# Índice

~~BOZZA~~

# P1P51FC20 - 006 : Operation

# 1. Informations

## Release

This document is integrally valid except for errors or omissions.

| Release | Description | Date |
|---|---|---|
| 1.0 | New manual. | 28/06/13 |

# 2. Hmi

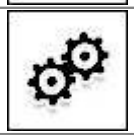
## Conventions adopted

The conventions adopted for the whole operator interface are:

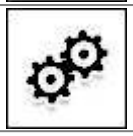
- The red-coloured (yellow-coloured in the set-up) values can be modified by the operator. To modify them, you can touch them to set them in the Entry state and use the virtual keyboard to enter the data, followed by the key  to confirm.
- Some parameters ensure a choice between two or more settings. To select the required setting use the key  .

Function keys:

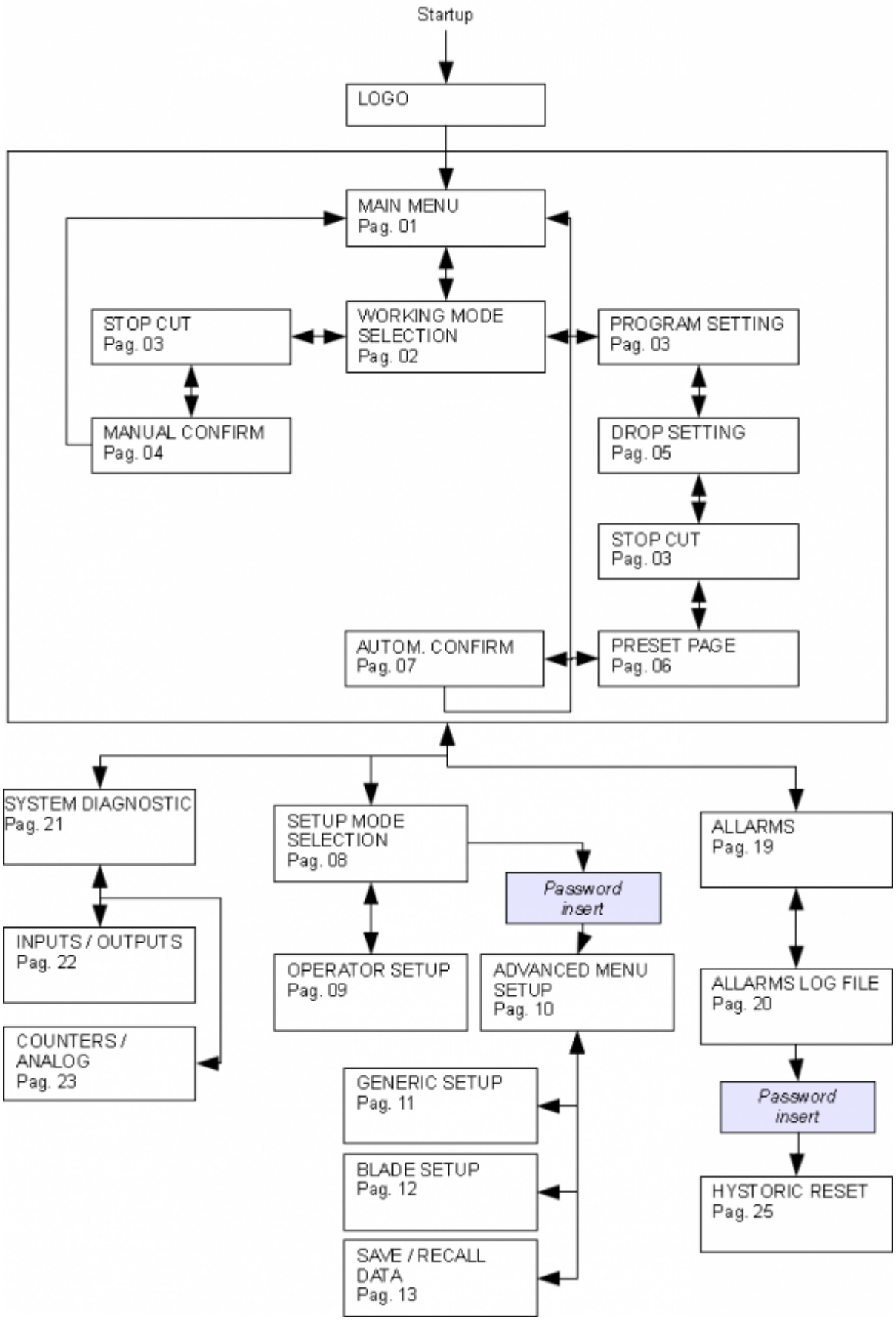
**The function keys are enabled in each page.**

| *Key* | *Icon* | *Description* |
|---|---|---|
| F1 |  | **SELECTOR FOR FLYWHEEL START / STOP.** Press to switch on the flywheel motor. |
| F2 |  | **RAIN ACTIVATION.** Press to activate the electro-valve O17 (rain activation). |
| F3 |  | **JOG UP DROP AXIS.** Press to manually move upwards the platform. |
| F4 |  | **JOG DOWN DROP AXIS.** Press to manually move downwards the platform. |
| F5 |  | **SELECTOR FOR WORK CYCLE START / STOP.** Press to activate or deactivate the selected work cycle. |
| F6 |  | **SETUP.** Press to access the SETUP menu of the program. **Password: 485000** |

Function LED:

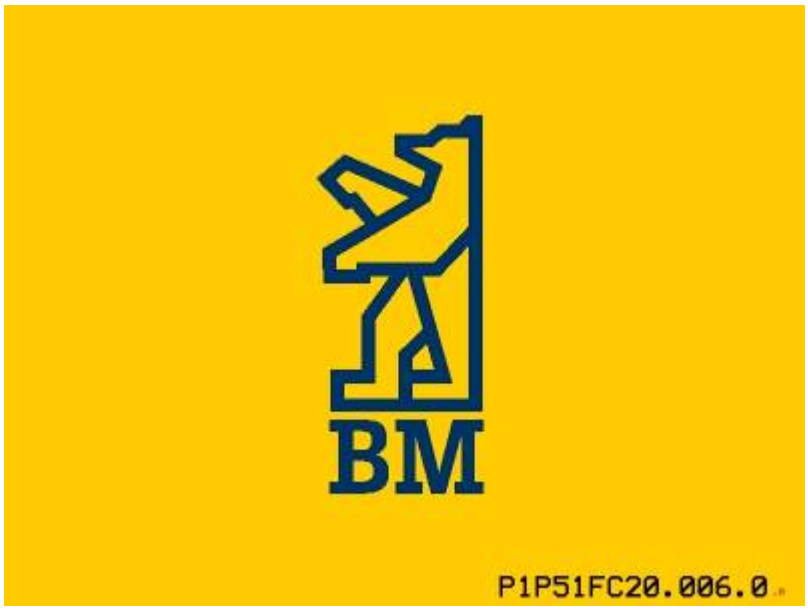
| *LED* | *Icon* | *Description* |
|---|---|---|
| F1 |  | **Flywheel motor state**<br>**OFF:** flywheel motor off<br>**BLINK:** flywheel motor on – waiting for star/delta exchange.<br>**ON:** flywheel motor on |
| F2 |  | **Water electro-valve exit state**<br>**OFF:** water electro-valve exit off<br>**ON:** water electro-valve exit on |
| F3 |  | not used. |
| F4 |  | not used. |
| F5 |  | **Work cycle state**<br>**OFF:** work cycle off<br>**ON:** work cycle on – the machine is working |
| F6 |  | not used. |

## Sailing among the visualizations



# Start page

The logo page is displayed for 5 seconds, then the main page is automatically displayed.




## Common parts

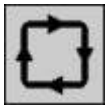
### Machine state

The machine state is always displayed in the upper left side:

 : machine in ALARM

 : machine in MANUAL

: machine in AUTOMATIC - work cycle OFF

 : machine in AUTOMATIC - work cycle ON

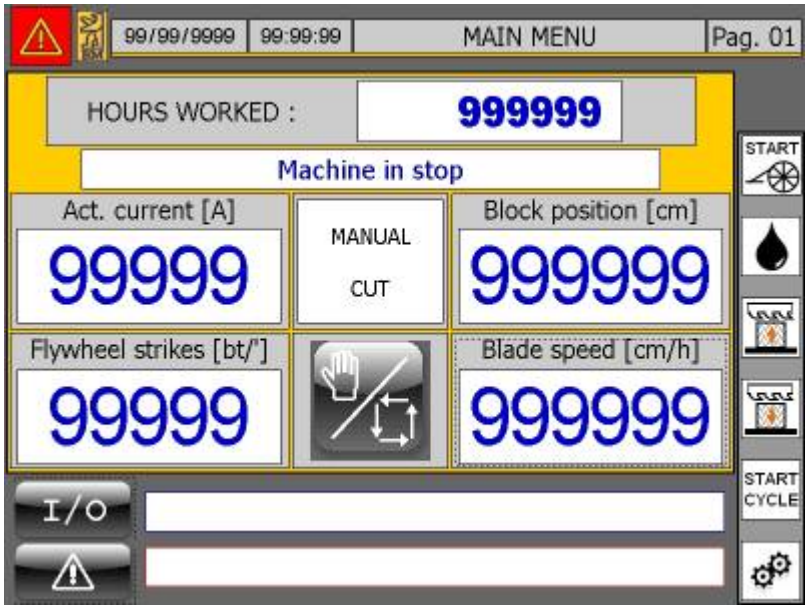
### Date, time, page

Each page includes the current date and time (which can be set in the general setup) and is clearly identifiable by a title and a progressive number

### Latest alarm

A field on a white background with a red outline, located on the bottom side of the page indicates, in case of machine in alarm, the latest emergency occurred. To display the full list or the log list from the latest reset, access the specific section.

## Main menu

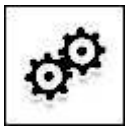



The left side of the page displays the keys to be pressed to pass to the other pages of the project:

 : access to DIAGNOSTICS pages

 : access to ALARMS pages

 : access to WORKING CYCLE SELECTION page

 : access to the SETUP pages

The upper side of the middle part of the page includes:

- **WORK HOURS [h] :** total of the work hours of the machine. The machine is considered as working when the flywheel motor is on.

If the machine requires some maintenance operations (see specific chapter) the icon is displayed  .

- **MACHINE STATE :** the automatic cycle of the machine is indicated in blue on a white background.
- **ABSORBED CURRENT [A] :** the instantaneous current which is absorbed by the flywheel motor during the cut phase. In setup you can set a maximum threshold to generate an excessive effort alarm;
- **BLOCK POSITION [cm] :** the position of the Drop axis;
- **FLYWHEL STROKES [bt/'] :** the strokes per minute of the flywheel;
- **DROP SPEED [cm/h] :** the movement speed of the Drop axis displayed in centimeters/hour. You can click on this field to directly access the automatic speed setting page.

At the middle of the page there is a message on the latest selected work cycle *MANUAL CUT* or *AUTOMATIC CUT.*

## Warnings

On the bottom side, in the white field with a blue outline, are displayed the messages of the system which do not require a stop in case of alarm:

| Message | Description |
|---|---|
| Switch on the blades motor | At the work cycle start it was detected that the flywheel motor is not running.<br>Switch on the motor |
| No water pressure | At the work cycle start it was detected no pressure in the water circuit.<br>Check any leaks<br>Check that I2 = ON |
| Null speed has been set | It was detected that a null speed was associated to an entry value.<br>Check the validity of the data entered in the DROP SETTING page. |
| Null automatic speed | It was detected that the AUTOMATIC WORK data was set to 0.<br>Check the validity of the data entered in the DROP SETTING page. |
| Error in exit speed setting | It was detected that the EXIT speed data was set to 0.<br>Check the validity of the data entered in the DROP SETTING page. |
| Error in the entry values | It was detected that the sum of the ENTRIES values exceeds the total cut value.<br>Check the validity of the data entered in the VALUE SETTING page. |
| Automatic cycle ended | Message that signals the automatic cycle has ended. |
| Enables rain control | At the work cycle start it was detected that the rain exit control has been de-activated. Check the appropriate parameter in the setup section. |
| Default data restore | The default restore procedure has been carried out. |
| Stop 1 lower than Stop 2 | It was detected that the data of Stop 1 Value is lower than Stop 2 Value.<br>Check the validity of the data entered in the STOP CUT VALUES SETTING page. |
| Drop stationary on Stop Cut 1 | The work cycle has stopped on the Stop 1 Value as it was expected. |
| Drop stationary on Stop Cut 2 | The work cycle has stopped on the Stop 2 Value as it was expected. |
| Stop Cut 1 lower than the Cut End | The Stop Cut 1 value has been set as lower than the value at which the drop stops for Stop Cut End.<br>Check the validity of the data entered in the STOP CUT VALUES SETTING page. |
| Stop Cut 2 lower than the Cut End | The Stop Cut 2 value has been set as lower than the value at which the drop stops for Stop Cut End.<br>Check the validity of the data entered in the STOP CUT VALUES SETTING page. |
| Break of slabs | The flywheel cannot be activated because the slab break input I24 is open. |

## Diagnostics menu


Through this screen you can access the various available diagnostics sections:

1 - Digital inputs and outputs diagnostics

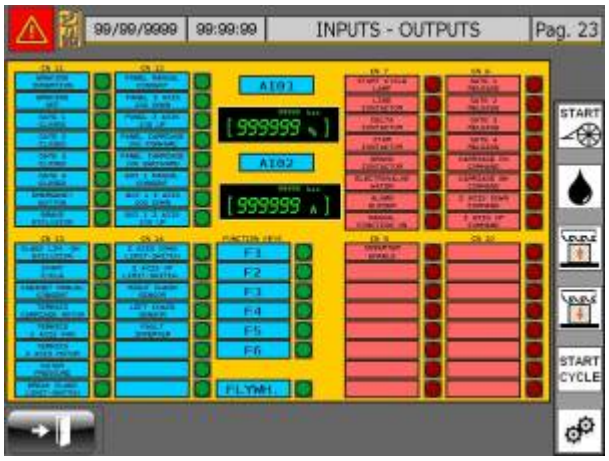
2 - Counting and analog output diagnostics

 : return to the MAIN MENU page

## Inputs and outputs diagnostics

By pressing the “INPUTS / OUTPUTS” key you can display the following screen which shows the state of each digital input and output and of the two analog inputs:

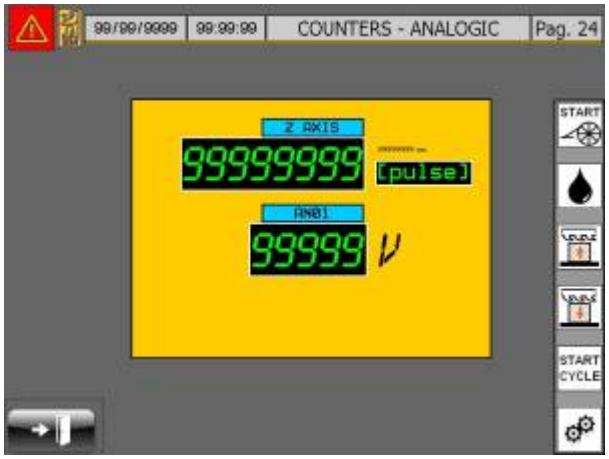
For each analog input it displays the value in bit and the resulting value after the scaling




## Counting and analog diagnostics

By pressing the “COUNT. / ANALOG” key you can display the following screen which shows the counting of the encoder of the axis Drop and the value of the analog output used.

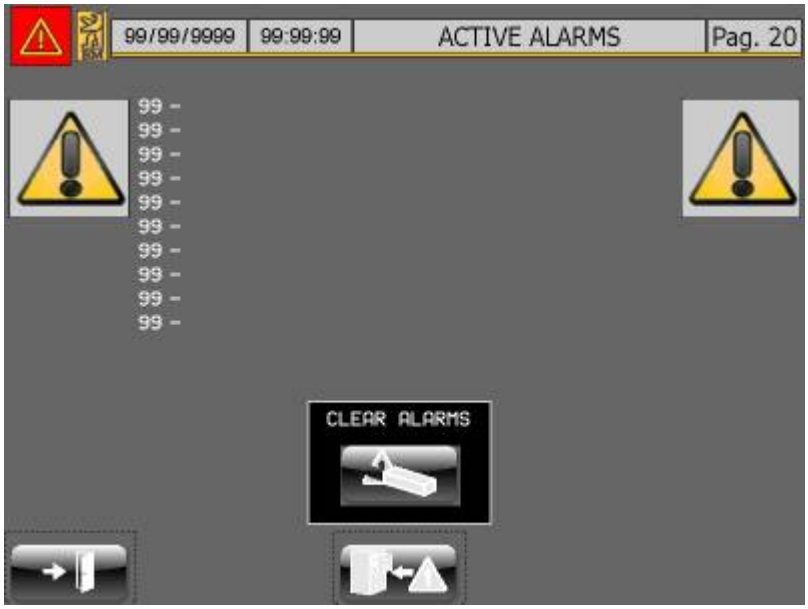
The counting is displayed in **encoder pulses** and, in smaller dimensions, the counting value in **measurement unit**.




 : return to the DIAGNOSTICS MENU page

# Alarms

If the key is pressed in the main menu (or in any other screen which presents it)  , the following page is displayed:




By pressing the key  the alarms are cancelled. If there are no alarms, after 2 seconds the exit out of this page will occur automatically.

## Alarm list

| Alarm | Reason | Solution |
|---|---|---|
| Mushroom emergency button | Manual emergency | Control the emergency mushroom button |
| Water pressure switch anomaly | No cooling water is detected | The valve could be closed. |
| Gate 1 interrupted | The gate controlled by input I3 has been opened. | - |
| Gate 2 interrupted | The gate controlled by input I4 has been opened. | - |
| Gate 3 interrupted | The gate controlled by input I5 has been opened. | - |
| Gate 4 interrupted | The gate controlled by input I6 has been opened. | - |
| Overload cut-out of carriage motor | Input I20 = ON | Control the motor associated to the thermics or the operation state of the thermics. |
| Overload cut-out of drop fan | Input I21 = ON | Control the motor associated to the thermics or the operation state of the thermics. |
| Overload cut-out of flywheel motor | Input I22 = ON | Control the motor associated to the thermics or the operation state of the thermics. |
| Break of encoder of Drop axis | The axis encoder does not work properly | - |
| Over-current of blade motor | The blade motor has absorbed a current value which is higher than the threshold | - |
| Stroke-counter out of the tolerance value | The stroke-counter has detected a difference of strokes/min higher than the set tolerance | - |
| FC intervention slabs break | During the cut a slab has broken and has opened input I24 | - |
| Fault of drop axis inverter | Input I29 = OFF | Check the presence of any errors in the drop axis inverter |
| Anomaly on the chains proximity on the left | The proximity on the left for the chains control does not send any signals. | - |
| Anomaly on the chains proximity on the right | The proximity on the right for the chains control does not send any signals. | - |

By pressing the key  you can go to the alarm log file.

## Alarm log file


The alarm log file can contain at most 60 registrations. It is a FIFO log file, therefore when the log file is full and another alarm is registered, the oldest in the list is removed.

It is important that the date and time in the set-up are correctly set, so that the diagnostics operations on the alarm are carried out as quickly and accurately as possible.

 : scrolls backward the pages of the alarm log file;

 : scrolls forward the pages of the alarm log file;

 : return to the ALARMS page

 : passage to the removal page of the alarm log file. This page is password-protected. The code to enter it is **485000**.

# Maintenance

The machine is provided with a very important alert regarding ordinary maintenance.

Indeed it requires, every 200 working hours of the fly-wheel motor, a general control described in the mechanical characteristics manual provided with this manual.

After 200 working hours, the following alert will be displayed at any start-up of the fly-wheel motor:


Press the key 

to confirm the display.

To reset its display you need to enter a maintenance performed code.

Contact the mechanical service by BM S.r.l. to perform the operation. For this alert you do not need to perform the maintenance to keep on working. However it is recommended to perform the intervention for it as soon as possible.

# Operation

## Manual

In the manual state the only allowed movements are the jog ones of the two axes.

The manual state is indicated by icon:  .

To move the axes in jog, make sure that the device is not in the alarm state.

**NB. the Carriage cannot be moved if the flywheel motor is running.**

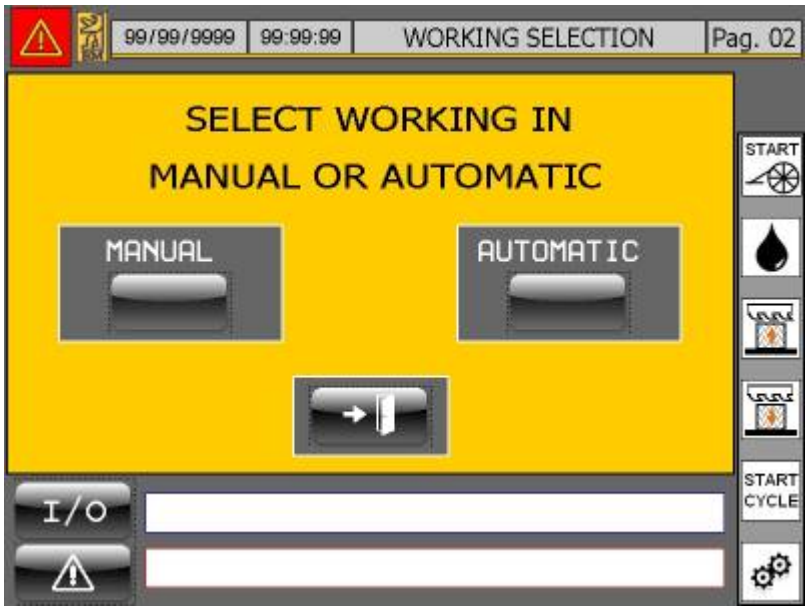
| | | |
|---|---|---|
| **F3** |  | **JOG UP DROP AXIS.** Press to manually move upward the drop.<br>ACTIVE ONLY WITH INPUT I19 = ON (manual selector from the switchboard) |
| **F4** |  | **JOG DOWN DROP AXIS.** Press to manually move downward the drop.<br>ACTIVE ONLY WITH INPUT I19 = ON (manual selector from the switchboard) |
| **I11** | - | **JOG UP DROP AXIS.** Press to manually move upward the drop.<br>ACTIVE ONLY WITH INPUT I9 = ON (manual selector from pushbutton station) |
| **I10** | - | **JOG DOWN DROP AXIS.** Press to manually move downward the drop.<br>ACTIVE ONLY WITH INPUT I9 = ON (manual selector from pushbutton station) |
| **I16** | - | **JOG UP DROP AXIS.** Press to manually move upward the drop.<br>ACTIVE ONLY WITH INPUT I14 = ON (manual selector from box 1) |
| **I15** | - | **JOG DOWN DROP AXIS.** Press to manually move downward the drop.<br>ACTIVE ONLY WITH INPUT I14 = ON (manual selector from box 1) |
| **I12** | - | **JOG UP CARRIAGE AXIS.** Use input I12 to manually move upward the block carriage.<br>ACTIVE ONLY WITH INPUT I9 = ON (manual selector from pushbutton station) |
| **I13** | - | **JOG BACKWARD CARRIAGE AXIS.** Use input I12 to manually move downward the block carriage.<br>ACTIVE ONLY WITH INPUT I9 = ON (manual selector from pushbutton station) |

# Manual Cut

Procedure to perform a cut in “MANUAL CUT” mode

## Working mode selection

Press the button on the screen  , from now on a series of pages will guide the oprrator to set the machine:




Press on the button **MANUAL**

## Stop cut


The machine is provided with the STOP CUT function: therefore you can program until 2 intermediate stops during the slab cut.

The two stop values can be set in STOP 1 and STOP 2.

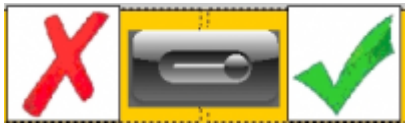
**NB. You cannot set a value of STOP 1 higher than the value of STOP 2.**

To deactivate one of the two values you can set the value to 0.

**NB. The STOP values can be modified even when the automatic cycle is running. A window will ask if you want to perform the required modification.**

You can enable or deactivate this function by operating on the specific video selector:

 : function deactivated

 : function enabled

The stop cut modes are described in the OPERATOR SETUP section in the specific manual.

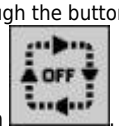
Press the button  to go on or the button  to go back to the previous page.

## Confirmation of Automatic Cut working


Press the button 

to go back to the main page or the button  to go back to the previous page.

## Manual Cut working start

| | |
|---|---|
| 1 | Make sure that the machine is not in the alarm state and that it is in the MANUAL state signalled by icon:  |
| 2 | Move in manual the Drop and Carriage axes to the start point of the cut you want to perform. |
| 3 | Activate input I18 – CYCLE START, through the button located on the front side of the panel below the terminal, to set the machine in the AUTOMATIC OFF state, signalled by icon   . |
| 4 | Start the flywheel motor by pressing the key F1<br>  <br>The activation of the motor is signalled first by the flashing of the LED F1 and then, once the star/delta exchange has occurred, by the fixed switching on.<br>At the same time the LED F2 activates as well, indicating the activation of the water electro-valve exit. |
| 5 | Start the cut in Manual Cut mode by pressing the key F5<br>  <br>The activation of the work cycle is signalled by the activation of the LED F5. |

In the Manual Cut procedure the platform starts from the value where it is and goes up until value 0 (bench edge) with a speed which is regulated by the potentiometer located on the front side of the operator panel.

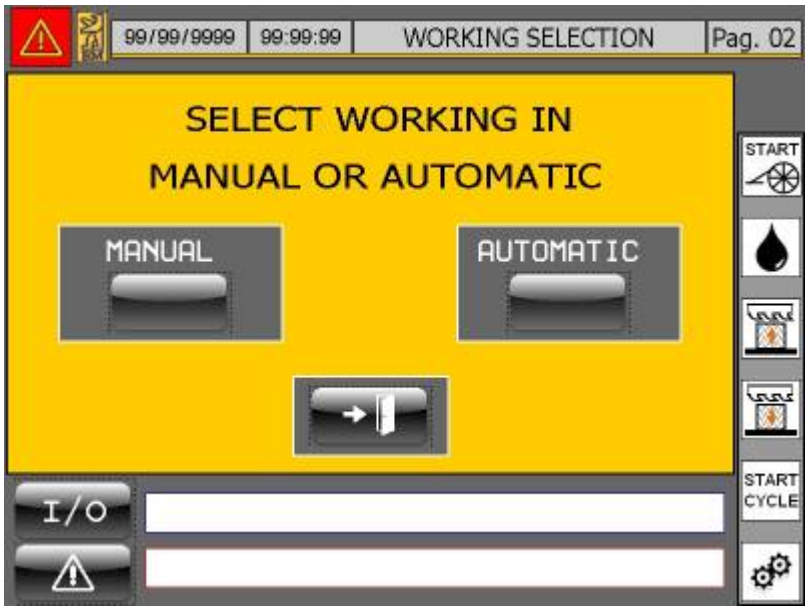
Once the value 0 has been reached the main motor switches off and the blade remains stationary at the reached value.

# Automatic cut

Procedure to perform a cut in “AUTOMATIC CUT” mode

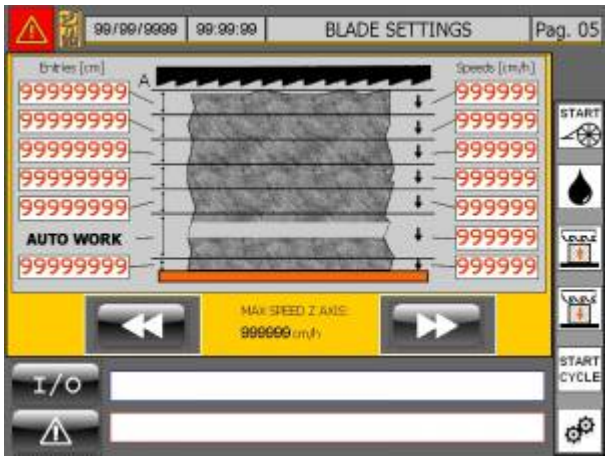
## Working mode selection

Press the button on the screen  , from now on a series of pages will guide the operator to set the machine:




Press on the button **AUTOMATIC**

## Drop setting




This page sets the entry speed of the blade into the material to be cut during the automatic cut.

You can set 5 different heights (ENTRY 1, ENTRY 2, ENTRY 3, ENTRY 4, ENTRY 5) during the entry phase of the blade into the block and associate a different drop speed to each of them.

- **Entries [cm]** : *INCREMENTAL* value during which the drop speed set in Speed [cm/h] is activated
- **Speed [cm/h]** : drop speed of the Blade axis used for the associated height.
- **AUTOMATIC WORK :** at the end of the space used for the entry of the blade into the block, the remainder of the lowering uses the speed that was set in this parameter.
- **EXIT** : Space of cutting end.

Example: You want to set a pre-set Quota of 100 and three Heights of 10 (with speed A), 20 (with speed B) and 30 (with speed C). Moreover the Automatic Work is set at speed D and an exit 5 with speed E.

When the automatic cycle starts the machine will perform the first 10 cm at speed A, the second 20 cm at speed B and the next 30 cm at speed C. The other 35 cm (100 – Entry 1 – Entry 2 – Entry 3 – EXIT) will be performed at speed D.

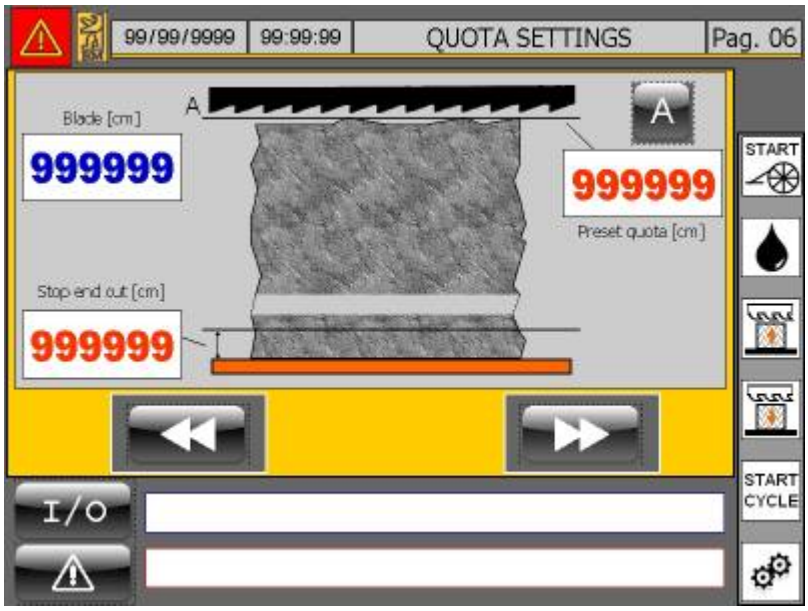
The last 5 will be performed at speed E. At the end of the lowering the blade moves up again with maximum speed.

**NB. You can enter a Height equal to 0 but you cannot associate a null Speed to a Height.**

**NB. The ENTRIES and the SPEEDS can be modified even when the automatic cycle is running.**

Press the button  to go on or the button  to go back to the previous page.

## Value setting




To work with the automatic speeds, it is required to set the starting value from which the device will start calculating the values of the various entries.

Therefore take the block below the blades and press the button  to load the value in the program.

| | |
|---|---|
| Blade [cm] | Instantaneous position of the Blade axis expressed in centimetres. |
| Block position [cm] | Height value of the Drop axis which is used to calculate the heights of the various entry speeds which are set in the bottom side.<br>Arrival value of the Drop axis rise at the end of each cut. |
| Press to learn the pre-set quota of the Drop axis. | |
| End cut stop [cm] | If it is different from 0, it indicates how many centimeters before the final value of the Drop axis it will stop, signalling that the automatic cycle has ended. |

Press the button  to go on or the button  to go back to the previous page.

## Stop cut


The machine is provided with the STOP CUT function: therefore you can program until 2 intermediate stops during the slab cut.

The two stop values can be set in STOP 1 and STOP 2.

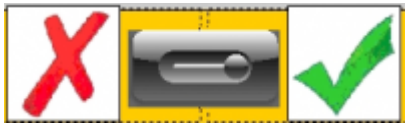
**NB. You cannot set a value of STOP 1 higher than the value of STOP 2.**

To deactivate one of the two values you can set the value to 0.

**NB. The STOP values can be modified even when the automatic cycle is running. A window will ask if you want to perform the required modification.**

You can enable or deactivate this function by operating on the specific video selector:

 : function deactivated

 : function enabled

The stop cut modes are described in the OPERATOR SETUP section in the specific manual.

Press the button  to go on or the button  to go back to the previous page.

## Conferma lavorazione Taglio Automatico


Press the button 

to go back to the main page or the button  to go back to the previous page.

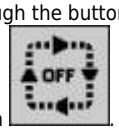
If the work cycle has been deactivated, the device calls the operator's attention on the fundamental operation of blade value self-learning:


If the operator presses the key YES, he informs the device that the self-learning has been performed, therefore the device goes back to the main page.

If he presses the key NO, that means the operation was forgotten. Therefore the device displays the Value Setting page again.

This request is not made if the automatic cycle is active.

## Start of Automatic Cut working

| | |
|---|---|
| 1 | Make sure that the machine is not in the alarm state and that it is in the MANUAL state signalled by icon:  |
| 2 | Move in manual the Drop and Carriage axes to the start point of the cut you want to perform. |
| 3 | Activate input I18 – CYCLE START, through the button located on the front side of the panel below the terminal, to set the machine in the AUTOMATIC OFF state, signalled by icon   |
| 4 | Start the flywheel motor by pressing the key F1<br>  <br>The activation of the motor is signalled first by the flashing of the LED F1 and then, once the star/delta exchange has occurred, by the fixed switching on.<br>At the same time the led F2 activates as well, indicating the activation of the water electro-valve exit. |
| 5 | Start the cut in Automatic Cut mode by pressing the key F5<br>  <br>The activation of the work cycle is signalled by the activation of the LED F5. |

**To stop the automatic working at any time, press the STOP button located on the front side of the panel below the terminal.**