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Inhaltsverzeichnis Dokumentation Content Documentation

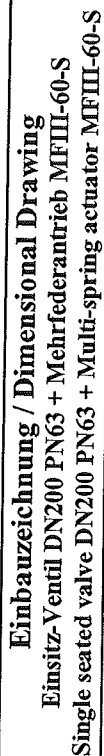
<u>MAN-Bestell-Nr./Order No.:</u>	B58/4500186097
<u>MAN-Auftrags-Nr./Comm.-No.:</u>	312411.10.9200
<u>MAN-Kennwort/Project:</u>	KOSBOOST
 <u>ARCA-Auftrags.-Nr./Order-No.:</u>	 2505362-KE
<u>ARCA-Pos.-Nr./Item-No.:</u>	100
 <u>TAG-Nr./TAG-No.:</u>	 FV-16074
<u>Serial-Nr./Serial-No.:</u>	1011222

Pos./Item	Bezeichnung/Description	Typ/Type	Mat.-Nr./ Mat-No.
	Einbauzeichnung/Dimensional Drawing		
	Ventilberechnung/Valve Calculation Sheet		
	Schemaplan für Zubehörgeräte/ Hook-up for accessories		
101	Betriebs- und Wartungsanleitung Ventil/ Operating and maintenance instructions valve	6H7-L2-LN, DN 200	3012663
102	Betriebs- und Wartungsanleitung Antrieb/ Operating and maintenance instructions actuator	812, MFIII-5-60.3-S	3015684
103	Betriebs- und Wartungsanleitung Stellungsregler/ Operating and maintenance instructions positioner	827A.E2-AB0-M1	2257124
106	Datenblatt 3/2-Wege-Magnetventil/ Data sheet 3/2-way solenoid valve	SVG327 A002 ASCO	3002195
108	Datenblatt pneum. Ventil/ Data sheet pneum. valve	DA025C-00-AA Norgren	3013050
110	Datenblatt Volumenverstärker/ Data sheet amplifier relay	EVEX 1300-02-F SMC	2264840
111	Datenblatt Drosselventil/ Data sheet throttling valve	T1100C 2800 Norgren	2253595
114	Datenblatt Filter- u. Reduzier-Station/ Data sheet filter and reducing station	961 DS961	2243092

Tönisvorst, 30.03.05
 KE/MW

ARCA Valve Group: Germany – Switzerland – The Netherlands – India – South Korea – P.R. China – Mexico

Sitz der Gesellschaft / Official Seat: D-47918 Tönisvorst (Germany), Kempener Str. 18 – Amtsgericht / Register: Kempen HRB8962
 Geschäftsführer / Director: Dr.-Ing. Rüdiger Kaspers, Heinz M. Nägel



2505362-KE, Pos. 100
KOSBOOST, TAG-No. FV-16074

6H7-L2-LN.812

Ventil - Imengamitor , Antrieb / Valve - Trim , Actuator

Gewicht:
weight: ca. 620 kg

56 bar 95°C

1.0619 GP240GH

95 bar

DN200 EN1092-1, Form B2

Anschluß End Connections

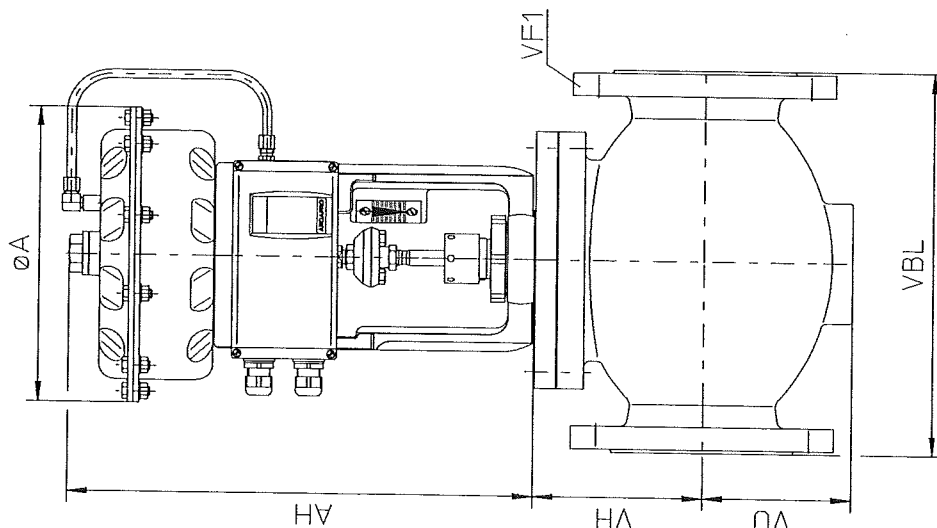
Alle Maße in mm / all dimensions in mm

AH	625
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2A	100
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99	99
100	100

VBL	700
-----	-----



Datum / date: 04.04.2005

ARCA-Regler GmbH D - 47918 Tönisvorst - <http://www.arca-valve.com> - eMail: sale@arca-valve.com

2002037

06.04.2005 10:48:34

Calculation header

Identifier

2002037

User-defined fields:

Tag No.

Bypass-CV L2LN

Medium selection and state

Medium

Operating temperature

State

Gas

t1

Mixed gas

47,0

°C

Gaseous (Standard conditions)

Gas, dry

First operating point (max. flow)

Calculation

Absolute pressure upstream of valve

Absolute pressure downstream of valve

Flow coefficient

☐ Mass flow rate☒ Volume flow rate (standard conditio...

Critical flow-related pressure difference

Critical real pressure difference

Type of flow

State of flow

p1

p2

Kv

qm

qn

 Δp_c Δp_{Xc}

Kv/Cv

57,0

5,6

74,479

76.360,0

59.100,0

38,139

31,787

Choked flow!

Turbulent flow

bar(a)

bar(a)

m³/h

kg/h

m³/h

bar(a)

bar(a)

Properties at first operating point

Real gas factor (t1, p1)

Isentropic exponent (t1, p1)

Z1

 κ

1,0

1,3

-

-

Physical constants

Standard conditions

☐ Density (standard conditions, dry gas)☐ Specific gas constant☒ Molecular weight

Real gas factor (standard conditions)

pn

R

M

Zn

0°C, 1013 mbar

1,292

287,1

28,96

1,0

kg/m³

J/kg*K

kg/kmol

-

Valve data

Valve type

Basic characteristic (IEC 60534-2-4)

Flow coefficient

Selected flow coefficient

Selected valve size

Flow velocity

Valve modifier (Cv/Cv100 = 0.75)

Valve modifier (Cv/Cv100 = 0.75)

Valve style modifier (Cv/Cv100 = 1)

Globe valve

Linear

Kv

Kvs

DN

u2

FL²

xT

Fd

74,479

100,0

DN 200

110,82

0,9

0,72

0,1

m³/h

m³/h

m/s

-

-

-

Load-dependent auxiliary values

Stroke/angle-of-rotation ratio

s/s100

73,958

%

Pipe upstream of valve☒ Size class upstream of valve

Pressure class upstream of valve

DN1

PN1

DN 150

PN 100

2002037.CCV

1(2)

2002037

06.04.2005 10:48:34

<input type="radio"/> Pipe outside diameter upstream of ...	Da1	168,3	mm
<input type="radio"/> Pipe wall thickness upstream of valve	s1	7,1	mm
<input type="radio"/> Pipe inside diameter upstream of v...	Di1	154,1	mm
Flow velocity in the pipe	u1R	18,339	m/s

Pipe downstream of valve

<input checked="" type="radio"/> Size class downstream of valve	DN2	DN 350	
<input type="radio"/> Pressure class downstream of valve	PN2	PN 16	
<input type="radio"/> Pipe outside diameter downstream ...	Da2	355,6	mm
<input type="radio"/> Pipe wall thickness downstream of ...	s2	8,0	mm
<input type="radio"/> Pipe inside diameter downstream of...	Di2	339,6	mm
Flow velocity in the pipe	u2R	38,436	m/s
Material group		Steel I	
Density of pipeline	ρ_P	7.850,0	kg/m³
Sound velocity in pipe material	cP	5.180,0	m/s

Noise calculation

Calculation standard (noise)

IEC 60534-8-3:2000

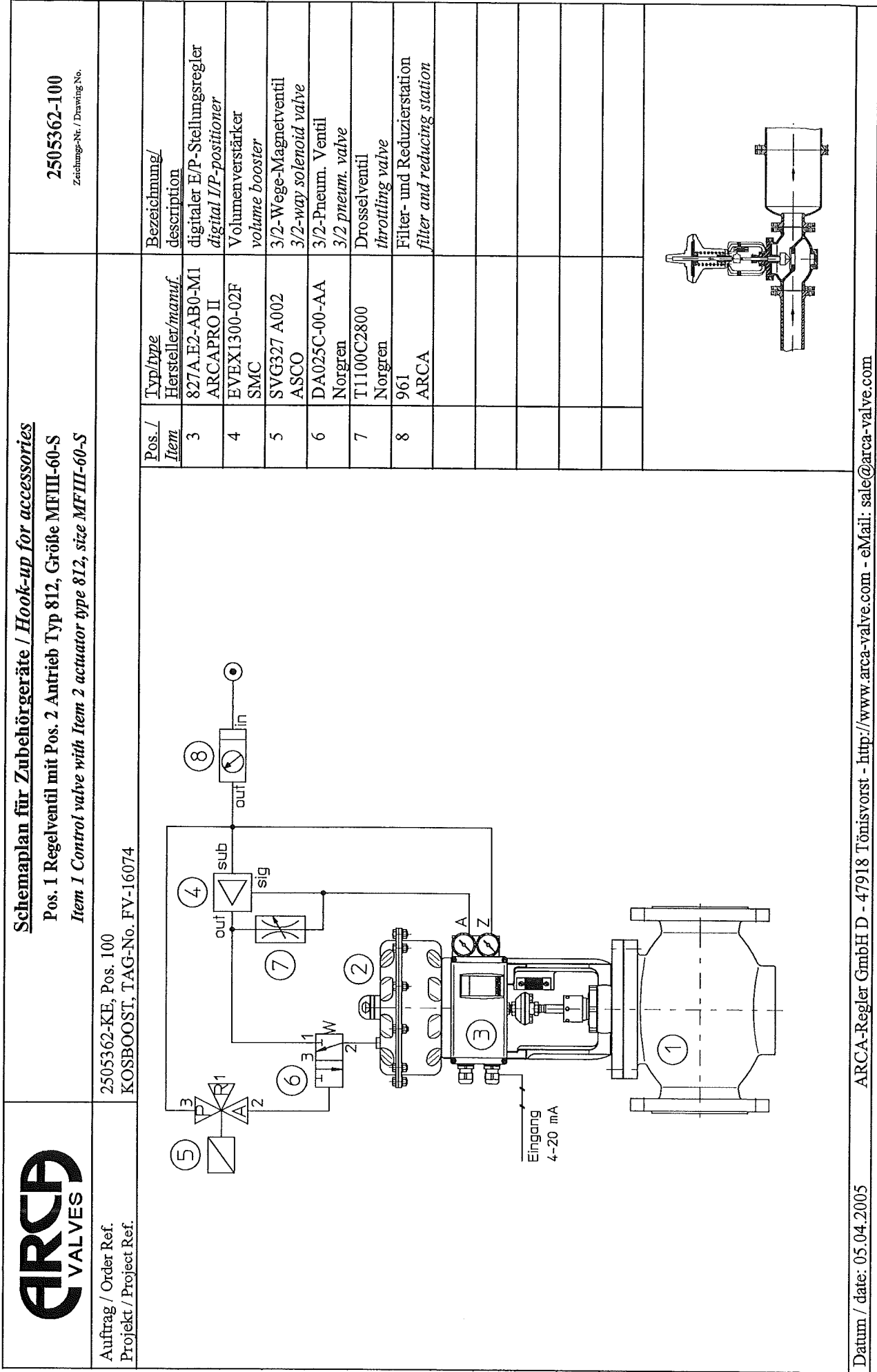
Calculated values

Low-noise design		Perforated plug	
Pressure level (correction)	ΔL_{Co}	-8,0	dB
Pressure level (mach no.)	ΔL_{Ma}	0,819	dB
Pressure level (low noise)	ΔL_{LN}	-4,11	dB
Transmission loss	Rr	-59,5	dB
Sound pressure level	Lpi	165,0	dB
Sound power level	Lwi	147,0	dB
Sound pressure (0 m distance, A-weight...	LpAa	99,2	dB(A)
Sound pressure level of valve (A-weight...	LpAa	90,9	dB(A)

Minor noise prediction data

Pressure ratio	x	0,902	-
Regime acc. to IEC 60534		Regime IV	
Acoustical efficiency factor	η	1,934	E -3 -
Peak frequency	fp	14.374,0	Hz
Ring frequency	fr	4.855,3	Hz
Temperature (vena contracta)	tVC	5,2413	°C
Speed of sound (p2)	cf2	345,67	m/s
Mach number (valve outlet)	MaDN	0,32059	-
Mach number (vena contracta)	MaVC	2,2211	-
Recommended nominal diameter (M=0.3)	DN	250,0	mm
Recommended nominal diameter (100m...	DN	250,0	mm
Power loss	P	4.523,7	kW
Stream power	Wm	1.102,0	kW

Further operating points



Single seated valve**6H7-L2-LN**


DN 200 PN 63

Design acc. to AD 2000-Regelwerk/DIN3840

Valve design	56 bar, 95°C
Medium	Nitrogen + Oxygen
KVS	100 lin
Order-No.	B58/4500186097
Comm.-No.	312411.10.9200
Project	KOSBOOST
Serial-No.	TAG-No.- Identification
1011222	FV-16074
ARCA Order-No.	2505362-KE
Item-No.	101
Drawing-No.	304054

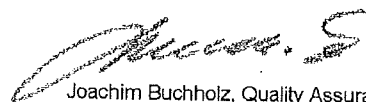
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1 Konformitätserklärung/ Declaration of Conformity

Konformitätserklärung/ Declaration of Conformity gemäß Richtlinie/acc. to directive 97/23 EG und Herstellererklärung/ and Declaration of Manufacturer nach Richtlinie/ acc. to directive 98/37 EG		
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Die/ The	ARCA Regler GmbH, D-47918 Tönisvorst		
erklärt, dass die Produkte/ declares that the products	<ul style="list-style-type: none"> • Regelventile / Control Valves Globe Type • Schaltventile / On/off Valves • Drelwegeventile / 3-Way Valves • mit freiem Spindelende (ohne Antrieb) / with free stem end (without actuator) • mit Membran-/Elektroantrieb / with Diaphragm/ Electric Actuators 		
ARCA Auftrags-Nr./Order No.	2505362-KE	Serial Nr./ No.	1011222
1. drucktragende Ausrüstungsteile im Sinne der EG-Druckgeräterichtlinie 97/23 EG und mit den Anforderungen dieser Richtlinie konform sind <i>are pressure containing equipment as per PED 97/23 EG and meet all requirements of this directive</i> 2. nicht vollständige Maschinen im Sinne der EG-Maschinenrichtlinie 98/37 EG sind, aber zutreffende Anforderungen dieser Richtlinie erfüllen <i>are no self-operating machines as per Machinery Directive 98/37 EG but meet all requirements referring to this directive</i> 3. nur unter Beachtung der Betriebsanleitung für die entsprechende Serial-Nummer betrieben werden dürfen <i>are only allowed for operation by observing the operating instructions for the respective serial No.</i>			
Die Inbetriebnahme dieser Armaturen ist erst zugelassen, wenn die Armatur beidseits an die Rohrleitung angeschlossen und eine Verletzungsgefahr damit ausgeschlossen ist. <i>The start of operation is only permitted, when the valve is connected to the pipework on both sides and danger of injuries is excepted.</i>			
Angewendete Normen/ Applied standards:			
AD 2000 Regelwerk	Vorschriften für druckführende Gehäuseteile / Directive for pressure containing body parts		
DIN EN 292-2000	Sicherheit von Maschinen, Teil 2: Technische Anforderungen/ Safety of Machines, Part 2: Technical requirements		
Typbeschreibung und technische Merkmale/ Description of type and technical characteristics:			
Baureihe/Series 8C, 6N, 6H, 100, 110, 120, 130, 140, 160, 170, 180, 200, 220, 230, 250, 280, 340, 350, 380, 391-813, 400, 410, 430, 440, 510, 520, 540, 550, 560, 570, 580, 811, 812, 813, 830, 840 und Betriebsanleitungen für entsprechende Serial-Nummern / and operating instructions for respective serial No. ANMERKUNG: Diese Herstellererklärung gilt für alle Typenvarianten der genannten Baureihen REMARK: This Declaration of Manufacturer is valid for all versions of the mentioned series			
Angewendetes Konformitätsbewertungsverfahren/ Applied conformity assessment procedure:			
nach Anhang II der Druckgeräte-Richtlinie 97/23 EG, Modul "H" / as per annex II of PED 97/23 EG, module "H"			
Benannte Stelle/ Notified Body:	Kenn-Nr./ Identification No.:		
Germanischer Lloyd Certification GmbH D-20416 Hamburg	0098		
Änderungen an Stellventilen und/oder Baugruppen, die Auswirkungen auf die technischen Daten des Stellventils, auf die <Bestimmungsgemäße Verwendung> gemäß Abschnitt 1 der Betriebsanleitung haben und die Armatur oder eine mitgelieferte Baugruppe wesentlich verändern, machen diese Erklärung ungültig. <i>In case of modifications on valves and/or assembled parts, that effect on the technical data of valves and <use as directed> acc. to paragraph 1 of operating instruction and alter the valve or assembled part in essence, this declaration becomes invalid.</i>			

Tönisvorst, 11.05.2004


Joachim Buchholz, Quality Assurance Manager

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Key-No.: 6H-GH-HI-PAA-0AA-0B-WN-J1

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ARCA-Regler GmbH D - 47918 Tönisvorst

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2 Description of function

Valves of this type are normally applied as control valves according to DIN 19226.

They reduce the pressure of a mass-flow by means of the valve plug.

The special feature of the valve is

- a perforated plug which, in combination with the seat
- is of two-stage execution
- the flow characteristics are determined by the hole patterns of valve plug and seat.
- metallic seal between valve plug and seat
 - At the stroke position 0% the plug is pressed with its tapered edge against the edge of the seat bore and closes the valve.
- balanced valve plug
 - The force which is exerted to the valve plug by the pressure of the medium is completely balanced by a system of piston and cylinder, so that the actuator must only compensate for the frictional forces of the packings.
- sliced stuffing box packing rings
 - adjustable

3 Warning symbols

Safety informations and warnings are intended to avert danger from the life and health of users and maintenance personnel and to prevent material damage. They are highlighted in this manual by the headings defined here. They are also marked by warning symbols next to where they appear. The headings used have the following meaning for the purposes of this manual and the product labels.

Danger



indicates that death, severe personal injury or substantial property damage will result if proper precautions are not taken.

Warning



indicates that death, severe personal injury or substantial property damage will result if proper precautions are not taken.

Caution



indicates that minor personal injury or property damage can result if proper precautions are not taken.

Note



indicates an important information about the product itself or the respective part of the instruction manual which is essential to highlight.

4 Safety Instructions

Warning



The valve is to be used exclusively for the application according to our order confirmation. Any other application is considered as not conforming and the user is fully responsible for any damage that may result from this.

Unauthorized modifications or the use of spare parts other than original ARCA parts exclude our liability for damages that may result from this. In this case, the user is bearing the full responsibility.

Maintenance and repair of the actuator must be carried out only by qualified personnel, and it is important to follow the corresponding rules and regulations for pressure vessels and steam boilers.

The actuators produce high positioning forces. Mounting and starting up must be carried out under careful consideration of the safety instructions.

Special reference is made to strictly follow the rules and regulations for plants with explosion hazards.

Before starting any maintenance works, it is important to ensure and well note the following:

- Drainage of the pipeline
- Get complete information on the possible dangers, which can occur through remainders of the flow medium and take suitable measures (safety gloves, safety glasses, etc.).
- Let the valve cool down, if required.
- Make sure that no third person can put the plant into operation.
- Remove any pressure, which might build up in a shut-off pipeline.

4.1 Qualified Personnel

Warning



in the sense of the operating instructions are persons who are familiar with the mounting, starting up, and operation of this product and who have the corresponding qualification for such works, e.g.

- Education or training according to the actual safety standards for maintenance and use of adequate safety equipment.
- First aid training
- For plants with explosion hazards: Special training or instructions, or the authorisation respectively to carry out works in plants with explosive hazards.

5 Mounting site

- The valve should be accessible at least from one side.
If mounted at an elevated level, a service gangway, or similar, should be provided.
- For valve sizes DN 100 or larger, an electric crane or tackle should be available.

6 Mounting

The valve is provided with flange connections and will be screwed into the pipeline after removing protective caps from the inlet and outlet sealing surfaces (flanges) by using the gaskets provided at site.

Caution



The following should be noted:

- Mounting position: Pipeline horizontal,
Spindle vertical;
Actuator above valve

For other mounting positions special provisions must be made to support the weight of the actuator.

- The valve must not be exposed to stress-loads of the pipeline.
- On the upstream- and downstream sides of the valve, the pipe should have a straight length of at least 10 x nominal diameter. Other armatures or branches are not allowed.
- A bypass-line with shut-off valves on the upstream- and downstream sides of the valve is recommended.

7 Actuator Mounting

Actuators of different types can be simply and easily mounted on each valve. This is achieved through the selection of standard parts for mounting and coupling purposes.

Caution



- If an electric actuator is used then the following information should be noted.
 - When the valve moves to its closed position, the supply to the motor is disconnected by a torque limit switch.
 - When the valve moves to its open position, the supply to the motor is disconnected by a travel limit switch.

8 Before first starting-up

Pickling and rinsing

The following procedures are recommended:

- (1) The trim is removed from the valve body before the pickling and rinsing process.
 - Dismantle the trim completely so that only the valve body will remain in the pipeline
 - Install rinsing kit in place of the valve seat (to be ordered separately)
 - Mount rinsing flange(s) (to be ordered separately)
 - Pickling and rinsing
 - Clean valve body, remove rinsing kit
 - Replace gaskets
 - Remount trim in the valve body
- (2) In place of the valve a spacer is fitted.
 - Remove valve from pipeline (in case of flanged valves)
 - Mount spacer into the pipeline
 - Pickling and rinsing
 - Remove spacer from pipeline
 - Replace gaskets and packings
 - Remount valve into the pipeline

9 Starting up

Warning



Follow instructions under section Safety Instructions on page 5.

Caution



- Avoid thermal shocks!
 - Bring valve slowly to operating temperature
- From temperature differences of approximately 300 K the temperature change velocity of max. 2 K/min has to be kept
- Check tightness of the flange connections
- Setting of gaskets: see also under DIN 2505 / 4.5
 - Tighten screw connections crosswise. (Table(s) of torque moments See page 12)
- Check tightness of stuffing box packing
 - tighten stuffing box screw (152)
 - avoid excessive force → deteriorated control quality

10 Maintenance

10.1 Servicing

Warning



- Clean spindle (50) regularly
 - Move actuator in its upper end position and secure it.
 - Clean spindle (50) with a soft cloth, but **never use grinding paper.**

10.2 Maintenance

The valve is mainly maintenance-free.

After a longer period of operation or under very changing operating conditions, the valve should be serviced according to section **Starting up** on page 7

10.3 Stuffing box package

The complete stuffing box set is interchangeable if leakage occurs.

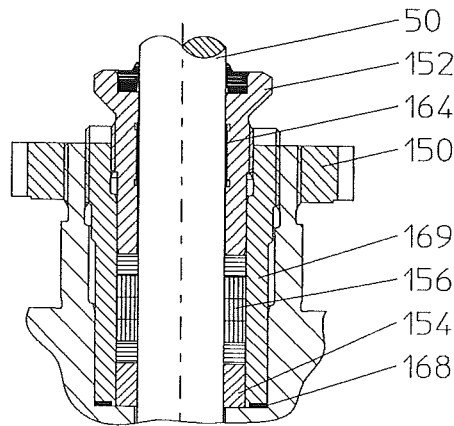


Fig. 1 -Stuffing box package- Detail X

11 Dismantling and remounting the valve

Warning



Follow instructions under section Safety Instructions on page 5

11.1 How to proceed

- Dismantling the valve
 - Dismantled parts have to be secured thoroughly against falling down (risk of injury or damage).
- Cleaning of all components.
- Remounting in the reverse order
 - by using the new parts.
 - Replacement of gaskets and packings.
 - insert - if provided - dynamically loaded O-rings and form-rings with O-ring grease, unless process conditions do not allow its use.
 - dynamically loaded gaskets of pure graphite -if provided -are greased with a thin layer of „Joudol-Grease“ (product of Messr. Burgmann) unless process conditions do not allow its use.
 - Pay attention to torque moments for screw connections. See under section **Table(s) of torque moments** on page 12
 - After mounting, the plug is to be moved into its upper and lower end positions by means of the actuator or manually. It must be made sure during this procedure that the plug should neither jerk nor scrape. If required, loosen the flange connections, centre the flange position and re-tighten the flange screws.
 - Take the valve into operation according to section **Starting up** on page 12
 - When ordering spare parts, please copy and complete form at the end of the operating instructions and send or fax it to the a.m. address.

11.2 Actuator

Warning



- **Move actuator in a medium position and secure it.**
- Disconnect actuator and take it off
 - Follow mounting instructions of the manufacturer of the actuator!

11.3 Top flange

Caution



- Unscrew stuffing box screw (152)
 - See also under **Fig. 1** on page 7
- Loosen screw-connection between body (1) and top flange (2).
- Take-off top flange (2).
 - The plug (26) is eventually taken off together with the top flange (2). Pull plug (26) out of the top flange (2).
 - **Attention ! Do not bend the spindle (50)!**

11.4 Stuffing box packing

- Remove packing set (156) and bottom ring (154).
 - See also under **Fig. 1** on page 7

11.5 Slide bearing

Note



- take the slide bearing (164) from the stuffing box screw (152). At the mounting of the slide bearing (164) you have to consider:
 - turn the coated side towards the spindle (50)
 - turn the tissue side towards the stuffing box screw (152)

11.6 Cylinder Tube

- Pull out cylinder tube (60).
 - Use mounting threads, depending on size and execution of valve.

11.7 Valve plug

Depending on the valve type, the plug (26) has already been dismantled. Otherwise

- Pull plug (26) with spindle (50) out of the body (1).

11.8 Spindle

The spindle (50) is interchangeable.

- Beat out the border of hex. nut (57)
- Unscrew and replace hex. nut (57)
- Pull spindle (50) out of the plug (26)

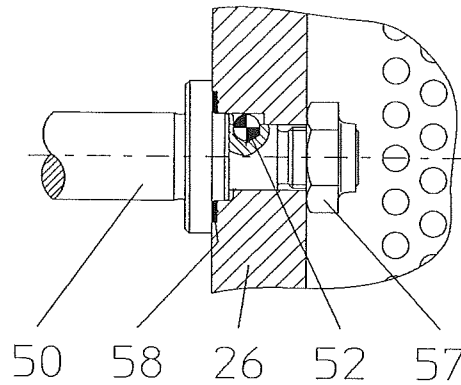


Fig. 2 -Mounting of plug and spindle

Picture shows example with perforated plug

11.9 Balance packing

- Exchange packing set (198, 199).

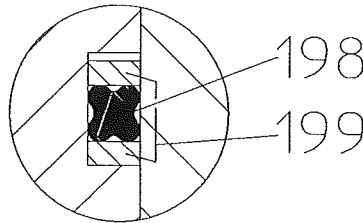
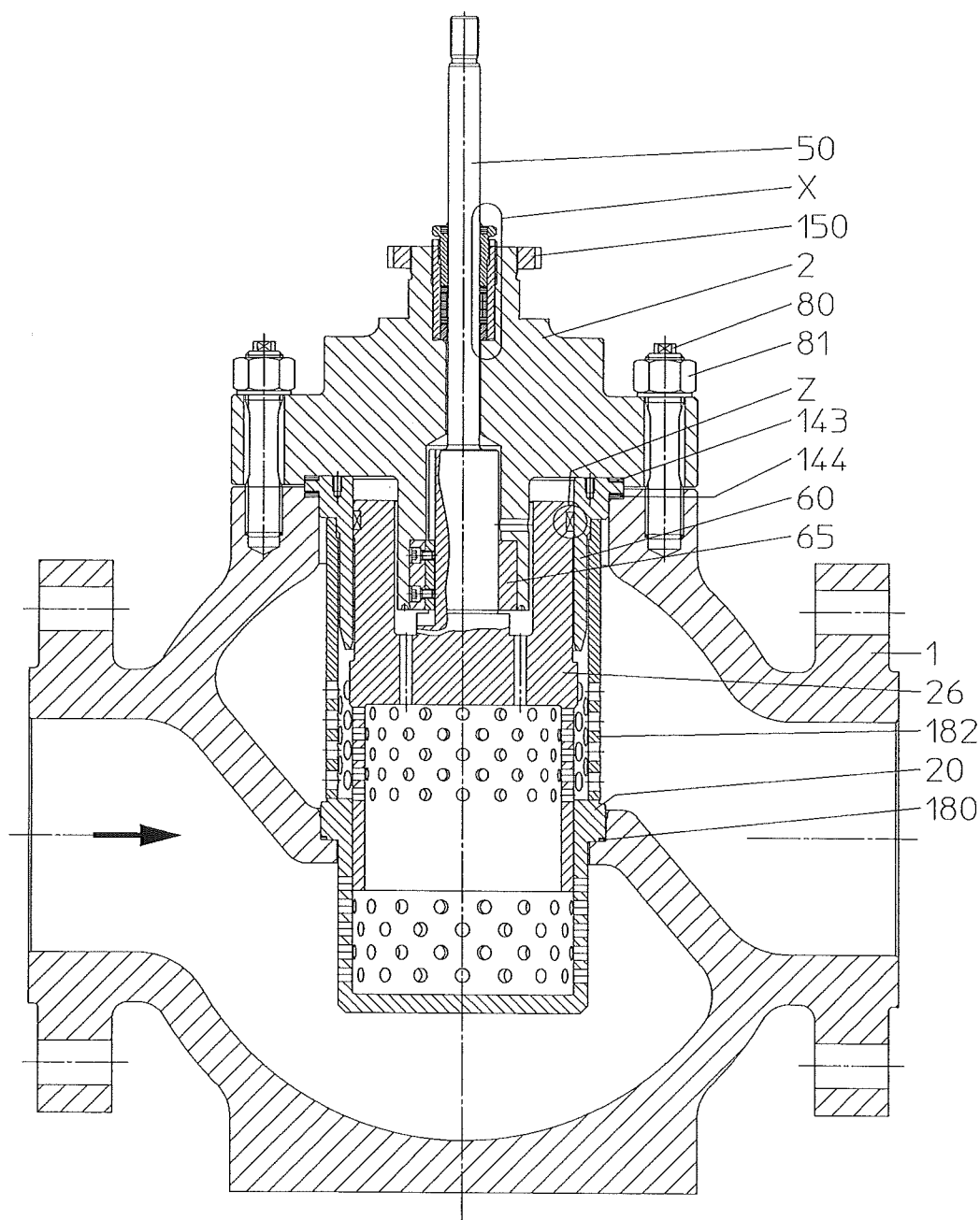


Fig. 3 -Balance packing - Detail Z

11.10 Spacer & seat

- Take spacer (182) and seat (20) out of the valve body (1).
- Replace sealing element (180).

12 Sectional Drawing No.304054



13 Parts List

Recommended spare parts are marked with an asterisk (*)

Item No.	Part Name
1	valve body
2	top flange
20 *	seat
26 *	valve plug (complete)
50 *	spindle
52 *	steel ball
57 *	hex. nut
58 *	gasket
60	cylinder tube
65	guide bushing
80 *	screw bolt
81 *	nut
143 *	gasket
144 *	gasket
150	slotted nut
152	stuffing box screw
154 *	bottom ring
156 *	packing set
164 *	slide bearing
168 *	gasket
169	sleeve
180 *	sealing element
182	spacer
198 *	sealing element
199 *	support ring

14 Table(s) of torque moments

14.1 *Screw connections, general*

Screws according to DIN2510

Thread-Size	Torque Moment [Nm]
M10	24
M14	65
M16	100
M20	200
M22	280
M24	350
M27	500
M30	600
M33	800
M36	1000

Spare parts quotation / Order

To: ARCA-Regler GmbH
P.O. Box 2120
D-47913 Tönisvorst
Tel.: 0 21 56 / 77 09-0
Fax.: 0 21 56 / 77 09 55
eMail: sale@arca-valve.com

From:

We refer to the Serial-number(s) _____

- ☐ We would like to have your quotation for the following spare parts:
☐ We herewith order the following spare parts:

Item No.	Part Name	quantity
20	seat	
26	valve plug (complete)	
50	spindle	
52	steel ball	
57	hex. nut	
58	gasket	
80	screw bolt	
81	nut	
143	gasket	
144	gasket	
154	bottom ring	
156	packing set	
164	slide bearing	
168	gasket	
180	sealing element	
198	sealing element	
199	support ring	

Date / Signature

Key-No.: 6H-GH-HI-PAA-0AA-0B-WN-J1

Printed: 30.03.2005

ARCA-Regler GmbH D - 47918 Tönisvorst

Page 13 of 13

Multi-spring actuator**812-34632-S B 0**

Order-No.	B58/4500186097
Comm.-No.	312411.10.9200
Project	KOSBOOST
Serial-No.	TAG-Identification
1011222	FV-16074
ARCA Order-No.	2505362-KE
Item-No.	102
Drawing-No.	206736

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1 Description of the function

The actuator series 812 is designed as a single-acting multi spring diaphragm actuator for armatures with a linear stroke. The central spindle (1) of the actuator is connected to the spindle of the armature by means of a coupling. The actuator spindle is precisely guided in a slide bearing (5), and the operating air chamber is sealed with a special gasket with wiper ring (3). Connected to the spindle (1) is a diaphragm plate (10), which supports the diaphragm (13) and transmits its movements to the spindle (1). The diaphragm (13) separates the actuator body (9, 15) into pressure chamber and spring chamber. The actuator spindle (1) is moved when the force of the operating air on one side of the diaphragm (13) surpasses the force of the springs (14) on the other side. The spring chamber is ventilated by means of a splashproof cap (17/98) to avoid positive or negative pressures in the spring chamber.

2 Execution

- compact design
- fabric-reinforced diaphragm
- flexible force control
- special splash-proof ventilation
- robust ductile casting yoke according to NAMUR
- the action (air-to-open/air-to-close) can be reversed with additional parts.

3 Warning symbols

Safety informations and warnings are intended to avert danger from the life and health of users and maintenance personnel and to prevent material damage. They are highlighted in this manual by the headings defined here. They are also marked by warning symbols next to where they appear. The headings used have the following meaning for the purposes of this manual and the product labels.



indicates that death, severe personal injury or substantial property damage will result if proper precautions are not taken.



indicates that death, severe personal injury or substantial property damage will result if proper precautions are not taken.



indicates that minor personal injury or property damage can result if proper precautions are not taken.



indicates an important information about the product itself or the respective part of the instruction manual which is essential to highlight.

4 Safety Instructions

Warning



Maintenance and repair of the actuator must only be carried out by qualified personnel. The actuators produce high positioning forces. Mounting and starting up must be carried out under careful consideration of the safety instructions. Special reference is made to strictly follow the rules and regulations for plants with explosion hazards. Before starting any maintenance works it must be secured that no third person can put the plant into operation.

4.1 Qualified Personnel

Warning



in the sense of the operating instructions are persons who are familiar with the mounting, starting up, and operation of this product and who have the corresponding qualification for such works, e.g.

- Education or training according to the actual safety standards for maintenance and use of adequate safety equipment.
- First aid training
- For plants with explosion hazards: Special training or instructions, or the authorization respectively to carry out works in plants with explosive hazards.

5 Mounting site

- The actuator should be easily accessible, at least from one side and from above.
If mounted in an elevated position, a service gangway or similar should be provided.
- For actuators size MFIII and larger, an electric crane or a hoist should be provided.

6 Mounting

The yoke of the actuator (34) is provided with a single, centred mounting hole, which allows a rotation of the actuator in any direction. The actuator is mounted to the armature by means of the slotted round nut of the armature. Actuator and armature are coupled with the stroke indicator.

Caution



Note:

Mounting position: pipe line horizontal;
actuator position vertical;
diaphragm chamber above the armature

In case of other arrangements please consult us for further information.

- Arrange position of actuator and additional equipment in true alignment with the armature!

7 Adjustment

7.1 Stroke

Caution



The mounting of the stroke indicator for coupling the actuator to the armature is carried out according to the instructions for the stroke indicator.

- When coupling the actuator to the armature, make sure that no traverse forces are transmitted to the spindle (1).
- Do not distort the spindle (1) radially!

– The stroke sensor (35) must be arranged in the cross-axis of the yoke (34), as shown in the sectional drawing.

Note



- When adjusting the stroke make sure that the closing position of the armature is not blocked by the internal, non-adjustable, stroke limitation of the actuator.

7.2 Signal air connection

The connections (Z₂ and with some types Z₃) of the actuator are threaded G¹/₄ ID.
The connection Z₁ at the front side of the yoke is threaded G¹/₈ ID.

7.2.1 Standard

- Close connection „Z₁“ at the yoke (34) by means of a screw plug.
- Connect supply air pipe to connection „Z₃“ by means of a pipe union.

7.2.2 when using an ARCA positioner (integrated mounting)

- Close connection „Z₂“ at the yoke (34) with plug screw (29).
- Install pipe (43) between connections „Z₂“ and „Z₃“
- Connect positioner according to its operating instructions.

8 Mounting the valve positioner

8.1 Integrated mounting of ARCA valve positioners

Operating air connection and stroke-tapping are realised directly when the positioner is plug-mounted. Further mounting details will be found in the operating instructions of the corresponding instrument.

8.2 Mounting according to IEC 534 (NAMUR)

The yoke (34) of the actuator has been designed according to the standard IEC 534 Part 6 (NAMUR) which allows the mounting of additional instruments by means of the mounting thread M8.

Additional parts are required for the stroke tapping according to NAMUR.

9 Modification / Exchange of spare parts

9.1 How to proceed

Follow instructions under section „Safety Instructions“

- Dismantling in the described order
- Cleaning of all components
- Remounting in the reverse order
 - using the new parts
- Lubricate O-rings with suitable O-ring grease
- The exchange of static gaskets and O-rings is not described.

9.2 Reversing the action from „air to close“ to „air to open“

- Dismantle positioner, if provided
- Install external air pipes (43)
- Remove screw plug (39) with ring gasket (38)
- Unscrew hex. nut (18)
- Unscrew complete sleeve (4)
- Take off the complete actuator head and turn it upside down
- When remounting, follow instructions under section **Stroke** on page 5!

9.2.1 additional mounting steps

- Mount threaded adapter (46) and protective spray water cover (17, 41)
- Mount plug screw (29)

9.3 Guiding and sealing elements

- Dismantle stroke indicator
 - Dismantle positioner, if provided
 - Install external air pipes (43)
 - Unscrew threaded pin (36) and remove stroke sensor (35)
 - Unscrew complete sleeve (4)
 - When remounting, follow instructions under section **Stroke** on page 5!
 - Remounting in the reverse order, using the new parts
 - The actuator spindle (1) must be free from edges before the complete bushing (4) is slide on. If required, remove edge with fine grinding paper.
- In case of damages in the range of the sealing element , the spindle must be exchanged!
The spindle must not be machined in this area!

Caution



9.4 Diaphragm

Danger



The springs (14) are installed with high tension. If the following instructions are not strictly regarded, grievous injuries, resulting in death, as well as serious material damages cannot be excluded.

- Dismantle positioner, if provided
- Install external air pipes (43)

Danger



- Remove 4 hex. nuts (23) and bolts (21) evenly spread over the circumference.
- Install long bolts (21) M10 x 80 in grade 8.8 and new hex. nuts (23) in grade 8.8.
– The long bolts (21) and nuts (23) in grade 8.8 are **not** part of our supply!
- Loosen hex. nuts (23) of the short bolts (21).
- Loosen hex. nuts (23) of the newly mounted bolts (21) evenly, to release the tension off the springs (14).

Note



- Take off upper cover of actuator (9)
- Unscrew hex. nut (18)
- Remove cup (27) from spindle (1).
- Remove diaphragm (13) and replace by a new diaphragm (13)
– The texture side of the diaphragm must show to the diaphragm plate (10)

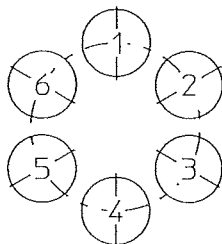
9.5 Springs

Caution



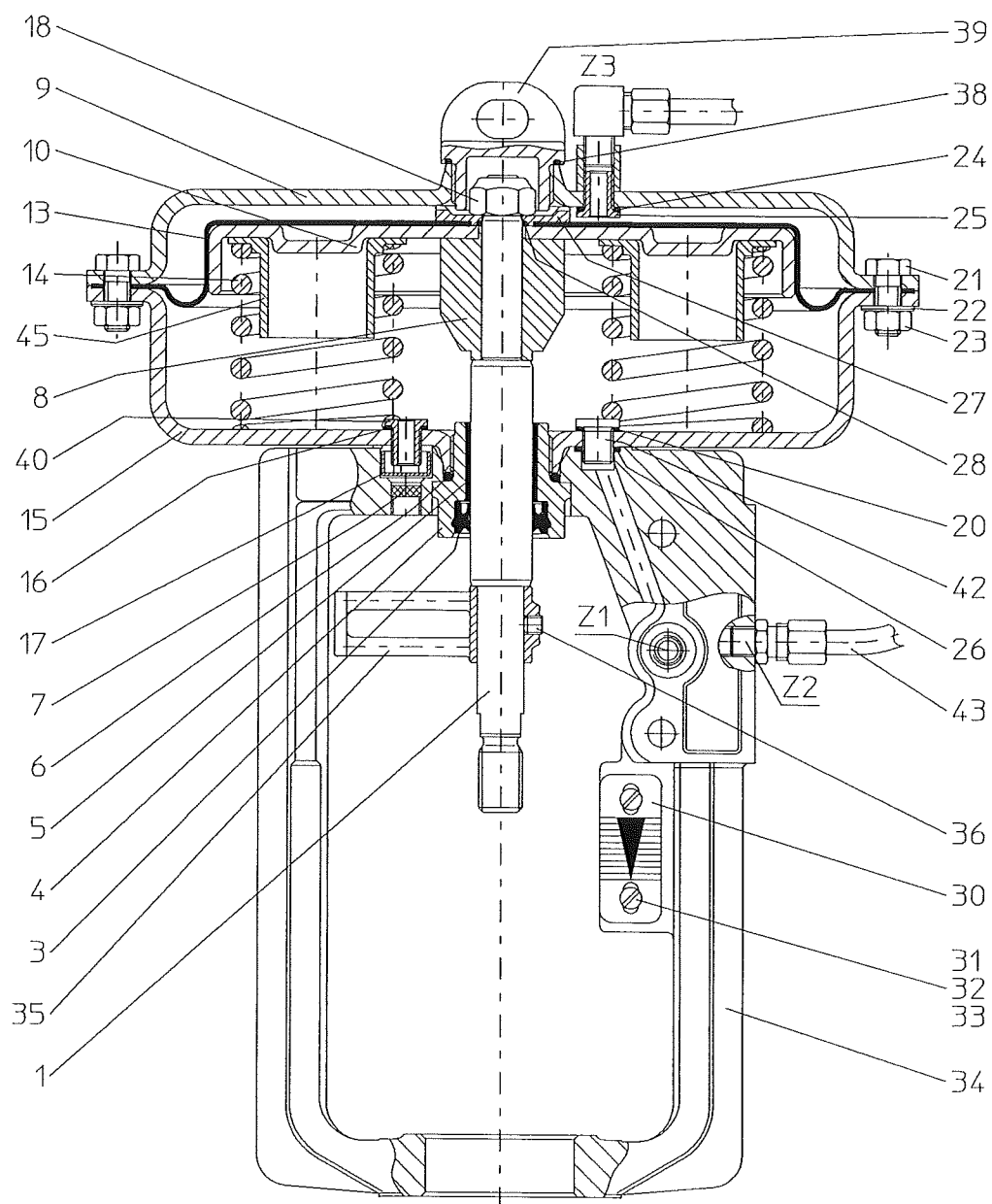
- Dismantling according to section **Diaphragm** on page 6 until diaphragm is removed (13).
- Pull reversing sleeve (8) with diaphragm plate (10) off the spindle (1).
- Exchange tension springs (14) against new springs.
– The springs should always be exchanged as a complete set!
– Note carefully the arrangement of the springs (14)!

Number of springs	Mounting at position
2	1 + 4
3	1 + 3 + 5
4	2 + 3 + 5 + 6
6	1-6
9	1 + 3 + 5 + 1 - 6
12	2x 1-6

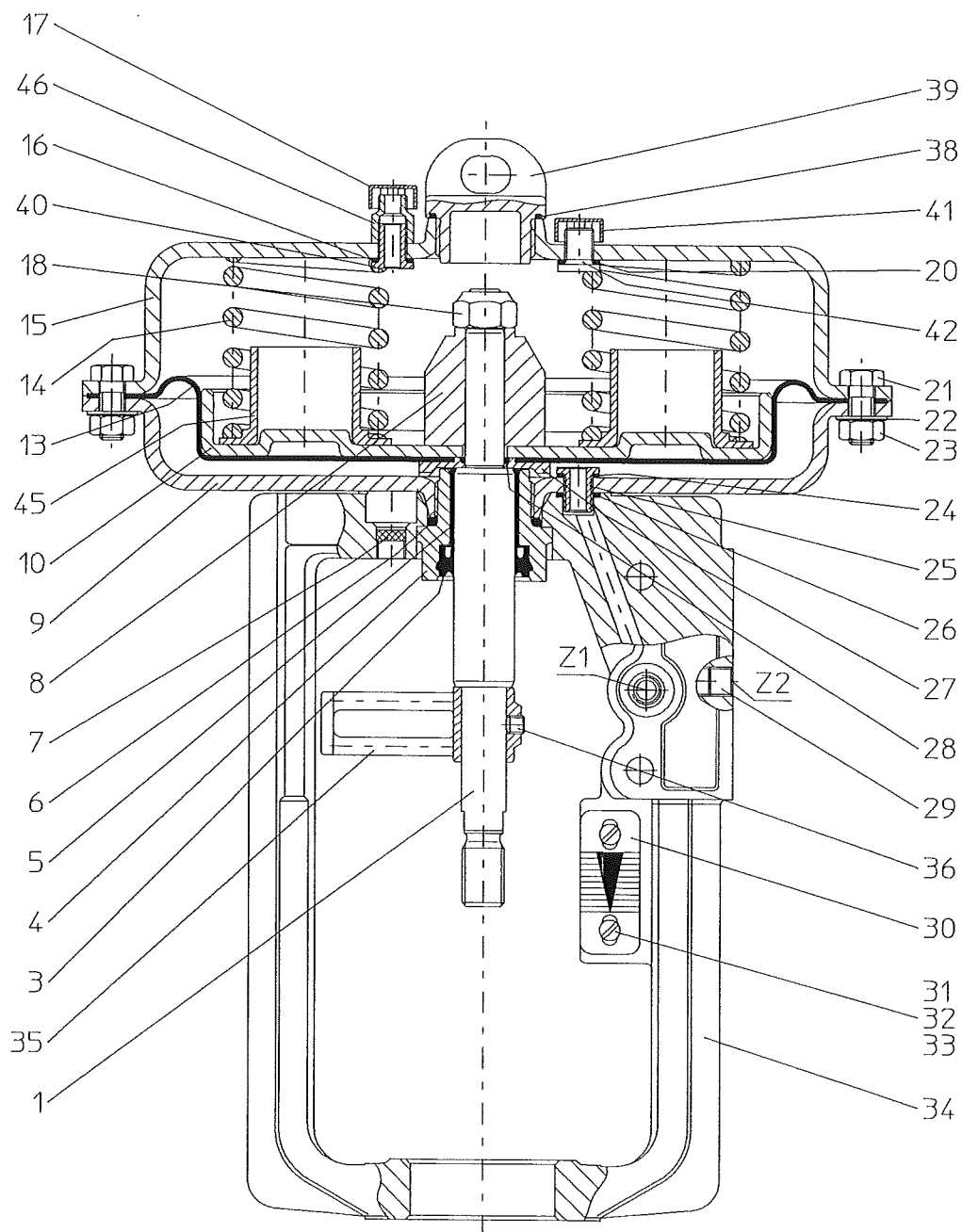


10 Sectional drawings

10.1 No.206736 (air to close)



10.2 No.206722 (air to open)



11 Parts List

Recommended spare parts are marked with an asterisk (*)
Spare parts list: see last page!

Item No.	Part Name
1	spindle
3 *	gasket
4	bushing
5 *	slide bearing
6 *	o-ring
7	filter
8	reversing sleeve
9	diaphragm cover
10	diaphragm plate
13 *	diaphragm
14 *	pressure spring
15	spring cover
16	gasket
17 *	protective cap
18 *	hex. nut
20	gasket
21	hex. screw
22	washer
23	hex. nut
24	gasket
25	threaded sleeve
26 *	o-ring
27	cup
28 *	o-ring
29	screw plug
30	stroke plate
31	cyl.- screw
32	lock washer
33	hex. nut
34	yoke
35	stroke sensor
36	threaded pin
38 *	gasket
39	screw plug
40	threaded sleeve
41	protective cap
42	screw plug
43 *	piping, complete
45	spring stop
46	threaded adapter

12 Table(s) of torque moments

12.1 Screw connections, general

Screws acc. to DIN933/931/939

Thread Size	Torque Moment [Nm]
M10	16
M12	30
M16	70
M20	100
M24	180
M27	330

Spare parts quotation / Order

To: ARCA-Regler GmbH
P.O. Box 2120
D-47913 Tönisvorst
Tel.: 0 21 56 / 77 09-0
Fax.: 0 21 56 / 77 09 55
eMail: sale@arca-valve.com

From:

We refer to the Serial-number(s) _____

☐ We would like to have your quotation for the following spare parts:

☐ We herewith order the following spare parts:

- ☐ Set of gaskets, consisting of parts Nos. 3, 5, 6, 17, 18, 26, 28, 38
- ☐ Diaphragm part No. 13
- ☐ Reversing set from air-to-close into air-to-open, consisting of parts Nos. 29, 41, 46.

Item No.	Part Name	quantity
3	gasket	
5	slide bearing	
6	o-ring	
13	diaphragm	
14	pressure spring	
17	protective cap	
18	hex. nut	
26	o-ring	
28	o-ring	
38	gasket	
43	piping, complete	

Date / Signature

Key-No.: 81-23-3S-B00

Printed: 04.04.2005

ARCA-Regler GmbH D - 47918 Tönisvorst

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ARCAPRO 827A.E/X* - * - *****

Electropneumatic Positioner for
Linear and Rotary Valve Actuators
Version without PROFIBUS PA



Operating Instructions

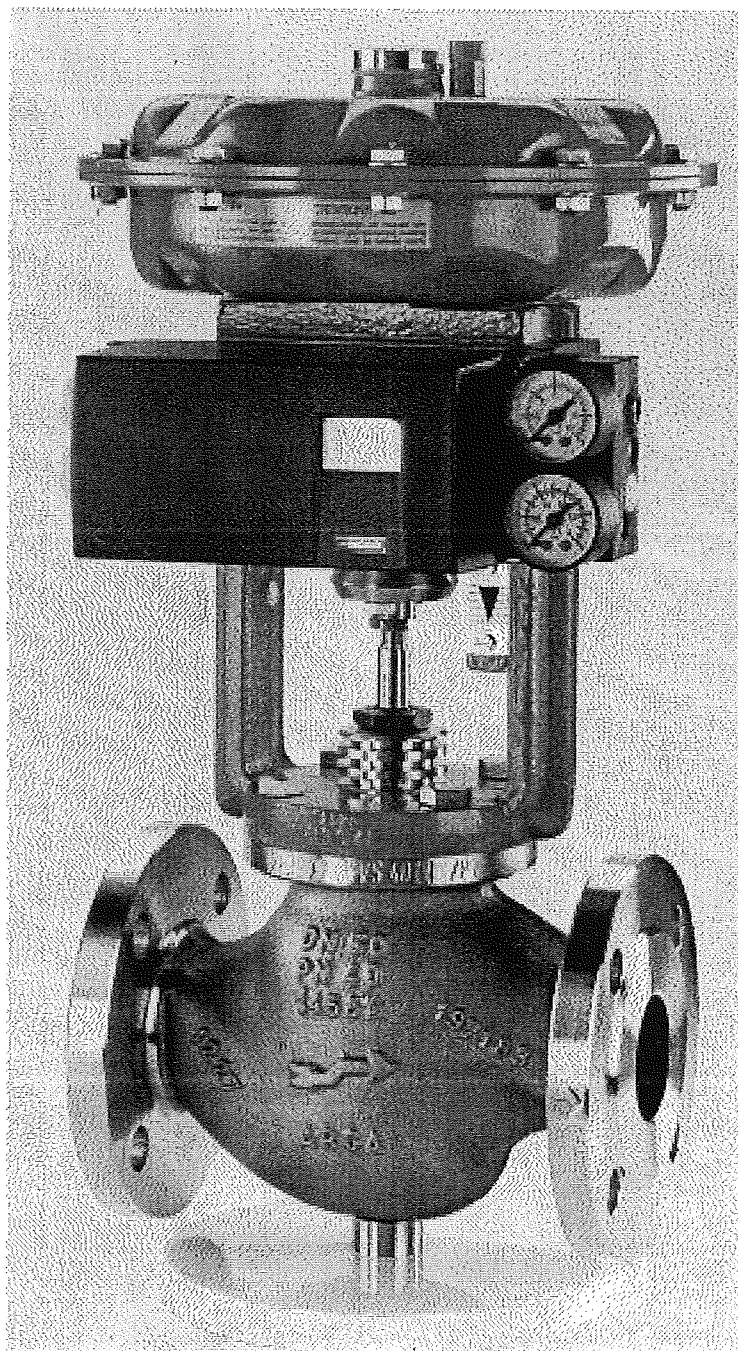


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1 Safety Instructions

1.1 Meaning of the Instructions



DANGER

means that death, serious injury and/or considerable damage to property **will** occur if the corresponding preventive measures are not taken.



WARNING

means that death, serious injury and/or considerable damage to property **can** occur if the corresponding preventive measures are not taken.



CAUTION

with a warning triangle indicates that slight injury and/or damage to property can occur if the corresponding preventive measures are not taken.

CAUTION

without a warning triangle signifies that damage to property can occur if the corresponding preventive measures are not taken.

ATTENTION

indicates that some undesired event or condition can occur if the corresponding instructions are not observed.



NOTE

indicates an important item of information about the product itself, how the product should be handled, or about the relevant part of the manual to which special attention should be paid.

1.2 Introduction

The basic steps required for assembly, connection and commissioning are described in these operating instructions.

These operating instructions do not replace the device manual for the ARCAPRO electropneumatic positioner. The device manual contains more extensive information on build standard, mode of operation and operating procedures.

The device manual can be obtained from us.

Safe operation

This equipment has been supplied from the factory in a totally safe condition. To maintain this condition and to ensure safe operation of the equipment, the instructions and warnings in these operating instructions must be observed by the user.

Qualified Personnel

in the context of these operating instructions are persons who are entrusted with the assembly, commissioning and operation of this product and who have the appropriate qualifications for their work activities, such as, for example:

- training or instruction or other entitlement to connect and disconnect, earth and identify electrical circuits and equipment in accordance with current technical safety standards,
- training or instruction in accordance with current technical safety standards in the maintenance and usage of appropriate safety equipment,
- training in First Aid;
- and who, in the case of devices with explosion protection, are trained, instructed or authorised to carry out work on the electrical equipment in plant subject to explosive hazard.



WARNING

The device may only be assembled and commissioned by qualified personnel.

The device is designed for connection to operate or safety extra-low voltage.

Electrical safety is determined entirely by the power supply devices.

High actuating forces are exerted by pneumatic actuators. To prevent injury, assembly and commissioning must be carried out whilst carefully observing the safety regulations for the actuator in use.

The necessity, when appropriate, of observing safety regulations for plant subject to explosive hazard is hereby explicitly emphasised.

Flawless and safe operation of this equipment presupposes proper transport, correct storage, installation and assembly as well as careful operation and maintenance.

2 Positioner delivery package

- Positioner in accordance with order and type key:

827A. ** - * * * - * * *

P	- for external potentiometer ¹⁾
1	- single-acting
2	- double-acting ¹⁾ (apart from EEx d only plastic housings)
M	- metal housing
K	- plastic housing (not EEx d)
0	- without communications
H	- HART
P	- PROFIBUS PA ¹⁾
0	- without binary outputs
B	- binary module
S	- slot initiator module
0	- without analogue output
A	- analogue module
2	- 2-wire
4	- 2/3/4-wire
E	- not explosion protected
X	- II2G EEx ia/ib IIC T6/T5/T4 ²⁾
N	- II3G EEx nA L [L] IIC T6 ¹⁾
D	- II2G EEx d IIC T6/T5/T4 ¹⁾

- Operating instructions in English

- Leaflet entitled "Operation –a short and concise description" in German and English
(packed with the equipment)

¹⁾ The device type is not described in these operating instructions. Please find the specific device characteristics and technical data in the corresponding separate documentation.

²⁾ Type 827A.X*-A**-*** only II2G EEx ia/ib IIC T4-T1

3 Assembly

3.1 General



DANGER

The positioner and its optional modules can be supplied as separate units and in various versions. Positioners and optional modules are available for operation in potentially explosive areas and in areas that are not subject to such hazards. Each of these versions is marked by a special type plate.

When retrofitting various components, it is important to ensure that only positioners and option modules are combined that are permitted for use in the relevant area. This is of particular importance for safe operation of the positioner in areas where the atmosphere may become explosive (Zones 1 and 2). It is essential that the device categories (2 or 3) of the device itself and of its optional extras are observed here.



WARNING

It is essential that the following sequence is observed during assembly in order to avoid injury or mechanical damage to the positioner/mounting kit:

- | | |
|--|---------------|
| 1. Mechanically mount the positioner | See section 3 |
| 2. Connect the auxiliary electrical power supply | See section 5 |
| 3. Connect the pneumatic auxiliary power | See section 6 |
| 4. Carry out the commissioning procedure | See section 7 |

It is also always necessary to ensure that water does not enter an open housing or threaded joint. This can, for instance, occur if the positioner is not immediately assembled and sealed in its final position on site.

Only dry compressed air may be used to operate the ARCAPRO. You should therefore make use of the usual water trap. In extreme cases it may even be necessary to use an additional dryer. This is of particular importance if the ARCAPRO will be operated at low ambient temperatures. In that case, please also set the purging air switch (on the valve block, above the pneumatic connections) into the "OUT" position.

For rotary actuators, use a sufficiently stable bracket (e.g. plate > 4 mm thick with reinforcements). On linear actuators, use the linear actuator mounting kit or the built-in fitting attachment.

3.1.1 Note on the Use of Positioners in Wet Environments

This information provides you with important notes on assembling the positioner in wet environments (frequent heavy rain and/or persistent tropical condensation) in which protection class IP 65 is no longer sufficient, in particular when there is a risk that the water might freeze.

In order to prevent water entering the device in normal operation (e.g. through the air outlet holes) or the display becoming hard to read, you should avoid the unfavourable installation positions shown in Figure 3-4.

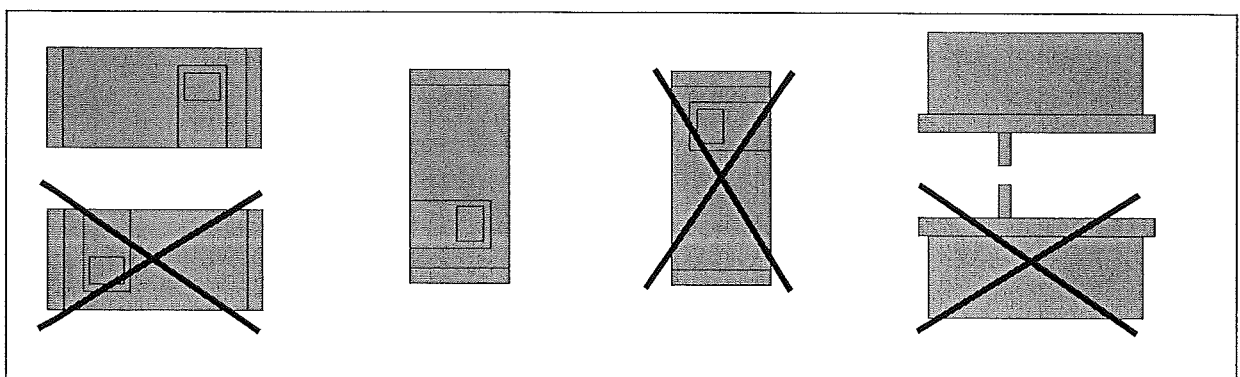


Bild 1 Favourable and unfavourable installation positions

If local conditions force you to operate the positioner in an unfavourable installation position, you can prevent the entry of water through additional measures.



CAUTION

Never clean the positioner with a high pressure cleaner. Protection class IP 65 is inadequate for this.

The steps necessary to prevent the entry of water depends on the installation position chosen. In certain cases you may need:

- Threaded joint with sealing rings (e.g. FESTO: CK -1 / 4-PK-6)
- Plastic hose, approx. 20 to 30 cm (e.g. FESTO: PUN- 8X1.25 SW)
- Cable ties (number and length depend on the local conditions)

Procedure

- Arrange the pipes in such a way that rainwater or condensation that runs along the length of the pipes can drop off before reaching the positioner's connection strip.
- Check that the seals for the electrical connections are correctly seated.
- Check that the seal of the housing cover is not damaged or soiled. Clean or replace it if necessary.
- If possible, mount the positioner in such a way that the sintered bronze silencer on the underneath of the housing is pointing downwards (vertical installation position). If this is not possible, the silencer should be replaced by a plastic hose using a suitable threaded joint.

Assembling the Threaded Joint with Plastic Hose

- Unscrew the sintered bronze silencer from the exhaust air opening on the underside of the housing.
- Screw the threaded joint mentioned above into the outlet opening.
- Fit the plastic hose mentioned above to the threaded joint and check that it is tightly seated.
- Use a cable tie to fasten the plastic hose to the fittings in such a way that the opening is pointing downwards.
- Check that the hose is not kinked, and that the exhaust air can flow out easily.

3.1.2 Notes for the Use of Positioners Subject to High Acceleration or Vibration

High acceleration forces occur on fittings that are heavily mechanically stressed, such as breakaway flaps, heavily shaking or vibrating valves or "steam hammer". These forces can be well outside the range specified in the technical data. In extreme cases this can result in displacement of the slip clutch.

In these cases the positioner is fitted as standard with a locking device for the slip clutch with which displacement as a result of the above-mentioned influences is inhibited.

The adjustment function is accessible beneath the black adjusting wheel of the slip clutch and recognisable on the yellow wheel with slots. The null point setting and slip clutch adjustment functions are marked with symbols on an auxiliary plate (see Figure 3-5).

Procedure

After the positioner has been fitted and fully set into operation, the slip clutch can be locked as follows:

1. Place a commercial screwdriver of about 4mm wide in a slot in the yellow wheel.
2. Turn the yellow wheel anti-clockwise with the screwdriver until it latches detectably. The slip clutch is thereby locked.
3. A locked slip clutch is to be recognised by an approximately 1mm wide gap between the yellow and black wheel.
4. If a null point setting is necessary, e.g. after a drive change, the locking is released by a clockwise rotation up to the stop of the yellow wheel. After the null point setting the slip clutch can be fixed again as described above.

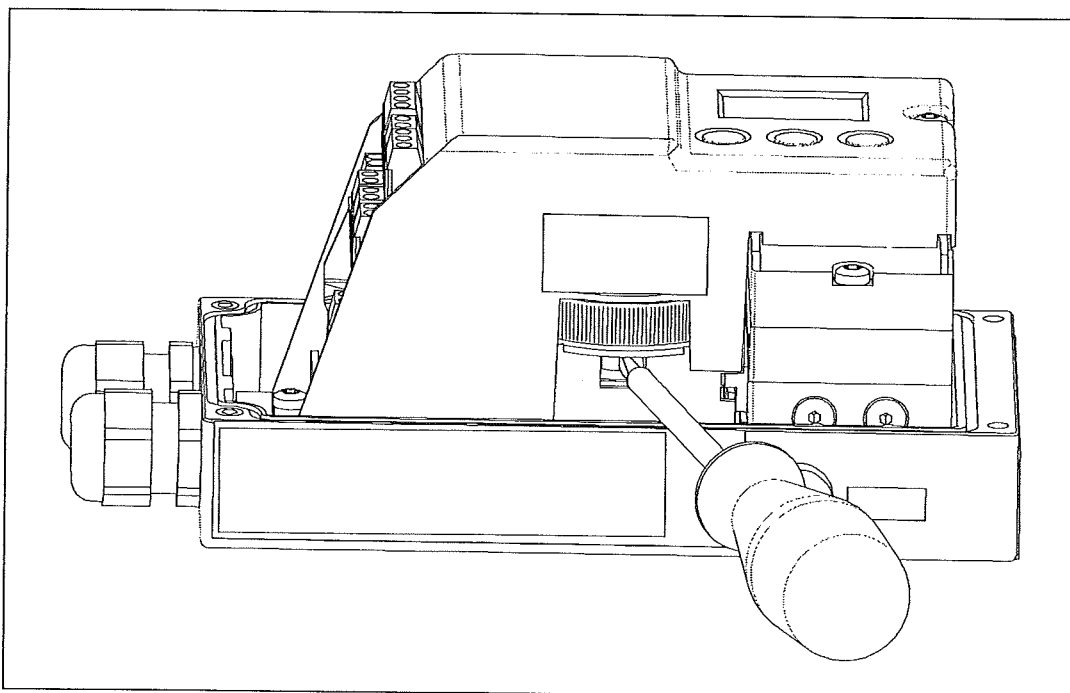


Figure 2 Locking the slip clutch

External Travel Acquisition

External travel acquisition is a possibility for those cases in which the measures described above are not sufficient, such as when vibration is heavy and persistent, at particularly high or low ambient temperatures, or in the presence of nuclear radiation. In this case the special positioner (see Type Key) is used at a distance from the fitting. A 10 k Ω potentiometer or a non-contact sensor (available, with mounting kit, as an accessory) can be used for the displacement acquisition.

The special version of the positioner should always be used for the regulation unit when, instead of the travel acquisition unit, some other potentiometer (with a resistance of 10 k Ω) mounted on the actuator is to be used.

3.2 Mounting Kit for "Integrated Fitting Linear Actuator"

Included with the "integrated fitting linear actuator" are (see Figure 3 for identifying numbers):

Serial no.	No. of items	Name	Note
1	1	Driver pin cpl. with roller	mounted on lever (2)
2	1	Lever	
3	2	Washer	B6.4 - DIN 125 - A2
4	1	Spring washer	A6 – DIN 137A- A2
5	1	Lock washer	A6 – DIN 127- A2
6	1	Cylinder head bolt	M6 x 25 DIN 7984 - A2
7	1	Hexagonal nut	M6 - DIN 934 - A4
8	1	Square nut	M6 - DIN 557 - A4
9	2	Cylinder head bolt	M8 x 65 - DIN 912 - A2
10	2	Lock washer	A8 - DIN 127 - A2
11	2	Screw plug	
12	1	O-ring	13 x 2.5

3.2.1 Assembly procedure (see Figure 2)

1. Adjust the pin (1) on the previously assembled lever to the value of the stroke range given on the actuator or, if this is not available as a scale value, at the next largest scale value. The centre of the pin must be positioned at the scale value. The same value can later be set during the commissioning under the parameter 3.YWAY, in order to display the displacement in mm after the initialisation.
2. Push the lever to the stop on the controller axis, and fix it with cylinder head screw (6).
3. Open the rear actuating pressure outlet by removing the screw (13) and the O-ring (14).
4. When fitting with spring chamber exhaust air supply open the exhaust air outlet by removing the screw (15) and the O-ring (16).
5. Seal the actuating pressure outlet with screw plug (11). When fitting with exhaust air supply remove exhaust air silencer and seal.
6. Insert the O-ring (12) in the intermediate bracket recess.
7. Locate the positioner on the actuator in such a way that the roller passes between the pins (17).
8. Align the controller horizontally at the intermediate bracket, and assemble it with the screws (9) and lock washers (10).

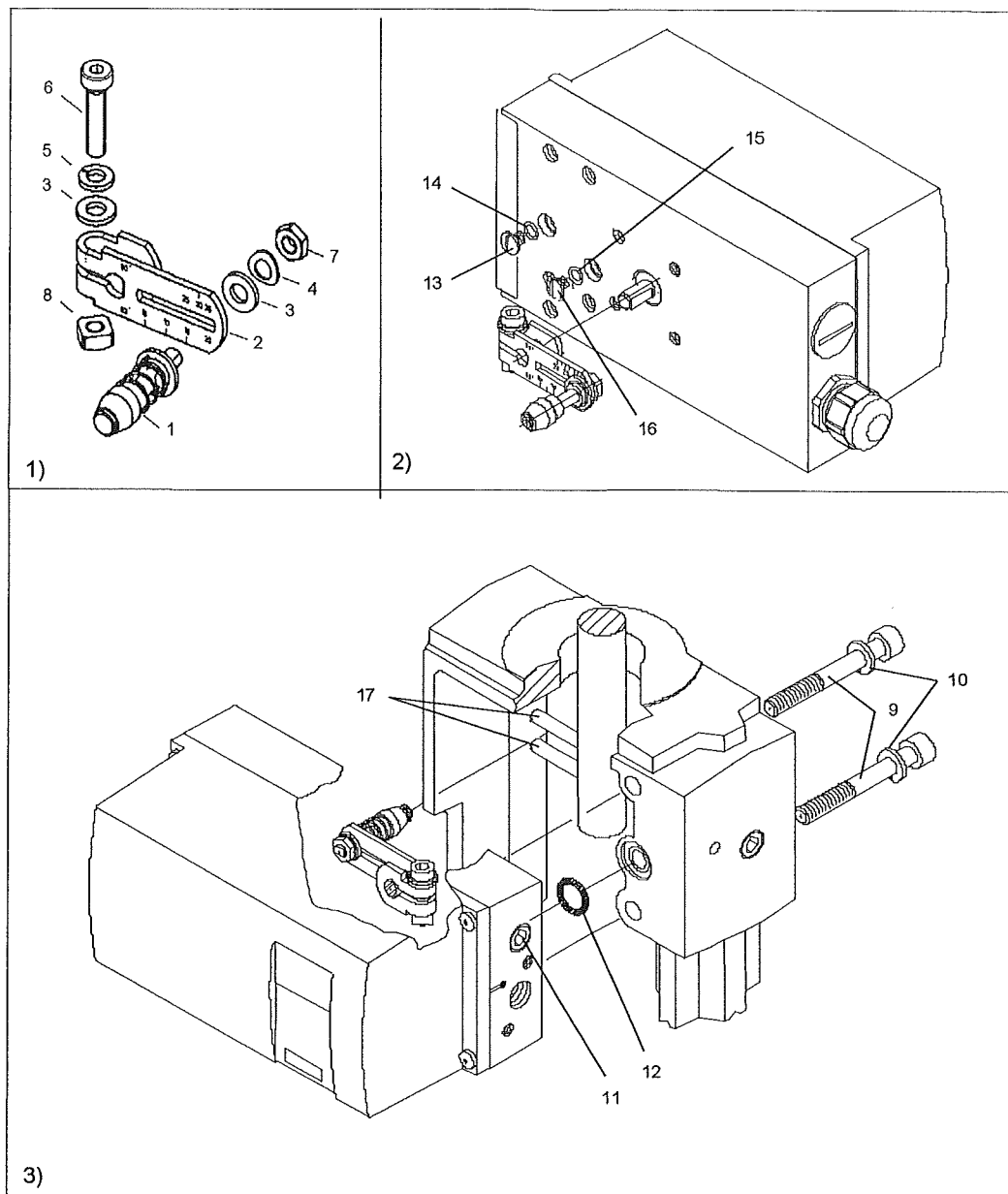


Figure 3 Assembly procedure for integrated fitting

3.3 "Linear Actuator IEC534" Mounting Kit

The "linear actuator IEC 534" mounting kit, stroke 3 mm to 35 mm, includes (see Figure 5 for identifying numbers):

Serial no.	No. of items	Name	Note
1	1	NAMUR fitting angle IEC 534	Standardised connecting location for fitting bracket with rib, column or flat surface
2	1	Sensing hoop	Guides the roller with the driver pin and turns the lever arm
3	2	Clamping piece	Assembly of the sensing hoop to the actuator's spindle
4	1	Driver pin cpl. with roller	Mounted on lever (5)
5	1	NAMUR lever	For stroke range 3 mm to 35 mm, or stroke range > 35 mm to 130 mm (order separately)
6	2	U-bolts	Only for actuators with columns
7	4	Hexagonal screw	M8 x 20 DIN 933-A2
8	2	Hexagonal screw	M8 x 16 DIN 933-A2
9	6	Lock washer	A8 - DIN 127-A2
10	6	Washer	B 8.4 - DIN 125-A2
11	2	Washer	B 6.4 - DIN 125-A2
12	1	Spring washer	A6 - DIN 137A-A2
13	3	Lock washer	A6 - DIN 127-A2
14	3	Cylinder head bolt	M6 x 25 DIN 7984-A2
15	1	Hexagonal nut	M6 - DIN 934-A4
16	1	Square nut	M6 - DIN 557-A4
17	4	Hexagonal nut	M8 - DIN 934-A4

3.3.1 Assembly procedure (see Figure 5)

1. Assemble the clamping pieces (3) using the hexagonal screws (14) and lock washers (13) to the actuator spindle.
2. Push the sensing hoop (2) into the cut-outs in the clamping piece. Adjust to the required length, and tightened the screws so that it is still just possible to push the sensing handle.
3. Adjust the pin (4) on the previously assembled lever to the value of the stroke range given on the actuator or, if this is not available as a scale value, at the next largest scale value. The centre of the pin must be positioned at the scale value. The same value can later be set during the commissioning under the parameter 3.YWAY, in order to display the displacement in mm after the initialisation.
4. Push the lever to the stop on the controller axis, and fix it with cylinder head screw (14).
5. Assemble the fitting angle (1) with two hexagonal screws (8), lock washer (9) and washers (10) to the rear of the positioner. The choice of the hole row depends on the width of the actuator's intermediate bracket width. The roller should engage in the sensing hoop (2) as close to the spindle as possible, but must not touch the clamping piece.
6. Hold the positioner with the fixing angle to the actuator in such a way that the pin (4) passes inside the sensing hoop (2).

7. Tighten the sensing hoop.
8. Prepare the assembly parts in accordance with the actuator type:
 - Actuator with a rib: hexagonal bolt (7), washer (10) and lock washer (9).
 - Actuator with a flat surface: four hexagonal bolts (7) with washer (10) and lock washer (9).
 - Actuator with columns: two U-bolts (6), four hexagonal nuts (17) with washer (10) and lock washer (9).
9. Attach the positioner with the previously prepared assembly parts to the intermediate bracket.

NOTE



Adjust the height of the positioner so that the horizontal position of the lever is achieved as close as possible to the centre of the stroke. The actuator's lever scale provides orientation here. It is essential that the horizontal lever position is passed through within the range of the stroke.

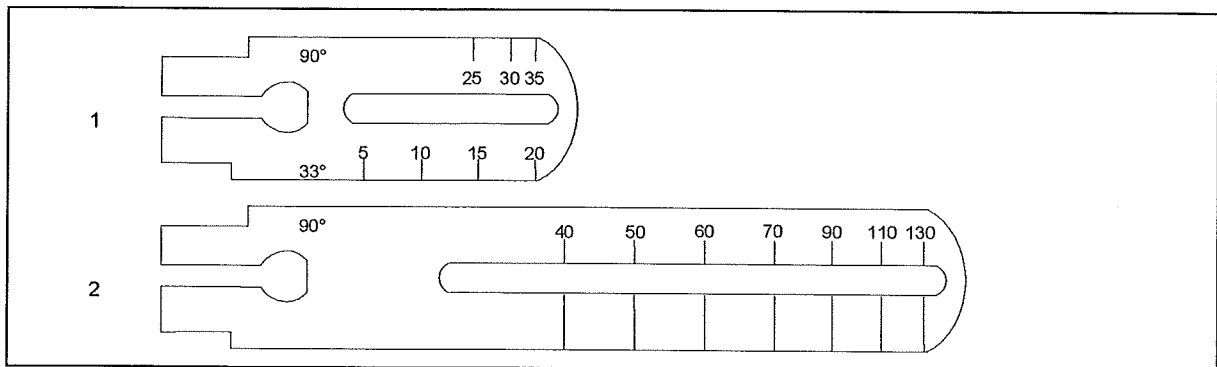


Figure 4 NAMUR lever 3 mm to 35 mm(1), NAMUR lever > 35 mm to 130 mm (2)

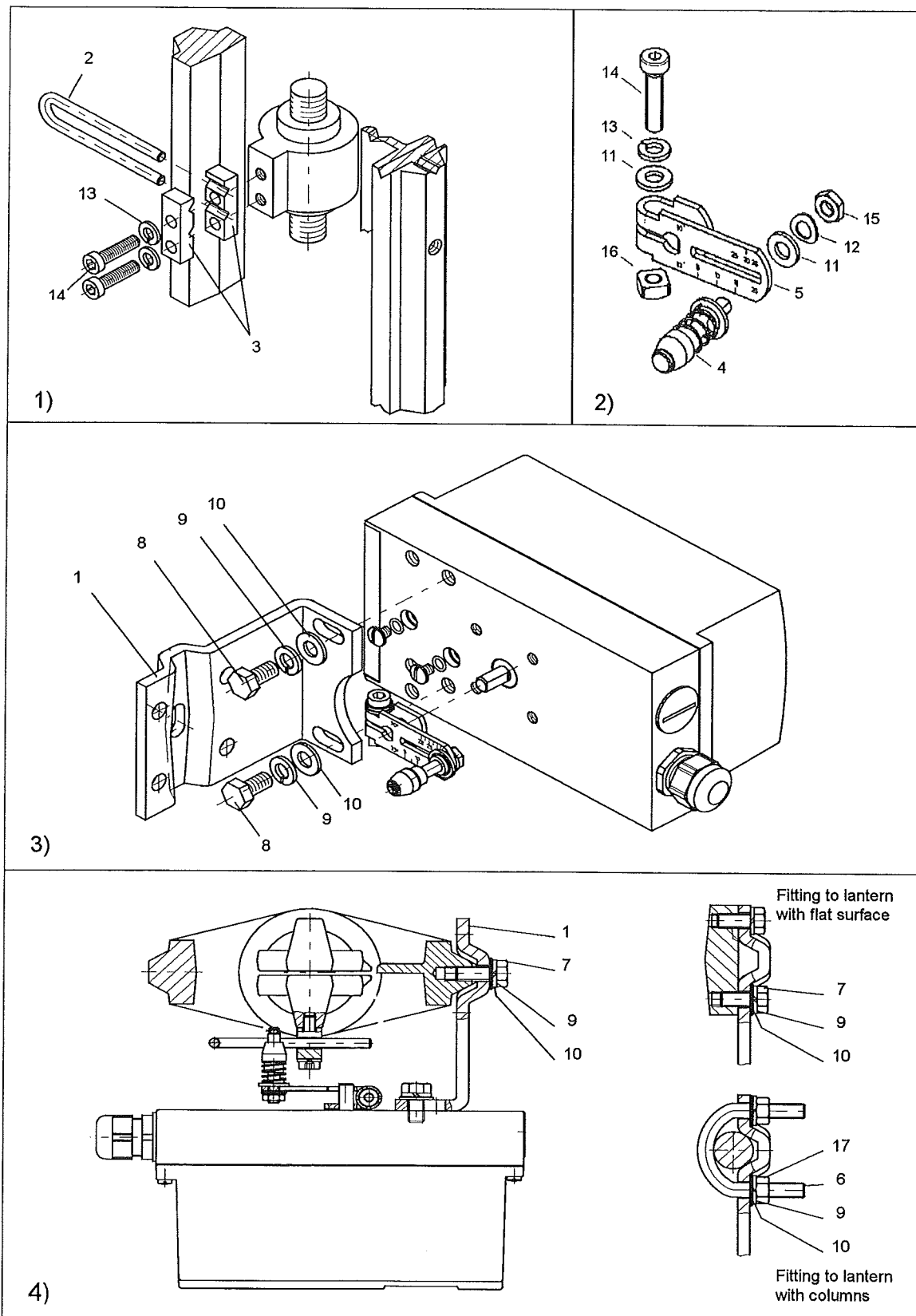


Figure 5 Assembly procedure for IEC 534 linear actuator

3.4 "Rotary Actuator VDI/VDE 3845" Mounting Kit

Included with the "VDI/VDE 3845 rotary actuator" mounting kit are (see Figure 6 for identifying numbers):

Serial no.	No. of items	Name	Note
2	1	Coupling wheel	Fitted to the position feedback shaft of the positioner
3	1	Driver pin	Fitted to the actuator's shaft stub
4	1	Labels	Display of the actuator position, consisting of: 4.1 and 4.2
4.1	8	Scale	Various divisions
4.2	1	Pointer	Reference point for scale
14	4	Hexagonal screw	DIN 933 - M6 x 12
15	4	Retaining washer	S6
16	1	Cylinder head bolt	DIN 84 - M6 x 12
17	1	Washer	DIN 125 – 6.4
18	1	Hexagonal socket bolt	Pre-assembled with coupling wheel
19	1	Hexagon key	For item 18

3.4.1 Assembly procedure (see Figure 6)

1. Attach the VDI/VDE 3845 fitting bracket ((9), actuator-specific, supplied by actuator manufacturer, see Figure 3-8) to the rear of the positioner, and fix it in place with the hexagonal screws (14) and retaining washers (15).
2. Stick the pointer (4.2) on the fitting bracket at the middle of the centring hole.
3. Push the coupling wheel (2) as far as it will go on the positioner axis, pull it back about 1 mm, and tighten the hexagonal socket bolt (18) with the supplied hexagonal key.
4. Place the driver pin (3) on the actuator's shaft stub and tighten it with cylinder head bolt (16) and washer (17).
5. Carefully place the positioner with the fitting bracket on the actuator so that the pin of the coupling wheel engages with the driver pin.
6. Align the positioner / fitting bracket centrally on the actuator, and screw tight (screws are not included with the supply, but are part of the actuator's fitting bracket!).
7. When commissioning according to Section 3.6 has been completed, take the actuator to its end position and stick the scale (4.1) on to the coupling wheel (2) according to the direction of rotation and the turning range. The scale is self-adhesive!

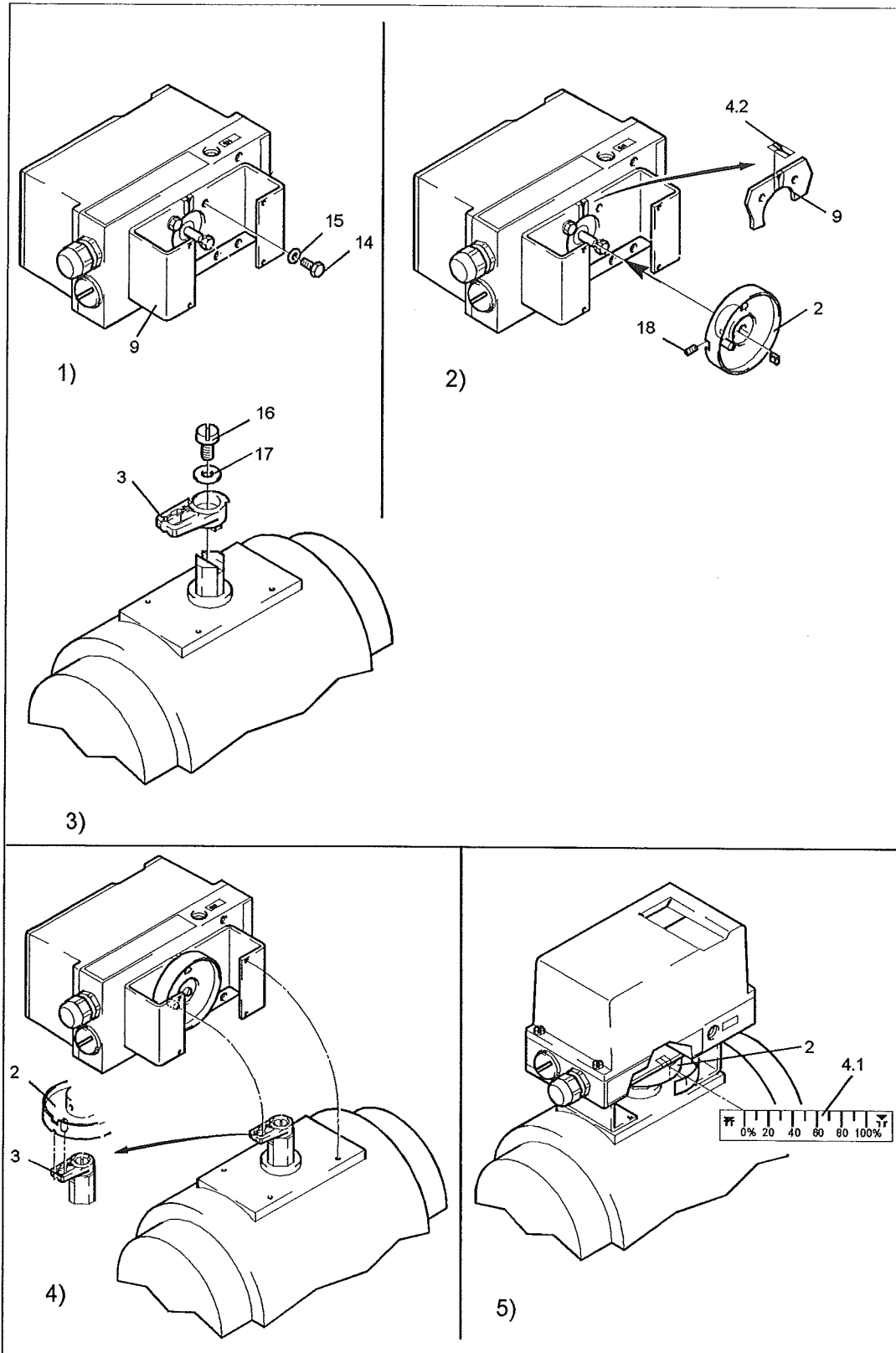


Figure 6 Assembly procedure for VDI/VE 3845 rotary actuator

4 Fitting the optional modules (see Figure 7)

- Unscrew housing cover.
- Unscrew assembly cover (1).
- **Analog module:** Push the analog module (3) into the lower circuit board guides, complete electrical connection with the accompanying flat ribbon cable (6).
- **Binary module:** Push the binary module (4) into the upper circuit board guides of the container, complete electrical connection with the accompanying flat ribbon cable (5).
- **Slot Initiator Module**
 1. Remove all the electrical connections to the main electronics (2).
 2. Undo the motherboard's fastening screws (2.1).
 3. Disengage the motherboard by carefully bending the four brackets.
 4. Insert the slot initiator module (7) from above as far as the container's upper circuit board guides.
 5. Push the slot initiator module in the container's circuit board guide about 3 mm to the right.
 6. Screw the special screw (7.1) through the slot initiator module in to the positioner's axis, observing the following notes:

The pins that are pressed into the bearing of the adjusting wheel must be aligned with the special screw shortly before contact. As screwing in continues, it is then necessary for the bearing of the adjusting wheel and the special screw to be turned at the same time, so that the pins enter into the special screw.
 7. Place the insulating cover (10) over the slot initiator module on one side underneath the main electronic board's support surface at the container wall. The cut-outs in the insulating cover must engage with the corresponding ridges on the container wall. Place the insulating cover and on the slot initiator module by carefully bending the container walls.
 8. Engage in main electronic board in the four brackets, and screw it back down again with the two fastening screws (2.1).
 9. Make the electrical connections between the main electronic board and the optional modules with the enclosed ribbon cables, and between the main electronic board and the potentiometer with the potentiometer cable.
 10. Fasten the supplied assembly cover instead of the standard version, using the two screws.
 11. Select those labels from the enclosed label set that are already present on the standard version of the assembly cover. Stick the selected labels on to the fitted assembly cover in the same way as on the standard version.
 12. Make all the electrical connections.

Adjust the two limit values:

13. Move the actuator to the first desired mechanical position.
14. Move the upper adjusting wheel (for output terminals 41-42) by hand until the output level changes.
15. Move the actuator to the second desired mechanical position.
16. Move the lower adjusting wheel (for output terminals 51-52) by hand until the output level changes.

NOTE



If you continue to turn the adjusting wheel beyond the switching point until it reaches the next switching point, you can set a high/low or a low/high transition.

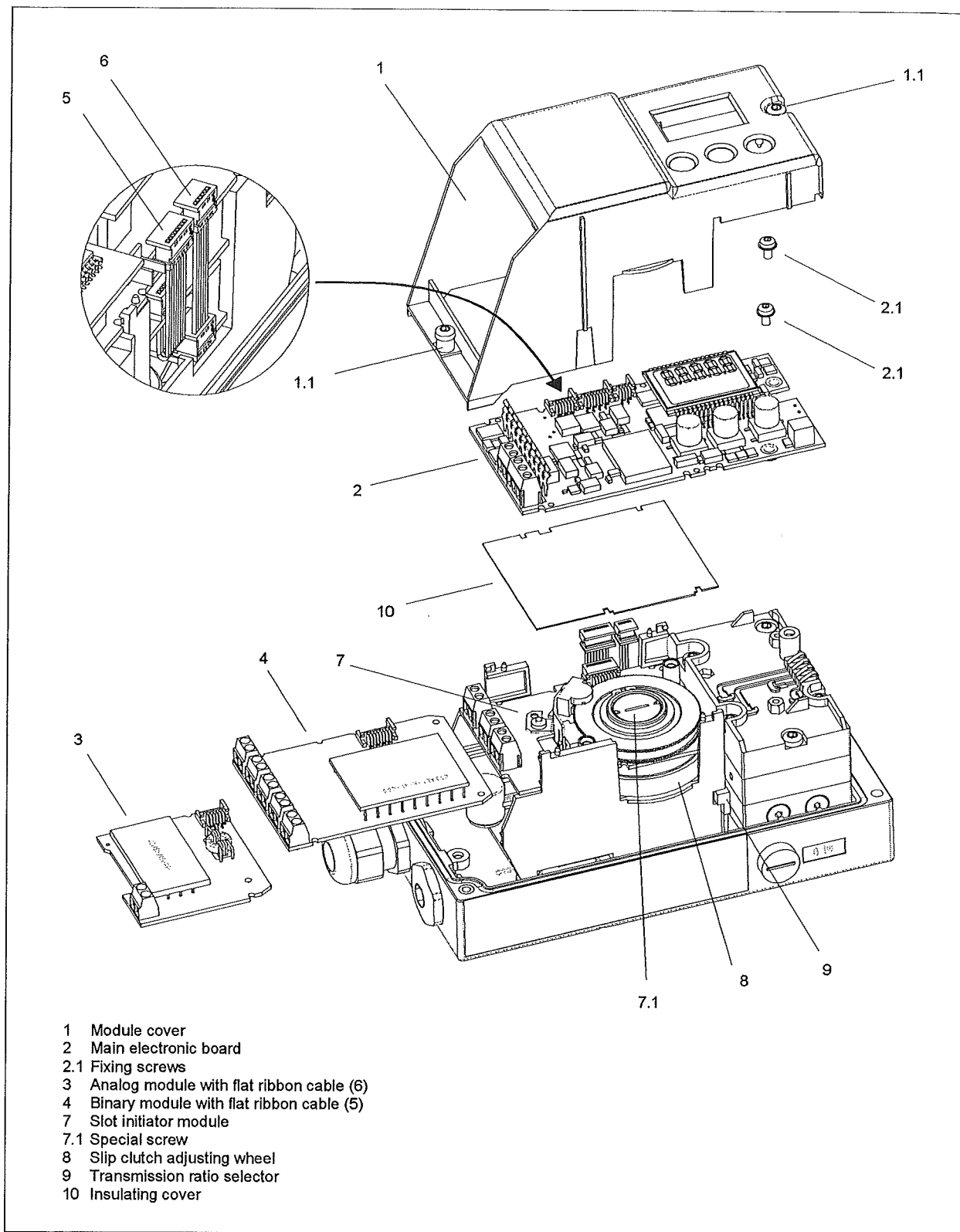


Figure 7 Fitting the option modules

5 Electrical Connections

Electrical connection: Screw terminals 2.5 mm²

Cable gland: M20 x 1.5

Signal range

Setpoint w: 4 to 20 mA with 2-wire connection (see Figure 8 to 10)
0/4 to 20 mA with 3- or 4-wire connection (see Figure 11)
Auxiliary power U_H : 18 V to 30 V



WARNING

Observe the appropriate regulations when making the electrical installation; in potentially explosive regions, this particularly means the rules and regulations for areas of explosive hazard. In Germany, for instance these are Elex V, VDE 0165.

ATTENTION

Never connect the current input (terminals 6 and 7) to a voltage source, otherwise the positioner can be destroyed. Always use a current source with a maximum output current of 20 mA.

Never connect the auxiliary voltage to terminal 3 for 3/4-wire connection, since this will also result in destruction of the positioner.

The plastic housing is metallised on the inside to increase electromagnetic compatibility (EMC) at high frequencies. An electrically conductive connection is made to this screen at the threaded sockets in the base plate.

Note that this protection is only effective if at least one of these sockets is joined by electrically conductive (bare metal) parts to earthed fittings.

5.1 Electrical connections for basic device

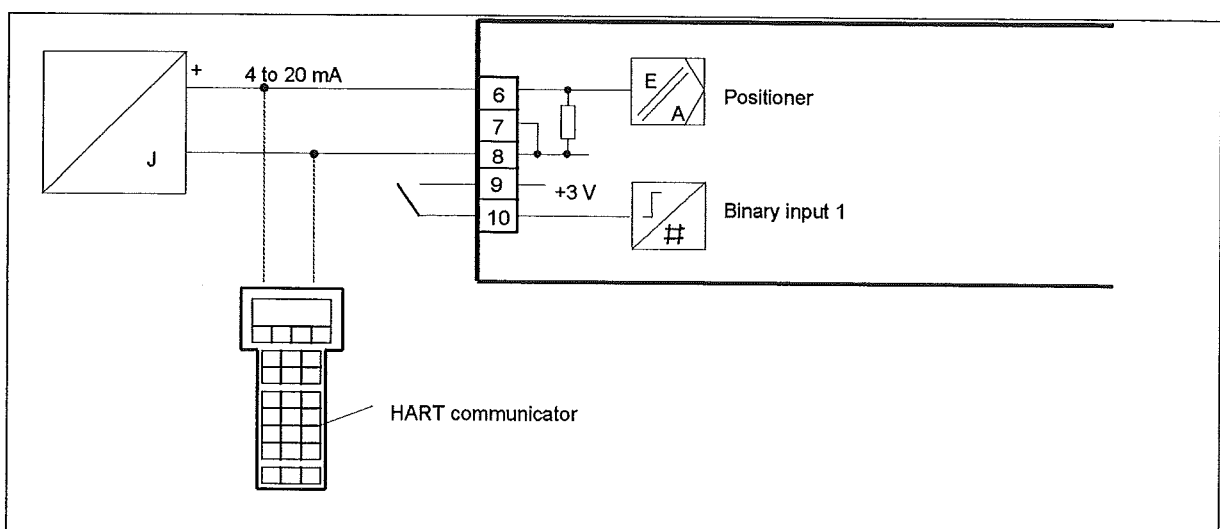


Figure 8 2-wire connection, not for explosive regions, Type 827A.E2

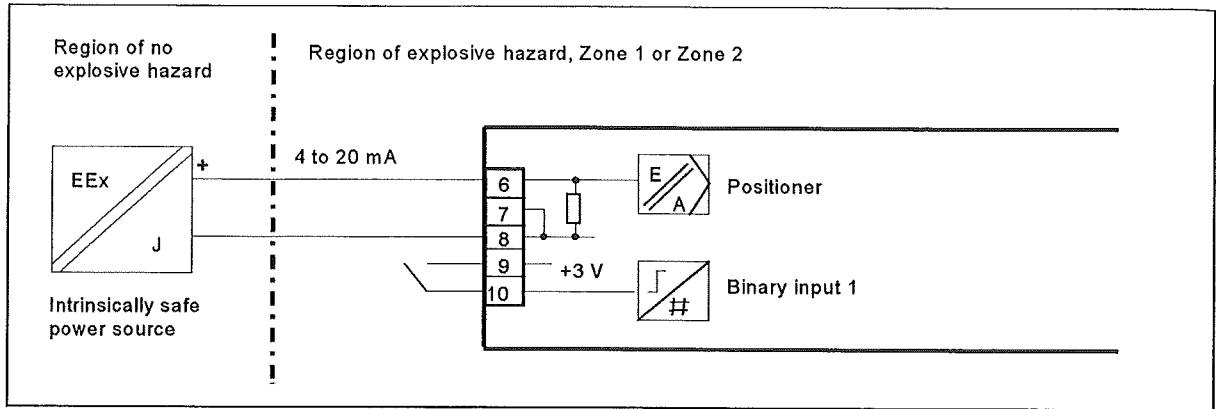


Figure 9 2-wire connection, for explosive regions, Type 827A.X2

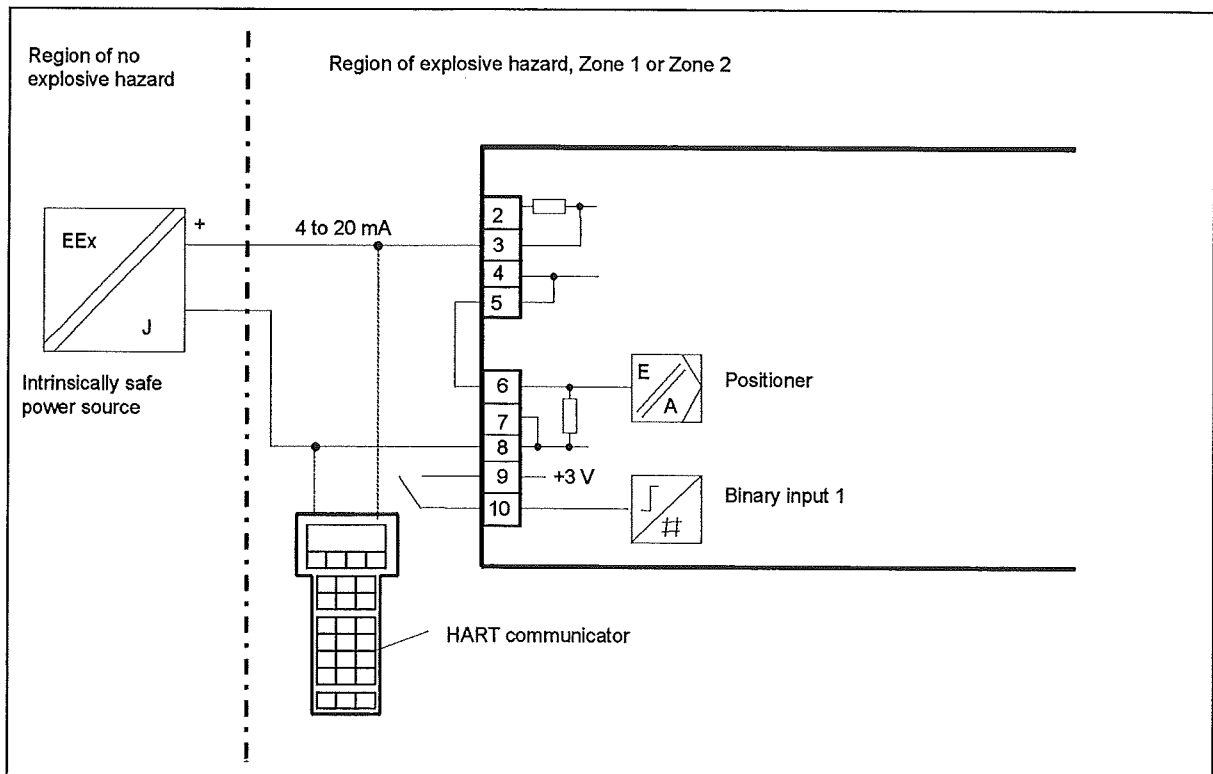


Figure 10 2-wire connection, for explosive regions, Type 827A.X4

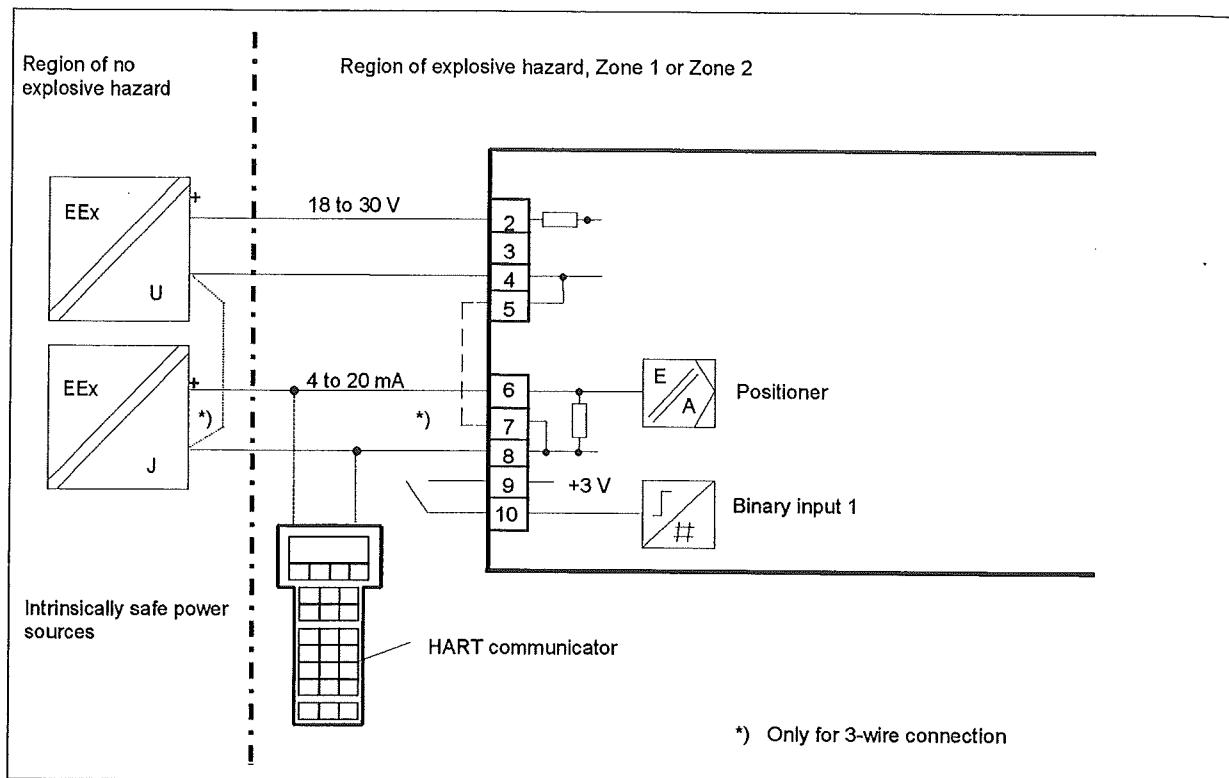


Figure 11 3/4-wire connection, for explosive regions, Type 827A.X4

5.2 Option Connections, Not Intrinsically Safe

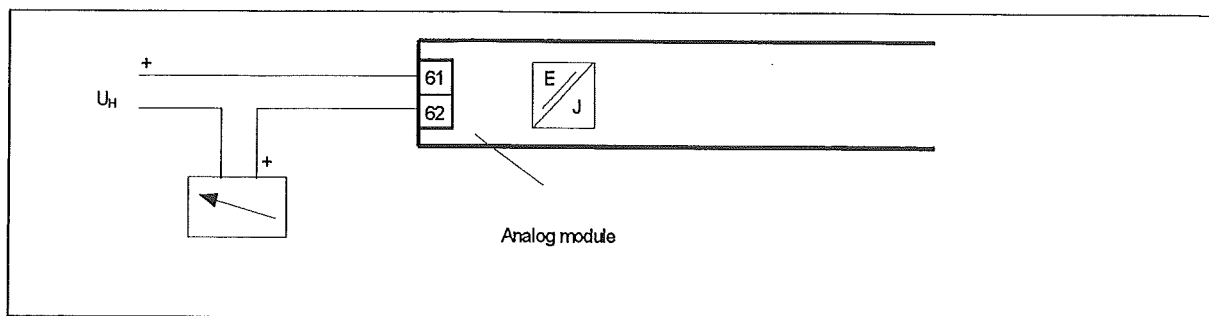


Figure 12 Analog module not for explosive regions

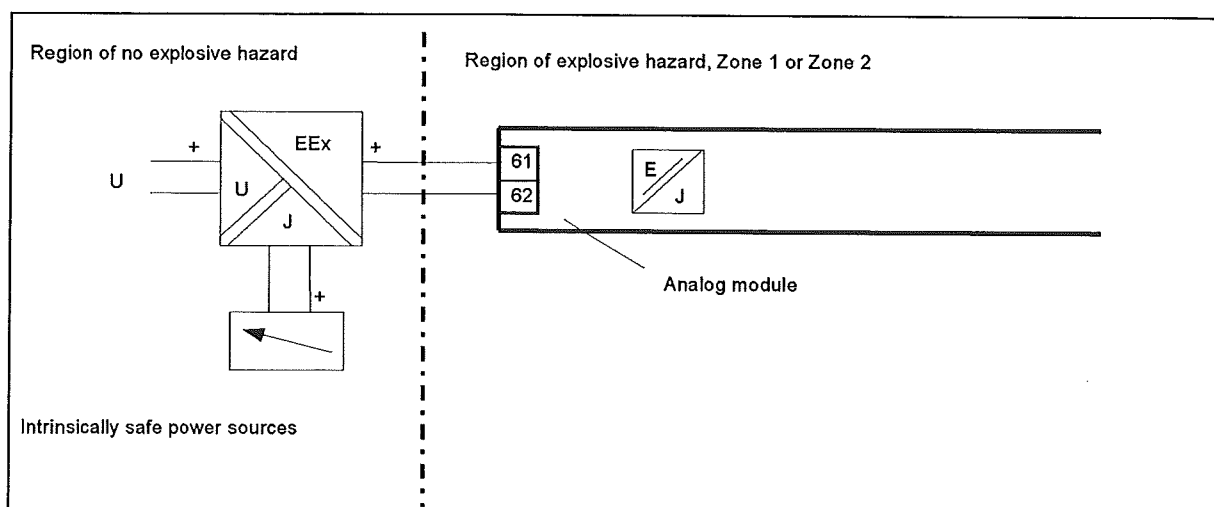


Figure 13 Analog module for explosive regions

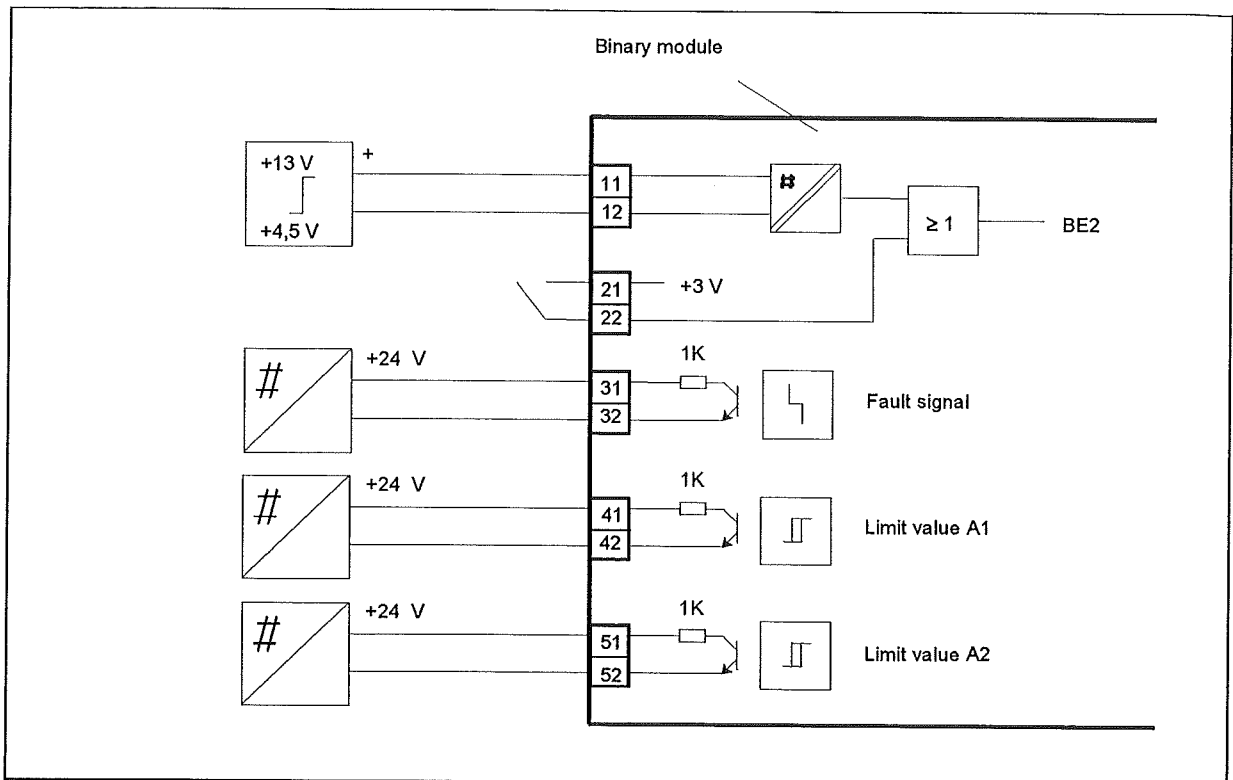


Figure 14 Binary module not for explosive regions

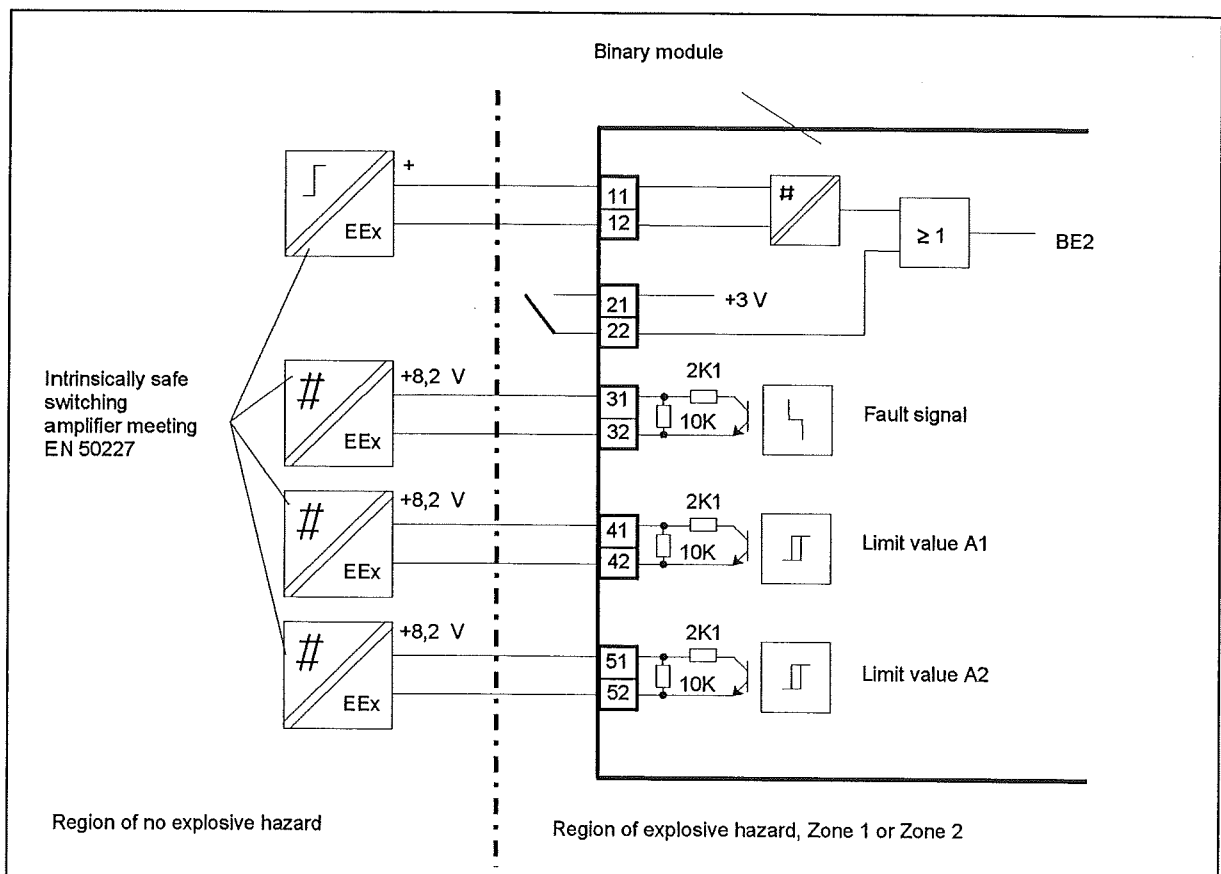


Figure 15 Binary module for explosive regions

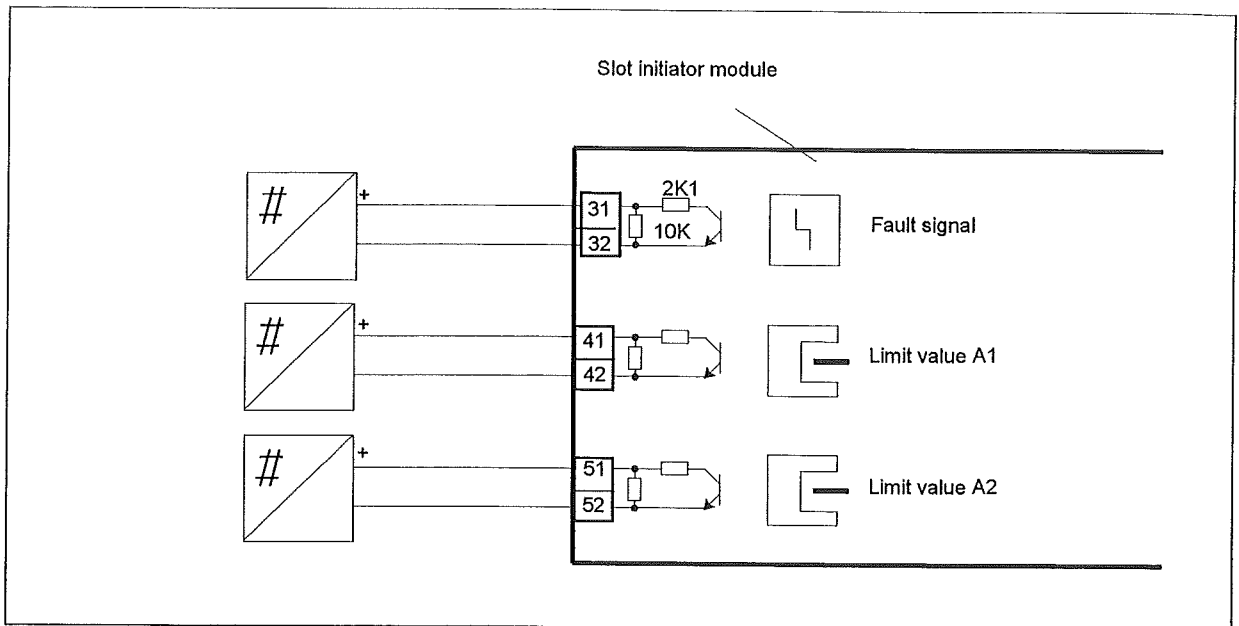


Figure 16 Slot initiator module not for explosive regions

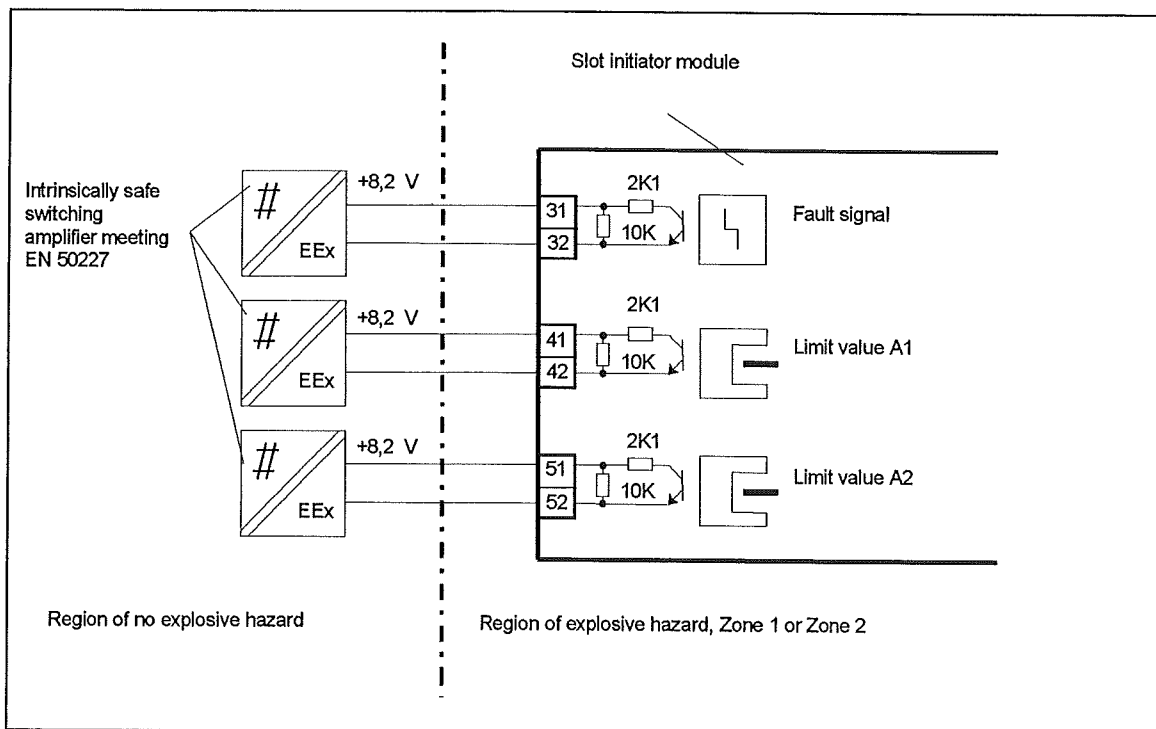


Figure 17 Slot initiator module for explosive regions

6 Pneumatic Connections



WARNING

For reasons of safety, the auxiliary pneumatic energy should only be connected after assembly when, in the presence of an electrical signal, the positioner is switched to the P-manual operating level (delivery status, see leaflet "Concise operating notes").



NOTE

Ensure correct air-quality! Oil-free, instrument quality air with no water or dust, solid material content max. 1 mg/m^3 (standard atmospheric conditions), max. particle size $1 \mu\text{m}$, oil content max. 0.1 mg/m^3 (standard atmospheric conditions), pressurised dew point 20 K below the lowest ambient temperature.

When working on the compressed air system ensure that any contamination present such as water, oil, swarf, soldering material residues etc. are expelled by blowing out.

The pneumatic connections (G1/4) are located on the right-hand side of the positioner (Figure 18).

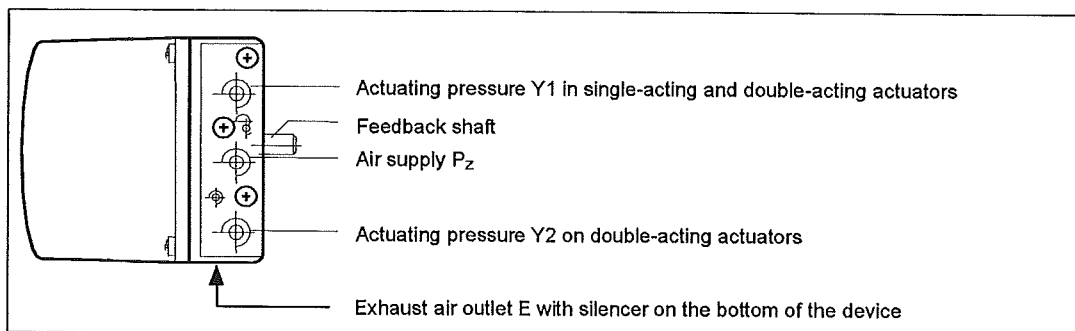


Bild 18 Pneumatic connections

In addition, the rear of the positioner has pneumatic connections for integrated fitting of single-acting linear actuators:

- actuating pressure Y1
- exhaust air outlet E

Except in cases of integrated ARCA fitting, these connections are closed by screws.

The exhaust air outlet E can be used to supply the sensing area and the spring chamber with dry, instrumentation-quality air to prevent corrosion.

Procedure

- If appropriate, connect manometer block for air supply and actuating pressure.
- Connection via internal thread G 1/4 DIN 45141:

P _Z	Air supply 1.4 to 7 bar
Y1	Actuating pressure 1 for single-acting and double-acting actuators
Y2	Actuating pressure 2 for double-acting actuators
E	Exhaust air output (remove silencer if necessary)
- Safety position at failure of auxiliary electrical power:

Single-acting:	Y1	Vents
Double-acting:	Y1	Max. actuating pressure (supply pressure)
	Y2	Vents
- Connect actuating pressure Y1 or Y2 (only on double-acting actuators) according to the desired safety position.
- Connect air supply to P_Z.

NOTE

So that spring-loaded pneumatic actuators can reliably exploit the maximum possible travel, it is necessary that the supply pressure exceeds the maximum required final pressure of the actuator by a sufficient margin.

6.1 Purging Air Switch

The purging air switch is accessible when the housing is open above the pneumatic connection strip on the valve block (Figure 2-4). In the IN position the interior of the housing is flushed by very small quantities of clean, dry instrumentation-quality air. In the OUT position, the purging air is fed directly outside.

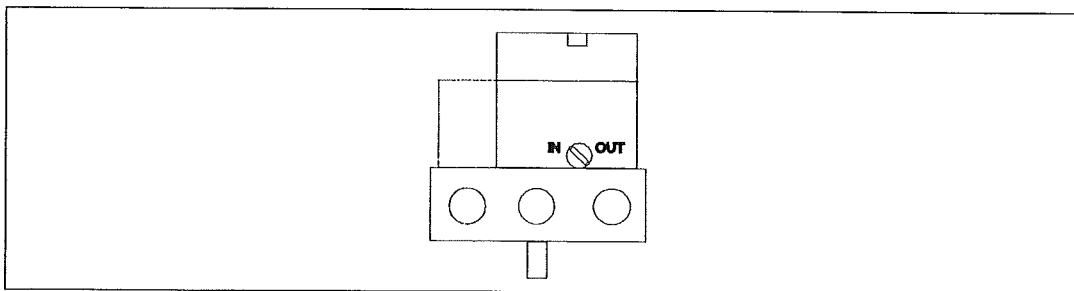


Figure 19 Purging air switch on the valve block, view of the positioner's pneumatic connections with open cover

6.2 Restrictors

In order to achieve floating times of > 1.5 s on small actuators, it is possible to reduce the air power by means of the restrictors Y1 and Y2 (Figure 2-5). By turning to the right, the air power is reduced until it is completely blocked. In order to adjust the restrictors, it is recommended that they are closed and then slowly opened (see initialisation RUN3).

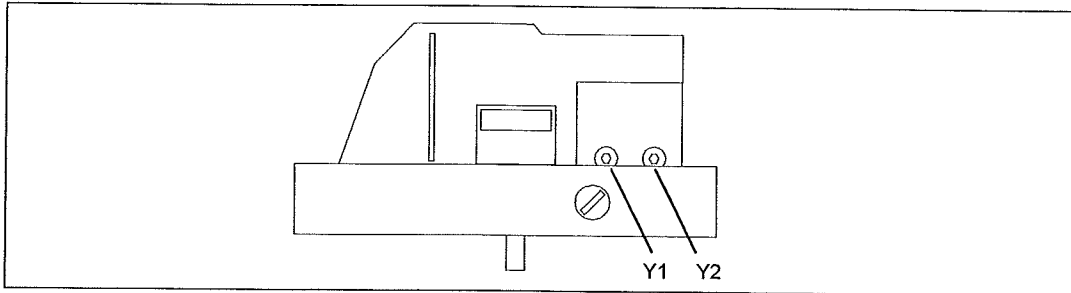


Bild 20 Restrictors

7 Commissioning

(see leaflet "Concise operating notes")

Because of the many ways in which it can be used, the positioner must be individually adjusted to the particular actuator (initialised) following assembly. This initialisation can be done in three different ways:

- **Automatic initialisation**

The initialisation takes place automatically. In this case, the positioner determines, one after another, the effective working direction, the travel distance or rotation angle and the actuator's adjustment times and adjusts the control parameters to match the dynamic behaviour of the actuator.

- **Manual initialisation**

The travel distance or rotation angle of the actuator can be set manually. The other parameters are automatically determined, just as in the case of automatic initialisation. This function is useful on actuators with soft end stops.



- **Copying Initialisation Data (Positioner Exchange)**

In devices with HART functionality, the initialisation data of one positioner can be read and copied into another positioner. This allows a faulty device to be exchanged, without having to interrupt a running process in order to carry out initialisation.

You only have to provide a few parameters to the positioner before initialisation. The others are pre-set in such a way that, under normal conditions, they do not have to be adjusted. If you observe the following points, you should have no problems with commissioning.

NOTE



You gain access to the previous parameter by pressing the  and  buttons at the same time.

7.1 Preparations for Linear Actuators

1. Assemble the positioner with the appropriate mounting kit (see section 3).

Stroke	Lever	Position of the transmission ratio selector
5 to 20 mm	short	33° (i.e. down)
25 to 35 mm	short	90° (i.e. up)
40 to 130 mm	long	90° (i.e. up)

2. Connect a suitable source of current or voltage.
3. Connect the actuator and the positioner to the pneumatic lines, and activate the positioner's auxiliary pneumatic power.
4. The positioner is now in the "**P-manual**" operating mode. The top line of the display now shows the current potentiometer voltage (P) in percent, e.g.: "**P37.5**", while "**NOINI**" flashes on the bottom line:



5. Check that the mechanics can move freely over the entire active range by moving the actuator with the \triangle and ∇ buttons as far as the end positions. The value P 5.0 may not be fallen below and P95.0 may not be exceeded. The difference of the two values must be greater than 25.0.

NOTE




You can move the actuator rapidly by pressing the button for the opposite direction as well while continuing to hold down the first direction button.

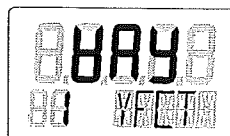
6. Now move the actuator so that the lever is horizontal. The display should show a value between **P48.0** and **P52.0**. If this is not the case, make appropriate adjustments to the slip clutch. The closer you can get to the "**P50.0**" value, the more accurately the positioner can determine the travel.


7.1.1 Automatic Initialisation of Linear Actuators

When you can move the actuator correctly, leave it in a central position and start the automatic initialisation:

1. Hold the operating mode button  pressed for longer than 5 s. This will bring you to the configuration mode.

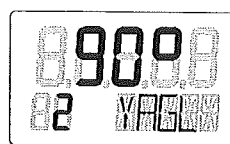
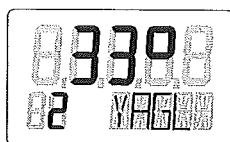
Display:



2. Switch to the second parameter by pressing the operating mode switch  briefly.

Display:


or

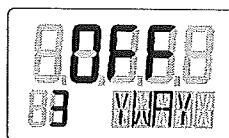


NOTE




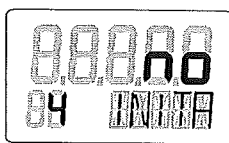
It is essential that this value matches the setting of the transmission ratio selector (33° or 90°).


3. Use the operating mode switch  to move on to the following display:



You only have to set this parameter if you want to have the total stroke determined displayed in mm at the end of the initialisation phase. To do this, you select the value in the display at which you have set the driver pin on the scale at the lever.

4. Use the operating mode switch  to move on to the following display:



5. Start the initialisation by pressing the  button for longer than 5 s.

Display:



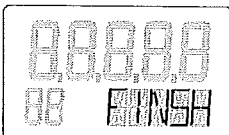
"RUN1" to "RUN5" appear in sequence in the lower display during the initialisation process.


NOTE

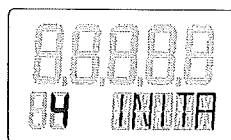



Depending on the actuator, the initialisation process can take up to 15 minutes.

The initialisation is completed when the following display appears:



The following display appears after briefly pressing the operating mode switch :



To leave the **Configuration** mode, press the operating mode switch  for longer than 5 s. The software status will be displayed after about 5 s. When the operating mode switch is released, the device will be in manual operation mode.


If you want to set other parameters use for this purpose the leaflet "Consize operating notes" or the device manual.

You can start at any time a subsequent initialisation from the manual or automatic operation.

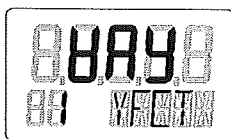
7.1.2 Manual Initialisation of Linear Actuators


With this function the positioner can be initialised without having to move the actuator hard against the end stops. The start and end positions of the travel are set manually. When you can move the actuator correctly, leave it in a central position and start the manual initialisation: The other initialisation steps (optimisation and control parameters) are carried out in the same way as under automatic initialisation.

Sequence of the manual initialisation of linear actuators

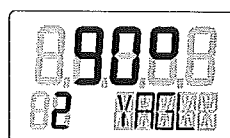
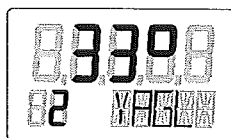
1. Hold the operating mode button  pressed for longer than 5 s. This will bring you to the configuration mode.

Display:



2. Switch to the second parameter by pressing the operating mode switch  briefly.
Display:


or

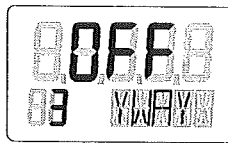


NOTE




It is essential that this value matches the setting of the transmission ratio selector (33° or 90°).


3. Use the operating mode switch  to move on to the following display:

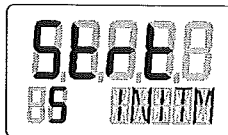


You only have to set this parameter if you want to have the total stroke determined displayed in mm at the end of the initialisation phase. To do this, you select the value in the display at which you have set the driver pin on the scale at the lever.

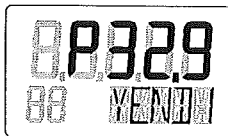
4. Press the operating mode switch  twice to move on to the following display:






5. Start the initialisation by pressing the  button for longer than 5 s.
Display:



6. After 5 s the display changes to:





(The potentiometer settings shown here and below are only illustrative examples.)

Now use the  and  buttons to move the actuator to the position that you wish to define as the first of the two end positions. Then press the operating mode switch . This will register the current position as end position 1, and will move on to the next step.

NOTE



If the message "RANGE" appears on the lower line, the selected end position is outside the permitted measurement range. There are a number of ways to correct this error:

- adjust the slip clutch until "OK" appears, then press the operating mode switch again, or
- use the  and  buttons to move to a different end position, or
- interrupt the initialisation by pressing the operating mode switch. You must then change to P-manual operation and correct the travel and the displacement accession in accordance with Step 1.

7. When Step 7 has been successfully completed, the following display appears:



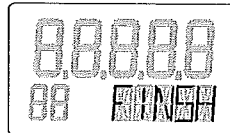
Now use the \triangle and ∇ buttons to move the actuator to the position that you wish to define as the second end position. Then press the operating mode switch \square . This will cause the current position to be registered as end position 2.

NOTE



If the message "Set Middl" appears, the lever arm must be moved to a horizontal position with the aid of the \triangle and ∇ buttons, and the operating mode switch then pressed. This will set the reference point for the sine correction on linear actuators.

8. The rest of the initialisation will now proceed automatically. "RUN1" to "RUN5" will appear in sequence on the lower line of the display. The following display appears when the initialisation has been completed successfully:



The first line also contains the stroke that has been determined, in mm, if the lever length has been given with the 3.YWAY parameter.

After briefly pressing the operating mode switch \square the lower line will again show 5.INITM. You are then once more in the Configuration operating mode.

You can now lock the slip clutch if appropriate (see para. 3.1.2).

To leave the Configuration mode, press the operating mode switch \square for longer than 5 seconds. The software status will be displayed after about 5 seconds. When the operating mode switch is released, the device will be in manual operation mode.

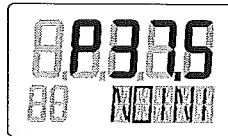
7.2 Preparations for Rotary Actuators



NOTE

Very important: In the positioner, place the transmission ratio selector in the 90° position (the usual adjustment angle for rotary actuators).

1. Assemble the positioner with the appropriate mounting kit.
2. Connect a suitable source of current or voltage.
3. Connect the actuator and the positioner to the pneumatic lines, and activate the positioner's auxiliary pneumatic power.
4. The positioner is now in the "P-manual" operating mode. The top line of the display now shows the current potentiometer voltage (P) in percent, e.g.: "P37.5", while "NOINI" flashes on the bottom line:



5. Check that the mechanics can move freely over the entire active range by moving the actuator with the \triangle and ∇ buttons as far as the end positions. The value P 5.0 may not be fallen below and P95.0 may not be exceeded. The difference of the two values must be greater than 25.0.




NOTE

You can move the actuator rapidly by pressing the button for the opposite direction as well while continuing to hold down the first direction button.

7.2.1 Automatic Initialisation of Rotary Actuators

When you can move the actuator correctly through its range, leave it in a central position and start the automatic initialisation:


1. Hold the operating mode button  pressed for longer than 5 s. This will bring you to the configuration mode.

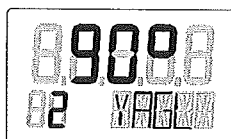
Display:




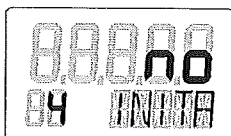
2. Use the ∇ button to set the parameter to "turn".
Display:




3. Switch to the second parameter by pressing the operating mode switch  briefly. This has automatically been set to 90°. Display:



4. Use the operating mode switch  to move on to the following display:



5. Start the initialisation by pressing the  button for longer than 5 s. Display:



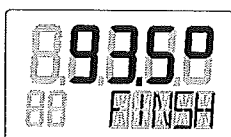
"RUN1" to "RUN5" appear in sequence in the lower display during the initialisation process.

NOTE




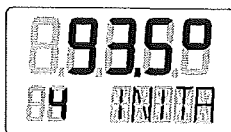
Depending on the actuator, the initialisation process can take up to 15 minutes.


The initialisation is completed when the following display appears:



The upper value gives the actuator's full turning angle (e.g. 93.5°).

The following display appears after briefly pressing the operating mode switch :



To leave the **Configuration** mode, press the operating mode switch  for longer than 5 s. The software status will be displayed after about 5 s. When the operating mode switch is released, the device will be in manual operation mode.


You can now lock the slip clutch if appropriate (see para. 3.1.2).

If you want to set other parameters use for this purpose the leaflet "Concise operating notes" or the device manual.

You can start at any time a subsequent initialisation from the manual or automatic operation.


7.2.2 Manual Initialisation of Rotary Actuators

With this function the positioner can be initialised without having to move the actuator hard against the end stops. The start and end positions of the travel are set manually. When you can move the actuator correctly, leave it in a central position and start the manual initialisation: The other initialisation steps (optimisation and control parameters) are carried out in the same way as under automatic initialisation.

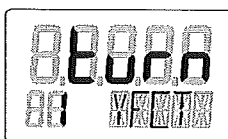
1. Hold the operating mode button  pressed for longer than 5 s. This will bring you to the configuration mode.


Display:



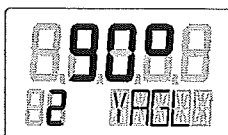
2. Use the  button to set the YFCT parameter to "turn".

Display:



3. Switch to the second parameter by pressing the operating mode switch  briefly.


Display:

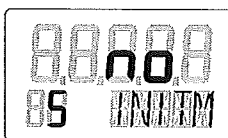


NOTE




Ensure that the transmission ratio selector is in the 90° position!

4. Press the operating mode switch  twice to move on to the following display:




The following steps are identical with step 5 for automatic initialisation of linear and rotary actuators.

Following successful initialisation, the pivoting range that has been determined is shown on the upper display in degrees.

After briefly pressing the operating mode switch  the lower line will again show 5.INITM. You are then once more in the Configuration operating mode.

You can now lock the slip clutch if appropriate (see para. 3.1.2).

To leave the Configuration mode, press the operating mode switch  for longer than 5 seconds. The software status will be displayed after about 5 seconds. When the operating mode switch is released, the device will be in manual operation mode.

7.3 Copying Initialisation Data (Positioner Exchange)

This function provides you with a facility for commissioning a positioner without having to carry out the initialisation routine. It allows, for instance, a positioner to be exchanged on operating plant where the automatic or manual initialisation could not be carried out without interrupting the process.



ATTENTION

Initialisation (automatic or manual) should nevertheless be carried out as soon as possible, as that is the only way that the positioner can be optimally adjusted to match the mechanical and dynamic properties of the actuator.

The HART communication interface is used to transfer the data from the positioner needing replacement over to the substitute device.

The following steps are required to exchange a positioner:

1. The device parameters and initialisation data (determined at initialisation time) of the device needing replacement are read in and saved using SIMATIC PDM or HART Communicator. This step is not required if the device has been parameterised with SIMATIC PDM and the data already stored.
2. Fix the positioner in its current position (mechanically or pneumatically).
3. Read and note the current position value from the display of the positioner that is being replaced. If the electronics are faulty, find the current position by measurement at the actuator or valve.
4. Dismount the positioner. Fit the lever arm of the positioner to the replacement device. Mount the replacement device to the fittings. Put the transmission ratio selector in the same position as on the faulty device. Download the device data and initialisation data from the SIMATIC PDM or the handheld device.
5. If the actual value displayed does not accord with the value noted from the faulty positioner, set the correct value with the slip clutch.
6. The positioner is now ready for operation.

The accuracy and the dynamic behaviour may not be as good as they would be following a proper initialisation. In particular the position of the hard end stops and the associated servicing data may be inaccurate. An initialisation must therefore be carried out at the next opportunity.

7.4 Maintenance and fault removal

7.4.1 Maintenance

The positioner requires almost no maintenance. Filters are fitted to the pneumatic connections to protect the positioner against large particles of dirt. Dirt present in the input air can collect on the filter and then adversely affect the operation of the positioner (increased travel time). In such a case, the filters can be cleaned as follows:

Positioner in metal housing

1. Switch off the auxiliary pneumatic energy and disconnect the hose lines.
2. Carefully remove the metal filters from the holes and clean them (e.g. with compressed air).
3. Insert the filters.
4. Connect the hose lines again and turn on the auxiliary pneumatic power.

Positioner in plastic housing

Dismantling

1. Switch off the auxiliary pneumatic energy and disconnect the hose lines.
2. Unscrew the cover.
3. Remove the three screws from the pneumatic connection strip.
4. Remove the filters and O-rings from behind the connection strip.
5. Clean the filters (e.g. with compressed air).

Fitting

6. First place the filters in the recesses of the plastic housing, and then place the O-rings on top of the filters.
7. Align the pneumatic connection strip flush on the two spigots, and screw it down with the three self-tapping screws. Ensure that the existing thread tap is used again. Do this by turning the screws anti-clockwise until they can be felt to engage in the start of the thread. Only then should the screws be tightened.
8. Put on the cover and screw it down.
9. Connect the hose lines again and turn on the auxiliary pneumatic power.



DANGER

In potentially explosive environments it is essential to avoid electrostatic discharges. These could be caused, for instance, by cleaning of the positioner with a dry cloth.

7.4.2 Fault removal

Diagnostic guide

	see Table			
In which operating mode does the fault appear?				
• Initialisation	1			
• Manual operation and automatic operation	2	3	4	5
In what environment and under what boundary conditions does the fault appear?				
• Wet environment (e.g. severe rain or constant condensation)	2			
• Vibrating (oscillating) fittings	2	5		
• Impact or shock loading (e.g. "steam hammer" or breakaway flaps)	5			
• Damp (wet) compressed air	2			
• Dirty compressed air (contaminated with solid particles)	2	3		
When does the fault appear?				
• Regularly (reproducible)	1	2	3	4
• Sporadically (not reproducible)	5			
• Mostly after a certain length of time of operation	2	3	5	

Table 1

Fault symptoms	Possible cause(s)	Remedial measures
Positioner remains in "RUN 1" mode.	<ul style="list-style-type: none"> Initialisation from end position started <u>and</u> Failure to wait for reaction time of max. 1 min. Mains pressure not connected or too low. 	<ul style="list-style-type: none"> Up to 1 min waiting time is required Do not start initialisation from end position Check mains pressure
Positioner remains in "RUN 2" mode.	<ul style="list-style-type: none"> Transmission ratio selector and Parameter 2 (YAGL) and also actual stroke are not in agreement. Stroke on lever incorrectly adjusted. Piezo valve(s) are not switching (see Table 2). 	<ul style="list-style-type: none"> Check settings: Check stroke on lever. See Table 2.
Positioner remains in "RUN 3" mode.	<ul style="list-style-type: none"> Actuator travel time too long 	<ul style="list-style-type: none"> Open restrictor completely and/or set PZ pressure to highest permissible value. If necessary use booster.
Positioner remains in "RUN 5" mode, does not get to "FINISH" (waiting time > 5 min).	<ul style="list-style-type: none"> "Slack" (play) in the positioner – actuator – fitting 	<ul style="list-style-type: none"> Rotary actuator: Check that grub screw on the coupling wheel is tight. Linear actuator: Check that lever on the positioner shaft is tight. Remove any other play between actuator and fitting.

Table 2

Fault symptoms	Possible cause(s)	Remedial measures
<ul style="list-style-type: none"> • "CPU test" flashes in the display (approx. every 2 sec). • Piezo valve(s) are not switching. 	<ul style="list-style-type: none"> • Water in the valve block (caused by wet compressed air) 	<ul style="list-style-type: none"> • In its early stages the fault can be removed by subsequent operation with dry air (if necessary in the dryer at 50 to 70°C) • Otherwise repair.
<ul style="list-style-type: none"> • Actuator will not move at all or only in one direction in both manual and automatic operating modes. 	<ul style="list-style-type: none"> • Dampness in the valve block 	
<ul style="list-style-type: none"> • Piezo valve(s) are not switching (also no soft "clicking" audible) if + or – key depressed in manual operating mode). 	<ul style="list-style-type: none"> • Screw between cover and valve block not screwed tight or cover jammed. 	<ul style="list-style-type: none"> • Tighten screw, if necessary remove cause of jam.
	<ul style="list-style-type: none"> • Dirt (chips, particles) in valve block 	<ul style="list-style-type: none"> • Repair or new unit
	<ul style="list-style-type: none"> • Deposits on contacts between electronics board and valve block; these can occur as a result of abrasion from long-term loading caused by severe vibration. 	<ul style="list-style-type: none"> • Clean all contact surfaces with spirit, if necessary bend valve block contact springs a little.

Table 3

Fault symptoms	Possible cause(s)	Remedial measures
<ul style="list-style-type: none"> • Actuator does not move 	<ul style="list-style-type: none"> • Compressed air < 1.4 bar 	<ul style="list-style-type: none"> • Set incoming air pressure to > 1.4 bar.
<ul style="list-style-type: none"> • Piezo valve(s) are not switching (however soft "clicking" audible) if + or – key depressed in manual operating mode). 	<ul style="list-style-type: none"> • Restrictor valve(s) closed (screw(s) at the right-hand stop) 	<ul style="list-style-type: none"> • Open restrictor screw(s) by turning to the left
	<ul style="list-style-type: none"> • Dirt in the valve block 	<ul style="list-style-type: none"> • Repair or new unit
<ul style="list-style-type: none"> • In steady-state automatic operating mode (constant setpoint) and in manual operating mode one piezo valve is constantly switching. 	<ul style="list-style-type: none"> • Pneumatic leakage in the positioner – actuator system. Begin leakage test in "RUN 3" (initialisation)!!! 	<ul style="list-style-type: none"> • Remove source of leakage in actuator and/or feed • In the case where actuator is intact and feed is fully sealed: Repair or new unit
	<ul style="list-style-type: none"> • Dirt in the valve block (see above) 	<ul style="list-style-type: none"> • Repair or new unit

Table 4

Fault symptoms	Possible cause(s)	Remedial measures
<ul style="list-style-type: none"> • In steady-state automatic operating mode (constant setpoint) and in manual operating mode both piezo valves are constantly switching alternately; actuator oscillates about a mean value. 	<ul style="list-style-type: none"> • Static friction in the stuffing box of fitting or actuator too large. 	<ul style="list-style-type: none"> • Reduce static friction or increase dead zone (parameter dEbA) until the oscillating movement stops.
	<ul style="list-style-type: none"> • Slack (play) in the positioner – actuator – fitting system 	<ul style="list-style-type: none"> • Rotary actuator: Check that grub screw on the coupling wheel is tight. • Linear actuator: Check that lever on the positioner shaft is tight. • Remove any other play between actuator and fitting.
	<ul style="list-style-type: none"> • Actuator too fast 	<ul style="list-style-type: none"> • Increase travel times by means of restrictor screws. • If fast travel time is necessary, increase dead zone (parameter dEbA) until the oscillating movement stops.
<ul style="list-style-type: none"> • Positioner does not drive fitting up to the stop (with a 100% input signal) 	<ul style="list-style-type: none"> • Supply pressure too low • Load voltage of the supply controller or system output is too low 	<ul style="list-style-type: none"> • Increase supply pressure • Interpose load transformer • Select 3/4-wire operation

Table 5

Fault symptoms	Possible cause(s)	Remedial measures
<ul style="list-style-type: none"> • Null point moves about sporadically (> 3 %). 	<ul style="list-style-type: none"> • As a result of impact or shock loading accelerations occur that are so high that the slip clutch is displaced (e.g. by "steam hammer" in steam pipework) 	<ul style="list-style-type: none"> • Remove causes of shock loading. • Re-initialise positioner. • Install strengthened slip clutch
<ul style="list-style-type: none"> • Equipment functionality completely fails: also no indication in the display 	<ul style="list-style-type: none"> • Electrical auxiliary power source inadequate (< 3,6 mA) 	<ul style="list-style-type: none"> • Check electrical auxiliary power source.
	<ul style="list-style-type: none"> • With very high long-term loading caused by vibration (oscillations): <ul style="list-style-type: none"> – Screws on the electrical connecting terminals can work loose. – Electrical connecting terminals and/or electronic components can be shaken loose. 	<ul style="list-style-type: none"> • Tighten screws and secure with sealant. • Repair • As a preventative measure mount positioner on rubber-metal mounts.

7.5 Parametrisation Table

Parameter name	Display	Function	Parameter value	Unit	Factory setting	Customer setting
1.YFCT	00 YFCT	Actuator type	turn (rotary actuator) WAY (linear actuator) LWAY (linear actuator without sine correction) ncSt (rotary actuator with NCS) -ncSt (ditto, inverted dir. of action)		WAY	
2.YAGL ¹⁾	02 YAGL	Nominal rotation angle of the feedback Set the transmission ratio selector (7) appropriately (see device view)	90° 33°	Degrees	33°	
2) 3.YWAY	03 YWAY	Stroke range (optional setting) If used, the value must correspond to the stroke range set at the actuator. The driver pin must be adjusted to the value of the actuator stroke or, if this is not on the scale, to the next largest scaled value.	OFF 5 10 15 20 (Short lever 33°) 25 30 35 (Short lever 90°) 40 50 60 70 90 110 130 (Long lever 90°)	mm	OFF	
4.INITA	04 INITA	Initialisation (automatic)	noIn no / ### Srt		no	
5.INITM	05 INITM	Initialisation (manual)	noIn no / ### Srt		no	
6.SCUR	06 SCUR	Setpoint current range	0 to 20 mA 4 to 20 mA		4 MA	
7.SDIR	07 SDIR	Setpoint direction	rising falling		rISE FALL	
8.SPRA	08 SPRA	Setpoint spk range start	0.0 to 100.0	%	0.0	
9.SPRE	09 SPRE	Setpoint spk range end	0.0 to 100.0	%	100.0	
10.TSUP	10 TSUP	Setpoint ramp OPEN	Auto 0 to 400	s	0	
11.TSDO	11 TSDO	Setpoint ramp CLOSED	0 to 400	s	0	
12.SFCT	12 SFCT	Setpoint function linear equal percentage 1:25, 1:33, 1:50 inverse equal percentage 25:1, 33:1, 50:1 freely adjustable	Lin 1- 25 1- 33 1- 50 n1- 25 n1- 33 n1- 50 FREE		Lin	
13.SL0 14.SL1 etc. to 32.SL19 33.SL20	03 SL00 (as an example)	Setpoint reference point at 0% 5% etc. to 95% 100%	0.0 to 100.0	%	0.0 5.0 etc. To 95.0 100.0	
34.DEBA	04 DEBA	Controller dead zone	Auto 0.1 to 10.0	%	Auto	
35.YA	05 YA	Manipulated variable limit start	0.0 to 100.0	%	0.0	
36.YE	06 YE	Manipulated variable limit end	0.0 to 100.0	%	100.0	
37.YNRM	07 YNRM	Manipulated variable magnitude normalisation to stroke to flow-through	MPOS FLOW		MPOS	
38.YDIR	08 YDIR	Manipulated variable direction for display	rising falling		rISE FALL	
39.YCLS	09 YCLS	Manipulated variable light closing without above only below only above and below	no uP do uP do		no	
40.YCDO	10 YCDO	Value for light closing downwards	0.0 to 100.0	%	0.5	
41.YCUP	11 YCUP	Value for light closing upwards	0.0 to 100.0	%	99.5	
42.BIN1 ⁴⁾	12 BIN1	Function of the BE 1 none message only block configuration block configuration and manual move valve to up position move valve to down position block movement	OFF on bLoc1 bLoc2 uP doWh StoP -on -uP -doWh -StoP		OFF	
43.BIN2 ⁴⁾	13 BIN2	Function of the BE 2 none message only move valve to up position move valve to down position block movement	OFF on uP doWh StoP -on -uP -doWh -StoP		OFF	
44.AFCT ⁵⁾	14 AFCT	Alarm function None A1=min., A2=max. A1=min., A2=min. A1=max., A2=max.	OFF normal inverted		OFF	
45.A1	15 A1	Trigger threshold alarm 1	0.0 to 100.0	%	10.0	
46.A2	16 A2	Trigger threshold alarm 2	0.0 to 100.0	%	90.0	
47.YFCT ⁵⁾	17 YFCT	Fault signal output function Fault Fault + not automatic Fault + not automatic + BE ("4" signifies logical Oring)	normal inverted			
48.YTIM	18 YTIM	Monitoring time for setting the "control deviation" fault message	Auto 0 to 100	s	Auto	
49.YLIM	19 YLIM	Trigger threshold fault signal "Control deviation"	Auto 0.0 to 100.0	%	Auto	
50.YSTRK	20 YSTRK	Limit value for displacement integral	OFF 1 to 1.00E9		OFF	
51.YDCHG	21 YDCHG	Limit value for change of direction	OFF 1 to 1.00E9		OFF	
52.YZERO	22 YZERO	Limit value for stop monitoring below	OFF 0.0 to 100.0	%	OFF	
53.YOPEN	23 YOPEN	Limit value for stop monitoring above	OFF 0.0 to 100.0	%	OFF	
54.YDEBA	24 YDEBA	Limit value for dead zone monitoring	OFF 0.0 to 10.0	%	OFF	
55.PRST	25 PRST	Preset (factory setting) "no" not activated "Srt" start of the factories settings After the button has been pressed for 5 s: "oCAY" ATTENTION: Preset has the effect of "NO INI"	no Srt oCAY			

1) If "turn" is selected, 33° can not be set

2) Parameter does not appear if 1.YFCT = turn is selected

3) Reference points only appear with the following selection: 12.SFCT = Free

4) NC contact means: the action when the switch is closed or the level is low

NO contact means: the action when the switch is closed or the level is high

5) normal means: high level with no fault

inverted means: low level with no fault

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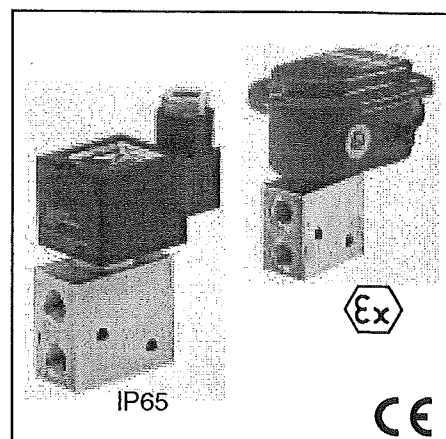
FEATURES

- Solenoid valves satisfy all relevant EC directives
- The solenoid valves are recommended for pilot applications with high flow, wide pressure ranges and no minimum operating pressure
- Spade plug connector version (standard coil or low power) or with the increased safety/epoxy encapsulation operator, intended for use in potentially explosive atmospheres, according to Directive ATEX 94/9/EC. European Standards EN50014, EN50019 and EN50028

GENERAL

Differential pressure 0 - 10 bar [1 bar = 100kPa]
Maximum viscosity 65 cSt (mm²/s)
Response times 75 - 100 ms

fluids (*)	temperature ranges (TS)	sealings (*)
air, inert gas, water, oil	-20°C to +80°C	NBR (nitrile / buna-n)
air, inert gas, water, oil	-20°C to +120°C	FPM (fluorelastomer / viton)
air, inert gas	-40°C to +40°C	VMQ (silicone)



MATERIALS IN CONTACT WITH FLUID

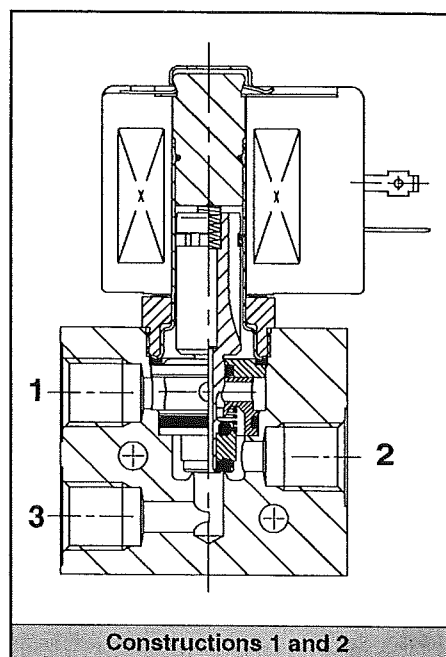
(*) Ensure that the compatibility of the fluids in contact with the materials is verified

Body Brass or stainless steel (AISI 316 SS)
Stem, core tube, springs Stainless steel
Core and plugnut Stainless steel
Sealings & poppets NBR, VMQ or FPM
Riderring PTFE (teflon)

ELECTRICAL CHARACTERISTICS

Coil insulation class F
Coil connector IP65 execution EEx em execution
Connector Spades Screw terminals
Connector specification Spade plug (Pg 11P)
Electrical safety ISO 4400
Standard voltages (U±10%) IEC 335 EEx II 2 G, CENELEC
(Other voltages and 60 Hz on request) DC (=) : 24V
AC (~) CMXX-FT / SMXX-FT: 24V-115V-230V/50Hz
CM12-F / SM12-F: 24V-115V (max.)/50Hz

coil type	power ratings					ambient temperature ranges (TS) (°C)	protection
	inrush	holding		hot/cold			
	~	~		=			
(C)	(VA)	(VA)	(W)	(W)			
Connector IP65 execution							
CMXX-FT	1	10	10	10	9 / 11,2	-40 to +55	moulded IP65
CM12-F (1)	2	3,7	3,7	3,7	3,5 / 3,6	-40 to +55	moulded IP65
EEx em execution							
SMXX-FT	3	10	10	10	9 / 11,2	-40 to +40	EEx em II T3
SM12-F (1)	4	3,7	3,7	3,7	3,5 / 3,6	-40 to +40/55	EEx em II T6/T5



SPECIFICATIONS

pipe size	orifice size	flow coefficient Kv port				operating pressure differential (bar)				execu- tion	coil type	(C)	catalogue number	OPTIONAL				
		1→2 (m³/h)	2→3 (m³/h)	1→2 (l/min)	2→3 (l/min)	min.	maximum (PS)		FPM					EPDM	CR	PTFE		
							water (*)										air (*)	
							~	=									~	=
G	(mm)	(m³/h)	(m³/h)	(l/min)	(l/min)						~ =							
U - Universal, brass body, NBR sealings and poppets																		
1/4	5,7	0,43	0,49	7,17	8,17	0	10	10	10	10	IP65	CMXX-FT	1	SC G327A001	V			
												CM12-F	2	SC G327A101	V			
												SMXX-FT	3	EM G327A001	V			
												SM12-F	4	EM G327A101	V			
U - Universal, stainless steel body, FPM sealings and poppets																		
1/4	5,7	0,43	0,49	7,17	8,17	0	10	10	10	10	IP65	CMXX-FT	1	SC G327A002				
												CM12-F	2	SC G327A102				
												SMXX-FT	3	WSEM G327A002				
												SM12-F	4	WSEM G327A102				
U - Universal, brass body, VMQ sealings and poppets (low temperature)																		
1/4	5,7	0,43	0,49	7,17	8,17	0	10	10	10	10	IP65	CMXX-FT	1	SC G327A011				
												CM12-F	2	SC G327A111				
												SMXX-FT	3	EM G327A011				
												SM12-F	4	EM G327A111				
U - Universal, stainless steel body, VMQ sealings and poppets (low temperature)																		
1/4	5,7	0,43	0,49	7,17	8,17	0	10	10	10	10	IP65	CMXX-FT	1	SC G327A012				
												CM12-F	2	SC G327A112				
												SMXX-FT	3	WSEM G327A012				
												SM12-F	4	WSEM G327A112				

(C) Construction type (1) Reduced power coil

The codes in the grey shaded areas correspond to commonly used products which can be supplied rapidly

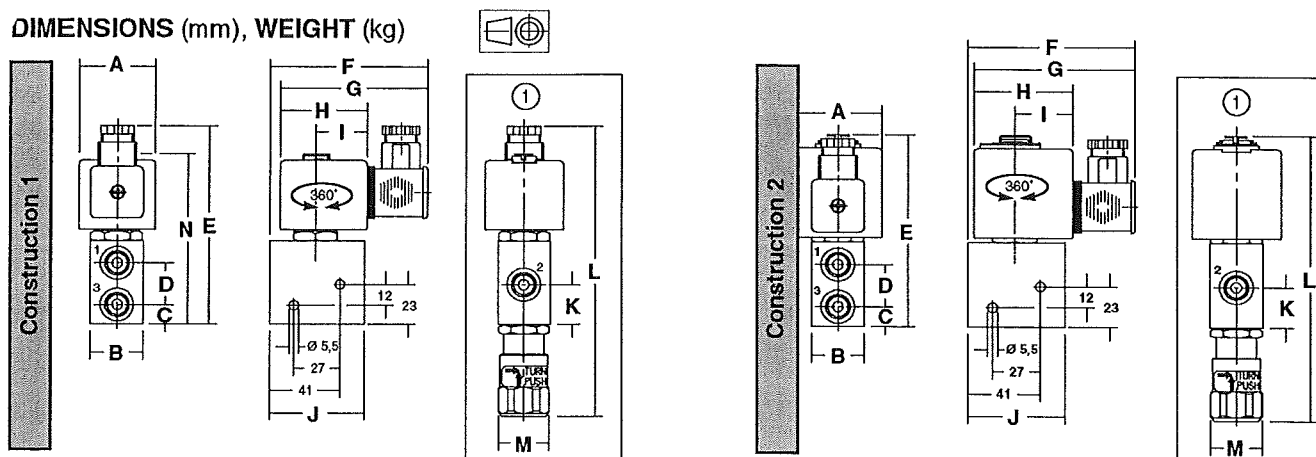
OPTIONS

- Waterproof enclosure with embedded screw terminal coil and Pg 13,5 cable gland to meet CEE 10 (IP67)
- Explosionproof enclosures for hazardous locations according to "CENELEC" and national standards (see section 10)
- EEx em execution: cable gland, conduit hub, stainless steel nameplate, other rectification mode (see V1047 Section 10)
- Explosionproof and watertight enclosures according to "NEMA" standards (see section 10)
- Compliance with "UL" standards
- Plug with visual indication and with peak voltage suppression or with cable length of 2m (see section 11)
- Manual operator (suffix MS)

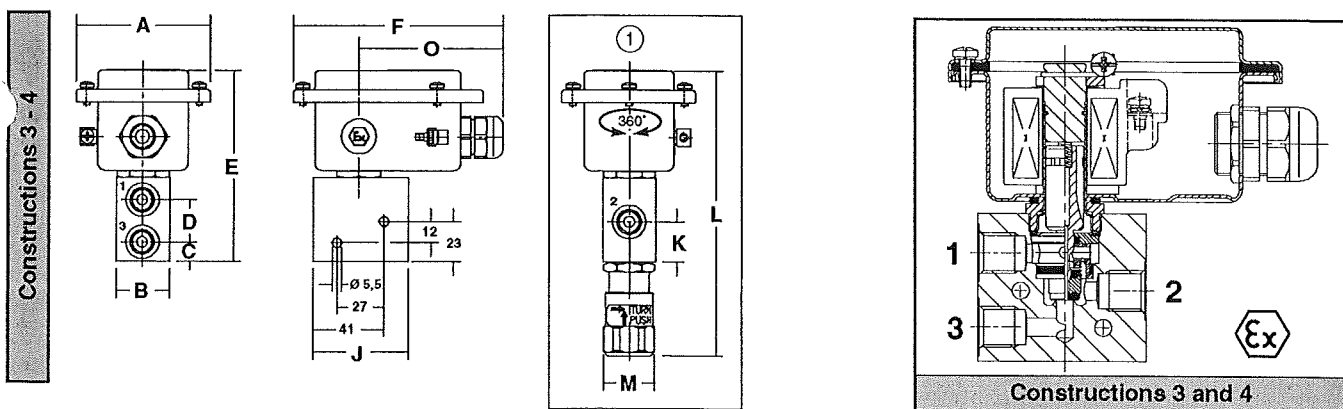
INSTALLATION

- The solenoid valves can be mounted in any position without affecting operation
- Mounting holes are provided in the valve body
- EEx em execution: solenoid enclosure has a cable gland with integral strain relief for cables with an o.d. from 6 to 12 mm and is provided with an internal and external connection facility for an earthing or bonding conductor
- Threaded pipe connection is standard: G = G (ISO 228/1)
- The third/fifth digit in the catalogue number indicates the standard pipe connection
- Other pipe threads are available on request
- Installation/maintenance instructions are included with each valve
- Spare Parts Kit and replacement coils are available (see section 11)

DIMENSIONS (mm), WEIGHT (kg)



① Screw type manual operator (suffix MS) optional



catalogue number	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	(C)	weight
SC G327A001, 011 SC G327A002, 012	45	30	11	24	114	91	80	50	30	55	23	167	29	90	-	1	0,95 (1)
SC G327A101, 111 SC G327A102, 112	50	30	11	24	109	95	87	56	33	55	23	162	29	-	-	2	1,05 (1)
EM G327A001, 011 WSEM G327A002, 012	77	30	11	24	109	120	-	-	-	55	23	162	29	-	81	3	1,00 (2)
EM G327A101, 111 WSEM G327A102, 112	77	30	11	24	112	120	-	-	-	55	23	165	29	-	81	4	1,10 (2)

(C) Construction type

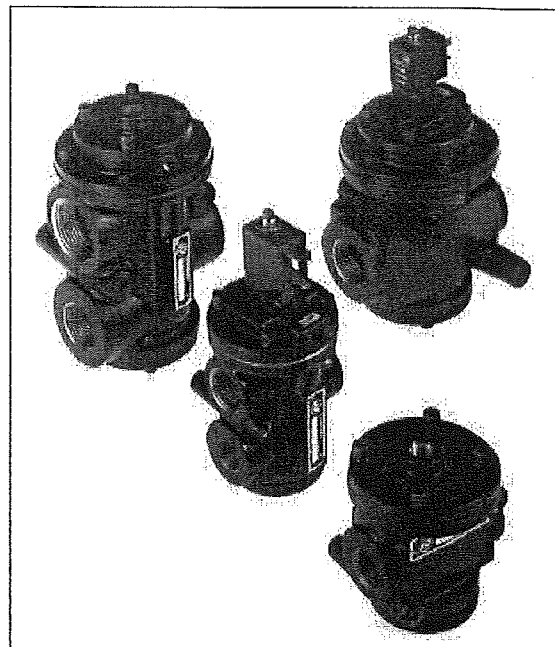
(1) Incl. coil and connector

(2) Incl. coil

All leaflets are available on: www.ascojoucomatic.com

In-line 2/2 and 3/2 Poppet Valves Solenoid and Pilot Actuated G^{3/8} to G2

- Exceptionally high flow
- High reliability
- Durable
- Reversible seals



Technical Data

Medium:

Filtered and lubricated compressed air.

Operation:

Poppet valve indirectly actuated.

Mounting:

Through-holes in valve body.

Port Size:

G^{3/8} to G2

Operating Pressure:

Maximum 20 bar. For details see overleaf.

Pilot Air Supply Pressure:

2-20 bar.

Flow Characteristics:

Cv up to 40

See table over for details.

Operating Temperature:

Solenoid pilot: -29°C to +54°C

Air pilot: -29°C to +79°C

*Consult our Technical Service for use below +2°C.

Materials:

Diecast aluminium alloy body and piston, aluminium or glass filled nylon end cover, nitrile rubber seals.

Options:

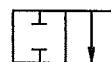
Vacuum service

Fluorocarbon seals

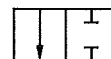
Ordering Information

To order standard poppet valves with coils, quote model number and voltage code from tables on page 5.4.291.02, eg. order DA024C-00-CE50110 for a 3-port, 2-position, normally closed, solenoid pilot operated spring return model with an internal pilot supply, fitted with a 110V/50Hz and manual locking override.

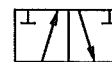
2/2 Normally Closed



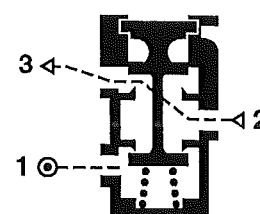
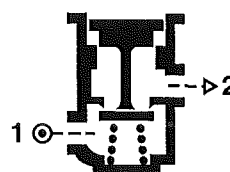
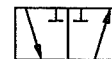
2/2 Normally Open



3/2 Normally Closed



3/2 Normally Open





General Information

2/2 and 3/2 Air Pilot Operated In-line Valves

Symbol	Basic Size	Port Size	Model	Type	Pilot Pressure (bar)	Operating Pressure (bar)	Cv Flow	Weight (kg)	Repair Kits
	G1/2	G3/8	AA013C-AA	NC	2-20	0-20	3,4	0,83	53474-03
		G1/2	AA014C-AA	NC	2-20	0-20	5,3	0,83	53474-03
		G3/4	AA015C-AA	NC	2-20	0-20	6,5	0,83	53474-03
	G1	G1	AA026C-AA	NC	2-20	0-20	13,5	1,82	53475-01
	G2	G2	AA039C-AA	NC	2-20	0-20	39,6	3,98	53822-01
	G1/2	G3/8	BA013C-AA	NO	2-20	0-20	3,8	0,83	53474-03
		G1/2	BA014C-AA	NO	2-20	0-20	5,4	0,83	53474-03
		G3/4	BA015C-AA	NO	2-20	0-20	6,3	0,83	53474-03
	G1	G1	BA026C-AA	NO	2-20	0-20	15,4	1,82	53475-01
	G2	G2	BA039C-AA	NO	2-20	0-20	39,6	3,98	53822-01
	G1/2	G3/8	DA023C-AA	NC	2-20	0-20	4,9	0,96	53474-03
		G1/2	DA024C-AA	NC	2-20	0-20	5,8	0,96	53474-03
		G3/4	DA025C-AA	NC	2-20	0-20	6,2	0,96	53474-03
	G1	G1	DA036C-AA	NC	2-20	0-20	14,6	1,86	53475-01
	G2	G2	DA039C-AA	NC	2-20	0-20	39,6	3,98	53822-01
	G1/2	G3/8	EA023C-AA	NO	2-20	0-20	4,6	0,96	53474-03
		G1/2	EA024C-AA	NO	2-20	0-20	5,5	0,96	53474-03
		G3/4	EA025C-AA	NO	2-20	0-20	5,8	0,96	53474-03
	G1	G1	EA036C-AA	NO	2-20	0-20	13,8	1,86	53475-01
	G2	G2	EA039C-AA	NO	2-20	0-20	39,6	3,98	53822-01

2/2 and 3/2 Solenoid Pilot Operated In-line Valves

Symbol	Basic Size	Port Size	Model	Type	Solenoid Pilot	Operating Pressure (bar)	Cv Flow	Weight (kg)	Repair Kit
	G1/2	G3/8	AA013C-00-CE*****	NC	Internal	2-10	3,4	0,98	53474-03
		G1/2	AA014C-00-CE*****	NC	Internal	2-10	5,3	0,98	53474-03
		G3/4	AA015C-00-CE*****	NC	Internal	2-10	6,5	0,98	53474-03
	G1	G1	AA026C-00-CE*****	NC	Internal	2-10	13,5	1,97	53475-01
	G2	G2	AA039C-00-CE*****	NC	Internal	2-10	39,6	4,13	53822-01
	G1/2	G3/8	BA013C-00-CE*****	NO	Internal	2-10	3,8	0,98	53474-03
		G1/2	BA014C-00-CE*****	NO	Internal	2-10	5,4	0,98	53474-03
		G3/4	BA015C-00-CE*****	NO	Internal	2-10	6,3	0,98	53474-03
	G1	G1	BA026C-00-CE*****	NO	Internal	2-10	15,4	1,97	53475-01
	G2	G2	BA039C-00-CE*****	NO	Internal	2-10	39,6	4,13	53822-01
	G1/2	G3/8	DA023C-00-CE*****	NC	Internal	2-10	4,9	1,11	53474-03
		G1/2	DA024C-00-CE*****	NC	Internal	2-10	5,8	1,11	53474-03
		G3/4	DA025C-00-CE*****	NC	Internal	2-10	6,2	1,11	53474-03
	G1	G1	DA036C-00-CE*****	NC	Internal	2-10	14,6	2,02	53475-01
	G2	G2	DA039C-00-CE*****	NC	Internal	2-10	39,6	4,13	53822-01
	G1/2	G3/8	EA023C-00-CE*****	NO	Internal	2-10	4,6	1,11	53474-03
		G1/2	EA024C-00-CE*****	NO	Internal	2-10	5,5	1,11	53474-03
		G3/4	EA025C-00-CE*****	NO	Internal	2-10	5,8	1,11	53474-03
	G1	G1	EA036C-00-CE*****	NO	Internal	2-10	13,8	2,02	53475-01
	G2	G2	EA039C-00-CE*****	NO	Internal	2-10	39,6	4,13	53822-01

***** Insert voltage code from table below.
 NC = normally open, NO = normally closed

Voltage Codes

Voltage	Code	Power Inrush/Hold
24V d.c.	00024	7,5W
110V a.c.	50110	12/8VA
220V a.c.	50220	12/8VA

Electrical Details for Solenoid Operators

Voltage Tolerance	+10/-15%
Rating	100% ED
Inlet Orifice	1,6mm
Electrical Connection	DIN 43650 Form B Industrial
Manual Override	Locking
Protection Class	IP65 (DIN 40050)

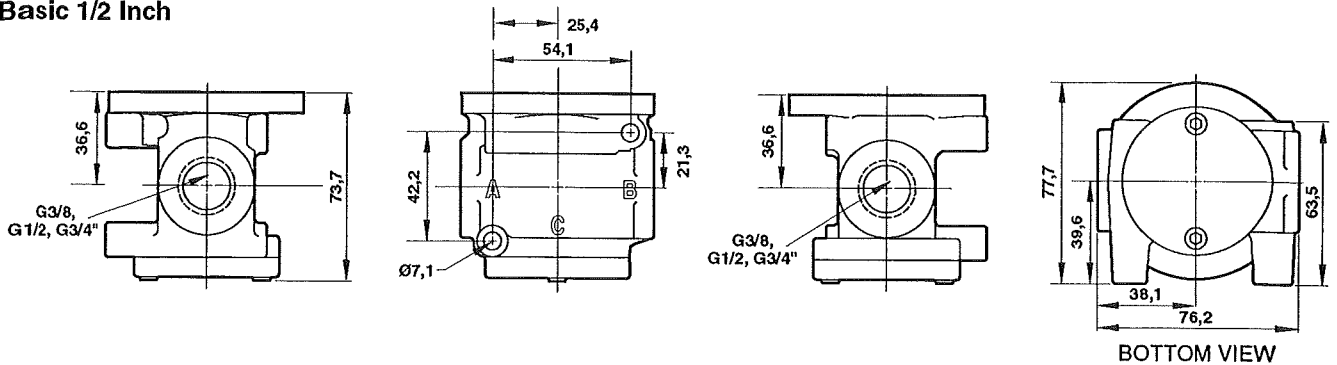
For details of connector plugs and light emitting gaskets see data sheet 7.7.001.



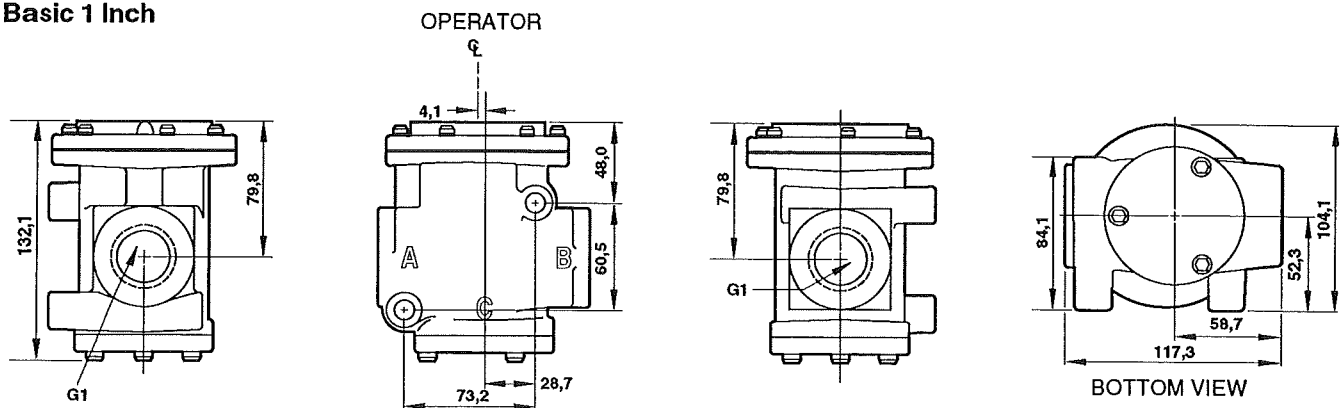
Dimensions

2/2 In-line

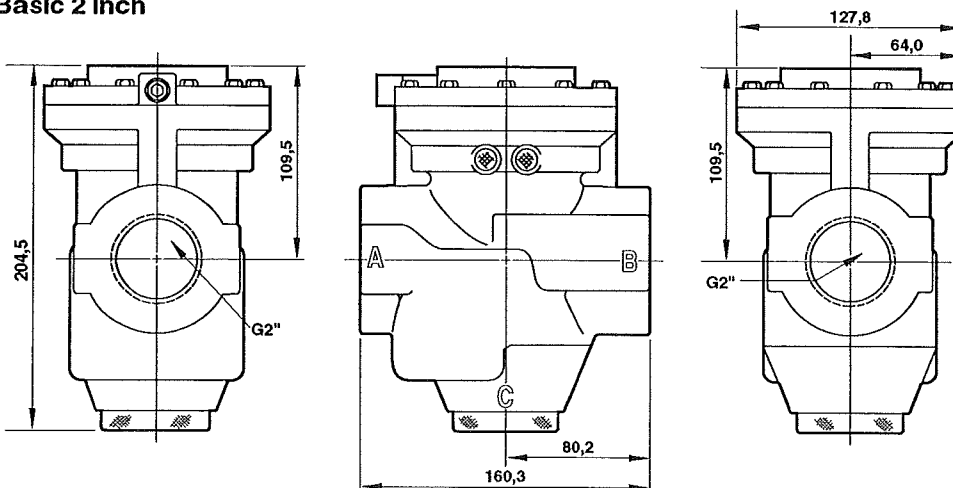
Basic 1/2 Inch



Basic 1 Inch



Basic 2 Inch



Warning

These products are intended for use in industrial compressed air systems only. Do not use these products where *pressures* and *temperatures* can exceed those listed under 'Technical Data'.

Before using these products with fluids other than those specified, for non-industrial applications, life-support systems, or other applications not within published specifications, consult NORGREN.

Through misuse, age, or malfunction, components used in fluid power systems can fail in various modes. The system designer is warned to consider the failure modes of all component parts used in fluid power systems and to provide adequate safeguards to prevent personal injury or damage to equipment in the event of such failure.

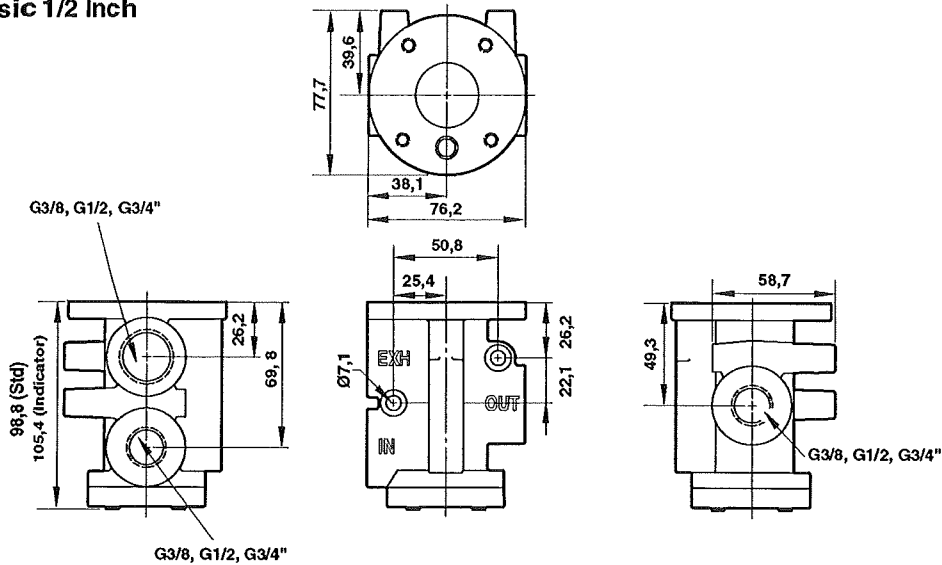
System designers must provide a warning to end users in the system instructional manual if protection against a failure mode cannot be adequately provided.

System designers and end users are cautioned to review specific warnings found in instruction sheets packed and shipped with these products.

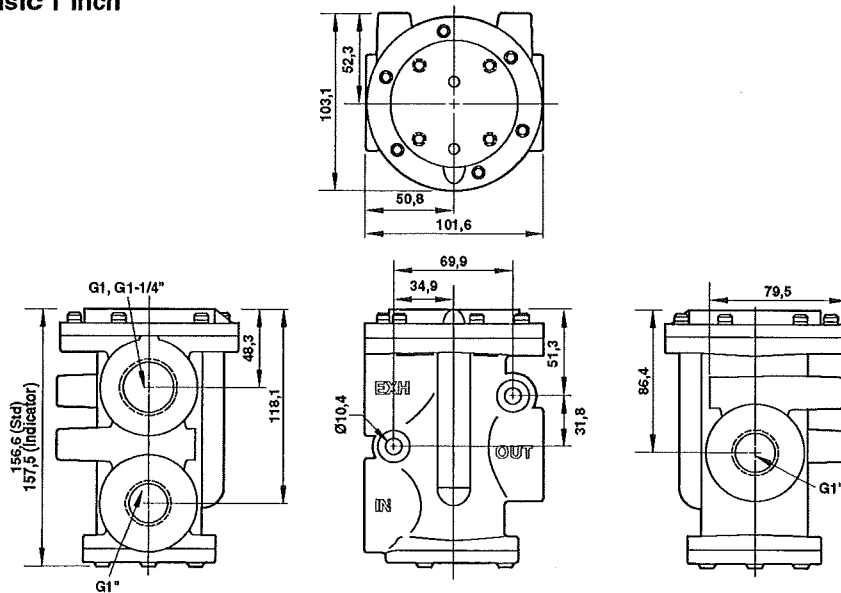


Dimensions 3/2 In-line

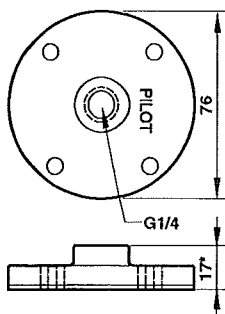
Basic 1/2 Inch



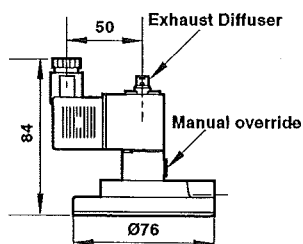
Basic 1 Inch



Air Operators Dimensions



Solenoid Operator Dimensions



* Gasket, 0,03 thick included in dimension.

Amplifier Relay

Type EVEX 1300-02F

with high exhausting capacity

Technical data:

Port size: G1/4"

Signal connection: G1/8"

Regulating flow: Kvs 2,3

Operating pressure: 0,5 - 9 bar

Operating temperature: -10°C* to +60°C

*In case of minus temperatures, please consider air condition.

Hysteresis: 0,3 bar

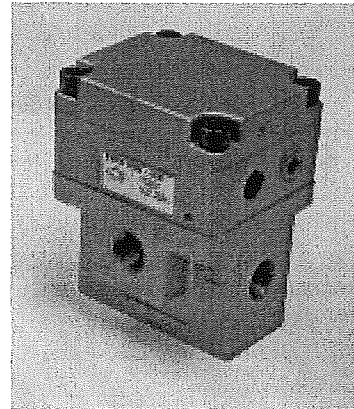
Repeatability: 0,1 bar

Sensitivity: 0,01 bar

Mounting: free

Weight: 0,4 kg

Operating medium: filtered compressed air, inert gases.



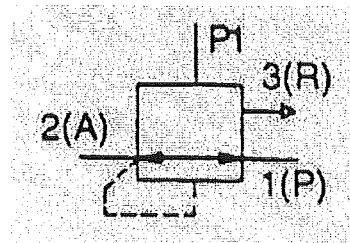
Material:

Body: Aluminium alloy

Gaskets: NBR

Trim: Aluminium and Stainless Steel

Symbol



Connections:

P1 = G1/8" signal input

1(P) = G1/4" air supply

2(A) = G1/4" actuator

3(R) = G1/4" blow-off opening

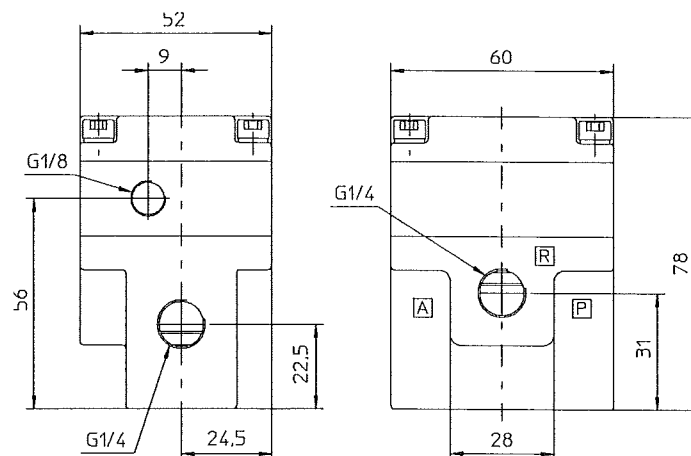
Function and application:

The amplifier valve is applied wherever signal pressure serves for the control of one or several actuators and where the signal transmitter does not supply enough pressure air in the requested floating time. The amplifier valve provides the actuator with a large air quantity, the pressure for the consumer being exactly adjusted to the signal pressure.

The amplifier valve has no own air consumption and that's why it is ideally suitable for air amplification of digital positioner ARCAPRO.

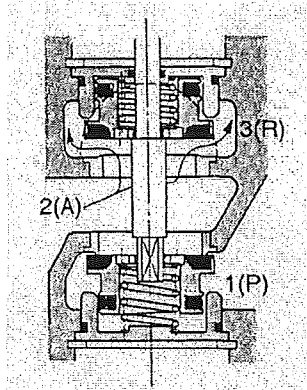
For stabilisation of control circuit a throttle valve has to be mounted between positioner 1(P) and actuator 2(A). Directly on blow-off connection 3(R) a blow-off silencer can be connected.

Dimensional drawing:

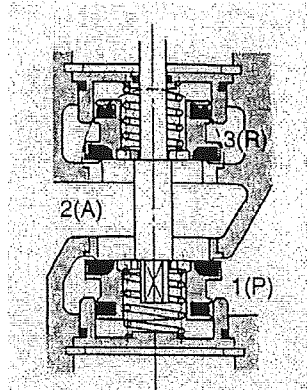


Construction:

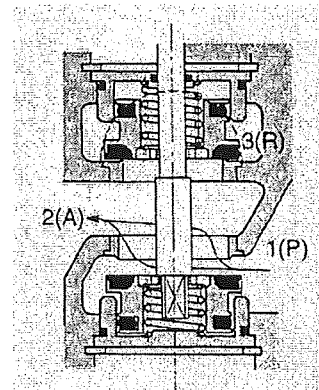
(1) port pressure A > pilot pressure P1



(2) port pressure A = pilot pressure P1



(3) port pressure A < pilot pressure P1



The balance between the acting force F1 of the pilot pressure (P1 port) over the upper surface of the pressure regulation piston ③ and the acting force F2 of the pressure at A port leading to a space under the piston through the feed back flow root closes a couple of poppet valves ⑥ and sets A port pressure that corresponds to P1 port pressure. The poppet valves are backed up by spring – in the pressure balance structure by means of A port pressure (2),

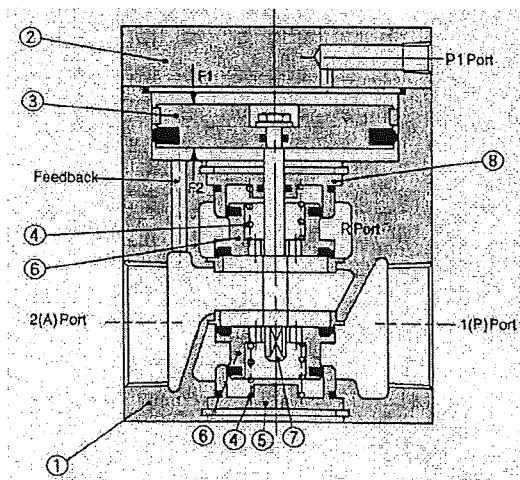
When A port pressure exceeds P1 port pressure, F2 becomes larger than F1, and the pressure regulating piston moves upward, opening the upper poppet valves. Thus air is released from A port to R port (1). When A port pressure lowers enough to restore the balance, the regulator valve returns again to the (2) condition.

When A port pressure is lower than P1 port pressure, F1 becomes larger than F2, and the pressure regulating piston moves downward, opening the lower poppet valves. Thus air is supplied from P port to A port (3). When A port pressure rises enough to restore the balance, the regulator valve returns to the (2) conditions.

Parts List:

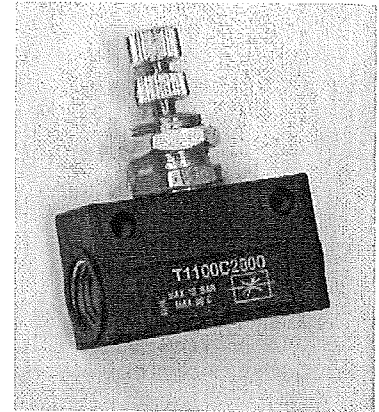
No.	Description	Material
1	Body	Aluminium alloy die cast
2	Cover	Aluminium alloy die cast
3	Piston	Aluminium alloy
4	Spring	Stainless steel
5	Valve guide	Aluminium alloy
6	Poppet valve	Aluminium alloy, NBR
7	Shaft	Stainless steel
8	Valve guide	Aluminium alloy

Cross sectional drawing:



Technical data:

Port size: **G1/4"**
 Regulating flow: **Kvs max. 0,28**
 Operating pressure: **0 – 10 bar**
 Operating temperature: **-20°C* to +80°C**
 *In case of minus temperatures, please consider air condition.
 Weight: **0,056 kg**
 Operating medium: **filtered compressed air, inert gases.**

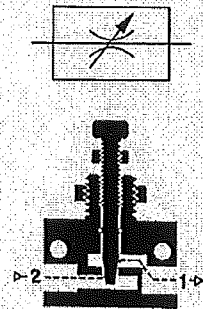


Material:

Body: **aluminium**
 Gasket: **nitrile O ring, POM seal**
 Trim: **brass**
 External parts: **aluminium alloy**

Design and function:

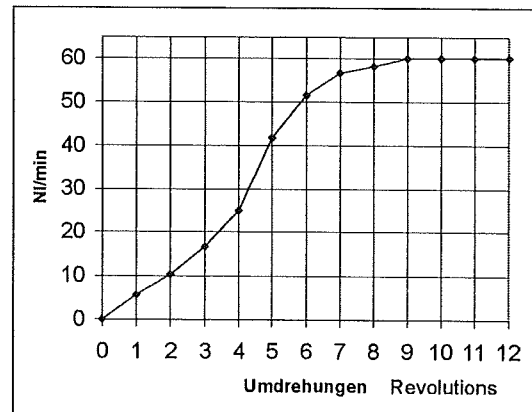
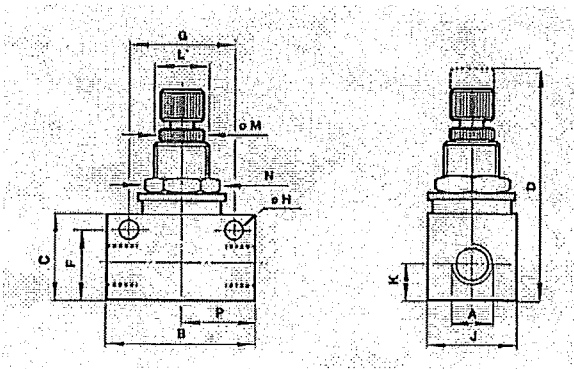
A threaded sleeve is screwed into a light alloy body with a throttling insert. This sleeve acts as a guide for the spindle which contains the throttling plug. A fine thread is provided for adjustment purposes. Even with small flow areas a sensitive adjustment is possible. The throttling valve can be fixed by means of a lock-nut.



Application:

Throttling valves regulate the air flow in both directions. They are used to control the setting time of pneum. actuators, allow the adjustment of air flow from exhaust nozzles and serve as resistances in pneumatic delay circuits.

Dimensional Drawing:



A	B	C	D	F	G	H	J	K	L	M	N	P
G1/4"	45	25,5	61,5	21	32	4,5	19	9,5	M14x1	Ø10	17	22,5

Filter and reducing station



The ARCA filter and reducing station is designed for an exact control of pressures at high air quantities (up to 34 m³/h), especially for the application at pneumatic positioners and control units as well as for similar critical cases.

This proven compact station has the following excellent features:

- high flow capacity
- exact pressure control
- quick response
- simple installation
- reliable oil and water separation
- reusable filter

Function:

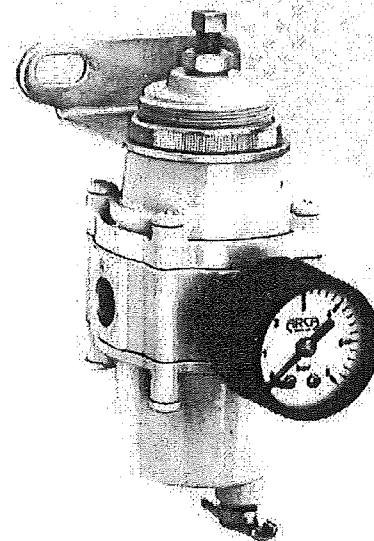
The filter and reducing station is a diaphragm-controlled pressure reducing valve. The desired output pressure is adjustable via the adjustment screw. The initial tension of the spring caused thereby produces the pressure at the diaphragm unit.

This force is equalized by the output pressure at the bottom side of the diaphragm combination. An increase of the spring force opens the main valve via the diaphragm unit. Now the output pressure increases until the equalization of force is achieved at the diaphragm unit. In the contrary case the decrease of the spring force lifts the diaphragm unit, the vent valve opens and the overpressure is released through the ventilation hole of the controller into the atmosphere until the forces at the diaphragm are equalized again.

The reducing station is provided with a filter-water collecting system which separates remainders of condensate, oil, pollutions such as rust, dust and oxide to avoid damages to the high-quality control units.

In case of frequent pollutions an additional prefilter with automatic outlet has to be installed.

By loosening the body screws the mounted 40µ nylon filter and the seat fitting behind it can be cleaned and reused without dismantling the station.

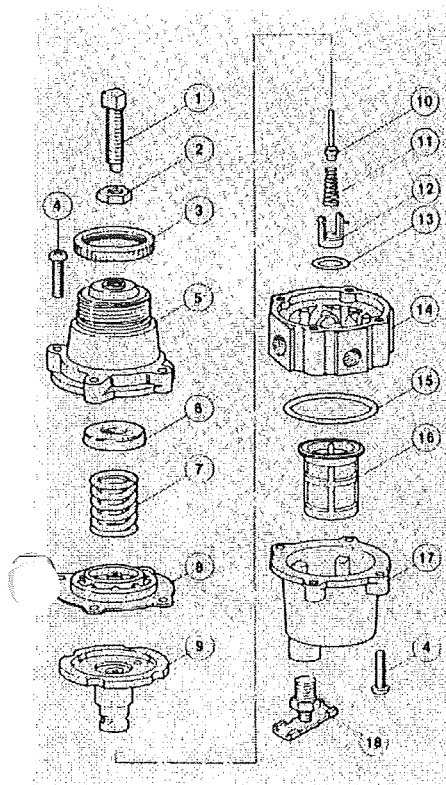


Installation:

The unit disposes of 4 connections 1/4" NPT. The air input "IN" can be mounted at the left or right side. The air output "OUT" is then at the opposite side right resp. left. In the right angle to these connections there are 2 connections "Gauge" which are internally connected with the air output. Alternatively, according to place and position of installation, a gauge can be mounted.

By means of the mounting bracket the filter and reducing station can be mounted at a wall. But also the mounting into a front panel is possible by using two flat nuts.

Technical data and dimensions



Technical Data:

Adjustment range	0 - 6 bar
Flow capacity (at 7 bar initial pressure and 1,4 bar control pressure)	34 m³/h*
Discharge capacity (control pressure 0,35 bar above set-value)	0,85 m³/h*
Adjustment accuracy	2,0 mbar
Sensitivity	< 0,5 mbar
Temperature range	0 - 50 degrees C
Upstream pressure	18 bar
Proper air consumption at 1,4 bar control pressure	max. 8 l/h*
Connections	1/4 NPT
Weight	0,6 kg
Filter material	nylon web
Mounting	tube, panel or bracket
Material	body: aluminium alloy trim: stainless steel, synthetic material diaphragm: BUNA-N

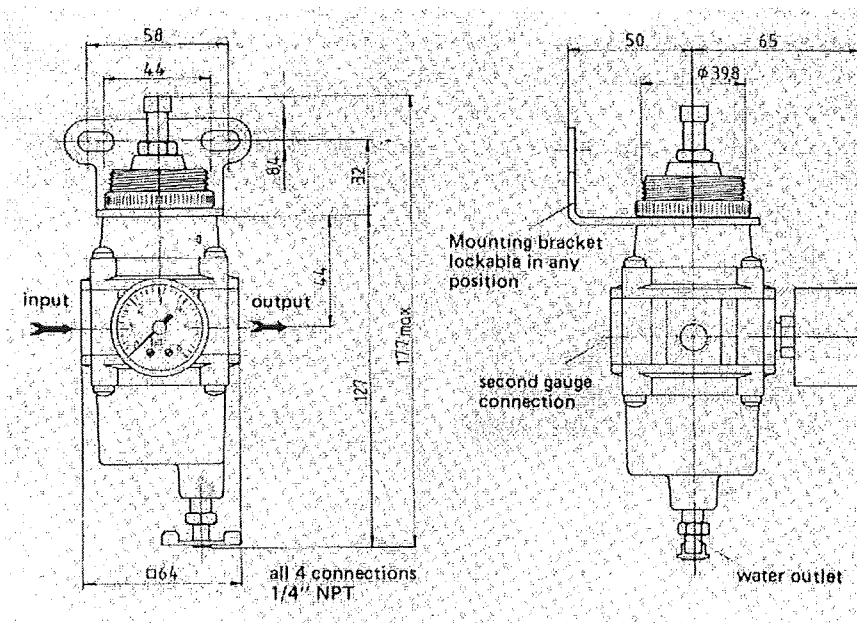
* (In standard condition)

The ARCA filter and reducing station is supplied with mounting bracket as standard.

- 1 adjustment screw
- 2 counter nut for adjustment
- 3 hex. flat nut
- 4 body screws
- 5 spring casing
- 6 spring plate
- 7 setpoint spring
- 8 *diaphragm complete
- 9 casing, pivot bearing
- 10 *cone
- 11 *cone spring
- 12 spring bracket
- 13 *O-ring
- 14 connecting block
- 15 *O-ring
- 16 *filter
- 17 filter casing
- 18 drainage screw

*These parts are only available as repair set

Technical data are subject to change without notice.



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eMail: sale@arca-valve.com • Internet: www.arca-valve.com