

summary of contents:

Using / Function / Features	1
Technical Data / Connection	2
Display / Function of Keys	3
Menu-Point: Basic Menu (Password)	4
Menu-Point: "Values Viewing"	5
Menu-Point: Output	6
Menu-Point: Adjusting of sensor with signal	7
Menu-Point: Adjusting of sensor without signal	8
Menu-Point: Indication Scaling	9
Menu-Point: Evaluation / Simulation / Further Functions / Save Data	9
Failures	10
Factory-provided Programming / Reset-Times	10
Examples	11
Programming Inputs/Outputs	11
Short Instructions (Operating Structure/Password)	12
Short Instructions (Menu "Values Setting")	13

**Using:**

The device DMP-400 is made for evaluation and converting of Hydrocont-P-sensors and analog input signals, into calibrated output signals with 4 relay-switching-points. The programming happens in cleartext process through the membrane keyboard on the front in connection with an LCD-display. The DMP-400 can be used for many different applications.

Function:

The inputs of DMP-400 can be connected as well as Hydrocont P-sensors with a supply of 5V DC and an output signal of 0,5 till 4,5DC, analog signals of 0...10V, 0...20mA and 4...20mA with a supply of 24V DC. The outputs can be reinforced (max. Turn-Down of 1:30) and converted to standardized signals of 0...10V, 0...20mA, 4...20mA, 10...0V, 20...0mA or 20...4mA. You can change the input signals and output signals through parametry or at the slide switches at the side of the device. It is possible to put 4 free programmable switch points (with separate programmable hysteresis). Additionally you can choose for every switch point between working and quiescent current. Thanks integrated linearization, (max. 25 linearity points) it is possible to linear the outputsignal, e. g. for calculation of volume in lying cylindrical tanks. You can choose between linearization with input signal and linearization without input signal. On the input signals can be programmed an integration time until 30sec. for blanking out wave movements in the tank.

The device DMP-400 possesses a tendence evaluation in form of an indication on the display (with arrows) and as relay outputs (1 relay for tendence increasing, 1 relay for tendence decreasing). The space of time and the increase of tendence evaluation can be chosen by the user.

All functions and adjustments are made from a micro-processor in connection with the LCD-display, because of that the cleartext processing is very easy. The digital indication is free scalable, for e. g. to show the filling in liters. Additionally there is a min- and max.value-saving, which is indicated simultaneously in analog bar as a trailing indicator. The programmed data will be saved in an EEPROM, so the data will exist after a voltage-loss as ever without using a battery.

Features:

- + LCD-Display for bar graph and free scalable digital indication
- + Languages: German and English
- + 4 relay outputs free programmable with separate programmable hysteresis
- + Programmable tendence indication
- + Tendence switchable an relay outputs
- + Linearization with 25 points with or without input signal possible
- + Input can be configurated for Hydrocont-P-Sensor or for analog signals
- + Sensor feeding of 5V DC (Hydrocont-sensor) switchable to 24V DC
- + Universal input and output for standardized signals
- + Output Turn-Down max. 1:30
- + Min- and Max-value-saving
- + Trailing indicator in bar graph
- + Damping up to 30sec. programmable
- + Saving static (without a battery)

Digital Evaluation and Indication Device

Type: DMP-400

for Hydrocont P and analoge signals with LCD-display and 4 relayoutputs
operation instructions TA 11.99 page 2 of 13

Technical Data:

Auxiliary power: 230V AC +-10% 50Hz
optional 24V DC (18-36V)
Power input: 3,2W

Inputs:

Input for Hydrocont P-sensor:
(factory-provided) 0,5-4,5V DC
Sensor supply: 5V DC +-0,5%

Input for analog signals: 0...10V; 0...20mA; 4...20mA
Sensor supply: 24V DC / 27mA, current limited
Linearity deviations: <0,1%
Temperature deviation: 0,05%/10K

Outputs:

Turn-Down max.: 1:30 = min. measure span 3,3%
Increase of zero shift max.: 96,5%
Voltage output: 0...10V / 10...0V
Burd: >10KOhm
Current output: 0...20mA / 4...20mA / 20...0mA
20...4mA
Burd: max. 800 Ohm
Switching outputs: 4 x relays; closing contact
the 4 relays are connected with themself via a common clamp screw (12 REF)

Max. capacity: 230V AC / 120VA;
220V DC / 120W

Operation mode: working or quiescent current
(programmable)

Hysteresis: free programmable

Indication:

Indication: LCD-display 2x8 digits

Operating:

Parametry, configuration and measure value adjusting happens via 4 keys on the front.

Ambient conditions:

operating temperature: 0...50°C
storage temperature: -20...70°C

EMC-Norms:

IEC 801-2 (ESD) DIN EN 60801 part 2 VDE 0843, Level 3
IED 801-4 (Burst) DIN EN 61000 4-4 VDE 0847, Level 3

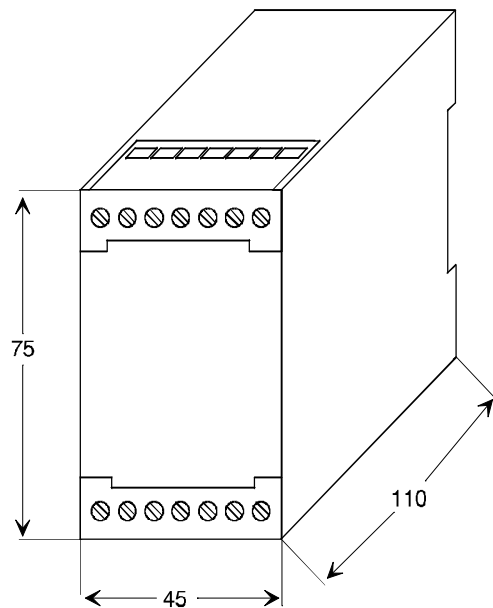
Housing:

Type: Snap-on rail fastener
Material: Macrolon
Width: 45mm
Fixing: Carrier rail fixing according to EN50022-35x7,5
Weight: 320gr.

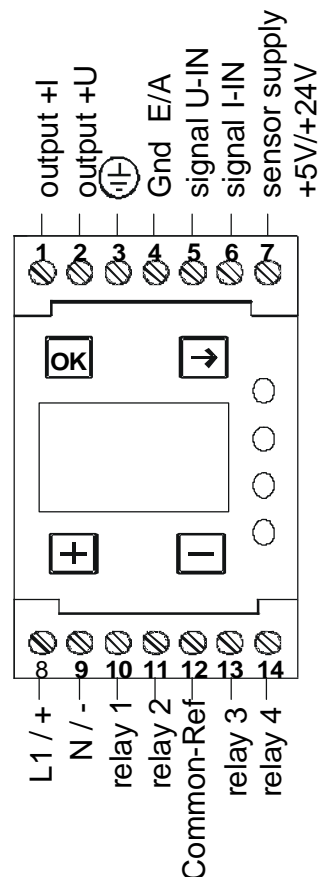
Order Code:

Type + Auxiliary Power
e. g.: DMP-400 / 230V AC

drawing:



Connection:



Display / Function of the keys:

The operation and indication elements on the front of the DMP-400 have following functions:

key "OK":

- jump into submenus and menus
- Bestätigen von Eingaben.

Value with scaling

as wished by the customer
 (0 ... 65000 possible)

Tendence indication:

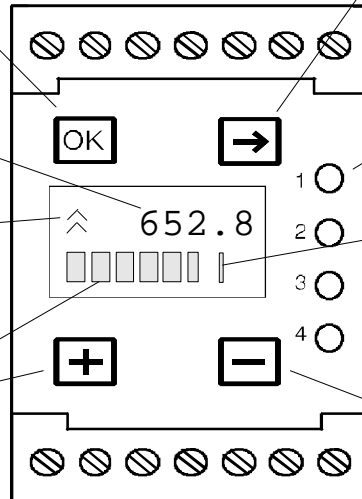
arrows up: increase
 arrows down: decrease

Value shown as analog bar:

40 segments

key "+":

- to raise numbers press this button
- retrieving of the max-value



key ">":

- to go through the menus
- starts the possibility to change s.th.
- If you change numbers, you can jump from digit to digit

LED-indication for relay 1-4

- If a LED lights up the respective relay is active.

Trailing indicator for Max-value:

will be reset, when you take off the power or when you press "+" and "-" at the same time.

key "-":

- to reduce numbers press this button
- retrieving of the min-value

Min- and Max-value-saving:

The DMP-400 possesses series-produced a min. and max. value-saving in measuring mode:

Retrieving the max-value:

The max. measured value since the last reset will be indicated, when pressing the key "+" during the devices is in measure mode.

Retrieving the min-value:

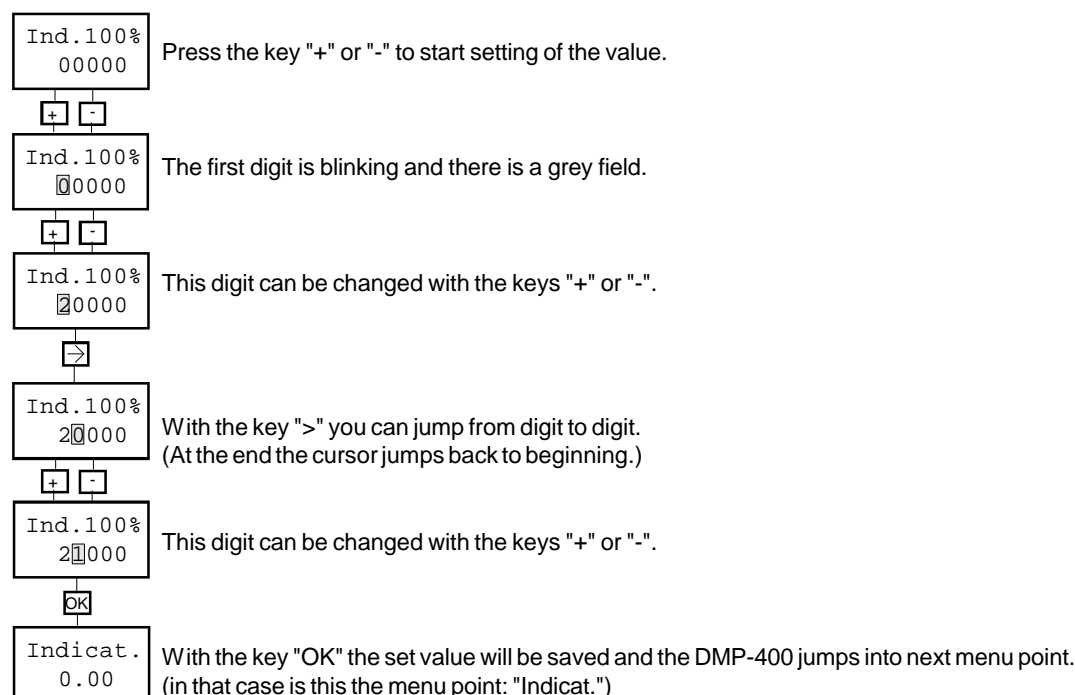
Press the key "-" during the device is in measuring mode, then the min. measured value since the last reset will be indicated an display.

Reset of min- and max-value-saving:

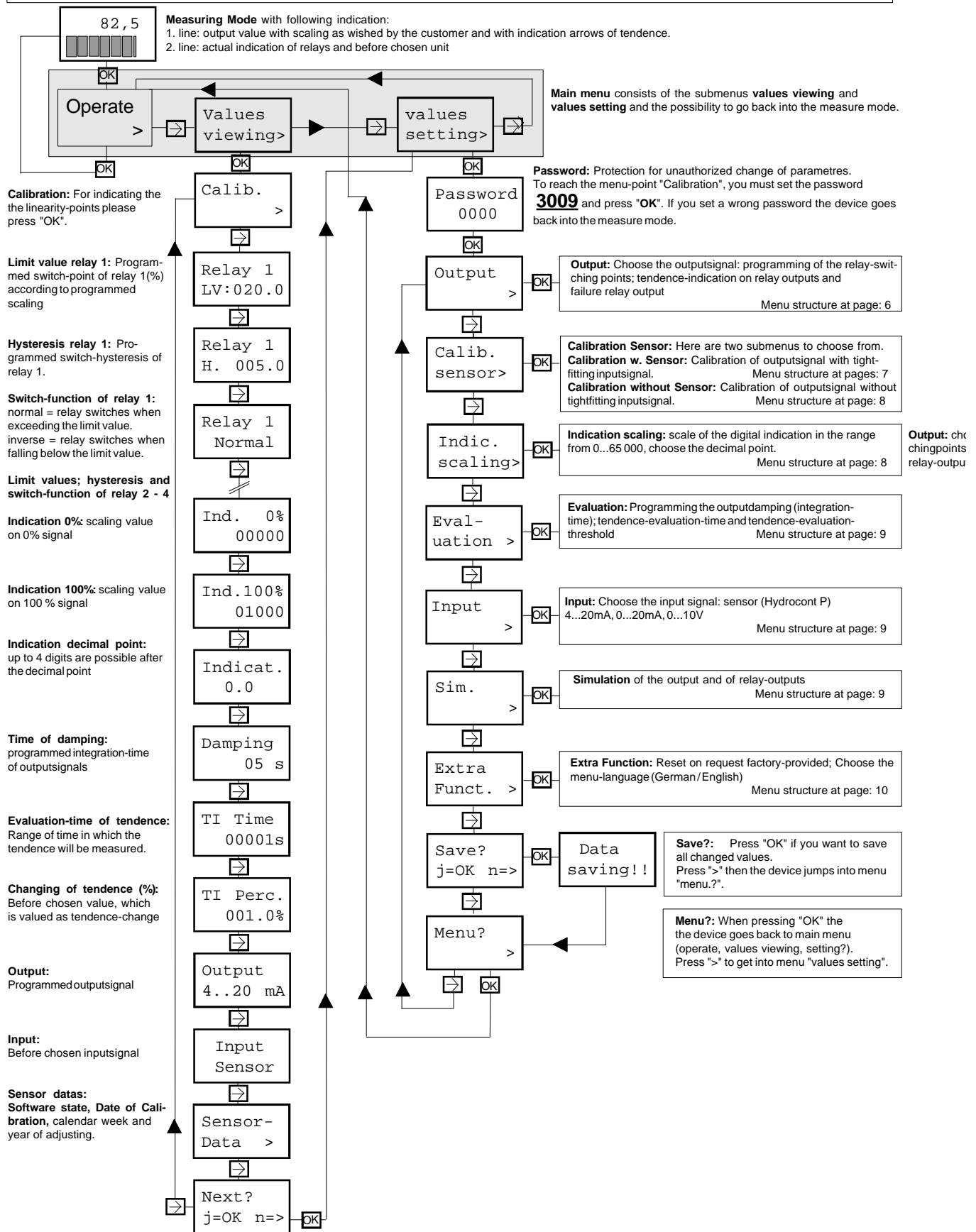
When pressing the keys "+" and "-" simultaneously the save will be reset.

Operation description for the keyboard:

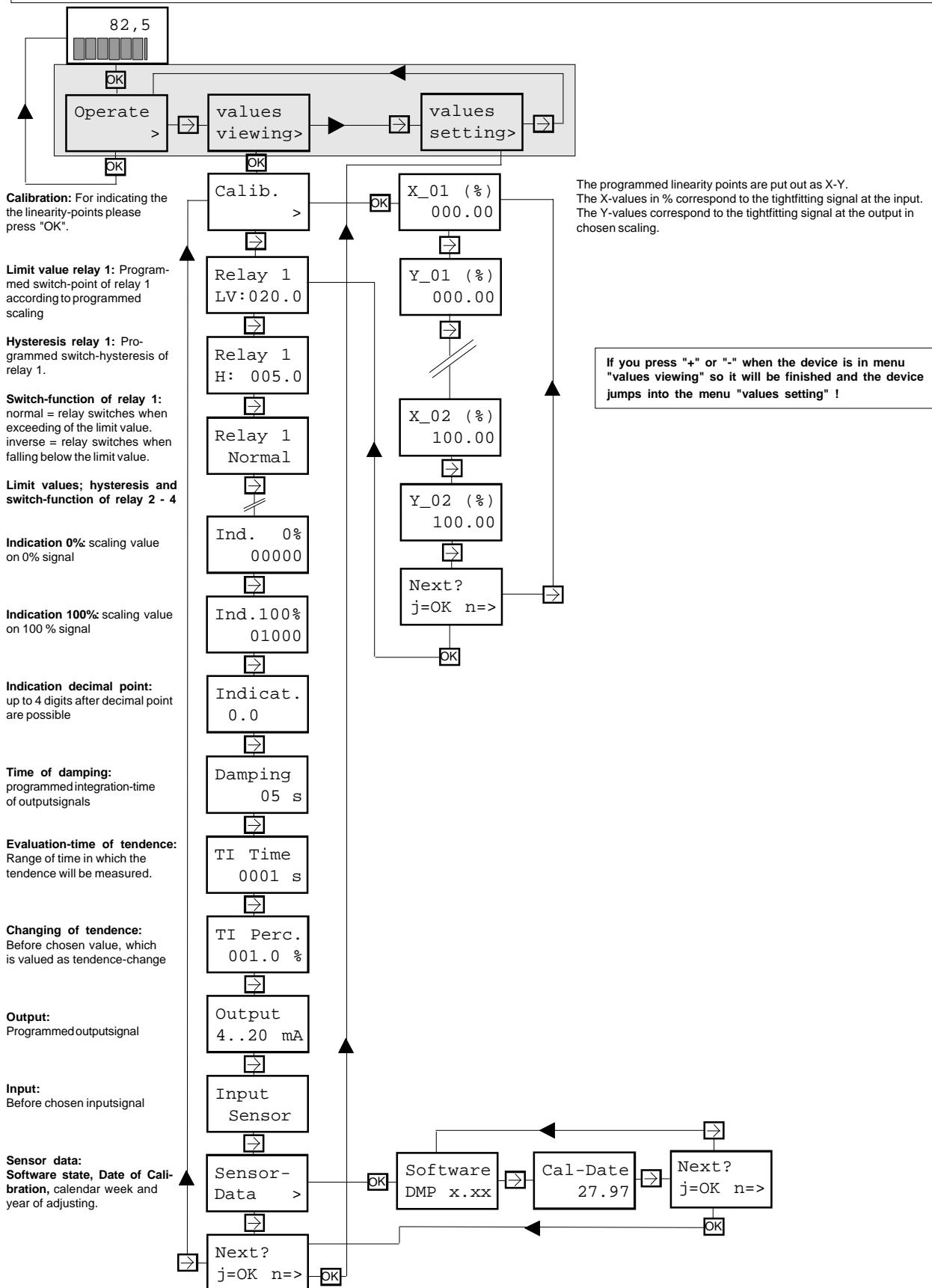
In example the scaling value should be changed on "display 100 %" in mode "indication scaling" from 00000 to 21000.



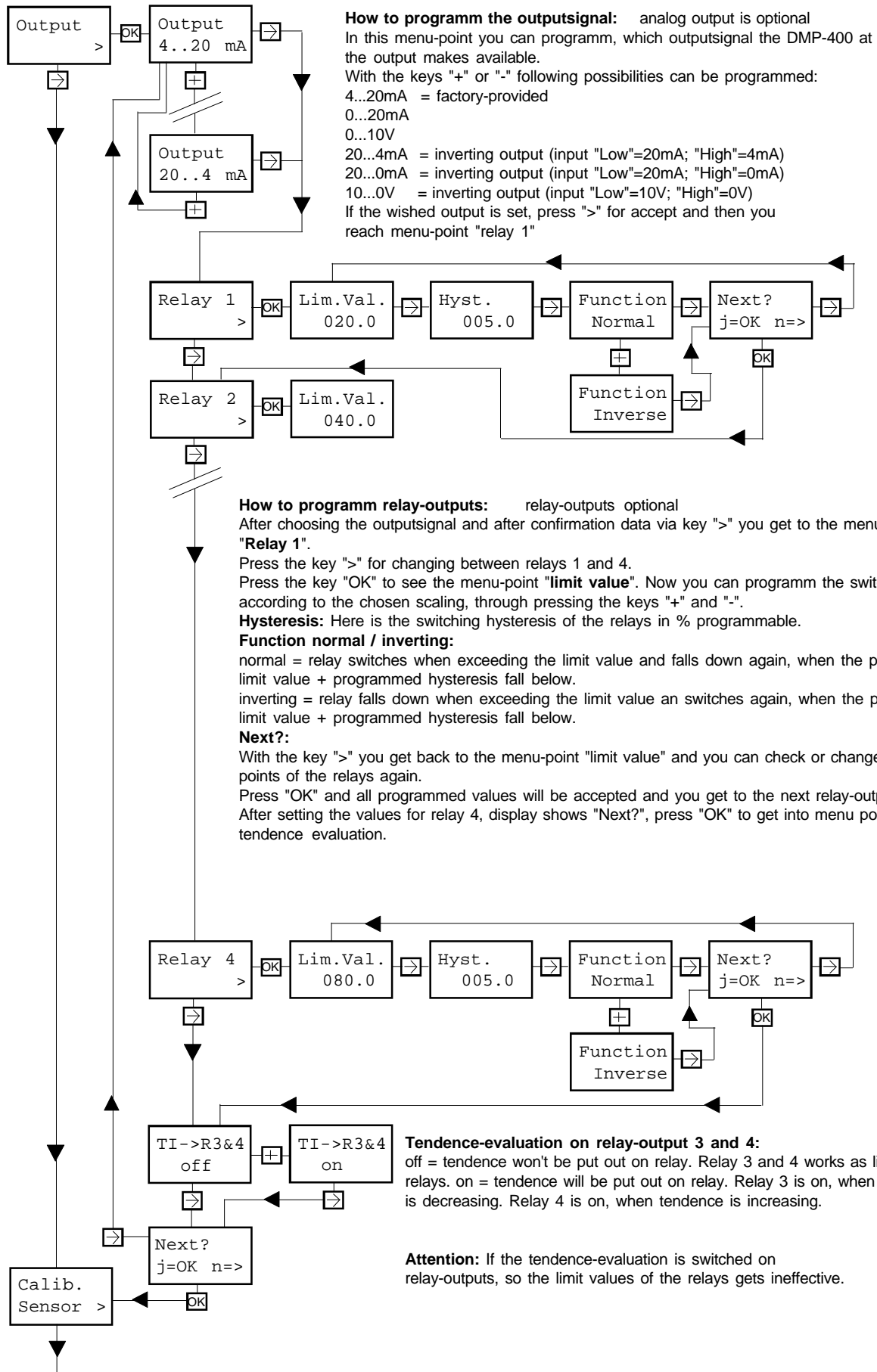
Menu structure:



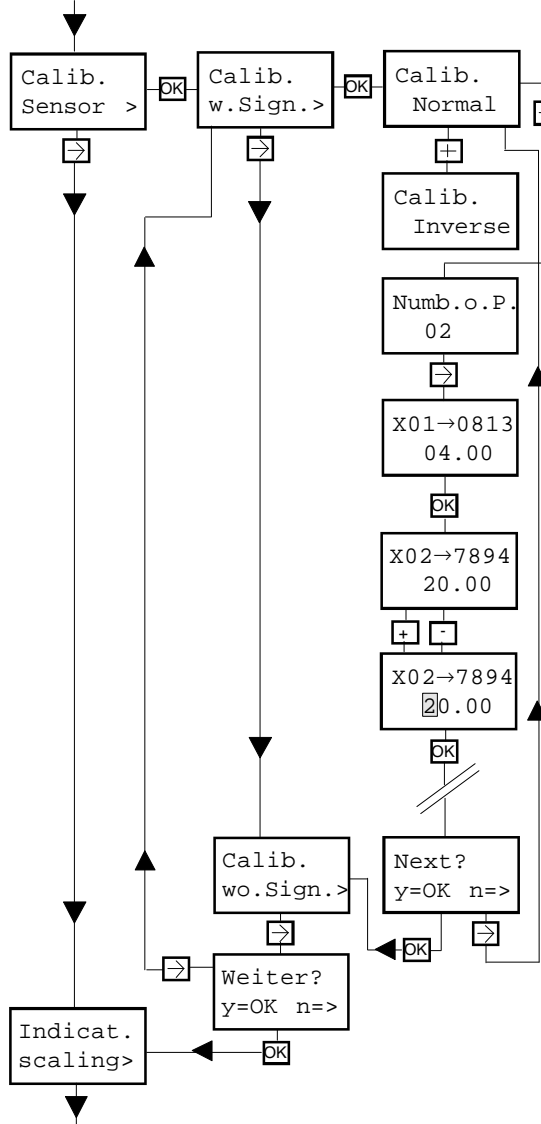
Menu "values viewing":



Menu Point "Output":



Menu Point "Calibration Sensor with Signal":



Type of Calibration: normal or inverse
 normal Calibration means, that the tank during the calibration must be filling (level increasing). The linearity points will be retrieved from the 1st till the last (max. 25).
 You must empty the tank when doing inverse calibration (level decreasing). The linearity points will be retrieved from the last (max. 25) till the first.

(following description corresponds to normal calibration)

Number of linearity points: (2...25 points are possible)
 On linear inputs only 2 points are necessary (min / max). Is a linearization requested, so the number of wished linearity points must be put in (max. 25 points). A linearization only is necessary, if e. g. an indication in volume is requested.

Input of 1. linearity point:

According to programming in menu-point "output" will be put out voltage or supply.

Factory-provided programming should be accepted:

Point X01 with key "OK" confirm (Do not make changes !!).

Linearity point should be calibrate again:

Put the signal to the input of DDM-400 and programm with the keys "+" and "-" the wished scaling value (simultaneously the respective voltage- or supply-value to it will be put out at output.) and press "OK".

To check the inputsignal, the display shows near the no. of point the supply at A/D-converter (0...9999).

The linearization can be checked so, too.

Attention: If even the display shows the correct value, the keys "+" or "-" must be pressed once to activate the output-value, so it will be accepted.

Input of 2. linearity point: To tightfitting inputsignal the belonging outputsignal to it is programmable.

Attention: The programmed value ever must be larger than the value in the linearity point before.

Input further linearity points: According how many linearity points was programmed in menu-point "Number of linearity points" they get worked through. This makes a linearization in lying cylindrical tanks possible.

Next?: After working through all linearity points:

Press the key ">" and you reach the menu-point "linearity-point", and you can check or change the menu-points of the relays again.

Press "OK" and all programmed values will be checked by a plausibility-test and you reach the menu-point "Calibration without pressure".

When the display is short-time indicating "TurnDown >1:30" and than "Reset?" the plausibility-test results that the first and last linearity point are to much narrow together. So the permitted Turn-Down 1:30 has been exceed. Appears "Zero>Span" and then "Reset?" the test results that the last linearity point is smaller than the first.

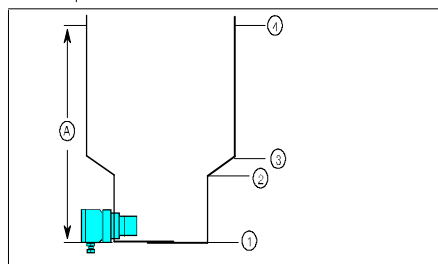
There are two possibilities of how to remove the failure:

Press ">", for "no". Device jumps back to linearity-point no. 1 and you can set all points new.

Press "OK" for "yes". The device will be set back to factory-provided programming and jumps back into measure mode.

(The same is, when doing the calibration without signal.)

Attention: If you made the calibration with signal, so the point "calibration without signal" must be skiped with pressing key ">" to leave the menu "calibration".



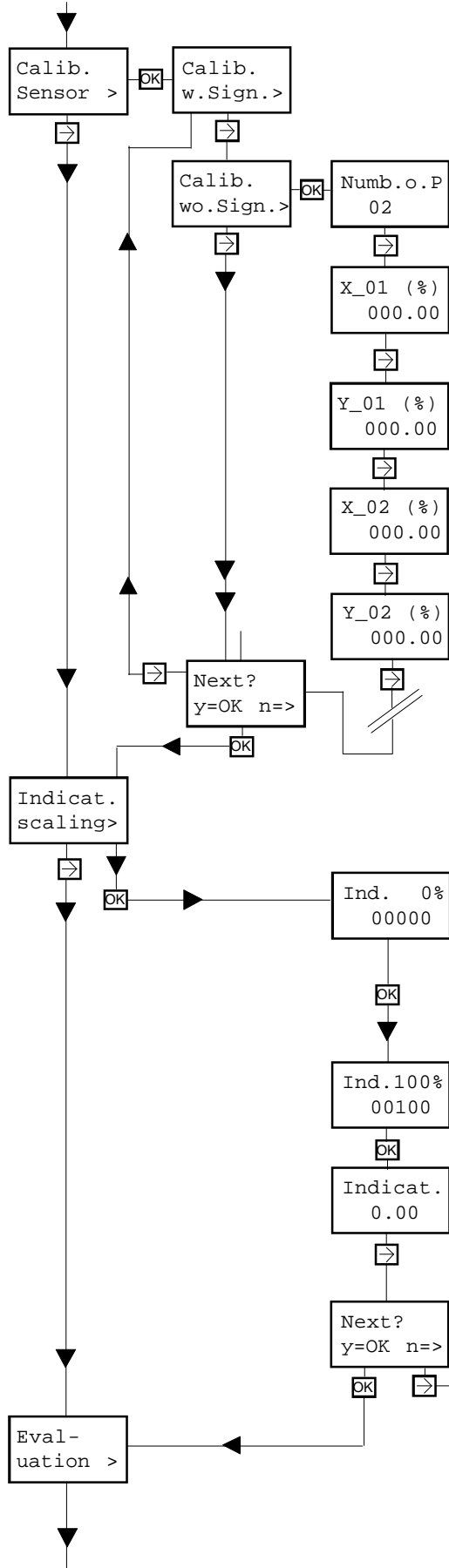
Example for programming:

Assignment: In a tank (see above) is a Hydrocont P-sensor integrated. The output of the DMP-400 must be linearized because the volume must be measured but in the tank is conical bulge. The filling height "A" corresponds to the whole range of measuring cell in the sensor. The output (4...20mA) of the DMP-400 is connected with an indicator, which shows on the display the filling in litres.

You can do programming as follows: Set in menu-point "Number o. P." 4 points. The factory-provided programming should be accepted, because the min-point "1" is when the tank is empty. For this you must press "OK" at "point 02". The first linearity point please put at position "2" on the tank. For this you have to fill the tank until point "2" is reached and then press the keys "+" and "-" in menu-point "2" as long as on the display of the indicator the correct litres are indicated. This value is to accept via pressing the key "OK". Then fill the tank until the point "3" is reached and set the correct voltage-value and confirm with "OK". The position "4" corresponds to the end-value of the measuring cell, therefore you should confirm the factory-provided programming!! For this press "OK" to confirm this menu-point without any change.

Annotation: A confirmation of the factory-provided programming is only possible for min- and max-point. Consequently the factory-provided programming of the min-point can only put on menu-point "point 01" and the max-point can only put on the last linearity point, no matter how many linearity points are set from the customer between min and max. The linearity point 1 and the last linearity point can be chosen by the customer free.

Menu Point "Calibr. Sensor without Signal" / "Indication Scaling":



If you can not put a signal on the input of DDM-400, so is here a linearization without an inputsignal possible. This function is advantageous in connection with a Hydrocont P-sensor, when e. g. the tank can not get filled for calibration, then is a "dry calibration" necessary.

Number of Points: (2...25 points are possible)

On linear inputs only 2 points are necessary (x01=Min/x02=Max). Is a linearization necessary, you must program the number of points here (max. 25 points x01-x25).

A linearization only is necessary when the indication for example in lying tanks in litres is requested.

The X-values always corresponds on the whole measure reange of input (in %), this results for e. g. on an input of 4...20mA a measure range of 16mA. If you set a X1-value with 10% for e. g., results this on zero 5,6mA when input 4...20mA.

Formula: $100 : \text{whole measure range of input} \times \text{rated-value of measuring input} = 100 : 16\text{mA} \times 1,6\text{mA} = 10\%$. The same is with x02 and so on.

Further example: A tank is 5m high. A pressure-sensor has a measure-range of 0-6m (0-600mbar). Requested is an outputsignal of 4mA on 0% filling and 20mA on 100 % filling. Formula: $100 : 6\text{m} \times 5\text{m} = 83,33\%$. Consequently make following programm:

x01 = 0% (the whole input measure-range)

y01 = 0% (of outputsignal or of indication)

x02 = 83,33% (of the whole input measure-range)

y02 = 100% (of outputsignal)

The Y-values always corresponds on output and will be programmed in physical units, according to indication-scaling.

Attention: Between the first and the last x- or y-point must be a difference of 3,3 %, that the permitted Turn-Down of 1:30 won't be exceeded.

Next?: After working through the calibration without signal:

Press ">" to reach the menu-point "zero-calibration", and you can check or change the menu-points again.

Press "OK" to confirm all values and than the device jumps into menu-point "Indication Scale"

Indication scaling: With indication scaling you can coordinate to the outputsignal a digital indication in the range of 0...65 000.

Indication 0%: Set the here the value, which on 0% of outputsignal should be indicated (bei 0mA, 4mA, 0V).

NOTICE: If there is indicated the right value anyway you must press once the key "+" or "-" to activate the zero-value and to confirm this.

If you set a value smaller than 65 000 the value won't be accepted and you do not get to the next menu point.

Indication 100%: Value, that should be shown on 100 % of outputsignal.

Indication decimal point: Following possibilities are to choose from and can be retrieved via the keys "+" and "-":

0 = no decimal-point; 0.0 = 1 digit after comma; 0.00 = 2 digits after comma until 4 digits after comma.

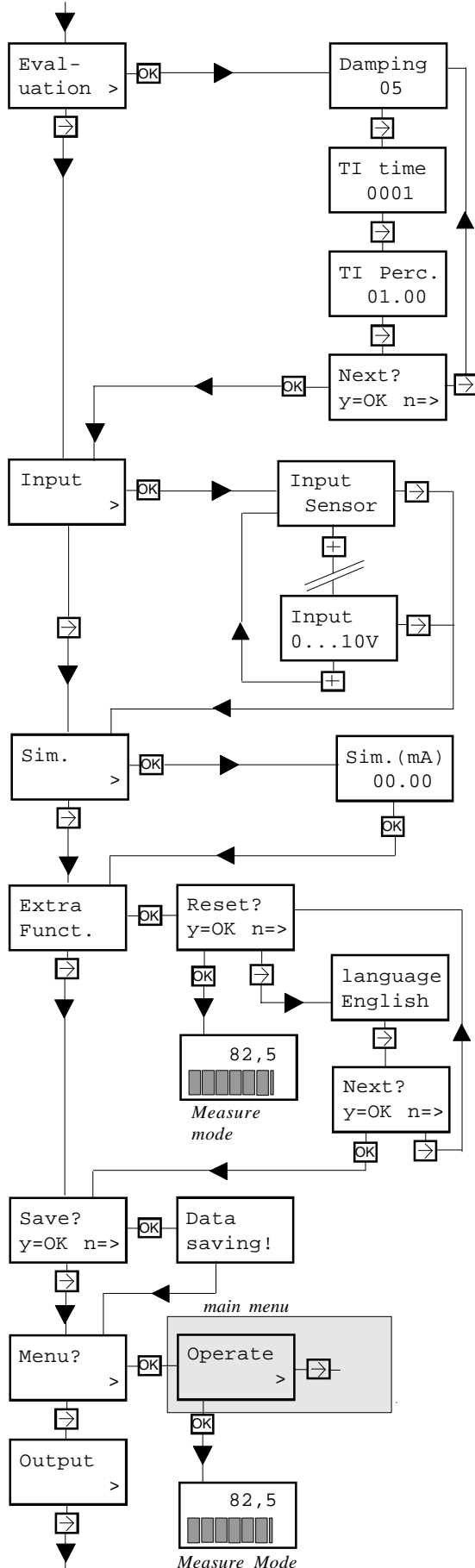
Next?: After finishing all points:

With the key ">" you will get back to menu-point "Indication 0%" and there you can check or change the menu-points again.

With the key "OK" the values get checked by a plausibility-test and you reach the menu-point "Evaluation".

When the display is short-time indicating "Zero > Span!!" and appears then again the menu-point "Indication 0%", then you set a bigger zero-value than the span-value.

Menu Point "Evaluation" / "Input" / "Simulation" / "Further Functions" / "Save":



Damping (integration-time): In many using it is necessary to damp the outputsignal, especially when the level in a tank have been measured with large wave movements.
 The damping-time can be programmed between 0 until 60sec.
 Inputs over 60sec. won't be accepted.

Tendence-evaluation-time: The measuring will be before and after of the programmed time compared. If the difference of these values bigger than the value in menu "tendence evaluation % percent", so that will be put out as increasing or decreasing tendence on display and on relay output (see at menu point "Output", too)

The **tendence evaluation time** can be programmed between 0...30000sec.

The **Tendence-evaluation % percent** in the range of 0...50%.

Input signal: following input signals can be chosen by pressing the keys "+" and "-":

"Input Sensor" = Signal of Hydrocont P (0,5...4,5V DC) with supply 5VDC max. 3mA

"Input 4..20mA" = with sensor supply 24V DC/27mA possible

"Input 0..20mA" = with sensor supply 24V DC/27mA possible

"Input 0..10V" = with sensor supply 24V DC/27mA possible

Important: SEE THE SWITCHES ON THE SIDE OF DMP-400 (page 10)

Simulation of outputsignal: According to programmed outputsignals it is here possible to set the voltage- or supply signals for tests on the output. The same will be with the relayoutputs.
 The signal and the relayoutputs will be on the output, when programming via keys "+" and "-".

Reset: Attention! if you confirm here with "OK", all data will be reset to factory-provided programming. Except the data in menu-point "input". Then the DDM-400 goes back into the measure mode.

Language: You can choose between German and English language via the keys "+" and "-".

Save:

When you confirm with "OK" all values will be saved and the indication shows "measure mode"

Menu?:

If you confirm this with "OK", the device jumps into measure mode

Important: If you don't save, all datas are lost, except the data changes in "Calib.Sensor" and "Input"linearity data.
 Press ">" and the DMP-400 jumps back to the beginning of main menu and there you can check or change all menu-points again.

Indication of failure / factory-provided data / reset:

	meaning:	solve the problem:
TurnDown >1:30	In menu-point "calibration sensor" the min- and span-value are to narrow together.	After this indication appears "reset?". If you confirm this the DMP-400 reset all data to factory-provided programming. If you press ">" you can programm the values again.
Zero > Span	In menu-point "calibration sensor" the last linearity point is smaller than the first. In menu-point "indication scale" the zero-value is bigger than the span-value.	When "calibration sensor" operation like above. When "indication scale" the device goes back to menu-point "indication 0%".
Intern Failure	During the cyclical self-test of the important device functions of the DMP-400 occurs an error.	The DMP-400 automatically makes a reset to factory-provided programm.
under flow	The measured value is smaller than the programmed measure-range of customer. A signal of 22mA - 11,5V is put out.	When the measured value move back into programmed measure-range the indication disappears. The device jumps back into measure mode.
over flow	The measured value is bigger than the programmed measure-range of customer. A signal of 22mA - 11,5V is put out.	When the measured value move back into programmed measure-range the indication disappears. The device jumps back into measure mode.
loop failure	In outputvoltage-circle is a break. Function is only possible on a output 0...20mA and 4...20mA.	Indication disappears when break is repaired.
sensor failure	e. g. break of signal-pipe. A signal of 24mA - 12,5V is put out and the relays will be off.	Indication disappears when break is repaired. The DDM-400 goes back to measure mode.

factory-provided programming:

"output" = 4..20mA

switching point relay 1 = 20,0 %; hysteresis relay 1 = 5 %; function = normal;
2 = 40,0 %; 2 = 5 %; function = normal;
3 = 60,0 %; 3 = 5 %; function = normal;
4 = 80,0 %; 4 = 5 %; function = normal;

"calibration sensor" = factory-provided programming according to chosen input (e.g. input "sensor" factory-provided)
0mbar = 4mA; end pressure = 20mA)

"indication-scale" = 0.0...100.0 %

"evaluation" = 0 sec. damping

"tendence-evaluation-time"
= 1 sec.

"tendence-evaluation%"
= 1,0 %

"input" = 4..20mA (when the customer make a reset, this menu-point won't be reset!)

Note:

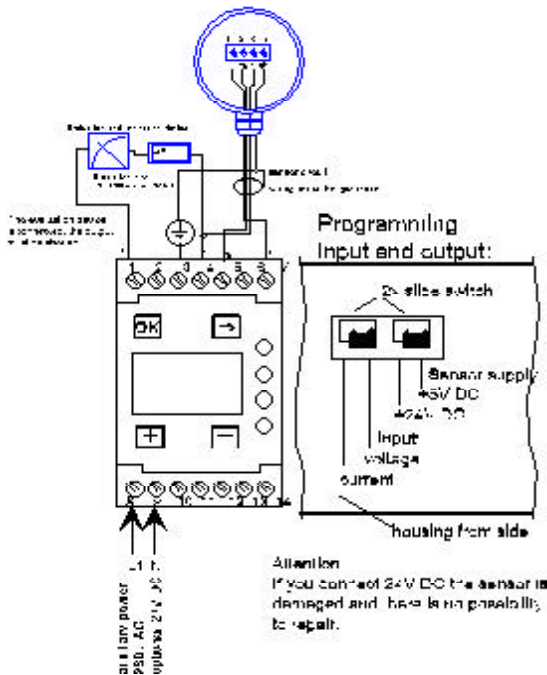
When between 60 min nobody press any key, the DMP-400 jumps back into measure mode.

Beispielsbeschaltungen / Programmierung der Ein- und Ausgänge

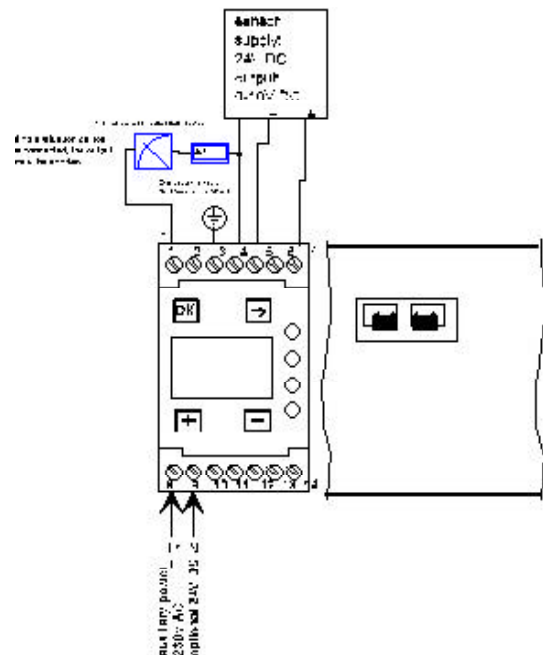
You can use the clamp 3 for connection of PE-wire of supply and for connection of ground of input and output.

Attention: Grounding of signal wires only should be grounded at one side.
 Don't put the protective conductor in sensor wire, too.

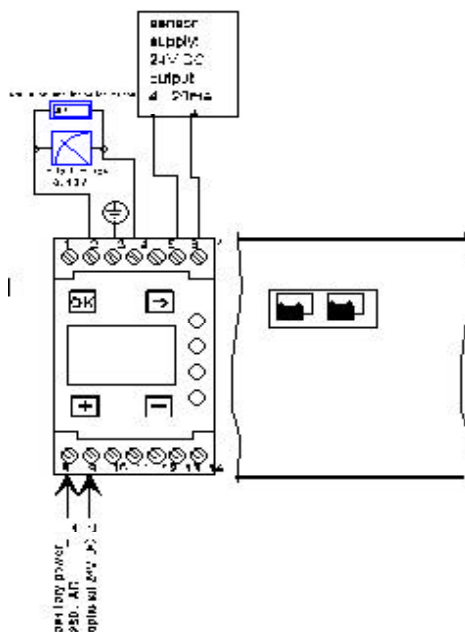
input: **sensor Hydrocont P**
 sensor supply: **5V DC**
 sensor output: **0,5...4,5V DC**
 output: **0...20mA/4...20mA**



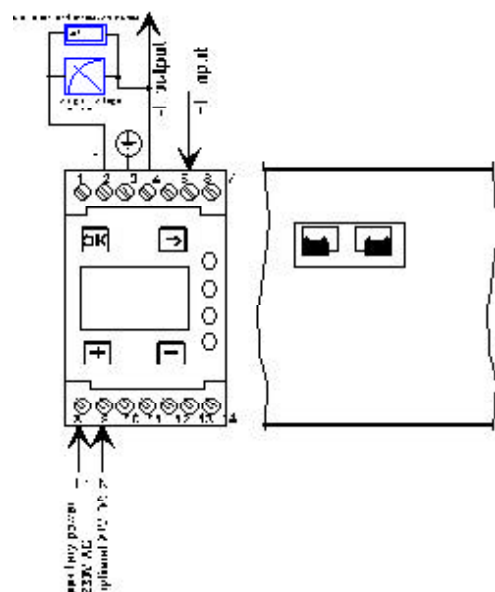
input: **sensor 3-wire 0...10V**
 sensor supply: **24V DC**
 sensor output: **0...10V DC**
 output: **0...20mA/4...20mA**



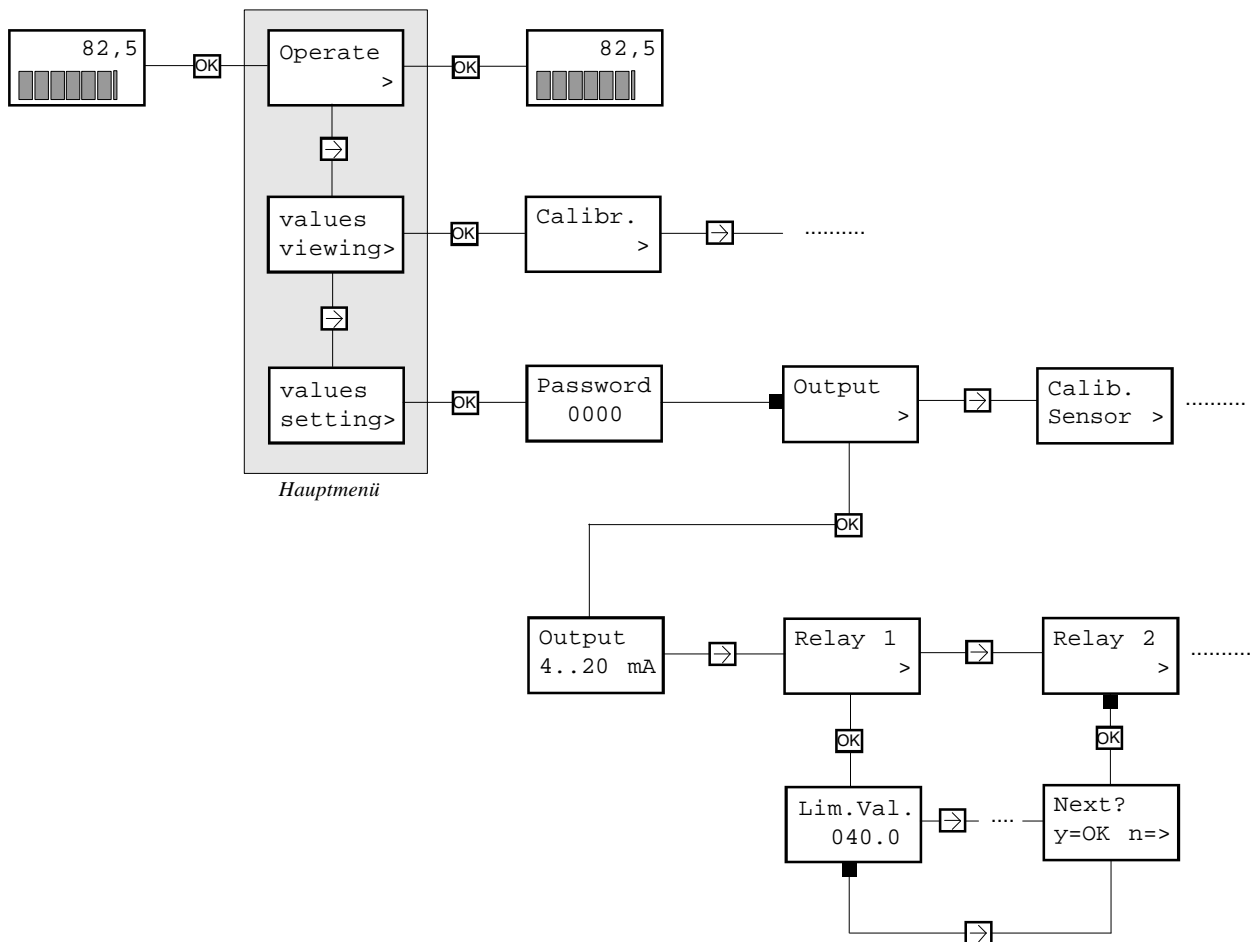
input: **sensor 2-wire**
 sensor supply: **24V DC**
 sensor output: **4...20mA**
 output: **0...10V**



input: **integration in measure-circle**
 sensor supply: **non**
 sensor output: **0...20mA/4...20mA**
 output: **0...10V**



Short Instructions (structure):



Operation Structure:

The operation is menu-leaded and via 4 keys in connection with a cleartext-indication on an LCD-display.

The jump from the measure-indicator into the main-menu is possible via pressing the key "OK". Press ">" when you wish to jump to next menu-point.

In menu-point "values viewing" the values only can be seen and not changed.

A parameter can be changed via keys "+" or "-" in menu-point "values setting" (password 3009).

There are two possibilities to do this:

- If you change one number, the cursor is blinking at the first digit after press the keys "+" or "-". The digits can be changed via pressing "+" or "-". If you press ">" you jump to the next digit. The key "OK" confirms the change and finish the parameter-changing.
- If you choose the new value from a list, then can you see it through with "+" or "-". The chosen value from a list will be confirmed immediate. It is not necessary to press "OK"!

If you see "Next?" on display you can press "OK" to reach the next menu-point. But if you press ">" the DMP-400 jumps back to beginning of sub-menu.

Short Instructions: Structure -> Menu "values setting"

