

# TOUCHSCREEN USER GUIDE



# 1. START-UP

Upon start-up, the touchscreen displays the “Ferrari Costruzioni Meccaniche” logo for about twenty seconds, the time it takes to load the operating system (**Fig.0**).



Fig. 0

A page with the Fastblock logo, the software version loaded on the device (ex:3.1) and a loading bar (**Fig.1**) are then displayed.



Fig. 1

A) Software version.

When loading is complete, the system starts communicating via CAN BUS with the Fast Block control unit: if there is a communication problem with the control unit, the loading bar will be displayed continuously. If the system is multimaster, the loading bar is displayed until all pneumatic pressure switches detect pressure in the circuit. If the connection is established correctly the system starts the reset procedure, i.e. the hydraulic motor is powered in order to position the transplanting elements in the appropriate position to start work (**Fig.2**).



Fig. 2

The reset procedure is stopped if one or more requirements are necessary to complete the operation. A message relating to the problem is then displayed:

- ALARM: PTO (see "ALARM no.2" alarm section for causes/solutions)
- ALARM: CARTER OPEN (see "ALARM no.3" alarm section for causes/solutions)
- ALARM: PROXY GRIPPER (see "ALARM no.4" alarm section for causes/solutions)
- ALARM: LOW PRESSURE (see "ALARM no.5" alarm section for causes/solutions)
- ALARM: PROXY ZERO (see "ALARM no.6" alarm section for causes/solutions)

## 2. WORK MENU

### 2.1 MAIN PAGE

Once the reset procedure is complete, the main work page is displayed (Fig.3).

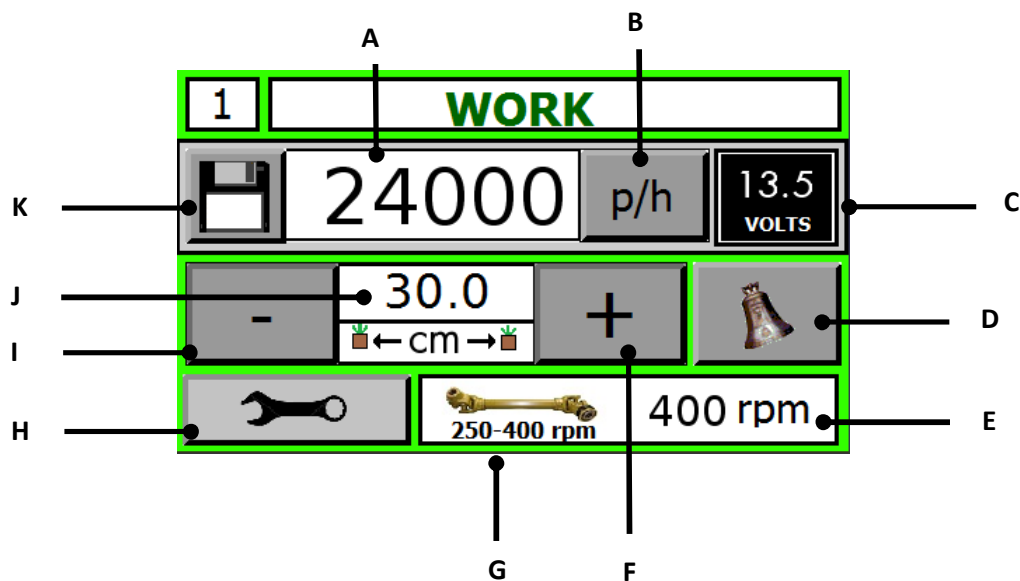


Fig. 3

- A) This box shows the operating speed in real time. The speed can be displayed in “plants/hour” or “metres/hour” (“yards/hour” if the Imperial measurement system is selected). Alternatively, it is possible to see the number of transplanted plants per hectare (as it varies according to the distance on the set row).
- B) Key for selecting the information to be displayed in box A).
- C) Power supply voltage indication
- D) Access to alarm management page.
- E) PTO speed (in systems without PTO, the box is replaced by an “HYDRAULIC PRESSURE ON-OFF” indicator that indicates the presence of pressure or not in the hydraulic circuit)
- F) Key for increasing the distance.
- G) Recommended PTO speed.
- H) Access to operating parameters page.
- I) Key for decreasing the distance.
- J) Transplanting distance.
- K) Access to data log page.

## 2.2 DATA LOG PAGE

Press key **K-Fig3** to access the data log page (**Fig.4**).

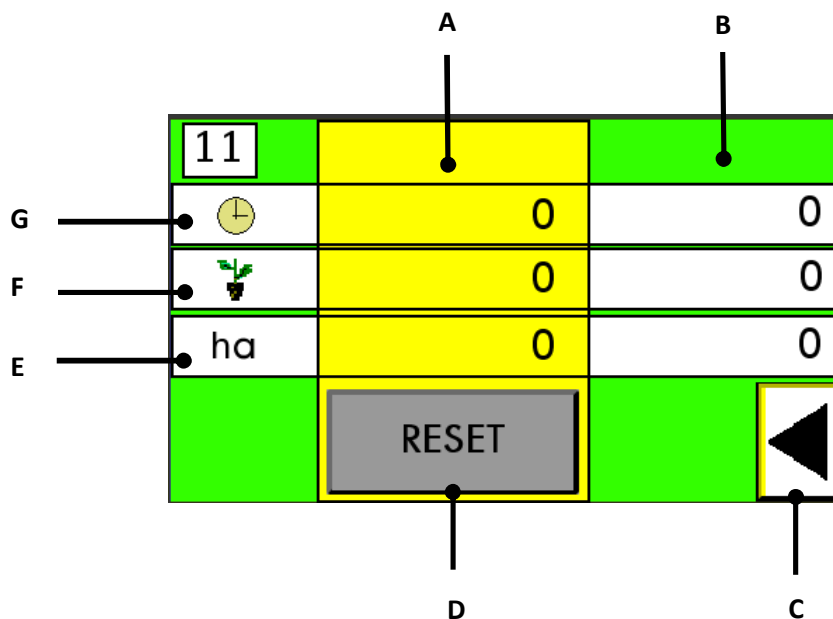


Fig. 4

- A) Partial data column
- B) Total data column
- C) Key for going back to the main work page.
- D) Partial data RESET key: press to reset the partial data
- E) Hectares worked (Acres if the Imperial measurement system is selected)
- F) Transplanted plants
- G) Work hours

## 2.3 ALARM SIGNALS

In the presence of an alarm the background of the icon **(D)** of the work menu **(Fig. 1)** turns red and there is an intermittent sound signal: press the key to access the alarm display page.

With reference to **(Fig. 5)**:

A) Alarm number indication.

B) Goes back to the main page of the work menu.

C) Indication of anomalous element number (information available if the alarm refers to a specific element). In case of “multimaster” system, if the alarm refers to a specific frame, the writing **(Frame n.)** will be displayed, together with the frame number relating to the alarm.

D) Access to the alarm on/off page

E) Alarm reference icon.

For the description of the alarms refer to the “**ALARMS**” chapter.

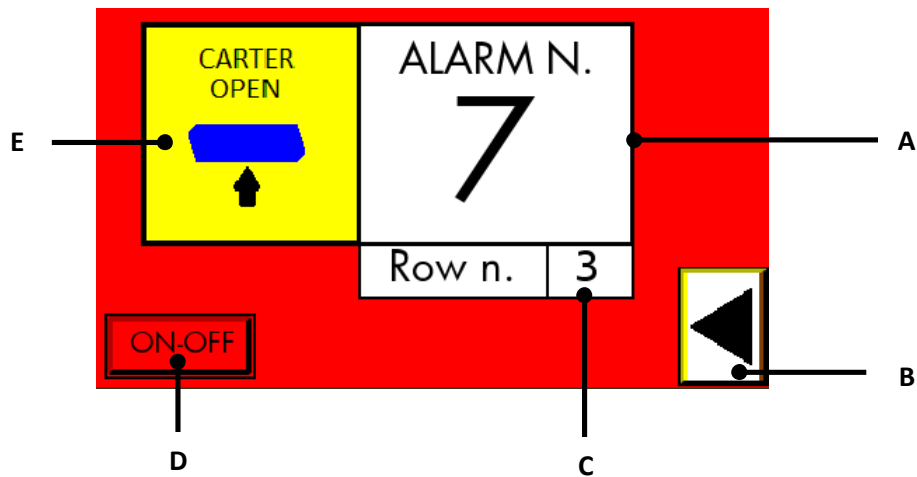


Fig. 5

Press key **D-Fig.5** to open the alarm on/off page **(Fig.6)**, from which one or more alarms can be disabled (except for alarm no.3, which cannot be disabled for safety reasons).

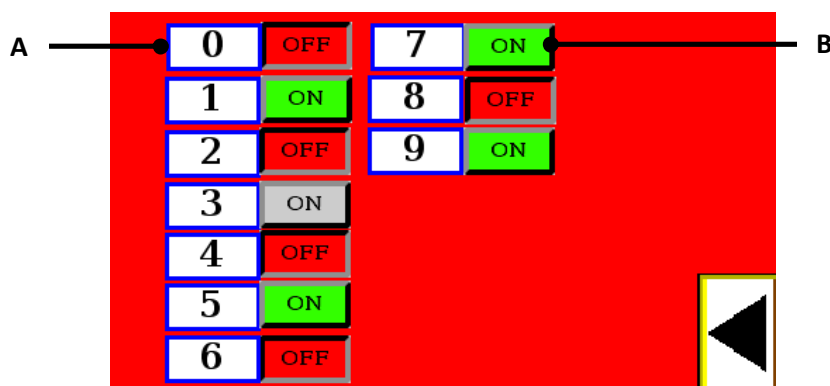


Fig. 6

A) Alarm number

B) Alarm Enabling/Disabling.

# 3. PROGRAMMING MENU

## 3.1 MAIN PAGE

Press key H-Fig3 to access the programming menu (Fig.7).

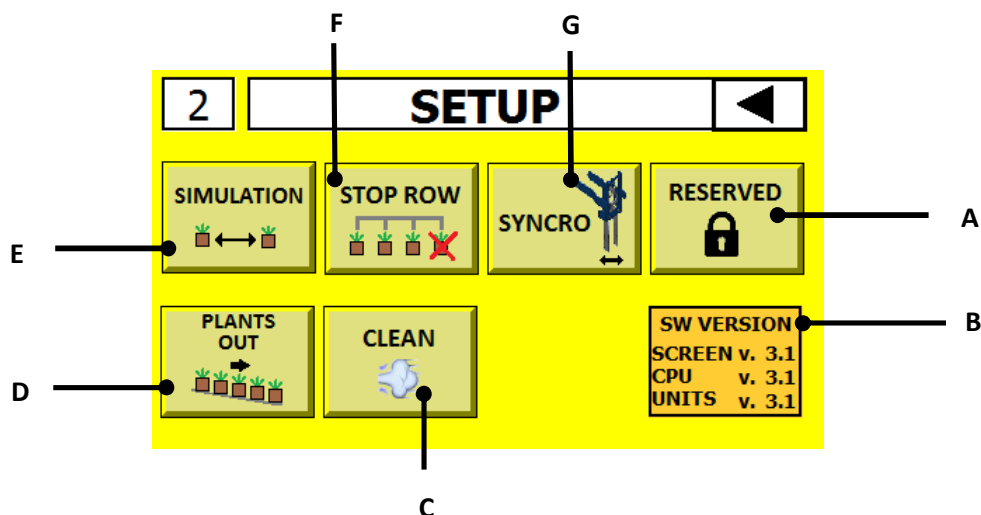


Fig. 7

A) Access to reserved menu.

B) Software versions: Screen (touchscreen OPUS A3), CPU (control unit), UNITS (unit control boards). If the unit boards are updated with different versions, the version number will be shown in red.

C) Key for activating the “end of day cleaning” function: press this button to activate the procedure (Fig.8). During the procedure, the hydraulic motor is powered and the air jets for cleaning the ploughshare are activated in sequence (Cleanermatic).

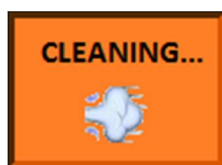


Fig. 8

D) Access to the plant unloading page (see 3.4)

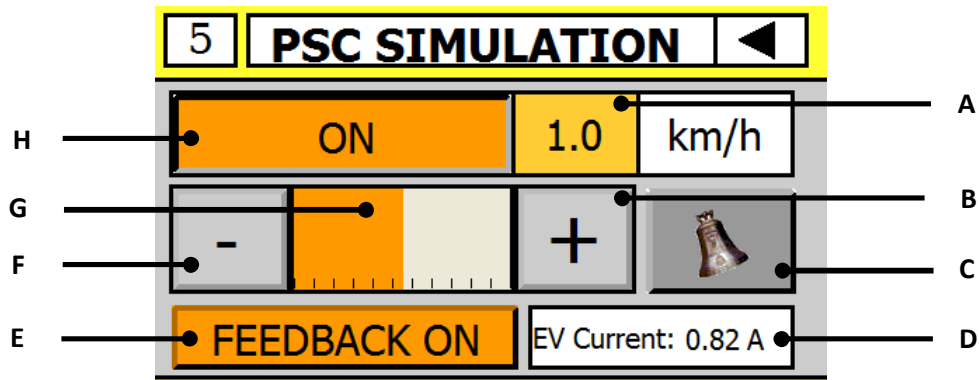
E) Access to the simulation page (see 3.2).

F) Access to the row disabling page (vedi 3.3).

G) Access to the setting page of the data relating to the synchronicity of opening and closing of the transplanting element grippers.

## 3.2 SIMULATION PAGE

Press key **F-Fig7** to access the simulation page (**Fig.9**).



*Fig. 9*

- A) Set simulation speed.
- B) Key for increasing the speed.
- C) Access to alarm management page.
- D) Hydraulic motor proportional solenoid valve current measurement (in case of multimaster system the electrical currents of the proportional valves of each frame will be displayed)
- E) Feedback On/No Feedback selector.
- F) Key for decreasing the speed.
- G) Speed bar graph.
- H) Simulation On/Off Selector

On the simulation page it is possible to simulate the machine progress and then activate the movement of the transplanting elements. Use selector H) to activate or disable the simulation and use keys F) and B) to increase and decrease the simulated speed. Selector E) is used to select the simulation mode: “feedback on” or “no feedback”.

In “feedback on” mode, you can set a speed in km/h (0 to 2 km / h) and the transplanting elements will move at a speed that ensures the distance set in the main menu.

In “no feedback” mode it is possible to set a percentage (from 1 to 100%), index of current flowing in the proportional solenoid valve. In this mode there is no feedback, the proportional solenoid valve is simply excited with a constant average voltage.

### 3.3 ROW DISABLING PAGE

Press key **D-Fig7** to access the row disabling page (**Fig.10**).

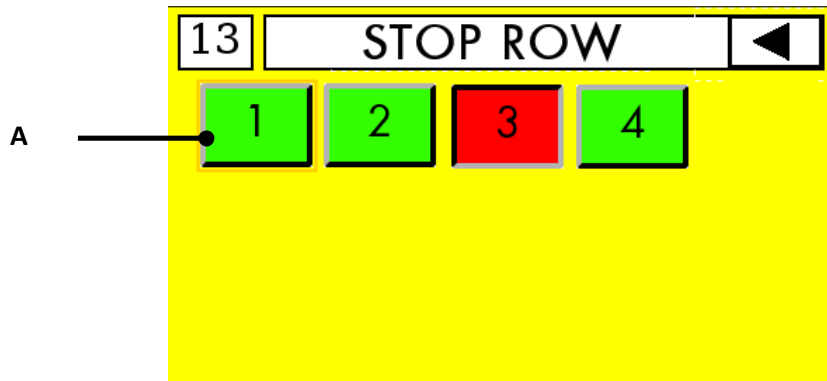


Fig. 10

Press the keys (**A-Fig10** and similar) marked with the row number to disable (red background) one or more transplant elements. The disabled elements close the storage grippers and do not deposit the plants on the ground.

### 3.4 PLANT UNLOADING PAGE

Press key **E-Fig7** to access the plant unloading page (**Fig.11**).

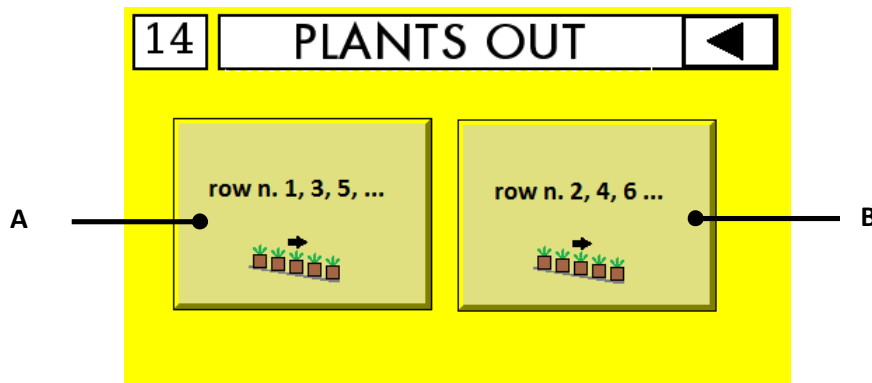


Fig. 11

Press keys (**A-Fig10**) and (**B-Fig10**) to activate the procedure for unloading the odd and even element plants respectively. (**Fig.12**: odd element unloading active)

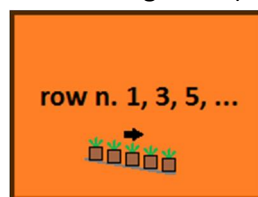


Fig. 12



The hydraulic motor is activated so that the elements to be unloaded are positioned with the initial stop lowered and the storage gripper open. This way the square blocks can be unloaded by pushing them manually.

### 3.5 SYNCRO PAGE

Press key **G-Fig7** to access the plant unloading page (**Fig.13**).

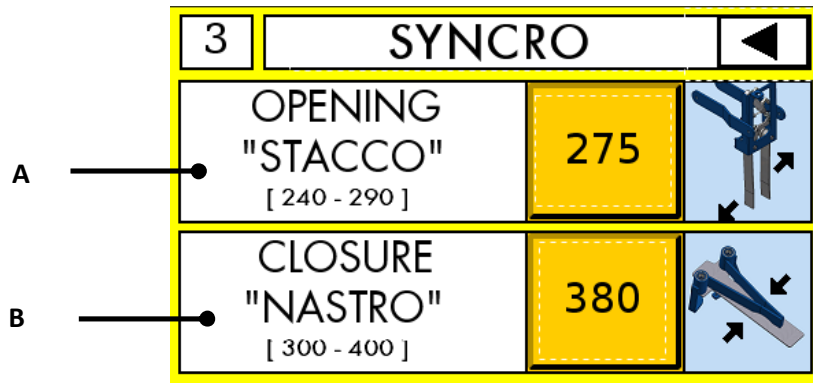


Fig. 13

- A) OPENING "STACCO" [imp]: goal opening point for the "stacco" gripper.
- B) CLOSURE "NASTRO" [imp]: closure point of the "nastro" gripper.

## 4. RESERVED SETUP MENU

The reserved programming menu can be accessed by pressing key **A-Fig7** and entering a password to be requested from Ferrari Costruzioni Meccaniche. It is important not to change the parameters contained in this section without the supervision of a Ferrari Costruzioni Meccaniche engineer.

### 4.1 RESERVED SETUP 1

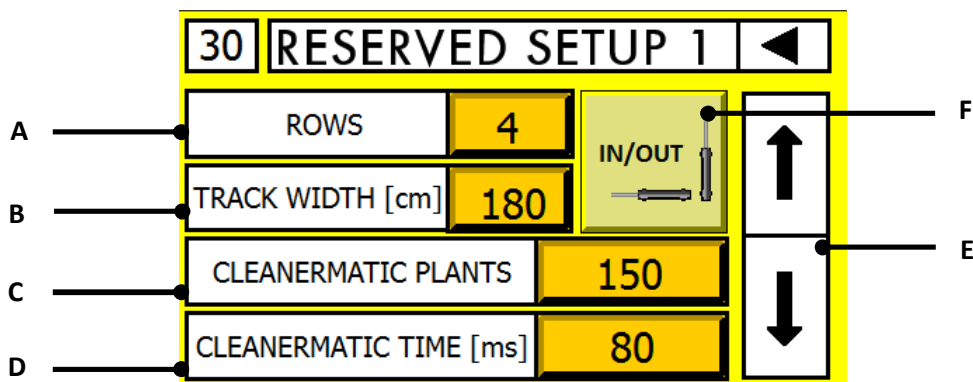


Fig. 14

- A) ROWS: number of machine transplanting elements.
- B) TRACK WIDTH: machine working width (in centimetres).
- C) CLEANERMATIC PLANTS: number of plants after which the air flow relating to the Cleaneromatic cleaning system is activated
- D) CLEANERMATIC TIME: length in milliseconds of the air flow relating to the Cleaneromatic cleaning system
- E) Access to INPUT/OUTPUT menu (see chapter 4.6)
- F) Programming menu page scrolling arrows

## 4.2 RESERVED SETUP 2

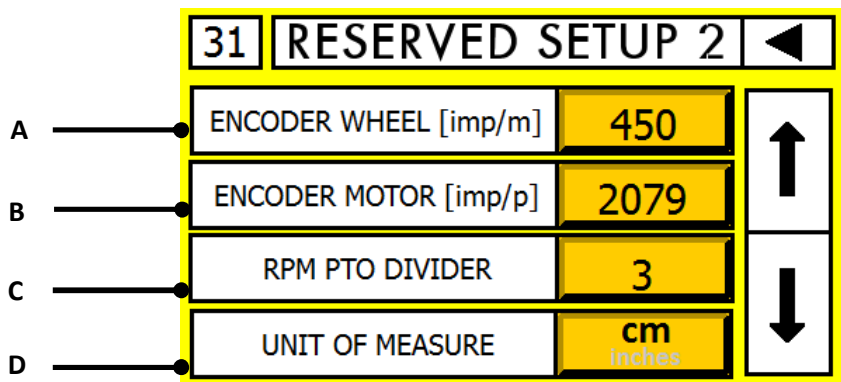


Fig. 15

- A) ENCODER WHEEL [imp/m]: number of pulses per metre of the encoder that measures the machine travel speed.
- B) ENCODER MOTOR [imp/p]: number of pulses per plant of the encoder located on the hydraulic motor.
- C) RPM PTO DIVIDER: number of pulses per revolution of the proximity sensor that detects the rotation of the PTO. Setting "0" in case there is no PTO but a signal "ON-OFF" which indicate the presence of hydraulic pressure.
- D) UNIT OF MEASURE [cm/inches]: selection of unit of measure to be used. By selecting "cm" the measurements in the work menu will be expressed in centimetres and hectares; by selecting "inches" the measurements in the work menu will be expressed in inches and acres.

## 4.3 RESERVED SETUP 3

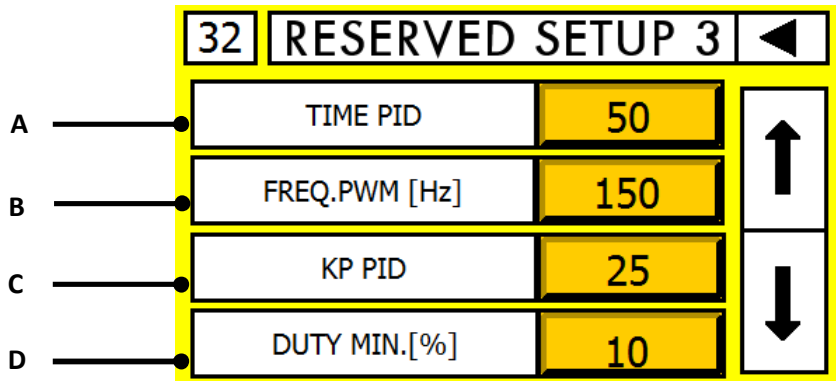


Fig. 16

- A) TIME PID [ms]: period of the proportional control used by the system to adjust the speed of the hydraulic motor in order to ensure the distance on the row set by the operator.
- B) FREQ. PWM [Hz]: frequency of the PWM wave used to control the current in the proportional solenoid valve that adjusts the oil flow in the hydraulic motor.
- C) KP PID: proportional coefficient of the proportional control used by the system to adjust the speed of the hydraulic motor in order to ensure the distance on the row set by the operator.
- D) DUTY MIN. [%]: minimum duty cycle of the PWM wave used to control the current in the proportional solenoid valve that adjusts the oil flow in the hydraulic motor.

## 4.4 RESERVED SETUP 5

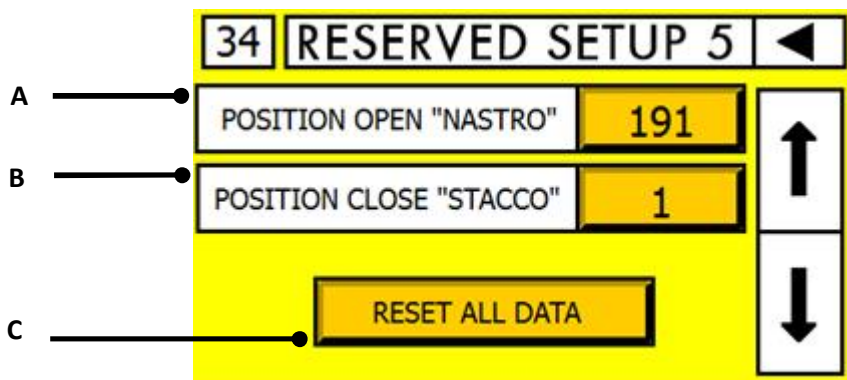


Fig. 17

- A) "NASTRO" OPEN POSITION [pulses]: "nastro" gripper opening point.
- B) "STACCO" CLOSED POSITION [pulses]: "stacco" gripper closing point
- C) Key for accessing the page for resetting all the parameters (see chapter 4.8)

## 4.5 RESERVED SETUP 6

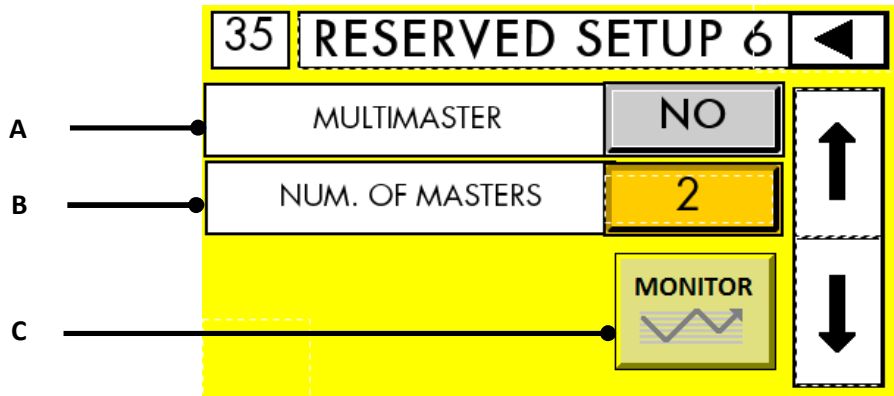


Fig. 18

- A) MULTIMASTER [yes/no]: setting relating to the presence or not of the multimaster configuration: this is necessary when the transplanting elements are fixed on different frames with independent transmission shaft. In these cases there is a control unit board for each element.
- B) NUM. OF MASTER: number of frames with independent transmission shaft
- C) Access to the monitor page of the working process (see chapter 4.7)

## 4.6 INPUT/OUTPUT MENU

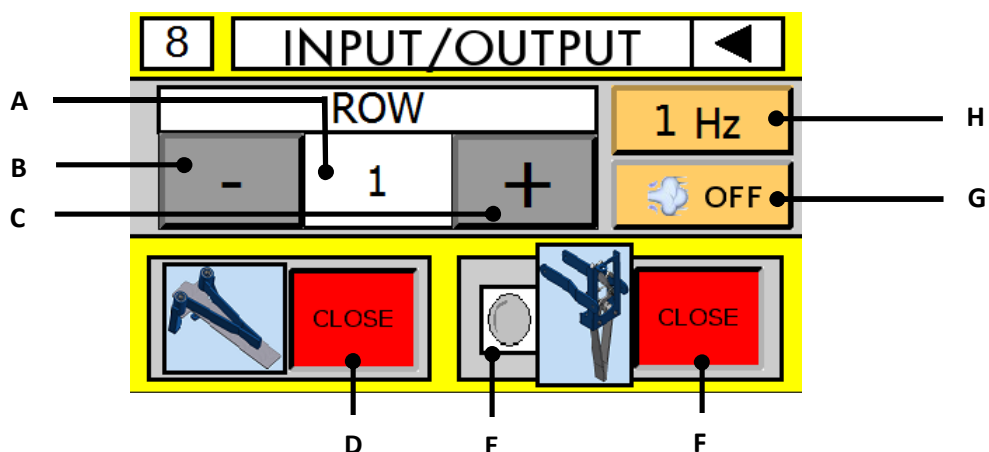


Fig. 19

- A) Number of transplanting element selected for the test.
- B) Key for decreasing the number of the transplanting element selected.
- C) Key for increasing the number of the transplanting element selected.
- D) “Nastro” gripper open/close key. Press briefly to open and close the gripper. Press and hold for a few seconds to activate the open/closed oscillation of the gripper at a frequency set by pressing box H).
- E) Gripper proximity sensor reading indicator.
- F) “Stacco” gripper open/close key. Press briefly to open and close the gripper. Press and hold for a few seconds to activate the open /closed oscillation of the gripper at a frequency set by pressing box H).
- G) Cleanermatic enabling key: press and hold to enable the Cleanermatic system air jet of the selected element.
- H) Oscillation frequency of the grippers in “oscillation” mode.

## 4.7 MONITOR

The “Monitor” page displays some of the work parameters. This page may be helpful in diagnosing any problems under the supervision of a Ferrari Costruzioni Meccaniche engineer. Below is a brief description of the values displayed.

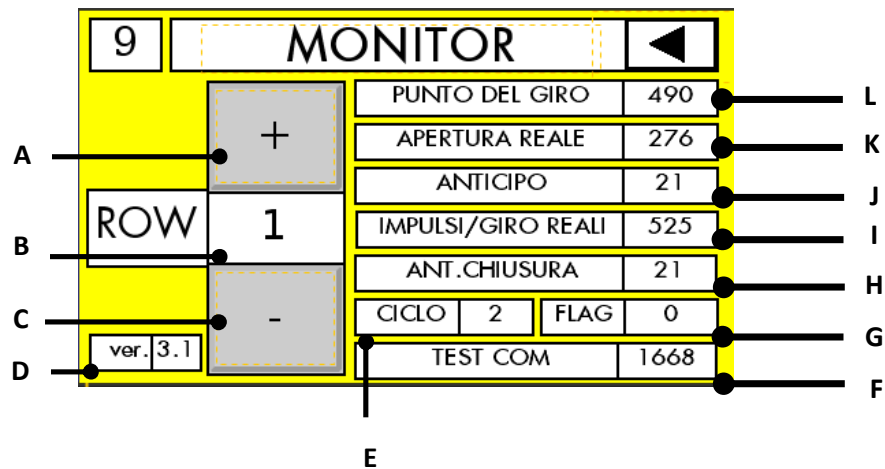


Fig.20

- A) Key for increasing the number of the transplanting element selected.
- B) Number of transplanting element selected for the work parameters monitor.
- C) Key for decreasing the number of the transplanting element selected.
- D) Software version of the selected element managing board.
- E) CYCLE: when the blockage of an element is being diagnosed by Ferrari Costruzioni Meccaniche’s technical staff, it may be useful to know at which point of the plant ground depositing cycle it stopped moving.

- F) TEST COM: test parameter of the serial communication with the transplanting element: if communication is established successfully, the displayed value increases rapidly from  $n \cdot 1000$  to  $n \cdot 1000 + 999$  with  $n$  equal to the number of the selected transplanting element (example: if the selected element is number 2 the value will range from 2000 to 2999).
- G) FLAG: parameter indicating the successfully occurred emergency closure of the “stacco” gripper.
- H) ANTICIPATION: to ensure the opening of the “stacco” gripper in the desired point of the cycle, it is necessary to anticipate the electrical opening pulse. The value indicates in real time by how many pulses the opening is anticipated.
- I) ACTUAL IMPULSES/REVOLUTION: number of impulses per revolution measured at the previous cycle.
- J) ANTICIPATION: to ensure the opening of the “stacco” gripper in the desired point of the cycle, it is necessary to anticipate the electrical opening pulse. The value indicates in real time by how many pulses the opening is anticipated.
- K) ACTUAL OPENING: measurement of the actual opening point of the “stacco” grippers carried out with the “stacco” grippers opening proximity sensor.
- L) REVOLUTION POINT: position in real time of the transplanting element with respect to the complete revolution.

## 4.8 RESET ALL

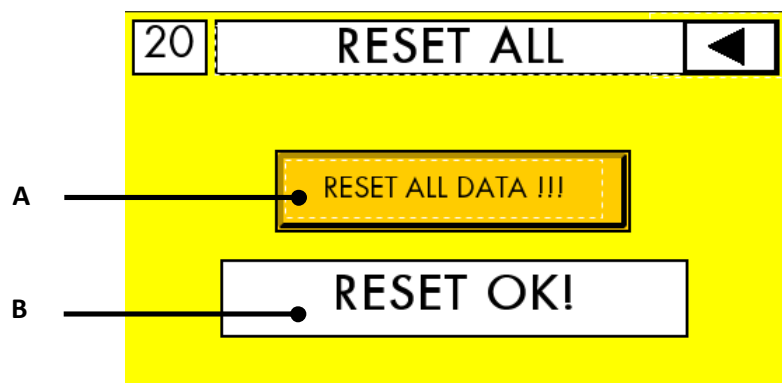


Fig.21

A) “Reset All Data” key: press and hold the key for a few seconds to reset the parameters to the default factory settings. When the procedure is successful, box B) is displayed.

## 5. TOUCHSCREEN/CONTROL UNIT REPLACEMENT

If the event of breakage, damage or malfunction of the Touchscreen or motherboard (control unit), the faulty device must be replaced immediately. When the damaged device has been removed a copy of the parameters is stored inside the working device. After the replacement, when the machine is started, the page shown in the **figure** is displayed.

Pressing key **(C)** copies the Touchscreen memory to the new installed motherboard (CPU) while pressing key **(A)** copies the motherboard memory to the new installed Touchscreen. Press key **(B)** to access a detailed list of the data stored on both devices.

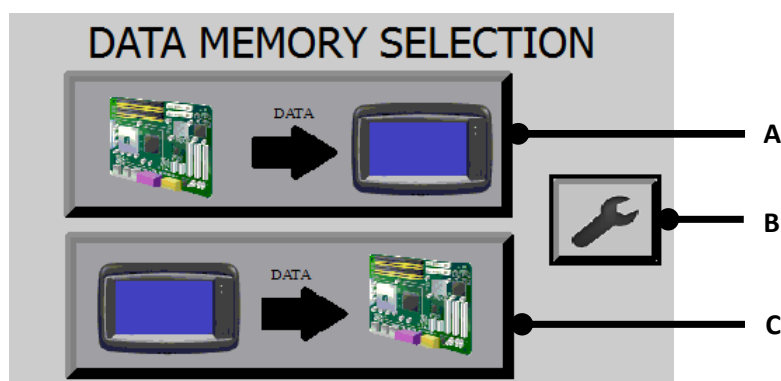


Fig.22

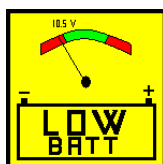
## 6. ALARMS

### ALARM N.0: PTO REVOLUTIONS NOT APPROPRIATE



Check that the cardan joint speed is included between 250 and 400 revolutions/minute.

### ALARM N.1: INSUFFICIENT ELECTRICAL SUPPLY



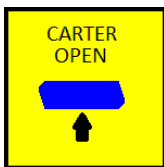
Check that the electrical connections are well tightened, above all that the battery terminals are not oxidized and that the alternator is charging.

## ALARM N.2: ELEVATED SPEED



Increase as much as possible the revolutions number of the cardan joint (400 rpm). If the alarm is displayed even under these conditions, decrease the advancement speed.

## ALARM N.3: PROTECTION CARTER OPEN



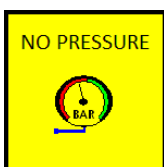
Check that the protecting carter of the elements are correctly positioned and fixed. Check the functioning of the proximity that detect the carter presence.

## ALARM N.4: PROXIMITY PINCER NOT DETECTED



Check the correct functioning of the plant "stacco" grippers and of the relating proximity that detect their opening. (Use IN/OUT section of the programming menu).

## ALARM N.5: PRESSURE LEVEL IS TOO LOW



Check the correct pressure level. Check compressor efficiency (filter and oil). Check pressure switch integrity.

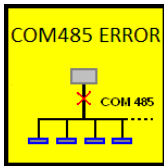
## ALARM N.6: PHASE PROXIMITY NOT DETECTED



Check reading and functioning of the zero phase proximity.

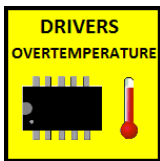


#### ALARM N.7: RS485 COMMUNICATION ERROR



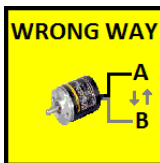
Check the correct wiring of the RS485 serial communication line that connects the control unit to the element boards.

#### ALARM N.8: ELEMENT BOARD DRIVER OVERTEMPERATURE



Check the correct wiring of the element board outputs in order to exclude short circuits. Check the correct functioning of the pneumatic valves.

#### ALARM N.9: WHEEL ENCODER A AND B PHASES ARE INVERTED



Invert phase A and phase B of the "Wheel" encoder.

#### ALARM N.10: DETECTED NUMBER OF IMPULSES/REVOLUTION IS WRONG



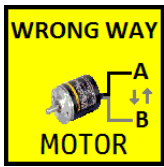
Check the correct wiring of the prescaler signal and the functioning of the phase proximity.

#### ALARM N.11: PROXIMITY GRIPPER WRONG POSITION



Check the correct position of the proximity detecting the opening of the "stacco" gripper.

**ALARM N.12: WHEEL ENCODER A AND B PHASES ARE INVERTED**



Invert phase A and phase B of the "Hydraulic motor" encoder.

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