Assisting the automation
industry since 1986

Antenna radar level meter

CPC-AR-70

INSTRUCTION MANUAL

Read the user's manual carefully before starting to use the unit or software.
Producer reserves the right to implement changes without prior notice.

CONTENT

Used symbols

To ensure maximum safety of control processes, we have defined the following safety instructions and information. Each instruction is labelled with the appropriate pictogram.

Alert, warning, danger

This symbol informs you about particularly important instructions for installation and operation of equipment or dangerous situations that may occur during the installation and operation. Not observing these instructions may cause disturbance, damage or destruction of equipment or may cause injury.

Information

This symbol indicates particularly important characteristics of the device.

Note

This symbol indicates helpful additional information.

Safety

All operations described in this instruction manual have to be carried out only by trained personnel or an accredited person. Warranty and post warranty service must be exclusively carried out by the manufacturer.

The product cannot be used in cases where its failure or malfunction could result in major material damage, damage to health or danger to life.

Improper use, installation or set-up of the level meter can result in crashes in the application (overfilling of the tank or damage of system components).

The manufacturer is not responsible for improper use, losses of work caused by either direct or indirect damage, and for expenses incurred during installation or use of the level meter.

1. Basic description

The **CPC-AR-70** radar level meter works on the FMCW (frequency modulated continuous wave) principle with a frequency of 25 GHz (K-Band).
The level meter is equipped with a compact covered funnel antenna. The antenna cover prevents dirt, vapors and gases from entering the antenna.
The CPC-AR-70 is intended for measuring the level of liquid and pasty substances.
The level meter is two-wire with a current output of 4 ... 20 mA with HART® communication. The measuring range is within 0,3 ... 8 m or 0,3 ... 20 m.

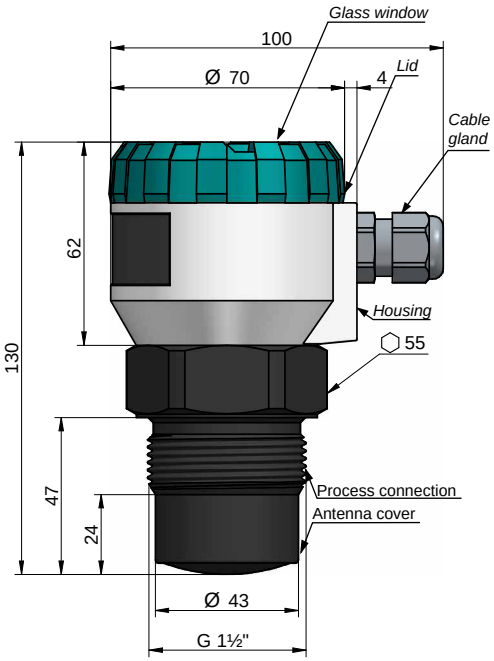
2. Range of application

Non-contact radar level meters with an antenna are suitable for continuous level measurement at medium and longer distances, liquids and pasty substances.
They can be used both in various closed tanks, containers, in semi-open sumps, and in open space. Their use is suitable where their advantages are fully applied:

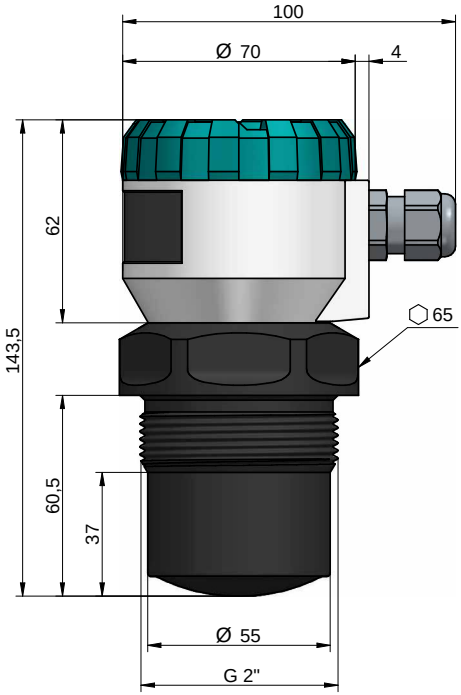
- non-contact measurement,
- the independence of the measurement from the temperature and pressure of the atmosphere above the surface,
- the possibility of measuring even in a vacuum,
- the possibility of measuring even in aggressive vapors,
- the measurement is independent of the medium parameters.

3. Dimensional drawing

CPC-AR-70-08



CPC-AR-70-20



4. Installation and putting into operation

This procedure has the following three steps:

- Mechanical mounting - see chapter 5
- Electrical connection - see chapter 6 and 7
- Settings - see chapter 8 and 9

5. Mechanical mounting

- Install the level meter in the vertical position into the upper lid of the tank or reservoir using a welding flange, a fastening nut or a flange so that the level meter axis can be perpendicular to the level of the measured liquid (Fig. 1).
- The min. dimensional parameters to install the level meter into a lid or a ceiling of a tank are given in Fig. 3.
- When installing in an open channel (reservoir, drain etc.), install the level meter onto a bracket as close as possible to the expected max. level.
- The reference plane for the measurement is the lower edge of the transducer (Fig. 2). In connection with the measurement principle, no signals reflected in the area immediately under the level meter can be evaluated. The zone (Fig. 2) determines the min. distance possible between the level meter and the highest level. The min. distances to the medium is 30 cm.
- It is necessary to install the level meter so that the bin level cannot interfere with the dead zone when filled up to the maximum. If the measured level interferes with the dead zone, the level meter will not work properly.

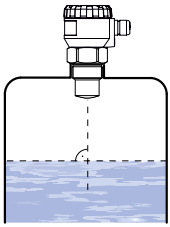


Fig. 1: Recommended installation in the tank

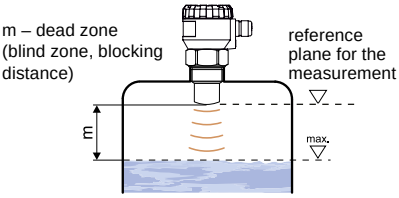


Fig. 2: Level meter dead zone

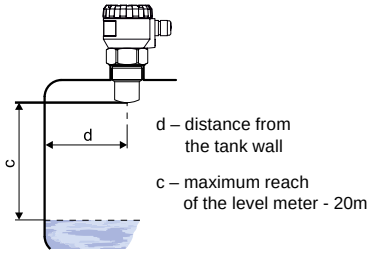
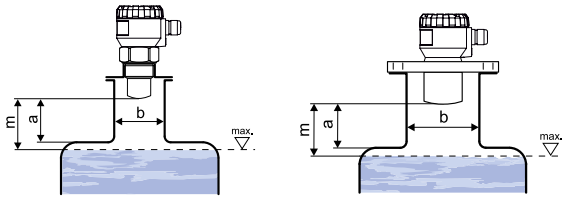


Fig. 3: Installation distance from the tank wall

CPC-AR–70–08, 20	d > 1/12 c (min. 200 mm)

- If the maximum level in the tank interferes with the dead zone, the level meter has to be mounted into a higher installation neck. In this way, the tank can be filled nearly up to the maximum volume. The inner neck surface has to be even and smooth (without edges and welded joints); the inner edge should be rounded where the radio wave leaves the pipe. The neck diameter should be as large as possible but the neck height should be as low as possible. Recommended dimensions of the input neck are given in Fig. 4.



CPC-AR–70–08, 20	a < b b > 100 mm

a – Neck height
b – Neck width
m – Dead zone (blind zone, blocking dist.)

Fig. 4: Possible installation of the installation neck

- If the emitted radio waves of the level meter is a ected by near objects (roughness on walls of the tank, various partitions, mixers etc.), it is necessary to map false reflections by activating the mode "TEACHING". In case of installed mixers, it is necessary to put the mixers to position under the level meter (direct the mixer paddle to the radio signal beam) (Fig. 5 and 6).

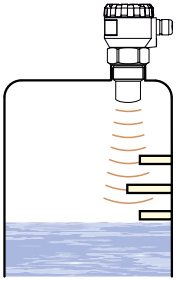


Fig. 5: False echo from obstacles in the tank

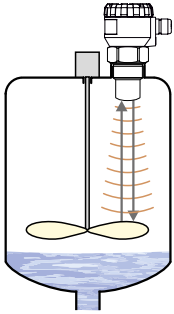


Fig. 6: False echo from the mixer paddle

- Do not install the level meter in or above the **filling** point (Fig. 7).

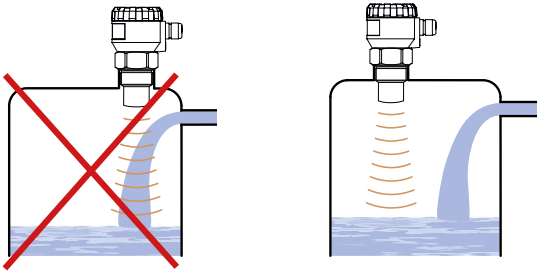


Fig. 7: Level meter installation outside the influence of filling

- During filling, mixing and other processes, foam can arise on the level of the measured liquid. The foam considerably absorbs the radio signal which might cause malfunction of the level meter (Fig. 9). For such cases, it is necessary to set up "SENSITIVITY" mode to "high" or contact the manufacturer if need. In case of a thin layer of foam, it is also possible to use the directional horn for improving receipt of the reflected echo.

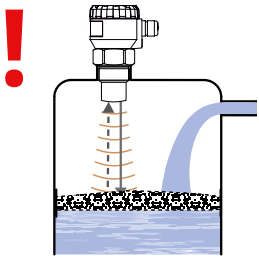


Fig. 8: Foam on the surface

- Scattering or attenuation of the radio signal can result if the level has been moderately stirred or rippled (by a mixer, coming liquid etc.). It can result in reduction of the measurement range or unreliable function of the level meter (Fig. 9).

- Rotating mixer blades can cause that the surface is stirred, which results in false reflections of the radio signal from the level and unreliable operation of the level meter (Fig. 10). For a rippled or swirling level, you can use the directional horn to eliminate scattering of the radio signal.

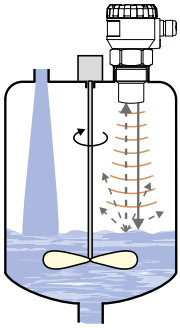


Fig. 9: Moderately stirred surface

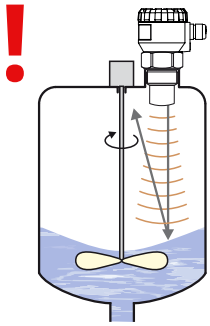


Fig. 10: Intensely stirred surface

- The level meter must not be installed in places with direct solar radiation and must be protected against weather e ects. If the installation in places with direct solar radiation is inevitable, it is necessary to mount a shielding cover above the level meter (Fig. 11).

- It is suitable to run the cable under a cable bushing (obliquely down in slack) according to Fig. 12 to prevent penetration of humidity. Then the rain and condensing water can flow o freely.

- The cable bushing and connector have to be su ciently tightened to prevent penetration of humidity.

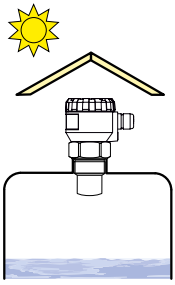


Fig. 11: Solar radiation shielding cover

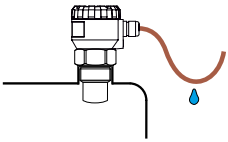


Fig. 12: Prevention of humidity ingress by droplets running down the cable

6. Electrical connection

The level meter is connected to consequential (evaluating) device with a suitable cable with the outer diameter of 6 to 8 mm using screw terminals located under the display module. The recommended cross section of cores for the current version 2 x 0,5 ÷ 0,75 mm^2
Plus pole (+) is connected to the terminal (+), minus pole (-) to the terminal (-) and the shielding (only for shielded cables) to the terminal (⏚)

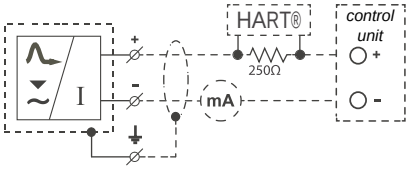


Fig. 13: Wiring diagram of the level meter with current output CPC-AR-70 _ _-_- I

Procedure to connect the cable to the level meter:

1. Unscrew the nut of the upper transparent lid.
2. Take the upper edge of the display module and take it out carefully by mild swinging up.
3. If you cannot grasp the module, you can use a small screwdriver. Insert it as far as the seam and use from several sides to slightly lift the module.
4. Release the cable outlet and thread the stripped supply cable in.
5. Connect the cable to the screw terminals according to the diagram in Fig. 14. Firmly tighten the terminals and the cable outlet.
6. Insert the display module back into the head so that the connector is properly connected.
7. Slide silicone seal on the thread of the level meter body, then tighten the nut of the upper lid.

Connect the cable to consequential device.

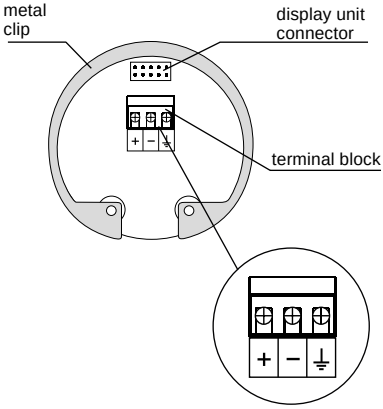


Fig. 14: Inside view of screw terminals of the level meter with current output CPC-AR-70_ _-_-I

Electrical connection can only be made in a voltage-free state!

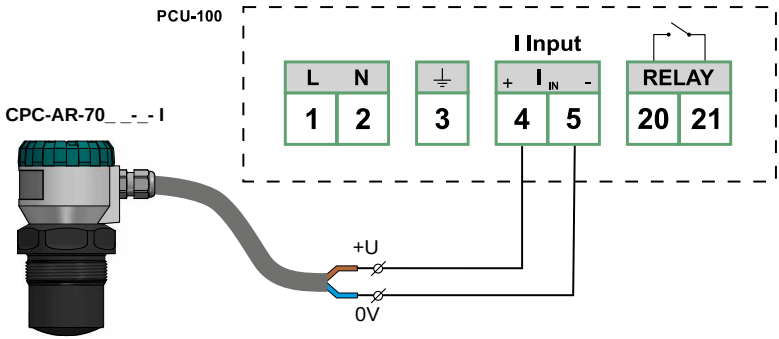
The power supply must be set up as a stabilized low-voltage safe voltage source with galvanic isolation. In the case of using a switched power supply, its design must e ectively suppress common mode interference on the secondary side. If the switched power supply is equipped with a PE protective terminal, it must be grounded!

If the sensor is located outdoors at a distance of more than 20 m from an outdoor switchboard or from a closed building, the electrical supply to the sensor must be supplemented with suitable surge protection.

Measures must also be designed and implemented in the electrical installation to reduce the e ects of static electricity to a safe level.

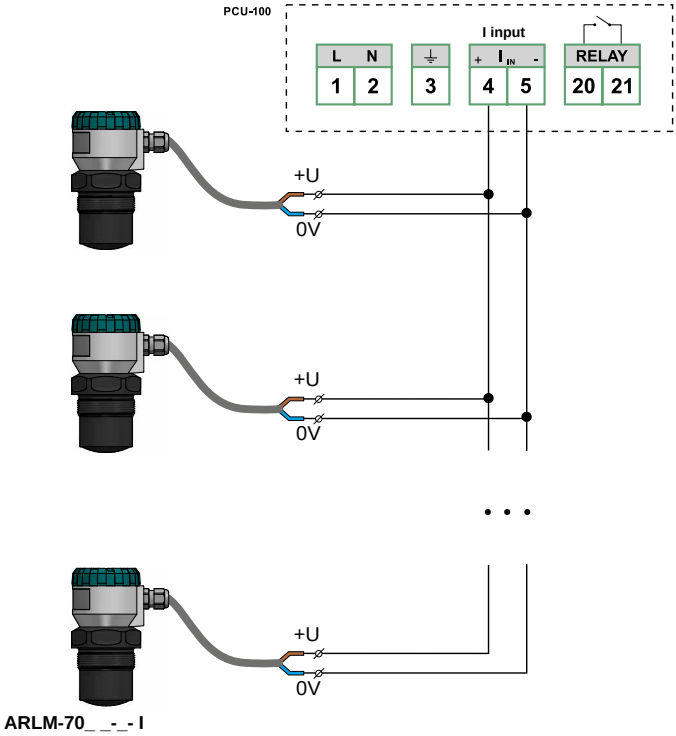
7. Examples of CPC-AR-70 connection

7.1. Connection diagram of the level meter with the current output to the PCU-100 unit



7.2. Connection diagram of the level meter with the current output to the PCU-100 unit

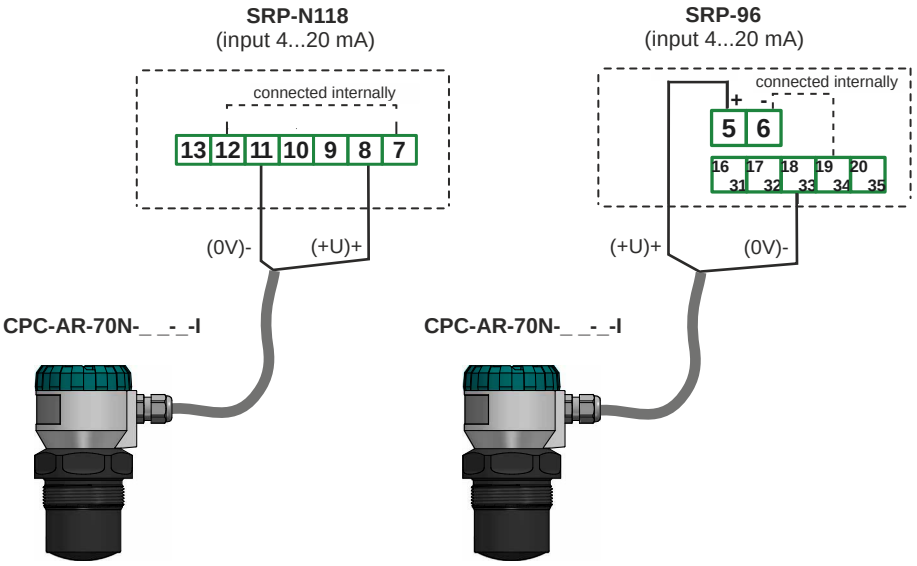
Demonstration in **MULTI-DROP** mode.



If HART® communication is in the POINT-TO-POINT mode, then only 1 level meter can be connected to the unit.

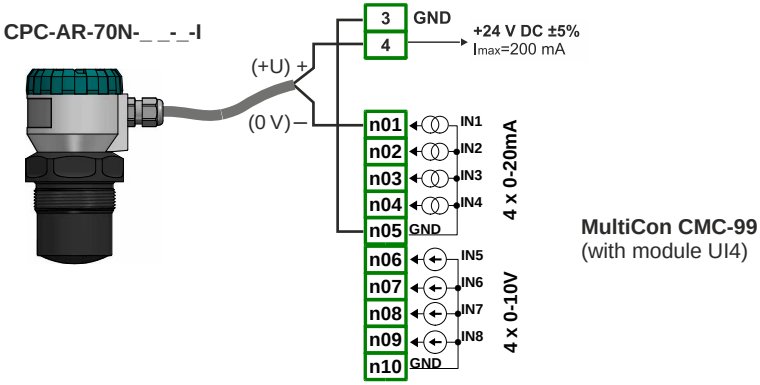
7.3. Wiring diagram of the level meter with current output and SRP unit

All connections must be made while power supply is disconnected !



Connection of SRP-N118 is valid for firmware version 6.00 or higher. In the older versions (up to version 5.99), the level meter output +U is connected to the terminal 7 and the output 0V to the terminal 10.

7.4. Wiring diagram of the level meter with current output and MultiCon CMC-99 unit



8. Setting elements

Settings are performed using 3 buttons located on the display module DM-70. All the settings are available in the menu of the level meter.

Button OK

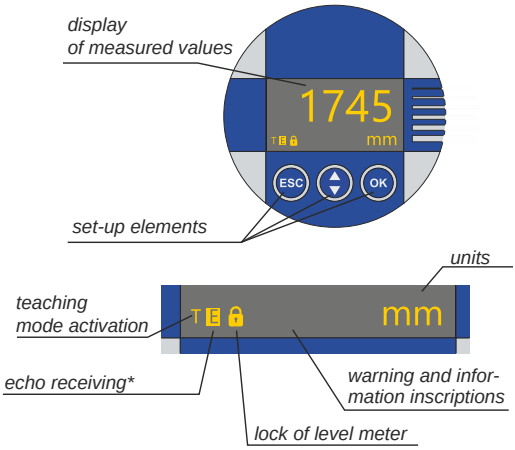
- Set-up mode access
- Confirmation of selected item in the menu
- Move the cursor in the line
- Saving of set-up data

Button

- Move in the menu
- Change of values

Button ESC

- Cancelling of carried out changes
- Shift one level up



* Slow flashing while the reflected signal (echo) is received from the measured level.

- **Status indication (left lower corner of the display):**

  symbol „E“ - **alternating flashing -** correct reception of the reflected wave indicating the level
  symbol „T“ - **permanent shine - "TEACHING"** mode is activated
  - **inverse shine -** activation of the **"TEACHING"** mode
  symbol 🔒 - **permanent shine -** the level meter is locked against unauthorized setting using a password, enter password to unlock (see MENU - PASSWORD)

- **Warning inscriptions:**

  NO ECHO - when empty tank, after you perform the procedure TEACHING
  - level meter is not able to measure (check the media or change the sensitivity)
  FIXED OUTPUT - the output stream is fixed to a constant value (see DIAGNOSTIC -CURRENT)
  LOW POWER - low supply voltage (must be in the range - see Technical specifications)
  NO PASSWORD - the level meter is protected using a password against unauthorized setting
  NO DATA AVAILABLE - display module doesn't communicate with the electronics of the level meter (e.g. incorrectly inserted display module into connector or measuring module is not functional).

- **Information inscriptions:**

  DISTANCE TO LEVEL - the display shows the current distance (see DIAGNOSTIC - DISTANCE)
  CURRENT - the display shows the current proud (see DIAGNOSTIC - CURRENT)

Level meter CPC-AR-70_-__-_-_-_-L is supplied without the display module (display) DM-70. To setup the level meter, it is necessary to connect a display module to it (or it can be configured via HART). When the settings are completed, the display module may be disconnected and the level meter then measures without it.

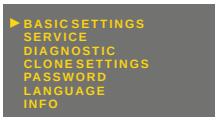
9. Operation and setting

Set the level meter using 3 buttons placed on the display module (see Chapter Set-up elements). After 5 min. of inactivity, the level meter automatically returns back to the measurement mode. If the password is active, the level meter will be also locked. The values that have not been confirmed using the button OK will not be saved! After the meter is locked, you cannot change the setting! When you attempt to edit, the words "NO PASSWORD" will appear on the display. How to unlock the level meter is given on pages 18. and 19.

After connection of the supply voltage to the level meter the display shows the logo "Simex" and the text "Starting" (approx. 15 sec). Then, the level meter goes to the measuring mode and the display shows the current measured value.

9.1. BASIC CONFIGURATION

After the first start of the level meter it is necessary to perform the basic configuration (setting of the measuring range, choice of units and possibly damping). The settings are accessible in the basic menu by pressing OK in the "BASIC SETTINGS"



LEVEL

Here it is possible to freely define the minimum / maximum distance of the level (item "DISTANCE TO LEVEL"). Measuring units are set in the "UNITS" menu.

UNITS: physical units of distance

ACTUAL: current distance to level

DISTANCE TO LEVEL:

MIN: defining the distance of the level meter from the minimal level

MAX: defining the distance of the level meter from the maximal level

If in the bottom of the display appears (when entering the values) the inscription "OUT OF LIMITS", the value specified for the item "DISTANCE TO LEVEL" is outside the measuring range of the level meter. If the inscription "SPAN TOO SMALL" is shown, it must be specified a larger span between MIN and MAX values.
For more information, see chapter "Specifications".
The decimal point position of the item 'LEVEL' is firmly set (according to the selected units).

1. To enter to the menu press OK the same button to select "BASIC SETTINGS". Then, using ▲▼ and OK select "LEVEL".
2. Now it is shown the item "LEVEL". By pressing OK and ▲▼ enter the distances of the level meter from the MIN level and for the MAX level.
3. By pressing OK button save the data. By next presses of the button ESC leave the menu. The level meter returns to measurement mode.

SENSITIVITY

Sensitivity level meter is defined in three steps.
„LOW“ – Low sensitivity in case of surrounding interferences a ecting the measurement.
„MEDIUM“ – Medium sensitivity (suitable for most applications).
„HIGH“ – Enhanced sensitivity for measured media partly absorbing the ultrasonic signal

Sensitivity can be set in three steps:
LOW – MEDIUM – HIGH.

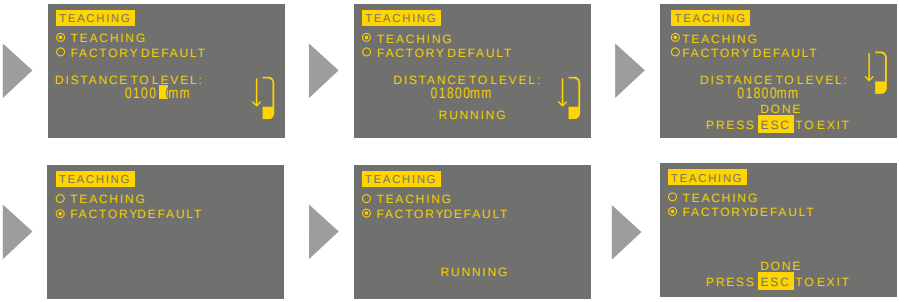
1. Pressing the button OK is for enter the menu, press the same button to select the item "BASIC SETTINGS". Then by pressing the buttons ▲▼ and OK is selected the item "SENSITIVITY".
2. Using the buttons OK and ▲▼ set the proper sensitivity.
3. After completion of setting pressing of the OK button saves the setting. Continue by pressing ESC to exit a menu and the level meter returns to the measuring mode.

TEACHING

The mode serves for **suppressing false reflections** resulting from reflection of the ultrasonic signal from roughnesses on walls of the tank, various partitions, mixers, other obstacles. The sensor starting this mode detects false reflections and save them in the memory. Then these false reflections will not a ect the subsequent measurement (they are masked out).

TEACHING - the distance is entered to the level. This mode creates a one-time false reflection map that it stored in memory.
FACTORY DEFAULT - run if it needs to clear the false reflection map and return the level meter to factory settings.
All modes can be activated repeatedly.

Before starting this mode it is necessary to empty the tank as much as possible (preferably completely).
If there are no obstacles mentioned in the tank, there is no need to run this mode.



1. To enter to the menu press OK the same button to select "BASIC SETTINGS". Then, using ▲▼ and OK select "TEACHING".

2. Now the menu item "TEACHING" is shown. After pressing the button OK you can select by pressing ▲▼ type of Teaching mode (TEACHING, or FACTORY DEFAULT). Confirmation of the mode is done with the button OK .Then is necessary to enter the distance to the level. If you are sure you can start the "TEACHING" procedure (false reflection mapping) by pressing OK button. During the mapping, the display shows flashing sign "RUNNING".

3. At mode TEACHING the procedure is completely finished when you can see the inscription "DONE" and "PRESS ESC TO EXIT". It is then possible to exit the menu by pressing the button ESC

In case of installed mixers, it is necessary to position the mixers under the level meter (direct the mixer blade to the ultrasonic signal beam).

If there are significant obstacles in the upper half of the tank, multiple false reflections can occur especially in closed tanks. In such cases it is necessary to reduce the level in the tank as much se possible to correctly mask these possible multiple false reflections.

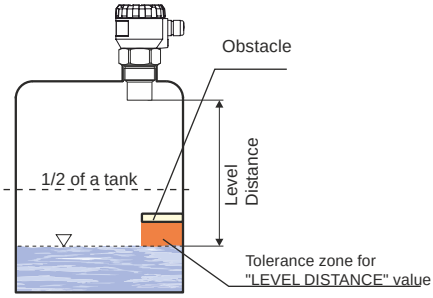
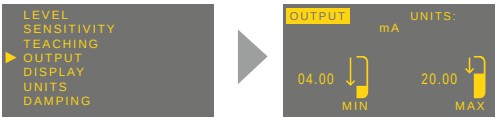


Fig. 21: Level distance zone „Set level distance"

OUTPUT

This item is displayed only for level meters with current output and is used to convert the measured data of the level meter to current output. Limit values of current are assigned to the MIN and MAX values specified in the LEVEL item. By default, the level meter is preset so that the value of the distance to the minimum (or maximum) level is assigned a current value of 4 mA (or 20 mA).

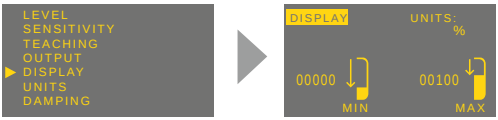


The measuring range can also be set inversely, when the minimum of the range corresponds to a higher level of the input quantity than the maximum of the range.

1. To enter to the menu press OK the same button to select "BASIC SETTINGS". Then, using ▲▼ and OK select "OUTPUT".
2. Then by pressing OK and ▲▼ enter the limit values of current.
3. By pressing OK button save the data. By next presses of the button ESC leave the menu. The level meter returns to measurement mode.

DISPLAY

This item is used to convert the measured data of the level meter to showing value on the display. Displayed limit values are assigned to the MIN and MAX values specified in the DISPLAY item. By default, the level meter is preset so that the value of the distance to the minimum (resp. maximum) level is assigned a displayed value of 0 % (resp. 100 %).



1. To enter to the menu press OK the same button to select "BASIC SETTINGS". Then, using ▲▼ and OK select "DISPLAY".
2. Then by pressing OK and ▲▼ enter the decimal point position of the item "DISPLAY", which is freely adjustable then by pressing OK and ▲▼ enter showed value on the display.
3. By pressing OK button save the data. By next presses of the button ESC leave the menu. The level meter returns to measurement mode.

UNITS

Level meter can process and convert a large number of di erent **physical values.** The setting is done in the item "UNITS".

LEVEL: Unit selection (mm, cm, m, in, ft)

DISPLAY: The unit showed on the display (%, mm, cm, m, in, ft, l, hl, m³, gal, bbl, mA)

1. To enter to the menu press OK the same button to select "BASIC SETTINGS". Then, using ▲▼ and OK select "UNITS".
2. Now the menu item "UNITS" is shown. By pressing the OK and ▲▼ button make the settings of individual items.
3. By pressing OK button save the data. By next presses of the button ESC leave the menu. The level meter returns to measurement mode.

DAMPING

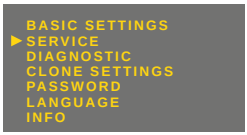
Setting the **response time** of the measurements. The function is useful for suppressing level fluctuations, waves and rapid changes of the level. The reaction time will depend on the exponential function. Damping with a defined delay in seconds represents the time when exponential reaches 2/3 of its maximum value.

The damping time can be set in the interval from 0 to 99 s.

1. To enter to the menu press OK the same button to select "BASIC SETTINGS". Then, using ▲▼ and OK select "DAMPING".
2. Now the menu item "DAMPING" is shown. By pressing the OK and ▲▼ button make the settings of individual items.
3. By pressing OK button save the data. By next presses of the button ESC leave the menu. The level meter returns to measurement mode.

9.2. SERVICE SETTINGS

In the supplemented configuration, you can set temperature di erence compensation, behaviour in case of fault conditions or HART® communication. Here, you can set the sensor into the initial state or reset it as well. The settings are accessible in the basic menu under the item "SERVICE"



FAILURE MODE

This item is a part of the level meter with a CPC-AR-70_-_-_-I current output. It defines the output current of the level meter in case of echo loss ("NO ECHO").

NO ECHO: Current in case of echo loss

The values can be set in five steps:
3,75 mA - 4 mA - 20 mA - 22 mA - LAST VALUE (last measured data)

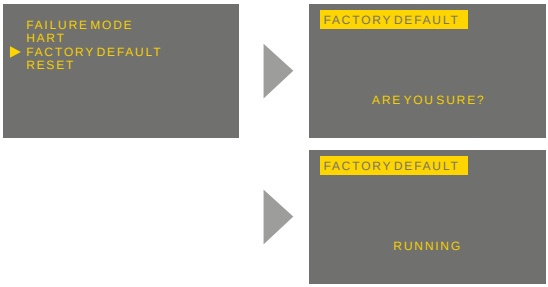
HART

This item is a part of the level meter with a CPC-AR-70_-_-_-I current output. Settings for HART® protocol (point to point, multidrop) and addresses for the multidrop mode. In multidrop mode, up to 15 devices can be connected to a single two wire cable.

In the case of address "00", the point to point mode is activated. The range "01" to "15" is reserved for addresses in the multidrop mode (current is fixed at 4 mA).

FACTORY DEFAULT

Load the factory default settings to the level meter. They are loaded by pressing button OK .
The default settings table is provided on pg. 27.



After pressing button OK the message "PROCESSING" will appear for a short time. After the default values are loaded, the title "FINISHED" and text "Press Esc to exit".

RESET

Complete restart of the level meter. The same e ect has also a short-time interruption of the supply voltage. To enable the resetting, press the button OK

During the restart process, "RUNNING" will be displayed. Then the level meter will be automatically turned off and on.

9.3. ADDITIONAL FUNCTIONS

Additional functions include modes for diagnostics or for copying settings. Furthermore, locking of modifications with a password, language mutation and information about the version of the level meter (display module). All these functions are accessible from the main menu.

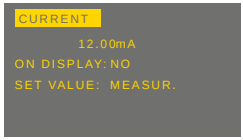
DIAGNOSTIC

DISTANCE TO LEVEL : display the actual value of the distance from the sensor to the level of the measured medium.

CURRENT: display the actual output current; only for level meter with a CPC-AR-70_-_-_-I current output

ON DISPLAY:
YES (the main display shows value from diagnostics: distance to level, current)

NO (the main display shows the standard measured value set by the DISPLAY item in the BASIC SETTINGS)



SET VALUE: setting the current to a fixed value (3,75 mA - 4 mA - 12 mA - 20 mA - 22 mA - MEASUR.)

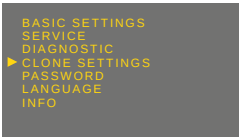
If parameter MEASUR. is selected, current corresponds with the measured value)

Option SET VALUE can be used to diagnose the connected evaluation device.

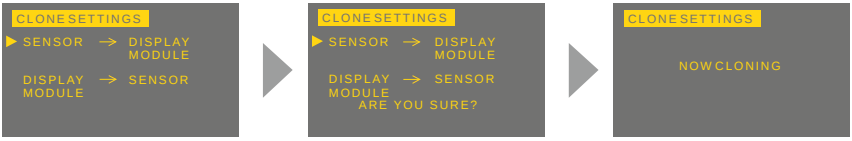
If the current is set (fixed) to a fixed value, the main display shows the FIXED OUTPUT and in section SET VALUE a title appears FIXED.

CLONE SETTINGS

This mode is intended for **copying** of the level meter (CPC-AR-70 body) **configuration into the display module** (DM–70) and back. The display module can then be removed from the level meter body and put into another level meter and make there the settings transfer (cloning),



The "CLONE SETTINGS" mode transfers all data, excluding setting of the "Teaching" and HART® (POLLING ADDRESS).



1. Press OK to enter the menu and select the item "CLONE SETTINGS". Copying of the settings from the body of the level meter to display module is done by selecting "SENSOR → DISPLAY MODULE". To transfer the settings from the display module to another level meter select the item DISPLAY MODULE → SENSOR.
2. The selected mode starts by pressing button OK. During transmission the display shows "NOW CLONING".
3. After completing the process in the middle of the screen displays "DONE". It is then possible to leave the menu and the mode by pressing the button ESC.

Incompatible type of level meter. Transfer of the settings can be realized only with the same type of level meter.

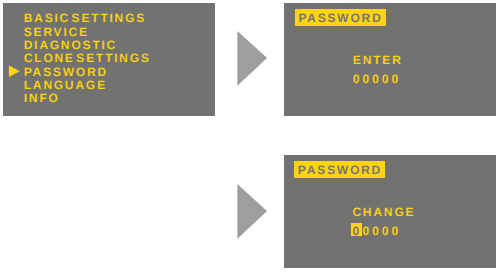
The data set is not stored into the display module (DM–70). The transfer can not be done. It is necessary to repeat the procedure of the copying the settings in the mode "CLONE SETTINGS".

PASSWORD

You can **lock** the level meter data against **unauthorized editing**.
After activating the password the data may be read, but can not be edited. If you try to edit the settings (without true password) the display shows "NO PASSWORD".
The password can be any 5-digit numeric combination. The combination of numbers 00000 is reserved for disabling the password.

1. Use the buttons OK and ▲▼ in the menu "PASSWORD" to select the mode "ENTER" for entering the password or the mode "CHANGE" for changing the password (when activated, the words are displayed inversely). Press the button OK once again to confirm the selection. You can change the password only when the level meter is unlocked. Otherwise, the words "NO PASSWORD" will be displayed.

2. Now you can edit the password. The actual edited item is displayed inversely. Press the button OK to move to the next position (clockwise direction), button ▲▼ serves to change the values (0 ... 9)
3. After the operation is completed, confirm the edited data by pressing the button OK



Display of status information to confirm data:
"YES" – correctly edited password
"NO" – incorrectly edited password
"OK" – the password saved (only in case of "CHANGE")

The password is automatically hidden after it is edited or changed ("00000" will appear).

To deactivate the password, edit the numerical combination "00000" in the mode "CHANGE".

The level meter with activated password will be automatically locked after 5 minutes of inactivity or after 5 min. from switching to measuring mode. Locking of level meter is indicated in the lower left corner of the screen by the letter "L".

If the password is lost, contact the manufacturer.

LANGUAGE

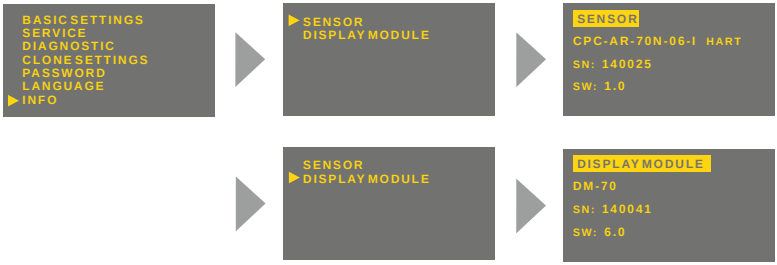
Setting the language of display menu.

You can set five kinds of language:

ČESKY – ENGLISH – DEUTCH – POLSKI - порусски

INFO

Information about the type, serial number and production date of the level meter (type, serial number – SN and firmware version – SW).



10. Protocol HART ®

Universal communication interface for data communication of peripheral devices with the level meter. Data transmission runs through the same line as the 4 ÷ 20 mA current loop without impact on analog communication. For setting the level meter and collection of measured data, it is necessary to have available a HART communicator, by which it is possible to communicate directly with the level meter, or using it, to mediate communication with a peripheral device, see image 16.

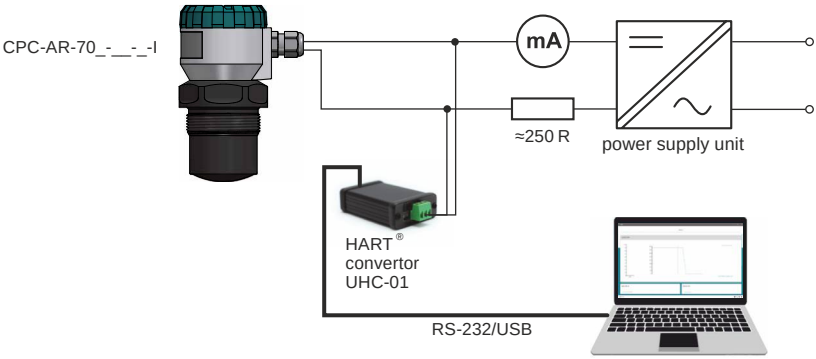


Fig. 16: Typical hardware configuration with HART

Revision

The implemented HART® protocol revision is No. 5

Universal commands	
0	Read unique identifier
1	Read primary variable
2	Read current and percent of range
3	Read current and four (predefined) dynamic variables
6	Write polling address
11	Read unique identifier associated with tag
12	Read message
13	Read tag, descriptor, date
14	Read PV sensor information
15	Read output information
16	Read final assembly number
17	Write message
18	Write tag, descriptor, date
19	Write final assembly number

Standard (practical) commands	
34	Write damping value
35	Write range values
40	Enter /exit fixed current mode
42	Perform master reset
44	Write PV units
49	Write PV sensor serial number

Meaning of variables:
PV (primary variable) - distance to level
SV (secondary variable) - value shown on the display
TV (tertiary variable) - not used
QV (quaternary variable) - level height

11. Function and status indication

Function and status indicationare signalled by:

- display module (see chapter 8)
- setting the fault current to the value selected in MENU - SERVICE - FAULT MODE (applies to the current version with HART® communication - **I**)
- status messages in HART® communication (valid for current version with HART ® communication - I)

12. Order code

CPC-AR-70N – □□ – □ – **I** – □ – □

set-up elements:
D : basic version with OLED display
C : basic version with LCD display
L : without display, metal lid

connection method:
B1 : plastic cable gland M16
B2 : plastic cable gland M20
H1 : outlet for protective conductor

process connection:
G1 1/2 : pipe thread G1 1/2" (version 08)
G2 : pipe thread G2" (version 20)

maximum range:
08 : 0,3 ... 8 m
20 : 0,3 ... 20 m

13. Accessories

1 x o-ring EPDM	included in the price		
telescopic bracket	at extra cost		
universal converter from USB to HART ®	at extra cost		
display unit	at extra cost		
fixing nut plastic	at extra cost	G1½ G2	
extension cable for display	at extra cost		
stainless steel or steel welding flange	at extra cost	G1½ G2	
protective hose (for type of cable outlet H1)	at extra cost		

14. Safety, protection, compatibility

The level meter CPC-AR-70 is equipped with protection against reverse polarity and output current overload.
Protection against dangerous contact is secured by low safety voltage that complies with EN 33 2000-4-41.
Electromagnetic compatibility according to EN 55022/B, EN 61326/Z1 and EN 61000-4-2 to 6.

15. Use, manipulation and maintenance

The level meter does not require any personnel for its operation. Follow-up displaying device is used to inform the technological entity operating personnel on the measured substance level height during the operation.

Maintenance of this equipment consists in verification of integrity of the level meter and of the supply cable. Depending on the character of the substance measured, we recommend to verify at least once per year the clarity of the ultrasound transducer emitting field and to clean it, respectively. In case any visible defects are discovered, the manufacturer or reseller of this equipment must be contacted immediately.

It is forbidden to perform any modifications or interventions into the CPC-AR-70 level meter without manufacturer's approval. Potential repairs must be carried out by the manufacturer or by a manufacturer authorized service organization only.

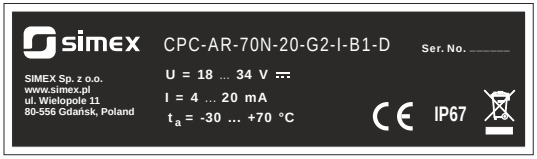
Installation, commissioning, operation and maintenance of the CPC-AR-70 level meter has to be carried out in accordance with this instruction manual; the provisions of regulations in force regarding the installation of electrical equipment have to be adhered to.

Installation in areas with potentially explosive atmospheres must be carried out in accordance with standard EN 60079-14 (Electrical apparatus for explosive gas atmospheres - Part 14: Electrical installations in hazardous areas other than mines) and respectively in accordance with other standards that apply to a given area.

The device must be installed to prevent tensile overload rope electrode level meter.

16. Marking of labels

Labels for type of CPC-AR-70N-_ _-_-I-_-_:



Example of label for type of CPC-AR-70N-20-G2-I-B1-D
Symbol of producer: logo and contact address
Level meter type: CPC-AR-70N–_ _–_–I–_–_
Serial number: Ser. No.: xxxxx – (from the left: production year, serial prodution number)
Supply voltage: U = 18 ... 34 V DC
Output current range: I = 4 ÷ 20 mA
Ambient temperature range: t_a = -30 ... +70 °C
Protection class: IP67
Compliance mark: CE
Electro-waste take-back system mark:

17. Technical specifications

Work environment		explosion-free area
Supply voltage		18...34V DC
Output type		current 4...20 mA with HART ®communication (limit values 3,9...20,5 mA)
Current consumption		4...20 mA / max. 22 mA
Basic measurement accuracy		3 mm (distance 1m ... 8/20 m) 10 mm (distance 0.3 m ... 1 m) (see Fig.17)
Current output error [1]		max. 80 µA
Resolution		0,1 mm
Maximum range		8 m or 20 m (see Fig.17)
Dead Zone [2]		30 cm (see Fig.17)
Adjustable measuring span (SPAN)		min. 200 mm
Function principle		FMCW
Operating temperature range		-30...+70°C
Max. operation overpressure		2 bar
Measuring frequency		25 GHz (K-Band)
Beam width (-3 dB)		10°
Measurement sensitivity		3 levels
Damping		1...99 sec
Status signaling (echo dropout) adjustable		3,75 mA, 4 mA, 20 mA, 22 mA, NO CHANGE
The time of the first measurement from the start of the power supply		20 sec
Separation capacity „power leads-housing“		2 nF / 500V AC
Maximum load resistance at	U = 24V U = 22V U = 20V	R = 270 Ω R = 180 Ω R = 90 Ω
Protection class		IP67
Recommended cable		PVC 2x0,75 mm ^{2} with a diameter of 6...8 mm
Tightening torque of the cable gland		3 Nm
Weight		approx 0,5 kg

[1] *This error only applies to the current output version. Data outputs (HART®) are not a ected by this error.*

[2] *Dead zone = Blind zone = Blocking distance*

Technical specifications – display module		
Display type		Matrix OLED, LCD [1]
Resolution		128 x 64 pixel
Character height / Number of digits measured value		9 mm / 5 Digits
Display colour	OLED	Yellow
	LCD	black with white background light
Buttons		Membrane switch panel
Ambient temperature range	OLED	-30...+70 °C
	LCD	-20...+70°C
Weight		46g

1) OLED - suitable for indoor and low-light applications.
LCD - suitable for outdoor applications particularly with direct sunlight.

Factory default	
	CPC-AR–70_–08
MIN LEVEL [1)]	8 000
MAX LEVEL [2)]	300
UNITS	mm; %;
DAMPING	5
SENSITIVITY	MEDIUM
FAILURE MODE – NO ECHO	4.00 mA
POOLING ADDRESS (HART®)	00
PASSWORD	No password

Factory default	
	CPC-AR–70_–20
MIN LEVEL [1)]	20000
MAX LEVEL [2)]	300
UNITS	mm; %;
DAMPING	5
SENSITIVITY	MEDIUM
FAILURE MODE – NO ECHO	4.00 mA
POOLING ADDRESS (HART®)	00
PASSWORD	No password

[1)] *Distance to min. level*
[2)] *Distance to max. level*

Used materials		
sensor part	**variants**	**standard material**
Lid	All types	aluminium alloy with powder coating
Glass window	All types	polycarbonate
Housing	Allt ypes	aluminium alloy with powder coating
Process fitting	All types	plastic PP
Display module	CPC-AR-70_...-D,C (with display)	plastic POM
Cable gland	All types	plastic PA

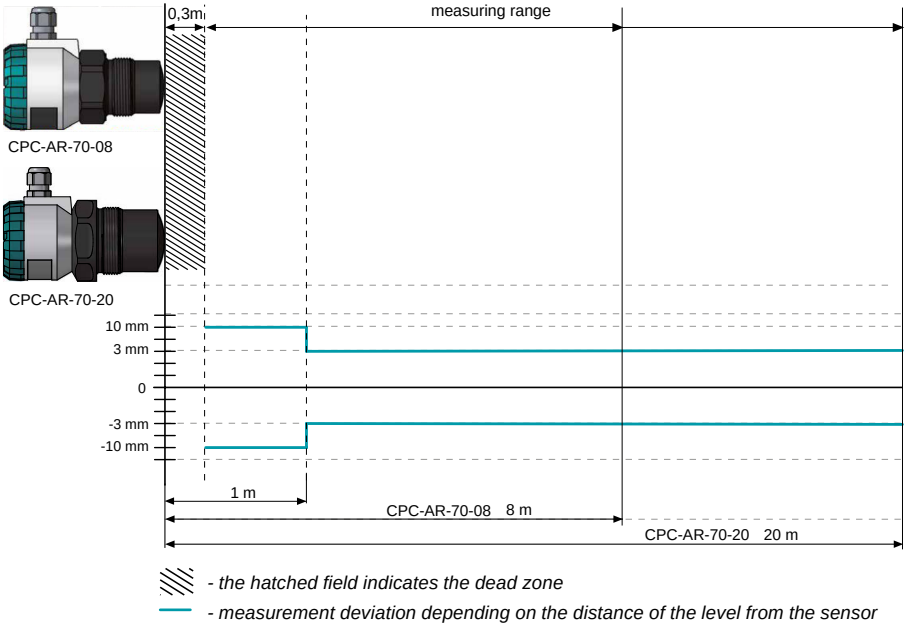


Fig. 17 Graph of dead zone and dependence of measurement error

18. Packaging, shipping and storage

The device **CPC-AR-70N** is packaged in a polyethylene bag, and the entire consignment is placed into a cardboard box. A suitable filler material is used in the cardboard box to prevent mechanical damage during transport. Remove the device from the packaging only just before using, thereby protecting it from potential damage.

A forwarding company will be used to ship goods to the customer. Upon prior agreement, ordered goods can be picked up in person at company headquarters. When receiving, please check to see that the consignment is complete and matches the order, or to see if any damage has occurred to the packaging and device during transport. Do not use a device clearly damaged during transport, but rather contact the manufacturer in order to resolve the situation.

If the device is to be further shipped, it must be wrapped in its original packaging and protected against impact and weather conditions.

Store the device in its original packaging in dry areas covered from weather conditions, with humidity of up to 85 % without e ects of chemically active substances. The storage temperature range -10 °C ... +50 °C.

19. General conditions and warranty

The manufacturer guarantees for the period of three (3) years that the product has the characteristics as mentioned in the technical specification.

The manufacturer is liable for defects ascertained within the warranty period and were claimed in writing.

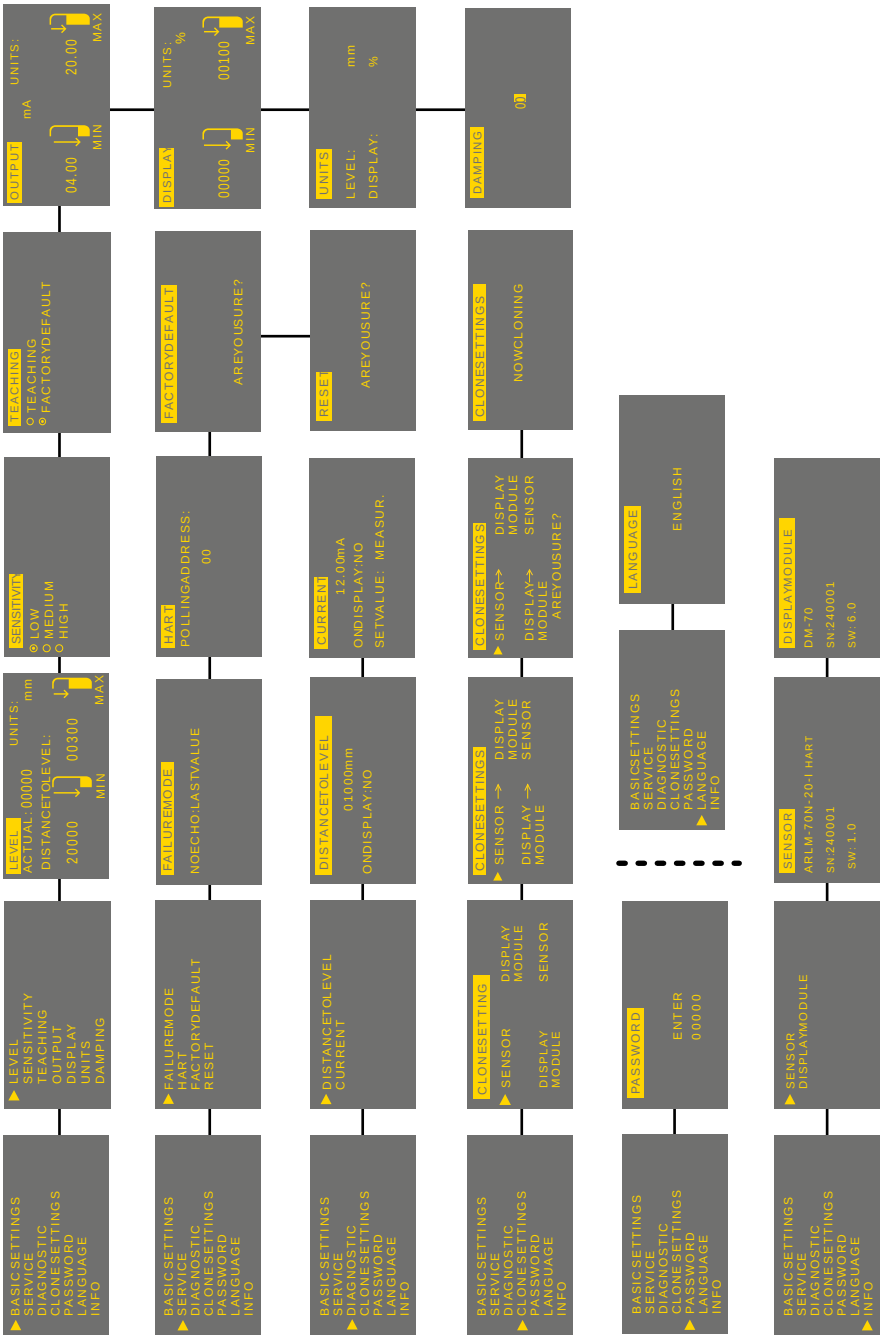
This guarantee does not cover the damages resulting from misuse, improper installation or incorrect maintenance.

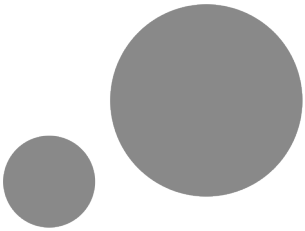
This guarantee ceases when the user or the other person makes any changes on the product or the product is mechanically or chemically damaged, or the serial number is not readable.

The warranty certificate must be presented to exercise a claim.

In the case of a rightful complaint, we will replace the product or its defective part. In both cases, the warranty period is extended by the period of repair.

20. Menu structure





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e-mail: info@simex.pl

applies to the firmware version: level meter 1.0
display module: 6.0 and higher

Find the updated version at www.simex.pl

version: 04/2025