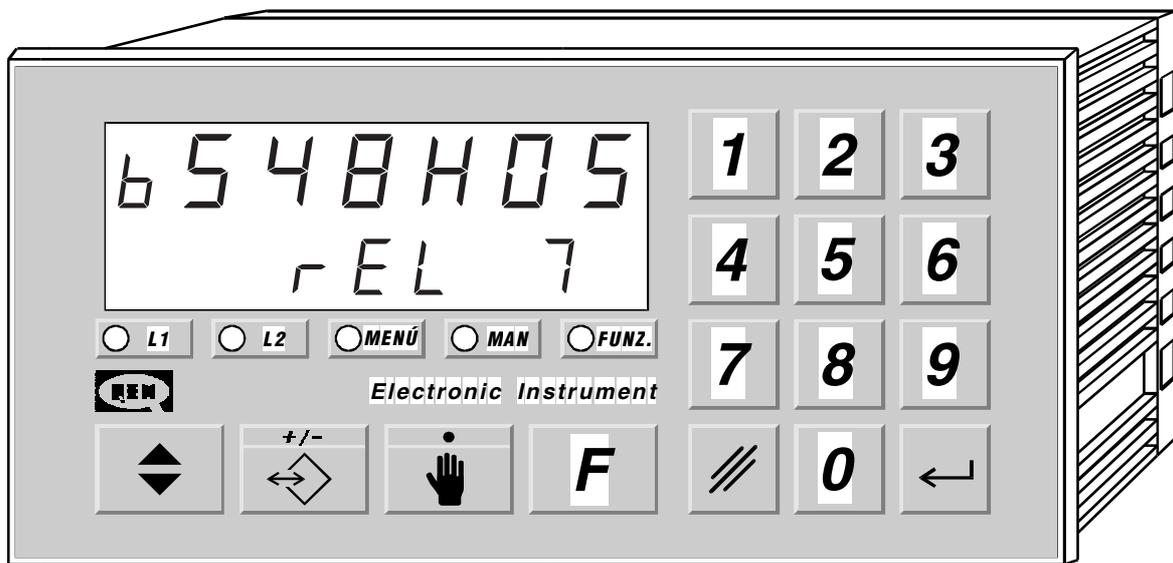


ANALOG ABSOLUTE OR INCREMENTAL POSITIONER WITH TOTALIZER  
PROGRAMMABLE IN COUNTER OF REPETITIONS OR PIECES  
COUNTER.

HB 548.05



## User's Manual

Enclosed to the "Manual of Set-up, Maintenance and Assistance"



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.***

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## CHAPTER 1

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### INTRODUCTION

*Complementary Features*

*References*

*Responsibility and validity*

*Description of operation*

## 1 - 1 COMPLEMENTARY FEATURES

This manual is to be considered as a complement to the "Manual of setup, maintenance and assistance" which provides the instructions for the performance of wirings, troubleshooting, procedures for startup and maintenance. This manual contains instructions for the instrument's use and or a correct programming.

We recommend then to read it carefully and, in case of misunderstanding, please contact QEM for any further instruction by sending the assistance fax which you shall find enclosed to the manual.

## 1 - 2 REFERENCES

The documentation concerning the instruments designed and sold by QEM has been divided into leaflets in order to allow an effective and quick reading according to the information required.

### *User's Manual*

*Explanation of the described software*

It is this manual, which shows all instructions to understand and use the instrument described. It is a manual concerning the software of the instrument; it shows the instructions to understand, program, calibrate and use the instrument described.

Once you install the instrument following all indications showed on the Manual of set-up, maintenance and assistance, with this User's manual, you are supplied with all necessary instructions for the correct use of the instrument and its programming.

### *Hardware Structure*

*Basic information concerning the series hardware and possibility of customization.*

A leaflet enclosed to this user's manual, which describes the hardware configuration concerning the series of the described instrument. It also shows the electric, technical and mechanical characteristics of the series and the possible hardware customizations according to the software version.

### *Manual of set-up maintenance and assistance*

*All necessary instructions for set-up, maintenance and assistance*

Deep knowledge of all necessary subjects for a correct set-up and maintenance.

This is made to allow us to provide you with most valid and safe instructions which shall allow you to perform products with a recognized quality and a safe reliability.

It also provides a valid support to all people who must face a technical assistance on an application including a QEM's instrument.

**1 - 3 RESPONSIBILITY AND VALIDITY**

**RESPONSIBILITY**

The firm QEM is free from any responsibility for damages to people or things due to the non observance of instructions and prescriptions contained in this manual and in the "Manual of set-up, maintenance and assistance". We also state that the customer/purchaser must use the instrument according to the instructions supplied by QEM and in case of doubt it must provide a written application to the firm QEM. Each authorization of use as a replacement shall be deemed as valida by QEM, in case of contestation, only if it has been written by QEM.

It is not allowed the reproduction or the delivery to third parties of this manual or of any of its parts without a prior written authorization made by QEM. Each infraction shall start a request of indemnization for the damages which QEM undergoes.

All rights on patents and models are reserved.

QEM reserves the right to partially or totally modify the characteristics of the instrument described and the documentation enclosed.

**Purpose**

The purpose of this manual is to show the general rules for the use of the instrument described.

**Instruction**

Write down and carefully store all parameters concerning the setting and programming of the instrument to the purpose of making easier eventual operations of spare parts replacement and assistance.

**VALIDITY**

This manual is valid for all instruments designed, manufactured and tested by QEM with the same ordering code. This document is integrally valid, except in case of errors or omissions.

<i>Release of instrument</i>	<i>Release of manual</i>	<i>Modifications made to the manual</i>	<i>Date of modifications</i>
7	0	New manual	06 / 11 / 96

## 1 - 4 DESCRIPTION OF OPERATION

The instrument HB 548.05 is an analog positioner operating on positive and negative levels, with the possibility to set the type of positioning (absolute or incremental). The memory can be configured by the operator in groups of paces (max. 255) which determine the number of programs available. To each pace can be associated (if enabled) a totalizer which can be configured as pieces counter or counter of repetitions of the level in use. The restart, the zero setting of the count, the increment of pace, may be configured so that their operation is automatic or managed by inputs. It has a series of manual functions (introduction of a value on the count, manual movements, etc...) to make easy the phases of calibration and to allow to the operator to operate on the positioning system.

It also has a function which allows to perform shifts to the level of delta ( $\Delta$ ), useful for example in the management of a small saw, for the shift of the mobile response during the cutting operation.

The instrument is adapted to an extreme variety of applications; it can manage, for example, axes with linear or circular movements, unwindings and cutting of materials, rotating tables, etc..

## CHAPTER 2

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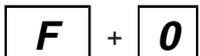
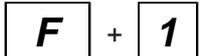
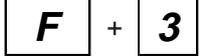
# INTERFACE OPERATOR / MACHINE

*Description of keyboard*

*Description of inputs*

*Description of outputs*

2 - 1 KEYBOARD DESCRIPTION

Key	Function
	<p><b>Normal Operation:</b> when pressed after the key "F" they select the functions available.  <b>Data entering:</b> they allow the data entering.</p>
	<p><b>Normal operation:</b> it selects the displayings of cycle. If pressed immediately it selects the following displaying. If pressed in a continuous way, it selects the previous displaying.  <b>Data entering:</b> scroll of the various parameters. If pressed immediately it selects the following parameter. If pressed in a continuous way, it selects the previous parameter.</p>
	<p><b>Normal operation:</b> it allows the access to the writing of the programs of work.  <b>Data entering:</b> it introduces or removes the sign +/-.</p>
	<p><b>Normal operation:</b> if there is no positioning in progress it allows the access to the manual functions: manual movements, introduction of a value on the count, positioning at an immediate level and search of the level of preset. It modifies the operation of the inputs I7 and I8 in jog dx and jog sx.  <b>Data entering:</b> it introduces the decimal point.</p>
	<p><b>Normal operation:</b> if there is no positioning in progress it allows to select the functions available.  <b>Data entering:</b> in the writing of the programs of work it allows to enter the end of program. It also allows the output from the selectable functions with the key "F" + "numeric key".</p>
	<p><b>Data entering:</b> it erases the entered value suggesting again the old value.</p>
	<p><b>Normal operation:</b> if enabled in set-up it controls the start to the level in execution (manual operation only).  <b>Data entering:</b> it stores in memory the data introduced.</p>
	<p>Not used.</p>
	<p>Not used.</p>
	<p>It goes On when pressing the key "MENU".</p>
	<p>It goes On when pressing the key "MAN".</p>
	<p>It goes On when pressing the key "F".</p>
	<p>Access to the functions protected by password.</p>
	<p>Choice of the program to place in execution.</p>
	<p>Choice of the pace to place in execution.</p>
	<p>Introduction of the blade thickness.</p>

<i>Key</i>	<i>Function</i>
<b>F</b> + <b>4</b>	Setting the override in percentage (%).
<b>F</b> + <b>5</b>	Setting level $\Delta$ (+, -).
<b>F</b> + <b>6</b>	Diagnostic inputs and outputs.

## 2 - 2 DESCRIPTION INPUTS

### Caracteristics of inputs

Please refer to the chapter "Electric characteristics" of the leaflet " Hardware Structure" enclosed to this manual.

				<i>Name</i>	<i>Logic status of activation</i>	<i>Way of activation</i>	<i>Polarizer</i>				
								<i>Description</i>			
I1	ON	I	P1	<b>Start.</b> it controls the positioning to the selected level. If the positioning is interrupted with a stop, with an emergency or with the switching OFF of the instrument, the activation of input I1 restarts the positioning from the point in which it was interrupted.							
I2	ON	I	P1	<b>Stop.</b> Its activation brings to zero with ramp of deceleration the analog reference supplied by the instrument interrupting the positioning.							
I3	OFF	C	P1	<b>Emergency.</b> Its disactivation brings to a zero (with no ramp of deceleration) the analog reference supplied by the instrument locking up the positioning. In these conditions the instrument does not get any signal for the movement and the axis is not reacted: it is then possible to move it and the instrument shall not contrast its movement.							
I4	ON	I	P1	<b>Restart.</b> Its reading is enabled when there is not in execution a positioning. During the manual procedures, the input is not enabled. It aborts the program in progress and suggests again the first pace of the program. It sends to zero the totalizer and if in set-up the parameter "Pr" is set to "1", at each restart the calculation is set to zero.							
I5	ON	I	P1	<b>Setting to zero the totalizer.</b> its operation is enabled with the parameter of set-up "PL" set to "1". It sets to zero the number of pieces or repetitions counted.							
I6	ON / OFF	I	P1	<b>Enabling zero impulse.</b> Its operation is defined by the type of "Search of preset" set in the set-up; upon its activation it is enabled the reading of the impulse of zero of the transducer for the loading of the level of preset.							

### Legend

C = Continuous Signal.

I = Impulsive Signal.

**Name**

	<i>Description</i>
<b>Vac</b>	<b>Voltage of power supply of instrument.</b> Alternated voltage according to the code fo your order.
<b>Vac</b>	<b>Voltage of power supply of instrument.</b> Alternated voltage according to the code fo your order
<b>GND</b>	<b>Ground conenction.</b> We recommend a conductor of Ø 4 mm.
<b>+</b>	<b>Positivo transducers' power supply.</b> Positive of voltage supplied by the instrument for the supply of the inputs of instrument and transducers.
<b>-</b>	<b>Negative of power supply transducers.</b> Negative of voltage supplied by the instrument for the supply of inputs and transducers.

**INPUTS OF COUNT**

<i>Name</i>	<i>Logic of operation</i>	<i>Polarizer</i>
-------------	---------------------------	------------------

			<i>Description</i>
PHA	N / P	PE	Input "phase A" incremental transducer.
PHB	N / P	PE	Input "phase B" incremental transducer.
Z	N / P	PE	Input "zero impulse" incremental transducer. If the parameter of set-up " $L^P$ " is set to "0", the input Z is in interruption (immediate acquirement). If " $L^P$ " is set to "1", the input Z has a minimum time of activation of 50 milliseconds.
<b>For the characteristics of inputs of count please refer to chapter "Electric Characteristics" of the leaflet "Hardware Structure " enclosed to this manual.</b>			

**Legend**

N= Transducer with logic NPN.  
 P= Transducer with logic PNP.

**Characteristics of expansion of inputs (option E)**

Please refer to the chapter "Electric Characteristics" of the leaflet "Hardware Structure" enclosed to this manual.

				<i>Name</i>	<i>Logic status of activation</i>	<i>Ways of activation</i>	<i>Polarizer</i>
				17	ON	I / C	P2
				18	ON	I / C	P2
				19	ON	I	P2
				I10	ON	I	P2
<b>Description</b>							
<p><b>Pace Increment.</b> It increments the pace in execution if the instrument is not performing a positioning. Its operation is enabled if the parameter of set-up " <i>IP</i>" is set to "0". With the output U6 = ON, it controls the manual forward movement of the axis.</p> <p><b>Totalizer Increment.</b> It increments the totalizer which can be configured as pieces counter or counter of repetitions. Its operation is enabled if the parameter of set-up "<i>PE</i>" is set to "1" and the parameter "<i>IL</i>" is set to "0". With the output U6 = ON, it controls the manual backwards movement of the axis.</p> <p><b>Search preset.</b> It controls the procedures of search preset (see dedicated paragraph). Its reading is enabled if the parameter of set-up "<i>EP</i>" is set to "0" and the instrument is not performing a positioning.</p> <p><b>Return to zero / Level of Δ.</b> Its reading is enabled if the instrument is not performing a positioning. With the parameter "<i>ΔI10</i>" set to "0" (function "F + 5") it controls the return to the level of zero with the speed of work. With the parameter "<i>ΔI10</i>" ≠ 0, it is enabled only with absolute positioning (parameter of set-up "<i>EP</i>" set to "0") and it controls the positioning to the level: "level in execution + <i>ΔI10</i>". In this positioning it is not enabled the recovery of clearances and the output of tolerance. If the input I10 is activated, with an automatic increment of pace and with the parameter "<i>ΔI10</i>" ≠ "0", at the end of the pace, the level in execution to which is added the value of "<i>ΔI10</i>" is that of the following pace.</p> <p><b>N.B.</b> With the use of input I10 it is not possible to use the start as pieces counter.</p>							

**Legend**

C = Continuous Signal.

I = Impulsive Signal.

## 2 - 3 OUTPUTS

### Characteristics of outputs

Please refer to chapter "Electric Characteristics" of the leaflet "Hardware Structure " enclosed to this manual.

				<i>Name</i>	<i>Logic status of activation</i>	<i>Polarizer</i>	<i>Ways of activation</i>		
								<i>Description</i>	
U1	ON	C1	X	<b>Tolerance.</b> It shows that the positioning has been achieved correctly and then within the limits set with the parameter of set-up "Tolerance". Its energising can be delayed by the parameter of set-up "tL". Energised for a minimum of 100 milliseconds.					
U2	ON	C1	X	<b>End of pace.</b> It is activated when the totalizer reaches the programmed value. If the totalizer is excluded, it is energised at the same time at the output of tolerance. It is de-energised at a pace increment (automatic or from input) or at a restart. It is energised for a minimum of 100 milliseconds.					
U3	ON	C1	X	<b>End of program.</b> It is energised at the end of the cyclr of work and once it is achieved the execution of all paces of program (and of its repetitions); it is de-energised at a restart. Energised for a minimum of 100 milliseconds.					
U4	ON	C1	C	<b>Search of preset OK.</b> It is enabled only with absolute positioning , it is energised at the end of a search of preset and it is de-energised at each new restart of the instrument.					
U5	ON	C1	C	<b>Error of followup.</b> In order to position, the instrument generates an ideal profile of the positioning (ramp of acceleration, tract at constant speed, ramp of deceleration). If the difference from the real position of the axis from the ideal profile exceeds the value set in set-up "Error of followup", it is energised this output to signal the malfunction.					

### Legenda

C= Continuous signal.

X= See description.

**Characteristics of expansion in outputs (opzione E)**

Please refer to the chapter "Electric Characteristics " of the leaflet "Hardware Structure" enclosed to this manual.

<b>Name</b>		<b>Logical status of Activation</b>		<b>Polarizer</b>	<b>Ways of activation</b>
<b>U6</b>	<b>ON</b>	<b>C2</b>	<b>C</b>	<b>Description</b>	
<b>U7</b>	<b>ON</b>	<b>C2</b>	<b>C</b>		

**Manual.** It signals that the mode of manual operation of the instrument has been selected (MAN key has been pressed).  
**ON** = Manual Operation , **OFF** = Automatic Operation.  
 It disables the operation of the inputs I7 (pace increment) and I8 (totalizer increment) to enable their operation as " manual forward" (I7) and "manual backward" (I8).

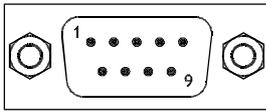
**Enabling axis.** It is energised upon the disactivation of the emergency (I3 = ON); it is deactivated after 300 milliseconds from the activation of the emergency (I3 = OFF).

**Legend**

C = Continuous Signal.

**Characteristics of serial RS 232C**

Please refer to the chapter "Electric Characteristics" of the leaflet "Hardware Structure" enclosed to this manual.

<b>Name</b>		<b>Description</b>	
<b>RX</b>	<b>Input reception instruments.</b>		Tank connector with 9 poles, male for serial connection.
<b>TX</b>	<b>Output transmission instrument</b>		
<b>GND</b>	<b>Common of serial connection.</b>		

## CHAPTER 3

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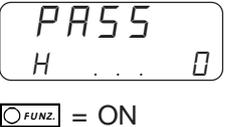
### STARTUP

*Programming (set-up)*

*Calibration*

### 3 - 1 SET-UP

These parameters determine the way of operation of the instrument and therefore their access is reserved to the installer; for the programming we foresee to enter a password as follows:

Description	Keyboard	Displaying
<p>Access to the programming of the set-up.</p> <p>Enter the access code "548" and confirm with <b>ENTER</b>.</p> <p>It is possible to exit in any moment from the entering of the password pressing the key <b>F</b>.</p>	<p><b>F</b> + <b>0</b></p> <p><b>5</b> <b>4</b> <b>8</b> <b>←</b></p> <p><b>F</b></p>	

FUNCTION	DISPLAY	DESCRIPTION
Mode of displaying		<p><b>0</b> = Normal Displaying.</p> <p><b>1</b> = Displaying with system HDR (High definition reading).</p> <p><b>N.B.</b> Please refer to the "Manual of set-up, maintenance ed assistance".</p>
Decimal digits		<p>It specifies the number of digits after the coma (max. 3), with which you wish to display the calculation (position of axis).</p> <p><b>N.B.</b> The introduction of the number of decimal digits conditions the DISPLAYING of the count; the precision of the positionings depends upon the number of impulses supplied by the transducer.</p>
Encoder resolution		<p>This parameter indicates by how much you must multiply the turn impulses of the encoder to provide the displaying of the lengths in the desired units of measure. you may enter values from 0.00200 to 4.00000 upon consideration that the frequency of the phases PH must not exceed the maximum frequency of count of the instrument.</p> <p><b>N.B.</b> Please refer to the "Manual of set-up, maintenance ed assistance".</p>
Unit of the speed		<p>It specifies whether the unit of measure (Um) of the speed of shifting in the axis is in minutes or in seconds (e.g. mm/minute, mm/second, ...).</p> <p><b>0</b> = Um / min.</p> <p><b>1</b> = Um / sec.</p>

FUNCTION	DISPLAY	DESCRIPTION
Maximum Speed Max. 9999		With this parameter is set the maximum speed of the axis, related then to the analog reference of +/- 10 V; the value is always referred to the unit of measure which is set (um/min. o um/sec.). <b>N.B.</b> The calculaiton of this parameter MUST be made by following the instructions shown in the paragraph "Calibration of analog axis".
Speed of work		With this parameter is set the speed of the axis in the positionings of work; the value is always referred to the unit of measure which is set (um/min. - um/sec.) and must be lower or equal to the maximum speed.
Speed of Δ return to zero		With this parameter is set the speed of the axis in the positionings at "Level +delta" or of return to zero (positionings commanded from the input I10); the value is always referred to the unit of measure which is set (um/min. - um/sec.) and must be lower or equal to the maximum speed.
Manual Speed		With this parameter is set the speed of the axis in the manual shiftings; the value is always referred to the unit of measure which is set (um/min. - um/sec.) and it must be lower or equal to the maximum speed.
Manual Speed slow		With this parameter is set the speed of the axis in the slow manual shiftings; the value is always referred to the unit of measure which is set (um/min. - um/sec.) and it must be lower or equal to the manual speed.
Wait of operation with manual shifting		<p><b>0</b> = The manual shiftings are with control of reaction.                      The instrument contrasts each shifting of the from the level reached which may be caused by the outside (offset, operator, ...).</p> <p><b>1</b> = The manual shifting has no control of reaction.                      The axis can be dragged and the position is not recovered.</p>
Acceleration Max. 9.99		With this parameter you set the ramp of acceleration of the axis; the value which is set determines the time employed by the axis to go from the stop to the speed of work.
Deceleration Max. 9.99		It determines the time in seconds of the axis, necessary to decelerate from the speed of work to zero.
Error of follow up Max. 9999		To manage a shifting of the axis, the instrument generates an ideal profile of the positioning. The error of follow up is the maximum difference acceptable between the position reached by the axis and the position which it should have reached, besides which is isgnalled the error of follow up (U5 = ON). The value introduced is in primary impulses of encoder multiplied by x 4.

FUNCTION	DISPLAY	DESCRIPTION
Maximum Level Max. 999999		It is the maximum level which can be reached by the axis; the value which is set is to be considered also as a maximum limit for the introduction of the levels of work. In the case of positioning with recovery of clearances backwards, the maximum level which is set should be able to be exceeded by the ultralevel.
Minimum Level Min. -999999		It is the minimum level which can be reached by the axis; the value which is set is to be considered also as a minimum limit for the introduction of the levels of work. In the case of positioning with recovery of clearances forward, the minimum level which is set should be able to be exceeded by the ultralevel.
Tolerance Max. 999.9		<p>It is the area of count around all levels of positioning which identifies the zones within which the positioning has been correctly achieved.</p> <p>Ex. Level 100.0 and tolerance 1.00; all positionings achieved between 101.0 and 99.0 are to be considered as correct.</p> <p>This parameter has always a decimal digit more than what is programmed in the parameter "Decimal digits" to allow the operation of the QPS (QEM POSITIONING SYSTEM).</p> <p><b>N.B.</b> Please refer to the "Manual of set-up, maintenance ed assistance".</p>
Function key <b>ENTER</b>		<p><b>0</b> = During the choice of the pace to be placed in execution, the key <b>ENTER</b> confirms the pace chosen without starting the axis.</p> <p><b>1</b> = During the choice of the pace to be placed in execution, the key <b>ENTER</b> commands the positioning at the chosen pace (if the input I1 = ON).</p>

This displaying appears if the parameter "Function key ENTER" is set to 1

Time of verification key <b>ENTER</b> Max. 9.99		It is the time, expressed in seconds, of activation of the key <b>ENTER</b> to place in execution the pace selected.
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Enabling waiting time for reaction of space		<p><b>0</b> = Disabled. The axis is always in reaction of space.</p> <p><b>1</b> = Enabled. At the end of a positioning a time is started (programmable with the parameter "t5") after which the axis is not in reaction of space anymore.</p>
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This displaying appears if the parameter "Enabling waiting time of reaction of space" is set to 1

Waiting time to enable the control of reaction of space Max. 9.99		It is the waiting time, expressed in seconds, besides which, after a positioning, a stop, an emergency, the control of reaction of space is disabled and then the axis is free to be dragged with no need for the instrument to contrast the movement trying to recover the position.
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FUNCTION	DISPLAY	DESCRIPTION
Choice of clearances recovery		<p>0 = Positioning with no recovery of clearances.</p> <p>1 = Positioning with forward recovery of clearances.</p> <p>2 = Positioning with backwards recovery of clearances.</p> <p><b>N.B.</b> Please refer to the "Manual of set-up, maintenance and assistance".</p>
<p>This displaying appears if the parameter "Choice of recovery of clearances" is set to 1 or 2</p>		
Ultralevel for recovery of clearances, $\Delta$ minimum positioning Min. 0.1 Max. 9999		<p>During the forward recovery of clearances the axis is positioned at: (level set-ultralevel) and, after the inversion time, it is positioned at the level which is set.</p> <p>During the backwards recovery of clearances the axis is first positioned at: (level set+ ultralevel) and, after the inversion time, it is at the level which is set. If there is no recovery of clearances or the positioning does not need recovery of clearances, and the space to run is smaller than the ultralevel, the instrument performs the positioning with the recovery of clearances.</p>
Time of inversion Max. 9.99		<p>To avoid possible mechanical stress, two to a too fast inversion in the direction of movement of the axis, you can enter a delay time of inversion expressed in seconds. This parameter conditions the operation only in case of positionings with recovery of clearances.</p>
Enabling blade thickness		<p>If you wish to compensate the thickness of the material removed with the cutting, you must enable the introduction of the blade thickness. In this case, to set the thickness of the blade, during the normal operation of the instrument, press the keys "F + 3".</p> <p>0 = The blade thickness is not enabled.</p> <p>1 = The blade thickness is enabled.</p>

FUNCTION	DISPLAY	DESCRIPTION
Delay time of activation of tolerance Max. 9.999		Delay time, expressed in seconds, of activation in the output of tolerance when the axis enters the area of tolerance. By introducing the value "0" the activation of the output is immediate.
Enabling totalizer		<p><b>0</b> = The totalizer (count of the processings performed) is not enabled.</p> <p><b>1</b> = The totalizer (count of the processings performed) is enabled.</p>
Pace Increment		<p>The increment pace allows to place in execution the scheduled processings in the pace following the one in use. The increment pace can be managed by an external signal to the instrument (operator, PLC, ...) or by the instrument itself; in this case, the increment pace is only managed to the purpose of the pace in use.</p> <p><b>0</b> = The increment pace is managed from the input I7.</p> <p><b>1</b> = The increment pace is managed automatically by the instrument. If the input I10 is activated, with an automatic increment of pace and with the parameter "dELTA" (function "F + 5") ≠ 0, to the purpose of the pace, the level in execution to which is added the value "dELTA", is that of the following pace.</p> <p><b>N.B.</b> If the instrument is not used with the expansion inputs / outputs, this parameter must be set to "1". With automatic increment of pace, to place in execution the first pace of program you must provide 2 times the restart.</p>
Delay time of start activation Max. 9.99		With this parameter it is possible to set a delay start time of the axis from the start moment, from an input or from the key <b>ENTER</b> (if the parameter "E" is set to "1"); the output of tolerance is de-energised at the command of start.

This displaying appears if the parameter "Enabling totalizer" is set to 1

Setting to zero the totalizer		<p><b>0</b> = The totalizer (count of the processings performed) is set to zero upon activation of the input I5.</p> <p><b>1</b> = The totalizer (count of the processings performed) is set to zero upon activation of the input I5 and upon restart.</p>
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FUNCTION	DISPLAY	DESCRIPTION
<p>Configuration of memory Max. 255</p>		<p>It states the number of paces which make up a program. In total there are 255 paces; by dividing then the number of available paces by the value introduced (number of paces per program), you obtain the number of usable programs.</p> <p><b>Example:</b></p> <p><b>Cn</b> = 10  <b>N° of programs</b> = 255 / 10 = 25</p> <p>The remaining paces from the division shall be added to the last program which has in this case a size of 15 paces.</p> <p><b>N.B.</b> Upon each variation of the "memory configuration", the data introduced must be written again.</p>
<p>Choice of type of positioning</p>		<p><b>0=Absolute Positioning.</b> With the choice of this type of positioning the totalizer, if enabled, becomes a pieces counter.</p> <p><b>1=Incremental Positioning.</b> With the choice of this type of positioning the totalizer, if enabled, can become a pieces counter or a counter of repetitions of the level. The procedure of search level of preset is not enabled. Furthermore, the input Z becomes a loading preset which can be used to set to zero or subtract the calculation.</p> <p><b>2= Incremental Positioning with setting to zero count.</b> With the choice of this type of positioning the totalizer becomes a counter of repetitions of the level. The procedure of search level of preset is not enabled. Furthermore, the input Z can be used to set to zero or subtract the calculation (parameter "CP" set to "0").</p> <p><b>N.B.</b> Please refer to the chapter "Tables and diagrams of operation".  Please refer to the "Manual of set-up, maintenance and assistance".</p>

FUNCTION	DISPLAY	DESCRIPTION
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These displayings appear if the parameter "Choice of type of positioning" is set to 0

Preset Loading		<p>The procedure of search of preset is performed:</p> <p><b>0</b> = Loading on the count the level of preset upon the disactivation of the input I6.</p> <p><b>1</b> = Loading on the count the level of preset upon activation of the input Z after that the axis has inverted the direction and the input I6 has been disactivated (sensitive to the descent front).</p> <p><b>2</b> = Loading on the count the level of preset upon activation of the input Z after that the input I6 = ON (impulsive).</p> <p><b>3</b> = It is not enabled the procedure of preset search. Upon activation of the input I6, the level of preset is loaded on the count.</p> <p><b>N.B.</b> See dedicated paragraph. Please refer to the "Manual of set-up, maintenance and assistance".</p>
Speed of preset		<p>With this parameter you set the speed of the axis for the search of the input of enabling; the value is always referred to the unit of measure which is set (um/min. - um/sec.) and it must be lower or equal to the maximum speed.</p>
Speed of search after the enabling of the zero impulse		<p>With this parameter you set the speed of the axis after the activation of the input of enabling; the value is always referred to the unit of measure which is set (um/min. - um/sec.) and it must be lower or equal to the speed of preset. We suggest to use very low values.</p>
Level of preset		<p>In the procedure of search of preset, it is the level that is loaded on the count with the zero impulse of the transducer (according to the way defined by the type of search of preset). It is possible to enter a level of preset included between maximum level and minimum level.</p>

This displaying appears if the parameter "Enabling totalizer" is set to 1

Increment of pieces counter		<p><b>0</b> = The increment pieces counter is associated to the input I8 (increment of totalizer).</p> <p><b>1</b> = The increment pieces counter is associated to the input of start (when the axis has reached the selected level).</p>
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FUNCTION	DISPLAY	DESCRIPTION
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**ALL THE FOLLOWING DISPLAYINGS APPEAR IF THE PARAMETER "CHOICE OF TYPE OF POSITIONING" IS SET TO 1 OR 2.**  
 This displaying appears if the parameter "Choice of type of positioning" is set to 1

<p>Operation of the totalizer</p>		<p><b>0</b> = The totalizer (count of the processings performed) is managed as a pieces counter incrementable from the input I8. When the axis reaches the level which is set, it remains in the position reached until all processings which have been set are performed.</p> <p><b>1</b> = The totalizer (count of the processings performed) is managed as a counter of repetitions incrementable from the input I8. A processing is made up of a positioning at the level which has been set; the axis repeats the positioning until all processings which have been set are performed.</p>
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This displaying appears only if the parameter "Operation of totalizer" is set to 1 and the parameter "Choice of type of positioning" is set to 1. it also appears in case the parameter "Choice of type of positioning" is set to 2

<p>Increment of counter of repetitions</p>		<p><b>0</b> = The increment of the counter of repetitions is associated to the input I8 (increment of totalizer).</p> <p><b>1</b> = The increment of the counter of repetitions is associated to the input of start (when the axis has reached the level selected).</p>
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<p>Type of setting to zero the count</p>		<p><b>0</b> = The calculation is set to zero.</p> <p><b>1</b> = The calculation is updated to the level of preset.</p> <p><b>2</b> = The calculation is set to zero by subtracting the value of the count reached to the level of positioning performed (which is used not to lose the absolute position in the angle shiftings).  <b>Example:</b></p> <p>Set-point = 360                  Count = 359; after setting to zero count = -1</p> <p><b>N.B.</b> With the parameter "tP" set to "1" the zero setting of the count can be performed only by activating the input Z.</p>
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This displaying appears if the parameter "Type of setting to zero count" is set to 1

<p>Level of preset</p>		<p>It is the value that is loaded on the count when you activate the command of setting to zero (tA). It is possible to enter a level of preset included between the maximum and the minimum level.</p>
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FUNCTION	DISPLAY	DESCRIPTION
This displaying appears if the parameter "Choice type of positioning" is set to 2		
Command of setting to zero		<p><b>0</b>=The command of setting to zero is performed through the activation of the input Z.</p> <p><b>1</b>=The command of setting to zero is performed automatically upon activation of the start (I1) after the end of a positioning.</p> <p><b>2</b>=The command of setting to zero is performed automatically upon activation of the start (I1) after the end of a positioning; furthermore the input sets to zero the calculation independently from the parameter "zC" (type of setting to zero count).</p>
Setting to zero the count upon restart		<p><b>0</b>=Upon restart the calculation is not set to zero.</p> <p><b>1</b>=Upon restart the calculation is set to zero with the ways which have been set in the parameter "zC" (type of setting to zero count).</p>
This displaying appears for all types of positioning		
Enabling the serial RS 232C		<p><b>0</b>=The serial RS 232C is disabled.</p> <p><b>1</b>=The serial RS 232C is enabled.</p>
This displaying appears if the parameter "Enabling RS 232C" is set to 1		
Speed of transmission RS 232C		<p>110 baud }            150 baud }            300 baud }            600 baud }            1200 baud }            2400 baud }            4800 baud }            9600 baud }</p> <p>Speed of transmission available; if the speed is wrong, accepting and displaying the wrong value, by default it is stored in memory the value 9600.</p>
Number of data bits		<p><b>7 bits</b> Number of data bits; if the number of bits is wrong, the instrument takes as default the value 8.</p> <p><b>8 bits</b></p>
Number of stop bits		<p><b>1 bit of stop</b> Number of stop bits; if the number of bits is wrong, the instrument takes as a default the value 2.</p> <p><b>2 bit of stop</b></p>
Parity bits		<p><b>0</b>=No parity.</p> <p><b>1</b>=Odd parity.</p> <p><b>2</b>=Pair parity.</p> <p>Value of default "0".</p>

FUNCTION	DISPLAY	DESCRIPTION
Code of address		<p>In case of connection of various instruments with Daisy-Chain configuration, it is necessary to assign to each instrument an identificative code. In case of a transmission from master with code "00", the string which is sent is received by all instruments.</p>
Enabling chksum		<p><b>0</b> = The chksum of the data transmitted is not enabled. Before sending another character, the instrument awaits from the PC the echo of the caractere previously transmitted.</p> <p><b>1</b> = The chksum of the data transmitted is enabled. It is calculated the l'OR exclusive of the dat awhich have been sent (see dedicated paragraph "Commands in RS 232C").</p>
<p><b>This displaying appears if the parameter "Enabling chksum" is set to 1</b></p>		
Transmission delay		<p>It is the time, expressed in milliseconds, that the instrument places between the transmission of a character and the sending of the following character.</p>
<p><b>Once the programming of the last function is achievede, the displaying of the first parameter of set-up appears again.</b></p>		

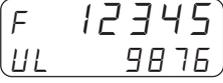
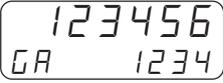
### 3 - 2 TARATURE

#### PROCEDURE OF CALIBRATION OF ANALOG OUTPUT

**Setting some parameters of set-up.**

You must set in set-up the parameters related to decimal digits, transducer's resolution, unit of speed.

Description	Keyboard	Displaying
<p><b>Access to the procedure of calibration</b>                      Activate the input of emergency (I3 = ON).                      Enter the password "123".</p>	<p><b>F</b> + <b>0</b>   <b>1</b> <b>2</b> <b>3</b> <b>↵</b></p>	<p>PASS H . . . 0</p>
<p>By the double arrow key it is possible to select three different displayings: "tu" (voltage of output), "OF" (offset count) "GA" (ring gain).</p>	<p><b>↕</b>   <b>↕</b>   <b>↕</b></p>	<p>000 tu 00                       345 OF 123                       123456 GA 1234</p>
<p><b>Verification of connections</b>                      The first thing to verify is the exact connection of the tachometer dynamo upon the startup. Select the displaying related to the "Voltage of output (tu)" and enter via the numeric keyboard a value of voltage, confirming it with the key ENTER. We suggest to enter a quite low value of voltage (e.g. 0.5 V) and to observe if the motore runs at apx. 1 / 20 of its maximum speed (if the drive accepts a maximum voltage of 10V).                      Supplying a positive voltage from the keyboard, the motor must run "forward" with a speed being proportional of the value introduced, and the calculation displayed must be increased.</p>	<p><b>↕</b>   <b>0</b> ÷ <b>9</b> <b>↵</b></p>	<p>000 tu 00</p>
<p><b>N.B. The value of voltage introduced from the keyboard is supplied by the analog output with no rampa of acceleration.</b></p>		
<p><b>Calibration of the offset</b>                      Select the displaying related to the calibration of the offset "offset in steps (OF)" and follows the indications described here below: the operator can enter with the numeric keys and the sign, a qualsiasi value that upon confirmation with <b>ENTER</b> shall be immediately shown in output.</p>	<p><b>↕</b>   <b>0</b> ÷ <b>9</b> <b>↵</b></p>	<p>345 OF 123</p>
<p><b>Calculation of the speed</b>                      The instrument is now able to calculate and display the value of the maximum speed to be entered in set-up in the parameter "Maximum speed (SA)".                      Select the displaying related to the "voltage of output introduced (tu)". Enter, via the numeric keyboard, a voltage of 10 volt (to which corresponds the maximum speed of the motor).</p>	<p><b>↕</b>   <b>1</b> <b>0</b> <b>↵</b></p>	<p>000 tu 00</p>
<p><b>N.B. The value of voltage introduced from the keyboard is supplied by the analog output without ramp of acceleration.</b>  <b>To be continued on the following page.</b></p>		

Description	Keyboard	Displaying
<p>In case it is not possible to move the axis to the maximum speed, enter a voltage of 1 volt. The displaying of the speed supplied by the instrument must be then multiplied by 10.                      With the axis in movement press the key <b>MAN</b>.                      On the upper display is displayed the frequency of count (detected on the phases of the encoder). On the lower display it is displayed the value of the maximum speed to enter in set-up in the parameter "Maximum speed".                      It is possible, in this displaying, to enter a filter on the displaying keeping pressed the key <b>ENTER</b>.</p>	  	
<p><b>Complete the programming of the set-up</b></p> <p><b>Calibration of the gain</b>                      Select the displaying related to the "Ring gain (GA)". This allows to quickly adapt the positioner to the sensitivity of input in the drive. <b>the bigger is the value of the ring gain, the greater is the readiness with which the axis moves but obviously the greater is the instability of the system.</b></p>		

## CHAPTER 4

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### USE

*Programs of work and auxiliary functions*

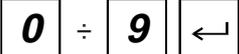
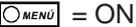
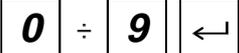
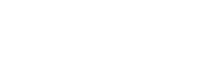
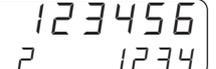
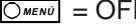
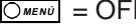
*Tables and diagrams of operation*

## 4 - 1 PROGRAMS OF WORK AND AUXILIARY FUNCTIONS

### INTRODUCTION OF THE PROGRAMS OF WORK

The program of work is made up of a certain number of paces, defined with the parameter of set-up "Memory Configuration".

For each pace it is possible to set a level of positioning (preselection) and the number of processings to make once the level which has been set is reached (totalizer).

Description	Keyboard	Displaying
Access to the writing of the programs of work.		
Select the desired program confirming it with <b>ENTER</b> (the number of the pace in phase of programming is displayed on the lower left display).		
On the upper line it is displayed the level of positioning (blinking). The operator can enter the desired level and confirm it with the key <b>ENTER</b> .		
Upon confirmation of the level of positioning, the line of the display on the down right corner starts to blink for the introduction of the totalizer (number of processings to perform at the level which has been set); the operator can enter the number of desired processings and confirm it with the key <b>ENTER</b> .		
Upon confirmation of the totalizer it is required to enter the end of program; if the operator decides to continue he must confirm with <b>ENTER</b> .		
It is then proposed the second pace of the selected program. The operator has the possibility to enter the level and the totalizer in the case of the second pace.		
Upon confirmation of the totalizer it is required to enter the end of program; if the operator decides to continue he must confirm with <b>ENTER</b> ; if this is not the case, press the key <b>F</b> to enter the end of program, confirming it with <b>ENTER</b> .		
To exit the writing of the programs, press the key <b>MENÙ</b> . It is possible to exit in any momento the programs' introduction; only those values confirmed with <b>ENTER</b> shall be stored in memory.		

### CHOICE OF THE WORKING PROGRAM TO BE EXECUTED

With the parameter of set-up "Memory Configuration" we have defined a certain number of programs of work, containing each a set of paces made of level of positioning and totalizer. For the choice of the program to be placed in execution, please follow these instructions:

Description	Keyboard	Displaying
<p>Access to the function of program choice .</p> <p>Enter the number of the desired program, confirming it with <b>ENTER</b>. Upon confirmation with <b>ENTER</b> of the number of program, the instrument requires the number of times that the program selected must be repeated before signalling the end of the program (number of cycles). The operator must then enter the number of repetitions of the program (1÷999). If you set the value 999, the calculation of the cycles is disabled and then the program is repeated "continuously". The choice of a program completely aborts the execution of the program which was previously in use.</p>	<p><b>F</b> + <b>1</b></p> <p><b>0</b> ÷ <b>9</b> <b>↵</b></p> <p><b>0</b> ÷ <b>9</b> <b>↵</b></p> <p><b>F</b></p>	<p>SCELETA Pr. 101</p> <p><input checked="" type="checkbox"/> FUNZ. = ON</p> <p>n. [ 1 2 1 401</p> <p><input type="checkbox"/> FUNZ. = OFF</p>
<p>To exit the function of program choice, press the key <b>F</b>.</p>		

### CHOICE OF PACE

With the choice of the program to be placed in execution, the instrument starts the positionings from the first pace of program. It is possible to select any pace (of the program in use) so that the execution of the program starts from the desired pace skipping all the previous paces.

Description	Keyboard	Displaying
<p>Access to the function of choice of pace.</p> <p>Enter the number of the pace from which you wish to start the program and confirm with <b>ENTER</b>. The execution of the program shall start with the command of axis start. If you wish that the program starts from the beginning, it is not necessary to perform the choice of the pace.</p>	<p><b>F</b> + <b>2</b></p> <p><b>0</b> ÷ <b>9</b> <b>↵</b></p> <p><b>F</b></p>	<p>SCELETA P5.111</p> <p><input checked="" type="checkbox"/> FUNZ. = ON</p> <p><input type="checkbox"/> FUNZ. = OFF</p>
<p>To exit the function of choice of program, press the key <b>F</b>.</p>		

## INTRODUCTION OF THE BLADE THICKNESS

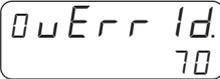
It is possible to compensate the quantity of material removed in the cutting operation by entering the thickness of the blade in use. The value introduced shall be added to all the levels of positioning, in order to increase the thickness of the blade.

Description	Keyboard	Displaying
Access to the function of introduction of blade thickness.	 + 	
Enter the thickness of the blade in use and confirm with <b>ENTER</b> .	 ÷  	<input checked="" type="checkbox"/> FUNZ. = ON
It is possible to modify the value of the blade thickness also during the execution of a program; the new value introduced shall be used for the remaining positionings.		
To exit the function of choice of program, press the key <b>F</b> .		<input type="checkbox"/> FUNZ. = OFF

## INTRODUCTION OF THE OVERRIDE

The override is the percentage of the speed of work which has been set in the set-up with which you must perform the positionings. By introducing 100%, the speed of positioning is the same than the speed of work, by introducing 50%, the speed of positioning is equal to half of the speed of work etc.

By modifying the speed of work, you modify by the same percentage also all other speeds which have been set.

Description	Keyboard	Displaying
Access to the function of introduction of override.	 + 	
Enter the desired percentage and confirm with <b>ENTER</b> .	 ÷  	<input checked="" type="checkbox"/> FUNZ. = ON
It is possible to modify the value of the override also during the execution of a program; the new values of speed shall be used for the remaining positionings.		
To exit the function of choice of program, press the key <b>F</b> .		<input type="checkbox"/> FUNZ. = OFF

## INTRODUCTION OF LEVEL OF DELTA

According to the value introduced, this parameter develops a double function: if the value introduced is zero, upon activation of the input dedicated, the axis is located at the zero level (the axis is moved until the calculation arrives on zero). If the level introduced is different from zero, upon activation of the input dedicated, the axis is located at the level of positioning plus the value introduced. This operation, which can be applied in different processings, has been conceived for the positioning of a mobile striker for small saws: once the material has been layed against the striker and the clamp has been closed, before th ecutting it is necessary to move the striker in order not to break the blade. By activating the dedicated input, the striker moves at the "level of cutting + level of delta". Upon activation of the start (if a new pace has not been put in execution), the axis returns to the level of positioning.

Description	Keyboard	Displaying
<p>Access to the function of introduction of level of delta.</p> <p>Enter the desired gap and confirm with <b>ENTER</b>.                      By setting the value "0", upon activation of the input I10, the axis is located to the level of zero.                      By setting a different value from "0", upon activation of the input I10, the axis is located to the level: "level in execution + Δ".</p> <p>N.B. With a value of Δ different from "0", the input I10 is enabled only with the parameter of set-up "L7" set to "0".</p> <p>It is possible to modify the value of the level of delta also during the execution of a program; the new value of difference shall be used for the remaining positionings.</p> <p>To exit the function of choice of program, press the key <b>F</b>.</p>	<p><b>F</b> + <b>5</b></p> <p><b>0</b> ÷ <b>9</b> <b>←</b></p> <p><b>F</b></p>	<p>DELTA 999999</p> <p><input checked="" type="checkbox"/> FUNZ. = ON</p> <p><input type="checkbox"/> FUNZ. = OFF</p>



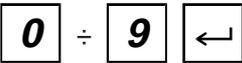
## SEARCH OF THE LEVEL OF PRESET (ENABLED ONLY WITH ABSOLUTE POSITIONING )

The instrument offers some functions for the manual management of the axis. It is possible to command the search of the level of preset also from the keyboard (for the description of the search level of preset see the dedicated paragraph).

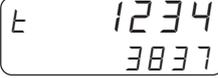
Description	Keyboard	Displaying
<p>Access to the manual functions manuali and selcting the displaying related to the search of the level of preset.</p>		
<p>The lower displays show the value of the count. Upon confirmation with <b>ENTER</b>, the calculation displayed blinks to signal the start of the search of preset and at the same time the axis moves to search the command of loading of the level of preset. Once you load the level of preset on the count, the display stops blinking to signal the end of the procedure.</p>		<p><input checked="" type="radio"/> MAN = ON</p>
<p>In the incremental positionings and incremental with setting to zero, the search of preset is disabled. Then if in set-up the parameter "tP" is set to "1" o "2", the instrument shall signal that the search of preset is disabled.</p>		 <p><input type="radio"/> MAN = OFF</p>
<p>To exit the manual functions at the end of the procedure or to abort the search of preset press the key <b>MAN</b>.</p>		

## INTRODUCTION OF A VALUE ON THE COUNT

The instrument offers some functions for the manual management of the axis. It is possible to modify the value of the count displayed by the instrument (position of axis), by entering the desired value. This function is specially useful in phase of setup and calibration.

Description	Keyboard	Displaying
<p>Access to the manual functions and selecting the displaying related to the introduction of a value on the count.</p>		
<p>The operator can enter the desired value of count. The lower displays show the value of the count introduced. Upon confirmation with <b>ENTER</b>, the instrument displays the value introduced.</p>		<p><input checked="" type="radio"/> MAN = ON</p>
<p>To exit the manual functions press the key <b>MAN</b>.</p>		<p><input type="radio"/> MAN = OFF</p>

**DISPLAYINGS**

Description	Keyboard	Displaying
<p><b>Display upper right corner</b> Count of axis.</p> <p><b>Display lower right corner</b> Level in execution.</p>		
<p><b>Display upper right corner</b> Count of totalizer.</p> <p><b>Display down right corner</b> Preselection of totalizer.</p>		
<p>If the totalizer is not enabled.</p> <p><b>Display upper left corner</b> Program in use.</p> <p><b>Display lower left corner</b> Pace in use.</p>		
<p><b>Display upper right corner</b> Cycles which have been set.</p> <p><b>Display lower right corner</b> Cycles made.</p>		

If it is present on the instrument the option RS 232C and in SET-UP is enabled the serial transmission, it is possible to transmit from a PC the control for the data writing and reading. The serial port can be configured programming the suitable parameters of SET-UP of the instrument.

It is possible to adjust the transmission speed, the number of data bits, the number of stop bits, parity bits, the enabling to the control of the chksum (OR exclusive) and the code with the address of the instrument.

If it is not chosen from the set-up the control of the chksum with delay of transmission of character, the instrument manages the echo of the character transmitted. The characters that compose the string are in hexadecimal format (Hex.).

The numeric data are managed by bytes (two characters per byte). The instrument is always slave, and can transmit only a request of the PC (master).

#### **Sintaxis of general transmission control from PC to the instrument.**

Each string of command sent by the PC, shall always start with the character "{" (value ascii=7B Hex.).

The first two characters are the code of address of the instrument to which is destined the message. The following two characters, must be two capital letters which identify the command code. The following 2 characters identify the length expressed in bytes of the string of data which are sent or of data to read in case there is a request for reading (you may read or write 100 bytes (Hex 64) at maximum). Follows then the operating number, i.e. the numeric value of the variables concerned by the transmission. The strings which are sent without placing before the character "{" and at the end of the character "@", are ignored.

In case the instrument finds a chksum different from that transmitted by the PC, the data shall not be accepted (the malfunction can be found by performing a verification of the equal feature between the chksum of the transmitted data and the chksum calculated by the instrument, that is sent by the same each time that is required an operation of data writing). The instrument controls the limits of the data transmitted and the enabling to accept it. If it is not enabled the control of the chksum, the echo received by the instrument is not controlled but used to continue the transmission of the characters.

#### ***Command of transmission.***

{ XX YY XXXX XX XX.. XX @

{ = Code of string of transmission start from PC ({}).

XX = Code of address. It identifies the instrument in transmission / reception (1 byte max.; value = 63 Hex.).

YY = Code of command (two letters).

TS = Request of data writing .

TL = Request of data reading.

XXXX = Address of data (2 byte max.; value = FFFF Hex.).

XX = Number of bytes transmitted or to be read (100 byte max.; value = 64 Hex.).

XX.. = String of data (it is not present in case of reading request).

XX = Chksum of the string transmitted excluded the characters of start and end of string ({} , @).

@ = Character of end of string.

#### ***Siyntaxis of general response command from instrument to PC.***

The instrument, operating as a slave, shall always transmit in response to the controls sent from the PC. Each string of response sent by the instrument, shall always start with the character "I" (value ascii=5B Hex.).

The first two characters shall be the code of address of the instrument in response to the requests to send the data made by the PC. The following two characters, shall be two capital letters which identify the command code.

To be continued on the following page.

After the command code, if the PC has required the reading of a data, follows the operating number, i.e. the values of the variables required by the PC and subsequently the two characters of chksum.

In case of response at a command of writing, after the code command, it is transmitted the chksum calculated by the instrument (if enabled). The characters which are sent without placing before "[" and at the end the character "@", are ignored. The chksum transmitted by the instrument, is the chksum of response to a command of writing from PC or the chksum of the string of reading data required by the PC. If during the transmission of the instrument arrives a wrong character of echo, the transmission itself is aborted.

### **Command of transmission.**

[ XX YY XX...X XX @

[ = Code of string of transmission start from instrument (I).

XX = Code of address. It identifies the instrument in transmission / reception (1 byte max.; value = 63 Hex.).

YY = Code of command (two letters).

RS = Response to a request of writing data.

RL = Response to a request of reading data.

XX...X = Address to be read.

XX = Chksum of the string transmitted excluded the of start and end of string ([, @), or of response to the command of writing of the PC.

@ = Character of end of string.

### **Example of writing data.**

In case you wish to transfer to the instrument 01, n. data having address of start "007F" and length 6 bytes, divided into 2 bytes, for the first data and, 1 byte for the second, you only need to operate as follows:

Code of address of instrument = 01 (Hex. 01).

Address of start = 127 (Hex. 007F).

Number of bytes to be written = 03 (Hex. 03).

Value to transfer of the first data = 1234 (Hex. 04D2).

Value to transfer of the second data = 88 (Hex. 58).

CHKSUM = It is calculated performing the XOR of the bytes that compose the string to transmit, with the exclusion of the character "{" (character of start of string) and of the character "@" (character of end string).

In this case then the string of characters must be made as follows:

{01TS007F0304D258 ... @

In the space left by the points you must enter the value of the CHKSUM of the string of characters transmitted. In this case the value is:

CHKSUM = 30 XOR 31 XOR 54 XOR 53 XOR 30 XOR 30 XOR 37 XOR 46 XOR 30 XOR 36 XOR 30 XOR 34 XOR 44 XOR 32 XOR 35 XOR 38=0E (value Hex.).

The string of characters to transfer is then:

{03TS007F0304D2580E@

***To be continued on the following page***

After performing the transmission of the string, you must wait for the response of the card that, in case the transmission has been performed with no error, shall occur with the following string of characters:

[01RS0E@

**Example of data reading.**

In case you wish to read from the instrument, to which we give the address code of instrument "12", n. data having the address of start "Hex. 086A" and length 4 bytes, divided into 1 byte for the first data and 3 bytes for the second, you must operate as follows:

Code of the address of the instrument = 12 (Hex. 0C).

Address of start = 2154 (Hex. 086A).

Number of bytes to be read = 04 (Hex. 04).

**CHKSUM** = It is calculated by performing the XOR of the bytes which make up the string to transmit, with the exclusion of the character "[" (character of start of string) and of the character "@" (character of end of string).

In this case then the string of characters transmitted by the PC to require the reading of the data to the instrument, must be made as follows:

{0CTL086A04 ... @

In the space left by the points, you must introduce the value of the CHKSUM of the string of characters transmitted. In this case the value shall be:

CHKSUM = 30 XOR 43 XOR 54 XOR 4C XOR 30 XOR 38 XOR 36 XOR 41 XOR 30 XOR 34=10 (value Hex.).

The string of characters to transfer is then:

{0CTL086A0410@

After performing the transmission of the string, you must wait the response of the instrument that, in case the transmission has been made with no error, and the values for the data required are for the first data, at a byte "37" (Hex. 25) and for the second data "123456" (Hex. 01E240), the following string of characters shall then be given:

[0CRL2501E24018@

After verifying that the value of chksum calculated on the data arrived is equal to the value of chksum transmitted by the instrument (if this isn't the case you must repeat the request of reading and the data arrived must not be accepted), you can find the values of the data required by decomposing the string of characters received in this way:

[ = Character of starting string.

0C = Address of the instrument from which comes the response.

RL = Code of command (response upon request of data reading).

25 = Hexadecimal value of the first data transmitted.

01E240 = Hexadecimal value of the second data transmitted.

18 = Value of chksum of the string transmitted (calculated with no consideration of characters "[" and "@").

@ = Character of end of string.

**N.B.** With the serial it is possible to write in the memory but not to manage the movements (manual movements, start, stop etc.).

**Address of data in the machine parameters.**

Address of data (in Hex.)	Length in bytes	Description of data	Values min-max (in decimal)
0000	1275	<p>Memory at 76 paces each of which occupies 5 bytes.</p> <p>0000 ] Level to perform ] <b>Pace</b>                      0001 ] <b>1</b>                      0002 ]</p> <p>0003 ] Preselect. of ]                      0004 ] totalizer ]</p> <p>0005 ] Level to perform ] <b>Pace</b>                      0006 ] <b>2</b>                      0007 ]</p> <p>0008 ] Preselect. of ]                      0009 ] totalizer ]</p> <p>"                      "                      "                      "                      "                      "</p> <p>04F6 ] Level to perform ] <b>Pace</b>                      04F7 ] <b>255</b>                      04F8 ]</p> <p>04F9 ] Preselect. of ]                      04FA ] totalizer ]</p>	

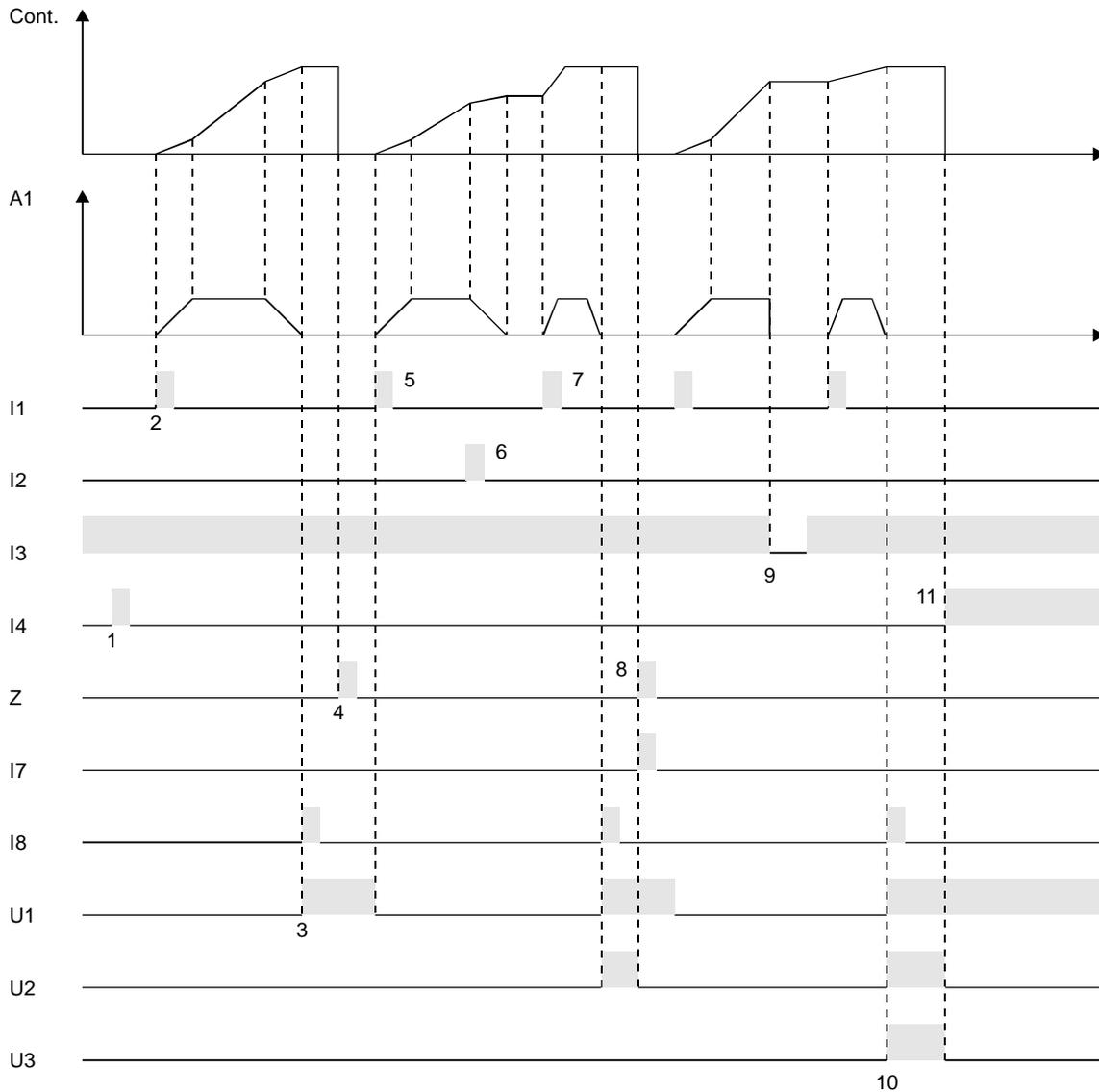
**Address of program data.**

Address of data (in Hex.)	Length in bytes	Description of data	Values min-max (in decimal)
0500	1	Program in execution	$1 \div \frac{n^0 \text{ paces available (76)}}{n^0 \text{ paces (X) program}}$
0501	1	Pace in execution	$1 \div n^0 \text{ paces per program}$
0502	2	Preselect. of totalizer	
0504	2	Count	
0506	2	Cycles set	$1 \div 9999$
0508	2	Cycles made	
050A	2	Input	
		<div style="display: flex; flex-direction: column; align-items: center;"> <div style="display: flex; justify-content: space-between; width: 100%;"> <span>B15</span><span>B14</span><span>B13</span><span>B12</span><span>B11</span><span>B10</span> </div> <div style="display: flex; justify-content: space-between; width: 100%; border: 1px solid black; margin: 2px;"> <div style="width: 15%;"></div> </div> <div style="display: flex; justify-content: space-between; width: 100%;"> <span>12</span><span>11</span><span>10</span><span>9</span><span>8</span><span>7</span><span>6</span><span>5</span><span>4</span><span>3</span><span>2</span><span>1</span><span>0</span> </div> </div>	
050C	1	Output	
		<div style="display: flex; flex-direction: column; align-items: center;"> <div style="display: flex; justify-content: space-between; width: 100%;"> <span>B7</span><span>B6</span><span>B5</span><span>B4</span><span>B3</span><span>B2</span><span>B1</span><span>B0</span> </div> <div style="display: flex; justify-content: space-between; width: 100%; border: 1px solid black; margin: 2px;"> <div style="width: 15%;"></div> </div> </div>	
050D	3	Count of axis	Minimum Level ÷ Maximum Level
0510	3	Level in execution	$1 \div n^0 \text{ paces per program}$
0513	3	Immediate Level	Minimum Level ÷ Maximum Level
0516	3	Level DI10	$-999999 \div 999999$
0519	3	Blade thickness	$-999999 \div 999999$
051C	2	Override	$1 \div 100$

**N.B.** The instrument allows the writing of a single parameter at once allowing thus to check the size of the data. The string of response at a command of writing can be negative in case you try to access to various parameters at the same time or the data introduced is not included within the limit values.

4 - 2 TABLES AND DIAGRAMS OF OPERATION

INCREMENTAL POSITIONING WITH SETTING TO ZERO COUNT AND COUNTER OF REPETITIONS



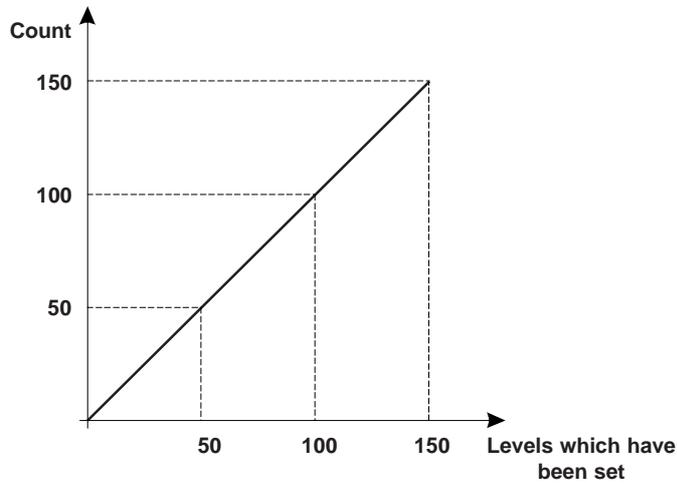
- 1 Upon restart it is set to zero the calculation ("Pr" = 1) and placed in await of execution the first pace of the program.
- 2 Upon the start (I1), the instrument generates A1 that commands the shift of the axis.
- 3 At the end of the positioning, it is activated the output of tolerance U1 and at the same time, by activating the input I8, it is given an increase to the totalizer (repetitions).
- 4 The activation of the input Z sets to zero the calculation of the axis.
- 5 With a new start, the axis starts a new positioning.
- 6 If during the movement, the stop is activated (I2), it is commanded a braking with ramp of deceleration.
- 7 The positioning interrupted is ended with a new start.

**To be continued on the following page**

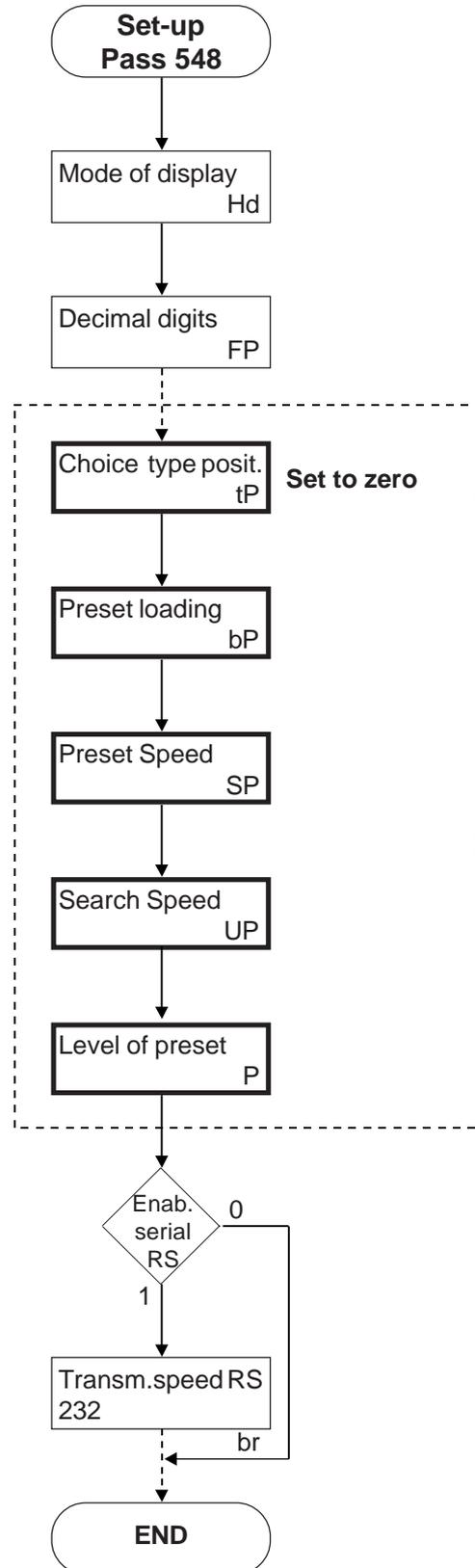
- 8 At the end of the positioning, it is activated the output of tolerance U1 and at the same time, by activating the input I8, it is given an increase to the totalizer (repetitions). In this case the output U2 of end of pace is activated and the input I7 is activated, to proceed with the following pace.
  - 9 If during a positioning, the emergency is activated (I3 = OFF), the analog output A1 is immediately brought at zero volt and to achieve the positioning you must provide again a start (I3 = ON).
  - 10 The new increase of totalizer, activates the output of end of program (U3) and of end of pace (U2).
  - 11 A new restart deactivates the outputs U2 and U3, sets to zero the calculation and arranges the instrument for a new cycle of work.
- N.B.** This operation has been obtained by introducing the following values in the parameters of set-up:  
"rG" = 0, "tL" = 0, "RL" = 1, "IP" = 0, "LP" = 1, "LC" = 0, "CR" = 0, "FL" = 1, "IL" = 0, "RR" = 1

**Structure of set-up for absolute positionings**

**Main characteristics of absolute positionings**

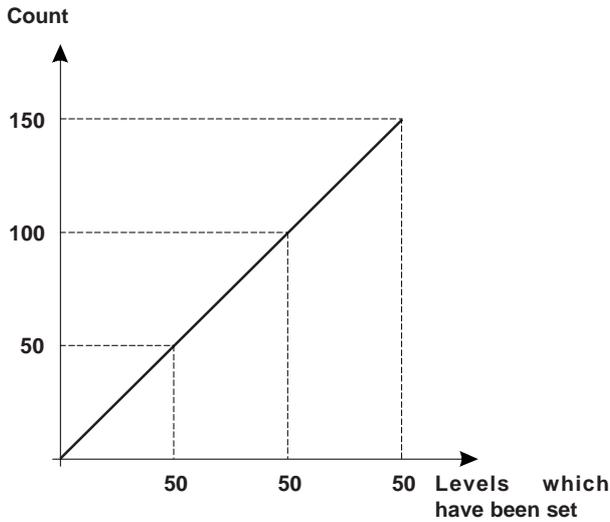


- Need to perform a search of preset totally managed by the instrument, with start from keyboard or from input.
- Setting a field of work. With the introduction of the minimum and maximum levels , it is defined the maximum gap of the axis. All attempts to position the axis besides the limits defines are made unuseful by a displaying of error.
- Management of a pieces counter. Then possibility to associate to each position to reach a certain number of processings.
- Levels of work referred to the zero machine.

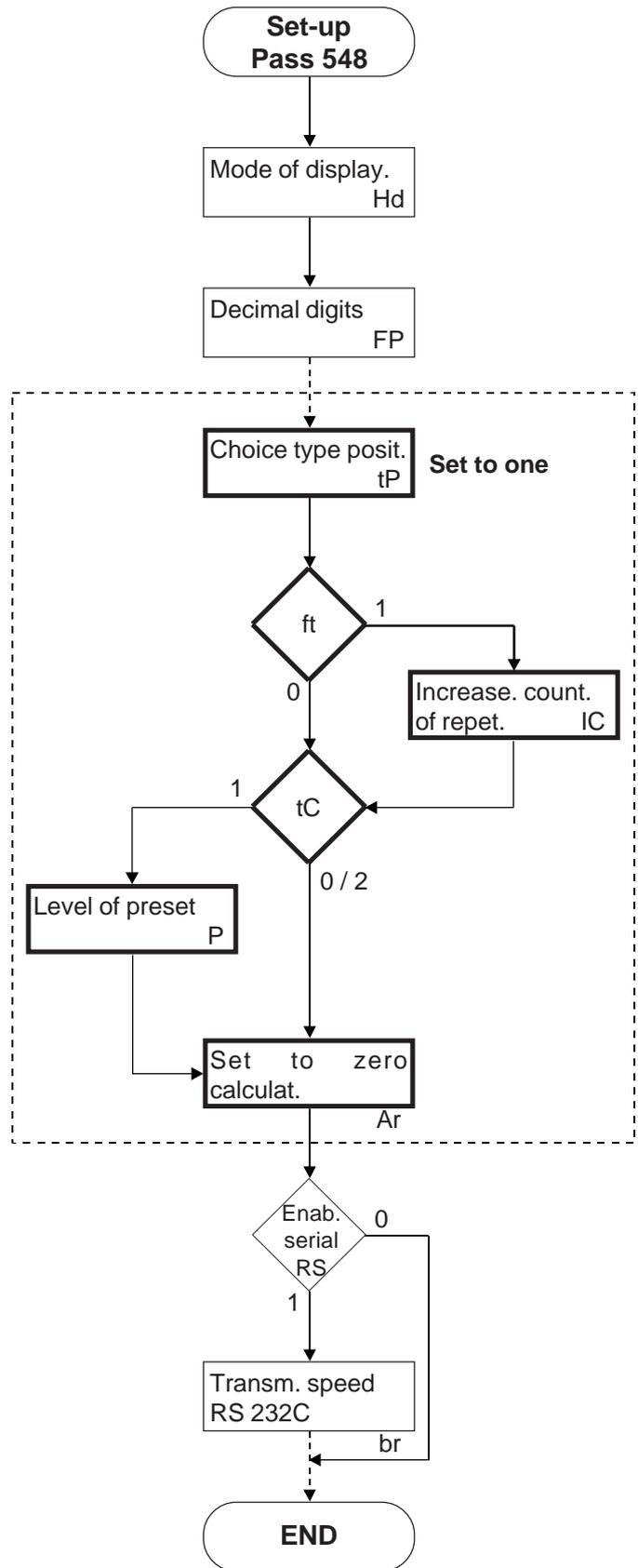


**Structure of set-up for incremental positionings**

**Main characteristics of incremental positionings**

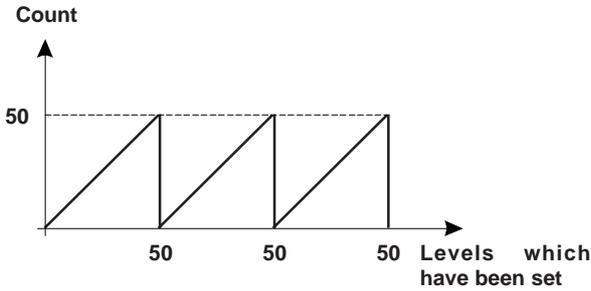


- Processings a pace.
- Levels of work not referred to the zero machine, but to the position reached by the axis in the previous positioning.
- Possibility to associate to each level a certain number of processings or, to set for each level introduced a certain number of repetitions of the same.
- Ideal for the optimization of the material to be cut (iron rod, paper sheet, marble sheet, etc.) because, if the levels are set correctly, at the end of the processing there are no rejects or scraps.
- Various possibilities to update the calculation. The main is the setting to zero by subtraction. In this way it is always possible to position by recovering the eventual error of the previous positioning. As a consequence, it is always possible to check the real position of the axis avoiding thus to accumulate the errors due to the mechanics.

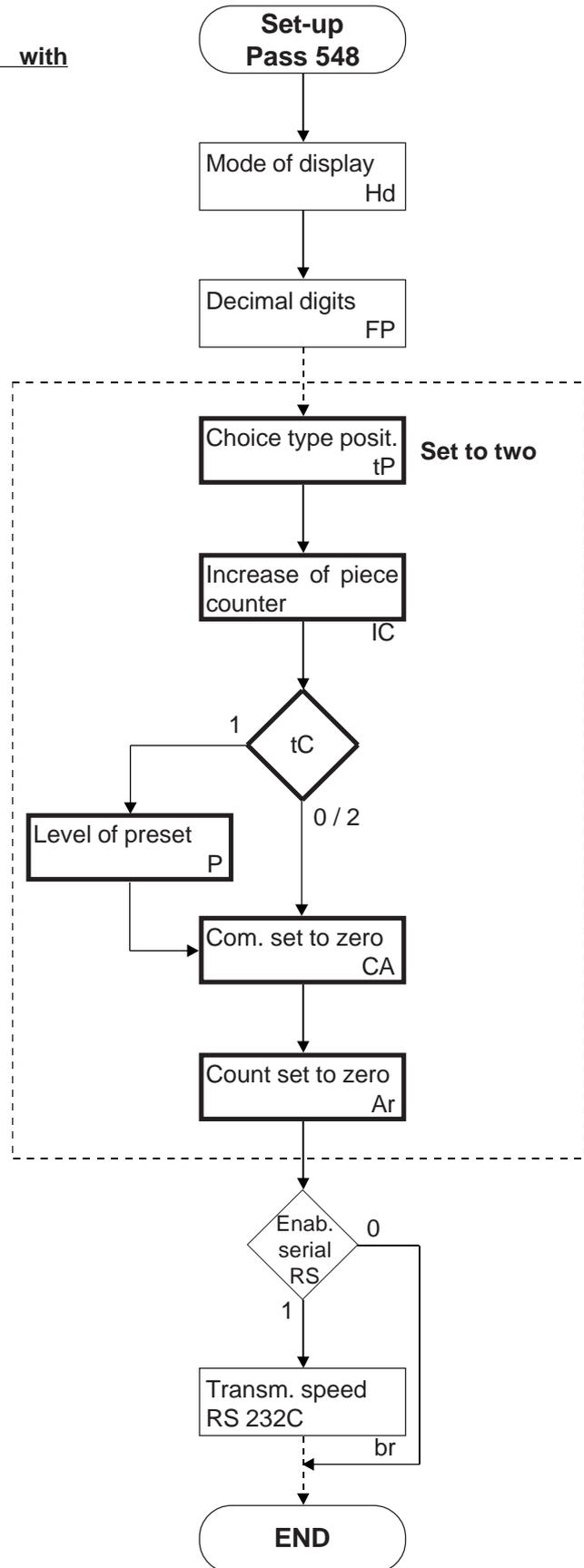


**Structure of set-up for incremental positionings with setting to zero**

**Main characteristics of incremental positionings with setting to zero**



- Ideale for the management of applications as unwinding and cutting, rotating tables, winding machines and similar devices.
- Possibility to associate to each level a certain number of repetitions of the same.
- The levels of work are not referred to the zero machine but to the position reached by the axis in the previous positioning.
- Various possibilities to update the calculation. The main is the setting to zero by subtraction. In this way it is always possible a position by recovering the eventual error of the previous positioning. As a consequence, it is always possible to check the real position of the axis avoiding thus to accumulate the errors due to the mechanics.



## PRESET SEARCH

### **"Mode 0" - Loading of the level of preset with the use of the input of enabling impulse of zero.**

The command of loading of the level of preset is supplied only from the input of enabling impulse of zero. Once you started the procedure of search of preset, the axis goes towards the sensor connected to the input of enabling the impulse of zero; when, in its stroke, the axis activates this input, it inverts the direction by slowing down.

Upon the disactivation of the input of enabling impulse of zero it is loaded the level of preset on the count of the instrument.

With this procedure the condition for the loading of the level of preset is that the input of enabling has been activated and then deactivated.

### **"Mode1" - Loading of the level of preset with the use of the zero impulse and of the input of enabling impulse of zero with inversion.**

The command of loading of the level of preset is supplied by the zero impulse of the transducer. Since an encoder supplies an impulse of zero to each revolution, it is necessary to understand in which zone of the axis you must get the impulse of zero; to this purpose it is used the input of enabling impulse of zero.

Once you started the procedure of search of preset, the axis goes towards the sensor connected to the input of enabling the impulse of zero; when, in its stroke, the axis activates this input, it inverts the direction by slowing down.

Upon the disactivation of the input of enabling the instrument is ready to get the impulse of zero; at the first impulse of zero supplied by the transducer it is loaded the level of preset on the count of the instrument.

With this procedure the condition for the loading of the level of preset is that the input of enabling has been activated and then deactivated and that an impulse of zero is acquired.

### **"Mode 2" - Loading of the level of preset with the use of the impulse of zero and of the input of enabling impulse of zero with no inversion.**

The command of loading of the level of preset is supplied by the zero impulse of the transducer. Since an encoder supplies an impulse of zero to each revolution, it is necessary to understand in which zone of the axis you must get the impulse of zero; to this purpose it is used the input of enabling impulse of zero.

Once you started the procedure of search of preset, the axis goes towards the sensor connected to the input of enabling the impulse of zero; when, in its stroke, the axis activates this input, it inverts the direction by slowing down.

The instrument is ready to get the impulse of zero: at the first impulse of zero supplied by the transducer it is loaded the level of preset on the count of the instrument.

With this procedure the condition for the loading of the level of preset is that the input of enabling is activated and an impulse of zero is acquired. To avoid error it is necessary that the space of activation of the input of enabling is smaller than the space run by the axis with an encoder revolution. If this is not the case, the zero impulse may be acquired in two different points.

### **"Mode 3" - Loading the level of preset from input.**

With this procedure the search of preset is not enabled. The command of loading of the level of preset is supplied by the activation of the input I6.

## CHAPTER 5

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# ASSISTANCE

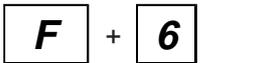
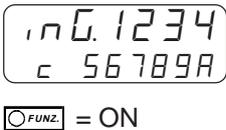
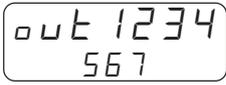
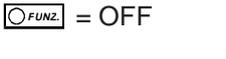
*Diagnostics of inputs and outputs*

*Instructions to fill up the fax of technical assistance*

*Guarantee*

### 5 - 1 DIAGNOSTIC OF INPUTS AND OUTPUTS

The instrument offers a diagnostic of the logic status of digital inputs and of the outputs; according to the numbers which are displayed, it is possible to understand if an input arrives to the instrument and if an output has been energised. The first displaying after the access to the function of diagnostic is related to the status of the inputs; if it is displayed the number 1, it means that the input 1 has been activated; if it is displayed the number 2, it means that the input 2 has been activated and so on. The input Z (impulse of zero of the transducer) is signalled with a C; if it is displayed, the impulse of zero is not present; if it is not displayed, the impulse of zero is supplied to the instrument. The following displaying is related to the logic status of the digital outputs. The same is valid for the correspondance (to an equal number corresponds the same output); the presence, for example, of the number 4 indicates that the instrument is energising the output 4.

Description	Keyboard	Displaying
Access to the function of diagnostic. It is displayed the status of the inputs ( <i>in</i> ).		
Pressing the key <b>ENTER</b> you toggle to the displaying of the status of the outputs ( <i>out</i> ).		
To exit the function of program choice, press the key <b>F</b> .		

### 5 - 2 INSTRUCTIONS TO FILL UP THE FAX OF TECHNICAL ASSISTANCE

*In order to be able to supply a quick, skilled and quality service, we need your help. If you need QEM's assistance to face eventual technical problems found in your applications, even though you performed all instructions supplied in the manual of "Set-up, maintenance and assistance", the problem continues, please fill up completely the fax form enclosed to the manual of Set-up, maintenance and assistance, and send it to QEM's Assistance Department. In this way you may allow our technicians to get all necessary information to better understand your problem (avoiding thus long and expensive telephone calls). Feeling sure about your availability and co-operation, QEM wishes you a very good job.*

**REMARK**

*If you must send an instrument to be repaired, please carefully follow the instructions shown in the following items.*

- If possible, please use the original package; in each case the package must protect the instrument against shocks which may occur during transport.
- Insert inside the package an exact description of the malfunction which you found and the part of wiring diagram which includes the instrument. In case the problem you found concerns data storage, also enclose the programming of the instrument (set-up, levels of work, auxiliary parameters...).
- If you need it, please state the request for a quotation for the repairing; if you do not require it, the cost shall be calculated as a whole.
- Our technicians shall give priority to the repairing of instruments which have been sent under the observance of the items listed in this note.

### 5 - 3 GUARANTEE

The guarantee is conform to the statements of the general conditions of sale.