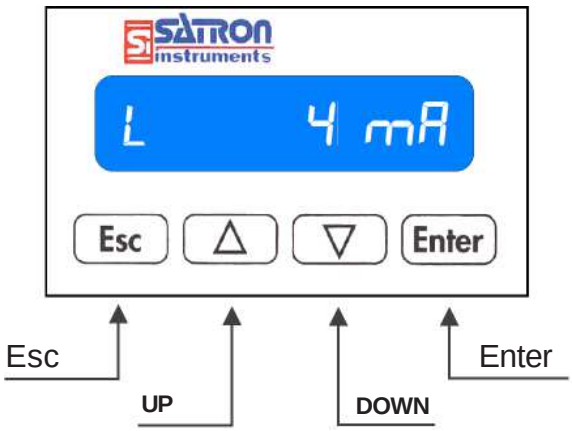
OPERATIONS

The user interface for the series V transmitters, housing option **N**, consists of display and operating keys. Among other things, the user interface allows you to set process variables in the desired units on the display and to configure the transmitter e.g. by setting the lower and upper range-values (**LRV**, **URV**) and the process variable's unit and tag code. In addition, you can perform diagnostic routines and view device information through the user interface.



The 8-character liquid crystal display (LCD) allows you to display information with letters and numbers.

OPERATING KEYS:
With the **UP/DOWN[↑↓]** arrow keys and **ENTER** and **ESC** you can move in the menus. The functions of the keys:

ENTER[↵]:
Press ENTER to move to a lower level in a menu or to accept a command or parameter value.

UP [↑]:
Use the UP arrow key to move up on the current menu level or to increase the selected parameter value.

DOWN [↓]:
Use the DOWN arrow key to move down on the current menu level or to decrease the selected parameter value.

ESC [X]:
Press ESC to move back towards the top of the main menu.

The main menu has 4 submenus: Measurement, Configuration, Info and Diagnostics menus. When the transmitter is powered up it will go to the Measurement menu's main display, i.e. Process Value.

1. MEASUREMENT MODE MENU: MEASURE

When the transmitter is powered up, it immediately shows the **MEASURE** menu's main display, **PROCESS VALUE**. Use the **UP/DOWN[↑↓]** keys to move in the menu. The menu does not have any variables adjustable by the user. Use the **ESC** key to exit the **MEASURE** menu to the main menu.

1.1 PROCESS VALUE (PV):

L 12.34

This shows the PV (process value/primary variable) which may be pressure, volume, differential pressure, etc. The letter at the left of the display specifies the linearization function in use. The available options are as follows:

L	Linear
Z	Zero-based linear
I	Inverted linear
S	Square root
U	User 16 points

Define the linearization function by selecting **LIN FUNC** from the **CONFIGUR** menu.

1.2 UNITS

BAR

With the **[↓]** key you can display the process value's unit. Define the unit by selecting **UNITS** from the **CONFIGUR** menu. If user-defined has been selected as linearization function, the text USER (default value) is shown as unit .

1.3 PRESSURE VALUE

P 12.34

The pressure detected by the sensor.

1.4 PRESSURE UNIT

BAR

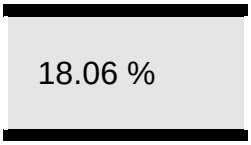
The unit of the pressure detected by the sensor.

1.5 MA, CURRENT LOOP

6.89 mA

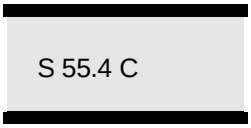
Current signal's value in milliamps.

1.6 %, PER CENT



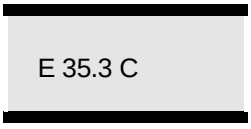
Current signal's value in per cents of full-range value.

1.7 S F/C, SENSOR TEMP



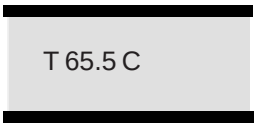
Sensor temperature in °C or °F. Select the unit from the **CONFIGUR** submenu.

1.8 E F/C, ELECTRONICS TEMP



The temperature of the transmitter's electronics, either °C or °F. Select the unit from the **CONFIGUR** submenu.

1.9 T F/C, PROCESS TEMP



The temperature of the process, either °C or °F. Select the unit from the **CONFIGUR** submenu.

2. CONFIGURATION MENU: CONFIGUR

Select Configuration mode from the main menu level with the **UP/DOWN[↑↓]** keys. Then press **ENTER** to access the **CONFIGUR** menu. In this submenu you can define the upper and lower range-values (**URV, LRV**), device identification code, linearization function, etc.

2.1. MANUFCTR

Manufacturer's name. Cannot be changed.

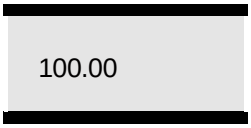
2.2. DEV TYPE

Product type code. Cannot be changed.

2.3. TAG

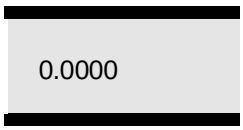
Tag code. You can enter free-format text one character at a time. When you select this option with **ENTER** the cursor will be at the left. Select characters with **ENTER** (to the right) and **ESC** (to the left). You can view the selectable characters one character at a time with the **UP/DOWN[↑↓]** keys until the desired character is found. When the cursor is at the right edge you can go back to the **CONFIGUR** menu either by accepting the new tag code with **ENTER** or by exiting without changing the tag code by pressing **ESC**. You can go back to edit mode by pressing the **ESC** key when asked to accept your entry. Apostrophe indicates the cursor position; at point, however, the cursor will disappear. A great deal of special characters are available besides letters and numbers.

2.4 PV URV, UPPER RANGE-VALUE



This is the process variable's upper range-value corresponding to 20 mA. Set the value in the selected units, which are displayed first. The numerical value is shown in the next screen where you can also edit the value. The procedure is similar to **TAG**, except that you first set the position of the decimal point with the **UP/DOWN[↑↓]** keys. After accepting that with **ENTER** you can edit each digit in the value in the same way as the characters in **TAG**. If the defined upper range-value is invalid, the display will blink and you go back to re-edit the value.

2.5 PV LRV, LOWER RANGE-VALUE

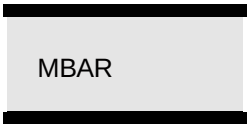


Here you set the process variable's lower range-value corresponding to 4 mA. The procedure is the same as for upper range-value.

2.6 PV DAMP, DAMPING

Time constant, in seconds, for output damping. The range is 0.025s to 60s. Set the value with the **UP/DOWN[↑↓]** keys and accept it with **ENTER**, or press **ESC** if you do not want to change the value.

2.7 UNITS



Here you can display or change the applied unit of measure. Press **ESC** to exit without making a change. Press **ENTER** to accept new value. Use the **UP/DOWN[↑↓]** keys to view the units. The selectable units include **KPA, TORR, ATM, MPa, INH2O, INHG, FTH2O, MMH2O, MMHG, PSI, BAR, MBAR, G SQCM, KG SQCM, PA.**

2.8 T UNITS

Select the temperature unit from this menu. The unit can be °C or °F. Proceed as described above to make the selection.

2.9 LANGUAGE

ENGLISH

From this menu you can select the desired language (**SUOMI, SVENSKA, ENGLISH, DEUTSCH or FRANCAIS**). Use the **UP/DOWN[↑↓]**keys to select the language, press **ENTER** to save the selection, or press **ESC** to exit without saving.

2.10 PASSWORD

12

From this menu you can set a password (0…999) for the transmitter. If a password has been specified, you cannot set any parameters or make any other settings on the transmitter unless you enter the correct ID number in this menu. Password is not in use when **PASSWORD** is 000 after reset. You enter the **PASSWORD** in the same way as **TAG**. **PASSWORD** will be on when you define a value between 1 and 999. If you forget password get on to Satron Instruments Inc.

2.11 LRV=PV

0.000000

Here you set the current process pressure as lower range-value (**LRV**). Accept the setting with **ENTER** when asked to confirm the value (**SAVE?**). Press **ESC** to exit if you do not want to change the value. Compare this function to **LRV**. Blinking value indicates an error, i.e., measured pressure is lower than the sensor's lower range-value or the difference between upper and lower range-values is not on the specified range.

2.12 URV=PV

90.00000

Here you set the current process pressure as upper range-value (**URV**). Accept the setting with **ENTER** when asked to confirm the value. Press **ESC** to exit if you do not want to change the value. Compare this function to **URV**. Blinking value indicates an error, i.e., measured pressure is higher than the sensor's upper range-value or the difference between upper and lower range-values is not on the specified range.

2.13 LIN FUNC

LIN

In this menu you select the output transfer function for current loop connection. The selection is done with the **UP/DOWN[↑↓]** keys, and the options are as follows:

LIN: Linear 4mA to 20mA [process value's zero point = current pressure value (value measured by sensor)].
LIN ZERO: Process value's zero point is the same as the lower range-value.
INV LIN: Inversely linear 20mA to 4mA.
SQR: Square root 4mA to 20mA.
USER LIN: User-defined 16-point interpolated transfer function for output. Enter the points through the **USER FUNCTION** option or through **HART** user interface.
USER SPL: The same as **USER LIN**, but this generates a smoother transfer function for the output.

2.14 HART® COMMUNICATION LINK SETTINGS

HART

Select this function with the **UP/DOWN[↑↓]**keys. In menus 1-3 you select the content of the burst message. You can view the available selections with the **UP/DOWN[↑↓]** keys. Available options:

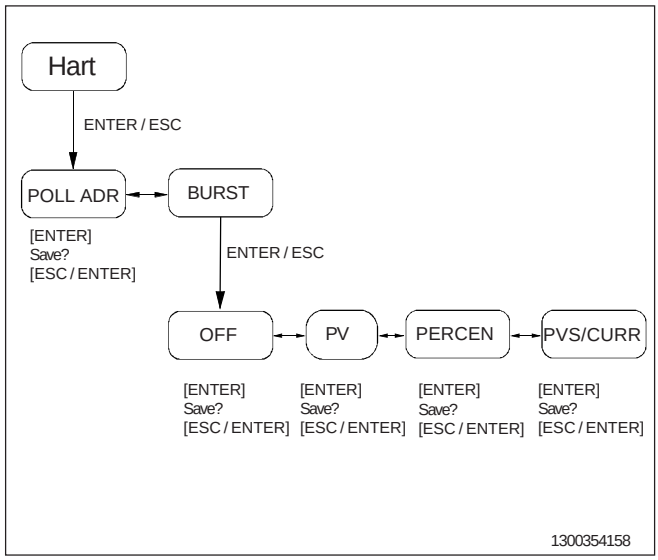
In menu 1 (PV): Transmitter sends process value PV to system.

In menu 2 (PERCEN%): Transmitter sends process variable's value in per cent of specified measuring range to master.

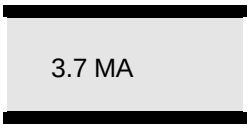
In menu 3 (PVS/CURR): Transmitter sends all process variables and current signal's value.

In menu 5 (POLL ADR): Select the transmitter's Hart® address. The address can be set between 0 and 15. Address 0 defines current loop, in which case the transmitter will operate in two-wire system. The procedure is the same as described above.

In menu 6 (BURST ON/OFF): Select the Burst mode. First define the process variable sent by the transmitter from menus 1-3. The procedure is the same as described above.



2.15 ALRM TYP



Current signal will settle at either 3.7 mA or 22.5 mA to indicate transmitter fault to an external device. Use the **UP/ DOWN[↑↓]**keys to select the current value from the menu. The default is 3.7 mA.

2.16 DATE

The date consists of a single field. For instance, 15022004 specifies 15 February 2004. You can edit the date in form ddmmyy. The calendar year can be selected from between 1900 and 2155. This date can be example date of calibration.

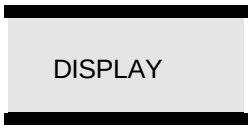
2.17 USER FUNC

In this menu you define the points for a user-defined function. You enter the pressure and corresponding output point by point. The number of points is at least 2 and at most 16. In this connection you can also define the corresponding reference temperature **T REF** and volume's temperature coefficient **V T COF**. Select and accept the numerical values as described above. Set the pressure and the corresponding output. Make the settings one character at a time in the same way as when defining **TAG**. Press **ESC** to return to the **CONFIGUR** menu. Press **ENTER** to edit the selected variable. Use the arrow keys to select the desired variable. The selectable variables include the following:

POINTS	volume of couple of points (2...16)
UNITS	unit (max. 8 markers)
PRES 0	1st reference pressure
OUT 0	Output corresponding to 1st reference pressure at reference temperature
PRES 1	2nd reference pressure
OUT 1	Output corresponding to 2nd reference pressure at referencetemperature
.	
.	
.	
PRES 15	16th reference pressure
OUT 15	Output corresponding to 16th reference pressure at reference temperature
TREF	Reference temperature
V T COF	Volume's temperature coefficient

You can change the variables in the same way as **TAG**.

2.18 DISPLAY



In this menu you can select the direction in which the display will be read:

NORMAL: From left to right. Transmitter mounted horizontally with process connection directed to the right.
ROTATED: Rotates the text 180 degrees from NORMAL.

2.19 BACKLGHT

In this menu you select the backlight on / off. The selection is done with the **UP/DOWN[↑↓]** keys, and the options are as follows:

MODE:

OFF	Backlight off
DELAYED	Backlight on 5 ... 75 s after the start, the default value is 60 s. Value is changed Satron pAdvisor program.
BUTTON	Backlight on 5 ... 75 s for the last button is pressed, the default value is 60 s. Value is changed Satron pAdvisor program.

BLINK:

OFF	Backlight blink off
ALARMS	Blacklight blinking (1/6 Hz) if the transmitter is in the alarm current.
WARNINGS	Blacklight blinking (1/6 Hz) if the text on the display is blinking.

3. DEVICE INFORMATION MENU: INFO

You can select the device information menu from the Main Menu level with the **ENTER** key. In this submenu you can view the upper and lower range-values (**URV, LRV**), device ID number, sensor's upper and lower scale-limits (**USL, LSL**), etc. Use the **UP/DOWN[↑↓]**keys to view these items. Press **ESC** to return to the Main Menu level. You cannot change the data displayed in this menu.

3.1 MANUFCTR:

The manufacturer of the transmitter.

3.2 DEV TYPE

Product type code.

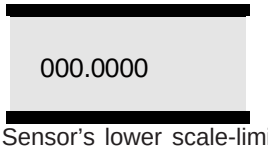
3.3 TAG

Tag code.

3.4 PV USL

Sensor's upper scale-limit in the selected units. Press **ENTER** to select this item. The configured unit will be displayed when you press **ENTER** a second time.

3.5 PV LSL

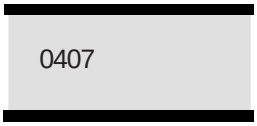


Sensor's lower scale-limit in the selected units. The procedure is the same as for **USL**.

3.6 MIN SPAN

Minimum span. Press **ENTER** to select this item. Press **ENTER** a second time to display the unit. Press **ESC** to exit.

3.7 ASSM NUM



The transmitter's assembly number. Press **ENTER** to select this item. Press **ESC** to exit. For instance, assembly number 0407 shows that the transmitter was made in week 07 of the year 2004.

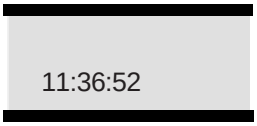
3.8 PV SNSR

The sensor's serial number. Press **ENTER** to select this item. Press **ESC** to exit.

3.9 VERSION

Version numbers of the transmitter's electronics and software. Press **ENTER** to select this item. Press **ESC** to exit. With the **UP/DOWN[↑↓]** keys you can select either **CPU HW, CPU SW, ADC HW, ADC SW** or **MAN REV** (manual revision) revision number or **CPU ID**-number from this submenu.

3.10 OP TIME



The value of the operation time save at 1 hour intervals. When the value of the counter is < 100 hours so value save 1-minute intervals.

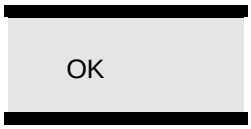
The value of the operation time counter on the display :

HH :MM :SS	when the value of counter is <100 hours
HHHH : MM	when the value of counter is <100000 hours
HHHHHHHH	when the value of counter is ≥100000 hours

4. DIAGNOSTICS MENU: DIAGNOST

Select the **DIAGNOST** menu on the Main Menu level with the **ENTER** key. This submenu allows you to examine the transmitter's internal errors and faults, to set the transmitter to give out a fixed current, and to calibrate the transmitter.

4.1 STATUS



Here you can display and reset accumulated errors one at a time. The text **OK** will be displayed if there are no errors. Possible error messages (alarm means a serious fault/error that also puts the current signal in fault status and makes the display blink):

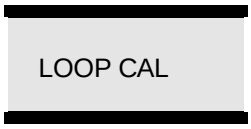
Table 1.
The content of error word 1
(EW1=0…15)

Bit	Error message	Description
0	P ER	Pressure (P) error
1	ST ER	Sensor temperature (ST) error
2	ET ER	Electronics temperature (ET) error
3	RANGE ER	Percentage of output under -10% or over 110% error
4	OUTSA WA	Output current saturated
5	ADCR ER	ADC converter runtime error
6		
7		
8	ADCS ER	ADC converter startup error
9	EEPRR ER	EEPROM checksum error
10	EEPRW ER	EEPROM write error
11	EECAL ER	EEPROM calibration error
12	HART ER	HART communication error
13	INTRN ER	Internal system error
14		
15		

4.2 LOOP TST

The transmitter can be set to give out a fixed current signal for testing the mA output. The first **ENTER** will switch the transmitter off from normal mode (**AUTO OFF**), the second **ENTER** will set it for 4 mA output, and the third **ENTER** for 20 mA output. The next **ENTER** after that will give default value 12 mA, which can be changed as desired with the **UP/DOWN[↑↓]** keys. The last **ENTER** will switch the transmitter back to normal mode (**AUTO ON**). The purpose of this test is to test the accuracy of the transmitter's current output with a reference meter. If any shortcomings are detected, refer to **4.3 LOOP CAL** for calibrating the mA output.

4.3 LOOP CAL



Here you can calibrate the current signal given by the transmitter. The first **ENTER** will switch the transmitter off from normal mode (**AUTO OFF**). The next **ENTER** will make the transmitter give out a signal which it assumes to be 4 mA. Use the **UP/DOWN[↑↓]** keys to change this value in accordance with the reading on the reference meter. Then press **ENTER** for 20 mA output, which you must also set in accordance with the reference meter. Press **ENTER** to accept the new reading. **Note**: Use a sufficiently accurate reference meter.

4.4 SENS.TRIM

Here you can calibrate the pressure values. Pressing **ENTER** will display **LWR.TRIM**, where you give the measured value for the sensor's lower calibration pressure. In the next display, **UPR.TRIM**, you give the measured value for the sensor's upper calibration pressure.

The procedure:

- Apply a pressure corresponding to the desired **LRV** (lower range-value).
- Select **DIAGNOST / SENS.TRIM**. Pressing **ENTER** will now display **LWR.TRIM**, and the next **ENTER** will show the pressure reading.
- Use the **UP/DOWN[↑↓]** keys to adjust the displayed pressure in accordance with the reference meter's pressure reading as described in **2.4 UPV**.
- Press **ENTER** to accept the adjusted reading, or press **ESC** to exit without saving the value.
- Apply a pressure corresponding to the desired **URV** (upper range-value).
- Pressing **ENTER[↵]** will display **UPR.TRIM**. The next **ENTER** will display the measured pressure.
- Use the **UP/DOWN[↑↓]** keys to adjust the displayed pressure in accordance with the reference meter's pressure reading.
- Press **ENTER** to accept the adjusted reading, or press **ESC** to exit without saving the value.

NOTE!
The difference between **LWR.TRIM** and **UPR.TRIM** must be at least the transmitter's minimum span.

4.5 PV ZERO

Here you can reset the transmitter. Pressing **ENTER** will display **PV=ZERO?**. Pressing **ENTER** a second time will display **SAVE?** The transmitter will be reset if you press **ENTER** after that.

MAIN MENU

- 1. MEASURE
  - 1.1 PV Process Value
  - 1.2 Unit Process Value
  - 1.3 Pressure Value
  - 1.4 Pressure Unit
  - 1.5 MA Current Loop
  - 1.6 % Percents
  - 1.7 S F/C Sensor Temp
  - 1.8 E F/C Electronics Temp
  - 1.9 T F/C Procss Temp
- 2. CONFIGUR
  - 2.1 MANUFCTR
  - 2.2 DEV TYPE
  - 2.3 TAG
  - 2.4 PV URV
  - 2.5 PV LRV
  - 2.6 PV DAMP
  - 2.7 UNITS
  - 2.8 T_UNITS
  - 2.9 LANGUAGE
  - 2.10 PASSWORD
  - 2.11 LRV=PV
  - 2.12 URV=PV
  - 2.13 LIN FUNC
  - 2.14 HART
  - 2.15 ALARM TYP
  - 2.16 DATE
  - 2.17 USER FUNC
  - 2.18 DISPLAY
  - 2.19 BACKLGHT
    - MODE
    - BLINK
- 3. INFO
  - 3.1 MANUFCTR
  - 3.2 DEV TYPE
  - 3.3 TAG
  - 3.4 PV USL
  - 3.5 PV LSL
  - 3.6 MIN SPAN
  - 3.7 ASSM NUM
  - 3.8 PV SNSR
  - 3.9 VERSION
    - CPU HW
    - CPU SW
    - ADC HW
    - ADC SW
    - CPU ID
    - MAN REV
  - 3.10 OP TIME
- 4. DIAGNOST
  - 4.1 STATUS
  - 4.2 LOOP TST
  - 4.3 LOOP CAL
  - 4.4 SENS.TRIM
  - 4.5 PV ZERO

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