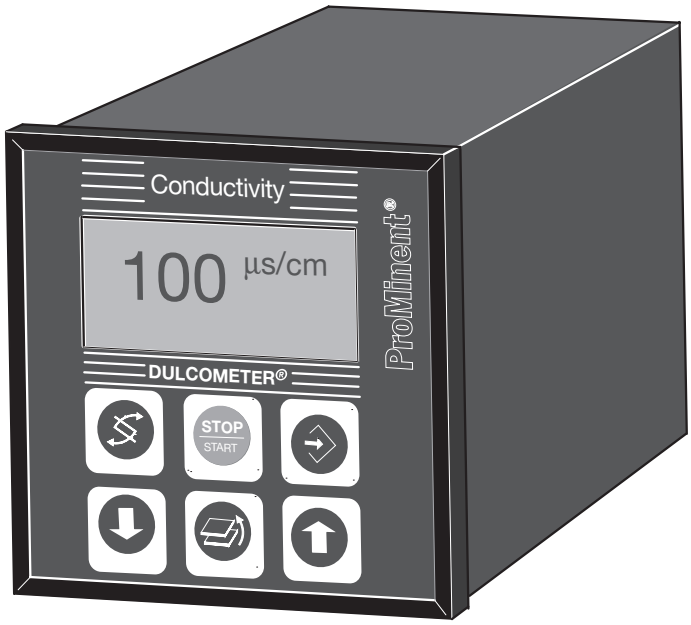
Operating Instructions
DULCOMETER® D1C
Part 2: Adjustment and Operation, Measured Variable Conductivity

D1C2-Leit.-001-GB



Please completely read through operating instructions! · Do not discard!
The warranty shall be invalidated by damage caused by operating errors!

Part No. 987926 **ProMinent Dosiertechnik GmbH · D-69123 Heidelberg · Germany** BA DM 085 08/01 GB

1 Device Identification / Identy Code

D1C A	DULCOMETER® Controller Series D1C / Version A
	Type of mounting
D	Control panel installation 96 x 96 mm
W	Wall mounting
	Operating voltage
0	230 V 50/60 Hz
1	115 V 50/60 Hz
2	200 V 50/60 Hz (only with control panel installation)
3	100 V 50/60 Hz (only with control panel installation)
4	24 V AC/DC
	Measured variable
L	Conductivity
	Connection of measured variable
1	Terminal, standard signal 0/4-20 mA
3	Terminal, conductive conductivity
	Correction variable
0	None
2	Temperature via terminal (PT 100)
3	Temperature via standard signal 0/4-20 mA
4	Manual temperature entry
	Feed forward control
0	None
1	As standard signal 0/4-20 mA
2	As frequency 0-500 Hz
3	As frequency 0-10 Hz
	Control input
0	None
1	Pause
	Signal output
0	None
1	Standard signal 0/4-20 mA measured value
2	Standard signal 0/4-20 mA control variable
3	Standard signal 0/4-20 mA correction variable
4	2 standard signal 0/4-20 mA output, free programmable
	Power control
A	Alarm relay
G	Alarm and 2 limit value relays
M	Alarm and 2 solenoid value relays
R	Alarm relay and servomotor with feedback
	Pump control
0	None
2	Two pumps
	Control characteristic
0	None
1	Proportional control
2	PID control
	Log output
0	None
	Language
D	German
E	English
F	French
I	Italien
N	Dutch
S	Spanish
P	Polish
A	Swedish
B	Portuguese
U	Hungarian

D1C A	___	___	L	___	___	___	___	___	___	___	___	0	E

Please enter the identity code of your device here!

2 Contents / General User Information

General User Information

These operating instructions describe the technical data and function of the series DULCOMETER® D1C controller, provide detailed safety information and are divided into clear steps. The activities to be carried out are identified by bold bullets (•).

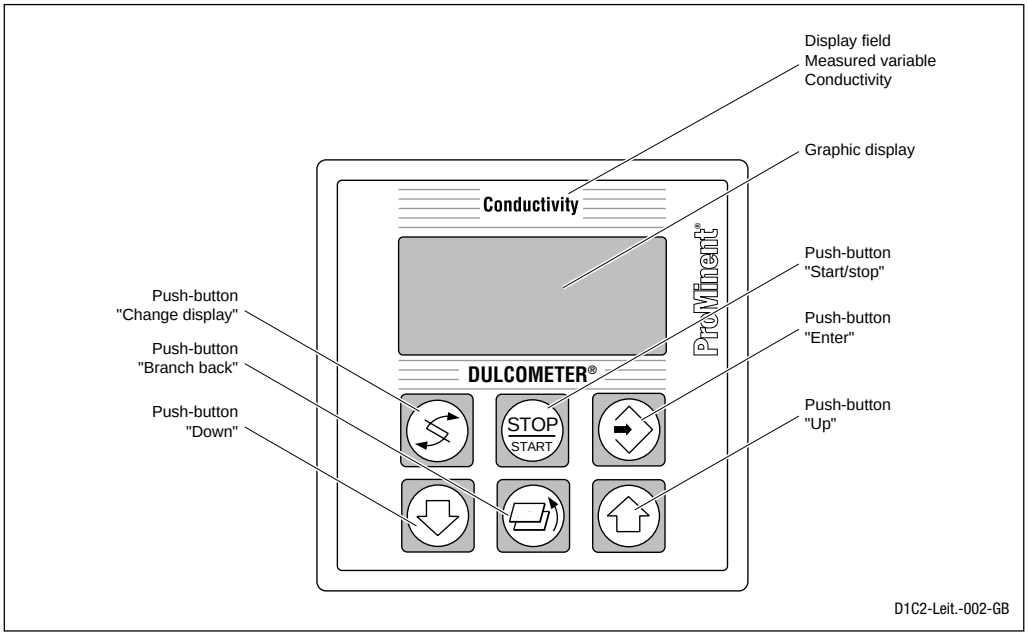
IMPORTANT:

Please observe the parts of these operating instructions applicable to your particular version! This is indicated in the Section "Device Identification / Identity Code"!

IMPORTANT:

Correct measuring and dosing is only possible in the case of impeccable operation of the probe. The probe has to be calibrated / checked regularly!

3 Device Overview / Controls



	CHANGE DISPLAY menu button To change over within a menu level and to change from one variable to another within a menu point.
STOP START	START/STOP menu button Start/stop of control and metering function.
	ENTER menu button To accept, confirm or save a displayed value or status. For alarm acknowledgement.

	UP menu button To increase a displayed numerical value and to change variables (flashing display)
	BRANCH BACK menu button Back to permanent display or to start of relevant setting menu.
	DOWN menu button To decrease a displayed numerical value and to change variables (flashing display).

4 Functional Description

NOTE

Please refer to the description of the complete operating menu in Section 8 for a detailed description of the individual characteristics of the D1C controller!

4.1 Operating Menu

The D1C controller permits settings to be made in two different menus. All values are preset and can be changed in the complete operating menu.

The controller is delivered with a restricted operating menu so that the D1C controller can be used effectively in many applications from the very onset. If adaptations prove to be necessary, all relevant parameters can then be accessed by switching over to the complete operating menu.

4.2 Access Code

Access to the setting menu can be prevented by setting up an access code. The D1C controller is supplied with the access code 5000 which permits free access to the setting menu. The calibration menu remains freely accessible even when access to the setting menu is blocked by the code.

4.3 Control

The D1C can operate as a proportional controller or as a PID controller - dependent on the device version (see identity code) and the setting.

The controlled variable is recalculated every second. Control procedures which require rapid correction of setpoint deviations (less than approx. 30 seconds) cannot be processed with this controller. The cycle times must be taken into consideration when activating solenoid valves (pulse length) in the same way as their running times when activating servomotors (3-point).

Via the control input pause, the control function (selection of controlled variable) can be switched off. The calculation of the controlled variable starts again after cessation of „pause“.

4.4 Feed Forward Control

The D1C controller can process a signal of a feed forward control. Depending on the device version (see identity code) and the setting, this signal can be obtained in any form of a 0–20 mA or 4–20 mA signal or as a digital contact signal with the maximum frequencies 10 Hz or 500 Hz.

During start-up, the zero point has to be checked. The multiplicative feed forward control is not designed for switching off permanently the actuating variable (signal ≈ 0).

This signal can be used, for example, for flow-proportional metering (multiplicative effect) or feed

forward-dependent basic load metering (additive effect). The result of control variable calculation from the proportional or PID control is multiplied by or added to the feed forward signal. A multiplicative feed forward variable at the level of the set rated value carries over the calculated control variable unchanged into the controlled variable:

Controlled variable = Feed forward variable/rated value x calculated control variable

An additive feed forward variable at the level of the rated value results in maximum controlled variable:

Controlled variable (max. 100 %) = Feed forward variable/rated value x max. controlled variable + calculated control variable

4.5 Error Messages

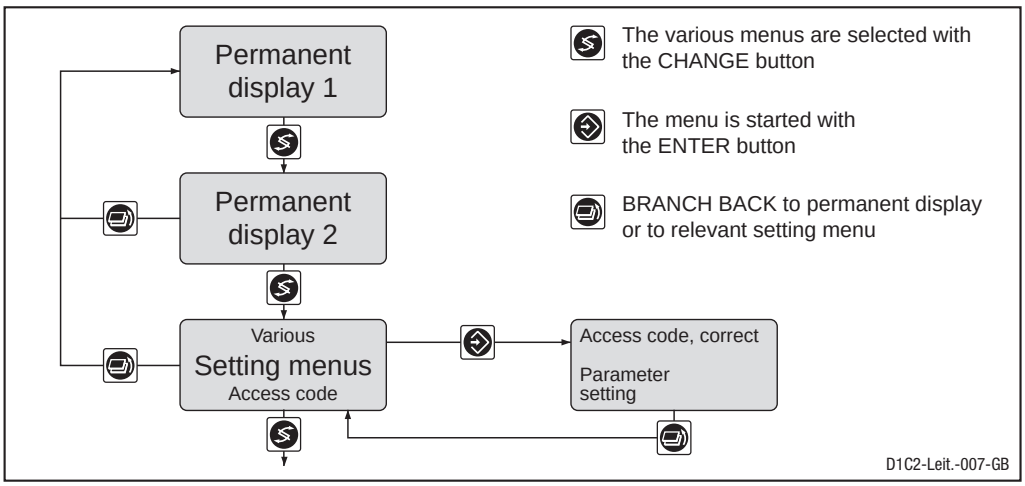
Error messages and information are indicated on the bottom line in the permanent display 1. Errors to be acknowledged (acknowledgement switches off the alarm relay) are indicated by the symbol „Ɛ“. Errors/ notes which still apply after acknowledgement are indicated alternately. Faults which are rectified of their own accord due to changed operating situations are removed from the permanent display without the need for acknowledgement.

5 Display Symbols

The display of the D1C controller uses the following symbols:

Description	Comment	Symbol
Limit value transgression Relay 1, upper	Symbol left	
Relay 1 lower	Symbol left	
Relay 2 upper	Symbol right	
Relay 2 lower	Symbol right	
Metering pump 1 (Increase conductivity) Control OFF	Symbol left	
Control ON	Symbol left	
Metering pump 2 (Reduce conductivity) Control OFF	Symbol right	
Control ON	Symbol right	
Solenoid valve 1 (Increase conductivity) Control OFF	Symbol left	
Control ON	Symbol left	
Solenoid valve 2 (Reduce conductivity) Control OFF	Symbol right	
Control ON	Symbol right	
Servomotor Control, open relay		
Control, close relay		
Without control		
Position feedback	Thickness of bar increases from left to right during opening	
Stop button pressed		
Manual metering		
Fault		

6 Operation



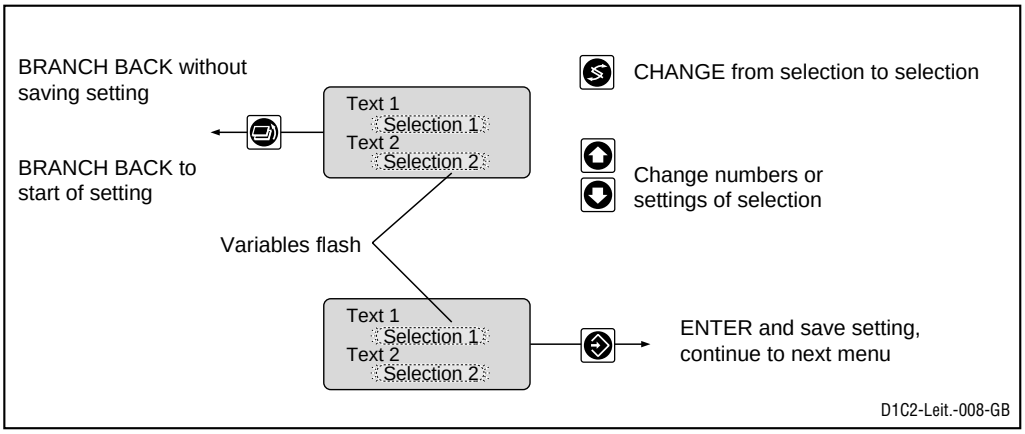
NOTE

Access to the setting menus can be barred with the access code!

The number and scope of setting menus is dependent on the device version!

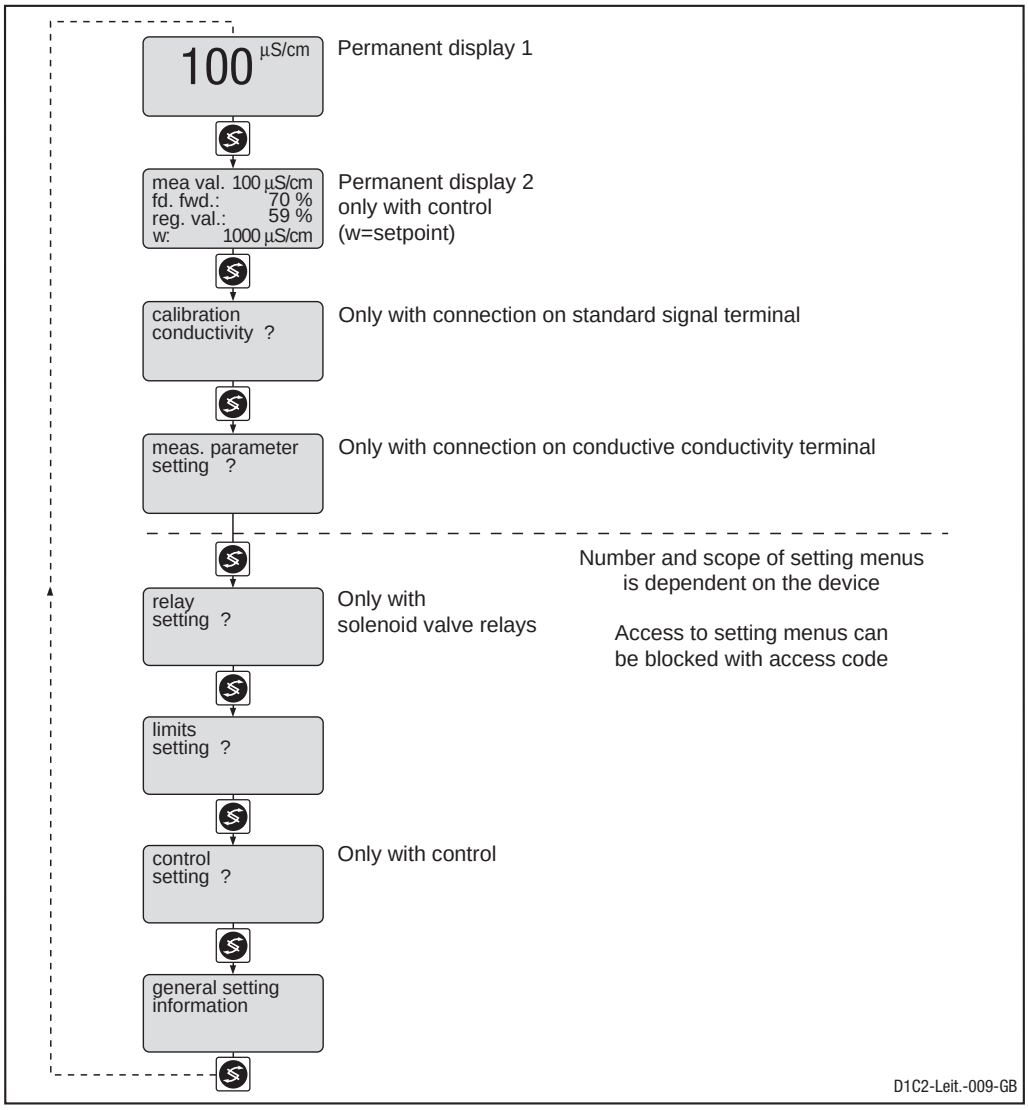
If the access code is selected correctly in a setting menu, then the following setting menus are also accessible!

If within a period of 10 minutes no button is pushed, the unit automatically branches back from the calibrating menu or a setting menu to the permanent display 1.

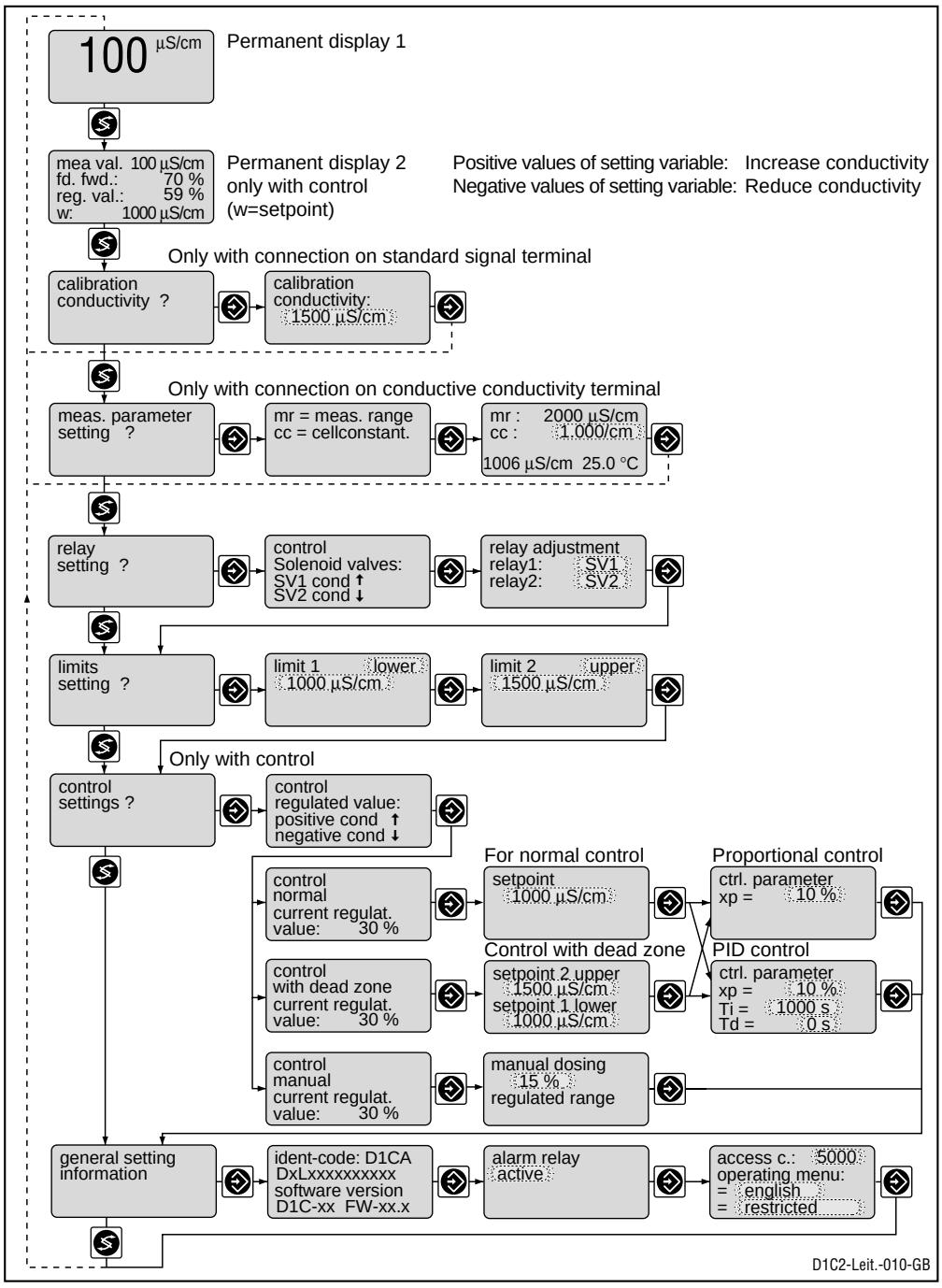


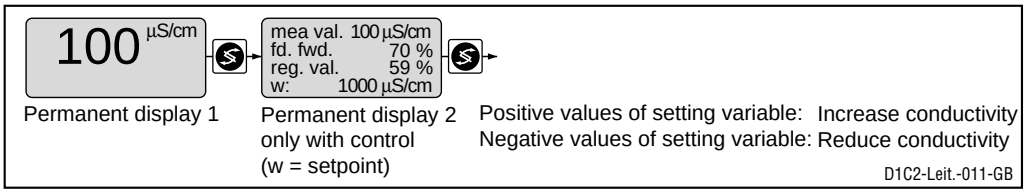
7 Restricted Operating Menu / Overview

The restricted operating menu permits simple operation of the most important parameters. The following overview shows the settings which can be selected:

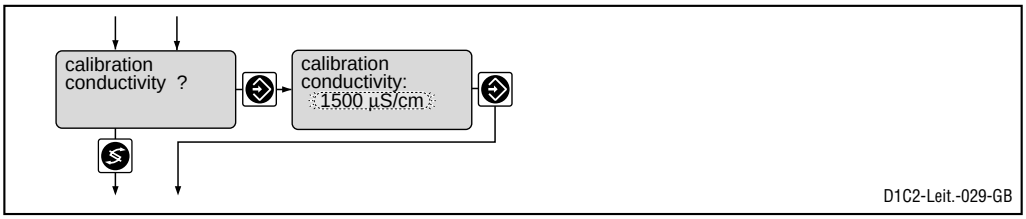


Restricted Operating Menu / Layout





Calibration conductivity with connection on standard signal



During calibration, metering is reduced to the set basic capacity. The standard signal of the output (measured value/correction value) is frozen.

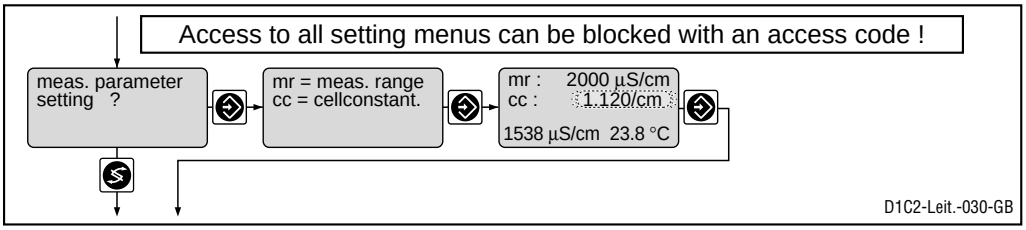
The actually measured value will be proposed; this value is adjustable. On successful completion of calibration, all error checks which refer to the measured value are restarted.

		Possible values		
	Initial value	Increment	Lower value	Upper value
Calibration conductivity	measured value	as per measuring range	as per measuring range	as per measuring range

Error message	Condition effect	Remarks
measured value too low value > xx mS/cm check measuring range	value < 2 % of measuring range	check measuring range
measured value too high value < xx mS/cm check measuring range	value > 100 % of measuring range	check measuring range

Calibration conductivity with connection on conductive conductivity terminals

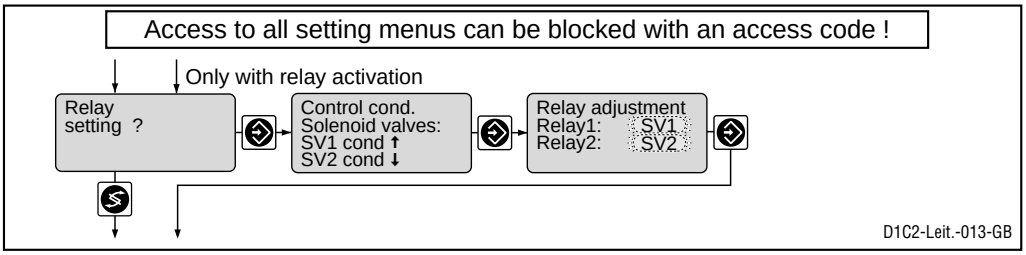
Measuring parameter



	Initial value	Possible values Increment	Lower value	Upper value	Remarks
Cellconstant cc	1.000/cm	0.0001/cm 0.001/cm 0.01/cm	0.0060/cm 0.150/cm 1.50/cm	0.1499/cm 1.499/cm 12.00/cm	cc can be adjusted for all mr over the complete area

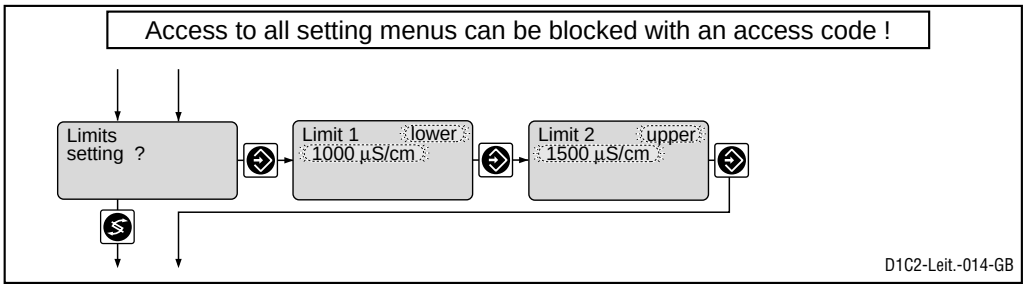
The measured value can be adjusted to the actual conductivity value by changing the cell constants.
The following menus apply generally!

Relays for Solenoid Valve Activation



	Initial value	Possible values Increment	Lower value	Upper value	Remarks
Relay adjustment	as per identity code	solenoid value limit value off			

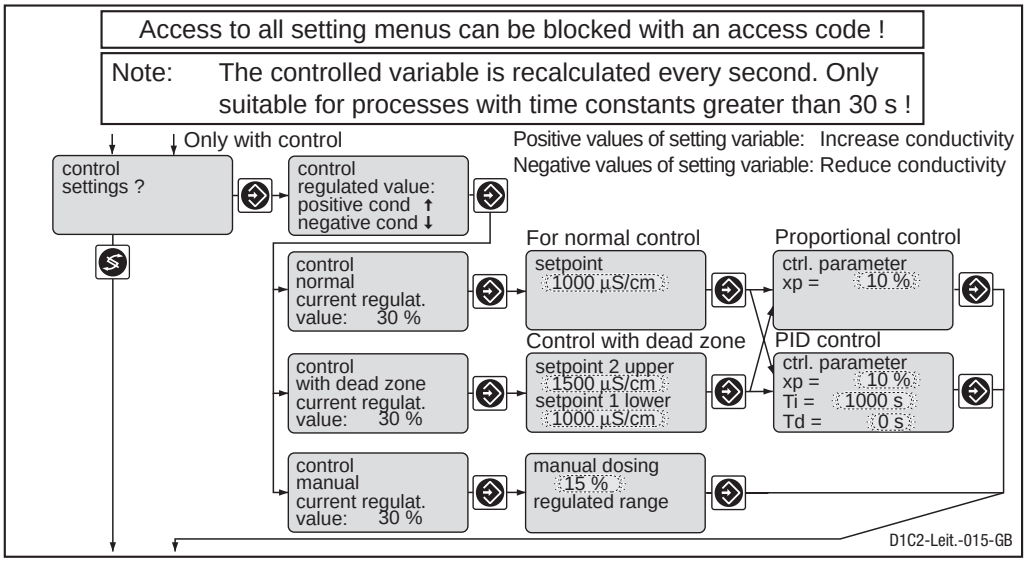
Limits



		Initial value	Increment	Lower value	Upper value	Remarks
Type of limit transgression	Limit 1:	lower	lower			
	Limit 2:	upper	upper off[2)]			
Limit value	Limit 1:	10 µS/cm	0.01 µS/cm	–1 µS/cm	21 µS/cm	meas. range 20 µS/cm
	Limit 2:	15 µS/cm				
	Limit 1:	25 µS/cm	0.01 µS/cm	–2.5 µS/cm	52.5 µS/cm	meas. range 50 µS/cm*
	Limit 2:	37.5 µS/cm				
	Limit 1:	100 µS/cm	0.1 µS/cm	–10 µS/cm	210 µS/cm	meas. range 200 µS/cm
	Limit 2:	150 mS/cm				
	Limit 1:	250 µS/cm	0.1 µS/cm	–25 µS/cm	525 µS/cm	meas. range 500 µS/cm*
	Limit 2:	375 µS/cm				
	Limit 1:	1000 µS/cm	1 µS/cm	-100 µS/cm	2100 µS/cm	meas. range 2000 µS/cm
	Limit 2:	1500 µS/cm				
	Limit 1:	2500 µS/cm	1 µS/cm	-250 µS/cm	5250 µS/cm	meas. range 5000 µS/cm*
	Limit 2:	3750 µS/cm				
	Limit 1:	10 mS/cm	0.01 mS/cm	-1 mS/cm	21 mS/cm	meas. range 20 mS/cm
	Limit 2:	15 mS/cm				
	Limit 1:	100 mS/cm	0.1 mS/cm	-10 mS/cm	210 mS/cm	meas. range 200 mS/cm
	Limit 2:	150 mS/cm				
	Limit 1:	500 mS/cm	1 mS/cm	-50 mS/cm	1050 mS/cm	meas. range 1000 mS/cm*
	Limit 2:	750 mS/cm				

* = only with connection on standard signal
2) = only with limit value relay

Control

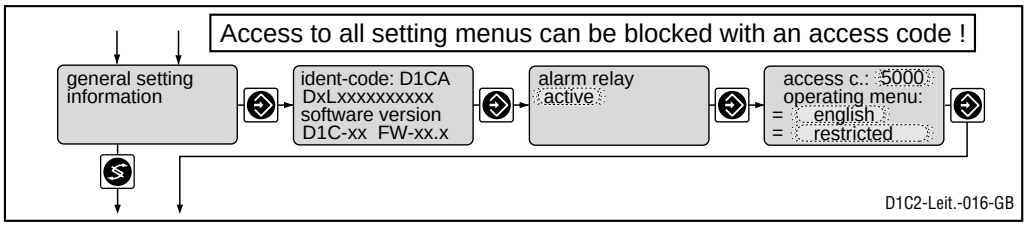


Restricted Operating Menu / Description

	Initial value	Possible values Increment	Lower value	Upper value	Remarks
Setpoint	10 µS/cm	0.01 µS/cm	-1 µS/cm	21 µS/cm	meas. range 20 µS/cm
	15 µS/cm	0.01 µS/cm	-2.5 µ/Sm	52.5 µ/Scm	meas. range 50 µS/cm*
	100 mS/cm	0.1 mS/cm	-10 µS/cm	210 µS/cm	meas. range 200 µS/cm
	250 µS/cm	0.1 µS/cm	-25 µS/cm	525 µS/cm	meas. range 500 µS/cm*
	1000 µS/cm	1 µS/cm	-100 µ/Scm	2100 µ/Scm	meas. range 2000 µ/Scm
	2500 µS/cm	1 µS/cm	-250 µS/cm	5250 µS/cm	meas. range 5000 µS/cm*
	10 mS/cm	0.01 mS/cm	-1 mS/cm	21 mS/cm	meas. range 20 mS/cm
	100 mS/cm	0.1 mS/cm	-10 mS/cm	210 mS/cm	meas. range 200 mS/cm
	500 mS/cm	1 mS/cm	-50 mS/cm	1050 mS/cm	meas. range 1000 mS/cm*
					2 setpoints necessary for control with dead zone. setpoint 1 < setpoint 2
					adjustment of measuring range on page 18
Control parameter xp	10 %	1 %	1 %	500 %	xp referred to measuring range
Control parameter Tn	off	1 s	1 s	9999 s	function off = 0 s
Control parameter Tv	off	1 s	1 s	2500 s	function off = 0 s
Manual metering	0 %	1 %	–100 %	+100 %	

* = only with connection on standard signal

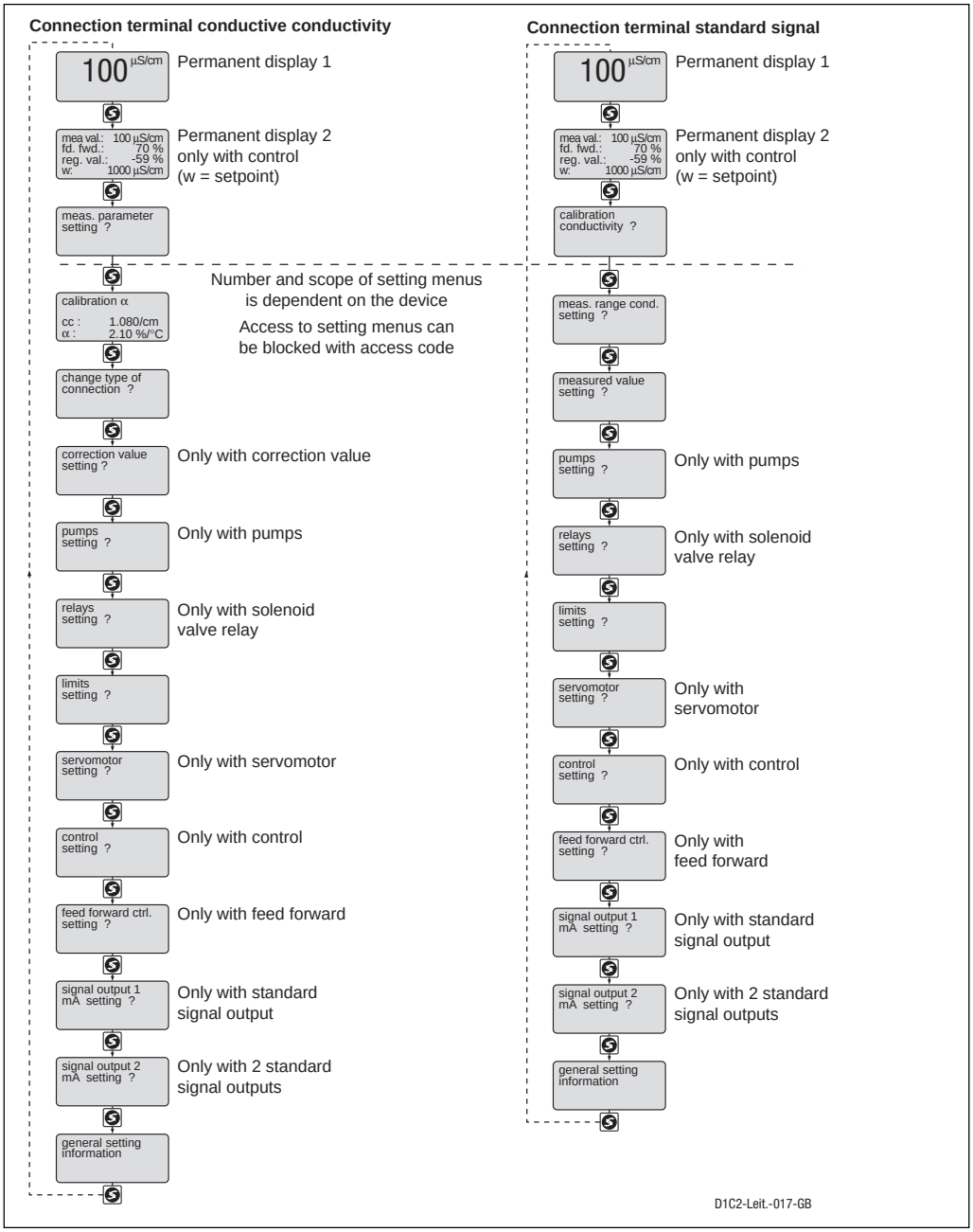
General Settings

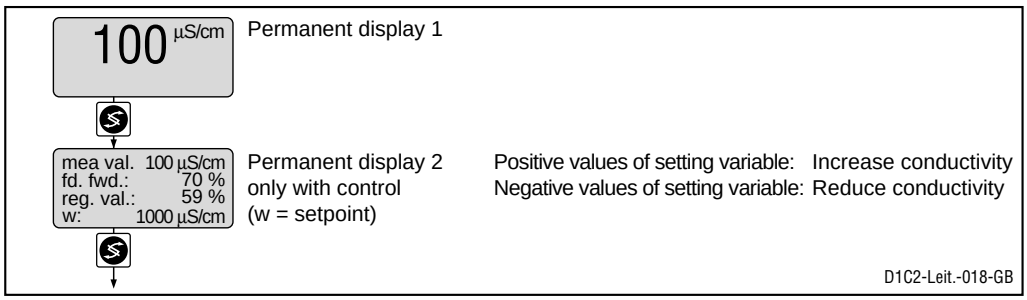


	Initial value	Possible values Increment	Lower value	Upper value	Remarks
Alarm relay	active	active not active			
Access code	5000	1	1	9999	
Language	as per identy code				
Operating menu	restricted	restricted complete			

Complete Operating Menu / Overview

All parameters of the controller can be set in the complete operating menu. The following overview shows the settings which can be selected:

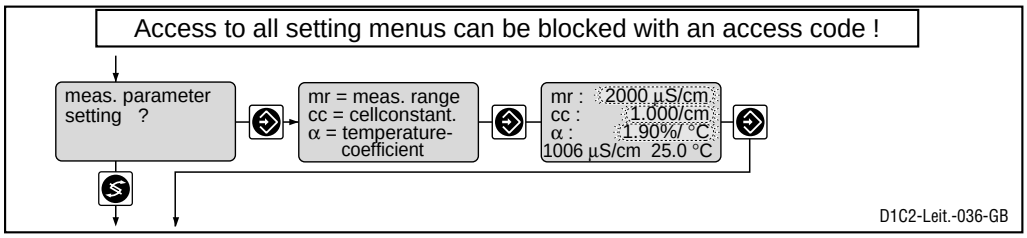




With connection on standard signal see page 19

With connection on conductive conductivity terminals:

Measuring parameter



	Initial value	Possible values Increment	Lower value	Upper value	Remarks
Measuring range mr	0....2000 µS/cm	0....20 µS/cm 0....200 µS/cm 0....2000 µS/cm 0....20 mS/cm 0....200 mS/cm			setpoints and limit values are switched to the corresponding startup values
Cellconstant cc	1000 /cm	0.0001/cm 0.001/cm 0.01/cm	0.0060/cm 0.150/cm 1.50/cm	0.1499/cm 1.499/cm 12.00/cm	cc can be adjusted for all mr over the complete area
Temperature-coefficient α	1.90 %/°C	0.01 %/°C	0 %/°C	10 %/°C	

The measured value can be adjusted to the actual conductivity value by changing the cell constants. Prerequisite is a known temperature coefficient and a constant temperature.

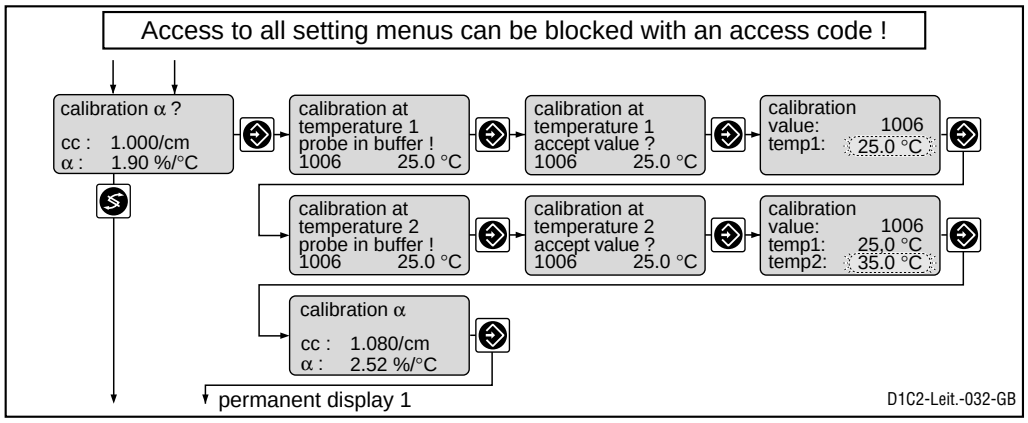
When changing the measuring range, metering and control are stopped, the setpoints, limit values, and the standard signal output are set to the corresponding startup values! Check these settings in all menus!

Calibrating temperature coefficient α

The temperature coefficient is a determined through two-output calibration. During the calibration procedure, metering is reduced to the set basic load. The monitoring of limiting values and error treatment are stopped. The standard signal of the output measured value or correction value is reduced to 0/4 mA.

ATTENTION:

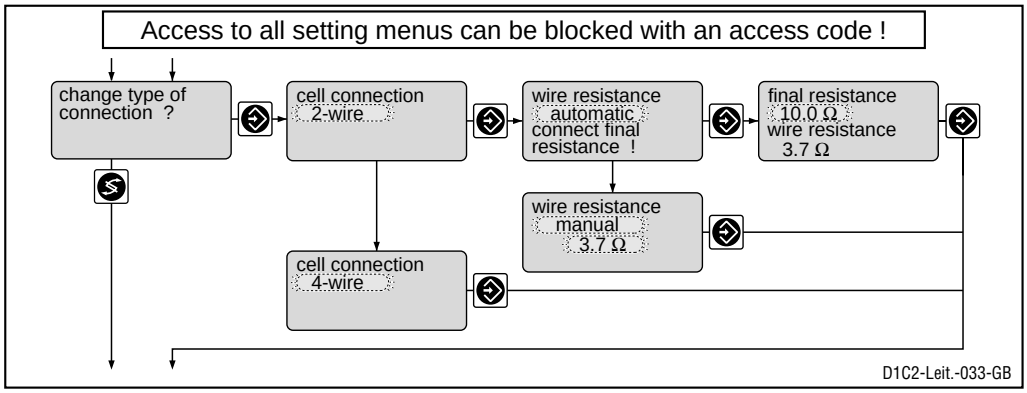
The conductivity values you enter must base on 25 °C. You must use the same solution when calibrating both temperatures!



	Initial value	Possible values Increment	Lower value	Upper value	Measuring range
Set sample	measuring value	0.01 µS/cm 0.1 µS/cm 1 µS/cm 0.01 mS/cm 0.1 mS/cm	- 1 µS/cm - 10 µS/cm - 100 µS/cm - 1 mS/cm - 10 mS/cm	21 µS/cm 210 µS/cm 2100 µS/cm 21 mS/cm 210 mS/cm	20 µS/cm 200 µS/cm 2000 µS/cm 20 mS/cm 200 mS/cm
Set temperature	correction value	0.1 °C	0 °C	100 °C	

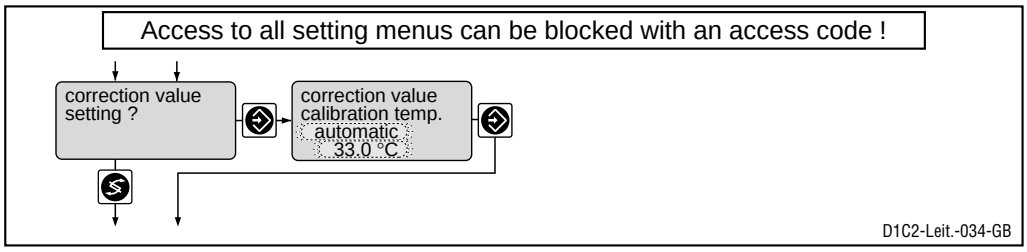
Error message	Condition	Remarks
temperature range restricted xx – 100 °C		For the chosen temperature coefficient a, a correct reading can only be obtained for the displayed temperature range.
temperature distance wrong	Δ temperature ≥ 10.0 °C Δ temperature ≤ 50.0 °C	

Cell connection



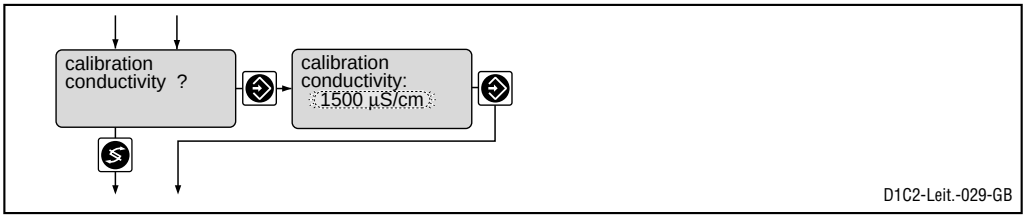
	Initial value	Increment	Lower value	Upper value
Cell connection	2-wire 4-wire	2-wire		
Determine wire resistance	manual automatic	manual		
Manual entry wire resistance	0.5 Ω	0.1 Ω	0 Ω	50 Ω
Final resistance	10.0 Ω	0.1 Ω	10 Ω	50 Ω

Correction value (only with connection on conductive conductivity terminals)



		Possible values		
	Initial value	Increment	Lower value	Upper value
Temperature compensation category	as per identity code	manual automatic off		
Manual temperature	25 °C	0.1 °C	0 °C	100 °C
Automatic temperature	correction value	0.1 °C	0 °C	100 °C

Calibration conductivity with connection standard signal



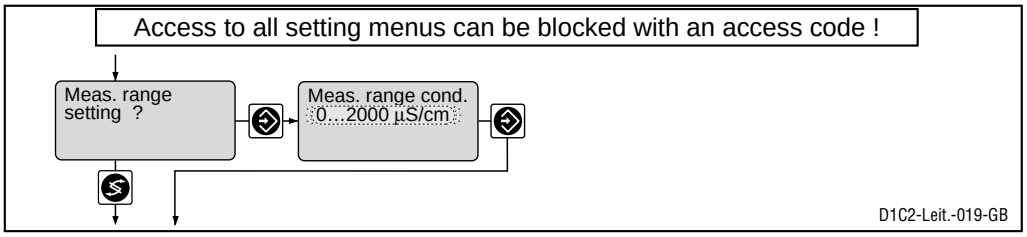
During calibration, metering is reduced to the set basic capacity. The standard signal of the output (measured value/correction value) is reduced to 0 mA or 4 mA.

The actually measured value will be proposed; this value is adjustable. On successful completion of calibration, all error checks which refer to the measured value are restarted.

		Possible values		
	Initial value	Increment	Lower value	Upper value
Calibration conductivity	measured value	as per measuring range	as per measuring range	as per measuring range

Error message	Condition effect	Remarks
measured value too low value > xx mS/cm check measuring range	value < 2 % of measuring range	check measuring range
measured value too high value < xx mS/cm check measuring range	value > 100 % of measuring range	check measuring range

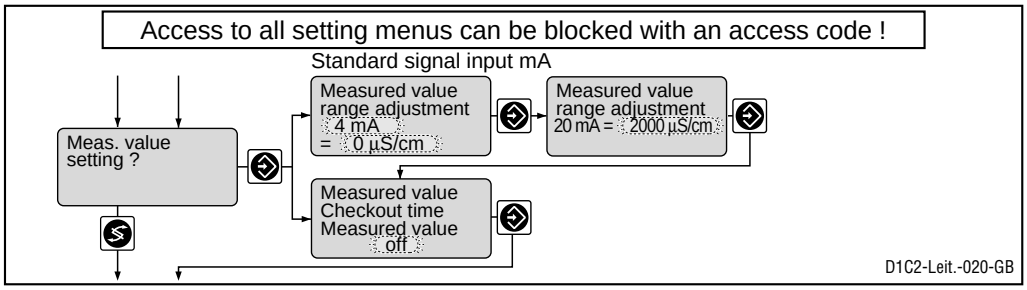
Measuring range



When changing the measuring range, setpoints and limit values are switched over to their respective initial values. The settings must be checked in all menus!

	Initial value	Possible values Increment	Lower value	Upper value	Remarks
Measuring range	0....2000 µS/cm	0....1000 mS/cm* 0....200 mS/cm 0....20 mS/cm 0....5000 µS/cm* 0....2000 µS/cm 0....500 µS/cm* 0....200 µS/cm 0....50 µS/cm* 0....20 µS/cm			setpoints and limit values are switched over to their respective initial values * only with connection on standard signal

Measured value



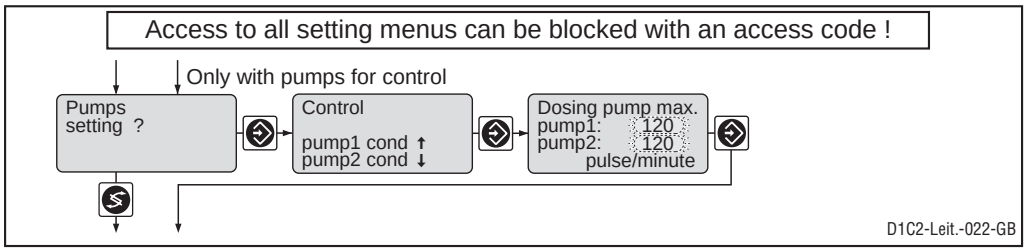
When changing the range adjustment, the adjustments in all menus have to be checked!

	Initial value	Possible values Increment	Lower value	Upper value	Remarks
Standard signal input lower signal limit	4 mA	0 mA 4 mA			
Allocated special voltage	0–2000 µS/cm	depending on measuring range	–5 % of final value	+5 % of final value	
Checkout time	off	1 s	1 s	9999 s	Constant measurement signal results in message and alarm. Function off = 0 s

Complete Operating Menu / Description

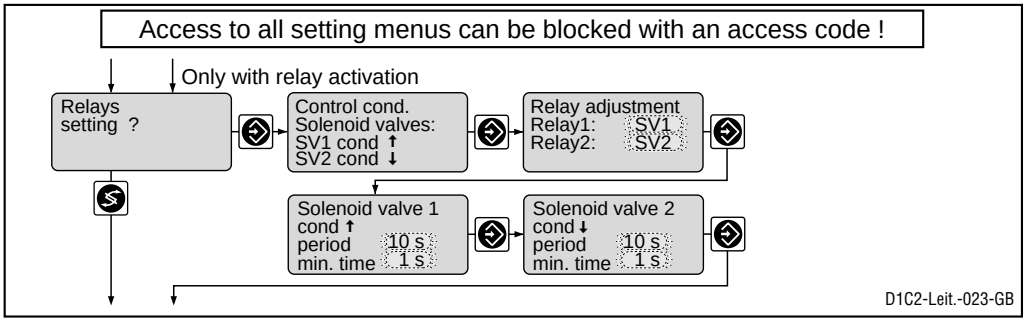
The following menus apply generally

Pumps



	Initial value	Possible values Increment	Lower value	Upper value	Remarks
Max. stroke/minute of pumps 1 and 2	120	1	1	500	off = 0 strokes/min

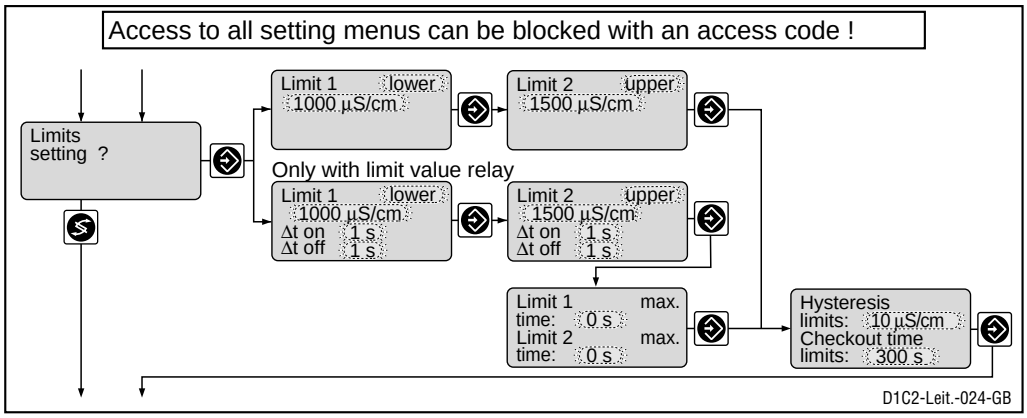
Relay for solenoid valve activation



	Initial value	Possible values Increment	Lower value	Upper value	Remarks
Relay adjustment	as per identity code	solenoid valve limit off			
Period	10 s	1 s	10 s	9999 s	
Min. time	1 s	1 s	1 s	period/2	

Complete Operating Menu / Description

Limits



	Initial value	Possible values Increment	Lower value	Upper value	Remarks
Type of limit transgression Limit 1: Limit 2:	lower upper	upper lower off 2)			limit transgression when exceeding or dropping below value
Limit 1; Limit 2	500; 750 mS/cm 100; 150 mS/cm 10; 15 mS/cm 2500; 3750 µS/cm 1000; 1500 µS/cm 250; 375 µS/cm 100; 150 µS/cm 25; 37 µS/cm 10; 15 µS/cm	1 mS/cm 0.1 mS/cm 0.01 mS/cm 1 µS/cm 1 µS/cm 0.1 µS/cm 0.1 µS/cm 0.01 µS/cm 0.01 µS/cm	–50 mS/cm –10 mS/cm –1 mS/cm –250 µS/cm –100 µS/cm –25 µS/cm –10 µS/cm –2.5 µS/cm –1 µS/cm	1050 mS/cm 210 mS/cm 21 mS/cm 5250 µS/cm 2100 µS/cm 525 µS/cm 210 µS/cm 52.5 µS/cm 21 µS/cm	meas. range 1000 ms/cm* meas. range 200 ms/cm meas. range 20 ms/cm meas. range 5000 µs/cm* meas. range 2000 µs/cm meas. range 500 µs/cm* meas. range 200 µs/cm meas. range 50 µs/cm* meas. range 20 µs/cm
Switch-on delay Limit 1; Limit 2	0 s	1 s	0 s	9999 s	only with complete operating menu
Switch-off delay Limit 1; Limit 2	0 s	1 s	0 s	9999 s	only with complete operating menu
Max. on time Limit 1; Limit 2	off	1 s	0 s/off	9999 s	only with complete operating menu function can be switched off
Hysteresis limits	5 mS/cm* 1 mS/cm 0.1 mS/cm 25 µS/cm* 10 µS/cm 2.5 µS/cm* 1.0 µS/cm 0.25 µS/cm* 0.10 µS/cm	1 mS/cm 0.1 mS/cm 0.01 mS/cm 1 µS/cm 1 µS/cm 0.1 µS/cm 0.1 µS/cm 0.01 µS/cm 0.01 µS/cm	–2 mS/cm –0.4 mS/cm –0.04 mS/cm –10 µS/cm –4 µS/cm –1 µS/cm –0.4 µS/cm –0.1 µS/cm –0.04 µS/cm	1050 mS/cm 210 mS/cm 21 mS/cm 5250 µS/cm 2100 µS/cm 525 µS/cm 210 µS/cm 52.5 µS/cm 21 µS/cm	Effective in direction of "cancelling limit transgression"
Checkout time limits	off	1 s	1 s/off	9999 s	function can be switched off

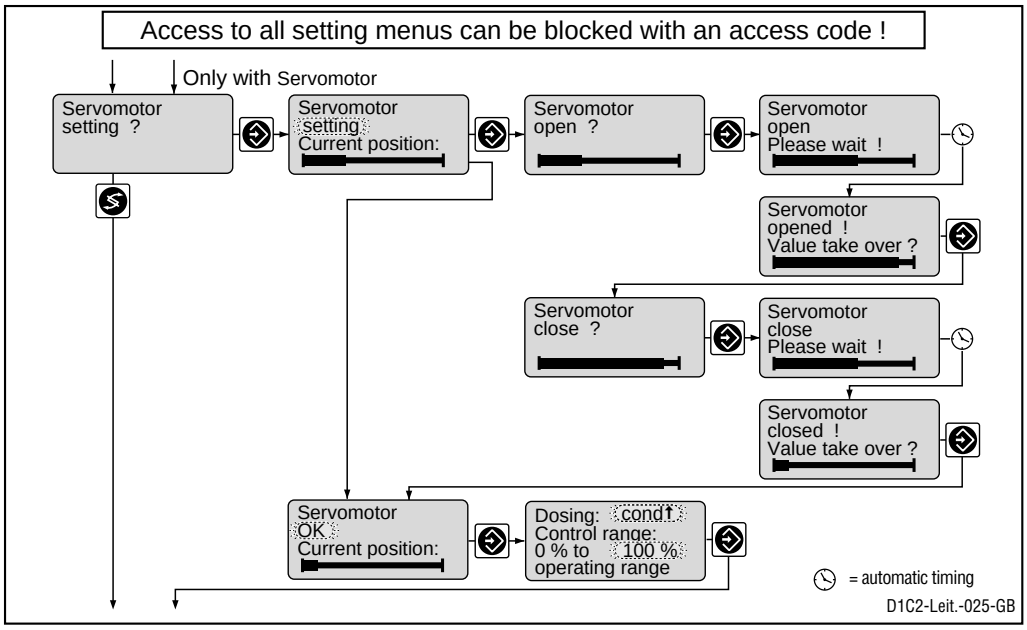
* = only with connection on standard signal, 2) = only with limit value relay

Servomotor

Activation of the servomotor must be carried out with the same meticulous care as taken when calibrating a measuring probe. The operating range is defined by the total resistance range of the feedback potentiometer. The maximum limit of the range actually used is set by defining the control range.

ATTENTION:

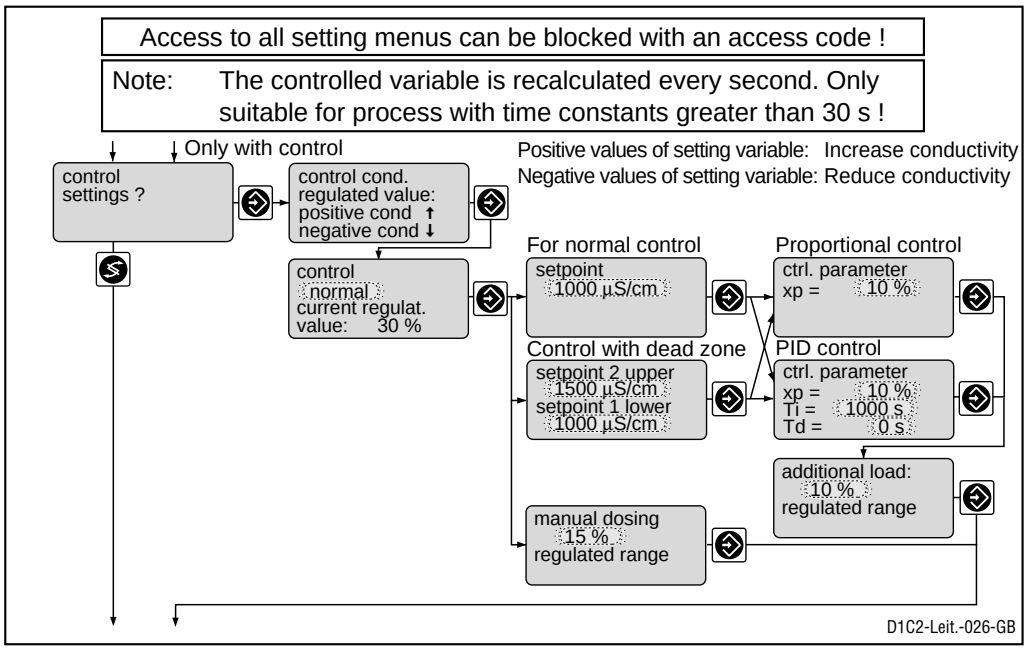
To ensure correct operation, the activation time of the actuator used should not be less than 25 seconds for the control range from 0...100 %!



	Initial value	Possible values Increment	Lower value	Upper value	Remarks
Servomotor	setting	setting ok off			
Control direction	cond. ↑	cond. ↑ cond. ↓			
Control range	100 %	1 %	10 %	100 %	in % of operating range

Complete Operating Menu / Description

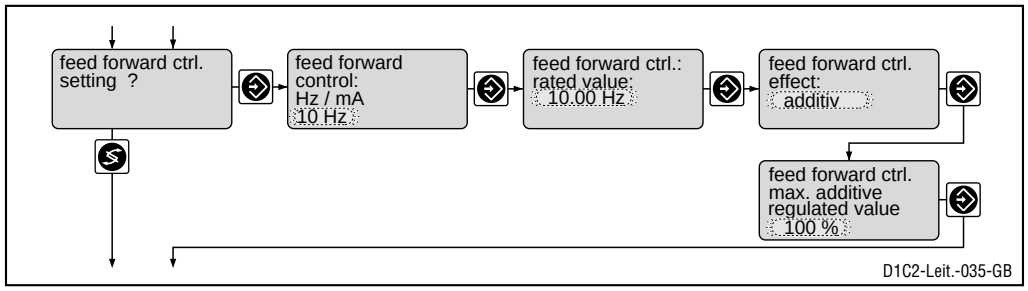
Control



	Initial value	Possible values Increment	Lower value	Upper value	Remarks
Control	normal	normal with dead zone manual			When controlling with dead zone, the feed forward control is not used for measured values within the dead zone
Setpoint	500 mS/cm 100 mS/cm 10 mS/cm 2500 µS/cm 1000 µS/cm 250 µS/cm 100 µS/cm 15 µS/cm 10µS/cm	1 mS/cm 0.1 mS/cm 0.01 mS/cm 1 µS/cm 1 µS/cm 0.1 µS/cm 0.1 µS/cm 0.01 µS/cm 0.01 µS/cm	–50 mS/cm –10 mS/cm –1 mS/cm –250 µS/cm –100 µS/cm –25 µS/cm –10 µS/cm –2.5 µS/cm –1 µS/cm	1050 mS/cm 210 mS/cm 21 mS/cm 5250 µS/cm 2100 µS/cm 525 µS/cm 210 µS/cm 52.5 µS/cm 21 µS/cm	meas. range 1000 mS/cm* meas. range 200 mS/cm meas. range 20 mS/cm meas. range 5000 µS/cm* meas. range 2000 µS/cm meas. range 500 µS/cm* meas. range 200 µS/cm meas. range 50 µS/cm* meas. range 20 µS/cm setpoint 2 ≥ setpoint 1
Control parameter xp	10 %	1 %	1 %	500 %	xp referred to measuring range
Control parameter Ti	off	1 s	1 s	9999 s	function off = 0 s
Control parameter Td	off	1 s	1 s	2500 s	function off = 0 s
Additional load	0 %	1 %	–100 %	+100 %	
Manual metering	0 %	1 %	–100 %	+100 %	

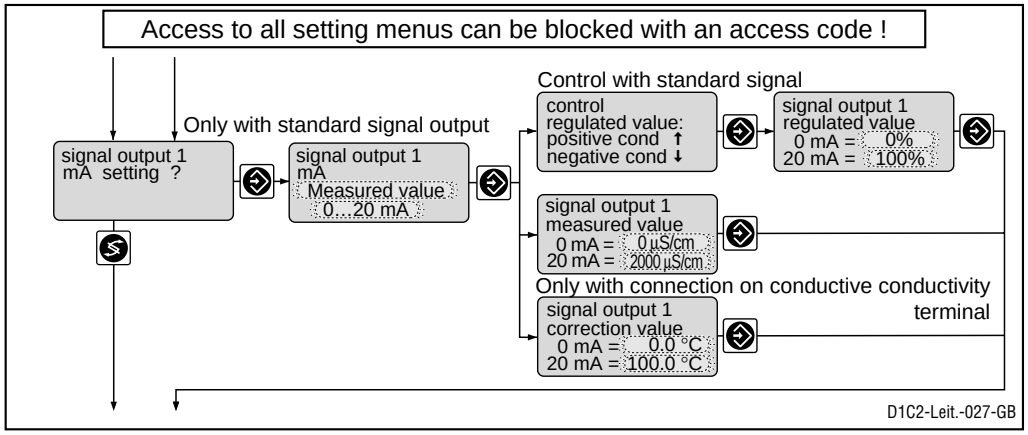
*only with connection on standard signal

Feed forward control

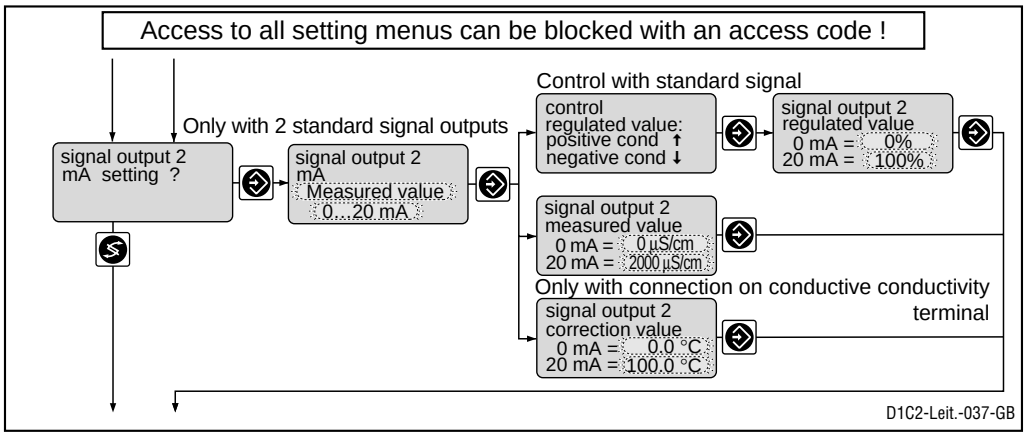


	Initial value	Possible values: Increment	Lower value	Upper value	Remarks
Feed forward control (Flow)	as per identity code with standard signal: 4–20 mA	None 10 Hz 500 Hz 0…20 mA 4…20 mA			signal processing: signal <0.02 Hz = no flow signal <0.2 Hz = no flow signal <0.2 mA = no flow signal <4.2 mA = no flow
Feed forward control rated value	10 Hz 500 Hz 20 mA	0.01 Hz 1 Hz 0.01 mA	0.1 Hz 5 Hz 0/4 mA	10 Hz 500 Hz 20 mA	Depended on signal type. Maximum limitation of range used.
Feed forward control effect	multiplicative	multiplicative additive			
Max. add. regulated value	100 %	1 %	–500 %	+500 %	only with add. feed forward control

Standard signal output 1



Standard signal output 2

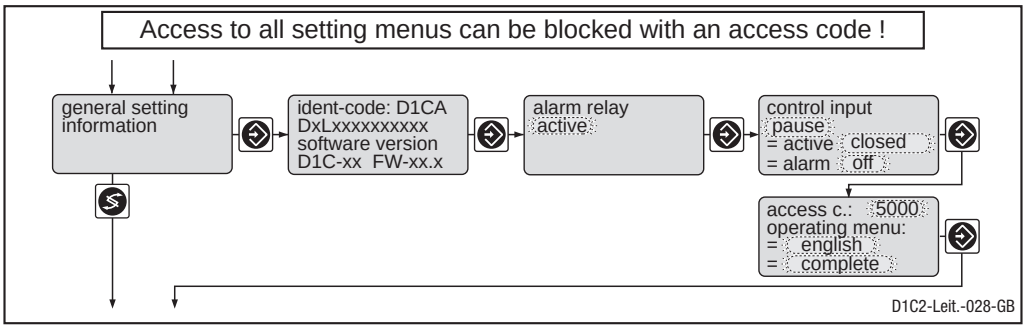


	Initial value	Possible values Increment	Lower value	Upper value	Remarks
Variable allocation	as per identity code	measured value controlled variable correction value			If control applicable only with correction variable
Output range	0…20 mA	0…20 mA 4…20 mA			
Range measured value	0–20 µS/cm 0–50 µS/cm 0–200 µS/cm 0–500 µS/cm 0–2000 µS/cm 0–5000 µS/cm 0–20 mS/cm 0–200 mS/cm 0–1000 mS/cm	0.01 µS/cm 0.01 µS/cm 0.1 µS/cm 0.1 µS/cm 1 µS/cm 1 µS/cm 0.01 mS/cm 0.1 mS/cm 1 mS/cm	–1 µS/cm –2.5 µS/cm –10 µS/cm –25 µS/cm –100 µS/cm –250 µS/cm –1 mS/cm –10 mS/cm –50 mS/cm	21 µS/cm 52.5 µS/cm 210 µS/cm 525 µS/cm 2100 µS/cm 5250 µS/cm 21 mS/cm 210 mS/cm 1050 mS/cm	meas. range 20 µS/cm meas. range 50 µS/cm* meas. range 200 µS/cm meas. range 500 µS/cm* meas. range 2000 µS/cm meas. ranges 5000 µS/cm* meas. range 20 mS/cm meas. range 200 mS/cm meas. range 1000 mS/cm*
Range controlled variable	0 %…+100 %	1 %	–100 %	+100 %	minimum range 1 %
Range correction value	0....100 °C	0.1 °C	0.0 °C	100 °C	minimum range 1 °C

*only with connection on standard signal

Complete Operating Menu / Description

General setting



	Initial value	Possible values Increment	Lower value	Upper value	Remarks
Alarm relay	active	active not active			
Pause	Pause	Pause Pause/Hold*			*If pause/hold is active the last valid setting value (PI-part) is frozen
Control input pause	closed	closed open			
Alarm pause	off	off on			Alarm relay can be triggered by pause contact
Access code	5000	1	1	9999	
Language	as per identity code				
Operating menu	complete	restricted complete			

* at software version 4.6

Hold function (all measurement variables)

When the pause/hold setting is selected, on activation, the controlled variable is frozen to the last value (PI-part is retained). This setting can be carried out in the complete operating menu – general settings information.

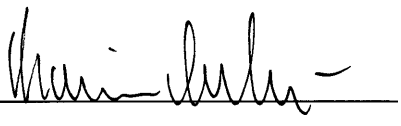
9 EC Declaration of Conformity

EC Declaration of Conformity

We,

ProMinent Dosiertechnik GmbH
Im Schuhmachergewann 5 - 11
D - 69123 Heidelberg

hereby declare that, on the basis of its functional concept and design and in the version brought into circulation by us, the product specified in the following complies with the relevant, fundamental safety and health stipulations laid down by EC directives.
Any modification to the product not approved by us will invalidate this declaration.

Product description :	***Measurement and control system, DULCOMETER***
Product type :	***D1C / D2C***
Serial number :	***see type identification plate on device***
Relevant EC regulations :	***EC - low voltage directive (73/23/EEC)*** ***EC - EMC - directive 89/336/EEC subsequently 92/31/EEC***
Harmonized standards used, in particular :	***EN 60335-1, EN 61010-1/2, EN 60204-1*** ***EN 50081-1/2, 50082-1, EN 55014-1/2*** ***EN 61000-3-2/3, EN 61000-6-2***
National standards and other technical specifications used, in particular :	
Date/manufacturer´s signature :	***11th December 2000*** 
The undersigned :	*Dr. Rainer V. Dulger, Executive Vice President R&D and Production*

10 Troubleshooting

Fault	Fault text	Symbol	Effect		Alarm with acknowledgement	Remarks	Remedy
			On metering	On control			
Measured value Signal exceeds/drops below value*	mS-meas. range ↑↓ Check ms-input		Basic load Basic load	Stop Stop	Yes Yes	meas. value out of meas. range. Signal <3.0 ±0.2 mA or >23 ±0.2 mA	Check range adjustment Check probe, transducer and cable connection
Checkout time meas. value exceeded*	Check ms-probe		Basic load	Stop	Yes	Function defectable	Check function of probe
Correction variable Signal exceeds/drops below value* upper limit temperature exceeded	Check te-input te-limit ↑		Basic load Basic load	Stop Stop	Yes Yes	Signal <3.0 ±0.2 mA or >23 ±0.2 mA α ≥ 4 %/°C	Check probe, transducer and cable connection
Feed forward control Signal exceeds/drops below value*	Check feed forward input				Yes	Signal <3.0 ±0.2 mA or >23 ±0.2 mA Value last valid is used	Check probe, transducer and cable connection
Limit transgression after checkout time limits	mS-limit 1 ↑↓ mS-limit 2 ↑↓				Yes	Function defectable	Define cause, reset values if necessary
Servomotor Position not reached	Servomotor defective				Yes	Servomotor closes	Check servomotor
Electronics error	System error		Stop	Stop	Yes	Electronic data defective	Call in service

Operation	Note text	Symbol	Effect		Alarm with acknowledgement	Remarks	Remedy
			On metering	On control			
Pause contact	Pause		Stop	Stop	No	No further fault check	–
Stop button	Stop		Stop	Stop	No	Relay drops out	–
Calibration* Calibration with error	mS-calibration insufficient		Basic load	Stop	–	–	Repeat calibration Check probe/buffer
During servomotor setting Position feed back wrong	Direction check					Without correct adjustment the last valid values are still used	Check connection of relay, potentiometer
Upper position <40 % max. value	Final value small						Adjust the operation region
Lower position >30 % range	Final value big						of the servomotor correctly

*only with connection on standard signal

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