MODEL · I4L

LOAD CELLS AND MILLIVOLTS

Weight · Load cell · mV

Signal converter for load cell and millivolts signals, isolated, for DIN rail mount.

Isolated signal converter for load cell signals and millivolts. Provides +5 Vdc excitation voltage to power the load cell, and 'sense' function to compensate for excitation voltage variations. Accepts direct connection of 1, 2, 3 or up to 4 load cells (typical 350 Ohms load cells). Accepts 4 and 6 wire load cells. Accepts unipolar and bipolar ranges up to ±80 mV.

Output signal configurable for 4/20 mA (active or passive) and 0/10 Vdc. Universal power supply from 18 to 265 Vac/dc. 3 way isolation between input, output and power circuits. Plug-in screw terminal connections. Circuit isolation prevents ground loops and transient propagation, protecting remote equipment and signal integrity.

Two configuration modes: (1) easy and fast using predefined configuration codes, and (2) advanced configuration trough the '*configuration menu*' to customize input and output signal ranges. Configuration through front push-button keypad and front display. 'Tare' function accessible from front key pad. Configurable display information (tare value, input signal value, output signal value, configured label, signal percentage, process value, excitation voltage and excitation current values). Manual '*force*' functions to generate low and high output signals, to validate remote instrumentation during installation. '*Password*' function to block non-authorized access to configuration menu. '*SOS*' mode to help on critical maintenance and repairs without affecting the manufacturing process. Designed for industrial use, with potential integration into a wide range of applications, excellent quality and optional customization.

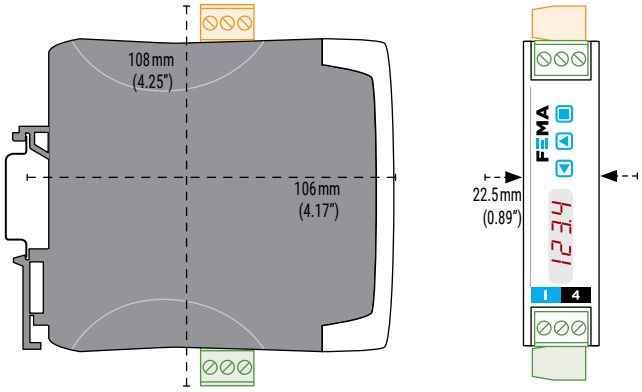
1. TECHNICAL SPECIFICATIONS

Input signal ranges for load cells	
signal ranges	from 0/5 mV up to 0/80 mV
bipolar signal ranges	from ±5 mV up to ±80 mV
excitation voltage	+5 Vdc
excitation voltage variations	automatic compensation
excitation current	max. 70 mA
Input signal ranges for millivolts	
signal ranges	from 0/5 mV up to 0/80 mV
bipolar signal ranges	from ±5 mV up to ±80 mV
excitation voltage	no
input impedance	10 MOhm typical (with 1 MOhms during 150 milliseconds, every 10 seconds approx.)
Accuracy at 25 °C*	see section 7 for each type of signal
'values for 4/20 mA output, for 0/10 Vdc output, add +0.05 % to indicated accuracy.	
Thermal stability	±150 ppm/°C (F.S.) for ranges up to 5 mV ±100 ppm/°C (F.S.) for ranges up to 20 mV ±75 ppm/°C (F.S.) for ranges up to 80 mV
Step response	
with '*no filter*'	<115 mSec. typ. (0 % to 99 % signal)
with '*50 Hz filter*' or '*60 Hz filter*'	<150 mSec. typ. (0 % to 99 % signal)
with '*50 and 60 Hz filter*'	<300 mSec. typ. (0 % to 99 % signal)
Output signal ranges	
active current output	4/20 mA active, max. <22 mA, min. 0 mA, load < 400 Ohm
passive current output	4/20 mA passive, max. 30 Vdc on terminals
voltage output	0/10 Vdc, max. <11 Vdc, min. -0.05 Vdc (typ.), load > 10 KOhm
' custom input and output ranges through the 'configuration menu' (for example : 4/12 mA, 0/5 Vdc, 20/4 mA, etc)	
Configuration system	
key pad + display	accessible at the front of the instrument
configuration modes	*(1) through preconfigured codes, (2) through 'configuration menu'*
Power supply	
voltage range	18 to 265 Vac/dc isolated (20 to 240 Vac/dc ±10%)
AC frequency	45 to 65 Hz
consumption	<3.0 W
power wires	1 mm² to 2.5 mm² (AWG17 to AWG14)
overvoltage category	2
Isolation	
input - output	3000 Veff (60 seconds)
power - input	3000 Veff (60 seconds)
power - output	3000 Veff (60 seconds)
Environmental	
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

2. HOW TO ORDER

I4L	Load cell signal converter
I4L.1442	Load cell signal converter with custom features

3. DIMENSIONS

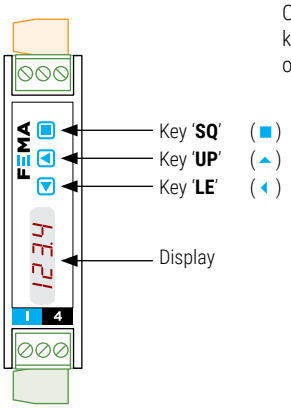


Mechanical

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

4. CONFIGURATION SYSTEM

The instrument allows for 2 configuration modes: (1) easy and fast using predefined configuration codes, and (2) advanced configuration through the '*configuration menu*'. Configuration is applied through the 3 push button keypad and the 4 red digit led display at the front of the instrument.



5. FUNCTIONS INCLUDED

'**Force**' functions . . . . . temporarily forces the signal output to the minimum ('**Force Low**'), to the maximum ('**Force High**') or to a selectable value ('**Force Set**'), to validate the function of the remote elements connected to the output during installation.

'**Label**' function . . . . . configure an alphanumerical label to be shown on display, and easily identify each unit.

'**SOS**' mode . . . . . manually set the output to a fixed value, to apply critical maintenance or repairs to the input signal section without affecting the manufacturing process.

'**Messages**' function . . . . . configure information to display at your request at front key '**LE**' (◀). See real time values for input signal, output signal, input percentage, process value or configured label.

'**On error**' function. . . . . configure the output response in case of error at the input.

'**Password**' function. . . . . prevents access from unauthorized operators to '*configuration menu*'.

6. CONNECTIONS: INPUT & OUTPUT

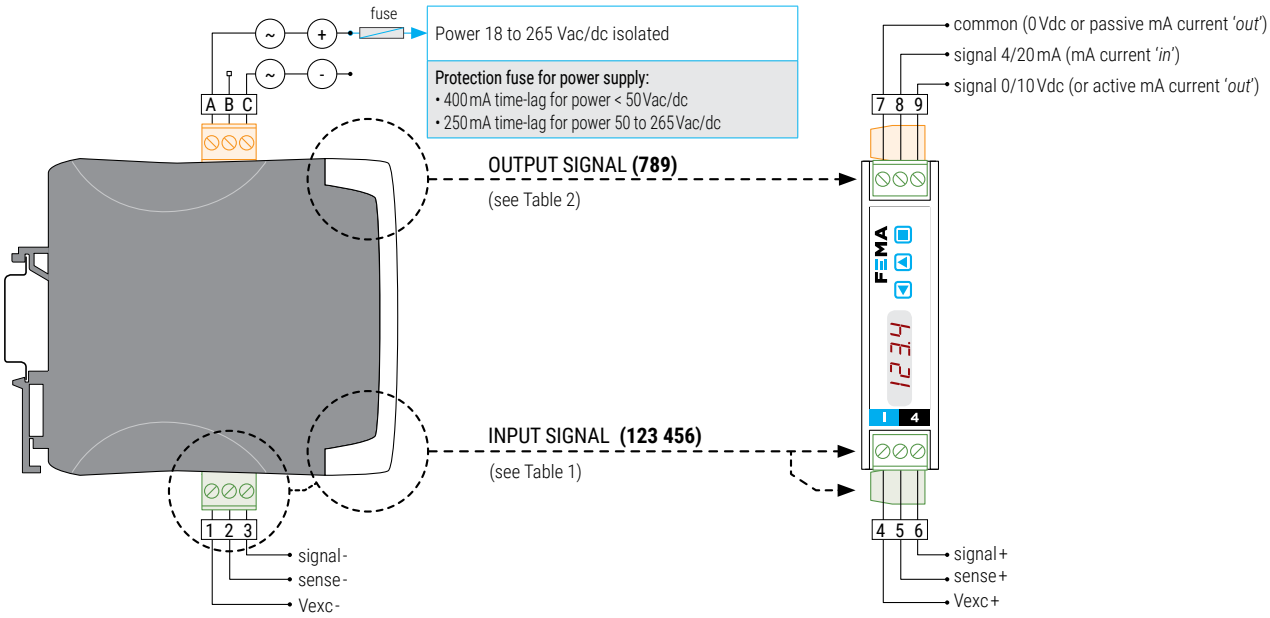
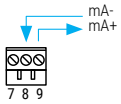
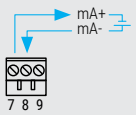
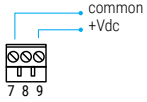


Table 1 | **INPUT signal connections**

Input signal	Input terminals 1	2	3	4	5	6
load cell	Vexc-	sense-	signal-	Vexc+	sense+	signal+
millivolts			mV-			mV+

Table 2 | **OUTPUT signal connections**

Output signal	Output terminals 7	8	9	Connections
4/20 mA active output		mA- (*in*)	mA+ (*out*)	
4/20 mA passive output* (**external loop power needed).*	mA+ (*out*)	mA- (*in*)		
0/10 Vdc	common		+Vdc	

7. PRECONFIGURED SIGNAL RANGES AND TYPICAL APPLICATIONS

The instrument has 2 different configuration modes: (1) easy and fast using predefined configuration codes, and (2) advanced configuration through the '*configuration menu*'.

The tables below provide a list of preconfigured input signal ranges, together with technical specifications for each range, and the associated preconfiguration codes.

Custom configurations

The '*configuration menu*' allows to configure custom ranges for both the input and the output ranges. For additional information see the '*User's Manual*' (see section 8).

Typical applications

- load cells that provide a 1 mV/V, 2 mV/V or 3 mV/V signals and can be powered from the instrument +5 Vdc excitation voltage.
- direct measurement of millivolt signals with ranges up to 0/80 mV and down to 0/5 mV.
- direct measurement of bipolar millivolt signals with ranges up to ±80 mV and down to ±5 mV.

⚠ INPUT and OUTPUT signals fully configurable through the configuration menu (see the *User's Manual at section* 8).

Table 3 | **Input ranges and technical specifications for load cell signals**

Sensor	Code for 4/20 mA output	Code for 0/10 Vdc output	Accuracy (% FS)	Max. oversignal	Zin
0/5 mV	010	110	<0.18 %	±12 Vdc	20 MOhm
0/10 mV	011	111	<0.13 %	±12 Vdc	20 MOhm
0/15 mV	012	112	<0.13 %	±12 Vdc	20 MOhm
0/20 mV	013	113	<0.10 %	±12 Vdc	20 MOhm
0/25 mV	014	114	<0.10 %	±12 Vdc	20 MOhm
0/30 mV	015	115	<0.10 %	±12 Vdc	20 MOhm
0/40 mV	016	116	<0.10 %	±12 Vdc	20 MOhm
0/50 mV	017	117	<0.08 %	±12 Vdc	20 MOhm
0/60 mV	018	118	<0.08 %	±12 Vdc	20 MOhm
0/70 mV	019	119	<0.08 %	±12 Vdc	20 MOhm
0/80 mV	120	120	<0.08 %	±12 Vdc	20 MOhm
±5 mV	121	121	<0.15 %	±12 Vdc	20 MOhm
±10 mV	122	122	<0.10 %	±12 Vdc	20 MOhm
±20 mV	123	123	<0.10 %	±12 Vdc	20 MOhm
±30 mV	124	124	<0.10 %	±12 Vdc	20 MOhm
±40 mV	125	125	<0.08 %	±12 Vdc	20 MOhm
±50 mV	126	126	<0.08 %	±12 Vdc	20 MOhm
±60 mV	127	127	<0.08 %	±12 Vdc	20 MOhm
±70 mV	128	128	<0.08 %	±12 Vdc	20 MOhm
±80 mV	129	129	<0.08 %	±12 Vdc	20 MOhm

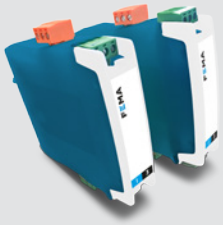
Table 4 | **Input ranges and technical specifications for millivolt signals**

Sensor	Code for 4/20 mA output	Code for 0/10 Vdc output	Accuracy (% FS)	Max. oversignal	Zin
0/5 mV	050	150	<0.15 %	±12 Vdc	10 MOhm
0/10 mV	051	151	<0.10 %	±12 Vdc	10 MOhm
0/15 mV	052	152	<0.10 %	±12 Vdc	10 MOhm
0/20 mV	053	153	<0.07 %	±12 Vdc	10 MOhm
0/25 mV	054	154	<0.07 %	±12 Vdc	10 MOhm
0/30 mV	055	155	<0.07 %	±12 Vdc	10 MOhm
0/40 mV	056	156	<0.05 %	±12 Vdc	10 MOhm
0/50 mV	057	157	<0.05 %	±12 Vdc	10 MOhm
0/60 mV	058	158	<0.05 %	±12 Vdc	10 MOhm
0/70 mV	059	159	<0.05 %	±12 Vdc	10 MOhm
0/80 mV	060	160	<0.05 %	±12 Vdc	10 MOhm
±5 mV	061	161	<0.12 %	±12 Vdc	10 MOhm
±10 mV	062	162	<0.07 %	±12 Vdc	10 MOhm
±20 mV	063	163	<0.07 %	±12 Vdc	10 MOhm
±30 mV	064	164	<0.07 %	±12 Vdc	10 MOhm
±40 mV	065	165	<0.05 %	±12 Vdc	10 MOhm
±50 mV	066	166	<0.05 %	±12 Vdc	10 MOhm
±60 mV	067	167	<0.05 %	±12 Vdc	10 MOhm
±70 mV	068	168	<0.05 %	±12 Vdc	10 MOhm
±80 mV	069	169	<0.05 %	±12 Vdc	10 MOhm

8. ADDITIONAL DOCUMENTATION

User's manual	www.fema.es/docs/5583_I4L_manual_en.pdf
Datasheet	www.fema.es/docs/5585_I4L_datasheet_en.pdf
Quick installation guide	www.fema.es/docs/5587_I4L_installation_en.pdf
Web	www.fema.es/docs/Series_I4

9. 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 . . . . . menu (front keypad)
isolation . . . . . 3 ways

SERIES I5
FIELD BUS

output signal . . . . . Modbus RTU, CANbus, ...
configuration . . . . . by menu (front keypad)
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

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Process | Temperature (Pt) | Counter | Weight | Flow | Time
Frequency | Temperature (tc) | Speed | Vac | Aac | Integrators
Potentiometer | Temperature (NTC PTC) | Period | Adc | Vdc | Resistances
Digital (Modbus RTU) | Digital (RS-485 RS-232) | Digital (BCD Parallel) | Digital (BCD Multiplex) | Custom