

Process weighing indicator For force and weighing processes Model FE330

WIKA data sheet FO 58.14

Applications

- Gravimetric level measurement (tanks, silos, containers, bioreactors)
- Industrial scales (floor scales, truck scales)
- Dynamic weighing
- Basic weighing and checkweighing

Special features

- Designed for installation in control cabinets
- High measurement resolution and fast weighing
- Interfaces for system integration
- Powerful calibration and system integration



Process weighing indicator, model FE330-B

Description

The model FE330 is a process weighing indicator for the acquisition, processing and output of precise weight and force values in industrial weighing applications.

One model – three versions

The instrument is available in three versions and offers several basic functionalities. It differs in the design of the front panel as well as in the available communication interfaces. The version with a stainless steel front panel is suitable for use in harsh industrial environments.

Designed for installation in control cabinets

Depending on the application, the instrument can be used free-standing or as a panel mounting. The compact aluminium case enables space-saving installation in control cabinets.

High measurement resolution and fast weighing

The instrument offers a high measurement resolution of 16,000,000 counting steps and up to 1,600 conversions per second. Adaptive digital filtering ensures fast signal processing and stable settling behaviour. The bright and large display is clearly legible even from greater distances.

Interfaces for system integration

The instrument offers serial interfaces (RS-232-C, RS-485) with Modbus® RTU as well as freely programmable inputs and outputs and analogue output signals. In addition, fieldbus and Ethernet interfaces are available for PLC integration, depending on the version.

Powerful calibration

Powerful calibration options, including electronic calibration "eCal" without test weights, enable simple and fast commissioning and maintenance.

Specifications

Overview of versions

Example: Model FE330-B



Overview of versions, model code level		
Model	FE330-A	FE330-B
Front panel material	Plastic	Stainless steel
Analogue output and interface		
AN	Analogue output	
MB	Modbus® RTU via the RS-485 interface	Modbus® RTU via the RS-232-C and RS-485 interfaces
	-	Modbus® TCP via the Ethernet interface
Fieldbus and Ethernet interfaces		
CC	-	CC-Link
CO	-	CANopen®
EC	-	EtherCAT®
EI	-	Ethernet/IP®
EN	-	Ethernet TCP/IP
PB	-	PROFIBUS DPV1
PL	-	POWERLINK
PN	-	PROFINET

Basic information		
Model	FE330-A	FE330-B
Nominal size, front panel	100 x 50 mm [3.94 x 1.97 in]	100 x 55 mm [3.94 x 2.16 in]
Case	Aluminium	
Rear panel	Stainless steel	
Mounting type	Free-standing	
	Panel mounting in a control cabinet	
Mounting	Mounting fixture with clamping screws	
Ingress protection, front panel	IP65	IP67
Functions		
Weighing functions	■ Taring ■ Zero point setting ■ Automatic zero point tracking ■ Automatic zero point setting at power-on ■ Motion detection ■ Net indication at power-on ■ Increased resolution	
Data output	■ Continuous ■ Fast continuous ■ BSI format ■ Print format	

Basic information		
Model	FE330-A	FE330-B
Analogue-to-digital converter (A/D)		
Device type	24-bit delta-sigma ratiometer with integrated analogue and digital filters	
High internal measurement resolution	Up to 16,000,000 digital steps	
Conversion rate	Up to 1,600 measured value per second	
Input sensitivity	0.4 $\mu\text{V/d}$ (approved in accordance with OIML)	
	0.1 $\mu\text{V/d}$ (not approved)	
Analogue input range	0 mV ... +18 mV (unipolar)	
	-18 mV ... +18 mV (bipolar)	
Measurement behaviour	Bidirectional signal input for force measurement	
Digital filter	10-stage programmable adaptive filter for faster measurements	

Measuring element / Measurement principle / Sensor element	
Type of measuring element	Via one or more load cell(s)
Illustration of the measuring chain principle	Load cell - junction box - remote capillary - instrument
Connection method	Electronic evaluation circuit consisting of amplifier circuit (instrument amplifier) and A/D converter circuit (A/DC)
Remote capillary	
Number of load cells	Up to 8 x 350 Ω
	Up to 18 x 1,100 Ω (in parallel)

Accuracy specifications	
Linearisation	3-point calibration for the calibration/correction procedure
Linearity error	Within 0.0015 % FS, ≤ 2 ppm / °C
Reference conditions	
Calibration	With test weight
	Electronic calibration (eCal) without test weight
	Zero point adjustment
	Span adjustment with test weight
	Span adjustment under load

Scale range		
Digital indicator or digital display		
Display resolution	From 1,000 to 999,999	
Type of display	7-segment LED display	
Character size	13.5 mm [0.532 in]	
Digits	6-digit	
Menu language	Numeric format	
Units	g, kg, t, lb, klb, N, kN	

Input signal / Output signal	
Input signal	mV/V signal of the connected strain gauge load cell(s)
Output signal	
For model FE330-A-AN and FE330-B-AN	
Current output	4 ... 20 mA 0 ... 20 mA
Voltage output	DC 0 ... 5 V DC 0 ... 10 V
Digital-to-analogue converter (D/AC)	For converting a digital measured value into an analogue signal
Resolution of the digital-to-analogue converter (D/AC)	16 bits
Max. cable length	300 m [984 ft] (max. transmission length of the signal)
Load capacity	Max. 500 Ω (current output)
Load resistance	Min. 10 k Ω (voltage output)
For model FE330-A-MB	
Digital inputs/outputs	2 x programmable digital inputs or outputs (I/O), not galvanically isolated
Input/Output voltage	DC 12 ... 28 V
Input current per input	Approx. 10 mA
Output current per output	Max. 100 mA
For model FE330-B	
Digital inputs (I/O)	4 x optoisolated digital inputs, galvanically isolated
Input voltage	DC 12 ... 28 V
Input current per input	Approx. 10 mA
Digital outputs	5 x potential-free relay contact outputs, galvanically isolated
Output voltage	$U_o \approx$ supply voltage – 1.5 V
Output current per output	Max. 100 mA
Switching voltage	Max. DC 30 V
Total current (all relays)	Max. 1 A
Transistor outputs ("Error" and "At Zero")	Solid-state outputs, not galvanically isolated
Auxiliary power	
Supply voltage of the instrument	DC 12 ... 28 V
Current supply of the instrument	Max. 300 mA
Supply voltage: instrument to the load cell(s)	DC 5 V
Current consumption: instrument to the load cell(s)	Max. 125 mA

Communication	Interfaces		Communication protocols			
Function	RS-232-C	RS-485	Modbus® RTU	CC-Link	CANopen®	PROFIBUS DPV1
Model FE330-A-AN and FE330-B-AN						
Serial point-to-point interface	✓	-	-	-	-	-
Serial digital communication		✓	-	-	-	-
Present on the hardware, not assigned	-	-	✓	✓	✓	✓
Model FE330-A-MB						
As communication signal: via RS-485 interface	-	-	✓	-	-	-
Modbus® RTU High-Low, Modbus® RTU Low-High	-	-	✓	-	-	-

Communication	Interfaces		Communication protocols			
Function	RS-232-C	RS-485	Modbus® RTU	CC-Link	CANopen®	PROFIBUS DPV1
Model FE330-A-MB and FE330-B-MB						
Serial interface	✓	✓	-	-	-	-
Baud rate in bps: 1200 / 2400 / 4800 / 9600 / 19200 / 38400 / 57600 / 115200	✓	✓	✓	-	-	-
Data bit and parity						
8 bit without parity (8N1)	✓	✓	✓	-	-	-
7 bit odd (7O1)	✓	✓	-	-	-	-
7 bit even (7E1)	✓	✓	-	-	-	-
8 bit odd (8O1)	✓	✓	✓	-	-	-
8 bit even (8E1)	✓	✓	✓	-	-	-
1 start bit and 1 stop bit	✓	✓	✓	-	-	-
Response time: up to 4 ms (response delay after commands)	✓	✓	✓	-	-	-
Connectivity						
Up to 31 devices can be connected per network	-	✓	✓	-	-	-
Model FE330-B-MB or with fieldbus interfaces						
As communication signal: via RS-232-C interface	-	-	✓	-	-	-
As communication signal: via RS-485 interface	-	-	✓	-	-	-
Modbus® RTU High-Low, Modbus® RTU Low-High	-	-	✓	-	-	-
Transmission rate						
156 kbit/s ... 10 Mbit/s (selectable)	-	-	-	✓	-	-
10 kbit/s ... 1 Mbit/s (selectable)	-	-	-	-	✓	-
Up to 12,000 kbit/s with automatic transmission rate detection	-	-	-	-	-	✓
Cabling						
Shielded 2-wire double cable (twisted pair cable)	-	-	-	-	-	✓
Shielded 2-wire bus cable (twisted pair cable)	-	-	-	-	✓	-
4-wire with 24 V power supply via the bus	-	-	-	-	✓	-
Shielded 3-wire double cable (twisted pair cable)	-	-	-	✓	-	-
Cable length						
Depending on the transmission medium and the transmission rate	-	-	-	-	-	✓
25 ... 500 m [82 ... 1,640 ft], depending on the transmission rate	-	-	-	-	✓	-
Galvanic isolation of the bus interface in the instrument	-	-	-	✓	✓	✓
Network structure (topology)						
Depending on the transmission medium	-	-	-	-	-	✓
Line structure without stubs	-	-	-	-	-	✓
Trunkline	-	-	-	✓	✓	-
Terminating resistors at both ends (trunkline)	-	-	-	✓	✓	-
Dropline	-	-	-	-	✓	-
Branch structure	-	-	-	✓	-	-
Response time: up to 4 ms (response delay after commands)	-	-	-	✓	✓	✓

Communication	Interfaces		Communication protocols			
Function	RS-232-C	RS-485	Modbus® RTU	CC-Link	CANopen®	PROFIBUS DPV1
Connectivity						
Up to 32 devices can be connected per segment	-	-	-	-	-	✓
Up to 125 devices can be connected per network	-	-	-	-	-	✓
Up to 64 devices can be connected per network	-	-	-	✓	-	-
Up to 127 devices can be connected per network	-	-	-	-	✓	-

Communication	Ethernet protocols				
Function	EtherCAT®	Ethernet/IP®	Ethernet TCP/IP	POWER-LINK	PROFINET
Model FE330-B, based on industrial Ethernet					
Modbus® TCP High-Low, Modbus® TCP Low-High	-	-	✓	-	-
Transmission rate					
10 Mbit/s, full-duplex ²⁾	-	✓	-	-	-
100 Mbit/s, full-duplex ²⁾	✓	✓	-	-	✓
100 Mbit/s, half-duplex ³⁾	-	-	✓	✓	-
Response time					
Up to 4 ms response delay after read/write commands	✓	✓	✓	✓	✓
Web function available – integrated web server	-	✓	✓	-	✓
Cabling					
Shielded, twisted Ethernet cables (twisted pair cables) and RJ-45 connectors	✓	✓	✓	✓	✓
Galvanic isolation of the bus interface in the instrument	✓	✓	-	✓	✓
Network structure (topology)					
Depending on the network cabling	✓	✓	-	-	✓
Free choice of network structure	-	-	-	✓	-
Line / Daisy chain structure	✓	✓	-	✓	✓
Bus structure	-	✓	-	-	✓
Tree structure	✓	✓	-	✓	✓
Star structure	✓	✓	-	✓	✓
Ring structure	-	-	-	✓	-
Ring redundancy (DLR) ⁴⁾					
Operation via ring cabling – maintains communication in the event of a cable break.	-	✓	-	✓	-
Addresses					
IP addressing via DHCP	-	✓	-	-	✓
Manual IP assignment	-	✓	✓	-	✓
Configurable device identity (e.g. name, IP address)	-	✓	-	-	✓

2) Full-duplex: simultaneous data transmission in sending and receiving direction.

3) Half-duplex: data transmission that can only be used alternately for sending and receiving.

4) DLR (Device Level Ring): device-level ring = ring redundancy

Electrical connection	
Connection type of the load cell(s)	4-wire technology
	6-wire technology
Cable length	Max. 1,000 m/mm ² [3,281 ft/in ²] with 6-wire technology

Operating conditions	
Operating temperature	-15 °C ... +55 °C [5 °F ... 131 °F]
Humidity	Max. 85 % relative humidity
Condensation	Non-condensing
Weight	
Model FE330-A	0.3 kg [0.66 lb]
Model FE330-B	0.4 kg [0.88 lb]

Packaging and instrument labelling	
Packaging	Individual packaging
Instrument labelling (product label)	See operating instructions, item no.: 14779088

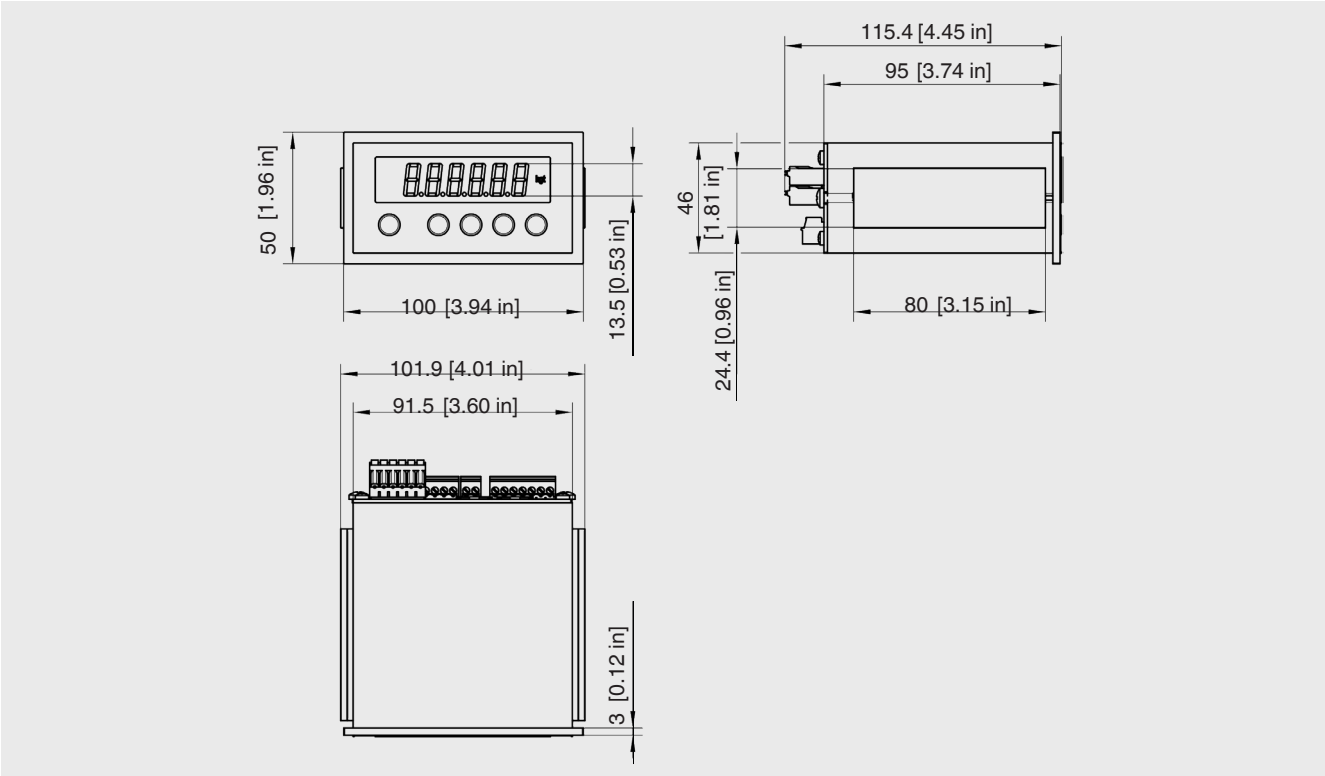
Approvals

Logo	Description	Region
	EU declaration of conformity	European Union
	EMC Directive	
	EN 61326 emission (group 1, class B) and immunity (industrial environments)	
	RoHS directive	

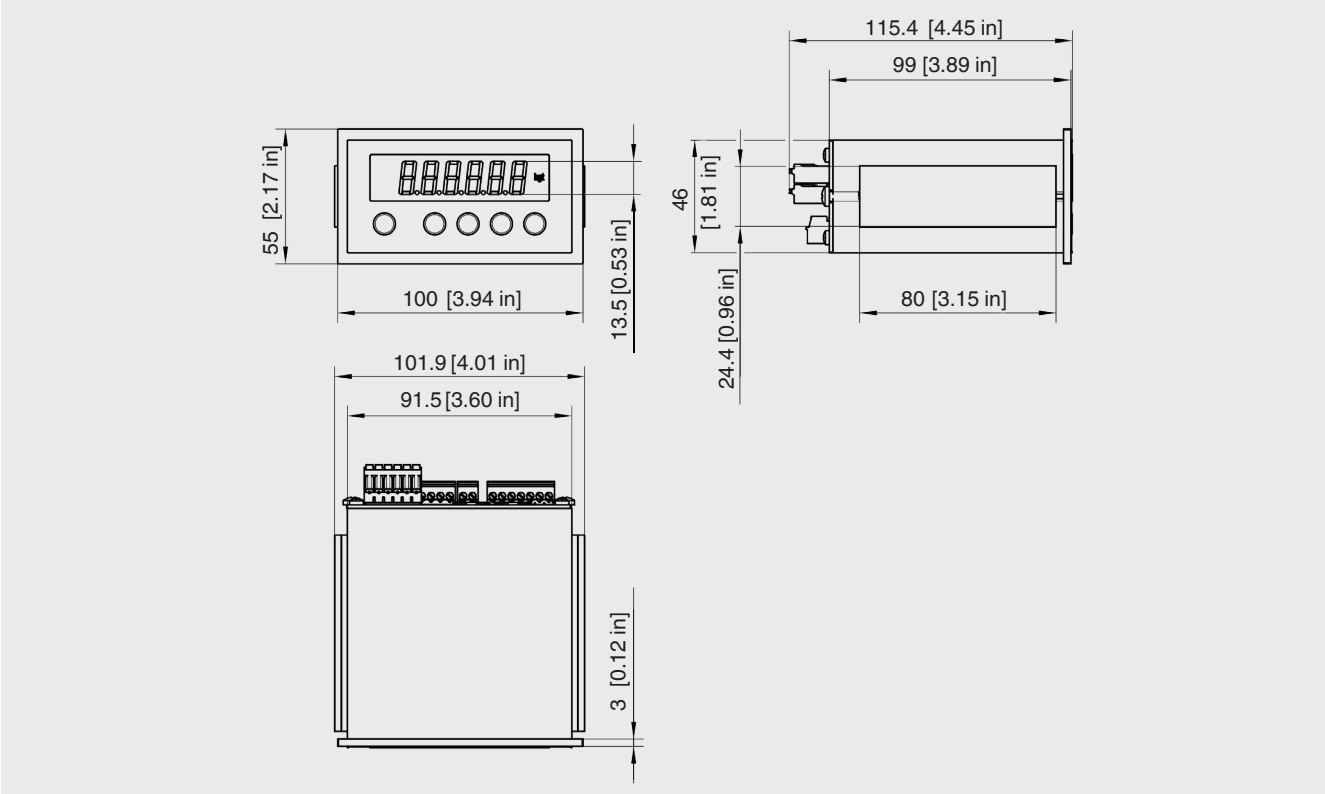
→ For approvals and certificates, see website

Dimensions in mm [in]

Model FE330-A



Model FE330-B



Accessories

Accessories included in the scope of delivery:

Model FE330-A

Connector	AN	MB
2-pin, green connector with 3.81 mm pitch for digital inputs or outputs	-	1
3-pin, green connector with 3.81 mm pitch for the analogue output	1	-
3-pin, red connector with 3.81 mm pitch for the power supply	1	1
6-pin, black connector with 3.81 mm pitch for RS-232-C and RS-485	1	1
7-pin black connector with 3.81 mm pitch for the load cell cable	1	1

Model FE330-B

Connector	AN	MB	For fieldbus interfaces
2-pin, green connector with 3.81 mm pitch for non-galvanically isolated outputs	1	1	1
3-pin, green connector with 3.81 mm pitch for the analogue output	1	-	1
3-pin, red connector with 3.81 mm pitch for the power supply	1	1	1
6-pin, black connector with 3.81 mm pitch for RS-232-C, RS-485 and galvanically isolated inputs and outputs	3	3	3
7-pin black connector with 3.81 mm pitch for the load cell cable	1	1	1

Accessories not included in the scope of delivery:

Model	Description	Order number
	Junction box, model B6578 For the parallel connection of up to four force transducers or load cells	64418893
-	Lead sealing for approved weighing system	On request
-	RS-232-C cable for connection to a PC (length: 3 m [9.84 ft])	On request
-	6-wire cable for load cells cut to length (each 0.22 cm ² [0.034 in ²]) – length: max. 200 m [656.17 ft]	On request

Modbus® RTU/TCP: is a registered trademark of Schneider Electric USA, Inc.

CANopen®: is a registered trademark of CAN in Automation e.V. (CiA)

CC-Link: is a registered trademark of Mitsubishi Electric Corporation

Ethernet/IP®: is a registered trademark of Xerox Corporation

EtherCAT®: is a registered trademark and patented technology of Beckhoff Automation GmbH & Co. KG and

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Ordering information

Model / Communication protocols / Accessories

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We reserve the right to make modifications to the specifications and materials.

