

**ETL 100-100-160 GGS AV11D200224 BKS BIE4 PD2EM**  
 Inline pump

**Operating data**

Requested flow rate		Actual flow rate	86.33 m <sup>3</sup> /h
Requested developed head		Actual developed head	5.48 m
Pumped medium	Water	Efficiency	79.2 %
	Clean water	MEI (Minimum Efficiency Index)	≥ 0.70
	Not containing chemical and mechanical substances which affect the materials	Power absorbed	1.62 kW
Max. ambient air temperature	20.0 °C	Pump speed of rotation	1232 rpm
Min. ambient air temperature	20.0 °C	NPSH required	1.99 m
Fluid temperature	12.0 °C	Permissible operating pressure	16.00 bar.g
Fluid density	999 kg/m <sup>3</sup>	Discharge press.	0.54 bar.g
Fluid viscosity	1.25 mm <sup>2</sup> /s	Min. allow. mass flow for continuous stable operation	3.25 kg/s
Suction pressure max.	0.00 bar.g	Shutoff head	7.84 m
Mass flow rate	23.96 kg/s	Max. allow. mass flow	31.38 kg/s
Max. power on curve	1.77 kW	Design	Single system 1 x 100 %
Min. allow. flow for continuous stable operation	11.72 m <sup>3</sup> /h		Tolerances to ISO 9906 Class 3B; below 10 kW acc. to paragraph 4.4.2

**Design**

Pump standard	Without	Shaft seal code	11
Design	Close-coupled in-line	Sealing plan	Single-acting mechanical seal with vented chamber (A-type casing cover, taper bore)
Orientation	Vertical		
Suction nominal dia.	DN 100	A liquid free of solids is assumed	
Suction nominal pressure	PN 16	Seal chamber design	Conical seal chamber (A-type cover)
Suction position	180° (down)	Contact guard	With
Suction flange drilled according to standard	EN1092-2	Wear ring	Casing wear ring
Discharge nominal dia.	DN 100	Impeller diameter	174.0 mm
Discharge nominal pressure	PN 16	Free passage size	15.1 mm
Discharge position	top (0°/360°)	Direction of rotation from drive	Clockwise
Discharge flange drilled according to standard	EN1092-2	Silicon free pump assembly	Yes
Surface type	Raised face (form B to EN 1092)	Bearing bracket construction	Close-coupled
Shaft seal	Single acting mechanical seal	Bearing bracket size	25
Manufacturer	KSB	Bearing type	Anti-friction bearings
Type	1	Lubrication type	Grease
Material code	BQ1EGG-WA	Color	Vermilion (RAL 2002)

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**Driver, accessories**

Driver type	Electric motor	Rated current	5.7 A
Drive standard mech.	IEC	Insulation class	F to IEC 34-1
Model (make)	KSB SuPremE®	Motor enclosure	IP55
Type series motor manufacturer	SuPremE C2 (with mounting plate for PumpDrive 2, non removable)	Cos phi at 4/4 load	0.68
Drive supplied by	Standard motor supplied by KSB - mounted by KSB	Motor efficiency at 4/4 load	89.5 %
Motor const. type	V1	Temperature sensor	3 PTC resistors
Motor size	100L	Terminal box position	0° same orientation
Efficiency class	Efficiency class IE4 acc. IEC/TS 60034-30-2 (2016) – free of magnets. The efficiency of the motor for a quadratic torque-speed characteristic is > 95% of the nominal efficiency even at 25% of the nominal power.	Motor winding	Viewed from the drive
Speed control selection	Speed adjustment	Connection mode	400 V
Frequency	50 Hz	Motor cooling method	Star
Designed for operation with frequency inverter	Yes	Motor material	Surface cooling
Rated voltage	400 V	Driver colour	Aluminium
Rated power P2	2.20 kW	CE-approval	Same as the pump
Available reserve	35.44 %		Yes

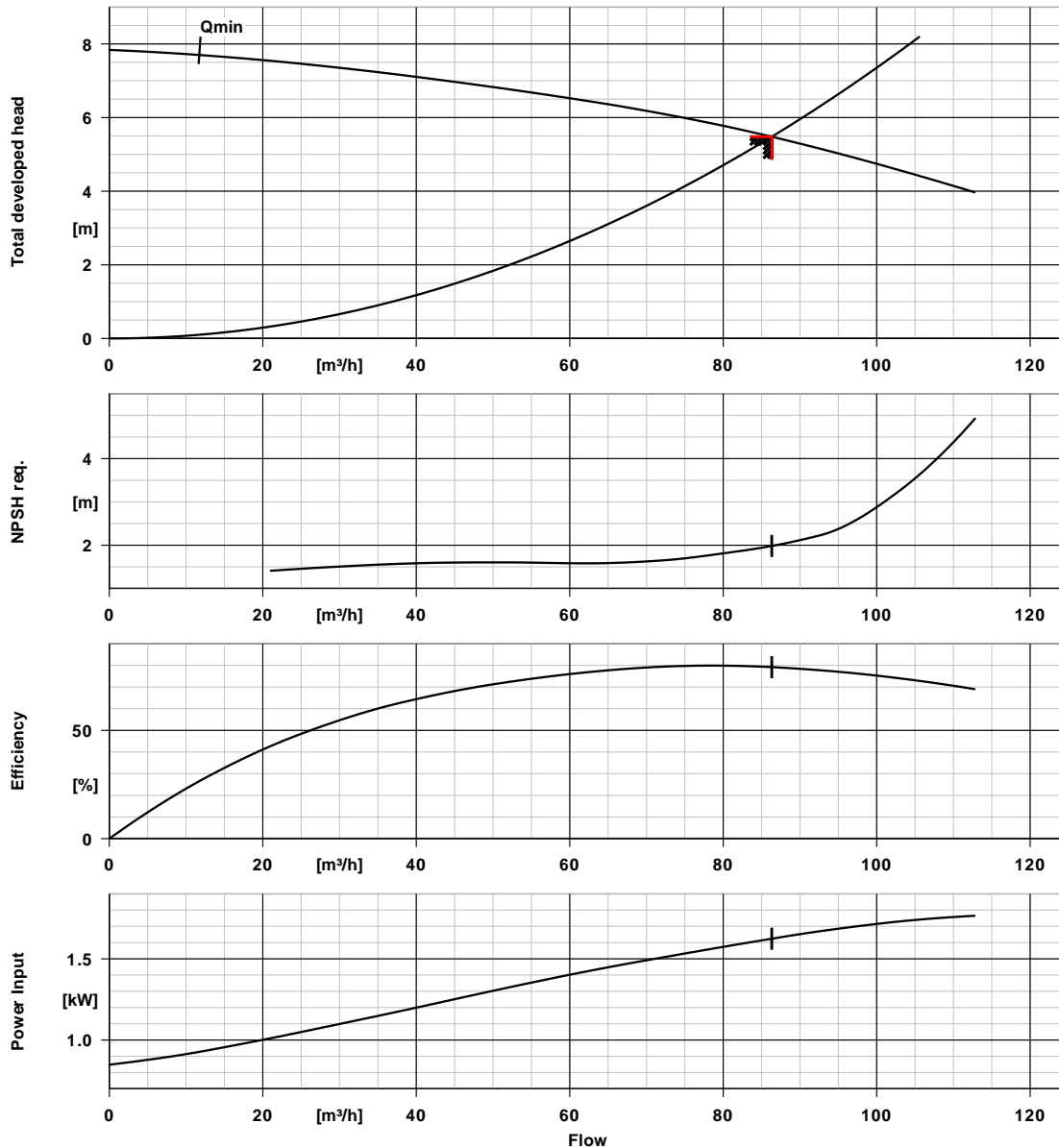
**Materials G**

**Notes 1**

General criteria for a water analysis: pH-value  $\geq 7$ ; chloride content (Cl)  $\leq 250$  mg/kg. Chlorine (Cl<sub>2</sub>)  $\leq 0.6$  mg/kg.

Volute casing (102)	Grey cast iron EN-GJL-250/A48CL35B	Joint ring (411)	Steel ST
Casing cover (161)	Grey cast iron EN-GJL-250/A48CL35B	Casing wear ring (502.1)	Grey cast iron GG/CAST IRON
Shaft (210)	Tempered steel C45+N	Casing wear ring (502.2)	Grey cast iron GG/CAST IRON
Impeller (230)	Grey cast iron EN-GJL-250/A48CL35B	Shaft sleeve (523)	CrNiMo steel
Motor stool (341)	Grey cast iron EN-GJL-250/A48CL35B	Stud (902)	Steel 8.8
Flat gasket (400)	DPAF seal plate asbestos free	Impeller nut (922)	Steel 8
		Key (940)	Steel C45+C / A311 GR 1045 CLASS A

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 Inline pump



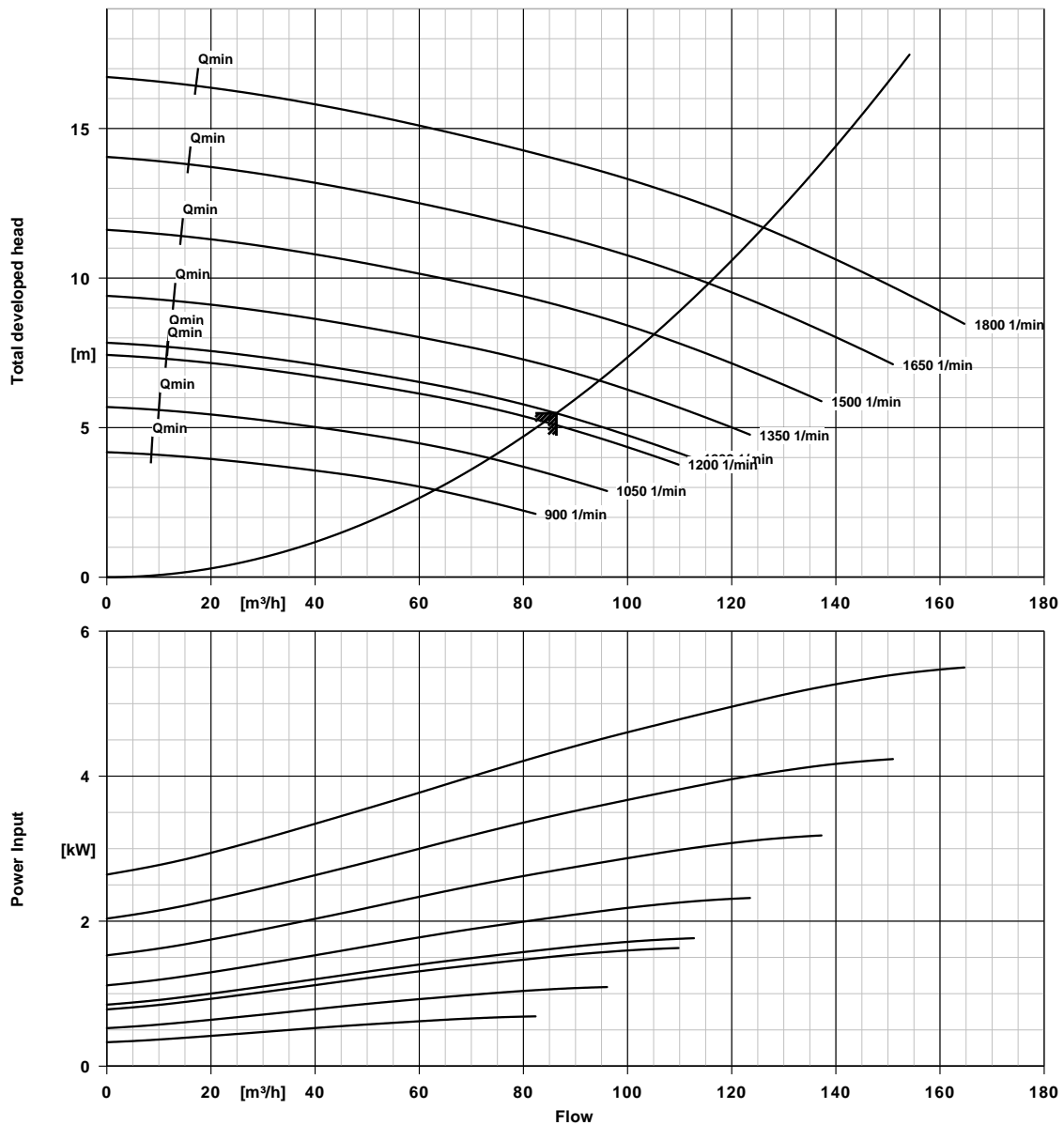
**Curve data**

Speed of rotation	1232 rpm	Efficiency	79.2 %
Fluid density	999 kg/m³	MEI (Minimum Efficiency Index)	≥ 0.70
Viscosity	1.25 mm²/s	Power absorbed	1.62 kW
Flow rate	86.33 m³/h	NPSH required	1.99 m
Requested flow rate	86.33 m³/h	Curve number	K1159.454/40
Total developed head	5.48 m	Effective impeller diameter	174.0 mm
Requested developed head	5.48 m	Acceptance standard	Tolerances to ISO 9906 Class 3B; below 10 kW acc. to paragraph 4.4.2

ETL 100-100-160 GGS AV11D200224 BKSBIE4 PD2EM

Version no.: 6

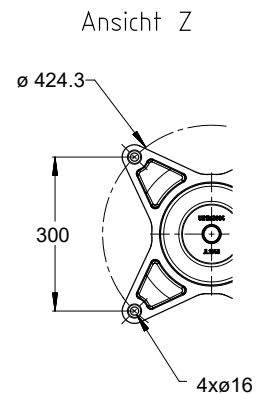
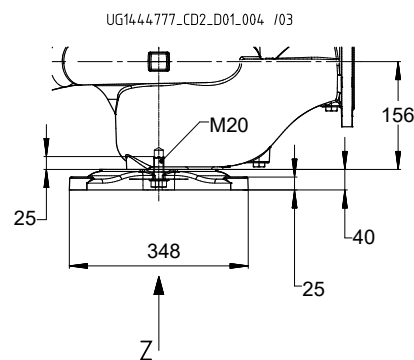
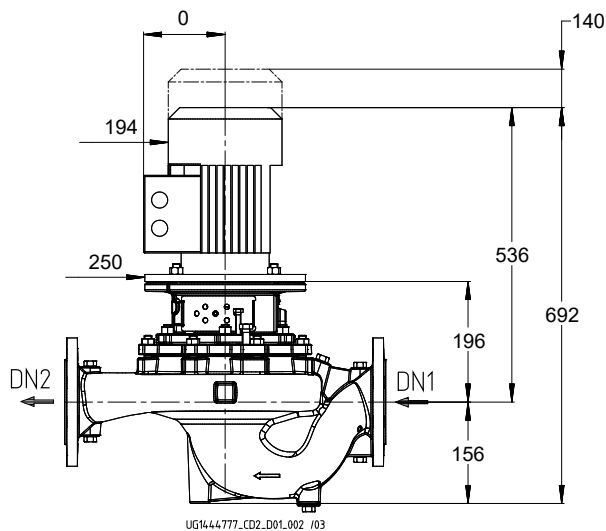
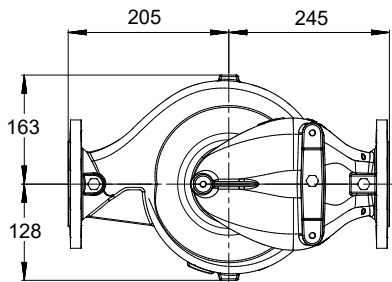
Inline pump



**Curve data**

Fluid density	999 kg/m <sup>3</sup>	Total developed head	5.48 m
Viscosity	1.25 mm <sup>2</sup> /s	Requested developed head	5.48 m
Flow rate	86.33 m <sup>3</sup> /h	MEI (Minimum Efficiency Index)	≥ 0.70
Requested flow rate	86.33 m <sup>3</sup> /h	Effective impeller diameter	174.0 mm

**ETL 100-100-160 GGSAV11D200224 BKSBI4 PD2EM**  
 Inline pump



*Drawing is not to scale*

*Dimensions in mm*

**Motor**

Motor manufacturer	KSB
Motor size	100L
Motor power	2.20 kW
Number of poles	4
Speed of rotation	1500 rpm
Position of terminal box	0° same orientation Viewed from the drive

**Connections**

Suction nominal size DN1	DN 100 / EN1092-2
Discharge nominal size DN2	DN 100 / EN1092-2
Nominal pressure suct.	PN 16
Rated pressure disch.	PN 16

**Weight net**

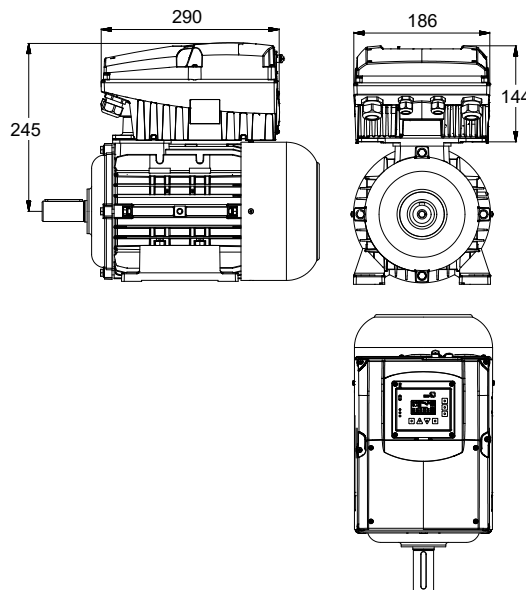
Pump	45 kg
Motor	24 kg
Total	69 kg

**Connect pipes without stress or strain!**

**For auxiliary connections see separate drawing.**

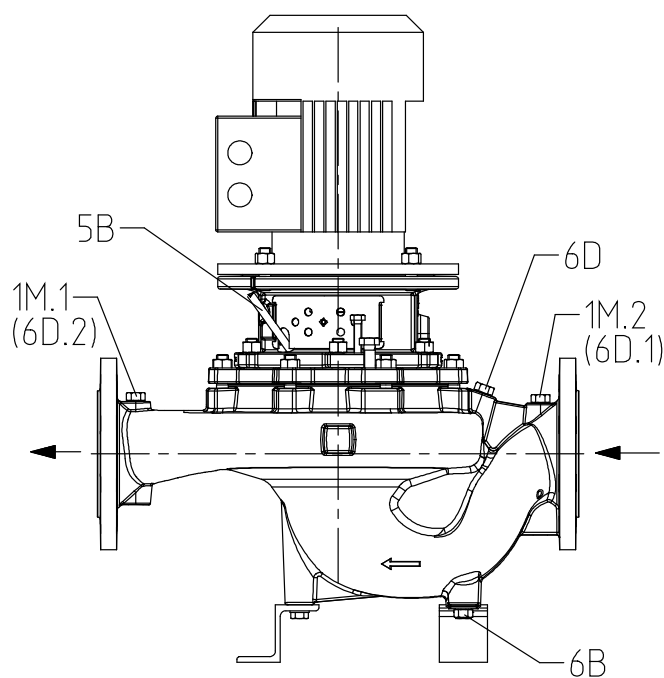
**ETL 100-100-160 GGSAV11D200224 BKSBI4 PD2EM**  
Inline pump

**Supplementary drawing for PumpDrive**



*Drawing is not to scale*

**ETL 100-100-160 GGSAV11D200224 BKSBI4 PD2EM**  
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**Connections**

Pump casing variant

1M.1 Pressure gauge connection

1M.2 Pressure gauge connection

6B Pumped liquid drain

6D Pumped medium - filling / venting

5B venting

G 3/8

G 3/8

G 3/8

G 3/8

G 1/4

XX46

Pressure sensor for PumpMeter fitted

Pressure sensor for PumpMeter fitted

Drilled and plugged.

Drilled and plugged.

Closed with venting plug

## PDRV2E\_002K20M\_KSUPBE4P4\_MOOOO

### PumpDrive 2

Modular, self-cooling frequency inverter enabling continuously variable speed control of asynchronous and synchronous reluctance motors.

Design concept of control unit	PumpDrive 2 Eco	Weight	6 kg
Display type	With standard control panel	PumpDrive length	290.0 mm
Rated power	2.20 kW	PumpDrive width	186.0 mm
Max. allowed current	6.0 A	PumpDrive height	144.0 mm
M12 module	With	Manufacturer	KSB
Remote operation	Without	PumpDrive adapter	No
Mounting	MM - Mounted on the motor	Designation	-

### Characteristic

Mains voltage: 3 ~ 380 V AC -10% to 480 V AC +10 %

Mains frequency: 50 - 60 Hz +/- 2%

Interference suppression class: <= 11 kW: EN 61800-3 C1 / EN 55011 Class B / cable length <= 5 m

Internal power supply: 24 V +/- 10 %, max. 600 mA DC

Service interface: optical

2 analog inputs, 0/2-10 V or 0/4-20 mA

1 analog output, 0-10 V or 4-20 mA

Digital inputs:

1 hardware enable input

3 parameterisable inputs

Relay output: 2 NO contacts, parameterisable

Environment:

IP 55 enclosure (acc. EN 60529)

Ambient temperature: -10 to 50 °C

Rel. humidity in operation: 5 % to 85 % (non-condensing)

Note regarding Outdoor installation: Provide the frequency inverter with suitable protection when installed outdoors to prevent condensation on the electronic equipment and exposure to excessive sunlight.

Housing:

Heat sink: die-cast aluminium

Housing cover: Polyamid, glass fibre reinforced

Control panel: Polyamid, glass fibre reinforced

Protective functions:

- Full protection by means of overcurrent limitation and PTC thermistor monitoring
- Automatic speed reduction at overload and excessive temperatures. Protection against phase failure motor side, short-circuit monitoring motor side (phase to phase and phase to earth), overvoltage/undervoltage
- Protection against motor overload
- Suppression of resonant frequencies
- Cable integrity monitoring (live zero)
- Protection against dry running and hydraulic blockage (sensorless via learning function)
- Characteristic curve control

Open/closed-loop control

- Open-loop control via analog input, display or fieldbus

- Closed-loop control mode via integrated PID controller

- Controlled variables: pressure, differential pressure delta-p (constant) or delta-p (variable), temperature, level control, flow rate

- Sensorless differential pressure control ( $\Delta p$  const) in a single-pump configuration

- Sensorless differential pressure control with dynamic pressure compensation ( $\Delta p$  var) in a single-pump configuration

- Sensorless flow rate control



**PDRV2E\_002K20M\_KSUPBE4P4\_MOOOO**

- Functional check run

Operation and display:

- Operating point estimation (Q, H)
- Optical service interface for connection to KSB Service Tool

PumpDrive functions:

- Programmable start and stop ramps
- Field-oriented control (vector control) with selectable motor control method (ASM, SuPremE)
- Automatic motor adaptation (AMA)
- Manual-0-automatic operation
- Sleep mode (stand-by mode)

Installation options:

- M12 module for bus connection of PumpMeter and for multiple pump operation of up to six pumps
- Wireless module for communication with a Smartphone
- Field bus module Modbus RTU, as an alternative to the M12 module.

## PumpMeter

Intelligent Pressure Transmitter PumpMeter - with on-site display of operating point

### General description:

PumpMeter is an intelligent pressure transmitter with on-site display of measurement values and operating data of the pump. It comes factory-provided completely assembled and parameterised for your individual pump, to be connected via M12 connector and immediately ready to operate. PumpMeter records the pumps load profile during operation in order to – if applicable – provide information on the potential for energy savings or increased availability.

### On-site display unit:

Backlit display unit for on-site display of measurement values and operating data of pump with intuitive and internationally comprehensible icons, rotatable in steps of 90°.

### Display values:

suction pressure, pressure at inlet of pump in bar, gauge pressure  
 discharge pressure, pressure at outlet of pump in bar, gauge pressure  
 differential pressure between in- and outlet of pump in bar  
 qualitative indication of operating point

Connection of display unit via connector (M12 x 1, 5-pin for power supply and utilization of communication interface.  
 Making alternatively available:  
 measurement value of discharge pressure via analogue signal 4 ... 20 mA  
 calculated value of differential pressure via analogue signal 4 ... 20 mA  
 all display values via serial interface RS 485 (Modbus RTU).  
 Service interface RS232 for parameterisation.  
 Factory provided parameterisation for individual pump.

### Sensors:

Two gauge pressure transmitters, one each factory provided on both, inlet and discharge side of pump. Connected to display unit via connector.

Accuracy of measurement (sum of errors; relating to measurement range):

±1% for fluid temperature -10 ... 100 °C

±2.5% for fluid temperature -30 ... -10 °C and 100 ... 140 °C

Material of measuring cell: stainless steel (no internal gasket)

Available measurement ranges:

-1 ... 10 bar (gauge pressure)

-1 ... 10 bar (gauge pressure)

Ambient conditions:

Type of protection: IP 65

Ambient temperature:

-30°C ... 80°C (during transport, storage)

-10°C ... 60°C (operation)

Fluid temperature: -30°C ... 140°C

Scuff resistance:

Ultraviolet resistance (outdoor installation)

Resistance to most cleaning agents

Resistance to oil mist

Silicone free:

No detrimental to paint adhesion

Electric data:

Power supply:

24V DC ± 10%, min. 140 mA

Interfaces, alternatively utilisable:

4 ... 20 mA, 3-conductor (discharge pressure or differential pressure)

RS485, Modbus RTU (Slave)

Service interface: RS232

EMC:

EN 61326 (Immunity: industrial environment, Emissions: applicable in home and building environment)