OPTITEMP LCD-D100 Handbook

Loop powered LCD display module

KROHNE

◼ IMPRINT

1.1 Intended use

The OPTITEMP LCD-D100 is a display module to convert a 4...20 mA current signal into digits show on the display and is powered from the measuring current.

LCD-D100 display module is intended for installation in different connection heads, fields or wall mounted housings.

The display module is configured by a smartphone with built-in NFC support or by using push buttons.

> ⚠ *DANGER!*
> *Responsibility for the correct use of the devices with special regard to suitability, intended use and the field of application lies solely with the operator.*

> ⚠ *DANGER!*
> *The LCD-D100 display module do not contain any serviceable parts inside. Always send defective devices to the manufacturer or the local distributor for repair or replace. If this is the case, attach a clear description of the malfunction for warranty claims.*

> ℹ *INFORMATION!*
> *The manufacturer is not liable for any damage resulting from improper use or use for other than the intended purpose.*

> ⚠ *CAUTION!*
> *Responsibility for the use of the measuring devices with regard to suitability, intended use and corrosion resistance of the used materials against the measured fluid lies solely with the operator.*

1.2 Conformity

The manufacturer certifies successful testing of the product by applying the conformity mark on the device.

This device fulfils the statutory requirements of the relevant directives.
For full information of the directives and standards and the approved certifications, please refer to the declaration of conformity which can be downloaded from the manufacturer's website.

DANGER!
For devices used in hazardous areas, additional safety notes apply; please refer to the Ex documentation, in preparation.

1.3 Safety instructions from the manufacturer

1.3.1 Copyright and data protection

The contents of this document have been created with great care. Nevertheless, we provide no guarantee that the contents are correct, complete or up-to-date.

The contents and works in this document are subject to copyright. Contributions from third parties are identified as such. Reproduction, processing, dissemination and any type of use beyond what is permitted under copyright requires written authorisation from the respective author and/or the manufacturer.

The manufacturer tries always to observe the copyrights of others, and to draw on works created in-house or works in the public domain.

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We hereby expressly prohibit the use of the contact data published as part of our duty to publish an imprint for the purpose of sending us any advertising or informational materials that we have not expressly requested.

1.3.2 Disclaimer

The manufacturer will not be liable for any damage of any kind by using its product, including, but not limited to direct, indirect or incidental and consequential damages.

This disclaimer does not apply in case the manufacturer has acted on purpose or with gross negligence. In the event any applicable law does not allow such limitations on implied warranties or the exclusion of limitation of certain damages, you may, if such law applies to you, not be subject to some or all of the above disclaimer, exclusions or limitations.

Any product purchased from the manufacturer is warranted in accordance with the relevant product documentation and our Terms and Conditions of Sale.

The manufacturer reserves the right to alter the content of its documents, including this disclaimer in any way, at any time, for any reason, without prior notification, and will not be liable in any way for possible consequences of such changes.

1.3.3 Product liability and warranty

The operator shall bear responsibility for the suitability of the device for the specific purpose. The manufacturer accepts no liability for the consequences of misuse by the operator. Improper installation or operation of the devices (systems) will cause the warranty to be void. The respective "Standard Terms and Conditions" which form the basis for the sales contract shall also apply.

1.3.4 Information concerning the documentation

To prevent any injury to the user or damage to the device it is essential that you read the information in this document and observe applicable national standards, safety requirements and accident prevention regulations.

If this document is not in your native language and if you have any problems understanding the text, we advise you to contact your local office for assistance. The manufacturer cannot accept responsibility for any damage or injury caused by misunderstanding of the information in this document.

This document is provided to help you establish operating conditions, which will permit safe and efficient use of this device. Special considerations and precautions are also described in the document, which appear in the form of icons as shown below.

1.3.5 Warnings and symbols used

Safety warnings are indicated by the following symbols.

DANGER!
This warning refers to the immediate danger when working with electricity.

DANGER!
This warning refers to the immediate danger of burns caused by heat or hot surfaces.

DANGER!
This warning refers to the immediate danger when using this device in a hazardous atmosphere.

DANGER!
These warnings must be observed without fail. Even partial disregard of this warning can lead to serious health problems and even death. There is also the risk of seriously damaging the device or parts of the operator's plant.

WARNING!
Disregarding this safety warning, even if only in part, poses the risk of serious health problems. There is also the risk of damaging the device or parts of the operator's plant.

CAUTION!
Disregarding these instructions can result in damage to the device or to parts of the operator's plant.

INFORMATION!
These instructions contain important information for the handling of the device.

LEGAL NOTICE!
This note contains information on statutory directives and standards.

- HANDLING
  This symbol designates all instructions for actions to be carried out by the operator in the specified sequence.
  ➲ RESULT
  This symbol refers to all important consequences of the previous actions.

1.4 Safety instructions for the operator

WARNING!
In general, devices from the manufacturer may only be installed, commissioned, operated and maintained by properly trained and authorized personnel.
This document is provided to help you establish operating conditions, which will permit safe and efficient use of this device.

2.1 General description

The OPTITEMP LCD-D100 is a loop powered digital display module for installation directly in a 4-20 mA loop without need for external power supply. The display converts the 4-20 mA signal into a 4-digit value shown on the display were the range of the value can be set from -1999 to 9999. It's designed to be mounted in connection heads / instrument housings with window and in suitable enclosures for field / wall mounting, in an industrial environment. Delivers with a high-contrast, easy-to-read LCD display with white LED-backlight as standard.

Configuration of the display module is possible with:

- A smartphone app - OPTICHECK Temperature Mobile / INOR Connect, makes it possible to read, write, save and share settings directly in the field.
- Three push buttons on the backside of the display module.

Available versions

- LCD-D100 with 8.9 mm digits and backlight
- LCD-D100 with 17.8 mm digits and backlight (Assembled in product LCD-W110 only.)

2.2 Nameplate

> **INFORMATION!**
> *Look at the device nameplate to ensure that the device is delivered according to your order.*

The display module can be identified by the information on the nameplates.
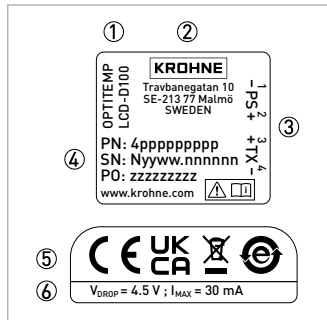
Figure 2-1: Example of nameplates for LCD-D100 display module

① Product name
② Manufacturer address
③ Terminals for power supply "PS" and 2-wire transmitter "TX" with number description
④ Part number, serial number (yyww = year and week of manufacturing) and batch number
⑤ Regulation symbols
⑥ 4...20 mA Loop voltage drop

3.1 Display Interface

Figure 3-1: Front side of LCD-D100 display module

① LCD display
② Assembly holes

Figure 3-2: Back side of LCD-D100 display module

① Pushbutton with step (decrease) function
② Pushbutton with enter function
③ Pushbutton with step (increase) function
④ Location of NFC antenna
⑤ Connection terminals
⑥ Assembly holes

3.2 Start up

When the display is connected to a 4-20 mA current loop it will first light up all display segments for two seconds, then it will flash and display the module's TAG / ID three times.
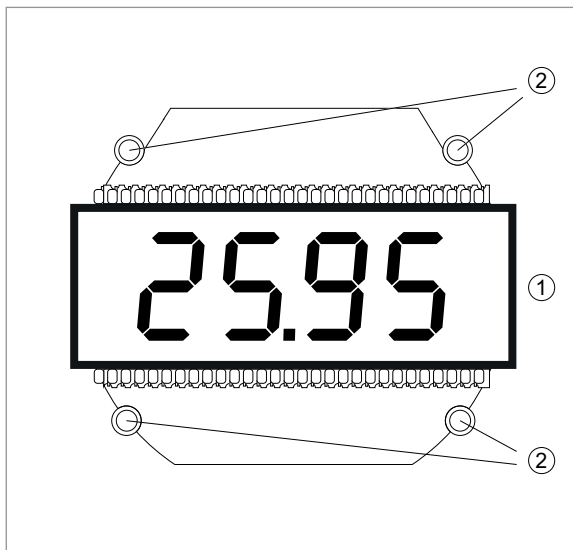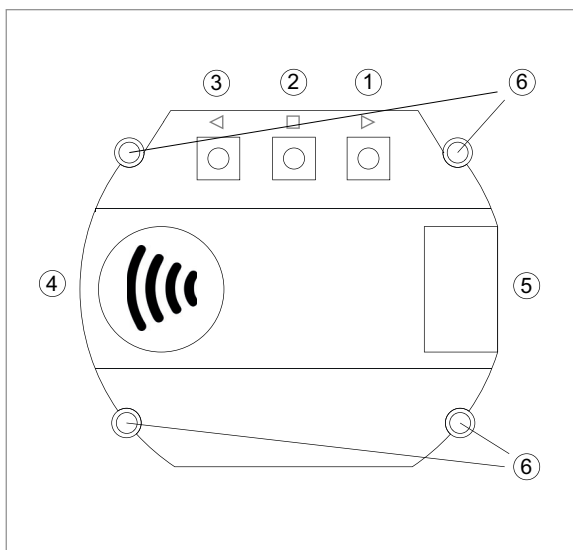Then it will be in display mode and actual measured values are displayed.

3.3 Factory default settings

The LCD-D100 module factory default values are shown in the figure below and also how they are presented on the LCD display.

	①	②
1	Lo	000.0
2	Hi	100.0
3	dEc	111.1
4	FLr	F 00
5	id	③
6	Fn	Fn00
7	bL	h iLo
8	nFc	on
9	rEF	-
10	dEF	-
11	End	-

Figure 3-3: Parameter description for factory default settings

① Parameter name
② Factory default value
③ The default setting value refers to display TAG / ID is the last four digits in the serial number.

Parameter description:

1. Engineering value related to the lower point (4 mA), the default setting value refers to 0.0 at lower point.
2. Engineering value related to the higher point (20 mA), the default setting value refers to 100.0 at higher point.
3. Decimal point location, the default setting value refers to 1 decimal.
4. Filter, the default setting value refers to "No filter".
5. TAG / ID number, the default setting value refers to the last four digits in the serial number for the display.
6. Display update interval, the default setting value refers to update display immediately.
7. Backlight mode, the default setting value refers to the backlight on but flashing during alarm.
8. NFC mode, the default setting value refers to the configuration via NFC is on.
9. Error correction, the default setting refers to no error correction.
10. Reset back to factory default.
11. End setup and return to indication.

3.4 Configuration

The LCD-D100 display module has two ways to do the configuration. NFC for communication with a smartphone and App or the three pushbuttons on the rear side of the module.

3.4.1 Configuration using NFC

The configuration procedure uses the NFC function in combination with a smartphone with built-in NFC support to perform all settings of the display. The display module does not need any power or other external connection, just place the smartphone's NFC antenna on top of the NFC antenna on the LCD-D100. The app makes it possible to read, write, save and share settings in unpowered mode, and the app contains also a link to download centre for product documentation.

Figure 3-4: Configuration with NFC
① Backside of LCD-D100 display module
② Smartphone

Before making a configuration of LCD-D100 display module you need to do following

1. Make sure that you have a mobile device with NFC communication activated
2. Download the app OPTICHECK Temperature Mobile / INOR Connect to your mobile device
3. Required versions for smartphone:
   iOS: iOS 13 or later and Iphone 7 or later
   Android: Android 4.4 or later

QR code for download the app
OPTICHECK Temperature Mobile

QR code for download the app
INOR Connect
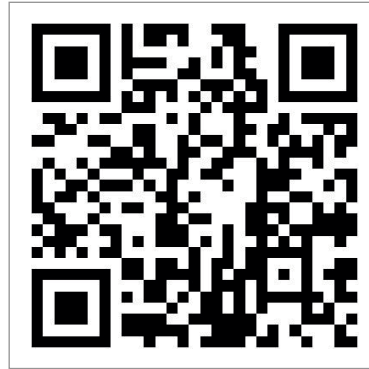
Configuration procedure:

1. Launch the app by clicking on the App icon or holding your mobile device against the display module on the part of the device where NFC is located (only possible with Android).
2. Click on "Read Configuration" and hold your mobile device against the display module as explained in the first section.
3. Edit the parameters.
4. Once you have set the desired values in the app, you transfer it to the display module by clicking the transfer button and holding the mobile device against the display module until a green check box appears confirming that the transfer has been completed.

3.4.2 Configuration using the 3 pushbuttons located on the backside of the indicator

The middle key " □ " is the enter key, the two outer keys with the left and right arrows are used to select various parameters. For position of the pushbuttons refer to *Display Interface* on page 11.

Key	Function
□ / " ② " Number refer to *Display Interface* on page 11.	Start the configuration mode and access to the main menu by pressing the pushbutton for 5 seconds in operating mode
	Select parameter to configure
	Move forward in menu
	End configuration of parameter
▷ / " ① " Number refer to *Display Interface* on page 11.	Decrease parameter value from predefinded value in configuration mode
◁ / " ③ " Number refer to *Display Interface* on page 11.	Increase parameter value from predefinded value in configuration mode
Press ◁ / " ③ " Number refer to *Display Interface* on page 11.	Show High (Hi) and Low (Lo), maximum / minimum measured values since last reset of the values in operational mode
Press ▷ / " ① " Number refer to *Display Interface* on page 11.	Show ID numbers in operational mode Returns to operational mode after 3 seconds
Press ▷ / "①" first and ◁ / "③" second in sequence under operational mode Number refer to *Display Interface* on page 11.	LCD test in operational mode, light up each segment in the display and return to operational mode afterwards
Press ▷ / " ③ " to display maximum and minumum readings and press and hold ◁ / " ① " while in this mode Number refer to *Display Interface* on page 11.	Clearing the maximum and minimum readings memory When the memory is cleared the display returns to normal operational mode

Table 3-1: Explanation of key and function (view from front side of the LCD-D100 display module)
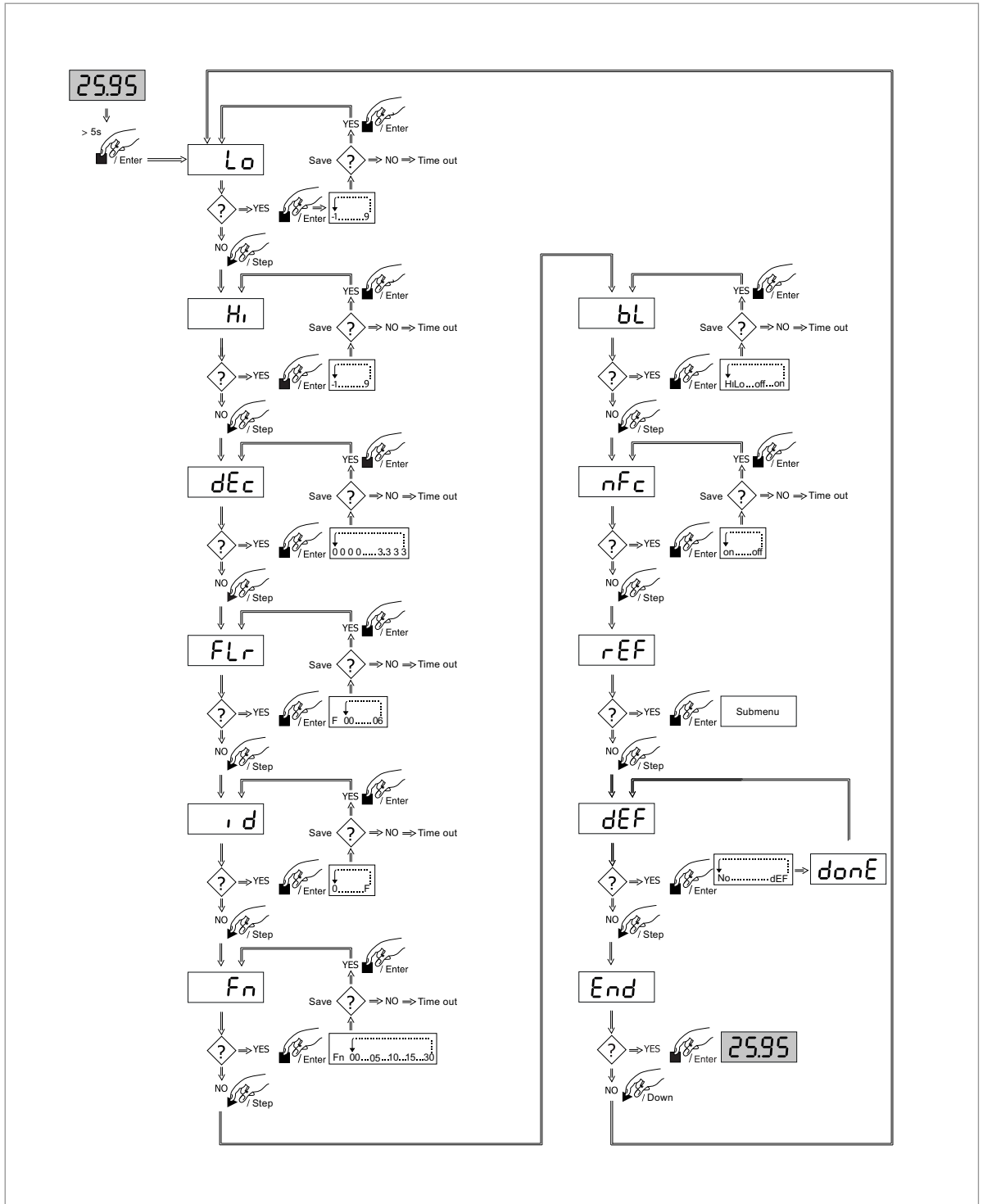
Figure 3-5: Configuration procedure using pushbuttons

3.4.3 Setup the span (Lo)

• Press ▷ / " ① " or ◁ / " ③ " to set the lower scale limit (displayed value for 4 mA input signal), within the limits of -1999 to 9999. Number refer to *Display Interface* on page 11.

3.4.4 Setup the span (Hi)

• Press ▷ / " ① " or ◁ / " ③ " key to set the upper scale limit (displayed value for 20 mA input signal), within the limits of -1999 to 9999. Number refer to *Display Interface* on page 11.

3.4.5 Setting the decimal point (dEc)

• Press key ▷ / " ① " or key ◁ / " ③ " to move the position of the decimal point for the range set by Hi and Lo in the range of 0 to 3 digits after the decimal point. Number " ① " and " ③ " refer to *Display Interface* on page 11.

Options of decimal point shown on the display:

• "111.1" - Factory default settings value with 1 decimal
• "22.22" - 2 decimals.
• "3.333" - 3 decimals.
• "0000" - No decimals

INFORMATION!
After changing the decimal point, please revise and set new span (Lo) and span (Hi) values for demanded values. Decimal point of the span (Lo) and span (Hi) will be changed when the setting of the decimal point (dEc) is changed.

Example (asume the configuration range 0...50 is required)
To be able to have the required span 0...50, the span (Hi) needs to be changed afterwards.

Decimal point (dEc)	Span (Lo)	Span (Hi)
Factory default settings "111.1":	000.0	050.0
After set the decimal point to "22.22":	00.00	05.00
Change the Span (Hi) to fulfil the configuration demands:	00.00	50.00

3.4.6 Setup of the filter (Flr)

The filter will prevent spikes and riple on the measured value to be shown on the screen. The low pass filter do an average calculation over the time set by the filter "Flr" and will slowly update the value when measured value changes.

• Press key ◁ / " ③ " to increase the filter value and key ▷ / " ① " to decrease the filter value.Number " ① " and " ③ " refer to *Display Interface* on page 11.
• Filter values ranging from 0 to 6 can be setted.

3.4.7 Setup of the tag ID (id)

- Press key ▷ / " ① " or key ◁ / " ③ " to set the tag ID. Number " ① " and " ③ " refer to *Display Interface* on page 11. Numbers between 0-9 and alphabets between A-F. Default value is the last four numbers in the serial number.

3.4.8 Setup of the update interval (Fn)

Fn=0 is the fastest and Fn=30 is the slowest.

- Press key ▷ / " ① " or key ◁ / " ③ " to set the update interval in seconds of the display value. Number "①" and "③" refer to *Display Interface* on page 11. Adjustable values for "Fn" are: 0, 5, 10, 15 and 30. The number represents number of seconds before display update.

3.4.9 Backlight mode (bL)

(Applies for versions with backlight)

- Press key ▷ / "①" or key ◁ / "③" to set the backlight mode HiLo / OFF / ON. Number "①" and "③" refer to *Display Interface* on page 11.

- When the HiLo mode is selected the backlight is on, but will flash during Hi / Lo alarm.
- When the Off mode is selected the backlight is always off.
- When on mode is selected the backlight is always on.

3.4.10 Setup of the NFC mode (nFc)

To be able to do configration via mobile phones the NFC mode need to be enabled. When NFC is disabled (OFF) the configuration can still be read by the smartphone. The function only disable to possibility to download a new configuration into the LCD-D100 module.

- Press and hold the middle key □ / "②" and press key ▷ / "①" or key ◁ / "③" to find the setup menu for NFC submenu.
- Press the middle key □ / " ② " to access into NFC menu.
- Press key ▷ / " ① " or key ◁ / " ③ " to set the NFC OFF / ON.
- Press the middle key □ / " ② " to save the changes and exit the submenu.
  Number " ① ", " ② " and " ③ " refer to *Display Interface* on page 11.

3.4.11 System error correction submenu (rEF)

If there is a loop current error for min and max value there is a function in the LCD-D100 to correct for the error called system error correction. With this function it's possible to correct the min and max current with ±0,5 mA to compensate for the error.

• Press □ / " ② ", function key to access to the submenu, press key ▷ / " ① " or key ◁ / " ③ " to navigate through the different sub parameters.

Submenu "r Lo": Trim the sensor signal to be the same as set for "Lo". Press function key □ / " ② ", If the display module managed to store the new "r Lo" value correct the display will show "Done" else the error code "Er:10" when the meassured value is to low or "Er:11" when the measured value is to high.

Submenu "r Hi": Trim the sensor signal to be the same as set for "Hi". Press function key □ / " ② ", If the display module managed to store the new "r Hi" value correct the display will show "Done" else the error code "Er:10" when the meassured value is to low or "Er:11" when the measured value is to high.

Submenu "rdEF": Reset the system error correction to default (no compensation). "r Lo" = 4 mA and "r Hi" = 20 mA.

Submenu "rEnd": Exit the "rEF" submenu. Number "①", "②" and "③" refer to *Display Interface* on page 11.

3.4.12 Setup of the default (dEF)

• Press the middle key □ / "②" and press key ▷ / "①" or key ◁ / "③" to find the setup menu for factory default (dEF).
Press the enter key □ / " ② " to set the device valules to factory default. Number " ① ", " ② " and " ③ " refer to *Display Interface* on page 11.

INFORMATION!
When a function have been changed then when leaving the specific function with the enter button the value will be saved automatically.
The LCD-D100 have a time out function in the configuration mode. When none of the push buttons have been used for 15 seconds the module will return to operating mode without saving any changes.
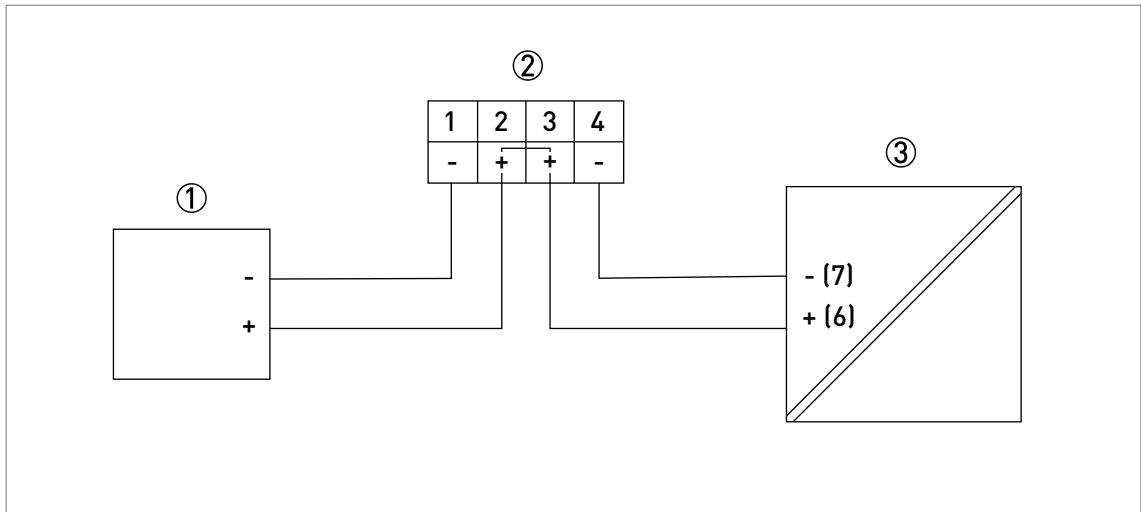
4.1 Connection diagram

Figure 4-1: LCD-D100 Connection diagram with in-head 2-wire transmitter

① Power supply (for the transmitter) ≈ 24 VDC
② LCD-D100 display module terminals (connection 2 and 3 are internally shorted)
③ Transmitter connection (numbers refer to 2-wire temperature transmitter terminals from Krohne / Inor)
  (The terminal numbers in the connection diagram can be different on transmitters from other company.)

Figure 4-2: LCD-D100 Connection diagram with rail-mount 2-wire transmitter

① Power supply (for the transmitter) ≈ 24 VDC
② LCD-D100 display module terminals (connection 2 and 3 are internally shorted)
③ Transmitter connection (numbers refer to 2-wire temperature transmitter terminals from Krohne / Inor)
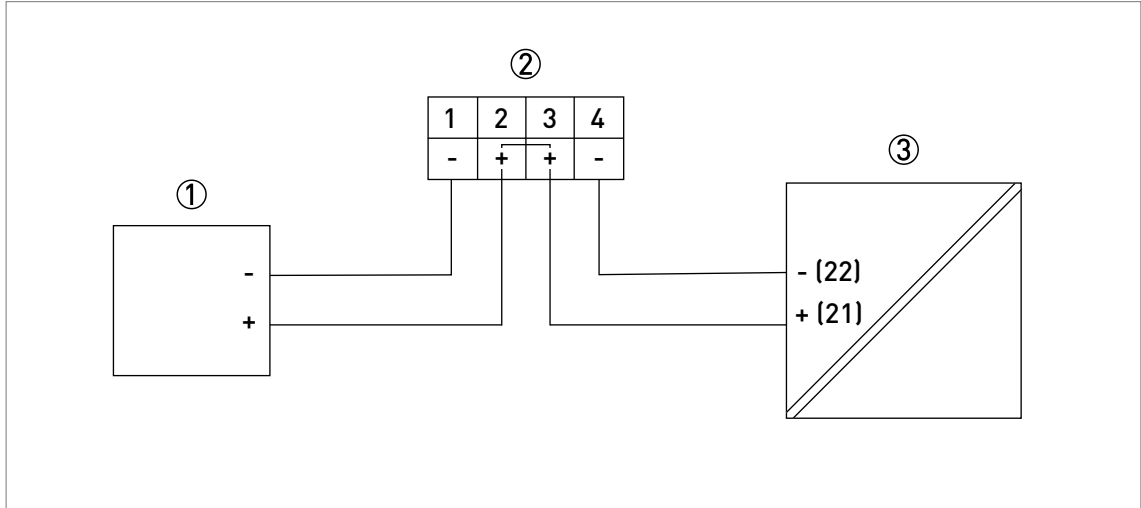 (The terminal numbers in the connection diagram can be different on transmitters from other company.)
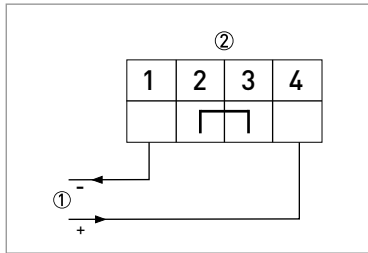
Figure 4-3: LCD-D100 Connection diagram with current source connected to display module terminals

①   Current source 4-20 mA
②   LCD-D100 display module terminals (connection 2 and 3 are internally shorted)

5.1 Operational mode

5.1.1 Show ID (id)

In operational mode it's possible to read out the ID of the device by pushing key ▷ / " ① " Number refer to *Display Interface* on page 11. The ID will flash three times and then the module will return to show measured values.

5.1.2 Show Min / Max values

The module has a built in peak detector storing the highest and lowest measured value since last reset. To get access to the values press key ◁ / " ③ " (number refer to *Display Interface* on page 11) and the device will show on the display "Hi" and then the max measured value. Then continue with "Lo" and then the min measured value. When shown the values the device will go back to operating mode and show measured values.

5.2 Operating in low ambient temperature

As the ambient temperature drops around the LCD display, the viscosity of the crystal liquid will also become more viscous. This effect can cause ghosting on the digits displayed on the screen and starts at temperatures around 0°C. The LCD-D100 module continues to function properly, it is an effect of the nature of LCD technology. To reduce the effect, the display update time "Fn" can be increased which gives a clearer reading of the display.

5.3 Error codes

Error code shown on the display.

User generated errors

- Er: 10 - To low measured reference value for error correction.
- Er: 11 - To high measured reference value for error correction.

System errors

- 80 - Error when loading settings from memory.
- 81 - Error when saving settings to memory.
- 82 - Error when applying default settings.

6.1 Service

No service required.

6.2 Availability of services

The manufacturer offers a range of services to support the customer after expiration of the warranty. These include repair, maintenance, technical support and training.

INFORMATION!
For more precise information, please contact your local sales office.

6.3 Returning the device to the manufacturer

6.3.1 General information

This device has been carefully manufactured and tested. If installed and operated in accordance with these operating instructions, it will rarely present any problems.

WARNING!
Should you nevertheless need to return a device for inspection or repair, please pay strict attention to the following points:
- *Due to statutory regulations on environmental protection and safeguarding the health and safety of the personnel, the manufacturer may only handle, test and repair returned devices that have been in contact with products without risk to personnel and environment.*
- *This means that the manufacturer can only service this device if it is accompanied by the following certificate (see next section) confirming that the device is safe to handle.*

WARNING!
If the device has been operated with toxic, caustic, radioactive, flammable or water-endangering products, you are kindly requested:
- *to check and ensure, if necessary by rinsing or neutralising, that all cavities are free from such dangerous substances,*
- *to enclose a certificate with the device confirming that it is safe to handle and stating the product used.*

6.3.2 Form (for copying) to accompany a returned device

⚠️ **CAUTION!**
To avoid any risk for our service personnel, this form has to be accessible from outside of the packaging with the returned device.

Company:	Address:
Department:	Name:
Telephone number: Fax number:	Email address:
Manufacturer order number or serial number:	
The device has been operated with the following medium:	

This medium is:		
	radioactive	
	water-hazardous (Biological risks etc...)	
	toxic	
	caustic, acid, corrosive, reactive etc...	
	flammable	
	We checked that all cavities in the device are free from such substances.	
	We have flushed out and neutralized all cavities in the device.	

We hereby confirm that there is no risk to persons or the environment caused by any residual media contained in this device when it is returned.	
Date:	Signature:
Stamp:	

6.4 Disposal

§

LEGAL NOTICE!
Disposal must be carried out in accordance with legislation applicable in your country.

Separate collection of WEEE (Waste Electrical and Electronic Equipment):

According to the directive 2012/19/EU or UK Regulation 2013 No. 3113, the monitoring and control instruments marked with the WEEE symbol and reaching their end-of-life **must not be disposed of with other waste**.
The user must dispose of the WEEE to a designated collection point for the recycling of WEEE or send them back to our local organisation or authorised representative.

6.4.1 Disassembling and recycling

This section describes (in short) the instructions of handling and disassembling the device when it's reached EOL (end of life) or is disposed after usage. The information given is sufficient to gather the most important parts of the device (by the end-user) which can be used for recycling.

The display module is composed of one display module and one LCD display PCBA firmly adhered to the surface of the display module. The display drive module is fully encapsulated in casting polymer plastic.

i

INFORMATION!
The products do not contain dangerous gases or materials.If there is contamination from the process, refer to Returning the device to the manufacturer on page 23.

i

INFORMATION!
Plastic parts in this product do not contain brominated flame retardants and are halogen free.

i

INFORMATION!
All plastic parts of this product weight below 50 g and as such very difficult to mark.

i

INFORMATION!
Printed circuit boards (PCB) for OPTITEMP LCD-D100 is halogen free by design and it is encapsulated in the casting polymer plastic, which means that dismantling the product is not possible. Please sort as electronic waste.

6.4.2 Disassembling and recycling of the LCD-D100 display module

Type	OPTITEMP	
Model	LCD-D100	
Usage	Loop powered LCD Display	
	Weight [g]	Weight [lb]
Total	51.7	0.114
Metal parts	9.5	0.021
Ceramic fibers	0.9	0.002
Plastic parts	34.1	0.075
Glass	7.2	0,016

Table 6-1: Total weight

To achieve reliability and quality performance of the product LCD-D100, it is encapsulated in casting polymer plastic, which means that dismantling the LCD-D100 is not possible. Please sort as electronic waste. The content of the LCD-D100 can be found in the following table.

	Material	CAS	Weight [g]	Weight [%]
	Thermoplastic: PA (Polyamide)	N/A	12	23.2
	Thermoplastic: Polyester	N/A	0.2	0.4
	Thermoplastic: Other	N/A	8.3	16.1
	Epoxy	N/A	13.6	26.3
	Glass	N/A	7.2	13.9
	Stainless steel	N/A	2.0	3.9
	Zinc	7440-66-6	1.0	1.9
	Lead free solder	NA	2.0	3.9
	Copper	7440-50-8	2.0	3.9
	Nickel	7723-14-0	2.0	3.9
	Brass	N/A	0.2	0.4
	Alumina (Al2O3)	1344-28-1	0.4	0.8
	Gold	7444-57-6	0.3	0.6
	Barium titanate (BaTiO3)	12047-27-7	0.5	1.0
RoHS	Polybrominated diphenyl Ethers (PBDE)	N/A	0	0
	Cadmium (Cd)	7440-43-9	0	0
	Mercury (Hg)	7439-97-6	0	0
	Lead (Pb)	7440-31-7	0	0
	Chrome VI (Cr VI)	7440-47-3	0	0
	Polybrominated biphenyls (PBB)	N/A	0	0
	Bis (2-ethylhexil) phthalate (DEHP)	117-81-7	0	0
	Butyl benzyl phthalate (BBP)	85-68-7	0	0
	Dibutyl phthalate (DBP)	84-74-2	0	0
	Diisobutyl phthalate (DIBP)	84-69-5	0	0

Table 6-2: Weight per material

7.1 Technical data

INFORMATION!
- *The following data is provided for general applications. If you require data that is more relevant to your specific application, please contact us or your local sales office.*
- *Additional information (certificates, special tools, software,...) and complete product documentation can be downloaded free of charge from the website (Downloadcenter).*

Standard version	Without Ex approvals
Intrinsically safe (IS) version	Refer to Ex approvals in the supplementary instructions, in preparation.
RoHS	Directive: 2011/65/EU
	UK regulation 2012 No. 3032
	Harmonized standard: EN IEC 63000
	China RoHS
Vibration resistance	Acc. to IEC 60068-2-6, test Fc, 10...2000 Hz, 5 g
Shock severity	Acc. to IEC 60721-4-4 Class 4M4 with method IEC 60068-2-27, 15 g / 6 ms
Radio Equipment Directive	EN 300 330
	EN 61326-1 EN 61326-2-3 EN 61000-6-2 EN 61000-6-4
	EN 61010-1
NAMUR compliance	According to NAMUR NE 43
Nominal indication scale	Input current 4...20 mA
Operational indication scale	Input current 3.8...20.5 mA
Displayed value on hold and fixed	3.6 mA < Input current ≤ 3.8 mA
Displayed value on hold and fixed	20.5 mA ≤ Input current < 21.0 mA
Lower failure signal	Input current ≤ 3.6 mA
Upper failure signal	Input current ≥ 21.0 mA
Current input	4...20 mA
Maximum current	30 mA
Minimum current for operation	≈ 3.5 mA
Voltage drop	Version with backlight: 4.5 V (regardless of setting for the backlight)
Display	7 -Segment black LCD with clear background, 4 digits (-1999 to 9999)
Digit height	8.9 mm / 0.35" (in instrument housing / connection heads)
	17.78 mm / 0.7" (in wall / field mounted indicator)
Backlight	White LED which is powered from the 4...20 mA loop (the backlight mode can be switched off)
Display resolution	±1 digit
Indication range	Any range between -1999 to 9999
Decimals	Selectable, 0 to 3
Low failure indication	Input current ≤ 3.6 mA, Flashing symbol Lo
High failure indication	Input current ≥ 21.0 mA, Flashing symbol Hi

Engineering units	Set of self-adhesive labels include for units: °C, °F, mA, mV, V, bar, mbar, Pa, kPa, MPa, pH, %, s, ms, µs, mm, cm, m
Response time	$\approx$ 1 s
	Power on delay: 5 s and stable after 1 min
NFC	Enable / disable the NFC mode to ON or OFF
HART transparent	YES
Configuration method	3 pushbuttons or NFC, located on the rear of the display (via NFC using the OPTICHECK Temperature Mobile App or INOR Connect APP)
Peak detect	Minimum and maximum readings are stored in a non-volatile memory
Ambient temperature range	-20...+70 °C / -4...+158 °F
Relative humidity	0...95% RH
Typical accuracy	±0.05% of span ±1 digit
Temperature influence	≤ 0.01% of full range per °C
Long term drift	Maximum ±0.02% of span per year
Connection terminal	Push-in spring connection
Wire cross-section solid / flexible	0.2 mm^2... 1.5 mm^2, AWG 24...16
Stripping length	8 mm / 0.3"
Wire cross-section with ferrule	0.25 mm^2...0.75 mm^2
Material	Copolymer polyamide and fiberglass
Weight for LCD-D100 with 8.9 mm digits	39.5 g / 0.087 lb
Mounting	4 holes, Ø 3.0 mm

Table 7-1: Specifications

7.2 Dimensions

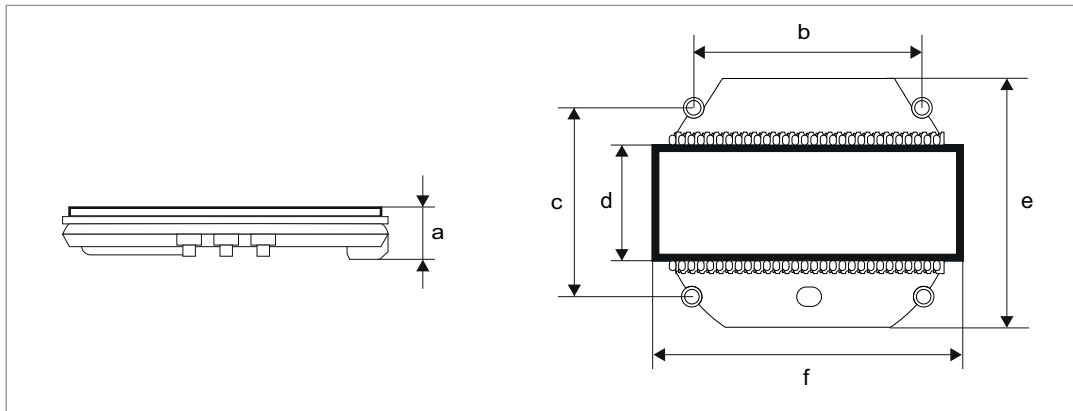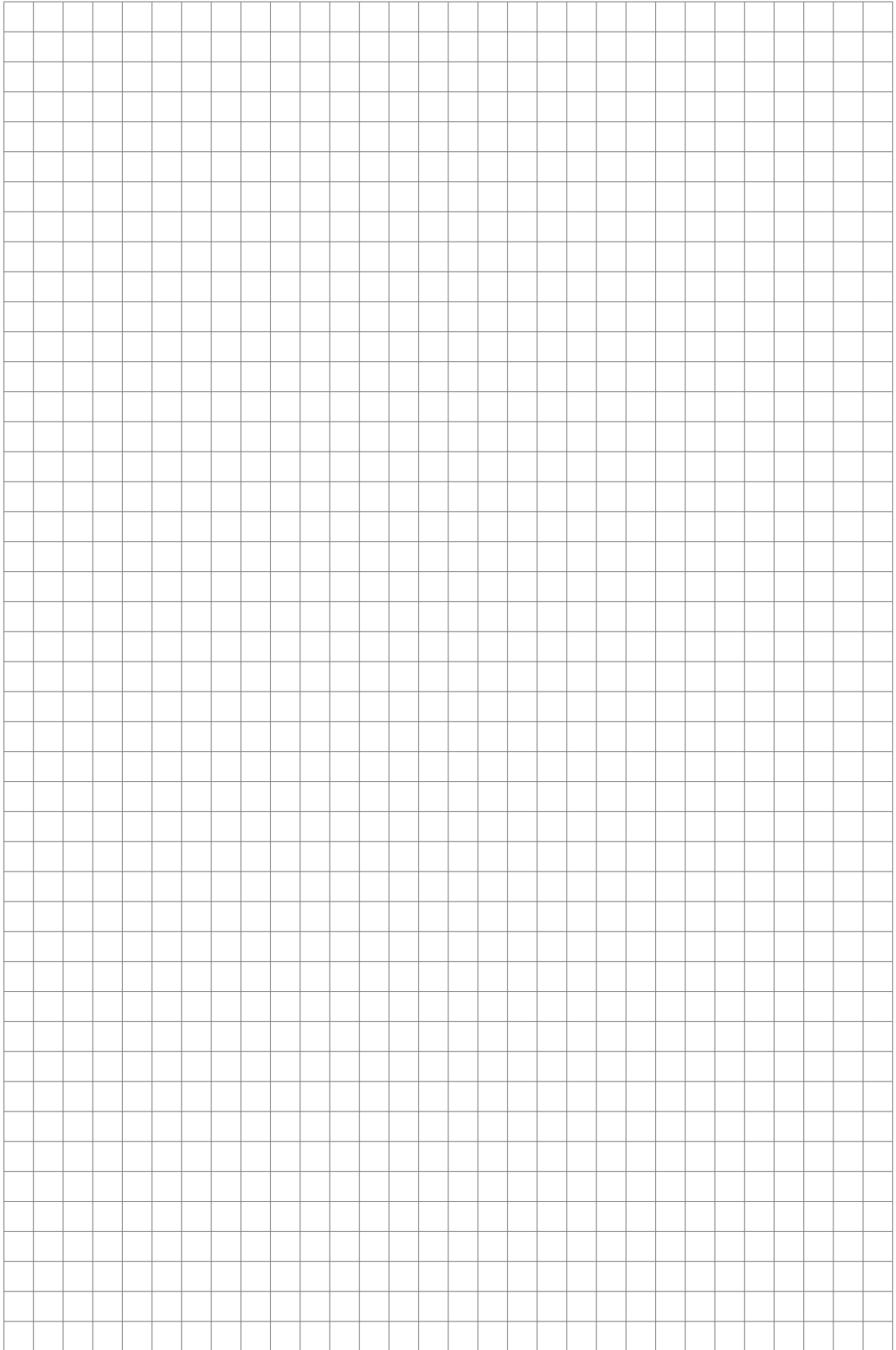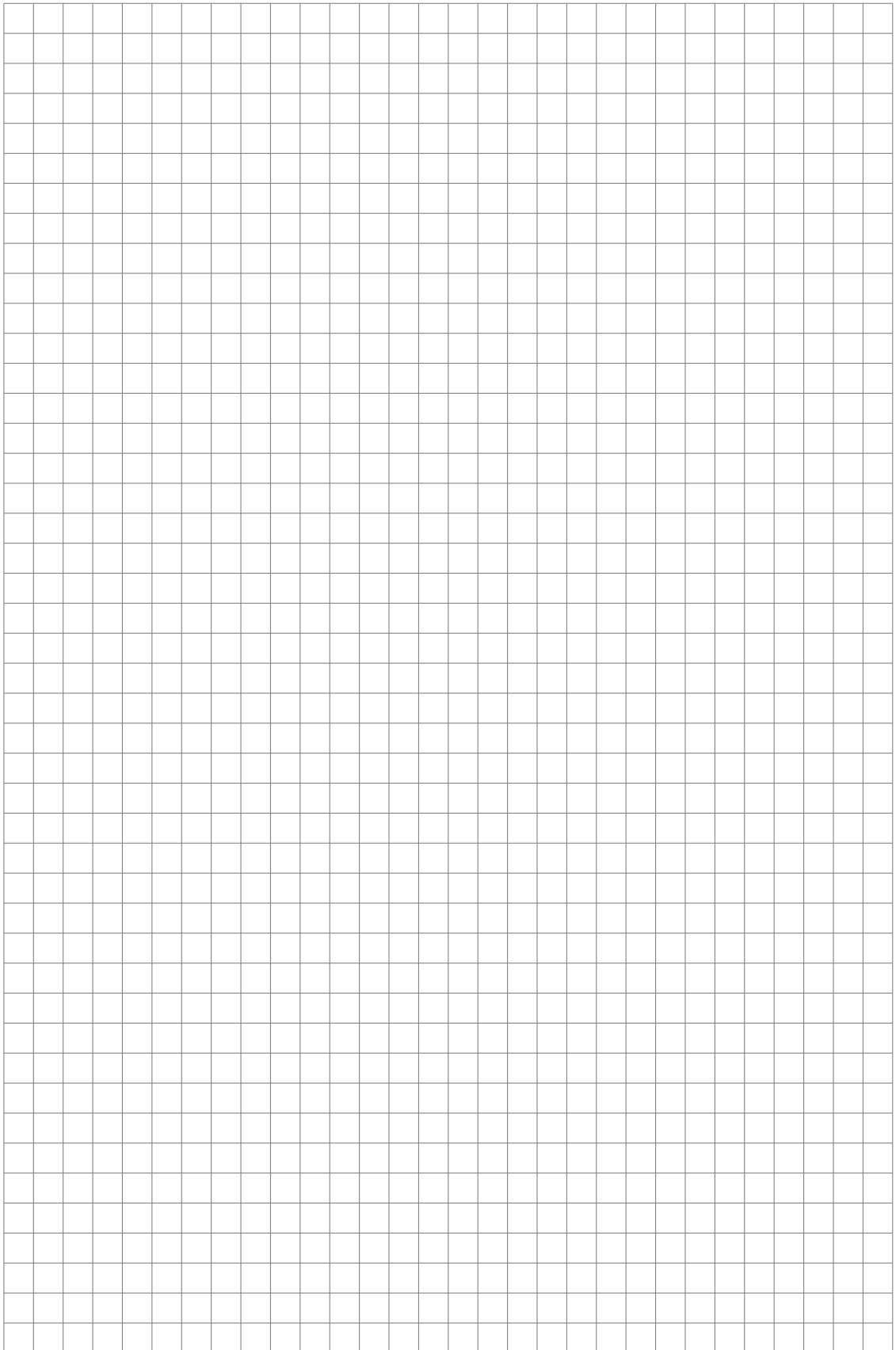
Figure 7-1: Display module

	Dimensions (LCD-D100 with 8.9 mm digits)	
	[mm]	[inch]
a	15.0 ± 0.5	0.59 ± 0.02
b	38.5 ± 0.2	1.52 ± 0.01
c	38.5 ± 0.2	1.52 ± 0.01
d	17.3 ± 0.5	0.68 ± 0.02
e	54.1 ± 0.5	2.13 ± 0.02
f	60.0 ± 0.5	2.36 ± 0.02

Table 7-2: Dimensions in mm and inch