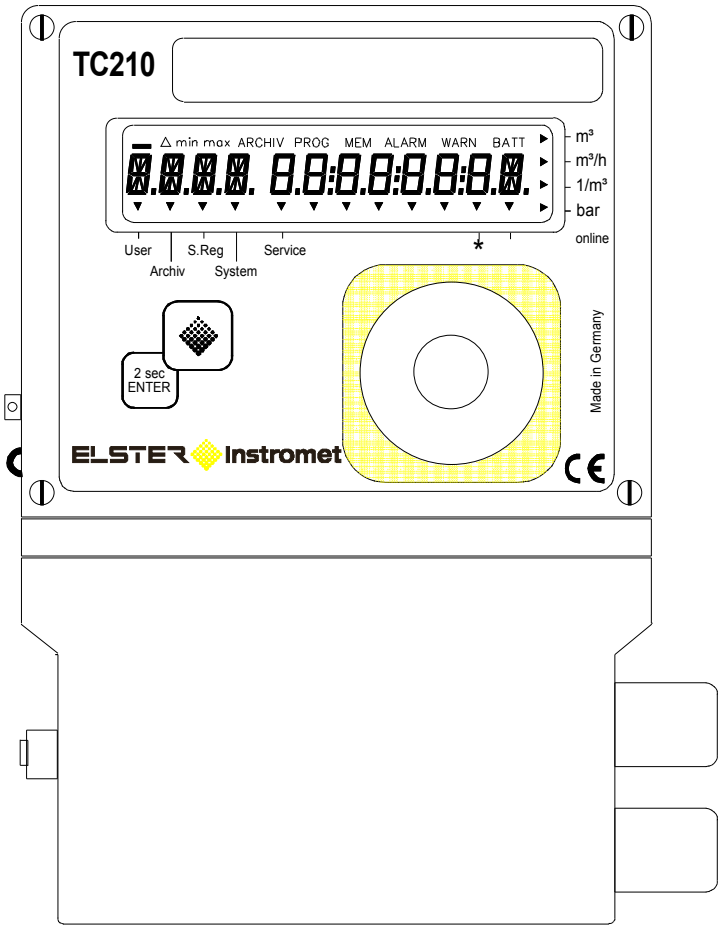
Short-Form Instructions (73018729, b)
Temperature-Volume Corrector TC210

A single-line display (LCD) with 12 characters, various special symbols (the TC210 does not use all the symbols) and a key are provided on the front panel for operation.
Identification of the values on the 12-character display occurs using abbreviated designations. Generally, an abbreviated designation consists of up to four letters which appear at the left end of the display. The right-hand eight places are normally used for displaying numerical values.



Key functions

Key	Action
	• **Downwards movement** within the current list: From the end of the list movement is then to the first value. • **Changing values in the entry mode**
 Hold pressed for 2 seconds (ENTER)	• **Initiate functions**, e.g. Clear all volumes => CLR.V • **Activate entry mode**, e.g. cp value of Input 1 => CP.I1 • **Update measurement** • **Open the submenu.** • **Return from a submenu** to the entry address in the higher level main menu. • **Display of second part of paired values**, e.g. standard volume => Vb (predecimal and post-decimal places)

Description of the symbols used in the display:

–	The value located in the display is a mean value.
Δ	Flashes briefly at the end of a measurement cycle.
PROG	"PROG" flashes when the calibration lock is open.
ALARM	At least one status message has occurred which is valid as an alarm. After the rectification of the cause of the fault, alarm messages remain in the status register until they are manually cleared. Flashing symbol => the corresp. state is still present and message is present in the momentary status. Non-flashing symbol => the corresp. state is passed, but the message has not yet been cleared in the status register.
WARN	At least one status message has occurred which is valid as a warning. After the rectification of the cause of the fault, warning messages remain in the status register until they are manually cleared. Flashing symbol => the corresp. state is still present and message is present in the momentary status. Non-flashing symbol => the corresp. state is passed, but the message has not yet been cleared in the status register.
BATT	"BATT" flashes when the remaining battery service life is less than the set warning limit (factory setting: 3 months).
Units	The arrows located in the right margin of the display point to the relevant physical unit for the displayed value.
Communication	If the arrow in the bottom right margin of the display points to "online", then a data transmission is running via the optical interface.
Uncalibrated values	If the arrow in the bottom right margin points to "✱", then the displayed value is an uncalibrated value.
Menus	The five left arrows in the bottom margin on the display are used for orientation and for better identification of the relevant displayed value.
Submenu	All the right-hand arrows flash for indicating a possible branch to a submenu except the arrow which, if applicable, indicates a unit. When you are in a submenu, the arrows in the bottom margin of the display flash. Exceptions are the arrows for the reference to the current display list and indications of an existing communication or an uncalibrated value.

Entry errors

Entry errors are output to the display if incorrect entries are made via the keypad by the operator. The display is structured as follows: **--xx--** (x = See table for error code)

Code	Description
01	The archive is empty, no values are available yet.
02	The archive value cannot be read. The archive has possibly just been opened by the interface for reading out.
04	Parameter cannot be changed via the keypad or is a constant.
05	No authorisation for changing the value. To change the value the appropriate lock must be opened.
07	Incorrect combination: The entered combination (numerical code) is incorrect and the lock is not opened.
11	Entry not possible due to special setting or configuration.

User interface structure

The user interface in the TC210 is structured as a list (main menu). From here at the appropriate entry points it is possible to skip into the submenus or the archive.

User (Main Menu)			
Vb	Standard volume [2]		C
VbT	Standard volume total quantity [2]		-
V	Actual volume [2]		C
VT	Actual volume total quantity [2]		-
T	Temperature		-
TIME	Date and time [2]		S
P.F	Pressure fixed value		S/C*
K.F	Gas law deviation factor, fixed value		S/C*
C	Conversion factor		-
TMIN [3]	Lower temperature alarm limit		C
TMAX [3]	Upper temperature alarm limit		C
EQ1T [3]	Coefficient 1 of temperature equation		C
EQ2T [3]	Coefficient 2 of temperature equation		C
EQ3T [3]	Coefficient 3 of temperature equation		C
ARCH	Archive	**ARC1** [4]	-
S.REG	Overall status register	**U1** [5]	-
SYS	System	**U2** [5]	-
SERV	Service	**U3** [5]	-

= The displayed value is subject to the calibration lock after commissioning according to calibration regulations.

ARCH (ARC1) [1]		
AONo	Block number	-
TIME	Storage time-point	-
Vb	Standard volume	-
VbT	Total quantity standard vol.	-
V	Actual volume	-
VT	Totaliser actual volume	-
T.MP	Temperature mean	-
P.MP	Pressure mean	-
C.MP	Conversion factor mean	-
ST.5	Status 5	-
ST.6	Status 6	-
ST.SY	System status	-
Ev	Trigger event	-
ER.Ch	Checksum	-

S.Reg (U1)		
SR.SY	System status register	-
SR.1	Status Register 1	-
SR.2	Status Register 2	-
SR.5	Status Register 5	-
SR.6	Status Register 6	-

SYS (U2)		
BAT.R	Remaining bat. life	-
MRL.T	Meas. range lower temperature	C
MRU.T	Meas. range upper temperature	C
T.F	Temperature substitute value	S
TARG	Ambient temperature range	C
Tb	Standard temperature	C
TYP.T	Type of temperature sensor	C
SN.T	Serial no. temperature sensor	C
Pb	Standard pressure	C
ST.CL	Status, customer's lock[6]	K
Cod.C	Customer combination [6]	K
VERS	Software version	-
CHK	Software checksum	-
M.CYC [3]	Measurement cycle time	C
DAYb [3]	Day boundary	C
ADJ.T [3]	Clock adjustment factor	C

SERV (U3)		
CLR	Clear status register	S
-	Display test	-
CP.I1	cp value Input 1 [6]	C
CP.I2	cp value Input 2 [6]	S
CP.O1	cp value Output 1	C
CP.O2	cp value Output 2	S
SAVE	Save all data [6]	S
BAT.C	Battery capacity [6]	S
ST.SL	Status, supplier's lock [6]	S
Cod.S	Supplier's code [6]	S
CLR.V	Clear counters [6]	C
FRZ	Freeze [6]	S
CLR.X	Initialise device [6]	C
Md.O1[3]	Mode Output 1	C
SC.O1[3]	Source Output 1	C
SP.O1[3]	Status pointer, Output 1	C
STAT[3]	Momentary status	-

Access rights

C => Calibration lock; M => Manufacturer's lock; S => Supplier's lock; K => Customer's lock; - => calculated or measured values (display only)

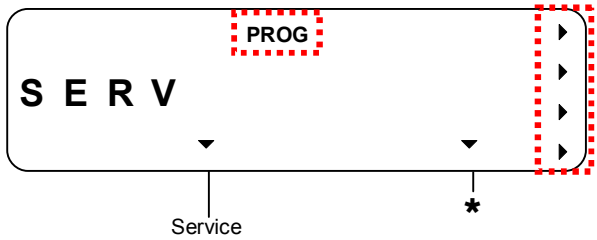
[1] Basic structure of an archive data record.
[2] Values subdivided into two (e.g.: pre- and post-decimal places). To display the second part of the value press the key for at least 2 s. Press the key again to return to the display list.
[3] User-specific values, i.e. the user can set which values are displayed.
[4] The archive is assigned under "ARC1".
[5] Submenus are assigned under "U1" – "U3".
[6] Quitting the menu at this point is **not** possible (value can be changed via keypad).

Example of changing values

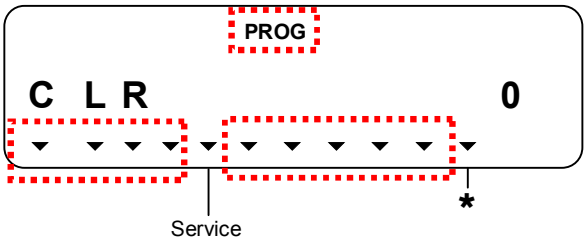
Adjustable values can be conveniently changed via the optical interface using the "WinPADS" parameterisation software. With the key on the device this is only possible with restrictions. The adjustable values are identified in the lists of the functional description.

"**cp value of Input 1**" is to be changed (short designation: **CP.I1**). The calibration lock must be open for this.

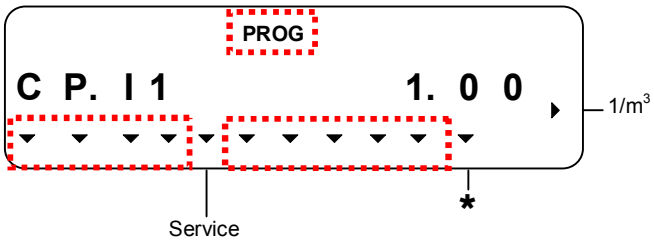
Open calibration switch => **PROG** flashes
Use key to access submenu **SERVICE**
(Right indicating arrows flash.



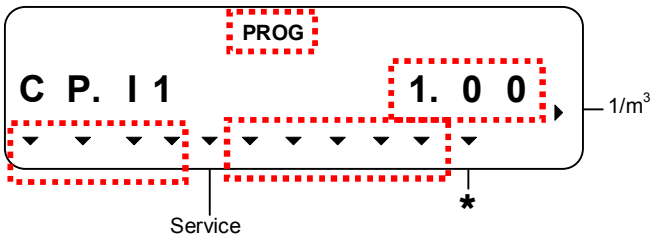
Press the key for at least 2 s. The value **CLR** (Clear status register) is displayed.
(Lower indicating arrows flash)



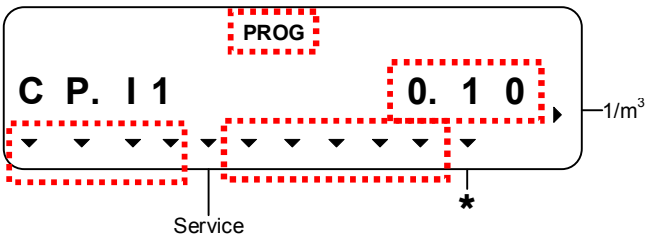
Keep pressing the key until the value **CP.I1** is displayed.



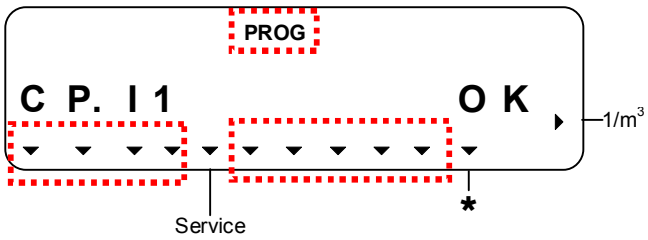
Press the key for at least 2 s. The displayed value flashes.



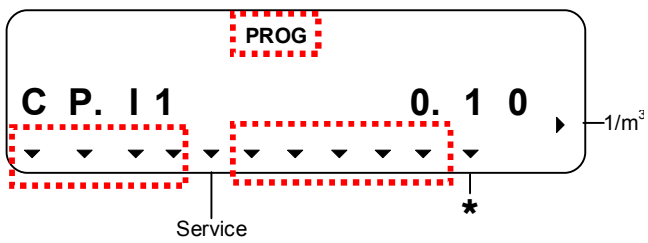
A decade value (1; 10; 100; 0.01; 0.10) can be set with the key, e.g. 0.01.



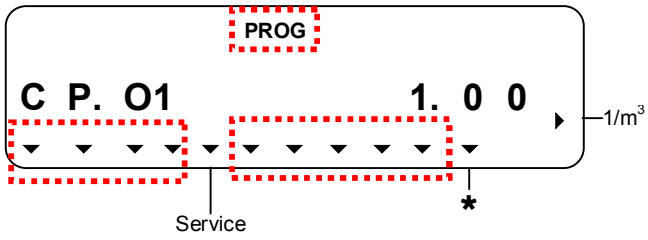
The entry is terminated by pressing the key for at least 2 s. **OK** is displayed briefly. Then the set **value** is displayed statically.



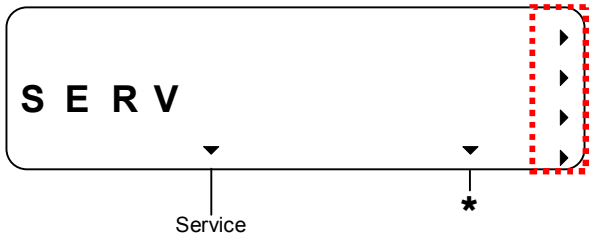
Quitting of the submenu also occurs automatically after the display is switched off (2 min.). The calibration lock must be closed again by pressing the calibration switch (PROG goes out).



To **quit the submenu** a value which cannot be changed using the key or can be displayed in two parts is brought into the display, e.g. keep pressing the key until **CP.O1** is displayed.



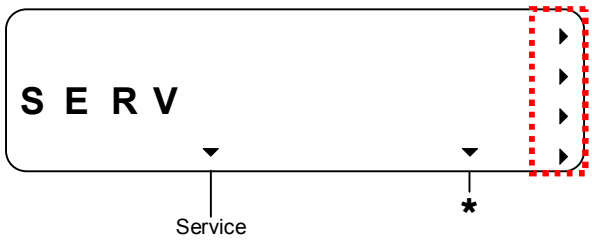
Quitting the submenu occurs by pressing the key for at least 2 s. The calibration lock is closed by pressing the calibration switch.
(PROG goes out.)



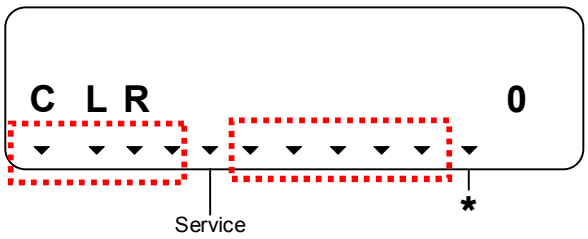
Supplier's lock: Status, closure, opening and changing the combination

Displaying the current status of the supplier's lock

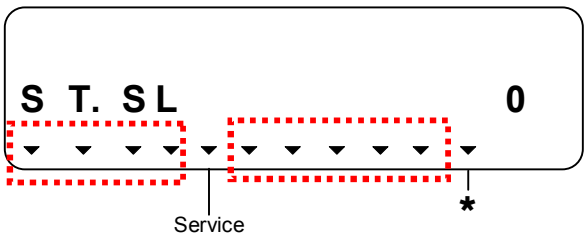
With the key move to the submenu **SERV**.
(Right indicating arrows flash)



Press the key for at least 2 s. The value **CLR** (Clear status register) is displayed.
(Lower indicating arrows flash)



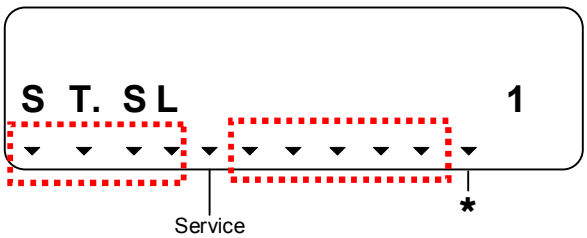
Keep pressing the key until the value ST.SL is displayed. The indication of "0" signifies a closed supplier's lock.



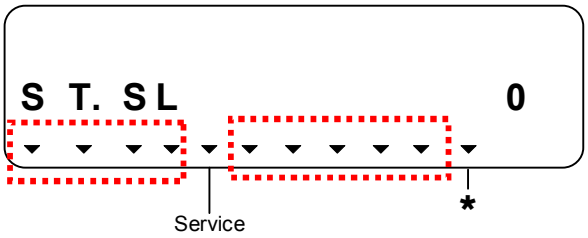
Closing the supplier's lock

To close the supplier's lock the status of the supplier's lock must be recalled in the submenu *Service* (see above), so that the following display appears:

The display of "1" indicates an open supplier's lock.



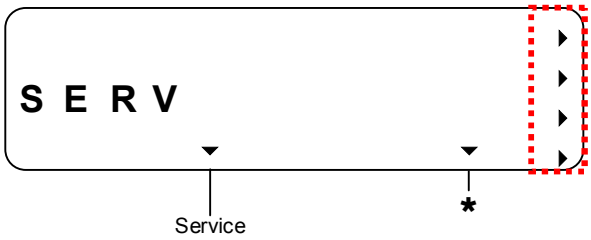
Press the key for at least 2 s. The display skips from "1" to "0". This concludes the entry and the supplier's lock is closed.



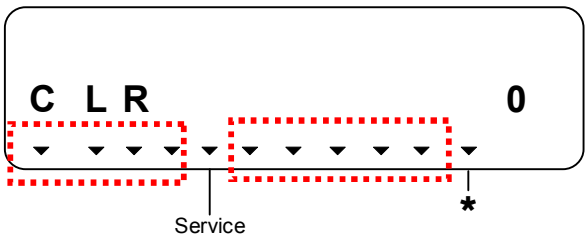
Opening the supplier's lock

Example customer combination: 13579Ad

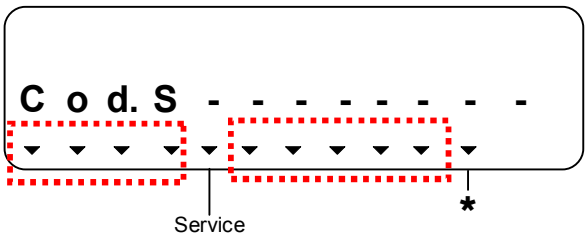
Move to the submenu **SERV** with the key
(Right indicating arrows flash)



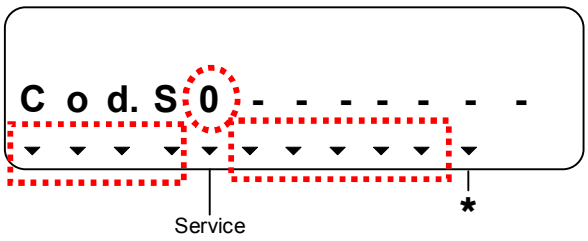
Press the key for at least 2 s. The value **CLR** (Clear status register) is displayed. (Lower indicating arrows flash.)



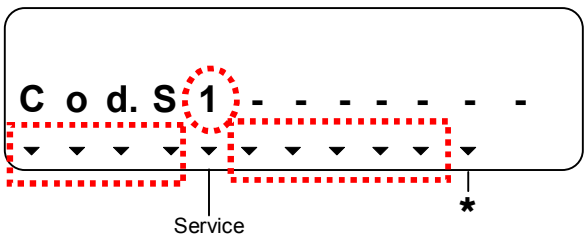
Keep pressing the key until the value **Cod.S** is displayed.



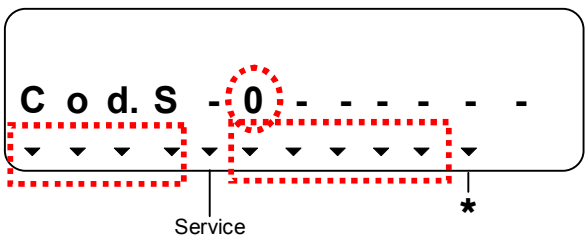
Press the key for at least 2 s.
The most significant figure flashes.



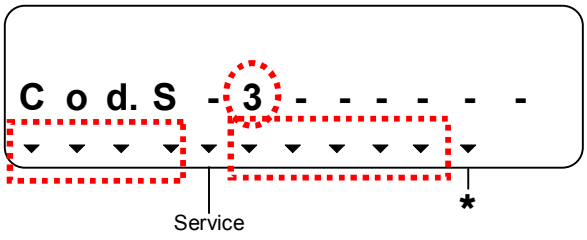
With the key this figure can be set to the desired value.



The figure to the right can be selected by pressing the key for at least 2 s (it then flashes).



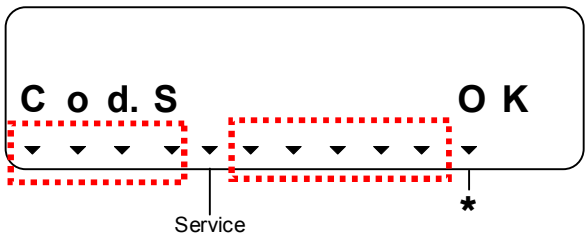
This figure can be set to the desired value with the key.



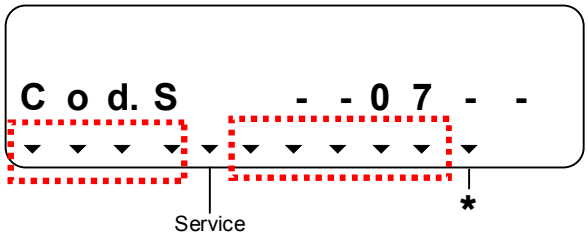
You can edit the remaining figures in the same manner.

- Press the key for at least 2 s => skip to next figure.
- Pressing the key again => sets the figure to the desired value.

After changing the last figure, press the key for at least 2 s to accept the entered code. If the **code is correct**, **OK** is displayed.



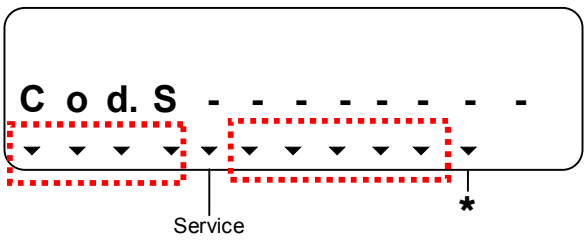
After changing the last figure, press the key for at least 2 s to accept the entered code. If the code **is incorrect**, **--07--** is displayed.



Changing the supplier's combination

Changing the supplier's combination is only possible with an open supplier's lock **(ST.SL = 1**, see above).

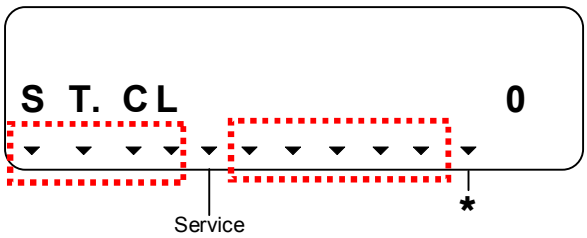
The change is made in the same way as for opening the supplier's lock (see above) using the value **Cod.S**.
Once the entry is complete, the supplier's code is changed.



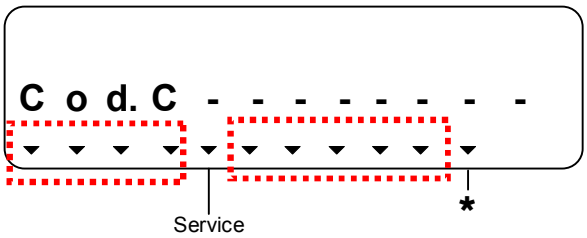
Customer's lock Status, closure, opening and changing the combination

The customer's lock is located in the submenu *System*. The procedure for opening, changing and closing corresponds to that of the supplier's lock. Here, the following displays are recalled:

Display of the status and closing of the customer's lock:



Opening the customer's lock and changing the combination:



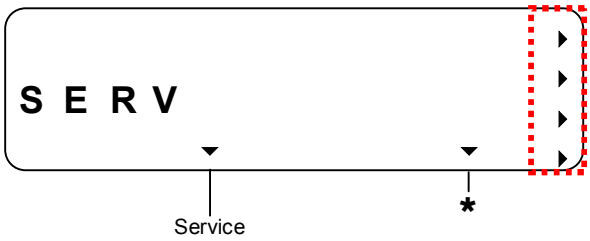
Quitting a submenu or the archive

- To **quit the archive** press the key for at least two seconds.
- To **quit a submenu** a value, which cannot be changed by key nor displayed in two parts, is brought into the display (e.g.: *CP.O1* in the submenu "*Service*"). The submenu is left by pressing the key for at least two seconds.
  The submenu is also left when the display switches off (after two minutes).

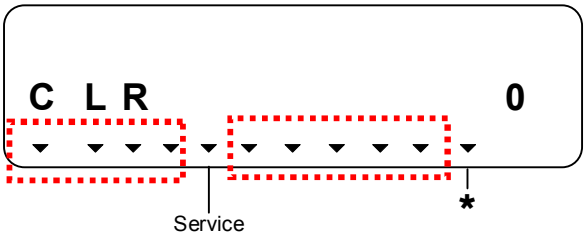
Example of initiating functions

The "**Status register**" is to be deleted (short designation: **CLR**).

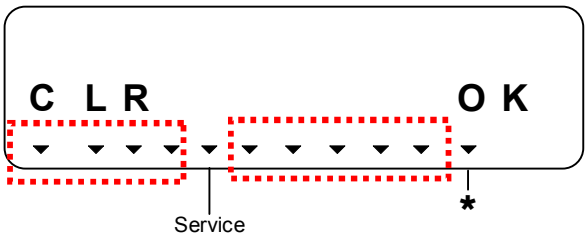
Use key to access **SERVICE** submenu
(Right indicating arrows flash)



Press the key for at least 2 s. The value **CLR** (Clear status register) is displayed. (Lower indicating arrows flash.)



Hold the key pressed for at least 2 s. The display skips to OK.



In this way all current alarms and warning messages are cleared. If no further alarm or warning messages are present, the symbols "ALARM" and "WARN" in the display are cleared.

To **quit the submenu**, a value which cannot be edited is brought into the display. E.g. keep pressing the key until the **display test** is shown. The submenu is left by pressing the key for at least two seconds. The submenu is also left when the display switches off (after two minutes).

Messages in the status registers 1, 2, 5 and 6

In *SR.1, SR.2, SR.5* and *SR.6* all messages are qualitatively equivalent.

Mes-sage	SR.1	SR.2	SR.5	SR.6
1	Alarm for:			
	-	-	C	T
2	No usable value for			
	-	-	T	-
4	Output error on output:			
	A1	A2	-	-
5	Error during pulse comparison:			
	-	E2	-	-
8	Warning for input			
	-	E2	-	-
10	Adjustment missing for:			
	-	-	T	-

Significance of the message "1" in the status register *SR.6*: The gas temperature is outside of the alarm limits.

Example: In the main menu (User List) the message 1 is displayed under the overall status register S.Reg and *ALARM* flashes. The arrows on the right side flash to indicate a submenu. Skipping into the submenu is by pressing the key for at least two seconds. Keep pressing the key until the message 1 appears in the display.