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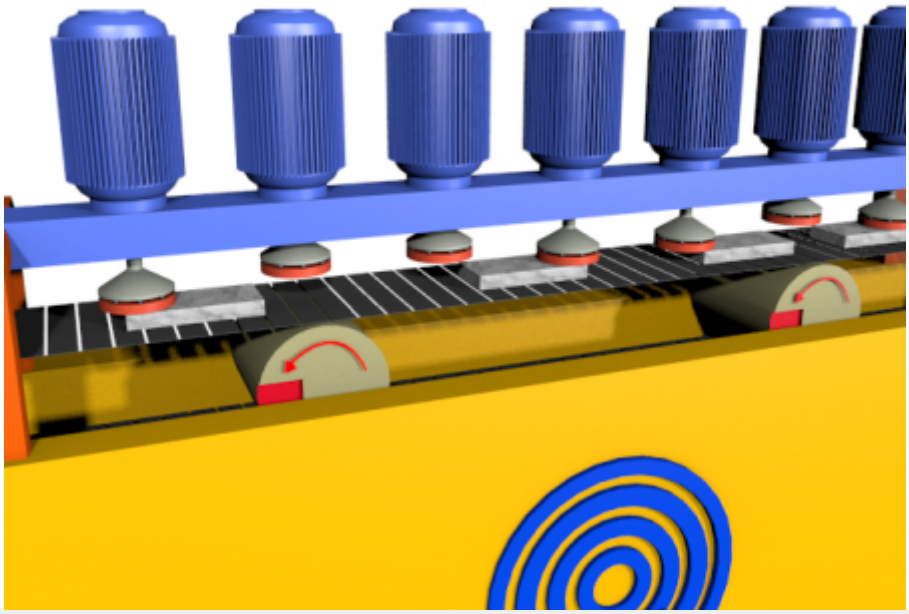

Document	**MDI_P1P20FH20-001**
Description	Installation Manual
Drawn up by	Michele Sandri
Approved by	Gabriele Bazzi
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	http://www.qem.eu/doku/doku.php/strumenti/qmoveplus/j1p20/mimj1p20fx
Language	English

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1. Description

Il software **P1P20FH20 - 001**, installato nell'hardware *Qmove **J1-P20-FH20***, realizza l'automazione di macchine **levigatrici/levigabordi** .

Caratteristiche principali

- lo strumento comanda **19 teste** di lavoro
- controlla l'**avviamento sequenziale dei motori** (per limitare l'eccessivo richiesta di corrente)
- gestisce l'eventuale **spostamento del ponte**
- per ogni testa di lavorazione è possibile impostare gli **anticipi e i ritardi di lavorazione**, sia all'**inizio**, sia alla **fine** del pezzo
- I comandi di salita/discesa delle teste di levigatura, vengono calcolati **automaticamente al variare della velocità** del nastro trasportatore.
- lo strumento conta i **metri lavorati** ed è in grado di lavorare fino a **30 pezzi** presenti contemporaneamente in macchina.

Altre Caratteristiche

- HMI con touchscreen
- Tasti funzione
- Programmi di lavoro
- Messaggi di allarme
- Messaggi di warning
- Reset dei pezzi difettosi
- Reset di tutti i pezzi in lavorazione
- Compensazione dell'offset del finecorsa di presenza pezzo
- Modo di lavorazione delle teste
    1. Levigatura
    2. Fresatura
    3. Molatura
    4. Spazzolatura
    5. Getto d'acqua

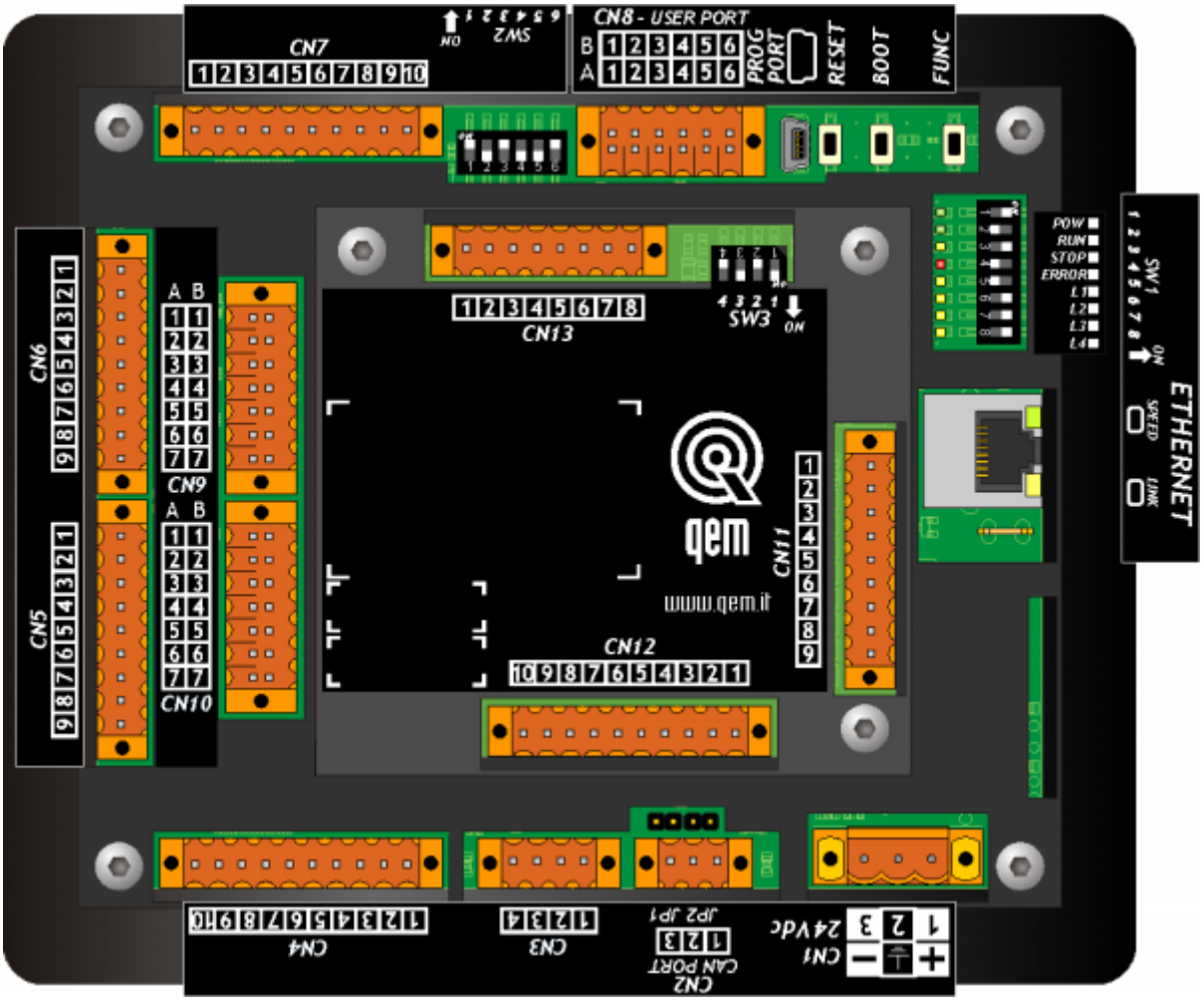
Opzioni e caratteristiche di possibile futura implementazione

- Con l'installazione dei moduli RMC1XX sarà possibile automatizzare **2 o 4 calibratori**
- Con l'installazione dei moduli RMC1YY sarà possibile leggere la **corrente di ogni testa**
- E' possibile dotare lo strumento del software necessario per realizzare delle **lavorazioni di bocciardatura**
- E' possibile dotare lo strumento di funzionalità software di **abilitazione/disabilitazione di ogni singola testa**
- E' possibile dotare lo strumento di porta **Etnernet, che consente di trasmettere i dati della macchina** agli uffici di programmazione della produzione .
- **Risparmio energetico :** accensione dei motori solo durante la lavorazione
  Nota : in questo caso si dovrà utilizzare un modulo di espansione degli I/O

Note Se il cliente è interessato a queste opzioni e caratteristiche, oppure altre di Sua scelta, contattare l'Ufficio Commerciale della QEM (info@qem.it)

2. Hardware J1-P20-FH20

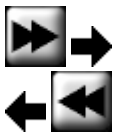
F1	MAIN MENU
F2	RESERVED SETUP (enter password)
F3	WORK PROGRAMS
F4	RESET ALL SLABS
F5	RESET SELECTED SLABS
F6	ALARMS
F7	ESC TO PREVIOUS SCREEN

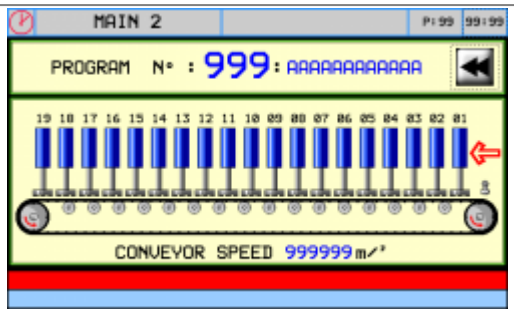


2.1 Standard Symbols & Buttons

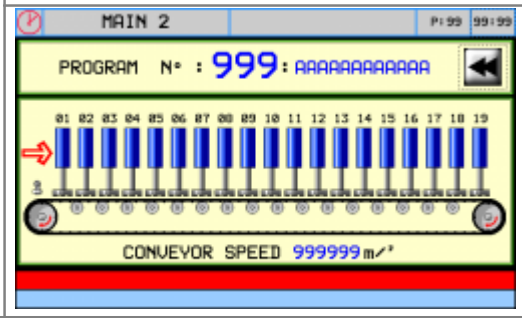
Button	Description	———————-	Top Bar Symbol	Description
	Confirm Popup entry			Manual
	Popup Select			Alarm
	Previous screen & Next screen			Automatic
	Scroll list			Function mode
	Reserved Area			Not initialized
	Quit without saving			Setup Locked/Unlocked
	Confirm setting			Calibration
	Green settings can be changed			
- - - - - - - - - - - -	- - - - - - - - - - - - - - - - - - - -	- - - - - - - - - - - - - - - - - -	- - - - - - - - - - - - -	- - - - - - - - - - - - - - - - - - - -

2.2 MAIN SCREEN





Right IN



Left IN

Top Bar (grey)
- Machine State
- Page name
- Page number
- Time

Bottom Bars
- Alarms (red)
- Warnings (light blue)

3. Startup

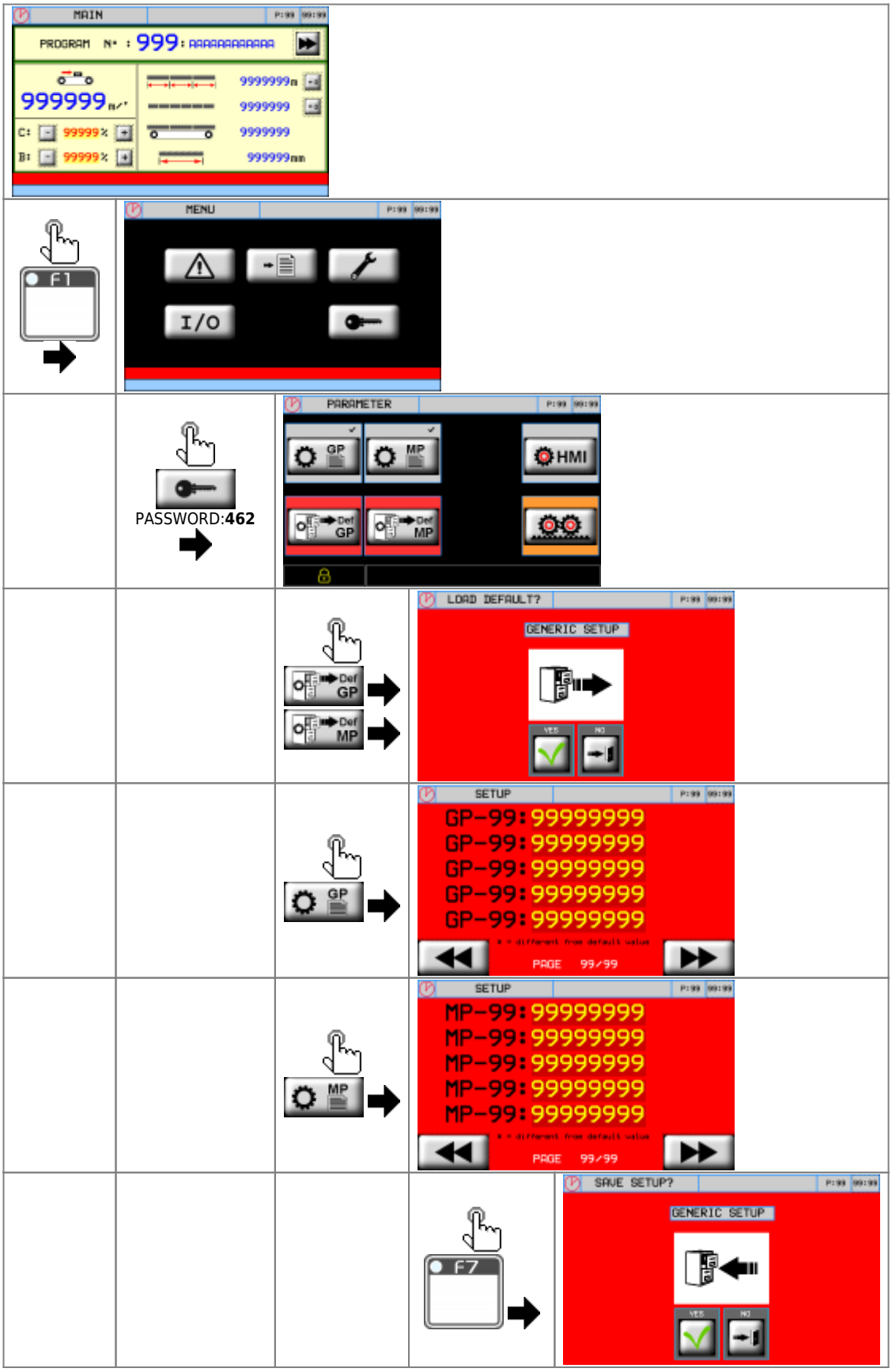
Important

hardware, wiring, general info, system info: Hardware manual

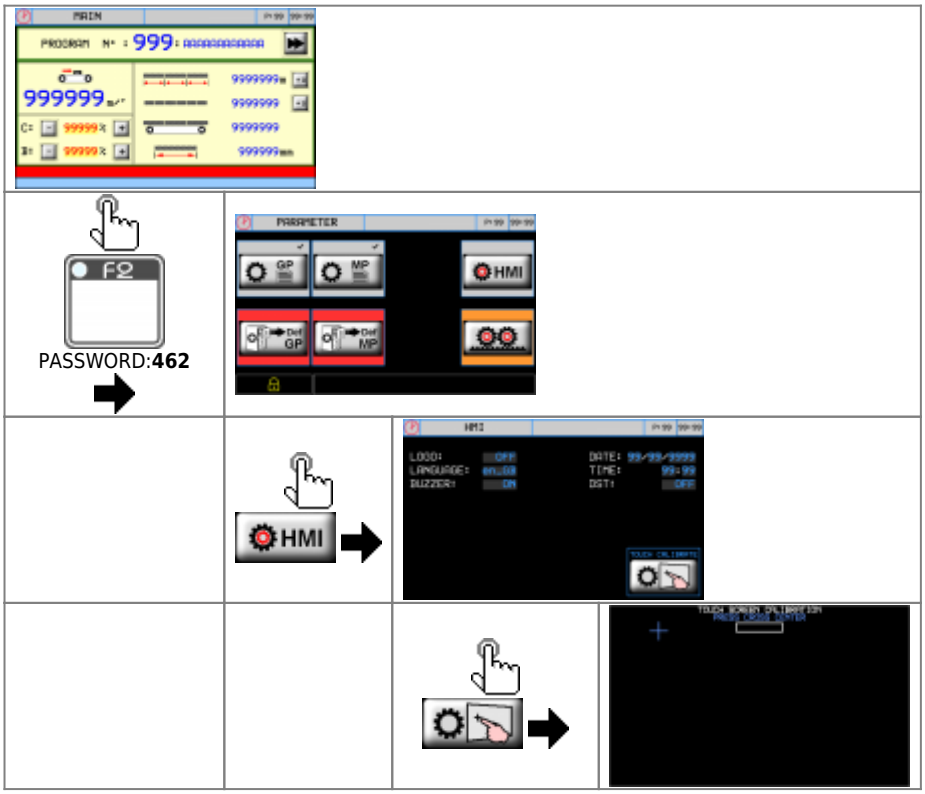
★Per una corretta messa in funzione della macchina, si raccomanda di seguire l'ordine delle attività di seguito descritte e illustrate

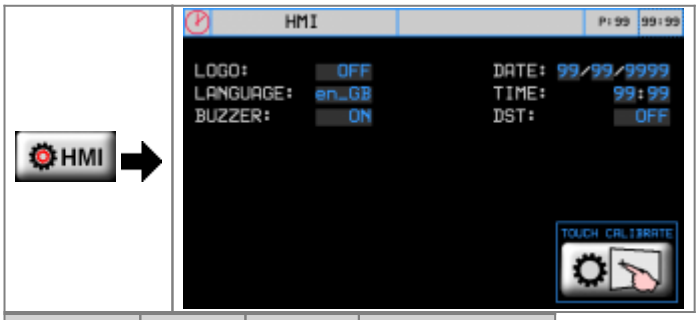
1. Control the application software code in the **Start screen**
2. Controllare la funzionalità del Touch in **HMI Setup**
3. Load the **Default Parameters**
4. Control the **General Parameters - GP** and **Machine Parameters - MP**
5. Check the **wiring** in **Diagnostic** (see **Typical Wiring Diagram**)
6. Check the **Beam direction** forward/backward in the Manual screen
7. Go to **Calibration**
    1. Check the count direction and calibrate the Belt resolution in **Belt Resolution**
    2. Calibrate the **Maximum Belt Speed Calibration**
    3. Calibrate the **Slab IN limit switch offset**
    4. Calibrate the **Head Calibration**
        1. Work diameter
        2. Set the **head distances from the slab IN limit switches**
        3. Set the **Dynamic head Up/Down correction** to the Belt speed
    8. Carry out the **Backup Procedure**
    9. Carry out the **Archiving Procedure**

1. **4. Setup**

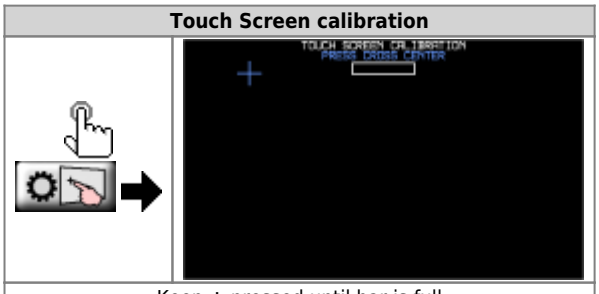

MAIN
PROGRAM N° : 999: AAAAAAAAAA
999999 m/'
9999999 m
9999999
9999999
999999 mm
C: 99999 %
B: 99999 %
F1
MENU
I/O
PASSWORD:462
PARAMETER
GP
MP
HMI
Def GP
Def MP
LOAD DEFAULT?
GENERIC SETUP
YES
NO
SETUP
GP-99: 99999999
PAGE 99/99
MP-99: 99999999
F7
SAVE SETUP?

1. **4.1 HMI Setup**





Parameter	*Default*	*Range*	*Description*
LOGO	ON	OFF ~ ON	**OFF**: No logo **ON**: logo
LANGUAGE	en_GB	-	**en_GB** : English **it_IT** : Italiano
BUZZER	ON	OFF ~ ON	**OFF**: no buzzer **ON**: buzzer
DATE	-	-	Set the date
TIME	-	-	Set the time
GMT TIME	OFF	OFF ~ ON	**OFF**: no legal time **ON**: legal time

Touch Screen calibration

Keep **+** pressed until bar is full

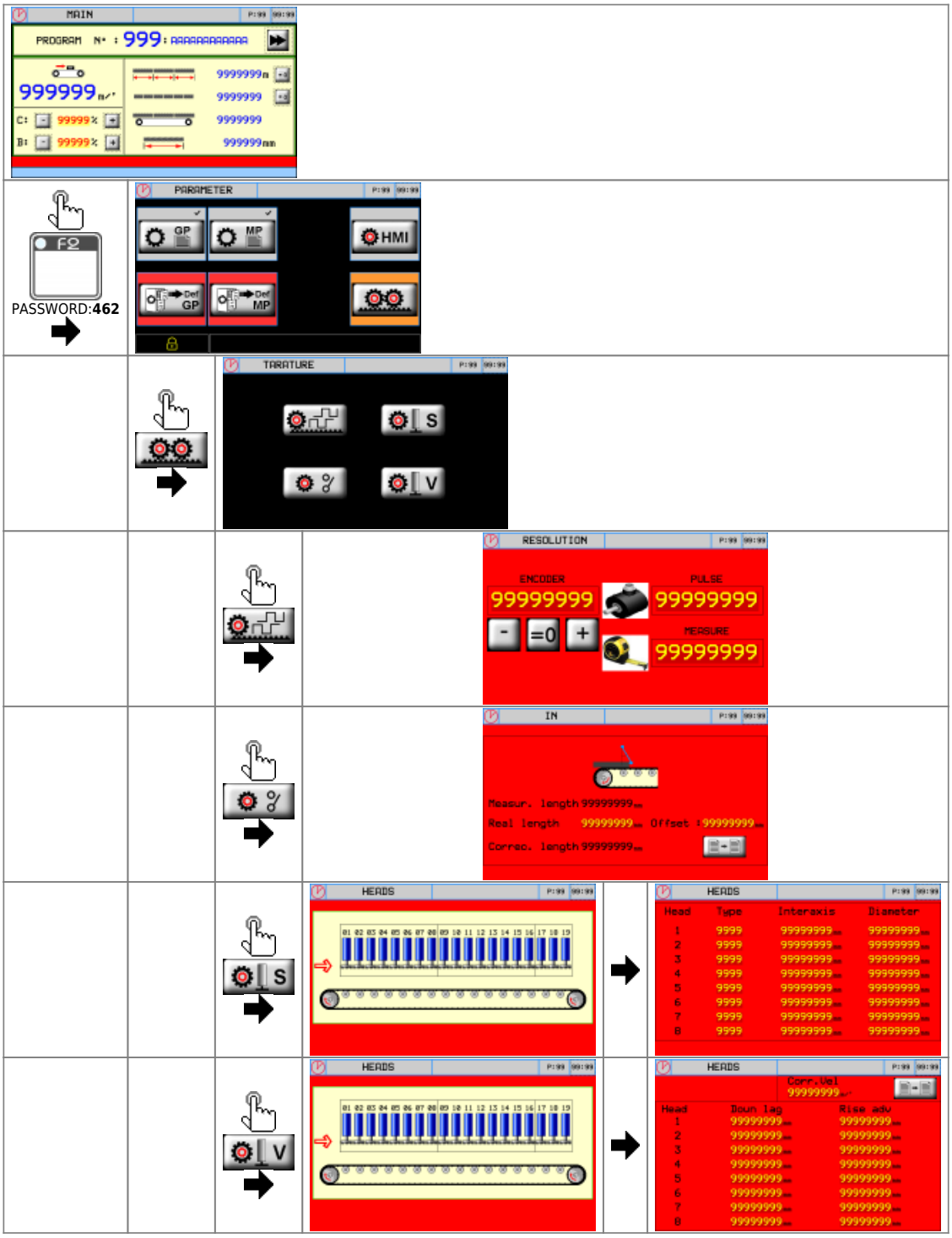
1. **4.2 General Parameters - GP**

Parameter	*U.M.*	*Default*	*Range*	*Description*
GP-01	-	4000	P (Pulse)	**Encoder pulse** reading x 4, corresponding to length in **Measure** .
GP-02	-	400.0	M (Measure)	**Length** corresponding to encoder pulses (**Pulse**) - P/M is the resolution. It must be 0.000935 ~ 1.000000. - Pulse ane Measure are set by the procedure Axis Resolution.
GP-03	-	1	0 ~ 3	**Decimal point** for Belt **speed** **0**=xxxx, **1**=xxx.x, **2**=xx.xx, **3**=x.xxx
GP-04	-	0	0 ~ 1	**Decimal point** for Belt **misura** **0**: xxxx, **1**: xxx.x
GP-05	-	1	0 ~ 1	**Heads Position** at belt speed below the minimum (GP-06) **0** = heads **remain DOWN** . **1** = heads **go to UP** .
GP-06	-	0.1	0 ~ 999999	**Minimum Belt speed**
GP-07	-	0.5	0 ~ 999999	**Speed Delta**, when above the filter is applied (GP-08).
GP-08	msec	50	0 ~ 9999	**Filter** on Belt speed
GP-09	-	0	0 ~ 5	**Sampling Time** of the frequency meter (used to determine the belt speed) **0** = 240 ms, **1** = 480 ms, **2** = 24 ms, **3** = 120 ms, **4** = 960 ms, **5** = 1920 ms.
GP-10	-	0	0 ~ 1	**0** = **Save** slabs when machine OFF **1** = **Do not save** slabs when machine OFF
GP-11	-	0	0 ~ 1	**Slab IN** (input I09) below **minimum speed** . **0** = YES **1** = NO
GP-12	mm	10.0	0 ~ 9999	**Distance**, if below two adjacent slabs are **worked in continuous** The slab counter still counts 2 slabs
GP-13	msec	1000	0 ~ 9999	**t1 time** for motor start output
GP-14	msec	1000	0 ~ 9999	**t2 time** between one motor start and another
GP-15	msec	1000	0 ~ 9999	**t3 time** between the last motor start and O24 output for end of motor start sequence
GP-16	-	0	0 ~ 1	**Abrasive Change Position** **0** = on backward LS **1** = on forward LS
GP-17	-	0	0 ~ 1	**Enclosures** contact logic **0** = NC **1** = NO

1. **4.3 Machine Parameters - MP**

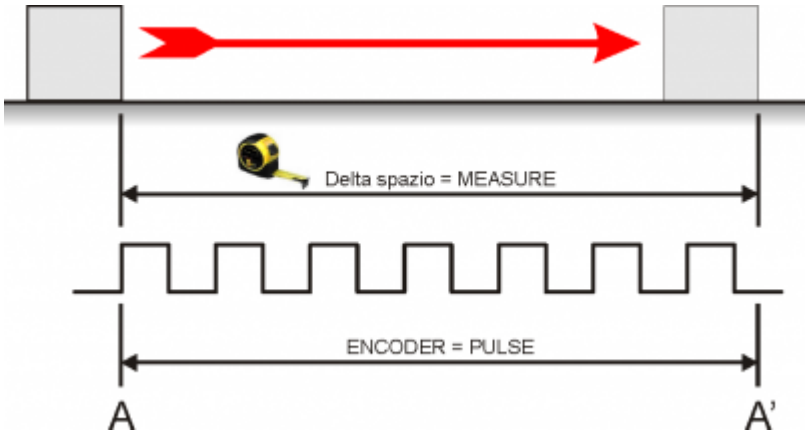
Parameter	*U.M.*	*Default*	*Range*	*Description*
MP-01	-	1	1 ~ 19	Number of heads
MP-02	mm	0	0 ~ 999999	Machine length Distance between the slab IN limit switch and end of the machine
MP-03	-	0	0 ~ 4	Belt **Command/Control** **0** - External Command/Control - speed reading **1** - **Command** - speed reading - analog out **2** - **Command** - speed reading - analog out (set by potentiometer). **3**: - **Command & Control** by encoder feedback - speed reading - analog out - Start/Stop from controller **4**: - **Command & Control** by encoder feedback - speed reading - analog out (set by potentiometer) - Start/Stop from controller
MP-04	-	0	0 ~ 1	**Beam Command** **0** = **External Control**. **1** = **Beam Control** with min & max limit switches and slowdown (Il movimento avviene con almeno un pezzo in macchina).
MP-05	-	0	0 ~ 1	**Motor Start Sequence** . **0** = NO **1** = yes
MP-06	-	-	-	-
MP-07	-	-	-	-
MP-08	m/min	5.0	0 ~ 5.0	**Maximum Belt speed** (AO1 = 10 Volt) (MP-03 > 0)
MP-09	m/min	3.0	0 ~ 5.0	**Max Belt Speed in automatic** (MP-03 > 0)
MP-10	m/min	1.0	0 ~ 5.0	**Belt Jog speed** (MP-03 > 0)
MP-11	-	0	0 ~ 1	**Beam start mode** in automatic (MP-04 = 1). **0** = Start with belt **1** = Start when slab IN
MP-12	s	1.000	0 ~ 999.0	**Tempo di ritardo** tra la Belt start and Beam start (MP-05 = 1)
MP-13	%	5.0	0 ~ 100.0	**% maximum speed** of Beam in automatic
MP-14	%	5.0	0 ~ 100.0	**Slow speed** of Beam in automatic (MP-04 = 1)
MP-15	%	50.0	0 ~ 100.0	**Jog speed** of Beam (MP-04 = 1)
MP-16	s	2.000	0 ~ 999.0	**Beam stop time** at max & min limit switches (MP-04 = 1)
MP-17	-	0	0 ~ 1	**Slab IN Direction** **0** = right **1** = left

1. **4.4 Calibration**



1. **4.4.1 Belt resolution**

Procedure



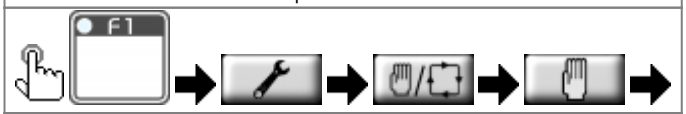
- Press + and check the ENCODER box increases(Analog out +1 Volt)
- Press - and check the ENCODER box decreases (Analog out -1 Volt)
- A - A' = The maximum space
- Take note of the start position (A)
- Zero-set the **ENCODER**: = 0
- Move the axis from A to A'
- Take note of the reading in **ENCODER** box and write it in the **PULSE** box
- Measure the distance from A to A' = **space delta**
- Enter the A - A' **space delta** in the **MEASURE** box

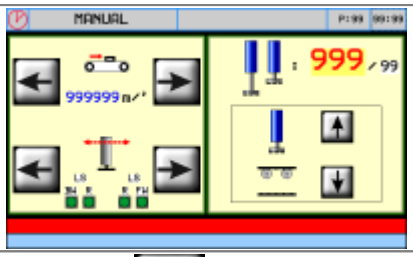
Important:

- **PULSE** must alway be greater than **MEASURE** (the best is “MEASURE x 10 = PULSE”)
- Enter **MEASURE** in the selected **unit measure**. E.G. if a unit measure of 1/10mm is selected and the **space delta** is 133.5mm, enter 1335 in the **MEASURE** box

1. **4.4.2 Maximum Belt Speed calibration**

Set the same speed in MP-08 and MP-10





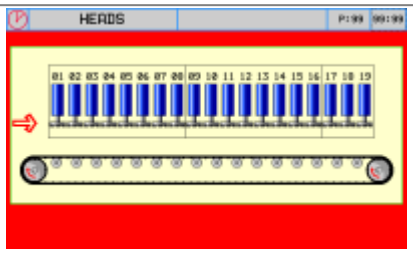
start the belt

Take note of the speed

Set the speed in MP-08

Set MP-09 and MP-10 as required

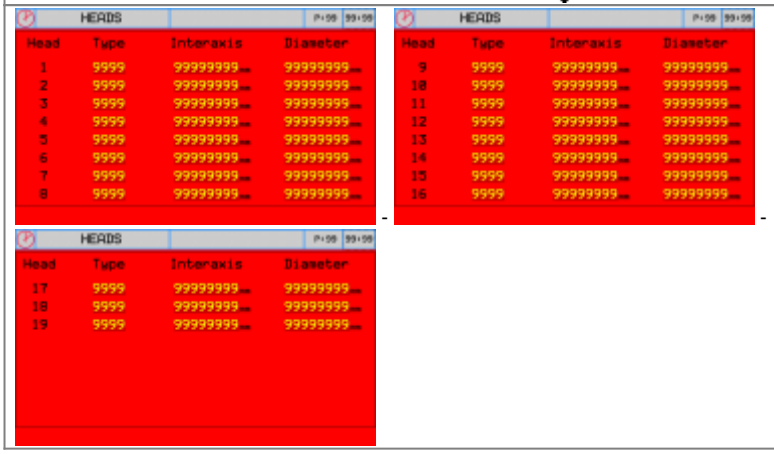
4.4.3 Head Calibration



OR

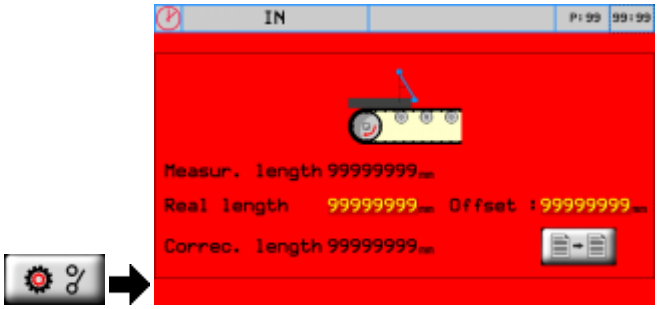
MP-16 = Slab infeed direction

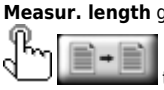
head group box



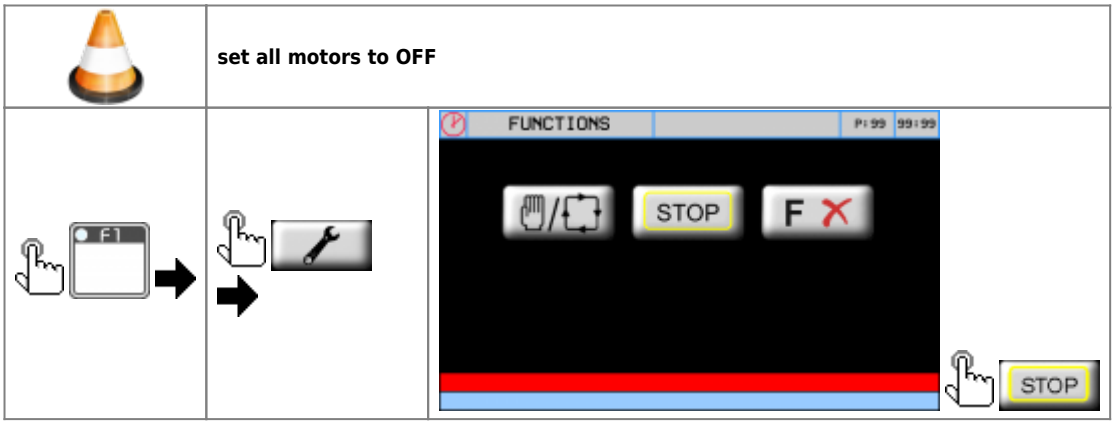
Parameter	*U.M.*	*Default*	*Range*	*Description*
Type	-	-	0 ~ 5	Head function modes **0**: OFF **1**: Polishing **2**: Milling **3**: molatrice **4**: Brush **5**: Air/water jet
Interaxis	mm	-	0 ~ 99999.0	Distance from **slab IN limit switch** to the **head center**
Diameter	mm	-	0 ~ 99999.0	Work diameter

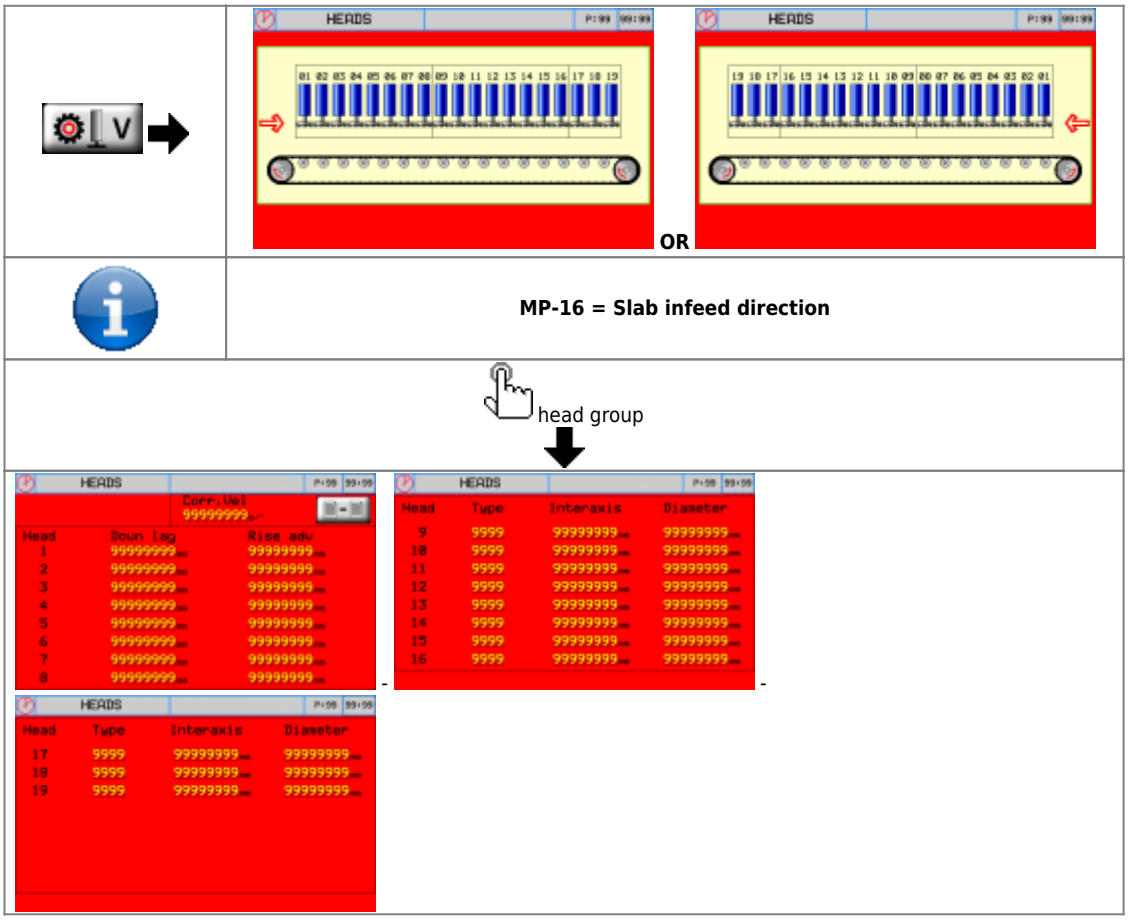
1. **4.4.4 Slab IN limit switch offset**



1. Measure the length of a slab and enter in **Real length**
2. **Start** the belt so the controller reads the slab length by the slab In limit switch
3. **Measur. length** gives the length reading
4.  to set the limit switch offset
5. The offset can also be changed manually
6. Correc. Length shows the new corrected length

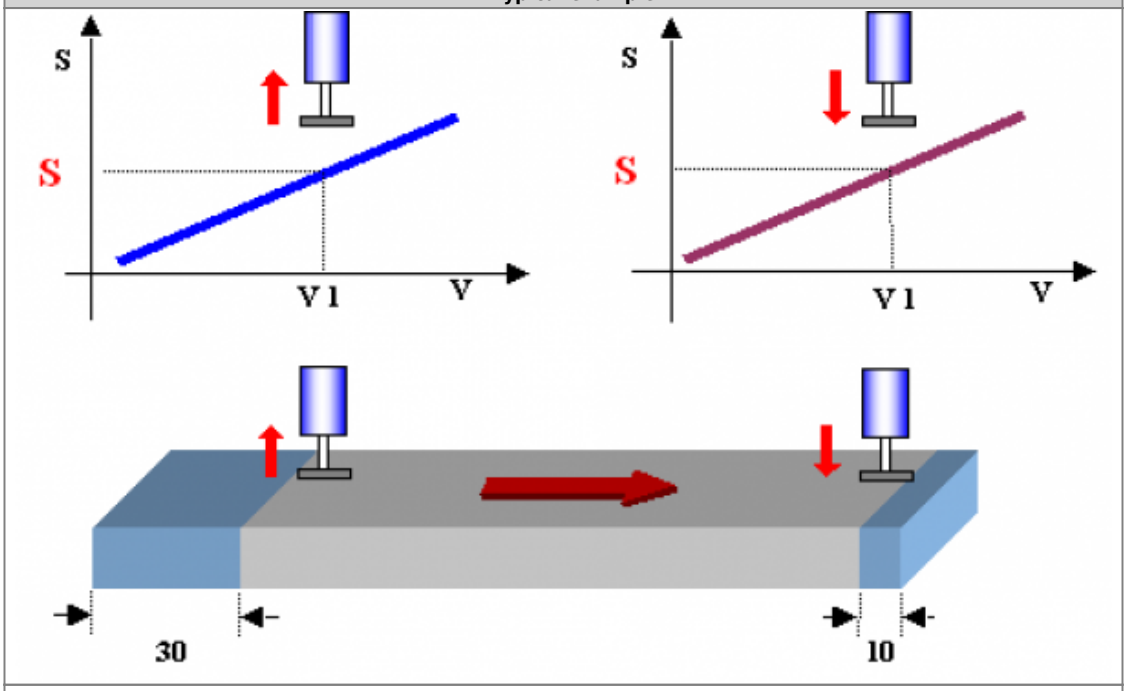
1. **4.4.5 Dynamic head Up/Down correction**





Parameter	*U.M.*	*Default*	*Range*	*Description*
SPEED CORR.	m/min	3.0	0 ~ 5.0	**Reference speed** for Dynamic calibration
Down lag	mm	-	-999.0 ~ 999.0	(+) **Delay distance** for head DOWN on **slab front** .
Rise adv	mm	-	-999.0 ~ 999.0	(+) **Advance distance** for head UP before **slab end** .
	Copy settings to all heads			

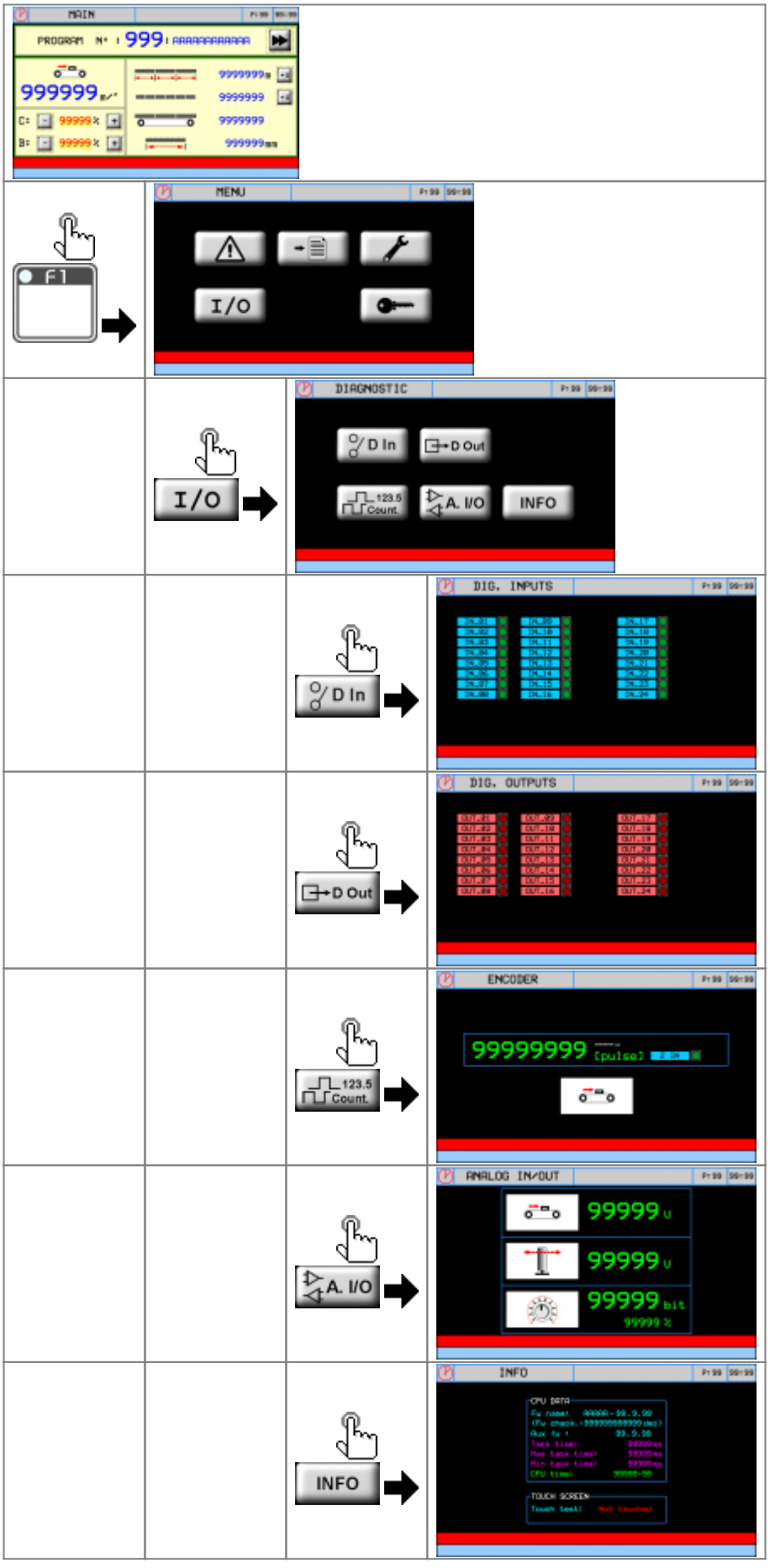
A Typical example



To Polish ALL the slab at V1 = 3 m/min, set **Downlag = 10**, **Rise adv = - 30**

The lags and advances for other speeds are calculated automatically

1. **5. Diagnostic**

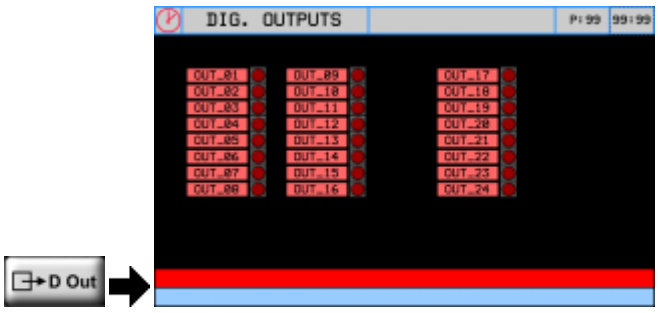


1. **5.1 Digital Input diagnostic**

INPUT	NAME	LOGIC	DESCRIPTION	
I01	Emergency	NC - O	**Stop**	with Alarm message
I02	Not used	-	-	
I03	Start motors	NO - C	**Start** motor sequence	con MP-05 = 1
I04	Power system enabled	NO - C	Machine ready	-
I05	NE	NC - O	In automatic, stop beam and belt /Reset the “motor rotation startup error” message	-
I06	Overload cutouts	NC - O	Chain of overload cutouts	with Alarm message
I07	Enclosures	NC - O	Chain of enclosures	
I08	Air pressure switch	NC - O	No air	
I09	Slab IN	NO / C	**Limit switch** for slab **length acquisition**	
I10	Not Used	-	-	
I11	Not Used	-	-	
I12	Inverter fault	NC - O	Inverter alarm	with Alarm message
I13	Beam Forward LS	NC - O	**Beam forward limit switch** with **fast speed**	con MP-04 = 1
I14	Beam Backward LS	NC - O	**Beam backward limit switch** with **fast speed**	
I15	Beam Forward Slow LS	NO - CC	**Beam forward limit switch** with **slow speed**	
I16	Beam Backward Slow LS	NO - CC	**Beam backward limit switch** with **slow speed**	

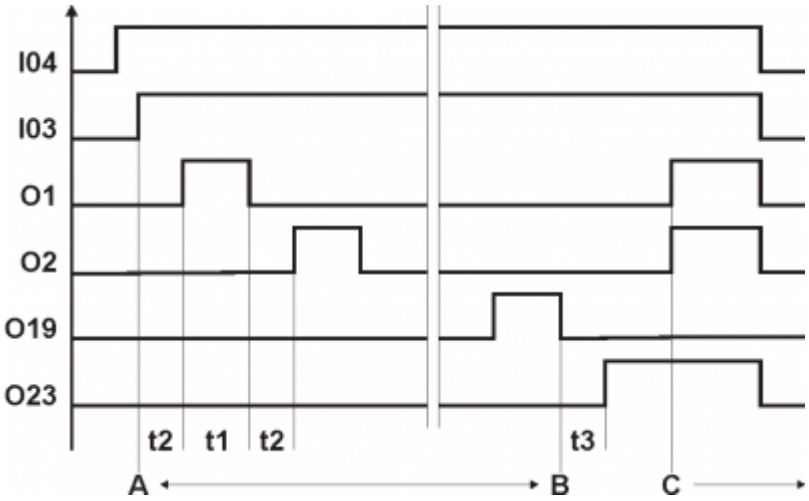
Note
★ NC - O = **N**ormally **C**losed contact, action when the contact **O**pens
★ NO - C = **N**ormally **O**pen contact, action when the contact **C**loses
★ NO - CC = **N**ormally **O**pen contact, action when the contact **C**losed in **C**ontinuous

5.2 Digital Output diagnostic



N°	DESCRIPTION
O1~O19	Head UP/DOWN and motor start commands
O20	Belt direction - **OFF** forward - **ON** backward
O21	Beam direction - **OFF** forward - **ON** backward
O22	**Water valve** output
O23	Trips when **slabs < 30** in machine (upline machine consensus)
O24	**Machine OK** output

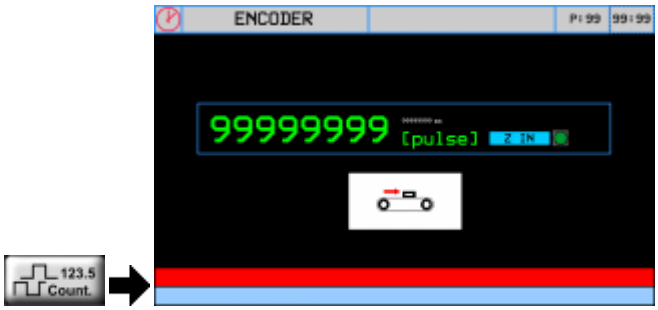
1. **5.3 Operating Diagrams**



- **t1** one motor start time
- **t2** time between one motor start and another
- **t3** at end of motor starts(O19 = OFF), wait **t3 time** for O23 = ON
- **O23 = ON** end of motor starts and OK to start loading slabs upline
- **A - B** start head motors time
- **C** time before machine is ready for work

5.4 Belt encoder count

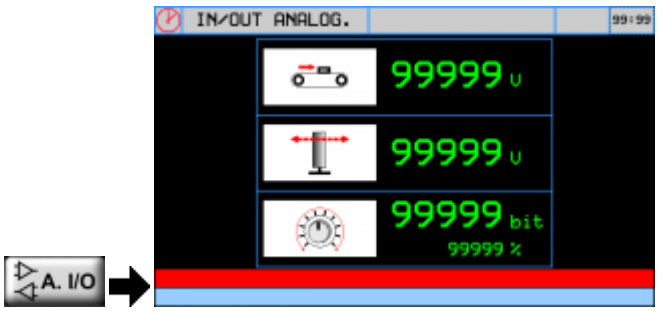
N°	NAME	DESCRIPTION
PHA1/PHB1	Belt encoder signals	- to measure the **slab lengths** and **establish their position** on the belt - measure the **feed speed of the slabs** and calculate the head Up/Down **advances - delays**



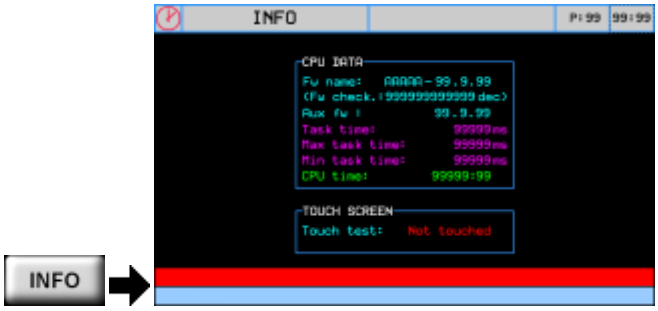
Note:
• **Z_INP** led signals the Z pulse input state (**not used** in this application).
• Pulse : Encoder pulses x 4

5.5 Analog Inputs and Outputs

N°	NAME	DESCRIPTION	
AI1	Analog input, belt speed variation (analog out AO1).	Potentiometer input. Reading in bit and percentage	
AO1	Out 0~10 Volt	Inverter command	Belt
AO2			Beam

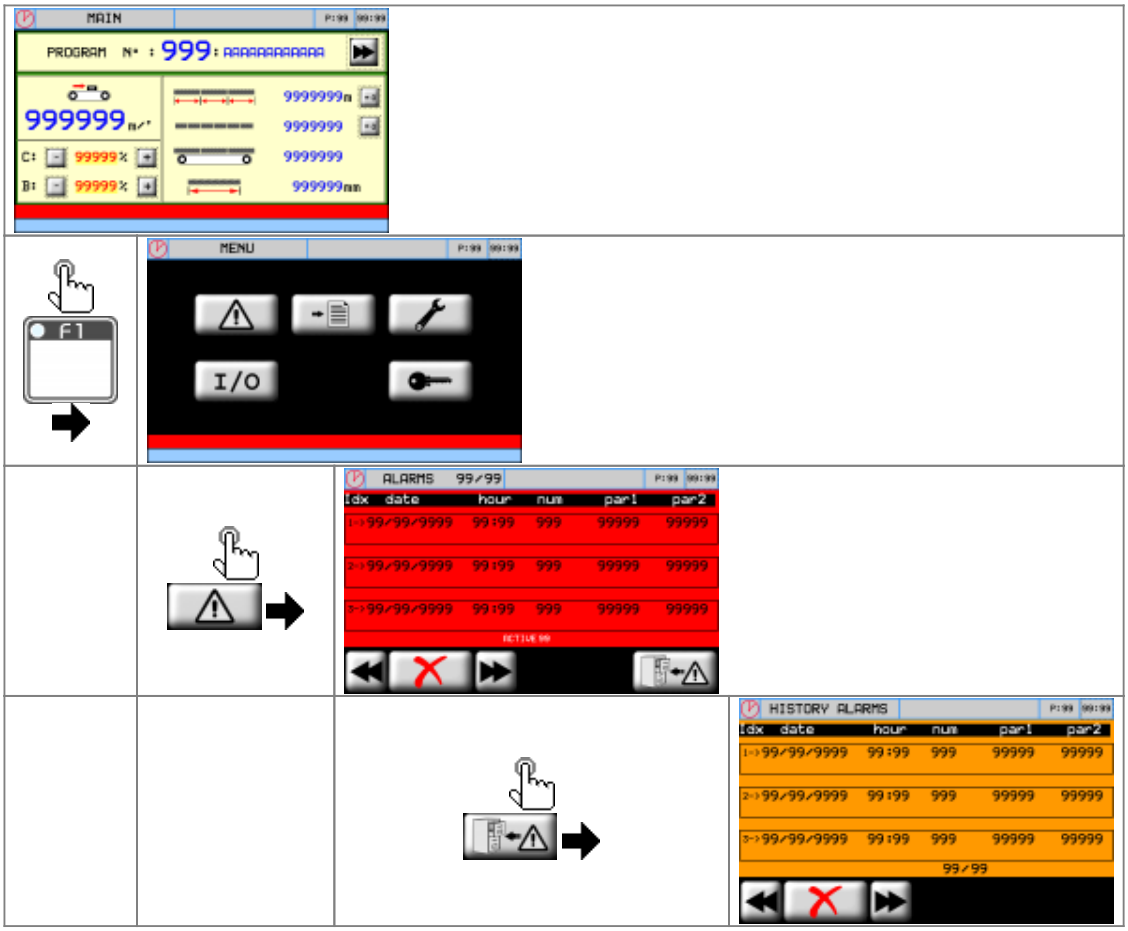


5.6 System Info

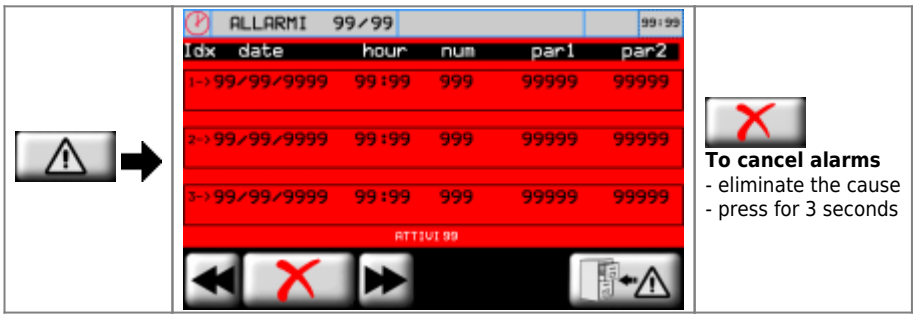


Fw name	firmware and checksum names
Aux fw	I/O module firmware (not used in this application
Task time	CPU cycle time: **Minimum, Medium, Maximum**
CPU time	CPU run time (hh:mm)
Touch screen	Test touch

1. ## 6. Alarms



6.1 Alarm list



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Message	Cause	Input
Emergency pressed	Check the emergency button and line	I01
Inverter fault	Control the inverter	I12
Belt encoder fault	Control the belt encoder (Acive only with MP-03 > 2).	
Overload cutouts	Check the overload cutouts	I06
Enclosures	Check the enclosures	I07
No air	Check the air pressure switch	I08
	the **Belt encoder fault** alarm trips automatically if the belt moves less 2 u.m. in 5 seconds (less than 60 mm/min)	

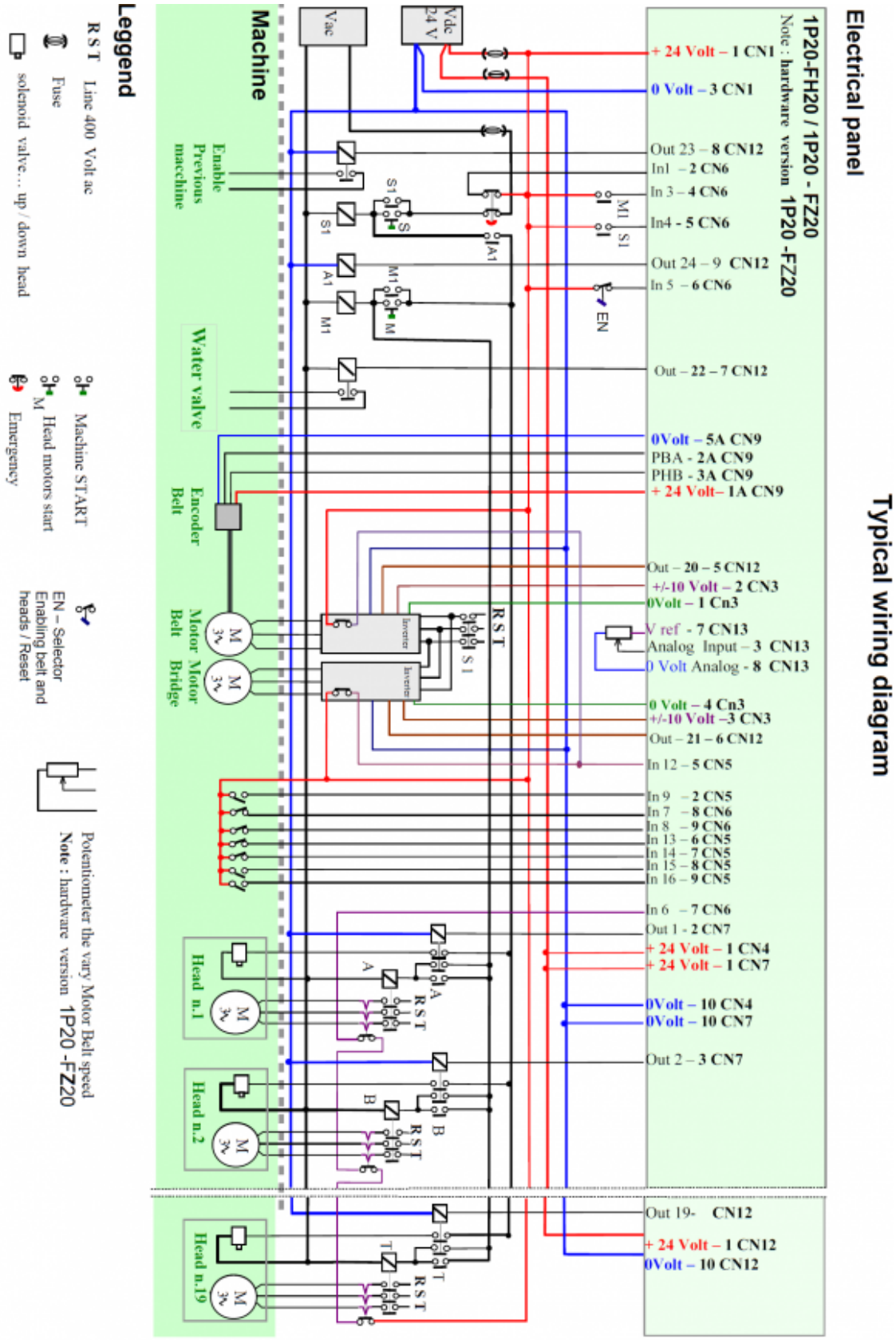
1. **6.2 Alarm history**

<table>
<tr>
<td> </td>
<td>
</td>
<td>
To cancel alarms
- eliminate the cause
- press for 3 seconds</td>
</tr>
<tr>
<td> </td>
<td colspan="2">Maximum 60 alarms</td>
</tr>
</table>

7. Warnings

Message	Description
Too many slabs in the machine	There are more than 30 slabs in the machine
Waiting for power system...	Waiting for the power system to startup (MP-08 enabled)(I04 = ON)
Going to change abrasive position...	The beam has been commanded to move to change abrasive
Power system disabled	Power system disabled (I04 = OFF).
Caution Motors off	Belt start attempted with motors off

1. **8. Typical wiring diagram**



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