Optical Level Control Unit TK3

Main Features
- High reliability ensured by absence of mechanical moving parts.
- Sight glass and electronic LEDs can be checked on the same side where is more comfortable to do inspections.
- Well consolidated steel with fused glass technology and the absence of seals ensures no leakage and good chemical compatibility.
- Direct mounting onto 3/4 bolts compressors
- Easy maintenance of the coil of the valve and of the Electro-Optic sensor that can be easily replaced without emptying or depressurizing the plant.
- No need to use external pressure reduction devices
- Maximum compatibility with particular media due to the possibility of mounting of different/custom valves
- 230 VAC /2A alarm relay output suitable for direct connection in the security chain of the system
- Adapters suitable for various types of compressors
- Unit conform to directives: *2004-108-CE *CEI EN 60204-1:2006

Application Description
The TK3 is designed to control the oil level in the compressor crankcase in order to avoid the compressor to run without oil and so improve its lifetime. TK3 monitors the oil level with the embedded electro-optic sensor and comprises a solenoid valve for oil filling and a relay output contact to give an alarm or directly stop the compressor (through a separate power relay).

The output contact (normally open) is closed when the oil level is enough and open if after a determined number of filling cycles the oil level is not restored. Alarm state is represented by the red LED. The LEDs on the Electronic box gives immediately info on the status of the system and act as follows:
- Power Light (green colour): always on when power is applied.
- Oil Good (green colour): steady on while oil level is good, blinking for a first period of oil missing (even due to turbulence, undulations, etc.) before start filling and is off when filling.
- Oil Filling (yellow colour): Off while oil level is good, steady on while injecting oil, blinking while (after filling) TK3 check if the oil level is restored.
- Alarm (red colour): Off while oil level is enough, steady on if after a determined number of filling cycles the oil level is not restored.

In each phase if the correct oil level is restored the oil feeding is stopped and the alarm is deactivated. In standard model the functioning sequence is the following:
- 10 sec of continuative absence of oil before start the filling phase
- 5 sec of oil injection
- 55 sec of oil monitoring before fill again or return to normal condition
- 10 filling cycles (resulting in 10minutes) before giving alarm in case of oil lack.

Functioning and alarm delay times can be customized in order to follow customer needing.
Model Oil Control TK3

Technical Data

<table>
<thead>
<tr>
<th>Supply voltage</th>
<th>24 VAC ± 10% @ 50 / 60Hz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply Current</td>
<td>0.6A (depending on the solenoid valve)</td>
</tr>
<tr>
<td>Electrical connection</td>
<td>9.4mm Industry Standard Connectors / EN175301-803A Connector</td>
</tr>
<tr>
<td>Output signal</td>
<td>Contact free relay output NO and NC</td>
</tr>
<tr>
<td>Relay outputs</td>
<td>Up to 230VAC @ 2A</td>
</tr>
<tr>
<td>Housing material</td>
<td>Nickel plated steel</td>
</tr>
<tr>
<td>Enclosure protection class</td>
<td>IP 65</td>
</tr>
<tr>
<td>Media Temperature</td>
<td>-40°C..+85°C</td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>-40°C..+60°C</td>
</tr>
<tr>
<td>Max working pressure</td>
<td>45 bar (up to 90 bar upon request)</td>
</tr>
<tr>
<td>MOPD</td>
<td>45 bar (up to 60 bar upon request)</td>
</tr>
<tr>
<td>Oil Return Line</td>
<td>7/16 – 20 UNEF male</td>
</tr>
</tbody>
</table>

Electrical Connections

Electronic Sensor Connections (Industry Std. 9.4mm).

Top View. The arrow indicates the glass side where the sensor is mounted on TK3 body. The 90° female flying part exit on the other side.

Solenoid Valve Connection EN 175301-803 (EX DIN 43650 size A)

The coil is connected between pins 1 and 2 and in the supplied harness is properly wired to the A connector of the Electronic Sensor.

A – Power Supply (cable with 2 wires and valve derivation)
1: Brown (close in alarm)
2: Brown (24VAC)
3: Blue (24VAC)

B – Relay (cable with 3 wires)
1: Brown (close in alarm)
2: Blue or Gray (open in alarm)
3: Black (common)
Installation notes

- Only qualified personnel should carry out installation/maintenance
- Protect hands and face from contacting the oil, which may contain harmful acid.
- Depressurize the system before attempting any work
- Switch off power supply and isolate compressor
- If fitting to an existing installation, drain the compressor crankcase to just under the oil level sight glass.
- Mount the TK3 body on the compressor (see below).
- The correct oil level in the compressor crankcase must be reached before restarting the system.

Installation instructions

- Ensure that both the glass surfaces of the Electronic Box and of the TK3 for the electronic are dry and clean.
- Mount the TK3 body (A) on the compressor with 3 or 4 supplied bolts and washers (F) using proper o-ring (D) for the flange.
- Mount the electro-optic sensor (B) on the TK3 body using the 2 supplied bolts and plastic washers (G) using supplied o-ring for electronic (E).
- Plug the Valve connector to the coil of the valve (C) using supplied gasket (H) and screw (I).
- Plug the Alarm and the Power connectors to the electro-optic sensor using supplied gaskets (H) and screws (I).

Note. If the TK3 need an adapter to be mounted onto the compressor, first mount the adapter onto the compressor then assemble the TK3 with the adapter.
Mechanical Dimensions

Note. - Quotes in mm -. L and L1 can vary depending on the adapter (see TK3 Adapter Addendum)

Ordering Code Examples (Other possibilities available on request)

<table>
<thead>
<tr>
<th></th>
<th>Std. Refrigerants (45 bar)</th>
<th>CO2 Systems (60 bar)</th>
<th>Std. Refrigerants (45 bar)</th>
<th>CO2 Systems (60 bar)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Left Version</td>
<td>Left Version</td>
<td>Right Version</td>
<td>Right Version</td>
</tr>
<tr>
<td>No Adapter</td>
<td>TK3-0000010005055600</td>
<td>TK3-0003010005055600</td>
<td>TK3-1000010005055600</td>
<td>TK3-1003010005055600</td>
</tr>
<tr>
<td>1 1/8” – 18 UNEF Adapter</td>
<td>TK3-0100010005055600</td>
<td>TK3-0103010005055600</td>
<td>TK3-1100010005055600</td>
<td>TK3-1103010005055600</td>
</tr>
<tr>
<td>¾” NPT Adapter</td>
<td>TK3-0200010005055600</td>
<td>TK3-0203010005055600</td>
<td>TK3-1200010005055600</td>
<td>TK3-1203010005055600</td>
</tr>
<tr>
<td>3/4/6 bolts flange Adapter</td>
<td>TK3-0300010005055600</td>
<td>TK3-0303010005055600</td>
<td>TK3-1300010005055600</td>
<td>TK3-1303010005055600</td>
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</table>

Recommendations

Teklab recommend the use of a 10 micron filter in the oil line to protect the sensor from contamination. While the device is totally maintenance free we recommend that the optical lens be cleaned during major servicing.

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