Intelligent Kbox S32

S32
2 AXIS POSITION CONTROLLER

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FEATURES

- two axis
- Operation in manual, in single positioning, in programme modes
- Memory capacity up to 99 programs, each one 33 steps
- Counter [0-9999]
- Easy calibration
- Single point / double point calibration possibility
- Error messages and warning messages
- Retract function
- Two speed positioning and autımatic stop offset calculation software
- External START / STOP inputs
- Programs and parameters is stored in memory ten years

PRINCIPLES OF OPERATION

The S32 controller is used to position machinary to any desired absolute position with 2 speed reversing drives on the basis of fast / slow / stop.

The controller outputs can be selected to operate :

1. Forward and reverse contactors.
2. Run and reverse, fast and slow for inverter systems.
3. Run and reverse, fast and slow for two speed motors.

Position is monitored by means of an incremental encoder (NPN). The actual position of the axis is displayed at all times. The controller calculates the difference between the actual and demanded position and sets the outputs to give the direction and speed to move the demanded position.

If the distance is greater than the value set in parameter "slow speed distance" the drive will first set off at high speed, as it reaches the distance from the demanded position equal to this parameter, the drive will drop to its low speed. It will now run at the slow speed until it reaches a distance from the demanded position equal to stop offset of the machinery then the drive stops.

The offset value which is due to inertia of the machinery learned by controller automatically.
If positioning does not occur within the limits set in parameter "tolerance",
the controller will try to carry if out again and again till the maximum set in "number of trials".

After the last attempt, positioning has not been carried out correctly, "position Ok" contacts will not close indicating something wrong, press stop and check the system.

Providing a speed low enough is used, the overrun will be consistent at all positions, then the stopping accuracy of +/- 0.1 mm can be achieved.

Retract value for the backstop set in the parameters would be used for example on a sheet metal bender, where backstop has to retract (move to a higher count value) whilst the bend is taking place.

MANUAL SETTING-UP

To setup the machine and getting correct direction of rotation and correct encoder signals, proceed as follows:

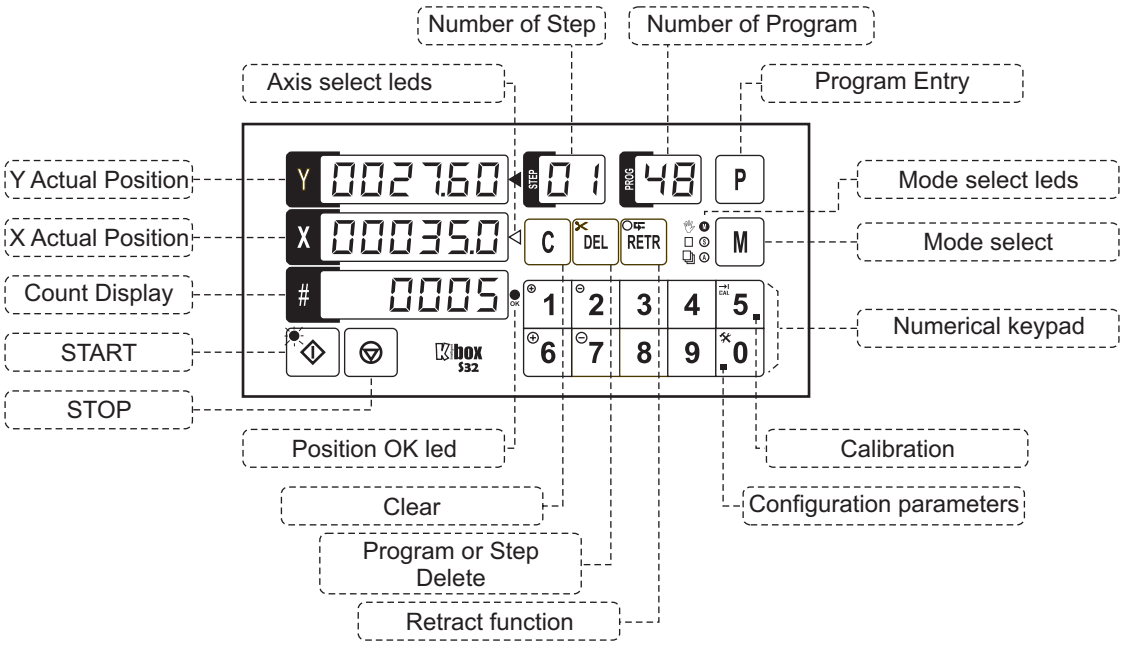
1. Select manual mode

2. Press one of the keys 1, 2, 6, 7 to check the correct direction and fast / slow speed.

If incorrect, change the cabling accordingly.

3. Press forward key (1 or 6), the actual display should count up (in positive quadrant).

If incorrect direction of count is present, interchange A / B cables of encoder.

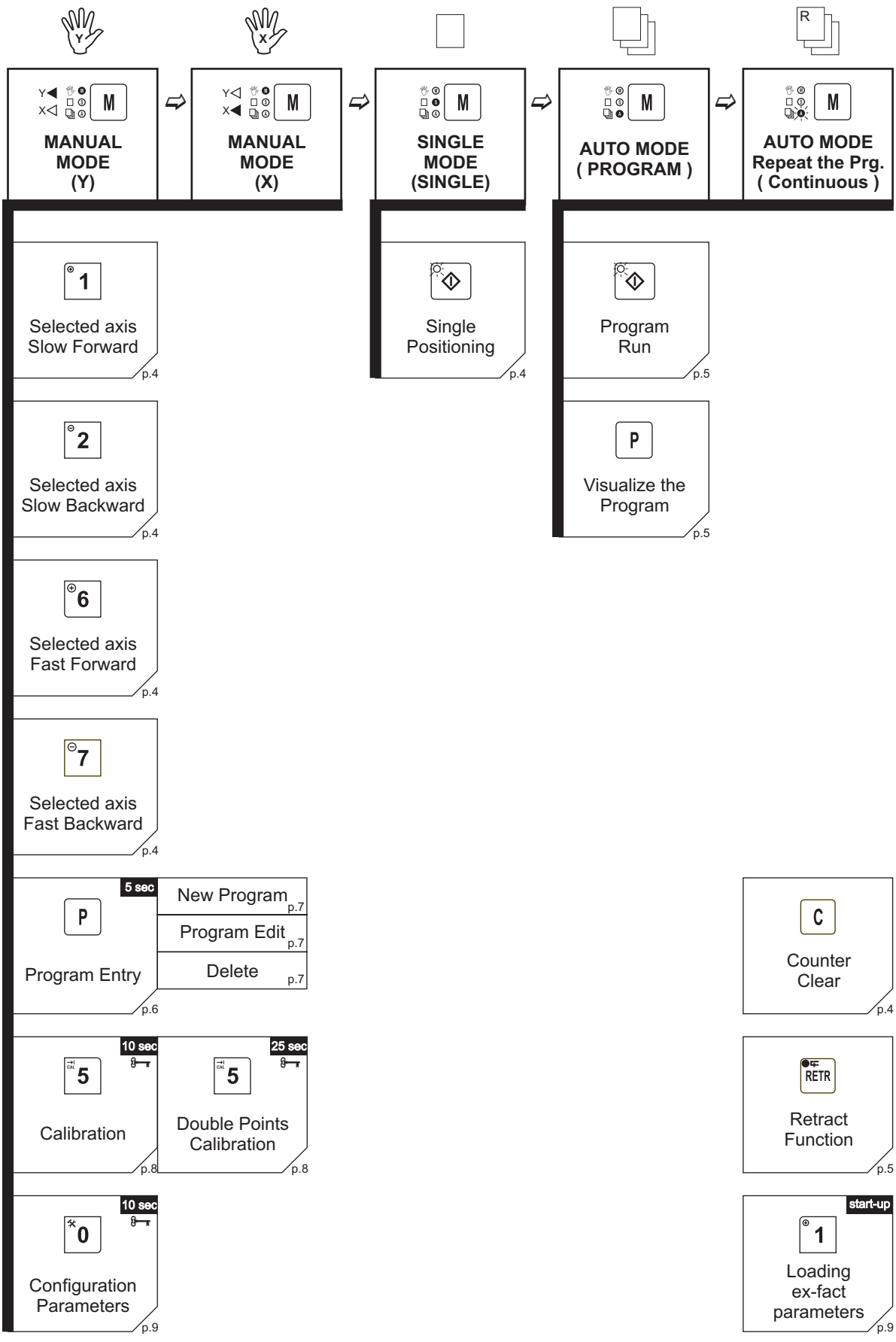


DISPLAY and KEYS

Y 0028.54	Y AXIS DISPLAY : Actual value is displayed for manual and single modes. In auto mode, it shows the value programmed before.
X 00067.3	X AXIS DISPLAY : Actual value is displayed for manual and single modes. In auto mode, it shows the value programmed before.
# 0005	COUNTER DISPLAY : It shows number of operations done (counts the count input) Press C to clear the count value.
PROG 29	PROGRAM NO DISPLAY : Selected program no (1..99)
STEP 01	STEP NO DISPLAY : Selected step no (1..33)
	SELECTED MODE : Leds indicate what mode is selected. (**M**)anual: Manual positioning, (**S**)ingle: Single positioning, (**A**)uto: Programmed mode
OK	OK LED : Operation is allowed only if OK led lighted. e.g. Ok led is lighted off during positioning and operation is not allowed.

START	START : Run / Enter
STOP	STOP : Stop / Exit
M	Mode select
P	Prpgram entry
C	Display clear / Counter clear
DEL	Program or Step delete
RETR	RETRACT function select

5 CAL	CALIBRATION (Only in **Manual** mode)
0	CONFIGURATION (Only in **Manual** mode)
1 2	Slow Motion for selected axis (Only in **Manual**)
6 7	Fast Motion for selected axis (Only in **Manual**)
1 2 3 4 5 / 6 7 8 9 0	Numerical keypad


MANUAL MODE (Y)
MANUAL MODE (X)
SINGLE MODE (SINGLE)
AUTO MODE (PROGRAM)
AUTO MODE Repeat the Prg. (Continuous)
1 Selected axis Slow Forward p.4
2 Selected axis Slow Backward p.4
6 Selected axis Fast Forward p.4
7 Selected axis Fast Backward p.4
Single Positioning p.4
Program Run p.5
P Visualize the Program p.5
P 5 sec Program Entry p.6
New Program p.7
Program Edit p.7
Delete p.7
5 10 sec Calibration p.8
5 25 sec Double Points Calibration p.8
0 10 sec Configuration Parameters p.9
C Counter Clear p.4
RETR Retract Function p.5
1 start-up Loading ex-fact parameters p.9

MANUAL MODE (Y)
Y axis selected, related keys used to position Y-axis.

MANUAL MODE (X)
X axis selected, related keys used to position X-axis.

SINGLE MODE
Y axis, X axis and Count values entered, with start positioning takes place.

AUTO MODE
Programmed position values can be called and used to position the machinery.

AUTO MODE (REPEAT)
Selected program no is repeated continuously.

MANUAL MODE (Y-axis and X-axis)

M key is pressed to light the led of desired axis and M led.

Press 1 or 2 for SLOW forward or reverse positioning

Press 6 or 7 for FAST forward or reverse positioning

SINGLE MODE

M key is pressed to light the S led for single positioning.

Press START

Y-axis display blinks (ready for value entry),
Press numerical keys for the desired Y position.

Press START to enter the written value.

X-axis display blinks (ready for value entry),
Press numerical keys for the desired X position

Press START

Counter display blinks (ready for value entry),
Press numerical keys for the desired count.

Press START to enter the values,

Positioning is carried out, when the position is found correctly OK contacts close (its led is on).
In this position, operations are counted, when the count is reached OK contacts open.

COUNT CLEAR

Press C to clear the counter. (Only in Manual and Single mode)

AUTO MODE

M — Press M to light the Auto led.

0..9 — Prog No display blinks (ready for entry)
Press numerical keys for the desired program no.

Press START to enter.

Positioning is carried out for step 01 position values. If the position is found correctly, OK contacts close.
Operations are counted, when the count is reached OK contacts open, then positioning is carried out for step 02 and it continues as before.
When the recorded steps are finished (max. 33 steps) it returns to step 01 and wait for start.

AUTO MODE (REPEAT)

M — Press M to blink the Auto led.

0..9 — Prog No display blinks (ready for entry)
Press numerical keys for the desired program no.

Press START to enter.

Positioning is carried out for each step as in the auto mode.
When the recorded steps are finished, it returns step 01 and repeats the program again.
This continuous operation (repeating the program) is exited by pressing STOP.

PROGRAM VISUALIZATION

M — Press M to light the auto led.

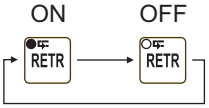
0..9 — Prog No display blinks.
Press numerical keys for the desired program no.

P — Press P.

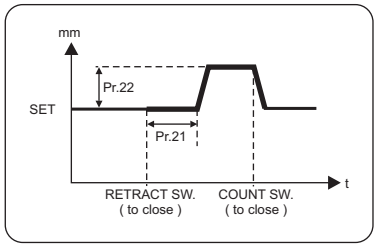
Step 01 position and count values are displayed.
With each press P, steps are visualized one after the other.
Press STOP to exit.

RETRACT FUNCTION

Backstop has to retract (set retract value in parameters) whilst the bend is taking place to bring to safe position.

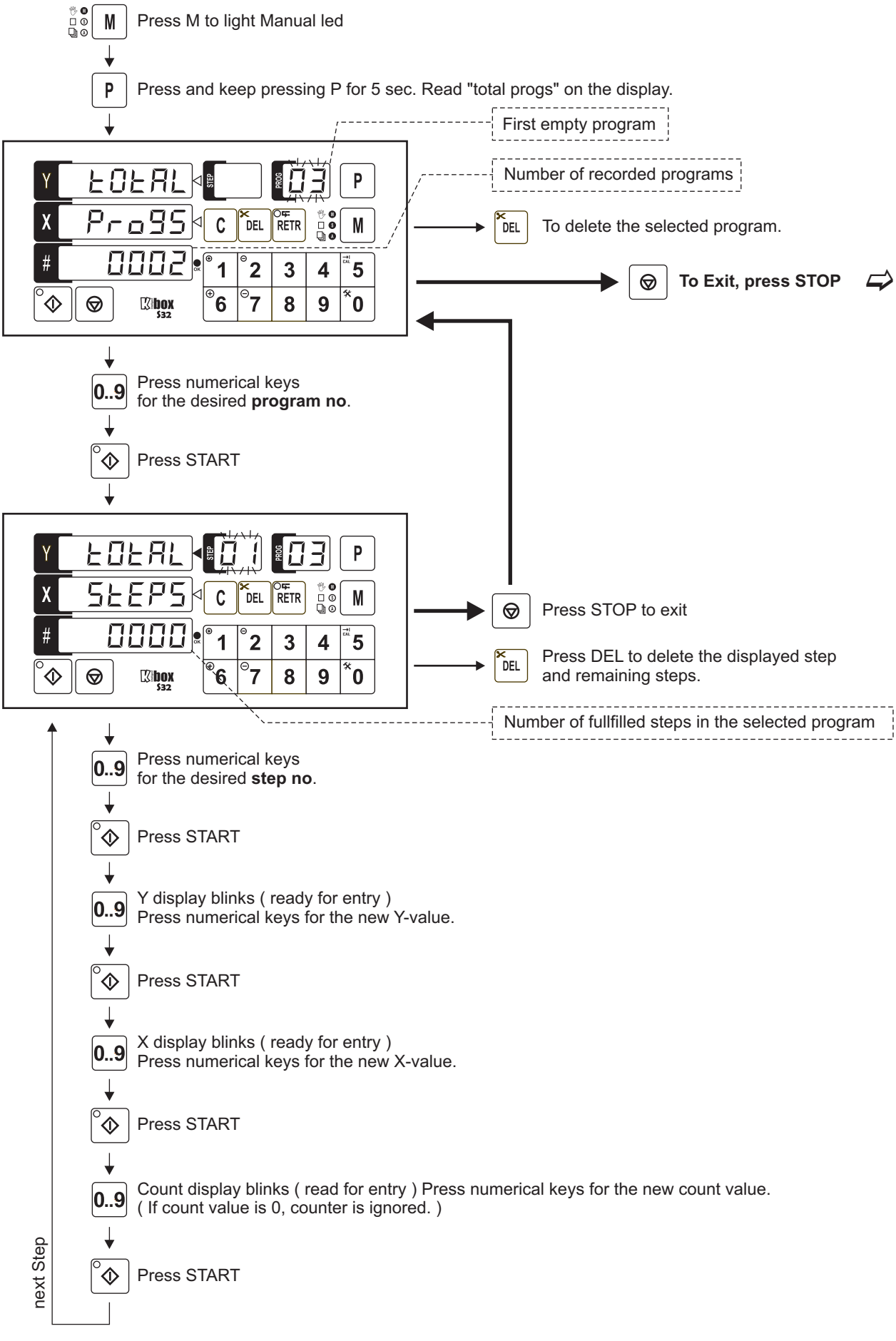


RETR — Press RETR key to light its led.
Press RETR key to cancel to retract function.

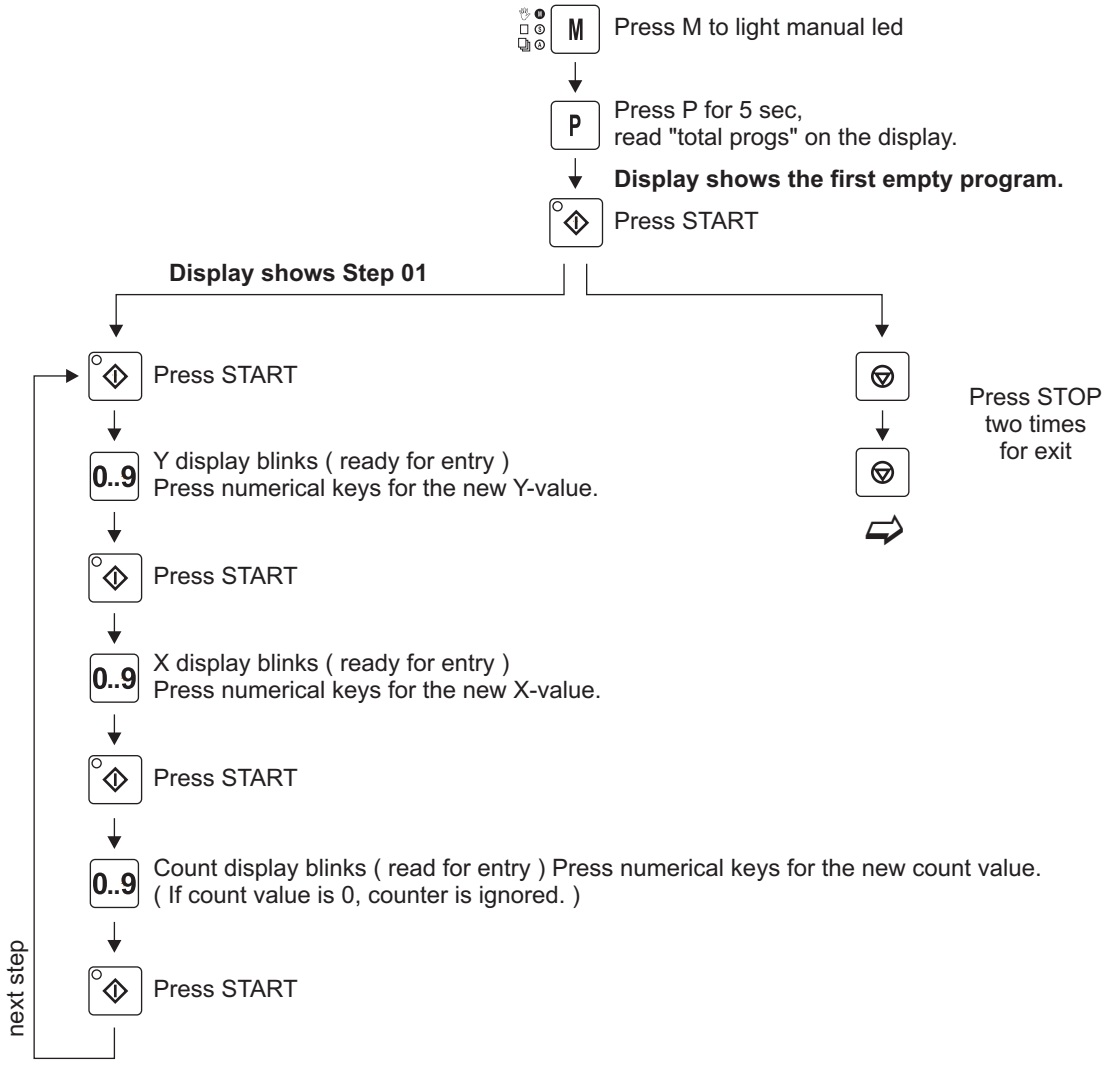


NOT : Retract Function
When retract input is closed, after retract delay (Pr.21), backstop is retracted for retract distance (Pr.22).
By count input closing, positioning to orginal position takes place.

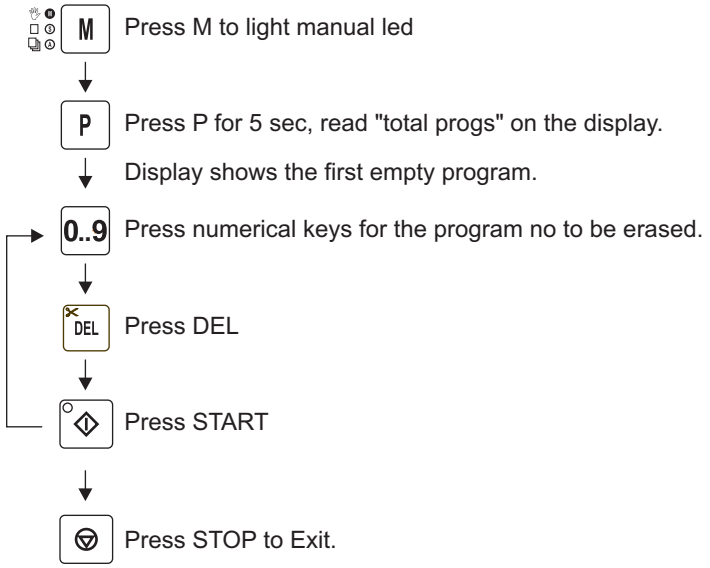
Pr.21 : Retract delay
Pr.22 : Retract distance


M
Press M to light Manual led
P
Press and keep pressing P for 5 sec. Read "total progs" on the display.
First empty program
Number of recorded programs
Y tOtAL
X Pro95
0002
STEP
PROG 03
P
C DEL RETR M
1 2 3 4 5
6 7 8 9 0
Kbox S32
DEL
To delete the selected program.
To Exit, press STOP
0..9
Press numerical keys
for the desired program no.
Press START
Y tOtAL
X StEPS
0000
STEP 01
PROG 03
Press STOP to exit
Press DEL to delete the displayed step
and remaining steps.
Number of fullfilled steps in the selected program
Press numerical keys
for the desired step no.
Press START
Y display blinks (ready for entry)
Press numerical keys for the new Y-value.
Press START
X display blinks (ready for entry)
Press numerical keys for the new X-value.
Press START
Count display blinks (read for entry) Press numerical keys for the new count value.
(If count value is 0, counter is ignored.)
Press START
next Step

PROGRAM ENTRY



PROGRAM ERASE



During the programming ;

1. If a new program is written over an old program, to erase the displayed step and the remaining steps, press DEL and then press START.
2. Erasing ALL programs : Press and keep pressing DEL, and energy is applied, release DEL. After 15 sec, all programs are erased.

SINGLE POINT CALIRATION (CORRECT POSITION)

M — Press M to light Manual led and the desired axis led.

Y◀ X◁

5 — Press CAL (5) for 10 sec. Read [CAL ibr] on the display.

PASS
000000

0..9 — Press numerical keys for the password. (Supervisor Password = 1974)

Press START

Y 000 1.00

0..9 — Press numerical keys for new value of the selected axis.

Press START. New value is read on the display.

DOUBLE POINT CALIBRATION

M — Press M to light manual led and the desired axis led.

Y◀ X◁

5 — Press CAL (5) for 25 sec.
Read [CAL -2] on the display.

PASS
000000

0..9 — Press numerical keys for the password. (Supervisor Password = 1974)

Press START. Read [POS- 1] on the display

Bring the position minumum, manually.

Press START

Y 000.00

0..9 — Press numerical keys for the measured value entry.

Press START

Press START, Read [POS-2] on the display.

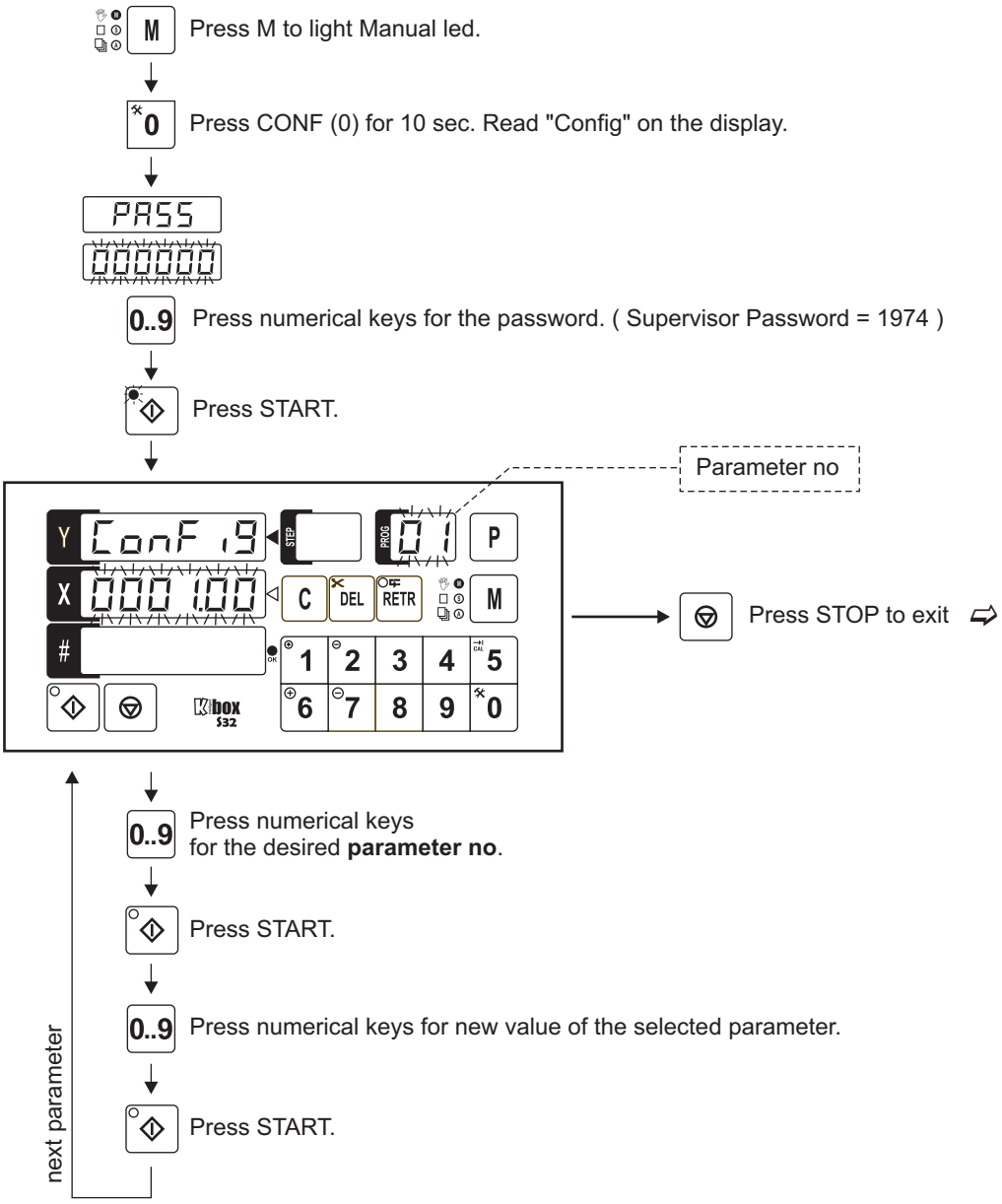
Bring the position maximum, manually.

Press START

Y 000 1.00

0..9 — Press numerical keys for the measured value entry.

Press START



PARAMETER TABLE

	Pr.No		Fact.default
	Y	X	
SLOW SPEED DISTANCE (mm)	01	11	0.50 / 30.0
PITCH (mm/tour)	02	12	0.16 / 10.00
ENCODER (pulse / tour)	03	13	100 / 100
DECIMAL POINT = 0..5	04	14	2 / 1
TOLERANCE (mm)	05	15	0.02 / 0.2
(Reserved)	06	16	1 / 1
TOL.WINDOW BLANKING (No=0, Yes=1)	07	17	1 / 1
MINUMUM SET (mm)	08	18	1.00 / 10.0
MAXIMUM SET (mm)	09	19	100.00 / 750.0
NUMBER of TRIALS	10	20	10 / 10

	Pr.No	Fact.default
RETRACT DELAY (0.01 sn)	21	0.20
RETRACT DISTANCE (mm)	22	5.0
(Reserved)	23	0
PASSW (4 digit) S.Pass = 1974	24	1971

EX-FACTORY PARAMETERS LOAD

1 keep pressing "1" and switch on the supply, read ConF 19 / FAct on the display.

TECHNICAL SPECIFICATIONS

FUNCTION	DATA
Supply voltage	24VAC (+/-10%)
Position sensor	Encoder (A,B ch.), 12VDC / PNP, 10 kHz
Inputs	6 Digital inputs, 12 VDC/PNP
Outputs	7 Relay outputs, 3A, NO
Ambient temperature	0..50°C
Front Dimensions	W x H = 192 mm x 96 mm
Depth (excl. terminals)	D = 86 mm
Panel cut-out	W x H = 186 mm x 92 mm

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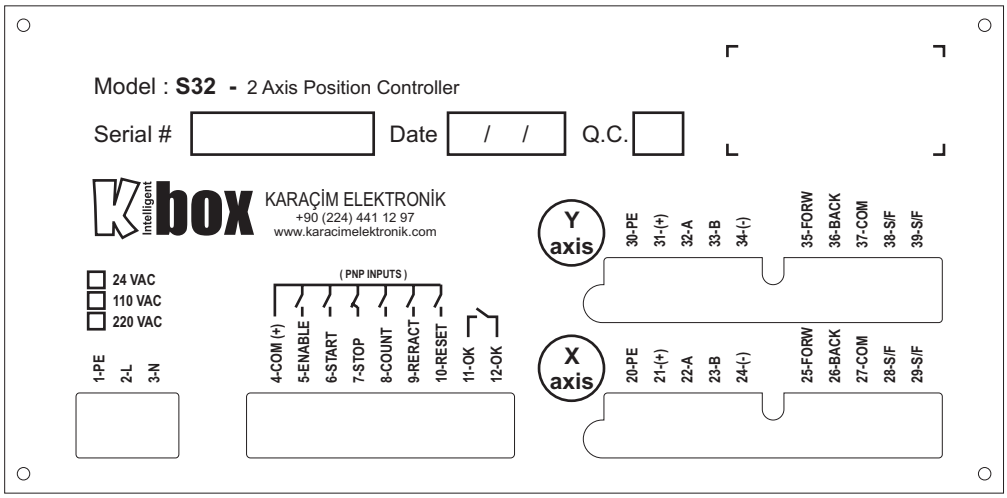

No		DESCRIPTION
1	PE	Protective Earth
2	L	Supply Line
3	N	Supply Neutral

4	COM (+)	Common
5	ENABLE [1]	Enable (NO)
6	START	External Start (NO)
7	STOP [2]	External Stop (NC)
8	COUNT	Count Input (NO)
9	RETRACT	Retract Input (NO)
10	RESET	Reserved
11	OK	Ready Output (NO)
12		

NOT

[1] ENABLE must be shorted to common to enable the positioning.

[2] STOP must be shorted to common to enable the positioning. (NK)

No		DESCRIPTION
20	PE	Protective Earth
21	(+)	Encoder Supply 12VDC
22	A	Encoder X - Ch. A
23	B	Encoder X - Ch. B
24	(-)	Encoder Supply GND
25	FORW	X Forward
26	BACK	X Backward
27	COM	Common
28	S/F	Open = Slow Close = Fast
29		

30	PE	Protective Earth
31	(+)	Encoder Supply 12VDC
32	A	Encoder Y - Ch. A
33	B	Encoder Y - Ch. B
34	(-)	Encoder Supply GND
35	FORW	Y Forward
36	BACK	Y Backward
37	COM	Common
38	S/F	Open = Slow Close = Fast
39		

ERROR MESSAGESS

ERROR MESSAGE	DESCRIPTION	TO DO
FAtAL Error 0001	Hardware Error (Y Axis)	*Apply to manufacturer*
FAtAL Error 0002	Hardware Error (X Axis)	*Apply to manufacturer*
Error 0003	Out of limits (parameters 8, 9, 18, 19)	*Check the given set values*
Error 0004	No change on the display during calibration	*Check encoder connections and mechanism*
Error 0005	Incorrect direction of count during calibration	*Check encoder connections and change ch.A / B*
Error 0006	Position is not found	*Check and again try*

INSTALLING

Attention ! :

To ensure a perfect function of the S32 the following insatllation guide-lines must be strictly observed and followed. Otherwise the guarantee expires and Karaçim takes no liability and guarantee for malfunctions or damages e.g. by incorrect installed wires or other external sources of error or interference, which are exactly explained below.

To guarantee a perfect operation of the S32, the following (external) measures have to be taken additionally :

PLACE OF INSTALLATION

Don't install the controller near to sources of interference generating strong inductive or capacitive interferences or strong electrostatic fields.
Install the external power supply directly beside the controller to avoid long low voltage wires.

POWER SUPPLY

Use a galvanic separation over an additional transformer.

WIRE INSTALLATION

Install all wires for low voltage and encoders always separately from power wires.
Avoid to install these wires close to any contactor or contactor wires.

SHIELDING

All external signal wires have to be installed shielded :
1. Rotary encoder wires
2. Wires for all other input signals
3. Wires for all output signals
4. Wires from the power supply to the S32

All shields have to be connected centrally low ohm to PE (Earth potantial),
connect only one-sided at the S32.

IMPORTANT !

1. Don't connect the S32 GND tp PE
2. Don't connect the shielding on both sides to PE
3. If the protective ground potential is heavily "contaminated" by interference voltages, try to connect the shielding to the GND potential instead of PE.

FAULT CLEARANCE

If there occurs interferences in spite of applying all above mentioned measures proceed as follows:
1. Add RC elements over contactor coils of AC contactors (for example 0,1 uF/100ohm)
2. Add recovery diodes over DC inductances
3. Add RC elements over each engine phase (in connector box of the engine)
4. Install a power filter before the external power supply