

# MODEL · 14F

## FREQUENCY SIGNALS



**Signal converter for impulses and frequency signals, isolated, for DIN rail mount.**

Isolated signal converter for frequency signals. Configurable to work with NPN, PNP, pick-up, Namur, mechanical contact, reed contact and other types of sensors. Dedicated input to measure frequency from AC signals up to 600 Vac. Accepts a wide range of frequency ranges, from 1 Hertz up to 1 MegaHertz. 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. Two configuration modes: <sup>(1)</sup>easy and fast using predefined configuration codes, and <sup>(2)</sup>advanced configuration through the 'configuration menu' to customize input and output signal ranges. Configuration through front push-button keypad and front display. Configurable display information (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

Input signal ranges Vac	
type of signals	NPN, PNP, pick-up, push-pull, mechanical contact, reed contact, Vac, ...
	different signal types can be detected by configuring the 'Sensor' parameters at the configuration menu
max. voltage at terminals	(see Table 3)
input impedance	(see Table 3)
maximum frequency	(see Table 3)
excitation voltage	15 Vdc @50 mA, 8.2 Vdc @50 mA, 5 Vdc @50 mA
typical detection levels	(see Table 3)
	detection levels are changeable through the 'trigger' parameter

Accuracy at 25 °C	
'slow' mode error	f <sup>2</sup> x 0.5 x 10 <sup>-6</sup> hz.
'fast' mode error	1/gate (see 'gate' parameter at user's manual) (typical error is 2 Hz for a 'gate' of 0.5 seconds)
quartz accuracy	±50 ppm
mA output accuracy	0.05 % FS
Vdc output accuracy	0.10 % FS
thermal drift	50 ppm/°C
min. detectable frequency	100 mHz (signals below 100 mHz are considered 0 Hz)
resolution	1 mHz

Step response	
in 'fast' mode	'Gate' parameter + 50 mSec.
in 'slow' mode	1/frequency + 50 mSec.

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
<i>* custom input and output ranges through the 'configuration menu' (for example : 4/12 mA, 0/5 Vdc, 20/4 mA, etc)</i>	

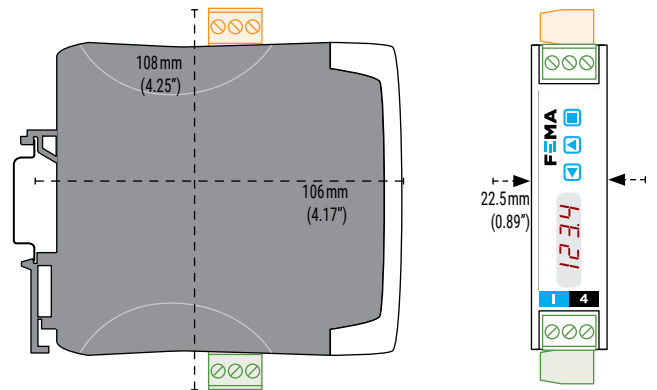
Configuration system	
key pad + display	accessible at the front of the instrument
configuration modes	<sup>(1)</sup> through preconfigured codes, <sup>(2)</sup> through 'configuration menu'
scalable units	scalable input ranges scalable output ranges scalable process display

Power supply	
voltage range	18 to 265 Vac/dc isolated (20 to 240 Vac/dc ±10%)
AC frequency	45 to 65 Hz
consumption	<3.5 W
power wires	1 mm <sup>2</sup> to 2.5 mm <sup>2</sup> (AWG17 to AWG14)
overvoltage category	2

### 2. HOW TO ORDER

<b>14F</b>	Signal converter for frequency signals
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### 3. DIMENSIONS



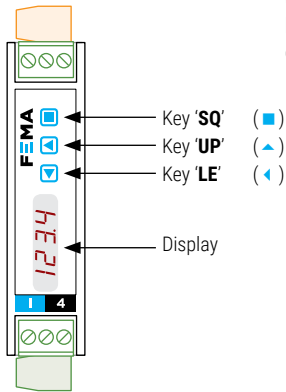
Isolation	
input - output	3000 Veff (60 seconds)
power - input	3000 Veff (60 seconds)
power - output	3000 Veff (60 seconds)

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

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: <sup>(1)</sup> easy and fast using predefined configuration codes, and <sup>(2)</sup> 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

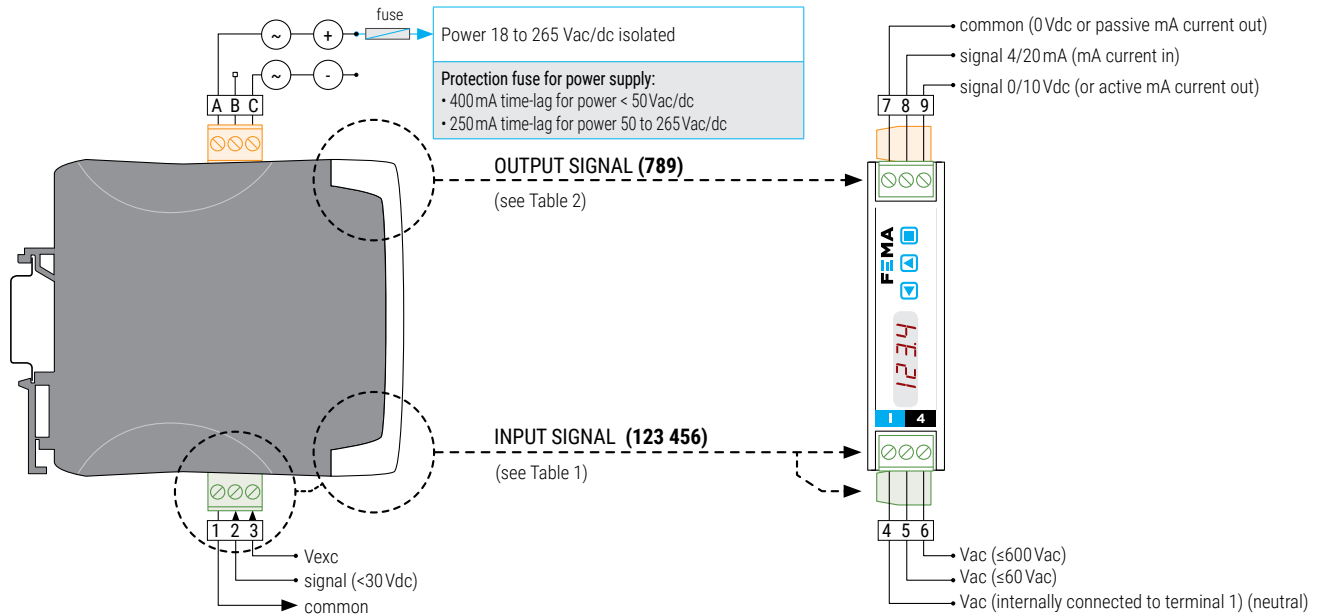


Table 1 | INPUT signal connections

Input signal	1	2	3	4	5	6
Vac <600Vac				~Vac		~Vac
Vac <60Vac				~Vac	~Vac	
Npn (2 wires)	common	signal				
Pnp (2 wires)		signal	Vexc			
Npn, Pnp (3 wires)	common	signal	Vexc			
Pick-up	common	signal				
Namur		signal	Vexc			
Mechanical contact	common	signal				
Reed contact	common	signal				
Others	common	signal	Vexc			

Table 2 | OUTPUT signal connections

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

## 7. PRECONFIGURED SIGNAL RANGES, TYPICAL APPLICATIONS AND MAX. FREQUENCIES

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

The tables below provide a list of preconfigured input signal ranges, 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

- frequency measurement from NPN, PNP, push-pull and similar sensors
- frequency measurement from pick-up sensors
- frequency measurement from AC power lines


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

Table 3 | Predefined input ranges

Input range	Code for 4/20mA output	Code for 0/10Vdc output
0/1Hz	010	110
0/2Hz	011	111
0/4Hz	012	112
0/6Hz	013	113
0/8Hz	014	114
0/10Hz	015	115
0/20Hz	016	116
0/40Hz	017	117
0/60Hz	018	118
0/80Hz	019	119
0/100Hz	020	120
0/200Hz	021	121
0/400Hz	022	122
0/600Hz	023	123
0/800Hz	024	124
0/1KHz	025	125
0/2KHz	026	126
0/4KHz	027	127
0/6KHz	028	128
0/8KHz	029	129
0/10KHz	030	130
0/20KHz	031	131
0/40KHz	032	132
0/60KHz	033	133
0/80KHz	034	134
0/100KHz	035	135
0/1MHz	036	136

Table 4 | Sensor types, maximum frequency, input impedance and detection levels

Sensor	Max. Frequency	Max. voltage at terminals	Input impedance	Typical detection levels
NPN	100KHz	±30Vdc	5.1K0mhs	'0' level <1V, '1' level >2V
PNP	100KHz	±30Vdc	5.1K0mhs	'0' level <1V, '1' level >2V
Mechanical	500Hz	±30Vdc	5.1K0mhs	'0' level <1V, '1' level >2V
Reed	500Hz	±30Vdc	5.1K0mhs	'0' level <1V, '1' level >2V
Pick-up	50KHz	±30Vdc	100K0mhs	>10mVpp
Namur	1MHz	±30Vdc	5.1K0mhs	---
TTL	1MHz	±30Vdc	5.1K0mhs	'0' level <1V, '1' level >2V
<600Vac	1KHz	800Vac	900K0mhs	---
<60Vac	1KHz	200Vac	340K0mhs	---



For Vac ranges, the minimum voltage levels recommended are 30Vac for the 600Vac range, and 6Vac for the 60Vac range. Signals with amplitude levels below 6Vac, should be treated as 'low voltage' signals.

## 8. ADDITIONAL DOCUMENTATION

<b>User's manual</b>	<a href="http://www.fema.es/docs/5799_I4F_manual_en.pdf">www.fema.es/docs/5799_I4F_manual_en.pdf</a>
<b>Datasheet</b>	<a href="http://www.fema.es/docs/5801_I4F_datasheet_en.pdf">www.fema.es/docs/5801_I4F_datasheet_en.pdf</a>
<b>Quick installation guide</b>	<a href="http://www.fema.es/docs/5803_I4F_installation_en.pdf">www.fema.es/docs/5803_I4F_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

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

<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	Aac	Vdc	Resistances
Digital	Digital	Digital	Digital	Custom	