MONDOLFO FERRO
AUTOMOTIVE SERVICE EQUIPMENT

Technical service manual

MT 3650

Cod. 4-115816_uk - 06/12

Italiano

English

Français

Deutsch

Español

Graphics and page-setting

Technical **P**ublications **O**ffice

TRANSLATION OF ORIGINAL INSTRUCTION

INDEX

COMIM - Code 4-115816_uk dated 06/12

1. ERROR MESSAGES

The machine can recognise a certain number of malfunction conditions and signals them by displaying the relevant messages.

- A - Notice Messages

A 3
wheel not suitable for performing the sensitivity calibration, use a medium sized wheel (for example 5.5”X14”) or a larger wheel, but DO NOT exceed a wheel weight of 40 Kg.

A 5
Incorrect wheel data for an ALU programme. Correct the set dimensions.

A 7
The machine is temporarily not enabled to select the programme requested.
Perform a wheel spin, then repeat the request.

A 20
Internal sensor in an incorrect position during calibration.
- Bring it to the indicated position and repeat the calibration.

External sensor in an incorrect position during calibration.
- carry out the calibration procedure correctly;
- check the external sensor is at 5 +/-1 notch in the rest position;
- in service, check (with the pointer of the external sensor resting on the flange of the swinging unit) that about 167 +/-30 notches are visualised;
- if the above points are not correct, adjust or replace the potentiometer.

A 23
Incomplete or incorrect data input in Precise ALU Program. Repeat the input correctly.

A 26
Programme available only after selecting one of the following programmes: ALU 1P / ALU 2P / Motorcycle Dynamic / Motorcycle ALU or if selected in the Motorcycle Programme but with the wheel NOT in the centred position.

A 31
Optimisation procedure (OPT) already launched by another user.

A 41
Incorrect wheel spin procedure on the wheel balancer without guard. The warning appears when the spin button is pressed for more than 10 seconds without pressing the "Start" key at the same time. Release the button and spin the wheel according to the procedure indicated in the "Wheel Spin (without guard)" paragraph.

Check the proper operation of the spin button and check for damage to the Start key on the keyboard.

A Stp
Wheel stop during the spin phase.
The rotation of the unit stopped before completing the entire reading cycle:
- check the weight tray does not touch the unit during the spin;
- check the communication between the MBU Mother board and the PEAL32F power supply card, via the flat commands (check picoflex connection, replacing cable and/or cards if necessary).

Wheel movement is not integral with swinging unit movement:
- make sure the wheel is tightened correctly.

A Cr
The contact of the microswitch associated with the guard casing is open.
- Check the correct working of the automatic start microswitch associated with the wheel guard casing (with the guard lowered, the contact of the switch must be closed);
- If the above checks have not pointed out any faulty components, the MBU32F Mother board should be replaced;
- Spin performed with guard raised;
- Lower the guard to carry out the spin.
- In the machine versions without the wheel guard and without the spin push button, check that the JUMPER is correctly connected to the Mother board.

- E - Error messages

E 1
Sensitivity calibration missing. Perform the sensitivity calibration procedure.
- The MBU32F card was changed. Perform the sensitivity calibration procedure.

E 2
Error condition on sensitivity calibration. Repeat the sensitivity calibration procedure.
Take particular care NOT to knock the machine during calibration.

Error condition on shaft assembly resetting.
First calibrate sensitivity and then reset the group.
If the message persists, check the following:
that the search card reads correctly by performing the encoder test (see paragraph “Service programmes”);
PK modules and phases as indicated in the paragraph “Service Programmes”.

E 3 I/E 2/3

Error condition at end of sensitivity calibration.
Repeat the calibration; if the message persists perform the following checks:
Check that the sensitivity calibration procedure has been performed correctly;
Check that the calibration weight is fastened correctly and in the correct position;
Check mechanical integrity of the calibration weight;
Check that the search card is reading correctly by conducting the encoder test.
PK modules and phases, as described in the paragraph “Service Programmes”:
Geometry of wheel used
From software version 1.2 loaded on the main board (MBU/CPU), if the display of the first gramme is enabled in the service environment (in this condition, the message “1 ON” is displayed in the specific box) at the end of calibration the following parameters are displayed:
L1= residual wheel unbalance calculated with respect to the barycentre of the calibration weight. The recommended value is less than 100g per side, otherwise balance the wheel before performing the calibration;
L2= unbalance detected with the calibration weight in position as indicated in the second calibration spin. This value must be 100g +/-5 on the inner side and less than 5g on the outer side;
L3= unbalance detected with the calibration weight in position as indicated in the third calibration spin. This value must be less than 5g on the inner side and 100g +/-5 on the outer side.
When error “E 3” is displayed, this means that the grammes acquired by the machine during the second (L2) and/or third spin (L3), are out of tolerance, therefore the previously described checks must be performed.

E 4

Error condition on calibration of the internal sensor and the external sensor, if present. Calibrate the internal sensor and the external sensor, if present.

E 6

Error condition when executing optimisation programme.
Repeat the procedure from the beginning.

E 12

a) Width sensor not in the rest position when machine was switched on. Switch off the machine, return the sensor to the correct position and switch back on.
b) External sensor not present or faulty. Visualisation of this error can be disabled by performing the following procedure:
- Select the "Sensor calibration" icon and press Enter.

E 16

motor temperature too high. Wait before performing a new spin (do not switch off the machine).

E 27

Excessive braking time. Check:
- that relay “RL1”, which inverts current for braking, is working correctly. If the relay functions correctly, at the beginning of braking, you will hear a mechanical tone coming from the power supply card. If not, replace the PEAL32F power supply card;
- check that the motor cables are connected correctly in the 6-pole connector;
- check that the 6-pole connector is connected correctly to the PEAL32F card.

E 28

Encoder counting error. Check:
- check the state of the encoder disc;
- check that the search card reads correctly by performing the encoder test (see paragraph “Service Programmes);
- check that the search card and the Main board are connected correctly with the 8 pole ribbon cable;
- if necessary, replace the search card or the Main board.

E 30

Wheel spin device failure.
Error condition related to the non-rotation of the unit after pressing the Start key.
If the wheel begins to rotate:
- check the encoder card is working.

If the motor does not start up:
- check that the motor power supply cable is correctly connected to the PEAL32F power supply card;

• check that the PEAL32F power supply card is working;
• check the motor is working.

E 32
The wheel balancer was jolted during the reading phase. Repeat the spin.
The wheel balancer makes checks on the disturbances; if the machine suffers excessive jolts during the reading of the unbalances, it displays this error.
If such disturbances are absent however, check inside whether:
• the wheel balancer is resting firmly on the floor;
• the swinging unit has noisy bearings;
• the securing ring nut is fastened tightly.
• Verify the correct reading of the Search card using the encoder test (see paragraph "service programs");
• Verify PK modules (see paragraph "service programs").

CCC CCC
Unbalance values greater than 999 grams.

2. TROUBLESHOOTING

The wheel balancer is equipped with self-test and self-diagnosis programmes supplying information about most possible faults and the relative interventions (refer to the list of error messages and the paragraph “Troubleshooting” in the User Manual).
There are, however, irregular working conditions that the machine is not able to recognise, and which are listed below.

CAUTION!
For all electrical irregularities, before replacing a card you are advised to check:
- the effectiveness of the wiring between those components probably involved in the malfunctioning. In particular, check:
- that the connectors are correctly inserted;
- that the contacts are correctly fixed to the ends of the individual wires of the cables;
- the stability of the mains voltage in the area where the machine is installed and the efficiency of the earthing system of the shop;
- for damage to the protection fuses installed in the power supply panel.

The table below summarises the general wiring diagram.

The machine does not switch on.
Using a voltmeter, check that there is a power supply voltage on the terminal board of the PEAL32F power supply card.
1) If there is no voltage on the PEAL32F card, check:
- that the power socket and the relative protection fuses are in proper working order;
- the correct connection of the plug to the machine power supply cable;
- the mains cable is not damaged;
- the main switch is working correctly.

2) If there is voltage on the PEAL32F card, check:
- the presence of the voltages envisaged on the PEAL32F card, i.e. from 90V to 250V;
- the efficiency of the power supply card, checking:
  • that the relative signalling LEDs light up;
- the correct wiring of the power supply cable of the MBU32F Mother board, and the correct insertion of its connectors;
- any short-circuits on the peripheral devices. For this purpose, detach all the cables of the connectors of the Mother board, apart from the power supply one, and try to switch on the machine;
- the monitor is powered. Check:
  • the power supply cable is correctly inserted in the power supply panel;
  • the green indicator light is switched on;
- the monitor, if correctly powered, is working properly. Check:
  • that the connector of the signal cable is correctly fixed to the FPGA graphic card.
- correct wiring of the internal and external sensor cables (if installed), i.e.: connector JSA2 external sensor cable, JDSI2 internal distance sensor cable.

If the above checks have not pointed out any faulty components, replace the FPGA graphic card.

The image on the monitor is not correctly displayed: it is not centred, not bright enough, there are strange colours, lines etc.
- adjust the registers in the front part of the LCD monitor, referring to the manual supplied together with the monitor;
- check that the monitor signal cable connection to the FPGA graphic card is fixed securely;

The image of the monitor is distorted.

- Check that the screen format setting is correct for the monitor installed on the machine (see paragraph "Selecting monitor display format")

Pressing the START key and/or lowering the guard, the machine does not perform the spin

In this case, the different causes can be distinguished on the basis of the display indications.

1) If the monitor continues to show the unbalance values previously calculated

The Mother board is not receiving or perceiving the START signal arriving from the keyboard or the micro-switch.

Check:

- the correct operation of the automatic start micro-switch associated with the wheel guard casing (with the guard lowered, the contact of the switch must be closed);
- the correct wiring of the automatic start micro-switch;
- the correct operation of the Start key.

If the above checks have not pointed out any faulty components, the MBU32F Mother board should be replaced.

2) If the monitor shows the geometric data of the wheel

The Mother board receives the signal from the START key or the microswitch, but the subsequent command is not carried out.

Check:

- the "command cable" connecting the Mother board to the "PEAL32F power supply card" is correctly inserted and wired;
- the "PEAL32 power supply card" is working correctly, as indicated in paragraph "2.1 PEAL32F power supply card". To do this, proceed as follows:
- disconnect the power supply cables of the motor;
- place the terminals of a tester (used as an alternating voltmeter) in contact with the terminals of the disconnected cables;
- press the START key. If the piloting part upstream of the measuring point is working correctly, you should read a voltage value of around 115/230 Volts (based on the type of power supply used).
- the spin motor is not damaged.
  Carry out this check using a multimeter on the PHOENIX connector connected to the PEAL32F power supply card:
  PIN3 – PIN6 mains voltage (230/115vac) while spinning or braking
  PIN4 – PIN5 mains voltage (230/115vac) while spinning or braking
  PIN1 – PIN2 zero voltage, i.e. termoswitch closed, spin correct
  PIN1 – PIN2 voltage approx. 3VDC, i.e. termoswitch open, spin NOT performed and error message "E 16"
  PIN1 GND
  PIN2 TERMOSWITCH
  If there is NO voltage across Pin3-Pin6 and/or Pin4-Pin5 there is a power supply card fault, whereas if there is voltage but the machine does not spin, there is a spin motor fault.
- for damage to the coil of relay "RL2", which is used to power the spin motor. If the relay operates correctly, after pressing START (or lowering the guard) there will be a mechanical tone coming from the Mother board. Otherwise, replace the PEAL32F power supply card.

If the above checks have not pointed out any faulty components, replace the Mother board.

For the machine version without a guard, check the proper operation of the Start key on the keyboard and of the button to the side of the machine. In the rest position, the button contact must be open whereas it must closed when pressed.

3) The monitor displays the message "A Cr".

The Start button was pressed on the keyboard.

Check:

- that the guard is lowered when a spin is performed (pressing the START button);
- the correct operation of the automatic start micro-switch associated with the wheel guard casing (with the guard lowered, the contact of the switch must be closed).
- in machine versions without a wheel guard but with an additional START button.
  Check soundness of the START button and, if necessary, check soundness of the START key on the keyboard.
- in machine versions without a wheel guard and without an additional START button.
  Check soundness of the JUMPER plugged into the Mother board's JMCR1 connector.

If the above checks have not pointed out any faulty components, replace the Mother board.

4)The displays show the message " E 30".
If you hear a strange noise, check the status of the pinion.
If the wheel starts to rotate normally, check the operation of the encoder card, see paragraph "Service programmes".
If the motor does not start up:
- check that the motor power supply cable is connected correctly;
- check motor operation.

Pressing the Start button and key, the machine does not perform the spin (wheel balancer version without the guard).
In this case, the different causes can be distinguished on the basis of the display indications.

1) The displays continue to show previously calculated unbalance values.
The Mother board is not receiving or perceiving the Start signal arriving from the Start button and key.
Check:
- the correct wiring of the START micro-switch;
- the correct operation of the micro-switch and the Start key.

If the above checks have not pointed out any faulty components, replace the Mother board.

2) If the geometric data of the wheel appear on the display.
The Mother board receives the signal from the Start button or key, but the subsequent command is not carried out.
Check:
- For damage to the coil of relay "RL2", which is used to power the spin motor. If the relay operates correctly, after pressing START (or lowering the guard) there will be a mechanical tone coming from the Mother board. Otherwise, replace the PEAL32F power supply card.
- For damage to the spin motor, checking that it is powered with the relative mains voltage. In the case of damage, replace the motor.

If the above checks have not pointed out any faulty components, replace the Mother board.

3) The message "A StP" appears on the displays.
- Either the Start button or key (or both) was released when the machine was in the spin or acquisition phase.

4) The displays show the message "E 30"
If you hear a strange noise, check the status of the pinion.
If the wheel starts to rotate, check the operation of the encoder card, see paragraph "Service programmes".
If the motor does not start up:
- check that the motor power supply cable is connected correctly;
- check motor operation.

If when commanding the spin (or when lowering the guard or pressing the Start key and the button) the wheel turns in the opposite direction (i.e. toward the operator), replace the PEAL32F power supply card.
In fact this irregularity is caused by the incorrect operation of the relay "RL1", which manages the inversion of current for wheel braking.

When switched on, the machine is blocked (it does not accept any command)
Check the keyboard is undamaged and is working. In this case, the keyboard itself should be replaced.

When the machine is switched on, the motor is powered
Probably, the relay "RL2" which is used to power the spin motor does not function correctly, i.e. it remains activated permanently. In that case, replace the PEAL32F power supply card.

The diameter and/or distance values acquired automatically with the sensors diverge from the real values.
Within the service environment, check the efficiency of the sensors (paragraph "Internal and external sensor").
For slight variances (maximum one inch), noted above all with alloy rims of greater thickness than usual, bear in mind the consideration already outlined in the paragraph specified above.

The width value acquired automatically with the sensors diverges from the real value.
If the potentiometer presents no irregularities, it may be sufficient to carry out a correct calibration of the external sensor.

The wheel balancer supplies non-repetitive unbalance values for a series of spins (differences greater than 3 grammes with unbalances of around 30 grammes)

Check (in this order):

- the machine is resting firmly on the floor and the feet are undamaged;
- the weight tray is correctly positioned i.e. not rubbing against the bell of the swinging unit during the spin;
- the anchor, fixed to the hub, does not touch the brake during the signal acquisition phase;
- the wheel is well blocked on the shaft i.e. there is no sliding between the wheel and the resting flange during the spin phase;
- to check this condition, make two reference marks with a piece of chalk, one on the flange and the other on the wheel, perfectly in line with each other. Check there has been no reciprocal movement between the two reference points after a few spins;
- the two pick-ups are correctly tightened (refer to the values of the signals visualised on the service page);
- the efficiency of the Mother board, replacing it with a new one.

If the above checks have produced a favourable result, replace the swinging unit and, if necessary, check for any noise from the bearings.

It is impossible to balance the wheel: applying the weights indicated by the wheel balancer, and performing a check spin, new unbalance values appear at random

Make the checks listed in the previous point.

Check also:

- that the geometric dimensions set are correct;
- the machine is not out of calibration (carry out the sensitivity calibration procedure);
- the anchor, fixed to the hub, does not touch the brake during the signal reading phase.
- the cable connecting the search card (encoder) to the Mother board is correctly inserted and wired;
- the search card (encoder) is working correctly (via the values visualised in service - see the paragraph “Service programs”). An operational defect in the search card prevents the machine from correctly calculating the position of the unbalances. In this case it is necessary to check:
- that the photodiodes of the search card are clean;
- the mechanical adjustment of the fork in relation to the search disk.

If the irregularity persists, replace the search card and, if necessary, the search disk (if damaged).

If the fault still does not disappear, replace the Mother board.

The motor remains activated, keeping the wheel in traction, and the current spin does not end

Perform all checks on the Mother board that were listed in the previous point.

Probably, the relay “RL2” which is used to power the spin motor does not function correctly, i.e. it remains activated permanently. In that case, replace the PEAL32F power supply card.

If instead after sampling (i.e. acquisition of wheel unbalance signals)in fall, the machine continues to spin the wheel instead of braking, check the operation of the relay “RL1” which inverts the current for braking.

If the relay functions correctly, at the beginning of braking, you will hear a mechanical tone coming from the power supply card. Otherwise, replace the PEAL32F power supply card.

During a spin:

• unknown characters appear on the monitor;

Check that the CF was inserted correctly in the graphic card and replace the CF if necessary;

• the machine resets.

The fault (usually sporadic) can arise due to the temporary absence of a power supply to the Mother board, or owing to a disturbance or malfunctioning of the Mother board.

Check:

- the correct wiring of the power supply cable of the Mother board, and the correct insertion of its connectors;
- the proper operation of the “PEAL32F power supply card”, checking in particular the values of the available power supply voltages (power supply values from 90 Volts to 270 Volts).

If the above checks have not pointed out any faulty components, replace the Mother board.

The brake at the end of the cycle is too long, or noisy

Check:

- If the bell of the swinging unit or the motor pulley slides on the belt during the braking phase. Then check the tension of the driving belt (nominal frequency 200Hz);
- Check the operation of the relay "RL1", which inverts the current for braking.

If the relay functions correctly at the end of the cycle, you will hear a mechanical tone coming from the Mother board. Otherwise, replace the PEAL32F power supply card.

The RPA programme does not function correctly, i.e. the wheel is not stopped in a centred position at the end of the spin or when pressing the Start key with the guard raised (if present)

Check:

- the state of wear and tear of the brake anchor;
- the distance between the anchor of the hub and the brake (nominal distance 0.2 mm -0/+0.05mm).

The spin device is noisy:

Check:

- If the bell of the swinging unit or the motor pulley slides on the belt during initial acceleration. Then check the tension of the driving belt (nominal frequency 200Hz);
- the motor is not mechanically damaged.
- after having removed the belt from the spin motor, check for excessive clearance between the pulley and drive shaft.
  If the result is positive, check for wear of the pin and seats on the shaft and pulley.
  Replace all parts found to be worn.
  Check that all the parts indicated in Figure 20 are in place:
  Code 2-00209 washer 4x9mm thickness 1mm;
  Code 2-91679 washer 4X12mm thickness 1mm;
  Code 2-02080 M4X10.
  Now fix the pulley following the order given in the figure and put some medium strength Loctite on the M4X10 screw.

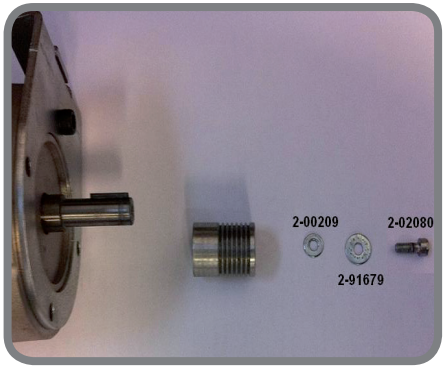


Fig.1

Touching the metal parts of the wheel balancer, you get an electric shock

Check the efficiency of the earthing connection of the socket (essential for the correct operation of the machine as well as for safety purposes).

- the earth cable is correctly connected inside the electric system and on the internal machine parts.

3. SOFTWARE CONFIGURATION SUMMARY TABLE

ENCODER NOTCH	HIDDEN FUNCTIONS
0	Function for electronically resetting the shaft assembly using a medium/large wheel. Procedure described in the service manual paragraph **"ZERO-SETTING OF THE SWINGING UNIT"**
50	Function for enabling/disabling wheel spin with the "Str on/off " button for versions without a wheel protective casing. Procedure described in the service manual paragraph **"MACHINE SOFTWARE CONFIGURATIONS"**.
55	Neutral Logo or Logo1 or 2 setting Procedure described in the service manual paragraph **"MACHINE SOFTWARE CONFIGURATIONS"**.
60	Function for enabling/disabling the weight tray clip. Procedure described in the service manual paragraph **"MACHINE SOFTWARE CONFIGURATIONS"**.
131	Jap/USA/EUr market To change the threshold to gx5 Procedure described in the service manual paragraph **"MACHINE SOFTWARE CONFIGURATIONS"**.
169	Changing the video ratio 4:3 , 16:9 , 16:10 Procedure described in the service manual paragraph **"MACHINE SOFTWARE CONFIGURATIONS"**
200	Function for calibrating the automatic inner sensor. Procedure described in the service manual paragraph **"INTERNAL SENSOR CALIBRATION"**.
244	Function for enabling wheel spin simulation. Procedure described in the service manual paragraph **"MACHINE SOFTWARE CONFIGURATIONS"**.

4. SERVICE PROGRAMMES

The aim of these programs is to make some data available, to allow the quick and easy checking of the efficiency of the various parts of the machine.
The data are visualised in the service environment, which is accessed by first selecting the icon  .

"Utilities", then the icon  "Configuration programs", then the icon  "Service program".
After making the selection, the display will visualise an image showing (from the top):
- the geometric data of the wheel: width, diameter, distance;
- the unbalance values (without thresholds) relating to the last spin made;
- the angular positions (written in white and expressed in notches) of the unbalances relating to the last spin made;
- the software versions loaded on the MBU32F card for the CPU (MBU) section of the graphic section (MSK);
- the presence of the threshold of 1 gram for the unbalance values shown. During normal

working, when the “gr x 1” unbalance visualisation mode is selected, the first gram of unbalance is not shown. In this condition, the message “1 OFF” is highlighted in the appropriate window. If, on the other hand, you wish to visualise the first gram of unbalance as well, you must select the icon  .
In this condition, the message “1 ON” is highlighted in the appropriate window.
In this condition, the sensitivity of the machine is also intensified so as to calculate and visualise the unbalance values with the greatest precision possible.

This characteristic allows you:
to visualise the unbalance values with the maximum precision allowed, so you can balance a wheel perfectly and then carry out further checks on it.
The technical assistance staff must always work with this condition.

- the presence of the rounding-off (to one inch) of the values obtained with the automatic sensor. When the rounding-off is activated, the message “ON” is shown in the appropriate window. If you wish to visualise the diameters acquired with the precision of a tenth of an inch, it is necessary to select the icon  . The message “OFF” appears on the display, indicating the setting of this new condition.

This function allows you:
to check with the maximum precision (a tenth of an inch) the match between the values obtained with the sensor and the nominal values of the wheels.

- The current value of the angular position transducer of the wheel (encoder), its variation interval, and two numerical values corresponding to the number of impulses counted by the encoder during a spin and the expected value for this count (XXX).

These data allow you:
to easily check the efficiency of the encoder. In particular, that the value of the encoder is continuously updated within the interval 0 - 255 when turning the shaft manually in the two directions, and that the two numerical values visualised on the right of the line are the same at the end of a spin made in the service environment.

If the two numerical values displayed on the right side of the row are NOT equal, the encoder card must be replaced:

- switch off the machine;
- remove the weight tray;
- fix the new encoder card so that its base is resting on the step on the motor support.

If this operation does not produce a positive result, replace the fork cable (and the encoder disk if necessary) in the following way:

- disassemble the fork;
- unscrew the 4 fixing screws then disassemble the disk (Figs.2 and 3), after using nippers to cut the two junction teeth in line with the “0” notch;

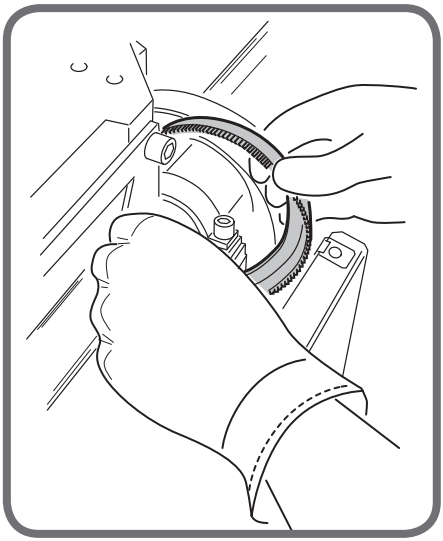


fig. 2

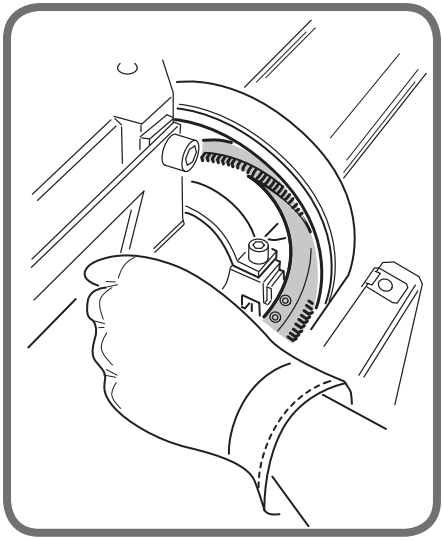


Fig. 3

- on the new disk, use nippers to cut the two junction teeth in line with the “0” notch. Insert the disk in the appropriate seat and tighten the 4 screws (previously loosened) but without blocking them. Adjust the disk so that the gap on the “0” notch is 0.9mm/1mm, as shown in figure 4. To check the width of the gap on the “0” notch you can use a normal feeler gauge;

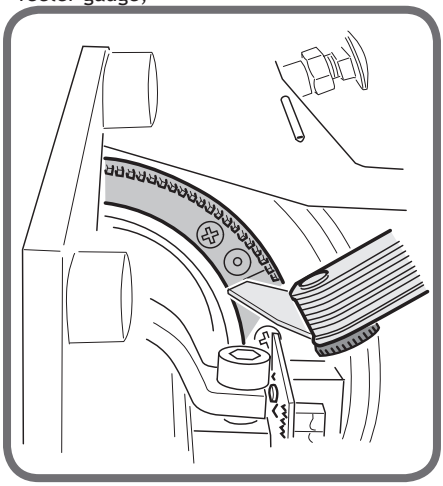


Fig. 4

- the values of the transducers / sensors used to obtain the geometric data of the wheel, together with their typical variation intervals.

These data allow you:

to easily check their efficiency. In particular, that when moving the sensor the relative values are continuously modified within the envisaged intervals (see also paragraph 6):

diameter sensor -110

distance sensor from 0 to 630 if the sensor rod is short (527mm); from 0 to 720 if the sensor rod is long (572mm);

There is a green window to the side of the distance sensor value that displays the message “ON”, which indicates the status of the zero sensor used for zero-setting the automatic sensor.

This message changes to “OFF” when the internal sensor is extracted and returns to “ON” when it returns to the rest position (reference distance sensor value 5 +/-1). If this update does not occur, carry out the checks described in the “internal and external sensor” chapter.

width potentiometer from 5 to 255 with external sensor present.

This value is updated by moving the external sensor towards and away from the operator. If the measuring sensor is not present, the (converted) voltage value deriving from the width potentiometer is equal to 245. This value remains fixed, and is NOT updated as the external sensor is missing.

- speed (rpm) and the number of any discarded periods in the last spin executed.

These data allow to:

check the correct spin speed (rpm) using an average sized wheel (typically 5.5” x 14”), the value of which must be within a range of 95 to 105;

check for interference during the spin. If there is a number different from 0/X (where X is the number of sampled periods during the spin) repeat the spin, taking care not to knock the wheel balancer during the readout phase.

If, however there is no interference, check inside to see whether or not:

• the wheel balancer is resting firmly on the floor;

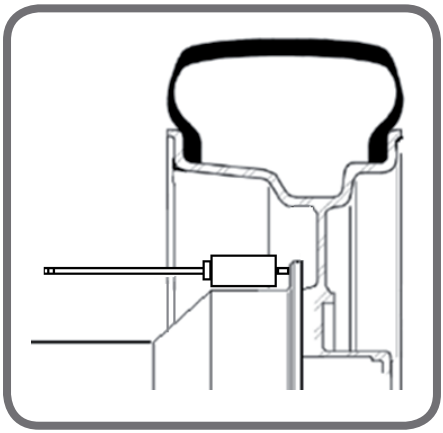
• the shaft assembly has noisy bearings;

• the securing ring nut is fastened tightly;

• that the anchor, fixed to the hub, is not touching the brake and, in the electromechanical locking devices, the clutch is not touching the anchor fixed to the cone of the internal device during the signal acquisition phase;

- the following numerical values:

1. extent of the signal generated by the internal pick-up;
2. extent of the signal generated by the external pick-up;
3. the phase displacement (in relation to the reference value of 180 degrees) of the signal of the external pick-up compared with that of the internal pick-up. The value is expressed in encoder notches (whole part) and in tenths of a notch (decimal part). One encoder notch corresponds to about 1.4 degrees.
4. to visualise or update the values, it is necessary to:
   - to calibrate with the 100 g weight, mount a previously balanced medium sized wheel (5.5”X14”) on the shaft assembly (after selecting “1 ON” mode with the icon ) and apply the calibration weight (100 g) on the external side;
   - to calibrate with the SLUG calibration counterweight, mount a previously balanced medium sized wheel (typically 5.5”X14”) or a larger wheel, but with a mass NOT exceeding 40 Kg. Apply the SLUG (calibration weight) in the position indicated in the figure:



- perform a spin.

The values visualised do not depend on the dimensions set.

These data allow you:

• to check that the values visualised are within the envisaged intervals, i.e. (see also the paragraph “Pick-up replacement and adjustment”):
  - internal pick-up signal: > 200
  - external “ “ “ : > 100
  - difference between pick-up phases: from -2.0 to + 2.0
  - the phase calibration coefficient.

This datum shows:

to check that the value visualised is within the envisaged interval, i.e. from -2.0 to +2.0.

You can exit the service environment by selecting the program exit icon.

If the pick-up phase difference is not within the specified range (+/-2), check that the search card is reading correctly by conducting the test described previously.

The aim of these programs is to make some data available, to allow the quick and easy checking of the efficiency of the various parts of the machine.

5. ELECTRICAL BOX CARDS

5.1 PEAL 32F power supply card

This power supply card allows the wheel balancer to be powered with a single-phase AC mains voltage varying from 100 - 240 Volts +/- 10% (A, fig.5).

After switch-on, the LEDs LD1 (green) must be lit up (as they indicate the power supply to the 5VDC card). Otherwise, check that the card is powered correctly.

The following red LEDS light up in sequence when a spin is performed:

• LD2 indicates the power supply to the spin motor (115/230VAC);
• LD3 indicates the end of spin braking with inversion of current mode;
• LD4 FR_ST indicates clamping braking or braking in a centred position if the RPA programme is enabled.

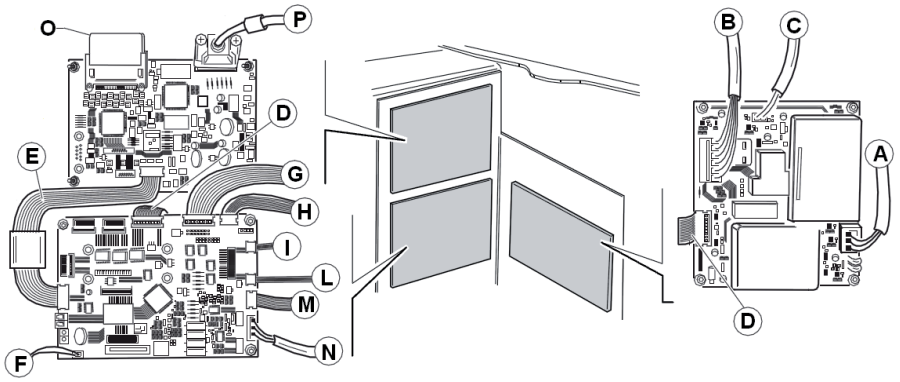


fig.5

5.2 "MBU32F" CPU board

On the cards used in the wheel balancer, there are certain hardware and software settings that allow them to be used on different models. Depending on the code of the spare part requested, the card is configured in the factory so further interventions by the installer are not necessary.

When the card is working correctly, the LD1 LED (+5V) is lit up with a fixed green light. This LED indicates the presence of power supply voltage for the card. If this is not the case, check (in this order):

- the correct functioning of the PEAL 32F card;
- the cable connection (D, fig.5) on the MBU card and on the PEAL 32F card;
- replace the power supply cable (D, fig.5);
- replace the MBU card.

5.3 GRFNEA-1 FPGA graphic card

This card manages the graphics on the machine and is directly connected to the CPU card via a flat cable (E, fig.5). It is equipped with a compact flash (O, fig.5) that contains all the files inherent to the graphics. This CF can be directly updated by using a PC and a compact reader.

When the card is working correctly, the LEDs LDG1, LDG2 and LDG3 are lit up with a fixed green light. If LED LDG4 lights up with a flashing red light, check the compact flash is correctly inserted. If the red light is fixed, check the connection of the flat cable on the GRFNEA and MBU32F cards (E, fig.5).

After switch-on. the machine loads the graphics. This operation, which lasts approx. 45 seconds, results in the display of a logo with a clock on the monitor.

If the visualisation of the "clock" logo lasts longer, check the compact flash is correctly loaded and, if necessary, format and reload the graphic files or replace the CF.

If the "clock" logo does not appear after switch-on, check:

- the connection of the monitor signals cable on the rear panel;
- the connection of the monitor power supply cable;
- the connection of the monitor signal cable on the connector (P, fig.5);
- the correct functioning of the graphic card;
- the CF is correctly inserted in the JCFC1 connector;
- the connection of the flat cable between the GRFNEA and MBU cards;
- replace the flat cable.

6. HARDWARE CONFIGURATION MBU32F MOTHER BOARD

On the boards used in the wheel balancer, there are certain hardware (deep switch and jumpers) settings that allow them to be used on different models. According to the code of the requested spare part, the board is configured in the factory. During the installation phase, it is recommended not to modify these configurations for any reason.

7. MACHINE SOFTWARE CONFIGURATIONS

When replacing the MBU32F CPU board or carrying out the board reset diagnostic test "t5", the wheel balancer must be configured based on the machine version.
For this configuration, proceed as follows:

7.1 Enabling of the wheel spin with a button

- access the service environment and, turning the unit, position it to encoder position notch 50;
- remaining on this notch, hold down the Enter button (with the cursor on the "spin counter" icon) for approx. 5 seconds. A window with the message "Start OFF" appears on the monitor;
- press Enter to enable the wheel spin with a button; the message "on" appears on the monitor;
- press the Escape key to exit.

7.2 Enabling the accessory weight tray device:

- Access the service environment and, turning the unit, position it to encoder position notch 60;
- Remaining on this notch, hold down the Enter button (with the cursor on the "spin counter" icon) for approx. 5 seconds. A window with the message "Handle OFF" appears on the monitor;
- Press Enter to enable the device, the message "on" appears on the monitor;
- Press the Escape key to exit.

IMPORTANT: after performing the machine configuration as described above and after pressing the Escape key to confirm/exit, turn off the machine off and on using the main switch located on its rear side.

IMPORTANT: with software release 01.4 (MBU and MSK) some configurations can be carried out as follows:

• Select the  "Utility Programme" icon;
• Keep the STOP key pressed for at least 10 seconds. A window opens on the screen with the letters "CFG X" where X is the number of the configuration on the board;
• Use the arrow or enter keys to change the type of machine configuration;
• Press the ESC key to exit;
IMPORTANT: after configuring the machine as described above and after pressing the Escape key to confirm/exit, turn the machine off and on with the main switch located at the back.

7.3 Selecting monitor display format

From MBU software version 1.1 on, this function may be used to change the screen format to suit the monitor used.
- access the service environment and, turning the unit, position it to encoder position notch 169;
- while still at this notch, press and hold ENTER (with the cursor on the "spin counter" icon) for approximately 5 seconds. A window with the following message is displayed on the monitor: "Video 4:3" (default setting)
- Press ENTER again to cycle through the following modes:
16:10
16:9
- select the desired screen format, then press ESCAPE to confirm and exit.

The table below shows the different selectable configurations:

Configuration Number	CFG1 (DEFAULT)	CFG2	CFG3	CFG4
CALIBRATION TYPE	SLUG	SLUG	SLUG	100g
MARKET: EUROPE/USA/JAPP	EUROPE	USA	JAPP	EUROPE
UNBALENCE UNIT OF MEASURE: GRAMS/OUNCES	GRAMS	OUNCES	GRAMS	GRAMS

7.4 Changing the unbalance threshold based on the market

- enter the service environment and, turning the unit, position to **notch 131**;
- Remaining on this notch, hold down the Enter button (with the cursor on the "spin counter" icon) for approx. 5 seconds. A window with the message "SEL EUr" (factory setting) is displayed on the monitor;
- Press ENTER to change the market (refer to the working zone), the message "USA" or "JAP" (Japan) will appear on the monitor;
- Press the ESCAPE key to exit and confirm the selection that was made.

7.5 Enabling wheel spin simulation

This programme makes it possible to perform subsequent wheel spins in automatic mode by setting a fixed time (seconds). This setting may be used to check over time if there are any mechanical or electronic machine anomalies.

- access the service environment and, turning the unit, position it to **notch 244**;
- Remaining on this notch, hold down the Enter button (with the cursor on the "spin counter" icon) for approx. 5 seconds. A window with the message "Delay= 10" appears on the monitor.
- Press the arrow keys to change the pause time between one spin and the next one. It is possible to change this time from a minimum of 5 seconds to a maximum of 180 seconds.
- Press ENTER to start the wheel spin simulation cycle.
- Press the ESCAPE key to stop the cycle and exit.

7.6 Enabling Neutral Logo setting

- access the service environment and, turning the unit, position it to **encoder position notch 55**;
- Remaining on this notch, hold down the Enter button (with the cursor on the "spin counter" icon) for approx. 5 seconds. A window with the message "Logo XXX" will appear on the monitor, where XXX is the machine setting;
- Press the Enter button to change the machine logo setting. The following settings will appear on the monitor:

Logo STD → manufacturer logo present
Logo OFF → manufacturer logo NOT present or activation of a specific logo if foreseen.
Logo 2 → manufacturer logo NOT present
Logo 3 → manufacturer logo NOT present

- Press the ESCAPE key to exit.

8. MEMORY ZERO-SETTING PROGRAMME E2PROM

To perform the t5 test for zero-setting the E2PROM calibration parameters proceed as follows:

- With the machine turned off, set the deep-switch (A, figure 5A) which is necessary for accessing the diagnostics mode, i.e:
- MBU32F: SW1 DSW2 to ON;
- Turn on the wheel balancer;
- A page with the "TEST SELECT" diagnostic programmes will appear on the display. Use the arrow keys to select the test called "5 E2PROM";
- Press the Enter key to confirm the selection. The card will automatically perform the zero-setting for the calibration parameters;
- Once the operation is complete, OK (green) will appear on the display to the side of the previously selected "5 E2PROM" test;
- Turn off the machine and return the deep-switch to its original position (all switches to OFF).

9. ZERO-SETTING OF THE SWINGING UNIT

If the main board MBU32F and/or the shaft assembly need to be replaced, reset the shaft assembly as follows after sensitivity has been calibrated:

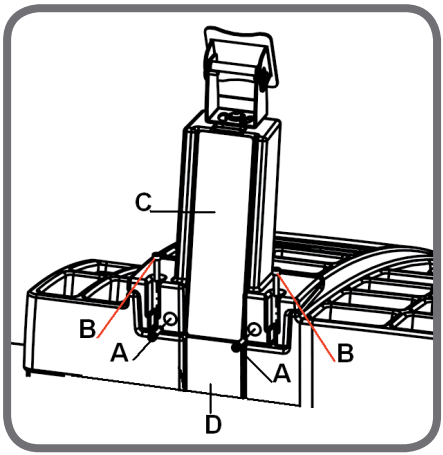
- mount a wheel of average dimensions (ex. 5.5”X14”) on the machine with a rim preferably in steel and with a maximum residual unbalance of 10 grams per side;

Important: to properly perform the zero-setting of the swinging unit, the wheel rim must be in perfect condition, without deformations or abrasions or dirt in the centring hole or on the plane that rests on the swinging unit. In addition, the centring accessories must be correct for the wheel type and be clean and in perfect condition.

- block the wheel on the unit by keeping the valve in the 12 o'clock position;
- enter the wheel dimensions (in manual mode or automatic mode in versions with a digital sensor);
- go to the service environment as described in the “Service Programme” paragraph
- turning the unit position to encoder position notch 0;
- remaining on this notch, hold down the Enter button (with the cursor on the “spin counter” icon) for approx. 5 seconds. A window with the message “GRP 0” appears on the monitor;
- perform a spin;
- at the end of the spin, a window with the message “GRP 180” appears on the monitor:
- move the wheel valve to the 6 o'clock position, then keeping the unit in this position, loosen the ring nut and return the wheel valve to the 12 o'clock position;
- spin a second time;
- when the spin is complete, the machine will automatically prepare the service environment
- exit the service environment by pressing the “Escape” key.
- check the effectiveness of the zero-setting of the unit, proceeding with wheel balancing. Then, move the wheel valve to the 6 o'clock position and, keeping the unit in this position, loosen the ring nut and return the wheel valve to the 12 o'clock position;
- perform a spin. The residual unbalance obtained must be max. 3 grams per side, otherwise, repeat the procedure, paying attention to the indicated positions and the residual unbalance of the used wheel.

10. DISASSEMBLING THE WEIGHT TRAY

- Disconnect the monitor signal and power supply cables;
- Remove the plate C, see attached figure;



- Remove the two previously disconnected cables, making them pass through the hole in closure plate D, see attached figure;
- Remove the weight tray cover, unscrewing the four M6 fixing screws.

11. UPDATING THE CONTROL UNIT OF THE MBU32F AND/OR THE FPGA GRAPHIC CARD CF

These cards are used with belt transmission wheel balancers.

Card description

- MBU161 card - Mother board, manages the wheel balancer and data processing.
- FPGA card - Graphic card.

All cards are controlled by a microprocessor with the relative firmware.

The FPGA and MBU32F card firmware can be updated when serviced.

It should be pointed out that:

- the FPGA card firmware is stored on a removable "compact flash" memory card".
- the FPGA card firmware version can be identified in the SERVICE environment under MSK.

The MBU32F firmware version can be identified in the SERVICE environment under MBU.
In order to work properly, the cards contained in the wheel balancer must have compatible firmware versions. If one card is replaced or updated, the other cards MUST be checked and updated if necessary.
The following table specifies the compatibility between the MBU32F and FPGA card firmware.

COMPATIBILITY TABLE FOR MBU32F AND MSK FW VERSIONS.

	MSK firmware release (FPGA CARD)		
MBU32F Firmware release	**1.4**	**1.5**	**1.6**
1.0	X		
1.1		X	X
1.2			X

To update the control unit (CPU) of the MBU32F card you must use a wbs programme. If it is not already installed on the PC to be used for the update, it can be downloaded as explained below. Then launch the "setup.exe" programme.

Downloading the software and firmware from the internet for card updating

If one or more cards needs to be updated, the Firmware that is required can be downloaded from the internet.
To download the updated firmware and graphics versions, proceed as follows:
Connect to the manufacturer's website.
Select "Private area".
Enter your username, password and then select "Enter". Select "Software Updates" in the new screen. Fill in the "Keyword" field using the keyword corresponding to the Firmware to be downloaded. Example:

- If you want to download the programming (wbs) Firmware for the update via PC enter "wbs".
- If you want to download the MBU Firmware enter the name of the machine to be updated.

N.B. The downloaded files are in a compressed format (.zip) and must therefore be unzipped before they can be used.

Updating the Firmware for the MBU32F card

To update the firmware, the wbs programme is necessary. If it is not already installed on the PC to be used for the update, it can be downloaded beforehand as explained in the previous paragraph. Then launch the "setup. exe" programme.
Important: the wbs programme is only compatible with Windows operating systems 98SE, 2000 and XP Professional.

"IMPORTANT: if a laptop is used to update the board from a laptop, the laptop must be connected to its mains power adapter. Using a laptop with battery power only (even if the battery is fully charged) may cause faults during the update procedure."

- With the machine switched off set the relative deep switch (A, figure 5A) which is necessary for the programming based on the card to be updated, i.e.:
- MBU32F: SW1 DSW1 to ON;

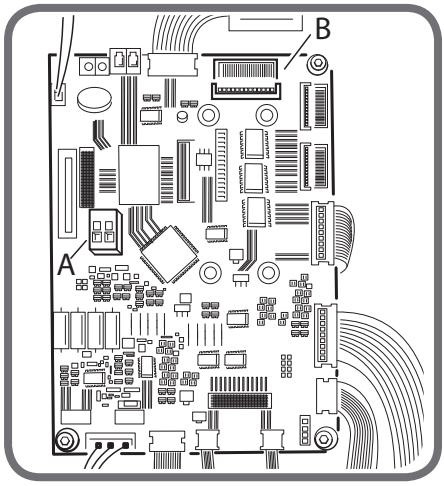


Fig.5A

- Connect the serial cable code 8-21100224 to the "JPS1A" connector of the card itself (see part B figure 5A). The other end of the cable is connected to the RS232 serial port on the PC. If the PC does not have a RS232 port use the RS232/USB adapter code 8-21100226.

If necessary, download the drivers for the adapter from the website "http://www.ftdichip.com"

- Turn the wheel balancer on.
- Start the wbs programme.
- The following control window for the wbs.exe programme will now open.

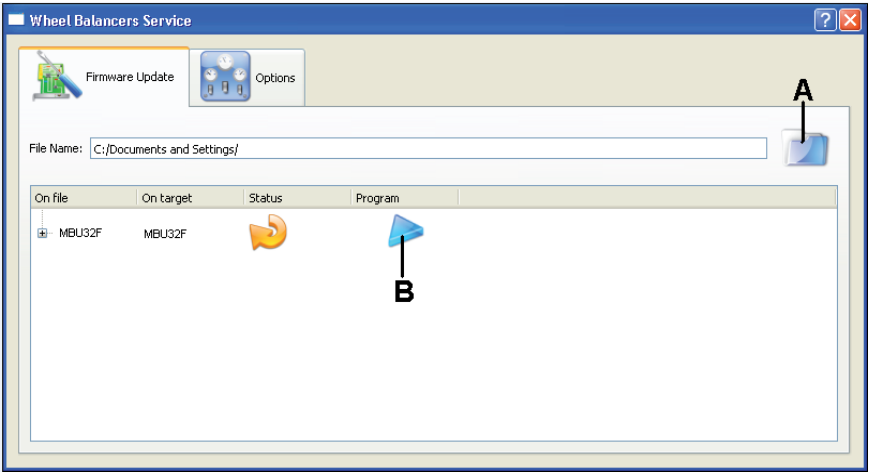


Fig.5B

- Select the folder icon A of figure 5B and upload in the programme the file with the .cef extension relative to the firmware version to update, previously downloaded from the web.
- Select the Options tab and the COM serial port where the programming cable is connected to the PC, see figure 5C.

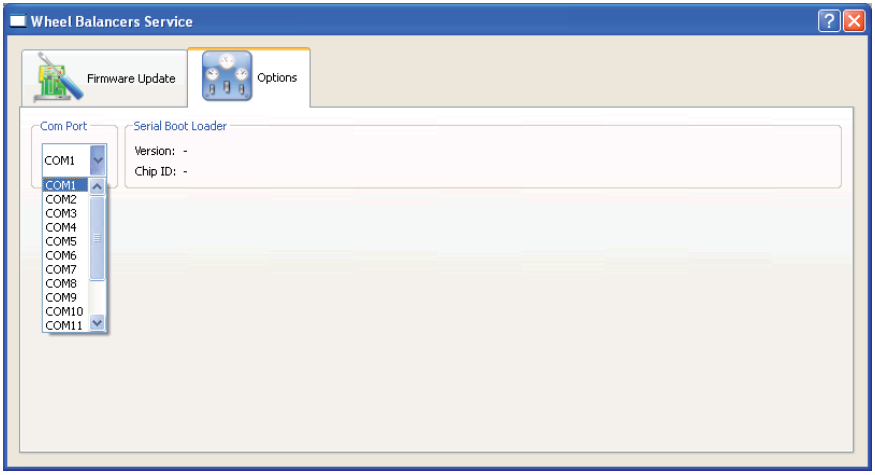


Fig.5C

- Activate the Firmware Update and select the icon B, figure 5b to start the programming procedure.

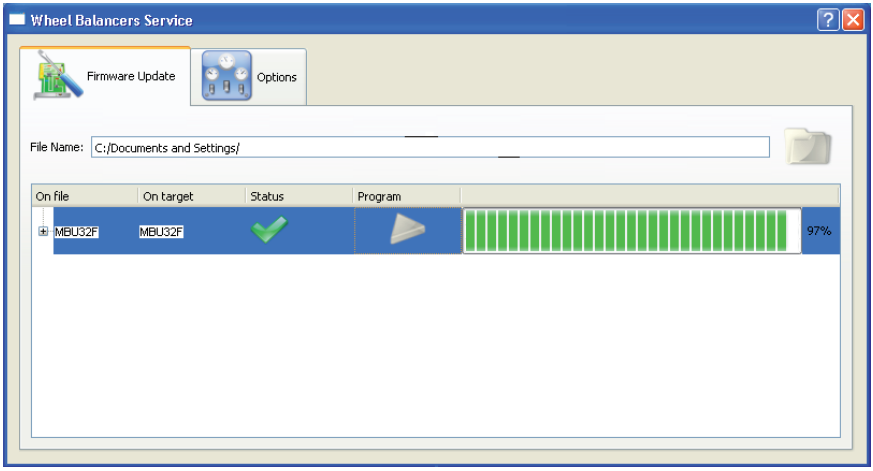
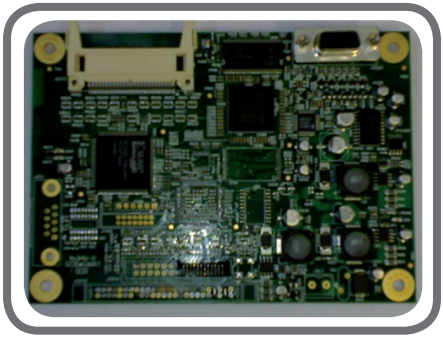


Fig.5D

"100%" is displayed when the programming procedure has been completed successfully.
After the programming procedure, close the application, switch off the machine and return the dip switch to the original position (all switches OFF).
- If an error message is displayed, check the serial cable wiring harness and repeat the programming procedure, turning the machine off and then on.

IMPORTANT: when the board FIRMWARE update is complete, test the E2PROM to reset the calibration parameters as described in the paragraph "E2PROM MEMORY RESETTING PROGRAMME". After this test, the following operations must be repeated in this order:
1. configure the machine based on the machine version as described in the paragraph "MACHINE SOFTWARE CONFIGURATIONS";
2. calibrate the internal sensor as described in the paragraph "INTERNAL SENSOR CALIBRATION";
3. calibrating the external sensor, if installed;
4. calibrating machine sensitivity;
5. resetting the group, see paragraph "shaft assembly resetting".

MSK GRAPHIC VERSION UPDATE (FPGA CARD)



Updating the SW graphic contained in the compact flash on card the MSK card requires a PC with a compact flash card reader or an equivalent external reader/programmer.
In the event of the machine experiencing graphic errors, format the CF before loading the

relative files, following the procedure described below.

1. format the CF using Windows XP as follows:
   - double click on “my computer”;
   - right click the port on which the CF is installed;
   - a window opens with a number of menus; select “formatta” (format), then select **FAT and NON FAT32** as the “File system” formatting type (see Fig. 5e);

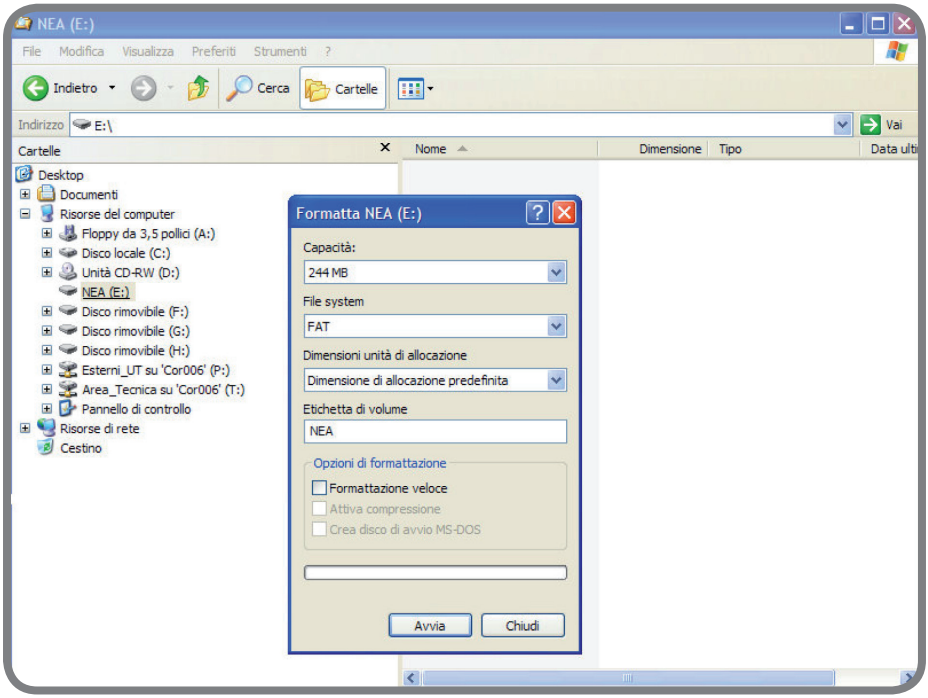


Fig. 5e

   - press “start” and wait for the formatting process to complete.

2. format using the programme “mkdosfs” as follows:
   - Access the manufacturer’s website.
     Select “Private area”.
     Enter your username, password and then select “Enter”.
     Select “Software Updates” in the new screen.
     Enter name of the FW you intend to download (mkdosfs.zip) in the “Keyword” search field.

   N.B. The downloaded files are in a compressed format (.zip) and must therefore be unzipped before they can be used.
   - copy the file “mkdosfs.exe” into the folder C:\WINDOWS;
   - copy and paste the file “indirizzo_formattazione_CF.txt” onto the desktop;
     Open the file “indirizzo_formattazione_CF.txt”, move the cursor onto the row corresponding to the size of the CF you intend to format (e.g., if the CF is 256Mb in size, the correct row is “**MKDOSFS -v -F 16 -R 1 -s 8 -n NEA X:”).** Replace the value “X” at the end of the row with the named assigned by the PC to the CF memory unit (e.g. “E:”).
   - click START (at the bottom left of the screen) then Programs -> Accessories, then open “Command prompt”;
   - copy the modified row in the file “indirizzo_formattazione_CF.txt” and paste into the command

prompt window. Use the right mouse button to open the menu for copying and pasting.

- press ENTER to start the formatting process. If the operation has been completed successfully, the messages shown in Fig.5f will be displayed on the monitor

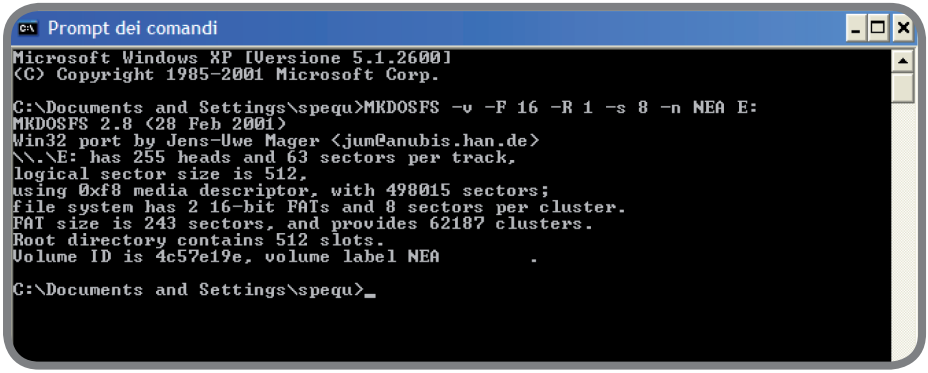


Fig. 5f

Warning: Make sure that you enter the correct letter assigned to the CF memory unit in the file “indirizzo_formattazione_CF.txt”, as entering the wrong letter may result in accidentally formatting another memory unit.

12. INTERNAL AND EXTERNAL SENSOR

To view the sensor signals access the service environment;

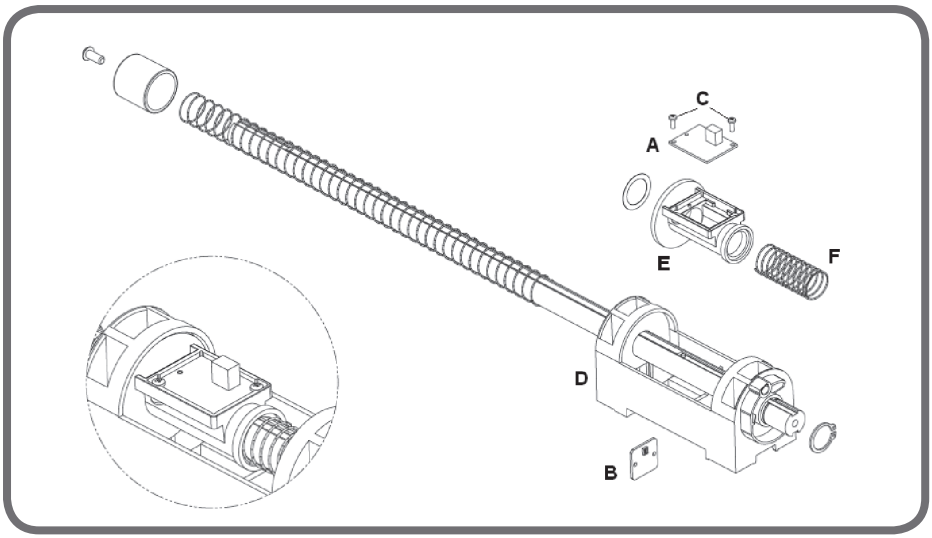


Fig. 6

12.1 Diameter sensor

Check that the stroke is made up of -110 notches with the lever resting on the bell of the swinging unit see Fig.7 (maximum error allowed +/- 5 notches in the position indicated).

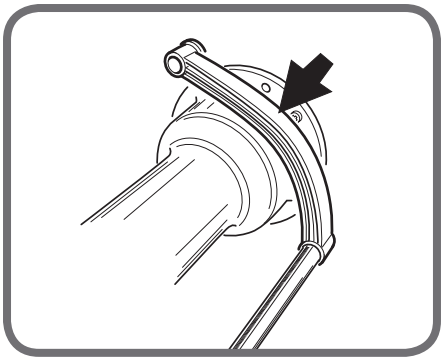


Fig. 7

If the sensor (B, fig.6) does not read, check:
- the connection flat (L, fig 5);
- that the sensor is correctly assembled in its housing.

If the checks above produce a negative result, replace the sensor

(B, fig.6) as follows:
- remove the weight tray;
- remove the sensor lever;
- disassemble the measuring sensor support (D, Fig. 6), using the 4 fixing screws, from the internal plane;
- disconnect the Picoflex from the sensor;
- disassemble sensor B, removing it from its seat;
- replace the sensor, assembling it by following the disassembly directions in the reverse order;
- check the sensor reads correctly, as indicated above.

12.2 Distance sensor

Check that the total stroke is 720 notches (maximum permitted error +/- 5 notches along the entire stroke);
If the sensor (A, fig.6) does not read, check:
- the connection flat (I, fig. 5);
- the correct mounting of the sensor in its housing (Picoflex connector in the direction of the swinging unit);

If the sensor needs to be replaced:
- remove the weight tray;
- Disconnect the Picoflex connector;
- unscrew the two self-threading screws (C, fig.6) then remove the sensor from the sensor support (E, Fig. 6);
- mount the new sensor, paying attention to the correct fixing direction of the sensor itself;
- check the functioning in the service environment.

12.3 Replacing the zero sensor (detects the rest position of the sensor arm)

In the case of an incorrect reading of the distance and diameter values, check the proper operation of the zero sensor as described in chapter “Service programmes”.
If the sensor (A, fig.6) does not read, check:
- the connection flat (I, fig. 5);
- the correct mounting of the sensor in its housing (Picoflex connector in the direction of the swinging unit);

If the zero sensor must be replaced, proceed as described in the paragraph “Distance sensor”. In fact, the zero sensor is mounted on the distance sensor card.
Note:
- if the sensor A flat must be replaced, check that the flat is reconnected correctly (see Fig. 6) on the card. Also, the fixing of the flat on the base must be done so that it is long enough for moving the sensor without having the cable risk to twist around the inside of spring F figure 6.

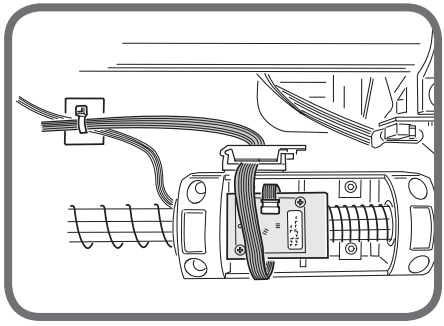


Fig. 6

12.4 Width potentiometer

Check it is at 5 +/- 1 notches in the rest position. If the resting value obtained is different from this, adjust the potentiometer:
- remove the cap from the sensor support box

and use a screwdriver to turn the shaft of the potentiometer until a value of 5 +/-1 appears on the screen.

If the value visualised does not change, check:

1. the connection cable (M, fig.5) on connector JSA2;
2. the potentiometer;
3. the Mother board.

If the potentiometer needs to be replaced:

- loosen the screws of the external sensor cover in order to remove it;
- disconnect the potentiometer cable;
- unhook the spring from the grommet of the potentiometer support plate;
- loosen the fixing screws of the potentiometer support plate;
- disassemble the gears and reassemble them on the new potentiometer, tightening the screw so that they rub against the shaft, thus permitting the subsequent adjustment;
- reassemble the new potentiometer with its relative gears on the plate and fix everything, ensuring that the teeth of the gears are aligned;
- re-hook the spring in the appropriate hole;
- reconnect the cable to the potentiometer;
- tighten the screw to block the gears onto the potentiometer shaft;
- turn the sensor completely towards the wheel resting flange of the machine, checking the electrical continuity of the potentiometer and the correct coupling of the gears along the entire stroke;
  as the travel of the potentiometer corresponds to about 250 numbers, if the potentiometer has been adjusted with a resting value of 5, the value at the end stop will be about 255;
- calibrate the external sensor as indicated in the User Manual;
- check the widths obtained are correct, using wheels with known dimensions (or a special tool). To obtain these data with a precision to a tenth of an inch, it is useful to first select the icon  in the service environment and visualise the message “OFF” in the appropriate window. The maximum error allowed for a wheel with a steel rim and of medium dimensions is +/- 0.2 inches.

Notes

Bear in mind that the rated width and diameter of the wheel (e.g. 6”x14”) refer to the resting planes of the tyre beads, that are obviously inside the rim. On the other hand, the data measured refer to external planes, so they will be lower than the rated values because of the thickness of the rim. The correction value therefore refers to an average thickness of the rim. This means that the data measured on wheels with different thicknesses may vary slightly (2 or 3 tenths of an inch maximum) from the rated values. This is not a lack of accuracy of the measuring devices, but reflects reality.

13. INTERNAL SENSOR CALIBRATION

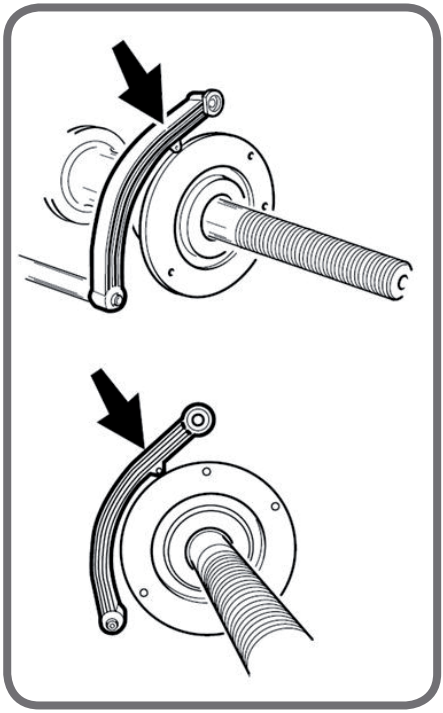


Fig. 9a

The internal sensor must be calibrated in the following cases:

- the machine displays the message E 4 (sensor calibration not performed) even after having calibrated the external sensor (if present);
- the main MBU32F board was replaced or the

board reset diagnostic test “t5” was carried out;
- the swinging unit has been replaced;
- it was necessary to disassemble the internal sensor due to the diameter sensor replacement.

The procedure for calibrating the internal sensor is as follows:

IMPORTANT! If the accessory weight tray device is installed, it must be enabled before executing the calibration procedure (see paragraph “MACHINE SOFTWARE CONFIGURATIONS”)

- Access the service environment and, turning the unit, position it to encoder position notch 200;
- Remaining on this notch, hold down the Enter button (with the cursor on the “spin counter” icon) for approx. 5 seconds. The graphic regarding the calibration of the internal sensor will appear on the monitor;
- Move the lever of the internal sensor so it rests against the swinging unit bell as shown in figure 9a;
- Press "Enter" to calibrate the diameter;
- Move the lever of the internal sensor so it rests against the swinging unit flange as shown in figure 9b;

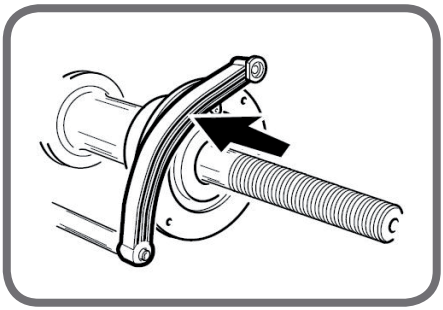


Fig. 9b

- Press "Enter" to calibrate the distance;
- Return the sensor to the rest position.

Exit the sensor calibration programme by pressing the “Escape” key.

If the calibration has been performed successfully, an acoustic consent signal is emitted. If the message A 20 is displayed, this indicates that the position of the sensor during the calibration phase is incorrect. Position it correctly, as already described, and repeat the procedure. If this message remains displayed, check in the service environment the correct reading of the distance, the diameter and the zero-setting in the rest position as reported in the “Service Programmes” paragraph.

14. PICK-UP REPLACEMENT AND ADJUSTMENT

To replace the pick-ups, follow this procedure:
- disconnect the connection of the pair of pick-ups from the MBU32F card (N, fig.9);
- loosen the pick-up pre-load springs completely (A, Fig.10);

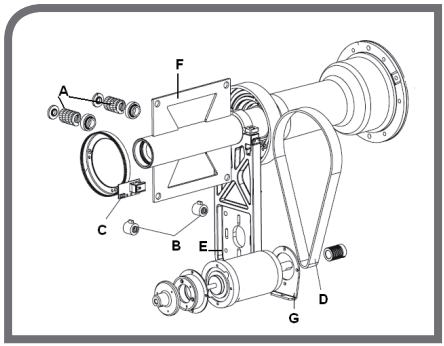


Fig. 10

- unscrew the two M10 dowels and replace the pick-ups (B, Fig. 10) with the new ones;
- assemble the new pair of pick-ups, ensuring that the spheres are correctly positioned inside the appropriate niches, and that the pick-up marked with the letter I (internal) is assembled on the right and the one with the letter E (external) is on the left (assuming you will work from in front of the machine);
- tighten the fixing dowels so that the pick-ups are slightly rubbed;
- tighten the locknuts as far as the blocking point, then unscrew them slightly (by about one side of the hexagon) so that the Belleville washers are working;
- manually tighten the two screws fixing the washers, recovering all the axial play;
- use an Allen spanner to tighten the two screws with the washers, making four complete turns with the spanner;
- reconnect the connector of the pick-ups.
- perform some settling spins;
- perform the sensitivity calibration procedure.

15. REPLACEMENT OF THE COMPLETE SWINGING UNIT

After checking that the unit is the real cause of the machine irregularities, replace it as indicated below.
- remove the weight tray;
- disconnect the power supply cable of the motor from the PEAL32F card;
- completely unscrew the 2 screws that hold the pre-load springs (A, Fig. 10) of the pick-ups;
- unscrew the two M10 dowels that fix the pick-ups (B, Fig. 10);
- disconnect the Picoflex connector of the encoder card then disassemble the card itself;
- remove the belt (D, Fig. 10) as described in the paragraph "Replacement and adjustment of the belt";
- disassemble the motor support (E, Fig. 10), unscrewing the two M8 fixing screws;
- remove the swinging unit (F, Fig. 10) after unscrewing the four M12 fixing screws and the relative locknuts;
- mount the new swinging unit, tightening the 4 screws (recommended rotation torque of 72Nm);
- remount the motor support, and then the encoder card on the support itself;
- remount and adjust the 2 pick-ups as described in the paragraph "Replacing and adjusting the pick-up";
- remount and adjust the belt as described in the paragraph "Replacing and adjusting the belt";
- close the weight tray again;
- perform the unit zero-setting procedure (see paragraph "Zero-setting of the swinging unit") and the sensitivity calibration procedure.

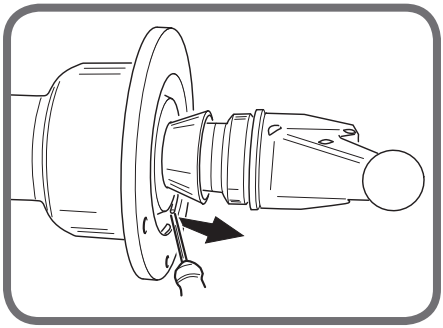


Fig. 11

If it is necessary to disassemble the spring located inside the unit bell, proceed as follows:
- insert a cone on the threaded hub;
- compress the spring by means of the securing ring nut;
- using a screwdriver, remove the ring as shown in figures 11 and 12.

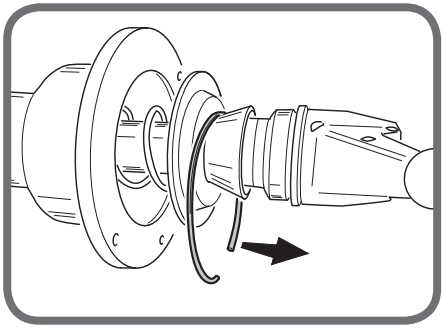


Fig. 12

16. SPIN AND BRAKE DEVICE

16.1 Replacing and adjusting the belt

- Remove the weight tray;
- Unscrew the fixing screws of the side closing panel on the motor compartment;
- Unscrew the nut and locknut used to tighten the belt (A1, A2, Fig. 13);
- Loosen the three motor fixing screws (B, Fig. 13) on the motor support;
- Disassemble the belt (C, Fig. 13) and replace it with the new one;
- Tighten the belt by screwing the nut A1. The belt is correctly tightened when the oscillation frequency of one of the two branches is equal to 200Hz. The tension must be measured using the specific instrument. Only in the case that suitable equipment is not available, approximate tension can be performed so that when pressing your finger on the middle of one of the two branches, the belt flexion is approx. 10mm.

Warning: excessive belt tension can cause, with machine use, damage to the motor bearings and/or motor shaft failure. a too slow belt can cause a decrease in performance, excessive noise at the beginning and when braking and rapid wear to the belt itself.

- Block the locknut A2;
- Block the motor fixing screws (B, Fig. 13).

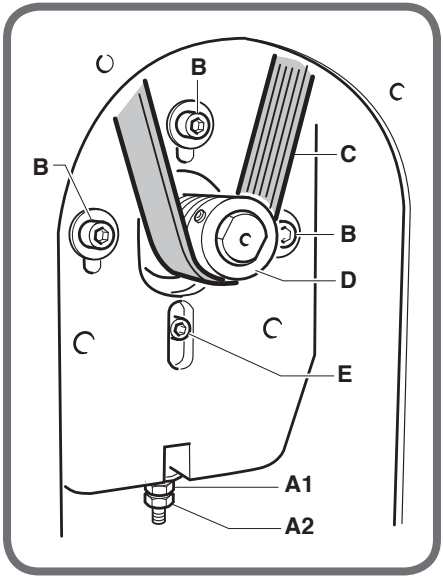


Fig. 13

16.2 Replacing the motor

- Remove the weight tray;
- Disconnect the power supply cable of the motor (B, fig.5) and clamping brake cable (C, fig.5) from the PEAL32F card;
- Unscrew the fixing screws of the side closing panel on the motor compartment;
- Unscrew the two nuts of the belt tightening screw (A, Fig. 13);
- Loosen the three motor fixing screws (B, Fig. 13);
- Disassemble the belt (C, Fig. 13) from the motor pulley (D, Fig. 13);
- Completely unscrew the three motor fixing screws previously loosened;
- Remove the motor with the flange (G, Fig. 10) from the aluminium support (E, Fig. 10);
- Unscrew the screw fixing the motor (E, Fig. 13) to the flange (G, Fig. 10);
- Remove the pulley, then replace the motor with the new one;
- Assemble it by following the demounting directions in the reverse order, applying medium thread-lock loctite 243 to fix the pulley;
- Mount the belt, referring to paragraph 13.1 “Replacing and adjusting the belt”;

16.3 Replacing the brake

In the event of irregularities in the braking device, replace it as follows:

- Remove the weight tray;
- Unscrew the fixing screws of the side closing panel on the motor compartment;
- Disconnect the brake power supply connector from the PEAL32F power supply card (C, fig.5);
- Remove the hub (A, fig.14) from the motor rotor by means of the 2 dowels (B, fig.14) and the brake coil (C, fig.14), loosening the 4 fixing screws of the stator;
- Assemble the hub and the new brake by following the disassembly directions in the reverse order. When fixing the hub (A, fig.14), the two dowels (B, fig.14) must be tightened in the flat part of the rotor stem, and the distance between the anchor fixed to the hub (D, fig.14) and the brake (C, fig.14) must be 0.2mm -0/+0.05mm (E, fig.14).

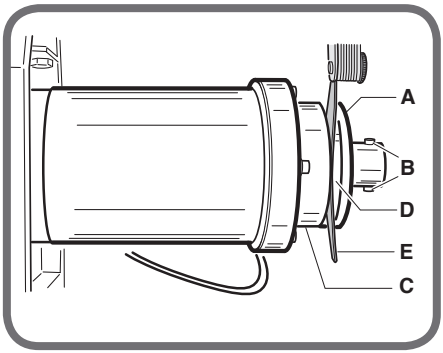


Fig.14

17. MOUNTING AND DEMOUNTING THE WHEEL GUARD

See the use and maintenance manual for the instructions for fitting and removing the wheel guard.

If there the guard works incorrectly (e.g. when the guard is lowered, the machine does not spin, or vice versa), check:

- the microswitch cable connection and, if necessary, the connection to the MBU32F board.
- that the microswitch is working correctly. If the microswitch is NOT working correctly, replace with a new component.

Proceed as follows to replace the microswitch:
- remove the weight tray
- disconnect the AMP connector from the Mother board
- if the microswitch fitted is a mechanical level/ wheel type switch, undo the two fastener screws to remove it;
- replace the microswitch, following the procedure for removal in reverse order to fit the new component.
- if the microswitch fitted is a magnetic REED switch (as shown in figure 15), lift the guard and remove the microswitch (A, Fig.15) and the magnet (B, Fig.15), undoing the 4 fastener screws;
- replace the microswitch and the magnet then assemble it by following the demounting directions in the reverse order.

Note:
- Lower the guard and check that the microswitch and the magnet are situated in front of each other (Fig. 15). If not, check that the two components are installed correctly and check if the rubber end stop (C, Fig. 15) is worn;
- With the guard still lowered, also check that there is a gap of 0.5 to 2.5mm between the microswitch and the magnet (Fig. 15). If it is less than 0.5mm, remove any washers installed on the sensor fastener. If it is greater than 2.5mm, insert washers on the sensor fastener to bring them closer together.

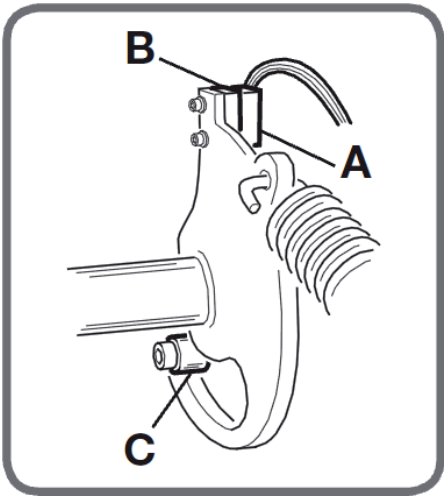


Fig.15

18. KEYBOARD REPLACEMENT

If it is necessary to replace the keyboard, owing to operational irregularities, proceed as follows:
- disassemble the keyboard via the adhesive velcro;
- remove the earth cable on the keyboard;
- remove the picoflex connector from the keyboard;
- replace the keyboard with a new one.
- if the fault persists, check that the keyboard connector ribbon cable is connected and in working order (G, fig.3).

If the following message appears when turning the machine on:
"WARNING HAS BEEN CONNECTED TO THE KEYBOARD? PRESS ENTER TO CONFIRM OTHERWISE OFF AND CONNECT"
check the connection of the keyboard to the Mother board connector and on the keyboard itself. Then press the ENTER key.
Then the following message will appear:
"SETUP IS CHANGING PLEASE WAIT"
wait until the following message appears:
"RESTART THE MACHINE"
Turn the machine off and then on.

LED LIGHT AND LASER LINE DEVICE

If the led light device does not work, check:
- In the menu dedicated to device activation (see user and maintenance manual);
- The correct wiring of the power supply cable between the ILL board (Fig.19) and the CPU board (A, Fig.17);
- The correct voltage on the connector pins (Fig.18) on the CPU board:
  - P1= board power supply ILL 5V DC;
  - P2= led light power supply when enabled for 2-3 V DC (0 VDC if off or deactivated);
  - P3= laser power supply when enabled for 2-3 V DC (0 VDC if off or deactivated);
  - P4= GND;
  - P5= GND;
  - P6= Voltage is NOT present (0 V DC) cable inserted correctly, whereas if 3 V DC is present, the cable is not inserted correctly or is interrupted.

  NOTE:
  In the latter condition (P6 presence of 3 V

DC voltage) the led light and the laser line do NOT work, as the machine automatically recognizes the device upon switching on, therefore the following icons are NOT present on the video:

- The correct voltage on the connector pins (Fig.19) on the ILL board:
  - P1= GND
  - P2= laser power supply when enabled for 2-3 V DC (0 VDC if off or deactivated);
  - P3= led light power supply when enabled for 2-3 V DC (0 VDC if off or deactivated);
  - P4= board power supply ILL 5V DC.

To carry out the previous voltage checks, the

led light can be enabled using the icon present in the service environment.
Caution: Pin 1 is the one near to corner B in figure 18.

- If the result of the above described voltage test is negative, check the continuity of the power supply cable;
- Replace the CPU board if necessary;
- If the result of the above described checks is negative, replace the ILL board as follows:
  - Remove the light support (A, Fig.20) by unscrewing the screws fixing the closure plate (B, Fig.20);
  - Disconnect the cable on the ILL board;
  - Remove the transparent cover (D, Fig.20) using the two screws fixing the support;
  - Disconnect the two Laser sensor power supply wires;
  - Remove the ILL board by turning the screws located at the centre of the board;
  - Replace the board with a new one and then reassemble the board, following the removal instructions in reverse order.

    NOTE:
    Check the correct polarity of the two Laser sensor power supply wires, see figure 19 (red cable +polarity, black cable -polarity).

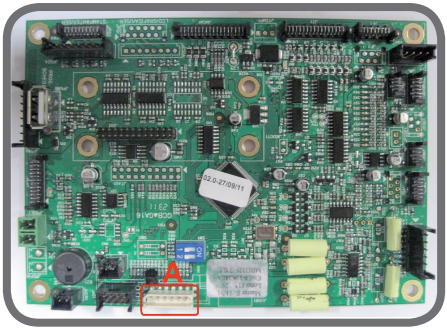


Fig.17

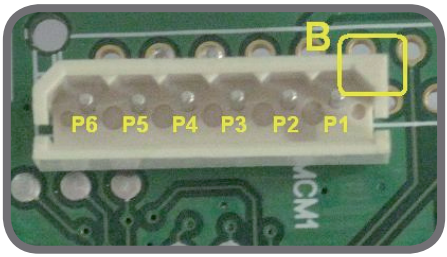


Fig.18

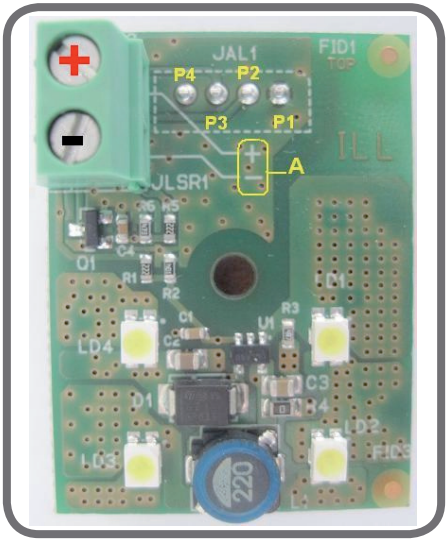


Fig.19

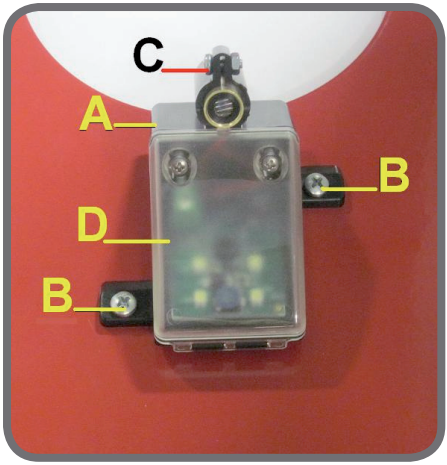


Fig.20

If the laser device does not work, check:

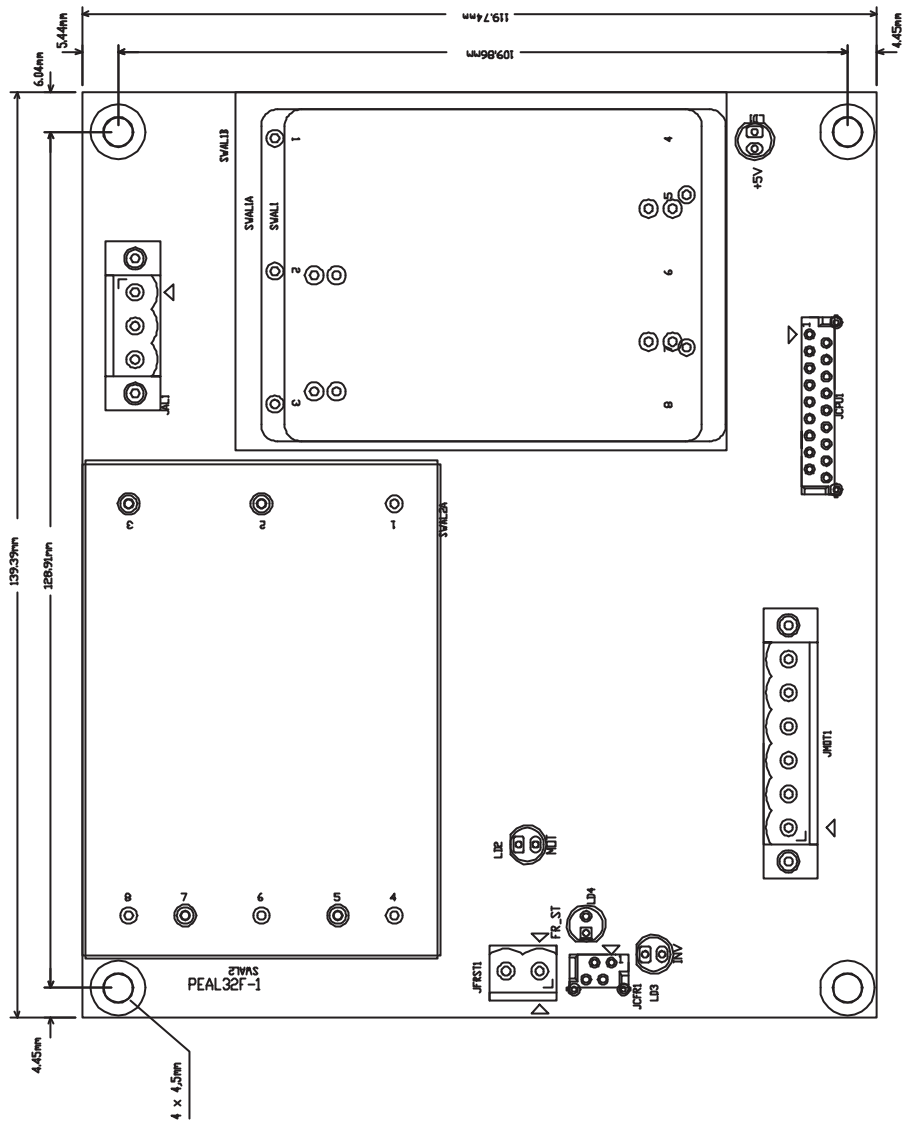
- In the menu dedicated to device activation (see user and maintenance manual);
- The correct wiring of the Laser cable on the ILL board, that is the red wire must be connected to the positive pole (+) and the black wire to the negative pole (-) see A, Fig.19;
- The correct voltage on the positive pole, approx. +5V DC, whereas on the negative pole 0V DC when on, whereas if off or disabled the voltage on the positive pole must be approx. +5V DC and approx. 4.5 V DC on the negative pole. To check these voltages use pin P1 on ILL board as the earth (Fig.19);
- The correct voltage on the connector pins (Fig.18) present on the CPU board and on the ILL board (Fig.19) as indicated in the previous paragraph; To carry out the previous voltage checks, the laser device can be enabled using the icon  present in the service environment.
- If the result of the above described checks is negative, replace the Laser sensor as follows:
  - Remove the transparent cover (D, Fig.120) using the two screws fixing the support;
  - Disconnect the two Laser sensor power supply wires;
  - Remove the sensor from its seat, then replace the laser with a new one. Reinstall the new sensor by following the removal instructions in reverse order

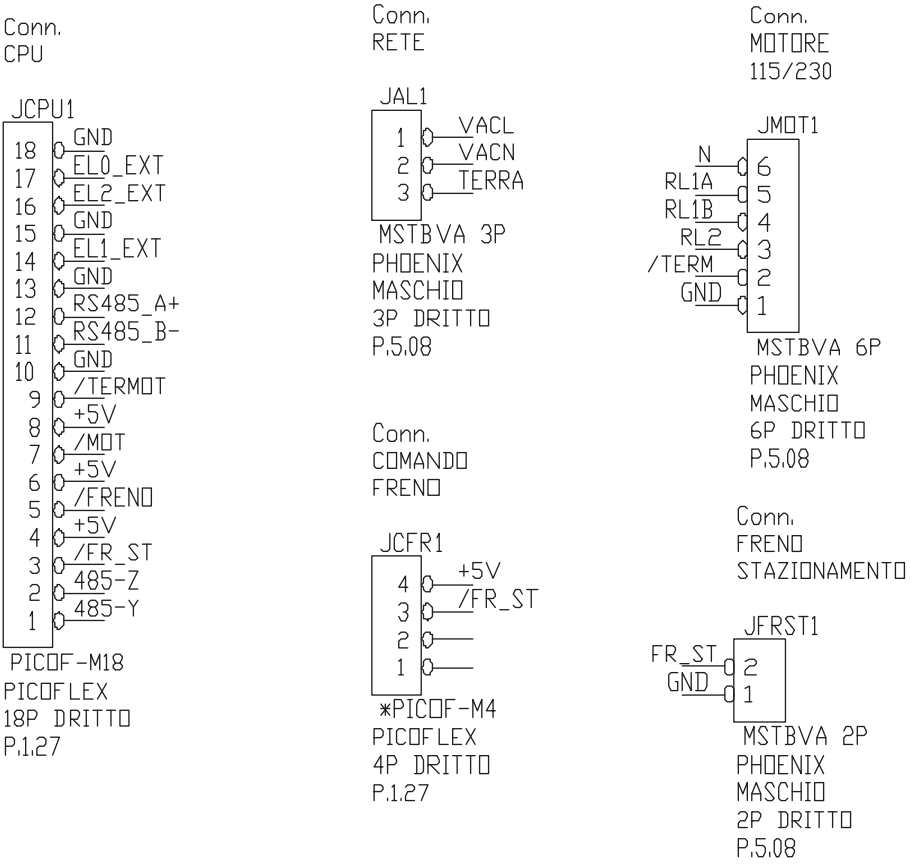
  NOTE:

  Check the correct polarity of the two Laser sensor power supply wires, see figure 19 (red cable +polarity, black cable -polarity).

If it is necessary to replace the laser or if the position of the laser line is NOT correct, perform the adjustment as follows:

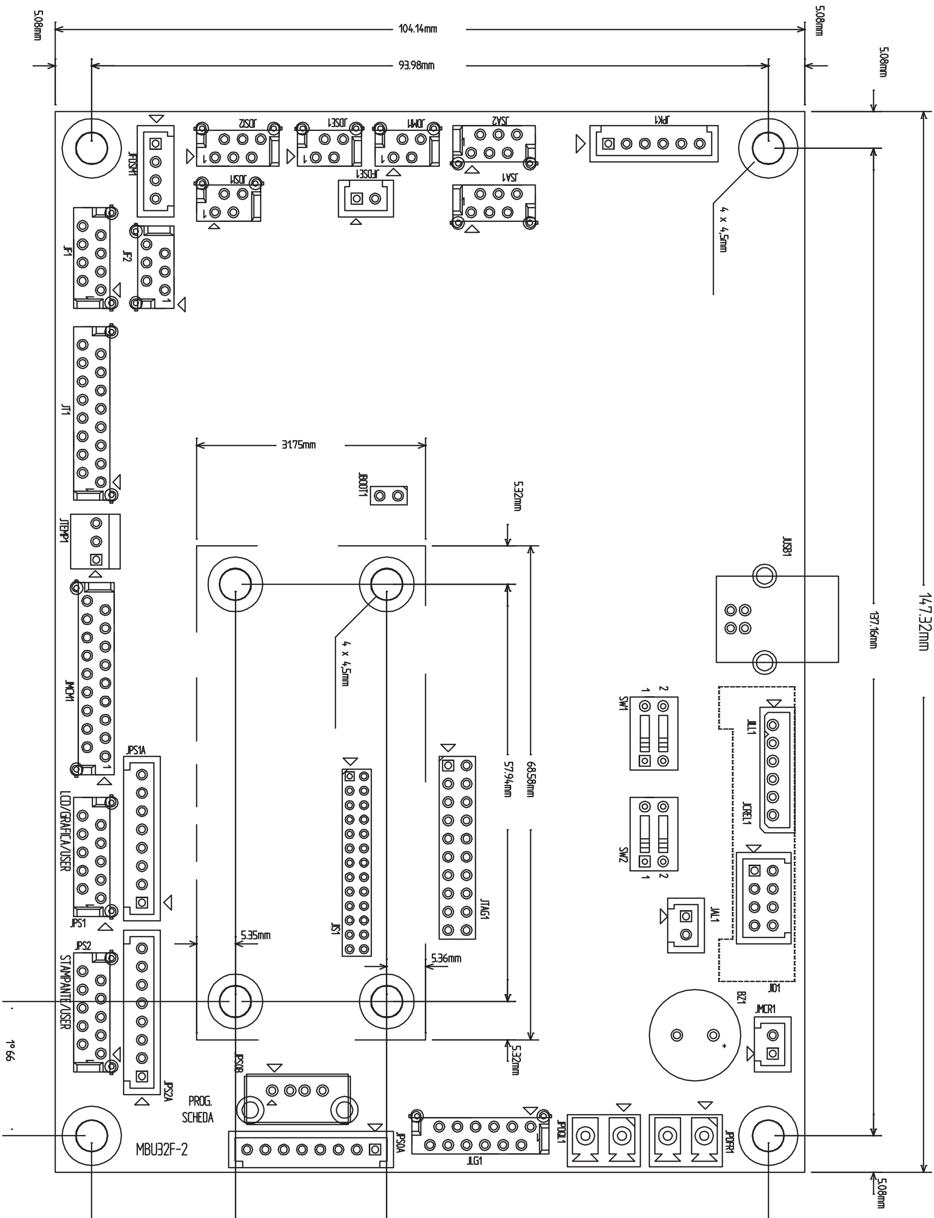
- Fix a cord (approx. 600mm) in the hole used for installing the calibration weight on the unit flange;
- Insert a lead on the end of the cord so that the cord remains perpendicular to the ground;
- Enable the laser using the icon  present in the service environment;
- Perform the adjustment so that the laser line corresponds with the entire length of the cord. To perform the adjustment adjust:
  - Either the light support (A, Fig.20) loosening the two screws fixing the closing panel (B, Fig.20), for lateral line movements;
  - Or the laser itself by turning it manually in its seat, loosening the support fixing screws (C, Fig.20).

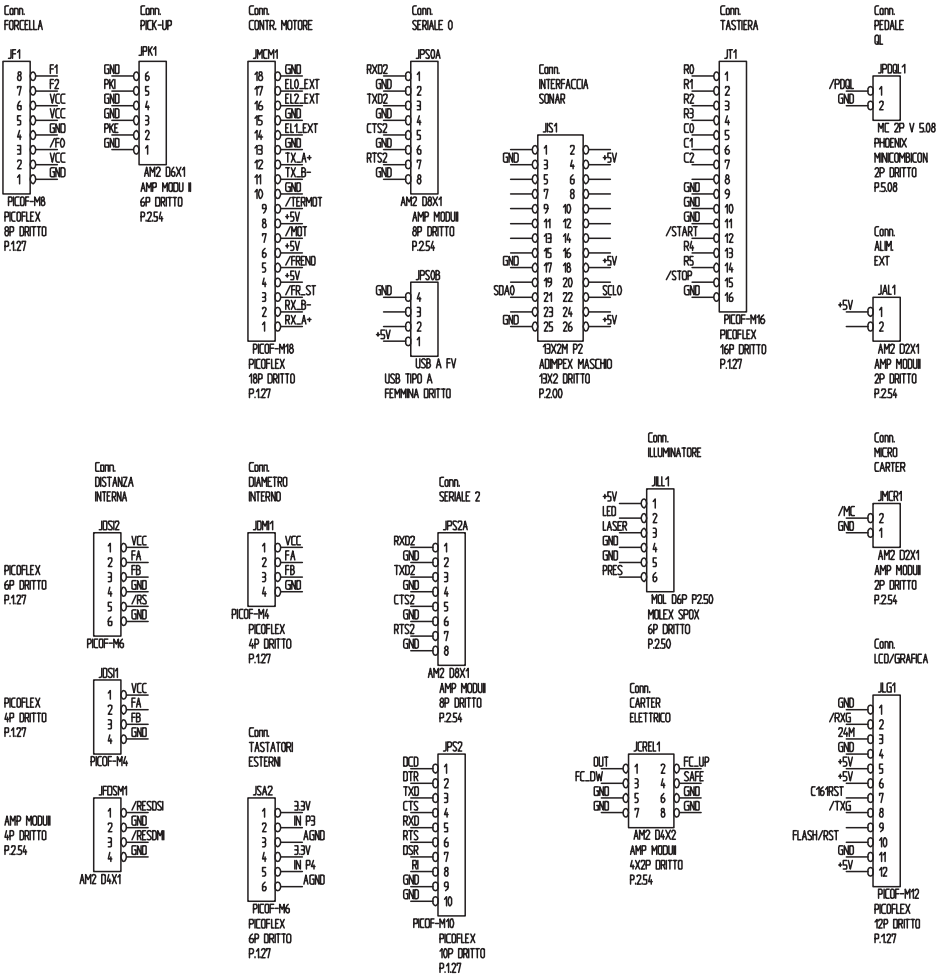

119,74mm
109,86mm
5,44mm
6,04mm
4,45mm
139,39mm
128,91mm
4,45mm
4 x 4,5mm
SVAL3
SVAL1A
SVAL1
SVAL2
SVAL2A
+5V
JAL1
JCAN
JMOT1
JFIRST1
JCAN1
LED1
LED2
LED3
LED4
FR_ST
PEAL32F-1



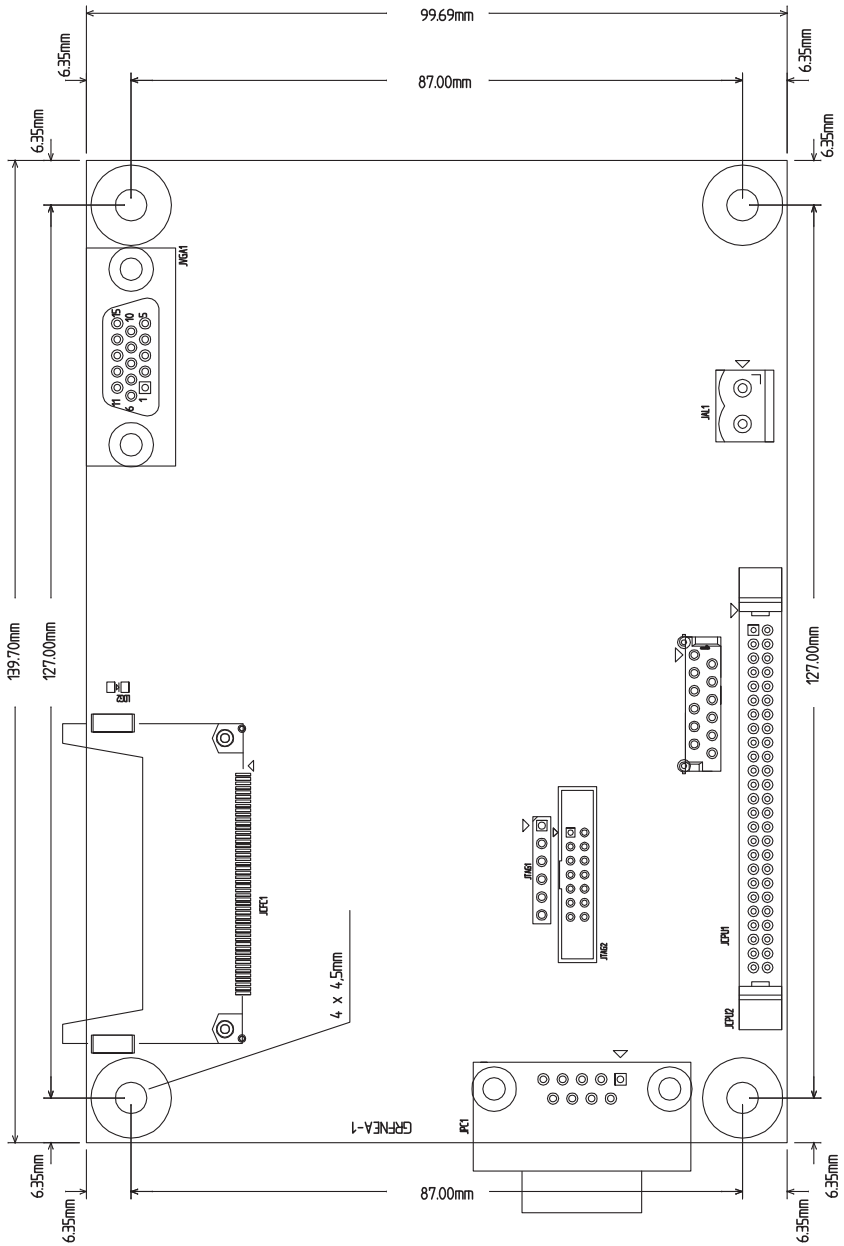
Card name: PEAL32F

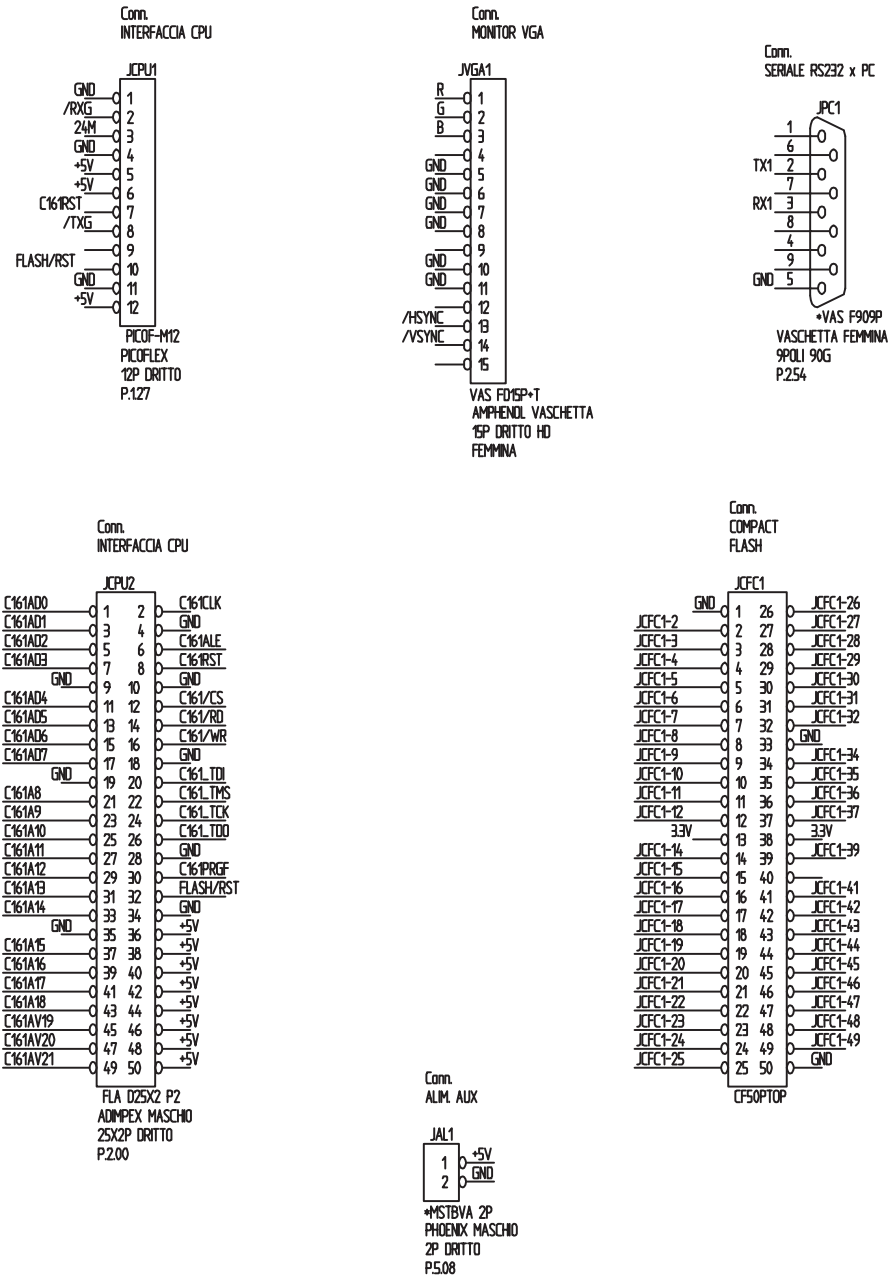
Code 4-109047


104.14mm
93.98mm
5.08mm
147.32mm
137.16mm
31.75mm
5.32mm
68.58mm
57.94mm
5.35mm
5.36mm
19.95mm
21.04mm
52.98mm
4 x 4,5mm
JFDSM1
JDSI2
JDSE1
JDM1
JSA2
JSA1
JRK1
JDSI1
JFDSE1
JF1
JF2
JT1
JBOOT1
JTEMP1
JUSB1
JMCM1
JPS1A
JPS1
LCD/GRAFICA/USER
JPS2
JPS2A
STAMPANTE/USER
JIS1
JTAG1
SW1
SW2
JLL1
JCRE1
JAL1
JIO1
BZ1
JMCR1
JPS0B
JPS0A
PROG.
SCHEDA
MBU32F-2
JLG1
JPRQL1
JPDFR1



Card name: MBU32F
Code 4-106240A


99.69mm
87.00mm
6.35mm
6.35mm
6.35mm
6.35mm
139.70mm
127.00mm
127.00mm
JVGA1
JAU1
JFC1
4 x 4,5mm
JTAG1
JTAG2
JDM1
JDM2
JPC1
GRENEA-1
87.00mm
6.35mm
6.35mm
6.35mm
6.35mm



Card name: FPGA2_32F
Code 4-109049

CE

COMIM - Cod. 4-115816_uk - 06/12

MONDOLFO FERRO S.p.a.
Viale dell'industria, 20 - 61037 MONDOLFO (PU) Italy
info@mondolfoferro.it
www.mondolfoferro.it