

**ETL 050-050-160 GGS AV66D200224 BKS BIE4 PD2M**

Inline pump

**Operating data**

Requested flow rate		Actual flow rate	35.00 m <sup>3</sup> /h
Requested developed head		Actual developed head	11.00 m
Pumped medium	Antifreeze on ethylene glycol base, inhibited, closed system, e.g. Antifrogen N or similar products	Efficiency	70.1 %
	Antifrogen N, concentration 40%	MEI (Minimum Efficiency Index)	≥ 0.70
	Not containing chemical and mechanical substances which affect the materials	Power absorbed	1.51 kW
Max. ambient air temperature	20.0 °C	Pump speed of rotation	1693 rpm
Min. ambient air temperature	20.0 °C	NPSH required	2.13 m
Fluid temperature	90.0 °C	Permissible operating pressure	16.00 bar.g
Fluid density	1009 kg/m <sup>3</sup>	Discharge press.	1.09 bar.g
Fluid viscosity	0.68 mm <sup>2</sup> /s	Min. allow. mass flow for continuous stable operation	2.32 kg/s
Suction pressure max.	0.00 bar.g	Shutoff head	14.28 m
Mass flow rate	9.81 kg/s	Max. allow. mass flow	15.67 kg/s
Max. power on curve	1.70 kW	Design	Single system 1 x 100 %
Min. allow. flow for continuous stable operation	8.29 m <sup>3</sup> /h		Tolerances to ISO 9906 Class 3B; below 10 kW acc. to paragraph 4.4.2

**Design**

Pump standard	Without	Material code	Q7Q7EGG
Caution: The overall length from suction to discharge can be different to the previous generation of Etaline.		Shaft seal code	66
Design	Close-coupled in-line	Sealing plan	Single-acting mechanical seal with vented chamber (A-type casing cover, taper bore)
Orientation	Vertical	Seal chamber design	Conical seal chamber (A-type cover)
Suction nominal dia.	DN 50	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	11.5 mm
Discharge nominal dia.	DN 50	Direction of rotation from drive	Clockwise
Discharge nominal pressure	PN 16	Silicon free pump assembly	Yes
Discharge position	top (0°/360°)	Bearing bracket construction	Close-coupled
Discharge flange drilled according to standard	EN1092-2	Bearing bracket size	25
Surface type	Raised face (form B to EN 1092)	Bearing type	Anti-friction bearings
Shaft seal	Single acting mechanical seal	Lubrication type	Grease
Manufacturer	Burgmann	Color	Vermilion (RAL 2002)
Type	MG13G6		

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**Driver, accessories**

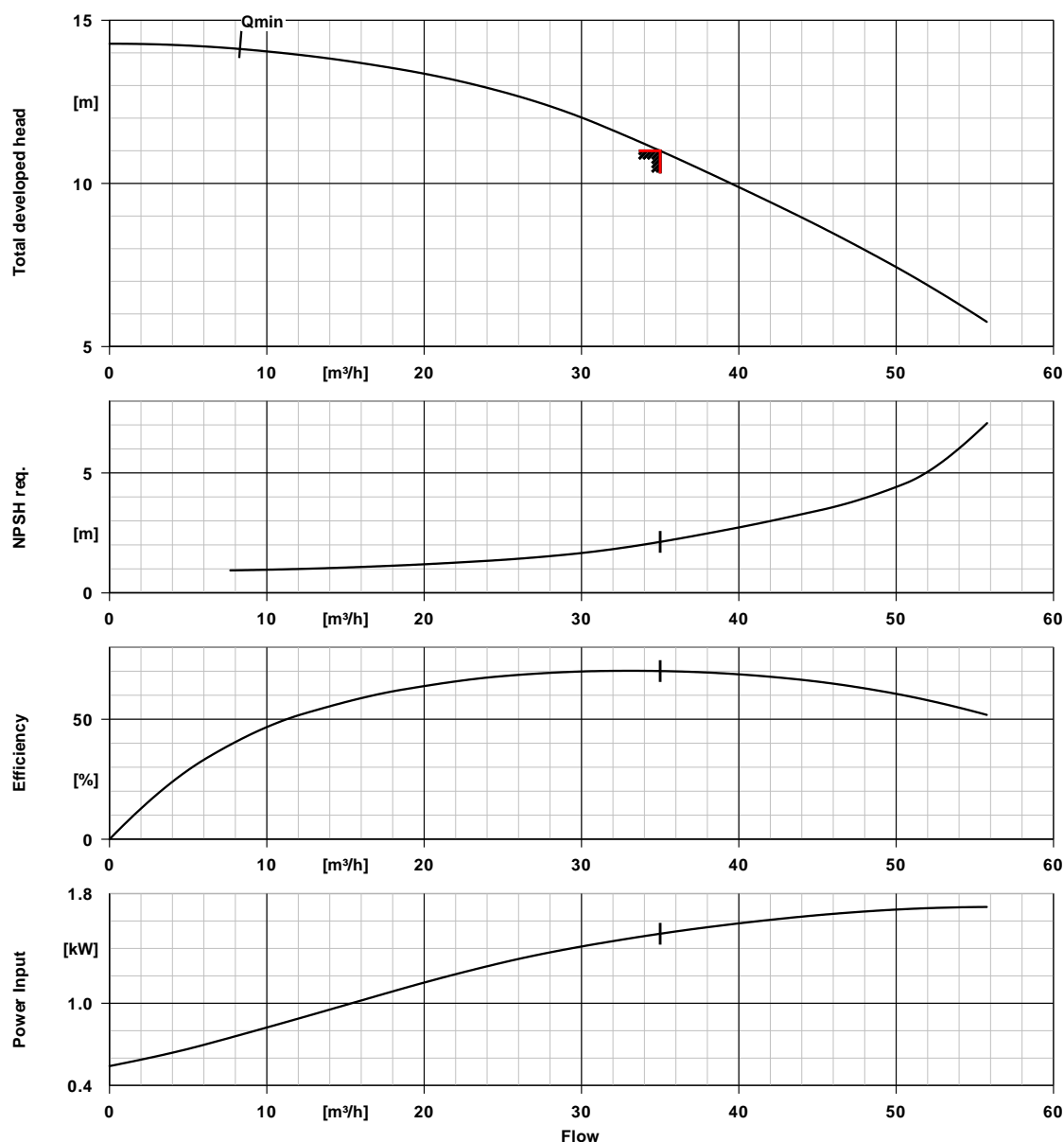
Driver type	Electric motor	Rated current	5.7 A
Drive standard mech.	IEC	Insulation class	F to IEC 34-1
Model (make)	KSB SuPremE®	Motor enclosure	IP55
Type series motor manufacturer	SuPremE C2 (with mounting plate for PumpDrive 2, non removable)	Cos phi at 4/4 load	0.68
Drive supplied by	Standard motor 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	45.86 %		Yes

**Materials G**

Volute casing (102)	Grey cast iron EN-GJL-250/A48CL35B	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
Motor stool (341)	Grey cast iron EN-GJL-250/A48CL35B	Impeller nut (922)	Steel 8
Flat gasket (400)	DPAF seal plate asbestos free	Key (940)	Steel C45+C / A311 GR 1045
Joint ring (411)	Steel ST		CLASS A

**ETL 050-050-160 GGS AV66D200224 BKS BIE4 PD2M**

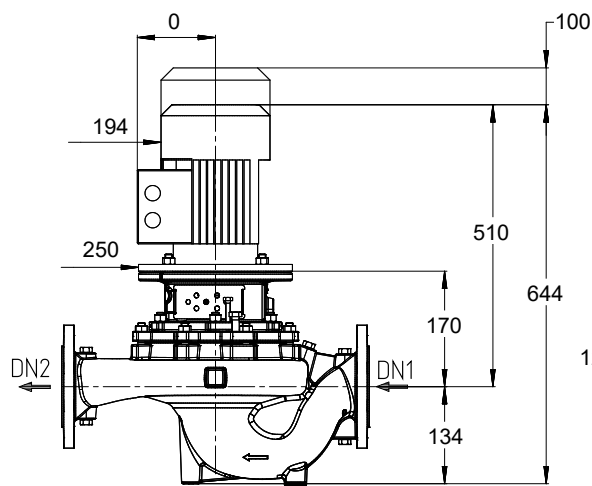
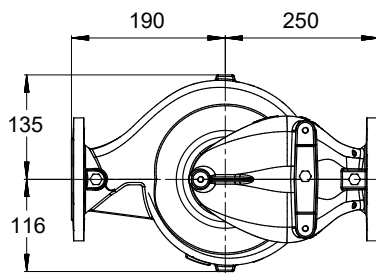
Inline pump

**Curve data**

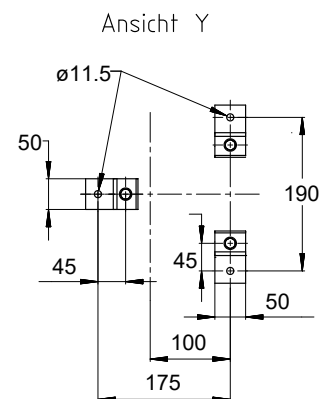
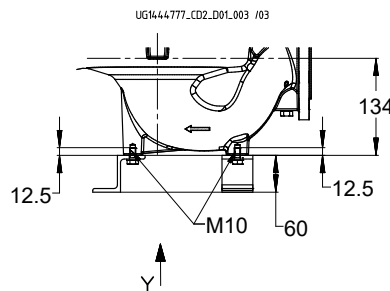
Speed of rotation 1693 rpm  
 Fluid density 1009  $\text{kg}/\text{m}^3$   
 Viscosity 0.68  $\text{mm}^2/\text{s}$   
 Flow rate 35.00  $\text{m}^3/\text{h}$   
 Requested flow rate 35.00  $\text{m}^3/\text{h}$   
 Total developed head 11.00 m  
 Requested developed head 11.00 m

Efficiency 70.1 %  
 MEI (Minimum Efficiency Index)  $\geq 0.70$   
 Power absorbed 1.51 kW  
 NPSH required 2.13 m  
 Curve number K1159.464/26  
 Effective impeller diameter 174.0 mm  
 Acceptance standard Tolerances to ISO 9906  
 Class 3B; below 10 kW  
 acc. to paragraph 4.4.2

## ETL 050-050-160 GGSAV66D200224 BKSBI4 PD2M 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 50 / EN1092-2
Discharge nominal size DN2	DN 50 / EN1092-2
Nominal pressure suct.	PN 16
Rated pressure disch.	PN 16

### Weight net

Pump	25 kg
Motor	24 kg
Total	49 kg

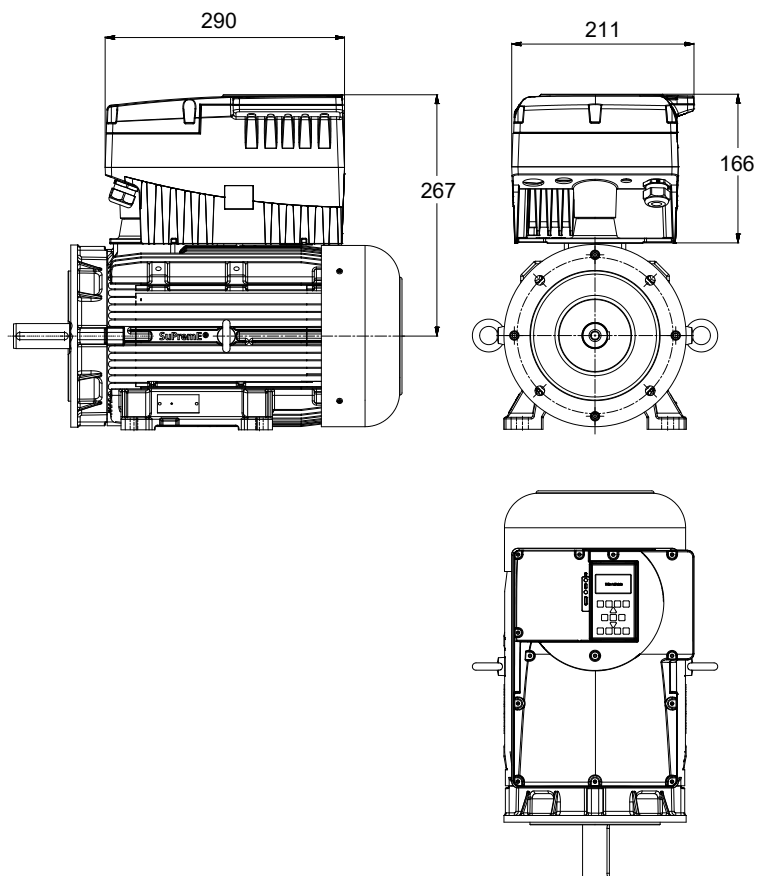
Connect pipes without stress or strain!

For auxiliary connections see  
separate drawing.

**ETL 050-050-160 GGSAV66D200224 BKSBI4 PD2M**  
Inline pump

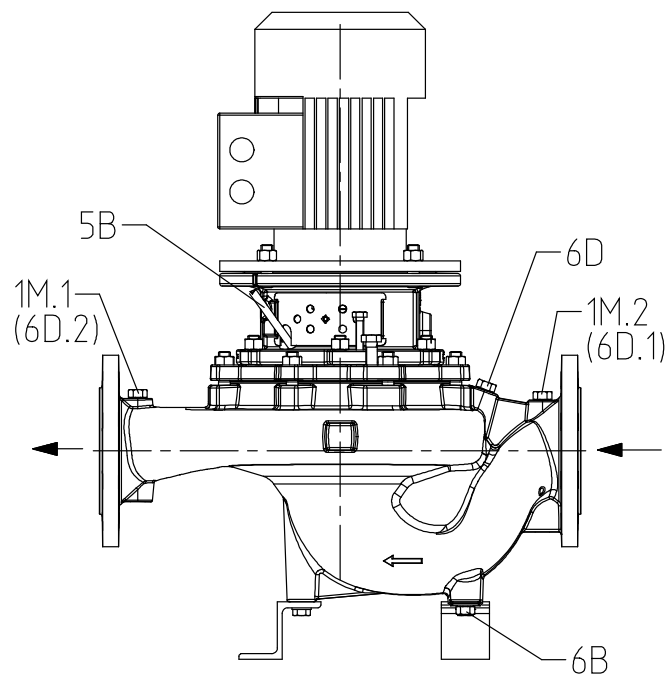
**Supplementary drawing for PumpDrive**

**ETL 050-050-160 GGSAV66D200224 BKSBI4 PD2M**  
Inline pump



*Drawing is not to scale*

**ETL 050-050-160 GGSAV66D200224 BKSBI4 PD2M**  
Inline pump



UG1444722\_D01\_003/ 02

## 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

**PDRV2 \_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
Display type	With graphic control panel
Rated power	2.20 kW
Max. allowed current	6.0 A
M12 module	With
Remote operation	Without
Main switch	Without
Fieldbus	without fieldbus

Optional IO module
Mounting
Weight
PumpDrive length
PumpDrive width
PumpDrive height
Manufacturer
PumpDrive adapter
Designation

Without
MM - Mounted on the motor
7 kg
290.0 mm
211.0 mm
166.0 mm
KSB
No
-

**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

Interference suppression class: > 11 kW: EN 61800-3: C2 / EN 55011 Class A, Group 1 / cable length <= 50 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

5 parameterisable inputs

Relay output: 2 changeover 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: die-cast aluminium

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
- User-definable max. speed (0 to 70 Hz or 140 Hz).
- 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



**PDRV2 \_002K20M\_KSUPBE4P4\_MOOOO**

- 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
- Sensorless dynamic pressure compensation for pipe friction losses (DFS curve), enabling higher energy savings.
- Flow rate estimation
- Alternative setpoint
- Functional check run

Operation and display:

- Display of measured values and alerts and for setting parameters, incl. fault history, operating hours counter (motor, frequency inverter)
- Display of operating point (Q, H)
- Energy savings meter
- Optical service interface for connection to KSB Service Tool.
- Commissioning Wizard
- Display can be removed and mount on a wall or piping

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 modules Profibus DP, LON, Modbus RTU, BACnet MS/TP, Profinet
- I/O extension board
- Master switch

## 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 pump's 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)