Nokeval

USER MANUAL

5.8.2008 V1.3

Setpoint unit

2022Setp

INTRODUCTION

2022Setp is a special edition of Nokeval 2022 multi-input indicator. It is available in wall-mounted "2800" enclosure or in a 1/8 DIN panel enclosure. Normally it is equipped with an analog output card, and possibly with serial communications card, an alarm relay card, or another analog output card. There is always one mA/V process input with transmitter supply 24 V 250 mA.

Configuration can be fully performed either with the front panel buttons or using serial communications and Mekuwin PC software. The latter option however requires a serial communications card.

SPECIFICATIONS

Input card

Galvanic isolation   Yes
Update rate   6 / sec typ

mA input

Input resistance   50 ohms
Physical range   0..24 mA
Calibr accuracy   ± 8 µA
Linearity   ± 3 µA
Tempco   ± 100 ppm/°C
Transmitter supply   24 V ±20% 260 mA

V input

Input resistance   1.1 Mohms
Physical range   0..12 V
Calibr accuracy   ± 5 mV
Linearity   ± 2 mV
Tempco   ± 100 ppm/°C

Analog output card

Galvanic isolation   Yes (shared with serial communication and another output card)

mA output

Max range   0..20.8 mA typ
Calibr accuracy   ± 8 uA
Linearity   ± 4 uA
Max load   12 V (600 ohm)

V output

Max range   0..10.5 V typ
Calibr accuracy   ± 5 mV
Max load   3 kohm

Serial communications card

Ports   RS-232 or RS-485
Galvanic isolation   Yes (shared with analog outputs)
Protocol   Nokeval SCL
Baud rates   300..19200 bit/s
Response   200 ms max

Alarm relays

Configuration   One or two two-relay cards (2000REL2) or one three-relay card (2000REL3)
Ratings   250 VAC 2 A non-inductive load

General

Power supply   85-260 VAC or 12-32 VDC

Ordering

The full ordering code for a panel indicator with one analog output and 85-260V supply is:
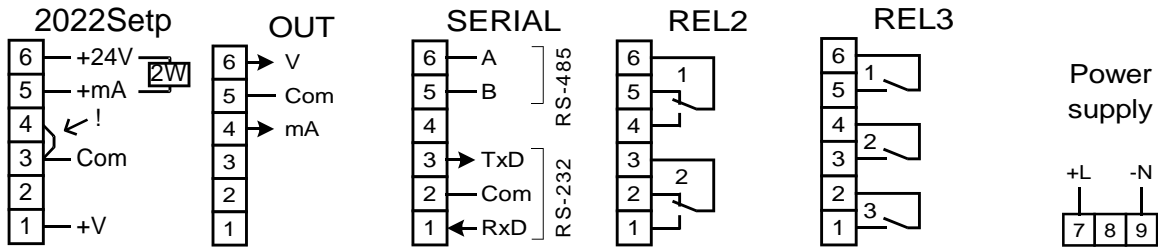**2022SETP-OUT-230VAC**
To add a serial card, include -RS- in the chain. To have relay cards, include -REL2- or -REL3-. Only two option cards can be included!

And for a wall-mounted indicator precede with 2800-:
**2800-**2022SETP-…

INSTALLATION

Connectors

Slot A = 2022Setp input card
Slot B = Analog output (or other option card)
Slot C = The second option card

An active milliamp signal is connected to A5+ and
A3-. A two-wire transmitter may be connected to
A6+ and A5-. Voltage signal is brought to
terminals A1+ and A3-. **Note that slot A**

**connectors 3 and 4 must always be linked
together!**

If a pre-fuse is used in 230V power supply
connection, it should be at least T500mA. The
indicator has an internal pre-fuse. The polarity of
the power supply has no matter.

Jumpers
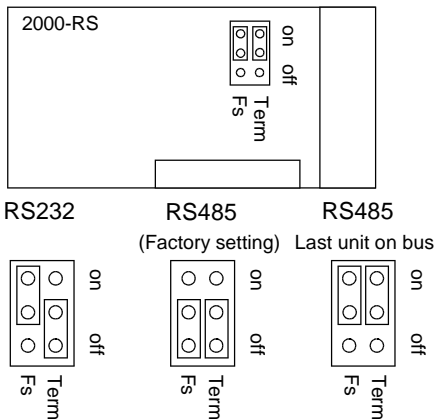
Configuration

Using front panel
The indicator can be fully configured using the
front panel keys. The configuration settings are
explained in chapter Settings, and using the front
panel is described in chapter User interface.

The indicator keeps measuring and updating the
alarms, but the serial output is not available.

Using configuration software
MekuWin program (free from Nokeval web site) is
used to configure the device using RS-232 or RS-
485 communication. If connection fails, check the
communications settings using front panel keys to

match those in MekuWin. The settings are
described in chapter Settings / Serial
communications, and the MekuWin program has a
manual of its own.

The Slot parameter in Mekuwin is used to select
which "slot" or card is configured. 0=Master
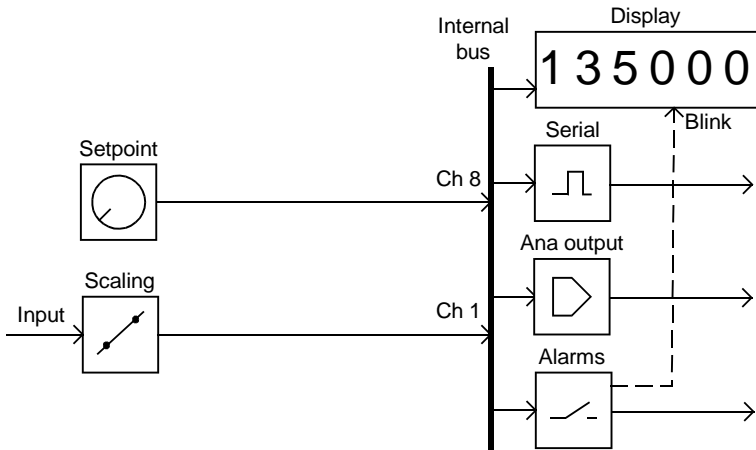(setpoint), 1=slot A (input), 2=slot B (output),
3=slot C.

The indicator keeps measuring during the
configuration, and the MekuWin monitor function
can be used to see the current readings.

3

OPERATION

Data flow

The mA or V input is first measured. This information is converted to a scaled reading (in any engineering units) using two freely selectable sample points, e.g. 4.112 mA corresponds to 0 bar and 16.501 mA corresponds to 6 bar. This is set up in slot A configuration menu. The reading is put available on internal channel 1, to be available for the outputs and the display.

There is one user-adjustable setpoint, that can be changed using the front panel buttons ▲ and ▼. This setpoint is available on channel 8.
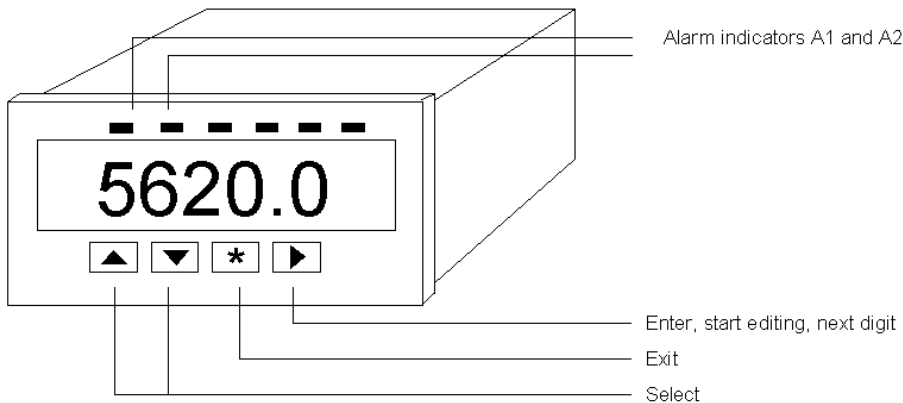
The alarms and analog output(s) can be taken from channel 1 (input) or channel 8 (setpoint).

USER INTERFACE

Front panel

Normal state

In normal state, this device displays the current measurement reading continuously functioning as an indicator.

The display can be set to three different modes. They are:
- **Normal**. The display consists of a channel number and a reading. The channel can be selected with ▲▼ keys. Channels: 1=input, 8=setpoint.
- **Setpoint**. The display is always showing the adjustable setpoint (channel 8), and it can be adjusted using buttons ▲ and ▼.
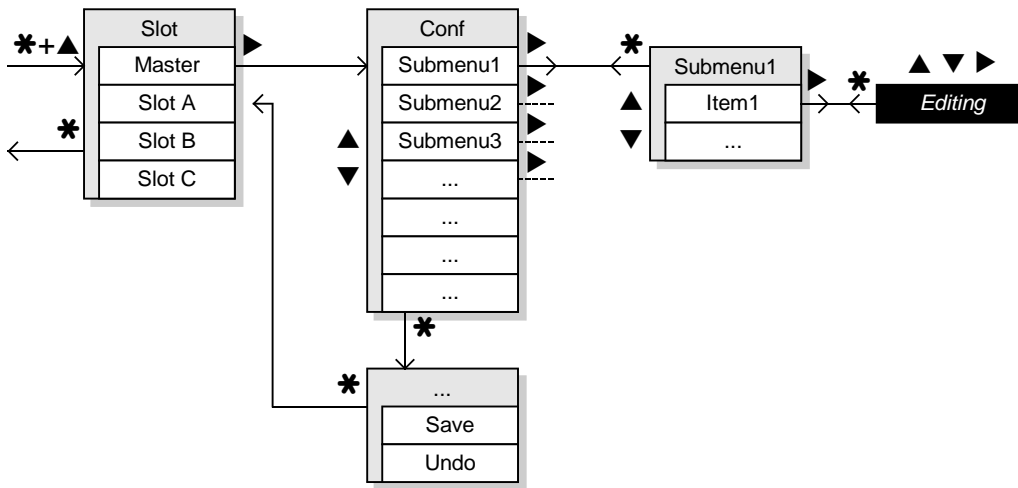
- **MeaSet**. The display shows normally the input (channel 1), but can be requested to show the setpoint by pressing ▲ or ▼ for the time specified in the settings. The setpoint can then be adjusted. The display is returned to input display when no buttons is pressed for a while.

The indicator LEDs A1-A4 show the status of the alarms. The Conf LED is lit when in configuration state. Additionally, M1 blinks when the setpoint is being adjusted.

Configuration state

Press ✱ and ▲ simultaneously two seconds to enter configuration state. First, select the slot to be configured. The options are Master, Slot A, Slot B, and Slot C. Proceed with ▶. If configuration password is set, you will now need to enter it (Cod.0 displayed). In case the password is not known, switch the power off, hold ✱ and ▶ keys pressed and switch the power on again.

✱+▲ → Slot | Master | Slot A | Slot B | Slot C →

✱ ←

Conf | Submenu1 | Submenu2 | Submenu3 | ... | ... | ... | ...

✱ ▲ ▼

Submenu1 | Item1 | ...

✱ ▲ ▼ ▶

Editing

✱

... | Save | Undo

The main level of the configuration menu is shown. You can select among menu items using ▲▼ keys. To edit the setting, push ▶ to start editing, and ✱ to get back to the menu. How to edit, see chapter Editing.

Most data types are edited simply with ▲▼ keys, finally exiting with ✱ key.

Floating point values, such as scaling and lopass filter, are edited with ▲▼▶ keys: select digit to edit (blinks) with ▶ and change it with ▲▼. When the decimal point is blinking, it can be moved with ▲▼. The first digit can be replaced with a minus sign.

To set a **password**, push ▲ to select Set (means password will be used), then push ▶ to enter the new password. Cod.0 is shown. The password is a sequence of six keypresses using all the four keys. Enter the same password twice; if they match, Set is shown again and you can exit with ✱. If they didn't match, Off is shown. Redo from start. To disable a password, push ▼ to select Off and exit with ✱.

When all **settings are done**, exit from the menu with ✱ key. Two options are shown: Save to keep the settings made, and Undo, to discard all the changes. Select Save or Undo and push ✱. Finally, exit from the slot selection by third ✱ (or select another slot with ▲▼ and so on).

Monitor state and simulation

Monitor function can be used while troubleshooting to view some internal values of the indicator. It can be accessed either from the front panel or using the configuration software.

Monitor mode is entered in the normal state by pressing ✱ and ▼ together. Select slot with ▲▼ and push ▶ to enter. The monitored item can be selected with ▲▼. To return to slot selection, push ✱. To return to normal state, push ✱ once more.

Objects to monitor are described in sections of each card.

Some monitor items have a possibility to be locked, so that the indicator does not anymore update them. Then they may be changed by the user to test the system. How to lock in Mekuwin, see its manual. To lock using the front panel, do as follows:

1. Enter the monitoring state as described and the slot you want to.
2. Select the item to be locked using ▲▼ buttons. Do not push ▶ yet.
3. Press and hold ▶ button. Then push ▲ also. Release them both.
4. Now you can enter a new value to simulate/test something.
5. Exit with ✱.

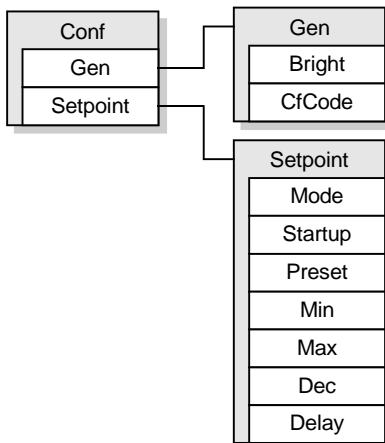To return to normal operation, do the same, but while holding ▶, push ▼.

MASTER / SETPOINT

The master is responsible of the user interface (display and buttons) and of the setpoint. To set up an analog output following the setpoint, see chapter Analog output.

Configuration menu

Conf
Gen
Setpoint

Gen
Bright
CfCode

Setpoint
Mode
Startup
Preset
Min
Max
Dec
Delay

The configuration menu of the master is divided in two sections, Gen (general) and Setpoint settings.

Gen\Bright

Display brightness 1-15. Default value 7.

Gen\CfCode

Password for all the configuration settings. Will apply for the other cards too. If the password is set and forgotten, turn the power off, hold ✱ and ▶ pressed and switch power on. To set the password, select Set, push ▶, and enter the same password twice. If Set is displayed again, you can exit with ✱. The password consists of six keypresses using all the buttons.

Setpoint\Mode

Operation mode, as described in chapter User interface, Normal mode.
- Normal: Displaying channel number + reading.
- Setpoint: Displaying the setpoint all the time.
- MeaSet: Displaying the input reading or the setpoint.

Setpoint\Startup

Setpoint value source after power-up.
- Preset: The initial setpoint value is set in the next menu item.
- Last: The setpoint is preserved during power-off.

Setpoint\Preset

Setpoint value after power-up. This item is hidden if Startup is set to Last.

Setpoint\Min, Setpoint\Max

These define the range where the setpoint can be adjusted.

Setpoint\Dec

Number of digits after the decimal point for the setpoint. Defines also the smallest setpoint step.

Setpoint\Delay

This defines how long ▲ or ▼ key has to be pressed until the setpoint adjustment mode is entered. The time is given in seconds (max 12).

Monitor menu

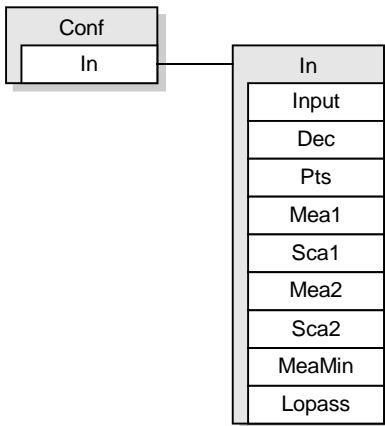The monitor menu has only one item, Mainch, which tells which internal channel is currently being displayed.

INPUT

2022SETP is an input card capable of measuring one mA or V signal. The reading will be put on internal channel 1.

Configuration menu

The configuration menu has one submenu, In, that contains the input settings.

Input

Input signal selection mA or V.

Dec

Number of digits to display after the decimal point. Can also be set negative to have fixed zeros. E.g. if Dec=-2, the display will be rounded to 0, 100, 200, etc.

Pts

Number of scaling points.

- 0: No input scaling. The input signal will be displayed as is, in mA or V.
- 1: One point offset scaling. Input signal Mea1 will be converted to scaled reading Sca1 using appropriate offset. In other words, Sca1-Mea1 is added to the input reading.
- 2: Two point scaling. Input signal Mea1 (in mA or V) is converted to scaled reading Sca1 (in any engineering units) and Mea2 is converted to Sca2. Linear interpolation and extrapolation is applied. E.g. to convert 4-20 mA to 0-100(%), set Mea1=4, Sca1=0, Mea2=20, Sca2=100.

Mea1, Sca1, Mea2, Sca2

Scaling points, see Pts.

MeaMin

Input signals (in mA or V) less than this will be regarded as a fault. Dashes are displayed and alarm relays pulled. If you have 4-20 mA input, you might use MeaMin=3.5 (mA). To disable, set to some large negative value, e.g. –10000.

Lopass

Digital lowpass filter for input. Functions like a RC circuit damping variations in the reading. Set the time constant in seconds. Recommended value 1. To disable filtering, set to 0.

Monitor menu

Mea

The input reading with no scaling applied, in mA or V. Can be locked to test the scaling and the outputs.

Sca

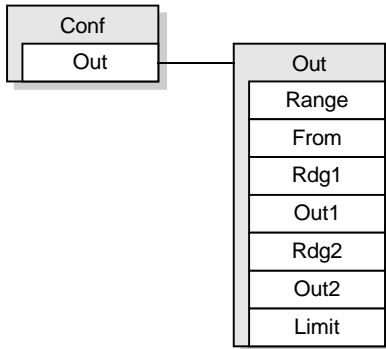The scaled input reading. Can be locked to test the outputs.

ANALOG OUTPUT

2000OUT is an analog output card with one active mA or V output.

Configuration menu

Conf
Out

Out
Range
From
Rdg1
Out1
Rdg2
Out2
Limit

All the output settings are in submenu Out.

Range

Physical output range:
- mA: milliamp output, capable of generating approx 0…20.8 mA.
- V: voltage output, generating approx 0… 10.5 V.

From

The internal channel that the output follows:
- 1: The input
- 8: The setpoint

Rdg1, Out1

The first point in output scaling. The reading Rdg1 (in engineering units) produces physical output Out1 (in mA or V).

Rdg2, Out2

The other point in output scaling. Linear interpolation and extrapolation is applied.

Limit

Output limiting. If enabled, the output will be limited to Out1…Out2, except in fault indication mode, when it will always give the maximum output possible. If disabled, the output will use all of its physical range (see Range).

Monitor menu

The monitor menu contains only one item, Out, that is the current output value in mA or V. Can be locked to feed different signals in order to test the external system.
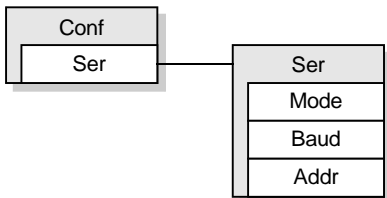
SERIAL

2000RS is a serial communications card containing both RS-232 and RS-485 connections. Only one of these can be used at a time. Moreover only one serial card can be used.

Configuration menu

Mode

Options SCL and Modbus. Only Nokeval SCL is currently available.

Baud

Baud rate 300, 600, 1200, 2400, 4800, 9600, or 19200 bits/s.

Addr

Serial bus address 0-123. When using several units on the same RS-485 bus, they must be set to different addresses. Additionally, this device will respond in "general call" address 126.

Monitor menu

Monitor menu has only one item, Count. It tells the number of serial commands processed. After 255, it will roll over to 0.

Serial commands

Serial communications is based on Nokeval SCL protocol. There is a separate manual "SCL manual" available from Nokeval web site.

The commands recognized by 2022Setp are:

MEA CH 1 ?

Returns the current reading on channel 2. The channels are:
1 = input on slot A
8 = setpoint

MEA SCAN 1 3

Returns the readings from channels 1-3 separated by one space, e.g. "101.000 0.00000 79800.". Scientific representation is not used.

KEY

Returns the current state of the keys. One hexadecimal character is returned, that is a sum of the codes:
▲ 1
▼ 2
✱ 4
▶ 8
Moreover, it will be succeeded by letter "L" if the key status is remained the same for at least 0.5 seconds.

TYPE

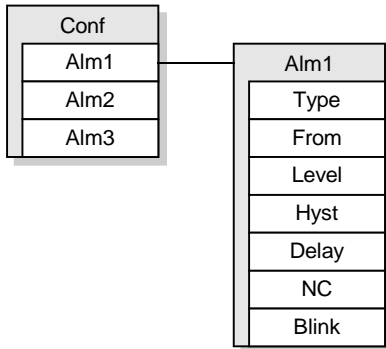Returns the type of the device, "2022SETP V1.3".

ALARMS

2000REL2 and 2000REL3 cards are alarm/relay cards. They have 2 and 3 relays correspondingly.

Configuration menu

```
Conf
  Alm1 ────── Alm1
  Alm2          Type
  Alm3          From
                Level
                Hyst
                Delay
                NC
                Blink
```

The configuration menu has two or three submenus, depending on the card type. The submenus are identical.

Type

- Off: The alarm is always off.
- Lo: The alarm activates when the reading falls below the alarm level and deactivates when it goes above alarm level + hysteresis.
- Hi: The alarm activates when the reading goes above the alarm level and deactivates when it falls below alarm level – hysteresis.
- Window: The alarm activates when the reading (on the channel selected in From setting) deviates more than Level from the setpoint value, and deactivates when the deviation falls below Level-Hyst.

Example 1: Type=Window, From=1, Level=5, Hyst=1. Alarm activates when the input reading goes above setpoint+5 and deactivates at setpoint+4. The alarm also activates when the input reading goes below setpoint-5 and deactivates at setpoint-4.

From

The channel that is monitored. 1=level, 8=setpoint.

Level

The alarm level. See Type.

Hyst

The difference between alarm activation and deactivation levels. Always positive. See Type.

ActDelay

Defines the time how long the alarm condition must be continuously true before the alarm will actually activate. The time is given in seconds, the maximum value being 4295 seconds.

DeaDelay

Like ActDelay, but affects the alarm deactivation. This is used only when Auto is selected in the Reset setting.

Reset

Alarm reset switch selection. Select always Auto, since this device does not have manual reset switches.

NC

Invert the operation of the relay. If set to Yes, the relay is pulled normally and released when the alarm is active. Will not affect the front panel LEDs.

Blink

If enabled, the display will blink on 1 Hz frequency when this alarm is active.

Monitor menu

The monitor menu has only one item, Alarms. It tells the state of the alarms. 0=no alarms, 1=alarm1, 2=alarm2, 4=alarm3, and any sum of these. Can be locked to manually test the relays.

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