For building an intrinsically safe fiber optic network in a hazardous location

- Intrinsically safe optical interface
- Point-to-point network topology available, with or without redundancy
- Transmission of Profibus DP, Modbus, HART and R. STAHL Servicebus
- Integrated analysis of the optical input signal

Technical Tips
Industry standardized connectors can be used for the fiber optic cable due to the protection technique, Ex op is, that is used.
The fiber optic connection can also be removed live.

Order Code  Network Structure
9186/12-11-11  ring, point-to-point redundant, line

Technical Specifications

<table>
<thead>
<tr>
<th>Entity Parameters</th>
<th>Fiber Optic Side</th>
<th>RS 485 Cable Side</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fiber optic interface</strong></td>
<td>Ex op is EN 60079-28 / NEC article 504 / 505</td>
<td>V_OC = ± 3.7 V, ISC = 148 mA, Po = 137 mW, Vmax = ± 4.2 V</td>
</tr>
<tr>
<td><strong>Max. radiated power PX</strong></td>
<td>≤ 15 mW</td>
<td><strong>Error message contact</strong></td>
</tr>
<tr>
<td><strong>Interface</strong></td>
<td>optical</td>
<td><strong>Vmax = 24 V, Imax = 600 mA</strong></td>
</tr>
<tr>
<td><strong>Signal Protocols</strong></td>
<td>protocol transparent</td>
<td><strong>Connector</strong></td>
</tr>
<tr>
<td><strong>Network topologies</strong></td>
<td>ring structure, line structure, point-to-point connection</td>
<td>Sub-D female X3, 9-pin</td>
</tr>
<tr>
<td><strong>Redundancy</strong></td>
<td>automatic switchover triggered by line fault</td>
<td>baud rate user selectable via DIP switches under the top cover of the unit, automatic detection with Profibus DP, transmission speed 1.2 kB/s...1.5 MBit/s</td>
</tr>
<tr>
<td><strong>Wave length</strong></td>
<td>850 nm</td>
<td><strong>Bit refresh</strong></td>
</tr>
<tr>
<td><strong>Transmission line length</strong></td>
<td>≤ 6561 ft (2000 m)</td>
<td>received bit is restored</td>
</tr>
<tr>
<td><strong>Connection</strong></td>
<td>ST6, BFOC/2.5 socket</td>
<td><strong>Cable length</strong></td>
</tr>
<tr>
<td><strong>Recommended fiber optic cables</strong></td>
<td>G 50 / 125, G 62.5 / 125</td>
<td>dependant on transmission speed and cable used</td>
</tr>
<tr>
<td><strong>Power Supply</strong></td>
<td>multimode only</td>
<td><strong>Terminating resistor</strong></td>
</tr>
<tr>
<td><strong>Indication</strong></td>
<td>green LED &quot;PWR&quot;</td>
<td>user set in external plug</td>
</tr>
<tr>
<td><strong>Nominal voltage V_nom</strong></td>
<td>24 V DC</td>
<td><strong>Indication of data received</strong></td>
</tr>
<tr>
<td><strong>Nominal current (at V_nom)</strong></td>
<td>67 mA</td>
<td>green LED &quot;RD&quot;</td>
</tr>
<tr>
<td><strong>Power consumption</strong></td>
<td>≤ 2 W</td>
<td><strong>Indication of data transmitted</strong></td>
</tr>
<tr>
<td><strong>Polarity reversal protection</strong></td>
<td>yes</td>
<td>amber LED &quot;TD&quot;</td>
</tr>
</tbody>
</table>

Fault monitoring
- Power supply failure red LED "PWR"
- error messaging contact = open
- Input signal level good green and amber LED "FO Signal", error messaging contact = closed
## Technical Specifications

### Fiber Optic Side

- **Fault monitoring**
  - Input signal level reduced (-1.5 dBm)
  - Fiber optic cable break or input signal level too low (-3 dBm)
- **Galvanic Isolation**
  - Test voltage under regulations EN 50020
  - I.S. RS 485 to power supply: 1.5 kV
  - Error message contact to power supply: 1.5 kV
  - Screen connection (PA) to power supply: 1.5 kV
  - I.S. RS 485 to error message contact: 500 V
  - I.S. RS 485 to screen connection (PA): 500 V
  - Error message contact to screen connection (PA): 500 V

### RS 485 Cable Side

- **Fault monitoring**
  - Amber LED "FO Signal"
  - Error messaging contact = open
  - Red LED "FO ERR"
  - Error messaging contact = open

## Network Topology

### Nonhazardous Location

- **Network Topology**

### Hazardous Location Zone 1 / Division 2

- **Network Topology**

### Nonhazardous Location

- **Network Topology**

### Hazardous Location Zone 1 / Division 2

- **Network Topology**
Intrinsically Safe Interfaces - Isolators

9186 Series, Fiber Optic Fieldbus Isolation Repeater - Zone 2 Version

For building an intrinsically safe fiber optic network in a zone 2 or nonhazardous location

- Intrinsically safe optical interface
- Point-to-point network topology available, with or without redundancy
- Transmission of Profinet, Modbus, HART and R. STAHL Servicebus
- Integrated analysis of the optical input signal
- RS 485 bus connection
- Ring and line network topologies available
- Error message contact and LED indication of signal level status
- Approved for installation in Zone 2

Technical Tips

Industry standardized connectors can be used for the fiber optic cable due to the protection technique, Ex op is, that is used. The fiber optic connection can also be removed live.

Order Code | Network Structure | Note
--- | --- | ---
9186/15-12-11 | ring, point-to-point redundant, line | -- --
9186/25-12-11 | point-to-point, end of line | without redundancy or ring network options

Technical Specifications

**Fiber Optic Side**

<table>
<thead>
<tr>
<th>Entity Parameters</th>
<th>Fiber Optic Side</th>
</tr>
</thead>
<tbody>
<tr>
<td>FM / cFM</td>
<td>pending</td>
</tr>
<tr>
<td>ATEX</td>
<td>Fiber optic interface Ex op is EN 60079-28</td>
</tr>
<tr>
<td>Max. radiated power $P_0$</td>
<td>$\leq 15 \text{ mW}$</td>
</tr>
</tbody>
</table>

**Interface**

<table>
<thead>
<tr>
<th>Signal</th>
<th>optical</th>
</tr>
</thead>
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<tr>
<td>Protocols</td>
<td>protocol transparent</td>
</tr>
<tr>
<td>Network topologies</td>
<td>ring structure, line structure, point-to-point connection</td>
</tr>
<tr>
<td>Redundancy</td>
<td>9186/15-12-11 only, automatic switchover triggered by line fault</td>
</tr>
</tbody>
</table>

**Wave length**

- 850 nm

**Transmission line length**

- $\leq 6561 \text{ ft (2000 m)}$

**Recommended fiber optic cables**

- G 50 / 125
- G 62.5 / 125

**Nominal voltage $V_{nom}$**

- 24 V DC

**Voltage range**

- 18 V ... 31.2 V

**Technical Specifications**

**RS 485 Cable Side**

<table>
<thead>
<tr>
<th>Interface</th>
<th>RS 485 Cable Side</th>
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<tbody>
<tr>
<td>Signal</td>
<td>RS 485 2-wire, half duplex</td>
</tr>
<tr>
<td>Protocols</td>
<td>Profinet, Modbus, HART, ServiceBus R.STAHL (IS1)</td>
</tr>
<tr>
<td>Connector</td>
<td>Sub-D female X3, 9-pin</td>
</tr>
<tr>
<td>Baud rate</td>
<td>user selectable via DIP switches under the top cover of the unit, automatic detection with Profinet, transmission speed 9.6 kBit/s ... 1.5 Mbit/s</td>
</tr>
<tr>
<td>Bit refresh</td>
<td>received bit is restored</td>
</tr>
<tr>
<td>Cable length</td>
<td>dependant on transmission speed and cable used</td>
</tr>
</tbody>
</table>

**Fault monitoring**

| Power supply failure | red LED "PWR", error messaging contact = open |
| Input signal level good | green and amber LED "FO Signal", error messaging contact = closed |
| Input signal level reduced (- 1.5 dBm) | amber LED "FO Signal", error messaging contact = open |
| Fiber optic cable break or input signal level too low (- 3 dBm) | red LED "FO ERR", error messaging contact = open |
### Technical Specifications

#### Fiber Optic Side
- **Power Supply**
  - Indication: green LED "PWR"
  - Nominal voltage \( V_{\text{nom}} \): 24 V DC
  - Voltage range: 18 V ... 31.2 V
  - Nominal current (at \( V_{\text{nom}} \)): 130 mA
  - Power consumption: 3 W
  - Polarity reversal protection: yes

#### RS 485 Cable Side
- **Fault monitoring**
  - Max. load of the contact: max. 60 V DC, 42 V, 1 A
- **Galvanic Isolation**
  - between RS 485 and power supply: \( \geq 1.5 \text{ kV} \)

### Network Topology

**Nonhazardous Location**

**Hazardous Location Zone 1 / Division 2**

**Nonhazardous Location**

**Hazardous Location Zone 1 / Division 2**