MONDOLFO FERRO
AUTOMOTIVE SERVICE EQUIPMENT

Technical service manual

MT 2450

Code 4-131046_uk - 12/2013

Elaborazione grafica e impaginazione

Ufficio **P**ubblicazioni **T**ecniche

INDEX

UK

Code 4-131046_uk - 12/2013

ELECTRICAL HOOK-UP

The balancing machine operates on single-phase power and is supplied preset for the specified power supply (115 VAC or 230 VAC).

WARNING

The power supply cannot be modified because the motor is specifically designed for the mains voltage and frequency specified on purchase.

SERVICE PROGRAMS

These programs are designed to make available a number of data allowing the efficiency of various parts of the machine to be checked quickly and easily.

The selection is made as follows:

- **press either of the two arrow keys and then, within two seconds, the key for setting the wheel dimensions.** This preselects the first service program (87);
- press the arrow keys to preset the subsequent (or previous) programs available, until the program of choice is located. When each preselection is made the code 8X ..9X (with the X varying depending on the program) appears on the left-hand display, and the message "Ent" flashes on the right-hand display to indicate that "Enter" must be pressed to confirm the selection made.
- press the "Enter" key to confirm.

If the preselection is not confirmed within about three seconds, the system exits from the Service environment automatically.

The service programs which can be selected by varying "X" are described below.

87 Working Environments

- allows three different operators to use the machine simultaneously:

Selecting the program displays:
- the message 1, 2 or 3 on the right-hand display;
- the message OP (operator) on the left-hand display.

This service program allows the operator (1, 2 or 3) to be selected by pressing the "Enter" key.

To confirm selection of a different operator, press the F key.

The following are retained in the memory for each working environment:
- balancing modes;
- working environment
- wheel dimensions;
- the last passage of the optimisation procedure (OPT).

To exit from the program (and the Service environment) press the "F" key.

90 Automatic Position Search (RPA):

Selecting the program displays:
- the message RPA on the left-hand display.

- the message ON or OFF on the right-hand display;

The automatic position search function can be set ON or OFF by pressing the “Enter” key.

To exit from the program (and the Service environment) press the “F” key.

91 Thresholds and rounding-offs

Remove/restore:

- the visualisation of the first gram of unbalance;
- rounding-off to the nearest inch for the diameter measured with the automatic sensor.

The selection of the programme determines the visualisation:
- of the “1 oF” message on the right display;
- of the “on .5” message on the left display.

During normal operation, also when the “gr x 1” unbalance visualisation mode is selected, the first gram of unbalance is not shown. In this condition, the message “1 oF” appears on the right display when programme “91” is selected. When the **ENTER** key is pressed, the first gram is then displayed and it is possible to amplify machine sensibility (the message “1 on” appears on the right display). By pressing the **ENTER** key again, you can set the two modes alternatively.

When the machine is turned on, it prepares to display the diameters measured with the automatic sensor, rounding-off to the nearest inch. In this condition, the message “on .5” appears on the left display when programme “91” is selected. When the **ENTER** key is pressed, the diameter measured with the automatic sensor is then displayed with the precision of a tenth of an inch (the message “oF .5” appears on the left display). By pressing the **ENTER** key again, you can set the two modes alternatively.

Important

Pressing the **ENTER** key changes the setting shown on the display, in correspondence of which the central part of the centred position indicator lights up. To transfer the control from one display to the other, press either of the two arrow keys.

You can exit the programme (and the service environment) by pressing the “F” key.

The programme is used to

- display the unbalance values with the maximum precision allowed, so you can balance a wheel perfectly and then carry out further checks on it;
- display with the maximum precision allowed (tenth of an inch) the correspondence between the diameter values measured with the automatic sensor and the nominal wheel values.

UK

93 Display of software release installed

Selecting the program displays:
- the message “rEL” (release) on the left-hand display.
- the numerical message “XX.Y” on the right-hand display, corresponding to the release of the program installed (also stated on the eprom label).

The “Enter” key can be pressed to display the date of the release in the format: day, month, year.

To exit from the program (and the Service environment) press the “F” key.

The program is used to:
check the release of the program installed on a machine to allow updates to be carried out if necessary without having to remove the circuit board from the machine to read the eprom label.

94 Standard imbalance values display

Selecting this program displays the imbalance values for the last wheel spin performed, calculated with reference to the standard calibration coefficients (the ones used by the machine when the circuit board has never been calibrated or if the calibration coefficients calculated previously have been accidentally deleted).

To exit from the program (and the Service environment) press the "F" key.

The program is used to:
- optimise the clamping of the pick ups on the basis of the mechanical characteristics of the central unit and those of the specific electronic circuit board.

95 Display of first gain synchronisation calibration coefficient.

Selecting the program displays:
- the string "F" on the left-hand display
- the synchronisation calibration coefficient on the right-hand display.

The value is expressed in notches (whole part) and eighths of a notch (decimal part) of an encoder (one notch corresponds to about 1.4 degrees).

To exit from the program (and the Service environment) press the "F" key.

The program is used to:
- check that the values of the synchronisation calibration coefficient displayed are within the permitted range, which is from -2.0 to +2.0.

96 Display of pick up signals and relative synchronisation

Selecting this program displays:
- the message "96" on the left-hand display;
- the message "GO" flashing on the right-hand display;

Before selecting the program the operator must:
- set CAR environment;
- fit an average-size 4WD wheel (generally 6" x 15") on the wheel balancer;
- balance it precisely after setting "1 on" mode using service program 91;
- apply a weight of 100 gr (3.5 oz) to the outside of the rim;
- perform a wheel spin.

The machine acquires the imbalance signals and then displays in this order:
- the difference F between the signals of the pick ups and the ideal value of 180° (on the right-hand display). The value is expressed in notches (whole part) and eighths of a notch (decimal part) of an encoder (one notch corresponds to about 1.4 degrees).
- values proportional to the level of the signals received from the Inside and Outside pick ups.

Notes
- The values displayed do not depend on the dimensions set.
- With the wheel at a standstill, the data read can be displayed in alternation by pressing the "Enter" key.

- A series of wheel spins can be carried out without exiting from the program.
- To exit from the program (and the Service environment) press the “F” key.

The program is used to:

- check that the values displayed are within the permitted ranges, as follows:
  - synchronisation difference **F** **from -2.0 to +2.0**
  - internal pick up signal **I** **from 200 to 280**
  - external “ “ **E** **from 110 to 170**

97 F Displaying search circuit board functions (encoder)

Selecting the program displays:

- the message “Pos” on the left-hand display.
- a numerical value between 0 and 255 on the right-hand display as the angle of the shaft varies.

If the program is recalled immediately after the machine is switched on, the display shows the message “Pos rot” to indicate that the shaft has to be turned until the encoder zero mark has passed in front of the search circuit board: at this point the message disappears.
It is also possible to perform a wheel spin (the message “97 GO” appears on the display) during which the pulses counted by the search board are read. At the end of the wheel spin the left-hand display shows the expected count value (256) while the value actually counted flashes on the right-hand display. These values are displayed for about five seconds, after which the shaft's current angle appears.

To exit from the program (and the Service environment) press the “F” key.

The program is used to:

- check the efficiency of the search circuit board. When the shaft is turned in either direction, the count must change continuously from 0 to 255, and at the end of a wheel spin the two values displayed must be the same.

98 Visualisation of internal sensor functions

The selection of the programme determines the visualisation:

- of the “di” message on the left display;
- of the value in notches deriving from the diameter sensor on the right display.

Moving the lever of the sensor, the value is continuously updated.
Pressing the key to set the keypad wheel data, you will see:

- the message “d” on the left display;
- the value in notches deriving from the distance sensor (1 notch = 0.5mm).

This value is updated by moving the sensor “in - out”.
Pressing the key to set the keypad wheel data, you will see:

- the message “FC” on the left display;
- the message “0-0” on the right display that indicates the status of the zero sensors used for the zero-setting of the automatic sensor.
  Specifically, the message on the left hand side is relative to the distance zero position sensor, while the message on the right is relative to the diameter zero position microswitch.

This message changes to “1-1” when the internal sensor is extracted and returns to “0-0” when it returns to the rest position. If this update does not occur, carry out the

UK

checks as described in the “internal sensor” chapter.
- You can exit the programme (and the service environment) by pressing the “F” key.

The programme is used to
check the efficiency of the sensors used for automatic data input. Moving the sensor, the values displayed must vary continuously within the following intervals:
diameter sensor ..... see chapter “internal sensor” paragraph “diameter sensor”
distance sensor ..... from 0 to 750

POWER SUPPLY BOARD SWITCH AND PEAC COMMAND SETUP

The complete table is provided to allow any checks required.

MBE 161	SW1-1 SW1-2 SW2-1	AVAILABLE	NOT MANAGED
	SW2-2	Test/Work	OFF
	SW3	START/STOP inversion	I
	JINT1	Set on “EM8xxx”	Jumper for analogue selection of groups EM7xxx or EM8x
	JEXT1	Set on “EM8xxx”	Jumper for analogue selection of groups EM7xxx or EM8x

E2PROM (t4) MEMORY ZERO-SETTING PROGRAMME

Proceed as follows to perform the E2PROM calibration parameter zero-setting test t4:
- With the machine switched off set the dip-switch (C, figure 1) that is necessary for accessing the diagnostics mode, i.e.:
  MBE161: SW2 DSW2 in ON;
- Turn the wheel balancer on;
- Use the arrow keys to select the test until the following appears on the display:
  “t 4” on the right display
- Press the enter button to confirm the selection. The card will automatically reset the calibration parameters;
- When the operation is complete the following will appear on the display:
  ttt on the left display;
  ttt on the right display;

if “test” correct, whereas “Err 5” if there is an error during the test. Pressing the F key exits from t4 and ttt – ttt appears on the display.

Perform the t4 test again in the case of an error. If the outcome is still negative, replace the MBE161 card.

- Turn off the machine and return the dipswitch to its original position (all switches are OFF).

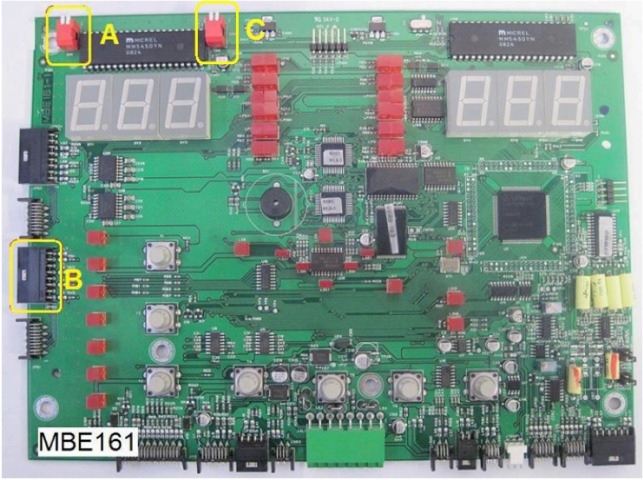


Fig.1

UPDATING THE CONTROL UNIT OF THE MBE BOARD

These cards are used with wheel balancers with gear transmissions or with a rubber wheel.

Board description

- MBE161 card. Processing board and interface with completely LED-based display.

The board is controlled by a microprocessor with relative firmware.

- The MBE161 card firmware version can be identified in the SERVICE environment under CPU.

UK

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 from the internet, proceed as follows:

- Connect to the manufacturer's WEBSITE

- Select “Private area”
- Enter your username, password and select “Enter”
- Select “Software Updates” in the new screen.
  - In the “Keyword” field, enter the keyword that corresponds to what you want to download. For example:
  - If you want to download the programming software (SAB16X or SAB32F) for the update via PC enter “SAB”.
  - If you want to download the MBU, MBE or SEB 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 MBE161 CARD

To update the firmware, the SAB16X 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 to install the programme.

Important: the SAB16X programme is only compatible with Windows operating systems 98SE, 2000 and XP Professional.

- With the machine switched off set the deep-switch (A, fig. 2) which is necessary for the programming based on the card to be updated:
  - MBE161: SW1 DSW2 in ON;

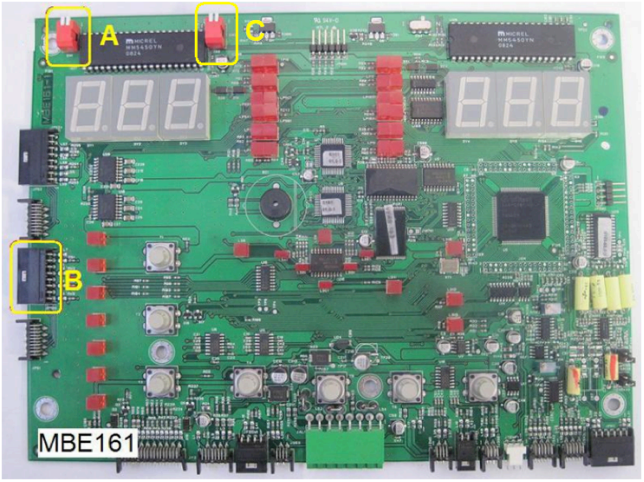
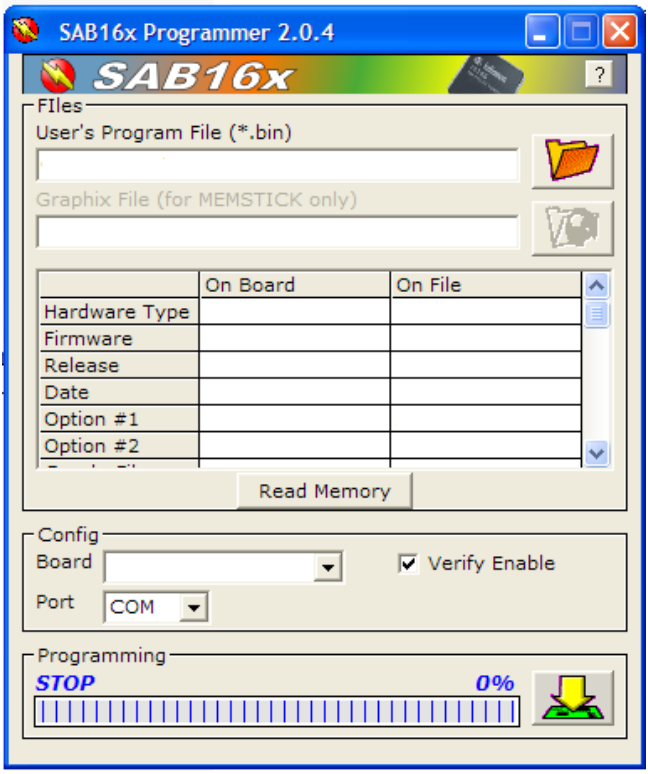


Fig. 2

- Connect one end of the serial cable code 8-21100224 to the “JPS1A” connector of the card (B, fig. 2) and the other end to the RS232 serial port of the PC. If the PC does not

have a RS232 port use the USB/RS232 adapter code 8-21100226.
- Turn the wheel balancer on.
- Open the previously downloaded file with the ."bin" extension of the firmware version to be updated. The control window for the SAB16X programme will open automatically.
- Select the COM serial port where the programming cable is connected to the PC.
- Select the Start  key to start the programming.
- The programme starts by deleting the software version on the card to be updated, displaying the following image on the status bar.



- When the “Programming” box opens, the “OK 100%” message means that the programming was completed successfully.
- At the end of programming, close the programme, turn off the machine and return the deep switch to its original position (all switches are 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.

UK

INTERNAL SENSOR

Select Function 98 to display the sensor signals

Diameter sensor [di]

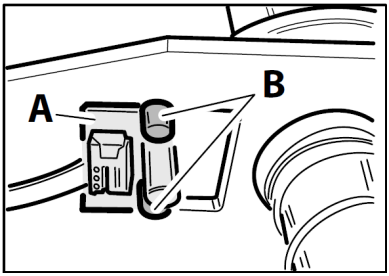
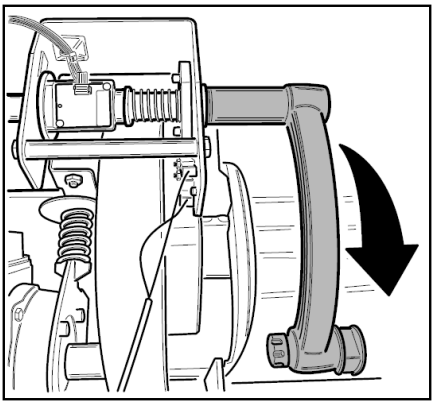


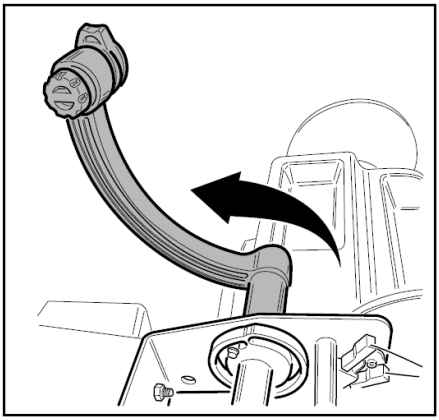
Fig.2a

Check that the machine reads the number of notches indicated below in the following positions:

Position 1 with lever fully forwards, 0 notches



Position 2 with lever fully backwards, 666 notches (maximum permissible error +/- 5 notches in indicated position)



Check the following if the sensor (A, Fig. 2a) does not read:
- the connection flat;
- that the sensor is correctly assembled in its housing.
If these checks do not rectify the problem, replace the sensor (A, fig.2a) as follows:
- remove the weight tray
- remove the sensor lever;
- disconnect the Picoflex from the sensor;
- remove the sensor A, undoing the two fastener screws (B, fig.2a);
- replace the sensor, assembling it by following the disassembly directions in the reverse order;
- check the sensor reads correctly, as indicated above.

Distance sensor [d]

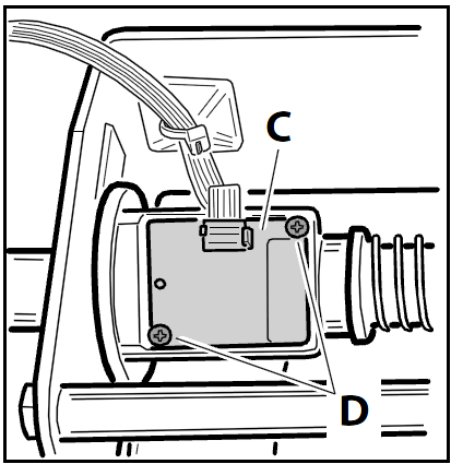


Fig.2b

Check that the total travel is 750 notches (maximum permissible error +/- 5 notches along entire travel);
Check the following if the sensor (C, Fig. 2b) does not read:
- the connection flat;
- 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;
- undo the two self-tapping screws (D, fig.2b) then remove the sensor from its mounting;
- mount the new sensor, paying attention to the correct fixing direction of the sensor itself;
- Check that the sensor is working correctly using programme 98 “Display internal sensor function”.

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

In the event of incorrect distance and diameter readings, check that the zero position sensor functions correctly as described in chapter “98 Displaying internal sensor function”.
Check the following if the sensor (C, Fig. 2b) does not read:
- the connection flat;
- that the sensor is installed correctly in its housing (see fig.2b, picoflex connector facing towards rear of machine);
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 board.

Note:
should it be necessary to replace the flat cable of sensor (C, figure 2b), ensure that the flat cable is reconnected correctly on the board (see fig.2c). The flat cable must be fastened to the base leaving a sufficient length of free cable to allow the sensor to move without the cable itself twisting around the shaft assembly pulley.

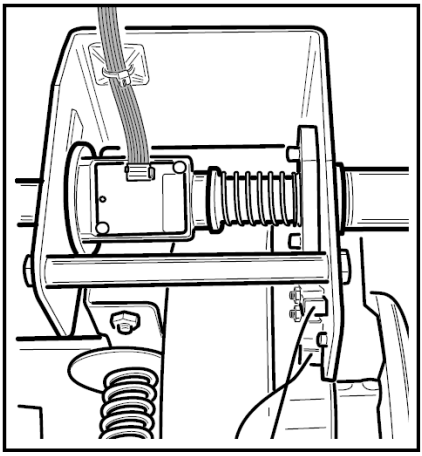


Fig.2c

Replacing/adjusting position of diameter microswitch

- With the measuring sensor in the rest position (fig. “Position 1 with lever fully forwards”), check that the microswitch actuator lever is not pressed (contacts 1 and 2 open).
- With the measuring sensor in the operating position (fig. “Position 2 with lever fully backwards”), check that the microswitch actuator lever is sufficiently depressed to activate the microswitch. In this position, the actuator lever must still have at least 0.5 mm of remaining free travel (contacts 1 and 2 closed). If the above conditions are not met,

adjust the position of the microswitch on its mounting.
- Perform the checks described above with a tester. If these checks do not rectify the problem, replace the microswitch, ensuring that the two contacts are reconnected correctly as shown in figure 2d. To replace the microswitch, loosen the two screws (A, figure 2d).
- Check the cable connecting the microswitch to the board.

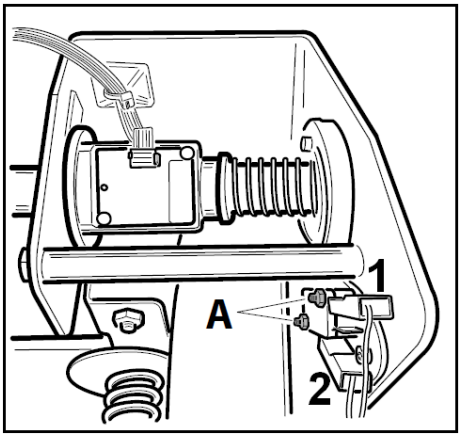


Fig.2d

IMPORTANT
In the event of any work on the measurement sensor, the measurement sensor itself must be calibrated as indicated in the use and maintenance manual.
- Check that the distance and diameter values read are correct, using wheels with known dimensions or a special tool. To set the aforementioned values with a precision of a tenth of an inch, on the display, select "OFF" for rounding to the nearest inch of the diameter values read by the automatic sensor display as described in chapter "91 Thresholds and rounding". The maximum error allowed for a wheel with a steel rim and of medium dimensions is +/- 0.2 inches.

Notes

Please note that the nominal diameter of a wheel (e.g. 14") refers to the tyre bead contact surface, which is inside the wheel rim itself. The values measured are with reference to external planes and, as a result, aresmaller than the nominal values due to the thickness of the rim itself. 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.

REPLACING AND ADJUSTING THE PICK UPS

- Open the weight-holder lid, first undoing the fixing screws.
- Remove the plastic guard of the central unit.
- Disconnect the pick up cable from the motherboard.
- Undo the two M8 dowels and remove the pick ups.
- Fit the new pair of pick ups, taking care that the two balls locate correctly inside the recesses provided, then tighten the fixing dowels so that the pick ups move with just a little friction.
  Fit the pick ups marked I on the right and those marked E on the left (working from a position facing the front of the machine).
- Reconnect the pick up cable.

Checks to ensure that the pick ups are operating correctly:

- Select the service program "96" to display the pick up data;
- fit an average-size 4WD wheel (e.g. 6 x 15") on the balancing machine and balance it as accurately as possible.
- Imbalance the wheel by applying 100 grams (3.5 oz) to its outside.
- Perform a wheel spin to check the pick up signal values and synchronisation;

The values to be checked are the following:

- pick up synchronisation difference	**F**	**from -2.0 to +2.0**
- internal pick up signal	**I**	**from 200 to 280**
- external pick up signals	**E**	**from 110 to 170**

If the values displayed at the end of the wheel spin are not within the specified ranges, adjust the dowels to regulate the tightness of the pick ups until the conditions are met. These values are normally obtained with a tightening torque of about 2 Nm.

- Tighten the lock-nuts into a block then undo them slightly (about one side of the hexagon) so that the Belleville washers present are operational.

During this operation the respective dowels should be kept still so that the pick up preload conditions remain unchanged.

- Close the weight-holder lid and the plastic guard of the central unit again;
- Perform sensitivity calibration both in CAR environment with a car wheel and in TRUCK environment with a truck wheel.

REPLACING THE CENTRAL UNIT

After making sure that the unit is really the cause of the machine's malfunctions, replace it as described below:

- Open the weight-holder lid, first undoing the fixing screws.
- Remove the plastic guard of the central unit.
- Disconnect the sensor rod return spring from the body of the machine, unscrew the fixing screws and remove the sensor from its seat. To access the return spring, remove the protective cap close to the adjuster foot on the back of the machine.
- Disconnect the brake cylinder air line.
- Remove the motor and its support by unscrewing the three screws fixed to the beam

(as described in the relative paragraph).
- Disconnect the connector on the search circuit board and the pick up cable on the motherboard.
- Unscrew the three fixing screws on the beam and remove the central unit.
- Fit the new central unit. The three fixing screws must be tightened to a torque of 48 Nm.
- Replace the search circuit board complete with support.
- Reconnect the pick up and search board connectors.
- Replace the motor complete with support and adjust the wheel spin device.
- Replace the sensor, reversing the operations carried out to disconnect it.
- Calibrate the sensor as described in the operator's manual.
- Perform a few wheel spins and check that the wheel spin device is operating correctly.
- Perform sensitivity calibration both in CAR environment (with a car wheel) and in TRUCK environment (with a truck wheel).

ADJUSTING THE WHEEL SPIN DEVICE

- Open the weight-holder lid, first undoing the fixing screws.
- Undo the lock-nut (D, fig. 3) which fixes the adjuster washer (A, fig. 3).
- Completely tighten the adjuster check nut (D, fig. 3). This eliminates the preload of the spring (B, fig 3).
- Undo the screws which fix the motor support (C, fig. 3) to the beam underneath.
- Position the motor unit so that the drive roller and the pulley are about 4-5 mm apart and the axis of the motor is parallel to that of the central unit.
- Tighten the screws which fix the motor support.
- Preload the spring (B, fig. 3), unscrewing the check nut (D, fig. 1); until the gap between the drive roller and the pulley has been reduced to 2 mm.
- Tighten the lock-nut.
- The wheel spin device has a limit stop screw which dampens the residual oscillations of the drive unit at the end of the wheel spin phase.
  Adjust the limit stop as follows:
  • position the screw so that it is not touching the leaf spring;
  • make sure that the drive unit is in the rest position (drive roller 2 mm from the pulley);
  • tighten the screw until it slightly preloads the leaf spring of the motor support;
- Perform a few trial wheel spins and check that the wheel spin device is operating correctly.
- Close the weight-holder lid again.
- If the screw (E, Fig.3) does not slide freely when activating the cylinder, turn the nut (F, Fig.3).

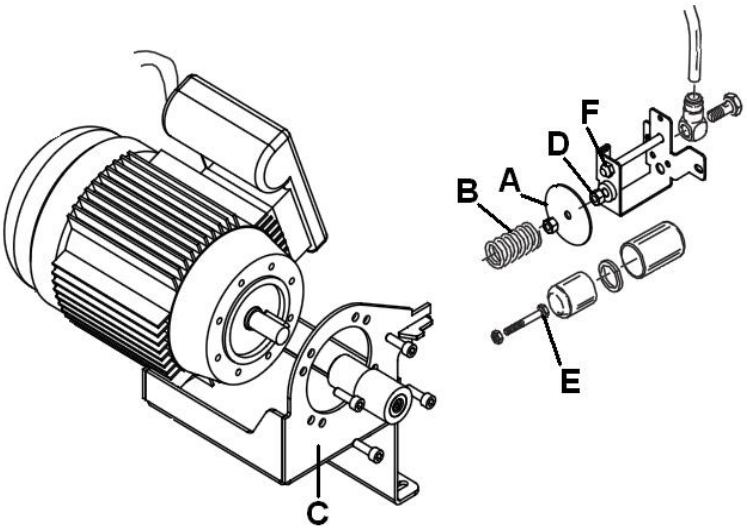


Fig.3

REPLACING THE WHEEL SPIN MOTOR AND/OR ROLLER

- Open the weight-holder lid, first undoing the fixing screws.
- Disconnect the motor cables from the PEAC circuit board connector.
- Undo the lock-nut which fixes the adjuster washer.
- Completely tighten the adjuster check-nut (D, fig. 3). This eliminates the preload of the spring (B, fig 3).
- Undo the screws which fix the motor support (C, fig. 3) to the beam underneath and remove the motor-support assembly.
- Check the state of the drive roller and reuse it on the new motor only if it is in perfect condition.
- Remove the roller by undoing the screw on the top.
- Apply medium thread glue to the locking screw and fit the roller on the new motor.
- Undo the screws which fix the motor to the support and replace it with the new one.
- Replace the motor-support unit on the supporting beam and adjust the wheel spin/ braking device as described in “Adjusting the wheel spin device”.
- Reconnect the motor power supply cables.
- Perform a wheel spin to check that the motor is operating correctly. Take any corrective measures necessary.
- Close the weight-holder lid again.

REPLACING THE BRAKE SHOES

- Open the weight-holder lid, first undoing the fixing screws.
- Remove the plastic guard of the central unit.
- Remove the search circuit board (B, fig. 4) from the supporting brake (C, fig. 4).
- Disconnect the motor power supply cable.
- Remove the wheel spin device and the motor unit.
- Disconnect the sensor rod return spring from the body of the machine, unscrew the fixing screws and remove the sensor from its seat. To access the return spring, remove the protective cap close to the adjuster foot on the back of the machine.
- Remove the pulley (D, fig. 4), unscrewing the two fixing dowels (E, fig. 4).
- Remove the brake shoes (A, fig. 4);
- Fit the new shoes.
- Apply medium thread glue to the locking dowels and replace the pulley.
- Turn the shaft by hand and check that the shoes do not touch the pulley when they are in the rest position.
- Replace the search circuit board, the motor-support unit and the wheel spin device.
- Adjust the wheel spin device as described in “Adjusting the wheel spin device”.
- Replace the sensor, reversing the operations carried out to disconnect it.
- Calibrate the sensor as described in the operator's manual.
- Perform a few wheel spins and check that the wheel spin device is operating correctly.
- Fit a truck wheel and check that the brake is working correctly.
- Close the weight-holder lid again.

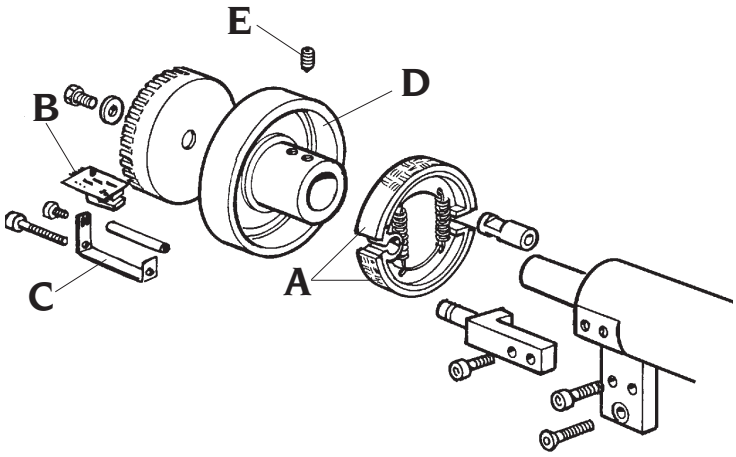


Fig.4

UK

TROUBLESHOOTING

The balancing machine features autotest and autodiagnostics programs which provide information about most possible failures and the relative corrective measures (refer to the list of error messages and the "Troubleshooting" section in the operator's manual). However, there are malfunctions which the machine is not able to recognise; a list of them is provided below.

WARNING

For all electrical malfunctions, before replacing a circuit board the following should always be checked:

- that the power supply is connected to the transformer primary correctly for the mains voltage available.
- that the voltages of the transformer secondaries are at the specified rated values (use a tester set as AC voltmeter and refer to the drawing of the transformer enclosed);
- that the wiring between the components probably involved in the malfunction is undamaged. In particular, check:
  - that the connectors are fitted correctly;
  - that the contacts are fixed correctly to the ends of the individual wires of the cables;
  - that the mains voltage in the zone where the machine is installed is stable and that the workshop's earth connection system is in good working order;
  - that the protective fuses on the transformer and on the power supply circuit board have not blown, and that the LEDs on the power supply board which indicate that the various power supply voltages are available illuminate.

The following is a summarising table, with reference to the general electrical wiring diagram.

THE MACHINE DOES NOT SWITCH ON

Use a voltmeter to check that the power supply voltage is reaching the terminal board of the transformer primaries.

1) If the voltage is not present on the primaries, check:

- that the power supply socket and the relative protective fuses are in good order;
- that the plug is correctly connected to the machine's power cord;
- that the mains power cord is undamaged;
- that the master switch is operating correctly.

2) If the voltage is present on the primaries check:

- that the transformer fuses have not blown;
- that the specified voltages are present on the transformer secondaries;
- that the power supply and PEAC control circuit board is working correctly, checking that the fuses on the board have not blown and that the relative indicator LEDs illuminate;
- that the motherboard power supply cable is wired correctly and its connectors are connected correctly;
- for short-circuits on the peripherals. To do this, disconnect all the cables from the motherboard connectors except for the power supply cable and try to switch on the machine;

If the checks listed above do not reveal faulty components, replace the motherboard.

"THE MACHINE DOES NOT PERFORM THE WHEEL SPIN WHEN the START BUTTON IS PRESSED and/OR THE GUARD IS LOWERED"

In this case the various causes can be identified on the basis of the information on the displays.

1) The displays continue to display the imbalance values calculated previously.
The motherboard is not receiving or not "hearing" the START signal from the keyboard or microswitch.
Check:
- that the automatic start microswitch associated to the wheel guard is operating correctly (when the guard is lowered the switch contact must be closed);
- that the cam which trips the automatic start device microswitch is set correctly;
- that the automatic start microswitch is wired correctly;
- that the START key is operating correctly.

If the checks listed above do not reveal faulty components, replace the motherboard.

2) The displays show the wheel's geometrical data.
The motherboard is receiving the signal from the START button or microswitch, but the resulting command is not being given.
Check:
- that the "control cable" connecting the motherboard to the "power supply and control" circuit board is connected and wired correctly;
- that the "power supply and control" circuit board is operating correctly;
- that the wheel spin motor is in good working order.

If the checks listed above do not reveal faulty components, replace the motherboard.

3) The displays show the message "Cr Err".
The contact of the microswitch associated to the guard is open.
Check:
- that the guard is lowered when a wheel spin is performed (by pressing the START button);
- that the automatic start microswitch associated to the wheel guard is operating correctly (when the guard is lowered the switch contact must be closed);

If the checks listed above do not reveal faulty components, replace the motherboard.

4) The displays show the message "Err 30
If abnormal noise is noted, check the condition of the roller or the setting of the wheel spin device.
If the wheel is rotated, check operation of the encoder circuit board, see "Service Programs".
If on the other hand the motor does not start:
- check the motor fuse on the Peac FU1 circuit board;
- check that the motor power supply cable is connected correctly;
- check operation of the PEAC circuit board;
- check operation of the motor.

"AT SWITCH-ON THE DISPLAYS SHOW "ttt"

After switching off the machine, set microswitch 2 of the "SW 2" pair in the "Work" position.

"THE DISTANCE VALUE ACQUIRED AUTOMATICALLY WITH THE SENSOR IS DIFFERENT FROM THE REAL VALUE"

In the service environment, check that the potentiometer is working correctly, by checking (see also "Replacing and Adjusting the Distance Potentiometer"):
- the continuity of the operating range;
- the travel stroke set.

If there are no anomalies on the potentiometer, calibrating the sensor correctly (see instructions in operator's manual) may be enough to remove the defect.

AT SWITCH-ON THE MACHINE IS CUT OUT

(it does not accept any commands)

Check:
- that all the keyboard keys are undamaged, i.e. that none of them is remaining constantly depressed due to a breakage. In this case, replace the keyboard;
- that a key is not remaining permanently depressed due to incorrect installation of the motherboard on the supporting panel.

Whenever a board is installed on the panel the greatest care must be taken to ensure that the keys, welded directly onto the motherboard, operate correctly. To do this, proceed as follows:
- tighten the board's four fixing screws, placed close to its edges;
- lightly engage the two nuts close to the keys until they turn with friction;
- press all the keys on the panel to check that they are working properly;
- finely adjust the tightness of the two nuts so that the keys are touching the polyester film but are not being pressed too hard.

THE BALANCING MACHINE PROVIDES NON-REPEATABLE IMBALANCE VALUES AT SUCCESSIVE WHEEL SPINS

(differences exceeding 3 grams with imbalances of the order of 30 grams)

Check, in this order:
- that the machine is resting firmly on the ground;
- that the weight-holder lid is positioned correctly (i.e. it does not rub against the bell of the central until during the wheel spin);
- that the brake shoes or motor roller are not touching the pulley during the signal acquisition phase. This might occur due to an error in adjustment of the wheel spin and braking device; in this case, adjust as described in "Adjusting the wheel spin device".
- that the wheel is firmly clamped to the wheel (i.e. there is no slip between the wheel and the supporting flange during the wheel spin).
- that the two pick ups are tightened correctly, referring to the values of the signals displayed using service program "96";
- that the motherboard is in good working order, by replacing it with a new one.

If the checks described above do not reveal any faults, replace the central unit, checking for noise on the bearings if appropriate.

IT IS NOT POSSIBLE TO BALANCE THE WHEEL: when the weights indicated by the balancing machine are applied and then a checking wheel spin is performed, new imbalance values appear at random.

Make the checks listed in the previous point.
Also check:
- that the geometrical dimensions set are correct;
- that the machine has not lost its calibration, by performing the three-spin calibration procedure;
- that the cable connecting the search circuit board (encoder) to the motherboard is connected and wired correctly;
- operation of the search circuit board (encoder) using service program “97” (see “Service Programs). An operating defect on the search board prevents the machine from calculating the position of the imbalances correctly. In this case, the following must be checked:
  - that the photodiodes of the search circuit board are not dirty;
  - that the mechanical setting of the fork in relation to the search disc is correct.

If the anomaly persists, replace the search circuit board.
If this does not eliminate the fault either, replace the motherboard.

THE MOTOR REMAINS ON, CONTINUING TO DRIVE THE WHEEL, and THE WHEEL SPIN IN PROGRESS DOES NOT COME TO AN END

Perform all the checks on the search circuit board listed in the previous point. Also check that the power supply and controls circuit board is in good working order, with special reference to the motor power supply relay.

BRAKING AT THE END OF THE CYCLE IS TOO LONG OR TOO NOISY

- Check the brake shoes for wear and replace them if necessary.
- Clean the working surfaces.

THE WHEEL SPIN DEVICE IS NOISY

Check, in this order:
- that the roller is not worn;
- that the brake shoes are not worn;
- that there is no mechanical damage to the motor;
- that the wheel spin device is set correctly;

DURING A WHEEL SPIN:

- **the machine remains cut out with the beeper sounding;"**
- **unknown characters appear on the displays;"**
- **the machine performs a lamp test and resets."**

The defect, normally sporadic, may occur due to a temporary loss of power on the motherboard, or due to an interference or malfunction on the motherboard.
Check:

- that the motherboard power supply cable is wired correctly and its connectors are connected correctly;
- that the "power supply and PEAC control circuit board" is operating correctly;
- that the motherboard power supply cable is wired correctly and its connectors are connected correctly;
- that the motor power supply and signal wires are not coupled;

If the checks listed above do not reveal faulty components, replace the motherboard.

TOUCHING THE METAL PARTS OF THE BALANCING MACHINE GIVE AN ELECTRIC SHOCK

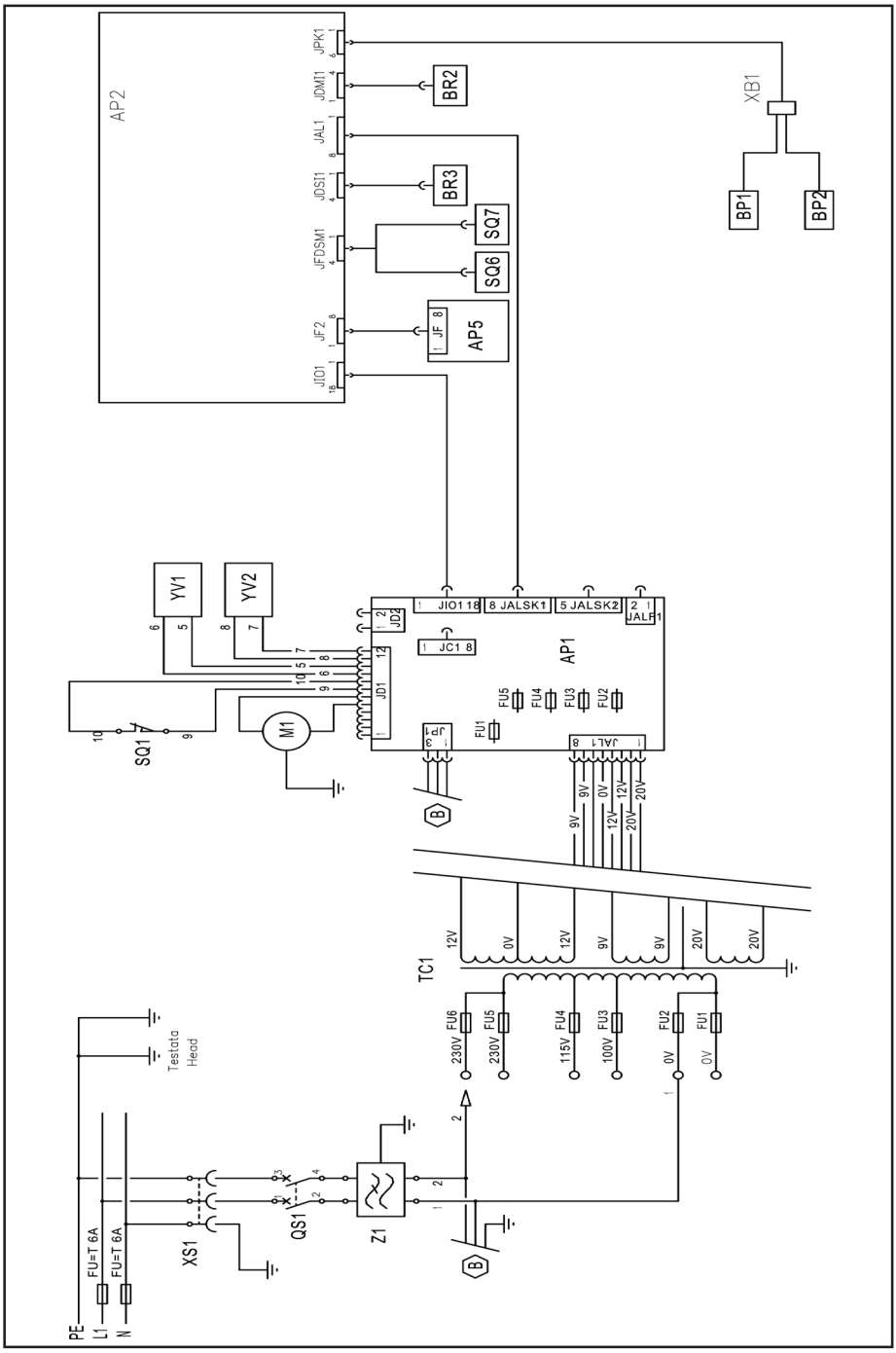
Check that the power supply socket is correctly connected to earth (essential for proper operation of the machine as well as for safety reasons).

Note

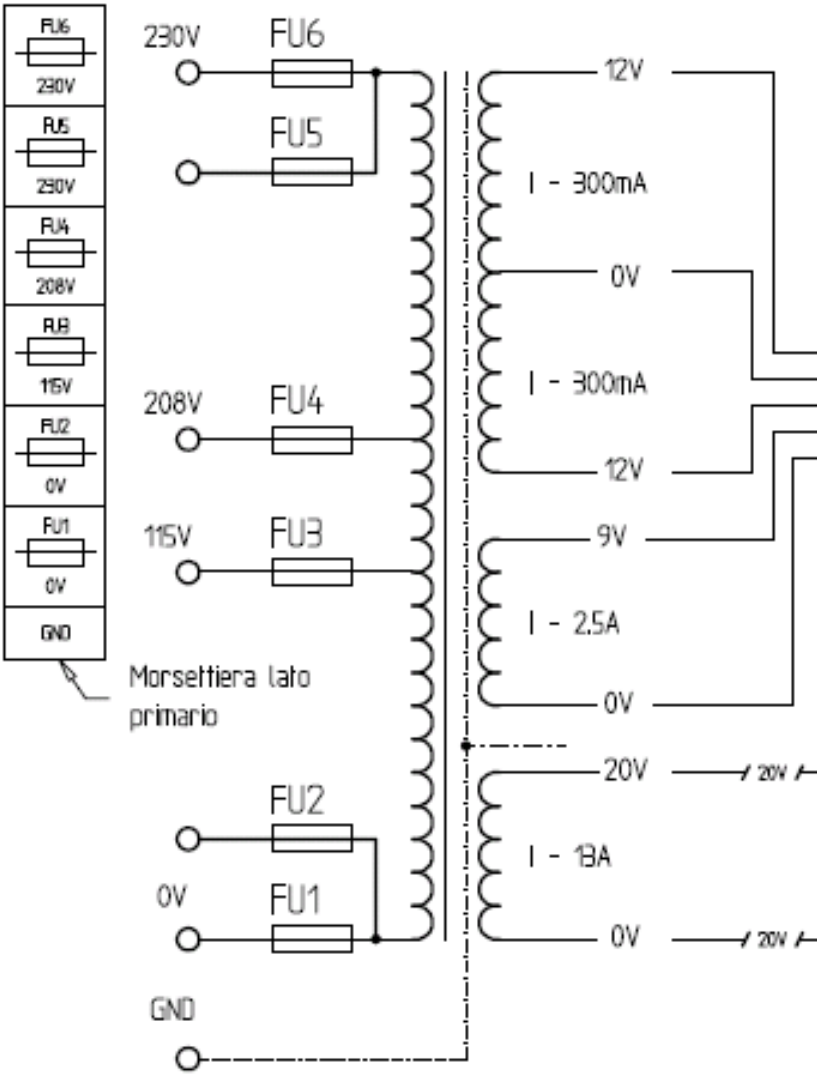
UK

GENERAL ELECTRIC LAYOUT DIAGRAMS

AP1 Power supply and controls board
AP2 Mother board (CPU)
AP5 Search board
BP1 Internal pick-up
BP2 External pick-up
FU.. Fuse
M1 Motor
QS1 Master switch
RP1 Internal distance potentiometer
SQ6 Distance resetting micro-switch
SQ7 Diameter resetting micro-switch
BR2 Diameter measuring sensor
BR3 Distance measuring sensor
SQ1 Safety guard microswitch
TC1 Power supply transformer
XB1 Connector
XS1 Power supply socket
YV1 Wheel spin solenoid valve
YV2 Brake solenoid valve
Z1 Mains filter

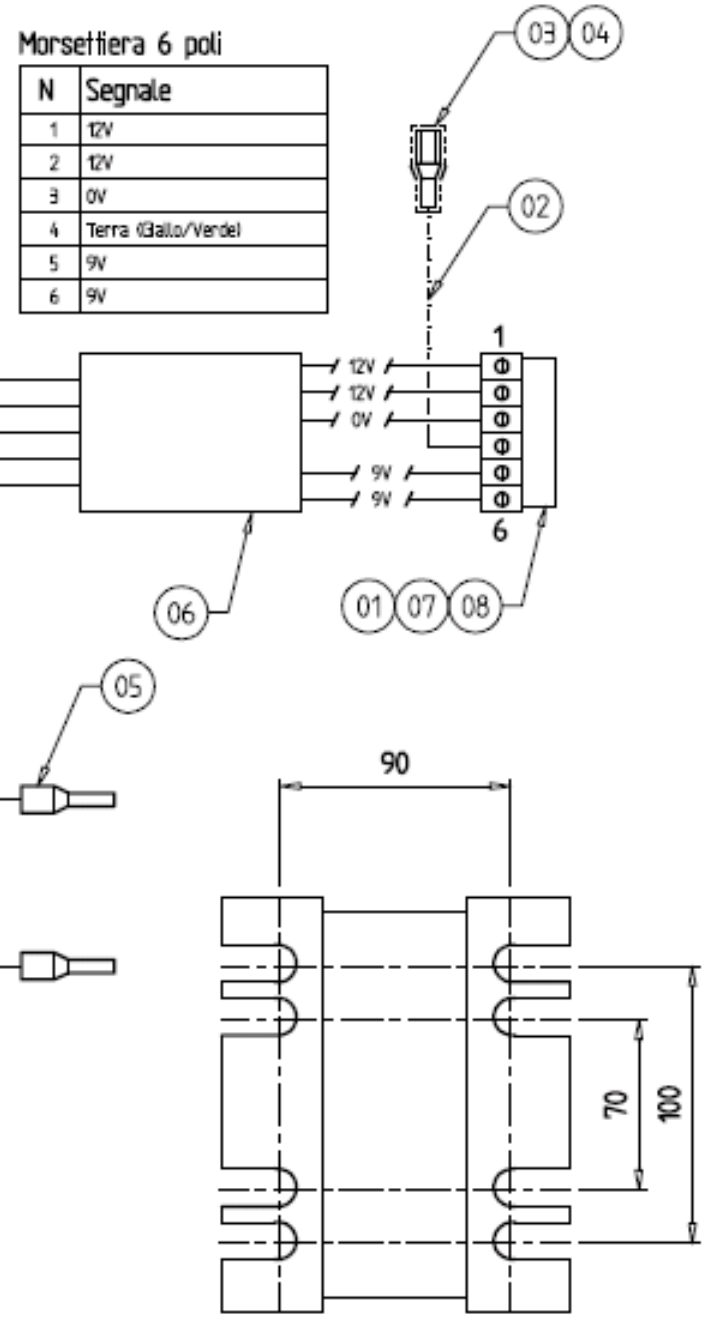

AP2
JPK1
JDM11
JAL1
JDS11
JFDSM1
JF2
JIO1
BR2
BR3
SQ7
SQ6
AP5
JF 8
XB1
BP1
BP2
YV1
YV2
JIO1 18
8 JALSK1
5 JALSK2
2 JALF1
JD2
JC1 8
AP1
JD1
FU5
FU4
FU3
FU2
FU1
JP1
JAL1 8
SQ1
M1
9V
0V
12V
20V
TC1
230V
115V
100V
FU6
FU5
FU4
FU3
FU2
FU1
Testata
Head
PE
L1
N
FU=T 6A
XS1
QS1
Z1

UK


FU6
230V
FU5
230V
FU4
208V
FU3
115V
FU2
0V
FU1
0V
GND
Morsettiera lato primario
230V
FU6
FU5
208V
FU4
115V
FU3
FU2
0V
FU1
GND
12V
I - 300mA
0V
I - 300mA
12V
9V
I - 2.5A
0V
20V
20V
I - 1A
0V
20V

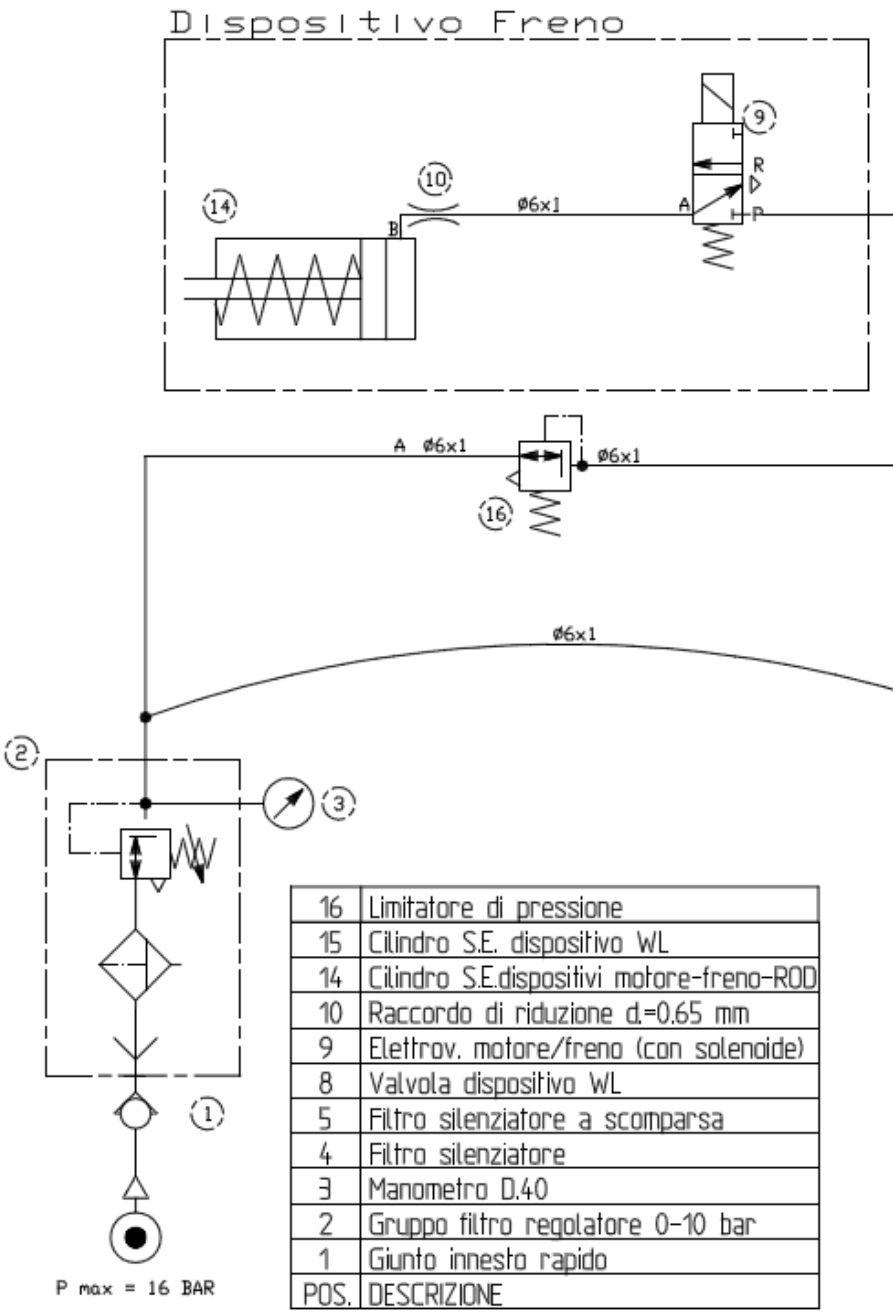
Morsettiera 6 poli

N	Segnale
1	12V
2	12V
3	0V
4	Terra (Giallo/Verde)
5	9V
6	9V

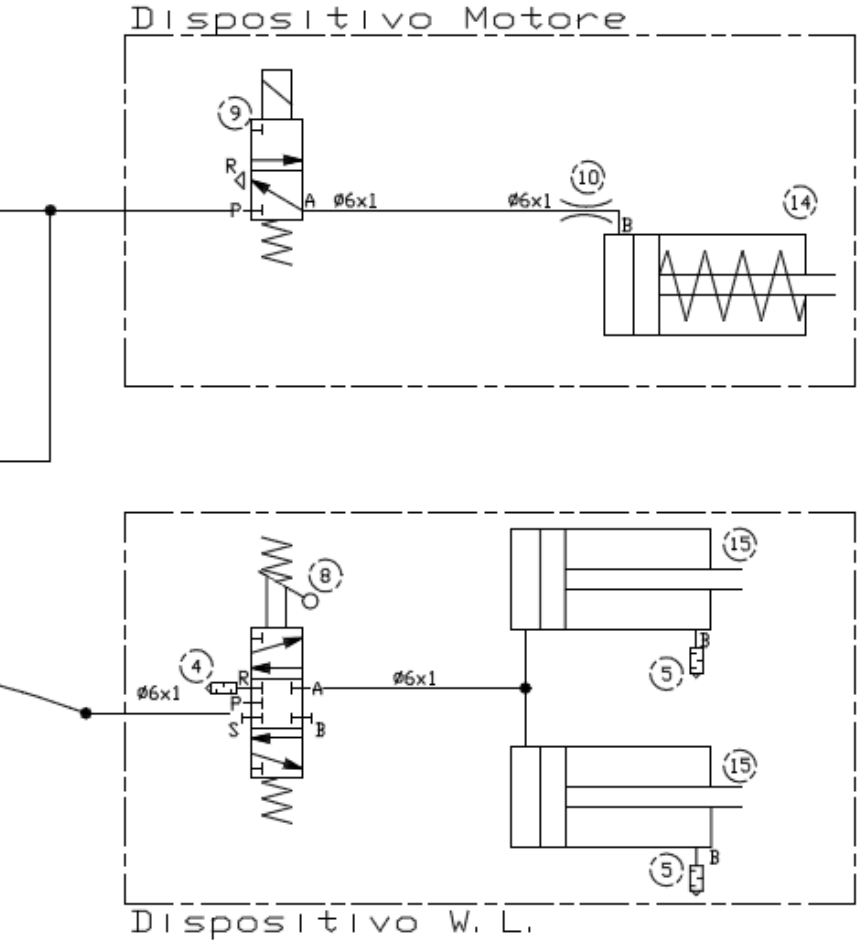


Cod. 4-101700

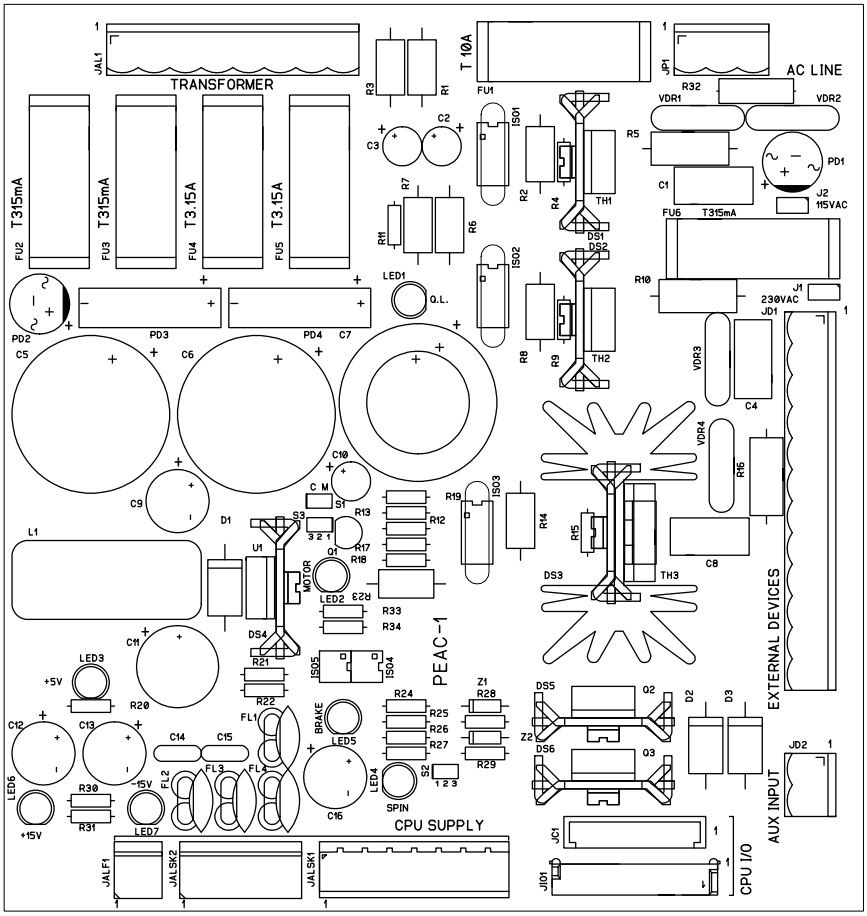
UK



16	Limitatore di pressione
15	Cilindro S.E. dispositivo WL
14	Cilindro S.E.dispositivi motore-freno-ROD
10	Raccordo di riduzione d.=0.65 mm
9	Elettrov. motore/freno (con solenoide)
8	Valvola dispositivo WL
5	Filtro silenziatore a scomparsa
4	Filtro silenziatore
3	Manometro D.40
2	Gruppo filtro regolatore 0-10 bar
1	Giunto innesto rapido
POS.	DESCRIZIONE


Dispositivo Motore
9
R
P
A
Ø6x1
Ø6x1
10
B
14
8
4
Ø6x1
R
P
S
A
B
Ø6x1
15
5
B
15
5
B
Dispositivo W. L.

UK



Connettore JALF1
AMP MTA 2 vie dritto
Alimentazione per display

1- GND
2- +5Vcc

Connettore JALSK2
AMP MTA 5 vie dritto
Alimentazione per scheda CPU

1- -12Vcc
2- GND
3- +12Vcc
4- GND
5- +5Vcc

Connettore JALSK1
AMP MODU 8 vie dritto
Alimentazione CPU - Display

1- N.C.
2- -12Vcc
3- GND
4- +12Vcc
5- GND (Display)
6- +5Vcc (Display)
7- GND (CPU)

Connettore JD2
WEIDMULLER 2 vie dritto
Input aux

1- In aux
2- GND

Connettore JC1
AMP MODUI 1x8 vie dritto
Comandi dalla scheda CPU

1- Comando motore
2- GND
3- Comando freno
4- GND
5- Feed back START (autoritenuta)
6- GND
7- Microswitch
8- Out aux

Connettore JD1
MOLEX Picoflex 18 vie dritto
Comandi dalla scheda CPU

1- Comando motore
2- NC
3- GND
4- NC
5- Comando freno
6- NC
7- GND
8- NC
9- Feed back START (Autoritenuta)
10- NC
11- GND
12- Out Aux
13- Microswitch
14- Input 5Vcc
15- NC
16- Input 5Vcc
17- GND
18- GND

Connettore JAL1
WEIDMULLER 8 poli dritto
Alimentazione dal trasformatore

1- 20Vac
2- 20Vac
3- 12Vac
4- 12Vac
5- 0Vac (Centrale)
6- Terra
7- 9Vac
8- 9Vac

Connettore JP1
WEIDMULLER 3 poli dritto
Alimentazione dalla rete

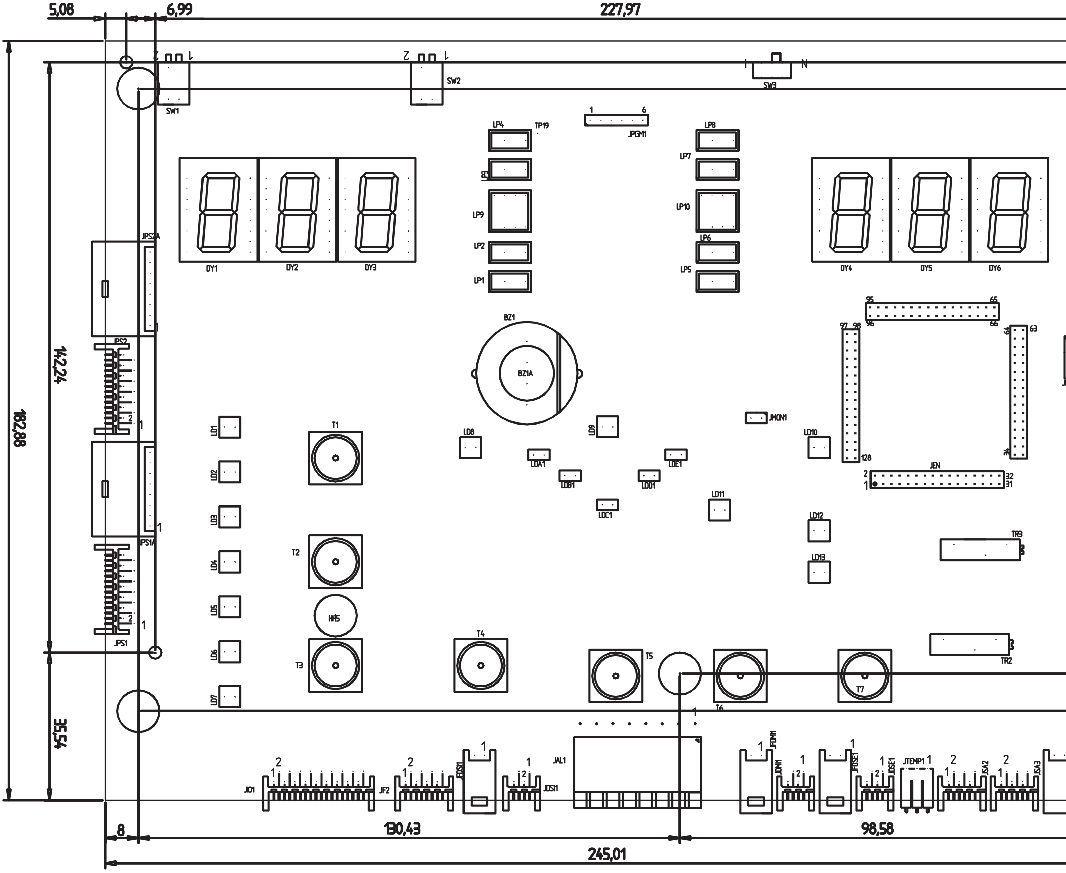
1- 230Vac (115Vac)
2- Non collegato
3- 230Vac (115Vac)

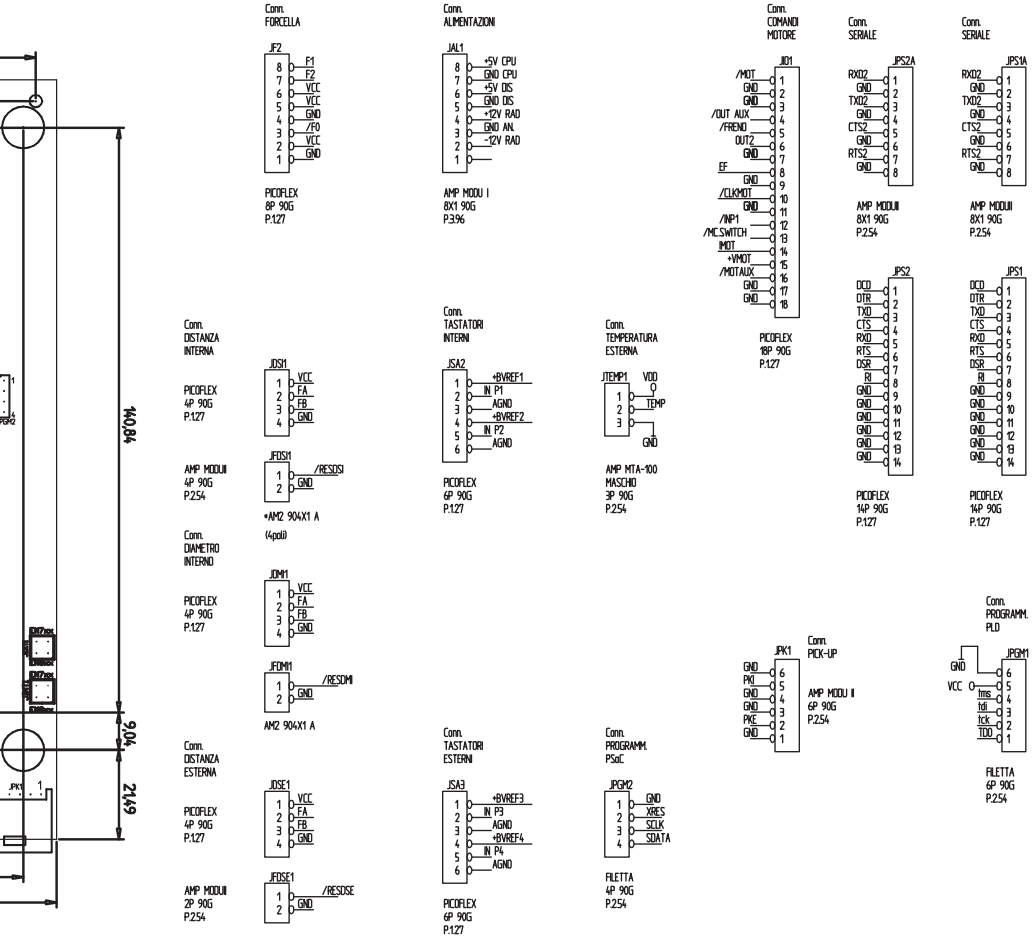
Connettore JD1
WEIDMULLER 12 vie dritto
Comando dispositivi

1- Freno Muller (+ 100Vdc)
2- Freno Muller (- 100Vdc)
3- Quick Lock Muller (230 o 115Vac)
4- Quick Lock Muller (230 o 115Vac)
5- Motore (230 o 115Vac)
6- Motore (230 o 115Vac)
7- Microswitch (input +)
8- Microswitch (input -)
9- Sgancio (+ 24Vdc)
10- Sgancio (- 24Vdc)
11- Freno Corghi (+ 24Vdc)
12- Freno Corghi (+ 24Vdc)

Cod. 457674B

UK


5,08
6,99
227,97
182,88
142,24
35,54
8
130,43
245,01
98,58
SW1
SW2
SW3
DY1
DY2
DY3
DY4
DY5
DY6
JPGM1
BZ1
BZ1A
T1
T2
T3
T4
T5
T6
T7
HR5
JPS2A
JPS2
JPS1A
JPS1
JEN
JMON1
TR2
TR3
JIO1
JF2
JDS1
JAL1
JTEMP1



UK

Cod. 4-104447A

CE

COMIM - Cod.4-131046 - 12/2013

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