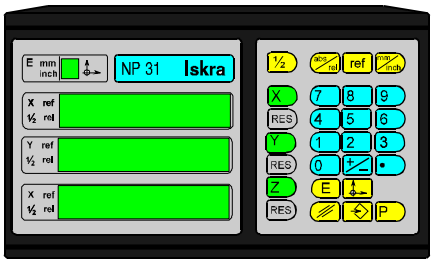
NP 31
OPERATING INSTRUCTIONS

DYSTRYBUTOR W POLSCE:

TOCK-AUTOMATYKA S.C.
15-384 Białystok ul. ks. abpa E. Kisiela 28
Tel/fax: (0-85) 661-61-21 , 66-11-0-11
e-mail: biuro@tock-aut.bialystok.pl
http: wwww.tock-aut.bialystok.pl



GENERAL DESCRIPTION

NP31 DRO is designed for operation on EDM machines
Two axis X and Y are used for position measuring and indication, while axes Z is used for measuring and positioning the depth of
erosion electrode.
Two operating modes are possible:

- BASIC mode (erosion indicator "**E** " is not lit). The device operate as a general purpose position readout (NP30)
- EDM mode (erosion indicator "**E** " is lit) in 2 diferent option: standard, and special. Option is choosed, by value of parameter P12 (EOpT). In this mode, aditional functions suitable for EDM machines are acitivated, The most important are:
  - reley output signal that indicates reaching of required erosion depth
  - reley output signal with delay for spark generator switch off
  - input signal for for values preset when the electrode touch the workpiece surface
  - checking and indication of error in case udesired movement in the X or Y axis occurs.

PARAMETERS:

P9 tg.td..... In standard option: Time delay of relay: " POSITION REACHED". Time is set in seconds, possible range is 0 - 99.9 sec.
In special option: Time delay of relay: " POSITION REACHED". Time is set in seconds, possible range is 0 - 99.9 sec. If 0 is choosed relay is switched until Z-axis position is over position set in P15. If Z-axis is in position relay is switched.

P10 Sp.td..... In standard option: Time delay of relay: " SPARK GENERATOR" Time is set in seconds, possible range is 0 - 99.9 sec.
In special option: Time delay of relay: " CLEANING POSITIONREACHED". Time is set in seconds, possible range is 0 - 99.9 sec. If 0 is choosed relay is switched until Z-axis position is over position set in P14. If Z-axis is in position relay is switched.

P11 Hold..... Value set in this parametar determine function of key: "RES".
If it is "0", key "RES" reset the absolute position of appropriate axes. If it is "1", key "RES" after press will cause freesing of coresponding axes (in background position is followed, appropriate axes indicator flashiing). Display is6 released with again press to key "RES" .

P12 Epos..... Value in this parameter set a tolerance field of undesired movement in X and Y axes during the erosion. It is set in increments .

P13 EOPt..... Value in this parameter set a option of EDM mode.
0 ..... standard option
1..... special option

P14 P_cL..... Value in this parameter set a position of activating relay "CLEANING POSITION REACHED". If Z axis positin is equal to this parameter, relay is switched. If Z axis position is across, relay is switched for time defined in P10.

P20 ... P29

P_tg..... Value in this parameters set a position of activating relay "TARGET POSITION REACHED". If Z axis position is equal to this parameter, relay is switched. If Z axis position is across, relay is switched for time defined in P9.

EDM mode of operation

After the EDM mode of operation has been switched on :

- X display allways shows only the programmed erosion depth in Z axis
- Y display allways shows the deepest value reached in Z axis
- Z display show actual absolute or relative position of electrode in Z axis

Two different option of EDM moe can be choosed:

1) Standard option

The functioning of relay's outputs is shown on figure 2. When a electrode reach the target erosion position relay "position reached" switch on for time which is set in parameter P 9.

When electrode reached required position it is possible to delayed switch off of spark generator (due to fine surface erosion). For that purpose NP31 has built in relay's output wich is switch on when the device is set in the EDM mode, and switch off when electrode reachd target position, after parametrically (P10) defined delayed time.

1) Special option

The functioning of relay's outputs is shown on figure 2. When a electrode reach the position relay "target position reached" switch on. The relay stays switched until position is not changed. If position is across, relay switched for time which is set in parameter P 9.

When electrode reach the cleaning position relay "cleaning position reached" switch on

The relay stays switched until position is not changed. If position is across, relay switched for time which is set in parameter P 10.

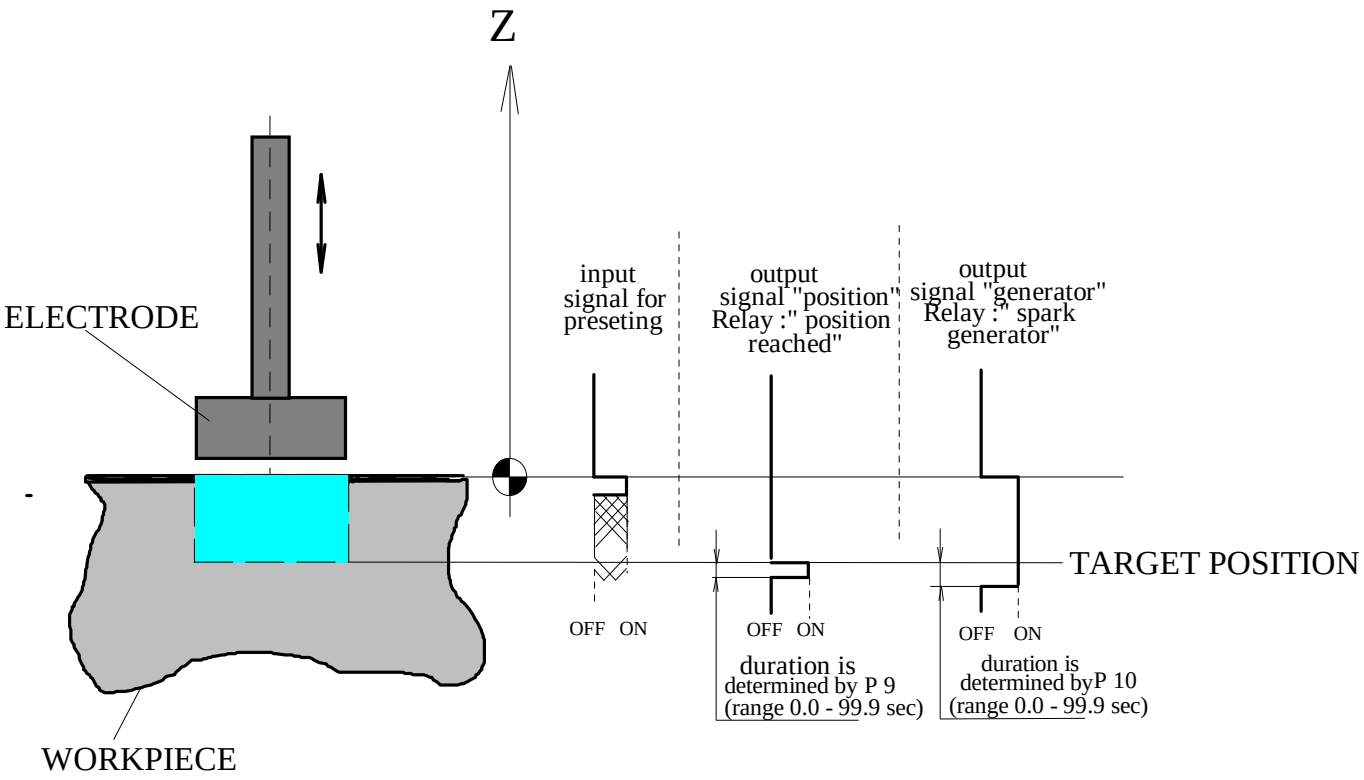


FIGURE 1

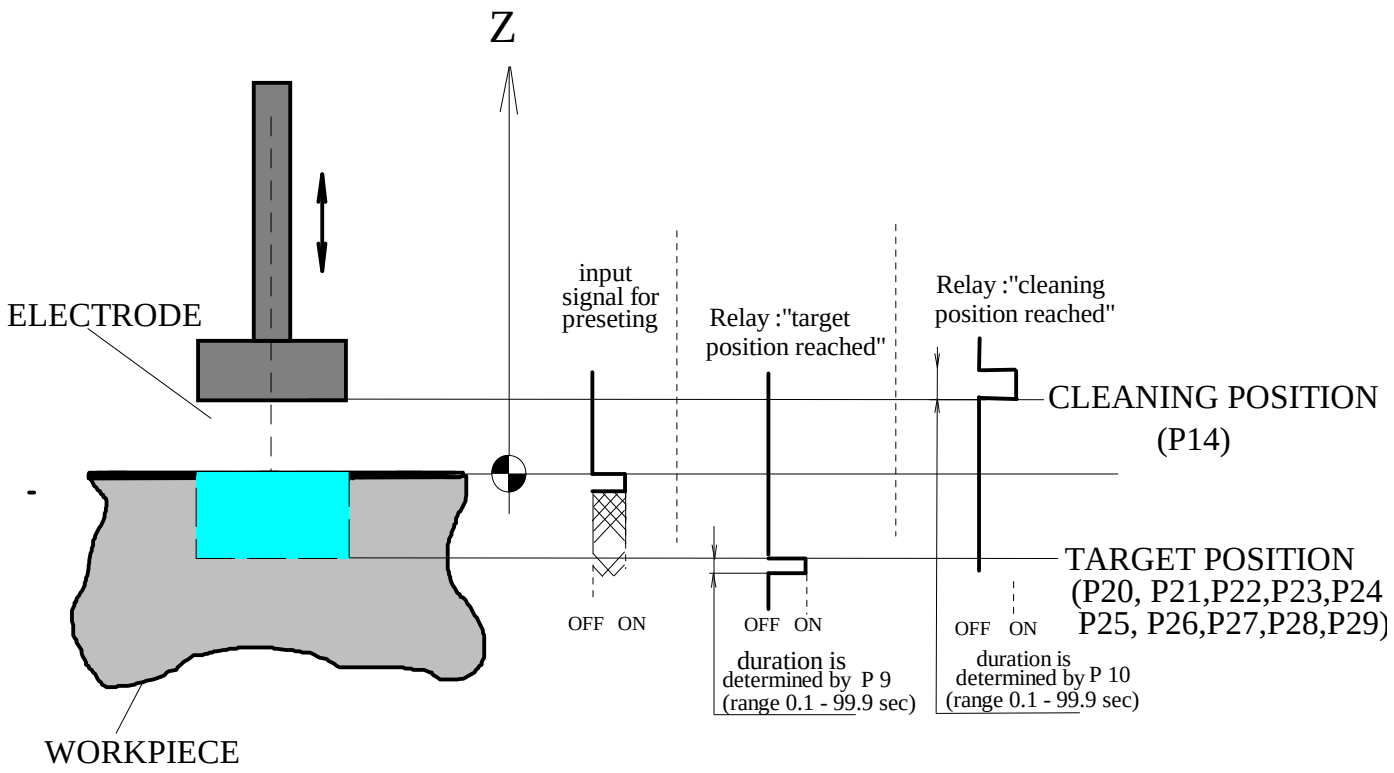


FIGURE 2

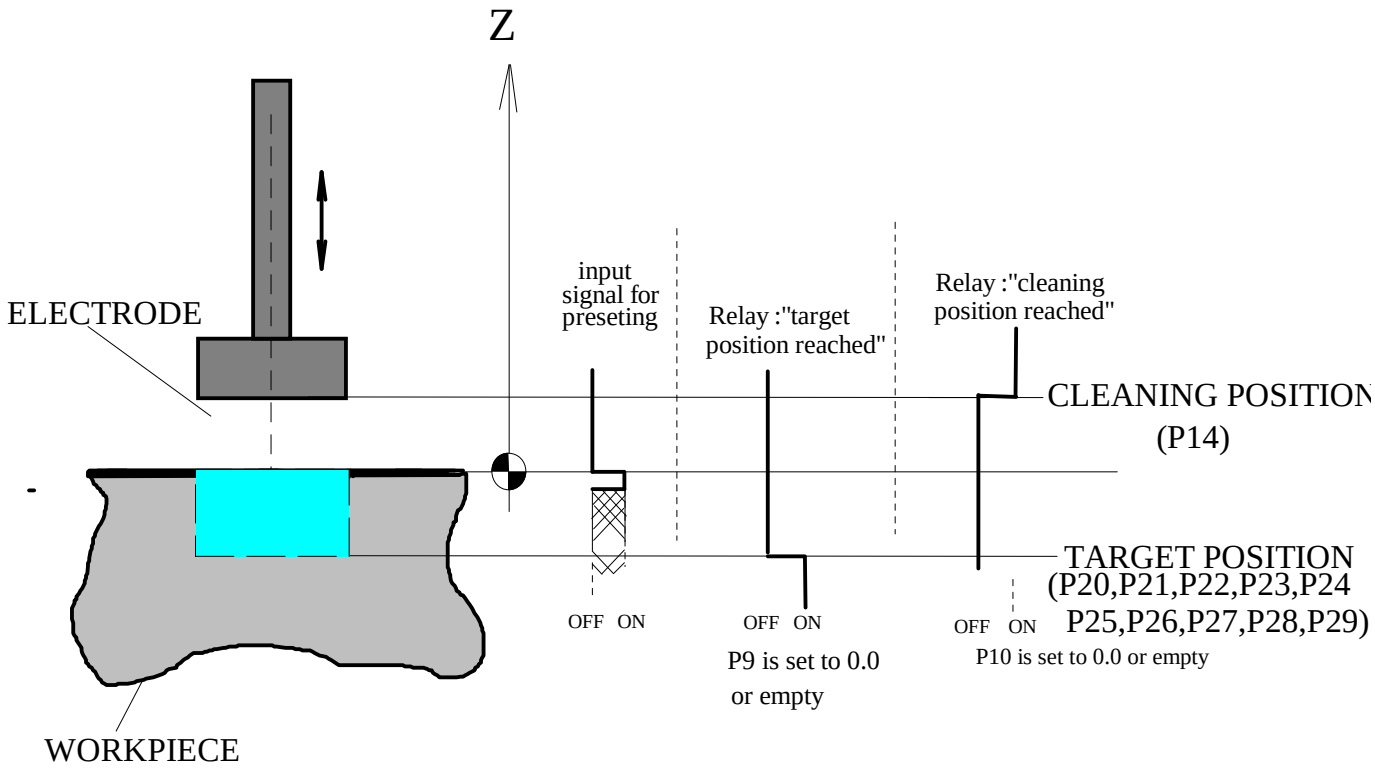
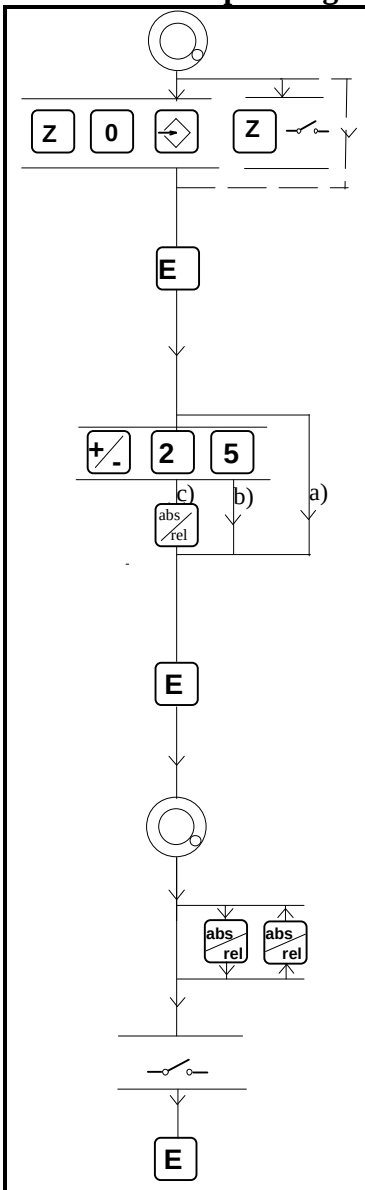


FIGURE 3

Procedure of operating in the EDM mode (STANDARD OPTION)



Lead the electrode to the workpiece suface.

Reset absolute position in Z axis, either manually or by means of an external signal. It is also possible not to chnge the absolute position.

Press the key **E** for the first time. Indicator **E** is flashing.
Z axis is switched on automatically:

- display Z shows the previously entered erosion depth. In case a relative value has been entered, indicator **REL** at Z axis is lit
- displays X and Y shows actual position

There are 3 possible ways of selection the erosion depth:

a) keep the previously entered value
b) entered a new value (eg. -25.00)
c) enter a new relative value (-25.00 **abs/rel**)

By pressing again the key **E** switch on the EDM mode. Indicator **E** lights steady. The relay output for spark generator is switched ON

Displays for variant b):

X **-25.000** .... programed depth
Y **0.000** ... the deepest depth reached actually
Z **0.000** ....actual absolute position; Counting moves from 0.000 to - 25.000

Displays for variant c):

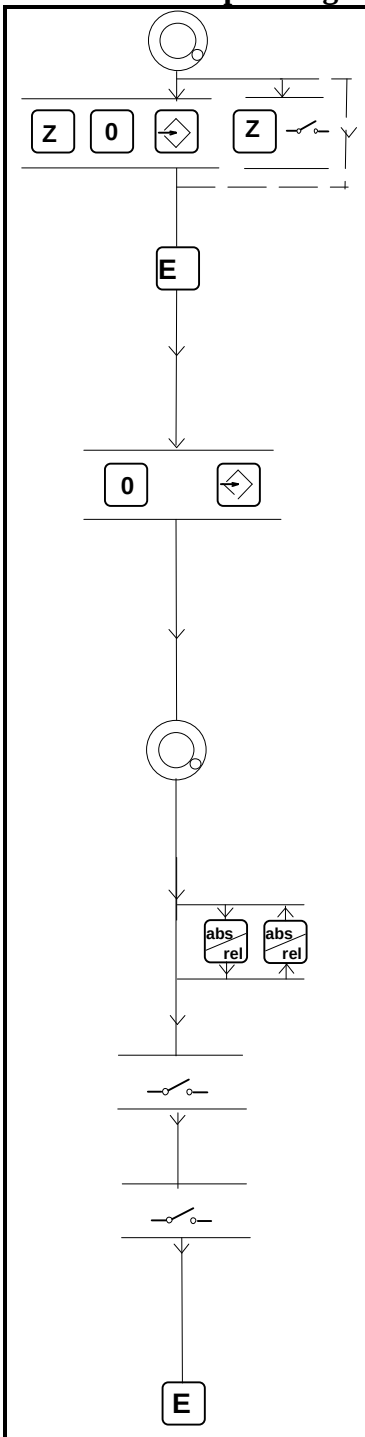
X **-25.000** .....programed depth
Y **0.000** .....the shortesst reached distance to the target
Z **0.000** ....relative position in relation to target Counting moves from -25.000 to 0.000

In case key **abs/rel** is pressed during operation, all displays will shows actual absolute positions. The EDM display mode return if key **abs/rel** will be pressed.
When the programed position is reached:

- the output signal “position” is switched ON, for the time wich is set in parameter P9
- the output signal “ spark generator “ will switched off after a time wich is set in parameter P10
- **Z** axes indicator flashes, while **E** indicator is still lit

Press the key **E** in order to switch off the EDM mode. The displays shows absolute position value in all axes

Procedure of operating in the EDM mode (SPECIAL OPTION)



Lead the electrode to the workpiece suface.

Reset absolute position in Z axis, either manually or by means of an external signal. It is also possible not to change the absolute position.

Press the key **E** for the first time. Axis displays are dark expect X-axes display which show charachter “E”;

Choose the proper presetted target position and confirm it by “ENTER”. (Choosed number correspond to target position in P20 . P29. 0 correspond to P20, 9 correspond to P29);

Indicator **E** lights steady.
Relay “Target position reached” is switched
Displays:

X **-25.000** .... programed depth
Y **0.000** ... the deepest depth reached actually
Z **0.000** ....actual absolute position; Counting
Moves from 0.000 to - 25.000

In case key **abs/rel** is pressed during operation, all displays will shows actual absolute positions. The EDM display mode return if key **abs/rel** will be pressed.

When the presetted target position is reached (P20 .. P29):

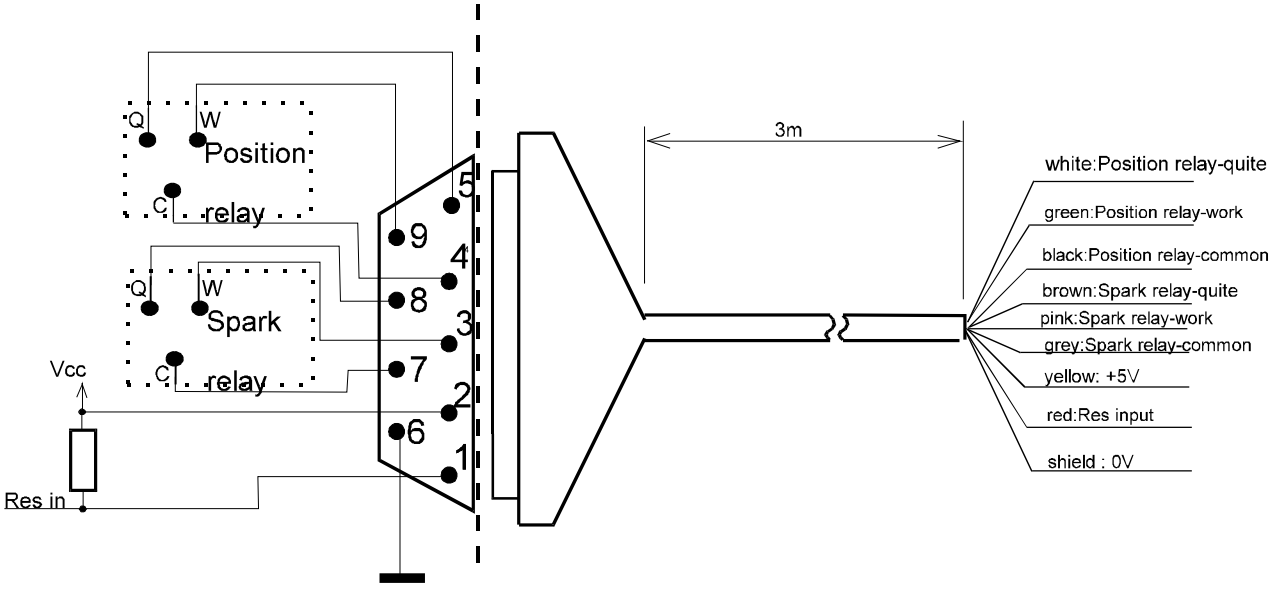
- the relay “target position reached” is switched ON, for the time wich is set in parameter P9 (figure 2 and figure 3);

When the presetted cleaning position is reached (P14):

- the relay “Cleaning position reached” is switched ON, for the time wich is set in parameter P10(figure 2 and figure 3);

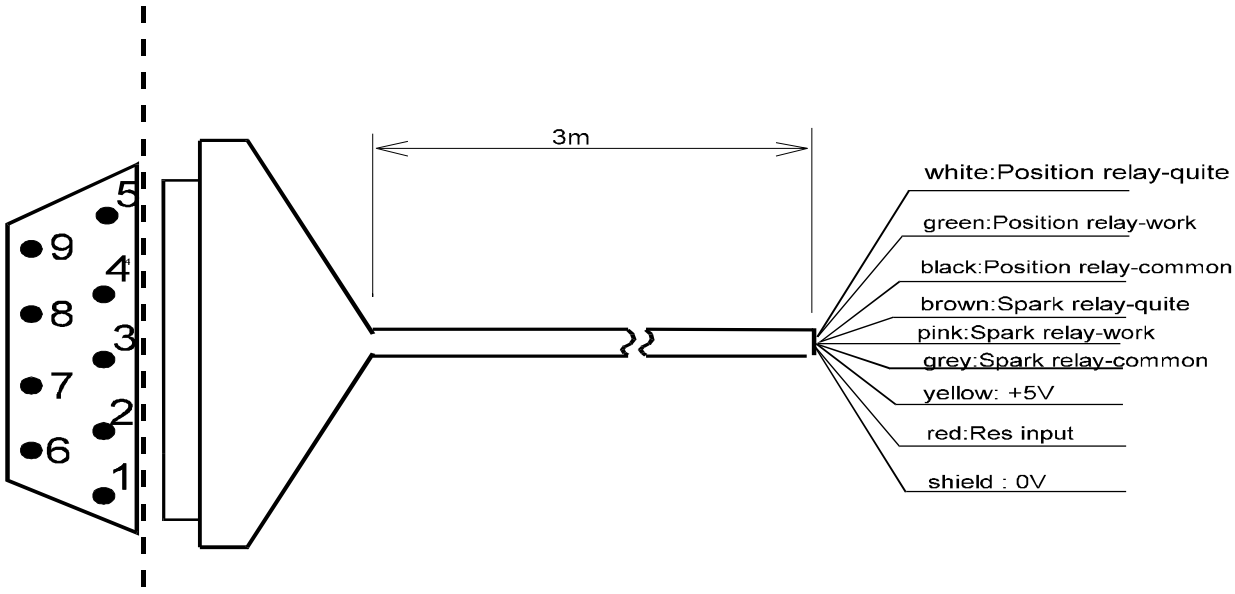
Press the key **E** in order to switch off the EDM mode. The displays shows absolute position value in all axes

CONNECTIONS:
Connector for relay's outputs:



pin	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
signal	Res in	+5V	Spark relay work contact	Position relay common conntact	Position relay quite conntact	0V	Spark relay common conntact	Spark relay quite conntact	Position relay work conntact
color	red	yello	pink	black	white	shield	grey	brown	green

Connector for RIE switches:



Relay:"position reached" = "Target position reached"
Relay:"spark generator" = "Cleaning position reached"