ANNEX

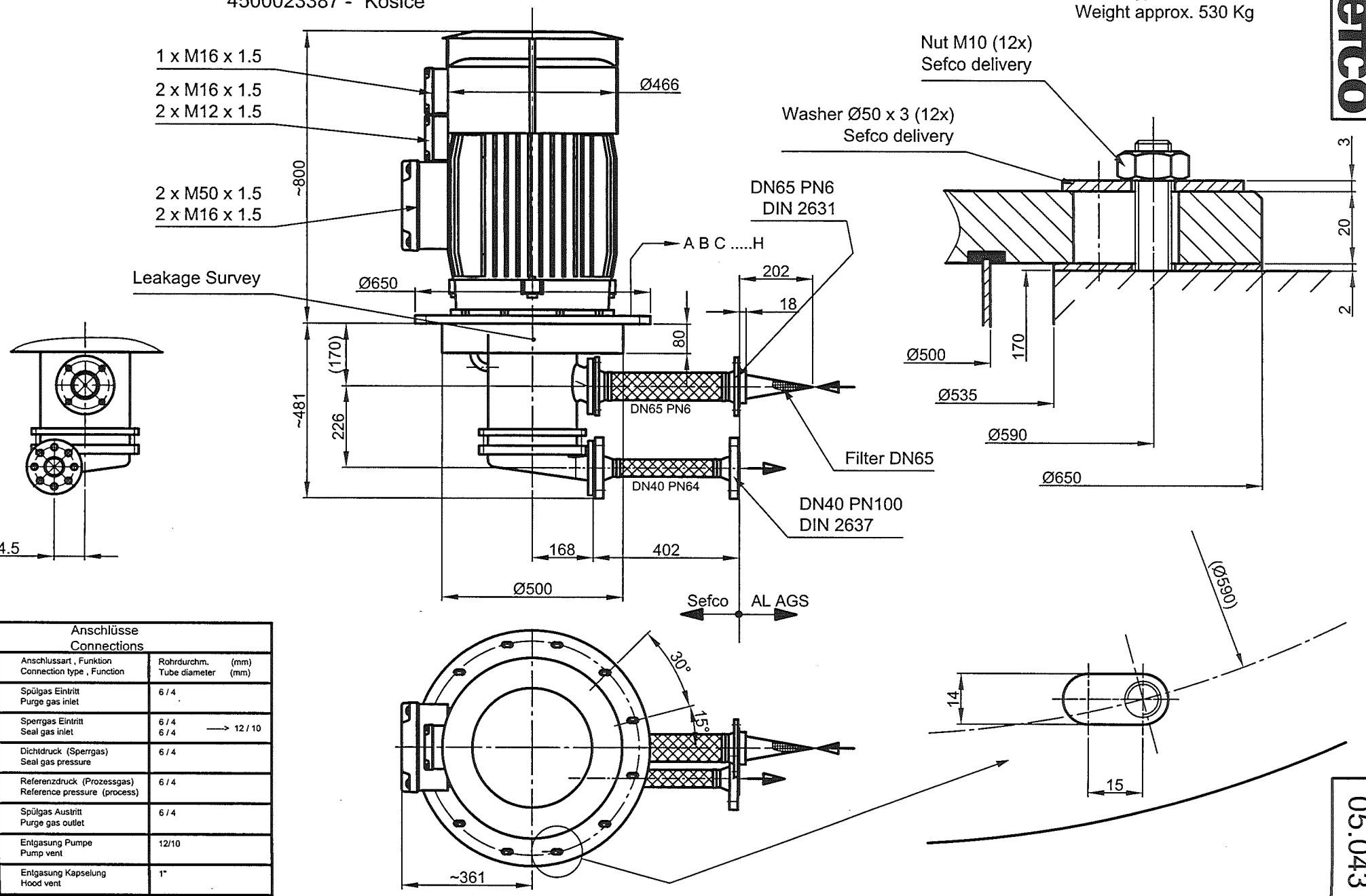
	Gezeichnet Dessiné	Geprüft Controlé
0	28.01.2005	CM

Arrangement Drawing : LOX IC Pumps P61100-P61200- Air Liquide AGS GmbH

4500023387 - "Kosice"

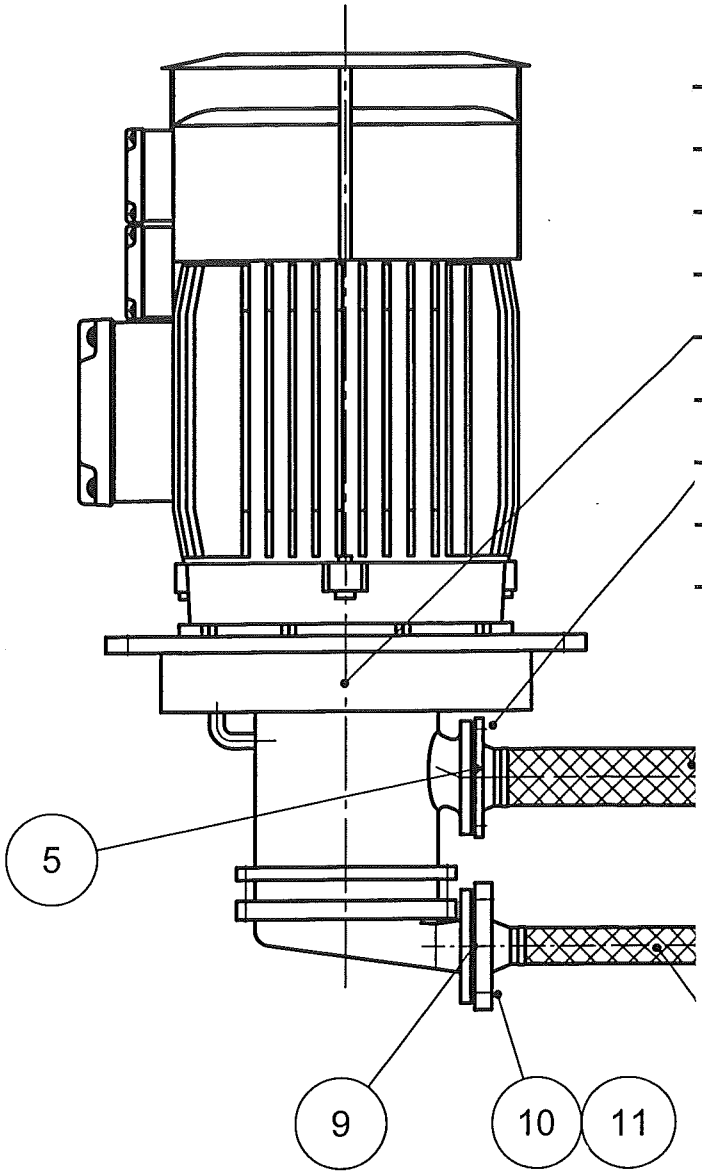
Pump Type : CL2 - 19 / EM - 50
Motor Type : 225M - 50 kW
Weight approx. 530 Kg

sefco



Anschlüsse Connections		
Pos.	Anschlussart , Funktion Connection type , Function	Rohrdurchm. (mm) Tube diameter (mm)
A	Spülgas Eintritt Purge gas inlet	6 / 4
B/E	Sperrgas Eintritt Seal gas inlet	6 / 4 6 / 4 → 12 / 10
C	Dichtdruck (Sperrgas) Seal gas pressure	6 / 4
D	Referenzdruck (Prozessgas) Reference pressure (process)	6 / 4
F	Spülgas Austritt Purge gas outlet	6 / 4
G	Entgasung Pumpe Pump vent	12/10
H	Entgasung Kapselung Hood vent	1"

05.043



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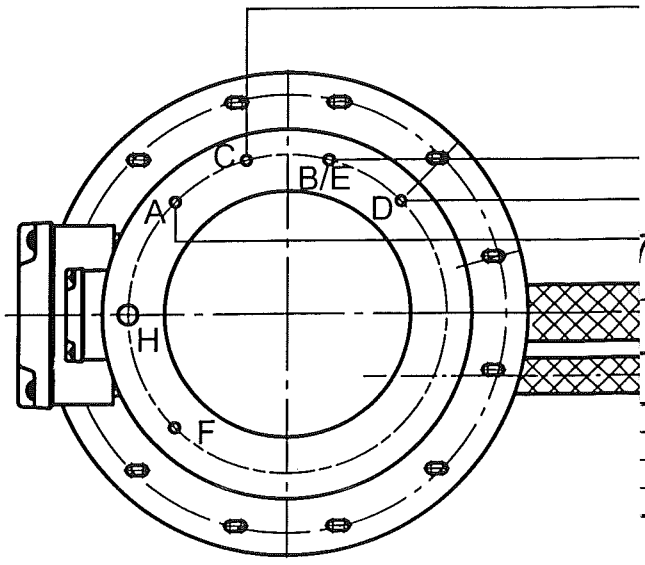

7 - "Kosice"

Werkstoff Matière		Modell Modèle	Bemerkungen Observations
Aenderungen		Ersetzt durch : Remplacé par : Ersatz für : Remplace :	

Massstab Echelle	Gezeichnet Déssiné	N.S.	27.04.2005
	Geprüft Controllé		
	Normgeprüft Conforme aux normes		
	Gesehen Vu		

05.043/14

Drawing: 05.043/14 **Accessories P61100 - P61200**

Item-No.	Parts per Unit	Nomenclature	Material
1	1	RTD's for seal leakage detection	
2	1	Suction strainer DN 65	
3	2	Gasket Ø 115 x 77 x 2	
4	1	Flexible suction hose DN65 PN6	
5	1	Gasket Ø 115 x 77 x 2	
6	4	Washer M12	
7	4	Hexagon cap screw M12 x 40	
8	1	Flexible discharge hose DN40 PN64	
9	1	Gasket Ø 92 x 49 x 2	
10	8	Washer M16	
11	8	Hexagon cap screw M16 x 55	
12	1	Gasket Ø 104 x 50 x 2	
13	3	Panel mount union Ø 6	
14	3	Panel mount union Ø 12	
15	2	Tube stub Ø 12	
16	2	Ball valve Ø 12	
17	2	Cable gland M12 x 1,5	
18	1	Control box seal-/purge gas regulation	
19	2	Female adaptor Ø 12 - 3/8"	
20	2	Male adaptor union Ø 12 - 3/8"	
21			
22			
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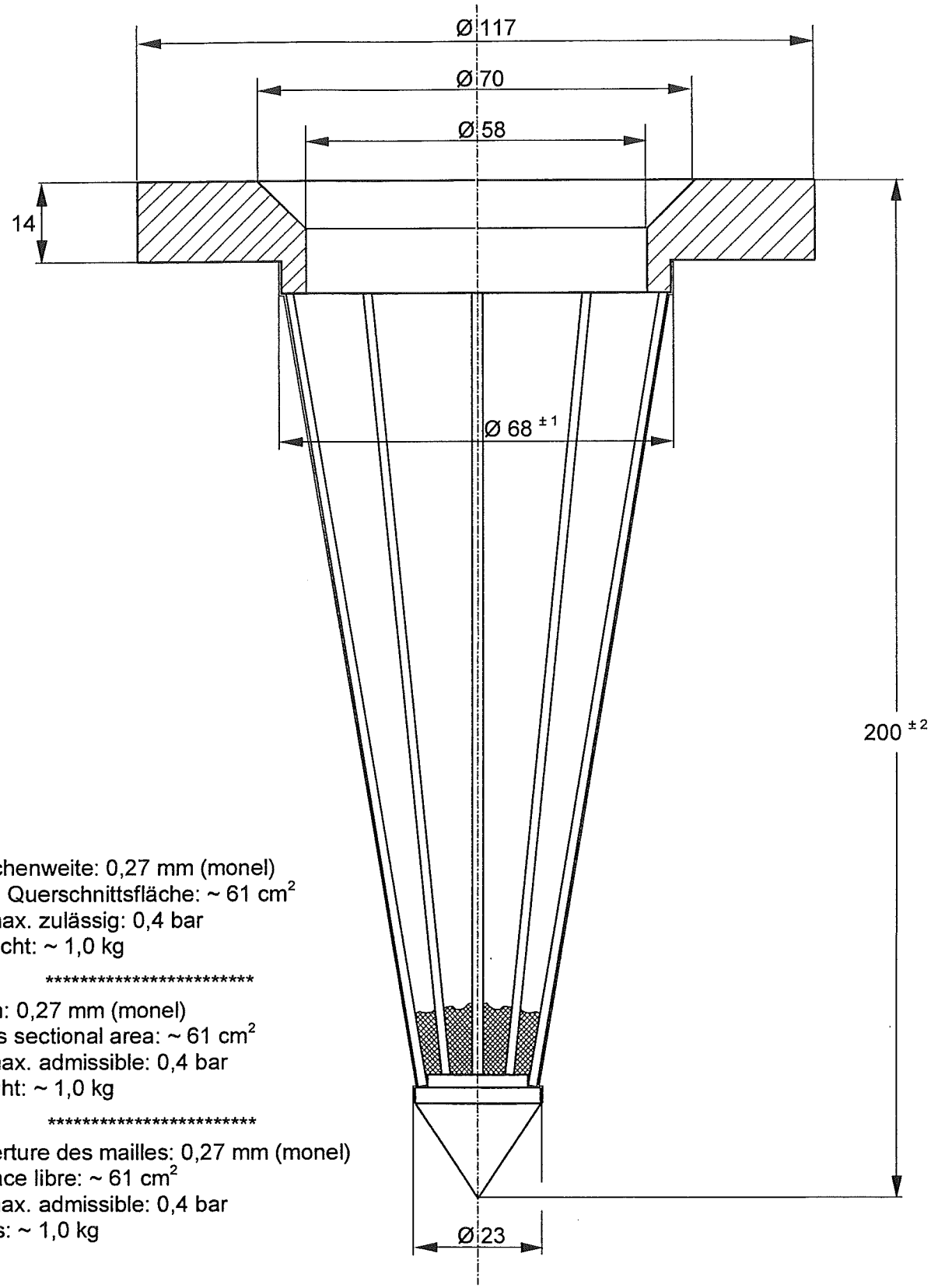
32			
33			

Rev:	Date
0	11.05.2005



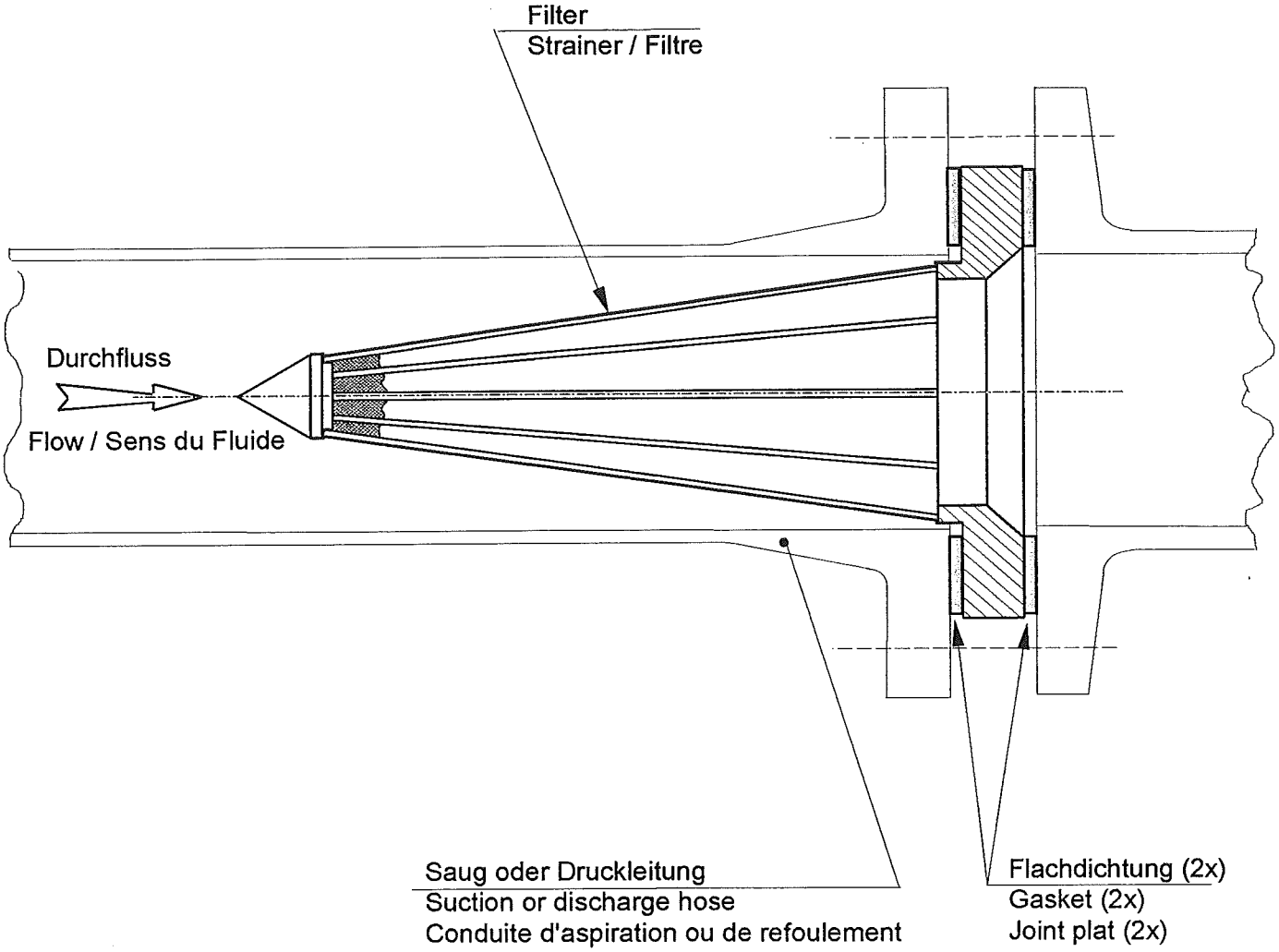
Maschenweite: 0,27 mm (monel)
Freie Querschnittsfläche: ~ 61 cm^2
Δp max. zulässig: 0,4 bar
Gewicht: ~ 1,0 kg

****

Mesh: 0,27 mm (monel)
Cross sectional area: ~ 61 cm^2
Δp max. admissible: 0,4 bar
Weight: ~ 1,0 kg

****

Ouverture des mailles: 0,27 mm (monel)
Surface libre: ~ 61 cm^2
Δp max. admissible: 0,4 bar
Poids: ~ 1,0 kg


Filter
Strainer / Filtre
Durchfluss
Flow / Sens du Fluide
Saug oder Druckleitung
Suction or discharge hose
Conduite d'aspiration ou de refoulement
Flachdichtung (2x)
Gasket (2x)
Joint plat (2x)

Temperaturüberwachung an der Pumpe
Temperature control at the pump
Protection thermique de la pompe

Die Pumpe *kann* mit folgenden Fühlern ausgerüstet sein :
The pump *can* be equipped with the following sensors :
La pompe *peut* être équipée des sondes suivantes :

Funktion	**Fühler Typ**	**Wellendichtung Typ**	**Empfohlene Schaltpunkte**
Function	**Sensor type**	**Shaft seal type**	**Recommended set point**
Fonction	**Type de sonde**	**Etanchéité type**	**Réglage recommandé**

Kaltfahrüberwachung	PT100		-140°C
Cool down survey	RTD		
Contrôle de mise à froid	PT100		

Leckage an der Dichtung	PT100	GRD oder Labyrinth	Alarm, alarme : -130° C Abschalten, shutdown, arrêt : -150° C
Seal leakage detection	RTD	Mechanical or labyrinth	
Détection de fuite à l'étanchéité	PT100	Mécanique ou à labyrinthes	

Leckage an der Dichtung	PT100	GRS (abhebende Dichtung)	Alarm, alarme : -160° C Abschalten, shutdown, arrêt : -180° C
Seal leakage detection	RTD	GRS (gas riding seal)	
Détection de fuite à l'étanchéité	PT100	GRS (à film gazeux)	

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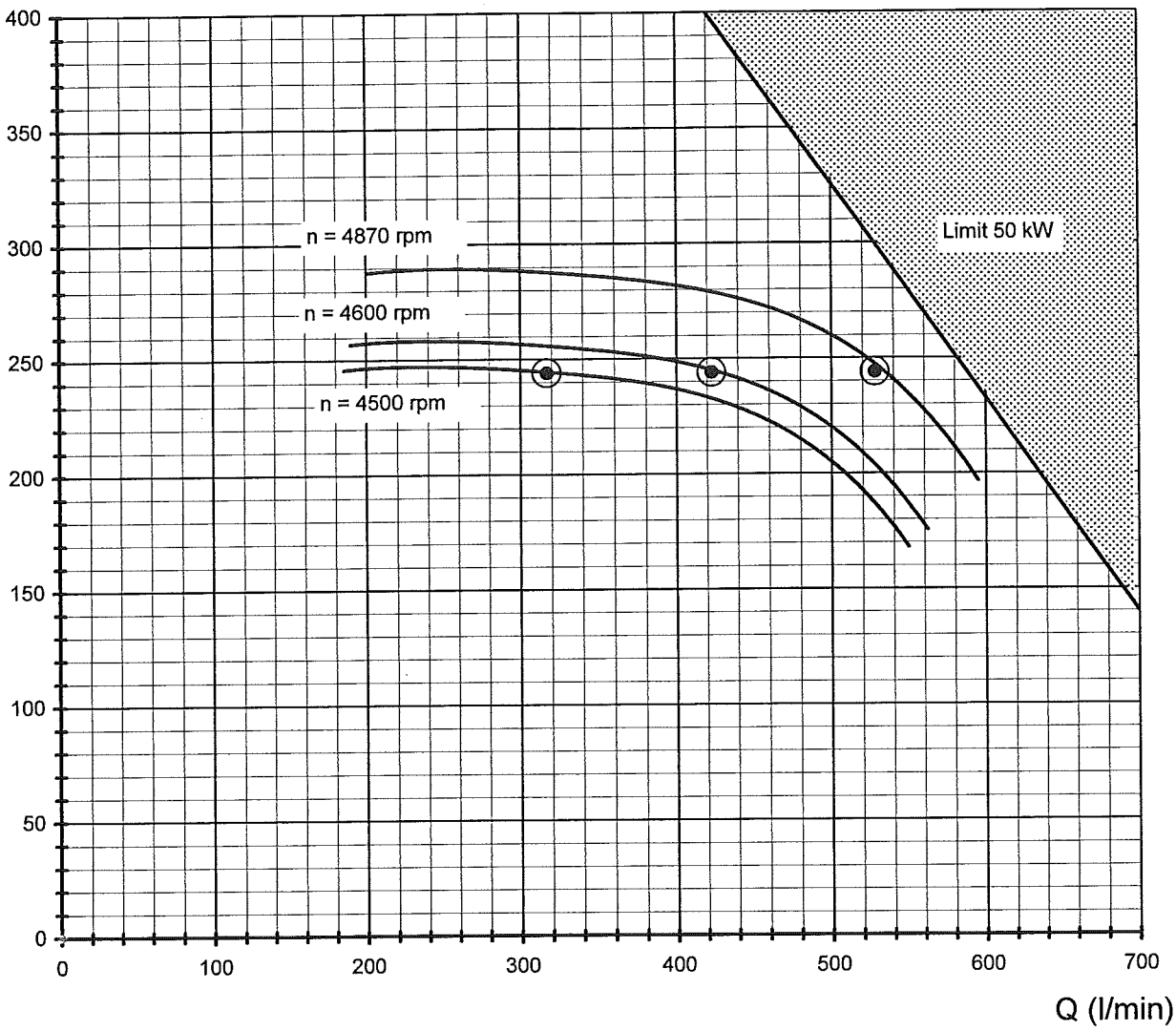
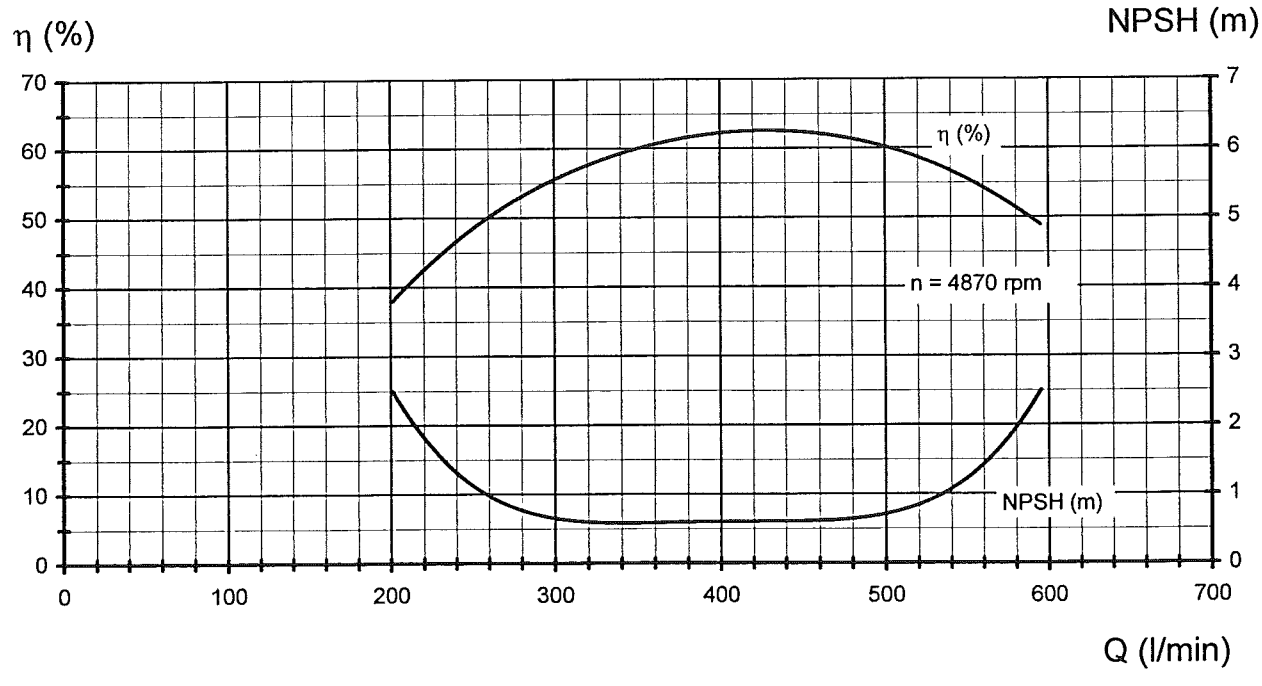
CL2 - 19

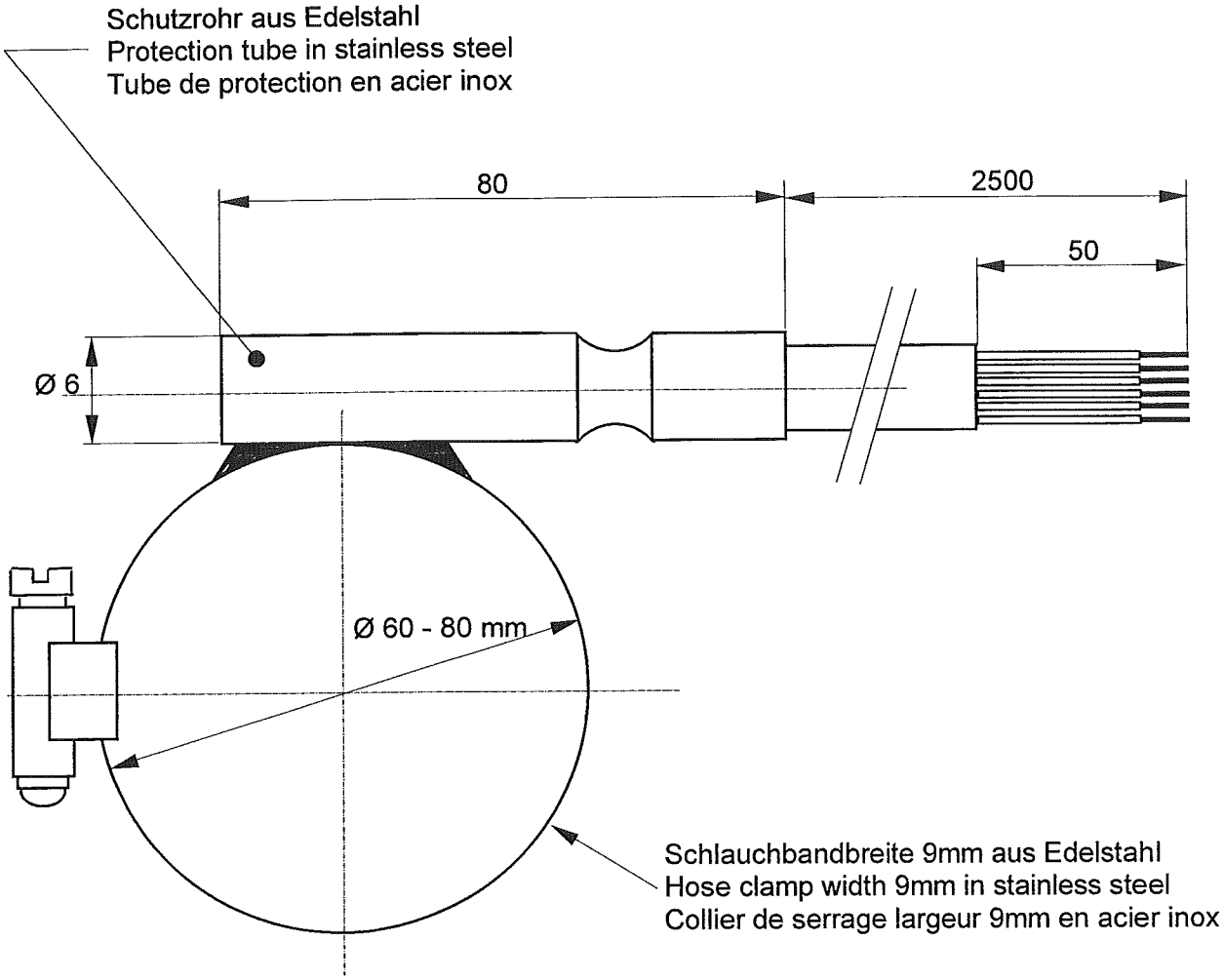
229-04/4B

Impeller ∅ 190 / 4.5 mm, with Inducer, Blade-ring
Diffusor 300+





Gezeichnet / Dessiné	NS	29.09.2004
Geprüft / Controllé	WP	29.10.2004



Typ - Type

- Widerstandsfühler 2x PT100, 2x 3 Leiter Klasse B mit Schlauchbandbride
- Temperature sensor 2x PT100 (dual RTD's), 2x 3 wires class B with hose clamp
- Sonde de température 2x PT100, 2x 3 conducteurs classe B avec collier de serrage

Temperatur :
Temperature: ± 200°C
Température:

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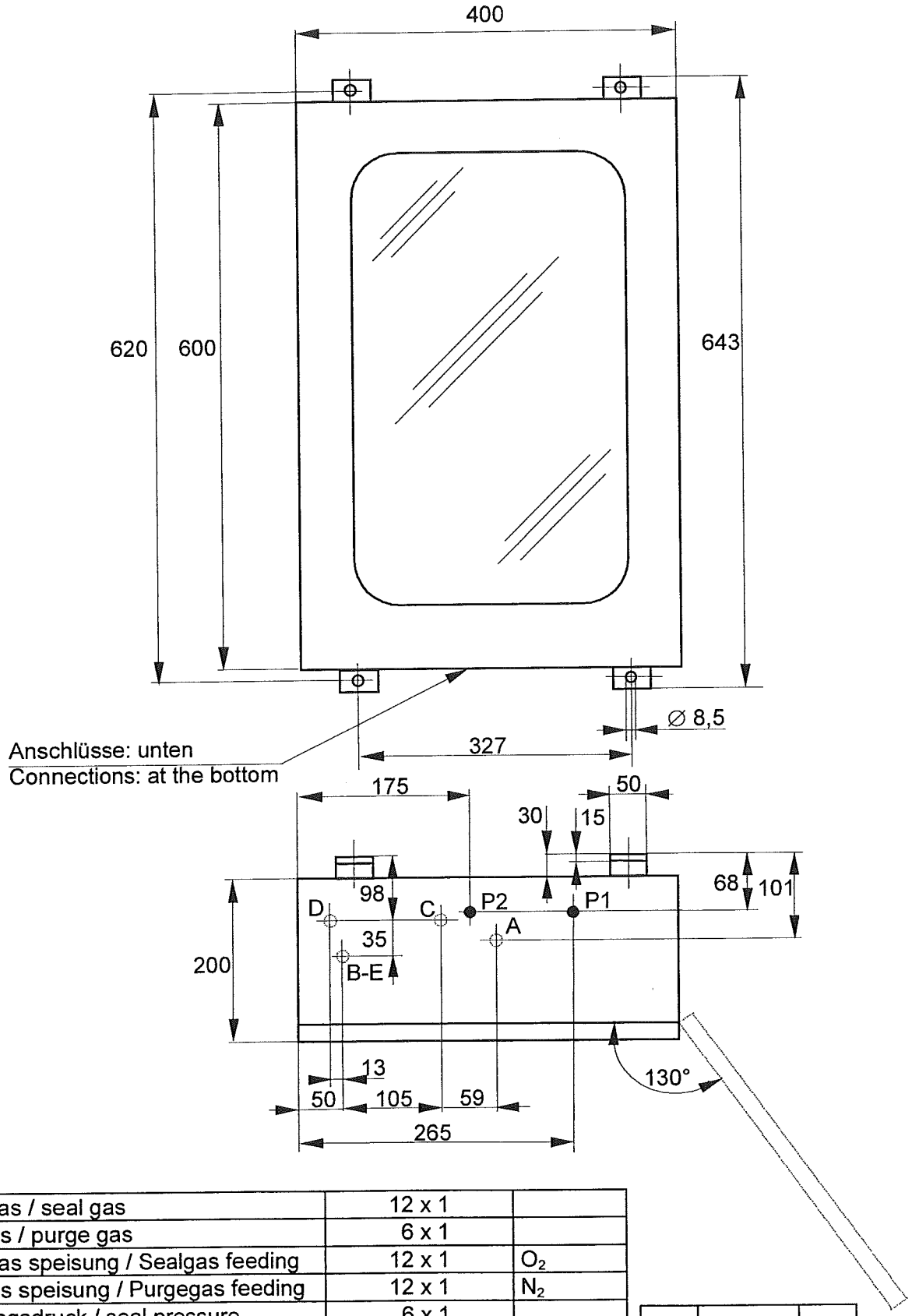
STEUERSCHRANK LABYRINTHDICHTUNG
CONTROLBOX LABYRINTH- SEAL

4 13161

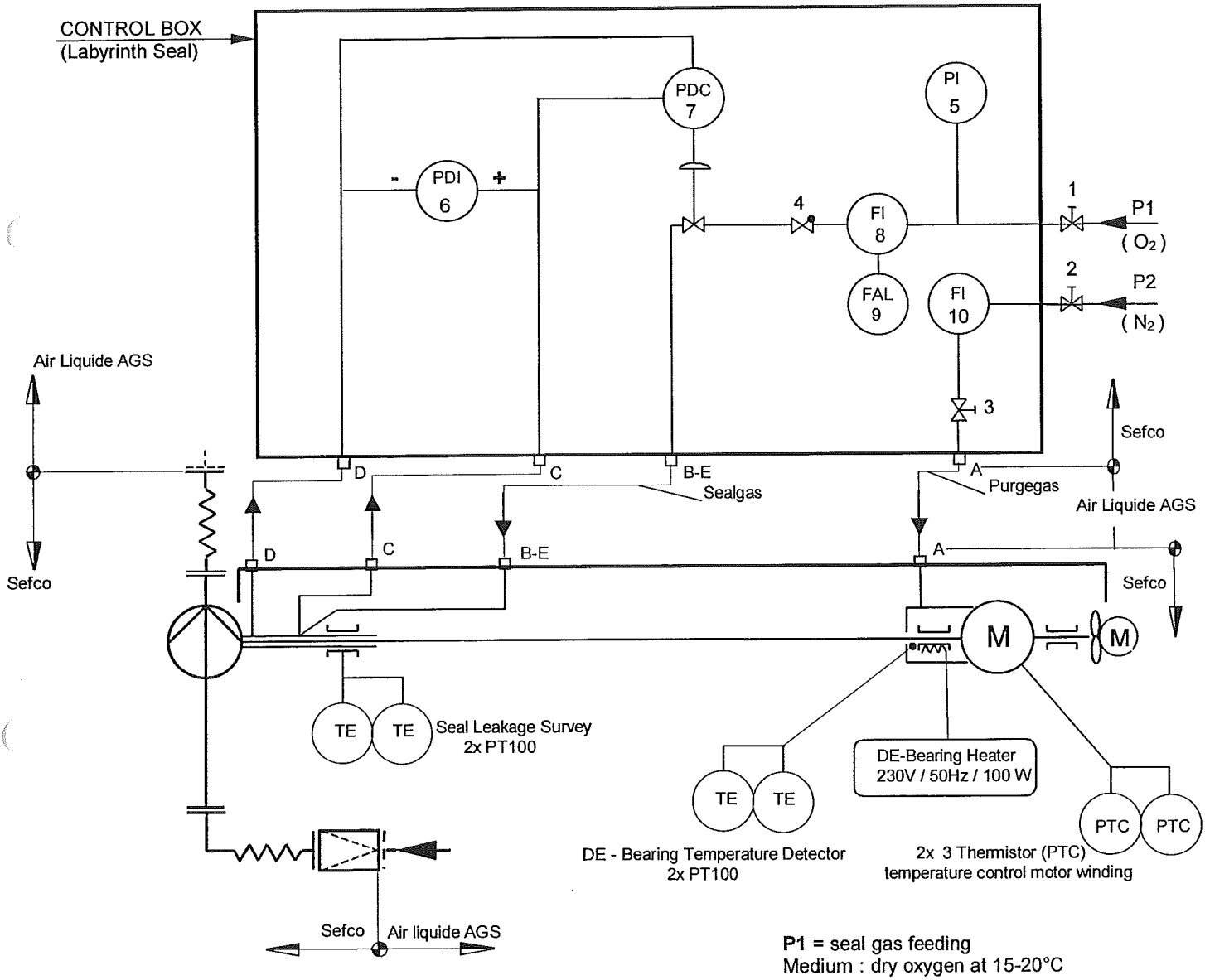


B-E	Sperrgas / seal gas	12 x 1	
A	Spülgas / purge gas	6 x 1	
P1	Sperrgas speisung / Sealgas feeding	12 x 1	O_2
P2	Spülgas speisung / Purgegas feeding	12 x 1	N_2
C	Dichtungsdruck / seal pressure	6 x 1	
D	Referenzdruck / reference pressure	6 x 1	
		Rohr ∅ / Tube ∅	

0	27.02.01	MR
Rev.	Date	dwg

Air Liquide AGS GmbH

Order.Nr. : 4500023387
Tag Nr. : **P61100 – P61200**
Project Name: „ ASU Kosice “



Pos.	Fitting for tube
A	Ø 6 x 1
B-E	Ø 12 x 1
C	Ø 6 x 1
D	Ø 6 x 1
P1 – P2	Ø 12 x 1

P1 = seal gas feeding
Medium : dry oxygen at 15-20°C
Pressure : 5 bar at box inlet

P2 = purge gas feeding
Medium : dry nitrogen at 15-20°C
Pressure : 5 bar at box inlet

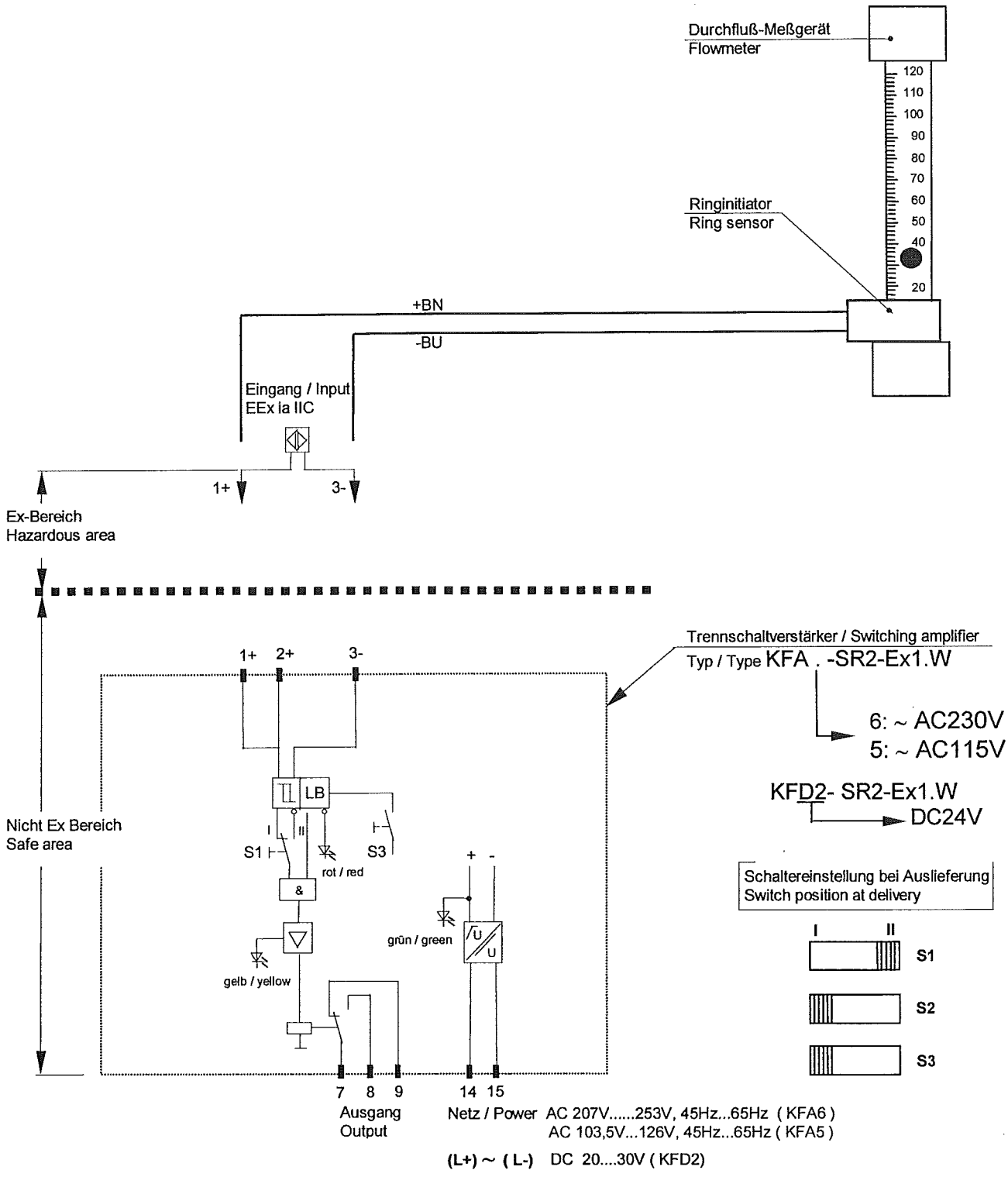
01	17.02.2005	WP	
0	26.01.2005	WP	
REV	DATE	DWG	CHECKED

Control Point		No. off	Instruments	Manufacturer	Type	Technical Data	Remarks
P1	1	1	Regulating valve	Serto	SO56121-12-12		O2
P2	2	1	Regulating valve	Serto	SO56121-12-12		N2
	3	1	Regulating valve	Serto	SO55221-6-6		
	4	1	Non-return valve	Serto	SO57321-12		
PI	5	1	Pressure gauge	Wika	111.10.63	0..10 bar	
PDI	6	1	Diff. Pressure gauge	Wika	711.11.100	0....6 bar	
PDC	7	1	Diff. Pressure regulator	Sefco	DP 65		
FI	8	1	Flow-indicator	Vögtlin	V 100.140.19 ov		
FAL	9	1	Ring Sensor	Pepperl-Fuchs	RC15-14-N3Y49839		
		1	Switching amplifier	Pepperl-Fuchs	KFD2-SR2-Ex1 W	24VDC	
FI	10	1	Flow-indicator	Vögtlin	V 100.140.16 ov		

Air Liquide AGS GmbH
Order Nr.: 4500023387
Tag Nr.: **P61100 - P61200**
Project Name: „ ASU Kosice “

0	17.02.2005	WP		
REV	**Datum**	**Gezeichnet**	**Geprüft**	

Durchflußüberwachung (Sperrgas) - Flow- Control (Seal- gas)



Standard Design

Design and accuracy correspond to normal specifications. This gauge can be used for all liquids and gases under pressure, except those which attack copper alloys, have a high viscosity or are liable to crystallize.

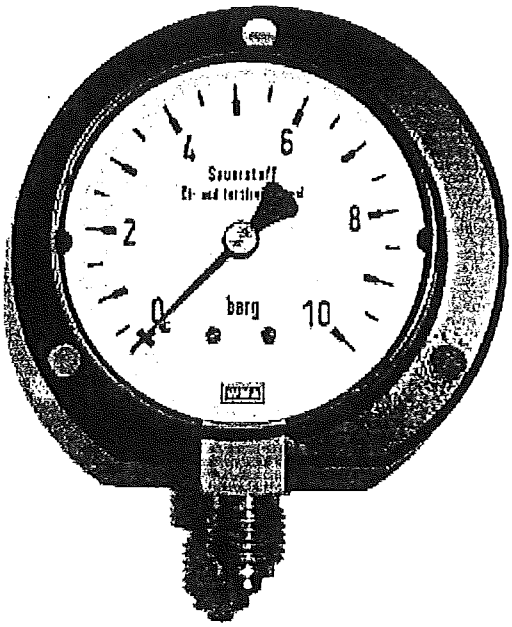
Application

Measurement of positive and negative pressures in the range up to 1000 bar maximum.

Type

Type	*Parts in contact with fluid*	*Type of case*
111.10	Copper alloy	steel with snap-in window

Technical characteristics



Accuracy: ± 1,6% off full scale deflection.

Temperature range

Ambient temperature: -25° up to +60 °C
Fluid temperature: soldered gauge up to +60 °C
welded gauge up to +100 °C

Temperature coefficient of indication (reference temperature +20 °C)

The deviation of the indication is +0,3% per 10 °C of the indicated value for higher temperatures and -0,3% per 10 °C of the indicated value for lower temperatures.
The temperature used for the correction of the indication is the temperature of the measuring system and not
the temperature of the process fluid.

Operating range

75% of full scale reading for static loads
60% of full scale reading for fluctuating loads
Short term peaks to full scale reading permissible

Design features of standard type

Compact measuring system design. This means that connection, tube base, measuring element, movement and dial constitute a functional unit freely mounted in the casing. The plastic window is fixed to the casing by a practical snap-fit bezel.

Application

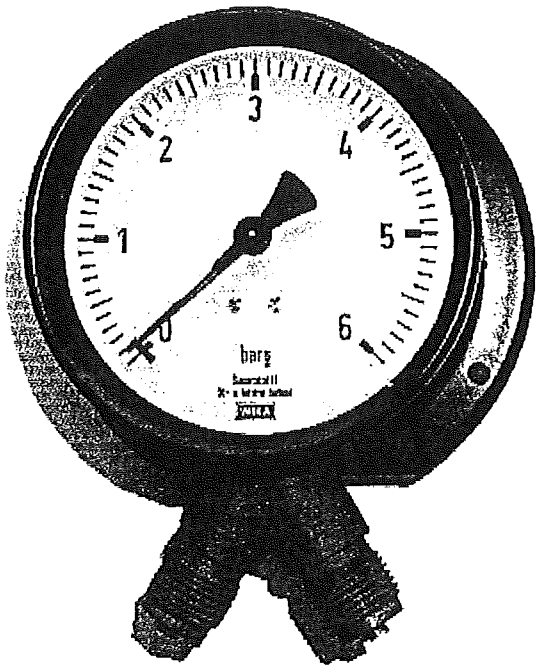
This pressure gauge is suitable with gaseous media and liquids of thin consistency not containing suspended matter. The dial indication facilitates readout of pressure differential as well as of both pressures applied (no vacuum).

Type

Type	*Wetted parts made of*	*Case design*
711.11	Copper alloy	Case and bezel ring black finish steel and V-connector

Measuring principle

The case contains two independently operating bourdon tube pressure elements. Any pressure applied to either one element results in proportional element deflection. Movement and pointer arrangement provides for indication of either one pressure on a 270° scale.



Design

Pressure elements are protected by a rigid case. Pressure element assembly together with dial, pointer and movement are a self contained unit and retained in the case in such a way that any case distortion will not affect measurement. Pressure elements of Cu-alloy are of the circular type. Cu alloy elements are soldered. The gauge window is made of flat instrument glass and retained by a slip-on bezel ring.

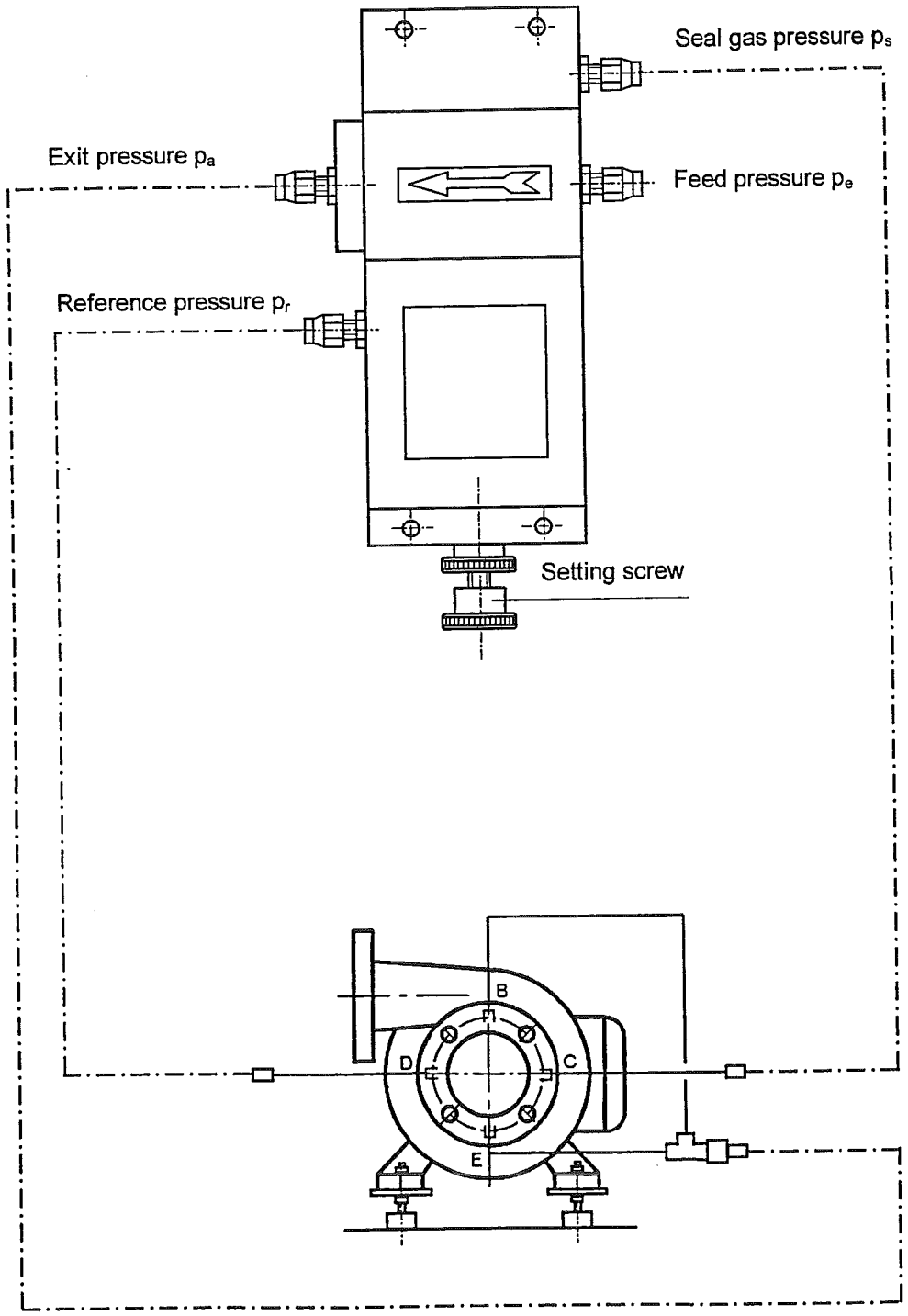
Instrument specification

Accuracy: DIN class 1,6.

Operating temperature
Ambient: -25° to +60 °C
Fluid: +60 °C max.

The differential pressure regulator SEFCO type DP 65 is a component of the seal-/purge gas control-box. It assures the tightness of the liquid gas-centrifugal pump with labyrinth seal and regulates the exit pressure (p_a). The reference pressure (p_r), measured in the pump, as well as the differential pressure (Δp), adjustable with the setting screw are the first reference. The resulting seal gas pressure (p_s) in the labyrinth seal is the second reference.

The differential pressure $\Delta p = p_s - p_r$ is adjustable in a range of approx. - 0,2 to + 0,5 bar ($p_s = p_a$ - piping losses).

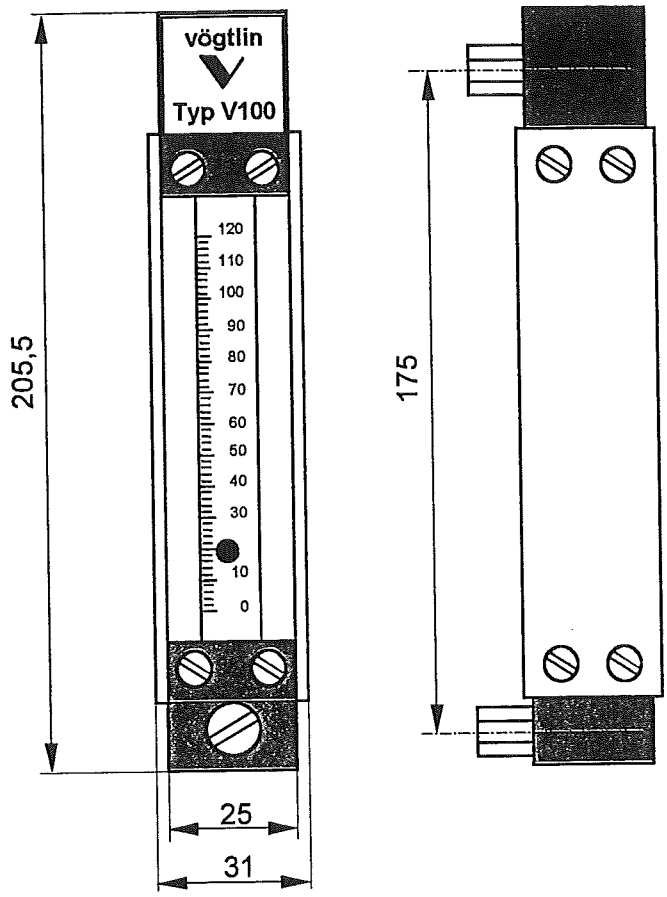


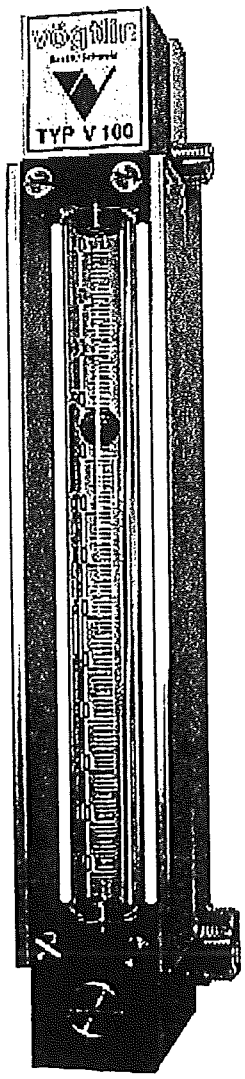
Description

The flowmeter V100 is used to measure small amounts of gas and liquids. The position of the float, in suspense in a calibrated metering tube, shows the momentary flowrate.

Design features

- Rigid Aluminium design for execution A
- Guaranteed stability of the floats
- Standard measuring range of 10:1
- Baked scales with contrasting background
- Simple exchange of the metering tube
- The flowmeter can be equipped with a limit switch. (ring sensor)





Type	V100-140
Execution	"A" Aluminium
Accuracy	± 2%
Glass-length (mm)	140
Scale-length (mm)	100/120
Fitting length (mm)	175
Float	ball
max. allowable pressure (bar)	16
max. Temperature (°C)	100
Connection	R1/4"
Pressure loss (mbar)	30

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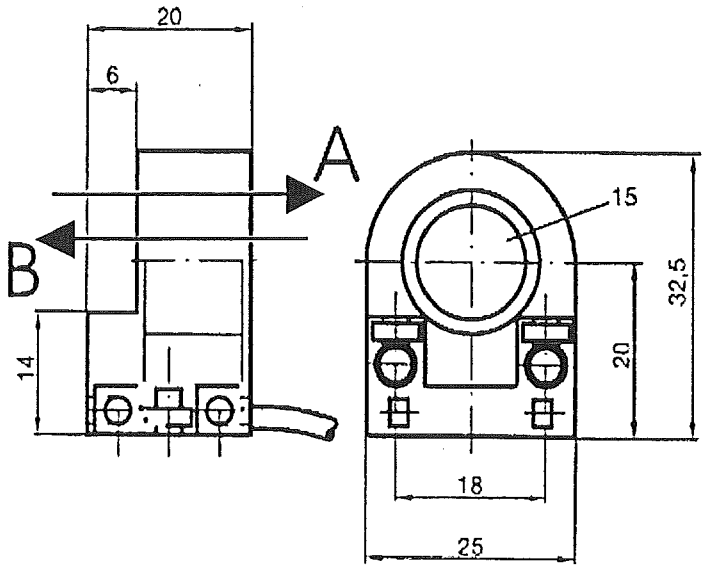
Pepperl+Fuchs

Inductive Sensor **Ring Type** **NAMUR** **2-wire**

Bistable

Direction detection

High feed speed
10 m/s

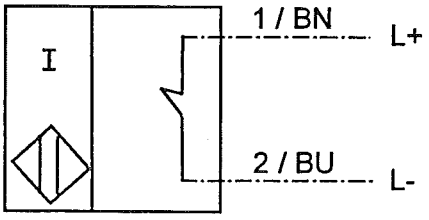


CE

Internal diameter	15 mm
Type	**RC15-14-N3**
Additional designation	**Y49839**
Measuring cylinder	Fe-metal
Diameter	3 mm
Length	4 mm
Nominal voltage	8 V
Current consumption	
Direction A	1 mA
Direction B	3 mA
Feed speed	10 m/s
Self inductance	70 µH
Self capacitance	90 nF
Output indicator	-
EMC to	EN 60947-5-2
In compliance with	EN 50227
Protection to IEC 60529	IP67
Operating temperature	-20 ...70 °C
Connection	2 m, PVC cable
Conductor cross section	0,14 mm^2
Housing material	PBT

Standard symbol, connection

N3



Transformer Isolated Barriers

KF-SR2-Ex1.W**
Output: Relay

- 1-channel
- Control circuit EEx ia IIC
- Reversible mode of operation
- 1 signal output with 1 changeover contact
- EMC acc. to NAMUR NE 21

24 V DC:

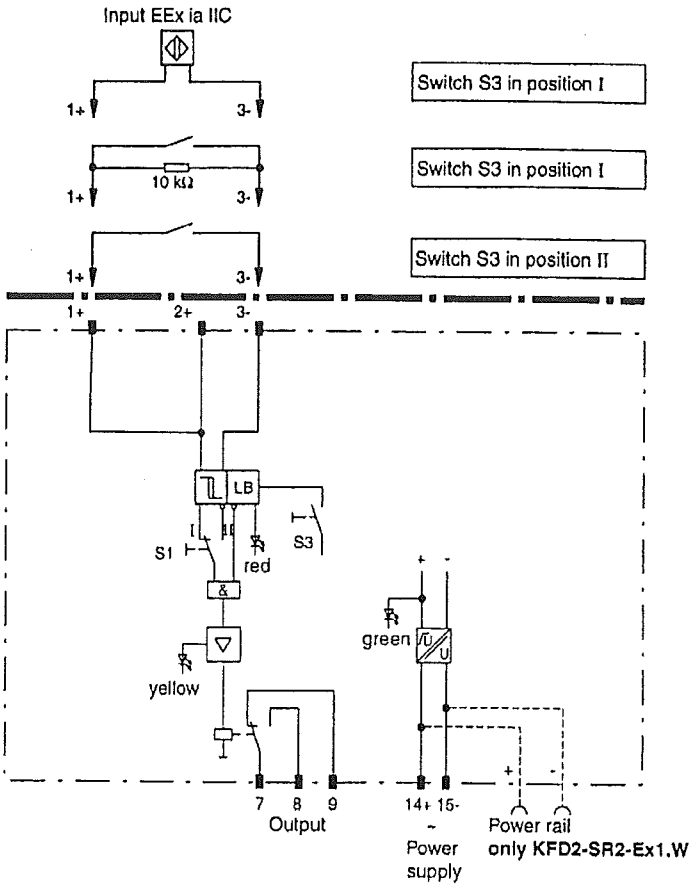
KFD2-SR2-Ex1.W
replaces model KFD2-SR-Ex1
115 V AC:

KFA5-SR2-Ex1.W
230 V AC:

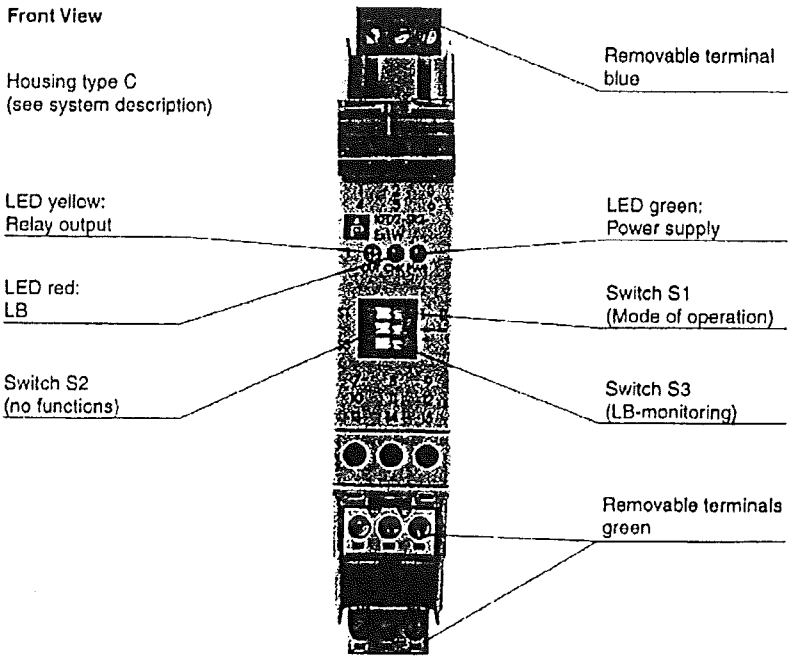
KFA6-SR2-Ex1.W

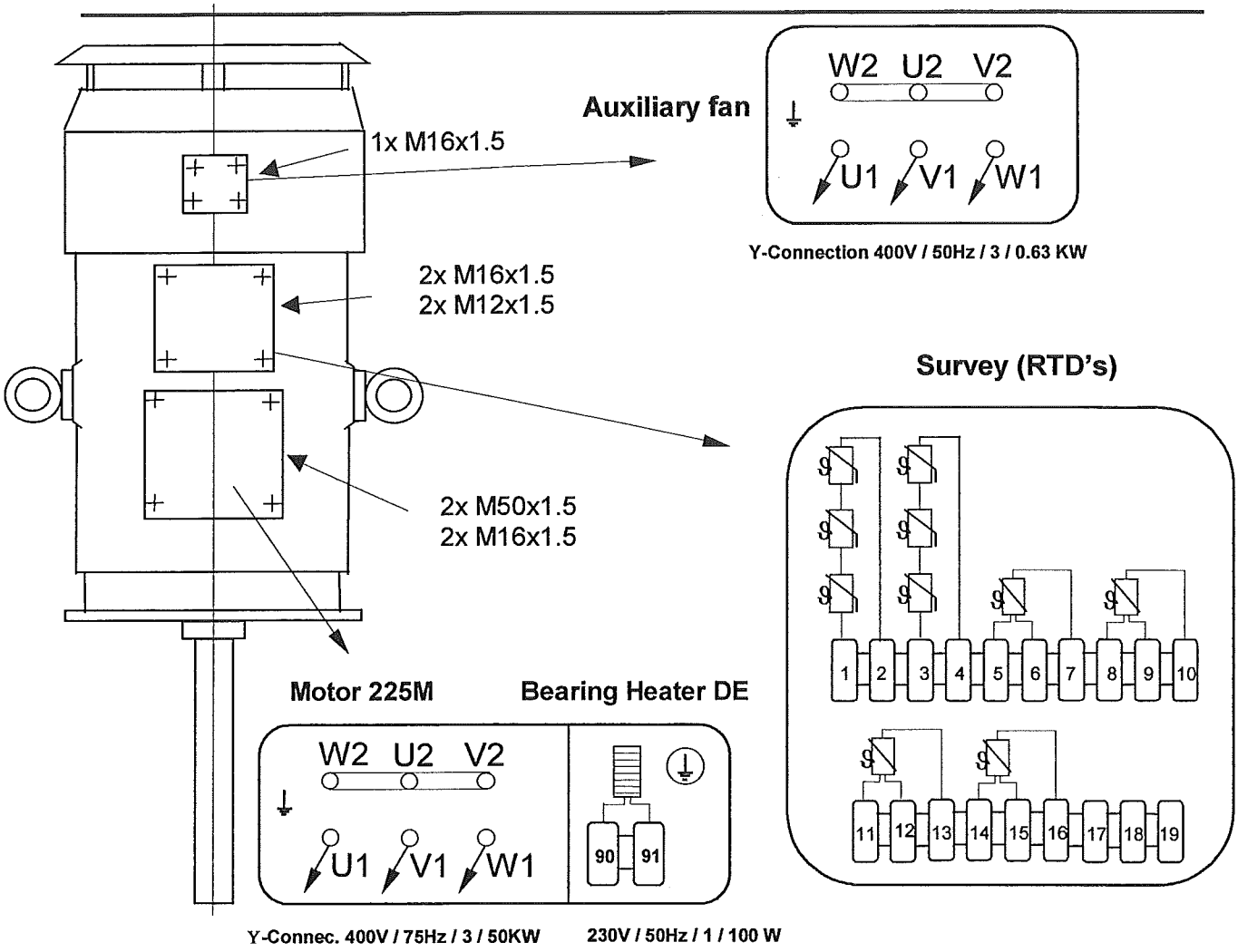
Function

The transformer isolated barrier transfers digital signals from the hazardous area. Sensors per DIN EN 60947-5-6 (NAMUR) or mechanical contacs may be used as alarms. The control circuit is monitored for lead breakage (LB).
AC units have a low heat build-up due to voltage peak value generation. This switching technique has been patented. The input is safely isolated from the output and the power supply in accordance with DIN EN 50020. The output and power supply are safely isolated from each other in accordance with DIN VDE 106 Section 101.



Aufbau





Wiring-Table

1-2	PTC alarm	Winding	ISO F
3-4	PTC disconnecting	Winding	ISO F
5-6-7 8-9-10	Temperature Detector RTD	Bearing DE	Dual
11-12-13 14-15-16	Temperature Detector RTD	Seal leakage detection	Dual
17-18-19	Spare		
90-91	Bearing heater	Bearing DE	

!	**RTD :**	Measuring current: 1 mA
!	**PTC thermistor sensors :**	Do not apply more than 2,5V !

0	16.02.2005	WP	
REV	DATE	DWG	CHECKED

Air Liquide AGS GmbH
Order Nr. 4500023387
Tag Nr, **P61100 – P61200**
Project name : ASU Kosice

Temperaturüberwachung E-Motor
Motor temperature control
Protection thermique du moteur

Der Motor *kann* mit folgenden Fühlern ausgerüstet sein :
The motor *can* be equipped with the following sensors :
Le moteur *peut* être équipé des sondes suivantes :

Messstelle	**Fühler Typ**	**Schaltpunkt** Werte können von Hersteller zu Hersteller leicht ändern	**Empfohlene Schaltpunkte** Alarm Zwischenwerte können nach belieben gesetzt werden
Control point	**Sensor type**	**Trip point** Values can change slightly by different manufacturers	**Recommended set point** Alarm points can be set in between upon need
Point de contrôle	**Type de sonde**	**Température de commutation** Ces valeurs peuvent différer légèrement suivant le fabricant du moteur	**Réglage recommandé** Les points d'alarme peuvent être placés au choix entre ces extrêmes

Lager AS	PT100		-40°C .. +120°C
Bearing DE	RTD		
Palier entraînement	PT100		

Lager BS	PTC	max. +120°C	
Bearing NDE	Thermistor		
Palier ventilateur	Thermistor		

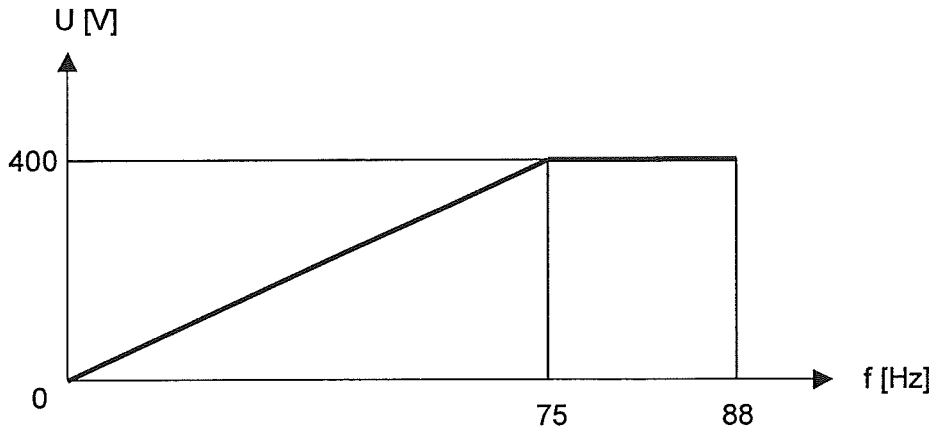
Lager BS	PT100		-40°C .. +120°C
Bearing NDE	RTD		
Palier ventilateur	PT100		

Wicklung	PTC	Isolationsklasse F Alarm : +130°C Abschaltung : +150°C	
Winding	Thermistor	Insulation class F Alarm : +130°C Trip : +150°C	
Bobinage	Thermistor	Isolation svt. F Alarme : +130°C Arrêt : +150°C	

E-Motor 225M - 50 kW

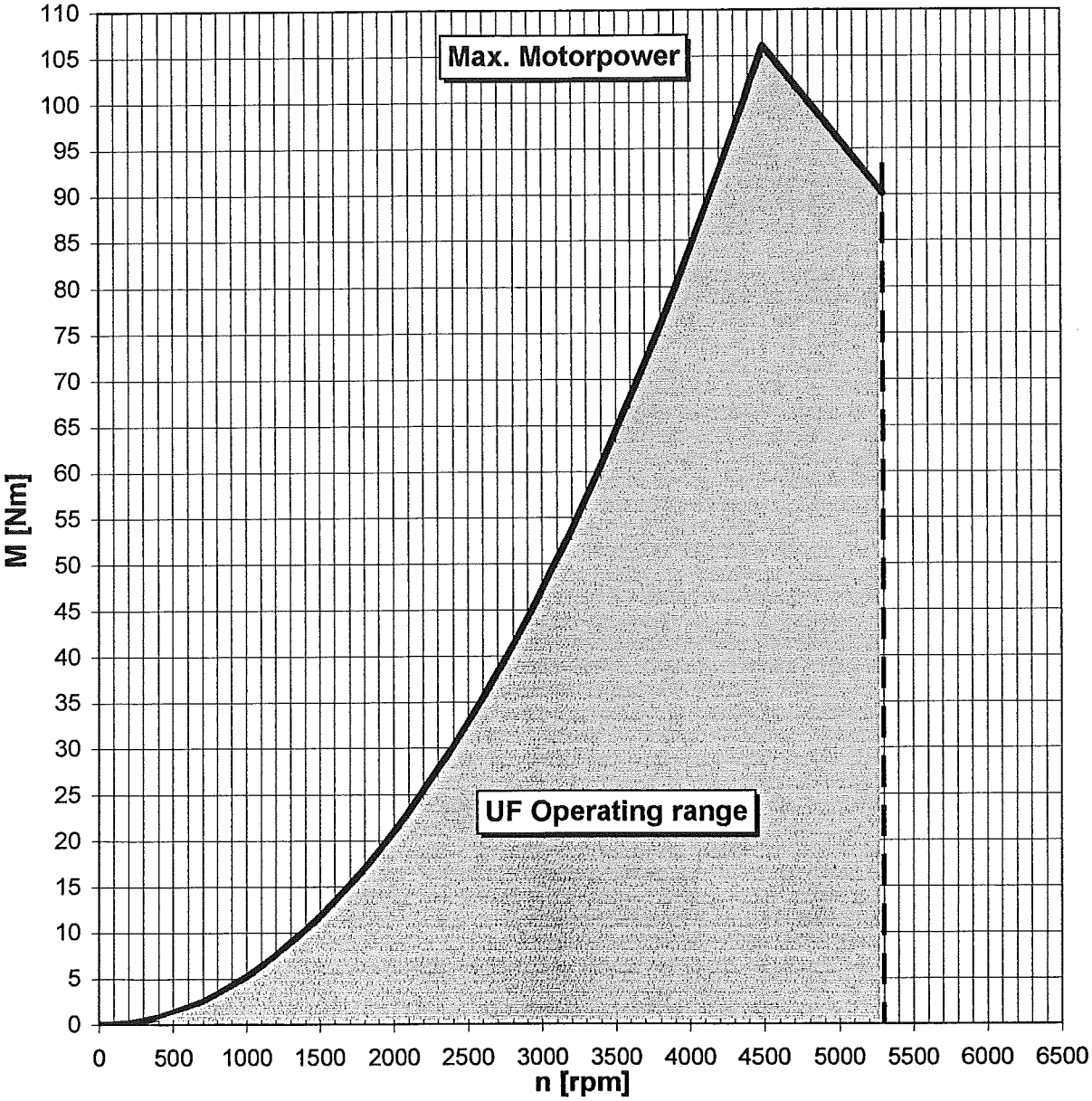
Air Liquide AGS GmbH
Order- Nr. : 4500023387
Tag- Nr. : **P61100 - P61200**
Project Name: „ ASU Kosice "

Nominal Power	50	[kW]	
Nominal Speed	4500	[min.$^{-1}$]	(Operating range : 4300 – 5300)
Nominal Frequency	75	[Hz]	(Operating range : 72 – 88)
Nominal Voltage	400	[V]	



sefco **Torque Curve** 05.043 / 10

Pump Type **CL2-19 / EM-50**	Nominal Power **50 [kW]**	Nominal Speed **4500 [rpm]**
Customer-Ref.	***Air Liquide AGS GmbH*** Order- Nr. : 4500023387 Tag- Nr. : **P61100 - P61200** Project Name: „ ASU Kosice “	



Operating and maintenance instructions

for rotary current induction motors with short-circuit rotor

designed in conformity with the

CE guideline on machines

Antriebstechnik KATT Hessen GmbH
Bahnhofstraße 66
D-34576 Homberg/Efze
Tel: 05681-99 52 0
Fax: 05681-49 00
e-mail: Info@akh-antriebstechnik.de

AKH
Antriebstechnik KATT Hessen

Chapters

Antriebstechnik KATT Hessen GmbH
Bahnhofstraße 66
D-34576 Homberg/Efze
Tel: 05681-99 52 0
Fax: 05681-49 00
e-mail: Info@akh-antriebstechnik.de

7. Commissioning

7.1 Insulating resistance test
- PTC resistor temperature sensor
- PT 100 platinum resistors

7.2 Initial commissioning
- Running smoothness
- Running noises
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7.4 Switching on

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8. Maintenance and inspection

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8.3 Lubrication and maintenance instructions for anti-friction bearings
- General
- Motors without re-lubricating device
- Motors with re-lubricating device
- Motors with re-lubricating device and automated grease volume governor
- Notes on re-lubrication

8.4 Spare parts

Antriebstechnik KATT Hessen GmbH
Bahnhofstraße 66
D-34576 Homberg/Efze
Tel: 05681-99 52 0
Fax: 05681-49 00
e-mail: Info@akh-antriebstechnik.de

1. Machine identification

Machine model :	FN 225 ML-2/F
Client :	Sefco AG
Article number of machine:	PB2*KFS303
Capacity :	50 kW
Synchronous speed :	4500 min^{-1}
Asynchronous speed :	4300 ÷ 5300 min^{-1}
Voltage :	400 V
Frequency :	75 Hz
Power factor cosφ :	0,91
Circuit :	Y
Nominal current :	90 A
Protective system :	IP 55
Insulation class :	F
Structural shape :	IM B5 / V1
Operating mode :	S1-S9

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e-mail: Info@akh-antriebstechnik.de

1.1 Notes on maintenance details (address of importing firm, addresses of service companies etc.)

Should service be required, it should be carried out by the responsible importing firm :

or by the manufacturer:

Company: Antriebstechnik KATT Hessen GmbH
Bahnhofsstraße 66

D -34 576 Homberg / Efze

Telefon: + 49 56 81 / 99 52 – 0
Telefax: + 49 56 81 / 49 00

2. Standards and regulations

The rotary current induction motors with short-circuit rotor referred to in the present operating and maintenance instructions comply with the provisions governing revolving electric machines and with German industrial standards, especially DIN VDE 0530 and IEC 34.

Heading	DIN VDE	IEC
Nominal operation and ratings for revolving electric machines	DIN VDE 0530, T 1	34 -1 85
Protective systems of electric revolving machines	DIN VDE 0530, T 5	34 -5
Cooling systems for electric revolving machines	DIN IEC 34, T 6	34 -6
Structural shapes of electric revolving machines	DIN IEC 34, T 7	34 -7
Wiring designation and direction of rotation of electric machines	DIN VDE 0530, T 8	34 -8
Surface cooled induction motors for intermittent service - assembly dimensions	DIN 42 681	72 -1
Cylindrical shaft ends for electric machines	DIN 748, T 3	72
Conic shaft ends for electric machines	DIN 1448	
Noise emission - limit values	DIN VDE 0530, T 9	34 -9
Integrated thermal protection		34 -11
Fitting flanges for electric machines	DIN 42 948	72 -2
Degree of vibration of electric revolving machines	DIN ISO 2373	34 -14
Regulations on electro-magnetic appliances	DIN VDE 0580	
(Radial) deep groove ball bearings	DIN 625	
(Radial) angular ball bearings	DIN 628	
Cylinder roller bearings	DIN 5412	

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3. Operating conditions

3.1 Use in accordance with destination

Regarding the use in accordance with destination of rotary current induction motors with short-circuit rotors, Antriebstechnik KATT Hessen assumes the operating conditions that correspond to the technical specifications previously defined by the customer.

The present operating and maintenance instructions include notes and recommendations regarding the use of the motors in order to guarantee or to promote:

- safety of persons and materials
- the preservation of the functional capacities
- ease of maintenance.

3.2 Working station and operating staff

The design of working stations and the qualification of the operating staff as a prerequisite for the orderly functioning of the motors are the user's liability.

The rotary current induction motors with short-circuit rotor manufactured by our Company comply with the DIN VDE 3100 (device safety) and with DIN EN 292 regulations.

The motors are so designed or constructed that they will not exceed the gauge readings that are determined in the relevant equipment standards and other documents specifying magnetic compatibility (EMV).

4. Delivery

Upon receipt of the motors, they must be checked immediately for visible shipping damages. Any damages should be noted down in the waybill and confirmed by the driver's signature.
Furthermore, the forwarder must be advised immediately and accordingly, with copy to the Antriebstechnik KATT Hessen.

Upon clients' request, large current rotary induction motors with sensitive rotors will be equipped ex works with a rotor fitting in order to protect the bearings from damages caused by shocks and vibrations during transportation. This should not be removed until just prior to winding-up of the motor elements.

Insofar as provided, the lifting screws or eyelets mounted to the lifting bars of the casing body are to be used for hoisting of the motors. It is imperative to make sure that, when lifting the motor, ancillary elements such as ventilator caps, separate fans, tacho generators, surge generators etc. suffer no damages.

No carrying ropes may be wound around shafts, pillow blocks, couplings, protective caps or similar elements. Machines or aggregates mounted onto base frames must be hoisted using the suspension fittings in the base frame - never use the lifting eyelets of the individual machine !

When setting the motors down, make sure they are lowered gently on the ground. Flange motors must be protected from rolling off.

5. Storage

If no immediate commissioning of the motors is scheduled or if they are put out of operation for an extended period, they must be stored on a dry site free from dust and vibrations.

Electric motors should not be stored indoors without packing. If stored outdoors, they must be equipped with a protective cover against precipitation.

In case of strong fluctuations of temperature or high air humidity, it is recommended that the integrated stop period heating be switched on (if required, subsequent installation to be ordered from the ANTRIEBSTECHNIK KATT HESSEN).

Measures against the forming of condensation must be taken. Polished shaft ends are to be protected from corrosion by means of varnish or grease.

Where larger motors without transport safety (shaft fixing) are involved, we recommend that the rotor be turned a little from time to time.

This prevents stop period indents on the rotor surfaces owing to high local bearing loads. It is recommended that vibration-damping underlays, e.g. rubber mats, be used.

6. Set-up

6.1 Set-up site

The motors must be affixed to a vibration-free foundation.

ATTENTION : All base fixing elements must be level. Possible height differences are to be compensated for by underlay sheets, only then can the fitting screws be tightened. Otherwise there is a risk of deformation and breaking of the motor casing.

More specifically where the motor is mounted onto a steel structure, adequate bracings must be planned against inadmissible vibrations coming from resonance. These problems are particularly evident with high-speed rotors (2-/4- pole).

Sufficient feed in terms of cooling air intake must be ensured. Where fan ventilation is concerned, the volume of cooling air specified on the rating plate must be made available, while also the possibly advised pressure drop must be taken into account.

Especially where measures are taken to ensure attenuation (e.g. set-up inside a sound absorbing casing), sufficient cooling air feed must be provided. To perform this, an efficient cooling air monitoring system (mechanical or thermal) is recommended.

The protective and cooling mode of the motors must be selected by the customers in accordance with conditions prevailing at the set-up site.

In case of doubt, please check back with ANTRIEBSTECHNIK KATT HESSEN.

6.2 Fitting of motor elements

Where machines that were not delivered in assembled condition are involved, only such components as are marked as matching may be used.

Prior to winding up transmission elements (couplings, pulleys etc.) the shaft end must be carefully cleaned (remove anti-corrosion varnish), lubricated or be rubbed with a paste.

Furthermore, should transport locking be provided (shaft locking) or otherwise screws or clamping pieces have been utilized, depending upon design these must be removed; if applicable, please observe special notes.

It is recommended that prior to assembly of the transmitting elements, the adapters to be wound up be heated so as to be able to push them onto the shaft without too much effort and with appropriate equipment.

At all times, strong shocks or impacts are to be avoided, as otherwise bearing damage can be expected. Please observe the assembly notes of the coupling ANTRIEBSTECHNIK KATT HESSEN.

6.3 Balancing level

As a basic principle, only couplings with trouble-free, i.e. smooth, carrier division should be utilized. Regarding the entire set of elastic transmission elements, special attention should be given to equal elasticity factor and quality level.

Every irregularity, especially with high rotary moment and owing to cranking forces in the shaft sector, will cause bending vibrations entailing a risk for serious motor damages by grinding of the rotor within the stator bundle of laminations. Please observe ANTRIEBSTECHNIK KATT HESSEN notes on assembly and adjustment, particularly where special couplings are involved. Adapters etc. must be balanced dynamically and, if at all possible, under operating speed.

Where coupling operation is involved, shafts must be mutually adjusted, axially and radially. The assembly instructions of the couplings ANTRIEBSTECHNIK KATT HESSEN in terms of methods, tolerances etc. must be strictly observed.

Where the belt-drive is concerned, it is important to make sure that both matching disks are flush, i.e. both shafts must be located in parallel position and the connection line between the disk centres must form a right angle with the shafts. Also make sure that the belt pre-tension is performed in accordance with the guidelines of the belt ANTRIEBSTECHNIK KATT HESSEN. Unnecessarily high pre-tension comprises a risk for shafts and bearings.

If at the time when the motor is ordered, the use of belt or pinion drive has not been discussed, an inquiry with ANTRIEBSTECHNIK KATT HESSEN indicating the technical transmission data inclusive of dimensions is a must with regard to clarifying the solidity proof for shaft and bearings loads.

For high radial belt tension, the use of an additional shaft for motor relief may be required under special circumstances.

We should also be informed regarding possible axial pressure/ axial tension loads to enable us to check the bearing design.

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The balancing level of the motor has been defined taking into account the DIN ISO 8821 standard (balancing of rotors and related parts) and the DIN ISO 2372 standard, in addition to customers' requirements.

- motors that have been gauged in accordance with the "full gauge spring" agreement receive no identification.
- motors that have been balanced in accordance with the "half gauge spring" agreement are identified by the letter H near the nut (front side of the shaft).
- motors that have been balanced in accordance with the "no gauge spring" agreement are identified by the letter N near the nut (front side of the shaft).

Depending on the balancing level of the motor, transmission elements balanced accordingly must be applied ! Our motors are balanced and checked taking the DIN ISO 8821 standard into consideration as well as the VDI 2056 assessment scale.

In case of doubt, please clarify with the ANTRIEBSTECHNIK KATT HESSEN in order to guarantee vibration-free functioning and optimal working life.

6.4 Motors with cylindrical roller bearings

In certain circumstances, unwinding malfunctions can occur with rotary current induction motors with reinforced bearing (cylinder roller bearing drive-side). More frequently, such problems arise with fast running (4-/2-pole) motors of small to average construction size under reduced radial load. Unexpected increase of the bearing temperature is the consequence. Remedial measures can consist of a different choice of bearing, after consultation with ANTRIEBSTECHNIK KATT HESSEN.

It is the entire motor concept that is essential for the bearing decision, taking into account thermal length expansion of the shafts as well as radial/axial loads.

Warning ! Safety notes !

- improper set-up leads to material damages and personal injuries!
- connecting, installing and grounding must be performed in accordance with national regulations !
- in any potentially explosive environment, the relevant special provisions must be observed!

7. Commissioning

7.1 Insulating resistance test

The insulating resistance of the winding against mass as well as the wound parts in relation to one another must be measured prior to commissioning or to re-commissioning after lengthy storage periods and must comply with the regulations in force in accordance with use. Test voltage : 1000 V (DC).

The minimum requirement for operating readiness is 300 MOhm, referring to a 20° C winding temperature.

Clean, dry windings show a multiple of the indicated limit values. For comparison purposes: smaller motors must show higher values than large motors, owing to shorter creep distances.
In case of doubt, please contact ANTRIEBSTECHNIK KATT HESSEN prior to commissioning of the motors.

The measuring of the insulating resistance should be carried out while the motor is disconnected; the motor and the interior of the terminal box must be clean.

For larger rotary current induction motors, the polarisation index (PI) can be used for further assessment of the winding insulation. The insulating resistance or the loading power is measured after one minute and again after 10 minutes. The 10-minute value is then divided by the one-minute value. The result should come to at least 1.5.

ATTENTION: If the indicated limit values of the insulating resistance fall short owing to humidity, careful subsequent drying of the winding should be performed only after consultation with ANTRIEBSTECHNIK KATT HESSEN !

The subsequent drying process can be completed e.g. by means of winding heating using direct current (e.g. welding motor-generator). During the process, the electric power may not exceed half the winding nominal current and the winding temperature must be permanently supervised in accordance with the relevant insulation material category (possibly on the basis of the measurement of the copper-resistance increase). The winding phases will need to be changed from time to time !

For the subsequent drying of short circuit rotor motors, the use of rotary current feed with correspondingly reduced voltage (approx. 5 to 6% of the machine nominal voltage) with locked rotor is also possible. This procedure could cause problems owing to inductive additional heating where welding rings with winding steel bands are involved. It is also imperative that the forming of power transition indentations on the rings be prevented while the rotor is inactive !

Closed construction shapes must be opened by removal of possible coolers or at least in the area of service traps, air gap measurement openings, clamping plates or blind covers, in order to allow for air exchange (if necessary, blow dry air through).

PTC resistor temperature sensor

With rotary current induction motors with thermal winding protection by means of resistors, special attention must be paid to the drying temperature that needs to be below the authorised temperature of the relevant insulating category of the motor. PTC resistors may only be tested applying a measuring voltage of less than 2.5 V (DC).

PT 100 platinum measuring resistances

Pt 100 measuring resistances (100 Ohm at 0° C), in conjunction with the test amplifiers and display units that are gauged accordingly, allow for correct winding thermometry. Monitoring is also possible by means of a resistance bridge or an ohmmeter with low holding-wire current (resistance alteration = 0.385 Ohm/K, i.e. 138.5 Ohm measured e.g. = winding temperature of 100° C).

7.2 Initial commissioning

VERY IMPORTANT: PRIOR TO INITIAL COMMISSIONING OF THE MOTOR, PLEASE READ OPERATING AND MAINTENANCE INSTRUCTIONS CAREFULLY !

Prior to commissioning, turn the rotor by hand and listen to hear whether any unusual noises can be heard. ANTRIEBSTECHNIK KATT HESSEN recommend that the motor be kept running, to begin with, for approximately one hour in unloaded state, i.e. uncoupled from the working machine. Correct running is given when no unacceptable vibrations or irregular bearing noises are noted.

Smoothness of running

The rotary current induction motors manufactured by ANTRIEBSTECHNIK KATT HESSEN have been tested with regard to smoothness of running prior to delivery. Should inexplicable vibrations occur, however, the motor must be uncoupled from the working machine and be started again to determine the cause of the vibrations.

If the running smoothness remains unsatisfactory, the cause could be a different balancing level of the components (coupling, pulley etc.) or the proper sequence of the fundament is located too near the motor revolving frequency. Experience has shown that proper frequency problems as a rule arise only with 2-pole motors. In order to check the kinetic quality of the motor alone, it must be run without composite parts and with the indicated kinetic agreement (agreement: "full gauge spring", "half gauge spring" "without gauge spring"), on neutral underlay (e.g. rubber mats or vibrating metals), and the vibrating speeds (mm/sec) measured.

Motors in coupling operation, i.e. with reduced radial load, show unexpected vibrations regardless of correct balancing. One reason might be a "jumping" of the rotor owing to increased storage air. Where bearings with reduced storage air are involved, these problems can be solved.
For motors with 2-groove ball bearings, the movable bearing should be pre-stressed (e.g. by means of disk springs).

Bearing noises

Tapping or knocking noises emerging from the bearing chambers indicate bearing damages. Bearing damages can arise from shipping, extensive storage periods etc. Screeching noises indicate skidding rollers inside the cylinder roller bearings. The cause could be a lubrication film that has not yet been fully built up (occasionally observed while roller bearings are unloaded).
In addition to a sonar rod or a stethoscope for subjective assessment by an expert, portable SPM 43 A or T 2000 testing devices can be used for bearing tests.

For any and all running noises, the differing design types of the motor casing must be taken into account with regard to loudness. (Cast casings always seem to be quieter than welded steel structures with tube coolers, for example.)

Lubrication

The lubrication and maintenance instructions are to be strictly observed !
Anti-friction bearings are provided, prior to delivery, with the required amount of lubricants for initial lubrication. (If necessary, please request specifications from ANTRIEBSTECHNIK KATT HESSEN).

The temperature of the anti-friction bearings may exceed the ambient temperature of 40° C by up to 50 K, higher temperatures may be acceptable, but are subject to certain conditions.

Electric wiring

Attention: Please compare the mains and desired operating data with the specifications on the motor rating plate !
NOTE THE WIRING MODE !

In regards to the admissible voltage fluctuations, the DIN VDE 0530 standard is applicable to electric machines; it is harmonised with the IEC 34-1 and standardises a tolerance of ± 5 %. The reference value is the nominal voltage indicated on the rating plate.

The data on the rating plate relate to (with tolerances) a maximum ambient temperature of 40° C, unless otherwise specified, with a maximum set-up altitude of 1000 m above sea level.

The connection must be performed using cables conforming to regulations, in expert fashion and in accordance with the local set-up regulations.

All connecting clamps must be firmly tightened, otherwise strong warming-up and subsequent destruction of the insulating material may be expected.

Connections of possible temperature monitoring devices (Pt 100- measuring resistances, PTC-resistors, bi-metallic temperature monitors) for winding and bearings as well as for out-of-service heating etc. are either located in an additional auxiliary terminal box or in the master terminal box, inclusive of wiring diagram and technical data. The use of these appliances is required for operating safety purposes.

For the grounding of casings, the terminal points are either located inside the terminal box or below, on the motor pedestal.

In order to prevent damages caused by wrong connections that might turn out to be serious, please get in touch with us as necessary.

The wiring diagram inside the cover of the terminal box must be observed. Special care is required with motors that are voltage- or pole-changing.

Where star/delta starting is involved, the change-over time relay must be adjusted so that the relaying star to delta switching occurs only after the tilting moment has been exceeded (after fade of the star starting power). Only in exceptional cases can differing conditions be scheduled after discussion and testing of the run-up period (e.g. with ventilated drives with higher mass number).

Furthermore, the thermal circuit breakers must grasp the winding lane current in the delta connections between motor and switch (contactor) where start switching of rotary current induction motors with short-circuit rotor are involved; they must therefore be adjusted to the lower star power (=0.577 x motor nominal current).

For the line-side motor protection, a switching device must be used in conjunction with a short-circuit fast release designed for the motor and the thermal releases adapted to the winding nominal power.

If the connection of the net phases L1 L2 L3 (RST) to the motor clamps U1 V1 W1 is in the same direction, the motor shaft will revolve in right-hand direction viewed from the outside toward the shaft bolt (revolving in clock-wise direction). If left-hand revolving is desired, two phases have to be exchanged.

Where motors are suitable for only one direction, because of the direction of rotation dependent ventilators or external ventilators, an appropriate identification in the form of a direction arrow is affixed to the motor casing or to the ventilator cap. An opposite direction is unacceptable, as overheating caused by the lack of cooling air would occur. In such an event change of direction can be carried out only by means of new or modified ventilators, re-balancing of the rotor will probably also be required !

In frequency converter operation, the instructions of the frequency converter ANTRIEBSTECHNIK KATT HESSEN must be observed.

WARNING ! SAFETY INSTRUCTIONS !

- Voltage and revolving machine elements mean danger to life !
- Inexpert set-up, operation and maintenance lead to material damage and personal injury!
- Connecting must be performed in accordance with national regulations !
- Prior to commissioning, all supervisory and protective equipment must be completely mounted and checked to see that it functions !

- The electric motor may be operated only in compliance with rating plate indications !
- Cooling must be reliably guaranteed during the entire operating time!
- Casing temperature increase during operation can cause burning !
- Flammable materials must be kept away from the machine !

7.3 Re-commissioning

If the machine is re-commissioned after extensive idle periods, the process is the same as under item 7.1 Insulating resistance test and item 7.2 Initial commissioning.

7.4 Switching-on

The electric wiring of the motor must be such that the switch-on can be operated only via deliberate activation of a command device expressly provided. Upon direct switch-on, the safety equipment must be applied so that upon switching all external conductors are disconnected.
Any danger to persons must be excluded in accordance with DIN EN 292.

7.5 Overload release protective device

Placing an unacceptably high power load on the motor is prohibited!

Depending on power, retarding releases or relays must be adjusted to the motor nominal power. Furthermore, they must be so selected that the motor is thermally protected even in the event of a short-circuit (i.e. with locked rotor). This requirement is assumed as complied with if the release period that can be seen from the release characteristic curve (starting temperature 20° C) for the ratio I_A/I_N does not exceed the heating time t_E indicated for the relevant temperature brackets.

7.6 Temperature monitoring

Upon client request, temperature monitoring can be ensured by means of PTC resistors (according to DIN 44081 or 44082), bi-metallic temperature monitors (according to VDE 0631) or Pt 100 platinum measuring resistances (according to DIN IEC 751).

If the temperature monitoring consists of PTC resistor temperature sensors, the motor is identified by an adequate additional plate "resistor temperature sensor").

8. Maintenance and inspection

The maintenance concerns mainly the bearing materials, the insulating materials and the cleaning in conformity with operating conditions.

The observance of the operating conditions and the putting into practice of the maintenance, inspection and revision recommended by the ANTRIEBSTECHNIK KATT HESSEN and completed by the user has decisive influence on the motors' working life.

For this purpose, our lubrication and maintenance instructions for anti-friction bearings as well as the notes contained in the specific set-up, operating and maintenance instructions are to be observed. If necessary, please get in touch with ANTRIEBSTECHNIK KATT HESSEN.

8.1 Cleaning

The cleaning of dust deposits from motors should be performed with a vacuum cleaner or bellows. In no circumstance may compressed air containing oil or water be used.

It is imperative that dirt be prevented from being blown inside the motors.

Motors with tube coolers require special care so that no dirt can block up the tubes. The tubes can be easily cleaned with a brush.

Motors that stand still for an extensive period under extreme climatic conditions with an ambient temperature exceeding 40° C and relative air humidity exceeding 95%, can still be commissioned provided their insulating resistance is located slightly below the restrictive value of 300 MOhm, and they are in clean condition.

In all events, consultation with ANTRIEBSTECHNIK KATT HESSEN is required.

8.2 Outdoor operation

Where the motors are operated outdoors without a protective roof (possible only for motors of IP 44 minimum protective type and in normal climate), an increased maintenance effort is required, particularly where extensive standstill periods are involved.

The motors operated outdoors should be taken into operation at least one hour per month to limit corrosion risk from condensation and precipitation. Where motors stand still during winter time, blocking of the external ventilator by snow and ice must be prevented.

WARNING ! SAFETY INSTRUCTIONS!

- Inexpert maintenance leads to material damage and personal injury !
- All work with the motor, excepted for re-lubrication, may be performed only during out-of-service periods, in a disconnected state and protected from inadvertent switching-on.
- Assembly and maintenance activities as well as operation may be performed only by specially trained staff !
- The operating and maintenance instructions are to be observed.

8.3 Lubrication and maintenance instructions for anti-friction bearings

General

Anti-friction bearings are precision parts. Appropriate lubrication is imperative to ensure long operation.
A low-vibration run and keeping to the relevant admitted loading capacities are a must for a long working life.

The proper lubrication type as indicated on the index plates for re-lubrication is a must. This will avoid damages to the bearings owing to use of wrong lubricants. The indicated lubrication intervals must be observed; excessive lubrication of the bearings can entail damages.

Unfavourable operating conditions could make corrections to the lubrication instructions necessary - if required, please consult us.

ATTENTION: The bearing grease loses its good lubricating features when the machine has been inoperative for some time, under unfavourable conditions and environmental influences!
If in doubt, please consult the ANTRIEBSTECHNIK KATT HESSEN of bearings, of lubricants or of the motors.

Motors without re-lubrication device

As a rule, the initial lubrication will be enough for the entire service life of the designed bearings, as motors without re-lubrication equipment are provided with a "for life" lubrication, i.e. the usable life of the grease exceeds the durability of the bearings.

The "for life" lubricated bearings are filled 30% to 40% of the available space with appropriate grease ex works.

A change of grease or an exchange of bearings where bearings with face-and-back sealing discs are concerned, is required where - owing to higher temperatures, influence of pollution (water, aggressive media) or from high dynamic-mechanical charges of grease film on the functioning surfaces - the usable life of the grease is considerably shorter than the anticipated durability of the grease bearings.

Should a new lubrication - also after extensive down time - be required, the old grease must be entirely removed, while the bearing cover and the bearing must be washed carefully, using petrol or cold cleaner. Then spread fresh grease on roll bearings and fill both bearing covers up to two thirds level grease.
Should you require clarification, please get in touch with ANTRIEBSTECHNIK KATT HESSEN.

Overfilling the grease causes inadmissible heating of the anti-friction bearings and must therefore be avoided! If possible, after the bearing covers have been replaced, check the smooth running of the motor by hand.

When re-commissioning is started, monitoring the motor is recommended. Noises and strongly increased heating suggest malfunctions. A careful examination of the procedure of re-lubrication must be undertaken in this event. Should you require clarification, please get in touch with ANTRIEBSTECHNIK KATT HESSEN

Motors with re-lubrication device

At every lubrication point of the motor a re-lubrication index plate is mounted, specifying the grease amount and the deadlines for re-lubrication. After re-lubricating three times, the external bearing covers must be dismounted and the old grease deposits removed from the inside. The bearing covers are then fitted again in cleaned and grease-free state.

After the bearing covers have been re-fitted, please check the smooth running of the motor by hand.

ATTENTION: Re-lubrication should always be carried out while motor is running, if necessary, provide lubricating pipe extensions. The pipes need to be always filled with grease.

Motors with re-lubricating device and automated grease volume governor

Re-lubrication should be carried out while the motor is running. Re-lubrication index plates are also installed for your information. The grease collectors are identified by special note plates.

An integrated centrifugal disk ejects the old grease that has been pressed out of the anti-friction bearings and that is then collected in a chamber. The chamber is arranged in conformity with the table below; it is emptied after several re-lubrication processes in the indicated manner. A check-up must be performed after 2 to 3 hours

ATTENTION: If an excessive grease volume is re-pressed in one process, that could lead to considerable bearing heating, as the excess amount of grease will be ejected only after hours.

Arrangement of the grease chamber	Evacuating procedure
Grease chamber below the ventilator cap - drive-side	Loosen screws, remove grease chamber, and empty
Grease chamber below the external bearing cover	Pull out slide, empty chamber
Grease chamber below the internal bearing cover	Reach into the bearing shield opening, pull out slide, empty chamber
Horizontal tubes below the ventilator cap - drive-side	Unscrew both stoppers, push out old grease with a rod

The notes apply correspondingly to different constructions.

Notes on re-lubrication

Prior and subsequent to every re-lubrication process, make sure the motor is running smoothly by applying a listening rod or a SPM measuring device to it.

If the indicated grease or grease showing the same soaping criteria is not available for motors with re-lubrication device, the bearings must be opened and the grease they contain be completely removed. A cleaning and new lubrication (as described in paragraph "motors without re-lubrication device") must be performed using a lubricant of equal quality.

A mixing of anti-friction bearing greases with differing soaping criteria is not acceptable, as the lubricity of the greases is definitely impaired by the mixing process. A regular maintenance of the anti-friction bearings in the outlined manner helps avoid anti-friction bearing damages.

Grease, grease quantity and relubrication intervals

The lubrication and maintenance instructions are to be stictly observed!
Motors with lubricating devices must be lubricated at the set intervals using the specified grade and quantity of grease. The relevant details are stated on the plates next to the lubricating points, or evident at lubrication specification.

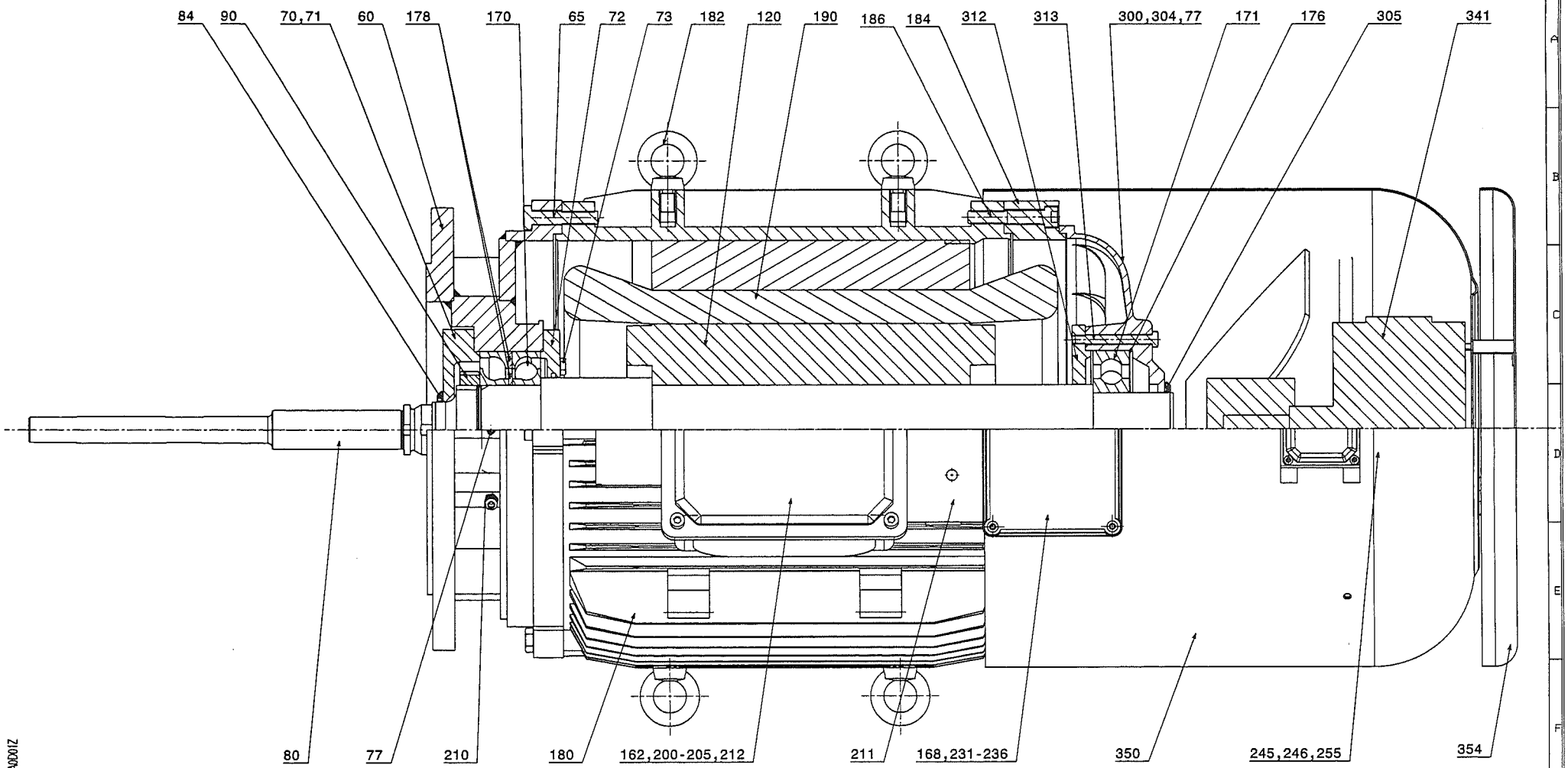
Motor-type	Bearing:	Grease:	Re-lubrication interval: [h]	Grease quantity: [g]
FN225ML-2/F	2x7216ACDGA/P4	Klüber Isoflex Alltime SL2	1500	25
	6313TBP63	Klüber Isoflex Alltime SL2	1500	10

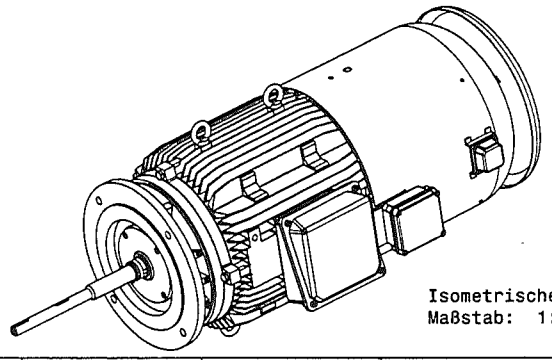
The re-lubrication interval is suitable for the application for operating duty which is in accordance with the ANTRIEBSTECHNIK KATT HESSEN instructions. For other operating duties consult with the ANTRIEBSTECHNIK KATT HESSEN.

8.4. Spare parts

It is recommended that a spare parts list be requested from ANTRIEBSTECHNIK KATT HESSEN. When ordering spare parts, the rating plate data and the serial number of the motor must be indicated, specifically the entire type denomination inclusive of all additional letters and figures. If a spare parts list is on hand, the spare parts designation and their current number according to list should be indicated.

In case rotating parts of the machine have been exchanged, particularly of machines with high revolving speed, a dynamic re-balancing must be performed under observation of the applied balancing agreement.





Isometrische Ansicht
Maßstab: 1:8

System/Pfad: Asynchronmotoren\Bg225\Zusammenbau\22VN5Z400A0D01Z

Vervielfältigungs- und Eigentumsrecht vorbehalten.
Diese Zeichnung darf ohne Genehmigung weder Dritten noch Konkurrenzfirmen weitergegeben werden.

ISO Toleranzen DIN 7160 DIN 7161	Einstiche für Sicherungsringe DIN471/472. Alle scharfen Kanten entgraten.					Zul.Abw. f. Maße a.Toleranzanzeige mittel ISO 2768		Oberflächen -schutz	Maßstab 1:2,5 (A3)		Gewicht
									Halbzeug/Werkstoff		
						2004	Datum	Name	Benennung	Drehstrom-Motor three-phase-motor BG 225 M	
						Bearb.	25.05.	Bi.			
						Gepr.					
						A.V.			Typ		
						AKH Antriebstechnik KATT Hessen			Zeichnungsnummer	22VN5Z400A0D01E Sk 13430	
Paßmaß	Abmaß	Zust.	Änderung		Datum	Name	Ursprung		Ers.f.:		Ers.d.:

client:
Sefco AG

article no.:
PB2*KFS303

motor-type:
FN 225 ML-2/F

part list: 22VN5Z400A0D01Z					
pos.	designation	model-no	norm draw-no	pcs	
60	flange end shiels	22FA40SF	Sk 13415	1	
65	hexagon screw	M12x60B		4	
70	bearing cover	DA140/050B	Sk 10759	1	
71	cylinder screw	M8x40		4	
72	bearing cover	DI140/093A	Sk 10778	1	
73	hexagon screw	M8x35B		3	
77	lubricator	SCHNH1M6		2	
80	motor shaft	22VZP00001	Sk 13434	1	
84	Stefa-Gamma-ring	GR050070		1	
90	nut	DRS80X2,0		1	
120	rotor	22RP2290		1	
162	terminal bord	KLB2M4		1	
168	terminal bord	AKB4-19		1	
170	spindle bearing	7216ACDGA/P4	DIN 628	2	
171	ball bearing	6313TBP63	DIN 625	1	
176	equalizer ring	KAS6313	DIN 1100	1	
178	shim ring	SS110/080P		1	
180	stator frame	22GM5G8N		1	
182	ring bolt	RS12	DIN 580	4	
184	stator frame extension	22ZR050	Sk 13436	1	
186	cylinder screw	M12x70A		4	
190	stator	22SP2290		1	
	Terminal box complete	KK22GKPL		1	
	Terminal box complete	KK08-11XKPL		1	
	Terminal box complete	KK034M-1KPL	Sk 6405	1	
210	cable gland	KVM8X1,25		2	
211	plate for terminal box	ZP08-22SF	Sk 6760	1	
212	terminal board	KLB6M10		1	
300	end shield	22LARHGF2	Sk	1	
304	cylinder screw	M12x70A		4	
305	Stefa Gamma ring	GR065085		1	
313	hexagon screw	M8x70B		4	
312	bearing cover	DI140/080D		1	
341	forced ventilator	DA-T-235-4	Süd Electric AG	1	
350	hood	22HA450-02		1	
354	protection cover	22HD		1	

date: 19.05.05
name: C.Gerhard

spare part list No.:
22VN5Z400A0D01Z
drawing No: Sk 13430

english

client:	article no.:	motor-type:
Sefco AG	PB2*KFS303	FN 225 ML-2/F

part list: KK22GKPL					
Pos.	designation	model no	norm draw-no	pcs	
200	Terminal box	KK22G-A07		1	
201	terminal box sealing	DK22GG		2	
202	cylinder screw	M8x30A	DIN 912	4	
203	terminal box cover	KD22GF		1	
204	terminal box cover sealing	DD22GG		1	
205	cylinder screw	M8x20A	DIN 912	4	
part list: KK08-11XKPL					
pos.	designation	model no	norm draw no	pcs	
231	terminal box	KK08AX0-04		1	
232	terminal box sealing	DK08-11XS		1	
233	cylinder screw	M5x12A	DIN 912	4	
234	terminal box cover	KD08-11X		1	
235	terminal box cover sealing	DD08-11XS		1	
236	cylinder screw	M4x10A	DIN 912	4	
part list: KK034M-1KPL					
pos.	designation	model no	norm draw no	pcs	
245	terminal box	KK034M-A	Kienle+Spies	1	
246	terminal box sealing	DK05-07NG		1	
255	terminal board	KLB6M4			

date: 19.05.05	spare part list No.:	
name: C.Gerhard	22VN5Z400A0D01Z	
	drawing No: Sk 13430	english

Certificates

sefco	Delivery Certificate	Ref. Nr.: 05.043/1A

Customer:	Air Liquide AGS GmbH - 4500023387 - ASU Košice - K70101		P61100
Pump Type:	CL2-19 / EM-50		
Motor:	Manufacture : AKH	Type: FN225ML-2F	Nr.: 19114.05/001
	P: 50 [KW]	U: Y 400 [V]	I: 90 [A]
	$n_{.range}$: 4300-5300 / $f_{.range}$: 72-88 [Hz]		$f_{field\ weakening\ point}$: 75 [Hz]
Pressure Test	Hydraulic pressure test of pump casing completed at 65 bar for 5 min.		
(EN 13275:2000/§5.2.2)	Date: 11.04.05	Signature: AK	
Degreasing	Pump cold end has been degreased with Trichlorethylen for LOX operation.		
(EN 12300:1999)	Date: 04.05.05	Signature: JMG	

LIN-Test

γ 0.7747 [daN/l]

Q [l/min]	p_{suct} [barg]	p_{del} [barg]	Δp [bar]	ΔH [m]	P_{el} [1)] [kW]	$P_{mech.}$ [kW]	η_{pump} [%]	T [°C]	n [rpm]	$f_{Converter\ at\ operation}$ [Hz]
200	1.20	23.45	22.25	287.2	19.5			-191.9	4961	83
250	1.19	23.40	22.21	286.7	21.6			-191.9	4961	83
300	1.17	23.25	22.08	285.0	23.7			-191.9	4961	83
350	1.14	23.30	22.16	286.0	25.9			-191.9	4961	83
400	1.11	22.90	21.79	281.3	27.7			-191.9	4961	83
450	1.10	22.15	21.05	271.7	29.7			-191.9	4961	83
500	1.09	21.05	19.96	257.6	31.7			-191.9	4961	83
528	1.09	20.20	19.11	246.7	32.5			-191.9	4961	83
550	1.05	18.60	17.55	226.5	33.7			-191.9	4961	83
580	1.05	16.30	15.25	196.9	34.4			-191.9	4961	83

1) P_{el} measured at converter inlet

Labyrinth Seal	(measured at 528 l/min, 4961 rpm)	
	Sealgas:	Gaseous nitrogen at approx.15°C
	Measure "A":	1.99 mm
	Feed pressure:	5 barg
	Reference pressure:	1.02 barg
	Sealgas pressure:	1.05 barg
	Sealgas flowrate:	34 mm = 3,2 Nm3/h

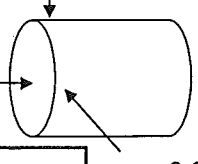
Remarks: Seal leakage, motor DE bearing RTD's, motor winding PTC thermistors and bearing heater: functional check OK

Impeller diam at test:	2x 190 mm
Tip width:	4,5 mm
With Inducer	yes
With blade-ring	yes
Diffusor type:	300+
Orifice ∅ :	
Δp regulator No:	388/O_2

Vibrations: (at DE motorshield) 0.55 [mm/s]

(at 528 l/min)

0.5 [mm/s]



Sound pressure level (at 528 l/min) 0.6 [mm/s]

81,5 dB(A)

	Date : 01.01.00	Signature:	B. Gutknecht

sefco	Delivery Certificate	Ref. Nr.: 05.043/1B

Customer:	Air Liquide AGS GmbH - 4500023387 - ASU Košice - K70101		P61100
Pump Type:	CL2-19 / EM-50		
Motor:	Manufacture : AKH	Type: FN225ML-2F	Nr.: 19114.05/001
	P: 50 [KW]	U: Y 400 [V]	I: 90 [A]
	n_{range}: 4300-5300	/ f_{range}: 72-88 [Hz]	$f_{field\ weakening\ point}$: 75 [Hz]
Pressure Test (EN 13275:2000/§5.2.2)	Hydraulic pressure test of pump casing completed at 65 bar for 5 min.		
	Date: 11.04.05	Signature: AK	
Degreasing (EN 12300:1999)	Pump cold end has been degreased with Trichlorethylen for LOX operation.		
	Date: 04.05.05	Signature: JMG	

LIN-Test

γ 0.7751 [daN/l]

Q [l/min]	p_{suct} [barg]	p_{del} [barg]	Δp [bar]	ΔH [m]	P_{el} 1) [kW]	$P_{mech.}$ [kW]	η_{pump} [%]	T [°C]	n [rpm]	$f_{Converter}$ at operation [Hz]
200	1.20	21.50	20.30	261.9	17.3			-192	4728	79
250	1.20	21.45	20.25	261.3	19.4			-192	4728	79
300	1.19	21.25	20.06	258.8	21.2			-192	4728	79
350	1.19	21.15	19.96	257.5	23			-192	4728	79
400	1.16	20.65	19.49	251.5	24.8			-192	4728	79
423	1.15	20.35	19.20	247.7	25.8			-192	4728	79
450	1.12	19.80	18.68	241.0	26.7			-192	4728	79
500	1.11	18.35	17.24	222.4	28.5			-192	4728	79
550	1.10	15.70	14.60	188.4	29.9			-192	4728	79

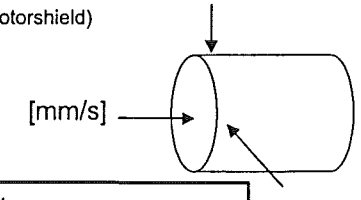
1) P_{el} measured at converter inlet

Labyrinth Seal	(measured at 423 l/min, 4728 rpm)	
	Sealgas:	Gaseous nitrogen at approx.15°C
	Measure "A":	1.99 mm
	Feed pressure:	5 barg
	Reference pressure:	1.1 barg
	Sealgas pressure:	1.12 barg
	Sealgas flowrate:	36 mm = 3,8 Nm3/h

Remarks: Seal leakage, motor DE bearing RTD's, motor winding PTC thermistors and bearing heater: functional check OK

Impeller diam at test:	2x 190 mm
Tip width:	4,5 mm
With Inducer	yes
With blade-ring	yes
Diffusor type:	300+
Orifice ∅ :	
Δp regulator No:	388/O_2

Vibrations: (at DE motorshield) [mm/s]



[mm/s]

Sound pressure level

dB(A)

	Date : 25.05.05	Signature:	B. Gutknecht

sefco — Delivery Certificate

Ref. Nr.: **05.043/1C**

Customer:	Air Liquide AGS GmbH - 4500023387 - ASU Košice - K70101		P61100
Pump Type:	CL2-19 / EM-50		
Motor:	Manufacture : AKH	Type: FN225ML-2F	Nr.: 19114.05/001
	P: 50 [KW]	U: Y 400 [V]	I: 90 [A]
	n_{range}: 4300-5300 /	f_{range}: 72-88 [Hz]	$f_{field\ weakening\ point}$: 75 [Hz]
Pressure Test (EN 13275:2000/§5.2.2)	Hydraulic pressure test of pump casing completed at 65 bar for 5 min.		
	Date: 11.04.05	Signature: AK	
Degreasing (EN 12300:1999)	Pump cold end has been degreased with Trichlorethylen for LOX operation.		
	Date: 04.05.05	Signature: JMG	

LIN-Test

γ 0.7751 [daN/l]

Q [l/min]	p_{suct} [barg]	p_{del} [barg]	Δp [bar]	ΔH [m]	P_{el} [1)] [kW]	$P_{mech.}$ [kW]	η_{pump} [%]	T [°C]	n [rpm]	$f_{Converter}$ at operation [Hz]
200	1.27	20.55	19.28	248.7	16.7			-192	4610	77
250	1.26	20.70	19.44	250.8	18.6			-192	4610	77
300	1.25	20.60	19.35	249.6	20.3			-192	4610	77
317	1.29	20.50	19.21	247.8	21			-192	4610	77
350	1.22	20.30	19.08	246.2	21.9			-192	4610	77
400	1.21	19.80	18.59	239.8	23.1			-192	4610	77
450	1.21	18.80	17.59	226.9	25.6			-192	4610	77
500	1.19	17.35	16.16	208.5	27.1			-192	4610	77

1) P_{el} measured at converter inlet

Labyrinth Seal	(measured at 317 l/min, 4610 rpm)	
	Sealgas:	Gaseous nitrogen at approx.15°C
	Measure "A":	1.99 mm
	Feed pressure:	5 barg
	Reference pressure:	1.21 barg
	Sealgas pressure:	1.23 barg
	Sealgas flowrate:	39 mm = 4,0 Nm3/h

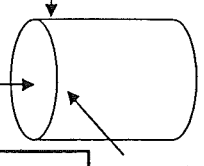
Remarks: Seal leakage, motor DE bearing RTD's, motor winding PTC thermistors and bearing heater: functional check OK

Impeller diam at test:	2x 190 mm
Tip width:	4,5 mm
With Inducer	yes
With blade-ring	yes
Diffusor type:	300+
Orifice ∅ :	
Δp regulator No:	388/O_2

Vibrations: (at DE motorshield) 0.37 [mm/s]

(at 317 l/min)

0.4 [mm/s]



Sound pressure level (at 317 l/min) 81.5 dB(A)

0.85 [mm/s]

	Date : 25.05.05	Signature: B. Gutknecht

sefco — Delivery Certificate

Ref. Nr.: **05.043/2A**

Customer:	Air Liquide AGS GmbH - 4500023387 - ASU Košice - K70101				P61200
Pump Type:	CL2-19 / EM-50				
Motor:	Manufacture : AKH		Type: FN225ML-2F		Nr.: 19114.05/002
	P: 50 [KW]		U: Y 400 [V]		I: 90 [A]
	$n_{.range}$: 4300-5300	/	$f_{:range}$: 72-88 [Hz]		$f_{:field\ weakening\ point}$: 75 [Hz]
Pressure Test (EN 13275:2000/§5.2.2)	Hydraulic pressure test of pump casing completed at 65 bar for 5 min.				
	Date: 11.04.05		Signature: AK		
Degreasing (EN 12300:1999)	Pump cold end has been degreased with Trichlorethylen for LOX operation.				
	Date: 04.05.05		Signature: JMG		

LIN-Test

γ 0.7664 [daN/l]

Q [l/min]	p_{suct} [barg]	p_{del} [barg]	Δp [bar]	ΔH [m]	P_{el} [1)] [kW]	$P_{mech.}$ [kW]	η_{pump} [%]	T [°C]	n [rpm]	$f_{Converter\ at\ operation}$ [Hz]
200	1.31	23.70	22.39	292.1	19.3			-190.1	4958	83
250	1.30	23.75	22.45	292.9	21.5			-190.1	4958	83
300	1.29	23.80	22.51	293.7	23.6			-190.1	4958	83
350	1.29	23.45	22.16	289.1	25.3			-190.1	4958	83
400	1.26	22.90	21.64	282.4	27.5			-190.1	4958	83
450	1.23	22.15	20.92	273.0	29.4			-190.1	4958	83
500	1.22	21.00	19.78	258.1	31.4			-190.1	4958	83
528	1.19	20.35	19.16	250.0	32.5			-190.1	4958	83
550	1.18	19.10	17.92	233.8	33.1			-190.1	4958	83
590	1.14	15.70	14.56	190.0	34.2			-190.1	4958	83

1) P_{el} measured at converter inlet

Labyrinth Seal	(measured at 528 l/min, 4958 rpm)	
	Sealgas:	Gaseous nitrogen at approx.15°C
	Measure "A":	1.92 mm
	Feed pressure:	5 barg
	Reference pressure:	1.15 barg
	Sealgas pressure:	1.17 barg
	Sealgas flowrate:	34 mm = 3,2 Nm3/h

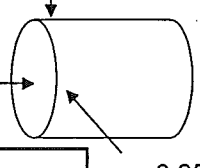
Remarks: Seal leakage, motor DE bearing RTD's, motor winding PTC thermistors and bearing heater: functional check OK

Impeller diam at test:	2x 190 mm
Tip width:	4,5 mm
With Inducer	yes
With blade-ring	yes
Diffusor type:	300+
Orifice ∅ :	
Δp regulator No:	391/O_2

Vibrations: (at DE motorshield) 1.0 [mm/s]

(at 528 l/min)

0.6 [mm/s]



0.95 [mm/s]

Sound pressure level (at 528 l/min) 78,5 dB(A)

	Date : 25.05.05	Signature: B. Gutknecht

sefco — Delivery Certificate

Ref. Nr.: **05.043/2B**

Customer:	Air Liquide AGS GmbH - 4500023387 - ASU Košice - K70101			P61200	
Pump Type:	CL2-19 / EM-50				
Motor:	Manufacture : AKH		Type: FN225ML-2F		Nr.: 19114.05/002
	P: 50 [KW]		U: Y 400 [V]		I: 90 [A]
	$n_{,range}$: 4300-5300	/	$f_{,range}$: 72-88 [Hz]		$f_{,field\ weakening\ point}$: 75 [Hz]
Pressure Test (EN 13275:2000/§5.2.2)	Hydraulic pressure test of pump casing completed at 65 bar for 5 min.				
	Date: 11.04.05		Signature: AK		
Degreasing (EN 12300:1999)	Pump cold end has been degreased with Trichlorethylen for LOX operation.				
	Date: 04.05.05		Signature: JMG		

LIN-Test

γ 0.7678 [daN/l]

Q [l/min]	p_{suct} [barg]	p_{del} [barg]	Δp [bar]	ΔH [m]	P_{el} [1)] [kW]	$P_{mech.}$ [kW]	η_{pump} [%]	T [°C]	n [rpm]	$f_{Converter\ at\ operation}$ [Hz]
200	1.29	21.75	20.46	266.5	17.3			-190.4	4728	79
250	1.28	21.80	20.52	267.3	19.3			-190.4	4728	79
300	1.25	21.80	20.55	267.6	21.2			-190.4	4728	79
350	1.23	21.40	20.17	262.7	22.8			-190.4	4728	79
400	1.22	20.70	19.48	253.7	24.7			-190.4	4728	79
423	1.20	20.35	19.15	249.4	25.6			-190.4	4728	79
450	1.20	19.85	18.65	242.9	26.4			-190.4	4728	79
500	1.19	18.50	17.31	225.4	28.0			-190.4	4728	79
550	1.13	15.90	14.77	192.4	29.5			-190.4	4728	79

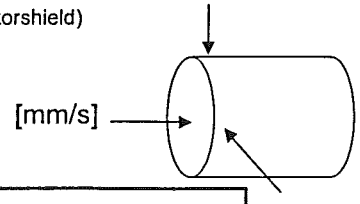
1) P_{el} measured at converter inlet

Labyrinth Seal	(measured at 423 l/min, 4728 rpm)	
	Sealgas:	Gaseous nitrogen at approx.15°C
	Measure "A":	1.92 mm
	Feed pressure:	5 barg
	Reference pressure:	1.16 barg
	Sealgas pressure:	1.2 barg
	Sealgas flowrate:	35 mm = 3,7 Nm3/h

Remarks: Seal leakage, motor DE bearing RTD's, motor winding PTC thermistors and bearing heater: functional check OK

Impeller diam at test:	2x 190 mm
Tip width:	4,5 mm
With Inducer	yes
With blade-ring	yes
Diffusor type:	300+
Orifice ∅ :	
Δp regulator No:	391/O_2

Vibrations: (at DE motorshield) [mm/s]



[mm/s]

Sound pressure level

dB(A)

	Date : 25.05.05	Signature:	B. Gutknecht

sefco — Delivery Certificate

Ref. Nr.: **05.043/2C**

Customer:	Air Liquide AGS GmbH - 4500023387 - ASU Košice - K70101		P61200
Pump Type:	CL2-19 / EM-50		
Motor:	Manufacture : AKH	Type: FN225ML-2F	Nr.: 19114.05/002
	P: 50 [KW]	U: Y 400 [V]	I: 90 [A]
	n_{range}: 4300-5300	/ f_{range}: 72-88 [Hz]	$f_{field\ weakening\ point}$: 75 [Hz]
Pressure Test (EN 13275:2000/§5.2.2)	Hydraulic pressure test of pump casing completed at 65 bar for 5 min.		
	Date: 11.04.05	Signature: AK	
Degreasing (EN 12300:1999)	Pump cold end has been degreased with Trichlorethylen for LOX operation.		
	Date: 04.05.05	Signature: JMG	

LIN-Test

γ 0.7678 [daN/l]

Q [l/min]	p_{suct} [barg]	p_{del} [barg]	Δp [bar]	ΔH [m]	P_{el} 1) [kW]	$P_{mech.}$ [kW]	η_{pump} [%]	T [°C]	n [rpm]	$f_{Converter\ at\ operation}$ [Hz]
200	1.27	20.60	19.33	251.8	16.4			-190.4	4610	77
250	1.25	20.60	19.35	252.0	18.3			-190.4	4610	77
300	1.23	20.55	19.32	251.6	20.1			-190.4	4610	77
317	1.29	20.55	19.26	250.8	21.1			-190.4	4610	77
350	1.21	20.05	18.84	245.4	21.7			-190.4	4610	77
400	1.21	19.45	18.24	237.6	23.4			-190.4	4610	77
450	1.2	18.60	17.40	226.6	25.0			-190.4	4610	77
500	1.19	17.10	15.91	207.2	26.6			-190.4	4610	77

1) P_{el} measured at converter inlet

Labyrinth Seal	(measured at 317 l/min, 4610 rpm)	
	Sealgas:	Gaseous nitrogen at approx.15°C
	Measure "A":	1.92 mm
	Feed pressure:	5 barg
	Reference pressure:	1.24 barg
	Sealgas pressure:	1.25 barg
	Sealgas flowrate:	39 mm = 4,0 Nm3/h

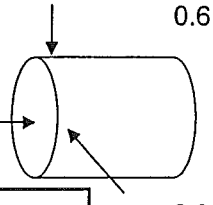
Remarks: Seal leakage, motor DE bearing RTD's, motor winding PTC thermistors and bearing heater: functional check OK

Impeller diam at test:	2x 190 mm
Tip width:	4,5 mm
With Inducer	yes
With blade-ring	yes
Diffusor type:	300+
Orifice ∅ :	
Δp regulator No:	391/O_2

Vibrations: (at DE motorshield) 0.6 [mm/s]

(at 317 l/min)

0.4 [mm/s]



0.9 [mm/s]

Sound pressure level (at 317 l/min) 79 dB(A)

	Date : 25.05.05	Signature: B. Gutknecht

Angst+Pfister

Suction hose item 4 on drawing
nº 05.043/14

Angst+Pfister AG
Thurgauerstrasse 66
CH-8052 Zürich
Postfach Hardhofstrasse 31
Telefon +41 1 306 61 11
Telefax +41 1 302 18 71

Angst+Pfister SA
Route du Bois-des-Frères 52
Case postale 19
CH-1219 Genève-Le Lignon
Téléphone +41 22 979 28 00
Téléfax +41 22 979 28 78

Lieferadresse / Adresse de livraison /
Delivery address:
Angst+Pfister AG – Logistikcenter

CH-8424 Embrach
Telefon +41 1 866 66 11
Telefax +41 1 866 66 22

Bankverbindung:
CS, 8050 Zürich, Kto. 570500-91, BC 4857
UBS, 8050 Zürich, Kto. 803.917.01J, BC 269

Customer No. 111219

Sefco AG
Herr F. Brodesser
Wuhrmattstr. 15

CH-4103 Bottmingen

Sefco AG
Maschinen-Anlagen
Wuhrmattstr. 15

CH-4103 Bottmingen

Official in Charge: Frau Ch. Schweri
Tel. direct: 044 306 64 05
23.05.05 11:55:05 /

Inspection certificate EN 10204-3.1 B FT-A05.292282

Your reference			Our reference
Herr Brodesser / Best.Nr. 05/2629			Frau Ch.Schweri
Job No.	**Order Date**	**Delivery Date**	**VS**
FT-A05.292282	11.03.2005	20.05.2005	A+P Zürich

Order specification/acceptance requierements:	
Test item:	Our part-no 80.0003.6190 Metal hose assembly ASSIWELL® 100 1.4541 DN 65, U1, NL 400 mm-PED Fitting 1: welding flange DN 65 PN 6 Fitting 2: welding flange DN 65 PN 6 Your part/drawing-no. 4 14869
Quantity:	2 pieces
Marking:	SB/A+P C540235-05, PS 6, DN 65, -196/+20°C, 05/2005, CE, 414869
Test:	Pressure and Tightness Test: 9 bar air Duration: 2 min.
Test result:	The hose(s) meet(s) the requirements.
Remarks:	

Material certificate

Element	Material	Ladle No.
Corrugated hose	1.4541	483669
Braid	1.4301	V3933
Welding Flange DN 65 PN 6	1.4435	E31602

We hereby certify, that the material described above has been tested and complies with the terms of the order contract.

Best regards
Angst + Pfister AG

ppa. H. Birmele

i.A. Ch. Schweri

Konformitätserklärung

nach Druckgeräterichtlinie 97/23/EG

für ein Druckgerät

Der Hersteller

Senior Berghöfer GmbH

Frankfurter Str. 199
D-34121 Kassel

erklärt hiermit, dass das Druckgerät

Beschreibung / Verwendungszweck:	Rohrleitung/ Edelstahl-Wellschlauch	
Typ-, Serien-, Fabrikationsnummer:	MW22 U1 // C 540235-05 // 414869	
max. zulässiger Druck PS:	6,00	bar
zulässige max./min. Temperatur TS:	+20/-196	°C
Nennweite DN:	65	
Herstelljahr.	05/2005	
Aufgebrachter Prüfdruck PT:	9	bar
Prüfmedium:	Luft	

mit der Druckgeräterichtlinie 97/23/EG übereinstimmt.

Angewandte Konformitätsbewertungsverfahren:	Modul A
Angewandte Normen und techn. Spezifikationen:	AD 2000, DIN EN 287-1, DIN EN 288
Weitere angewandte EG-Richtlinien:	keine

Eingeschaltete benannte Stellen:

Überwachung QS-System:	--
Prüfung / Überwachung / Kontrollen während der Fertigung:	TÜV Hessen (0091)

Zugehörige Bescheinigungen:

EG-Entwurfsprüfbescheinigung Nr.:	./.
EG-Baumusterprüfbescheinigung Nr.:	./.
EG-Konformitätsbescheinigung Nr.:	./.

Ort, Datum:
Kassel, 19.05.2005

Unterschrift Geselle

Angst+Pfister

Discharge hose item 8 on drawing
nº 05.043/14

Angst+Pfister AG
Thurgauerstrasse 66
CH-8052 Zürich
Postfach Hardhofstrasse 31
Telefon +41 1 306 61 11
Telefax +41 1 302 18 71

Angst+Pfister SA
Route du Bois-des-Frères 52
Case postale 19
CH-1219 Genève-Le Lignon
Téléphone +41 22 979 28 00
Téléfax +41 22 979 28 78

Lieferadresse / Adresse de livraison /
Delivery address:
Angst+Pfister AG – Logistikcenter

CH-8424 Embrach
Telefon +41 1 866 66 11
Telefax +41 1 866 66 22

Bankverbindung:
CS, 8050 Zürich, Kto. 570500-91, BC 4857
UBS, 8050 Zürich, Kto. 803.917.01J, BC 269

Customer No. 111219

Sefco AG
Herr F. Brodesser
Wuhrmattstr. 15

CH-4103 Bottmingen

Sefco AG
Maschinen-Anlagen
Wuhrmattstr. 15

CH-4103 Bottmingen

Official in Charge: Frau Ch. Schweri
Tel. direct: 044 306 64 05
23.05.05 11:52:59 /

Inspection certificate EN 10204-3.1 B FT-A05.292282

Your reference			Our reference
Herr Brodesser / Best.Nr. 05/2629			Frau Ch.Schweri
Job No.	Order Date	Delivery Date	VS
FT-A05.292282	11.03.2005	20.05.2005	A+P Zürich

Order specification/acceptance requierements:

Test item:	Our part-no 80.0003.6184 Metal hose assembly ASSIWELL® 100 1.4541 DN 40, U1, NL 400 mm-PED Fitting 1: spez. 8-Loch welding flange DN 40 PN 100 Fitting 2: welding flange DN 40 PN 100 Your part/drawing-no. 4 14782
Quantity:	2 pieces
Marking:	SB/A+P C540235-04, PS 64, DN 40, -196/+20°C, 05/2005, CE0091, 414782
Test:	Pressure and Tightness Test: 96 bar air Duration: 1 min.
Test result:	The hose(s) meet(s) the requirements.
Remarks:	

Material certificate

Element	Material	Ladle No.
Corrugated hose	1.4541	T422037
Braid	1.4301	V3933
spez. 8-Loch Welding Flange DN 40 PN 100	1.4306	E 504593
Welding Flange DN 40 PN 100	1.4435	500256

We hereby certify, that the material described above has been tested and complies with the terms of the order contract.

Best regards
Angst + Pfister AG

ppa. H. Birmele

i.A. Ch. Schweri

Konformitätserklärung

nach Druckgeräterichtlinie 97/23/EG

für ein Druckgerät

Der Hersteller

Senior Berghöfer GmbH

Frankfurter Str. 199
D-34121 Kassel

erklärt hiermit, dass das Druckgerät

Beschreibung / Verwendungszweck:	Rohrleitung/ Edelstahl-Wellschlauch	
Typ-, Serien-, Fabrikationsnummer:	DW72 U1 // C 540235-04 // 414782	
max. zulässiger Druck PS:	64,00	bar
zulässige max./min. Temperatur TS:	+20/-196	°C
Nennweite DN:	40	
Herstelljahr.	05/2005	
Aufgebrachter Prüfdruck PT:	96	bar
Prüfmedium:	Wasser	

mit der Druckgeräterichtlinie 97/23/EG übereinstimmt.

Angewandte Konformitätsbewertungsverfahren:	Modul A1
Angewandte Normen und techn. Spezifikationen:	AD 2000, DIN EN 287-1, DIN EN 288
Weitere angewandte EG-Richtlinien:	keine

Eingeschaltete benannte Stellen:

Überwachung QS-System:	--
Prüfung / Überwachung / Kontrollen während der Fertigung:	TÜV Hessen (0091)

Zugehörige Bescheinigungen:

EG-Entwurfsprüfbescheinigung Nr.:	./.
EG-Baumusterprüfbescheinigung Nr.:	./.
EG-Konformitätsbescheinigung Nr.:	./.

Ort, Datum:
Kassel, 19.05.2005

Unterschrift Geselle

23.05.2005

EG-MANUFACTURER-DECLARATION

- according to EC-Machine-Recommendation, Appendix II B -

We hereby declare, represented by the undersigned, that the hereinafter stated electrical equipment

Three-Phase-Motor
of
Antriebstechnik Katt Hessen

is intended for the installation into a maschine in its standard axecution. The respective commissioning is prohibited until it has been ascertained, that the machine into which the product has to be installed, corresponds to the following provisions relevant to the subject:

EC-Machine-Recommendation **89/392/EEC**
altered by **91/368/EEC**
altered by **93/68/EEC**

Applied harmonized standards:

1. **EN 292 Part 1 und 2**
   Safety regulations for machines, principles, general design prinziples
2. **EN 60 204**
   Electrical equipment of industrial machinery

Applied standards and technical specifications:

Title	DIN VDE	IEC
Rated operation and characteristics for rotating electrical machines	DIN VDE 0530, T 1	34 –1 85
Attachment measurements according to the performance declarations for IMB 3	DIN 42 673	72
Attachment measurements according to the performance declarations for IMB 5, IMB 10 and IMB 14	DIN 42 677	72
Protection classes of rotating electrical machines	DIN VDE 0530, T 5	34 –5
Cooling of rotating electrical machines	DIN IEC 34, T 6	34 –6
Design of rotating electrical machines	DIN IEC 34, T 7	34 –7

Antriebstechnik KATT Hessen GmbH
Bahnhofstraße 66
D-34576 Homberg/Efze
Tel: 05681-99 52 0
Fax: 05681-49 00
e-mail: Info@akh-antriebstechnik.de

Antriebstechnik KATT Hessen

Title	DIN VDE	IEC
Port identification and sense of rotation for electrical machines	DIN VDE 0530, T 8	34 –8
Surface-cooled three-phase motors for interrupted opration - attachmemt measurements	DIN 42 681	72 –1
Cylindrical shaft ends for electrical machines	DIN 748, T 3	72
Conical shaft ends for electrical machines	DIN 1448	
Noise emission limit	DIN VDE 0530, T 9	34-9
Attached thermic protection		34-11
Starting up characteristics of squirrel-cage induction motors at 50 Hz-600V	DIN VDE 0530, T 12	34-12
Mounting flanges for electrical machines	DIN 42948	72-2
Oscillation power of rotating electrical machines	DIN ISO 2373	34-14
Regulations for electromagnetic devices	DIN VDE 0580	
Safety of devices	DIN VDE 31000	
(Radial) groove ball bearing	DIN 625	
(Radial) angular ball bearing	DIN 628	
Cylinder roller bearing	DIN 5412	

Homberg/Efze, 23.05.05

Date, Signature

Antriebstechnik KATT Hessen GmbH
Bahnhofstraße 66
D-34576 Homberg/Efze
Tel: 05681-99 52 0
Fax: 05681-49 00
e-mail: Info@akh-antriebstechnik.de

KATT AKS AKH Antriebstechnik KATT Hessen