Technical Documentation
Regenerative Turbine Pump with Canned Motor

Y-2951-W-MM
Description

Hermetically sealed centrifugal pump with canned motor.

Impeller (230) and inner magnet (847) are assembled to the same shaft (211), the shaft is supported by a medium-lubricated sleeve bearing (310). The power transmission from motor to shaft is produced by a rotating field, generated by coils, directly to the inner magnet.

The can (816) separates the pumping chamber from the atmosphere. An integrated electronic circuit 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.

Applications

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

Temperature controlling and industrial cooling
- cooling of machines, systems and production processes
- cooling of industrial and medical lasers
- climatisation of control cabinets
- tempering devices in laboratory applications

Further applications
- drinking water supply in railcars and on ships
- etc.
# Technical Data

**Pumped media**
Clear or unclear liquids or mixtures without solids and with good lubricating qualities, not aggressive to the pump components, density and viscosity similar to water. Other liquids on request.

**Temperature / Medium**
-30 °C up to +80 °C (-22 °F up to +176 °F), medium has to be liquid!

**Installation**
Dry installation in buildings or in roofed places outdoors. Not permitted in Ex-zones.

**Ambience**
-30 °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**
2000 to 5000 rpm, possible parameters set by Speck Pumpen

**Direction of rotation**
Left (view from pump front side), cf. marking on pump connections

**Protection class**
IP 54, higher degree of protection on request

**Sound pressure level**
max. 46 db(A) in a distance of 1 m (3.3 ft) to all sides

**Connecting wire**
1000 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**
M16 x 1.5 plastics black

**Pumping capacity**
H<sub>max</sub>. 45 m (147 ft)
Q<sub>max</sub>. 12 l/min (3.2 USGPM)

**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 temperature**
approx. +90 °C (+194 °F)

**Storage temperature**
-40 °C up to +120 °C (-40 °F up to +248 °F)

**Lacqueur**
Motor casing powder-coated RAL 9005 black mat, pump housing unpainted

**Weight**
1950 g (4.30 lbs)
**Material**

<table>
<thead>
<tr>
<th>Component</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Casing parts</td>
<td>1.4581 or brass</td>
</tr>
<tr>
<td>Impeller</td>
<td>PEEK (polyetheretherketone with 30% fibre glass)</td>
</tr>
<tr>
<td>Shaft</td>
<td>1.4122</td>
</tr>
<tr>
<td>Sleeve bearing</td>
<td>SiC</td>
</tr>
<tr>
<td>Separating can</td>
<td>PPS (polyphenylensulfide with 40% fibre glass)</td>
</tr>
<tr>
<td>O-rings</td>
<td>FKM</td>
</tr>
</tbody>
</table>
Every operating point can be reached within these characteristic fields by setting different drive parameters.

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 ±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

Pump connections
The preferred position for the installation of the pump is a horizontal position. By loosening the tension clamp, the position of the pump connections (state of delivery: on top) can be removed deliberately. For Y-2951-W-MM in the ranges of 90° to the left (9 o’clock position) or 90° to the right (3 o’clock position). Clamping torque is 3 - 5 Nm. Avoid an incident flow from below.

Installing instructions
An open and well-ventilated place has to be chosen for the installation of the pump. Foot fastening with four M6 screws in an appropriate, accessible place. The connections of suction and discharge pipe to the pump casing and the pump connections in general should be assembled tension free.
Size of pipes should not range below ¼”. 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 strand 2,5 mm² with the 24 V-negative pole of the power supply unit. Pay attention to use well-dimensioned cable connections.

In addition, optional features are available:

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.

Wire specification

Supply lines
<table>
<thead>
<tr>
<th>Function</th>
<th>Cross sections</th>
<th>Colour</th>
</tr>
</thead>
<tbody>
<tr>
<td>+24 VDC</td>
<td>AWG 14 = 2.5 mm²</td>
<td>red</td>
</tr>
<tr>
<td>Power GND</td>
<td>AWG 14 = 2.5 mm²</td>
<td>black or blue</td>
</tr>
</tbody>
</table>

Control lines
<table>
<thead>
<tr>
<th>Function</th>
<th>Cross sections</th>
<th>Colour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signal GND</td>
<td>AWG 20 = 0.75 mm²</td>
<td>black option available</td>
</tr>
<tr>
<td>Active Low</td>
<td>AWG 20 = 0.75 mm²</td>
<td>green option available</td>
</tr>
<tr>
<td>Tach Out</td>
<td>AWG 20 = 0.75 mm²</td>
<td>brown option available</td>
</tr>
<tr>
<td>Control Voltage</td>
<td>AWG 20 = 0.75 mm²</td>
<td>yellow option available</td>
</tr>
<tr>
<td>Control Current</td>
<td>AWG 20 = 0.75 mm²</td>
<td>grey option available</td>
</tr>
<tr>
<td>Interface</td>
<td>AWG 20 = 0.75 mm²</td>
<td>white only applicable by Speck Pumpen</td>
</tr>
<tr>
<td>Interface</td>
<td>AWG 20 = 0.75 mm²</td>
<td>blue only applicable by Speck Pumpen</td>
</tr>
</tbody>
</table>

Single wires bound in an insulating hose
**Optional 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].

![Diagram](image)

Resistance $R$ has to be selected according to applied voltage $V_{DC}$, that the current $I_c$ may not exceed 20 mA.
At $V_{DC} = 10$ 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 resistant to inverse polarity for a short term. In this case the inverse polarized supply voltage is short-circuited (max. 100 A for 100 ms). 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.

**Trouble shooting**

<table>
<thead>
<tr>
<th>Disturbance</th>
<th>Cause</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pump does not deliver</td>
<td>Supply suction pipe and pump are not bled correctly or not filled completely</td>
<td>Fill or bleed pump and/or pipes completely</td>
</tr>
<tr>
<td></td>
<td><strong>Motor does not run</strong></td>
<td><strong>Connect motor to the power supply correctly</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Hydraulic parts of the pump are blocked or stuffed by solids</strong></td>
<td><strong>Disassemble pump, remove solids</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Hydraulic parts of a pump are dirty, sticky, incrusted or worn out</strong></td>
<td><strong>Disassemble pump, clean pump parts</strong></td>
</tr>
<tr>
<td>Pump delivers with interruptions</td>
<td>Supply suction pipe and pump are not bled correctly or not filled completely</td>
<td>Fill or bleed pump and/or lines completely</td>
</tr>
<tr>
<td>Delivery performance too low</td>
<td>Electronical parts too hot: Motor reduces speed</td>
<td>Keep motor ventilated</td>
</tr>
</tbody>
</table>
### UL approvals of material used

<table>
<thead>
<tr>
<th>Component</th>
<th>Material, manufacturer, comment</th>
<th>UL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor electronics</td>
<td>PCB and plug as well as plastic parts being in contact with conductors</td>
<td>UL94 V-0</td>
</tr>
<tr>
<td>Casting compound</td>
<td>WEVO casting compound PD 4431 FL&lt;br&gt;The electronic components are covered, only electrolyte capacitors and connector pins protrude from the compound.</td>
<td>UL94 V-0 (UL / CSA-File E108885)</td>
</tr>
<tr>
<td>Motor casing</td>
<td>Die-cast aluminium&lt;br&gt;Polyester resin based Interpon® 610 powder coating</td>
<td>Not applicable UL 1332</td>
</tr>
<tr>
<td>Separating can</td>
<td>ALBIS PLASTIC GmbH, Tedur® L 9107-1 (PPS-GF40)</td>
<td>UL94 V-0 (UL / CSA-File E80168)</td>
</tr>
<tr>
<td>Impeller</td>
<td>VICTREX® PEEK™ 450FC30&lt;br&gt;Luvocom® 1105-0699 (PEEK fiber-reinforced, lubricant modified)</td>
<td>UL94 V-0 (UL / CSA-File E161131)</td>
</tr>
<tr>
<td>Pump casing</td>
<td>1.4581</td>
<td>Irrelevant</td>
</tr>
<tr>
<td>Strands</td>
<td>The connecting cable has single strands which are bundled in an insulating hose.</td>
<td>UL3266 / CSA AWM I A/B</td>
</tr>
<tr>
<td>Insulating hose</td>
<td>Isotex (combination of glassfibre and silicon)</td>
<td>UL-1441 / UL94 V-0</td>
</tr>
<tr>
<td>Cable gland</td>
<td>Jacob GmbH, polyamide PA6</td>
<td>UL 514B (UL / CSA-File E140310)</td>
</tr>
</tbody>
</table>