

Installation and Setting-Up Instructions Spare Parts List

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DOCUMENTS

Technical Specifications: BPLV700

Installation and Setting-Up Instructions: BPLV700AV

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1. INSTALLATION

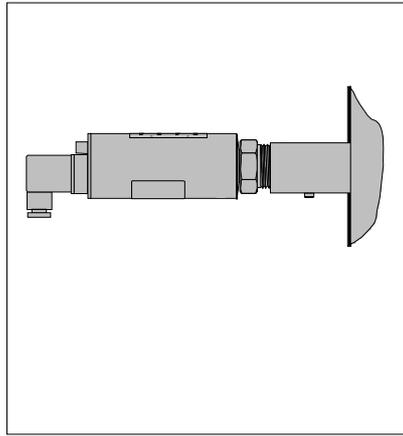
1.1 Mechanical installation

Mounting recommendations: Fig. 1-1

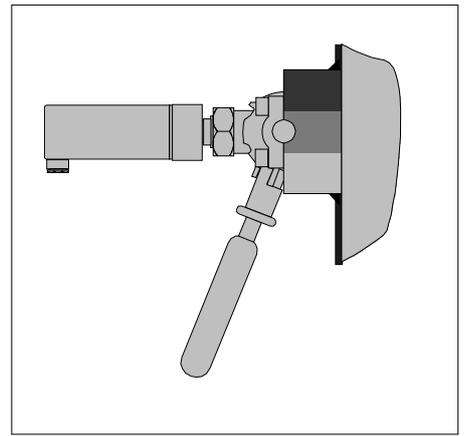
- Process connection direction: horizontal
- Cable entry direction: from below
- Connector coupling direction, calibration direction: horizontal

Other considerations:

- Steam should not be admitted to the transmitter's sensing element.
- In outdoor installations you should make sure that water condensed from e.g. a steam line will not freeze and, by expanding, damage the transmitter's sensor diaphragm. For instance, this can be avoided by installing heat insulation up to the sensor diaphragm.



installation with process coupling

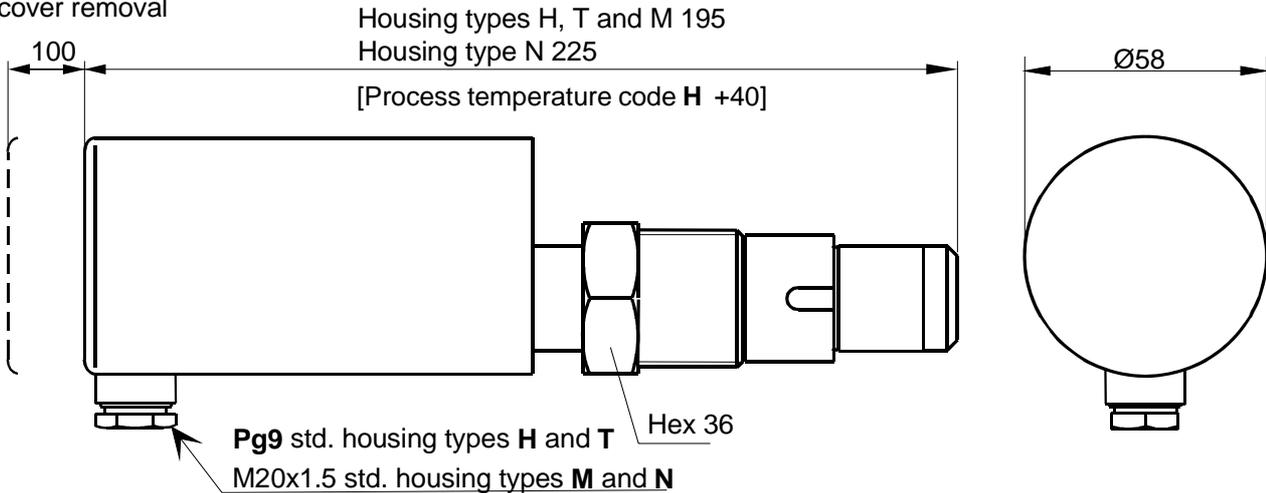


installation with PASVE mounting/service valve

Figure 1-1 Recommended mounting positions

NOTE Dimensions are in millimeters

Clearance for cover removal



Clearance for cover removal

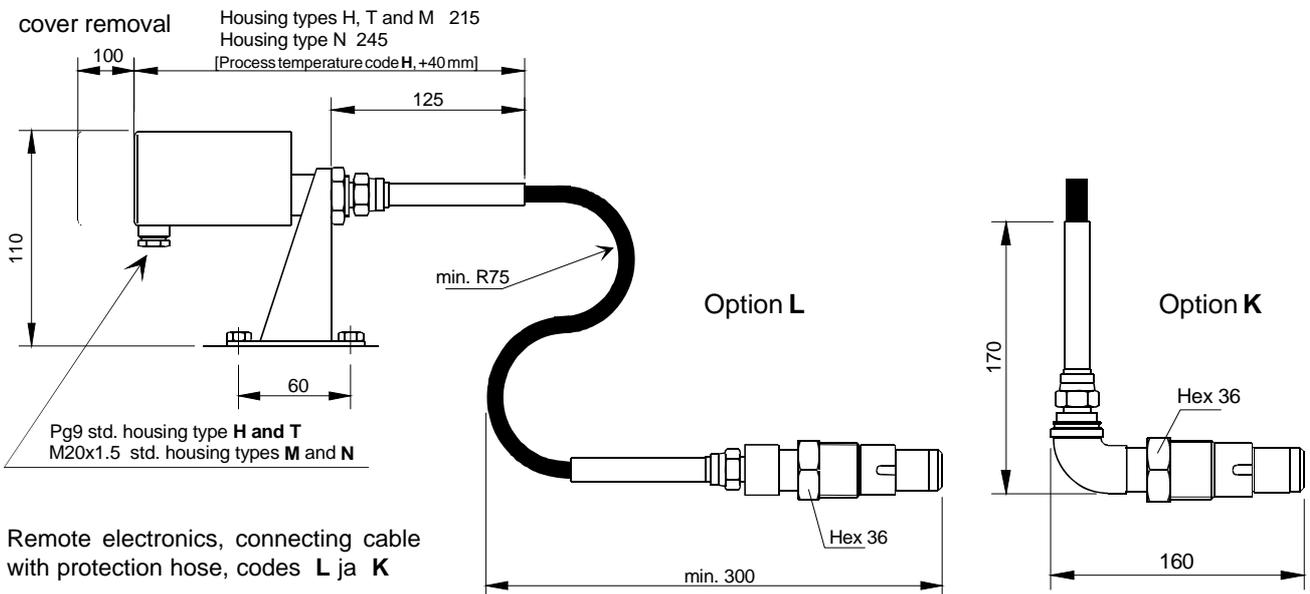


Figure 1-2 Basic mounting dimensions

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1.1.1 Installing welded process couplings

Mounting hole for coupling

- Make a $\varnothing 45.5$ mm (+0.5/-0.2 mm) hole in the tank wall or pipe, as shown in Figure 1-3.

Welding the coupling

These instructions apply to all welded couplings; welding the G1 standard coupling is described here as an example.

- Place the coupling in the mounting hole as shown in Fig. 1-4. Then weld with several runs so as to prevent the coupling's oval distortion and tightness problems.
- The transmitter must be out of the coupling while the coupling is welded. You can use the shut-off plug shown in Fig. 1-5 to shut the coupling. The plug protects the coupling's sealing face and permits the starting of the process without the transmitter.
- It is always recommendable to use the welding assistant (M1050450) while welding the coupling to prevent any distortions due to heat.
- Do not make weld grounding via any transmitter's body!

1.1.2 Mounting the transmitter on the coupling

Procedure

- Make sure that the coupling's sealing face is clean.
- Remove the orange protective plug from the transmitter's diaphragm.

Do not touch the diaphragm! Figure 1-6.

- Insert the transmitter **in a straight line** into the coupling (Fig. 1-7), so that the guide groove on the transmitter aligns with the stop pin on the coupling. The transmitter settles into position when the groove and pin are aligned, and will be prevented from rotating in the coupling.

When inserting the transmitter, be careful not to damage the edge of the sensor diaphragm on the edges of the coupling or on the end of the stop pin!

- Lock the transmitter in position by screwing the hex nut fully home. Finger tightness is sufficient to tighten the sealing faces. However, we recommend final tightening with a tool to eliminate the effect of vibration and other such factors. Apply 60 ± 20 Nm torque.

Do not use sealing tape etc. on threaded connection!

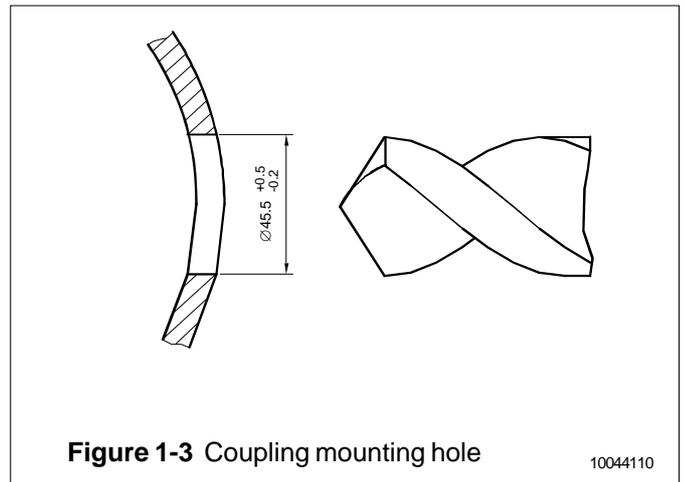


Figure 1-3 Coupling mounting hole

10044110

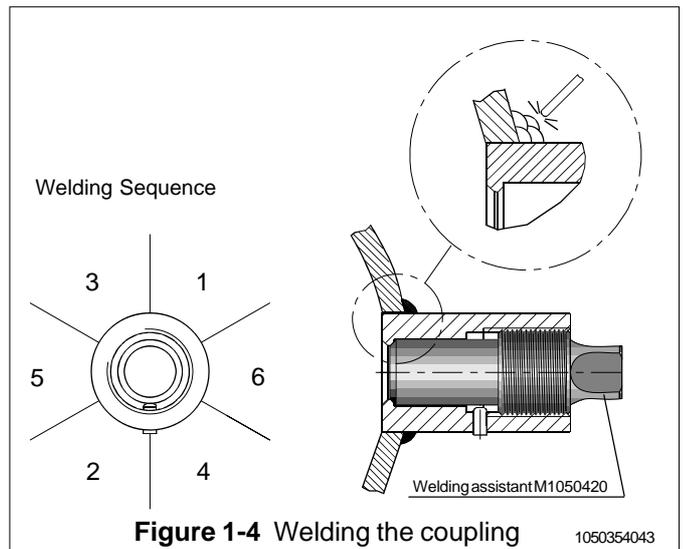
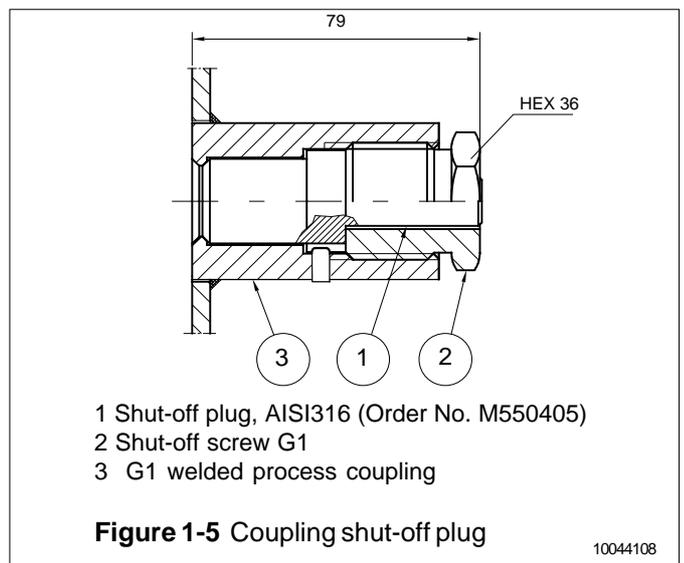


Figure 1-4 Welding the coupling

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- 1 Shut-off plug, AISI316 (Order No. M550405)
- 2 Shut-off screw G1
- 3 G1 welded process coupling

Figure 1-5 Coupling shut-off plug

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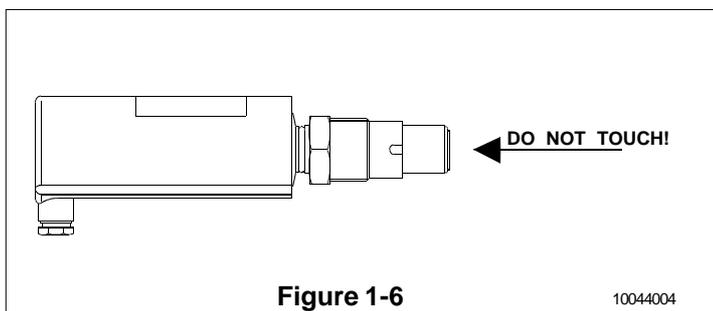


Figure 1-6

10044004

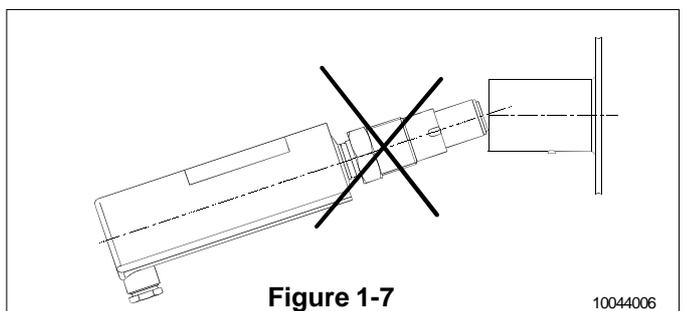


Figure 1-7

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1.1.3 Couplings

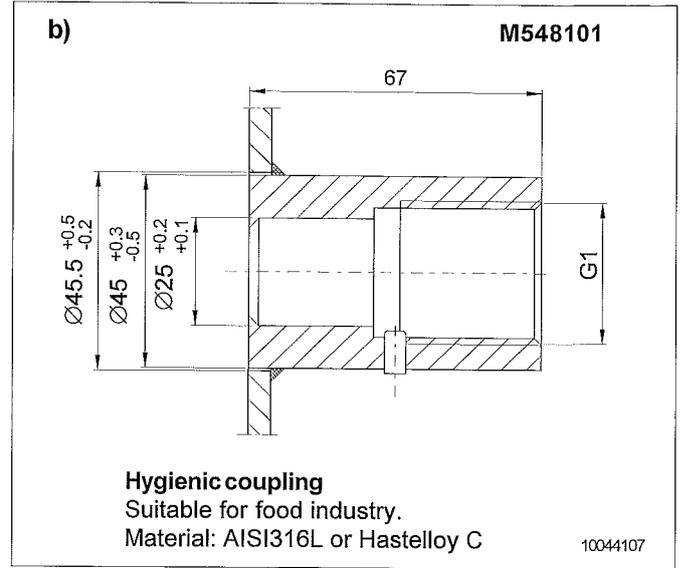
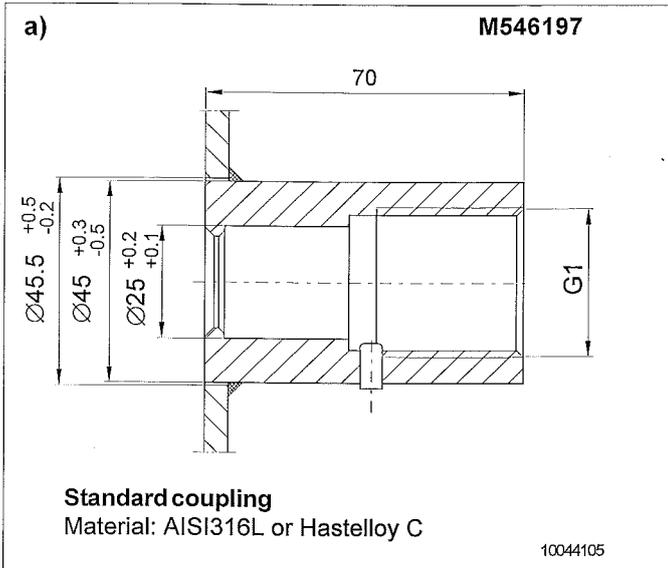


Figure 1-8 Welded couplings

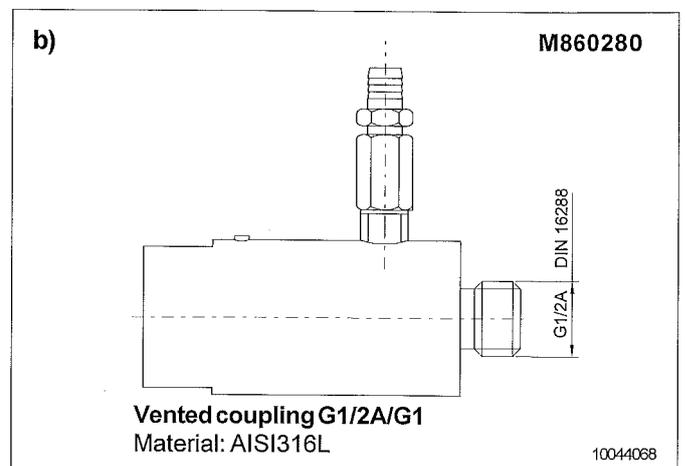
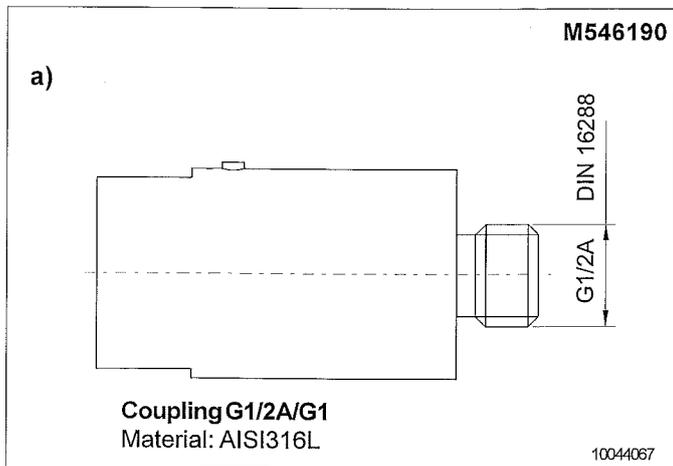
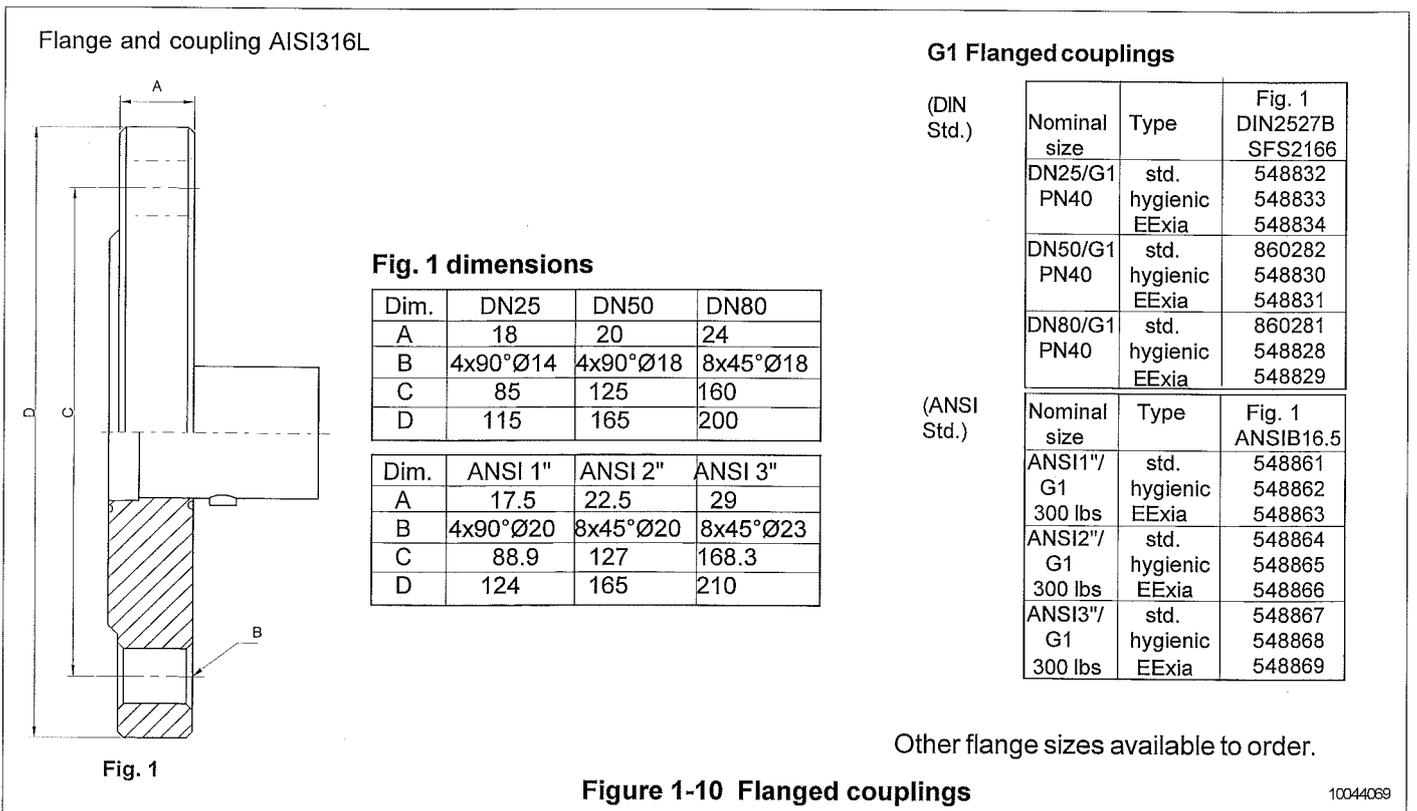


Figure 1-9 Special couplings



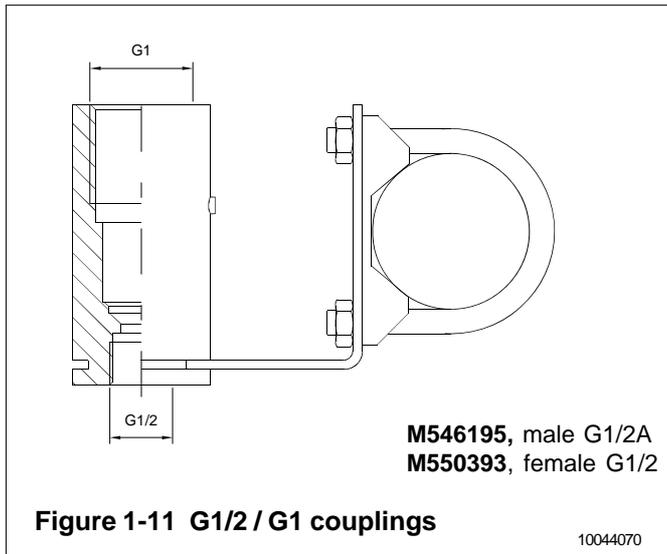


Figure 1-11 G1/2 / G1 couplings

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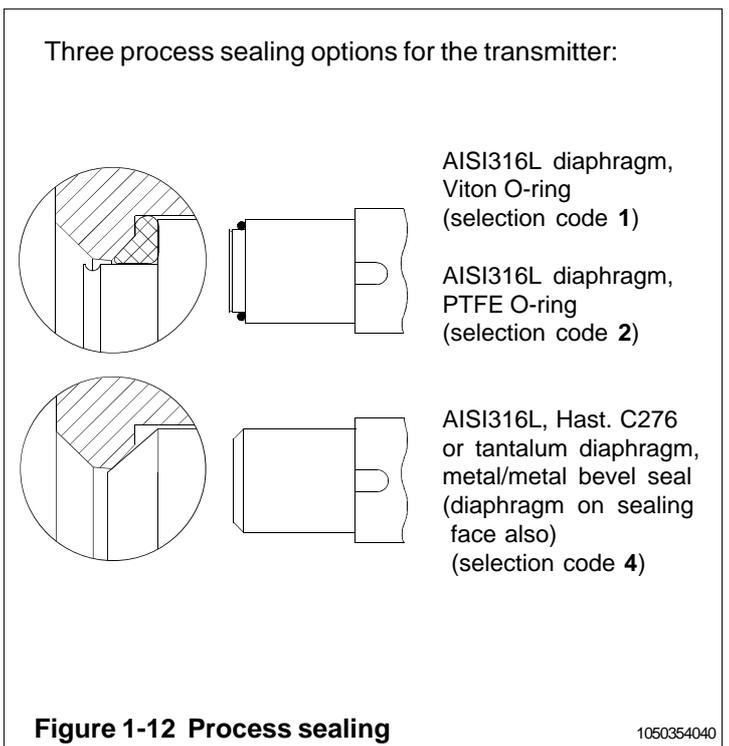


Figure 1-12 Process sealing

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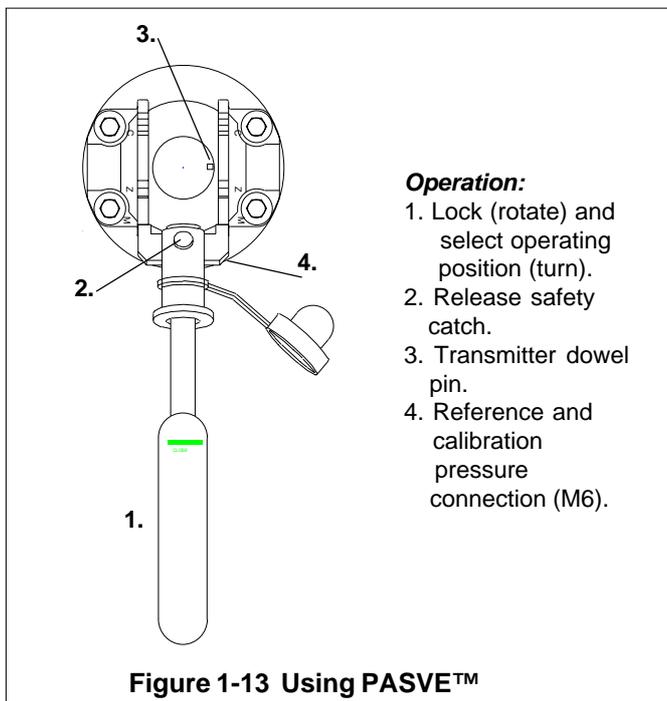


Figure 1-13 Using PASVE™

1.1.4 Installing the transmitter with PASVE™ mounting/service valve

The three-position PASVE® mounting/service valve makes the installation of the transmitter easy. All necessary cleaning, zero adjustment and replacement operations will be easy and fast to perform with PASVE® without stopping the process.

All PASVE™ types are also available with pneumatic actuator, flushing and limit switches.

Flange	Dimension D
ANSI 3" 150 lb	191
ANSI 3" 300 lb	210
DN80 PN40	200

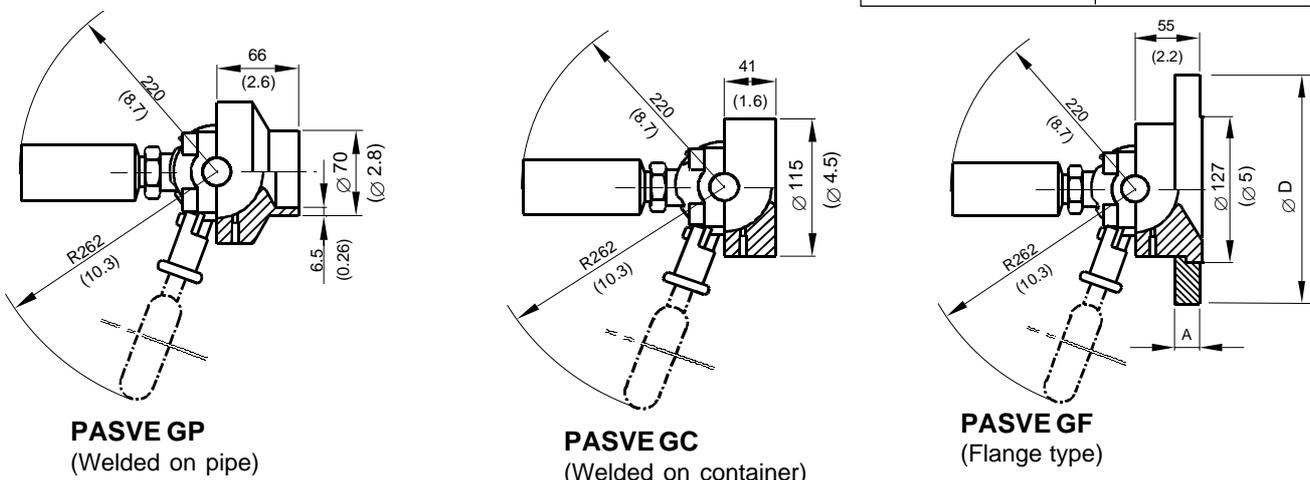


Figure 1-14 Mounting dimensions for different PASVE™ types

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1.2 Electrical connections

Supply voltage and load of the transmitter according to the figure 1-16.

We recommend shielded twisted-pair cable as signal cable.

The signal cable should not be installed near high-voltage cables, large motors or frequency converters.

The shield of the cable is grounded at the power supply end or according to the recommendations of the manufacturer of the used control system.

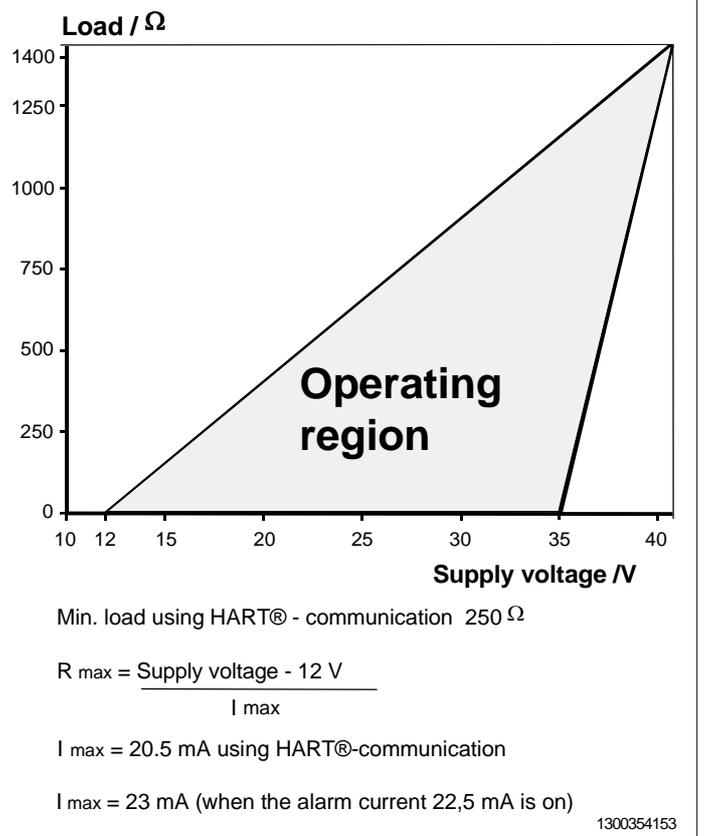
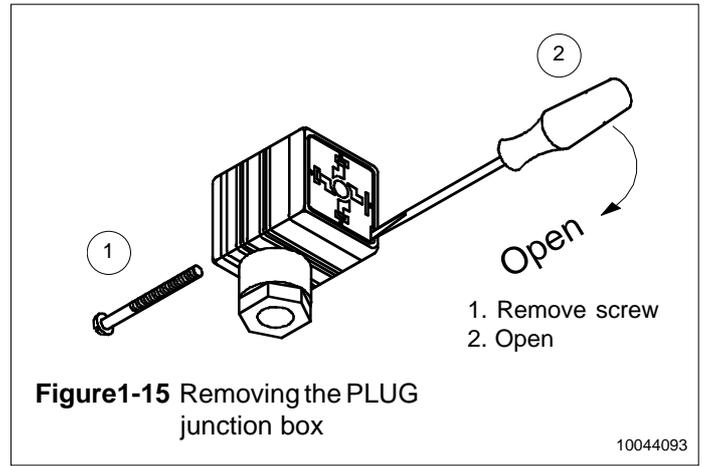
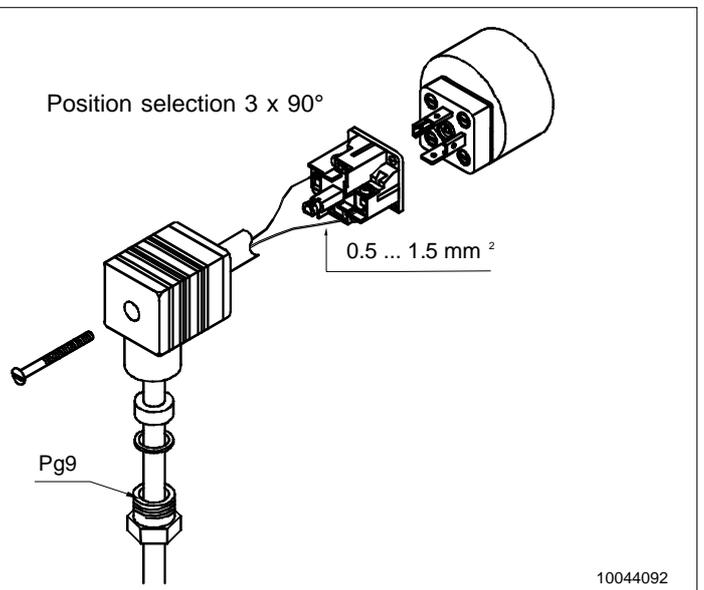
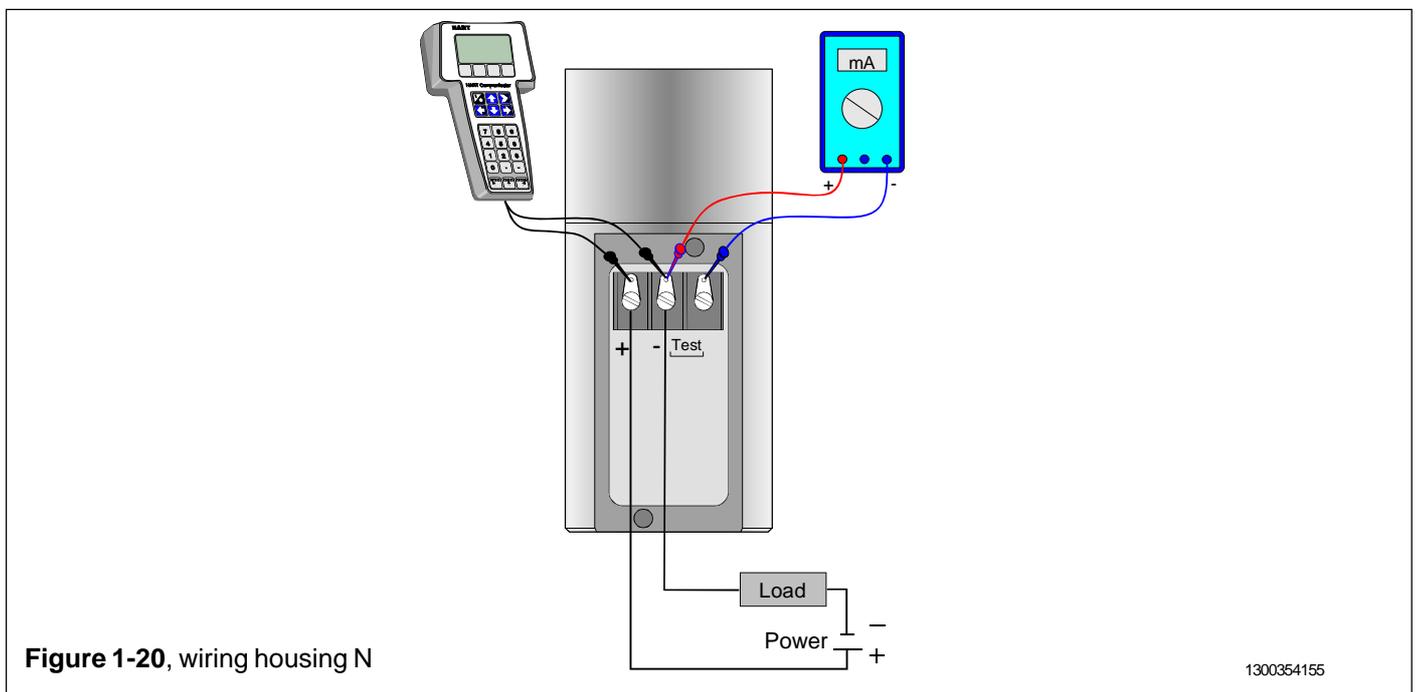
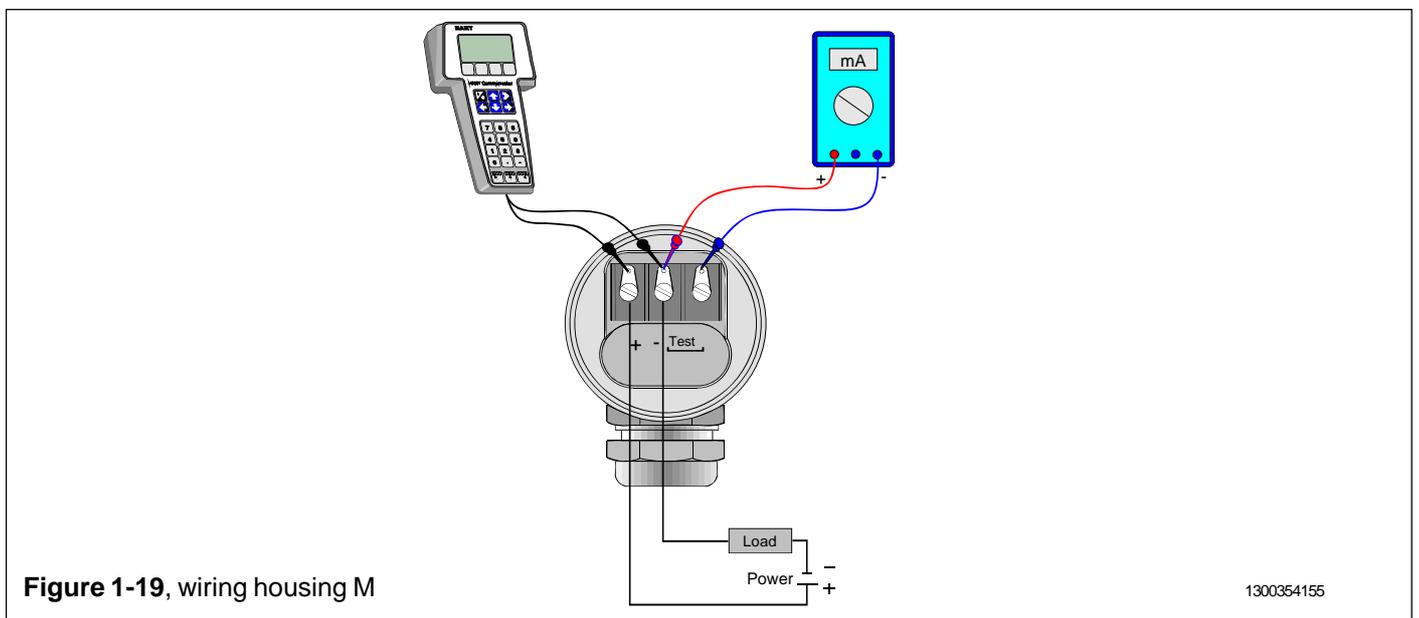
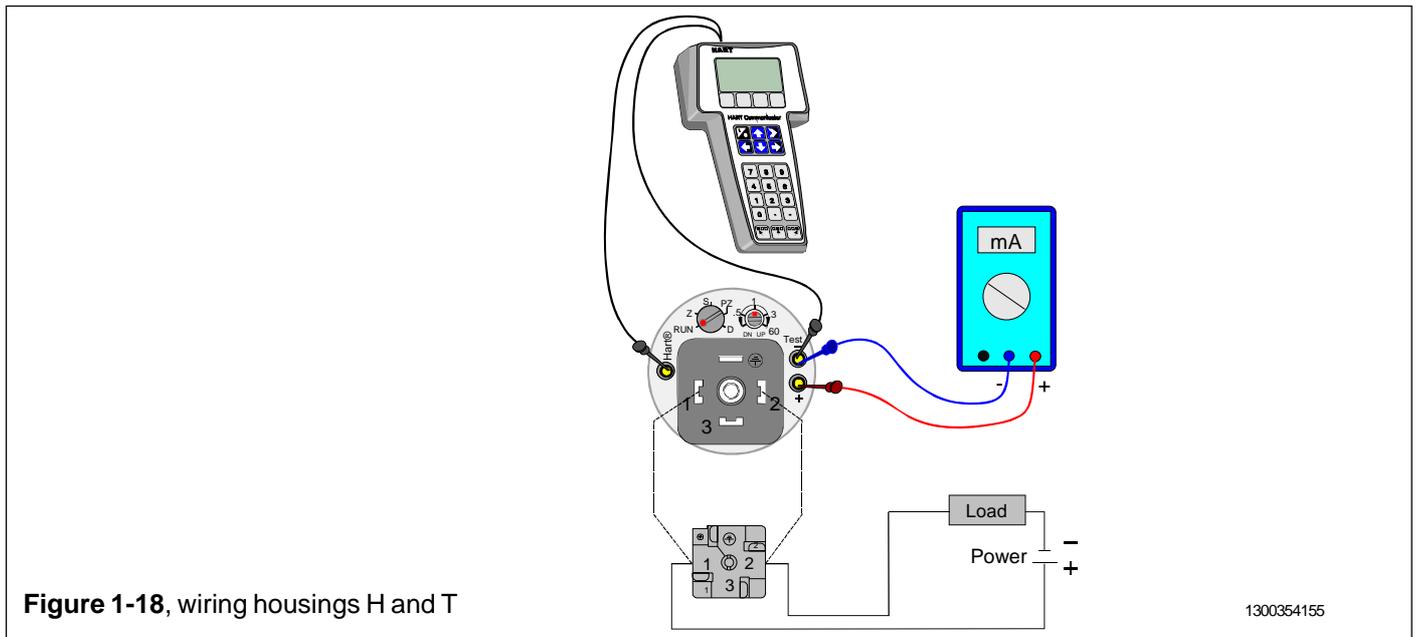


Figure 1-16 Supply voltage and load capacity





2 SETTING UP

2.1 Using the 275 user interface

Operation keys

The six operation keys are located above the alphanumeric keyboard:

The ON/OFF key (**I/O**) switches the user interface on and off. When you switch the user interface on, it starts looking for a HART® transmitter connected to it. If the transmitter is not found, the message “**No Device Found. Press OK**” will be displayed.

The **ONLINE** menu is displayed when the user interface finds the transmitter.

(**^**) This key allows you to move upwards in menus and scroll lists forwards.

(**v**) This key allows you to move downwards in menus and scroll lists backwards.

(**<**) This two-function key allows you to move the cursor to the left and to go back to a previous menu.

(**>**) This two-function key allows you to move the cursor to the right and to select a menu option.

(**>>>**) The quick-selection key will start the user interface and display the quick-selection menu. You can define the desired menu as quick-selection menu.

Function keys

With function keys F1, F2, F3 and F4 you can perform the program functions displayed above each function key. When you move in the software menus, the functions of these keys will change in accordance with the currently selected menu.

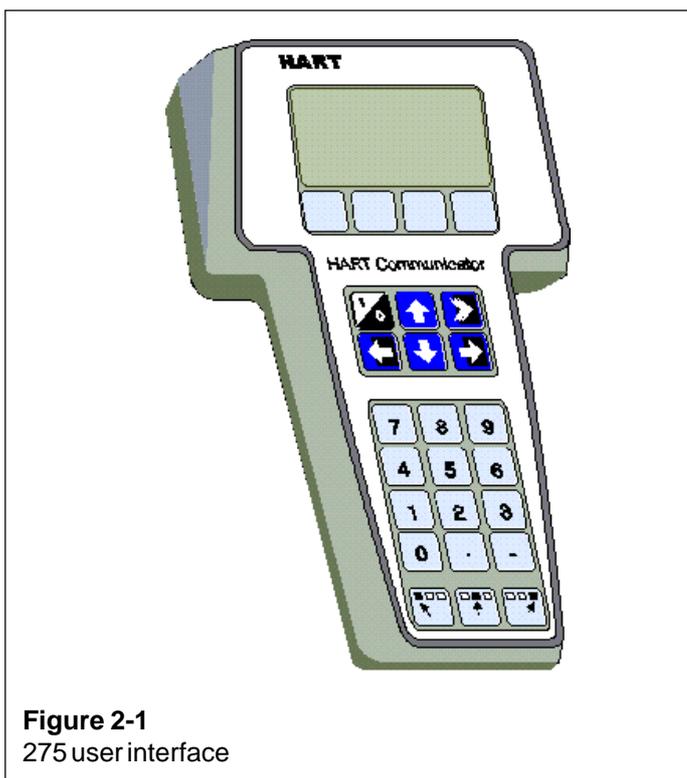


Figure 2-1
275 user interface

2.2 Setting up through HART® 275 user interface

After installing and connecting the transmitter, connect the user interface to the transmitter. The following menu is displayed:

- 1 Measurement
- 2 Configuration
- 3 Information
- 4 Diagnostics

To change the measuring range, unit damping time constant to output mode (linear/square-root), select **Configuration**.

The following menu is then displayed:

- 1 Range values
- 2 Detailed config

To change the measuring range, select **Range values**.

The selection displays the following menu:

- 1 LRV (lower range value)
- 2 URV (upper range value)
- 3 LSL (lower sensor limit)
- 4 USL (upper sensor limit)
- 5 Min span (minimum span)
- 6 Apply values

To change the measurement unit, damping time constant or output mode, select **Detailed config** from the **Configuration** menu.

The selection displays the following menu:

- 1 Damping
- 2 Pres. unit
- 3 Tempr. unit
- 4 Alarm current
- 5 Write protect
- 6 Lin. func
- 7 Diff EI status
- 8 Burst mode
- 9 Burst option
- Poll addr
- Tag
- User function
- User funct. setup

After these activities or if the transmitter is supplied with the ready configuration you must correct a zero error of the transmitter in a final installation position.

Press **Diagnostics** and **PV Zero calibr.**

The selection displays the following menu: **Give correct value for Zero pressure in ...**

The current zero point will be shown in display and the final zero error correction can be done.

2.3 Using the 375 user interface



Figure 2-2
375 user interface

2.4 Setting up through HART® 375 user interface

After installing and connecting the transmitter, connect the user interface to the transmitter. The following menu is displayed: **Main menu**. To select the **HART Application**.

The following menu is then displayed:

- 1 Measurement**
- 2 Configuration**
- 3 Information**
- 4 Diagnostics**
- 5 Review**

To change the measurement unit, damping time constant or output mod, select **Configuration**.

The following menu is then displayed:

- 1 Range values**
- 2 Output**
- 3 Transfer function**
- 4 General setup**

To change the measurement unit, select **Range values**.

The following menu is then displayed:

- 1 LRV**
- 2 URV**
- 3 LSL**
- 4 USL**
- 5 Min span**
- 6 Apply values**

To change the damping time constant, select **Output** from the **Configuration** menu.

The following menu is then displayed:

- 1 Damping**
- 2 Alarm current**

To change the output mode, select **Transfer function** from the **Configuration** menu.

The following menu is then displayed:

- 1 Lin. func**
- 2 User function data**

After these activities or if the transmitter is supplied with the ready configuration you must correct a zero error of the transmitter in a final installation position.

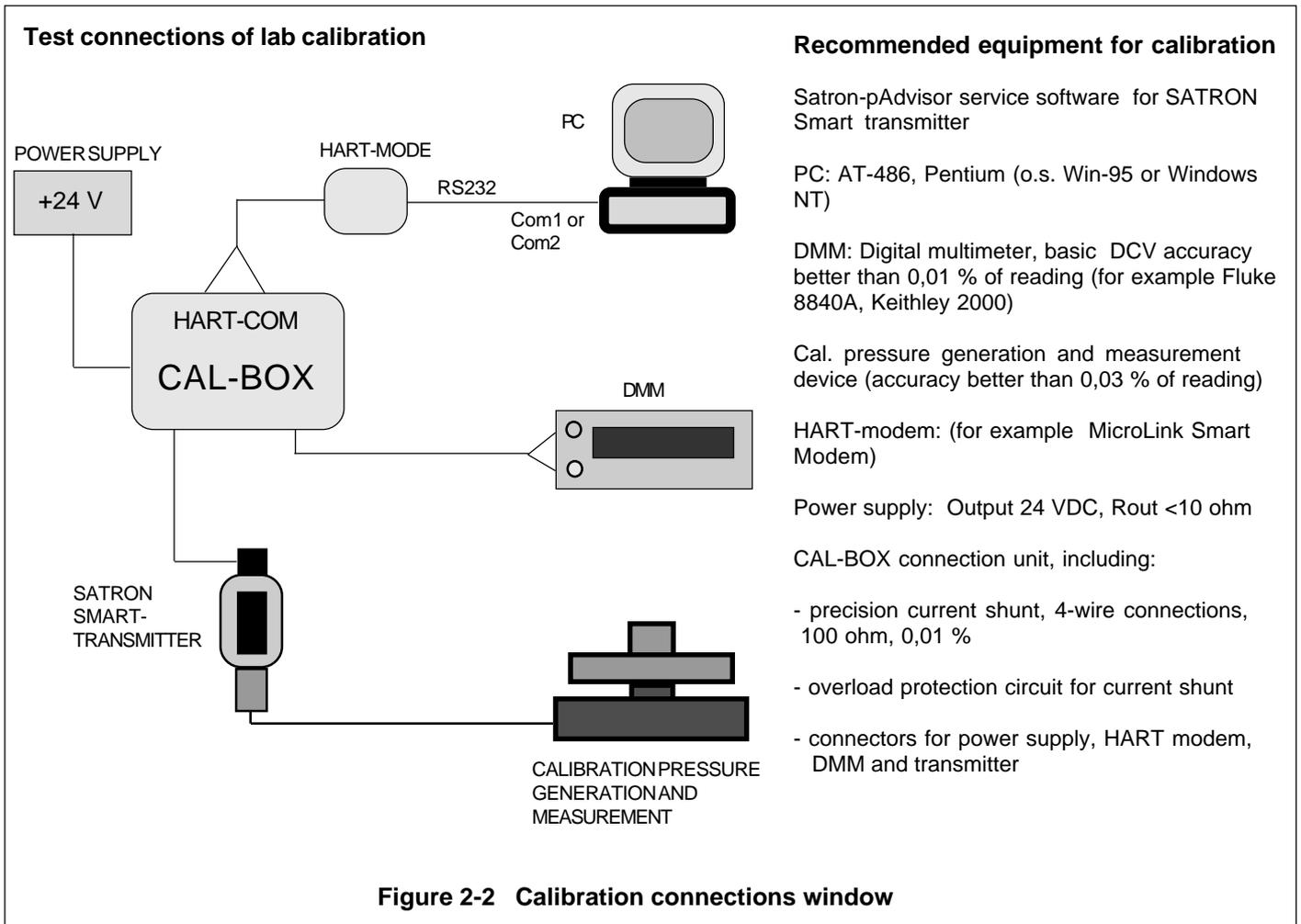
The First press **Diagnostics** and then **Sensor trim** and then **Zero trim**

The following text is then displayed : *WARN-Loop be removed from automatic control*

The final zero error correction can be done to select **ABORT** or **OK** on the display .

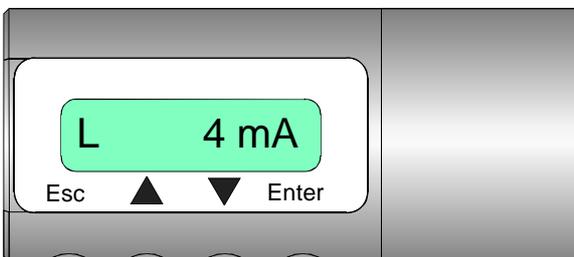
2.5 Setting-up with Satron-pAdvisor Service Software

When you will have available all the operations of the Smart transmitter, we recommend the use of Satron-pAdvisor Service Software program in setting-up. Satron Instruments Inc. will deliver you the program, HART-modem and CAL-BOX according the order.



2.6 Setting-up with local switches

The additional instruction of display menus is enclosed to this manual.

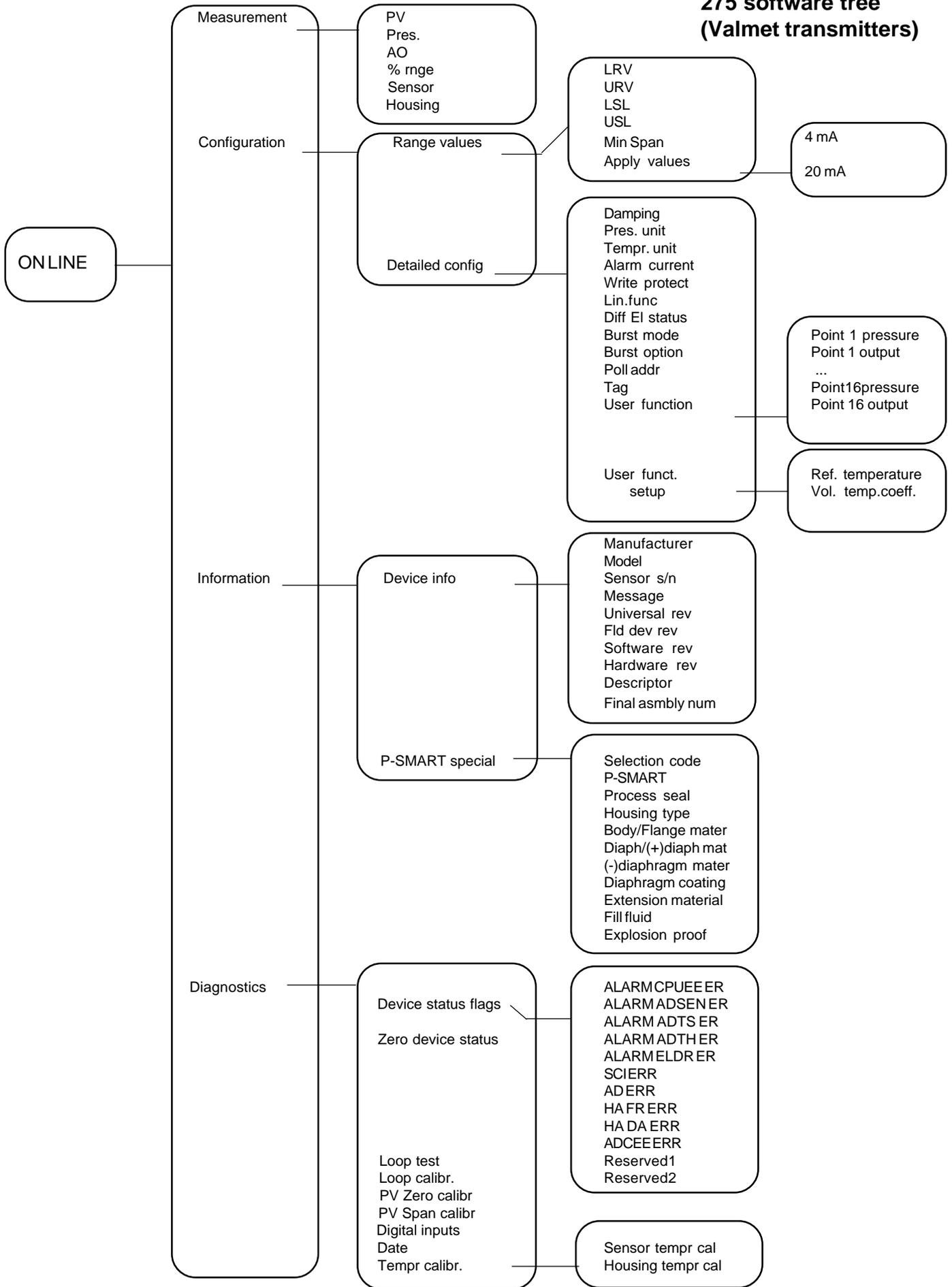


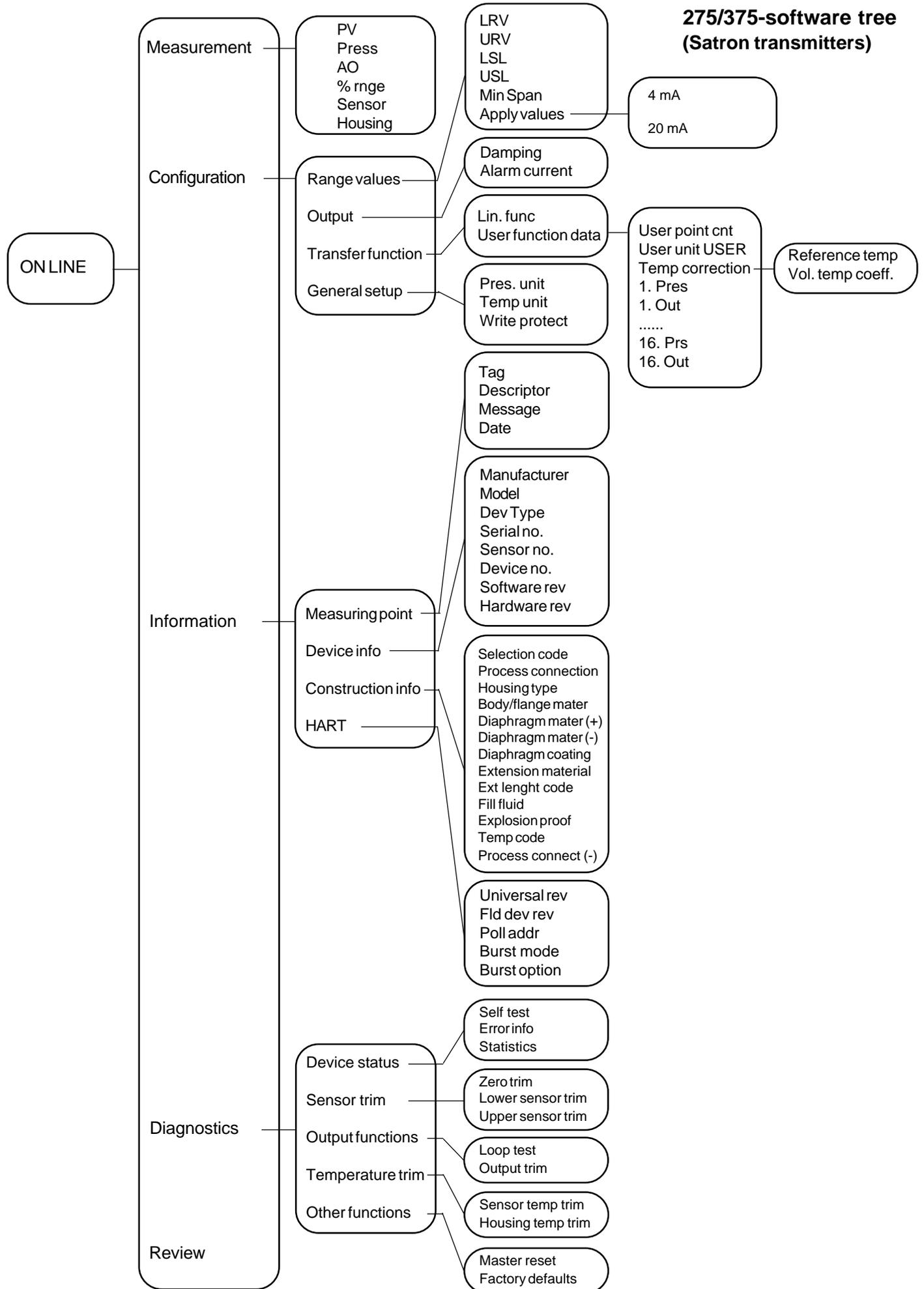
Keyboard :

- Esc = Press **Esc** move back towards the top of the main menu.
- ▲ = Use the **UP** arrow key to move up on the current menu level or to increase the selected parameter value.
- ▼ = Use the **DOWN** arrow key to move down on the current menu level or to decrease the selected parameter value.
- Enter = Press **ENTER** to move to a lower level in a menu or to accept a command or parameter value.

Figure 2-3 VG pressure transmitter with display

275 software tree (Valmet transmitters)





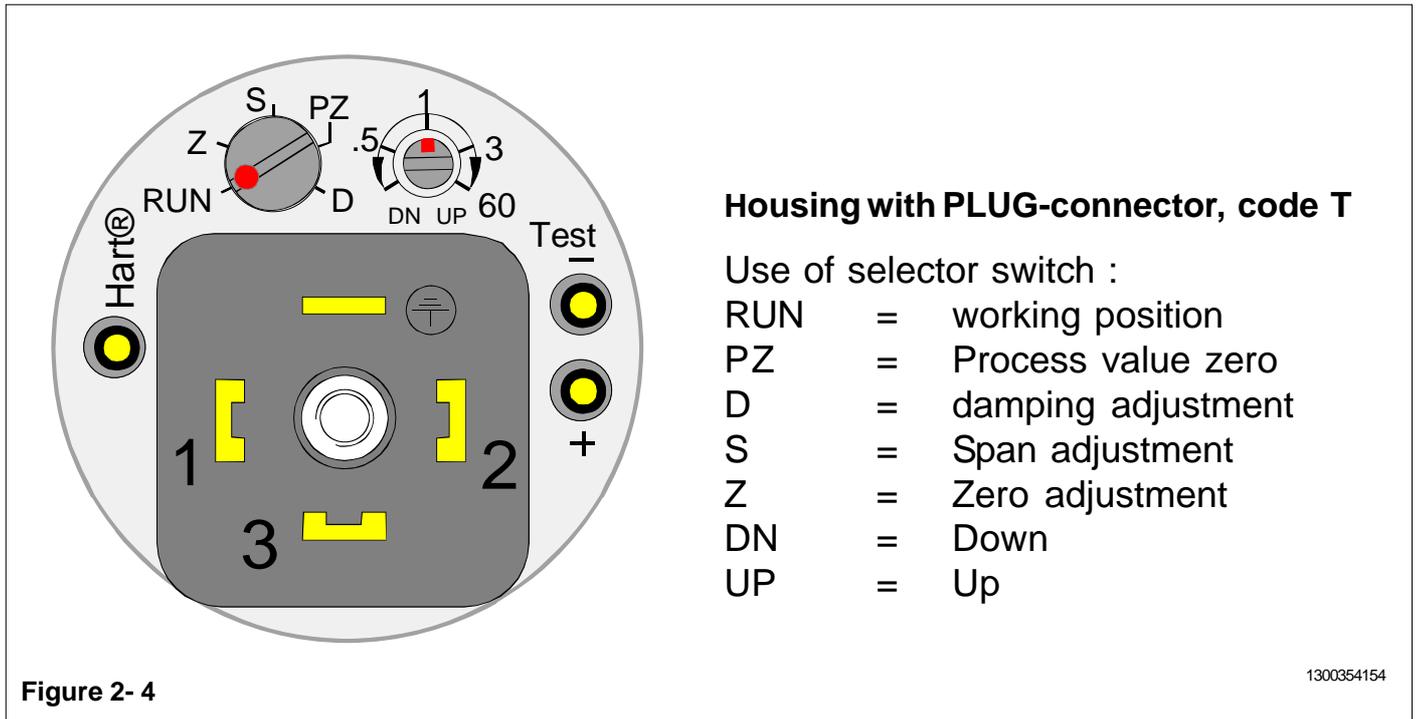
2.7 Set-up calibration, housing code T (with manual adjuster)

The transmitter is factory-calibrated, with 1 sec. electrical damping, for the range specified in the order. If range is not specified, the transmitter will be calibrated for the maximum range.

Zero and Span adjusters are at the end of the housing, under protective rubber shield. TEST jacks are also under protective rubber shield. Figure 2-4: housing T with PLUG connector

Checkout procedure

- See that the ripple on the supply voltage does not exceed 2.5 V_{pp} on 0-1000 Hz frequency range.
- Check the nameplate for the factory-calibrated range and zero suppression/elevation.
- If necessary, readjust the zero.



Housing with PLUG-connector, code T

Use of selector switch :

- RUN = working position
- PZ = Process value zero
- D = damping adjustment
- S = Span adjustment
- Z = Zero adjustment
- DN = Down
- UP = Up

Figure 2- 4

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3 CALIBRATION

3.1 Adjustability

Maximum span is 25 times the minimum span for SATRON VG transmitter

Span adjustments is made from outside the housing, under the protective rubber shield (figure 3-1).

Zero suppression and elevation

Maximum zero suppression is 86 % of max. span, and maximum zero elevation is 100 % of max. span. Zero adjustments is made from outside the housing, under the protective rubber shield (figure 3-2).

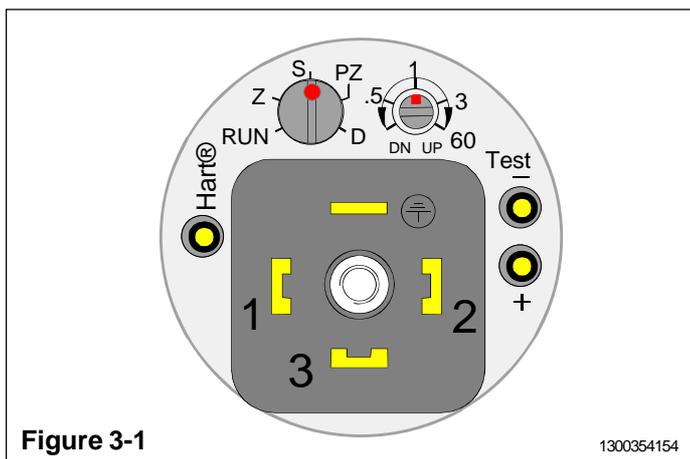


Figure 3-1

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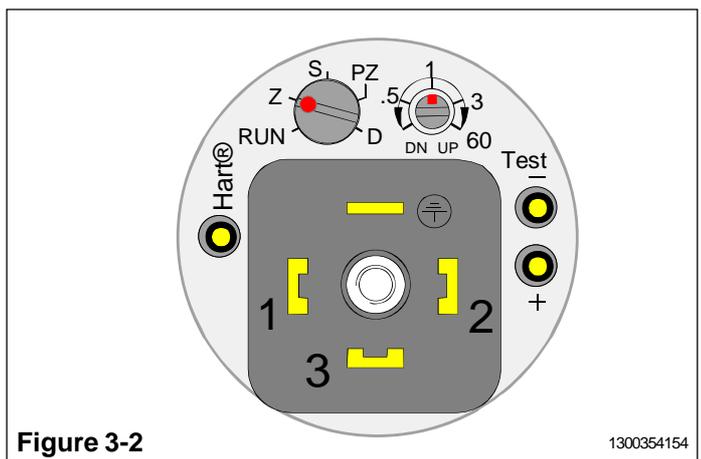


Figure 3-2

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Measuring range

The lower and upper range-values cannot differ from zero by more than the maximum span.

For example, range 4 transmitter whose measuring range is 0-4/100 kPa cannot be adjusted to measure 100...104 kPa pressure, because maximum span is 100 kPa.

Calibration stand

The calibration stand shown in Fig. 3-3 is available from the manufacturer. The stand is equipped with coupling and pressure connection facility. (Order number: V545728.)

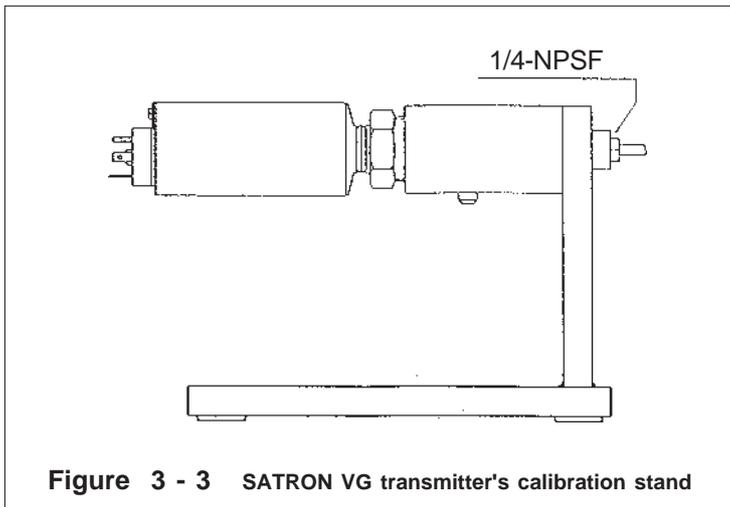


Figure 3 - 3 SATRON VG transmitter's calibration stand

3.2 Damping

If pulsation occurs in the measured pressure, it can be damped with the damping trimmer position D under the protective rubber shield on the housing.

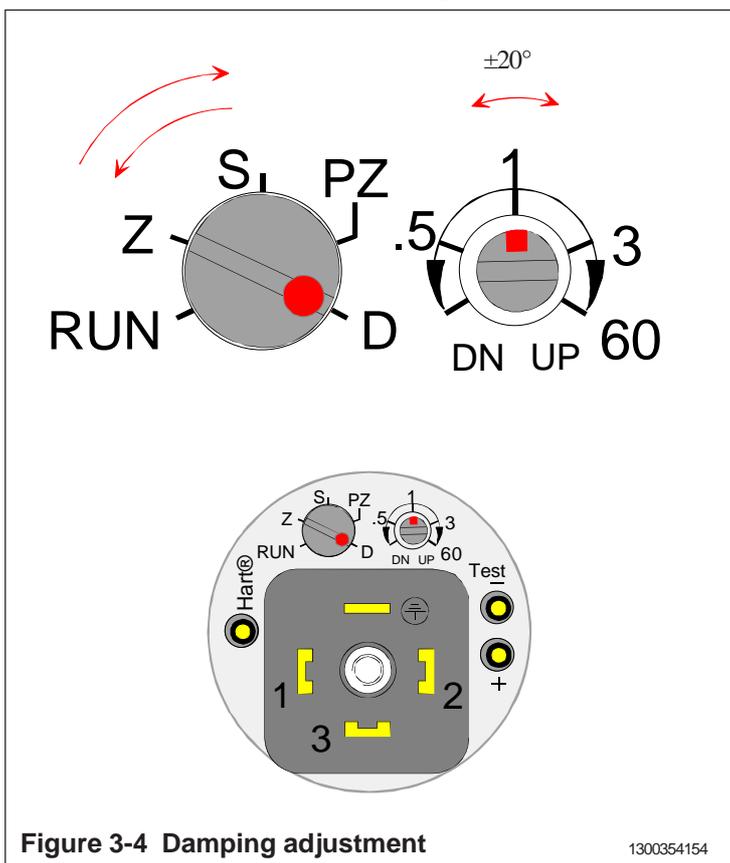


Figure 3-4 Damping adjustment

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The transmitter is factory-calibrated with minimum electrical damping.

To increase the damping, turn the trimmer clockwise.

Adjusting the damping does not affect the transmitter's other calibration.

Damping adjustment :

1. Turn the selector switch from RUN to position D
2. Turn the regulating switch about $\pm 20^\circ$ so damping adjustment is activated. Turn the regulating switch to desired value of damping. 0 s on the left side, 60 s in the right side.
3. Turn the selector switch from position D to position RUN.

3.3 Calibration examples

The calibration stand shown in Fig. 3-3 or a similar arrangement is used to calibrate the transmitter.

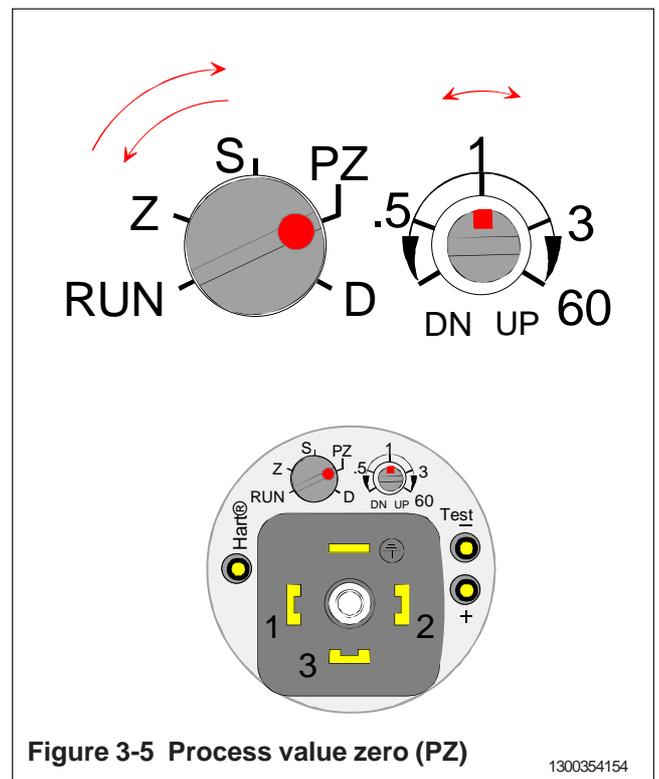


Figure 3-5 Process value zero (PZ)

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First step is process value zero :

1. Turn the selector switch from position RUN to position PZ.
2. PV ZERO is done when the damping trimmer is turned once to both edges at least for 1 sec.
3. Turn the selector switch from position PZ to position RUN.

The maximum correction during one calibration time is limited to 5 % of the sensor maximum range. All the changes made using the PZ-function can be recalled by turning the calibration trimmer to both edges three times (reset factory settings).

Measuring range: 0...300 kPa (range 5 transmitter).
Span: 300 kPa

Procedure

- Apply zero pressure.
- 1. Turn the selector switch from position RUN to position Z.
- 2. Turn the regulating switch about $\pm 20^\circ$ so adjustment is activated.
- 3. Turn the regulating switch to a point where output is closest to 4 mA. (adjustment range on fine adjustment range is $\pm 0.75\%$ of span and speed of adjustment is $\pm 2.5\%$ of span / s)
- 4. Turn the selector switch from position Z to position RUN.

- Apply full-span pressure.
- 1. Turn the selector switch from position RUN to position S.
- 2. Turn the regulating switch about $\pm 20^\circ$ so adjustment is activated.
- 3. Turn the regulating switch to a point where output is closest to 20 mA. (adjustment range on fine adjustment range is $\pm 0.75\%$ of span and speed of adjustment is $\pm 2.5\%$ of span / s)
- 4. Turn the selector switch from position S to position RUN.

- Apply zero pressure.
- Repeat the adjustments to achieve the desired accuracy.

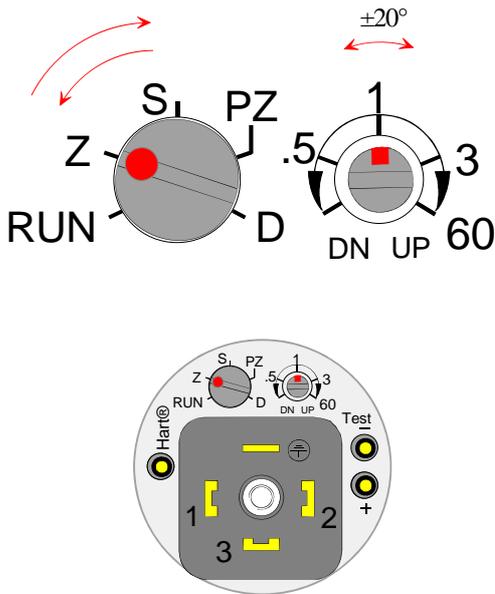


Figure 3-6 Set the lower range-value

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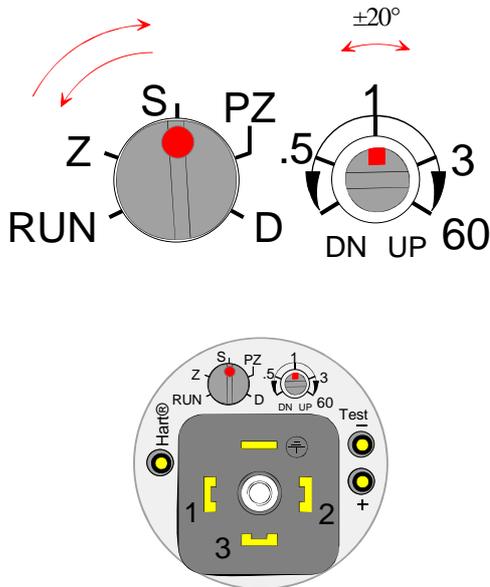


Figure 3-7 Set the upper range-value

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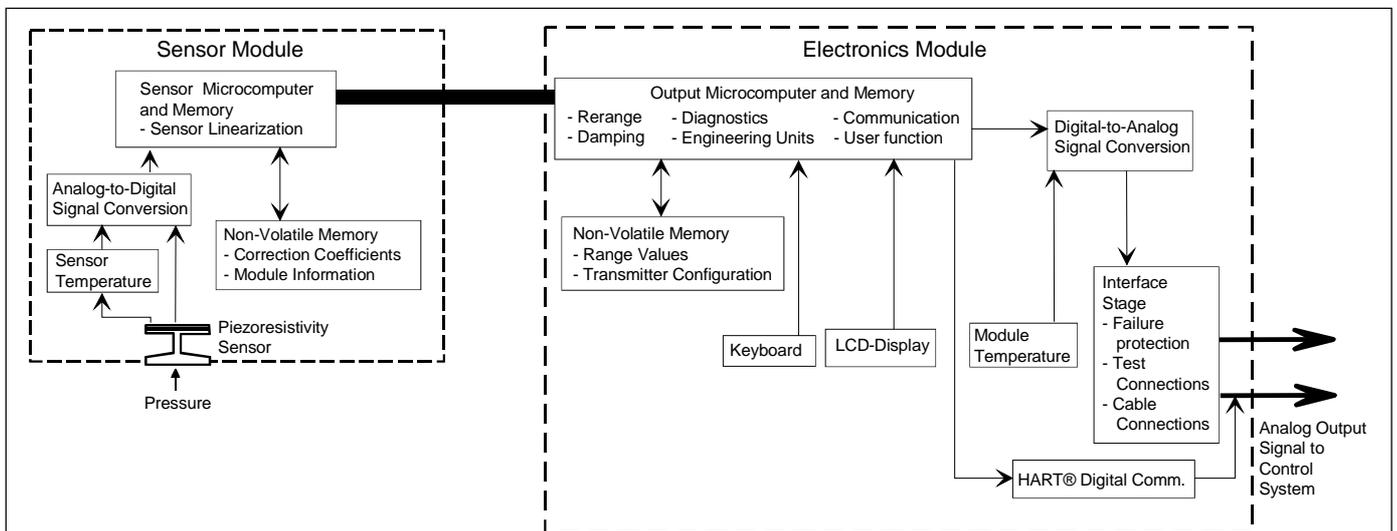


Figure 4-1 Functional construction of the SATRON VG pressure transmitter

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4. CONSTRUCTION AND OPERATION

4.1 Smart transmitter

Sensor Module

The piezoresistive sensor, which has a silicone oil fill, is isolated from the process with a diaphragm. Sensor pressure and temperature are measured with a 24-bit AD converter. Linearity and temperature effects are digitally corrected with an internal microprocessor connected to the sensor module.

The **sensor** converts pressure to electrical signal. The conversion is carried out through a Wheatstone bridge supplied with direct current. The elastic displacement produced in the bridge by the pressure causes bridge unbalance which is measured as a DC voltage signal.

Compensation includes temperature compensation and linearization. Each sensor is calibrated individually through a resistance network connection. The temperature information required by compensation is derived from a temperature measuring element located by the Wheatstone bridge.

Electronics Module

The electronics module converts the process pressure signal from the sensor module to 4-20 mA output signal. The conversion can be made in linear, square root or inverted mode, or it can be done through user-selectable pressure/output point pairs (2-16 points).

Transmitters provided with own display (code **N**) is equipped with operating keys that allow you to define the transmitter's all functions.

The active functions required for **signal shaping** are in a customized IC which is divided into two sub-blocks: amplifier block and standard-signal shaping block. The standard-signal shaping block also includes zero, span and damping adjustments.

The **interface stage** includes failure protections to ensure the transmitter's operation and nonfailure in possible failure conditions. This stage also includes the TEST and cable connections

5. PARTS LIST

When ordering spares, please quote this document's number BPLH700AV and date 2004-04-30, the name and order number of the required part, and the transmitter's serial number. Parts indicated with asterisk (*) as well as screws, nuts and seals (packings) are spare parts.

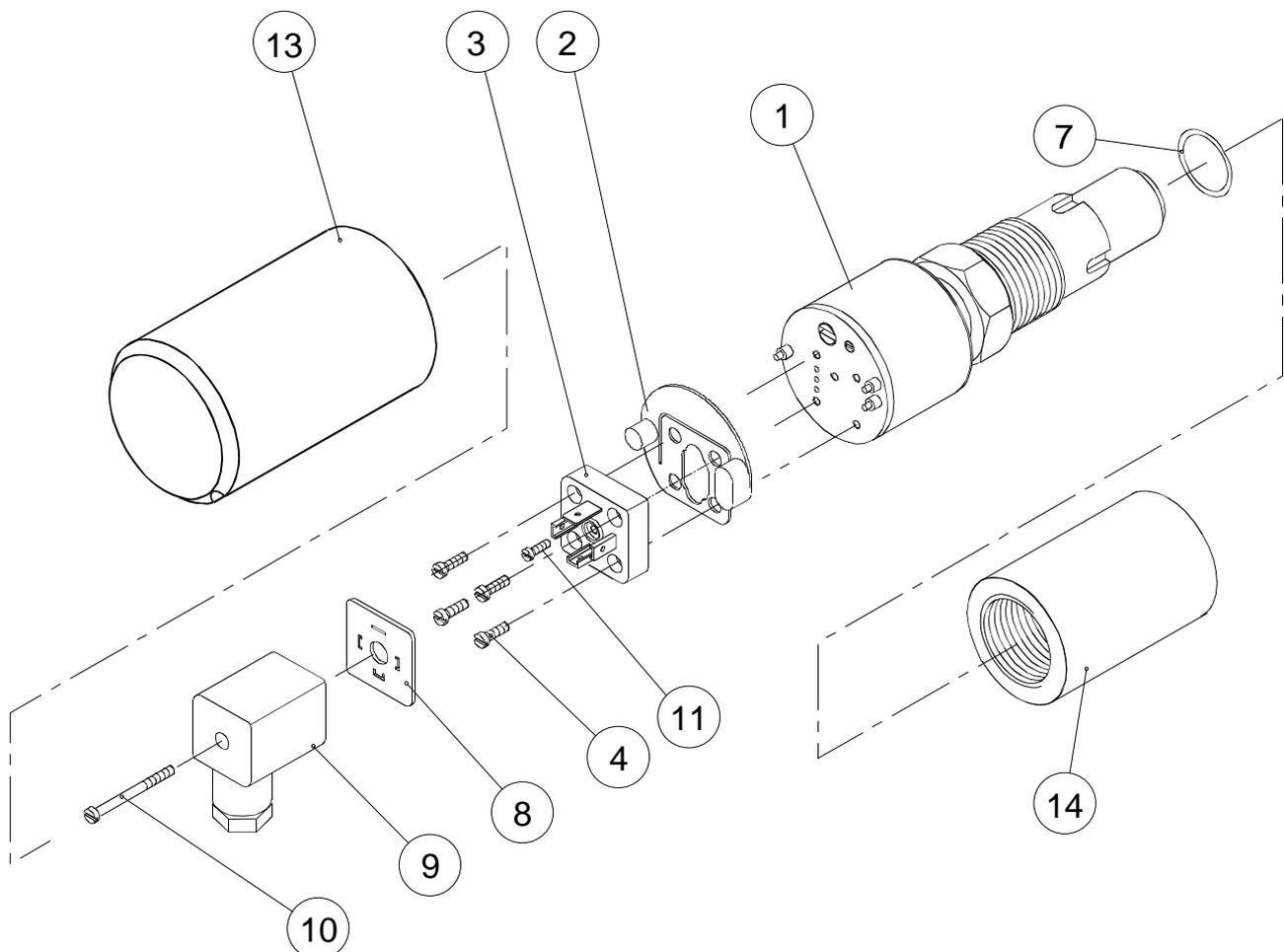
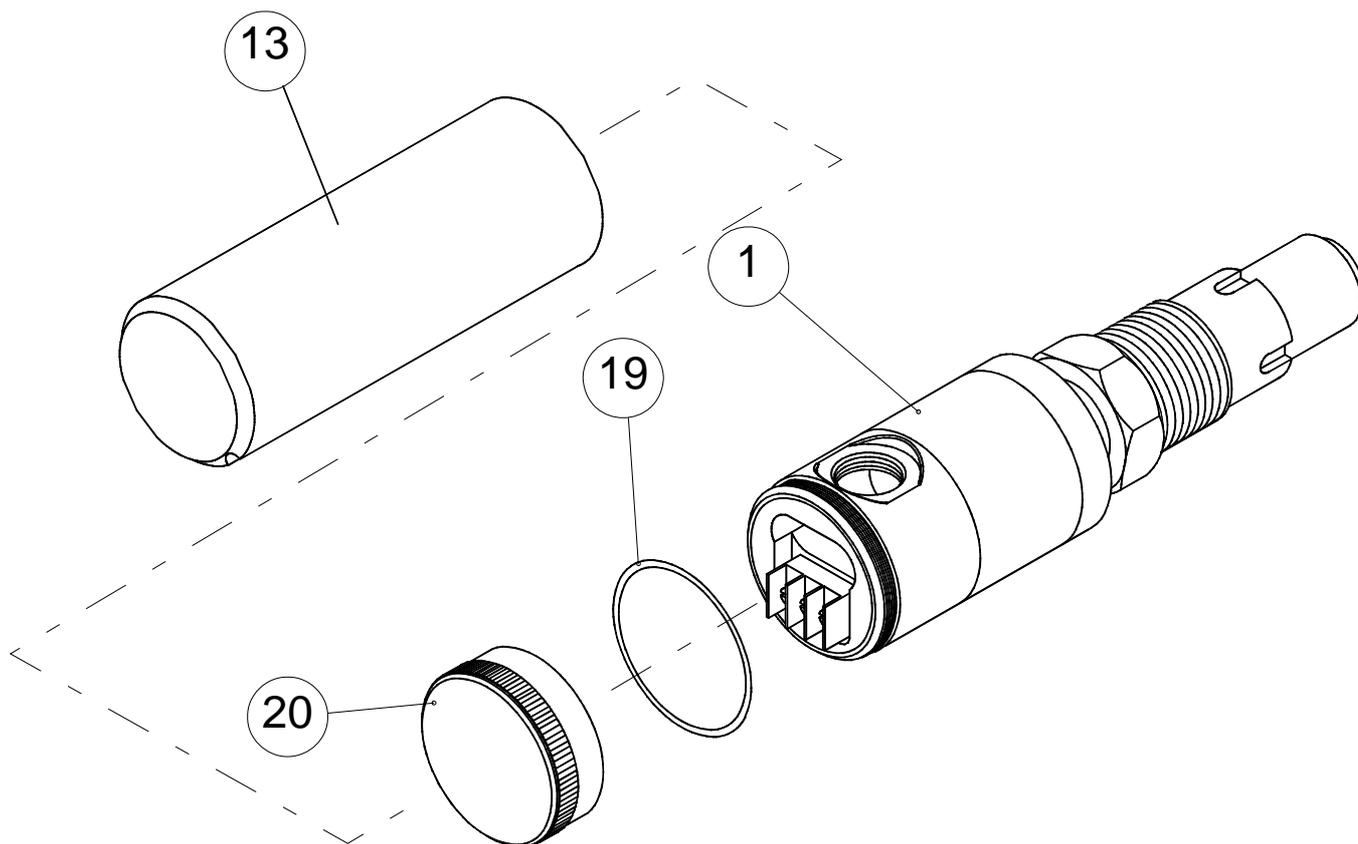


Figure 5-1 Parts list: Enclosure H and T, housing with PLUG connector



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Figure 5-3 Parts list:
Enclosure **M**, housing with terminal board

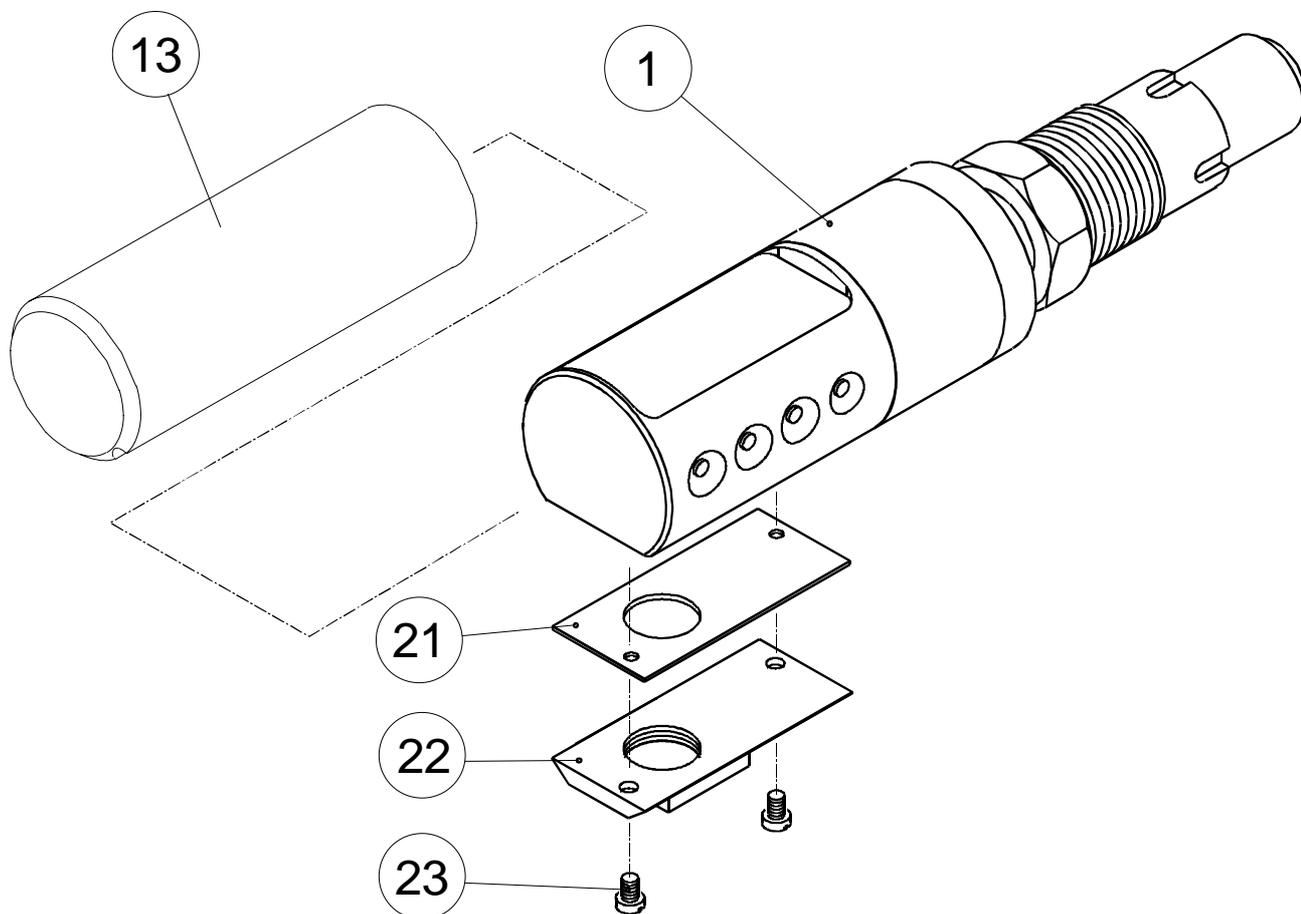


Figure 5-4 Parts list:
Enclosure **N**, housing with display

1300354162

Number	Name	Order number	Number	Name	Order number
1	Sensing element		* 13	Protection cup, housing H, M and T	T1300295
2	Seal	T1300207	* 13	Protection cup, housing N	T1300296
* 3	Device plug DIN43650	72900114			
4	Cylinder-head screw M3 x 10 SFS2179 Zne	51603021			
7	O-ring 20 x 2 , Viton® (PTFE)	80012500 (80550847)	* 14	Coupling	see chapter 1.1.3
8	Seal GDM3-17,silicone	72900116	* 15	Mounting clamp	V544953
* 9	Wiring box GDM3009, DIN43650	72900111	* 16	Support plate	V543223
10	Cylinder-head screw S M3 x 35 SFS2179 A4	51723053	17	Hex nut M8 SFS2067 A4	56022800
11	Cylinder-head screw S M3 x 4 VSM 13302 Zne	51613009	* 18	Mounting bracket S	T1050009
			19	O-ring, 42x2 FPM (Viton®)	80013800
			* 20	Cover M	T1300256
			21	Seal N, Silicone rubber	T1300262
			* 22	Cover N	T1300260
			23	Cylinder-head screw S M4x8 SFS2176 A4	51624012

Notes



MEETS THE COUNCIL OF THE EUROPEAN UNION DIRECTIVE
89/336/EEC FOR ELECTROMAGNETIC COMPATIBILITY
REQUIREMENTS.



Satron Instruments Inc.

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