Omniterm LPR & LPS Loop Repeater/Splitter

Model C2463B LPR (Loop Repeater) & C2464B LPS (Loop Splitter)

Model Number
C2463B

DATASHEET

- Isolate 0/4-20mA loops
- Create extra isolated 0/4-20mA signals
- Create extra drive in an existing loop.
- Very low volt drop/insertion resistance
- 0-20mA or 4-20mA input
- Voltage or current outputs
- 24Vdc powered
- Output current loops individually isolated.
- SIL2 Compliant

Features

- DIN Rail or surface mountable
- Narrow 22.5mm module width
- 20 - 30V dc powered.
- 1500Vac Isolation Input/Output/Power Supply
- No Field Calibration necessary
- Wide operating temperature range
- High Accuracy
- CE Mark Compliant

The **OMNITERM LPR** current loop repeater and **OMNITERM LPS** current loop splitter products are specifically designed to create additional current loop signals from an existing current loop signal with minimal effect on the impedance of the existing loop.

Part of the Omniterm Range

Forming part of OMNIFLEX's extensive OMNITERM range of industrial instrumentation, the OMNITERM LPR and LPS are designed to be DIN rail or surface mounted and are an economical 22.5mm wide.

Overview

The Omniterm LPR has a single isolated output in a 22.5mm wide DIN rail mount housing while the LPS has two isolated outputs that fits two separate channels into the same 22.5mm width for high density applications.

These 24Vdc powered modules accept a 0-20mA or 4-20mA input, and create 0-20mA or 4-20mA outputs. The output current loops repeat the input signal and are isolated from the input signal and 24Vdc power supply. Impedance changes on the output loops have no effect on the input loop.

The LPR has an internal 250 ohm precision resistor that can be connected to provide a convenient 1-5Volt output for connecting to a PLC's etc. with voltage input.

These second-generation products utilises advanced electronic techniques to achieve high accuracy with minimum loop losses and zero field calibration.

High Reliability

These products are designed for high reliability, and are suitable for use in SIL1 and SIL 2 safety loops in accordance with IEC61508. See the separate reliability datasheet for design parameters.

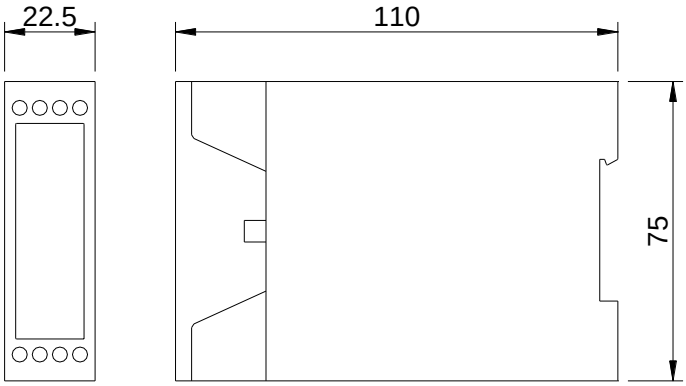
High Accuracy

These second-generation products utilise advanced electronic techniques to achieve high accuracy with minimum loop losses and zero field calibration.

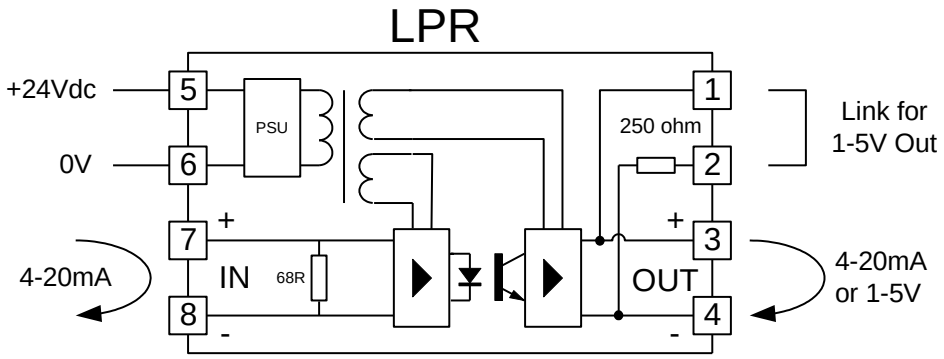
Application

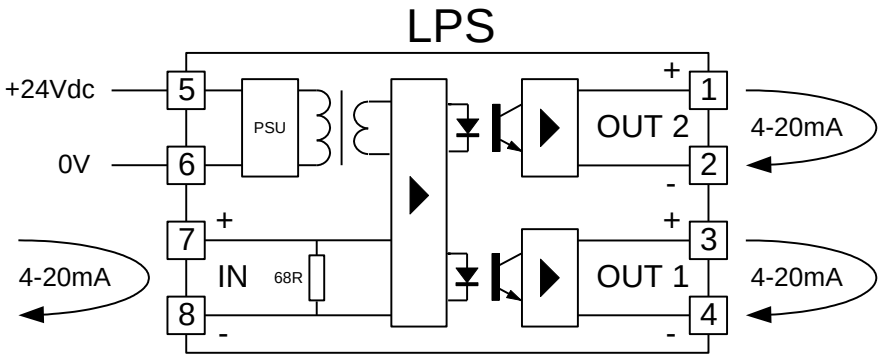
In many applications, there is a need to convert the 4-20mA into 1-5Volts for an RTU, PLC or DCS etc. This is normally inconvenient because the precision resistor needs to be sourced, mounted and wired independently without causing loop errors. To overcome this obstacle, the LPR version also includes a precision 250 ohm resistor that can be connected into the circuit to convert the output into 1-5V within the module

Mechanical Layout



Connection Diagrams





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Specifications

Input

Absolute Maximum input current range	0-25mA
Input Volt drop	1.35V maximum at 20mA
Equivalent insertion loop resistance	68 ohms at 20mA

Output

Output current	Matches input current
Min. load resistance	0
Max. load resistance	1k at 20 mA, 24Vdc supply
Internal 250 Resistor	0.1% 50ppm/°C

Power Supply

Operating Range	20-28Volts dc
Supply Current	30mA maximum

Performance (at 20°C; 250 load; Input range 4-20mA)

Initial Accuracy	<20uA
Effect of load impedance	< .02% of Full Scale per 100 change
Response time	

Isolation

Isolation Test Voltage	1500Vrms Input/Output/Power Supply

Compliance to Standards

Functional Safety	IEC61508 SIL1 and SIL2
Human Safety	EN 60950
Emissions	EN 55011 & EN 50081-2 Group I, Class A
Immunity – ESD	IEC 61000-4-2, level 3
Immunity – RF Fields	IEC 61000-4-3, level 3
Immunity – Fast Transients	IEC 61000-4-4:1995 1 kV – input/output lines
Functional Safety to (IEC 61508)	IEC 61000-4-4 2 kV – DC power port 1 kV – input/output lines

Reliability Data (See separate Reliability Report)

	LPR Model C2463B	LPS Model C2464B
MTBF	90.7 years	80,5 years
PFD (TI = 1 year)	7.66×10^{-4}	8.84×10^{-4}
SFF	86%	86%

Temperature

Storage	-20 to +70°C
Operating	0 to +60°C
Effect of Temperature	< 100ppm/ C

Weight

	LPR Model C2463B	LPS Model C2464B
Unpacked	130g approx.	130g approx.
Packed	155g approx.	155g approx.

Housing

Dimensions(w x h x d)	22.5mm x 75mm x 110mm
Material	ABS Flammability Class HB as per UL94
Terminals	Screw-clamp - 2.0mm^2 wire size max.

Ordering Infomation

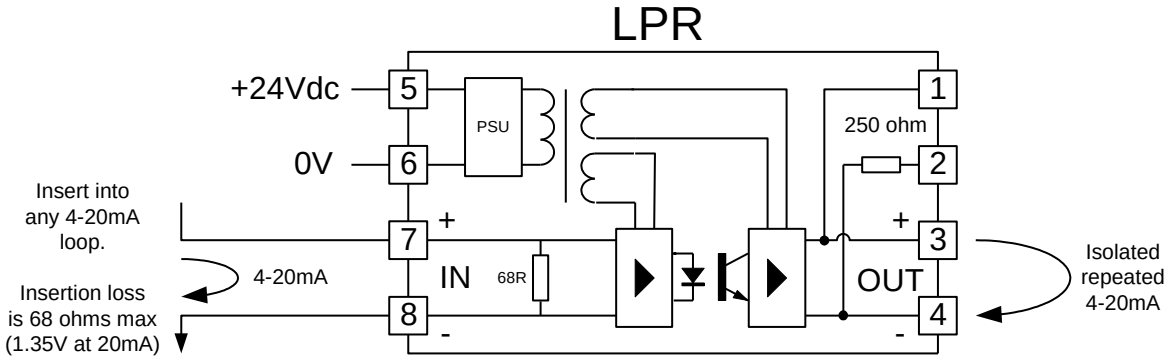
Order Code	Description
C2463B	Omniterm LPR Loop Repeater (single output with 250 ohm resistor)
C2464B	Omniterm LPS Loop Splitter (dual outputs)

Application Examples

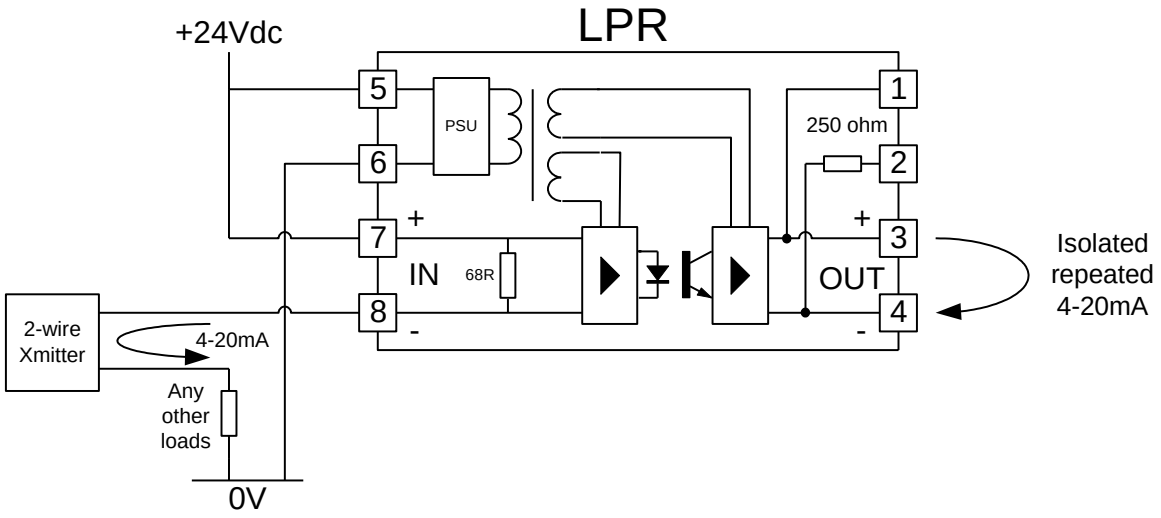
Basic Connection: Repeating a current loop

NOTES:

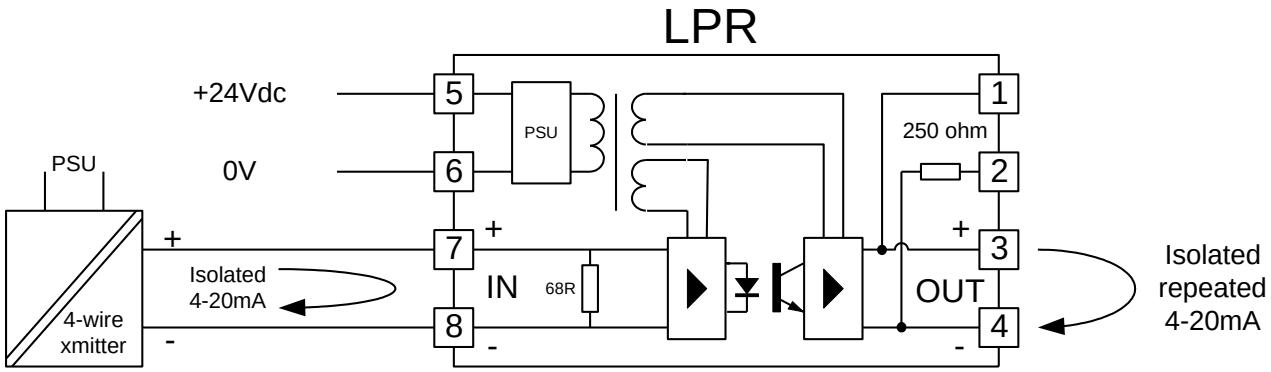
1. Insertion loss in the input loop is minimal at 1.35 Volts (68 ohms) maximum at 20mA.
2. Output loop has no effect on the input loop.
3. The LPS may be substituted for the LPR in all of these applications where two isolated output loops are required.



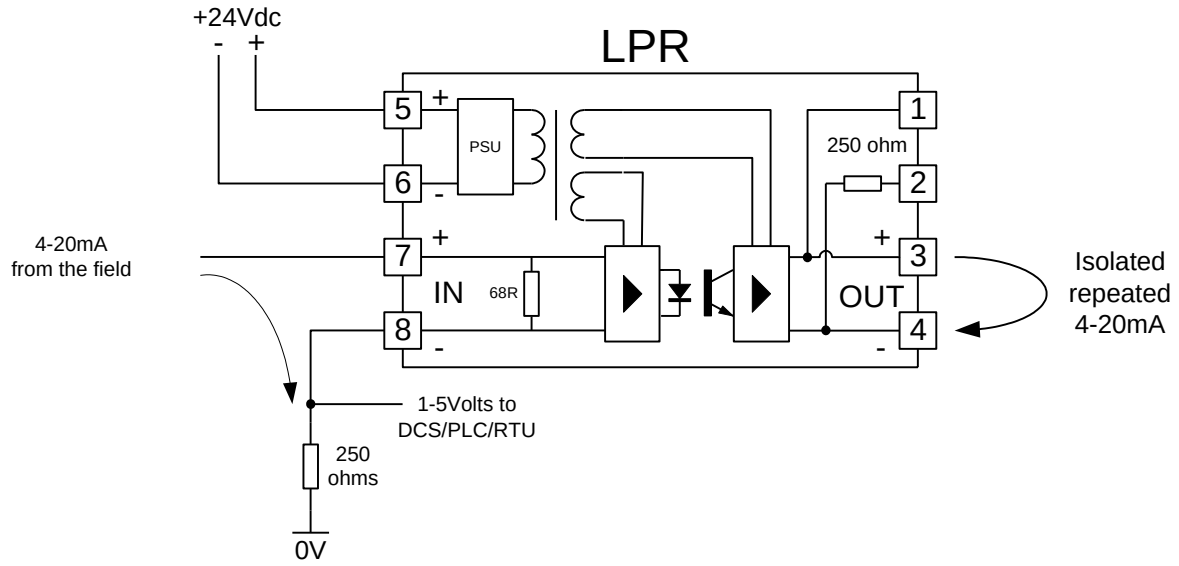
Example 1: Repeating the current loop from a two-wire transmitter



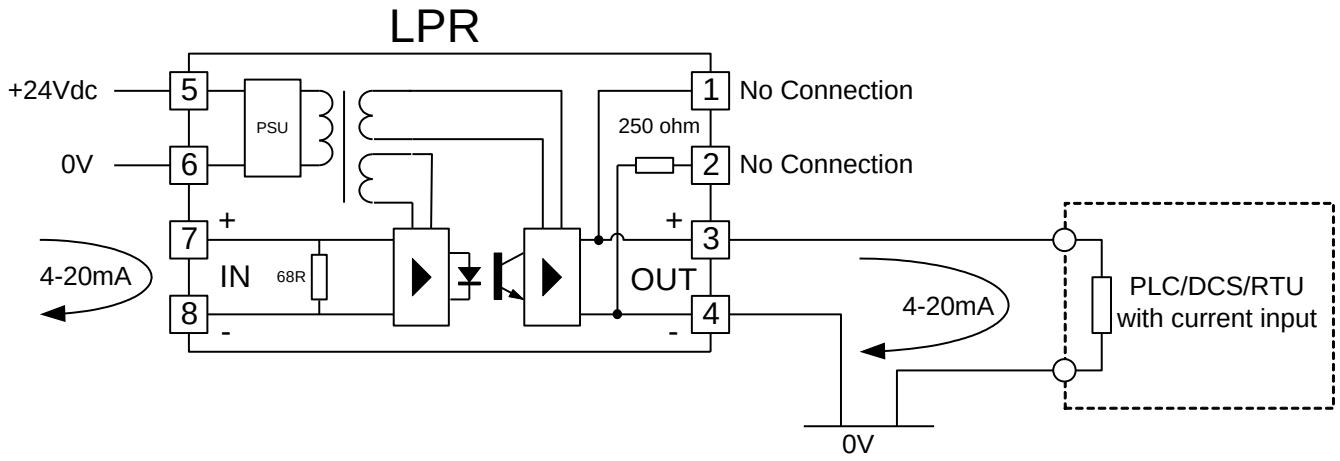
Example 2: Repeating the current loop from a four-wire transmitter



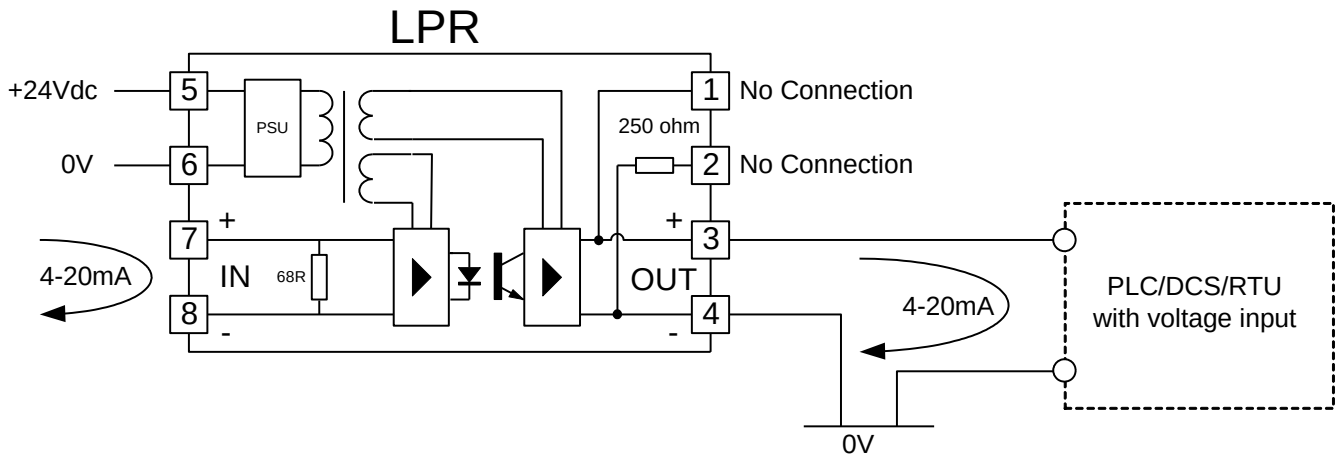
Example 3: Repeating the current in a 1-5V input DCS/PLC/RTU loop.



Example 4: Connecting an LPR output to a current input on a PLC/DCS or RTU

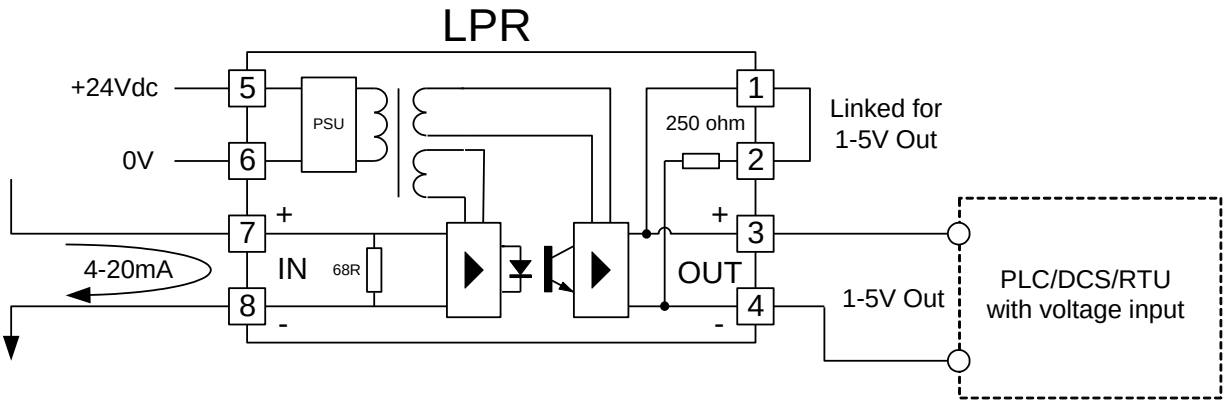


Example 5: Connecting an LPR output to a voltage input on a PLC/DCS or RTU



Note: This is assuming PLC voltage input has a built-in 500 ohm resistor across the input. Consult with PLC manufacturer. See Examples 3 and 6.

Example 6: Connecting an LPR output to a voltage input on a PLC/DCS or RTU



Application Note

Using the Omniterm LPR or LPS to monitor SIL1 and SIL2 Safety Loops

The LPR and LPS modules have been certified to SIL1 and SIL2 for use in safety loops.

There is an increasing awareness today of the importance of safety in dangerous processes. IEC61508 is the most universally applied standard for the qualification of Safety Integrity in Safety Instrumented Systems.

Individual control loops are usually certified to Safety Integrity Level 1 (SIL1) or SIL2 as specified in IEC61508, with redundancy employed to increase this to higher SIL levels when appropriate.

As part of the system design, it is common to want to monitor these critical current loops using independent systems. The difficulty arises of connecting the monitoring system to these critical loops without affecting their safety integrity level, accuracy or performance.

The Omniterm LPR and LPS have been certified to SIL1 and SIL2 for this application. Connecting an Omniterm LPR or Omniterm LPS to your SIL1 and SIL2 safety critical current loop will not affect the safety of the loop. The output of the Omniterm LPR or LPS can be safely connected to any SCADA, PLC, or RTU system without this connection affecting the integrity level of the original current loop in any way.

Because the safety loop is not passing between input and output of the Omniterm LPR or LPS, the accuracy, reliability, and speed of the Omniterm LPR or LPS do not affect the performance of the current loop. The reliability of the safety loop is considerably enhanced in this configuration.

Because of the low insertion loss and full electrical isolation of the input stage of the Omniterm LPR or LPS, only a minimal volt drop will occur in the loop by the addition of the Omniterm LPR or LPS, making the monitoring of almost any existing current loop possible.