USER MANUAL

14.2.2013 V2.3

STRAIN GAUGE TRANSMITTER

6841

Nokeval

INTRODUCTION

6841 is a DIN rail mounted strain gauge / weighing transmitter. It is equipped with a small display and push buttons to allow configuration without a separate programming device. There are also two alarm relays, analog output, and RS-485 serial output with Nokeval SCL and Modbus protocols. The sensor can be connected using 6-wire measurement to eliminate wire resistance effect. Sensor excitation is about 10 volts DC.

The device can be calibrated or taught in up to six points.

SPECIFICATIONS

Input

Excitation:

From transmitter	10 V ±10% 150 mA
Externally	2.5 … 11 VDC
Max wire resistance	100 ohm
Max load	78 ohm

Measurement:

Ranges	-40…+40 mV and -40…+100 mV
Input impedance	>10 Mohm
Inlinearity	<0.02%
Zero error	<0.01 mV
Zero drift	<10 ppm/°C
Gain drift	<100 ppm/°C
Update rate	about 4 Hz (10 and 14 Hz also available but with less accuracy)

Analog output

mA output:

Range	0-20 mA or less (e.g. 4-20)
Accuracy 25°C	±0.008 mA
Overrange	0…21 mA typ
Max load	1000 ohms

V output:

Range	0-10 V or less
Accuracy 25°C	±0.005 V
Overrange	0…10.6 V typ

Serial output

Protocols	Nokeval SCL or Modbus RTU or ASCII-CRLF auto transmission
Baud rates	1200…57600 bit/s
Bit configuration	SCL/ASCII: 8N1 Modbus: 8E1
Response time	Max 100 ms

Alarm relays

Maximum load	2 A / 250 VAC resistive

External switch

Threshold level	about 2.5 V
Pullup	5 V / 1 kohm
Functions	Min/Max reset Tare Hold Alarm reset

General

Isolation	Input is isolated from outputs. Serial and analog outputs sharing common (-). Power supply isolated.
Supply voltage	85-260 VAC or 24 VDC
Operating temp	0..60 °C
Humidity	0..95 %RH non-cond.
Weight	250 g
Connectors	2.5 mm^2, detachable

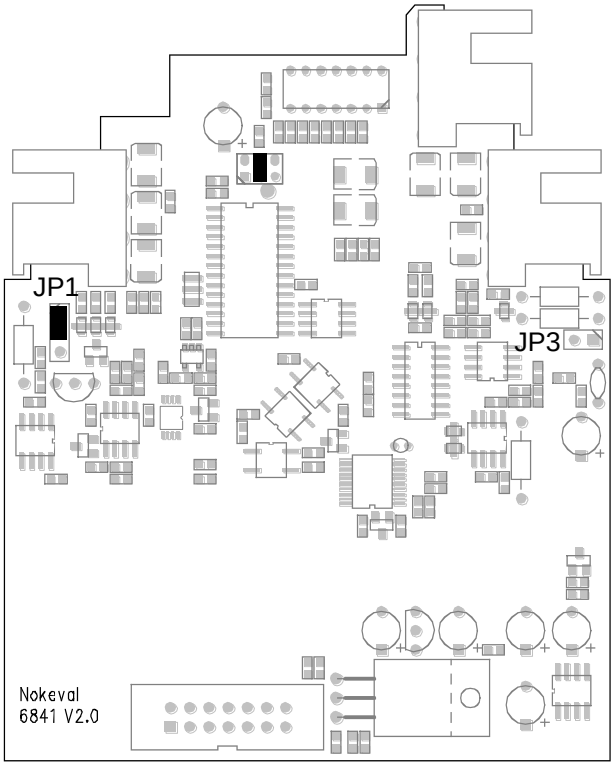
INSTALLATION

Jumpers

The case has to be opened to access the jumpers. Jumper locations and positions are represented in the picture. Factory settings are shown bold.

JP1 selects between external switch input or passive 2-wire analog output on connector B1.

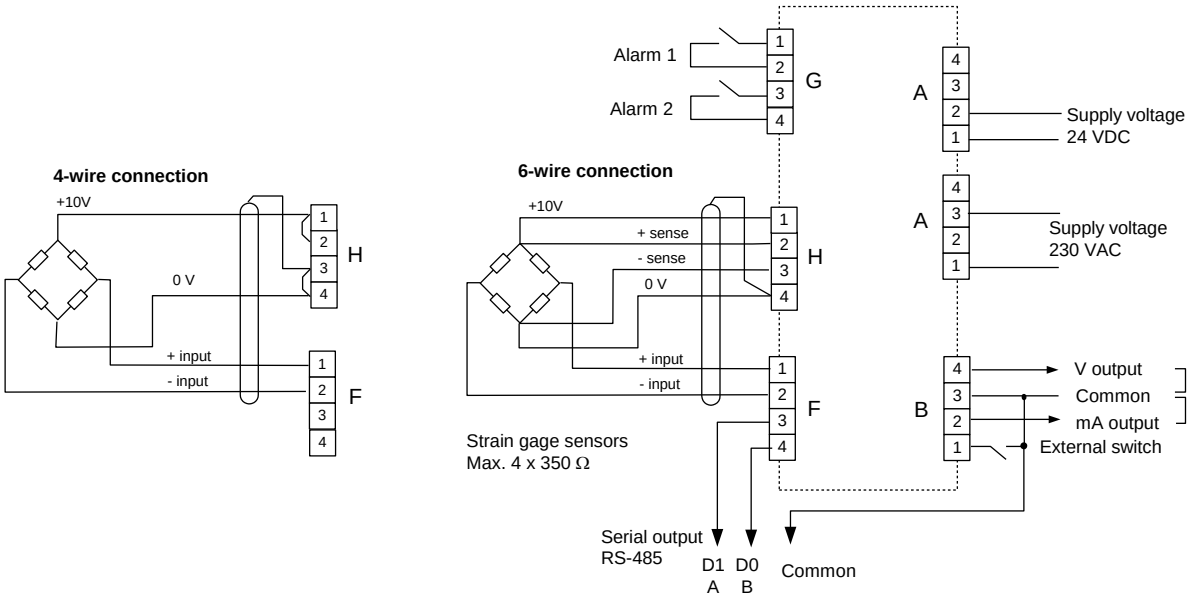
6841 can also measure a half-bridge. In this case two 1 kohm 0.1% precision resistors have to be added on the circuit board and JP3 has to be closed.



JP1
- **Connector B1 is an external switch input**
- Connector B1 is a passive mA output (B1+, B2-)

JP3
- Full bridge
- Half bridge

Connectors



Configuration

Using front panel

The transmitter can be fully configurated using the front panel keys, but the numerical values can't be fed precisely, since there are only four digits. The configuration settings are explained in chapter Settings, and using the front panel is described in chapter User interface.

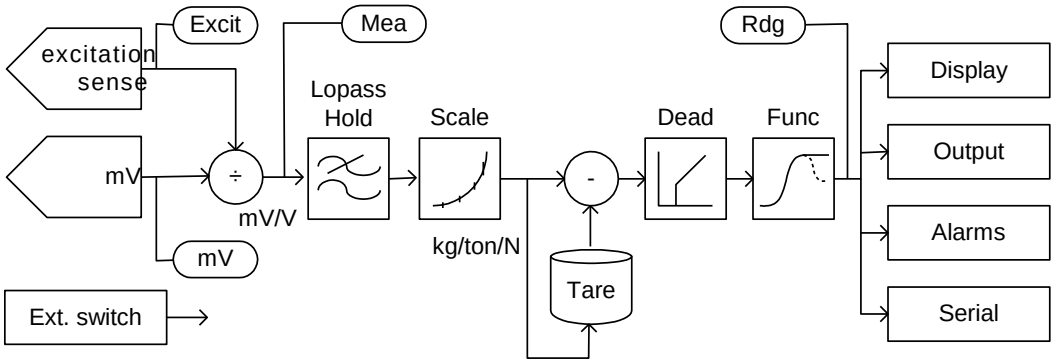
The transmitter keeps measuring and updating the analog output and alarms, but the serial output is not available.

Using configuration software

MekuWin program (free from Nokeval web site) is used to configure the device using RS-485 communication. If connection fails, check the communications settings using front panel keys to match those in MekuWin, and make sure the device is in SCL mode. The settings are described in chapter Settings, and the MekuWin program has a manual of its own.

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

OPERATION



6841 weighing / strain gauge transmitter feeds about 10 V excitation voltage to the sensor. Alternatively an external excitation 2.5…11 VDC can be used. There is no need for precision voltage source, as 6841 measures the excitation voltage. When using 6841 to excite the bridge, 6-wire connection can be used, so that bridge excitation is measured using separate wires, eliminating errors from wire resistance.

The transmitter has two analog inputs (see block diagram above), excitation sense and the sensor signal (mV). The mV signal is first divided by measured excitation voltage, resulting in relative signal mV/V. Because the bridge excitation is very seldom exactly 10.000 V, you should always speak of the relative signal mV/V.

Disturbances in the signal can be attenuated with an adjustable lowpass filter, and the input can be freezed with Hold function.

Sensor signal is converted to engineering units with up to 6 signal-display value pairs. This way combines both the scaling and the linearization.

Tare function can be used for zeroing the tare weight or other zero error. Tare value can be set either by feeding it with front panel keys, or let the transmitter to tare itself to a preset value.

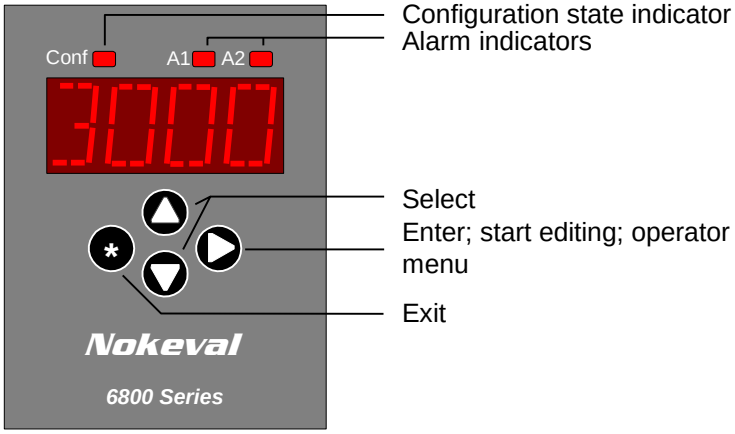
Dead function hides small zero drifts by dropping the display reading to zero when the sensor signal falls below the set level. It can alternatively be used to prevent negative readings.

Display and outputs can be configured to follow minimum or maximum value. Minimum and maximum memory can be reset on front panel or with an external switch. These values are not preserved during power-off.

The final reading is shown on the display, and the same reading is used for analog output, serial output, and alarms.

USER INTERFACE

Front panel



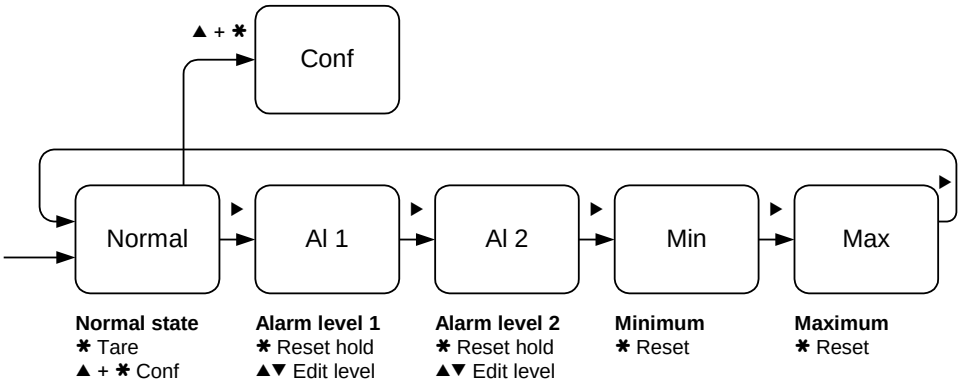
Normal state

In normal state, this device displays the current measurement reading continuously functioning as an indicator. The A1 and A2 indicator LEDs indicate the current state of the alarms.

If some function for FP key is enabled in the configuration menu (see e.g. Tare function), you can activate the function by pressing ✱ key.

The device is in this state after power-up.

Operator menu



Alarm levels and minimum/maximum memory can be accessed without entering the configuration state. Use the ▶ key to select operator function (Alarm level 1 – Alarm level 2 – Minimum – Maximum – Normal); the blinking indicator LED indicates the current function.

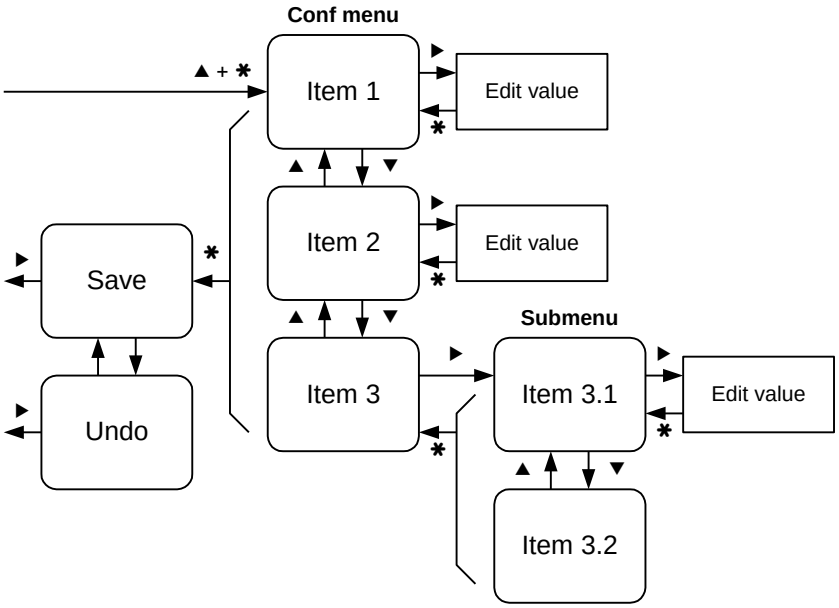
When an alarm LED is blinking, the alarm level can be changed. Press ▲ or ▼ until the first digit starts blinking, then edit as described in chapter Editing. To reset the alarm (when alarm reset is not auto), press ✱ for one second while alarm LED is blinking. Both alarms are reset separately.

When a A1 LED is blinking together with Conf LED, minimum reading is displayed, and it can be reset with ✱ key press for one second. A2 with Conf blinking indicates correspondingly maximum reading.

If password is set (Opcode in configuration menu), alarm level cannot be changed nor functions reset without entering the correct password.

Configuration state

Press ▲ and ✱ simultaneously two seconds to enter configuration state. When entered, the Conf LED will light. If configuration password is set, you will 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 – PWDC is displayed briefly.



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. See chapter Editing for how to edit.

The menu is organizated hierarchically. You can enter Gen, In, Out, Alm1, Alm2, ExtSw, and Ser submenus by selecting them with ▲▼ keys, and entering the submenu with ▶ key. See the menu chart in page 9.

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 changes. Select Save or Undo and push ▶.

Editing

Most data types are edited with simply ▲▼ 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 key presses 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 ✱.

Monitoring

Monitor function can be used while troubleshooting to view some internal values of the transmitter. 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. Monitored item can be changed with ▲▼. To return to the normal state, push ✱.

Items

Some items are shown in the block diagram in page 5 in a rounded corner boxes.

- **Rdg**: Latest reading, the same that is displayed in normal state.
- **Mea**: Latest unscaled measurement result mV/V attenuated with lowpass filter. This value is mV value divided by Excit value.
- **mV**: Latest measurement result from bridge mV signal.
- **Excit**: Latest measurement result from bridge excitation voltage (V).
- **Tare**: Current zero shift / tare value, the same value as In/Tare/Value in configuration menu.
- **Out**: Current output signal (V or mA).
- **Alarms**: Current state of the alarms: 0=none, 1=Alarm1, 2=Alarm2, 3=both active.
- **ExtSw**: Recognized state of the external switch: Off=not active, On=active.

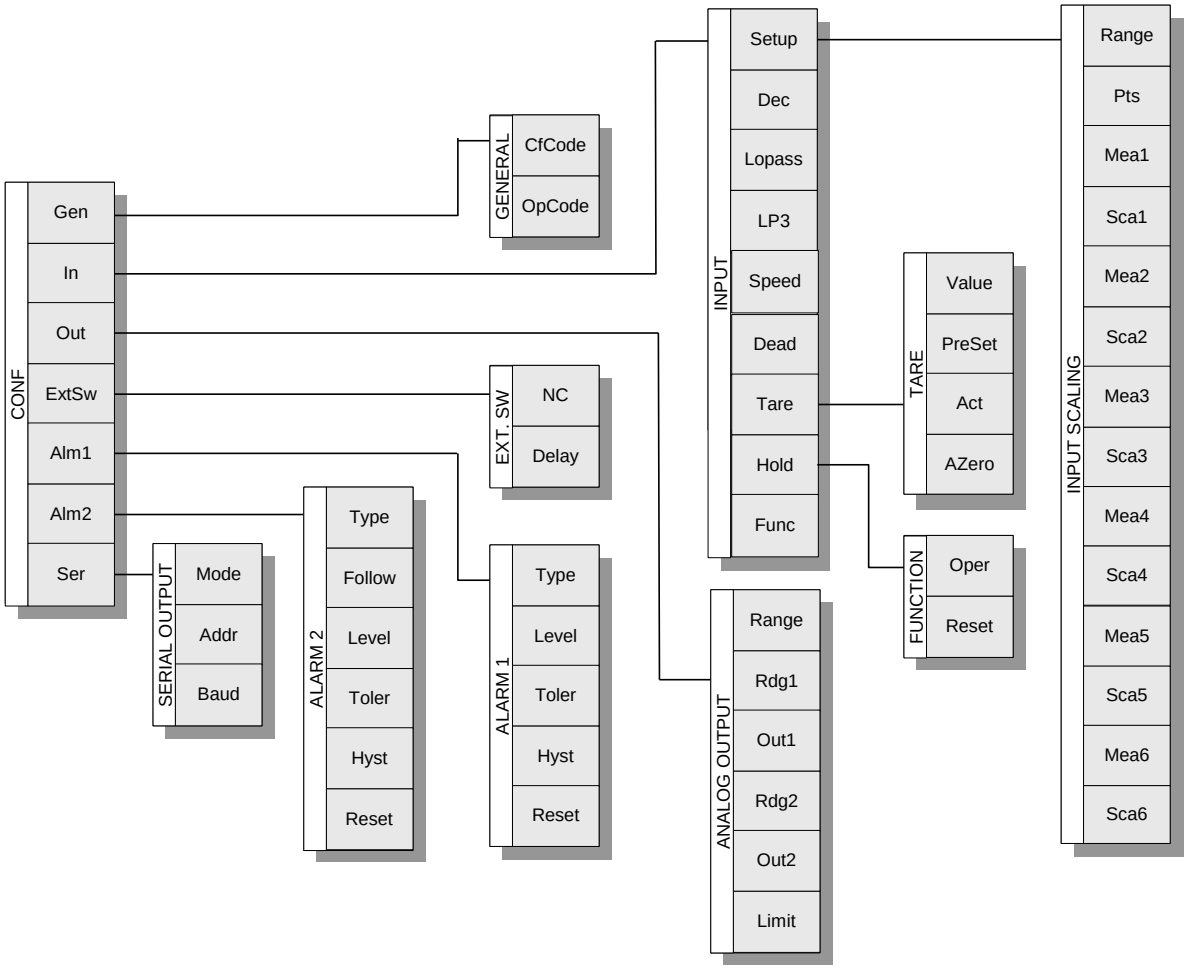
Latest item in the Monitor menu is **Diag**, that can be used to view fault conditions detected by the transmitter. In monitor mode, use ▼ key to select Diag and push ▶. If nothing happens, there is no active diagnostics messages. But if happens, you can use ▲▼ keys to browse messages in case there is more than one active message.

6841 has three diagnostics messages:

- **ExcLow**: Bridge excitation voltage is below 2 V. Check the wiring.
- **Overrange**: mV input has been overranged. Check the wiring and input range selection In/Setup/Range.
- **ADErr**: Error in communication with A/D converter. The transmitter needs service.

SETTINGS

Menu tree



Page numbers

Sensor setup

Sensor signal is converted to force or weight value in In/Setup submenu.

First select appropriate measurement range (In/Setup/Range). Then select how many linearization/scaling points you need (Pts). Feed the corresponding amount of sensor signals (Mea1…) in mV/V, and the corresponding readings (Sca1…). The sensor signals can be also teached, if test weights are available.

Range

The measurement range for mV input. The maximum 11 V excitation is used, so determine the maximum sensor signal by multiplying its sensitivity (mV/V) with 11 and select appropriate range. The ranges are:

- **40 mV** (-40…+40 mV)
- **100 mV** (-40…+100 mV)
- **180 mV** (-40…~+130 mV)

Example: sensor gives 2 mV/V with maximum load applied, so maximum signal is 2×11 = 22 mV. Select 40 mV range.

The sensor signal can be examined using Monitor function, if its magnitude is not known. See page 7.

Pts

Number of scaling/linearization points:

- **0**: No scaling. Sensor signal (mV/V) is used as is on the display and outputs.
- **1**: One point scaling. One sensor signal (mV/V) and one display reading (kg, ton, N) is set, and the transmitter calculates the coefficient using these. Zero signal gives zero reading.
- **2**: Two point scaling. Two signal-reading pairs are entered, giving possibility for zero shift.
- **3…6**: Several points scaling/linearization. Several signal - reading pairs are entered, and linear interpolation used between these. Outside the points linear extrapolation with two nearest points is used. Sensor signals (Mea1…) must be in ascending order, Mea1<Mea2<Mea3 etc.

Mea1…6

Sensor signals (mV/V), corresponding to readings in Sca settings. The signal is given as the sensor output divided by the sensor excitation, as this ratio is not dependent on the current excitation voltage!!!

Sca1…6

Scaled readings (kg, ton, N…) that should be displayed with sensor signals in Mea settings. The measurement unit can be any.

Teaching

If precise test weights are available, the transmitter can be taught with these weights, correcting both sensor and transmitter errors. The transmitter is used to measure the sensor signal, and the precise readings are paired with these results.

The sensor signal can be investigated using Monitor function, but there is an easier way to do the teaching:

1. It is recommended to **remove taring**: Set In/Tare/Value to 0.000. This is not necessary, but helps checking.
2. Select measurement **range** In/Setup/Range.
3. Select number of teaching **points** In/Setup/Pts.
4. Apply the least heavy **weight** (first weight is often 0 kg).
5. Go to **Mea1** in In/Setup submenu so that ”Mea1” appears on the display.
6. **Press** and keep pressed ▶ key, and press ▲ too. Then release them both. Current input signal is displayed. Exit with ✱.
7. Feed the **correct weight** of the calibration weight in **Sca1**.
8. **Repeat** operations 5-7 for Mea2/Sca2 etc, advancing from smallest weight to the next.

If using MekuWin configuration program, use Lock operation (small L button next to the value) on Mea1…6 to copy the current input to the Mea value. Enter the real weight in the correspondig Sca.

Other input settings

General input settings found in In submenu:

Dec

The number of digits on the right hand side of the decimal point. Selectable between -2 and 3. If the number of digits won’t fit in the display, the decimal count is automatically decreased temporarily.

A negative value means that there is no decimals and that the right most digits will always be zero. E.g. Dec=-2, the display is rounded to 0, 100, 200 etc.

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.

LP3

Select between first order (**No**) and third order (**Yes**) lowpass filter. Third order filter gives faster settling and better damping.

Speed

There is three measurement rates to select from: 4, 10, and 14 measurements/sec. The accuracy specifications are valid for 4/sec only.

Dead

Dead zone around zero. If the reading is closer to zero than the Dead value, the display is rounded to zero. This is especially handy in weighing and flow measurement applications.

To prevent negative values only, set Dead=0. To disable the dead zone, set Dead=-1 or any negative value.

If auto-zero function (In/Tare/AZero) is engaged, Dead setting is used to determine the auto-zero range, and the dead zone operation is not used.

Hold

Input hold. When the switch selected here is activated, the input reading is freezed to its current value, until the switch is deactivated.

While freezed, the display shows “Hold” alternately with the reading.

Options:

- **Off**: not used.
- **FP**: using front panel ✱ key.
- **ExtSw**: with external switch (see ExtSw submenu).
- **Both**: either of the previous.

Tare function

There is three methods to change zero shift / tare value:

- Enter the shift (tare) manually to In/Tare/Value.
- Let the transmitter to zero itself to zero or other value (In/Tare/Act and Preset).
- Let the transmitter auto-zero itself when the reading is near enough zero (In/Tare/AZero).

Settings associated with zero shift / tare are in In/Tare submenu:

Value

Value that is subtracted from the reading. You can feed the tare offset manually.

Example: If the display shows readings that are too low by 7.2, correct this by decreasing the Tare/Value by 7.2.

Act

Tare/zero switch select. When the switch specified here is activated, the transmitter will tare itself to the value specified in In\Tare\Preset.

Options:

- **Off**: not used.
- **FP**: using front panel ✱ key.
- **ExtSw**: with external switch (see ExtSw submenu).
- **Both**: either of the previous.

Preset

The reading to which the transmitter will tare itself, when the switch selected in In/Tare/Act is activated. The transmitter calculates new In/Tare/Value so that the reading corresponds to Preset with current input signal.

AZero

Automatic zeroing. When the reading (on the display) has been close enough to zero the time specified here (1-30 sec), the transmitter calculates new tare value to get exactly zero reading. The zone width is specified with In/Dead.

To disable, set to zero. In this case, In/Dead will work as specified.

Input special functions

Special functions for input can be selected in In/Func submenu.

Oper

Special function select.

- **Off**: nothing special.
- **Min**: display and outputs follow the minimum reading.
- **Max**: maximum reading.

Minimum and maximum are not preserved over power-off situations.

See also Freset and Operator menu.

Reset

Function reset switch select. When the switch selected here is activated, the minimum and maximum memories are reset to the current reading. This applies to the minimum and maximum values seen in the Operator menu too.

Options:

- **Off**: not used.
- **FP**: using front panel ✱ key.
- **ExtSw**: with external switch (see ExtSw submenu).
- **Both**: either of the previous.

Analog output

The analog output follows display reading with all the functions: lowpass filter, dead zone, tare, min/max func etc.

Settings associated to analog output are in Out submenu.

Range

Range selection:

- **Off**: no analog output
- **V**: voltage output 0-10V or less
- **mA**: current output 0-20mA or less

Rdg1

Display reading corresponding to physical output value specified in Out1.

Out1

Physical output (V or mA) corresponding to reading Rdg1

Rdg2

Reading corresponding to Out2.

Out2

Output corresponding to Rdg2.

Limit

Output limit:

- **No**: Analog output will use the whole physical range in overrange situations (about 0…11 V or 0…21 mA).
- **Yes**: Analog output is limited between Out1 and Out2. Used with chart recorders typically.

Example

4-20mA signal wanted from weighing reading 0-1000 kg. Set:
Range = mA
Rdg1 = 0 (kg)
Out1 = 4 (mA)
Rdg2 = 1000 (kg)
Out2 = 20 (mA)

External switch

One external switch can be connected to the transmitter. The switch may be used for one or more of the following:

- Min/Max function reset (In/Func/Freset)
- Zero/Tare (In/Tare/Act)
- Input hold (In/Hold)
- Alarm reset (Alm1/Reset and Alm2/Reset)

Note: To be able to use the switch, jumper J5 must be in correct position. See page 3.

Settings concerning the external switch input are in ExtSw submenu:

NC

Reverse operation (normally closed):

- **No** = Normally open contact (NO): activated by closing the points or pulling the voltage low.
- **Yes** = Normally closed contact (NC): activated by opening the points or letting the voltage be pulled high by the internal pullup.

Delay

Operation delay to enhance immunity to disturbances. Set the time in secods that the switch must be activated (or deactivated) to be recognized. (The time is rounded to nearest multiple of 0.26 seconds.)

Alarm relays – Alm1 and Alm2

There is two independent alarm relays. They can be freely to low level or high level or window alarms. The second alarm level can be set to follow the first so that they can be adjusted together. Alarm settings are accessed in the configuration menu Alm1 and Alm2 submenus, but the alarm levels are also accessible in the Operator menu (see page 6).

When power supply is cut off, the relay 1 will open (NO) and the relay 2 close (NC).

Alm1 and Alm2 submenus:

Type

Alarm type:

- **Off**: Not used.
- **Lo**: Alarm when reading goes below Level+Toler.

- **Hi**: Alarm when reading goes over Level+Toler.
- **LoNc**: Like Lo, but relay operation inverted.
- **HiNc**: Like Hi, but relay operation inverted.
- **Inside**: Alarm when reading is between Level-Toler…Level+Toler.
- **Outside**: Alarm when reading is not between Level-Toler…Level+Toler.
- **Settled**: Alarm when the reading has settled. In this type, the other alarm settings are not used except the Reset setting.

Level and Follow

Alarm level value. See also Toler. If Alarm 2 has its Follow set on, its actual level is Alarm 1 level added with Alarm 2 level. This way both levels can be adjusted together, and Alarm 2 level is not seen in Operator menu.

Toler

With Lo, Hi, LoNc, and HiNc alarms, Toler is an offset that is added to the Level setting. This can be used in batching: Operator is going to batch 500 kg, so he sets Level=500. But if we know that an additional 5 kg comes after the valve has closed, we can compensate this by setting Toler=-5, making the actual alarm level be 495 kg.

With window alarms Inside and Outside, Toler setting defines the window width: the alarm levels are Level-Toler and Level+Toler.

Hyst

Alarm hysteresis. When an alarm has activated, it won't deactivate until the reading goes back the amount specified in Hyst setting. Always a positive value.

Example: High level alarm at Level=50, Hyst=5. Alarm activates when the reading goes over 50, but deactivates at 45.

Reset

Alarm hold/reset:

- **Auto**: Alarm deactivates when the reading goes below/over the set limit by the Hyst value without operator intervention.
- **FP**: Alarm is not deactivated until the operator resets it with ✱ key in normal state.
- **ExtSw**: Alarm is not deactivated until reset by the external switch.
- **Both**: Alarm can be reset both with front panel and with the external switch.

Alarm cannot be deactivated by any means when the alarm conditions are still met (e.g. reading exceeds the high level alarm level).

Serial output

Serial output RS-485 can be used for reading measurement results and for configuration.

Configuration settings concerning the serial output are in Ser submenu. See also the chapters concerning the serial protocols.

Mode

- **SCL**: The transmitter is a slave using Nokeval SCL protocol, and responds when told to. In this state, it can be used in data acquisition systems, or configured with Nokeval configuration software.
- **Modbus**: The transmitter is a slave using Modbus RTU protocol, and responds when addressed.
- **ASCII**: The transmitter sends readings using ASCII characters, without being commanded. The reading is composed of characters -0123456789. and may be preceded by spaces. The reading is terminated by CRLF (ASCII codes 13 and 10).

Addr

Serial bus address. With SCL protocol, use address 0-123. With Modbus, use 1-247. When using SCL, this unit will respond at address 126 too.

Baud

Baud rate. 1200, 2400, 4800, 9600, 19200, 38400, or 57600 bits/sec. Other transfer parameters are fixed to 8 data bits, no parity, 1 stop bit, this is 8N1, except with Modbus they will be 8E1.

Other settings

Gen submenu contains settings that are not associated with inputs or outputs.

Cfcode

Password to Configuration menu. When set, configuration settings can't be accessed without knowing this.

Setting: When Cfcode is displayed, push ▶. Select ▲ Set and push ▶. Cod.0 is displayed. Enter six keypresses (e.g. ▲▲▼▼✱▶) and then the same again. If these matched, Set is displayed again and you can exit with ✱.

Disabling: When Cfcode is displayed, push ▶, and select ▼ Off.

Opcode

Password to Operator menu, where alarm levels and min/max memories can be accessed. See Cfcode above about entering.

SCL COMMANDS

Nokeval SCL protocol is specified in a separate manual that can be downloaded from Nokeval web site.

Commands available are:

TYPE ?

Returns model number and software version: ”6841 V2.2” (without quotation marks).

SN ?

Returns the serial number, if it is stored in the transmitter:
e.g. ”A123456”.

MEA CH 1 ?

Returns the latest reading (the same value that can be seen on the display). Uses characters “-0123456789.”. Scientific representation (e.g. 3.2e-6) is not used. The reading has always six significant digits (negative readings five).

TARE

Adjusts the Tare value so that the current reading corresponds to the In\Tare\Preset value. The transmitter will indicate 0.0 this on.

MN xxxxxxxxxx

Configuration commands from MekuWin configuration software.

CH 1 AV 1 xxxxx

Changes alarm 1 level to xxxxx (Alm1/Level). Possible characters are space, +, -, decimal point, and digits 0…9.

CH 1 AV 2 xxxxx

Changes alarm 2 level (Alm2/Level).

MODBUS COMMANDS

Supported commands

- **3 Read Holding Registers**: reading the settings.
- **6 Write Single Register**: changing the settings.
- **16 Write Multiple registers**: changing the settings.
- **17 Report Slave ID**: checking the device type.
- **109 Meku**: Mekuwin configuration software uses this.

When the settings are changed by writing a Holding register, the settings are stored in the non-volatile EEPROM memory immediately. It might take several dozens of milliseconds for the transmitter to respond to the next command.

The maximum length of the command is 220 bytes. The maximum length of the response is the same. This sets the limit to number of registers with commands 3 and 16.

The command 17 will return 0x11 <bytecount> 0x00 0xFF, followed with ”6841 V2.3 A123456”, for example.

When the serial connection settings are changed, the changes do not affect until the transmitter is powered down. This is to prevent breaking the connection while making the changes.

Data types

- BOOL: Off/on setting. Only the least significant bit is used.
- BYTE: One byte setting. Only the lower word of the Modbus register is used.
- WORD: 16-bit setting.
- ENUM: Option list setting. The options listed in section Enum tables.
- CODE: Password 12 bits. 0=not used.
- FLOAT: 32-bit floating point number IEEE 754. Least significant word first (LSWF, little-endian).

Within one Modbus register, the data is represented the most significant byte first (MSBF, big-endian).

Holding registers

Register	Name	Type	Values
0	Conf\Gen\Cfcode	CODE	
1	Conf\Gen\Opcode	CODE	
2	Conf\In\Dec	BYTE	Signed -2...4
3..4	Conf\In\Lopass	FLOAT	Unsigned
5	Conf\In\LP3	BOOL	
6	Conf\In\Speed	ENUM	See table E1
7..8	Conf\In\Dead	FLOAT	Signed
9	Conf\In\Hold	ENUM	See table E2
10	Conf\In\Setup\Range	ENUM	See table E3
11	Conf\In\Setup\Pts	BYTE	Unsigned 0...6
12..13	Conf\In\Setup\Mea1	FLOAT	Signed
14..15	Conf\In\Setup\Sca1	FLOAT	Signed
16..17	Conf\In\Setup\Mea2	FLOAT	Signed

18..19	Conf\In\Setup\Sca2	FLOAT	Signed
20..21	Conf\In\Setup\Mea3	FLOAT	Signed
22..23	Conf\In\Setup\Sca3	FLOAT	Signed
24..25	Conf\In\Setup\Mea4	FLOAT	Signed
26..27	Conf\In\Setup\Sca4	FLOAT	Signed
28..29	Conf\In\Setup\Mea5	FLOAT	Signed
30..31	Conf\In\Setup\Sca5	FLOAT	Signed
32..33	Conf\In\Setup\Mea6	FLOAT	Signed
34..35	Conf\In\Setup\Sca6	FLOAT	Signed
36..37	Conf\In\Tare\Value	FLOAT	Signed
38..39	Conf\In\Tare\Preset	FLOAT	Signed
40	Conf\In\Tare\Act	ENUM	See table E2
41	Conf\In\Tare\AZero	BYTE	Unsigned 0...30
42	Conf\In\Func\Oper	ENUM	See table E4
43	Conf\In\Func\Reset	ENUM	See table E2
44	Conf\Out\Range	ENUM	See table E5
45..46	Conf\Out\Rdg1	FLOAT	Signed
47..48	Conf\Out\Out1	FLOAT	Signed
49..50	Conf\Out\Rdg2	FLOAT	Signed
51..52	Conf\Out\Out2	FLOAT	Signed
53	Conf\Out\Limit	BOOL	
54	Conf\ExtSw\NC	BOOL	
55..56	Conf\ExtSw\Delay	FLOAT	Unsigned
57	Conf\Alm1\Type	ENUM	See table E6
58..59	Conf\Alm1\Level	FLOAT	Signed
60..61	Conf\Alm1\Toler	FLOAT	Signed
62..63	Conf\Alm1\Hyst	FLOAT	Unsigned
64	Conf\Alm1\Reset	ENUM	See table E7
65	Conf\Alm2\Type	ENUM	See table E6
66	Conf\Alm2\Follow	BOOL	
67..68	Conf\Alm2\Level	FLOAT	Signed
69..70	Conf\Alm2\Toler	FLOAT	Signed
71..72	Conf\Alm2\Hyst	FLOAT	Unsigned
73	Conf\Alm2\Reset	ENUM	See table E7
74	Conf\Ser\Mode	ENUM	See table E8
75	Conf\Ser\Addr	BYTE	Unsigned 0...255
76	Conf\Ser\Baud	ENUM	See table E9
1000	Tare	BYTE	

The unit can be tared (offset to zero) by writing value 84 (‘T’) to holding register 1000.

Input registers

Register	Name	Type	Values
0..1	Mon\Rdg	FLOAT	Signed

2..3	Mon\Mea	FLOAT	Signed
4..5	Mon\mV	FLOAT	Signed
6..7	Mon\Excit	FLOAT	Signed
8..9	Mon\Tare	FLOAT	Signed
10..11	Mon\Out	FLOAT	Signed
1000	Mon\Rdg	WORD	Signed

The current scaled reading can be read from input register 0 in IEEE754 floating point form, or alternatively from holding register 1000 as a 16-bit integer. The integer should be divided by 10^{Dec}, where Dec is the location of the decimal point set in configuration menu In\Dec, to get the real reading.

Starting from firmware version 2.3, the input readings can be read from Holding registers 5000 onwards in floating point format the same way they are read from Input register 0 onwards. They are available in integer format from register 6000 onwards.

Enum explanations

Table E1

Value	Speed
0	4 Hz
1	10 Hz
2	14 Hz

Table E2

Value	Reset
0	Off
1	FP
2	ExtSw
3	Both

Table E3

Value	Range
0	40mV
1	100mV
2	180mV

Table E4

Value	Oper
0	Off
1	Min
2	Max

Table E5

Value	Range
0	Off
1	V
2	mA

Table E6

Value	Type
0	Off
1	Lo
2	Hi
3	LoNc
4	HiNc
5	Inside
6	Outside
7	Settled

Table E7

Value	Reset
0	Auto
1	FP
2	ExtSw
3	Both

Table E8

Value	Mode
0	SCL
1	Modbus
2	ASCII

Table E9

Value	Baud
0	1200
1	2400
2	4800
3	9600

4	19200
5	38400
6	57600

7	115200

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