

13-1-2005

**Recommended Spare parts 205101 for IJ006 burner
installation**

For start-up operation

Pos.	Qty.	Description
1	2	Ignition rod, code no. 20211
2	2	Flame rod, code no. 20212 special , L= 102 mm
3	1	Ignition transformer, code no. 00.7100007.01

For 2 years operation

1	6	Ignition rod, code no. 20211
2	6	Flame rod, code no. 20212 special , L= 102 mm
3	2	Ignition transformer, code no. 00.7100007.01
4	3	High limit gas pressure switch LGW150A4/2 IP65, 30-150 mbar code 00.9102514.27
5	1	Coil for MVDLE515/5, 230V/50/60Hz, IP65 coil no. 300, 229986
6	1	Proportional gas controlvalve FRNG515 code no. 00.9105075.12
7	1	Controlmotor ARIS NL6020, 230V/50Hz incl. 2x position switch, IP65 code nr. 605356.203
8	1	Coil for MVD5080/5, 230V/50/60Hz, IP65 coil no. 550, 229989
9	1	Leakage gas pressure switch LGW150A4/2 IP65, 30-150 mbar code 00.9102514.27
10	1	Combustion air blower, type QT/HE 3060, 18,5 kW 3x400V, 50/60Hz (excl. silencer/filter)

2



Eclipse Combustion

13-1-2005

Pos.	Qty.	Description
11	1	Combustion air pressure switch LGW150A4/2 IP65, 30-150 mbar code 00.9102514.27
12	1	Burner relais LGK 16.333A27, 230V/50Hz code no. 00.9123030.00
13	1	Leaktest controller LDU11.523A27 code no. 00.9123302.00
14	1	Temperature limit switch STBow..... code nr. 00.9103002.01
15	1	Temperature controller DICON500 incl. output 1 and 2 3 pnt stepping output 3,4 and 5 relais input 1 and 2 analog universal code nr. 605356.251
16	1	Temperature limit switch iTRON 08 code nr. 00.9104004.01

Validity of the quotation:

3 months after date of quotation

Price:

Excl. VAT, packing, mounting and start up in the field. Our prices are do not included any costs for tests or inspections by client, authority or third party.

Delivery:

EXW Gouda, The Netherlands (Incoterms 2000)

Delivery time:

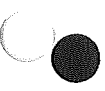
4 weeks after written order

Eclipse Technical Services:

We can quote commissioning of the equipment by Eclipse Global Services, with offices and support locations throughout the world.

Eclipse trained Field Service Technicians are also available to conduct maintenance and a thorough systematic inspection of all safety related features and functions of your combustion system at your convenience.

1





Eclipse Combustion

13-1-2005

Payment:

100% on delivery, payment within 8 days after date of invoice net cash

This quotation is subject to the terms and conditions as specified in the Orgalime 2000

We trust to have served you with this quotation and we look forward to receiving your comments.

Best regards,

Peter Biermans.

Eclipse Combustion
Combustion Burners
& Equipment

Combustion Tec
Oxygen-Fuel Burners
& Equipment

Exothermics
Heat Exchangers
& Recuperators

Algas•SDI
Liquid Vaporizers &
Gas Mixing Equipment

2

6

6

- Bulletins

<u>Description</u>	<u>: Type</u>	<u>Bulletin</u>	<u>Make</u>	<u>Language</u>
Burner Data	: IJ06	330-6	Eclipse	E
Installation Guide	: IJ	330	Eclipse	E
Blower	: QT/HE 3060		Alldays Peacock	E
Ignition transformer	: TRS820P/T2		Cofi	E
Pressure switch	: LGW A4	5.08	Dungs	E
Gascock	: KH 84		Bee	E
Gascock	: KSN 75		Bee	E
Gascock	: 1710		Rubinetterie	E
Gasfilter	: 502116		Marchel	E
Pressure regulator	: FRNG	4.14	Dungs	E
Pressure regulator	: J125		Jeavons	E
Pressure gauge	: 1482		Eriks	E
Push button cock	: VE		A.Z.	E
Solenoid valve	: MVD /5	6.20	Dungs	E
Control valve	: BVM	720	Eclipse	E
Control motor	: NL		Aris	E
Burner relay	: LGK	7785	Landis & Staefa	E
Gas leakage tester	: LDU	7696	Landis & Staefa	E
Temperature controller	: Dicon	70.3570	Jumo	E
High temperature switch	: STBOW	701130	Jumo	E
Level limit switch	: FTL50A		Endress + Hauser	E

Eclipse Combustion bv

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C



**Eclipse
Combustion**

ImmersoJet Burners

Model 6" IJ

Version 2.20

Main Specifications

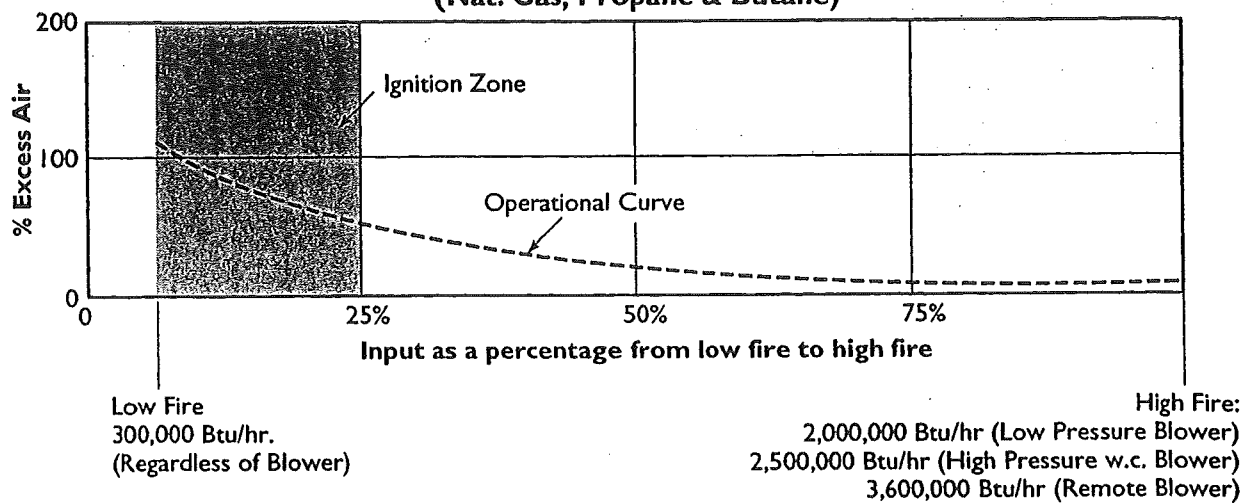
PARAMETER		BLOWER SIZE		
Blower Type		10"w.c. Packaged (60Hz)	15"w.c. Packaged (60Hz)	Remote Blower
Maximum Input (Btu/hr)		2,000,000	2,500,000	3,600,000
Minimum Input (Btu/hr)		300,000	300,000	300,000
Air Inlet Pressure ("w.c.) @Max. Input – Air pressure at burner inlet (Tap "A")		9	14.4	30
Main Gas Pressure ("w.c.) into regulator	Max.	125	125	125
	Min.	14	21	41
Tube Backpressure ("w.c.)		2.6	4	9.2
Weight-less actuator (lbs)		275	290	185
CO emissions (ppm)		<100	<100	<100
Piping		N.P.T. or B.S.P.		
Flame Detection		Flamerod or U.V. Scanner.		
Fuel ⁽¹⁾		Natural gas, Propane, Butane For any other mixed gas, contact Eclipse for orifice sizing.		

(1) Different fuels require different nozzles and orificies.

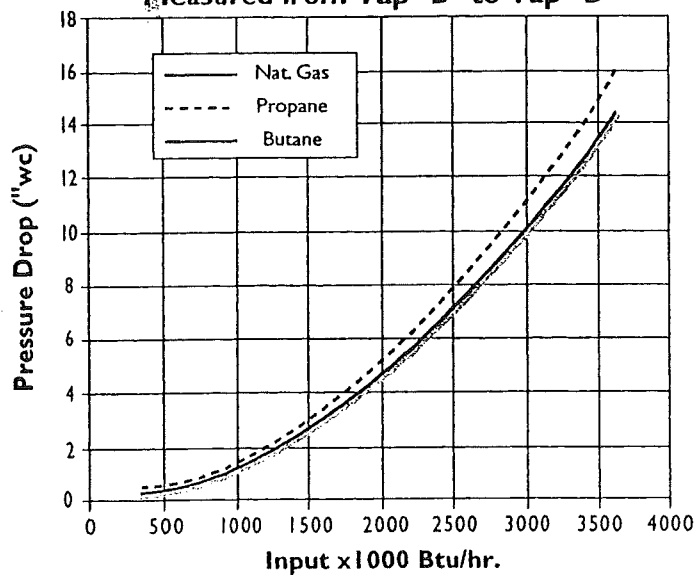
- All information is based on laboratory testing with a tube effective length of 50.4 feet. Different tube sizes and conditions may affect the data.
- All information is based on standard tube design. Changes in the tube will alter performance and pressures.
- All inputs based upon gross caloric values.
- Eclipse reserves the right to change the construction and/or configuration of our products at any time without being obliged to adjust earlier supplies accordingly.
- Plumbing of air and gas will affect accuracy of orifice readings. All information is based on generally acceptable air and gas piping practices.

Performance Data

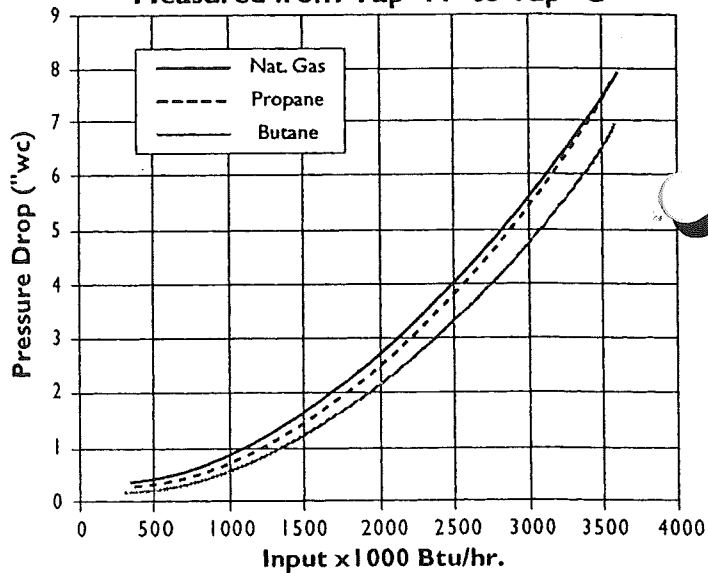
**Typical Operational Curve & Ignition Zone
(Nat. Gas, Propane & Butane)**



**Gas Orifice ΔP vs. Input
Measured from Tap "B" to Tap "D"**

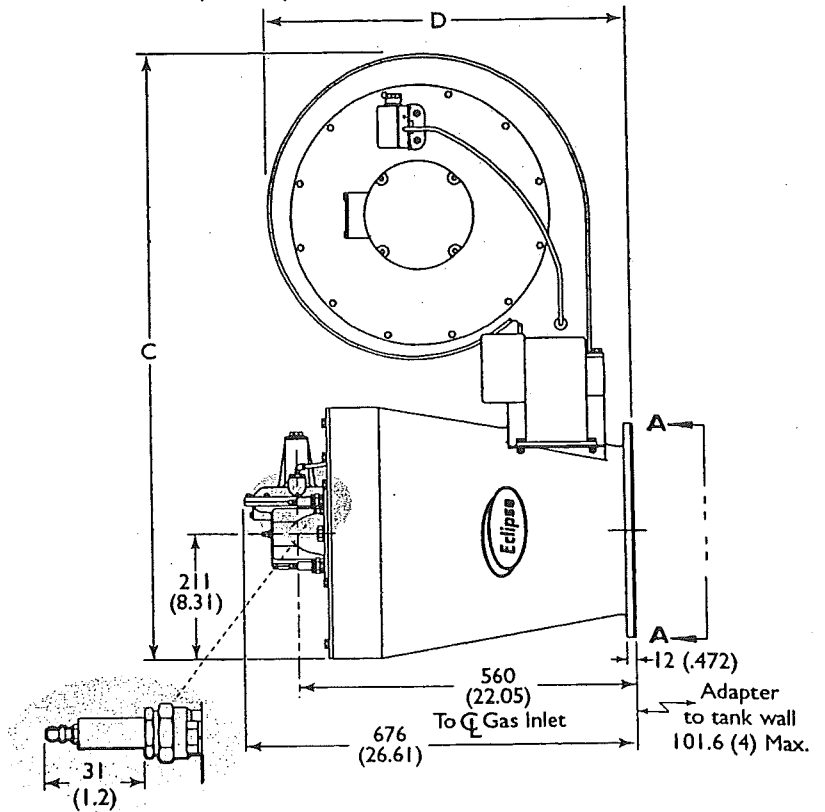
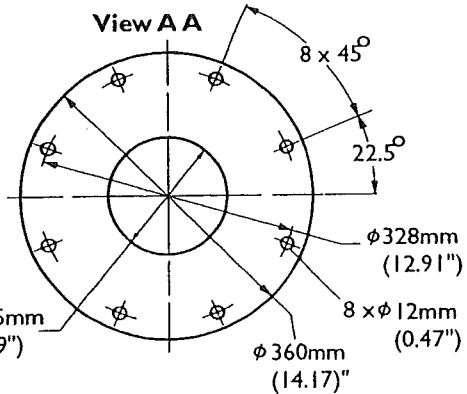
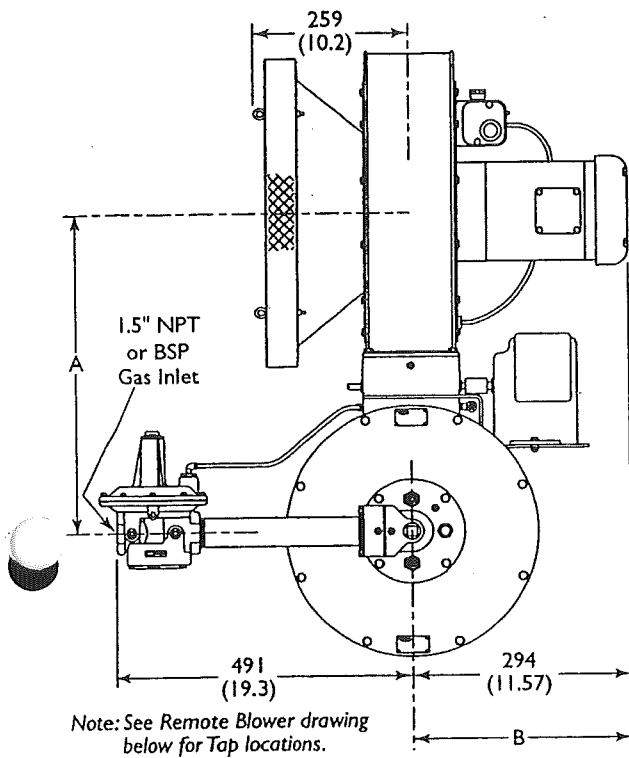


**Air Orifice ΔP vs. Input @ 3% O₂
Measured from Tap "A" to Tap "C"**

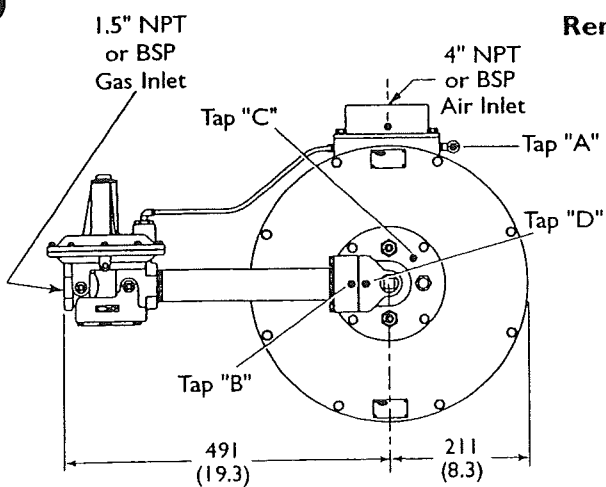


Dimensions & Specifications

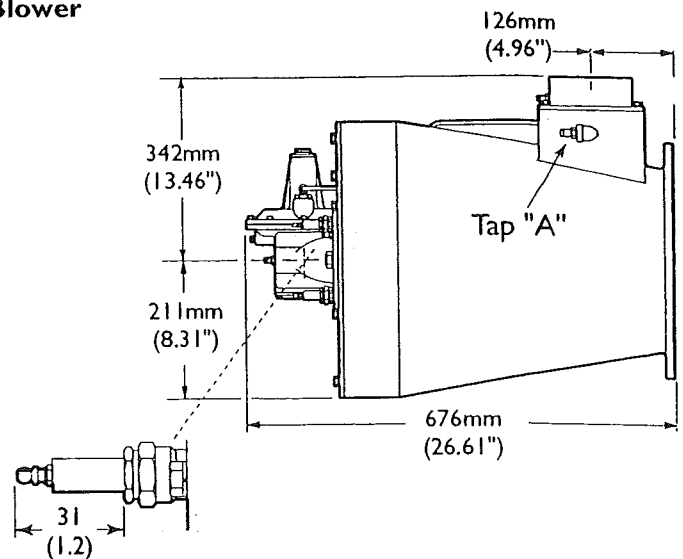
Dimensions in mm (inches)



	A	B		C	D
		60 HZ	50 HZ		
Low pressure blower	508mm (20.00")	330mm (12.99")	306mm (12.04")	958mm (37.71")	545mm (21.45")
High pressure blower	533mm (20.98")	362mm (14.25")	320mm (12.60")	1013mm (39.88")	604mm (23.78")



Remote Blower



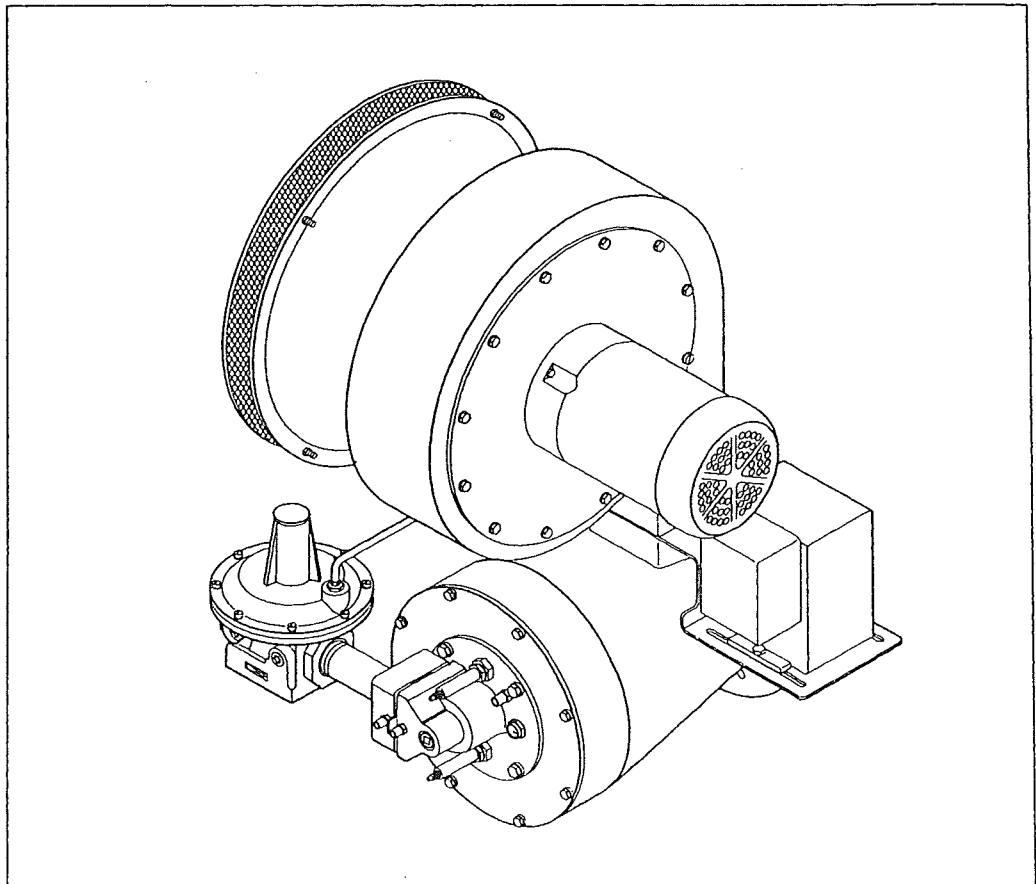


Eclipse Combustion
www.eclipsenet.com



Immersion Burners

ImmersoJet Series
version 2.20



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Any operation expressly prohibited in this Guide, any adjustment, or assembly procedures not recommended or authorized in these instructions shall void the warranty.



About this manual

AUDIENCE

This manual has been written for people who are already familiar with all aspects of an immersion burner and its add-on components, also referred to as "the burner system."

These aspects are:

- installation
- use
- maintenance.

The audience is expected to have experience with this kind of equipment.

IMMERSOJET DOCUMENTS

Installation Guide No. 330

- This document

Data Sheet No. 330-2, 330-3, 330-4, 330-6, 330-7, 330-8

- Available for individual IJ models
- Required to complete installation in this guide

Design Guide No. 330

- Used with Data Sheet to design burner system

Price List No. 330

- Used to order burners

RELATED DOCUMENTS

- EFE 825 (Combustion Engineering Guide)
- Eclipse bulletins and Info Guides:
610, 710, 720, 730, 742, 744, 760, 930

Purpose

The purpose of this manual is to make sure that the design of a safe, effective and trouble-free combustion system is carried out.

DOCUMENT CONVENTIONS

There are several special symbols in this document. You must know their meaning and importance.

The explanation of these symbols follows below. Please read it thoroughly.



Danger:

Indicates hazards or unsafe practices which **WILL** result in severe personal injury or even death.

Only qualified and well trained personnel are allowed to carry out these instructions or procedures.

Act with great care and follow the instructions.



Warning:

Indicates hazards or unsafe practices which could result in severe personal injury or damage.

Act with great care and follow the instructions.



Caution:

Indicates hazards or unsafe practices which could result in damage to the machine or minor personal injury.
Act carefully.



Note:

Indicates an important part of the text. Read thoroughly.

HOW TO GET HELP

If you need help, you can contact your local Eclipse Combustion representative. You can also contact Eclipse Combustion at any of the addresses listed on the back of this document.

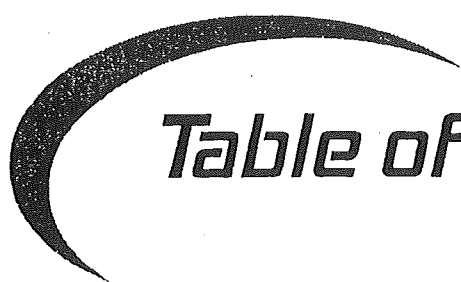


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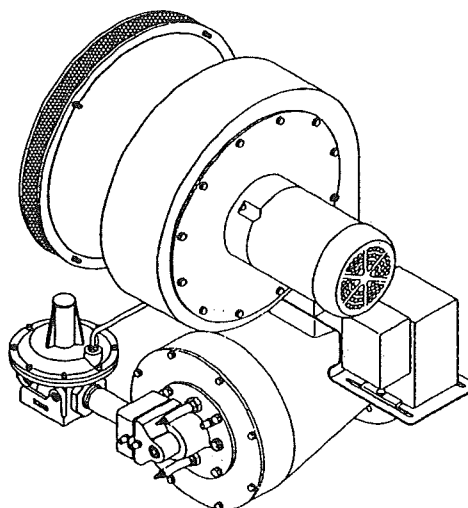
Introduction

1

PRODUCT DESCRIPTION

The ImmersoJet (IJ) is a nozzle-mix tube-firing burner that is designed to fire at high velocities through small diameter immersion tubes. The standard burner includes a packaged blower, actuator control motor, integral butterfly valve, ratio regulator, burner body, combustion chamber, nozzle (specific to fuel used), rear cover, spark and flame rods, and gas orifice (also specific to fuel used).

The ImmersoJet Burner



FEATURES

The combustion gases from the burner scrub the inner tube surface and produce high heat transfer rates. This, in combination with the high velocity flow through the smaller diameter tubes allows for system efficiencies in excess of 80%.

The smaller IJ tubes also have smaller bends which means less tank space is occupied by the tubes. With a combustion chamber that is integral to the burner body, the new version of the ImmersoJet can sit lower on the tank than previous IJ models.



2

INTRODUCTION

SAFETY

In this section you will find important notices about safe operation of a burner system.



Danger:

The burners covered in this manual are designed to mix fuel with air and burn the resulting mixture. All fuel burning devices are capable of producing fires and explosions when improperly applied, installed, adjusted, controlled or maintained.

Do not bypass any safety feature; You can cause fires and explosions.

Never try to light the burner if the burner shows signs of damage or malfunctioning.



Warning:

The burner is likely to have HOT surfaces. Always wear protective clothing when approaching the burner.



Note:

This manual gives information for the use of these burners for their specific design purpose. Do not deviate from any instructions or application limits in this manual without written advice from Eclipse Combustion.

Read this entire manual before you attempt to start the system. If you do not understand any part of the information in this manual, then contact your local Eclipse representative or Eclipse Combustion before you continue.

CAPABILITIES

Adjustment, maintenance and troubleshooting of the mechanical and the electrical parts of this system should be done by qualified personnel with good mechanical aptitude and experience with combustion equipment.

OPERATOR TRAINING

The best safety precaution is an alert and competent operator. Thoroughly instruct operators so they demonstrate an adequate understanding of the equipment and its operation. Regular retraining must be scheduled to maintain a high degree of proficiency.

REPLACEMENT PARTS

Order replacement parts from Eclipse only. Any customer-supplied valves or switches should carry UL, FM, CSA, CGA and/or CE approval where applicable.

Installation

3

INTRODUCTION

HANDLING AND STORAGE

POSITION OF COMPONENTS

APPROVAL OF COMPONENTS

Limit controls and safety equipment

In this section you will find the information and instructions needed to install the burner and system components.

Handling

1. Make sure the area is clean.
2. Protect the components from weather, damage, dirt and moisture.
3. Protect the components from excessive temperatures and humidity.

Storage

1. Make sure the components are clean and free of damage.
2. Store the components in a cool, clean, dry room.
3. After making sure everything is present and in good condition, keep the components in original packages as long as possible.

The position and amount of components are determined by the kind of control method chosen. All the control methods can be found in Design Guide 330, Chapter 3 "System Design." Use the schematics in that chapter to build your system.

All limit controls and safety equipment must comply with the current following standards:

- NFPA Standard 86
- NFPA Standard 86C

All devices must be listed, certified or approved by the following agencies:

- UL
- FM
- CGA

Electrical wiring

All the electrical wiring must comply with one of these standards:

- NFPA Standard 70
- ANSI-C11981
- EN 746-2

The electrical wiring must also be acceptable to the local authority having jurisdiction.

Gas piping

All the Gas piping must comply with one of these standards:

- NFPA Standard 54
- ANSI Z223
- EN 746-2

The gas piping must also be acceptable to the local authority having jurisdiction.

Where to get the standards

The NFPA Standards are available from:
National Fire Protection Agency
Batterymarch Park
Quincy, MA 02269

The ANSI Standards are available from:
American National Standard Institute
1430 Broadway
New York, NY 10018

The UL Standards are available from:
333 Pfingsten Road
Northbrook, IL 60062

The FM Standards are available from:
1151 Boston-Providence Turnpike
P.O.Box 9102
Norwood, MA 02062

The CGA Standards are available from:
55 Scarsdale Road
Toronto, Ontario
Canada M3B 2R3

Information on the EN standards, and where to get the standards is available from:

Comité Européen de Normalisation
Stassartstraat 36
B-1050 Brussels
Phone: +32-25196811
Fax: +32-25196819

Comité Européen de Normalisation Electronique
Stassartstraat 36
B-1050 Brussels
Phone: +32-25196871
Fax: +32-25196919

CHECKLIST BEFORE INSTALLATION

Intake

To admit fresh combustion air from outdoors, provide an opening in the room of at least one square inch per 4000 Btu/hr.

If there are corrosive fumes or materials in the air, then supply the burner with clean air from an uncontaminated area.

Exhaust

Do not allow exhaust gases to accumulate in the work area. Provide some positive means for exhausting them from the building.

Access

Make sure the burner is installed in such a way that it is easily accessed for inspection and maintenance.

Environment

Make sure that the local environment matches the original operating specifications. Check the following items:

- voltage, frequency and stability of the electrical power.
- type and supply pressure of the fuel.
- availability of enough fresh, clean combustion air.
- humidity, altitude and temperature of air.
- presence of damaging corrosive gases in the air.

Configuration

Verify the configuration of the ImmersoJet burner package:

- Make sure piping orientation is correct. See page 12 of this manual for guidance on changing the orientation.
- Make sure spark plug is installed.
- Make sure flame sensor is installed. It may be either a flame rod or a U.V. scanner, depending on the type of flame monitoring control system being used.

For detailed information on how to install and connect a flame rod, refer to:

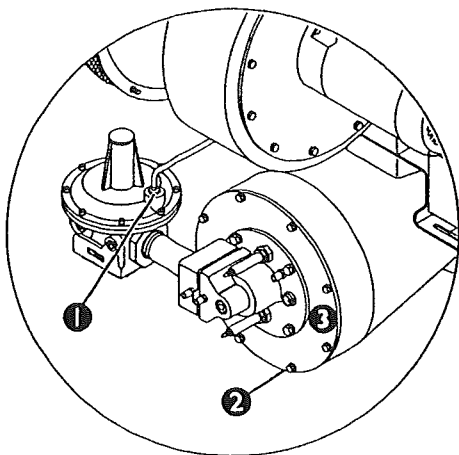
- Bulletin / Info guide 832.

For detailed information on how to install and connect a U.V. scanner, refer to:

- straight U.V. scanner; Bulletin / Info Guide 854
- 90° U.V. scanner; Bulletin / Info Guide 852
- self-check U.V. scanner; Bulletin / Info Guide 856.

PREPARE THE BURNER

Rotate the rear cover plate assembly (optional)



Component Locations

ImmersoJet burners are designed to be easily installed under a variety of conditions. Some minor preparation may be required to install the new ImmersoJet into specific systems.

Component Positions

It is possible to change the relative position of the gas inlet to the air inlet. This can be convenient for the routing of the piping. The following procedure illustrates how to rotate the rear cover plate assembly:



Caution

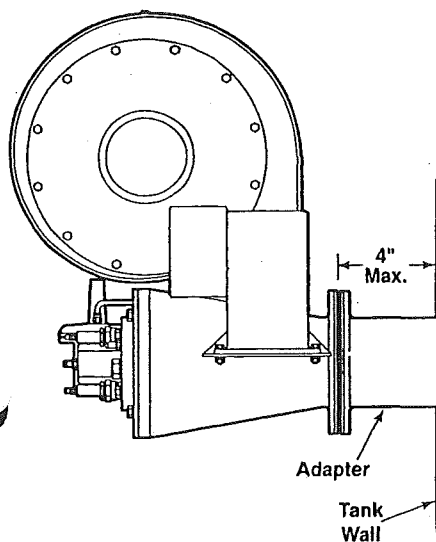
The ratio regulator must be installed with the spring housing in a vertical upright position. The burner system will not operate properly if the ratio regulator is not correctly installed. If the rear cover plate assembly is rotated, make sure the ratio regulator is positioned properly. Adding pipe lengths can increase pressure drop and effect performance.

To rotate the rear cover plate assembly:

1. Disconnect loading line at ratio regulator. ①
2. Remove outer bolts. ②
3. Rotate rear cover plate assembly ③ to desired position.
4. Reinstall outer bolts. ②
5. Position the ratio regulator with the spring housing in a vertical upright position.
6. Reconnect loading line at ratio regulator ①. If necessary, connect loading line to the burner pressure tap connection on opposite side of air inlet.

INSTALLATION

Burner



Piping

Dimensions

Bolt the burner to the immersion tank wall or immersion tube flange. For bolt hole patterns, see the Data Sheet for your ImmersoJet model.



Caution

If adapters are used, burner flange should not be spaced farther than 4" from tank wall.

Tank wall

Make sure that the wall of the tank is strong enough to carry the weight of the burner. If necessary, reinforce the tank wall area where you plan to install the burner.



Caution

Burner body surface temperature near the flange can exceed 200 deg. F (100 deg. C). If an adapter flange is used, higher temperatures may occur. Allow a free, convective flow of air around the burner and do not cover with insulation.

Layout

Install all the piping as shown in the system schematics found in Chapter 3 of IJ Design Guide 330.

Support the piping

Use brackets or hangers to support the piping; don't let burner support the weight of the piping. If you have questions, consult your local gas company.

Pipe connections

1. Install a pipe union in the line to each burner. This simplifies removal of the burner.

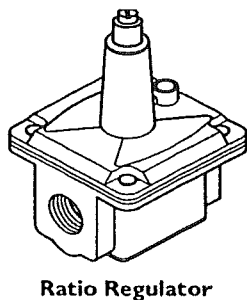
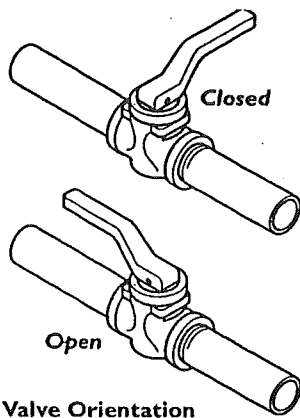
Avoid piping configurations that could cause high pressure drops. Read the following notes and contact Eclipse Combustion with any questions.



Note:

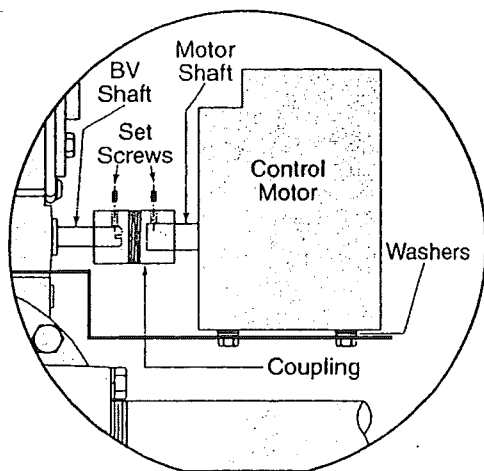
Flexible pipe nipples may cause higher pressure drops than equivalent standard pipes. Consider that when sizing the lines.

Valves



Ratio Regulator

Flame monitoring control system



Control Motor



Note:

The pressure drop of the gas and the air in the piping is a critical parameter. Make sure that the size of all the piping is large enough to prevent excessive pressure losses. Refer to Eclipse Engineering Guide EFE 825, page 13 for details.

Valve orientation

Install all the valves in such a way that the arrow (if present) on the valve body points in the direction of flow.

Gas cocks

Make sure that the handle of a gas cock is at a right angle to the valve body when the valve is in the closed position. This is an important position indicator.

Ratio regulator

The ratio regulator is installed on the burner at the factory. When mounting the burner, be sure that gas flow through the regulator is horizontal and the spring housing points upward.

For information, refer to the Bulletins of the flame monitoring control system:

- Veriflame; Bulletin 818
- Multiflame; Bulletin 820
- Bi-Flame; Bulletin 826.

Control Motor

Install a control motor to modulate the air butterfly valve if not previously installed on the burner.



Note:

Be sure the control motor shaft and air butterfly valve shaft are aligned properly. If using an Eclipse Actuator Mounting Parts Kit, the supplied washers may be used as shims (stacked 0, 1, or 2 high) to ensure proper alignment. Additionally, a flexible coupling can be used to handle minor misalignment.

CHECKLIST AFTER INSTALLATION

To verify proper system installation, do the following:

1. Make sure that there are no leaks in the gas lines or the air lines.
2. Make sure all the components of the flame monitoring control system are properly installed. This includes verifying that all switches are installed in correct locations and all wiring, pressure and impulse lines are properly connected.
3. Make sure components of spark ignition system are installed and functioning properly.
4. Make sure that the blower rotates in the correct direction. If incorrect, then have a qualified electrician rewire the blower to reverse its rotation.
5. Make sure all valves are installed in proper location and correctly oriented relative to the gas or air flow direction.

Adjustment, Start & Stop

4

INTRODUCTION

In this chapter you will find instructions on how to adjust a system, and how to start and stop a system.



Danger:

Do not bypass any safety feature. You can cause fires and explosions.

Obey the safety precautions in Chapter 2 "Safety".

Read all of this chapter before starting your system.

ADJUSTMENTS

Preparation

1. Set the air pressure switch so that it drops out at 4" w.c. (10 mbar) below the air inlet pressure listed in the appropriate IJ Data Sheet.
2. Set the low gas pressure switch at 4" w.c. (10 mbar) below the gas pressure measured at the inlet to the main gas valve train.
3. Set the high gas pressure switch at 4" w.c. (10 mbar) above the gas pressure measured at the inlet to the main gas valve train.
4. Close all the burner gas cocks.
5. Try to light the burner to be sure that the flame monitoring system indicates a flame failure.
6. Activate pressure switches and other limit interlocks. Make sure that the main gas valve train closes.



Danger:

If simulated limits or simulated flame failures do not shut down the fuel system within the required failure response time, immediately correct the problem before proceeding.

ADJUSTMENTS (CONTINUED)

Control Panel Settings

During burner adjustment, you will need to drive the control motor to high and low fire several times. You may do this with the process temperature control, setting it to a higher temperature for high fire or a lower temperature for low fire; or your equipment may be fitted with a manual override attached to the control motor. Before attempting to adjust the burner, determine how you will control the motor position and become familiar with the method.

Regulator Settings

The main gas regulator must be adjusted to supply minimum fuel pressure at the ratio regulator inlet per the data sheet. Higher gas pressures may be required for operation at firing rates greater than 1,000,000 Btu/hr. See the appropriate Data Sheet 330 for your burner. Maximum fuel pressure at the ratio regulator is dependent on the regulator model. See Bulletin 742 for additional information.

Air Adjustment

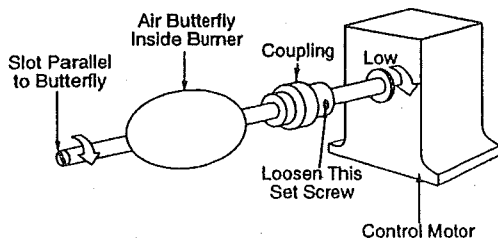


Figure 4.1
Air Adjustment

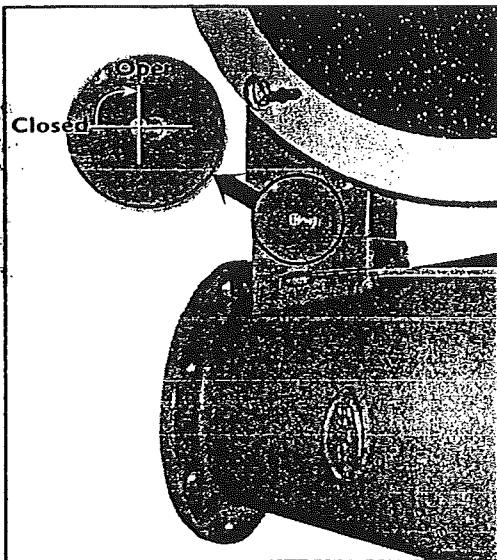


Figure 4.2
BV Rotation

Gas Valves

Close all manual and automatic gas valves.

Packaged Blower—Low Fire Air



Note:

The slot on the end of the butterfly valve shaft is parallel to the plane of the butterfly. This can be used as a visual indication of valve position.

1. Drive the control motor to the low fire position.
2. Loosen the setscrew on the motor side of the flexible coupling.
3. Adjust the air butterfly valve until the slot is perpendicular to the air flow.
4. Hold the shaft firmly in place and tighten the setscrew.

Packaged Blower—High Fire Air

1. Drive the control motor to the high fire position (fully open).

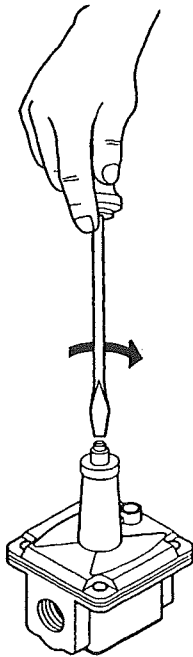


Note:

The actuator must open the BV as shown in figure 4.2. If it does not, refer to the actuator's literature for instructions on how to reverse the direction of travel.

2. Verify that the slot on the end of the butterfly valve shaft is parallel to air flow (fully open). If necessary, adjust the control motor travel for high fire.
3. Cycle the control motor several times, checking high and low fire positions. If they don't repeat, check for a loose valve shaft coupling or binding of the motor or valve.

Gas Adjustment



High Fire Gas Adjustment

High fire gas flow requires no adjustment. The size of the integral gas orifice is selected based on the fuel (natural gas, propane or butane) specified at the time the burner is ordered.



Note:

Ratio regulator is used only to adjust low fire gas. Adjustment will NOT affect high fire gas.

Low Fire Gas Adjustments


Low fire gas adjustment is factory set for most applications. It can be field adjusted if necessary:

1. Drive the air butterfly valve to low fire.
2. Make sure the combustion air blower is running.
3. Open manual gas cock.
4. Start the ignition sequence through the flame monitoring control system.



Danger:

Do not touch the ignition plug or the ignition wire when the ignition is on. You will get a shock.

5. If burner does not light, turn the adjusting screw on the ratio regulator 1/2 turn clockwise  and repeat step 4.



Note:

Initially it may be necessary to repeat step 4 two or three times to purge all the air out of the gas pipework.

6. After the burner is ignited, drive the air butterfly valve to high fire. Make sure the burner stays lit.

START PROCEDURE

1. Open all the manual gas cocks to the burner.
2. Start the control system (steps may be manual or automatic):
 - Start the blower (if controlled separately)
 - Allow time to purge tube
 - Initiate low fire start
 - Start the flame monitoring system and ignition sequence
3. Verify that flame is present at the burner.



Danger:

If a burner does not light, and the system does not shut down automatically, then you must close the main gas cock. An uncontrolled flow of gas can cause fires and explosions.

To avoid electric shock, do not touch the ignition plug or the ignition wire when the ignition is on.

STOP PROCEDURE

1. Stop the control system:
 - Stop the flame monitoring system
 - Stop the blower (if controlled separately)
 - For extended shutdown periods, shut off the main power to the control system
2. Close all the manual gas cocks to the burner.
3. For extended shutdown periods, shut off the manual valves in the burner gas line upstream of the main gas regulator.

Maintenance & Troubleshooting

5

INTRODUCTION

This section is divided into two parts:

- The first part describes the maintenance procedures.
- The second part helps identify problems that may occur, and gives advice on how to solve these problems.

MAINTENANCE

Preventive maintenance is the key to a reliable, safe and efficient system. The core of any preventive maintenance program is a list of periodic tasks.

Following are suggestions for a monthly list and a yearly list.



Note:

The monthly list and the yearly list are an average interval. If your environment is dirty, then the intervals may be shorter. Other standards may take precedence for your particular application.

Monthly Checklist

1. Inspect flame-sensing & ignition devices for good condition and cleanliness.
2. Test all the alarm systems for proper signals.
3. Check valve motors and control valves for free, smooth action and adjustment.
4. Test the interlock sequence of all safety equipment; manually make each interlock fail, noting that related equipment closes or stops as specified by the manufacturer.
5. Test main fuel hand-valves for operation.
6. Clean or replace the combustion air blower filter.

Yearly Checklist

• Perform all monthly checks plus:

1. Leak test shut-off valves for tightness of closure.
2. Inspect loading lines for leaks.
3. Make sure that the following components are not damaged or distorted:
 - the burner nozzle
 - the spark plug
 - the flame sensor
4. Inspect the immersion tube for leaks and excessive corrosion.

TROUBLESHOOTING GUIDE

PROBLEM	POSSIBLE CAUSE	SOLUTION
Cannot initiate start sequence	• Main power is off	Make sure power is on to control system
	• No power to control	Call qualified electrician to investigate
	• Air pressure switch has not made contact	Check air-pressure switch adjustment Check air filter Check blower rotation Check outlet pressure from blower Check tubing and electrical connections to pressure switches
	• High gas pressure switch has tripped	Check incoming gas pressure Adjust gas pressure if necessary Check pressure switch setting and operation
	• Low gas pressure switch has activated	Check incoming gas pressure Adjust gas pressure if necessary Check pressure switch setting and operation
	• Malfunction of flame monitoring control system such as shorted out flame sensor or electrical noise in the sensor line	Have a qualified electrician investigate and rectify
	• Purge cycle not completed	Check flame monitoring control system, purge timer, interlocks and limit switches

PROBLEM	POSSIBLE CAUSE	SOLUTION
Start-up sequence runs but burner does not light	No ignition: • There is no power to the ignition transformer	Restore power to the ignition transformer Check flame monitor control
	No ignition: • Open circuit between the ignition transformer and the spark plug	Repair or replace the wiring and connectors to the spark plug Check ground connection to the transformer
	No ignition: • The spark plug needs cleaning	Clean the spark plug
	No ignition: • The spark plug is not correctly grounded to the burner	Clean the threads of the spark plug and the burner Do not apply grease to the threads of the spark plug
	Too much gas: • Wrong orifice or no orifice installed or wrong nozzle	Check orifice size for fuel type Check nozzle number for fuel type
	Too much gas: • Damaged ratio regulator	Replace ratio regulator
	Too much gas: • Gas pressure out of the main gas pressure regulator is too high	Adjust main gas regulator If necessary, remove regulator and investigate
	Not enough gas: • Gas valve not open	Check all manual valves Check wiring to automatic gas shut-off valve
	Not enough gas: • Start gas solenoid valve does not open	Check solenoid valve coil for proper operation. Replace if necessary
	Not enough gas: • Air in the gas line	Open gas cock Purge gas line
	Not enough gas: • Damaged or missing ratio regulator loading line	Inspect and replace as required
	Not enough gas: • Damaged ratio regulator	Inspect and replace as required
	Not enough gas: • Improper orifice	Check orifice size for fuel type
	Not enough gas: • The gas pressure out of the main gas pressure regulator is too low	Adjust main gas regulator If necessary, remove regulator and investigate
	Not enough gas: • Wrong nozzle for fuel type	Check nozzle number for fuel type

PROBLEM	POSSIBLE CAUSE	SOLUTION
The low fire flame is weak or unstable	• Low fire adjusted too low	Increase low fire gas setting
	• Not enough gas	Check gas adjustment and modify to increase gas flow
	• Not enough air	Check air adjustment Investigate any change, i.e. blocked filter, loose connections
The burner goes off when it cycles to high fire	• Insufficient air (flame too rich)	Check air adjustment Check air filter, clean or replace if required Check ratio regulator and loading line
	• Insufficient gas	Check ratio regulator and loading line Check main gas regulator
The burner is erratic and does not respond to adjustment	• Flame signal weak	Check condition of flame monitoring device
	• Internal damage to the burner. Some parts inside the burner may be loose or dirty	Contact your Eclipse Combustion representative or the Eclipse factory
The burner is unstable or produces soot or smoke	• The air/gas ratio is out of adjustment	Check adjustments, ratio regulator and loading lines
Cannot achieve full capacity	• Air filter is blocked	Clean or replace the air filter
	• Gas pressure is too low into the main gas pressure regulator	Adjust gas pressure
	• Increased tube pressures	Check for blockage
	• Poor piping practices	Contact factory

Appendix

CONVERSION FACTORS

Metric to English.

FROM	TO	MULTIPLY BY
cubic meter (m ³)	cubic foot (ft ³)	35.31
cubic meter/hour (m ³ /h)	cubic foot/hour (cfh)	35.31
degrees Celsius (°C)	degrees Fahrenheit (°F)	(°C × 1.8) + 32
kilogram (kg)	pound (lb)	2.205
kilowatt (kW)	Btu/hr	3414
meter (m)	foot (ft)	3.28
millibar (mbar)	inches water column ("wc)	0.401
millibar (mbar)	pounds/sq in (psi)	14.5 × 10 ⁻³
millimeter (mm)	inch (in)	3.94 × 10 ⁻²

Metric to Metric.

FROM	TO	MULTIPLY BY
kiloPascals (kPa)	millibar (mbar)	10
meter (m)	millimeter (mm)	1000
millibar (mbar)	kiloPascals (kPa)	0.1
millimeter (mm)	meter (m)	0.001

English to Metric.

FROM	TO	MULTIPLY BY
Btu/hr	kilowatt (kW)	0.293 × 10 ⁻³
cubic foot (ft ³)	cubic meter (m ³)	2.832 × 10 ⁻²
cubic foot/hour (cfh)	cubic meter/hour (m ³ /h)	2.832 × 10 ⁻²
degrees Fahrenheit (°F)	degrees Celsius (°C)	(°F - 32) ÷ 1.8
foot (ft)	meter (m)	0.3048
inches (in)	millimeter (mm)	25.4
inches water column ("wc)	millibar (mbar)	2.49
pound (lb)	kilogram (kg)	0.454
pounds/sq in (psi)	millibar (mbar)	68.95

Part Numbers ImmersoJet Series version 2.20

Pos	Qty	Description	IJ-Size-2	IJ-Size-3	IJ-Size-4	IJ-Size-6	IJ-Size-8
1	1	Drawing, packaged with blower	200782	200792	200787	101227	10001637
2	4	Gasket, mounting	20256	20265	20258	20337	20337
3	1	P.F. plug test, 1/8" NPT	13445	13445	13445	13445	13445
4	1	Body	7102-1	7113-1	7043-1	7121-1	7121-2***
5	1	Chamber, combustion	7105-1	7112-1	7109-1	7120-1	7120-1
6	*	Screw, M4 x 16	4 x 20241	6 x 20241	8 x 20241	9 x 20242 (M6)	9 x 20242 (M6)
7	1	Plate, adapter, RC	20104	20266	19988	20320	20320
8	*	Screw, M8 x 22	4 x 15886	10 x 15886	12 x 15886	12 x 15886	12 x 15886
10	1	Cover, rear	7103-1	7107-1	7013-1	7013-1	7013-1
11	1	Spark rod, 1/2" NPT	20211	20211	20211	20211	20211
12	1	Peepsight	11737	11737	11737	11737	11737
13	1	Flamerod, 1/2" NPT	20212	20212	20212	20212	20212
13	1	UV scanner adapter	10033	10033	10033	10033	10033
14	2	Seal, O'Ring, Viton	14777	17037	14778	14778	14778
15	4	Screw, hex head, M8 x 45, gas inlet block	15893	15893	15893	15893	15893
16	*	Screw, socket head, M8 x 50 (BV Only)	4 x 20246	4 x 20270	4 x 16015	2 x 20257	2 x 20257
17	2	Fitting, tube, Prestolok	14689	14689	14689	14689	14689
19	1	Tube, nylon	34505	34505	34505	34505	34505
**	1	Nameplate, ImmersoJet burner	20729	20729	20729	20729	20729
**	4	Screw, drive, nameplate	18933	18933	18933	18933	18933
22	1	Plug, 3/4" NPT	18880	18880	18883	18883	18883
23	1	Nozzle, machined, Natural Gas	100226 (7104)	100231 (7114)	100227 (7042)	102126 (7119)	102126 (7119)
23	1	Nozzle, machined, Propane/Butane	100229	100230	100228	102126	102126
24	1	Actuator, EMP-423-5	22755	22755	22755	22755	22755
24	1	Actuator, EMP-424-5	22735	22735	22735	22735	22735
24	1	Honeywell M9174-C-7284	15273-4	15273-4	15273-4	15273-4	15273-4
24	1	Actuator, EMA-418-1	10912	10912	10912	10912	10912
24	1	Actuator, Eclipse Rotary	Varies with configuration of actuator				
26	1	Blower	Varies with configuration of burner system				
27	1	Filter	200758	200757	200757	200756	200756
27	1	Grille	10514	10515	10515	10515	10515
27	1	Filter/silencer	15405	20505	20505	15407	15407
29	1	Plate, orifice, Natural Gas	14191-23	14934-4	14188-21	14188-1	14188-3***
29	1	Plate, orifice, Propane	14191-14	14934-13	14188-7	14188-6	14188-33***
29	1	Plate, orifice, Butane	14191-3	14934-12	14188-14	14188-4	14188-9***
30	1	Coupling	21134	21134	21134	21134	21134
31	1	Motor, blower	Varies with configuration of burner system				
32	1	Nipple, NPT	20488	18778	18808	18808	14791***
32	1	Nipple, BSP	20487	20421	20607	20607	20823***
33	1	Block, inlet, gas - NPT	3974-2	7001-1	3973-3	3973-3	3973-2***
33	1	Block, inlet, gas - Rc	3974-1	7001-3	3973-1	3973-1	3973-10***
34	1	Regulator, ratio, NPT	19997	15939	20312	20312	10315***
34	1	Regulator, ratio, BSP	19998	19999	20311	20311	19990***
35	1	Butterfly valve, packaged blower	102246	102267	102278	102277	102277
37	1	Block, inlet, air - NPT, remote blower	3973-5	7108-2	3996-1	100041	100041
37	1	Block, inlet, air - BSP, remote blower	3973-7	7108-3	3996-2	100041-1	100041-1
40	1	Screw, hexhead, M4 x 12	20394	20394	20849	20242 (M6)	20242 (M6)
42	4	Screw, buttonhead, M6 x 12	15881	15881	15881	15891 (hex)	15891 (hex)
**	1	Actuator mounting kit - Honeywell	100256	100260	100264	100268	100268
**	1	Actuator mounting kit - Eclipse	100257	100261	100265	100269	100269
**	1	Actuator mounting kit - Eclipse Rotary with blower	100317	100317	100317	100317	100317
**	1	Actuator mounting kit - Eclipse Rotary less blower	100318	100320	100322	100324	100324
**	1	Switch, air	20475	20475	20475	20475	20475
**	1	Kit, air switch mounting	101146	101146	101146	101146	101146
**	1	Screw, M6 x 12	15894	15894	15894	15894	15894
**	1	Plug	20605	20605	20605	20605	20605

* Quantity varies with product configuration

** Not Illustrated

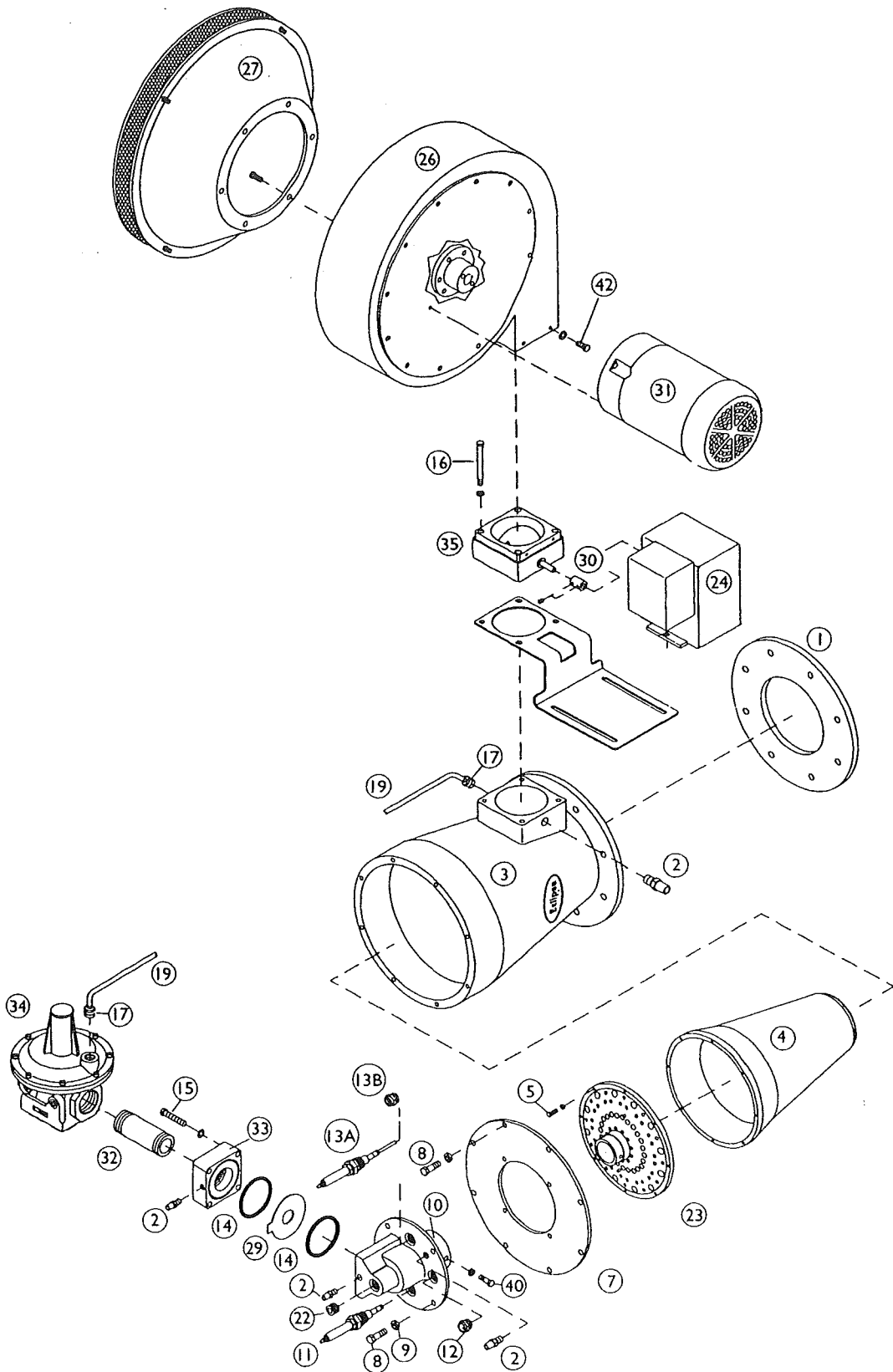
*** Applies to remote blower models.

Packaged blower models are same as IJ-6

Eclipse ImmersoJet v2.20 Installation Guide 330, 9/26/03

Illustrated Parts View

ImmersoJet Series version 2.20





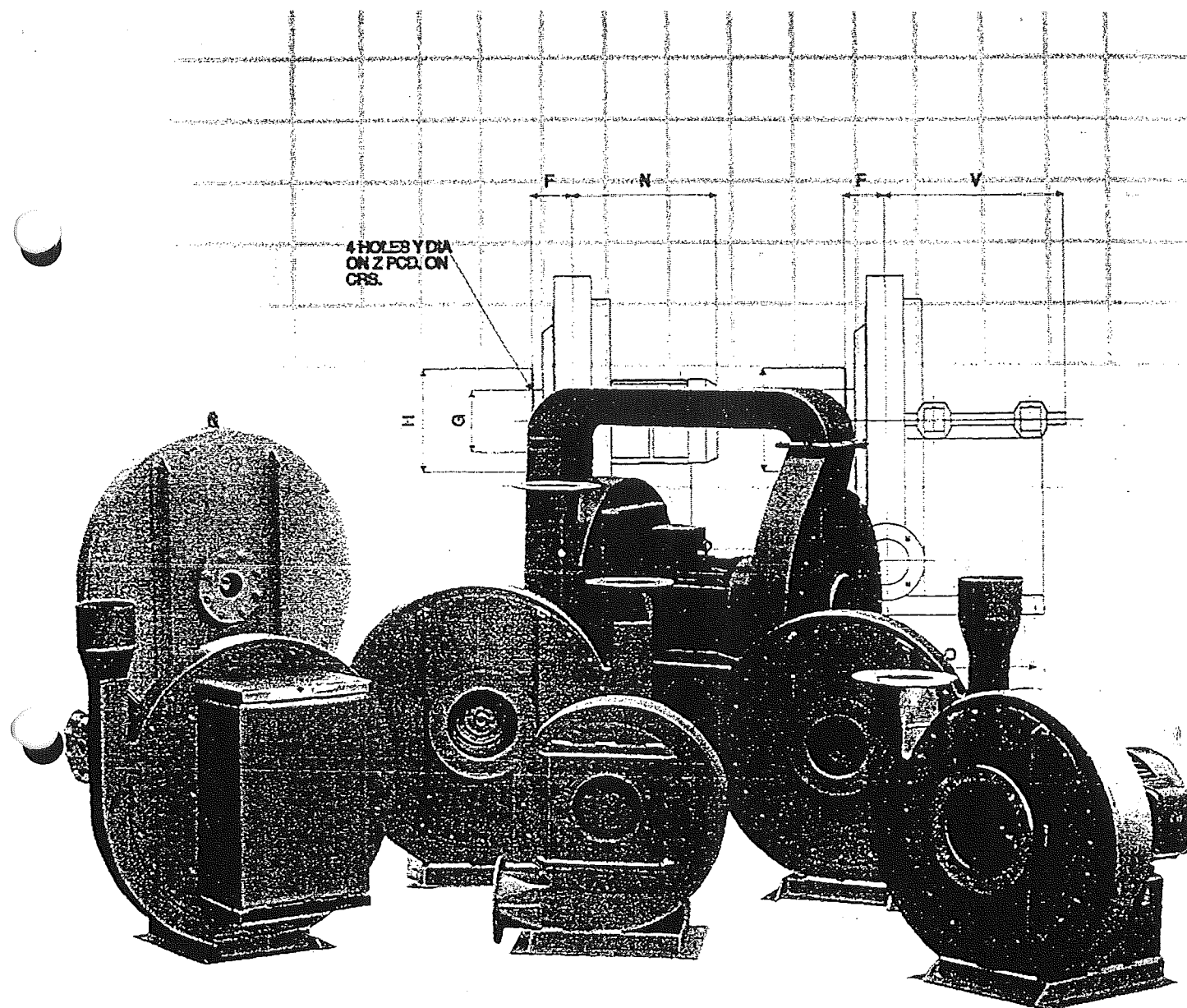
Eclipse Combustion
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QT. CENTRIFUGAL FANS ●

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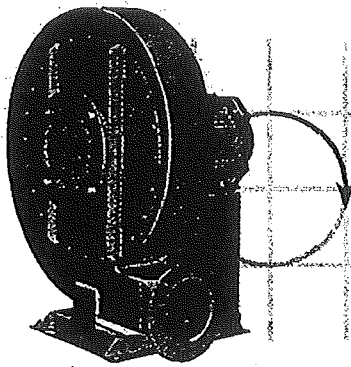
Winter Stoke Road
Weston Super-Mare
North Somerset
England

Tel: 01934 636263

Fax: 01934 623727

Email:
apco@alldays-peacock-co.com

Web Site:
www.apco1650.demon.co.uk



Single fan pressures up to 2300mm SWG

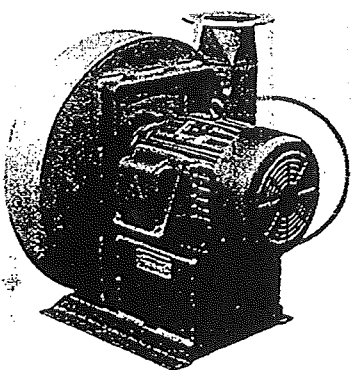
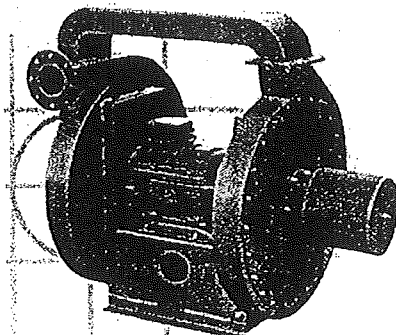
Ventilateur a etage unique pour pressions jusqu'a 2300mm SWG

Einstufiges gebläse für schube bis zu 2300mm SWG

Two stage fan for pressures up to 4600mm

ventilateur a deux etages pour pressions jusqu'a 4600mm

Zweistufiges gebläse für schube zu 4600mm



Fans manufactured in special steels, stainless steel etc.

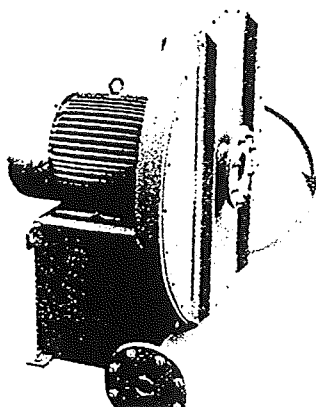
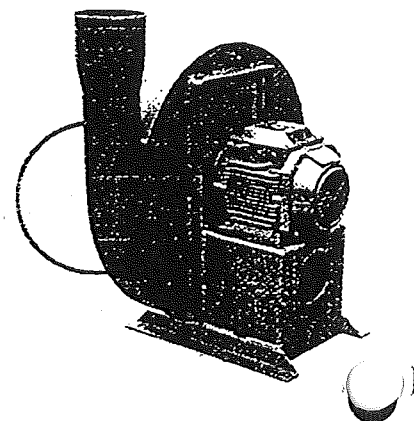
Materiaux speciaux utilises pour la fabrication des ventilateurs, incolloy etc.

Gebläse sind aus speziellen materialien hergestellt, z. b. aluminium

Special fans supplied with modifications to standard

Ventilateurs speciaux disponibles avec de simples modifications du standard

Auf anfrage werden spezielle gebläse geliefert, die im vergleich zu standardversionen geringfügig modifiziert sind



Fans to customer specialised requirements

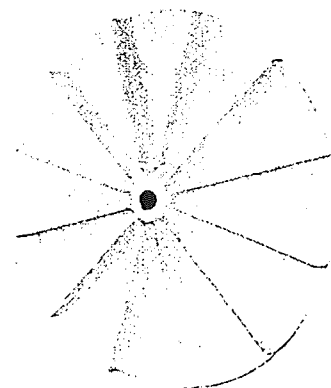
Ventilateurs se conformant aux besoins speciaux des clients

Gebläse entsprechend kundenspezifischer spezifikation

Paddle impellers as alternative for material handling

Roues mobiles type aileron, pour manutention de materiaux

Schaufelradpropeller für materialtransportzwecke





Fan Specification

CASING. ITEM NO 1 & 8

The casing is manufactured from fully welded steel plate, heavily stiffened to ensure maximum rigidity. The inlet cone is fabricated and designed to ensure a smooth flow of air into the impeller eye. The fan outlet can be flanged or spigot type to suit your individual requirements.

STIFFENING RING. ITEM NO 2

Manufactured from steel flat, the ring is stitch welded into the casing and gives additional stiffness to the fan case.

COVERPLATE. ITEM NO 3 & 4

The coverplate is manufactured from steel and incorporates the inlet cone. There are various types of connections supplied for the inlet, these are:- Flanged, spigot or guarded.

IMPELLER. ITEM NO 5, 6 & 7

Fabricated from steel, the impeller can be riveted or welded depending on the design features. The unit is secured onto the shaft by either a taperlock hub or a cast iron boss with gib head key.

SHAFT SEAL. ITEM NO 9

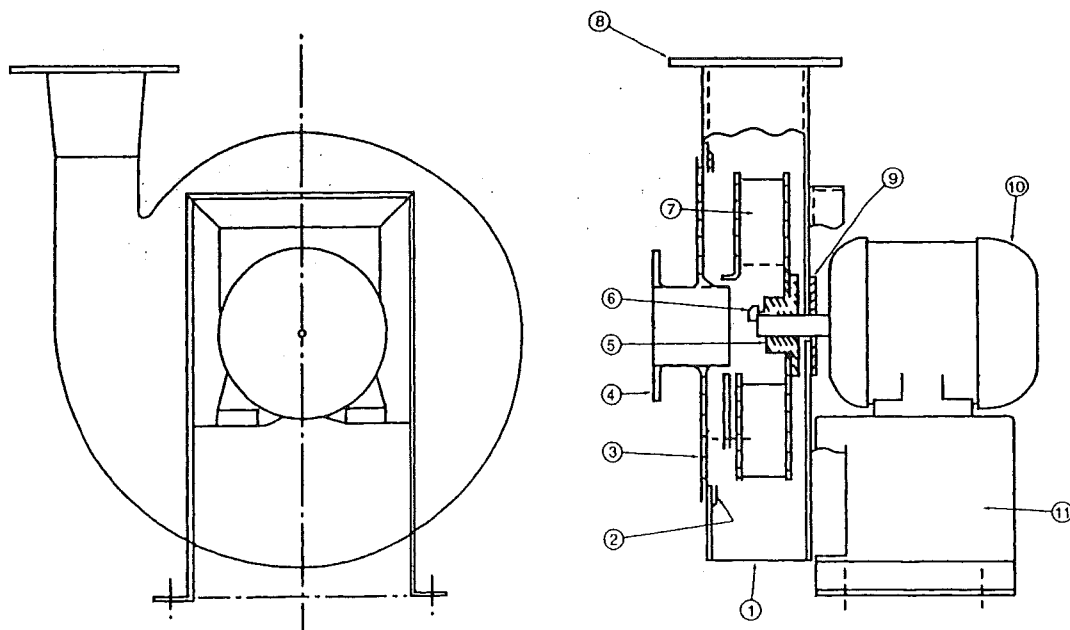
A simple shaft seal is supplied as standard for fans handling gases and other special material. Various other designs can be offered such as carbon, labyrinth, double lip type and many more.

MOTOR. ITEM NO 10

Any type of motor can be supplied from the basic TEFC through to special flameproof.

MOTOR PEDESTAL. ITEM NO 11

Fabricated from mild steel, the pedestal is designed to support the fan case and motor and be suitable to install on customers foundations with no vibration.





SPECIFICATION DU VENTILATEUR.

CARTER. ITEM No 1 et 8.

Le carter est fabriqué à partir de tôle grosse, fortement renforcée pour un maximum de rigidité. Le cône d'entrée est conçu et fabriqué pour assurer un flux d'air uniforme vers le centre de la roue mobile. La sortie du ventilateur peut être à bride ou à emboîtement pour convenir aux besoins individuels.

BAGUE DE RENFORT. ITEM No 2.

La bague, fabriquée en acier plat, est fixée au carter par soudage à épinglage et renforce le carter du ventilateur.

PLAQUE DE PROTECTION. ITEMS No 3 et 4.

La plaque de protection est en acier et incorpore le cône d'entrée. Il y a divers types de connexions fournies avec l'entrée: à bride, à emboîtement ou à barrières.

ROUE MOBILE. ITEMS No 5, 6 et 7.

La roue mobile est en acier et peut être rivée ou soudée, dépendant des caractéristiques du ventilateur. L'ensemble est fixé à l'arbre par un moyeu à alésage conique ou par une bosse en fonte et une clavette et contreclavette.

JOINT D'ETANCHEITE DE L'ARBRE. ITEM No 9.

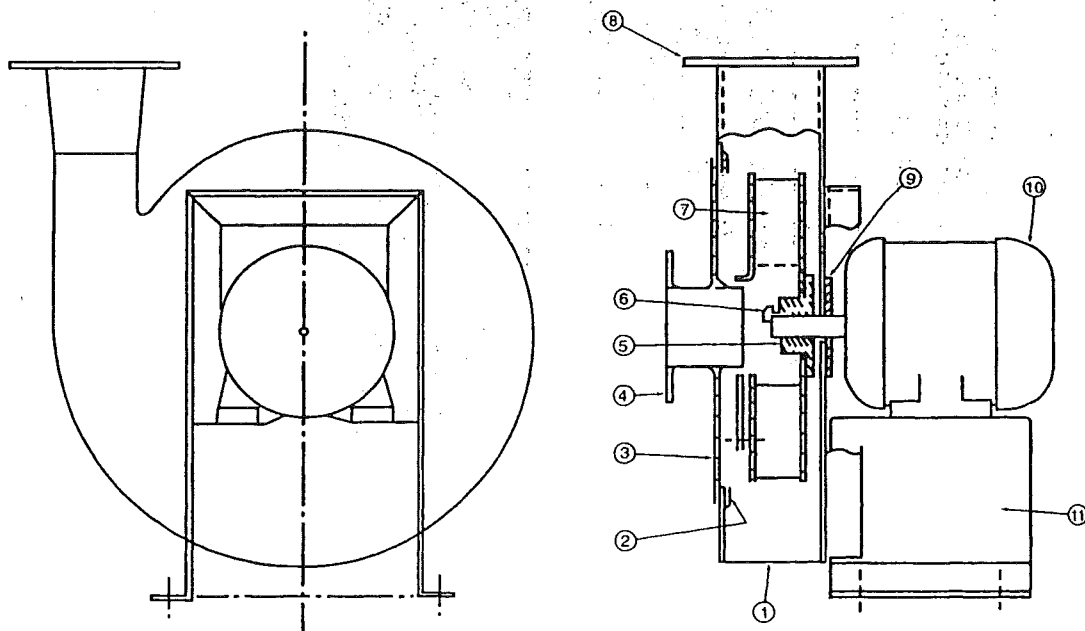
Un simple joint d'étanchéité pour l'arbre est standard sur les ventilateurs pour gaz et autres matériaux spéciaux. D'autres designs sont disponibles tels les types carbone, labyrinthe, double lèvres et divers autres.

MOTEUR. ITEM No 10.

N'importe quel type de moteur peut être fourni; du moteur de base TEFC au moteur spécial ignifuge.

SOCLE DE MOTEUR. ITEM No 11.

Fabriqué en acier doux, le socle est conçu pour soutenir le carter du ventilateur et le moteur; il convient pour être installé sur les fondations des clients et ne produit pas de vibrations.



GEBLÄSESPEZIFIKATION

GEHÄUSE, POSTEN 1 UND 8

Das Gehäuse ist aus verschweißten Stahlplatten gefertigt und für maximale Steifigkeit

verstärkt. Der Einlaßkonus gewährleistet einen geschmeidigen und gleichmäßigen Luftfluß in das Lüfterradauge. Der Gebläseauslaß kann individuellen Anforderungen entsprechend mit Flanschen oder Muffen versehen werden.

VERSTEIFUNGSRING, POSTEN 2

Der aus Flachstahl gefertigte Ring ist in das Gehäuse heftgeschweißt und sorgt für zusätzliche Steifigkeit des Gebläsegehäuses.

ABSCHLUSSPLATTE, POSTEN 3 UND 4

Die Abschlußplatte ist aus Stahl hergestellt und nimmt den Einlaßkonus auf. Für den Einlaß sind verschiedene Anschlußtypen verfügbar: Flansch, Muffe oder Schutzblech (Umhüllung).

LÜFTERRAD, POSTEN 5, 6 UND 7

Das aus Stahl hergestellte Lüfterrad kann in Abhängigkeit der Designmerkmale genietet oder verschweißt werden. Es wird entweder durch eine Kegelverschlußnabe (Spannabe) oder eine Gußeisenbosse mit Nasenkeil auf der Welle gesichert.

WELLENDICHTUNG, POSTEN 9

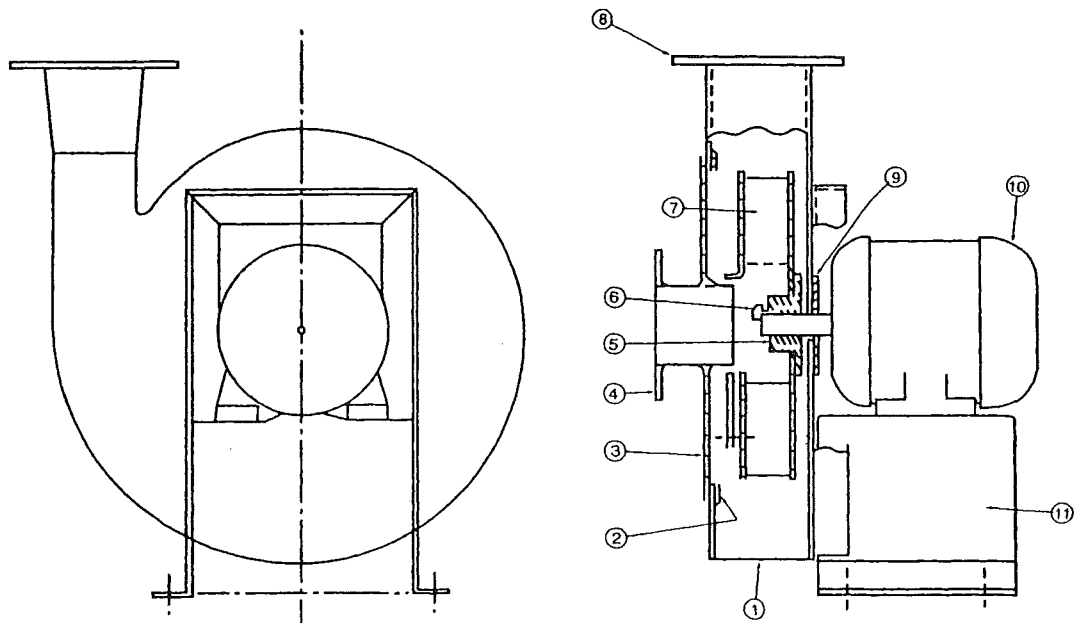
Für Gebläse, die zum Umgang mit Gasen und anderen speziellen Materialien eingesetzt werden, wird standardmäßig eine einfache Wellendichtung geliefert. Auf Anfrage können auch verschiedenste andere Designs angeboten werden, wie beispielsweise Karbon-, Labyrinth- und doppellippige Dichtungen.

MOTOR, POSTEN 10

Es sind alle Motortypen erhältlich, angefangen beim TEFC-Motor (vollkommen geschlossen mit Ventilator Kühlung) bis hin zu flammensicheren/schlagwettergeschützten Motoren.

MOTORBOCK, POSTEN 11

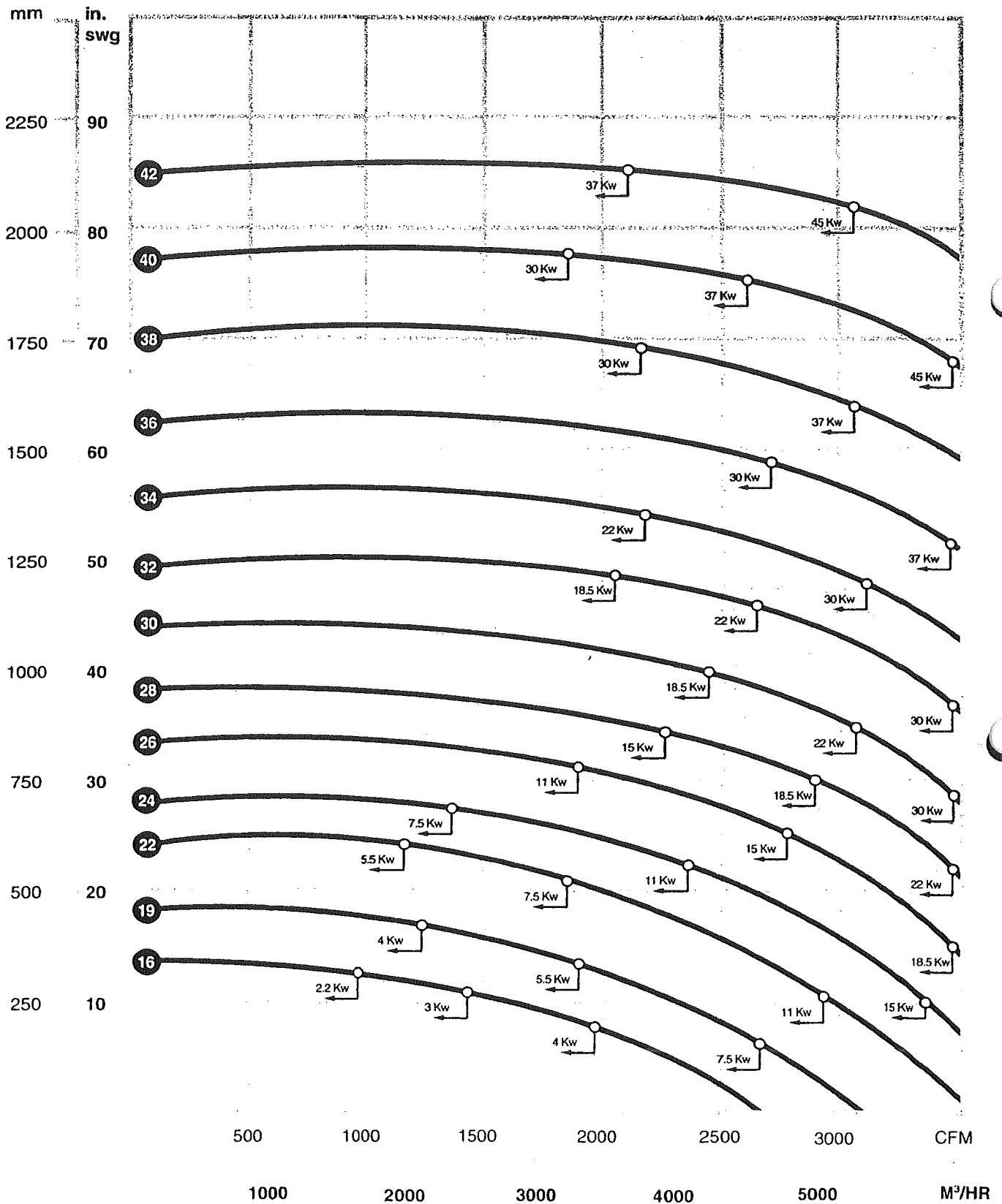
Der aus Flußstahl hergestellte Lagerbock trägt Gebläsegehäuse und Motor und ist zur vibrationsfreien Installation auf den Fundamenten der Produktionsstätten des Kunden geeignet.



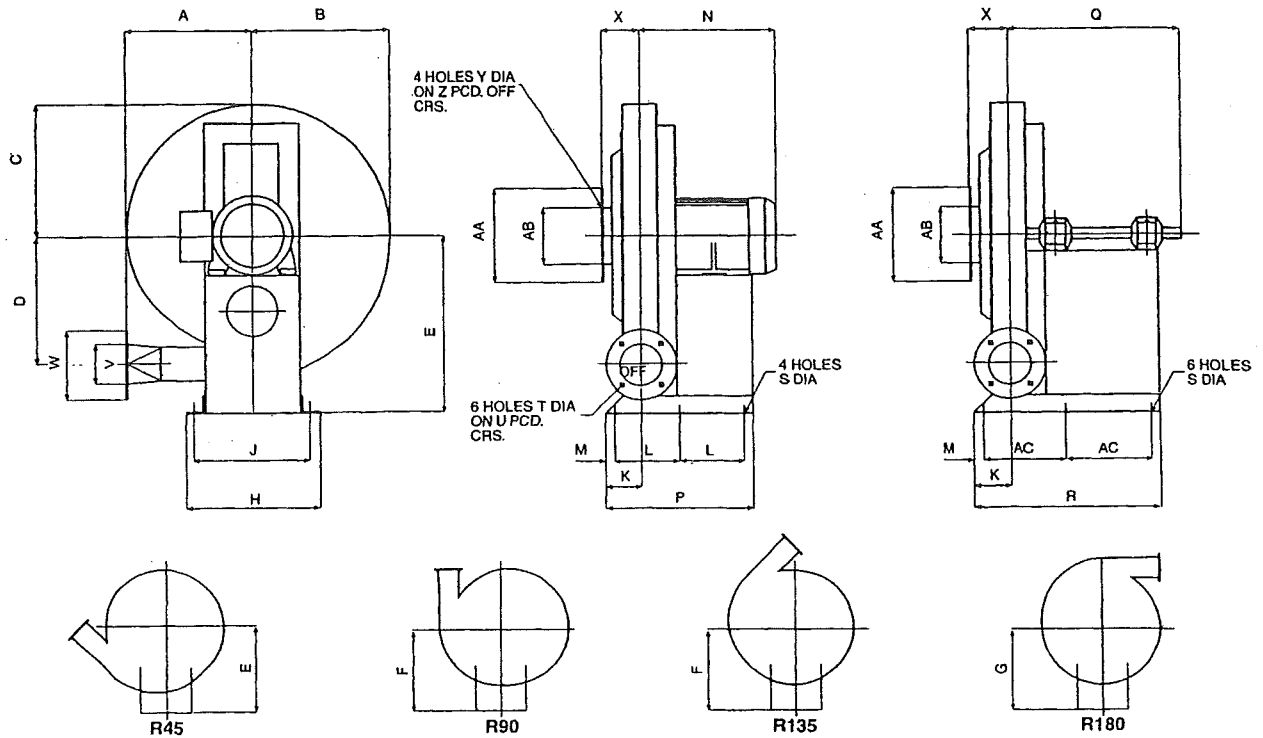
Type 60 QT/HE Fan Range

speed 2900rpm

density: 1.2 kg/M³

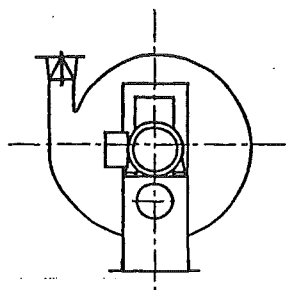


60 QT/LS and QT/HE fans assembly 4 & assembly 3 bare shaft

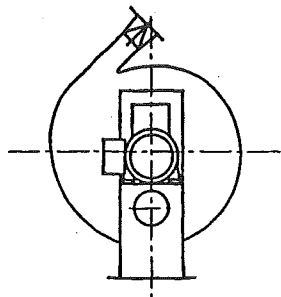


SIZE	A	B	C	D	motor KW	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	KG
1660	267	330	299	299	2.2	451	368	324	378	338	123	183	25	397	416	755	717	16	11	216	152	254	127	11	273	318	216	334	113
					3	451	368	324	378	338	123	204	25	438	457	755													121
					4	451	368	324	378	338	123	213	25	457	476	755													133
					5.5	489	406	362	406	366	123	213	25	457	476	755	717	16	11	216	152	254	127	11	273	318	216	334	138
1960	305	368	337	337	5.5	489	406	362	406	366	123	213	25	457	476	755													138
					7.5	489	406	362	406	366	123	213	25	457	476	755													138
					11	527	432	406	406	366	123	213	25	457	476	755	717	16	11	216	152	254	127	11	273	318	216	334	144
					15	527	432	406	406	366	123	213	25	457	476	755	581	580	755										144
2260	343	406	375	375	11	527	432	406	406	366	123	213	25	457	476	755													176
					15	552	457	432	406	366	123	213	25	457	476	755	717	16	11	216	152	254	127	11	273	318	216	334	152
					18.5	552	457	432	470	430	123	265	25	581	580	755													187
					22	552	457	432	470	430	123	265	25	581	580	755	632	623	755										187
2460	368	432	400	400	11	578	483	457	470	430	123	265	25	581	580	755	717	16	11	216	152	254	127	11	273	318	216	334	197
					15	578	483	457	470	430	123	265	25	581	580	755													197
					18.5	578	483	457	470	430	123	265	25	581	580	755	632	623	755										218
					22	603	508	483	470	430	123	265	25	581	580	755	717	16	11	216	152	254	127	11	273	318	216	334	208
2660	394	457	425	425	11	603	508	483	470	430	123	265	25	581	580	755													208
					15	603	508	483	470	430	123	265	25	581	580	755													208
					18.5	603	508	483	470	430	123	265	25	581	580	755	632	623	755										229
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3460	494	559	527	527	22	679	584	558	505	465	123	296	25	651	642	755													261
					30	679	584	558	550	510	123	347	25	752	743	755													342
					22	705	610	583	550	510	123	296	25	651	642	755	717	16	11	216	152	254	127	11	273	318	216	334	270
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4060	570	635	603	603	30	756	661	634	550	510	123	347	25	752	743	755	717	16	11	216	152	254	127	11	273	318	216	334	372
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					45	756	661	634	600	560	123	367	25	790	781	755													450
					30	781	686	659	550	510	123	347	25	752	743	755	717	16	11	216	152	254	127	11	273	318	216	334	384
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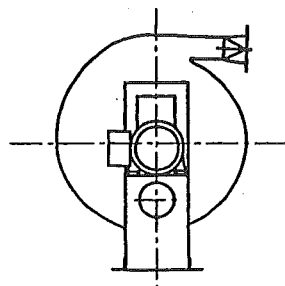
Direction of rotation and angle of discharge



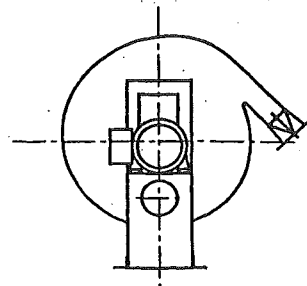
RDO (R90)



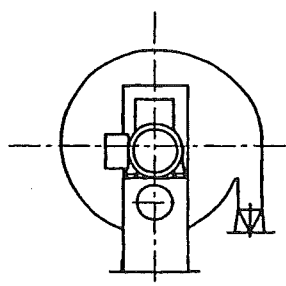
RD45 (R135)



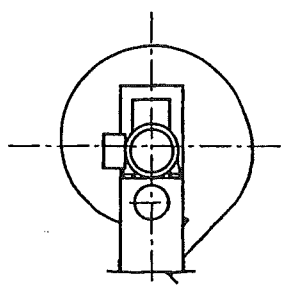
RD90 (R180)



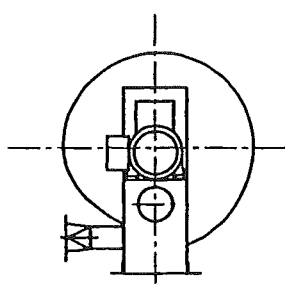
RD135 (R225)



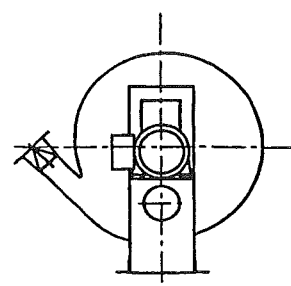
RD180 (R270)



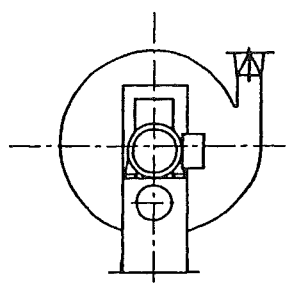
RD225 (R315)



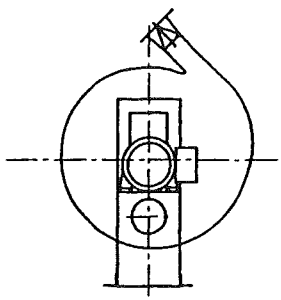
RD270 (R0)



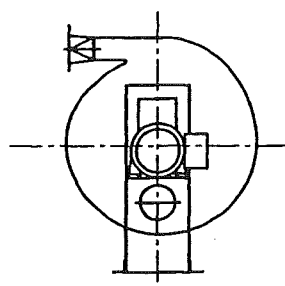
RD315 (R45)



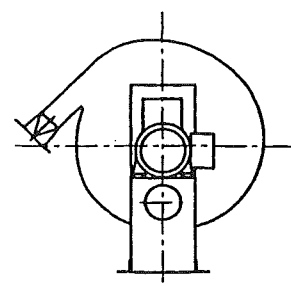
LGO (L90)



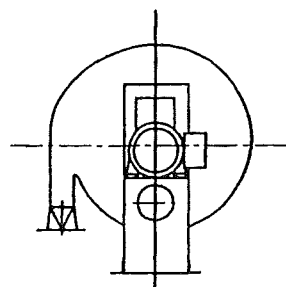
LG45 (L135)



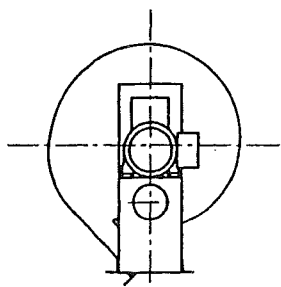
LG90 (L180)



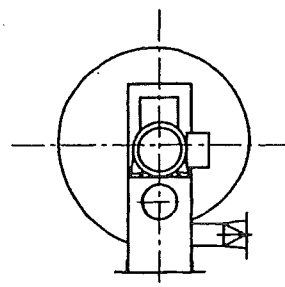
RD135 (R225)



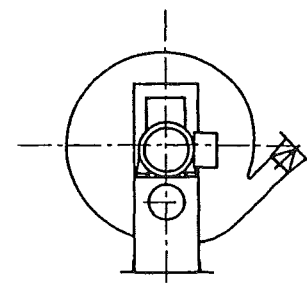
LG180 (L270)



LG225 (L315)

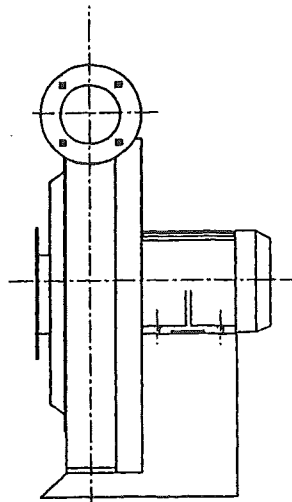


LG270 (L0)

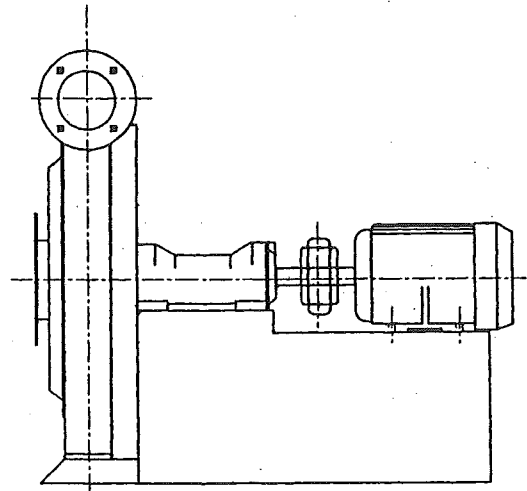


LG315 (L45)

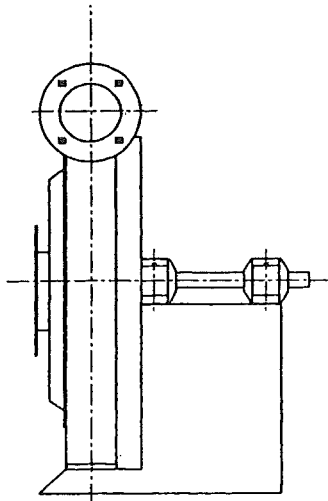
Standard fan assemblies and drive arrangements



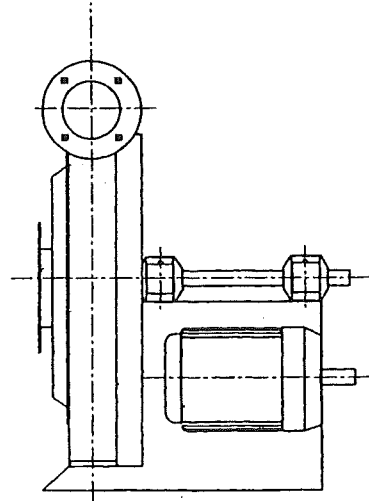
ASSEMBLY 4 DIRECT DRIVEN



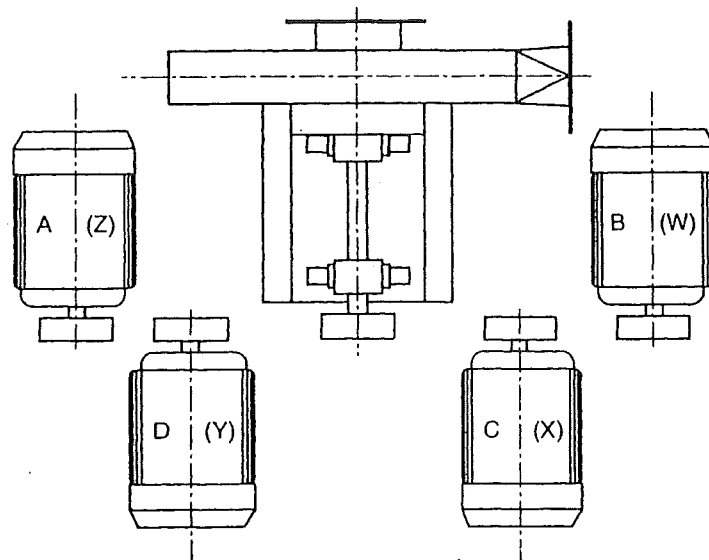
ASSEMBLY 6 FLEXIBLE COUPLING DRIVE



ASSEMBLY 3 BELT DRIVE

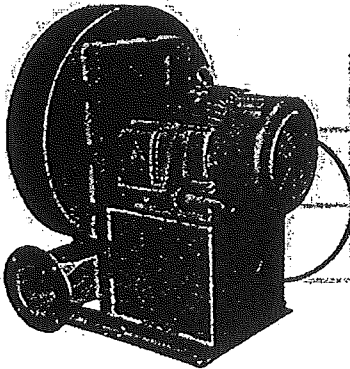


ASSEMBLY 3A BELT DRIVE
MOTOR MOUNTED ON SIDE OF PEDESTAL



MOTOR POSITIONS

Product Range



QT & CRB type fan for low volume high pressure applications

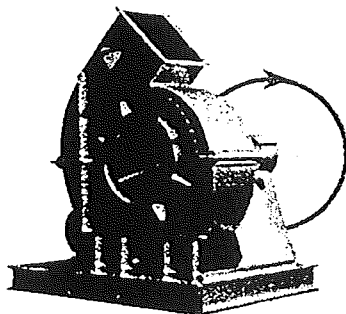
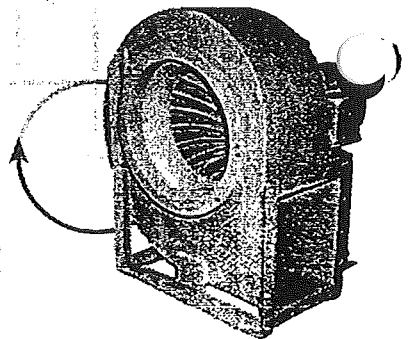
Ventilateur de type QT & CRB pour applications haute pression a faibles volumes

Gebläse type QT & CRB für kleinvolumen-hochdruckeinsatzfälle

DV, MV, LM, Fans Incorporating Multivane type impellers with forward curved, curved radial and curved backward type blades. Generally used for clean air applications

Ventilateurs de type DV, MV, LM, incorporant des roues à vanes multiples dotées d'ailettes courbées radialement et courbées en arrière. Utilisés généralement pour les applications à air stérile

Gebläse typ DV, MV, LM mit Mehrlamellen-Laufrädern mit nach vorn, radial und nach hinten gekrümmten flügeln. Im allgemeinen für staubfreie Einsatzfälle



PB fans having paddle type impellers suitable for heavy dust loading and material handling

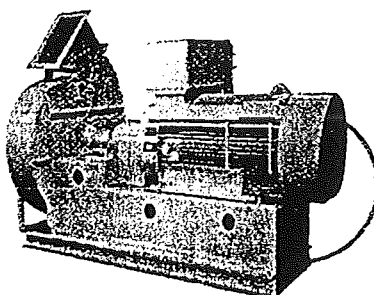
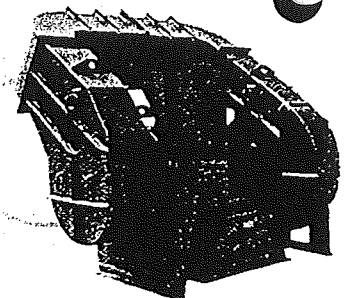
Ventilateur de type PB à roues à pales ouvertes convenant aux applications à charge élevée de poussière et au traitement de matières

Gebläse typ PB mit schaufel-Laufrädern für schwere Staubbeltung und materialhandhabung

BLN fans having plain backward inclined type blades suitable for clean air applications and light dust loadings

Ventilateurs de type BLN à ailettes lisses inclinées en arrière convenant aux applications à air stérile et aux charges légères de poussière

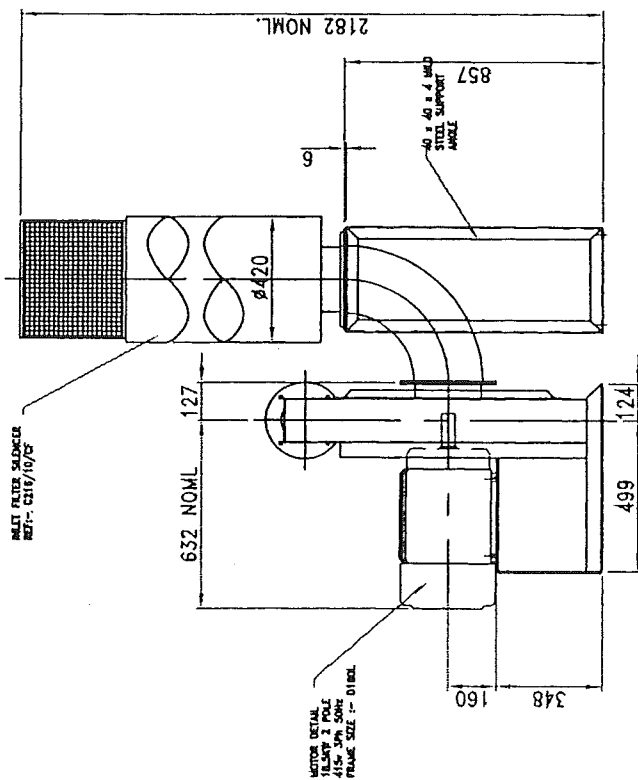
Gebläse typ BLN mit flachen, nach hinten geneigten flügeln für staubfreie einsatzfälle und leichte staubbelastung



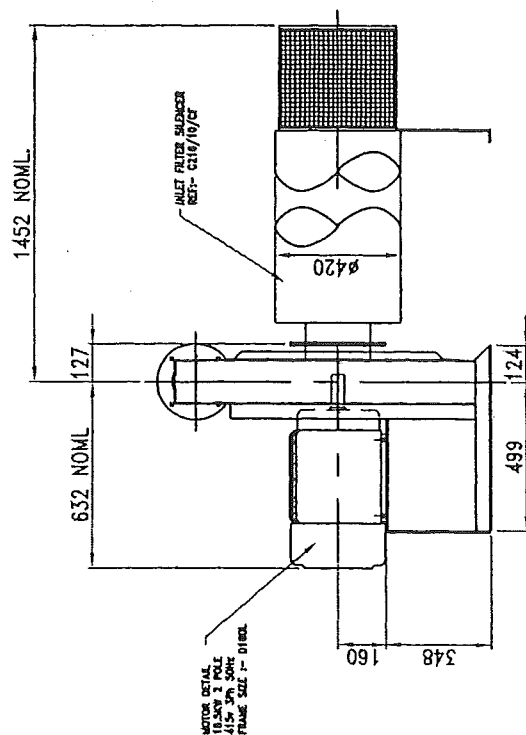
D fans having plain backward inclined type blades suitable for clean air applications and light dust loadings

Ventilateur de type D à ailettes lisses inclinés en arrière pour les applications à air stérile et charges légères de poussière

Gebläse typ D mit flachen, nach hinten geneigten flügeln für staubfreie einsatzfälle und leichte staubbelastung



FILTER/SILENCER IN VERTICAL ATTITUDE



FLUTTER/SALICER IN HORIZONTAL ATTITUDE

[illegible]

1

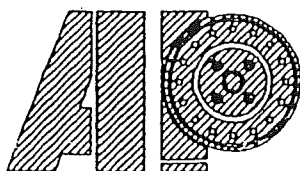
2

3

1000

THE QT & CRB RANGE OF FANS

INSTALLATION OPERATING & MAINTENANCE INSTRUCTIONS



ESTABLISHED 1650

ALLDAYS PEACOCK & CO LTD
INDUSTRIAL FAN ENGINEERS

A SPIRE GROUP COMPANY

WINTERSTOKE ROAD, WESTON-SUPER-MARE, AVON, BS23 3YS
TEL: 01934 636263. FAX: 01934 623727



Eclipse Combustion bv

P.O. Box 37, 2800 AA Gouda, The Netherlands

1

2

3

UNLOADING AND HANDLING

Precautions are taken in our works when packing and loading to ensure safe arrival of fan equipment on site. Careless handling during transit, when unloading and when erecting, can result in serious damage, every reasonable care must be taken during these operations.

On small and self contained fan units always use the lifting points provided.

On large fans where the equipment is despatched in parts the following precautions must be observed:

(a) When lifting the impeller in general, try to avoid slinging by blades or sideplate. Do not jerk and protect against sling damage. For example, if shaft is not fitted, arrange slings on either side of the impeller by means of a supporting bar through the hub, or if the shaft is fitted and extends through the impeller, two slings should be used, one on either side.

(b) On overhung impeller arrangements when shaft is in position, place sling around shaft close to backplate and have another sling around sideplate to balance.

(c) Always protect the shaft from the sling. Scratching or bruising of journals must be strictly avoided.

(d) Do not lower the impeller violently on the floor, when standing it on edge, the weight should be taken on the side of the backplate.

(e) Fan casings should be lifted by the lugs provided or by shackles attached to the joint flange holes.

(f) Baseplates and pedestals can be lifted by eye bolts through the bolt holes for bearings or motors, or hook slings to hand holes at sides of these items.

(g) Treat bearings with care. When dismantled at site for erection, they must be protected against damage and dirt throughout all stages of erection.

STORAGE

Fans should be stored in a clean, dry atmosphere free from vibration. It is recommended that the fan shaft be given an occasional (e.g. weekly) rotation to prevent brinelling of the bearing races.

FOUNDATIONS

Foundations should be checked to fan arrangement drawing before erection.

CONCRETE FOUNDATIONS

Check height and ensure there is the required grouting allowance between foundation and fan base. check location of hold down bolt pockets. The location of plinths should be checked in relation to the fan layout drawing. Use steel packers to obtain correct height of fan, the packers being approximately the same width as the baseplate or pedestal flange and placed close to hold down bolts.

SUPPORTING STEELWORK

Steelwork levels should be checked (including holes in the various beams). The steelwork should be level and rigid. Make certain, if it is of bolted construction, that all bolts are tight. Fully welded supporting structures are preferable, but, for heavy installations, if bolts are used, they should preferably be fitted, bolts with the usual clearances are sometimes unsatisfactory because the structure can move under operating conditions.

INSTALLATION

SMALL AND SELF-CONTAINED FAN UNITS

Lift, level and place on foundation, position correctly including its height, then set level by use of packers placed close to hold down bolts. A spirit level should be used on surface of baseplate to ensure that fan unit is level.

The correct positioning of the fan to drawing should be based on the fan discharge flange.

For these assemblies all adjustments have been made at our works and it is only necessary to erect the whole unit and not to change the alignment.

When the fan is correctly positioned and leveled, place hold down bolts in holes in concrete and leave them loose with some thread left for final tightening. Grout in up to bottom of baseplate or slightly higher and leave to set. Not until grouting has set hard should the hold down bolts be fully tightened (4 to 5 days).

If the fan is mounted on steelwork the hold down bolts can of course, be tightened immediately the fan is positioned correctly and levelled.

The connecting ductwork must not be tightened to fan until it is bolted down securely.

FANS WITH CASING SUPPORTED INDEPENDENTLY FROM BEDPLATE

Set bottom half of casing approximately into position, then baseplate, then place impeller and shaft into position in bearings.

Next, for final setting, it must be decided which part of fan must be used as the basis for setting. Generally it will be the fan discharge flange to which ducting will connect. If the discharge of the fan is in the bottom half of the casing, the top half of the casing should not be put into position. If, on the other hand, the fan discharge is in the top half of the casing, the latter should be placed in position and two or three bolts positioned in the joint so as to position the casing from the discharge flange, after which, remove the top half and proceed with the positioning and lining up without it.

Adjust so that:-

- (a) The fan casing is level and discharge flange is in the correct position.
 - (b) Baseplate and shaft are level and the shaft is concentric with the seal hole.
 - (c) For cold fans the cone should be set central with the impeller eye, but, for hot fans an allowance has to be made for rise of casing relative to shaft. See Fig.2 page 7.
- On paddle bladed fans such as the Europa PB range where there is no inlet cone, the impeller should be positioned axially central in the fan casing unless otherwise on the General Arrangement drawing.
- On high efficiency fans such as the Europa BA and BL range, it is essential that the axial relationship of the impeller and cone is correct, otherwise the fan performance will be adversely affected. See Fig.3 page 8.
- (d) Lift and put into place top half of fan casing.
 - (e) Place motor in position and line up.
 - (f) Make final check on coupling or Vee drive alignment (see manufactures' leaflet).
 - (g) When all is correct and checked, place hold down bolts in position loosely leaving some thread for final tightening, then grout in and leave for 4 or 5 days to set hard before fully tightening hold down bolts.
 - (h) Check that no debris etc. has been left in the fan casing or impeller.

(j) Make certain that duct flanges mate correctly. Forcing by drift must be avoided as this distorts the fan and causes unsatisfactory running. If the ducts do not mate up correctly the ducts should be modified to suit. Loose flanges for mating up are usually arranged to avoid this trouble.

The fan casing joints and the ducting joints are usually made with gaskets the same width as the flanges.

(k) If the bearings are water cooled, connect up water cooling piping using a little white lead for threads or an equivalent jointing compound.

ANTI-VIBRATION MOUNTS.

Where anti-vibration mountings are fitted it is most important that the fan is isolated from surrounding ductwork by means of flexible connections on both inlet and outlet.

In the case of a Vee belt driven fan unit, the fan and motor must be mounted on a combination baseplate to enable anti-vibration mounts to be used.

For installation and setting details, see manufacturers' leaflet.

STARTING UP

On initial starting up, proceed as follows:-

- (a) Check that there is no debris in fan casing.
- (b) Rotate impeller by hand to check freedom of movement.
- (c) Check that all holding down bolts are tight.
- (d) Close any dampers and inlet controls.
- (e) Check driving unit for correct rotation.
- (f) Start up.
- (g) Open any dampers when fan is at operating speed.

FIG 1. POSITION OF IMPELLERS IN CASING AND ROTATION.

The following diagrams illustrate the different impeller designs, the way they are correctly positioned in the casing and correct direction of rotation relative to the fan discharge.

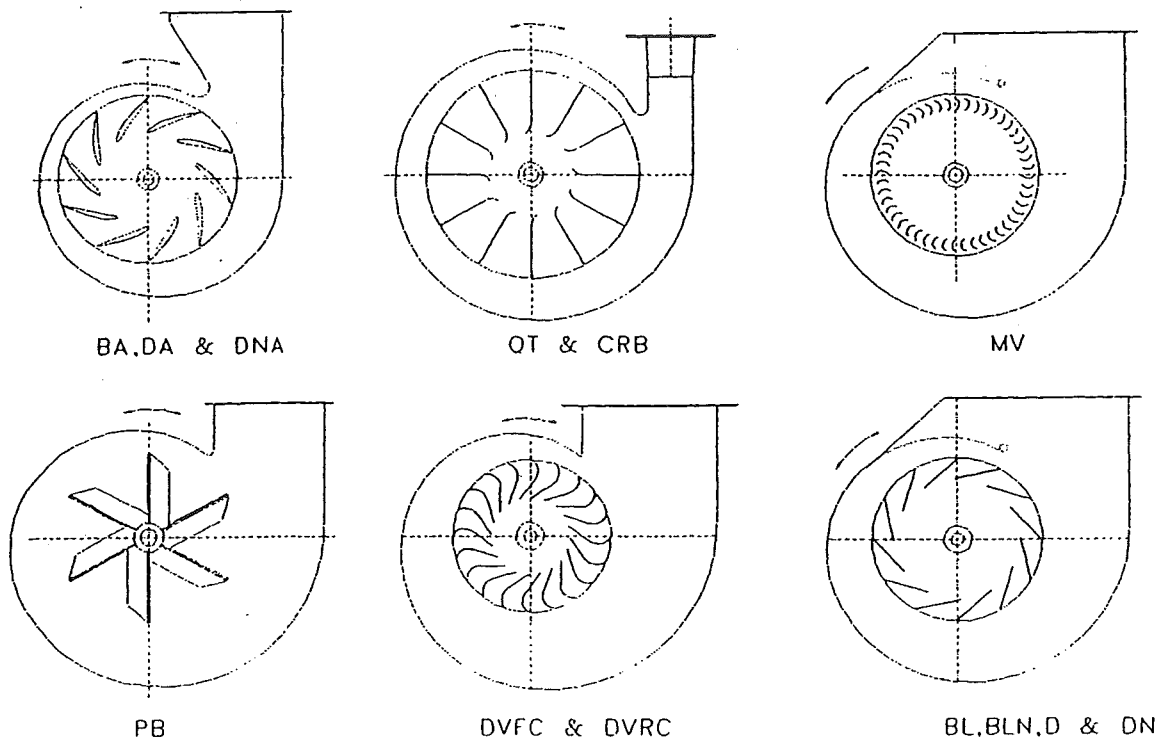
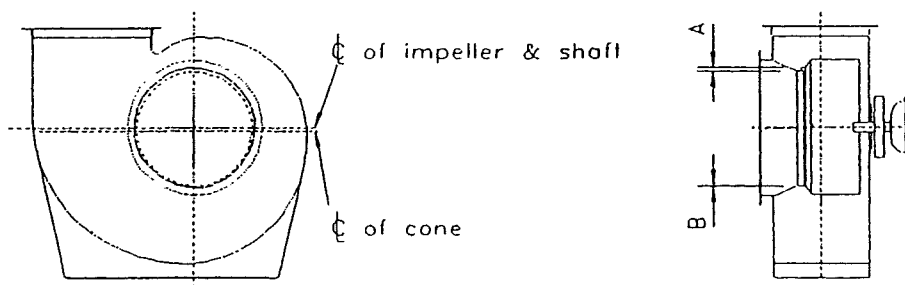


FIG 2. CONE SETTING (HOT GAS FANS ONLY)



To allow for casing expansion at temperature, the inlet cone may have to be set low. A minimum clearance of 3mm between cone and impeller see (dimension B) is acceptable.

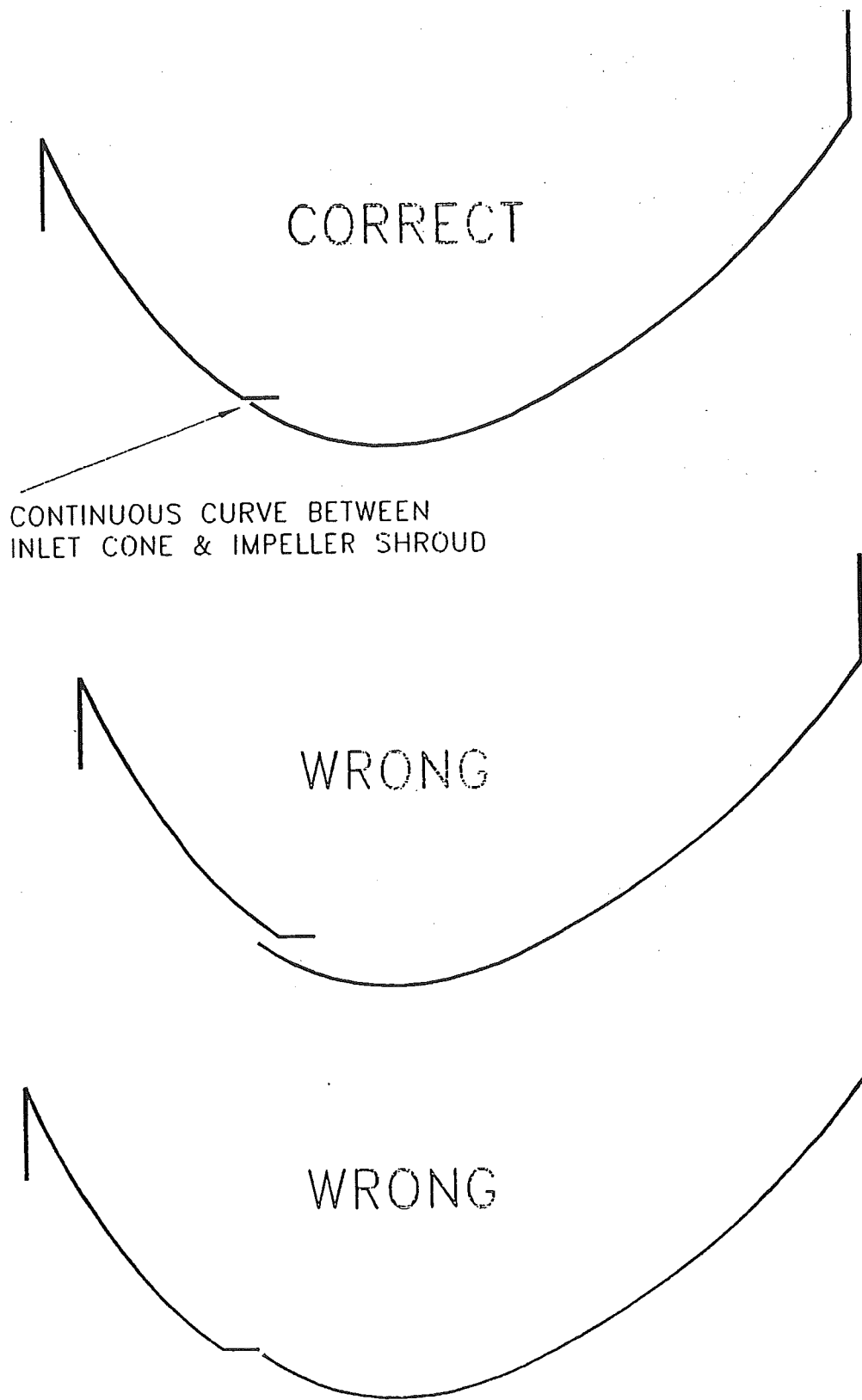


FIG.3 EUROPA BA AND BL CONE SETTING

MARINE FANS (INERT GAS)

It is most important that the fan is isolated from the surrounding ductwork by means of flexible connections on both inlet and outlet flanges to avoid placing any stresses on fan components.

On direct coupled units the flexible coupling is released prior to delivery to obviate any problem arising relative to shaft and bearings, as a result of lifting or transport procedures.

For lining up procedure, see manufacturer's leaflet, a copy of which is included in these instructions (where applicable).

On installations near a ship's engine room, there is risk of brinelling during stand-down periods. It is therefore recommended that the shaft be given an occasional (e.g. weekly) rotation during these periods.

HOT GAS FANS WITH WATER COOLED SHAFTS

The water box is situated adjacent to the fan pulley and has a packed gland shaft seal. This seal should not be adjusted unless leakage takes place and then only giving the minimum amount of adjustment necessary. A small seepage of one to two drops of water per minute is normal from this type of gland and serves to lubricate the sealing element.

The water flow rate should be sufficient to keep the exit water no more than lukewarm. Generally a flow of 2-5 gallons per minute is sufficient. Always use clean water.

The water inlet and water outlet are provided with flexible pipe connections. It is not recommended that these connections be removed and rigid pipe connections made direct to the waterbox as this may lead to movement of the box and subsequent leakage.

On no account should lifting tackle be applied to the waterbox as this may result in distortion and subsequent water leakage.

FANS ON WET COLLECTOR APPLICATIONS

Where fans are operating on Wet Collector installations problems may arise due to buildup on the impeller blades. It is therefore recommended that the impellers are inspected and cleaned on a weekly basis.

ARDUOUS DUTY FANS (GLASS CYCLING)

The impellers on fans used in these applications should be dye penetrant tested by Alldays Peacock & Co. Ltd or an independent Inspection Company every 6 months for signs of deterioration. A visual Inspection of the impeller should also be carried out at 3 monthly intervals. If any such signs are present the impeller should immediately be removed and returned to Alldays Peacock & Co. Ltd for repair and rebalancing. Alldays Peacock & Co. Ltd recommend that a recognised Vibration Monitoring system be fitted to the fan.

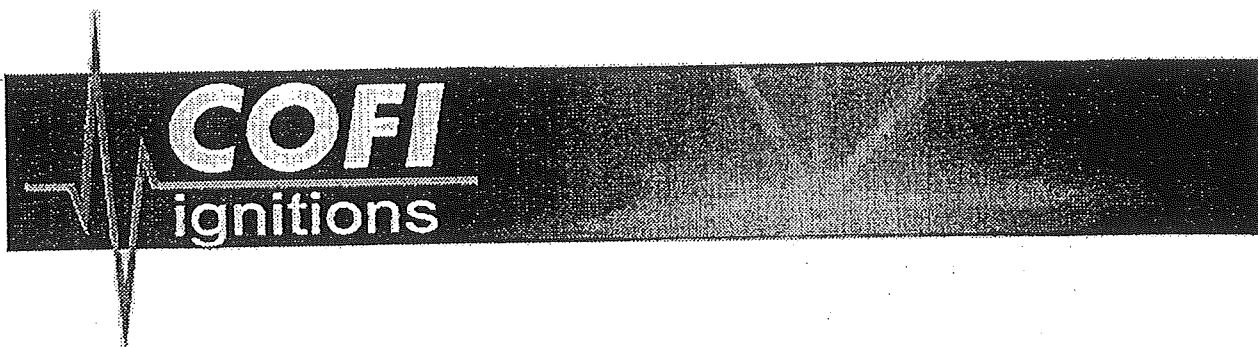
CHANGING GAS BOOSTER SEALS

Gas Booster Fans are fitted with special seal arrangements which enable an inert purge to be connected. The maximum purge pressure must not exceed 0.5 bar.

Changing Gas Booster seal sets should be carried out in the following sequence:-

1. Remove the interconnecting ductwork between the two stages.
2. Remove the coverplates from both stages.
3. Remove each impeller from the motor shaft. Set aside noting which impeller came from which case.
4. Unbolt the detachable stage from the fan pedestal and set aside.
5. Unbolt the motor and remove.
6. The seal housings are now removed from the sides of the cases.
7. Using a suitable tool such as a screwdriver remove and discard the old seals.
8. Insert the first seal into the housing ensuring that it is the correct way round (see diagram) and gently drive in until it is hard against the shoulder of the housing.
9. The second seal is now installed but left slightly proud of the housing.
10. Refit the keeper plates to the seal housings and tighten, this will ensure that the second seal is positioned to the correct depth.
11. Re-assembly is the reverse of steps 1 to 6. Before refitting the interconnecting ductwork ensure that the fan is free to rotate without interference.

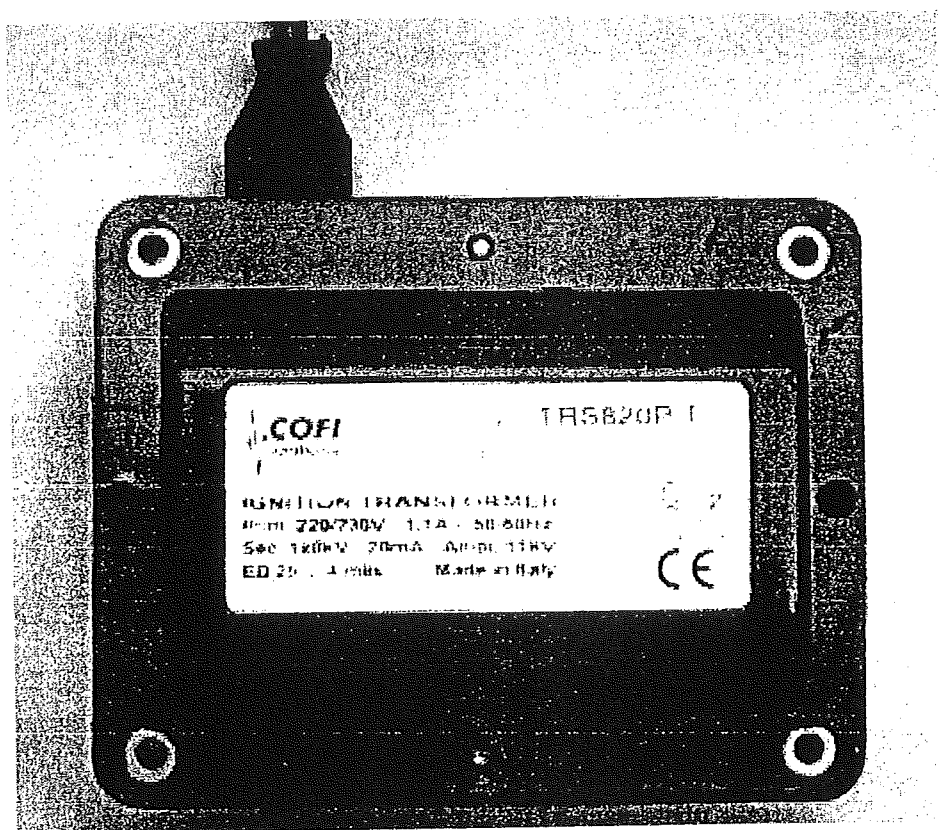
Care must be taken to ensure that the correct impeller is fitted in the correct case as they are handed.



IGNITION TRANSFORMER

(Technical data)

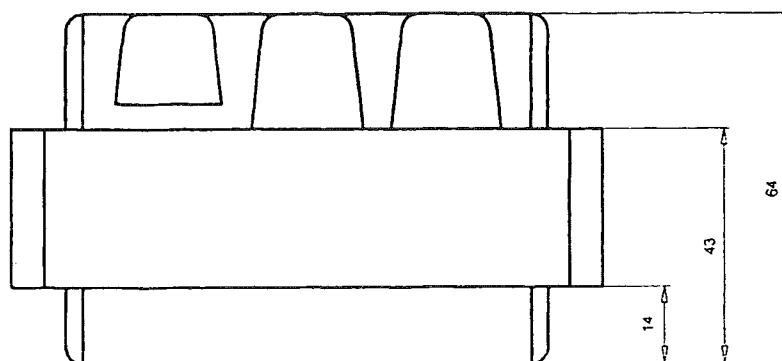
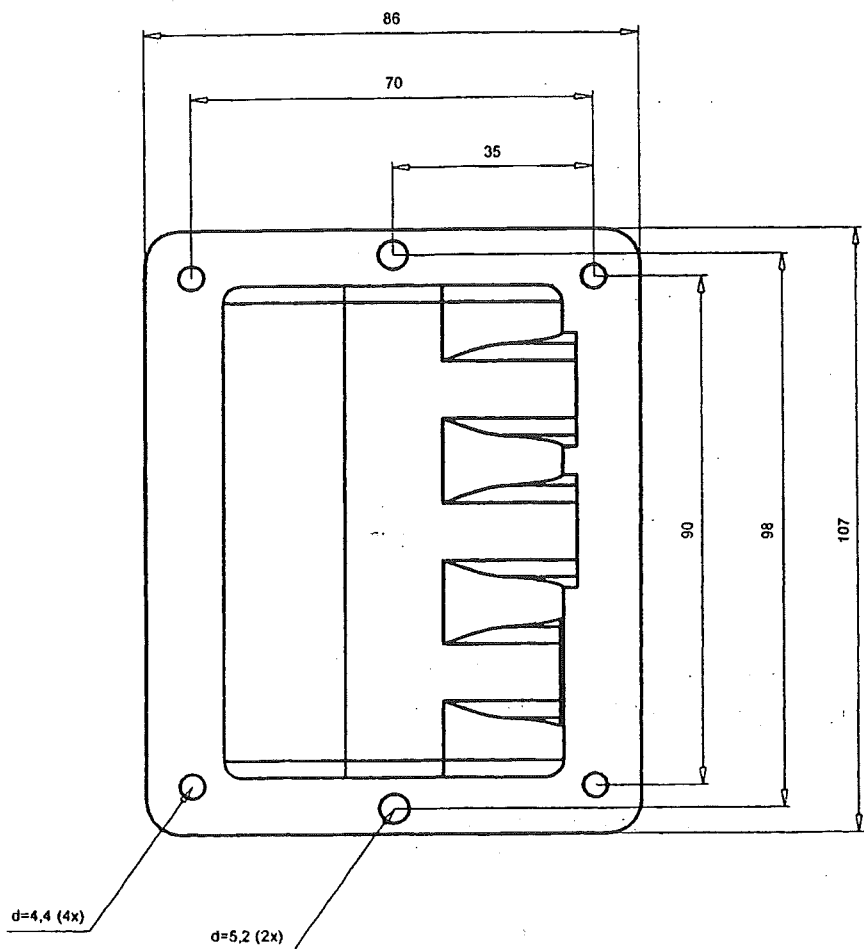
Ignition transformer type TRS820P/T2 tested version according to VDE 0550 en SEV BA9.



Input voltage	: 220 - 230 V, AC
Output voltage	: 1 x 8 kV
Input current	: 1 A
Output current	: 20 mA
Switch on time	: 25% in 4 min.
Input cable size	: 3 x 0.75
Weight	: 1,6 kg

Changes reserved.

MEASUREMENTS (in mm)

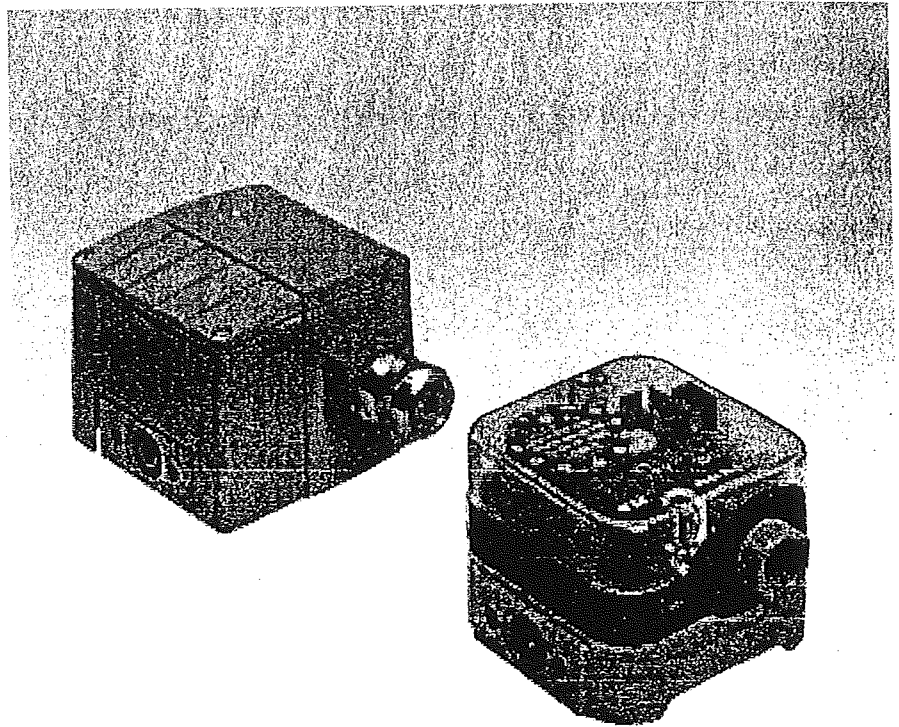


**Differential pressure
switches for air, flue
and exhaust gases**
Pressure switch for gas

DUNGS®

**LGW...A4
LGW...A4/2**

5.08



Technical description

The differential pressure switch LGW...A4 is an adjustable differential pressure switch for automatic burner controls.

It is suitable for switching a circuit on, off or over on changes in actual pressure value relative to the set reference value. The reference value (switching point) is adjusted on a setting wheel provided with a scale. The test nipple is integrated in metal housing as standard.

Application

Differential pressure monitoring in firing, ventilation and air-conditioning systems. Differential pressure switches: suitable for air, flue and exhaust gases. Pressure switches: suitable for gases of families 1,2,3 and other neutral gaseous media.

Approvals

EC type test approval as per EC Gas Appliance Directive:

LGW...A4	CE-0085 AQ 0673
LGW...A4/2	CE-0085 AQ 0673

EC type test approval as per EC Pressure Equipment Directive:

LGW...	CE0036
--------	--------

Approvals in other important gas-consuming countries.

TÜV (German Technical Inspectorate) test as pressure switch; special construction type as per TRD 604 and VdTÜV leaflet, Edition 100/1, as well as Class "S" as per EN 1854.

Functional description

Differential pressure switch in pressure and vacuum ranges. The differential pressure acts via the diaphragm against the force of the setting spring on the microswitch. The pressure switch operates without any auxiliary power.

Differential pressure switch LGW...A4

The switching mechanism responds to differential pressure which acts between the two pressure chambers. It switches an electric circuit on, off or over when the set reference value is exceeded or undershot.

Overpressure switch LGW...A4

Pressure connection G 1/4

The switching mechanism responds if there is an overpressure which switches on, off or over to an electric circuit if the set reference value is exceeded or undershot.

Single-acting pressure switch in the overpressure range. The vent plug G 1/8 may not be closed.

Vacuum switch LGW...A4

Pressure connection G 1/8

The switching mechanism responds to vacuum which switches an electric circuit on, off or over when the set reference value is exceeded or undershot. Single-acting pressure switch in vacuum range. The vent plug G 1/4 may not be closed.

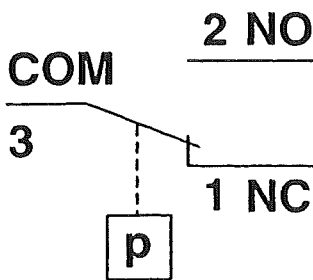
LGW...A4 switching function

As pressure rises:

1 NC opens, 2 NO closes

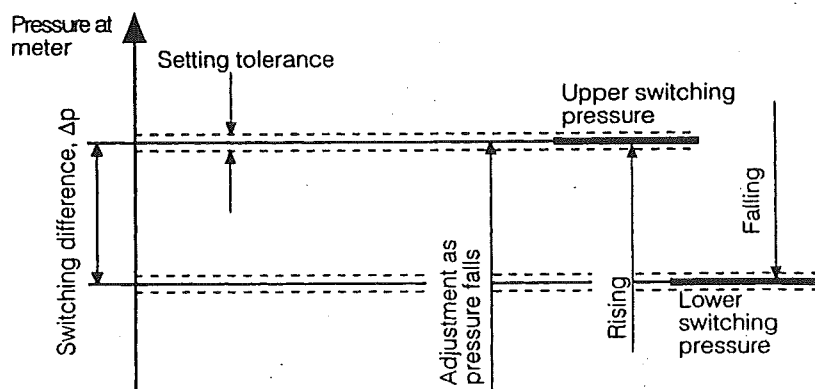
As pressure falls:

1 NC closes, 2 NO opens



Definition of switching difference Δp

The switching difference Δp is the pressure difference between the upper and lower switching pressures.



LGW...A4, Design: Clear cover

Protection class: IP 54

- IP 54
- 5 Protection against ingress of solid particles $\phi \geq 1$ mm.
Protection against access to hazardous parts using $\phi \geq 1$ mm wire
Complete contact protection
 - 4 Protection against a water jet.
No hazardous conditions may result.

LGW...A4/2, Design: Metal housing

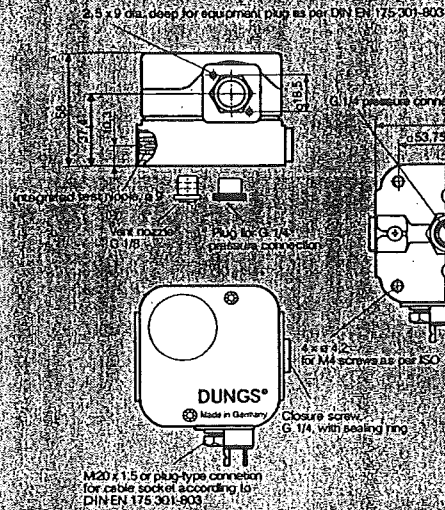
Protection class: IP 65

- IP 65
- 6 Protection against the entry of dust (dust sealed).
Protection against access to hazardous parts using $\phi \geq 1$ mm wire
Complete contact protection
 - 5 Protection against a water jet from a nozzle directed at the unit (housing) from any directions
No hazardous conditions may result (water jet).

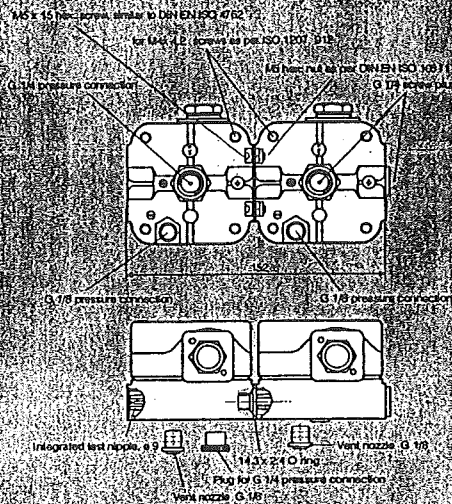
Max. operating pressure	LGW 3 A4 - LGW 150 A4 500 mbar (50 kPa) LGW 3 A4/2 - LGW 150 A4/2 500 mbar (50 kPa)			
Pressure connection	P+: G 1/4 female thread ISO 228 on centre of housing underside: gas or air P+: G 1/4 screw plug on side of housing: gas or air P-: G 1/8 female thread ISO 228 on side of housing underside: only air			
Measuring connection	Instrument gland integrated in metal housing, \varnothing 9			
Temperature range	Ambient temperature: -15 °C to +70 °C Medium temperature: -15 °C to +70 °C Storage temperature: -30 °C to +80 °C			
Materials	LGW...A4 Housing base aluminum die casting Hood Polycarbonate Switch Polycarbonate Diaphragms NBR Switching contact Standard: fine silver (Ag) Optional: gold-plated fine silver (Au), suitable for DDC applications: 24 VDC; 0.02 A			
	LGW...A4/2 Housing base Diecast aluminum Hood Extrusion cast zinc, powder-coated Switch Polycarbonate Diaphragms NBR Switching contact Standard: fine silver (Ag) Optional: Sterling silver, gold plated (Au), Suitable for DDC applications: 24 VDC; 0.02 A			
Switching voltage	Ag contact	AC eff.	min. 24 V	max. 250 V
	Au contact	DC	min. 24 V	max. 48 V
Nominal current	Ag contact	DC	min. 5 V	max. 24 V
	Au contact	AC eff.	10 A	
Switching current	Ag contact	DC	20 mA	
	Au contact	AC eff.	min. 20 mA	max. 6 A bei $\cos \varphi$ 1
Electrical connection	Standard LGW...A4	AC eff.	min. 20 mA	max. 3 A bei $\cos \varphi$ 0,6
	Standard LGW...A4/2	DC	min. 20 mA	max. 1 A
Degree of protection	Special design	DC	min. 5 mA	max. 20 mA
	LGW...A4, LGW...A4/2	at screw terminals via M20 x 1.5 cable gland		
Adjustment	Standard LGW...A4	at screw terminals via M20 x 1.5 cable gland		
	Standard LGW...A4/2	at screw terminals via M20 x 1.5 cable gland		
Setting tolerance	Special design	plug connection for line sockets as per		
	LGW...A4, LGW...A4/2	DIN EN 175 301-803, 3-pin with protection contact		
Reference value setting device	LGW...A4	IP 54 as per IEC 529 (EN 60529), (transparent hood)		
	LGW...A4/2	IP 65 as per IEC 529 (EN 60529), (metal housing)		
Reference value setting device	If pressure increases in vertical installation position. Optionally adjustment for rising or falling pressure possible on site. If installation position deviates, note change in switch point.			
	$\pm 15\%$ switch point deviation referred to reference value and installation in vertical position.			
Reference value setting device	Standard: blue Version "Y": Yellow			

Dimensions [mm]

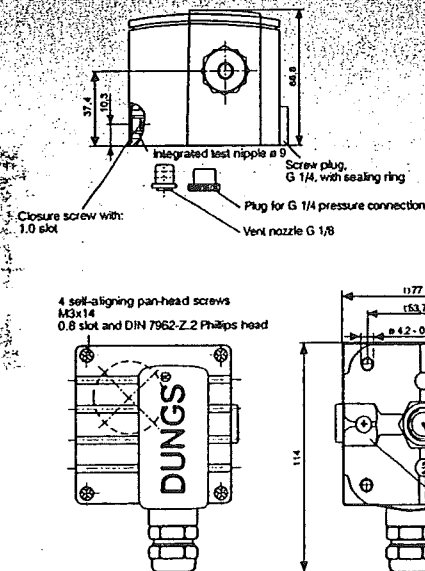
LGW... A4



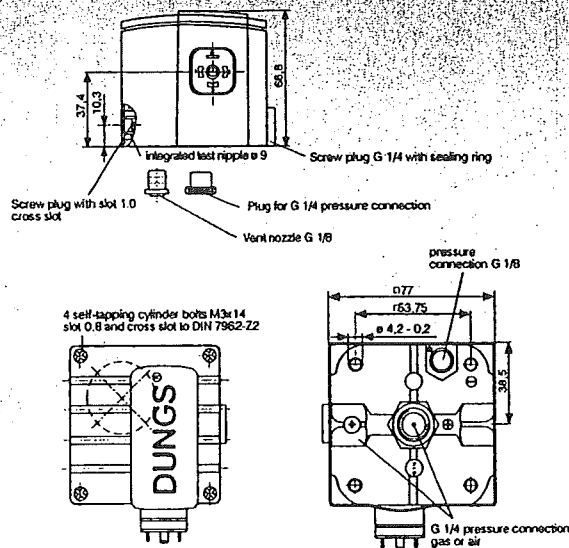
LGW... A4 / LGW... A4



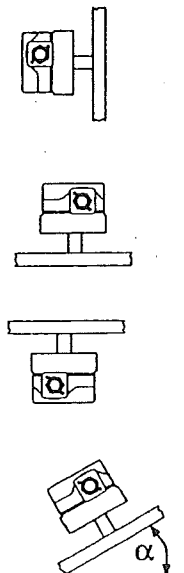
LGW... A4/2 with metal housing, cable gland M 20 x 1.5



LGW... A4/2 with metal housing, plug-in connection for sockets accord. to DIN EN 175 301-803



Installation position



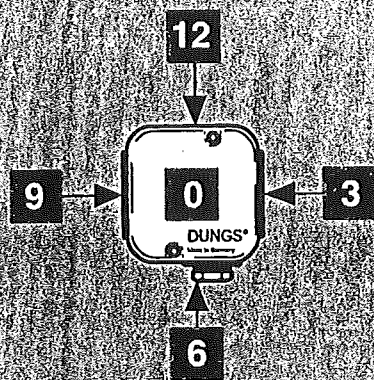
Standard installation position

When installed horizontally, the pressure switch switches at a pressure higher by approx. 0.5 mbar

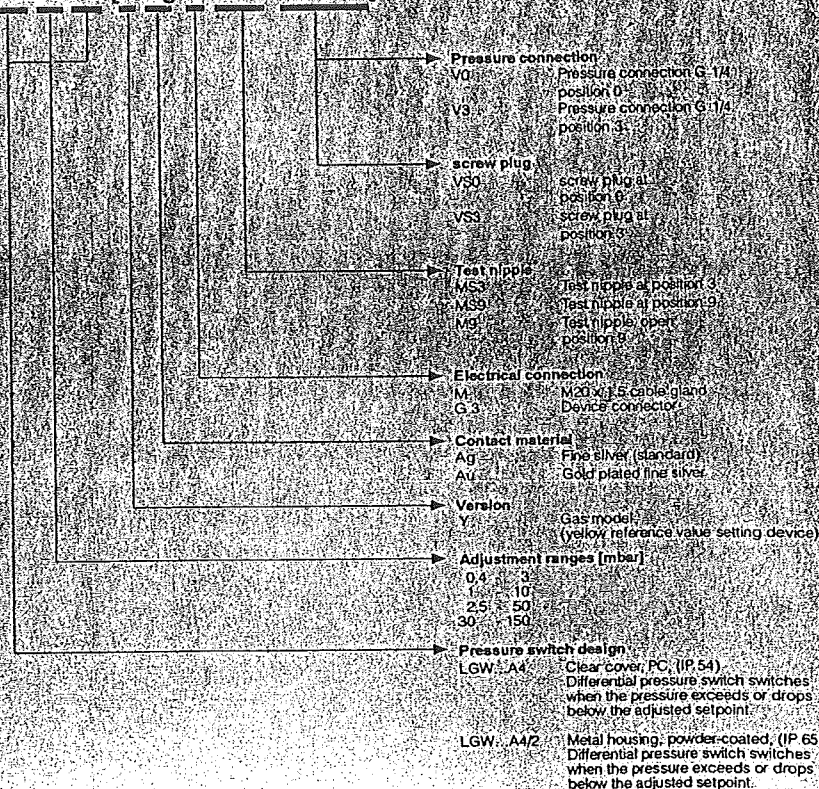
When installed horizontally overhead, the pressure switch switches at a pressure lower by approx. 0.5 mbar

When installed in an intermediate installation position, the pressure switch switches at pressure deviating from the set reference value by max. ± 0.5 mbar.

Designation



LGW 3 A4 [Y-Ag-M-MS9-V0-VS3]



Order example

Pressure switch design

LGW 3 A4 differential pressure switch

Setting range

30 - 150 mbar

Contact material

Ag fine silver (standard)

Electrical connection

Cable gland M20 x 1.5

Test nipple

MS 9

Pressure connection G 1/4

V0-VS3; at position 0 and position 3 with closure screw

LGW 150 A4 [Ag-M-MS9-V0-VS3]

Accessories for

LGW...A4 pressure switch

Order No.

Kit: G3 equipment plug, 3-pin + E

219 659

Line sockets, 3-pin + E
grey GDMW

210 318

G 1/4 test nipple
and seal ring (5 x)

230 398

G 1/4 screw plug
and seal ring (5 x)

230 396

Double pressure switch mounting kit

213 910

Metal mounting bracket

230 288

G 1/4 screw-in glands,
only for air

230 279

G 1/8 screw-in glands,
only for air

230 278

Glowlamp mounting kit, 230 V

231 773

Glowlamp mounting kit, 120 V

231 772

Signal lamp mounting kit, 24 V

231 774

Differential pressure switches
for air, flue and exhaust gases
Pressure switch for gas

LGW...A4
LGW...A4/2

DUNGS®

Technical Summary 1 mbar = 100 Pa = 0.1 kPa = 10 mm WS

1 Pa = 0.01 mbar ≈ 0.1 mm WS

Model	Version [Ag-M-MS9-V0-VS3]	Order No.	Setting range [mbar]	Degree of protection	Differential pressure switch Δp [mbar]
LGW...A4 Differential pressure switch	LGW 3 A4	221 590	0,4 - 3	IP 54	≤ 0.3
	LGW 10 A4	221 591	1 - 10	IP 54	≤ 0.5
	LGW 50 A4	221 592	2,5 - 50	IP 54	≤ 1
	LGW 150 A4	221 593	30 - 150	IP 54	≤ 3
Supplied in collective packaging					

Model	Version [Ag-M-MS9-V0-VS3]	Order No.	Setting range [mbar]	Degree of protection	Differential pressure switch Δp [mbar]
LGW...A4/2 Differential pressure switch	LGW 3 A4/2	232 041	0,4 - 3	IP 65	≤ 0.3
	LGW 10 A4/2	232 046	1 - 10	IP 65	≤ 0.5
	LGW 50 A4/2	232 048	2,5 - 50	IP 65	≤ 1
	LGW 150 A4/2	232 050	30 - 150	IP 65	≤ 3
Supplied in separate packaging					

Model	Version [Ag-G3-MS9-V0-VS3]	Order No.	Setting range [mbar]	Degree of protection	Differential pressure switch Δp [mbar]
LGW...A4/2 Differential pressure switch	LGW 3 A4/2	232 716	0,4 - 3	IP 65	≤ 0.3
	LGW 10 A4/2	232 717	1 - 10	IP 65	≤ 0.5
	LGW 50 A4/2	232 718	2,5 - 50	IP 65	≤ 1
	LGW 150 A4/2	232 719	30 - 150	IP 65	≤ 3
Supplied in separate packaging including line socket					

Model	Version [Y-Ag-M-MS9-V0-VS3]	Order No.	Setting range [mbar]	Degree of protection	Differential pressure switch Δp [mbar]
LGW...A4 Differential pressure switch	LGW 3 A4 Y	242 864	0,4 - 3	IP 54	≤ 0.3
	LGW 10 A4 Y	242 865	1 - 10	IP 54	≤ 0.5
	LGW 50 A4 Y	242 866	2,5 - 50	IP 54	≤ 1
	LGW 150 A4 Y	242 867	30 - 150	IP 54	≤ 3
Supplied in collective packaging					

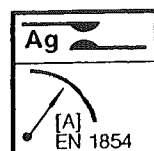
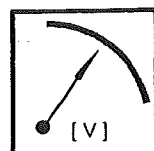
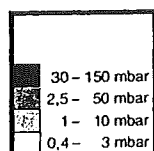
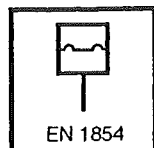
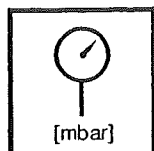
We reserve the right to make any changes in the interest of technical progress.

Head Offices and Factory
Karl Dungs GmbH & Co. KG
Siemensstraße 6-10
D-73660 Urbach, Germany
Telefon +49 (0)7181-804-0
Telefax +49 (0)7181-804-166

Postal address
Karl Dungs GmbH & Co. KG
Postfach 12 29
D-73602 Schorndorf, Germany
e-mail info@dungs.com
Internet www.dungs.com

**DUNGS®****Betriebs- und Montageanleitung**

Differenzdruckwächter für Luft, Rauch- und Abgase, Überdruckwächter für Gas
LGW...A4, LGW...A4/2
Doppeldruckwächter
LGW...A4/LGW...A4

**Operation and assembly instructions**

Differential pressure switch for air, flue and exhaust gases, pressure switch for gas
LGW...A4, LGW...A4/2
Double pressure switch
LGW...A4/LGW...A4

Max. Betriebsdruck
Max. operating pressure
Pression de service maxi.
Max. pressione di esercizio
 $P_{max} = 500 \text{ mbar}$

Druckwächter/ Pressure Switch/
Pressostat/ Pressostato
Typ/Type/Type/Tipo
LGW...A4, LGW...A4/2
nach / acc. / selon / a norme
EN 1854

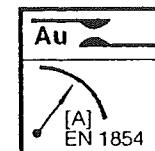
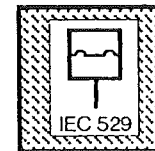
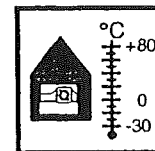
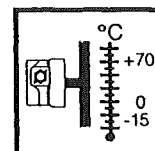
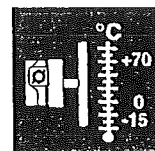
Einstellbereiche
Setting ranges
Plages de réglage
Campi di taratura

Ag-Kontakt/Ag contact
Contact Ag/Contatti Ag
-(AC) eff. min./mini 24 V,
-(AC) max. /maxi. 250 V
=(DC) min./mini. 24 V,
=(DC) max. /maxi. 48 V
Au-Kontakt/Au contact
Contact Au/Contatti Au
=(DC) min./mini. 5 V,
=(DC) max. /maxi. 24 V

Nennstrom/nominal current/courant nominal/corrente nominale -(AC) 10 A
Schaltstrom/current on contact/courant de commutation/corrente di intervento
-(AC) eff. min./mini 20 mA,
-(AC) max. /maxi. 6 A $\cos \varphi 1$
-(AC) max. /maxi. 3 A $\cos \varphi 0,6$
=(DC) min./mini. 20 mA
=(DC) max. /maxi. 1 A

Notice d'emploi et de montage

Pressostat différentiel pour air, fumée et gaz brûlés, Contrôleur de surpression pour gaz
LGW...A4, LGW...A4/2
Pressostat double
LGW...A4/LGW...A4

**Istruzioni di esercizio di montaggio**

Pressostato differenziale per aria, gas di combustione e di scarico, pressostati di sovrappressione per gas
LGW...A4, LGW...A4/2
Pressostato doppio
LGW...A4/LGW...A4

Umgebungstemperatur
Ambient temperature
Température ambiante
Temperatura ambiente
-15 °C ... +70 °C

Mediumtemperatur
Medium temperature
Température du fluide
Temperatura fluido
-15 °C ... +70 °C

Lagertemperatur
Storage temperature
Température de stockage
Temperatura stoccaggio
-30 °C ... +80 °C

Schutzart / Degree of protection
Protection / Protezione
LGW... A4
IP 54 nach / acc. / selon / a norme
IEC 529 (EN 60529)
LGW... A4/2
IP 65 nach / acc. / selon / a norme
IEC 529 (EN 60529)

Nennstrom/nominal current/courant nominal/corrente nominale
-(DC) 20 mA
Schaltstrom/current on contact/courant de commutation/corrente di intervento
=(DC) min./mini. 5 mA
=(DC) max./maxi. 20 mA

Einbaulage / Installation position / Position de montage / Posizione di montaggio

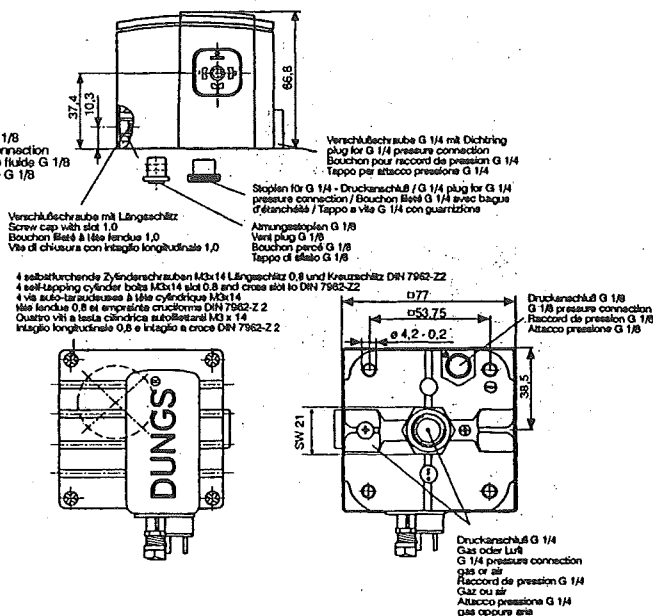
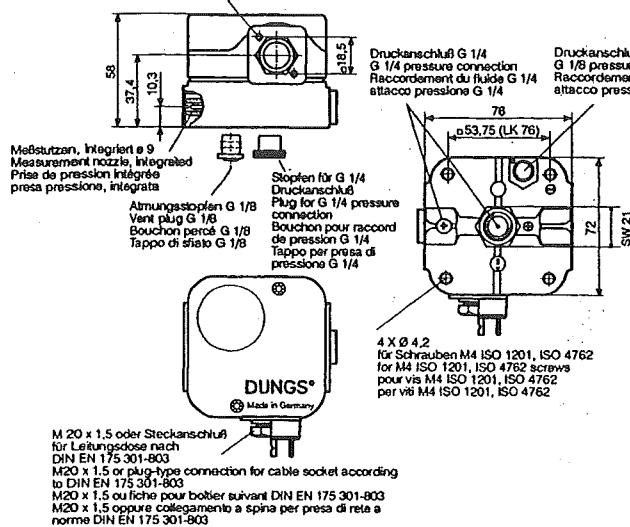
	Standardeinbaulage Standard installation position Position de montage standard Posizione standard
	Bei waagerechtem Einbau schaltet der Druckwächter bei einem um ca. 0,5 mbar höheren Druck. In the horizontal installation position the switching pressure is increased by approx. 0.5 mbar. Monté horizontalement, le pressostat commute à une pression d'environ 0,5 mbar plus élevée. Con montaggio orizzontale il pressostato scatta ad pressione superiore di circa 0,5 mbar.
	Bei Einbau waagerecht über Kopf schaltet der Druckwächter bei einem um ca. 0,5 mbar niedrigeren Druck. When the pressure switch is mounted horizontally overhead, its switching pressure decreases by approx. 0.5 mbar. Monté horizontalement à l'envers, le pressostat commute à une pression d'environ 0,5 mbar moins élevée. Con montaggio orizzontale capovollo il pressostato scatta ad una pressione inferiore di circa 0,5 mbar.
	Bei Einbau in einer Zwischeneinbaulage schaltet der Druckwächter bei einem vom eingestellten Sollwert maximal $\pm 0,5 \text{ mbar}$ abweichenden Druck. When the pressure switch is mounted in an intermediate position, its switching pressure deviates by max. $\pm 0.5 \text{ mbar}$ from the setpoint. Monté dans une position intermédiaire, le pressostat commute à une pression d'un maximum de $\pm 0,5 \text{ mbar}$ par rapport à la valeur de consigne réglée. Con il montaggio in una posizione intermedia il pressostato scatta ad una pressione diversa da quella nominale di max. $\pm 0,5 \text{ mbar}$.

Einbaumaße / Dimensions / Cotes d'encombrement / Dimensioni [mm]

LGW...A4

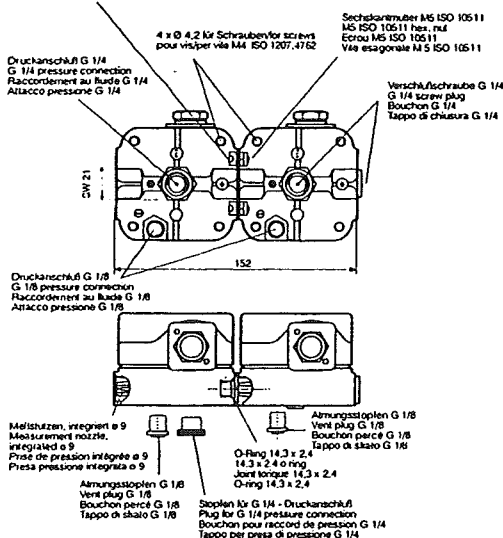
LGW...A4/2

Ø 2,5 x 9 tief für Gerätestecker DIN EN 175 301-803
2,5 x 9 dia. deep for DIN EN 175 301-803 equipment plug
Ø 2,5 x 9 de profond pour embase de connecteur DIN EN 175 301-803
foro per spina Ø 2,5 x 9 DIN EN 175 301-803



Einbaumaße / Dimensions Cotes d'encombrement / Dimensioni [mm] LGW...4 / LGW...A4

Innensechskantschraube M5 x 12, ähnlich ISO 4762
M5 x 12 socket head screw, similar to ISO 4762
Vis à six pans creux M5 x 12, similaire à ISO 4762
Vite esagonale interna M5 x 12, simile ISO 4762

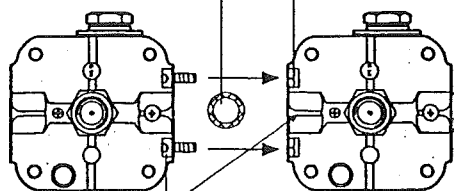


Montageset Doppeldruckwächter Double pressure switch: Side-By-Side Mounting Kit Kit de montage pour pressostat double Set di montaggio per il pressostato doppio LGW...A4 / LGW...A4

Bestell-Nr.
Order-No.
Réf. de commande
Nr. codice
213 910

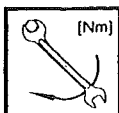
O-Ring Ø 14,3 x 2,4
O ring Ø 14,3 x 2,4
Joint torique Ø 14,3 x 2,4
O-Ring Ø 14,3 x 2,4

Sechskantmutter M5 ISO 10511
M5 hex. nut, ISO 10511
Ecrou M5 ISO 10511
Vite esagonale M5 ISO 10511



Innensechskantschraube M5 x 12, ähnlich ISO 4762
M5 x 12 hex. socket bolt (ISO 4762)
Vis six-pans creux M5 x 12, similaire à ISO 4762
Vite esagonale interna M5 x 12, simile ISO 4762

Vor Zusammenbau: Schraube aus Meßstutzen entfernen.
Before assembly: Remove the screw from the test nipple.
Avant assemblage: retirer la vis de la prise de mesure.
Prima dell'assemblaggio, togliere la vite dal raccordo per misurazione.



max. Drehmomente / Systemzubehör
max. torque / System accessories
max. couple / Accessoires du système
max. coppie / Accessorio di sistema

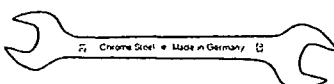
M 4 G 1/4
2,5 Nm 7 Nm

Drehmoment Haubenschraube
max. torque cap-head screw
Couple max. pour les vis du couvercle
Coppia max. per vite a cappuccio

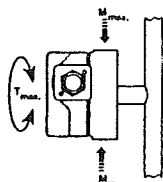
1,2 Nm



Geeignetes Werkzeug einsetzen!
Please use proper tools!
Utiliser des outils adaptés!
Impiegare gli attrezzi adeguati!



Gerät darf nicht als Hebel benutzt werden
Do not use unit as lever.
Ne pas utiliser le pressostat comme un levier.
L'apparecchio non deve essere usato come leva.



DN Rp	6 1/8	8 1/4	
M _{max.}	25	35	[Nm] t ≤ 10 s
T _{max.}	15	20	[Nm] t ≤ 10 s

Einbau
LGW...A4, LGW...A4/2

1. Der Druckwächter wird direkt auf einen Rohrstutzen mit R 1/4 Außengewinde aufgeschraubt. Bild 1.
2. Nach Einbau Dichtheits- und Funktionskontrolle durchführen.

⚠ **Auf vibrationsfreien Einbau achten! Bild 2.**

Installation of
LGW...A4, LGW...A4/2

1. Screw the pressure switch directly on a tube socket with R 1/4 outer thread (see Fig. 1).
2. After installation, perform a leakage and function test.

⚠ **Ensure that the pressure switch is installed free of vibration! (see Fig. 2).**

Montage
LGW...A4, LGW...A4/2

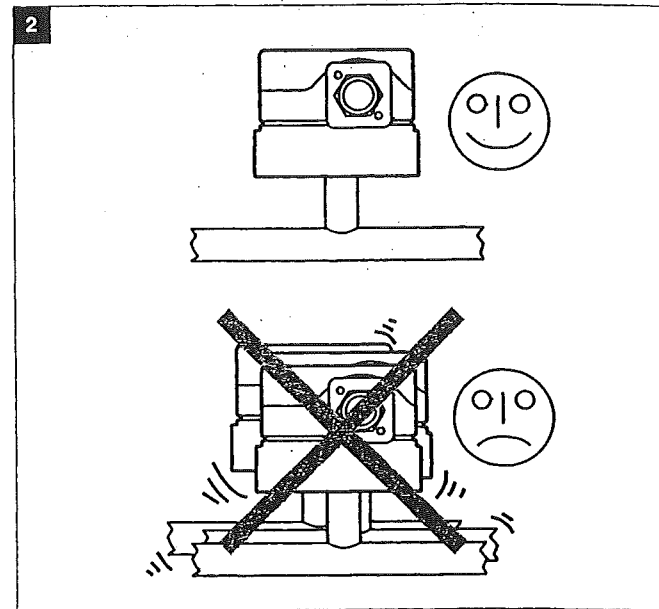
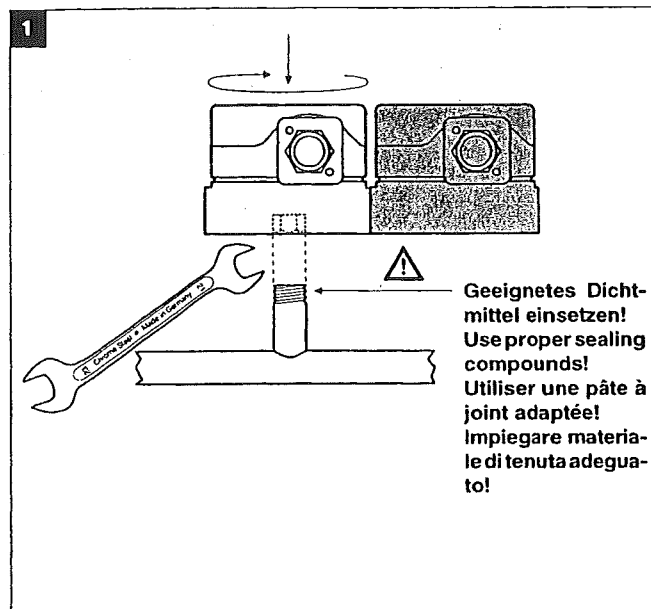
1. Le pressostat peut se visser directement sur un piquage R 1/4" Fig. 1.
2. Après le montage contrôler la jonction et l'étanchéité.

⚠ **Veiller à ce que l'appareil ne subisse pas de vibrations! Fig. 2.**

Montaggio
LGW...A4, LGW...A4/2

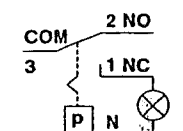
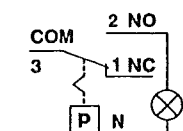
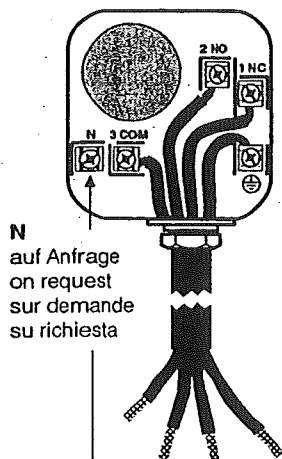
1. Il pressostato viene avvitato direttamente su un tubo di sostegno con filetto esterno R 1/4 (Fig. 1)
2. Dopo il montaggio effettuare i controlli di tenuta e funzionalità.

⚠ **Evitare possibilità di vibrazioni! Fig. 2.**

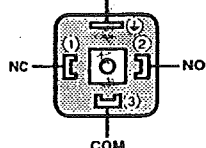


Elektrischer Anschluß
Electrical connection
Raccordement électrique
Allacciamento elettrico
IEC 730-1 (VDE 0631 T1)

M20 x 1,5



DIN EN 175 301-803



⚠ Erdung nach örtlichen Vorschriften.

Grounding acc. local regulations.

Mise à la terre selon normes locales.

Messa a terra secondo prescrizioni locali.

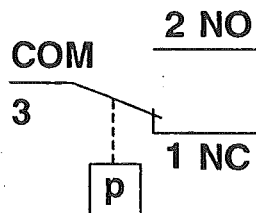
Zur Erhöhung der Schaltleistung wird bei DC-Anwendungen < 20 mA und 24 V der Einsatz eines RC-Gliedes empfohlen.

To increase the switching capacity, we recommend that you use a RC device for current values < 20 mA and 24 V d.c. applications.

Pour augmenter la puissance de rupture, l'utilisation d'un circuit RC est préconisée pour les applications à courant continu < 20 mA et 24 V.

Per aumentare la potenza d'inservimento con applicazioni DC < 20 mA e 24 V, consigliamo l'impiego di un elemento RC.

Schaltfunktion
Switching function
Schéma de fonctionnement
Funzione di commutazione
pressostato
LGW...A4, LGW...A4/2



Bei steigendem Druck:
 1 NC öffnet, 2 NO schließt.
 Bei fallendem Druck:
 1 NC schließt, 2 NO öffnet.

While pressure is increasing:
 1 NC opens, 2 NO closes.
 While pressure is decreasing:
 1 NC closes, 2 NO opens.

Pression montante:
 1 NC ouvre, 2 NO ferme.
 Pression descendante:
 1 NC ferme, 2 NO ouvre

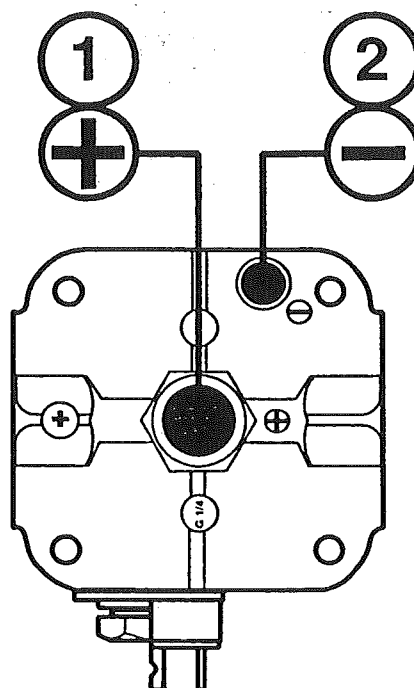
Con pressione in salita:
 1 NC apre, 2 NO chiude.
 Con pressione in discesa:
 1 NC chiude, 2 NO apre

Druckanschluß
Pressure port
Prise de pression
Attacco pressione

- | | |
|---|---|
| 1 Druckanschluß G 1/4 (+) für Gas und Luft | 2 Druckanschluß G 1/8 (-) nur für Luft |
| 1 Pressure port Rp 1/4 (+) for gas and air | 2 Pressure port Rp 1/8 (-) only for air |
| 1 Prise de pression G 1/4 (+) pour gaz et air | 2 Prise de pression G 1/8 (-) uniquement pour l'air |
| 1 Attacco pressione G 1/4 (+) per gas ed aria | 2 Attacco pressione G 1/8 (-) solo per l'aria |

Famiglia	1 + 2 + 3
Family	1 + 2 + 3
Famille	1 + 2 + 3
Famiglia	1 + 2 + 3

Luft, Rauch- und Abgase
Air, flue and exhaust gases
Air, fumée et gaz brûlés
Aria, gas di combustione e di scarico



Einstellung des Druckwächters

Haube mit geeignetem Werkzeug demontieren, Schraubendreher No. 3 bzw. PZ 2, Bild 1. Haube abnehmen.

⚠ Berührungsschutz ist nicht grundsätzlich gewährt, Kontakt mit spannungsführenden Teilen möglich.

Einstellung LGW ... A4

Druckwächter am Einstellrad mit Skala **■** auf vorgeschriebenen Drucksollwert einstellen, Bild 2.

Anleitung des Brennerherstellers beachten!

Druckwächter schaltet bei steigendem Druck: Einstellung auf die linke Begrenzungslinie **↑■**.

Druckwächter schaltet bei fallendem Druck: Einstellung auf die rechte Begrenzungslinie **■↓**.

Haube wieder aufsetzen!

Setting the pressure switch

Dismount the hood using a suitable tool, e.g. screwdriver no. 3 or PZ1, Fig. 1. Remove hood.

⚠ There is no protection against accidental contact. Contact with live parts is possible.

Setting LGW ... A4

Set the pressure switch at the setting wheel **■** to the specified pressure setpoint using the scale, Fig. 2.

Follow the instructions of the burner manufacturer!

Pressure switch switches as pressure increases: Set to left limit line **↑■**. Pressure switch switches as pressure reduces: Set to right limit line **■↓**.

Remount hood!

Réglage des pressostats

Enlever les vis du capot en utilisant un tournevis N°3. ou PZ 2, Fig 1. Enlever le capot.

⚠ La protection n'est pas garantie, contact avec des pièces sous tension possible.

Réglage de LGW ... A4

Régler le pressostat avec son bouton gradué **■** à la valeur désirée Fig. 2.

Respecter les recommandations du constructeur du brûleur!

Le pressostat commute par pression montante: régler sur la ligne de limitation gauche **↑■**. Le pressostat commute par pression descendante: régler sur la ligne de limitation droite **■↓**. Remonter le capot!

Regolazione del pressostato

Smontare la calotta con un attrezzo adeguato, ossia cacciavite nr. 3 - rispettiv, PZ 2, figura 1. Togliere la calotta.

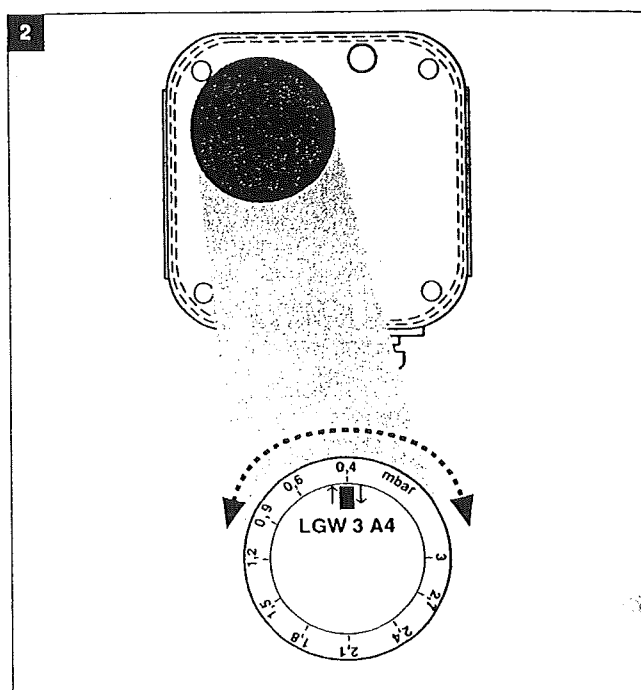
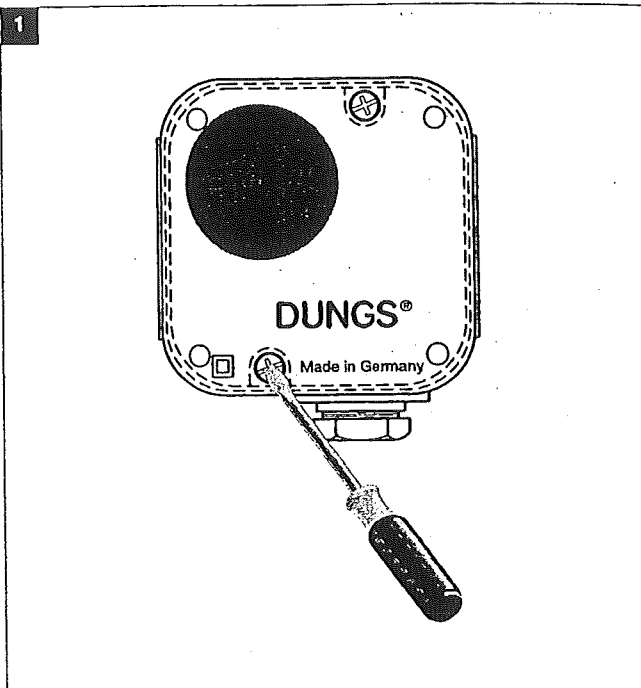
⚠ Non è sostanzialmente garantita la protezione da scariche, è possibile il contatto con conduttori di tensione.

Regolazione LGW ... A4

Tarare il pressostato, come in figura 2, sul valore di pressione nominale prescritto, agendo sulla rotella della scala graduata **■**.

Prestare attenzione alle prescrizioni del produttore del bruciatore!

Il pressostato scatta con pressione in salita: regolazione sulla linea di delimitazione sinistra **↑■**. Il pressostato scatta con pressione in discesa: regolazione sulla linea di delimitazione destra **■↓**. Rimontare la calotta!



Ersatzteile / Zubehör Spare parts / Accessories Pièces de rechange / access. Parti di ricambio / Accessori	Bestell-Nummer Ordering No. No. de commande Codice articolo
Verschlußschraube G 1/4 mit Dichtring Screw plug Rp 1/4 with sealing ring Bouchon G 1/4 avec joint Tappo a vite G 1/4 con anello di tenuta	230 396
Befestigungswinkel, Metall Metal mounting bracket Equerre de fixation, métal Cantonale di fissaggio in metallo	230 288
Set: Gerätestecker G3, 3-pol + E Kit: G3 equipment plug, 3-pin + E Kit: Fiche G3, 3 pôles + terre Set composto da: Spina G3 a 3 poli + terra nur/only/pour/sole LGW...A4	219 659
Winkel-Einschraubstutzen G 1/4 nur für Luft G 1/4 screw-in glands only for air Manchon coudé G 1/4 pour air uniquement Tronchetto avvitabile angolare G 1/4 solo per aria	230 279
Winkel-Einschraubstutzen G 1/8 nur für Luft G 1/8 screw-in glands only for air Manchon coudé G 1/8 pour air uniquement Tronchetto avvitabile angolare G 1/8 solo per aria	230 278

Ersatzteile / Zubehör Spare parts / Accessories Pièces de rechange / access. Parti di ricambio / Accessori	Bestell-Nummer Ordering No. No. de commande Codice articolo
Glimmlampen Montage-Set 230 V Glowlamp mounting kit 230 V Lampes fluorescentes kit de montage 230 V Set di montaggio lampadine a bagliore 230 V	231 773
Glimmlampen Montage-Set 120 V Glowlamp mounting kit 120 V Lampes fluorescentes kit de montage 120 V Set di montaggio lampadine a bagliore 120 V	231 772
Signallampe Montage-Set 12 V Pilot lamp mounting kit 12 V Lampotémoin kit de montage 12 V Set di montaggio spia di segna- lazione 12 V	231 774
Montage-Set Doppeldruck- wächter Double pressure switch: Side- By-Side Mounting Kit Kit de montage pour pressostat double Set di montaggio per il presso- stato doppio	213 910
Meßstutzen G 1/4 mit Dichtring G 1/4 test nipple and seal ring Prise de mesure G 1/4 avec ba- gue d'étanchéité Attacco pressione G 1/4 con anello di tenuta	230 398
Leitungsdose 3 pol. + E grau, GDMW Power socket, 3-pole + E grey, GDMW Connecteur gris 3 pôles + terre Presa di corrente a 3 poli + terra, grigia, GDMW	210 318

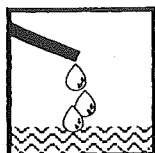


Arbeiten am Druckwächter dürfen nur von Fachpersonal durchgeführt werden.

Work on the pressure switch may only be performed by specialist staff.

Seul du personnel spécialisé peut effectuer des travaux sur le pressostat.

Qualsiasi operazione effettuata sul pressostato deve essere fatta da parte di personale competente.

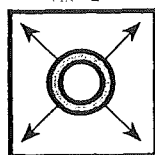


Kondensat darf nicht in das Gerät gelangen. Bei Minustemperaturen, durch Vereisung Fehlfunktion/Ausfall möglich.

Do not allow condensate to flow into the equipment. In case of sub-zero temperatures, malfunction or equipment failure may be possible due to icing.

Eviter l'entrée de condensat dans le pressostat, une prise en glace par température négative nuirait à son fonctionnement.

Nell'apparecchio non deve infiltrarsi alcuna condensa. Alle temperature negative sarebbero possibili disfunzioni dovute a formazione di ghiaccio.



Rohrleitungsdichtheitsprüfung: Kugelhahn vor dem Druckwächterschließen.

Pipeline leakage test: close ball valve upstream of the pressure switch.

Contrôle de l'étanchéité de la conduite: fermer le robinet à boisseau sphérique avant le pressostat.

Per la prova di tenuta delle tubature: chiudere il rubinetto a sfera davanti al pressostato.

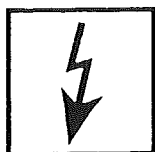


Nach Abschluß von Arbeiten am Druckwächter: Dichtheitskontrolle und Funktionskontrolle durchführen.

On completion of work on the pressure switch, perform a leakage and function test.

Une fois les travaux sur le pressostat terminés, procéder toujours à un contrôle d'étanchéité et de fonctionnement.

Al termine dei lavori effettuati su un pressostato: predisporre un controllo sia della tenuta che del funzionamento.



Niemals Arbeiten durchführen, wenn Gasdruck oder Spannung anliegt. Offenes Feuer vermeiden. Örtliche Vorschriften beachten.

Never perform work if gas pressure or power is applied. No naked flame. Observe local regulations.

Ne jamais effectuer des travaux sous pression ou sous tension. Eviter toute flamme ouverte. Observer les réglementations.

In nessun caso si debbono effettuare lavori in presenza di pressione gas o di tensione elettrica. Evitare i fuochi aperti e osservare le prescrizioni di sicurezza locali.



Bei Nichtbeachtung der Hinweise sind Personen- oder Sachfolgeschäden denkbar.

If these instructions are not heeded, the result may be personal injury or damage to property.

En cas de non-respect de ces instructions, des dommages corporels ou matériels sont possibles.

La non osservanza di quanto suddetto può implicare danni a persone o cose.

Kugelhähne aus Messing

brass ball valves

Baureihe
84

mit vollem Durchgang
full port design

R $\frac{1}{4}$ - R2

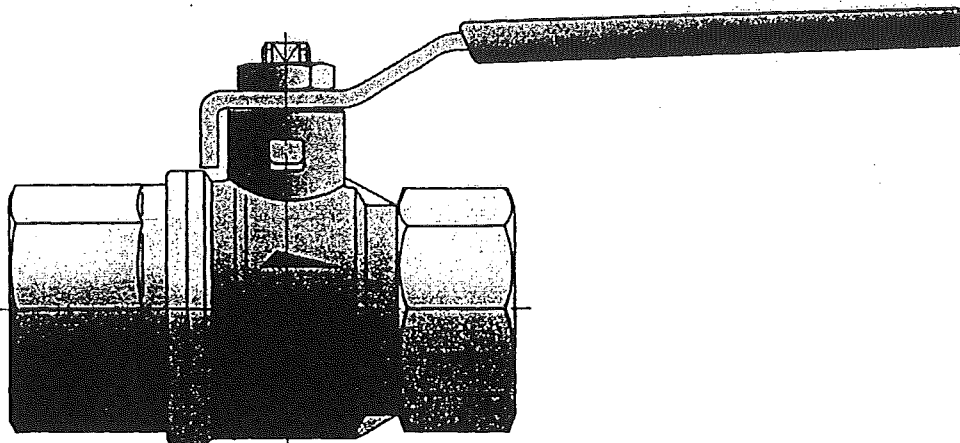


Gas-Zulassung nach DIN 3537
Certification-gas acc. to DIN 3537

DIN-DVGW 91.01 e 384 "G"
CE - 0085 AQ 1104

(nur Typ 84 und 84.2)
(only type 84 and 84.2)

Trinkwasser-Zulassung nach DIN 3546-1 (alle Typen, both connections)
Certification-drinking water acc. to DIN 3546-1 DIN DVGW NW-6102 AT 2638



Konstruktions-Merkmale

- voller Durchgang
- Innen / Außengewinde
- Innengewinde nach DIN 2999
- Außengewinde nach ISO 7/1
- Baulänge nach DIN 3202-M3
- silikonfrei
- ausblassichere Schaltspindel mit doppelter O-Ring Abdichtung
- Flügelgriff bis 1" (DN 25)
Hebelgriff für alle Nennweiten

Material:

Gehäuse: MS 58 vernickelt
Kugel: MS 58 verchromt
Kugeldichtung: PTFE
Schaltwellen-
dichtung: 2 Viton O-Ringe
Griff: Stahl verzinkt mit
gelber Kunststoff-
ummantelung

Temperaturbereich:

-20° bis +170°C
(abhängig vom Betriebsdruck)

Verwendung:

*Gas, Wasser, Öl, Trinkwasser, Druckluft,
Kraftstoffe, Heizöl

* bei Gas sind die Hähne nur bis PN 1 zugelassen

Design features

- full port design
- female thread / male thread
- female thread acc. to DIN 2999
- male threads acc. to ISO 7/1
- length of complete valve acc. to DIN 3202-M3
- free of silicone
- blow out proof stem design with double O-ring sealing
- t-handle up to size 1" (DN 25)
standard handle for all types

material:

body: brass nickel plated
ball: brass chrom plated
ball seal: PTFE
stem seal: 2 Viton O-rings
handle: steel zinc coated with
yellow plastic cover

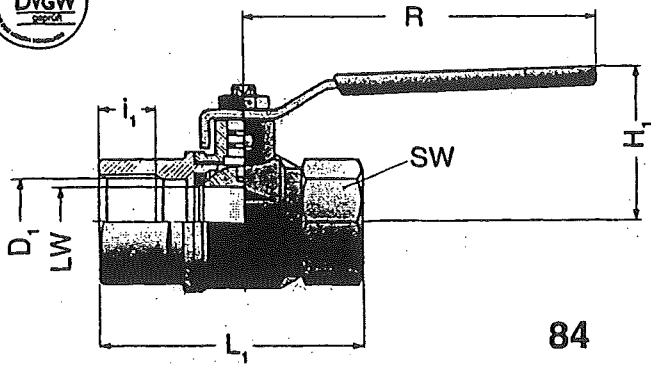
working temperature:

-20° to +170°C
(depending from working pressure)

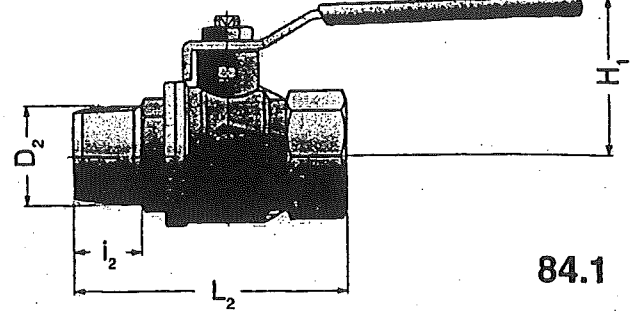
suitable for:

*gas, oils, water, drinking water, compressed air
fuels

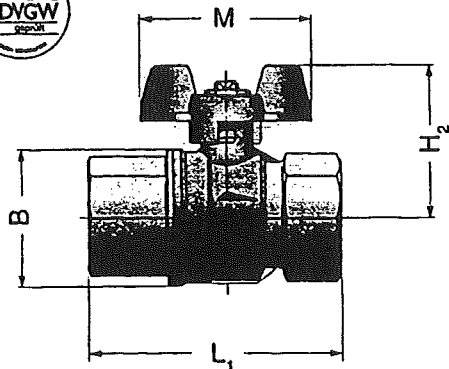
* for gas only PN 1



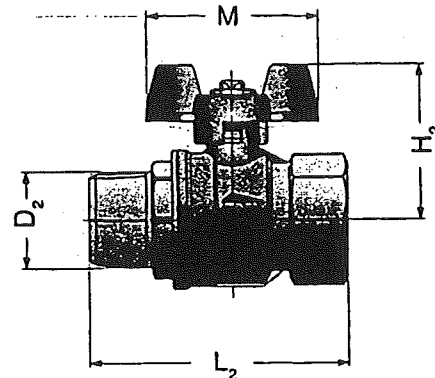
84



84.1



84.2



84.3

Bestellbeispiel

Kugelhahn beiderseits
Innengewinde
mit Flügelgriff 1/2

84.2 - 1/2

ordering example

ball valve
female / female thread
with t-handle 1/2

84.2 - 1/2

i1 = nutzbare Gewindetiefe, i1 = length of thread

Maße in mm, dimensions in mm

DN	LW	*PN bar	D ₁ DIN 2999	D ₂ ISO 7/1	L ₁ ±2	L ₂ ±2	i ₁	i ₂	B	H ₁	H ₂	R	M	SW	Gewicht weight -kg
6	8	40	Rp 1/4	R 1/4	50	56,5	12	13,5	25	38	38	82	50	20	
10	9,5	40	Rp 3/8	R 3/8	60	56,5	12	13,5	25	38	38	82	50	20	0,147
15	15	40	Rp 1/2	R 1/2	75	70	15,5	16,5	32	43	43	100	50	25	0,250
20	19	40	Rp 3/4	R 3/4	80	76	17	18	39	50	50	120	60	32	0,380
25	24	40	Rp 1	R 1	90	92,5	21	22	49	54	54	120	60	41	0,570
32	30	40	Rp 1 1/4	R 1 1/4	110	106	23	24	59	73	73	160	-	50	0,960
40	38	40	Rp 1 1/2	R 1 1/2	120	113	23	24	72	79	79	160	-	55	1,180
50	48	40	Rp 2	R 2	140	133	26,5	27,5	86	86	86	160	-	70	1,900

Flanschkugelhähne aus Sphäroguß

Flange-ball valves in spheroidal graphite cast iron

Baureihe
KSN 75

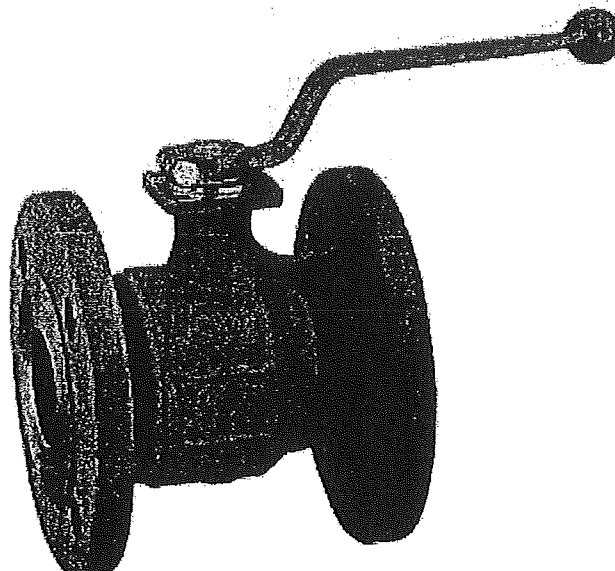
voller Durchgang DN 25 - DN 150
full port design DN 25 - DN 150

PN 16



Gas-Zulassung, gas-registration nach DIN 3547 T1
GGRL (90/396/EWG) + PED (97/23/EG)

DIN DVGW NG-4313AT0309
CE-0085AT0437



Konstruktions-Merkmale

Bauart:

- zweiteiliges Gehäuse, verschraubt
- voller Durchgang
- Fire - Safe - Design
- schwimmende Kugel

Aufbauten:

- Montageflansch nach DIN ISO 5211 bzw. DIN 3337
- lieferbar mit elektrischem oder pneumatischem Drehantrieb
- Direktaufbau möglich

Baulänge:

EN 558-1 Reihe 27 (DIN 3202 - F4)

Kugeldichtung:

- 3 - seitige Kammerung

Schaltwelle:

- ausblassicher

Dichtflächen:

EN 1092-2 (DIN 2526 Form C)
andere Ausführungen auf Anfrage

Flanschanschlußmaße:

EN 1092-2 PN 16 (DIN 2501, PN 16)

Verwendung:

Gas: Brenngase der 1., 2. und 3. Gasfamilie

Druckgeräterichtlinie:

PED (97/23/EG) max. Kat. 4

Hinweis:

Kugelhahn DN 150 kann nur bei geöffneter Kugel ein- bzw. ausgebaut werden

Design features

design:

- 2-piece ball valve, "screwed design"
- full port design
- fire - safe - design
- floating ball

mounting:

- mounting flange acc. to DIN ISO 5211 resp. DIN 3337
- available with electric or pneumatic actuators
- direct mounting possibility

length face to face:

EN 558-1 line 27 (DIN 3202 - F4)

ball seal:

- triple side encapsulated

stem :

- blow out proof stem design

faces:

acc. to EN 1092-2 (DIN 2526 type C)
other types on request

flange dimensions:

acc. to EN 1092-2 PN 16 (DIN 2501, PN 16)

suitable for:

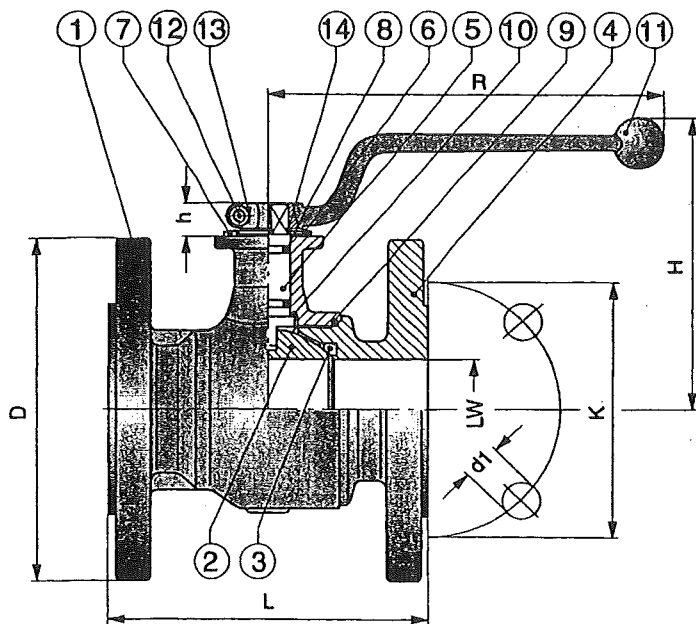
gas: 1., 2. and 3. gas category

pressure equipment directive:

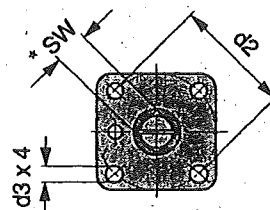
PED (97/23/EC) max. cat. 4

remark:

ball valve DN 150 can only be installed or removed with ball in open position



* SW bei DN 150 Zweiflach
* SW DN 150 2-flat stem



Montageflansch
mounting flange

Kugel Bauart
A Messing hartverchromt
B GG 25 (0.6025)
F Edelstahl (1.4408)

Temperaturbereich
-10°C bis +70°C

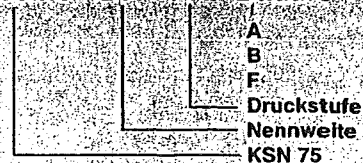
ball type
A brass hard-chrome plated
B GG 25 (0.6025)
F stainless steel (1.4408)

working temperature
-10°C to +70°C

Nr./no	Bezeichnung	description	Werkstoff	material	Mat.-Bezeichnung
1	Gehäuse	body	Sphäroguß	nodular cast iron	GGG 40 (0.7040)
2	Kugel	ball	Messing	brass	Cu Zn 39 Pb 3
3	Kugeldichtung	ball seal	Teflon	Teflon	PTFE (alt. 25% GF)
4	Flansch	flange	Sphäroguß	nodular cast iron	GGG 40 (0.7040)
5	Schaltwelle	stem	Edelstahl	stainless steel	1.4104
6	Anschlagscheibe	stop washer	St. verz.	St. zinc plated	-
7	Kerbstift	stop pin	St. verz.	St. zinc plated	-
8	O-Ring	O-Ring seal	Viton	Viton	FPM
9	O-Ring	O-Ring seal	Perbunan	Perbunan	NBR
10	Anlaufring	bearing ring	Polyamid	Polyamid	-
11	Griff	handle	Alu (rot)	Alu red anod.	-
12	Zylinderschraube	bolt	St. verz.	St. zinc plated	-
13	Skt.-Mutter	nut	St. verz.	St. zinc plated	-
14	Sprengring	snap ring	Edelstahl	stainless steel	1.4305

Bestellangaben

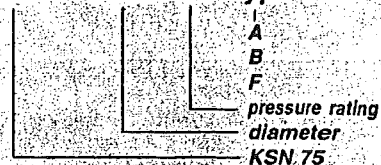
Baureihe - DN - PN - Bauart



Bestellbeispiel:
KSN 75 - 50 - 16 - B

ordering dates

serie - DN - PN - type

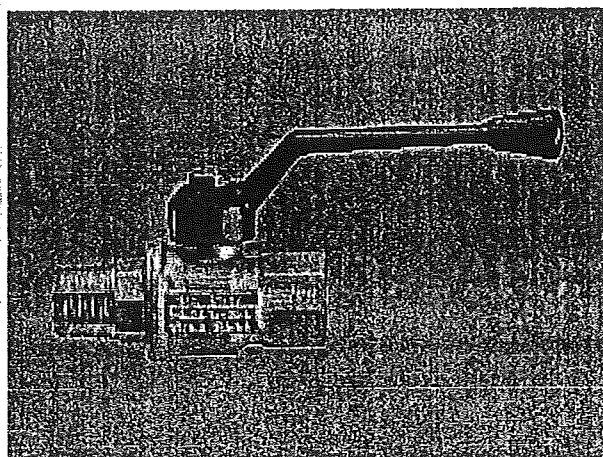


ordering example:
KSN 75 - 50 - 16 - B

z = Anzahl der Flanschlöcher, number of flange holes

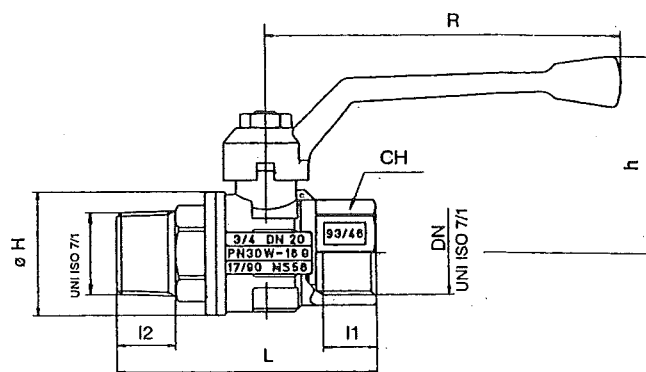
Maße in mm, dimensions in mm

DN	LW	L	D	K	h	z	d1	H	R	Montageflansch mounting flange DIN ISO 5211	SW	d2	d3	Gewicht - weight ~ kg	
														A	B, F
25	25	125	115	85	14,5	4	14	114,0	165	F 05	11	50	7	3,300	3,300
32	32	130	140	100	14,5	4	18	125,0	165	F 05	11	50	7	4,900	4,900
40	40	140	150	110	16,5	4	18	135,5	185	F 05	14	50	7	5,900	6,100
50	50	150	165	125	16,5	4	18	142,5	185	F 05	14	50	7	7,200	7,600
65	65	170	185	145	18,0	4	18	158,0	230	F 07	17	70	9	11,200	12,000
80	80	180	200	160	22,5	8	18	185,5	360	F 07	22	70	9	13,600	15,400
100	100	190	220	180	22,5	8	18	202,5	360	F 10	22	102	11	18,800	22,400
125	125	200	250	210	25,0	8	18	223,0	360	F 10	22	102	11	24,200	-
150	142	210	285	240	39,5	8	22	230,0	625	F 10	27	102	11	32,200	-

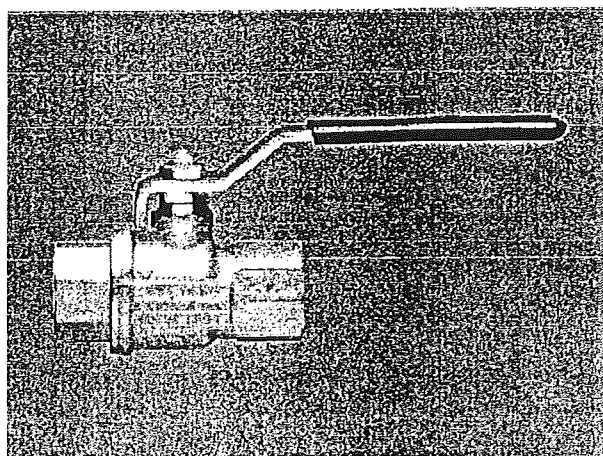


Art. **1701**

EN 331: 1998

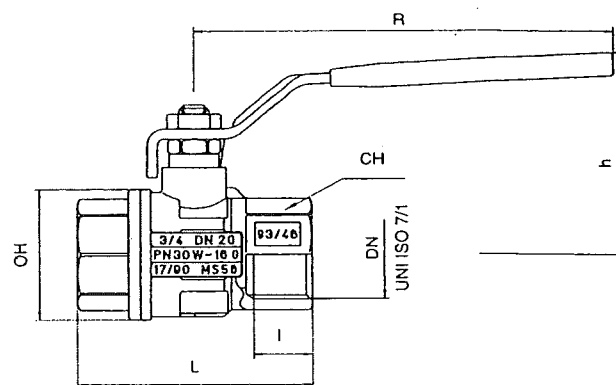


DN	I1	I2	L	H	CH	R	h	Kv	PN	Kg	
1/4	8	11	12,5	58,5	23	20	95	48	5,4	64	0,14
3/8	10	11,4	13	59,5	23	20	95	48	6	64	0,14
1/2	15	15	17	72,5	32	25	95	51	16,3	30	0,23
3/4	20	16,3	18,5	81,5	39	31	110	60	29,5	30	0,36
1	25	19,1	21,5	94,5	49	38	110	64	43	30	0,57
1 1/4	32	21,4	24	111	59	48	160	78	89	25	0,94
1 1/2	40	21,4	24	119	73	54	160	86	230	25	1,50
2	50	25,7	28	140	86	67	170	104	265	25	2,07
2 1/2	65	30,2	30,2	175	111	90	205	127,5	540	16	4,14
3	80	33,3	33,3	203,5	136	105	205	138,5	873	16	6,35
4	100	39,3	39,3	250	166	130	260	161	1390	16	11,2



Art. **1710**

EN 331: 1998



DN	I	L	H	CH	R	h	Kv	PN	Kg	
1/4	8	11	51,5	23	20	98	44,5	5,4	64	0,15
3/8	10	11,4	51,5	23	20	98	44,5	6	64	0,13
1/2	15	15	62	32	25	98	48	16,3	30	0,22
3/4	20	16,3	69	39	31	122	58	29,5	30	0,36
1	25	19,1	83	49	38	122	62	43	30	0,55
1 1/4	32	21,4	96	59	48	153	78	89	25	1,00
1 1/2	40	21,4	108	73	54	153	85	230	25	1,50
2	50	25,7	126	86	67	162	96,5	265	25	2,02
2 1/2	65	30,2	152	111	90	205	120	540	16	3,66
3	80	33,3	177	136	105	205	131,5	873	16	5,90
4	100	39,3	214	166	130	260	165	1390	16	10

CARATTERISTICHE GENERALI	
ARTICOLO	1700
ATTACCO	FEMMINA-FEMMINA UNI ISO 7/1
DIAMETRO NOMINALE	Da mm 8 a mm 100
MANOVRA	Rotazione di 90° dell'organo di comando
ORGANO DI COMANDO	Leva alluminio UNI 5076 verniciato con polvere epossidica nera

SPECIFICATIONS	
ITEM	1700
THREAD ENDS	FEMALE-FEMALE UNI ISO 7/1
ORIFICE	From mm 8 to mm 100
MANOEUVRE	90° rotation of the lever
LEVER	Aluminium handle UNI 5076 painted with black epoxy powder

CARACTÉRISTIQUES GÉNÉRALES	
ARTICLE	1700
RACCORDEMENT	FEMELLE-FEMELLE UNI ISO 7/1
DIAMÈTRE NOMINAL	De mm 8 à mm 100
MANOEUVRE	Rotation de 90° de la poignée
ORGANE DE COMMANDE	Poignée aluminium UNI 5076 émaillée avec poudre époxy noire

BESCHREIBUNG	
ARTIKEL	1700
ANSCHLUSS	IG-IG NACH UNI ISO 7/1
NENNWEITE	Von mm 8 bis mm 100
BETÄTIGUNG	90° Umdrehung des Absperrorgans
ABSPERRORGAN	Aluminiumhebel UNI 5076 Epoxid-beschichtet schwarz

CARACTERISTICAS GENERALES	
ARTICULO	1700
CONEXIÓN	HEMBRA-HEMBRA UNI ISO 7/1
DIÁMETRO NOMINAL	Desde mm 8 hasta mm 100
ACCIONAMIENTO	Rotación de 90° del órgano de accionamiento
ÓRGANO DE ACCIONAMIENTO	Palanca en aluminio UNI 5076 barnizado con polvo epoxídico negro

CONDIZIONE DI ESERCIZIO	
Montaggio nel sistema di condotta fissa	
Ulteriori informazioni nel catalogo Specifiche Tecniche	
Pressione nominale (PN) in bar	
Per temperature > 80°C vedere diagramma nel catalogo Specifiche Tecniche	
KV: Coefficiente di efflusso espresso in m³/h alla pressione differenziata di 100 kPa	
Vuoto: Max 10³ torr.	
Limiti di temperatura: -20°C +160°C	
Direzione flusso: nei due sensi	
Si consiglia l'utilizzo delle valvole in posizione APERTA o CHIUSA evitando le soluzioni intermedie, e di manovrare almeno due volte l'anno.	

APPLICATION	
Assembly in rigid pipe system	
Other specifications in the "Technical Specifications" catalogue	
Nominal pressure (PN) in bar	
For temperature > 80°C see diagram in the "Technical Specifications" catalogue	
KV: flow coefficient in m³/h at differential pressure of 100 kPa	
Vacuum: Maximum 10³ torr.	
Temperature range: -20°C +160°C	
Direction of flow: both directions	
We recommend the valve use in fully open or closed, not in mid position, and to manoeuvre the valve at least twice a year.	

CONDITION D'UTILISATION	
Montage dans le système de conduite fixe	
Autres informations dans le catalogue "Spécifications Techniques"	
Pression nominale (PN) en bar	
Pour les températures > à 80°C voir le diagramme dans le catalogue "Spécifications Techniques"	
KV: Coefficient de perte en m³/h à la pression différentielle de 100 kPa	
Tenue au vide: Maximum 10³ torr.	
Limites de température: -20°C +160°C	
Direction du fluide: Dans les deux directions	
Les vannes à boisseau sphérique sont conçues pour être utilisées en position ouverte ou fermée. Nous déconseillons l'utilisation dans des positions intermédiaires, la manœuvre de la vanne est conseillée au moins deux fois pendant l'année.	

BETRIEBSBEDINGUNGEN	
Einbau in starres Rohrleitungssystem	
Weitere Informationen in den Technischen Angaben	
Nenndruck (PN) in bar	
Für Temperaturen über 80°C siehe Diagramm in den Technischen Angaben	
KV: Ausflußkoeffizient m³/h bei einem Differenzdruck von 100 kPa	
Vakuum: Max 10³ torr.	
Temperaturbereich: -20°C +160°C	
Durchflussrichtung: beliebig	
Es wird empfohlen die Kugelhähne in komplet geschlossener oder geöffneter Position zu montieren. Zwischenstellungen sind zu vermeiden. Die Kugelhähne sind mindestens zwei mal im Jahr zu betätigen.	

CONDICIONES DE INSTALACIÓN	
Montaje en el sistema de tubería fija	
Para más informaciones consultar el catalogo "Technical Specifications"	
Presión nominal (PN) en bar	
Para temperaturas > 80°C ver el diagrama en el catalogo "Technical Specifications"	
KV: Coeficiente de caudal indicado en m³/h a la presión diferencial de 100 kPa	
Vacío: máximo 10³ torr.	
Limites de temperaturas: -20°C +160°C	
Dirección del flujo: en ambos sentidos	
Se aconseja la utilización en posición abierta o cerrada, evitando posiciones intermedias, y de maniobrar la válvula cuanto menos dos veces por año.	

DISPONIBILE ANCHE NELLE OPZIONI

1701	M/F leva alluminio verniciata nera
1710	F/F leva acciaio zincato rivestita in PVC nero
1715	Attacco a saldare con leva acciaio zincato rivestita PVC blu
1720	F/F farfalla alluminio verniciata nera
1721	M/F farfalla alluminio verniciata nera
1780	F/F cappuccio piombabile
1781	M/F cappuccio piombabile
5869	F/F ISO 7/1-Rc leva acciaio zincato rivestita in PVC rosso
5980	F/F leva acciaio zincato rivestita in PVC giallo
Prolunga di manovra (art.5808)	
Locking handle (art.6100)	
Memory stop (art.6110)	
Oval handle (art.6120)	

OPTIONS AVAILABLE

1701	M/F black enamelled aluminium handle
1710	F/F zinc steel black PVC coated handle
1715	copper to copper connection with zinc steel blue PVC coated handle
1720	F/F black enamelled aluminium T-handle
1721	M/F black enamelled aluminium T-handle
1780	F/F with locking cap
1781	M/F with locking cap
5869	F/F ISO 7/1-Rc zinc steel red PVC coated handle
5980	F/F zinc steel yellow PVC coated handle
Manoeuvre extension (art.5808)	
Locking handle (art.6100)	
Memory stop (art.6110)	
Oval handle (art.6120)	

DISPONIBILE AUSSI DANS LES OPTIONS

1701	M/F poignée aluminium émaillée noire
1710	F/F poignée en acier zingué revêtu de PVC noir
1715	raccord pour tube cuivre avec poignée en acier zingué revêtu de PVC noir
1720	F/F poignée à papillon aluminium émaillé noir
1721	M/F poignée à papillon aluminium émaillé noir
1780	F/F capuchon plombable
1781	M/F capuchon plombable
5869	F/F ISO 7/1-Rc poignée en acier zingué revêtu de PVC rouge
5980	F/F poignée en acier zingué revêtu de PVC jaune
Allonge de manoeuvre (art.5808)	
Dispositif de blocage (art.6100)	
Memory stop (art.6110)	
Poignée ovale (art.6120)	

VERFÜGBARE OPTIONEN

1701	AG/IG mit schwarz lackiertem Aluminiumhebel.
1710	IG/IG Verzinkter Stahlhebel mit schwarzer PVC Ummantelung
1715	Lötanschluss mit verzinktem Stahlhebel und blauer PVC Ummantelung
1720	IG/IG Schwarz lackierter Aluminiumgriff
1721	AG/IG mit schwarz lackiertem Aluminiumgriff
1780	IG/IG mit Blockierungskappe
1781	AG/IG mit Blockierungskappe
5869	IG/IG ISO 7/1-Rc Verzinkter Stahlhebel mit schwarzer PVC Ummantelung
5980	IG/IG Verzinkter Stahlhebel mit schwarzer PVC Ummantelung
Spindelverlängerung (art.5808)	
Blockiervorrichtung (art.6100)	
Stellungsregler (art.6110)	
Ovale Absperrorgan (art.6120)	

DISPONIBILE TAMBIEN EN LAS OPCIONES

1701	M/H palanca aluminio barnizada negra
1710	H/H palanca acero zincado revestida en PVC negro
1715	unión tubo cobre con palanca acero zincado revestida en PVC azul
1720	H/H mariposa aluminio barnizada negra
1721	M/H mariposa aluminio barnizada negra
1780	H/H capuchón emplomable
1781	M/H capuchón emplomable
5869	H/H ISO 7/1-Rc palanca acero zincado revestida en PVC rojo
5980	H/H palanca acero zincado revestida en PVC amarillo
Prolongación de maniobra (art.5808)	
Bloqueo palanca (art.6100)	
Memory stop (art.6110)	
Palanca oval (art.6120)	

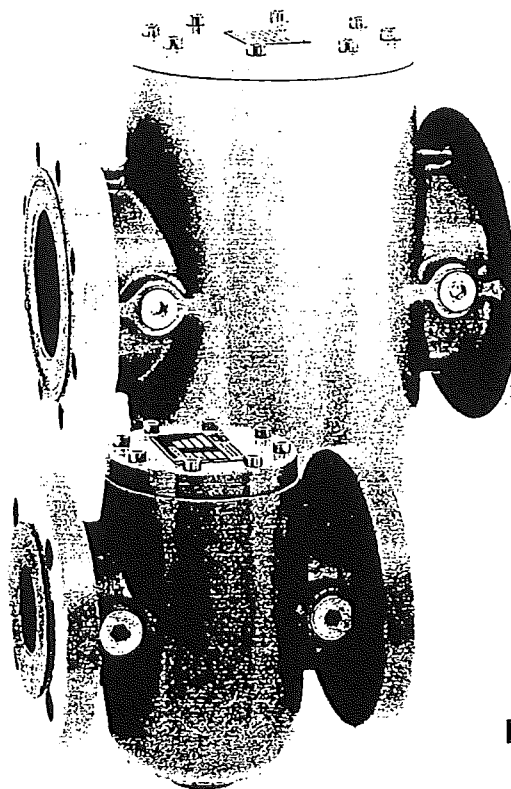


HTB-Gasfilter PN 4 und Gasfilter PN 16

HTB-filter for gas PN 4 and filter for gas PN 16

HTB-filtres pour gaz PN 4 et filtres pour gaz PN 16

SYSTEM „MARCHEL”



DVGW-registriert



Bestimmungsgemäße Verwendung

Gas- und Luftfilter zum Schutz nachgeschalteter Geräte und Armaturen vor Verschmutzung. Geeignet zur Abscheidung von Festpartikeln aus Erdgas, Stadtgas, Flüssiggas und Luft nach DVGW-Arbeitsblatt G 260.

Betriebsdaten

- Baureihe ... 25 04 (HTB) für max. 4 bar Betriebsdruck
- Baureihe ... 20 16/... 21 16 für max. 16 bar Betriebsdruck
- zulässige Einsatztemperatur -10°C bis $+80^{\circ}\text{C}$

Ausführung

- nach DIN 3386
- Gehäuse aus GGG 40.3
- Deckel aus R-ST 37-2
- Filtermatte aus Polypropylen-Wirrfaser-Vlies
- Flansche DIN 2533 PN 16, gebohrt nach DIN 2501 PN 16
- DN 25 – DN 40 mit Messbohrung Rp $\frac{1}{4}$ im Ein- und Ausgang rechts
- DN 50 – DN 150 mit Messbohrung Rp $\frac{1}{2}$ im Ein- und Ausgang rechts und Säuberungsbohrung Rp $\frac{1}{2}$ im Boden

Einbau

- in waagrecht und senkrecht führende Innenleitungen
- Montage- und Wartungsanleitung für „Marchel“-Gasfilter beachten

Allgemeines

- DVGW-geprüft und -registriert Baureihe ... 25 04 (HTB): Reg.-Nr. DG-4501AS0636 Baureihe ... 20 16/21 16: Reg.-Nr. DG-4501AS0101
- kurze Baulängen
- günstiges Verhältnis zwischen Filteroberfläche und Rohrquerschnitt; dadurch geringe Druckverluste, große Staubspeicherkapazität und lange Standzeit
- hoher Abscheidegrad, Porenweite $\leq 50\text{ }\mu\text{m}$
- Baureihe ... 25 04 erfüllt die Anforderungen der höheren thermischen Beständigkeit (HTB, 650°C – 30 Minuten)

Technische Änderungen vorbehalten.

Correct and proper use

Gas- and airfilters for the protection against blockage of devices and fittings connected downstream. Suitable for separation of solid particles from natural gas, town gas, liquid gas and air, accordance with DVGW code of practice G 260.

Operating data

- series ... 25 04 (HTB) operating pressure max. 4 bar
- series ... 20 16/... 21 16 operating pressure max. 16 bar
- temperature -10°C to $+80^{\circ}\text{C}$

Construction

- conforms to DIN 3386
- housing steel casting GGG 40.3
- cover R-ST 37-2
- filter pad: polypropylen fleece
- flange DIN 2533 PN 16, drilled to DIN 2501 PN 16
- DN 25 – DN 40 with pressure test drilling Rp $\frac{1}{4}$ right at the inlet and at the outlet
- DN 50 – DN 150 with pressure test drilling Rp $\frac{1}{2}$ right at the inlet and the outlet and vent connection Rp $\frac{1}{2}$ in the bottom

Fitting

- can be fitted in horizontal and vertical indoor pipes
- observe to assembly and maintenance instructions for "Marchel" gasfilters

General data

- DVGW-approved and registered series ... 25 04 (HTB): reg. no. DG-4501AS0636 series ... 20 16/21 16: reg. no. DG-4501AS0101
- short lengths
- favourable relation between filtration area and pipe cross-section, therefore low pressure loss, great dust accumulation and long life
- high filtration, $\leq 50\text{ }\mu\text{m}$
- series ... 25 04 meets the requirements of the higher thermal resistance (HTB, 650°C – 30 minutes)

We reserve the right to make changes.

Utilisation conforme aux prescriptions

Des filtres à gaz et à l'air pour la protection des appareils et des armatures intercalés en arrière contre les impuretés. Les filtres sont destinés à décanter les particules solides du gaz naturel, du gaz de ville, du gaz combustible liquéfié et de l'air selon directive DVGW G 260.

Dates d'opération

- la gamme ... 25 04 (HTB) pression d'opération max. 4 bar
- la gamme ... 20 16/... 21 16 pression d'opération max. 16 bar
- température -10°C à $+80^{\circ}\text{C}$

Construction

- selon DIN 3386
- boîtier acier de fonte GGG 40.3
- couvercle R-ST 37-2
- filtre: en mousse de polypropylen
- bride selon la norme DIN 2533 PN 16, percées selon la norme DIN 2501 PN 16
- DN 25 – DN 40 avec perçage de pression Rp $\frac{1}{4}$ à droite en amont et en aval
- DN 50 – DN 150 avec perçage de pression Rp $\frac{1}{2}$ à droite en amont et en aval et raccordement d'aération Rp $\frac{1}{2}$ dans le fond

Montage

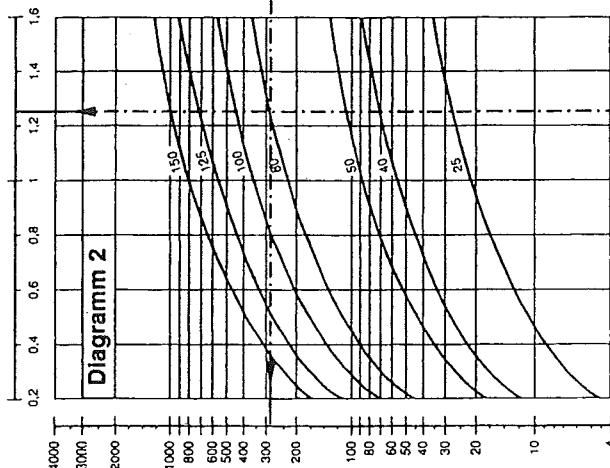
- dans une tuyauterie horizontale ou verticale au dedans
- faire attention à notice de montage et d'entretien des filtres à gaz «Marchel»

Informations générales

- éprouvé et enregistré selon DVGW la gamme ... 25 04 (HTB): reg. no. DG-4501AS0636 la gamme ... 20 16/21 16: reg. no. DG-4501AS0101
- dimensions du boîtier courtes
- peu de perte de pression, grande capacité d'accumulation de poussière et longue durée de vie résultant d'une relation favorable entre surface et diamètre
- filtrage important, $\leq 50\text{ }\mu\text{m}$
- la gamme ... 25 04 satisfait aux exigences de résistance thermique accrue (HTB, 650°C – 30 minutes)

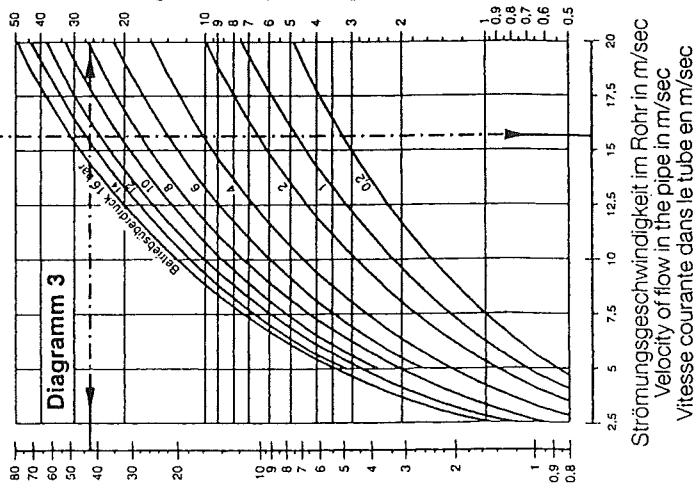
Toutes caractéristiques sont sujettes à modification sans avis préalable.

Filteranströmgeschwindigkeit in m/sec
Velocity of flow in the filter in m/sec
Vitesse courante dans le filtre en m/sec



Gasdurchfluss in m³/h (Betriebszustand)
Flow rate in m³/h (operating situation)
Caractéristiques de débit en m³/h (situation d'opération)

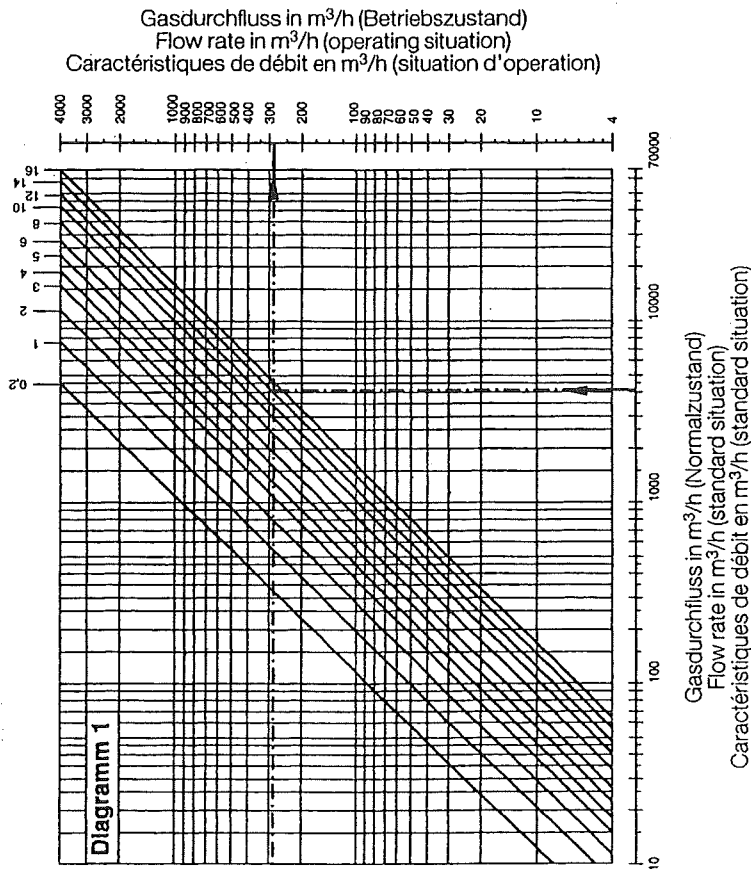
Druckverlust in mbar für Erdgas, Erdölgas ($dv = 0,64$)
Pressure loss in mbar for natural gas ($dv = 0,64$)
Perte de charge en mbar pour du gaz naturel ($dv = 0,64$)



Druckverlust in mbar für Luft ($dr = 1$)
Pressure loss in mbar for air ($dv = 1$)
Perte de charge en mbar pour de l'air ($dv = 1$)

Strömungsgeschwindigkeit im Rohr in m/sec
Velocity of flow in the pipe in m/sec
Vitesse courante dans le tube en m/sec

Betriebsüberdruck in bar
Excess pressure in bar
Surpression en bar



Gasdurchfluss in m³/h (Normalzustand)
Flow rate in m³/h (standard situation)
Caractéristiques de débit en m³/h (standard situation)

Die Diagramme gelten für Gase nach
DVGW-Arbeitsblatt G 260 sowie für Luft.

Handhabung der Diagramme

- siehe Beispiel:
- Medium Erdgas
- Durchfluss 4150 m³/h
- Betriebsüberdruck 14 bar

Ergebnis:

- mindestens Filtergröße DN 80 erforderlich (Diagramm 1)
- Filteranströmgeschwindigkeit 1,25 m/sec (Diagramm 2)
- Strömungsgeschwindigkeit im Rohr 15,6 m/sec (Diagramm 3)
- Druckverlust 27 mbar (Diagramm 3)

The diagrams are for gases acc. to
DVGW-direction G 260 and for air.

Example for using the
diagrams:

- natural Gas
- flow rate 4150 m³/h
- operating excess pressure 14 bar

Result:

- at least filter size DN 80 (diagramme 1)
- flow rate in operating situation 283 m³/h (diagramme 1)
- velocity of flow in the filter 1,25 m/sec (diagramme 2)
- velocity of flow in the pipe 15,6 m/sec (diagramme 3)
- pressure loss 27 mbar (diagramme 3)

Les diagrammes sont valables pour gaz selon
directive DVGW G 260 et pour l'air.

Exemple pour l'utilisation
des diagrammes:

- gaz naturel
- débit 4150 m³/h
- excès de pression d'exploitation 14 bar

Résultat:

- grandeur de filtre au moins DN 80 (diagramme 1)
- débit en standard situation 283 m³/h (diagramme 1)
- vitesse courante dans le filtre 1,25 m/sec (diagramme 2)
- vitesse courante dans le tube 15,6 m/sec (diagramme 3)
- perte de pression 27 mbar (diagramme 3)

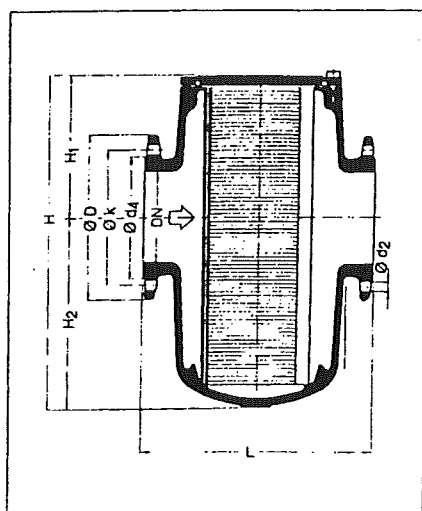


Baureihe ... 2504
version ... 2504
modèle ... 2504

Typ Type	pe max. bar	HTB	Baumaße Dimensions					Flansch flange bride				Gewicht weight poids
			Anschluß connection raccord	L mm	H mm	H1 mm	H2 mm	D mm	k mm	d ₄ mm	d ₂ Anz. No.	
25 25 04	4	HTB	DN 25	146	115	57	58	115	85	68	4x14	4,6
40 25 04	4	HTB	DN 40	197	150	75	75	150	110	88	4x18	8,0
50 25 04	4	HTB	DN 50	210	202	90	112	165	125	102	4x18	12,7
80 25 04	4	HTB	DN 80	268	323	135	188	200	160	138	8x18	26,7
100 25 04	4	HTB	DN 100	319	390	166	224	220	180	158	8x18	40,0
125 25 04	4	HTB	DN 125	361	475	206	269	250	210	188	8x18	54,6
150 25 04	4	HTB	DN 150	400	557	240	317	285	240	212	8x22	75,2

Baureihe ... 2016/... 2116
version ... 2016/... 2116
modèle ... 2016/... 2116

25 20 16	16	-	DN 25	146	115	57	58	115	85	68	4x14	4,6
40 20 16	16	-	DN 40	197	150	75	75	150	110	88	4x18	8,0
50 21 16	16	-	DN 50	210	202	90	112	165	125	102	4x18	12,7
80 20 16	16	-	DN 80	268	323	135	188	200	160	138	8x18	26,7
100 20 16	16	-	DN 100	319	390	166	224	220	180	158	8x18	40,0
125 20 16	16	-	DN 125	361	480	211	269	250	210	188	8x18	56,0
150 20 16	16	-	DN 150	400	562	245	317	285	240	212	8x22	77,0



Achtung! Attention!

Zum Auswechseln der Filtermatte ist mindestens Ausbauhöhe H erforderlich.

Construction height H at least is required to change the filter pad.

Le remplacement des natte filtrantes exige du moins l'hauteur d'agencement H.

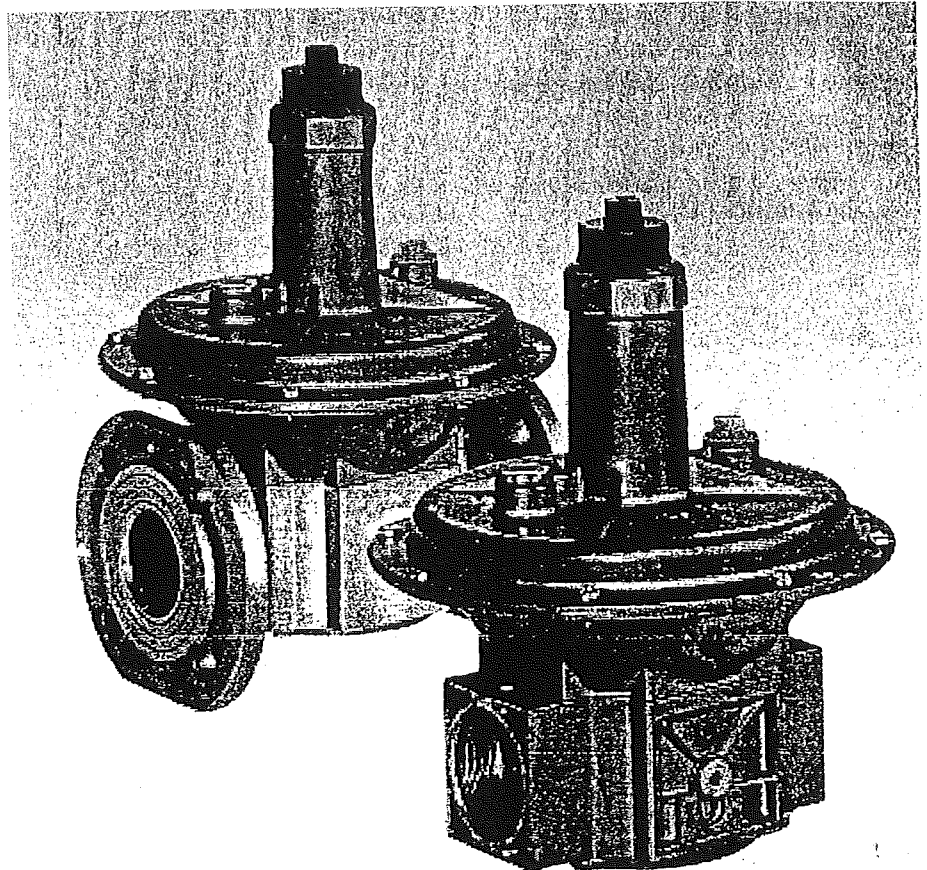
Technische Änderungen sowie geringfügige Abweichungen durch Fertigungstoleranzen vorbehalten.
Changes in technic or slight deviations in demand of production tolerances reserved.
Modifications techniques et déviations peu importantes par tolérances en productions réservées.

Pressure regulator FRNG

Zero pressure regulator
Constant pressure regulator
Compressed air-controlled pressure regulator

DUNGS®

4.14



Technical description

The DUNGS pressure regulator, type FRNG, has an adjustable setpoint spring and defined counterspring. The pressure regulator complies with EN 88 and DIN 3380:

- Input pressures up to 50 mbar for zero pressure applications
- Input pressures up to 200 mbar for constant pressure applications
- Bypass prepared, Rp 3/8 to Rp 2
- Sturdy, precise and sensitive regulation of regulator output pressure
- Inlet pressure compensation diaphragms
- Safety diaphragms
- Internal pulse for regulator output pressure as standard, external pulse connection prepared
- Connection for blower pressure as standard

Application

The DUNGS pressure regulator, type FRNG, is suitable for gases of families 1, 2, 3 and other neutral gaseous media. Does not contain any non-ferrous metals, suitable for gases of up to max. 0.1 vol.% H₂S, dry.

Approval

EC type test approval as per EC Gas Appliance Directive:
FRNG 5... CE-0085 AQ7126
Approvals in other important gas consuming countries.

FRNG Spring-loaded pressure regulator with adjustable setpoint spring and defined counterspring. Internal tap of regulator output pressure; external pulse and blower pressure connections prepared. Suitable for controlling regulator output pressure via a pneumatic command variable.

Specifications

Nominal diameters	DN 10 15 20 25 40 50 65 80 100 125 150
Pipe thread as per ISO 7/1	Rp 3/8 1/2 3/4 1 1 1/2 2
Flange	Connection flange per DIN 2501 Part 1, to fit preweld flange as specified in DIN 2633 (PN 16) DN 40 to DN 100, ISO 7005-2 (PN 16)
Max. operating pressure	up to 500 mbar (50 kPa)
Pressure regulator	Pressure regulator as per EN 88, Class A, Group 2, DIN 3380 RG 10, EN 12078
Input pressure range	
Zero pressure regulator	5 to 50 mbar
Constant pressure regulator	5 to 200 mbar
Compressed air-controlled pressure regulator	to 500 mbar
Pressure stage	PN 1
Output pressure range	Zero pressure regulator - 3 to 5 mbar Constant pressure regulator -10 to 150 mbar Pressure with compressed air up to max. 300 mbar.
Materials of gas-conveying parts	Housing: aluminium, steel, no non-ferrous metals Seals and diaphragms: NBR
Ambient temperature	-15 °C to +70 °C
Installation position	Regulator dome from vertically upright to lying horizontally Rp 1/2 - DN 100 DN 125 -HS-, DN 150 -HS- with measuring unit type Measuring unit guide: Measuring unit with two guides for improved regulation when the regulator is installed with the regulator dome in horizontal position. -HS- = Horizontal Support Regulator dome in vertical position DN 125, DN 150
Measuring/ignition gas connections	G 1/4 ISO 228 on both sides in inlet section
Measurement opening	G 1/8 ISO 228 in the baseplate (option DN 125, DN 150) Reclosable opening for setting system-specific values when the system is put into operation, e. g. gas motor
Bypass	Bypass prepared: Rp 3/8 to Rp 2 on right of housing
Pulse connection	Internal in outlet section, externally prepared on housing: Rp 3/8 to Rp 1 left, G 1/8; on both sides from Rp 1 1/2, DN 40 G 1/4; internal pulse lockable
Blow-off line / pressure connection for blower pressure	Blow-off line needs no routing, use existing connection as pressure connection for command variable (blower pressure). Connection: G 1/4 to Rp 1; from Rp 1 1/2, DN 40: G 1/2
Blower pressure command variable	For constant pressure applications and gas-air ratio applications at pressure ratio of approx. 1:1 and in compressed-air controlled operation: $p_{\max} = 150 \text{ mbar}$

Spring selection

The output pressure is provided by the force of the installed adjustable spring, the counterspring and the the blower pressure applied. The pres-

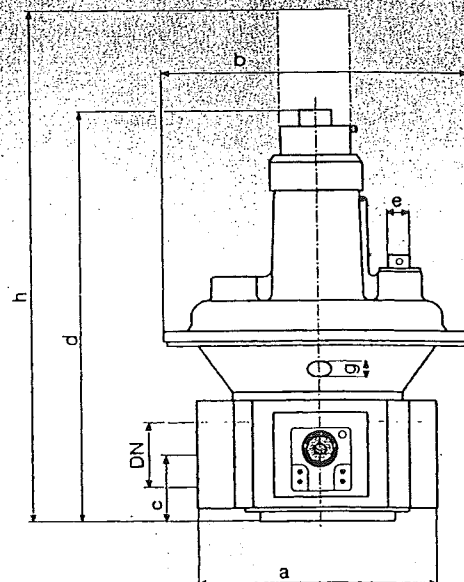
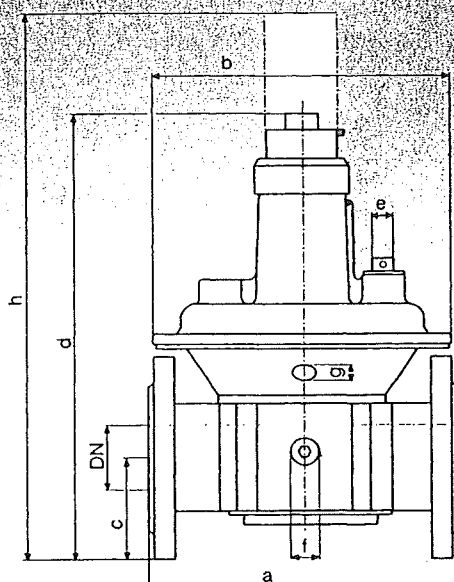
sure regulator is equipped with the brown spring No. 1 as standard. By exchanging the adjustable spring, it is possible to achieve larger positive zero

point shifts (offsets) of the output pressure (refer to Fig. Compressed air-controlled pressure regulator).

Setpoint spring range [mbar]	2.5...9	5...13	5...20	10...30	25...55	30...70	60...110	100...150	140...200
Spring colour	brown	white	orange	bluw	red	yellow	black	pink	grey
Nominal diameter Rp/DN	Standard	Spring 2 to 9 for compressed air applications only							
Rp 3/8, Rp 1/2	229 817	229 818	229 821	229 821	229 822	229 823	229 824	229 825	229 826
Rp 3/4	229 833	229 834	229 836	229 836	229 837	229 838	229 839	229 840	229 841
Rp 1	229 842	229 843	229 845	229 845	229 846	229 847	229 848	229 849	229 850
Rp 1 1/2, DN 40	229 851	229 852	229 854	229 854	229 869	229 870	229 871	229 872	229 873
Rp 2, DN 50	229 874	229 875	229 877	229 877	229 878	229 879	229 880	229 881	229 882
DN 65, 80	229 883	229 884	229 886	229 886	229 887	229 888	229 889	229 890	229 891
DN 100	229 892	229 893	229 895	229 895	229 896	229 897	229 898	229 899	229 900
DN 125	229 901	229 902	229 904	229 904	229 905	229 906	229 907	229 908	243 416
DN 150	229 909	229 910	229 912	229 912	229 913	229 914	229 915	229 916	243 417

Standard Offset ≤ 5 mbar (Closing force of counterspring in closed position)

Dimensions



Type	Order No.	p _{max.} [mbar]	Rp / DN	Dimensions [mm]							Weight [kg]	
				a	b	c	d	e	f	g	h	
FRNG 503	220 967	500	Rp 3/8	75	115	24	143	G 1/4	G 1/4	G 1/8	225	0.60
FRNG 505	220 968	500	Rp 1/2	75	115	24	143	G 1/4	G 1/4	G 1/8	225	0.60
FRNG 507	220 969	500	Rp 3/4	100	130	28	165	G 1/4	G 1/4	G 1/8	245	1.00
FRNG 510	220 970	500	Rp 1	110	145	33	190	G 1/4	G 1/4	G 1/8	310	1.20
FRNG 515	209 064	500	Rp 1 1/2	150	195	40	250	G 1/2	G 1/4	G 1/4	365	2.50
FRNG 520	209 065	500	Rp 2	170	250	47	310	G 1/2	G 1/4	G 1/4	450	3.50
FRNG 5040	159 350	500	DN 40	200	195	65	280	G 1/2	G 1/4	G 1/4	395	3.50
FRNG 5050	209 067	500	DN 50	230	250	75	340	G 1/2	G 1/4	G 1/4	480	5.00
FRNG 5065	209 068	500	DN 65	290	285	95	405	G 1/2	G 1/4	G 1/4	590	7.50
FRNG 5080	209 069	500	DN 80	310	285	95	405	G 1/2	G 1/4	G 1/4	590	10.00
FRNG 5100	214 422	500	DN 100	350	350	105	495	G 1/2	G 1/4	G 1/4	760	16.00
FRNG 5125	220 758	500	DN 125	400	400	135	635	G 1/2	G 1/4	G 1/4	1000	28.00
FRNG 5150	224 212	500	DN 150	480	480	160	780	G 1/2	G 1/4	G 1/4	1180	38.00
FRNG 5125	243 265 -HS-*	500	DN 125	400	400	135	635	G 1/2	G 1/4	G 1/4	1000	28.00
FRNG 5150	243 266 -HS-*	500	DN 150	480	480	160	780	G 1/2	G 1/4	G 1/4	1180	38.00

Bypass restrictor
Rp 3/8 - Rp2

225 256

* -HS- Horizontal Support/
Measuring unit guide

Functional description

Functions according to the force comparison principle between the force of:

- the adjustable setpoint spring
 - the defined counterspring
 - the differential pressure at the working diaphragm
- and
- the force due to weight of the moving parts

The counterspring acts against the adjustable spring and the weight due to force of the moving parts. Depending on the pretension of the adjustable spring and the installation position,

the force of the counterspring is compensated.

Overcompensation leads to positive regulator output pressures, partial compensation leads to negative regulator output pressures.

Instructions

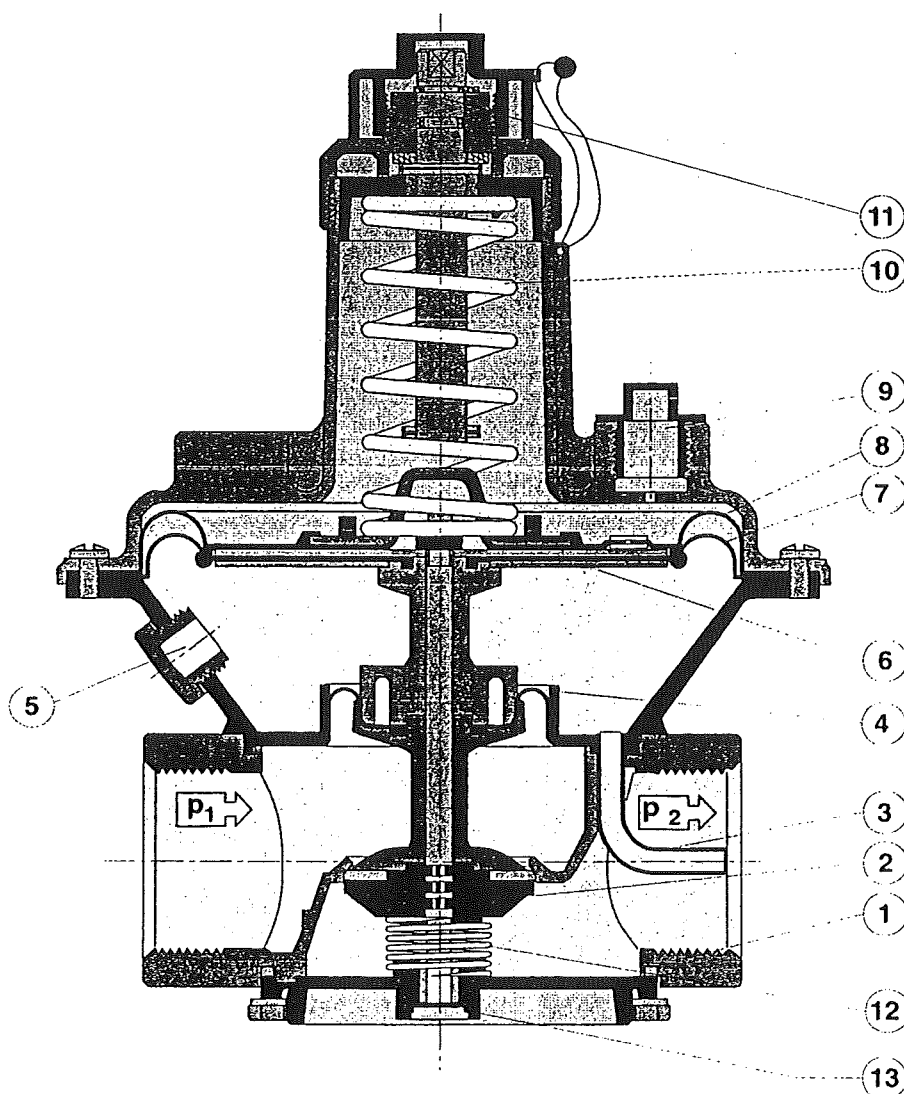
Gas-conveying lines, pulse and connection lines must be made of steel and at least PN 1, DN 6. The lines must be resistant to thermal, chemical and mechanical loads. The lines must be durable and deformation- and crack-proof.

Do not route condensate from lines into the pressure regulator.

Do not apply burning gas or combustion gas air mixtures to the installation chamber of the adjustable spring. Pressure regulators for this application on request.

FRNG 515 sectional drawing

Pressure regulator in closed position



1	Housing	6	Diaphragm disk	11	Adjustment device
2	Regulating cup	7	Working diaphragm	12	Counterspring
3	Pulse tap, internal	8	Safety diaphragm	13	Option DN 125, DN 150
4	Compensation diaphragm	9	Breathing plug		Measurement opening with
5	External pulse	10	Setpoint spring		screw plug G 1/8

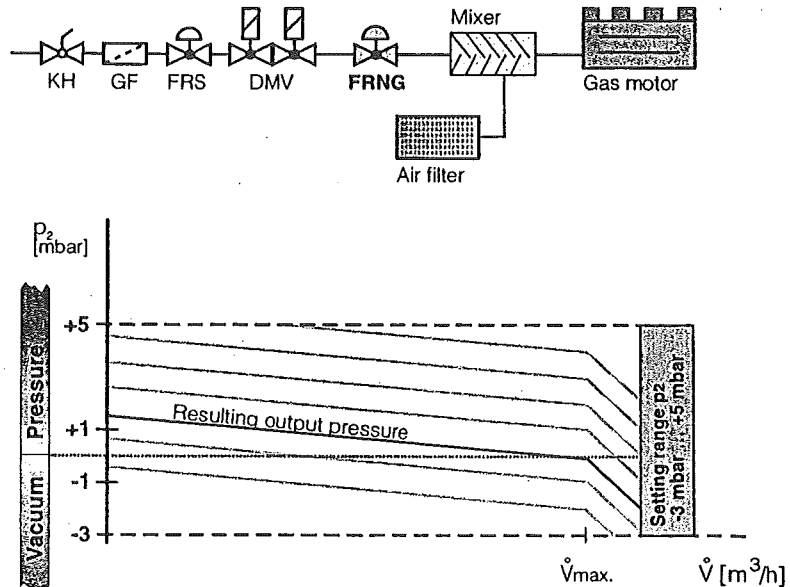
Application of zero pressure regulator (standard design)

The FRNG regulates a gas flow proportional to the consumer vacuum for gas motors and self-intaking gas equipment.

The regulator is adjusted within the setting range at the setpoint spring.

$$\dot{V}_{\min} = \dot{V}_{\max} \times 0.1$$

For \dot{V}_{\max} , see volumetric flow pressure drop characteristic.



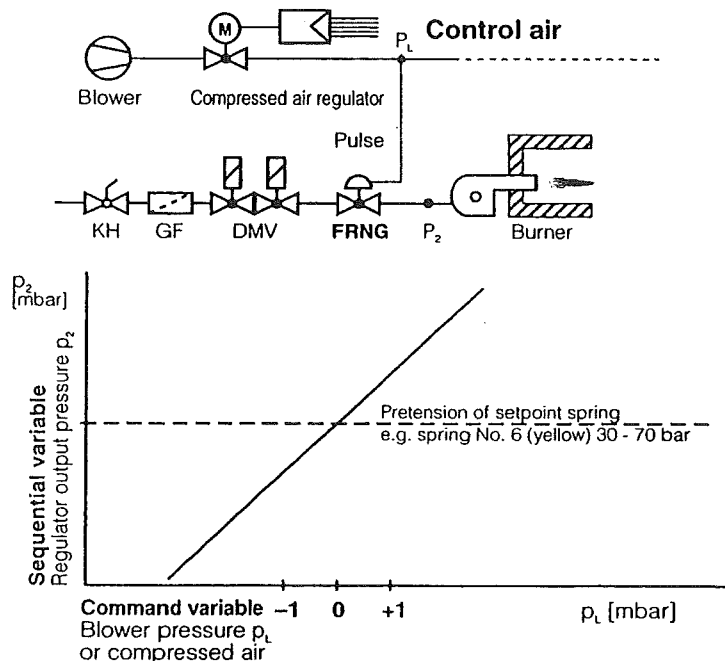
Application with compressed air-controlled pressure regulator (standard design)

For externally controlled gas equipment.

In connection with a selected setpoint spring, the regulator output pressure can be controlled depending on the blower pressure (compressed air). The command variable can be up to +150 mbar.

$$\dot{V}_{\min} = \dot{V}_{\max} \times 0.05$$

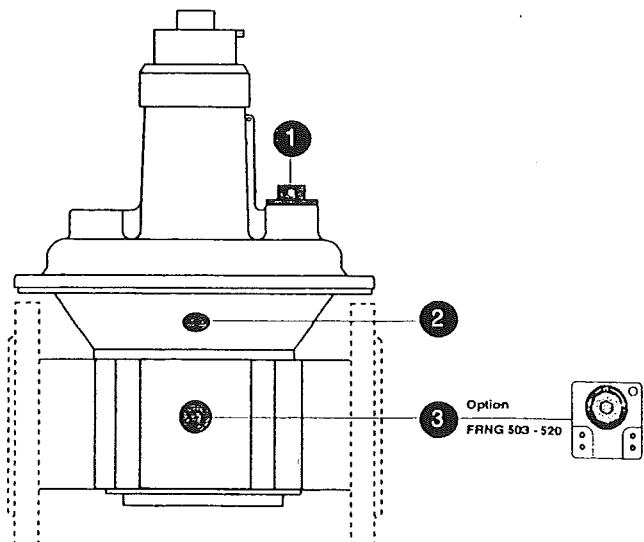
For \dot{V}_{\max} , see volumetric flow pressure drop characteristic.



Pressure taps

Pulse and blower connection

- 1 Breathing plug or connection for blow-off line. Only route blow-off line in special cases or connection for air pulse line
- 2 Connection for external gas pulse. Internal pulse must be closed.
- 3 Pressure connection in inlet section G 1/4 ISO 228 screw plug, Rp 3/8 to Rp 2 with bypass cover prepared for mounting adjustable bypass restriction.



Application of constant pressure regulator (standard design)

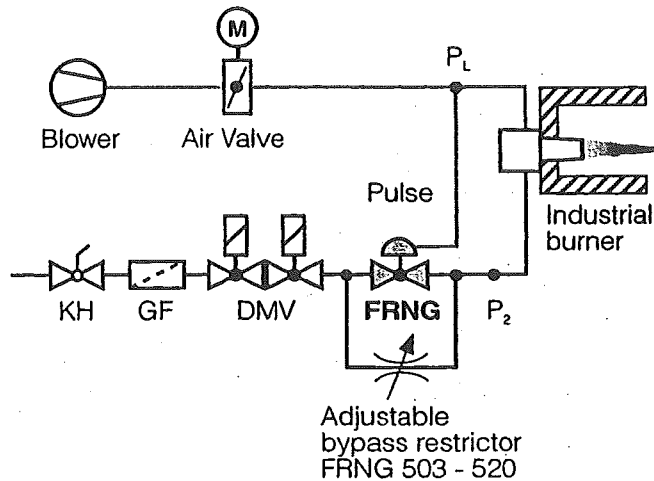
As constant pressure regulator for gas-air ratio regulators with fixed efficiency pressure ratio $V = 1:1$ on gas equipment operated with differential pressure.

The offset range of the counterspring can be set by the setpoint spring. The moving parts are compensated by the force due to weight.

Gas supply or air supply are adjustable at full load and partial load.

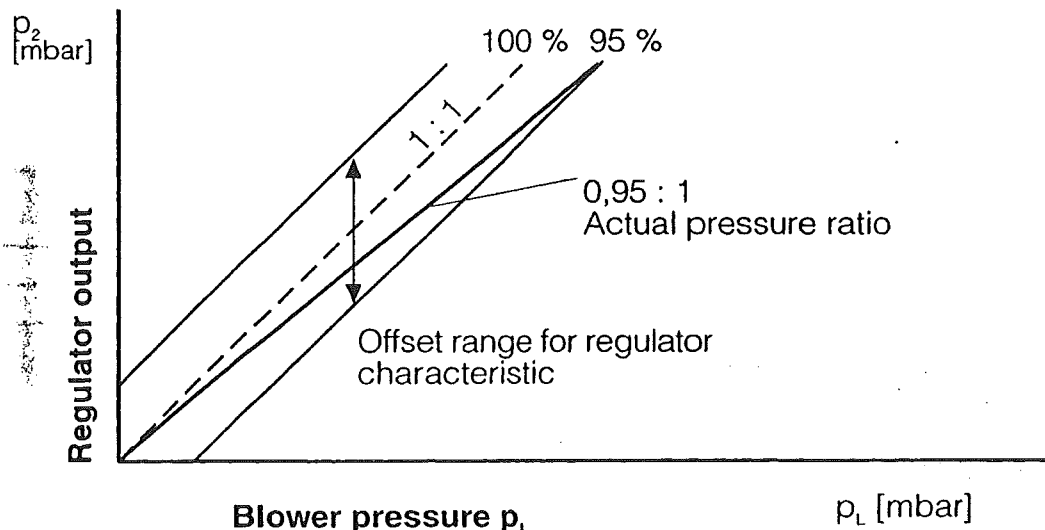
Basic load is adjustable via bypass restrictor.

The command variable can be up to +150 mbar.

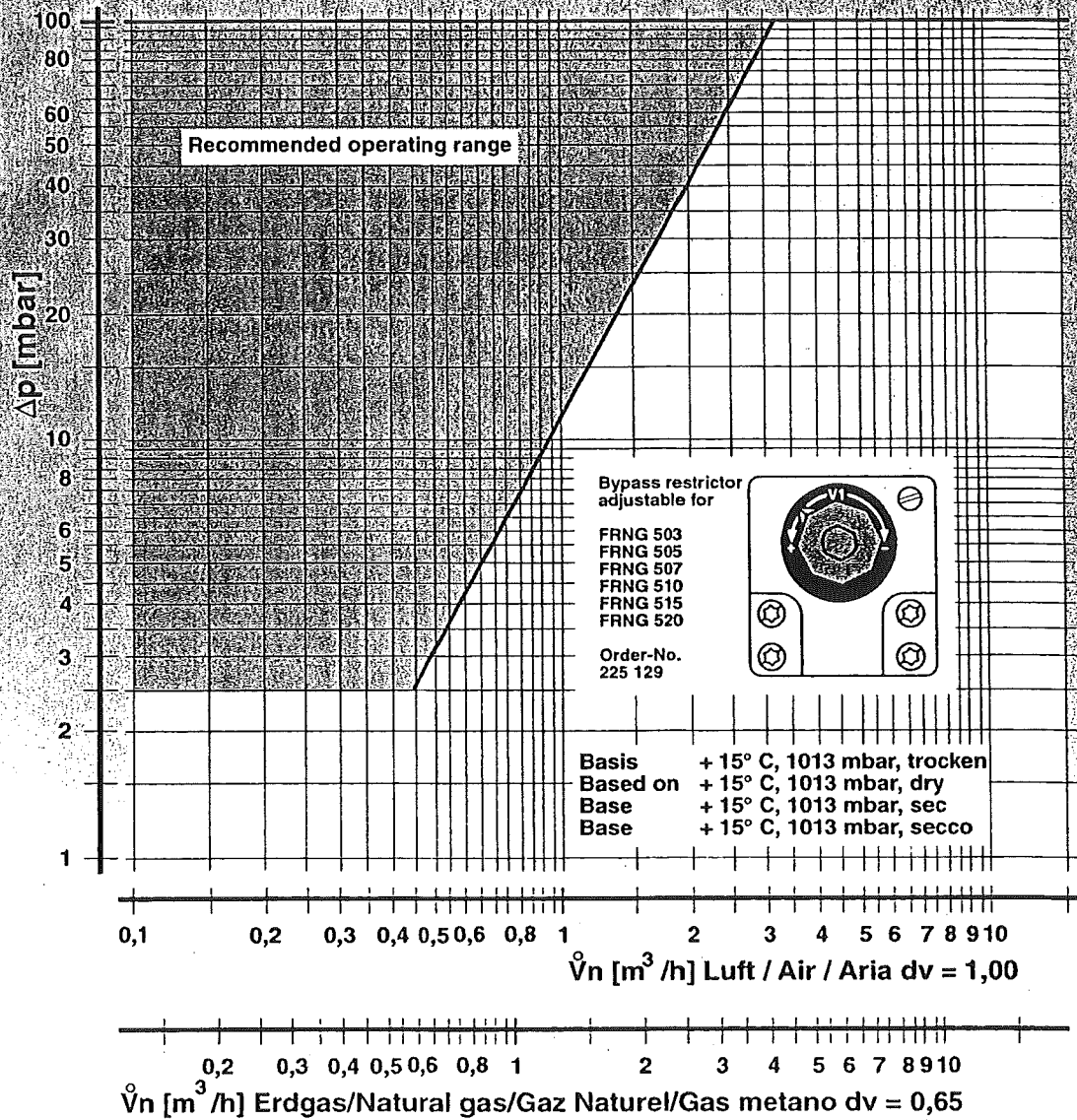


$\dot{V}_{min} = \dot{V}_{max} \times 0,05$

For \dot{V}_{max} , see volumetric flow pressure drop characteristic.



Volumetric flow pressure difference characteristic
Bypass restrictor

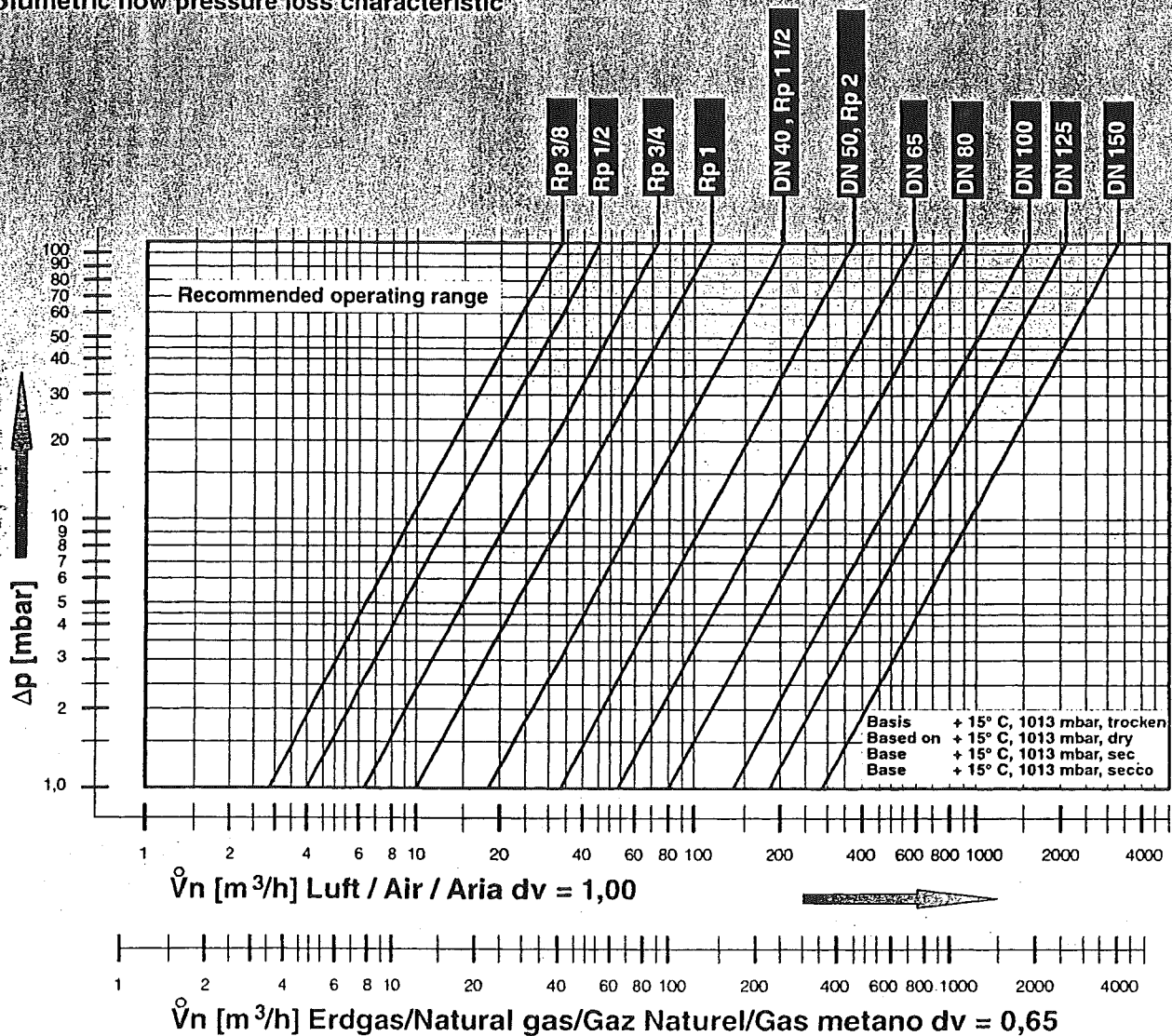


Pressure regulator
FRNG

Zero pressure regulator
Constant pressure regulator
Compressed air-controlled
pressure regulator

DUNGS®

Volumetric flow pressure loss characteristic



We reserve the right to make any changes in the interest of technical progress.

Head Offices and Factory
Karl Dungs GmbH & Co. KG
Siemensstraße 6-10
D-73660 Urbach, Germany
Telephone +49 (0)7181-804-0
Fax +49 (0)7181-804-166

Postal address
Karl Dungs GmbH & Co. KG
Postfach 12 29
D-73602 Schorndorf, Germany
e-mail info@dungs.com
Internet www.dungs.com

D

GB

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I

DUNGS®

Betriebs- und Montageanleitung

Gas-Druckregelgerät
 Nulldruckregler
 Gleichdruckregler
 Druckluftgeführter Regler

Typ FRNG

Nennweiten
 Rp 3/8 - Rp 2
 DN 40 - DN 150

Operation and assembly instructions

Gas pressure regulator
 Zero pressure regulator
 Air / gas ratio control
 Pneumatic controller

Type FRNG

Nominal diameters
 Rp 3/8 - Rp 2
 DN 40 - DN 150

Notice d'emploi et de montage

Régulateur de pression de gaz
 Régulateur de pression zéro
 Régulateur de proportion
 Régulateur à commande pneumatique

Type FRNG

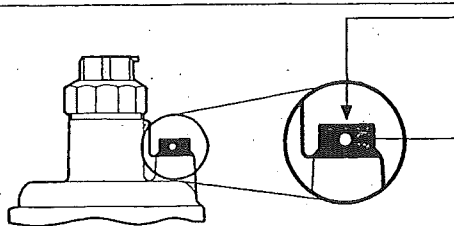
Diamètre nominaux
 Rp 3/8 - Rp 2
 DN 40 - DN 150

Istruzioni di esercizio e di montaggio

Regolatore di pressione gas
 Regolatore di pressione zero
 Regolatore di rapporto aria/gas
 Regolatore ad aria compressa

Tipo FRNG

Diametri nominali
 Rp 3/8 - Rp 2
 DN 40 - DN 150



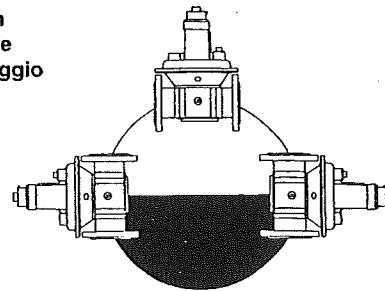
Atmungsstopfen
 Vent plug
 bouchon percé
 tappo di sfiato
 Atmungsdüse
 Vent nozzle
 Raccordement de mise à l'air libre
 ugello di sfiato

Atmungsdüse niemals verschließen!
 Never close vent nozzle!
 Ne jamais obturer raccordement de mise à l'air libre!
 non otturare mai l'ugello di sfiato!

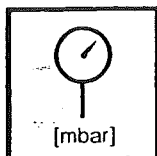
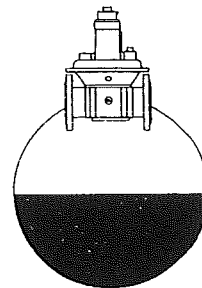
Einbaulage
Installation position
Position de Montage
Posizione di montaggio

Rp 3/8 - Rp 2
 DN 40 - DN 100

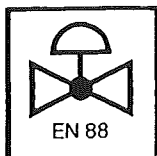
DN 125 -HS-
 DN 150 -HS-


Einbaulage
Installation position
Position de Montage
Posizione di montaggio

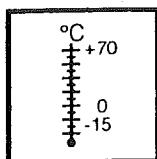
DN 125
 DN 150



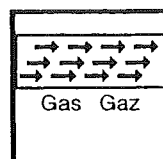
Max. Betriebsdruck
 Max. operating pressure
 Pression de service maxi.
 Max. pressione di esercizio
 $p_{max.} = 500 \text{ mbar}$



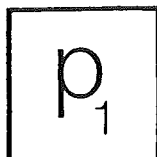
Klasse A, Gruppe 2
 Class A, Group 2
 Classe A, Groupe 2
 Classe A, Gruppo 2
 nach / acc. / selon / a norme
 EN 88, DIN 2633



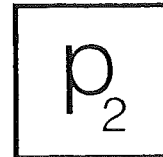
Umgebungstemperatur
 Ambient temperature
 Température ambiante
 Temperatura ambiente
 -15 °C ... +70 °C



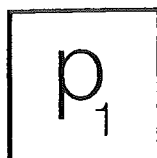
Famiglia 1 + 2 + 3
 Family 1 + 2 + 3
 Famille 1 + 2 + 3
 Famiglia 1 + 2 + 3
 geeignet für Gase bis max. 0,1 vol. % H₂S
 suitable for gases of up to max. 0,1 vol. % H₂S, dry.
 convient aux gaz jusqu'à max. 0,1 % en vol. d'H₂S sec.
 adatto per gas fino ad un volume max. % di 0,1 H₂S secchi.



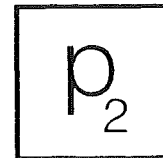
Nulldruckregler
 Zero governor
 Régulateur de pression zéro
 Regolatore di pressione zero
 $p_{1, max./maxi.} = 50 \text{ mbar}$
 $(p_1 = p_e)$



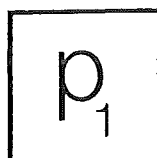
Nulldruckregler
 Zero pressure regulator
 Régulateur de pression zéro
 Regolatore di pressione zero
 $p_2: -3 \dots +5 \text{ mbar}$
 $(p_2 = p_e)$



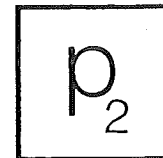
Gleichdruckregler 1:1
 Air / gas ratio control 1:1
 Régulateur de proportion 1:1
 Regolatore di rapporto 1:1
 $p_{1, max./maxi.} = 200 \text{ mbar}$
 $(p_1 = p_e)$



Gleichdruckregler
 Air / gas ratio control
 Régulateur de proportion
 Regolatore di rapporto
 $p_2: -10 \dots +150 \text{ mbar}$
 $(p_2 = p_e)$



Druckluft geführt
 Controlled by air pressure
 A commande pneumatique
 Regolazione ad aria compressa
 $p_{1, max./maxi.} = 500 \text{ mbar}$
 $(p_1 = p_e)$



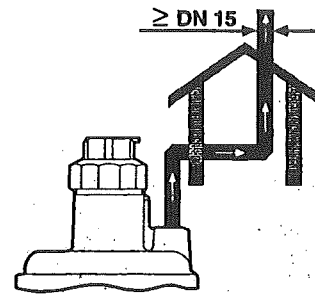
Druckluft geführt
 Controlled by air pressure
 A commande pneumatique
 Regolazione ad aria compressa
 $p_{2, max./maxi.}: 300 \text{ mbar}$
 $(p_2 = p_e)$

Abblaseleitung,
nur in Sonderfällen notwendig
Sicherheitsmembrane einge-
baut.

Blow-off line,
only necessary in special cases
Safety diaphragm built in.

Conduite de mise à l'air libre,
nécessaire uniquement dans des
cas spéciaux.
Membrane de sécurité montée

Linea di scarico,
necessario solo in casi speciali.
All' interno dello stabilizzatore é
montata una membrana di sicu-
rezza.



Anwendung Nulldruckregler

Die Gegenfeder wirkt der Einstellfeder und der Gewichtskraft der beweglichen Teile entgegen. Abhängig von der Vorspannung der Einstellfeder und der Einbaulage wird die Kraft der Gegenfeder kompensiert.

Application Zero pressure regulator

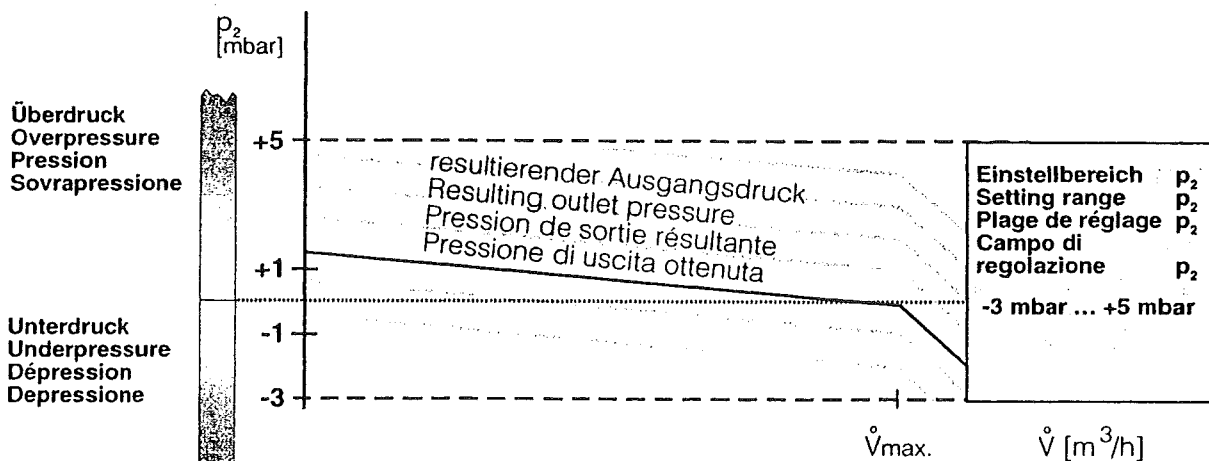
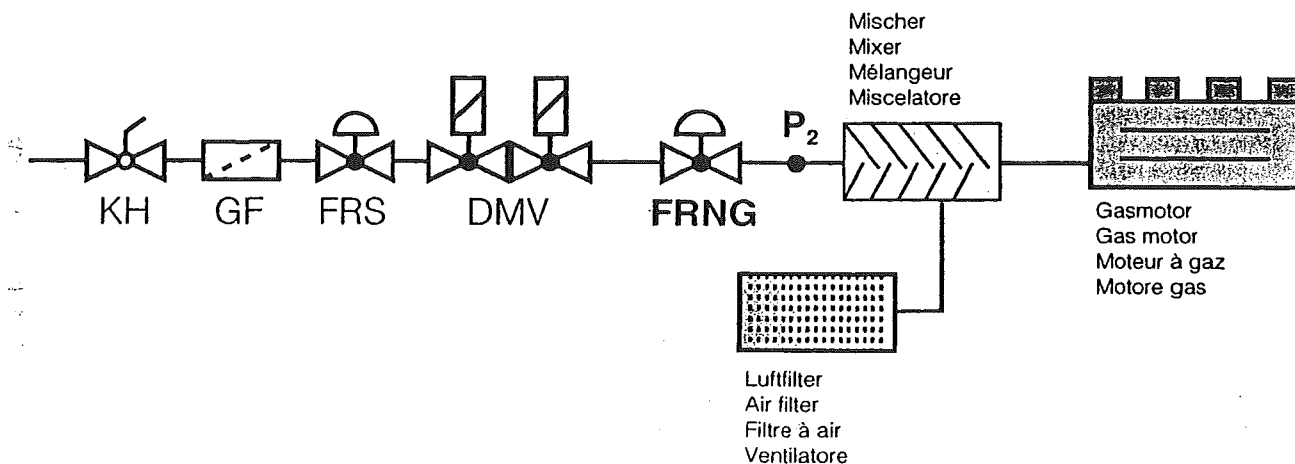
The counterspring counteracts the setting spring and the weight force of the moving parts. Depending on the pretension of the setting spring and the installation position, the force of the counterspring is compensated.

Application Régulateur de pression zéro

Le ressort antagoniste agit contre le ressort de réglage et le poids des pièces mobiles. La force du ressort antagoniste est compensée en fonction de la tension du ressort de réglage et de la position de montage.

Applicazione del regolatore di pressione zero

La molla antagonista agisce contro la forza della molla di regolazione e la forza di peso delle parti mobili. La forza della molla antagonista viene compensata in dipendenza alla pretensione della molla di regolazione ed alla posizione di montaggio.



Anwendung Gleichdruckregler

Durch die Einstellfeder kann ein Offset erzeugt werden.
Wird bei maximalem Gebläse-
druck p_L das Verhältnis auf 1:1
justiert ergibt sich in der Teillast
ein Gasüberschuß (Gasvorlauf).
Wird in einem Teillastpunkt das
Verhältnis auf 1:1 justiert so stellt
sich bei Vollast ein Luftüberschuß
ein (Luftvorlauf).
Die Abweichung von der Ur-
sprungsgeraden (100%) beträgt
ca. $\pm 5\%$.

Application Air / gas ratio control

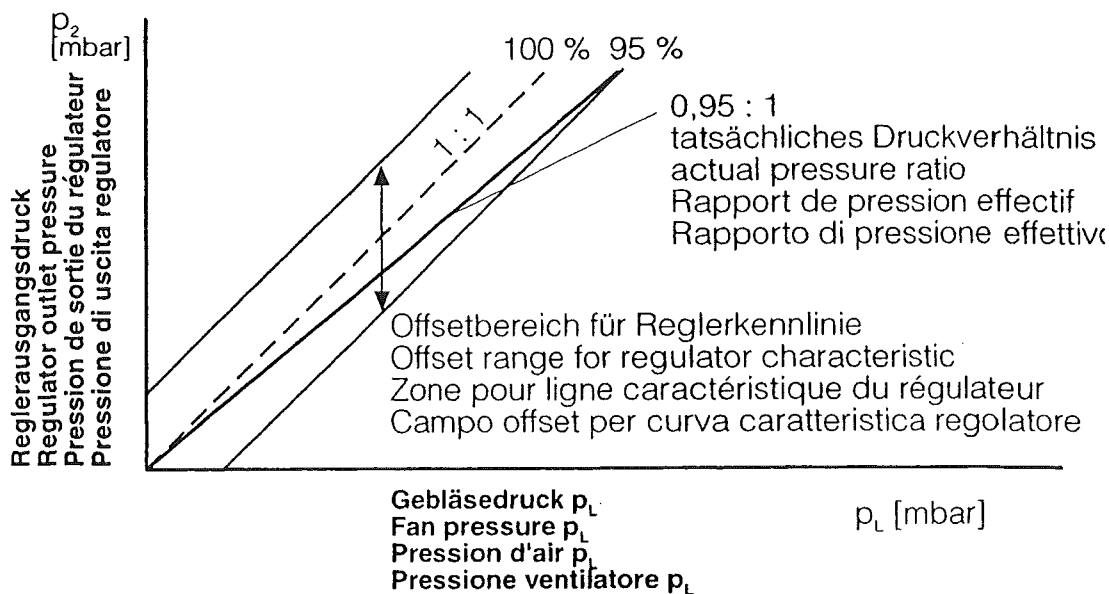
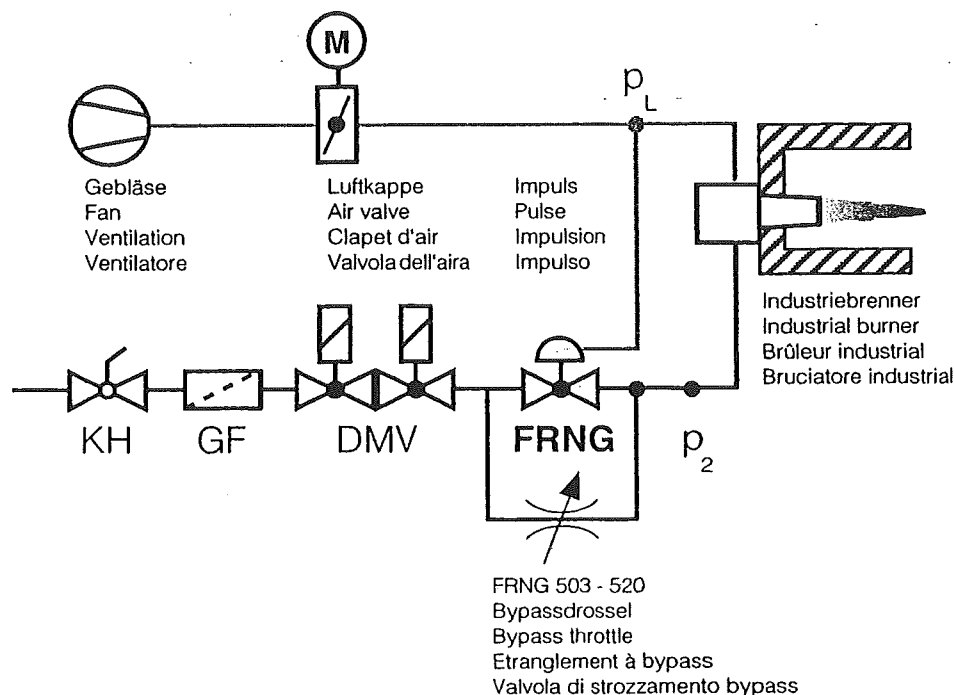
The setting spring can generate an
offset.
If the ratio is adjusted to 1:1 during
maximum fan pressure p_L , a gas
excess (gas advance) results in
partial load.
If the ratio is adjusted to 1:1 in a
partial load point, an air excess
results at full load (air advance).
The deviation of the original straight
line (100%) is approx. $\pm 5\%$.

Application Régulateur de proportion

Avec le ressort de réglage on peut
réaliser un décalage de ligne car-
actéristique pour un rapport réglé
à 1:1 avec une pression d'air p_L
maxi, nous aurons un excès de
gaz à charge moyenne (alimenta-
tion gaz). Pour un rapport réglé à
1:1, à charge moyenne, nous
aurons un excès d'air à pleine charge
(alimentation air). Le décalage
par rapport à la droite d'origine
(100%) est d'environ $\pm 5\%$.

Applicazione del Regolatore di rapporto

Mediante la molla di regolazione
si può generare una preapertura.
Se a pressione massima del ven-
tilatore p_L , viene regolato il rap-
porto 1:1, si ottiene un'eccedenza
di gas nel carico parziale (pre-
afflusso gas). Se in un punto del
carico parziale viene regolato il
rapporto 1:1, viene regolata a
pieno carico un'eccedenza d'aria
(preafflusso aria).
La deviazione dalle rette iniziali
(100%), è di ca. $\pm 5\%$.



Anwendung Druckluft geführt

In Verbindung mit einer ausgewählten Einstellfeder kann der Reglerausgangsdruck in Abhängigkeit eines Gebläsedruckes (Druckluft) geführt werden. Die Federvorspannung der Einstellfeder addiert sich zum Druck des Gebläses. Der maximale Reglerausgangsdruck beträgt:

$$p_{2, \max} = 300 \text{ mbar}$$

Der Anschluß der Gebläseleitung muß den Belastungen standhalten und dauerhaft sein. Die Druckluft muß staubfrei und trocken sein, Verunreinigungen dürfen nicht eingetragen werden. Der maximale Gebläsedruck beträgt:

$$p_{L, \max} = 150 \text{ mbar}$$

Application Controlled by air pressure

In connection with a selected setting spring, the regulator outlet pressure can be controlled depending on a fan pressure (air pressure). The pretension of the setting spring is added to the fan pressure. The maximum regulator output pressure is:

$$p_{2, \max} = 300 \text{ mbar}$$

The connection of the fan pressure line must withstand the occurring stresses and must be permanent. The pressurised air must be dust-free and dry and must not entrain any contamination. The maximum fan pressure is:

$$p_{L, \max} = 150 \text{ mbar}$$

Application A commande pneumatique

En liaison avec un ressort de réglage, la pression de sortie peut être pilotée par une pression d'air (air comprimé) la tension du ressort de réglage s'additionne à la pression d'air. La pression de sortie maximale du régulateur s'élève à:

$$p_{2, \max} = 300 \text{ mbar}$$

Le raccordement de la pression d'air doit être résistant. L'air comprimé doit être exempt de poussière et sec. Il faut éviter toute pénétration d'impuretés. La pression de l'air maximalerégulateur s'élève à:

$$p_{L, \max} = 150 \text{ mbar}$$

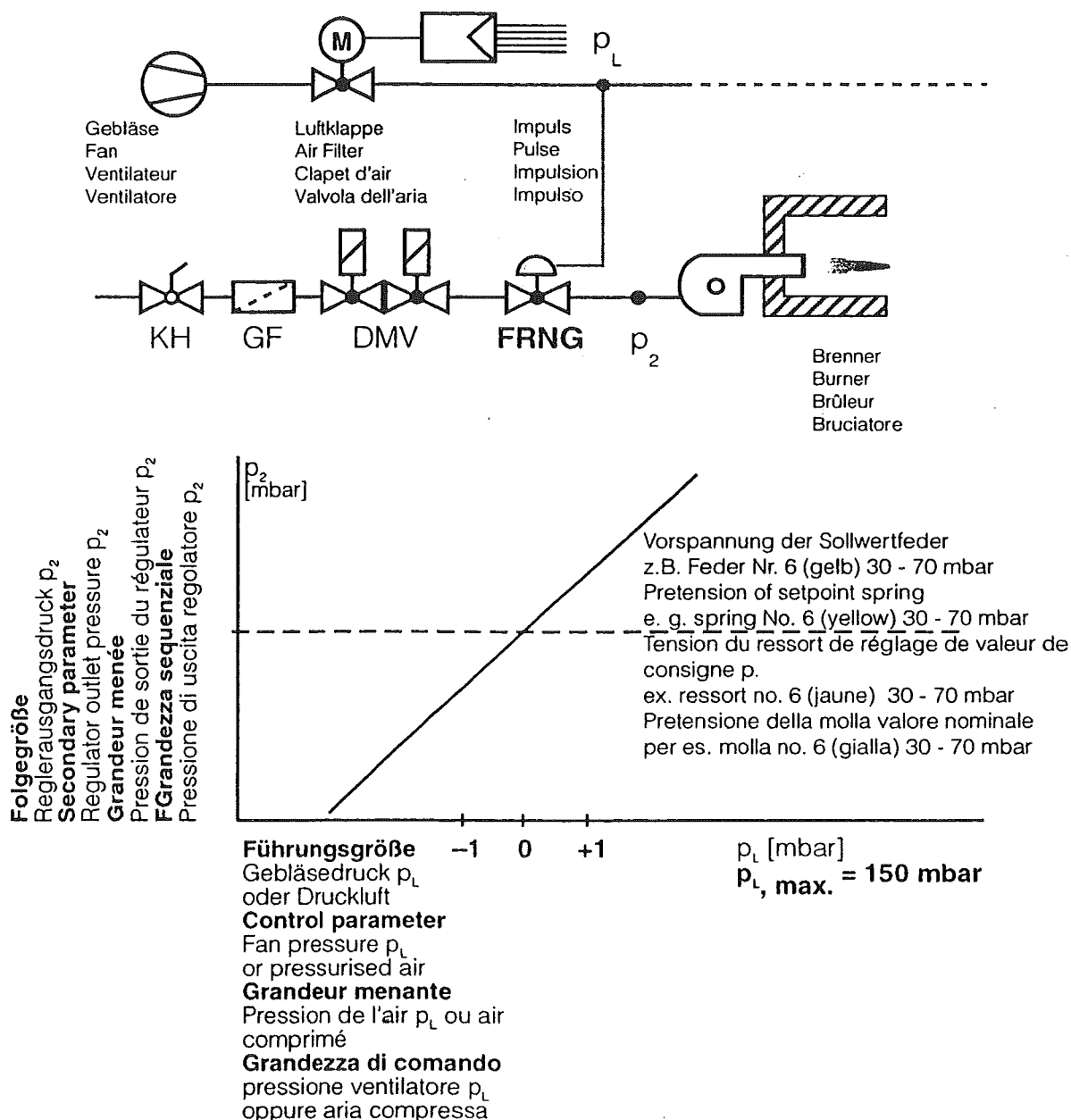
Applicazione regolazione ad aria compressa

La pressione di uscita del regolatore in combinazione con una molla di regolazione scelta, può venire pilotata in dipendenza di una determinata pressione del ventilatore (aria compressa). La pretensione della molla di regolazione viene addizionata alla pressione del ventilatore. La pressione di uscita massima del regolatore è:

$$p_{2, \max} = 300 \text{ mbar}$$

Il collegamento del conduttore di pressione del ventilatore, deve essere resistente alle sollecitazioni e duraturo. L'aria compressa non deve contenere polvere ed essere secca, non devono venire trasportate impurità. La pressione di ventilatore massima è:

$$p_{L, \max} = 150 \text{ mbar}$$



Druckabgriffe

- 1 Atmungsstopfen
oder
Anschluß für Gebläsedruck
≥ DN 40, Rp 1 1/2
Verschlußschraube G 1/2
- 2 Anschluß für externen Impuls
Verschlußschraube G 1/4
ISO 228, beidseitig.
- 3 Verschlußschraube G1/4
ISO 228 im Eingangsbereich,
beidseitig

Pressure taps

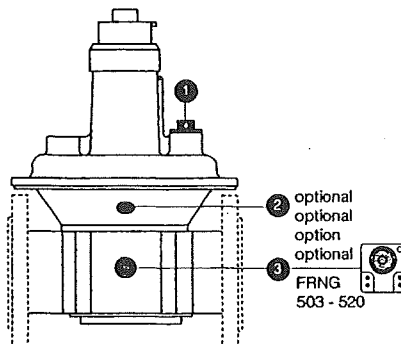
- 1 Vent plug
or
Connection for fan pressure
≥ DN 40, Rp 1 1/2
G 1/2 screw plug
- 2 Connection for external pulse
G 1/4 screw plug ISO 228, on
both sides
- 3 G 1/4 screw plug ISO 228, in
inlet pressure range, on both
sides

Prises de pression

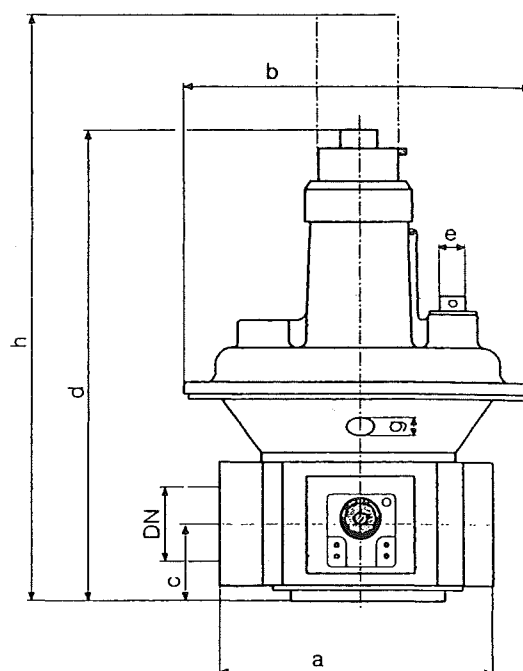
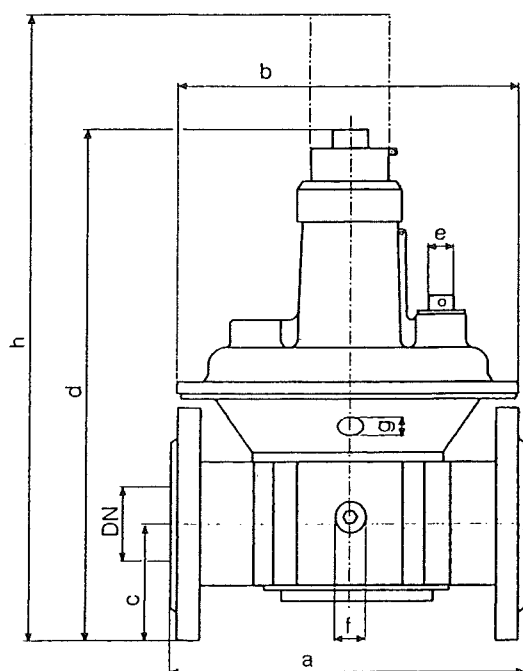
- 1 Bouchon percé ou raccorde-
ment pour pression d'air ≥ DN
40, Rp 1 1/2 bouchon fileté G 1/2
- 2 Raccordement pour impulsion
externe bouchon fileté G1/4
ISO 228, bilatéral
- 3 Bouchon fileté G1/4
ISO 228, dans la zone d'entrée,
bilatéral

Manopola a pressione

- 1 Tappo di sfiato
oppure attacco pressione
ventilatore
≥ DN 40, Rp 1 1/2
Tappo a vite G 1/2
- 2 Attacco per impulso esterno
Tappo a vite G 1/4 ISO 228
da entrambi i lati
- 3 Tappo a vite G 1/4 ISO 228
nel campo di entrata, da
entrambi i lati

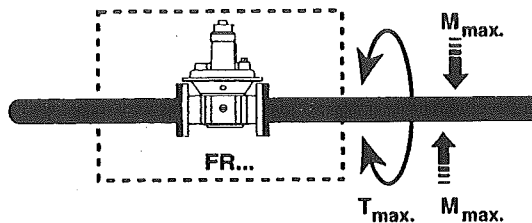


Einbaumaße / Dimensions / Cotes d'encombrement / Dimensioni [mm]



Typ Type Type Tipo	Bestell-Nummer Order number No. de commande Codice articolo	$p_{max.}$ [mbar]	Rp / DN	Einbaumaße / Dimensions Cotes d'encombrement / Dimensioni [mm]								Gewicht Weight Poids Peso [kg]
				a	b	c	d	e	f	g	h	
FRNG 503	220 967	500	Rp 3/8	75	115	24	143	G 1/4	G 1/4	G 1/4	225	0,60
FRNG 505	220 968	500	Rp 1/2	75	115	24	143	G 1/4	G 1/4	G 1/4	225	0,60
FRNG 507	220 969	500	Rp 3/4	100	130	28	165	G 1/4	G 1/4	G 1/4	245	1,00
FRNG 510	220 970	500	Rp 1	110	145	33	190	G 1/4	G 1/4	G 1/4	310	1,20
FRNG 515	209 064	500	Rp 1 1/2	150	195	40	250	G 1/2	G 1/4	G 1/4	365	2,50
FRNG 520	209 065	500	Rp 2	170	250	47	310	G 1/2	G 1/4	G 1/4	450	3,50
FRNG 5040	159 350	500	DN 40	200	195	65	280	G 1/2	G 1/4	G 1/4	395	3,50
FRNG 5050	209 067	500	DN 50	230	250	75	340	G 1/2	G 1/4	G 1/4	480	5,00
FRNG 5065	209 068	500	DN 65	290	285	95	405	G 1/2	G 1/4	G 1/4	590	7,50
FRNG 5080	209 069	500	DN 80	310	285	95	405	G 1/2	G 1/4	G 1/4	590	10,00
FRNG 5100	214 422	500	DN 100	350	350	105	495	G 1/2	G 1/4	G 1/4	760	16,00
FRNG 5125	220 758	500	DN 125	400	400	135	635	G 1/2	G 1/4	G 1/4	1000	28,00
FRNG 5150	224 212	500	DN 150	480	480	160	780	G 1/2	G 1/4	G 1/4	1180	38,00
FRNG 5125 -HS-	243 265	500	DN 125	400	400	135	635	G 1/2	G 1/4	G 1/4	1000	28,00
FRNG 5150 -HS-	243 266	500	DN 150	480	480	160	780	G 1/2	G 1/4	G 1/4	1180	38,00

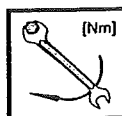
Gerät darf nicht als Hebel benutzt werden
Do not use unit as lever.
Ne pas utiliser le pressostat comme un levier.
L'apparecchio non deve essere usato come leva.



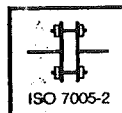
DN Rp	3/8	1/2	3/4	1	40 1 1/2	50 2	65 2 1/2	80 —	100 —	125 —	150 —
M_{max.} [Nm] t ≤ 10 s	70	105	225	340	610	1100	1600	2400	5000	6000	7600
T_{max.} [Nm] t ≤ 10 s	35	50	85	125	200	250	325	400	—	—	—



Druckregelgerät durch geeigneten Schmutzfänger vor Verunreinigung schützen!
Protect pressure regulator against contamination by using suitable dirt traps!
Protéger le régulateur contre les impuretés avec un filtre adapté!
Proteggere il regolatore di pressione con dispositivi antipolvere adeguati!



	M 3	M 4	M 5	M 6	M 8	G 1/8	G 1/4	G 1/2	G 3/4
max. Drehmomente / Systemzubehör max. torque / System accessories max. couple / Accessoires du système max. coppie / Accessorio di sistema	0,5 Nm	2,5 Nm	5 Nm	7 Nm	15 Nm	5 Nm	7 Nm	10 Nm	15 Nm



max. Drehmomente / Flanschverbindung max. torque / Flange connection max. couple / Raccordement à brides max. coppie / Collegamento a flangia	M 16 x 65 (DIN 939)	Stiftschraube Setscrew Goujon Vite per acciaio
	50 Nm	



Geeignetes Werkzeug einsetzen!
Please use proper tools!
Utiliser des outils adaptés!
Impiegare gli attrezzi adeguati!

Schrauben kreuzweise anziehen!
Tighten screws crosswise!
Serrer les vis en croisant!
Stringere le viti incrociate!

**Gewindeausführung FRNG
Einbau**
Vor Einbau Staubschutzkappen
entfernen!
Durchflußrichtung beachten:
Pfeil am Gehäuse.

1. Gewinde schneiden.
2. Geeignetes Dichtmittel verwenden.
3. Geeignetes Werkzeug verwenden.
4. Nach Einbau Dichtheitskontrolle.

**Threaded version FRNG
Mounting**
Remove dirt protection caps before mounting.
Note flow direction: Arrow on housing.

1. Tap thread.
2. Use suitable sealing agent.
3. Use suitable tool.
4. Perform leak tests after mounting.

**Version fileté FRNG
Pose**
Avant la pose, enlever le capuchon de protection contre la poussière!
Tenir compte du sens du débit: flèche sur le boîtier

1. Fileter.
2. Employer un produit d'étanchéité approprié.
3. Utiliser un outillage adapté.
4. Après la pose, effectuer un contrôle d'étanchéité

**Esecuzione filettata FRNG
Montaggio**
Prima di eseguire il montaggio, togliere le calotte antipolvere! Fare attenzione alla direzione di flusso: freccia sull'involucro.

1. Tagliare il filetto
2. Utilizzare adeguate guarnizioni.
3. Utilizzare adeguate guarnizioni.
4. Dopo il montaggio effettuare una prova di tenuta.

**Flanschausführung FRNG
Einbau**
Vor Einbau Staubschutzkappen
entfernen!
Durchflußrichtung beachten:
Pfeil am Gehäuse.

1. Stiftschrauben unten einsetzen.
2. Dichtungen einsetzen.
3. Stiftschrauben oben einsetzen.
4. Stiftschrauben festziehen. Drehmomentetabelle beachten!
Auf korrekten Sitz der Dichtung achten!
5. Nach Einbau Dichtheitskontrolle.

**Flange version FRNG
Mounting**
Remove dirt protection caps before mounting.
Note flow direction: Arrow on housing.

1. Insert setscrews.
2. Insert seals.
3. Insert setscrews.
4. Tighten setscrews. Refer to torque table
Ensure correct seating of the seal!
5. Perform leak tests after mounting.

**Version à bride FRNG
Pose**
Avant la pose, enlever le capuchon de protection contre la poussière!
Tenir compte du sens du débit: flèche sur le boîtier

1. Insérer les goujons inférieurs.
2. Insérer les joints.
3. Insérer les goujons supérieurs.
4. Serrer les goujons à fond en respectant les couples indiqués dans le tableau.
Veiller ce que le joint soit bien en place!
5. Après la pose, effectuer un contrôle d'étanchéité.

**Esecuzione flangiata FRNG
Montaggio**
Prima di eseguire il montaggio, togliere le calotte antipolvere! Fare attenzione alla direzione di flusso: freccia sull'involucro.

1. Inserire le viti.
2. Inserire le guarnizioni.
3. Inserire le viti.
4. Stringere le viti osservando la tabella del momento torcente.
Prestare attenzione al corretto posizionamento della guarnizione!
5. Dopo il montaggio effettuare una prova di tenuta.

Justage des Ausgangsdrucks (Sollwerteinstellung)

Werkseitig eingegebte Einstellfeder: p_2 2,5 - 9 mbar
Schließkraft der Gegenfeder in Geschlossenstellung: Standard Offset 5 mbar

1. Schutzkappe A abschrauben.
2. Justage (+)
Verstellspindel B
"Rechtsdrehen" =
Vergrößerung des Ausgangsdruckes (Sollwertes)

oder

- Justage (-)
Verstellspindel B
"Linksdrehen" =
Verkleinerung des Ausgangsdruckes (Sollwertes)
4. Überprüfen des Sollwertes.
 5. Schutzkappe A aufschrauben.
 6. Plombierung (Seite 9).

Adjustment of outlet pressure (setpoint adjustment)

Factory setting:
Standard spring p_2 2,5 - 9 mbar
Sealing force of counterspring in closed position: standard offset 5 mbar

1. Unscrew protective cap A.
2. Adjustment (+)
Setting spindle B
"Turn counterclockwise" =
Increasing outlet pressure (setpoint)

or

- Adjustment (-)
Setting spindle B
"Turn clockwise" =
Reducing outlet pressure (setpoint)
4. Check setpoint
 5. Screw on protective cap A.
 6. Attach lead seal (Page 9).

Réglage de la pression de sortie (réglage de la valeur de consigne)

Réglage d'usine:
ressort standard p_2 2,5 à 9 mbar
Pression de serrage du ressort antagoniste en position fermée: Position standard 5 mbars

1. Dévisser le capuchon protecteur A.
2. Réglage (+)
tige de réglage B
"tourner vers la droite" =
augmentation de la pression de sortie (valeur de consigne)

ou bien

- Réglage (-)
tige de réglage B
"tourner vers la gauche" =
diminution de la pression de sortie (valeur de consigne)
4. Vérifier la valeur de consigne
 5. Revisser le capuchon protecteur A
 6. Plombage (page 9).

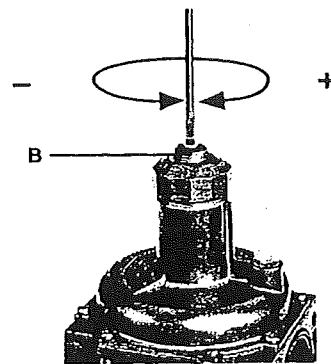
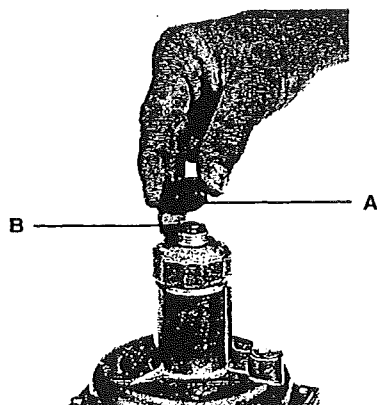
Taratura fine della pressione di uscita (regolazione valore nominale)

Taratura in fabbrica:
molla standard p_2 2,5 - 9 mbar
Forza di chiusura della molla antagonista in posizione di chiusura: offset standard 5 mbar

1. svitare la calotta A di protezione
2. Taratura (+) 'ruotare a destra la vite di regolazione B = Aumento della pressione / uscita (valore nominale)

oppure

- Taratura (-)
ruotare verso sinistra il la vite B = diminuzione della pressione / uscita (valore nominale)
4. controllare il valore nominale tarato
 5. riavvitare la calotta di protezione A
 6. piombatura (vedere pag. 9)



Austausch der Einstellfeder

Replace setting spring

Remplacement du ressort de réglage

Cambio della molla

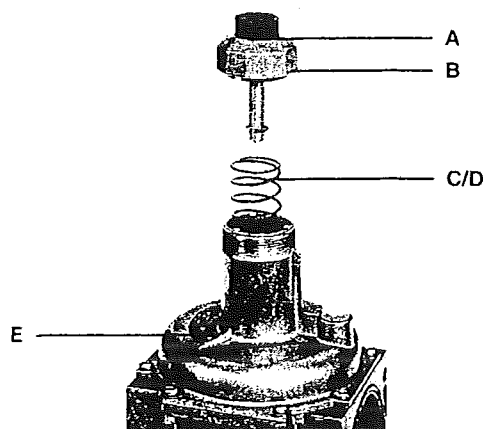
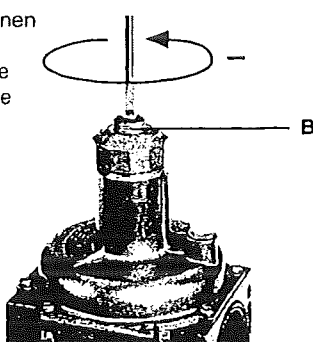
1. Schutzkappe A entfernen. Durch Linksdrehen der Verstellspindel B die Feder entspannen. Bis gegen den Anschlag drehen.
2. Komplette Verstellereinrichtung B abschrauben und Feder C entnehmen.
3. Neue Feder D einsetzen.
4. Komplette Verstellereinrichtung montieren und gewünschten Offset justieren.
5. Schutzkappe A aufschrauben. Klebeschild E auf das Typenschild aufkleben.
6. Plombierung

1. Remove protective cap. A. Release spring by turning adjustment spindle B counter clockwise. Turn spindle to stop.
2. Unscrew complete adjustment device B and remove spring C.
3. Insert new spring D.
4. Assemble complete adjustment device and adjust desired offset.
5. Screw on protective cap A. Stick adhesive label E onto typeplate.
6. Attach lead seal.

1. Enlever le capuchon protecteur A. Détendre le ressort en tournant vers la gauche la tige de réglage.
2. Tourner jusqu'à la butée.
3. Insérer le nouveau ressort D.
4. Monter le dispositif de réglage complet et régler le décalage souhaité.
5. Visser le capuchon protecteur A. Coller l'autocollant E sur la plaque de type.
6. Plombage

1. Togliere la calotta A. Ruotando a sinistra la vite B la molla si libera. Ruotare fino contro l'arresto.
2. Svitare completamente il dispositivo B e sfilare la molla C.
3. inserire la nuova molla D.
4. montare il dispositivo completo e tarare l'uscita desiderata
5. riavvitare la calotta A. Incollare l'adesivo E sulla targhetta
6. Piombatura

entspannen
release
détendre
scaricare



Meßöffnung

G 1/8 ISO 228 im Bodendeckel
(Option DN 125, DN 150)
Widerverschließbare Öffnung zur
Einstellung anlagenspezifischer
Werte bei der Inbetriebnahme der
Anlage z. B. Gasmotor.

1. Gasversorgung unterbrechen.
2. Stromzufuhr unterbrechen.
3. Verschluss-Schraube 1 (G 1/8) ent-
fernen, Bild 1, 3.
4. Schutzkappe A entfernen
5. Justage (+)
Verstellspindel B
"Rechtsdrehen" =
Vergrößerung des Ausgangs-
druckes (Sollwertes)

oder

- Justage (-)
Verstellspindel B
"Linksdrehen" =
Verkleinerung des Ausgangs-
druckes (Sollwertes)
6. Überprüfen des Sollwertes.
 7. Schutzkappe A aufschrauben
 8. Verschluss-Schraube 1 (G 1/8)
eindrehen, Bild 3. Drehmoment-
tabelle beachten
 9. Nach Abschluss der Arbeiten
Dichtheits- und Funktionskontrol-
le durchführen.

Measurement opening

G 1/8 ISO 228 in the baseplate
(option DN 125, DN 150)
Reclosable opening for setting sys-
tem-specific values when the sys-
tem is put into operation, e. g. gas
motor

1. Turn off gas supply.
2. Switch off power supply.
3. Remove screw plug 1 (G1/8)
(Fig. 1, 3).
4. Unscrew protective cap A.
5. Adjustment (+)
Setting spindle B
"Turn counter-clockwise" =
Increasing outlet pressure
(setpoint)

or

- Adjustment (-)
Setting spindle B
"Turn clockwise" =
Reducing outlet pressure
(setpoint)
6. Check setpoint
 7. Screw on protective cap A.
 8. Verschluss-Schraube 1 (G 1/8)
eindrehen (Fig. 3). Refer to
torque table
 9. On completion of work, perform
a leak and functional test.

Prise de mesure

G 1/8 ISO 228 dans le couvercle de
fond (en option DN 125, DN 150)
ouverture verrouillable pour le réglage
de valeurs spécifiques à l'instal-
lation lors de la mise en service de
celle-ci, moteur à gaz par ex.

1. Fermer l'arrivée du gaz.
 2. Couper l'arrivée du courant.
 3. Enlever le bouchon 1 (G 1/8)
(Fig. 1, 3).
 4. Dévisser le capuchon pro-
tecteur A.
 5. Réglage (+)
tige de réglage B
"tourner vers la droite" =
augmentation de la pression de
sortie (valeur de consigne)
- ou bien
- Réglage (-)
tige de réglage B
"tourner vers la gauche" =
diminution de la pression de sor-
tie (valeur de consigne)
6. Vérifier la valeur de consigne
 7. Revisser le capuchon protec-
teur A
 8. Verschluss-Schraube 1 (G 1/8) ein-
drehen (Fig. 3) en respectant les
couples indiqués dans le tableau.
 9. Effectuer un contrôle d'étanchéi-
té et de fonction après chaque
intervention.

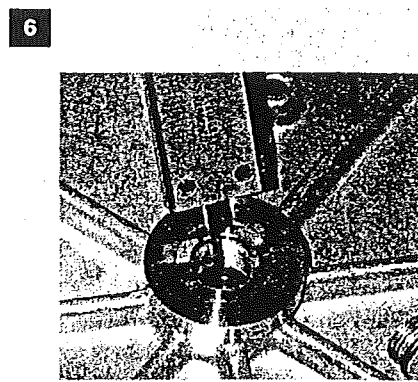
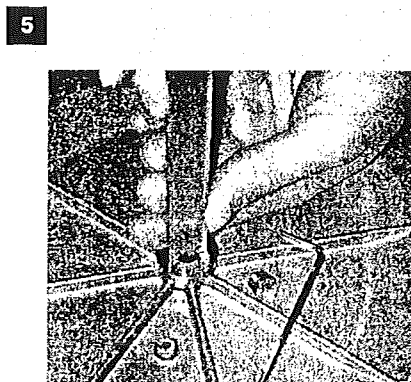
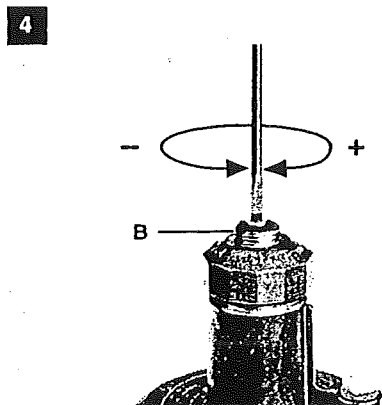
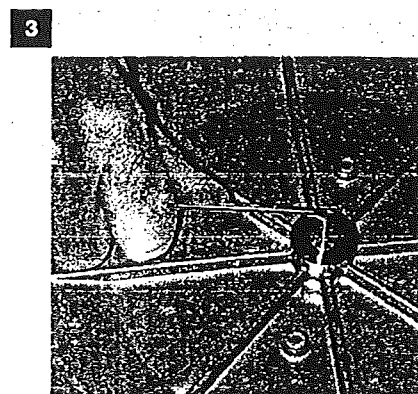
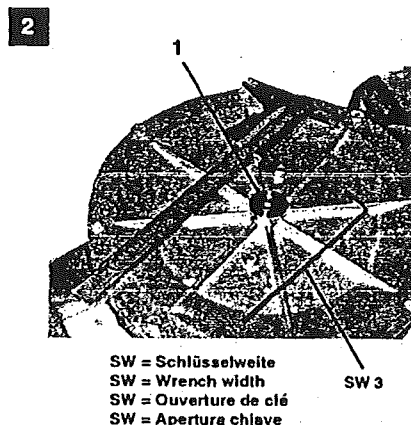
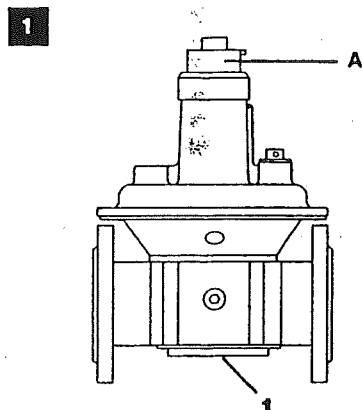
Apertura di misurazione

G 1/8 ISO 228 nel coperchio di
fondo (opzioni: DN 125, DN 150),
apertura richiudibile per la regola-
zione di valori specifici dell'implan-
to per la messa in funzione di esso,
per es. motore a gas.

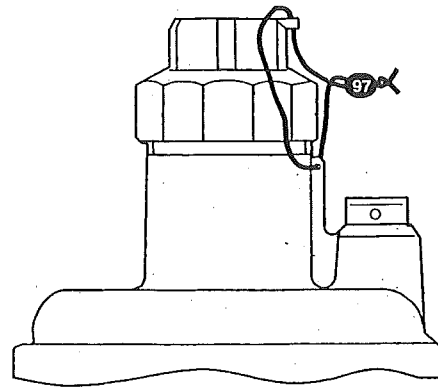
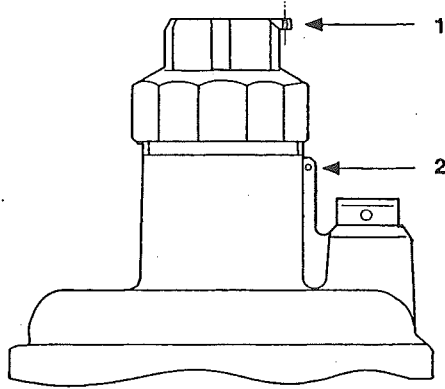
1. Interrompere l'alimentazione del gas.
2. Interrompere l'alimentazione
elettrica.
3. Togliere le viti di chiusura 1 (Fig. 1, 3)
4. Svitare la calotta A di protezione
5. Taratura (+) ruotare a destra
la vite di regolazione B
= Aumento della pressione/uscita
(valore nominale)

oppure

- Taratura (-)
ruotare verso sinistra il
la vite B = diminuzione
della pressione/ uscita (valore
nominale)
6. controllare il valore nominale tar-
rato
 7. riavvitare la calotta di protezione A
 8. Verschluss-Schraube 1 (G 1/8)
eindrehen (Fig. 3) osservando la
tabella del momento torcente.
 9. Al termine delle operazioni effet-
tuare un controllo di tenuta e di
funzionamento.



Plombierung
Attaching lead seal
Plombage
Piombatura



1
 Plombierungsöse in der Verschlusskappe \varnothing 1,5 mm.

1
 \varnothing 1,5 mm dia. lead seal eye in sealing cap.

1
 Oeillet de plombage dans le capuchon obturateur \varnothing 1,5 mm.

1
 Occhiello per piombatura nella calotta di chiusura \varnothing 1,5 mm.

2
 Plombierungsöse im Reglergehäuse \varnothing 1,5 mm.

2
 \varnothing 1,5 mm dia. lead seal eye in regulator housing.

2
 Oeillet de plombage dans le boîtier du régulateur \varnothing 1,5 mm.

2
 Occhiello per piombatura sull'involucro del regolatore \varnothing 1,5 mm.

Nach Einstellung des gewünschten Drucksollwertes / Offset:

After setting desired pressure set-point / offset:

Après réglage de la pression de consigne souhaitée / offset:

Dopo la regolazione del valore nominale desiderato / offset:

1. Schutzkappe aufschrauben.
2. Draht durch 1 und 2 ziehen.
3. Plombe um Drahtenden drücken, Drahtschleife kurz halten.

1. Screw on protective cap.
2. Pull wire through 1 and 2.
3. Press lead seal around wire ends, keep wire loop small

1. Visser le capuchon protecteur
2. Faire passer le fil entre 1 et 2
3. Comprimer le plomb et les extrémités du fil. Maintenir la boucle courte.

1. avvitare la calotta di chiusura
2. tirare il filo attraverso i punti 1 e 2
3. Piombare le estremità del filo lasciando corto l'anello passante.

Außerbetriebsetzung
Blockierung der Reglerfunktion

Putting out of operation
Blocking regulator function

Mise hors service
Blocage de la fonction de réglage

Messa fuori servizio, Bloccaggio della funzione del regolatore

1. Schutzkappe A entfernen. Durch Linksdrehen der Verstellspindel B die Feder entspannen. Bis gegen den Anschlag drehen.
2. Komplette Verstellrichtung B abschrauben und Feder C entnehmen.
3. Blockierhülse einsetzen
4. Komplette Verstellrichtung B wieder montieren und bis an den unteren Anschlag drehen.
5. Schutzkappe A aufschrauben. Regler kennzeichnen "Blockiert"
6. Plombierung

1. Remove protective cap A. Release spring by turning adjustment spindle B counter-clockwise. Turn the spindle to stop
2. Unscrew complete adjustment device B and remove spring C.
3. Insert blocking sleeve.
4. Re-assemble complete adjustment device and turn to bottom stop.
5. Screw on protective cap A. Mark regulator "blocked".
6. Attach lead seal.

1. Enlever le capuchon protecteur A. Détendre le ressort en tournant vers la gauche la tige de réglage B. Tourner jusqu'à la butée.
2. Dévisser l'ensemble du dispositif de réglage B et extraire le ressort C.
3. Insérer la douille de blocage.
4. Remonter le dispositif complet de réglage et tourner jusqu'à la butée inférieure.
5. Visser le capuchon protecteur A. Marquer le régulateur "bloqué".
6. Plombage.

1. Togliere la calotta di chiusura. Ruotando in senso antiorario la vite B la molla si libera. Ruotare fino contro l'arresto.
2. Svitare completamente il dispositivo B e sfilare la molla C
3. inserire il cilindretto di bloccaggio
4. rimontare il dispositivo completo di regolazione e ruotare fino all'arresto inferiore
5. avvitare la calotta A e siglare il regolatore con la voce "bloccato"
6. Piombatura

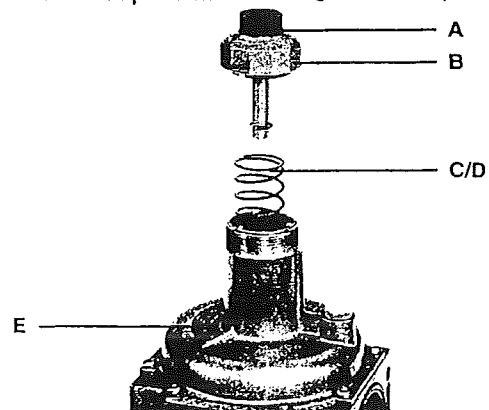
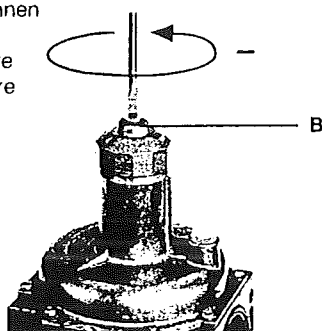
Kennlinie siehe Diagramm: mechanisch offen

For characteristic, see diagram: mechanically open

Ligne caractéristique : voir diagramme : mécaniquement ouvert

Linea caratteristica vedi diagramma 1: apertura meccanica

entspannen
 release
 détendre
 scaricare



**Verschließen Interner Impuls,
externer Impuls ist vorbereitet**

**Bei Verwendung des externen
Impulses muß der interne Im-
puls verschlossen werden.**

Der im Ausgangsbereich des
Druckregelgerätes angeordnete
Impulsabgriff wird mit einer ge-
eigneter Silikondichtmasse ver-
schlossen.

Hierzu wird das Impulsrohr auf
ca 2/3 der Länge gefüllt.
Unbedingt die Anleitung des
Dichtmassen Herstellers beach-
ten und für vollständige Aushär-
tung sorgen.

**Sealing internal pulses, external
pulse only optional**

**When using the external pulse,
seal the internal pulse.**

Seal the pulse tap located in the
outlet of the pressure regulator
using a suitable silicon compound.
Fill the pulse tube to approx. 2/3 of
the length.

Please follow the instructions of the
sealing compound manufacturer
and make sure that the compound
hardens completely.

**Fermeture impulsion interne,
l'impulsion externe est préparée**

**Si l'on utilise l'impulsion exte-
rne, il faut impérativement obs-
truer l'impulsion interne.**

La prise d'impulsion qui se trouve
dans la zone de sortie du régula-
teur de pression est scellée à l'aide
d'une masse d'étanchéité adéqua-
te en silicone. Pour ce faire, on
remplit au 2/3 env. de sa longueur
le tube d'impulsion.

Respecter impérativement les ins-
tructions du fabricant de la masse
d'étanchéité et faire le nécessaire
pour obtenir un durcissement com-
plet.

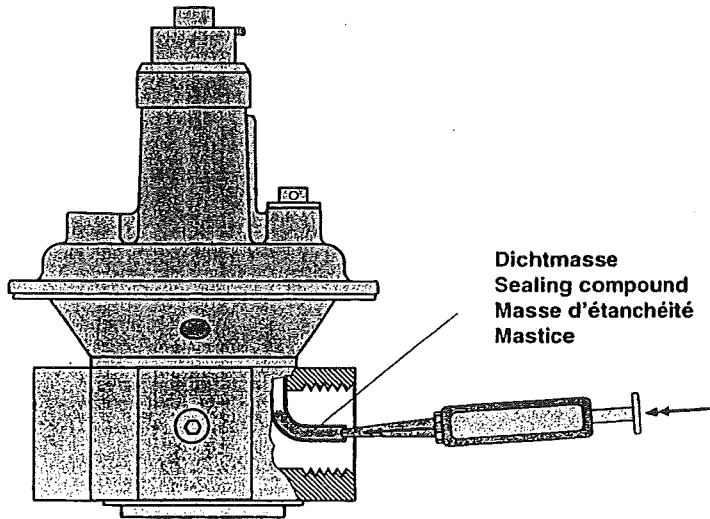
**Chiusura della presa d'impul-
so interno; l'impulso esterno è
predisposto**

**Se si fa uso dell'impulso ester-
no, si deve chiudere la presa
dell'impulso interno.**

La presa di impulso nel campo di
uscita del regolatore di pressio-
ne, si deve otturare con un masti-
ce di silicone appropriato.

Riempire allo scopo il tubo di
impulso fino a ca. 2/3 della sua
lunghezza.

Attenersi assolutamente alle istru-
zioni del fabbricante del mastice
e provvedere al totale indurimen-
to di quest'ultimo.



**Externer Impulsanschluß,
externer Impuls ist vorbereitet**

Der externe Impulsanschluß er-
folgt an den Anschlüssen der
Membranschale.

Der Anschluß muß sicher gegen
Verformung, Abriß, gasdicht und
dauerhaft sein. Er muß den me-
chanischen, thermischen und
chemischen Belastungen stand-
halten.

Der gegenüberliegende An-
schluß kann durch einen Meß-
stutzen verschlossen werden.

Der Meßstutzen erlaubt die Mes-
sung des tatsächlich wirkenden
Reglerausgangsdruckes.

Der Anschluß des externen Im-
pulses am Gasgerät erfolgt nach
Maßgabe des Geräteherstellers.

**External pulse connection, ex-
ternal pulse is prepared**

Connect the external pulse line to
the connections on the diaphragm
shell.

Secure the connection against
deforming and break-off. It must
be gas-tight and permanent and
must withstand mechanical, ther-
mal and chemical stresses.

You can seal the opposite connec-
tion using a test nipple.

Using the test nipple, you can meas-
ure the actual active regulator out-
let pressure.

Follow the dimension specifications
of the equipment manufacturer
when connecting the external pulse
line to the gas equipment.

**Prise d'impulsion externe, l'im-
pulsion externe est préparée**

La prise d'impulsion externe s'ef-
fectue aux raccordements prévus
sur le corps du régulateur à la
hauteur de la membrane.

La prise doit être résistante aux
déformations, à l'arrachement,
étanche au gaz et solide. Elle doit
résister aux charges mécaniques,
thermiques et chimiques.

La prise qui se trouve en face peut
être fermée à l'aide d'une prise de
mesure.

La prise de mesure permet de
mesurer la pression de sortie ef-
fective du régulateur.

Prise de l'impulsion externe de l'ap-
pareil à gaz conformément aux ins-
tructions du fabricant de l'appareil.

**Collegamento dell'impulso
esterno; l'impulso esterno è
predisposto**

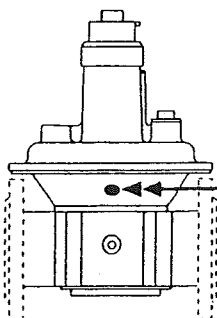
Il collegamento dell'impulso
esterno si effettua agli attacchi
della coppa della membrana.

L'attacco deve essere sicuro con-
tro deformazione e strappi; deve
essere a tenuta di gas e duraturo.
Deve essere resistente alle solle-
citazioni meccaniche, termiche e
chimiche.

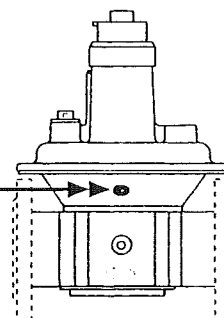
L'attacco sul lato opposto, si può
chiudere mediante un misurato-
re.

Il misuratore permette la misura-
zione della pressione di uscita
del regolatore veramente effica-
ce.

Per il collegamento dell'impulso
esterno all'apparecchio del gas,
attenersi alle istruzioni del fabbri-
cante dell'apparecchio.



**Externer Impulsanschluß
External pulse connection
Prise d'impulsion externe
Attacco impulso esterno**

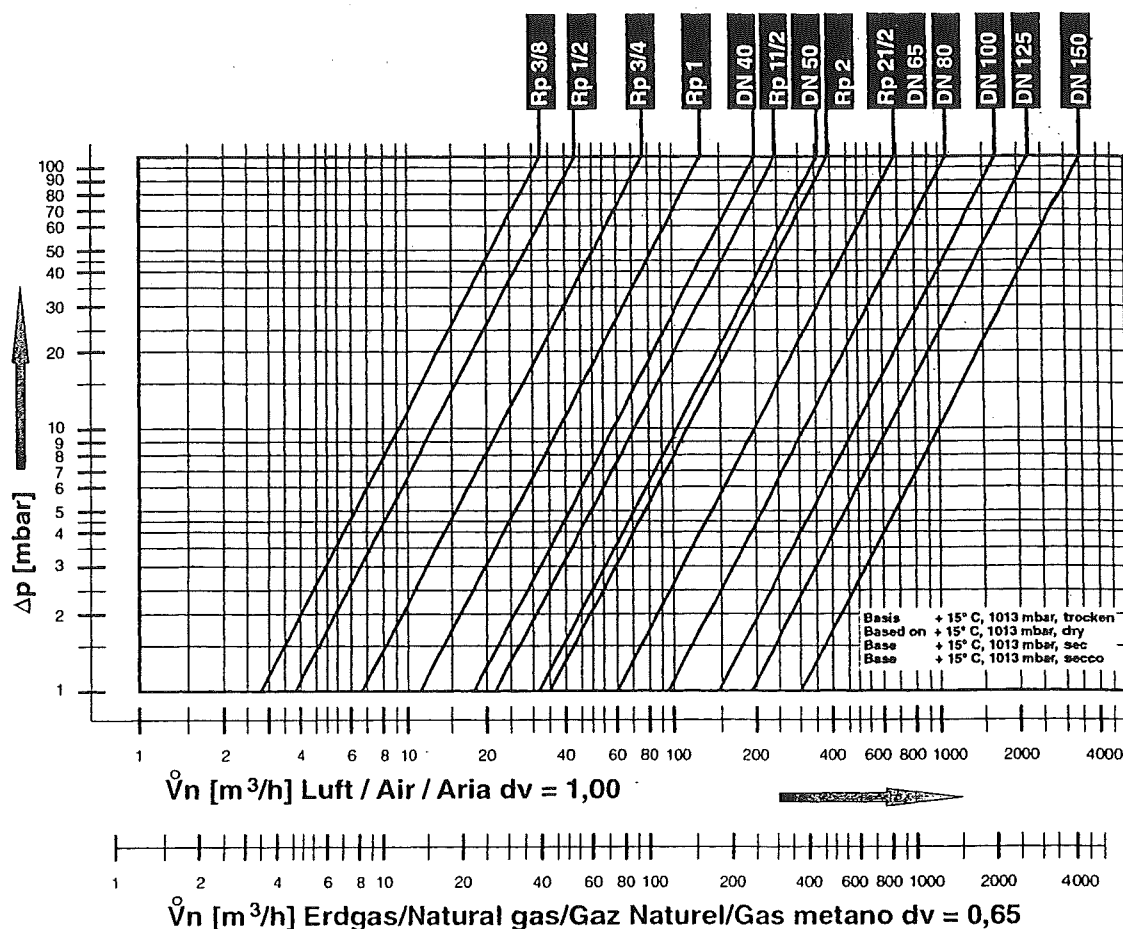


mechanisch offen / für Geräteauswahl FRNG Durchflußdiagramm 2 anwenden

mechanically open / use flow diagram 2 for equipment selection FRNG

mécaniquement ouvert / pour sélectionner un FRNG, utiliser la courbe des débits 2

aprire meccanicamente / per scelta dell'apparecchio FRNG utilizzare diagramma portata 2

**Gerätevorauswahl, blockierte Druckregelgeräte**

Mit Hilfe der Volumenstrom - Druckgefälle Kennlinie der Druckregelgeräte im mechanisch offenem Zustand ist eine Vorauswahl der Nennweite möglich.

Das Druckgefälle zwischen Eingangsdruck p_1 und Reglerausgangsdruck p_2 in Verbindung mit dem maximalem Volumenstrom V_{max} bestimmen die Nennweite des Druckregelgerätes.

Der durch Δp_{min} und V_{max} beschriebene Betriebspunkt liegt links der zuwählenden Nennweite des Druckregelgerätes.

Der Druckabfall über blockierte Druckregelgeräte wird durch die Kennlinien "mechanisch offen" beschrieben.

Die entgültige Festlegung erfolgt nach Maßgabe des Anlagenherstellers.

Equipment preselection, blocked pressure regulators

You can preselect the nominal diameter using the volume flow pressure reduction characteristic of the pressure regulators in mechanically open state. The pressure reduction between inlet pressure p_1 and regulator outlet pressure p_2 in connection with the maximum volume flow V_{max} determine the nominal diameter of the pressure regulator.

The working point described by Δp_{min} and V_{max} is on the left of the nominal diameter of the pressure regulator to be selected.

The pressure reduction via blocked pressure regulators is described by the "mechanically open" characteristics.

Final definition is performed according to the dimension specification of the equipment manufacturer.

Choix de l'appareil, pressostats bloqués

La ligne caractéristique de chute de pression de débit volumétrique des régulateurs de pression mécaniquement ouverts permet une présélection du diamètre nominal. La chute de pression entre la pression d'alimentation P_1 et la pression de sortie du régulateur P_2 en relation avec le débit volumétrique maximum V_{max} , déterminent le diamètre nominal du pressostat. Le point de fonctionnement décrit par Δp_{min} et V_{max} , se trouve à gauche du diamètre nominal à sélectionner du régulateur de pression.

La chute de pression par l'intermédiaire de régulateurs de pression bloqués est décrite par la ligne caractéristique "mécaniquement ouvert".

La détermination définitive s'effectue conformément aux instructions du fabricant de l'installation.

Preselezione degli apparecchi, regolatori di pressione bloccati

Con l'ausilio della curva caratteristica della differenza di pressione del flusso volumetrico dei regolatori di pressione allo stato di apertura meccanica, è possibile effettuare la preselezione del valore nominale.

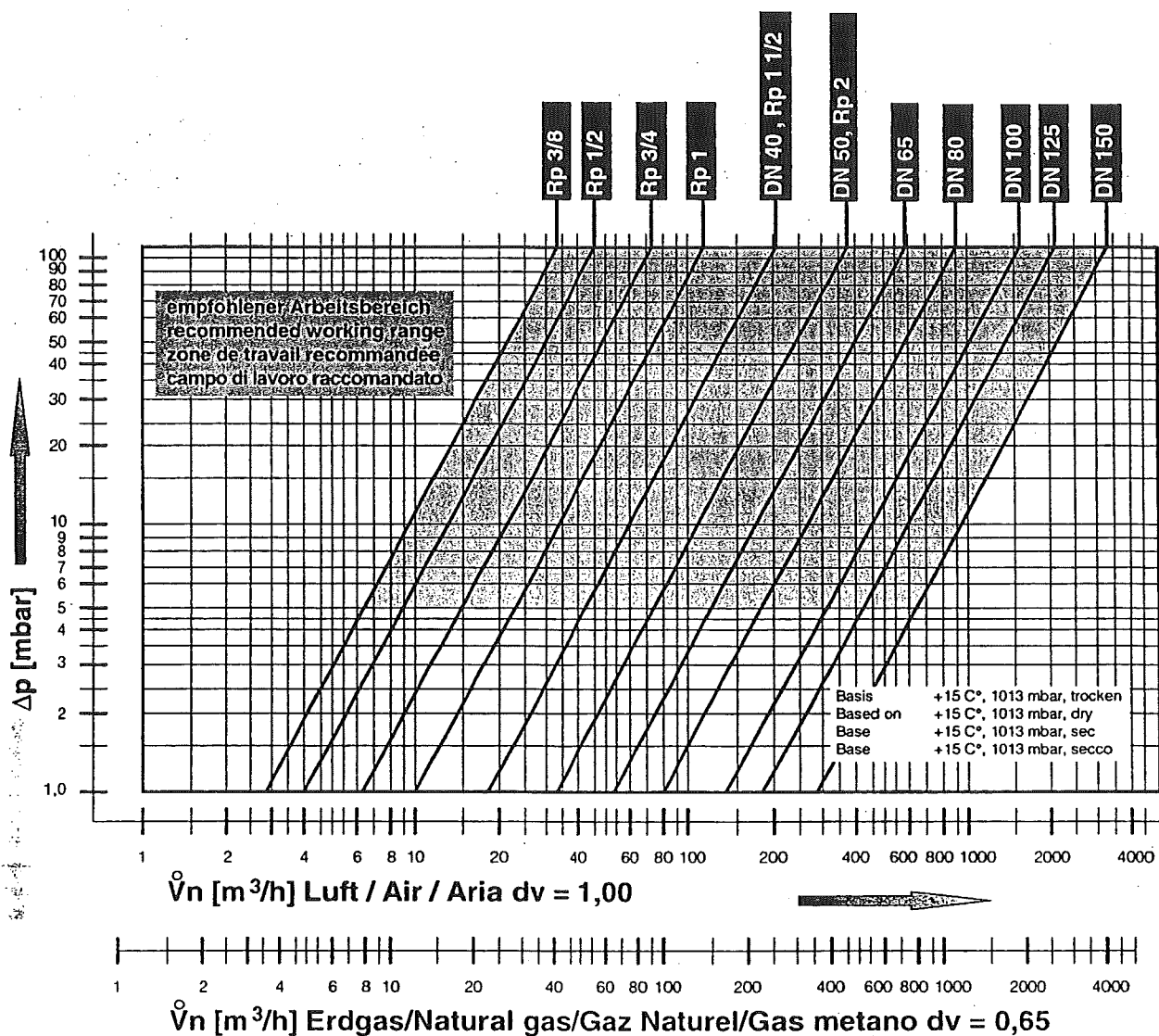
La differenza fra la pressione di entrata p_1 e la pressione di uscita dal regolatore p_2 , in combinazione con il flusso volumetrico massimo V_{max} , determinano il valore nominale del regolatore di pressione.

Il punto di esercizio descritto con Δp_{min} e V_{max} si trova a sinistra del valore nominale del regolatore di pressione, da selezionare.

La caduta di pressione attraverso regolatori di pressione bloccati, viene descritta tramite la curva caratteristica "apertura meccanica".

La determinazione definitiva avviene secondo le indicazioni del fabbricante degli apparecchi del gas.

Im eingeregelter Zustand
in regulated state
en régulation
già tarato



Nulldruckregler
Zero pressure regulator
Régulateur de pression zéro
Regolatore di pressione zero

$$\dot{V}_{min.} = 0,1 \times \dot{V}_{max.}$$

Gleichdruckregler
Air / gas ratio control
Régulateur de proportion
Regolatore di rapporto

$$\dot{V}_{min.} = 0,05 \times \dot{V}_{max.}$$

Druckluftgeführter Regler
Controlled by air pressure
A commande pneumatique
Regolatore comandato da aria compressa

$$\dot{V}_{min.} = 0,05 \times \dot{V}_{max.}$$

$$\dot{V}_{\text{verwendetes Gas/gas used/gaz utilisé/gas utilizzato}} = \dot{V}_{\text{Luft/air/aria}} \times f$$

f =

Dichte Luft
Air density
Poids spécifique de l'air
Densità dell'aria

spez. Gewicht des verwendeten Gases
Spec. weight of gas used
poids spécifique du gaz utilisé
peso specifico del gas utilizzato

Gasart
Type of gas
Type de gaz
Tipo di gas

Dichte
Density
Poids spécifique
Densità
[kg/m³]

d_v

f

Erdgas/Nat.Gas/
Gaz naturel/Gas metano

0.81

0.65

1.24

Stadtgas/City gas/
Gaz de ville/Gas città

0.58

0.47

1.46

Flüssiggas/LPG/
Gaz liquide/Gas liquido

2.08

1.67

0.77

Luft/Air/
Air/Aria

1.24

1.00

1.00

Ersatzteile / Zubehör Spare parts / Accessories Pièces de rechange / acces. Parti di ricambio / Accessori	Bestell-Nummer Order No. No. de commande Codice articolo
Verschlußschraube mit Dicht- ring Locking screw and sealing ring Bouchon fileté avec joint d'étanchéité Tappo a vite con guarnizione	5 Stück/Set 5 Pieces/Set 5 Pièces/Set 5 Pezzi/Set
G 1/8	230 395
G 1/4	230 396
G 1/2	230 401
G 3/4	230 402
Meßstutzen mit Dichtring Test nipple with sealing ring Prise de pression avec joint Misuratore con guarnizione	5 Stück/Set 5 Pieces/Set 5 Pièces/Set 5 Pezzi/Set
G 1/8	230 397
G 1/4	230 398
Atmungsstopfen Vent plug Bouchon percé Tappo di sfiato	5 Stück/Set 5 Pieces/Set 5 Pièces/Set 5 Pezzi/Set
G 1/4	230 399
G 1/2	230 403
Schutzkappe mit Plombierösen Protective cap with lead seal option Bouchon de protection avec oeillet de plombage Calotta di protezione con possibilità di piombatura	5 Stück/Set 5 Pieces/Set 5 Pièces/Set 5 Pezzi/Set
FRNG 505 - 510	230 400
FRNG 515 - 520, 5040 - 5050	230 404
FRNG 5065 - 5100	230 405
FRNG 5125, 5150	230 428
Dichtungen für Flansche Sealing ring for flanges Joints d'étanchéité pour brides Guarnizioni per flange	2 Stück/Set 2 Pieces/Set 2 Pièces/Set 2 Pezzi/Set
DN 40	231 600
DN 50	231 601
DN 65	231 603
DN 80	231 604
DN 100	231 605
DN 125	231 606
DN 150	231 783
Stiftschraubensatz Set of setscrews Goujons Serie di viti per acciaio	4 Stück/Set 4 Pieces/Set 4 Pièces/Set 4 Pezzi/Set
M 16 x 55 (DN 40 - DN 50)	230 422
M 16 x 65 (DN 65 - DN 100)	230 424
M 16 x 75 (DN 125)	230 430
M 20 x 90 (DN 150)	230 446
Blockierhülse Blocking sleeve Douille de blocage Cilindretto di bloccaggio FRNG 505 - FRNG 5150	auf Anfrage on request à la demande su richiesta
Meßwerke Repair kits Éléments de mesure Apparecchi di misurazione FRNG 505 - FRNG 5150	auf Anfrage on request à la demande su richiesta

Ersatzteile / Zubehör Spare parts / Accessories Pièces de rechange / acces. Parti di ricambio / Accessori	Bestell-Nummer Ordering No. No. de commande Codice articolo
Feder Auswahl FRNG / Selection of FRNG springs Sélection des ressorts FRNG / Scelta della molla FRNG	
Nr.1 2,5 - 9 mbar	braun/brown/brun/marrone
Nr.2 5 - 13 mbar	weiß/white/blanc/bianco
Nr.3 5 - 20 mbar	orange/orange/orange/arancia
Nr.4 10 - 30 mbar	blau/blue/bleu/blu
Nr.5 25 - 55 mbar	rot/red/rouge/rosso
Nr.6 30 - 70 mbar	gelb/yellow/jaune/giallo
Nr.7 60 - 110 mbar	schwarz/black/noir/nero
Nr.8 100 - 150 mbar	rosa/pink/rose/rosa
Nr.9 140 - 200 mbar	grau/grey/gris/grigio
FRNG 503/505 FRNG 507	
Nr.1 2,5 - 9 mbar	229 817 229 833
Nr.2 5 - 13 mbar	229 818 229 834
Nr.3 5 - 20 mbar	229 820 229 835
Nr.4 10 - 30 mbar	229 821 229 836
Nr.5 25 - 55 mbar	229 822 229 837
Nr.6 30 - 70 mbar	229 823 229 838
Nr.7 60 - 110 mbar	229 824 229 839
Nr.8 100 - 150 mbar	229 825 229 840
Nr.9 140 - 200 mbar	229 826 229 841
FRNG 510 FRNG 515/5040	
Nr.1 2,5 - 9 mbar	229 842 229 851
Nr.2 5 - 13 mbar	229 843 229 852
Nr.3 5 - 20 mbar	229 844 229 853
Nr.4 10 - 30 mbar	229 845 229 854
Nr.5 25 - 55 mbar	229 846 229 869
Nr.6 30 - 70 mbar	229 847 229 870
Nr.7 60 - 110 mbar	229 848 229 871
Nr.8 100 - 150 mbar	229 849 229 872
Nr.9 140 - 200 mbar	229 850 229 873
FRNG 520/5050	
Nr.1 2,5 - 9 mbar	229 874
Nr.2 5 - 13 mbar	229 875
Nr.3 5 - 20 mbar	229 876
Nr.4 10 - 30 mbar	229 877
Nr.5 25 - 55 mbar	229 878
Nr.6 30 - 70 mbar	229 879
Nr.7 60 - 110 mbar	229 880
Nr.8 100 - 150 mbar	229 881
Nr.9 140 - 200 mbar	229 882
FRNG 525/5065/5080	
Nr.1 2,5 - 9 mbar	229 883
Nr.2 5 - 13 mbar	229 884
Nr.3 5 - 20 mbar	229 885
Nr.4 10 - 30 mbar	229 886
Nr.5 25 - 55 mbar	229 887
Nr.6 30 - 70 mbar	229 888
Nr.7 60 - 110 mbar	229 889
Nr.8 100 - 150 mbar	229 890
Nr.9 140 - 200 mbar	229 891
FRNG 5100	
Nr.1 2,5 - 9 mbar	229 892
Nr.2 5 - 13 mbar	229 893
Nr.3 5 - 20 mbar	229 894
Nr.4 10 - 30 mbar	229 895
Nr.5 25 - 55 mbar	229 896
Nr.6 30 - 70 mbar	229 897
Nr.7 60 - 110 mbar	229 898
Nr.8 100 - 150 mbar	229 899
Nr.9 140 - 200 mbar	229 900
FRNG 5125 FRNG 5150	
Nr.1 2,5 - 9 mbar	229 901 229 909
Nr.2 5 - 13 mbar	229 902 229 910
Nr.3 5 - 20 mbar	229 903 229 911
Nr.4 10 - 30 mbar	229 904 229 912
Nr.5 25 - 55 mbar	229 905 229 913
Nr.6 30 - 70 mbar	229 906 229 914
Nr.7 60 - 110 mbar	229 907 229 915
Nr.8 100 - 150 mbar	229 908 229 916
Nr.9 140 - 200 mbar	243 416 243 417

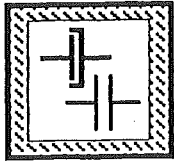


Arbeiten am Gas-Druckregelgerät dürfen nur von Fachpersonal durchgeführt werden.

Work on the gas pressure regulator may only be performed by specialist staff.

Seul du personnel autorisé peut effectuer des travaux sur le régulateur de pression.

Qualsiasi operazione effettuata sul regolatore di pressione gas deve essere fatta da parte di personale competente.

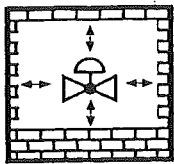


Flanschflächen schützen. Schrauben kreuzweise anziehen.

Protect flange surfaces. Tighten screws crosswise

Protéger les surfaces de brides. Serrer les vis en croisant.

Proteggere le superfici della flangia. Stringere le viti in modo incrociato.

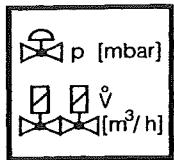


Direkter Kontakt zwischen dem Gas-Druckregelgerät und dem aushärtendem Mauerwerk, Betonwänden, Fußböden ist nicht zulässig.

Do not allow any direct contact between the gas pressure regulator and hardened masonry, concrete walls or floors.

Eviter tout contact direct entre le régulateur de pression et la maçonnerie, les cloisons en béton et planchers en cours de séchage.

Non é consentito il contatto diretto fra il regolatore di pressione gas e murature invecchiate, pareti in calcestruzzo, pavimenti.

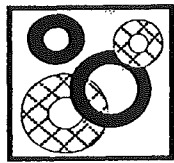


Nennleistung bzw. Druck-sollwerte grundsätzlich am Gas-Druckregelgerät einstellen. Leistungsspezifische Drosselung über das Magnetventil.

Always adjust nominal output or pressure set-points on the gas pressure regulator and performance-specific throttling using the solenoid valve.

Régler toujours le débit nominal ou les pressions de consigne sur le régulateur de pression. Limitation au niveau de la vanne, en fonction du débit.

Effettuare in linea di massima la regolazione di potenza nominale e valori nominali di pressione sul regolatore di pressione gas. La regolazione specifica di potenza va fatta attraverso la valvola.

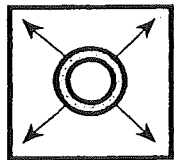


Grundsätzlich nach Teilausbau/-umbau neue Dichtungen verwenden.

Always use new seals after dismantling and mounting parts.

Après un démontage ou une modification, utiliser toujours des joints neufs.

In linea di massima, dopo lo smontaggio e il rimontaggio di alcune parti, utilizzare nuove guarnizioni.



Rohrleitungsdichtheitsprüfung: Kugelhahn vor den Armaturen/Gas-Druckregelgerät schließen.

Pipeline leak test: close ball cock upstream of fittings/FRNG.

Contrôle de l'étanchéité de la conduite: fermer le robinet à boisseau sphérique avant les robinetteries / FRNG.

Per la prova di tenuta delle tubature: chiudere il rubinetto a sfera davanti ai corpi valvola / FRNG.

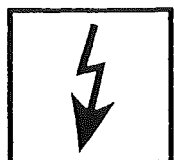


Nach Abschluß von Arbeiten am Gas-Druckregelgerät: Dichtheitskontrolle und Funktionskontrolle durchführen. $p_{\text{test}} \leq 500 \text{ mbar}$

On completion of work on the FRNG, perform leak and function test. $p_{\text{test}} \leq 500 \text{ mbar}$

Une fois les travaux sur le FRNG terminés, procéder toujours à un contrôle d'étanchéité et de fonctionnement. $p_{\text{test}} \leq 500 \text{ mbar}$

Al termine dei lavori effettuati su un FRNG: predisporre un controllo sia della tenuta che del funzionamento. $p_{\text{test}} \leq 500 \text{ mbar}$



Niemals Arbeiten durchführen, wenn Gasdruck oder Spannung anliegt. Offenes Feuer vermeiden. Öffentliche Vorschriften beachten.

Never perform work if gas pressure or power is applied. No naked flame. Observe public regulations.

Ne jamais effectuer des travaux sous pression et ou sous tension. Eviter toute flamme ouverte. Observer les réglementations.

In nessun caso si debbono effettuare lavori in presenza di pressione gas o di tensione elettrica. Evitare i fuochi aperti e osservare le prescrizioni pubbliche.



Bei Nichtbeachtung der Hinweise sind Personen- oder Sachfolgeschäden denkbar.

If these instructions are not heeded, the result may be personal injury or damage to property.

En cas de non-respect de ces instructions, des dommages corporels ou matériels sont possibles.

La non osservanza di quanto suddetto può implicare danni a persone o cose.

Änderungen, die dem technischen Fortschritt dienen, vorbehalten / We reserve the right to make any alterations in the course of technical progress
Sous réserve de toute modification constituant un progrès technique / Ci riserviamo qualsiasi modifica tecnica e costruttiva

Verwaltung und Betrieb
Head Offices and Factory
Usine et Services
Administratifs
Amministrazione e
Stabilimento

Karl Dungs GmbH & Co. KG
Siemensstr. 6-10
D-73660 Urbach
Telefon +49 (0)7181-804-0
Telefax +49 (0)7181-804-166

Korrespondenzanschrift
Postal address
Adresse postale
Indirizzare la corrispondenza a

Karl Dungs GmbH & Co. KG
Postfach 12 29
D-73602 Schorndorf
e-mail info@dungs.com
Internet www.dungs.com

ELSTER  **Jeavons**

**Catalogue,
Performance,
Maintenance and
Commissioning
Instructions for
1 1/2" - 2"**

J125

Regulator

ELSTER AMCO

J125

1½" & 2" Service Regulator

Catalogue

General Information

CS2503C

Regulating Capacity

Flow Capacity Figures – 1½" size

DS2501B

Flow Capacity Figures – 2" size

DS2502B

Commissioning Instructions

How to install the unit

E2504E

General Arrangements

Units with no Safety Shut Off

Units with OPSS

Units with OPSS & UPSS

Diaphragm Case Assembly

OPSS Assembly

OPSS / UPSS Assembly

UPSS Assembly

Parts List

General Parts List

Spares Kits

Alternative Valve Seats

Spring Table

Loading Springs Available

Maintenance Instructions

Regulator Assembly

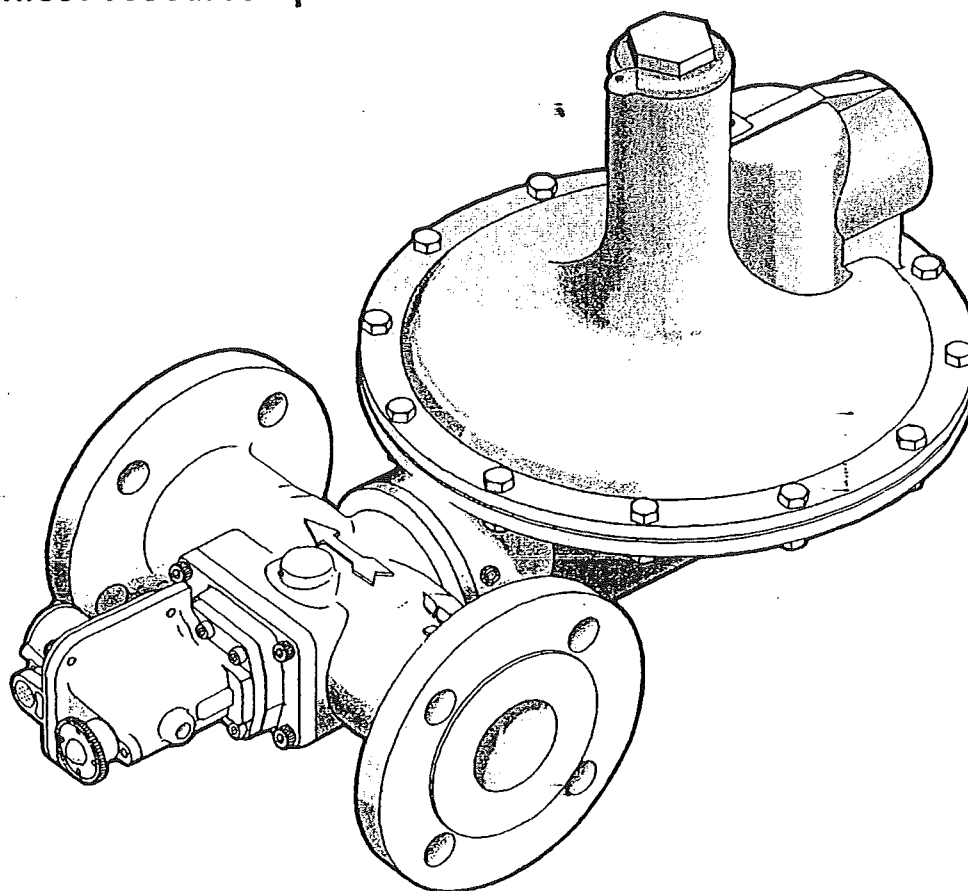
Diaphragm Case Assembly

Safety Shut Off Assembly

1½" / 2" J125 MKII

Example illustrated is a
J125-S4 version with USSA
Over Pressure Slam Shut option.

Inlet Pressures up to 8.6 Bar



The MKII Jeavons J125 service regulator is fitted with an improved internal mechanism and can be supplied with the USSA safety shut-off assembly for both overpressure and/or underpressure protection.

APPLICATION

The J125 series provides a full range of regulators for service applications where accurate pressure control is required. The units are ideal for industrial pressure reducing, metering stations and for district distribution. A monitor version of the J125 is also available. The regulators are designed to maintain high accuracy and efficiency with inlet pressures up to 8.6 Bar (125 PSIG). Available with screwed connections, sizes 1½" and 2", and 50mm flanged connections.

Several valve orifices are available to cover the full inlet pressure range, together with a comprehensive number of outlet pressure springs.

The unit has been designed for ease of installation and servicing in confined areas. The diaphragm case can be fully rotated and, during inspection and servicing, the case can be removed without disturbing the pipework.

All units are suitable for operation on natural, liquid petroleum and manufactured gases.

Various versions of this regulator comply with the requirements of BGC/PS/E26 & IGE/TD/10. The USSA unit is designed to meet the requirements of the standards BGES/V9 & DIN3381.

SIZES

1½" x 1½", 2" x 2" and 50mm x 50mm

NORMAL OPERATING TEMPERATURE

-20°C to +70°C.

CONNECTIONS

Taper or parallel screwed to BS21

Flanged to DIN, BS4504-NP16

Other standards may be available upon request

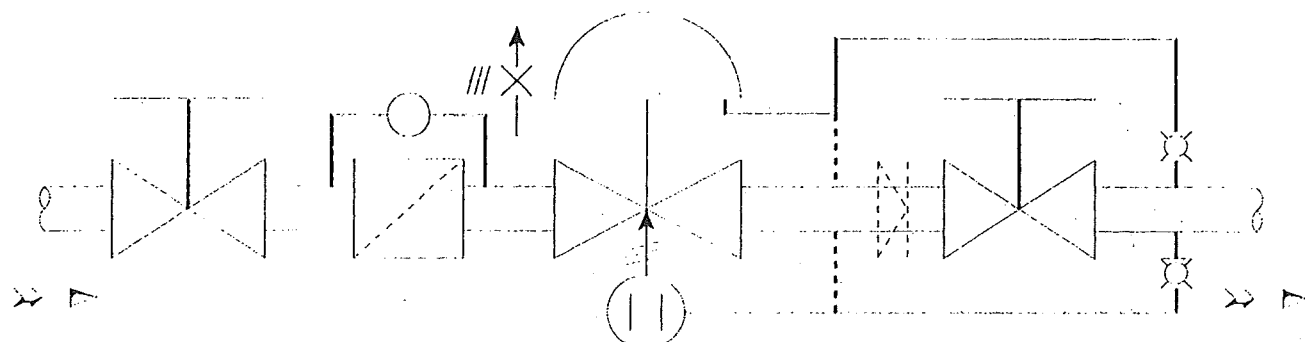
APPROVAL

The 1½" and 2" J125 has been approved to modules B + D of the PED 97/23/EC by BSI (Notified body No. 0086). It is classified as Category IV equipment and a pressure accessory.

OPTIONS

The J125 can be fitted with a full or limited capacity relief valve. In addition, the regulator can be supplied with the Jeavons Universal Safety Shut-off Assembly (USSA). This provides overpressure and/or underpressure protection with immediate shut-off at the regulator inlet. It uses well proven principles to give exceptional consistency of operation and an unrivalled insensitivity to nuisance tripping. The J125 is also available for use in a monitor application.

SCHEMATIC INSTALLATION DIAGRAM



REGULATOR SPRINGS

All Springs are colour coded for ease of identification.

mb	" WC	Part No.	Colour
8.8 - 15	3.5 - 6	J12509-091	Red
14 - 20	5.5 - 8	J12509-092	Orange
21 - 35	8.5 - 14	J12509-093	Yellow
36 - 70	14.5 - 28	J12509-094	Green
69 - 138	1 - 2 PSI	J12509-095	Royal Blue
104 - 173	1.5 - 2.5 PSI	J12509-096	Brown - Royal Blue
138 - 207	2 - 3 PSI	J12509-097	Brown - Green
207 - 350	3 - 5 PSI	J12509-098	Black - Green

OPSS SPRINGS

mb	" WC	Part No.	Colour
18 - 60	7.5 - 24	J12506 - 281	Black
50 - 80	20 - 32	J12506 - 282	Orange
60 - 110	24 - 44	J12506 - 283	Red
100 - 210	40 - 84	J12506 - 284	Dark Green
200 - 350	3 - 5 PSI	J12506 - 287	Yellow
280 - 500	4 - 7 PSI	J12506 - 288	White

UPSS SPRINGS

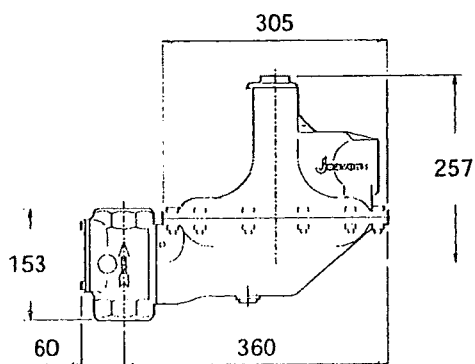
mb	" WC	Part No.	Colour
8 - 16	3 - 6	J12506 - 285	Light Blue
16 - 60	6 - 24	J12506 - 286	Brown
60 - 150	24 - 60	J12506 - 289	Purple

J125 VERSIONS

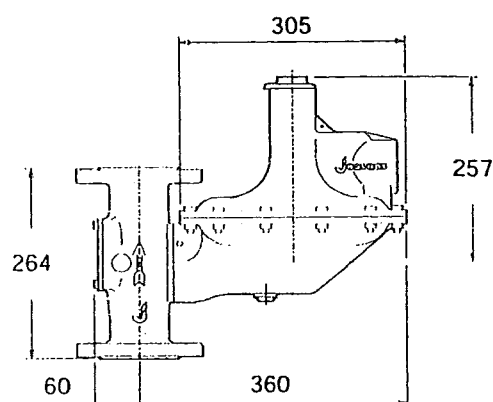
The following table indicates the code numbers for the various J125 versions available.

TYPE	Full Capacity Relief (FR)	Limited Capacity Relief (LR)	Over Pressure Slam Shut (OPSS)	Under Pressure Slam Shut (UPSS)	Unit Weight (kg)	
					Screwed	Flanged
J125 - S1					10.4	16.5
J125 - S2	*				10.4	16.5
J125 - S3		*			10.4	16.5
J125 - S4	*		*		10.9	17.0
J125 - S5		*	*		10.9	17.0
J125 - S6	*			*	10.9	17.0
J125 - S7		*		*	10.9	17.0
J125 - S8	*		*	*	10.9	17.0
J125 - S9		*	*	*	10.9	17.0
J125 - S10			*		10.9	17.0
J125 - S11				*	10.9	17.0
J125 - S12			*	*	10.9	17.0

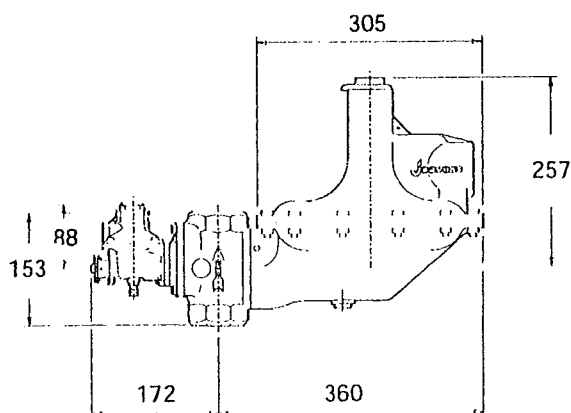
J125 S1/S2/S3 SCREWED



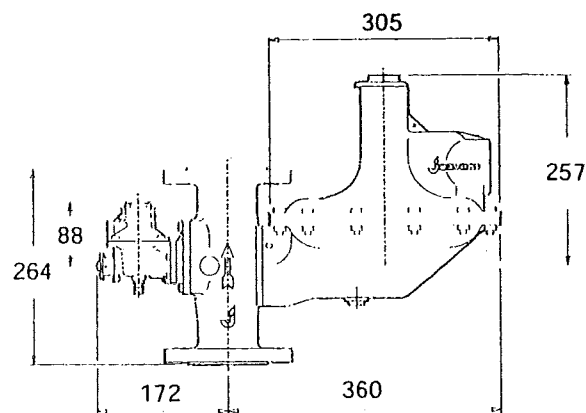
J125 S1/S2/S3 FLANGED



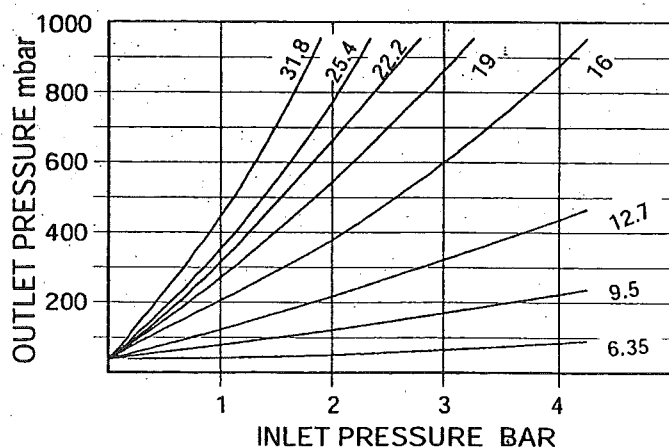
J125 S4 - S12 SCREWED



J125 S4 - S12 FLANGED



RELIEF VALVE PERFORMANCE



ORIFICE SIZES

Orifice Size	
Inches	(mm)
1/4"	6.35
3/8"	9.5
1/2"	12.7
5/8"	15.9
3/4"	19.1
7/8"	22.2
1"	25.4
1 1/4"	31.8

INLET PRESSURES

For maximum inlet pressures see separate data sheets

ORIFICE SELECTION

For optimum regulator performance, the largest permissible orifice size should be selected from this table. For the optimum relief valve performance, the smallest orifice should be selected.

SERVICING

The J125 has been designed for ease of access, inspection and servicing of all the internal components. A soft spares kit is available for all versions.

MATERIAL SPECIFICATION

Description	Material
Regulator Body	Nodular Iron BS2789
Regulator Valve Disc and "O"Rings, USSA Diaphragm	Nitrile Synthetic Rubber (Buna)
USSA Valve Disc and "O"Rings	Nitrile Synthetic Rubber (DIN 3535 Part 3)
Regulator Valve, Valve Seat and USSA Valve	Aluminium Alloy BS4300/5 or BS1474
Regulator Case and Cover, Relief Valve, Spring Holder, Top Cap, Adaptor Plate, USSA Body and Cover	Aluminium Alloy BS1490
Regulator and USSA Valve Spindle	Stainless Steel BS970
Regulator Diaphragm	Reinforced Synthetic Rubber
USSA Internals	Acetal Resin
Lever Arm, Regulator Diap Plate, Vent Valve Plates, Clamping Plate and Spring Guide	Mild Steel, Zinc Plated and Passivated
Springs	Carbon Steel, Zinc Plated and Passivated

QUALITY

Elster Jeavons is committed to a programme of continuous quality enhancement. All equipment designed and manufactured by Elster Jeavons benefits from the company's quality assurance standards, which are approved to ISO 9001 (BS5750 Part 1).

PERFORMANCE

Detailed performance data is provided on separate technical bulletins.

Elster Jeavons has a programme of continuous product development and improvement and in consequence the information in this leaflet may be subject to change or modification without notice

Capacities in SCMH 0.6sg gas

Droop = 20%

CAPACITY CHART

6.35mm (1/4") Orifice

Spring Range (mbar)	8.8 - 15	14 - 20	21 - 35	36 - 70	69 - 138	104 - 173	138 - 207	207 - 350
Setting Pressure (mbar)	15	17.5	35	60	100	150	200	345
Inlet Pressure (mbar)								
350	34	35	32	30	30	26	22	-
689	50	51	49	50	47	38	45	35
1000	60	60	59	58	58	56	55	55
1500	76	76	75	72	72	75	70	75
2000	91	92	91	90	85	95	90	95
3000	121	121	121	126	115	120	110	115
4000	145	150	155	155	145	155	140	150
5000	160	165	175	175	170	180	170	175
6000	180	185	180	185	180	190	180	185
8000	230	230	240	230	230	240	215	225

9.5mm (3/8") Orifice

69	20	20	-	-	-	-	-	-
138	34	36	28	-	-	-	-	-
200	40	42	38	38	-	-	-	-
350	53	55	50	53	44	42	41	-
689	76	78	72	80	68	70	73	58
1000	87	92	88	99	86	91	95	80
1500	104	108	109	123	111	116	122	114
2000	119	124	126	152	130	146	151	140
3000	140	144	157	186	178	190	196	190
4000	160	164	178	218	210	230	242	236
5000	180	185	207	244	230	250	264	258
7000	-	-	-	282	284	294	311	314

12.7mm (1/2") Orifice

50	27	29	20	-	-	-	-	-
69	33	35	27	-	-	-	-	-
138	49	52	45	48	-	-	-	-
200	57	61	55	61	42	-	-	-
350	72	75	74	83	63	64	68	-
689	93	97	102	115	95	105	114	90
1000	107	111	121	135	118	131	149	125
1500	120	124	142	166	152	167	182	174
2000	132	137	157	182	180	198	222	211
3000	152	157	182	212	219	246	282	274
4000	174	178	208	234	251	292	322	326
5000	-	-	224	249	274	314	344	349

15.9mm (5/8") Orifice

50	32	33	-	-	-	-	-	-
69	38	40	32	-	-	-	-	-
138	53	56	49	67	-	-	-	-
200	60	64	58	75	54	-	-	-
350	72	76	75	99	77	77	78	-
689	89	93	96	129	115	120	128	104
1000	100	105	115	149	137	146	167	141
1500	113	120	132	170	170	184	207	195
2000	123	128	148	190	196	211	239	225
3000	142	149	173	210	233	254	287	288
4000	-	-	194	230	259	287	324	338
5000	-	-	-	-	270	304	344	360

Capacities in SCMH 0.6sg gas

Droop = 20%

19.1mm (¾") Orifice

Spring Range (mbar)	8-8-15	14-20	21-35	36-70	69-138	104-173	138-207	207-350
Setting Pressure (mbar)	15	17.5	35	60	100	150	200	345
Inlet Pressure (mbar)								
50	40	43	-	-	-	-	-	-
69	48	51	37	-	-	-	-	-
138	64	68	57	71	-	-	-	-
200	72	77	70	86	58	-	-	-
350	90	93	90	112	87	88	96	-
689	113	115	120	150	123	137	154	124
1000	127	129	138	167	154	171	188	168
1500	150	154	163	193	181	202	238	220
2000	170	174	183	212	210	240	274	266
3000	194	196	213	244	260	283	340	335
4000	-	-	242	273	285	322	397	416
5000	-	-	-	281	297	336	414	434

22.2mm (7/8") Orifice

50	41	45	-	-	-	-	-	-
69	51	56	-	-	-	-	-	-
138	70	76	67	-	-	-	-	-
200	79	86	85	98	-	-	-	-
350	95	102	109	131	100	102	109	-
689	123	130	145	179	150	167	193	162
1000	146	154	172	198	190	206	226	210
1500	182	188	203	236	234	257	288	279
2000	-	-	231	266	274	300	344	340
2500	-	-	-	289	305	337	386	392
3000	-	-	-	-	332	366	433	440

25.4mm (1") Orifice

50	47	51	40	-	-	-	-	-
69	54	57	49	-	-	-	-	-
138	71	76	73	-	-	-	-	-
200	77	84	84	105	70	73	-	-
350	94	99	108	131	105	115	120	130
689	121	126	136	167	150	179	198	163
1000	135	138	158	190	180	210	230	207
1500	-	-	189	215	215	246	285	270
2000	-	-	-	235	245	278	319	320

31.8mm (1¼") Orifice

50	43	45	48	-	-	-	-	-
69	50	53	56	-	-	-	-	-
138	66	73	82	96	-	-	-	-
200	78	82	92	117	83	-	-	-
350	94	97	117	143	122	141	144	-
689	-	-	149	178	174	208	210	195
1000	-	-	171	201	210	231	247	239
1500	-	-	-	-	234	269	296	306
2000	-	-	-	-	-	304	333	360

Capacities in SCMH 0.6sg gas. Droop = 20%

CAPACITY CHART

6.35mm (1/4") Orifice

Spring Range (mbar)	8.8 - 15	14 - 20	21 - 35	36 - 70	69 - 138	104 - 173	138 - 207	207 - 350
Setting Pressure (mbar)	15	17.5	35	60	100	150	200	345
Inlet Pressure (mbar)								
350	35	35	35	37	25	26	22	-
689	45	50	50	46	40	38	45	35
1000	60	60	60	60	55	56	55	55
1500	75	80	70	80	75	75	70	75
2000	85	90	95	90	95	95	90	95
3000	125	125	120	120	120	120	110	115
4000	155	150	155	155	145	155	140	150
5000	160	165	175	175	170	180	170	175
6000	180	185	180	185	180	190	180	185
8000	230	230	240	230	230	240	215	225

9.5mm (3/8") Orifice

Setting Pressure (mbar)	15	17.5	35	60	100	150	200	345
69	30	30	25	-	-	-	-	-
138	40	40	35	-	-	-	-	-
200	50	50	45	45	-	-	-	-
350	70	70	60	65	50	55	55	-
689	100	100	90	100	80	90	95	75
1000	125	125	120	125	105	115	125	100
1500	155	155	155	155	135	150	160	135
2000	185	190	190	190	165	190	190	170
3000	245	250	250	255	230	250	255	230
4000	310	315	315	315	300	315	315	300
5000	330	335	340	345	335	335	340	335
7000	-	-	-	405	400	405	415	410

12.7mm (1/2") Orifice

Setting Pressure (mbar)	15	17.5	35	60	100	150	200	345
50	25	30	25	-	-	-	-	-
69	30	35	30	-	-	-	-	-
138	50	55	45	50	-	-	-	-
200	70	75	60	65	40	40	-	-
350	100	110	85	100	85	70	80	-
689	150	160	130	145	105	115	135	90
1000	190	200	165	190	135	150	180	130
1500	245	255	225	250	180	205	240	180
2000	295	305	275	305	225	255	300	225
3000	380	410	390	430	315	355	420	315
4000	430	460	515	540	440	480	530	435
5000	-	-	580	580	540	550	580	535

15.9mm (5/8") Orifice

Setting Pressure (mbar)	15	17.5	35	60	100	150	200	345
50	35	38	-	-	-	-	-	-
69	45	48	30	-	-	-	-	-
138	75	80	55	-	-	-	-	-
200	90	95	65	85	50	-	-	-
350	130	135	95	120	70	80	80	-
689	205	210	150	190	115	135	135	115
1000	260	265	205	240	145	185	185	165
1500	335	345	285	320	195	245	255	230
2000	380	400	360	400	255	315	320	295
3000	445	470	525	555	370	455	465	420
4000	-	-	670	705	520	600	605	545
6000	-	-	-	-	-	700	700	640

Capacities in SCMH 0.6sg gas Droop = 20%

19.1mm (3/4") Orifice

Spring Range (mbar)	8.8 - 15	14 - 20	21 - 35	36 - 70	69 - 138	104 - 173	138 - 207	207 - 350
Setting Pressure (mbar)	15	17.5	35	60	100	150	200	345
Inlet Pressure (mbar)								
50	35	45	-	-	-	-	-	-
69	45	60	45	-	-	-	-	-
138	70	85	75	90	-	-	-	-
200	90	110	100	120	65	-	-	-
350	130	145	135	165	105	130	135	-
689	190	205	200	250	155	205	220	170
1000	235	250	250	300	210	265	290	235
1500	320	330	330	390	275	355	400	325
2000	370	395	420	485	350	455	500	415
3000	465	490	565	600	515	610	655	590
4000	-	-	600	655	615	690	760	760
5000	-	-	-	670	625	700	785	785

22.2mm (7/8") Orifice

50	40	45	-	-	-	-	-	-
69	45	55	-	-	-	-	-	-
138	70	85	80	-	-	-	-	-
200	95	110	100	125	-	-	-	-
350	130	145	140	170	105	120	125	-
689	195	205	205	240	160	190	215	165
1000	240	250	250	295	210	250	285	225
1500	320	330	330	390	290	335	375	310
2000	-	-	420	490	360	430	485	390
2500	-	-	-	560	440	520	580	475
3000	-	-	-	-	540	605	645	545

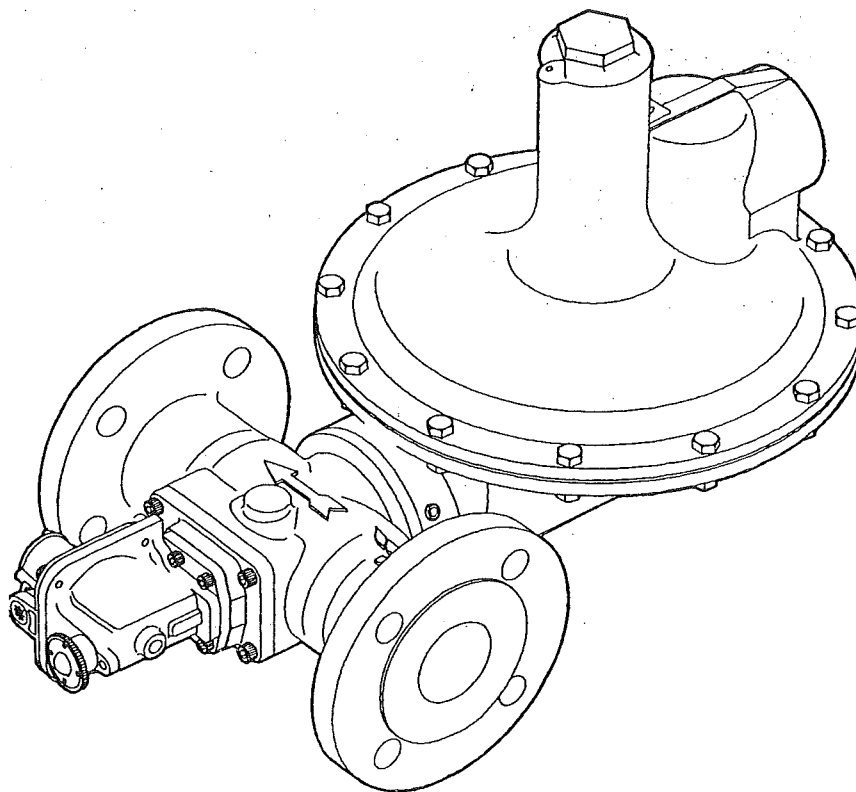
25.4mm (1") Orifice

50	50	45	40	-	-	-	-	-
69	65	58	48	-	-	-	-	-
138	100	95	75	-	-	-	-	-
200	135	125	100	140	75	90	-	-
350	175	168	135	180	120	140	80	-
689	265	260	230	300	190	230	150	170
1000	330	335	305	360	250	300	210	245
1500	-	-	371	416	330	330	300	360
2000	-	-	-	-	420	510	375	460

31.8mm (1 1/4") Orifice

50	65	60	50	-	-	-	-	-
69	80	80	60	-	-	-	-	-
138	130	125	105	-	-	-	-	-
200	165	165	135	180	110	-	-	-
350	220	220	190	245	150	180	160	-
689	-	-	290	365	240	280	290	215
1000	-	-	380	450	325	345	390	315
1500	-	-	-	-	460	490	520	465
2000	-	-	-	-	-	600	630	570

COMMISSIONING AND MAINTENANCE INSTRUCTIONS



REGULATOR TYPES

TYPE	FULL CAPACITY RELIEF	LIMITED CAPACITY RELIEF	OVER PRESSURE SAFETY DEVICE	UNDER PRESSURE SAFETY DEVICE
J125-S1				
J125-S2	✓			
J125-S3		✓		
J125-S4	✓		✓	
J125-S5		✓	✓	
J125-S6	✓			✓
J125-S7		✓		✓
J125-S8	✓		✓	✓
J125-S9		✓	✓	✓
J125-S10			✓	
J125-S11				✓
J125-S12			✓	✓

CHECK WITH DESIGNATION
NUMBER ON REGULATOR NAMEPLATE
AND CROSS REFERENCE TO TABLE TO
ESTABLISH WHICH, IF ANY, OF THE
SAFETY FEATURES ARE FITTED.

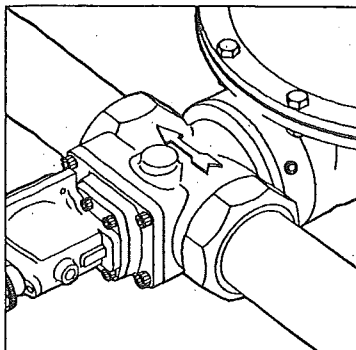
FITTING UNITS INTO PIPEWORK.

Fig. 1.

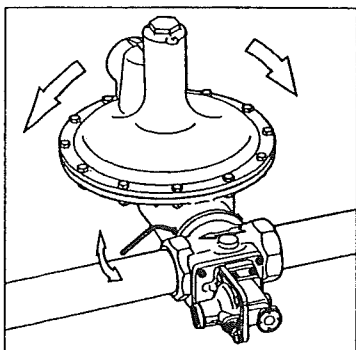


Fig. 2.

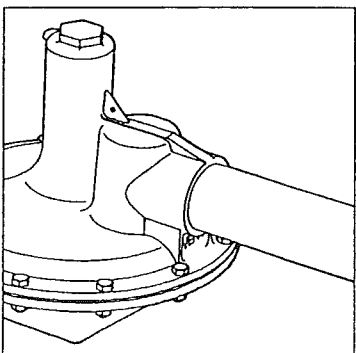


Fig. 3.

- 1) The unit should not be installed in a corrosive environment.
- 2) The ambient temperature (surface temperature) should be within the limits stated on the regulator catalogue.
- 3) Check the maximum allowable pressure on the regulator nameplate against the installation specification.
- 4) Remove the protection from inlet and outlet ports.
- 5) Ensure that installation pipework is thoroughly clean.
- 6) The direction of gas flow must be the same as the arrows on the regulator body. See Fig. 1.
- 7) Install the regulator into pipework using jointing compound approved to national standards.
- 8) In order to fit the regulator into confined spaces it may be necessary to rotate the diaphragm case. This is achieved by slacking off the three set screws, rotating the diaphragm case, and then re-tightening the set screws evenly. See Fig. 2.

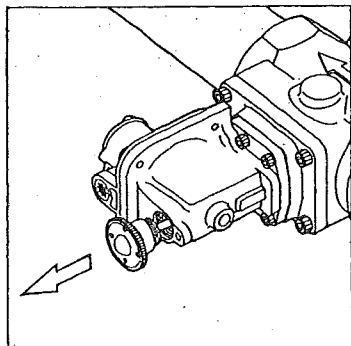
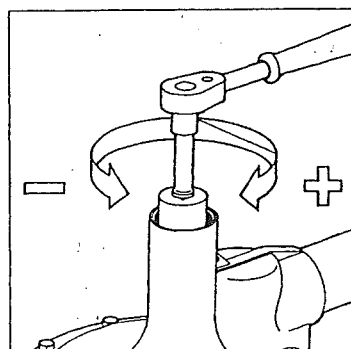
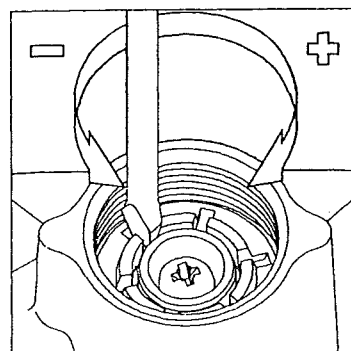
INSTALLATION OF VENT LINE.

- 1) Remove clip and vent screen from regulator top cover.
- 2) Connect the vent line (2"), using a jointing compound approved to national standards, and lead to atmosphere in accordance with national standards. Ensure that no water can penetrate vent pipeline. See Fig. 3.
- 3) If the regulator is fitted with an internal relief valve, ensure that the vent line is of sufficient diameter to carry gas vented by the relief valve to a safe outside location. Reference to any national standard.

FOR PRE-SET UNITS ONLY.

- 1) Turn off downstream valves.
- 2) Slowly turn on inlet supply.
- 3) If safety shut-off device is not fitted, go to instruction 6.
- 4) If safety shut-off device is fitted unscrew reset spindle end cap and firmly pull. Hold in this position until the outlet pipework is fully pressurised, then release reset spindle end cap gently. See Fig. 4.
- 5) Re-screw reset spindle end cap into body, ensuring not to jam reset spindle.
- 6) Commission downstream appliances.

WARNING : DO NOT UNDER ANY CIRCUMSTANCES WEDGE OPEN SAFETY SHUT-OFF RESET END CAP AS THIS WILL NOT ALLOW THE SAFETY DEVICE(S) TO FUNCTION IN ADVERSE PRESSURE CONDITIONS.

**SETTING THE REGULATOR & SAFETY
SHUT OFF DEVICE PRESSURES.**

Fig. 4.

Fig. 5.

Fig. 6.

OPSS = Over Pressure Safety Shut-off.
UPSS = Under Pressure Safety Shut-off.

- 1) Turn off inlet and outlet valve's).
 - 2) Remove top cap from regulator cover.
 - 3) Insert a 11/4" A/F socket over the top of the adjustment screw.
 - 4) Turn anticlockwise (-) to reduce loading on regulator spring to minimum. See Fig. 5 (If no safety devices are fitted go to instruction 10).
 - 5) Remove top cap from safety shut-off device cover (If UPSS only go to instruction 8).
 - 6) Insert a flat bladed screwdriver into one of the partial slots on the OPSS spring holder. See Fig. 6.
 - 7) Turn clockwise (+) to increase loading on OPSS spring to maximum
 - 8) If UPSS fitted, insert a pozidriv screw driver (No.2 point) into UPSS adjusting screw in bottom spring holder. See Fig. 7.
 - 9) Turn anticlockwise (-) to reduce loading on UPSS spring, making sure screw head does not protrude from the bottom spring holder.
 - 10) Slowly open inlet valve's).
 - 11) If safety device fitted, re-cock by unscrewing reset spindle end cap and pulling firmly. Hold in this position until the outlet pipework is fully pressurised, then release reset spindle end cap gently. Re-screw reset spindle end cap into body. See Fig. 4.
 - 12) Turn regulator adjustment screw clockwise (+) to increase the loading on the spring until the required outlet pressure, plus approximately 1"wg (2.5mbar) is obtained. (This is an allowance for the regulator being set with zero flowrate).
- If UPSS only go to instruction 19, if no safety device go to instruction 26.
- 13) Apply external pressure source to a suitable point on the outlet pipework. Increase pressure to that required for OPSS trip-off.
- Note: If pressure test point on underside of slam shut unit is used as external source point, care must be taken to ensure pressures are equalised across restricted orifice within test point.
- 14) Slowly turn OPSS spring holder anticlockwise (-) until OPSS device trips off. See Fig. 6.
 - 15) Reduce external pressure source to level set in instruction 12.

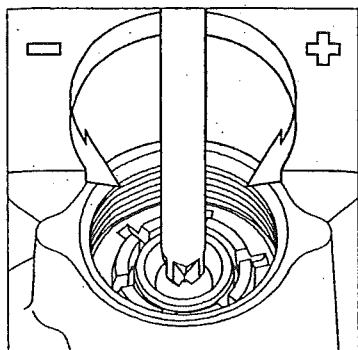


Fig. 7.

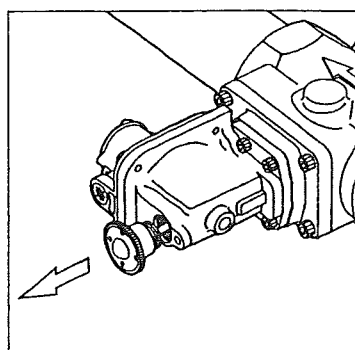


Fig. 8.

16) Re-cock OPSS device by unscrewing reset spindle end cap and firmly pull. Hold in this position until the outlet pipework is fully pressurised, then release reset spindle end cap gently. Re-screw reset spindle end cap into body. See Fig. 8.

17) Slowly increase external pressure to check for OPSS trip-off. Trim adjustment if necessary and repeat instructions 15 - 17.

18) Remove external pressure source.

NOTE : OPSS device is now set.

19) Close inlet valve's.

20) Reduce inlet pressure to approximately 2 PSI (140mbar).

21) Reduce outlet pressure by introducing a slow controlled bleed until the required UPSS trip-off pressure is obtained and close bleed.

22) Slowly turn UPSS adjusting screw clockwise (+) until UPSS device trips off. See Fig. 7.

23) Slowly open inlet valve to regain inlet pressure up to approximately 2 PSI (140mbar), then close inlet valve.

24) Re-cock UPSS device by unscrewing reset spindle end cap and firmly pull. Hold in this position until the outlet pipework is fully pressurised, then release reset spindle end cap gently. Re-screw reset spindle end cap into body. See Fig. 8.

25) Slowly reduce outlet pressure to check for UPSS trip-off. Trim adjustment if necessary and repeat instructions 23 - 25.

NOTE : UPSS device is now set.

26) Commission installation's.

27) Trim the regulator outlet pressure if necessary once normal flow rates have been achieved.

28) Replace all top caps (seal if necessary).

WARNING : DO NOT UNDER ANY CIRCUMSTANCES WEDGE OPEN SAFETY SHUT-OFF RESET END CAP AS THIS WILL NOT ALLOW THE SAFETY DEVICE(S) TO FUNCTION IN ADVERSE PRESSURE CONDITIONS.

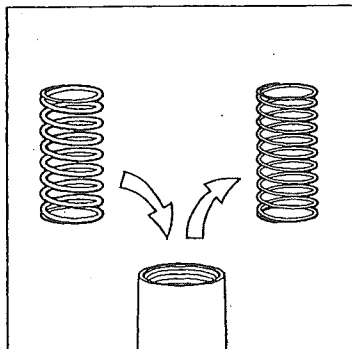


Fig. 9.

IF THE REQUIRED REGULATOR OUTLET PRESSURE CANNOT BE ACHIEVED WITH THE SPRING FITTED.

- 29) Remove top cap from regulator cover.
- 30) Choose a loading spring from catalogue or page 17 that will give the required outlet pressure range.
- 31) Fully unscrew and remove the adjustment screw, See Fig. 10.
- 32) Remove spring and replace with new one. See Fig. 9.
- 33) Screw adjustment screw back in place.
- 34) Adjust the outlet pressure as described previously.
- 35) Replace the top cap (seal if necessary).

NOTE : Outlet pressure is now set.

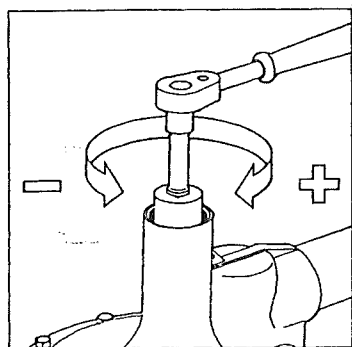


Fig. 10.

IF THE REQUIRED TRIP-OFF PRESSURES CANNOT BE ACHIEVED WITH THE SPRINGS FITTED.

A) OPSS spring.

- 36) Remove top cap from the safety shut-off device cover.
- 37) Choose an OPSS spring from the catalogue or page 17 that will give the required pressure range.
- 38) Fully unscrew and remove top spring holder. See Fig. 11.
- 39) Remove spring and replace with new one. See Fig. 9.
- 40) Screw spring holder back in place, ensuring that castellated spigot is uppermost in chimney. See Fig. 11.
- 41) Adjust the trip-off pressure as described previously.
- 42) Replace the top cap (seal if necessary).

NOTE : OPSS pressure is now set.

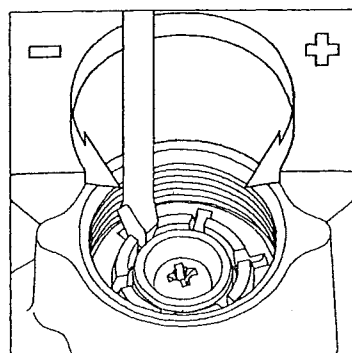
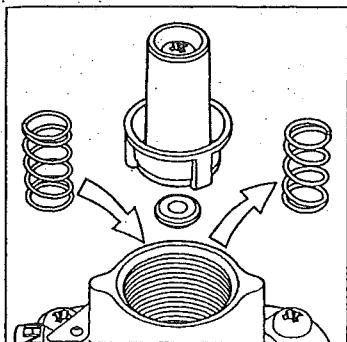


Fig. 11.

B) UPSS spring.

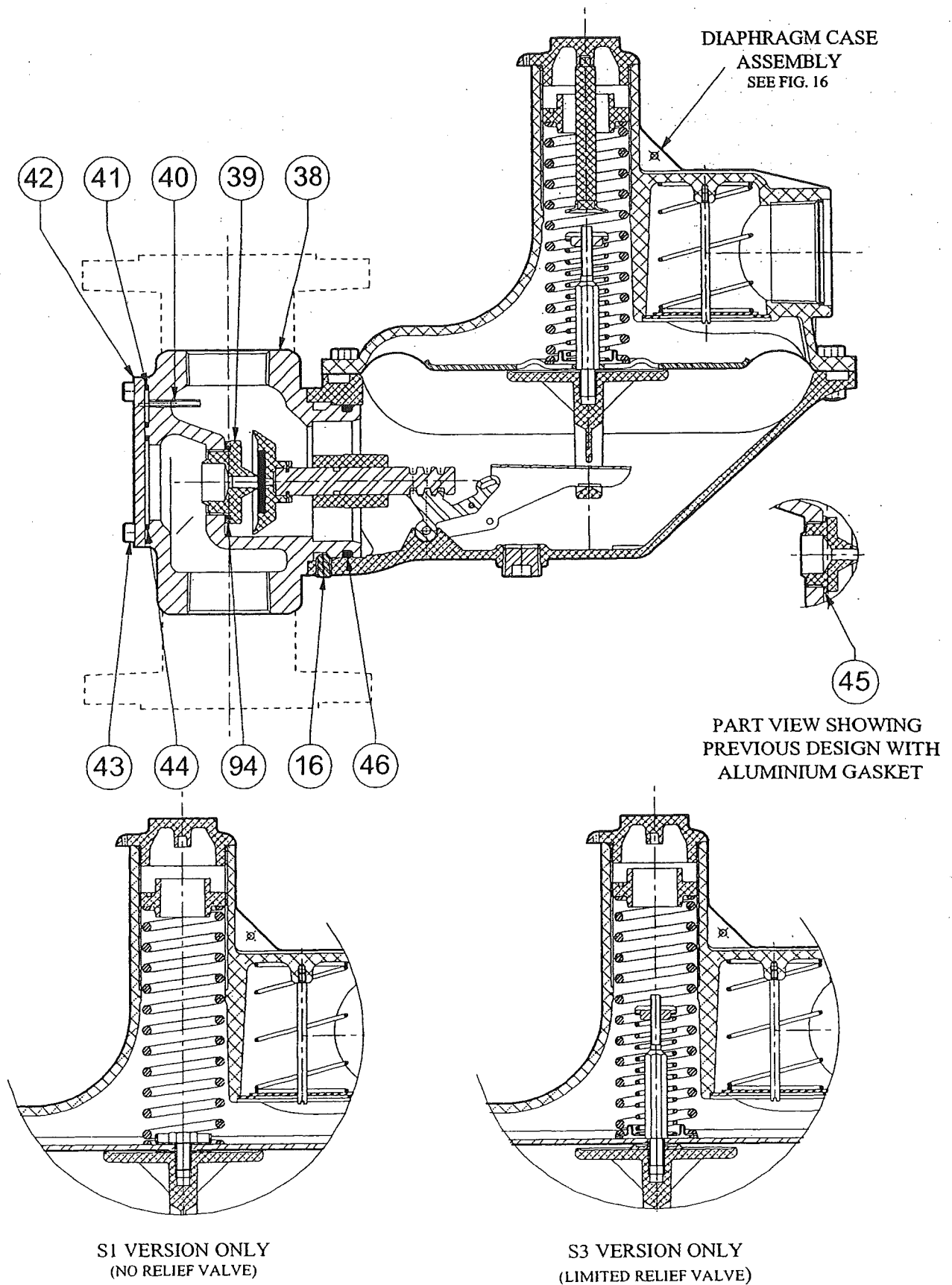
- 43) Remove top cap from the safety shut-off device cover.
- 44) Choose an UPSS spring from the catalogue or page 17 that will give the required pressure range.
- 45) Fully unscrew and remove top spring holder. See Fig. 11.
- 46) Remove OPSS spring (or spacer tube if UPSS only).



- 47) Remove bottom spring holder and UPSS top spring holder.
- 48) Remove UPSS spring and replace with new one. See Fig. 12.
- 49) Replace UPSS spring holder, ensuring that spigot locates in UPSS spring.
- 50) Replace bottom spring holder locating three webs into slots in bottom of cover, ensuring not to disturb UPSS spring and UPSS spring holder.
- 51) Replace OPSS spring (or spacer tube if UPSS only).
- 52) Screw top spring holder back in place, ensuring that castellated spigot is uppermost in chimney. See Fig. 11. (If UPSS only ensure that spacer tube is firmly clamped).
- 53) Adjust the trip-off pressure as described previously.
- 54) Replace the top cap (seal if necessary).

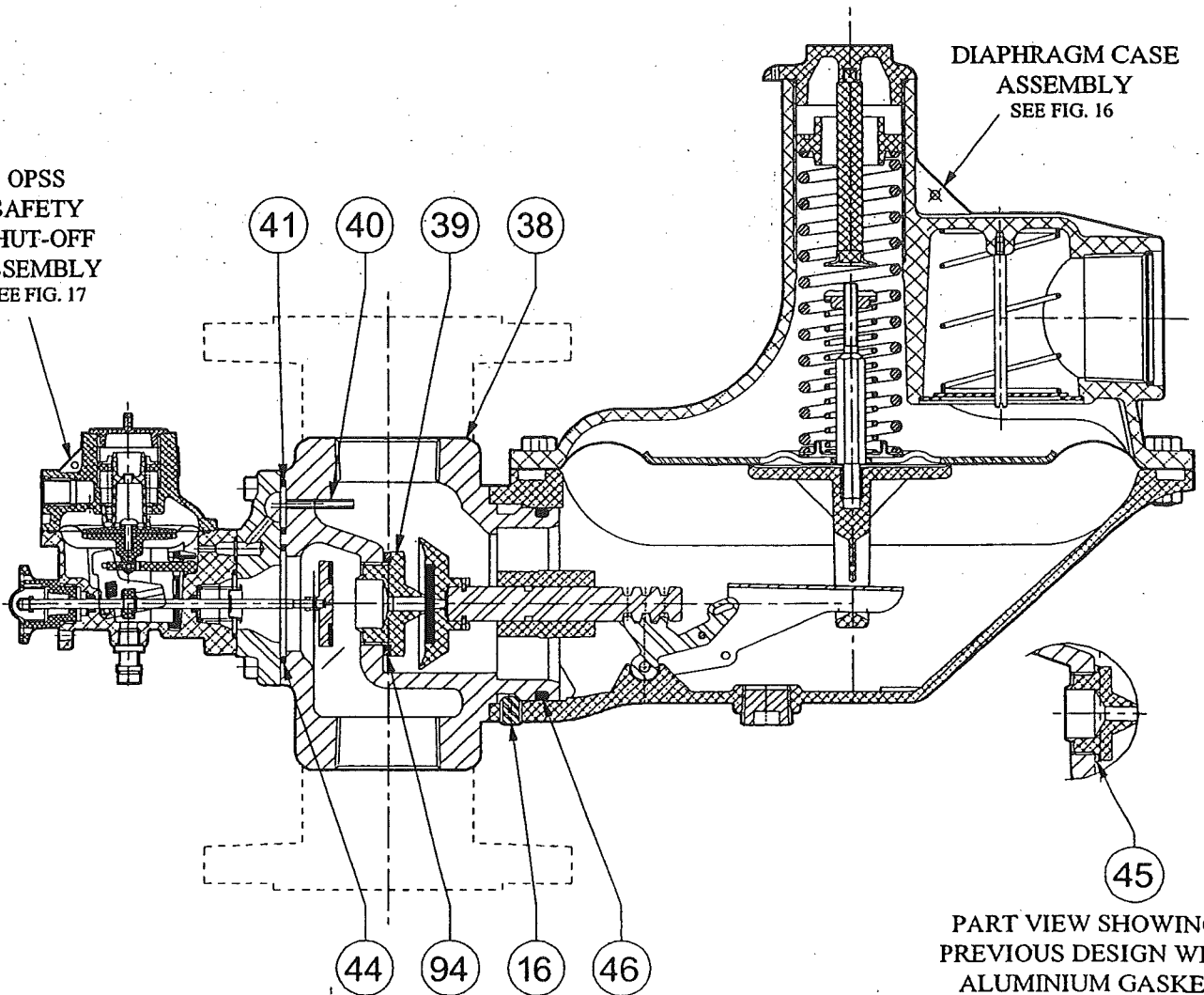
NOTE : UPSS pressure is now set.

J125-S1, S2, S3 ASSEMBLY FIG. 13

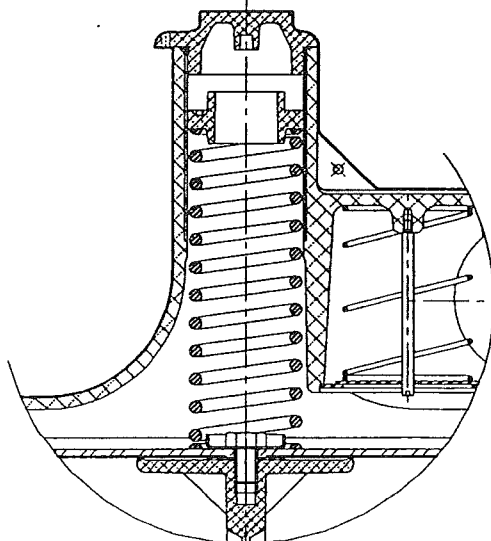


OPSS
SAFETY
SHUT-OFF
ASSEMBLY
SEE FIG. 17

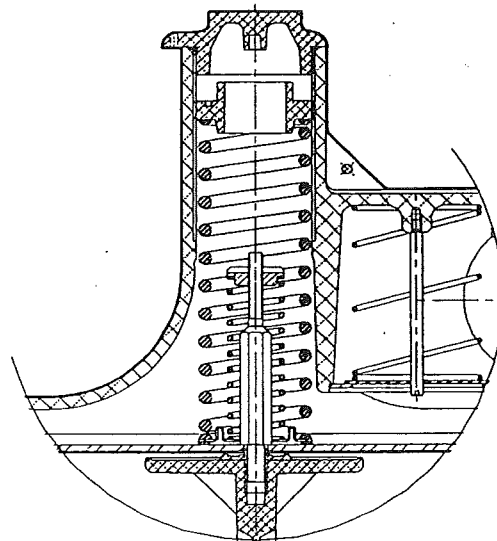
DIAPHRAGM CASE
ASSEMBLY
SEE FIG. 16



PART VIEW SHOWING
PREVIOUS DESIGN WITH
ALUMINIUM GASKET



S10 VERSION ONLY
(NO RELIEF VALVE)

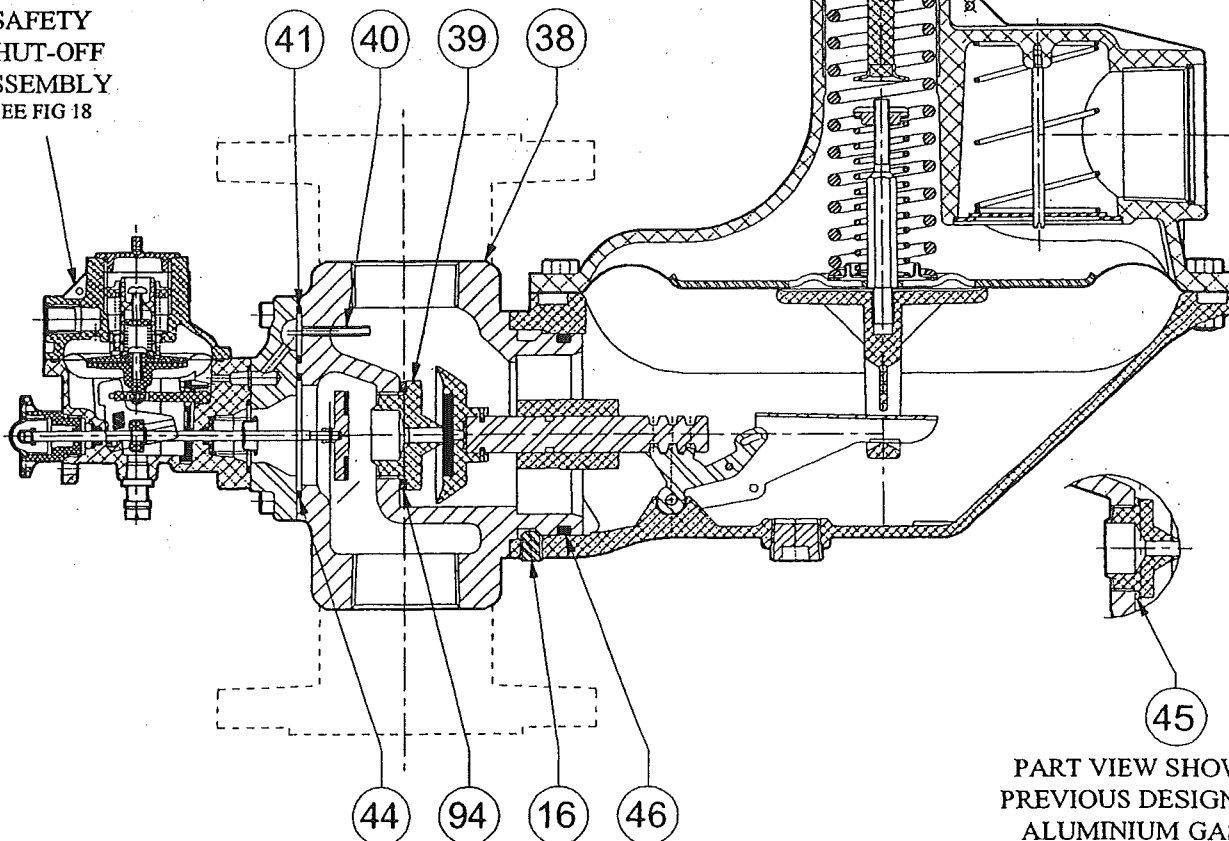


S5 VERSION ONLY
(LIMITED RELIEF VALVE)

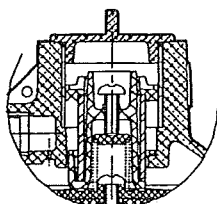
J125-S6, S7, S8, S9, S11, S12 ASSEMBLY FIG. 15

OPSS / UPSS
SAFETY
SHUT-OFF
ASSEMBLY
SEE FIG 18

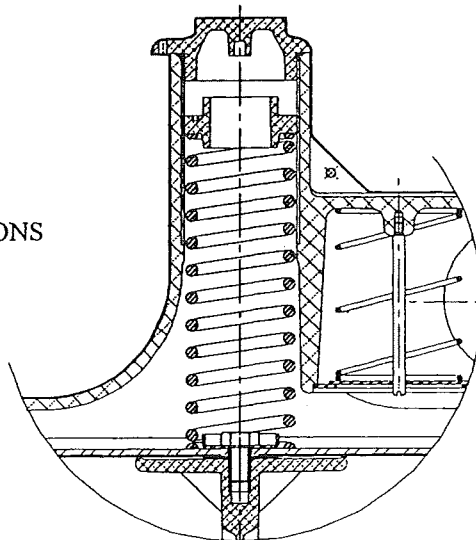
DIAPHRAGM CASE
ASSEMBLY
SEE FIG 16



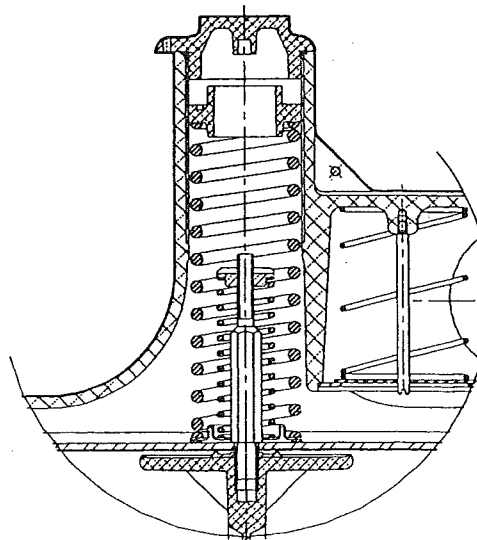
PART VIEW SHOWING
PREVIOUS DESIGN WITH
ALUMINIUM GASKET



S6, S7 & S11 VERSIONS
UPSS ONLY
SEE FIG 19

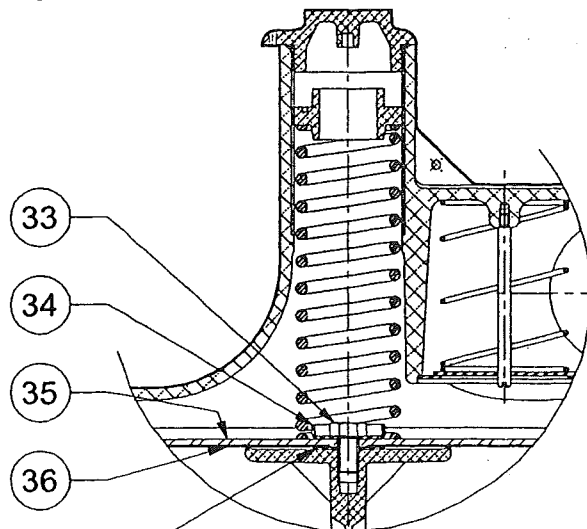
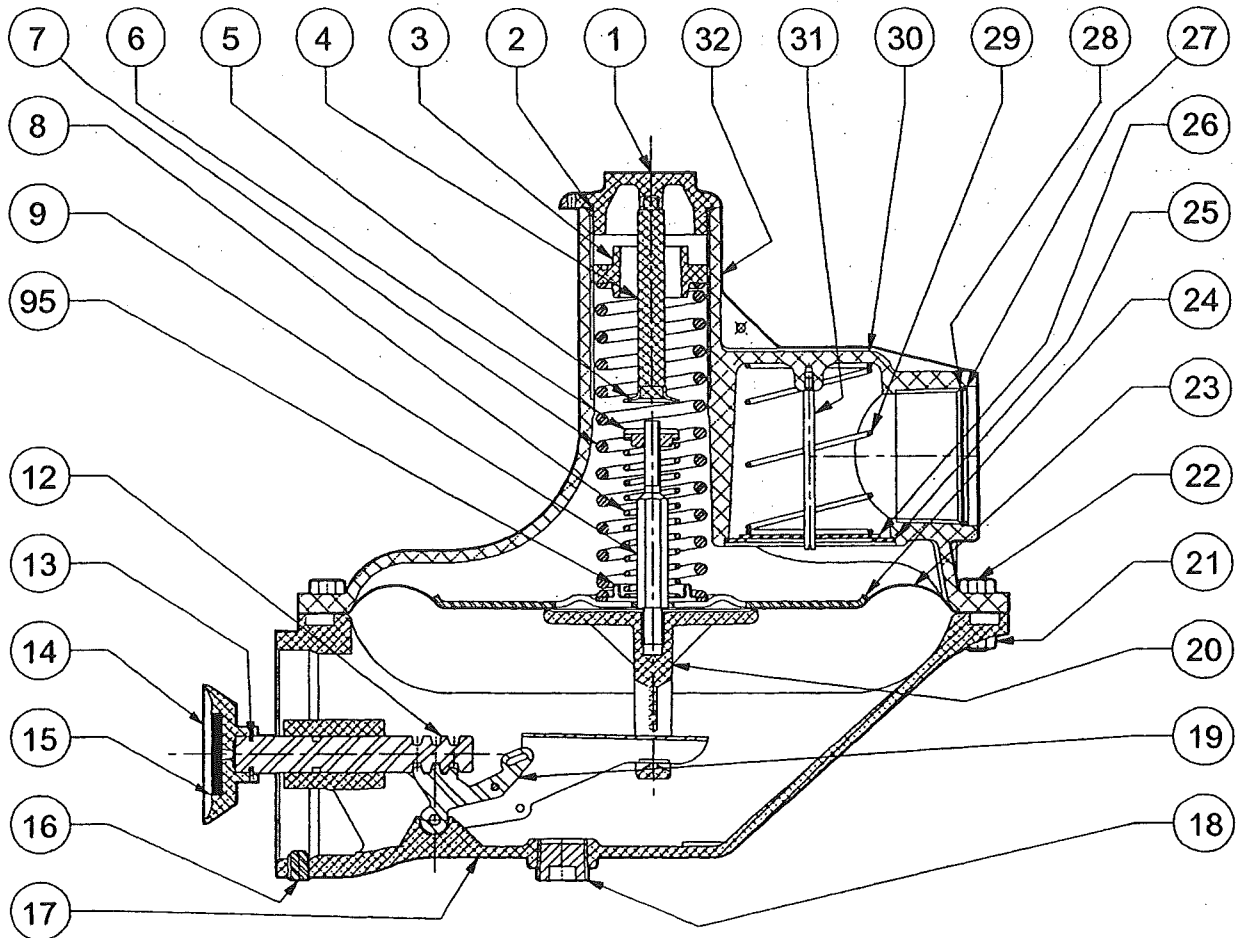


S11 & S12
VERSIONS ONLY
(NO RELIEF VALVE)

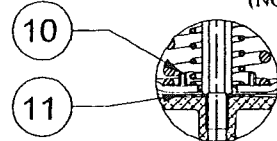


S7 & S9
VERSIONS ONLY
(LIMITED RELIEF VALVE)

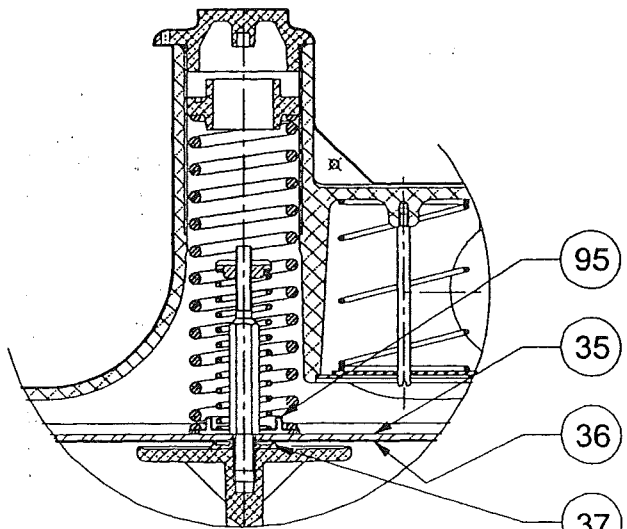
DIAPHRAGM CASE ASSEMBLY FIG. 16



**S1, S10, S11 AND S12
VERSIONS ONLY
(NO RELIEF VALVE)**

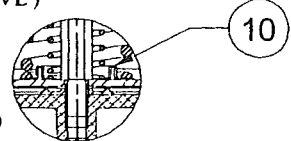


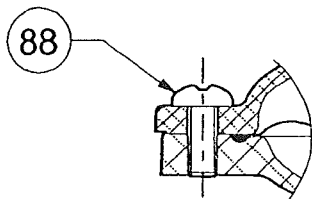
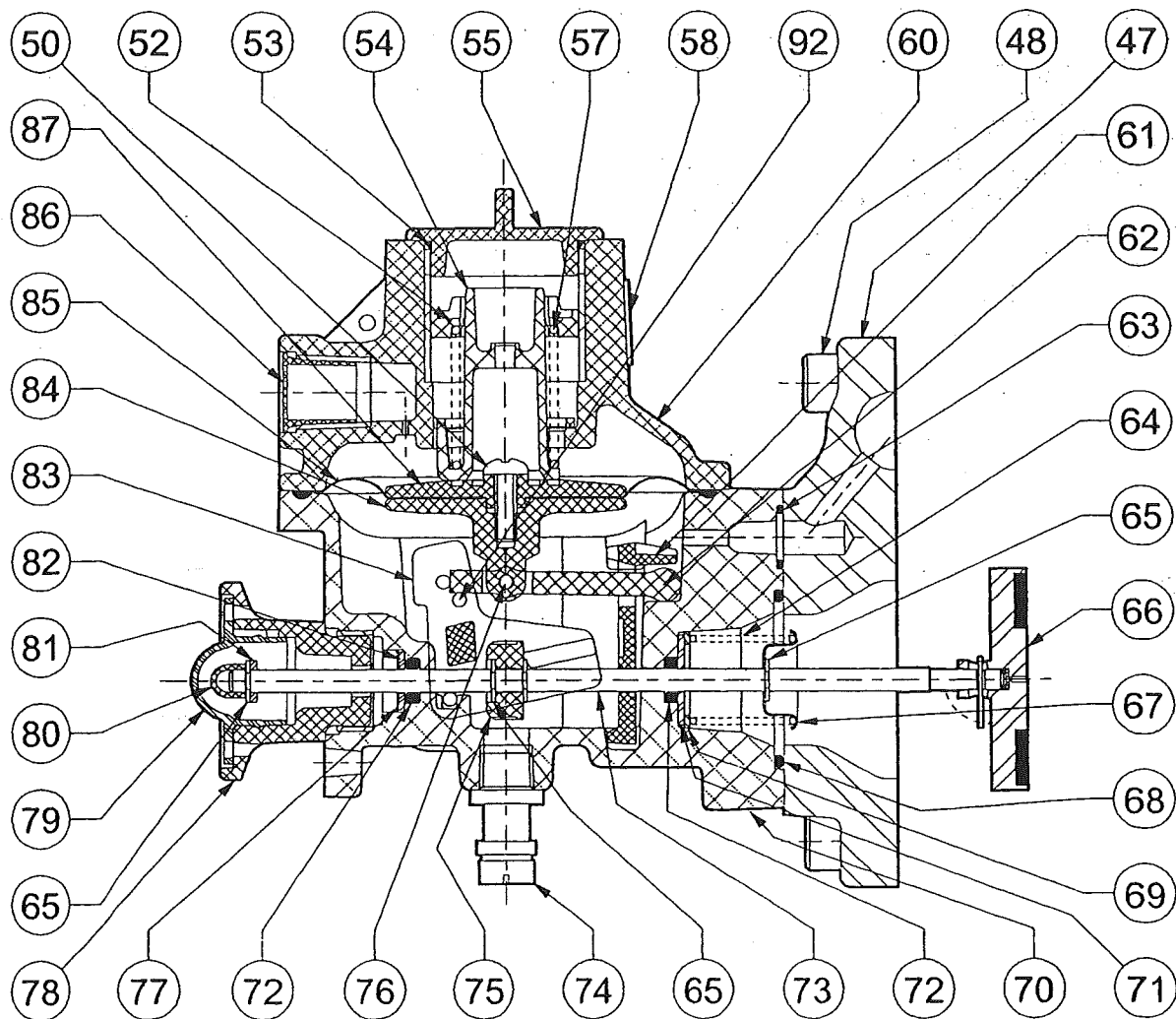
**S2, S4, S6 AND S8
VERSIONS ONLY
(FULL RELIEF VALVE)
(UP TO SEPTEMBER 2001)**



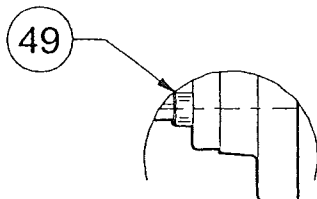
**S3, S5, S7 & S9
VERSIONS ONLY
(LIMITED RELIEF VALVE)**

**S3, S5, S7 AND S9
VERSIONS ONLY
(LIMITED RELIEF VALVE)
(UP TO SEPTEMBER 2001)**

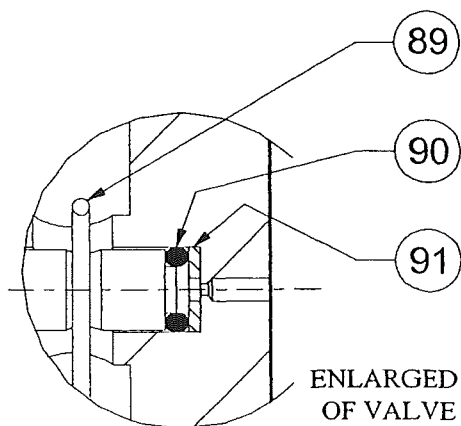




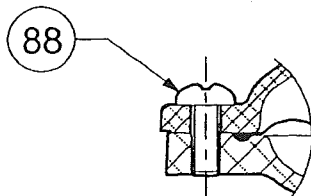
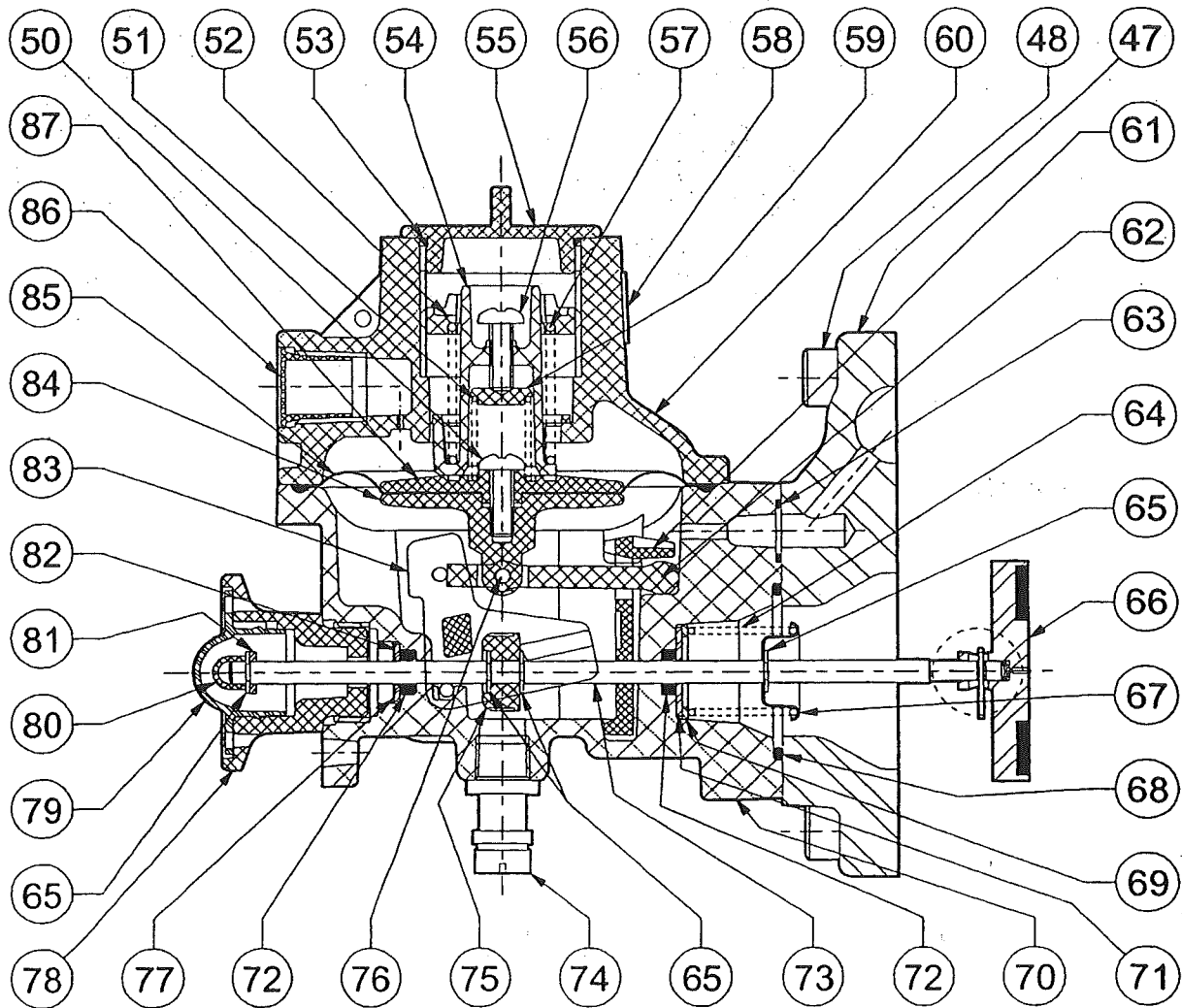
TOP COVER TO
BODY FIXING



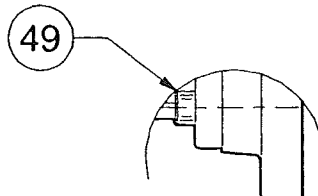
OPSS BODY TO
ADAPTOR PLATE
FIXING



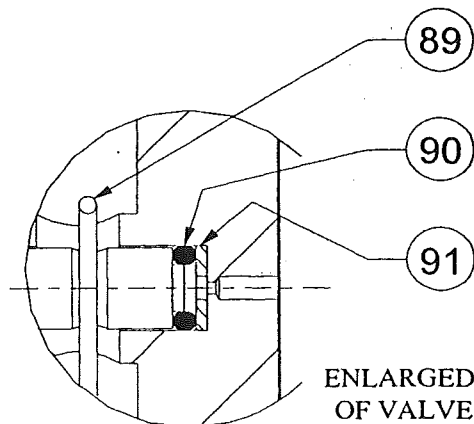
ENLARGED VIEW
OF VALVE DISC



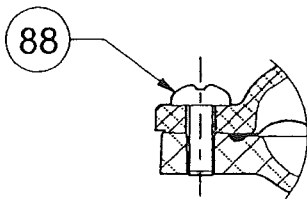
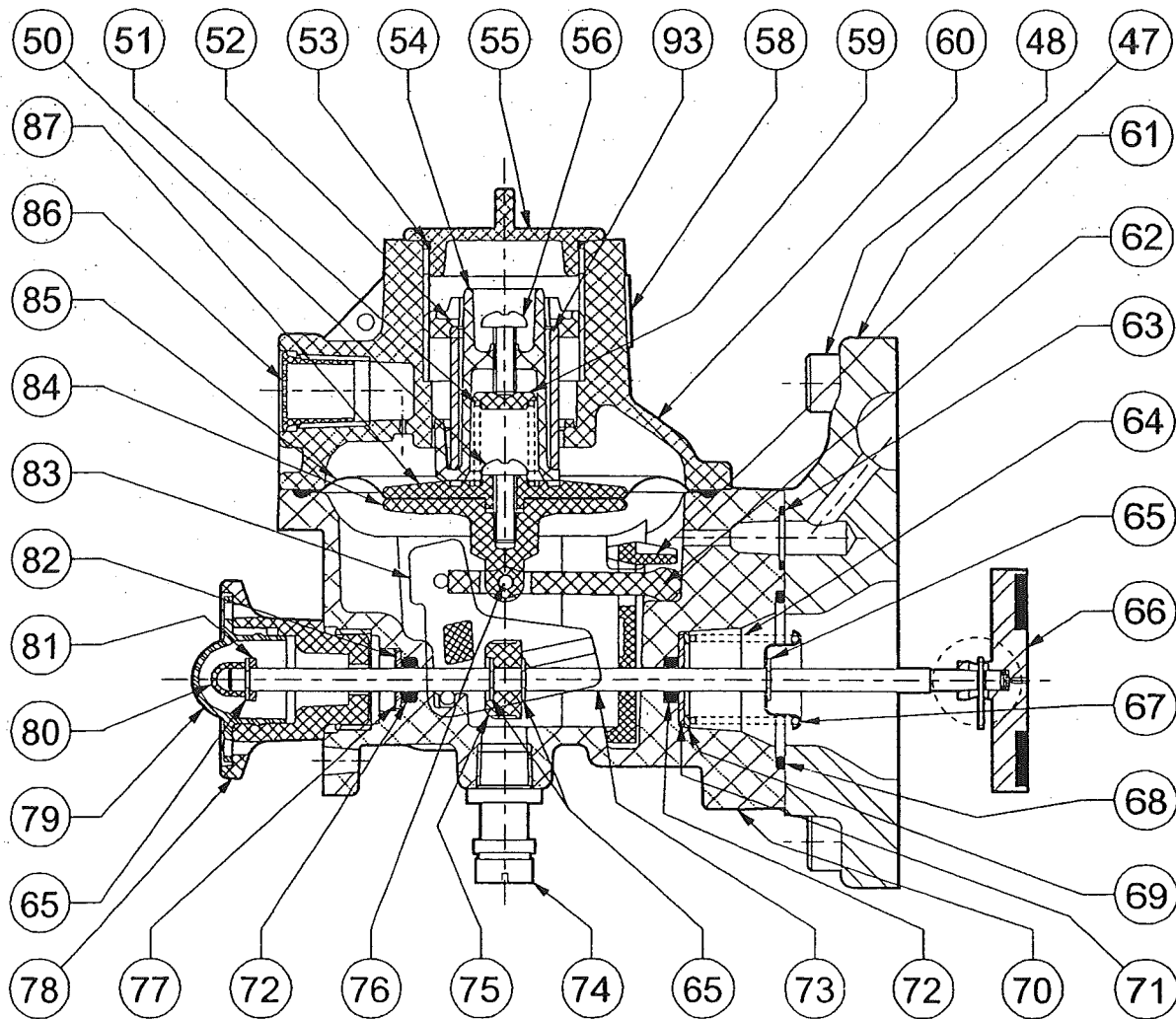
TOP COVER TO
BODY FIXING



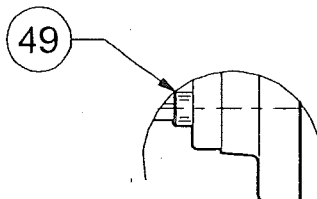
OPSS/UPSS BODY
TO ADAPTOR
PLATE FIXING



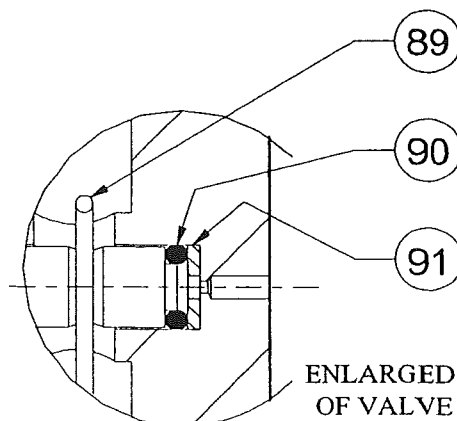
ENLARGED VIEW
OF VALVE DISC



TOP COVER TO
BODY FIXING



UPSS BODY
TO ADAPTOR
PLATE FIXING



ENLARGED VIEW
OF VALVE DISC

PARTS LIST

TABLE 1.

ITEM No.	DESCRIPTION	PART No.	No OFF
1	TOP CAP	I70103P002	1
2	"O" RING (TOP CAP)	JOBS133 *	1
3	ADJUSTMENT SCREW	I73183P001	1
4	ROD STOP	I73056P001	1
5	FLANGE STOP ROD	I73174P001	1
6	SPRING ADJUSTING NUT (Full Relief)	I71533P001	1
7	LOADING SPRING	SEE TABLE	1
8	RELIEF VALVE SPRING	J12509-099	1
9	RELIEF VALVE STEM	I73058P001	1
10	SPRING LOCATOR (Up to September 2001)	I73175P001	1
11	FLAT WASHER (No Relief) (Was Full & No Relief (Up to September 2001))	I13981P076	1
12	VALVE PLUNGER	I72627P001	1
13	RETAINER CLIP	I72858P001 *	1
14	SEAT DISC HOLDER	I72624P001 *	1
15	VALVE SEAT DISC	I70041P072 *	1
16	SOCKET GRUB SCREW	JSA1012S0NSS	3
17	REGULATOR DIAPHRAGM CASE	I72628 (+ if tapped)	1
18	PLUG (C/Sunk Recess ½" BSP Galv)	JMFP2G04 (if fitted)	1
	PLUG (C/Sunk Recess ½" NPT Galv)	I11970P031 (if fitted)	1
19	LEVER ASSEMBLY	I72626G001	1
20	DIAPHRAGM STEM	I72629P005	1
21	HEXAGON NUT	JNA8FZD	12
22	SCREW HEX HEAD	JSA825HHNZG	12
23	DIAPHRAGM (Full Relief)	I70014P203 *	1
24	DIAPHRAGM PLATE (Full Relief)	I73057P002 *	1
25	VENT VALVE SEAT	J12509-028	1
26	VENT VALVE DISC	J12509-029	1
27	VENT SCREEN SPRING CLIP	J12509-038	1
28	VENT SCREEN	J12509-037	1
29	VENT VALVE SPRING	J12509-060	1
30	TOP COVER	J12509-079 +	1
31	VENT VALVE GUIDE PIN	J12509-042	1
32	NAMEPLATE	J8112-124	1
33	HEX CAP SCREW	JSNEIHHNZR	1
34	SPRING GUIDE	I72272P001	1
35	DIAPHRAGM PLATE (No / Limited Relief)	I70012P052 *	1
36	DIAPHRAGM (No / Limited Relief)	I70014P143 *	1
37	RELIEF VALVE CUP	I73054P002	1

PARTS LIST

TABLE 1. CONTINUED

ITEM No.	DESCRIPTION	PART No.	No. OFF
38	SCREWED BODY 1½"	J12508-080 +	1
	SCREWED BODY 2"	J12509-080 +	1
	FLANGED BODY 50mm	J12509-081 +	1
39	VALVE SEAT	SEE TABLE	1
40	IMPULSE TUBE SCREWED	J12509-112	1
	IMPULSE TUBE FLANGED	J12509-111	1
41	"O" RING	JORM0195-30 *	1
42	BLANKING PLATE	J12509-083	1
43	SCREW (Blanking Plate)	JSA616SANSS	4
44	"O" RING	JORM0495-30 *	1
45	GASKET (Aluminium)(For Bonded Seal see Item 94)	I70019P094 *	1
46	"O" RING	JOBS338 *	1
47	ADAPTOR PLATE (USSA)	J12509-082Z01	1
48	SCREW (Adaptor Plate/Reg Body)	JSA620SANSS	4
49	SCREW (OPSS Body/Adaptor Plate)	JSA516SANSS	4
50	SCREW (Shut-off Diaphragm)	JSA412XPTZ	1
51	UPSS SPRING	SEE TABLE	1
52	SAFETY SHUT OFF SPRING HOLDER	J12506-248	1
53	"O" RING (Safety Shut Off Top Cap)	JORM0251-16D *	1
54	BOTTOM SPRING HOLDER	J12506-250	1
55	SAFETY SHUT OFF TOP CAP	J12506-142	1
56	SCREW (UPSS Adjustment)	JSA412XPTZ	1
57	OPSS SPRING	SEE TABLE	1
58	SAFETY SHUT-OFF NAMEPLATE	J150D-076	1
59	UPSS SPRING HOLDER	J12506-249	1
60	SAFETY SHUT-OFF TOP COVER	J12506-240 +	1
61	TRIP-OFF LEVER RETAINING PLATE	J12506-243	1
62	TRIP-OFF LEVER	J12506-242	1
63	"O" RING (Impulse Passage) Replaces JORM0081-16D	JOBS011D *	1
64	VALVE SPRING	J12506-049	1
65	CIRCLIP VALVE SPINDLE	JCIR1500-015B *	4
66	VALVE DISC (Moulded)	J12509-109M *	1
67	VALVE SPRING CUP	J12506-251	1
68	"O" RING (Safety Shut off/Adaptor Plate)	JORM0276-24D *	1
69	CIRCLIP (Front "O" Ring Washer)	JCIR2000K-17B *	1
70	SAFETY SHUT OFF BODY	J12506-239 +	1
71	FRONT "O" RING RETAINING WASHER	J12506-252	1
72	"O" RING (Shut-Off Spindle)	JOBS105D *	2

PARTS LIST

TABLE 1. CONTINUED

ITEM No	DESCRIPTION	PART No	No. OFF
73	SAFETY SHUT-OFF VALVE SPINDLE	J12509-110	1
74	PRESSURE TEST NIPPLE	JPTN01-0-71	1
75	TRIP-OFF BUSH	J12506-244	1
76	NEEDLE ROLLER	JNR02S	1
77	STARLOCK WASHER	JCIR1305-043B	1
78	RESET SPINDLE END CAP	J12506-254	1
79	COVER (Spindle End Cap)	J12506-255	1
80	INDICATOR CAP (Safety Shut Off)	JCLOSEMC4	1
81	WASHER-REAR (circlip protection)	J12506-292	1
82	REAR "O" RING RETAINING WASHER	J12506-253 *	1
83	TRIP-OFF LATCH	J12506-241	1
84	LOWER DIAPHRAGM PLATE	J12506-247	1
85	SAFETY SHUT-OFF DIAPHRAGM	J12506-246 *	1
86	VENT SCREEN	J12506-277	1
87	TOP DIAPHRAGM PLATE	J12506-245	1
88	SCREW (Top Cover/Body)	JSA512XPTS	4
89	"R" CLIP VALVE	J12506-274 *	1
90	"O" RING VALVE	JO200606-4475D *	1
91	GASKET VALVE	J12506-267 *	1
92	NEEDLE ROLLER (OPSS only)	JNR02S	1
93	UPSS SPACER TUBE	J12506-279	1
94	BONDED SEAL (Replaces Aluminium Gasket see Item 45)	JBSMB45017 *	1
95	SPRING LOCATOR ASSY (From October 2001)	I73175G001	1

NOTES: Item marked * is contained in spares kits (See table below).
Part Numbers ending with + require connection information.

VALVE SEAT

ORIFICE SIZE	PART NUMBER
1/4" - 6.35mm	J12509-101
3/8" - 9.5mm	J12509-102
1/2" - 12.7mm	J12509-103
5/8" - 15.9mm	J12509-104
3/4" - 19.1mm	J12509-105
7/8" - 22.2mm	J12509-106
1" - 25.4mm	J12509-107
1 1/4" - 31.8mm	J12509-108

REGULATOR SPRINGS

mb.	"w.g.	PART NUMBER	COLOUR
8.8 - 15	3.5 - 6	J12509-091	RED
14 - 20	5.5 - 8	J12509-092	ORANGE
21 - 35	8.5 - 14	J12509-093	YELLOW
36 - 70	14.5 - 28	J12509-094	GREEN
69 - 138	1 - 2 PSI	J12509-095	ROYAL BLUE
104 - 173	1.5 - 2.5 PSI	J12509-096	BROWN - ROYAL BLUE
138 - 207	2 - 3 PSI	J12509-097	BROWN - GREEN
207 - 345	3 - 5 PSI	J12506-098	BLACK - GREEN

OVER PRESSURE SLAM-SHUT SPRINGS

mb.	"w.g.	PART NUMBER	COLOUR
18 - 60	7.5 - 24	J12506-281	BLACK
50 - 80	20 - 32	J12506-282	ORANGE
60 - 110	24 - 44	J12506-283	RED
100 - 210	40 - 84	J12506-284	DARK GREEN
200 - 350	3 - 5 PSI	J12506-287	YELLOW
280 - 500	4 - 7 PSI	J12506-288	WHITE

UNDER PRESSURE SLAM-SHUT SPRINGS

mb.	"w.g.	PART NUMBER	COLOUR
8 - 16	3 - 6	J12506-285	LIGHT BLUE
16 - 60	6 - 24	J12506-286	BROWN
60 - 150	24 - 60	J12506-289	PURPLE

NOTE: A minimum differential of 30mb must be maintained between OPSS and UPSS set pressures

SPARES KITS

REGULATOR TYPE	SPARES KIT PART NUMBER
J125-S1 & S3	SK2529-01
J125-S2	SK2529-02
J125-S4, S6 & S8	SK2529-03
J125-S5, S7, S9, S10, S11 & S12	SK2529-04

Drawing Reference : Figs. 13, 14 & 15

Parts List Reference : Table 1

NOTE : Numbers in brackets identify items on drawings.

Regulator Dismantling Procedure

1. Check external surfaces for excessive corrosion.
2. Disconnect diaphragm case assembly from regulator body (38) by removing the three grub screws (16), gently pull out the case from the regulator body (38).
3. Disconnect the safety shut-off unit assembly, or blanking plate (42), from the regulator body (38) by removing the four cap screws (43) or (48).
4. Remove valve seat (39) assembly from the regulator body (38).
5. Remove bonded seal (94) or gasket (45) from valve seat (39) assembly. Note: the old design valve seat assembly with gasket (45) was glued into body (38).
6. Wipe clean the valve seat (39) assembly, check for any damage and take note of whether bonded seal (94) or aluminium gasket (45) is fitted to the valve seat.
7. Check that the impulse tube (40) is clear. DO NOT REMOVE TUBE FROM BODY.

Regulator Rebuilding Procedure.

NOTE : Inspect all sealing "O" rings, and replace where necessary
(a soft spares kit is available for this purpose, see page 17.)

The use of Molykote 111 "O" ring lubricant is recommended during the rebuild - unless for use with oxygen when no lubricant should be used.

1. If, when the valve seat (39) assembly was dismantled, the bonded seal (94) was fitted, then replace with a new bonded seal (94). DO NOT USE ALUMINIUM GASKET (45).
2. If, when the valve seat (39) assembly was dismantled, the aluminium gasket (45) was fitted, then replace with new aluminium gasket (45). DO NOT USE WITH BONDED SEAL (94).
Note: The bonded seal (94) and aluminium gasket (94) CANNOT be interchanged with each other, due to valve seat (39) being a different length and this may affect unit performance and safety.
3. Refit valve seat (39) assembly into regulator body (38) by screwing it in until metal contact is made.
4. Fit new "O" ring (46) onto diaphragm case assembly and apply "O" ring lubricant.
5. Insert diaphragm case assembly into regulator body (38) being careful not to damage the "O" ring, secure in place with three grub screws (16).
6. Replace "O" rings (41) and (44) into regulator (38) making sure the contact surfaces are clean and the "O" rings are lubricated.
7. Locate and secure the safety shut-off assembly, or blanking plate (42), in place using four cap screws (43) or (48).
8. Test unit for gas tightness.
9. Commission unit as described on pages 2 - 6.

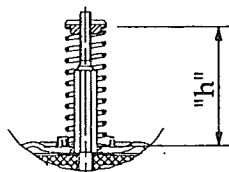
Drawing Reference : Fig 16

Parts List Reference : Table 1

NOTE : Numbers in brackets identify items on drawing.

Diaphragm Case Dismantling Procedure.

1. Unscrew top cap (1) and remove "O" ring (2).
 2. Unscrew and remove adjusting screw (3) and loading spring (7).
 3. Remove top cover (30) by unscrewing the 12 nuts (21) and screws (22).
- NOTE: It is not recommended to strip down the Vent Valve Assembly items: (25), (26), (29) & (31).
For Relief Versions go to instruction (6).
4. Remove diaphragm assembly (35), from the diaphragm case (17).
 5. Unscrew the hexagon cap screw (33) from the diaphragm assembly (35) to allow assembly to be dismantled.
- For No Relief Version go to instruction (9).
6. Prior to dismantling the relief valve assembly, measure the height "h" of the relief valve spring (8). The spring will have to be compressed to the same dimension on reassembly.



7. Remove diaphragm assembly (FullRelief)(23) or (Limited Relief)(35), and relief assembly from the diaphragm case (17).
8. Unscrew spring adjusting nut (6) from Diaphragm assembly (23) or (35) to allow assembly to be dismantled.
9. Using a pair of pliers, remove retaining clip (13), so seat disc assembly (14) can be removed from valve plunger (12).
10. Valve plunger (12) and lever assembly (19) can be removed from the diaphragm case (17).

Diaphragm Case Rebuilding Procedure.

NOTE : Inspect all sealing "O" rings, diaphragms and gaskets and replace where necessary (a soft spares kit is available for this purpose see page 17).

1. Check main diaphragm (23) or (36) for signs of damage, if necessary replace with a new diaphragm assembly (23) + (24) or (35) + (36).
2. Check that the sealing surfaces on the diaphragm (23) + (36) and diaphragm stem (20) are clean.

For Relief versions go to instruction (7).

3. Push cap screw (33) through centre hole of spring guide (34) with lip facing screw head.
4. Now push cap screw (33) through centre hole of diaphragm assembly (35) + (36), with diaphragm plate lip facing spring guide (34).
5. Replace flat washer (11) over cap screw (33).
6. Screw diaphragm stem (20) onto cap screw (33) securing diaphragm assembly

For No Relief version go to instruction (18)..

Diaphragm Case Rebuilding Procedure continued..

For Full & Limited Relief units built after September 2001 go to instruction (11).

Full & Limited Relief units before October 2001

7. (Full Relief Version): Replace flat washer (11), over centre hole in diaphragm stem (20).
(Limited Relief Version): Replace relief cup (37) with projections facing upwards, over centre hole of the diaphragm stem (20).
8. Screw relief valve stem (9) into diaphragm stem (20).
9. Place diaphragm assembly (full relief (23) + (24)) or (limited relief (35) + (36)) with diaphragm plate lip facing upwards, on top of relief cup (37) or flat washer (11).
10. Replace spring locator (10) with convolution facing upwards, over relief valve stem (9). We now go to Instruction 16.

Full & Limited Relief units after September 2001

11. (Limited Relief Version): Replace relief cup (37) with projections facing upwards, over centre hole of the diaphragm stem (20).
12. Screw relief valve stem (9) into diaphragm stem (20).
13. (Limited Relief Version): Place diaphragm assembly (35) + (36)) with diaphragm plate lip facing upwards, on top of relief cup (37) .
14. (Full Relief Version): Place diaphragm assembly (23) + (24)) with diaphragm plate lip facing upwards, on top of relief valve stem (9) .
15. Replace spring locator (95) with convolution facing upwards, over relief valve stem (9).
16. Place relief spring (8) over relief valve stem (9).
17. Screw relief spring adjusting nut (6) with spigot located in relief spring (8), onto relief valve stem (9). Screw relief adjusting nut (6) to the required height "h", as measured during dismantling, see instructions (page 19).
18. Place lever assembly (19) into the slot in the diaphragm case (17).
19. Check valve disc (15) and valve disc holder (14) for damage and excessive wear, if necessary replace with a new assembly.
20. Refit valve disc assembly on to valve plunger (12) using retainer clip (13).
21. Push valve plunger (12) through hole in the diaphragm case (17) and engage grooves into teeth in lever assembly (19).
22. Relocate the main diaphragm / relief valve assembly into position. Make sure of the following:
(a) The lever assembly (19) is fitted correctly into the slot in the diaphragm stem (20).
(b) The holes in the diaphragm (23) or (36) and diaphragm case (17) are aligned correctly.
23. Check that the vent valve in the top cover (30) moves freely.
24. Replace top cover (30) on top of diaphragm case (17) taking care not to damage diaphragm (23) or (36), and secure in place using 12 screws (22) and nuts (21).
25. Place loading spring (7) into chimney of top cover (30).
26. With slot in adjusting screw (3) facing upwards, screw adjusting screw (3) into the chimney of the top cover (30), so that it locates on loading spring (7).
27. For Full Relief Version only: Screw rod stop assembly (4) and (5) into top cap (1).
28. Replace "O" ring (12) onto top cap (1).
29. Screw top cap (1) into chimney of top cover (30).
30. Screw 3 grub screws (16) into case (17).
31. Refit screen (28) and clip (27) into vent.

For reassembly to body see page 18.

Drawing Reference : Figs. 17, 18 & 19.

Part list Reference : Table 1.

NOTE : Numbers in brackets identify items on drawing.

Safety Shut-off Dismantling Procedures.

1. Unscrew top cap (55) and remove "O" ring (53).
 2. Unscrew and remove top spring holder (52) together with OPSS spring (57), or UPSS spacer tube (93).
 3. Remove bottom spring holder (54) together with UPSS screw (56) if fitted.
DO NOT REMOVE UPSS SCREW (56).
 4. Remove top cover (60) by unscrewing the four screws (88).
 5. If fitted remove UPSS spring holder (59) together with UPSS spring (51).
 6. Lift diaphragm assembly from body (70).
 7. Unscrew diaphragm clamping screw (50) and remove top diaphragm plate (87) and main diaphragm (85).
 8. Remove needle roller (76) to release lever arm (62) from lower diaphragm plate (84).
 9. Remove "R" clip (89) from spindle (73). Valve (66) (with "O" ring (90) and gasket (91) inside) can now be removed. Push valve spring cup (67) towards body (70) and remove circlip (65). Valve spring cup (67) and valve spring (64) can now be withdrawn.
 10. Remove four screws (49) securing USSA body (70) to adaptor plate (47).
 11. Remove "O" rings (63) and (68) from USSA body (70).
 12. Unscrew reset spindle end cap (78) and pull out until it comes to a stop.
 13. Within body prise visible circlip (65) from valve spindle (73) to release trip-off bush (75).
 14. Slide trip-off bush (75) forward and prise second circlip (65) from valve spindle (73).
 15. Withdraw valve spindle (73) and end cap assembly (65),(78),(79),(80) & (81) from body (70). Remove trip-off lever retaining plate (61), trip-off bush (75) and trip-off latch (83).
 16. Remove circlip (69), front "O" ring retaining washer (71) and front "O" ring (72).
- NOTE : It is not recommended to interfere with the rear "O" ring (72) unless absolutely necessary. A new "O" ring and starlock washer should be refitted if dismantled.
17. Remove starlock washer (77), rear "O" ring retaining washer (82) and rear "O" ring (72) from body (70).
 18. It is not necessary to remove test point (74).

Safety Shut-off Rebuilding Procedure.

NOTE : Inspect all sealing "O" rings, diaphragms and gaskets and replace where necessary (a soft spares kit is available for this purpose see page 17).

The use of Molykote 111 "O" ring lubricant is recommended during the rebuild - unless for use with oxygen when no lubricant should be used.

1. Fit new "O" ring (72) into rear "O" ring groove in body (70) and apply "O" ring lubricant. Replace rear "O" ring retaining washer (82) and secure with new starlock washer (77), making sure starlock washer is central in bore.
2. Locate lever retaining plate (61) into recesses in body (70).
3. Position trip-off bush (75) with slots engaged with rails of trip-off latch (83) and arrow facing away from steel needle rollers. Relocate assembly into body (70) making sure that the needle roller is correctly positioned in raised recess in body (70).
4. Push valve spindle (73) and cap assembly (65),(78),(79),(80) & (81) through rear of body (70), trip-off bush (75), lever retaining plate (61) and front of body (70).
5. Slide trip-off bush (75) up against lever retaining plate (61) and fit a new circlip (65) into groove on valve spindle (73) furthest away from trip-off bush (75).
6. Slide trip-off bush (75) back against 1st circlip (65) and fit a 2nd new circlip (65) to groove on valve spindle (73) which clamps trip-off bush (75) to valve spindle (73).
7. Fit new "O" ring (72) into front "O" ring groove in body (70) and apply "O" ring lubricant, replace front "O" ring retaining washer (71) and secure firmly with new circlip (69).
8. Replace valve spring (64) into front face of body (70).
9. Locate valve spring cup (67) over spindle (73) and into valve spring (64)
10. Push valve spring cup (67) to compress valve spring (64) until circlip (65) can be assembled into groove in spindle (73) nearest body (70).
11. Fit new "O" rings (63) and (68) into grooves in front face of body (70).
12. Reassemble adaptor plate (47) to body (70) and secure with four screws (49).
13. Place gasket (91) into centre hole of valve (66). Insert "O" ring (90) into centre hole of valve (66).
14. Push valve assembly (66) over spindle (73), align hole in valve (66) and spindle (73), assemble together with "R" clip (89).
15. Align hole in diaphragm (85) with convolution upper most, with hole in lower diaphragm plate (84). Locate spigot of top diaphragm plate (87) through diaphragm (85) and into recess in lower diaphragm plate (84). Secure with diaphragm clamping screw (50).
16. Position slot in lever arm (62) over spigot on lower diaphragm plate (84) and align holes, replace needle roller (76) through holes.
17. Unscrew reset end cap (78) and withdraw it, until it comes to a stop.
18. Locate diaphragm assembly and lever arm (62) into recess between lever retaining plate (61) and body (70), ensuring bead of diaphragm (85) locates into groove in body (70).

Safety Shut-off Rebuilding Procedure Continued:

19. Replace bottom spring holder (54) together with UPSS screw (56) if fitted, into chimney of top cover (60) by aligning ribs of bottom spring holder (54) with slots in top cover (60).
20. Replace OPSS spring (57), or UPSS spacer tube (93), into bottom spring holder (54).
21. Screw top spring holder (52) into chimney of top cover (60) ensuring that castellated spigot is uppermost. If UPSS spacer tube (93) is fitted, screw top spring holder (52) down firmly.
22. If fitted locate UPSS spring (51) into recess in top diaphragm plate (87), refit UPSS spring holder (59) ensuring that spigot locates in UPSS spring (51).
23. Replace top cover assembly (60) and secure with four screws (88), ensuring UPSS spring arrangement (51) and (59) if fitted is undisturbed. Take care not to pinch diaphragm bead (85).
24. Fit new "O" ring (53) to top cap (55) and screw into chimney of top cover (60).
25. If removed, replace test point (74).
26. For reassembly to body see page 18

A monitor version of the J125 regulator is also available which is not included in these instructions:

Elster Jeavons is committed to a programme of continuous quality enhancement. All equipment designed and manufactured by Elster Jeavons benefits from the company's quality assurance standards, which are approved to ISO 9001 (BS5750 Part 1).

Elster Jeavons has a programme of continuous product development and improvement and in consequence the information in this leaflet may be subject to change or modification without notice.

CAPSULE TYPE PRESSURE GAUGE

Class. 1,6 acc. DIN 16013/14

Diameter 63/100 and 160 mm

Zero adjustment from the front side

Fig. 1481 Case D = 63 mm

Fig. 1482 Case D = 100 mm

Fig. 1483 Case D = 160 mm

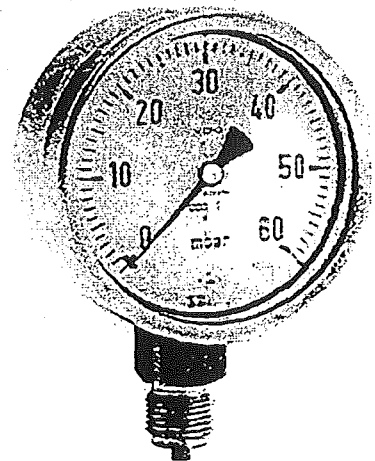
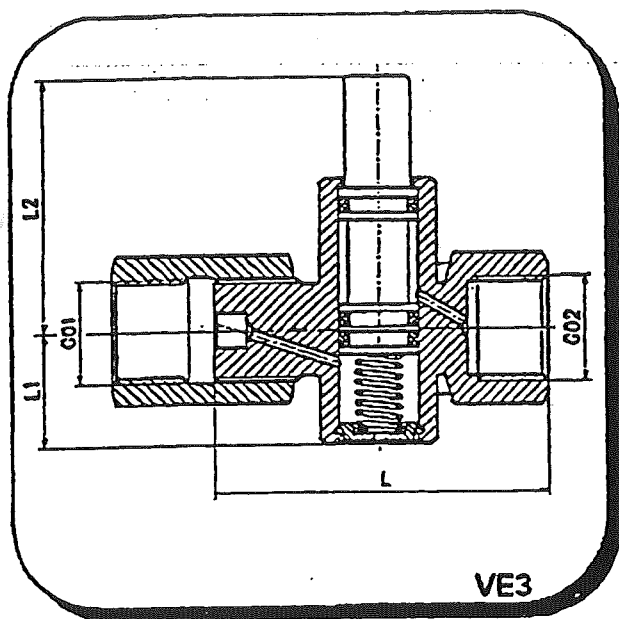


Fig. 1482

Material	Case	- Stainless Steel 304
	Tube element	- Copper alloy
	Movement	- Brass Ms58
	Connection	- Brass Ms58
	Window	- Instrument glass
	Face	- Aluminum, white with black figures acc. DIN 16128
Range	Pressure	- 0 to 16/25/40/60/100/160/250 and 400 mbar*
	Vacuum	- -16/25/40/60/100/160/250/400 to 0 mbar
	Vacuum/ Pressure	- -10/+30 -10/+50 -10/+90 mbar
Temperature	: Max. 50°C	
Connection	: Bottom or back, D63 G1/4" - D100/160 G1/2"	
Attention	: Not suitable for liquid media or humid gaseous media	
Options	: With stainless steel tube element	
	: With zero adjustment as differential pressure gauge	

* The lowest pressure range for D63 mm is 40 mbar, for D100/160 is this 25 mbar/6 mbar

Push Button for Pressure Gauge VE3



Material

Housing	: Brass 2.0401, nickel-plated
Push button	: Brass 2.0401, nickel-plated
Isolating disk	: Brass 2.0401, nickel-plated
Pressure spring	: X12CrNi 17 7 K DIN17224
Gasket	: NBR (O-Ringe)
Snapring	: Steel B16 DIN7993-Zn, zinc-plated
Lubricant	: Nontrop RB 3
Stressing socket	: Brass 2.0401, nickel-plated

Temperature range

10°C + 70°C (depends on operating pressure)

Dimensions

Nominal size	: DN2
Inlet size	: Internal thread G 1/2" acc. DIN ISO 228
Outlet size	: Internal thread G 1/2" acc. DIN ISO 228 or Stressing socket acc. DIN16283 with internal thread G 1/2" acc. DIN ISO 228-I

Use

All fluid and gaseous Media depending on compatibility to used material.

Ordering information

PN bar	L mm	L1 mm	L2 mm	G01 ISO228	G02 ISO228	Term	Order No
10*		225	60	1/2"	1/2"	VE3-2-G1/2	10-002-014

* Certified for gas up to PN4

AZ

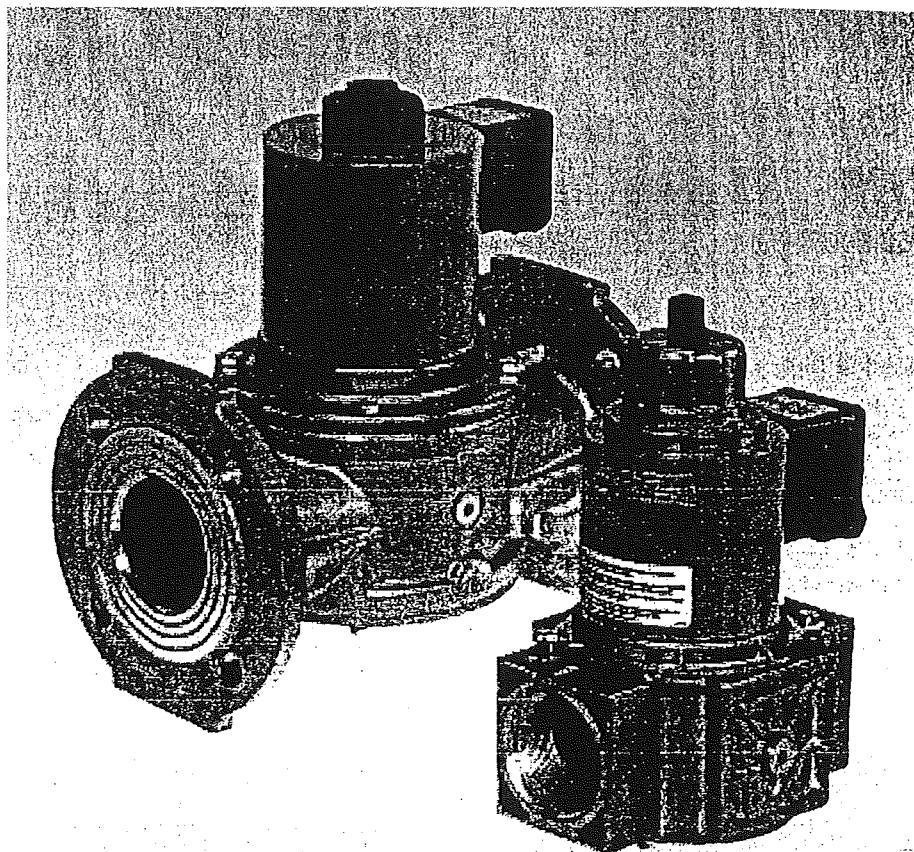
Industrietechnik GmbH

Single-stage safety solenoid valves

MVD, MVD/5,
MVDLE/5

DUNGS®

6.20



Technical description

The DUNGS safety solenoid valve MVD, MVD/5, MVDLE/5 is a single-stage automatic shut-off valve as per EN 161 for gas burners and gas appliance.

- Max. operating pressure up to 200, 360 or 500 mbar
- normally closed
- MVD: fast opening
- MVDLE: Slow opening with adjustable fast stroke for start gas volume
- Main volume adjustable (MVD/MVDLE)
- DC solenoid, rectifier wiring with radio interference suppression in terminal box with PG screw union
- Mountable closed position signal contact to monitor closed position of valve (.../5)
- Pipe thread as per ISO 7/1
- Flange connection as per DIN 2633, ISO 7005
- Reliable function, rugged and maintenance-free
- On request, design without non-ferrous metals

Application

The solenoid valve is used for securing, limiting, shutting off and releasing gas supply to gas burners and gas appliances.

The DUNGS safety solenoid valve MV... is suitable for gases of families 1, 2, 3 and other neutral gaseous media.

Approval

EC type test approval as per EC Gas Appliance Directive:

MV... CE-0085 AO3219

EC type test approval as per EC Pressure Equipment Directive:

MV... CE0036

Approvals in other important gas consuming countries.

Special designs for the North American market with UL, FM and CSA registrations.

MV/5	Single-stage solenoid valve, normally when closed, fast opening, fast closing
MVD/5	Single-stage solenoid valve, normally when closed, fast opening, fast closing, manual limitation of flowing gas volume by adjusting main volume
MVDLE/5	One-stage solenoid valve, normally when closed, slow opening, fast closing, Opening time adjustment with fast stroke range, Main volume adjustment

Specifications

Nominal diameters	10 15 20 25 40 50 65 80 100 125 150 200
Pipe thread as per ISO 7/1, Rp	3/8 1/2 3/4 1 1 1/2 2 2 1/2
Flange	Connection flange as per DIN 2501 Part 1, to fit preweld flanges as per DIN 2633 (PN 16) DN 20 to DN 200, ISO 7005-2 (PN 16)
Max. operating pressure	up to 200 mbar (20 kPa), 360 mbar (36 kPa) or up to 500 mbar (50 kPa) - refer to type overview
Solenoid valve	Valve as per EN 161, Class A, Group 2, single-stage mode
Pressure stage	PN 1
Closing time	< 1 s
Opening time	< 1 s for MVDLE approx. 20 s at room temperature 20°C and without fast stroke
Fast stroke	Adjustable
Main volume adjustment	Manually adjustable on MVD and MVDLE
Materials of gas-conveying parts	Housing: aluminium, steel, brass Seals: NBR basis
Voltage/frequency	230 V AC (+10 % -15 %); 50-60 Hz - other voltages on request
Rating / power consumption	Refer to type overview
Switch-on duration	100 %
Degree of protection	IP 54, IP 65 on request
Electrical connection	At screw terminals via PG* 11 cable gland (* = heavy-gauge conduit thread) Plug connection as per DIN 175 0301-803 can be retrofitted
Switching rate	MVD.../5: max. 1000/h MVD 2200, MVDLE.../5: max. 100/h MV 5100/5 S, MV 2125/5 S, MV 2150/5 S: max. 20/h
Measuring/ignition gas connection	G 1/4 ISO 118, on both sides in inlet section, additionally G 3/4 on input side, form size DN 40 (flange) upwards
Dirt trap	Sieve installed, mesh width 1 mm
Ambient temperature	-15 °C to + 60 °C
Installation position	Solenoid from vertically upright to horizontally lying
Closed position signal contact	Type K01/1, DIN-tested, mountable on DN 10 - DN 150
Valve proving system	Type VDK 200 A SO2, mountable via G 1/4 test connection, Type VPS 504, mountable with adapter up to DN 80
Accessories	K01 closed position signal contact, see Datasheet 12.01 211 202 Equipment plug for line socket, DIN 175301-803 215 733

Type	p _{max.}	DN / Rp	Sole-noid No.	Order No.	P _{max.} [VA]	I _{max.} ~ (AC) 230 V	Opening time	Dimensions [mm]						Weight [kg]
								a	b	c	d	e	f	
MVD 203/5	360	Rp 3/8	100	108 571	15	0.08	< 1 s	50	60	90	75	155	190	0.85
MVD 205/5	360	Rp 1/2	100	013 102	15	0.08	< 1 s	50	75	135	75	113	200	1.00
MVD 207/5	200	Rp 3/4	150	013 227	32	0.13	< 1 s	60	100	135	80	160	190	1.75
MVD 207/5	360	Rp 3/4	200	121 962	25	0.15	< 1 s	75	100	135	80	160	190	2.4
MVD 210/5	360	Rp 1	200	013 490	25	0.15	< 1 s	75	110	135	90	165	190	2.45
MVD 215/5	200	Rp 1 1/2	280	015 446	60	0.26	< 1 s	80	150	170	116	210	255	4.3
MVD 215/5	360	Rp 1 1/2	300	129 977	60	0.30	< 1 s	95	150	170	116	210	255	5.4
MVD 220/5	200	Rp 2	300	011 767	60	0.30	< 1 s	95	170	175	130	220	255	5.90
MVD 225/5	200	Rp 2 1/2	400	119 701	90	0.48	< 1 s	115	230	215	165	270	325	10.90
MVDLE 203/5	360	Rp 3/8	100	108 597	15	0.08	approx. 20 s	50	60	135	75	155	190	0.95
MVDLE 205/5	360	Rp 1/2	100	013 284	15	0.08	approx. 20 s	50	75	135	75	155	200	1.10
MVDLE 207/5	360	Rp 3/4	200	013 276	25	0.15	approx. 20 s	75	100	165	80	190	190	2.55
MVDLE 210/5	360	Rp 1	200	013 524	25	0.13	approx. 20 s	75	110	165	90	195	190	2.75
MVDLE 215/5	200	Rp 1 1/2	280	015 412	60	0.26	approx. 20 s	80	150	205	116	245	255	4.4
MVDLE 215/5	360	Rp 1 1/2	300	122 002	60	0.30	approx. 20 s	95	150	205	116	245	255	5.5
MVDLE 220/5	200	Rp 2	300	011 775	60	0.26	approx. 20 s	95	170	205	130	250	255	6.20
MVDLE 225/5	200	Rp 2 1/2	400	118 935	90	0.48	approx. 20 s	115	230	295	165	350	320	11.40
MVD 503/5	500	Rp 3/8	100	158 090	15	0.08	< 1 s	50	60	90	75	155	190	0.85
MVD 505/5	500	Rp 1/2	100	158 110	15	0.08	< 1 s	50	75	90	75	113	200	1.00
MVD 507/5	500	Rp 3/4	200	157 530	25	0.15	< 1 s	75	100	135	80	160	190	2.40
MVD 510/5	500	Rp 1	200	157 540	25	0.15	< 1 s	75	110	135	90	165	190	2.60
MVD 515/5	500	Rp 1 1/2	300	157 550	60	0.30	< 1 s	95	150	175	116	210	255	5.40
MVD 520/5	500	Rp 2	400	167 200	90	0.48	< 1 s	115	170	190	130	235	300	8.80
MVD 525/5	500	Rp 2 1/2	500	170 750	80	0.42	< 1 s	130	230	215	165	270	370	14.50
MVDLE 503/5	500	Rp 3/8	100	222 077	15	0.08	approx. 20 s	50	60	135	75	155	190	0.80
MVDLE 505/5	500	Rp 1/2	120	222 078	24	0.11	approx. 20 s	50	75	150	75	170	220	1.00
MVDLE 507/5	500	Rp 3/4	200	222 079	25	0.15	approx. 20 s	75	100	165	80	190	190	2.50
MVDLE 510/5	500	Rp 1	250	222 080	30	0.12	approx. 20 s	75	110	190	90	220	213	2.60
MVDLE 515/5	500	Rp 1 1/2	300	222 081	60	0.30	approx. 20 s	95	150	205	116	245	255	5.6
MVDLE 520/5	500	Rp 2	400	222 082	90	0.48	approx. 20 s	115	170	225	130	270	300	11.10
MVD 2020/5	200	DN 20	150	110 841	32	0.13	< 1 s	60	150	135	105	160	190	2.3
MVD 2020/5	360	DN 20	200	on request	25	0.15	< 1 s	75	150	135	105	160	190	2.9
MVD 2025/5	360	DN 25	200	110 882	25	0.13	< 1 s	75	160	165	115	195	190	3.50
MVD 2040/5	200	DN 40	280	111 146	60	0.26	< 1 s	80	200	170	150	210	255	6.8
MVD 2040/5	360	DN 40	300	119 906	60	0.30	< 1 s	95	200	170	150	210	255	7.0
MVD 2050/5	200	DN 50	300	111 187	50	0.26	< 1 s	95	230	175	165	230	255	7.70
MVD 2065/5	200	DN 65	400	169 390	90	0.48	< 1 s	115	290	215	185	275	320	12.70
MVD 2080/5	200	DN 80	500	169 400	80	0.42	< 1 s	130	310	250	200	305	360	26.50
MVD 2100/5	200	DN 100	550	169 410	90	0.48	< 1 s	150	350	310	240	395	480	31.00
MVDLE 2020/5	360	DN 20	200	110 858	25	0.13	approx. 20 s	75	150	165	105	190	190	3.50
MVDLE 2025/5	360	DN 25	200	110 890	25	0.13	approx. 20 s	75	160	165	115	195	190	4.00
MVDLE 2040/5	200	DN 40	280	119 914	60	0.26	approx. 20 s	80	200	205	150	245	255	6.9
MVDLE 2040/5	360	DN 40	300	111 153	80	0.30	approx. 20 s	95	200	205	150	245	255	7.1
MVDLE 2050/5	200	DN 50	300	111 195	60	0.26	approx. 20 s	95	230	205	165	250	255	7.50
MVDLE 2065/5	200	DN 65	400	170 930	90	0.48	approx. 20 s	115	290	295	185	350	320	13.30
MVDLE 2080/5	200	DN 80	500	170 940	80	0.42	approx. 20 s	130	310	320	200	390	360	26.50
MVDLE 2100/5	200	DN 100	550	170 950	90	0.48	approx. 20 s	150	350	385	240	470	465	31.00
MVD 5020/5	500	DN 20	200	170 600	25	0.13	< 1 s	75	150	135	105	160	190	3.50
MVD 5025/5	500	DN 25	200	170 630	25	0.13	< 1 s	75	160	135	115	165	190	4.00
MVD 5040/5	500	DN 40	300	170 660	60	0.26	< 1 s	95	200	170	150	230	255	7.00
MVD 5050/5	500	DN 50	400	170 690	90	0.48	< 1 s	115	230	190	165	235	300	12.00
MVD 5065/5	500	DN 65	500	165 510	80	0.42	< 1 s	130	290	235	185	295	370	17.00
MVD 5080/5	500	DN 80	550	165 640	90	0.50	< 1 s	150	310	290	200	360	465	32.00
MVD 5100/5	500	DN 100	60E	166 150	90	7.5*	< 1 s	170	350	360	240	418	600	42.00
MVDLE 5020/5	500	DN 20	200	222 084	25	0.13	ca. 20 s	75	150	165	80	190	190	3.50
MVDLE 5025/5	500	DN 25	250	222 085	30	0.12	ca. 20 s	75	160	190	90	220	213	3.90
MVDLE 5040/5	500	DN 40	300	222 086	60	0.26	ca. 20 s	95	200	205	116	245	255	7.00
MVDLE 5050/5	500	DN 50	400	222 087	90	0.48	ca. 20 s	115	230	225	130	270	300	13.10

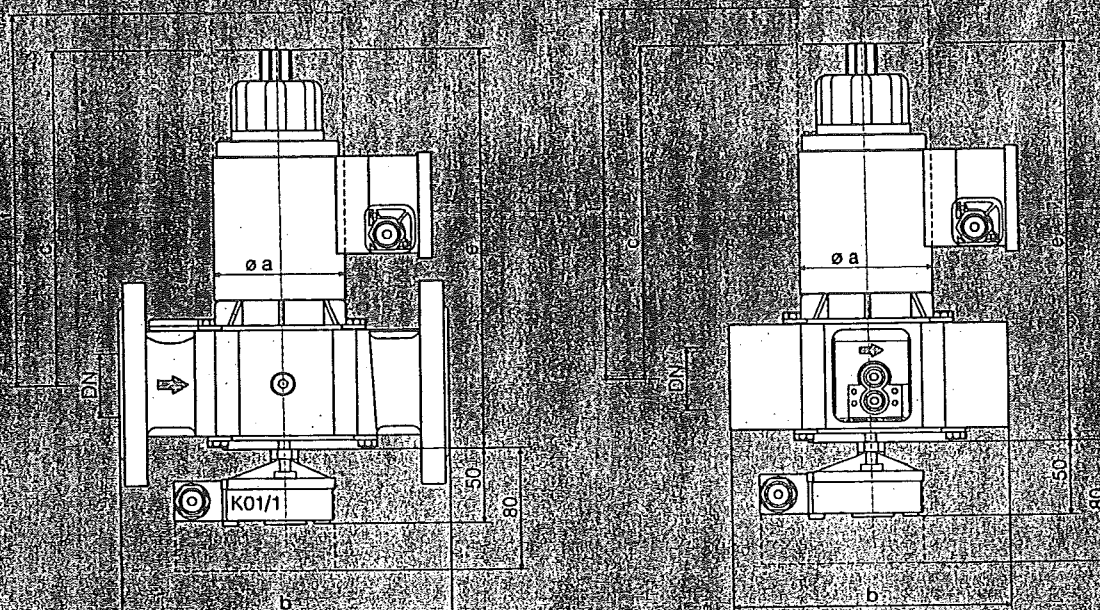
f = Space requirement for solenoid changing

d = largest width

* = for max. 3 s

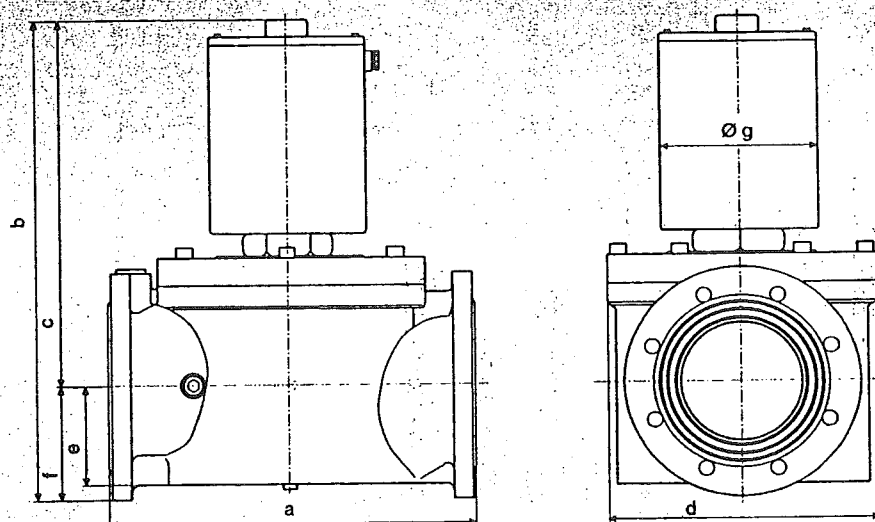
Ignition gas valve, Type MV 502, refer to Datasheet 6.01

Dimensions [mm]
MVD 203 - 525/5
MVDLE 2020/5 - 5100/5



d = largest width
K01/1 closed position indicator

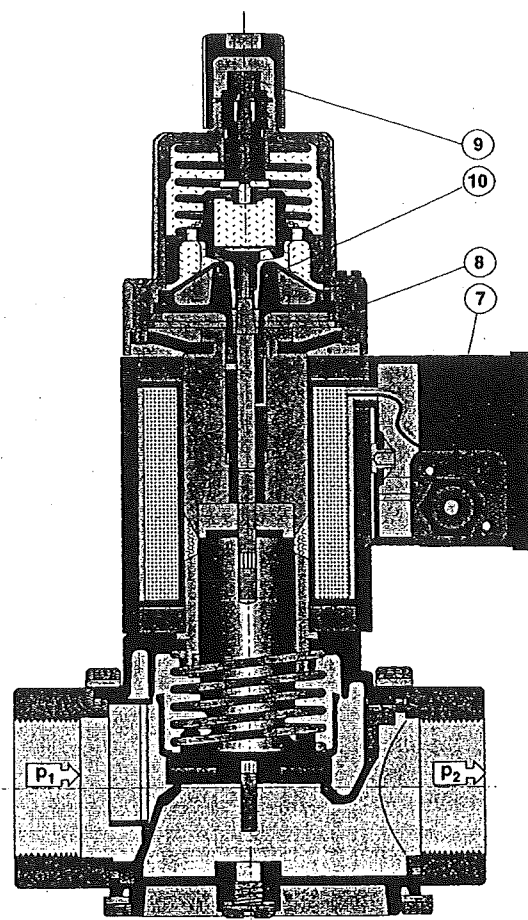
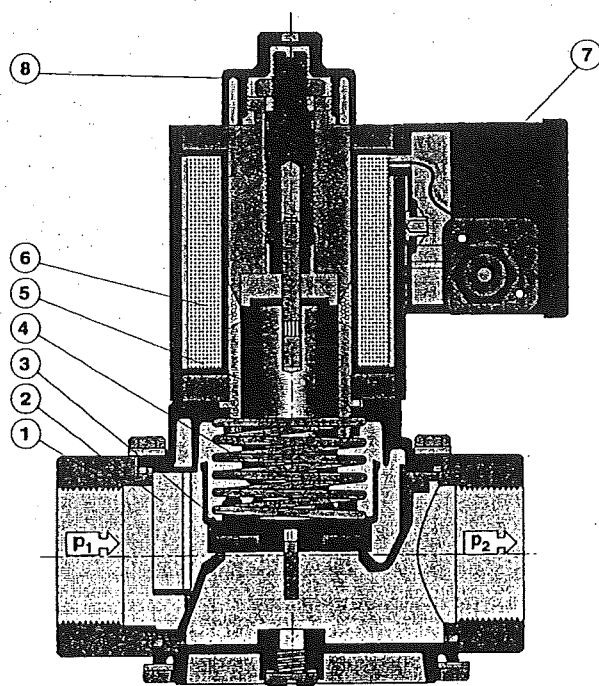
Dimensions [mm]
MV 5100/5 S - MVD 2200



Type	P _{max.}	DN/Rp	Order No.	Sole-noid No.	P _{max.} [VA]*	I _{max.} ~ (AC) 230 V [A]**	Opening time	Opening Dimensions [mm]							Weight [kg]
								a	b	c	d	e	f	g	
MV 5100/5 S	500	DN 100	220 754	60S	90	7,5	< 1 s	350	465	365	240	80	100	170	39.0
MV 2125/5 S	200	DN 125	224 681	60S	90	7,5	< 1 s	400	531	406	290	112	125	170	56.0
MV 2150/5 S	200	DN 150	224 682	61S	90	10	< 1 s	480	582	439	290	125	143	170	62.0
MVD 5100/5	500	DN 100	166 150	60E	90	7,5	< 1 s	350	465	365	240	80	100	170	39.0
MVD 5125/5	500	DN 125	159 840	60E	90	7,5	< 1 s	400	531	406	290	112	125	170	56.0
MVD 5150/5	500	DN 150	160 350	61E	90	10	< 1 s	480	582	439	290	125	143	170	62.0
MVD 2200	200	DN 200	213 892	70E	90	10	< 1 s	600	760	590	415	160	170	214	123.0

* Electrical rating in open state

** Switch-on current for approx. 3 s



- 1 Housing
- 2 Sieve
- 3 Valve plate
- 4 Closing spring

- 5 Armature
- 6 Solenoid coil
- 7 Electrical connection

- Setting
- 8 - Main volume
- 9 - Fast stroke
- 10 - Hydraulic brake

Functional description

The DUNGS safety solenoid valve is an automatic shut-off valve operated with auxiliary power.

The electromagnetic drive opens against the force of the closing spring

4. The stroke of armature 5 can be limited by the setting screw 8.

The hydraulic brake 10 permits slow opening. Fast stroke 9 can be adjusted.

If the auxiliary power is interrupted (operating voltage), closing spring 4 closes the valve within 1 second.

The closed position of the valve can be monitored by a mountable closed position signal contact.

$$\dot{V}_{\text{verwendetes Gas/gas used/ gaz utilisé/gas utilizzato}} = \dot{V}_{\text{Luft/air/aria}} \times f$$

f =

Dichte Luft
Spec. weight air
poids spécifique de l'air
peso specifico aria

Dichte des verwendeten Gases
Spec. weight of gas used
poids spécifique du gaz utilisé
peso specifico del gas utilizzato

Gasart
Type of gas
Type de gaz
Tipo di gas

Dichte
Spec. Wgt.
poids spécifique
Peso specifico
[kg/m³]

dv

f

Erdgas/Nat. Gas/
Gaz naturel/Gas metano

0.81

0.65

1.24

Stadtgas/City gas/
Gaz de ville/Gas città

0.58

0.47

1.46

Flüssiggas/LPG/
Gaz liquide/Gas liquido

2.08

1.67

0.77

Luft/Air/
Air/Aria

1.24

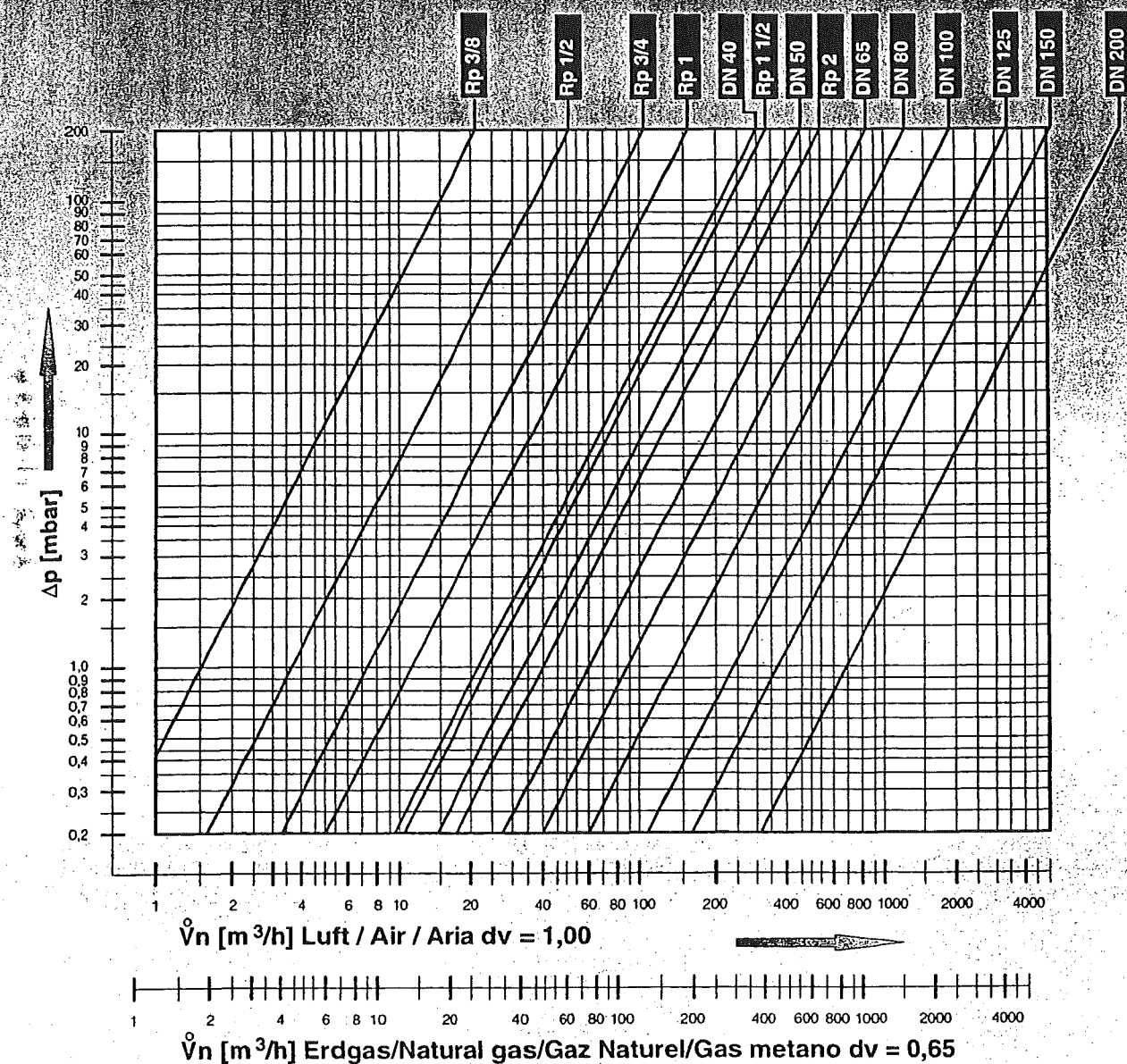
1.00

1.00

Single-stage safety
solenoid valves
MVD, MVD/5,
MVDLE/5

DUNGS®

Flow diagram



We reserve the right to make any changes in the interest of technical progress.

Head Offices and Factory
Karl Dungs GmbH & Co. KG
Siemensstraße 6-10
D-73660 Urbach, Germany
Telephone +49 (0)7181-804-0
Fax +49 (0)7181-804-166

Postal address
Karl Dungs GmbH & Co. KG
Postfach 12 29
D-73602 Schorndorf, Germany
e-mail info@dungs.com
Internet www.dungs.com

Betriebs- und Montagean- leitung

Magnetventil einstufige Betriebsweise

Typ MVD .../5
Typ MVDLE .../5
Nennweiten
Rp 3/8 – Rp 2 1/2
DN 20 – DN 100

Operation and assembly instructions

Solenoid valve one stage operation

Type MVD .../5
Type MVDLE .../5
Nominal diameters
Rp 3/8 – Rp 2 1/2
DN 20 – DN 100

Notice d'emploi et de mon- tage

Electrovanne de sécurité à une allure

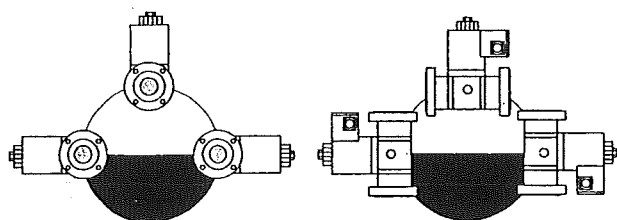
Type MVD .../5
Type MVDLE .../5
Diamètres nominaux
Rp 3/8 – Rp 2 1/2
DN 20 – DN 100

Istruzioni di esercizio di montaggio

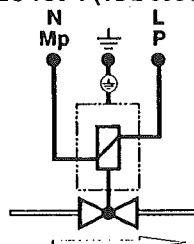
Valvole elettromagnetiche monostadio

Tipo MVD .../5
Tipo MVDLE .../5
Diametri nominali
Rp 3/8 – Rp 2 1/2
DN 20 – DN 100

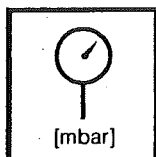
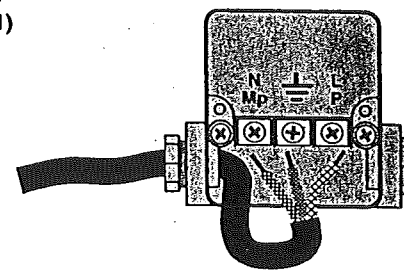
Einbaulage Installation position Position de montage Posizione di montaggio



Elektrischer Anschluß Electrical connection Raccordement électrique Allacciamento elettrico IEC 730-1 (VDE 0631 T1)

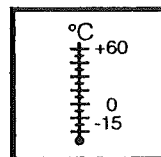


Erdung nach örtlichen Vorschriften
Grounding acc. local regulations
Mise à la terre selon normes locales
Messa a terra secondo prescrizioni locali

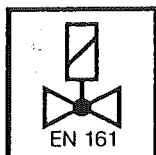


[mbar]

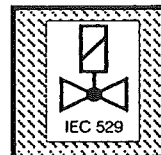
Max. Betriebsdruck
Max. operating pressure
Pression de service maxi.
Max. pressione di esercizio
MV ... 2.../5 $p_{max.} = 200/360$ mbar
MV ... 5.../5 $p_{max.} = 500$ mbar



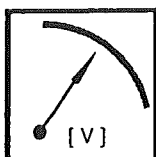
Umgebungstemperatur
Ambient temperature
Température ambiante
Temperatura ambiente
-15 °C ... +60 °C



Klasse A, Gruppe 2
Class A, Group 2
Classe A, Groupe 2
Class A, Gruppo 2
nach / acc. / selon / a norme
EN 161

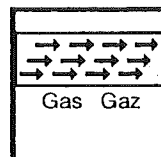


Schutzart/Degree of protection
Protection/Protezione
IP 54 nach / acc. / selon / a norme
IEC 529 (DIN EN 60529)
Optional/Optional/Optional/Optional
IP 65



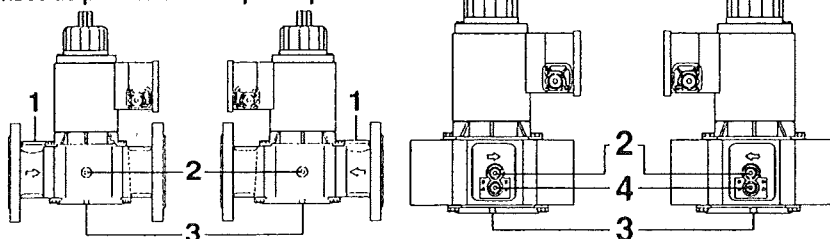
[V]

U_n ~(AC) 230 V -15 % +10 %
oder/or/ou/o
~(AC) 110 V-120V, ~(AC) 240 V
=(DC) 48 V, =(DC) 24 V- 28V
Einschaltdauer/Switch-on duration/
Durée de mise sous tension/ Durata
inserzione 100 %



Familie 1 + 2 + 3
Family 1 + 2 + 3
Famille 1 + 2 + 3
Famiglia 1 + 2 + 3

Druckabgriffe / Pressure taps Prises de pression / Manopola a pressione



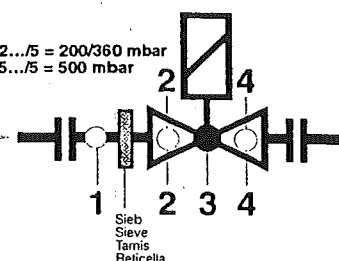
1
nur Flanschfassung ab DN 25
Only flange version from DN 25
Uniquement version à bride à
partir de DN 25
Solo esecuzione flangia da DN 25
Verschlußschraube
Sealing plug
Bouchon fileté
Vite di chiusura
G 3/4 DIN ISO 228

2
Verschlußschraube
Sealing plug
Bouchon fileté
Vite di chiusura
G 1/4 DIN ISO 228

3
Anschlußmöglichkeit für Endkon-
takt / Connection for C.P.I. / Possi-
bilità di raccordo per fine corsa/ Possibilità di
attacco per finecorsa: K01/1
Verschlußschraube / Sealing plug
Bouchon fileté / Vite di chiusura
G 1/8 DIN ISO 228

$p_{max.}$
maxi.

MV 2.../5 = 200/360 mbar
MV 5.../5 = 500 mbar



4
Rp 1/2 – Rp 2
nur Gewindeausführung
Only threaded version
Uniquement version filetée
Solo esecuzione filettata
Bypassbohrung unter Verschluß-
deckel, optional / Bypass port
under cover, optional / Percage
de dérivation sous couvercle / Foro
per bypass sotto il coperchietto,
optional.

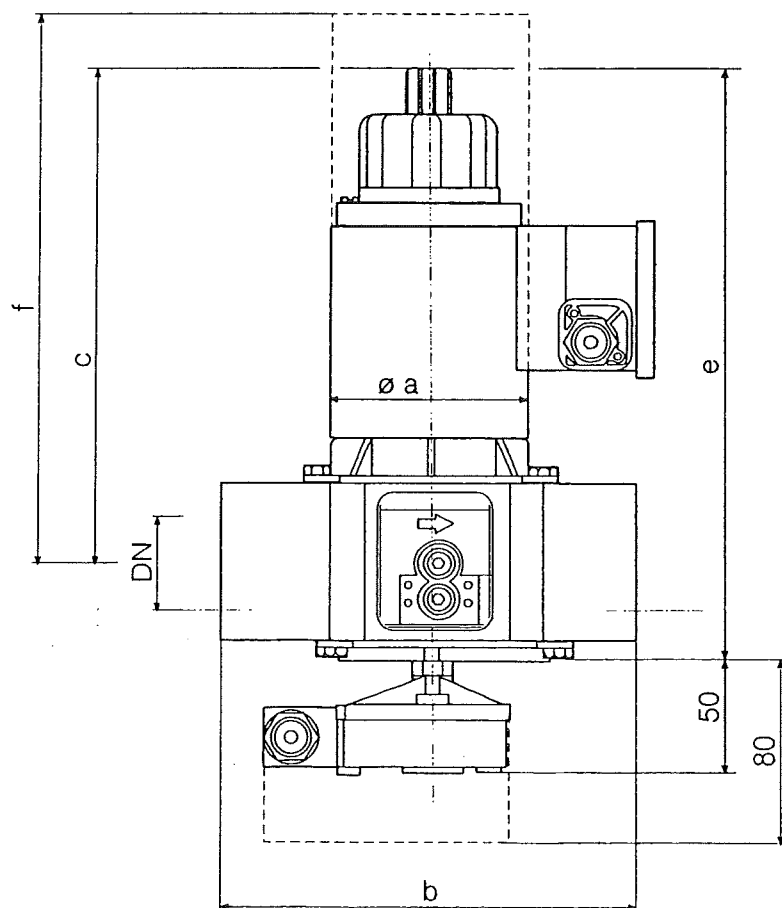
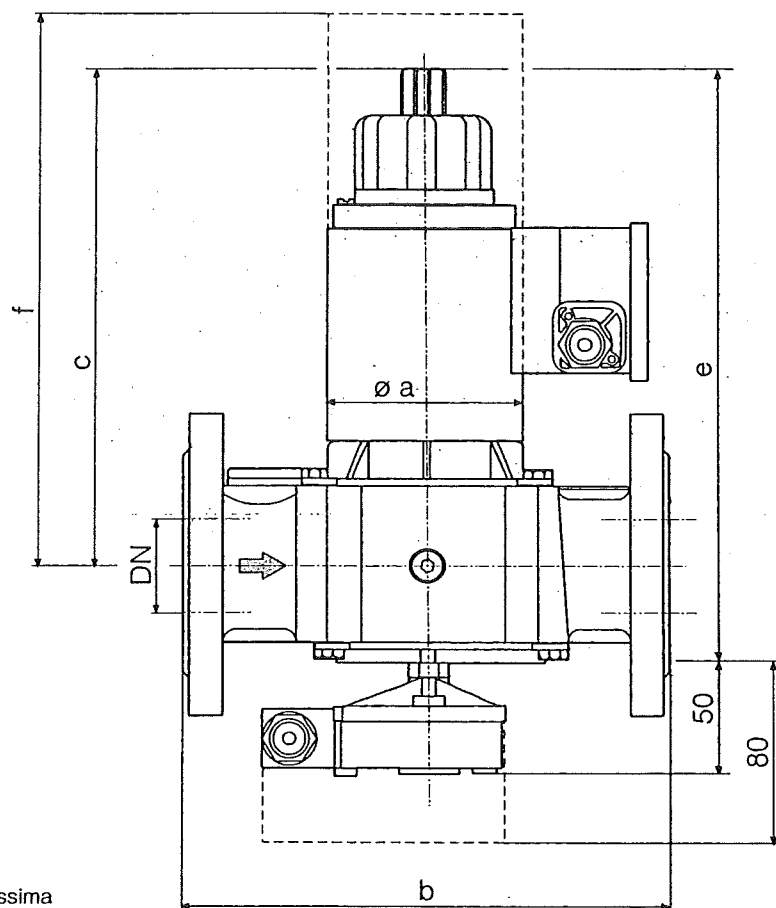
Typ Type Tipo	P _{max.}	DN / Rp	Magnet-Nr. Solenoid-No. ...	P _{max.} [VA]	I _{max.} ~(AC) 230 V	Öffnungszeit Opening time Durée d'ouverture Tempo apertura	Einbaumaße / Dimensions / Cotes d'encombrement / Dimensioni [mm]						Gewicht Weight Poids Peso [kg]
							a	b	c	d	e	f	
MVD 203/5	360	Rp 3/8	100	15	0,08	< 1 s	50	60	90	75	155	190	0,85
MVD 205/5	360	Rp 1/2	100	15	0,08	< 1 s	50	75	135	75	113	200	1,00
MVD 207/5	200	Rp 3/4	150	32	0,13	< 1 s	60	100	135	80	160	190	1,75
MVD 207/5	360	Rp 3/4	200	25	0,15	< 1 s	75	100	135	80	160	190	2,40
MVD 210/5	360	Rp 1	200	25	0,15	< 1 s	75	110	135	90	165	190	2,45
MVD 215/5	200	Rp 1 1/2	280	60	0,26	< 1 s	80	150	170	116	210	255	4,30
MVD 215/5	360	Rp 1 1/2	300	60	0,30	< 1 s	95	150	170	116	210	255	5,40
MVD 220/5	200	Rp 2	300	60	0,30	< 1 s	95	170	170	130	220	255	5,90
MVD 225/5	200	Rp 2 1/2	400	90	0,48	< 1 s	115	230	215	165	270	325	10,90
MVDLE 203/5	360	Rp 3/8	100	15	0,08	ca. 20 s	50	60	135	75	155	190	0,95
MVDLE 205/5	360	Rp 1/2	100	15	0,08	ca. 20 s	50	75	135	75	155	200	1,10
MVDLE 207/5	360	Rp 3/4	200	25	0,15	ca. 20 s	75	100	165	80	190	190	2,55
MVDLE 210/5	360	Rp 1	200	25	0,13	ca. 20 s	75	110	165	90	195	190	2,75
MVDLE 215/5	200	Rp 1 1/2	280	60	0,26	ca. 20 s	80	150	205	116	245	255	4,40
MVDLE 215/5	360	Rp 1 1/2	300	60	0,30	ca. 20 s	95	150	205	116	245	255	5,50
MVDLE 220/5	200	Rp 2	300	60	0,26	ca. 20 s	95	170	205	130	250	255	6,20
MVDLE 225/5	200	Rp 2 1/2	400	90	0,48	ca. 20 s	115	230	295	165	350	320	11,40
MVD 503/5	500	Rp 3/8	100	15	0,08	< 1 s	50	60	90	75	155	190	0,85
MVD 505/5	500	Rp 1/2	100	15	0,08	< 1 s	50	75	90	75	113	200	1,00
MVD 507/5	500	Rp 3/4	200	25	0,15	< 1 s	75	100	135	80	160	190	2,40
MVD 510/5	500	Rp 1	200	25	0,15	< 1 s	75	110	135	90	165	190	2,60
MVD 515/5	500	Rp 1 1/2	300	60	0,30	< 1 s	95	150	175	116	210	255	5,40
MVD 520/5	500	Rp 2	400	90	0,48	< 1 s	115	170	190	130	235	300	8,80
MVD 525/5	500	Rp 2 1/2	500	80	0,42	< 1 s	130	230	215	165	270	370	14,50
MVDLE 503/5	500	Rp 3/8	100	15	0,08	ca. 20 s	50	60	135	75	155	190	0,85
MVDLE 505/5	500	Rp 1/2	120	24	0,11	ca. 20 s	50	75	150	75	170	220	1,00
MVDLE 507/5	500	Rp 3/4	200	25	0,15	ca. 20 s	75	100	165	80	190	190	1,70
MVDLE 510/5	500	Rp 1	250	30	0,12	ca. 20 s	75	110	190	90	220	213	2,60
MVDLE 515/5	500	Rp 1 1/2	300	60	0,30	ca. 20 s	95	150	205	116	245	255	5,60
MVDLE 520/5	500	Rp 2	400	90	0,48	ca. 20 s	115	170	225	130	270	300	11,10
MVD 2020/5	200	DN 20	150	32	0,13	< 1 s	60	152	135	105	160	190	2,30
MVD 2020/5	360	Dn 20	200	25	0,15	< 1 s	75	152	135	105	160	190	2,90
MVD 2025/5	360	DN 25	200	25	0,13	< 1 s	75	160	165	115	165	190	3,50
MVD 2040/5	200	DN 40	280	60	0,26	< 1 s	80	200	170	150	230	255	6,80
MVD 2040/5	360	DN 40	300	60	0,30	< 1 s	95	200	170	150	230	255	7,00
MVD 2050/5	200	DN 50	300	50	0,26	< 1 s	95	230	170	165	220	255	7,70
MVD 2065/5	200	DN 65	400	90	0,48	< 1 s	115	290	215	185	275	320	12,70
MVD 2080/5	200	DN 80	500	80	0,42	< 1 s	130	310	250	200	305	360	26,50
MVD 2100/5	200	DN 100	550	90	0,48	< 1 s	150	350	310	240	395	480	31,00
MVDLE 2020/5	360	DN 20	200	25	0,13	ca. 20 s	75	150	165	105	190	190	3,50
MVDLE 2025/5	360	DN 25	200	25	0,13	ca. 20 s	75	160	165	115	195	190	4,00
MVDLE 2040/5	200	DN 40	280	60	0,26	ca. 20 s	80	200	205	150	245	255	6,90
MVDLE 2040/5	360	DN 40	300	80	0,30	ca. 20 s	95	200	205	150	245	255	7,10
MVDLE 2050/5	200	DN 50	300	60	0,26	ca. 20 s	95	230	205	165	250	255	7,50
MVDLE 2065/5	200	DN 65	400	90	0,48	ca. 20 s	115	290	295	185	350	320	13,30
MVDLE 2080/5	200	DN 80	500	80	0,42	ca. 20 s	130	310	320	200	390	360	26,50
MVDLE 2100/5	200	DN 100	550	90	0,48	ca. 20 s	150	350	385	240	470	465	31,00
MVD 5020/5	500	DN 20	200	25	0,13	< 1 s	75	150	135	105	160	190	3,50
MVD 5025/5	500	DN 25	200	25	0,13	< 1 s	75	160	135	115	165	190	4,00
MVD 5040/5	500	DN 40	300	60	0,26	< 1 s	95	200	170	150	230	255	7,00
MVD 5050/5	500	DN 50	400	90	0,48	< 1 s	115	230	190	165	235	300	12,00
MVD 5065/5	500	DN 65	500	80	0,42	< 1 s	130	290	235	185	295	370	17,00
MVD 5080/5	500	DN 80	550	90	0,50	< 1 s	150	310	290	200	360	465	32,00
MVD 5100/5	500	DN 100	60E	90	7,5*	< 1 s	170	350	360	240	418	600	42,00
MVDLE 5020/5	500	DN 20	200	25	0,13	ca. 20 s	75	150	165	80	190	180	3,50
MVDLE 5025/5	500	DN 25	250	30	0,12	ca. 20 s	75	160	190	90	220	213	3,90
MVDLE 5040/5	500	DN 40	300	60	0,26	ca. 20 s	95	200	205	116	245	255	7,00
MVDLE 5050/5	500	DN 50	400	90	0,48	ca. 20 s	115	230	225	130	270	300	13,10

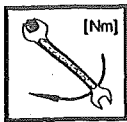
f = Platzbedarf für Magnetmontage
Space requirement for mounting solenoid
Encombrement pour montage de l'aimant
Ingombro per montaggio bobina

d = größte Breite
Max. width
Largeur maxi.
Larghezza massima

* = für max. 3 s
for max. 3 s
pour max. 3 s
per max. 3 s

d = größte Breite
Max. width
Largeur maxi.
Larghezza massima

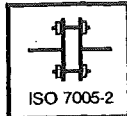




[Nm]

max. Drehmomente / Systemzubehör
max. torque / System accessories
max. couple / Accessoirs du système
max. coppie / Accessorio di sistema

M 3	M 4	M 5	M 6	M 8	G 1/8	G 1/4	G 1/2	G 3/4
0,5 Nm	2,5 Nm	5 Nm	7 Nm	15 Nm	5 Nm	7 Nm	10 Nm	15 Nm



ISO 7005-2

max. Drehmomente / Flanschverbindung
max. torque / Flange connection
couple maxi. / Joint à brides
max. coppie / Collegamento a flangia

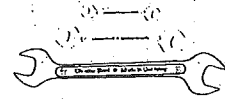
M 16 x 65 (DIN 939)
50 Nm

Stiftschraube
Setscrew
Goujon
Vite per acciaio

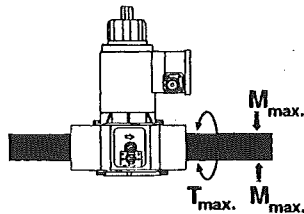


Geeignetes Werkzeug einsetzen!
Please use proper tools!
Utiliser des outils adaptés!
Impiegare gli attrezzi adeguati!

Schrauben kreuzweise anziehen!
Tighten screws crosswise!
Serrer les vis en croisant!
Stringere le viti incrociate!



Gerät darf nicht als Hebel benutzt werden.
Do not use unit as lever.
Ne pas utiliser la vanne comme un levier.
L'apparecchio non deve essere usato come leva.



DN	—	—	20	25	40	50	65	80	100
Rp	3/8	1/2	3/4	1	1 1/2	2	2 1/2	—	—
[Nm] t ≤ 10 s									
M _{max.}	70	105	225	340	610	1100	1600	2400	5000
[Nm] t ≤ 10 s									
T _{max.}	35	50	85	125	200	250	325	400	400

Gewindeausführung MV .../5 Einbau

1. Gewinde schneiden.
2. Geeignetes Dichtmittel verwenden, Bild 1.
3. Geeignetes Werkzeug verwenden, Bild 1.
4. Nach Einbau Dichtheits- und Funktionskontrolle.

Threaded version MV .../5 Mounting

1. Tap thread.
2. Use suitable sealing agent, refer to Fig. 1.
3. Use suitable tool, refer to Fig. 1.
4. Perform leak and functional tests after mounting.

Version fileté MV .../5 Pose

1. Fileter.
2. Employer un produit d'étanchéité approprié, figure 1.
3. Utiliser un outillage adapté, figure 2.
4. Après la pose, effectuer un contrôle d'étanchéité et de fonctionnement.

Esecuzione filettata MV .../5 Montaggio

1. Tagliare il filetto
2. Utilizzare adeguate guarnizioni, Fig. 1.
3. Utilizzare adeguate guarnizioni, Fig. 1.
4. Dopo il montaggio effettuare una prova di tenuta e funzionamento.

Flanschausführung MV .../5 Einbau

1. Stiftschrauben A, B, C und D einsetzen, Bild 2.
2. Dichtung I und J einsetzen.
3. Stiftschrauben E, F, G und H einsetzen, Bild 2.
4. Stiftschrauben festziehen. Drehmomentetabelle beachten! **Auf korrekten Sitz der Dichtung achten!**
5. Nach Einbau Dichtheits- und Funktionskontrolle.

Flange version MV .../5 Mounting

1. Insert setscrews A, B, C and D, refer to Fig. 2.
2. Insert seals I and J.
3. Insert setscrews E, F, G and H, refer to Fig. 2.
4. Tighten setscrews. Refer to torque table **Ensure correct seating of the seal!**
5. Perform leak and functional tests after mounting.

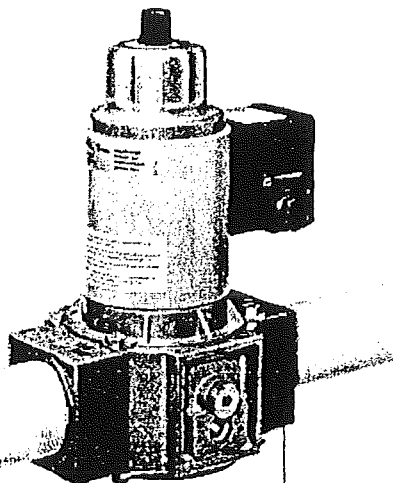
Version à bride MV .../5 Pose

1. Insérer les goujons A, B, C et D, figure 2.
2. Insérer les joints I et J.
3. Insérer les goujons E, F, G et H, figure 2.
4. Serrer les goujons à fond en respectant les couples indiqués dans le tableau. **Veiller ce que le joint soit bien en place!**
5. Après la pose, effectuer un contrôle d'étanchéité et de fonctionnement.

Esecuzione flangiata MV .../5 Montaggio

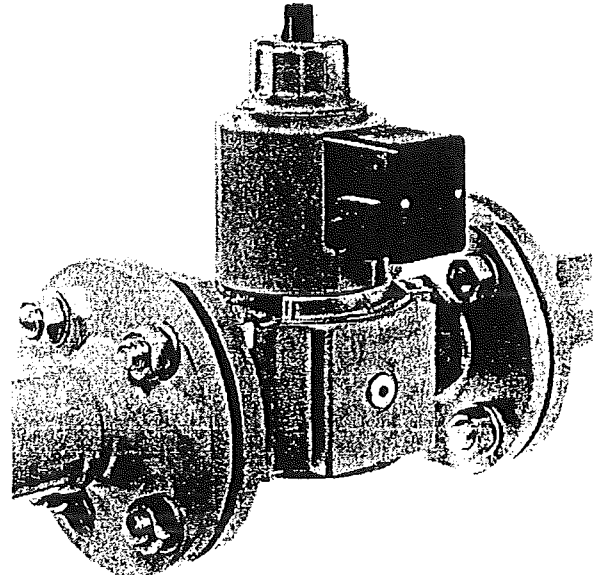
1. Inserire le viti A, B, C e D, Fig. 2.
2. Inserire le guarnizioni I e J.
3. Inserire le viti E, F, G e H, Fig. 2.
4. Stringere le viti, osservando la tabella del momento torcente. **Prestare attenzione al corretto posizionamento della guarnizione!**
5. Dopo il montaggio effettuare una prova di tenuta e funzionamento.

1

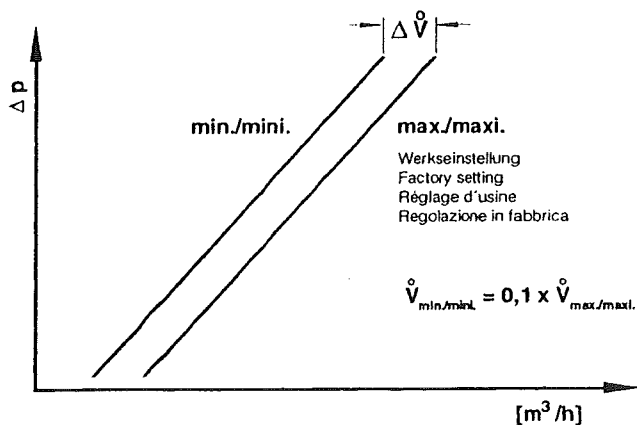
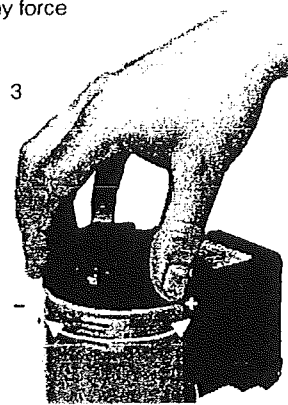
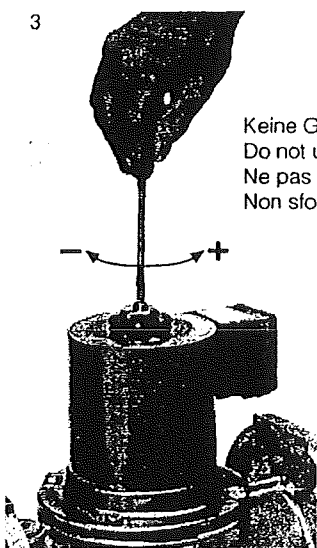
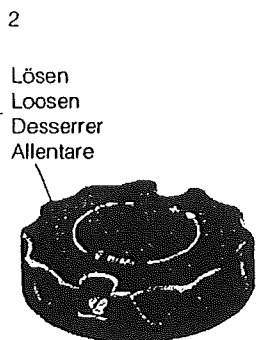
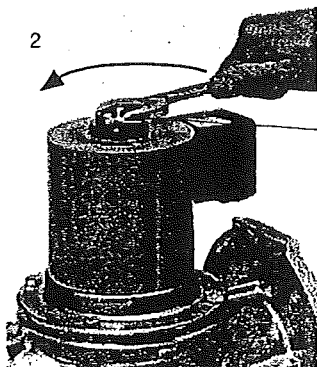
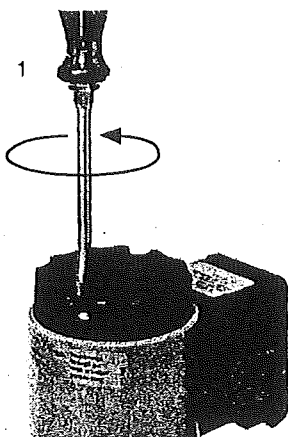


Montagefläche
Mounting
Face de montage
Superficie x il montaggio

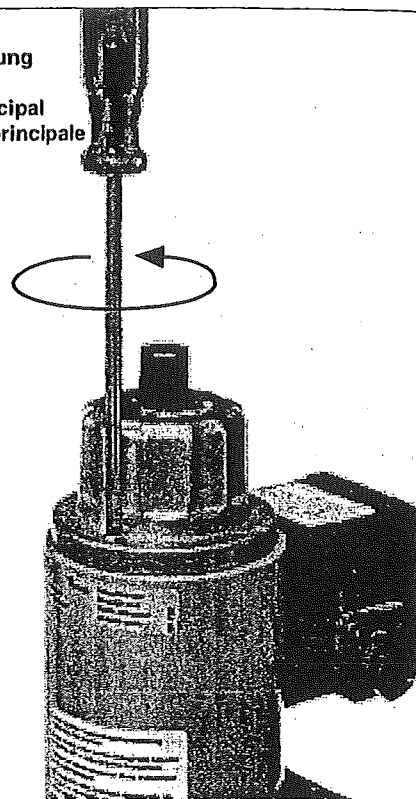
2



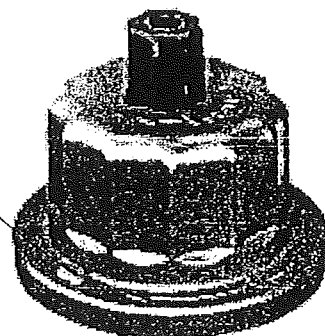
MVD .../5
Hauptmengeneinstellung
Setting the main flow
Réglage du débit principal
Regolazione portata principale



MVDLE .../5
Hauptmengeneinstellung
Setting the main flow
Réglage du débit principal
Regolazione portata principale



Schraube lösen
Loosen screw
Desserrer la vis
Allentare la vite



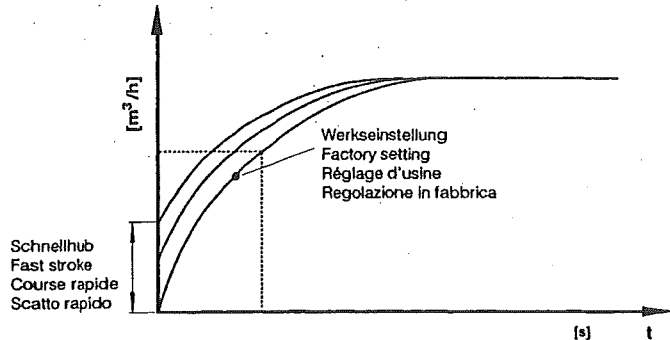
Keine Gewalt anwenden
Do not use any force
Ne pas forcer
Non sforzare



MVDLE .../5
SchnellhubEinstellung V start

Werkseinstellung MVDLE .../5:
Schnellhub nicht eingestellt

1. Einstellkappe E von der Hydraulik abschrauben.
2. Einstellkappe drehen und als Werkzeug benutzen.
3. Linksdrehen = Vergrößerung des Schnellhubes (+).



MVDLE .../5
Rapid stroke adjustment V start

Factory setting MVDLE .../5:
Rapid stroke not adjusted

1. Unscrew the adjustment cap E from the hydraulic brake.
2. Invert the adjustment cap and use as a tool.
3. Turn anti-clockwise = increase rapid stroke (+).

MVDLE .../5
Réglage course rapide V start

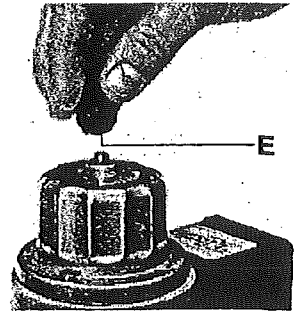
Réglage en usine MVDLE .../5:
Course rapide non réglée

1. Dévisser le capuchon de réglage E du frein hydraulique.
2. Tourner le capuchon de réglage et l'utiliser comme outil.
3. Rotation à gauche = augmentation de la course rapide (+).

MVDLE .../5
Regolazione scatto rapido Vstart

Regolazione in fabbrica del MVDLE .../5: Scatto rapido non regolato

1. Svitare dall'idraulico la farfalla E.
2. Fare ruotare la valvola a farfalla utilizzandola come attrezzo.
3. Rotazione antioraria = aumento dello scatto rapido (+).



Austausch Hydraulik oder Einstellteller

1. Anlage ausschalten.
2. Sicherungslack über der Senkkopfschraube A entfernen.
3. Senkkopfschraube A ausschrauben.
4. Zylinderkopfschraube B ausschrauben.
5. Einstellteller C bzw. Hydraulik D abheben.
6. Einstellteller C bzw. Hydraulik D austauschen.
7. Senk- und Zylinderkopfschraube wieder eindrehen. Senkkopfschraube nur so festziehen, daß Hydraulik noch gedreht werden kann.
8. Senkkopfschraube A mit Sicherungslack überziehen.
9. Dichtheitsprüfung über Druckabgriff Verschlußschraube 2:
MVD 2 ... $p_{max.} = 200$ mbar
MVD 5 ... $p_{max.} = 500$ mbar
10. Funktionskontrolle durchführen.
11. Anlage einschalten

Replacing hydraulic brake unit or adjustment plate

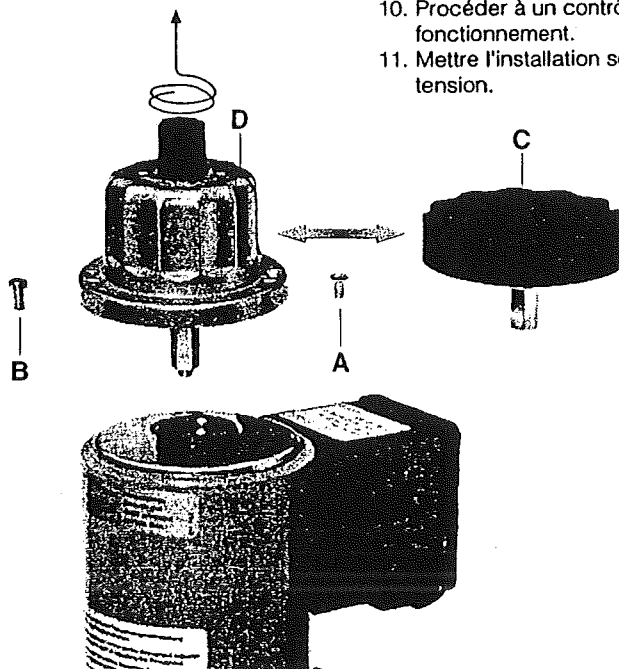
1. Switch off firing system.
2. Remove locking varnish from countersunk screw A.
3. Unscrew countersunk screw A.
4. Unscrew socket head screw B.
5. Raise adjustment plate C or hydraulic brake D.
6. Exchange adjustment plate C or hydraulic brake D.
7. Screw in countersunk and socket head screw. Only tighten socket head screw so that hydraulic brake can just be turned.
8. Coat countersunk screw A with locking varnish.
9. Leakage test: Pressure tap at sealing plug 2:
MVD 2 ... $p_{max.} = 200$ mbar
MVD 5 ... $p_{max.} = 500$ mbar
10. Perform functional test.
11. Switch on firing system.

Remplacement du frein hydraulique ou du disque de réglage

1. Mettre l'installation hors tension.
2. Eliminer le vernis de blocage au-dessus de la vis à tête fraisée A.
3. Dévisser la vis à tête fraisée A.
4. Dévisser la vis à tête cylindrique B.
5. Soulever le disque de réglage C ou le frein hydraulique D.
6. Remplacer le disque de réglage C ou le frein hydraulique D.
7. Revisser les vis à tête fraisée et à tête cylindrique. Serrer la vis à tête fraisée.
8. Enduire la vis à tête fraisée A de vernis de blocage.
9. Contrôle d'étanchéité via la prise de pression bouchon fileté 2:
MVD 2 ... $p_{max.} = 200$ mbar
MVD 5 ... $p_{max.} = 500$ mbar
10. Procéder à un contrôle de fonctionnement.
11. Mettre l'installation sous tension.

Sostituzione dell'idraulico o del piattello di regolazione

1. Disinserire l'impianto
2. Rimuovere la lacca di sigillo sopra la vite a testa svasata A.
3. Svitare la vite a testa svasata A.
4. Svitare la vite a testa cilindrica B.
5. Sollevare il piattello C o l'idraulico D.
6. Sostituire il piattello C o l'idraulico D.
7. Riavvitare la vite a testa cilindrica e stringere la vite a testa svasata soltanto fino a che l'idraulico possa ancora essere fatto ruotare.
8. Sigillare con la lacca la vite a testa svasata A.
9. Prova di tenuta attraverso il tappo a su presa di pressione 2:
MVD 2 ... $p_{max.} = 200$ mbar
MVD 5 ... $p_{max.} = 500$ mbar
10. Effettuare la prova di funzionamento.
11. Reinserire l'impianto.



Magnetwechsel

1. Hydraulik bzw. Einstellteller entfernen, wie auf Seite 6 "Austausch Hydraulikoder Einstellteller", Punkt 1 - 5, beschrieben.
2. Magnet auswechseln.
Magnet-Nr. und Spannung unbedingt beachten!
3. Hydraulik bzw. Einstellteller wieder montieren, wie auf Seite 6 "Austausch Hydraulikoder Einstellteller", Punkt 7 - 11, beschrieben.

Changing solenoid

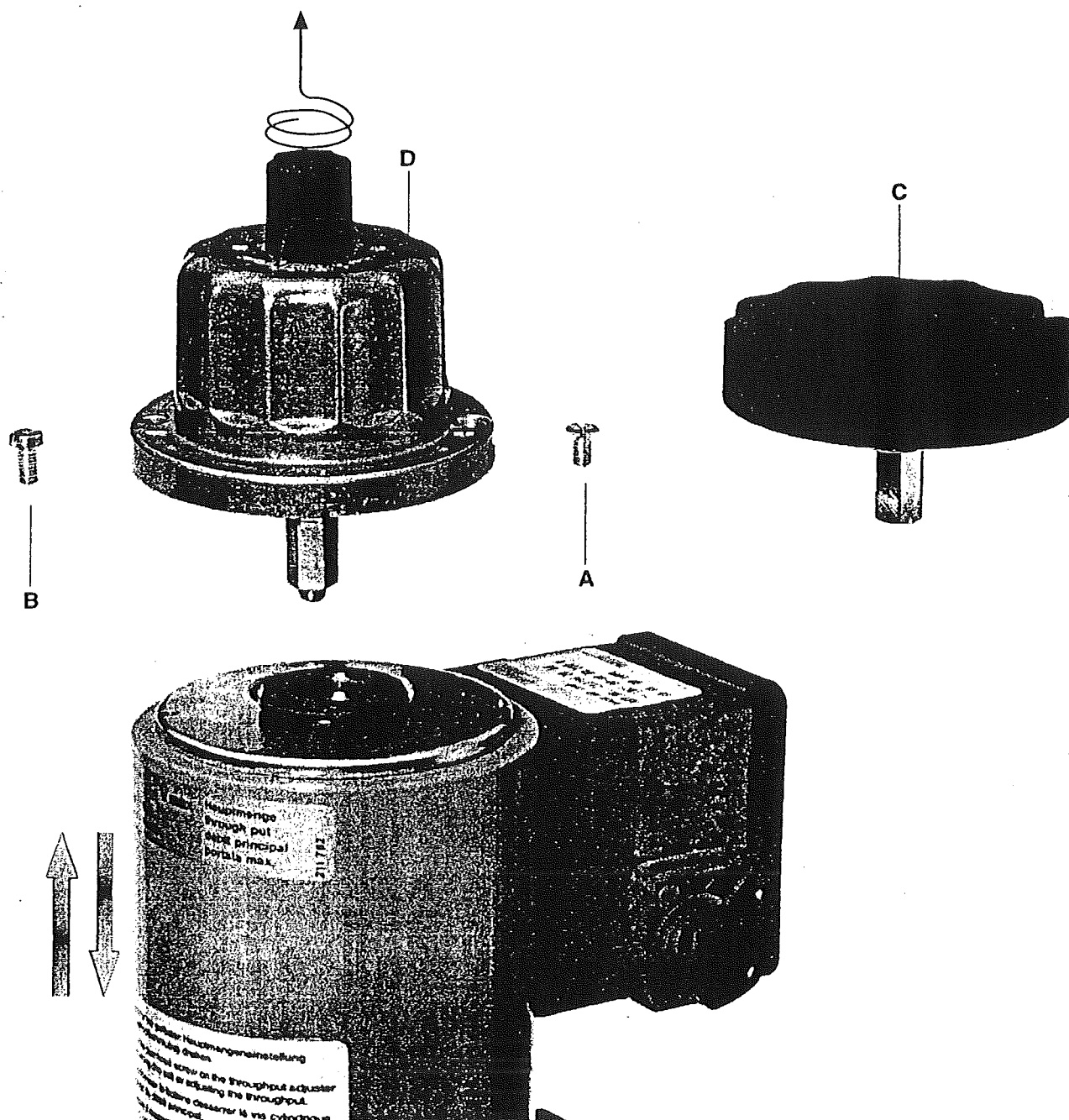
1. Remove hydraulic brake unit or adjustment plate as described in Section "Replacing hydraulic brake unit or adjustment plate", Items 1-5 on page 6.
2. Replace solenoid
Note solenoid no. and voltage!
3. Remount hydraulic brake unit or adjustment plate as described in Section "Replacing hydraulic brake unit or adjustment plate", Items 7-11 on page 6.

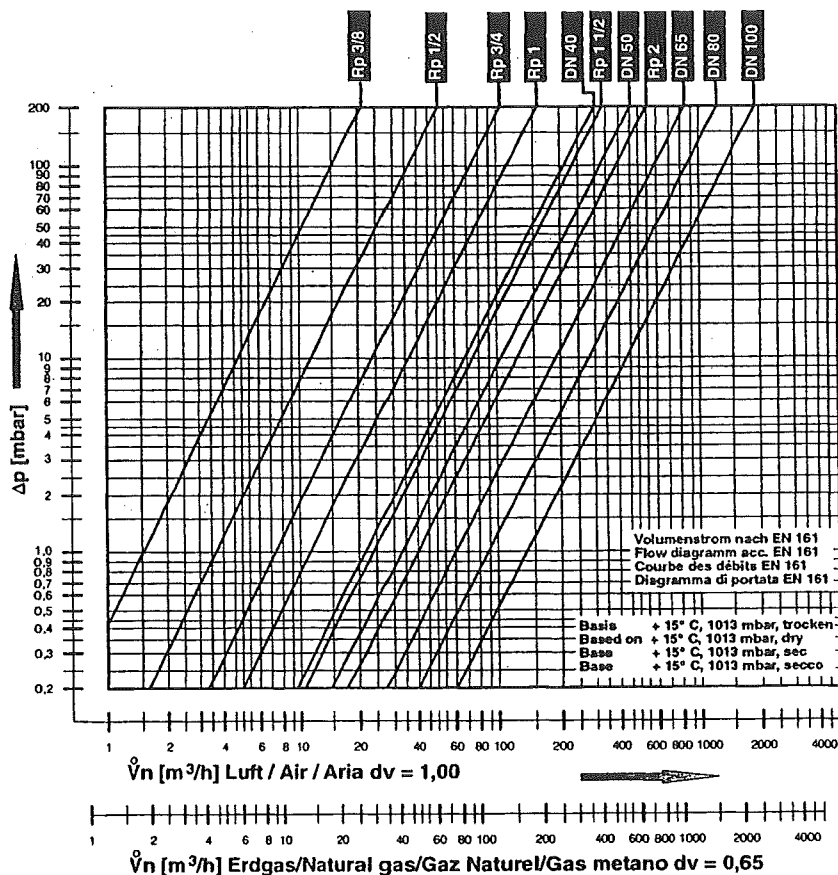
Remplacement de l'aimant

1. Déposer le frein hydraulique ou le disque de réglage, comme indiqué en page 6 "Remplacement du frein hydraulique ou du disque de réglage".
2. Remplacer l'aimant.
Tenir impérativement compte de la réf. de l'aimant et de la tension!
3. Remonter le frein hydraulique ou le disque de réglage, comme indiqué en page 6 "Remplacement du frein hydraulique ou du disque de réglage".

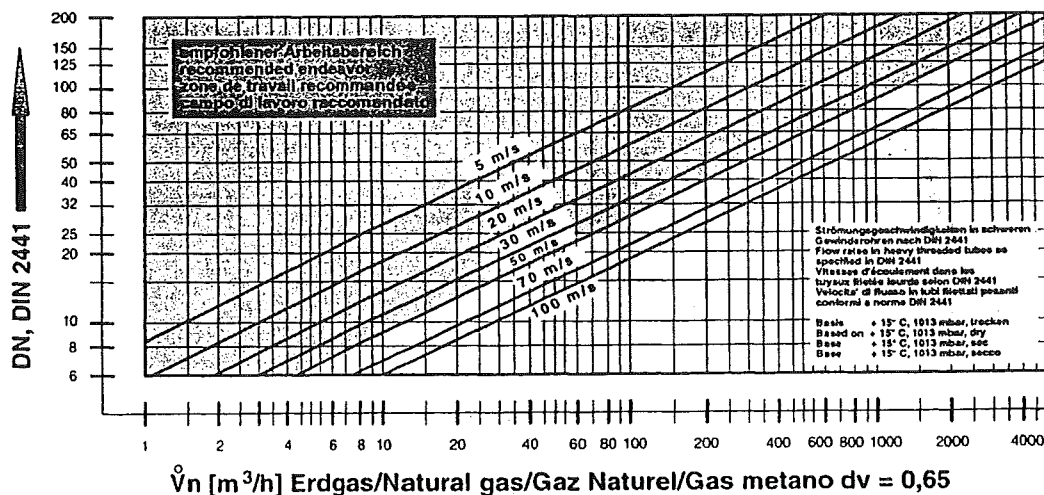
Sostituzione bobina

1. Togliere l'idraulico ed il piattello di regolazione come descritto a pag. 6 "sostituzione idraulico o piattello" punti da 1 a 5.
2. Sostituire la bobina.
Prestare assolutamente attenzione al numero della bobina e alla tensione!
3. Rimontare l'idraulico ed il piattello di regolazione come descritto a pag. 6 "sostituzione idraulico o piattello" punti da 7 a 11.





Strömungsgeschwindigkeit / Flow rate / Vitesse d'écoulement / Velocità Flusso



$$\dot{V}_{\text{verwendetes Gas/gas used/ gaz utilisé/gas utilizzato}} = \dot{V}_{\text{Luft/Air/aria}} \times f$$

f =

Dichte Luft
Spec. weight air
poids spécifique de l'air
peso specifico aria

Dichte des verwendeten Gases
Spec. weight of gas used
poids spécifique du gaz utilisé
peso specifico del gas utilizzato

Gasart Type of gas Type de gaz Tipo di gas	Dichte Spec. Wgt. poids spécifique Peso specifico [kg/m³]	d_v	f
Erdgas/Nat.Gas/ Gaz naturel/Gas metano	0.81	0.65	1.24
Stadtgas/City gas/ Gaz de ville/Gas città	0.58	0.47	1.46
Flüssiggas/LPG/ Gaz liquide/Gas liquido	2.08	1.67	0.77
Luft/Air/ Air/Aria	1.24	1.00	1.00

Ersatzteile / Zubehör Spare parts / Accessories Pièces de rechange / access. Parti di ricambio / Accessori	Bestell-Nummer Ordering No. No. de commande Codice articolo
Verschlußschraube mit Dichtring Locking screw and sealing ring Bouchon fileté avec bague d'étanchéité Tappo a vite con guarnizione	5 Stück/Set 5 Pieces/Set 5 Pièces/Set 5 Pezzi/Set
G 1/8 G 1/4 G 3/4	230 395 230 396 230 402
Steckverbindung DIN EN 175301-803 Set IP 54 Connector DIN EN 175301-803 Set IP 54 Connexion DIN EN 175301-803 Jeu IP 54 Collegamento a spina DIN EN 175301-803 Set IP 54	 215 733
Einstellteller für Hauptmenge Adjustment plate for main flow Disque de réglage pour débit principal Piattello regolazione per portata principale	
Rp 3/8 – Rp 1/2 Rp 3/4 – Rp 2, DN 20 – DN 50 Rp 2 1/2, DN 65 – DN 100	231 789 231 790 231 791
Hydraulikbremse Hydraulic brake Frein hydraulique freno idraulico	223 159
Rp 3/8 – Rp 1/2 Rp 3/4 – Rp 2, DN 20 – DN 50 Rp 2 1/2, DN 65 – DN 100	223 158 223 157
Einsteckscheibe Insert washer Disque à emboîtement Dischetto da inserire	
Rp 3/8 – Rp 1/2 Rp 3/4 – Rp 2, DN 20 – DN 50 Rp 2 1/2, DN 65 – DN 100	231 563 231 564 231 787
Leitungsdose, schwarz Line socket, black Prise noire Spina, nera GDMW, 3 pol. + E	215 699
Dichtungen für Flanschen Measuring connections with sealing ring Prise de pression avec joint guarnizioni per flange	2 Stück/Set 2 Pieces/Set 2 Pièces/Set 2 Pezzi/Set
DN 40 DN 50 DN 65 DN 80 DN 100	231 600 231 601 231 603 231 604 231 605
Stiftschraubensatz Set of setscrews Goujons Serie di viti per acciaio	4 Stück/Set 4 Pieces/Set 4 Pièces/Set 4 Pezzi/Set
M16 x 55 (DN 20 – DN 50) M16 x 65 (DN 65 – DN 100)	230 422 230 424
Meßstutzen mit Dichtring Test nipple with sealing ring Prise de pression avec joint Misuratore con guarnizione	5 Stück/Set 5 Pieces/Set 5 Pièces/Set 5 Pezzi/Set
G 1/8 G 1/4	230 397 230 398

Ersatzteile / Zubehör Spare parts / Accessories Pièces de rechange / access. Parti di ricambio / Accessori	Bestell-Nummer Ordering No. No. de commande Codice articolo
Schutzkappe Protective cap Capuchon protecteur Calotta di protezione	5 Stück/Set 5 Pieces/Set 5 Pièces/Set 5 Pezzi/Set
MVD 2.../5 (p _{max} 200 mbar) Rp 3/8 – Rp 1/2 Rp 3/4 – Rp 2, DN 20 – DN 50 Rp 2 1/2, DN 65 – DN 100	 231 795 231 796 231 797
MVD 5.../5 (p _{max} 500 mbar) Rp 3/8 – Rp 1/2 Rp 3/4 – Rp 2, DN 20 – DN 50 DN 50 – DN 65 Rp 2 1/2, DN 80	 231 795 231 796 231 797 231 798
MVDLE 2.../5 + MVDLE 5.../5 Rp 3/8 – Rp 2, DN 20 – DN 50 Rp 2 1/2, DN 65 – DN 100	 231 799 231 796
Ersatzmagnet Replacement solenoid Bobine de rechange Bobina di ricambio	auf Anfrage on request sur demande su richiesta

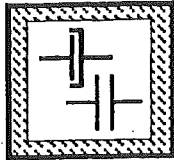


Arbeiten am Magnetventil dürfen nur von Fachpersonal durchgeführt werden.

Work on the solenoid valve may only be performed by specialist staff.

Seul du personnel spécialisé peut effectuer des travaux sur l'électrovanne.

Qualsiasi operazione effettuata sulle valvole deve essere fatta da parte di personale competente.

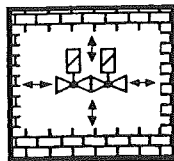


Flanschflächenschützen. Schrauben kreuzweise anziehen. Auf mechanisch spannungsfreien Einbau achten.

Protect flange surfaces. Tighten screws crosswise. Mount tension free.

Protéger les surfaces de brides. Serrer les vis en croisant. Eviter les tensions mécaniques lors du montage.

Proteggere le superfici della flangia. Stringere le viti in modo incrociato. Fare attenzione a che il montaggio meccanico sia senza tensioni.

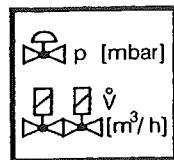


Direkter Kontakt zwischen Magnetventil und dem aushärtendem Mauerwerk, Betonwänden, Fußböden ist nicht zulässig.

Do not allow any direct contact between the solenoid valve and hardened masonry, concrete walls or floors.

Eviter tout contact direct entre l'électrovanne et la maçonnerie, les cloisons en béton et planchers en cours de séchage.

Non è consentito il contatto diretto fra la valvola e murature invecchiate, pareti in calcestruzzo, pavimenti.

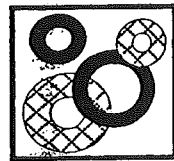


Nennleistung bzw. Druck-sollwerte grundsätzlich am Gasdruckregelgerät einstellen. Leistungsspezifische Drosselung über das Magnetventil.

Always adjust nominal output or pressure set-points on the gas pressure regulator and performance-specific throttling using the MV .../5.

Régler toujours le débit nominal ou les pressions de consigne sur le régulateur de pression. Limitation au niveau de MV .../5, en fonction du débit.

Effettuare in linea di massima la regolazione di potenza nominale e valori nominali di pressione sul regolatore di pressione gas. La regolazione specifica di potenza va fatta attraverso la MV .../5.

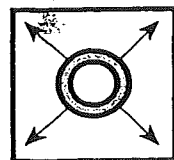


Grundsätzlich nach Teileausbau/-umbau neue Dichtungen verwenden.

Always use new seals after dismantling and mounting parts.

Après un démontage ou une modification, utiliser toujours des joints neufs.

In linea di massima, dopo lo smontaggio e il rimontaggio di alcune parti, utilizzare nuove guarnizioni.



Rohrleitungsdichtheitsprüfung: Kugelhahn vor den Armaturen/MV .../5 schließen

Pipeline leakage test: close ball valve upstream of fittings/MV .../5.

Contrôle de l'étanchéité de la conduite: fermer le robinet à boisseau sphérique avant les électrovannes / MV .../5.

Per la prova di tenuta delle tubature: chiudere il rubinetto a sfera davanti ai corpi valvola / MV .../5.

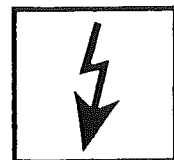


Nach Abschluß von Arbeiten am Magnetventil: Dichtheits- und Funktionskontrolle durchführen.

On completion of work on the solenoid valve, perform a leakage and function test.

Une fois les travaux sur l'électrovanne terminés, procéder toujours à un contrôle d'étanchéité et de fonctionnement.

Al termine dei lavori effettuati su una valvola elettromagnetica: predisporre un controllo sia della tenuta che del funzionamento.



Niemals Arbeiten durchführen, wenn Gasdruck oder Spannung anliegt. Offenes Feuer vermeiden. Öffentliche Vorschriften beachten.

Never perform work if gas pressure or power is applied. No naked flame. Observe public regulations.

Ne jamais effectuer des travaux lorsque la pression ou la tension sont présentes. Eviter toute flamme. Observer les réglementations.

In nessun caso si debbono effettuare lavori in presenza di pressione gas o di tensione elettrica. Evitare i fuochi aperti e osservare le prescrizioni pubbliche.



Bei Nichtbeachtung der Hinweise sind Personen- oder Sachfolgeschäden denkbar.

If these instructions are not heeded, the result may be personal injury or damage to property.

En cas de non-respect de ces instructions, des dommages corporels ou matériels sont possibles.

La non osservanza di quanto suddetto può implicare danni a persone o cose.

Änderungen, die dem technischen Fortschritt dienen, vorbehalten / We reserve the right to make alterations in the course of technical improvement
Sous réserve de toute modification constituant un progrès technique / Ci riserviamo qualsiasi modifica tecnica e costruttiva

Verwaltung und Betrieb
Head Offices and Factory
Usine et Services Administratifs
Amministrazione e Stabilimento

Karl Dungs GmbH & Co. KG
Siemensstraße 6-10
D-73660 Urbach
Telefon +49 (0)7181-804-0
Telefax +49 (0)7181-804-166

Korrespondenzanschrift
Postal address
Adresse postale
Indirizzare la corrispondenza a

Karl Dungs GmbH & Co. KG
Postfach 12 29
D-73602 Schorndorf
e-mail info@dungs.com
Internet www.dungs.com



Butterfly Valves

Full Port & Reduced Port

Version 2.00

Product Description

Eclipse Butterfly Valves are designed to control air and gas flow to all types of combustion systems. *They should not be used as tight shut-off valves.*

Types available

Valves are available for either manual or automatic control and in either full port or reduced port construction in 1/2" through 4", with Rc threads. High pressure drop valves are also available in 1/2", 3/4" and 1". Wafer type valves are available in 6" and 8".

Thread Connections

The 1/2" through 4" valves are available Rc threads. The 6" and 8" valves are wafer type butterfly valves designed to be sandwiched between flanges on connecting pipes.

Shutters

Furnished with nonbeveled shutters.

Indication

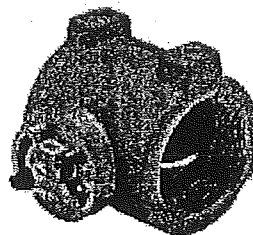
All Eclipse butterfly valves feature an easy to read indicator plate and a slot on the end of the shaft to provide visual indication of the disc position.

Control

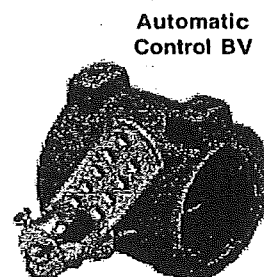
Manual butterfly valves 4" and smaller have an adjusting cover for setting disc position. A locking screw secures the cover at the desired setting.

Automatic control butterfly valves are furnished with a control arm that can be attached to the shaft. This allows integration with a variety of position control devices.

Manual wafer butterfly valves are adjusted by rotating a control arm which can be locked to the indicating plate after positioning.



Manual Control BV



Automatic Control BV

Accessories

Eclipse stocks a selection of electric operators and mounting kits which can be ordered separately.



Note:

ALL 1/2" Butterfly Valves DO NOT have a "separate" shutter. The shutter is part of the shaft.

Main Specifications

PARAMETER		SPECIFICATIONS
Maximum operating pressure:	1/2" thru 4" 6" & 8"	350 mbar 210 mbar
Operating temperature range:		0 to 60° C.
Materials of construction:	Body: Shaft: Shutter: Shaft Packing Seal:	Powder Coated Cast Iron Zinc plated steel Carbon steel Nitrile rubber (Buna-N)
Approvals:	UL All models	CE Rc 1/2 thru Rc 3 models only
Typical application:	Control of air or gas flow in combustion system	
Notes on European applications:	4" screwed not acceptable for gas use. 3" screwed is acceptable if pressure is limited to 100 mbar	

Rc Model Selection and Capacities

Rc Size	Full Port Valves				Reduced Port Valves			
	Manual		Automatic		Manual		Automatic	
	Nonbeveled shutter 90° rotation		Nonbeveled shutter 360° rotation		Nonbeveled shutter 90° rotation		Nonbeveled shutter 360° rotation	
	Catalog Number	Item Code	Catalog Number	Item Code	Catalog Number	Item Code	Catalog Number	Item Code
1/2	102BVM	101103	2BVM-A	202081	-----	-----	-----	-----
3/4	103BVM	101104	3BVM-A	101248	-----	-----	-----	-----
1	104BVM	101105	4BVM-A	101249	104BVM-R	101255	4BVM-AR	101261
1-1/4	-----	-----	-----	-----	-----	-----	-----	-----
1-1/2	106BVM	101106	6BVM-A	101250	106BVM-R	101256	6BVM-AR	101262
2	108BVM	101107	8BVM-A	101251	108BVM-R	101257	8BVM-AR	101263
2-1/2	110BVM	101108	10BVM-A	101252	110BVM-R	101258	10BVM-AR	101264
3	112BVM	101109	12BVM-A	101253	112BVM-R	101259	12BVM-AR	101265
4*	116BVM	101110	16BVM-A	101254	116BVM-R	101260	16BVM-AR	101266
75° rotation								
6" wafer	124BV-B	500915	24BV-AB	500998	124BV-RB	500690	24BV-ARB	500975
8" wafer	132BV-B	500913	32BV-AB	500999	132BV-RB	500691	32BV-ARB	500976

Rc Size	High Pressure Drop Valve			
	Manual		Automatic	
	Nonbeveled shutter 90° rotation		Nonbeveled shutter 360° rotation	
	Catalog Number	Item Code	Catalog Number	Item Code
1/2	402BVM-HD	100131	402BVM-AHD	100132
3/4	403BVM-HD	100135	403BVM-AHD	100136
1	404BVM-HD	100120	404BVM-AHD	100100



Note:

Wafer Butterfly Valves are not threaded.
For dimensional information, see page 4.

Multifactors for gases other than air

Gas - Sp. Gr.	Natural - .6	Propane - 1.5	Butane - 2.0
Multifactor	1.29	.81	.70

Rc Size	Flow Coefficient Kv-Full Open	Full Port							
		Capacity nm ³ /h air - mbar pressure drop							
		1	2	3	5	8	10	13	15
1/2"	4.7	4	6	7	9	12	13	15	16
3/4"	13.7	12	17	21	27	34	38	43	46
1"	25.5	22	32	39	50	63	70	80	86
1-1/2"	95.8	84	118	145	187	236	264	300	322
2"	155.0	136	192	234	302	382	427	486	521
2-1/2"	277.0	242	342	419	541	683	763	868	932
3"	393.0	344	486	595	767	969	1,082	1,232	1,322
4"	704.0	615	870	1,065	1,374	1,735	1,938	2,207	2,368
6" wafer *	2251.0	1,968	2,782	3,405	4,392	5,548	6,197	7,056	7,572
8" wafer *	3637.0	3,180	4,495	5,502	7,097	8,964	10,013	11,400	12,234

Rc Size	Flow Coefficient Kv-Full Open	Reduced Port							
		Capacity nm ³ /h air - mbar pressure drop							
		1	2	3	5	8	10	13	15
1"	12.1	11	15	18	24	30	33	38	41
1-1/2"	27.0	24	33	41	53	67	74	85	91
2"	53.9	47	67	82	105	133	148	169	181
2-1/2"	75.9	66	94	115	148	187	209	238	255
3"	128.0	112	158	194	250	315	352	401	431
4"	210.0	184	260	318	410	518	578	658	706
6" wafer *	479.0	419	592	725	935	1,181	1,319	1,501	1,611
8" wafer *	625.0	546	772	946	1,220	1,540	1,721	1,959	2,102

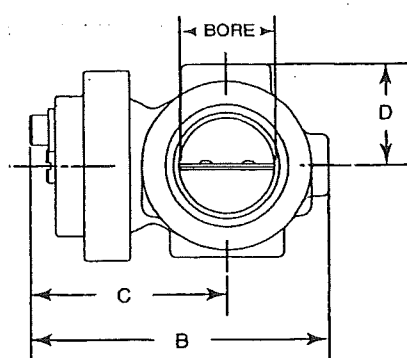
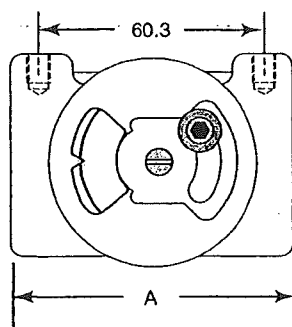
Rc Size	Flow Coefficient Kv-Full Open	High Pressure Drop							
		Capacity nm ³ /h air - mbar pressure drop							
		1	2	3	5	8	10	13	15
1/2"	2.3	2.0	2.8	3.5	4.5	5.7	6.3	7.2	7.7
3/4"	2.8	2.4	3.5	4.2	5.5	6.9	7.7	8.8	9.4
1"	3.6	3.1	4.4	5.4	7.0	8.9	9.9	11.3	12.1

* 4" screwed valve not approved for European use.

6" and 8" wafer type may be used with DN150 and DN200 flanged fittings.

Dimensions, Manual Valves with Rc threads

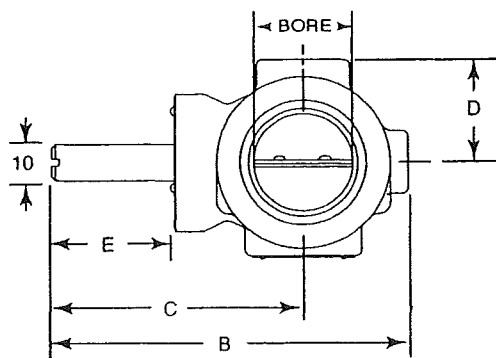
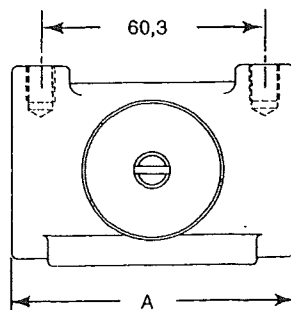
Rc Size	FULL PORT Nonbeveled shutter 90° rotation			REDUCED PORT Nonbeveled shutter 90° rotation			HIGH PRESSURE DROP 90° rotation			Dimensions, mm			
	Catalog Number	Item Code	BORE mm	Catalog Number	Item Code	BORE mm	Catalog Number	Item Code	BORE mm	A	B	C	D
1/2	102BVM	101103	15,5	-	-	-	402BVM-HD	100131	11,0	76,2	77,5	52,1	30,2
3/4	103BVM	101104	22	-	-	-	403BVM-HD	100135	14,0	76,2	77,9	52,5	27,0
1	104BVM	101105	28	104BVM-R	101255	22	404BVM-HD	100120	2 x 11,0	73,0	84,7	54,5	33,3
1-1/2	106BVM	101106	42	106BVM-R	101256	30				79,4	97,0	60,5	41,3
2	108BVM	101107	54	108BVM-R	101257	39				79,4	113,0	68,5	49,2
2-1/2	110BVM	101108	67	110BVM-R	101258	45				98,4	129,2	78,5	57,2
3	112BVM	101109	82	112BVM-R	101259	57				98,4	141,7	84,5	63,5
4	116BVM	101110	106	116BVM-R	101260	71				127,0	168,9	97,5	77,8



Dim: mm

Dimensions, Automatic Valves with Rc Threads

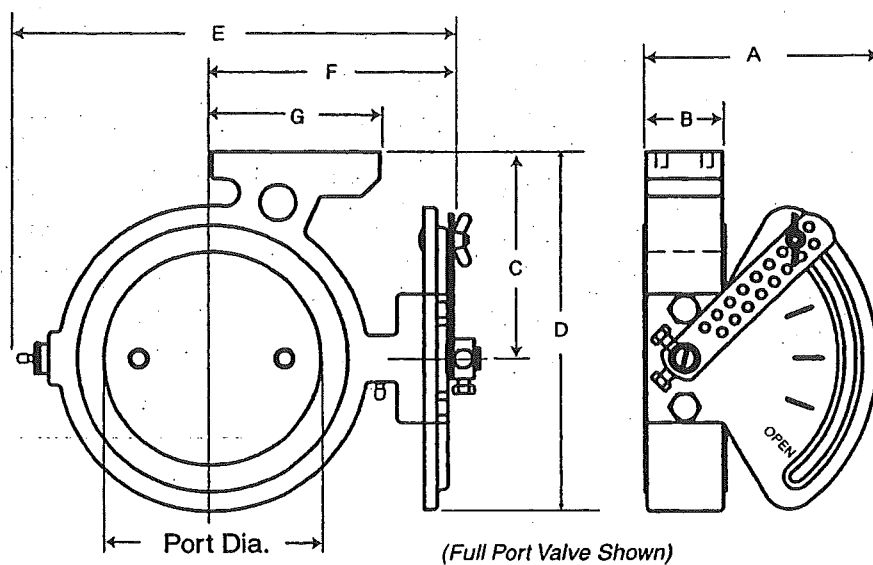
Rc Size	FULL PORT Nonbeveled shutter 360° rotation			REDUCED PORT Nonbeveled shutter 360° rotation			HIGH PRESSURE DROP 360° rotation			Dimensions, mm				
	Catalog Number	Item Code	BORE mm	Catalog Number	Item Code	BORE mm	Catalog Number	Item Code	BORE mm	A	B	C	D	E
1/2	2BVM-A	202081	15,5	-	-	-	402BVM-AHD	100132	11,0	76,2	93,0	67,7	30,2	15,0
3/4	3BVM-A	101248	22	-	-	-	403BVM-AHD	100136	14,0	76,2	91,3	65,9	27,0	15,0
1	4BVM-A	101249	28	4BVM-AR	101261	22	404BVM-AHD	100100	2 x 11,0	73,0	99,2	70,6	33,3	15,0
1-1/2	6BVM-A	101250	42	6BVM-AR	101262	30				79,4	113,5	77,0	41,3	15,0
2	8BVM-A	101251	54	8BVM-AR	101263	39				79,4	129,4	84,9	49,2	25,0
2-1/2	10BVM-A	101252	67	10BVM-AR	101264	45				98,4	145,3	94,5	57,2	15,0
3	12BVM-A	101253	82	12BVM-AR	101265	57				98,4	158,0	100,8	63,5	25,0
4	16BVM-A	101254	106	16BVM-AR	101266	71				127,0	184,9	113,5	77,8	25,0



Dim: mm

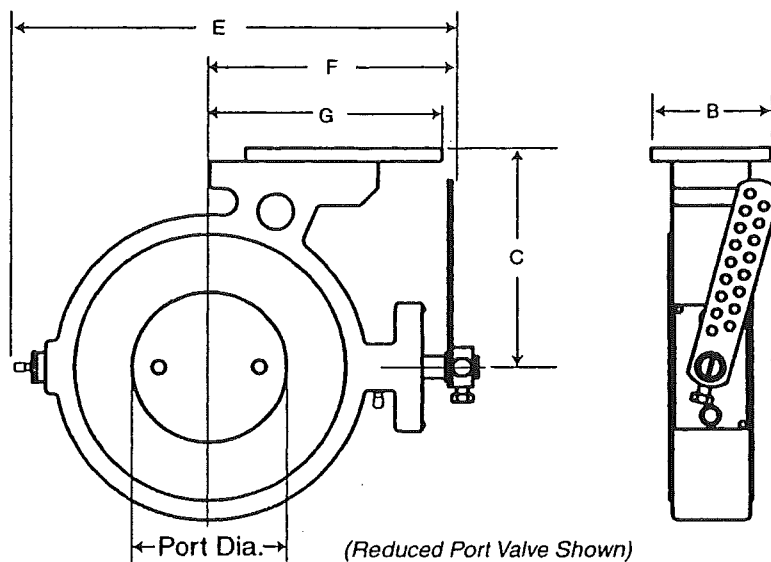
Dimensions, Wafer type valves

Manual valves



Size	Cat. No.	Item Code	Dimensions mm								Approx Wgt. kg
			A	B	C	D	E	F	G	Port Dia.	
Full Port Manual											
6"	24BV-B	500915	162	83	148	257	289	97	117	152	13
8"	32BV-B	500913	162	83	178	317	351	206	130	203	16
Reduced Port Manual											
6"	24BV-RB	500690	162	83	148	257	289	97	117	108	16
8"	32BV-RB	500691	162	83	178	317	351	206	130	130	23

Automatic Valves

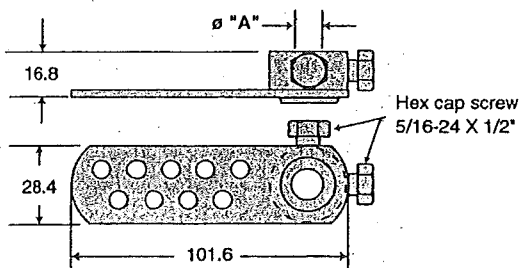


Size	Cat. No.	Item Code	Dimensions mm								Approx Wgt. kg
			A	B	C	D	E	F	G	Port Dia.	
Full Port Auto											
6"	24BV-AB	500998	162	83	157	257	289	97	162	152	13
8"	32BV-AB	500999	162	83	187	317	351	206	193	203	16
Reduced Port Auto											
6"	24BV-ARB	500975	162	83	157	257	289	97	162	108	16
8"	32BV-ARB	500976	162	83	187	317	351	206	193	130	23

Accessories for automatic BV's

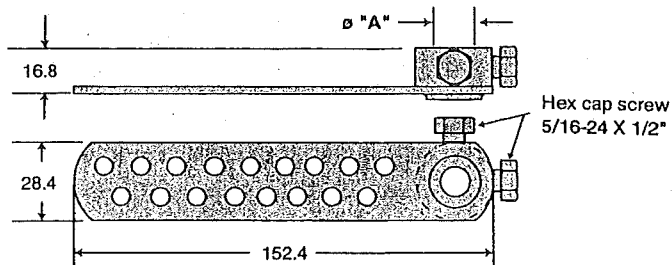
Crank arms for general use

Crank Arm Item Code	DIM "A" mm
500527	9.6
500535	12.8
500536	16.0



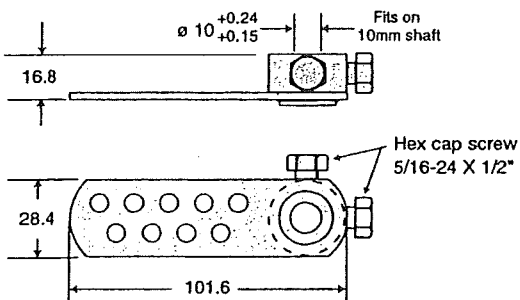
Materials: Zinc plated carbon steel

Crank Arm Item Code	DIM "A" mm
500537	16.0
500538	9.6
500539	12.8



Materials: Zinc plated carbon steel

Item Code 102265 Dims: mm



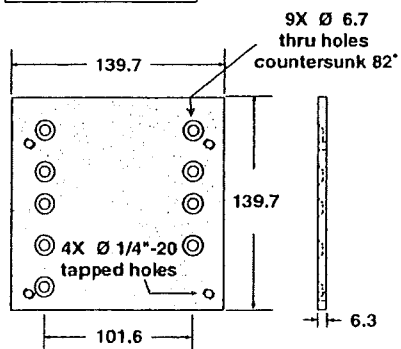
Materials: Zinc plated carbon steel

Linkage control rods

			Inches	Code	mm
Zinc plated cold rolled steel			1/2	10175-1	305
				10175-2	381
Dia. Inches	Item Code	Length mm		10175-3	457
				10175-4	610
5/16	12730	203		10175-5	762
	12730-1	254		10175-6	914
	12730-2	381		10175-7	1219
	12730-3	610		10175-8	1524
	12730-5	152		10175-9	1829

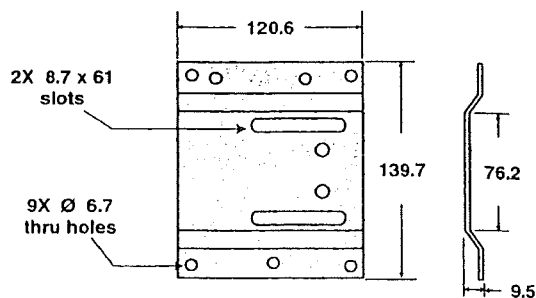
Mounting plates for Honeywell and EMP/EMA actuators

Item Code 12758
Mounting plate Dims: mm



Material: Powder coated mild steel

Item Code 13095
Mounting plate Dims: mm



Material: Powder coated mild steel

Swivel Connectors for 5/16" Diameter Control Rods



Item Code 500558 is a rotating swivel block connector assembly for joining control rod to control arm. It allows 360° rotation.



Item Code 500569 serves to connect two control rods to one control arm and also allows 360° rotation.

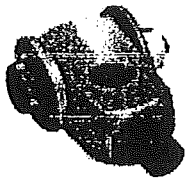


Item Code 14316 swivel connector allows 360° rotation. It provides a 20° flex from the swivel center line to accommodate an angular approach of a linkage control rod, but immediacy of response is less positive than Item Code 14264 (at right).

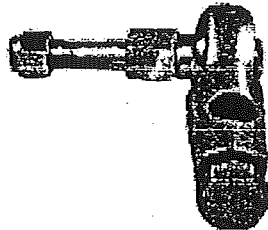


Item Code 14264 is a non-flexing swivel connector that allows 360° rotation around swivel center line. It provides a more positive positioning and immediacy of response than Item Code 14316 (at left).

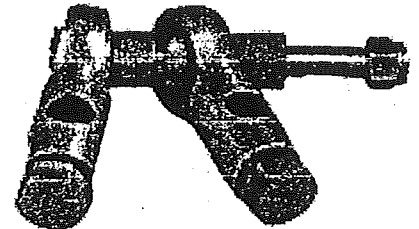
for 1/2" Diameter Control Rods



Item Code 500542 is a swivel block that rotates 360°



Item Code 500543 is a single ball swivel that rotates 360° while permitting an angular approach of rod toward control arm.



Item Code 500544 is a double ball swivel that connects two rods to one control arm. Allows angular approach of rod to arm, rotates 360°.

ECLIPSE
Innovative Thermal Solutions

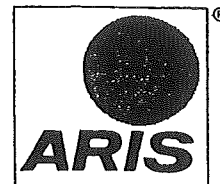
Eclipse Combustion

www.eclipsenet.com

ISO 9001 Registered

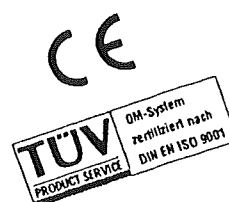
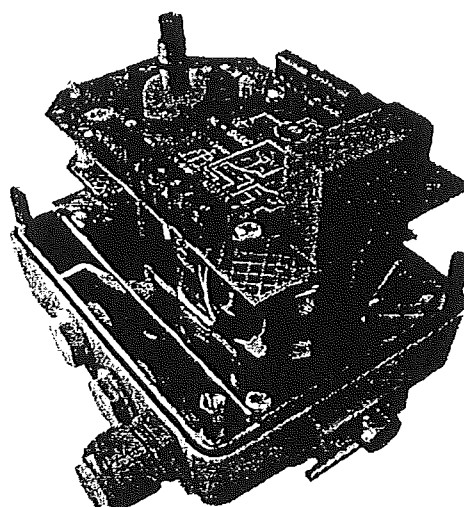
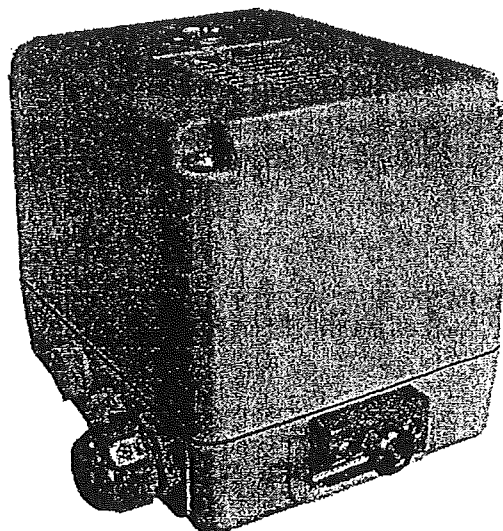
ARIS rotary-and part-turn actuator

Range NL



ARIS rotary- and part-turn actuators are primarily used to move regulate and control industrial process equipment.
For example: Control and butterfly valves, which ARIS also offers as complete fitting system.

The economical actuator manufactured in large scale and with 100 % continuous duty is available ex stock in four models, either as standard actuator or as modulating actuator for control signal 4 - 20mA, in combination with ARIS microprocessor controller PMR 2-LC.



**Licenced to
Ex Zone 2 und 22
(Option)**

Solid compact structure designed for industrial use
Robust requiring very little maintenance.

Short-circuit proof synchronous motor.

To fit any fitting position.

No mechanical brake required.

100% control accuracy due to extremely short motor starting and stopping times (milliseconds).

Continuous control times, even with fluctuations voltage and load.

Reduced prices.

Attractive ex works delivery time

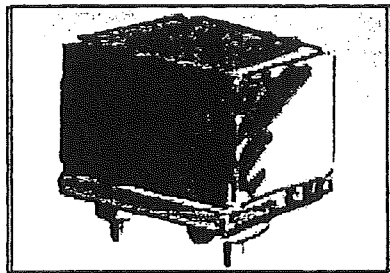
Numerous options such as additional switches, potentiometer, microprocessor controller PMR 2-LC, Ex Zone 2 und 22.

ARIS rotary-and part-turn actuator

Range NL

Housing

- Zinc diecasting housing.
- Hood made from corrosion-resistant aluminium diecasting GD Al Si12 (Cu), painted with silicone-free structural paint.
- 1 cable fitting
2 cable entries.
- Protection class IP65 according to DIN EN 60529.



Motor

- Short-circuit proof alternating current synchronous motor.
- Single-pole, reversible.
- 230V $\pm 10\%$, 50/60Hz $\pm 5\%$.
- 100% continuous duty.
- Starting and stopping times in milliseconds
- Minimal pulse lengths 50 -200ms (type-dependent)
- Control steps 100 % maintained.
- Insulation category B in accordance with VDE 0530.

Gear box

- Robust maintenance free steel spur gear
- Grease lubrication
- Self-lubricating bronze bearing.

Potentiometer (Option)

- For an external position indicator and/or desired value comparison.
- The potentiometer's range can be set to 10 rotations on the actuator's output shaft (standard 90°)

Actuation

- By means of manual switch gear.
- Via 2-level, 3-level and continuous controller.
- Option:
- ARIS microprocessor controller PMR 2-LC (integrated in the actuator) for set values of 0/4 - 20mA, 0-10V.

Ambient temperature

- -15°C bis +60°C.

Switching off

- 2 limit switches (standard).
- All path-dependant switches activated by means of continuous adjustable control cams.
- Exact limitation of end of travel and intermediate positions.

Options

- Licenced to Ex Zone 2 and 22
- Special voltages on request.

Installation

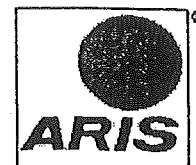
- Simple installation by means of solid mounting bracket /ISO-flanges.
- Easy connection to mounting shaft by:
- Hand lever coupling
- Lever arm, clamping lever arm, ball-and-socket joint, rods, spring rods.
- Flexible shaft coupling
- Rigid shaft coupling.
- Claw coupling.

Manual operation (NL ISO)

- For the manual operation of the actuator shaft/fitting, by hexagon SW8 and sideways gear disengagement, hand wheel with position indication attachable.
- All adjusted control cam and potentiometer settings are kept when manually operating.

Order details

- Model.
- Torque.
- Actuating time.
- Motor voltage and frequency.
- Options required.
- For orders with potentiometers it is standard to set the maximal range to the 90° regulating distance.
- May be set to another regulating distance if requested.
- The switches can be set to the provided regulating distance required.



Model	Actuating time s/90°	Torque Nm	Power consumption VA	Turn and swivelling range	Weight kg
NL 1520 ISO	15	20	max. 20	Standard 0-90°, optional up to 10U*	3,4
NL 3020 ISO	30	20	max. 20		3,4
NL 3020 Standard	30	20	max. 20		3,4
NL 6020 Standard	60	20	max. 20		3,4
* From 100 pieces on request. ** Other torques up to 40 Nm and special designs from 100 pieces available.					

ARIS Microprocessor controller

Range PMR 2-LC

The ARIS microprocessor controller PMR 2-LC is used for straightforward and accurate positioning of ARIS actuators of NL type.
The actuating is given via an external set value.

Thanks to a multitude of control options and a very simple adjustment the microprocessor controller suits every area of industrial application where accurate positioning of actuators is required.

Special features

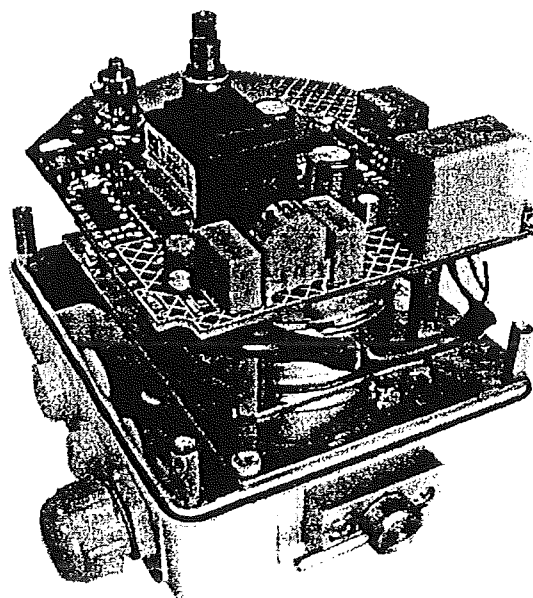
- Simple operation.
- Setup possible without control signal (standard presets can be selected).
- Short putting-into-operation period.
- No Relais, Triacs for motor operation.
- Input / Output galvanically separated.
- 2 integrated limit switches

Technical Data

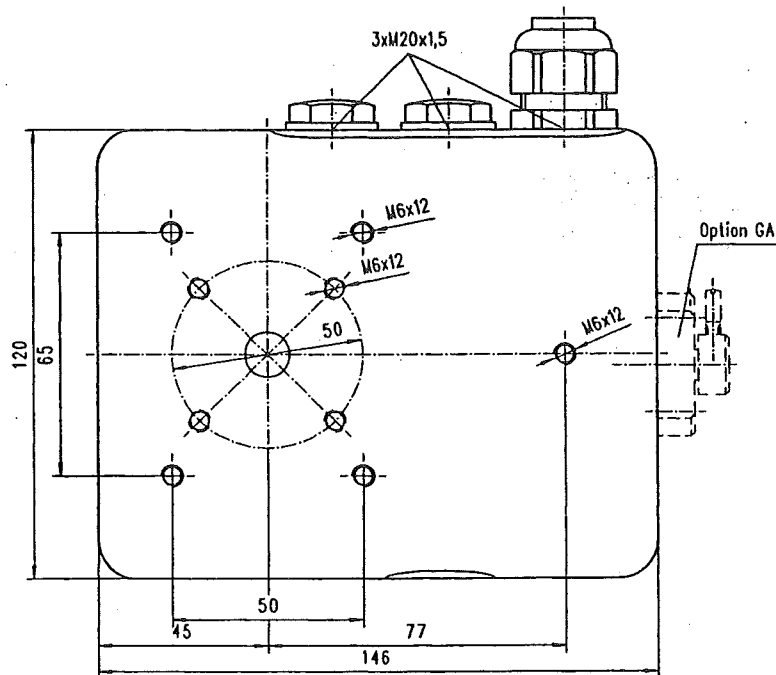
- Input:
4 - 20mA / 0 - 20mA / 0-5V / 0 - 10V.
- Output:
4 - 20mA / 0 - 20mA.
Resolution:
10Bit.
- Ambient temperature:
0° up to +60°C.
- Voltage:
230V 50(60)Hz.

Options

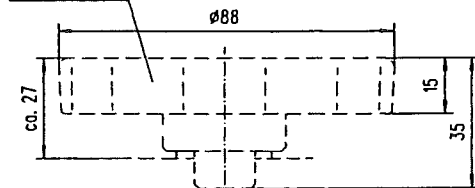
- 2 additional auxiliary switches.



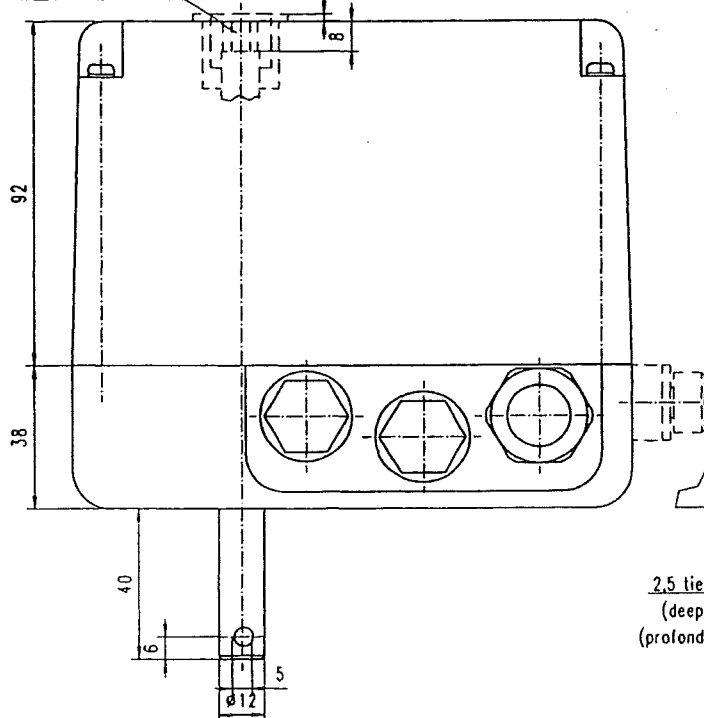
Dimensions



Option Handrod

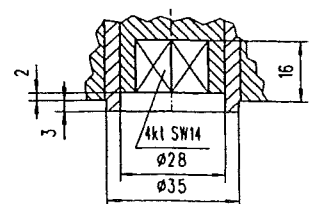


Option 6kl-Welle SW8

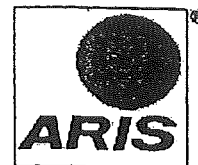


2,5 tiel
(deep)
(profond)

Option Poßf.



Option ISO-Flansch F05



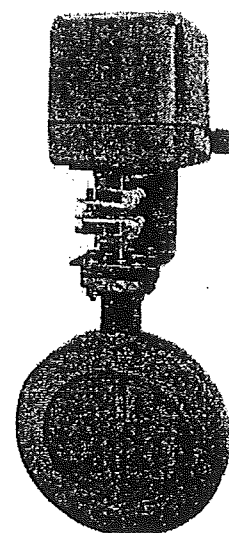
Fittings for NL actuator

ARIS gas butterfly valve GK

ARIS gas butterfly valves of GK series are used as control valves without zero closing with type test according to the gas appliance directive (90/396/EEG) in gas pipelines. These valves are to be mounted between flanges in accordance with DIN EN 2531 - 2533 (PN 6 - 16), dielectrically.

Technical data

- Housing GG25.
- Valve plate: Aluminium.
- Shaft: Stainless steel.
- Range: DN25 up to DN250.
- Differential pressure: max. 1bar.
- Torque transmission by clamping lever clutch.

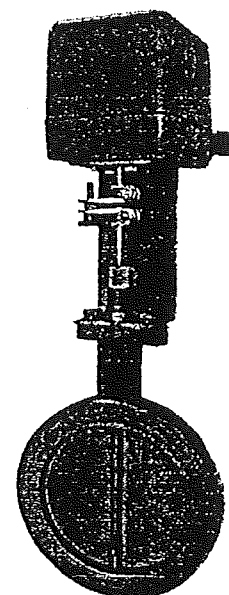


ARIS butterfly valve RD-K

ARIS butterfly valves of RD-K series are used for control of nearly every medium, also in the high temperature range. These valves are to be mounted between flanges in accordance with DIN EN 2531-2533 (PN 6 - 16), dielectrically.

Technical data

- Torque range DN25 up to DN250.
- Differential pressure
 - DN25-DN125: 200mbar
 - DN150-DN250: 100mbar.
- Force transmission by clamping lever clutch.



Temperature and material table: RD-K

Temperature*	Housing	Valve Plate	Shaft
up to 150°C	GG25	yellow brass	yellow brass
up to 280°C	GG25	St	1.4305
up to 350°C	GG25	1.4301	1.4305
up to 450°C	GGG40	1.4301	1.4305
up to 550°C	GGG40 40µm chem. nickel pltd.	1.4571	1.4571

*Attention! The resistance of temperature is dependent on the medium and the differential pressure.

5

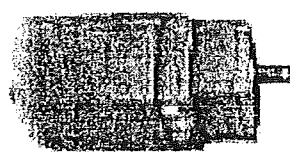
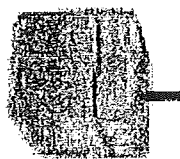
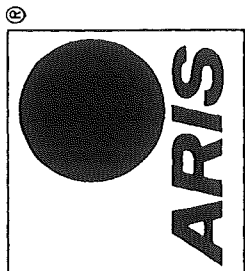


Betriebsanleitung für

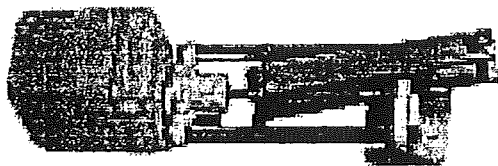
Operating Instructions for / Instructions de service pour

Antriebe der Baureihen N, K, K-A und V

Actuators of type N, K, K-A and V / Actionneurs série N, K, K-A et V



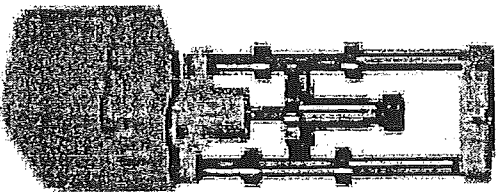
N



K

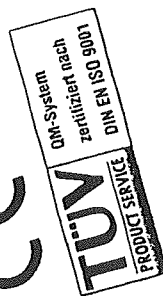


K-A



V

CE



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Haftung

ARIS Antriebe sind ausschließlich für den industriellen Einsatz konzipiert.

ARIS Antriebe werden vor der Auslieferung im Werk geprüft. Die endgültige Funktionsüberprüfung muss jedoch im Gesamtsystem von qualifiziertem technischen Personal vorgenommen werden.

Die ARIS Antriebe und Steuerungen GmbH übernimmt keine Haftung für eventuelle Produktionsfehler und daraus resultierende Schäden oder Folgeschäden, nachdem der Antrieb überprüft, eingebaut und für funktionstüchtig erklärt wurde.

Die ARIS Antriebe und Steuerungen GmbH übernimmt insbesondere dann keine Haftung für eventuelle Produktionsfehler und daraus resultierende Schäden oder Folgeschäden bei unsachgemäßem Einsatz des Antriebes, wenn der Antrieb nicht ausreichend innerhalb eines Gesamtsystems getestet wurde, oder wenn während eines ersten oder weiteren Tests Fehler festgestellt wurden und der Antrieb nicht sofort außer Betrieb gestellt wurde. Insbesondere ist darauf zu achten, dass durch den Einsatz von ARIS Antrieben keine Sach- bzw. Personenschäden entstehen.

Liability

ARIS actuators are designed for industrial application only.

ARIS actuators are thoroughly tested in factory prior to delivery. However, the final operational test as part of an overall system must be performed by qualified technical staff.

ARIS Antriebe und Steuerungen GmbH does not assume any liability for possible defects of fabrication or any damage or consequential damages resulting from it, once the actuator has been checked, installed, and released for operation.

In particular, ARIS Antriebe und Steuerungen GmbH does not assume any liability for defects of fabrication or any damage or consequential damages resulting from it in case of inappropriate use, insufficient testing of the actuator as part of an overall system, or if deficiencies have been detected during the initial or further tests and the unit has not been put out of service immediately. Particular care should be taken to avoid personal injury or damage to property when operating ARIS actuators.

Garantie

Les servomoteurs ARIS sont exclusivement conçus pour une utilisation industrielle.

Les actionneurs ARIS sont contrôlés en usine avant leur livraison au client. Le fonctionnement final doit toutefois être testé dans l'ensemble du système par un personnel technique qualifié.

La société ARIS Antriebe und Steuerungen GmbH n'assume aucune responsabilité pour d'éventuels vices de fabrication, ni pour des dommages directs ou consécutifs en découlant après que le servomoteur ait été vérifié, monté et déclaré en parfait état de fonctionnement.

En particulier, la société ARIS Antriebe und Steuerungen GmbH n'assume aucune responsabilité pour d'éventuels vices de fabrication, ni pour des dommages directs ou consécutifs en découlant en cas d'utilisation incorrecte de l'actionneur lorsque celui-ci n'a pas été testé suffisamment au sein d'un système global ou lorsque des erreurs ont été constatées lors du premier essai ou d'un essai ultérieur et que l'actionneur n'a pas alors été mis immédiatement hors service.

Il faut surtout veiller à ce que l'emploi des actionneurs ARIS ne provoque pas de dommages matériels et corporels.

Bei Nichtbeachtung der Betriebsanleitung sowie unsachgemäßer Handhabung erlischt die Garantie.

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Sicherheitshinweise/ Montagehinweise

Allgemeine Hinweise

- ARIS Antriebe sind ausschließlich für den industriellen Einsatz konzipiert.
- Lesen Sie vor Installation und Inbetriebnahme unbedingt diese Bedienungsanleitung.
- Beim Betrieb elektrischer Geräte stehen zwangsläufig bestimmte Teile unter gefährlicher Spannung. Arbeiten an elektrischen Anlagen oder Betriebsmitteln dürfen nur von einer Elektrofachkraft oder von unterwiesenen Personen unter Anleitung und Aufsicht einer Elektrofachkraft den elektrotechnischen Regeln entsprechend vorgenommen werden.
- Beachten Sie bei der Montage, Inbetriebnahme und bei Prüfarbeiten unbedingt alle geltenden Sicherheits- und Unfallverhaltensvorschriften.
- Stellen Sie sicher, dass Sie vor Beginn aller Arbeiten/Montagen usw. am Antrieb alle davon betroffenen Maschinen/Anlagen abgeschaltet haben.

Safety Instructions/ Installation Instructions

General Recommendations

- ARIS actuators are designed exclusively for industrial application.
- Read these operating instructions carefully before installing and setting into operation.
- When operating electrical devices certain components are necessarily under live voltage. Work on electrical installations or equipment must only be carried out by expert electricians or duly instructed personnel under the guidance and supervision of an expert electrician in accordance with pertinent rules and regulations.
- Strictly observe all applicable regulations for safety and accident prevention during installation, commissioning and testing work.
- Before starting any work, installation, etc. on the actuator, make sure you did properly disconnect all equipment/installations affected by it.

Précautions d'emploi/ Instructions de montage

Recommandations générales

- Les actionneurs ARIS sont exclusivement conçus pour une utilisation industrielle.
- Avant de procéder à l'installation et à la mise en marche, il est indispensable de lire attentivement le présent mode d'emploi.
- Lors du fonctionnement des appareils électriques, certains éléments sont nécessairement mis sous tension dangereuse. Seul du personnel qualifié en électricité ou des personnes formées sous surveillance et instruction d'un personnel qualifié en électricité sont autorisés à effectuer des travaux, conformément aux règles électrotechniques, auprès des installations et outillages électriques.
- Lors du montage, de la mise en service et des travaux d'essai, veuillez respecter strictement toutes les prescriptions de sécurité et instructions préventives contre les accidents en vigueur.
- Avant d'effectuer toutes sortes de travaux et de montage etc. à l'actionneur, vérifiez que toutes les machines et installations actionnées par ce dernier ont été arrêtées.

Hinweise für Arbeiten am Antrieb

- Beachten Sie, dass durch die Inbetriebnahme des Antriebs damit verbundene Armaturen/Hebel/Gestänge bewegt werden.
- Überprüfen Sie die einwandfreie Funktion aller Not-einrichtungen an Ihrer Maschine/Anlage.
- Überprüfen Sie nach Abschluss aller Einstellarbeiten die einwandfreie Funktion des Antriebs und der vom Antrieb bewegten Armaturen/Hebel usw.
- Montieren bzw. arbeiten Sie unter keinen Umständen mit einem beschädigten Antrieb.

Hinweise für die Montage

- Antrieb vor dem Einbau auf Schäden untersuchen.
- Vor Montage Korrosionsschutzmittel (falls für Lagerung eingesetzt) entfernen und durch Fett ersetzen.
- Die Einschraubtiefe für Anschluss-Gewindebohrungen darf für Baureihe N 1-4A 12mm und für Baureihe N 5-6 16mm nicht überschreiten!

Instructions for Working on Actuators

- Please note, when starting the actuator all attached fittings/levers/rod assemblies, etc. start to move with it.
- Check all emergency devices of your equipment/plant for correct operation.
- After completion of any adjustment work, verify proper functioning of the actuator and all attached fittings/levers, etc. moved by it.
- Never install or work on a defective actuator.

Installation Instructions

- Check actuators for any signs of damage prior to installation.
- Remove corrosion protection (if applied for storage purposes) and replace by grease before installation.
- Thread reach of connecting bores must not exceed 12mm on models N 1-4A and 16mm on models N 5-6!

Instructions pour travaux effectués sur l'actionneur

- Veuillez considérer que la mise en marche de l'actionneur provoque la mise en mouvement de la robinetterie, des leviers et des tiges.
- Vérifiez le bon fonctionnement de tous les arrêts et installations d'urgence de votre machine/installation.
- Après avoir terminé tous les travaux de réglage, contrôlez le fonctionnement irréprochable de l'actionneur ainsi que de la robinetterie et des leviers etc. actionnés par ce dernier.
- N'effectuez en aucun cas des travaux ou des montages avec un actionneur endommagé.

Instructions pour le montage

- Avant l'installation de l'actionneur, vérifiez que celui-ci est en parfait état.
- Avant le montage, éliminez l'anticorrosif (au cas où il aurait été utilisé pour le stockage) et remplacez le par de la graisse.
- La profondeur filetée pour les raccords taraudés ne doit pas dépasser 12mm pour la série N 1-4A et 16mm pour la série N 5-6!

- Überprüfen Sie vor Inbetriebnahme die Dichtigkeit der Kabeleinführungen und Blindstopfen.
- Ziehen Sie die Haubenschrauben gleichmäßig fest an.
- Nicht in Betrieb nehmen, bevor Endschalter eingestellt worden sind.
- Schützen Sie den Antrieb vor Witterungseinflüssen (z.B. durch ein Schutzdach).
- Antrieb keinen harten Erschütterungen aussetzen (z.B. durch Fallenlassen).
- Keine Seile, Haken u.ä. direkt am Antrieb befestigen.
- Antrieb nicht am Handrad anheben.
- Dauerhaftes Überlasten und Blockieren des Antriebs führt zu Antriebssschäden.
- Funkenlöschkondensatoren können Einfluss auf die Drehrichtungsstabilität der Antriebe nehmen und zu Schäden führen.
- Verwenden Sie nur ARIS Original-Zubehör.

Vor dem Einbau von Kupplungen beachten

Die Abtriebswellen nicht gewaltsam drehen.
Abtriebswelle und Armaturenspindel müssen zentrisch laufen (evtl. Ausgleich durch elastische Kupplung).

- Check imperviousness of cable entries and blind plugs prior to setting into operation.
- Tighten evenly all screws of the cover.
- Do not start operation before properly setting the limit stop switches.
- Protect actuators from atmospheric exposure (e.g. canopy).
- Protect actuators from shocks and impacts (e.g. by dropping it).
- Do not fasten ropes, hooks or similar directly to the actuator.
- Do not lift the actuator by the hand wheel.
- Permanent overloading and blocking of the actuator may damage it.
- Spark quenching condensers may affect the sense of rotation stability of the actuator and cause damage.
- Use only original ARIS accessories.

Note when installing couplings

Do not turn the output shaft by force.
Output shaft and fittings spindle must be running centred (compensate with flexible coupling, if necessary).

- Avant la mise en service, vérifiez l'étanchéité des câbles, des entrées de câbles et des tampons borgnes.
- Serrez les vis du capot avec la même intensité.
- Ne pas mettre l'actionneur en marche avant que les interrupteurs de fin de course ne aient été réglés.
- Protégez l'actionneur des intempéries (p. ex. par un toit de protection)
- Protégez l'actionneur des chocs violents (p. ex. ne pas le laisser tomber).
- Ne rien accrocher directement à l'actionneur (câbles, crochets etc.).
- Ne pas soulever l'actionneur par la manivelle.
- Une surcharge et un blocage permanents de l'actionneur entraînent un dysfonctionnement.
- Les condensateurs à étouffement d'étincelles peuvent influencer la stabilité du sens de rotation des actionneurs et provoquer des dommages.
- N'utilisez que des accessoires originaux ARIS.

Avant l'installation des accouplements, veuillez à ce que

L'arbre de sortie ne soit pas tourné avec force.
L'arbre de sortie et la tige de la robinetterie doivent tourner de manière centrée (évl. équilibrage par accouplement élastique).

⚠ Hinweis Schutzarten

IP54 (Standard), IP65/66/67 (Option)

Für alle Antriebe sind die nachfolgend aufgeführten Punkte unbedingt zu beachten:

Die Inbetriebnahme des Antriebes ist nur zulässig bei ordnungsgemäß geschlossener Haube sowie geschlossener Kabeleinführungen.

1. Kabeleinführungen

- Bei Lagerung, Montage und Inbetriebnahme ist unbedingt dafür Sorge zu tragen, dass die Kabeleinführungen fachgerecht verschlossen sind. Es dürfen nur Kabel verwendet werden, die für den Durchmesser der Kabeleinführungen geeignet sind.

2. Haubenmontage

- Bei der Haubenmontage ist auf einwandfreien Sitz der 4 Dicht- und Sicherungsscheiben (4 x 9) unter den Haubenschrauben (IP65-IP67) und des O-Ringes (153 x 2) im Antriebsgehäuse zu achten.

- Die Haube darf an der Anschlussfläche keine Beschädigungen aufweisen.
- Die Haubenschrauben gleichmäßig anziehen.

3. Gehäuse/Haube

- Es dürfen keine zusätzlichen Bohrungen in das Antriebsgehäuse und die Haube eingebracht werden.

⚠ Types of Protection

IP54 (Standard), IP65/66/67 (Option)

The following must be strictly observed for all types of actuators:

Actuators may be set into operation only with properly closed covers and sealed cable entries.

1. Cable Entries

- When storing, installing or setting into operation make sure that all cable entries are always perfectly sealed. Use only cables suitable for the diameters of cable entries.

2. Installation of Cover

- When installing the cover ensure correct seat of the 4 sealing and locking washers (4 x 9) underneath the cover screws (IP65-IP67) and of the O-ring (153 x 2) inside the actuator housing.
- The facing surface of the cover must not show any signs of damage.
- Tighten the screws of the cover evenly.

3. Housing/Cover

- No additional bore holes are permitted in the housing or cover of the actuator.

⚠ Information Classes de protection IP54 (standard), IP65/66/67 (en option)

Pour tous les actionneurs, veuillez strictement respecter les points suivants :

La mise en service de l'actionneur n'est autorisée que lorsque le capot et les entrées de câble sont correctement fermés.

1. Entrées de câble

- Lors du stockage, du montage et de la mise en service, veuillez strictement à ce que les entrées de câble soient correctement fermées. N'utiliser que des câbles correspondant au diamètre des entrées de câble.

2. Montage du capot

- Lors du montage du capot, veillez à la bonne assise des 4 garnitures presse-étoupe (4 x 9) sous les vis du capot (IP65-IP67) et du joint torique (153 x 2) placé dans le boîtier de l'actionneur.
- La face de raccordement du capot ne doit présenter aucun endommagement.
- Serrez les vis du capot de manière égale.

3. Boîtier/Capot

- Aucun alésage supplémentaire ne doit être réalisé sur le boîtier de l'actionneur ou sur le capot.

⚠ Zu beachten bei Betrieb in EX-Bereichen der Zone II (Option)

⚠ *Standardantriebe sind zum Einsatz in EX-Bereichen der Zone II nicht zugelassen.*

Für Antriebe, die für den Betrieb in explosionsgefährdeten Bereichen der Zone II hergestellt und ausgeliefert wurden, sind nachfolgend aufgeführte Punkte unbedingt einzuhalten:

⚠ *Es sind die jeweiligen Landesvorschriften für die Errichtung elektrischer Anlagen in explosionsgefährdeten Bereichen zu berücksichtigen.*

Der Antrieb darf elektrisch nur bei ordnungsgemäß geschlossener Haube sowie geschlossener Kabeleinführungen Verfahren werden.

1. Gerätekennzeichnung

- Prüfen Sie vor der Inbetriebnahme, ob die Gerätekennzeichnung folgende Angaben enthält:
 „⚠ II 3 G Ex II T4“ oder „⚠ II 3 G Ex II T5“
 und ob die Fabr.-Nr. auf dem Typenschild der Haube mit der Fabr.-Nr. im Antrieb übereinstimmt.

⚠ Instructions for Operation in EX Zone II Locations (Option)

⚠ *Standard actuators are not approved for use in Ex Zone II locations.*

The following must be strictly observed for all actuators manufactured and delivered for use in Ex Zone II locations:

⚠ *Applicable national rules and regulations for assembling electric installations in hazardous locations must be observed.*

Actuators may be electrically operated only with properly closed cover and sealed cable entries.

1. Device Identification

- Before starting operation check if the device identification contains the following specification:
 „⚠ II 3 G Ex II T4“ or „⚠ II 3 G Ex II T5“
 and if the serial numbers marked on the type plate of the cover and inside the actuator are identical.

⚠ A respecter lors d'un fonctionnement en milieu EX de la zone II (en option)

⚠ *L'utilisation des actionneurs standard dans les milieux EX de la zone II est interdite.*

Pour les actionneurs conçus et livrés pour une utilisation en milieu à danger d'explosion de la zone II, les points suivants doivent absolument être respectés :

⚠ *Les réglementations en vigueur dans chaque pays relatives au montage des installations électriques en zone à danger d'explosion doivent être observées.*

L'actionneur ne doit être actionné de manière électrique que lorsque le capot et les entrées de câble sont correctement fermés.

1. Signalisation de l'appareil

- Avant la mise en service, vérifiez que les caractéristiques techniques suivantes sont indiquées sur la signalisation de l'appareil : „⚠ II 3 G Ex II T4“ ou „⚠ II 3 G Ex II T5“ et que le n° de fabrication de la plaque signalétique et le n° de fabrication de l'actionneur concordent.

- Bei fehlender Angabe oder keiner Übereinstimmung der Fabr.-Nr. dürfen die Antriebe nicht in explosionsgefährdeten Bereichen der Zone II in Betrieb genommen werden.

2. Kabeleinführungen

- Vor Inbetriebnahme ist unbedingt dafür Sorge zu tragen, dass die Kabeleinführungen fachgerecht verschlossen sind. Es dürfen nur Kabel verwendet werden, die für den Durchmesser der Kabeleinführungen geeignet sind.

3. Haubenmontage

- Bei der Haubenmontage ist auf einwandfreien Sitz der 4 Dicht- und Sicherungsscheiben (4 x 9) unter den Haubenschrauben und des O-Ringes (153 x 2) im Antriebsgehäuse zu achten.
- Die Haube darf an der Anschlussfläche keine Beschädigungen aufweisen.
- Die Haubenschrauben sind gleichmäßig anzuziehen.

4. Gehäuse, Haube

- Es dürfen keine zusätzlichen Bohrungen in das Antriebsgehäuse und die Haube eingebracht werden.

- Should the specification be missing or the serial numbers not be identical the actuator must not be set into operation in potentially explosive Zone II locations.

2. Cable Entries

- Before start of operation verify that all cable entries are perfectly sealed. Make sure to use only cables suitable for the diameter of the cable entry.

3. Installation of Cover

- When installing the cover ensure correct seat of the 4 sealing and locking washers (4 x 9) underneath the cover screws and of the O-ring (153 x 2) inside the actuator housing.
- The facing surface of the cover must not show any signs of damage.
- Tighten the screws of the cover evenly.

4. Housing, Cover

- No additional holes are permitted in the housing or cover of the actuator.

- En cas de manque de signalisation ou si les numéros de fabrication ne concordent pas, la mise en service des actionneurs en milieu à danger d'explosion de la zone II est interdite.

2. Entrées de câble

- Avant la mise en service, veuillez strictement à ce que les entrées de câble soient correctement fermées. N'utiliser que des câbles correspondant au diamètre des entrées de câble.

3. Montage du capot

- Lors du montage du capot, veillez à la bonne assise des 4 garnitures de presse-étoupe (4 x 9) sous les vis du capot (IP65/IP66) et du joint torique (153 x 2) placé dans le boîtier de l'actionneur.
- La face de raccordement du capot ne doit présenter aucun endommagement.
- Serrez les vis du capot de manière égale.

4. Boîtier/Capot

- Aucun alésage supplémentaire ne doit être réalisé sur le boîtier de l'actionneur ou le capot.

Beschreibung

Allgemein

ARIS Antriebe werden zur Betätigung von Regel- und Absperrorganen (Klappen, Ventile, Hähne, Schieber, Dosierpumpen usw.) eingesetzt.

Die Antriebe können lageunabhängig montiert werden. Der Anbau an das Stellorgan erfolgt über Konsolen, die am Antrieb befestigt werden.

Serienmäßig stehen verschiedene Konsolen zur Verfügung.

Die Antriebe der Baureihe N sind mit einer Dauerfett schmierung versehen und wartungsfrei.

Andere Baureihen siehe jeweiliges Kapitel „Wartung“.

Parallelbetrieb

Werden mehrere Antriebe über einen gemeinsamen Kontakt gesteuert, muss jeder Antrieb mit einem Relais für Parallelbetrieb ausgestattet werden (siehe »Schaltplan« auf Seite 18).

Description

General

ARIS actuators are used to operate control and shut-off devices (dampers, valves, cocks, gates, metering pumps, etc.). The actuators can be mounted in any orientation.

Direct attachment to the control unit is made by means of mounting brackets which are fastened to the actuator.

A choice of different mounting brackets is available. "N" series actuators are equipped with a permanent grease lubrication and thus maintenance-free.

For other series, see corresponding chapters "Maintenance".

Parallel Operation

If several actuators are controlled via one common contact each actuator must be fitted with a relay for parallel operation (see »Wiring Diagram« on page 18).

Description

Généralités

Les actionneurs ARIS sont utilisés pour l'actionnement d'organes de réglage et d'obturation (volets, soupapes, robinets, tiroirs, pompes de dosage etc.).

Les actionneurs peuvent être montés indépendamment de la position.

Le montage sur l'organe de réglage est effectué par l'intermédiaire de consoles fixées sur l'actionneur. Différentes consoles sont disponibles en série.

Les actionneurs de la série N sont graissés à vie et ne nécessitent aucun entretien.

Pour d'autres séries, voir le chapitre correspondant „Entretien“.

Marche en parallèle

Lorsque plusieurs actionneurs sont commandés par l'intermédiaire d'un contact commun, chaque actionneur doit être équipé d'un relais pour la marche en parallèle (voir »schéma de couplage« de la page 18).

Handrad (Option)

Bei Ausfall der elektrischen Energie kann der Antrieb über ein Handrad betätigt werden.

Das Handrad darf nur im spannungslosen Zustand betätigt werden.

1. Betriebsspannung des Antriebes ausschalten.
2. Handrad H in Position V drücken und in die gewünschte Richtung drehen. (Schaltnocken der Wegschalter und Potentiometer werden mitgedreht. Justierte Positionen bleiben erhalten).
3. Nach Erreichen der gewünschten Position Handrad H loslassen (setzt sich automatisch in die Ruhestellung R zurück).

Zur Vermeidung des Überfahrens der Wegschalter und Potentiometer bei Handbetrieb, Endstellung der Armatur mechanisch begrenzen.

Hand Wheel (Option)

In the event of a power failure the actuator can be operated with the help of a hand wheel.

The hand wheel may be operated only in power-off condition.

1. Switch off operating voltage of the actuator.
2. Push hand wheel H into position V and turn in the desired direction. (Control cams of position switches and potentiometers are also turned with it. Set positions are retained).
3. After reaching the desired position let the hand wheel H go (it returns automatically to its initial position R).

To avoid overrunning position switches and the potentiometer during manual operation, set the limit positions of the actuator mechanically.

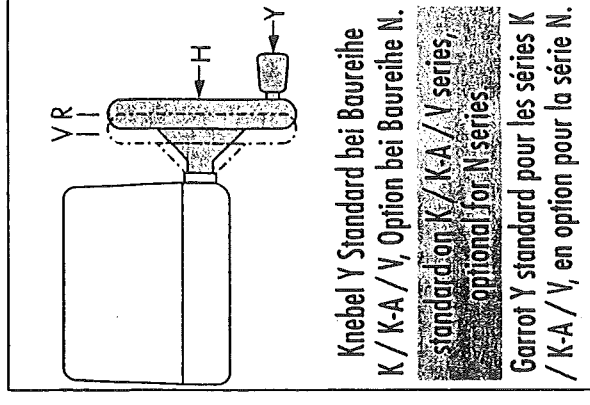
Roue à main (en option)

En cas de panne de courant, l'actionneur peut être actionné à l'aide d'une roue à main.

La roue à main ne doit être utilisée lorsqu'aucune tension n'est appliquée.

1. Éteignez la tension de service de l'actionneur.
2. Poussez la roue à main H en position V et tournez dans la direction souhaitée. (les cames de contacteur des interrupteurs de course et les potentiomètres tournent en même temps. Les positions ajustées sont maintenues).
3. Une fois la position souhaitée atteinte, relâchez la roue à main (elle retourne automatiquement sur la position neutre R).

Pour éviter un dépassement des interrupteurs de course et des potentiomètres en fonctionnement manuel, limitez mécaniquement la position finale de la robinetterie.



Knebel Y Standard bei Baureihe K / K-A / V, Option bei Baureihe N. standard K / K-A / V series, optional for N series.
Garrot Y standard pour les séries K / K-A / V, en option pour la série N.

⚡ Elektrischer Anschluss

⚠ Bei der elektrischen Installation und Inbetriebnahme sind die geltenden Vorschriften zu beachten. Bei der elektrischen Installation und Inbetriebnahme von explosionsgeschützten Betriebsmitteln sind zusätzlich die jeweiligen Landesvorschriften für die Errichtung elektrischer Anlagen in explosionsgefährdeten Bereichen zu berücksichtigen.

- Kontrolle, ob Stromart, Netzspannung und Frequenz mit den Motordaten (siehe Typenschilder auf Haube und im Antrieb) übereinstimmen.
- Kabelverschraubungen passend zur Anschlussleitung einsetzen.
- Beachten Sie unbedingt den in der Haube eingeklebten Schaltplan.
- Für Kleinspannungen (z.B. Potentiometer) sind separate, ggf. abgeschirmte Leitungen zu verwenden.
- Sämtliche Elemente wie Schalter, Potentiometer, Relais usw. sind werkseitig verdrahtet und auf Klemmen geführt.
- Folgen Sie den unter „Drehrichtungsbestimmung“ beschriebenen Schritten beim Anschluss des Antriebes (siehe Seite 15).
- Vor Inbetriebnahme des Antriebes Wegendschalter einstellen (siehe Seite 19).

Schutzart IP65 (Option) bis IP67 (Option) ist nur bei Verwendung geeigneter Kabelverschraubungen gewährleistet.

⚡ Electrical Connection

⚠ Applicable rules and regulations concerning electric installations and setting into operation must be strictly observed. Regarding connection and setting into operation of explosion-proof electrical equipment the applicable national regulations for assembling electric installations in hazardous locations must be complied with.

- Check for conformity of type of current, line voltage, and frequency with motor characteristics (see type plate on cover and inside the actuator).
- Use screwed cable glands appropriate for the connecting line.
- Make sure to follow the wiring diagram affixed inside the cover.
- For extra-low voltages (e.g. potentiometer) separate wires must be used, if necessary shielded ones.
- All components like switches, potentiometer, relays, etc. are already wired in factory to the connection terminal.
- Follow the steps explained under "Determining the Sense of Rotation" when connecting the actuator (see page 15).
- Before setting the actuator into operation adjust the position limit switches (see page 19).

Types of protection IP65 (optional) up to IP67 (optional) are guaranteed only when using appropriate screwed.

⚡ Branchement électrique

⚠ Lors de l'installation électrique et de la mise en service, veuillez respecter les réglementations en vigueur. Pour ce qui est de l'installation électrique et la mise en service de matériel antidéflagrant, veuillez également observer les réglementations nationales relatives au montage des installations électriques en zones à danger d'explosion.

- Vérifiez que le type de courant, la tension de secteur et la fréquence correspondent aux caractéristiques du moteur (voir plaque signalétique sur le capot et à l'actionneur).
- Mise en place des passe-câbles à vis ajustés à la ligne de raccordement
- Veuillez absolument observer le schéma de couplage collé à l'intérieur du capot.
- Pour de faibles tensions (p.ex. le potentiomètre), utilisez des câbles séparés et éventuellement blindés.
- Tous les éléments tels que les interrupteurs, potentiomètres, relais etc. sont câblés en usine sur bornier.
- Lors du branchement de l'actionneur, suivez les instructions de la section „Définition du sens de rotation“ (voir page 15)
- Avant la mise en service de l'actionneur, procédez au réglage de l'interrupteur de fin de course (voir page 19).

La classe de protection IP65 (en option) jusqu'à IP67 (en option) n'est garantie qu'avec l'utilisation des passe-câbles à vis appropriés.

Drehrichtungsbestimmung für 230V Standard

Wegabschaltung/Kraftabschaltung

(Kraftabschaltung nicht für Baureihe N)

Aufgrund der internen Verdrahtung ergibt sich folgende Zuordnung von Drehrichtung (Blickrichtung durch den Antrieb zur Gewindespindel/Abtriebswelle) und Endschalter:

1. Liegt Netzspannung an Klemme 1 und 2, erfolgt *Links-drehung* der Gewindespindel/Abtriebswelle.

Begrenzung dieser Drehrichtung durch oberen Schalter SL. Bei betätigtem Schalter liegt Netzspannung auf Klemme 4 an.

2. Liegt Netzspannung an Klemme 1 und 3, erfolgt *Rechts-drehung* der Gewindespindel/Abtriebswelle.

Begrenzung dieser Drehrichtung durch unteren Schalter SR. Bei betätigtem Schalter liegt Netzspannung auf Klemme 5 an.

3. Läuft der Antrieb gegensinnig zu den Steuerbefehlen, externe Anschlüsse von Klemme 2 und 3 tauschen.

Eine Änderung der internen Verdrahtung darf nie vorgenommen werden.

Determining the Sense of Rotation for Standard 230V

Position switch-off/power cut-off

(Power cut-off not on "N" series)

Based on the internal wiring the following assignments apply to sense of rotation (looking through the actuator towards the threaded spindle/output shaft) and limit stop switches:

1. Applying line voltage to terminals 1 and 2 produces CCW rotation of the threaded spindle/output shaft.

The upper SL switch limits this sense of rotation. If this switch is actuated line voltage is applied to terminal 4.

2. Applying line voltage to terminals 1 and 3 produces CW rotation of the threaded spindle/output shaft.

The lower SR switch limits this sense of rotation. If this switch is actuated line voltage is applied to terminal 5.

3. If the actuator runs in opposite direction to the control commands, switch external connections between terminals 2 and 3.

The internal wiring must never be changed.

Définition du sens de rotation pour 230V standard

Coupure de course/Coupure de force

(Pas de coupure de force pour la série N)

En raison du câblage interne, il résulte le rapport suivant entre le sens de rotation (en regardant à travers l'actionneur sur la tige filetée/l'arbre de sortie) et la fin de course.

1. Si les bornes 1 et 2 se trouvent sous tension, la tige filetée/l'arbre de sortie tourne à gauche.

Limitation de ce sens de rotation par l'interrupteur de fin de course supérieur SL. Lorsque celui-ci est actionné, la borne 4 est sous tension de secteur.

2. Si les bornes 1 et 3 se trouvent sous tension, la tige filetée/l'arbre de sortie tourne à droite.

Limitation de ce sens de rotation par l'interrupteur inférieur R. Lorsque celui-ci est actionné, la borne 5 est sous tension de secteur.

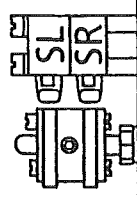
3. Lorsque l'actionneur réagit à l'inverse des des instructions de réglage, échangez les raccordements externes des bornes 2 et 3 et de la borne 3 à 2.

Ne jamais effectuer de modifications au câblage intérieur.

Wegabschaltung

Position switch-off

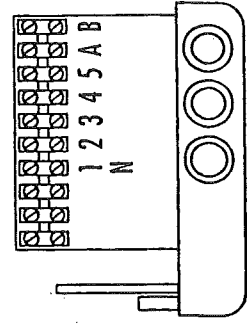
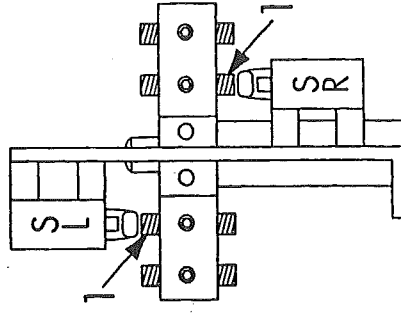
Coupure de course



Kraftabschaltung (nicht Baureihe N)

Power cut-off (not on "N" series)

Coupure de force (sauf pour la série N)



⚠ Hinweis Kraftschalter (nicht für Baureihe N)

Bei Lieferung sind alle kraftabhängigen Schalter auf die angegebene Stellkraft fest eingestellt.
Das Verstellen der Stellschrauben 1 für die Endschalter ist untersagt (Beeinflussung der Stellkräfte) und führt zum Garantieverlust.

Einsatzbereich Kraftabschaltung mit Wegschaltung (nicht für Baureihe N)

Bei Antrieben mit zusätzlicher Wegschaltung kann die Kraftabschaltung unterschiedliche Funktionen haben:

1. Sie dient als Endlagenbegrenzung beim Öffnen und Schließen einer Armatur.
2. Sie dient als Sicherheitsabschaltung in beide Richtungen (Blockierfall), wenn die Drehrichtung zum Öffnen und Schließen der Armatur über die Wegabschaltung begrenzt wird (z.B. Mindestmengeneinstellung).

⚠ Note concerning power-controlled switches (not on "N" series)

On delivery all power-controlled switches are adjusted to the specified actuating power.
Adjusting the set screws 1 for the limit stop switches is strictly prohibited (affects actuating power) and voids the guarantee.

Fields of application Power cut-off with position switch-off (not on "N" series)

For actuators with additional position switching the power cut-off may serve various purposes:

1. It serves as a position limit stop when opening or closing a fitting.
2. It serves as an automatic off-switch in both directions (case of blockage) if the sense of rotation for opening and closing a fitting is limited by position switch-off (e.g. minimum quantity adjustment).

⚠ Avis Interrupteur de force (sauf pour la série N)

Lors de la livraison, tous les interrupteurs dépendant de la force motrice sont réglés de manière fixe sur la force de réglage indiquée.
Le dérèglage des vis de réglage 1 pour les interrupteurs de fin de course est interdit (influence sur les forces de réglage) et a pour conséquence la perte de la garantie.

Champ d'application Coupure de force avec commutation de course (sauf pour la série N)

Pour les actionneurs équipés d'une commutation de course supplémentaire, la coupure de force peut servir à de différentes fins :

1. Limitation de la fin de course lors de l'ouverture et de la fermeture d'une robinetterie.
2. Arrêt de sécurité dans les deux sens (en cas de blocage), lorsque le sens de rotation pour ouvrir et fermer la robinetterie est limité par la coupure de course (p. ex. réglage des volumes minimum).

Schaltplan

- SL Endschalter, Linkslauf
- SR Endschalter, Rechtslauf
- S1 Hilfsschalter 1
- S2 Hilfsschalter 2
- S3 Hilfsschalter 3
- S4 Hilfsschalter 4
- R1 Potentiometer 1
- R2 Potentiometer 2
- R3 Potentiometer 3
- R4 Heizung
- M Stellungsmelder
- K1 Relais für Parallelbetrieb

Die Weggenschalter können je nach Ausführung anders als im Schaltplan dargestellt angeordnet sein (siehe hierzu Schaltplan im Antrieb).

Wiring Diagram

- SL Limit stop switch, CCW rotation
- SR Limit stop switch, CW rotation
- S1 Auxiliary switch 1
- S2 Auxiliary switch 2
- S3 Auxiliary switch 3
- S4 Auxiliary switch 4
- R1 Potentiometer 1
- R2 Potentiometer 2
- R3 Potentiometer 3
- R4 Heater
- M Position indicator
- K1 Relay for parallel operation

Depending on the particular model, the position limit switches may be arranged differently than indicated in the wiring diagram (please check the wiring diagram inside the actuator).

Schéma de couplage

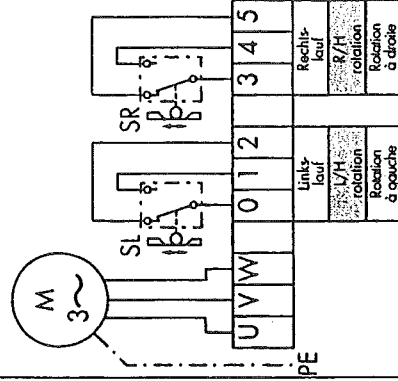
- SL Interrupteur de fin de course, rotation à gauche
- SR Interrupteur de fin de course, rotation à droite
- S1 Interrupteur auxiliaire 1
- S2 Interrupteur auxiliaire 2
- S3 Interrupteur auxiliaire 3
- S4 Interrupteur auxiliaire 4
- R1 Potentiomètre 1
- R2 Potentiomètre 2
- R3 Potentiomètre 3
- R4 Chauffage
- M Indicateur de position
- K1 Relais pour marche en parallèle

En fonction de la version, il se peut que les interrupteurs de fin de course soient disposés d'une autre manière que celle indiquée au présent schéma de couplage (se référer au plan de couplage dans l'actionneur).

Drehstromanschluss

Three-phase current connection

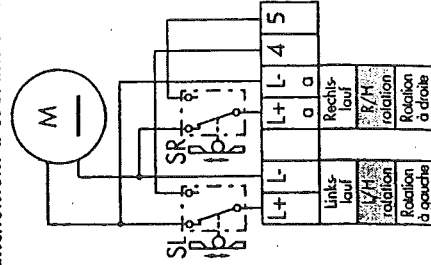
Branchement à courant triphasé



Gleichstromanschluss

Direct current connection

Branchement à courant continu

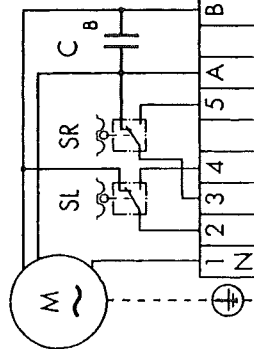


Interne Verdrahtung im
Stellantrieb
Internal wiring in the
actuator
Câblage intérieur dans
actionneur

Standardausführung

Standard version

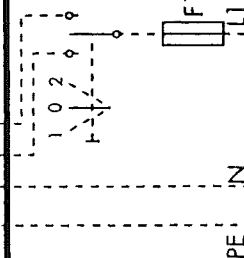
Version standard



Außen liegende Steuerung
und Beschaltung

External control and
circuitry

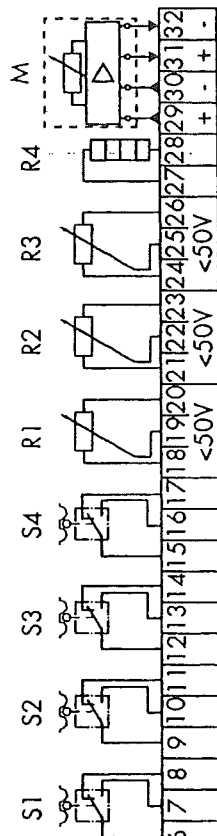
Comande et câblage
externes



Optionen

Options

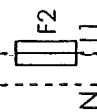
Options



Wechselstromanschluss

Alternating-current connection

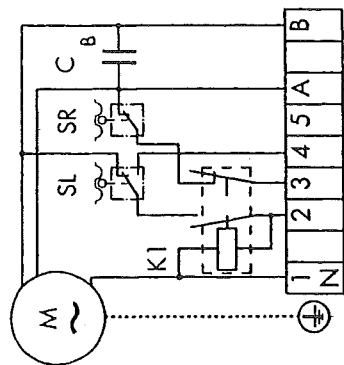
Branchement au courant alternatif



Parallelbetrieb (Option)

Parallel drive (Option)

Comande parallèle (Option)



Wegschalter einstellen

Je nach Ausführung können Schaltern bereits werkseitig auf eine Schaltposition justiert sein.

Beispiel 4er Justierschaltlocke (JNO)

Weghilfsschalter S1 und S2 (Option)

Die Justierschaltlocke JNO dient zur Ansteuerung von zwei Wegendschaltern und max. zwei Weghilfsschaltern.

Die Einstellschrauben NL, NR, N1, N2 sind unterschiedlich lang und dienen zur Verstellung der dazugehörigen Schaltlocken L, R, 1, 2. Die längste hervorstehende Schraube (markiert) dient immer zur Verstellung der Schaltlocke L und des obersten Schalters SL. Entgegen dem Uhrzeigersinn verringert sich die Schraubenhöhe der Einstellschraube für die (den) jeweils darunterliegende(n) Schaltlocke/Schalter.

Wegendschalter

- Spannung für Linksdrehung anlegen (siehe Seite 15): Antrieb dreht in vorgegebene Richtung. Schaltlockenwelle E dreht mit oder gegen die Drehrichtung der Abtriebswelle.

Setting Position Switches

Depending on the particular model control cams may be pre-set in factory to a specific switching position.

Example: Multiple-adjustment control cam (JNO 4)

Auxiliary position switches S1 and S2 (option)

The multiple-adjustment control cam JNO serves to control two position limit switches plus maximum two auxiliary position switches.

The adjusting screws NL, NR, N1, N2 are of different length and are intended to adjust the corresponding control cams L, R, 1, 2. The longest protruding screw (marked) always adjusts control cam 1 and the uppermost switch SL. CCW adjustment reduces the height of the adjusting screw of the corresponding control cam/switch directly underneath.

Position limit switches

- Apply voltage for CCW rotation (see page 15): the actuator rotates in the pre-set direction. The control camshaft E rotates in the same or in opposite direction to the sense of rotation of the output shaft.

Réglage de l'interrupteur de course

En fonction de la version, il se peut que des cames de contacteur soient déjà ajustées en usine sur une position de commande.

Exemple: Came de contacteur d'ajustage quadruple (JNO)

Interrupteur auxiliaire de course S1 et S2 (en option)

La came de contacteur d'ajustage JNO sert à commander deux interrupteurs de fin de course et au maximum deux interrupteurs auxiliaires.

Les vis de réglage NL, NR, N1, N2 sont de différentes longueurs et servent au réglage des cames de contacteur correspondantes L, R, 1, 2. La vis la plus longue et qui dépasse (marquée) sert au réglage de la came de contacteur 1 et de l'interrupteur supérieur SL. En tournant dans le sens inverse aux aiguilles d'une montre, la hauteur de la vis de réglage pour la (les) came(s) de contacteur respective(s) située(s) audessous diminue.

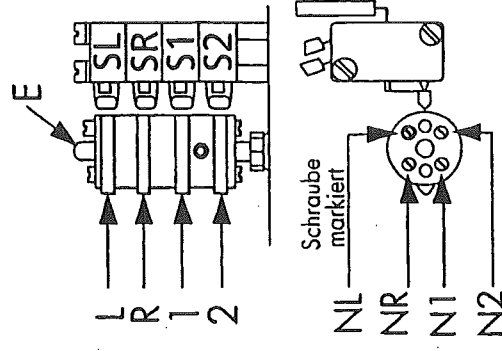
Interrupteur de fin de course

- Mettre la tension pour rotation à gauche (voir page 15): L'actionneur tourne dans le sens de rotation sélectionné. La came de contacteur E tourne dans le même sens que l'arbre de sortie ou dans le sens inverse.

Justierschaltlocke JNO

Multiple-adjustment control cam JNO

Came de contacteur JNO



2. Bei Erreichen der einzustellenden Endlage Spannung abschalten (Getriebe darf nicht blockieren).
3. Nockenscheibe L mittels Schraube NL in Drehrichtung der Schaltnockenwelle E so verdrehen, bis Wegendshalter SL klickt.
4. Nockenscheibe R mittels Schraube NR für entgegengesetzte Drehrichtung wie unter Schritt 1–3 beschrieben einstellen.
5. Zur Kontrolle beide Endlagen nochmals elektrisch anfahren und evtl. nachjustieren.
6. Auf Anfrage können verschiedene Nockenscheiben geliefert werden (13, 14).

Weghilfsschalter

1. Gewünschte Position anfahren. Schaltposition muss aus gewünschter Drehrichtung angesteuert werden.
2. Nockenscheibe 1 mittels Schraube N1 in Drehrichtung der Schaltnockenwelle E so verdrehen, bis Weghilfsschalter S1 klickt.
3. Nockenscheibe 2 mittels Schraube N2 in Drehrichtung der Schaltnockenwelle E so verdrehen, bis Weghilfsschalter S2 klickt.
4. Zur Kontrolle gewünschte Schaltposition nochmals elektrisch anfahren und evtl. nachjustieren.

2. Cut off power once the limit position to be adjusted has been reached (gear unit must not block).
3. Turn cam disk L with the help of screw NL in the sense of rotation of the control camshaft E until the position limit switch SL clicks.
4. Turn cam disk R with help of the screw NR in opposite direction to the sense of rotation as described in above steps 1-3.
5. To control both limit positions approach them again electrically and readjust, if necessary.
6. Various different cam disks are available upon request (13, 14).

Auxiliary position switches

1. Approach desired position. The switching position must be activated from the desired sense of rotation.
2. Turn cam disk 1 with the help of screw N1 in the sense of rotation of the control camshaft E until the auxiliary position switch S1 clicks.
3. Turn cam disk 2 with the help of screw N2 in the sense of rotation of the control camshaft E until the auxiliary position switch S2 clicks.
4. For control purposes, approach the desired switching positions again electrically and readjust, if necessary.

2. Couper la tension après avoir atteint la position finale à régler (l'engrenage ne doit pas bloquer).
3. Tournez le disque de came L à l'aide de la vis NL dans le sens de rotation de l'arbre de came de contacteur E jusqu'au clic de l'interrupteur de fin de course E.
4. Pour le sens de rotation inverse, réglez le disque de came R au moyen de la vis NR comme décrit aux points 1-3.
5. A des fins de contrôle, actionnez les deux fins de course électriquement et procédez éventuellement à un réajustage.
6. Sur demande, différents disques de came sont livrables (13, 14).

Interrupteurs auxiliaires

1. Réglez la position souhaitée. La position de commande doit être réglée à partir du sens de rotation souhaité.
2. Tournez le disque de came 1 à l'aide de la vis N1 dans le sens de rotation de l'arbre de came de contacteur E jusqu'au clic de l'interrupteur auxiliaire S1.
3. Tournez le disque de came 2 à l'aide de la vis N2 dans le sens de rotation de l'arbre de came de contacteur E jusqu'au clic de l'interrupteur auxiliaire S2.
4. A des fins de contrôle, actionnez électriquement les deux fins de course et procédez éventuellement à un réajustage.

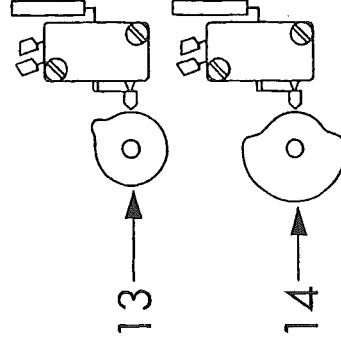
13= Standardnockenscheibe
330°

14= Nockenscheibe mit unterschiedlichem Schaltwinkel
3° bis 270°

13= Standard cam disk — 330°
14= Cam disk with different switching angle — 3° to 270°

13= Disque de came standard
330°

14= Disque de came avec angle de contact différent
3° à 270°



Justierschaltnocke (1er JNS)

Wegschalter

1. Einzelnocken sind bei Auslieferung lose auf Schaltnockenwelle E gesteckt.
2. Spannung anlegen (siehe Seite 15): Antrieb dreht in vorgegebene Richtung. Schaltnockenwelle E dreht mit oder gegen die Drehrichtung der Abtriebswelle.
3. Bei Erreichen der einzustellenden Endlage Spannung abschalten (Getriebe darf nicht blockieren).
4. **Nockenscheibe L so verdrehen, dass man gut an die Schrauben S und J kommt**, dann mit dem Innensechskantgewindestift S arretieren. Mit Schlitzschraube J Schaltnocke in Drehrichtung der Schaltnockenwelle E verdrehen, bis Wegendschalter SL klickt.
5. Nockenscheibe R für entgegengesetzte Drehrichtung wie unter Schritt 2-4 beschrieben arretieren (S) und einstellen.
6. Zur Kontrolle beide Endlagen nochmals elektrisch anfahren und evtl. mit Schlitzschrauben J nachjustieren (Feinjustage).
7. Bei weiteren Schaltern: Einstellung wie unter Punkt 2-6.

Single-adjustment control cam (JNS 1)

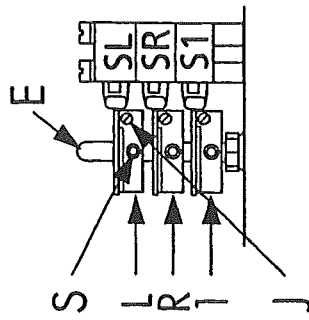
Position switches

1. Single-adjustment cams are delivered loosely fitted to the control camshaft E.
2. Apply voltage (see page 15): The actuator rotates in pre-set direction. The control camshaft E rotates in the same or in opposite direction to the sense of rotation of the output shaft.
3. Cut off power once the limit position to be adjusted has been reached (gear unit must not block).
4. Turn cam disk L to allow free access to the screws S and J, then lock with the hexagon socket set screw S. Turn the cam disk with the slotted screw J in the sense of rotation of the control camshaft E, until the position limit switch SL clicks.
5. Adjust cam disk R for opposite sense of rotation as described in steps 2-4, then lock screw (S).
6. To control both limit positions approach them again electrically and, if necessary, readjust with slotted screw J (fine adjustment).
7. For further switches: Proceed according to above steps 2-6.

Came de contacteur d'ajustage (1ère JNS)

Interrupteur de course

1. Lors de la livraison, des cames de contacteur simple sont librement placées sur l'arbre de came de contacteur E.
2. Appliquez la tension (voir page 15): L'actionneur tourne dans le sens indiqué. L'arbre de came de contacteur E tourne dans ou à l'inverse du sens de rotation de l'arbre de sortie.
3. Couper la tension au moment où vous atteignez la fin de course à régler (veillez à ce que l'engrenage ne bloque pas).
4. Tournez le disque de came L de manière à ce qu'un accès facile aux vis S et J soit assuré, puis bloquez le réglage au moyen de la goupille filetée à six pans creux S. Tournez à l'aide de la vis de fente J la came de contacteur dans le sens de rotation de l'arbre de came de contacteur E jusqu'à ce que vous entendiez un clic de l'interrupteur de fin de course SL.
5. Pour le sens de rotation inverse, réglez et arrêtez (S) le disque de came R selon les instructions 2-4.
6. A des fins de contrôle, actionnez les deux fins de course de manière électrique et procédez éventuellement à un réajustage (ajustage de précision).
7. Autres interrupteurs : Réglage comme décrit aux points 2-6.



13= Standardnockenscheibe
330°

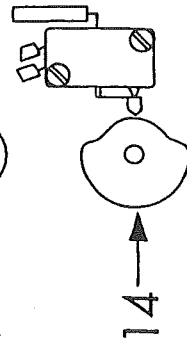
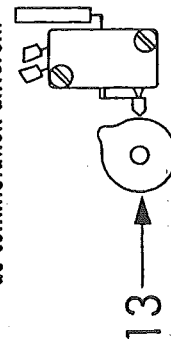
14= Nockenscheibe mit unterschiedlichem Schälwinkel
3°-270°

13= Standard cam disk

14= Cam disk with different switching angle

13= Disque à came standard

14= Disque à came avec angle de commutation différent



Messingschaltnocke (Option)

Wegschalter

1. Nockenscheiben L und R sind bei Auslieferung lose auf Schaltnockenwelle E gesteckt.
2. Spannung anlegen (siehe Seite 15): Antrieb dreht in vorgegebene Richtung. Schaltnockenwelle E dreht mit oder gegen die Drehrichtung der Abtriebswelle.
3. Bei Erreichen der einzustellenden Endlage Spannung abschalten (Getriebe darf nicht blockieren).
4. Nockenscheibe L in Drehrichtung der Schaltnockenwelle E so verdrehen, bis Wegenschalter SL klickt — dann **einen** der Innensechskantgewindestifte S zur Befestigung anziehen.
5. Nockenscheibe R für entgegengesetzte Drehrichtung wie unter Schritt 2–4 beschrieben einstellen und arretieren (S).
6. Zur Kontrolle beide Endlagen nochmals elektrisch anfahren und evtl. nachjustieren.
7. Bei weiteren Schaltern: Einstellung wie unter Punkt 2–6.

Brass Control Cam (Option)

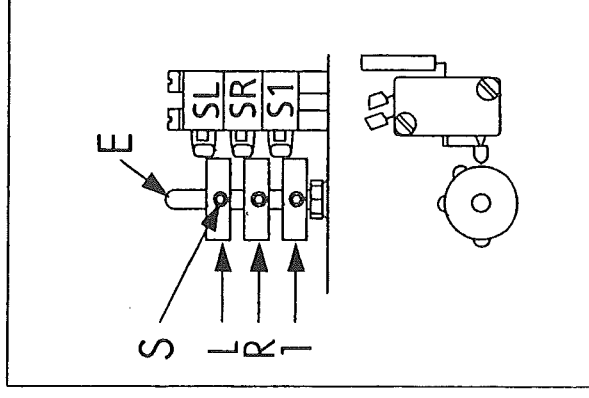
Position switches

1. Cam disks L and R are delivered loosely fitted to the control camshaft E.
2. Apply voltage (see page 15): The actuator rotates in pre-set direction. The control camshaft E rotates in the same or in opposite direction to the sense of rotation of the output shaft.
3. Cut off power once the limit position to be adjusted has been reached (gear unit must not block).
4. Turn cam disk L in the sense of rotation of the control camshaft E until the position limit switch SL clicks — then lock **one** of the hexagon socket set screws (S).
5. Adjust cam disk R for opposite sense of rotation and lock screw (S) as described in steps 2–4.
6. To control both limit positions approach them again electrically and readjust, if necessary.
7. For further switches: Proceed according to above steps 2–6.

Came de contacteur en laiton (en option)

Interrupteur de course

1. Lors de la livraison, les disques de came L et R sont librement placés sur l'arbre de came de contacteur E.
2. Appliquez la tension (voir page 15): L'actionneur tourne dans le sens de rotation indiqué. L'arbre de came de contacteur E tourne dans ou à l'inverse du sens de rotation de l'arbre de sortie.
3. Couper la tension au moment où vous atteignez la fin de course à régler (veillez à ce que l'engrenage ne bloque pas).
4. Tournez le disque de came L dans le sens de rotation de l'arbre de came de contacteur E jusqu'à ce que vous entendiez un clic de l'interrupteur de fin de course SL — pour arrêter le réglage, serrez ensuite l'une des goupilles à six pans creux.
5. Pour le sens de rotation inverse, réglez et arrêtez (S) le disque de came R selon les instructions 2–4.
6. A des fins de contrôle, commandez électriquement les deux fins de course et procédez éventuellement à un ré-ajustage (ajustage de précision).
7. Autres interrupteurs :
Réglage comme décrit aux points 2–6.



Kraftabhängige Schalter

Standard bei Baureihe V

Option bei Baureihe K und K-A

Kraftschalter

Bei Lieferung sind die Kraftschalter SL und SR auf die angegebene Stellkraft fest eingestellt.

Die Kraftschalter schalten den Motor in Schub- bzw. Hubrichtung ab, sobald die fest eingestellte Stellkraft erreicht wird, schützen somit den Antrieb und die Armatur vor Beschädigung und sorgen für dichten Sitz der Armatur.

Das Verstellen der Stellschrauben L und R ist untersagt (Beeinflussung der Abschaltkräfte) und führt zum Garantieverlust.

Krafthilfsschalter

Bei Lieferung sind die Krafthilfsschalter S1 und S2 auf die angegebene Stellkraft fest eingestellt.

Krafthilfsschalter S1 und S2 werden je nach Schub- bzw. Hubrichtung (max. je einer möglich) von den Stellschrauben 1 und 2 betätigt.

Die Krafthilfsschalter werden immer vor den Kraftschaltern betätigt.

Power-controlled Switches

Standard on V Series

Optional for K and K-A Series

Power limit stop switches

On delivery, the power limit stop switches SL and SR are set to the specified actuating power.

Power limit stop switches disconnect the motor in linear or lifting direction as soon as the adjusted actuating power is reached, thus preventing damage to the actuator and fitting as well as ensuring leak-proof seat of the fitting.

Adjusting the set screws L and R is strictly prohibited (affects disconnecting power) and voids the guarantee.

Power-controlled auxiliary switches

On delivery, the power-controlled auxiliary switches S1 and S2 are set to the specified actuating power.

The power-controlled auxiliary switches S1 and S2 are actuated in linear or lifting direction (max. one each) by the set screws 1 and 2.

Power-controlled auxiliary switches are always actuated before the power limit stop switches.

Interrupteurs de fin de course à coupure de force

Standard pour la série V

En option pour les séries K et K-A

Interrupteur de fin de course à coupure de force
Lors de la livraison, les interrupteurs à coupure de force SL et SR sont réglés de manière fixe sur la puissance de réglage indiquée.

Les interrupteurs de fin de course à coupure de force arrêtent le moteur dans le sens de levage ou de poussée dès que la puissance de réglage est atteinte. Ils protègent ainsi l'actionneur et la robinetterie des endommagements en assurant également l'étanchéité.

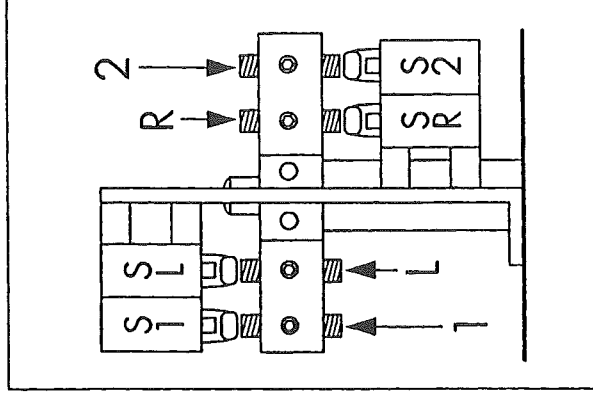
Toute modification du réglage des vis de réglage L et R est interdite (influence sur la coupure de force) et a pour conséquence la perte de la garantie.

Interrupteur auxiliaire à coupure de force

Lors de la livraison, les interrupteurs auxiliaires S1 et S2 sont réglés de manière fixe sur la puissance de réglage indiquée.

Les interrupteurs auxiliaires sont actionnés selon le sens de levage ou de poussée (l'un des deux possible au maximum) par les vis de réglage 1 et 2.

Les interrupteurs auxiliaires à coupure de force sont toujours actionnés avant les interrupteurs de fin de course à coupure de force.



Potentiometer (Option)

Elektrischer Anschluss

Klemmen 18, 19 und 20 entsprechend der gewünschten Anforderung beschalten (Spannung $\leq 50V$); (siehe Seite 17–18).

Nur separate, ggf. abgeschirmte Leitungen verwenden.

In der Haube eingeklebten Schaltplan beachten.

Einstellen

Vor der Justage des Potentiometers P Weg-endschalter einstellen.

Beide Endlagen elektrisch anfahren (siehe Seite 15).

Stellweg und Potentiometerauflösung beachten. **Der bestellte Stellweg darf nicht überschritten werden**, da bei dauerhafter Überschreitung eine Beschädigung der Rutschkupplung R nicht auszuschließen ist.

Potentiometer P stellt sich über Rutschkupplung R automatisch grob ein.

Der Stellweg der Armatur wird durch ein Zwischengetriebe und eine Rutschkupplung R auf den elektrischen Drehwinkel des Potentiometers übertragen.

Beide Endlagen nochmals elektrisch anfahren (siehe Seite 15) und Potentiometer P mit der Rutschkupplung R nachjustieren.

Potentiometer (Option)

Electrical connection

Wire terminals 18, 19 and 20 according to requirements (voltage = 50V); (see pages 17–18).

Use only separate wires, if necessary, shielded ones.

Follow the wiring diagram inside the cover.

Setting:

Set position limit switches first, then adjust the potentiometer P.

Approach both limit positions electrically (see page 15).

Consider regulating distance and potentiometer resolution. The regulating distance must not be overrun as permanent overrunning could damage the slip clutch R.

The potentiometer P makes automatically a rough adjustment via slip clutch R.

The regulating distance of the fitting is transferred by an intermediate gear and the slip clutch R to the electric rotation angle of the potentiometer. Approach again electrically both limit positions (see page 15) and readjust the potentiometer P with slip clutch R.

Potentiomètre (en option)

Connexion électrique

Câblage des bornes 18, 19 et 20 suivant l'exigence souhaitée (tension 50V); (voir page 17–18).

N'utilisez que des câbles séparés, évtl. blindés. Veuillez vous conformer aux plans de couplage figurant à l'intérieur du capot.

Réglage

Avant l'ajustage du potentiomètre P, procédez au réglage des interrupteurs de fin de course.

Commandez électriquement les deux fins de course (voir page 15).

Veillez à la course et à la résolution du potentiomètre. Ne pas dépasser la course. Un dépassement permanent de la course déterminée pourrait provoquer l'endommagement de l'accouplement patinant.

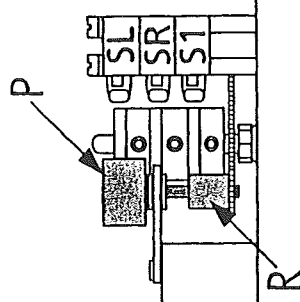
Le potentiomètre est automatiquement réglé de manière approximative par l'accouplement patinant R.

La course de réglage de la robinetterie est transmise à l'angle de rotation du potentiomètre au moyen d'un engrenage intermédiaire et d'un accouplement patinant R. Commandez encore une fois électriquement les deux fins de course. (voir page 15) et rajustez le potentiomètre P à l'aide de l'accouplement patinant R.

Baureihe N

Series N

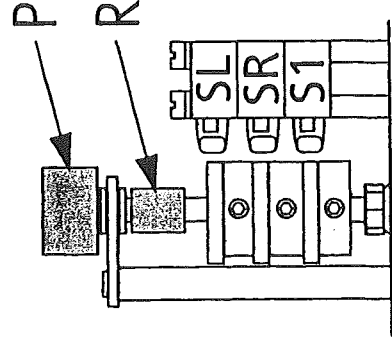
Série N



Baureihe K/K-A/V

Series K/K-A/V

Série K/K-A/V



Transport

Antriebe nur in der Originalverpackung transportieren.
Antriebe keinen harten Erschütterungen aussetzen (z.B. durch Fallenlassen).

Lagerung / Stillstandzeiten

In gut gelüfteten, trockenen Räumen auf Paletten oder in Regalen lagern (vor Feuchtigkeit schützen).

Zum Schutz gegen Staub und Schmutz mit Folie abdecken.

Vermeidung von Kondenswasserbildung (z.B. bei Temperaturschwankungen).

Bei Lagerung länger als 4 Monate folgende Punkte zusätzlich beachten:

Feuchtigkeitsabsorbierende Mittel unter die Abdeckhaube des Antriebes legen.

Transport

Transport actuators only in their original packing.
Protect actuators against shocks and heavy impacts (e.g. by dropping it).

Storage / Downtimes

Store on pallets or in shelves in well ventilated, dry rooms (protect against humidity).

Cover with foil to protect against dust and dirt.

Avoid condensation of water (e.g. due to fluctuation of temperature).

Observe the following if storage time exceeds 4 months:

Place moisture-absorbing agents inside the cover.

Transport

Ne transporter les actionneurs que dans leur emballage original.

Ne pas exposer des actionneurs à de fortes secousses (p. ex. en les laissant tomber).

Stockage / Temps d'arrêt

Stockez les actionneurs dans des locaux bien aérés et secs sur des palettes ou dans des rayonnages (protéger de l'humidité).

Protégez-les de la poussière et de l'encrassement à l'aide d'une feuille en plastique.

Évitez la condensation d'eau (p. ex. en cas de fluctuations de température).

A observer de plus en cas de période de stockage supérieure à 4 mois :

Mettez des produits absorbant l'humidité sous le capot protecteur de l'actionneur.

Getriebeauskupplung (Option)

1. Betriebsspannung des Stellantriebes ausschalten.
2. Hebel B (Auto/Hand) in die Stellung »Hand« drehen. Kraftfluss vom Motor zur Abtriebswelle wird unterbrochen.
3. Diese Stellung dient zur Schnellverstellung der Abtriebswelle bei Einstellarbeiten.
4. Armatur in gewünschte Position drehen (keine Trennung der Abtriebs- und Armaturenwelle nötig). (Schaltknocken der Wegend-/Weghilfsschalter und Potentiometer werden mitgedreht. Justierte Positionen bleiben erhalten.)
5. Hebel B (Auto/Hand) in die Stellung »Auto« zurückdrehen. Kraftfluss des Motors kann wieder auf die Armatur einwirken.
6. Betriebsspannung des Stellantriebes einschalten.

Zur Vermeidung des Überfahrens der Endschalter bei Handbetrieb, Endstellungen der Armatur mechanisch begrenzen. Der Stellantrieb darf im ausgekuppelten Zustand nicht elektrisch angesteuert werden!

Gear Disengaging (Option)

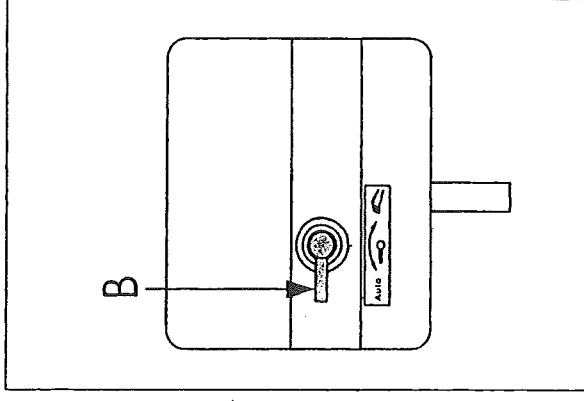
1. Switch off operating voltage of actuator.
2. Move lever B (Auto/Manual) to position »Manual«. Flow of power between motor and output shaft is interrupted.
3. This position serves for quick adjustments of the output shaft during adjustment work.
4. Turn the fitting to the desired position (no need to disengage output and fittings shafts). (Control cams of the position limit/auxiliary position switches and potentiometer turn with it. Set positions are retained.)
5. Move lever B (Auto/Manual) back to position »Auto«. Power flow between motor and fitting is restored.
6. Switch-on operating voltage of actuator.

To avoid the risk of overrunning the limit stop switches during manual operation, set the limit positions of the fitting mechanically. The actuator must not be electrically activated when disengaged!

Débrayage de l'engrenage (en option)

1. Coupez la tension de service de l'actionneur.
2. Tournez le levier B (Auto/Main) sur la position »Main«. Le flux de force du moteur à l'arbre de sortie est interrompu.
3. Lors des travaux de réglage, cette position sert à un réglage rapide de l'arbre de sortie.
4. Tournez la robinetterie dans la position souhaitée (une séparation de l'arbre de sortie et de la robinetterie n'est pas nécessaire). (Les cames de contacteur des interrupteurs de fin de course/interrupteurs auxiliaires et les potentiomètres sont également tournés. Des positions ajustées sont maintenues.)
5. Remplacez le levier B (Auto/Main) sur la position »Auto«. Le flux de force peut de nouveau actionner la robinetterie.
6. Remettez la tension de service de l'actionneur.

Pour éviter un dépassement des interrupteurs de fin de course en fonctionnement manuel, limitez mécaniquement les fins de course de la robinetterie. Ne jamais commander électriquement l'actionneur en état de débrayage!



Montage

Konsolenbefestigung

1. Klappenversteller/Schubantrieb mittels vormontierter Befestigungskonsolle L montieren.

Mitnehmerverbindung

1. Das zu bewegende Teil (z.B. Hebelarm) und Mitnehmerlaschen M mit Verbindungsbolzen B verbinden.
2. Teile einfetten
3. Unterlegscheibe U über Verbindungsbolzen B legen.
4. Sicherungssplint S in Bohrung des Verbindungsbolzen B einsetzen.
5. Enden des Sicherungssplintes auseinanderbiegen.

Installation

Bracket assembly

1. Attach the damper/linear-motion actuator with the pre-assembled mounting bracket L.

Drive type fastening

1. Join the part to be moved (e.g. lever arm) and the lug link plate M with the connecting pin B.
2. Grease parts
3. Place washer U on top of connecting pin B.
4. Insert locking split-pin S into hole of connecting pin B.
5. Spread ends of locking split-pin.

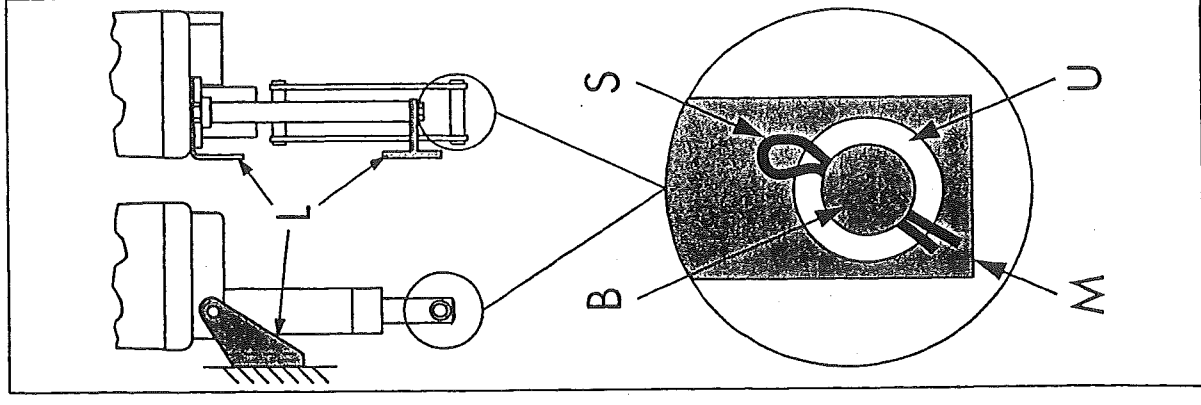
Montage

Fixation à consoles

1. Montez les servomoteurs de commande pour clapets/servomoteurs linéaires à l'aide de la console de fixation L pré-montée.

Connexion à entraînement

1. Reliez la partie à entraîner (p. ex. bras de levier) et les languettes d'entraînement au moyen du boulon de liaison B.
2. Graissez les éléments.
3. Posez la rondelle U sur le boulon de liaison B.
4. Placez la goupille d'arrêt fendue S dans l'alésage du boulon B.
5. Repliez les extrémités de la goupille d'arrêt fendue vers l'extérieur.



Außenliegende Wegbegrenzung bei Kraftabschaltung (Option)

Baureihe K und V

Zur mechanischen Begrenzung der Endlagen können die Wegbegrenzungsringe 1–4 stufenlos eingestellt werden.

1. Wegbegrenzungsringe 1–4 sind bei Lieferung nicht eingestellt.
2. Befestigungsschrauben 0 und U lösen.
3. Spannung für Rechtslauf anlegen (siehe Seite 18). Spindelmutter bewegt sich in Richtung Antrieb.
4. Bei Erreichen der einzustellenden Endlage Spannung abschalten (Getriebe darf nicht blockieren).
5. Wegbegrenzungsringe 1 und 2 parallel bis zum Anschlag an die Doppelgabel (Baureihe K) bzw. die Spindelmutter (Baureihe V) verschieben – dann arretieren (0).
6. Wegbegrenzungsringe 3 und 4 für entgegengesetzte Drehrichtung wie unter Schritt 3–5 beschrieben einstellen und arretieren (U).
7. Zur Kontrolle beide Endlagen nochmals elektrisch anfahren und evtl. nachjustieren.

External Travel Stop with power cut-off (option)

Series K and V

The continuously adjustable travel check rings 1–4 can be used as mechanical stops for the limit positions.

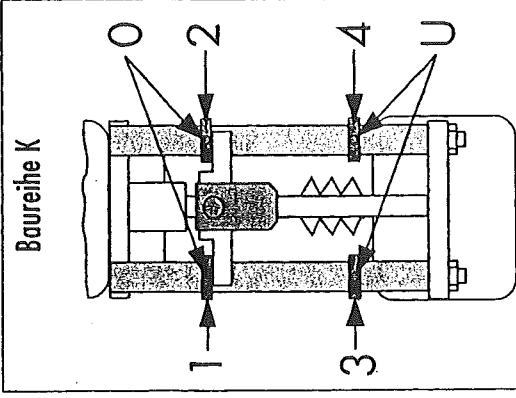
1. Travel check rings 1–4 are not set upon delivery.
2. Loosen fastening screws 0 and U.
3. Apply voltage for CW rotation (see page 18). The spindle moves towards the actuator.
4. Cut voltage when reaching the limit positions to be adjusted (gear unit must not block).
5. Move travel check rings 1 and 2 parallel up to the buffer of the double fork (series K) or the spindle nut (series V) – then tighten screw (0).
6. Adjust travel check rings 3 and 4 for CCW rotation as described in above steps 3–5 and tighten screw (U).
7. To control both limit positions approach them again electrically and readjust, if necessary.

Limitation de course extérieure en cas de coupure de force (en option)

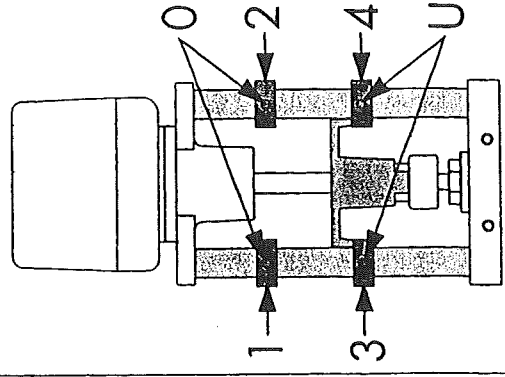
Séries K et V

Pour limiter mécaniquement les fins de course, les anneaux de limitation de course 1–4 peuvent être réglés en continu.

1. Lors de la livraison, les anneaux de limitation de course 1–4 ne sont pas réglés.
2. Désserrez les vis de fixation 0 et U.
3. Appliquez la tension pour rotation à droite (voir page 18). L'écrou de la tige filetée se déplace dans la direction de l'actionneur.
4. Une fois la fin de course à régler atteinte, coupez la tension (l'engrenage ne doit pas bloquer).
5. Faites glisser parallèlement les anneaux de limitation de course 1 et 2 jusqu'à la butée sur la double fourche (série K) ou l'écrou de la tige filetée (série V), puis arêtez-les (0).
6. Pour le sens de rotation inverse, réglez et arêtez (U) les anneaux de limitation de course 3 et 4 comme décrit aux points 3–5.
7. A des fins de contrôle, actionnez encore une fois électriquement les deux fins de course et procédez évtl. à un réajustage.



Baureihe V



Außenliegende Wegbegrenzung bei Wegabschaltung (Option)

Baureihe K und V

Vor Einstellung der Wegbegrenzung die Wegabschaltung einstellen (siehe Seite 19-22).

Zur Vermeidung des Überfahrens der Endschalter und Potentiometer bei Handbetrieb, können die Endstellungen des Antriebs mechanisch begrenzt werden.

1. Wegbegrenzungsringe 1-4 sind bei Lieferung nicht eingestellt.
2. Befestigungsschrauben O und U lösen.
3. Spannung für Rechtslauf anlegen (siehe Seite 18), bis Abschaltung durch Schalter SR erfolgt. Spindelmutter bewegt sich in Richtung Antrieb.
4. Wegbegrenzungsringe 1 und 2 bis an die Doppelgabel (Baureihe K) bzw. die Spindelmutter (Baureihe V) verschieben - ca. 1 mm Spalt zwischen Wegbegrenzungsringe und Doppelgabel einhalten - dann arretieren (O).
5. Wegbegrenzungsringe 3 und 4 für entgegengesetzte Drehrichtung wie unter Schritt 3 und 4 beschrieben einstellen und arretieren (U).

External Travel Stop with position switch-off (option)

Series K and V

Before setting travel stops adjust the position switch-off first (see pages 19-22).

To avoid overrunning limit stop switches and potentiometer during manual operation, the limit positions of the actuator can be set mechanically.

1. Travel check rings 1-4 are not set upon delivery.
2. Loosen fastening screws O and U.
3. Apply voltage for CW rotation (see page 18) until the SR switch disconnects. The spindle nut moves towards the actuator.
4. Move travel check rings 1 and 2 up to the double fork (series K) or spindle nut (series V) - ensuring an air gap of approx. 1 mm between travel check rings and double fork - then tighten screw (O).
5. Adjust travel check rings 3 and 4 for CCW rotation as described in above steps 3 and 4 and tighten screw (U).

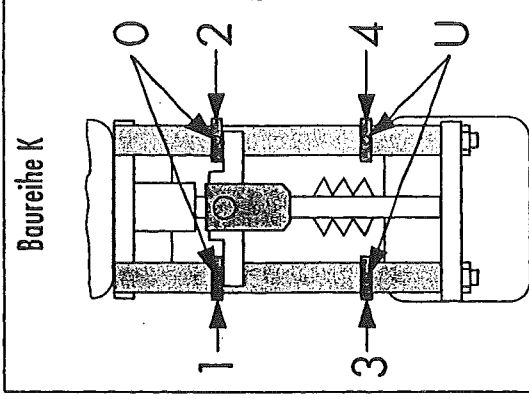
Limitation de course extérieure en cas d'arrêt de course (en option)

Série K et V

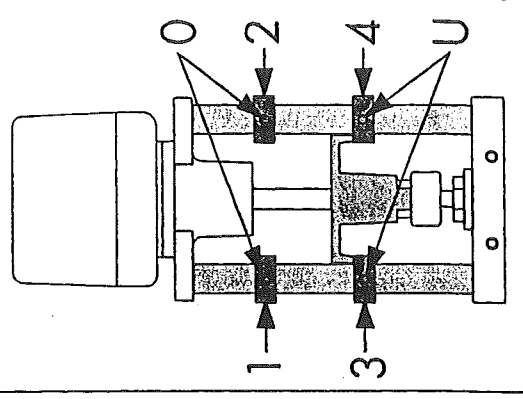
Avant de procéder à la limitation de course, réglez l'arrêt de course (voir page 19-22).

Pour éviter un dépassement des fins de course et des potentiomètres en fonctionnement manuel, les fins de course de l'actionneur peuvent être limitées mécaniquement.

1. Lors de la livraison, les anneaux de limitation de course 1-4 ne sont pas réglés.
2. Déserez les vis de fixation O et U.
3. Appliquez la tension pour rotation à droite (voir page 18) jusqu'à la coupure par l'interrupteur SR. L'écrou de la tige fileté se déplace dans la direction de l'actionneur.
4. Faites glisser les anneaux de limitation de course 1 et 2 jusqu'à la butée sur la double fourche (série K) ou l'écrou de la tige fileté (série V) (respecter un écart d'environ 1 mm entre la limitation de course et la double fourche), puis arrêtez (O).
5. Pour le sens de rotation inverse, réglez et arrêtez (U) les anneaux de limitation de course 3 et 4 comme décrit aux points 3 et 4.



Baureihe V



Wartung

Baureihe K

Antriebsmotor und Getriebebestufen

Dauerschmierung

Schubstufe

Je nach Schalthäufigkeit und Umgebungseinflüssen – spätestens alle 6 Monate – Gewindespindel gründlich reinigen und nachfetten (bei Verschmutzung entsprechend früher).

Trockenlauf vermeiden!

Trapezgewinde über den gesamten Stellbereich ausreichend mit Fett einstreichen.

Werkseitig wird das Spezial-Lagerfett OKS 416 (OKS Spezialschmierstoffe GmbH, 80993 München) eingesetzt.

Temperaturbereich des Fettes -40°C bis +100°C.

Ein Fett gleicher Güte kann auch verwendet werden.

Bei Gewindespindel mit Faltenbalg zusätzlich beachten:

1. Faltenbalg beidseitig lösen.
2. Fettlagerungen im Faltenbalg und an der Spindel entfernen.
3. Einfetten.
4. Faltenbalg beidseitig wieder befestigen.

Normale Wälzlagerfette sind für diese Gewindespindel nicht geeignet.

Maintenance

Series K

Motor and gear unit of actuator

Permanent lubrication

Linear motion unit

Thoroughly clean and re-lubricate the threaded spindle according to switching frequency and surrounding conditions – at least every 6 months – (in case of dirt accumulation, clean earlier).

Avoid dry running!

Apply sufficient grease to the entire adjusting area of the trapezoid thread.

Factory uses special bearing grease type OKS 416 (OKS Spezialschmierstoffe GmbH, 80993 München).

Temperature range of the grease -40°C to +100°C.

Any grease of identical properties may be used.

In case of threaded spindles with expansion bellows take care of the following:

1. Unfasten both ends of the expansion bellows.
2. Remove grease deposits inside the expansion bellows and on the spindle.
3. Grease the unit.
4. Fasten again both ends of the expansion bellows.

Standard types of roller bearing grease are not suitable for this threaded spindle.

Entretien

Série K

Moteur de commande et tige fileté

Graissage permanent

Niveau de poussée

En fonction du nombre des opérations et des conditions environnantes, la tige fileté doit être scrupuleusement nettoyée et graissée au plus tard tous les six mois (en cas d'encrassement, à des intervalles plus courts).

Évitez la marche à sec!

Appliquez suffisamment de graisse sur toute la plage de réglage du filet trapézoïdal.

En usine, la graisse de coussinet spéciale OKS 416 (OKS Spezialschmierstoffe GmbH, 80993 München) est utilisée.

Température supportée par la graisse de -40°C à +100°C.

Une graisse de qualité similaire peut également être utilisée.

Observez en particulier pour les tiges filetées avec soufflet :

1. Détachez le soufflet des deux côtés.
2. Enlevez les dépôts de graisse à l'intérieur du soufflet sur la tige fileté.
3. Graissez.
4. Refixez le soufflet sur les deux côtés.

Des graisses pour roulements d'usage courant ne conviennent pas à ce type de tige fileté.

Wartung

Baureihe K-A

Antriebsmotor und Getriebestufen

Dauerschmierung

Schubstufe

Je nach Schaltheufigkeit und Umgebungseinflüssen – spätestens alle 6 Monate – Gewindespindel gründlich reinigen und nachfetten (bei Verschmutzung entsprechend früher).

Trockenlauf vermeiden!

1. Antrieb ganz ausfahren und entlasten.
Wenn eine Entlastung nicht möglich ist, darauf achten, dass keine Querkräfte auf die Gewindespindel einwirken.
2. Schutzrohr vom Gehäuse losschrauben und an das Ende der Schubstange ziehen.
3. Freigelegte Gewindespindel ausreichend mit Fett einstreichen.
4. Schutzrohr wieder in das Gehäuse einschrauben.
Werkseitig wird das Spezial-Lagerfett OKS 416 (OKS Spezialschmierstoffe GmbH, 80993 München) eingesetzt.

Temperaturbereich des Fettes -40°C bis +100°C.

Ein Fett gleicher Güte kann auch verwendet werden.

Normale Wälzlagerfette sind für diese Gewindespindel nicht geeignet.

Maintenance

Series K-A

Motor and gear unit of actuator

Permanent lubrication

Linear motion unit

Thoroughly clean and re-lubricate the threaded spindle according to switching frequency and surrounding conditions – at least every 6 months – (in case of dirt accumulation, clean earlier).

Avoid dry running!

1. Fully extend the actuator and disengage.
If disengaging is impossible make sure that no lateral forces are acting on the threaded spindle.
2. Screw the protective tube off the housing and pull it back to the end of the push rod.
3. Apply sufficient grease to the uncovered threaded spindle.
4. Screw the protective tube back into the housing.
Factory uses special bearing grease type OKS 416 (OKS Spezialschmierstoffe GmbH, 80993 München).

Temperature range of the grease from -40°C to +100°C.

Any grease of identical properties may be used.

Standard types of roller bearing grease are not suitable for this threaded spindle.

Entretien

Série K-A

Moteur de commande et vitesses

Graissage permanent

Niveaux d'entraînement

En fonction du nombre des opérations et des conditions environnantes, la tige fileté doit être scrupuleusement nettoyée et graissée au plus tard tous les six mois (en cas d'encrassement, à des intervalles plus courts).

Évitez la marche à sec!

1. Sortez entièrement l'actionneur et déchargez-le.
Si une décharge n'est pas possible, veillez à ce que des forces latérales n'agissent pas sur la tige fileté.
2. Dévisser le tube protecteur du boîtier et tirez-le à l'extrémité de la tige de poussée.
3. Appliquez suffisamment de graisse sur la tige fileté déchargée.

4. Revissez le tube protecteur dans le boîtier. En usine, la graisse de coussinet spéciale OKS 416 (OKS Spezialschmierstoffe GmbH, 80993 München) est utilisée.

Température supportée par la graisse de -40°C à +100°C.

Une graisse de qualité similaire peut également être utilisée.

Des graisses pour roulements d'usage courant ne conviennent pas à ce type de tige fileté.

Montage

Laternenbefestigung

1. Ventilantrieb mit montiertem Befestigungsflansch L auf Ventilhals A setzen.
2. Befestigungsflansch L mit den 4 Gewindestiften G arretieren.

Mitnehmerverbindung

1. Überwurfmutter U über Ventilspindel W stecken.
2. — bei Ventilspindel ohne Gewinde geteilten Mitnehmer R in Nut der Ventilspindel W setzen
— bei Ventilspindel mit Gewinde vollen Mitnehmer R auf Ventilspindel W schrauben und mit Gewindestift F arretieren.
3. Ventilspindel W so in Handrad S führen, dass Mitnehmer R nicht mehr sichtbar ist.
4. Überwurfmutter U auf Handrad S festdrehen.
Zwischen Handrad S und Ventilspindel W darf ein geringes Spiel zur Aufnahme von Toleranzen zwischen Antrieb und Armatur sein. Spiel möglichst gering halten.
5. Überwurfmutter U mit Gewindestift F arretieren.

Installation

Bracket Assembly

1. Place valve actuator with attached flange L onto valve neck A.
2. Lock flange L with the 4 headless pins G.

Drive type fastening

1. Place union nut U onto valve spindle W.
2. — for valve spindles without thread: place split clutch drive ring R into the channel of valve spindle W
— for threaded valve spindles: screw solid clutch drive ring R onto valve spindle W and lock with headless pin F.
3. Introduce valve spindle W into hand wheel S until the clutch drive ring R is not anymore visible.
4. Fasten union nut U on hand wheel S.
Clearance between hand wheel S and valve spindle W should be minimal to compensate for tolerances between actuator and fitting. Keep clearance as small as possible.
5. Lock union nut U with headless pin F.

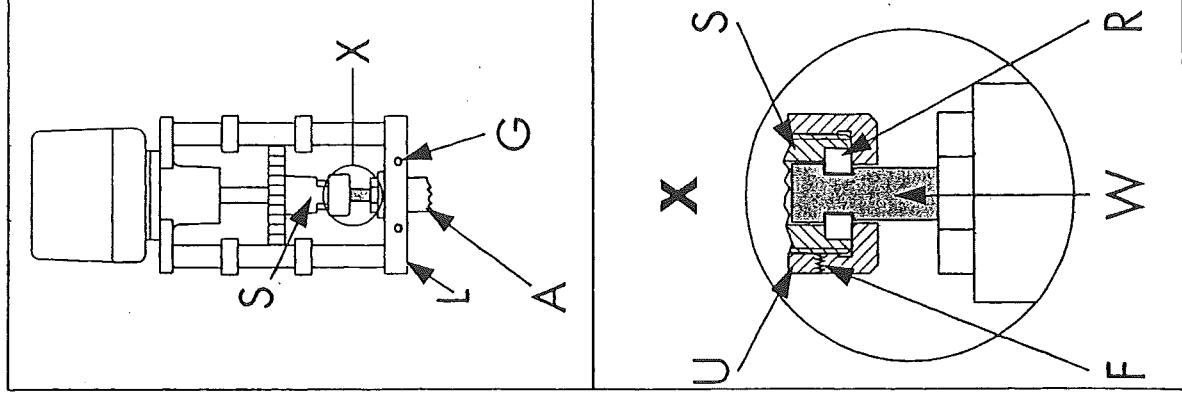
Montage

Fixation des lanternes

1. Placez le servomoteur pour soupapes avec la bride de fixation montée L sur le collet de soupape A.
2. Arrêtez la bride de fixation L à l'aide des 4 goupilles filetées G.

Connexion à entraînement

1. Placez l'écrou-raccord U sur la tige de soupape W.
2. — pour la tige de soupape sans filet, placez la bague d'entraînement R dans la rainure de la tige de soupape W
— pour la tige de soupape avec filet, vissez la bague d'entraînement R en entier sur la tige de soupape W et arrêtez à l'aide de la goupille filetée F.
3. Entrez la tige de soupape W dans la roue à main S de manière à ce que la bague d'entraînement ne soit plus visible.
4. Fixez en tournant l'écrou-raccord U sur la roue à main.
Pour la réception des tolérances entre l'actionneur et la robinetterie, un léger jeu entre la roue à main S et la tige de soupape W est admis. Veillez à ce que le jeu ne soit pas trop important.
5. Arrêtez l'écrou-raccord U avec la goupille filetée F.



Arretierbare Spindelmutter

Bei Ausfall der elektrischen Energie kann das Ventil über eine Spindelmutter betätigt werden.

Die Spindelmutter darf nur im spannungslosen Zustand betätigt werden.

1. Ausgangsstellung der Spindelmutter markieren (Filzstift).
2. Arretierungsbolzen R aus Führungsnut F auskuppeln und um 90° drehen.
3. Ventil mit der Spindelmutter H in gewünschte Position drehen. Schaltackten der Wegend-/Weghilfsschalter und Potentiometer werden nicht mitgedreht.

4. Zur Zurückstellung auf Motorbetrieb Spindelmutter in Ausgangsstellung drehen und Arretierungsbolzen R ein-kuppeln.

Zur Vermeidung des Überfahrens der Endschalter und Potentiometer bei Handbetrieb, Endstellungen des Ventils mechanisch begrenzen (bei Wegabschaltung).

Lockable Spindle Nut

In case of a power outage the valve can be actuated with the help of a spindle nut.

The spindle nut may be actuated only in idle condition.

1. Mark initial position of the spindle nut (felt-tip pencil).
2. Disengage locking pin R from guiding groove F and turn 90°.
3. Turn the valve to the desired position with the help of spindle nut H. Control cams of position limit/auxiliary position switches and potentiometer are not turned with it.

4. To reset for motor operation turn the spindle nut back to its initial position and engage locking pin R.

To avoid overrunning limit stop switches and potentiometer during manual operation, set the limit positions of the actuator mechanically (for position switch-off).

L'écrou à tige filetée arrêtable

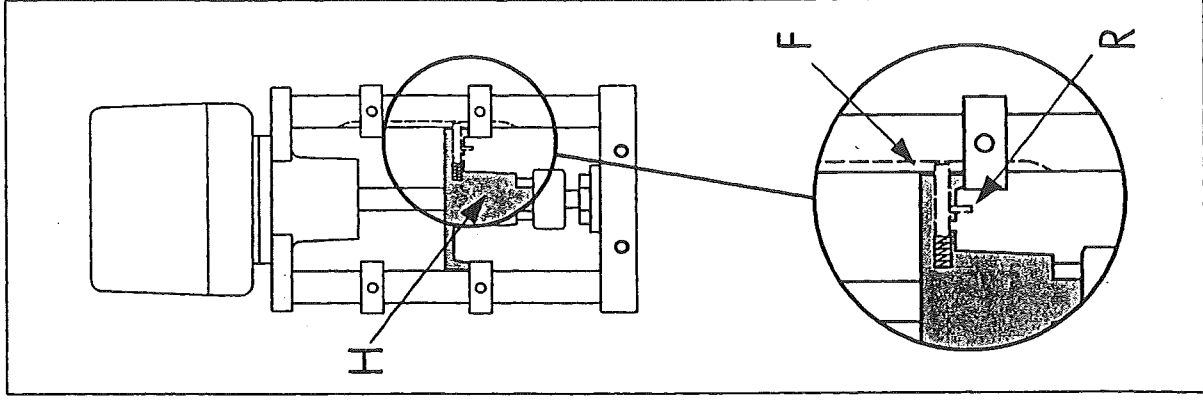
En cas de panne d'électricité, la soupape peut être commandée par un écrou à tige filetée.

L'écrou à tige filetée ne doit être actionné qu'en cas d'absence de tension.

1. Marquez (au crayon-feutre) la position de départ de l'écrou à tige filetée.
2. Débrayez le boulon d'arrêt R de la rainure de guidage F et tournez le à 90°.
3. Tournez la soupape à l'aide de l'écrou à tige filetée H sur la position souhaitée. Les cames de contacteur des interrupteurs de fin de course/interrupteurs auxiliaires ne tournent pas en même temps.

4. Pour revenir sur la commande par moteur, tournez l'écrou à tige sur la position initiale et embrayez le boulon d'arrêt R.

Pour éviter un dépassement des interrupteurs de fin de course en fonctionnement manuel, limitez mécaniquement les fins de course de la soupape.



Wartung

Baureihe V

Antriebsmotor und Getriebestufen

Dauerschmierung

Schubstufe

Je nach Schaltheufigkeit und Umgebungseinflüssen – spätestens alle 6 Monate – Gewindespindel gründlich reinigen und nachfetten (bei Verschmutzung entsprechend früher).

Trockenlauf vermeiden!

Trapezgewinde über den gesamten Stellbereich ausreichend mit Fett einstreichen.

Werkseitig wird das Spezial-Lagerfett OKS 416 (OKS Spezialschmierstoffe GmbH, 80993 München) eingesetzt.

Temperaturbereich des Fettes -40°C bis +100°C.

Ein Fett gleicher Güte kann auch verwendet werden.

Normale Wälzlagerfette sind für diese Gewindespindel nicht geeignet.

Maintenance

Series V

Motor and gear unit of actuator

Permanent lubrication

Linear-motion unit

Thoroughly clean and re-lubricate the threaded spindle according to switching frequency and surrounding conditions – at least every 6 months – (in case of dirt accumulation, clean earlier).

Avoid dry running!

Apply sufficient grease to the entire adjusting area of the trapezoid thread.

Factory uses special bearing grease type OKS 416 (OKS Spezialschmierstoffe GmbH, 80993 München).

Temperature range of the grease -40°C to +100°C.

Any grease of identical properties may be used.

Standard types of roller bearing grease are not suitable for this threaded spindle.

Entretien

Série V

Actionneur et vitesses

Graissage permanent

Niveaux d'entraînement

En fonction du nombre des opérations et des conditions environnantes, la tige filetée doit être scrupuleusement nettoyée et graissée au plus tard tous les six mois (en cas d'encrassement, à des intervalles plus courts).

Évitez la marche à sec!

Appliquez suffisamment de graisse sur toute la plage de réglage du filet trapézoïdal.

En usine, la graisse de coussinet spéciale OKS 416 (OKS Spezialschmierstoffe GmbH, 80993 München) est utilisée.

Température supportée par la graisse de -40°C à 100°C.

Une graisse de qualité similaire peut également être utilisée.

Des graisses pour roulements d'usage courant ne conviennent pas à ce type de tige filetée.

Technische Daten

Gehäuse

Schutzarten nach DIN EN 60 529

IP54 (Standard)

IP65 (Option), IP66 (Option), IP67 (Option)

Motor

230V $\pm 10\%$, 50/60Hz $\pm 5\%$, 100% ED (Standard)

Sonderspannung /-frequenz siehe Typenschild (Option)

Isolationsklasse B nach VDE 0530

Schalter

Umschalter (Öffner/Schließer)

Schaltleistung max. 10(3)A, 250V AC

Umgebungstemperatur

-15°C bis +60°C (Standard)

Bis -40°C mit Heizung (Option)

Bis +80°C (Option)

Einbau-lage

Beliebig

CE Dieses Gerät entspricht den folgenden EG-Richtlinien:
73/23 EWG. »Elektrische Betriebsmittel zur Verwendung innerhalb bestimmter Spannungsgrenzen.«
89/336 EWG. »Elektromagnetische Verträglichkeit«.

Technical Data

Housing

Types of protection according to DIN EN 60 529

IP54 (Standard)

IP65 (Option), IP66 (Option), IP67 (Option)

Motor

230V $\pm 10\%$, 50/60Hz $\pm 5\%$, 100% ED (Standard)

Special voltage /frequency: see type plate (Option)

Insulation class B according to VDE 0530

Switches

Change-over switch (break/make contact)

Breaking capacity max. 10(3)A, 250V AC

Ambient temperature

-15°C to +60°C (Standard)

Up to -40°C with heater (Option)

Up to +80°C (Option)

Fitting position

Any

CE This appliance complies with the following EG directives: 73/23 EEC. »Electrical Equipment for Use Within a Certain Voltage Range.«
89/336 EEC. »Electromagnetic Compatibility«.

Caractéristiques techniques

Capot

Classes de protection selon la norme DIN EN 60 529

IP54 (standard)

IP65 (en option), IP66 (en option), IP67 (en option)

Moteur

230V $\pm 10\%$, 50/60Hz $\pm 5\%$, 100% ED (standard)

Tension et/ou fréquence spéciale, cf. plaque signalétique (en option)

Classe d'isolement B selon la norme VDE 0530

Interrupteur

Commutateur (contact repos/contact travail)

Puissance de couplage 10(3)A, 250V AC max.

Température ambiante

-15°C bis +60°C (standard)

jusqu'à -40°C avec chauffage (en option)

jusqu'à +80°C (en option)

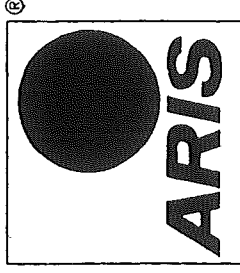
Position de montage

Quelconque

CE Cet appareil est conforme aux directives de la CE suivantes : CEE 73/23 »Matériel électrique à utiliser dans certaines limites de tension.«
CEE 89/336 »Compatibilité électromagnétique«.

ARIS Antriebe und Steuerungen GmbH

Löhestraße 18
53773 Hennef - Germany
Fon: +49 (0) 22 42/913 62-0
Fax: +49 (0) 22 42/913 62-99
aris@stellantriebe.de
www.stellantriebe.de



Auslandsvertretungen

Sales agencies

Représentations à l'étranger

ÖSTERREICH

BIBUS Austria GmbH
Eduard-Klinger-Straße 12
3423 St. Andrä-Wördern
Fon: +43/22 42/3 33 88
Fax: +43/22 42/3 33 88 10
office@bibus-austria.com
www.bibus-austria.com

FRANKREICH

E.G.A.I. - Aprotec
B.P. n° 6
77410 Claye-Souilly CEDEX
Fon: +33/1/60 26 10 25
Fax: +33/1/60 27 05 54
agaiaprotec@wanadoo.fr

NIEDERLANDE

FC Ubel & Ventil B. V.
P.O. Box 385
2740 AC Waddinxveen
Fon: +31/182/64 22 22
Fax: +31/182/64 22 33
info@fcx.nl
www.fcx.nl

TÜRKEI

NUR Elektrotechnik Limited Sirketi
Des Sanayi Sitesi, 113 Sokak
Ç 04 Blok, No. 3 Yukari Dudullu
Ümraniye - Istanbul
Fon: +90/216/420 22 18
Fax: +90/216/527 15 75
nurelektro@ixir.com

INDIEN

Peregrine Technologies Pvt. Ltd.
C/212 New Usha Nagar,
Village Road
Bhandup (W) Mumbai 400078
Fon: +91/22/560 39 24
Fax: +91/22/569 57 22
sales@peregrinetechnologies.org
www.peregrinetechnologies.org

Weitere Vertretungen

Other sales agencies
Autres représentations

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Spanien
Ungarn
Italien

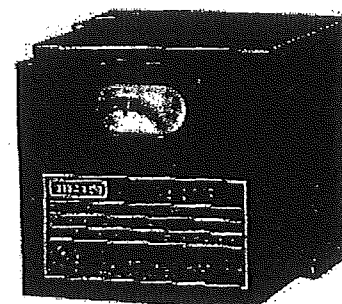
Burner Controls for continuously operating Burners

(with self-checking flame signal amplifier)

**LOK16...
LGK16...
Series ...A...**



ISO 9001



Supplementary data sheets 7712 and 7713

Burner controls for continuously operating multi-stage or modulating burners of medium to high capacity; with air pressure supervision for checked air damper control.

The gas burner controls are tested to EN298 and CE certified in compliance with the directives for gas-fired appliances and electromagnetic compatibility.

The oil burner controls are tested to EN230 and CE marked in compliance with the directives for electromagnetic compatibility.

Use

The burner controls LOK16... and LGK16... feature a self-checking flame supervision circuit. This circuit initiates the required safety actions not only in the case of premature or missing flame signals, but also in the case of any kind of failure on the flame detector, the detector cables or the flame signal amplifier that might simulate a flame signal **during burner operation**. These burner controls are therefore suited for all types of oil- or gas-fired combustion plant where the use of self-checking flame supervision systems is either mandatory or advisable:

- Burners in continuous operation
- Burners in intermittent operation that, in the case of great heat demand, might however operate continuously for more than 24 hours, e.g. in plants using boiler sequencing
- Burners that need to comply with the German specifications TRD411 and TRD412 for steam boilers
- Burners in plants where, for specific safety requirements, supervision of the burner by a self-checking flame supervision system seems advisable
- The control program and the connection circuitry of these burner controls are **identical** to those of the LAL2... and LFL1... respectively (with the exception of LFL1.148) so that existing plants can also be equipped with self-checking burner controls
 - provided very good detector current values were measured in the plant supervised so far by LFL1..., and
 - provided the following flame detectors are either already installed or can subsequently be fitted:

LOK16...

- Selenium photocell detector RAR...

LGK16...

- UV detector QRA5..., designed specifically for use with LGK16...
- Ionization current detector electrode
- UV detector QRA5... together with ionization current detector electrode, e.g. for burners with pilot burner

Mechanical design

The burner controls are of plug-in design. Housing and plug-in baseplate are made of shock- and heat-resistant black plastic.

The lockout indicator, fault signal lamp and reset button are located in the unit's viewing window. The burner control has an exchangeable unit fuse and a spare fuse.

Operation

Prerequisites for burner start-up

- Burner control is reset and in the start position (terminals 11 and 12 under voltage)
- Air damper is closed. Limit switch «z» for the CLOSED position must feed voltage from terminal 11 to terminal 8
- All control contacts between terminals 12 and 5 (limit thermostat, control thermostat, etc.) must be closed

A

Start

When «R» closes, the burner control's sequence switch starts running. At the same time, the fan motor connected to terminal 6 (only pre-purging) receives voltage and, on completion of «t7», the fan motor or flue gas fan at terminal 7 (pre- and post-purging) also receives voltage. On completion of «t16», the control command to open the air damper is given via terminal 9. During the running time of the motor, the sequence switch does not operate, as terminal 8, via which the motor of the sequence switch first receives voltage, is not under voltage during that period of time. The sequence switch starts again and programs only after the air damper is fully open and limit switch «a» has changed over to feed voltage to terminal 8.

t1

Pre-purge time with air damper fully open (nominal amount of combustion air).

Shortly after the start of the pre-purge time, the air pressure monitor «LP» must change over, thus interrupting the current path between terminal 4 and terminal 13. Otherwise, the burner control would go to lockout (start of air pressure check). At the same time, terminal 14 must be under voltage since this current path is used to power the ignition transformer and the fuel valves.

t3'

With the LOK16..., an ignition transformer connected to terminal 15 is therefore switched on at this moment in time (long pre-ignition). If there is no «LP», the ignition transformer receives voltage already with the start command.

On completion of the pre-purge time, the burner control via terminal 10 runs the air damper into the low-flame position, which is determined by the changeover point of auxiliary switch «m». During the positioning time, the sequence switch stops again until terminal 8 receives voltage from «m».

t5

Interval. On completion of «t5», terminal 20 receives voltage. At the same time, control outputs 9 to 11 and input 8 are galvanically separated from the unit's control section, so that the latter is protected against reverse voltages from the load control circuit.

The start-up sequence of the burner control ends with the release of load controller «LR» at terminal 20. The sequence switch switches itself automatically off, depending on the time variant used, either immediately or after some so-called «idle steps», that is, without changing the contact positions.

**Expanding flame
burners with
LOK16... or LGK16...**

t3 Short pre-ignition time; then fuel release via terminal 18.

t2 Safety time (part load)

On completion of the safety time latest, a flame signal must be present at the input of the flame signal amplifier, or else the burner control initiates lockout.

t3n Post-ignition time (only with the LOK16..., provided the ignition transformer is connected to terminal 15).

t4 Interval until the fuel valve at terminal 19 is enabled.

**Interrupted pilot
burners with LGK16...
(burners with pilot
burner)**

t3 Short pre-ignition time; then release of fuel for the pilot burner via terminal 17.

t3'

t2 1st safety time (pilot load)

t2'

No later than at the end of the safety time, a flame signal must be present at the input of the flame signal amplifier, or else the burner control initiates lockout.

t4 Interval until the fuel valve at terminal 19 is enabled (start load of the main burner).

t4'

Times «t2'», «t3'» and «t4'» are only programmed by burner controls LGK16.335 and LGK16.635.

t9 2nd safety time. On completion of the safety time, the main burner must have been ignited by the pilot burner, since the pilot gas valve is closed on completion of «t9».

B Operating position of the burner

B-C Burner operation (generation of heat)

During burner operation, the load controller drives the air damper to the nominal load or low-flame position, depending on heat demand. Here, the nominal load is enabled by auxiliary switch «v» in the air damper actuator.

C Controlled shut-down by «R»

In the case of a controlled shut-down, the fuel valves are closed immediately and, at the same time, the sequence switch starts again and programs the

t6 Post-purge time (post-purging with fan M2 connected to terminal 7).

Shortly after the start of the post-purge time, voltage at terminal 10 is reinstated, so that the air damper is driven into the MIN position.

The full closing of the air damper starts only shortly before the completion of the post-purge time, initiated by the control signal on terminal 11, which also remains under voltage during the following burner off period.

D-A End of control program (= start position)

When, on completion of «t6», the sequence switch has reset the control contacts into their start positions, thereby switching itself off, the detector and flame simulation test is started again. However, during the burner off period, lockout can occur only if the faulty flame signal lasts a few seconds. Hence, short ignition pulses of the UV detector caused by cosmic radiation do not initiate lockout.

Warning notes

- To protect the burner control from electric overload, both ignition and ionization electrode must be located such that arcing over of the ignition spark to the ionization electrode cannot occur.
- In the geographical areas where DIN standards are in use, the installation must be in compliance with VDE requirements, particularly with the standards DIN/VDE0100 and 0722!
- Condensation and ingress of humidity must be avoided!
- Ignition cables must always be laid separately, maintaining the greatest possible distance to the unit and other cables.
- Observe the notes on the laying of detector cables (refer to «Technical data»!)
- The electrical wiring must be made in compliance with national and local standards and regulations!
- LOK16... and LGK16... are safety devices. It is therefore not permitted to open, interfere with or modify the units!
- Check wiring carefully before putting the unit into operation!
- The unit must be completely isolated from the mains before performing any work in the electronic connection area of the LOK16... or LGK16...!
- Check all safety functions when putting the unit into operation or after changing a fuse!
- Ensure protection against electric shock hazard on the unit and at all electrical connections by appropriate mounting!
- Electromagnetic emissions must be checked from an application point of view!
- The UV detector current measuring unit KF8832 is not suited for continuous operation!
- It is not permitted to connect two UV detectors QRA5... in parallel!
- When using the QRA5..., earthing of terminal 22 is mandatory!
- Supervision with detector electrode FE and UV detector QRA5... is possible, but for safety reasons, both flame detectors may not be active at the same time, with the exception of the 2nd safety time «t9». At the end of the 2nd safety time, one of the detected flames must have extinguished, e.g. by shutting down the pilot valve via terminal 17!
- All regulations and standards applicable to the particular application must be observed!
- Installation and commissioning work must always be carried out by qualified personnel!

Functions

Principle of self-checking

In contrast to conventional amplifiers, the signal delivered by the flame detector is handled dynamically and not statically. To achieve this, it is converted into a sequence of control pulses and is then delivered to the flame relay circuit. The latter is designed such that the flame relay can be energized only by a flame signal in the described form. If the pulses change due to a faulty detector or faulty detector cables, the relay is de-energized and the burner control initiates the required safety actions.

With UV supervision, it must also be ensured that self-ignition of the UV tube (e.g. due to ageing) does not simulate a flame signal. For this reason, the incident radiation at the UV cell is periodically interrupted by a shutter.

In addition to the self-checking facility, the flame signal circuit is subjected to a functional test during the pre-purge time. If it does not operate correctly, the start-up sequence is aborted or the burner goes to lockout.

Furthermore, if mains voltage drops to a level where the safe operation of the burner is no longer ensured, burner operation is automatically interrupted. When the mains voltage returns to the normal level, the burner control repeats the start-up sequence. However, if the detector signals are only slightly above the minimum levels, such mains voltage fluctuations may also cause burner lockout.

Technical data LOK16... and LGK16...

Mains voltage	AC 220 V -15 %...AC 240 V +10 % or AC 100 V -15 %...AC 110 V +10 %	Mounting position	optional
Mains frequency	50 Hz -6 %...60 Hz +6 %	Degree of protection	IP40
Power consumption	3.5 VA	Weight	
Pre-fuse (external)	16 A max., slow	- Burner control	approx. 1000 g
Unit fuse	T6,3H250V, acc. to IEC 127	- Baseplate	approx. 165 g
Perm. input current at terminal 1	5 A, to VDE 0660 AC3	Identification code to EN298	F B / M L L X K
Perm. current load on control terminals	4 A, to VDE 0660 AC3		

Required switching capacity of switching devices

- between terminals 4 and 5, 4 and 12 1 A,
AC 250 V
- between terminals 4 and 14 depending on load
of terminals 15, 16,
18, 19 (LGK: 16...19), min. 1A, AC 250 V

Environmental conditions:

- Transport	IEC721-3-2
Climatic conditions	class 2K2
Temperature	-50...+60 °C
Humidity	< 95 % r.h.
Mechanical conditions	class 2M2
- Operation	IEC721-3-3
Climatic conditions	class 3K5
Temperature	-20...+60 °C
Humidity	< 95 % r.h.

CE conformance

According to the directives of the European Community	
Electromagnetic compatibility EMC	89/336 EEC incl. 92/31 EEC
Gas appliance directive	90/396 EEC
Emissions	EN 50081-1
Immunity	EN 50082-2

Condensation, formation of ice and ingress of water are not permitted.

Flame supervision

	RAR... (LOK16...)	QRA5x.C... (LGK16...)	QRA5x.D... (LGK16...)	IONIS: (LGK16...)
Operating voltage (terminal 23 or 24)	< DC 1 V ±10 %	280 V ¹⁾ ±10 %	280 V ¹⁾ ±10 %	245 V ¹⁾
Min. detector current required	DC 6 µA	DC 35 µA ²⁾	DC 120 µA ²⁾	DC 12 µA
Max. possible detector current	DC 25 µA	DC 70 µA ²⁾	DC 270 µA ²⁾	DC 100 µA
Short-circuit current	-	-	-	approx. AC 300 µA
Max. length of detector cable (laid separately)	100 m	³⁾	³⁾	60 m ⁴⁾

¹⁾ AC voltage, measured with no detector current at AC 230 V mains voltage.

Internal resistance of measuring instrument 10 MΩ. The shutter motor of the UV detector QRA5... is powered by mains voltage

²⁾ Refer to specifications given on the KF8832 for measuring the detector current

³⁾ • Detector cable laid in a minimum distance of 5 cm from other mains carrying cables:

- As a multiple cable
- With five single wires

50 m max.
70 m max.

- With shielded three-wire control cable connected to terminals 3, 4 and 5 of the UV detector QRA5... and normal mains cable connected to terminals 1 and 2:

15 m max.

- With two shielded single-wire coaxial cables (≤ 45 pF/m, e.g. RG62) connected to terminals 3 and 4 of the UV detector QRA5... and normal mains cable connected to terminals 1, 2 and 5:

60 m max.

- If possible, the shielding should be earthed at both ends of the cable!

⁴⁾ Longer cable distances are possible when connecting low capacitance detector cables to terminal 24 of the burner control (especially against earthed wires!)

Type summary

Switching times are given in seconds, in the order of the start-up sequence, valid for a frequency of 50 Hz. At 60 Hz frequency, the times are reduced by about 20 %.

The type references are valid for burner controls operating at AC 230 V, 50...60 Hz. For burner controls operating at AC 100...110 V, 50...60 Hz, the last two digits of the type reference read ...17 in place of ...27.

LOK16...

For flame supervision with a selenium photocell detector RAR7... or RAR8... for oil burners

Preferred use: Flash- steam generators		Universal application	Medium or heavy oil burners
LOK16.140A27		LOK16.250A27*	LOK16.650A27
t1	10	22,5	67,5
t2	4	5	5
t2'	—	—	—
t3	2	2.5	2.5
t3'	From start command 2)		
t3n	10	15	15
t4	8	7.5	7.5
t4'	—	—	—
t5	4	7.5	7.5
t6	10	15	15
t7	2	2.5	2.5
t8	30	47.5	92.5
t9	—	—	—
t10	6	10	10
t11	Optional		
t12	Optional		
t16	4	5	5
t20	32	35	12.5
max.	1	1	1

LGK16...

For flame supervision with UV detector QRA5... or ionization current detector electrode

Preferred use:		Flash-steam generat.	Flash-steam generators	D (also WLE), F	D, A	GB	F I	B NL
LGK16...		.122 A27	.133 A27	.322 A27*	.333 A27*	.335 A27*	.622 A27	.635 A27
t1	10	9	36	31.5	37.5	66	67.5	
t2	2	3	2	3	2.5	2	2.5	
t2'	—	—	—	—	5	—	5	
t3	4	3	4	6	5	4	5	
t3'	—	—	—	—	2.5	—	2.5	
t3n	—	—	—	—	—	—	—	
t4	6	6	10	12	12.5	10	12.5	
t4'	—	—	—	—	15	—	15	
t5	4	3	10	12	12.5	10	12.5	
t6	10	14.5	12	18	15	12	15	
t7	2	3	2	3	2.5	2	2.5	
t8	30	29	66	72	75	96	105	
t9	2	3	2	3	5	2	5	
t10	6	6	8	12	10	8	10	
t11	Optional							
t12	Optional							
t16	4	3	4	6	5	4	5	
t20	32	60	—	27	22.5	—	—	
max.	1	1	1	1	1	1	1	

Ordering

For use with oil burners

Burner control without baseplate, for AC 230 V*

Control program and connection diagram like

Preferred use for/in

LOK16.140A27
LOK16.250A27*
LOK16.650A27

LAL2.14
LAL2.25
LAL2.65

Flash-steam generators
Universal applications
Heavy oil burners

Baseplate

AGM16...

Coding of the baseplate allows only the use of LOK16... types

Flame detectors

RAR7... or RAR8...

Selenium photocell detector (refer to data sheet 7713)

For use with gas, oil and dual-fuel burners (depending on type of flame detector)

LGK16.122A27*
LGK16.133A27
LGK16.322A27*
LGK16.333A27*
LGK16.335A27*
LGK16.622A27*
LGK16.635A27*

LFL1.122
LFL1.133
LFL1.322
LFL1.333
LFL1.335
LFL1.622
LFL1.635

Flash-steam generators
Flash-steam generators
D (WLE), F
D, A
GB
I, F
B, NL

Baseplate

AGM17...

Coding of the baseplate allows only the use of LGK16... types

Detector electrode
Flame detector

Delivered by the burner manufacturer
Self-checking UV detector (refer to data sheet 7712)

Accessories for UV detector See data sheet 7712

* Also available for AC 100...110 V; in that case, the last two digits of the type reference read ...17 in place of ...27

Fitting notes

Conversion of existing plant

When converting plants to LOK16... or LGK16..., the existing LAL or LFL baseplate must be secured by a cylinder-shaped grooved pin, thus ensuring that only one of the LOK16... or LGK16... types can be fitted.

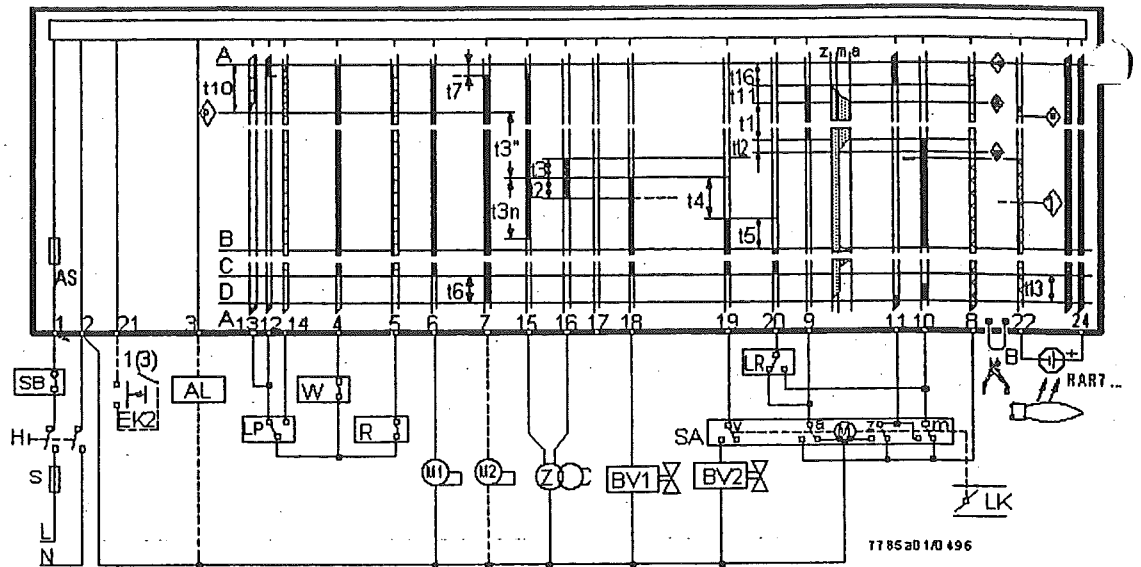
Ordering no. for grooved pin: 4 166 8024 0

Location of grooved pin: between terminals 10/11 of the LAL baseplate and between terminals 4/5 of the LFL baseplate.

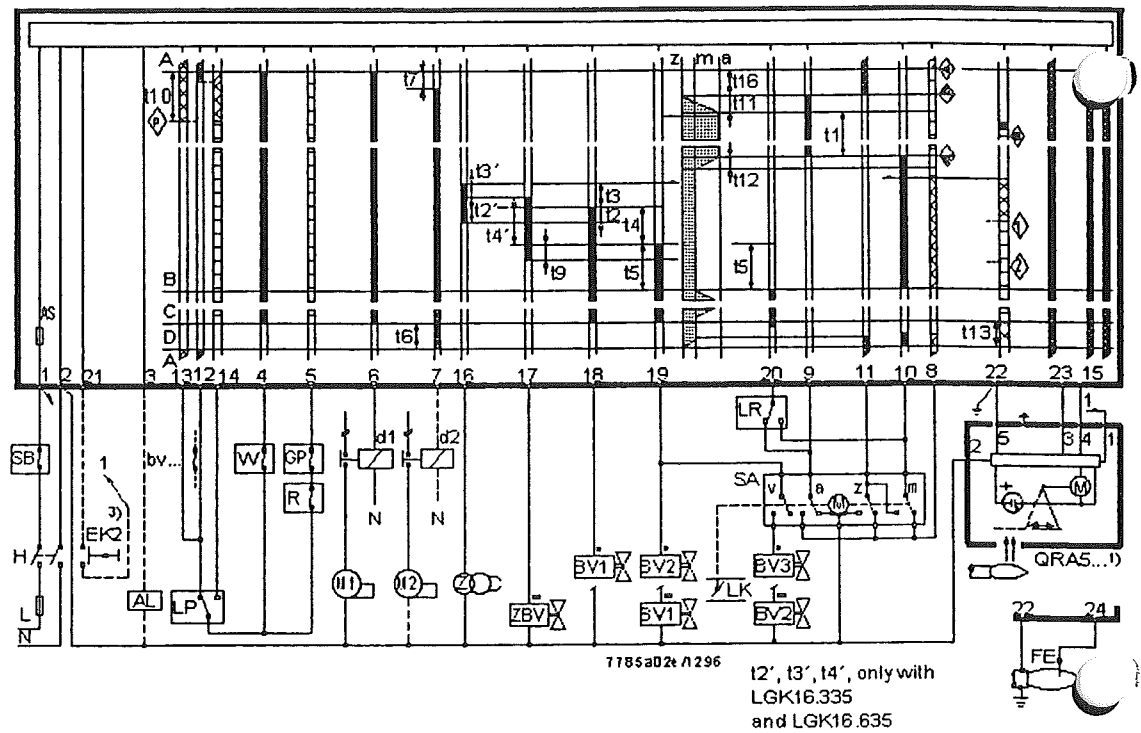
Repetition in the event of loss of flame

By removing wire link B on the bottom side of the unit, the LOK16... can be switched to start repetition in the event of loss of flame during operation. For this purpose, the link must be completely cut off, but it must be made certain that this is in compliance with the local standards and regulations!

Use of terminals



L GK16...



Control signals delivered by the burner control



Permissible input signals

XXXXXXXXXXXXXXXXXXXX

7785d02D\0196

Required input signals: if these signals are not present at the points in time marked by symbols or during the shaded periods of time, the burner control interrupts the start-up sequence or initiates lockout

- Valid for expanding flame burners
- Valid for burners with a pilot burner which is shut down after the main burner has ignited

- 1) When used with the QRA5..., earthing of terminal 22 is mandatory

Legend (for the entire data sheet)

a	Changeover limit switch for air damper's OPEN position	LR	Load controller
AL	Remote lockout warning device (alarm)	m	Auxiliary changeover switch for the air damper's MIN position
AR	Main relay (load relay) with «ar» contacts	M...	Fan or burner motor
AS	Unit fuse	QRA...	UV detector
B	Wire link (on the burner control's baseplate)	R	Control thermostat or pressurestat
BR	Lockout relay with «br» contacts	RAR...	Selenium photocell detector
BV...	Fuel valve	SA	Air damper actuator
bv...	Auxiliary contact in the valve actuator for the fully closed position check	SB	Safety limit thermostat
d...	Contact or relay	SM	Synchronous motor of sequence switch
EK...	Lockout reset button	v	In the air damper actuator: auxiliary changeover switch for the release of fuel in function of the air damper position
FE	Ionization current detector electrode	V	Flame signal amplifier
FR	Flame relay with «fr» contacts	W	Limit thermostat or pressure monitor
FS	Flame signal	z	In the air damper actuator: limit switch for the air damper's CLOSED position
GP	Gas pressure monitor	Z	Ignition transformer
H	Mains isolator	ZBV	Pilot valve
L	Lockout warning lamp		
LK	Air damper		
LP	Air pressure monitor		
A	Start-up	C	Controlled shut-down
B	Operating position	D	End of control program

Lockout indication positions when there is no input signal (refer to «Control program in the event of faults»):

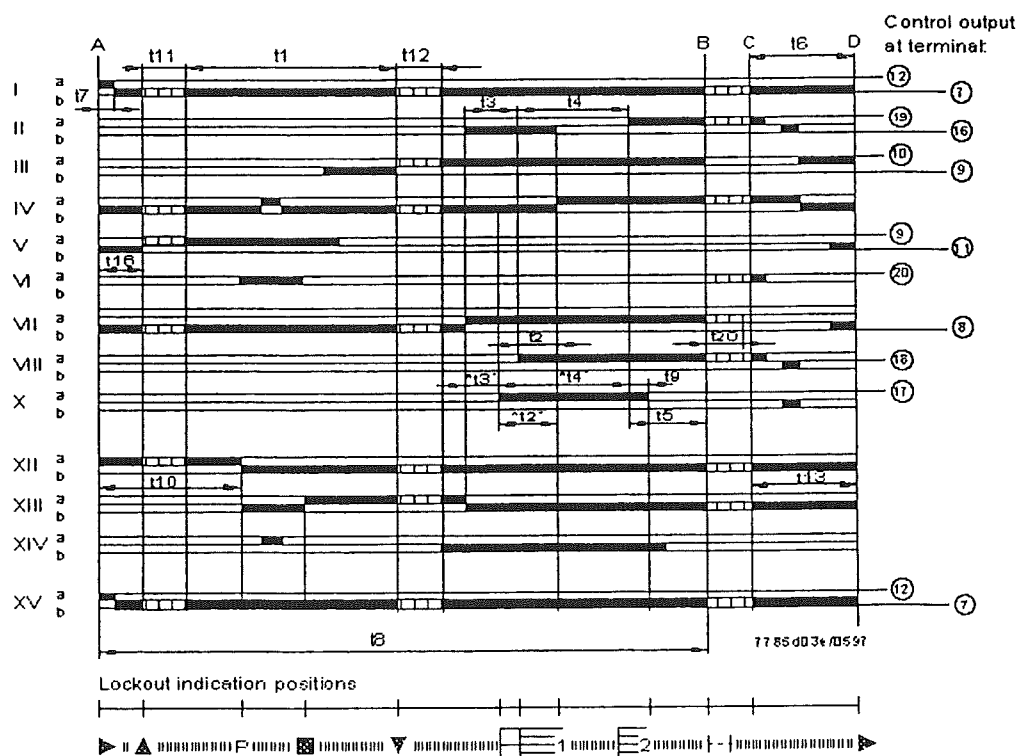
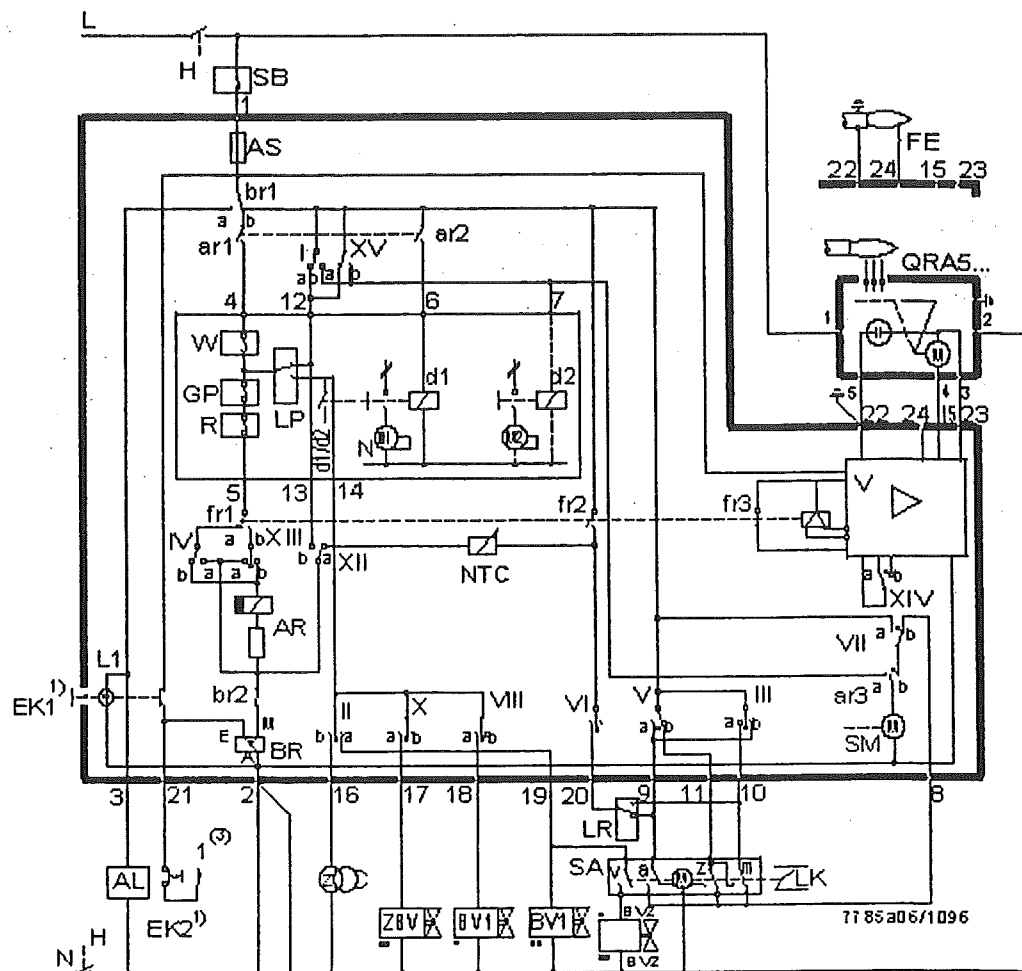
- ◀ No start
- ▲ Abortion of start-up sequence
- ▼ Abortion of start-up sequence
- Lockout (fault in the flame supervision circuit)
- 1 Lockout (no flame)
- 2 Lockout (no flame)
- P Lockout (no air pressure)

Legend (for the times)

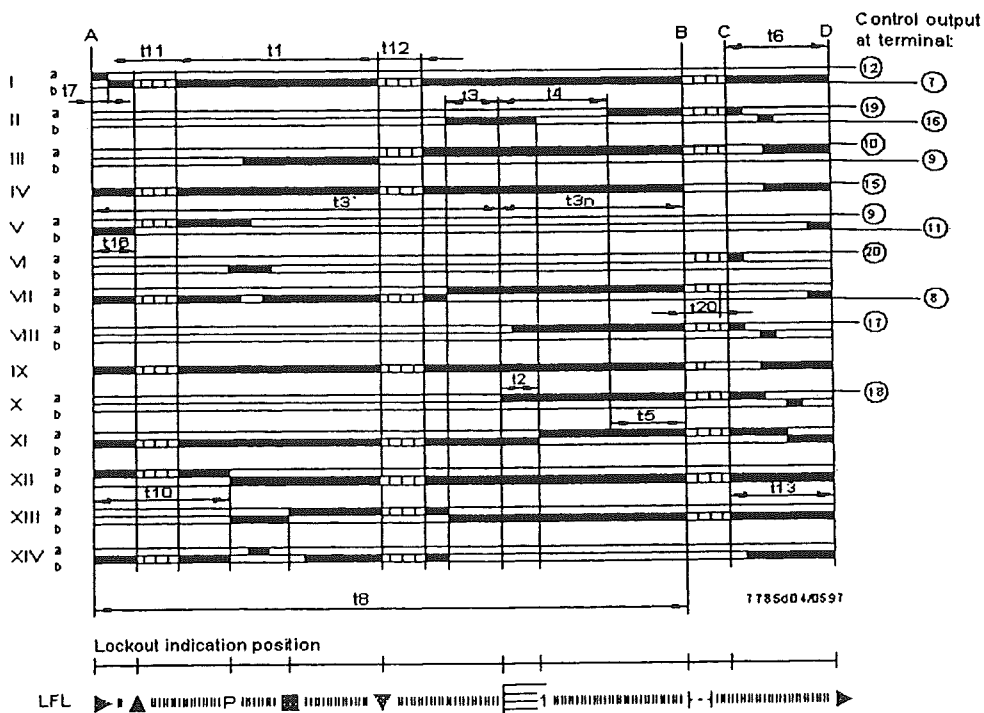
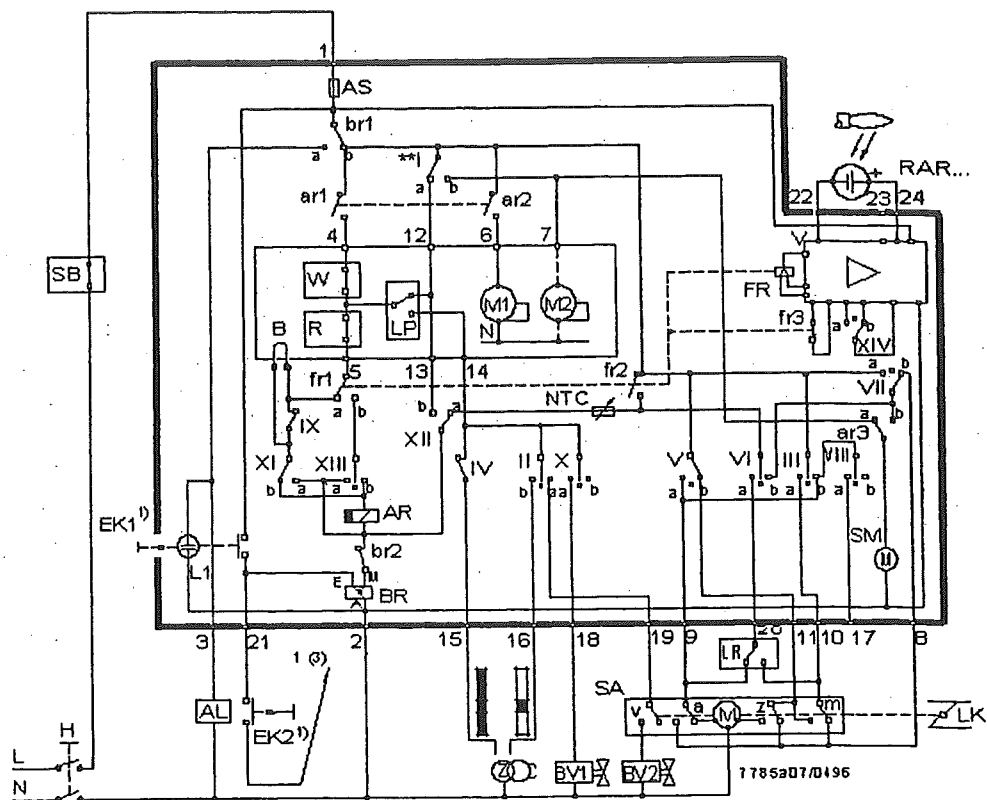
t1	Pre-purge time with air damper fully open
t2	Safety time or 1st safety time with burners using a pilot burner
t2'	Safety time or 1st safety time with burners using a pilot burner
t3	Pre-ignition time
t3'	Pre-ignition time
t3n	Post-ignition time (ignition transformer connected to terminal 15)
t4	Interval from the start of «t2» or «t2'» to the release of the valve connected to terminal 19
t4'	Interval from the start of «t2» or «t2'» to the release of the valve connected to terminal 19
t5	Interval from the end of «t4» or «t4'» to the release of the load controller or valve at terminal 20
t6	Post-purge time (identical with the permissible after-burn time «t13»)
t7	Switch-on delay for fan motor M2
t8	Duration of start-up sequence excluding «t11» and «t12»
t9	2nd safety time with burners using a pilot burner
t10	Interval from the start to the beginning of the air pressure check
t11	Running time of air damper into OPEN position
t12	Running time of air damper into low-flame position
t13	Permissible after-burn time
t16	Interval from the start to the OPEN command for the air damper
t20	Interval to the self-shutdown of the sequence switch
max.	Safety time in the event of loss of flame during operation

Only burner controls LGK16.335... and LGK16.635... program the times «t2'», «t3'» and «t4'».

LGK16...



- 10/17



Control program under fault conditions

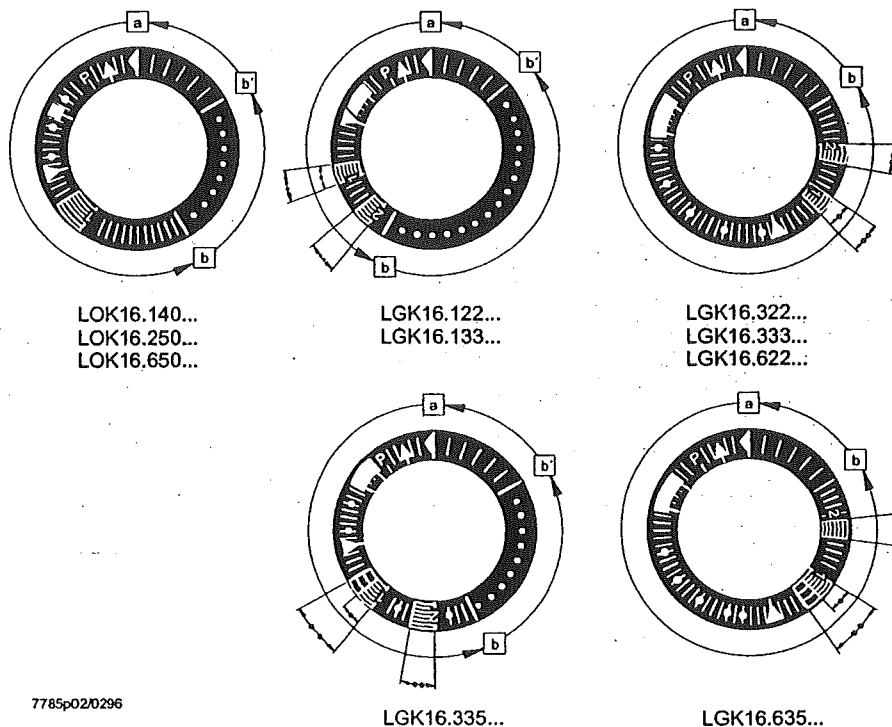
In case of any disturbance, the supply of fuel is immediately interrupted. At the same time, the sequence switch stops and thus the lockout indicator, too. The symbol appearing above the reading mark indicates the kind of fault:

- ◀ **No start**, because one of the contacts is not closed (also refer to «Prerequisites for burner start-up») or **lockout during or after completion of the control program** due to extraneous light (e.g. flame not extinguished, leaking fuel valves, faulty flame supervision circuit, or similar).
- ▲ **Abortion of start-up sequence**, because limit switch «a» has not fed the OPEN signal to terminal 8. Terminals 6, 7 and 14 and, in case LOK16... is used, terminal 15, also remain under voltage until the fault is corrected.
- P **Lockout**, because the air pressure signal has not been received at the start of the air pressure check.
Any air pressure failure after this point in time also causes burner lockout!
- **Lockout due to a fault in the flame supervision circuit.**
- ▼ **Abortion of start-up sequence**, because auxiliary switch «m» has not delivered the positioning signal for the low-flame position to terminal 8. Terminals 6, 7 and 14 and, in case LOK16... is used, terminal 15, also remain under voltage until the fault is corrected.
- 1 **Lockout**, because no flame signal has been received on completion of the (1st) safety time.
- 2 **Only with the LGK16...:**
Lockout, because no flame signal has been received on completion of the 2nd safety time (flame signal of the main flame with interrupted pilot burners).
- | **Lockout *)**, because the flame signal has been lost during burner operation or air pressure failure has occurred.

*) LOK16...

If wire link «B» has been cut off and the flame is lost during burner operation, the burner control programs a repetition of the start-up sequence with the full program.

Lockout indication



a-b Start-up sequence

b-b' With some time variants: «idle steps» of the sequence switch up to the self-shutdown after burner start-up
(b' = operating position of sequence switch)

b(b')-a Post-purge sequence after the controlled shut-down. In start position «a», the sequence switch switches itself automatically off or immediately initiates another burner start-up (e.g. after a fault has been corrected)

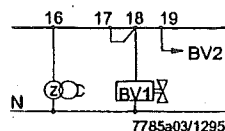
- Duration of safety time with expanding flame burners
- Duration of safety times with interrupted pilot burners

When lockout has occurred, the burner control can immediately be reset. After resetting, and also after correction of a fault which resulted in a shut-down, or after a mains failure, the sequence switch always runs into its start position, whereby **only** terminals 7, 9, 10 and 11 receive voltage in accordance with the control program. It is only then that the burner control programs a restart of the burner.

Note: do not press the reset button for more than 10 seconds.

Connection examples

LGK16...

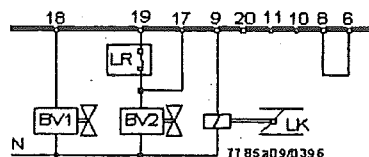


Doubling of safety time with expanding flame burners

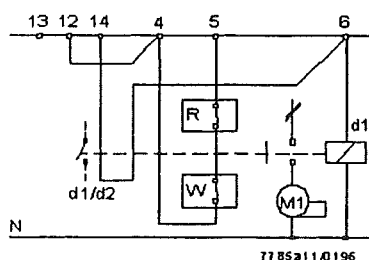
when using burner control LGK16.335 or LGK16.635.

By connecting terminals 17 and 18, the safety time is doubled and the pre-ignition time is reduced by 50 %. **Before using this circuit, it must be ensured that the longer safety time is in compliance with national standards and regulations!**

LOK16...



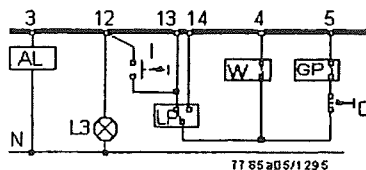
Control of the air damper actuator during operation by feeding control signals to terminal 17



Wiring required for operation without air pressure supervision

If an auxiliary contact of the fan contactor is included in the circuit as shown in the diagram, ignition and fuel release are possible only when the contact is closed.

LOK16.../LGK16...

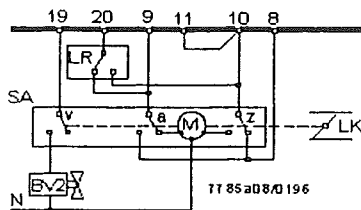


Semi-automatic start-up

The burner is switched on manually by pressing button «I». Then, the burner control programs the start-up sequence and flame supervision.

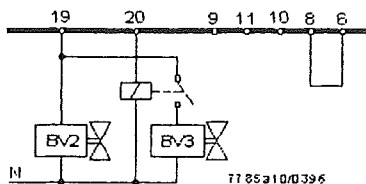
The burner is switched off manually by pressing button «0», or automatically by the limit thermostat or pressure monitor «W», or the gas pressure monitor «GP». «L3» indicates when the burner control is ready to be started; it extinguishes shortly after the burner is switched on.

For the other connections, refer to the connection diagrams.



Connection of air damper actuators without changeover limit switch for the CLOSED position

«Z» is set to low-flame



Control of a fuel valve by terminal 20 in the case of burners without air damper or with an air damper not controlled by the burner control

The relay is not required if the valve connected to terminal 20 is **hydraulically series-connected** to a valve controlled by terminal 18 or 19. If no air damper actuator is used, terminal 8 must be connected to terminal 6.

Measuring the detector current

LOK16.../RAR...

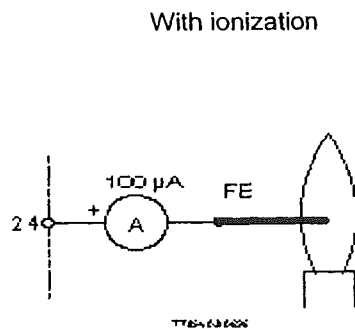
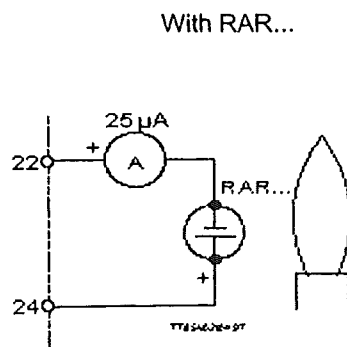
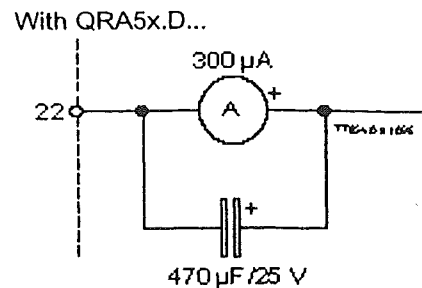
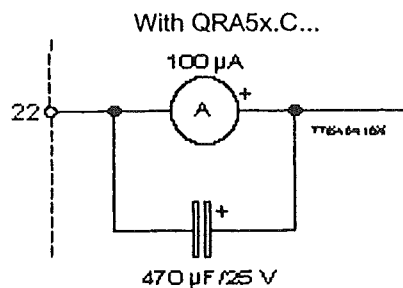
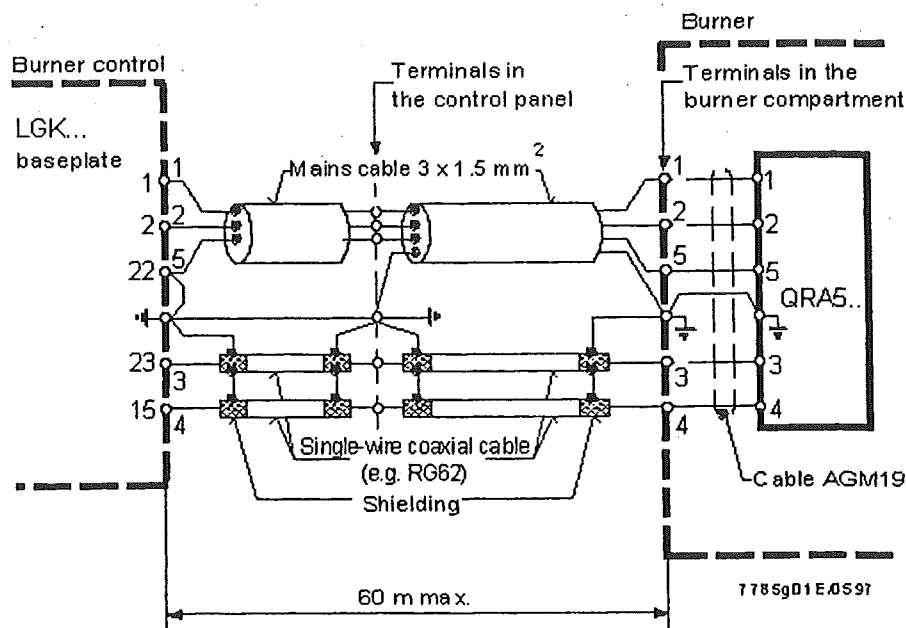
The measuring instrument must be connected between the detector and terminal 22 (+pole to terminal 22).

LGK16.../QRA5...

Use the KF8832 measuring instrument (not suited for continuous operation!).
There is **no** self-checking while measurements are made.
The KF8832 is not required when using the QRA5x.D....

LGK16.../FE

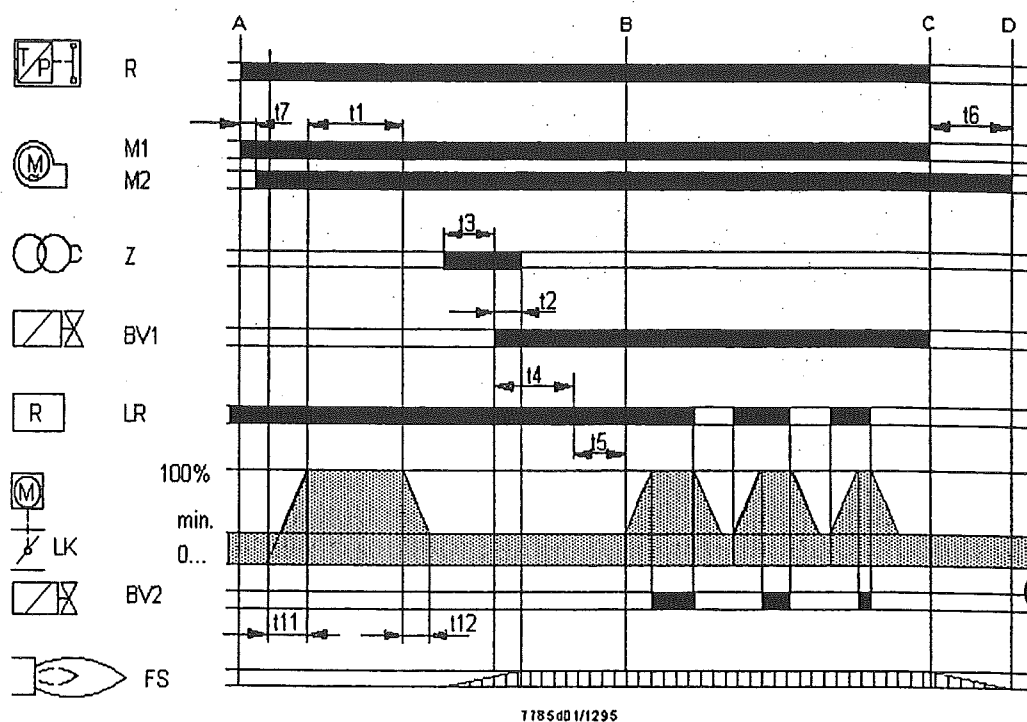
The measuring instrument must be connected between terminal 24 and the detector electrode (+pole to terminal 24).



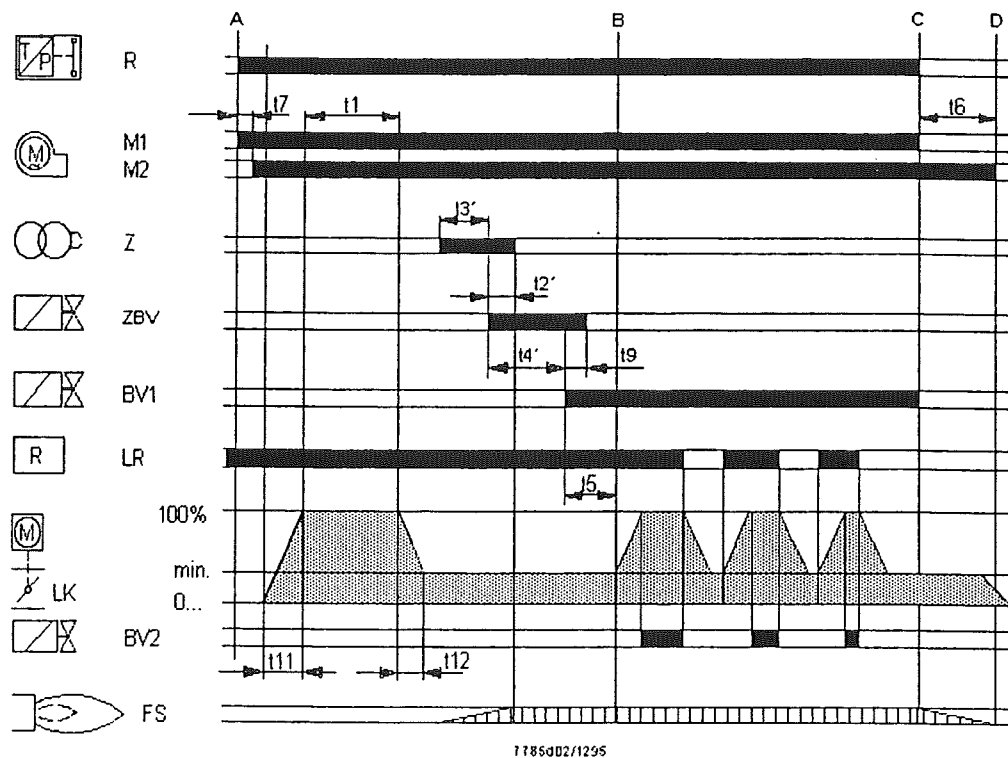
Sequence diagrams

Expanding flame burners (burners without a pilot burner), controlled and supervised by LOK16... or LGK16...

Air damper in low-flame position during burner off times (min.).



Interrupted pilot burners (burners with a pilot burner), controlled and supervised by LGK16.335 or LGK16.635, for example. The other types of burner controls of the LGK16... range program the times «t2», «t3», «t4» and «t9» for the pilot burner.





ISO 9001



VALVEGYR®

Gas Valve Proving System

LDU11...

Series ...A...

The LDU11... control unit is designed for gas valve proving in gas-fired combustion plant equipped with 2 safety shutoff valves.

During each startup cycle, the control unit automatically programs the valve proving test and, in the event of leakage, prevents the burner from starting up.

The LDU11... and this Data Sheet are intended for use by OEMs which integrate the gas valve proving system in their products.

The LDU11... control unit is designed for automatic gas valve proving (leakage test) based on the pressure proving principle.

It is for use in gas-fired combustion plant with or without vent pipe to atmosphere.

In the case of plants with no vent pipe where EN standards apply, the notes given in «Connection examples without vent pipe to atmosphere» must be observed.

Used in connection with one or two commercially available pressure switches, gas valve proving is automatically initiated with every burner startup, either

- prior to burner startup
- during the prepurge time if it lasts a minimum of 60 seconds
- immediately after the controlled shutdown, or
- on completion of the burner control's control program, e.g. at the end of the post-purge time

The valve proving test is based on the 2-stage pressure proving principle:

1. First test phase: the valve on the mains side is tested by evacuating the test space and by monitoring the atmospheric pressure in it.
2. Second test phase: the valve on the burner side is checked by pressurizing the test space and by monitoring the gas pressure.

If the pressure increases excessively during the first test phase «Test1», or decreases excessively during the second test phase «Test2», the control unit will inhibit burner startup and initiate lockout.

In that case, the lockout reset button will light up to indicate the fault. Remote indication of the fault is also possible. A program indicator, which stops whenever a fault occurs, indicates which of the valves is leaking.

The control unit can be reset either on the unit itself or via an electric remote resetting facility.

Warning notes



To avoid injury to persons, damage to property or the environment, the following warning notes should be observed.

Do not open, interfere with or modify the unit.

- Before performing any wiring changes in the connection area of the LDU11..., completely isolate the unit from the mains supply (all-polar disconnection)
- Ensure protection against electric shock hazard by providing adequate protection for the control unit's terminals
- Check wiring and all safety functions
- Fall or shock can adversely affect the safety functions. Do not put such units into operation, even if they do not exhibit any damage

Mounting notes

- Observe the relevant national safety regulations

Installation notes

- Installation, commissioning and maintenance work must be carried out by qualified staff
- Always run ignition cables separate from the unit and other cables while observing the greatest possible distances

Commissioning notes

Commissioning and maintenance work must be carried out by qualified staff.

Disposal notes



The unit contains electric and electronic components and may not be disposed of together with household garbage.
Local and currently valid legislation must be observed.

Mechanical design

The control unit is of plug-in design. Housing and plug-in base are made of impact-proof and heat-resistant plastic.

The housing contains:

- The synchronous motor of the sequence switch with its geartrain and step action sequence switch
- The camshaft with its 15 nonadjustable cams
- The program indicator at the head of the camshaft
- One main and one auxiliary relay
- The lockout relay which can be electrically reset from a remote location and which provides the «Lockout» and «Reset» functions
- The unit fuse and a spare fuse

All electrical components are interconnected via printed circuits.

The plug-in base carries the following terminals:

- 24 connection terminals
- 2 auxiliary terminals («31» and «32»)
- 3 earth terminals
- 3 neutral terminals, prewired to terminal 2 (neutral input)

The following knockout holes are available for cable entry:

- 14 knockout holes for cable entry by means of cable glands, 8 at the side and 6 at the bottom of the base
- 6 threaded knockout holes at the side for cable entry glands Pg11 or M16

Plug-in base and terminals are designed such that erroneous plugging in of a unit with the same housing, which is not suited for use with the relevant burner, is made impossible. Visible in the transparent lockout reset button, the program indicator informs service staff about the program sequence, the type of fault and the point in time the fault occurred, using easy-to-remember symbols.

Ordering

Control unit for gas valve proving, without plug-in base

- For AC 220...240 V, 50...60 Hz
- For AC 100...110 V, 60...60 Hz
- For AC 220...240 V, 50...60 Hz
- For AC 100...110 V, 50...60 Hz

LDU11.323A27
LDU11.323A17
LDU11.523A27
LDU11.523A17



Plug-in base

AGM11

Technical data

General unit data

Mains voltage

- | | |
|----------------|---------------------------------|
| - LDU11.323A27 | AC 220 V -15 %...AC 240 V +10 % |
| - LDU11.323A17 | AC 100 V -15 %...AC 110 V +10 % |
| - LDU11.523A27 | AC 220 V -15 %...AC 240 V +10 % |
| - LDU11.523A17 | AC 100 V -15 %...AC 110 V +10 % |

Mains frequency	50...60 Hz ±6 %
-----------------	-----------------

Power consumption

- | | |
|--------------------|--------|
| - During the test | 3.5 VA |
| - During operation | 2.5 VA |

Primary fuse (external)	T10 / 500V
-------------------------	------------

Unit fuse	T6.3H250V to IEC 127
-----------	----------------------

Perm. input current at terminal 1	5 A continuously to VDE 0660 AC3
-----------------------------------	----------------------------------

Perm. current rating of control terminals	4 A to VDE 0660 AC3
---	---------------------

Required switching capacity

of pressure switch «DW»	min. 1 A, AC 250 V
-------------------------	--------------------

Mounting orientation	optional
----------------------	----------

Degree of protection	IP 40
----------------------	-------

Weight

- | | |
|----------------|----------------|
| - LDU11... | approx. 1000 g |
| - Plug-in base | approx. 165 g |

Environmental conditions

Transport

IEC 721-3-2	
Climatic conditions	class 2K2
Mechanical conditions	class 2M2
Temperature range	-50...+60 °C
Humidity	< 95 % r.h.

Operation

IEC 721-3-3	
Climatic conditions	class 3K5
Mechanical conditions	class 3M2
Temperature range	-20...+60 °C
Humidity	< 95 % r.h.



Condensation, formation of ice and ingress of water are not permitted!

CE conformity

According to the directives of the European Union

Electromagnetic compatibility EMC	89 / 336 EEC incl. 92 / 31 EEC
-----------------------------------	--------------------------------

Directive for gas appliances	90 / 396 EEC
------------------------------	--------------

Function

During the first phase of the valve proving test, called «Test1», atmospheric pressure must exist in the length of pipe between the 2 valves to be tested.

In plants with a vent pipe to atmosphere, atmospheric pressure is available if the valve proving test is made prior to or during the prepurge time.

In plants without vent pipe, atmospheric pressure is made available as the control unit opens the valve on the burner side during the time «t4».

If the valve proving test is performed after burner operation, the valve on the burner side after the controlled shutdown can be kept open until «t4» has elapsed, thus reducing the pressure in the test space and making certain its gas content is burnt off in the combustion chamber during the postpurge time.

Prerequisite for this procedure is a suitable control program of the burner control as provided by Landis & Staefa burner controls LFE..., LFL..., LGK... or LEC...

The test space is closed off after it has been evacuated. During the first test phase «Test1», which then follows, the control unit checks with the pressure switch if the atmospheric pressure in the test space is maintained.

If the valve on the mains side is leaking, causing the pressure to rise above the switching point of the pressure switch, the control unit will trigger an alarm and initiate lock-out. The program indicator then stops to indicate «Test1».

If the pressure does not increase because the valve closes correctly, the control unit continues its program with the second test phase «Test2».

For that purpose, the valve on the mains side is opened during «t3» so that the test space is pressurized («filling» the test space).

During the second test phase – if the valve on the burner side is leaking – this pressure may not fall below the switching point of the pressure switch. If it does, the control unit will initiate lockout also, thus preventing the burner from starting up.

On successful completion of the second test phase, the control unit closes the internal control loop between terminals 3 and 6 (circuit path: terminal 3 – contact «ar2» - terminals 4 and 5 – contact III – terminal 6).

This control loop is normally included in the start control loop of the burner control.

After the control loop has been closed, the programming mechanism of the control unit returns to its start position to switch itself off.

During these so-called idle steps, the positions of the programming mechanism's control contacts remain unchanged.

Program and lockout indicator

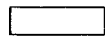
In the event of lockout, the programming mechanism stops and thus the position indicator fitted to the spindle of the mechanism.

The symbol that stops above the reading mark indicates the test phase during which lockout occurred and also gives the number of programming steps completed from the start of this test phase (1 step = 2.5 seconds).

Meaning of the symbols



Start position = operating position



In plants without vent valve:

evacuation of test space by opening the valve on the burner side

Test1

«Test1» with atmospheric pressure (valve proving test on the mains side)



Filling the test space by opening the valve on the mains side

Test2

«Test2» with gas pressure (valve proving test on the burner side)

III

Idle steps until programming mechanism switches itself off



Operating position = start position for the next valve proving test

In the event of lockout, all terminals receiving voltage from the control unit will be deenergized, except terminal 13, which is used for lockout indication.

After a reset, the programming mechanism automatically returns to its start position to immediately program a new valve proving test.

Note

Do not press the reset button for more than 10 seconds.

Control program after a power failure

A power failure prior to evacuating the test space does not cause the program sequence to change.

If a power failure occurs after the evacuation, the valve proving test will not be continued when power is restored, but the programming mechanism first returns to its start position and then performs the complete valve proving test.

Calculating the leakage rate escaping from a length of pipe

$$Q_{\text{Leck}} = \frac{(P_G - P_W) \cdot V \cdot 3600}{P_{\text{atm}} \cdot t_{\text{Test}}}$$

Legend

Q_{Leck}	in dm^3 / h	Permissible leakage rate in dm^3 or liters per hour
P_G	in mbar	Overpressure in pipe section between the valves to be tested, at the beginning of the test phase
P_W	in mbar	Overpressure set on pressure switch «DW» (normally set to 50 % of the gas mains pressure)
P_{atm}	in mbar	Absolute pressure (1013 mbar normal pressure)
V	in dm^3	Volume of test space confined by the valves to be tested, including the space in the valves themselves
t_{Test}	in s	Duration of proving time

Example

P_G	= 30 mbar	$Q_{\text{Leck}} = \frac{(30-15) \times 10.36 \times 3600}{1013 \times 27.5} = 20 \text{ l/h}$
P_W	= 15 mbar	
P_{atm}	= 1013 mbar	Any valve leakage rate exceeding 20 l/h causes the control unit to initiate lockout
V	= 10.36 dm^3	
t_{Test}	= 27.5 s	

Note

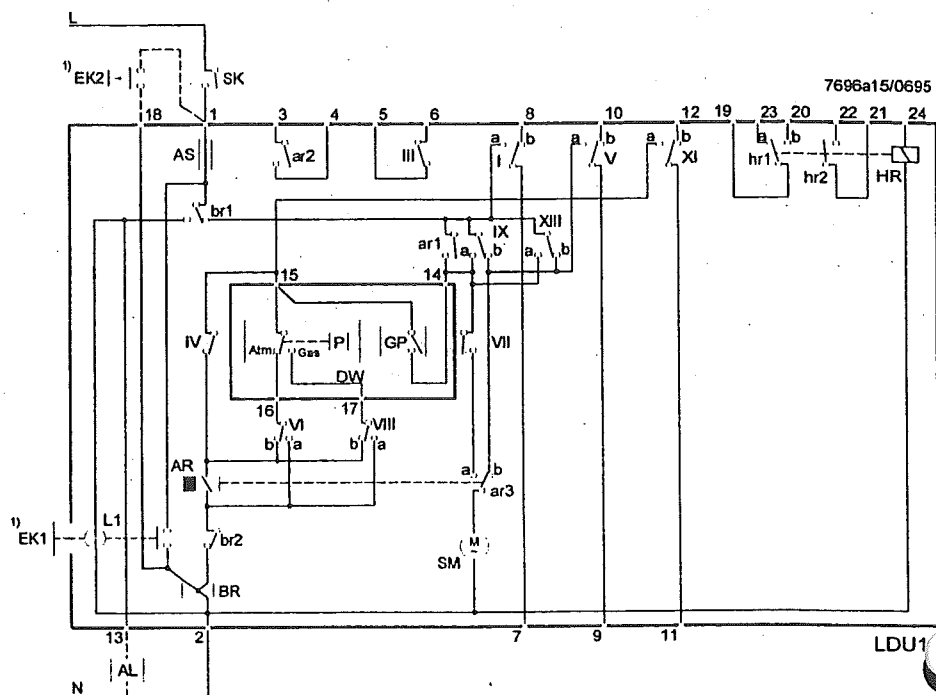
Select volume of pipe section «V» between the gas valves to be checked and overpressure « P_W » set on pressure switch «DW» such that the maximum permissible gas leakage rate « Q_{Leck} » will not exceed the rate specified in the local regulations.

Connection diagram

Legend

- AL Alarm signal for «leaking valve»
- AR Main relay with contacts «ar...»
- AS Unit fuse (built-in)
- BR Lockout relay with contacts «br...»
- DW Pressure switch for valve proving test
(does not replace the gas pressure switch used to signal lack of gas)
- EK1 Lockout reset button
- EK2 Remote lockout reset button
- GP Gas pressure switch (for lack of gas)
- HR Auxiliary relay with contacts «hr...»
- L1 Lockout warning lamp (built-in)
- SK Control contact
- SM Synchronous motor of programming mechanism

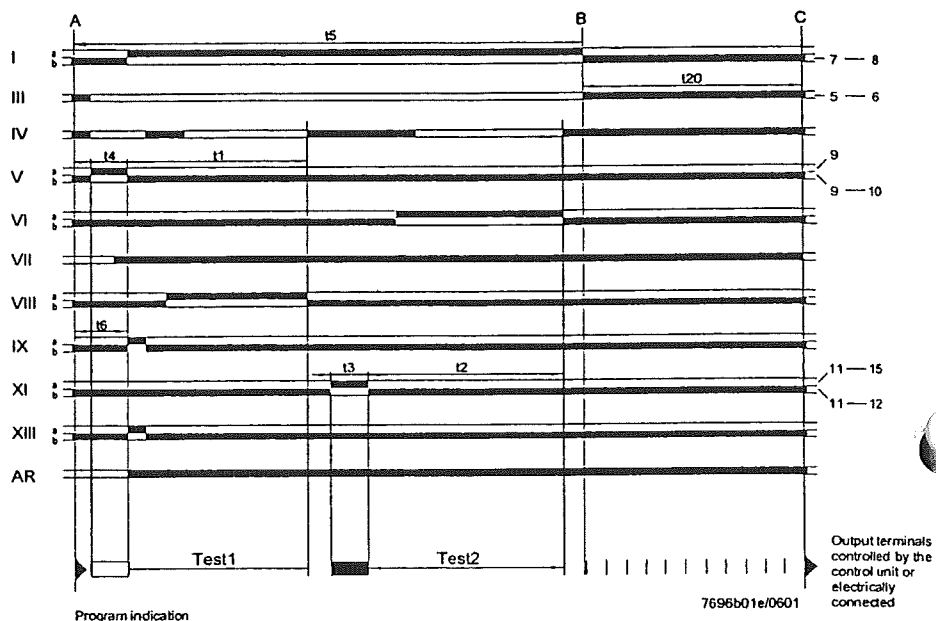
- 1) Do not press «EK...» for more than 10 seconds



Sequence diagram

Legend

- t1 22.5 s First test phase with atmospheric pressure
- t2 27.5 s Second test phase with gas pressure
- t3 5 s Filling the test space with LDU11.323...
- 2.5 s with LDU11.523
- t4 5 s Evacuating the test space with LDU11.323...
- 2.5 s with LDU11.523
- 5 s with LDU11.523
- t5 67.5 s Total duration of valve proving test until burner is enabled
- t6 7.5 s Interval from start to energizing main relay «AR»
- t20 22.5 s Running time of programming mechanism until it switches itself off in the operating = start position (idle steps)

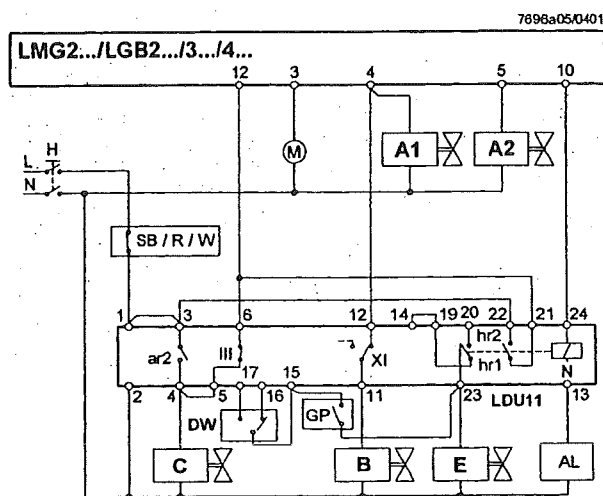


- A Gas valves controlled to evacuate the test space
- B Gas valves controlled to fill the test space
- C Vent valve, normally open; closed during valve proving test from the beginning of «Test1»

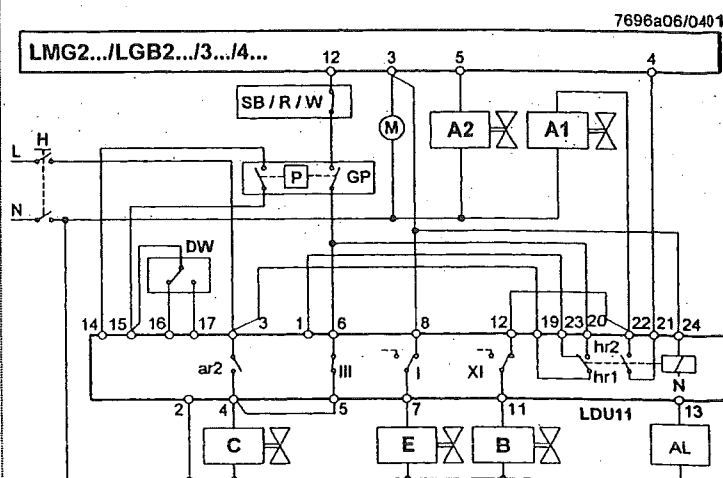
Connection examples with vent pipe to atmosphere using burner controls LMG2..., LGB2..., LGB3... or LGB4...

For other connections, refer to the connection diagram of the relevant burner control.

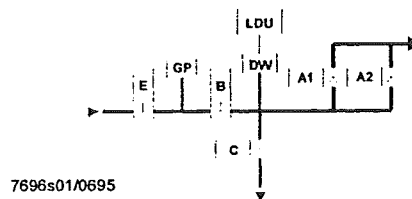
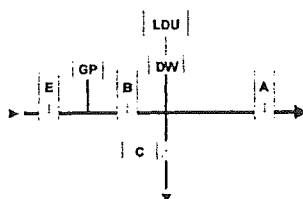
Valve proving test prior to burner startup



Valve proving test following immediately the controlled shutdown



Plants with vent pipe to atmosphere



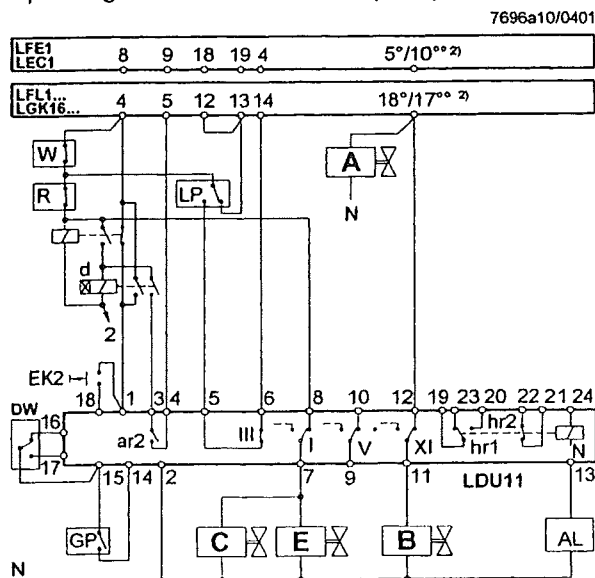
7696s01/0695

Connection examples with vent pipe to atmosphere using burner controls LFE..., LFL... or LGK..., or the control unit LEC...

Valve proving test during the prepurge time (min. 60 s) and following immediately the controlled shutdown in plants with vent pipe to atmosphere.

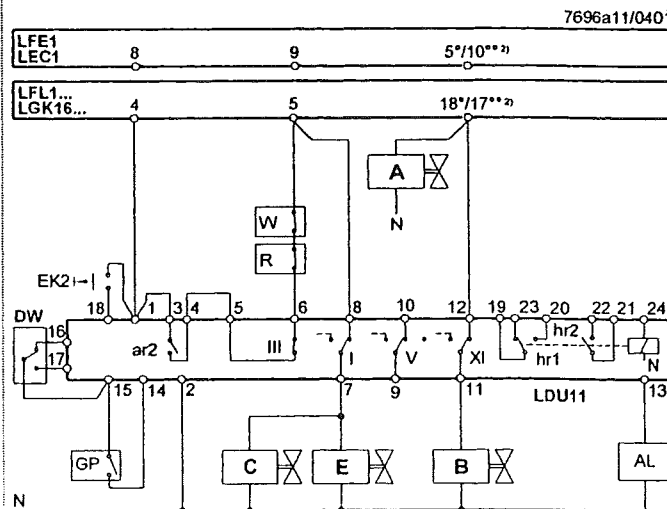
Delay on make of relay d > 2 s.

2) Expanding flame burner or interrupted pilot burner



Valve proving test following immediately the controlled shutdown

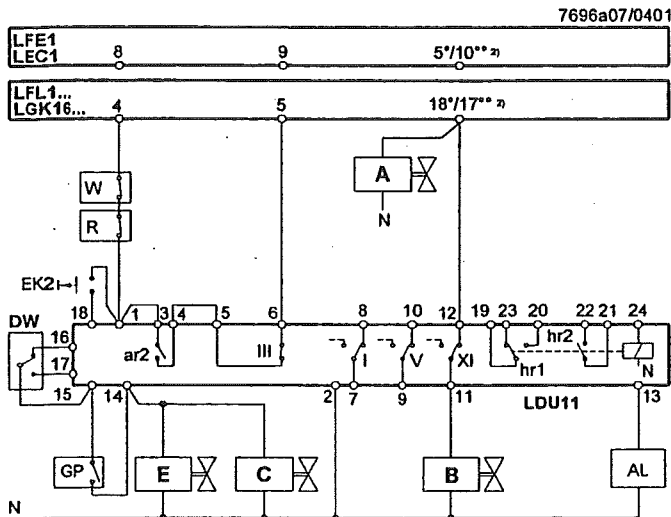
2) Expanding flame burner or interrupted pilot burner



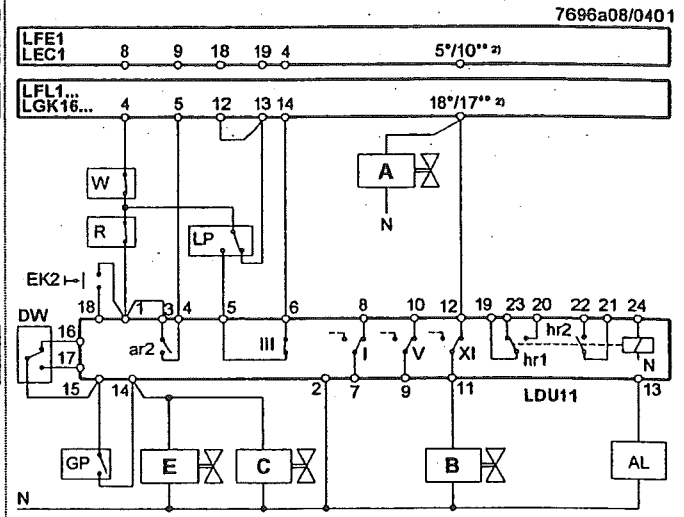
Connection examples with vent pipe to atmosphere using burner controls LFE..., LFL... or LGK..., or the control unit LEC...

For other connections, refer to the connection diagram of the relevant burner control.

Valve proving test just prior to burner startup
2) Expanding flame burner or interrupted pilot burner



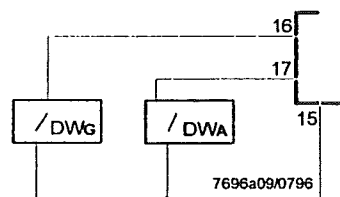
Valve proving test during the prepurge time (min. 60 s)
2) Expanding flame burner or interrupted pilot burner



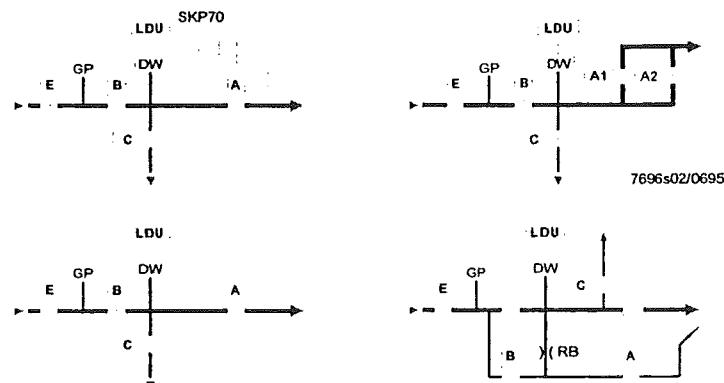
Valve proving test with 2 pressure switches

- DWG** Pressure switch for the valve proving test with gas pressure.
This pressure switch must be set to the minimum gas pressure permitted during the proving test.
If this pressure is not reached during the test, the control unit will initiate lockout.
- DWA** Pressure switch for the gas valve proving test with atmospheric pressure.
This pressure switch must be set to the maximum gas pressure permitted during the proving test with atmospheric pressure.
If this pressure is exceeded during the test, the control unit will initiate lockout.

DWG and DWA must be overload-proof up to the gas pressure level.



Plants with vent pipe to atmosphere

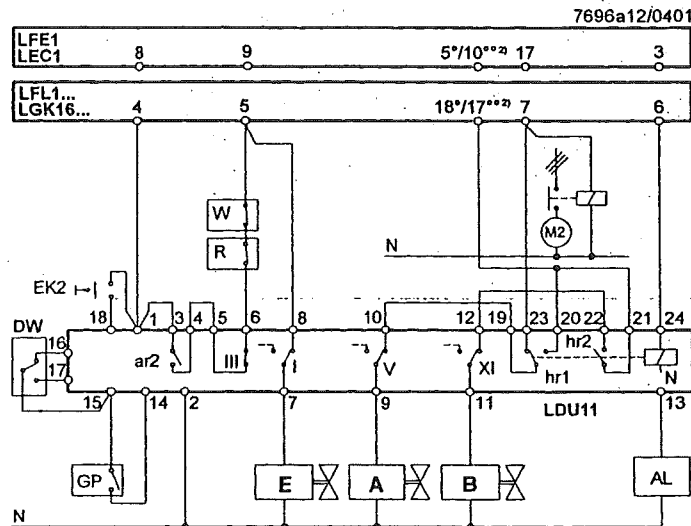


Connection examples without vent pipe to atmosphere (for applications not covered by EN 676) using burner controls LFE..., LFL... or LGK..., or the control unit LEC...

Valve proving test following immediately the controlled shutdown in plants without vent pipe.

Valve «A» or «A1» remains open after the controlled shutdown until the start of the first test phase is reached in order to evacuate the test space and to burn off the gas in the combustion chamber during the afterburn time.

²⁾ Expanding flame burner or interrupted pilot burner

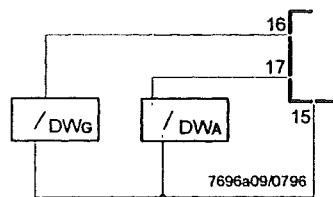


Valve proving test with 2 pressure switches

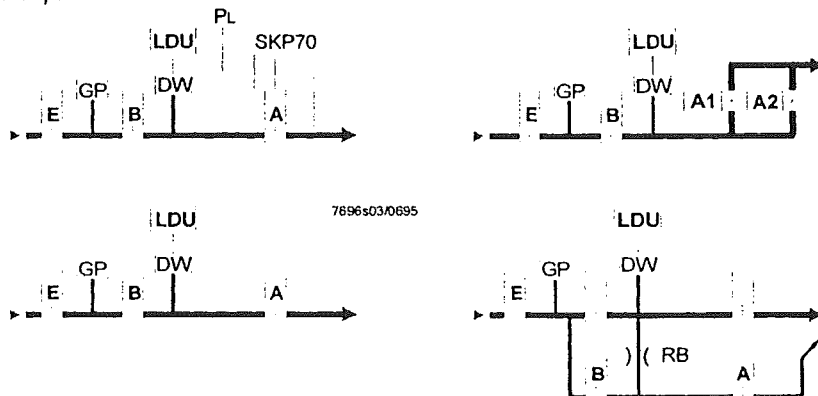
DWG Pressure switch for the valve proving test with gas pressure.
This pressure switch must be set to the minimum gas pressure permitted during the proving test.
If this pressure is not reached during the test, the control unit will initiate lockout.

DWA Pressure switch for the gas valve proving test with atmospheric pressure.
This pressure switch must be set to the maximum gas pressure permitted during the proving test with atmospheric pressure.
If this pressure is exceeded during the test, the control unit will initiate lockout.

DWG and DWA must be overload-proof up to the gas pressure level.



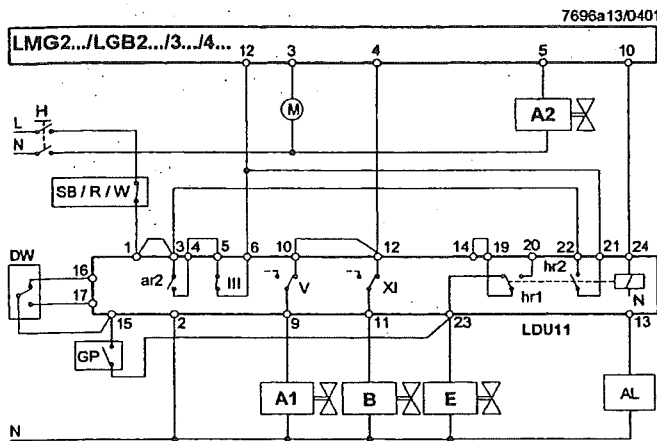
Plants without vent pipe to atmosphere



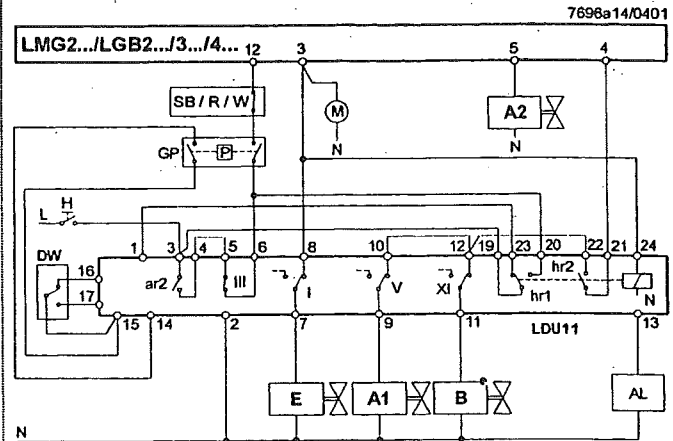
Connection examples without vent pipe to atmosphere using burner controls LMG2..., LGB2..., LGB3... or LGB4...

For other connections, refer to the connection diagram of the relevant burner control.

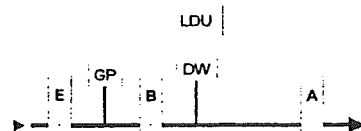
Valve proving test prior to burner startup



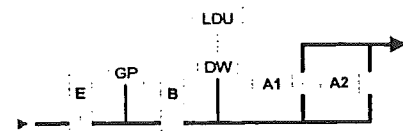
Valve proving test following immediately the controlled shutdown



Plants without vent pipe to atmosphere



7696s04/0695



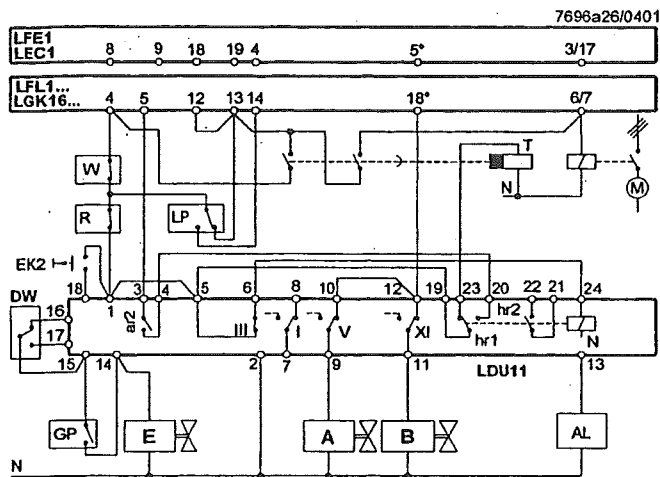
Legend

- A, A1, A2** Gas valves controlled to evacuate the test space
- AL** Alarm signal for «Leaking valve»
- B** Gas valve controlled to fill the test space
- C** Vent valve, normally open; closed during valve proving test from the beginning of «Test1»
- DW** Pressure switch for valve proving test (does not replace the gas pressure switch used to signal lack of gas)
- E** Safety shutoff valve, normally closed (optional)
- EK2** Remote lockout reset button
- GP** Gas pressure switch (for lack of gas)
- H** Main switch
- LP** Air pressure switch
- M...** Fan («M2»: pre- and postpurging)
- PL** Reference pressure for SKP70...
- R** Control thermostat or pressurestat (e.g. boiler control thermostat)
- RB** Pipe orifice; its diameter must be determined such that in the event of a leaking pilot gas valve «A», the pilot flame cannot afterburn on completion of the second safety time so that presence of the main flame cannot be simulated
- SB** Safety limit thermostat
- T** Delay off time relay; the time should be set to approx. «t16» (min. «t7»... max. «t10») of the burner control
- W** Limit thermostat or pressure switch or pressure limiter

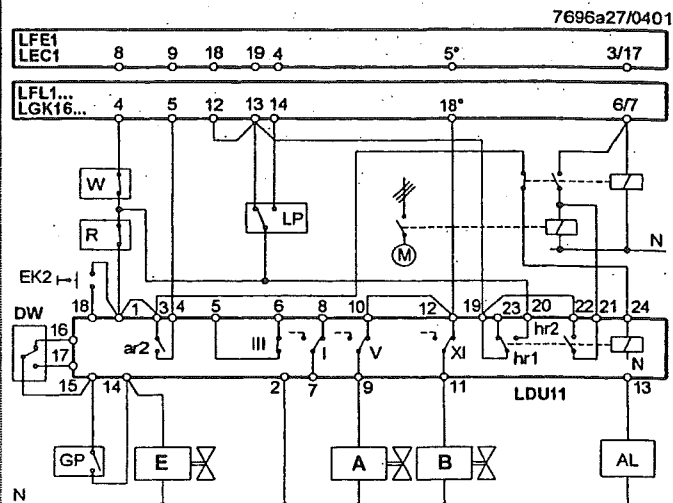
Connection examples without vent pipe to atmosphere using burner controls LFE..., LFL... or LGK..., or control unit LEC... and the SKP70... with expanding flame burners

For other connections, refer to the connection diagram of the relevant burner control

Valve proving test just prior to burner startup



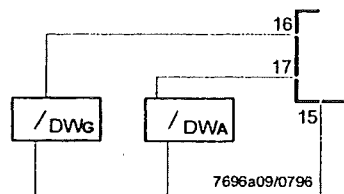
Valve proving test during the prepurge time (min. 60 s)



Valve proving test with 2 pressure switches

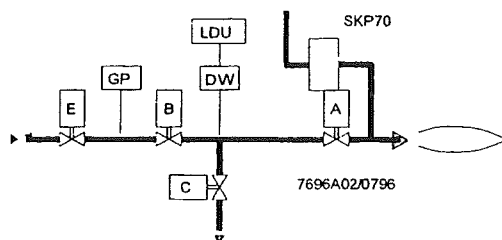
- DWG** Pressure switch for the valve proving test with gas pressure.
This pressure switch must be set to the minimum gas pressure permitted during the proving test.
If this pressure is not reached during the test, the control unit will initiate lockout.
- DWA** Pressure switch for the gas valve proving test with atmospheric pressure.
This pressure switch must be set to the maximum gas pressure permitted during the proving test with atmospheric pressure.
If this pressure is exceeded during the test, the control unit will initiate lockout.

DWG and DWA must be overload-proof up to the gas pressure level.



Air pressure «PL» for the SKP... must be sufficiently high to open the SKP70... although the burner's air damper is closed.
Otherwise, the LDU11... will initiate lockout when performing «Test1».

Plants without vent pipe to atmosphere



LDU11... with plug-in
base AGM11...

[illegible]

7696m01/0296



JUMO DICON 400/500

Universal process controllers

B 70.3570
Operating Manual

7.99/00370043



Please read this Manual before starting up the instrument. Keep this manual in a place which is at all times accessible to all users. Please assist us to improve this manual where necessary. Your suggestions will be most welcome.

Phone	within Germany	(0661) 6003-727
	from abroad	(++49) 661 6003-0
Fax	within Germany	(0661) 6003-508
	from abroad	(++49) 661 6003-607



All the necessary settings and, where appropriate, alterations inside the unit are described in this operating manual. If any problems should arise during start-up, do not carry out any unauthorized manipulations on the unit. This endangers your rights under the warranty! Please contact the nearest subsidiary or the main factory.



When returning chassis, modules or components, the rules of EN 100 015 "Protection of electrostatically sensitive components" must be observed. Use only the appropriate ESD packaging for transport.

Please note that we cannot be held liable for any damage caused by ESD (electrostatic discharges)

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Contents

1.1 Description

This series of universal, freely configurable process controllers is available in the formats 96mm x 96mm and 96mm x 48mm (portrait and landscape format).

The instruments feature two 4-digit 7-segment displays, five or eight LEDs for indicating the switching status and operating modes, an 8-digit matrix display, as well as six keys for operation and configuration.

Additional functions include self-optimisation, parameter set switching, and up to eight limit comparators.

Linearisations for conventional transducers are held in the memory; a customized linearisation table can be programmed.

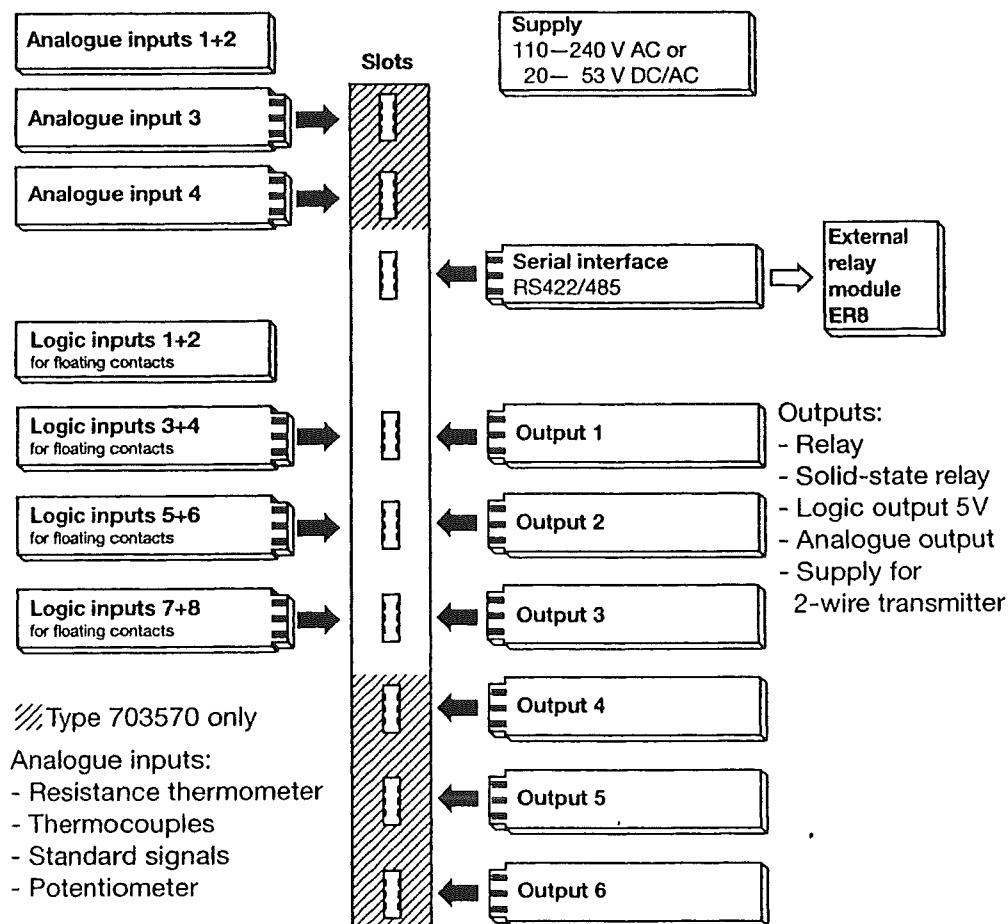
The process controller can be adapted to a variety of tasks with the aid of a maths module.

The instruments can be integrated into a data network via a serial interface, or can be expanded through an external relay module.

A setup program is available for easy configuration from a PC.

The electrical connection is at the rear by screw terminals.

1.2 Block structure



1 Introduction

1.3 Typographical conventions

1.3.1 Warning signs



Danger

The signs for **Danger** and **Warning** are used in this manual under the following conditions:

This sign is used when there may be **danger to personnel** if the instructions are disregarded or not followed accurately.



Warning

This sign is used when there may be **damage to equipment or data** if the instructions are disregarded or not followed accurately.



Warning

This sign is used when special care must be taken when handling components that are sensitive to electrostatic discharges.

1.3.2 Note signs



Note

This symbol is used when your attention is drawn to a **specific remark**.



Reference

This symbol refers to additional information in other manuals, chapters or sections.

*** Action**

This sign refers to an action to be performed. The individual steps are marked by this asterisk, e. g.

* Press  key

1.3.3 Presentation



Key combination

The depiction of keys together with a plus sign means that first the **ENTER** key has to be pressed and held down, and then a further key is pressed.

CONFIG 1

Dot-matrix display

Texts and messages are visualised on the dot-matrix display.

2 Identifying the instrument version

2.1 Type designation

703570/ (1) 0 (2) - (3) - (4) - (5) / (6) , (7)

703575/ (1) - (2) 0 0 (3) 0 0 0 (4) - (5) / (6) , (7)

(1) Basic type extension			
Format:			
96mm x 96mm	0		
48mm x 96mm portrait	1		
96mm x 48mm landscape	2		
Version:			
Standard with factory settings	8		
Customized programming	9		
Language for instrument texts:			
German		1	
English		2	
French		3	

(2) Analogue input			
not assigned	0	0	0
Universal input			
(all transducers except			
voltage -10/2/0 — 10V)	1	1	1
voltage -10/2/0 — 10V	2	2	2

(3) Output					
not assigned	0	0	0	0	0
Relay (changeover	1	1	1	1	1
contact)					
Solid-state relay 230V 1A	3	3	3	3	3
Logic 0/5V	3	3	3	3	3
Logic 0/22V	4	4	4	4	4
Analogue output	5	5	5	5	5
Supply for 2-wire					
transmitter	6	6	6	6	6
Two logic inputs	7	7	7	-	-

(4) Supply		
20 — 53V DC/AC 46 — 63Hz	2	2
110 — 240V AC -15/+10%		
48 — 63Hz	2	3

(5) Interface		
not assigned	0	0
RS422/485	5	4

(6) Maths and logic module		
not available	0	0
available	0	3

(7) Approvals		
DIN 3440 ¹	0	5
Underwriters Laboratories Inc.	0	6
(UL) ²		1
Germanischer Lloyd (GL) ¹	0	6
DIN 3440 and GL ¹	0	6
DIN and UL ¹	0	6
GL and UL ¹	0	6
DIN 3440, GL and UL ¹	0	6

1. not with Type 703575
2. available as standard

2 Identifying the instrument version

2.2 Accessories

External relay module ER8 Supply 93 — 263V AC Sales No. 70/00325805
External relay module ER8 Supply 20 — 53V DC/AC Sales No. 70/00325806
PC interface for setup program Sales No. 70/00301315
Setup program for Windows® 95/98 and NT4.0 Hardware requirements: <ul style="list-style-type: none">- PC-486DX-2-100- 16 Mbyte RAM- 15 Mbyte available on hard disk- CD-ROM- 1 free serial interface

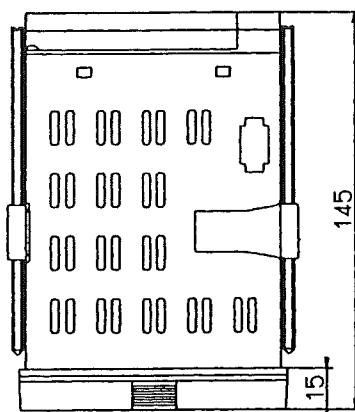
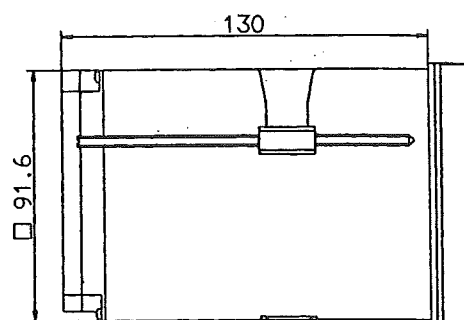
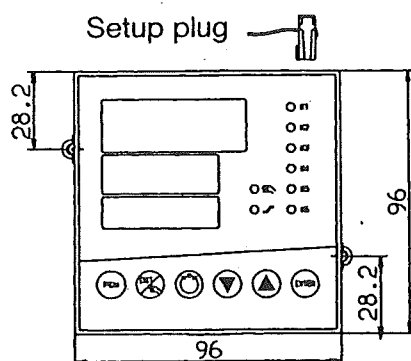
3 Installation

3.1 Location and climatic conditions

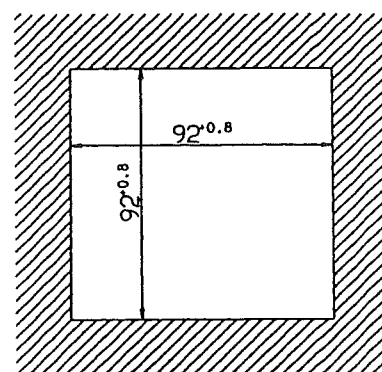
The instrument location should as far as possible be free from shock and vibration. Electromagnetic fields, e. g. from motors, transformers etc. should be avoided. The ambient temperature at the location should be between -5 and 50 °C at a relative humidity of not more than 90 %.

3.2 Dimensions

3.2.1 Type 703570/0...

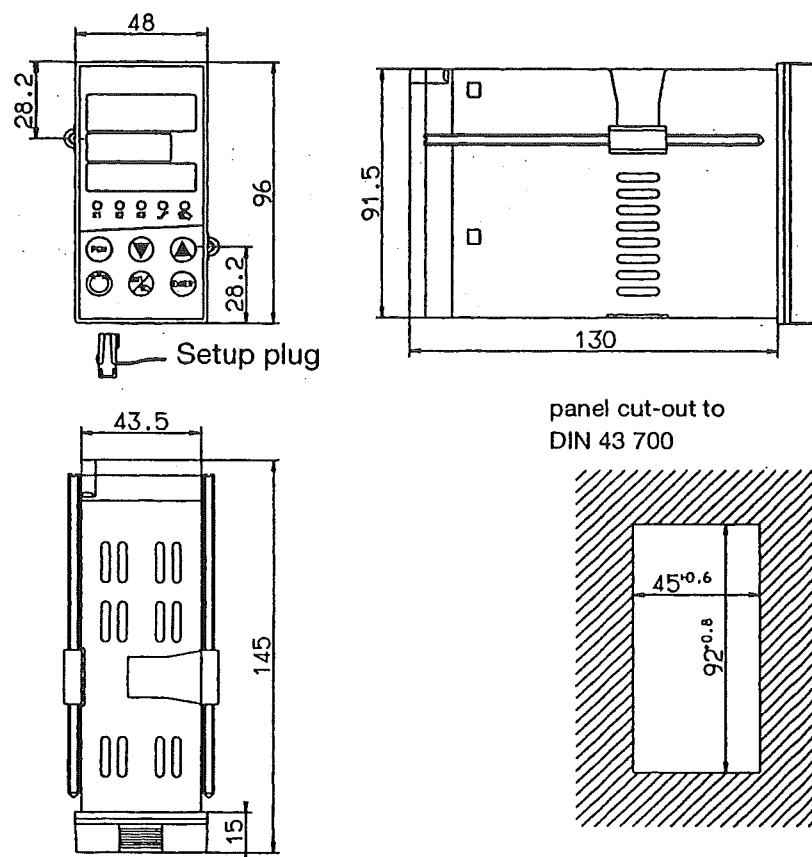


panel cut-out to DIN 43 700

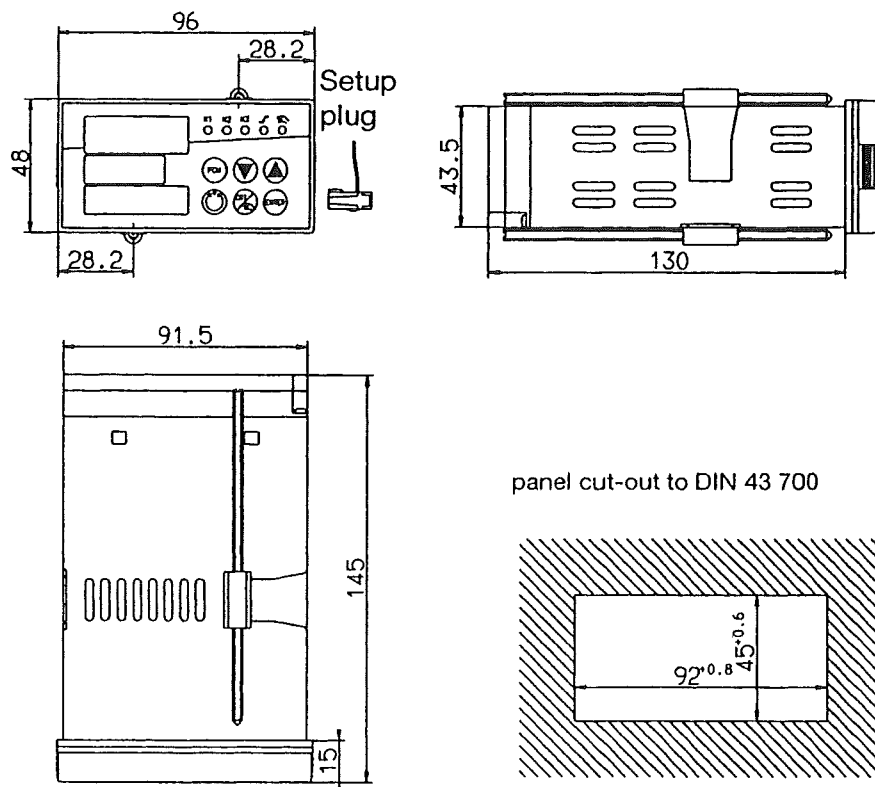


3 Installation

3.2.2 Type 703575/1...



3.2.3 Type 703575/2...

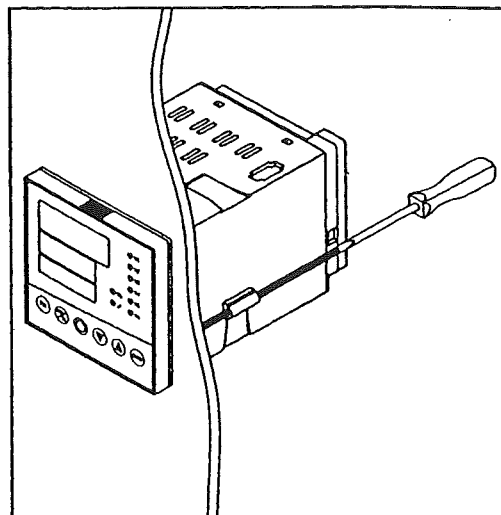


3.3 Edge-to-edge mounting

Type	Minimum spacing of the panel cut-outs	
	horizontal	vertical
without setup plug:		
703570/0...	11 mm	30 mm
703575/1... (portrait format)	11 mm	30 mm
703575/2... (landscape format)	30 mm	11 mm
with setup plug:		
703570/0...	11 mm	65 mm
703575/1... (portrait format)	11 mm	65 mm
703575/2... (landscape format)	65 mm	11 mm

3.4 Fitting in position

- * Fit the seal provided on to the instrument housing.
- * Insert the controller from the front into the panel cut-out.
- * Insert the mounting brackets from the rear of the panel into the guides at the sides of the housing.
The flat sides of the brackets must be against the housing.
- * Place the brackets against the rear of the panel and tighten them evenly using a screwdriver.



3.5 Cleaning the front panel

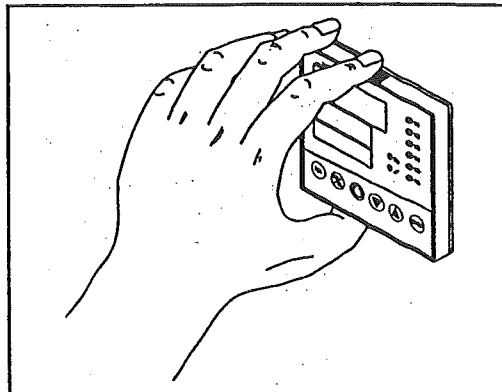
The front panel can be cleaned with the usual rinsing and cleaning agents. It has limited resistance to organic solvents (e. g. methylated spirits, white spirit, P1, xylol and similar.). Do not use high-pressure cleaning equipment.

3 Installation

3.6 Removing the controller chassis

The controller chassis can be removed from the housing for servicing.

- * Press together the knurled areas top and bottom (left and right with landscape format) on the front panel and pull out the controller chassis.



When inserting the controller chassis, care must be taken that the lugs (underneath the knurled areas) snap into position.

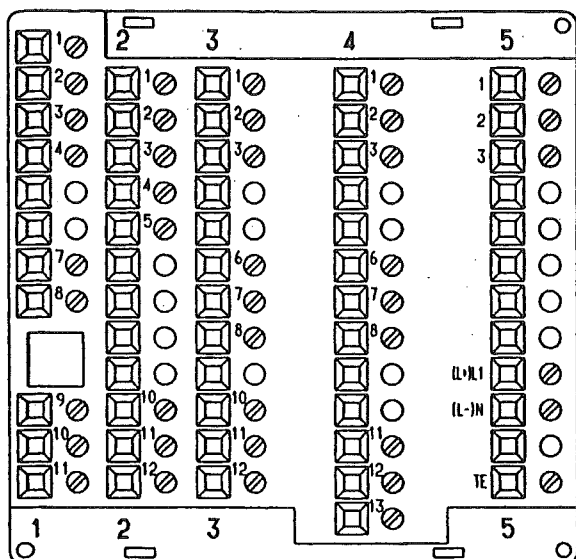
4.1 Installation notes

- ☐ The choice of cable, the installation and the electrical connection of the instrument must meet the requirements of VDE 0100 "Regulations on the installation of power circuits with nominal voltages below 1000 V" or the appropriate local regulations.
- ☐ The electrical connection must only be carried out by properly qualified personnel.
- ☐ If contact with live parts is possible when working on the instrument, it has to be isolated on both poles from the supply.
- ☐ A current-limiting resistor interrupts the supply circuit in the event of a short circuit. The load circuit has to be fused for the maximum relay current in order to prevent welding of the output relay contacts in the event of a short-circuit.
- ☐ Electromagnetic compatibility conforms to the standards and regulations specified under Technical data.
⇒ Section 12.1 "Technical data"
- ☐ Input, output and supply lines should be run separately and not parallel to each other.
- ☐ Sensor and interface lines should be screened and twisted together. Do not run them close to live components or cables. Earth the screen at one end at the instrument on terminal TE.
- ☐ Earth the instrument at terminal TE to the earth conductor. This line must have at least the same cross-section as the supply lines. Earth lines should be run in a star layout to a common earth point which is connected to the earth conductor of the supply. Do not loop the earth connections, i. e. do not run them from one instrument to another.
- ☐ Do not connect additional loads to the supply terminals of the instrument.
- ☐ The instrument is not suitable for installation in hazardous areas.
- ☐ Apart from faulty installation, there is a possibility of interference or damage to controlled processes due to incorrect settings on the controller (setpoint, data of parameter and configuration levels, internal adjustments). Safety devices independent of the controller, such as overpressure valves or temperature limiters/monitors, should always be provided and should be capable of adjustment only by specialist personnel. Please refer to the appropriate safety regulations in this connection. Since adaptation (self-optimisation) cannot be expected to handle all possible control loops, there is a theoretical possibility of unstable parameter settings. The resulting process value should therefore be monitored for its stability.
- ☐ The maximum permitted voltage difference between the inputs of the controller and TE is 30 V AC or 50 V DC.

4 Electrical connection

4.2 Connection diagrams

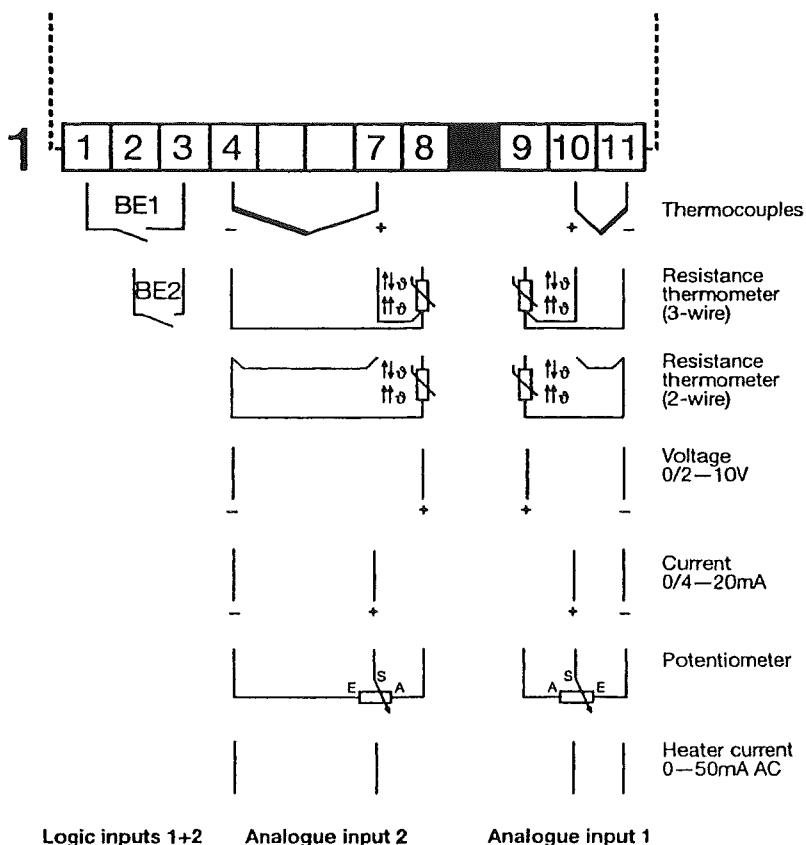
4.2.1 Type 703570



The electrical connection must only be made by suitably qualified personnel.



The instrument version can be identified by the type code.



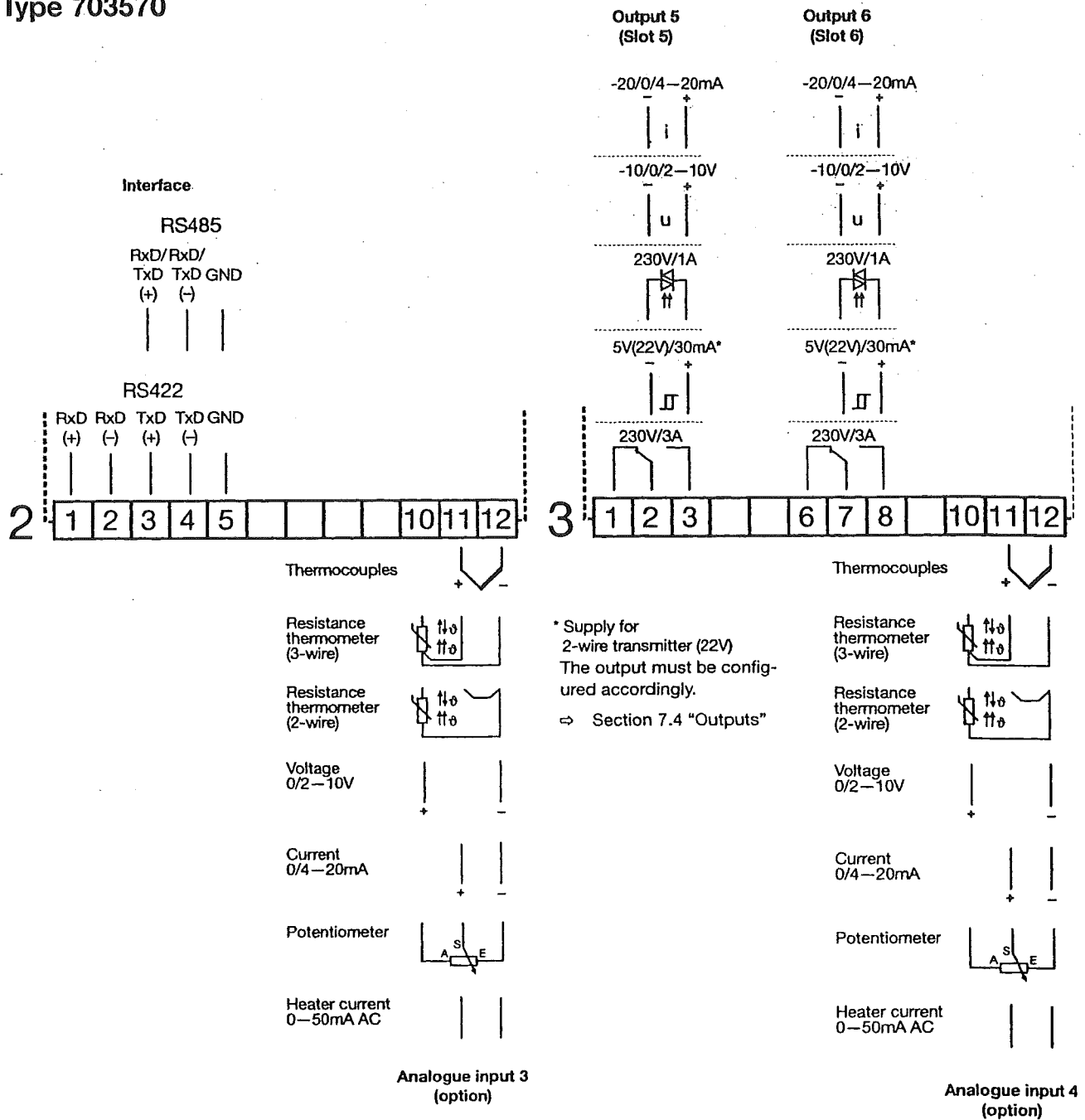
Additional analogue input signals	
Signal	Connection like
0 – 1V	0 – 10V
-1 to +1V	0 – 10V
-10 to +10V	0 – 10V
0 – 100mV	thermocouple
-100 to +100mV	thermocouple



When a thermocouple with internal temperature compensation is wired up to the analogue inputs 1, 3 or 4, Pt500, Pt1000 or KTY must not be connected to analogue input 2.

4 Electrical connection

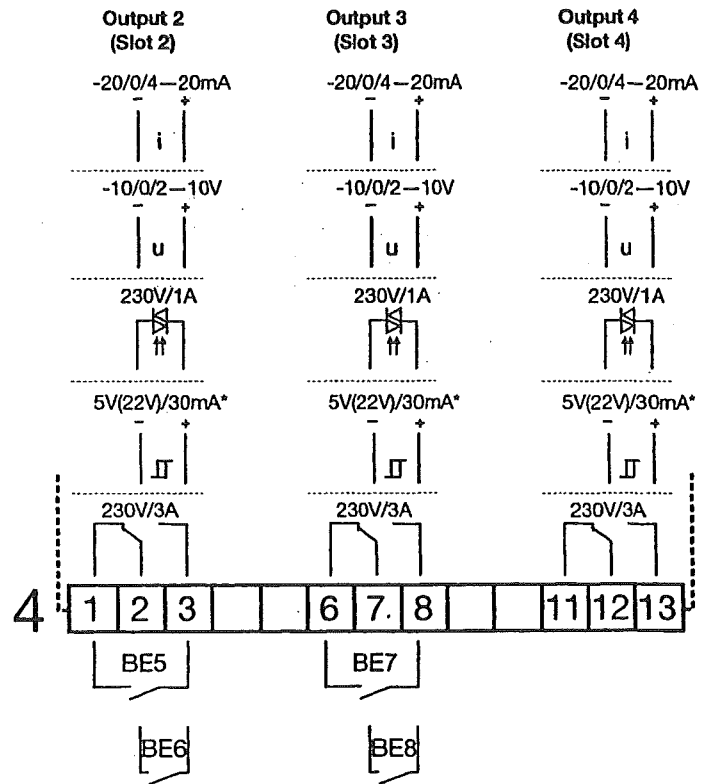
Type 703570



Additional analogue input signals	
Signal	Connection like
0—1V	0—10V
-1 to +1V	0—10V
-10 to +10V	0—10V
0—100mV	thermocouple
-100 to +100mV	thermocouple

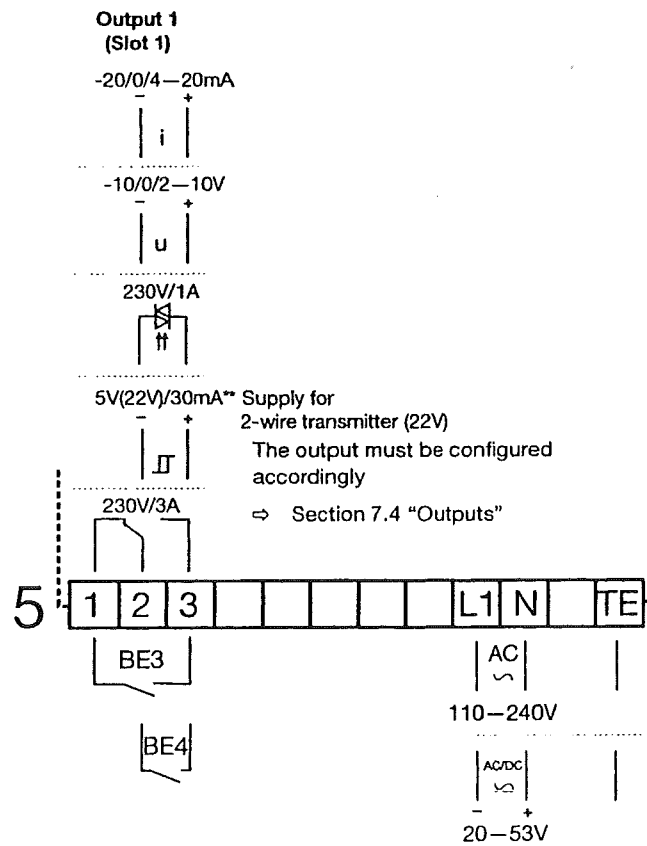
4 Electrical connection

Type 703570



Logic inputs 5+6
(Slot 2)

Logic inputs 7+8
(Slot 3)

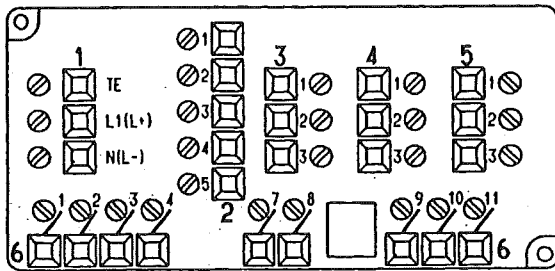


Logic inputs 3+4
(Slot 1)

Mains supply

4 Electrical connection

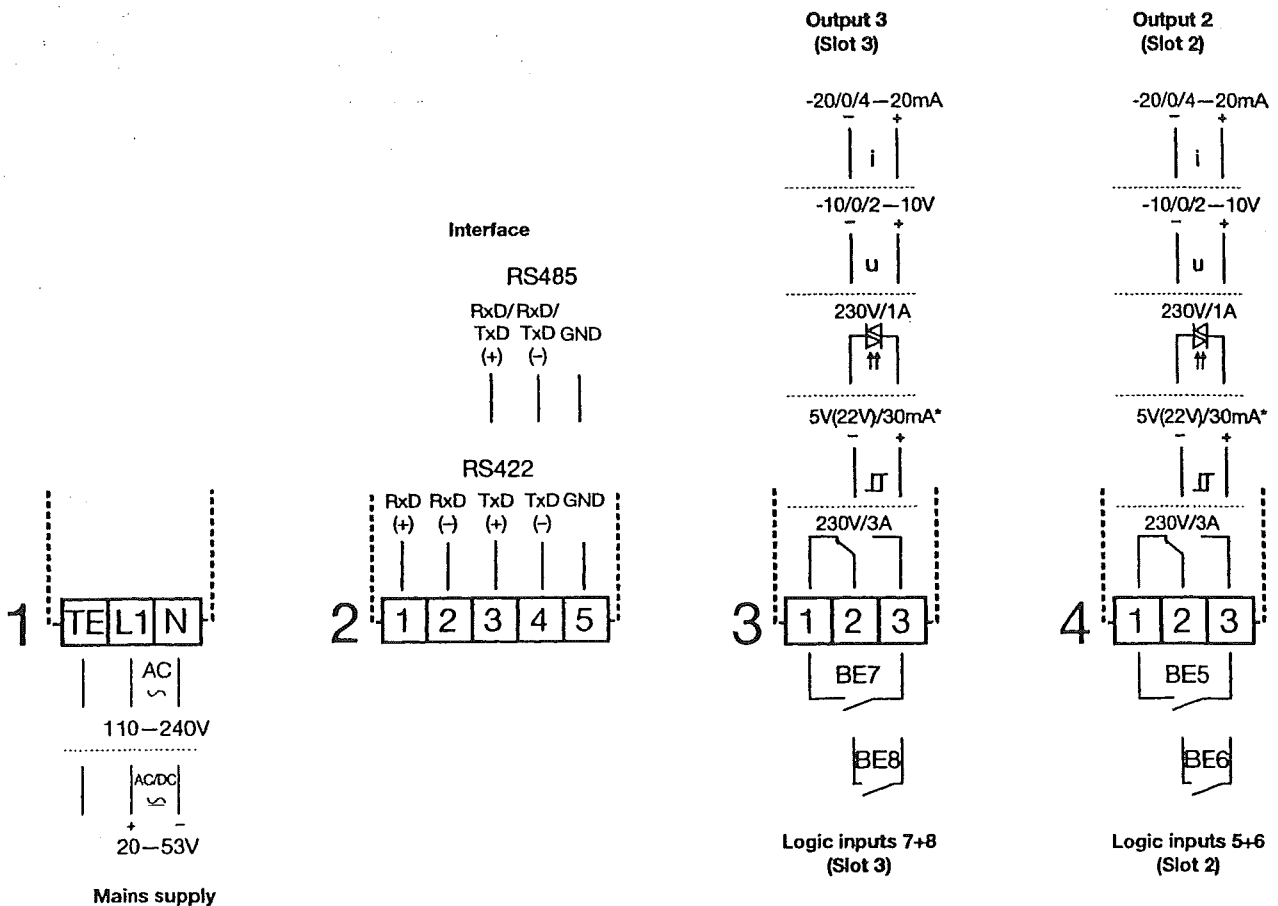
4.2.2 Type 703575 (portrait and landscape format)



The electrical connection must only be carried out by properly qualified personnel



The instrument version can be identified by the type code.



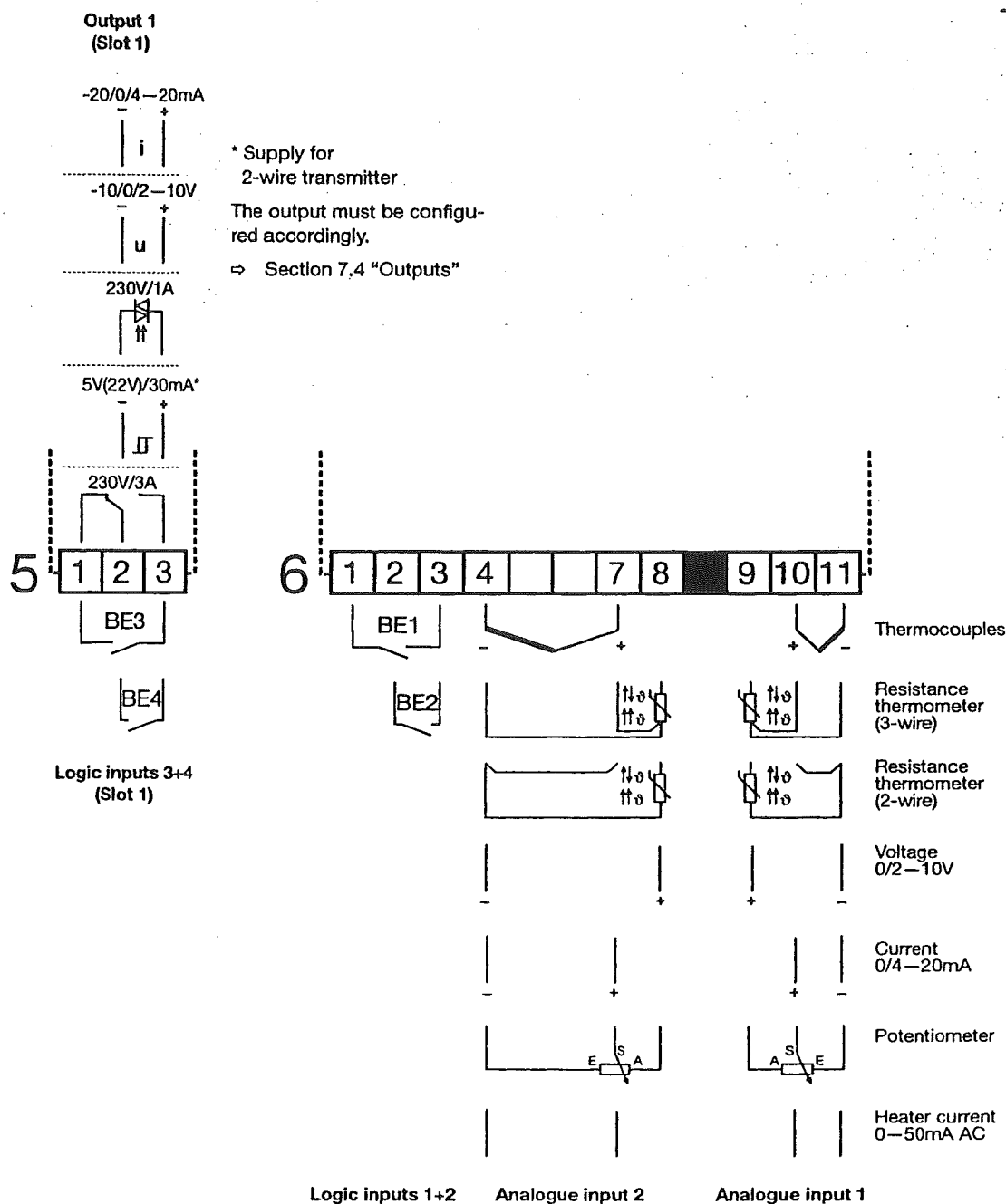
* Supply for 2-wire transmitter

The output must be configured accordingly.

⇒ Section 7.4 "Outputs"

4 Electrical connection

Type 703575

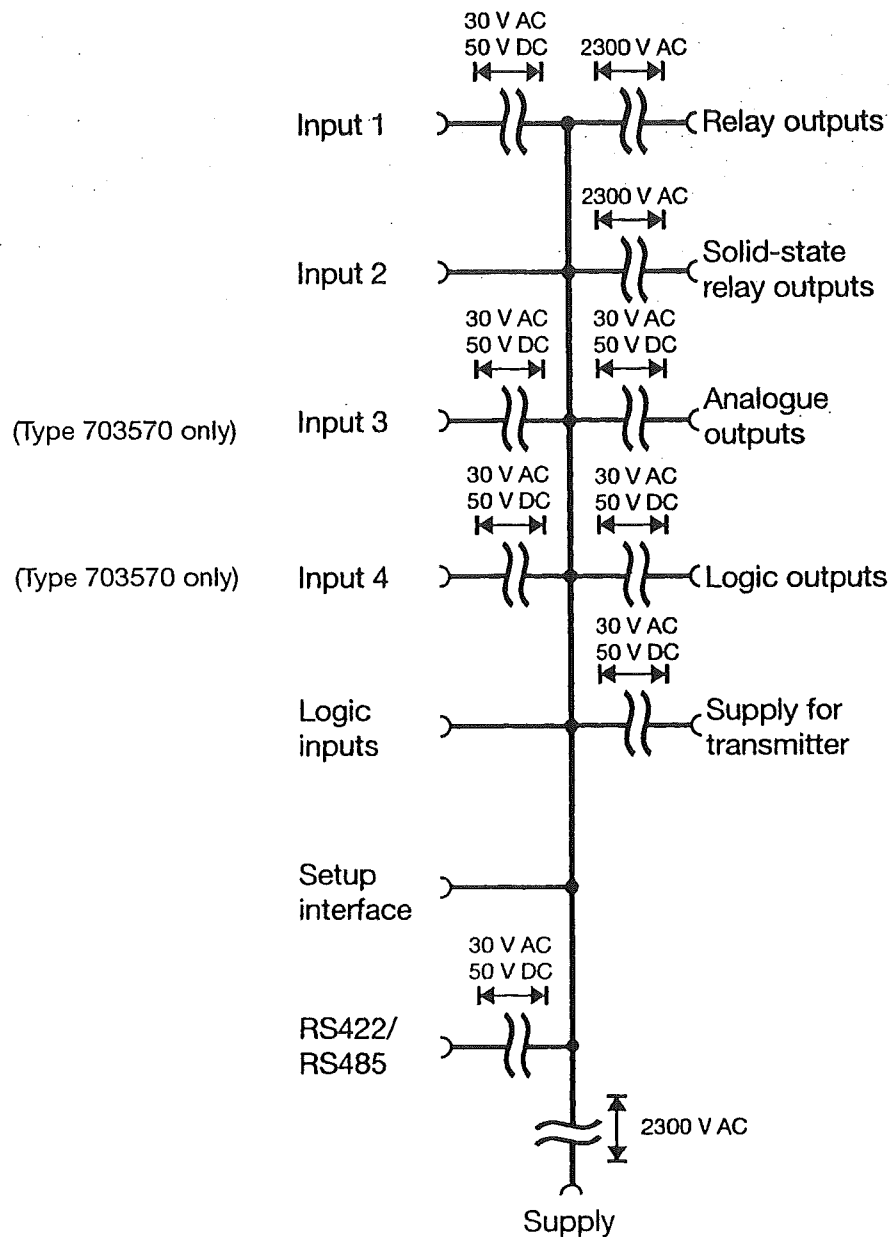


Additional analogue input signals	
Signal	Connection like
0–1V	0–10V
-1 to +1V	0–10V
-10 to +10V	0–10V
0–100mV	thermocouple
-100 to +100mV	thermocouple

When a thermocouple with internal temperature compensation is wired up to analogue input 1, a Pt500, Pt1000 or KTY must not be connected to analogue input 2.

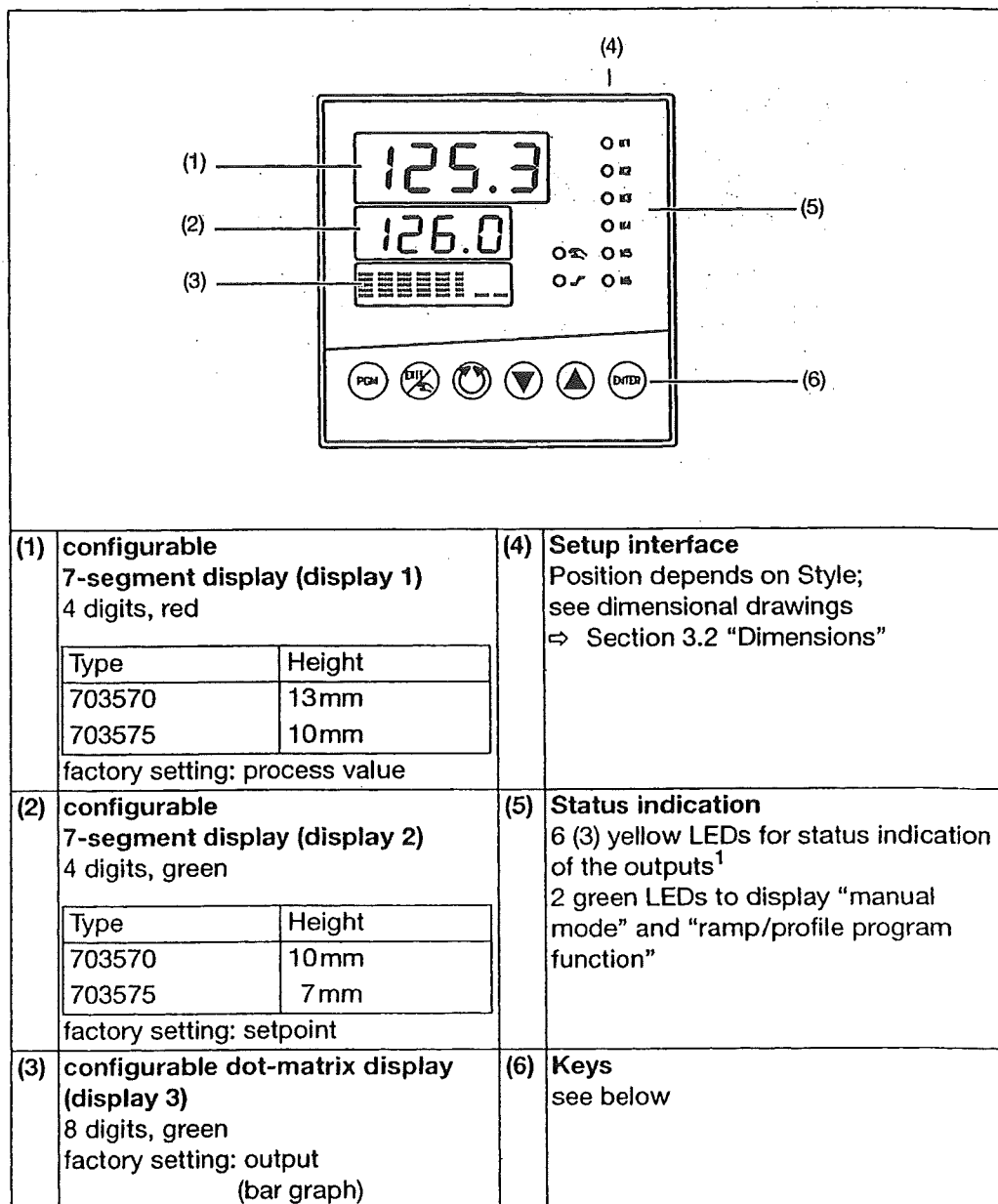
4.3 Isolation

For Type 703570 and Type 703575



4 Electrical connection

5.1 Displays and controls



1. no display with analogue inputs

⇒ Section 7.7 "Display"

Key designation

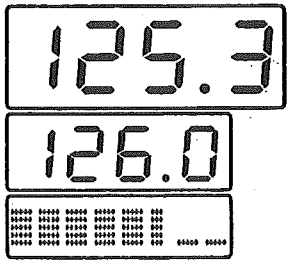


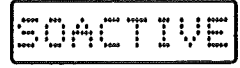
Keys from left to right:

PGM	for programming
Exit/Hand	for programming and for manual mode ¹
Automatic	to start programs
Increment	to increase parameter values
Decrement	to decrease parameter values
Enter	for programming and display switching

1. In the description below the key is shown according to its function (**EXIT** or).

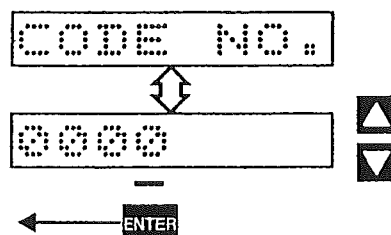
5 Operation

5.2 Operating modes and states

Operating mode/ state	Display	Notes
Normal display		<p>The displays present the values according to the display configuration. ⇒ Section 5.6 "Display switching"</p> <p>factory setting:</p> <ul style="list-style-type: none"> - process value - setpoint - output (bar graph)
Ramp and profile program function		<p>A ramp or a profile is run. ⇒ Section 7.5 "Ramp and profile program function"</p>
Manual mode		<p>The output is modified by hand. ⇒ Section 5.5 "Manual mode"</p>
Self-optimisation		<p>Self-optimisation is running. ⇒ Section 8.1 "Self-optimisation"</p>
Alarm messages	-	⇒ Section 12.2 "Alarm messages and display priorities in the normal display"
○ - LED is off; ● - LED is on		

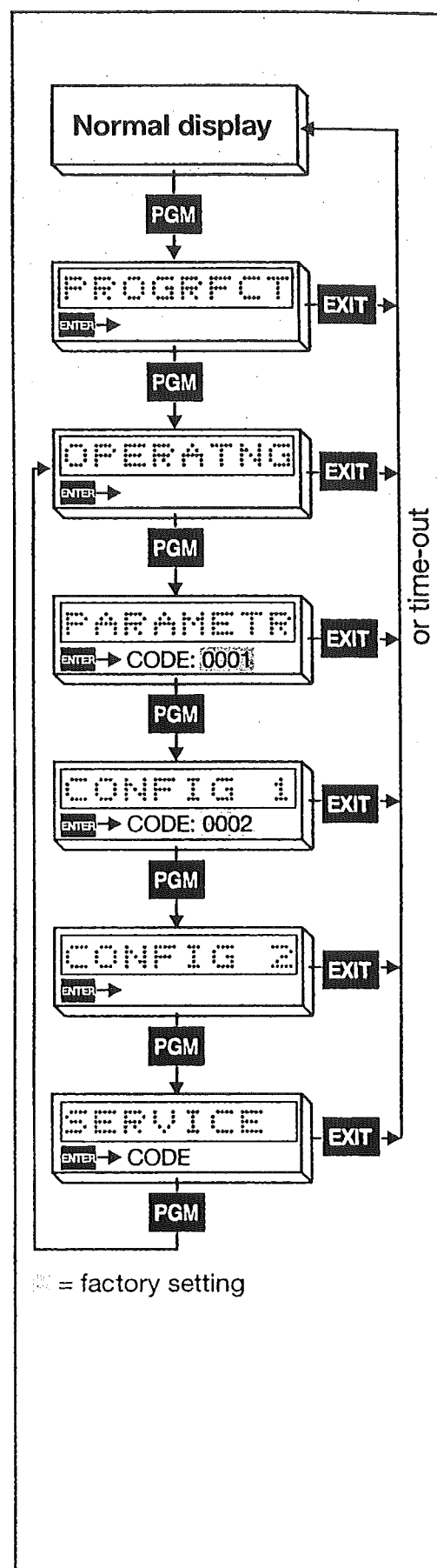
5.3 Principle of operation

Normal display	Initial status
Profile program function	<p>Eight segments of the program function are programmed here.</p> <p>This level only appears when the profile program function has been activated.</p>
Operating level	This level can be used to program set-points and indicate process variables.
Parameter level	The parameters at this level are used to adapt the controller to the control loop.
Configuration level 1	This level serves to adapt the controller to the control task.
Configuration level 2	The software version and the hardware specifications of the controller are indicated here.
Service	Only accessible to service personnel.
Time-out	If no key has been pressed during a configurable period of time (factory setting: 30sec), the controller automatically returns to normal display.
Code request	In order to access some levels, a code has to be entered first. The codes can be changed via the setup program.



Codes are entered digit by digit.

- * Enter the digit with ▲ and ▼
- * Step on to the next digit with ENTER

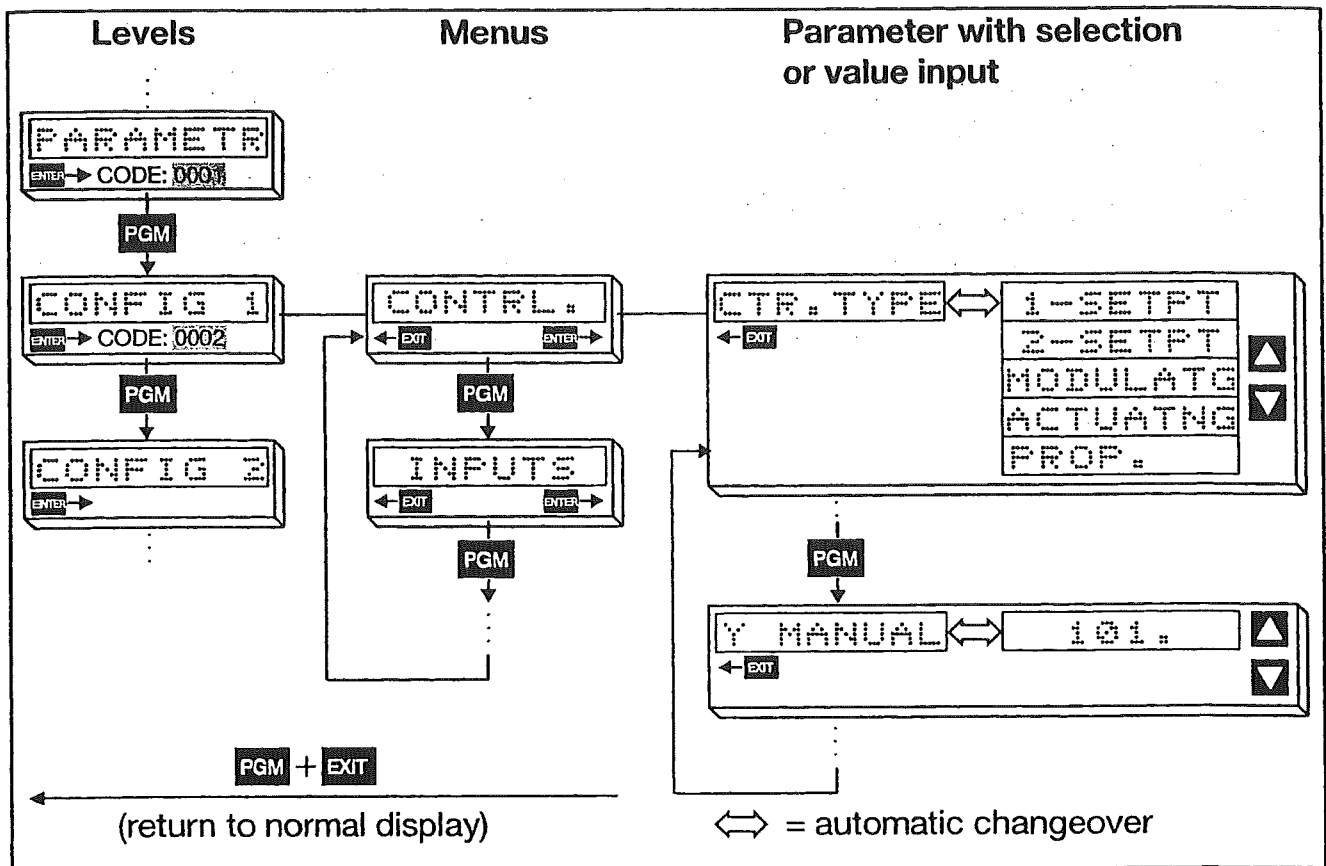


■ = factory setting

5 Operation

Levels and menus

Each level is divided into menus, thus creating a tree structure which has a selection or a value input at the end of each branch.



Value input

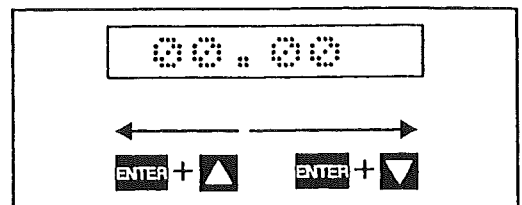
- * Increase the parameter value with ▲
- * Decrease the parameter value with ▼

The longer the key is pressed, the more quickly the value changes. Approx. 1 sec after releasing the key, the entry is accepted automatically (display flashes briefly).

Parameters can be altered within their value range, or within the maximum values that can be displayed (e. g. 2 decimal places: -99.99 to +99.99).

Shift decimal point

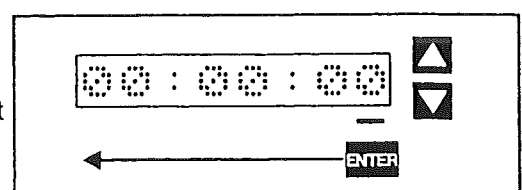
- * Increase the decimal places with ENTER + ▲
- * Decrease the decimal places with ENTER + ▼ (the last digit must be 0)



Time input

Time inputs and codes are entered digit by digit.

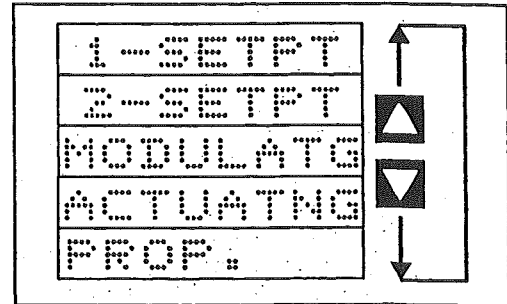
- * Increase or decrease the value (digit) with ▲ and ▼
- * Confirm the entry and select the next digit with ENTER



Selection

- * Step upwards in the selection list with ▲
- * Step downwards in the selection list with ▼

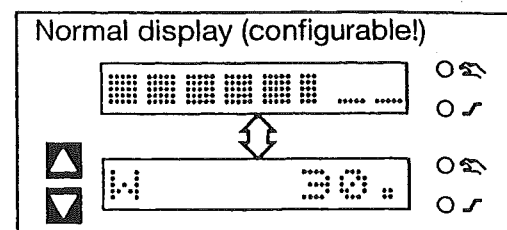
The selection will be automatically accepted after approx. 1 sec.



5.4 Altering setpoints

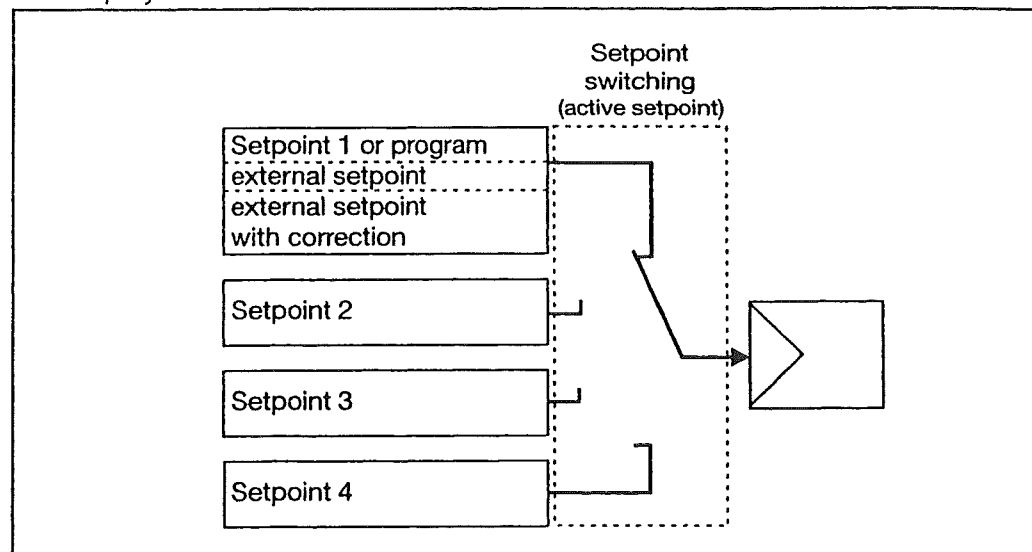
The active setpoint (see setpoint switching) is altered in normal display.

- * Alter the setpoint with ▲ and ▼
(The entry is documented on the matrix display)



Setpoint switching

If setpoint switching is programmed, the active setpoint is altered in the normal display.



Setpoint inputs via the interface have priority.

Relevant settings

Operating level → Setpoints

Configuration level 1 → Controller → Controller inputs




Configuration level 1 → Controller → Setpoint limits



Configuration level 1 → Logic functions

5 Operation

5.5 Manual mode

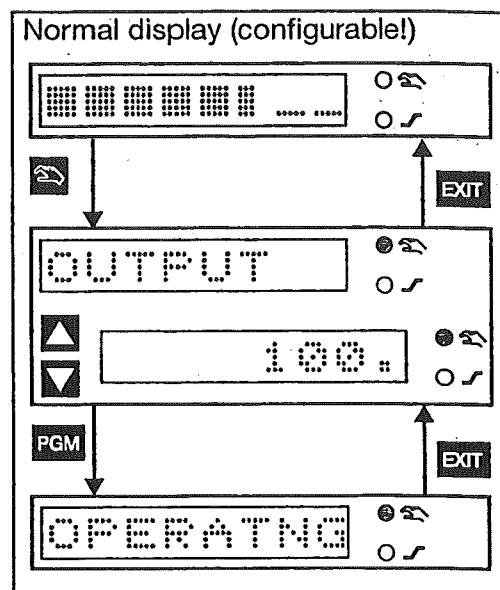
The control loop can be opened by changing over to manual mode, and the output is then adjusted manually.

- * Change to manual mode with 
- * Alter the controller output with  and 
(The output is accepted automatically after approx. 2 sec)
- * Terminate manual mode with **EXIT**

With modulating controllers, the  and  keys are used to adjust the clockwise/anticlockwise rotation of a motorised actuator. The output is only indicated with the stroke retransmission connected.

 - valve open

 - valve closed



The levels can also be accessed from the manual mode. The manual mode can be inhibited.

⇒ Section 7.1 "Controller"

Relevant settings

Configuration level 1 → Controller → Controller inputs

Configuration level 1 → Controller → Manual output

Configuration level 1 → Controller → Manual mode

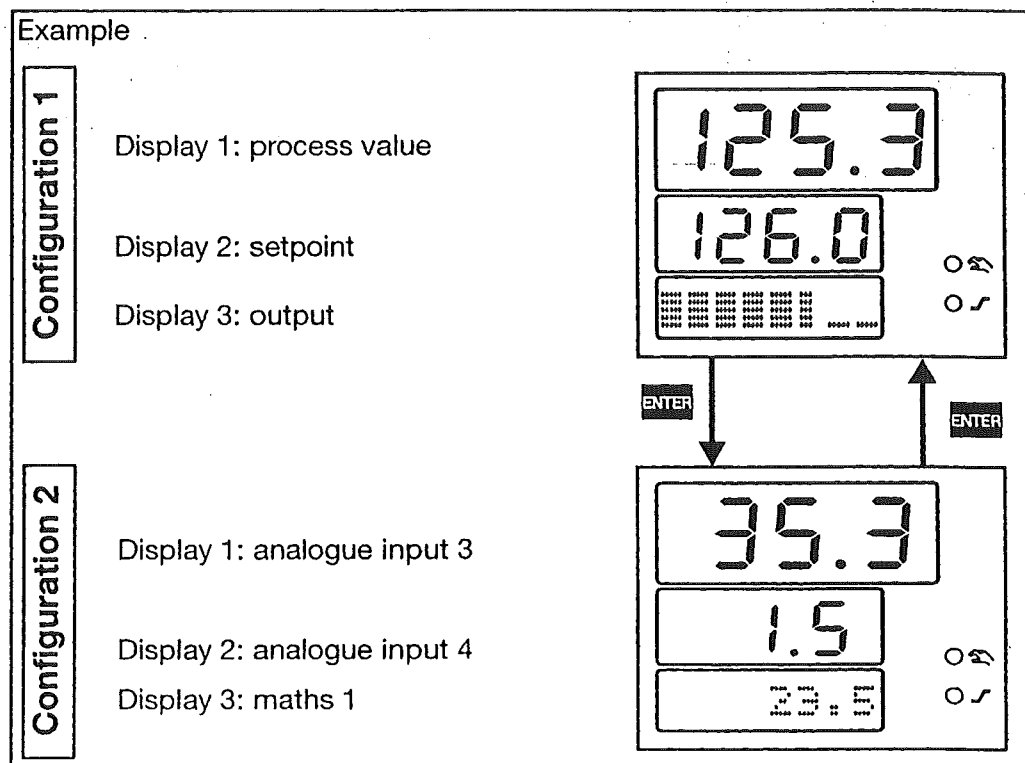
Configuration level 1 → Logic functions

5.6 Display switching

Two display configurations can be provided that determine the visualisation of values and process variables on the 7-segment displays and the dot-matrix display.

* Switch display over with **ENTER**

or automatic changeover after an adjustable interval



Relevant settings

Configuration level 1 → Display → Configuration 1+2

Configuration level 1 → Display → Automatic display switching

5 Operation

5.7 Operating level

General

Four setpoints can be indicated and altered at the operating level, in addition different process variables can be displayed.

Access the level by ...

* pressing **PGM** (2x **PGM** with activated program function) in normal display or in manual mode

OPERATING

Setpoints

Setpoint 1
Setpoint 2
Setpoint 3
Setpoint 4

Process variables

Analogue input 1
Analogue input 2
Analogue input 3
Analogue input 4
Mathematics 1
Mathematics 2
Output

Parameter	Value/selection	Description
→ SETPTS		Value input within the defined setpoint limits
→ W1	0.	
→ W2	0.	
→ W3	0.	
→ W4	0.	
→ PROCESS		Value display
→ ANALOG 1	0.	
→ ANALOG 2	0.	
→ ANALOG 3	0.	
→ ANALOG 4	0.	
→ MATHS 1	0.	
→ MATHS 2	0.	
→ OUTPUT	0.	

6 Parameter level

General Two parameter sets can be stored.

Access the level by ... * pressing **PGM** twice (3x **PGM** with activated program function) in normal display or in manual mode.

Access code The level is protected by a code.
factory-set code: 0001

Select parameter set * Select parameter set with **PGM**

PARAMETR → PARASET1

Parameters	Display	Value range	factory-set	Meaning
Controller structure	STR 1	P, I, PD, PI, PID	PID	Structure 2 refers to the second output in the case of a double-setpoint controller. With modulating controllers, only PI and PID are possible.
	STR 2	P, I, PD, PI, PID	PID	
Proportional band	XP1	0 – 9999 digit	0 digit	Size of the proportional band AT Xp1,2 =0 the controller structure is not effective!
	XP2	0 – 9999 digit	0 digit	
Derivative time	TV1	0 – 9999 sec	80 sec	Influences the differential component of the controller output signal
	TV2	0 – 9999 sec	80 sec	
Reset time	TN1	0 – 9999 sec	350 sec	Influences the integral component of the controller output signal
	TN2	0 – 9999 sec	350 sec	
Switching cycle time	CY1	0 – 9999 sec	20 sec	For a switching output, the cycle time should be selected so that the energy supply to the process is virtually continuous, while, at the same time, not overloading the switching devices.
	CY2	0 – 9999 sec	20 sec	
Contact spacing	XSH	0 – 999 digit	0 digit	Spacing between two control contacts for double-setpoint controllers, modulating controllers and proportional controllers with integral actuator driver.
Switching differential	XD1	0 – 999 digit	1 digit	Differential of switching controllers for Xp = 0.
	XD2	0 – 999 digit	1 digit	
Stroke time	TT	5 – 3000 sec	60 sec	Utilised stroke time of the control valve on modulating controllers and proportional controllers with integral actuator driver.
Working point	Y0	-100 to +100%	0%	Output for P and PD controllers (y = Y0 at x = w).
Output limiting	Y1	0 – 100%	100%	Maximum output limit
	Y2	-100 to +100 %	-100%	Minimum output limit
Minimum relay ON time	TK1	0 – 60sec	0sec	Limitation of the switching rate on switching outputs
	TK2	0 – 60sec	0sec	



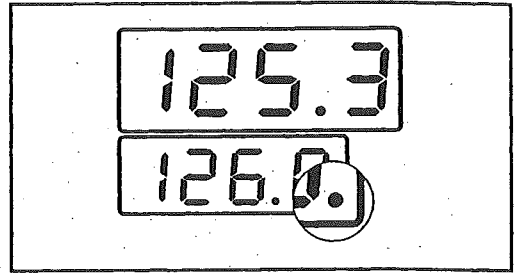
The display of the parameters on the unit depend on the controller type that was selected.

⇒ Section 7.1 "Controller"

6 Parameter level

Active parameter set

When parameter set 2 is active, the decimal point is lit up on the right of display 2.



7 Configuration level 1

General

The following applies to the representation of parameters and functions on the unit:

The parameter is not displayed when

- the instrument features do not permit the function assigned to the parameter.
Example: Output 3 cannot be configured when output 3 is not available to the instrument.
- the parameter is irrelevant for the function that was previously configured.
Example: Analogue input 1 is configured to "Pt100", which means that display start/end for standard signals will not be indicated.

Access the level by ...

- * pressing **PGM** 3 times (4x **PGM** with activated program function) in normal display or in manual mode.

Access code

The level is protected by a code.

factory-set code: 0002

Overview

→ Controller
⇒ Page 35

→ controller type
control direction
controller inputs

→ process value
external setpoint
external setpoint
with correction
stroke retransmission
additive disturbance
multiplying disturbance

setpoint limits

→ setpoint start
setpoint end

manual output
self-optimisation
output 1+ 2 for self-
optimisation
dead band
fuzzy control 1
fuzzy control 2

→ Limit comparators
⇒ Page 37

→ limit comparator 1–8

→ function
action
switching differential
limit value
function on over/
underrange
switch-on delay
pulse function

LK inputs

→ limit comparator PV
limit comparator setpoint

→ = press **ENTER** !

7 Configuration level 1

→ Inputs ⇒ Page 40	→ analogue input 1 – 4	→ transducer linearisation measurement correction constant cold-junction temperature external cold-junction temperature heater current monitoring display start display end range start range end filter time constant customized recalibration	→ start value end value
	supply frequency unit		
→ Outputs ⇒ Page 45	→ output 1 – 6	→ function output signal zero point end value output signal on under/overrange	
→ Ramp and program function ⇒ Page 46	→ function ramp slope unit of slope		
→ Maths/logic ⇒ Page 48	→ mathematics 1+2	→ function variable a variable b range start range end linearisation	
	logic 1+2		
→ Display ⇒ Page 53	→ configuration 1+2	→ display 1 – 3	→ display value decimal point
	time-out automatic display switching		
→ Logic function ⇒ Page 55	→ logic input 1 – 8 limit comparator 1 – 8 logic output 1+2		
→ Interface ⇒ Page 57	→ type of protocol data format	→ baud rate parity stop bit	
	instrument address minimum response time		

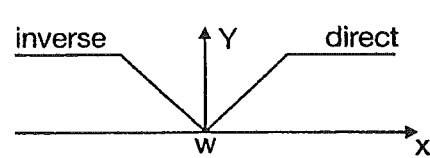
→ = press **ENTER** !

7 Configuration level 1

7.1 Controller

The following are set here: controller type and input variables of the controller, setpoint limits, conditions for manual mode, the presets for self-optimisation and the fuzzy logic.


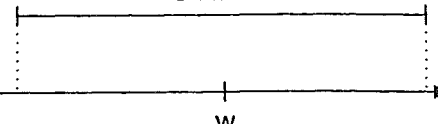
CONFIG 1 → CONTRL.

Parameters	Value/selection	Description
Controller type → CTR . TYPE	1-SETPT 2-SETPT MODULTNG ACTUATNG PROP.	single-setpoint controller double-setpoint controller modulating controller proportional controller with integral actuator driver proportional controller
Control direction → DIRECTN.	DIRECT INVERSE	Direct Inverse  <p>inverse: The controller output Y is > 0 when the process value is smaller than the setpoint (e. g. heating). direct: The controller output Y is > 0 when the process value is larger than the setpoint (e. g. cooling).</p>
Inputs of the controller process value external setpoint external setpoint with correction stroke retransmission additive disturbance multiplying disturbance	→ INPUTS → PV → EXTSET → EXTCORR → Y RETRM → ADD DIST → MUL DIST	NO FUNCT ANALOG 1 ANALOG 2 ANALOG 3 ANALOG 4 MATHS 1 MATHS 2 no function* analogue input 1** analogue input 2 analogue input 3 analogue input 4 Mathematics 1 Mathematics 2 Defines from which analogue inputs or maths functions the controller receives the signals. Stroke retransmission has to be configured in the case of a proportional controller with integral actuator driver! External setpoint with correction: External setpoint + setpoint 1 = present setpoint The external setpoint can be corrected upwards or downwards from the keys (setpoint 1). The present setpoint appears on the (LED) display. * factory-set for all, except process value ** factory-set for process value

Factory settings are shown **bold**.

7 Configuration level 1

CONFIG 1 → CONTRL.

Parameters	Value/selection	Description
Setpoint limits setpoint start setpoint end	→ WLIMITS → STARTVAL → END VAL	0. 400. -1999 – 0 to +9999 -1999 – 400 to +9999  The setpoint limits are ineffective with setpoint input via the interface.
Manual output	→ Y MANUAL	101. -100 – 100 101 = last output Defines the output after changing over to manual mode and on over/underrange.
Manual mode	→ MAN. MODE	ENABLED INHIBTD enabled inhibited
Self-optimisation	→ TUNE	ENABLED INHIBTD enabled inhibited
Output 1 for self-optimisation	→ TUNEOUT1	RELAY SSRELAY ANOUTPUT Relay solid-state relay and logic output analogue output type of controller output 1 on self-optimisation
Output 2 for self-optimisation	→ TUNEOUT2	RELAY SSRELAY ANOUTPUT Relay solid-state relay and logic output analogue output type of controller output 2 on self-optimisation
Dead band	→ DEADBAND	0. 0 – 100 digit serves to minimise the output movement within the dead band; e. g. with noisy signals. Dead band  The deadband is only effective with controller structures with I-component.
Fuzzy control 1	→ FC1	0. 0 – 100 0 = fuzzy control off Intensity of the fuzzy signal added to the controller output to improve the control quality.
Fuzzy control 2	→ FC2	30. 0 – 30 – 100 Influences the controller parameters during activated fuzzy module to improve the control quality.

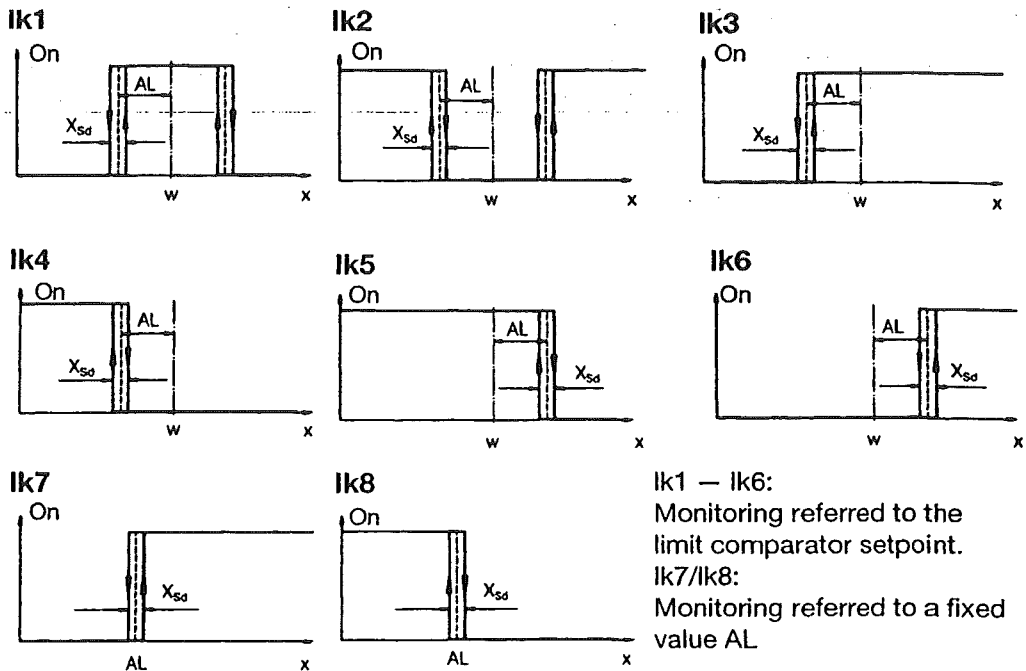
Factory settings are shown **bold**.

7.2 Limit comparators

Limit comparators (limit monitors, limit contacts) can be used to monitor an input variable (limit comparator process value) against a fixed limit value or another variable (limit comparator setpoint). When a limit is exceeded, a signal can be output.

Limit comparator functions

Limit comparators can have different switching functions.



w = limit comparator setpoint, AL = limit,
x = limit comparator process value, X_{sd} = differential

CONFIG 1 → LIMITC

Limit comparator 1

...

Limit comparator 8

Parameters	Value/selection	Description
→LIMITC1	-	Configuration of limit comparators as in example "limit comparator 1" below.
...	-	
→LIMITC8	-	

Factory settings are shown bold.

CONFIG 1 → LIMITC → LIMITC1


Function

Parameters	Value/selection	Description
→FUNCTION	NO FUNCT LK1 ... LK8	no function function lk1 ... function lk8

Factory settings are shown bold.

7 Configuration level 1

CONFIG 1 → LIMITC → LIMITC1

	Parameters	Value/selection	Description
Action	→ ACTION	ABSOLUTE RELATIVE	absolute relative (explanation see below)
Switching differential X_{sd}	→ DIFFERTL	1.	0 – 1 – 100 digit
Limit value AL	→ LIMIT	0.	-1999 – 0 to +9999 digit
Function on over/underrange	→ RANGEFCT	RELDE-EN RELENERG	relay de-energised relay energised
	 If a limit comparator is connected to an output, then the setting "Output signal on over/underrange" of the output has priority. ⇒ Section 7.4 "Outputs"		
Switch-on delay	→ DELAY	0.	0 – 9999sec
Pulse function	→ PULSEFCT	0.	-1 – 0 to +9999s The limit comparator is auto- matically reset after an adjustable interval. -1= The limit comparator has to be reset with the ENTER key or the logic function (all displays off).
Limit comparator inputs	→ INPUTS	ANALOG 1	analogue input 1*
limit comparator process value	→ PV LK	...	...
limit comparator setpoint	→ SET LK	ANALOG 4 MATHE 1 MATHE 2 PV SETPOINT RAMPENDV CNTRLDEV OUTPUT	analogue input 4 mathematics 1 mathematics 2 process value setpoint** ramp end value control deviation output
			* factory-set for LK process value ** factory-set for LK setpoint

Factory settings are shown bold.

7 Configuration level 1

Absolute

At the time of the alteration, the limit comparator acts in accordance with its function.

Relative

The limit comparator is in the OFF status.

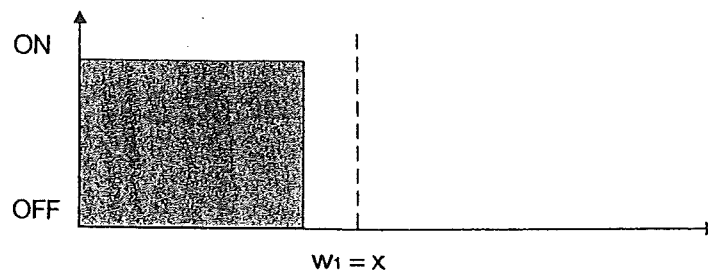
An alteration of the limit or the (limit comparator) setpoint could cause the limit comparator to switch ON. Such a reaction will be suppressed, and this condition maintained until the (limit comparator) process value has moved away from the switch-on region (grey area).

Example:

Monitoring the (controller) process value x with function lk4

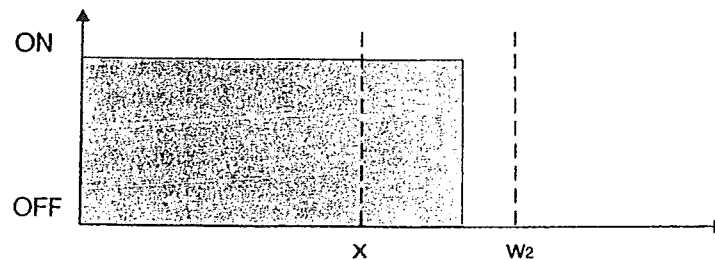
Setpoint alteration $w_1 \rightarrow w_2$

a) Initial status



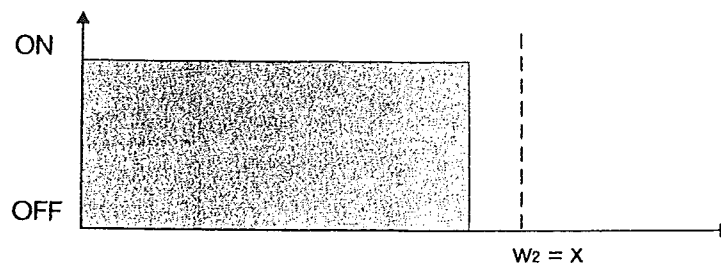
b) Status at the time of the alteration.

The limit comparator remains on "OFF" although the process value is within the switch-on region.



c) Control stabilised

The limit comparator again operates according to its function.



This function also prevents a limit comparator from being triggered during the start-up phase.

7 Configuration level 1

7.3 Inputs


The analogue inputs are configured here.

CONFIG 1 → INPUTS

Parameters	Value/selection	Description
Analogue input 1 →ANALOG 1		Configuration of the analogue inputs as in the example "analogue input 1" below.
...		
Analogue input 4 →ANALOG 4		
Supply frequency →PWRFREQ	50 HZ 60 HZ	50Hz 60 Hz
Unit →UNIT	DEGREE C DEGREE F	°C °F

Factory setting are shown bold.

CONFIG 1 → INPUTS → ANALOG 1


Parameters	Value/selection	Description
Transducer →PROBE	NO FUNCT RESTHERM TC INTRN TC EXTRN TC CONST POT HEATCURR 0 - 20mA 0 - 1 V 0 -100mV -1 - 1V +/-100mV 4 - 20mA 0 - 10V 2 - 10V +/-10V	no function* resistance thermometer** thermocouple (internal cold junction) thermocouple (external cold junction) thermocouple (constant cold junction) potentiometer heater current 0 – 50mA AC 0 – 20mA 0 – 1V 0 – 100mV -1 to +1V -100to +100mV 4 – 20mA 0 – 10V 2 – 10V -10Vto +10V * factory-set on analogue input 2, 3, 4 ** factory-set on analogue input 1 For heater current, the heater current monitoring of the output must also be configured (see "heater current monitoring" below).
 The selection of the transducers depends on the hardware configuration of the analogue inputs. -10/0/2 – 10V will only be indicated if configured accordingly. ⇒ Section 9 "Retrofitting of cards"		

Factory settings are shown bold.

7 Configuration level 1

CONFIG 1 → INPUTS → ANALOG 1

Linearisation

Parameters	Value/selection	Description									
→LINTAB	LINEAR PT100 PT1000 PT500 PT50 CUE0 KTY PTK9 NI100 TC TPE J TC TPE E TC TPE K TC TPE N TC TPE T TC TPE B TC TPE R TC TPE S TC TPE U TC TPE L CUST LIN W5RE W26 W3RE W25 W3RE W26	linear Pt 100 Pt 1000 Pt 500 Pt 50 Cu 50 KTY (1kΩ at 25°C)* Pt K9 Ni 100 Fe-Con J NiCr-Con E NiCr-Ni K NiCrSi-NiSi N Cu-Con T Pt30Rh-Pt6Rh B Pt13Rh-Pt R Pt10Rh-Pt S Cu-Con U Fe-Con L customized linearisation W5Re-W26Re W3Re-W25Re W3Re-W26Re * for other types, see setup program (extended configuration) for customized linearisation up to 20 interpolation points can be realised (with setup program only).									
→OFFSET	0.	-1999 — 0 to +9999 digit Measurement correction can be used to correct a measured value by a certain amount upwards or downwards. Examples: <table> <tr> <th>measured value</th><th>offset</th><th>displayed value</th></tr> <tr> <td>294.7</td><td>+0.3</td><td>295.0</td></tr> <tr> <td>295.3</td><td>- 0.3</td><td>295.0</td></tr> </table>  The controller uses the corrected value (= displayed value) for its calculation. This value does not corres- pond to the actually measured value. If incorrectly applied, this can result in impermissible values of the control variable.	measured value	offset	displayed value	294.7	+0.3	295.0	295.3	- 0.3	295.0
measured value	offset	displayed value									
294.7	+0.3	295.0									
295.3	- 0.3	295.0									

Measurement correction

Factory settings are shown **bold**.

7 Configuration level 1

CONFIG 1 → INPUTS → ANALOG 1

Parameters	Value/selection	Description
Constant cold-junction temperature for thermocouples →CJTEMP	50.	0 – 50 – 100 digit Temperature of the cold-junction thermostat
External cold-junction temperature for thermocouples →EXTTEMP	ANALOG 1 ... ANALOG 4	Analogue input 1 ... Analogue input 4 Measurement of the cold-junction temperature with a temperature probe.
Heater current monitoring (output) →HEATMON	NO FUNCT OUTPUT1 ... OUTPUT6	no function Output 1 ... Output 6 The heater current is evaluated using a current transformer with a standard output signal; it can be monitored by linking the analogue input to a limit comparator. The measurement is always made when the heating contact is closed. The measured value is retained until the next measurement.
Display start →DSPLSTRT	0.	-1999 – 0 to +9999 digit
Display end →DISPLEND	100.	-1999 – 100 to +9999 digit On transducers with standard signal and on potentiometers, a displayed value is assigned to the actual signal. Example: 0 – 20mA \triangleq 0 – 1500°C. The range of the physical signal can be 20% wider or narrower without triggering an alarm.
Range start →RNGESTRT	-1999.	-1999 to +9999 digit
Range end →RANGEEND	9999.	-1999 to +9999 digit The measuring range of the transducers can be restricted for monitoring. Going under/overrange (range start, range end) will result in an alarm. Example: Pt100 (range: -200 to +850°C). An alarm message is to be output for temperatures outside the range 15 – 200°C. → range start: 15 range end: 200

Factory settings are shown **bold**.

7 Configuration level 1

CONFIG 1 → INPUTS → ANALOG 1

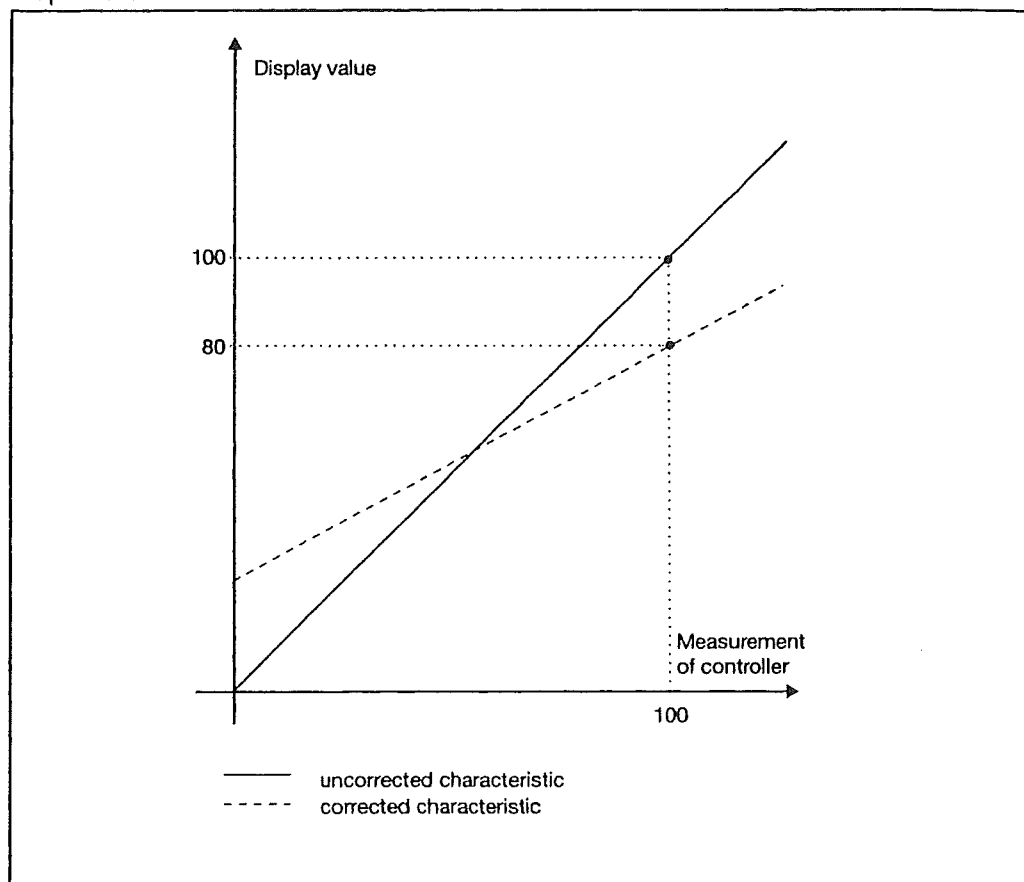
	Parameters	Value/selection	Description
Filter time constant	→ FILTER	0.6	0 — 0.6 — 100 sec To adjust the digital input filter (0sec = filter off). When filter time constant is large: - high damping of disturbance signals - slow reaction of process value indication to PV changes - low limit-frequency (2nd order low-pass filter)
	→ RECAL		
Customized recalibration	→ STARTVAL	0.	-1999 — 0 to +9999 digit
	→ ENDVALUE	1.	-1999 — 1 to +9999 digit (for explanation, see below) factory-set access code: 0004

Factory settings are shown **bold**.

Customized recalibration

A signal is processed electronically (conversion, linearisation ...) to produce a measured value via the analogue inputs of the controller. This measured value enters into the calculations of the controller and can be visualised on the displays (measured value = indicated value).

This fixed relationship can be modified if required, i. e. the position and the slope of the measurement characteristic can be altered.



7 Configuration level 1

Procedure

Apply two measurement points ((1), (3)), one after another, to the controller; they should be as far apart as possible.

At these measurement points, enter the required display value (start value, end value) in the controller. A reference instrument is most convenient for determining the measured values M1 and M2.

Measurement conditions must remain stable during programming.

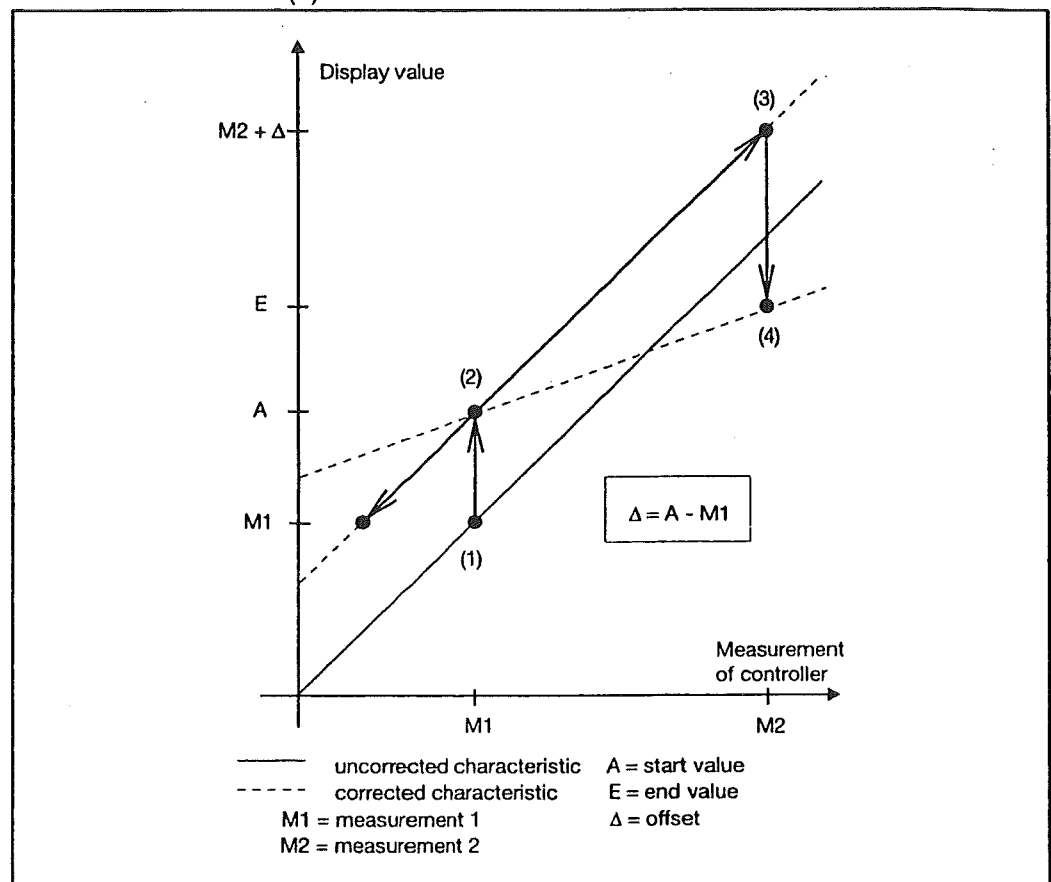
Programming

* Move to measurement point (1)

* Enter start value (2) ¹

* Move to measurement point (3)

* Enter end value E (4) ¹



☞ If recalibration is carried out without reference instrument, the offset Δ must be taken into account when moving to measurement point (3).

To cancel recalibration, the start and end values have to be programmed to the same value. This sets the start value to 0 and the end value to 1.

Any subsequent recalibration will otherwise be based on the corrected characteristic.

1. If start value=0 or end value =1 is to be set, then the value must first be altered using \blacktriangle or \blacktriangledown to enable correction.

7.4 Outputs

The outputs are configured here.

CONFIG 1 → OUTPUTS

Output 1

...

Output 6

Parameters	Value/selection	Description
→OUTPUT1	—	Configuration of the outputs as shown in the example "Output 1" below.
...	—	
→OUTPUT6	—	

Factory settings are shown **bold**.

CONFIG 1 → OUTPUTS → OUTPUT1

Function

Parameters	Value/selection	Description
→FUNCTION	NO FUNCT ANALOG1 ... ANALOG4 MATHS 1 MATHS 2 PV SETPOINT RAMPENDV CNTRLDEV OUTPUT W1 ... W4 CTRLOUT1 CTRLOUT2 VALUE XY OUT LK1 ... OUT LK8 LOGIN B1 ... LOGIN B8 LOGIC 1 LOGIC 2 MAN. MODE TRANSMITT	no function* analogue input 1 ... analogue input 4 mathematics 1 mathematics 2 process value setpoint ramp end value control deviation output setpoint 1 ... setpoint 4 controller output 1** controller output 2 address value limit comparator output 1 ... limit comparator output 8 logic input 1 ... logic input 8 logic 1 logic 2 manual mode supply for 2-wire transmitter * factory-set on all outputs except output 1 ** factory-set on output 1
Output signal for analogue output	→SIGNAL 0 — 10 V 2 — 10 V -10 — 10V 0 — 20mA 4 — 20mA -20 — 20mA	0 — 10V 2 — 10V -10 to +10V 0 — 20mA 4 — 20mA -20 to +20mA

Factory settings are shown **bold**.

7 Configuration level 1

CONFIG 1 → OUTPUTS → OUTPUT 1

Parameters	Value/selection	Description
→ STARTVAL	0.	-1999 — 0 to +9999 digit
→ ENDVALUE	100.	-1999 — 100 to +9999 digit A physical output signal is assigned to the value range of an output variable. Example: Setpoint 1 (value range: 150—500°C) is to be output via the analogue output (0—20mA). i.e.: 150 — 500°C Δ 0 — 20mA zero: 150 end value: 500 ☞ Setting for analogue controller outputs with direct action (e. g. cooling): zero: 0 end value: -100
→ RANGEFACT	0.	0 — 101 101=last output signal is retained The output produces a defined signal. ☞ If the output is a controller output, the controller switches over to manual mode and the settings for manual output apply. ⇒ Section 7.1 "Controller"

Factory settings are shown bold.

7.5 Ramp and profile program function

The ramp or profile program function is activated here.

CONFIG 1 → RAMP

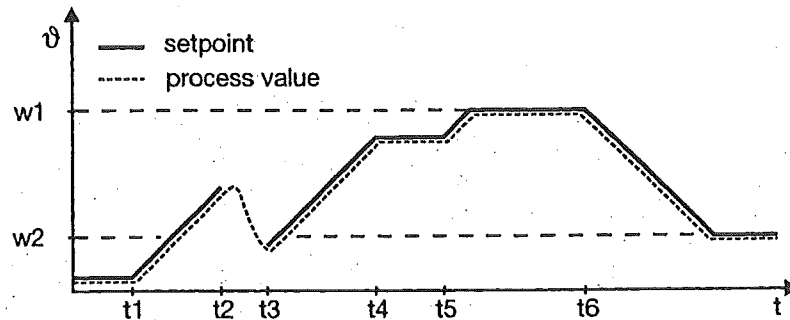
Parameters	Value/selection	Description
→ FUNCTION	NO FUNCT RAMP PROGRFCT	no function ramp function profile program function
→ SLOPE	0.	0 — 999
→ UNIT	DEGC/MIN DEGC/HR DEGC/DAY	degree Celsius/minute degree Celsius/hour degree Celsius/day

Factory setting are shown bold.

7 Configuration level 1

Ramp function

A rising or a falling ramp function can be implemented. The ramp end-value is determined by the setpoint input.



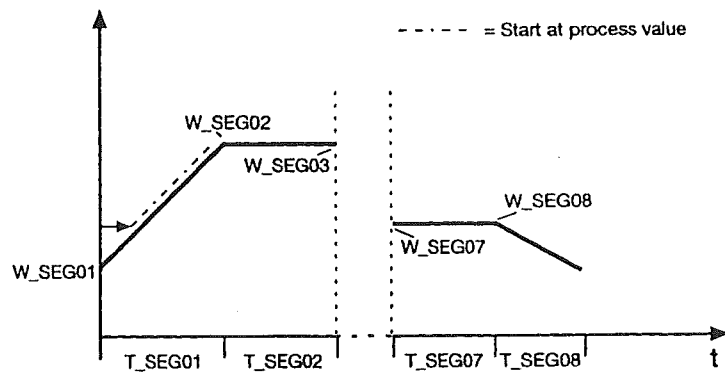
- t1 power on (w1 active)
- t2–t3 power failure/manual mode/probe break
- t4–t5 ramp stop
- t6 setpoint switching to w2



The ramp function is interrupted on a probe break or for manual mode. The outputs react as for over/underrange (configurable).


Profile program function

It is possible to produce a profile program with up to eight segments. When this function is activated, an additional level (PROGFACT) appears on the screen at which the eight segment setpoints (W_SEG01 – W_SEG08) and the eight segment times (T_SEG01 – T_SEG08) are programmed.




The program starts at the process value or the program start (adjustable via the setup program only!). When starting at the process value, the profile is searched to find a setpoint that corresponds to the process value at the instant of the start. The profile then continues from this point. If the process value is outside the profile, a start is made at the first program segment. With segments that are not required, the segment time must be 0.

Starting the program

- * Start and cancel program with 
- or via the logic function

Holding the program

- * Hold and continue program with 

7 Configuration level 1

7.6 Maths and logic module

This menu is shown only with enabled maths and logic module.

CONFIG 1 → MATHSLOG

Mathematics 1

Mathematics 2

Logic 1

Logic 2

Parameters	Value/selection	Description
→MATHS 1	—	Configuration of mathematics as shown in example "Maths 1" below.
→MATHS 2	—	
→LOGIC 1	NO FUNCT FORMULA	no function logic formula
→LOGIC 2	NO FUNCT FORMULA	no function logic formula

Factory settings are shown **bold**.

CONFIG 1 → MATHSLOG → MATHS 1

Function

Variable a

Variable b

Range start

Range end

Parameters	Value/selection	Description
→FUNCTION	NO FUNCT DIFFERNC RATIO HUMIDITY FORMULA	no function difference (a-b) ratio (a/b) humidity (a;b) maths formula
→VAR A	ANALOG1 ... ANALOG4 MATHS 1 MATHS 2	analogue input 1 ... analogue input 4 mathematics 1 mathematics 2
→VAR B	ANALOG1 ANALOG2 ANALOG3 ANALOG4 MATHS 1 MATHS 2	analogue input 1 analogue input 2 analogue input 3 analogue input 4 mathematics 1 mathematics 2
→RNGESTRT	-1999.	-1999 to +9999sec
→RANGEEND	9999.	-1999 to +9999sec
		Definition of a value range for the result of a mathematical calculation. If the value range is infringed, an alarm message will be produced.

Factory settings are shown **bold**.

7 Configuration level 1

CONFIG 1 → MATHSLOG → MATHS 1

Linearisation

Parameters	Value/selection	Description
→LINTAB	LINEAR	linear
	PT100	Pt 100
	PT1000	Pt 1000
	PT500	Pt 500
	PT50	Pt 50
	CU50	Cu 50
	KTY	KTY
	PTK9	Pt K9
	NI100	Ni 100
	TC TPE J	Fe-Con J
	TC TPE E	NiCr-Con E
	TC TPE K	NiCr-Ni K
	TC TPE N	NiCrSi-NiSi N
	TC TPE T	Cu-Con T
	TC TPE B	Pt30Rh-Pt6Rh B
	TC TPE R	Pt13Rh-Pt R
	TC TPE S	Pt10Rh-Pt S
	TC TPE U	Cu-Con U
	TC TPE L	Fe-Con L
	CUST LIN	customized linearisation
	W5RE W26	W5Re-W26Re
	W3RE W25	W3Re-W25Re
	W3RE W26	W3Re-W26Re

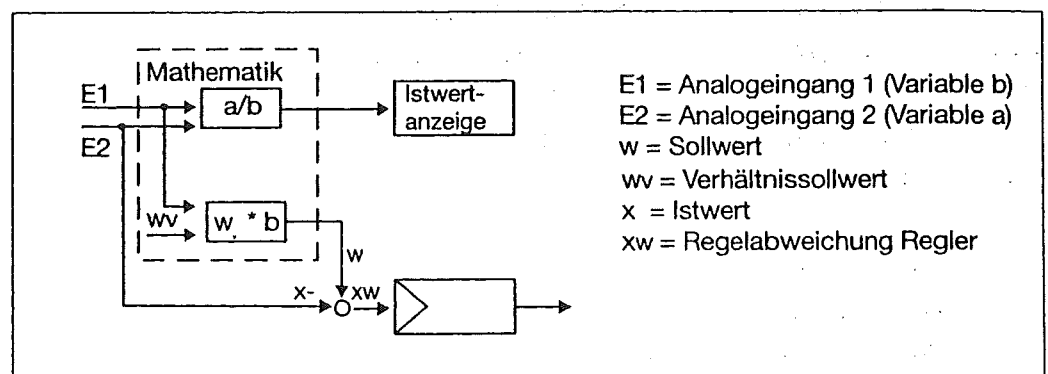
Factory settings are shown bold.

Ratio control

The control is always based on variable a.

The maths module forms the ratio of the measurements a and b (a/b) and produces the setpoint for the controller. The ratio of the measured values a and b can be called up and indicated via the "Maths 1" or "Maths 2" functions.

The required ratio a/b is programmed in the setpoint input as setpoint (ratio setpoint).



Humidity control

The humidity controller receives the process value from a psychrometric humidity probe through the mathematical linkage of wet bulb and dry bulb temperatures.

Variable a - dry bulb temperature

Variable b - wet bulb temperature


7 Configuration level 1

Formula input

- The formula character string consists of ASCII-characters and has a maximum length of 70 characters.
- The formula can only be entered in the setup program.
- The formulae can be entered freely according to the usual mathematical rules.
- Spaces can be inserted in the formula character string without restriction. No spaces are allowed within function designations, variable names and constants.

Mathematical formula

Mathematical signs and functions

Priority	Mathematical sign/function	Note
high	()	brackets
	SQRT, MIN, MAX, LOG, LN, SIN, COS, TAN, ABS, EXP, INT, FRC	functions
	**	exponent (x^y)
	+, -	sign
	*, /	multiplication, division
low	+, -	addition, subtraction

Variables

Variable name	Note
E1	analogue input 1
...	...
E4	analogue input 4
M1	mathematics 1
M2	mathematics 2
X	process value
WR	controller setpoint
WE	ramp end value
XW	control deviation
Y	output
W1	setpoint 1 (operating level)
...	...
W4	setpoint 4 (operating level)
YH	output heating
YK	output cooling
ADRA	storage address (analogue)
TEMP	temperature at terminals
T0	sampling time
RXK1	controller output 1
RXK2	controller output 2

7 Configuration level 1

Variable name	Note
ADRB	storage address (binary)
LK1 ... LK8	output limit comparator 1 ... output limit comparator 8
B1 ... B8	logic input 1 ... logic input 8
L1 L2	logic 1 logic 2
HAND	manual mode

Functions


Syntax	Function
SQRT(a)	square root of a Examples: SQRT(E2) SQRT(13.5+E3)
MIN (a1, a2 ...)	returns the smallest value of a series of arguments Examples: MIN(3, 7) (returns the value 3) MIN(E1, E2, E3, 0.1)
MAX (a1, a2 ...)	returns the largest value of a series of arguments Examples: MAX(3, 7) (returns the value 7) MAX(E1, E3, E3, 0.1)
LOG(a)	logarithm to base 10 Examples: LOG(1000) (returns the value 3) LOG(E1/100)
LN(a)	logarithm to base e Examples: LN(2.71828128) (returns the value 1) LN(E1/100)
SIN(a)	sine of a a in degrees (0 – 360°C) Examples: SIN(90) (returns the value 1) SIN(E1*360/100)
COS(a)	cosine of a a in degrees (0 – 360°C) Examples: COS(180) (returns the value -1) COS (E1*360/100)
TAN(a)	tangent of a a in degrees (0 – 360°C) Examples: TAN(45) (returns the value 1) TAN(E1*45/100)
ABS(a)	absolute value of a Examples: ABS(-12) (returns the value 12) ABS(13.5+E3)

7 Configuration level 1

Syntax	Function
EXP(a)	exponential function e^a Examples: EXP(1) (returns the value 2.718) EXP(E1/100)
INT(a)	integer portion of a Examples: INT(8.3) (returns the value 8) INT(E1)
FRC(a)	decimal portion of a Examples: FRC(8.3) (returns the value 0.3) FRC(E1)

Logic formula

Logic operators

Priority	Operator	Note
high	()	brackets
	NOT, !	negation
	AND, &	AND linkage
	XOR, ^	exclusive OR linkage
	OR, |	OR linkage
low		

Variables

Variable names	Note
RXK1 RXK2	controller output 1 controller output 2
ADRB	storage address (binary)
Lk1 ... LK8	output limit comparator 1 ... output limit comparator 8
B1 ... B8	logic input 1 ... logic input 8
HAND	manual mode

Edge recognition

Edge	Note
/	variable is "TRUE" only with rising edge (e. g. /B1)
\	variable is "TRUE" only with falling edge (e. g. \B1)

7 Configuration level 1

Constants

Constant name	Note
TRUE	logic 1
FALSE	logic 0

Enabling maths and logic module

The maths and logic module can be enabled through a code via the setup program.

⇒ Extras → Enabling extra Codes

7.7 Display

The two display configurations are set here, as well as the time-out during configuration at the levels.

CONFIG 1 → DISPLAY

Parameters	Value/selection	Description
→ DSPCONF1		Configuration of the displays as shown in the example "Configuration 1" below.
→ DSPCONF2		
→ TIMEOUT	30.	0 — 30 — 9999sec 0=time-out OFF Interval after which an automatic return to normal display occurs if no key is pressed.
→ SCROLL	0.	0 — 9999sec 0=automatic changeover OFF Interval between the changeover of the two displays

Factory settings are shown **bold**.

CONFIG 1 → DISPLAY → DSPCONF1

Parameters	Value/selection	Description
→ DISPLAY1		
→ DISPLVAL	NO FUNCT ANALOG 1 ... ANALOG 4 MATHS 1 MATHS 2 PV SETPOINT RAMPENDV CNTRLDEV OUTPUT VALDISPL	no function analogue input 1 ... analogue input 4 mathematics 1 mathematics 2 process value setpoint ramp end value control deviation output address value
→ DECPOINT	XXXX.	XXXX. — X.XXX

Factory settings are shown **bold**.

7 Configuration level 1

CONFIG 1 → DISPLAY → DSPCONF 1

Display 2
Display value

Decimal point

Display 3
Display value

Decimal point

Parameters	Value/selection	Description
→ DISPLAY2 → DISPLVAL	NO FUNCT ANALOG 1 ... ANALOG 4 MATHS 1 MATHS 2 PV SETPOINT RAMPENDV CNTRLDEV OUTPUT VALDISPL	no function analogue input 1 ... analogue input 4 mathematics 1 mathematics 2 process value setpoint ramp end value control deviation output address value
→ DECPOINT	XXXX.	XXXX....X.XXX
→ DISPLAY3 → DISPLVAL	NO FUNCT ANALOG 1 ... ANALOG 4 MATHS 1 MATHS 2 PV SETPOINT RAMPENDV CNTRLDEV OUTPUT VALDISPL LIMITC BARG Y BARG XW TXTDISPL	no function analogue input 1 ... analogue input 4 mathematics 1 mathematics 2 process value setpoint ramp end.value control deviation output address value limit comparators (switching states) bar graph output bar graph control deviation text display
→ DECPOINT	XXXX.	XXXX.—X.XXX

Factory settings are shown **bold**.

Decimal point

If the value to be displayed can no longer be represented with the programmed decimal place, then the number of decimal places will be automatically reduced. If, subsequently, the measurement becomes smaller then the number will be increased to the programmed decimal point value.

7.8 Logic functions

Functions are assigned here to the logic signals of the logic inputs, limit comparators and the logic module.

CONFIG 1 → LOGICFCT

Logic input 1

...

Logic input 8

Limit comparator 1

...

Limit comparator 8

Logic 1

Logic 2

Parameters	Value/selection	Description
→LOGIN B1	NO FUNCT	no function
...	TUNESTRT	start self-optimisation
...	TUNESTOP	cancel self-optimisation
→LOGIN B8	MAN.MODE	changeover to manual mode
→OUT LK1	MANINHBT	manual mode inhibit
...	RAMPSTOP	ramp stop
...	RAMP OFF	ramp off
→OUT LK8	W SWITCH	setpoint switching
→LOGIC 1	X SWITCH	process value switching
→LOGIC 2	P SWITCH	parameter set switching
	KEYINHBT	key inhibit
	LEVINHBT	level inhibit
	TXTDISPL	text display*
	DISPLOFF	all displays off

* A maximum of 10 texts are input and assigned to the logic functions in the setup program

The functions are active when the contact is closed or the switching status is "ON".

All displays off:
 - all displays are switched off
 - limit comparators are acknowledged

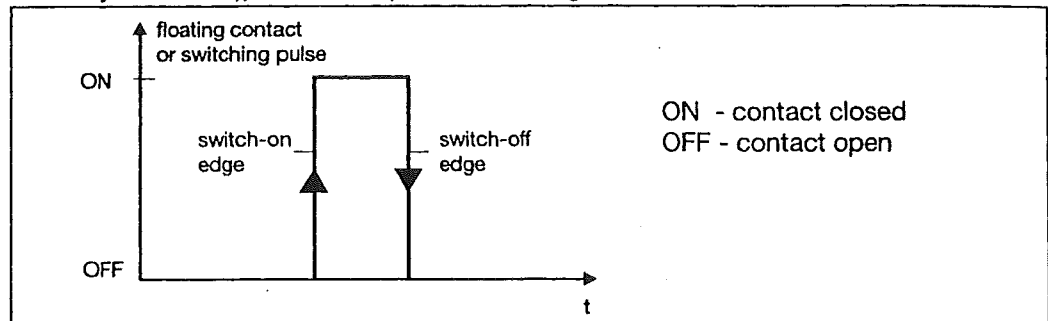
Text display and all displays off:
 response according to priority list

!

Factory settings are shown **bold**.

Switching action

The logic functions are activated via the logic inputs (floating contacts (switches/relay contacts)), limit comparators or logic.



The functions are divided into two groups:

7 Configuration level 1

Edge-triggered functions

The logic function reacts to switch-on edges.

The following functions are edge-triggered:

- start of self-optimisation

State-triggered functions

The logic function reacts to ON or OFF switching states.

Combined logic functions

A combination of two control variables (logic inputs, limit comparators and logic) is used to implement the functions setpoint/process value switching.

Any control variable can be selected. The states Z1 — Z2 are assigned to the control variables in descending order of the control variables (see list on the right).

Control variable	State
Logic input 1	
...	
Logic input 8	
Limit comparator 1	→ Z1
...	
Limit comparator 8	→ Z2
Logic 1	
Logic 2	

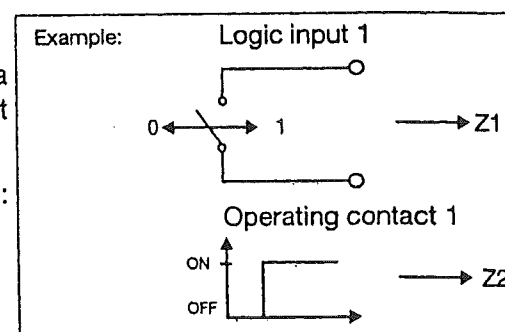
Example:

The process value is to be selected via one logic input and the state of one limit comparator.

This results in the following assignment:

Z1 - logic input 1

Z2 - limit comparator 1



Setpoint	Process value	Z2	Z1
setpoint 1/external setpoint/program	configured controller process value	0	1
setpoint 2	analogue input 2	0	1
setpoint 3	analogue input 3	1	0
setpoint 4	analogue input 4	1	1

0 = contact open /OFF

1 = contact closed /ON



If switching between two setpoints or process values only is required, then only one logic function has to be configured.

If more than two logic functions are configured to setpoint switching (process value switching), then only the first two (see list "Control variable - State") are significant.

7.9 Interface

CONFIG 1 → INTERFCE

	Parameters	Value/selection	Description
Protocol type	→ PROTOCOL	MODBUS MODINT	MODbus/Jbus MODbus int
Data format	→ DATAFMT		
Baud rate	→ BAUDRATE	1200 2400 4800 9600 1920	1200 baud 2400 baud 4800 baud 9600 baud 19200 baud
Parity	→ PARITY	NONE ODD EVEN ZERO	no parity odd parity even parity zero parity
Stop bit	→ STOPBIT	1 2	1 stop bit 2 stop bits
Unit address	→ UNITADDR	0.	0 – 1 – 254
Minimum response time	→ MIN TIME	0.	0 – 500msec Minimum period of time that elapses between the request of an instrument within a data network and the response of the controller.

Factory settings are shown bold.



Interface description B70.3570.2

7 Configuration level 1

8.1 Self-optimisation

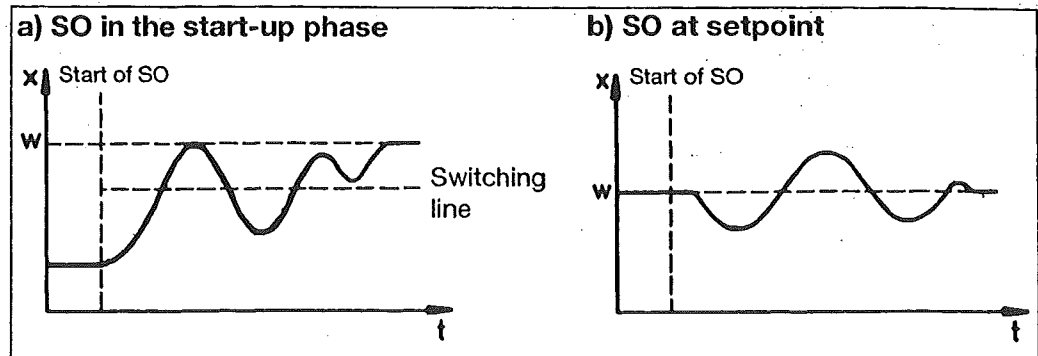
Procedure

Self-optimisation SO establishes the optimum controller parameters for PID or PI controllers.

Depending on the controller type, the following controller parameters are defined:

Reset time (T_{n1} , T_{n2}), derivative time (T_{v1} , T_{v2}), proportional band (X_{p1} , X_{p2}), switching cycle time ($Cy1$, $Cy2$), filter time constant (dF)

The controller selects one of two procedures (a or b) in accordance with the size of the control deviation.



The types of the controller outputs have to be defined for self-optimisation.

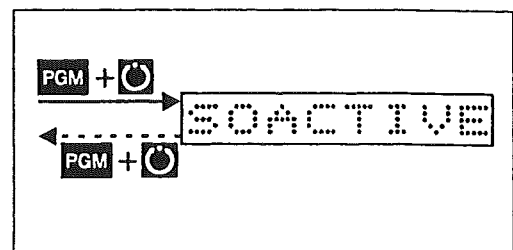
⇒ Section 7.1 "Controller"

Start of self-optimisation

Self-optimisation is automatically terminated, or can be cancelled.



Starting self-optimisation is not possible with active level inhibit.



8 Optimisation

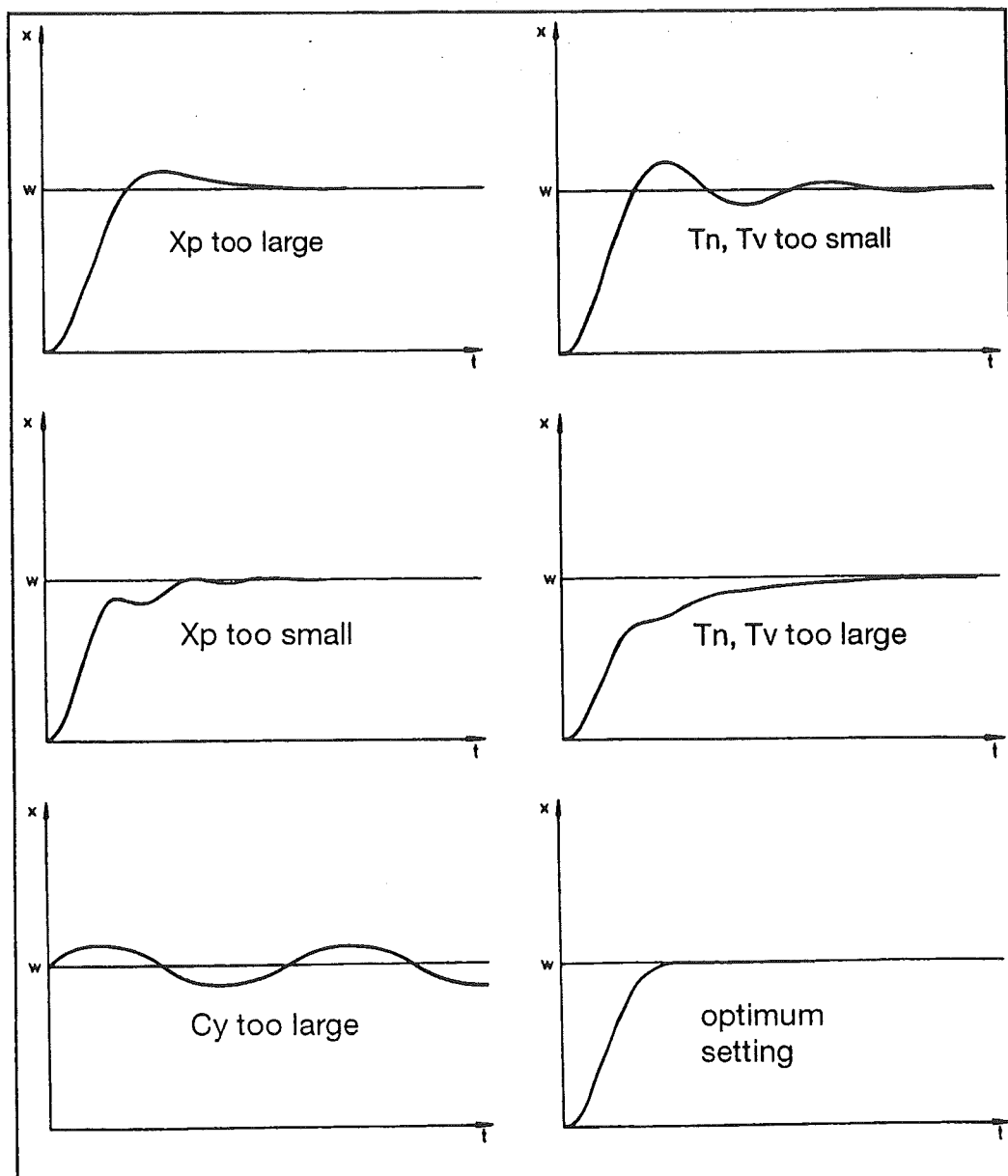
8.2 Checking the optimisation

Start-up procedure

The optimum adjustment of the controller to the process can be checked by recording the start-up with the control loop closed. The diagrams below indicate possible maladjustments and how these can be corrected.

Control response

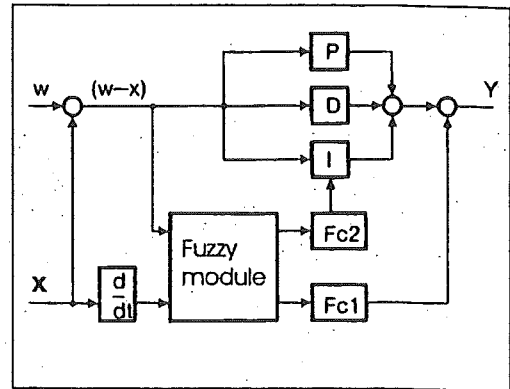
The control response of a third-order control loop of a PID controller is shown as example. However, the procedure for adjusting the controller parameters can also be applied to other control loops.



8.3 Fuzzy parameters

In addition to the algorithms for the various controller structures, the controller software also includes a fuzzy module. This can be used to improve both the control and the disturbance response of controllers with I-action.

When the fuzzy module is activated, the output y is made up of the controller output and the output signal of the fuzzy module.



The parameter $Fc1$ affects the intensity of the fuzzy signal:

$Fc1 = 0$: Fuzzy module not activated

$0 < Fc1 \leq 100$: Fuzzy module activated

If the fuzzy module activated by $Fc1$ makes corrections to the output y , the reset time T_n is influenced during correction.

The parameter $Fc2$ is used to adjust the degree of influence on the reset time T_n .

$Fc2 = 0$: no influence on T_n

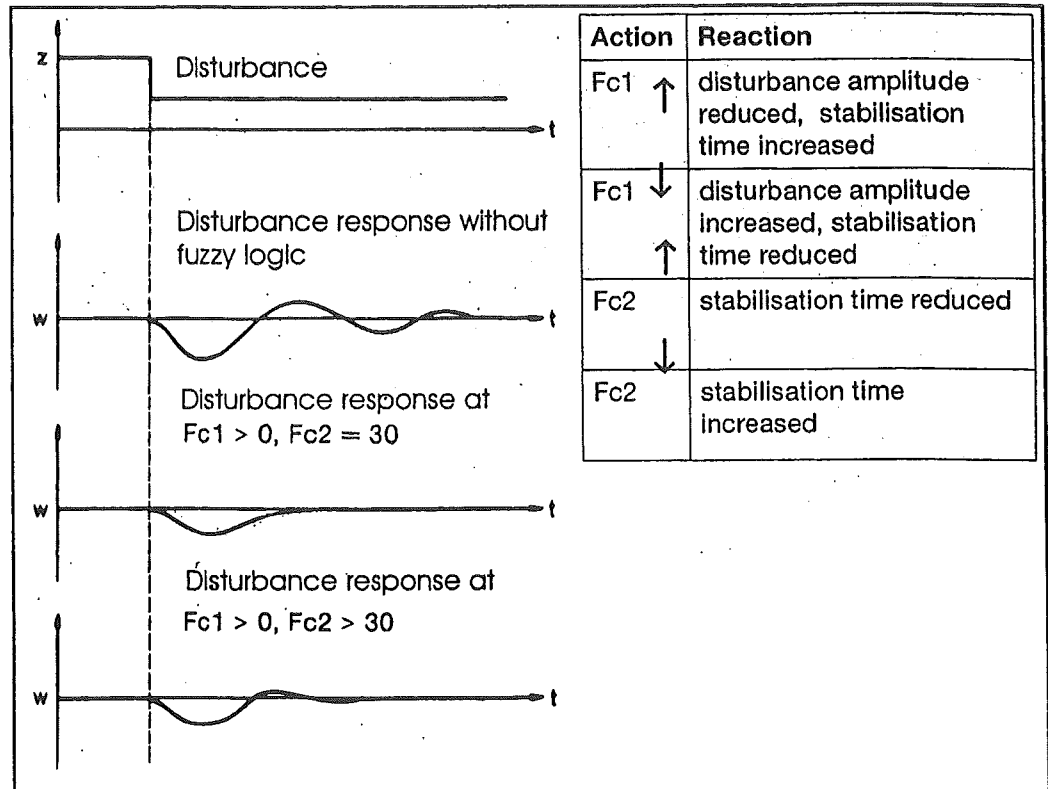
$0 < Fc2 \leq 100$: influence on T_n

When supplied, and also after self-optimisation, the fuzzy parameters are set to $Fc1 = 0$ and $Fc2 = 30$.

The fuzzy module can be activated at any time by setting $Fc1 > 0$.

The setting $Fc2 = 30$ is suitable for many applications. The optimum setting can be determined with the aid of the table below.

8 Optimisation



If the fuzzy module is inactivated ($Fc1=0$), $Fc2$ is also ineffective

The action and sensitivity of the fuzzy parameters depend largely on the process to be controlled.

The influence is greater in the case of proportional controllers than with switching controllers.

9 Retrofitting of cards

The following steps are necessary for retrofitting cards:



Only qualified personnel are permitted to retrofit cards.



The cards can be damaged by electrostatic discharges. Avoid electrostatic charges during fitting and removal. Carry out the card change on a workbench which is earthed.

Identifying the card

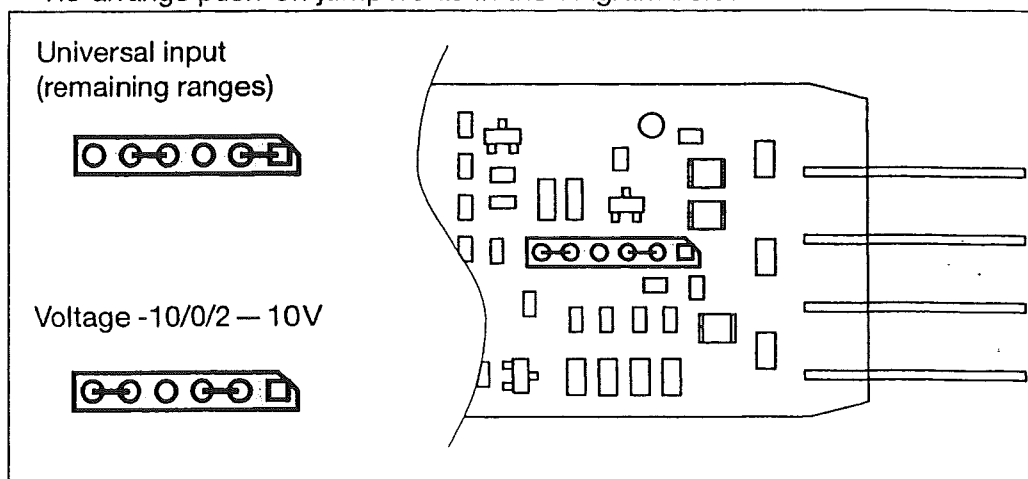
* Identify the card by the sales no. affixed to it.

Cards	Code	Sales No.
<u>Analogue input 3 and 4:</u> Universal input	1/2	70/00366099
<u>Outputs/logic inputs:</u> Relay (changeover contact)	1	70/00366100
Solid-state relay 230V 1A	2	70/00366101
Logic 0/5V	3	70/00366102
Logic 0/22V	4	70/00366103
Analogue output	5	70/00366104
Supply for 2-wire transmitter	6	70/00366105
Two logic inputs	7	70/00366106
RS422/485 interface	54	70/00366107

Configuring the analogue input

The analogue inputs are supplied ex-factory as universal inputs. They can be reconfigured to the standard signals -10/0/2 – 10V.

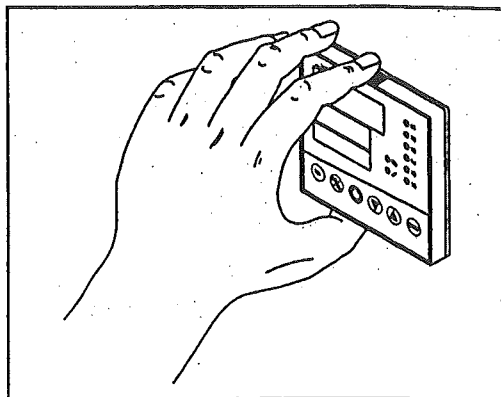
* Re-arrange push-on jumpers as in the diagram below



9 Retrofitting of cards

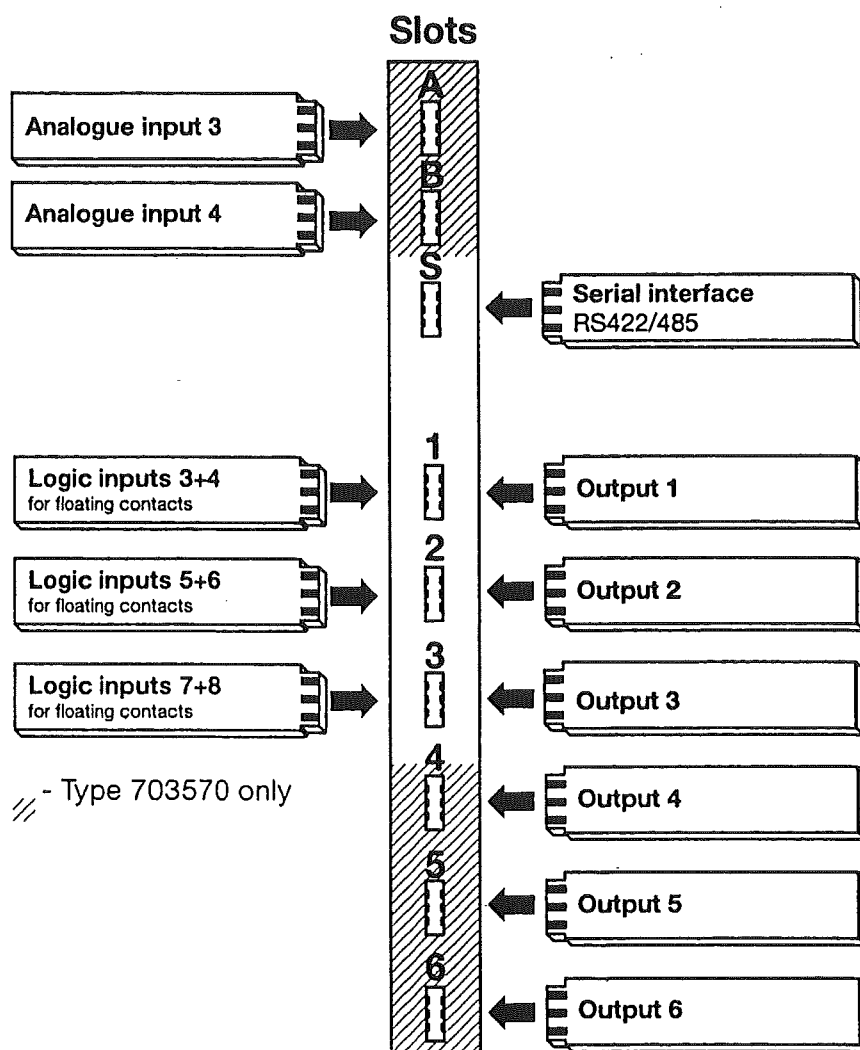
Removing the controller chassis

- * Pull off setup plug
- * Press together the knurled areas on the panel top and bottom (or left and right with landscape format) and pull out the controller chassis.

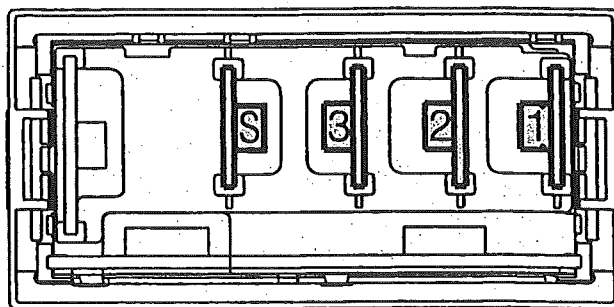
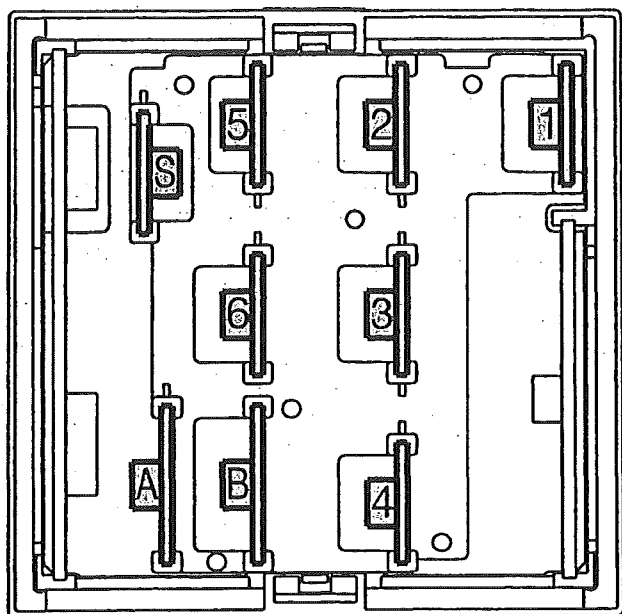


Assigning the slot

- * Determine the corresponding slot for the card

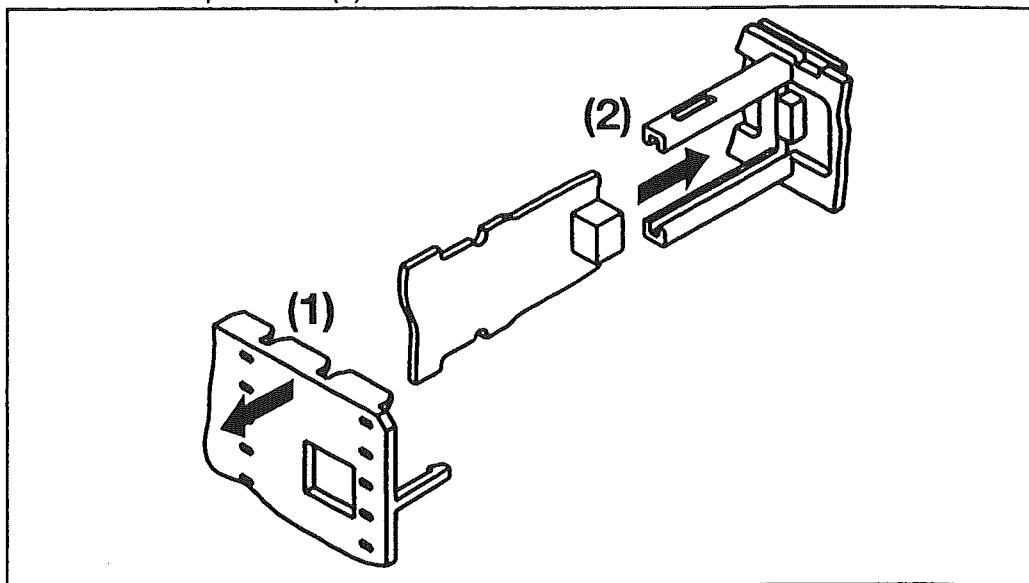


9 Retrofitting of cards



Inserting the card

- * Pull off the guide plate (1)
- * Insert the card into the guide until the projections on the card snap into the notches provided (2).



Inserting the controller chassis

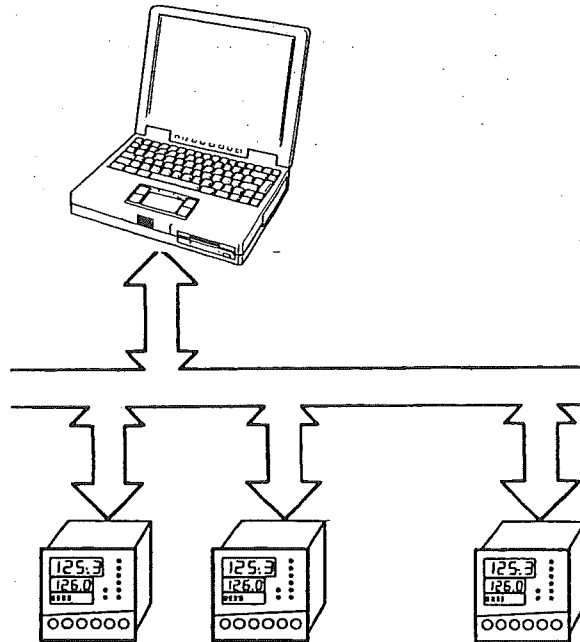
- * Fit on the guide plate
- * Push the controller chassis into the case until the lugs (underneath the knurled area) snap into place.

9 Retrofitting of cards

10 RS422/485 interface

The controller can be integrated into a data network via the interface. The following applications can be implemented, for example:

- process visualisation
- system control
- generating a report



The bus system is designed on the master-slave principle. A master computer can address up to 31 controllers and instruments (slaves). The interface is a serial interface to the RS422 and RS485 standards.

The following data protocols are possible:

- MODbus protocol
- Jbus protocol



Interface description B70.3570.2

10 RS422/485 interface

11.1 External relay module ER8

Through the use of the external relay module ER8, the controller can be expanded by eight relay outputs (changeover contacts). Communication with the controller is via the RS422/485 interface. All signals for switching outputs can be produced. Configuration is via the setup program only.

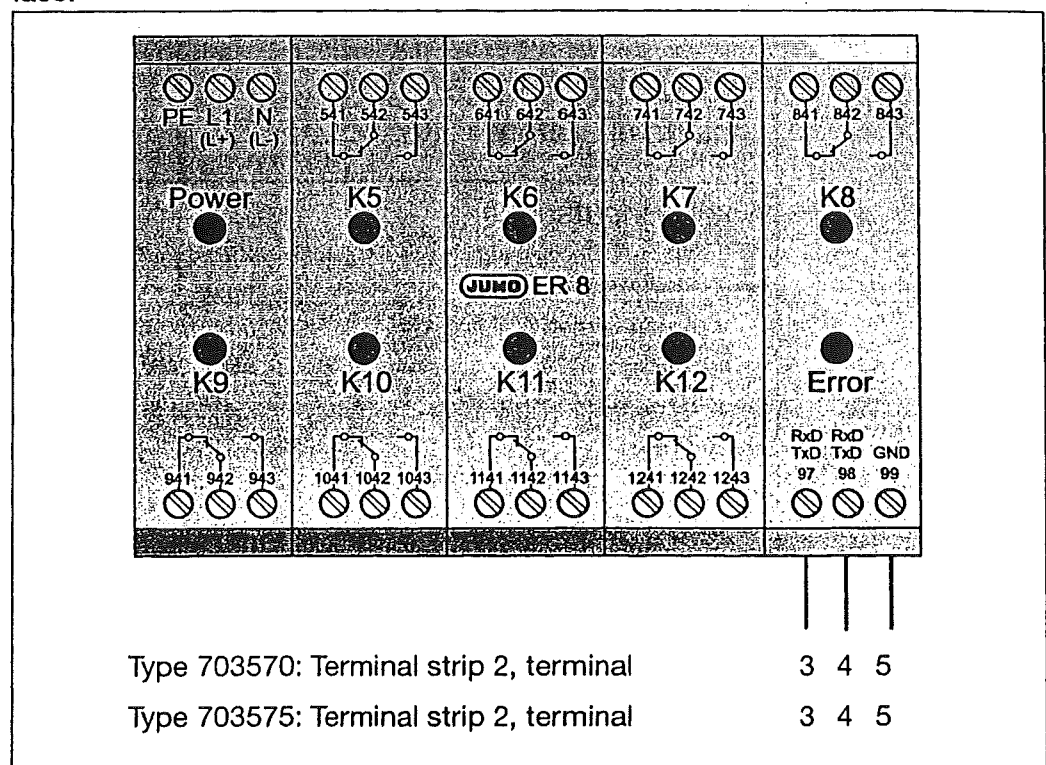
⇒ Section 7.4 "Outputs"



If the relay module ER8 is connected to the interface, no further communication is possible via the interface.

Connection

The electrical connection is carried out like the connection to an RS485 interface.



Configuring the relay module

- * Activate the relay module via the setup program
Edit → Settings only via setup → Expanded configuration

This activates the menu *Edit → External relay module*.

- * Configure the relay module



If the setup plug is connected to the controller, the relay module will not be operated and the relay contacts are de-energised.

11 Accessories

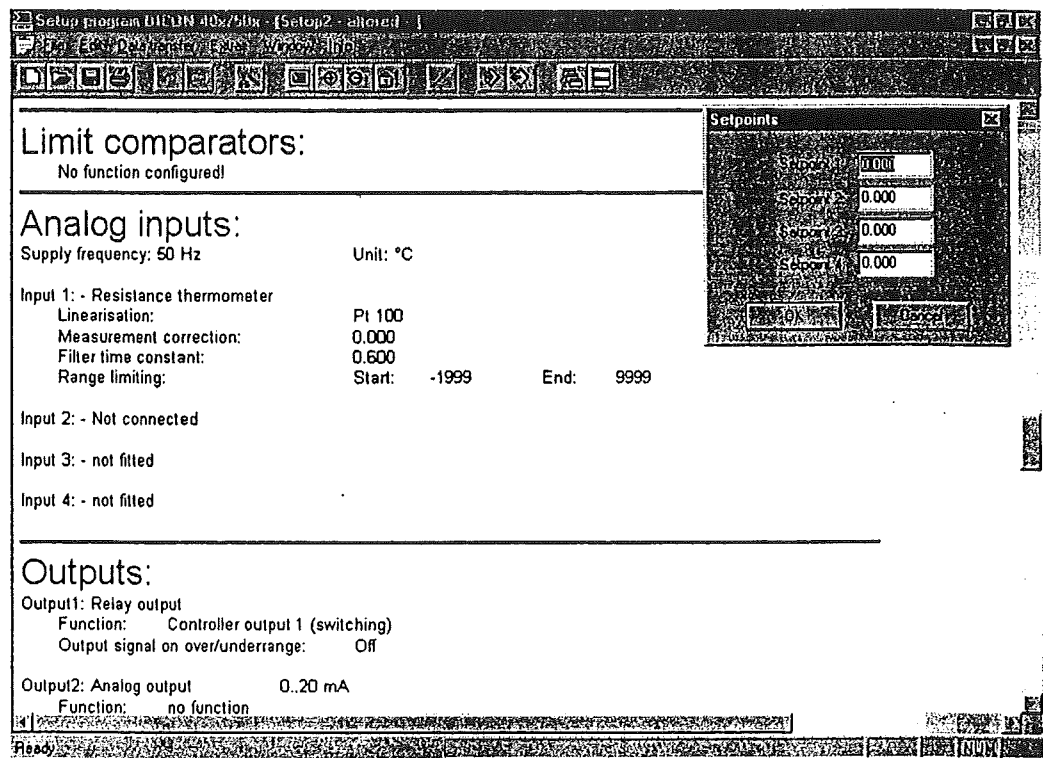
11.2 Setup program

A setup program for Windows® 95/98/NT4.0 is available for easy configuration of the controller.

Hardware requirements:

- PC-486DX-2-100
- 16 Mbyte RAM
- 15 Mbyte available on hard disk
- CD-ROM
- 1 free serial interface

The program shows the current configuration as a list in the background. The corresponding entry template is called up by double-clicking on the list, or via the menus.



Some controller functions can only be configured via the setup program:

- Customized linearisation (input of a linearisation table)
- Display brightness
- Switching off code request
- Configuring relay module

12.1 Technical data

Thermocouple input

Designation	Range	Meas. accuracy	Ambient temperature error
Fe-Con L	-200 +900°C	≤0.25%	100 ppm per °C
Fe-Con J EN 60 584	-210 +1200°C	≤0.25%	100 ppm per °C
Cu-Con U	-200 +600°C	≤0.25%	100 ppm per °C
Cu-Con T EN 60 584	-270 +400°C	≤0.25%	100 ppm per °C
NiCr-Ni K EN 60 584	-270 +1372°C	≤0.25%	100 ppm per °C
NiCr-Con E	-270 +1000°C	≤0.25%	100 ppm per °C
NiCrSi-NiSi N EN 60 584	-270 +1300°C	≤0.25%	100 ppm per °C
Pt10Rh-Pt S EN 60 584	-50 +1768°C	≤0.25%	100 ppm per °C
Pt13Rh-Pt R EN 60 584	-50 +1768°C	≤0.25%	100 ppm per °C
Pt30Rh-Pt6Rh B EN 60 584	0 – 1820°C	≤0.25%	100 ppm per °C
W5Re-W26Re	0 – 2320 °C	≤0.25%	100 ppm per °C
W3Re-W25Re	0 – 2400 °C	≤0.25%	100 ppm per °C
Cold junction	Pt100 internal, external or constant		

Resistance thermometer input

Designation	Type of connection	Range	Meas. accuracy	Ambient temperature error
Pt100 EN 60 751	2-wire/3-wire	-200 +850°C	≤0.05%	50 ppm per °C
Pt 50,500, 1000 EN 60 751	2-wire/3-wire	-200 +850°C	≤0.1%	50 ppm per °C
KTY11-6	2-wire	-50 +150°C	≤1.0%	50 ppm per °C
PtK9	2-wire	lithium-chloride sensor		
Sensor lead resistance	max. 30 Ω per conductor in 2-/3-wire circuit			
Measuring current	250 μA			
Lead compensation	not required for 3-wire circuit. For 2-wire circuit, lead compensation can be provided in the software by process value correction.			

Input for standard signals

Designation	Range	Meas. accuracy	Ambient temperature error
Voltage	0 – 10V, input resistance $R_E > 100k\Omega$	≤0.05%	100 ppm per °C
	-10 – 10V, input resistance $R_E > 100k\Omega$	≤0.05%	100 ppm per °C
	-1 to +1V, input resistance $R_E > 100k\Omega$	≤0.05%	100 ppm per °C
	0 – 1V, input resistance $R_E > 100k\Omega$	≤0.05%	100 ppm per °C
	0 – 100mV, input resistance $R_E > 100k\Omega$	≤0.05%	100 ppm per °C
	-100 to +100mV, input resistance $R_E > 100k\Omega$	≤0.05%	100 ppm per °C
Current	4 – 20mA, voltage drop ≤ 1V	≤0.05%	100 ppm per °C
	0 – 20mA, voltage drop ≤ 1V	≤0.05%	100 ppm per °C
Heater current	0 – 50mA AC	≤1%	100 ppm per °C
Potentiometer	min. 100Ω, max. 10kΩ		

Measurement circuit monitoring¹

Transducer	Over/underrange	Probe/lead short circuit ¹	Probe/lead break
Thermocouple	•	-	•
Resistance thermometer	•	•	•
Voltage 2 – 10V 0 – 10V	•	•	•
	•	-	-
Current 4 – 20mA 0 – 20mA	•	•	•
	•	-	-
Potentiometer	min. 100Ω, max. 10kΩ		

• = recognised – = not recognised

1. In the event of an error, the outputs move to defined states (0%, 100%, -100% configurable).

Standard version

12 Appendix

Outputs

Relay contact rating contact life	changeover contact 3A at 250VAC resistive load 150,000 operations at rated load
Logic current limiting load resistance	0/5V 20mA $R_{load} \geq 250\Omega$ min.
Solid-state relay contact life	1A at 230V
Voltage output signals load resistance	-10 to +10V / 0 – 10V / 2 – 10V $R_{load} \geq 500\Omega$ min.
Current output signals load resistance	-20 to +20mA / 0 – 20mA / 4 – 20mA $R_{load} \leq 450\Omega$ max.
Supply for 2-wire transmitter voltage current	22V 30mA

Controller

Controller type	Single-setpoint controller, double-setpoint controller, modulating controller, proportional controller, proportional controller with integral actuator driver
Controller structures	P/PD/PV/PID
A/D converter	resolution better than 15 bit
Sampling time	210msec

Electrical data

Supply (switched mode power supply)	110 – 240V, 15% +10% AC 48 – 63Hz 20 – 53V AC/DC 48 – 63Hz
Test voltages (type test)	to EN 61 010, Part 1 overvoltage category II, pollution degree 2
Power consumption	10VA max. for Type 703570 7VA max. for Type 703575
Data backup	EEPROM
Electrical connection	at the rear via screw terminals, conductor cross-section up to 2.5mm ² and core-end sleeve (length: 10mm)
Electromagnetic compatibility	EN 50 081-1, EN 50 082-2, NAMUR recommendation NE21
Safety standards	to EN 61 730-1 for Type 703570 to EN 61 010-1 for Type 703575


Housing

Housing type	plastic housing for panel mounting to DIN 43 700		
Type	703575/1...	703575/2...	703570/0...
Bezel in mm	48 x 96 (portrait)	96 x 48 (landscape)	96 x 96
Depth behind panel in mm	130	130	130
Panel cut-out in mm	45 ^{+0.6} x 92 ^{+0.8}	92 ^{+0.8} x 45 ^{+0.6}	92 ^{+0.8} x 92 ^{+0.8}
Ambient/storage temperature range	-5 to 50°C / -40 to +70°C		
Climatic conditions	rel. humidity not exceeding 90% annual mean, no condensation		
Operating position	unrestricted		
Protection	to EN 60 529, front IP65, rear IP20		
Weight (fully fitted)	approx. 420g	approx. 420g	approx. 730g

Standard version

12.2 Alarm messages and display priorities in the normal display

Alarm messages in plain language (matrix display)

Priority	Display	Notes
high	(no display)	Logic function "All displays off" is configured and active
	BREAK E1	Probe break or short-circuit at input x
	... BREAK E4	
	ORANGE 1	Overrange at input x
	... ORANGE 4	
	URANGE 1	Underrange at input x
	... URANGE 4	
	ORANGEM1	Overrange (maths module)
	ORANGEM2	(calculation result > range end)
	URANGEM1	Underrange (maths module)
	URANGEM2	(calculation result < range start)
	MATH1 ERR	Mathematical error
	MATH2 ERR	(violation of mathematical rules; impermissible values)
	LOG1 ERR	Logic error
	LOG2 ERR	(violation of mathematical rules)
	ERS ERR	Error on relay module
	(Text)	Text display (logic input 1)

	(Text)	Text display (logic input 8)
	(Text)	Text display (limit comparator 1)

	(Text)	Text display (limit comparator 8)
	(Text)	Text display (logic 1)
	(Text)	Text display (logic 2)
	SOACTIVE	Self-optimisation has been activated
low	(display as configured)	-



Acknowledging alarm messages

On pressing the **ENTER** key, the message disappears.

12 Appendix

Alarm messages in numerical display

Display	Notes
9999. ORANGE 1 or BREAK E1	<ul style="list-style-type: none">- Overrange- Probe break (segment display flashes)
- 1999. URANGE 1	Underrange (segment display flashes)
----	No measurement

12.3 Character set for matrix display

The special characters for text entries in the setup program are shown below.
They are entered from the keys using the key combination Alt + XXX

0	32	64	@	96	`	128	Ç	160	á	192	224	α
1	33	65	A	97	a	129	ü	161	í	193	225	β
2	34	66	B	98	b	130	é	162	ó	194	226	Γ
3	35	67	C	99	c	131	â	163	ú	195	227	Π
4	36	68	D	100	d	132	ä	164	ñ	196	228	Σ
5	37	69	E	101	e	133	à	165	Ñ	197	229	σ
6	38	70	F	102	f	134	á	166		198	230	μ
7	39	71	G	103	g	135	ç	167		199	231	γ
8	40	72	H	104	h	136	ê	168	¿	200	232	φ
9	41	73	I	105	i	137	ë	169		201	233	θ
10	42	74	J	106	j	138	è	170		202	234	Ω
11	43	75	K	107	k	139	ï	171		203	235	δ
12	44	76	L	108	l	140	î	172		204	236	∞
13	45	77	M	109	m	141	ì	173		205	237	∅
14	46	78	N	110	n	142	Ä	174		206	238	ε
15	47	79	O	111	o	143	Å	175		207	239	∩
16	48	80	P	112	p	144	É	176		208	240	
17	49	81	Q	113	q	145	æ	177		209	241	
18	50	82	R	114	r	146	Æ	178		210	242	
19	51	83	S	115	s	147	ô	179		211	243	
20	52	84	T	116	t	148	ö	180		212	244	
21	53	85	U	117	u	149	ò	181		213	245	
22	54	86	V	118	v	150	û	182		214	246	
23	55	87	W	119	w	151	ù	183		215	247	
24	56	88	X	120	x	152	ÿ	184		216	248	°
25	57	89	Y	121	y	153	Ö	185		217	249	·
26	58	90	Z	122	z	154	Ü	186		218	250	
27	59	91	[	123	{	155	ø	187		219	251	
28	60	92	\	124	|	156	£	188		220	252	
29	61	93	]	125	}	157	¥	189		221	253	
30	62	94	^	126	~	158		190		222	254	
31	63	95	_	127		159		191		223	255	

200 — 210 reserved for bar graph display

12 Appendix

12.4 Instrument features (configuration level 2)

The software version and the hardware features of the process controller are shown here

CONF 2

	Parameters	Value/selection	Description
Version	→VERSION	50.0X.0X	version number
VDN number	→VDN NO.	STANDARD XXX.XXXX	standard version VDN number (change of the standard version)
Analogue input 3	→IN3	NO	universal input voltage input -10/0/2 – 10V
Analogue input 4	→IN4	YES	
Analogue inp. 1 10V	→IN1 10V	NO	not available available
Analogue inp. 2 10V	→IN2 10V	YES	
Analogue inp. 3 10V	→IN3 10V		
Analogue inp. 4 10V	→IN4 10V		
Slot 1	→OUTPUT1	NO	not available relay solid-state relay analogue output logic output 5V logic output 22V or voltage output for 2-wire transmitter two logic inputs
Slot 2	→OUTPUT2	RELAY	
Slot 3	→OUTPUT3	SSRELAY	
Slot 4	→OUTPUT4	ANOUTPUT	
Slot 5	→OUTPUT5	LOGIC 5V	
Slot 6	→OUTPUT6	OUTP 22V LOGIN	
Setup interface	SETUP	NO YES	not connected connected
Interface	INTERFCE	NO RS422/485	not available RS 422/485
Mathematics	MATHLOG	NO YES	not available available

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12



MEASUREMENT AND CONTROL

M. K. JUCHHEIM GmbH & Co

36035 Fulda

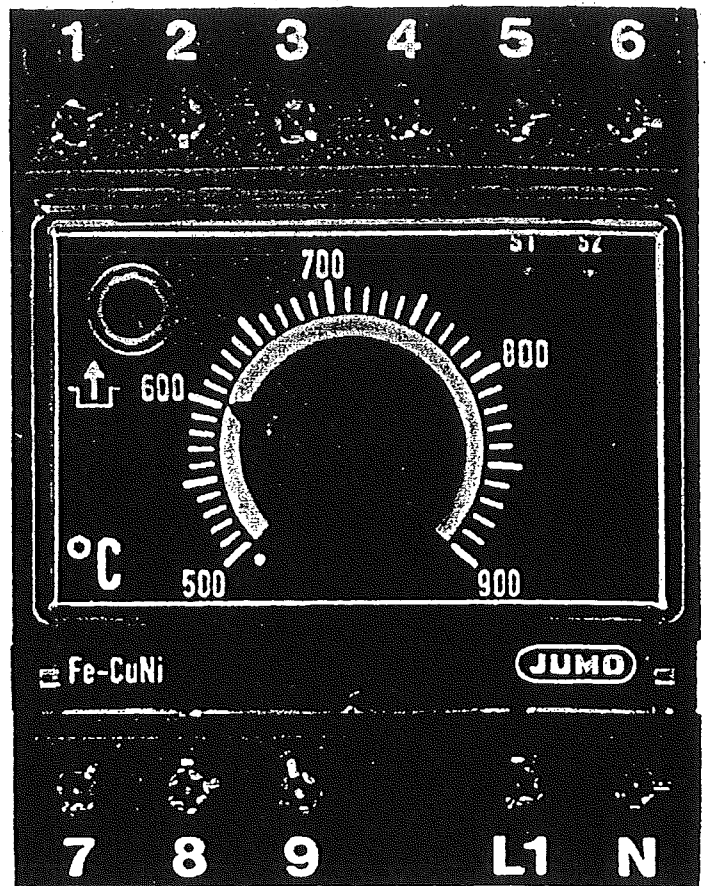
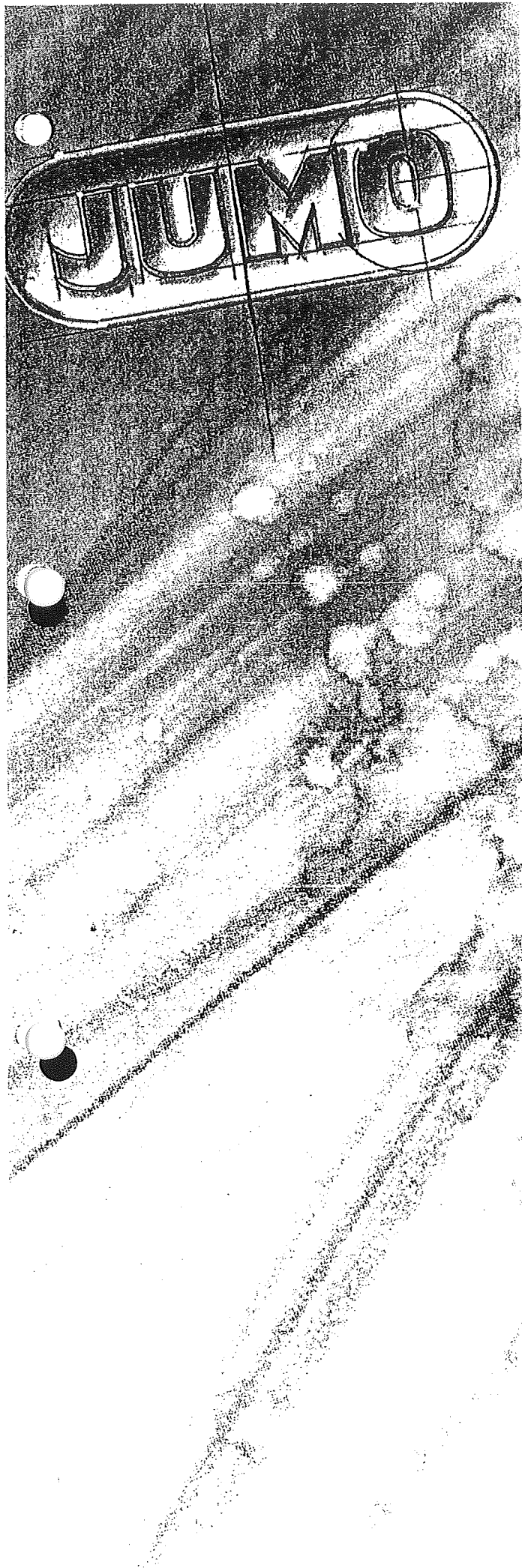
Germany

Phone (int. +49) 661 60 03 - 0

Fax (int. +49) 661 60 03 - 607

Telex 49701 juf d

email JUMO_de@e-mail.com



(Safety)
Temperature limiter
(Safety)
Temperature monitor
to DIN 3440

B 70.1130
Operating Instructions

Version 1 / 8.98 / 00354358

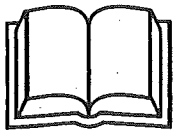
Conformance symbol

The instrument conforms with the requirements of DIN 3440.



If any servicing is required, the instrument must be returned to the main factory.

In accordance with the recommendations of Germanische Lloyd, specific applications require the availability of a replacement instrument.



Please read these Operating Instructions before commissioning the instrument. Keep the operating instructions in a place which is accessible to all users at all times.

Please assist us to improve these operating instructions, where necessary.

We are always grateful for your suggestions.

Phone	in Germany	(06 61) 6003-727
	from abroad	(+49) 661 6003-0
Fax	in Germany	(06 61) 60 03-5 08
	from abroad	(+49) 661 6003-607



Should any difficulties arise during start-up, you are asked not to carry out any unauthorised manipulations on the instrument. You could endanger your rights under the warranty!

Please contact the nearest JUMO office or the main factory.

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1 Introduction

1.1 Description

The areas of application for (safety) temperature limiters or monitors ((S)TB or (S)TW) are to be found wherever thermal processes have to be monitored, and where the system must be set to a safe operating condition in the event of a fault. If the permitted temperature limit is reached, or a fault occurs within the permitted temperature range (probe break/short-circuit, component defect, power failure), then the instrument switches off without delay. If the fault is no longer present, then TB and STB must be reset manually. This can be done by means of a reset pushbutton on the instrument, or by an external reset button. The flow of energy is only enabled again when the temperature is lower (O-function) or higher (S-function) than the preset limit temperature by the amount of the switching differential. In the event of a short-term power failure (≤ 1 min) within the satisfactory range of the system, the instrument is enabled automatically after the power has been restored. The amount of the switching differential is 3°C, 10°C, 30°C or 100°C.

The analogue limit setting knob for the limit temperature is mounted on the front panel. An unintentional or unauthorised adjustment of the limit setting is prevented by a clear cover which can be lead-sealed. The instruments are intended for use as built-in units for fixing onto standard rails to EN 50022-35. The screw terminals for the electrical connection (max. conductor cross-section 2.5mm²) are on one wiring level.

The instruments function over defined temperature ranges between 0 and 2000 °C.

Temperature monitor TW*

Temperature monitors are devices which, after cutting out, are automatically reset when the probe temperature has fallen below the preset limit value by the amount of the switching differential.

Safety temperature monitor STW*

Safety temperature monitors are temperature monitors which, in addition, meet the requirements for enhanced safety to DIN 3440.

1 Introduction

Temperature limiter TB*

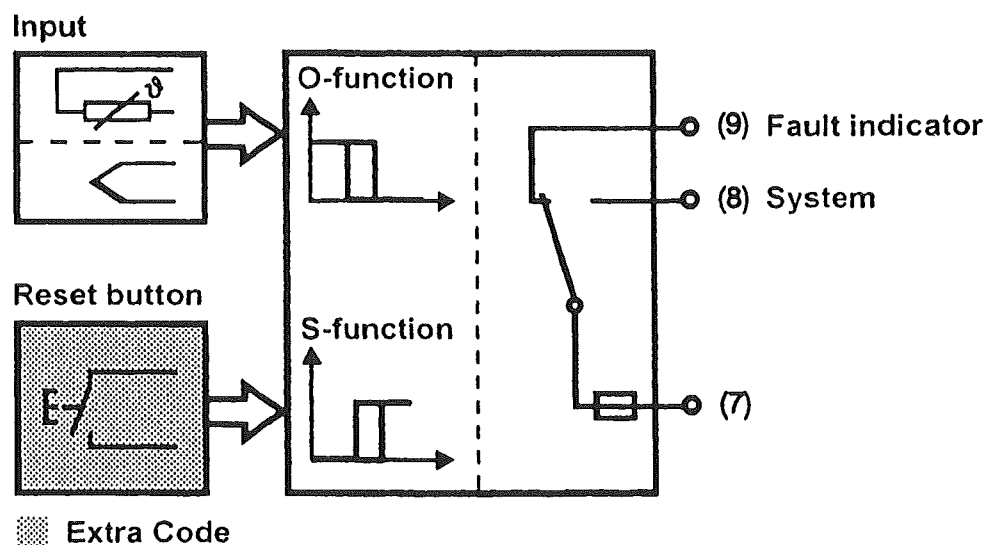
Temperature limiters are devices which are locked out after cutting out. They can be reset, either manually or by means of a tool, when the probe temperature has fallen below the limit value by the amount of the switching differential.

Safety temperature limiter STB*

Safety temperature limiters are temperature limiters which, in addition, comply with the requirements for enhanced safety according to DIN 3440.

* Extract from DIN 3440

1.2 Block structure



1 Introduction

1.3 Type designation

(1) (2) (3) (4)

701130 / * * * * - * * * - * * / * * *

(1) Basic type extensions	
0151	Temperature monitor with O-function
0152	Temperature monitor with S-function
0153	Temperature limiter with O-function
0154	Temperature limiter with S-function
0251	Safety temperature monitor with O-function
0252	Safety temperature monitor with S-function
0253	Safety temperature limiter with O-function
0254	Safety temperature limiter with S-function

(2) Measurement inputs	
001	Resistance thermometer Pt100 in 2-wire circuit
037	W3Re-W25Re
042	Fe-Con L
043	NiCr-Ni K
044	Pt10Rh-Pt S
046	Pt30Rh-Pt6Rh B

1 Introduction

(3) Supply

02	230V AC, +10% / -15% 48—63Hz
05	115V AC, +10% / -15% 48—63Hz
08	24V AC, +10% / -15% 48—63Hz

(4) Extra Codes

202	Switching differential 3°C (only for Pt100)
205	Switching differential 10°C
206	Switching differential 30°C
208	Switching differential 100°C
229	Lead resistance 1Ω internally compensated*
231	Lead resistance 10Ω internally compensated*
233	Lead resistance 30Ω internally compensated*
235	Lead resistance 50Ω internally compensated*
245	Internal reset button (extra Code with TB only)
062	GL

* Lead compensation resistor LAW (10Ω) is included in the delivery

Accessories

External reset button RT
Sales No. 70/97097865

Mounting plate BS
Sales No. 70/00059172

Lead compensation resistor LAW (10Ω)
Sales No. 70/00322800

1.4 Registration number

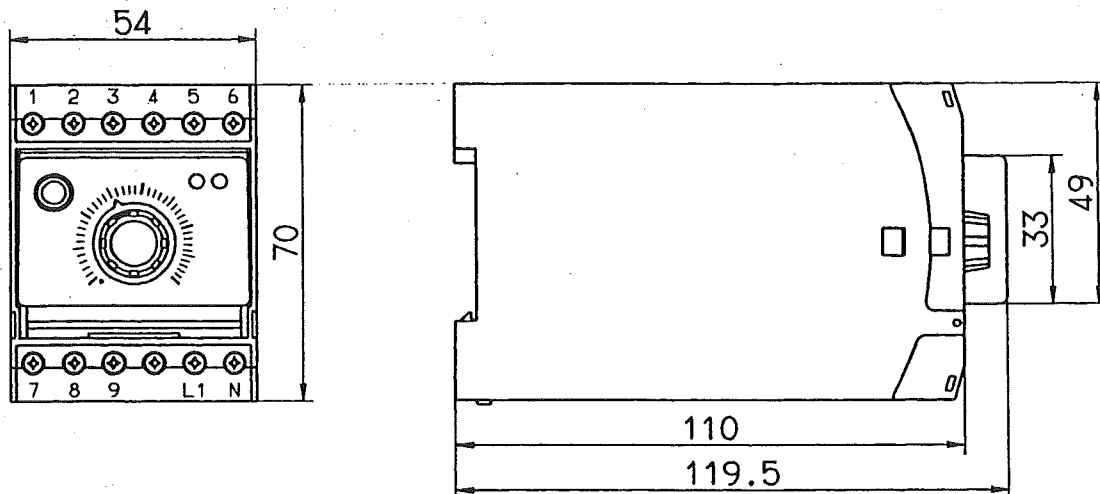
For Type 701130/... : TB/TW/STB/STW 1091 97

2 Installation

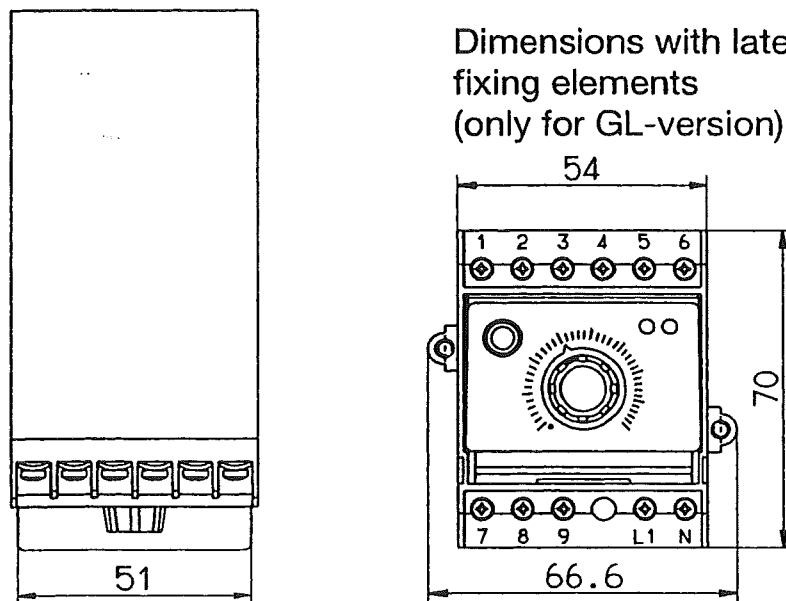
2.1 Location and climatic conditions

The location and the climatic conditions must meet the requirements defined in the specifications under Technical Data. (⇒ Chapter 8).

2.2 Dimensions



Dimensions with lateral
fixing elements
(only for GL-version):



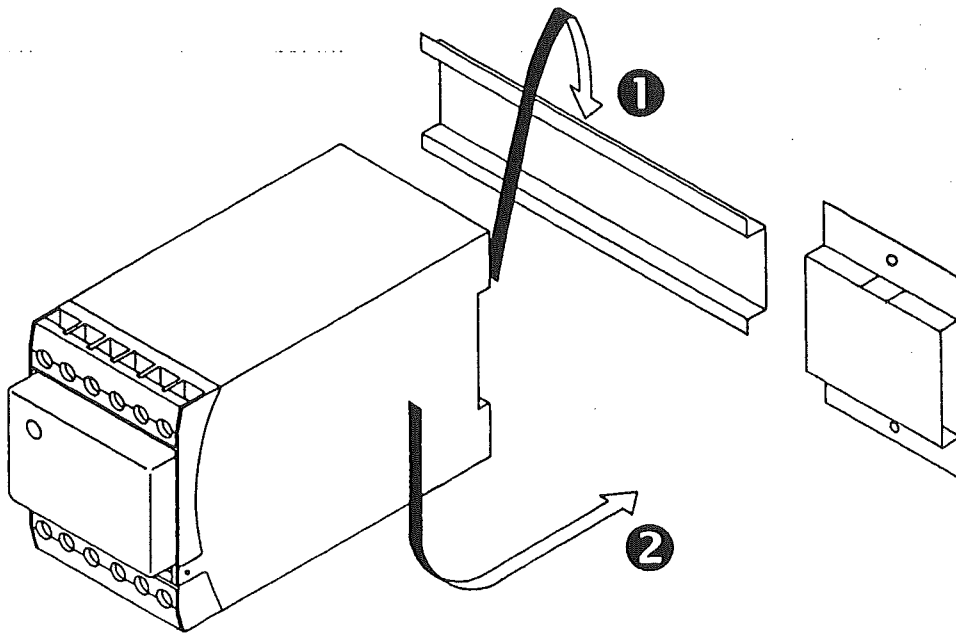
mm	inch
33	1.30
49	1.93
51	2.01
54	2.13
66.6	2.62
70	2.76
110	4.33
119.5	4.70

2 Installation

2.3 Mounting on a standard rail or a mounting plate

The instruments are designed as built-in units and are protected to IP20 as standard.

- * Insert the instrument from above into the standard rail or into the cut-out of the mounting plate ❶ and swing it down until it snaps into position ❷

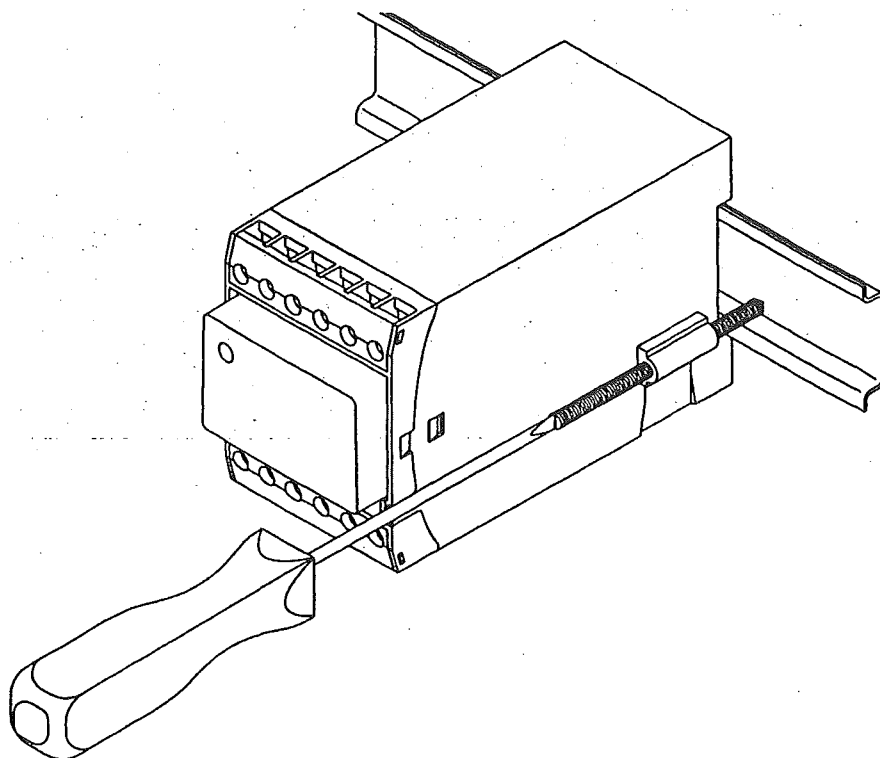


Mounting the GL-version:

- * Push the fixing elements into the guides on the sides
- * Insert the unit from above into the rail and swing it down until it snaps into position (as above)
- * Push the fixing elements up to the rail and tighten them evenly with a spanner.

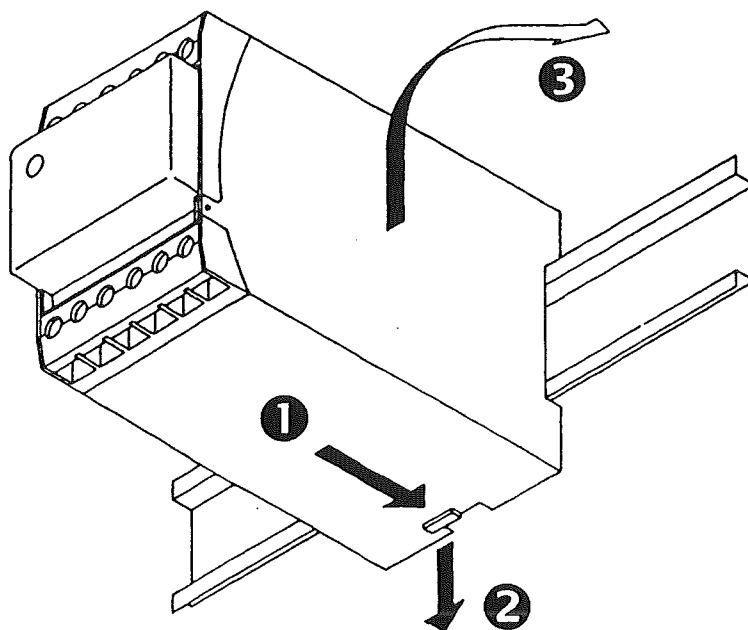
(see diagram on next page!)

2 Installation



2.4 Removal

- * Insert a screwdriver in the direction of the arrow under the clip ❶
- * Press the clip down ❷ and swing the unit up at the same time ❸



3 Electrical connection

3.1 Installation notes

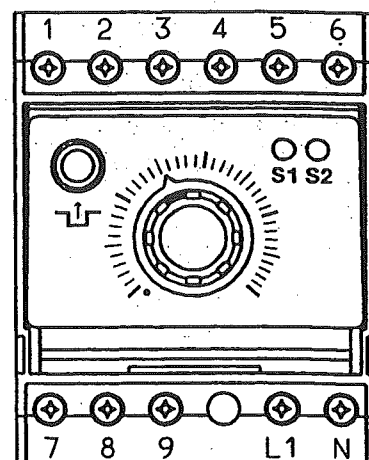
- The requirements of VDE 0100 "Regulations for the installation of power equipment with rated voltages up to 1000V" or the equivalent national regulations must be observed in the choice of cable material, the installation and the electrical connection of the equipment.
- The electrical connection must only be made by properly qualified personnel.
- Isolate the instrument on both poles from the supply if there may be contact with live parts during work.
- The electromagnetic compatibility (EMC) conforms to the standards and regulations listed under Technical Data.
⇒ Chapter 8
- Sensor, output or supply cables should be routed separately from one another, and not laid in parallel.
- Sensor cables must be twisted and shielded. Avoid running them close to current-carrying components or cables.
- Do not connect any additional loads to the supply terminals of the instrument.
- The instrument is not suitable for installation in hazardous areas.
- Inductive components in the neighbourhood of the instrument, such as contactors or solenoid valves, must have RC combinations fitted for interference suppression.
- The approval of the instrument to DIN 3440 is only valid if the temperature probes marked with * in Chapter 8 "Technical Data" are used.
If temperature probes are used which are not marked or listed, then the approval of the instrument and probes must be checked.

3 Electrical connection

3.2 Connection diagram



The electrical connection must only be carried out by qualified personnel.



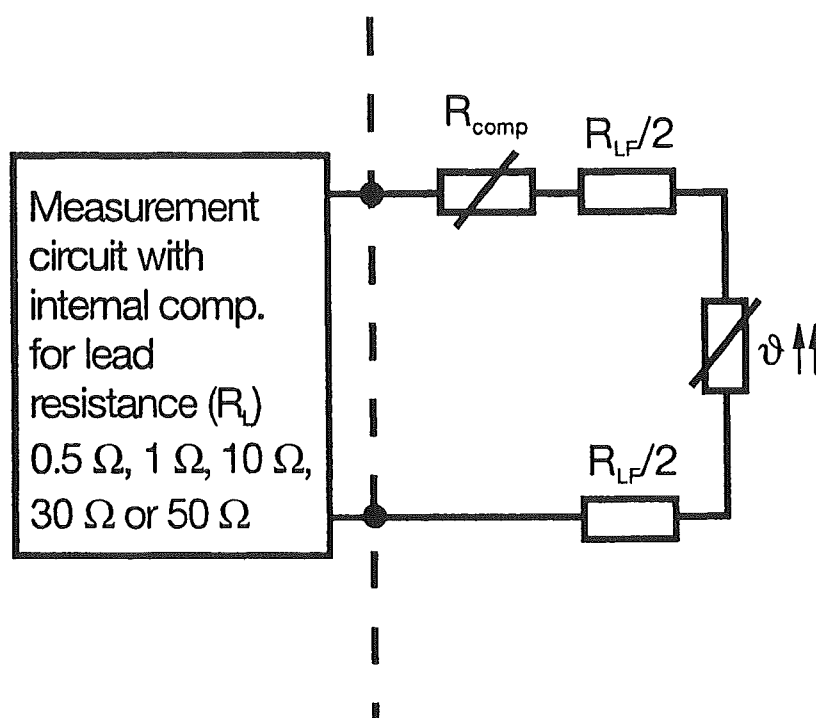
Connection for	Terminals	
Relay output 230V 2A, resistive load	7 common 8 n.o. (make) 9 n.c. (break)	
Supply as on label	L1 line N neutral	
External reset pushbutton	5 6	
Resistance thermometer in 2-wire circuit	1 2 LAW= Lead compensation resistor	
Thermocouple	1 - Thermocouple 1 2 + 3 - Thermocouple 2 4 +	

3 Electrical connection

3.3 Lead compensation

A lead resistance of 0.5Ω is allowed for internally as standard; 1Ω , 10Ω , 30Ω or 50Ω (extra Code) to special order.

A lead compensation resistor LAW (10Ω ; included in the delivery package when the appropriate extra Code is ordered) is required for the connection to Pt 100 resistance thermometers with a max. operating temperature of 700°C .



Compensation condition: $R_L = R_{comp} + R_{LF}$

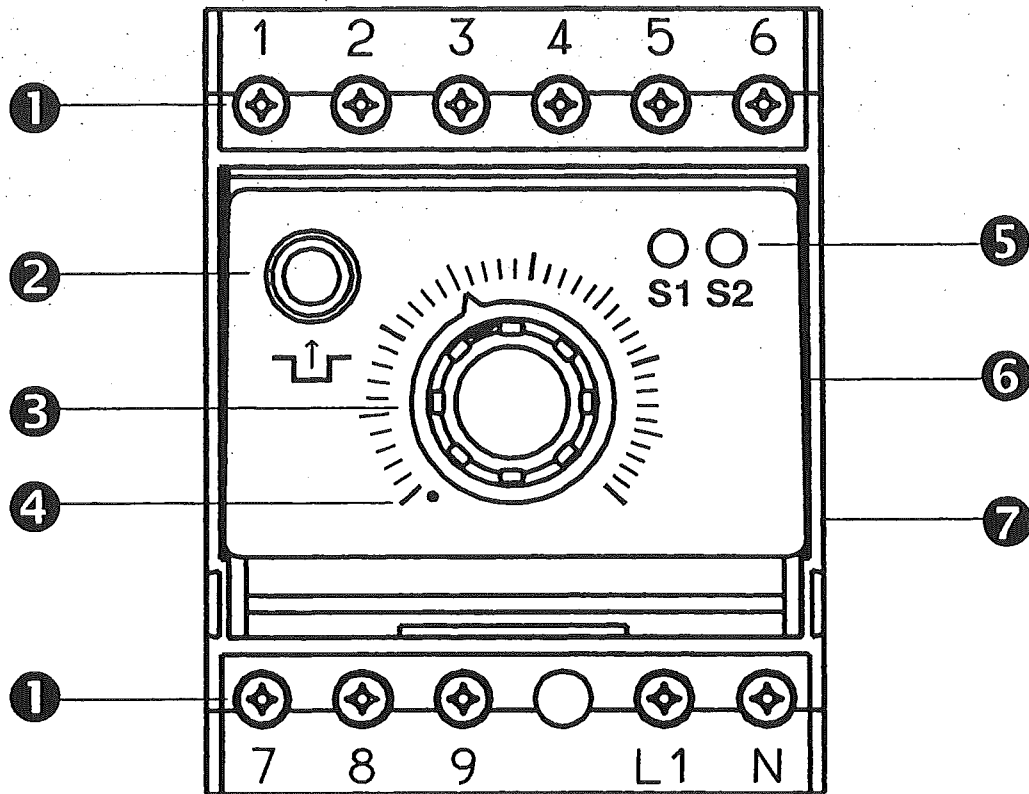
R_L internally compensated lead resistance of the measuring circuit

R_{comp} resistance of the lead compensation resistor LAW

R_{LF} resistance of the probe leads

4 Function

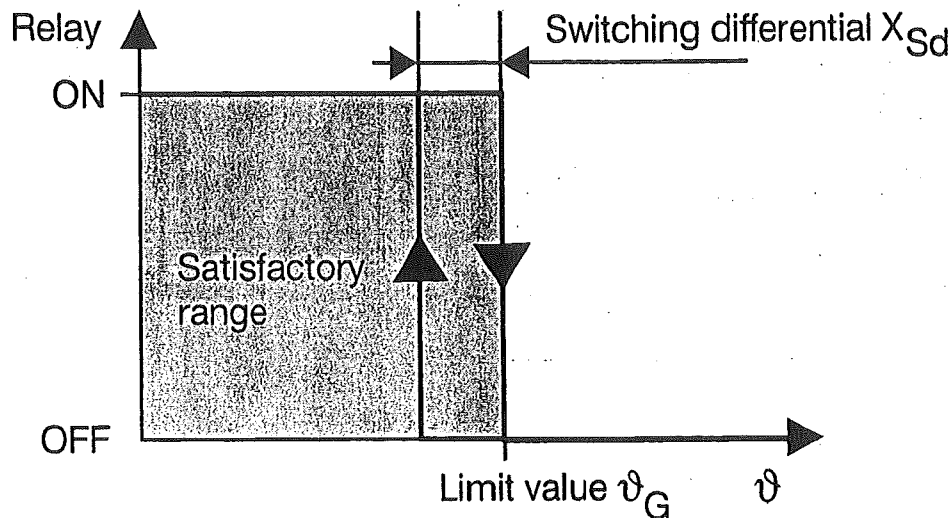
4.1 Indication and controls



1	Screw terminals, max. 2.5mm ²
2	Reset button (extra Code with TB only)
3	Limit setting knob
4	Limit scale
5	Fault indicator for channel 1 (S1) and channel 2 (S2) S2 only for STB and STW
6	Lead-sealable clear cover
7	Plastic casing

4 Function

4.2 O-function



Response in normal operation

- $\vartheta < \vartheta_G$
 - temperature rises
- ⇒ the relay drops out at $\vartheta = \vartheta_G$.

Response after rising above the limit

- $\vartheta > \vartheta_G$
 - temperature falls
- ⇒ the relay pulls in automatically at $\vartheta = \vartheta_G - X_{Sd}$ (STW and TW), or has to be reset manually (STB and TB)

Response in fault condition

In the event of a fault (probe break/short-circuit, faulty electronics, supply failure) the relay drops out.

When

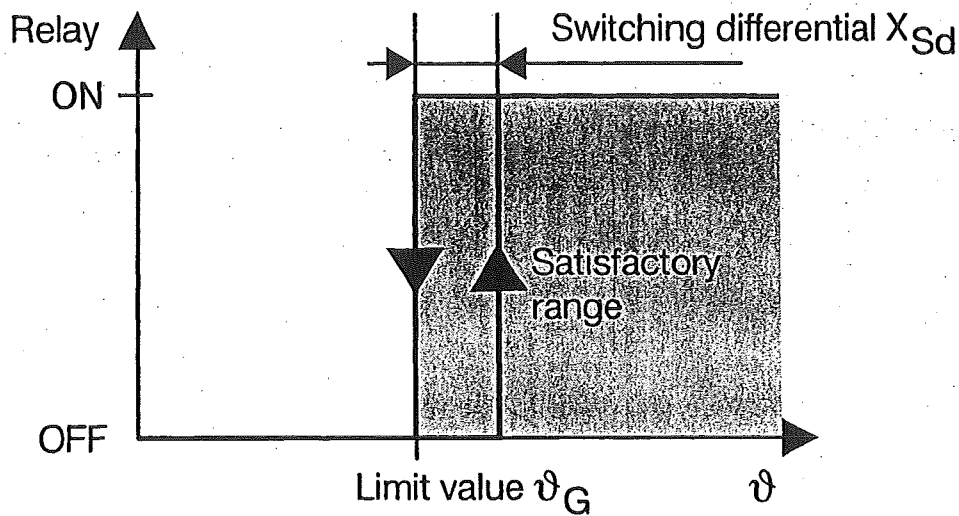
- the fault has been cleared
- $\vartheta \leq \vartheta_G - X_{Sd}$

⇒ then the relay pulls in automatically (STW and TW).

STB and TB must be reset manually. Only in the event of a short-term power failure (≤ 1 min) in the satisfactory range of the system, will the instrument automatically be enabled after the power has been restored.

4 Function

4.3 S-function



Response in normal operation

- $\vartheta > \vartheta_G$
 - temperature falls
- ⇒ the relay drops out at $\vartheta = \vartheta_G$.

Response after falling below the limit

- $\vartheta < \vartheta_G$
 - temperature rises
- ⇒ the relay pulls in automatically at $\vartheta = \vartheta_G + X_{sd}$ (STW and TW), or has to be reset manually (STB and TB)

Response in fault condition

In the event of a fault (probe break/short-circuit, faulty electronics, supply failure) the relay drops out.

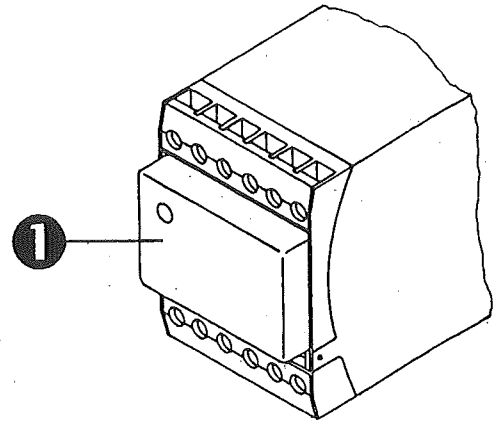
When

- the fault has been cleared
 - $\vartheta \geq \vartheta_G + X_{sd}$
- ⇒ then the relay pulls in automatically (STW and TW).

STB and TB must be reset manually. Only in the event of a short-term power failure (≤ 1 min) in the satisfactory range of the system, will the instrument automatically be enabled after the power has been restored.

5 Starting up

The setting of the limit value must not change by itself under operating conditions. A clear cover ❶ which is lead-sealable is therefore provided to prevent unintentional or unauthorised adjustment.



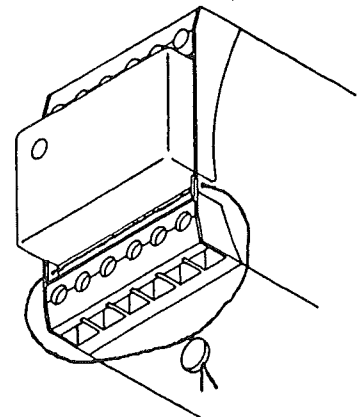
- * Swing the clear cover upwards and remove it.
- * Set the required limit on the scale using the limit setting knob. The limit setting can easily be read, even when the clear cover is in position. The start and end of the range are fixed by stops.
- * After setting the limit, carry out the function test (⇒ Chapter 6) and lead-seal the clear cover.



The safety circuit must be reset after every switch-on or break in the mains supply, by using the internal or external reset button (only for TB and STB).

Only in the event of a short-term power failure (≤ 1 min) in the satisfactory range of the installation, will the instrument automatically be enabled after the power has been restored.

For lead sealing, a hole is provided on each side of the clear cover. A wire is passed through these holes to connect the cover and the casing. The wire ends are secured by a lead seal.



6 Functional test

6.1 Test frequency

The safety temperature monitors and limiters fulfil the requirements made in Draft DIN 3440 A1 of September 1991.

In addition, the instrument must undergo an annual functional test.



Generally, the functional test always starts from the satisfactory range of the system, i.e. the fault signal diodes must not be lit up and the STBs must be reset.

It is necessary to short-circuit or open the measurement input circuit(s) for the functional test. The reset button must also be short-circuited during the test.

For a rapid functional test it is therefore recommended that the buttons I, II, and III are included in the measurement or reset circuits.



When connecting thermocouples and buttons it is important to ensure that no additional thermal e.m.f occurs (temperature differences at the terminals).

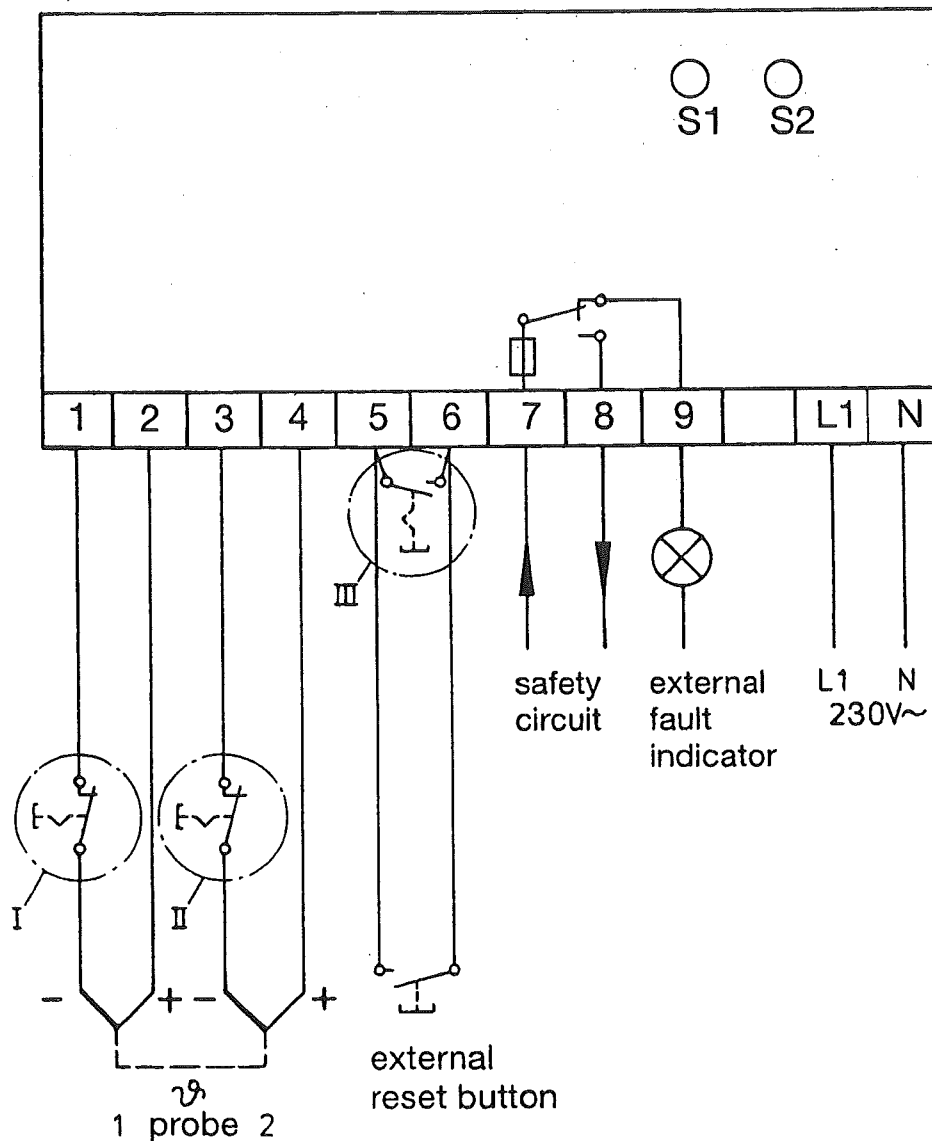
When resistance thermometers and buttons are connected, it must be ensured that the contact resistance is not too high. ($0.4\Omega \approx 1^\circ\text{C}$ error).



Carry out a functional test after every malfunction!

6 Functional test

6.2 Testing STBs and STWs with O-function when thermocouples are connected



- * Short-circuit the reset button
- * Simulate a probe break of thermocouple 1:
 - ☐ The LEDs S1 and S2 must light up.
 - ☐ The external fault indicator must light up. The safety circuit must be opened.
 - ☐ The LEDs S1 and S2 must go out after about 5 sec.
 - ☐ The external fault indicator remains lit up and the safety circuit remains open.

6 Functional test

- * Remove the short-circuit across the reset button:
 - ☐ The LEDs S1 and S2 light up again.
 - ☐ The external fault indicator remains on.
- * Remove the probe break:
 - ☐ If the probe temperature is within the permitted temperature range i.e. **below** the limit setting by the switching differential, then the two LED S1 and S2 must go out after approx. 5 sec.
 - ☐ For an STW, the external fault indication must also disappear and the safety circuit must close.
 - ☐ For an STB, the external fault indication must continue to be lit up and the safety circuit must remain open. The safety circuit is only closed again when the reset button is pressed.
- * Repeat the procedure for thermocouple 2.

Check response on power failure (STB).

In the satisfactory range of the system:

- * Switch off mains:
 - ☐ Wait for approx. 1 min
- * Switch on mains:
 - ☐ The LEDs S1 and S2 must light up for approx. 5 sec and then go out
 - ☐ The external fault indicator must go out after a further 2 sec approx. and the safety circuit must close automatically.

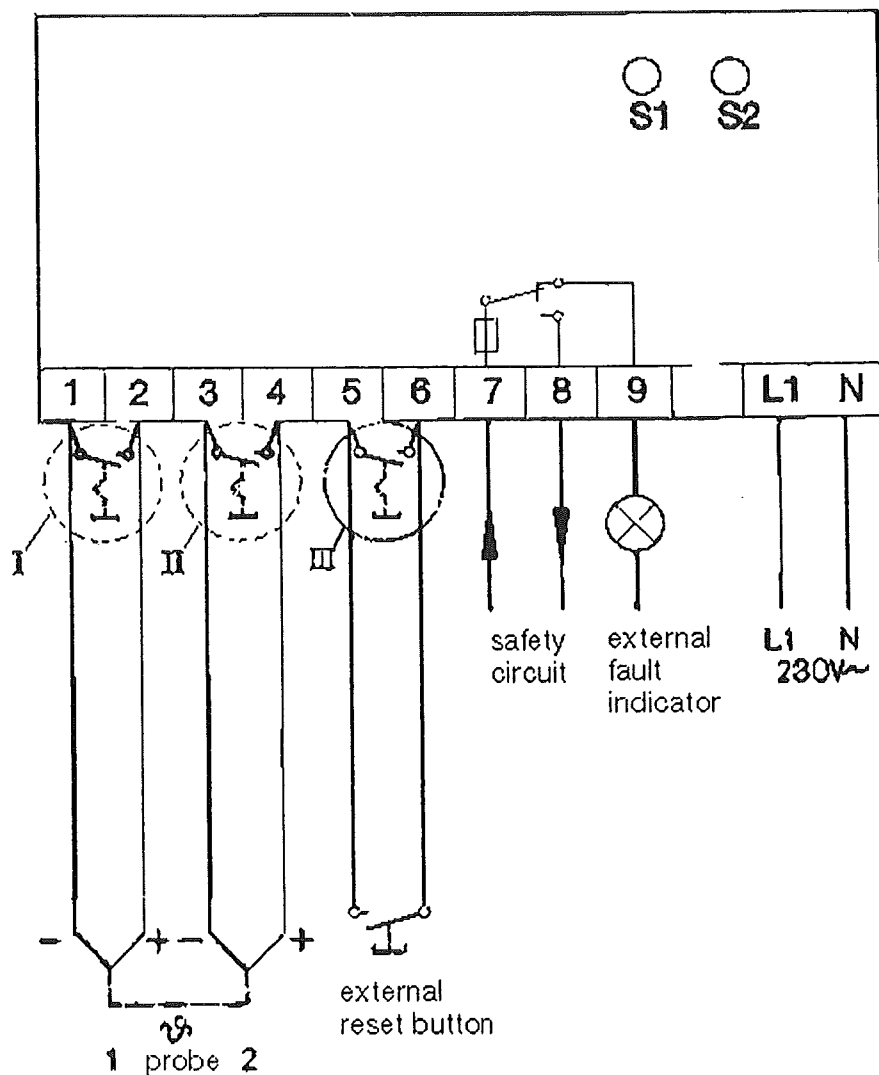
In the event of a fault:

- * Simulate a probe break of the thermocouple 1:
 - ☐ The LEDs S1 and S2 must light up.
- * Remove the probe break of thermocouple 1:
 - ☐ The LEDs S1 and S2 must go out after about 5 sec.
 - ☐ The safety circuit remains open.

6 Functional test

- * Switch off mains for at least 5 sec.
- * Switch on mains:
 - ☐ The LEDs S1 and S2 must light up for about 5 sec and then go out.
 - ☐ The external fault indication continues to be lit up and the safety circuit remains open. The safety circuit will only close again, and the external fault indication will go out, when the reset button is pressed.

6.3 Testing STBs and STWs with S-function when thermocouples are connected



6 Functional test

- * Short-circuit the reset button
- * Simulate a probe short-circuit of thermocouple 1:
 - ☐ The LEDs S1 and S2 must light up.
 - ☐ The external fault indication must light up. The safety circuit must be open.
 - ☐ LEDs S1 and S2 must go out after approx. 5 sec.
 - ☐ The external fault indication remains lit and the safety circuit remains open.
- * Remove short-circuit of reset button:
 - ☐ The LEDs S1 and S2 light up again.
 - ☐ The external fault indication remains on.
- * Remove probe short-circuit:
 - ☐ If the probe temperature is within the permitted temperature range, i.e. **above** the limit setting by the switching differential, then the two LEDs S1 and S2 must go out after approx. 5 sec.
 - ☐ For an STW, the external fault indication must also disappear and the safety circuit must close.
 - ☐ For an STB, the external fault indication must continue to be lit up and the safety circuit must remain open. It will only close again when the reset button is pressed.
- * Repeat the procedure for thermocouple 2.

Check the response after power failure (STB only)

In the satisfactory range of the system:

- * Switch off mains:
 - ☐ Wait for approx. 1 min
- * Switch on mains:
 - ☐ The LEDs S1 and S2 must light up for approx. 5 sec and then go out.

6 Functional test

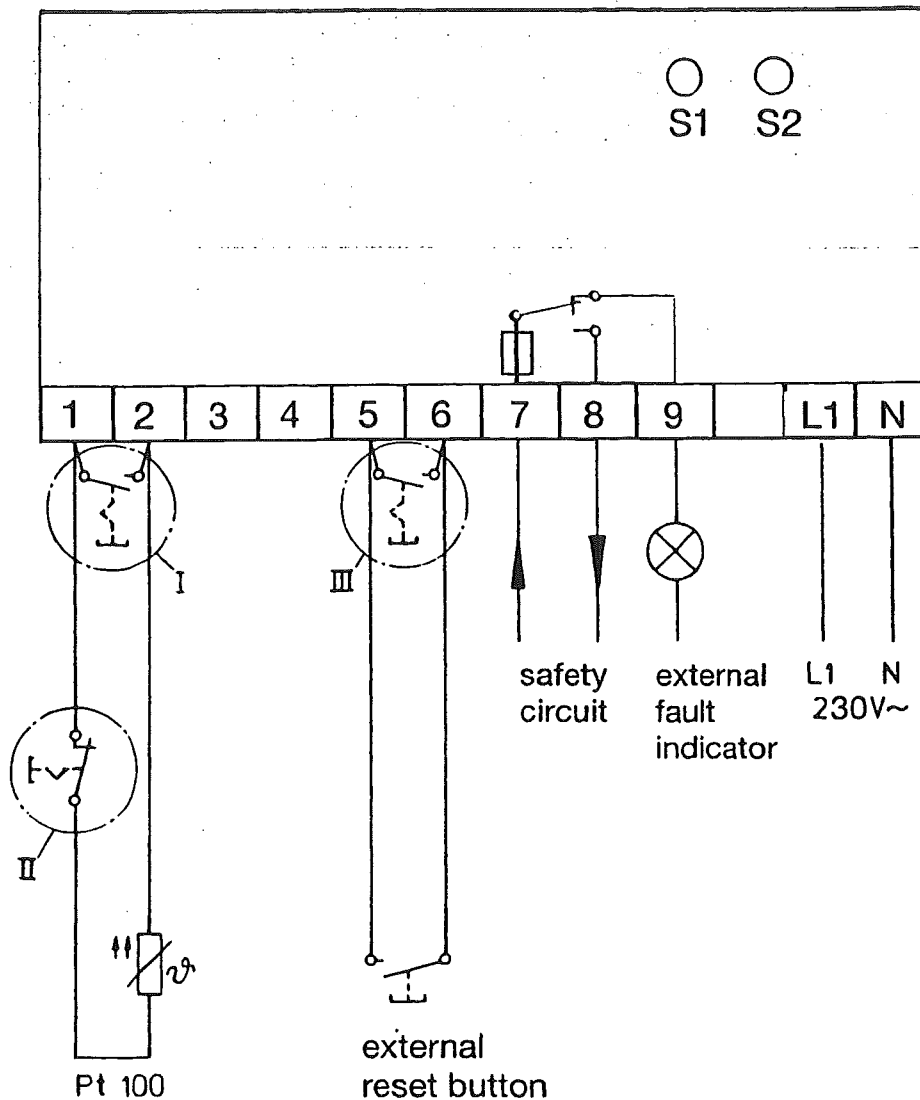
- ☐ The external fault indication must go out after a further 2 sec (approx.) and the safety circuit must close automatically.

In the event of a fault:

- * Simulate a probe short-circuit of thermocouple 1:
 - ☐ The LEDs S1 and S2 must light up.
- * Remove the probe short-circuit of thermocouple 1
 - ☐ The LEDs S1 and S2 must go out after approx. 5 sec.
 - ☐ The safety circuit remains open.
- * Switch off mains for at least 5 sec
- * Switch on mains:
 - ☐ The LEDs S1 and S2 must light up for approx. 5 sec and then go out.
 - ☐ The external fault indication continues to be lit up and the safety circuit remains open. Only when the reset button is pressed, will the safety circuit close and the external fault indication go out.

6 Functional test

6.4 Testing STBs and STWs with O- or S-function when connecting resistance thermometers



- * Short-circuit the reset button
- * Simulate a probe break:
 - ☐ The LEDs S1 and S2 must light up.
 - ☐ The external fault indication must light up. The safety circuit must be open.
 - ☐ The LEDs S1 and S2 must go out after approx. 5 sec.

6 Functional test

- ☐ The external fault indication continues to be lit up and the safety circuit remains open.
- * Remove the short-circuit across the reset button:
 - ☐ The LEDs S1 and S2 light up again.
 - ☐ The external fault indication remains on.
- * Remove the probe break:
 - ☐ If the probe temperature is within the permitted temperature range (i.e. below the limit setting by the switching differential for an O-function, or above the limit setting by the switching differential for an S-function), then the two LEDs S1 and S2 go out after approx. 5 sec.
 - ☐ For an STW, the external fault indication must also go out and the safety circuit must close.
- * For an STB, the external fault indication must continue to be lit up and the safety circuit must remain open. The safety circuit will only close again when the reset button is pressed.
- * Short-circuit the reset button
- * Simulate a probe short-circuit:
 - ☐ The LEDs S1 and S2 must light up.
 - ☐ The LEDs S1 and S2 must go out after approx. 5 sec.
- * Remove short-circuit across the external reset button:
 - ☐ The LEDs S1 and S2 light up again.
- * Remove the probe short-circuit:
 - ☐ If the probe temperature is within the permitted temperature range (i.e. below the limit setting by the switching differential for an O-function, or above the limit setting by the switching differential for an S-function), then the two LEDs S1 and S2 must go out after approx. 5 sec.
 - ☐ For an STW, the external fault indication must go out and the safety circuit must close.

6 Functional test

- ☐ For an STB, the external fault indication must continue to be lit up and the safety circuit must remain open. It is only closed again when the reset button is pressed.

Check response after a power failure (STB)

In the satisfactory range of the system:

* Switch off mains:

- ☐ Wait approx. 1 min

* Switch on mains:

- ☐ The LEDs S1 and S2 must light up for approx. 5 sec and then go out.
- ☐ The external fault indication must go out after (approx.) a further 2 sec and the safety circuit must close automatically.

In the event of a fault:

* Simulate a probe break:

- ☐ The LEDs S1 and S2 must light up.

* Remove the probe break:

- ☐ The LEDs S1 and S2 must go out after approx. 5 sec
- ☐ The safety circuit remains open.

* Switch off mains for at least 5 sec

* Switch on mains:

- ☐ The LEDs S1 and S2 must light up for approx. 5 sec and then go out.
- ☐ The external fault indication continues to be lit up and the safety circuit remains open. Only when the reset button is pressed, will the safety circuit close and the external fault indication go out.

7 Test in the event of a fault

In the event of a system fault, the instrument switches off the system. This condition is indicated by LED S1 lighting up (S1 and S2 on instruments with enhanced safety). The fault is signalled simultaneously by the external fault indication. In this condition, the relay of the temperature limiting device (STB, TB, STW, TW) is not operated.

Initial condition: STB has switched off the system.

Fault indicators are lit	Fault indicators are off
<p>The fault is still present in the system (over/undertemperature, probe break/short-circuit)</p> <p>* Press the reset button (at least 5 sec) until S1 and S2 go out</p> <p>If the safety circuit remains open, the system and the probe circuit have to be checked.</p>	<p>* Press the reset button</p> <p>If the instrument remains inhibited after pressing the reset button, the replacement instrument must be installed and the functional test carried out.</p>

8 Technical data

Inputs

Resistance thermometer

Pt100 in 2-wire circuit: 0—120°C*
 0—300°C*
 0—400°C*
 0—600°C*
 200—500°C*

Ambient temperature error: 0.8°C/10°C

Lead compensation:

A lead resistance of 0.5Ω is allowed for internally as standard;
1Ω, 10Ω, 30Ω or 50Ω on request. A lead compensation resistor
LAW (10Ω) is required for connection to resistance thermometers
with a max. operating temperature of 700°C.

Double thermocouples

NiCr-Ni K: 200— 600°C*
 400— 800°C*
 600—1000°C*
 800—1200°C

Pt10Rh-Pt S: 400— 800°C*
 800—1200°C*
 1000—1400°C
 1200—1600°C

Pt30Rh-Pt6Rh B: 800—1200°C*
 1000—1400°C*
 1200—1600°C
 1400—1800°C

Fe-Con L: 50— 450°C*
 200— 600°C*
 500— 900°C

W3Re-W25Re: 1600— 2000°C

Ambient temperature error: 2.0°C/10°C

* For temperature probes used in accordance with DIN 3440, the
max. limit temperature of the instrument is determined by the
upper meas. temperature of the selected temperature probe.

8 Technical data

Outputs

Relay

with floating changeover contact

Switching capacity: 2 A 230 V AC, resistive load
protected by fuse 2A M

Contact life: 100.000 switching operations at rated load

General data

Switching point accuracy $\pm 2\%$ of span

Switching differential 3°C (for Pt100 only),
10°C, 30°C or 100°C

Supply

230V AC, +10% / -15% 48—63Hz

115V AC, +10% / -15% 48—63Hz

24V AC, +10% / -15% 48—63Hz

Power consumption 4 VA approx.

Permissible ambient temperature 0 to +55 °C

Permissible storage temperature -40 to +80 °C

Climatic conditions rel. humidity 75% max., no condensation

Protection IP20 (to EN 60529)

Electrical safety

to EN 60730-1 '96

creepage distances:

mains to electronics and probe $\geq 8\text{ mm}$

mains to relay $\geq 3\text{ mm}$

relay to electronics and probe $\geq 8\text{ mm}$

Instrument can be connected to SELV circuits.

8 Technical data

Test voltages

to EN 60730-1 '96 Tab. 13.2

Electromagnetic compatibility

to EN 50081-1, EN 50082-2

Ambient conditions

to EN 60730-1 '96 Para. 2.12.6

"normal"

Operating conditions

The instrument is designed as a built-in device according to:

- VDE 0160 5.5.1.3 5/88
- VDE 0106 Part 100 3/83

Operating position

unrestricted

Weight

250g approx.

Dimensions (WxHxD)

54mm x 70mm x 110mm

Casing

Plastic

Combustibility class V0

With extra Code "GL"

The instrument meets Application Category C according to the GL-guideline.

Temperature:

0 to 55°C

Rel. humidity:

not exceeding 100% r.H.

Vibration:

not exceeding 0.7g

Standard accessories

- Operating Instructions B 70.1130
- 2 fixing elements (only for GL-version)
- LAW (only with extra Code 229, 231, 233, 235)





MEASUREMENT AND CONTROL

M.K. JUCHHEIM GmbH & Co.

36035 Fulda

Germany

Phone ++49 6 61-60 03-0

Fax ++49 6 61-60 03-6 07

Telex 49 701 juf d

email JUMO_de@e-mail.com

United Kingdom

JUMO Instrument Co. Ltd.

Temple Bank, Riverway

GB-Harlow,

Essex CM20 2TT

Phone (0 12 79) 63 55 33

Fax (0 12 79) 63 52 62

USA

JUMO PROCESS CONTROL INC.

735 Fox Chase,

Coatesville, PA 19320

Phone 610-380-8002,

800-554 JUMO

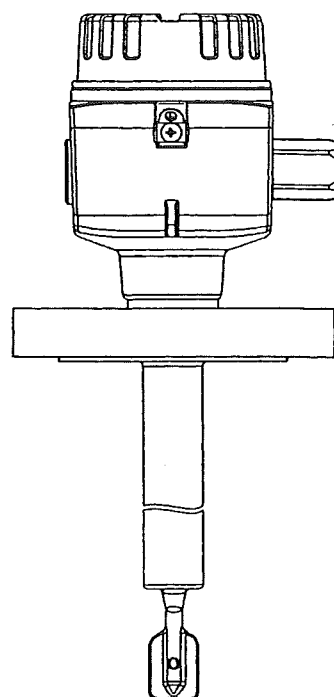
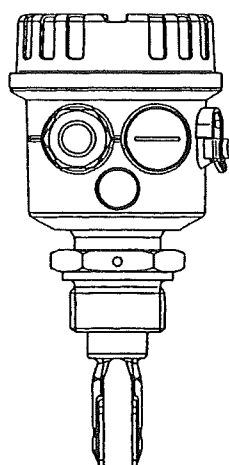
Fax 610-380-8009



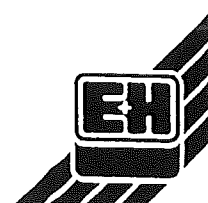
BA 213F/24/ae/04.02
52005008

liquiphant M FTL 50, FTL 51

Level Limit Switch



Endress+Hauser
The Power of Know How



IMPORTANT NOTICE RETURN AUTHORIZATION POLICY

Endress+Hauser must pre-approve and assign a Return Authorization number to any instrument you plan to return. Please identify the Return Authorization number clearly on all shipping cartons and paperwork.

Please note that the issuance of a Return Authorization number does not automatically mean that credit will be issued, or that the return is covered by our warranty. An Endress+Hauser associate will contact you regarding the disposition of your returned equipment.

In order to serve you better, and to protect our employees from any potentially hazardous contaminants, Endress+Hauser must return unopened, at the sender's expense, all items that do not have a Return Authorization number.

To get a Return Authorization number for **credit**, call **888-ENDRESS**

To get a Return Authorization number for **calibration or repair**, call **800-642-8737**

To get a Return Authorization number in **Canada**, call **800-668-3199**

Please be sure to include the following information when requesting a Return Authorization number. This information will help us speed up the repair and return process.

Customer name:

Customer address:

Customer phone number:

Customer contact:

Equipment type:

Original sales order or purchase order number:

Reason for return:

Failure description, if applicable:

Process material(s) to which the equipment has been exposed:

OSHA Hazard Communication Standard 29CFR 1910.1200 mandates that we take specific steps to protect our employees from exposure to potentially hazardous materials. Therefore, all equipment so exposed must be accompanied by a letter certifying that the equipment has been decontaminated prior to its acceptance by Endress+Hauser.

The employees of Endress+Hauser sincerely appreciate your cooperation in following this policy.

Address your equipment to:

Endress+Hauser
2350 Endress Place
Greenwood, IN 46143
Return Authorization number:

In Canada:

Endress+Hauser
1440 Graham's Lane, #1, Burlington
Ont. Canada L7S 1W3
Return Authorization number:

Effective November 1987

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1 Safety Instructions

1.1 Approved Usage

The Liquiphant M FTL 50 and FTL 51 is designed for level limit detection in liquids. If used incorrectly, it is possible that application-related dangers may arise. The level limit switch Liquiphant M FTL 50 and 51 may be installed, connected, commissioned, operated and maintained by qualified and authorized personnel only, under strict observance of these operating instructions, any relevant standards, legal requirements, and, where appropriate, the certificate.

1.2 Safety Conventions and Symbols

In order to highlight safety-relevant or alternative operating procedures in the manual, the following conventions have been used, each indicated by a corresponding icon.

Safety Conventions

Note!

A note highlights actions or procedures which, if not performed correctly, may indirectly affect operation or may lead to an instrument response which is not planned.



Caution!

Caution highlights actions or procedures which, if not performed correctly, may lead to personal injury or incorrect functioning of the instrument.



Warning!

A warning highlights actions or procedures which, if not performed correctly, will lead to personal injury, a safety hazard or destruction of the instrument.



Explosion Protection



Device certified for use in explosion hazardous area



If the Liquiphant M has this symbol embossed on its nameplate, it can be installed in an explosion hazardous area.



Explosion hazardous area

Symbol used in drawings to indicate explosion hazardous areas.

Devices located in and wiring entering areas with the designation "explosion hazardous areas" must conform with the stated type of protection.



Safe area (non-explosion hazardous area)

Symbol used in drawings to indicate, if necessary, non-explosion hazardous areas. Devices located in safe areas still require a certificate if their outputs run into explosion hazardous areas.

Warning! (For Intrinsically Safe Units)

Installation shall be in accordance with the National Electrical Code (ANSI/NFPA 70) and ANSI/ISA RP 12.6, "Wiring Practices for Hazardous (Classified) Locations, Instrumentation Part I: Intrinsic Safety".



1.3 Handling

Hold by housing, flange or extension tube.

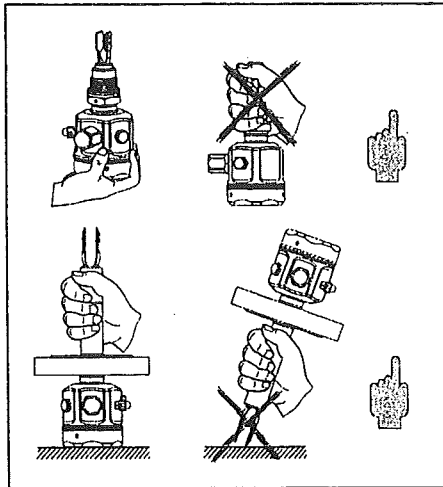


Figure 1.1

Do **not** bend.
Do **not** shorten.
Do **not** lengthen.

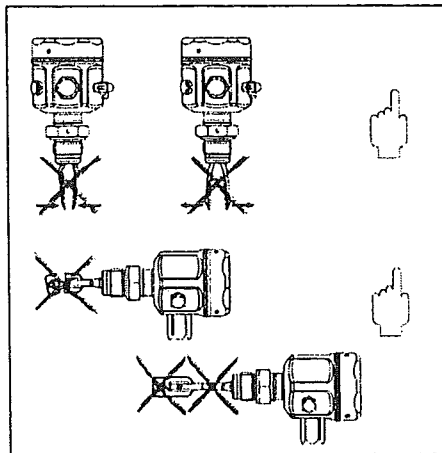


Figure 1.2

1.4 Repairs, Dangerous Chemicals

See Return Authorization Policy on page 2.

1.5 Technical Improvements

The manufacturer reserves the right to modify technical data without prior notice.

2 System Description

2.1 Introduction

The Liquiphant M is a level limit switch for use in all liquids

- with a temperature between -40°F and 300°F (-40°C and 150°C)
- with a pressure up to 930 psig (64 bar) depending on process connection
- with a viscosity up to 10,000 cP
- with a density from 0.5 SGU

This function is not affected by density, dielectric, flow (max. 16 ft/s), turbulence, bubbles, foam, vibration, bulk solids content or build-up. The Liquiphant is thus the ideal replacement for float switches.

2.2 Measurement Principle

The forks vibrate at their resonant frequency. This frequency is reduced when covered with liquid. The change in frequency then activates a limit switch.

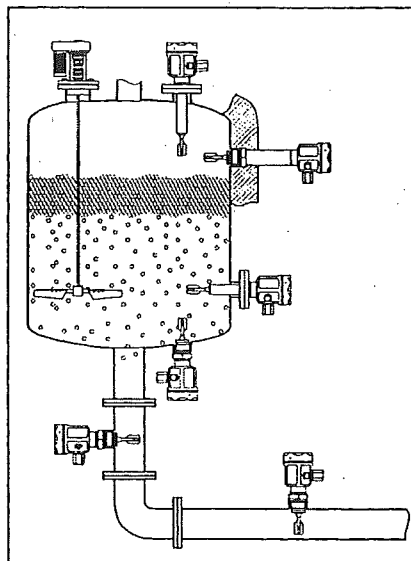
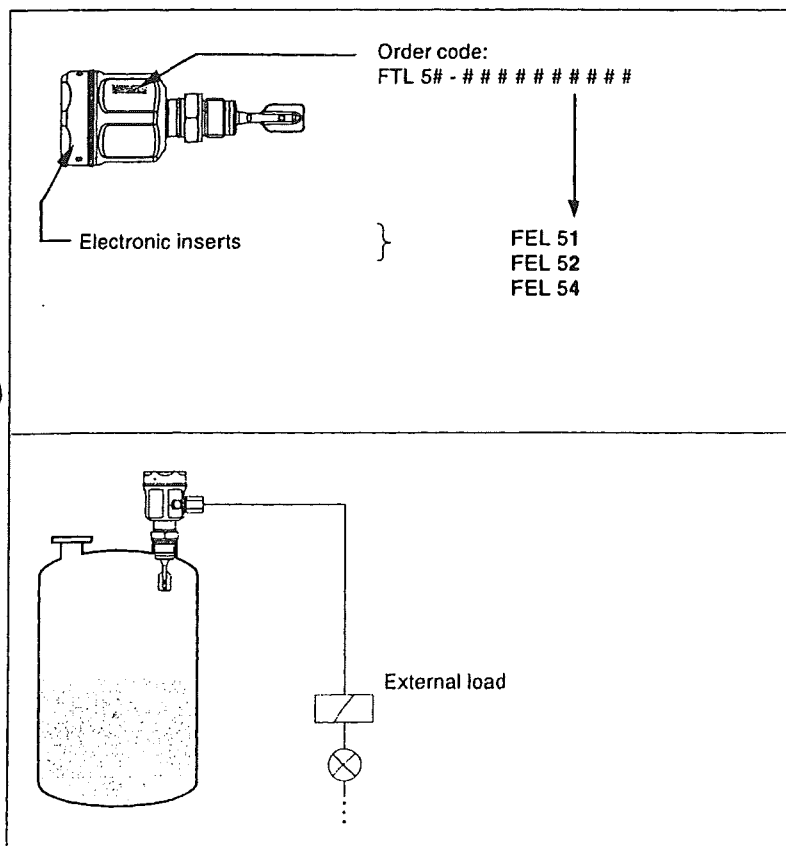


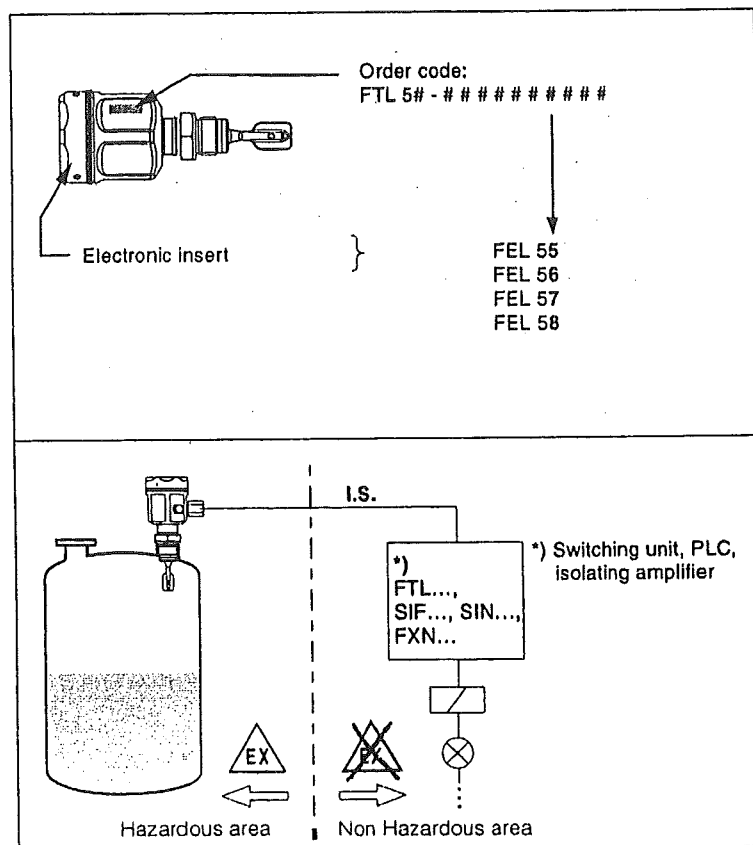
Figure 2.1
Level limit detection in liquids

2.3 Measuring System

- For direct connection



- For connection via switching unit



3 Mounting and Installation

Switchpoints on the sensor depend on the mounting position with reference to water, density 1 SGU, 73.4°F (23°C), pressure 0 psia (0 bar).

Note!

The switchpoints of the Liquiphant **M** are at different positions than those of the previous version Liquiphant **II**.

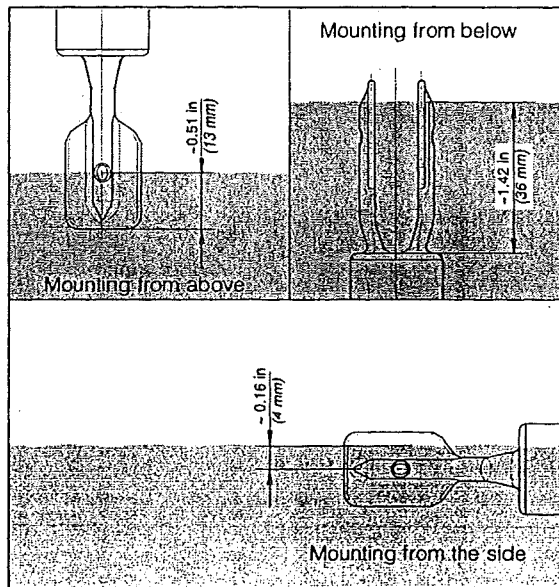


Figure 3.1
Mounting positions

Below are examples of mounting with regard to the viscosity ν of the liquid and the amount of build-up.

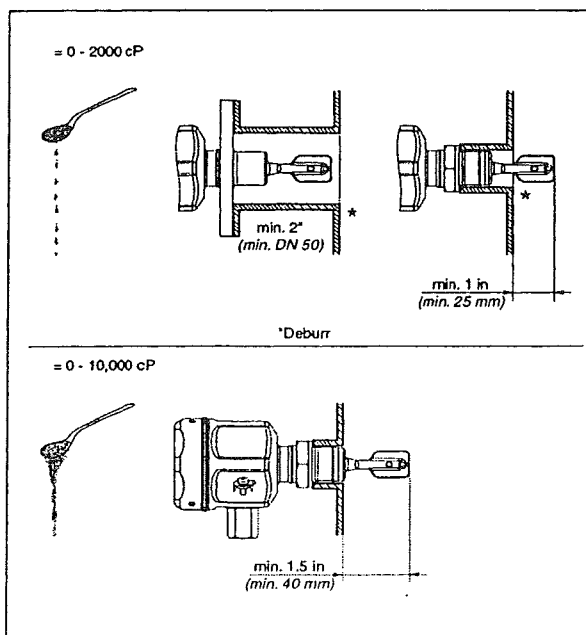


Figure 3.2
Mounting examples with regard
to liquid viscosity

Consider build-up. Fork may not contact the build-up. Ensure that there is sufficient distance between the build-up expected on the tank wall and the fork.

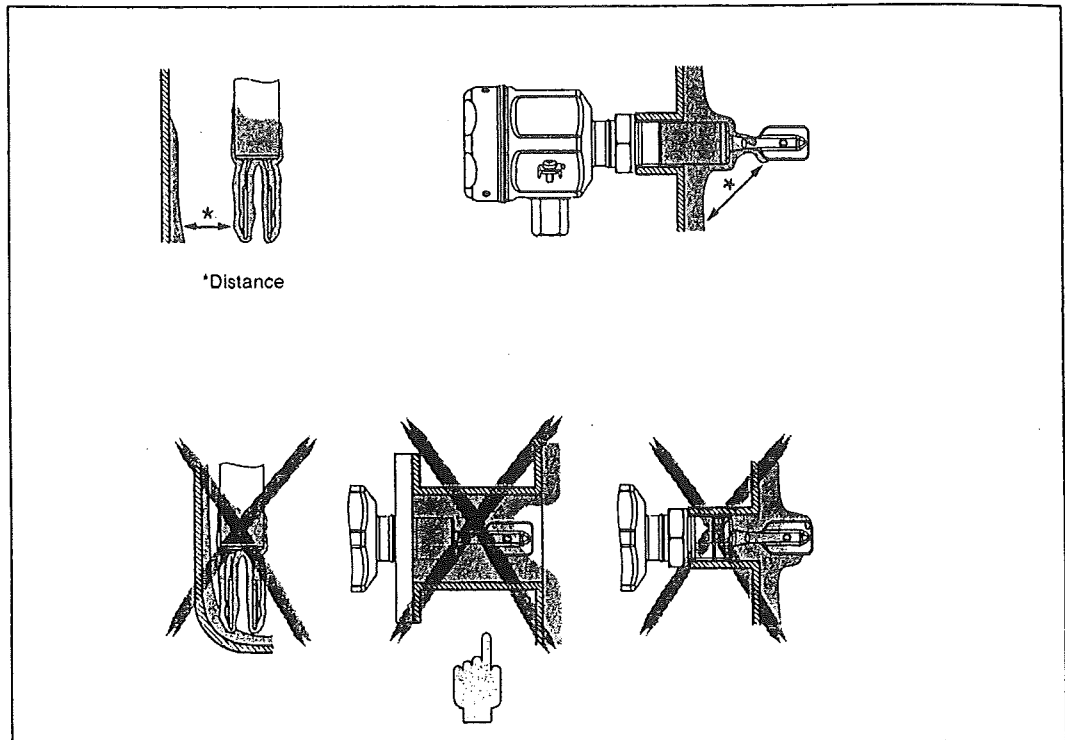
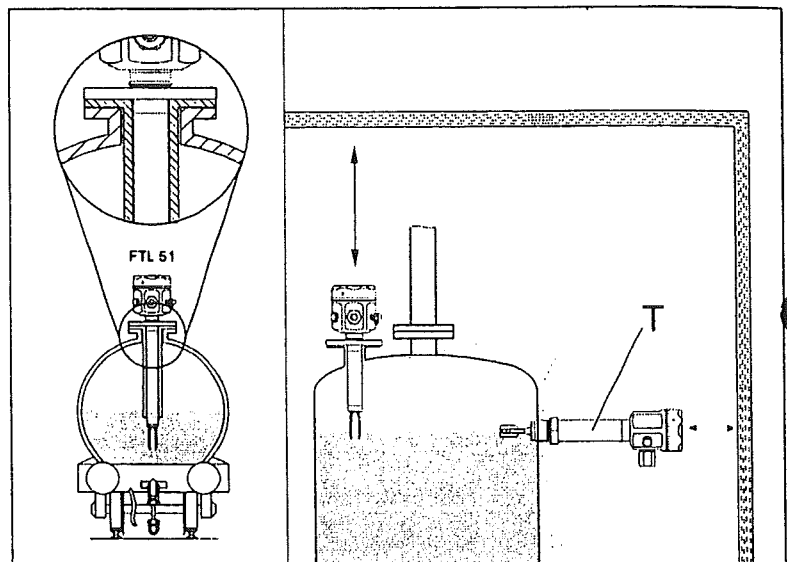


Figure 3.3
Fork may not contact the build-up

Support the
Liquiphant M FTL 51
with high dynamic
loads

T = with temperature
spacer for insulated
tanks



Allow adequate
clearance outside
the tank for
mounting, electrical
connection and
adjustment.

For optimum mounting, without problem, even with high viscosity: position the fork so that the narrow edge of the tines is vertical. This ensures that the liquid can run off easily.

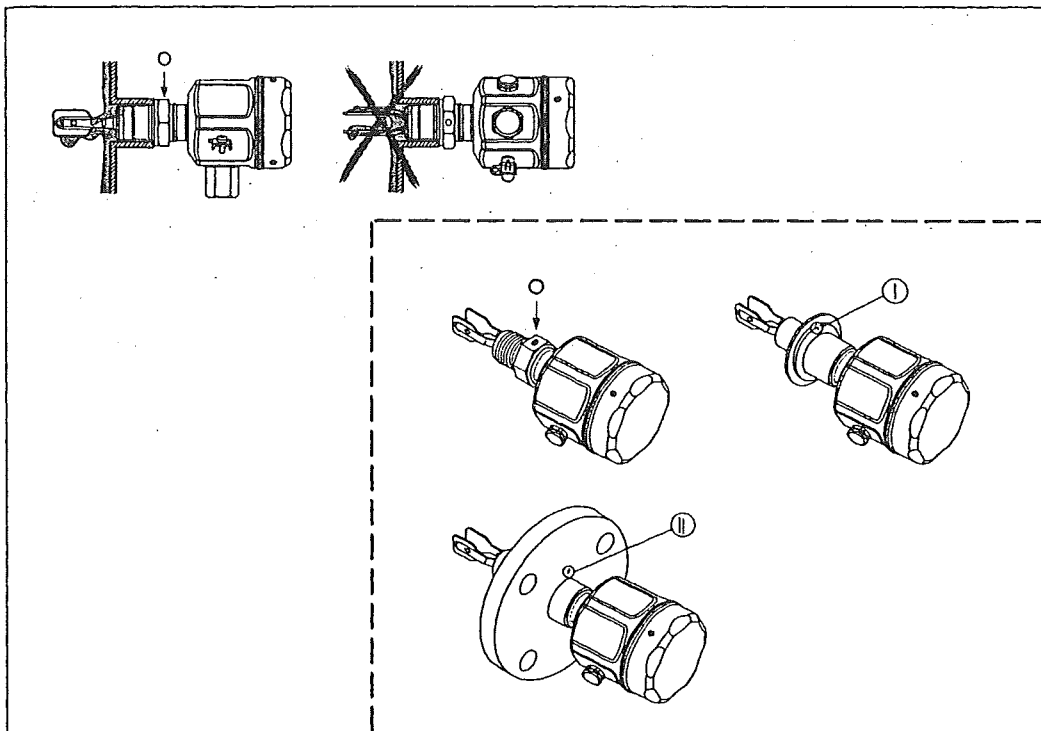
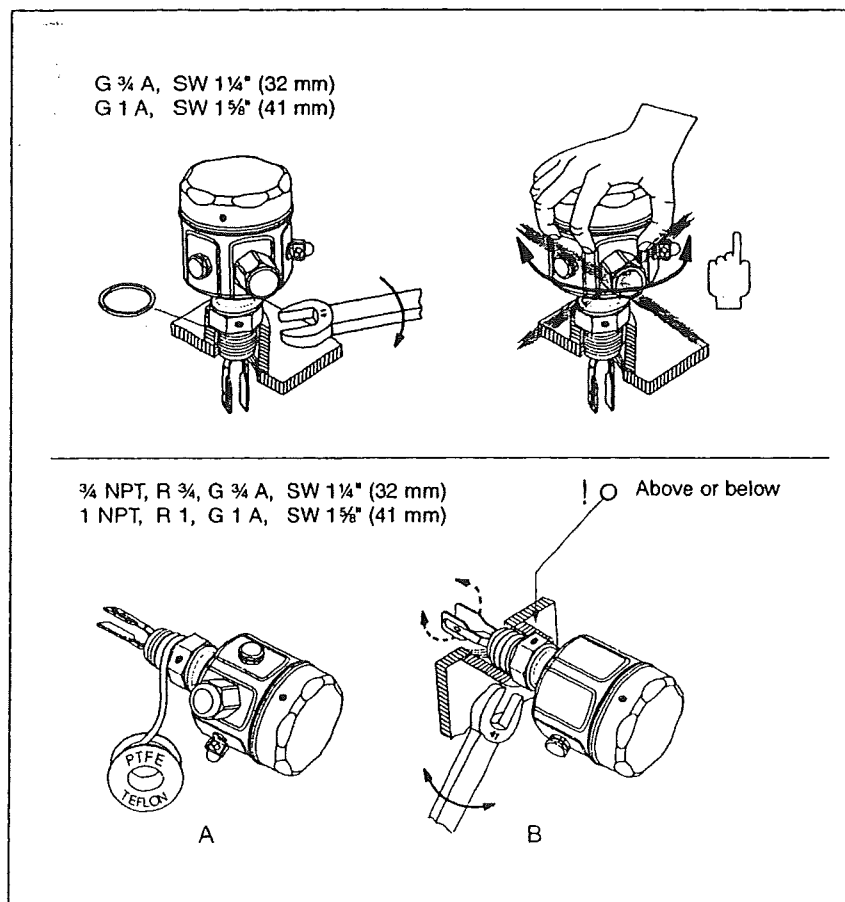


Figure 3.4
Orientation of fork tines:
Marking above or below

Screw Liquiphant into process connection. **DO NOT** use housing to turn.



Orientation in pipes: Marking in direction of flow.

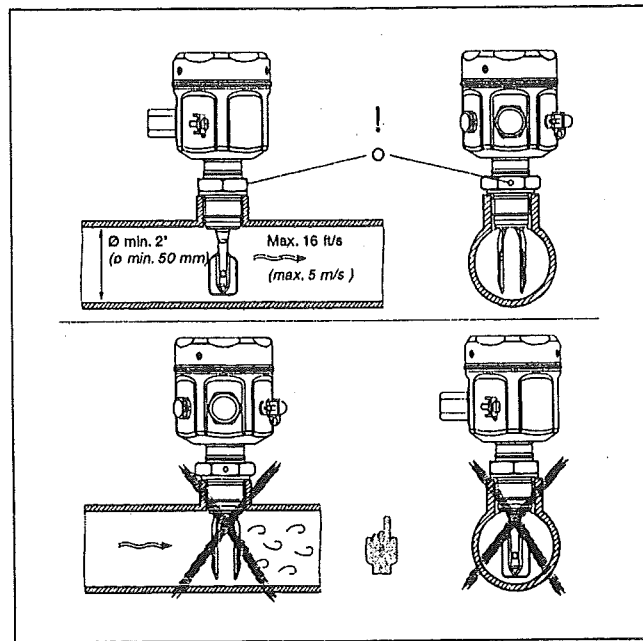


Figure 3.4
Orientation in pipes

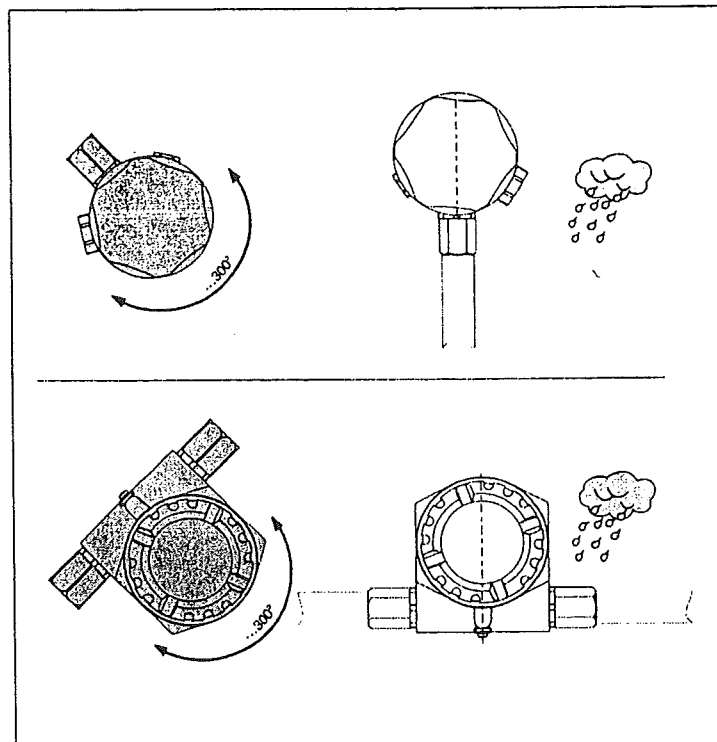


Figure 3.5
Cable entry orientation

4 Setup and Connections

4.1 Setup

Minimum/maximum fail-safe mode

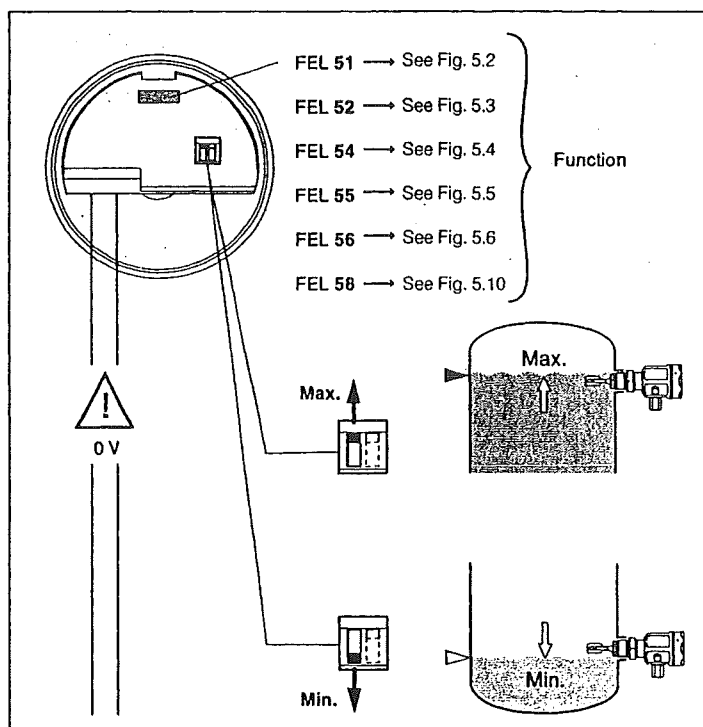


Figure 4.1
Minimum/Maximum fail-safe mode

Liquid density: Density ρ measured in g/cm^3 (SGU) or in kg/l .

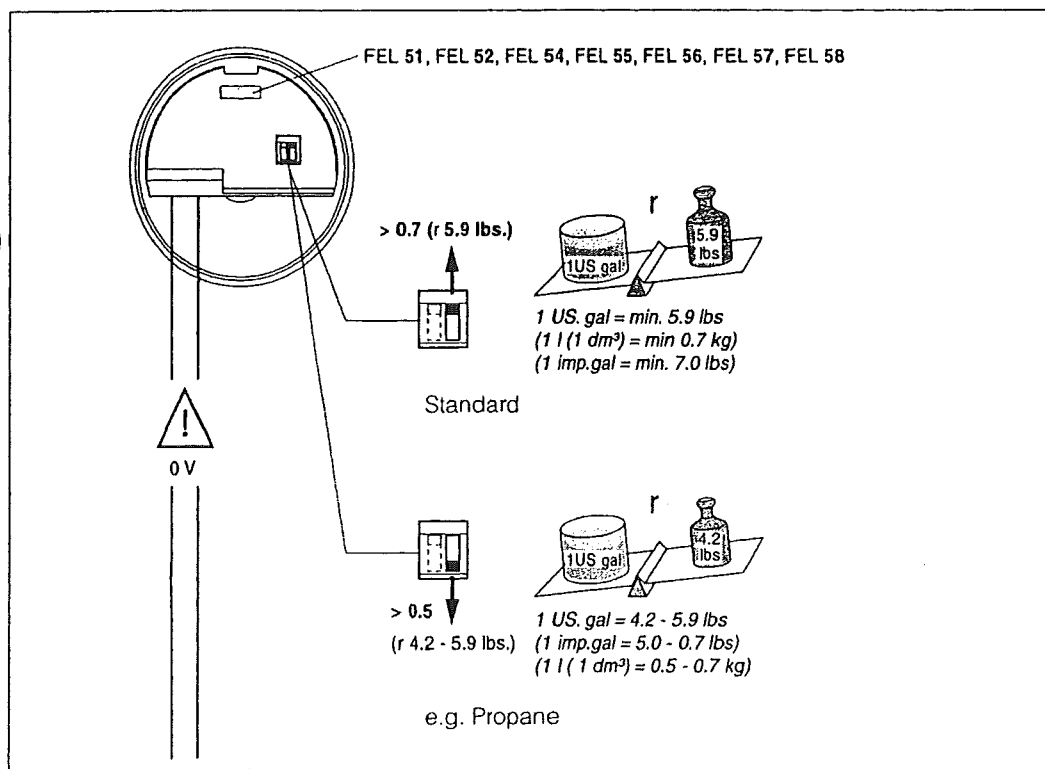


Figure 4.2
Liquid density

FEL 57

Functional test:

Test phase on switch-on (see figures 5.8 and 5.9 and switching unit for sequence).

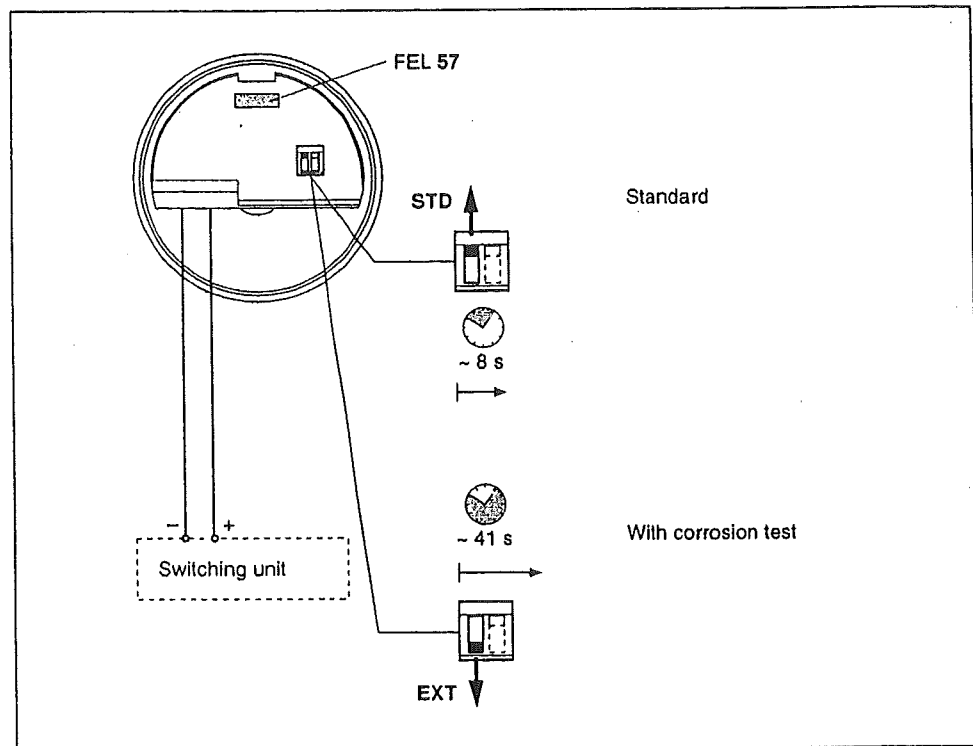
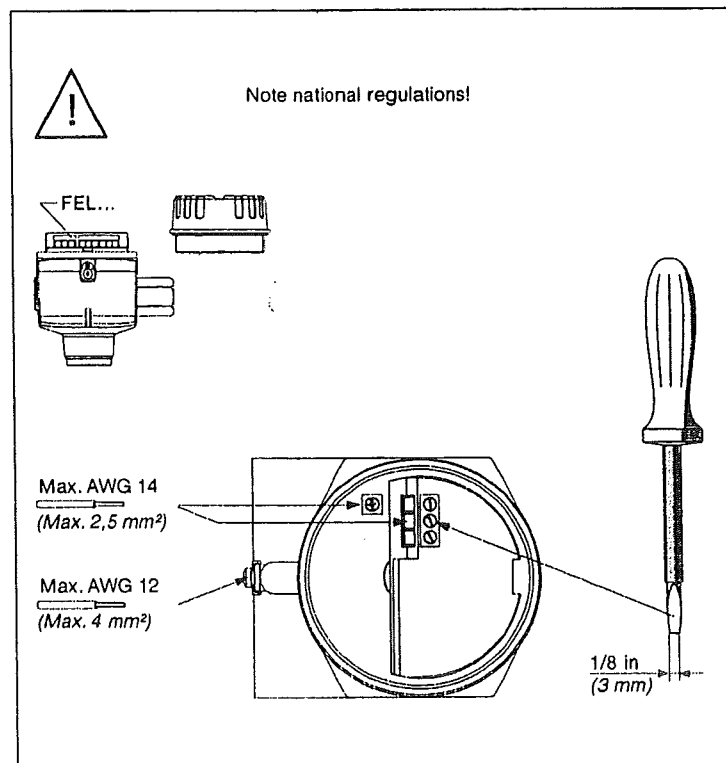


Figure 4.3
FEL 57
Functional Test

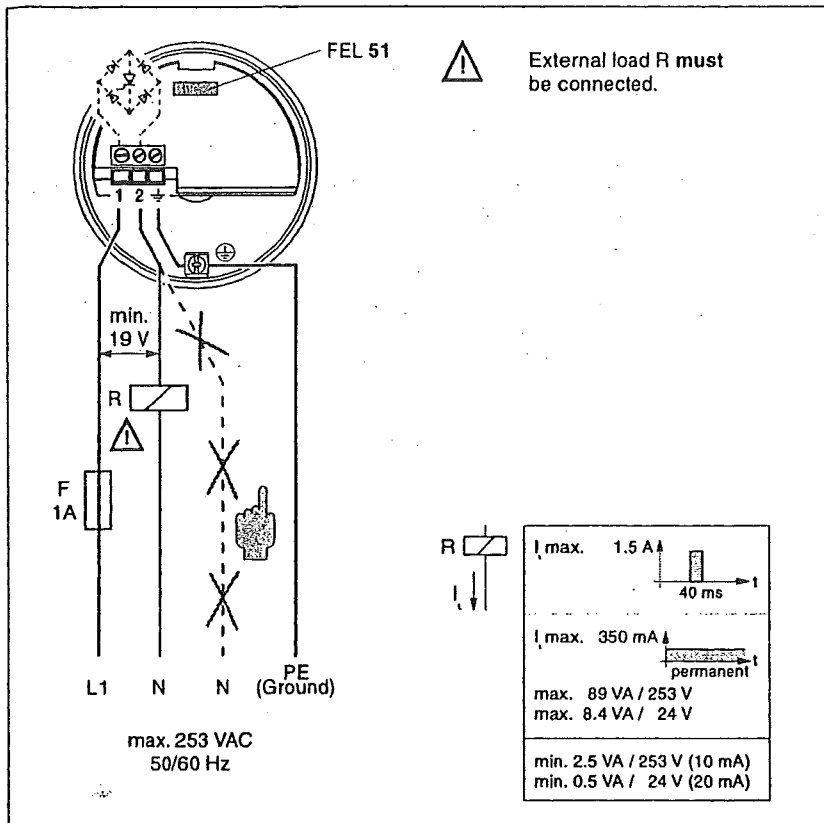
4.2 Connections

Note National Electrical Codes.



Connections FEL 51

Two-wire AC connection



Destruction
Caution!

Figure 4.4
FEL 51
Two-wire AC connection

Connections FEL 52

DC connection (PNP)

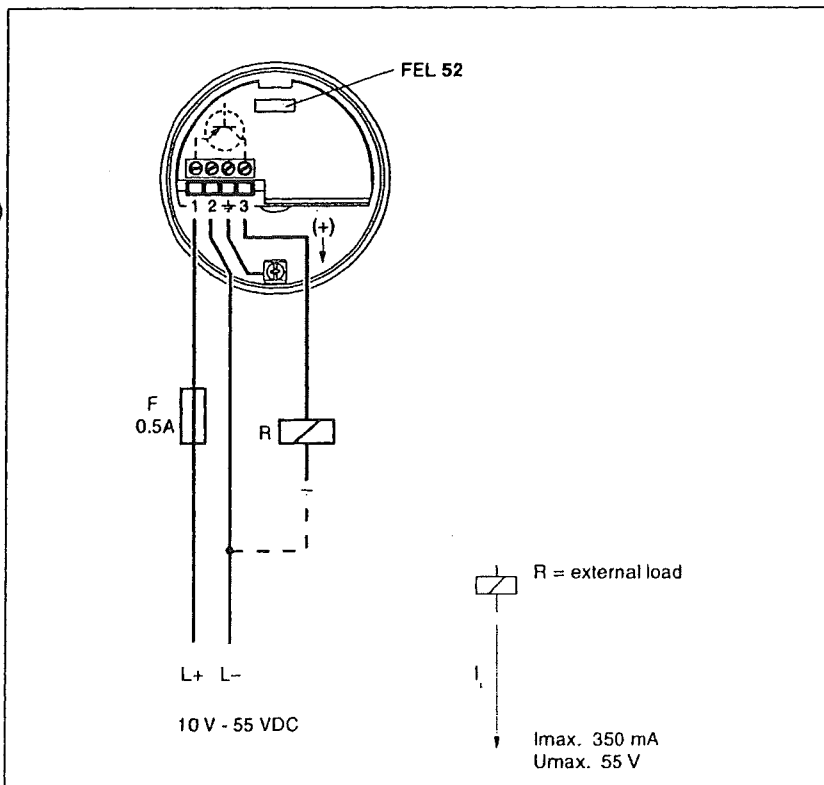


Figure 4.5
FEL 52
DC Connection (PNP)

Connections FEL 54

Universal connection

Relay output

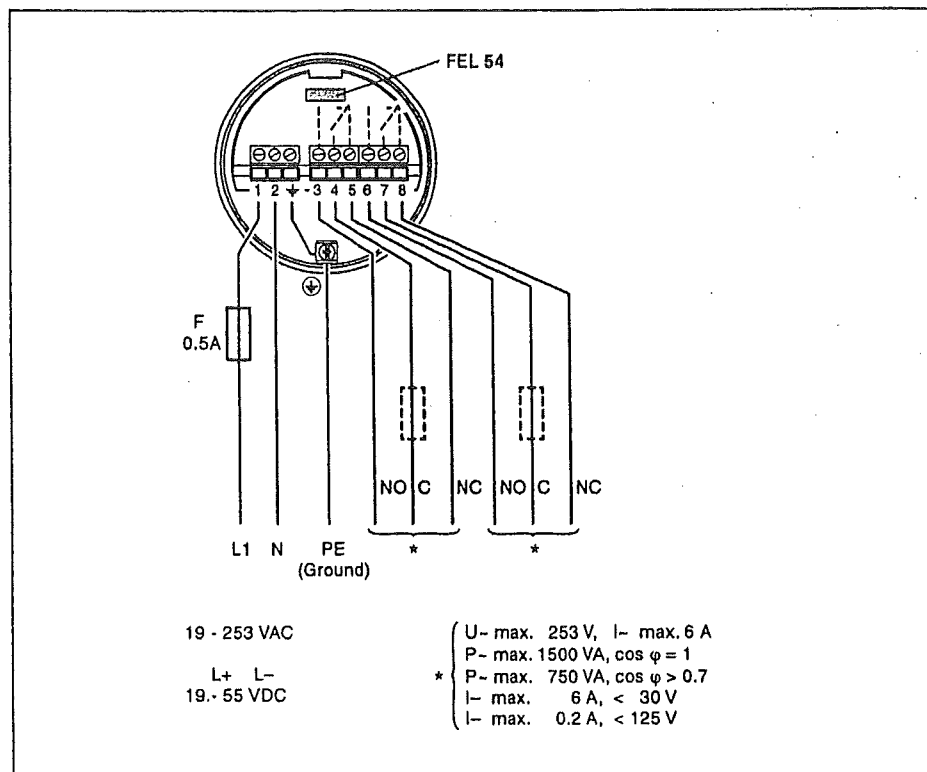


Figure 4.6
FEL 54
Universal connection
Relay output

Connections FEL 55

Output

16 / 8 mA (4-20)

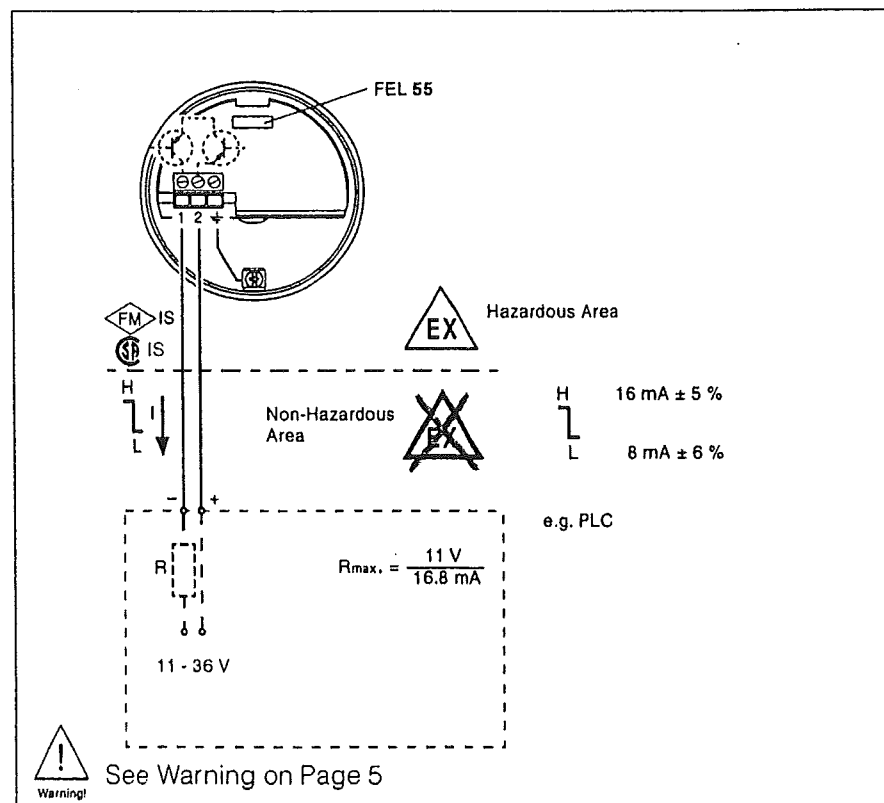


Figure 4.7
FEL 55
Output
16 / 8 mA (4-20)

Connections FEL 56

NAMUR output
 $<1.0 \text{ mA} / > 2.1 \text{ mA}$

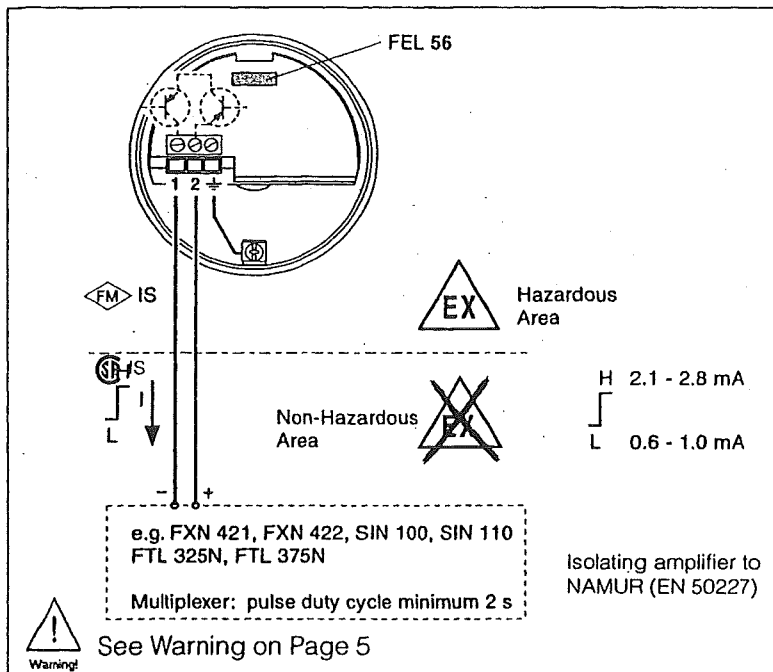


Figure 4.8
 FEL 56
 NAMUR output
 $<1.0 \text{ mA} / > 2.1 \text{ mA}$

Connections FEL 57

PFM output
 150 Hz / 50 Hz

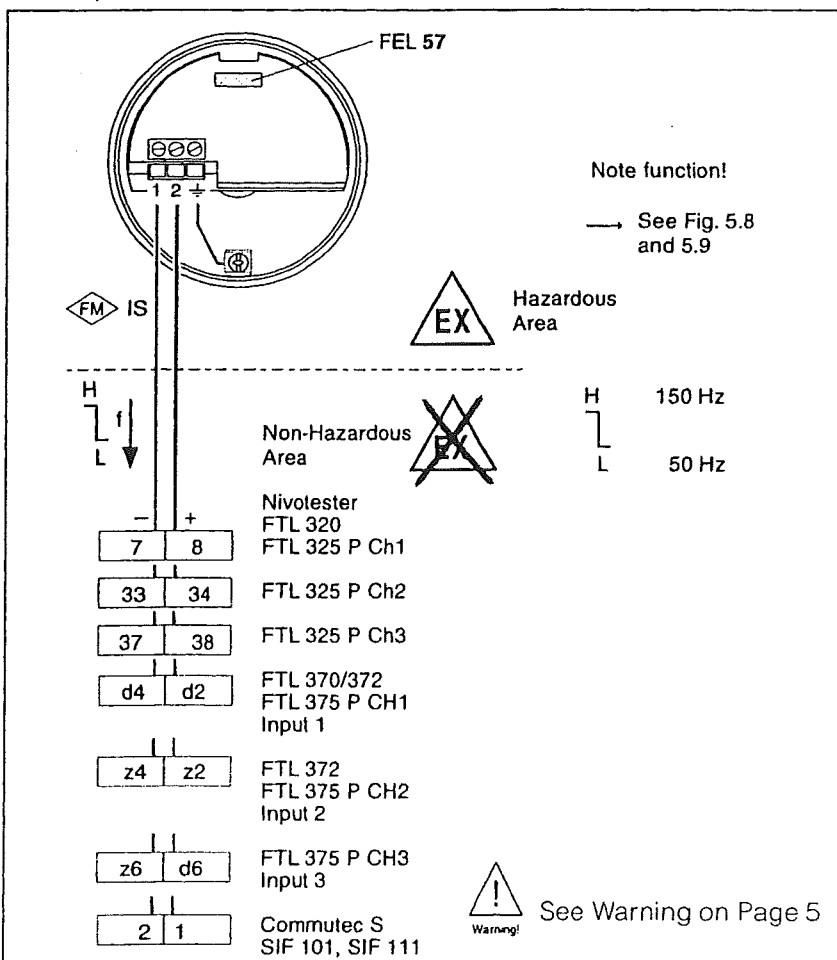


Figure 4.9
 FEL 57
 PFM output
 150 Hz / 50 Hz

Connections FEL 58

NAMUR output H-L

>2.1 mA / <1.0 mA

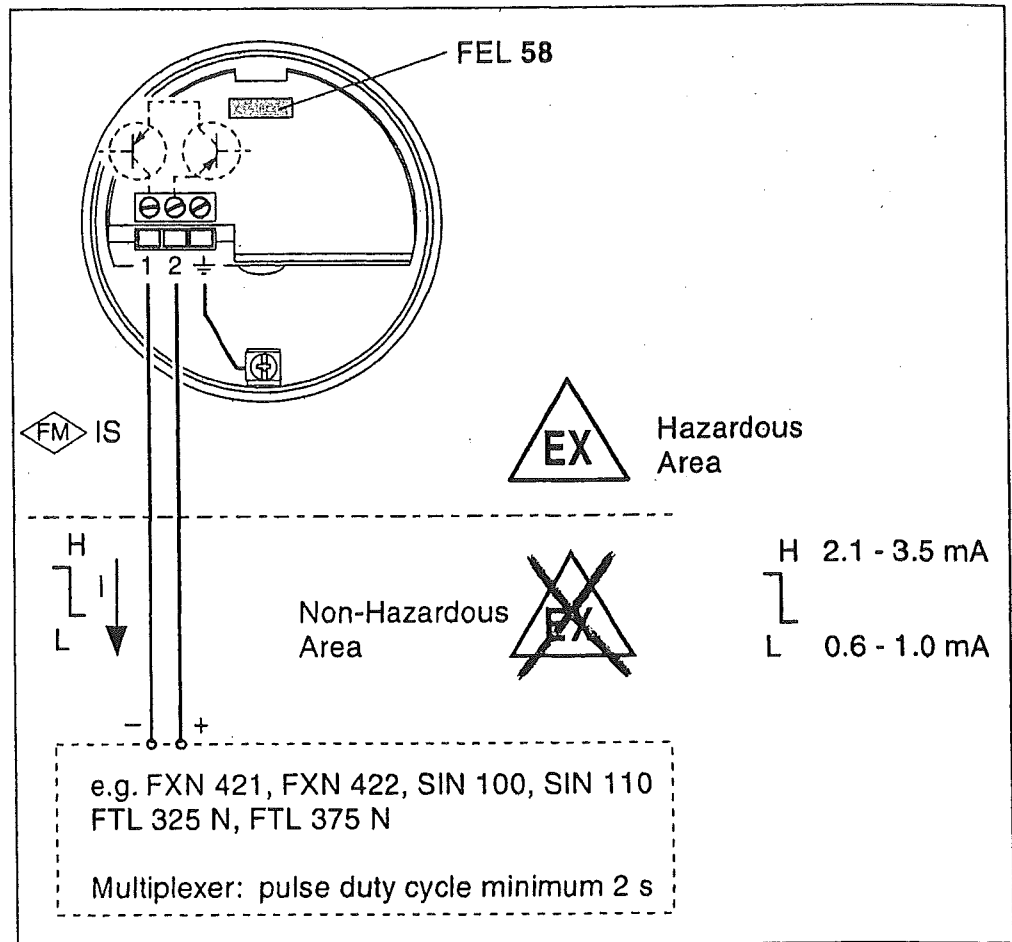


Figure 4.10
FEL 58
NAMUR output H-L
>2.1 mA / <1.0 mA

5 Function

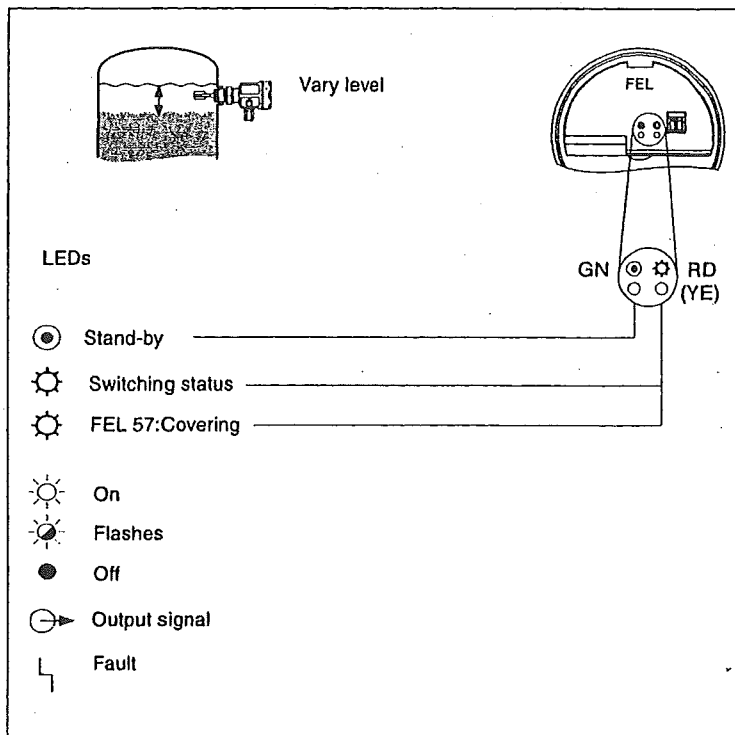
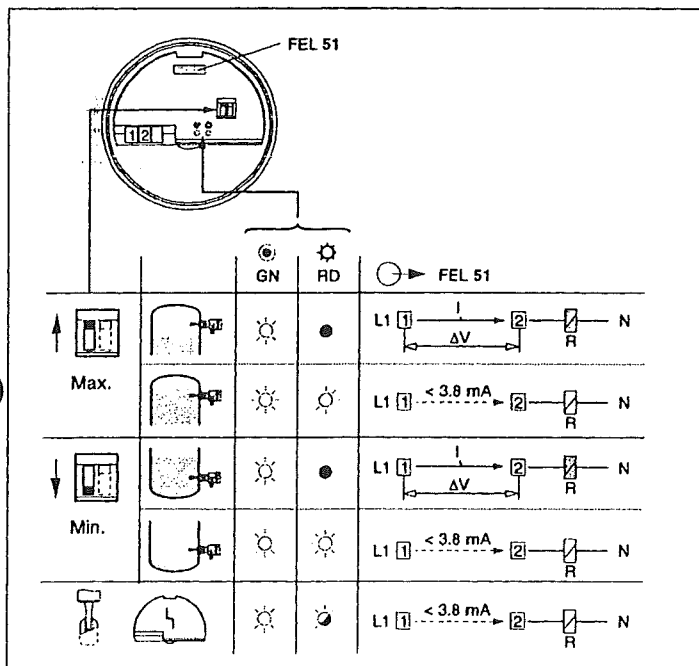


Figure 5.1
Display elements

Function FEL 51



$\Delta V_{\text{FEL 51}}$ max. 12V

Figure 5.2
FEL 51

Function FEL 52

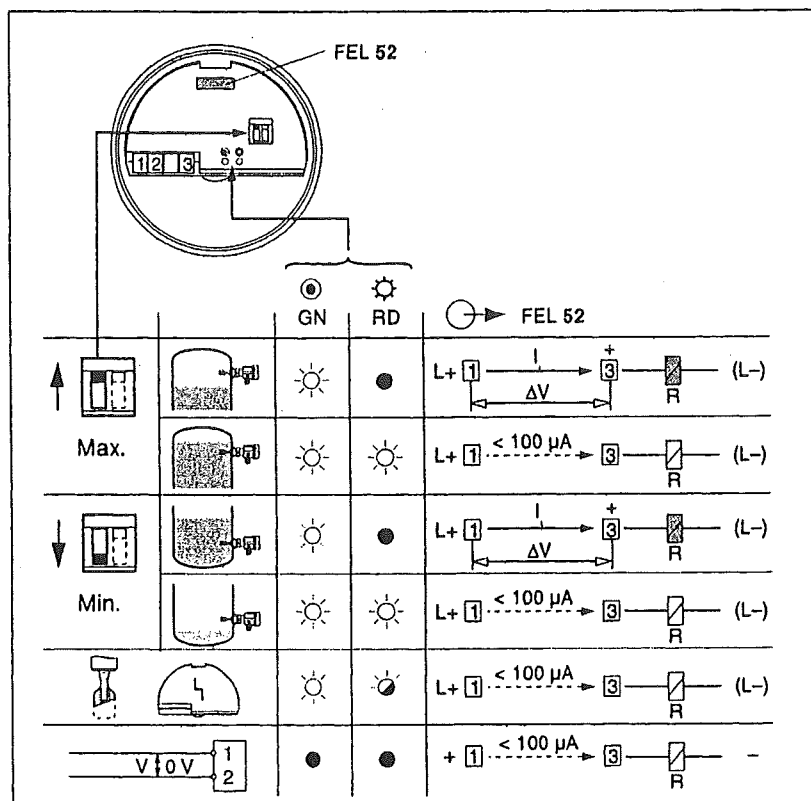


Figure 5.3
FEL 52

Function FEL 54

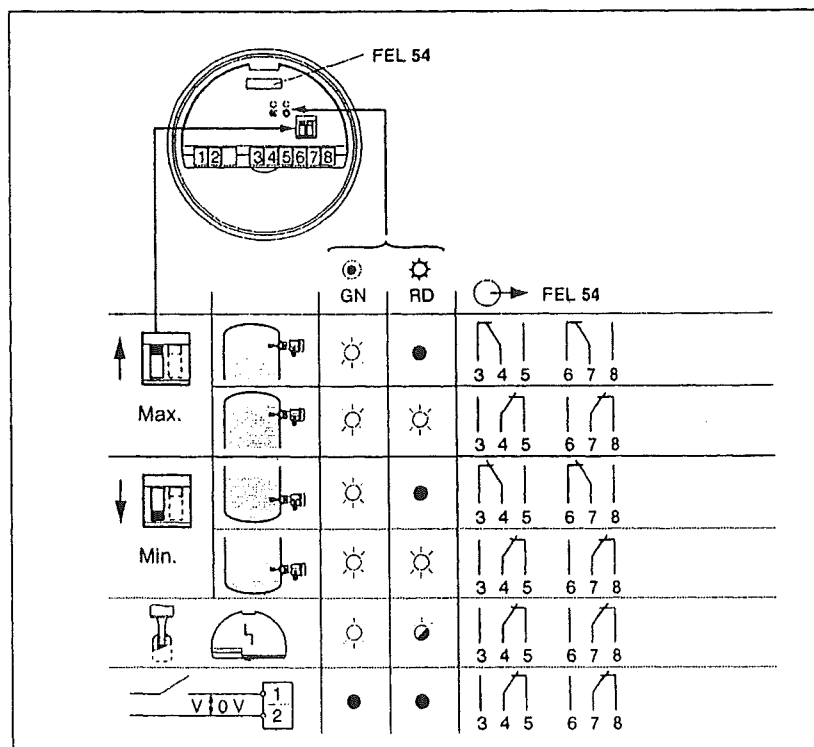


Figure 5.4
FEL 54

Function FEL 55

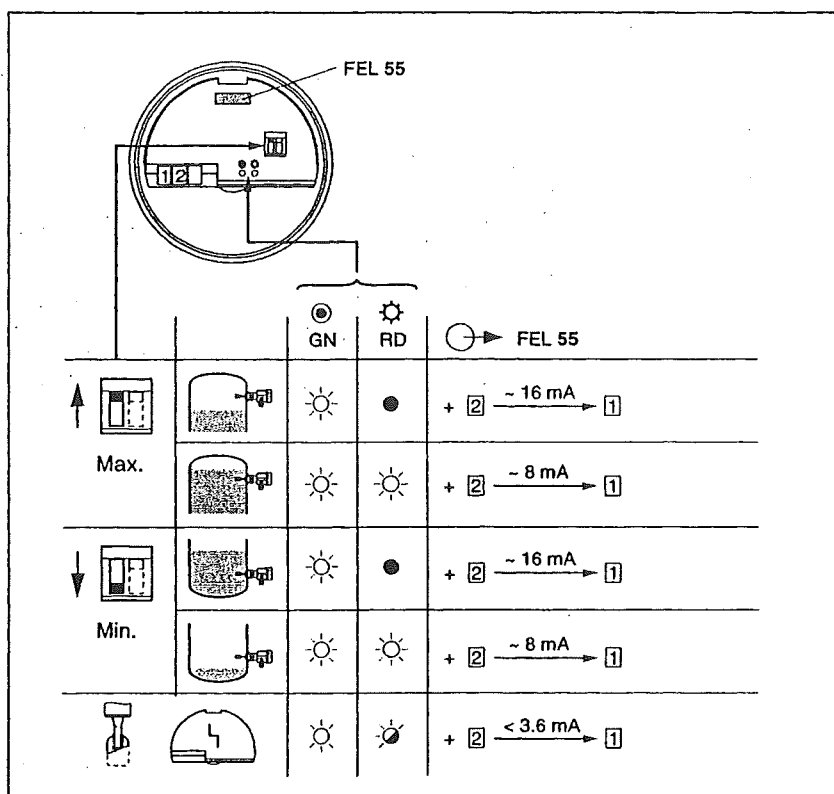


Figure 5.5
FEL 55

Function FEL 56

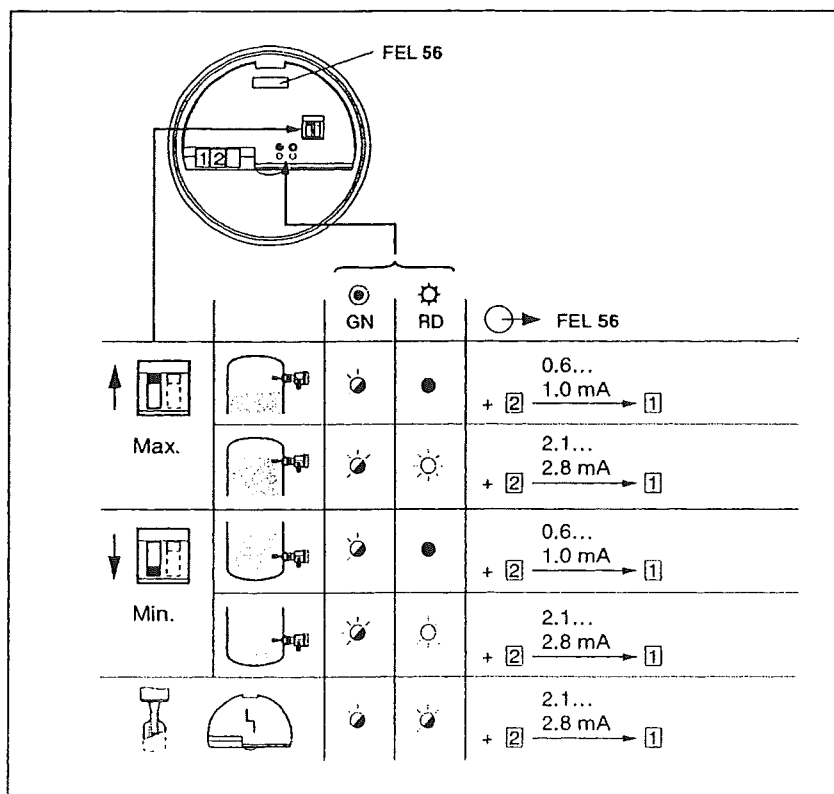


Figure 5.6
FEL 56

Function FEL 57

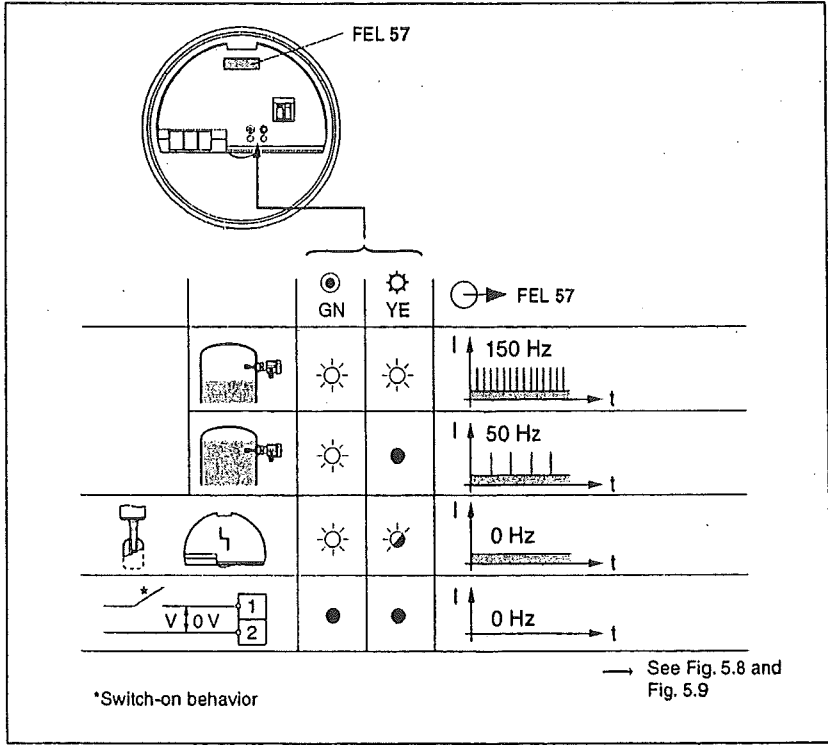


Figure 5.7
FEL 57

Function FEL 57 Switch-on behavior STD (Test phase*)

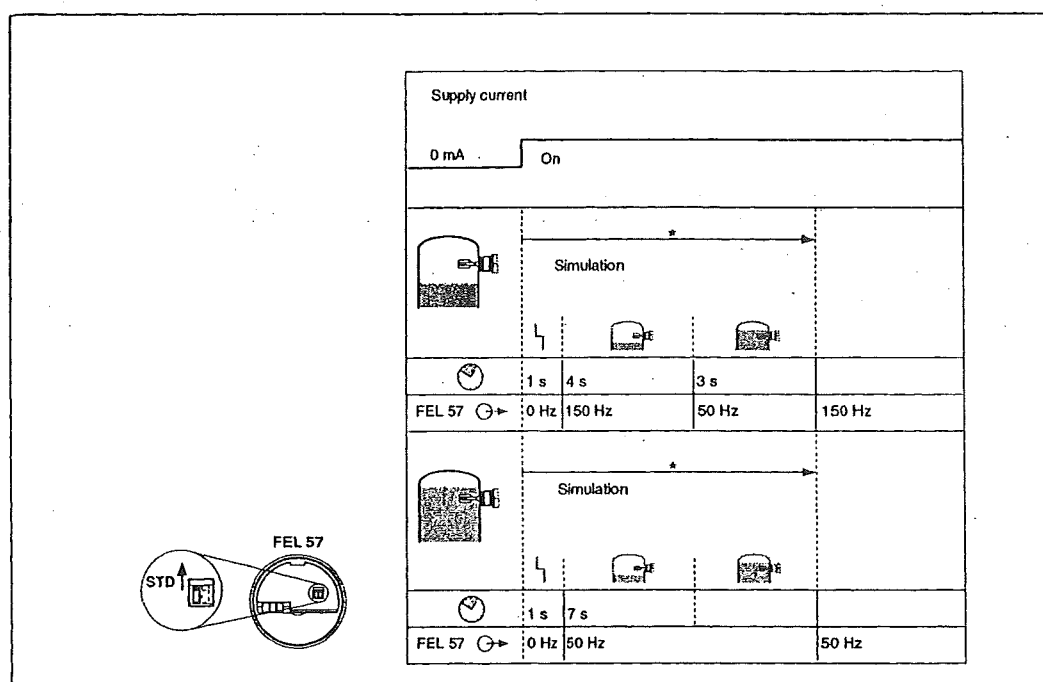


Figure 5.8
FEL 57
Switch-on behavior STD

Function FEL 57 Switch-on behavior EXT (Test phase*)

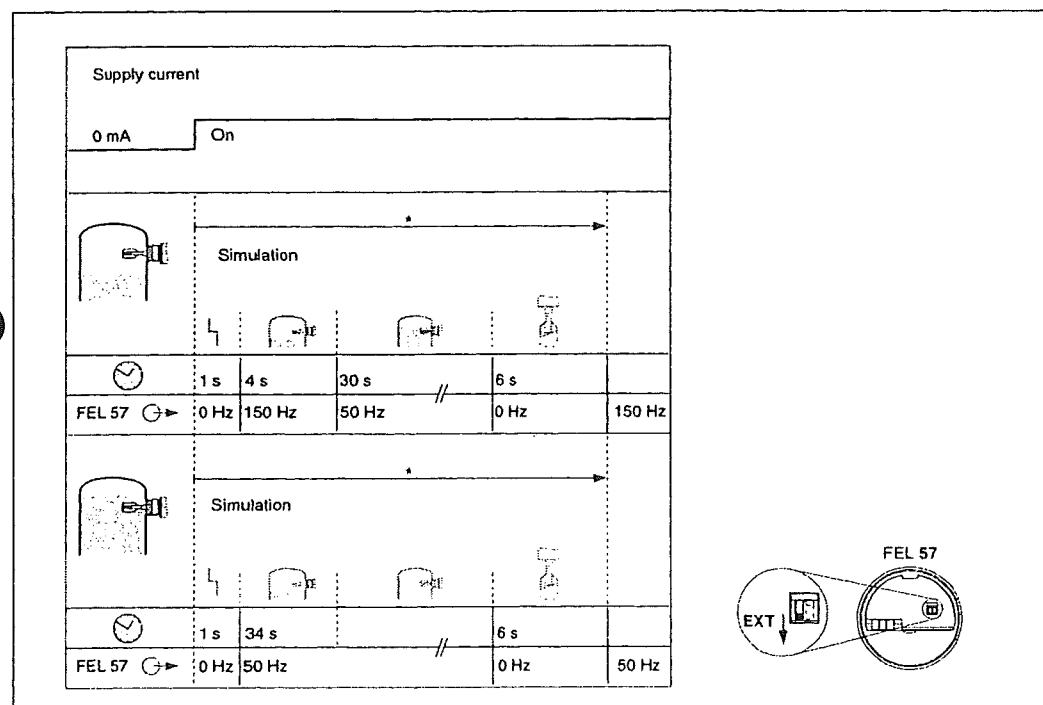


Figure 5.9
FEL 57
Switch-on behavior EXT

Function FEL 58

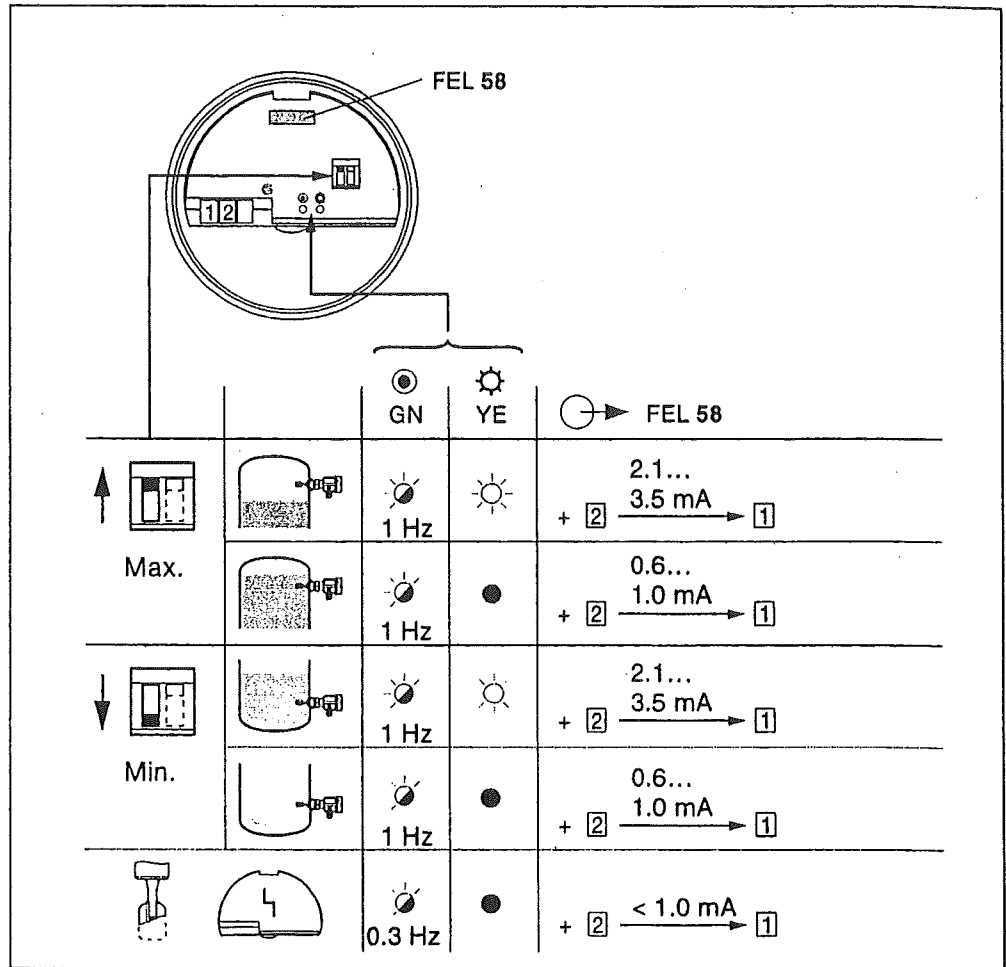


Figure 5.10
FEL 58

Function FEL 58 (Test Button)

Normal operation	Test button ^①		Operation
Max Min	GN YE	① ②	~ 2 s later
Max.	GN YE	GN YE	GN YE
Min.	GN YE	GN YE	GN YE
Max.	GN YE	GN YE	GN YE
Min.	GN YE	GN YE	GN YE

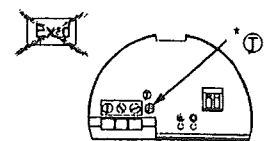
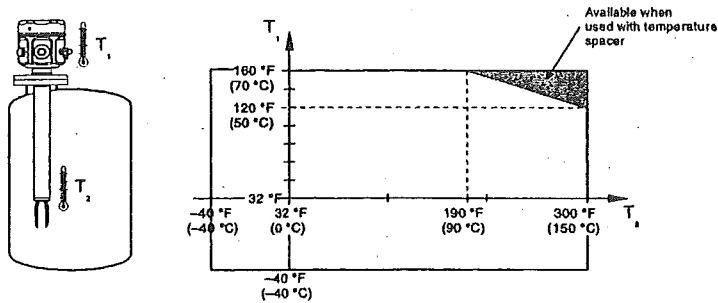


Figure 5.11
FEL 58 Test button*

6 Technical Data

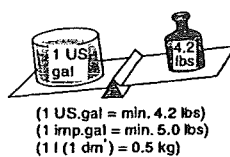
Ambient temperature T₁

Process temperature T₂

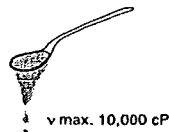


Process pressure
p = max. 930 psig (64 bar)
Depending on process connection

Density ρ

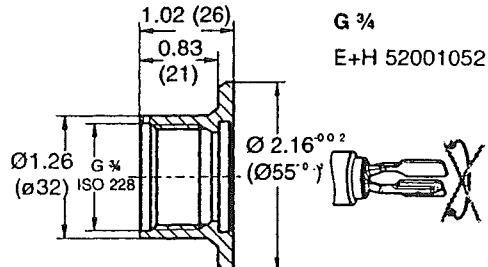


Viscosity ν



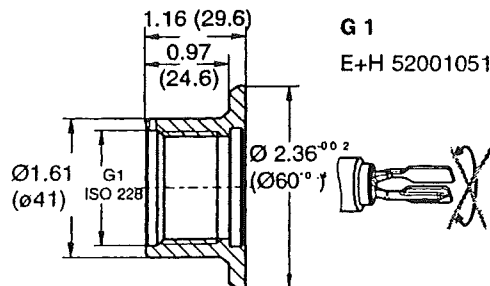
6.1 Accessories

Weld-in sockets

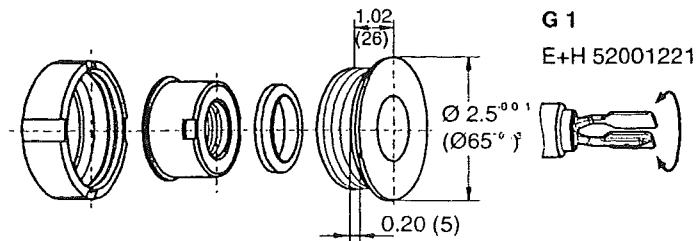


max. 360 psi/300°F
(max. 25 bar/150°C)

max. 580 psi/210°F
(max. 40 bar/100°C)



G 1
E+H 52001051

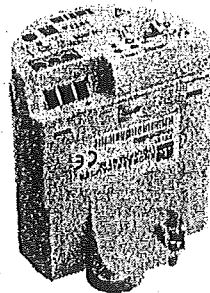


G 1
E+H 52001221

Dimensions are in inches (mm)

6.2 Spare Parts

Electronic inserts

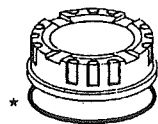


FEL 51	E+H 52002304
FEL 52	E+H 52002305
FEL 54	E+H 52002306
FEL 55	E+H 52002307
FEL 56	E+H 52002308
FEL 57	E+H 52002309
FEL 58	E+H 52010527

Warning!

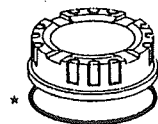
FEL 55, FEL 56 and FEL 57 that have been used in **non**-explosion hazardous areas **may not** be re-used in explosion hazardous areas.

Housing covers, seals



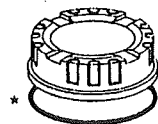
Alu w/EPDM O-ring

E+H 52002699



Alu (EX) w/EPDM O-ring

E+H 52002698



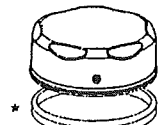
PBT-FR (cover only)

E+H 943461-0000



EPDM O-ring

E+H 017717-0003



AISI 304/316L (cover only)
(1.4301/1.4435)

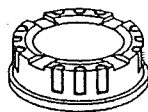
E+H 943301-0000



MVQ Silicone Seal

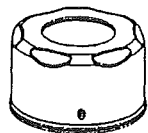
E+H 943304-0000

* Lubricate with silicone grease or graphite



PA 12

Transparent cover
For Plastic housing
E+H 943461-0001



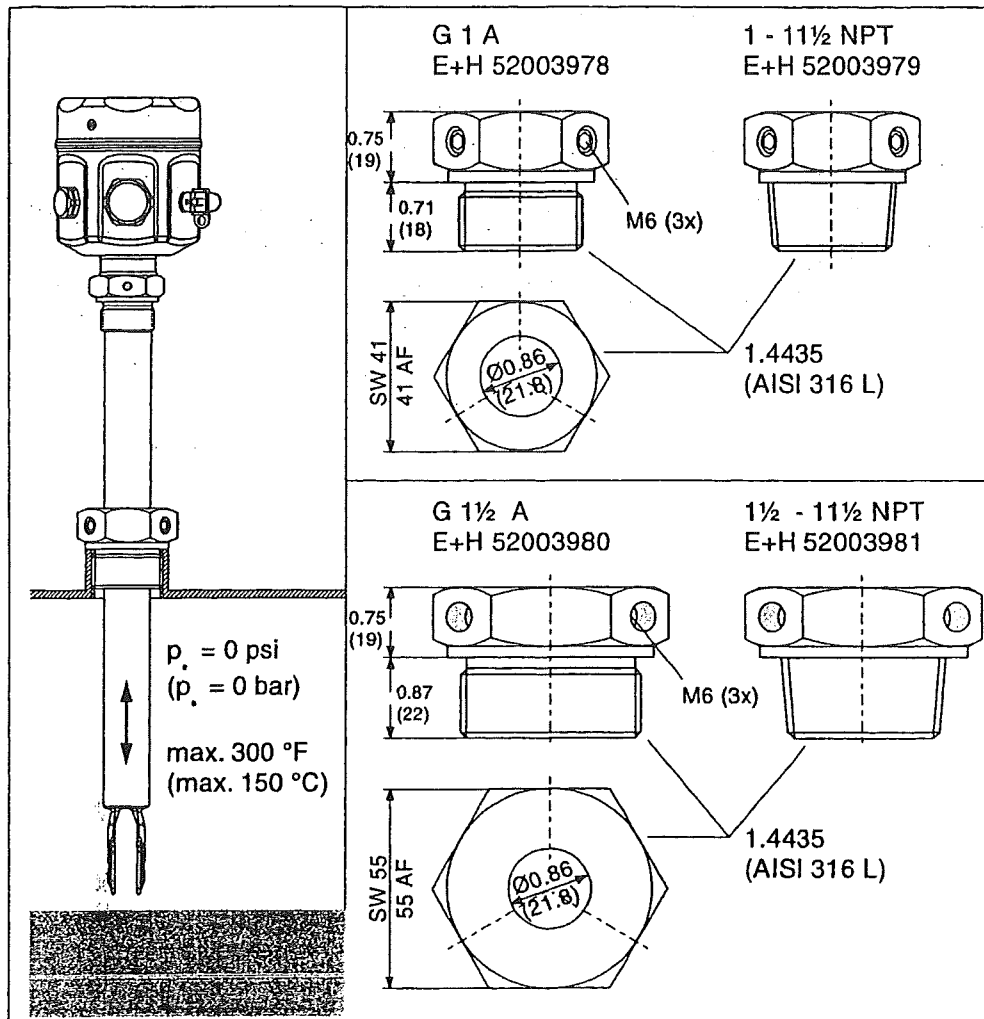
AISI 316L
(1.4435)

Stainless Steel cover with glass window
For Stainless Steel housing
E+H 943301-1000

With Polycarbonate window
E+H 52001403

Sliding sleeves

Sliding sleeves for unpressurized operation.



High pressure sliding sleeves.

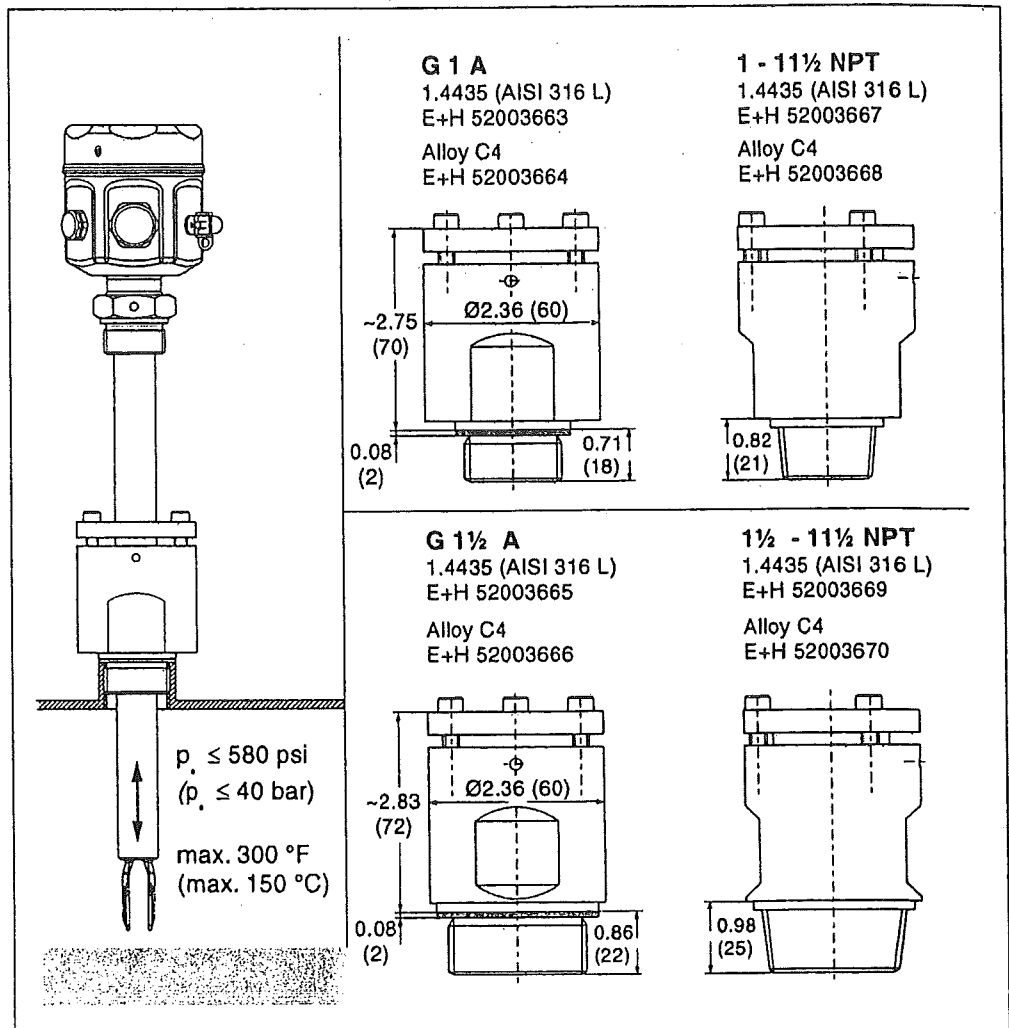
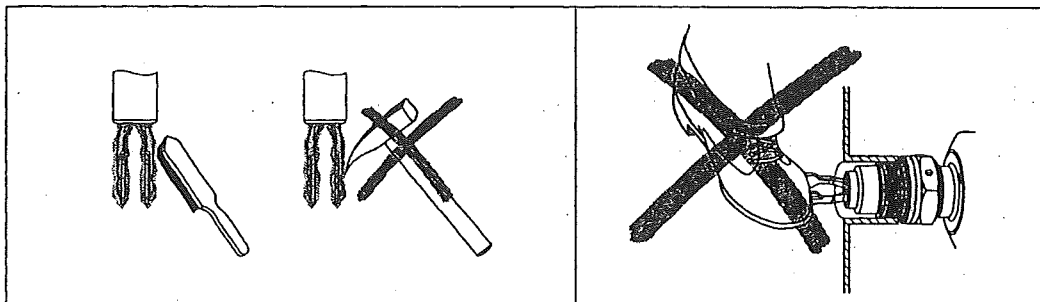


Figure 6.2
High pressure sliding sleeves

7 Maintenance & Troubleshooting

7.1 Maintenance

Removal of thick encrustation

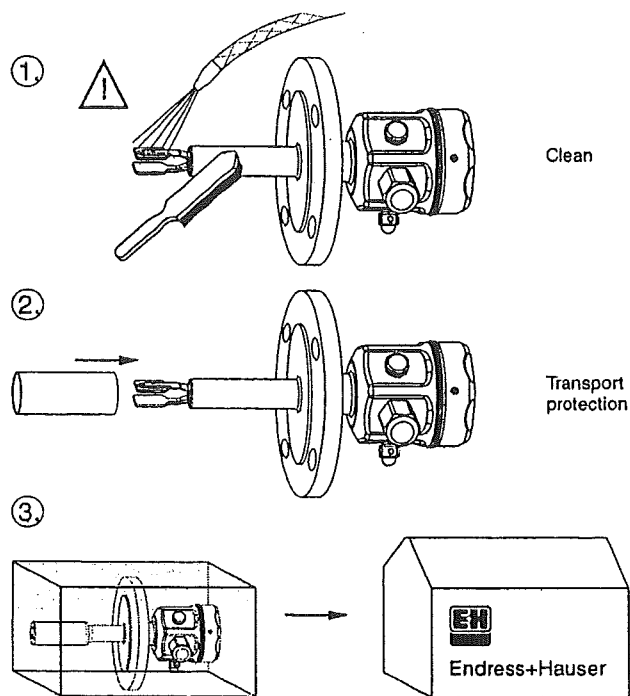


Do Not use as a step!

7.2 Troubleshooting

Fault	Reason	Remedy
Does not switch	No power	Check power
	Faulty signal line	Check signal line
	Faulty electronic insert – FEL 51 connected directly to L1 and N	Exchange –always connect FEL 51 via external load
	Density of liquid too low	Set density to > 0.5 at electronic insert
	Fork encrusted	Clean fork
	Fork corroded (Indication on FEL: red/yellow flashes, FEL 58: green flashes 0.3 Hz)	Exchange fork and process connection
	FEL 51: Internal resistance of connected relay too large	Connect suitable relay
	FEL 51: Holding current of connected relay too low	Connected resistor in parallel with relay
Switches incorrectly	FEL 54: Contacts welded together (after short-circuit)	Exchange FEL 54; put fuse in contact circuit
Switches incorrectly after power failure	Min- / Max- fail-safe mode set wrong	Set correct mode at electronic insert
	Sporadic faulty switching	Thick heavy foam, very turbulent conditions, foaming liquid
	Extreme RFI	Mount Liquiphant in bypass
	Extreme vibration	Use shielded cable
	Water in housing	Decouple, damp, turn fork 90°
Switches incorrectly after power failure	FEL 52: Output overloaded	Screw cover and cable gland tight
	FEL 57, Behavior during switch-on test (functional test)	Reduce load, (cable) capacitance
Switches incorrectly after power failure	FEL 57, Behavior during switch-on test (functional test)	Observe switching behavior of FEL 57; After power failure block plant control for up to 45 s.

7.3 Repair at Endress+Hauser



See page 2 (RA Policy)

7.4 Order Codes

Liquiphant M FTL 50 –

1	2	3	4	5	6
---	---	---	---	---	---

FTL 50: Compact

FTL 51: With extension pipe

Liquiphant M FTL 51 –

1	2	3	4	5	6
---	---	---	---	---	---

- 1 **Certificates and Approvals**
- A General purpose, without any special certificate
 - P FM approved, intrinsically safe, CL I, II, III; Div. 1; Gr. A-G (inserts 55, 56, 57, 58 only)
 - Q FM approved dust ignition proof, CL II, III; Div. 1, Gr. E-G
 - Q FM approved, explosion proof, CL I, II, III; Div. 1, Gr. B-G (Aluminum housing E7)
Gr. A-G if E5 housing is used
 - R FM approved dust ignition proof, CL II, III; Div. 1, Gr. E-G
 - R FM approved, non-incendive, CL I, Div. 2, Gr. A-D
 - R FM approved, special protection, CL II, III, Div. 2, Gr. F-G
 - U CSA, General purpose
 - S CSA intrinsically safe, CL I, Gr. A-D; Class II, Gr. E-G; CL III (inserts 55, 56, 57, 58 only)
 - T CSA explosion proof, CL I, Gr. A-D; Class II, Gr. E-G, CL III
 - non-incendive, CL I, Div. 2, Gr. A-D; Class II, Div. 2, Gr. E-G; CL III (Aluminum housing only)
 - Y Others

- 2 **Process Connection, Material¹**
- GM2½" NPT threaded connection, 316L SS
 - GM5½" NPT threaded connection, Alloy C4
 - GW2G1 BSP, 316L SS mounting for weld-in adapter
 - GN2 1" NPT threaded connection, 316L SS
 - GN5 1" NPT threaded connection, Alloy C4
 - A82 ANSI 1" flange, Class 150, RF, 316L SS
 - AA2 ANSI 1¼" flange, Class 150, RF, 316L SS
 - AB2 ANSI 1¼" flange, Class 300, RF, 316L SS (FTL 51)
 - AC2 ANSI 1½" flange, Class 150, RF, 316L SS
 - AD2 ANSI 1½" flange, Class 300, RF, 316L SS (FTL 51)
 - AE2 ANSI 2" flange, Class 150, RF, 316L SS
 - AE5 ANSI 2" flange, Class 150, RF, 316L SS, with Alloy C4 plating
 - AF2 ANSI 2" flange Class 300, RF, 316L SS (FTL 51)
 - AG2 ANSI 2" flange, Class 600, RF, 316L SS (FTL 51)
 - AJ2 ANSI 2½" flange, Class 300, RF, 316L SS (FTL 51)
 - AL2 ANSI 3" flange, Class 150, RF, 316L SS
 - AM2 ANSI 3" flange, Class 300, RF, 316L SS (FTL 51)
 - AP2 ANSI 4" flange, Class 150, RF, 316L SS
 - AO2 ANSI 4" flange, Class 300, RF, 316L SS (FTL 51)
 - AR2 ANSI 4" flange, Class 600, RF, 316L SS (FTL 51)
 - TC2 1½" Tri-clamp², 316L SS
 - TE2 2" Tri-clamp², 316L SS
 - YY9 Others

- 3 **Length L**
- Length, temperature spacer, 2nd line of defense
 - AA Compact 2.6" (66 mm) (FTL 50)
 - DB* "4.7 in" / "118 mm", 316L SS (FTL 51)
 - DE* "4.7 in" / "118 mm", Alloy C4 (FTL 51)
 - CB inches: 6 in - 115 in, 316L SS (FTL 51)
 - CE inches: 6 in - 115 in, Alloy C4 (FTL 51)
 - IA 2.6" plus temperature separator (5.5") (FTL 60)
 - KB Temperature separator, 316L SS, length in inches (6" to 115") (FTL 51)
 - KE Temperature separator, Alloy C4, length in inches (6" to 115") (FTL 51)
 - LB* Length type II, temperature separator, 316L SS (FTL 51)
 - LE* Length type II, Alloy C4, temperature separator (FTL 51)
 - QA 2.6" plus 2nd line of defense (5.5") (FTL 50)
 - SB 2nd line of defense, length in inches (6" to 115"), 316L SS (FTL 51)
 - SE 2nd line of defense, length in inches (6" to 115"), Alloy C4 (FTL 51)
 - TB* 2nd line of defense, length type II, 316L SS (FTL 51)
 - TE* 2nd line of defense, length type II, Alloy C4 (FTL 51)
 - YY Others

¹Length type II, for replacing Liquiphant II (FTL 360, FTL 365, FDL 30 or FDL 35)
When replacing Liquiphant II with a Liquiphant M FTL 51, the switchpoint is the same when mounted vertically.

- 4 **Output**
- Electronic Insert
- 1 FEL 51, two-wire, AC, 19 - 253 V
 - 2 FEL 52, three-wire DC, 10 - 55 V, PNP transistor output
 - 4 FEL 54, universal, 19 - 253 VAC, 19 - 55 VDC, potential-free DPDT relay
 - 5 FEL 55, two-wire DC 11 - 36 V, Output 8/16 mA, I.S.
 - 6 FEL 56, two-wire acc. to NAMUR (EN 50227), I.S.
 - 7 FEL 57, PFM signal transmission on two-wire cabling, I.S.
 - 8 FEL 58, NAMUR with push button
 - 9 Special version

- 5 **Housing, Cable Entry**
- E4 Polyester housing NEMA 4X, adapter ½" NPT
 - E5 Aluminum housing NEMA 4X, ¾" NPT
 - E6 Stainless Steel housing NEMA 4X, adapter ½" NPT
 - E7 Aluminum housing, NEMA 4X, ¾" NPT with separate connection compartment (see separate instruction manual KA 163F)
 - Y9 Others

- 6 **Additional Fittings**
- A Basic fittings
 - C 3.1.B material certificate
 - Y Other fittings

For application and selection assistance,
in the U.S. call 888-ENDRESS

For total support of your installed base, 24 hours a day,
in the U.S. call 800-642-8737

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