

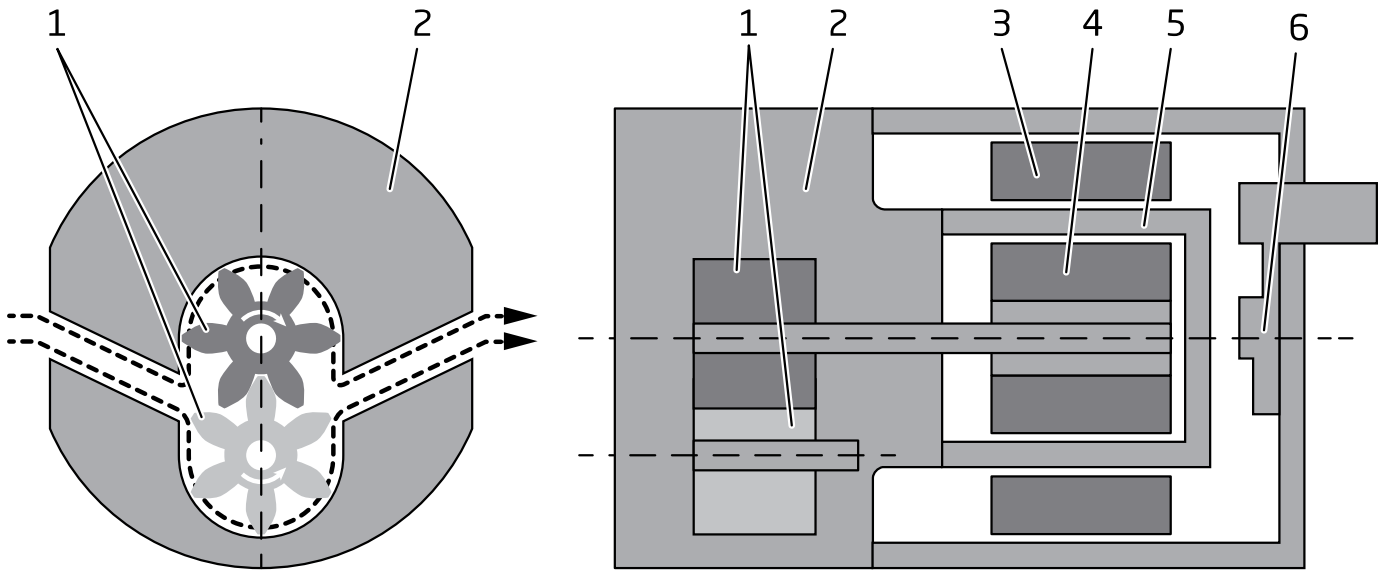
Technical Documentation
Gear Pump with Canned Motor

ZY-13...-MM



ZY-13...-MM

Gear pump with canned motor



Function of a gear pump

An external gear pump featuring an involute gear profile has two gear wheels (1) which rotate in a casing (2) with suction and pressure connection. One of the gear wheels is driven by a motor. The medium to be pumped is transported in the cavities between teeth and casing.

Gear pumps are displacement pumps. This displacement principle allows for the delivery of clear viscous liquids.

They are self-priming and robust due to their simple design.

Function of the drive

The power transmission from motor to shaft is produced by a rotating field generated by coils (3) directly to the inner magnet (4). The can (5) separates the pumping chamber from the atmosphere. An integrated electronic circuit (6) provides for the rotating field and controls the pump speed.

The drive is free from bearings and rotating components. No maintenance is necessary in standard operation.

Application

The pump can be used in the following application, e.g:

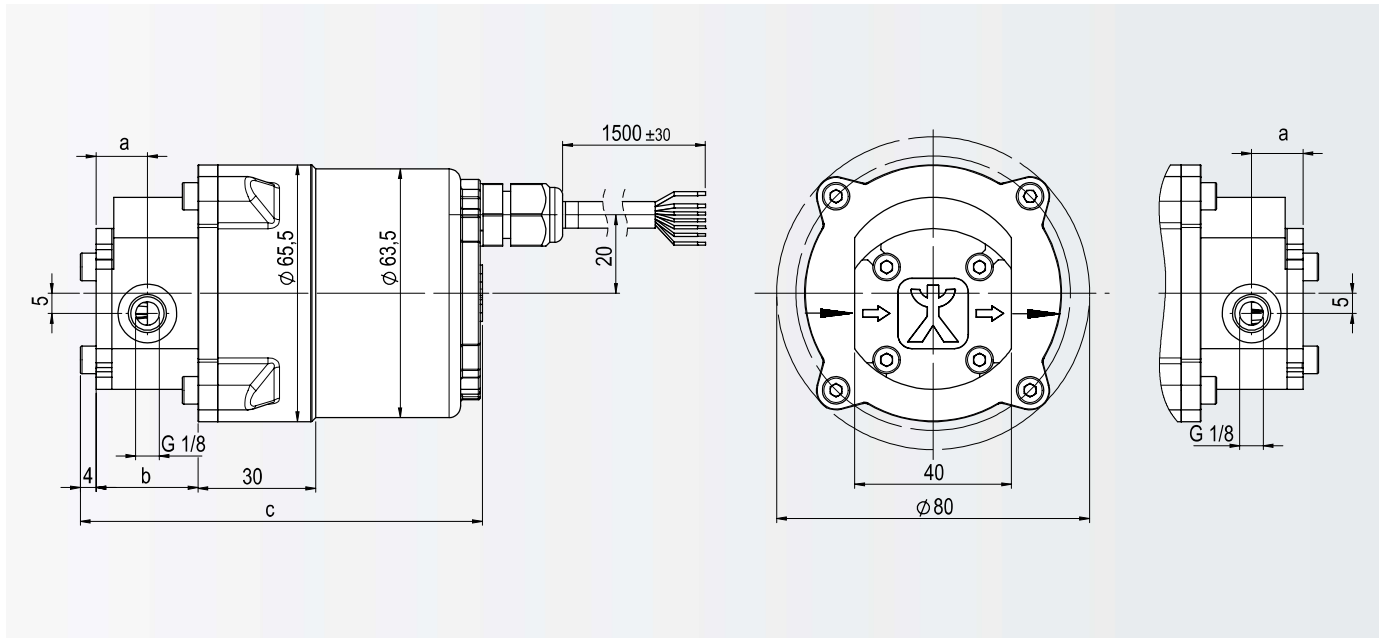
- » cooling of welding devices
- » cooling of charging stations for electric cars

Technical data

Pumped media	Clear or unclear liquids or mixtures without solids and with good lubricating qualities, not aggressive to the pump components. Other liquids on request.
Temperature of delivery	-35 °C up to +60 °C (max. viscosity 500 mm ² /s)
Installation	Dry installation in buildings or in roofed places outdoors. Not permitted in Ex-zones.
Ambience	-35 °C up to +60 °C (-31 °F up to +140 °F) ambient temperature, max. 80% air humidity. Protect the pump against ambient atmosphere or vapours with high concentrations of acids or solvents..
Static system pressure	max. 20 bar (max. 290 psi)
Power consumption (P1)	50 W (0.067 HP), depending on load and speed
Nominal voltage	24 V
Operating voltage	20 to 26 V
Current consumption	max. 2.2 A, depending on load and speed
Fuse	5 A
Speed	1,000 to 4,500 rpm (possible parameters set by factory)
Protection class	IP 65 (standard) up to IP 6K9K
Sound pressure level	max. 55/56/58 db (A) in a distance of 1 m (3.3 ft) to all sides
Connecting wire	1,500 mm +/- 30 mm (59" +/- 1,1"), 7-core cable, see detailed information in table „wire specification
Cable connection	M 12 x 1.5 plastics black
Pumping capacity	ZY-1305-MM: p _{max.} 8,7 bar (126 psi) / Q _{max.} 1,4 l/min (0.37 USGPM) ZY-1309-MM: p _{max.} 4,5 bar (65 psi) / Q _{max.} 2,7 l/min (0.71 USGPM) ZY-1314-MM: p _{max.} 2,6 bar (28 psi) / Q _{max.} 4,7 l/min (1.24 USGPM)
Lifetime	20,000 hours of operation according to standard mode of operation
Dry running protection	Not existing, the pump has to be protected against dry running by the user.
Blocking protection	In the state of a blocked impeller the starting attempts will be continued indefinitely.
Overload protection	Integrated electronics automatically reduce motor speed when reaching max. admissible motor temperature.
Max. surface temp..	approx. +90 °C (+194 °F)
Storage temperature	+5 °C up to +35 °C, for short time period (< 8h) -50 °C up to +120 °C with completely drained pump or with frost-proof media inside the pump
Lacqueur	Motor casing and pump casing without lacqueur
Weight	0,79 / 0,86 / 0,90 kg

Description

Dimensional drawing

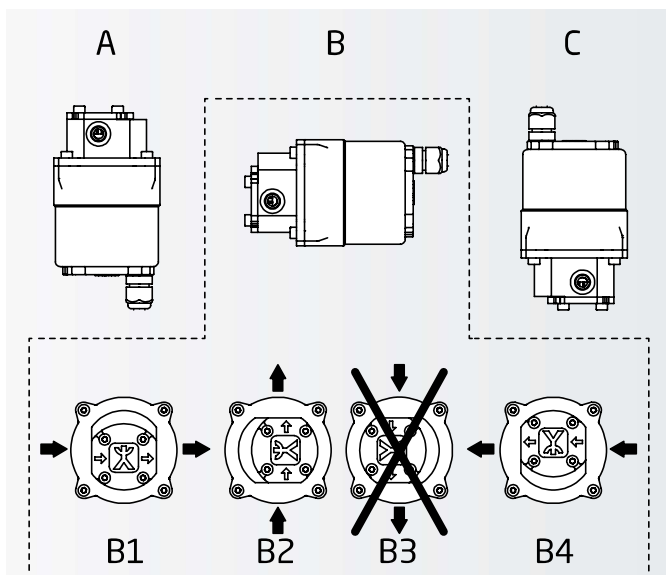


Dimensions

	a	b	c
ZY-1305-MM	12	21,5	95
ZY-1309-MM	13	26,0	102,5
ZY-1314-MM	16	30,5	107,0

Materials

Pump casing	1.4308 / stainless steel
Motor casing	Die-cast aluminium
Gear wheel	PEEK
Separating can	PPS (polyphenylensulfide with 40% fibre glass)



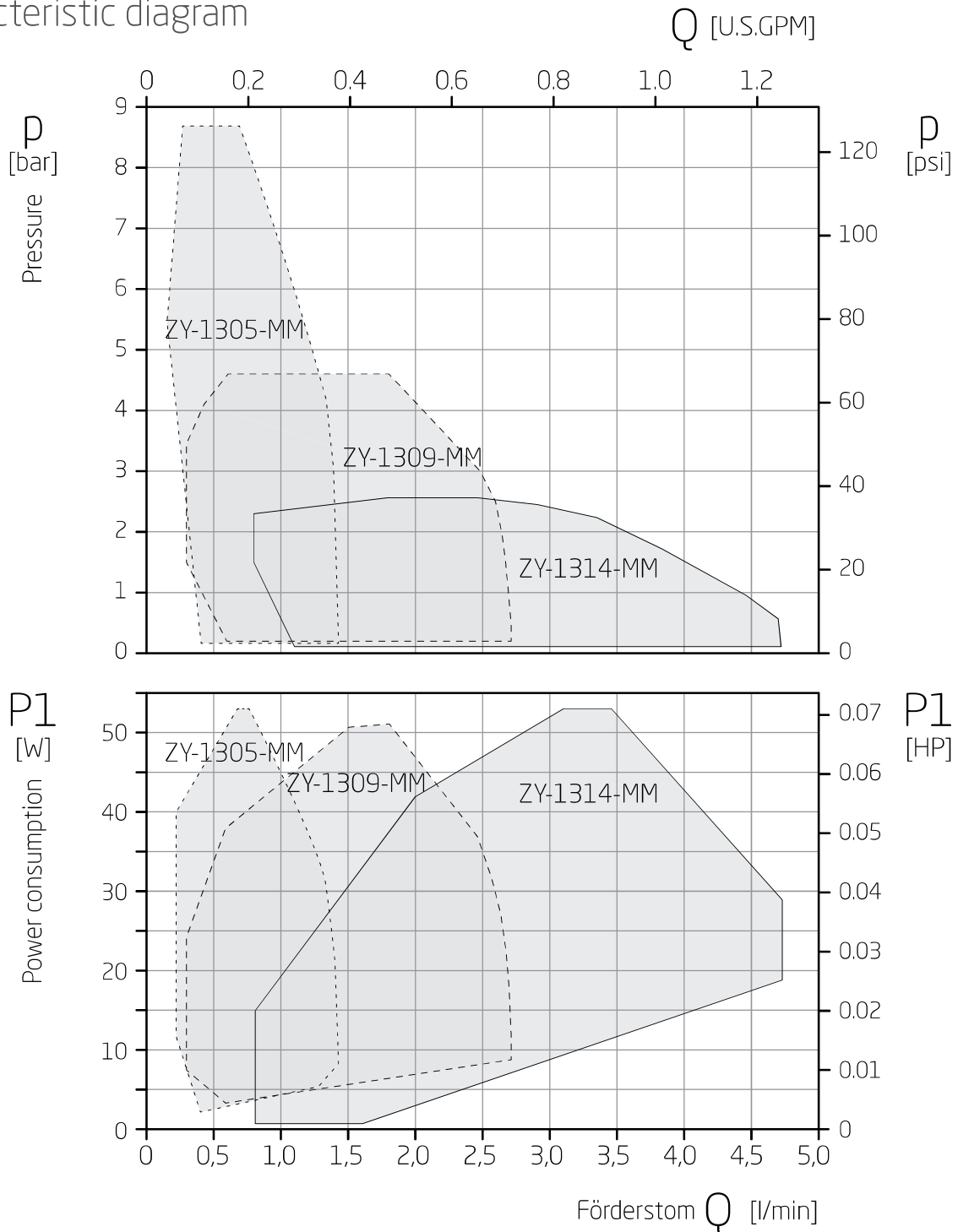
Permissible installation positions

A, C = permissible

B1, B2, B4 = permissible and recommended

B3 = not permissible

Characteristic diagram



Every operating point can be reached within these characteristic diagrams by setting speed parameters of the drive accordingly.

The characteristic fields are applicable for the delivery of water of 20 °C (68 °F) temperature and an ambient temperature of 20 °C (68 °F).

The tolerance of total head and capacity is $\pm 10\%$, performance tolerance is $+ 10\%$. If the property of the pumped media differs, the characteristic fields change.

The power consumption P_1 specifies the electrical power input.

Fixing and installation

Installation positions

Refer to preceding page

Installing instructions

An open and well-ventilated place has to be chosen for the installation of the pump. The connections of suction and delivery pipe to the pump casing and the pump connections in general should be assembled tension-free. The pump connections are not to be loaded. Line size not less than 1/8 inch. Do not use any kind of insulating material around the pump. Check all pipes according to fixed position and tightness.

Cable routing

Install connecting cable without tensile stress, kink-free and abrasion-free. Provide cable protection conduits if necessary.

Electrical installation

Connect the red strand 0.34 mm² with the 24 V positive pole of the power supply unit. Connect the black strand 0.34 mm² with the 24 V negative pole of the power supply unit. Pay attention to use well-dimensioned cable connections.

Features

Adjustable speed

Motor speed is defined by the control lines proportional to applied voltage (0 – 10 V).

- » 0 - 2 V: motor off
- » 2 - 10 V: 1,000-4,500 rpm
- » $n = 437.5 \times (U - 2) + 1,000$

Connect the yellow strand 0.14 mm² with the 0 – 10 V-positive pole of the control voltage source. Connect the black strand 0.34 mm² with the negative pole of the control voltage or power source.

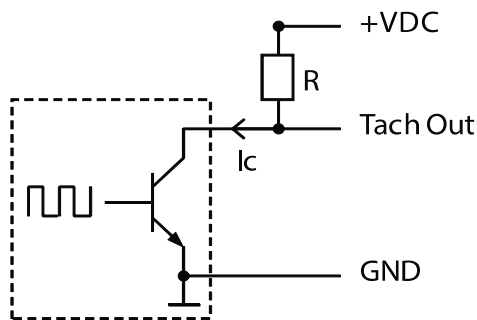
Turn on/off

The motor can be turned on and off by the control line „Active Low“ without cutting off power supply. Connect the green strand (Active Low) with GND (black strand 0.34 mm²) to turn off the motor.

Speed signal

A speed proportional open collector square signal is issued by the brown control line (Tach Out), referring to GND.

Speed [Hz] = frequency of rectangular signal [Hz]



Resistance R has to be selected according to applied voltage VDC, that the current I_c may not exceed 20 mA. At VDC = 10 V, R usually is approx. 1 kΩ.

Inverse-polarity protection

Supply lines (+ 24 VDC and GND) are not protected against inverse polarity, but resistant to inverse polarity for a short term. In this case the inverse polarized supply voltage is short-circuited (max. 10 A for 100 ms).

For this reason, a fuse (5 A) is obligatory when connecting the pump to batteries or vehicle electric systems.

When connecting to electronic power supplies (power of less than 100 W), a fuse is not required.

Control lines are protected up to ± 25 V (right and inverse polarized).

Initial operation

The hydraulic system has to be completely filled and bled before the first start up. The pump has to be filled with the pumped medium. For bleeding the system please pay attention to the instructions by the manufacturer.

Shut-off valves on suction side and on pressure side have to be opened completely.

The delivery of the pump medium has to be initiated immediately after commissioning the pump (no more than 5 seconds). If priming does not occur, the pump has to be turned off to avoid damages of dry running.

Wire specification

	Function	Cross sections	Colour	Remark
Supply lines	+ 24 VDC	AWG 22 $\hat{=}$ 0.34 mm ²	red	
	GND	AWG 22 $\hat{=}$ 0.34 mm ²	black	
Control lines	Active Low	AWG 26 $\hat{=}$ 0.14 mm ²	green	
	Tach Out	AWG 26 $\hat{=}$ 0.14 mm ²	brown	
	Control Voltage	AWG 26 $\hat{=}$ 0.14 mm ²	yellow	
	Interface	AWG 26 $\hat{=}$ 0.14 mm ²	white	only applicable by Speck Pumpen
	Interface	AWG 26 $\hat{=}$ 0.14 mm ²	blue	only applicable by Speck Pumpen

Trouble shooting

Defect	Cause	Rectification
Pump does not deliver	Supply or suction pipe and pump are not bled correctly or not filled completely	Fill or bleed pump and/or pipes completely
	Motor does not run	Connect motor to the power supply correctly
	Hydraulic parts of the pump are blocked or stuffed by solids	Disassemble pump, remove solids
Pump delivers with interruptions	Hydraulic parts of a pump are dirty, sticky, incrustated or worn out	Disassemble pump, clean pump parts
	Supply suction pipe and pump are not bled correctly or not filled completely	Fill or bleed pump and/or lines completely.
Delivery performance too low	Electronical parts too hot: Motor reduces speed	Keep motor ventilated

UL approvals of material used

Pump type ZY-13...-MM has no UL approval, but some materials meet UL requirements.

Component	Material, manufacturer, note	UL
Motor electronic	Circuit board, plug and plastic material contacting the leads	UL 94 V-0, V-2, HB
Casting compound	Silicone molding resin, Kunshan Yuling Electronic Technology Co., Ltd	UL 94 V-0 (UL-File E351939)
Motor casing	Aluminium die cast	Irrelevant
Separating can	ALBIS PLASTIC GmbH, Tedur® L 9107-1 (PPS-GF40)	UL 94 V-0 (UL / CSA-File E80168)
Gear wheel	PEEK	On request
Rotor	PPS 6/65	UL94 V-0 UL-File E109088
Pump casing	1.4305 / stainless steel	Irrelevant
Cable	Shanghai Xiangyi Electronic Equipments Co Ltd	UL 2464 (UL-File E332958)
Wire connection	PA66/EPDM Shanghai RIYU ELECTRONIC EQUIPMENTS CO LTD	UL94 V-2 (UL-File E41938)



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