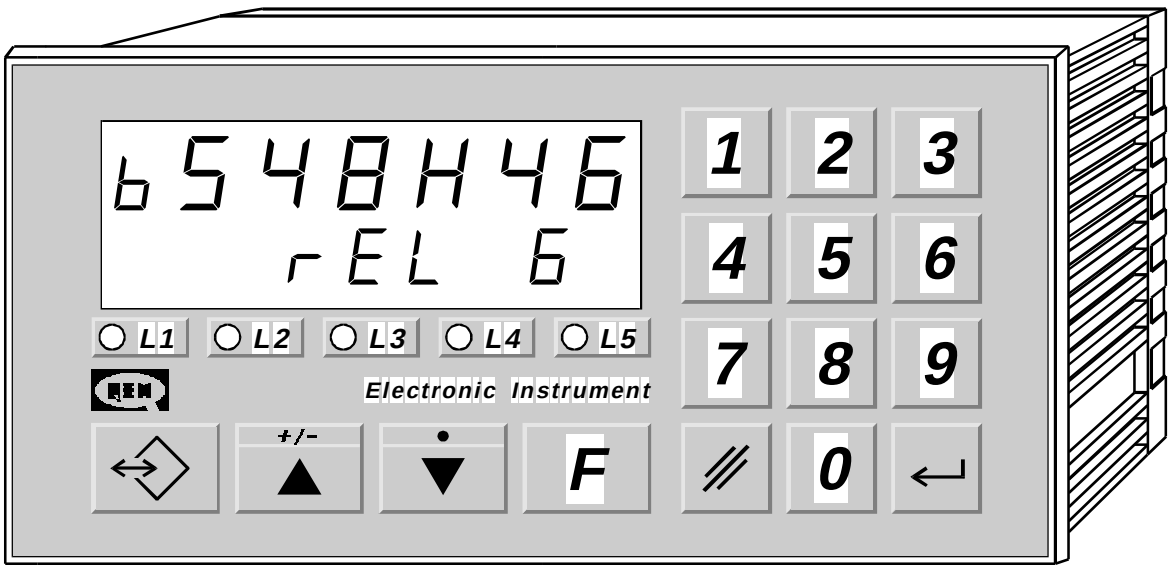
CONTROL OF LAPPING, MILLING AND GRINDING MACHINES WITH A MAXIMUM OF 20 HEADS

HB 548.46



User's Manual

Complement to the "Manual of Installation, Maintenance and Assistance"

Quality in Electronic Manufacturing

INDEX OF SUBJECTS IN THIS MANUAL

CHAPTER 1

INTRODUCTION

Complementarity

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Responsibility and validity

Description of operation

1 - 1 COMPLEMENTARITY

This manual is to be considered as a complement to the "Manual of installation, maintenance and assistance" which supplies the indications for the performance of wirings, troubleshooting, procedures for startup and maintenance. This manual contains indications for the instrument's use and for a correct programming.
We recommend therefore a careful reading and, in case of misunderstandings, please contact QEM for any further explanation, by sending the Assistance Fax which you find enclosed to the manual.

1 - 2 REFERENCES

The documentation concerning the instruments which are designed and sold by QEM has been divided into various sheets in order to allow an effective and quick reading according to the information being seeked.

User's Manual

Explanation of the software described

It is the present manual, which shows all instructions for the comprehension and the use of the instrument described. It is a manual concerning the instrument's software; it shows all instructions for the comprehension, programming, calibrations and use of the instrument described.
Once you install the instrument by following the instructions shown on the Manual of Installation, maintenance and assistance, with this User's Manual you are supplied with all necessary instructions for the correct use of the instrument and for its programming.

Hardware Structure

Basic information concerning the hardware of the series and possibility of customizations.

It is a sheet enclosed to this User's manual, describing the hardware configuration concerning the series of the instrument described.
It also shows the electrical, technical and mechanical characteristics, of the series and also the possible hardware customizations according to the software version.

Manual of installation, maintenance and assistance

All what you need for Installation, Maintenance and Assistance.

Further explanation of all necessary subjects for a correct installation and maintenance.
This is made to allow us to supply valid and safe instructions which shall allow you to perform products with a recognized quality and safe reliability.
It is also a valid support for all those who must face a technical assistrance on an application which includes a QEM's instrument.

1 - 3 RESPONSIBILITY AND VALIDITY

RESPONSIBILITY

QEM is free from any responsibility for damages to people or things due to unobservance of the instructions and prescriptions contained in this manual and in the "Manual of installation, 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 he must send a written application to QEM. Any authorization for further use and replacement shall be deemed as valid by QEM, in case of contestation, only if it has been written by QEM.

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

Purpose
The purpose of this manual is to indicate the general rules to use the instrument described.

Indication
Write down and carefully store all parameters concerning the settings and programming of the instrument in order to make easier the eventual operations of replacement and assistance.

VALIDITY
This manual can be applied to all designed instruments, built and tested by QEM and having the same ordering code. This document is integrally valid except for mistakes or omissions.

Instrument's Release	*Manual Release*	*Modifications made to the Manual*	*Modifications Date*
0	0	New manual	28 / 02 / 97
6	1	Manual updated	22 / 03 / 00
7	1	Transparent modification at the user	01 / 06 / 11

Issued by the Person in Charge for the Documentation: *.....*

Approved by the Person in Charge for the Product: *.....*

1 - 4 DESCRIPTION OF OPERATION

The instrument HB 548.46 allows to manage at the same time a maximum of 20 working heads. The heads may be configurated, via the set-up configuration, as lapping machines, milling machines or grinding machines. The processing parameters may be stored in programs and then, in case of change of production, you may reduce the times of set-up of the machine.
The instrument HB 548.46 allows to perform, during the processing, some corrections to the working levels, in order to compensate eventual delays in the machine response. These corrections shall be made bearing into consideration the shifting speed of the belt in order to automatically compensate the working levels according to the speed variations of the same; we recommend then to perform the corrections at the maximum speed of the belt in order to reduce error possibility. The system is made of a bidirectional counter linked to the advancement of the material on the conveyor belt and a maximum of 5 fixed sensors of piece presence which allow to get and correct for the whole length of the conveyor belt, the image of the pieces introduced. In case of use of the heads as grinding heads, you may set in the program every how many linear meters you must activate the head descent for the compensation of the wear and for how long it must remain activated.
In case of use of the heads as lapping heads, in the correction data you can set the advance or delay level of head descent compared to the sheet start and the advance or delay level of head upwards compared to the sheet end.
In case you use the heads as milling heads, it is possible to set in the program the level of delay or advance about the milling start compared to the sheet start and the milling length or the advance or delay level about the milling end compared to the sheet end and the milling end.
The instrument allows the processing of 30 pieces at the same time. During normal operation you may display the following parameters: "Speed belt", "Processed meters", "Number of worked pieces", "Belt frequencymeter" and "Piece length".
If in set-up the parameter "Automatic Reset" is set to 0 or 2, the instrument stores in memory the levels of the pieces under processing and recalls them again upon restart.

CHAPTER 2

OPERATOR/MACHINE INTERFACE

Keyboard Description

Inputs Description

Outputs Description

2 - 1 KEYBOARD DESCRIPTION

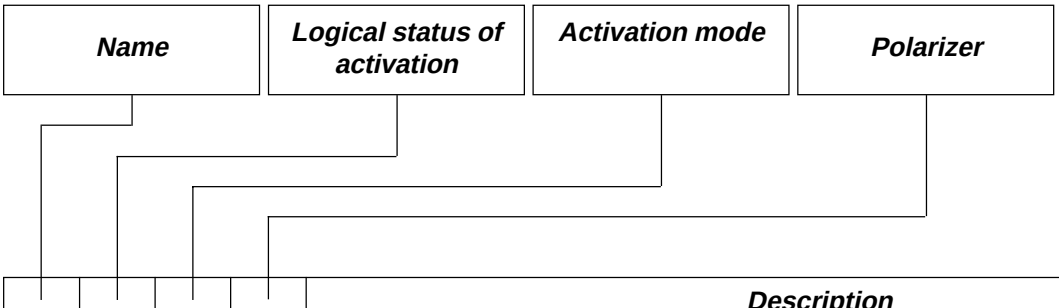
Key	*Function*
0 ÷ 9	**Normal operation:** if pressed after the key "**F**" they select the available functions. **Data entering:** they allow the data entering.
	**Normal operation:** it allows the access to the writing of the processing data. **Data entering:** not used.
	**Normal operation:** if pressed impulsively it selects the previous displaying. If pressed in a continuous way it performs the continuous scroll of the displays with a pace of 0.25 seconds. **Data entering:** it enters or removes the sign + / -.
	**Normal operation:** if pressed impulsively it selects the following displaying. If pressed in a continuous way it performs the continuous scroll of the displays with a pace of 0.25 seconds. **Data entering:** it enters the decimal point.
F	**Normal operation:** it allows to select the available functions. Inside the introduction of the working programs, if pressed for 1 second, it disables the selected head. **Data entering:** not used.
 **CLEAR**	**Normal operation:** if pressed for one second (during the displayings) it sets to zero the displayed counters. **Data entering:** it erases the entered value proposing again the old value.
 **ENTER**	**Normal operation:** not used. **Data entering:** it confirms the data entered.
L1	It goes ON during the introduction of the processing data.
L2	It goes ON if there are under processing 30 (or more) pieces at the same time.
L3	It is ON in case the count of the encoder is negative (in this case you must invert between them the phases of the encoder).
L4	not used.
L5	It goes ON when pressing "**F**".
F + 0	Access to the functions protected by password.
F + 1	Choice of the program to be executed.
F + 2	Processing restart.
F + 3	Heads' corrections.

To be continued on next page

Key	*Function*
F + **4**	Displaying of the grinding wheels counters.
F + **6**	Diagnostic of inputs and outputs.

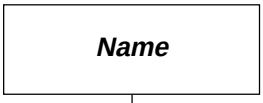
2 - 2 INPUTS DESCRIPTION

Characteristics of inputs
Please refer to che chapter "Electrical characteristics of the "Hardware structure" sheet enclosed to this manual.



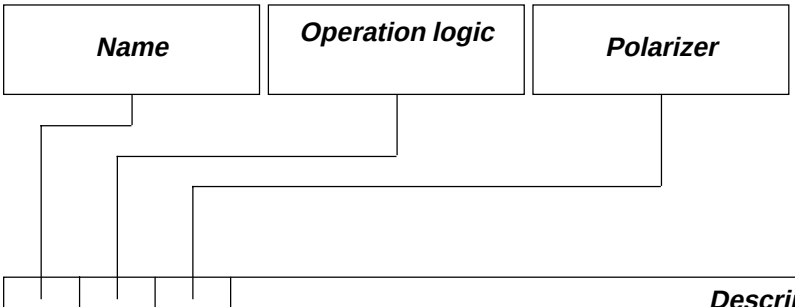
				Description
I1	**ON**	**C**	**P1**	**Sensor of presence piece 1.** Fixed sensor which allows to get the image of the pieces introduced at the beginning of the conveyor belt. If the input I1 = ON and the instrument goes OFF, upon the startup and switching ON again of the plant the piece reading is continued. If the input I1 = OFF and the instrument is switched OFF, upon the startup and switching ON again of the plant the input I1 is ON, the piece is ignored.
I2	**ON**	**C**	**P1**	**Sensor of presence piece 2.** Fixed sensor which allows the correction of the position of the image of the pieces introduced in an intermediate zone of the conveyor belt.
I3	**ON**	**C**	**P1**	**Sensor of presence piece 3.** Fixed sensor which allows to get the position of the image of the pieces introduced in an intermediate zone of the conveyor belt.
I4	**ON**	**C**	**P1**	**Sensor of presence piece 4.** Fixed sensor which allows to get the position of the image of the pieces introduced in an intermediate zone of the conveyor belt.
I5	**ON**	**C**	**P1**	**Sensor of presence piece 5.** Fixed sensor which allows to get the position of the image of the pieces introduced in an intermediate zone of the conveyor belt.
I6	**ON**	**C**	**P1**	**Processing restart .** Upon its activation for 2 seconds, it is performed a processing restart (see function "F+2").

Legend
C = Continuous signal.



	Description
Vac	**Voltage of instrument's power supply.** Alternated voltage according to the code of your order.
Vac	**Voltage of instrument's power supply.** Alternated voltage according to the code of your order.
GND	**Ground connection.** We recommend a conductor with Ø 4 mm.
+	**Positive of transducers' power supply.** Positive of voltage supplied by the instrument for the supply of the inputs of the instrument and transducers.
-	**Negative of transducers' power supply.** Negative of voltage supplied by the instrument for the supply of the inputs of the instrument and transducers.

COUNT INPUTS

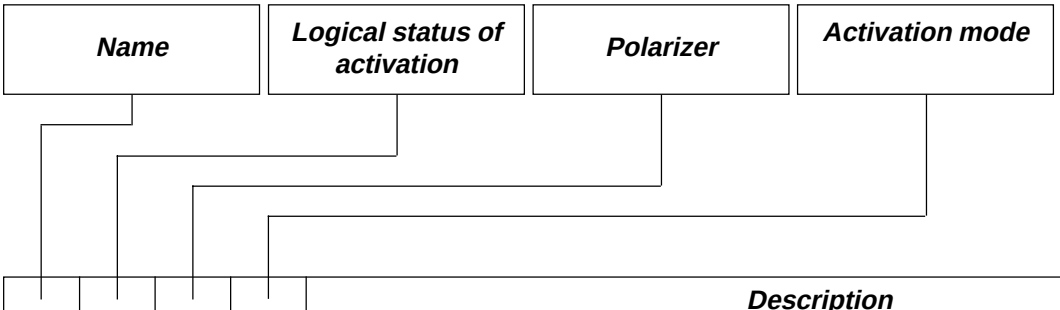


			Description
PHA	**N / P**	**PE**	**Input"phase A" incremental transducer.**
PHB	**N / P**	**PE**	**Input"phase B" incremental transducer.**
Z	**N / P**	**PE**	**Not used.**
			For the characteristics of the count inputs please see the chapter "Electric characteristics" of the "Hardware structure" sheet enclosed to this manual.

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

2 - 3 OUTPUTS

Characteristics of outputs
Please refer to che chapter "Electrical characteristics" of the "Hardware structure" sheet enclosed to this manual.

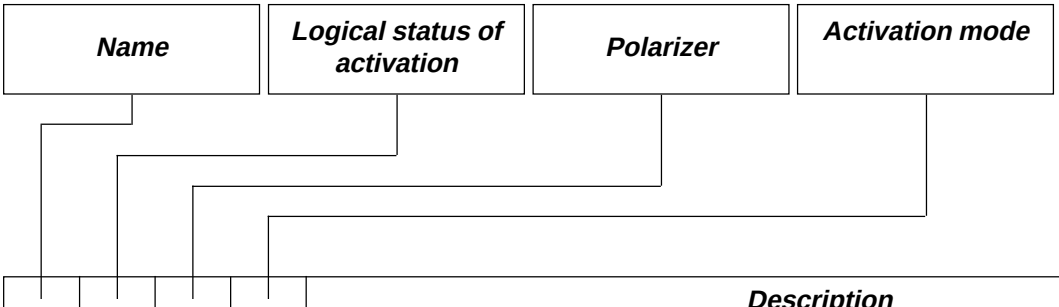


				Description
U1	**ON**	**C1**	**C**	**Instrument reset.** This output is activated according to the choice performed with the set-up parameter "rA" and it is de-activated after the conveyor belt has performed a complete revolution in order that there are no pieces under processing.
U2	**ON**	**C1**	**C**	**Blower.** The output remains energised if there is at least one piece inside the machine (space between the limit switch of presence of piece 1 and the value of the machine's length).
U3	**ON**	**C1**	**C**	**Pieces alarm.** It is activated when the number of pieces under processing at the same time is equal to or greater than 30.
U4	**/**	**C1**	**/**	**Not used.**
U5	**/**	**C1**	**/**	**Not used.**

Legend
C = Continuous signal.

Characteristics of expansion in outputs U20

Please refer to che chapter "Electrical characteristics" of the "Hardware structure" sheet enclosed to this manual.



				Description
U6	**ON**	**C2**	**C**	**Head descent 1.** Upon its activation it commands the descent of head 1.
U7	**ON**	**C2**	**C**	**Head descent 2.** Upon its activation it commands the descent of head 2.
U8	**ON**	**C2**	**C**	**Head descent 3.** Upon its activation it commands the descent of head 3.
U9	**ON**	**C2**	**C**	**Head descent 4.** Upon its activation it commands the descent of head 4.
U10	**ON**	**C2**	**C**	**Head descent 5.** Upon its activation it commands the descent of head 5.
U11	**ON**	**C2**	**C**	**Head descent 6.** Upon its activation it commands the descent of head 6.
U12	**ON**	**C2**	**C**	**Head descent 7.** Upon its activation it commands the descent of head 7.
U13	**ON**	**C2**	**C**	**Head descent 8.** Upon its activation it commands the descent of head 8.
U14	**ON**	**C2**	**C**	**Head descent 9.** Upon its activation it commands the descent of head 9.
U15	**ON**	**C2**	**C**	**Head descent 10.** Upon its activation it commands the descent of head 10.
U16	**ON**	**C2**	**C**	**Head descent 11.** Upon its activation it commands the descent of head 11.
U17	**ON**	**C2**	**C**	**Head descent 12.** Upon its activation it commands the descent of head 12.
U18	**ON**	**C2**	**C**	**Head descent 13.** Upon its activation it commands the descent of head 13.
U19	**ON**	**C2**	**C**	**Head descent 14.** Upon its activation it commands the descent of head 14.
U20	**ON**	**C2**	**C**	**Head descent 15.** Upon its activation it commands the descent of head 15.
U21	**ON**	**C2**	**C**	**Head descent 16.** Upon its activation it commands the descent of head 16.
U22	**ON**	**C2**	**C**	**Head descent 17.** Upon its activation it commands the descent of head 17.
U23	**ON**	**C2**	**C**	**Head descent 18.** Upon its activation it commands the descent of head 18.
U24	**ON**	**C2**	**C**	**Head descent 19.** Upon its activation it commands the descent of head 19.
U25	**ON**	**C2**	**C**	**Head descent 20.** Upon its activation it commands the descent of head 20.

Legend

C = Continuous signal.

CHAPTER 3

STARTUP

Programming (set-up)

3 - 1 SET-UP

These parameters determine the operation mode of the instrument and therefore their access is reserved to the installer; for the programming we have forecast the introduction of a password as follows:

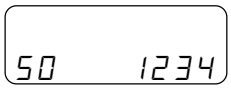
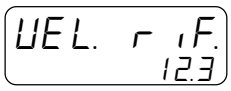
Description	Keyboard	Display
Access to the set-up programming	**F** + **0**	PASS H . . . 0 L5 = ON
Enter the access code "548" and confirm with **ENTER**.	**5** **4** **8** ↵	
It is possible to exit in any moment the password entering by pressing **F**.	**F**	

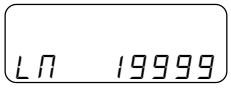
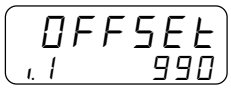
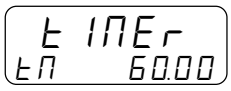
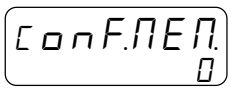
FUNCTION	DISPLAY	DESCRIPTION
Encoder Resolution	FE 4.00000	This parameter indicates by how much you must multiply the turn impulses of the encoder in order to obtain the display of the lengths in the desired units of measure. You may enter values from 0.00200 to 4.00000 bearing in mind that the frequency of the phases F1 must not exceed the maximum frequency of the instrument's count. **N.B.** Please refer to the "Manual of installation, maintenance and assistance".
Number of sensors for piece presence	nS 1	This parameter indicates how many sensors of piece presence are used to get the images of the pieces introduced.

This displaying appears if the parameter "Number of sensors for piece presence" is greater than 1

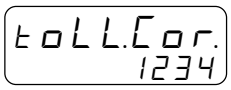
Interaxis of sensor for piece presence (2÷5) Max. 19999	SEnSorE 2 12345	It is the distance between the sensors of presence of piece 1 and the sensor of presence of piece 2, 3, 4 and 5. Here shall be displayed only the interaxis related to the sensors programmed with the parameter "**nS**".

Number of heads Max. 20	nt 12	Number of heads used on the equipment. By setting the lower value or equal to 8, the interruption of the comparisons is 1 millisecond. By setting the value greater than 8, the interruption of the comparisons is 2 milliseconds.
Heads' interaxis (1÷20) Max. 19999	intErAS. 1 12345	It is the distance of heads from the sensor of piece presence 1. Here shall be displayed only the interaxis concerning the number of heads programmed in the parameter "**nt**".

FUNCTION	DISPLAY	DESCRIPTION
Choice of heads' operation (1÷20)		**0** = Head not present. **1** = Lapping head. **2** = Milling head. **3** = Grinding head.
Enabling heads at zero speed		**0** = When the machine goes under the threshold of zero speed (parameter "**50**"), the heads remain in position. **1** = When the machine goes under the threshold of zero speed (parameter "**50**"), all heads are lifted and they come down again when the machine restarts and the speed exceeds the threshold.
Threshold of zero speed		It is the number of encoder impulses (primary encoder impulses) which are read in the time unit of 1 second under which the instrument considers the machine as stopped
Threshold of filter speed		It is the threshold of the speed variations (expressed in m / min.) within which it is introduced the filter for the displaying.
Reference speed		it is the speed (mt/min.), with whitch the parameters "Head corrections" (F+3), and "Offset" (set-up) are compared.
Averages of reading under stabilization		It indicates every how many readings under stabilization it is calculated the speed to be displayed if the changes of the readings are lower than the programmed threshold of the parameter "**SF**".
Number of check for inputs of piece presence		The instrument checks the state of inputs each millisecond. This parameter indicates for how many checks, and then for how many milliseconds, the input must keep the logical status so that the instrument gets the variation.
Automatic reset		**0** = The instrument stores in memory the levels of the pieces under processing and it keeps them even after the switching OFF. **1** = The instrument, at the restart, energises the output U1. **2** = The instrument energises the output U1 when exiting the setting of the set-up parameters or at the change of the processing data. **3** = Upon restart, the instrument, energises the output U1 when exiting the programming of the setup parameters, or at the change of the processing data.

FUNCTION	DISPLAY	DESCRIPTION
Machine length Max. 19999		It is the distance between the sensor of presence of piece 1 and the blower. Until there is a piece within this value, the output U2 remains energised.
Offset input of piece presence (I1) Min. -999 Max. 999		It is the difference of the intervention point between the upwards front and the descent front of input I1 (piece presence). The value entered advances (positive value) or delays (negative value) the end of the piece compared to the descent front of input I1.
Activation time of grinding heads Max. 60.00		It is the time, in seconds, of activation of heads configured as grinding-wheel when it is reached the lenght setted in the working program.
Memory configuration		**0** = The programming of the processing data is single for all heads (maximum number of programs = 163). **1** = The programming of the processing data is separated for every single head (maximum number of programs = 8). **2** = The programming of the processing data is separated in two groups (maximum number of programs = 81). **3** = The programming of the processing data is separated in three groups (maximum number of programs = 54). **4** = The programming of the processing data is separated in four groups (maximum number of programs = 40). **N.B.** See dedicated paragraph.

This dispaly appears i fht eparameter "Number of sensors for piece presence" is > 1

Tolerance for sensor for piece correction (min.1, Max.9999)		It is the tolerance for the correction sensor respect to the beginning of the piece. If the theoretic position of the piece is different from the real one for a distance bigger than the value setted, the instrument will not correct the position and activates led L4 for 3 seconds. This parameter must be setted to a value lower than the minimum lenght of the pieces to be worked.
Once the programming is achieved it is recalled the display of the first set-up parameter		

MEMORY CONFIGURATION

The division of the groups is made according to the following formula:

$$\frac{\text{Number of heads in use (set-up)}}{\text{Memory configuration (set-up)}}$$

The eventual remaining amount is summed to the last group.

Example
Number of heads = 17
Memory configuration = 3
The first group shall be made of heads 1, 2, 3, 4 e 5
The second group shall be made of heads6, 7, 8, 9 e 10
The third group shall be made of heads11, 12, 13, 14, 15, 16 e 17

N.B. Inside the same group be it the lapping heads, be it the milling heads may operate at the same time.

CORRECTION HEADS

You have the possibility to enter, for each head enabled, a correction value on the level of intervention in order to compensate eventual differences in the intervention times of the heads themselves.

Description	Keyboard	Display
Access to the function of heads' correction.	F + 3	C.d. - 1234 1 CS 53
		○ L5 = ON
The operator may enter the value for the correction level for descent of head 1 (max. 9999 min. -999) and confirm with **ENTER**. The lower display (CS) starts to blink and it indicates the belt speed currently in use	0 ÷ 9 ↵	
The operator may enter the value for the correction level for upwards movement of head 1(max. 127min. -128) and confirm with **ENTER**.	0 ÷ 9 ↵	
N.B. If the head is not enabled or you are under grinding wheel operation mode, the display is referred to the following head. **The correction values refers to the reference speed introduced in set-up.**		
The operator may enter the value for the correction level for descent of head2 and confirm with **ENTER** and so on up to the correction of the last head enabled.	0 ÷ 9 ↵	C.d. 200 2 un 12.3
By pressing the key indicated after performing a modification and before confirming with **ENTER**, the display shows againt the value existing before the modification.	//	
Pressing the keys indicated it ispossible to perform the scroll of the correction values in sequence.	• ▼ +/- ▲	
To exit press the key indicated. The display shows again the displaying in use.	F	○ L5 = OFF

CHAPTER 4

USE

Working programs and auxiliary functions

Tables and diagrams of operation

4 - 1 WORKING PROGRAMS AND AUXILIARY FUNCTIONS

ENTERING THE WORKING PROGRAMS (PARAMETER OF SET-UP "MEMORY CONFIGURATION" SET TO 0)

Description	Keyboard	Display
Access to the writing of the working programs.	⇔	PrOGr. nr. 1
The operator may choose the program in which to enter the processing data and confirm with **ENTER**.	**0** ÷ **9** ↵	○ L1 = ON
N.B. If in set-up you have programmed lapping heads only, here shall appear only those data related to the lapping heads; if you have programmed milling heads only, here shall appear only those data concerning the milling heads; if you have programmed grinding heads only, here shall appear only those data concerning the grinding wheels.		
With lapping head The operator may enter the delay or the advance (expressed in millimeters) between the beginning of the piece and the head descent (start of the lapping head processing) and confirm with **ENTER**.	**0** ÷ **9** ↵	QUOTA IL 12345
It is required the introduction of the delay or advance (expressed in millimeters) It is required the introduction of the delay o dell'anticipo (expressed in millimeters) between the end of the piece and the upwards movement of the head (end of lapping head processing). The operator may enter the value and confirm with **ENTER**. The display shows again the current displayings.	**0** ÷ **9** ↵	QUOTA FL 2345
With milling head The operator may enter the distance (expressed in millimeters) between the beginning of the piece and the beginning of the milling operation of the head (start of the processing in the milling head) and confirm with **ENTER**.	**0** ÷ **9** ↵	QUOTA IF 12345
If the processing of milling operation is made at the end of the piece you must disable this parameter by pressing impulsively the key indicated. By pressing again the key indicated the parameter is enabled again.	**F**	QUOTA IF no
It is required the introduction of the distance (expressed in millimeters) between the end of the piece and the end of the milling operation of the head (end of the processing in the milling head). The operator may enter the value and confirm with **ENTER**.	**0** ÷ **9** ↵	QUOTA FF 2345
If the processing of milling operation is made at the beginning of the piece you must disable this parameter by pressing impulsively the key indicated. By pressing again the key indicated the parameter is enabled again.	**F**	QUOTA FF no

Prosegue alla pagina successiva.

Description	Keyboard	Display
It is required the introduction of the lenght (expressed in millimeters) of the milling operation performed with the head (lenght of milling operation). The operator may enter the value and confirm with **ENTER**.	0 ÷ 9 ↵	LF 1000
With grinding head The operator may enter the linear meters after which you must activate the solenoid valve to compensate the wear of the grinding wheel and confirm with **ENTER**. If the operator sets zero value, the head is disabled.	0 ÷ 9 ↵	IN 12345
N.B. If in set-up the parameter "rA" is set to 2 or 3, if you perform a change in the data of the program in use, the output U1 is activated (the eventual pieces under processing are set to zero). At each program change, or each time you change the value of the meters which have been set in the heads configurated as grinding heads, the instrument activates the related outputs for the time which has been set.		
Pressing for one second the key indicated, you disable the operation of the heads selected and on the lower display appears "disab."	F × 1 sec.	tN disAb.
To scroll the various displayings press the keys indicated.	+/- ▲ ▼	
To exit in any moment, press the key indicated.	⇔	L1 = OFF

INTRODUCTION OF THE WORKING PROGRAMS (PARAMETER OF SET-UP "CONFIGURATION OF MEMORY SET TO 1)

Description	Keyboard	Display
Access to the writing of the working programs.	⇔	PrOGr. nr. 1
		L1 = ON
The operator may choose the program in which to introduce the data of processing and confirm with **ENTER** (max. 8).	0 ÷ 8 ↵	
With lapping head The operator may enter the delay or the advance (expressed in millimeters) between the beginning of the piece and the descent of head 1 (start of lapping head processing) and confirm with **ENTER**.	0 ÷ 9 ↵	1 9.tA 1L 12345
It is required the introduction of the delay o advance (expressed in millimeters) between the end of the piece and the upwards movement of the head 1 (end of lapping head processing). The operator may introduce the value and confirm with **ENTER**.	0 ÷ 9 ↵	1 9.tA FL 2345
It is required the introduction of the delay or advance (expressed in millimeters) between the beginning of the piece and the descent of head 2 (start of lapping head processing). The operator may introduce the value and confirm with **ENTER**. Upon confirmation with **ENTER** you shall be asked to enter the delay, or advance, between the end of the end of the piece and the upwards movement of head 2 and so on up to the programming of the last head enabled.	0 ÷ 9 ↵	2 9.tA 1L 12345
With milling head The operator may enter the distance (expressed in millimeters) between the beginning of the piece and the beginning of the milling operation of head 1 (start of milling head processing) and confirm with **ENTER**.	0 ÷ 9 ↵	1 9.tA 1F 12345
If the processing of milling operation is made at the end of the piece you must disable this parameter by pressing impulsively the key indicated. By pressing again the key indicated, the parameter is enabled again.	F	1 9.tA 1F no
It is required the introduction of thedistance (expressed in millimeters) between the end of the piece and the end of the milling operation of head 1 (end of milling machine processing).The operator may introduce the value and confirm with **ENTER**.	0 ÷ 9 ↵	1 9.tA FF 2345
If the processing of milling operation is made at the beginning of the piece you must disable this parameter by pressing impulsively the key indicated. By pressing again the key indicated, the parameter is enabled again.	F	1 9.tA FF no

To be continued on next page.

Description	Keyboard	Display
It is required the introduction of the lenght (expressed in millimeters) of the milling operation performed with head 1 (lenght of milling operation). The operator may introduce the value and confirm with **ENTER**. Upon confirmation with **ENTER** you shall be asked for the introduction of the distance between the beginning of the piece and the beginning of the milling operation performed with head 2 and so on up to the programmig of the last head enabled.	**0** ÷ **9** ↵	1 9.tA LF 1000
With grinding head The operator may enter thelinear meters after which you must activate the solenoid valve to compensate the wear of the grinding wheel and confirm with **ENTER**. If the operator setsthe value zero the head is disabled.	**0** ÷ **9** ↵	1 noLA 1M 12345
N.B. If in set-up the parameter "rA" is set to 2 or 3, if you perform a change in the data of the program in use, you activate the output U1 (the eventual pieces under processing are set to zero). At each change of program, or each time you change the value of the meters which were set in the heads configurated as grinding wheel, the instrument activates the related outputs for the time which was set.		
Pressing for a second the key indicated, you disable the operation of the selected heads and on the lower display appears "d iSAb.".	**F** × 1 sec.	1 tnr tN d iSAb.
To scroll the various displayings press the keys indicated.	+/- ▲ • ▼	
To exit in any moment, press the key indicated.	↔	○ L1 = OFF

INTRODUCTION OF THE WORKING PROGRAMS (PARAMETER OF SET-UP "CONFIGURATION OF MEMORY SET TO 2, 3, 4)

Description	Keyboard	Display
Access to the writing of the working programs.	◇	PrOGr. nr. 1
		L1 = ON
The operator may choose the program in which introduce the data of processing and confirm with **ENTER**.	0 ÷ 9 ↵	
With lapping head The operator may enter the delay or the advance (expressed in millimeters) between the beginning of the piece and the descent (start of lapping head processing) of heads related to the first group (A) **ENTER**.	0 ÷ 9 ↵	A QUOTA IL 12345
It is required the introduction of the delay or advance (expressed in millimeters) between the end of the piece and the upwards movement (end of the lapping machine processing) of the heads related to the first group (A). The operator may introduce the value and confirm with **ENTER**. Upon confirmaiton with **ENTER** it is required the programming of the heads related to the following groups (B if in set-up the parameter "Memory Configuration" is set to 2, B and C if it is set to 3 and B, C and D if set to 4).	0 ÷ 9 ↵	A QUOTA FL 2345
With milling head The operator may enter the distance (expressed in millimeters) between the beginning of the piece and the beginning of the milling operation (start of milling head processing) of the heads related to the first group (A) and confirm with **ENTER**.	0 ÷ 9 ↵	A QUOTA IF 12345
If the processing of milling operation is made at the end of the piece you must disable this parameter by pressing impulsively the key indicated. By pressing again the key indicated, the parameter is enabled again.	F	A QUOTA IF no
It is required the introduction of the distance (expressed in millimeters) between la end of the piece and the end of the milling operation (end of mililng head processing) of the heads related to the first group(A). The operator may enter the value and confirm with **ENTER**.	0 ÷ 9 ↵	A QUOTA FF 2345
If the processing of milling operation is made at the beginning of the piece you must disable this parameter by pressing impulsively the key indicated. Pressing again the key indicated the parameter is enabled again.	F	A QUOTA FF no

To be continued on next page.

Description	Keyboard	Display
It is required the introduction of the lenght (expressed in millimeters) of the milling operation (lenght of milling operation) performed with the heads related to the first group (A). The operator may introduce the value and confirm with **ENTER**. Upon confirmation with **ENTER** it is required the programming of the heads related to the following groups (B if in set-up the parameter "Memory Configuration" is set to 2, B and C if set to 3 and B, C and D if set to 4).	**0** ÷ **9** ↵	A QUOTA LF 1000
With grinding head The operator may enter the linear meters after which you must activate the solenoi dvalve of group A to compensate the wear of the grinding wheel and confirm with **ENTER**. If the operator sets the value to zero, the group is disabled.	**0** ÷ **9** ↵	A MOLA IN 12345
N.B. If in set-up the parameter "rA" is set to 2 or 3, if you perform a variation of the dara of the program in use, it is activated the output U1 (the eventual pieces under processing are set to zero). At each program change, or each time you change the value of the meters which have been set in the heads configurated as grinding heads, the instrument activates the related outputs for the time which has been set.		
Pressing for one second the key indicated, you disable the operation of the selected groups and on the lower display appears "dISAb.".	**F** × 1 sec.	A tnr tN dISAb.
To scroll the various displayings press the key indicated.	+/- ▲ **YES**	
N.B. Do not use this key to scroll the parameters, because it may dispkay wrong values; if you accidentally press this key, exit from program introduction and enter again from the beginning.	▼ **NO**	
To exit in any moment, press the key indicated.	⇔	L1 = OFF

CHOICE OF THE WORKING PROGRAM TO BE EXECUTED

Description	Keyboard	Display
Access to the function of program choice.	**F** + **1**	SCELTA PrG. 1
		L5 = ON
The operator may enter the number of program to be executed and confirm with **ENTER**. The selected program shall be executed and the display shall show again the current displayings.	**0** ÷ **9** ↵	
N.B. If you select a different program form the one in use, and the parameter of set-up "automatic reset" "rA" is set to 2 or 3, upon confirmation with ENTER, it is activated the output U1 (with zero reset of the eventual pieces under processing).		
To exit in any moment the function, press the key indicated.	**F**	L5 = OFF

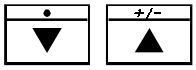
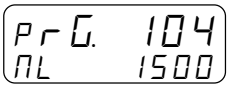
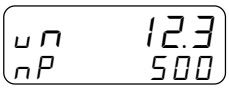
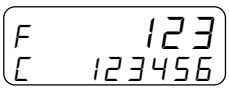
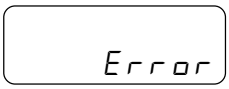
RESTART OF PROCESSING

Description	Keyboard	Display
Access to the function of restart of processing.	**F** + **2**	rESTArt LAU.
		L5 = ON
Pressing the key **ENTER** for 2 seconds, the instrument performs a restart of processing and the display shall show again the current displayings.	↵ × 2 sec.	
N.B. By restart of processing we mean the zeor reset of the image of all pieces present on the conveyor belt; the meters worked and the number of pieces made are not reset to zero.		
To exit in any moment the function, press the key indicated.	**F**	L5 = OFF

DISPLAY OF GRINDING WHEELS COUNTERS

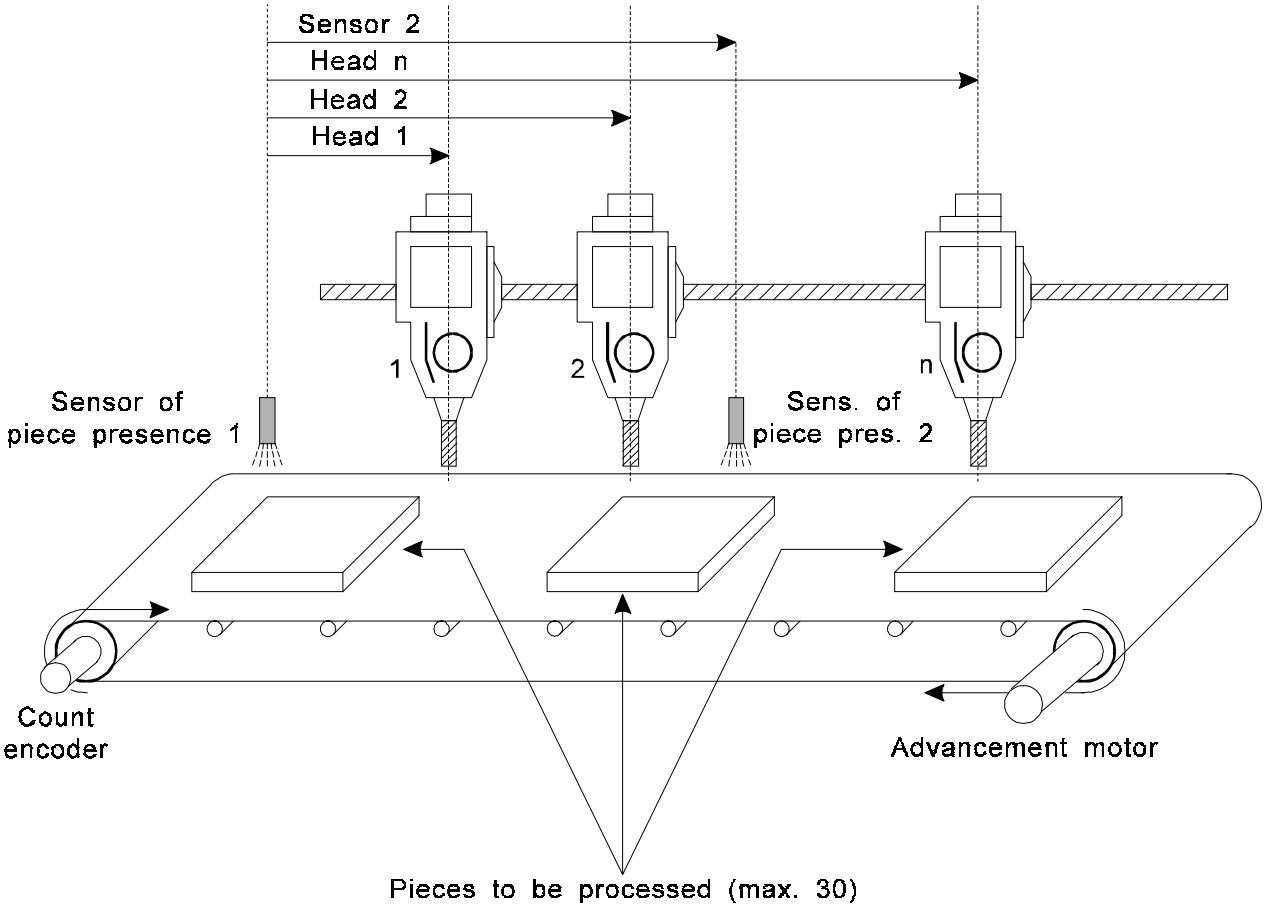
Description	Keyboard	Display
Access to the display of the grinding wheels counters. Her eis displayed the counter of the first head enabled at the processing of grinding (example head nr. 1).	F + 4	nEt. LAu. 1 1234 L5 = ON
Pressing for a second the key indicated it is loaded on the counter the value of the linear meters introduced in the working program.	× 1 sec.	
Pressing the key indicated it is displayed the following counter of grinding wheel which is enabled.	▼	nEt. LAu. 2 1234
N.B. If heads 19 and 20 are used as grinding heads, upon switching OFF their counts are not saved.		
To exit in any moment the function, press the key indicated.	F	L5 = OFF

DISPLAYS

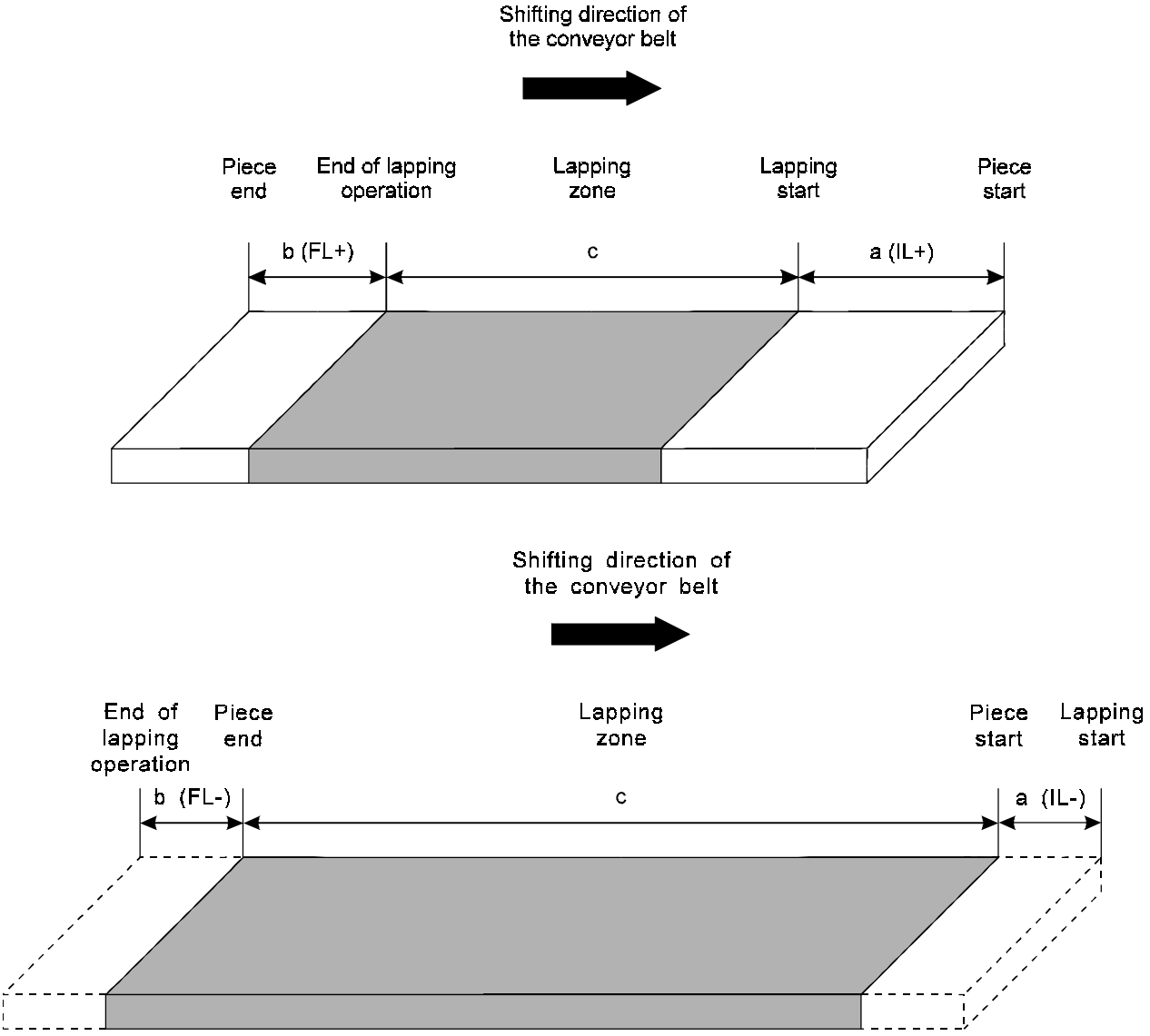
Description	Keyboard	Display
Upper right display Program in use. ***Lower right display*** Worked linear meters.		
Pressing the key indicated, it is set to zero the counter of the linear meters processed.	 × 1 sec.	
Upper right display Belt speed expressed in m / min.. ***Lower right display*** Number of processed pieces.		
Pressing the key indicated, it is set to zero the counter of the worked pieces.	 × 1 sec.	
Upper right display Frequencymeter. ***Lower right display*** Lenght of piece (conditioned by the parameter of set-up "Offset of piece presence").		
Pressing the key indicated, the count is reset to zero.	 × 1 sec.	
If the operator introduces a value not included whithin acceptable limits.		
If input I6 is activated for 2 sec., the instrument displays for one second this message.		

4 - 2 TABLES AND DIAGRAMS OF OPERATION

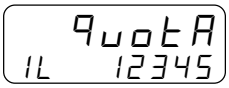
HEADS OF PROCESSING AS LAPPING AND MILLING HEADS



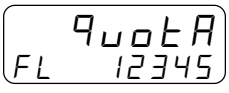
USE OF HEADS AS LAPPING HEADS



Example:
When the operator sets the processing data he must set two parameters:



The operator must enter the level "a" which identifies the advance or the delay of descent of the head from the piece start.

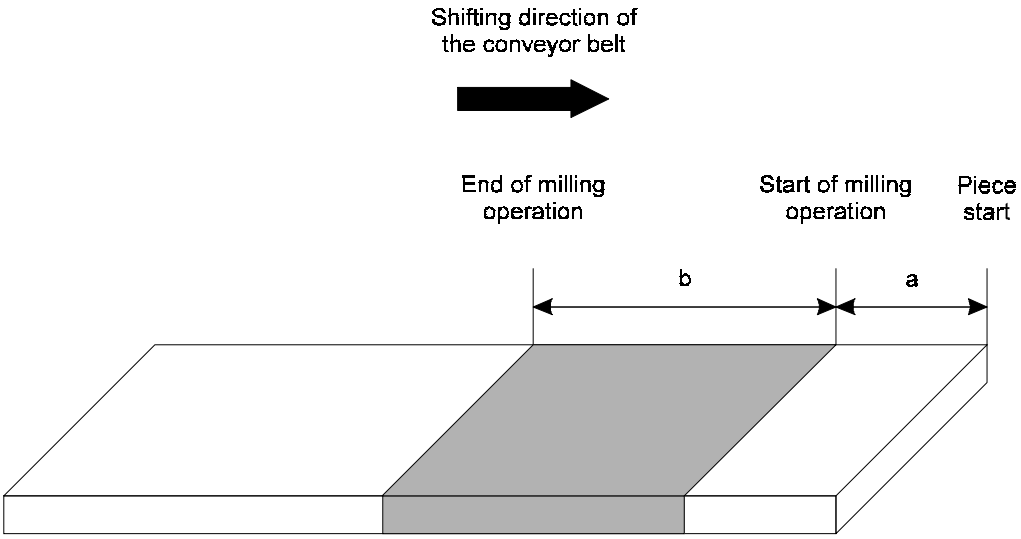


The operator must enter the level "b" which identifies the advance or the delay of upwards movement of the head compared to the end of the piece.

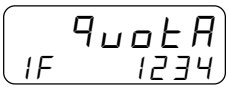
USE OF HEADS AS MILLING HEADS

The use of the head as milling head must be performed in two ways.
1) Milling operation at the beginning of the piece.
2) Milling operation at the end of the piece.

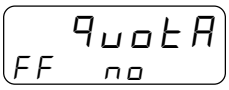
Case nº 1.



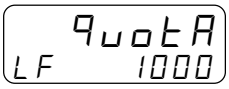
Example:
If the head 2 is confiigurated as milling head and you wish to perform a milling operation at the piece start, when the operator sets the working program he must set the following parameters:



The operator must introduce the level "a" which identifies the delay of descent of the head from the beginning of the piece.

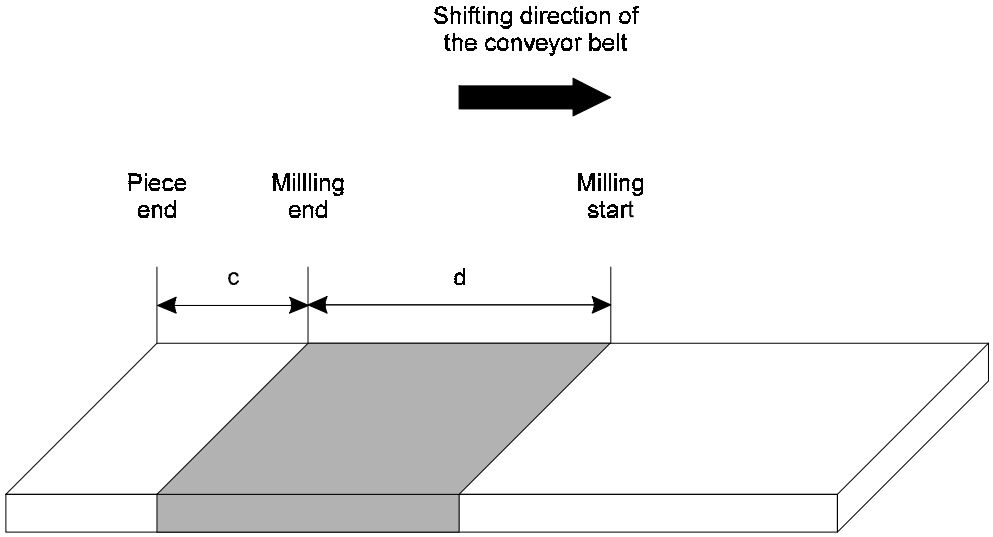


This parameter must be disabled (press the key "F")

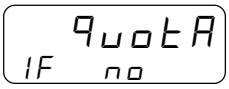


The operator must enter the level "b" which identifies the lenght of the milling operation to be performed.

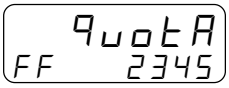
Caso nº 2.



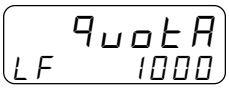
Example:
If the head 3 is confiigurated as lapping head and you wish to perform a milling operation at the end of the piece, when the operator sets the working program he must set the following parameters:



This parameter must be disabled (press the key "F")



The operator must enter the level "c" which identifies the distance between the end of the piece and the end of the milling operation.



The operator must enter the level "d" which identifies the lenght of the milling operation to be performed.

Case nº 2 has been created for user's easy comprehension, but you may consider it similar to case nº 1, with the only difference that the level "a" of case nº 1, in case nº 2 should be calculated as:
a = (Lenght of piece - c - d)

CHAPTER 5

ASSISTANCE

Diagnostic of inputs and outputs

Instructions on How to Fill Up the Technical Assistance Fax

Guarantee

5 - 1 DIAGNOSTIC OF INPUTS AND OUTPUTS

The instrument offers a diagnostic of the logical status of digital inputs and outputs; according to the numbers displayed, it is possible to understand whether an input arrives to the instrument and whether the output has been energised.
The first displaying after the access to the function of diagnostics concerns 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 (zero pulse of the transducer) is isgnalled with a C; if it is displayed, the zero pulse is not present; if it is not displayed, the zero pulse is supplied to the instrument.
The following display is related to the logical status of the digital outputs: It is valid the same correspondance (to a same number corresponds the same output); the presence, for example, of number 4 indicates that the instrument is energising the output 4

Description	Keyboard	Display
Access to the diagnostic function. The status of the inputs is displayed (ı).	F + 6	ı 12345 6
		L5 = ON
Pressing the key **ENTER** you switch to the display of the outputs status (o).	↵	o 123 67 89Abcd
Pressing the key **ENTER** you switch to the display of the status of expansion outputs (u).	↵	u EFGH ı LM nPQrS
To exit the function of program choice press **F**.	F	L5 = OFF

5 - 2 INSTRUCTIONS ON HOW TO FILL UP THE FAX FOR TECHNICAL ASSISTANCE

In order to be able to provide a quick, specific and quality assistance, we need your help.
If you need QEM's assistance to face the eventual troubleshooting in your applications and even though you performed all instructions indicated in the manual of "Installation, maintenance and assistance", the problem still continues, please fill up every blank of the fax enclosed to the manual of Installation, maintenance and assistance and send it to QEM's Assistance Department.
In this way you shall allow our technicians to get the necessary elements to understand your problem (avoiding thus expensive telephone calls).
We thank you for your cooperation and here at QEM's we really wish you a good job.

REMARK

If you must send an instrument to be repaired, please strictly follow our instructions indicated here below:

- If possible, use the original packaging; in any case the packaging must protect the instrument against shocks due to transport.
- Insert into the package a detailed description of the malfunction you found and the part of wiring diagram which includes the instrument. In case the problem you discovered concerns data storage, please also include the instrument's programming (set-up, working levels, auxiliary parameters, etc.).
- If you need it, please explicitely require the quotation of charges for the repairing: if you do not ask for it, the charges shall be calculated as a whole.
- Our technicians shall give priority to the repairing of those instruments which have been sent according to the items listed above.

5 - 3 GUARANTEE

The guarantee is conform to the definitions of the general sales conditions.

REMARKS

REMARKS