COIL WINDING MACHINE ERN G-VERSION

USER'S GUIDE

Version: 3.3

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ERN 100, 150, 200

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1. INTRODUCTION

Universal coil winding machines ERN 100, 150, 200 are designed for winding heavy coils, transformers, chokes, resistors and especially for distribution transformes.

1.1 Characteristic features:

- wide range of application for winding simple or complicated coils, multichamber coils, trapezoidal or asymetric windings
- AC servo, that is used like a spindle drive, assures excellent dynamical parameters, constant torque and accurate positioning
- wire guide on ball bearings with a separate AC servo motor
- accurate reversible turn counting
- microprocessor-controlled winding cycle without time waste
- wide programming options
- memory for 160 complicated coils (up to 350 steps)
- viewable and easy reading graphical display
- special functions LAYER-STOP, AUTOMATIC CORRECTION, MANUAL REGIME
- 4 programmable digital outputs
- 4 programmable digital inputs
- communication with PC by optically isolated interface RS-232 and USB host port
- UPS for back-up of power

2. TECHNICAL DATA	ERN 100	ERN 150	ERN 200
Pitch range (mm/rev):	0,000 - 160	0,000 - 160	0,000 - 160
Winding width (mm):	400 - 800 - 1200	400-800-1200	400-800-1200
Winding speed / torque (rpm/Nm):	600 / 75 300 / 150	300 / 150 150 / 300	150 / 270 75 / 540
Accuracy of spindle stop (rev):	0,01	0,01	0,01
Spindle position pre-set (rev):	0,01	0,01	0,01
Max.speed of wire guide - shift (mm/s)	100	100	100
- winding	75	75	75
Acceleration/deceleration:	table	table	table
Max.coil diameter (mm):	600 - 800	600 - 800	600 - 800
Distance between centres (mm):	800 ; 1200 ; 1600	800 ; 1200 ; 1600	800 ; 1200 ; 1600
Dimensions (mm):	1800x740 ; 2300x740; 2800x740	1800x740 ; 2300x740; 2800x740	1800x740 ; 2300x740; 2800x740
Weight (kg):	600 ; 750 ; 900	650 ; 800 ; 950	700 ; 850 ; 1000
Power supply (V/Hz):	3 x 400 / 50-60	3 x 400 / 50-60	3 x 400 / 50-60
Power consumption (kVA):	max. 7	max. 7	max. 7
Noise (dB):	74	74	74

2.1. Climatic conditions

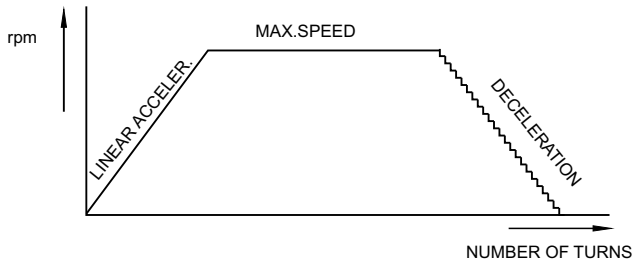
Machine is designed for normal workshop´s conditions with relative air moisture 70% and temperature in the range +15 up to +30°C.

3. DESCRIPTION OF MACHINE

Coil winding machine ERN consists of the following parts:

- controller containing control electronics and programming elements
- drive unit containing servomotor with gears, pitch control unit with separate servo motor, power electronics and control elements
- UPS unit containing UPS for power back-up, transformer and power supply
- base frame
- tailstock
- wire guide adjustable
- foot pedal
- support with spool holders and dereelers (optional accessories)

Winding cycle (linear acceleration, max.speed, linear deceleration and stop) is running automatically after the pressing the START-button. Deceleration is controlled by microprocessor to ensure accurate stopping and spindle positioning.



3.1 DESCRIPTION OF CONTROLS

1 - STAND BY switch

2 - EMERGENCY STOP - disconnects power in emergency

3 - POWER ON indicator

4 - START button - starts winding cycle

5 - STOP button - interrupts winding cycle

6 - Four-way JOYSTICK

7 - DISPLAY

8 - ENTER button - enters data to the memory

9 - PLUS and MINUS buttons - parameters correction and step choice

10 - RESET - sets the initial state

11 - Numeric buttons - enter the notes also

12 - Multifunction buttons - display served options choice

13 - Function buttons

14 - Connector for serial interface RS 232

15 - Gear cover with timing belt

16 - Connector for foot pedal

17 - Fixing screws

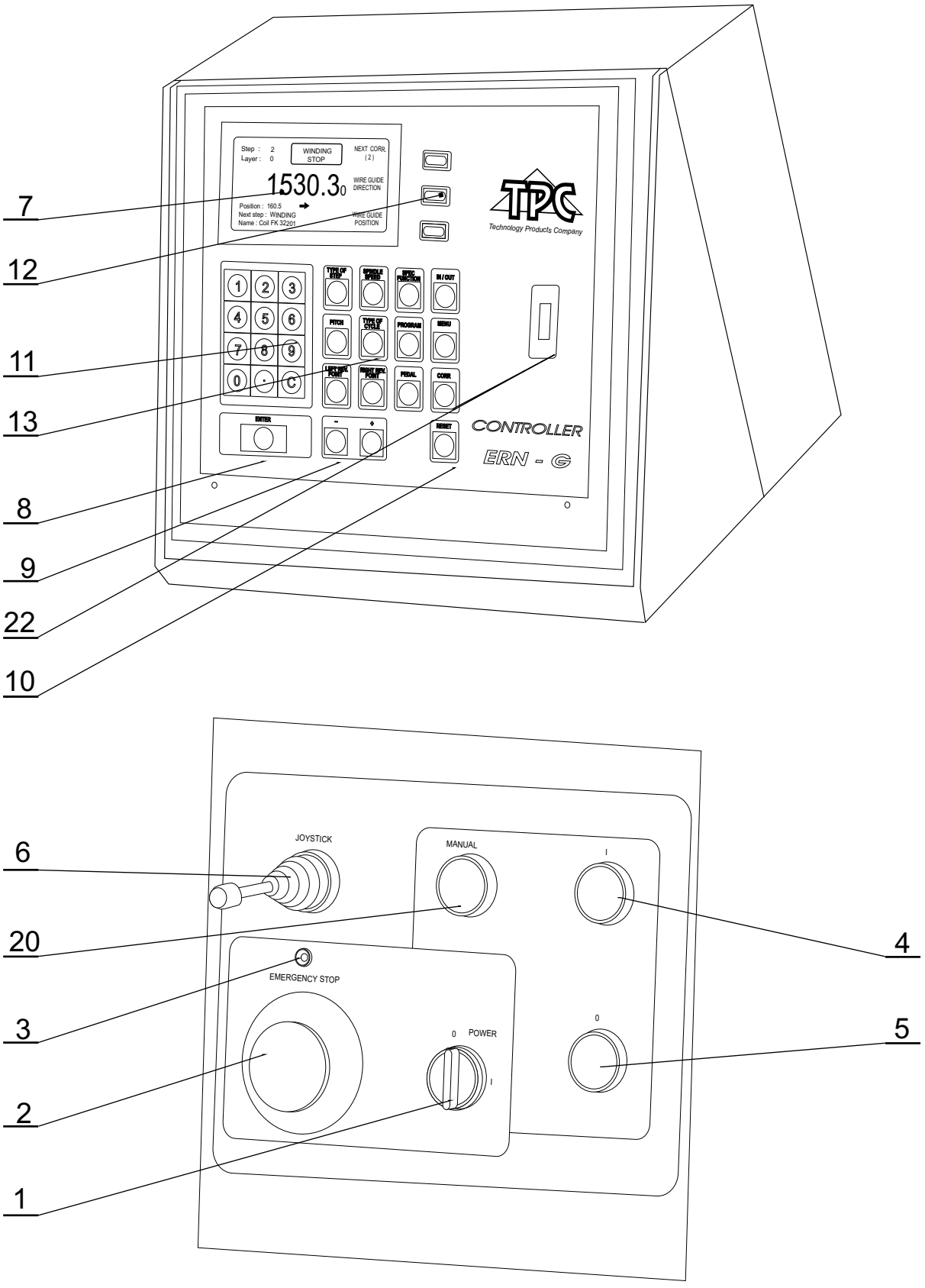
18 - Connector for inputs ,outputs and joystick

19 - STAND BY switch - disconnects the main power to the driver

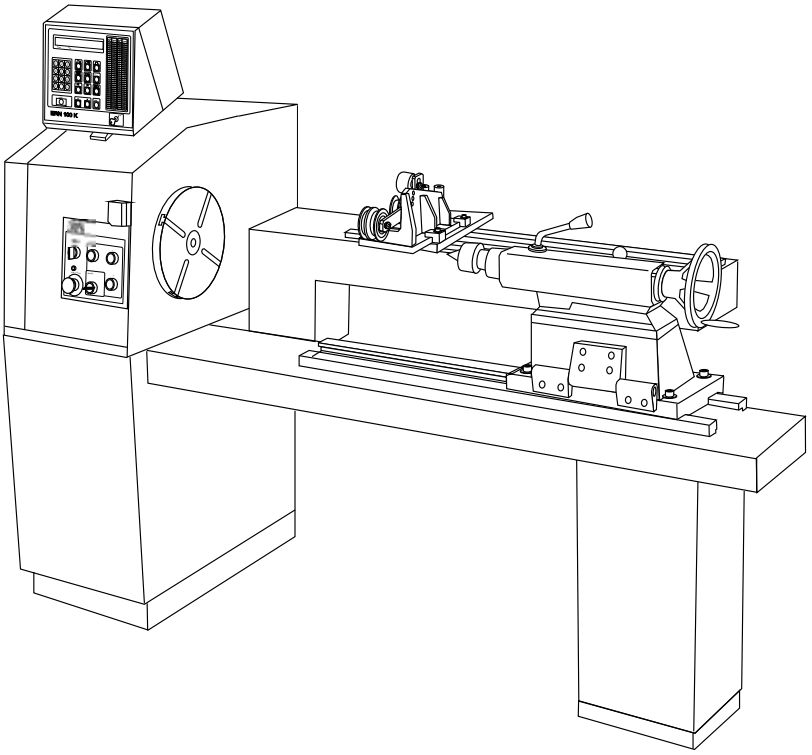
20 - MANUAL button - allows manually winding by pedal

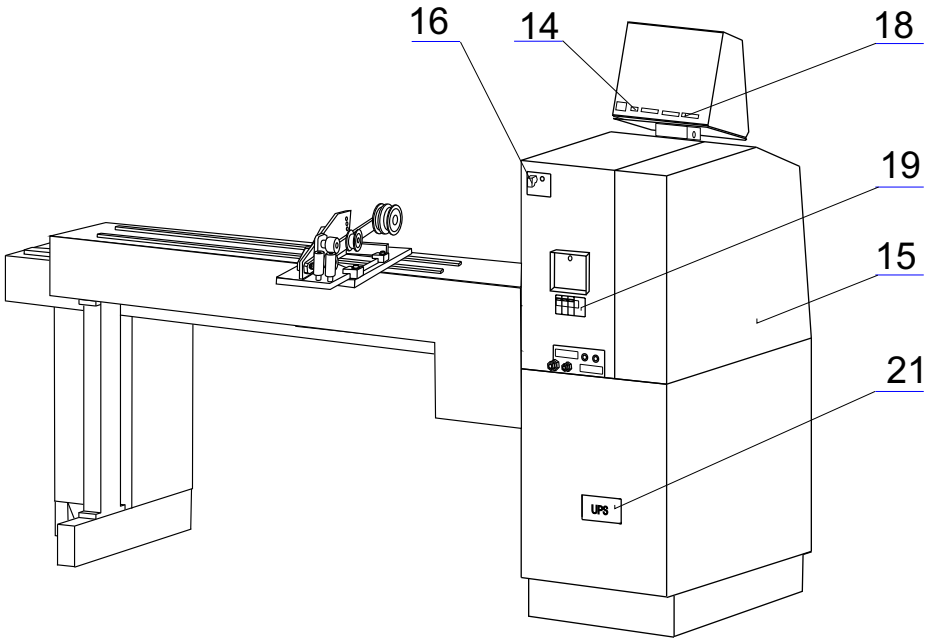
21 - UPS

22 - USB host port


7
12
11
13
8
9
22
10
Step : 2
Layer : 0
WINDING STOP
NEXT CORR. (2)
1530.30
WIRE GUIDE DIRECTION
Position : 160.5
Next step : WINDING
Name : Coil FK 32201
WIRE GUIDE POSITION
TPC
Technology Products Company
ENTER
RESET
CONTROLLER
ERN - G
6
20
3
2
1
4
5
JOYSTICK
MANUAL
EMERGENCY STOP
POWER
0
I

ERN 100, 150, 200





4. INSTALLATION AND PREPARATION OF WORKING EQUIPMENT

4.1 Mechanical installation

The winding machine is fixed to the transport wooden pallet. It is necessary to prepare a level balanced surface for its final location. The both frame surfaces must be balanced horizontal in one surface. The winding machine is moved by lifting at 3 pendant eyes. At the winding of heavy coils there is recommend to fix the base frame with screws M 12 directly to flooring surface.

4.2 Power connection

The machine must be connected to four- or five-wire system of the supply voltage 3N/PE400V/230V,50 Hz TN-S with tolerance +-5% and max. power consumption 7 kVA. Before plug in the connection cable make sure that electric power accordance with technical requirements. Only professional staff who are qualified in electrical engineering are allowed to install the power connection to the machine.

There is no guarantee for damages caused by wrong or out of range connection to the power supply.

Four-wire system - recommended connecting

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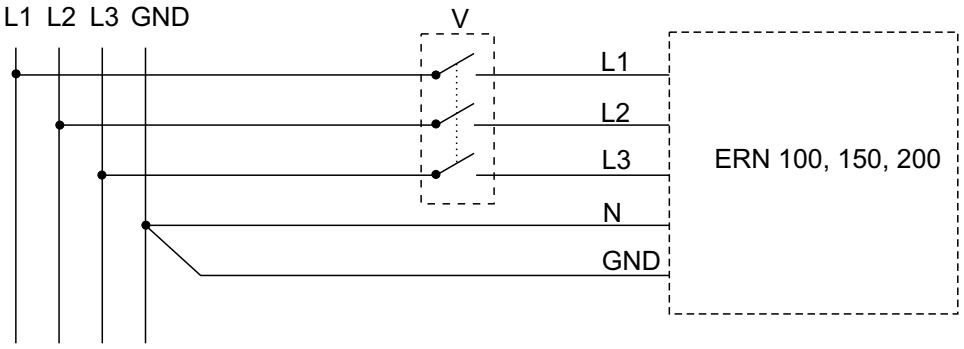
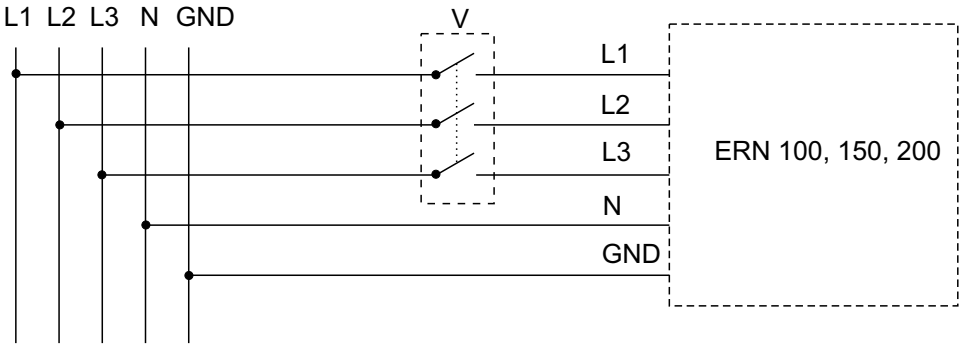


Five-wire system - recommended connecting



An additional switch "V" is recommended to use in case, if the lead-in cable is fixly connected to the line distribution. If the moving terminal is used for the installation, this switch will be not necessary.

4.3 UPS

The UPS is alive constantly, if the main switch (19) is in off-position, as well. In common running the UPS must be switched on constantly. In case of continual fall-out loss of the line voltage, e.g. electric distribution breakdown, repairs and re-designs or when the running is dead, it is necessary to set the UPS to off, that the useless discharge of storage batteries does not arise. For this purpose we remove the supply cover (21) and press the off button with a suitable tool (e.g. a pen). Repeated switch on is made by pressing the on button.

The winding machine is switched over to the stand-by position by setting the switch (1) to off. After few second the display shows POWER OFF. Actual winding data is recorded in the EEPROM. We return to the initial regime by repeated switching on the switch (1) and can continue winding.

If the electric power supply was broken in the whole system - e.g. by setting the switch EMERGENCY STOP (2) to off, by the main switch (19) or the lenght of fall-out loss of the line voltage surpassed the battery capacity of the UPS (more than 90 minutes), the hard RESET will arise after renewing electric power supply. After pressing the ENTER button the last remembered data from EEPROM will be set up.

If the electric power supply is broken while winding, the spindle will stop and the winding machine switch over to the stand-by after few second. After renewing electric power supply the machine returns to the initial regime, but in the position like after pressing the STOP button.

Keep always the following order at switching off and on the winding machine:

SWITCH ON: a) the UPS - if it was off
b) the main switch or EMERGENCY STOP (2)
c) the stand-by switch (1)

SWITCH OFF: a) the stand-by switch (1), wait till the display shows POWER OFF
b) the main switch (19)
c) the UPS only if it is necessary

4.4 Machine preparation for running

The machine operating is allowed only by skilled person who is acquainted with user´s guide and safety formulas. The training is provided by producer or qualified person.

The machine is delivered partly disassembled for easier packing and transport.
Before you switch the machine on, for the first time, assemble it as follows:

a) Mount the controller on the drive unit. Connect the power plug, 25-pin connector and 9-pin CAN connector on the back panel of the controller

b) Check and fasten the fuse cartridges on the back panel of the drive unit

c) Connect the foot pedal to the connector (16)

d) The UPS cover (21) is removed and the UPS is switched on by pressing the button

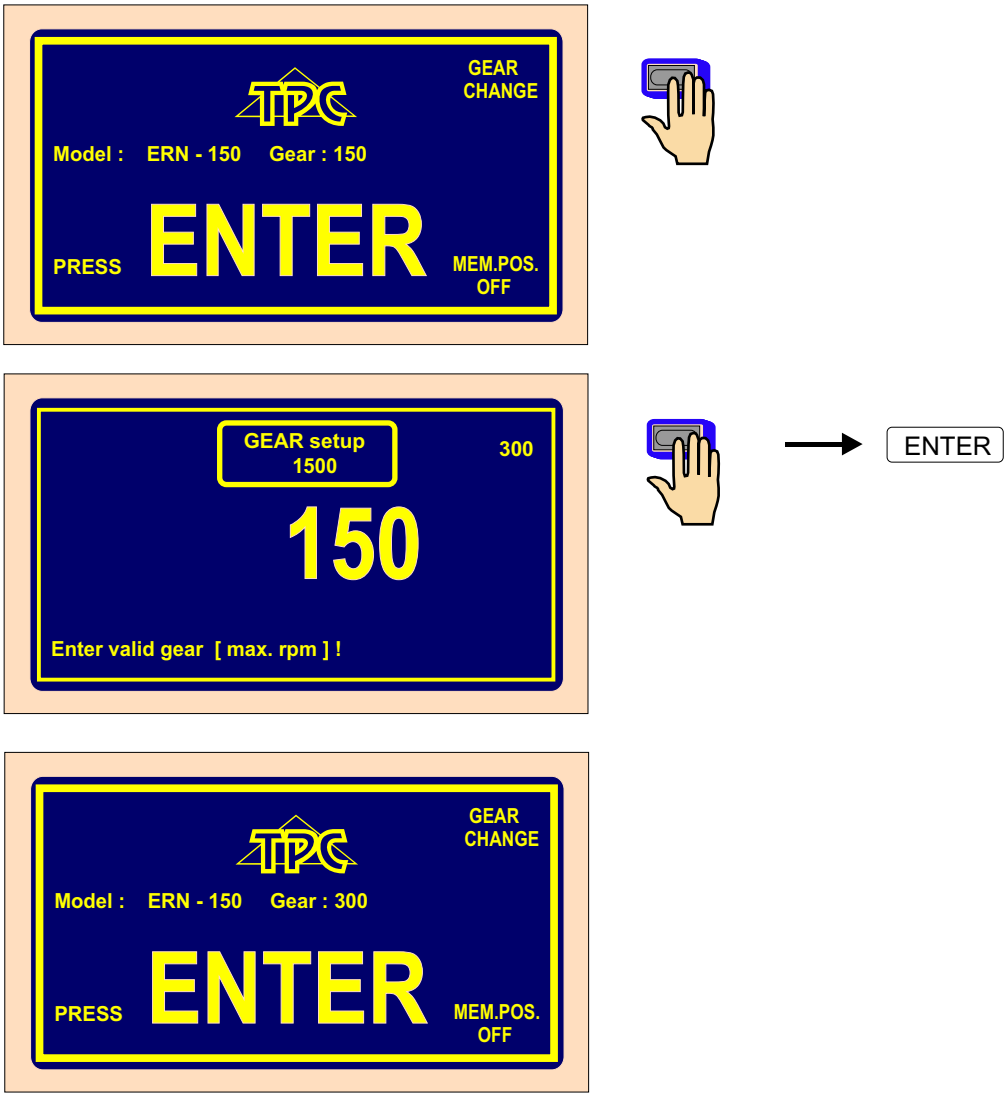
Assembly is completed by this and prepared to work.

5. WINDING OPERATION

5.1 Machine switching ON and gear setting

After switching ON (1) the introduction window shows,

which provides informations about, for what type of machine is controller set.
In this window we can change the set gear, which must be in ABSOLUTE ACCORDANCE with the set of mechanical gear.



After pressing ENTER-button, the initial set is done, which means, that wire guide is shifted left home (zero position), zero number of turns, zero step and the last program is set.

5.2 Winding data back up while electricity drop

In this window, we can activate the initial setting of the machine (wire guide position, number of turns and step) for the back up values.

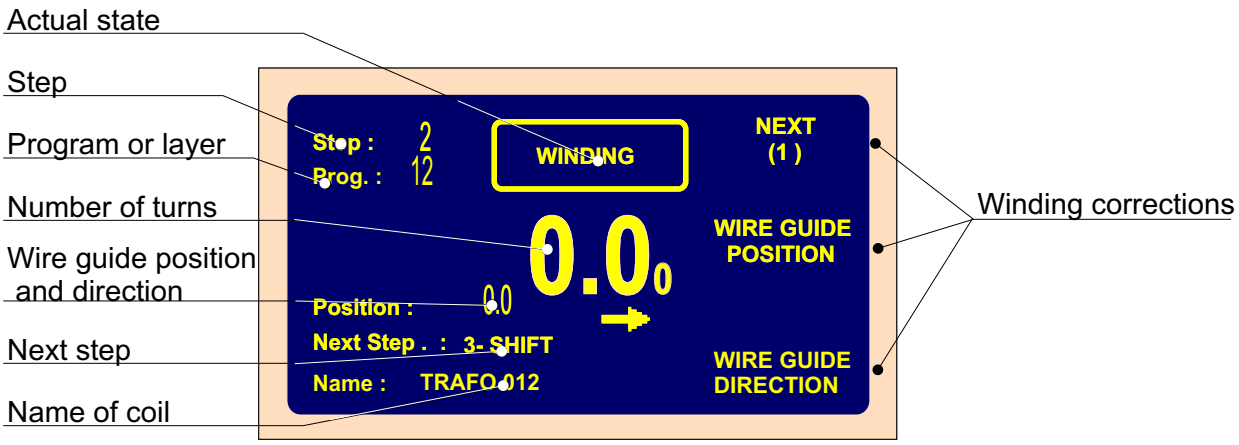
After the activation of this function (MEM.POS.ON) the initial setting will be actualized for the values, memorized while electricity drop.

FOR USING THIS FUNCTION, THE MACHINE MUST BE EQUIPPED WITH THE UNINTERRUPTIBLE POWER SUPPLY UNIT (UPS) AND THE REPORT OF ELECTRICITY DROP (relay for POWER) MUST BE INSTALLED.
IF THE MACHINE IS NOT EQUIPPED BY THIS, THE ACTIVATION OF THIS FUNCTION DOES NOT INFLUENCE THE INITIAL SETTING, WHICH IS STILL SET ON ZERO VALUES.

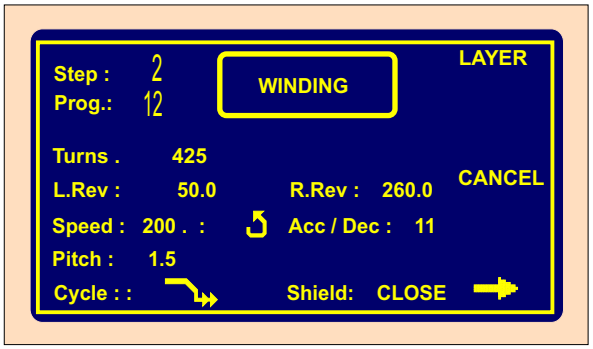
5.3 Winding and view window

These are two basic windows, in which we can start programmed cycle.
Repeated pressing of the ENTER-button caused the switching.

Winding window - provides actual information about winding process



View window - displayes the view of programmed step parameters



Winding is possible only in these two windows. If any other window is opened, the cycle start is blocked.

5.4 Explanation of conceptions STANDSTILL, START, STOP

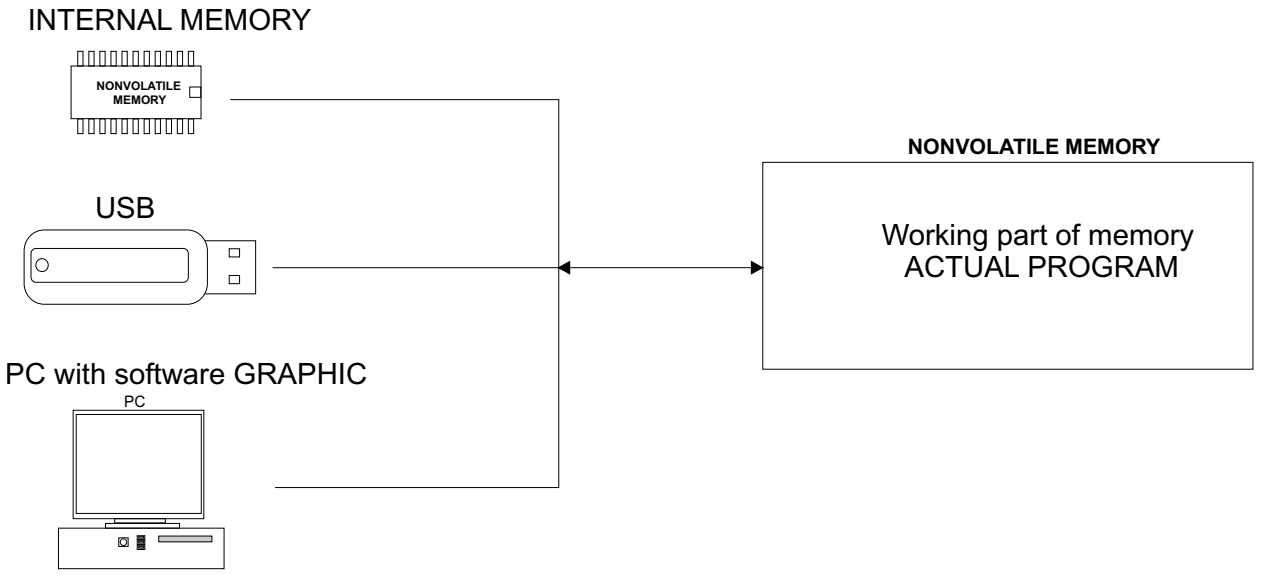
STANDSTILL: State after switching ON the machine and pressing ENTER, or after the step finishing. Start from this state shifts program one step forward, generally.
E.g. when we are in the step 0, after starting, the step 1 is running.

START: Active run of some step type (winding,shift,jump and pause).

STOP: State after pressing the STOP-button (cycle interruption).
Repeated start activates interrupted run and there is no step shifting.

5.5 Winding program selection

Winding program, we are just working with(we can perform winding or program creation) is called **ACTUAL PROGRAM**. Actual program is located in so-called working part of memory. Desired winding program can be loaded to the working part of memory either from internal memory of the Winder, USB flash drive or a PC equiped by software GRAPHIC.



Proceeding by program selection:

- internal memory - see section 7, page 50
- USB flash drive - see section 10, page 62
- PC - see GRAPHIC manual

5.6 Start and stop of winding cycle (program)

Winding cycle is actuated by pressing START-button (4), or foot pedal.
There is a possibility to start program from each step. Required step is set up by the buttons [-] [+] , or numeric keyboard.

STOP-button (5) interrupts the winding cycle. It is the priority button, what means, that the cycle interruption at incorrect time (while deceleration), may cause inaccurate stopping and positioning of the spindle.
Cycle interruption at the step WINDING allows almost all corrections and adjustments.
Repeated cycle start by START-button or foot pedal activates step, where the program interruption has been done.
Step types SHIFT, JUMP and PAUSE do not allow any corrections or adjustments during interruption.

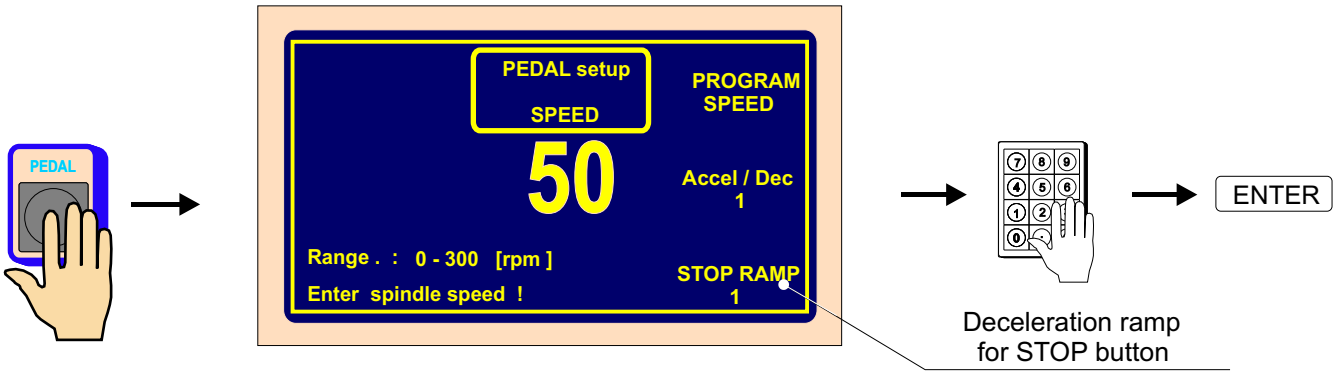
5.7 Foot pedal

Winding machine may be equiped by following types of foot pedals:

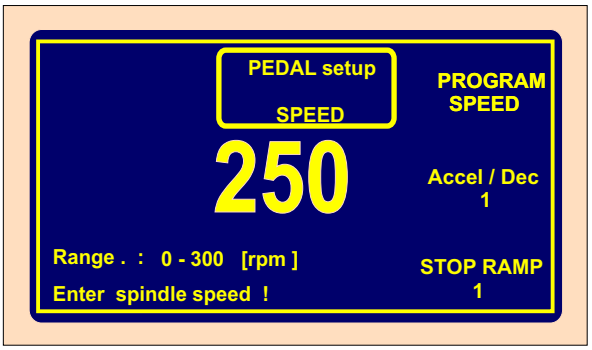
Double foot pedal controls START, BRAKE RELEASE
- left pedal releases the spindle brake
- right pedal works as parallel START-button

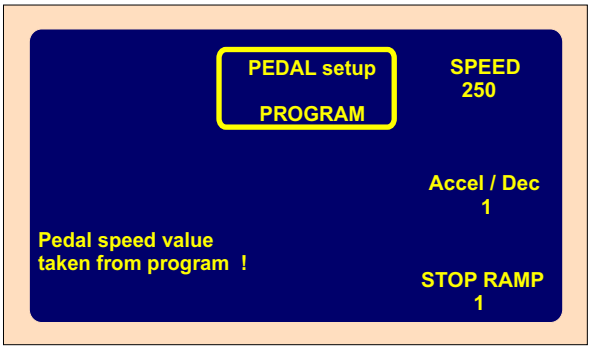
Double foot pedal controls SPEED, BRAKE RELEASE
- left pedal releases the spindle brake
- right foot pedal controls spindle speed depending on pressing level

Maximal speed, acceleration and deceleration ramp may be set up by PEDAL button.



Speed set up like this, is valid for assigned program and it is independent on speed programmed, in single program steps. Explain as: max.speed (ordinary lower) set up by START pedal may be different, then max.speed set up by START-button.
If we require the same max.pedal speed as speed, programmed in single program step, we need to press multifunction button PROGRAM SPEED.





Accel. / Decel. ramp for pedal

CODE	Accel.time (sec.)	Decel. time (sec.)
1	1	0,5
2	2	1
3	3	1,5
4	4	2
5	6	3
6	8	4
7	10	5
8	12	6

Max. pedal speed is controlled by values, programmed in single program steps, in this case.

Acceleration and deceleration ramp values are always taken from window PEDAL SETUP.

Winding cycle start continuity

This option is utilized during winding start. Wire application and winding of the first turns is done by pedal and then by pressing START-button (4) cycle continues.

5.9 WINDING CORRECTIONS

Program corrections and adjustments are allowed only in the state "STANDSTILL" or "Winding STOP". Keys are blocked in other states. When there is peep warning after the key pressing, the operation is illogical or inaccessible.

5.9.1 Spindle reference position setting

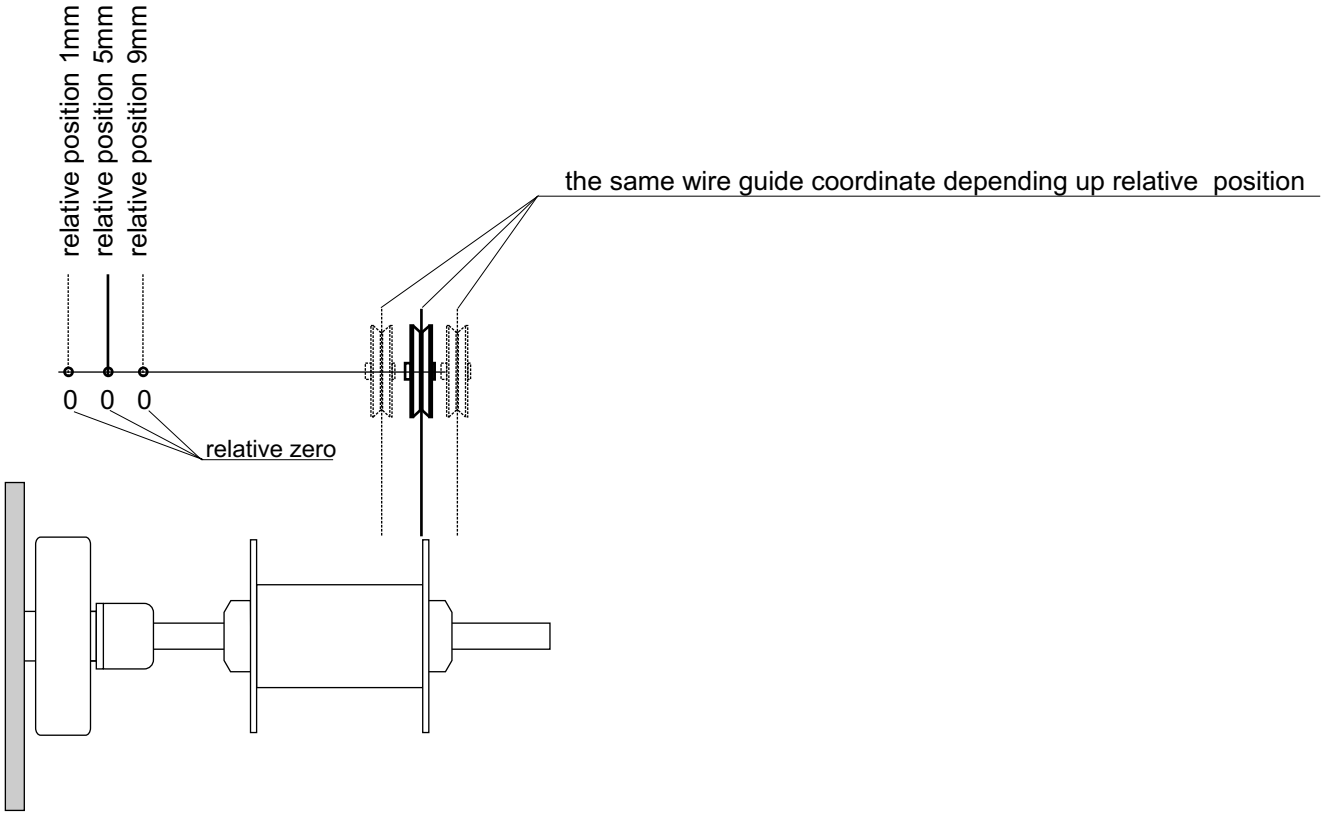
The spindle can be positioned in the range +- a few degrees and exact position is kept for any amount of windings.

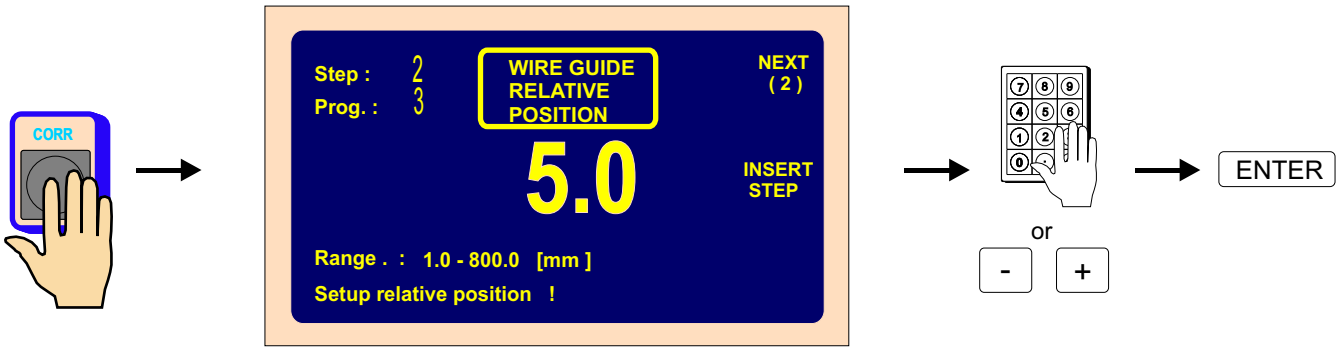
Reference (zero) spindle position is set up by follows:
- switch the brake-off by the switch (6)
- turn the spindle manually to the required position and return the switch (6) to the former position
- press RESET then ENTER

Note: When you switch the machine ON (by switch POWER or EMERGENCY STOP), RESET is running automatically and the spindle position is taken as reference position.

5.9.2. Wire guide relative position setting

This correction shifts zero coordinate of the wire guide (relative zero position). It allows you to correct the wire gude position to be in accordance with the bobbin or winding tool.
Default : 5 mm



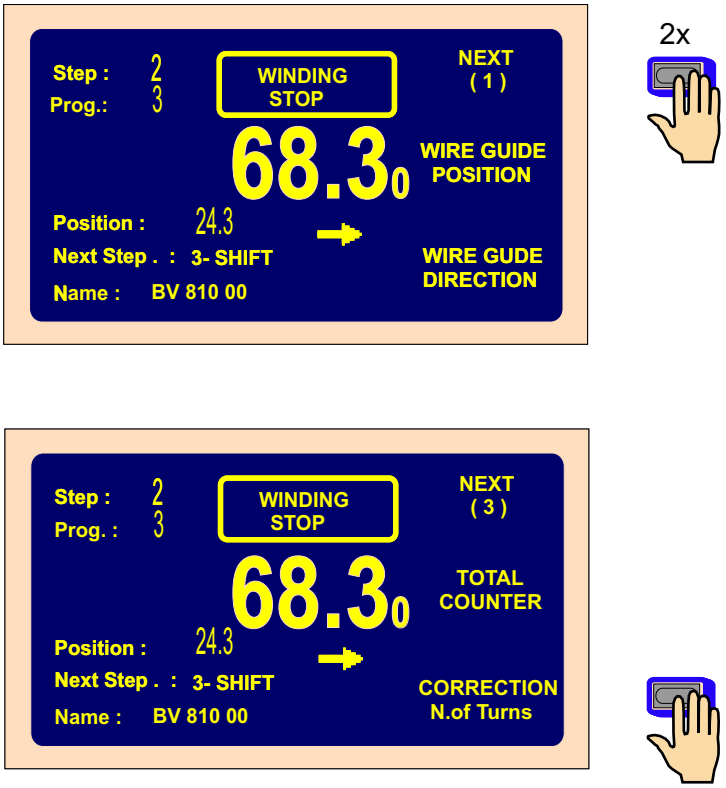


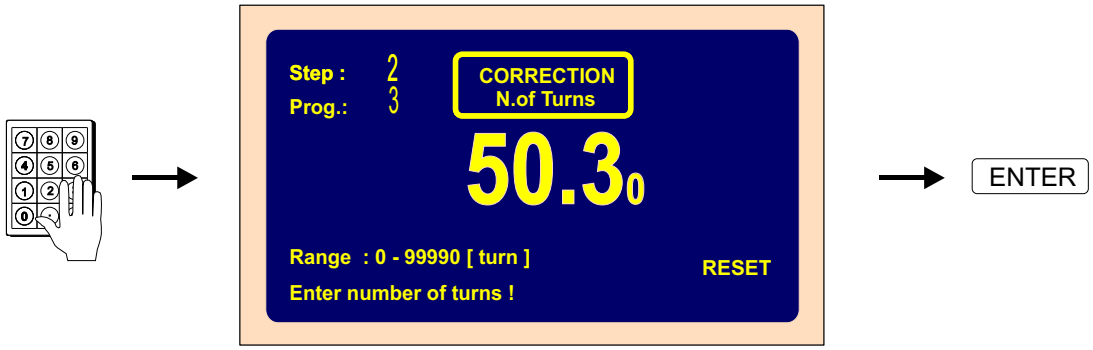
Holding the buttons	-	+	pressed (cca 0,5 s) moves the wire guide continuously.

5.9.3. Number of turns correction

We can change the number of turns counted actually.

Correction of decimal turn number e.g. XX.3 to XX.0 without adequate spindle turn, leads to the loss of reference position..



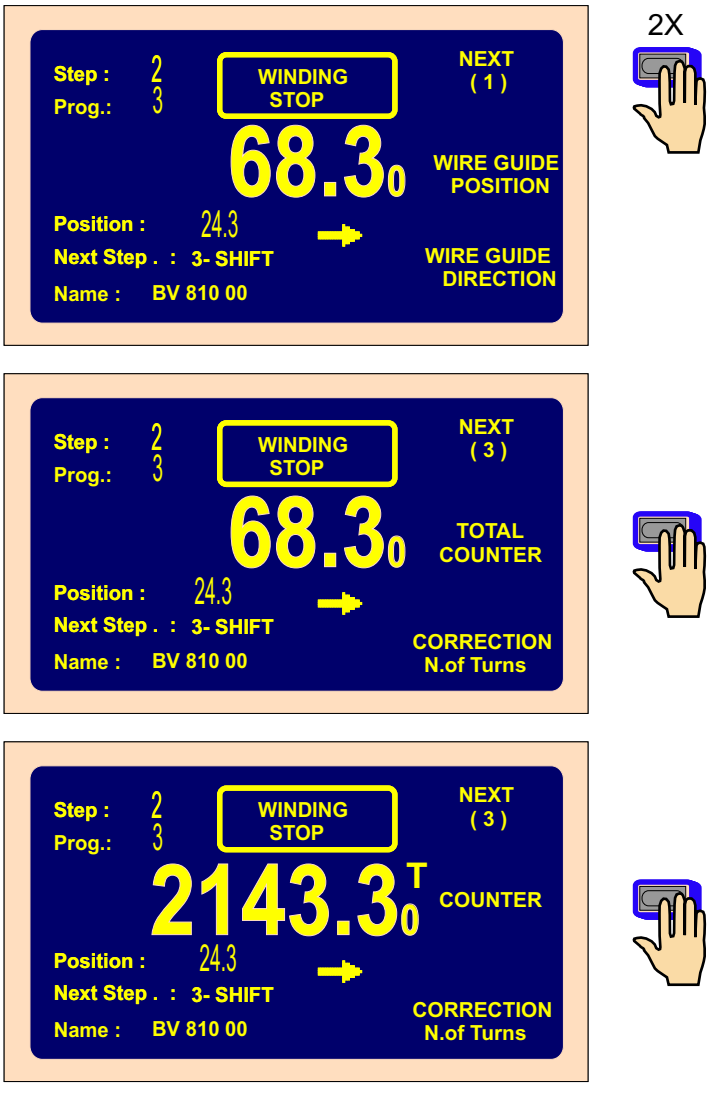


Multifunction RESET-button set to zero actual counter state.

5.9.4 Total counter

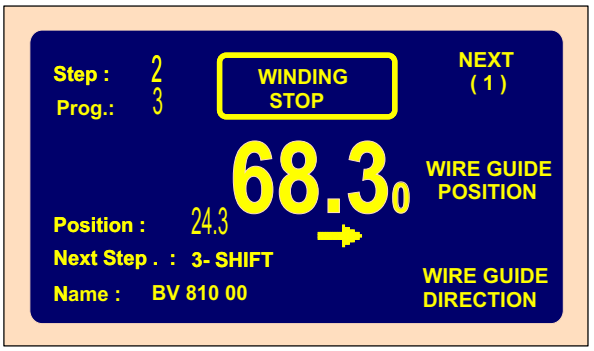
We can switch between TOTAL COUNTER and COUNTER. TOTAL COUNTER counts all spindle turns until it is set to zero by RESET, or is set differently by numeric keyboard.

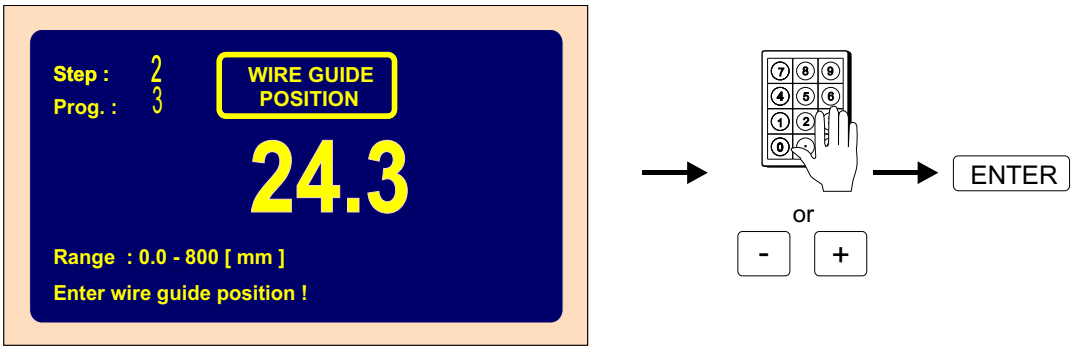
Both counters are independent. By switching is only displayed one of it !



5.9.5. Wire guide correction

Correction allows you to correct the wire guide position while winding process.

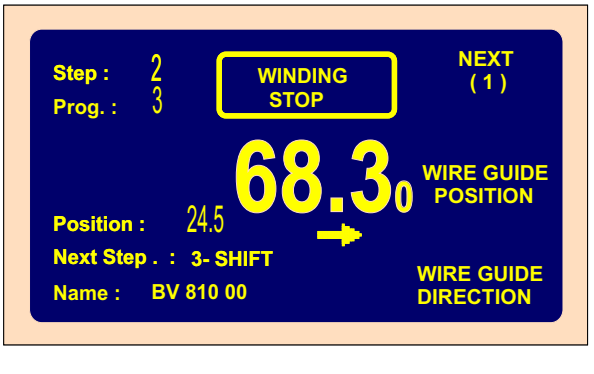




Holding the buttons	-	+	pressed (cca 0,5 s) moves the wire guide continuously.

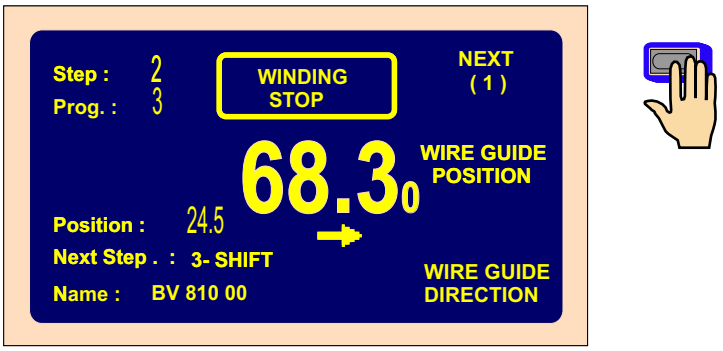
5.9.6. Wire guide direction change

Correction allows you to change the direction of wire guide while winding.

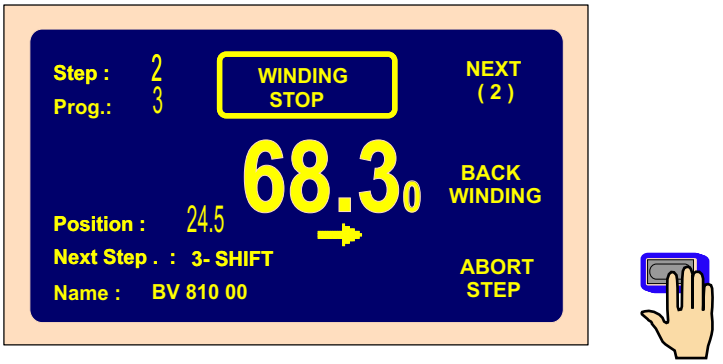


5.9.7. Step abort

Correction allows you to abort actual running step.

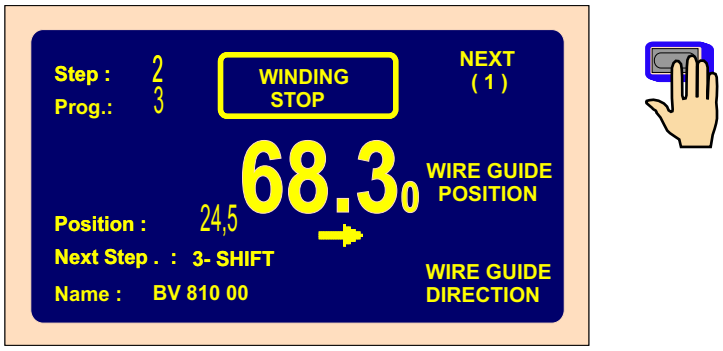


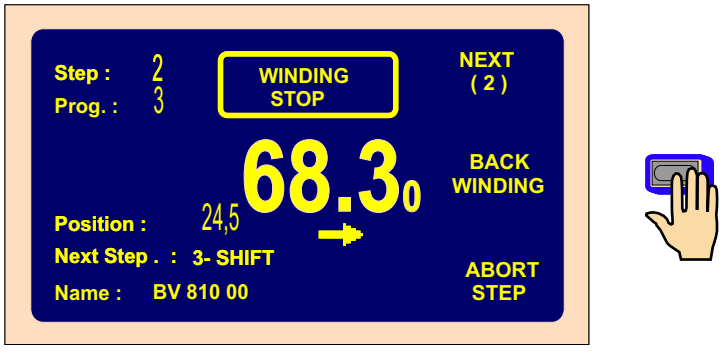
Multifunction ABORT STEP button returns the STANDSTILL state.



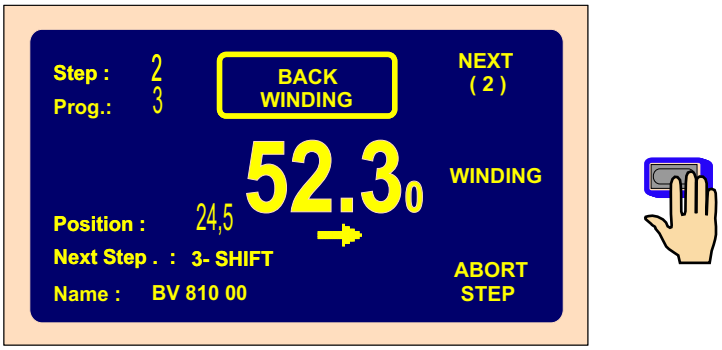
5.9.8. Back winding

Correction allows you to wind back the required number of turns.





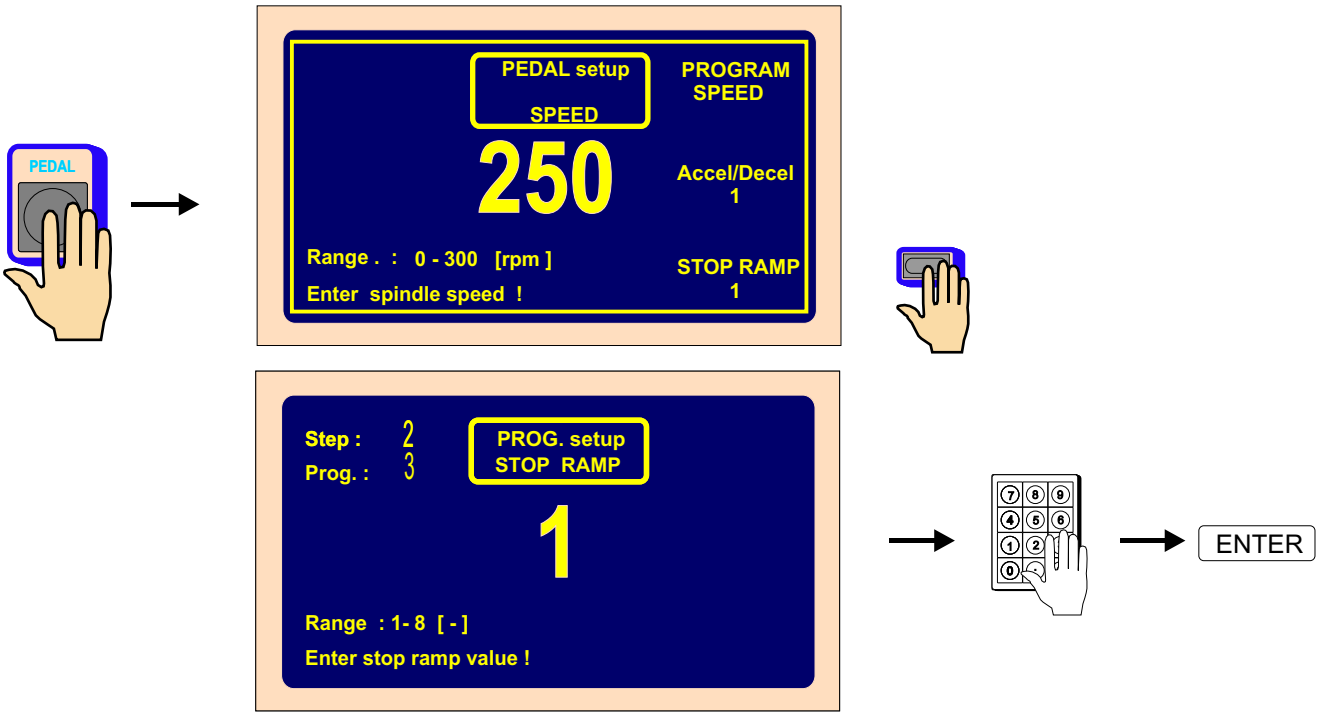
We can wind back required number of turns only by pedal. The number of turns is counted back and the wire guide moves in opposite direction.



Pressing of multifunction button "WINDING" ends back winding.

5.9.9. Deceleration ramp for the STOP-button

Deceleration ramp for the STOP button can be set. This ramp is whenever a bit faster (control by software) than programmed deceleration ramp.

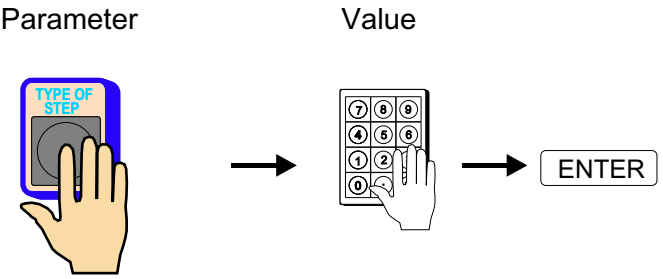


CODE	TIME [s]
1	1,0
2	1,5
3	2,0
4	3,0
5	4,0
6	6,0
7	8,0
8	12,0

Presentated values are valid for max.speed.

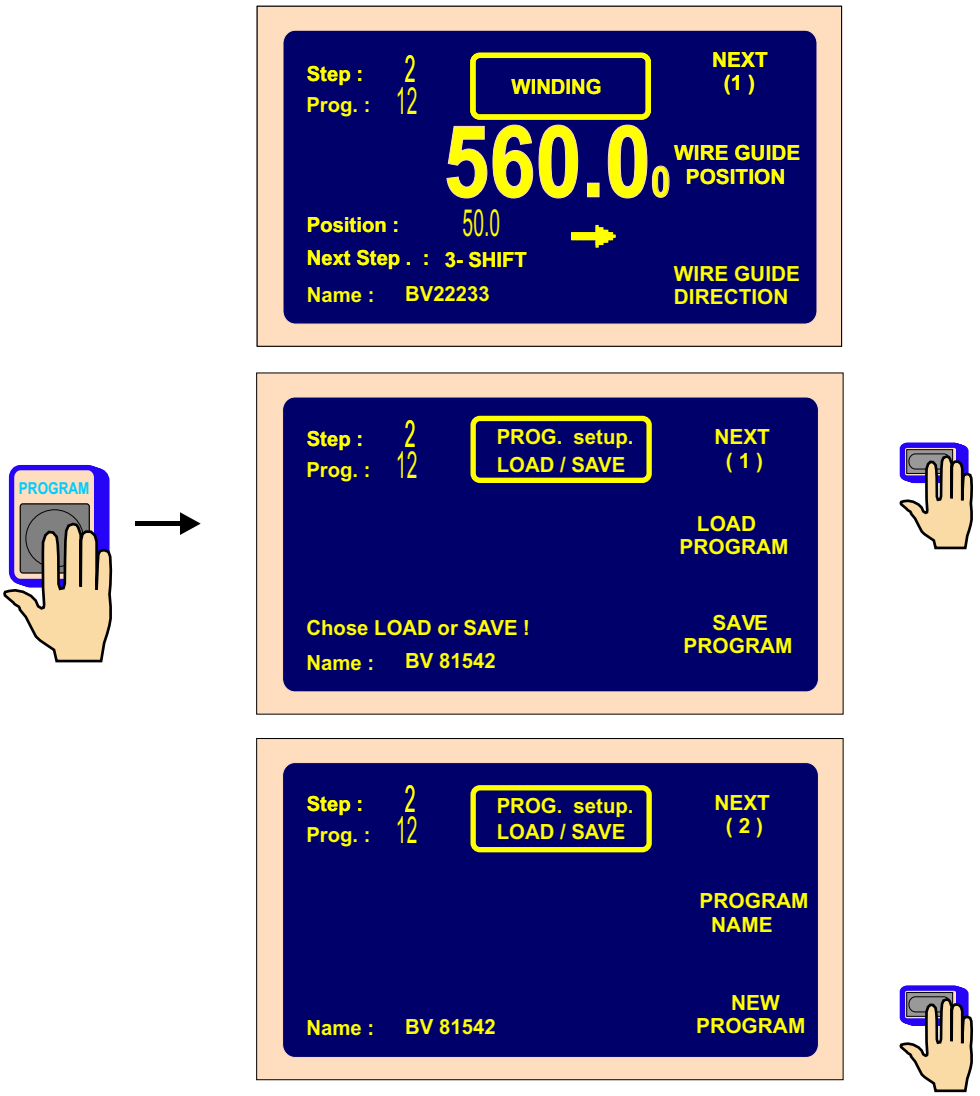
6. PROGRAMMING

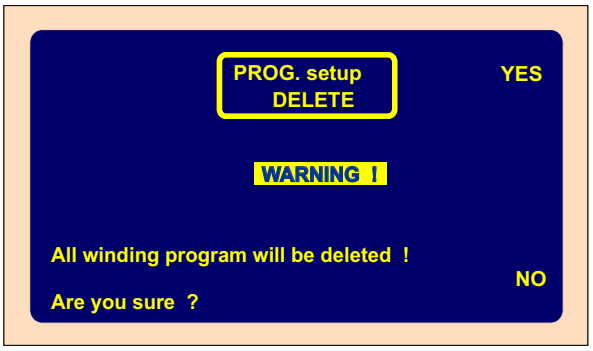
Entering the data:

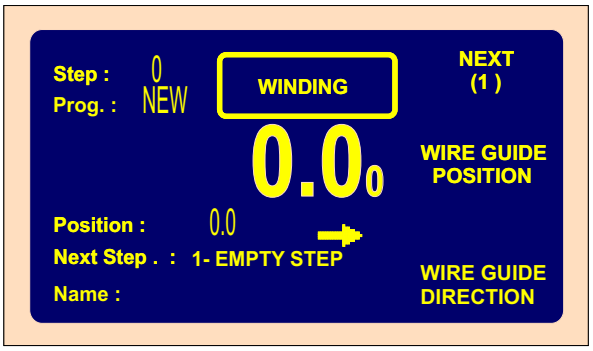


Use the ENTER-button for execution entered value or for return from any function.

Programming is not possible in the step 00. By button + or numeric keyboard we need to choose any other step.When there is peep warning after the keep pressing,the operation is illogical or inaccessible.
Created program is saved to the working part of memory (program in this memories is designated as a ACTUAL PROGRAM). We can either owerwrite (or modify) the already existing program, or open the new one.

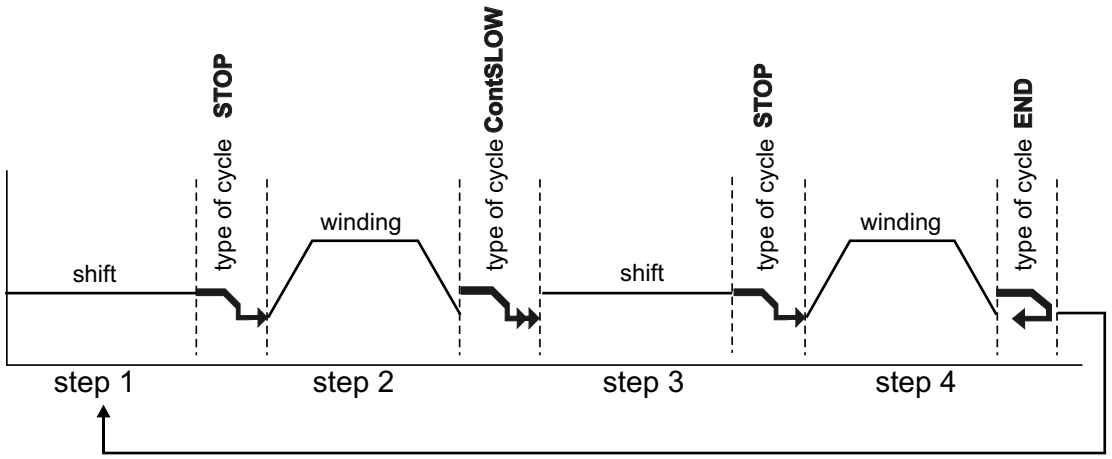






6.1 Basis of programming

Winding program is logical sequence of a few(1-350) joined steps.



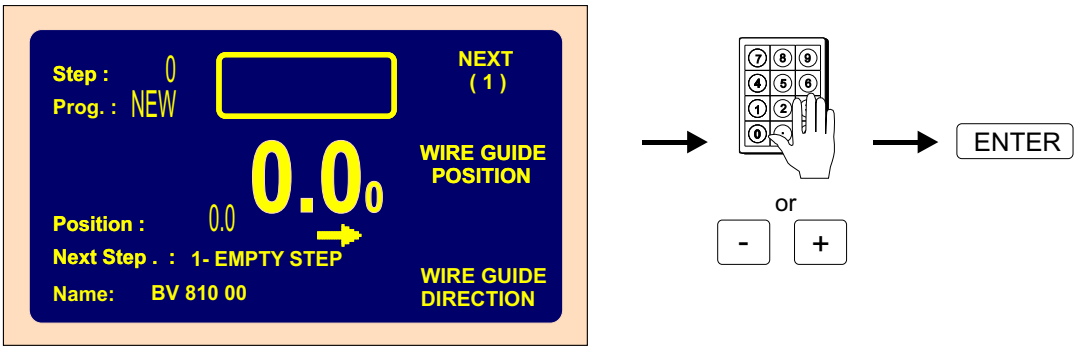
Joining to the next step is defined by the type of cycle.
If the type of cycle "END " is programmed to the specific step, it comes to this, that end of program and after pressing START- button, program is restarted and step 1 is running.

Max.step capacity for the one winding program is 350 !

6.2 Step choice

Only in the winding or viewable window we can choose the required step as follows:

a) directly by numeric keyboard
b) by buttons [-] or [+]



6.3 Step parameters programming

6.3.1 Basic step types

Every step can be programmed as WINDING, SHIFT, JUMP or PAUSE.

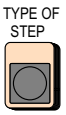
Winding - is defined by following parameters: number of turns, speed and spindle direction, pitch, left and right reversal point

Shift - spindle is not turning and the wire guide is shifting to the programmed coordinate

Jump - spindle is not turning and the wire guide is shifting from its position to the left or right, in accordance with the programmed value

Pause - spindle and wire guide are idle and the pause duration depends on programmed time

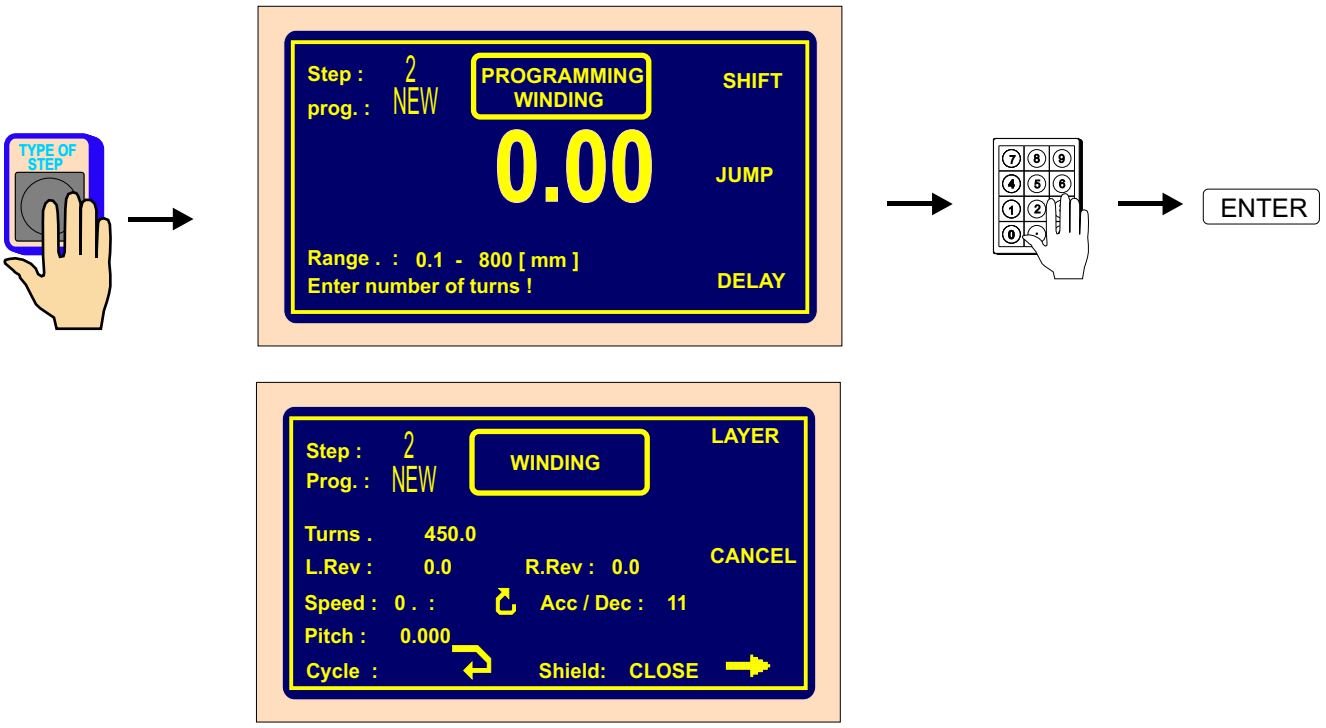
6.3.2 Choice of step type

By pressing the button 

and then by pressing the multifunction buttons we can choose the desired step type. Concurrently, we can entry the main parameter of the chosen step type, what means:
- number of turns for winding
- coordinate value for shift
- lenght for jump
- time for pause

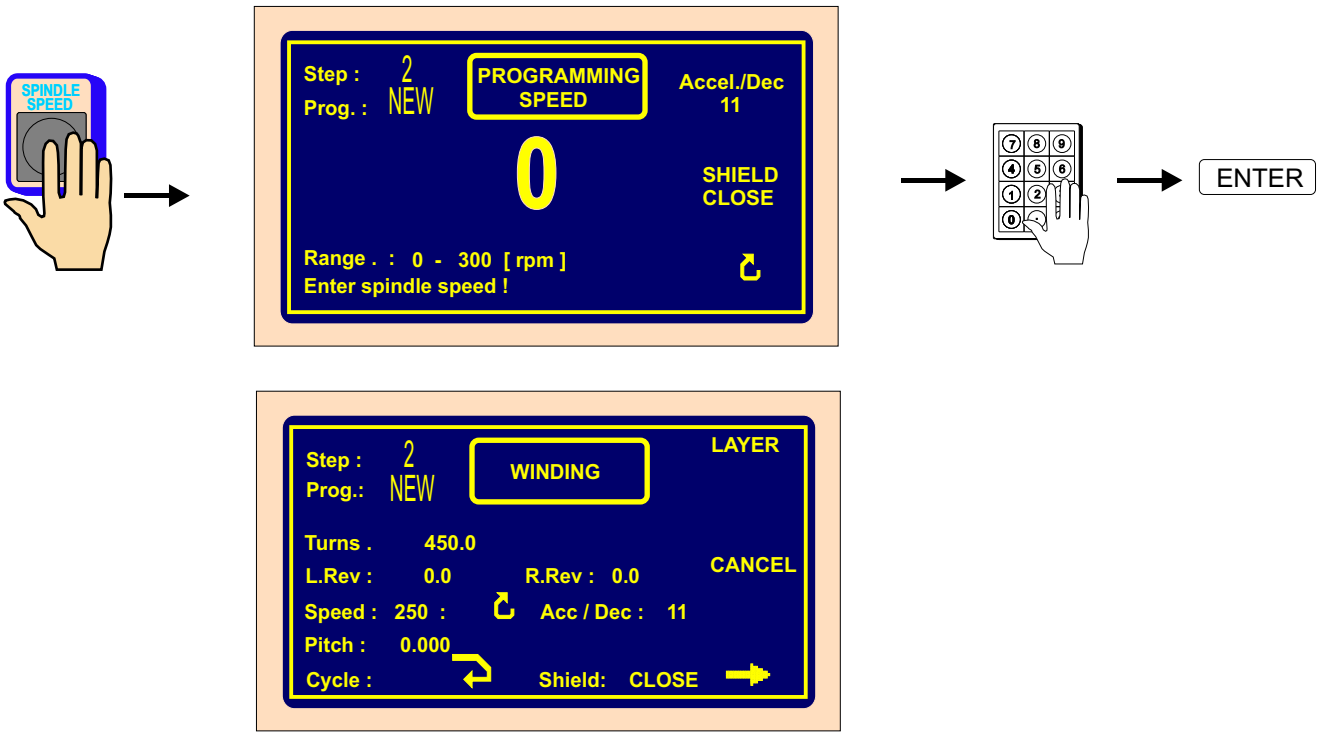
6.3.3 Winding step

Number of turns

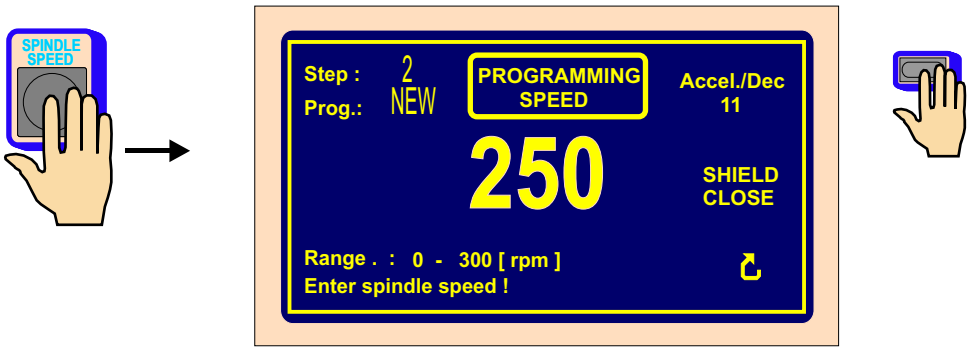


If " **0** " is programmed to the number of turns, this winding step turns the spindle to the zero reference position. Direction of the spindle speed is taken from the previous winding step !

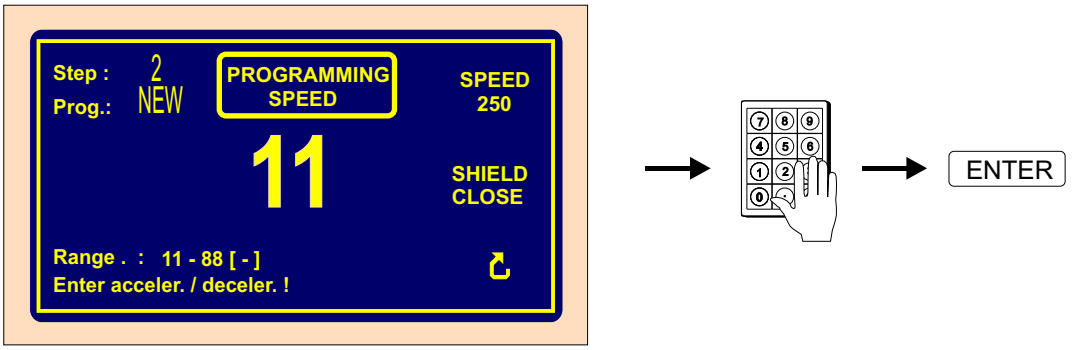
Spindle speed

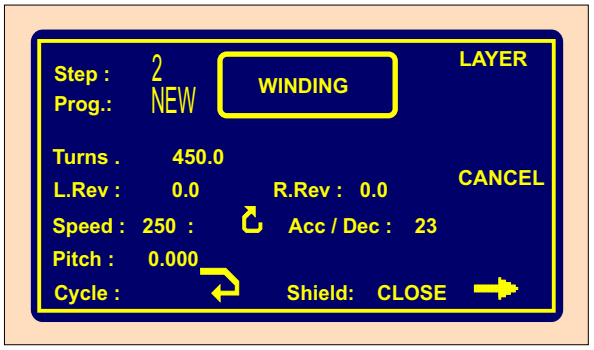


Spindle acceleration and deceleration



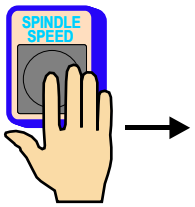
Entry of values 1 to 8 for acceleration and deceleration according to the enclosed table.

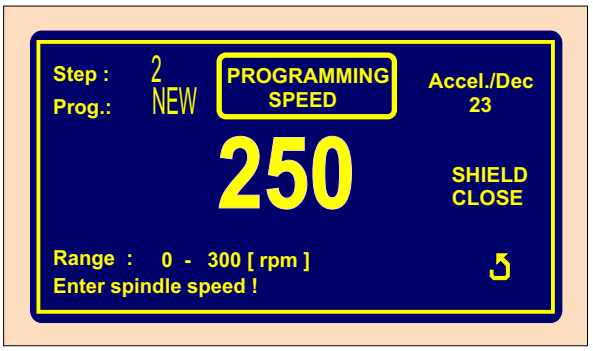




CODE	ACCEL. (s)	DECCEL. (s)
1	1,5	1,5
2	2,3	2,3
3	3	3
4	4,5	4,5
5	6	6
6	9	9
7	12	12
8	16	16

Spindle direction and protection shield

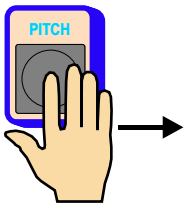


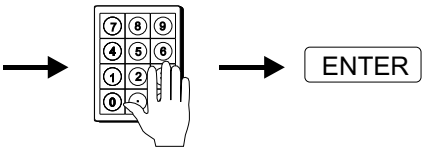


Protection shield programming

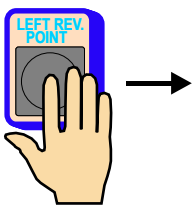
Spindle direction programming

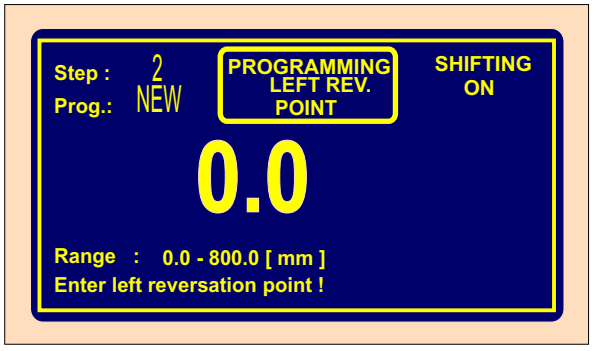
Pitch

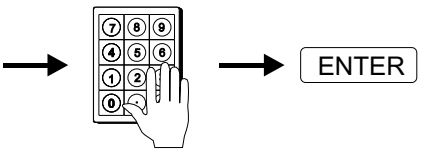


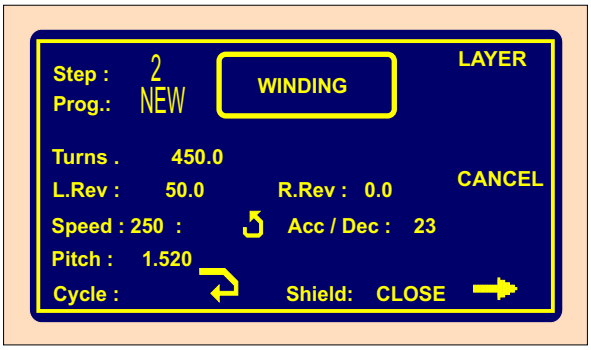


Left reversal point

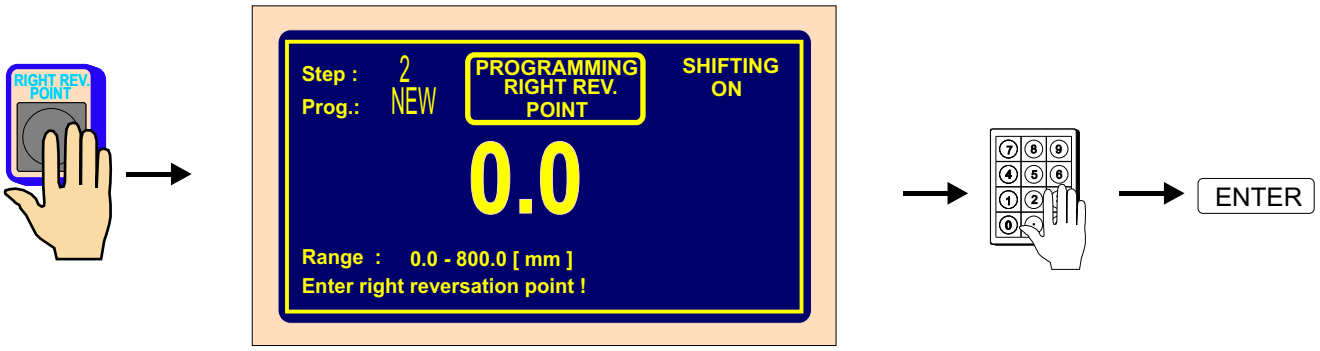


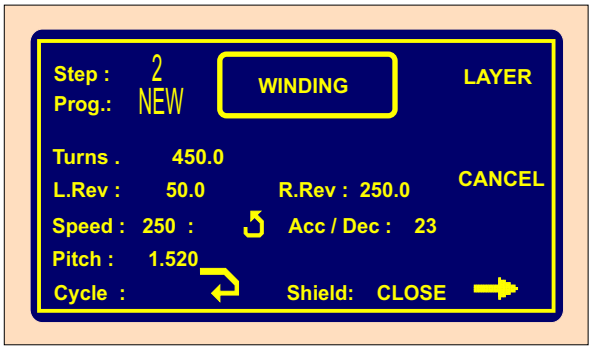






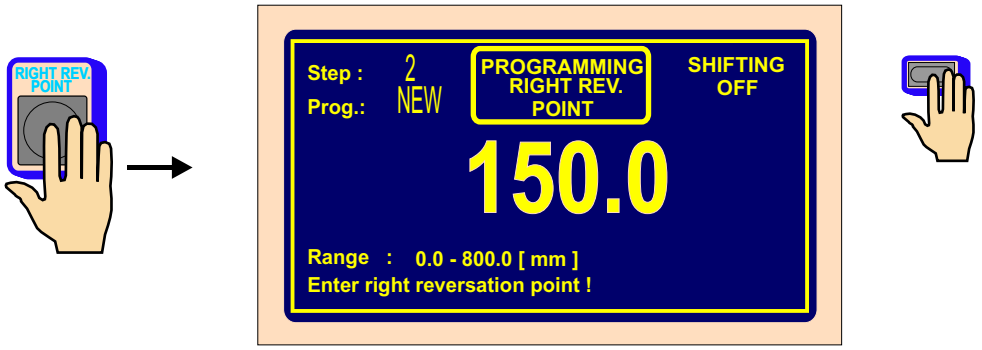
Right reversal point





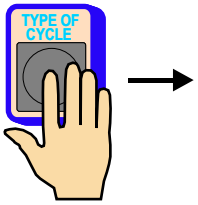
Switching OFF the wire guide shifting during programming

We can switch OFF the wire guide shifting by multifunction button SHIFT ON / OFF during programming.

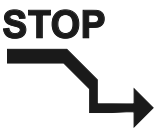


Type of cycle

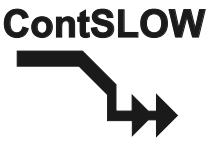
Set the type of cycle and choose, how to continue to the next step.



End of program
By pressing START-button, program is restarted and step 1 is running.

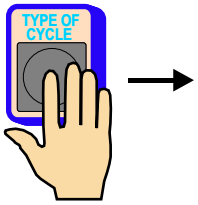


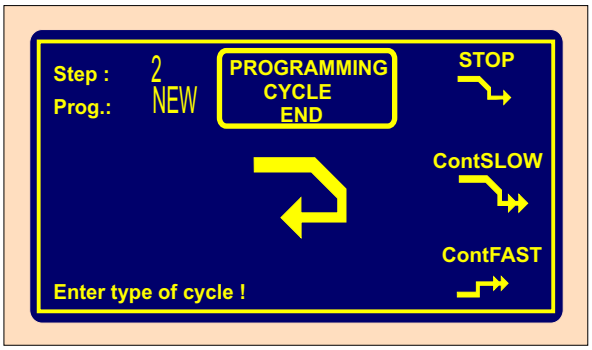
Cycle stop
After step finish, program stops and the next step is activated by START-button.

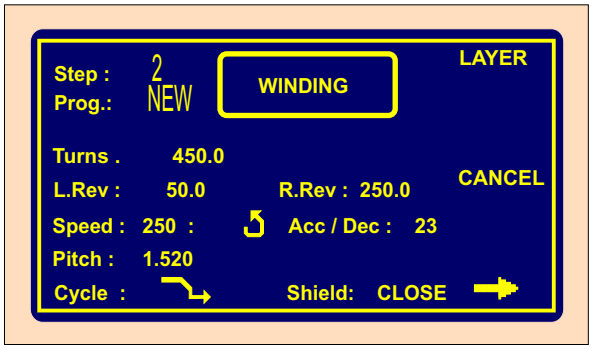


Continual cycle with deceleration
After step finish, program starts the next step automatically, without pressing the START-button. Winding step decelerates to zero, at first.

Continual cycle without deceleration
After step finish, program starts the next step automatically, without pressing the START-button. Spindle deceleration is canceled. Only winding steps can be joined by this cycle.







Number of turns cancel and the wire guide direction after start

Number of turns cancel after start

Wire guide direction after start

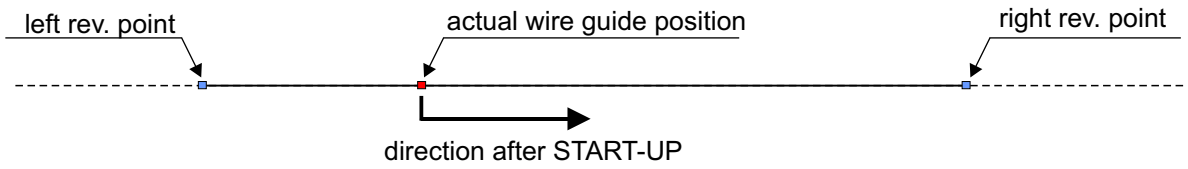
Number of turns cancel.

CANCEL - previous counted number of turns is cancelled after START-UP the winding type of step

NOT
CANCEL - counted number of turns is not cancelled

Wire guide direction after start.

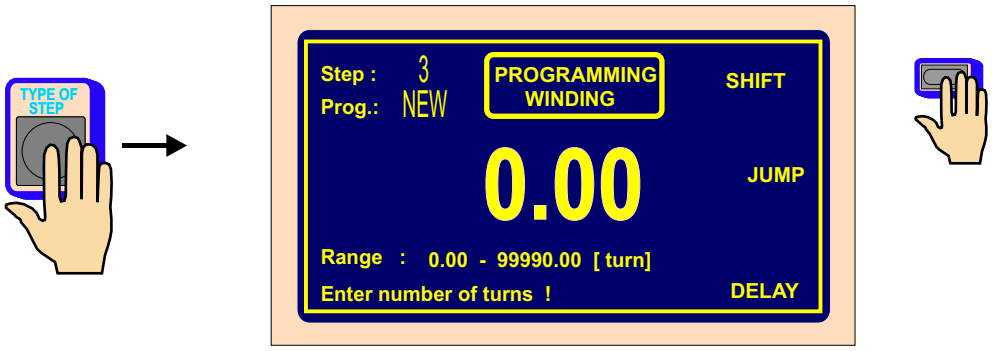
-**right** moving the wire guide after START -UP,if its position is between left and right reversal point

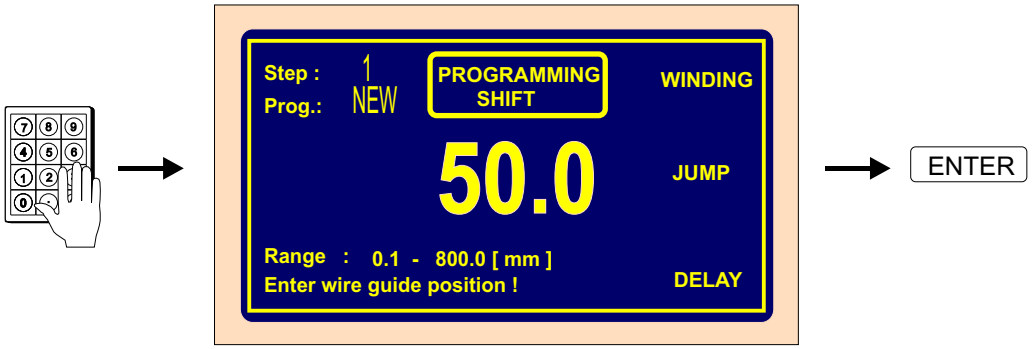


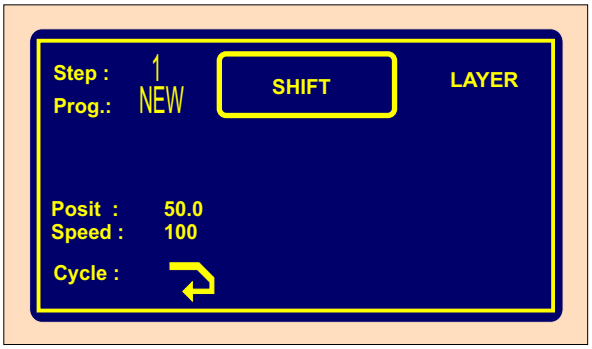
- the same,but **left** moving

6.3.4 Wire guide shift

Coordinate of shift

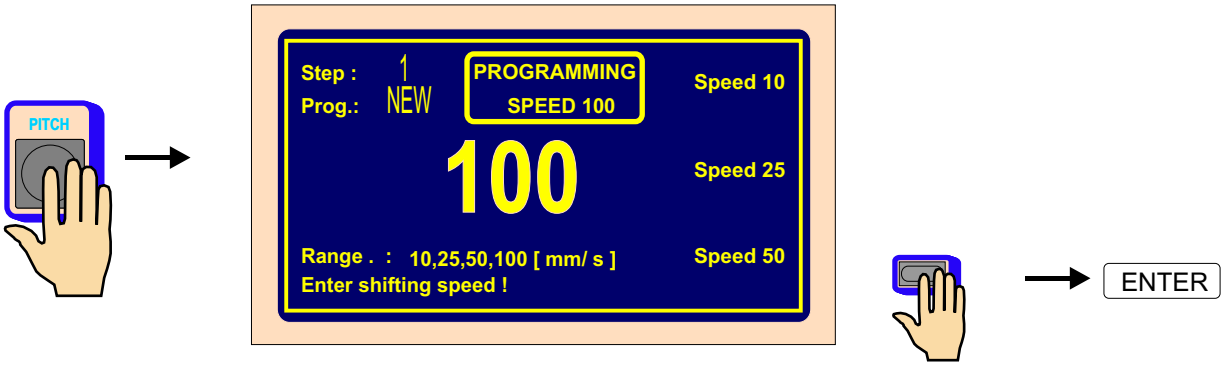


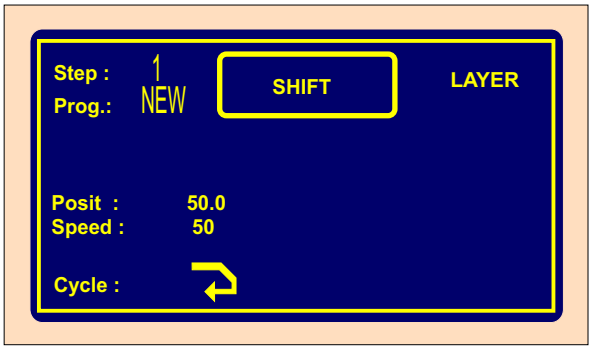




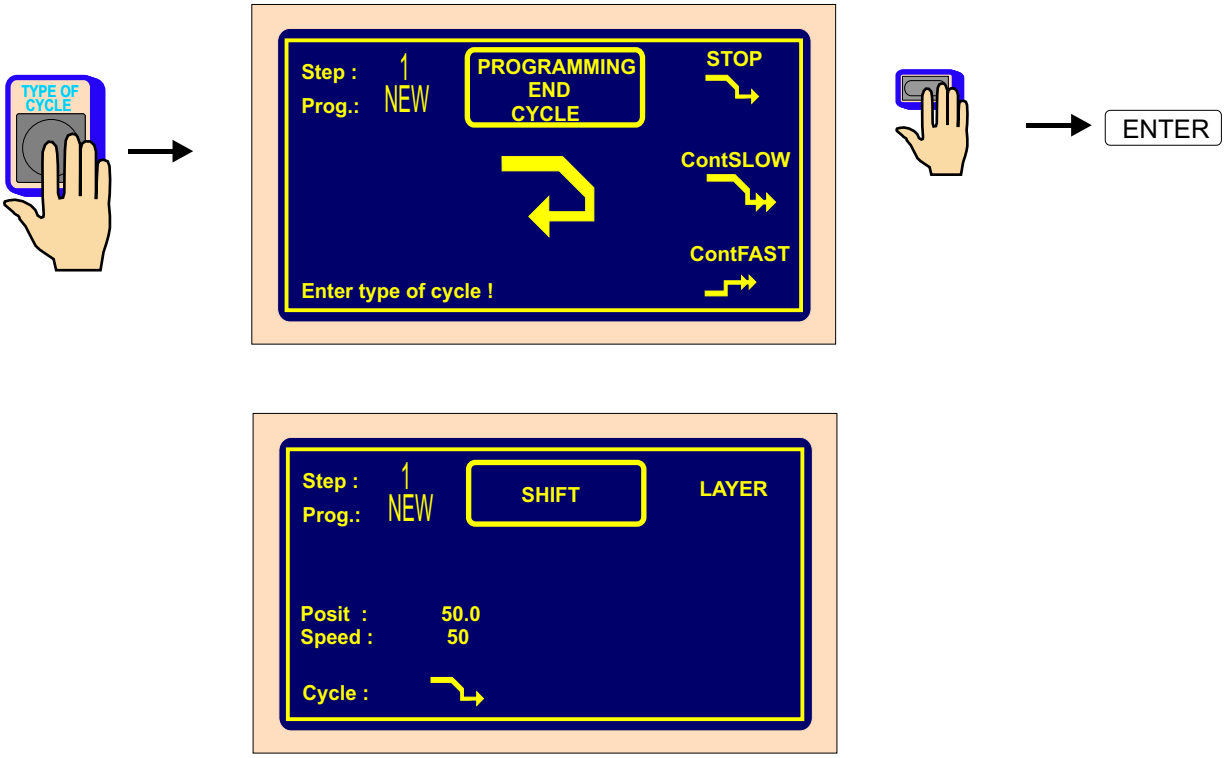
Speed of the shift

The speed of shift is set at 100 mm/sek automatically, while programming.
If lower speed is required,we can change it as follows:.



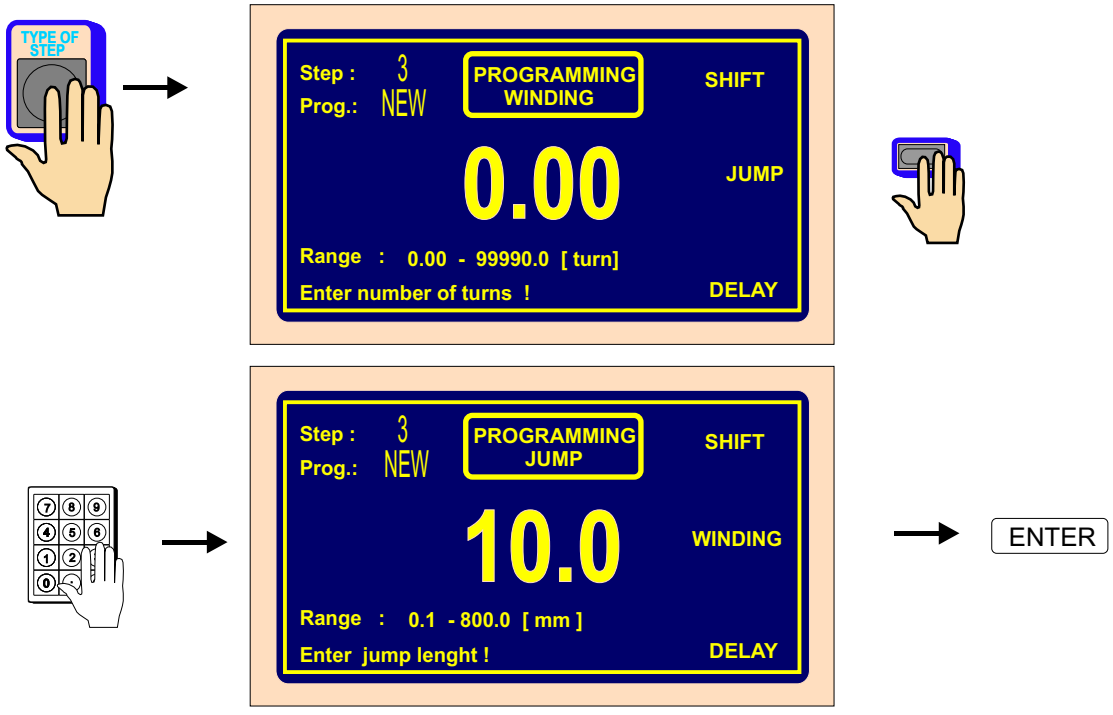


Type of cycle

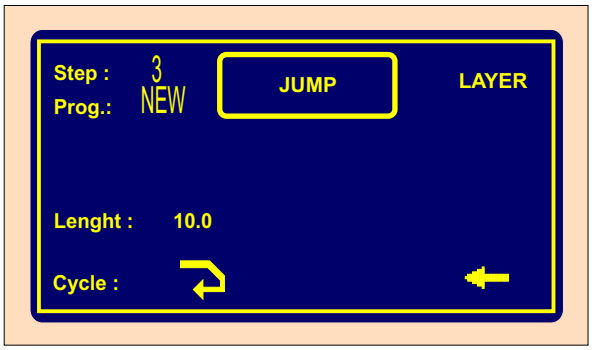


6.3.5 Wire guide jump

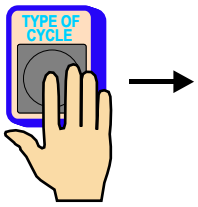
Lenght of jump

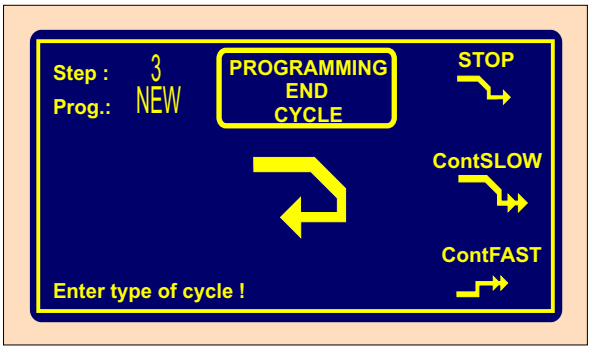


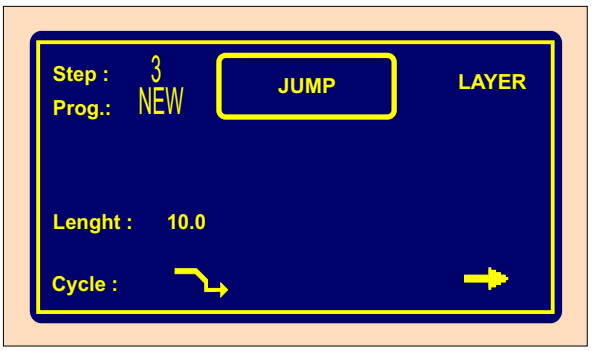
Direction of jump



Type of cycle

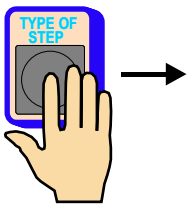


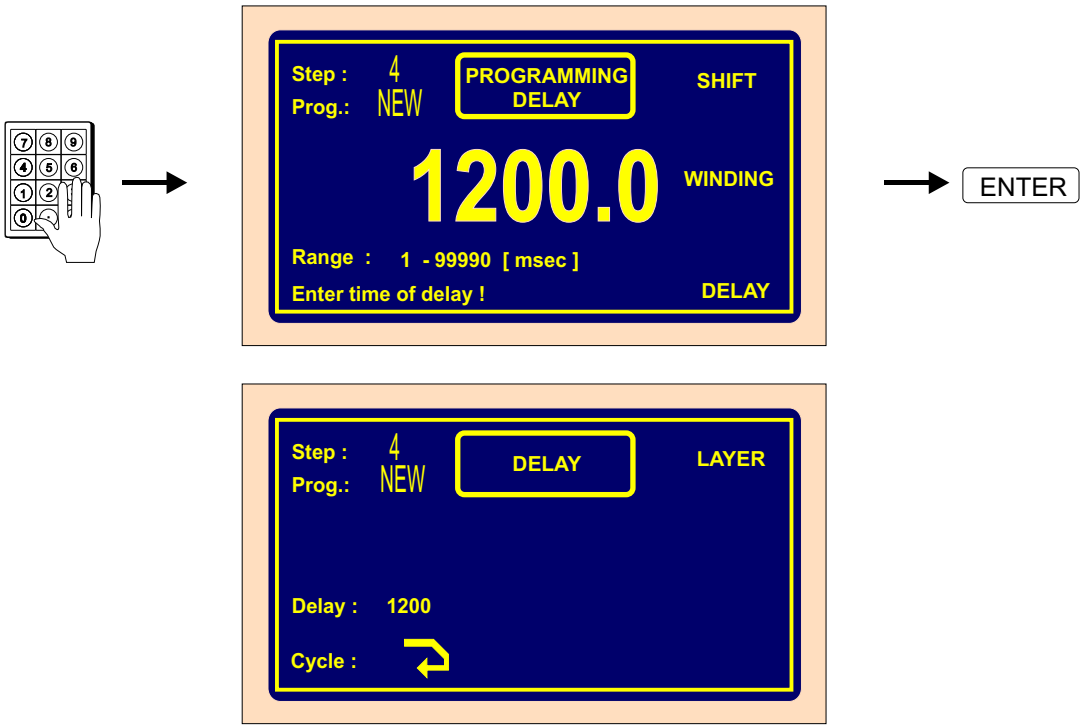




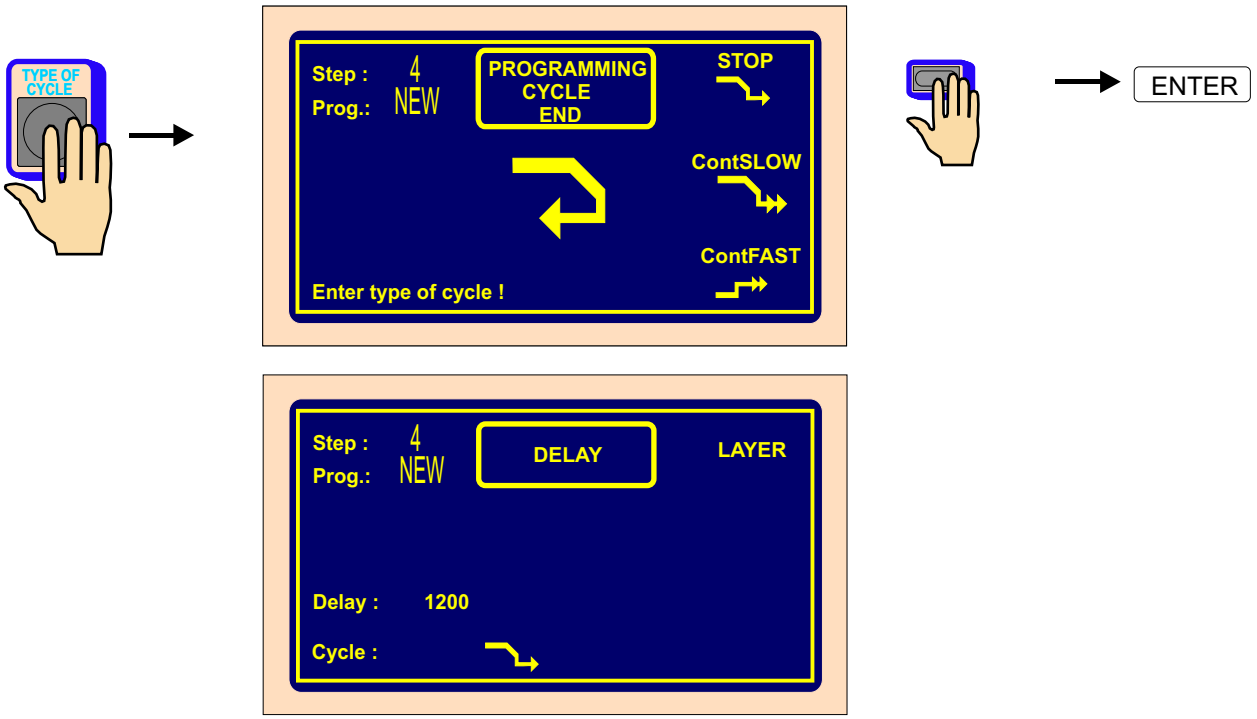
6.3.6 Pause

Time of pause



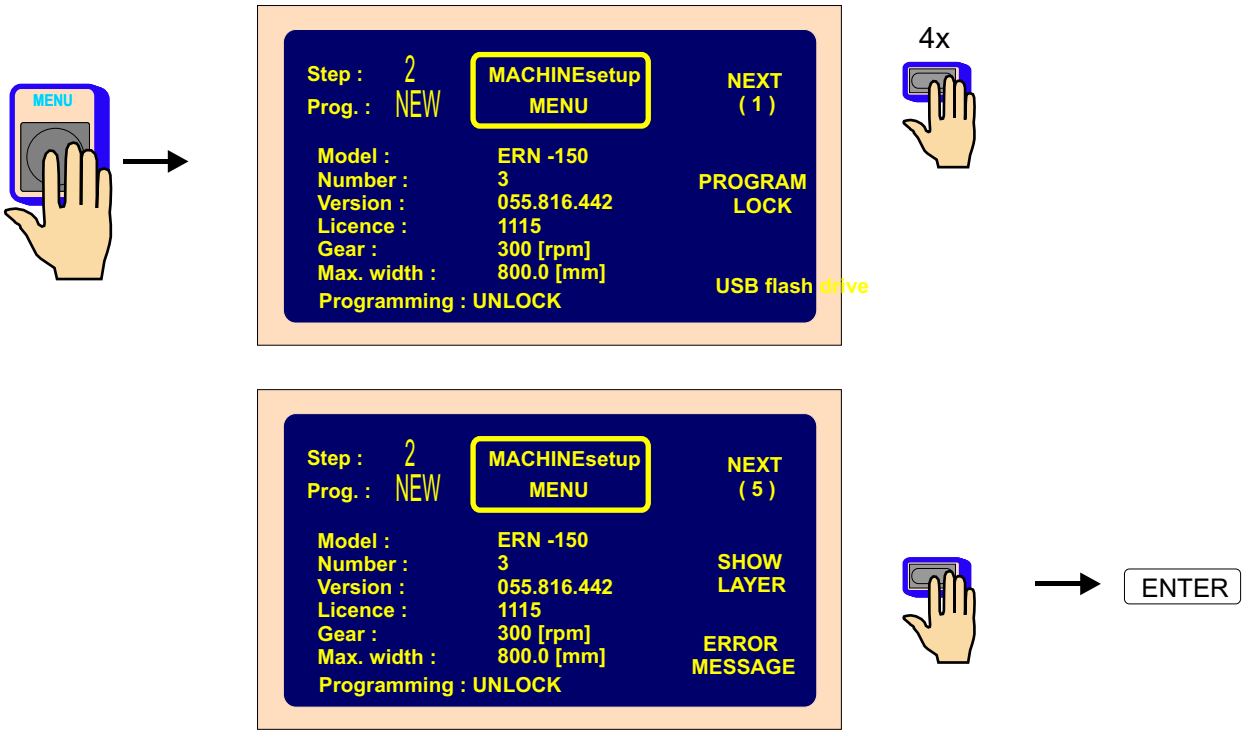


Type of cycle

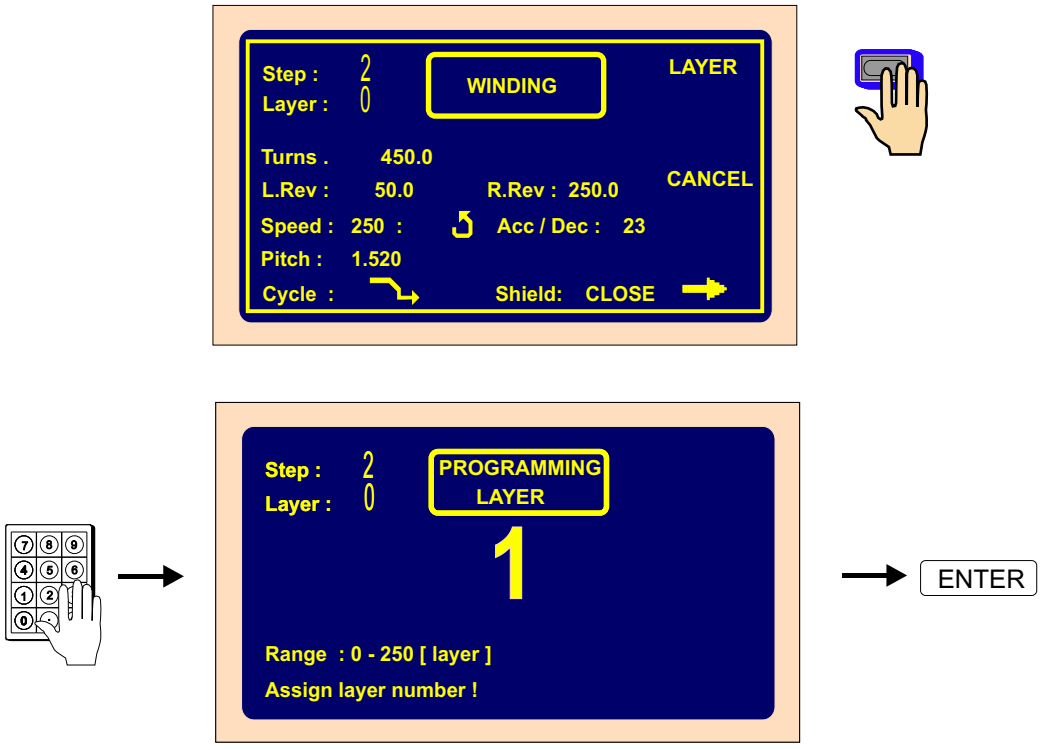


6.4 Display and assignment of the layer

We can display the number of layer instead of program. Readout showed on display can be switched by multifunction button.



We can assign the layer number to every step, according to winding instruction. The same number of layer can be assigned to a few consecutive steps. While winding, the assignment is displayed as it is programmed.

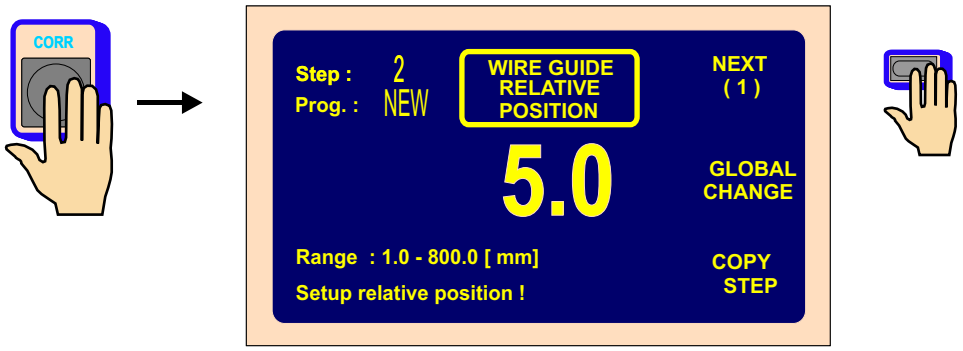


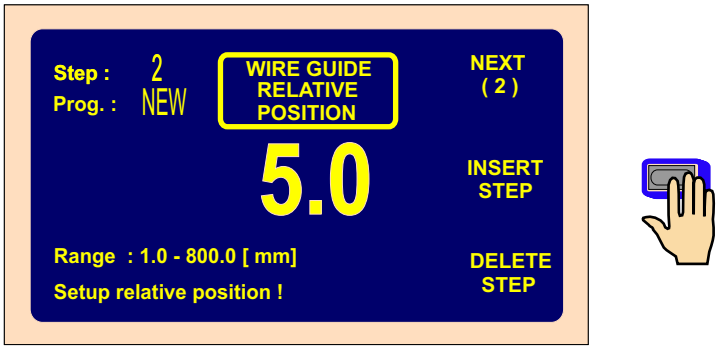
6.5 Programming corrections

Following functions simplify programming or corrections.

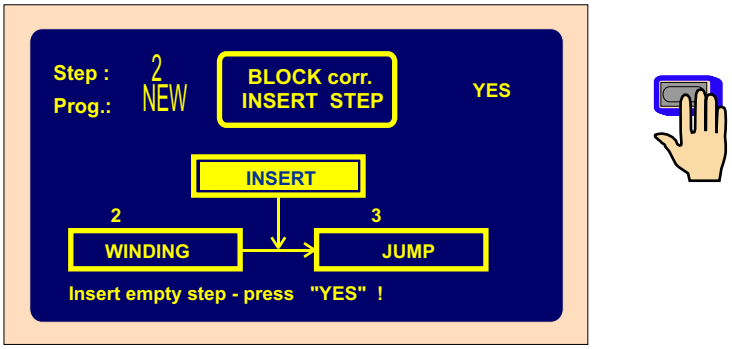
6.5.1 Empty step insertion

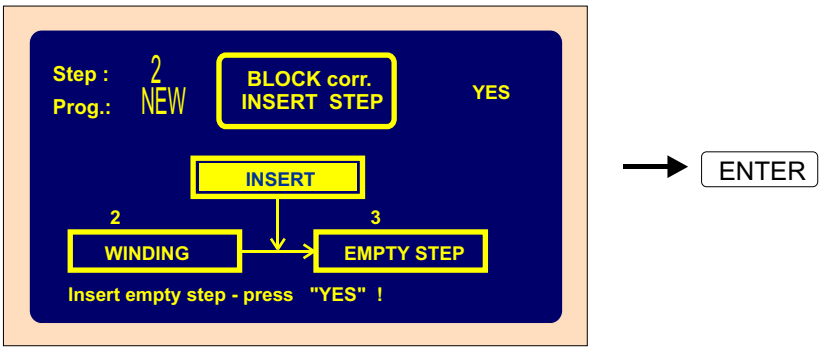
Empty step can be insert anywhere inside the program and then can be completed with required parameters. Following steps are shifted in value " +1", automatically.





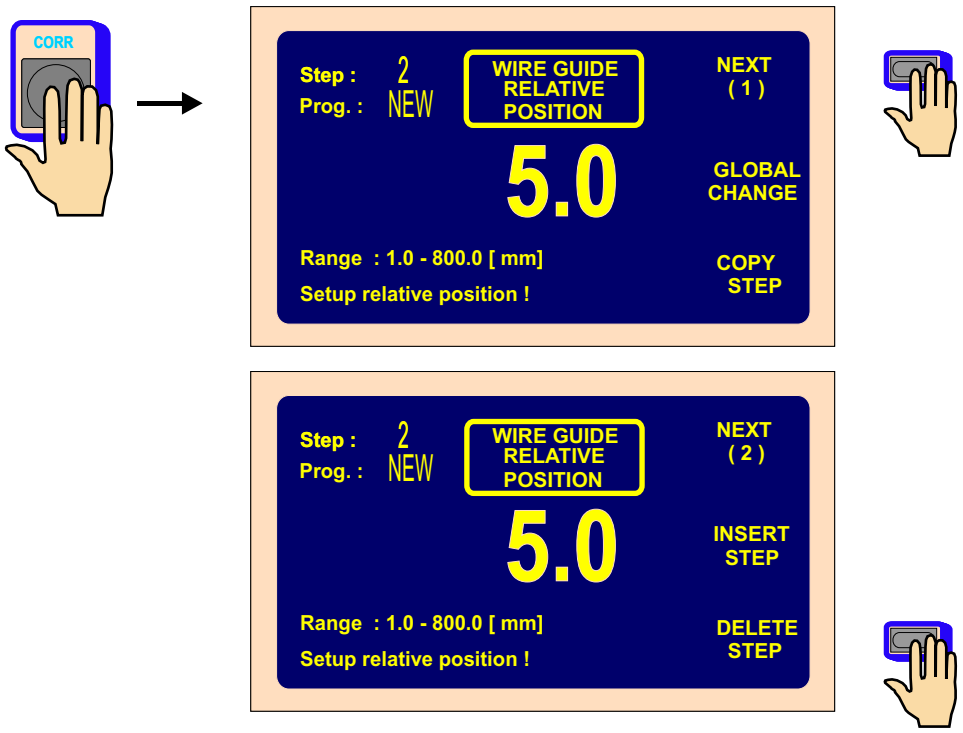
Position for step insertion is chosen by buttons [-] [+]



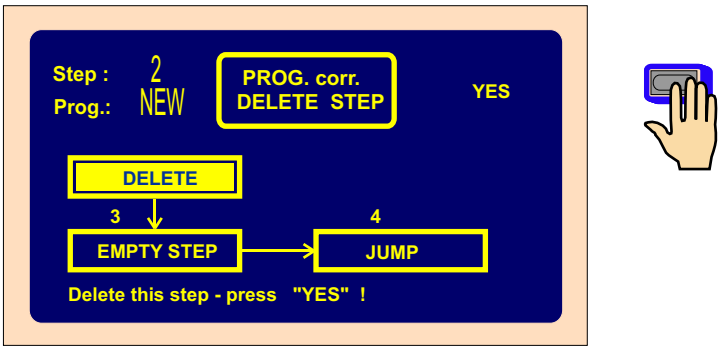


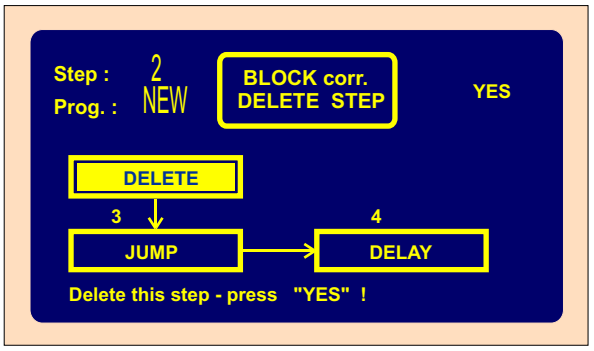
6.5.2 Step cancel

Each step in program can be canceled. Following steps are shifted in value " -1", automatically.



Step, which we wish to cancel is chosen by buttons [-] [+]

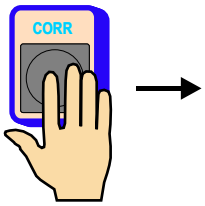


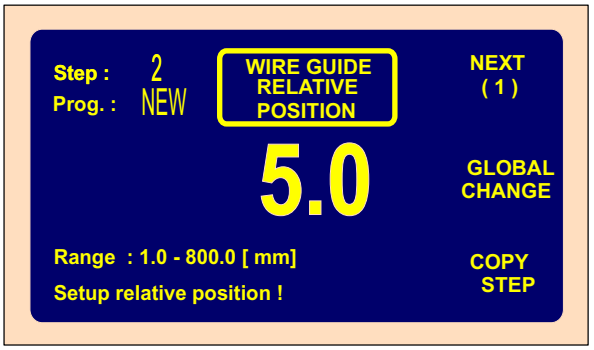


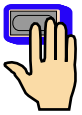
→ ENTER

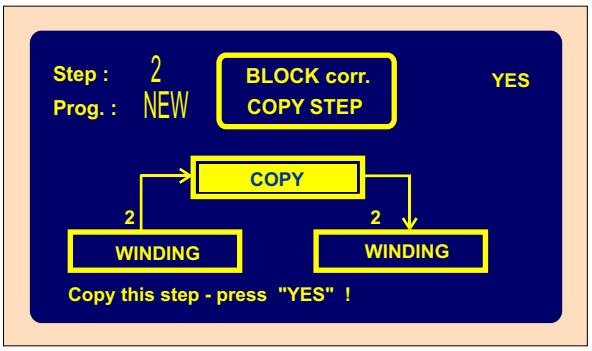
6.5.3 Step copy

Each step, already programmed, can be copied to another step (previous or next).

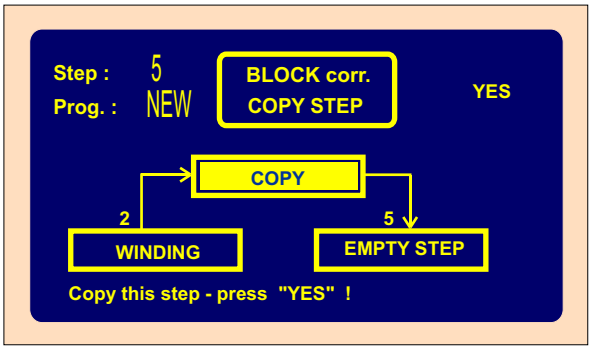








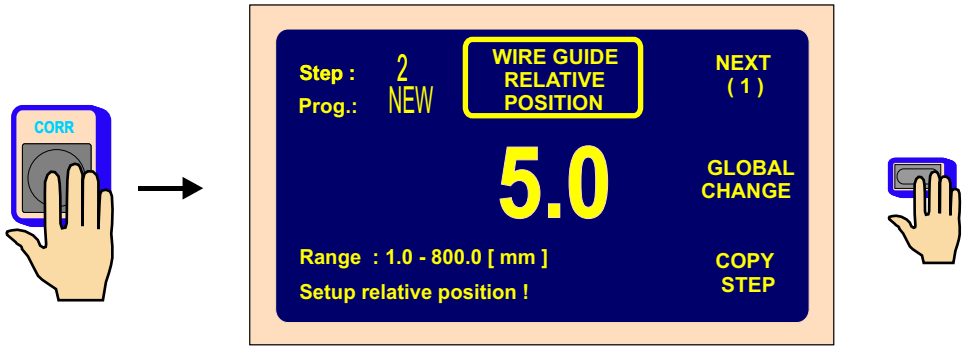
Actual step is copied and inserted to the step, which is chosen by buttons [-] [+]

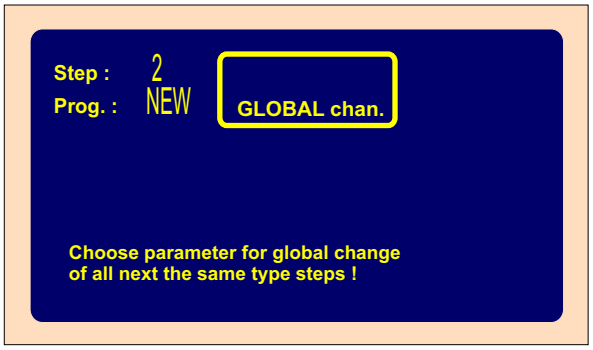


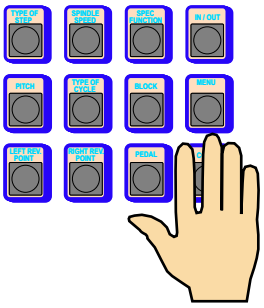
→ ENTER

6.5.4 Global change

Function allows you to change one chosen parameter in all the following steps, which must be the same type. For example: if the actual step is winding, chosen parameter will be changed in all following winding steps. This is valid for all other step types (SHIFT,JUMP,PAUSE).





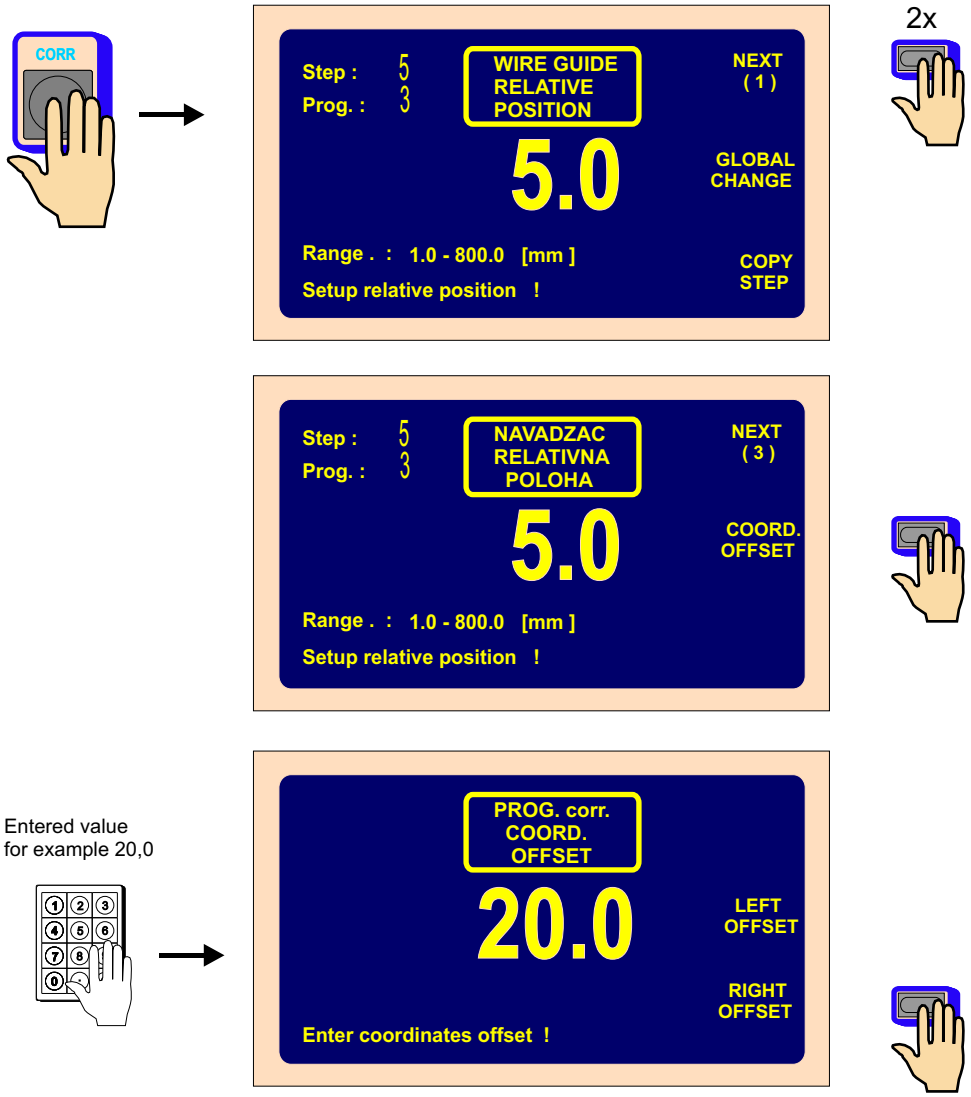


Choose the parameter for changing - e.g. pitch

The pitch is changed in all other consecutive winding steps.

6.5.5 Coordinate offset

Correction provides offset all coordinates in program to the left or right about entered value.

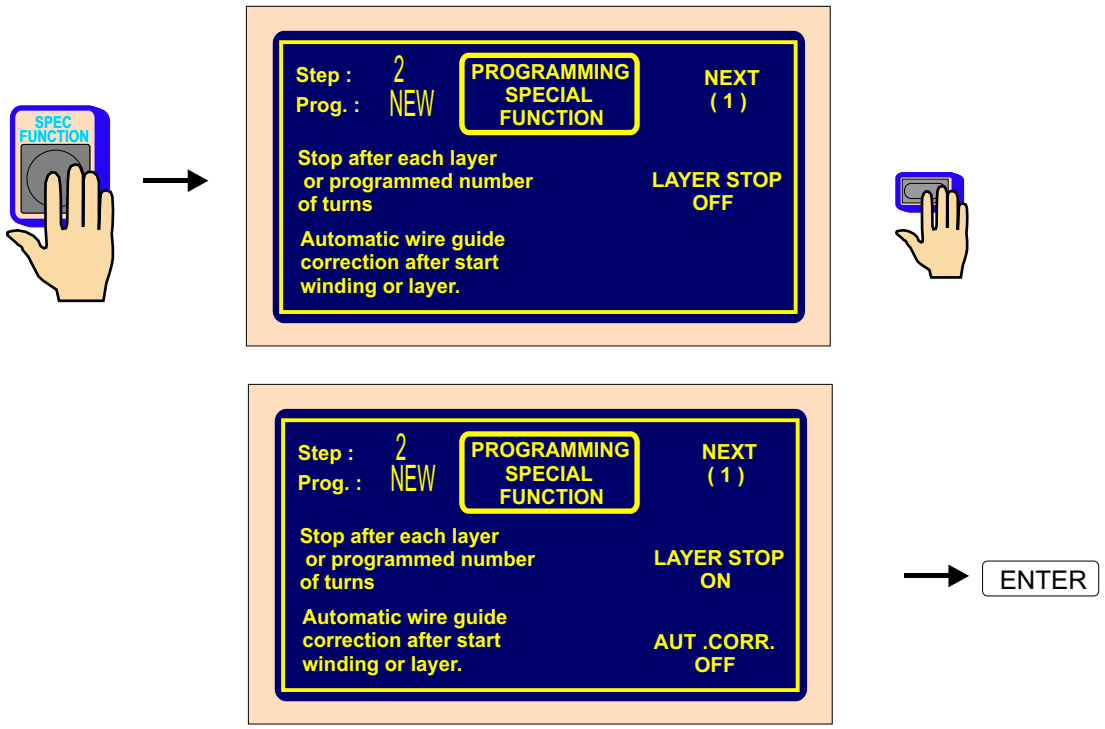


All programmed coordinates / left,right reversal points and shifts/ are incremented about value 20,0 mm.

6.6 Special functions

6.6.1 Layer stop

This function activates winding step STOP, after each wound layer.

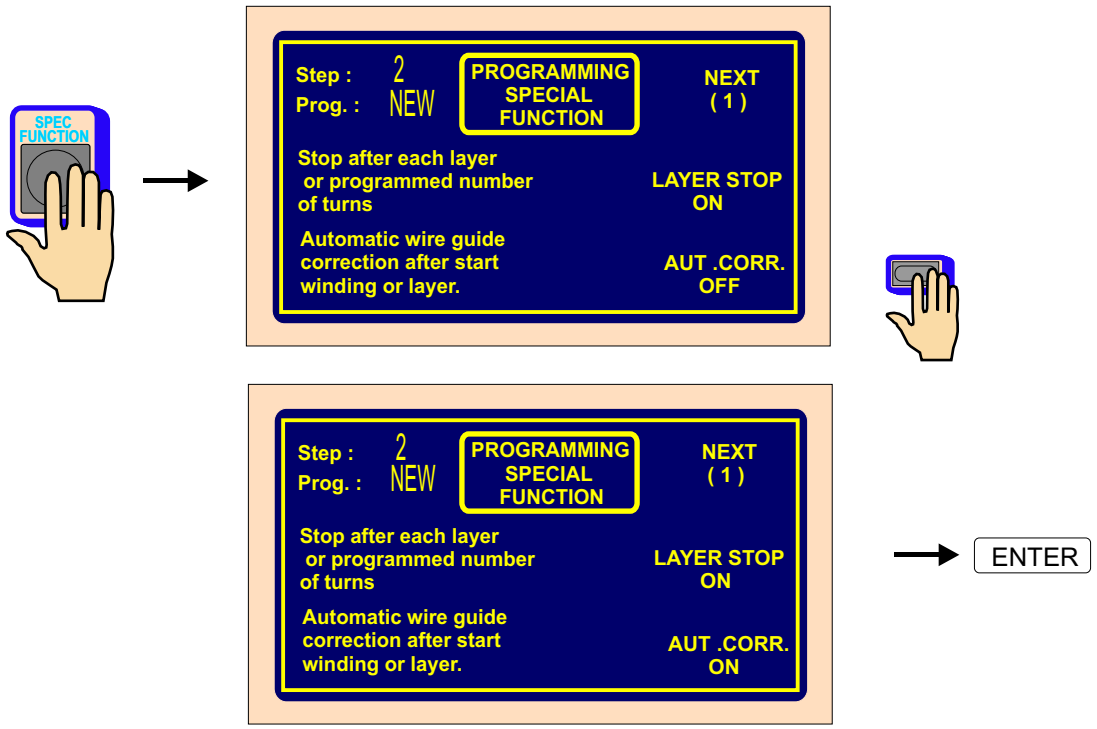


Until programmed number of turns is not reached, machine stops after each layer on the left or right reversal point.

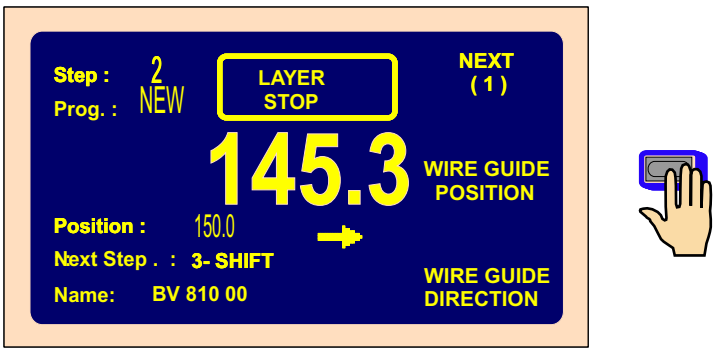
> If the assigned layer is displayed, this function will increment its value automatically, after each layer.

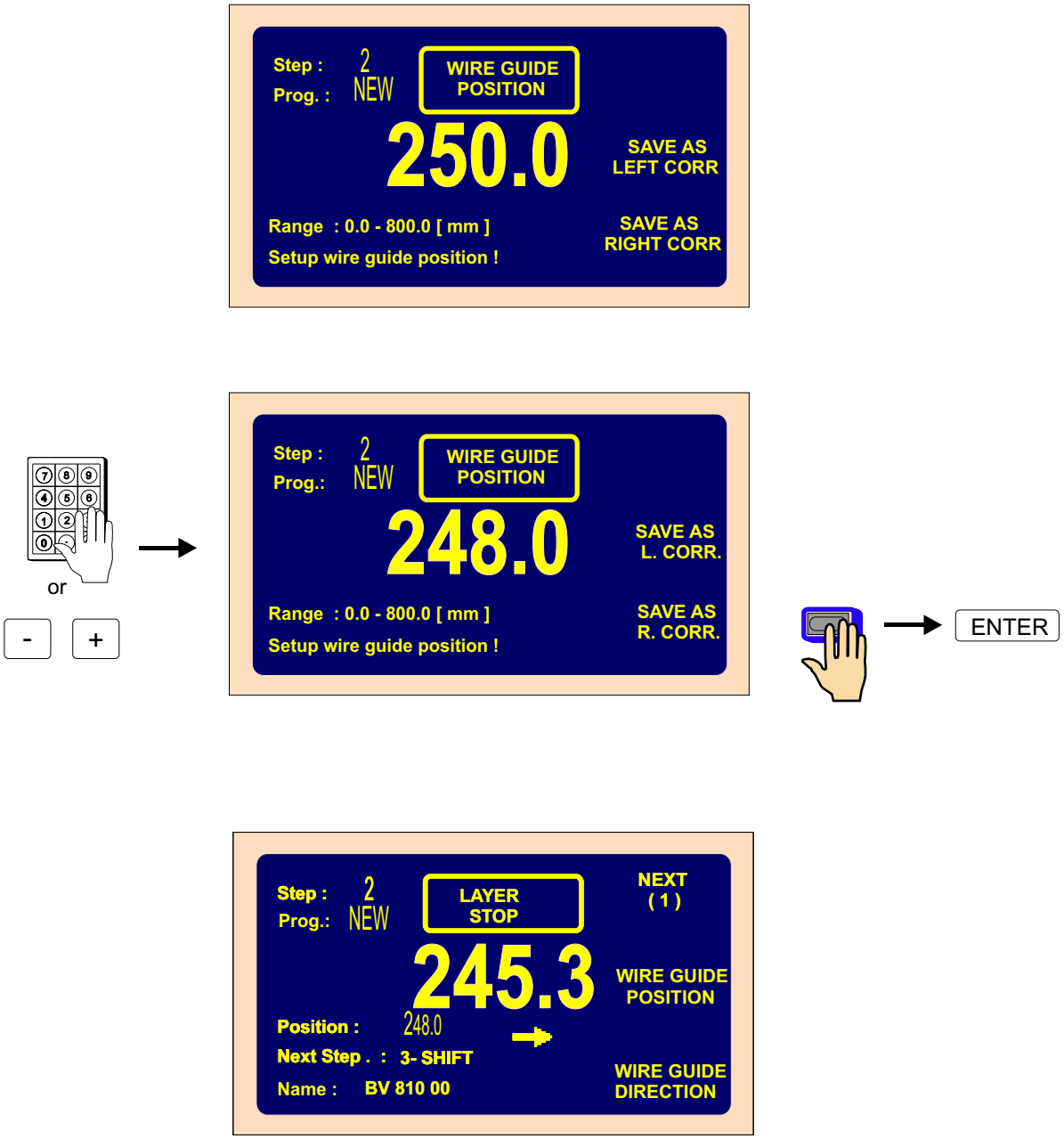
6.6.2 Automatic correction

Utilization of this function is mainly related to previous function LAYER STOP.
It allows you to correct wire guide position after following start of the layer.



After the first layer is wound (e.g. from left to the right), press the wire guide correction button and correct the wire guide position. This corrected position is saved by pressing SAVE AS RIGHT CORRECTION button. Likewise, we insert and save the left correction after the second layer (from right to the left) is wound. For all the following layers in this step, all the corrections are done automatically, after start.



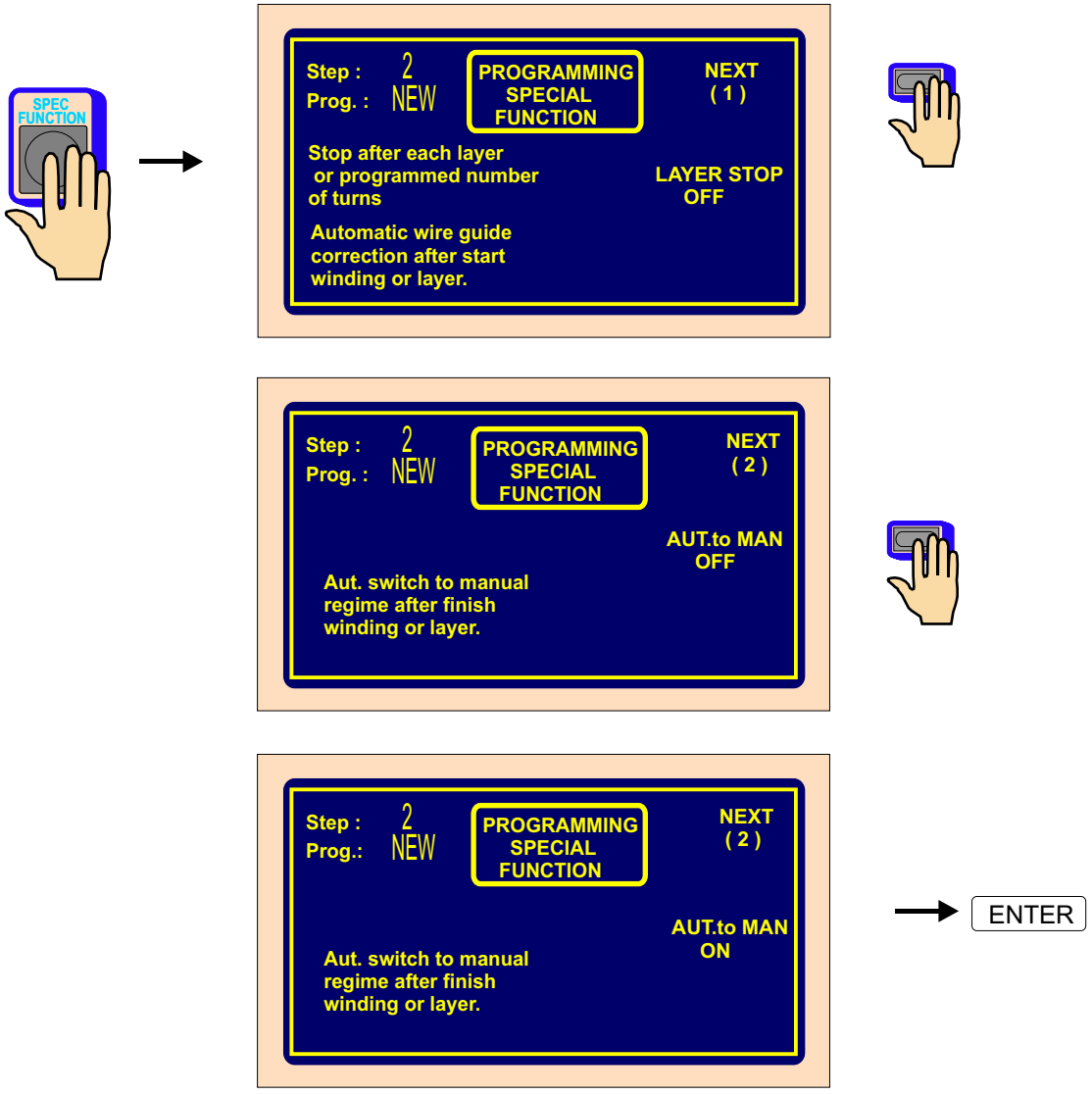


Maximal value for wire guide correction can not overreach ± 10 mm position diversion, after the layer is wound. Higher values are not accepted !

6.6.3 Automatic switch to manual regime

Function provides automatically machine switch to manual regime, after the layer or whole winding step is completed.

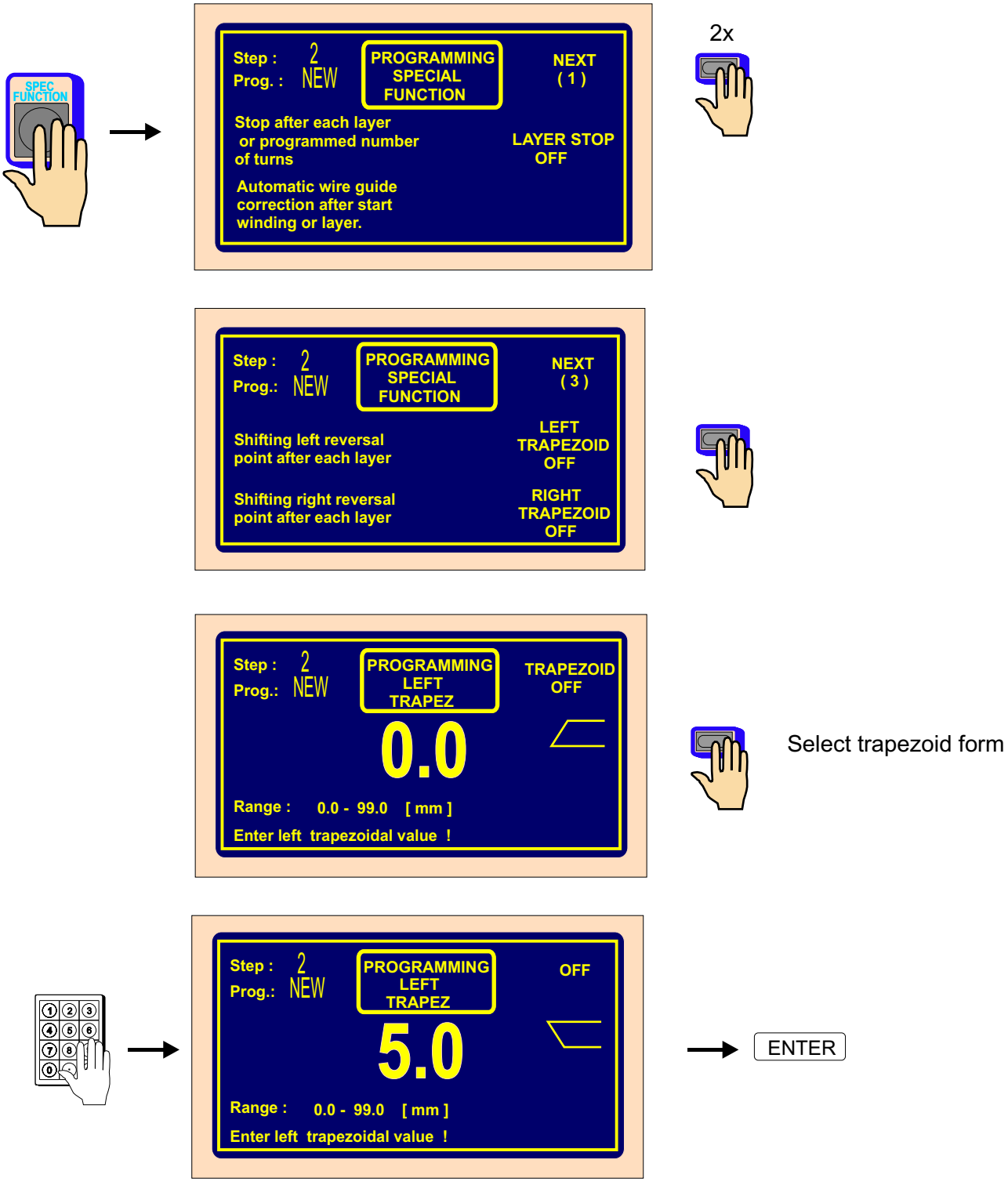
> We can wind, just by foot pedal in manual regime. Also, the value of the pitch is taken from the actual step. The wire guide direction is controlled by multifunction button WIRE GUIDE DIRECTION. The number of turns, that is wound in this regime is not defined.

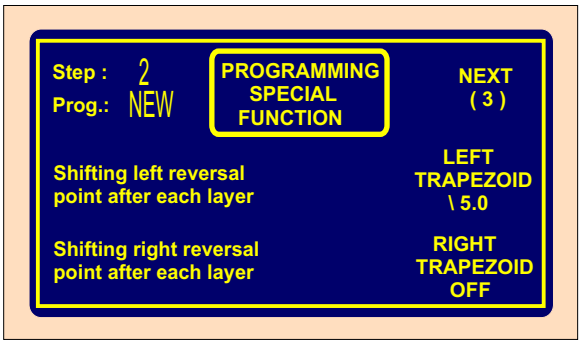


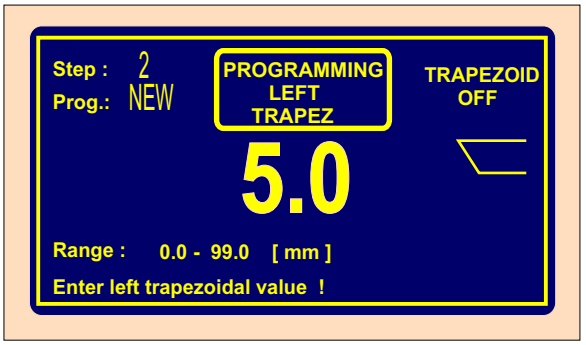
Manual regime switch OFF is done by pressing MANUAL button.

6.6.4 Trapezoidal winding

Function provides shifting of reversal points after each layer automatically.

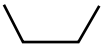






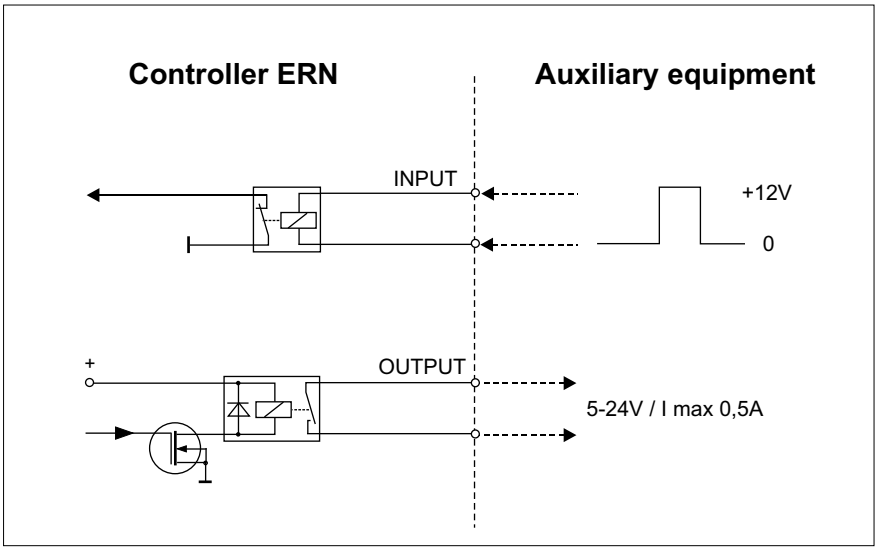
Switch function off

Available form of trapezoidal windings :

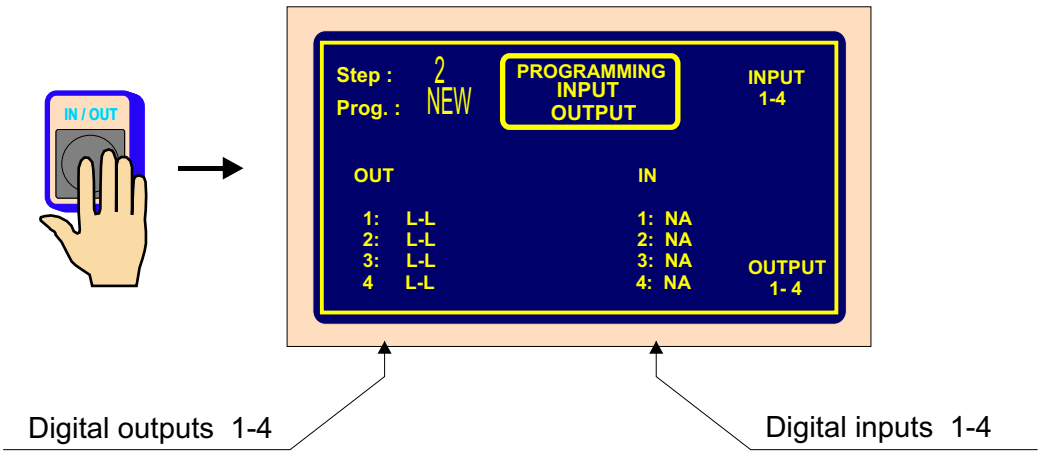
	left trapezoid : **OFF**	right trapezoid : **/ X,X**
	left trapezoid : **OFF**	right trapezoid : **\ X,X**
	left trapezoid : **\ X,X**	right trapezoid : **OFF**
	left trapezoid : **/ X,X**	right trapezoid : **OFF**
	left trapezoid : **\ X,X**	right trapezoid : **/X,X**
	left trapezoid : **/ X,X**	right trapezoid : **\ X,X**
	left trapezoid : **\ X,X**	right trapezoid : **\ X,X**
	left trapezoid : **/ X,X**	right trapezoid : **/ X,X**

6.7 Auxiliary inputs and outputs

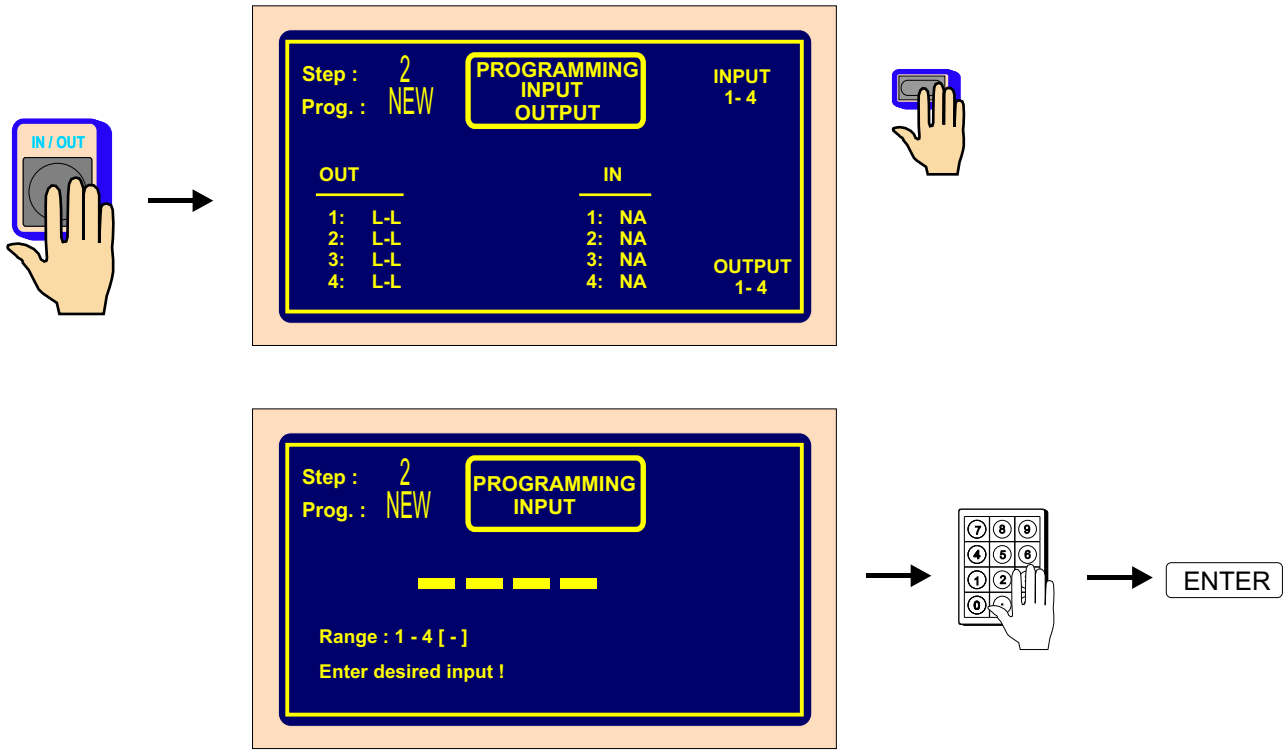
Machine provides an oportunity to program and control up to 4 auxiliary digital outputs and 4 digital inputs in each step. Digital inputs and outputs are galvanise isolated. Relay is applied in standard equipment.



6.7.1 View window for inputs and outputs

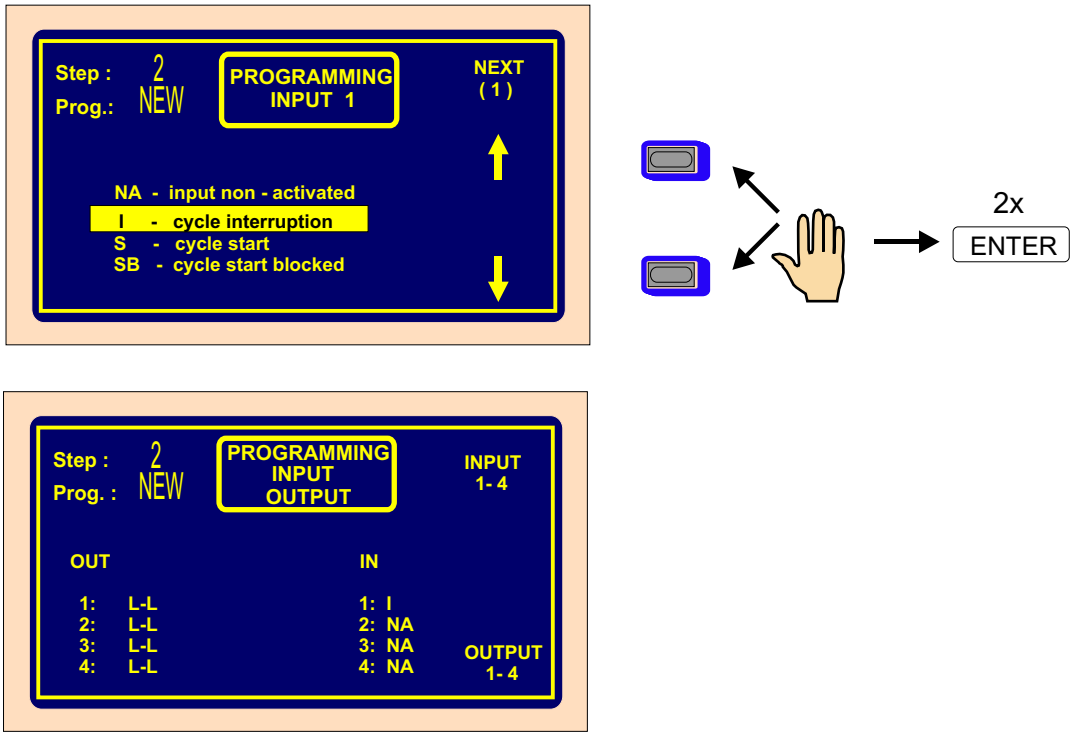


6.7.2 Digital inputs programming



Each digital input can be programmed as:

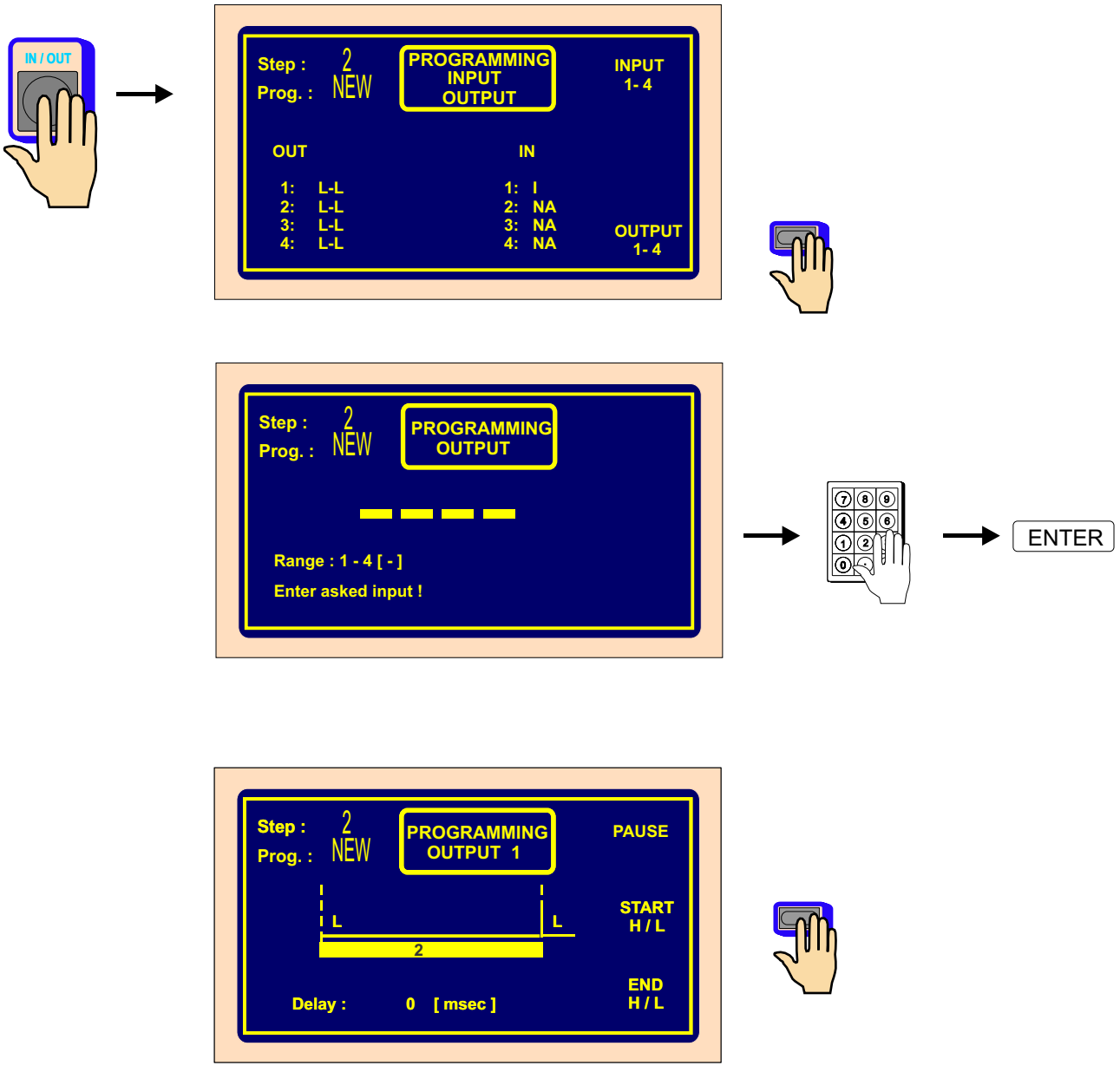
NA - input is inactive
I - winding cycle interrupton is done, if input is high (+ 12 V)
S - winding cycle start is done, if input is high (+12 V)
SB - start is blocked, while duration of high (+ 12V)

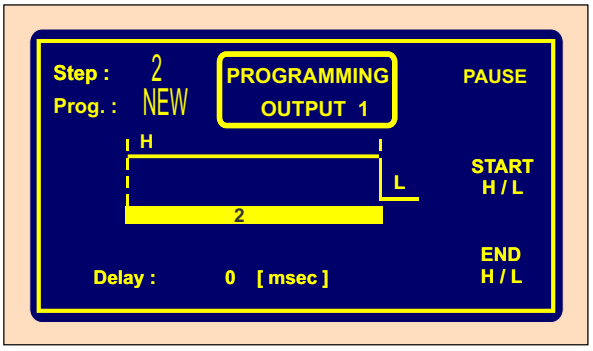


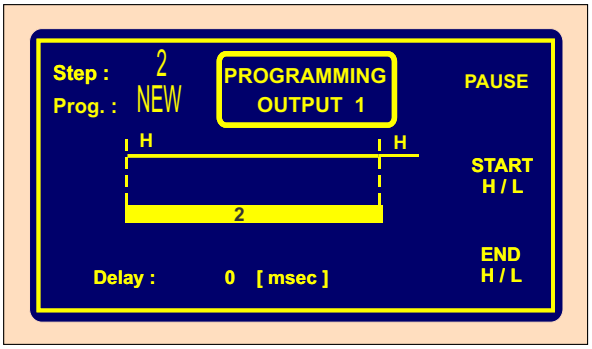
6.7.3 Digital outputs programming

3 following parameters can be programmed in digital outputs 1 - 4:

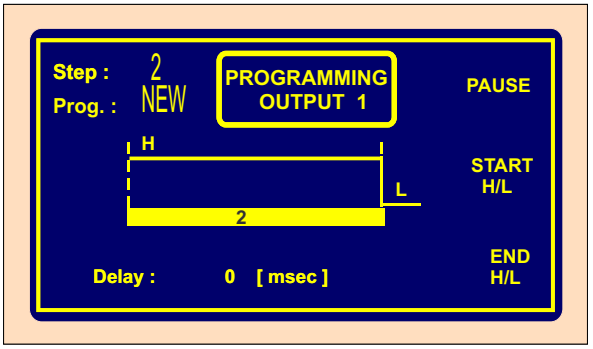
- level of output, after step start - up (L - relay on, H - relay off)
- level of output, after step finish - up (L - relay on, H - relay off)
- delay of output action

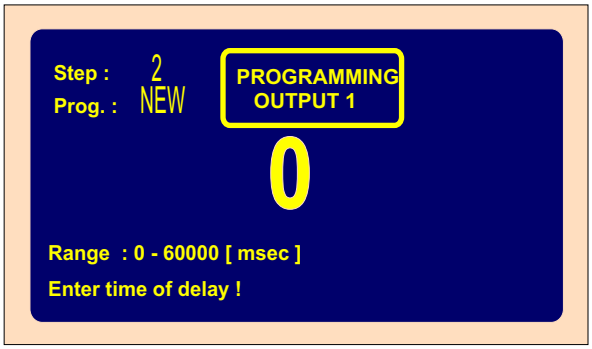


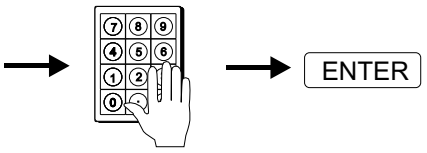

Step :
Prog. :
2
NEW
PROGRAMMING
OUTPUT 1
PAUSE
H
L
2
START
H / L
END
H / L
Delay :
0
[msec]

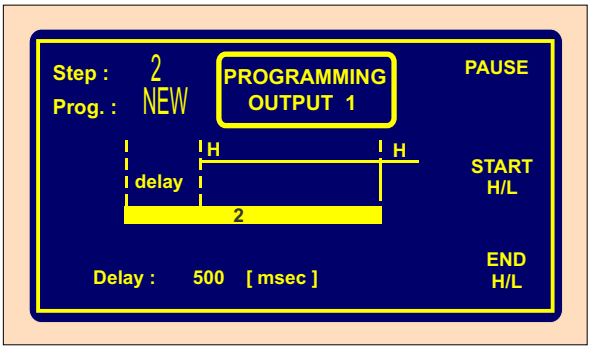

Step :
Prog. :
2
NEW
PROGRAMMING
OUTPUT 1
PAUSE
H
H
2
START
H / L
END
H / L
Delay :
0
[msec]

Delay


Step :
Prog. :
2
NEW
PROGRAMMING
OUTPUT 1
PAUSE
H
L
2
START
H/L
END
H/L
Delay :
0
[msec]


Step :
Prog. :
2
NEW
PROGRAMMING
OUTPUT 1
0
Range : 0 - 60000 [msec]
Enter time of delay !

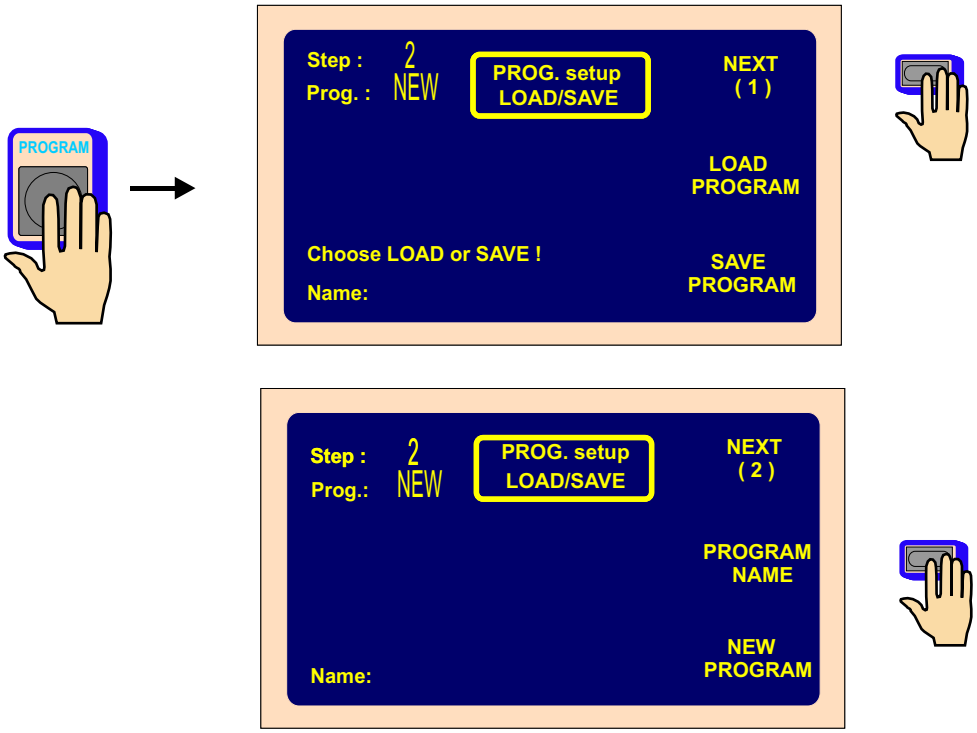

ENTER

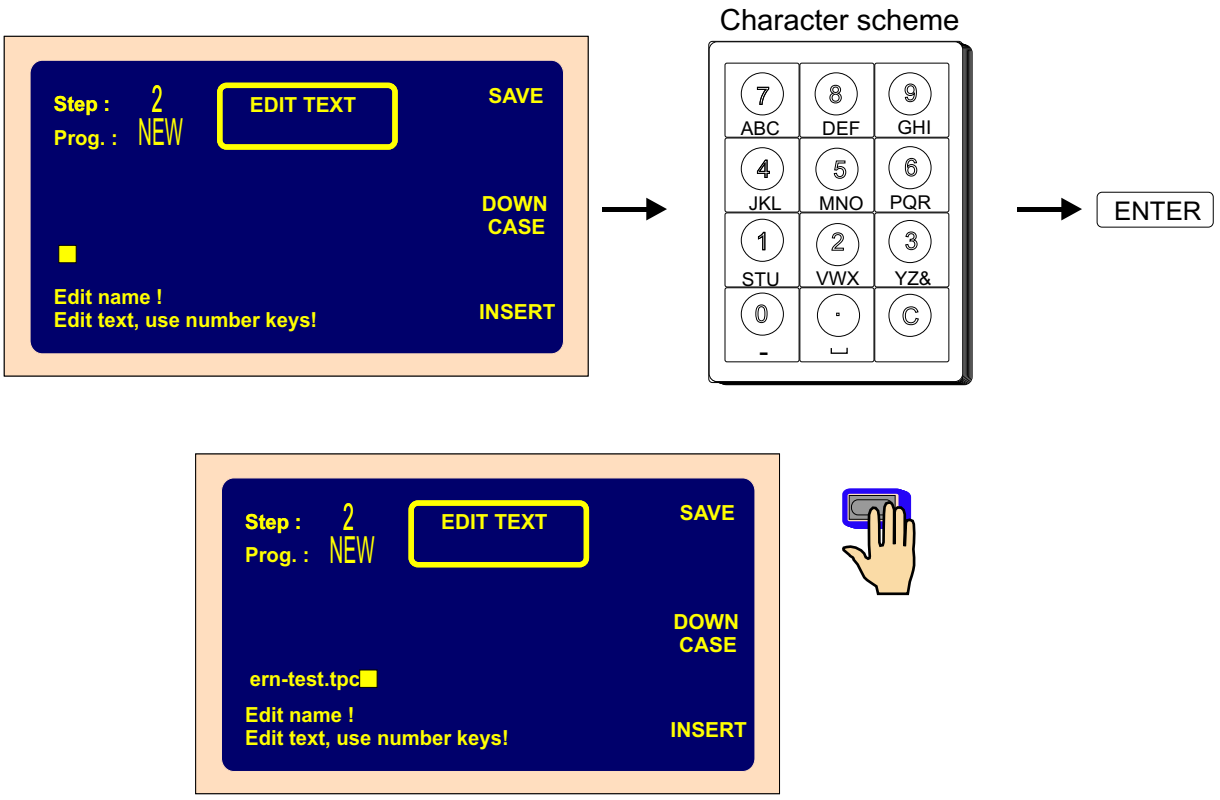


6.8. Program name

Created winding program shoud be named for quick and easy orientation. The name can consist of max.24 characters in accordance with Character scheme. If winding programs are stored to USB flash drive as well, is highly recommended to use format **8.3** (1 to 8 characters,optionally followed by a period "." then extention up to 3 characters.) For example "ern-test.tpc"

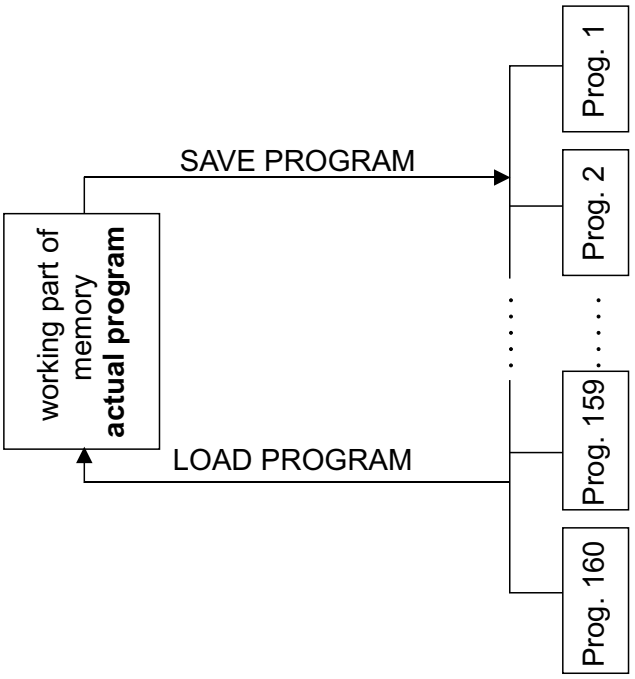
Long file names for USB flash drive are not supported !



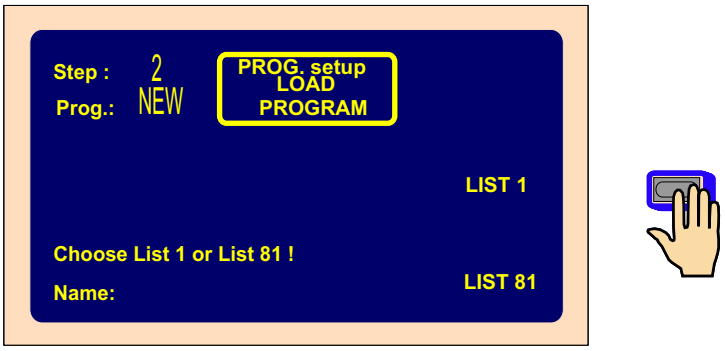


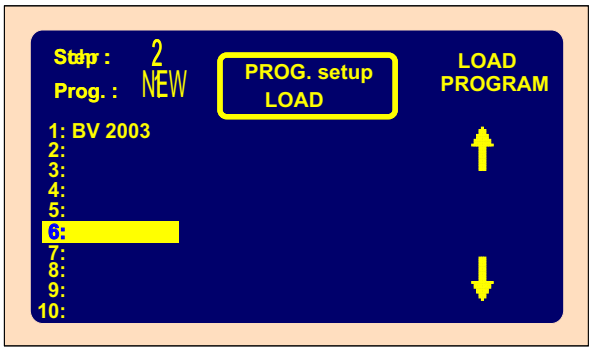
7. Program saving and opening

Actual program is placed in working part of memory. This program can be saved to an optional block or other saved program can be opened.

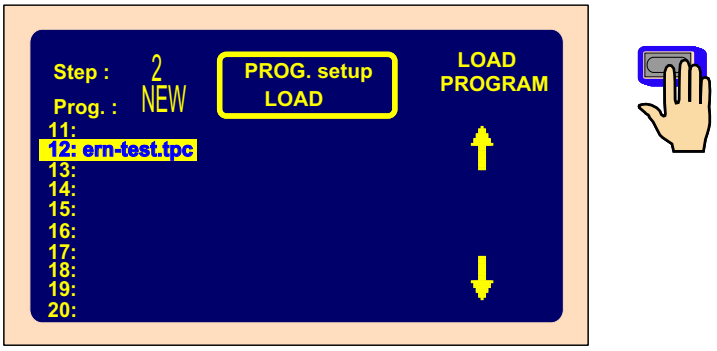


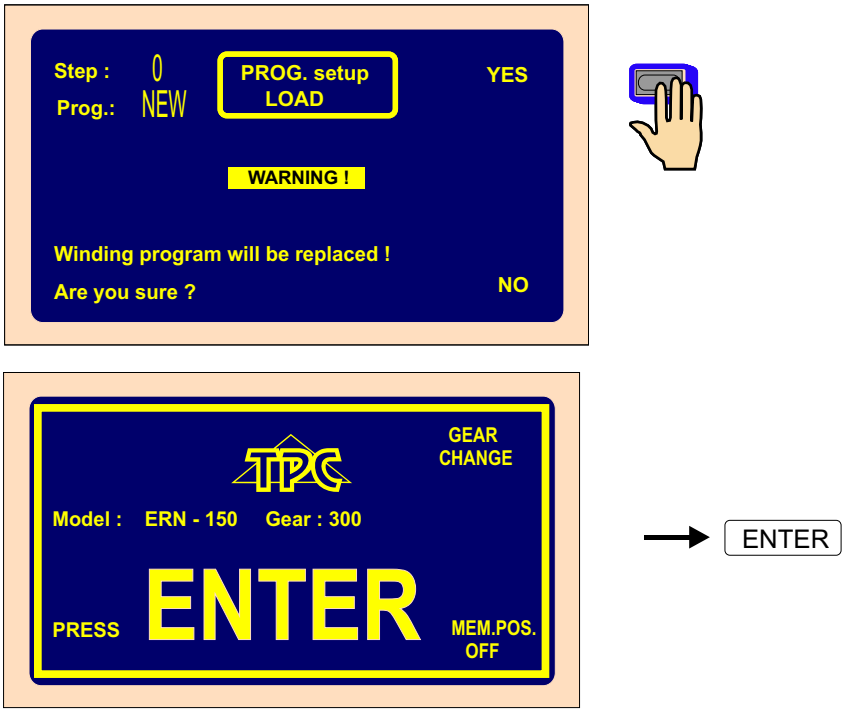
7.1 Program opening





Listing by button - or +

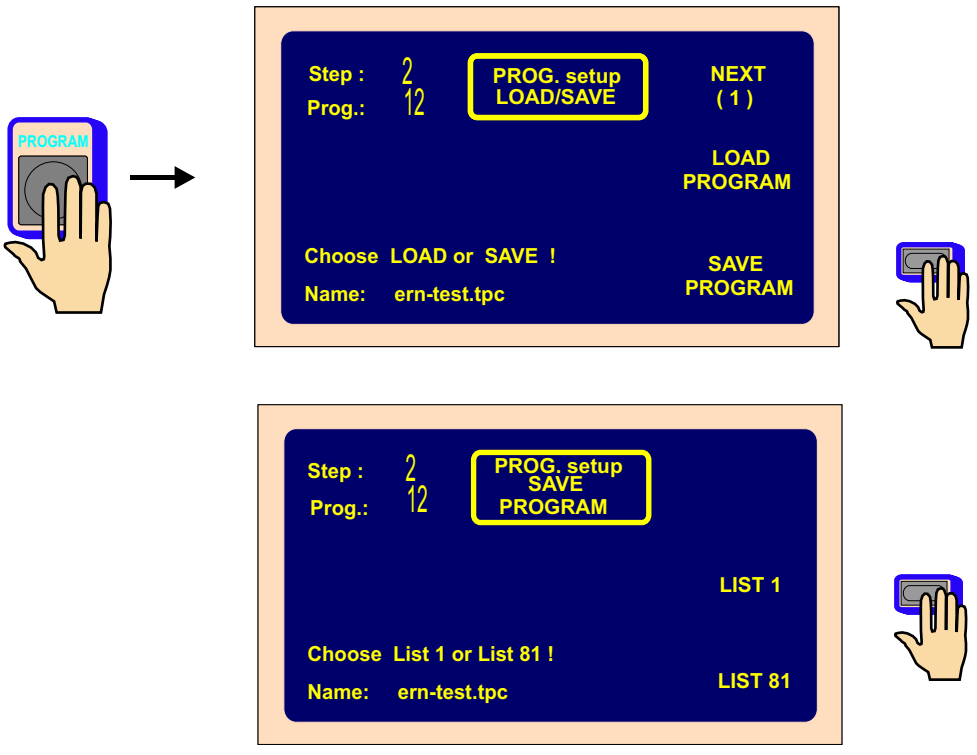


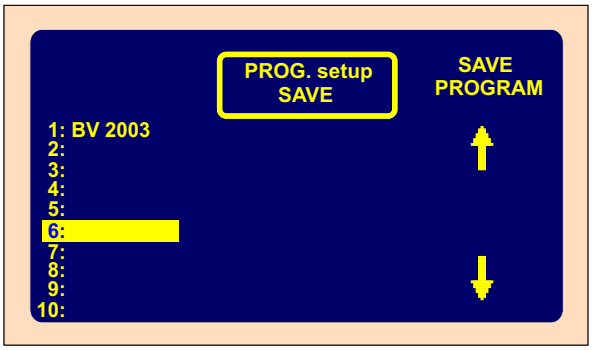


7.2 Program saving

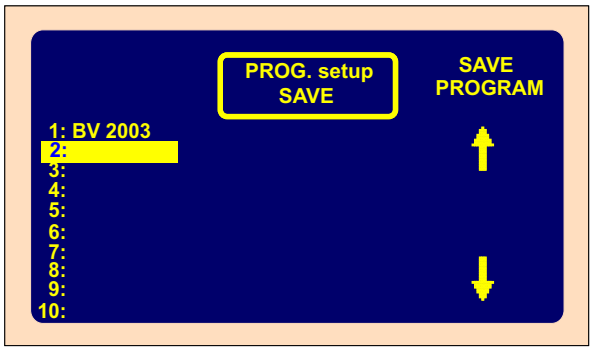
Capacity of the internal memory is 11500 steps divided to 160 blocks. Max. step capacity is limited as follows:

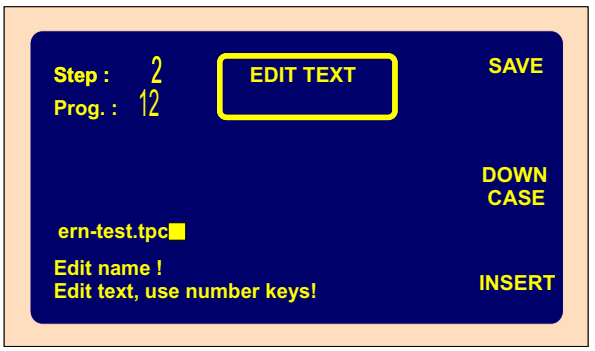
Blocks 1 - 10 : max.capacity up to 350 steps
Blocks 11 - 20 : max.capacity up to 100 steps
Blocks 21 - 160 : max.capacity up to 50 steps





Select block for saving



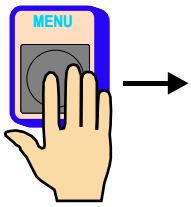


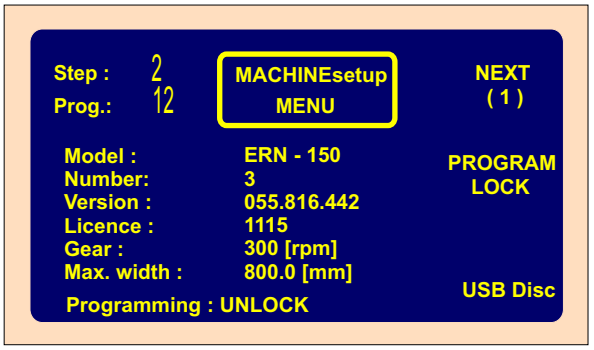
Correct program name
if required

2x
ENTER

8. MENU

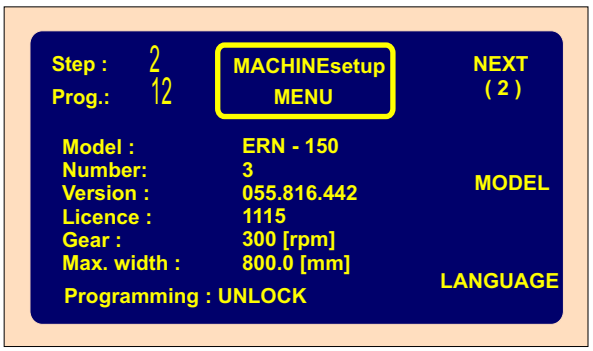
Displays and allows to change some machine basic setting.





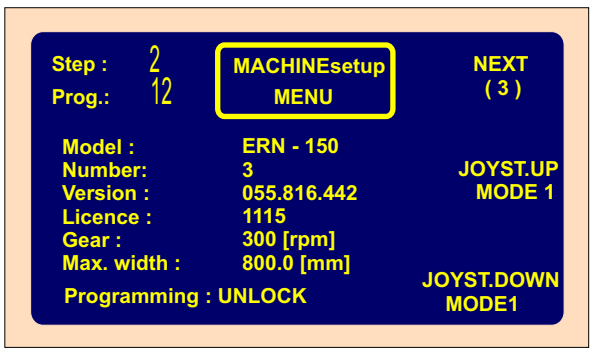
Program locking

USB flash drive



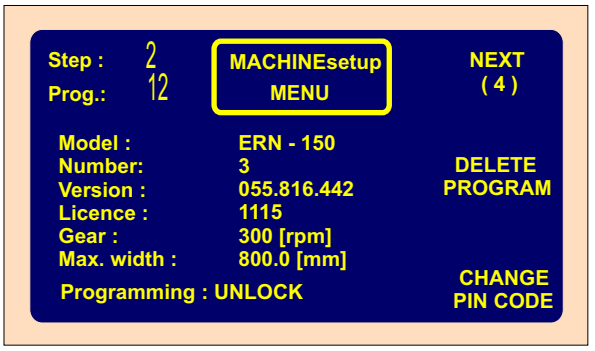
Machine model choice

Display language



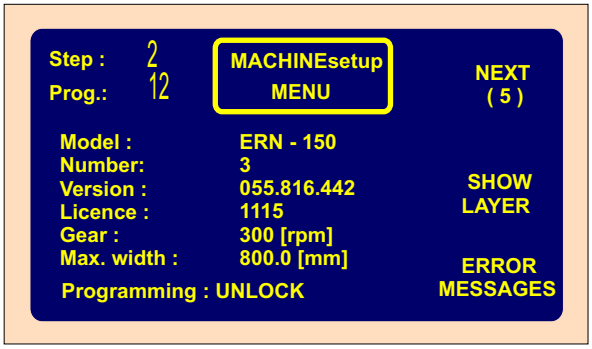
Joystick action UP

Joystick action DOWN



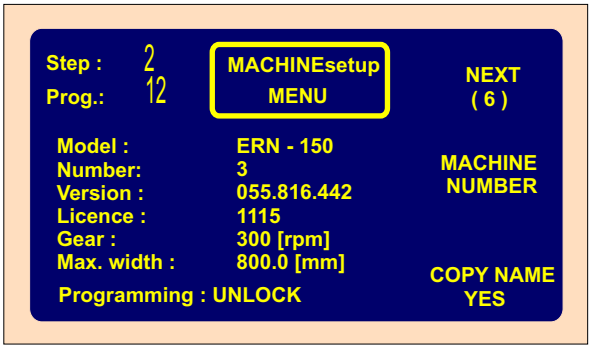
Program delete

Access code setting



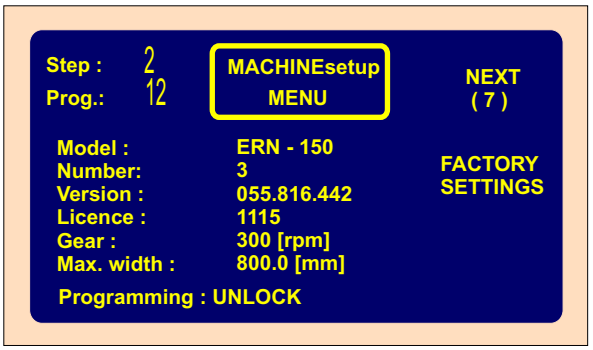
Display program or layer

Error messages



Winder number

Accept file name



Factory settings

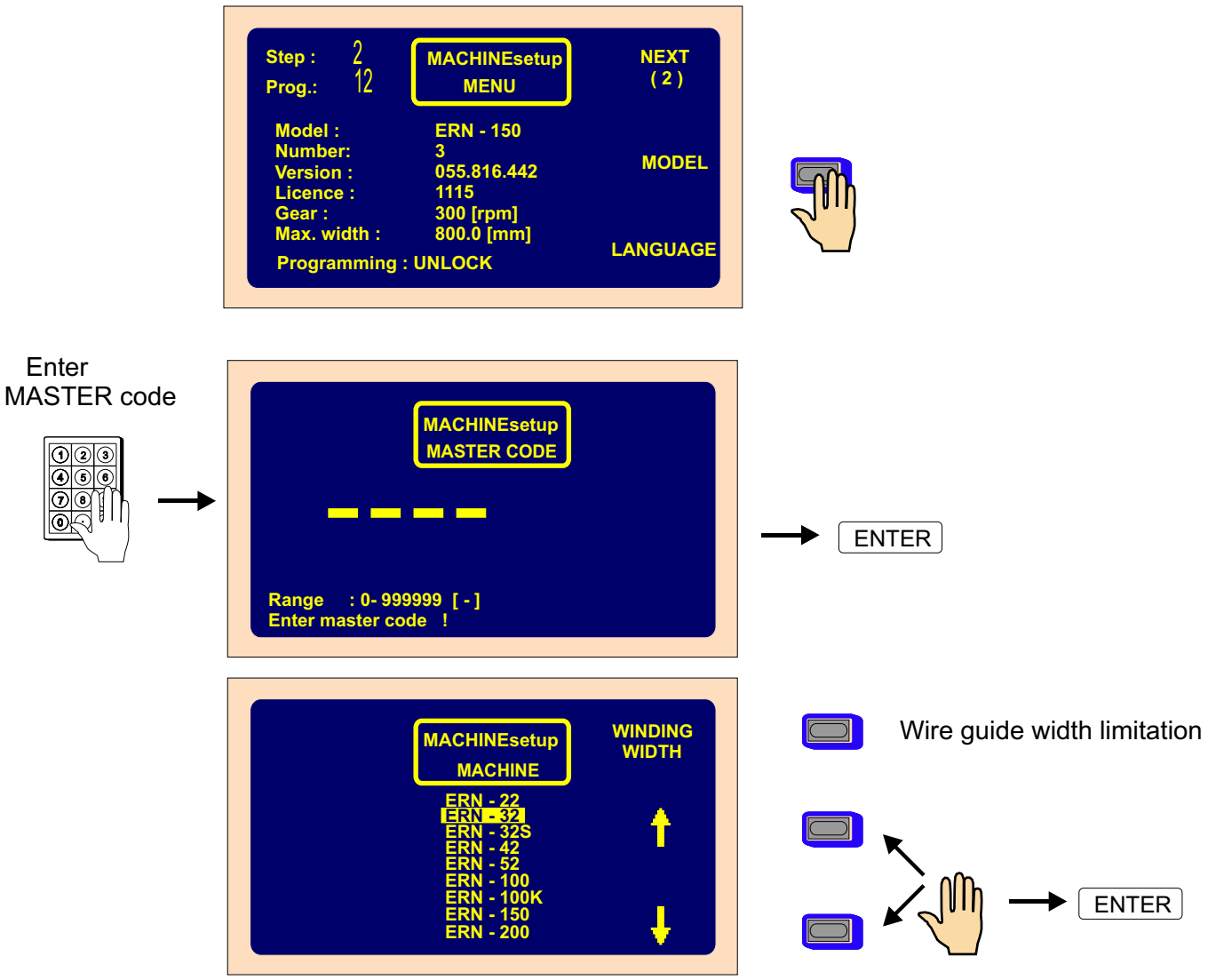
8.1 Program locking

Programming can be locked or unlocked by entering MASTER or PIN code. Corrections which are performed during winding process (wire guide correction, back winding, abort step etc.) are not blocked.

8.2 USB flash drive

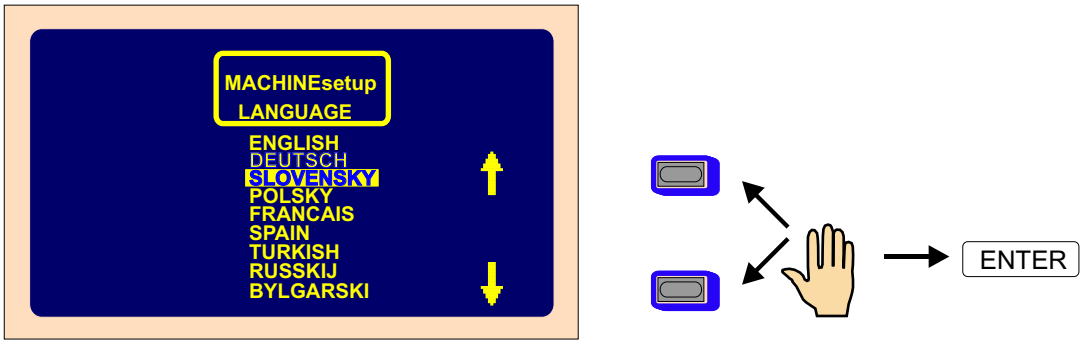
Entry to USB flash drive directory. If USB flash drive is not connected, the button is inactive.

8.3 Machine model choice



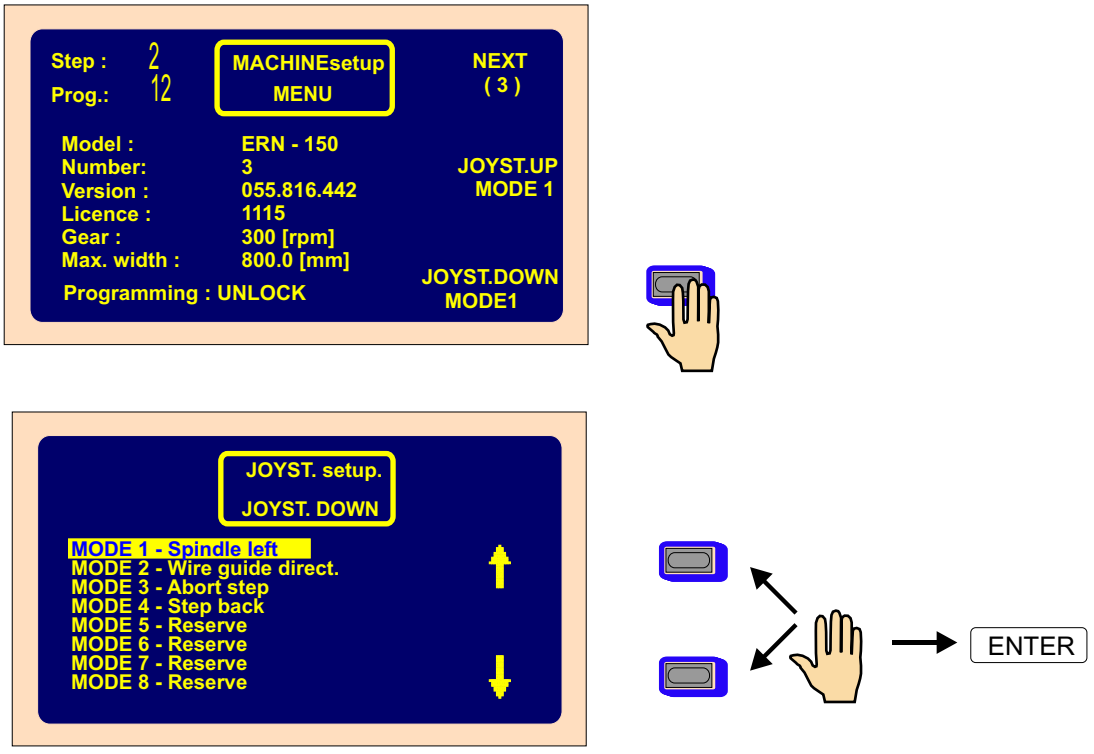
8.4 Display language

Allows you to choose display language.



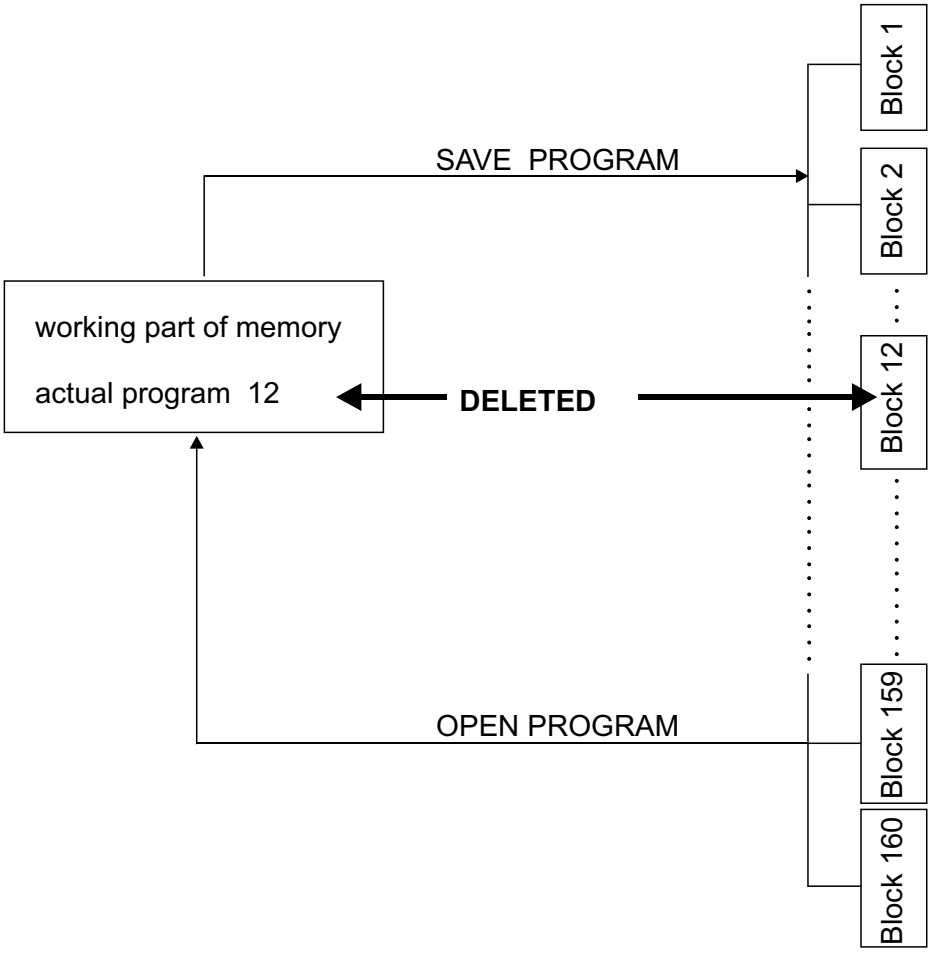
8.5 Joystick action

If the machine is equipped with a four-way joystick, the action of its UP and DOWN position can be programmed. Left and right position is fixed for wire guide correction.



8.6 Program (block) delete

Working part of memory and appropriate block can be deleted.



8.7 Access PIN code setting

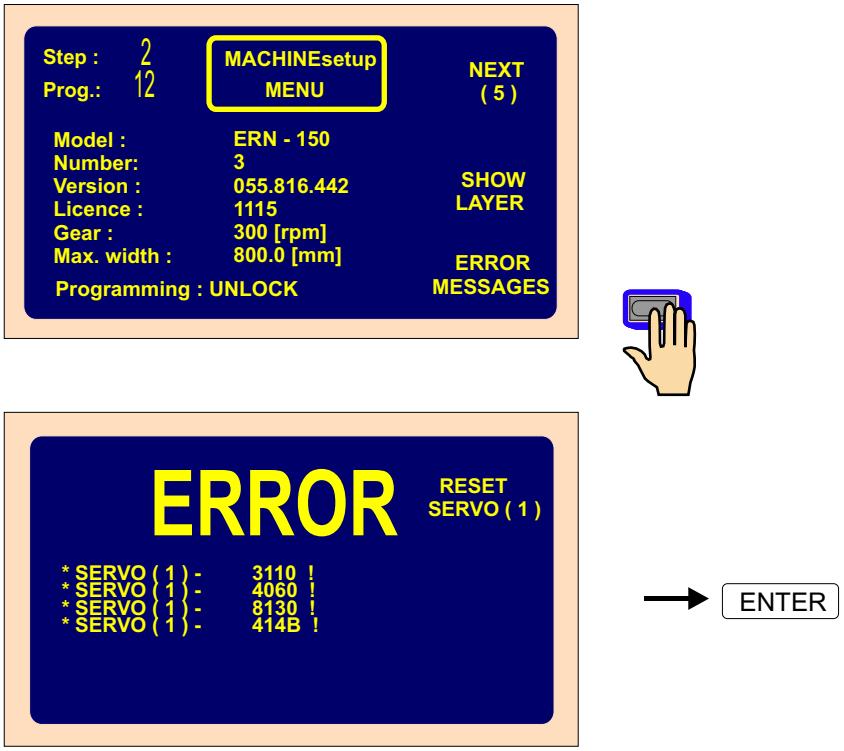
Available codes for user :

- MASTER code - allows you to change all settings in menu. This code is fixed by producer and is referred to guarantee certificate.

- PIN code - lock and unlock programming. This code can be set by user in range 0 - 999999 Default : "0"

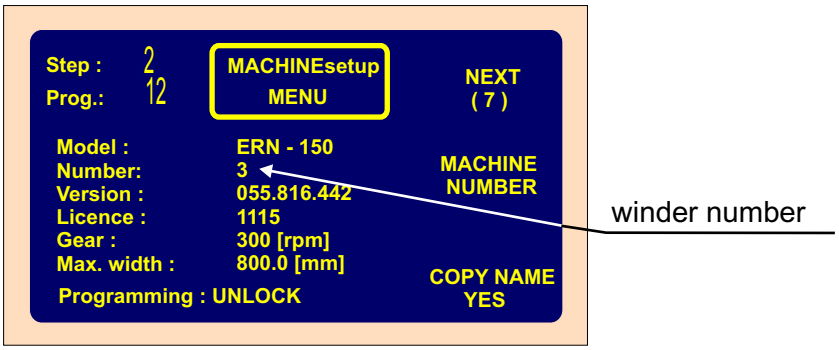
8.8 Error messages

Digital control by CAN- bus provides to store and display eventual errors of Servo Drive.
Displayed errors are dedicated for service.



8.9 Winder number

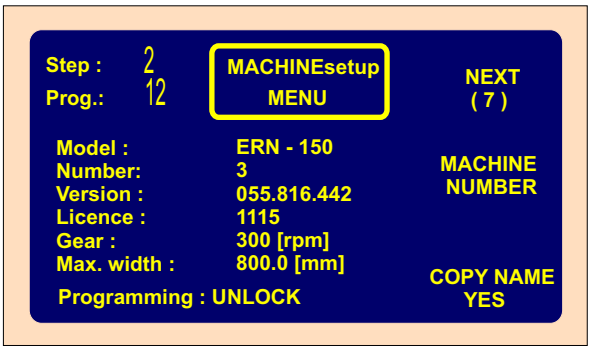
Winder number can be set for easy network identication.



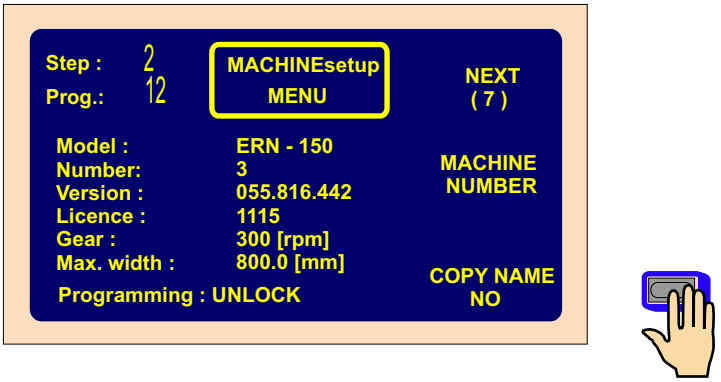
8.10 Accept file name

Winding programs, stored as files on USB flash drive or PC, can be named in different, for example short form,as the previous.

COPY NAME
YES - file name is accepted and displayed as a name of coil.



COPY NAME
NO - file name is not displayed as a name of coil.



9. ERROR report

Mistakes in program are displayed by writing ERROR messages:

ERROR Microswitch

Mechanical displace of the wire guide. It appears in case, that the lateral power on the wire guide overcomes the torque of the step motor.
Next procedure: press RESET

ERROR Spindle speed versus pitch

Pitch or spindle speed is too high (exceed the max.wire guide speed 75 mm/sek)
Next procedure: press ENTER and correct either spindle speed or pitch

ERROR Wire guide position out of range

Winding width is out of range.
Next procedure: press ENTER and correct either relative position or reversal points

ERROR Program is not logic

Program is not logic in the case type of cycle ContFAST, next step can not be the shift, jump or winding with the opposite speed direction.

10.USB host port

The controller is equiped with USB host port. This port is designed only for a USB flash drive.
Do not connect any other equipments (mouse, keyboard, etc.) to this port!

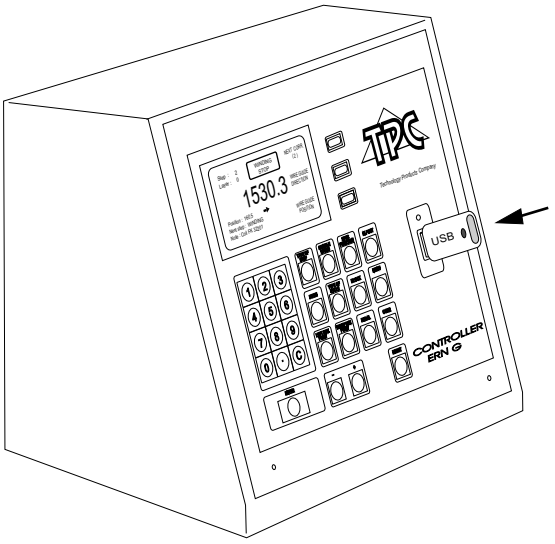
The suitable USB flash drive is delivered with each new machine. Mostly of another USB flash drives (KINGTON,PQI,SANflash drive) can be used. We recommend to test optimal model-especially as for writing speed.

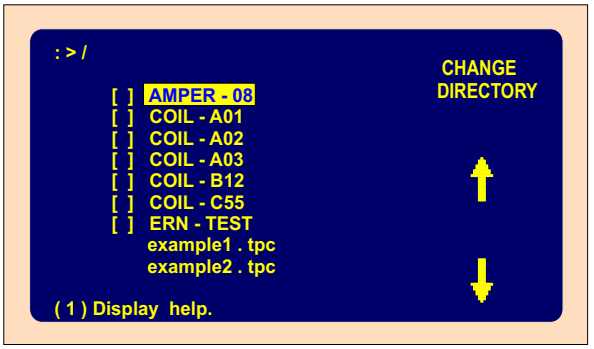
There are limitations to the type of flash drive which can be used. All flash drives must have a sector size of 512bytes. Various cluster sizes have been tested up to 32kB. Formatting FAT 16 or FAT 32.

Key features

- provides reading from or writing to a USB flash drive
- tree directory for a quick program searching
- storage of unlimited winding programs
- easy transfer winding programs to or from a PC.
  No other communication program needed
  and no problem with cables and correct port setting
- simply and easy way for machine upgrade.
  Files for upgrade can be sent by e-mail
- back-up of all winding programs in machine memory

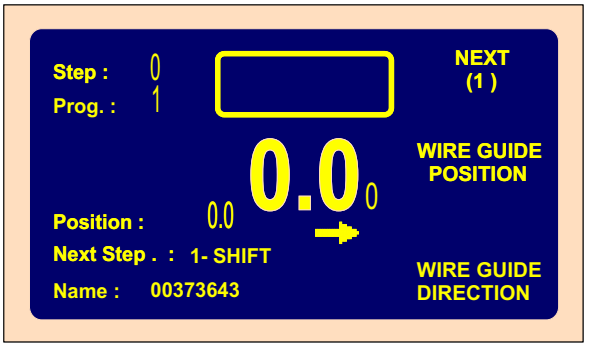
If a flash drive is connected to USB port, then the root directory of the flash drive is displayed



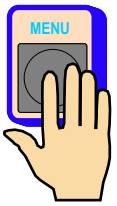


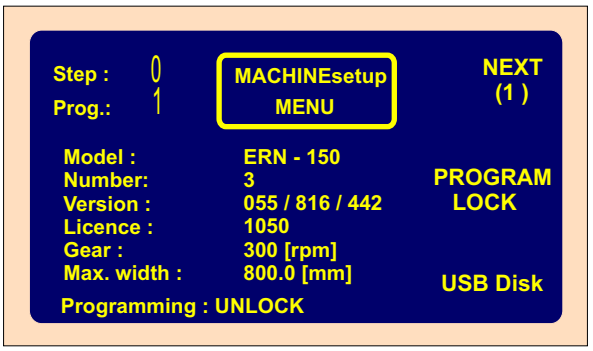
Press ENTER to return to the winding window

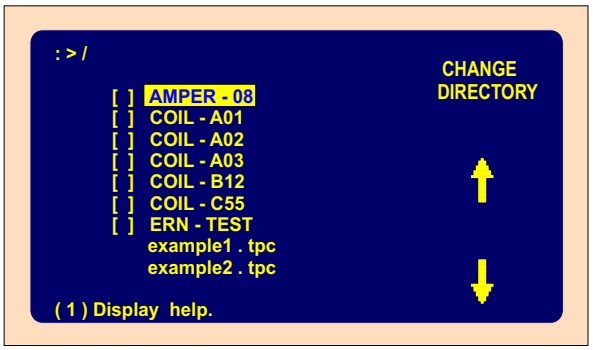
→ ENTER



Press MENU → USB to return to the root directory



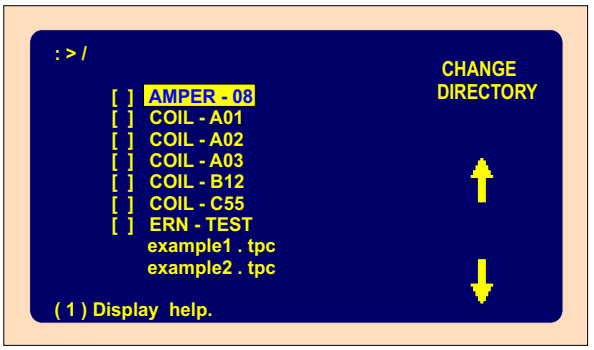




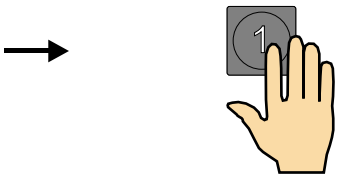
You can disconnect the flash drive when no file is read or written.

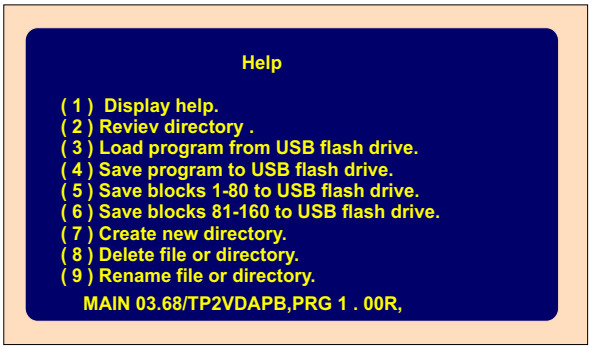
Warning ! : If a flash drive is removed during a write operation then data corruption is likely

10.1 Display help



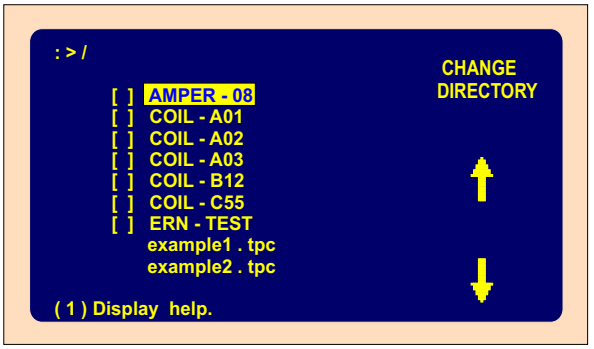
Press [1] to display help



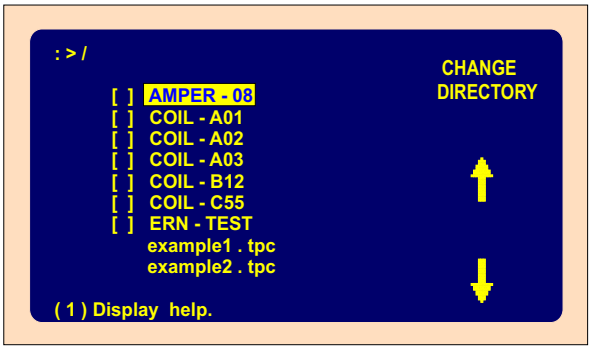


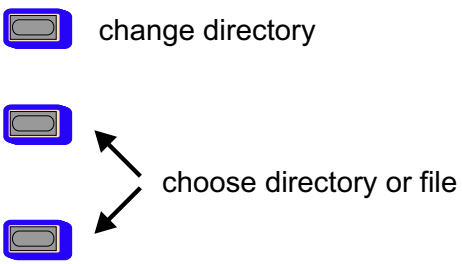
Press [ENTER] to return to the root directory

[ENTER]



10.2 Tree type structure





Pres [+] or [-] to change list of directory

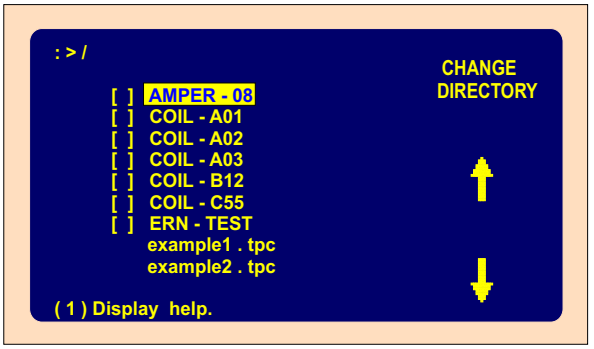
Max. number of displayed files or subdirectories in one directory is 100

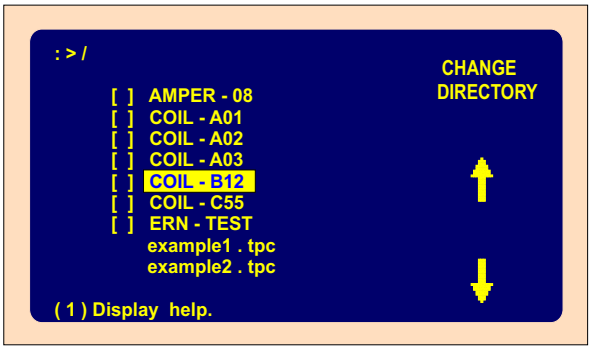
Filename format consists of 1 to 8 characters, optionally followed by a period (".") then and extention of up to 3 characters. (8.3) For example " ern-test.tpc "
Except leters and numbers one of the folowing characters can be used : - _ &
Space is not allowed !

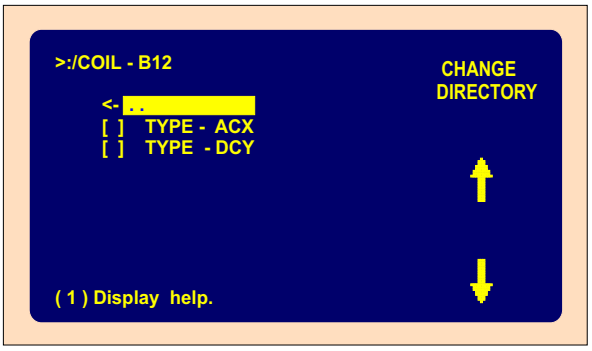
IMPORTANT : Long file names are not supported .

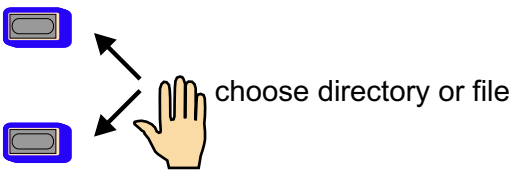
Note : Uppercase - name of directory
Lowercase - name of file

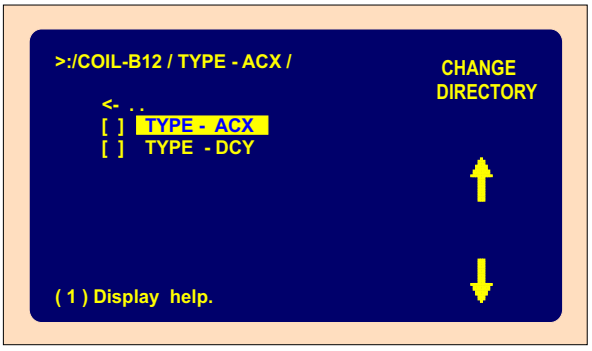
10.3 Read from flash drive

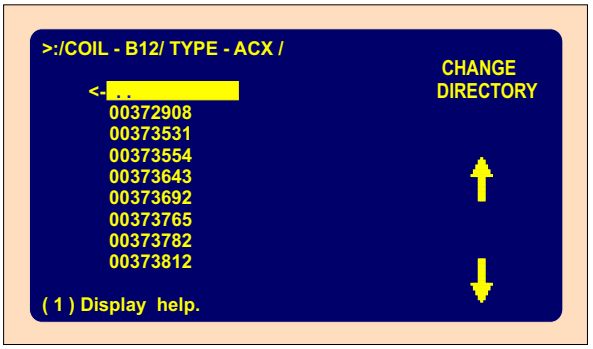


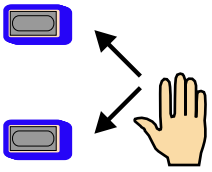




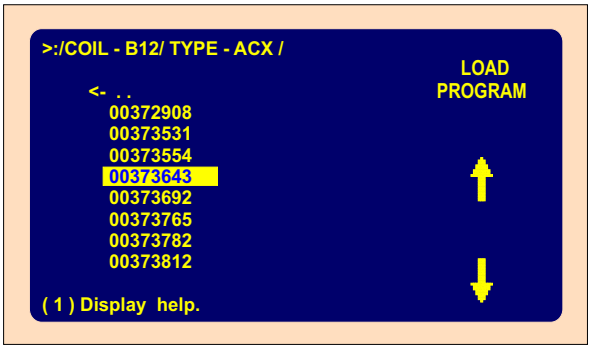


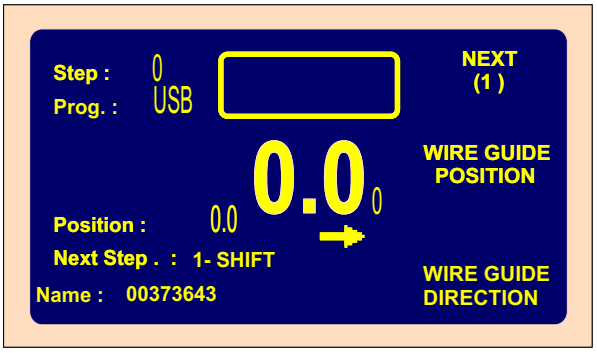




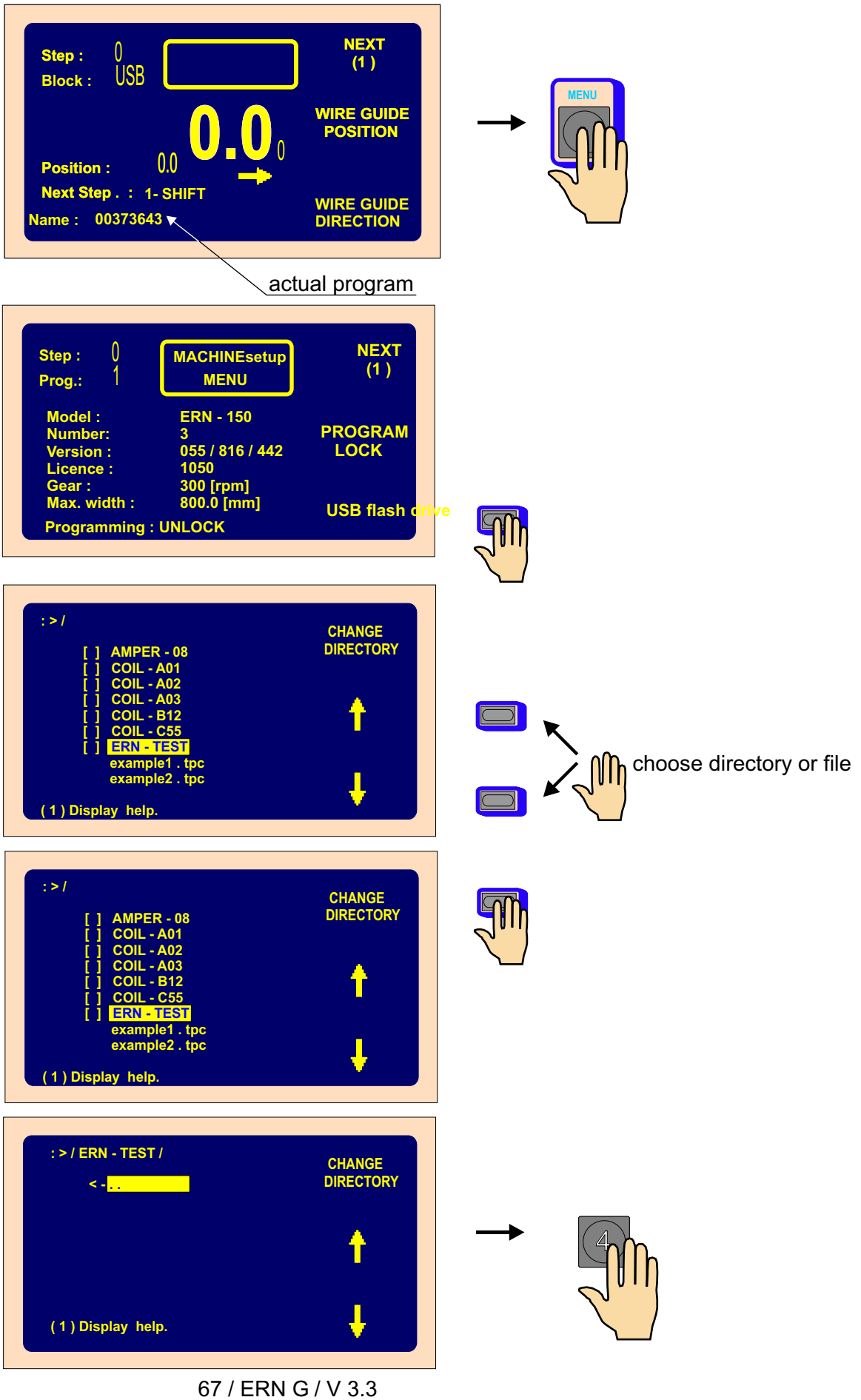


choose directory or file

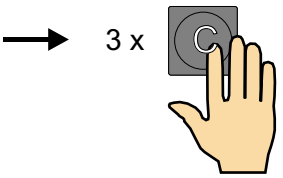


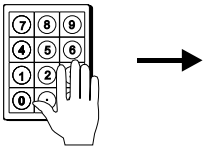


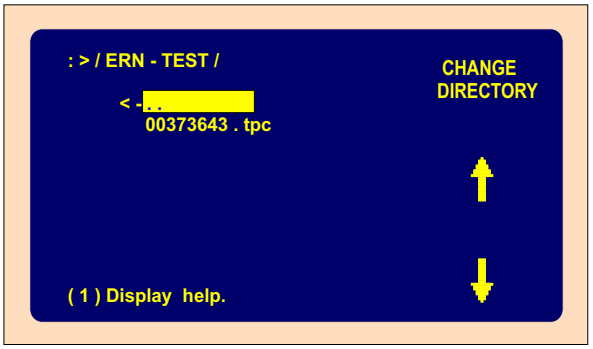
10.4 Save actual program to flash drive.



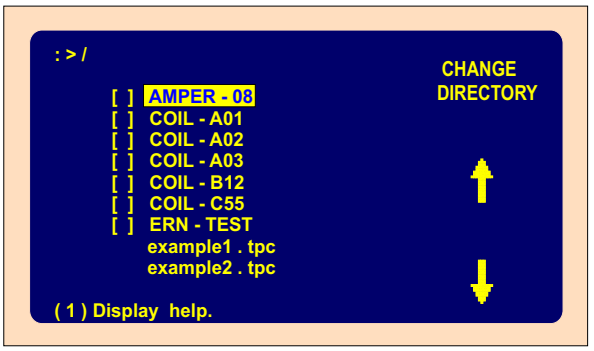
You can change or modify the name and extention .

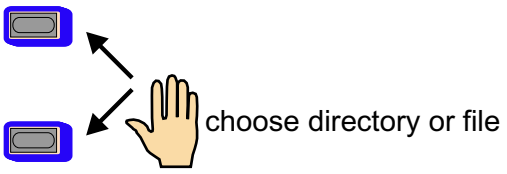


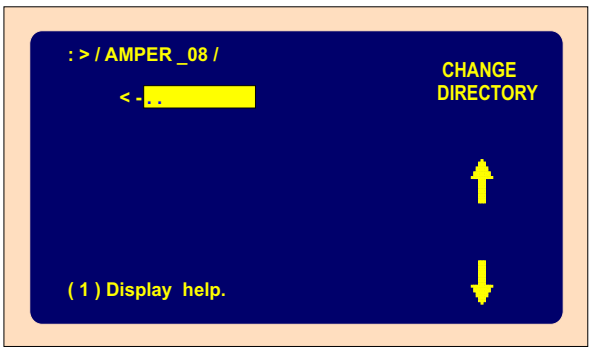


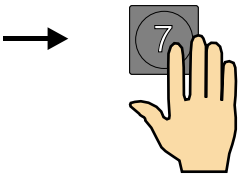


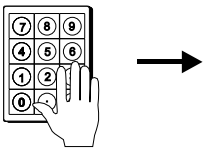
10.5 Create new directory

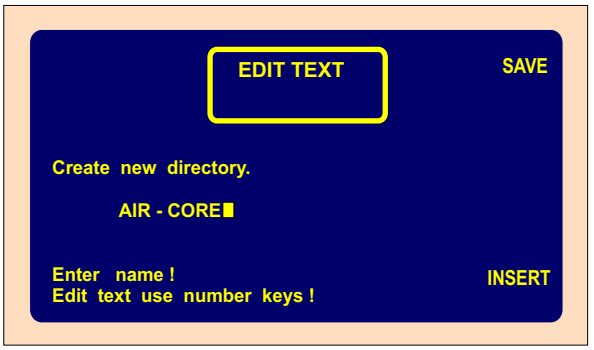


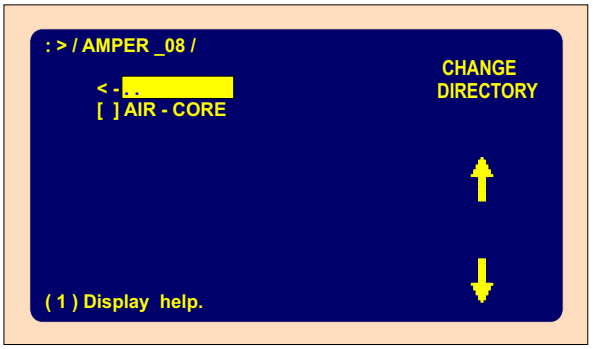






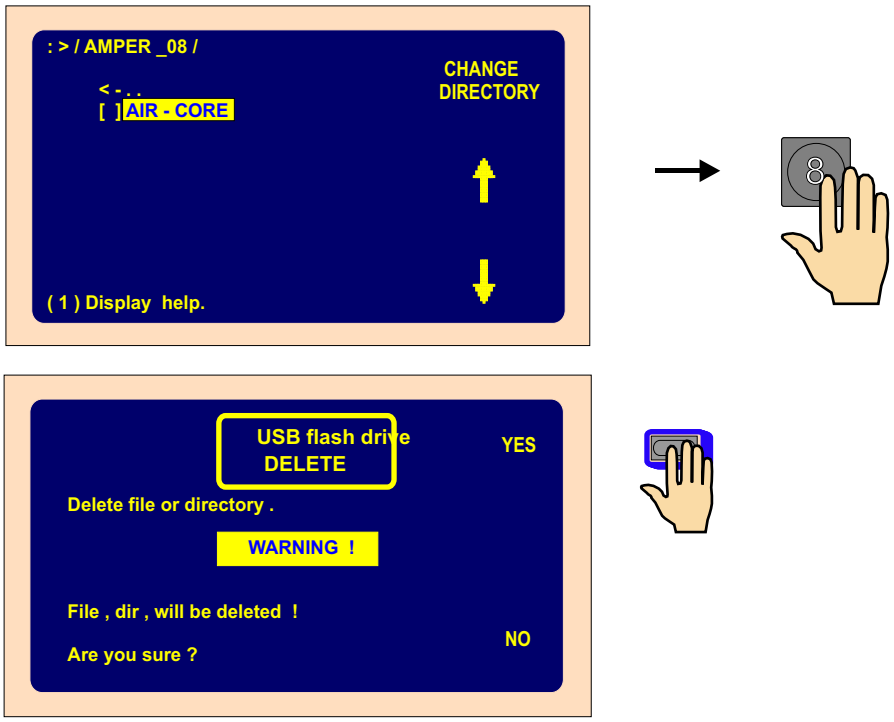




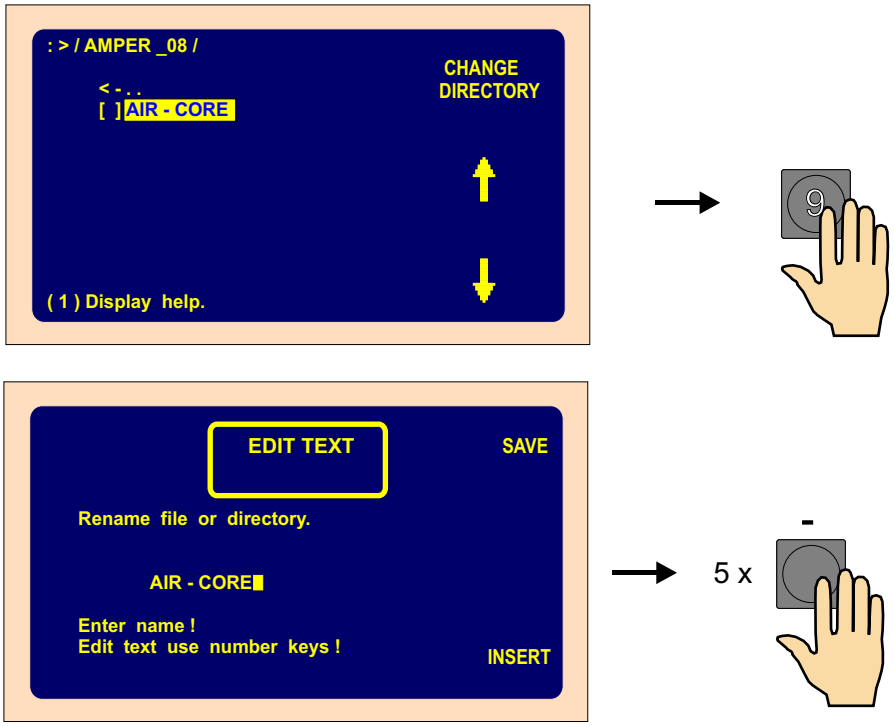


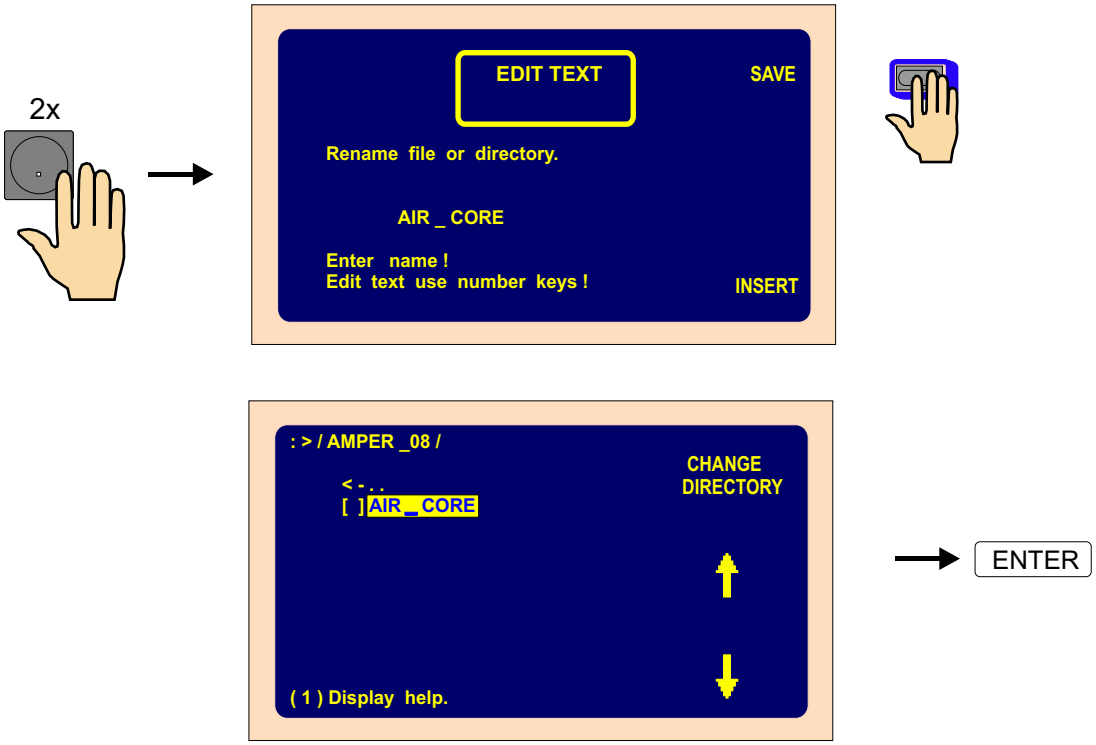
IMPORTANT : Long file names are not supported .

10.6 Delete file or directory

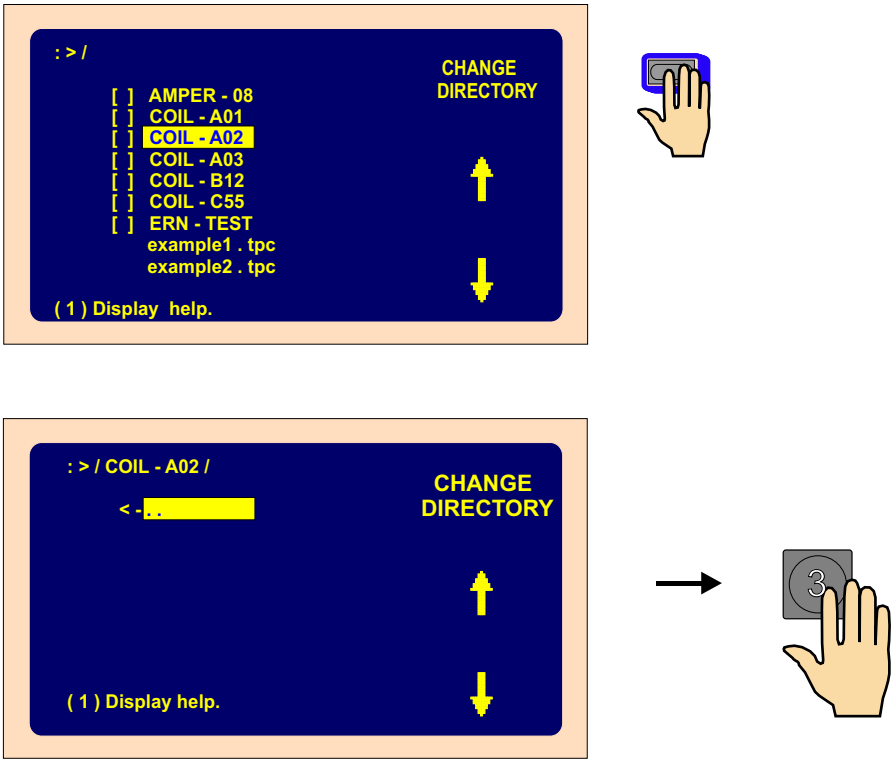


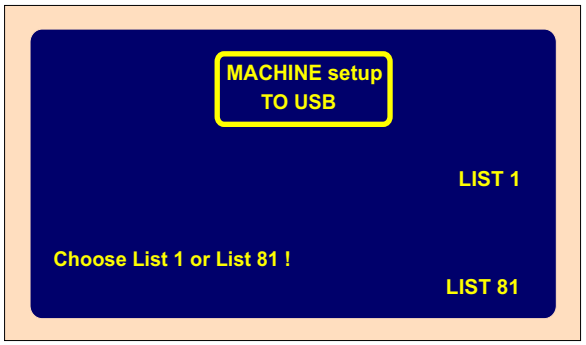
10.7 Rename file or directory

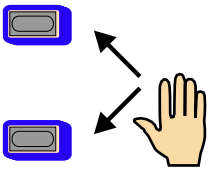




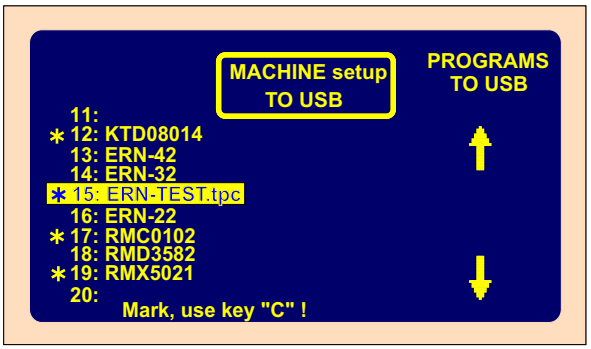
10.8 Save marked programs to USB flash drive

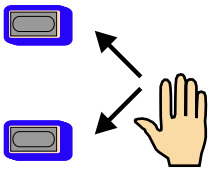




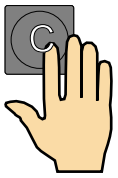


choose list

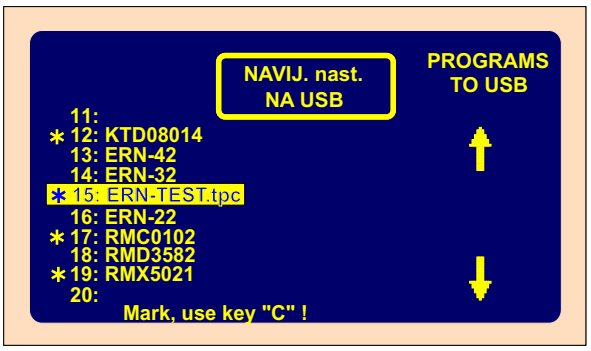


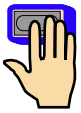


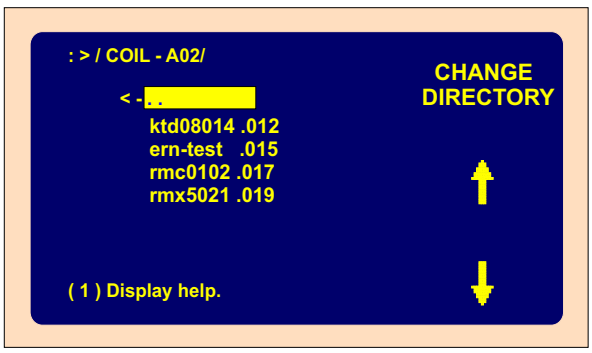
choose file
to mark



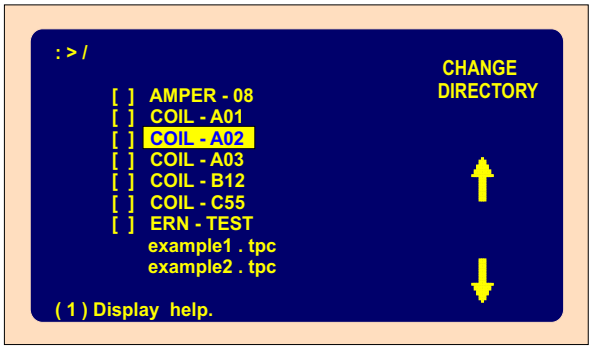
Required file mark by using key "C"

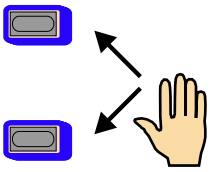




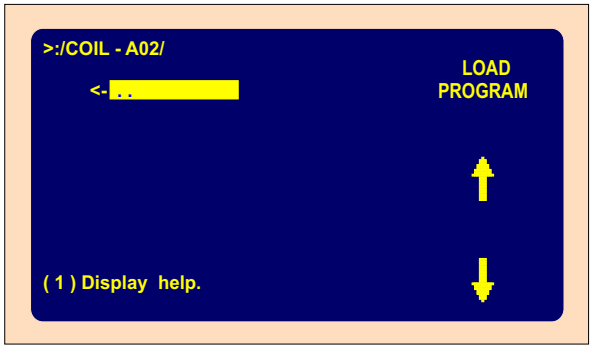


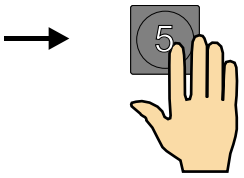
10.9 Save programs 1- 80 (81-160) to USB flash drive

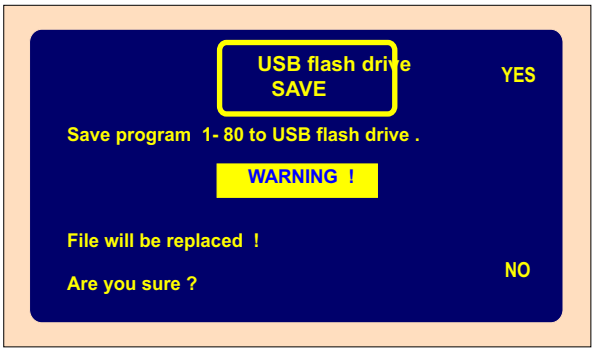


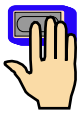


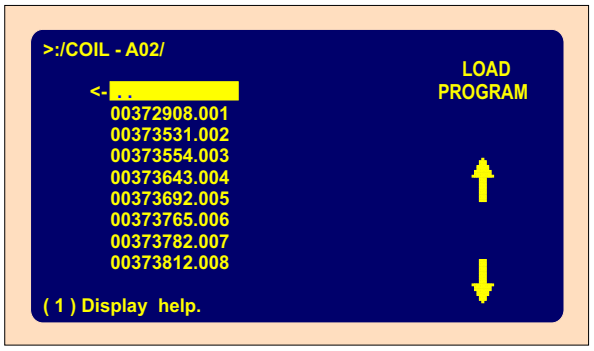
choose directory or file





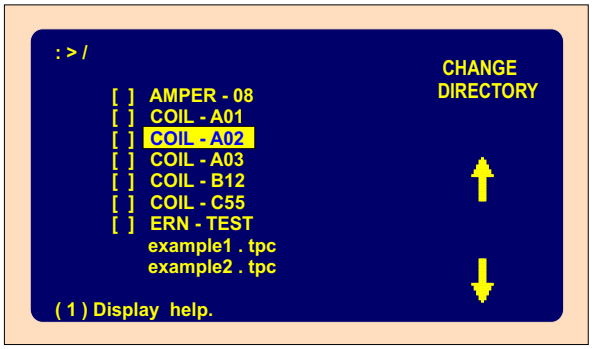


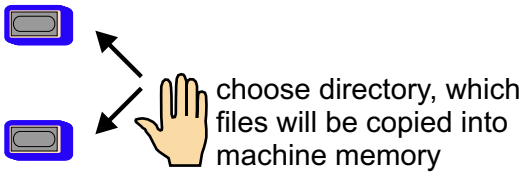


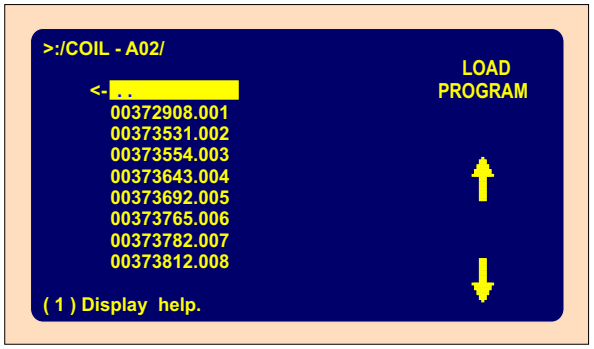


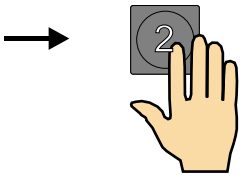
The same procedure for programs 81-160 by key 6

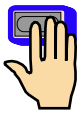
10.10 Load program from USB flash drive











Note : Files will be saved in the machine´s memory according to the suffix order (001-160).

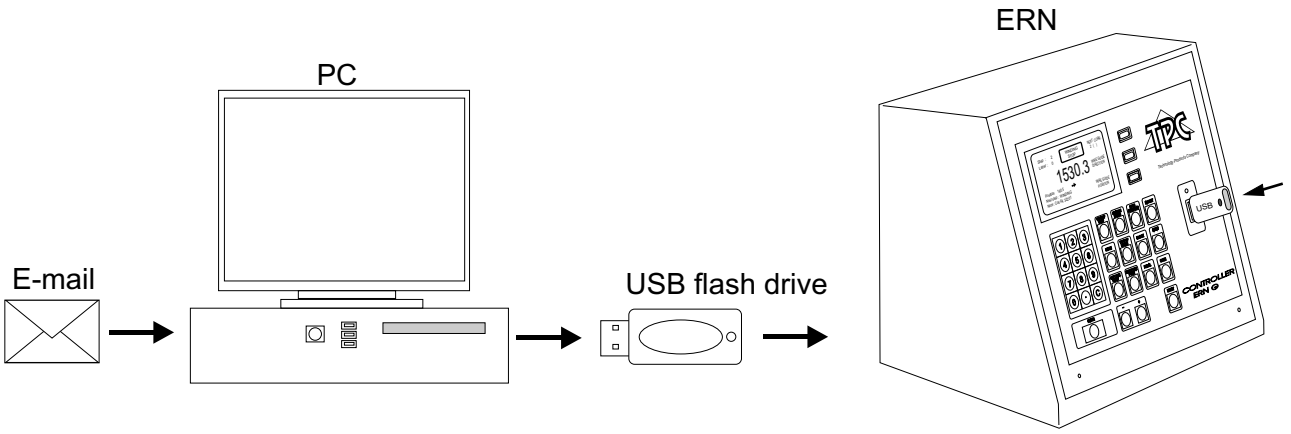
Files not marked 001-160 on the flash drive will not be transfered.

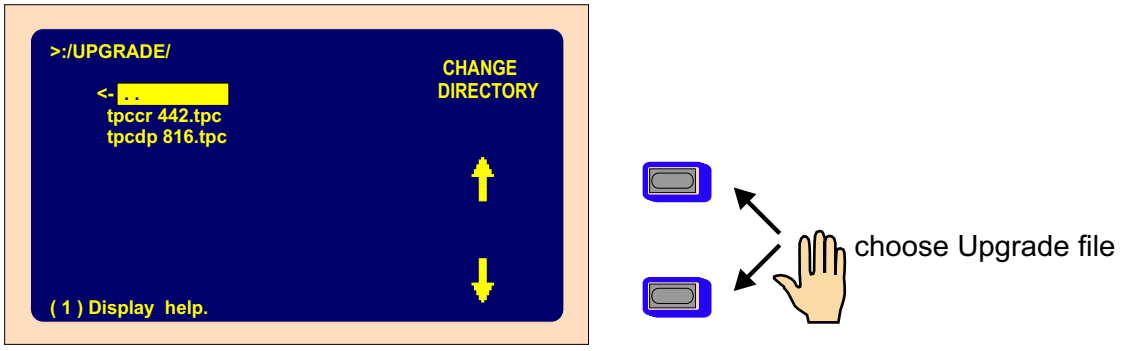
10.11 Firmware Upgrades

Ugrade files sent by E-mail provide upgrading the firmware if required.
There are two type of Upgrade files :
- tpccrxxx.tpc - Upgrade for the control board
- tpcdpxxx.tpc - Upgrade for the display and key board

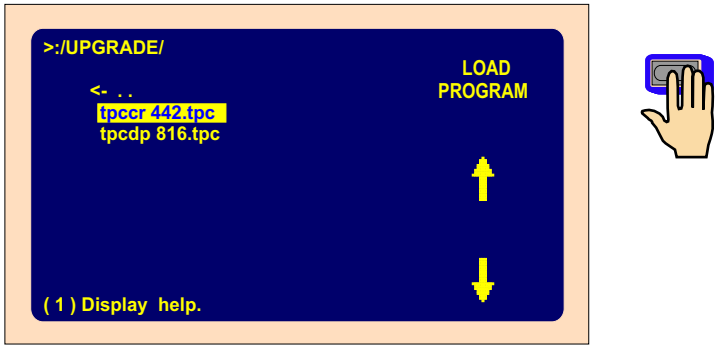
where : xxx is version number (for example tpccr442.tpc)

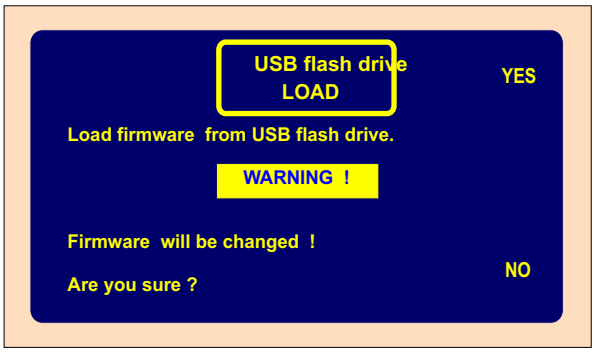
Important : Consult each Upgrade and especially suitable combination of versions with manufacturer.

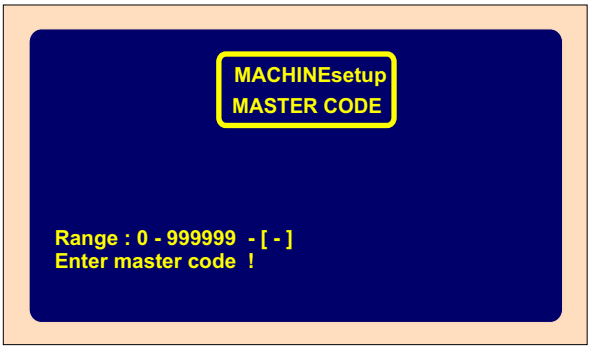




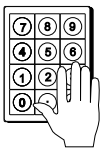
Control board upgrade







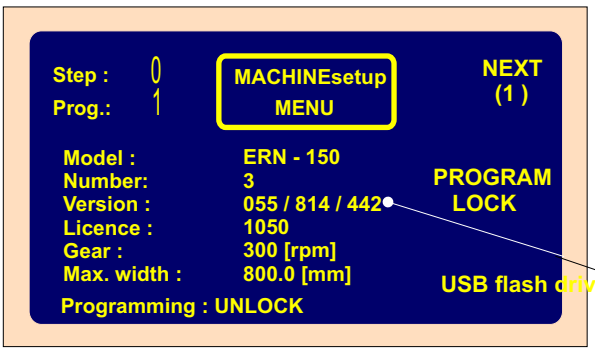
Enter your MASTER CODE



→ ENTER

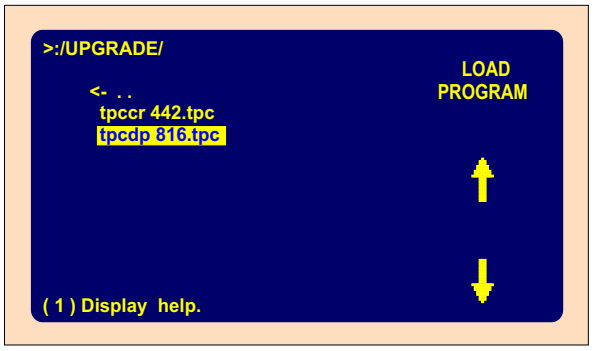
Wait for ENTER

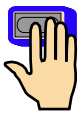
Note : Upgrade tpccrxxx.tpc takes approx.one minute

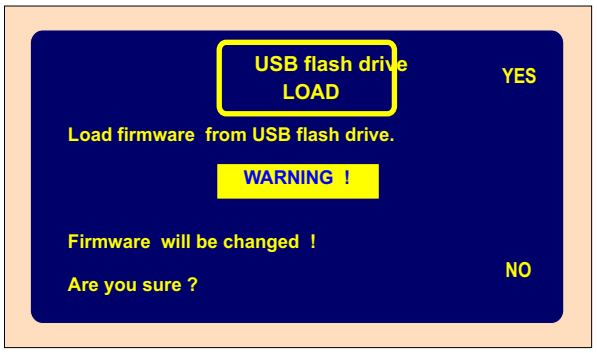


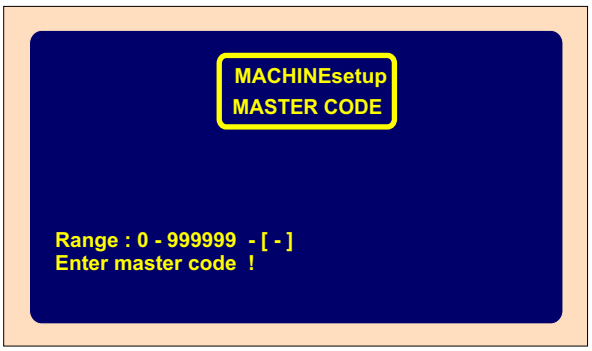
check version

Diplay board upgrade

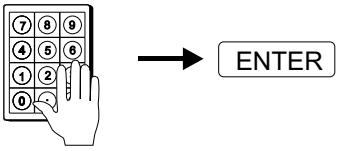




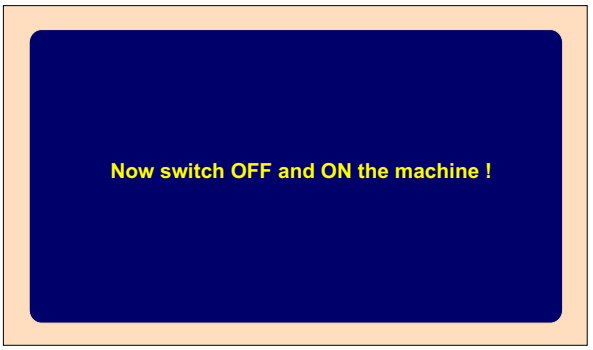




Enter your MASTER CODE

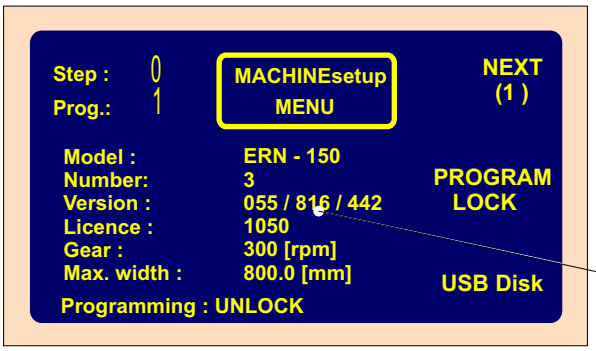


Wait for switch OFF/ ON



Between switch OFF and ON please wait a few seconds.

Note :Upgrade tpcdpxxx.tpc takes approx. two minutes



check version

11. GEAR CHANGE

11.1 GEAR CHANGE ERN 100

Timing belt drive is under the cover (15).
The machine is delivered with the default "300" gear.

Changing to the gear "600":

- switch off the machine and unplug it
- remove the cover (15), attached by 3 screws
- loosen 4 screws (17) and remove the timing belt

- remove the "300" timing gear and replace it with the "600" gear.
- use the shorter timing belt, put on, tension and attach it with the screws (17)

After each gear change is necessary to rewrite the new gear to the controller.

11.2 GEAR CHANGE ERN 150

Timing belt drive is under the cover (15).
The machine is delivered with the default "150" gear.

Changing to the gear "300":

- switch off the machine and unplug it
- remove the cover (15), attached by 3 screws
- loosen 4 screws (17)

- remove the "300" timing gear and replace it with the "150" gear.
- use the shorter timing belt, put on, tension and attach it with the screws (17)

After each gear change is necessary to rewrite the new gear to the controller.

11.3 GEAR CHANGE ERN 200

Timing belt drive is under the cover (15).
The machine is delivered with the default "150" gear.

Changing to the gear "75":

- switch off the machine and unplug it
- remove the cover (15), attached by 3 screws
- loosen 4 screws (17)

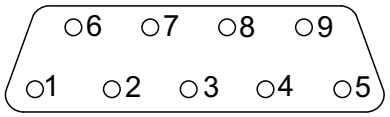
- remove the "150" timing gear and replace it with the "75" gear.
- tense timing belt, and attach it with the screws (17)

After each gear change is necessary to rewrite the new gear to the controller.

12. Serial interface RS 232

The machine is equipped with the optically isolated serial interface RS 232 for communication with PC. Connecting cable and software, offered by producer as optional accessories, allows to create and file winding program in PC.

Connector scheme



Pin	Signal
1	
2	S in
3	S out
4	
5	GND
6	
7	
8	
9	12V DC/100mA

13. PACKAGE CONTENTS

ERN 100,150

Documents delivered with the machine:

1 pc certificate of quality and completeness

1 pc user´s guide

1 pc AC servo drive user´s guide

1 pc APC Smart-UPS user´s guide

Supplied Accessories:

2 pcs fuse T 315 mA/250 V

2 pcs fuse T 1,25 A/250 V

1 pc microswitch WN 559 00

1 pc timing belt 5MR - 600 -25 (ERN 100)

1 pc timing belt 5MR - 700 -25 (ERN 150)

1 pc timing gear 60 5M 25 - 6W

3 pcs allen key

ERN 200

Documents delivered with the machine:

1 pc certificate of quality and completeness

1 pc user´s guide

1 pc AC servo drive user´s guide

1 pc APC Smart-UPS user´s guide

Supplied Accessories:

2 pcs fuse T 630 mA/250 V

2 pcs fuse T 1,25 A/250 V

1 pc microswitch WN 559 00

1 pc timing gear 36 teeth

3 pcs allen key

14. FUSE CHANGE

Change the wrong fuses at the power switch OFF and the main power plug disconnected. The fuses are on the back panel of the drive box. Be sure to use only the types of fuses specified by the producer.

15. MAINTENANCE

As the machine contains a minimum number of mechanical gears, the maintenance is simple. To ensure trouble-free work, following operations are recommended:

- clean regulary the winding space of dust, dirt and wire ends
- check tension of the timing belt
- the ball bearings have permanent grease filling, no lubrication is needed

16. WARRANTY PERIOD AND SERVICE

Warranty period is 24 months from the date of delivery.
Warranty and after warranty repairs are provided by the producer.