

## MODEL · I4E

# ELECTRICAL AC & DC SIGNALS



### Signal converter for electrical signals, isolated, for DIN rail mount.

Isolated signal converter for electrical signals. Configurable to measure AC/DC voltages (ranges from 50 mVac/dc up to 600 Vac/dc), AC/DC currents (ranges from 5 mAac/dc up to 5 Aac/dc) and frequency signals (up to 100 Hz). Unipolar and bipolar signal ranges accepted for DC voltages and DC currents. Output signal configurable for 4/20 mA (active and 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.

Predefined configuration codes for fast and easy configuration and advanced configuration to customize input and output signals ranges. Configuration through front push-button keypad and front display. Configurable information messages (input signal value, output signal value, configured label, signal percentage and process value). 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.

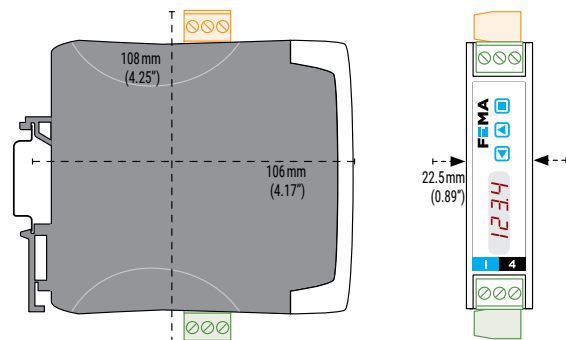
## 1. TECHNICAL SPECIFICATIONS

<b>Input signal ranges Vac</b>	
ranges	from 0/50 mVac up to 0/600 Vac
type of measure	True RMS
connections accepted	phase-to-neutral phase-to-phase
category of measure	CAT-III up to 300 Vac
<b>Input signal ranges Vdc</b>	
unipolar ranges	from 0/50 mVdc up to 0/600 Vdc
bipolar ranges	from ±50 mVdc up to ±600 Vdc
<b>Input signal ranges Aac</b>	
ranges	from 0/5 mAac up to 0/5 Aac
type of measure	True RMS
connections accepted	phase-to-neutral phase-to-phase
<b>Input signal ranges Adc</b>	
unipolar ranges	from 0/5 mAdc up to 0/5 Adc
bipolar ranges	from ±5 mAdc up to ±5 Adc
<b>Frequency AC</b>	
ranges	up to 100 Hz
measured from	measured from existing Vac and Aac signal ranges
<b>Accuracy at 25 °C</b>	see section 7 for each type of signal
<b>Thermal stability</b>	150 ppm/°
<b>Step response</b>	
AC signals	<350 mSec. typ. (0% to 99% signal)
DC signals	<90 mSec. typ. (0% to 99% signal) 'no filter' <175 mSec. typ. (0% to 99% signal) '50 Hz filter' or '60 Hz filter' <350 mSec. typ. (0% to 99% signal) '50 and 60 Hz filter'
<b>Output signal ranges</b>	
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. -0.1 Vdc (typ.), load > 1 KOhm
<b>Configuration system</b>	
key pad + display	accessible at the front of the instrument
configuration	full 'configuration menu'
scalable units	scalable input ranges scalable output ranges scalable process display
<b>Power supply</b>	
voltage range	18 to 265 Vac/dc isolated (20 to 240 Vac/dc ±10%)
AC frequency	45 to 65 Hz
consumption	<1.5 W
power wires	1 mm <sup>2</sup> to 2.5 mm <sup>2</sup> (AWG17 to AWG14)
overvoltage category	2
<b>Isolation</b>	
input - output	3000 Veff (60 seconds)
power - input	3000 Veff (60 seconds)
power - output	3000 Veff (60 seconds)
<b>IP protection</b>	IP30

## 2. HOW TO ORDER

MODEL	CUSTOMIZATION
I4E	<input type="text"/>
	↑ .XXXX (customized execution)

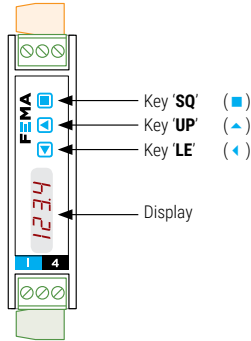
## 3. DIMENSIONS



<b>Impact protection</b>	IK06
<b>Temperature</b>	
operation	from 0 to +50 °C
storage	from -20 to +70 °C
'warm-up' time	15 minutes
<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

## 4. CONFIGURATION SYSTEM

The instrument is fully configurable from 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

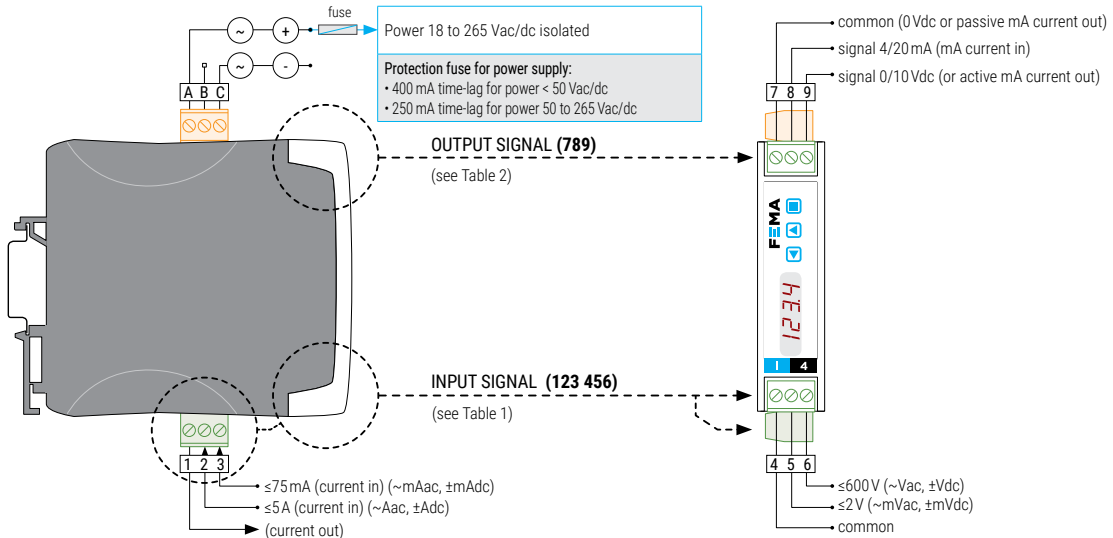


Table 1 | INPUT signal connections

Input signal	Input terminals					
	1	2	3	4	5	6
≤600 Vac				~Vac		~Vac
≤600 Vdc				comm.		±Vdc
≤2 Vac				~mVac	~mVac	
≤2 Vdc				comm.	±mVdc	
≤5 Aac	~Aac	~Aac				
≤5 Adc	-Aac (out)	+Aac (in)				
≤75 mAac	~mAac		~mAac			
≤75 mAdc	-mAac (out)		+mAac (in)			
Frequency	Connect to the Aac, mAac, Vac or mVac terminals, according to the signal measured (AC voltage or AC current)					

Table 2 | OUTPUT signal connections

Output signal	Output terminals			Connections
	7	8	9	
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. SIGNAL RANGES AVAILABLE AND TYPICAL APPLICATIONS

List of available signal ranges, with technical specifications for each range and associated predefined configuration codes. Configuration menu allows to customize intermediate ranges, and bipolar ranges for DC voltage and DC current signals. For additional information see the User's Manual (see section 8).

Typical applications include measurement of electrical signals from :

- current shunts of 50mV, 60mV, 100mV, 150mV, ...
- signals from DC batteries of 12 Vdc, 24 Vdc, 48 Vdc, ...
- signals from tachometric dynamos of  $\pm 60$  Vdc
- power lines of 230 Vac, 115 Vac, 48 Vac, 24 Vac
- AC current leaks of down to 5mAac and below
- 50 and 60 Hz frequency signals from AC power lines
- signals from X/5 and X/1 current transformers

Table 4 | Input ranges and technical specifications for AC voltage signals

Input range	Code for 4/20 mA output	Code for 0/10 Vdc output	Accuracy (% FS)	Max. oversignal	Zin
0/600 Vac	010	110	<0.30 %	800 Vac	13 MOhm
0/450 Vac	011	111	<0.30 %		
0/300 Vac	012	112	<0.30 %		
0/150 Vac	013	113	<0.30 %		
0/100 Vac	014	114	<0.30 %		
0/60 Vac	015	115	<0.30 %		
0/30 Vac	016	116	<0.30 %		
0/15 Vac	017	117	<0.30 %		
0/10 Vac	018	118	<0.30 %		
0/2 Vac	019	119	<0.30 %		
0/1 Vac	020	120	<0.30 %	50 Vac	81 KOhm
0/500 mVac	021	121	<0.30 %		
0/300 mVac	022	122	<0.30 %		
0/200 mVac	023	123	<0.30 %		
0/150 mVac	024	124	<0.30 %		
0/100 mVac	025	125	<0.30 %		
0/75 mVac	026	126	<0.30 %		
0/60 mVac	027	127	<0.30 %		
0/50 mVac	028	128	<0.30 %		

Table 6 | Input ranges and technical specifications for AC current signals

Input range	Code for 4/20 mA output	Code for 0/10 Vdc output	Accuracy (% FS)	Max. oversignal	Zin
0/5 Aac	055	155	<0.30 %	7 Aac (max. 7 sec.)	20 mOhm
0/4 Aac	056	156	<0.30 %		
0/3 Aac	057	157	<0.30 %		
0/2 Aac	058	158	<0.30 %		
0/1 Aac	059	159	<0.30 %		
0/500 mAac	060	160	<0.30 %		
0/300 mAac	061	161	<0.30 %	150 mAac	3.33 Ohm
0/75 mAac	062	162	<0.30 %		
0/50 mAac	063	163	<0.30 %		
0/20 mAac	064	164	<0.30 %		
0/10 mAac	065	165	<0.30 %		
0/5 mAac	066	166	<0.30 %		

Table 3 | Input ranges and technical specifications for AC frequency signals

Input range	Code for 4/20 mA output	Code for 0/10 Vdc output	Accuracy (% FS)
0/100 Hz (Vac)	089	189	<0.20 %
45/55 Hz (Vac)	090	190	<0.20 %
55/65 Hz (Vac)	091	191	<0.20 %
0/100 Hz (Aac)	092	192	<0.20 %
45/55 Hz (Aac)	093	193	<0.20 %
55/65 Hz (Aac)	094	194	<0.20 %

Table 5 | Input ranges and technical specifications for DC voltage signals

Input range	Code for 4/20 mA output	Code for 0/10 Vdc output	Accuracy (% FS)	Max. oversignal	Zin
0/600 Vdc	032	132	<0.20 %	800 Vdc	13 MOhm
0/450 Vdc	033	133	<0.20 %		
0/300 Vdc	034	134	<0.20 %		
0/150 Vdc	035	135	<0.20 %		
0/100 Vdc	036	136	<0.20 %		
0/60 Vdc	037	137	<0.20 %		
0/30 Vdc	038	138	<0.20 %		
0/15 Vdc	039	139	<0.20 %		
0/10 Vdc	040	140	<0.20 %		
0/2 Vdc	041	141	<0.20 %		
0/1 Vdc	042	142	<0.20 %	50 Vdc	81 KOhm
0/500 mVdc	043	143	<0.20 %		
0/300 mVdc	044	144	<0.20 %		
0/200 mVdc	045	145	<0.20 %		
0/150 mVdc	046	146	<0.20 %		
0/100 mVdc	047	147	<0.20 %		
0/75 mVdc	048	148	<0.20 %		
0/60 mVdc	049	149	<0.20 %		
0/50 mVdc	050	150	<0.20 %		

Table 7 | Input ranges and technical specifications for DC current signals

Input range	Code for 4/20 mA output	Code for 0/10 Vdc output	Accuracy (% FS)	Max. oversignal	Zin
0/5 Adc	072	172	<0.20 %	7 Adc (max. 7 sec.)	20 mOhm
0/4 Adc	073	173	<0.20 %		
0/3 Adc	074	174	<0.20 %		
0/2 Adc	075	175	<0.20 %		
0/1 Adc	076	176	<0.20 %		
0/500 mAdc	077	177	<0.20 %		
0/300 mAdc	078	178	<0.20 %	150 mAdc	3.33 Ohm
0/75 mAdc	079	179	<0.20 %		
0/50 mAdc	080	180	<0.20 %		
0/20 mAdc	081	181	<0.20 %		
0/10 mAdc	082	182	<0.20 %		
0/5 mAdc	083	183	<0.20 %		

## 8. ADDITIONAL DOCUMENTATION

<b>User's manual</b>	<a href="http://www.fema.es/docs/5082_I4E_manual_en.pdf">www.fema.es/docs/5082_I4E_manual_en.pdf</a>
<b>Datasheet</b>	<a href="http://www.fema.es/docs/5089_I4E_datasheet_en.pdf">www.fema.es/docs/5089_I4E_datasheet_en.pdf</a>
<b>Quick installation guide</b>	<a href="http://www.fema.es/docs/5091_I4E_installation_en.pdf">www.fema.es/docs/5091_I4E_installation_en.pdf</a>
<b>Web</b>	<a href="http://www.fema.es/docs/Series_I4">www.fema.es/docs/Series_I4</a>

## 9. OTHER SIGNAL CONVERTERS ... AND MORE



### SERIES I3

#### SERIES 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

