The MTL 9121-IS is a fieldbus repeater isolator which repeats the fieldbus signal from a safe area, Zone 2 fieldbus to an intrinsically safe fieldbus for connection to devices in Zone 1. The 9121-IS provides up to 120mA, typically powering up to 8 x 15mA field devices in Gas Group IIC.

The 9121-IS is certified to FISCO (Fieldbus Intrinsically Safe Concept) requirements in IEC60079-11: 2011 Equipment protection by intrinsic safety i and IEC 60079-25: 2010 Intrinsically Safe Electrical Systems. This allows the power supplied to the IS fieldbus to exceed the limit set in the original FF-816 IS physical layer profile. This increases the number of devices on an IS fieldbus from typically 4 x 20mA devices with maximum of 80m cable run, to up to 6 x 20mA devices with 400m cable run using the 9121-IS.

In addition, FISCO reduces the documentation required. Intrinsically safe systems have been installed in accordance with IEC 60079-25: 2010 Intrinsically Safe Electrical Systems entity calculations or similar local code of practice. This requires:
- calculation of cable parameters
- comparison of safety descriptions
- creation of descriptive system document

The administrative work involved in carrying this out in accordance with the end users procedures is usually considerable. Simply adding a new field device to an IS segment will require all this documentation to be updated.

Fieldbus intrinsically safe systems can now also be installed in accordance with FISCO requirements in IEC 60079-25: 2010 Intrinsically Safe Electrical Systems. This:
- eliminates need to calculate cable parameters
- reduces safety documentation to a list of devices
- allows addition of devices without a review of safety documentation
- as proven by test, allows longer cables with higher capacitance

To install a fieldbus system to the FISCO requirements in IEC 60079-25: 2010 Intrinsically Safe Electrical Systems the cable used in the system must comply with the following parameters:
- Loop resistance $R_c$: 15 to 150 ohms/km
- Loop inductance $L_c$: 0.4 to 1 mH/km
- Capacitance $C_c$: 80 to 200 nF/km
- Maximum length of each spur cable: 60 m in IIC and IIB
- Maximum length of each trunk cable: 1 km in IIC 5 km in IIB

When cable which complies with this specification is used, no further consideration of cable parameters is necessary. Virtually any instrument cable suitable for a fieldbus signal will comply.

*FOUNDATION™ fieldbus is a trademark of Fieldbus Foundation™, Austin, Texas.*
MODULE SPECIFICATION
See also Common Specification

OUTPUT

Number of channels
One

Voltage
12.4V (min.) at 25°C (see note)

Design current
0 to 120mA

Current limit
>140mA

Output ripple
Complies with clause 22.6.2 of the fieldbus standard†

Minimum load
No load

Maximum cable length
Determined by IS load, see MTL Application Note AN9026 for details

Isolation
Input to output: 250V ac rms
Input and output to power supply: 250V ac rms
 Um = 250V rms

INPUT

Input voltage
19.2 - 30V dc

Current consumption:
235mA (typical) 330mA (max.) at 20V
190mA (typical) 265mA (max.) at 24V
155mA (typical) 215mA (max.) at 30V

Power dissipation with 110mA load:
2.9W (typical) 4.3W (max.)

Input protection
Fuse + supply reversal diode

Note: Temperature coefficient 12mV/°C. If the power supply and fieldbus cable are operated at low temperatures, the reduced resistance of the cable more than compensates for the reduction in output voltage.

SAFETY

Location of module
Safe area, Zone 2, IIC T4 hazardous area.

Location of field wiring
Zone 1, IIC T4 hazardous area.

Field wiring protection
Intrinsically safe

Certification Code
©II(2) GD [Ex ib] IIC, ©II 3 GD Ex nA IIC T4.

Safety description
14V, 180mA, 2.52W, 0.20μF*, 300μH*

ATEX certificate numbers
MTL02ATEX9121
BAS02ATEX7276

IECEx certificate number
IECEx BAS 04.0031

Certification is compatible with
Fieldbus FOUNDATION FF816-FISCO.
FISCO requirements in IEC60079-11:
2011 Equipment protection by intrinsic safety i and IEC 60079-25: 2010 Intrinsically Safe Electrical Systems
EC Directive 94/9/EC (ATEX 100A)

MECHANICAL

Mounting
DIN rail/surface mounting

Module width
42mm

Weight
360g

LED INDICATORS

<table>
<thead>
<tr>
<th></th>
<th>OFF</th>
<th>ON</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power (green)</td>
<td>Power fail</td>
<td>Power OK</td>
</tr>
<tr>
<td>Fault (red)</td>
<td>Normal</td>
<td>Fault</td>
</tr>
<tr>
<td>Host Comm (yellow)</td>
<td>Comms failure</td>
<td>Comms OK</td>
</tr>
<tr>
<td>IS Comm (yellow)</td>
<td>Comms failure</td>
<td>Comms OK</td>
</tr>
</tbody>
</table>

* When used in accordance with IEC/TS 60079-27, there is no need to take into consideration Co and Lo.
COMMON SPECIFICATIONS

MECHANICAL
Mounting method
- Flat panel or DIN - rail
DIN-rail types
- ‘Top hat’, 35 x 7.5mm to EN 50022 or 35 x 15mm to EN 50022

ENVIRONMENTAL
Ambient temp
- Operating, optimum orientation *
  - -40°C to +70°C
  (except where stated in individual module specifications)
- Operating, non-optimum orientation *
  - -40°C to +50°C
  (except where stated in individual module specifications)
Storage
- -40°C to +85°C
Relative Humidity
- 5 to 95% RH (non-condensing)

Vibration - Operating, Storage & Transport

<table>
<thead>
<tr>
<th>Shape</th>
<th>Test Environments</th>
<th>Parameters</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sinusoidal Vibration</td>
<td>EN 60068-2-6</td>
<td>10-500 Hz</td>
<td>6 g for surface mounting, 1 g for DIN-rail mounting</td>
</tr>
<tr>
<td>Random Vibration</td>
<td>BS2011: Part 2.1</td>
<td>20-500 Hz</td>
<td>5 g for surface mounting, 1 g for DIN-rail mounting</td>
</tr>
</tbody>
</table>

Shock - Storage & Transport

<table>
<thead>
<tr>
<th>Shape</th>
<th>Test Environments</th>
<th>Parameters</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN 60068-2-32</td>
<td></td>
<td></td>
<td>1 m drop onto flat concrete</td>
</tr>
<tr>
<td>EN 60068-2-27</td>
<td></td>
<td></td>
<td>30 g peak acceleration with 11 ms pulse width</td>
</tr>
<tr>
<td>EN 60068-2-27</td>
<td></td>
<td></td>
<td>30 g peak acceleration with 11 ms pulse width</td>
</tr>
</tbody>
</table>

Ingress Protection
- IP20 to BS EN 60529
  (Additional protection by means of enclosure).
Corrosive atmospheres:
- Designed to meet ten year service in Class G3 corrosive environment, as defined by ISA Standard SP71.04

ELECTRICAL
EMC compliance
- To EN 61326-1:2013 Electrical equipment for measurement, control and laboratory use - EMC requirements.
- Class A equipment Table 2 - Industrial locations

Electrical safety
- EN 61010-1

PHYSICAL NETWORK

IEC61158-2
- FOUNDATION Fieldbus H1
- Profinet PA

TERMINALS (PLUGGABLE)
- Rising cage clamp screw terminals
  - Specify -PS
  - Conductor size: 0.14 to 2.5mm²
- Spring clamp terminals
  - Specify -PC
  - Conductor size: 0.14 to 2.5mm²

FIELDBUS TERMINATOR
Host side
- Selectable by switch on top of unit
IS side
- Permanently connected terminator

HOST SIDE POWER (selectable by switch on top of unit)
- Voltage
  - 14V
- Current
  - 0 to 30mA
- Output ripple
  - Complies with clause 22.6.2 of the fieldbus standard
- Minimum load
  - No load
- Maximum cable length
  - Determined by host side load

Terminal numbering

<table>
<thead>
<tr>
<th>Host side</th>
<th>NI/IS connection</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Power Supply No 1 +ve</td>
</tr>
<tr>
<td>2</td>
<td>Power Supply 0V</td>
</tr>
<tr>
<td>3</td>
<td>Power Supply No 2 +ve</td>
</tr>
<tr>
<td>4</td>
<td>Fieldbus trunk +ve</td>
</tr>
<tr>
<td>5</td>
<td>Fieldbus trunk shield</td>
</tr>
<tr>
<td>6</td>
<td>Fieldbus trunk -ve</td>
</tr>
<tr>
<td>7</td>
<td>NI/IS fieldbus trunk +ve</td>
</tr>
<tr>
<td>8</td>
<td>NI/IS fieldbus trunk shield</td>
</tr>
<tr>
<td>9</td>
<td>NI/IS fieldbus trunk -ve</td>
</tr>
</tbody>
</table>

ORDERING INFORMATION

<table>
<thead>
<tr>
<th>Host side</th>
<th>Host side</th>
</tr>
</thead>
<tbody>
<tr>
<td>9121-IS-PC</td>
<td>FISCO power supply, IIC, with spring clamp terminals</td>
</tr>
<tr>
<td>9121-IS-PS</td>
<td>FISCO power supply, IIC, with screw terminals</td>
</tr>
<tr>
<td>9321-SC</td>
<td>Spur Connector - Entity (for use with 9121-IS)</td>
</tr>
<tr>
<td>9322-SC</td>
<td>Spur Connector - Ex ia</td>
</tr>
<tr>
<td>9323-SC</td>
<td>Spur Connector - Entity (for use with 9122-IS or 9121-IS)</td>
</tr>
</tbody>
</table>