MultiCONT

INSTALLATION AND PROGRAMMING MANUAL

1. version

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■ 2

TABLE OF CONTENT

1. Application 4
2. Technical data 4
3. Order code 6
3.1. Dimensions 7
3.2. Safety regulation of Ex approved units 8
4. Electric connection…… 9
4.1. Arrangement of the cable terminals 9
4.2. Wiring of the transmitters 10
4.2.1. Wiring of the 2-wire transmitters 10
4.2.2. Wiring 4-wire transmitters …… 11
4.2.3. Wiring of combined system 12
5. Programming of MultiCONT 13
5.1. Steps of programming 14
5.1.1. Stepping between menu tables and scrolling menupoints 15
5.1.2. Activation of devices, relays and current generators 16
5.1.3. Assignment of (relays and current) output 17
5.1.4. Editing parameter values 18
5.1.5. Editing staves 19
5.2. Putting into operation of network with MultiCONT 20
5.2.1. Preparing transmitters 20
5.2.2. Wiring 21
5.2.3. Setting up of MultiCONT 21
5.3. Main menu 27
5.4. MultiCONT configuration 28
5.5. Programming devices 35
5.6. Remote programming 36
5.6.1. Editing the linearisation table 38
5.7. Relay configuration 39
5.8. Current generator configuration 45
5.9. Switching on 46
5.10. Measurement mode 48
6. Errors, Error messages, Error codes 49
7. Protection of settings by hardware 51
8. Fuse replacement 52

Appendix

1. The ID identification codes of the manufacturer 53
2. The menu of theMultiCONT PRW-100 54
3. Programming the relays 55
4. Programming the current generators 56
5. Measurment mode 57

Thank you for choosing a NIVELCO instrument.
We are sure that you will be satisfied throughout its use.

1. APPLICATION

MultiCONT P-100 series is first of all a controller and display capable to provide powering for 2-wire transmitters and accomplish complex control tasks. Further it is a „MASTER" for all NIVELCO made smart transmitters as well as a universal interface between field devices with HART and other components of the process control system such as PC, PLC, displays and different actuators. **MultiCONT P-100** units support communication with a maximum of 15 ordinary or 2 Ex certified HART-capable NIVELCO made 2- or 4-wire transmitters. Should a system contain more transmitters than one **MultiCONT** can handle further **MultiCONT** units can be organized in row by RS485. Remote programming of the transmitters and downloading of the measured data is a routine for the **MultiCONT.** Measured values and new values calculated from the measured ones can control different outputs such as 4 … 20 mA, relays and digital output. Large DOT matrix LCD panel facilitate a wide variety of display functions including tank content visualization. The output facilities of the basic unit can be extended with external (relay and/or current generator) modules.

Explosion proof certified versions of the **MultiCONT** should be accommodated in non-hazardous area.

2. TECHNICAL DATA

TYPE			P□□-1□□-□
Installation			Wall mounting
Ambient temperature		PRC, PRD, PRW	-20 °C ... +50 °C
		PRH	-30 °C ... +50 °C
Output	Transmitter power supply		30 V DC 60 mA, for Ex version 22 mA
	Display		120 x 32 Dot-matrix/ 128 x 64
	Analogue		Max. 2 x 4 … 20 mA, galvanically isolated max load 500 ohm, over-voltage protection (isolation voltage 1000 V)
	Relay		Max. 4 x SPDT 250 V AC ; AC 1. 5 A
	RS 485 interface		Galvanic isolated (isolation voltage 1000 V) HART protocol
	HART		U_s = 26.5 V DC (U_s = 25.8 … 26.2 V DC Ex) 60 mA for 2-wire transmitters HART output signal level 0.5 ±0.1 V_{pp} trapezoid 1200 / 2200 Hz Input resistance 255 ohm. Cable max.75 ohm, max. 225 nF

TYPE		P□□ - 1□□-□
Cables	Powering, relays, analogue 4 … 20 mA	0.5 … 2.5 mm² core cross section
	RS 485 interface	Shielded, twisted cable pair, cross section: 0.5 … 2.5 mm²
	HART cabling	Below 1500 m Shielded, twisted cable pair, min. cross section ∅0,5mm Over 1500 m Two shielded, twisted cable, min. cross section ∅0,8mm Resistance max. 75 ohm, capacitance max. 225 nF
Number of transmitters to be powered		15 ordinary or maximum 4 Ex transmitters
Power supply / consumption / maximum voltage		85 … 255 V AC 50 … 60 Hz / 12 VA / 255 V_{eff} 10,5 … 28 V AC 50 … 60 Hz / 12 VA / 28 V_{eff} 10,5 … 40 V DC / 11 W / 40 V DC
Housing material		Polycarbonate (PC)
Ingress protection		IP65
Ex marking		⟨Ex⟩ II (1) G [EEx] ia IIB
Intrinsical safety data		U_{omax} = 30 V I_{max} = 140 mA P_{max}= 1 W L_{max} = 30 mH C_{max} = 300 nF
Electric protection		Class I/III
Mass		0.9 kg

3. ORDER CODE

MultiCONT P □ □ – 1 □ □ – □

EXTENSION	CODE
Standard *	R
Not possible	E

ENCLOSURE	CODE
IP 65	W
IP 65 with transparent cover	C
IP 65 with lockable transparent cover	D
IP 65 with transparent cover and heating	H

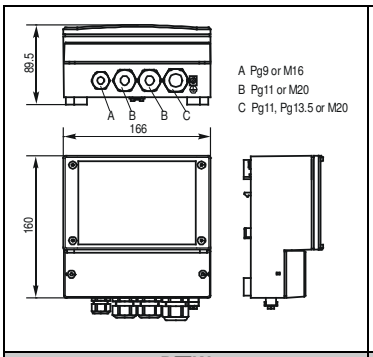
INPUT	CODE
1 tx with HART	1
4 tx with HART	4
8 tx with HART	8
15 tx with HART	M

OUTPUT	CODE
Display only	0
1 relay	1
2 relays	2
3 relays	3
4 relays	4
1 relay + 1x4…20 mA Analogue output	5
2 relays + 1x4…20 mA Analogue output	6
3 relays+ 1x4…20 mA Analogue output	7
4 relays + 1x4…20 mA Analogue output	8
4 relays + 2x4…20 mA Analogue output	9
RS 485 interface	A
Internet communication	B
GSM communication	C

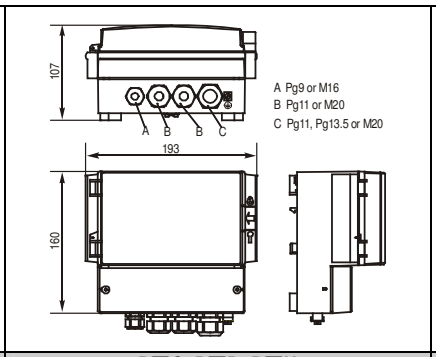
POWER SUPPLY	CODE
85 … 255 V AC	1
24 V AC / DC	2
85 … 255 V AC Ex	5
24 V AC / DC Ex	6

Order codes of the certified units are followed by „Ex" tag.
* Standard units can be extended with relay-, current generator- and combined modules.

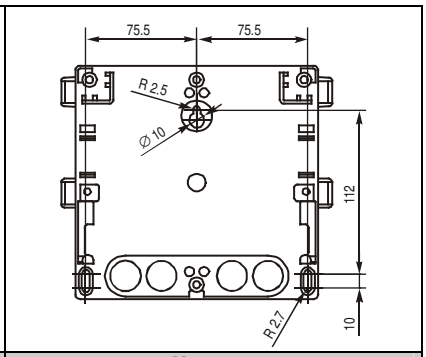
3.1. DIMENSIONS



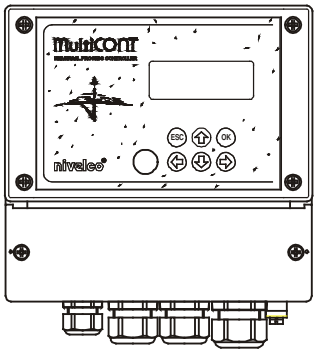
P□W



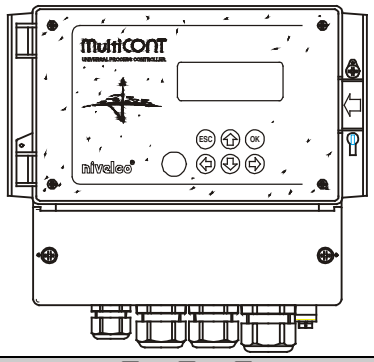
P□C, P□D, P□H



MOUNTING



P□W



P□C, P□D, P□H

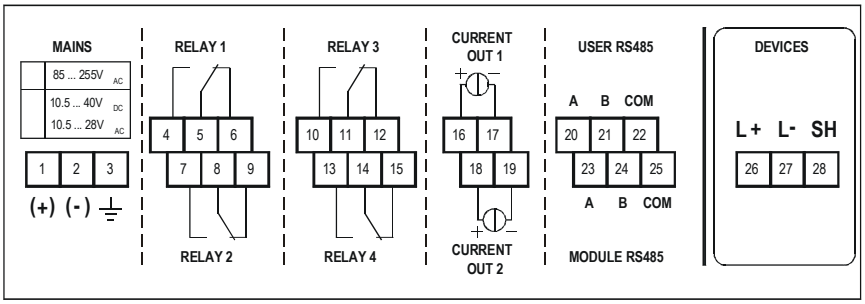
3.2. SAFETY REGULATION FOR THE EX APPROVED UNITS

See arrangement of the Ex certified devices in 4.2.4

- Explosion proof certified versions should be accommodated in non-hazardous area!
- Device should be protected against direct sunshine!
- Power supply and temperature data must not exceed those given in the Technical Data!
- Cable of the Ex certified devices in hazardous area should be connected to the terminals L+ and L- !
- Housing of the transmitters should be grounded!
- Wiring to the transmitters should be made with shielded, twisted cable pair!

4. ELECTRIC CONNECTION

4.1. ARRANGEMENT OF THE CABLE TERMINALS



After loosening threads and removing cover of the wiring terminal the cables can be connected. The same cable should not be used for AC and DC as well as different cables should be applied for SELV and mains voltage.

For requirements of the cables see Technical Data.

Number of TX	Cable capacity (pF / m)			
	65	95	160	225
1	2800	2000	1300	1000
5	2500	1800	1100	900
10	2200	1600	1000	800
15	1850	1400	900	700

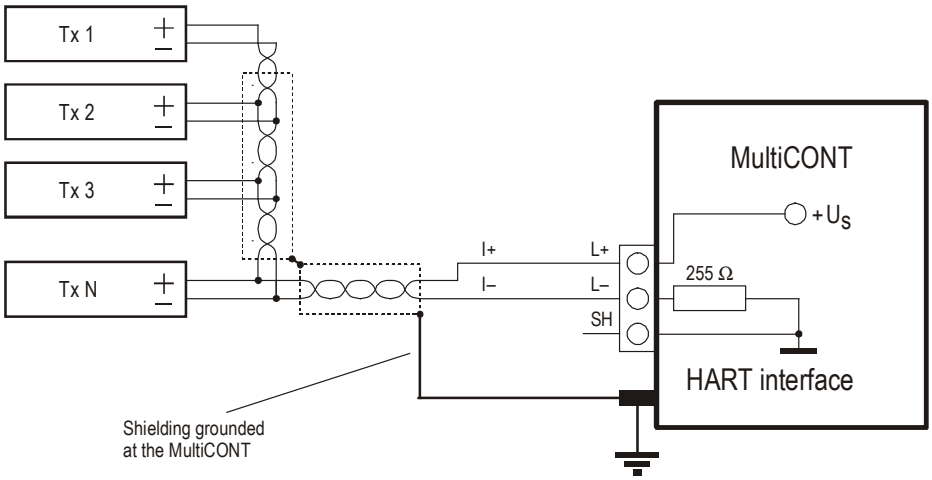
Shielding of the interconnecting cable between the transmitter and the controller should be grounded at one end preferably at the MultiCONT.

Intrinsically safe (Ex) transmitters should be connected through the terminals L+, L- to the controller. These points are galvanically isolated from the other parts of the electronics and the power supply for the Ex transmitter is current, voltage and power limited.

4.2. WIRING

Before wiring the units are suggested to be checked for type (all Tx with HART), value of loop current and polling address (transmitters should have different addresses). See 5.2. Steps of set up

4.2.1. Wiring of the 2-wire transmitters



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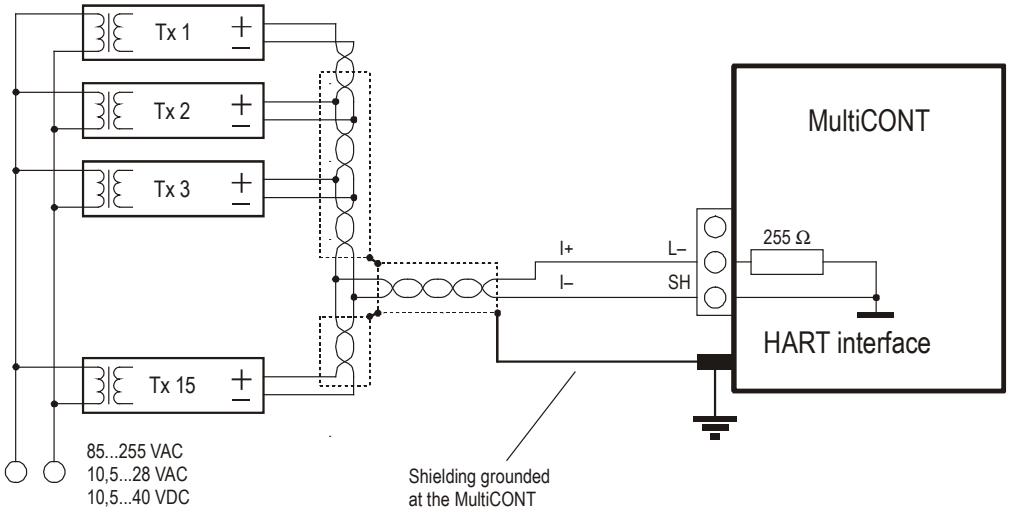
4.2.2. Wiring of the 4-wire transmitters



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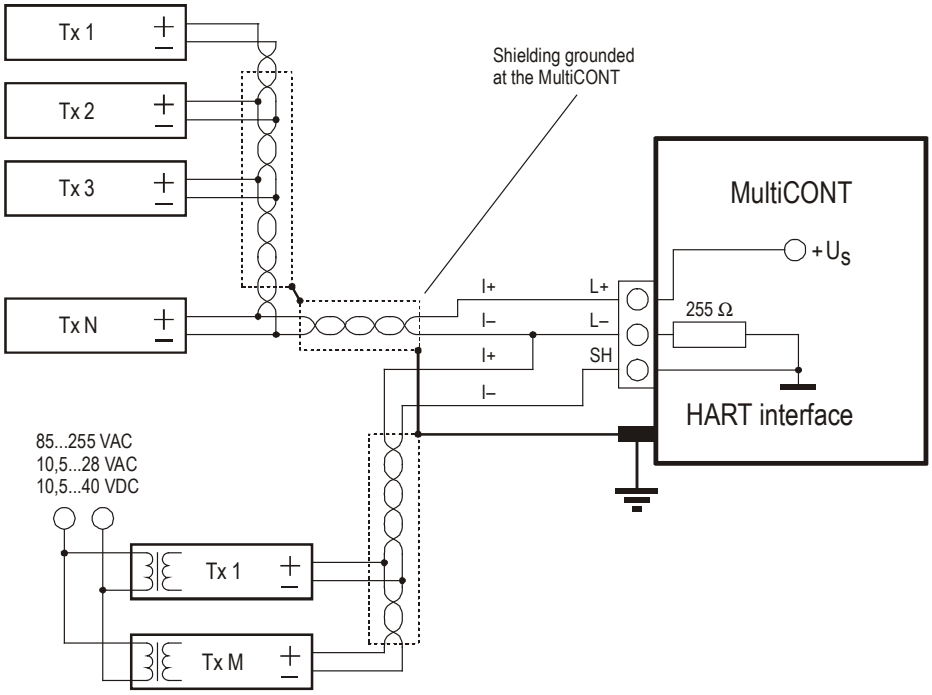
4.2.3. Combined system (containing 2- and 4-wire transmitters)



■ 12

5. PROGRAMMING OF MULTICONT

During programming the following can be performed:

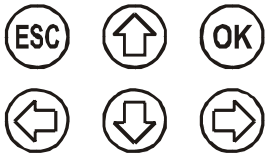
- *Automatic detection of devices (transmitters)*
  connected to the MultiCONT, their taking up in the list of devices. Devices not being on the list are part of the system but unable to communicate with the MultiCONT (see 5.2.3 Main menu/MultiCONT config/ DEV detect).
- *Activation, inactivation of devices (transmitters)*
  Theoretically all devices in the system should be working. For this, however devices should be activated, since MultiCONT will query the activated transmitters only and those, which are inactive not. Devices wishing to be temporarily out of use for any reason can be cut out by inactivation. (See 5.2.3 Main menu/ Devices)
- *Activation, inactivation of relays and current generators*
  Relays and current generators of the MultiCONT should also be activated (see Attachment 3 and 4)
- **Assignment of the MultiCONT outputs (relays, current generators) to devices (transmitters)**
  or to functional values composed from the measured values
- **Setting composition of functional values**
  Functional values can be composed from measured values such as difference (of e.g. two levels), sum of two measurement values, average of measurements.
- **Remote programming of devices**
  however programming of devices is supposed to perform in the workshop before their installing and wiring.
  (P01, P02, etc. parameters of the transmitters will be used in this Manual the same way as described in their Installation and User's Manual)
- **Programming of MultiCONT**
  Relay parameters and current generator parameters of the MultiCONT will be identified as RP1, RP2, RP3 and CR1, CR2, CR3 respectively.

For planning, erection and putting into operation of systems involving MultiCONT sound knowledge of the HART standard and devices applied is required.

During programming full scale of operation such as polling of devices, function of relays and current generators will be maintained. Modifications will only be effective after clicking **OK** in Main menu /**Save** and returning back to measurement. If the MultiCONT is left in Programming Mode by mistake, it will automatically return to measurement after 5 minutes following the last clicking on any key (modifications will be lost!).

5.1. STEPS OF PROGRAMMING

Programming is to perform by the 6 programming keys aided by Menus displayed on the 120x32 point graphic screen.
Images displayed on the screen can be divided in three groups. On images of the measurement/operation there are initials in the right upper corner for **M**easurement, **U**ser, **R**elay assignments, **C**urrent generator assignments and **E**rror report. In the right upper corner of the images for programming/setting there is the number of the menu table with name in the same row and 3 further menu points beneath. Pointer next to the number of the menu table showing up or down indicate further menu points above or below the 3 ones displayed. Complete overview of the programming and menus is to be found on table 5.5.1. Detailed process of the programming is described in 5.2 and 5.5. Third group of images is the text in frame containing information, messages and requests.
Default values, actual menu point and value or character to edit will be indicated by grey background in this Manual and displayed reversed on the screen. Space to be filled or edited is marked with ▸ and ◂



Press (OK) for entering Programming mode and Menu points and (ESC) for quitting

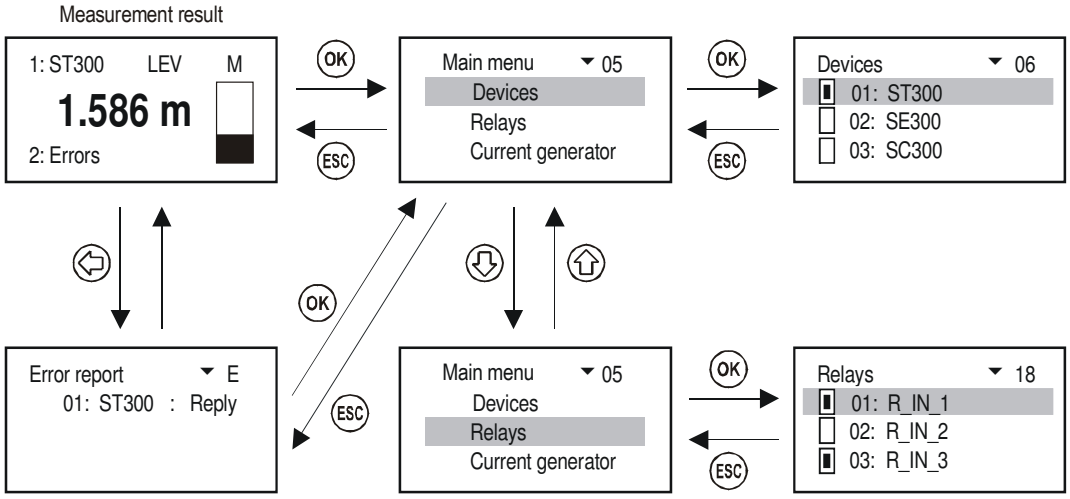
Press **ESC** to scroll menu Points

Keys (⇦) (⇨) are used for editing parameters with numbers or text, choosing local value or position of character to edit and in some menu tables (e.g. in table 18). for marking/activating.

Keys (⇩) (⇧) are used for scrolling numbers and characters when editing parameters with numbers or text.

users1

5.1.1. Stepping between menu tables and scrolling menu points



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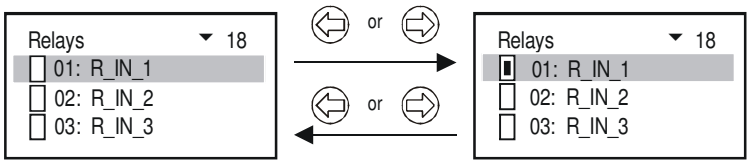
5.1.2 Activation of devices, relays and current generators

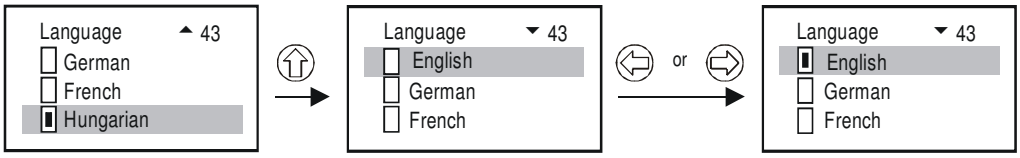
Devices on the list may be active (▮) or inactive(☐). Only active devices will be queried. Active relays and current generators operate according to their setting, inactive relays are de-energized output of inactive current generator is 0 mA.



No active relay. R_IN_1 is active

Change over between active and inactive relay states with keys ⇦ ⇨ .

Marking/activating of other functions or features (activation of current generator, language, strategy, etc.) will be performed the same way.



After activating a language, it will be changed immediately.

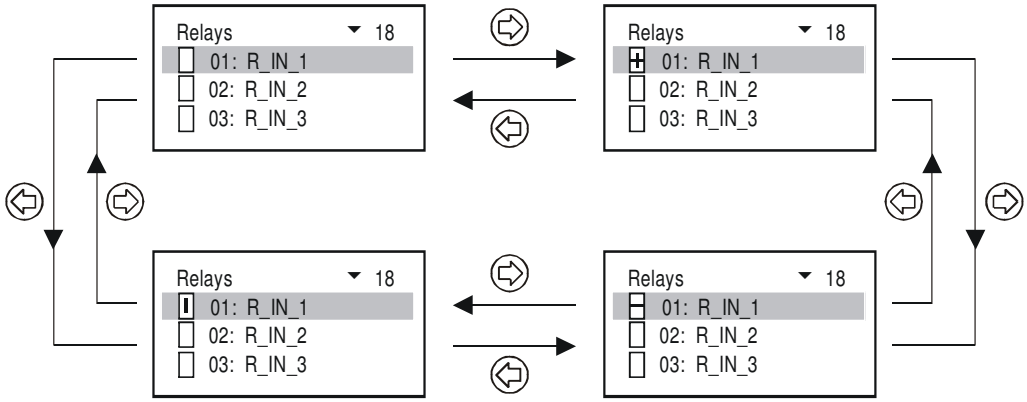
users1

5.1.3. Assignment of (relay and current) outputs

During configuring relays and current generators should be assigned to field devices

- ⊞ Value is taken with positive sign (for summation)
- ⊟ Value is taken with negative sign (for measuring difference)
- I Average will be calculated with devices of this marking

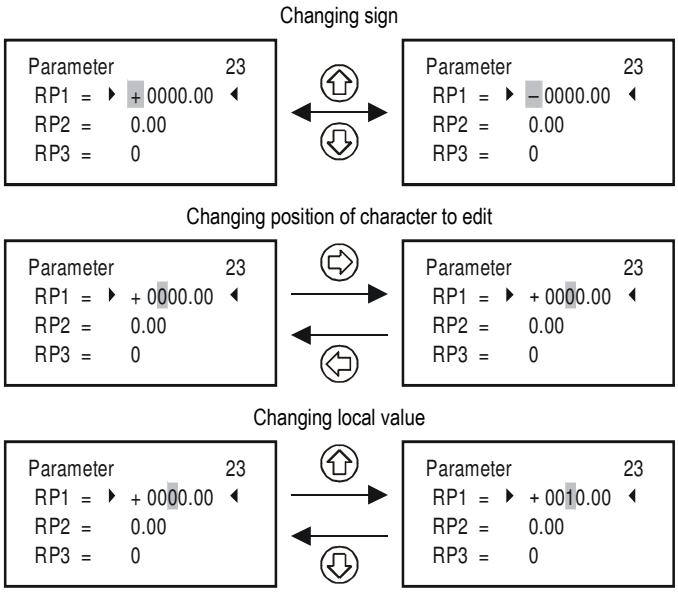
Change over with keys ⇦ ⇨ .



users1

5.1.4. Editing parameter values

MultiCONT parameters have mathematics signs and local values. Signs and value can be modified with keys ⇦ ⇨ .
The keys ⇧ and ⇩ are for reversing the sign or changing a character.

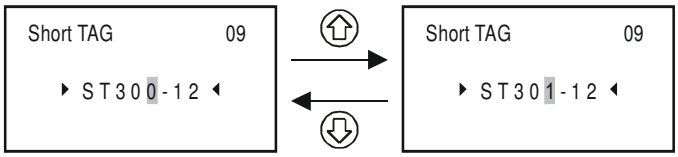


users1

5.1.5. Editing staves

Scrolling order of staves:

ABCDEFGHIJKLMNOPQRSTUVWXYZ [\ ] ^ _ ! ” # $ % & ’ ( ) * + , - . / 0123456789 : ; < = > ? @



5.2. PUTTING INTO OPERATION NETWORK WITH MULTICONT

5.2.1 Preparing transmitters

It is suggested to check preferably in the workshop the „**Polling address**" (in P19 or P13) and **current output** of the transmitters. The loop current of the ordinary MultiCONT is max. 60mA, and max. 22mA with the Ex certified version. If the loop current exceeds this value the voltage will be too low for the transmitters to start to work. In networks with more than one field device the units should be addressed with numbers 1 … 15 and the current of the transmitters will be limited to 4mA. This constraint may be subject to overwriting with programming in some devices (se table below). It is important that the loop power should not exceed the above limit.
Further precondition of proper operation is the different polling addresses for different devices.

Parameters of the „Polling address" and "constant current" of NIVELCO made devices

Device series	Polling address parameter	Constant current parameter
ST300	P19	P08
SC300	P19	P08
SE300	P19	P08
SG300	P19	P08
CT300	P19	P08
MT300	P19	P08
TB	P13	N/A
NB	P13	N/A
PDT (2)	P13	N/A
PDT (4)	P13	N/A

users1

5.2.2. Wiring

Wiring has to be performed according to the previous instructions as per section 2.
Technical Data and section 4. Electric Connection.

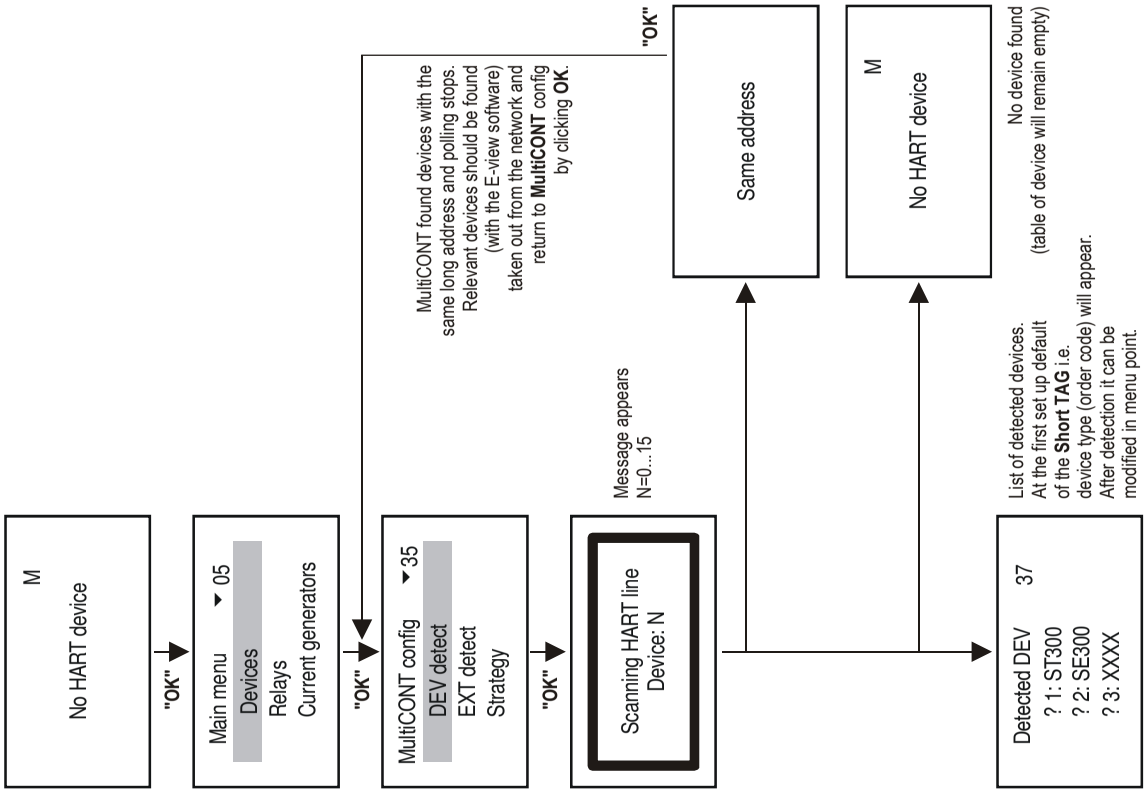
5.2.3. Setting up MultiCONT

Switching on initiates a **test process**, during which MultiCONT is checking the memory, which is storing settings of the unit. (See 5.9 Switching on)
This process lasting about 50 sec can be accelerated (time period. 25 sec) by pressing key **ESC**
In case of positive result the process will continue with polling and finally

message appears on the screen since the table of devices is empty.

To **change Language** take the route Main menu/MultiCONT config/**Language** go to and mark the Language required with pressing keys ↑ and ↓ as well as →. To keep this language setting should be saved in Main menu/**Save config** menu point otherwise with re-powering of the unit default English will return.

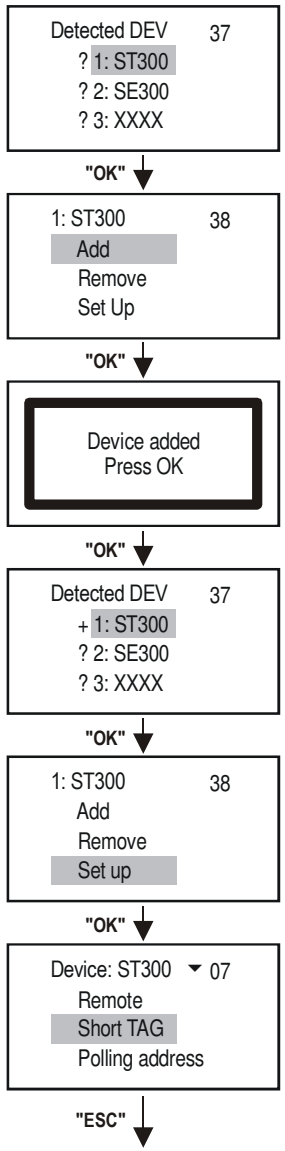
To **detect devices** start program Main menu/Local config/**DEV detect**


M
No HART device
"OK"
Main menu 05
Devices
Relays
Current generators
"OK"
MultiCONT config 35
DEV detect
EXT detect
Strategy
"OK"
Message appears
N=0...15
Scanning HART line
Device: N
MultiCONT found devices with the same long address and polling stops. Relevant devices should be found (with the E-view software) taken out from the network and return to MultiCONT config by clicking OK.
"OK"
Same address
M
No HART device
No device found
(table of device will remain empty)
List of detected devices.
At the first set up default of the Short TAG i.e. device type (order code) will appear.
After detection it can be modified in menu point.
Detected DEV 37
? 1: ST300
? 2: SE300
? 3: XXXX

The question is what to do if the MultiCONT fail to find all devices?

1. In this case one of the transmitters is not HART-capable. Confer name plates and 3.1 Order Code
2. There are more devices in the system than the actual MultiCONT can handle (Confer nameplate and 3.1 Order Code). Information is provided on the route and **in menu point** Main menu/Local config/Report/**Devices** (See 5.3.) with numbers **0nn/0mm**. Number of devices listed is represented by **nn**" and numbers of devices that can be handled is represented by **mm.**
3. Device is out of order. Dismount the unit and check it in the workshop.

Next steps are **adding devices to the list, setting devices** and **activating devices**



"?" is to signify that the unit has answered to the query but it is non on the list yet.
Goto to the unit to be added by pressing keys ⇩ and ⇧ click OK

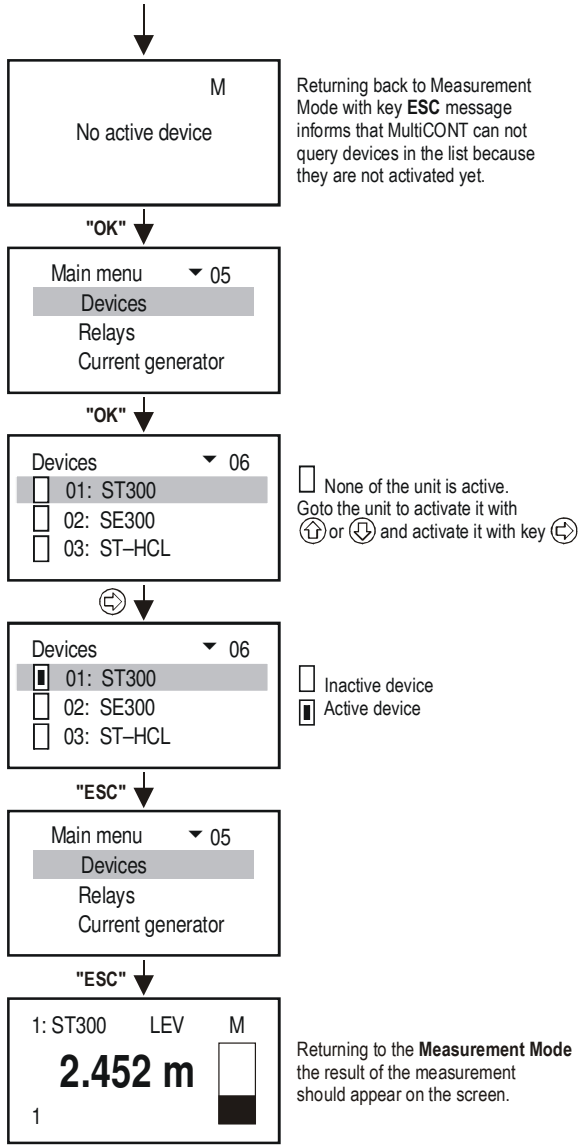
Adding device to the list will be represented by the change of "?" to "+"

Device No 1 has added to the list
Selecting **Remove** "+" will be changed to "?" and device removed from the list.

Setting and viewing of features of devices can only be performed in **Set up** if they are on the list (with "+" marking).

Short TAG being the order code (e.g ST300) can be changed here.

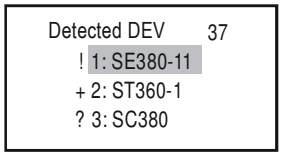
These steps must be carried on by all instruments you wish to add


M
No active device
Returning back to Measurement Mode with key **ESC** message informs that MultiCONT can not query devices in the list because they are not activated yet.
"OK"
Main menu 05
Devices
Relays
Current generator
"OK"
Devices 06
01: ST300
02: SE300
03: ST–HCL
None of the unit is active.
Goto the unit to activate it with
or and activate it with key
Devices 06
01: ST300
02: SE300
03: ST–HCL
Inactive device
Active device
"ESC"
Main menu 05
Devices
Relays
Current generator
"ESC"
1: ST300 LEV M
2.452 m
1
Returning to the **Measurement Mode** the result of the measurement should appear on the screen.

It is essential not to mix up Polling address and list-tag of the units. Polling addresses 1 …. 15 given to devices during their programming mainly in the workshop is for the HART detection and query. MultiCONT is identifying devices on the basis of the multi-decimal list-tags 1, … 8, 9, A, B, … F assigned to the unit on its detection.

Note:

If the list of DEVices was not empty at the starting of the search than the following can appear on the screen

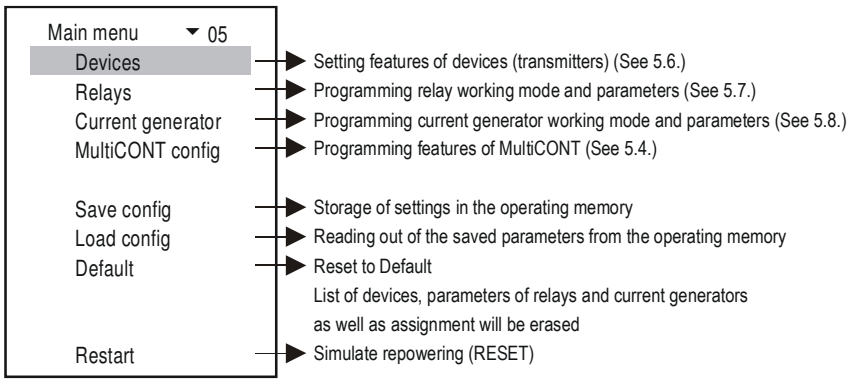


"!" included in the list, but failed to answer
"+" included in the list and answered
"?" not included in the list, but answered

The list can be modified on Menu table 38 in menu point **Add** and **Remove** or the whole list can be erased in Main menu/**Default**

5.3. MAIN MENU

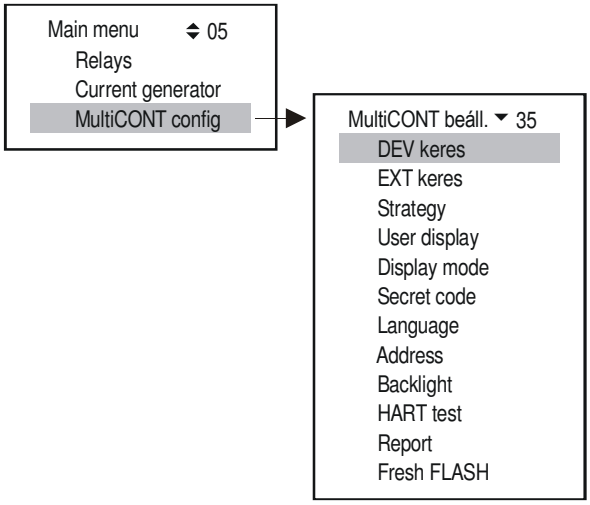
Main menu can always be entered by pressing key **OK** . See complete menu in 5.5.1



You find this menu network in the Appendix 2.

5.4. MULTICONT CONFIGURATION

On Menu Tables 35 the configuration of the MultiCONT can be changed. Grey field represents default (manufacturer's setting).
Main menu/**Default config** will reset default.



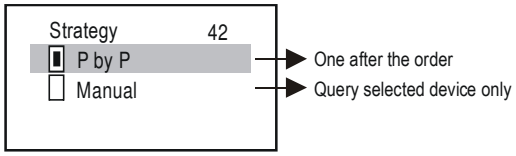
users1

Detect DEV: MultiCONT will detect transmitters (max 15) in the HART network and compile a list with Multi decimal marking 1,… ,8,9,A,B,…,F (See also 5.2.3 Setting up MultiCONT)

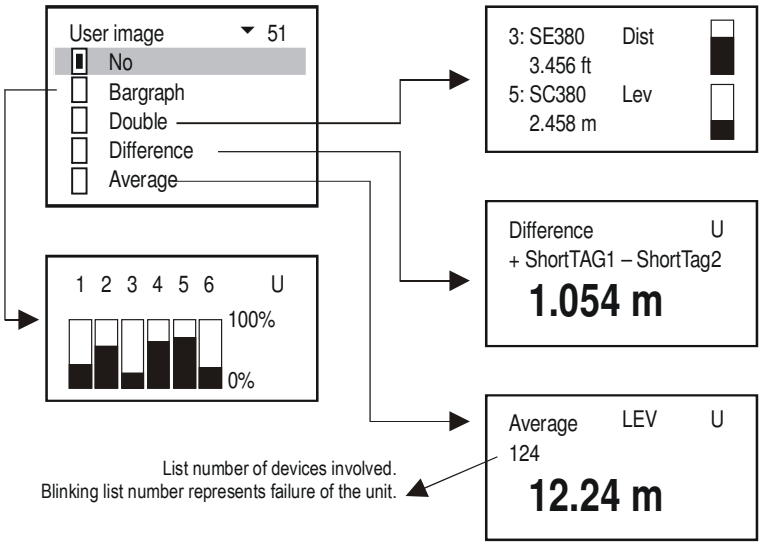
"!" = included in the list, but failed to answer
"+" = included in the list and answered
"?" = not included in the list, but answered

Detect EXT: Detection of extension modules such as Relay-, Current Generator- or Combined Modules

Strategy: Performing query

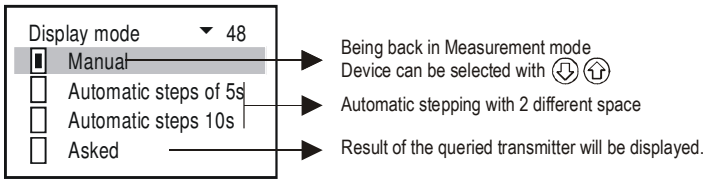


User's image: Beyond the Measurement image **M** (as shown at the end of section 5.2.3) the following User's images **U** can be compiled in the User's Image below (table 51) and displayed in the measurement mode for better information.

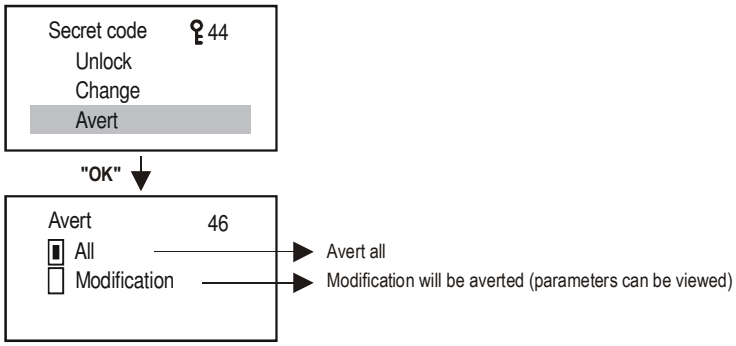


users1

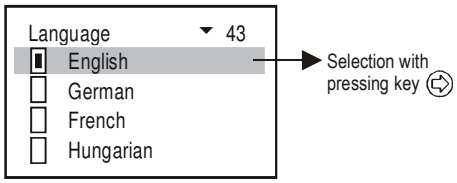
Display Mode: Steps of displaying measurement results



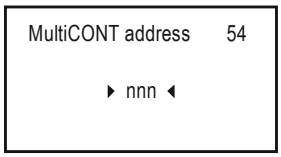
Secret code: Reading or modification of the configuration of the MultiCONT can be protected with eight-digit secret code other than zero. Key next to the menu table number represents presence of secret code. If the key is blinking access is enabled.



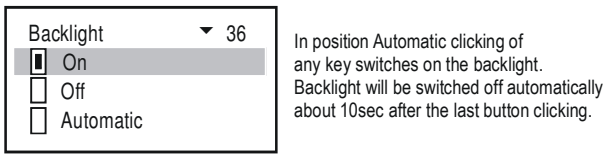
Language: Selection of the language of programming and measurement.



MultiCONT address: Address (1…254) for systems with several MultiCONT units connected together over RS485 interface

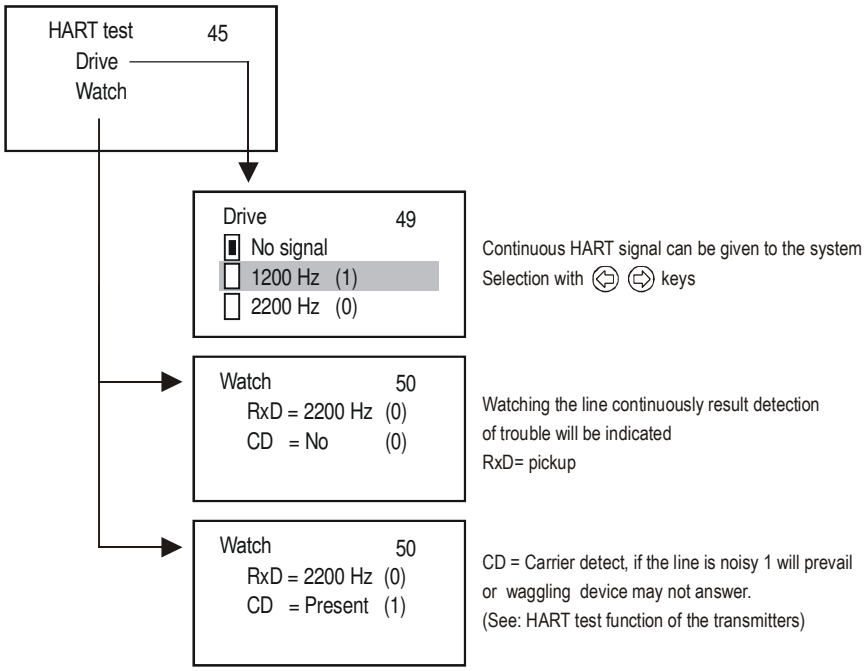


Backlight: Operation of the display backlight can be set here.

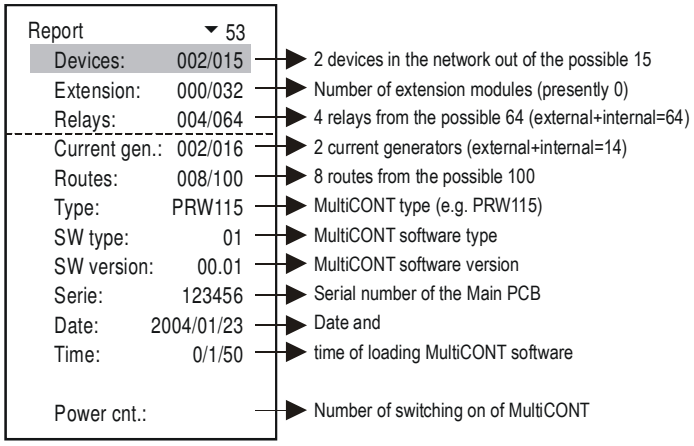


users1

HART test: HART line can be tested

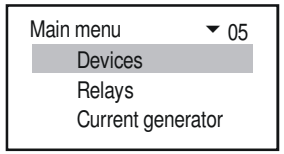


Report: Report provides information on the network such as number of devices (transmitters), relays, current outputs, extension modules involved and capable to handle. Assignment of a relay or current generator to a device will be called route.

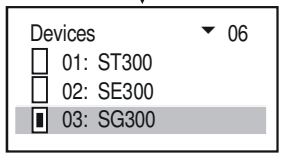


Fresh FLASH: For trouble-free operation of the program-memory this program should be run once a year

IMPORTANT! **Do not forget to save settings in menu point Main menu/**Save**.**



"OK"



Go to the required devices with keys ⇧ and ⇩ and click OK
to enter its file in order to view and/or change parameters
Table of the inactive device will not appear!!

"OK"

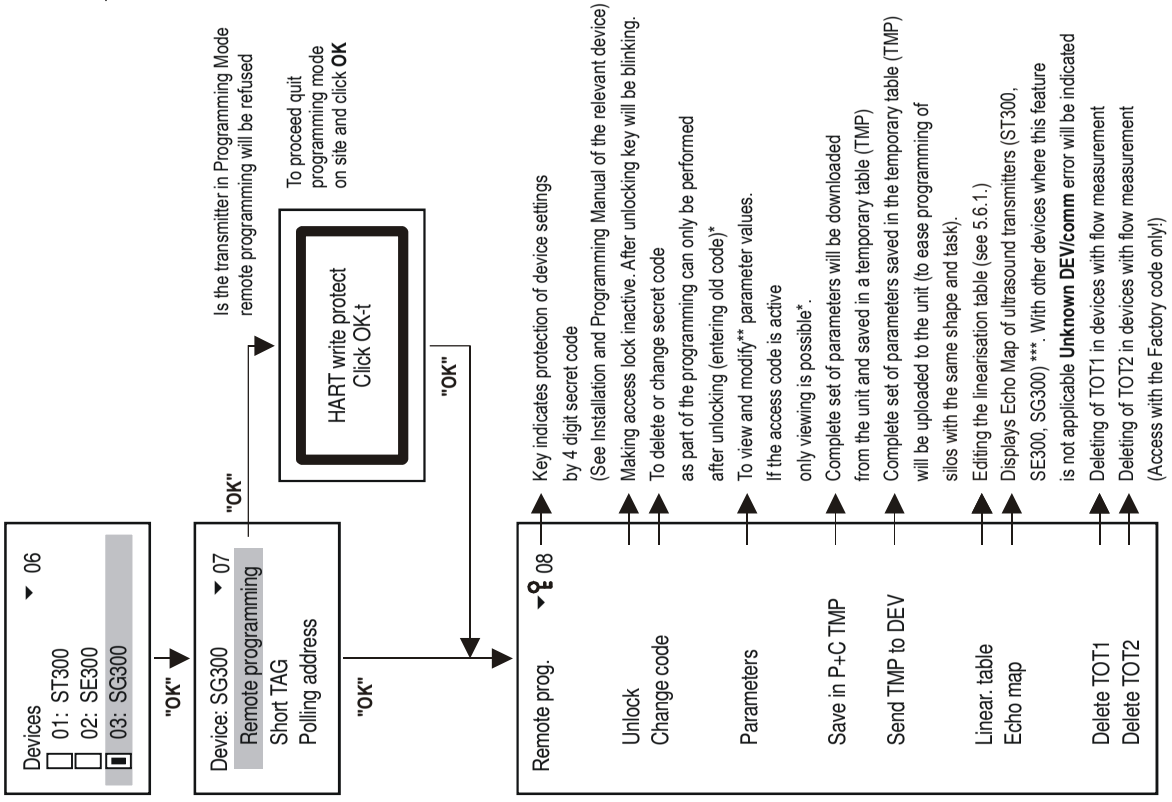
Device: SG300 07

Remote programme	To perform remote programming. See details in 5.6.
Short TAG	To view and change **Short TAG** with ⇦ ⇨ ⇧ ⇩ and OK
Polling address	Short address: 1…15 for HART detection of devices. It can be modified even with active access lock* **Modification requires special care** **thus it is not recommended!**
Message	32 character field offered to the user to edit any message relating to the technology or operation
Descriptor	16 character field offered to the user to identify the process medium
Date	Date to be assigned to the unit
Final ass. number	n.a.
Factory ID	Assigned to NIVELCO by HART Communication Foundation (fixed 151)
Device type ID	NIVELCO code 1=ST300 EchoTREK (4 wire) 6=MT300 NIVOTRACK 2=SC300 EasyTREK 20=TB THERMOCONT 3=SE300 EchoTREK (2 wire) 21=NB NIVOPRESS 4=SG300 22=PDT (2) univ. controller 5=CT300 THERMOCONT 23=PDT (4) univ. controller
SW version	Software version of the unit (transmitter) (See relevant Manual)
HW version	Hardware version of the unit (transmitter) (See relevant Manual)
Device ID	Electronic serial number of device assigned by the factory.
Major version	n.a.
Device version	n.a.

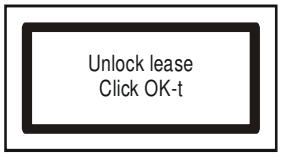
Parameter address of the Polling address and Access lock may be different with different devices.

5.6. REMOTE PROGRAMMING

Select required device as described above.



* If the access is denied the following message appears

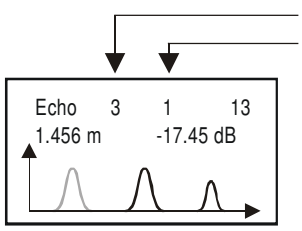


After entering secret code and clicking OK access is free for programming.

** Parameters entered during remote programming via MultiCONT will be sent immediately to and checked in the field device only. If the parameter value is incorrect or not applicable the following message appears:

Installation and Programming Manual of the relevant device should be consulted.

*** Explanation of the Echo Map of the ultrasound devices



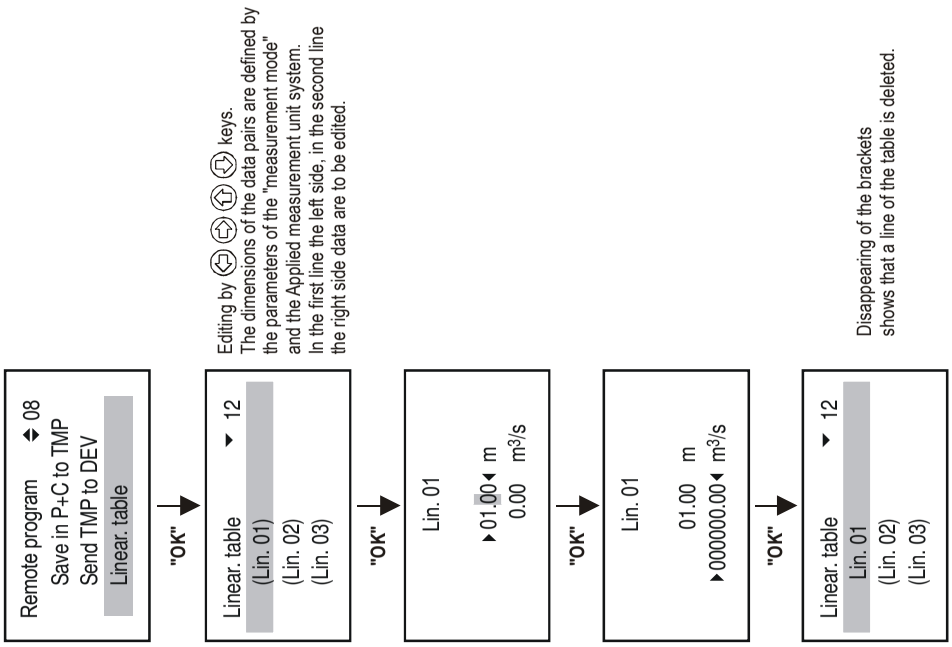
Number of echoes

Distance and amplitude of the first echo. Echo values to display can be selected with ⇦ and ⇨.

Image will be displayed as stored on entering into the relevant parameter with blinking echo measured in that very moment. Refresh screen with click **ESC** and **OK**.

users1

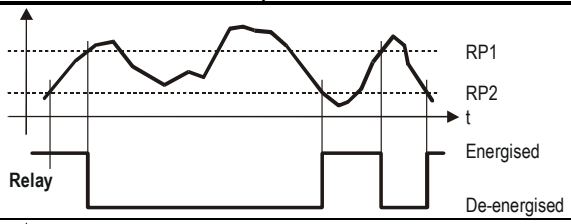
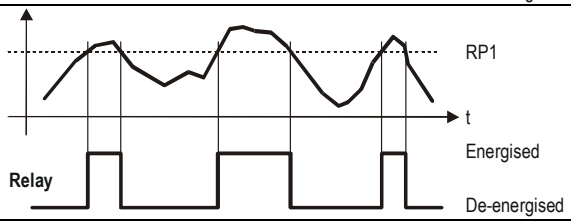
5.6.1. Editing the linearisation table

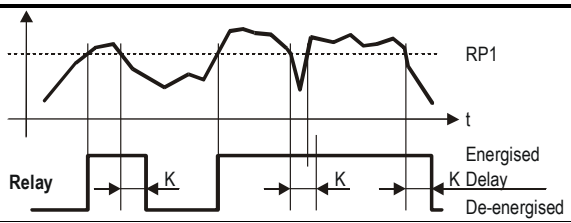
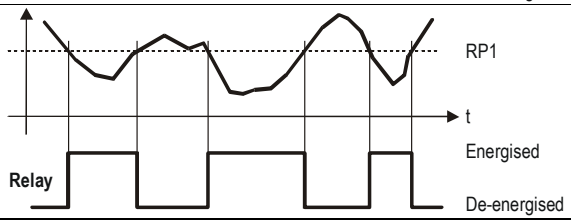
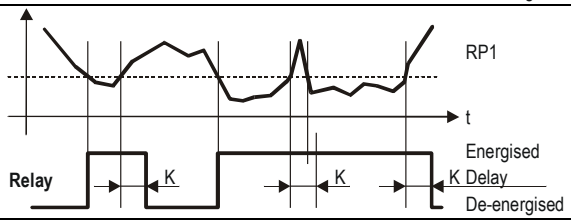
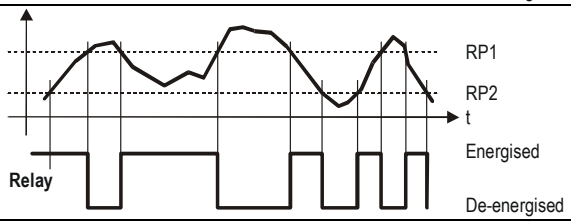


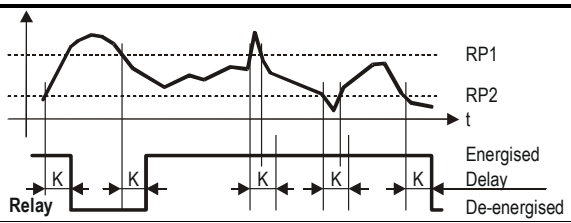
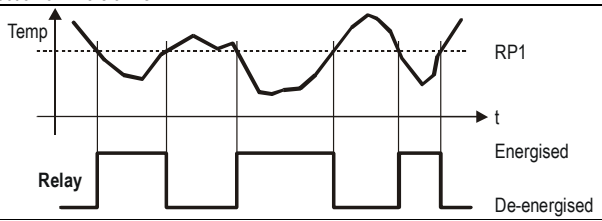
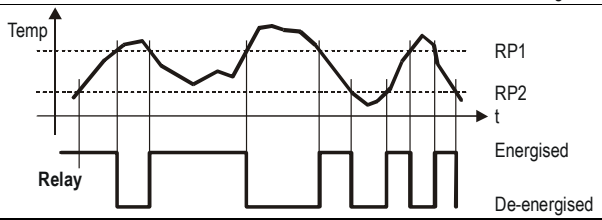
Warning! To let the transmitter compute the measurment results according to the table, it has to be activated in parameter P48 (s. the User's and Programming Manual of the given transmitter).

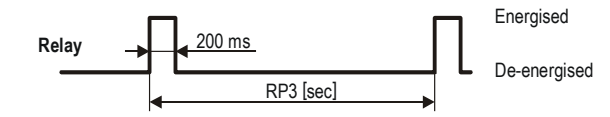
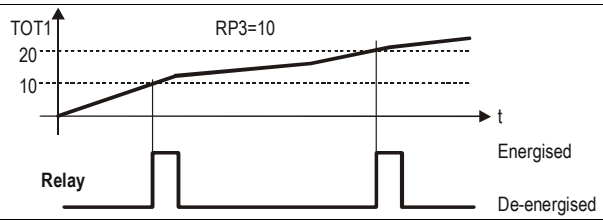
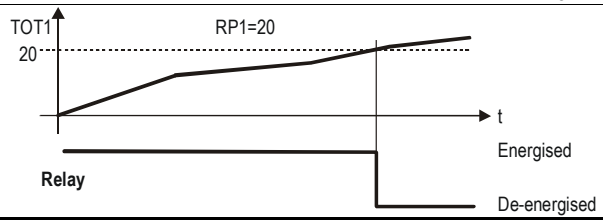
5.7. RELAY CONFIGURATION

First of all relays should be ***assigned to a field device(s)***, which will be performed in the menu point Main menu/Relays/ Program/**Source**. (Relay operation can also be assigned to the difference value of two devices or to the average of more devices). Secondly relevant function is to ***select*** in the menu point Main menu/Relays/Program/***Function.*** Finally ***parameters have to be programmed*** i.e. values of the switching points P1 and P2 entered in dimensions defined by the Measurement Mode of the field device to which the relay has been assigned. Thus if the measurement mode is LEVEL [m] (e.g. with a device of SE-300 i.e. P01=x1 and P00=00x), switching points have to be entered in LEVEL [m]. For overview see Menu system of the MultiCONT Attachment 3. The relay functions in detail are as below (default cursive in grey background).

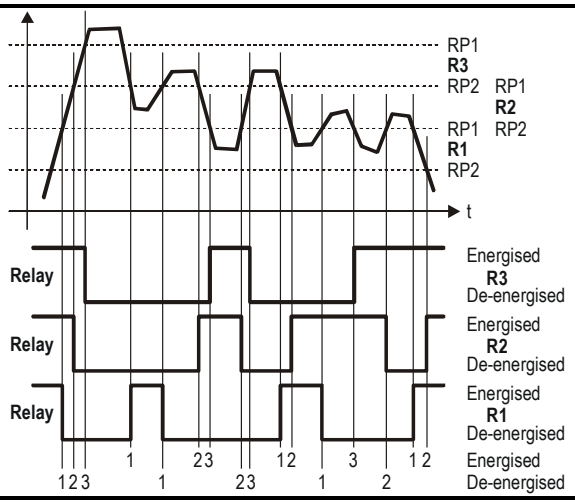
Function	Operation	Prog. Par
Switching diff. (2-point control) *Default: filling with energized relay:* *Inversion=OFF,* *over RP1 relay will be de-energized below RP2 energized* Inversion of the operation with change over of RP1 and RP2 or with selection of Inversion=ON		RP1,RP2
ALARM low *Default: Inversion=OFF* *Below RP1 relay will be de- energized* Inversion of the operation (below RP1 relay will be *energized* with selection of Inversion=ON Switching difference = 2.5% of RP1		RP1

ALARM low with delayed switching *Default: Inversion=OFF* *below RP1 relay will be de- energized with 0 sec delay* Delay can be set under RP3 in sec		RP1, RP3
ALARM high *Default: Inversion=OFF* *over RP1 relay will be de- energized* Inversion of the operation (over RP1 relay will be *energized* with selection of Inversion=ON Switching difference = 2.5% of RP1		RP1
ALARM high with delayed switching *Default: Inversion=OFF* *over RP1 relay will be de- energised with 0 sec delay* Delay can be set under RP3 in sec		RP1, RP3
Window comparator *Default: Inversion=OFF* *Within the range of RP1..RP2 relay will be energised* Inversion of the operation (within the range of RP1..RP2 relay will be de-energised) with selection of Inversion=ON		RP1, RP2

Window D comparator with delayed switching *Default: Inversion=OFF* *Within the range of RP1..RP2 relay will be energised with 0 sec delay* Inversion of the operation (Within the range of RP1..RP2 relay will be de-energised) with selection of Inversion=ON		RP1, RP2, RP3
Error *Default: Inversion=OFF* *In case of error relay will be de-energised. RP3=0 with any error RP3=n with error of **n** code* Inversion of the operation (in case of error relay will be energised) with selection of Inversion=ON		RP3
Temperature *Default: Inversion=OFF* *RP1 over temperature of relay will be de-energised* Inversion of the operation (over temperature of RP1relay will be energised) with selection of Inversion=ON Switching difference = 2.5% of RP1		RP1
Temperature W (window comp) *Default: Inversion=OFF* *Within the range of RP1..RP2 relay will be energised* Inversion of the operation: (within the range of RP1..RP2 relay will be de-energised) with selection of Inversion=ON		RP1, RP2

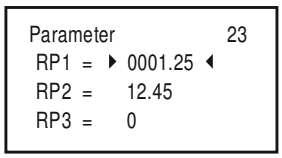
Impulse C *Default: Inversion=OFF* *relay will be energised for appr. 200ms in 0 intervals* Inversion of the operation with selection of Inversion=ON Interval can be set under RP3 in sec		RP3
Impulse F *Default: Inversion=OFF* *relay will be energised for appr. 200ms with each amount of flow set under RP3 (default=0)* Inversion of the operation with selection of Inversion=ON		RP3
TOT1 *Default: Inversion=OFF* *relay will be de-energised when TOT1 reaches value of RP1* Inversion of the operation (relay will be energised) with selection of Inversion=ON		RP1

users1

Alt S (optimised pump control) *Default: Inversion=OFF* More relays assigned to one source (transmitter) so that the number of switching-on will be the same for all relays. Relays connected in series will be energised and de-energised one after the other irrespectively of fulfilment of the condition Relays programmed for this work would operate in the following sequence for **Switching diff** 3 31 32 2 21 *energized* 123 2 12 1 1 De- *energized* In case of **Alt** sequence for energizing and de-energizing will be 123-123.		RP1, RP2

users1

Notes:

1.


Parameter are to program in the Main menu/Relays/Relay/Program/**Parameter** menu table by going to the relevant parameter with ↑↓ entering value in between pointers and clicking **OK**. Programming parameters can only be completed with clicking **OK** after setting RP3 (even if it is zero or not applicable in the given function!)

2. Inactive relays are de-energised (See: Main menu/**Relays**).
3. More than one device can be assigned to any of the relays (Main menu/Relays/Program/**Source**)
   The result will be the mathematical combination of sources marked with **+** or **–** signed in the menu point **Source**.
   If the measurement mode or dimension of devices are different MultiCONT will send error message **Program** (See 6. Errors, Error messages)
   The result of the transmitters marked with ⊞ are added.
   The result of the transmitters marked with ⊟ is deducted from that result of the transmitters marked with ⊞ are added.
   Computes the average of the results of the transmitters marked with |
   The instrument indicates error if the dimension or the measurement mode of the transmitters is different.
4. If RP1=RP2 in operation mode **Switching diff** relay will operate according to **ALARM low**
5. If RP1=0 in operation mode **ALARM low** relay will always be *energized*
6. If RP1=0 in operation mode **ALARM high** relay will always be de- *energized*
7. Error **Program** will be indicated (See 6. Error, Error messages, …) if
   – in operation mode **Impulse F** more than one source is assigned too
   – RP3=0 in operation mode **Impulse F** or **Impulse C** 0
8. If **Error** function selected no (source) assignment is required since errors of all devices will be monitored.
9. Relay state will not be changed if its source does not reply!

For a detailed overview of the Programming s. Appendix 3.

5.8. CURRENT GENERATOR CONFIGURATION

First of all current generators should be ***assigned to a field device***, which will be performed in the menu point Main menu / Relays / Program / **Current generator**.

The result of the transmitters marked with ⊞ are added.

The result of the transmitters marked with ⊟ is deducted from that result of the transmitters marked with ⊞ are added.

Computes the average of the results of the transmitters marked with |

Secondly relevant function is to ***select*** in the menu point Main menu/Relays/Program/***Function.*** Finally ***parameters have to be programmed*** i.e. values of the switching points P1 and P2 entered in dimensions defined by the Measurement Mode of the field device to which the current generators has been assigned. Thus if the measurement mode is LEVEL [m] (e.g. with a device of SE-300 i.e. P01=x1 P00=00x), switching points have to be entered in LEVEL [m]. Operation of the current generator can also be assigned to the difference value of two devices or to the average of more devices. For overview see Menu system of the MultiCONT Appendix 4. The functions of the current generators in detail are as below.

FUNCTION	OPERATION	PROG.PAR.
Analogue Output	Current output is proportional to the primary measured value selected in the device (DIS, LEV, VOL, FLOW, etc.) CP1 is assigned to 4mA, CP2 is assigned to 20mA.	CP1,CP2
Error 3.6mA	CP3=0 current output will be provided with any error CP3=n current output will be provided in case of error with code „n" For error codes see 6. Error codes During trouble free operation the current output is 4mA	CP3
Error 22mA		

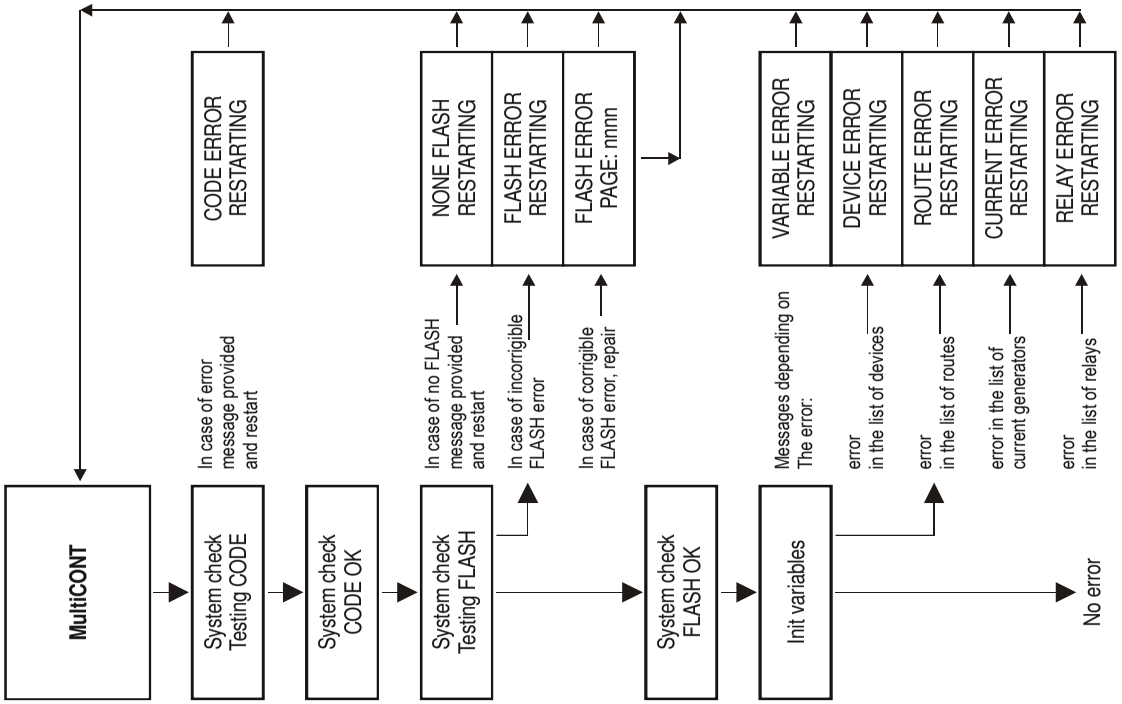
Menue:

Program :

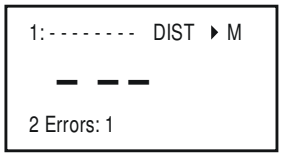
1. Programming error will be indicated if in analogue output operation mode CP1=CP2 and output current will not change
2. Value of the output current will not change if the unit assigned does not answer!
3. If the current output is not activated the output will be 0 mA.
4. If **Error** function selected no (source) assignment is required since errors of all devices will be monitored
5. The programmed parameters can only be saved at C3 by pressing **OK**.

5.9. SWITCHING ON

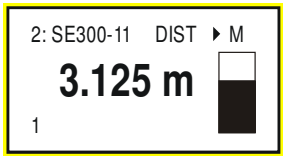
On powering a test program checking the hardware of MultiCONT will be run that can be followed on the screen by the (English) messages displayed. The procedure takes about 50s and it can be accelerated by click on **ESC** (time approximately 25 s).



Since parameters necessary for the trouble free operation are stored in the FLASH in case of FLASH error the unit should be sent to the service.
After the successfully completed test polling and query will be performed on the basis of the previous configuration and the MultiCONT will enter Measurement Mode and it will work in accordance with setting of 5.4 Main menu/**MultiCONT config** (See 5.10 Measurement Mode)



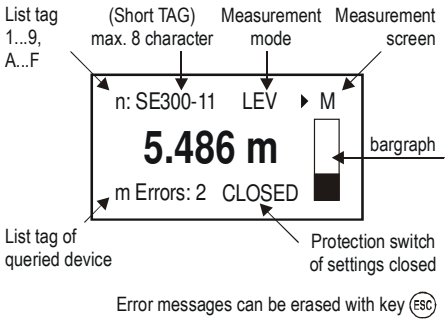
There is no response from device no. 1. (there is no result to display)
Error “Response” can be red in the error list.



The result of the device no. 2. is on the display.
Device no. 1. Is under asking.

5.10. MEASUREMENT MODE

After the successfully completed test following the switch-on the MultiCONT will automatically enter the Measurement Mode. Measurement values will be queried and displayed in accordance with the device list and settings of 5.4 Main menu **/MultiCONT config.** In the upper row list-tag (1,…9,A.,...F). and Short TAG abbreviation of the measurement (DIST, LEV, VOL, etc.), in the middle measurement value and dimension, bargraph, in the bottom row list-tag of the unit being under query, number of errors as well as state of the access lock is displayed. Beyond the Measurement Image, User Images, relay–device, current generator-device assignment and error list can be viewed in this operation mode (See Attachment 5). Beyond the Measurement Image, User Images (**Range, Dual, Difference and Average)** can also be selected here. (See 5.4 Main menu/MultiCONT config/Users image.) During programming full scale of operation such as polling of devices, function of relays and current generators will be maintained. If the MultiCONT is left in Programming Mode by mistake, it will automatically return to measurement after 5 minutes following the last clicking on any key.



Error messages can be erased with key (ESC)

The relay-device and current generator devise coupling can be seen in this measurement mode.

See Appendix 5.

Even if a possible error does not exists any more, it will be displayed at the given instrument until it is confirmed (**ESC**). Beside the standard display mode, other ones can also chosen (**Bargraph, Double, Difference, Average)** s. 5.4. Main Menu/MultiCONT config/User display.
Measuring, asking the devices and controlling the relays and the current generators are carried on also during programming . If the instrument remains accidentally in programming mode, it returns automatically after 5 sec to measurement mode. The MultiCONT saves the number of switches and the working hours.

6. ERRORS, ERROR MESSAGES, ERROR CODES

In case of failure (blinking) error message appears immediately on the **M**easurement image even if the error does not occur to the transmitter being on the screen. (See **M** image above) Failures will be collected in the Error list with list number of the error, short TAG and description of the failure. After ceasing of possible error it should be erased from the list by going to the relevant row and pressing **ESC**. Thus for instance relay set for function Error will indicate error even after correction of failure until the error is confirmed as above.

ERROR CODE	MESSAGE	ERROR DESCRIPTION	CORRECTION
1	Init	Device does not reply after switching-on*	Check wiring of device
2	Answer	Device with normal operation fail to provide replies **	Check wiring of device
3	Sensor	Sensor failure on the device ***	Check device (transmitter)
4	Device	Other device failure	Check programming of device (See relevant Install and Prog. Manual), and measurement conditions
5	Program	Error occurred during programming of relay or current generator ****	Check programming
6	Save	Error occurred in the course of saving in the memory	Send device to the service by repeated occurrence.

* Device, being on the list and activated does not reply after switching-on. Possible reasons:
- network has been modified before re-powering (device was disconnected, wiring changed, etc.)
- device failed to reach operation conditions (not able to provide measurement results) e.g. STD-300 can not measure until amplification reaches operation conditions..

** Device with normal operation fail to provide replies. Possible reasons:
- breaking down of device
- broken cable
- noisy HART line (See Main menu/MultiCONT config/HART test)

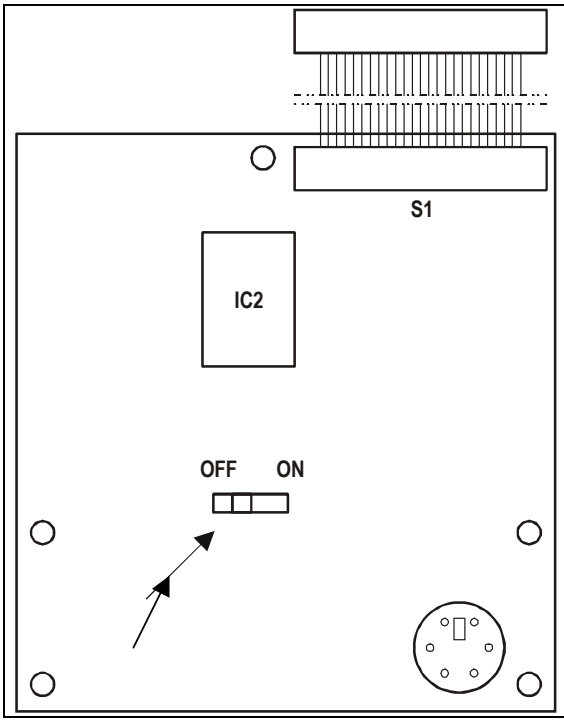
*** Special indication belongs to the failure of the sensors. This information appears on breaking down of the transducer in the ultrasound transmitter or cracking of the magnet disc, break of the magnetostrictive wire in the magnetostrictive transmitter. On the other hand this is the message displayed when echo loss condition occurs with the ultrasonic measurement.

The device answers but there is no valid result because of sensor error.

**** Programming error will be caused:

- assignment of sources with different measured values and/or with different dimension to a relay or current generator
- current generator programmed to analogue output and CP1=CP2
- assignment of (Impulse F) relay to flow and there are more than one source
- assignment of (Impulse F) relay to flow and RP3=0

7. PROTECTION OF SETTING BY HARDWARE



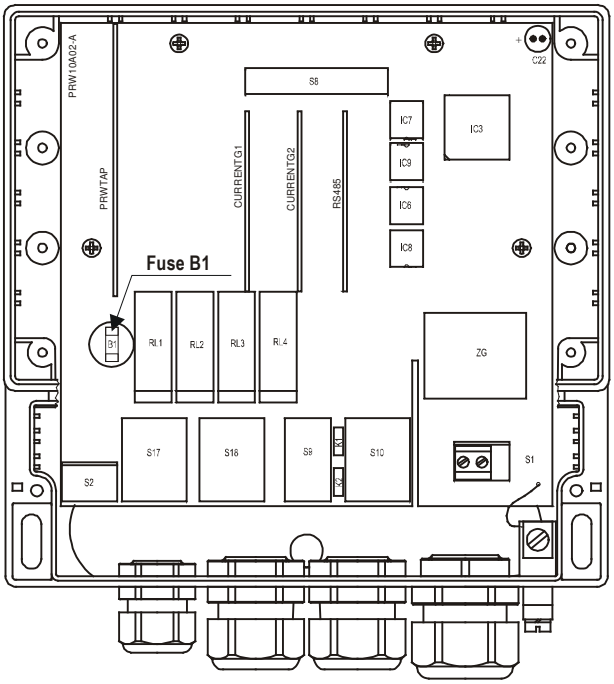
Protection switch can be accessed after loosing nuts fastening the front panel.

The switch for protection of settings in its **ON** position will hinder modification of parameters effecting operation of the MultiCONT such as:

- relay parameters
- current generator parameters
- involving activation of devices
- remote programming
- refusing access to **Service** menu
- refusing access to the menus **DEV detect**, **EXT detect** and **Strategy** under MultiCONT config

The switch is not influencing changes not effecting operation of the MultiCONT such as language, backlight, user image, etc)

8. REPLACING FUSE



Loosen four nuts, which are fastening the front panel. Tilt forward the front panel carefully, in order not to span cable band and replace the fuse.

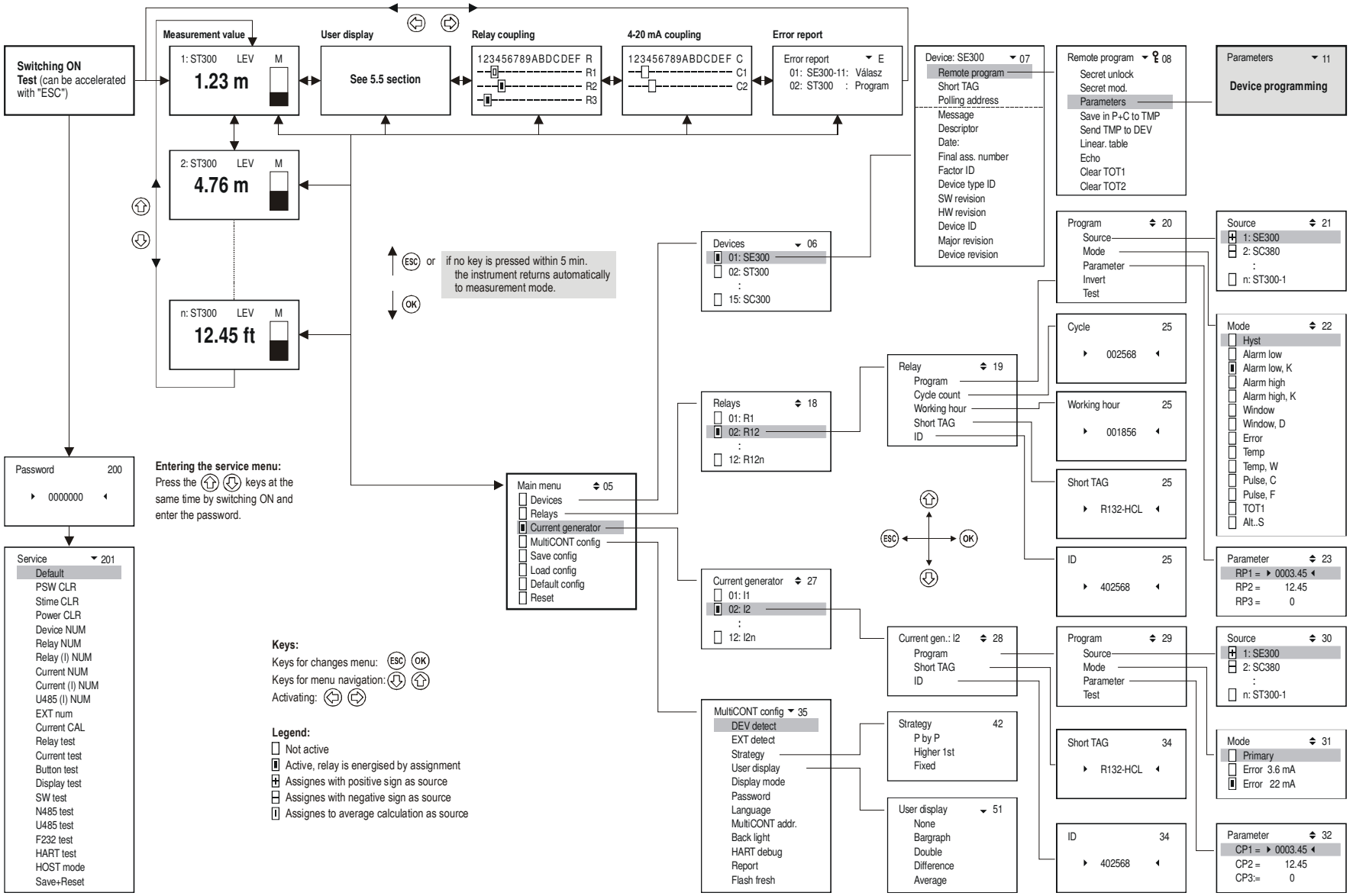
MultiCONT has one fuse the value of which depends on the power supply

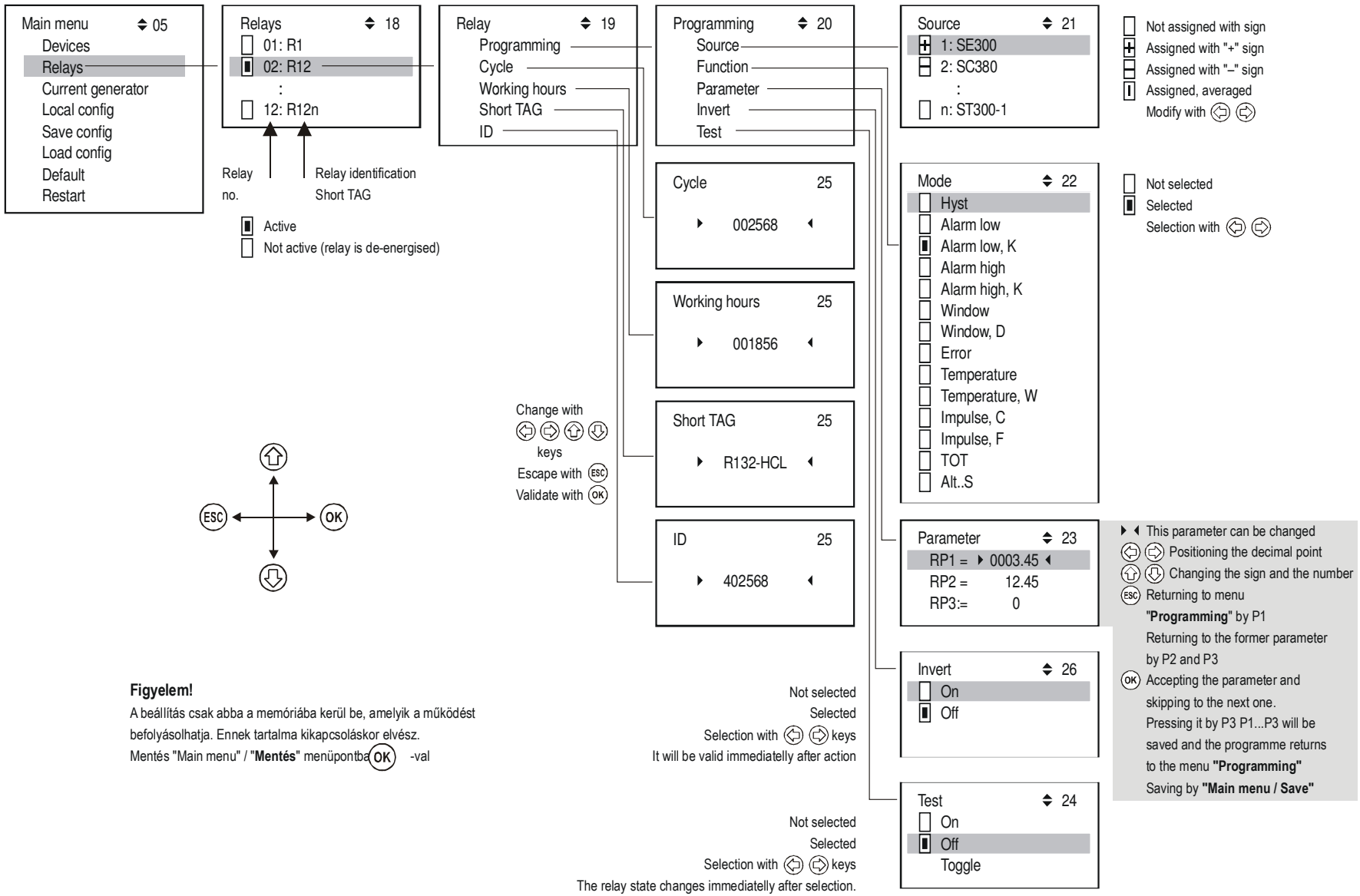
POWER SUPPLY	FUSE
85…255 V AC 50…60Hz	T400mA
10,5…28 V AC 50…60Hz 10,5…40 V DC	T1A

Warning!
Only fuses as per the table above can be used for replacement.

APPENDIX 1. THE ID IDENTIFICATION CODES OF THE MANUFACTURERS

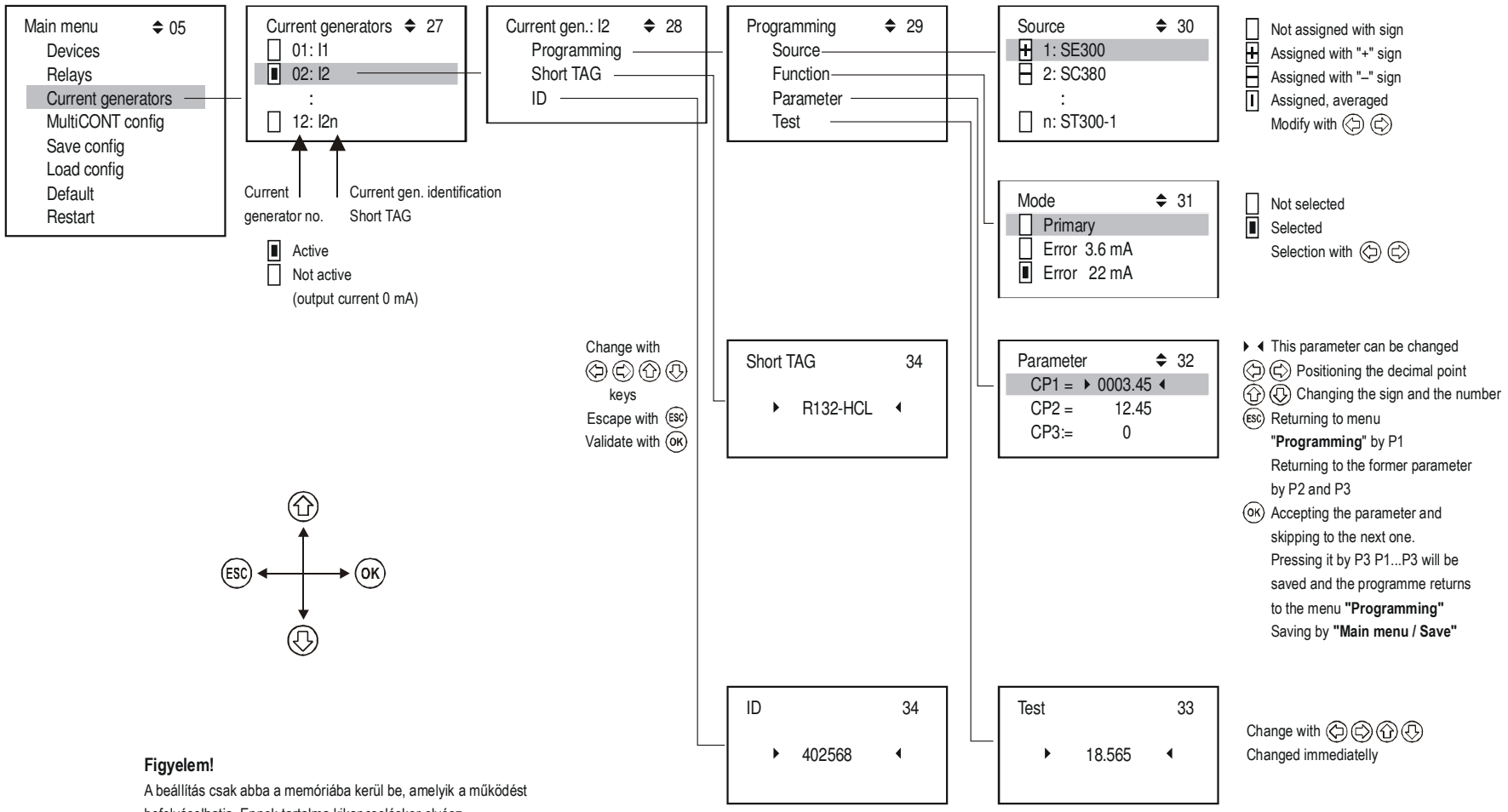
1 "Acromag",
2 "Allen Bradley",
3 "Ametek",
4 "Analog Devices",
5 "Elsag Bailey",
6 "Beckman",
7 "Bell Microsensor",
8 "Bourns",
9 "Bristol Babcock",
10 "Brooks Instrument",
11 "Chessel",
12 "Combustion Engineering",
13 "Daniel Industries",
14 "Delta",
15 "Dieterich Standard",
16 "Dohrmann",
17 "Endress & Hauser",
18 "Elsag Bailey",
19 "Fisher Controls",
20 "Foxboro",
21 "Fuji",
22 "ABB Automation",
23 "Honeywell",
24 "ITT Barton",
25 "Kay Ray/Sensall",
26 "ABB Automation",
27 "Leeds & Northrup",
28 "Leslie",
29 "M-System Co.",
30 "Measurex",
31 "Micro Motion",
32 "Moore Industries",
33 "Moore Products",
34 "Ohkura Electric",
35 "Paine",
36 "Rochester Instrument Systems",
37 "Ronan",
38 "Rosemount",
39 "Peek Measurement",
40 "Schlumberger",
41 "Sensall",
42 "Siemens",
43 "Weed",
44 "Toshiba",
45 "Transmation",
46 "Rosemount Analytic",
47 "Metso Automation",
48 "Flowserve",
49 "Varec",
50 "Viatran",
51 "Delta/Weed",
52 "Westinghouse",
53 "Xomox",
54 "Yamatake",
55 "Yokogawa",
56 "Nuovo Pignone"
57 "Promac",
58 "Exac Corporation",
59 "Meggitt Mobrey",
60 "Arcom Control System",
61 "Princo",
62 "Smar",
63 "Foxboro Eckardt",
64 "Measurement Technology",
65 "Applied System Technologies",
66 "Samson",
67 "Sparling Instrumnets",
68 "Fireye",
69 "Krohne",
70 "Betz",
71 "Druck",
72 "SOR",
73 "Elcon Instruments",
74 "EMCO",
75 "Termiflex Corporation",
76 "VAF Instruments",
77 "Westlock Controls",
78 "Dexelbrook",
79 "Saab Tank Control",
80 "K-TEK",
81 "Flowdata",
82 "Draeger",
83 "Raytek",
84 "Siemens Milltronics PI",
85 "BTG",
86 "Magnetrol",
87 "Metso Automation",
88 "Milltronics",
89 "HELIOS",
90 "Anderson Instrument Company",
91 "INOR",
92 "ROBERTSHAW",
93 "PEPPERL+FUCHS",
94 "ACCUTECH",
95 "Flow Measurement",
96 "KAMSTRUP",
97 "Knick",
98 "VEGA",
99 "MTS Systems Corp.",
100 "Oval",
101 "Masoneilan-Dresser",
102 "BESTA",
103 "Ohmart",
104 "Harold Beck and Sons",
105 "Rittmeyer Instrumentation",
106 "Rossel Messtechnik",
107 "WIKA",
108 "Bopp & Reuther Heinrichs",
109 "PR Electronics",
110 "Jordan Controls",
111 "Valcom s.r.l.",
112 "US ELECTRIC MOTORS",
113 "Apparatebau Hundsbach",
114 "Dynisco",
115 "Spriano",
116 "Direct Measurement",
117 "Klay Instruments",
118 "Action Instruments",
119 "MMG Automatiky DTR",
120 "Buerkert Fluid Control Systems",
121 "AALIANT Process Mgt",
122 "POUNDS INSTRUMENT",
123 "ZAP S.A. Ostrow Wielkopolski",
124 "GLI",
125 "Fisher-Rosemount Performance Technologies",
126 "Paper Machine Components",
127 "LABOM",
128 "Danfoss",
129 "Turbo",
130 "TOKYO KEISO",
131 "SMC",
132 "Status Instruments",
133 "Huakong",
134 "Duon Systems",
135 "Vortek Instruments, LLC",
136 "AG Crosby",
137 "Action Instruments",
138 "Keystone Controls",
139 "Thermo Electric Co.",
140 "ISE-Magtech",
141 "Rueger",
142 "Mettler Toledo",
143 "Det-Tronics",
144 "TN Technologies",
145 "DeZURIK",
146 "Phase Dynamics",
147 "WELLTECH SHANGHAI",
148 "ENRAF",
149 "4tech ASA",
150 "Brand Instruments",
151 **"NIVELCO",**
152 "Camille Bauer",
153 "Metran",
154 "Milton Roy Co.",
155 "PMV",
156 "Turck",
157 "Panametrics",
158 "Stahl",
159 "Analytical Technology Inc.",
160 "Fieldbus International",
161 "BERTHOLD",
162 "InterCorr",
163 "China BRICONTE Co Ltd",
164 "Electron Machine",
165 "Sierra Instruments",
166 "Fluid Components Intl",


Switching ON
Test (can be accelerated with "ESC")
Measurement value
1: ST300 LEV M
1.23 m
2: ST300 LEV M
4.76 m
n: ST300 LEV M
12.45 ft
User display
See 5.5 section
Relay coupling
123456789ABDCDEF R
R1
R2
R3
4-20 mA coupling
123456789ABDCDEF C
C1
C2
Error report
Error report E
01: SE300-11: Válasz
02: ST300 : Program
ESC or OK
if no key is pressed within 5 min. the instrument returns automatically to measurement mode.
Password 200
0000000
Entering the service menu:
Press the keys at the same time by switching ON and enter the password.
Service 201
Default
PSW CLR
Stime CLR
Power CLR
Device NUM
Relay NUM
Relay (I) NUM
Current NUM
Current (I) NUM
U485 (I) NUM
EXT num
Current CAL
Relay test
Current test
Button test
Display test
SW test
N485 test
U485 test
F232 test
HART test
HOST mode
Save+Reset
Main menu 05
Devices
Relays
Current generator
MultiCONT config
Save config
Load config
Default config
Reset
Devices 06
01: SE300
02: ST300
:
15: SC300
Relays 18
01: R1
02: R12
:
12: R12n
Current generator 27
01: I1
02: I2
:
12: I2n
MultiCONT config 35
DEV detect
EXT detect
Strategy
User display
Display mode
Password
Language
MultiCONT addr.
Back light
HART debug
Report
Flash fresh
Device: SE300 07
Remote program
Short TAG
Polling address
Message
Descriptor
Date:
Final ass. number
Factor ID
Device type ID
SW revision
HW revision
Device ID
Major revision
Device revision
Relay 19
Program
Cycle count
Working hour
Short TAG
ID
Current gen.: I2 28
Program
Short TAG
ID
Strategy 42
P by P
Higher 1st
Fixed
User display 51
None
Bargraph
Double
Difference
Average
Remote program 08
Secret unlock
Secret mod.
Parameters
Save in P+C to TMP
Send TMP to DEV
Linear. table
Echo
Clear TOT1
Clear TOT2
Program 20
Source
Mode
Parameter
Invert
Test
Cycle 25
002568
Working hour 25
001856
Short TAG 25
R132-HCL
ID 25
402568
Program 29
Source
Mode
Parameter
Test
Short TAG 34
R132-HCL
ID 34
402568
Parameters 11
Device programming
Source 21
1: SE300
2: SC380
:
n: ST300-1
Mode 22
Hyst
Alarm low
Alarm low, K
Alarm high
Alarm high, K
Window
Window, D
Error
Temp
Temp, W
Pulse, C
Pulse, F
TOT1
Alt..S
Parameter 23
RP1 = 0003.45
RP2 = 12.45
RP3 = 0
Source 30
1: SE300
2: SC380
:
n: ST300-1
Mode 31
Primary
Error 3.6 mA
Error 22 mA
Parameter 32
CP1 = 0003.45
CP2 = 12.45
CP3:= 0
Keys:
Keys for changes menu: ESC OK
Keys for menu navigation:
Activating:
Legend:
Not active
Active, relay is energised by assignment
Assignes with positive sign as source
Assignes with negative sign as source
Assignes to average calculation as source



Figyelem!

A beállítás csak abba a memóriába kerül be, amelyik a működést befolyásolhatja. Ennek tartalma kikapcsoláskor elvész.
Mentés "Main menu" / "**Mentés**" menüpontba OK -val



Figyelem!

A beállítás csak abba a memóriába kerül be, amelyik a működést befolyásolhatja. Ennek tartalma kikapcsoláskor elvész.
Mentés "Main menu" / "**Mentés**" menüpontba OK -val

APPENDIX 5. MEASUREMENT MODE