Data sheet

ETL 040-040-160 GGSAV11D200302 BKSBIE5 PD2EM
Inline pump

Operating data

Requested flow rate	22.00 m³/h	Actual flow rate	22.00 m³/h
Requested developed head	20.41 m	Actual developed head	20.41 m
Pumped medium	Water Clean water Not containing chemical and mechanical substances which affect the materials	Efficiency	64.0 %
		MEI (Minimum Efficiency Index)	≥ 0.70
		Power absorbed	1.91 kW
		Pump speed of rotation	2174 rpm
Max. ambient air temperature	20.0 °C	NPSH required	2.86 m
Min. ambient air temperature	20.0 °C	Permissible operating pressure	16.00 bar.g
Fluid temperature	20.0 °C		
Fluid density	998 kg/m³	Discharge press.	2.00 bar.g
Fluid viscosity	1.00 mm²/s	Min. allow. mass flow for continuous stable operation	1.09 kg/s
Suction pressure max.	0.00 bar.g		
Mass flow rate	6.10 kg/s	Shutoff head	23.29 m
Max. power on curve	2.62 kW	Max. allow. mass flow	12.43 kg/s
Min. allow. flow for continuous stable operation	3.95 m³/h	Design	Single system 1 x 100 % Tolerances to ISO 9906 Class 3B; below 10 kW acc. to paragraph 4.4.2

Design

Pump standard	Without	Material code	BQ1EGG-WA
Caution: The overall length from suction to discharge can be different to the previous generation of Etaline.		Shaft seal code	11
		Sealing plan	Single-acting mechanical seal with vented chamber (A-type casing cover, taper bore)
		A liquid free of solids is assumed	
Design	Close-coupled in-line	Seal chamber design	Conical seal chamber (A-type cover)
Orientation	Vertical		
Suction nominal dia.	DN 40	Contact guard	With
Suction nominal pressure	PN 16	Wear ring	Casing wear ring
Suction position	180° (down)	Impeller diameter	174.0 mm
Suction flange drilled according to standard	EN1092-2	Free passage size	5.8 mm
		Direction of rotation from drive	Clockwise
Discharge nominal dia.	DN 40	Silicon free pump assembly	Yes
Discharge norminal pressure	PN 16	Bearing bracket construction	Close-coupled
Discharge position	top (0°/360°)	Bearing bracket size	25
Discharge flange drilled according to standard	EN1092-2	Bearing type	Anti-friction bearings
		Lubrication type	Grease
Surface type	Raised face (form B to EN 1092)	Color	Vermilion (RAL 2002)
Shaft seal	Single acting mechanical seal		
Manufacturer	KSB		
Type	1		

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Driver, accessories

Driver type	Electric motor	Rated current	7.6 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	0.70
		Motor efficiency at 4/4 load	89.8 %
		Temperature sensor	3 PTC resistors
Drive supplied by	Standard motor supplied by KSB - mounted by KSB	Terminal box position	0° same orientation Viewed from the drive
Motor const. type	V1	Motor winding	400 V
Motor size	100L	Connection mode	Star
Efficiency class	Efficiency class IE5 acc. IEC/TS 60034-30-2 (2016) – free of magnets. Motor size 80 with ferrite 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 cooling method	Surface cooling
		Motor material	Aluminium
		Driver colour	Same as the pump
		CE-approval	Yes
Speed control selection	Speed adjustment		
Frequency	100 Hz		
Designed for operation with frequency inverter	Yes		
Rated voltage	400 V		
Rated power P2	3.00 kW		
Available reserve	57.31 %		

Materials G

Notes 1
General criteria for a water analysis: pH-value >= 7; chloride content (Cl) <=250 mg/kg. Chlorine (Cl2) <=0.6 mg/kg.

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

Performance curve

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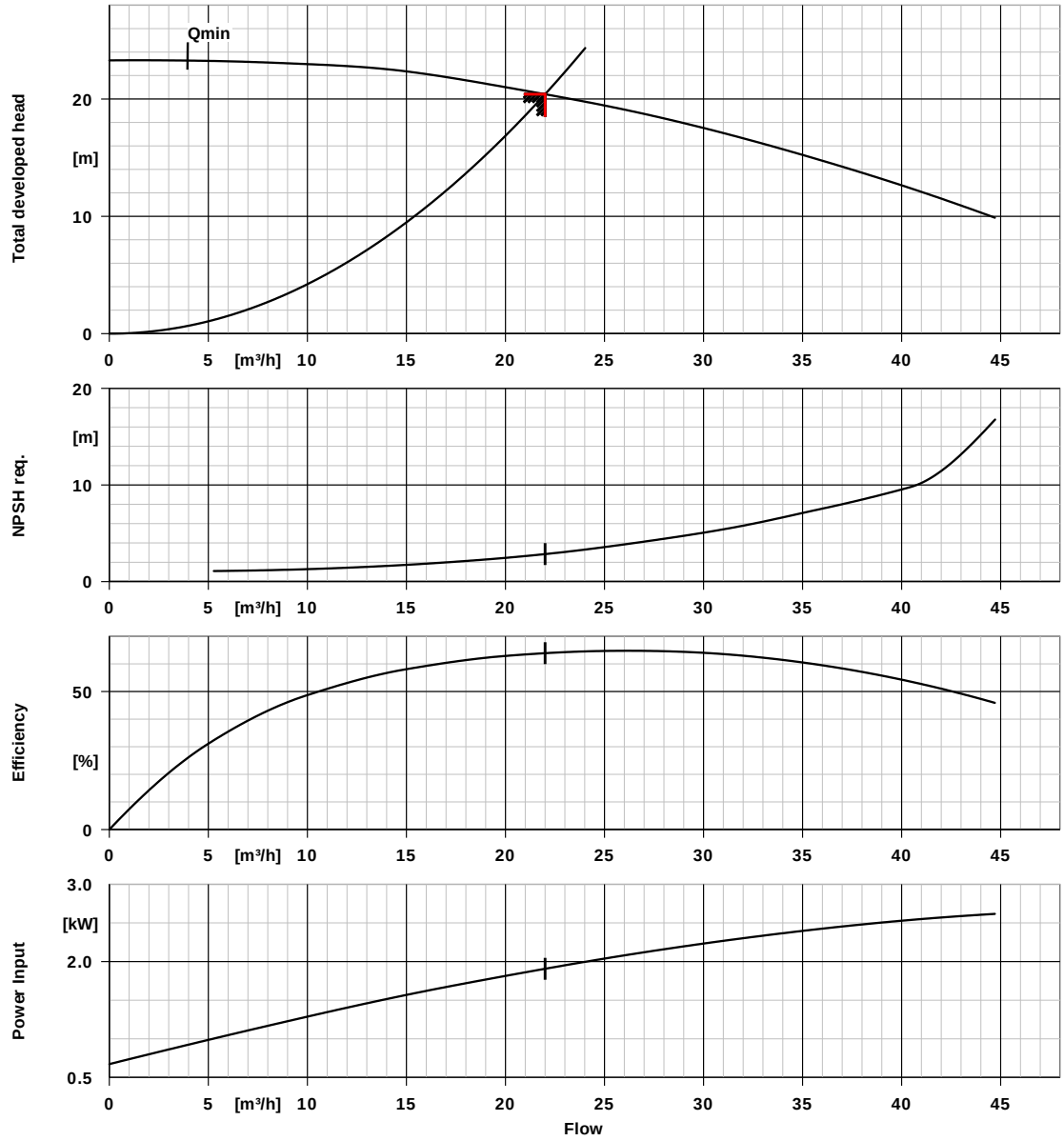


Curve data

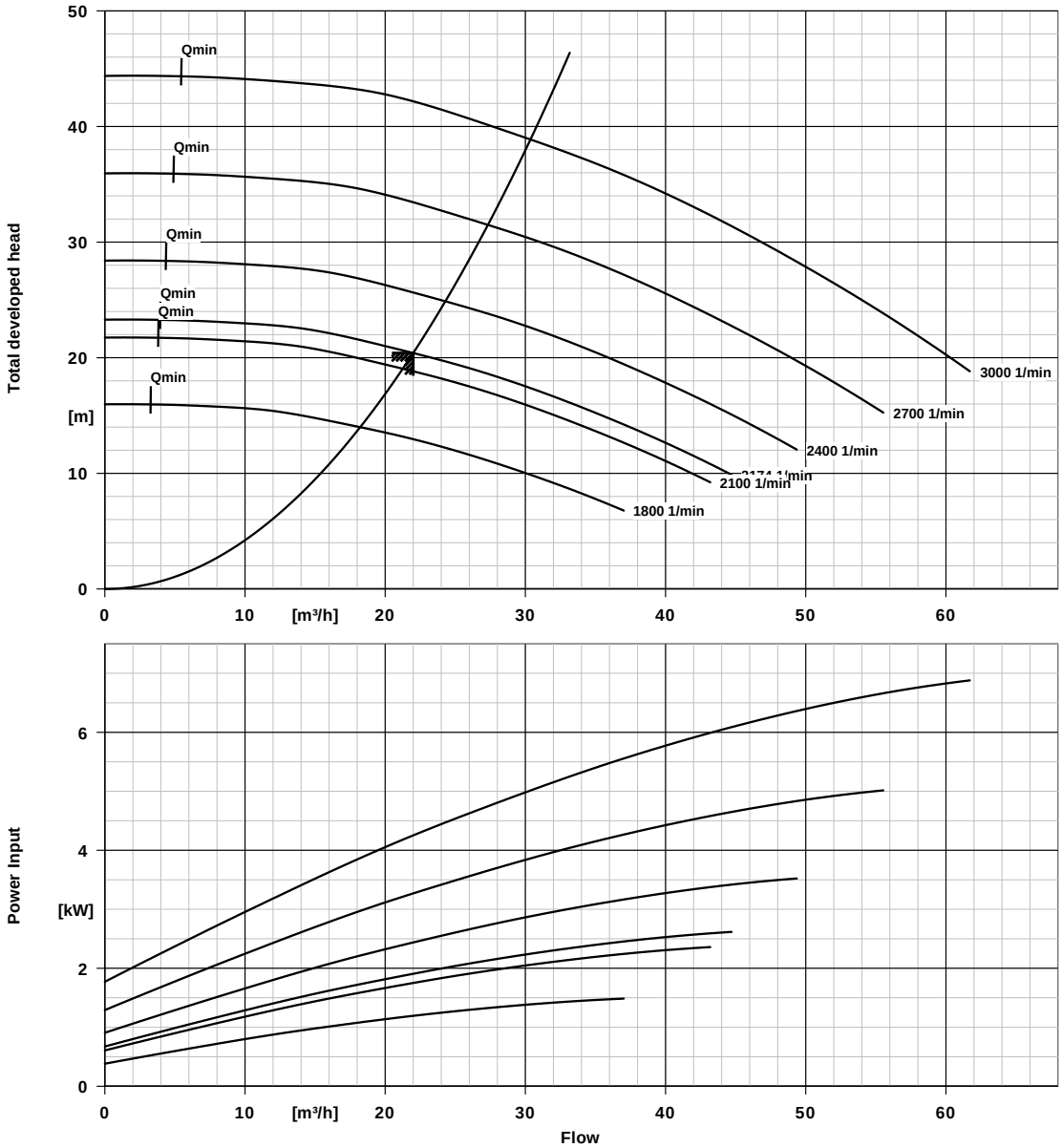
Speed of rotation	2174 rpm
Fluid density	998 kg/m³
Viscosity	1.00 mm²/s
Flow rate	22.00 m³/h
Requested flow rate	22.00 m³/h
Total developed head	20.41 m
Requested developed head	20.41 m

Efficiency	64.0 %
MEI (Minimum Efficiency Index)	≥ 0.70
Power absorbed	1.91 kW
NPSH required	2.86 m
Curve number	K1159.464/22
Effective impeller diameter	174.0 mm
Acceptance standard	Tolerances to ISO 9906 Class 3B; below 10 kW acc. to paragraph 4.4.2

Speed curve

ETL 040-040-160 GGSAV11D200302 BKSBIE5 PD2EM

Inline pump

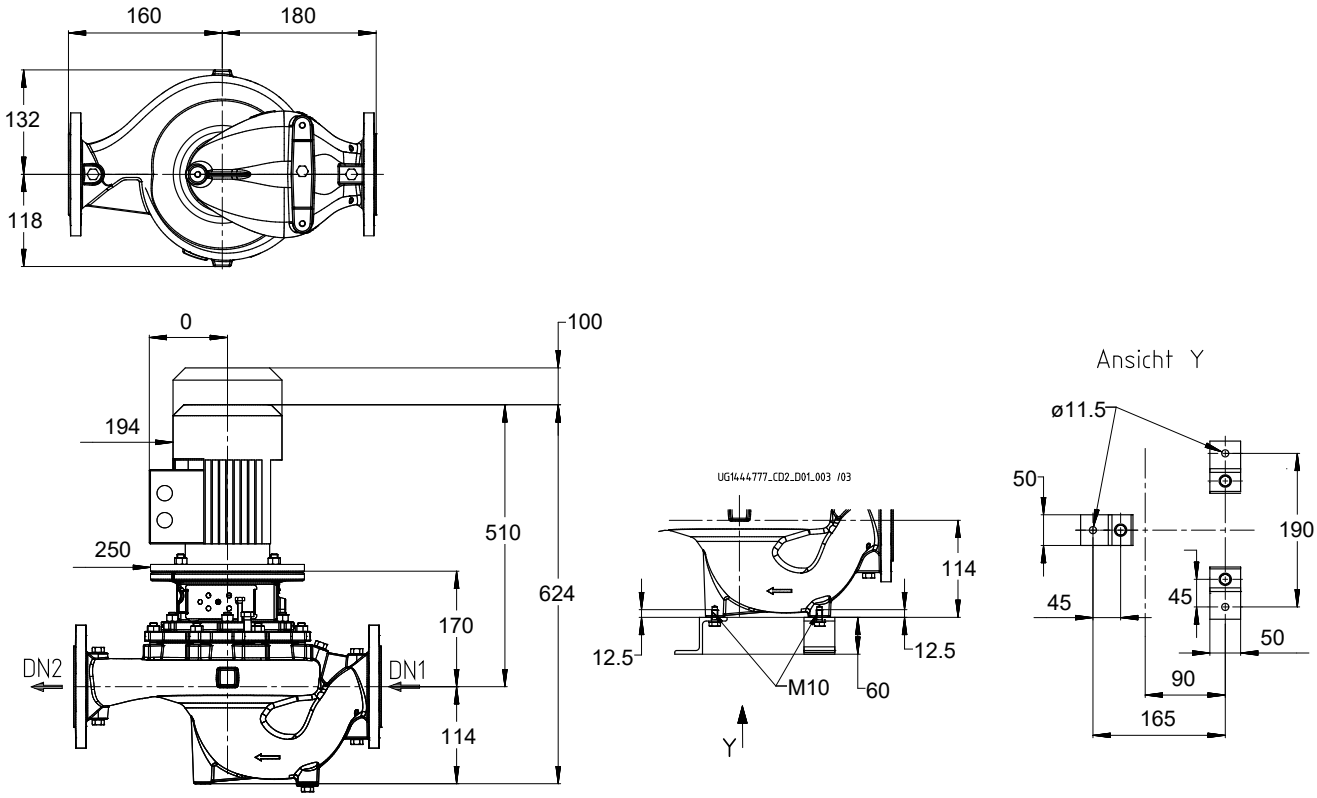


Curve data

Fluid density	998 kg/m³	Total developed head	20.41 m
Viscosity	1.00 mm²/s	Requested developed head	20.41 m
Flow rate	22.00 m³/h	MEI (Minimum Efficiency Index)	≥ 0.70
Requested flow rate	22.00 m³/h	Effective impeller diameter	174.0 mm

Installation plan

ETL 040-040-160 GGSAV11D200302 BKSBIE5 PD2EM
Inline pump



Drawing is not to scale *Dimensions in mm*

Motor

Motor manufacturer	KSB
Motor size	100L
Motor power	3.00 kW
Number of poles	2
Speed of rotation	3000 rpm
Position of terminal box	0° same orientation Viewed from the drive

Connections

Suction nominal size DN1	DN 40 / EN1092-2
Discharge nominal size DN2	DN 40 / EN1092-2
Nominal pressure suct.	PN 16
Rated pressure disch.	PN 16

Weight net

Pump	21 kg
Motor	24 kg
Total	45 kg

Connect pipes without stress or strain!

For auxiliary connections see separate drawing.

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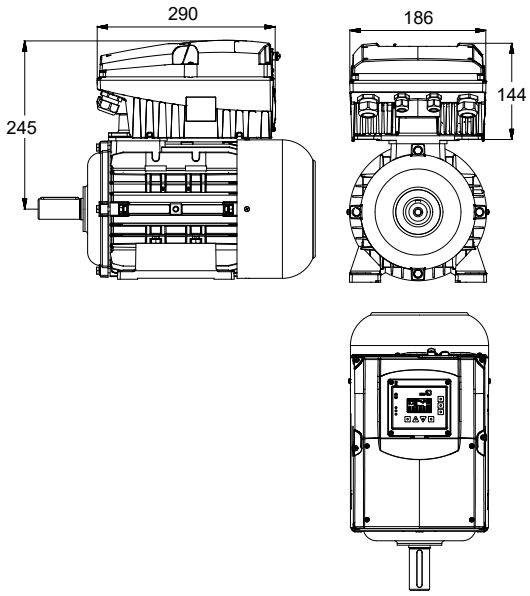
Inline pump

Supplementary drawing for PumpDrive



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Connection plan

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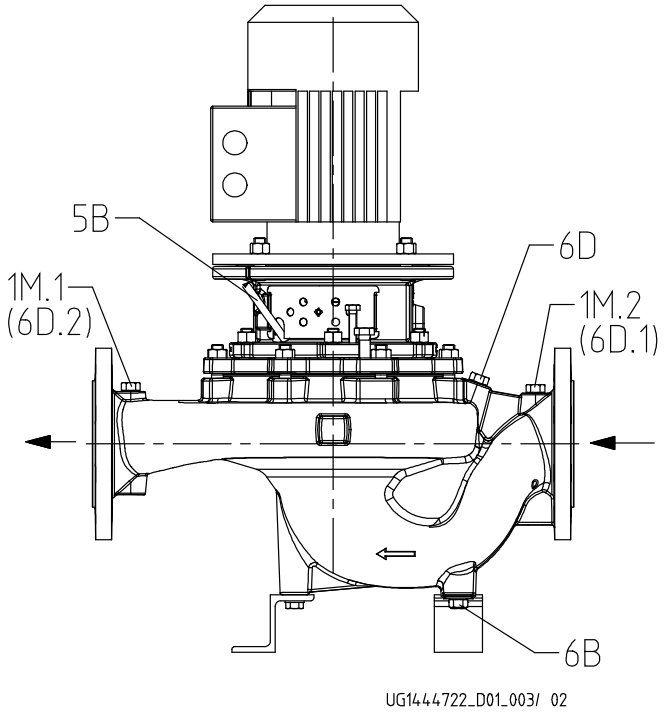
Inline pump



Connections

Pump casing variant		XX46
1M.1 Pressure gauge connection	G 1/4	Pressure sensor for PumpMeter fitted
1M.2 Pressure gauge connection	G 1/4	Pressure sensor for PumpMeter fitted
6B Pumped liquid drain	G 1/4	Drilled and plugged.
6D Pumped medium - filling / venting	G 1/4	Drilled and plugged.
5B venting	G 1/4	Closed with venting plug

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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
Display type	With standard control panel
Rated power	3.00 kW
Max. allowed current	8.0 A
M12 module	With
Remote operation	Without
Mounting	MM - Mounted on the motor

Weight	6 kg
PumpDrive length	290.0 mm
PumpDrive width	186.0 mm
PumpDrive height	144.0 mm
Manufacturer	KSB
PumpDrive adapter	No
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 (Δp const) in a single-pump configuration
- Sensorless differential pressure control with dynamic pressure compensation (Δp var) in a single-pump configuration
- Sensorless flow rate control

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- 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 in 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)