DATCON
INDUSTRIAL MEASUREMENT

DT4200

Process Indicator

Operating Instructions

CE

Contents

7. Setting-up

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9. Dismounting

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1. About this document

1.1. Function

This operating instructions manual has all the information you need for quick set-up and safe operation of DT4200. Please read this manual before you start setup.

1.2. Target group

This operating instructions manual is directed to trained personnel. The contents of this manual should be made available to these personnel and put into practice by them.

1.3. Symbolism used

Information, tip, note
This symbol indicates helpful additional information.

Caution, warning, danger
This symbol informs you of a dangerous situation that could occur. Ignoring this cautionary note can impair the person and/or the instrument.

List
• The dot set in front indicates a list with no implied sequence.

Action
→ This arrow indicates a single action.

Sequence
1 Numbers set in front indicate successive steps in a procedure.

2. For your safety

2.1. Authorised personnel

All operations described in this operating instructions manual must be carried out only by trained and authorised specialist personnel. For safety and warranty reasons, any internal work on the instruments must be carried out only by DATCON personnel.

2.2. Appropriate use

The DT4200 is a 4-20 mA loop-powered process indicator. Detailed information on the application range of the DT4200 is available in chapter „Product description”.

2.3. Warning about misuse

Inappropriate or incorrect use of the instrument can give rise to application-specific hazards, or demage to system components through incorrect mounting or adjustment.

2.4. General safety instructions

The DT4200 is a high-tech instrument requiring the strict observance of standard regulations and guidelines. The user must take note of the safety instructions in this operating instructions manual, the country-specific installation standard as well as all prevailing safety regulations and accident prevention rules.

2.5. CE conformity

A DT4200 is in conformity with the provisions of the following standards:
EN 61326:2000 (EMC)

2.6. Environmental instructions

Protection of the environment is one of our most important duties.
Please take note of the instructions written in the following chapters:

- Chapter **3.4. Storage and transport**
- Chapter **9.2. Disposal**

3. Product description

3.1. Delivery configuration

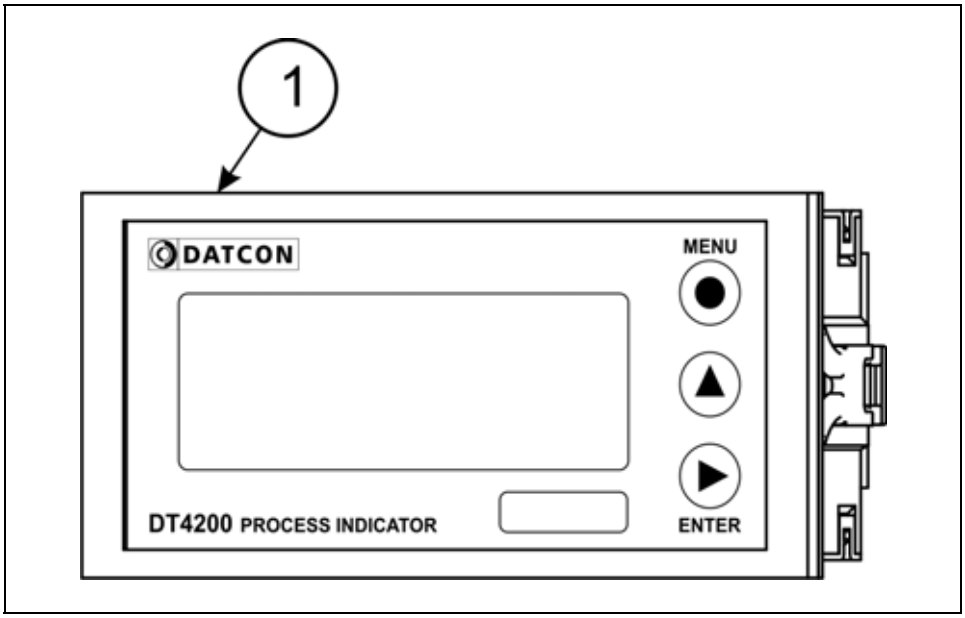
Delivered items

The scope of delivery encompasses:

- DT4200
- 1 pc. panel sealing (1)
- 2 pc. mounting clamps (enclosed in a nylon bag)
- documentation:
  this oparating instructions manual
  certification
  warranty

Main parts

The instrument is built from the following main parts:



1. instrument case

3.2. Principle of operation

Area of application

DT4200 is an process indicator enable linear process variables to be displayed.Two isolated outputs are available with different operating modes for limit signaling or for simple control purposes.

Use the enclosed seal between the instrument and the panel when mounting the instrument to assure IP 65 from the front.

Operating principle

The 4-20 mA current flows through a measuring resistor and is converted by a 16 bit A/D converter into digital value. The digital value is processed by a microcontroller. The user may set up the the configuration parameters: scaling, decimal point position, display refresh rate, signal filtering, limit modes, limit values, etc. through the front panel membrane keypad and the parameters stored in EEPROM. A two level password protects the settings from unauthorised changes.
The 4 ½-digit liquid crystal display make process variables easily visible at a distance. A label defining the appropriate engineering unit may be attached to the right of the display.

DT4200 has two optically isolated transistor outputs for limit signaling or for simple control purposes.

Power supply

DT4200 is loop-powered from 4-20 mA signal, dropping less than 2 V at 20 mA.

3.3. Adjustment

DT4200 can be adjusted through the 3 button front panel keypad. All configuration parameters are stored in the instrument EEPROM for unlimited period of time, even when the loop current beeng switched off.
In factory setting the DT4200 displays the 4-20 mA loop current with a resolution of three decimals.
The instrument doesn't need any internal adjustment.

3.4. Storage and transport

This instrument should be stored and transport in places whose climatic conditions are in accordance with Chapter **10.1. Technical specifications**, as described under the title: Environmental conditions.

The packaging of DT4200 consist of enviroment-friendly, recyclable cardboard is used to protect the instrument against the impacts of normal stresses occurring during transportation. The corrugated cardboard box is made from environment-friendly, recyclable paper. The inner protective material is polyfoam and nylon, which should be disposed of via specialised recycling companies.

4. Mounting

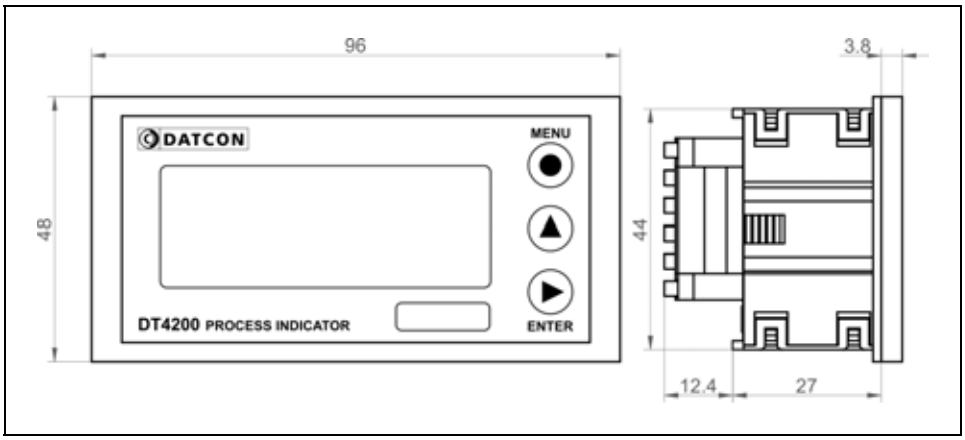
4.1. General instructions

Use the enclosed seal between the instrument and the panel when mounting the instrument to assure IP 65 from the front.

Mounting positions

Select a mounting position you can easily read the display reach for mounting and connecting the instrument and that minimises the hazard of water, dust or dump getting into the instrument.

4.2. Main dimensions of the instrument

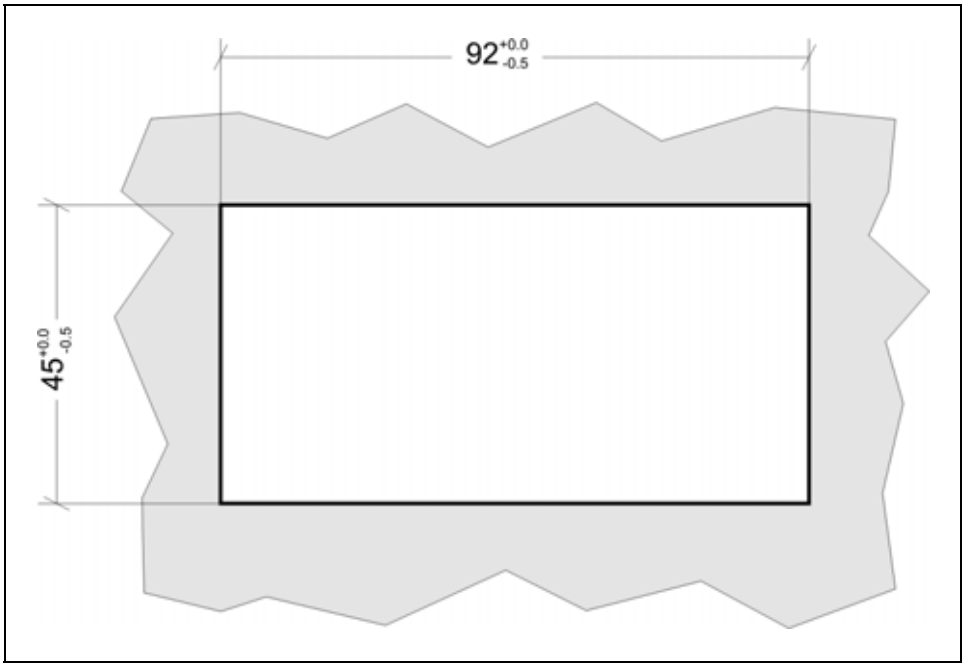


4.3. Mounting

Preparatory steps

The instrument is housed in a DIN standard 96 x 48 x 50 mm ABS case. It can be fix in the panel with the two enclosed mounting clamps.

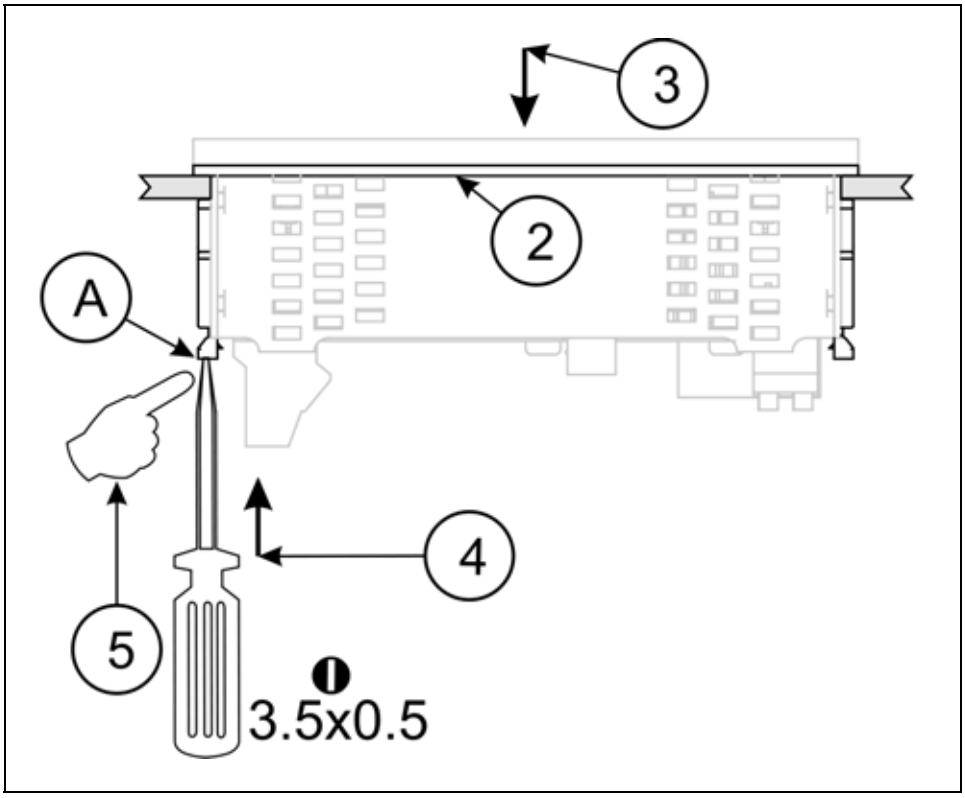
Dimensions of panel cutout



1. Cut-out the panel according to the figure shows above.

The cut-out needs special tools, it must be carried out by trained specialist personnel.

Mounting with the mounting clamps



2. Put on the enclosed seal onto the instrument case from the rear side and fit it to the instrument holding frame (Figure step 2).
3. Put the instrument into the prepared cut-out until it possible and check the fitting of the seal between case and mounting surface.
4. Put one of the enclosed mounting clamp onto the tip of a screwdriver (A) and put the clamp with the help of the screwdriwer into the hole on the side of the instrument.
5. Push the mounting clamp with your finger tip as far as you can while keeping the case in it’s position.
Repeat the 4., 5. steps with the other clamp.
Please do not exercise forces higher than necessary, as it may cause damages to the clamp.

5. Connecting

5.1. Preparing the connection

Always observe the following safety instructions:

- Connect or disconnect only in the complete absence of line voltage
- Take note the data concerning on the overcurrent protection in installation.
- Use only a screwdriver with appropriate head

Select connecting cable

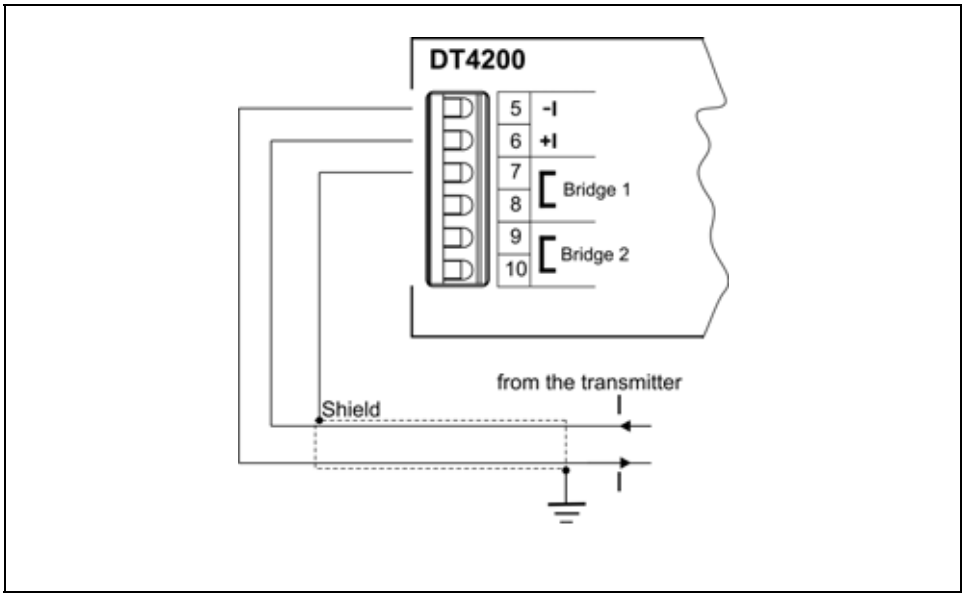
Take note the suitability of the connecting cable (wire cross-section, insulation, etc.).
You may use either solid conductor or flexible conductor.
In case of using flexible conductor use crimped wire end.
In case of mains connection the wire cross-section should be 0.25-1.5 mm^2.
In case of connection communication cables take note the concerning prescriptions (www.modbus.org).
It's an important rule that the power cables and signal cables should lead on a separate way.

Preparing cables

Prepare the cable for the connection.
Strip approx. 8 mm insulation.
In case of using flexible cable, use crimped wire end.

Wiring plan, connecting the DT4200 as a terminal device:
(see also "Application example")

Be careful the polarity of the cable.



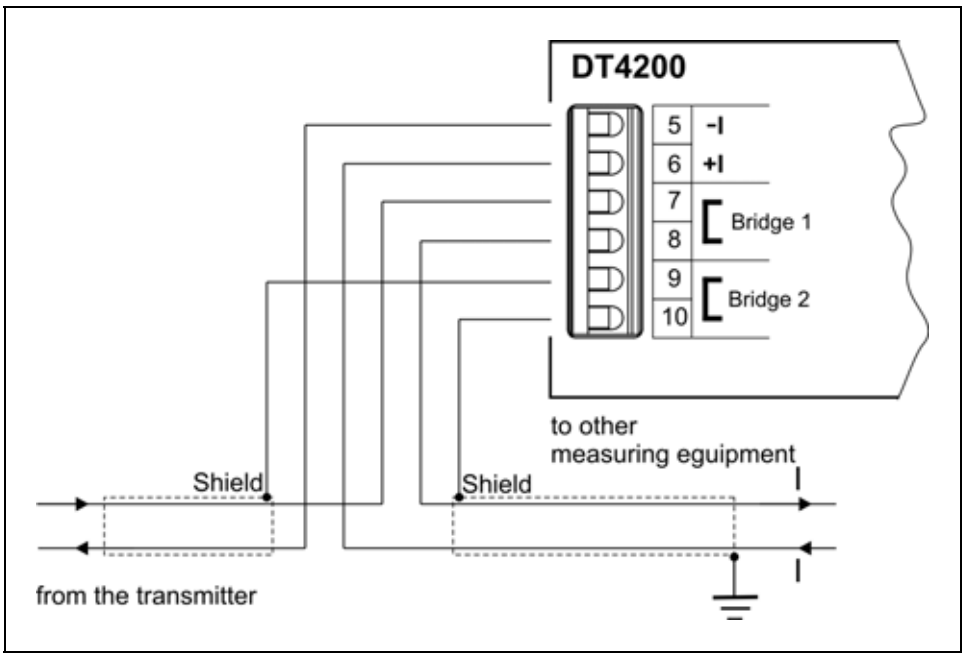
Connecting the cables

- The DT4200 is situated in the „middle" of the current loop.

In this case one cable comes from the signal source and another cable goes to the processing unit(s).
The following figure shows this case.

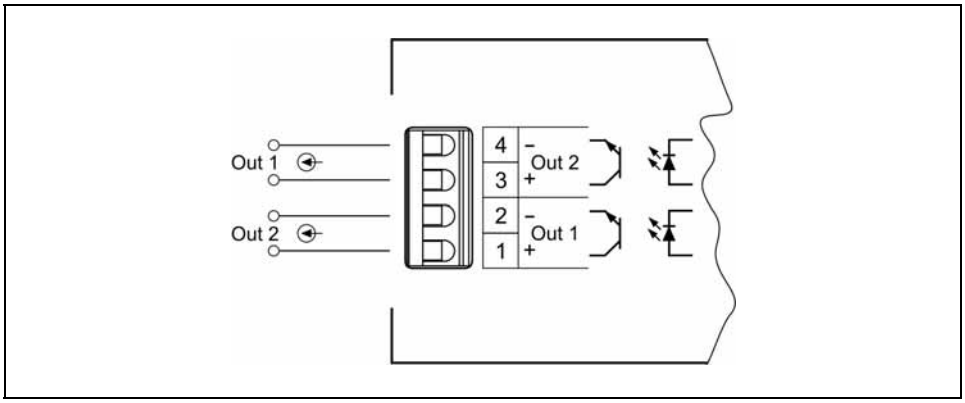
Wiring plan, connecting the instrument as an intermediate device
(see also "Application example")

Be careful the polarity of the cables.



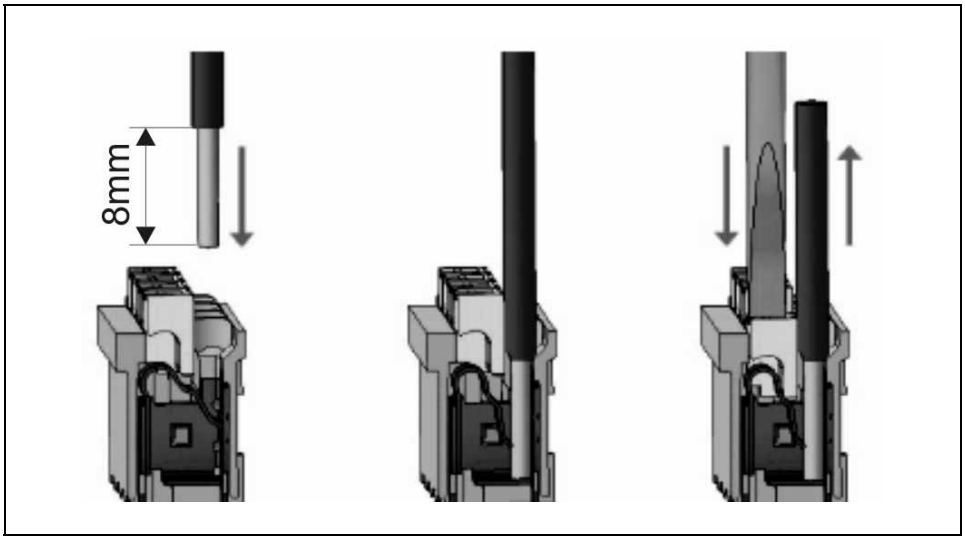
Wiring plan, connecting the limit outputs
(see also "Application example")

Be careful the polarity of the cables.



Connecting the cables into the terminal assemblies

Make sure before connection that the current loop is switched off.
The push-in direct connector assemblies used allow a fast connection of the cables.
Their proper usage is shown by the following figure:



1. Push the stripped cable-end until it possible into the terminal assembly. In the case of flexible cable-ends, you can facilitate opening the connection part by pushing down the white button.

2. By pushing the wire in, the self-closing connection is being established. Check it by pulling it outwards slightly.

(3. When you disassemble the cable, push down the white button by a screwdriver, and pull the cable-end out.)

There is no need to use great force for pushing the cable in, neither for removal. The button can be pushed down easily. Please do not exercise forces higher than necessary, as it may cause damages to the terminal assembly.

Finishing step

1. Check if the cables are connected properly (have you connected all the cables; have you connected them to the right place; is the connection stable; do not the cable-ends touch each other).

Checking the connections

After you have completed the connections, put the current loop under voltage, in such a way that the nominal 4-20 mA current should flow in the loop. If the connection is correct, numbers or a characters has to appear on the display.

If nothing appears on the display, most probably there is no current flowing in the loop. Check if the current is present by using an ampermeter. If the current value is in the 4-20 mA range, check if everything has been done in accordance with Chapter **5.1 Connecting into the current loop**.

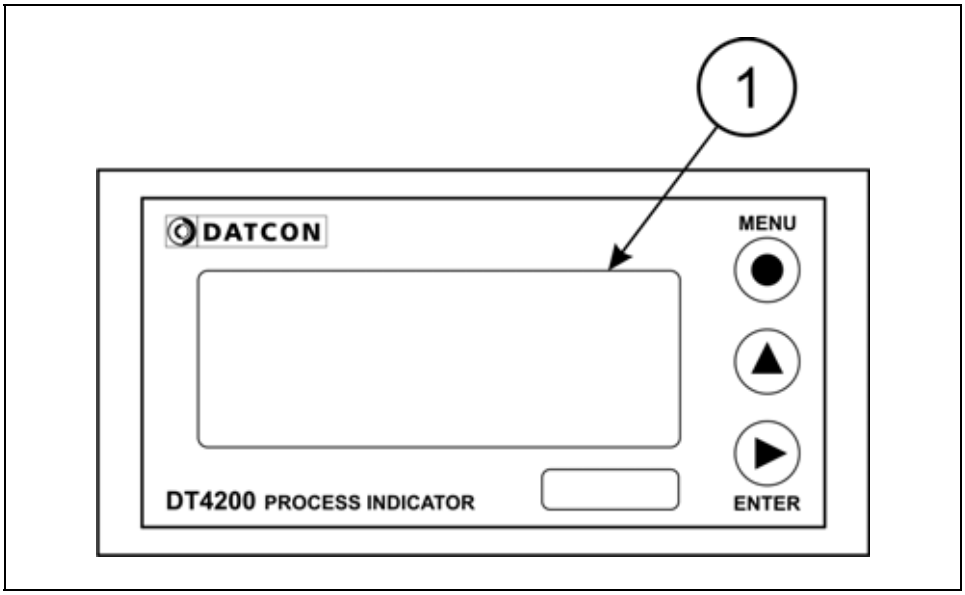
You may check the voltage at the pins **5** and **6** of the terminal assembly, the voltage should be a value between 1.5 and 2.2 V, while pin **6** is the positive one, if the connection is correct. In the case of reverse polarity, the voltage value is less than 1 V, and **5** is the positive pin.

With this you have completed the connection of DT4200.

6. Display and manual controls

6.1. The first start-up

The display



The display is indicated by the arrow (1)

After the instrument has been installed and connected into the current loop, first you see on the display the type of instrument: dt, 4200, than the current in mA, with a resolution of 3 decimals.

In the case of an error message

If anything else appears on the display instead of the numbers showing the current value (e.g. a message with blinking letters), then it is an error message of the instrument.

In order to define the error more accurately, please go to Chapter **10.3. Error messages** or **10.4. Messages of critical errors**, found at the end of this Manual, in the Appendix.

6.2. Characters and mnemonics appearing on the display

DT4200 has a 7-segment type display. It means that maximum 7 bars are used to form each characters. The numbers can be read easily, some of the letters, marks however, looks unusual:

A = A, b = B, c = C, d = D, E = E, F = F, 9 = G,
h = H, ı = I, J = J, H = K, L = L, ıı = M, n = N,
o = O, P = P, q = Q, r = R, S = S, t = T, U = U,
u = V, '' = W, H = X, y = Y, 2 = Z

All mnemonics (code words) presented on the display comes from English expressions in abbreviated form. The following part gives a list of the possible mnemonics and their meaning. The left-side column shows the characters appearing on the display. The right-side column gives first the meaning, then the full English word in brackets and, after the hyphen, and explanation may be given.

Login text

dt	**DT** - Datcon instrument
4200	**4200** - Type of the instrument

Error messages

E:Ado	**A/D overflow** (**E**rror: **A/D O**verflow)
E: 3.5	**Loop current < 3.5 mA**
E:20.5	**Loop current > 20.5 mA**
E:ScE	**Scaling error** (**E**rror: **Sc**ale)
E:UF_	**Underflow** (**E**rror: **U**nder**f**low)
E:oF¯	**Overflow** (**E**rror: **O**ver**f**low)
E:¯ıı¯	**Minimum-maximum** (**E**rror: **M**issing **M**inimum-**M**aximum)

Messages of critical errors

S:Adh	**A/D failure** (**S**ervice: **AD H**ardware)
S:EEh	**EEPROM failure** (**S**ervice: **EE**PROM **H**ardware)
S:EEP	**EEPROM write error** (**S**ervice: **EE**PROM **P**rotected)
S:cAL	**Calibration error** (**S**ervice: **Cal**ibration)
S:dFS	**Default factory settings** (**S**ervice: **D**efault **F**actory **S**ettings)
E:LSE	**The last saving was not successful** (**E**rror: **L**ast **S**ave)

During measuring

FULL	**20000** - The value presented on the display is twenty-thousand
-FLL	**-20000** The value presented on the display is minus twenty-thousand

During code writing

codE	**Code?** (**Code**)
bAd.c	**Bad Code** (**Bad C**ode)
USEr	**A User login took place** (**User**)
SUPr	**A Supervisor login took place** (**Sup**ervisor)

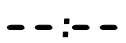
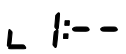
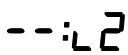
During setting up

LO.L 1	**The typed number is lower than allowed** (**Lo**w **Li**mit)
h 1.L 1	**The typed number is higher than allowed** (**Hi**gh **Li**mit)
----	**Low numeric value not possible to display**
----	**High numeric value not possible to display**
r.tYPE	**Re-type it please** (**R**e-**typ**e)
A.ESc	**Automatic escaping** (**A**uto **Esc**ape) - after 1 minute
EH it	**Exit from the setting** (**Exit**)
bUSY	**The instrument is making calculations, please wait (Busy)**
rEdY	**The requested operation has been completed** (**Ready**)
SAvE	**The saving of the settings is being done** (**Save**)
no	**No, I don't want this menu** (**No**)
YES	**Yes, the menu can be started** (**Yes**)

Minimum-maximum values on the display
(▲ button)

	**Minimum value** (**MIN**imum)
	**Maximum value** (**MAX**imum)
	**Firmware version** (F**i**R**M**ware**E**)
	Low numeric value not possible to display
	High numeric value not possible to display

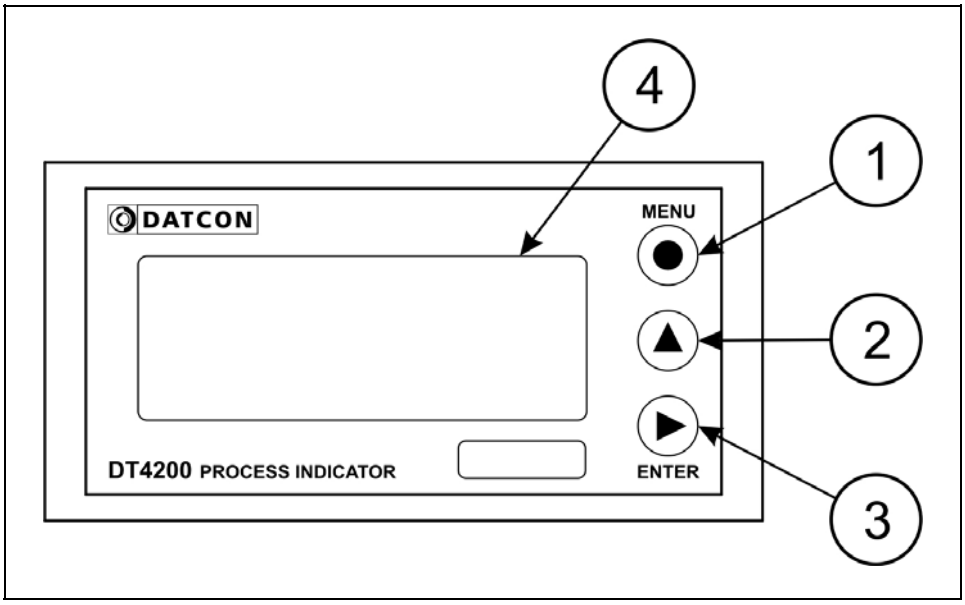
Limit values on the display

	**Both limit outputs are switched off**
	**The limit output No.1 is switched on** (**L**imit **1**)
	**The limit output No.2 is switched on** (**L**imit **2**)
	**Both limit outputs are switched on**

6.3. Manual controls

DT4200 can be adjusted by the membrane push-buttons indicated by **(1)**, **(2)**, and **(3)** in the drawing.

Functions of the push-buttons during measurement



(1) MENU button: Entering the menu
When you push this button, the device will ask for a password (code) in accordance with Chapter **7.1. Typing the code (password) in**, when the right code has been given, it enters into the menu. **During this time the measurement is suspended, and the limit outputs don't change**. If no keys are pressed for a period of one minute, the instrument restarts and the measurement goes on.

(2) ▲ button: displaying minimum value, maximum value, firmware version. The above values and the firmware version remains on the display as long as the button is being pressed. **During this time the measurement is suspended, and the limit outputs don't change**.

Using this function:

1. Press the ▲ button as long as you see this: MIN.
This mnemonic indicates that it will be displayed the minimum value measured after the last clear.
2. Keeping the button pressed down, after 1.5 sec the minimum value will be displayed as long as the button is pressed down.
3. Press the ▲ button second time as long as you see this: MAX.
The mnemonic indicates that it will be displayed the maximum value measured after the last clear.
4. Keeping the button pressed down, after 1.5 sec the maximum value will be displayed as long as the button is pressed down.
5. Press the ▲ button third time as long as you see this: FrIE. The mnemonic indicates that it will be displayed the firmware version.
6. Keeping the button pressed down, after 1.5 sec the firmware version will be displayed as long as the button is pressed down.
Format: Y, M, DD, where Y=year, H=month, and NN=day).

Comments:

- Pressing the ▲ button repeatedly, the above process starts from operation „1.”, enable to display the three values sequentially.
- When you release the ▲button more than 5 sec. and you press down the button ▲ again the minimum value will be displayed independently of which value would be the next one. The reason of this operation mode is to get used this sequence: minimum value, maximum value, firmware version.
- To clear minimum and maximum values is possible as written in 14. Menu item, after log in as a supervisor **(Clear Minimum and maximum values)**.

(3) ENTER button: displaying the status of the limit output and clearing the alarm (alarm acknwledgement).
It's functionality depends on the operating mode of displaying the limits. In default factory setting this function is switched off, therefore pushing the button does not cause any changes. Detailed description is in Chapter **7.3. Display modes of limit output status**.

Other function: in „Alarm Mode" it switches the limit output off.

7. Setting-up

7.1. Typing the code (password) in

The importance of the code

You may enter the menu only after you have typed your code in. The code is made from 3 numeric characters. This solution prevents unauthorised persons from changing the settings of the instrument.

Levels of authorisation

- **User level**: allows the modification of the most necessary parameters only. The rest of the menu is not even shown for users. The user code default factory setting is: **000**.
- **Supervisor level**: allows the modification of all parameters for the authorised person. The supervisor code default factory setting is: **100**.

Typing the code in

1. Press the **MENU** button. The blinking codE mnemonic shows that the device is asking for the code.
2. Three zeros appear: 000. The zero at the left side is blinking.
   - Pressing the ▲ button you can increase the value of the blinking number:

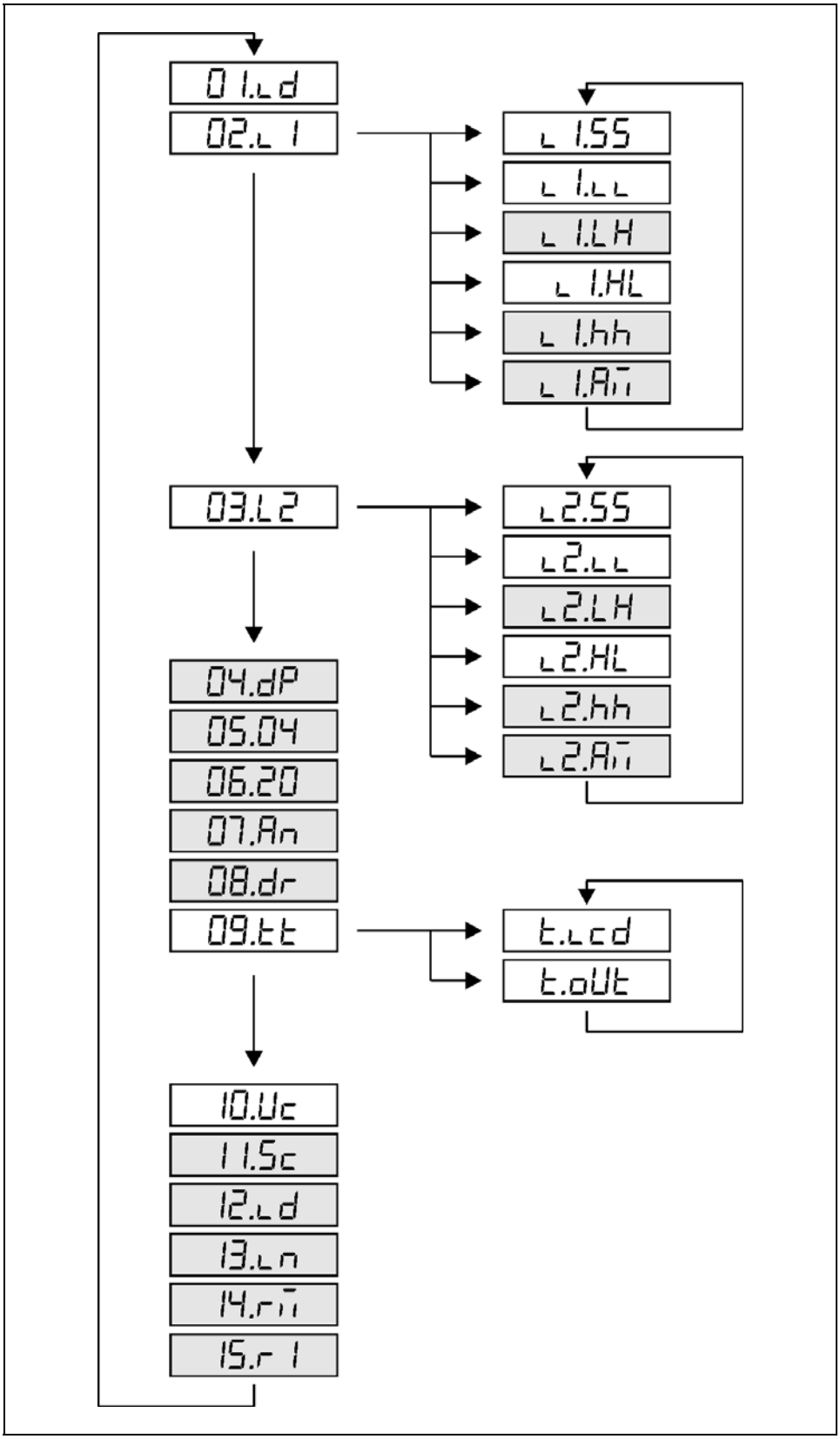
   1, 2, 3, 4, 5, 6, 7, 8, 9, 0, etc.
   - Pressing the ► button to select the next digit.
3. Pressing the ▲ and the ► buttons, type in either the user code or the supervisor code.
4. Press the **MENU** button. If a correct code has been type in, the mnemonic USEr (login as a user) or the mnemonic SUPr (login as a supervisor) is displayed and stays there for 2.5 seconds; then the first menu item is shown on the display: 0 1.Ld.
5. If an incorrect code has been typing in, the mnemonic bAd.c (**BAD C**ode) is shown on the display and stays there for 2.5 seconds; then the instrument exits from the menu, and goes on with the measurement.
   Start typing the code in again from Point 1.

Automatic exit from the request for the code

If no buttons are pressed, the instrument displays the mnemonic A.ESc (**A**uto **Esc**ape) after 1 minute has passed from the last pressing of a button, and it RESTARTS, i. e. goes back to the measuring mode. This solution is due to security: unauthorised persons, after 1 minute, will not be able to change the settings of the instrument, should it be left alone for some reason.

7.2. The menu

The menu structure



01: Limit-value display
26. page

02: Limit value 1
03: Limit value 1
28. page

04: Decimal point
36. page

05: Scale 4 mA
37. page

06: Scale 20 mA
39. page

07: Averaging number
41. page

08: Display refresh time
43. page

09: Tests
45. page

10: User code
47. page

11: Supervisor code
49. page

12: Display mode
51. page

13: Leader zeros
53. page

14: Min. and max. erase
55. page

15: Default
56. page

Comment:
The menu items shown in grey appear only in the case of a supervisor-level login.

7.3. Display modes of limit output status

(01. menu item)

Function

The state of the limit outputs (whether they are switched on or off) can be displayed. Here you can define the conditions, on which displaying should depend.
[Default factory setting: OFF]

Sequence of operations

1. Enter the menu by the user or the supervisor code. Chapter **7.1. Typing the code in** describes how you can type the code in. You see on the display: 0 1.Ld.
2. Enter the given menu item by pressing the **ENTER** button.
3. You can read the mnemonic oFF on the display. The mnemonic is blinking.
4. Pressing the ▲ button, select the desired display mode.

oFF: **switched off**
The instrument never displays the state of limit outputs [default factory setting]

- d.btn: **Dynamic button** (**D**ynamic **B**u**t**to**n**)
It displays the state of limit outputs as long as the **ENTER** button is kept pressed.

- t.btn: **Timed button** (**T**imed **B**u**t**to**n**)
It displays the state of limit outputs for a period as long as the **ENTER** button is kept pressed + for 2.5 seconds.

- S.btn: **Static button** (**S**tatic **B**u**t**to**n**)
Displaying the state of limit outputs can be switched on/off by pressing the **ENTER** button.

- AU.cE: **Automatic: when changed** (**Au**to: **C**hang**e**)
After a change has taken place in the state of limit outputs (switching off or on) it displays for a period of 2.5 seconds.
If you keep the **ENTER** button pressed down, the measurement results are displayed.

- AU.PL: **Automatic: periodical** (**Au**to: **P**eriodica**l**)
In every 2.5 seconds it displays the states of limit outputs automatically for 2.5 seconds.
If you keep the **ENTER** button pressed down, the measurement results are displayed.

Sequence of operations

- on: **Always on** (**ON**)

It always displays the states of limit outputs.
If you keep the **ENTER** button pressed down, the measurement results are displayed.
(This operating mode is useful when the states of limit outputs is more important than the measured value.)

Exit from the menu item

1. After finishing the settings, press the **MENU** button to exit from the given menu item, and you see: 0 I.Ld.
(2. If you want to change the settings you have done just now, or if you just want to check what you have typed in, go on with the operation from point 2 of the **Sequence of operations**.)
(3. If you don't want to exit the menu (you want to do further settings), then you may select the desired menu items by pressing the ▲ button.)

Exit from the menu

1. Press the **MENU** button. First the mnemonic SAvE (**Save**), then the mnemonic EH it (**Exit**) are shown on the display. With this the storing of the settings is completed. The instrument has exited the menu and goes on with the measurement.

7.4. Setting up the limit outputs (02. and 03. menu items)

Function

The instrument has two limit outputs. They are identical with each other, and work independently.
Operation: the instrument keeps comparing the displayed physical value with the (adjustable) limit value. It switches the output ON depending whether the displayed value is higher than the limit value. (There are other operating modes too, in which it operates if the displayed value is between or out of the two (adjustable) limit values.)
In Chapter **10.8. Limit outputs** in the Appendix you find a detailed training material on the limit outputs.

Setting the operating mode
Sequence of operations

1. Enter the menu with the supervisor code.
The way the code should be type in can be found in Chapter **7.1. Typing the code in**. You see on the display:
 .
2. Keep stepping by pressing the ▲ button as long as you see this menu item:  .
3. Enter the menu item by pressing the **ENTER** button.
4. You see the mnemonic  on the display.
L1 (**L**imit 1) means: limit output No. 1.
SS (**S**ettings) means: settings. Here you can define the operating mode for the limit output. Enter by pressing the **ENTER** button.

Setting the operating mode
Sequence of operations

5. Keep stepping by pressing the ▲ button you can select the desired limit-output operating mode.

- oFF: the output is always in switched off condition. [default factory setting]
- ≥L: (**≥L**) The output gets switched on, when the displayed physical value is higher than or equal with the low limit value (LL).
- <L: (**<L**) The output gets switched on, when the displayed physical value is lower than the low limit value (LL).
- ≥L.≤H: (**≥L** and **≤H**) The output gets switched on, when the displayed physical value is between the low limit value (LL) and the higher limit value (HL).
- <L.>H: (**<L** or **>H**) The output gets switched on, when the displayed physical value isn't between the low limit value (LL) and the high limit value (HL).
- on: the output is always in switched on condition

Setting the operating mode
Sequence of operations

6. After you have selected the desired operating mode for the limit output, press the **MENU** button. This takes you out from the given sub-menu item, and you see this: L 1.55.

7. If you had selected the oFF or the on mode, there is no need to do any further settings. For finishing the operation, please go on from the point **Exit from the menu item**.

Low limit value
Sequence of operations

8. Keep stepping by pressing the ▲ button as long as you see this sub-menu item: L 1.LL. LL (**L**ow **L**imit) means: the low limit value. Here you can define the numerical value by which the device will compare the measured physical values.
9. Enter by pressing the **ENTER** button.
10. You see this 0.000 on the display and the arrow (←) is blinking in the upper left corner. The arrow indicates that the uppermost digit (the „half" digit) is being selected from the 4 and half digits, and now it can be modified by pressing the ▲ button.
11. Pressing the ▲ button you can switch on or off the „half" digit, or you can type in the value 20.000.

- 10.000 = 10.000
- FULL = 20.000
- 0.000 = 0.000

12. Pressing the ► button you can select the next digit.
13. Pressing the ▲ button you can increase the value of the blinking digit:

1, 2, 3, 4, 5, 6, 7, 8, 9, 0, etc.

14. When the last digit (right-side) is being selected, and you press the button ►, a blinking colon appears on the left side: : 0.000. The colon indicates that the plus/minus sign is being selected, and it can be modified by pressing the ▲ button.
15. Pressing the ▲ button you can switch on or off the minus sign.

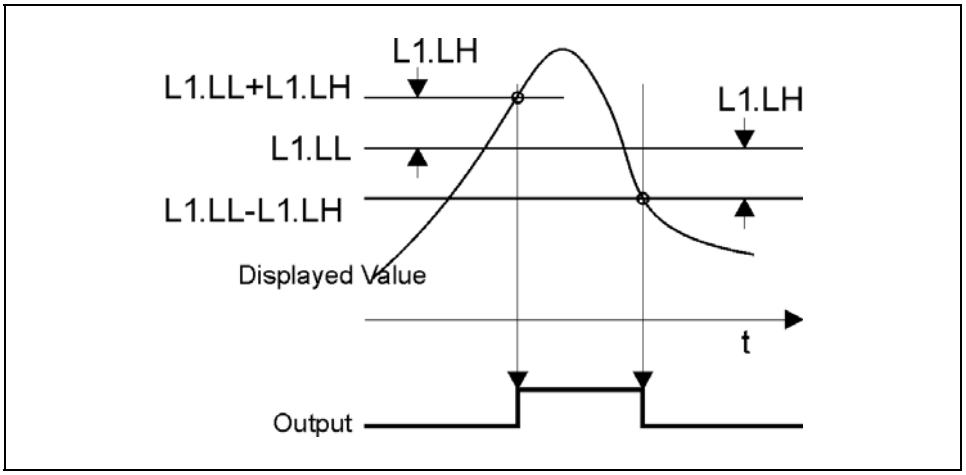
- 10.000 = 10.000
- - 10.000 = -10.000

16. After you have defined the value for the limit, press the **MENU** button to exit from the sub-menu item, and you see this: L 1.LL.

Hysteresis of the low limit
Sequence of operations

16. Keep stepping by pressing the ▲ button as long as you see this sub-menu item: L 1.LH. LH (**L**ow **H**ysteresis) means: the hysteresis of the low limit value. Here you can define a numerical value which provides the hysteresis of the low limit value (LL) by having **added to and subtracted from** it. Consequently, the actual hysteresis is twice the value defined here.

View of the used terms



Comment: according to this drawing, the limit output is in the 2L operating mode.

Hysteresis of the low limit
Sequence of operations

17. Enter by pressing the **ENTER** button.

18. You see this .000 on the display. This is the value of L1.LH. It can be changed between 000 and 999. The digit at the left side is blinking.

19. Pressing ► button you can select the next digit.

20. Pressing ▲ button you can increase the value of the blinking digit:

1, 2, 3, 4, 5, 6, 7, 8, 9, 0, etc.

21. After you have set the value of the hysteresis, press the **MENU** button to exit from the sub-menu item, and you see this: L 1.LH.

22. If you had selected the 2L or the cL limit-value operating mode, there is no need to do further settings. For finishing the operation, go on with the steps from the part: **Exit from the menu item**.

High limit value Sequence of operations

Setting the high limit value and It's hysteresis is necessary in that case only, if you had selected the 2L.Sh or the cL.Sh operating mode.

23. Pressing the ▲ button keep stepping as long as you see this sub-menu item: L 1.HL. HL (**H**igh **L**imit) means: the high limit value. Here you can define the higher numerical value, to which the instrument compares the measured physical values.
24. Enter by pressing the **ENTER** button.
25. You see this 0.000 on the display, and the arrow (←) is blinking in the upper left corner. The arrow indicates that the uppermost digit (the „half" digit) is being selected from the 4 and half digits, and now it can be modified by pressing the ▲ button.
26. Pressing the ▲ button you can switch the „half" digit on or off, or you can type in the value 20.000.

- 10.000 = 10.000;
- FULL = 20.000
- 0.000 = 0.000

27. Pressing the ► button you can select the next digit.
28. Pressing the ▲ button you can increase the value of the blinking digit:

1, 2, 3, 4, 5, 6, 7, 8, 9, 0, etc.

29. When the last digit (right-side) is being selected, and you press the ► button, a blinking colon appears on the left side: : 0.000. The colon indicates that the plus/minus sign is being selected, and it can be modified by pressing the ▲ button.
30. Pressing the ▲ button you can switch the minus sign on or off.

- 10.000 = 10.000;
- - 10.000 = -10.000

31. After you have set the value for the limit, press the **MENU** button to exit from the sub-menu item, and you see this: L 1.HL.
32. L1.HL must not be lower than L1.LL. Should the case be this, the instrument call attention you by a blinking mnemonic LO.L 1, and exchanges the wrong value to the lowest permissible value.

Hysteresis of the high limit
Sequence of operations

33. Keep stepping by pressing the ▲ button as long as you see this sub-menu item: L 1.hh. HH (**H**igh **H**ysteresis) means: the hysteresis of the high limit value. Here you can define a numerical value which provides the hysteresis of the high limit value (HL) by having **added to and subtracted from** it. Consequently, the actual hysteresis is twice the value defined here.
34. Enter by pressing the **ENTER** button.
35. You see this .000 on the display. This is the value of L1.HH. It can be changed to any values between 000 and 999. The digit at the left side is blinking.
36. Pressing the ► button you can select the next digit.
37. Pressing the ▲ button you can increase the value of the blinking digit:

1, 2, 3, 4, 5, 6, 7, 8, 9, 0, etc.

38. After you have set the value of the hysteresis, press the **MENU** button to exit from this sub-menu item, and you see this: L 1.hh.

Exit from the menu item

1. After finishing the settings, press the **MENU** button to exit from the given menu item, and you see this: 02.L 1.
(2. If you want to change the setting you have done just now, or if you just want to check what you have typed in, go on with the operation from point 2 of the **Sequence of operations.**)
(3. If you don't want to exit the menu (you want to do further settings), then you may select the desired menu items by pressing the ▲ button.)

Exit from the menu

1. Press the **MENU** button. First the mnemonic SAvE (**Save**), then the mnemonic EH it (**Exit**) are shown on the display. With this the storing of the settings is completed. The instrument has exited the menu and goes on with the measurement.

You find a detailed training material on the limit outputs in the Appendix, in Chapter **10.8 Limit outputs**.

7.5. Limit output alarm mode

Function

In alarm mode, the limit output is switching on when the limit condition exist. But the output stays switched on (independent from the limit condition) until the **ENTER** button is pressed (alarm acknowledge). (All these information are described in detail in Chapter **7.4. Setting up the limit output No. 1.**)

Sequence of operations

1. Enter the menu by the supervisor code.
Chapter **7.1. Typing the code in** describes how you can type the code in. You see on the display: 0 1.Ld.

2. Keep stepping by pressing the ▲ button as long as you see this menu item: 02.L 1.
3. Enter the menu item by pressing the **ENTER** button.
4. Keep stepping by pressing the ▲ button as you see this sub-menu item: L 1.AM (**A**larm **M**ode).
5. Enter by pressing the **ENTER** button.

6. You see this oFF on the display. The mnemonic is blinking.
7. You can switch the alarm mode on by pressing the ▲ button.

- oFF = the limit output will switch off automatically when the condition that had caused it to switch on ceases to exist [default factory setting].

- on = switching the limit output off is possible only by pressing the ENTER button. It stays switched on, no matter if the condition that had caused it to switch on ceases to exist.

Exit from the menu item

1. After finishing the settings, press the **MENU** button to exit from the menu item, and you see this: L 1.AT.
2. Press the **MENU** button to exit from the menu item, and you see this: 02.L 1.

(3. If you don't want to exit the menu, as you want to do further settings, then you may select the desired menu items by pressing the ▲ button.)

Exit from the menu

1. Press the **MENU** button. First the mnemonic SAVE (**Save**), then the mnemonic EXIT (**Exit**) are shown on the display. With this the storing of the settings is completed. The instrument has exited the menu and goes on with the measurement.

7.6. Decimal point position (04. menu item)

Function

Setting the position of the decimal point on the display, or switching the decimal point off.
[Default factory setting: 3 decimals]

Sequence of operations

1. Enter the menu by typing the supervisor code.
The way the code should be type in is described in Chapter **7.1. Typing the code in.** You see this on the display:
01.Ld.
2. Keep stepping by pressing the ▲ button as long as you see this menu item: 04.dP.
3. Enter the menu item by pressing the **ENTER** button.
4. You see this d.EcP on the display. The mnemonic is blinking.
5. You can move the decimal point to the right by pressing the ▲ button.

- d.EcP = 3 decimals [default factory setting]
- dE.cP = 2 decimals
- dEc.P = 1 decimal
- dEcP = no decimals
- .dEcP =4 decimals

Exit from the menu item

1. After finishing the setting, press the **MENU** button to exit from the menu item, and you see this: 04.dP.
(2. If you want to change the setting you have done just now, or if you just want to check what you have typed in, go on with the operation from point 3 of the **Sequence of operations**.)
(3. If you don't want to exit the menu, as you want to do further settings, then you may select the desired menu items by pressing the ▲ button.)

Exit from the menu

1. Press the **MENU** button. First the mnemonic SAvE (**Save**), then the mnemonic EH it (**Exit**) are shown on the display. With this the storing of the settings is completed. The instrument has exited the menu and goes on with the measurement.

7.7. The physical value assigned to 4 mA (05. menu item)

Function

Defining the physical value that should be assigned to the loop current value 4 mA, this can be any numerical value within the range that can be displayed (-20000 - 20000). [Default factory setting: 4.000]
For the purpose of scaling not only the physical value that belongs to 4 mA, but also the physical value that belongs to 20 mA must be set (the following menu item).

Sequence of operations

1. Enter the menu by typing the supervisor code.
The way the code should be type in is described in Chapter **7.1. Typing the code in.** You see on the display: 0 !.Ld.
2. Keep stepping by pressing the ▲ button as long as you see this menu item: 05.04.
3. Enter the menu item by pressing the **ENTER** button.
4. You see 4.000 on the display, the arrow (←) is blinking in the upper left corner. The arrow indicates that the uppermost digit (the „half" digit) is being selected from the 4 and half digits, and now it can be modified by pressing the ▲ button.
5. Pressing the ▲ button you can switch the „half" digit on or off, or you can type in the value 20.000.

- 14.000 = 14.000,
- FULL = 20.000
- 4.000 = 4.000

6. Pressing the ► button you can select the next numerical digit.
7. Pressing the ▲ button you can increase the value of the blinking digit:

1, 2, 3, 4, 5, 6, 7, 8, 9, 0, etc.

8. When the last digit (right-side) is being selected, and you press the ► button, a blinking colon appears on the left side: : 4.000. The colon indicates that the plus/minus sign is being selected, and it can be modified by pressing the ▲ button.
9. Pressing the ▲ button you can switch the minus sign on or off.

- 4.000 = 4.000
- - 4.000 = -4.000

Exit from the menu item

1. After finishing the setting, press the **MENU** button, to exit from the menu item, and you see this: 05.04.
(2. If you want to change the setting you have done just now, or if you just want to check what you have typed in, go on with the operation from point 3 of the **Sequence of operations**.)
(3. If you don't want to exit the menu, as you want to do further settings, then you may select the desired menu items by pressing the ▲ button.)

Exit from the menu

1. Press the **MENU** button. First the mnemonic SAvE (**Save**), then the mnemonic EH it (**Exit**) are shown on the display. With this the storing of the settings is completed. The instrument has exited the menu and goes on with the measurement.

7.8. The physical value assigned to 20 mA
(06. menu item)

Function

Defining the physical value that should be assigned to the loop current value 20 mA, which can be any numerical value within the range that can be displayed (-20000 - 20000).
[Default factory setting: 20.000]

For the purpose of scaling not only the physical value that belongs to 20 mA, but also the physical value that belongs to 4 mA must be set (the previous menu item).

Sequence of operations

1. Enter the menu by typing the supervisor code.
The way the code should be type in is described in Chapter **7.1. Typing the code in.** You see on the display: 0 1.Ld.
2. Keep stepping by pressing the ▲ button as long as you see this menu item: 06.20.
3. Enter the menu item by pressing the **ENTER** button.
4. You see this FULL on the display. It's meaning is: 20.000. The arrow (←) is seen blinking in the upper left corner. The arrow indicates that the uppermost digit (the „half" digit) is being selected from the 4 and half digits, and now it can be modified by pressing the ▲ button.
5. Pressing the ▲ button you can switch the „half" digit on or off, or you can type in the value 20.000. e.g. when the value on the display was 3.456, the following values are available by pressing the ▲ button:

- 13.456 = 13.456
- FULL = 20.000
- 3.456 = 3.456

Sequence of operations

6. Pressing the ► button you can select the next digit.
7. Pressing the ▲ button you can increase the value of the blinking digit:

1, 2, 3, 4, 5, 6, 7, 8, 9, 0, etc.

8. When the last digit (right-side) is being selected, and you press the ► button, a blinking colon appears on the left side: : 3.456. The colon indicates that the plus/minus sign is being selected, and it can be modified by pressing the ▲ button.
9. Pressing the ▲ button you can switch the minus sign on or off.

- 3.456 = 3.456
- - 3.456 = -3.456

Exit from the menu item

1. After finishing the setting, press the **MENU** button, to exit from the menu item, and you see this: 06.20.
(2. If you want to change the setting you have done just now, or if you just want to check what you have typed in, go on with the operation from point 3 of the **Sequence of operations**.)
(3. If you don't want to exit the menu, as you want to do further settings, then you may select the desired menu items by pressing the ▲ button.)

Exit from the menu

1. Press the **MENU** button. First the mnemonic SAvE (**Save**), then the mnemonic EH it (**Exit**) are shown on the display. With this the storing of the settings is completed. The instrument has exited the menu and goes on with the measurement.

7.9. The number of averaged measurements
(07. menu item)

Function

The instrument performs cca. 15 measurements in each seconds. The displayed measurement result is generated as the average of several measurements.
Here you can define the number of measurements that should be used for calculating the averaged numerical value. By increasing this number the display stability increases, but the signal settling time becomes lower.
[Default factory setting: 8]

Sequence of operations

1. Enter the menu by typing the supervisor code.
The way the code should be type in is described in Chapter **7.1. Typing the code in.** You see on the display: 0 !.Ld.
2. Keep stepping by pressing the ▲ button as long as you see this menu item: 07.An.
3. Enter the menu item by pressing the **ENTER** button.
4. You see this 8 on the display. The number is blinking.
5. Pressing the ▲ button select the number of measurements to be averaged for the displayed numerical value.

- 8 : The displayed value is the average of the last 8 measurements.
[Default factory setting]
(The display settling time after the stabilisation of the input signal: 0.5 seconds.)
- 16 : The displayed value is the average of the last 16 measurements.
(The display settling time after the stabilisation of the input signal: 1 second.)
- 32 : The displayed value is the average of the last 32 measurements.
(The display settling time after the stabilisation of the input signal: 2 seconds.)

Sequence of operations

- 1 : The displayed value is the same as the last measurement result; the previous measurements do not influence this value.
(The display settling time after the stabilisation of the input signal: 0.1 second.)
- 2 : The displayed value is the average of the last 2 measurements.
(The display settling time after the stabilisation of the input signal: 0.1 second.)
- 4 : The displayed value is the average of the last 4 measurements.
(The display settling time after the stabilisation of the input signal: 0.3 seconds.)

Exit from the menu item

1. After finishing the setting, press the **MENU** button, to exit from the menu item, and you see this: 07.An.
(2. If you want to change the setting you have done just now, or if you just want to check what you have typed in, go on with the operation from point 3 of the **Sequence of operations**.)
(3. If you don't want to exit the menu, as you want to do further settings, then you may select the desired menu items by pressing the ▲ button.)

Exit from the menu

1. Press the **MENU** button. First the mnemonic SAvE (**Save**), then the mnemonic EH it (**Exit**) are shown on the display. With this the storing of the settings is completed. The instrument has exited the menu and goes on with the measurement.

7.10. Display refresh time (08. menu item)

Function

The instrument performs cca. 15 measurements in each seconds. It's too fast to see the changing of the measurement value.
Here you can define the time periods by which the instrument displays the new measurement values.
[Default factory setting: 0.5 second]

Sequence of operations

1. Enter the menu by pressing a supervisor code.
The way the code should be type in is described in Chapter **7.1. Type the code in.** You see on the display: 01.Ld.
2. Keep stepping by pressing the ▲ button as long as you see this menu item: 08.dr .
3. Enter the menu item by pressing the **ENTER** button.
4. You see this 0.5 S on the display. It's meaning: 0.5 seconds) The 0.5 numerical value is blinking.
5. Pressing the ▲ button select the time periods by which the instrument should display the new measurement values.

- 0.5 S = once in each 0.5 seconds [Default factory setting].
- 1.0 S = once in each 1 second.
- 1.5 S = once in each 1.5 seconds.
- 2.0 S = once in each 2 seconds.
- 0.1 S = once in each 0.1 seconds.
- 0.3 S = once in each 0.3 seconds.

Exit from the menu item

1. After finishing the setting, press the **MENU** button, to exit the menu item, and you see this: 08.dr .
(2. If you want to change the setting you have done just now, or if you just want to check what you have typed in, go on with the operation from point 3 of the **Sequence of operations**.)
(3. If you don't want to exit the menu, as you want to do further settings, then you may select the desired menu items by pressing the ▲ button.)

Exit from the menu

1. Press the **MENU** button. First the mnemonic SAvE (**Save**), then the mnemonic EH it (**Exit**) are shown on the display. With this the storing of the settings is completed. The instrument has exited the menu and goes on with the measurement.

7.11. Tests (09. menu item)

Function Checking the display and the limit outputs.

Sequence of operations

1. Enter the menu by typing either the user code or the supervisor code.
The way the code should be type in is described in Chapter **7.1. Typing the code in.** You see this: 0 1.Ld.
2. Keep stepping by pressing ▲ button as long as you see this menu item: 09.tt.
3. Enter the menu item by pressing the **ENTER** button.
4. You see this t.Lcd on the display. (It's meaning: Display test). The mnemonic Lcd is blinking.
5. If you want to test the display, press the **ENTER** button. In this case all the segments on the display get switched on. By pressing the ▲ button several times you can select from several test patterns by which you can decide whether the display is good or not. You may exit from the display test by pressing the **MENU** button. You see this t.Lcd again.
6. If you want to test the limit outputs, press the ▲ button to switch to the t.oUt mnemonic from the t.Lcd mnemonic. (It's meaning: Output test).
7. Press the **ENTER** button.
8. You see this: 1._ 2._ . The blinking sign after 1 indicates the status of the first limit output, the blinking sign after 2 indicates the status of the second limit output. In this present case both of them are switched off. This is why the blinking sign is in the lower position.
9. Pressing the ▲ button, you can switch the outputs on.

- 1._ 2._ = both are switched OFF.
- 1.¯ 2._ = 1. ON; 2. OFF.
- 1._ 2.¯ = 1. OFF; 2. ON.
- 1.¯ 2.¯ = both are switched ON.

Sequence of operations

Comment: the status you have selected here remains unchanged as long as you exit the menu, and the instrument starts measuring.
10. You can exit from the display test by pressing the **MENU** button. You see the blinking t.out mnemonic.

Exit from the menu item

1. Press the **MENU** button, to exit from the Tests menu item, and you see this: 09.tt.
(2. If you want to return to the tests, go on from **point 3 of the Sequence of operations**.)
(3. If you don't want to exit the menu because you want to perform further settings, you can select the desired menu items by pressing the ▲ button.)

Exit from the menu

1. Press the **MENU** button. First the mnemonic SAvE (**Save**), then the mnemonic EH it (**Exit**) are shown on the display. With this the storing of the settings is completed. The instrument has exited the menu and goes on with the measurement.

7.12. Changing the user code (10. menu item)

Function

You can define new codes instead of the factory-defined user code. The code is an optional number within the range between 000 and 999.
[Default factory setting: 000]

Sequence of operations

1. Enter the menu by typing either the user code or the supervisor code.
The way the code should be type in is described in Chapter **7.1. Typing the code in.** You see this: 01.Ld.
2. Keep stepping by pressing the ▲ button as long as you see this menu item: 10.Uc.
3. Enter the menu item by pressing the **ENTER** button.
4. You see on the display: 000.
The digit on the left side is blinking.

• Pressing the ▲ button you can increase the value of the blinking digit:

1, 2, 3, 4, 5, 6, 7, 8, 9, 0, etc.

• Pressing the ► button you can select the next digit.

3. Pressing the buttons ▲ and ►, type in the new user code.
4. Press the **MENU** button.
5. You have to type the new code in twice. This prevents an error in defining the new code due to typing mistakes. This is indicated by the mnemonic r.tYP (re-type).
6. Pressing the buttons ▲ and ► type in the new user code again.
7. Press the **MENU** button.
8. When the code you wrote in for the first time is not identical with the code written in for the second time, a blinking mnemonic rbAd.c warns you on the error, and the device exits from the menu item. You see this 10.Uc on the display. (The user code has not changed, the old one is valid.) Restart the operation from Point 3.

Sequence of operations

9. If the codes written in for the first and second time are identical with each other, the device exits from the menu item. You see this 10.Uc on the display.

Do not forget the user code you have specified. If you forget it, defining another one is possible only by using a supervisor code for entering into the menu.

Returning into the menu item Changing the user code

1. As you have already left the menu item **Changing the user code**, you see this: 10.Uc.
(2. If you want to change the setting you have performed just now, or if you just want to check what you have typed in, continue the operation from **Point 3 of the Sequence of operations.**)
(3. If you do not want to exit from the menu, as you want to perform further settings, you may press the ▲ button to select the desired menu items.)

Exit from the menu

1. Press the **MENU** button. First the mnemonic SAuE (**Save**), then the mnemonic EH it (**Exit**) are shown on the display. With this the storing of the settings is completed. The instrument has exited the menu and goes on with the measurement.

7.13. Changing the supervisor code (11. menu item)

Function

You can define new codes instead of the factory-defined supervisor code. The code is an optional number within the range between 000 and 999.
[Default factory setting: 100]

Sequence of operations

1. Enter the menu by typing the supervisor code.
The way the code should be type in is described in Chapter **7.1. Typing the code in.** You see this: 0 1.Ld.
2. Keep stepping by pressing the ▲ button as long as you see this menu item: 11.5c.
3. Enter the menu item by pressing the **ENTER** button.
4. You see on the display: 100. The digit on the left side is blinking.

- Pressing the ▲ button you can increase the value of the blinking digit:

1, 2, 3, 4, 5, 6, 7, 8, 9, 0, etc.

- Pressing the ► button you can select the next digit.

3. Pressing the buttons ▲ and ►, type in the new supervisor code.
4. Press the **MENU** button.
5. You have to type the new code in twice. This prevents an error in defining the new code, due to typing mistakes. This is indicated by the mnemonic r.tYP (re-type).
6. Pressing the buttons ▲ and ► type in the new supervisor code again.
7. Press the **MENU** button.
8. When the code you wrote in for the first time is not identical with the code written in for the second time, a blinking mnemonic rbAd.c warns you on the error, and the instrument exits from the menu item. You see this 11.5c on the display. (The supervisor code has not changed, the old one is valid.) Restart the operation from Point 3.

Sequence of operations

9. If the codes type in for the first and second time are identical with each other, the instrument exits from the menu item. You see this 11.5c on the display.

Do not forget the supervisor code you have specified. If you forget it, defining another one is possible in the service only.

Returning into the menu item Changing the supervisor code

1. As you have already left the menu item **Changing the supervisor code**, you see this: 11.5c.
(2. If you want to change the setting you have performed just now, or if you just want to check what you wrote in, continue the operation from **Point 3 of the Sequence of operations.**)
(3. If you do not want to exit from the menu, as you want to perform further settings, you may press the ▲ button to select the desired menu items.)

Exit from the menu

1. Press the **MENU** button. First the mnemonic SAvE (**Save**), then the mnemonic EH it (**Exit**) are shown on the display. With this the storing of the settings is completed. The instrument has exited the menu and goes on with the measurement.

7.14. Display operating modes (12. menu item)

Function

The instrument has a 4-and-a-half-digit display. It is possible to switch it into a 3-and-a-half-digit display mode. In this case the display behaves like a 3-and-a-half-digit display during measurement. (The mnemonics are displayed in four digits).
[Default factory setting: four-and-a-half-digit operating mode.]

Sequence of operations

1. Enter the menu by typing a supervisor code.
The way the code should be type in is described in Chapter **7.1. Typing the code in.** You see on the display: 0 1.Ld.
2. Keep stepping by pressing the ▲ button as long as you see this menu item: 12.Ld.
3. Enter the menu item by pressing the **ENTER** button.
4. You see this 1.4 on the display. The mnemonic is blinking.
5. You may switch between the two operating modes by pressing ▲ button.

- 1.4 = four-and-a-half-digit operating mode [Default factory setting]
- 1.3 = three-and-a-half-digit operating mode

In the three-and-a-half-digit operating mode the possible range of numbers to display is reduced to the values being between -2000 and 2000.

Exit from the menu item

1. After finishing the setting, press the **MENU** button, to exit from the menu item, and you see this: 12.Ld.
(2. If you want to change the setting you have performed just now, or if you just want to check what you have typed in, continue the operation from **Point 3 of the Sequence of operations.**)
(3. If you do not want to exit from the menu, as you want to perform further settings, you may press the ▲ button to select the desired menu items.)

Exit from the menu

1. Press the **MENU** button. First the mnemonic SAvE (**Save**), then the mnemonic EH it (**Exit**) are shown on the display. With this the storing of the settings is completed. The instrument has exited the menu and goes on with the measurement.

7.15. Disable displaying the leader zeros
(13. menu item)

Function

Leader zero: the zeros that stand before an integer of no value. E.g. the instrument displays the value 5.2 together with the leader zeros:

005.2 (default factory setting), or without the leader zeros: 5.2.

In this menu item you can either disable displaying of the leader zeros, or you can enable this function again.

Sequence of operations

1. Enter the menu by typing a supervisor code.
The way the code should be type is described in Chapter **7.1. Typing the code in.** You see on the display: 0 !.Ld.
2. Keep stepping by pressing the ▲ button as long as you see this menu item: 13.Ln.
3. Enter the menu item by pressing the **ENTER** button.
4. You see this nULL on the display. The text is blinking.
5. You may switch between the two operating modes by pressing ▲ button.

- nULL = the leader zeros are shown on the display (default factory setting).
- SPcE = the leader zeros are not shown on the display.

Comment: one zero directly before the decimal point is always shown on the display.

Exit from the menu item

1. After you have performed the setting, press the **MENU** button. This takes you out from the menu item, and you see this: 13.Ln.
(2. If you want to change the setting you have done just now, or if you just want to check what you have typed in, go on with the operation from point 3 of the **Sequence of operations**.)
(3. If you do not want to exit from the menu because you want to perform other settings too, you may press the ▲ button to select the desired menu item.)

Exit from the menu

1. Press the **MENU** button. First the mnemonic SAvE (**Save**), then the mnemonic EH it (**Exit**) are shown on the display. With this the storing of the settings is completed. The instrument has exited the menu and goes on with the measurement.

7.16. Clear minimum and maximum values

(14. menu item)

Function

To clear the measured and stored mimimum and maximum values.

Sequence of operations

1. Enter the menu by typing the supervisor code.
The way the code should be type in is described in Chapter **7.1. Typing the code in.** You see this on the display:
01.Cd.
2. Keep stepping by pressing the ▲ button as long as you see this menu item: 14.rn.
3. Enter the menu item by pressing the **ENTER** button.
4. The mnemonic no is shown on the display. The mnemonic is blinking.
Now you still have the possibility to exit. If you want to exit, as you do not want to clear the minimum and maximum values after all, press the **MENU** button. This takes you out from this menu item, and you see this: 14.r 1.
5. If you want to clear the minimum and maximum values, press the ▲ button to change the „NO” to „YES”.

- no = I do not want to clear
- YES = I want to clear

Exit from the menu item

1. After you have performed the setting, press the **MENU** button. This takes you out from the menu item, and you see this: 14.rn.
(2. If you do not want to exit from the menu because you want to perform other settings too, you may press the ▲ button to select the desired menu item.)

Exit from the menu

1. Press the **MENU** button. First the mnemonic SAvE (**Save**), then the mnemonic EH it (**Exit**) are shown on the display. With this the storing of the settings is completed. The instrument has exited the menu and goes on with the measurement.

7.17. Resetting the default settings (15. menu item)

Function

In this case **all** the settings are deleted, and the default factory setting is restored.
Using this function makes sense in that case, when the settings of the instrument have changed so much, that it is easier to start the setting-up process from the default factory setting.

It is not possible to cancel this operation once the command has been issued.

Sequence of operations

1. Enter the menu by typing the supervisor code.
The way the code should be type in is described in Chapter **7.1. Typing the code in.** You see this on the display:
01.Ld.
2. Keep stepping by pressing the ▲ button as long as you see this menu item: 14.r 1.
3. Enter the menu item by pressing the **ENTER** button.
4. The mnemonic no is shown on the display. The mnemonic is blinking.
Now you still have the possibility to exit. If you want to exit, as you do not want to reset the default settings after all, press the **MENU** button. This takes you out from this menu item, and you see this: 14.r 1.
5. If you want to reset the default settings, press the ▲ button to change the „NO” to „YES”.

- no = I do not want to reset the default settings
- YES = I want to reset the default settings

6. Press the **MENU** button.

The instrument displays the mnemonic bUSY (busy), then the mnemonic rEdY (ready). After then it restarts: dt , 9000.
According to the factory settings, it measures the loop current with a resolution of three decimals.

8. Fault rectification

8.1. Fault finding

The instrument has a sophisticated self-test function. It is able to detect and display the majority of the errors.

All the error messages are described in detail in chapters **10.3** and **10.4** of the Appendix.

In the case of an error that causes total inability of the instrument to function, nothing appears on the display.

8.2. Repairing

In accordance with Point **2.1.**: **For safety and warranty reasons, any internal work on the instrument must be carried out by DATCON personnel.**

In the case of errors, it is recommended to notice of the displayed error message, as well as of the phenomenon seen.
These information please communicate to the Datcon service personnel.

9. Dismounting

9.1. Dismounting procedure

The steps described in Chapter **4. Mounting** should be performed in reverse sequence. Upon dismounting the instrument, observing all the safety rules is mandatory, like upon mounting.

Only qualified and authorised professionals may perform the dismounting operations.

9.2. Disposal

According with the concerning EU directive, the Manufacturer undertakes the disposal of the instrument that are manufactured by it and intended to be destroyed. Please deliver it in contamination-free condition to the site of the Manufacturer or to a specialised recycling company.

10. Appendix

10.1. Technical specifications

Power supply	
Supply:	4-20 mA, loop-powered
Voltage drop:	see: at Input parameters
Reverse polarity protection:	yes
Maximum current:	80 mA
Input parameters	
Input signal:	Current
Range:	3.5-20.5 mA
Voltage drop:	< 2 V (at 20 mA), < 2.2 V (at 4 mA)
Display / manual controls	
Display unit:	LCD, 4 ½ digit, 7 segments decimal point and negative sign
Character height:	12.7 mm
Display range:	-20 000 - 20 000
Relation between the display and the input signal:	Any values to be displayed could be selected (within the display range) to be assigned to the 4 mA and the 20 mA values.
Display refresh time:	0.1; 0.3; **0.5**; 1.0; 2.0 sec (adjustable)
Manual controls:	3 membrane push-buttons on the front cover
Decimal point:	position can be selected, or it can be switched off
Accuracy	
4 mA:	typical 1 µA max. 3 µA (23 ˚C ±2 ˚C)
4 mA:	typical 2 µA max. 7 µA (-20 - +60 ˚C)
20 mA:	typical 2 µA max. 5 µA (23 ˚C ±2 ˚C)
20 mA:	typical 8 µA max. 20 µA (-20 - +60 ˚C)
Long term stability:	2 µA / 1 year

Measuring parameters

Characteristics:	Linear
Measuring frequency:	15 measurements / second
Number of averaged samples:	1; 2; 4; **8**; 16; 32 (adjustable)

Limit outputs

Output type:	optically isolated passive switching transistor
Current in OFF condition:	I < 0.1mA (at 9 V)
Voltage in ON condition:	U < 1.2 V (at 10 mA)
Load rating:	30 V, 30 mA max.
Refreshing time:	same as the display's one
Hysteresis:	0 - ±999 (the last 3 digits of the display)

Environmental conditions

Operating temperature range:	0-60 °C (-20 - +60 °C on request)
Storing temperature range:	-25 - +70 °C

Electromagnetic compatibility (EMC)

In accordance with EN 61326:2000

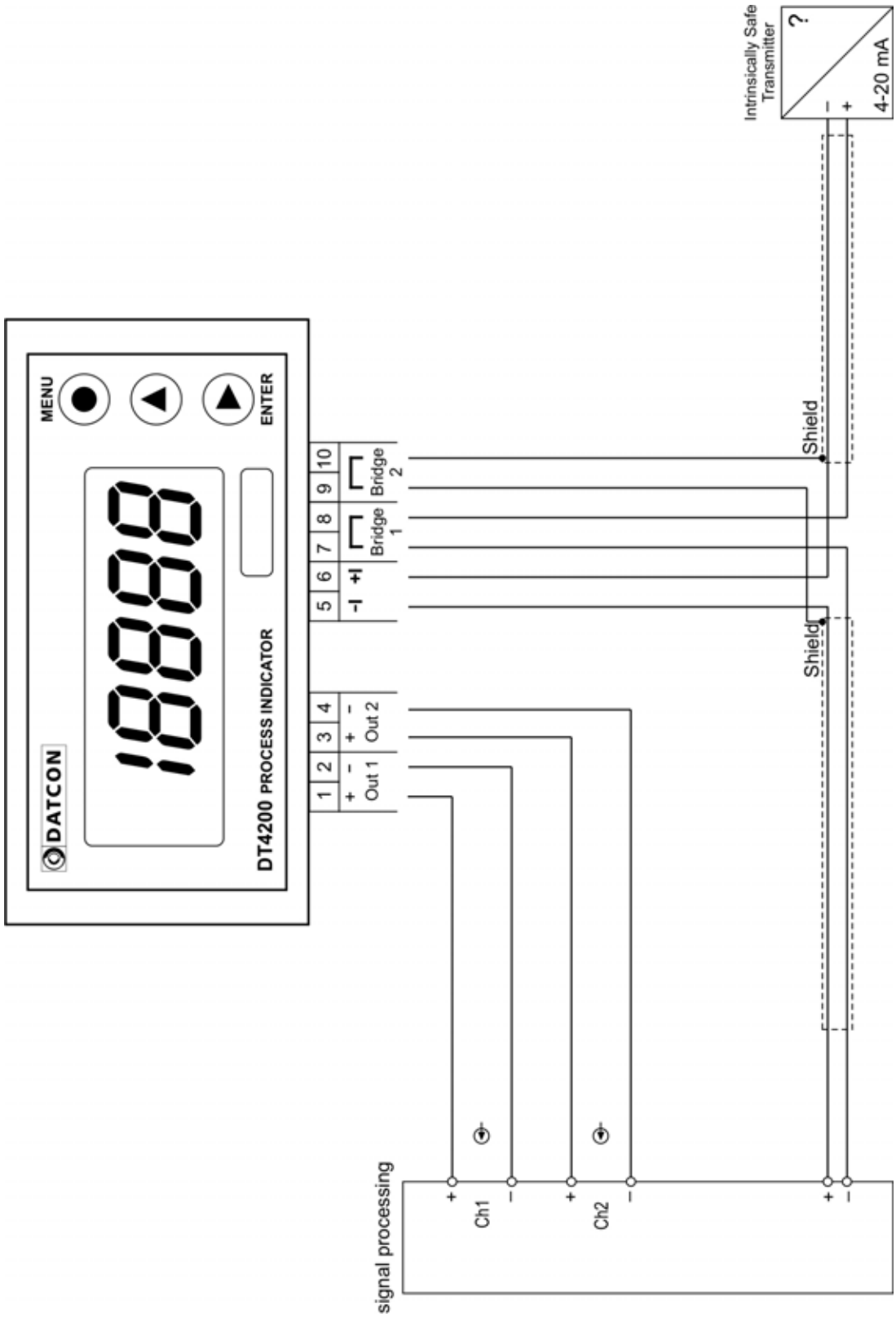
Immunity:	-A- criterion
Noise emission:	-A- class

General data

Housing:	panel instrument
Dimensions [mm]:	96 x 48 x 45 (width x height x depth)
Panel cut off:	91 x 44 (width x height)
Weight:	0.15 kg
Protection:	IP 65 (front) IP 30 (rear)
Mounting position:	Optional, see: figure 4.2.
Connection cable:	0.25-1.5 mm^2
Connection:	
Signal, option:	6 pole push-in direct connection
Limit output:	4 pole push-in direct connection

The manufacturer reserves the right to change specifications.

10.2. Application example



10.3. Error messages

The instrument has a sophisticated self-testing function; it is capable of detecting the majority of the errors. All mnemonics (code words) presented on the display comes from English expressions in abbreviated form.

E:Ado

A/D overflow (**E**rror: **A/D O**verflow)
The loop current is too high, it cannot be measured.
Repairing: the measuring loop (most probably the transmitter) is faulty, therefore too high current flows in the loop. Repair the measuring loop.

E: 3.5

Loop current < 3.5 mA
The loop current is too low, it cannot be measured.
Repairing: the measuring loop (the transmitter) is faulty or, the load resistance in the loop is too high. Repair the measuring loop.

E:20.5

Loop current > 20.5 mA
The loop current is too high, it cannot be measured.
Repairing: the measuring loop (most probably the transmitter) is faulty, therefore too high current flows in the loop. Repair the measuring loop.

E:ScE

Scaling error (**E**rror: **Sc**al**e**)
The value of the physical quantities corresponding to the currents 4 mA and 20 mA is set to zero.
Repairing: set the actual physical value.

E:UF_

Underflow (**E**rror: **U**nder**f**low)
The physical quantity is lower than the minimum that can be displayed. (In the case of four-and-a-half-digit display mode: < -20 000; in the case of three-and-a-half-digit display mode: < -2 000.)
Repairing: most probably you haven't set the scale of the instrument correctly when you specified the physical values, or the measuring loop is faulty.

E:oF-

Overflow (**E**rror: **O**ver**f**low)
The physical quantity is higher than the maximum that can be displayed. (In the case of four-and-a-half-digit display mode: >20 000; in the case of three-and-a-half-digit display mode: >2 000.)
Repairing: such as Underflow.

10.4. Messages of critical errors

Such errors are caused normally by structural injuries or damages. Repair is done by the service of Datcon. In case of error it is recommended to notice of the displayed error message, as well as of the phenomenon seen and communicate to the Datcon service personnel.

S:Adh

A/D fault (**S**ervice: **A/D H**ardware)
Either the A/D converter or It's communication bus is faulty.
Repairing: by the service
AD-t mindenütt A/D-re javítani

S:EEh

EEPROM fault (**S**ervice: **EE**PROM **H**ardware)
The memory storing the operation parameters, or it's communication bus is faulty, therefore access to the stored parameters is not possible.
Repairing: by the service

S:EEP

EEPROM writing error (**S**ervice: **EE**PROM **P**rotected)
The memory storing the operation parameters is faulty, therefore changing the stored parameters in not possible.
Repairing: by the service

S:cAL

Calibration error (**S**ervice: **Cal**ibration)
The instrument must be re-calibrated in the factory.
Repairing: by service

S:dFS

Default Factory Settings (**S**ervice: **D**efault **F**actory **S**ettings)
The instrument needs to be re-calibrated, and the operating parameters have also got damaged.
Repairing: by service

E:LSE

The last saving was not successful (**E**rror: **L**ast **S**av**e**)
Saving of the parameters modified last time was unsuccessful. The error was caused most probably by an interruption of the current loop. The status prior to the modification was preserved.
Repairing: Enter the menu, check the parameters. Change the incorrect values to the desired values, then exit the menu in the regular way. Pay attention to ensure that the loop current should not get interrupted during the operation.

10.5. Description of the menu items

You find a description of the menu items in the following part. A description on the handling of the menu is in Chapter **7. Settings**.

01.Ld

Display modes of limit output status (**L**imit **D**isplaying)
[Default Factory Setting: OFF]

- oFF Switched off (**OFF**)

It never displays the limit output status.

- d.btn Dynamic button (**D**ynamic **B**u**t**to**n**)

As long as the **ENTER** is being pressed down.

- t.btn Timed button (**T**imed **B**u**t**to**n**)

As long as the **ENTER** is being pressed down + for 2.5 seconds.

- S.btn Static button (**S**tatic **B**u**t**to**n**)

The display can be switched ON/OFF by **ENTER**.

- AU.cE Automatically: when changes (**Au**to: **C**hang**e**)

For a period of 2.5 sec, after a change has taken place in the output. Disabling: by **ENTER**

- AU.PL Automatically: periodical (**Au**to: **P**eriodica**l**)

Periodical: ON/OFF in each 2.5 seconds. Disabling: by **ENTER**.

- on Always ON (**ON**)

Disabling: by **ENTER**.

02.L 1

Limit output configuration sub-menu No.1.(**L**imit **1**)
Detailed description in the chapters **7.3.**, **7.4.**, **7.5.**.

03.L2

Limit output configuration sub-menu No.2. (**L**imit **2**)
It is the same as for limit output No.1., but everything pertains to limit output No.2. Detailed description in the chapters **7.3.**, **7.4.**, **7.5.**.

04.dP

Access is possible by supervisor code only.

Decimal point position select (Decimal **P**oint**)**
The position of the decimal point in the display can be defined here, or you can switch the decimal point off.
[Default factory setting: 3]

05.04

Access is possible by supervisor code only

Physical value assigned to 4 mA
The physical value to be assigned to the 4 mA loop current. Any values can be defined for it within the minimum-maximum interval that can be displayed . [Default factory setting: 4 000]

06.20

Access is possible by supervisor code only

Physical value assigned to 20 mA
The physical value to be assigned to the 20 mA loop current. Any values can be defined for it within the minimum-maximum interval that can be displayed. [Default factory setting: 20 000]

07.An

Access is possible by supervisor code only

Averaging number (**A**veraging **N**umber)
The displayed measurement result is generated as the average of several measurements. The number of measurements can be defined here.
By increasing this number the display stability increases too, but the signal settling time becomes lower.
[Default factory setting: 8]

08.dr

Access is possible by supervisor code only

Display refresh time (**D**isplay **R**efresh)
The instrument performs cca. 15-16 measurements in each seconds. It's too fast to see the changing of the measurement value.
Here you can define the time periods by which the instrument displays the new measurement values.
[Default factory setting: 0.5 sec]

09.tt

Test programmes sub-menu (Test**)**

- t.Lcd Display testing (**T**est: **LCD**)
Checking if the display works correctly.

- t.oUt Output testing (**T**est: **Out**put)
Displaying and changing the status of the limit outputs, independently of their operating modes.

10.Uc

Changing the User Code (**U**ser **C**ode)
The new User Code must be typed in twice, in order to avoid any typing errors. The mnemonic r.tYP (**R**e-**Typ**e) warns you to type the code for the second time, after you have typed it once. If the two codes are not identical with each other, the mnemonic bAd.C (**Bad C**ode) appears on the display, and the instrument exits the menu item.

Make sure not to forget the User Code, otherwise a new one can be defined only if you enter the menu by a Supervisor Code [Default factory setting: 000]

11.Sc
Access is possible by supervisor code only

Changing the Supervisor Code (**S**upervisor **C**ode)
The new Supervisor Code must be typed in twice, in order to avoid any typing errors. The mnemonic r.tYP (**R**e-**Typ**e) warns you to type the code for the second time, after you have typed it once. If the two codes are not identical with each other, the mnemonic bAd.C (**Bad C**ode) appears on the display, and the instrument exits the menu item.

Make sure not to forget the Supervisor Code, otherwise a new one can be defined in the service only. [Default factory setting: 100]

12.Ld
Access is possible by supervisor code only

Display mode (**L**C**D**)

- 1.4: four-and-a-half-digit mode (-19999 - 19999).
- 1.3: three-and-a-half-digit mode (-1999 - 1999).

[Default factory setting: four-and-a-half-digit]

13.Ln
Access is possible by supervisor code only

Disable displaying leader zeros (**L**eader **N**ull)

- nULL: the leader zeros are displayed
- SPCE (**Spa**ce): the leader zeros are not displayed, only one standing before the integer [Default factory setting: leader zeros are displayed]

14.rM

Access is possible by supervisor code only

Clear minimum and maximum values (**R**eset **M**in. & max.)

Select YES for clear the minimum and maximum values.

15.r 1

Access is possible by supervisor code only

Restoring the default settings (**R**eset **1**)

When you select YES, all the parameters will be reset to the default factory setting, and the instrument restarts.

It is not possible to withdraw this command subsequently!

10.6. Messages and error messages during setting up

The following mnemonics may displayed when the settings are being performed.

LO.L 1	**The value you have defined is lower than permissible** (**Lo**w **Li**mit) The instrument has replaced the value you have defined to the permitted lowest value.
hi.L 1	**The value you have defined is higher than permissible** (**Hi**gh **Li**mit) The instrument has replaced the value you have defined to the permitted highest value.
EHit	**Exit from the menu, returning to the normal operating mode** (**Exit**)
SAuE	**Saving the changed parameters is being done** (**Save**)
---- (4 lines at the **bottom** of the display)	**Low numerical value, not possible to display** This mnemonic is displayed in that case when you have switched the display mode from four-and-a-half-digit to three-and-a-half-digit, and the numerical value of a previously defined parameter does not „fit" to the display format.
- - - - (4 lines at the **top** of the display)	**High numerical value, not possible to display** This mnemonic is displayed in that case when you have switched the display mode from four-and-a-half-digit to three-and-a-half-digit, and the numerical value of a previously defined parameter does not „fit" to the display format.
bUSY	**The instrument is performing internal operations** (**Busy**)
rEdY	**The requested task has been successfully completed** (**Ready**)
no	**I do not want this menu item** (**No**)
YES	**Yes, the menu item may be started (Yes)**

10.7. Setting up the instrument (Example)

Exercise

There is a pressure transmitter with a measurement range of 5-150 bar corresponds to 4-20 mA.
Let the settings of DT4200 be the following:

- Number of decimals: 2.
- The physical value assigned for the 4 mA current: 5.00
- The physical value assigned for the 20 mA current: 150.00
- The leader zeros are not displayed.

Enter the menu

Enter the menu by using a Supervisor Code.
The way the code should be typing in is described in Chapter **7.1. Typing the code in.** You see on the display:
01.Ld.

Setting the decimal point

1. Keep stepping by pressing the ▲ button as long as you see this menu item: 04.dP.
2. Enter the menu item by pressing the **ENTER** button.
3. You see this d.EcP on the display. The mnemonic is blinking.
4. Set the number of decimals to two by pressing the ▲ button:
dE.cP.
5. Press the **MENU** button, to exit from the menu item, and you see this: 04.dP.

Setting the physical value assigned to 4 mA

1. Pressing the ▲ button keep stepping as long as you see this menu item: 05.04.
2. Enter the menu item by pressing the **ENTER** button.
3. Pressing the ▲ button you can increase the value of the blinking number:
4. Pressing the ► button you can select the next digit.
5. Set the value 05.00.
6. Press the **MENU** button, to exit from the menu item, and you see this: 05.04.

Setting the physical value assigned to 20 mA

1. Pressing the ▲ button keep stepping as long as you see this menu item: 06.20.
2. Enter the menu item by pressing the **ENTER** button.
3. Pressing the ▲ button you can increase the value of the blinking number:
4. Pressing the ► button you can select the next digit.
5. Set the value 150.00.
6. Press the **MENU** button, to exit from the menu item, and you see this: 06.20.

Disabling the leader zeros

1. Pressing ▲ button keep stepping as long as you see this menu item: 13.Ln.
2. Enter the menu item by pressing the **ENTER** button.
3. You see this nULL on the display. The mnemonic is blinking.
4. Pressing the ▲ button switch to the SPcE mnemonic.
5. Press the **MENU** button, to exit from the menu item, and you see this: 13.Ln.

Exit the menu

1. Press the **MENU** button. First the mnemonic EH it (**Exit**), then the mnemonic SAuE (**Save**) is displayed. With this the storing of the settings is completed. The instrument has exited the menu and goes on with the measurement.

10.8. The limit outputs (training material)

Outputs

The DT4200 has two optically isolated limit outputs that work independently from each other. The two outputs are equivalent. The following information and examples relate to output No.1. All these, however, are applicable for output No.2 too, without modification.

Limit values assigned to the output

The limit output has two possible conditions: switched OFF or switched ON.

To one output two limit values can be defined. The lower one is called: L 1.LL.

L 1 means a parameter to be assigned to the limit output No.1 (**L**imit 1).

LL (**L**ow **L**imit) means that this is the lower one among the two limit values.

The high limit value is designated as L 1.HL, where HL (**H**igh **L**imit) means that this is the higher one among the two limit values.

As the names indicate, the value of the high limit must not be lower than the value of the low limit. Therefore if you increase the value of the L 1.LL parameter, and it happens to be higher than the value of L 1.HL, then L 1.HL takes automatically the value of L 1.LL.

The operating mode of the output defines the way in which the measured input signal should control the limit output, depending on the above-described two definiable limit values. (All this will be clear through the description and example provided in the following pages).

Limit output sub-menu

In the menu, the second menu-item (02.L 1) contains all the parameters that relate to the limit output No.1.
When you enter the menu, you get into a sub-menu.
The menu structure is presented by the figure **7.2. Menu structure**.
The items within the sub-menus are not numbered. Instead, L 1 is used showing that all the menu items that constitute the sub-menu in question belong to the limit output No.1. This prevents you from mixing it up with the main menu.

Sub-menu items

You will find a detailed description of the limit-value sub-menu items in the following text.

L 1.SS

Operating mode (**S**ettings)
It defines the conditions under which the limit output should switch ON depending on the value of the measured and displayed physical signal. [Default factory setting: OFF]
Detailed description: on the following page

L 1.LL

Low limit value (**L**ow **L**imit)
It is one of the numerical values, to which the instrument compares the measured signal continuously. [Default factory setting: 0]

L 1.Lh

Lo limit value hysteresis (**H**ysteresis for **L**L)
This is the half of the hysteresis value that belongs to the low limit value. [Default factory setting: 0]

L 1.hL

High limit value (**H**igh **L**imit)
It is the other numerical value, to which the instrument compares the measured signal continuously. It's value must not be lower that the value of L 1.LL. [Default factory setting: 0]

L 1.hh

High limit value hysteresis (**H**ysteresis for **H**L)
This is the half of the hysteresis value that belongs to the high limit value. [Default factory setting: 0]

L 1.AT

Alarm mode (**A**larm **M**ode)
[Default factory setting: OFF]
Detailed description in the chapter: **Alarm Mode**.

Detailed description of the operating mode

(L 1.55)

The operating modes define the conditions under which the limit output should switch ON depending on the value of the measured and displayed physical signal.

oFF **Switched OFF**
The output is always switched OFF. [default factory setting]

≥L **≥ low limit**
It switches ON if the measured value is ≥ low limit.

<L **< low limit**
It switches ON if the measured value is < low limit.

≥L.≤h **Interval between the low and the high limits**
It switches ON when (measured value ≥ low limit) AND (measured value ≤ high limit).

<L.>h **A range outside the low and high limits**
It switches ON when (measured value < low limit) OR (measured value > high limit).

on **Always switched ON**
Independently from the measured value, the output is always ON.

The essentials about the hysteresis

To each limit values can be assigned different hysteresis values.

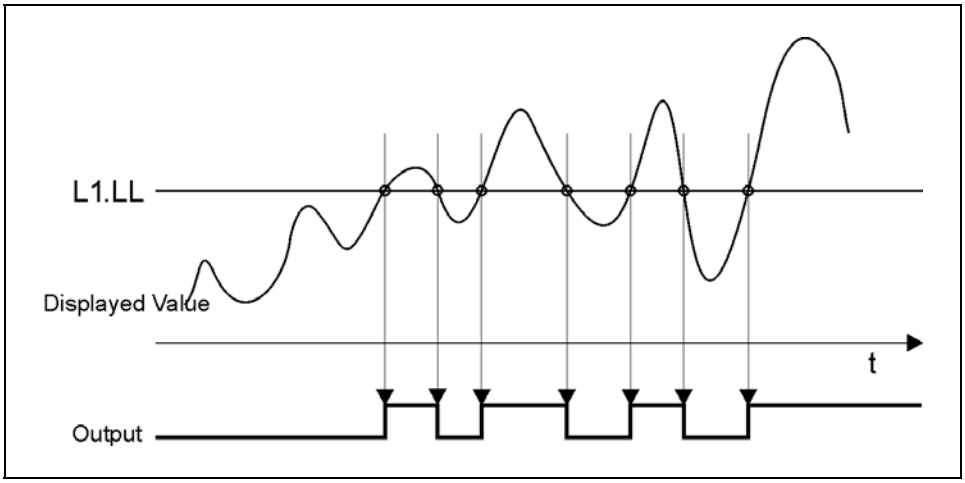
To L 1.LL belongs: L 1.Lh,

To L 1.hL belongs: L 1.hh.

The essentials about the hysteresis:
It makes it possible that the output should switch off not at the same numerical value at which it had switched on. What is the benefit of that? You may avoid the undesired consequence, when the output switches on and off several times near the limit values, due to a drift of the input signal, or due to it's ripple. This is demonstrated by an example in the following pictures.

Example:
Hysteresis > 0

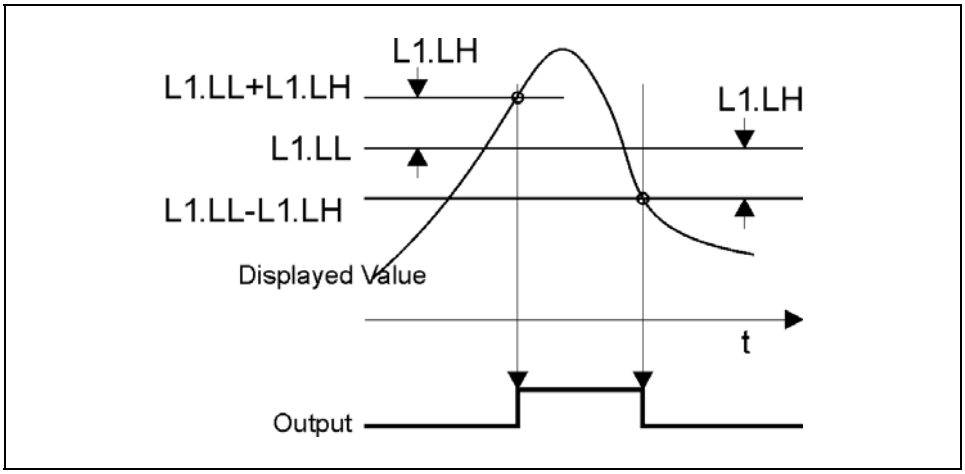
Comment: the precondition for the following examples is that the output is in $\overline{3}L$ mode, that is, it switches ON when the measured value ≥ L1.LL (low limit). The input signal has an increasing characteristic, but rippled. L $1.LL$ value = 1000. The value of the relevant hysteresis (L $1.Lh$) = 0.



A hysteresis with a value of zero means that the limit detection has no hysteresis. The output switches ON when the value on the display reaches or is in excess of 1000, and switches OFF when it goes lower than 1000 again.

Figure:
Hysteresis > 0

The following figure shows the essentials of hysteresis, when it's value is higher than zero

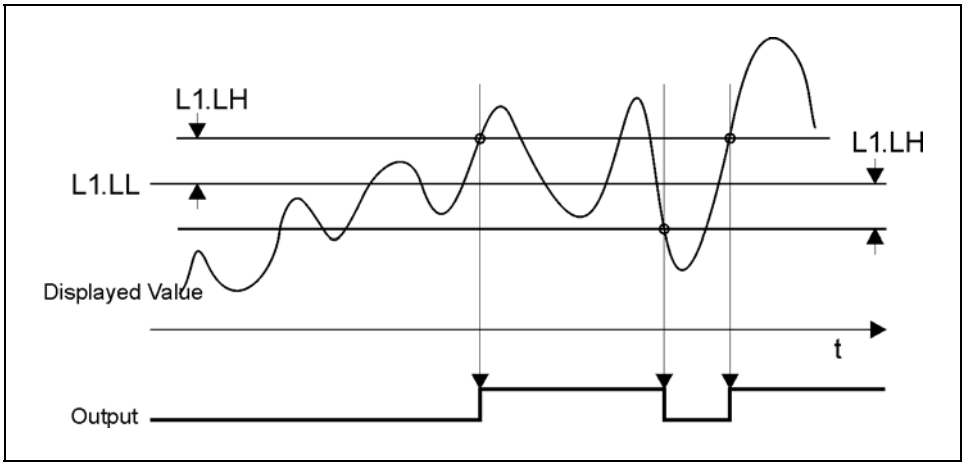


Example:
Hysteresis > 0

If you want the output to switch ON only once in the case of the signal presented by the previous example, then set the value of the hysteresis L 1.LH higher than 0.
In practice the hysteresis value could be depend from two aspects:

- amplitude of the ripple or the measure of the drift on the input signal
- or when the user needs two different values to switch ON and switch OFF not in relation the ripple or the drift. (This is demonstrated by the example at the end of this chapter.)

In this example the value of the hysteresis (L 1.LH)= 10.
How does it affect the switching of the output?



When the displayed value increases, the output does not switch ON at 1000, only at the value 1000+10=1010.
After it has switched ON, and the signal begin to decrease, it does not switch OFF as long as the value reaches the value of 990 (1000-10).

It can be seen, that the difference between the switching ON and OFF, that is the actual hysteresis, is equal with twice the L 1.LH parameter, that is 20.
It is also demonstrated that the hysteresis value of 10, that is used in the example, has actually improved the situation: the former number of switches, 4, has reduced to 2. If we had selected a value twice as much, the result would have been only one switching on.

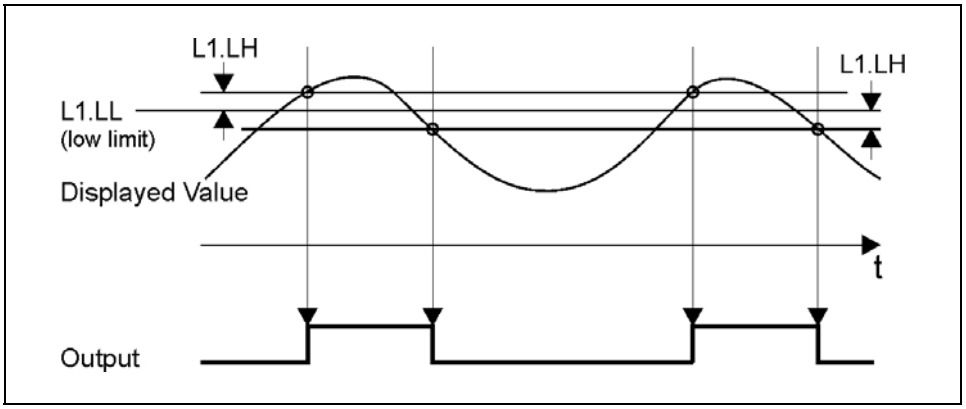
Detailed description of the limit value operating modes

oFF

- oFF**: Switched OFF** [this is the default factory setting]

Independent of the measured value, the limit output is always switched OFF.

- **: It switches ON, when: measured value ≥ low limit**



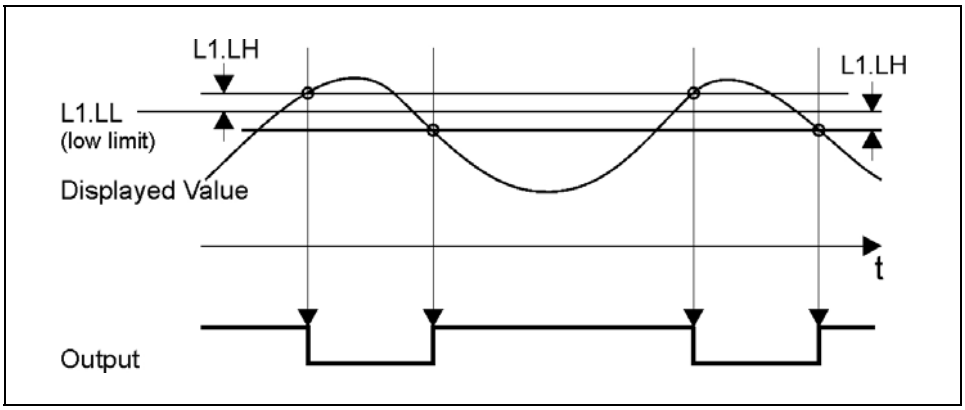
The output switches ON, if the displayed value ≥ numerical value defined as the L 1.LL.

In this operating mode the value of the L 1.hL parameter is indifferent: it does not influence the operation of the output.

Example for the application:
Switching a cooling system ON above a given temperature value.

CL

- **CL : It switches ON, when the measured value < low limit**



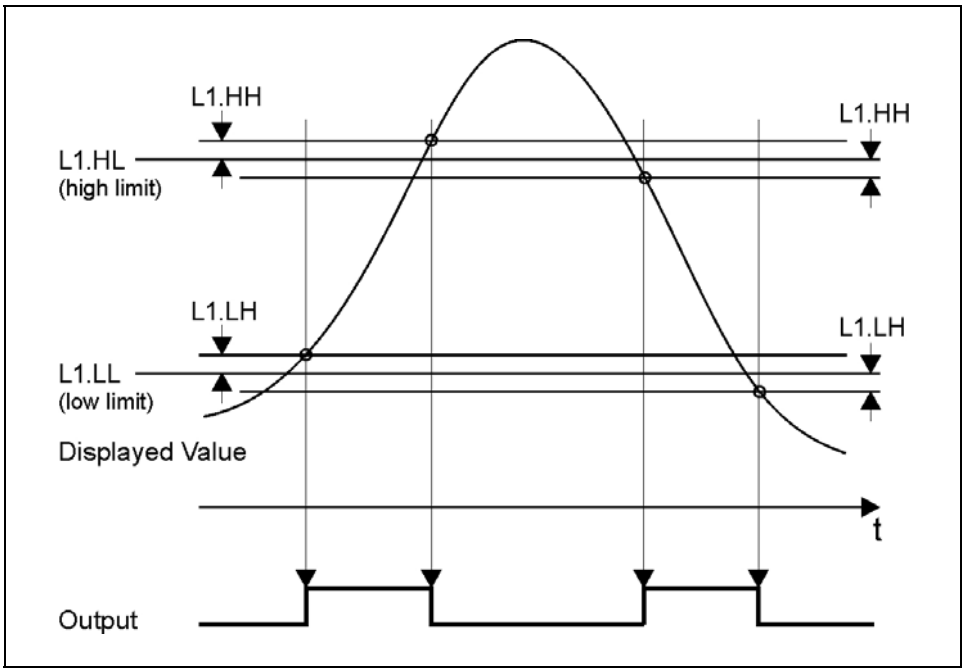
The output switches ON, if the displayed value is lower than the numerical value defined as the L 1.LL parameter.

In this operating mode the value of the L 1.hL parameter is indifferent: it does not influence the operation of the output.

Example for the application:
Switching ON a heating system below a given temperature value.

L1.Sh

• L1.Sh: **It switches ON, when (measured value ≥ low limit) AND (measured value ≤ high limit)**

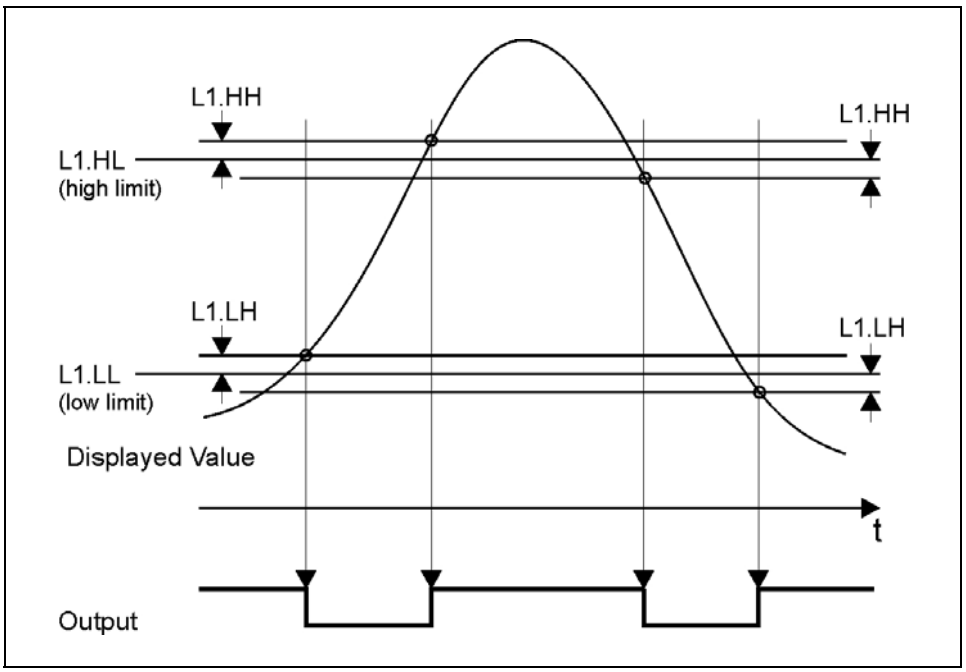


The output switches ON, when the displayed value ≥ numerical value defined as the L1.LL parameter AND, besides, it is ≤ numerical value defined as the L1.hL.

Example for the application:
It indicates that the measured value is between the desired limits.

cL.oh

• cL.oh: **It switches ON, when (measured value < low limit) OR (measured value > high limit)**



The output switches ON, when the displayed value is lower than the numerical value defined as the L 1.LL parameter OR higher than numerical value defined as the L 1.hL.

Example for the application:
It indicates that the measured value out of the desired limits.

Displaying the limit values

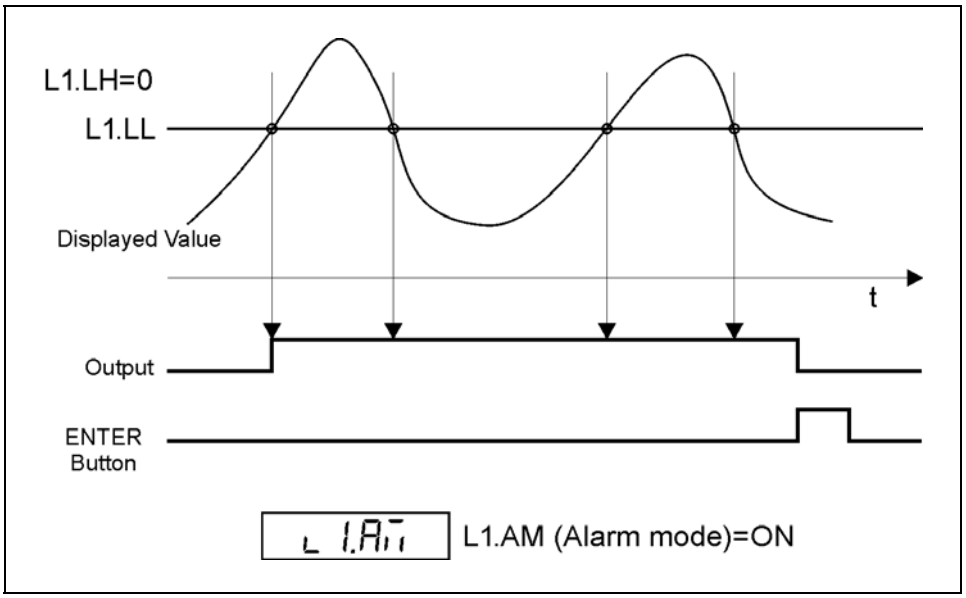
(Switching the displaying on: from the **04.LD** menu item.)

- Both outputs are OFF: --:--
- Output 1 is ON, output 2 is OFF: L 1:--
- Output 1 is OFF, output 2 is ON: --:L2
- Both outputs are ON: L 1:L2

If the Alarm Mode is ON, and the given output is in alarm status, the above displays appear blinking. The blinking stops only when the acknowledgement is done manually (Upon pressing the **ENTER** button).

Alarm Mode

The limit output may work in Alarm mode too. This mode is switched ON by the L 1.AM parameter. According to the default factory setting it is switched off (oFF). When the Alarm mode is ON (on), the limit output switches on when it has to switch on according to the measured and displayed physical value, but it will not switch off even if the value changes so that it should cause it to switch off. The output can be switched off by pressing the **ENTER** button only (acknowledgement).



Of course, if the condition that causes the output to switch on persists, the limit output will switch on again when the **ENTER** button is released.

After switching on the instrument

After switching on the instrument the limit outputs are disabled as long as it performs at least three measurements necessary for a complete averaging. This takes a few seconds maximum. In this way can be avoid false signalling due to transients that may appear in the measuring loop.

Example for the practical usage of the limit outputs

There is a 100-litre tank, whose liquid level is indicated by the instrument DT4200 in 0-100 litres, without decimals.

Task:

The limit output No.1 should control a pump, that switches ON when the liquid-level goes lower than 70 litres, and switches OFF when it goes higher than 90 litres.

The limit output No.2 should control a buzzer. The buzzer should be signalling continuously as long as a manual acknowledgement takes place, in those cases when the liquid level goes, at any time, lower than 50 litres, or when it goes higher than 95 litres.

The settings of the limit outputs are as follows:

L 1.SS operating mode= CL (Switches ON, when the liquid level is lower than the low limit)

L 1.LL Low limit = 80

L 1.Lh Hysteresis of the low limit = 10

L 1.hL High limit = 80 (it's value is indifferent)

L 1.hh Hysteresis of the high limit = 0 (it's value is indifferent)

L 1.Ai Alarm mode = oFF

L2.SS Operating mode= CL.Sh (Switches ON, when the liquid level does not fall between the limits.)

L2.LL Low limit = 50

L2.Lh Hysteresis of the low limit = 0

L2.hL High limit = 95

L2.hh Hysteresis of the high limit = 0

L2.Ai Alarm mode = on

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