

e.syline



TROUBLESHOOTING GUIDE

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FAULTS, ERRORS, MALFUNCTIONS AT THE INSTALLATION/FIRST START

These conditions are generally related to wrong machine settings, or minor installation mistakes. Most of the times they will be solved by adjusting the value of one or more parameters, or by performing simple checks on the installation.

No switching on: check the input voltage, the state of the power cable and the plug/socket. If this condition is accompanied by a circuit-breaker trip, consider checking the ground connection.

PB error: the voltage is enough to switch on the system, but too low to operate the pump. Check the input voltage and especially if it drops down along the power line. If so, the cable section may be inadequate for its length: consider using a power cable with a larger conductors' section; alternatively, the voltage is too high.

The pump does not start: the pump is switched on but does not start running when required. It means that the system is already under pressure, with a higher value than the Set Point. Increase the value of SP and/or decrease the value of RP; If SP is finely set, it is possible that the suction and delivery traded places (suction connected to the outlet and vice versa).

BL Error: if it occurs at the very first start, it usually means the pump wasn't filled up. Fill the pump completely with clean water and restart the system; if the pump was already full, it means that it still requires one or more attempts to be fully primed. Reset the pump to restart the priming process; if there is water, but the priming process is undergoing difficulties, try to increase the value of the TB parameter by some seconds (*NOTE, it is strongly advised to set TB back to the original value after the priming is successful*) if the error persists, it indicates a problem with suction.

Noisy pump (positive suction head): when working with this type of installation, the self-priming is not necessary, and the presence of the self-priming shutter may cause abnormal noise from the pump; switch place of the shutter and the spring, as explained on the dismantling/assembly guides.

The pump does not stop: when this happens after the installation, the cause is normally a leak in the system. Check the pipes/fittings/etc.; Also sucking air can have such effect. Control the suction pipes and try to prevent air from getting in.

Insufficient delivery: if the pump is working with negative suction head, it may be working in a border-line condition. Remember that the deeper the suction goes, the lower maximum flow the pump is capable to delivery. Try to shorten and optimize the suction; if the suction depth is not concerning, or the pump has a positive suction head, the cause of the insufficient delivery should be searched in the system.

Unwanted starts: the main cause can be a leak in the system.

Tips about Suction:

E.sybox line pumps are equipped with a self-priming system, which allows them, in case of negative suction head, to suck up to 8 meters deep (compared to the pump inlet). This is a theoretical value: most of the times along the suction we have additional components (valves, filters), curves, etc., any of which results in a smaller or greater head loss. To reduce these losses and optimize the suction power (and also to avoid dry-run faults), you may follow these tips:

1. reduce the number of curves along the suction pipes;
2. avoid curves right before the pump inlet, especially elbows (90° or more);
3. do not use soft pipes; they can be flexible, but not bendable;
4. use an inlet pipe with a diameter at least as large as the pump inlet;
5. consider that any additional valve, filter or other additional component implicates a head loss, which is increased in case the component is in bad condition. Check that the valves are working properly, the filters are clean, etc.;
6. do not over-tight the fittings: this may cause cracks, which make the inlet pressure drop and largely decrease the suction capability; this of course can affect positive-suction head systems, too.

No immediate pressure at the tap: if the value of SP has been increased from the factory setting, the pressure charge of the expansion vessel should be increased accordingly. If the gap is too wide, the vessel will not be able to compensate the pressure loss at the opening, and the result will be an initial low pressure at the utility. Charge the pressure vessel with a higher pressure.

The pump starts only after the flow reaches zero: after opening a utility, the flow falls to zero before the pump starts. This means that the expansion vessel is charged with too high a pressure, in particular higher than the start pressure (SP-RP). Discharge the vessel to a correct pressure.

Fluctuating behavior: for most systems, the factory settings of the GI and GP parameters are good, but according to the type of system, an adjustment may be required. Try to decrease the value of the first parameter gradually, and if the working point does not become stable, start decreasing the other parameter, too. If this still does not work, set the two parameters back to the original values and repeat the process, this time increasing them; another parameter that may affect this behavior is OD: the factory setting is “1” (rigid), which adapts to most systems. If required, change the setting to “2”.

[NOTE]: GI and GP settings are saved separately for OD mode 1 and 2; when switching from one mode to the other, GI and GP are automatically set to the respective values.

Propagate configuration (multi-pump systems - large E.sybox only): some parameters, when changed on one inverter, aren't automatically transmitted to the other machine. In this case, the operation must be confirmed manually by pressing “+” on the inverter which has the most updated parameters.

Error while updating using a newer pump (multi-pump systems - large E.sybox only): if the two software versions are not compatible they cannot communicate; the pump will usually get stuck to the message “ERROR FW UPLOAD”. In such cases it is advised to try the manual updating procedure (as described at paragraph 11.2.1.1 of the manual), or the updating via E.sylink.

If the update procedure between two compatible versions gets blocked to the loader screen (“LV LOADER vX.Y”), it means that the pump had suffered a previous irreversible damage to the main board (usually short-circuit error types) and the board must be replaced.

Check the table in the appendix for the communication compatibility between different firmware versions.

GENERAL ERRORS, FAULTS, MALFUNCTIONS

These faults can occur anytime, and for the most various reasons, both internal and external.

The pump does not stop: one or more impellers and/or hydraulic parts may be clogged. Dismantle the pump and clean the dirty components. Another, rare cause may be a malfunction of the flow sensor: in this case first verify that it is not the sensor itself to be dirty or clogged; if it is clean and the flowmeter rotates freely, there may be an electric problem and the sensor must be replaced.

Insufficient delivery: one or more impellers and/or hydraulic parts may be clogged. Dismantle the pump and clean the dirty components. Alternatively, the clog may be in the suction pipe. Also make sure that the diameter of this pipe is sufficiently large (see “tips about suction”).

Unwanted starts: E.sybox line pumps have an integrated non-return valve. If this valve is blocked or faulty, the pump may start without any request of water. Dismantle the valve and check it. Replace if necessary. It is also possible that the pressure vessel is not well charged. Verify its pressure.

BL error: When this error occurs in other times than the first start/installation, the causes may be various. The most obvious is an actual lack of water, especially if the pump sucks from a tank or well; in case the presence of water is assured, refer to the “tips about suction” list.

When the expansion vessel is not finely charged (the best pressure value is normally <SP-RP-0,7>), sudden changes in the request of flow by the system, which imply considerable drops in pressure, will not be managed well enough and this may cause BL. Dirty and/or partially clogged components (impellers, ducts, etc.) can also lead to BL. Other causes are to be searched in the sensors: a faulty pressure sensor causes an incorrect reading of the actual pressure, and can trigger the dry-run protection; a faulty flow sensor which measures a very little flow rate will cause BL (the minimum flow rate that can be measured by the machine is 2 l/min. If the flow rate is lower, the displayed value is zero, and the pump stops or gets blocked. Make sure that the minimum water request is great enough).

[NOTE] The system tries to reset the fault automatically by starting the pump following this schedule: once every 10 minutes for a total of 6 attempts; once every hour for a total of 24 attempts; once every 24 hours for maximum 30 days.

OC error: motor overload/over-absorption of current. This condition usually occurs when a block or damage of one or more mechanical parts causes an extra absorption of current, that overloads the motor. The pump needs to be checked internally, searching for clogs, blocks, dirt, broken parts, or anything else that can prevent a smooth rotation and optimal working.

[NOTE] The system tries to reset the fault automatically by starting the pump following this schedule: once every 10 minutes for a total of 6 attempts; once every hour for a total of 24 attempts; once every 24 hours for maximum 30 days.

BP1 error: pressure sensor fault. This error may occur because of an actual damage/malfunction of the sensor (which must be replaced), or because of dirt, oxidation, communication failure between the sensor and the main board. First check the general state of the sensor: if it is clean, well connected and there are no evident signs of damage, it may be broken and must be replaced.

PB error: the input voltage is out of the allowed range (either too high or too low). If the power-line voltage is correct, check the value at the pump input; if the latter is lower, this means the issue must be searched in the power cable, which may be damaged or may need to have a larger section, according to its length. If all the previous checks show no anomalies, the voltage-detection circuit on the HV board may be faulty and the board must be replaced. This error self-resets when the values get back to normal.

LP error: the input voltage is below the minimum safe value and triggers the low-voltage protection. If the power-line voltage is correct, check the value at the pump input; if the latter is lower, this means the issue must be searched in the power cable, which may be damaged or may need to have a larger section, according to its length. If all the previous checks show no anomalies, the voltage-detection circuit on the HV board may be faulty and the board must be replaced.

HP error (also VSUP in E.sybox Mini/Mini 3): the input voltage is above the maximum safe value and triggers the high-voltage protection. If the measured input voltage has a correct value, the

voltage-detection circuit on the HV board may be faulty and the board must be replaced.

OT error (also HVOT in E.sybox Mini/Mini 3): over-heating of the power stages. In particular, it is based on the temperature of the heatsink; verify the correct thermal contact between the heatsink and the power terminals, as well as the temperature of the environment and of the liquid. If none of these checks reveals problems, there may be a fault on the electronic circuit which detects the temperature; test the HV board (see the guide at the end of this section) and replace if required.

SC error: short circuit between the motor phases. The error may be caused either by an actual failure of the motor or by a damage to the electronic board. First measure the resistance between the couples of motor phases (see dismantling/assembly guide): if one or more measures are zero (or a very small number), the corresponding phases are damaged, and the motor must be replaced; if the measurements give a good response, it is necessary to analyze the main board to find the root cause (see the guide at the end of this section).

PD error: irregular/unexpected switching off. This is most of the times due to a sudden cut of power supply and does not imply irreversible damage unless it occurs repeatedly. More rarely it is due to an actual fault of the main board.

PH error: pump overheating. The causes may be mechanical or electronic. In the latter case, an analysis of the main board is required (see the guide at the end of this section).

ESC error: short circuit to earth. Refer to error SC.

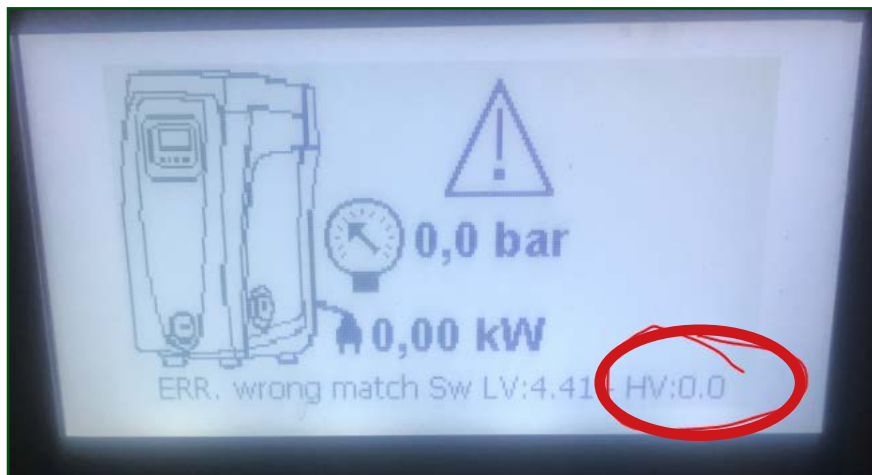
HL error: hot liquid. E.sybox line pumps are manufactured to work with liquids up to +35°C (+40°C for non-domestic use); verify the temperature of the pumped fluid and make sure it does not rise beyond this value. The continuous use of hot liquids may damage several components and lead to pump failure.

NC error: no current. The motor and the pump are disconnected. Verify the state of the internal wiring (see the dismantling/assembly guides), both in terms of good connection and of dry/clean terminals. A persistent error may indicate a damage to the motor: verify the state of the phases.

EY error: this error can occur only when the anti-cycling function (AY parameter - technical assistance menu) is activated, and after 40 (forty) consecutive starts in a short period of time. Check for a leakage in the system.

ERR. WRONG MATCH error (E.sybox Mini/Mini 3): there is a communication error between the main board (High-Voltage board) and the display board (Low-Voltage board, where the system firmware is uploaded). This error is generally caused by a mistake in replacing the LV board, which has hardware and/or software not compatible with the version of the HV board. It is important to check the right spare parts lists, not only in relation to the pump's product code,

but also to the revision number! If the error message shows “0.0” as HV software version (see picture), it means instead that the problem is on the HV board. Proceed with the electronic analysis (see the guide at the end of this section) and replace if required.



BASIC MAIN-BOARD ANALYSIS

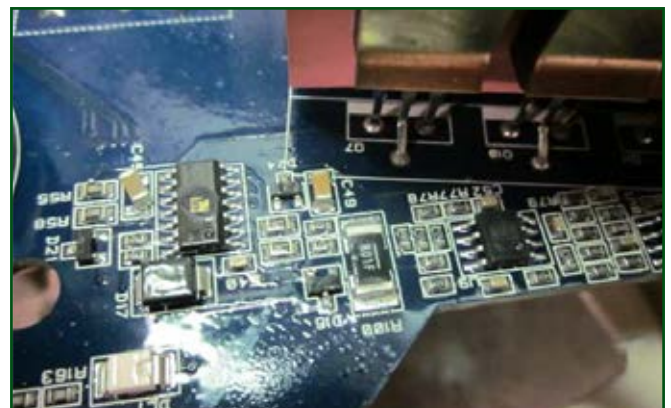
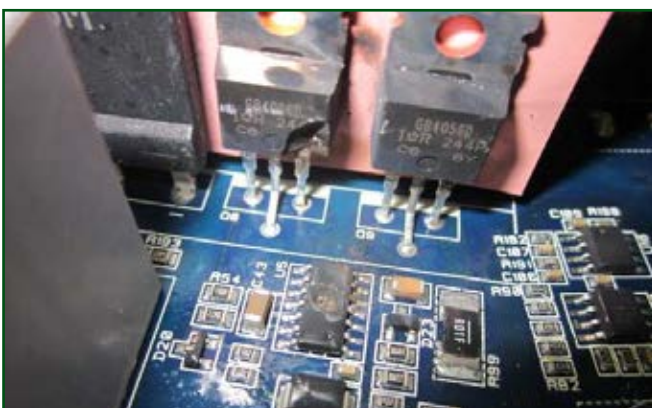
e.sybox

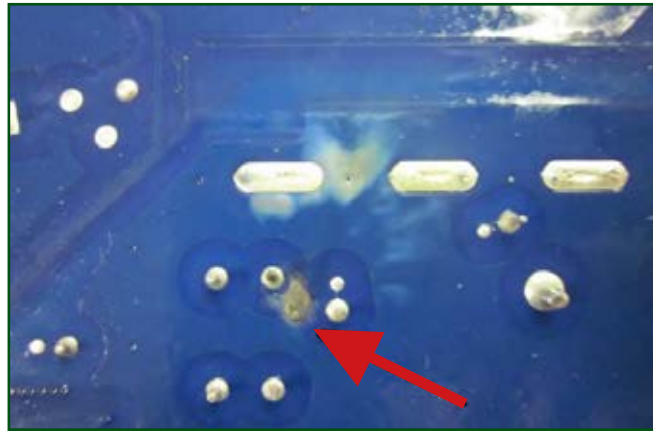
Cases which cause error E18, SC or HOT PUMP

Most cases with error E18, SC or HOT PUMP are caused by humidity and water particles due to filling through the Motor inspection hole. These particles can cause short circuit faults, internal errors or disconnecting the main switch; that is why the product should be verified carefully when it returns.

Short circuit, Residual current device or thermal-magnetic switch breaking circuit

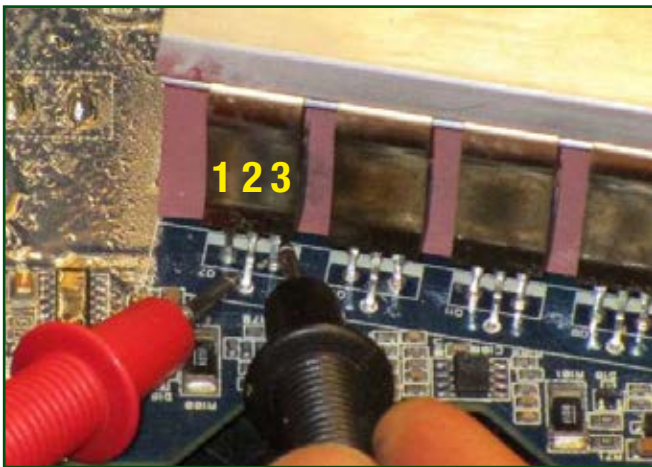
In cases like these, as seen in the photos, the discharges in the driver zone and in the power module are caused by an external overvoltage or atmospheric discharge.





Short circuit SC, EOC, Residual current device or thermal-magnetic switch breaking circuit – no visible damage

A- If by verifying the board, you can't detect any clearly damaged or burned components, measure the power terminals: configure the multimeter for diode testing and proceed as shown in the photo. The value should be approximately like in the photo but could vary slightly.



OPERATIONAL TIPS

First measure between pins 2 and 3; then measure between pins 1 and 3. Repeat the same procedure for all terminals.

This example is referring to a measurement of a terminal in good conditions, meaning that it is working. If a terminal is damaged, the tester will show short circuit or a value near to zero. In case only 1 terminal is in short circuit, it might be a malfunctioning component. If 2 or more terminals are damaged, this means that the product has received an atmospheric discharge, overvoltage or wrong connection of cables.

B- If no terminal is faulty, you can measure the rectifier to understand if the product is working or is damaged:



Even if just one of the measurements, which you see in the four steps, shows short circuit or a value near to zero on the Multimeter, the bridge might have been damaged due to an overvoltage or a discharge from outside.

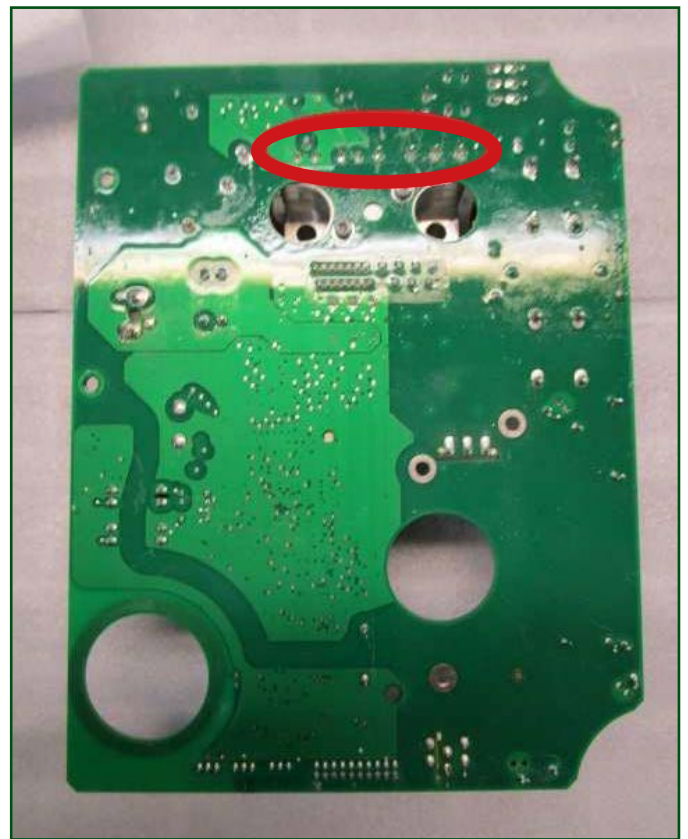
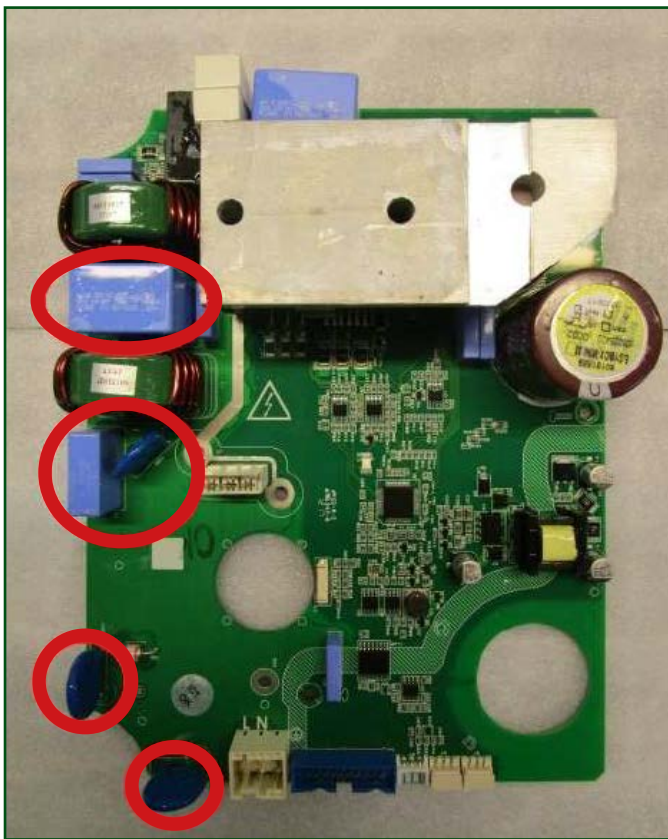
e.sybox Mini & e.sybox Mini 3

Cases which cause error E18, SC or HOT PUMP

Most cases with error E18, SC or HOT PUMP are caused by humidity and water particles due to filling through the Motor inspection hole. These particles can cause short circuit faults, internal errors or disconnecting the main switch; that is why the product should be verified carefully when it returns.

Short circuit SC, EOC, Residual current device or thermal magnetic switch breaking circuit

If the components circled in red have exploded or look damaged, these discharges are caused by an external overvoltage or by atmospheric discharge.



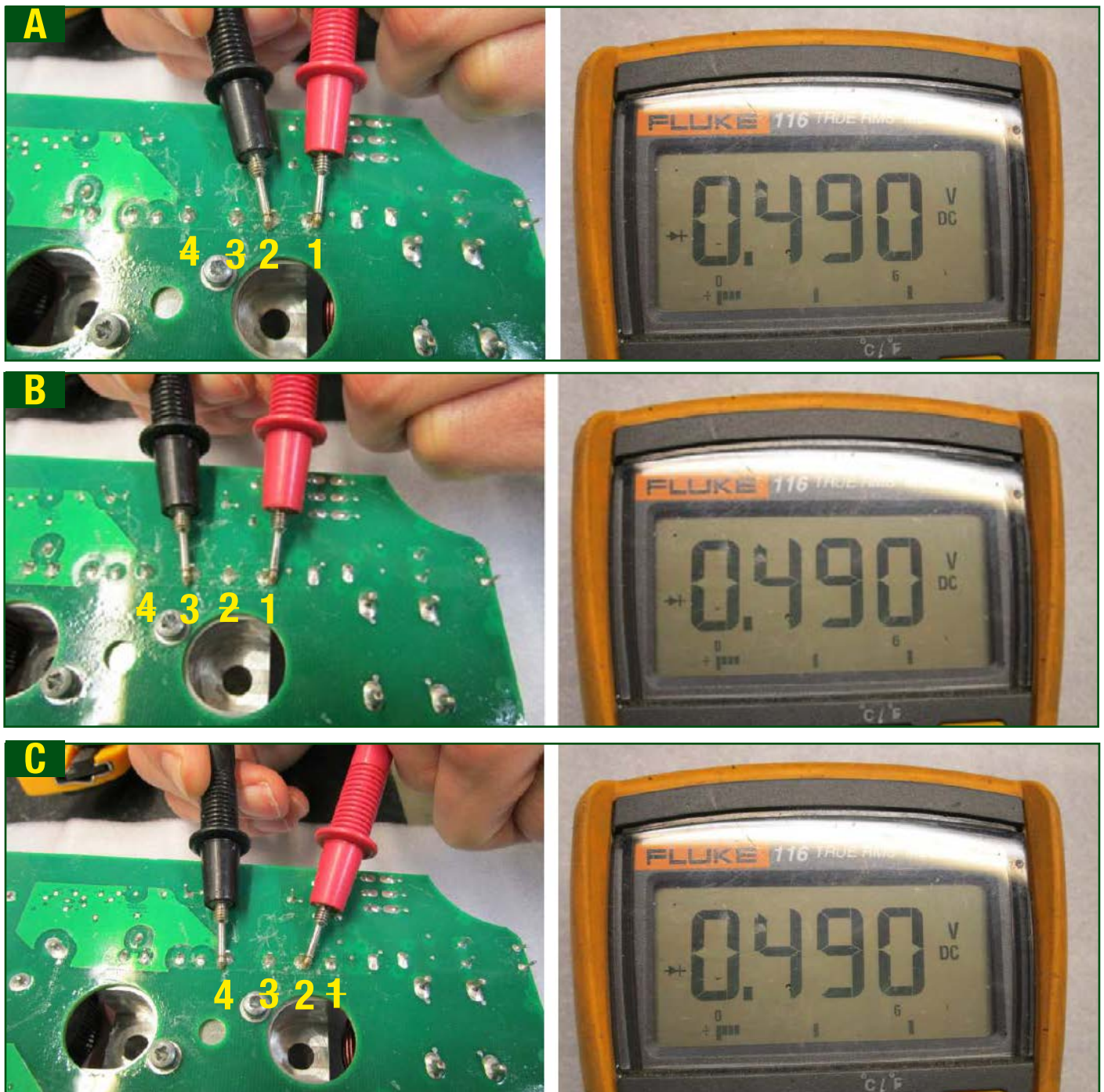
Diode Bridge and mosfet, on the power factor corrector circuit.

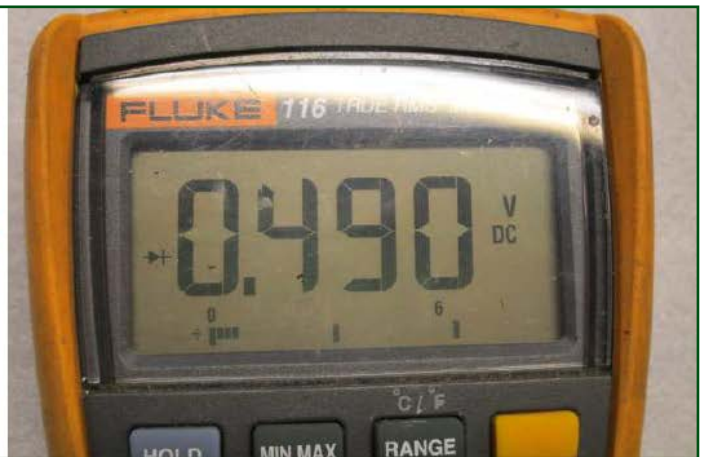
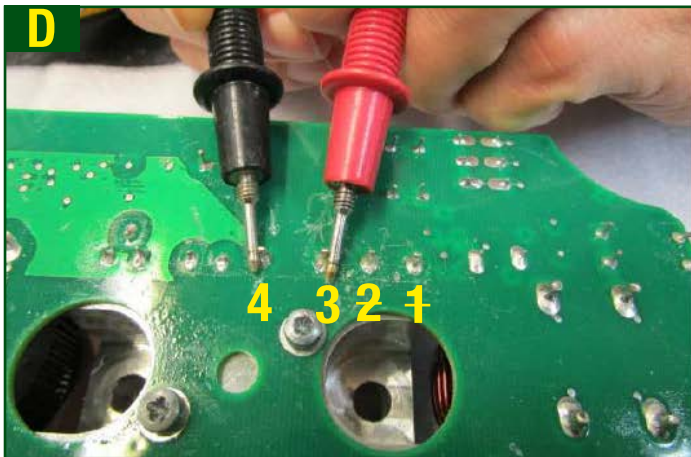
Short circuit SC, EOC, Residual current device or thermal magnetic switch breaking circuit – no visible damage

If by verifying the board, you can't detect any clearly damaged or burned components, it is probably one of the components on the power factor corrector circuit which is faulty. It is necessary to measure Diode Bridge and Mosfet on this circuit.

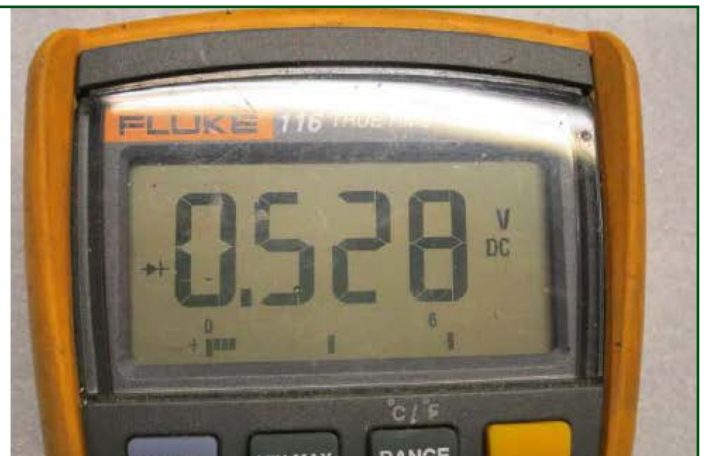
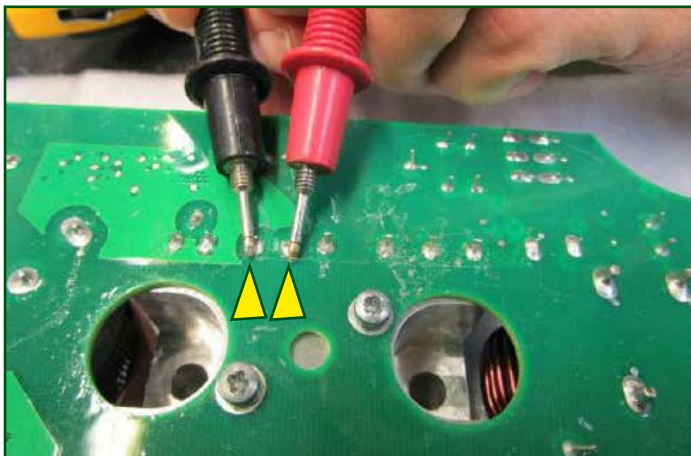
A - Diode Bridge measurement

Configure the Multimeter for diode testing and proceed as you see in the photos. The value should be approximately like in the photo, but could vary slightly.

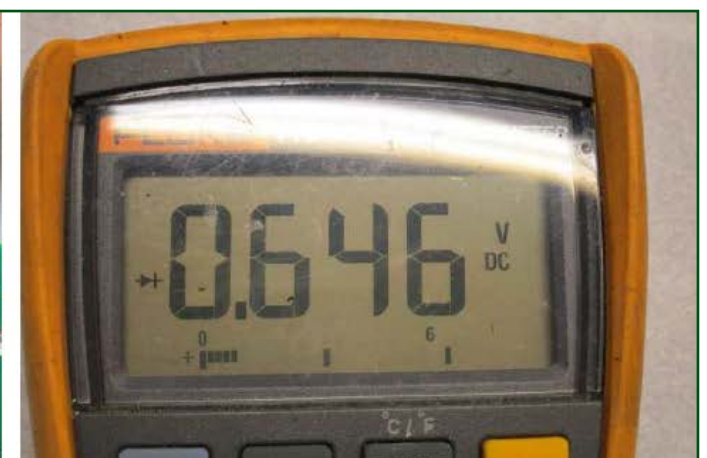
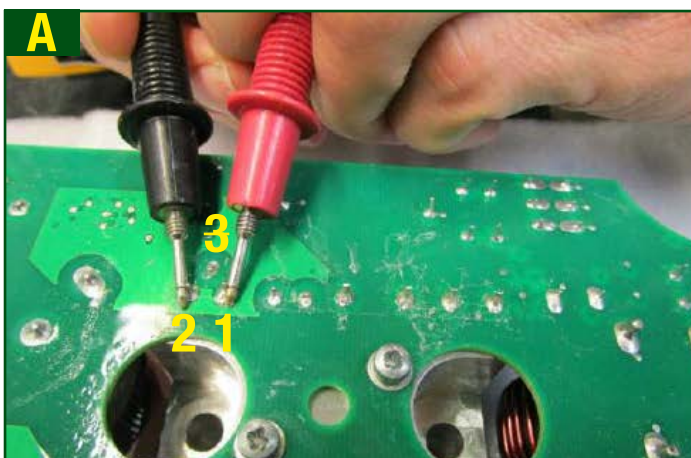


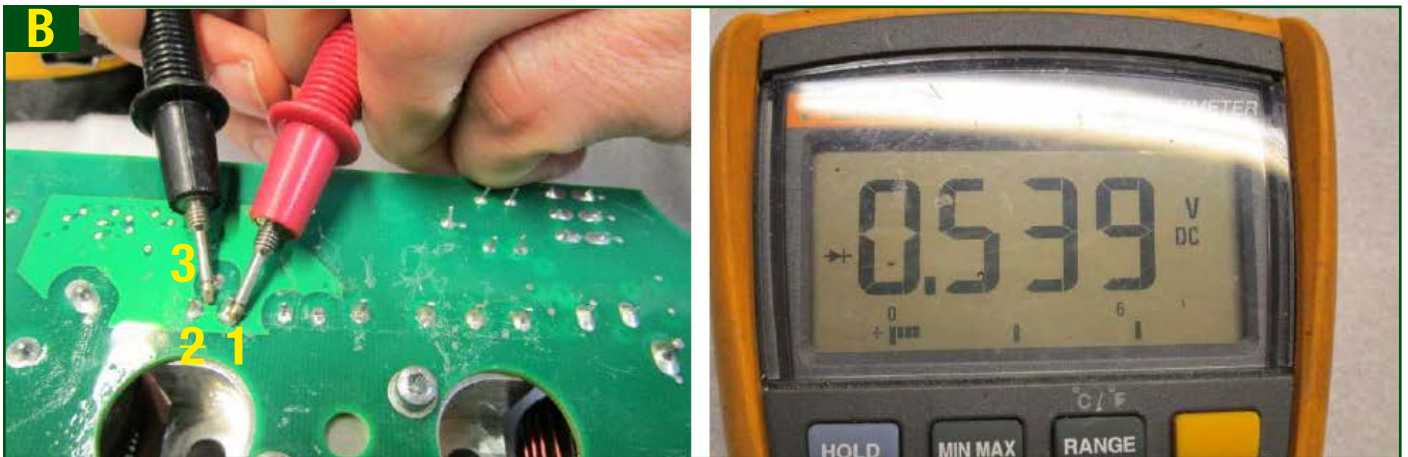


B - Diode measurement



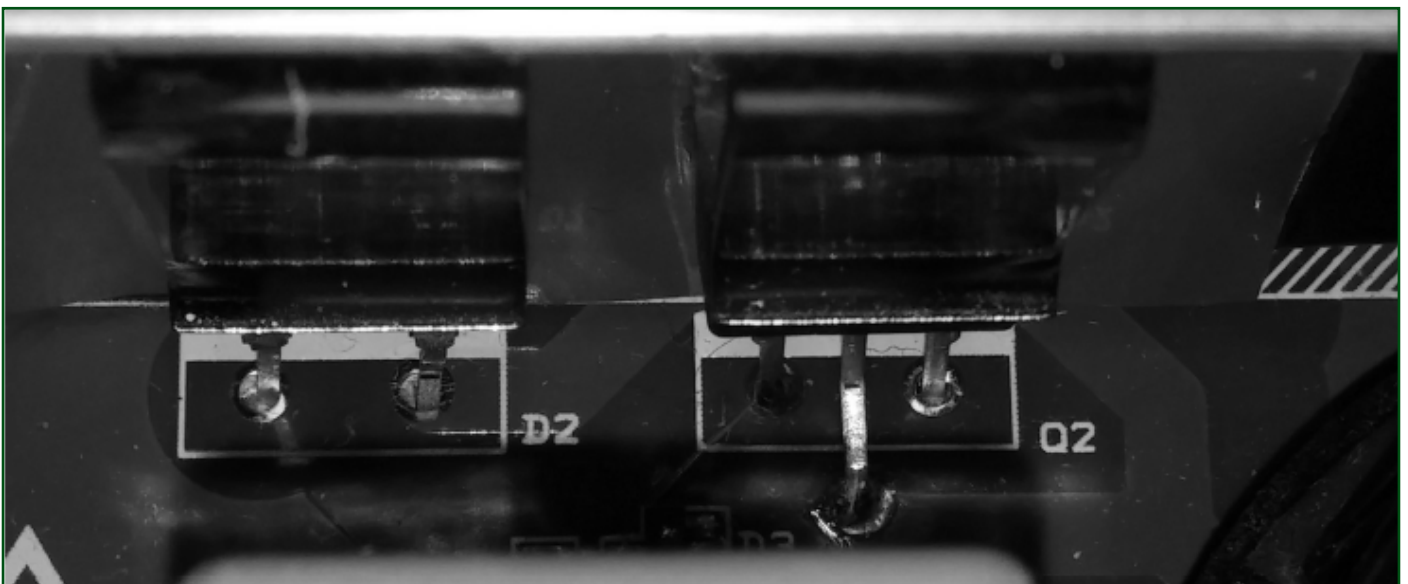
C - Mosfet measurement





These examples are referring to measurements of a terminal in good conditions, meaning that it is working. If a terminal is damaged, the tester will show short circuit or a value near to zero. In case this component is damaged as described above, the main board must be replaced.

Visually check that the components in the figure below show no signs of breakage, otherwise the power factor correction circuit is damaged, and the inverter must be replaced.



Wrong match error

The 5V circuit does not work properly and the cause may be a fault of some component/s of this circuit (see photo below). The inverter must be replaced.



INTERNAL ERRORS

These error codes are related to specific areas and circuits of the main electronic board. Their causes can be either completely internal (a faulty or damaged circuit/component) or external with consequences on one or more components of the board (the external factor causes an internal malfunction)

E0, E1, ..., E15: these internal errors have purely internal causes, and occur rarely; when such errors appear, the source of the problem may be located in the firmware, and a possible solution is software update. If the error persists, an analysis and (probably consequent) replacement of the LV and/or HV electronic board are required; in any case, please contact Customer Service for further details and for the possible return of the components for analysis.

E16: HV board microprocessor's failure. The fault/damage is located either in the microprocessor itself or in the related and adjacent circuits, and the HV board must be replaced. Please contact Customer Service for the possible return of the components for analysis.

E17: faulty/damaged EEPROM component of the HV board. Replace the electronic board and please contact Customer Service for the possible return of the components for analysis.

E18-19: the error is related to the detection of excessive current consumption by the electronic board. The attention must be first directed to the rotating parts, especially the motor shaft, which may be blocked or have a hard rotation; check also the condition of the impellers. If the rotation looks normal, the fault may be a consequence of inefficient suction. Check that the suction line, as well as any other extra components like valves or filters, is not blocked or dirty and make sure the pump is not sucking air. See the “tips about suction” paragraph in the first section of the guide. If all the previous checks do not point out any issues, the fault is on the main board, which requires analysis (see the guide in the previous section) and possible replacement. E19 is not a specific error but it means that E18 has not been solved yet, after several self-reset attempts.

E20-21: see E18. This error is very similar, but it is more related to power factors, therefore it is more likely to be caused by suction problems. If the suction is fine from every point of view, the rotating parts may be responsible, especially the impellers and other components which determine the hydraulic performance. If all the previous checks do not point out any issues, the fault is on the main board, which requires analysis (see the guide in the previous section) and possible replacement. E21 is not a specific error but it means that E20 has not been solved yet, after several self-reset attempts.

VD, V0, V1, ..., V5: they can all be classified as “power supply error”, but their causes are strictly internal and do not depend on the external power supply. Report these faults to Customer Service and replace the main board.

DCC error (E.sybox Mini/Mini 3): first signs of short circuit to the power terminals. The board requires analysis (see the guide in the previous section).

PFC error (E.sybox Mini/Mini 3): overcurrent of the PFC component. Report this fault to Customer Service.

OTHER FAULTS

Severe leaks, pump body splashing a lot of water: verify the presence of cracks. This type of damage is typically due to water freezing inside the pump. It is important to empty the pump completely when the pump is unused for some time. The pump must be left plugged in, in order to let the anti-freeze protection work.

ANTI-FREEZE protection: when the water temperature drops to 4°C, the pump runs automatically at low speed (1500 rpm) until the water temperature rises to 10°C

If the temperature drops too low, or the pump is left unplugged, the water that remained inside the pump will freeze the ice can crack and break the pump body and/or other parts.

Pump not switching on, several burned components on the main board: it is the effect of an electrical surge/high over-voltage. See the analysis guide in the previous section for more details and pictures.

APPENDIX

Average power consumption in standby

e.sybox 230V	e.sybox Mini/Mini 3 230V	e.sybox Mini/Mini 3 DV
3,5 W @ 230 V	3,9 W @ 230 V	4,2 W @ 230 V 3,6 W @ 115 V

Average power consumption in standby

VERSION	1.11	2.7	3.11	4.0	5.1
1.11	OK	NO	NO	OK	OK(*)
2.7		OK	NO	OK	OK(*)
3.11			OK	OK	OK
4.0				OK	OK
5.1					OK

(*) *supposed compatible but not tested yet*



