Quick setup guide

**TDR sensor for continuous level
measurement of bulk solids**

VEGAFLEX 82

Modbus and Levelmaster protocol

Converter version in second chamber

Rod and cable probe

Document ID: 47596

Contents

Information:
This quick setup guide enables quick setup and commissioning of your instrument.

You can find supplementary information in the corresponding, more detailed Operating Instructions Manual as well as the Safety Manual that comes with instruments with SIL qualification. These manuals are available on our homepage.

Operating instructions VEGAFLEX 82 - Modbus and Levelmaster protocol - Rod and cable probe: Document-ID 41833
Editing status of the quick setup guide: 2023-05-23

1   For your safety

1.1   Authorised personnel

All operations described in this documentation must be carried out only by trained, qualified personnel authorised by the plant operator.

During work on and with the device, the required personal protective equipment must always be worn.

1.2   Appropriate use

VEGAFLEX 82 is a sensor for continuous level measurement.

You can find detailed information about the area of application in chapter " *Product description*".

Operational reliability is ensured only if the instrument is properly used according to the specifications in the operating instructions manual as well as possible supplementary instructions.

1.3   Warning about incorrect use

Inappropriate or incorrect use of this product can give rise to application-specific hazards, e.g. vessel overfill through incorrect mounting or adjustment. Damage to property and persons or environmental contamination can result. Also, the protective characteristics of the instrument can be impaired.

1.4   General safety instructions

This is a state-of-the-art instrument complying with all prevailing regulations and directives. The instrument must only be operated in a technically flawless and reliable condition. The operator is responsible for the trouble-free operation of the instrument. When measuring aggressive or corrosive media that can cause a dangerous situation if the instrument malfunctions, the operator has to implement suitable measures to make sure the instrument is functioning properly.

The safety instructions in this operating instructions manual, the national installation standards as well as the valid safety regulations and accident prevention rules must be observed by the user.

For safety and warranty reasons, any invasive work on the device beyond that described in the operating instructions manual may be carried out only by personnel authorised by the manufacturer. Arbitrary conversions or modifications are explicitly forbidden. For safety reasons, only the accessory specified by the manufacturer must be used.

To avoid any danger, the safety approval markings and safety tips on the device must also be observed.

1.5   Conformity

The device complies with the legal requirements of the applicable country-specific directives or technical regulations. We confirm conformity with the corresponding labelling.

The corresponding conformity declarations can be found on our homepage.

Electromagnetic compatibility

Instruments in four-wire or Ex d ia version are designed for use in an industrial environment. Nevertheless, electromagnetic interference from electrical conductors and radiated emissions must be taken into account, as is usual with class A instruments according to EN 61326-1. If the instrument is used in a different environment, the electromagnetic compatibility to other instruments must be ensured by suitable measures.

1.6 NAMUR recommendations

NAMUR is the automation technology user association in the process industry in Germany. The published NAMUR recommendations are accepted as the standard in field instrumentation.

The device fulfils the requirements of the following NAMUR recommendations:

- NE 21 – Electromagnetic compatibility of equipment
- NE 53 – Compatibility of field devices and display/adjustment components
- NE 107 – Self-monitoring and diagnosis of field devices

For further information see www.namur.de.

1.7 Environmental instructions

Protection of the environment is one of our most important duties. That is why we have introduced an environment management system with the goal of continuously improving company environmental protection. The environment management system is certified according to DIN EN ISO 14001.

Please help us fulfil this obligation by observing the environmental instructions in this manual:

- Chapter " *Packaging, transport and storage*"
- Chapter " *Disposal*"

2 Product description

2.1 Configuration

Type label

The type label contains the most important data for identification and use of the instrument:

Fig. 1: Layout of the type label (example)

1 Instrument type
2 Product code
3 Approvals
4 Power supply and signal output, electronics
5 Protection rating
6 Probe length (measurement accuracy optional)
7 Process and ambient temperature, process pressure
8 Material wetted parts
9 Order number
10 Serial number of the instrument
11 Symbol of the device protection class
12 ID numbers, instrument documentation
13 Reminder to observe the instrument documentation
14 Notified authority for CE marking
15 Approval directives

Serial number - Instrument search

The type label contains the serial number of the instrument. With it you can find the following instrument data on our homepage:

- Product code (HTML)
- Delivery date (HTML)
- Order-specific instrument features (HTML)
- Operating instructions and quick setup guide at the time of shipment (PDF)
- Test certificate (PDF) - optional

Move to " www.vega.com" and enter in the search field the serial number of your instrument.

Alternatively, you can access the data via your smartphone:

- Download the VEGA Tools app from the " *Apple App Store*" or the " *Google Play Store*"
- Scan the QR-code on the type label of the device or

- Enter the serial number manually in the app

3 Mounting

3.1 General instructions for use of the instrument

Protection against moisture

Protect your instrument against moisture ingress through the following measures:

● Use a suitable connection cable (see chapter " *Connecting to power supply*")
● Tighten the cable gland or plug connector
● Lead the connection cable downward in front of the cable entry or plug connector

This applies mainly to outdoor installations, in areas where high humidity is expected (e.g. through cleaning processes) and on cooled or heated vessels.

⚠ **Note:**
Make sure that during installation or maintenance no moisture or dirt can get inside the instrument.

To maintain the housing protection, make sure that the housing lid is closed during operation and locked, if necessary.

3.2 Mounting instructions

Installation position

Mount the device in such a way that the distance to vessel installations or to the vessel wall is at least 300 mm (12 in). In non-metallic vessels, the distance to the vessel wall should be at least 500 mm (19.7 in).

During operation, the probe must not touch any installations or the vessel wall. If necessary, fasten the probe end.

In vessels with conical bottom it can be advantageous to mount the device in the center of the vessel, as measurement is then possible nearly down to the lowest point of the bottom. Keep in mind that measurement all the way down to the tip of the probe may not be possible. The exact value of the min. distance (lower blocking distance) is stated in chapter " *Technical data*" of the operating instructions.
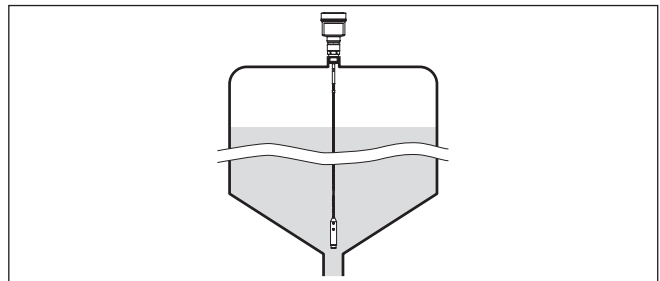

Fig. 2: Vessel with conical bottom

Type of vessel

Plastic vessel/Glass vessel
The guided microwave principle requires a metallic surface on the process fitting. Therefore, in plastic vessels, etc., use an instru-

ment version with flange (from DN 50) or place a metal sheet (ø > 200 mm/8 in) beneath the process fitting when screwing it in.

Make sure that the plate has direct contact with the process fitting.

When using the probes without metal vessel wall, e.g. in plastic vessels, the measured value can be influenced by strong electromagnetic fields (emitted interference according to EN 61326: class A).

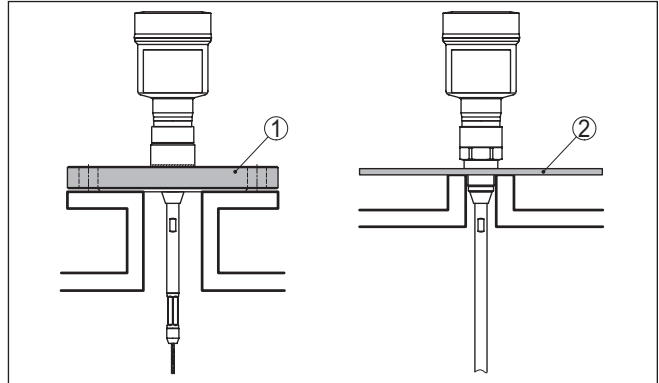Use a probe in coax version for applications in liquids.

Fig. 3: Mounting in non-metallic vessel

1   Flange
2   Metal sheet

Concrete vessel
When mounting in thick concrete ceilings, VEGAFLEX 82 should be mounted front flush to the lower edge. In concrete silos, the distance to the wall should be at least 500 mm (20 in).
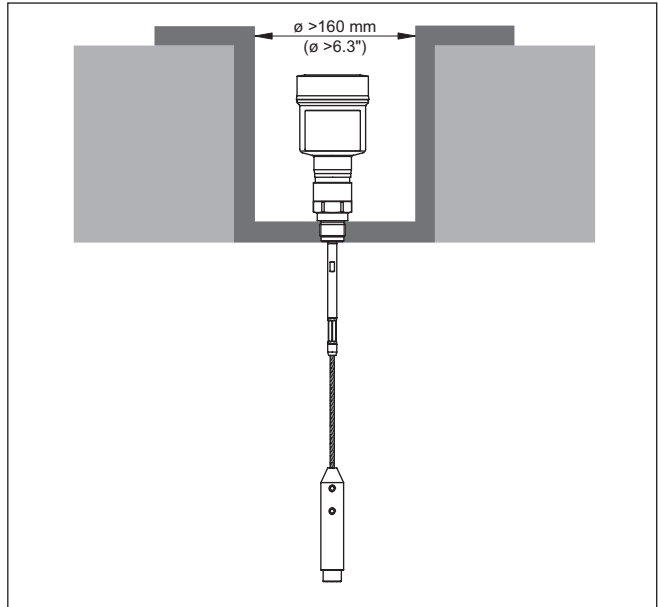
Fig. 4: Mounting in concrete silo

Nozzle

If possible, avoid nozzles. Mount the sensor flush with the vessel top. If this is not possible, use short nozzles with small diameter.

Higher nozzles or nozzles with a bigger diameter can generally be used. They can, however, increase the upper blocking distance. Check if this is relevant for your measurement.

In such cases, always carry out a false signal suppression after mounting. You can find further information under " *Setup procedure*".
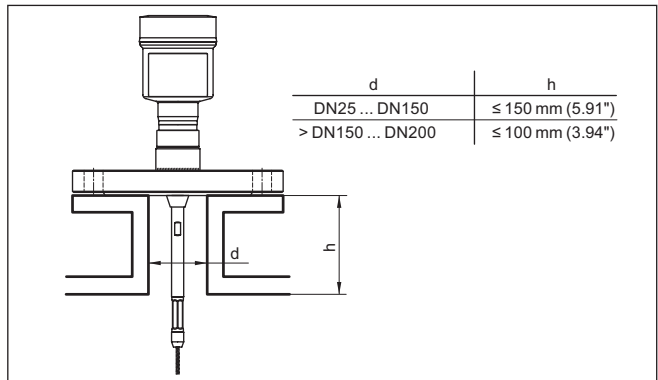

d	h
DN25 ... DN150	≤ 150 mm (5.91")
> DN150 ... DN200	≤ 100 mm (3.94")

Fig. 5: Mounting socket

When welding the nozzle, make sure that the nozzle is flush with the vessel top.
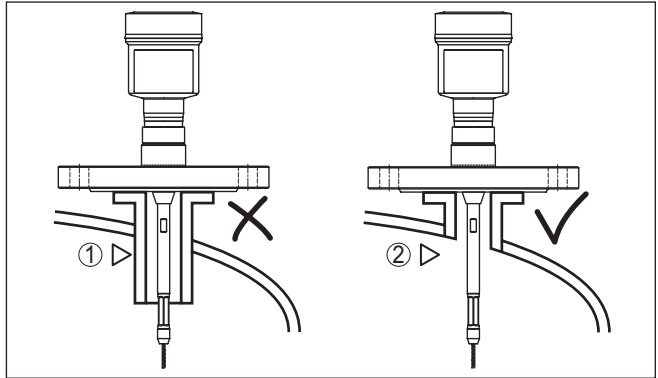
Fig. 6: Nozzle must be installed flush

1   Unfavourable mounting
2   Nozzle flush - optimum mounting

4 Connecting to power supply and bus system

4.1 Connecting

Connection technology

The voltage supply and signal output are connected via the spring-loaded terminals in the housing.

Connection to the display and adjustment module or to the interface adapter is carried out via contact pins in the housing.

ℹ Information:
The terminal block is pluggable and can be removed from the electronics. To do this, lift the terminal block with a small screwdriver and pull it out. When reinserting the terminal block, you should hear it snap in.

Connection procedure

Proceed as follows:

1. Unscrew the housing lid

2. If a display and adjustment module is installed, remove it by turning it slightly to the left

3. Loosen compression nut of the cable gland and remove blind plug

4. Remove approx. 10 cm (4 in) of the cable mantle, strip approx. 1 cm (0.4 in) of insulation from the ends of the individual wires

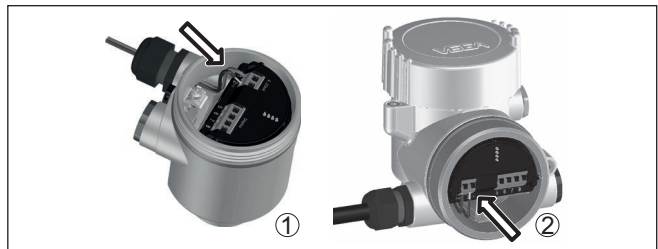5. Insert the cable into the sensor through the cable entry

Fig. 7: Connection steps 5 and 6

1 Single chamber housing
2 Double chamber housing

6. Insert the wire ends into the terminals according to the wiring plan

ℹ Note:
Solid cores as well as flexible cores with wire end sleeves are inserted directly into the terminal openings. In case of flexible cores without end sleeves, press the terminal from above with a small screwdriver, the terminal opening is then free. When the screwdriver is released, the terminal closes again.

7. Check the hold of the wires in the terminals by lightly pulling on them

8. Connect the shielding to the internal ground terminal, connect the external ground terminal to potential equalisation

9. Tighten the compression nut of the cable entry gland. The seal ring must completely encircle the cable

10. Reinsert the display and adjustment module, if one was installed

11. Screw the housing lid back on

The electrical connection is finished.
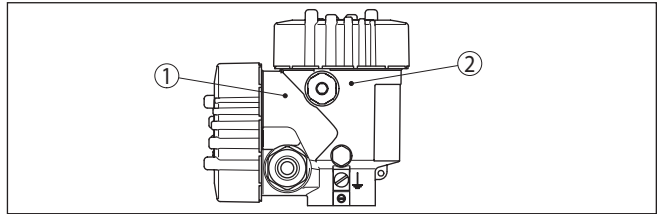
4.2 Wiring plan

Overview

Fig. 8: Position of connection compartment (Modbus electronics) and electronics compartment (sensor electronics)

1   Connection compartment
2   Electronics compartment

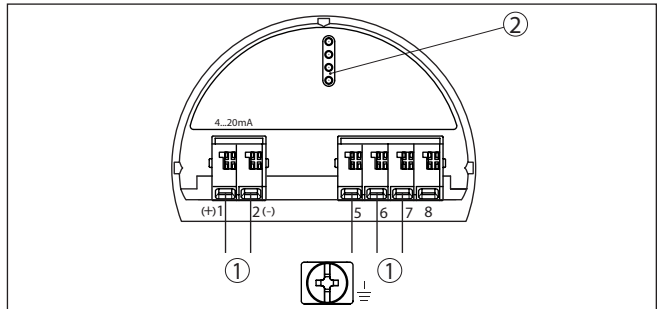**Electronics compartment**

Fig. 9: Electronics compartment - double chamber housing

1   Internal connection to the connection compartment
2   For display and adjustment module or interface adapter
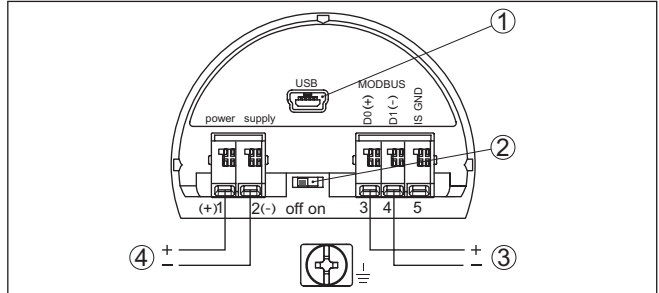
Connection compartment

Fig. 10: Connection compartment

1 *USB interface*
2 *Slide switch for integrated termination resistor (120 Ω)*
3 *Modbus signal*
4 *Voltage supply*

Terminal	Function	Polarity
1	Voltage supply	+
2	Voltage supply	-
3	Modbus signal D0	+
4	Modbus signal D1	-
5	Function ground when installing according to CSA (Canadian Standards Association)	

5 Set up the sensor with the display and adjustment module

5.1 Adjustment volume

The display and adjustment module is only used for parameter adjustment of the sensor, i.e. for adaptation to the measurement task.

The parameter adjustment of the Modbus interface is carried out via a PC with PACTware. You can find the procedure in chapter " *Set up sensor and Modbus interface with PACTware*".

5.2 Insert display and adjustment module

The display and adjustment module can be inserted into the sensor and removed again at any time. You can choose any one of four different positions - each displaced by 90°. It is not necessary to interrupt the power supply.

Proceed as follows:

1. Unscrew the housing lid

2. Place the display and adjustment module on the electronics in the desired position and turn it to the right until it snaps in.

3. Screw housing lid with inspection window tightly back on

Disassembly is carried out in reverse order.

The display and adjustment module is powered by the sensor, an additional connection is not necessary.

Fig. 11: Insertion of the display and adjustment module

i **Note:**
If you intend to retrofit the instrument with a display and adjustment module for continuous measured value indication, a higher lid with an inspection glass is required.

5.3 Parameter adjustment - Quick setup

Quick setup

To quickly and easily adapt the sensor to the application, select the menu item " *Quick setup*" in the start graphic on the display and adjustment module.

Quick setup
Extended adjustment

You can find " *Extended adjustment*" in the detailed operating instructions.

General information

Measurement loop name
In the first menu item you can assign a suitable measurement loop name. You can enter a name with max. 19 characters.

Type of medium
In the next menu item you can see which type of medium the instrument is suitable for. If your instrument is only suitable for a certain medium, this menu item is not visible.

Application
In this menu item, you can select the application. You can choose between level measurement and interface measurement. You can also choose between measurement in a vessel or in a bypass or standpipe.

Measurement loop name	Application	Type of medium
TANK 04	Level vessel ▼	Liquid ▼
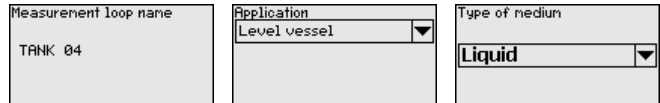
Level measurement

Medium - dielectric constant
In this menu item, you can define the type of medium (product).
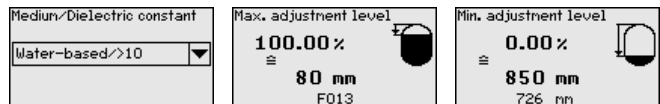
Max. adjustment
In this menu item, you can enter the max. adjustment for the level.

Enter the appropriate distance value in m (corresponding to the percentage value) for the full vessel. The distance refers to the sensor reference plane (seal surface of the process fitting). Keep in mind that the max. level must lie below the dead zone.

Min. adjustment
In this menu item, you can enter the min. adjustment for the level.

Enter the suitable distance value in m for the empty vessel (e.g. distance from the flange to the probe end) corresponding to the percentage value. The distance refers tot he sensor reference plane (seal surface of the process fitting).

Medium/Dielectric constant	Max. adjustment level	Min. adjustment level
Water-based/>10 ▼	100.00 % ≙ 80 mm F013	0.00 % ≙ 850 mm 726 mm

Linearisation

Linearisation

A linearization is necessary for all vessels in which the vessel volume does not increase linearly with the level - e.g. a horizontal cylindrical or spherical tank, in case the indication or output of the volume is required. Corresponding linearization curves are preprogrammed for these vessels. They represent the correlation between the level percentage and vessel volume.

The linearization applies for the measured value indication and the current output. By activating the suitable curve, the percentage vessel volume is displayed correctly.

Linearization	False signal suppression
Linear ▼	**Change?**
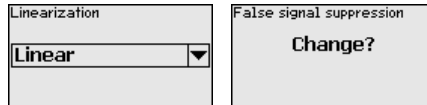
6   Setup with smartphone/tablet (Bluetooth)

6.1   Preparations

Activate Bluetooth   Make sure that the Bluetooth function of the display and adjustment module is activated. For this, the switch on the bottom side must be set to "*On*".
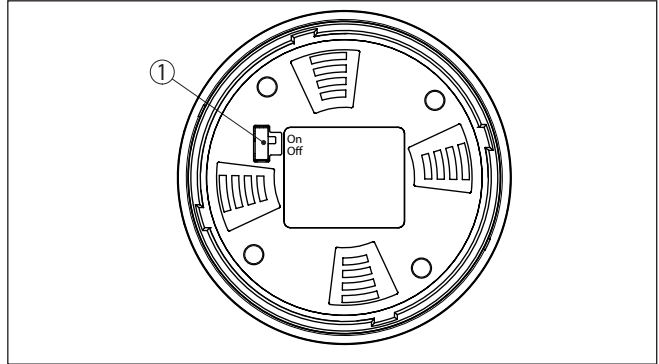

Fig. 12: Activate Bluetooth

1   Switch
On =   Bluetooth active
Off =   Bluetooth not active

Change sensor PIN   The security concept of Bluetooth operation absolutely requires that the default setting of the sensor PIN be changed. This prevents unauthorized access to the sensor.

The default setting of the sensor PIN is "**0000**". First of all you have to change the sensor PIN in the adjustment menu of the sensor, e.g. to "**1111**":

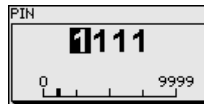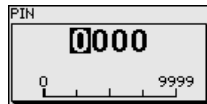1.   In the adjustment menu, go to "*Additional adjustments*", "*PIN*"

● **Note:**
ℹ The menu item "*PIN*" is only displayed if in the menu "*Setup*", "*Lock/ Unlock adjustment*" the adjustment is released.
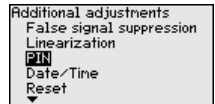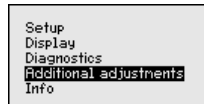
2.   Change sensor PIN

● **Note:**
ℹ Bluetooth access can only be established if the current sensor PIN differs from the default setting "**0000**". It is possible both when the

PIN is deactivated and when it is activated (adjustment menu "*Setup*", "*Lock/Unlock adjustment*").

6.2 Connecting

Preparations

Smartphone/Tablet
Start the adjustment app and select the function "Setup". The smartphone/tablet searches automatically for Bluetooth-capable instruments in the area.

PC/Notebook
Start PACTware and the VEGA project assistant. Select the device search via Bluetooth and start the search function. The device automatically searches for Bluetooth-capable devices in the vicinity.

Connecting

The message "*Instrument search running*" is displayed. All devices found are listed in the operating window. The search is automatically continued continuously.

Select in the device list the requested device. The message "*Connecting*" is displayed.

Authenticate

For the first connection, the operating device and the sensor must authenticate each other. After successful authentication, the next connection functions without authentication.

For authentication, enter in the next menu window the 4-digit sensor PIN.

6.3 Sensor parameter adjustment

The sensor parameterization is carried out via the adjustment app on the smartphone/tablet or the DTM on the PC/notebook.
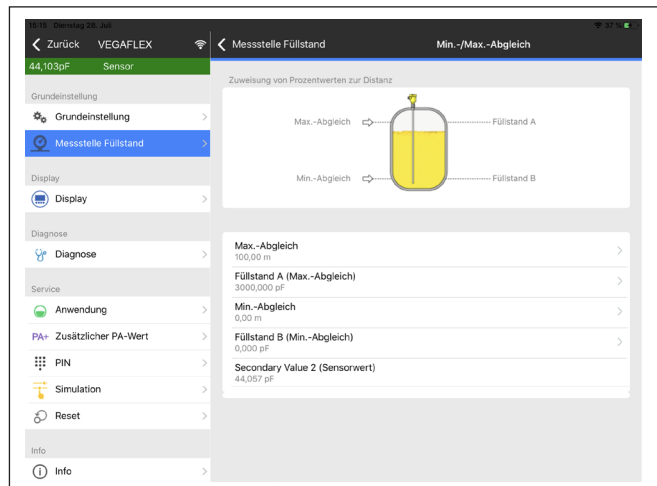
App view

Fig. 13: Example of an app view - Setup sensor adjustment

47596-EN-230605

7 Supplement

7.1 Technical data

Note for approved instruments

The technical data in the respective safety instructions which are included in delivery are valid for approved instruments (e.g. with Ex approval). These data can differ from the data listed herein, for example regarding the process conditions or the voltage supply.

All approval documents can be downloaded from our homepage.

Electromechanical data - version IP67

Options of the cable entry

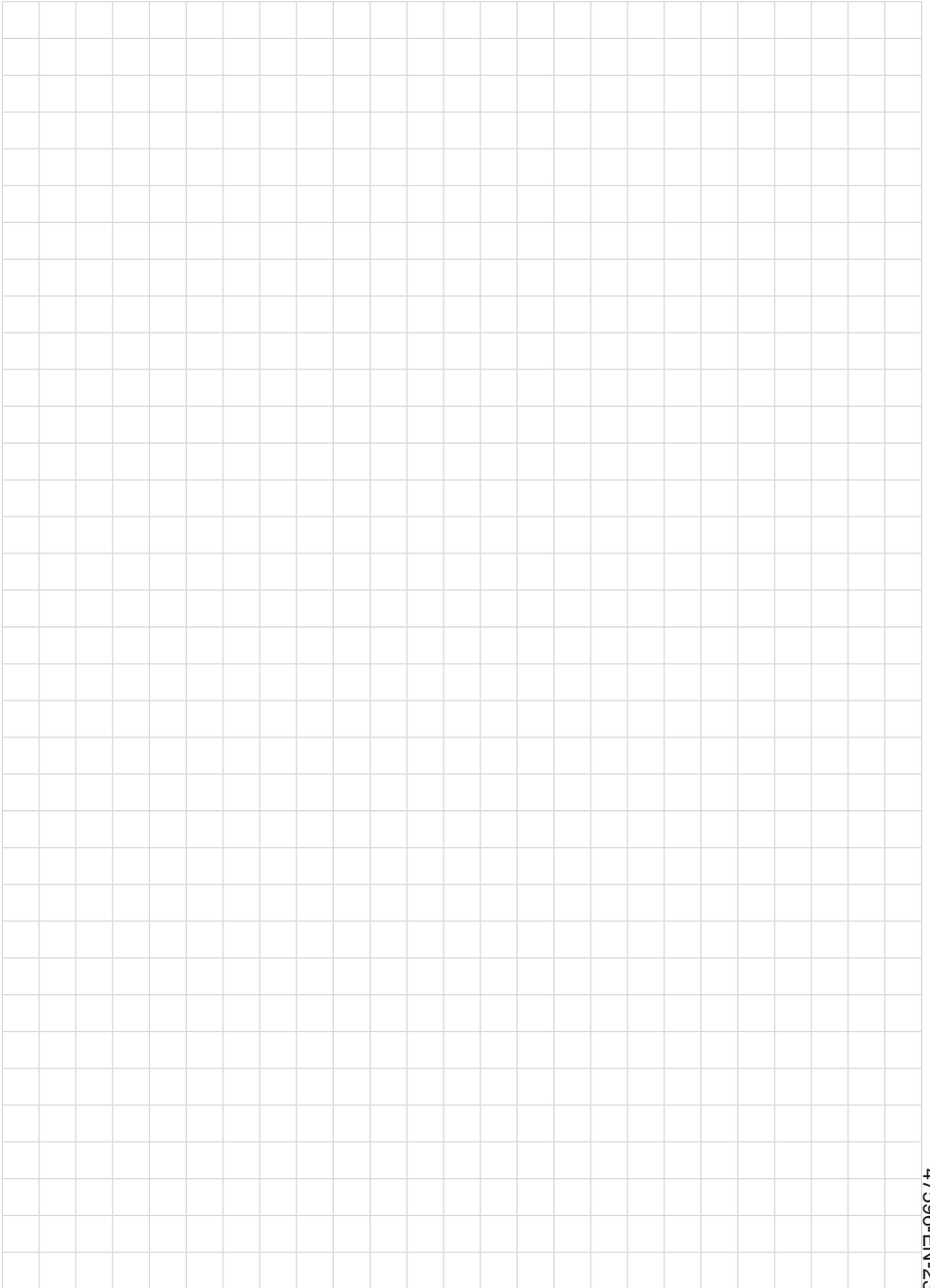|	
‒ Cable entry	M20 x 1.5; ½ NPT
‒ Cable gland	M20 x 1.5; ½ NPT (cable ø see below table)
‒ Blind plug	M20 x 1.5; ½ NPT
‒ Closing cap	½ NPT

Material cable gland	Material seal insert	Cable diameter				
		4.5 … 8.5 mm	5 … 9 mm	6 … 12 mm	7 … 12 mm	10 … 14 mm
PA	NBR	–	●	●	–	●
Brass, nickel-plated	NBR	●	●	●	–	–
Stainless steel	NBR	–	●	●	–	●

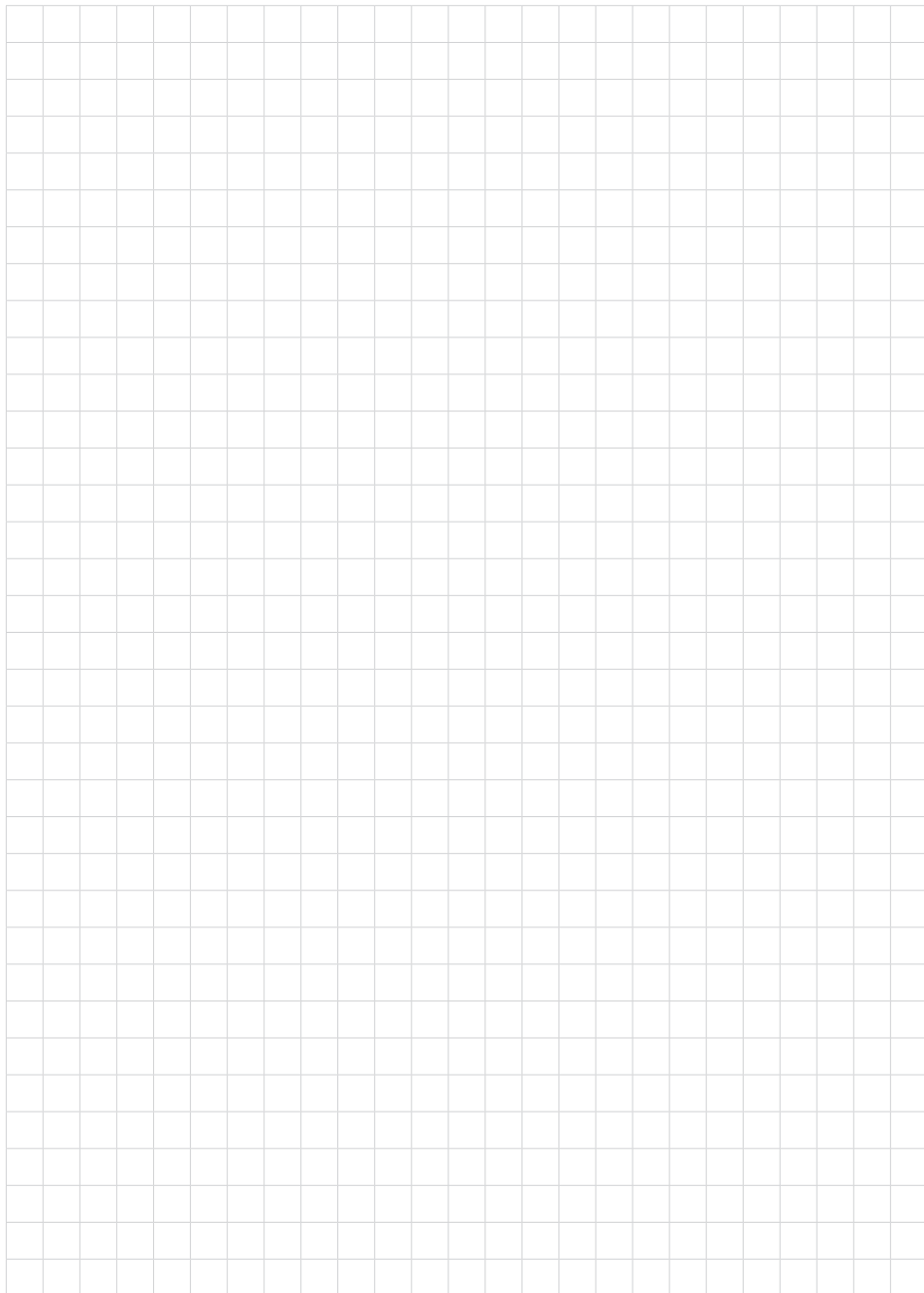Wire cross-section (spring-loaded terminals)

‒ Massive wire, stranded wire	0.2 … 2.5 mm² (AWG 24 … 14)
‒ Stranded wire with end sleeve	0.2 … 1.5 mm² (AWG 24 … 16)

Voltage supply

Operating voltage	8 … 30 V DC
Max. power consumption	520 mW
Reverse voltage protection	Integrated

47596-EN-230605

VEGAFLEX 82 • Modbus and Levelmaster protocol

47596-EN-230605

VEGA

Printing date:

$C \epsilon$

47596-EN-230605