

# Data Processing Receiver Type FRN-FO-LWL for ZHM 01/2



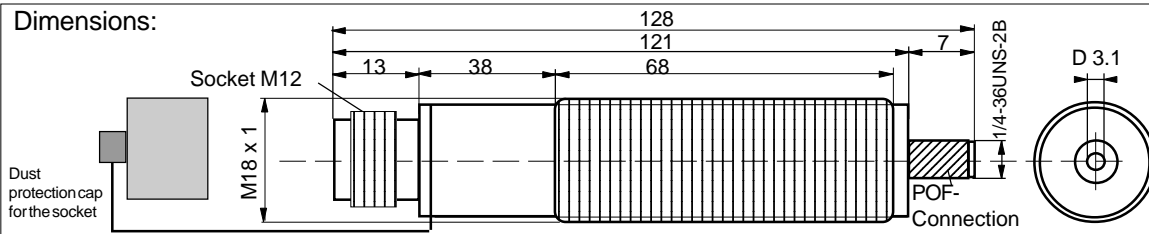
II 3G Ex nA IIB T4 Gc  
II 3D Ex tc IIIA T135°C Dc IP67

## Housing M18

- Applicable as data processing unit at gear pump rate of flow indicators type FOP 60/01-CT-CX
- Simple connection of synthetic fibre optics without special tools
- Applicable in Ex Zone 2

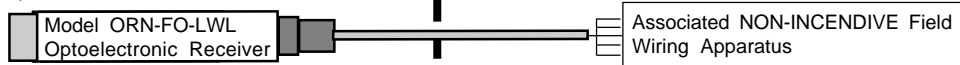
Type	FRN-FO-LWL / E3401 0026										
<b>Technical Data</b>											
Housing	M18										
Number of receivers	1										
For data processing at	Flow indicators type FOP 60/01-CT-CX										
Type of Ex protection Gas, at 94/9/EC	II 3G Ex nA IIB T4 Gc										
Type of Ex protection Dust, at 94/9/EC	II 3D Ex tc IIIA T135°C Dc IP67										
Applicable in Ex zones	Zones 2 and 22										
Frequency range	0.5Hz to 1200Hz										
Minimum optical input power	$\geq 0.2\mu\text{W}$ (LWL, L:10m, D:1mm; pulse with $\geq 10\mu\text{s}$ )										
Supply voltage	24 VDC $\pm 15\%$ , $U_m = 30\text{VDC}$										
Current consumption	25mA										
Maximum power dissipation	0.7W										
Output	Push-Pull, 10mA										
Output impedance	max.150Ω, RL: 1500Ω to 10kΩ										
Fault indication outputs	not implemented										
Housing	M18, yellow brass, nickel plated										
Enclosure rating at EN 60529	IP 67 (with fitted POF and fitted cable connector)										
Vibration and shock resistance	Vibration: 30g over 20Hz to 2kHz. Shock: 100g for 3ms										
Ambient operating temperature range $T_{amb}$	$-20^\circ\text{C} < T_{amb} < +50^\circ\text{C}$										
Storage temperature range	$-20^\circ\text{C} \dots +70^\circ\text{C}$										
Relative humidity	15% ... 90%, noncondensing										
Pollution degree, at EN 60664-1	4										
Device designation, at EN 60947-5-2	T3A18CS2										
Electrical connection	Socket M12, 5 terminals, IP67, type Lumberg RSFM 5										
POF fitting	POF-connection for PHOENIX Q-FSMA connectors (Phoenix Article-No.: 18 85 99 4)										
Applicable POF's	Outside diameter: 2.2mm / Core diameter: 1mm										
POF length	1m to 10m										
Accessories (included)	- 2x Nuts M18 - 1x Safety lock device, mount at the cable connection, for locking the connection. (black synthetic device) - 1x Warning plate "WARNING - Explosion Hazard - Do Not Disconnect While Circuit Is Live Unless Area Is Known To Be Non-Hazardous", self-sealing, for gluing on the cable connector. - 1x Protection cap for the sensor connector.										
Accessories (not included)	- POF connector PHOENIX Q-FSMA, Article-No.: 18 85 99 4 - Cord set Lumberg 5 terminals RKTS 5-298/xx (straight type), or RKWTH 5-298/xx (right angle type)										
Options	- Device for ATEX II 2G Ex d IIC T6 Gb, II 2D Ex tb IIIB T90°C Db IP67 applicable in Ex Zones 1, 2, 21, 22. On demand.										
Function / Output signal:	<p> <math>V_{High} \geq 20\text{V}</math>  <math>V_{Low} \leq 1\text{V}</math> </p> <p>Output frequency 1Hz to 1kHz</p>										
Connection layout:	<p>Socket M12 IP67, 5 terminals</p> <table border="0"> <tr> <td>1/ brown</td> <td>+24VDC</td> </tr> <tr> <td>2/ white</td> <td>NC</td> </tr> <tr> <td>3/ blue</td> <td>0V</td> </tr> <tr> <td>4/ black</td> <td>Frequency output</td> </tr> <tr> <td>5/ grey</td> <td>PE/PA</td> </tr> </table>	1/ brown	+24VDC	2/ white	NC	3/ blue	0V	4/ black	Frequency output	5/ grey	PE/PA
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ATEX related designations	<p>CE</p> <p>Device type: FRN-FO-LWL</p> <p>ATEX Declaration by manufacturer at 94/9/EC</p> <p><math>T_{amb}: -20^\circ &lt; T_{amb} &lt; 50^\circ</math></p> <p>Date of construction: Numerals 5 to 8 of the serial number (Year/Week)</p> <p>Manufacturer with address</p> <p>II 3G Ex nA IIB T4 Gc</p> <p>II 3D Ex tc IIIA T135°C Dc IP67</p> <p>Electrical data according to the chart</p>										

**Dimensions:**



**Control Drawing for Hazardous Areas:**

HAZARDOUS (CLASSIFIED) LOCATIONS Zones 2, 22 | NON-HAZARDOUS AREA



**Notes:**

- Nonincendive Circuit Parameters; Model ORN-FO-LWL  
 $V_{max} = 30VDC$   $V_{oc} = 30VDC$   
 $I_{max} = 25mA$   $I_{sc} = 25mA$   
 $C_i = 0$   $C_a = 0$   
 $L_i = 0$   $L_a = 0$   
 $P_i = 700mW$
- Selected Associated Nonincendive Field Wiring Apparatus shall satisfy the following: Class 2 power supply  

Associated Nonincendive Field Wiring Apparatus	Model ORN-FO-LWL
$V_{oc}$	$\leq V_{max}$
$I_{sc}$	$\leq I_{max}$
$C_a$	$\geq C_i + C_{cable}$
$L_a$	$\geq L_i + L_{cable}$
$V_{max}$	$\geq V_{oc}$
$I_{max}$	$\geq I_{sc}$
$C_i + C_{cable}$	$\leq C_a$
$L_i + L_{cable}$	$\leq L_a$
- If the electrical parameters of the cable are unknown, the following values shall be used:  
 Capacitance: 60pF / ft, Inductive: 0.70uH / ft
- Nonincendive Field Wiring must be wise in accordance with 510.4B of the NEC/NFPA70.

**Operating Manual / EC - Declaration of Conformity:**

**INSTALLATION INSTRUCTIONS FOR HAZARDOUS LOCATIONS:**

- A. "WARNING - EXPLOSION HAZARD - SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I, DIVISION 2"**
- B. "WARNING - EXPLOSION HAZARD - WHEN IN HAZARDOUS LOCATIONS, TURN OFF POWER BEFORE REPLACING OR WIRING MODULES."**
- C. "WARNING - EXPLOSION HAZARD - DO NOT DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NONHAZARDOUS."**

Provides nonincendive field circuits when installed per the installation instructions. The local equipotential bonding have to be done. The PE/PA connection (terminal 5 of the cordset) and the cable shield must be connected reliable and noncorrosive to PE. The PE terminal and the socket are solid connected to the housing. ONLY Lumberg cordsets RKTS 5-298/..M (Straight type) or RKWTH 5-298/..M (Right angle type) are allowed. The cable have to be installed and protected against damages. The cable with termination fittings, or in cable tray systems and installed in a manner to avoid tensile stress at the termination fittings. To connect cables inside hazardous locations only use certificated Ex e housings. All cable terminals must be connected outside hazardous locations. When installing the sensor, the safety lock device must be fitted at the cable connector. The additional adhesive warning label must be fixed to the connector housing at the connection cable.

**Additional installation instruction for ATEX applications:**  
 The data processing receiver Type FRN-FO-LWL is only applicable for the Ex zones 2 and 22. It is necessary to take into consideration the valid international and national rules and regulations (EN 60079-14). The maximum rated input voltage  $U_m = 30VDC$  must not be exceeded.


**General mounting prescriptions:**  
 Do not exceed the maximum ratings. The electrical connections must be exactly as shown in the connection diagram. The cable shield must be connected short. The cable shield should be connected to the protection earth, large-surfaced. Connection cables must not be installed parallel to high voltage cables.

**Function**  
 The optical data processing units types FRN-FO-LWL are applicable with gear pump rate of flow indicators type FOP 60/01-CT-CX. The data receiver unit converts the optical input signals to an electrically output signal equivalent to the rate of flow, with a frequency of 1Hz to 1kHz. The output pulse width is constant 500us(+/-1%).

**Mounting the POF**  
 For mounting the POF a quick connector type Q-FSMA-KT (Phoenix No.: 1885994) will be required. (Not included in the package). POF specifications: Core diameter: 1mm, Cladding diameter: 2.2mm. Fix the connector Q-FSMA-KT at the data processing unit FRN-FO-LWL. Cut the POF with the special cutter carefully and push them through the quick connector inside the optical receiver set. Rigid fasten the locking nut at the quick connector. Do not use optical

fibres longer than 10m. The functional safety of the data receiver is given by the working up of the optical fibres. Specially near the sensor, the fibre optics must not be buckled or laid with a small radius. Buckled or bad laid fibre optics results to a strong decrease of performance. Avoid performance decreasing and failures caused by wear, by a functional mounting of the fibre optics.

**Maintenance**  
 Protect the fibre optic adaptor at the data receiver and the optical fibres against pollution. Please set up the protection caps if no optical fibres are connected. If the fibre optic adapter is contaminated, clean with alcohol. Do not use aggressive solvents. Plastic optical fibres can be destroyed by strong solvents. Equipment must only be repaired or serviced by the manufacturer.

**Safety informations to warm housing surface**   
 The surface of the sensor can be warm, specially at a ambient temperature of +50°C. Disconnect the sensor from power supply and let him cooling before touching.

**General safety instructions:**  
 "WARNING - EXPLOSION HAZARD - WHEN IN HAZARDOUS LOCATIONS, TURN OFF POWER BEFORE REPLACING OR WIRING MODULES. DO NOT DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NONHAZARDOUS". The mounting of the sensor in dusty locations without fixed cordset or protection cap results in a high ignition risk. The data receiver must not be used for Accident-Prevention! In worst case the output can change to any state! When installing and operating with the sensor, it is necessary to take into consideration the relevant international and other national regulations: EN 60079-14, single directive 1999/92/EC.

The sensor and the fibre optic are conform to the following standards:  
 EN 60079-0:2009, EN 60079-15:2010, EN 60079-31:2010, EN 60529:2000, EN 61000-6-1/-2, EN 61000-6-3/4, EN 60529:2000, ATEX directive: 94/9/EC, Machine directive: 2006/42/EC, EMC: 2004/108/EC, RoHS: 2002/95/EC.

**General Notes, disposal**  
 We reserve the right to modify our equipment. Our equipment is designed such way, that it has the least possible adverse effect on the environment. It neither emit or contain any damaging or siliconized substances and use a minimum of energy and resources. No longer usable or irreparable units must be disposed of in accordance with local waste disposal regulations.

**Declaration of Conformity**  
 Approval: UL-Recognized, File No. E300158.  
 ATEX: Declaration of conformity by manufacturer at 94/9/EC. ATEX certification of quality type production of Ex devices at the directive 94/9/EC, CE 0158. Certification No: BVS 03 ATEX ZQS /E118. The conformity of the devices with the UL and EC standards and directives and the observation of the Quality Safety System ISO 9001:2008 with the ATEX module "Production", declares:

Hans Bracher, Matrix Elektronik AG 

FRN-FO-ATEX\_e10/2013-08-27/HB

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