

# MODEL · I3LP-102

## LOOP POWERED SIGNAL DUPLICATOR



**Loop powered duplicator, isolated, for 4/20mA signals, for DIN rail mount.**

I3LP-102 is a loop powered signal duplicator. Accepts a 4/20mA signal and generates two 4/20mA output loops, replicas of the input, while providing a high isolation between all circuits. The instrument is powered from the input loop. No configuration needed. No power needed.

Connect and ready to work directly out of the box.

Circuit isolation prevents ground loops and transient propagation, protecting remote equipment and signal integrity.

Plug-in screw terminals for fast and easy installation. Standard DIN rail mount. Designed for industrial use, with potential integration into a wide range of applications, reduced cost, excellent quality and available customization.

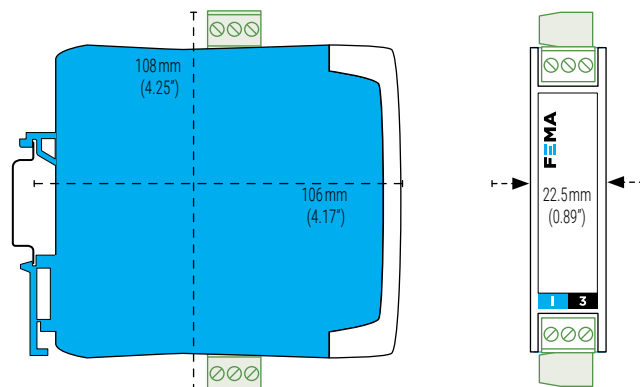
### 1. TECHNICAL SPECIFICATIONS

<b>Input signals</b>	
signal	4 to 20 mA
max. oversignal	50 mA
voltage drop on terminals	12 Vdc (at 20 mA, each load 50 Ohm) (see Table 4)
input impedance	$Z_{in} = Z_{i1} + Z_{i2} + 2 * (2.73 * I^2 - 98.8 * I + 1159) \pm 10\%$ (see Table 5) ( <i>I</i> expressed in mA, <i>Z</i> expressed in Ohm)
<b>Accuracy at 25 °C</b>	
	class <0.20% (load 0 Ohm) (see Table 6)
<b>Thermal drift</b>	
	<25 ppm/°C (F.S.)
<b>Step response</b>	
	<10 mSec. (0% to 99% signal) (load 0 Ohm) (see Table 7)
<b>Output signals</b>	
signals	4 to 20 mA
scaling	relation 1:1 between input and outputs
maximum load at output	from 0 up to 100 Ohm, for each output
protection	short-circuit protected open loop protected
<b>Configuration</b>	
	no configuration needed
<b>Power</b>	
	loop powered from the input loop
<b>Isolation</b>	
input - outputs	2000 Vac, 50 Hz, (tested for 60 seconds)
between outputs	2000 Vac, 50 Hz, (tested for 60 seconds)
<b>Environmental</b>	
IP protection	IP30
impact protection	IK06
operation temperature	from 0 to +50 °C
storage temperature	from -20 to +70 °C
'warm-up' time	15 minutes
humidity	0 to 95% non condensing
altitude	up to 2000 meters
<b>Mechanical</b>	
size	106 x 108 x 22.5 mm
mounting	standard DIN rail (35 x 7.5 mm)
connections	plug-in screw terminals (pitch 5.08 mm)
housing material	polyamide V0
weight	<150 grams
packaging	120 x 115 x 30 mm, cardboard

### 2. HOW TO ORDER

<b>I3LP-102</b>	Isolated signal duplicator (1 input, 2 outputs)
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### 3. DIMENSIONS



## 4. CONNECTIONS: INPUT & OUTPUT

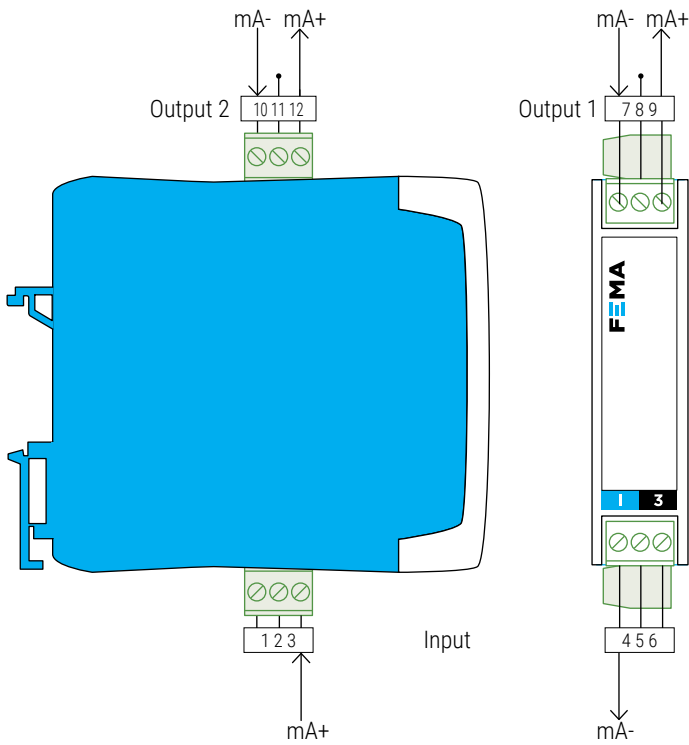


Table 1 | I3LP-102 CONNECTIONS - INPUT SIGNAL

	Input					
	1	2	3	4	5	6
	n.c.	n.c.	mA+ (in)	mA- (out)	n.c.	n.c.

Table 2 | I3LP-102 CONNECTIONS - OUTPUT SIGNAL

	Output 1			Output 2		
	7	8	9	10	11	12
	mA- (in)	n.c.	mA+ (out)	mA- (in)	n.c.	mA+ (out)

Table 3 | I3LP-102 CONNECTIONS

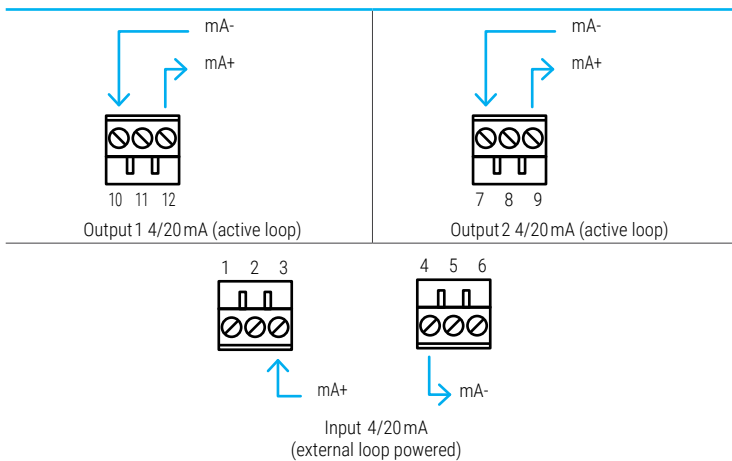
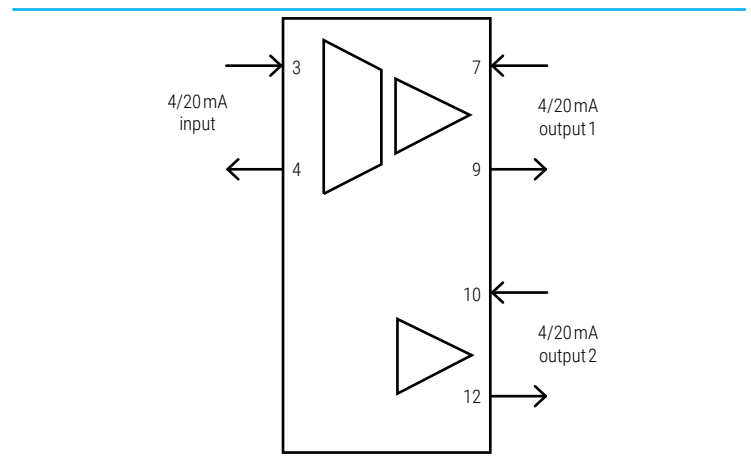


Table 4 | I3LP-102 SCHEMATIC



## 5. ADDITIONAL TECHNICAL INFORMATION

### INPUT - OUTPUT RELATION

The instruments accepts a 4/20mA input signal loop and provides two independent and isolated 4/20mA outputs. Both outputs are a replica of the input.

### ACTIVE AND PASSIVE LOOPS

The instrument is powered from the input signal loop, therefore, the input signal loops must be 'active', and powered from an external power supply.

The output signal loops are 'active', therefore, no external power supply must be used to power the output loops. Connecting an external power supply to the output loops may damage the instrument. Each output loop is powered from the input loop.

Do not connect an external power supply to the output signal loop.

### EXTENDED RANGE SIGNALS

The instrument will follow the input signal down to 0.5mA, although the output may be out of accuracy specifications.

The instrument will follow the input signal up to 50mA, although the output may be out of accuracy specifications.

### MAXIMUM OVERSIGNAL AND PROTECTIONS

'Maximum oversignal' is the maximum signal accepted by the instrument. Higher signal values may damage the instrument. Lower signal values are non destructive but may be out of accuracy specifications.

### PROTECTION AGAINST INVERTED CONNECTIONS

The instrument is not damaged when the input signal connection is inverted. The output signal loops will be open (0mA) and the input signal loop will remain closed (current flows).

### VOLTAGE DROP ON TERMINALS

The voltage drop, at the input terminal, is lower than 11.4Vdc at 20mA, for output loads  $Z_{L1}$  and  $Z_{L2}$  below 50Ohm each. See 'Table 5' for calculated examples of the input impedance.

### INPUT IMPEDANCE

The input impedance can be calculated with the following equation (where 'I' is the current on the loop expressed in 'mA',  $Z_{in}$  is the input impedance seen on input terminals, and  $Z_{L1}$  and  $Z_{L2}$  are the loads connected to the output loops expressed in Ohm). See 'Table 6' for calculated examples of the input impedance.

$$Z_{in} = Z_{L1} + Z_{L2} + 2 * (2.73 * I^2 - 98.8 * I + 1159) \pm 10\%$$

### ACCURACY

The typical accuracy for each instrument is class <0.20%, for an output load of 0Ohm and class <0.35% for an output load of 50 Ohm. Higher loads can be connected as long as the element powering the input signal loop can provide enough energy to power the system. When connecting higher loads, the error will increase. See 'Table 7' for accuracy data on different current values and output impedances.

### OPEN OUTPUT LOOP PROTECTION

When an output loop opens, the current at the input loop continues flowing and the voltage on input terminals will increase up to 10Vdc if one output loop is open, or 20Vdc if both output loops are open.

### SHORT-CIRCUIT OUTPUT LOOP PROTECTION

The instrument is not damaged when the output circuit loops are short-circuited.

### ISOLATION

All circuits are isolated between them and tested for 2000Veff (@50Hz) between circuits, for 60 seconds. In particular :

- the isolation between input and output circuits is tested by applying 2000Veff (@50 Hz) between input and output circuits, for 60 seconds.
- the isolation between output circuits is tested by applying 2000Veff (@50 Hz) between output circuits, for 60 seconds.

Table 5 | VOLTAGE DROP ON INPUT TERMINALS

V <sub>in</sub>	mA signal		
	4mA	12mA	20mA
Load			
00hm	6.5Vdc	8.8Vdc	11.0Vdc
50Ohm	6.6Vdc	9.4Vdc	12.0Vdc

Table 6 | INPUT IMPEDANCE TYPICAL (Z<sub>in</sub>) VALUES (±10%)

Z <sub>in</sub>	mA signal		
	4mA	12mA	20mA
Load Z <sub>L1</sub> , Z <sub>L2</sub>			
0 - 00hm	16140hm	7320hm	5500hm
50 - 500hm	17140hm	8320hm	4500hm

Table 7 | TYPICAL ACCURACY

	Load		
	Load (00hm)	Load (500hm)	Load (1000hm)
Class	<0.2%	<0.35%	<0.50%

Table 8 | STEP RESPONSE TIMES

	Load		
	Load (00hm)	Load (500hm)	Load (1000hm)
Response time	<10mSec.	<15mSec.	<25mSec.

## 6. ADDITIONAL DOCUMENTATION

<b>User's manual</b>	<a href="http://www.fema.es/docs/5807_I3LP102_manual_en.pdf">www.fema.es/docs/5807_I3LP102_manual_en.pdf</a>
<b>Datasheet</b>	<a href="http://www.fema.es/docs/5813_I3LP102_datasheet_en.pdf">www.fema.es/docs/5813_I3LP102_datasheet_en.pdf</a>
<b>Quick installation guide</b>	<a href="http://www.fema.es/docs/5819_I3LP102_installation_en.pdf">www.fema.es/docs/5819_I3LP102_installation_en.pdf</a>
<b>Web</b>	<a href="http://www.fema.es/Series_I3">www.fema.es/Series_I3</a>

## 7. OTHER SIGNAL CONVERTERS ... AND MORE



### SERIES I3

Section **OEM**

output signal ..... 4/20 mA, 0/10 Vdc  
 configuration ..... by codes (inside)  
 isolation ..... 3 ways



### SERIES I4

**FULLY CONFIGURABLE**

output signal ..... 4/20 mA, 0/10 Vdc, ...  
 configuration ..... by menu (front)  
 isolation ..... 3 ways



### SERIES I5

**FIELD BUS**

output signal ..... Modbus RTU, CANbus, ...  
 configuration ..... by menu (front)  
 isolation ..... 3 ways



### SERIES B

**LARGE FORMAT DISPLAYS**

digit ..... 60 and 100 mm  
 reading ..... 25 and 50 meters  
 mounting ..... wall, panel, hanging  
 housing ..... metallic IP65

<b>50</b> YEARS 1969-2019	<b>Q</b> ISO 9001 Certified Quality	<b>CE</b> EN-61010-1 Security	<b>CE</b> EN-61326-1 Electromagnetic C.	<b>5</b> YEARS Extended Warranty
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Process	Temperature	Counter	Weight	Flow	Time
Frequency	Temperature	Speed	Vac	Aac	Integrators
Potentiometer	Temperature	Period	Ade	Vdc	Resistances
Digital	Digital	Digital	Digital	Custom	