Technical Documentation
Gear Pump with Canned Motor

ZY-2009-MM

speck

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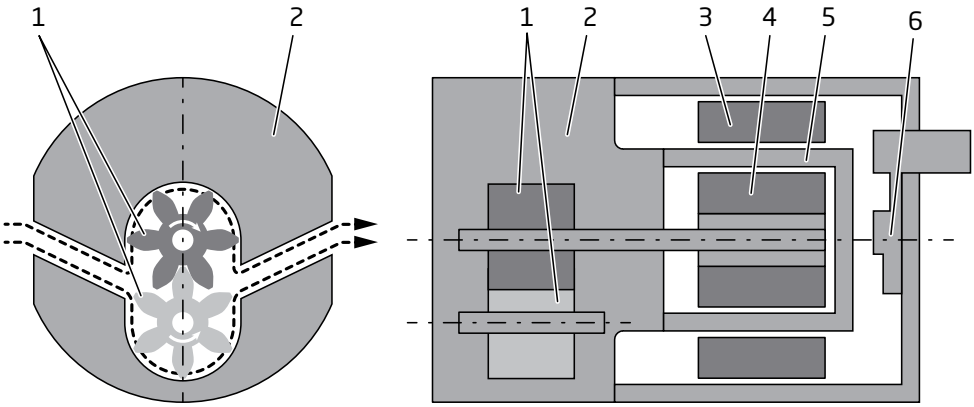


Function of a gear pump

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:

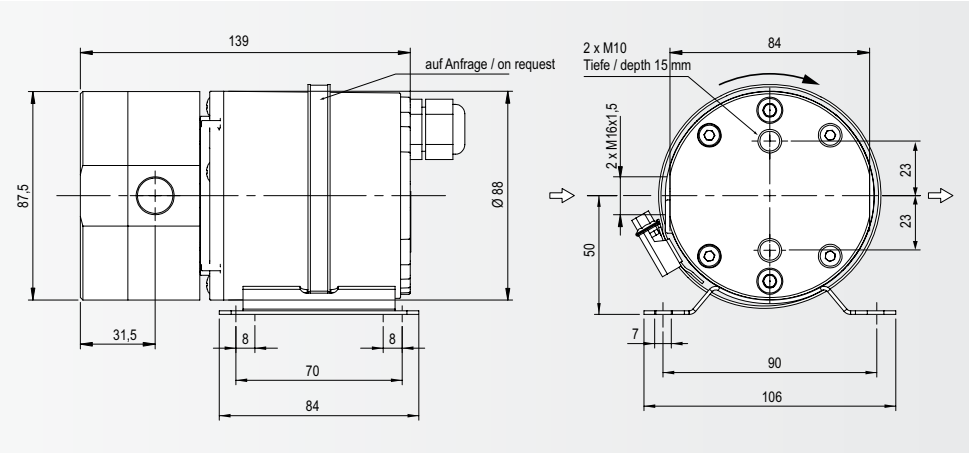
» delivery of fuel in motor vehicles and railcars

Technical data

Pumped media	Diesel and oils; other non-corrosive media on request.
Temperature of delivery	- 35 °C up to + 80 °C (liquid media)
Installation	Dry installation in buildings or in roofed places outdoors. Not permitted in Ex-zones.
Ambience	- 35 °C up to + 40 °C (-22 °F up to +176 °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. 2.5 bar (max. 36.3 psi)
Motor power	max. 180 W (0.23 HP), depending on load and speed
Nominal voltage	24 V
Operating voltage	18 to 28 V
Current consumption	max. 7.5 A, depending on load and speed
Fuse	10 A
Speed	1,000 to 4,000 rpm (possible parameters set by factory)
Protection class	IP 54, higher degree of protection on request
Sound pressure level	max. 46 db (A) n a distance of 1 m (3.3 ft) to all sides
Connecting wire	1,000 mm +/- 20 mm (39.3" +/- 0,8") insulating hose with loose wire-endings 50 mm (1.9"), isolated without ferrules, 5 mm (0.2") stripped. See detailed information in table „wire specification"
Cable connection	M 16 x 1.5 plastics black
Pumping capacity	$p_{max.}$ 8 bar, $Q_{max.}$ 4.5 l/min
Lifetime	20,000 hours of operation according to standard mode of operation
Protection against dry running	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
Lacqueur	Motor casing powder-coated RAL 9005 black mat, pump casing without lacqueur
Weight	2.8 kg (6.18 lbs)

Description

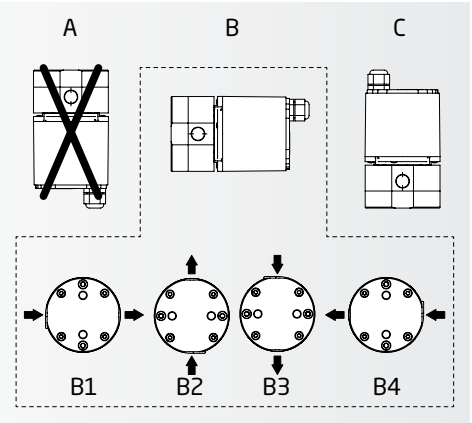
Dimensional drawing



Materials

Casing	EN-GJS-400-15 / spheroidal graphite cast iron
Gear wheel	Steel
Separating can	PPS (polyphenylensulfide with 40% fibre glass)

EN-GJS-400-15 = EN-JS 1030 = GGG-40



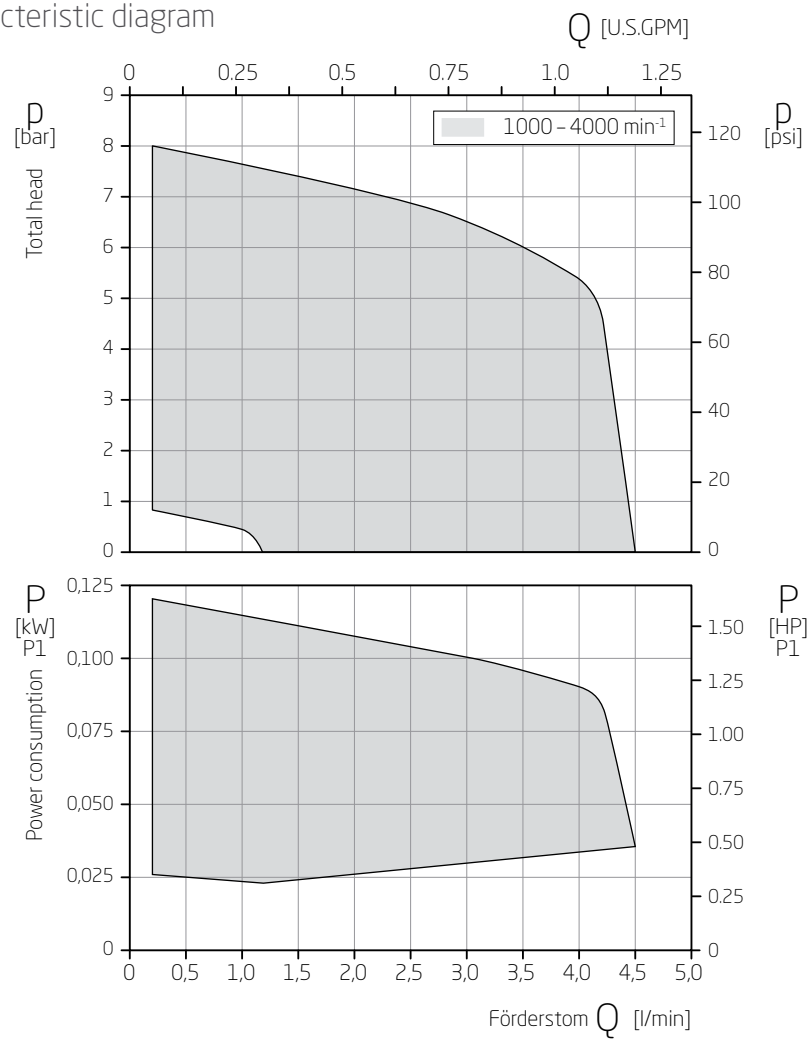
Permissible installation positions

A = not permissible

B = permissible and recommended

C = permissible

Characteristic diagram



Every operating point can be reached within these characteristic diagrams by setting different drive parameters.

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

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

The power consumption P1 specifies the electrical power input.

Fixing and installation

Installation positions
refer to preceding page

Assembly with casing bore holes
On the front side of the casing there are two M 10 holes, which are used for fixing.

Assembly with tension clamp (optional)
Foot fixed with four M 6 screws:
By loosening the tension clamp, the position of the pump can be relocated.
Clamping torque is 3 - 5 Nm.

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 ¼ inch. Do not use any kind of insulating material around the pump. Check all pipes according to fixed position and tightness.

Electrical connections
The connecting wire has to be installed tension-free.

Electrical Installation

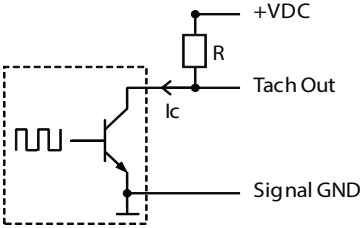
Connect the red strand 2.5 mm² with the 24 V positive pole of the power supply unit.
Connect the black / blue strand 2.5 mm² with the 24 V negative pole of the power supply unit.
Pay attention to use well-dimensioned cable connections.

Optional features

Option: Adjustable speed
Motor speed is defined by the control lines proportional to applied voltage (0 – 10 V) or current (0 – 20 mA). Speed depends on the particular programming of the motor. If the control lines are not connected, the motor runs with a programmed speed for 0 V, respectively for 0 mA. Connect the yellow strand 0.75 mm² with the 0 – 10 V-positive pole of the control voltage source or the grey strand with the 0 - 20 mA-positive pole of the control power source. Connect the black strand 0.75 mm² with the negative pole of the control voltage or power source.

Option: 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 Signal GND (black strand 0.75 mm²) to turn off the motor.

Option: Speed signal
A speed proportional open collector square signal is issued by the brown control line (Tach Out), referring to signal GND.
Speed [Hz] = frequency of rectangular signal [Hz].



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

Notice
Supply ground (Power GND) and signal ground (Signal GND) are connected internally!

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

For this reason, a fuse (10 A) is obligatory when connecting the batteries/vehicle electric systems.
When connecting to electronic power supplies (power of less than 500 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 commissiong 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 14 ≙ 2.5 mm²	red	
	Power GND	AWG 14 ≙ 2.5 mm²	black or blue	
Control lines	Signal GND	AWG 22 ≙ 0.75 mm²	black	option available
	Active Low	AWG 22 ≙ 0.75 mm²	green	option available
	Tach Out	AWG 22 ≙ 0.75 mm²	brown	option available
	Control Voltage	AWG 22 ≙ 0.75 mm²	yellow	option available
	Control Current	AWG 22 ≙ 0.75 mm²	grey	option available
	Interface	AWG 22 ≙ 0.75 mm²	white	only applicable by Speck Pumpen
	Interface	AWG 22 ≙ 0.75 mm²	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
	Hydraulic parts of a pump are dirty, sticky, incrusted or worn out	Disassemble pump, clean pump parts
Pump delivers with interruptions	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

Component	Material, manufacturer, note	UL
Motor electronic	Circuit board, plug and plastic material contacting the leads	UL 94 V-0
Casting compound	WEVO casting compound PD 4431 FL The electronic components are covered, only electrolyte capacitors and terminal pins stick out..	UL 94 V-0 (UL / CSA-File E108835)
Motor casing	Aluminium die cast Coating powder polyester resin Interpon® 610	Irrelevant UL 1332
Separating can	ALBIS PLASTIC GmbH, Tedur® L 9107-1 (PPS-GF40)	UL 94 V-0 (UL / CSA-File E80168)
Gear wheel	Steel	Irrelevant
Pump casing	EN-GJS-400-15 / spheroidal graphite cast iron	Irrelevant
Strands	The connecting wire is executed as single strands bundled in an insulating hose	UL 3266 / CSA AWM I A/B
Insulating hose	Isotex (combination of glassfibre and silicone)	UL 1441 / UL 94 V-0
Wire connection	Jacob GmbH, polyamide PA6	UL 514 B (UL / CSA-File E140310)

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