

EA14F || Level Indicator

The EA14F is an intelligent multi-function level instrument that measures and displays level when connected to an NC54 or NC56 Capacitive Level Transmitter. The measured value can (optionally) be transmitted to the EA14F as a standardised 2-wire or 3-wire electrical signal. Its programmable limit detection functions enables it also to act as an accurate and versatile level switch.

Principles of Operation

The electronic module converts the analogue signal from the level transmitter and then digitally processes these values. The microcontroller based EA14F has a high degree of user programmability, making it a truly versatile device. The electronic module computes the level, controls the local digital display and (optionally) produces a new analogue signal output. The measurements can be filtered, scaled, inverted or linearised through a user-defined look-up table.

The EA14F can be programmed to display the value of either input or converted output signal. The input signal can be converted using its freely-programmable look-up table function for linearisation or conversion to derived units of measurement, e.g., %, m³, Kg, etc.

The external level transmitter is connected to and energized by the electronic module through a flexible signal cable terminated by a plug-in connector.

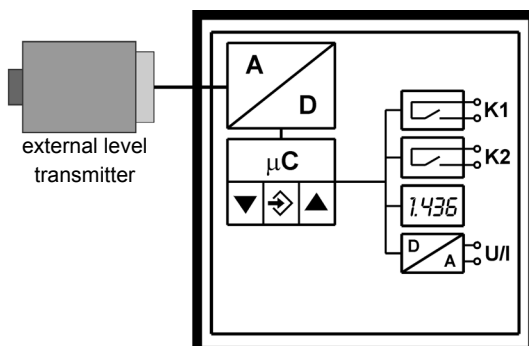


Features

- Large bright LED display
- Displays either input signal value, percentage of volume or its converted value
- 2 independent limits with a choice of logic modes
- Optional analog signal output, with digital scaling, linearisation, inversion, and offset adjustment.
- User-defined look-up table for signal conversion, with up to 30 points

Typical Applications

- Liquid level or quantity indication with limit detection, and optional transmitter output for vessels with complex shapes
- Simplified level control
- Simplified level monitoring



Schematic Diagram



Specifications

General

Measuring range	ma V	0/4...20 mA 0...10 V
Straight line error (max.)°	%FS	0.1
Straight line error (typ.)°	%FS	< 0.05
Tc span (max.)°°	%FS 10K	<0.1
Tc span (typ.)°°	%FS 10K	< 0.025
Tc zero point (max.)°°	%FS 10K	<0.1
Tc zero point (typ.)°°	%FS 10K	<0.025

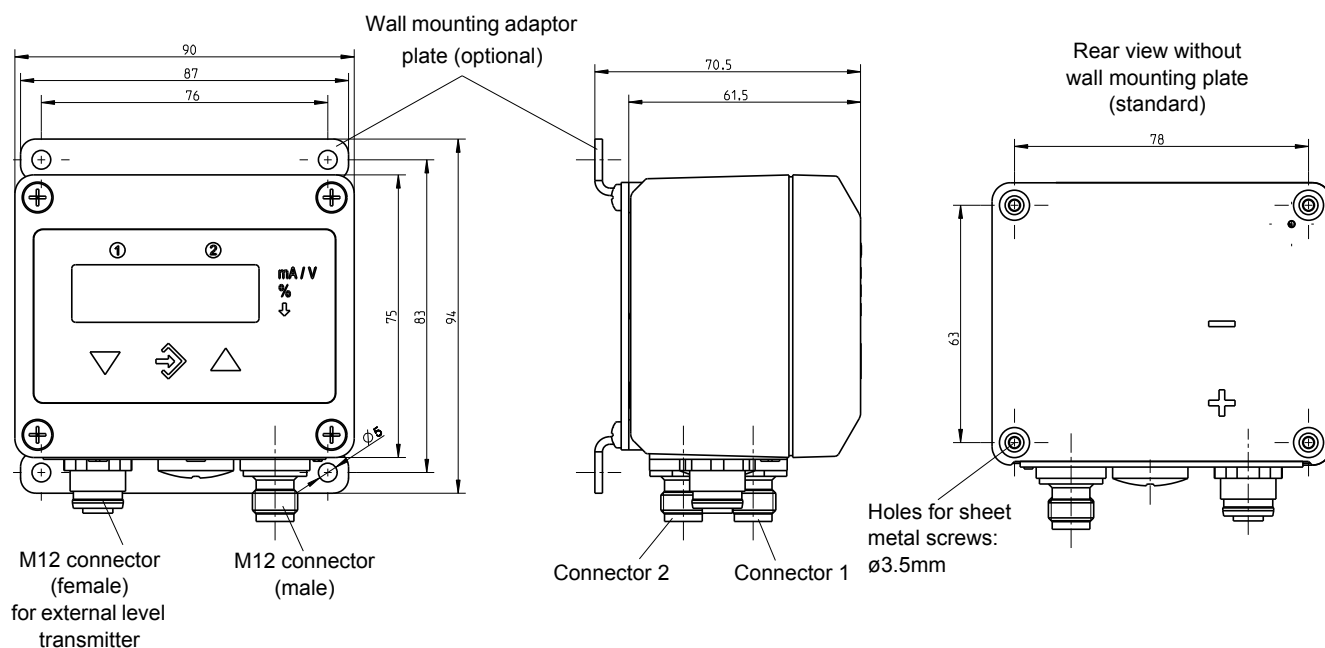
Shown values characterize the electronic module only, values of the attached level transmitter are not included (see data sheet level transmitter).

°: Straight line error = nonlinearity + hysteresis; at 25°C; pressure within specified range (characteristic linear, not spreaded)

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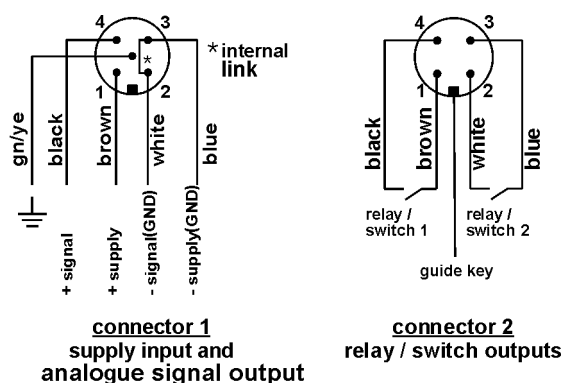
Operating temp. (ambient)	-10 ... 70°C
Operating temp. (media)	See data sheet level transmitter
Storage temperature	-20 ... 70°C
Protection class (housing)	IP 65 per DIN EN 60529
Electrical	
Nominal supply voltage	24 V DC / AC
Operating supply voltage	12 ... 32 V DC / AC
Output signal	0 ... 20 mA, 4 ... 20 mA, or 0 ... 10 V DC (3-wire)
Output signal load	For current output $R_L \leq (U_B - 4 \text{ V}) / 0,02 \text{ A}$ ($U_B \leq 26\text{V}$), else $R_L \leq 1100 \Omega$ For voltage output $R_L \geq 2 \text{ K}\Omega$ ($U_B \geq 15 \text{ V}$), $R_L \geq 10 \text{ K}\Omega$ ($U_B = 12 \dots 15\text{V}$)
Power consumption	Approx. 2 W / VA (without external level transmitter)
Switching contacts	2 sets of programmable voltage free relay contacts: N/O or N/C $U_{\text{max}} = 32 \text{ V DC / AC}$; $I_{\text{max}} = 2 \text{ A}$; $P_{\text{max}} = 64 \text{ W / VA}$ Optional, instead of relay outputs: 2 programmable voltage free MOSFET switch outputs; NO/NC, $U = 3 \dots 32 \text{ V DC/AC}$, $I_{\text{max}} = 0,25 \text{ A}$, $P_{\text{max}} = 8 \text{ W/VA}$, $R_{\text{ON}} \leq 4 \Omega$
Display	3½ digit LED
Connections	
External transmitter supply	Supply of EA14F, fused via PTC (approx. 8 Ω)
Max. current	≤ 250 mA for the external level transmitter (limited by PTC)
Electrical connections	Two round-shell multi-pin connector sockets (M12, male) Connector 1: 5-pin: power input and analogue signal output Connector 2: 4-pin: relay contacts / solid-state switch outputs
External level transmitter	Two round-shell multi-pin connector sockets (M12, female) or square-shell 4-pin connector (female), acc. to DIN EN 175 301-803-A, 1m cable
Materials, Mounting	
Materials, housing	Polyamide PA6,6
Materials, media contact	See data sheet level transmitter
Mounting	Mounting holes at rear for panel mounting Wall mountable using adaptor plate If the instrument is intended for outdoor application, we highly recommend using an adequate protective housing (or at least a big enough shelter) as protection against UV-radiation on the membrane keyboard and against exposure of the instrument to rain or snow.

Dimensions (all units in mm unless stated otherwise)



Electrical connections

The pinning of connector 1 is also used for the M12 connector for the external level transmitter.



Programming

Via membrane key-switches or by using PC-programming interface (accessory).

Programming mode can be password protected.

	Settings
Input filtering	0.0...100.0s (10/90% step response time) for signal output, display seperated
Relay / switch 1/2	Activation point, de-activation point, response time delay (0...100 secs), logic (N/O or N/C)
Measurement unit selection	mA V, %, free unit of scale
Free unit of scale	Minimum and maximum value, position of decimal point
Output signal start/end value	Can be set at any point of measuring range (2)
Zero suppression	0...100 counts (1)
Zero pressure calibration	±100 counts (3)
Output characteristic	Linear, square rooted, horizontal cylindr. tank, table (3...30 entries)
Password range	001 ... 999 (000 = password protection disabled)

(1) Measured value deviations up to 100 counts, symmetric about zero, are set to zero. Used for zero drift suppression.

(2) Maximum effective turn-down ratio = 4:1. Only the output signal is affected. Transfer function is inverted if start value > end value.

(3) Zero calibration setting may change with mounting orientation.

Ordering Code

Level Indicator	EA14	F	0	0	0				K	0	M	
Level		F										
Electrical connection level transmitter											M	
M12 round-shell multi-pin connector												
Signal input												
0 - 20 mA, 3-wire (STANDARD)											A	
4 - 20 mA, 2-wire											B	
0 - 10 V DC, 3-wire (STANDARD)											C	
Signal output												
No signal output												0
0 - 20 mA, 3-wire (STANDARD)												A
0 - 10 V DC, 3-wire (STANDARD)												C
4 - 20 mA, 3-wire (STANDARD)												P
Supply voltage												
24 V DC/AC (12-32 V DC/AC)												K
Display and limit switching outputs												
3½ digit LED display, 2 sets of voltage-free relay contacts												3
3½ digit LED display, 2 sets of solid-state switch outputs												6
Electrical connections												
M12 round-shell multi-pin connectors												M
Mounting												
Rear fastening holes(standard)												0
Wall mounting												W

Accessories

Ordering code	Designation	Pins	Application	Length
06401993	cable with M12 connector	4-pin	for relay / switch	2 m
06401994	cable with M12 connector	4-pin	for relay / switch	5 m
06401995	cable with M12 connector	5-pin	for supply / signal	2 m
06401996	cable with M12 connector	5-pin	for supply / signal	5 m
04005144	wall mounting adapter set			
EU03.F300	PC-programming interface with SW			