

User Manual

Supplement to "Installation, maintenance and servicing manual"



*Quality in Electronic
Manufacturing*



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CHAPTER 1

INTRODUCTION

Supplementary nature of manual

References

Responsibility and validity

Description of operation

1 - 1 SUPPLEMENTARY NATURE OF MANUAL

This manual is to be considered as a supplement to the "Installation, maintenance and servicing manual" which contains information on wiring, checking and eliminating faults, start-up and maintenance procedures. This manual gives instructions on the use and correct programming of the instrument.

You are urged, therefore, to read the manual carefully and, if you have any queries, to contact QEM for further explanations by sending the assistance fax contained in the manual.

1 - 2 REFERENCES

The documentation relative to the instruments designed and sold by QEM has been divided into different booklets for effective and speedy consultation, according to the type of information required.

<i>User manual</i>	<i>Hardware structure</i>	<i>Installation, maintenance and servicing manual</i>
<p><i>Explanation of software.</i></p> <p>This manual gives all the necessary information for the understanding and use of the instrument described. The manual deals with the instrument software; it gives information on the understanding, programming, calibration and use of the instrument described.</p> <p>Once the instrument is installed following the indications given in the Installation, maintenance and servicing manual, this user manual gives all the necessary information for the correct use and programming of the instrument.</p>	<p><i>Basic information on the standard hardware in the series plus customisation possibilities.</i></p> <p>This booklet is enclosed with the user manual and describes the hardware configuration for the series of instruments described. It also gives the standard electrical, technical and mechanical specifications for the series, together with the possibilities of hardware customisation in relation to the different software versions.</p>	<p><i>All the necessary information for installation, maintenance and assistance.</i></p> <p>In-depth explanations of all essential details for correct installation and maintenance.</p> <p>The aim is to provide you with valid and accurate information for the manufacture of products of recognised quality and reliability. It is also a valid support for whoever needs technical assistance concerning a machine that includes a QEM instrument.</p>

1 - 3 RESPONSIBILITY AND VALIDITY

RESPONSIBILITY

QEM declines all responsibility for any injury to persons or damage to things resulting from the failure to observe the instructions and rules in this manual and the "Installation, maintenance and servicing manual". It is furthermore specified that the customer/purchaser is bound to use the instrument according to the instructions provided by QEM and, if any doubts arise, to send a written query to QEM. Any authorisation for exceptions or substitutions, if contested, will be deemed valid by QEM only if written consent has been given by QEM.

The reproduction or the transfer of all or part of this manual to third parties is forbidden without QEM's written consent. Any transgression will result in a claim for compensation for the damages sustained. All rights deriving from patent or designs are reserved.

QEM reserves the right to make partial or complete modifications to the characteristics of the instrument described and the corresponding documentation.

Objective

The objective of this manual is to give the general rules for the use of the instrument described.

Recommendation

Write down all the instrument setting and programming parameters, keeping them in a safe place to facilitate any future replacement or servicing operations.

VALIDITY

This manual is applicable to all instruments designed, manufactured and tested by QEM with the same order code. This document is valid in its entirety, save errors or omissions.

<i>Instrument release</i>	<i>Manual release</i>	<i>Modifications to manual</i>	<i>Date of modifications</i>
0	0	New manual	21 / 03/ 00
5	0	Transparent modification at the user	01 / 06 / 11

1 - 4 DESCRIPTION OF OPERATION

The instrument HB 548.49 is an ON / OFF positioner, working with positive and negative measurements, with the possibility of setting the type of positioning (absolute or incremental). The operator can set the memory in groups of steps (max. 255) to determine the number of programs available. Each step can be associated to a totaliser (when enabled) that can be configured as a piece counter or a repeat counter for the quota in use. Restart, count zero reset, step increase, can all be configured so that their functions are automatic or governed by the inputs. It is provided with a series of manual functions (entry of a value in the count, manual movements, etc...) to facilitate the calibration stages and to allow the operator to act on the positioning system. It is also provided with a function that allows movements at delta (Δ) quota, useful for example in governing a saw, to move the mobile jig locators during the cut. The serial port allows to write and read the instrument's parameters from a PC.



CHAPTER 2

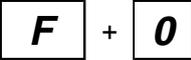
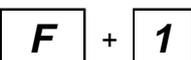
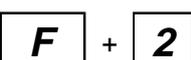
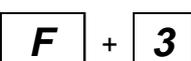
OPERATOR / MACHINE INTERFACE

Description of keyboard

Description of inputs

Description of outputs

2 - 1 DESCRIPTION OF KEYBOARD

Key	Function
	<p>Normal operation: pressed after the "F" key, they select the functions available. They allow direct access to the entry of an immediate quota. Data input: enables entry of data.</p>
	<p>Normal operation: selects cycle displays. Impulse pressure selects the successive display. Continuous pressure selects the previous display. Data input: scrolls the various parameters. Impulse pressure selects the successive display. Continuous pressure selects the previous display.</p>
	<p>Normal operation: allows access to writing of work programs. Data input: inserts or removes the +/- sign.</p>
	<p>Normal operation: if no positioning is in course, allows access to the manual functions: manual movements, preset quota search and entry of a value in the count. Data input: inserts the decimal point.</p>
	<p>Normal operation: if no positioning is in course, allows selection of available functions. Interrupts positionings at the immediate quotas. Data input: enables the selection of available functions and also allows exit from functions selected with "F" + "Numerical key". When inserting the work program, it introduces the end of program.</p>
	<p>Normal operation: stops any positioning in course except for immediate quotas. Data input: cancels the value entered and restores the old value.</p>
	<p>Normal operation: when enabled in set-up it commands start at the quota being executed. Data input: memorises the data introduced.</p>
	<p>Lights when positioning on Δ quota or "0". Disactivated when within tolerance.</p>
	<p>Lights during count inversion.</p>
	<p>Lights when the "MENU" key is pressed.</p>
	<p>Lights when the "MAN" key is pressed.</p>
	<p>Lights when the "F" key is pressed.</p>
	<p>Access to functions protected by password.</p>
	<p>Choice of program to be executed.</p>
	<p>Choice of step to be executed.</p>
	<p>Introduction of blade thickness.</p>



<i>Key</i>	<i>Function</i>
F + 4	Introduction of $\Delta I9$.
F + 5	Modification of preset quota.
F + 6	Input and output diagnostics.

2 - 2 DESCRIPTION OF INPUTS

Input Characteristics

Refer to the chapter entitled "Electrical Characteristics" in the "Hardware structure" booklet enclosed with this manual.

				<i>Name</i>	<i>Operating logic</i>	<i>Activation mode</i>	<i>Polarizer</i>
				I1	ON	I / C	P1
				I2	ON	I	P1
				I3	ON	I / C	P1
				I4	ON	I	P1
				I5	ON	I	P1
				I6	ON	I / C	P1
				<i>Description</i>			
I1	ON	I / C	P1	<p>Enable zero impulse / count inversion. Enabled when "tP" set-up parameter is set on "0" and enables the reading of the transducer zero impulse when loading the preset quota on the count. Its functions are defined by the type of "Preset search" set in set-up. Enabled with "tP" set-up parameter on "1" or "2" as countinversion, it inverts the direction of the incremental encoder count.</p>			
I2	ON	I	P1	<p>Start. Commands positioning at the selected quota. If positioning is interrupted by a stop (I3 = ON), or by switching off the instrument, activation of input I2 will restore positioning to where it was interrupted. N.B. In incremental positionings with zero reset and the "IL" set-up parameter set on "0" (repeat counter increase governed by input I4), the count will not be reset to zero on starting unless the previously ended repetition is counted (I4 = ON impulsive).</p>			
I3	ON	I / C	P1	<p>Stop. If, during positioning, a stop is activated, the axis stops and the movement and tolerance outputs are deactivated. To terminate the interrupted movement, a start must be given (I2).</p>			
I4	ON	I	P1	<p>Totaliser increase. When activated, it increases the totaliser count by one unit (count of operations performed). It is enabled with the "At" set-up parameter set on "1" and the "IC" parameter set on "0".</p>			
I5	ON	I	P1	<p>Totaliser zero reset. When activated, the totaliser (count of operations performed) is reset to zero. The zero refers only to the number of operations performed (and therefore counted) in the current step. It is enabled when the "At" set-up parameter is set on "1".</p>			
I6	ON	I / C	P1	<p>Restart. Aborts the current program and returns to the first step of the program. Reading is enabled when positioning is not in course. During manual procedures, entry is not enabled. If in set-up the parameter "Ar" is set on "1", the count will be reset to zero for every restart. If in set-up the parameter "LD" is set on "1" it will reset the totaliser to zero.</p>			

Key

C = Continuous signal

I = Impulse signal

Name

	<i>Description</i>
Vac	Instrument supply voltage. Alternating voltage as per code in your order.
Vac	Instrument supply voltage. Alternating voltage as per code in your order.
GND	Ground connection. Recommended a conductor of Ø 4 mm.
+	Transducers positive power supply. Positive voltage supplied by instrument for instrument and transducers inputs power.
-	Transducers negative power supply. Negative voltage supplied by instrument for instrument and transducers outputs power.

COUNT INPUTS

Name **Operating logic** **Polarizer**

			<i>Description</i>
PHA	N / P	PE	Input "phase A" bi-directional incremental transducer.
PHB	N / P	PE	Input "phase B" bi-directional incremental transducer.
Z	N / P	PE	Incremental transducer "zero impulse" input. If the set-up parameter "tP" is set on "0" input Z is interrupted (immediate acquisition). If set-up parameter " tP " is set on "1" input Z as a minimum acquisition time of 50 milliseconds. For details of the count inputs, refer to the chapter "Electrical characteristics" in the "Hardware structure" booklet enclosed with this manual.

Legenda

N= Transducer with NPN logic.

P= Transducer with PNP logic.

Characteristics of input expansion (option E)

Refer to the chapter "Electrical Characteristics" in the "Hardware structure" booklet enclosed with this manual.

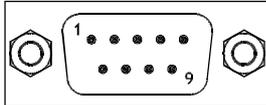
				<i>Name</i>	<i>Operating logic</i>	<i>Activation mode</i>	<i>Polarizer</i>
Descrizione							
17	ON	I	P2	Step increase. If the instrument is not performing a positioning operation, it increases the current step. It is enabled when the set-up parameter " <i>IP</i> " is set on "0".			
18	ON	I	P2	Preset search. Commands the preset search procedure (see relative paragraph). Reading is enabled when the set-up parameter " <i>LP</i> " is set on "0" and if the instrument is not performing a positioning operation.			
19	ON	I	P2	$\Delta I9$ / Zero quota. When the input is activated and the set-up parameter " <i>FD</i> " is set on "0" poitioning is commanded at the zero quota (if the minimum quota is greater than zero, the axis positions itself on the minimum quota). With the set-up parameter " <i>FD</i> " \neq "0" positioning is commanded at the quota: "quota in execution" + " <i>FD</i> ". If the start is activated during movement, the axis returns to the quota in execution. When the axis enters within tolerance of the zero quota or the quota: (quota in execution + " <i>FD</i> "), the tolerance output is activated (U10).			

Key

I = Impulse signal

Characteristics of serial port RS 232C

Refer to the chapter "Electrical Characteristics" in the "Hardware structure" booklet enclosed with this manual.

		<i>Name</i>
Description		
RX	Reception input.	
TX	Transmission output	
GND	Common serial connection.	
		9 pin connector for serial communication.

2 - 3 OUTPUTS

Characteristics of outputs

Refer to the chapter "Electrical characteristics" in the "Hardware structure" booklet enclosed with this manual.

				<i>Name</i>	<i>Operating logic</i>	<i>Polarizer</i>	<i>Activation mode</i>		
				U1	ON	C1	C	Forward. When this output is energised it commands the forward movement of the axis (the count displayed by the instrument increases).	
				U2	ON	C1	C	Back. When this output is energised it commands the backward movement of the axis (the count displayed by the instrument decreases).	
				U3	ON	C1	C	Slow down. This output reduces the axis speed in proximity of the arrival point. Its energisation depends on how the set-up parameter "Slow down" is programmed.	
				U4	ON	C1	P	Tolerance. Signals that positioning has been terminated correctly and therefore within the limits set with parameters "Positive tolerance" and "Negative tolerance". Its activation can be delayed by setting parameter " LR " in inertia calibration. The tolerance output is de-activated at the stop, when switching to manual or selecting the functions "F + 1" e "F + 2".	
				U5	ON	C1	C	End of program/brake release. If configured in set-up as end of program, it is activated at the end of the work cycle and de-activated when restarting from an input (minimum 300 milliseconds). If configured as brake enabling, it is activated 70 milliseconds before activation of the forward or back outputs, and is de-activated during the band of inertia.	

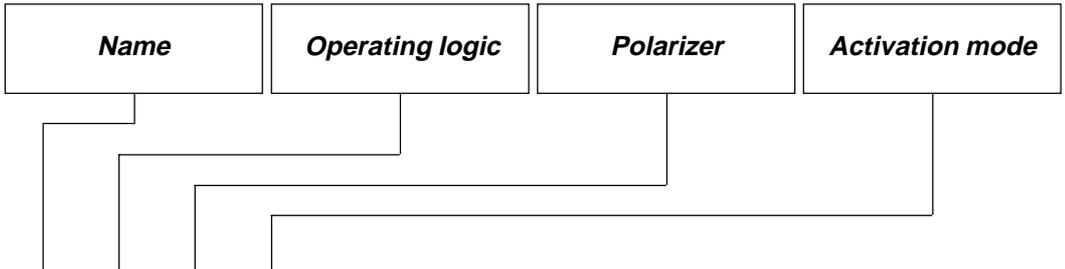
Key

C = Continuous signal.

P = Programmable in set-up.

Characteristics of output expansion (option E)

Refer to the chapter "Electrical characteristics" in the "Hardware structure" booklet enclosed with this manual.



				<i>Description</i>
U6	ON	C2	P	Step end. Activated when the totalizer reaches the set value. If the totalizer is excluded, it is energised at the same time as the tolerance output. De-energised at a step increase (automatic or from input) or when restarting from an input. If the step increase is automatic, it is energised for 300 milliseconds.
U7	ON	C2	C	Preset search OK. Enabled only with absolute positioning. If the preset search is terminated correctly (power factor correction for the axis position with the count displayed by the instrument), the instrument energises this output. It is de-energised every time the instrument is restarted.
U8	ON	C2	P	End of program. This output is energised to signal that the current program has been completed and therefore all the programmed operations are complete. If more than one cycle has been implemented (repetition of the program), it is energised at the conclusion of the set cycles. It is de-energised when restarting from an input.
U9	ON	C2	C	Manual. Signals that manual functions have been selected for the instrument. (ON=Manual functions, OFF=Automatic functions).
U10	ON	C2	P	Tolerance I9. Activated as for output U4 when positioning is commanded at zero or "quota + Δ".

Key

C= Continuous signal.

P= Programmable in set-up.



CHAPTER 3

SETTING UP FOR OPERATION

Set-up

Calibration

3 - 1 SET-UP

Since these parameters set the instrument's operating mode, access is restricted to the installer only; a password must be entered for programming operations as follows:

Description	Keyboard	Display
Stop the instrument (I3 = ON) before access to the set-up programming.	F + 0	
Introduce the access code "548" and confirm with ENTER .	5 4 8 ←	<input type="checkbox"/> FUNZ. = ON
Exit is possible at any time after introducing the password by pressing the F key.	F	

FUNCTION	DISPLAY	DESCRIPTION
Display method		<p>0 = Normal display.</p> <p>1 = Display with HDR system (High definition reading).</p> <p>N.B. Refer to the "Installation, maintenance and servicing manual".</p>
Enable the forcing of count visualization		<p>0 = Forcing of count visualization disabled.</p> <p>1 = The count visualization is forced to the value of the actual quota, when the count of the axis is at +/- 1 bit from the quota in execution (function CALPPM).</p> <p>2 = The count visualization is forced to the quota in execution, when the count of the axis is in the tolerance range.</p>
Decimal figures		<p>Specifies the number of figures after the decimal point (max. 3), with which to display the count (axis position).</p> <p>N.B. Introduction of decimal figures influences the DISPLAY of the count; precision in positioning depends on the number of impulses supplied by the transducer.</p>
Encoder resolution		<p>This parameter indicates by how much the encoder revolution impulses must be multiplied to display the lengths in the required unit of measurement. Values can be introduced from 0.00200 to 4.00000 bearing in mind that the frequency of the PH phases must not exceed the instrument's maximum count frequency.</p> <p>N.B. Refer to the "Installation, maintenance and servicing manual".</p>

FUNCTION	DISPLAY	DESCRIPTION
Slow down Max. 9999		This parameter establishes the distance from the positioning quota at which the axis must slow down to facilitate the stop. The speed change point (energising of the slow down output) is given by: "positioning quota" - "slow down". If the values introduced are too small the precision of positioning may be comprised. N.B. Refer to the "Installation, maintenance and servicing manual".
Negative tolerance Max. 999.9		The limit of negative tolerance allowed in positioning the axis. The tolerance range is therefore defined by this parameter and the "Positive tolerance". This parameter always has one decimal figure more than programmed in the "Decimal figures" parameter to allow QPS functions (QEM POSITIONING SYSTEM). N.B. Refer to the "Installation, maintenance and servicing manual".
Positive tolerance Max. 999.9		The limit of positive tolerance allowed in positioning the axis. The tolerance range is therefore defined by this parameter and the "Negative tolerance". This parameter always has one decimal figure more than programmed in the "Decimal figures" parameter to allow QPS functions (QEM POSITIONING SYSTEM). N.B. Refer to the "Installation, maintenance and servicing manual".
Minimum time for activation of outputs U4, U6, U8, U10 Min. 50 msec.		The minimum time, expressed in milliseconds, for activating outputs U4, U6, U8, U10.
Slow down time Max. 9.99		In some configurations for the connection of remote switched commanding the motor, the simultaneous energisation of remote operations and slow down switches can cause short circuiting. Introduction of this time governs the alternate energisation of the remote switches: de-energisation of the remote operations switch, energisation of the slow down switch, re-energisation of the operations switch; all within the set time. During this time, the axis must not enter the tolerance range due to inertia.
Function of the ENTER key		0 = During the choice of the step to be performed, the ENTER key confirms the chosen step without starting the axis. 1 = During the choice of the step to be performed, the ENTER key commands positioning on the chosen step (if input I3 = OFF).

This display appears when the parameter "ENTER key functions" is set on 1

Check time for ENTER key Max. 9.99		The time, expressed in seconds, for activating the ENTER key to execute the step selected.
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FUNCTION	DISPLAY	DESCRIPTION
Delay time for start activation Max. 9.99		This parameter allows the setting of a delay time for starting the axis after giving the start command; the tolerance output or brake command are de-energised/energised when the start command is given. Useful in applications when another operation must be terminated before the axis start (re-entry of a mechanical stop commanded by the tolerance output...).
Maximum quota Max. 999999		The maximum quota reachable by the axis; the value set is to be considered also the maximum limit for introducing the work quotas. When positioning with the recovery of reverse play, the maximum set quota must allow for an increase by the value of "overquota + inertia". With set-up parameter "LP" set on "1" the maximum quota is forced to 999999.
Minimum quota Min. -99999		The minimum quota reachable by the axis; the value set is to be considered also the minimum limit for introducing the work quotas. When positioning with the recovery of forward play, the minimum set quota must allow for an increase by the value of "overquota + inertia". With set-up parameter "LP" set on "1" the minimum quota is forced to -99999.
Functions of output U5		<p>0 = Output U5 signals the end of the program.</p> <p>1 = Output U5 becomes a motor brake release; it is activated 70 milliseconds before the forward and back outputs and is de-activated during the phase of inertia.</p> <p>2 = Output U5 becomes a motor brake block; it is de-activated 70 milliseconds before the forward and back outputs and is activated during the phase of inertia.</p>
This display appears when the parameter "Functions of output U5" is setted to 1 or 2		
Advance time for brake lock / unlock respect to start command		It is the time in advance for the disabling of brake lock output with "Functions of output U5" = 1, respect to start command. It is the time in advance for the activation of brake unlock output with "Functions of output U5" = 2, respect to start command. Maximum value is 9.99 seconds.
Choice of play recovery		<p>0 = Positioning without play recovery.</p> <p>1 = Positioning with forward play recovery.</p> <p>2 = Positioning with back play recovery.</p> <p>N.B. Refer to the "Installation, maintenance and servicing manual".</p>

FUNCTION	DISPLAY	DESCRIPTION
Overquota for play recovery, Δ minimum positioning Min. 0.1 Max. 9999		During forward play recovery the axis positions on: (set quota-overquota-inertia) and, after inversion time, positions on the set quota. During back play recovery the axis first positions on: (set quota +overquota+inertia) and, after inversion time, positions on the set quota. If there is no play recovery or if positioning does not require play recovery, and the space to be covered is less than the overquota, the instrument performs positioning with play recovery. N.B. The real quota for play recovery is calculated by summing the overquota "0A" and the inertia. If the value 0 is introduced, the instrument does not carry out the Δ minimum positioning. Refer to the "Installation, maintenance and servicing manual".
Inversion time Max. 9.99		To avoid any mechanical stress due to inversions that are too rapid in the axis' direction of movement, a delay time, expressed in seconds, can be inserted for inversion. This parameter has an influence on functions only when positioning with play recovery. N.B. Refer to the "Installation, maintenance and servicing manual".
Enabling of Δ I9		0 = The quota for Δ I9 can be introduced only solo in set-up. 1 = The quota for Δ I9 can be introduced only with the function "F + 4".

This display appears when the parameter "Enable Δ I9" is set on 0

Quota for Δ I9		If the value "0" is set by activating input I9, the axis positions on quota zero. If a value other than zero is set by activating input I9 the axis positions on the quota: "Quota selected + F0". When input I9 is de-activated, and the axis is restarted it returns to the selected quota. N.B. Δ with "F0" \neq 0 is enabled in absolute positioning. The Δ I9 quota must be set above the overquota for play recovery.
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Enable blade thickness		When wishing to compensate the thickness of material removed by the cut, it is necessary to enable the introduction of the blade thickness. In this case, to set the blade thickness, press keys "F+3" during normal instrument functions. 0 = Blade thickness not enabled. 1 = Blade thickness enabled.
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FUNCTION	DISPLAY	DESCRIPTION
Enable totaliser		<p>0 = the totaliser (count of operations performed) is not enabled. 1 = the totaliser (count of operations performed) is enabled.</p>
<p>These displays appera if the parameter "Enable totaliser" is set on 1</p>		
Totaliser increase side		<p>0 = the totaliser (count of operations performed) is increased on the descent side. 1 = the totaliser (count of operations performed) is increased on the ascent side.</p>
Totaliser zero reset		<p>0 = the totaliser (count of operations performed) is reset to zero when input I5 is activated. 1 = the totaliser (count of operations performed) is reset to zero when input I5 is activated and when restarting.</p>
Step increase		<p>Step increase allows execution of the operations programmed in the current and successive steps. Step increase can be governed by a signal from outside the instrument (operator, PLC, ...) or from the instrument itself; in this case the step increase is governed exclusively for the step in use.</p> <p>0 = Step increase is governed by input I7. 1 = Step increase is governed automatically by the instrument. In this case, after execution of the last programmed step, on restart the totaliser is always reset to zero independently of the parameter "E0".</p> <p>N.B. With automatic step increase, restart has to be activated twice to execute the first step of the program.</p>
Memory configuration Min. 3 Max. 255		<p>Determines the number of steps making up a program. Altogether 255 steps are available; dividing therefore the number of available steps by the introduced value (number of steps per program), we obtain the number of programs that can be used.</p> <p>Example:</p> <p>Cn = 10 N° of programs = 255 / 10 = 25</p> <p>The steps remaining after division are added to the last program which in this case will have the dimension of 15 steps.</p> <p>N.B. Each time the "Memory configuration" is altered, the data introduced must be rewritten.</p>

FUNCTION	DISPLAY	DESCRIPTION
Choice of type of positioning		<p>0=Absolute positioning. the totaliser, when enabled, is configured as piece counter and input I1 has the function of enabling the zero impulse.</p> <p>1=Incremental positioning. The totaliser, when enabled, is configured as piece counter or quota repeat counter. Input Z has the function of preset loader and can be used to reset or subtract the count while input I7 becomes count reverse (the minimum and maximum counts are forced respectively to "-99999" e "999999").</p> <p>2=Incremental positioning with count zero reset. The totaliser, when enabled, is configured as a quota repeat counter. Input Z has the function of preset loader and can be used to reset or subtract the count (parameter "CR" set on "0"). Input I1 becomes count reverse and the automatic re-calculation of inertia is not enabled.</p> <p>3=Incremental/absolute positioning. The totaliser, if enabled, is configured as quota repeat counter. Input I1 has the function of enabling the zero impulse.</p>

These displays appear if the parameter "Choice of type of positioning" is set on 0

Preset loading		<p>Preset search procedure is carried out:</p> <p>0=Loading the preset quota on the count when input I1 is de-activated.</p> <p>1=Loading the preset quota on the count when input Z is activated after the axis has inverted its direction and input I1 has been de-activated (sensitive to the descent side).</p> <p>2=Loading the preset quota on the count when input Z is activated after input I1 = ON (impulse).</p> <p>3=The preset quota search procedure is not enabled. When input I1 is activated, the preset quota is loaded on the count. Its reading is inhibited at the end of the program.</p> <p>N.B. See relative paragraph. Refer to the "Installation, maintenance and servicing manual".</p>
Preset quota		<p>During the preset search procedure, the quota is loaded on the count with the transducer zero impulse (according to the modality defined by the type of preset search). Any preset quota can be introduced between the maximum and minimum quotas.</p>

FUNCTION	DISPLAY	DESCRIPTION
Zero impulse logic state		If the encoder generates the zero impulse by activating input Z (PNP) it must be set on "0", otherwise if it generates the zero impulse by de-activating input Z (NPN) it is set on "1". If this parameter is programmed correctly, the input diagnostics will show the letter "E" when there is no zero impulse.

This visualization appears if the parameter "Choice of type of positioning" is set to 3 and the parameter "Enable totaliser" is set to 1

Increment of quota repetitions		<p>0 = Repetitions of the quota in execution are incremented by input I4.</p> <p>1 = Repetitions of the quota in execution are automatically incremented when the tolerance is activated after a positioning.</p>
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All following displays appear if the parameter "Choice of type of positioning" is set on 1 or 2

This display appears if the parameter "Choice of type of positioning" is set on 1 and the parameter "Totaliser functions" is set on 1

Totaliser functions		<p>0 = The totaliser (count of operations performed) is governed as an incrementable piece counter by input I4. When the axis reaches the set quota it remains in that position until all the set operations have been performed.</p> <p>1 = The totaliser (count of operations performed) is governed as an incrementable piece counter by input I4. An operation therefore consists of positioning at the set quota; the axis repeats positioning until all set operations have been carried out.</p>
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This display appears if the parameter "Choice of type of positioning" is set on 1 or 2 and the parameter "Totaliser functions" is set on 1

Repeat counter increment		<p>0 = The repeat count is incremented by input I4.</p> <p>1 = The repeat count is incremented automatically when activating the tolerance after positioning.</p>
--------------------------	---	---

FUNCTION	DISPLAY	DESCRIPTION
Type of count zero reset		<p>0 = The count is reset to zero.</p> <p>1 = The count is updated to the preset quota.</p> <p>2 = The count is reset to zero by subtracting the count value obtained when reaching the positioning quota performed (used to not lose the absolute position in angular movements).</p> <p>Example:</p> <p>Set-point = 360 Count = 359; after count zero reset = -1</p> <p>N.B. With parameter "tP" set on "1" the count zero reset can be obtained only by activating input Z (if input I1 = ON).</p>

This display appears when the parameter "Type of count zero reset" is set on 1

Preset quota		<p>This is the quota loaded on the count if input Z is activated or an automatic zero reset command is given. A preset quota can be introduced between the maximum and minimum quotas.</p>
--------------	---	--

These displays appear if the parameter "Choice of type of positioning" is set on 2

Zero reset command		<p>0 = Activation of input Z (input for the transducer zero impulse) commands the count zero reset (display of axis position).</p> <p>1 = The count zero reset (display of axis position) occurs with each start (start of positioning) after the end of positioning.</p> <p>N.B. If the parameter "tP" is set on "2", the parameter "tC" on "2" and "tA" on "1", when input I2 is activated the count is reset to zero without subtraction and the successive start will not perform the subtraction.</p>
Count zero reset when restarting		<p>0 = When restarting the count is not reset to zero.</p> <p>1 = When restarting the count is reset to zero according to the modality set in parameter "tC" (type of count zero reset). If "tC" is set on "2" the count is reset to zero without subtraction.</p>

This display appears for every kind of positioning

Enable serial port RS 232C		<p>0 = Serial port RS 232C is disabled</p> <p>1 = Serial port RS 232C is enabled</p>
----------------------------	---	--

FUNCTION	DISPLAY	DESCRIPTION
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This display appears if the parameter "Enable serial port RS 232C" is set to 1

Transmission speed RS 232C		110 baud 150 baud 300 baud 600 baud 1200 baud 2400 baud 4800 baud 9600 baud <p>Available transmission speed; if speed is written wrong, the default value (9600) will be selected.</p>
Number of bits		7 bits Number of bits for each data; if number is wrong, the default value (8) will be selected. 8 bits
Number of stop bits		1 bit of stop Number of stop bits; if number is wrong, the default value (2) will be selected. 2 bit of stop
Parity bit		0 = No parity. 1 = Odd parity. 2 = Even parity. Default value "0".
Address code		When connecting more instruments in Daisy-Chain configuration, it is necessary to assign to each instrument an identifier code. In case of a Master transmission with code "00", the string sent is received from all the instruments.
Enable chksum		0 = Data chksum is not enabled. Before sending a character, the instrument waits for the echo for the preceding character from the PC. 1 = Data chksum is enabled. It is calculated the XOR of data sent.

This display appears if the parameter "Enable chksum" is set to 1

Transmission delay		It is the delay, in milliseconds, from the transmission of one character and the following.
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Enable writing of set-up parameters from serial port		0 = The set-up parameters are enabled for reading only from the serial port 1 = The set-up parameters are enabled for reading and writing from the serial port.
--	---	--

After programming the last function, the display of the first set-up parameter is given again.

3 - 2 CALIBRATIONS

INTRODUCTION OF A SINGLE FIXED INERTIA VALUE FOR ALL POSITIONINGS.

A) The instrument must be in stop position. ➔ Activate the stop input (I3 = ON continuous)

B) Introduce access code "123" ➔ Enter sequence **F** + **0**

The instrument displays:  ➔ Introduce code 123 from keyboard and confirm with key 

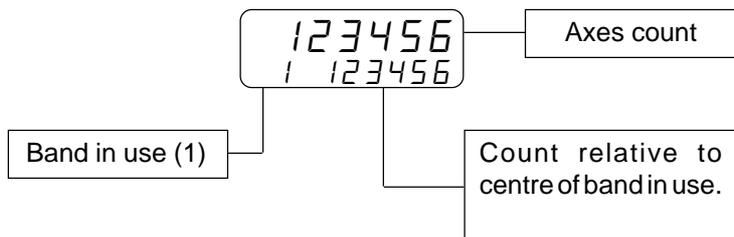
E) After confirming code 123, the instrument will display: ➔ From keyboard introduce value "0" (excluding the eight bands) and confirm with key 

 Inserting "0" the axis will be considered a single band; inserting "1", the axis is divided into eight equal bands.

F) After confirming value "0", the instrument displays: ➔ From the keyboard introduce value "0" (re-calculation excluded) and confirm with key 

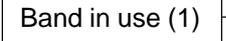
 Inserting "0" re-calculation is disabled; inserting "1", re-calculation is enabled.

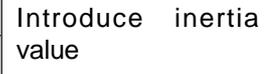
G) After confirming value "0", the instrument displays: ➔ Press key 



H) The instrument will display: ➔ At this point the operator can introduce the inertia value using the numerical keys and confirm with key 

 Inertia value currently in use

 Band in use (1)

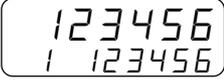
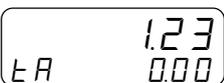
 Introduce inertia value

N) After confirming the introduced value, the instrument displays: ➔ Set the delay time for tolerance activation. To return to normal displays confirm with 

 This display is relative to the setting of the "tolerance activation delay time".

AUTOMATIC RE-CALCULATION OF A SINGLE INERTIA VALID FOR ALL POSITIONINGS

- As before the "TA" parameter must be set (tolerance activation delay time).
- To obtain the display relative to "TA" follow the scheme below (A÷G).

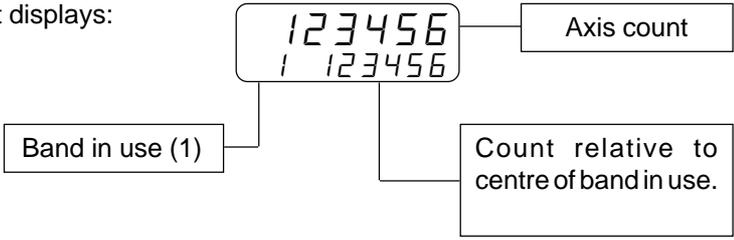
- A)** The instrument must be in stop position. ➔ Activate the stop input (I3 = ON continuous)
- B)** Introduce the access code "123" ➔ Enter the sequence
- The instrument displays:  ➔ From the keyboard enter code 123 and confirm with key 
- C)** The instrument displays:  ➔ Enter value "0" and confirm with key 
- D)** The instrument displays:  ➔ Enter value "0" and confirm with key 
- E)** The instrument displays:  ➔ Press key 
- F)** The instrument displays:  ➔ Enter value "0" and confirm with key 
- G)** The instrument displays:  ➔ Set the tolerance activation delay time and confirm with key  to return to normal displays.

- Once the "TA" parameter is set, proceed with the automatic inertia calculation.

H) Return to the function of automatic inertia calculation by inserting again the access code 123.

- I)** After confirming code 123, the instrument displays:  ➔ From the keyboard introduce value "0" (excluding the eight bands) and confirm with key 
- By inserting "0" the axis is considered a single band; inserting "1", the axis is divided into eight equal bands.

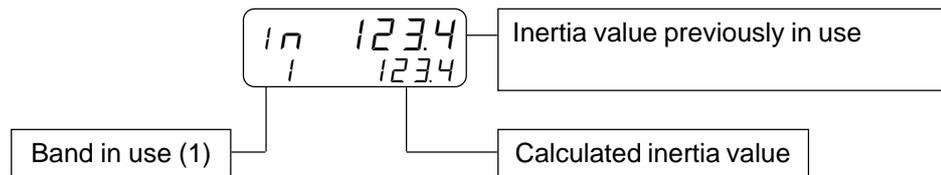
- L)** After confirming the value "0", the instrument displays:  ➔ From the keyboard introduce value "1" (enabled for re-calculation) and confirm with key 
- By inserting "0" re-calculation is disabled; inserting "1", re-calculation is enabled.

- M)** After confirming value "1", the instrument displays: 
- 

Follows on next page.

N) De-activate the stop input (I3=OFF) and press the "ENTER" key. The axis will move until reaching the central point of its stroke. When positioning is terminated and after the time "TA", the instrument will calculate the inertia value applied to axis movement. Press "ENTER" again; the axis will again attempt positioning at the stroke centre, adopting however the inertia calculated in the previous positioning. The axis should conclude positioning within the tolerance range inserted in set-up. If, after various attempts, the axis has never positioned properly, it will be necessary to modify the values for slow-down, tolerance, and tolerance activation delay time.

O) Once the axis is positioned correctly, press the key  and the instrument will display:



P) When the inertia value is confirmed with "ENTER", the instrument displays the tolerance activation delay time (the operator can choose either to confirm or modify this value). When the parameter "TA" is confirmed with "ENTER", the instrument automatically exits the inertia calculation function.

HOW TO ENABLE THE AUTOMATIC RE_CALCULATION OF EIGHT DIFFERENT INERTIAS FOR EIGHT AXIS BANDS.

The following procedure must be observed when calibrating the axis using the re-calculation of the eight bands.

First of all, set the parameter "TA" (tolerance activation delay time).

To obtain the display relative to "TA", follow the steps listed in the next page (A÷H).

- A) The instrument must be in stop position ➔ Activate the stop input (I3 = ON continuous)
- B) Enter the access code "123" ➔ Enter the sequence  + 
- C) The instrument displays:  ➔ From the keyboard enter code 123 and confirm with the key 
- D) The instrument displays:  ➔ Enter value "0" and confirm with key 
- E) The instrument displays:  ➔ Enter value "0" and confirm with key 
- F) The instrument displays:  ➔ Press key 
- G) The instrument displays:  ➔ Enter value "0" and confirm with key 

Follows on next page.

H) The instrument displays:  → Set the tolerance activation delay time; confirm with key  to return to normal displays.

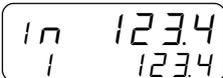
I) Return to the automatic inertia calculation function by entering again the access code 123.

L) After confirming the code 123, the instrument displays:  From the keyboard, enter value "1" (eight bands enabled) and confirm with key . Inserting "0" the axis is considered a single band; inserting "1", the axis is divided into eight equal bands.

M) After confirming value "0", the instrument displays:  From the keyboard, enter value "1" (re-calculation enabled) and confirm with key . Inserting "0" re-calculation is disabled; inserting "1", re-calculation is enabled.

N) After confirming value "1", the instrument will display: . The display shows "123456" (Axis count) and "1 123456" (Count relative to the centre of the band in use). A label "Band in use (1÷8)" points to the "1" in the second line.

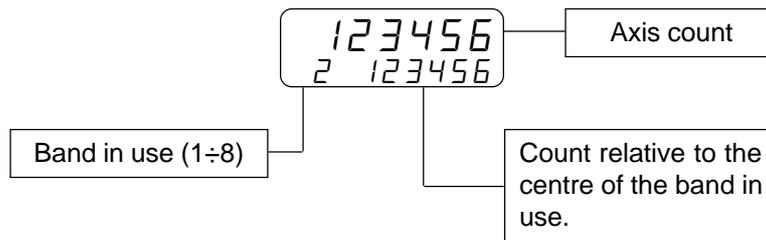
O) De-activate the stop input (I3 = OFF) and press the "ENTER" key. The axis will move until reaching the centre point of the first band. When positioning is concluded and after the time "TA", the instrument calculates the inertia value set for axis movement within the first band. Then press "ENTER" again; the axis will re-attempt positioning at the centre of the first band, using however the inertia calculated during the previous positioning. The axis should conclude its positioning within the range of tolerance inserted in set-up. If, after a few attempts, the axis has never positioned itself correctly, it is necessary to modify the values for slow-down, tolerance and tolerance activation delay time.

P) When the axis positioned correctly, press the key  and the instrument will display: . The display shows "In 123.4" (Inertia value previously in use) and "1 123.4" (Calculated inertia value). A label "Band in use (1÷8)" points to the "1" in the second line.

The operator can modify this (if necessary) or it can be confirmed with key .

Follows on next page.

Q) After confirming with "ENTER" the inertia relative to the first band, the instrument displays:



R) When the "ENTER" key is pressed, the instrument positions the axis to calculate the inertia relative to the second band. Practically, it is necessary to repeat points M, N, O. Inertia is calculated for all eight bands.

S) When the inertia relative to the eighth band is confirmed with "ENTER", the instrument displays the tolerance activation delay time. This "TA" may be different from the time set before starting calibration since the instrument, if necessary, has modified it to supply a more precise calculation of the inertia. When the "TA" parameter is confirmed with "ENTER", the instrument automatically exits the inertia calculation function.



CHAPTER 4

USE

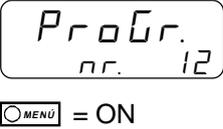
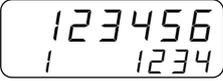
Work programs and auxiliary functions

Operation graphs and tables

4 - 1 WORK PROGRAMS AND AUXILIARY FUNCTIONS

HOW TO ENTER THE WORK PROGRAMS

The work program consists of a certain number of steps, defined with the set-up parameter "Memory configuration". For each step it is possible to set a positioning (preselection) quota and the number of processes to be performed once the set quota is reached (totaliser).

Description	Keyboard	Display
Enter the work program writing.		
Select the program required and confirm with ENTER (the number of the step being programmed is shown in the bottom left of the display).	 ÷  	
The top line gives the positioning quota (flashing). The operator can introduce the quota required and confirm it with the ENTER key.	 ÷  	
When the positioning quota is confirmed, the bottom line will start to flash in the bottom right of the display for the introduction of the totaliser (number of operations to be made at the set quota).	 ÷  	
The operator can introduce the number of operations required and confirm with ENTER .	 	
When the totaliser is confirmed, the instrument requests the introduction of program end; if the operator decides to continue, he must confirm with ENTER .		
The second step of the selected program is then displayed; the operator has the possibility to enter the quota and the totaliser relative to the second step.		
When the totaliser is confirmed, the instrument requests the introduction of program end; if the operator decides to continue, he must confirm with ENTER .		
Otherwise, press the key F to introduce program end, and confirm with ENTER .		
To exit programs writing, press the MENU key. It is possible to exit program introduction at any time; only the values confirmed with ENTER will be memorised.		

CHOICE OF THE WORK PROGRAM TO BE PERFORMED

A certain number of work programs has been defined with the set-up parameter "Memory configuration", each containing a series of steps composed of a positioning quota and the totaliser. To choose the program to be performed, follow the instructions given below:

Description	Keyboard	Display
<p>Enter the program choice function. Any eventual positioning will be interrupted.</p>	<p>F + 1</p>	<p>SCELEA Pr. 01</p>
<p>Type in the number of the program required and confirm with ENTER.</p>	<p>0 ÷ 9 ←</p>	<p><input checked="" type="checkbox"/> FUNZ. = ON</p>
<p>When the program number is confirmed with ENTER, the instrument requests the number of times that the selected program must be repeated before signalling program end (number of cycles). The operator must then introduce the number of program repetitions (1÷999) and confirm with ENTER. If the value 999 is set, the cycle count is disabled and the program is then repeated "infinitely". If the parameter "E" in set-up is set on "0" the program choice function is abandoned and by activating input I2 the selected program is activated as if a restart had been activated. If the parameter "E" is set on "1" and the ENTER key is pressed for less than the time set, the display phase remains and the program is executed by activating input I2; the display returns to showing the displays in use.</p>	<p>0 ÷ 9 ←</p>	<p>n. [1 2 1] 401</p>
<p>N.B. The program end exit (U5) is activated at the conclusion of the set cycles.</p>		
<p>The choice of a program totally aborts the execution of the program previously in use.</p>		
<p>To abandon the function, press key F.</p>	<p>F</p>	<p><input type="checkbox"/> FUNZ. = OFF</p>

CHOICE OF STEP

When the choice is made for the program to be performed, the instrument starts positionings for the first program step. Any step can be selected (of the program in use) so that program operations start from the required step, jumping all the previous steps.

Description	Keyboard	Display
Enter the step choice function.	F + 2	
Type in the number of the step from which to start the program and confirm ENTER .	0 ÷ 9 	<input checked="" type="checkbox"/> FUNZ. = ON
Execution of the program will start with the axis start command. If the program is to start from the beginning, it is not necessary to choose the step.	F	<input type="checkbox"/> FUNZ. = OFF

INTRODUCTION OF THE BLADE THICKNESS (SET-UP PARAMETER "AL" SET ON "1")

The quantity of material removed during the cut can be compensated by inserting the thickness of the blade used. The value introduced will be summed to all the positioning quotas to increase them by the blade thickness.

Description	Keyboard	Display
Enter the function for introducing the blade thickness (if the set-up parameter "AL" is set on "1").	F + 3	
Type in the thickness of the blade in use and confirm with ENTER .	0 ÷ 9 	<input checked="" type="checkbox"/> FUNZ. = ON
The value of the blade thickness can also be modified during the execution of a program; the new value introduced will be used for the remaining positionings.	F	<input type="checkbox"/> FUNZ. = OFF

INTRODUCTION OF ΔI9

Description	Keyboard	Display
<p>Activate the stop input (I3 = ON) and enter the function for the introduction of ΔI9.</p>	<p>F + 4</p>	<p>dELTA 123456</p>
<p>If the set-up parameter "FD" is set on "0", activation of input I9 will position the axis on: "quota selected +FD". If input I9 is deactivated, and a new start command given, the axis returns to the selected quota.</p>	<p>0 ÷ 9 ←</p>	<p><input checked="" type="radio"/> FUNZ. = ON</p>
<p>N.B. Δ with set-up parameter "FD" ≠ 0 is enabled in absolute positioning. The quota for ΔI9 must be set above the overquota for play recovery.</p>	<p>F</p>	<p><input type="radio"/> FUNZ. = OFF</p>
<p>To exit the program choice function, press key F.</p>		

CHANGING THE VALUE OF THE PRESET QUOTA

Description	Keyboard	Display
<p>Enter the function for changing the preset quota.</p>	<p>F + 5</p>	<p>P 123456</p>
<p>The operator can change the value of the preset quota introduced in set-up and confirm it with the ENTER key. Preset quotas can be introduced between the maximum and minimum quotas.</p>	<p>0 ÷ 9 ←</p>	<p><input checked="" type="radio"/> FUNZ. = ON</p>
<p>To exit the program choice function, press key F.</p>	<p>F</p>	<p><input type="radio"/> FUNZ. = OFF</p>

POSITIONING ON AN IMMEDIATE WORK QUOTA

Description	Keyboard	Display
<p>Use any numerical key to select the display relative to introducing the immediate quota. The top displays show the count (position of the axis), the bottom displays show the immediate positioning quota introduced.</p>	<p>0</p>	<p>23456.7 12.3</p>
<p>The operator can introduce the immediate quota required.</p>	<p>0 ÷ 9 ←</p>	<p>23456.7 = 12.3</p>
<p>The bottom left display will signal the introduction by highlighting 3 segments. When the introduced value is confirmed with ENTER, if the set-up parameter "E" is set on "1", after the time "LE" the instrument positions the axis at the quota introduced, deactivating the tolerance and activating the movement outputs after the time "ES". If in set-up the parameter "LP" is set on "0", input I4 will display the incrementable piece counter. This display will remain through the positioning phase to quota "+Δ". During the return to quota, it will show the introduced quota and once tolerance is reached it will show the piece counter again.</p>	<p>F</p>	
<p>N.B. If the instrument is switched off during positioning on an immediate quota, on restarting it will still show the immediate positioning before switching off; to restart, confirm with ENTER and start, or type in a new immediate quota. To stop positioning in the immediate quota, it is sufficient to press any key. Each time a new positioning is given, the piece counter is reset to zero.</p>		
<p>To exit immediate quota insertion, press key F.</p>		

MANUAL MOVEMENT OF THE AXIS

The instrument offers certain functions for manual management of the axis. From the keyboard it is possible to move the axis in the two directions and with two different speeds. After selecting the manual axis movement function, using key 7 the axis can be moved "back" (the count decreases), using key 9 the axis can be moved "forwards" (the count increases). Key 8 is used to select the manual movement speed (slow or fast).

Description	Keyboard	Display
<p>Enter manual functions and select the display relative to axis movements.</p>	 	
<p>The bottom left display shows the speed selected with key 8 (L = slow, F = fast). The bottom right display shows the count (axis position). During manual movements the limits set with minimum and maximum quotas (set-up) are enabled.</p>	  	 = ON
<p>To exit manual functions, press the key MAN.</p>		 = OFF

PRESET QUOTA SEARCH (WITH SET-UP PARAMETER "LP" SET ON "0")

The instrument offers certain functions for manual management of the axis. The search for the preset quota can be commanded also from the keyboard (see relative paragraph for the description of the preset quota search).

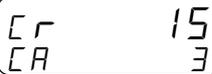
Description	Keyboard	Display
<p>Enter manual functions and select the display relative to the preset quota search.</p>	 	
<p>The bottom displays show the count value. On confirming with ENTER, the given count will flash to signal that the preset search has started and at the same time the axis will move to search for the command for loading the preset quota. Once the preset quota is loaded on the count, the display stops flashing to signal the end of the procedure.</p>		 = ON
<p>N.B. The preset search can be commanded by activating input I8. If the ENTER key is pressed again during the preset search, the axis will invert the direction of its search.</p>		 = OFF

INTRODUCTION OF A VALUE IN THE COUNT

The instrument offers certain functions for manual axis management. The count value displayed by the instrument (axis position) can be modified by introducing the required value. This function is specially useful during the installation and calibration phases.

Description	Keyboard	Display
Enter manual functions and select the display relative to the introduction of a value in the count.	 	
The operator can introduce the count value required. The bottom displays show the value of the count introduced. When confirmed with ENTER , the instrument displays the value introduced.	 ÷  	<input checked="" type="radio"/> MAN = ON
To exit manual functions, press the MAN key.		<input type="radio"/> MAN = OFF

DISPLAYS

Description	Keyboard	Display
<p>Top right Display Axis count.</p> <p>Bottom right Display Current quota.</p>		
<p>Top left Display Program in use.</p> <p>Bottom left Display Step in use.</p> <p>Top right Display Totaliser count.</p> <p>Bottom right Display Totaliser preselection.</p>		
<p>If the totaliser is not enabled.</p> <p>Top right Display Program in use.</p> <p>Bottom right Display Step in use.</p>		
<p>Top right Display Preselection of cycles.</p> <p>Bottom right Display Cycles count.</p>		
<p>When the stop is activated and an immediate quota is to be introduced.</p>		



4 - 2 WORK GRAPHS AND TABLES

PRESET SEARCH

"Mode 0" - Loading the preset quota using the zero impulse enabling input.

The command for loading the preset quota is provided only by the zero impulse enabling input.

When the preset search procedure is started, the axis moves towards the sensor connected to the zero impulse enabling input; when the axis activates this input during its stroke, it slows down and inverts its direction.

When the zero impulse enabling input is deactivated the preset quota is loaded onto the instrument count. In this procedure for loading the preset quota, the condition is that the enabling input is activated and successively deactivated.

"Mode 1" - Loading the preset quota using the zero impulse and the zero impulse enabling input with inversion.

The command to load the preset quota is provided by the transducer zero impulse. Since an encoder supplies a zero impulse for every turn, it must be decided in which axis zone to acquire the zero impulse; for this reason the zero impulse enabling input is used.

When the preset search procedure is started, the axis moves towards the sensor connected to the zero impulse enabling input; when the axis activates this input during its stroke, it slows down and inverts its direction.

When the enabling input is deactivated, the instrument is ready to acquire the zero impulse: on the first zero impulse provided by the transducer, the preset quota is loaded onto the instrument count.

In this procedure for loading the preset quota, the condition is that the enabling input is activated and successively deactivated and a zero impulse is acquired.

"Mode 2" - Loading the preset quota using the zero impulse and the zero impulse enabling input without inversion.

The command to load the preset quota is provided by the transducer zero impulse. Since an encoder supplies a zero impulse for every turn, it must be decided in which axis zone to acquire the zero impulse; for this reason the zero impulse enabling input is used.

When the preset search procedure is started, the axis moves towards the sensor connected to the zero impulse enabling input; when the axis activates this input during its stroke, it slows down but maintains its direction.

The instrument is ready to acquire the zero impulse: on the first zero impulse supplied by the transducer the preset quota is loaded onto the instrument count.

In this procedure for loading the preset quota, the condition is that the enabling input is activated and a zero impulse is acquired. To avoid errors, the space for activating the enabling input must be less than the space travelled by the axis with a turn of the encoder. Otherwise the zero impulse can be acquired in two different points.

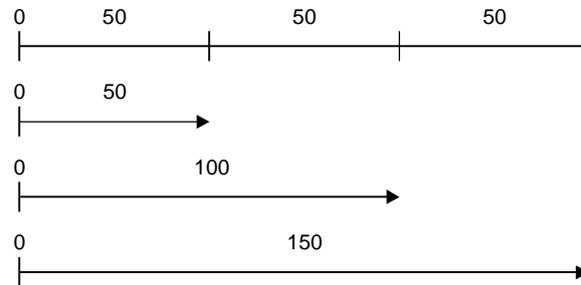
"Mode 3" - Loading the preset quota from an input.

In this procedure the preset search is not enabled. The command for loading the preset quota is provided by the activation of input I1 (enabling of zero impulse).

DESCRIPTION OF POSITIONINGS

The operator can choose the type of positioning in set-up to optimise machine functions.

ABSOLUTE POSITIONING:



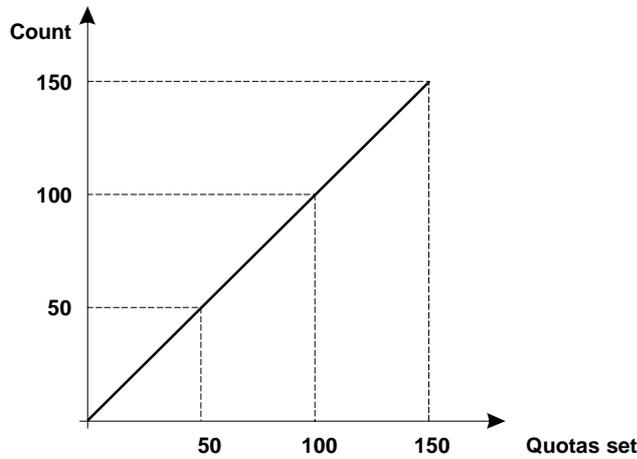
The quotas introduced always refer to the machine zero.
To position on the quotas, the absolute value must be introduced at each step.

1st step 50
2nd step 100
3rd step 150

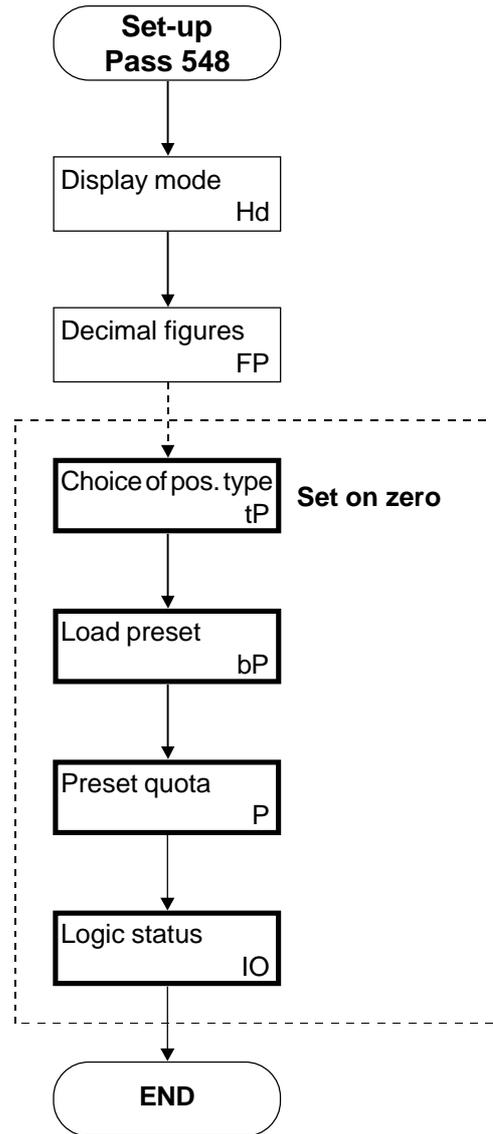
With this type of positioning it is not possible to program the number of quota repetitions and the totaliser, when enabled, can be used only as a piece counter.

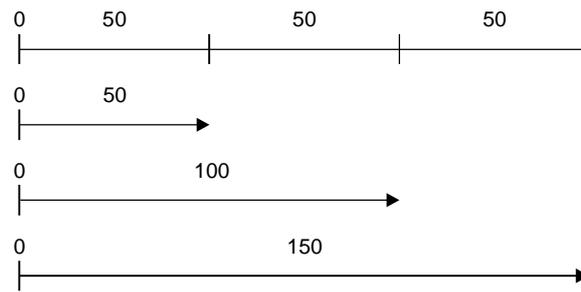
Set-up structure for absolute positionings

Main features of absolute positionings



- Requires a preset search totally governed by the instrument, giving a start from the keyboard or input.
- Setting of a work field. When minimum and maximum quotas are inserted the maximum axis travel is defined. Any attempt to position the axis outside the set limits is aborted and the error is displayed.
- Piece counter management. The possibility therefore to associate a certain number of operations with every position to be reached.
- Work quotas referred to the machine zero.



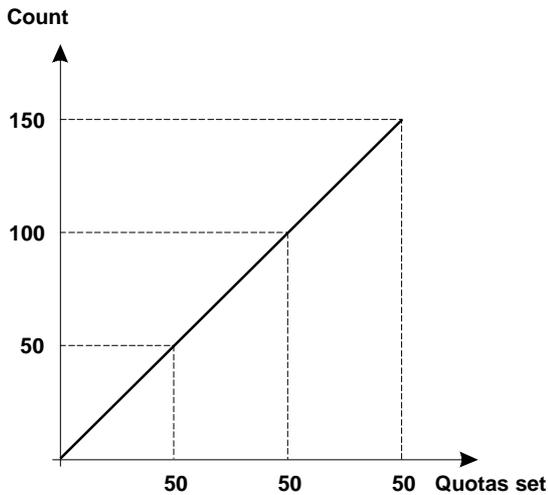
INCREMENTAL POSITIONING:

The quotas introduced are always summed algebraically to the previous quota but always referred to the machine zero. In this type of positioning the incremental quota of the quota referred to the previous quota is introduced. The choice can be made to execute the 3 quotas in a single step, using the totaliser as a repeat counter, or in 3 steps without the totaliser or using it as a piece counter.

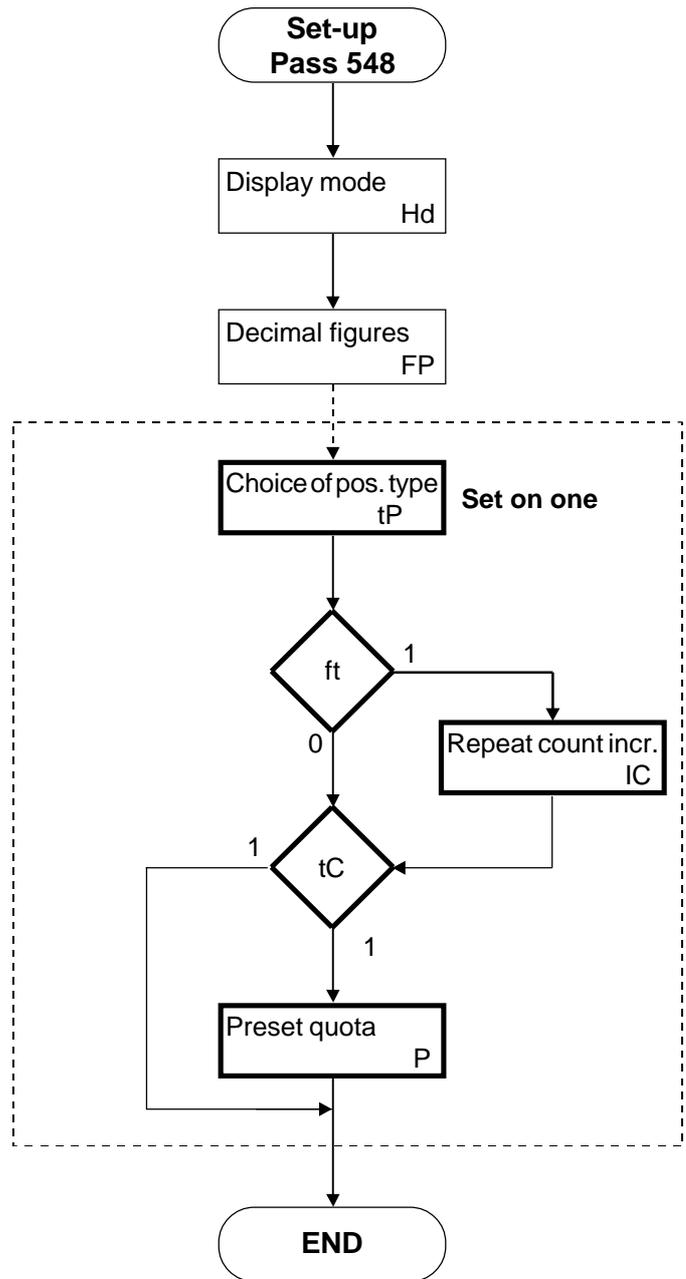
1st step 50 tot. 3 or:
1st step 50 tot. 1
2nd step 50 tot. 1
3rd step 50 tot. 1

Set-up structure for incremental positionings

Main features of incremental positionings



- Step operations.
- Work quotas not referred to the machine zero, but to the position reached by the axis in the previous positioning.
- Possibility of associating a certain number of operations to each quota or to set a certain number of repetitions of each quota introduced.
- Ideal for optimising the material to be cut (iron rod, paper sheet, marble slab, etc.) since there is no waste or off-cut if the quotas are set correctly.
- Various possibilities for updating the count. Mainly zero reset by subtraction. This way it is always possible to position and recover the eventual error in the previous positioning. This means that the real position of the axis can always be controlled thus avoiding an accumulation of mechanical errors.



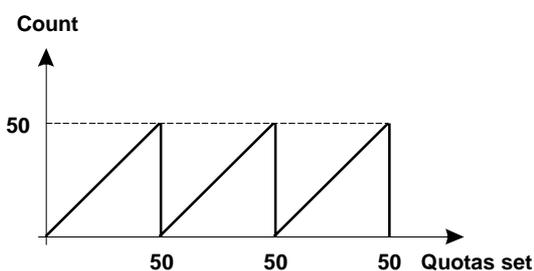
INCREMENTAL POSITIONING WITH COUNT ZERO RESET.

The quotas introduced always refer to zero. The count is automatically reset to zero or from the input every time positioning is made. Programming of the steps is identical to incremental positioning. The totaliser is used only as a repeat counter.

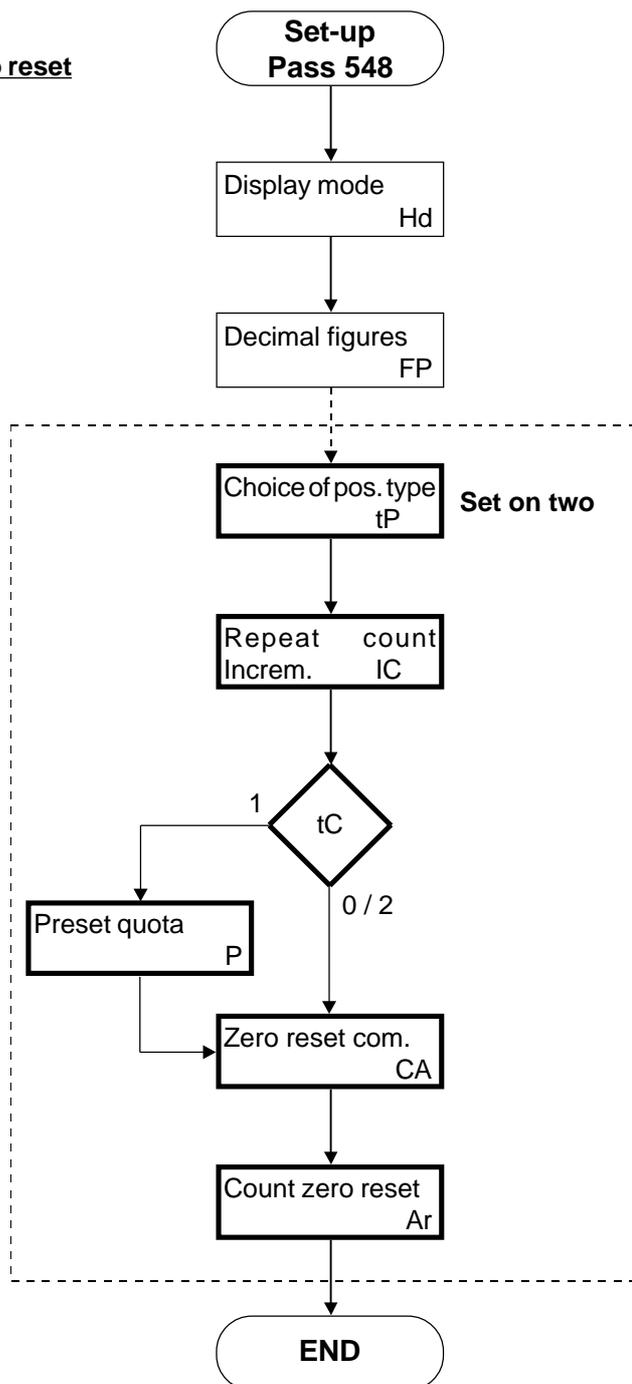
During an incremental positioning with the axis within tolerance, if the successive preselection exceeds the bottom scale (± 999999), the instrument automatically subtracts the quota reached from the count and preselection and the counts return to zero.

Set-up structure for incremental positionings with zero reset

Main features of incremental positionings with zero reset



- Ideal for managing applications such as unreeling and cutting, rotating tables, reelers and similar operations.
- Possibility of associating a certain number of repetitions with each quota.
- The work quota are not referred to the machine zero but to the position reached by the axis in the previous positioning.
- Various possibilities for updating the count. Mainly, zero reset by subtraction. In this way positioning is always possible with recovery of the eventual error in previous positioning. Therefore the real position of the axis can always be controlled, avoiding the accumulation of mechanical errors.

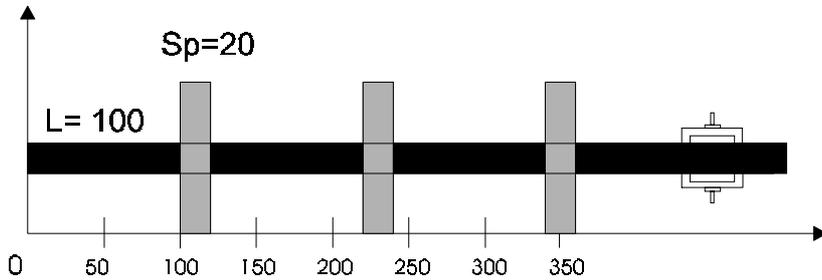


INCREMENTAL / ABSOLUTE POSITIONING

Quotas introduced are in algebraic sum to the previous quota but always referred to the machine zero. The programming is the same of the incremental mode, while the positioning is the same of the absolute mode.

Example:

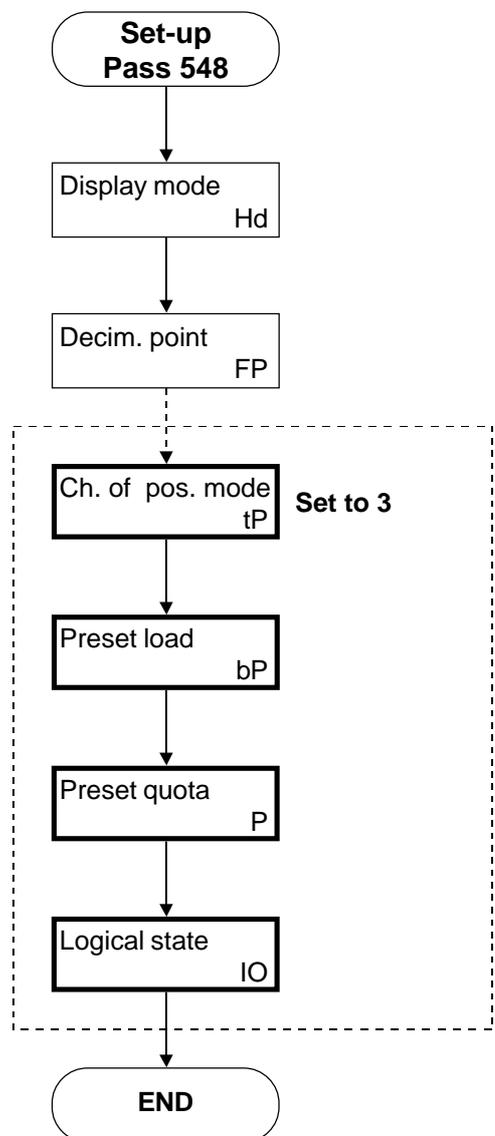
Quota = 100 nr. of pieces = 3 Blade thickness = 20



Functioning:

- The first positioning is performed at 120
- The second positioning is performed at 240
- The third positioning is performed at 360

- Necessity to execute a preset search managed totally by the instrument, with start from keyboard or form input.
- Setting of a working range. By inserting minimum and maximum quotas, the maximum range of the axis is defined. An error message will be displayed if a quota is over the axis range.
- Management of a quota repetitions counter and the possibility of knowing the number of pieces executed.
- The first quota of a program is referred to the machine zero, the following quotas are incremental (positive) and decremental (negative) respect of the first quota.
- If more than a working cycle is selected, the following cycle begins from the absolute quota of the first program's step.





SERIAL PORT RS232C DESCRIPTION

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 200 bytes (Hex C8) 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.

{ AA YY XXXX XX XX.. XX @

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

AA = 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 (200 byte max.; value = C8 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.

To be continued on the following page.



Syntax 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 "[" (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.

In case of response to a reading command, follows the data required and the checksum if enabled. In case of response to a writing command, after the command code will be transmitted the checksum calculated by the instrument.

Characters sent without the first character "[" and the last "@" must be ignored. In case that the instrument finds a checksum different from the calculated one, data are not accepted.

Command of transmission.

[AA YY XX...X XX @

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

AA = 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 "1040" and length 3 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 = 4160 (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 = 01 (Hex. 01).

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:

{01TS10400304D201 ... @

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 = 05

The string of characters to transfer is then:

{01TS10400304D20105@

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. 100E" 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 = 4110 (Hex. 100E).
 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:

{0CTL100E04 ... @

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 = 6B (value Hex.).

The string of characters to transfer is then:

{0CTL100E046B@

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 errors, 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.



ADDRESS OF MEMORY FOR READING PARAMETERS FROM SERIAL PORT

Set-up parameters			
Addr.	Dim.	Description	R/W
1000	1	High definition reading	RW
1001	1	Enable the forcing of count visualization	RW
1002	1	Decimal figures	RW
1003	3	Encoder resolution	RW
1006	2	Slow down	RW
1008	2	Negative tolerance	RW
100A	2	Positive tolerance	RW
100C	2	Minimum time for activation of outputs U4, U6, U8, U10	RW
100E	2	Slow down time	RW
1010	1	Function of ENTER key	RW
1011	2	Check time for ENTER key	RW
1013	2	Delay time for start activation	RW
1015	3	Max. quota	RW
1018	3	Min. quota	RW
101B	1	Functions of output U5	RW
101C	2	Advance time for brake lock/unlock	RW
101E	1	Choice of play recovery	RW
101F	2	Overquota for play recovery	RW
1021	2	Inversion time	RW
1023	1	Enabling of delta I9	RW
1024	3	Quota for delta I9	RW
1027	1	Enable blade thickness	RW
1028	1	Enable totaliser	RW
1029	1	Totaliser increase side	RW
102A	1	Totaliser zero reset	RW
102B	1	Step increase	RW
102C	1	Memory configuration	RW
102D	1	Choice of type of positioning	RW
102E	1	Preset loading	RW
102F	3	Preset quota	RW
1032	1	Zero impulse logic state	RW
1033	1	Totaliser functions	RW
1034	1	Repeat counter increment	RW
1035	1	Type of count zero reset	RW
1036	1	Zero reset command	RW
1037	1	Count zero reset when restarting	RW
1038	1	Enable serial port	RW
1039	2	Transmission speed	RW
103B	1	Number of bits	RW
103C	1	Number of stop bits	RW
103D	1	Parity bit	RW
103E	1	Address code	RW
103F	1	Enable checksum	RW
1040	2	Transmission delay	RW

R=Read

W=Write

To be continued on the following page

Inertia calibration parameters			
Addr.	Dim.	Description	R/W
2000	1	Enabling of 8 inertia bands	RW
2001	1	Enabling of inertia recalculation	RW
2002	2	Inertia band 1	RW
2004	2	Inertia band 2	RW
2006	2	Inertia band 3	RW
2008	2	Inertia band 4	RW
200A	2	Inertia band 5	RW
200C	2	Inertia band 6	RW
200E	2	Inertia band 7	RW
2010	2	Inertia band 8	RW
2012	2	Delay time in tolerance activation	RW

Machine parameters			
Addr.	Dim.	Description	R/W
3000	1	Program in execution	RW
3001	1	Step in execution	RW
3002	2	Totaliser preselection	R
3004	2	Totaliser count	RW
3006	2	Cycle selected	RW
3008	2	Cycle executed	RW
300A	3	Count	RW
300D	3	Quota in execution	R
3010	3	Immediate quota	RW
3013	3	Blade thickness	RW

Input/output diagnostic			
Addr.	Dim.	Description	R/W
4000	2	Inputs (binary) <div style="display: flex; justify-content: center; gap: 5px;"> <div style="display: flex; flex-direction: column; align-items: center;"> B15<input type="checkbox"/></div> <div style="display: flex; flex-direction: column; align-items: center;"> B14<input type="checkbox"/></div> <div style="display: flex; flex-direction: column; align-items: center;"> B13<input type="checkbox"/></div> <div style="display: flex; flex-direction: column; align-items: center;"> B12<input type="checkbox"/></div> <div style="display: flex; flex-direction: column; align-items: center;"> B11<input type="checkbox"/></div> <div style="display: flex; flex-direction: column; align-items: center;"> B10<input type="checkbox"/></div> <div style="display: flex; flex-direction: column; align-items: center;"> I10<input type="checkbox"/></div> <div style="display: flex; flex-direction: column; align-items: center;"> B9<input type="checkbox"/></div> <div style="display: flex; flex-direction: column; align-items: center;"> B8<input type="checkbox"/></div> <div style="display: flex; flex-direction: column; align-items: center;"> B7<input type="checkbox"/></div> <div style="display: flex; flex-direction: column; align-items: center;"> B6<input type="checkbox"/></div> <div style="display: flex; flex-direction: column; align-items: center;"> B5<input type="checkbox"/></div> <div style="display: flex; flex-direction: column; align-items: center;"> B4<input type="checkbox"/></div> <div style="display: flex; flex-direction: column; align-items: center;"> B3<input type="checkbox"/></div> <div style="display: flex; flex-direction: column; align-items: center;"> B2<input type="checkbox"/></div> <div style="display: flex; flex-direction: column; align-items: center;"> B1<input type="checkbox"/></div> <div style="display: flex; flex-direction: column; align-items: center;"> B0<input type="checkbox"/></div> </div>	R
4002	2	Outputs (binary) <div style="display: flex; justify-content: center; gap: 5px;"> <div style="display: flex; flex-direction: column; align-items: center;"> U10<input type="checkbox"/></div> <div style="display: flex; flex-direction: column; align-items: center;"> B9<input type="checkbox"/></div> <div style="display: flex; flex-direction: column; align-items: center;"> B8<input type="checkbox"/></div> <div style="display: flex; flex-direction: column; align-items: center;"> B7<input type="checkbox"/></div> <div style="display: flex; flex-direction: column; align-items: center;"> B6<input type="checkbox"/></div> <div style="display: flex; flex-direction: column; align-items: center;"> B5<input type="checkbox"/></div> <div style="display: flex; flex-direction: column; align-items: center;"> B4<input type="checkbox"/></div> <div style="display: flex; flex-direction: column; align-items: center;"> B3<input type="checkbox"/></div> <div style="display: flex; flex-direction: column; align-items: center;"> B2<input type="checkbox"/></div> <div style="display: flex; flex-direction: column; align-items: center;"> B1<input type="checkbox"/></div> <div style="display: flex; flex-direction: column; align-items: center;"> B0<input type="checkbox"/></div> </div>	R

R=Read
W=Write

To be continued on the following page

Working programs

Addr.	Dim.	Description	R/W
5000	1275*	Memory with 255 steps, each one is of 5 bytes.	RW
5000 5001 5002 5003 5004	Quota to be exec. Total. Presel.	Step 1	
5005 5006 5007	Quota to be exec.	Step 2	
5008 5009	Total. Presel.		
" " " " " "			
54F6 54F7 54F8	Quota to be exec.	Step 255	
54F9 54FA	Total. Presel.		
6000	85**	End of program in all enabled programs.	RW

R=Read
W=Write

* = The maximum number of bytes to read and/or write is 70 (max. length of the transmission string).
If you want to read all programs steps you need to send more strings.

** = The number of bytes of the control parameter of the position of end program depends on the number of enabled programs in the set-up parameter "Memory configuration" (Cn).

Ex.

Cn = 25

Number of programs = 10,

The number of bytes to read/write is 10. In each byte is indicated the end of program position.



CAPITOLO 5

ASSISTANCE

Input and output troubleshooting

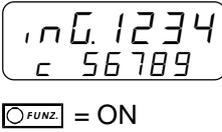
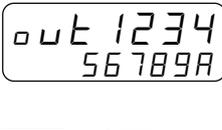
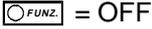
How to complete the technical assistance fax form

Warranty

5 - 1 INPUT AND OUTPUT TROUBLESHOOTING

The instrument provides diagnostics of the logic status of the digital input and outputs; according to the numbers displayed, it is possible to understand whether an input arrives at the instrument and if an output has been energised. The first display after access to the diagnostics function refers to the inputs status; if number 1 is displayed, input 1 has been activated; display of the number 2 means that input 2 has been activated and so on. Input Z (transducer zero impulse) is signalled with a C; if this is shown, there is no zero impulse; if not shown, the zero impulse is supplied to the instrument.

The successive display refers to the logic status of the digital outputs. The same correspondence (each number corresponds with its equal output); for example, the presence of the number 4 indicates that the instrument is energising output 4.

Description	Keyboard	Display
Access to diagnostics functions. The input status (<i>in</i>) will be displayed.	 + 	
Press the ENTER key to pass to display of outputs status (<i>out</i>).		
To exit the program choice function, press key F .		

5 - 2 HOW TO COMPLETE THE TECHNICAL ASSISTANCE FAX FORM

We need your help if we are to provide you with a quick, efficient and high-quality service. Whenever you need the assistance of QEM in dealing with any technical problems that may arise in your applications and, even though all the instructions in the "Installation, maintenance and servicing manual" have been followed, the problem persists, we invite you to complete all parts of the fax form enclosed with the installation, maintenance and servicing manual, and to send it to the QEM assistance office. In this way, our service engineers will have all the essential information for understanding your problem (avoiding long and costly telephone calls). Thanking you for your kind co-operation, QEM wishes you all the best in your work.

NOTE

- If you have to send us an instrument for repair, please read carefully the following points.
- When possible, use the original packing; in any event, the packaging must protect the instrument from bumps during transport.
 - Be sure to enclose in the pack a detailed description of the problem you have encountered, together with the part of the wiring diagram that concerns the instrument. If the problem has been found in the data memory, please enclose also the instrument programming (set-up, work quotas, auxiliary parameters ...).
 - If necessary, ask us specifically for an estimate on the repairs. If no estimate is requested, the cost will be calculated on completion.
 - Our service engineers will give priority to instruments that are sent in accordance with the instructions given in these notes.

5 - 3 WARRANTY

The warranty conditions are as stated in the general conditions of sale.