Nokeval

made to measure

201, 202, 301, 302 & 305

User Manual

Document information

Device Scope:	201_202_301_302_305
Firmware Versions:	2.0 - 2.2
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Markings

Warning

Waste Electrical and Electronic Equipment Directive

Warnings

Read this manual carefully before using the device.

Only Nokeval Oy authorized services may repair or modify the device. The device includes no user serviceable parts.

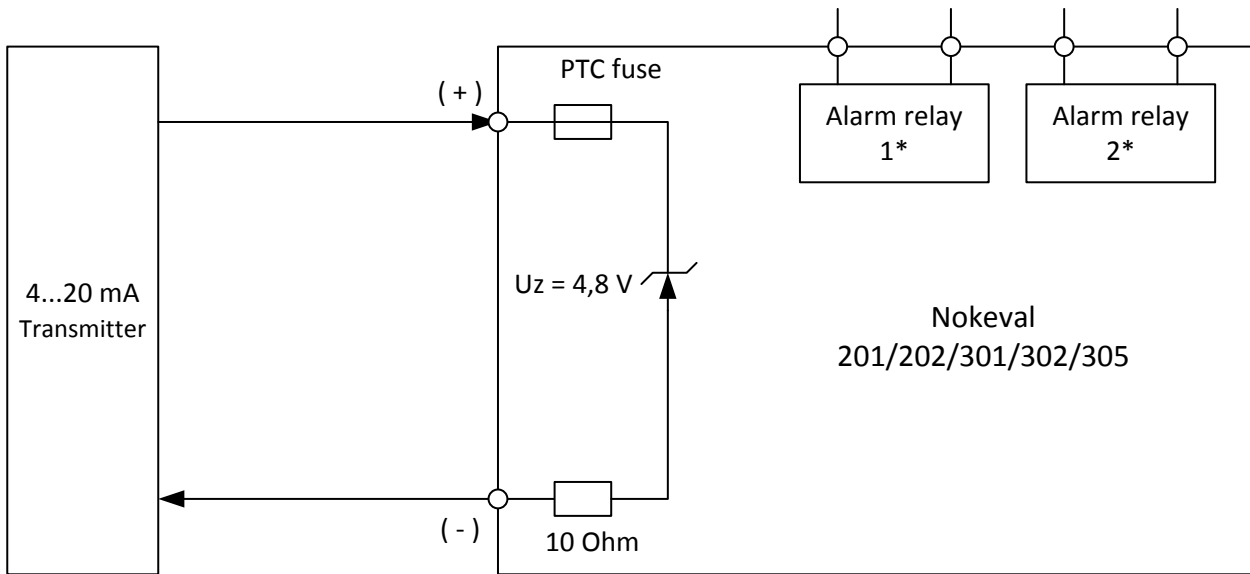**The device must not be disposed with household waste. Observe local regulations concerning electronic waste recycling.**

Trademarks

Any trademarks mentioned in this manual are the property of the respective trademark owners.

Contents

Introduction

The models 201 and 202 are panel models. The models 301, 302 and 305 are IP67 protected field enclosure models.

The models 202 and 302 include alarm relays*.

The models 301 and 302 have two cable glands. The smaller case model, 305, only has one cable gland.

All these models are loop powered LED displays and all required power is supplied by the 4-20 mA loop. This enables cost efficient placement in locations where a separate power supply is not available.

The display scaling, the alarm levels and all other settings can be controlled via the front panel or with the free MekuWin software. Using MekuWin requires a cable connected to the POL connector of the device. When using more than one decimal the display can be soothed with the digital filter. Device configuration can be protected with a password. The keyboard can be disabled by removing a jumper.

The alarm function is for applications where alarm limits rarely change. The alarm relays cannot pull simultaneously with less than an 8 mA loop current, so typically either a high alarm and a low alarm or two high alarm configurations are used.
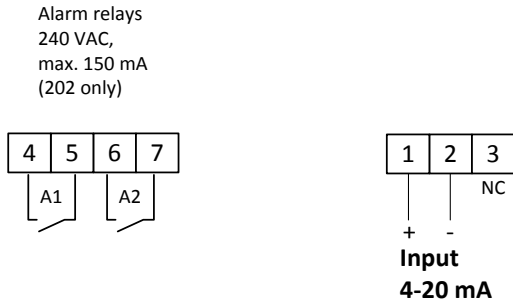
Installation

Mittakuvat

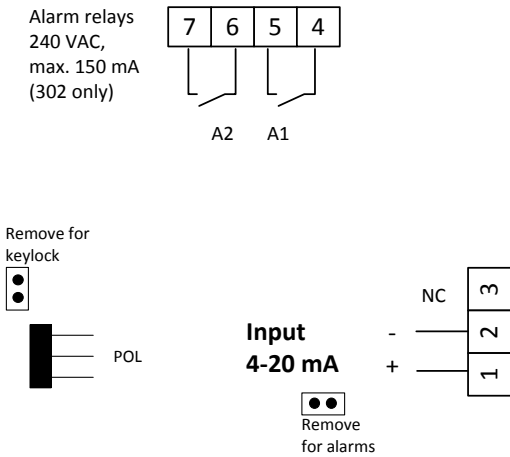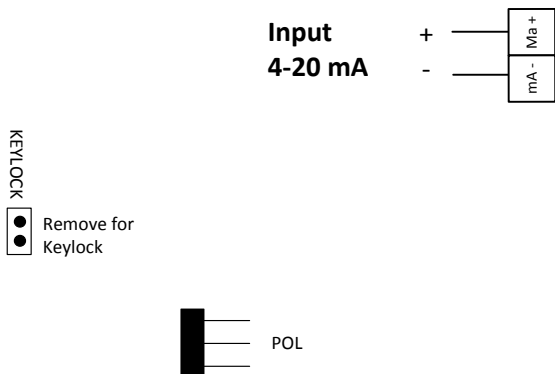

201 & 202

301 & 302

305 & 306
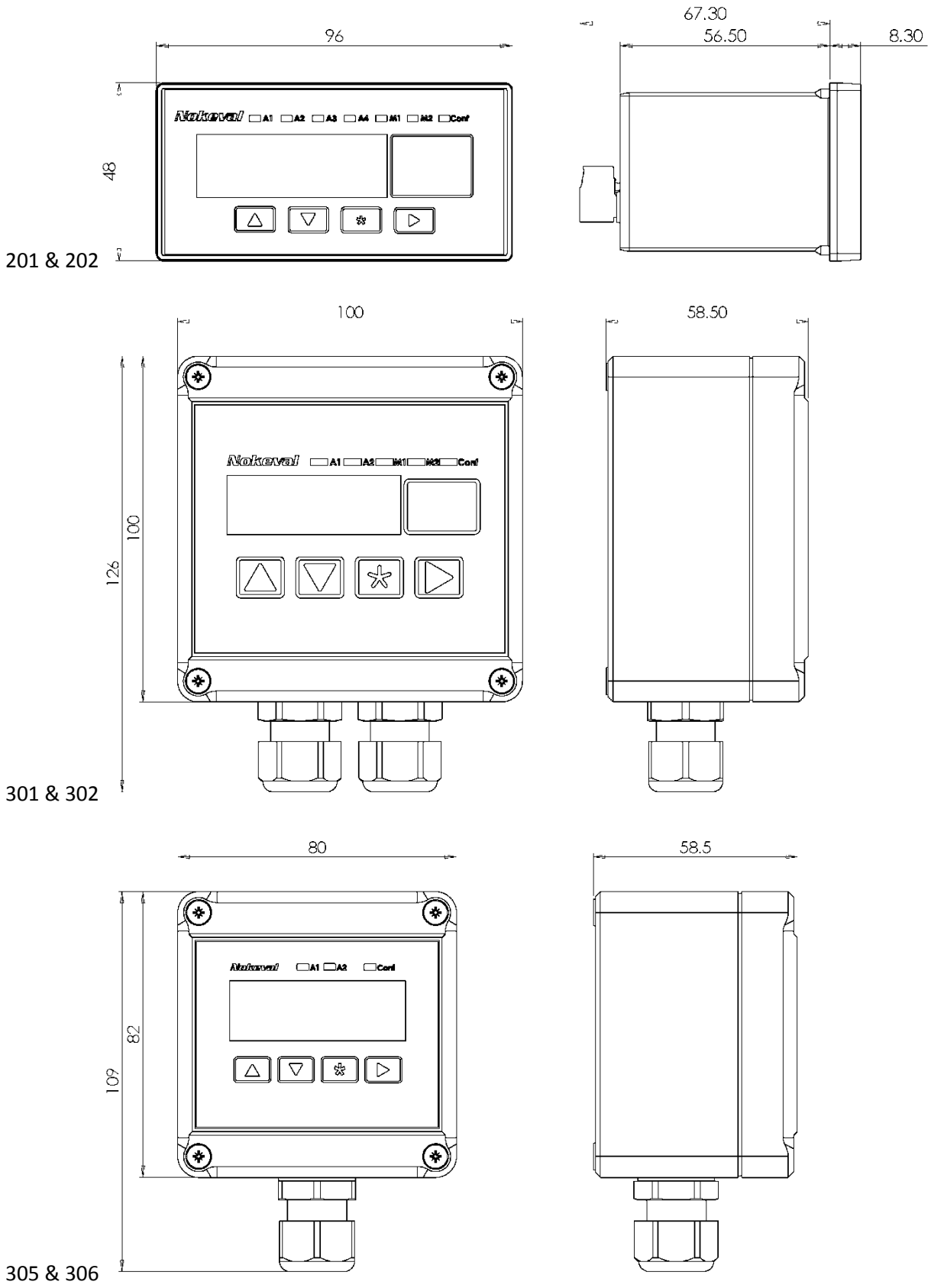
Connection

Models 201 and 202: connectors are located behind the device with the exception of the POL connector, which is located inside behind the front panel.

Alarm relays
240 VAC,
max. 150 mA
(202 only)

4	5	6	7

A1   A2

1	2	3

NC

+   -

**Input
4-20 mA**

Models 301 and 302: connectors are located inside the device behind the display.

Alarm relays
240 VAC,
max. 150 mA
(302 only)

7	6	5	4

A2   A1

Remove for
keylock

POL

NC   3

**Input   -   2
4-20 mA   +   1**

Remove
for alarms

Model 305: connectors are located inside the device behind the display.

**Input   +   Ma +
4-20 mA   -   mA -**

KEYLOCK

Remove for
Keylock

POL

Connect the 4…20mA input to terminals 1 (+) and 2 (-). On models 301/302/305, refer to the polarity markings on the circuit board.

For chaining devices, use the free terminal 3.

On models 202 and 302, connect the alarms to terminals 4 and 5 (A1 low/high alarm) and 6 and 7 (A2 high alarm).

Configuration with device keyboard

Start configuration by pressing and holding the keys ✱ and ▲ for two seconds.

Configuration with the MekuWin software

1. Download MekuWin from www.nokeval.com and install it.
2. Connect a DCS772 device to a Windows computer's USB port and connect a POL-3PIN adapter to the DCS772.
3. Connect the adapter to the POL connector of the device.
4. Run MekuWin.
5. Verify the following settings: Protocol SCL, Baud 9600, Parity 8N1, Address 0.
6. Click Connect Direct. MekuWin will connect to the device.
7. Change configuration as desired and save.
8. Detach the cables.

Scaling

Set the Lo display value. This is displayed with a 4mA current. Default is 0. Configuration with keyboard:

1. Press and hold ✱ and ▲ for two seconds. The Conf LED will light up.
2. Press ▼ five times to move to the Lo setting.
3. Press ▶ to enter the Lo setting.
4. To change numbers, press ▶ to select and change with ▲ and ▼.
5. To move the decimal point, first select it with ▶, then move it with ▲ and ▼.
6. When the Lo setting is at the desired value, press ✱.

Next set the Hi display value. This is displayed with a 20mA current. Default is 100.0.

1. Press ▼ to move to the Hi setting.
2. Press ▶ to enter the Hi setting.
3. To change numbers, press ▶ to select and change with ▲ and ▼.
4. To move the decimal point, first select it with ▶, then move it with ▲ and ▼.
5. When the Hi setting is at the desired value, press ✱.

Press ✱ and ▶ to save. The Conf LED will turn off. The device is now ready for use.

Alarm configuration for models 202 and 302

1. Press and hold ✱ and ▲ for two seconds. The Conf LED will light up.
2. Press ▶ to enter the AL L setting.
3. To change numbers, press ▶ to select and change with ▲ and ▼.
4. When the AL L setting is at the desired value for the low alarm, press ✱.
5. Press ▼ to move to the HY L setting.
6. Press ▶ to enter the HY L setting.
7. Press ▲ to change the minus sign to 0 to enable the alarm function.
8. To enter a bigger hysteresis, press ▶ and make a change with ▲.
9. When the HY L setting is at the desired value for hysteresis, press ✱.
10. Press ▼ to move to the AL H setting.
11. Press ▶ to enter the AL H setting.
12. To change numbers, press ▶ to select and change with ▲ and ▼.
13. To move the decimal point, first select it with ▶, then move it with ▲ and ▼.
14. When the AL H setting is at the desired value for the low alarm, press ✱.
15. Press ▼ to move to the HY H setting.
16. Press ▶ to enter the HY H setting.
17. Press ▲ to change the minus sign to 0 to enable the alarm function.
18. To enter a bigger hysteresis, press ▶ and make a change with ▲.
19. When the HY H setting is at the desired value for hysteresis, press ✱.

Press ✱ and ▶ to save. The Conf LED will turn off. The alarms are now ready for use.

Settings

Conf
AL L
HY L
AL H
HY H
Dec
Lo
Hi
Dead
LoPass
Intens
TrF
Poly
ALCf
CFCO

Poly
P1
P2
P3
P4
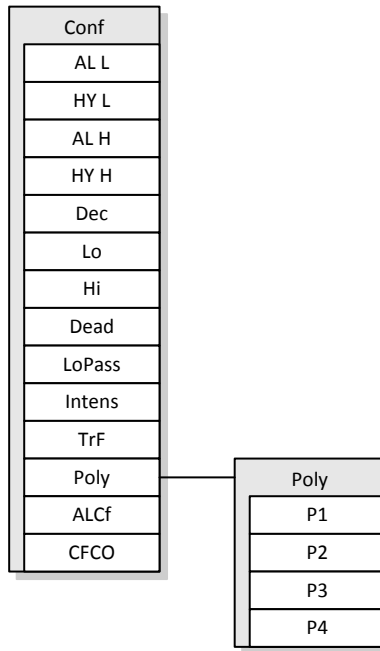
AL L (Alarm Low)

The A1 relay will activate when the display value goes below this setting (when ALCF=LoHI) or above it (when ALCF=HIHI).

Both alarms cannot be active simultaneously. Alarm low must not be set higher than alarm high. If the input current falls below 3 mA, the alarm relays are disabled automatically, because the available power is not sufficient for the relays. Default is 20.0.

HY L (Hysteresis Low) (starting from firmware V2.2)

Hysteresis prevents relays from changing their state needlessly when the display value fluctuates near the alarm level. The alarm is deactivated when the display value moves away from the alarm level by the value of HY L. For example if AL H = 20 and HY L = 5, the alarm is activated when the display value is 80 and is deactivated when the display value is 15.

A keyboard alarm reset can be enabled by setting the hysteresis higher than the scaled range (for example 9999). This way the alarm stays on waiting for a ▼ key press or for the display value to decrease under the alarm level. The alarm is then switched off because both relays cannot be active simultaneously.

Alarm can be disabled completely by changing this setting to a negative value. This will however not reduce voltage drop. For models 201, 301 and 305 the default is -1.0. For 202 and 302, the default is 1.0.

AL H (Alarm High)

The A2 relay will activate when the display value goes above this setting.

Both alarms cannot be active simultaneously. Alarm low must not be set higher than alarm high. Default is 80.0.

HY H (Hysteresis Low) (starting from firmware V2.2)

Hysteresis prevents relays from changing their state needlessly when the display value fluctuates near the alarm level. The alarm is deactivated when the display value moves away from the alarm level by the value of HY H. For example if AL H = 80 and HY H = 5, the alarm is activated when the display value is 80 and is deactivated when the display value is 75.

A keyboard alarm reset can be enabled by setting the hysteresis higher than the scaled range (for example 9999). This way the alarm stays on waiting for a ▼ key press or for the display value to decrease under the alarm level. The alarm is then switched off because both relays cannot be active simultaneously.

Alarm can be disabled completely by changing this setting to a negative value. This will however not reduce voltage drop. For models 201, 301 and 305 the default is -1.0. For 202 and 302, the default is 1.0.

ALHy (Alarm Hysteresis) (only in firmware V2.0-V2.1)

Hysteresis prevents relays from changing their state needlessly when the display value fluctuates near the alarm level. The alarm is deactivated when the display value moves away from the alarm level by the value of ALHy. For example if AL H = 80 and ALHy = 5, the alarm is activated when the display value is 80 and is deactivated when the display value is 75.

A keyboard alarm reset can be enabled by setting the hysteresis higher than the scaled range (for example 9999). This way the alarm stays on waiting for a ▼ key press or for the display value to decrease under the alarm level. The alarm is then switched off because both relays cannot be active simultaneously.

Alarms can be disabled completely by changing this setting to a negative value. This will however not reduce voltage drop. For models 201, 301 and 305 the default is -1.0. For 202 and 302, the default is 1.0.

Dec (Decimal)

The number of decimals displayed. Options are 0, 1, 2 or 3. Default is 1.

Lo (Low)

The display value shown with a 4mA current. Default is 0.000.

Hi (High)

The display value shown with a 20mA current. Default is 100.0.

Dead

Dead changes the lowest numbers of the display to show zero. For example if Dead=5, the display will function normally with a value higher than 5, but values lower than 5 will be forced to 0. Negative display values can be disabled by setting Dead=0. Negative values will disable this setting. Default is -1.00.

LoPass (Low-Pass)

A digital low-pass filter for damping big display values and fluctuations. The value is a time constant in seconds. Default is 0.5 seconds. The filter is disabled when the value is 0. Alarms are controlled by the filtered value, so the low-pass filter also increases alarm reaction time. Default is 0.5.

Intens (Intensity)

Display intensity. With the current below 6mA, the intensity decreases automatically so that at 4mA it is at most half of the maximum intensity. Value range is 1...15. Default is 15.

TrF (Transfer Function)

LIN = normal display, Sqrt = square root or PoLy = polynomial function. Before square rooting negative values (<4 mA), the minus sign will be removed and afterwards returned. This enables, for example, measuring backward flow assuming the sensor works correctly.

Poly (Polynomial)

This menu will be visible if the TrF setting is changed to PoLy. Defaults are P1 = 1, P2 = 0, P3 = 0, P4 = 0. More information about this function is available at support@nokeval.com

ALCF (Alarm Configuration)

LoHI = low and high alarms. HIHI = two high alarms. Default is LoHI.

CFCo (Configuration security code)

CFCo is a security code needed to enter device configuration. Enable this by changing the value from oFF to Set.

When Cod.0 appears to the display, press keys 1-4 to enter six digit code twice in a row. Left key corresponds digit 1, next key corresponds digit 2 etc.

Undo

Exits configuration and cancels any configuration changes.

Save

Exits configuration and saves any configuration changes.

Calibration

CAL

1. Press and hold ▲, ▼ and ✱.
2. Press ▼ to move to the CAL setting.
3. Press ▶ to enter the CAL setting.
4. Enter calibration code by pressing ▲ ▲ ▼ ▼ ▲ ✱.
5. Supply accurate 4mA current to the device input.
6. Press ▶ and then ✱.
7. Press ▼ to move to the 20mA position.
8. Supply accurate 20mA current to the device input.
9. Press ▶ and then ✱.
10. Press ✱, ▶ and ✱ to save calibration.

Operation

LED lights
From left to right: A1 alarm on, A2 alarm on, not in use, not in use, Configuration state on.

Restore default settings and remove configuration code
Press and hold ✱ and ▶ for 2 seconds while switching power on.

Keyboard lock, models 201 and 202
The keyboard lock prevents unauthorized or accidental use of the keyboard. To enable the keyboard lock, set a jumper to the two top pins of the POL connector on the right side of the device display. The pins are marked with "Keylock".

Keyboard lock, models 301 and 301
The keyboard lock prevents unauthorized or accidental use of the keyboard. To enable the keyboard lock, remove the jumper from the "Remove for keylock" jumper header.

Removing alarm function to reduce voltage drop
Set a jumper to "Alarms OFF" or "Remove for alarms" jumper header. This will reduce voltage drop by 2.5V.

Empty space on the right side of the front panel
This is space for a unit sticker. A sticker sheet is supplied with the device.

Maintenance

The device will not need special maintenance. If incorrect values (error>0.05% of the range) are displayed, the device is in need of calibration.

Clean the external parts of the device with a soft cloth, mild soap water or isopropyl alcohol.

Troubleshooting

No display.
Measure the voltage between pins 1 and 2. Pin 1 should be positive. Remove the positive wire from terminal block 1. Measure between the top of pin 1 terminal block screw and removed positive wire. The current should be at least 4mA. If the device still has no display, return it for service.

Keyboard not working.
With models 201 and 202, make sure that the POL connector has no jumper in the top two pins. With 301/302/305, make sure the "Remove for keylock" or "KEYLOCK" jumper header is not closed.

A1 or A2 LED is lit but the alarm relays do not work.
Make sure the "Alarms OFF" or "Remove for alarms" jumper header is not closed. Also note that the alarm relays cannot be on simultaneously with a loop current below 8mA. Models 201, 301 and 305 have no alarm relays.

The device has no Filt setting.
Firmware version V2.0 replaced the Filt setting with the LoPa (Low Pass) setting. These two settings have different operating principles. Consult this manual for further information.

302 alarm relay connector has different numbering than in the earlier user manual and on the device label.
To avoid potential confusion when connecting different models, the relay connector numberings for models 302 and 202 were harmonized in May 2013. A1 and A2 relay positions and relay functionality have not changed – the change concerns the numbers only.

My device is a special model 302SEN and I would like a user manual for it.
This manual applies to 302SEN starting from firmware version V2.0. 302SEN without a case will differ from a regular 302 only by its ALCf HiHi setting. Also note that with 302SEN devices with V2.0 firmware, the alarm 1 relay is of normal close type whereas in other firmware versions it is of normal open type.

My device has no functions or settings mentioned in the user manual.
If your firmware version V1.1 or below, please refer to the manual at http://www.nokeval.com/pdf/manuals/en/301_302_305_306_V1.0-1.1_manual.pdf. The firmware version is printed on the device label and also displayed when the device is turned on.

This user manual has no information about models 306 or 350.
Models 306 and 350 are discontinued. For these devices, refer to the manual at http://www.nokeval.com/pdf/manuals/en/301_302_305_306_V1.0-1.1_manual.pdf

The device has no ALHy setting.

Firmware version V2.2 replaced the Filt setting with the HY L and HY H settings. These two settings enable different hysteresis setting for two alarms. If you need newer firmware version for your device, you can send your device to Nokeval service.

A1 or A2 LED will not light up and the alarm relays do not work.

Make sure ALHy, HY L or HY H value is not negative.

Specifications

Display	4-num. red LED, 14.5 mm digit height with adjustable intensity
Keyboard	Keys under the front panel surface
Input	4-20 mA
Display range	-999....9999, free scaling
Accuracy	0,05% of span @18…28 °C
Thermal drift	< 100 ppm/°C
Measurement speed	about 0,25 s (4 Hz)
Screw terminals	Removable. 2,5 mm² conductor, except model 305 1,5 mm²
Protection	Input is protected for wrong polarity and over current of 100mA
Voltage drop in current loop	Maximum of 4.8 V with 4-20 mA (comparable to 240 ohms loop resistance). With alarms on maximum of 7.3 V.

202 and 302 alarms

Alarm relays 202, 302	2 solid state relays, maximum of 250 VDC/VAC, Cat II, 150 mA, about 12 ohms. Insulation to current loop is momentarily 4 kV.
Alarm reset	Automatic or hold, reset with keyboard.
Alarm mode	High- and low alarm or two high alarms

Environment

Operating temperature	0...+60 °C
Humidity	< 95 %RH non-condensing
Pollution degree	2
Altitude	Models 202 and 302 <2000 meters. Models 201, 301 and 305 not defined.
Protection class 201, 202	IP65 with the gasket installed and IP40 without the gasket
Protection class 301, 302, 305	IP67

Measurements

Weight 201	About 103g
Weight 202	About 115g
Weight 301	About 205g
Weight 302	About 218g
Weight 305	About 142g

Measurements 201/202	Width 96mm	Height 48mm	Depth 65mm (+ 11mm connector)
Panel size 201/202	Width 92mm	Height 45 mm	
Measurements 301/302	Width 100mm	Height 100mm*	Depth 57mm.
Measurements 305	Width 82mm	Height 80mm*	Depth 57mm.

*301, 302 and 305 height is measured without additional 25mm height added by cable glands.

Cable glands 301, 302	2 pcs M16x1.5, cable diameter 5-10mm
Cable gland 305	1 pcs M16x1.5, cable diameter 5-10mm

Packing list

201 & 202

☐ NGS-NK case brackets (12869)

☐ NGS-94-DA gasket to case NGS-94xx (12867)

☐ Unit sticker sheet (90766)

or

301, 302 & 305

☐ Unit sticker sheet (90766)

Packers marking: