Flow monitoring
For the Connection of Flow Sensors
IO-Link device with transistor outputs
FM-IM-3UP63X

- Transistor outputs for flow, temperature and faults
- Adjustment of switchpoint, no teaching of flow boundaries (QuickTeach)
- LED band for indication of flow speed and media temperature
- Monitoring of operating and display range
- Detection of wire-break and short-circuit on the sensor side
- Standard IO or IO-Link operating mode
- Parametrized via pushbutton or software-supported via IO-Link

**Functional principle**

All non-Ex flow sensors from the FCS series (immersion sensors) and FCI series (inline series) can be operated with the FM-IM external processing unit.

The flow module features four status LEDs as well as a 10-segment LED band for local monitoring. Software-based diagnostic options are also available to the user, such as wire-break and short-circuit on the sensor side. Furthermore, monitoring of flow rates and media temperatures within a predefined operating and display range.

The upper and lower limits of the flow range are taught in using the max./min. teach mode implemented. The flow switchpoint is easily adjusted by means of the Quick-Teach function, without having to program a lower and upper limit of the flow range. Working on the calorimetric principle, the connectible sensors not only detect the flow rate but also the media temperature.

The flow module can be operated either in IO-Link (IOL) or in standard IO (SIO) mode via the integrated IO-Link interface. In SIO mode, the switching outputs are operated in the standard way. In IOL mode the current process signal is transmitted cyclically as a 10 bit-serial value.

Parametrization is initiated either via pushbutton or software-supported via IO-Link interface. The actual parametrization is then implemented via the tool-based DTM or IO-DO within the FDT frame PACTware™ or acyclically near the control via On-Request Data Objects (ORDO).

**Type designation**

- **FM-IM-3UP63X**
- **Ident no.** 7525100

**Operating voltage**

- 20…30 VDC
- No-load current I ≤ 63 mA

**Teach modes**

- QuickTeach; min/max adjustment. Teach modes incl. DeltaFlow monitoring (teach modes are automatically released with the change of flow speed).

**Flow speed**

- [%] after min/max adjustment (permanent) % after Quick-Teach (permanent)
- Medium temperature [°C] with the SET button temporarily pressed typical ± 1 % (of full scale)
- Repeatability media temperature typical ± 1 K
- Measuring accuracy media temperature typical ± 7 K
- Switchpoint hysteresis media temperature 2 K

**Input function**

- Connection of flow sensors ≤ 15 VDC
- Sensor voltage ≤ 35 mA
- Sensor current approx. 110 mA
- Sensor current limitation
- Measuring frequency 5 Hz (every 200 ms with software filter)

**Flow monitoring**

- Temperature monitoring transistors output
- Error monitoring transistors output

**Switching characteristic**

- PNP active high / active low parametrizable (transistor output error monitoring only active low)
- Switching voltage 20…30 VDC
- Switching current 100 mA

**Electrical connections**

- 5-pole removable reverse polarity protected terminal blocks
- Terminal cross-section 1.5…2.5mm²

**Communication**

- IO-Link spec. 1.0
- Transmission rate 38.4 kbps (COM 2)
- Transmission physics 3-wire physics (PHY 2)
- Communication channel Clamp 12 and via front panel jack COM (PC)
- Communication modes Tool based engineering via FDT / DTM, IO-DO
- Acyclic communication via On-Request Data Objects

**Approvals**

- CE, C-UL U.S. submitted
- acc. to NE21

**Electromagnetic compatibility (EMC)**

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## Flow monitoring

*For the Connection of Flow Sensors*

**IO-Link device with transistor outputs**

**FM-IM-3UP63X**

<table>
<thead>
<tr>
<th>Design</th>
<th>Terminal chamber</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions</td>
<td>89 x 110 x 27 mm</td>
</tr>
<tr>
<td>Housing material</td>
<td>Polycarbonate/ABS</td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>-25...+70 °C</td>
</tr>
<tr>
<td>Mounting type</td>
<td>DIN rail mounting and mounting panel</td>
</tr>
<tr>
<td>Protection class</td>
<td>IP20</td>
</tr>
<tr>
<td>MTBF</td>
<td>109 Years</td>
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</tbody>
</table>
Flow monitoring
For the Connection of Flow Sensors
IO-Link device with transistor outputs
FM-IM-3UP63X

Note
flow module
FM-IM-3UP63X
Ident-no. 7525100

Wiring Diagram

Note
Optionally available:
IO-Link communication line IOL-COM/3M
Connection between FM-IM (PC Port) and IO-Link master
Ident-no. 7525110

Wiring Diagram
Flow monitoring
For the Connection of Flow Sensors
IO-Link device with transistor outputs
FM-IM-3UP63X

LED display

<table>
<thead>
<tr>
<th>LED</th>
<th>Color</th>
<th>Status</th>
<th>Description</th>
</tr>
</thead>
</table>
| Pwr | green | on     | Operating voltage applied
     |       |        | Device ready for operation |
     |       | flashing | Operating voltage applied |
     |       |         | IO-Link communication active |
     |       |         | (inverted flash with T on 900 ms and T off 100 ms) |
| Flow | yellow | off   | Switching output flow [low] |
     |       | on     | Switching output flow [high] |
     |       | flashing | Teach mode / display of diagnostic data |
     |       |         | for specification see manual |
| Temp | yellow | off   | Switching output media temperature [low] |
     |       | on     | Switching output media temperature [high] |
     |       | flashing | Teach mode / display of diagnostic data |
     |       |         | for specification see manual |
| Fault | red | off | Switching output fault [high] |
     |       | on | Switching output flow [low] |
     |       |         | (for error pattern in combination with LEDs see manual) |

For detailed description of the display patterns and flashing codes see instruction manual FM-IM / FMX-IM (D101880)

IO-Link (Process Data Objects)

<table>
<thead>
<tr>
<th>Bit</th>
<th>15</th>
<th>14</th>
<th>13</th>
<th>12</th>
<th>11</th>
<th>10</th>
<th>9</th>
<th>8</th>
<th>7</th>
<th>6</th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
<th>0</th>
</tr>
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<tbody>
<tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Flow Value 10 Bit (Bit 15 = MSB, Bit 6 = LSB)</td>
<td>not assigned</td>
<td>Out 3 (Fault)</td>
<td>Out 2 (Temp)</td>
<td>Out1 (Flow)</td>
</tr>
</tbody>
</table>