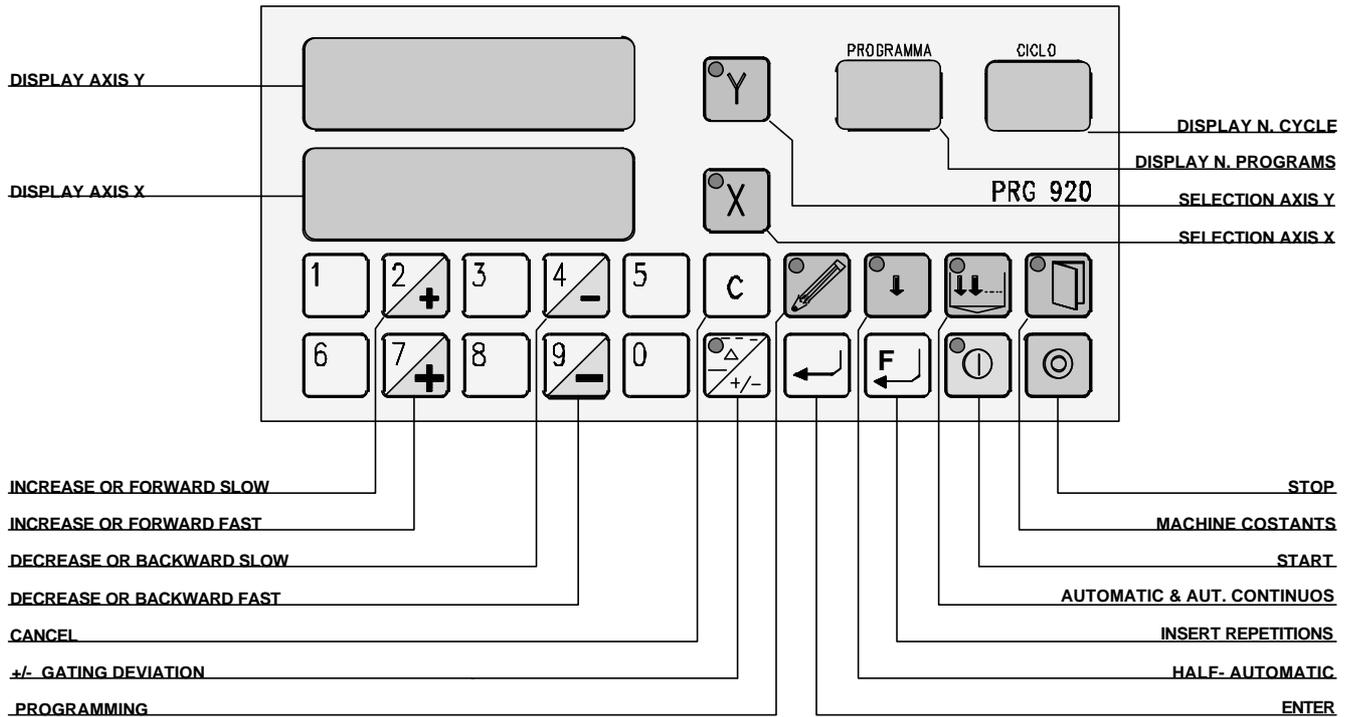# 2 PARALLEL AXIS

PROGRAMMABLE POSITIONER

PRG 920

MANUAL FOR USE AND PROGRAMMING

SOFTWARE TYPE P01
HARDWARE TYPE C01

FRONTAL POSITIONER PRG 920

DISPLAY AXIS Y

DISPLAY AXIS X

PROGRAMMA   CICLO

PRG 920

DISPLAY N. CYCLE
DISPLAY N. PROGRAMS
SELECTION AXIS Y
SELECTION AXIS X

INCREASE OR FORWARD SLOW
INCREASE OR FORWARD FAST
DECREASE OR BACKWARD SLOW
DECREASE OR BACKWARD FAST
CANCEL
+/- GATING DEVIATION
PROGRAMMING

STOP
MACHINE COSTANTS
START
AUTOMATIC & AUT. CONTINUOS
INSERT REPETITIONS
HALF- AUTOMATIC
ENTER

TECHNICAL FEATURES:

- Feeding : 24 V a.c. + 20% - 10%
- Absorbed power : 20 VA
- Output encoder feeding or optical line : 12 V CC 100 mA   stabilized   for each axis.
- Max. counting frequence 10 Khz with multiplication x4
- Relay axis movement control with interlock of contacts   between: INCREASE/DECREASE and SLOW/FAST
- Electrical decoupled inputs by means of photocouplers
- High luminosity led display 5 digits + negative sign for each   axis
- High luminosity led display 2 digits for the number of program
- High luminosity led display 2 digits for the number of cycle
- Water and abrasion-proof, polycarbonate keyboard with tactile   sensitività

- Electronical circuit, completely realized with CMOS Technology,   RISC Micro Controller Technology
- Memory for "machine constants" and programs on EEPROM , thus   without   buffer battery.
- Memory capacity up to 99 programs , each one made up by 20   cycles
- "Intelligent" axis completely indipendent in their own   parameters   and   in their own configuration
- Power/down supervisor circuit as warrant of a very high security   in   data storage
- Connections with external circuits with extractable terminals.
- Anodized aluminium embedding container in compliance with DIN   standards 43700 192x96x125
- Drilling measures of the panel for embedding : 186x92.

IN COMPLIANCE WITH:

EN 50081-1 FOR NOISES RADIATION
EN 50082-2 FOR NOISES EXEMPTION
AS PROVIDED BY THE LAW ABOUT ELECTRO-MAGNETIC COMPATIBILITY.

READING OF THE INSTRUCTION MANUAL

This manual describes the functioning and programming of PRG 920. In some points we refer to the installed software or to the hardware configuration since this product is very flexible either in construction or in programming, so it has been possible to produce it in a lot of versions, which are different in order to permit the most suitable functioning of the machine on which it is assembled.

So this instruction manual describes all the main functionings of the positioner but for functional details, please read the last page of the manual where we have shortly noted the modifications carried out on each single product.

RUNNING MODE

PRG 920 positioner can settle two powered axis in a manual, semiautomatic and automatic mode.

PRG 920 positions in manual or semiautomatic mode the gated axis by means of the respective buttons, whereas in automatic mode it positions the axis according to the program previously memorized.

PRG 920 has a memory capable of holding up to 99 programs, from number 1 up to 99 and each program can include up to 20 positions each axis, and these positions may have 99 repetitions. Each couple of positions with the relative repetitions makes up a cycle of the program.

With "repetitions" we mean the number of times that the contact connected to the increase cycle input has to close in order to permit the passage to the following cycle.

Anyway it is possible to program a cycle by gating only an axis.

Semiautomatic mode acts as a single cycle of a program, with the difference that it is directly carried out without memorizing it.

It is possible to pass from a functioning mode to another one by simply pressing the button of the desired functioning mode.

This operation will cause the closing of the present functioning mode and the opening of the selected one.

PRG 920 has also a memory desk, where the parameters necessary to the functioning of the two axis are stored; these parameters are called machine constants and they are completely indipendent between the two axis.

MACHINE CONSTANTS

In order to write or correct the machine constants, act as follows:

Press button MACHINE CONSTANTS for about 5 seconds. The cycle display will show the number of parameter, whereas the dispaly of position will show the relative value. By pressing button ENTER it's possible to read the different parameters, and in order to correct or write them press the button of the axis to write on, write the requested value, press ENTER to memorize and then pass to the following parameter. By pressing the button of the axis to gate, You must take into consideration that the first time You press the button it's to gate the axis for writing, the second time it's to disable it, so the value on the display disappears; the third time is to gate the axis again for reading and so on. In any case, if an axis has been gated for writing but without using numerical buttons to change its value, the data in the memory won't be changed.

Once the parameters have been read or written, press STOP button to exit this operation.

1 Axis-position, reading limits from -99999 up to 99999.
2 Taking-up slack value : if set on zero the taking-up slack value will not be carried out; if positive, the taking-up slack value is carried out in positive or increasing direction, if negative it's carried out in negative or decreasing direction.
3 Value of the change of speed: if set on zero the axis moves only at slow speed.
4 Value of inertia in negative or decreasing direction, or only readable, since PRG 920 adjusts it automatically at every positioning according to the installed software.
5 Value of inertia in positive or increasing direction, or only readable, since PRG 920 adjusts it automatically at every positioning, according to the installed software.
6 Value of tolerance, where positioning is accepted.

7 Value of deviation.
8 Value of time, in tenths of a second, to pass from the moment when a deviation is controlled till
   the moment it's carried out.
9 Value of the minimum limit switch from -99999 up to 99999.
10 Value of the maximum limit switch , from - 99999 up to 99999.
11 Value of the multiplication constant of the encoder impulses X1 X2 X4
12 Value of the decimal multiplication constant of the encoder impulses from 0,000001 up to 1,999999.
   By setting 0 this parameter is excluded. The six numbers of this parameter are decimal and the negative
   sign has the function of 0,..... whereas the absence of the negative sign has the function of 1,....
13 Value of reset, from -99999 up to 99999, where the position of the axis is immediately sett
   when operating the relative input.
14 Decimal point position: by setting 0 = reading without decimal 1= one decimal 2= two decimals
   3= three decimals.
15 Value of time, in tenths of second, that pass or among the end of positioning and the controll of
   position reached, in the limits of tolerance, or in occasion of reversing movement.
16   Option of positioning.

           0 If the position request is in the limits of tolerance it is positioned.
           1 If the position request is in the limits of tolerance it is not positione.

           0 Spending from fast to slow it stays the value of the change speed and it
              then takes back slow.
           1 Spending from fast to slow it doesn't stay the value of the cange speed
              but commutes only relais.

           0 It comes effected the calculus of the inertia.
           1 It doesn't come effected the calculus and the relative adjournment of the inertia.

           0 At the end of each positioning comes visualized the position really reached.

           1 At the end of each positioning, comes visualized the in demand position, if
              this is in the limits of the tolerance.

PROGRAMMING

By pressing button PROGRAMMING, the led on it will light up as well as the display of programs, showing the
first empty program at disposal.
Confirm with ENTER, in order to write in the proposed program or insert the number of the program to write or
read again by using the numerical buttons , then press button ENTER If the recalled program is empty, the led
on button PROGRAMMING starts flashing, showing you are in writing mode; the displays of position will show
a flashing 00000 for axis Y , thus showing that it is waiting to receive some data and 0 for axis X, showing that
the axis is waiting for being selected. The display of cycles will show 1.
In order to write a series of positions and of possible relative repetitions, max. 99 for each cycle, select the
desired axis by means of the relative button, thus making its led flashing, write the desired position by using
numerical buttons. When making a mistake, press C to cancel the content of the display, that will show again
00000. Once the correct value has been written, select the other axis if You want to write or deselect it by
means of the relative button, thus making the led switch off; confirm with ENTER to pass to the following cycle
or with button INSERT REPETITIONS if You want to pair some repetitions to that cycle.
In this case this value will appear on both the displays if both axis have been previously written or only on the
previously written axis and this number shows the number of repetitions, confirm with ENTER or write the
desired number of repetitions and then confirm with ENTER. Positions displays will be set again on zero and
the display of cycles will show 02, so it will be possible to program the following cycle by repeating the above
mentioned procedure and so on.
Once the last cycle has been written and confirmed with ENTER, by pressing button PROGRAMMING, it's
possible to exit writing operation and visualization will start again from the first written cycle and it will be
posible to read again the program by pressing button ENTER,that shows only the position, or button INSERT
REPETITIONS , that allows the visualization of repetitions or by pressing button STOP the visualization will

show the first empty program at disposal, thus permitting the reading or writing of another program, or by pressing again STOP button PRG 920 exits programming procedure , returning in manual mode.
If the recalled program contains some data , the led on button
PROGRAMMING will remain on but with fix light and on the position display of the relative axis will appear the position which makes up the first cycle; the cycle display will show 1.By pressing again ENTER the visualization will show the second cycle and so on, by showing again the first one, after having visualized the last cycle of a program. Pressing button INSERT REPETITIONS insted of ENTER , the previous effect is obtained with the difference that after position, also the repetitions will be visualized.
It's also possible to correct programs already written.
To make corrections, position on the cycle and then on the data to be corrected, then press button PROGRAMMING, correct the data and confirm with ENTER.
To cancel a part or a whole program, position on the cycle from which You want to start cancelling and press button C for about one second; by pressing button C on the first cycle of program, the whole program will be cancelled. There is also the possibility to cancel quickly all the memory desk of programs: it's enough to be in programming and keep pressed button C for about 5 seconds, after that PRG 920 will start cancelling all the programs.

MANUAL MODE

Upon start-up PRG 920 is ready for manual mode.
This operative mode can be recognized by the displays, as in this mode, only the display connected with the position of axis are gated.
In this mode, it's possible to control the movement of one axis by pressing first of all the button of the axis to gate, thus making the relative led light up, then by means of the four buttons :
SLOW INCREASE, FAST INCREASE, SLOW DECREASE, FAST DECREASE.
The limit switches, for the minimum and maximum attainable position , are operating even in manual mode, but they are exceeded by the value of inertia of the system in fast or slow speed, according to the pressed button.

SEMIAUTOMATIC MODE

By pressing button SEMIAUTOMATIC in manual mode, the led on the relative button will light up and the displays of positions will show the flashing present position on axis Y and the present position on axis X.
So it will be possible to write the position to reach directly on axis Y or it will be possible to de-select it by using the button for selection, thus making the relative led switch off. Then it will be possible to pass to axis X by selecting it , thus making the position and the relative led on button for selection flash; then write the position to reach or it will be possible to de-select the axis.
Once the position or positions to reach has been introduced by means of the numerical buttons, it is possible to introduce only values included among the limits of the limit switches previously setted and by pressing button START positioning will start.
By pressing button INSERT REPETITIONS instead of button START, the display will show 01, which shows the number of repetitions to program.
Confirm 01 or write the number of repetitions, max. 99, and confirm with START, thus allowing the beginning of positioning.
In this condition , the led on button START will be on, to show that a positioning is taking place.
If for every reason , positioning, or positionings if selected axis are more than one, doesn't occur within the limits of the programmed tolerance, PRG 920 will try to carry it out again, max. for three times, and if also after the last attempt positioning has not been carried out correctly, O.K. POSITION relay will stay open and the led on button START will start flashing, thus indicating the anomaly. Press button STOP to exit this operation and check if the non-positioning was due to a wrong setting of the machine constants or to mechanical problems.
At the end of positioning, by pressing again button ENTER, it's possible to introduce new data , in order to carry out another positioning, whereas by pressing button STOP it's possible to select the other axis and to carry out a positioning, or by pressing again button STOP , PRG 920 returns again in manual mode.
By using STOP button, it's possible to stop positioning or the counting of repetitions in every moment.
PRG 920 permits positionings even if the requested position is included among the value obtained from the present position more or less the value of inertia of the system.

In this case, the positioner places on its own at a distance so far as three times the inertia of the system from the present position , it means in the more suitable direction for positioning and from that position it permits to the axis to place to the requested quota.

When establishing the mechanical limits of the system you have to take into consideration that even if PRG 920 doesn't accept values of positioning higher than the limits programmed on the machine constants, it exceeds these limits, in order to make a correct positioning, according to the taking-up slack value plus the value of the inertia system in high speed, or it exceeds the above mentioned limits of three times the value of inertia in slow speed.

AUTOMATIC MODE

In AUTOMATIC mode it's possible to execute the programs previously stored through function PROGRAMMING. As far as the considerations on the movements of the controlled axis is concerned, take into consideration the same rules as for SEMIAUTOMATIC mode. By pressing button AUTOMATIC, the led on the relative button will light up and the display of programs will show the number of the last one that has been executed.

Confirm it or set the number of the desired program by means of the numerical buttons: by pressing button START positioning will start, otherwise the first position, or positions, to reach will appear on the display of position by confirming with ENTER; press ENTER again and visualization will show the second cycle and so on.

Then press START button and positining will start from the visualized positioning.

If before pressing START or during the execution of the program You press again AUTOMATIC button, the led , already light up on this button, will start flashing, thus showing that the program will be executed in CONTINUOUS mode; at the end of program, it will be carried out again until You press button AUTOMATIC and the relative led will stop flashing.

When the positioning of the first programmed cycle has been carried out, according to the installed software , PRG 920 awaits that the INCREASE CYCLE contact closes so many times as programmed in the cycle repetitions , in order to position itself according to the second cycle and so on, or in automatic mode after positioning of the first cycle has been completed, it passes to the positioning of the second cycle and so on.

When choosing the number of program, in case the selected number is not accepted, it means that the requested program is without any data.

By using button STOP it is possible to interrupt positioning in every moment and the display of cycles and programs will start flashing.

By pressing button START it's possible to start the program again.

By pressing again button STOP , the execution of the program will be interrupted and display of programs will show the number of the last executed program, thus allowing the new execution of the program or the selection of a new one.

By pressing again button STOP , it is possible to return in manual mode.

In every moment, when the program is being carried out, the display of cycles shows the number of cycle which is being executed and the display of programs will show the number of program.

END OF PROGRAM

This is a contact that closes for about 0,5 seconds each time that a program in execution has been concluded , it means it concludes its last cycle.

O.K. POSITION

O.K. position is a contact which opens during movements and closes 0.5 seconds after the execution of positioning.

It remains open if positioning has not had a positive result, in semiautomatic mode if the repetitions counter has reached the value previously setted ; in automatic mode at the end of each program in programming mode and when entering the machine constants.

MANUAL-SEMIAUTOMATIC/AUTOMATIC

This is a contact which opens its own contact when PRG 920 is in MANUAL and SEMIAUTOMATIC mode and closes it when positioner is in AUTOMATIC mode.

CYCLE INCREASE

When this input is closed all the programmed repetitions are counted.
At each closing, the counter is increased of one unit.

EXTERNAL START

This input repeats the function of the button placed on the frontal.

EXTERNAL STOP

It repeats the function of the button placed on the frontal , with the only difference that each time this input is gated, the positioner returns on manual mode.
This input must be connected to a contact normally closed.

GATING

Gating a contact which closes each time a movement starts and opens about 0,5 seconds after the end of the movement.
Each axis may be equipped with this contact.

DEVIATION

Deviation is a function gated by the relative button; it is activated when the led is on and it makes the axis position increase according to the value programmed in the machine constants, when the relative input is closed.
The increase occurs after the time, programmed in the machine constants, has passed.
During this movement the O.K. position is closed.
The coming back to the previous position occurs when the cycle-increase input, which has priority on deviation, closes; in fact it's possible to come back to the value even if the deviation movement has not finished; during this movement of return O.K. position is open. Each axis may be equipped with this input.

RESET

Each time this input is closed, the reset value, memorized on the machine constants, is stored on the counter and this value is the new position of the controlled axis. This happens only if the output of 0 of the encoder is not connected to the INPUT 0. Each axis may be equipped with this input.

0 ENCODER INPUT

Each time this input is gated from the encoder output, the value of reset memorized on the machine constants is stored on the counter and this is the new position of the controlled axis. This happens only if the contact on RESET input is closed.
Each axis may be equipped with this input.

MEMORANDUM OF THE MEMORIZED MACHINE CONSTANTS

N.	CONSTANT VALUE	AXIS Y	AXIS X
2	TAKING-UP SLACK VALUE		
3	CHANGE OF SPEED		
4	INERTIA -		
5	INERTIA +		
6	TOLERANCE		
7	DEVIATION		
8	DELAY OF DEVIATION		
9	MINIMAL LIMIT-SWITCH		
10	MAXIMAL LIMIT-SWITCH		
11	ENCODER MULTIPLICATION		
12	DECIMAL ENCODER MULTIPLICATION		
13	RESET		
14	POSITION OF THE DECIMAL		
15	TIME OF CALCULUS CORRECT POSITION		
16	OPTIONES OF POSITIONING		

TABLE OF GENERAL OPTIONS

AFTER POSITIONING IT PASSES TO THE FOLLOWING CYCLE WITHOUT THE O.K. OF THE INCREASE CYCLE INPUT	
MANUAL OUTPUT - SEMIAUTOMATIC/AUTOMATIC	
END OF PROGRAM OUTPUT	
EXTERNAL STOP INPUT , NORMALLY OPEN	

TABLE OF OPTIONS ON EACH SINGLE AXIS

	Axis X	Axis Y
THE AXIS REACHES RESET VALUE AFTER EVERY POSITIONING		
GATING OUTPUT		
DEVIATION INPUT		
RESET INPUT		

0 ENCODER INPUT		