

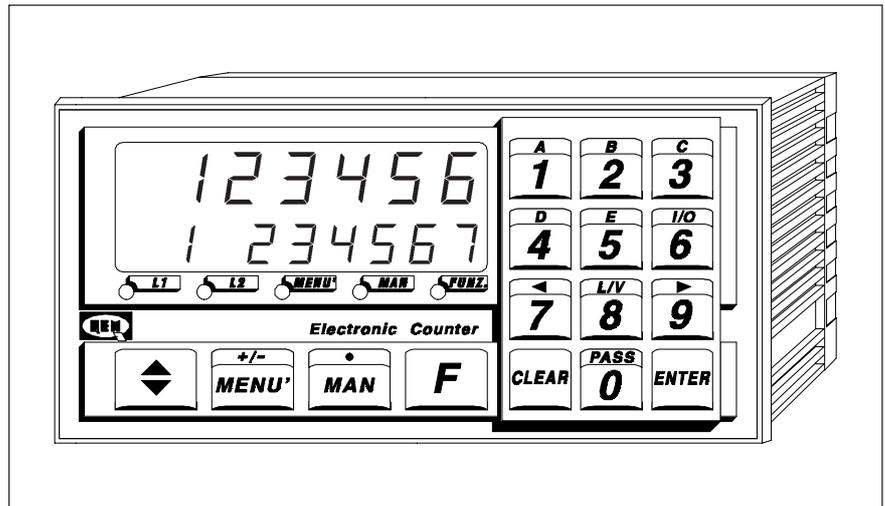


qem

ANALOG SINGLE AXIS POSITIONER WITH POSSIBILITY OF SELECTION OF SPEED AND POSITIONING LEVEL THROUGH INPUTS.

HB 548.17

- Size DIN 72 x 144.
- Encoder resolution multiplier.
- Antiscratch membrane keyboard.
- Incorporated encoder feeder..
- AC/DC static outputs.
- Non volatile memory.
- Analog output ± 10 V type CNC.



DESCRIPTION OF OPERATION

The instrument HB 548.17 is a single axis analog positioner which allows to select the level in use through a binary code acquired by the dedicated inputs. Once the positioning is made, the code is proposed again on the outputs to allow the operator to verify the reading of the inputs. 31 levels are available, ten of which are available to the operator for 10 selectable programs, the remaining levels are fixed for all programs. It is possible,

furthermore, to select up to 4 different speeds through external inputs. The keyboard in polycarbonate antiscratch is performed with mechanical actuators which provide the operator with the tactile feeling of the key switching on. The calculation of the preselections and the parameters of operation are stored on non volatile memory to guarantee maximum reliability and safety of operation also in limit conditions.

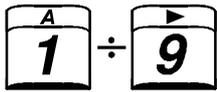


This product is an electronic instrument and is thus not to be considered as a machine. Consequently, it is not subject to the requirements stated in EEC Directive 89/392 (Machines Directive). It is hereby specified that, if the QEM instrument is used as a component part of a machine, it must not be switched on if the machine does not comply with the Machines Directive.

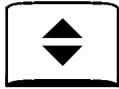
The instrument mark does not absolve the Customer from the fulfilment of his or her legal obligations regarding the finished product.

Il catalogo descrive le modalità di utilizzo del prodotto e non è vincolante al funzionamento dello strumento

DESCRIPTION OF KEYBOARD



They allow to enter data.
When pressed after key **F** they select the function indicated on the upper part of the key.



When pressed impulsively it displays the following display window.
When pressed in a continuous way for a second it displays, where enabled, the previous display window.



It allows to enter the working levels.
When entering data, it enters or removes the sign + / -.



It allows the access to manual functions.
When entering data it enters the decimal point.



It enables the selection of the functions indicated on the upper part of the numeric key.



When entering data it puts at zero the entered value and suggests again the old value..



When entering data it confirms the entered data.



Not used.



Not used.



It goes on during the programming of menu.



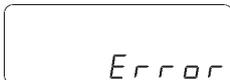
It goes on during the performance of manual functions.



It goes on during the the selection of a function indicated in the upper part of the numerical keyboard.

ERROR DISPLAY

If during any data introduction the operator enters a value not included within acceptable limits, the display shows for 1 second:



Once the error display time is achieved, the display shows again the data to be entered, suggesting again the old value.

DESCRIPTION OF INPUTS

Number term. b.	Name	Signal	Input activat.	Description
17	I1	C	ON	BINARY CODE LEVEL SELECTION 2⁰ . Time of activation 50 ms.
18	I2	C	ON	BINARY CODE LEVEL SELECTION 2¹ . Time of activation 50 ms.
19	I3	C	ON	BINARY CODE LEVEL SELECTION 2² . Tempo di attivazione 50 ms.
20	I4	C	ON	BINARY CODE LEVEL SELECTION 2³ . Tempo di attivazione 50 ms.
21	I5	C	ON	BINARY CODE LEVEL SELECTION 2⁴ . Tempo di attivazione 50 ms.
22	I6	C	ON	STROBE BYNARY CODE . On the upwards front if output U10=OFF it is acquired the binary code after a programmable acquisition time. With the input I6=ON it is activated the start of axis only if before has been performed a preset search (U7=ON), while with the input I6=OFF the axis is in stop. If you activate input I6, with inputs I1, I2, I3, I4 e I5=OFF, the instrument disables the space reaction.

I=Impulsive input C=Continuous input

DESCRIPTION OF INPUTS USED WITH THE EXPANSION (ORDERING CODE "E")

Number term. b.	Name	Signal	Input activat.	Description
32	I7	I	ON	CONTROL FOR PRESET SEARCH . It is enabled with input I6=OFF. If it is activated during the preset research, it reverses the direction of search. If the input is programmed as a preset loading, the search is not performed..
33	I8	I/C	ON	ENABLING ENCODER ZERO IMPULSE . Upon its activation it enables the loading of the preset level on the calculation. During the search of level of preset the software limit switches of the max. and min .level have no influence. The operation of the input depends upon the type of preset research programmed in the set-up.
34	I9	C	OFF / ON	MINIMUM LIMITS SWITCH / SPEED SELECTION 2¹ . If the set-up parameter "speed number"=1, when the input I9 becomes OFF, it places the axis in stop and enables only the manual shifting forward of the axis. If the parameter of set-up "speed number"=4, it assumes a binary code for the selection of speed being 2 ¹ .
35	I10	C	OFF / ON	MAXIMUM LIMIT SWITCH / SPEED SELECTION 2⁰ . If the setup parameter "speed number"=1, when the input I10 becomes OFF, it places the axis in stop and enables only the manual shifting of axis backwards. If the parameter of set-up "speed number=4, it assumes a binary code for the speed selection being 2 ⁰ .

I=Impulsive input C=Continuous input

DESCRIPTION OF OUTPUTS				
Number term. b.	Name	Signal	Duration	Description
7	U1	C	/	BINARY CODE LEVEL IN USE 2⁰. It is activated 50 ms. after is made the activation of the tolerance output (U6). It is disactivated (U1=OFF) when the strobe is disactivated. It is disactivated with output U10=ON.
8	U2	C	/	BINARY CODE LEVEL IN USE 2¹. It is activated 50 ms. after is made the activation of the tolerance output (U6). It is disactivated (U2=OFF) when the strobe is disactivated. It is disactivated with output U10=ON.
9	U3	C	/	BINARY CODE LEVEL IN USE 2². It is activated 50 ms. after is made the activation of the tolerance output (U6). It is disactivated (U3=OFF) when the strobe is disactivated. It is disactivated with output U10=ON.
10	U4	C	/	BINARY CODE LEVEL IN USE 2³. It is activated 50 ms. after is made the activation of dell'uscita di tolleranza (U6). It is disactivated (U4=OFF) when the strobe is disactivated. It is disactivated with output U10=ON.
11	U5	C	/	BINARY CODE LEVEL IN USE 2⁴. It is disactivated 50 ms. after is made the activation of the tolerance output (U6). It is disactivated (U5=OFF) when the strobe is disactivated. It is disactivated with output U10=ON.
I=Uscita impulsiva C=Uscita continua				

DESCRIPTION OF OUTPUTS USED WITH THE EXPANSION (ORDERING CODE "E")				
Number term. b.	Name	Signal	Duration	Description
26	U6	C	min. 300 ms	TOLERANCE. It is activated when the axis is in tolerance (it depends upon the delay time of enabling of tolerance). In manual it is activated when, in immediate level, the axis is in tolerance..
27	U7	C	/	PRESET RESEARCH OK. It is activated at the end of a preset research or a preset load. It is disactivated upon ignition of the instrument or at a order of preset research.
28	U8	C	/	FOLLOW UP ERROR. It indicates that the axis does not follow the profile generated in the limits of the threshold hwich have been set. Its activation remains until the wrror continues.
29	U9	C	/	STARTUP ENABLING. Using this output, the startup shall not be enabled to operation until the moment in which the instrument is able to manage the axis. Upon ignition, after the power-up time, it is activated after 500 ms. the instrument enables the startup.
30	U10	C	/	MANUAL SWITCHED ON. It is activated when the instrument is in manual procedure.
I=Impulsive output C=Continuous output				

DESCRIPTION OF OPERATION OF KEY F

The operator may choose the desired function by operating as follows:

Press key **F** ; this led goes on and  on the display appears



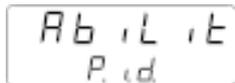
The operator may select through the alphanumeric keyboard the desired function. When pressing the n° key the display shows the selected function. The functions may be:

F + 



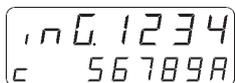
Choice of program to execute.

F + 

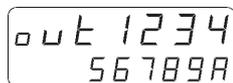


Programming of parameters P.I.D.

F + 

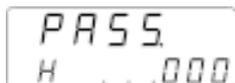






Diagnostic function of inputs and outputs.

F + 



Function of set-up and calibration with introduction of password.

To exit the functions press **F** this led goes off  and the display shows again the displays in use.

DESCRIPTION OF OPERATION OF KEY MAN

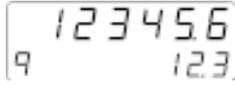
The operator may choose the desired function by operating as follows:

Press key ; any positioning in progress is aborted this led goes on , and on the display appears:



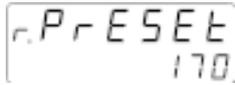
It is selected the axis movement via the keys **7, 8, 9**.

Pressing the key  the display shows:



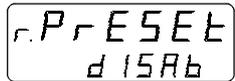
It is selected the positioning at an immediate level.

Pressing the key  the display shows:



It is selected the preset research.

N.B. If the setup parameter "type of preset loading"=2, the function of preset research is disabled and on the display appears:



To exit manual operation press the key  when you are not under data entering.

When the instrument exits the manual state, it sores the function which was selected and reappears at a new activation of the manual.

INTRODUCTION OF PARAMETERS OF SET-UP

These parameters determine the operation way of the instrument and then their access is reserved to the installer; for the programming is forecast the entering of a key word (password) as follows:

- Press the key **F** and then the key **PASS 0** this led goes on **FUNZ**

- On the display appears  which is the request of the access code.

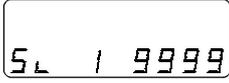
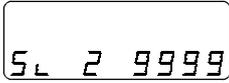
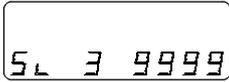
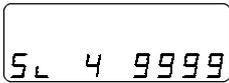
- Enter with the numeric keys 548 and press **ENTER**; the parameters become then accessible.

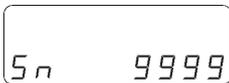
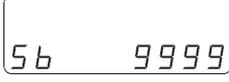
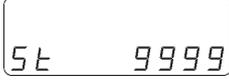
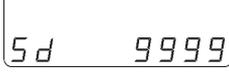
(At the end of introduction of each function press **ENTER** to confirm and pass at the following).

FUNCTION	DISPLAY	DESCRIPTION
Display mode		<p>0= Normal display.</p> <p>1= Display with system HDR (High definition reading). See paragraph dedicated.</p>
Decimal digits		It specifies the number of digits after the coma with which the size of the axis it is to be displayed (max. 3).
Encoder resolution		<p>This parameter indicates by what must be multiplied the impulses of rotation of the encoder to give the display of the lengths in the measuring unit desired. You can enter values from 0.00200 to 4.00000 bearing in mind that the frequency of phases PH must not exceed 20 KHz.</p> <p>The formula to calculate the resolution is as follows:</p> $R = \frac{\text{Shifting obtained with the rotation of an encoder revolution (Whole N}^\circ)}{\text{N}^\circ \text{ of impulses of encoder revolution}}$ <p>If for example we have a shifting by 123,4 mm. and an encoder of 500 imp. / revolution:</p> $R = \frac{1234}{500} = 2,468$
Unit of speed		<p>It specifies the measuring unit (Um) of the axis shifting speed.</p> <p>0= Um / min.</p> <p>1= Um / sec.</p>
Maximum speed		It indicates maximum speed which can be entered or which reaches the axis when the analog voltage AN1 is at 10 V. To be calculated experimentally. The value must be in programmed measuring units (max. 9999 Um / min or Um / sec.).
Choice of speed number		<p>1= Only a working speed is enabled.</p> <p>4= Four working speeds are enabled and which are selectable from external outputs (I9 and I10).</p>

This displaying appears if the parameter "choice of speed number" = 1

Working speed		It indicates the speed of the axis with which you wish to work (max. 9999 Um / min or Um / sec.).
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FUNCTION	DISPLAY	DESCRIPTION
These displaying appear if the parameter "Choice of speed number" = 4		
Speed 1		It indicates the speed with which the axis moves if it is selected, through the external inputs I9 and I10, the speed 1 (max. 9999 Um / min or Um / sec.).
Speed 2		It indicates the speed with which the axis moves if it is selected, through the external inputs I9 and I10, the speed 2 (max. 9999 Um / min or Um / sec.).
Speed 3		It indicates the speed with which the axis moves if it is selected, through the external inputs I9 and I10, the speed 3 (max. 9999 Um / min or Um / sec.).
Speed 4		It indicates the speed with which the axis moves if it is selected, through the external inputs I9 and I10, the speed 4 (max. 9999 Um / min or Um / sec.).

Manual Speed		It indicates the speed with which is moved axis in manual (max. 9999 Um / min or Um / sec.).
Slow manual Speed		It indicates the speed with which is moved axis in manual and is set the slow shifting (max. 9999). The introduced value must be lower or equal to the manual speed.
Test Speed		It indicates the speed at which is moved the axis during the execution of the test for calibration of parameters P.I.D. (max. 9999 Um / min or Um / sec.).
Preset Speed		It indicates the speed with which is performed the search of preset level (max. 9999 Um / min or Um / sec.).
Research speed after enabling of zero impulse		It indicates the speed at which moves the axis after the activation of the enabling of zero impulse (max. 9999 Um / min or Um / sec.). The introduced value must be lower or equal to the preset speed.

These displaying appear if the parameter "Choice of speed number" = 1

Acceleration		It is the time in seconds which is used by the axis to go from zero speed to maximum speed set in set-up (max. 9,99 sec.)
Deceleration		It is the time in seconds which is used by the axis to go from zero speed to maximum speed set in set-up (max. 9,99 sec.)

These displaying appear if the parameter "Choice of speed number" = 4

Manual acceleration		It is the time in seconds which is used by the axis to go from zero speed to manual speeds (manual, tests, preset research) set in set-up (max. 9,99 sec.).
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FUNCTION	DISPLAY	DESCRIPTION
Manual deceleration		It is the time used by the axis to go from manual speeds (manual, test, . preset research) set in the set-up, to the zero speed (max. 9,99 sec.).
Acceleration 1		It is the time used by the axis to go from zero speed to maximum speed selected in set-up, when it is selected through the external inputs the speed of 1 (max.9,99 sec.).
Deceleration 1		It is the time used by the axis to go from maximum speed set in set-up to zero speed, when it is selected through the external inputs the speed of 1 (max.9,99 sec.).
Acceleration 2		It is the time used by the axis to go from zero speed to maximum speed selected in set-up, when it is selected through the external inputs the speed of 2 (max.9,99 sec.).
Deceleration 2		It is the time used by the axis to go from maximum speed set in set-up to zero speed, when it is selected through the external inputs the speed of 2 (max.9,99 sec.).
Acceleration 3		It is the time used by the axis to go from zero speed to maximum speed selected in set-up, when it is selected through the external inputs the speed of 3 (max.9,99 sec.).
Deceleration 3		It is the time used by the axis to go from maximum speed set in set-up to zero speed, when it is selected through the external inputs the speed of 3 (max.9,99 sec.).
Acceleration 4		It is the time used by the axis to go from zero speed to maximum speed selected in set-up, when it is selected through the external inputs the speed of 4 (max.9,99 sec.).
Deceleration 4		It is the time used by the axis to go from maximum speed set in set-up to zero speed, when it is selected through the external inputs the speed of 4 (max.9,99 sec.).

Tolerance		Limit of absolute tolerance allowed to positioning (max. 999 Um).
Time of delay of activation of tolerance		It is the time expressed in seconds, of delay in activation of tolerance output since when the axis has entered the tolerance range. By introducing zero value, the activation of output is immediate (min. 0,00 sec., max. 9,99 sec.).
Inversion time		To avoid possible mechanical stress, due to too rapid inversions in the direction of movement of axis, you can enter a delay time to the inversion expressed in seconds (min. 0,01 max. 9,99).
Follow up error		It is the maximum difference between the position which should take the axis and the real position in which it is in that moment, besides which it is signalled the error of follow up (U8=ON). The entered value (max. 32767) is in primary impulsed of encoder multiplied by 4.

FUNCTION	DISPLAY	DESCRIPTION
Direction of preset research		<p>0= The axis goes forward.</p> <p>1=The axis goes backwards</p>
Type of preset load		<p>0= The loading of preset level is performed upon disactivation of input of enabling of zero impulse after the axis has inverted the direction (see paragraph "Research of preset level with analog positioning").</p> <p>1= The loading of preset level is performed upon activation of zero impulse after the axis has inverted the direction and the input of enabling of zero impulse has been disactivated (see paragraph "Research of preset level with analog positioning").</p> <p>2= It is not activated a procedure of preset research and upon the activation of input I8, the preset level is loaded on the calculation of the axis (see paragraph "Research of preset level with analog positioning").</p>
Minimum level		It is the minimum working position allowed to the program. If the level in execution is lower than the minimum level, the axis goes to the minimum level (-99999 ÷ +999999).
Maximum level		It is the maximum working position allowed to the program. If the level in execution is greater than the maximum level, the axis goes to the maximum level (-99999 ÷ +999999).
Preset level		It is the level which is loaded on the calculation at the end of the procedure of preset research. It is possible to introduce a level of preset included between the maximum and minimum level.
Data P.I.D.		<p>Access to reading and/or writing of data P.I.D.</p> <p>0= Access not enabled.</p> <p>1= Access to the data reading.</p> <p>2= Access to the data reading and writing.</p>
Choice of clearance recovery		<p>0= Positioning without clearances recovery.</p> <p>1= Positioning with clearances recovery forward.</p> <p>2= Positioning with clearances recovery backwards.</p>

This displaying appears if the parameter "Choice of clearances recovery" ≠0

Ultralevel for clearances recovery		During the clearances recovery forward the axis is positioned at:(set level - ultralevel) and, after the inversion time, it is positioned at the set level. During the recovery of clearances backwards, the axis is positioned on: (set level + ultralevel) and, after the inversion time, it is positioned at the set level.
Time of acquisition of binary code		It is the time expressed in milliseconds, of activation of input of strobe to place under execution the selected level (max. 999; min. 001).

FUNCTION	DISPLAY	DESCRIPTION
Number of levels accessible to the operator		It is the maximum number of accessible levels for the programming with the key MENU (max. 10).
To exit in any moment the introduction of parameter of SET-UP press the key F		

STRUCTURE OF PROGRAMS

Quote	Prog. 1	Prog. 2	Prog. 3			Prog. 10
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
-						
-						
-						
-						
-						
31						

} Programmable with the key **MENU** and selectable with the keys F and 1.

} Programmable with password.

ENTERING WORKING LEVELS THROUGH THE KEY MENU

The operator may introduce the working levels operating as follows:

Press key  ; on the display appears:



The operator may introduce via numeric keyboard, the desired program. Upon confirmation with **ENTER** the display shows:



The operator may introduce via numeric keyboard, the first level (the number of accessible levels is set in the set-up). Upon confirmation with **ENTER** the display shows:



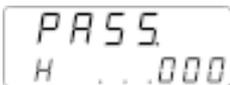
The operator may introduce via numeric keyboard, the second level (the number of accessible levels is set in the set-up). Upon confirmation with **ENTER** the display shows: the third level and so on up to the last one.

To exit in any moment the working levels introduction, press the key  ; the display shows again the displayings in use.

PROGRAMMING OF LEVELS THROUGH PASSWORD

For the programming of levels it is forecast the introduction of a key word (password) as follows:

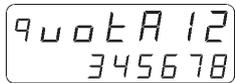
- Press the key  and then the key  this led goes on 

- On the display appears  which is the request of the access code

- Enter via the numeric keys the value 456 and press  ; on the display appears:



The number of accessible levels for the programming through password goes from n° 11 to n° 31. The operator may introduce via alphanumeric keyboard the first level (11). Upon confirmation with **ENTER** the display shows:



The operator may introduce via alphanumeric keyboard the second level. (12). Upon confirmation with **ENTER** the display shows the third one and so on up to the 31st.

to exit in any moment the levels programming press  this led  goes off and the display shows again the displayings in use.

CHOICE OF PROGRAM TO PLACE UNDER EXECUTION

The operator may choose the program to place under execution operating as follows:

Disactivate the input I6.

Press in sequence the keys  and  ; this led goes on  and on the display appears:



The operator may choose via numeric keyboard the number of desired program (max. 10). Upon confirmation with **ENTER** the led **FUNZ.** goes off and the display shows again the displaying in use.

To exit the choice of program to execute press  the led  goes off and the display shows again the displaying in use.

SETTING THE PARAMETERS OF P.I.D. ADJUST

To write the adjust parameters P.I.D. operate as follows:

The parameter "Data P.I.D." (set-up) must be=2.

Press in sequence  and  ; the display shows

The operator can, through numeric keyboard, choose to perform the test for the calibration of parameters P.I.D. Introducing "0" the test is not enabled and it is allowed the only modification of parameters of adjust P.I.D. Introducing "1", upon confirmation with **ENTER** the display shows:

Through the numeric keyboard the operator can enter the test level. Upon confirmation with **ENTER**, the axis moves forward and backwards of the level introduced from the point in which is placed the axis.



Through the numeric keyboard the operator can program the percentage of the value of profile of generated space (feed forward), to convert in analog voltage and to send to the output AN1 (slave). This percentage is to be searched until the error assumes a value oscillating around zero. If in setup has been programmed exactly the maximum speed, the percentage "FF" should be around 100,0%. The value indicated on the display, on the left bottom side, indicates the synchronism error while the value on the display on the right bottom side indicates the integral register. After the introduction of the new value, pressing **ENTER** the value is confirmed.



The operator can enter via numeric keyboard the proportional gain of the space error. Setting the value "1" with a unit error value, an error voltage corresponds being 0,15 mV. This values must be increased until the system of adjust comes into instability. After entering the new value, pressing **ENTER** the value is confirmed. The error display of space provides to the operator the indication whether the system is under adjust.



Via numeric keyboard the operator can enter the integral time (expressed in milliseconds). To a constant error, after the set time, the correction of the integral becomes equal to the error itself, then smaller then the smaller is the time, and the greater becomes the influence of the integral correction. After the introduction of the new value pushing **ENTER** the data is confirmed.



The operator can enter via numeric keyboard the time of derivate (expressed in seconds). The value indicated on the display on the bottom right side indicates the derivate register. After the introduction of the new value, pressing **ENTER** the data is confirmed.

N.B. To a correct calibration corresponds a space error, expressed in measuring units, near to zero during shiftings and equal to zero with the axis stopped.

Pressing the key  it is possible to pass in sequence from a displaying to another.

N.B. At each confirmation with **ENTER** shall be stored the data introduced and the new parameters shall become immediately operating.

If in setup the value of data P.I.D.=0 the request of access to the parameters is not accepted.

If in setup the value of data P.I.D.=1 shall be enabled the reading of the adjust parameters and not their setting.

Pressing the key  ; the display shows:

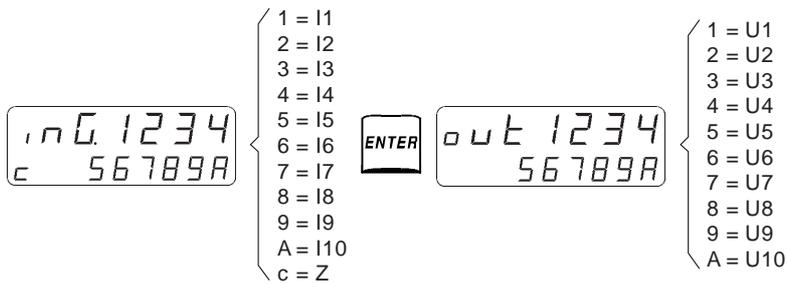
The display shows the maximum error of positive and negative synchronism calculated by the instruments every 50 ms. and the value in volts of the analog voltage A1 (display on the left bottom side).

To exit the setting of adjust parameters press  ; the display shows again the displaying in use.

DISPLAYING OF INPUTS/OUTPUTS

To display the state of inputs and outputs operate as follows:

Press in sequence **F** and **6** ; this led goes on  and on the display appears:



To exit the displaying of inputs/outputs press the key **F** this led  goes off and the display shows again the displayings in use.

SHIFTING OF AXIS IN MANUAL

To move the axis in manual operate as follows:

Press the key  ; this led goes on  and it is activated the output U10.

Press the key  until the display shows:

	<p>In manual are enabled the keys 7, 8, 9. The key 8, selects the manual shifting in slow or speed signalling on the display on left bottom side with letter L (slow) or F (fast). Pressing the key 7, the axis moves backwards and upon release of the key the shifting is interrupted. Pressing the key 9, the axis is shifted forward and upon release of the key the shifting is interrupted. The display shows the axis calculation.</p>
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N.B. During the manual shifting are enabled the stops on minimum and maximum levels programmed in SET-UP.

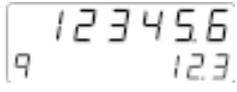
To exit in any moment the manual shifting press the key  ; this led  goes off and the output U10 is disactivated. The display shows again the displayings in use.

POSITIONING AT AN IMMEDIATE LEVEL

To enter an immediate level operate as follows:

Press the key ; this led goes on  and this output is activated U10.

Press the key 

 On the upper line appears the calculation while on the lower line appears the level previously entered. Through the numerical keyboard the operator can change and confirm with **ENTER**. The axis shall move to reach the value entered with the same operating mode of the working positioning.

To exit the introduction of immediate level press  when you are in introduction of level; this led  goes off, the output U10 is disactivated and the display shows again the displayings in use.

SEARCHING THE PRESET LEVEL

To perform a preset research operate as follows:

Press the key ; this led goes on  and it is activated output U10.

Press the key  until the display shows:

 It is displayed the axis calculation. Upon confirmation with **ENTER**, the display blinks and the axis is shifted to search the zero impulse; upon its activation it is loaded the preset level. At this point the axis achieves the research and the display stops blinking indicating the end of the preset research.

To exit the introduction of preset research or to abort the procedure if this is not achieved, press the key ; this led goes off , the output U10 is disactivated and the display shows again the displayings in use.

DISPLAYINGS

By the key  it is possible to display the messages in sequence.

Number of level in execution  Calculation
Level

N.B. If you selected a level whose value is greater than the maximum level or lower than the minimum level, upon the activation of input I6, on the display appears:



FUNCTION: The instrument is equipped with non volatile memory of the position reached by the calculation; however it may happen that the axis is shifted with the instrument not supplied, so it is necessary to recover the exact position compared to a known point. To obtain maximum precision of this point of reference, normally we use the zero impulse of the incremental encoder enabled by a mechanical contact or by a proximity sensor, only on a determined point of the axis.

enabling shall toggle from ON to OFF (descent front).

With a type of preset loading=1. The axis shall move at the speed of preset (setup) in the direction set in the setup. Until it is not activated the limit switch of enabling of zero impulse of the encoder, the axis continues its movement. Upon activation of the enabling input, the axis is stopped and reverses the direction going at the speed of research of zero impulse (setup) and waits to come out from the enabling limit switch (descent front) and then enables the reading of the zero impulse. Upon activation of the zero impulse it is loaded the preset level on the calculation.

With the preset loading type=0. The zero impulse of the encoder is not used. The axis shall move at the preset speed (setup) in the direction set in the setup. Until it is not activated the limit switch of enabling of zero impulse of the encoder, the axis continues its movement. Upon activation of the enabling input, the axis is stopped and reverses the direction going at the speed of research of zero impulse (setup) and waits to come out from the enabling limit switch. The preset level shall be loaded on the calculation when the input of

With preset loading type=2. The enabling contact is used to load the preset level without performing the procedure of preset research (only with axis stopped).

NOTES OF PRESET RESEARCH

It may occur that the axis, instead of going to the enabling limits switch of zero impulse, goes in the opposite direction, jumping over the activation of the research limit switch and activating a limit switch of the machine, which provokes the lockup of the same. To avoid this problem, you only need that the enabling limit switch remains activated until it is reached the minimum or maximum level to which is being directed the axis during the preset research. To reverse the direction of revolution of the axis you only need to activate again the procedures of preset research.

The preset research never uses the clearances recovery. At the end of the preset research the axis is positioned at the preset level..

In order to exactly manage the preset research, to the instrment can be implemented the outputs of **PRESET RESEARCH OK** and **PRESET RESEARCH IN PROGRESS**.

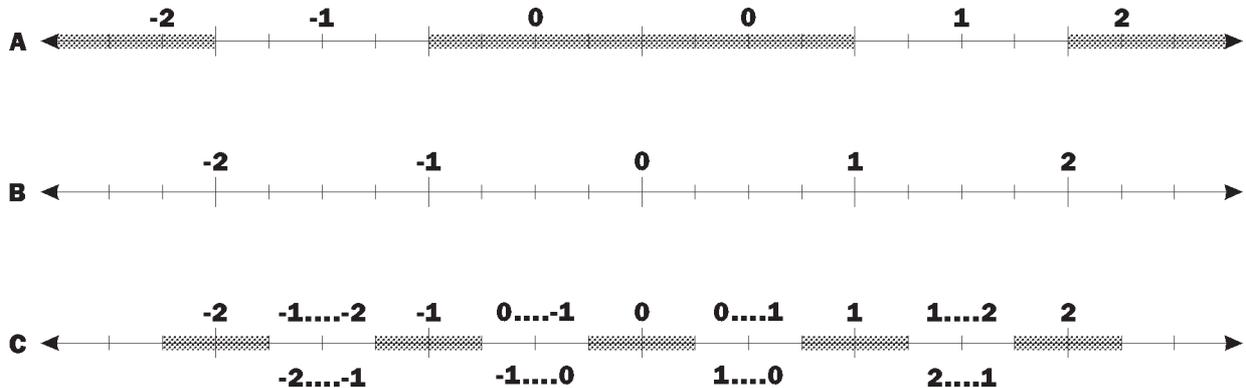
IMPORTANT: During the research are not activated the software limit switches (maximum and minimum level of the axis).

N.B. To control the preset research, it is necessary to activate the inputs of control and enabling (manual, emergency, enabling of startup, preset research...).

SYSTEM OF DISPLAY HDR (HIGH DEFINITION READING)

This system allows to display the evolution of a bidirectional calculation with a definition being greater compared to the system of traditional reading because it allows to estimate, if the resolution of the transducer allows it, the space gap which ranges between the unit displayed and the previous or following unit. The space included among each unit read on the display is divided into 4 equal parts; the two extreme parts are zones in which the display shows the digits in a stable way, in the two central zones, on the contrary, the display shows alternatively a digit and the other one, pointing out the fact that it is at half way between both of them.

The system HDR is totally effective if the resolution of the transducer requires a multiplicative coefficient lower or equal to 2,00000 while if the multiplicative coefficient is included between 2,00001 and 4,00000 the displayed values result centered but it is not detected (or it is detected only for certain values) the intermediate tract in which the digit obscillates between one and the other displaying.



A=Normal display.

B=Real Shifting.

C=Display in HDR.

As you can see from the diagrams the HDR system centers the displayings in the real position allowing to estimate the intermediate distances between the units with no need to display or to set measuring data being 10 times smaller than necessary.

ELECTRIC CONNECTIONS OF INPUTS

1	XXX	Power supply voltage $V_{ac} \pm 15\%$ 50 / 60 Hz.
2	XXX	Power supply voltage $V_{ac} \pm 15\%$ 50 / 60 Hz.
3	GND	Ground onenction (we recommend a conductor being $\varnothing 4$ mm.).
4	+	Positive transducers' supply 12 V 150 mA.
5	-	Negative transducers' supply.

ENCODER
INPUTS
ONLY 12 V

12	PE	Terminal for polarization of the encoder (+ NPN, - PNP).
13	PH	Input phase 1 increasing encoder.
14	PH	Input fase 2 increasing encoder.
15	Z	Zero impulse increasing encoder.

INPUTS
12 V ÷ 24 V

16	P1	Terminal of polarization of inputs (+ NPN, - PNP).
17	I1	(C) Binary code level selection 2^0 .
18	I2	(C) Binary code level selection 2^1 .
19	I3	(C) Binary code level selection 2^2 .
20	I4	(C) Binary code level selection 2^3 .
21	I5	(C) Binary code level selection 2^4 .
22	I6	(I) Strobe binary code.

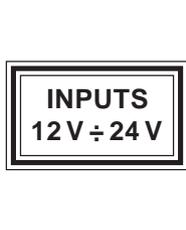
ELECTRIC CONNECTIONS OUTPUTS

6		Polarization terminal of outputs (+ PNP, - NPN).
7	U1	(C) Binary code level in use 2^0 .
8	U2	(C) Binary code level in use 2^1 .
9	U3	(C) Binary code level in use 2^2 .
10	U4	(C) Binary code level in use 2^3 .
11	U5	(C) Binary code level in use 2^4 .

ELECTRIC CONNECTIONS OF OUTPUTS USED WITH THE EXPANSION (ORDERING CODE "E")

23	A1	Analog output ± 10 V (speed and position reference).
24	GA	Common of the analog output (it can be or not connected to the ground).
25	C2	Polarization terminal of outputs (+ PNP, - NPN).
26	U6	(C) Tolerance.
27	U7	(C) Preset research OK.
28	U8	(C) Follow up error.
29	U9	(C) Startup enabling.
30	U10	(C) Manual connected.

ELECTRIC CONNECTIONS OF INPUTS USED WITH THE EXPANSION (ORDERING CODE "E")

	31	P2	Terminal of polarization of inputs (+ NPN, - PNP).
	32	I7	(I) Control for preset research.
	33	I8	(I/C) Enabling impulse of zero encoder.
	34	I9	(C) Minimum limit switch / Speed selection 2 ¹ .
	35	I10	(C) Maximum limit switch / Speed selection 2 ⁰ .

GENERAL CHARACTERISTICS OF CONNECTIONS

INPUTS

Each input ON/OFF is universal, optoisolated and may receive digital signals be it in logic NPN be it PNP. By connecting the terminals P1, P2, PE to the + all the inputs accept signals of a type NPN, i.e. with closing to the negative of the voltage of power supply. By connecting the terminals P1, P2, PE to - all the inputs become of a type PNP, i.e. with closing to the positive of the voltage of power supply. Each input is protected against short circuits to both the poles of the power supply so it is practically indestructible. You can connect in parallel several inputs with the same logic, if the output which pilots them is able to support the total current required, which is equal to the number of the inputs connected together multiplied by 10 mA.

OUTPUTS

The dc outputs are optoisolated in direct voltage and they all have a common terminal among them (C1, C2). By connecting this terminal to a voltage + all the outputs become of a type PNP, connecting it to a voltage - all outputs become of a type NPN. The maximum direct voltage applicable is 50 V. The outputs can support currents up to 70 mA with a voltage drop typical of 3,5 V between the output and the common. With the dc outputs you can pilot also relays at 24 Vac.

EXECUTION OF CALIBRATION PHASES OF ANALOG INPUTS

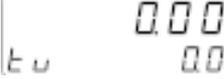
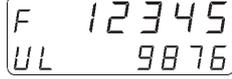
To the purpose of making easier the execution of calibration phases of the analog outputs, connect the instrument to the servosystem and proceed as follows::

- Suitably activate the enabling inputs of axis, emergencies, manual, start.

- Press the key **F** and then the key **0** this led goes on 

- On the display appears  which is the request for the access code

- Enter with the numeric keys the value 123 and press **ENTER**; on the display appears

 Encoder calculation with resolution
Entered voltage of output.   Frequency.
Speed Um / min. o Um / sec.

The first thing to verify is the exact connection of the tachometer dynamo to the drive, by activating the corresponding input of start. The operator may program a value of voltage with sign which, once it is confirmed with **ENTER**, shall be immediately generated in output by the positioner. The drop of the start sends immediately at zero the voltage value. to put at zero the output in voltage press the key **CLEAR**. We suggest to enter a voltage value quite low (ex. 0,5 V) and observe if the motor runs at about 1 / 20 of its maximum speed (if the drive accepts a maximum voltage of 10 V). If the motor runs much more quickly, it means that the tachometer dynamo does not output the voltage in a correct way and this may be caused by one of the following reasons:

- 1) It is not connected to the motor.
- 2) It generates a signal of direction being contrary to the direction of the motor, so that the axis runs away; it is then necessary to invert the connections of the tachometer dynamo..
- 3) The drive foresees a tachometer reaction of a different level compared to the one in use; in this case it is necessary to check and calibrate the trimmer which adjusts the tachometer gain on the drive.

IMPORTANT: Until you are not sure that the tachometer reaction has been correctly performed, it is better to separate the movement of the motor from that of load, in order to avoid that eventual connection errors cause serious damage to the mechanical instruments..

Once it has been proved the correct operation of the tachometer dynamo, it is possible to verify, by observing the display of the calculation on the display, if the movement of the motor has caused a positive or negative increase of the calculation compared to the direction of revolution of the motor; practically there should be the exact connection of the two phases of the increasing encoder whichm if necessary, must be inverted between them..

When, besides the tachometer dynamo, it is connected also the encoder, you must observe if providing to the drive a positive voltage the motor moves in the same direction; if this is not the case, you must invert between them the two wires of the analog output connected between the drive and the positioner.

- Pressing the key 

- On the display appears  Frequency.
Speed Um / min. o Um / sec.

The instrument shows the frequency which is sent by the encoder with the analog voltage to the previously set value. It is furthermore possible to display the movement speed of the system considering in the calculation of the speed the parameters of resolution, decimal digits and units of the speed entered in the setup. By setting an output voltage of 10 V it is possible to state the maximum speed you wish to obtain with the maximum voltage on analog output of the instrument. In this way it is optimized at 100% the adjustment scale of the positioner. Furthermore, by setting several values of output voltage and detecting the obtained speeds, we can determine the linearity of the speed adjuster (drive, motor).

- Keeping pressed the key **ENTER** it is introduced the filter on the displaying.

N.B. To obtain maximum desired working speed it is necessary that the speed which can be obtained with the output reference at 10 V is greater at least than 5% of the one displayed (**continued on the following page**).

EXECUTION OF CALIBRATION PHASES OF ANALOGS OUTPUTS

- Pressing again the key  we return to the previous displaying

To pass to the programming of offset, be it during the displaying of the output, be it during the speed displaying, operate as follows:

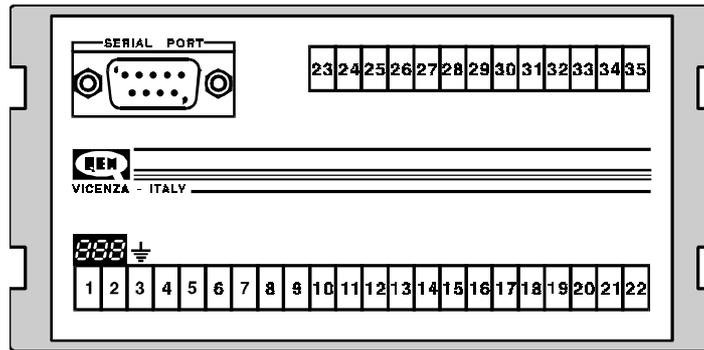
- Press the key 

- On the display appears  Encoder calculation with resolution 4.
Value of offset in steps by 0,15 mV.

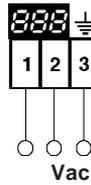
The operator can introduce through the numeric keys and the sign, any value which upon confirmation with **ENTER** shall be immediately presented in output. The procedure of calibration foresees to vary from keyboard the offset and to observe the behaviour of the axis with the display of the calculation; the offset is calibrated when the axis (and then the calculation) remains fixed; once the axis firmness is reached, it is better to write down on a piece of paper the value of offset and the offset until you obtain that the motor turns in an opposite direction compared to the previous one. The definitive value of offset shall be the value between the two values.

- Pressing in any moment  you exit and the display shows again the displayings in use.

CONNECTIONS



Connection of power supply voltage

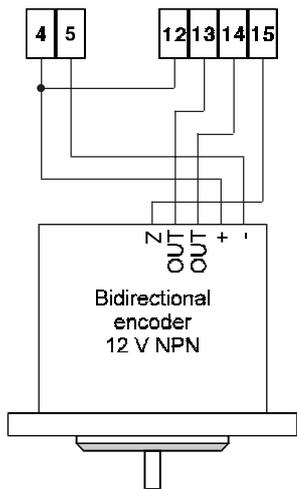


Power supply voltage: 24 Vac, 420 mA
110 Vac, 95 mA
220 Vac, 50 mA

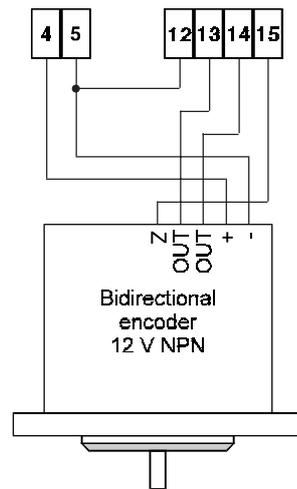
CONNECTION OF INPUTS ON/OFF

Connection of encoder with power supply of the instrument

Connection with the encoder NPN



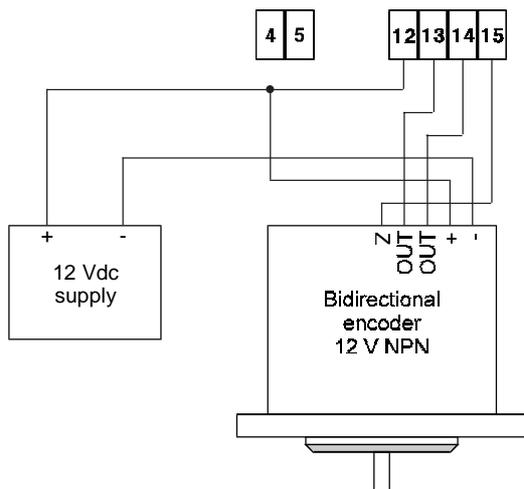
Connection with the encoder PNP



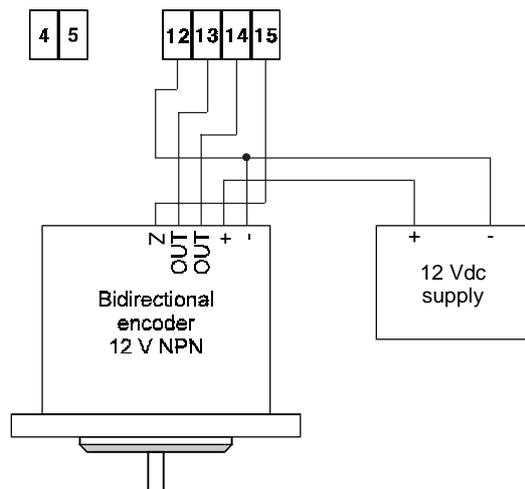
N.B. The connection of the transducers (encoder, proximity) and electromechanical contacts to the inputs of the instrument, using the feeder at 12 V present on terminals 1 and 2, must bear into consideration the maximum current which the feeder can output.

Connection of encoder with external power supply

Connection with encoder NPN

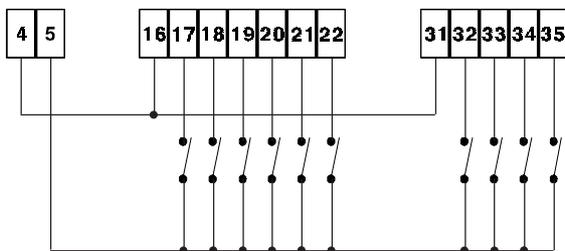


Connection with encoder PNP

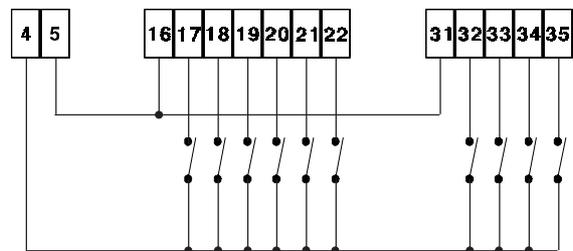


Connection of inputs ON / OFF with power supply of instrument

Connection with inputs NPN



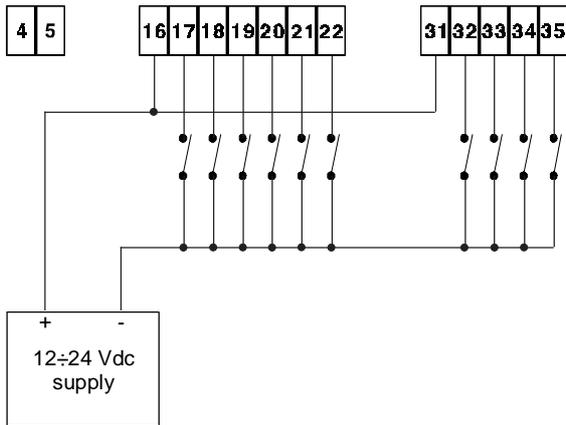
Connection with inputs PNP



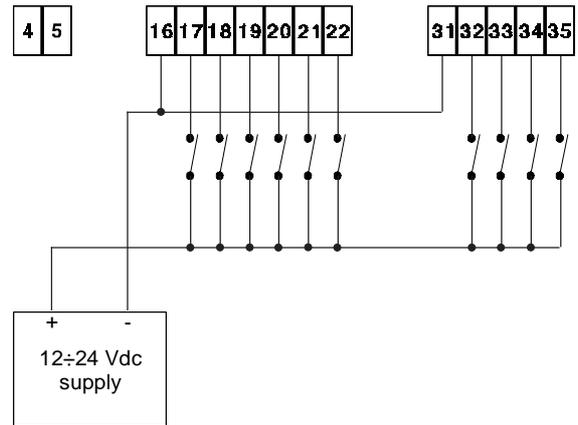
CONNECTION OF INPUTS/OFF

Connection of inputs with external power supply

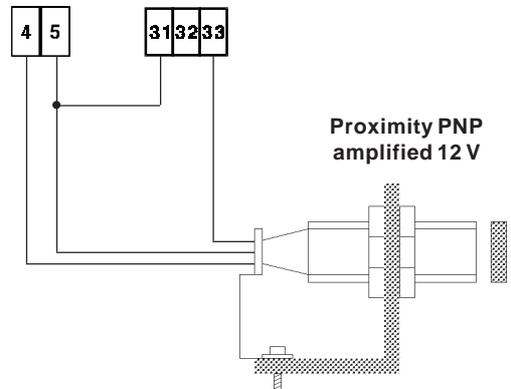
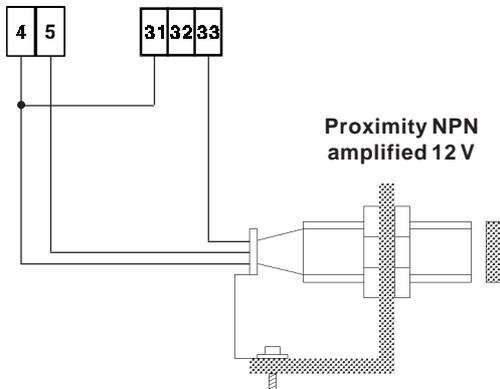
Connection with inputs NPN



Connection with inputs PNP

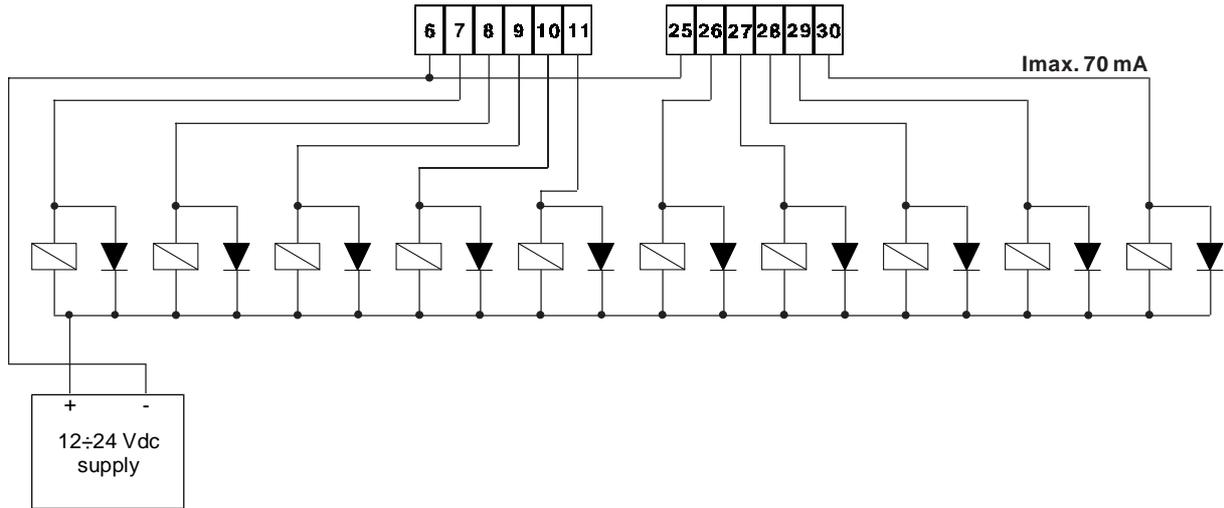


Connection with amplified proximity

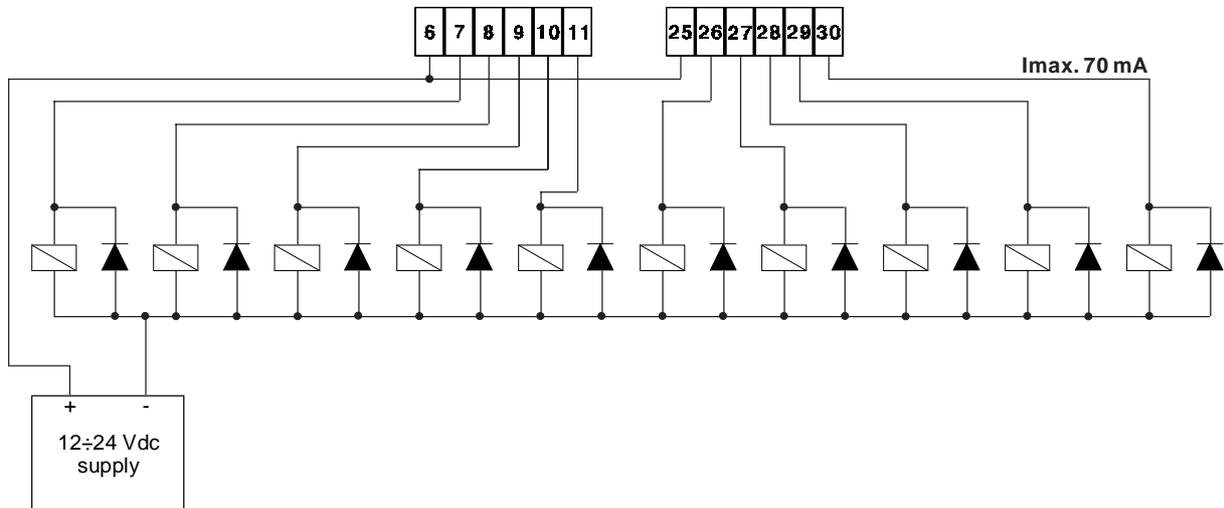


CONNECTION WITH OUTPUTS ON/OFF

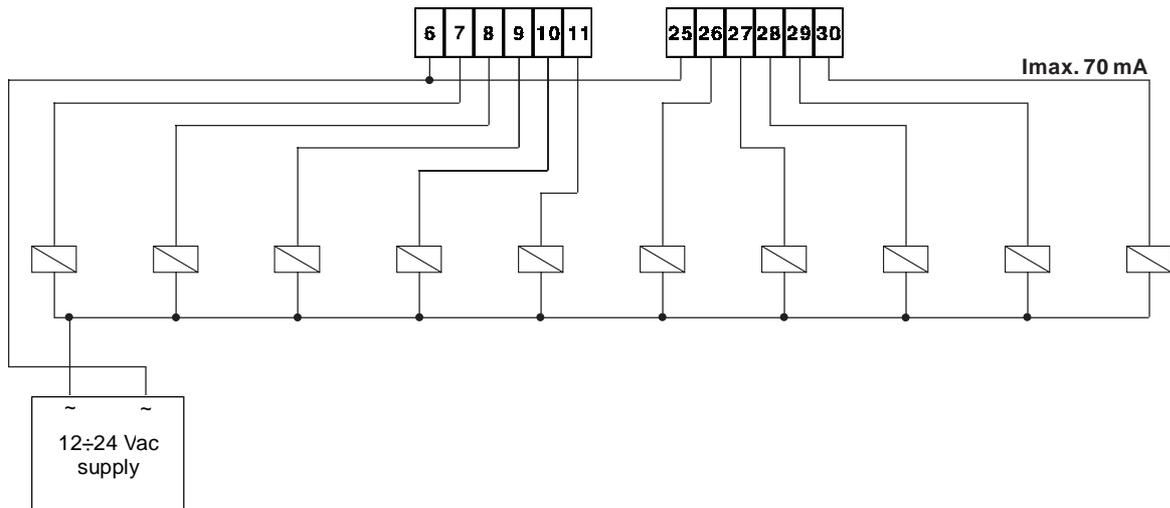
Connection with outputs NPN



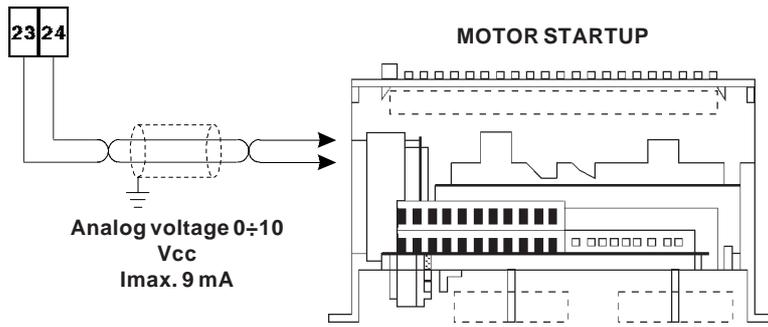
Connection with outputs PNP



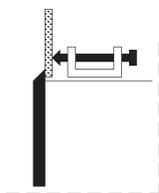
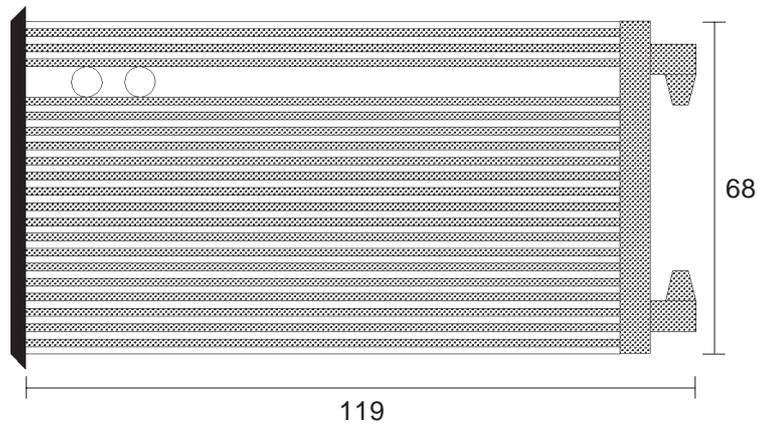
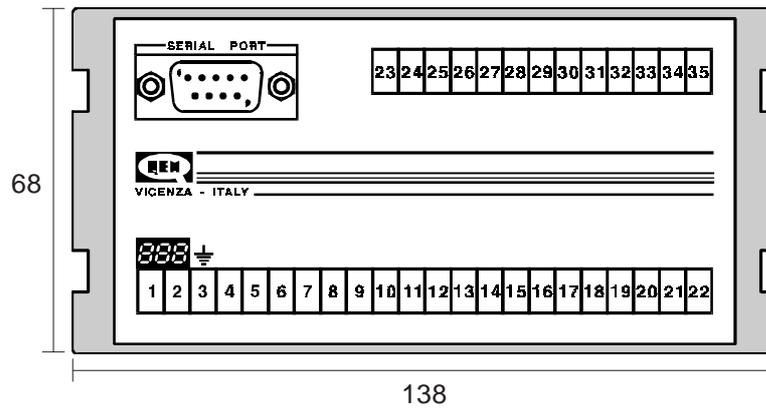
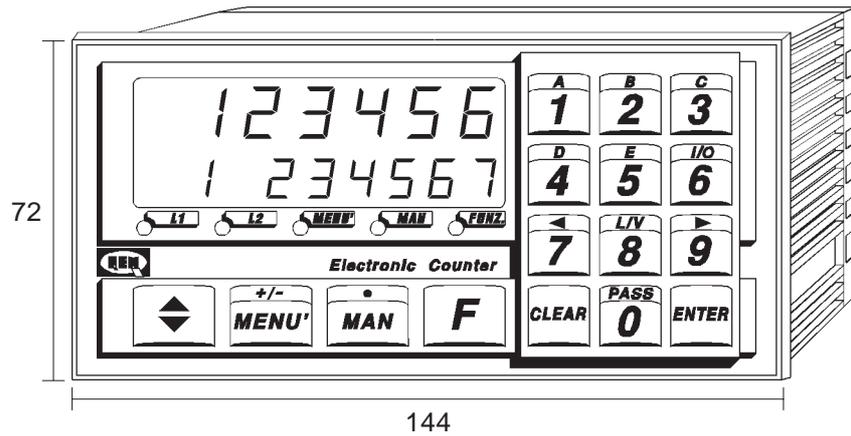
Connection with relay in alternated



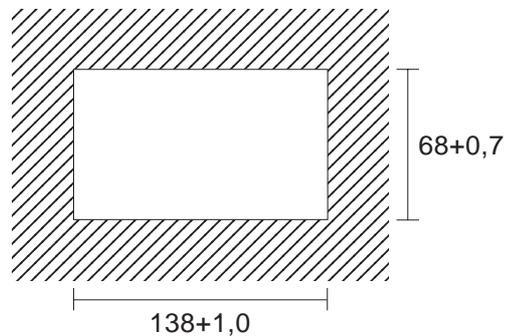
CONNECTION OF ANALOG OUTPUTS



SIZE



ATTENTION!
After laying the connection pin to the panel, perform only half a rotation in order not to tear the frame.



N.B. All levels are in millimeters.

ORDERING CODE

HB 548.17 / **/** **/** **24**

Voltage power supply 24 = 24 Vac.
110 = 110 Vac.
220 = 220 Vac.

E = Expansion with 4 inputs NPN / PNP and 5 static outputs at 24 Vac / dc, 70 mA.

C = Analog output type CNC, galvanically insulated, with resolution ± 15 bits.

The manufacturer reserves to modify, without notice, the characteristics of the described equipment.
The manufacturer excludes any liability for damages caused by a mistaken or not suitable use of the instrument.



Quality in Electronic Manufacturing  Data 15/03/95 Foglio tecnico
B548H17.1

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