SERVICE MANUAL AF2

FTA Fault Tree Analisys Manual

FAULT TREE ANALYSIS SERVICE MANUAL

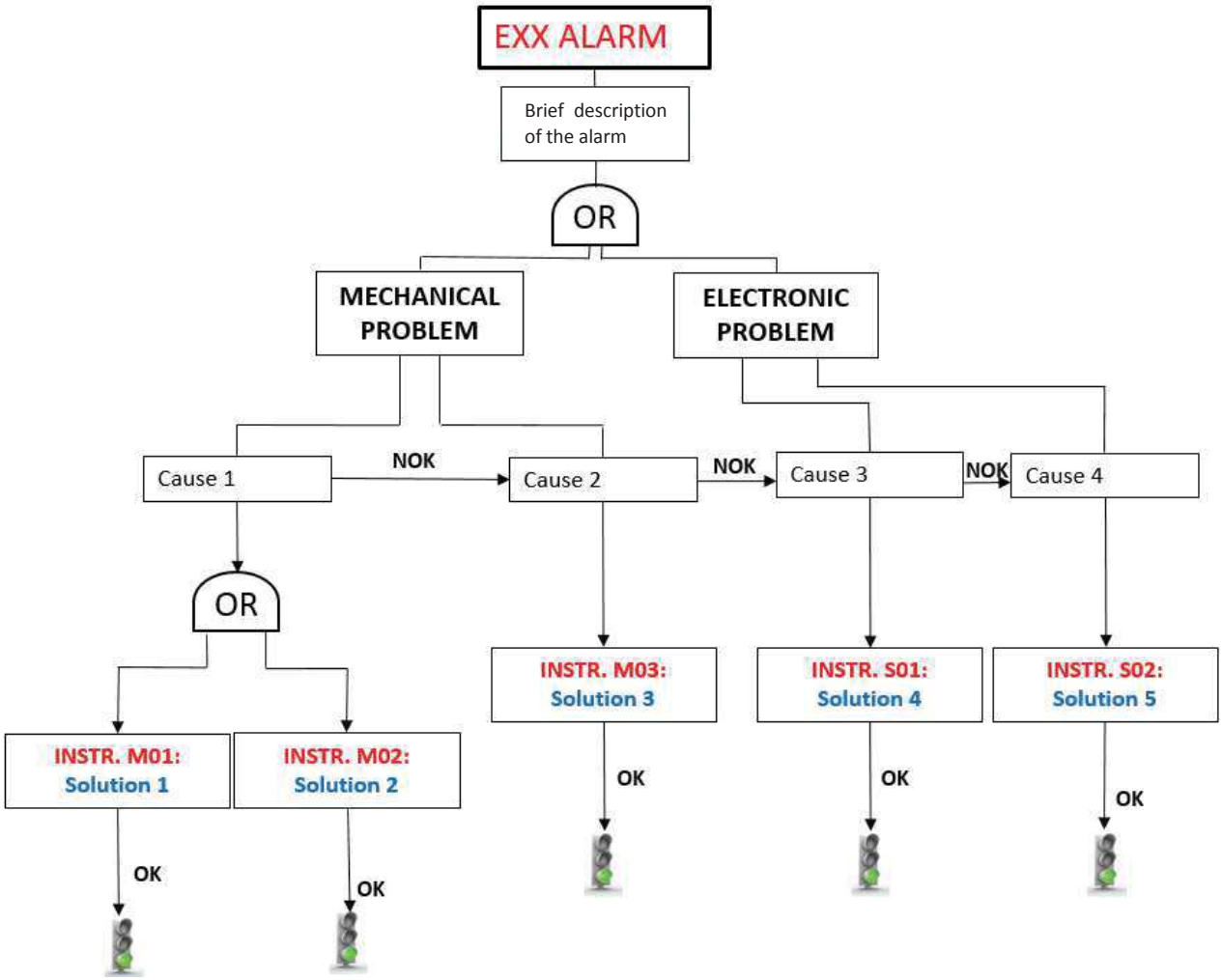
INTRODUCTION

This manual has been developed with the flowing logic: every alarm has been analyzed starting with a division on the possible causes: MECHANICAL and ELECTRONIC problems.

The possible causes are analyzed to help technicians solve the error: the causes of the problems are analyzed starting from the appliance inlets (water connection for the mechanical part and electricity connection for the electronic one).

Every possible cause is presented with its solution: an instruction at the end of the manual with pictures and details.

EXAMPLE:



LEGEND:

 the problem has been solved using the solution above, no further action is required

NOK → cause "x" is not the root of the problem, it is necessary to check cause "x+1"

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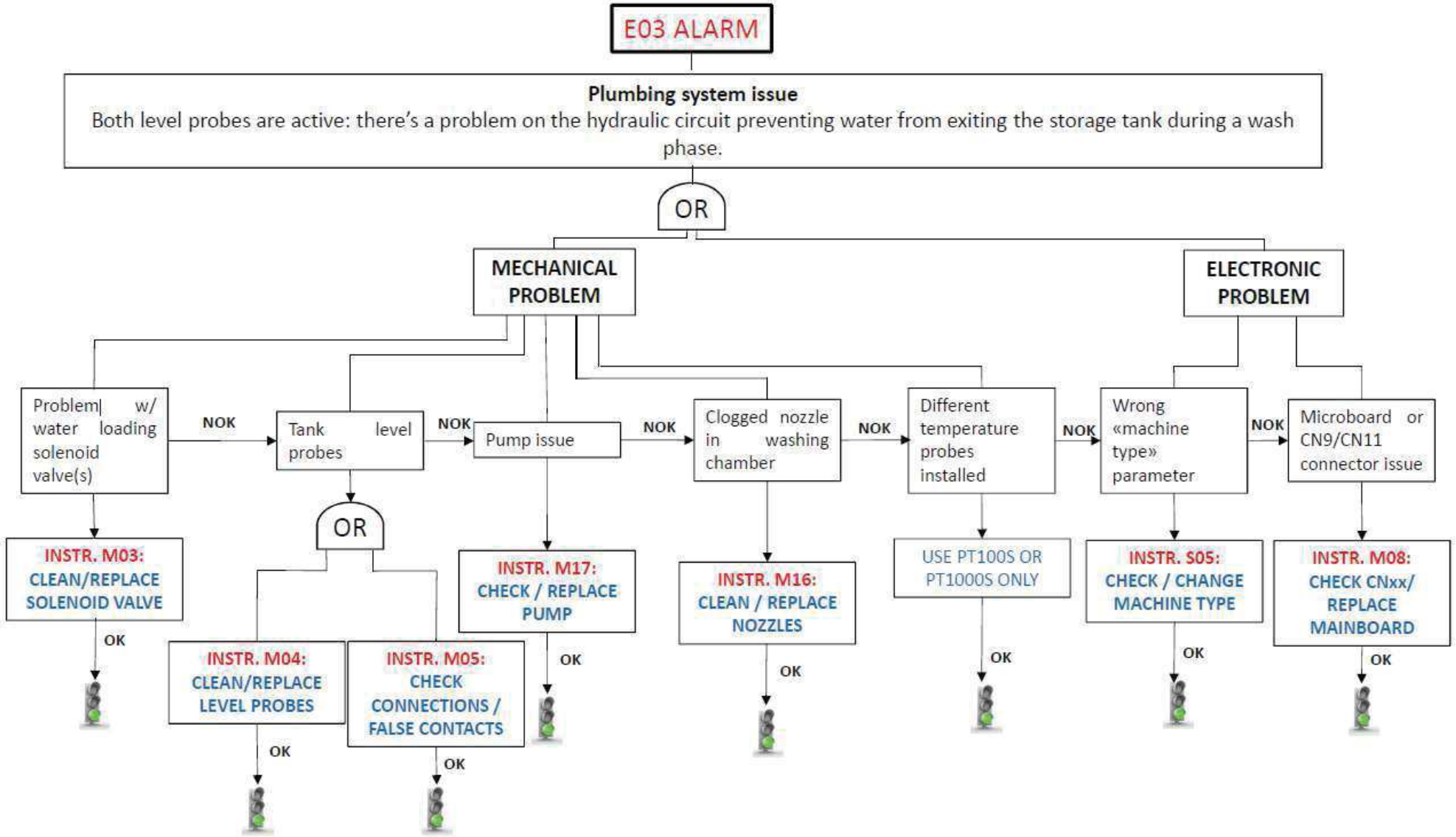

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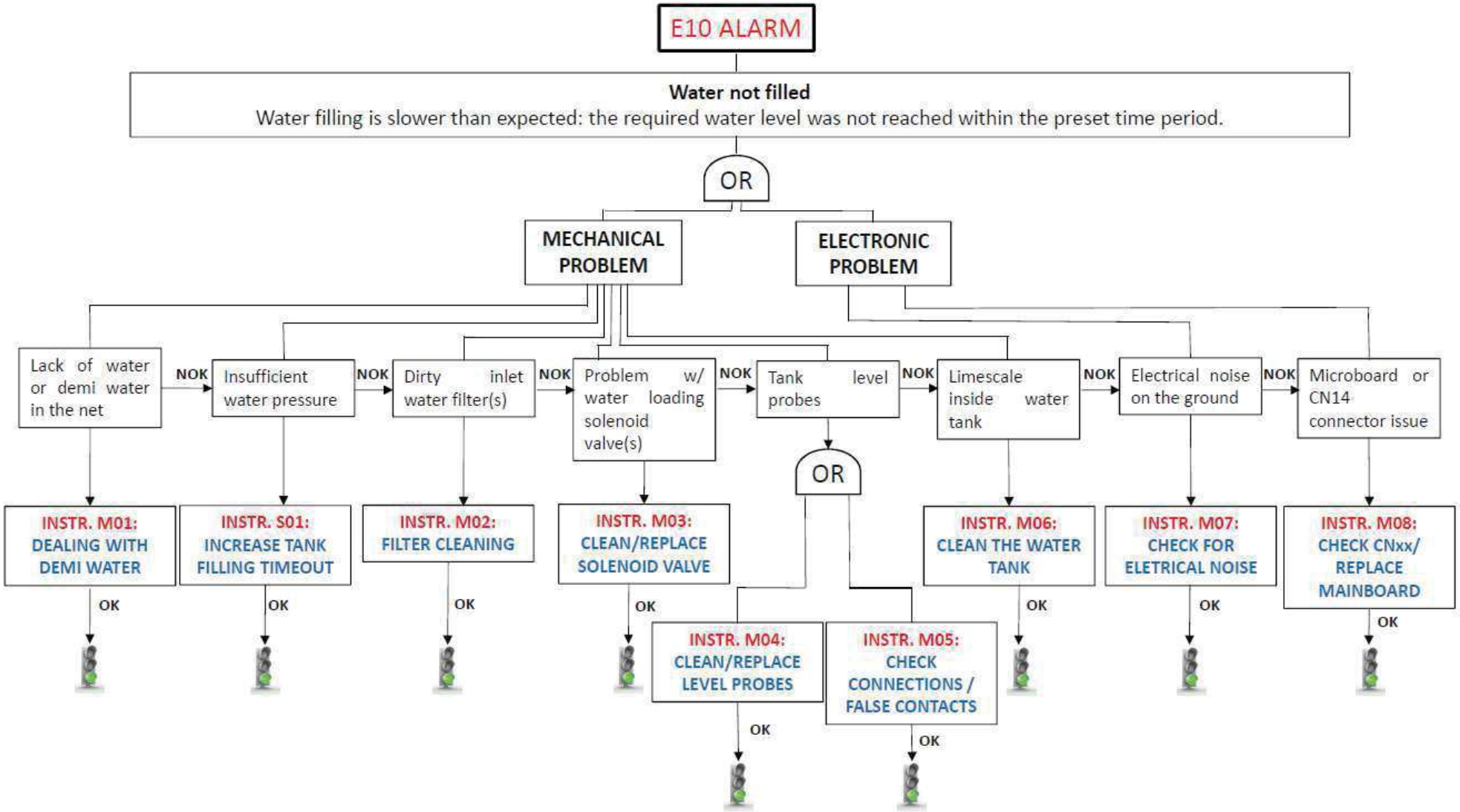

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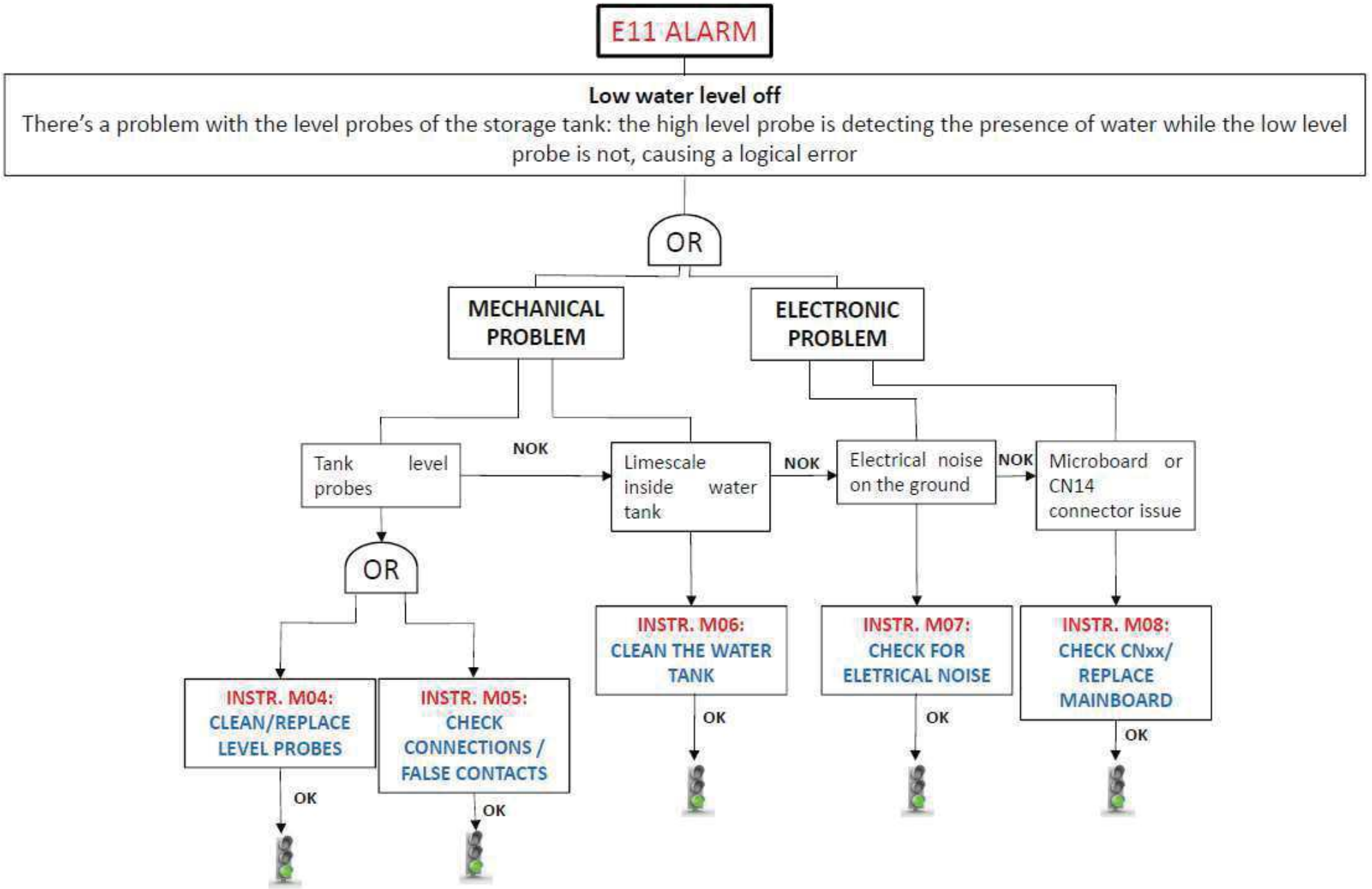

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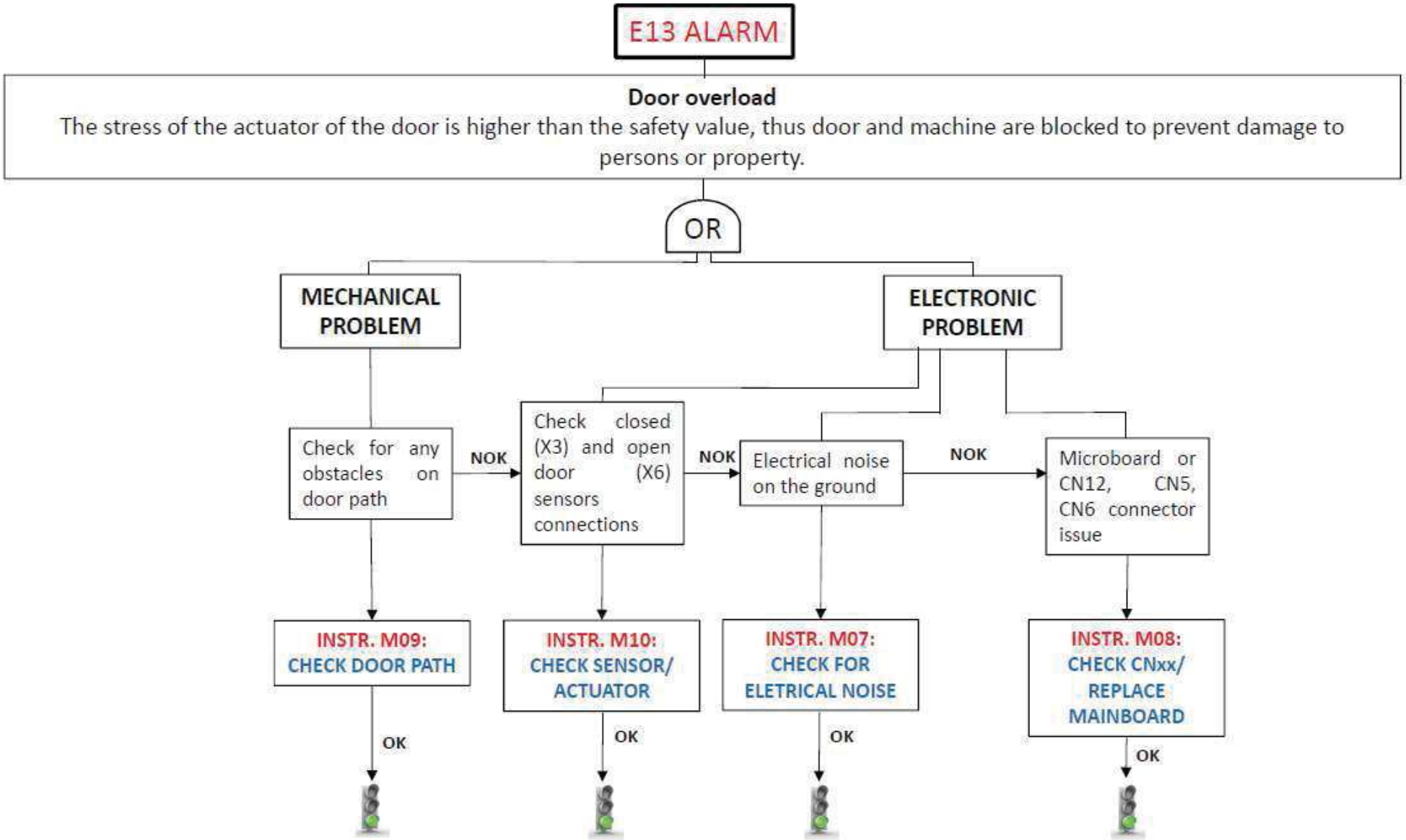

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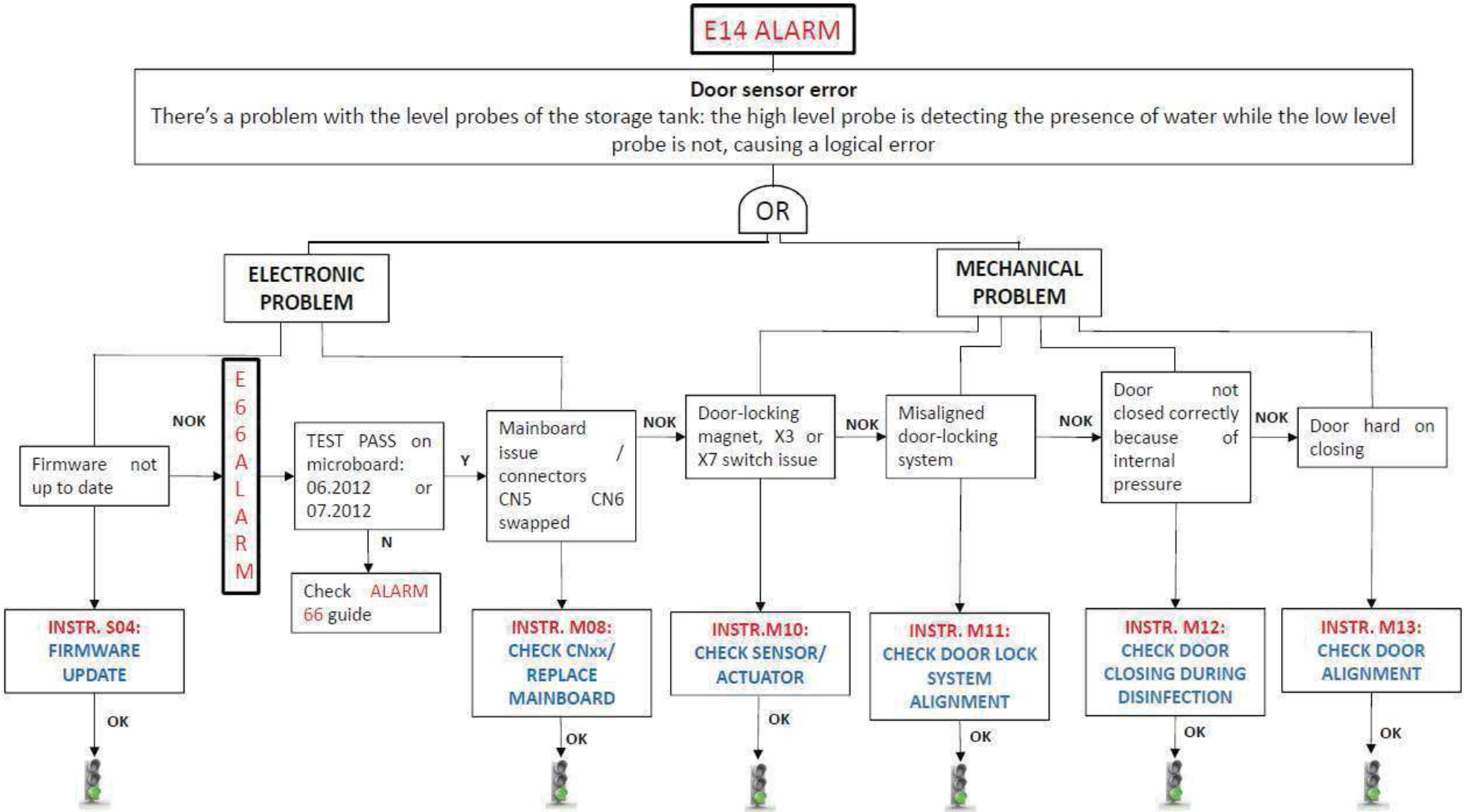

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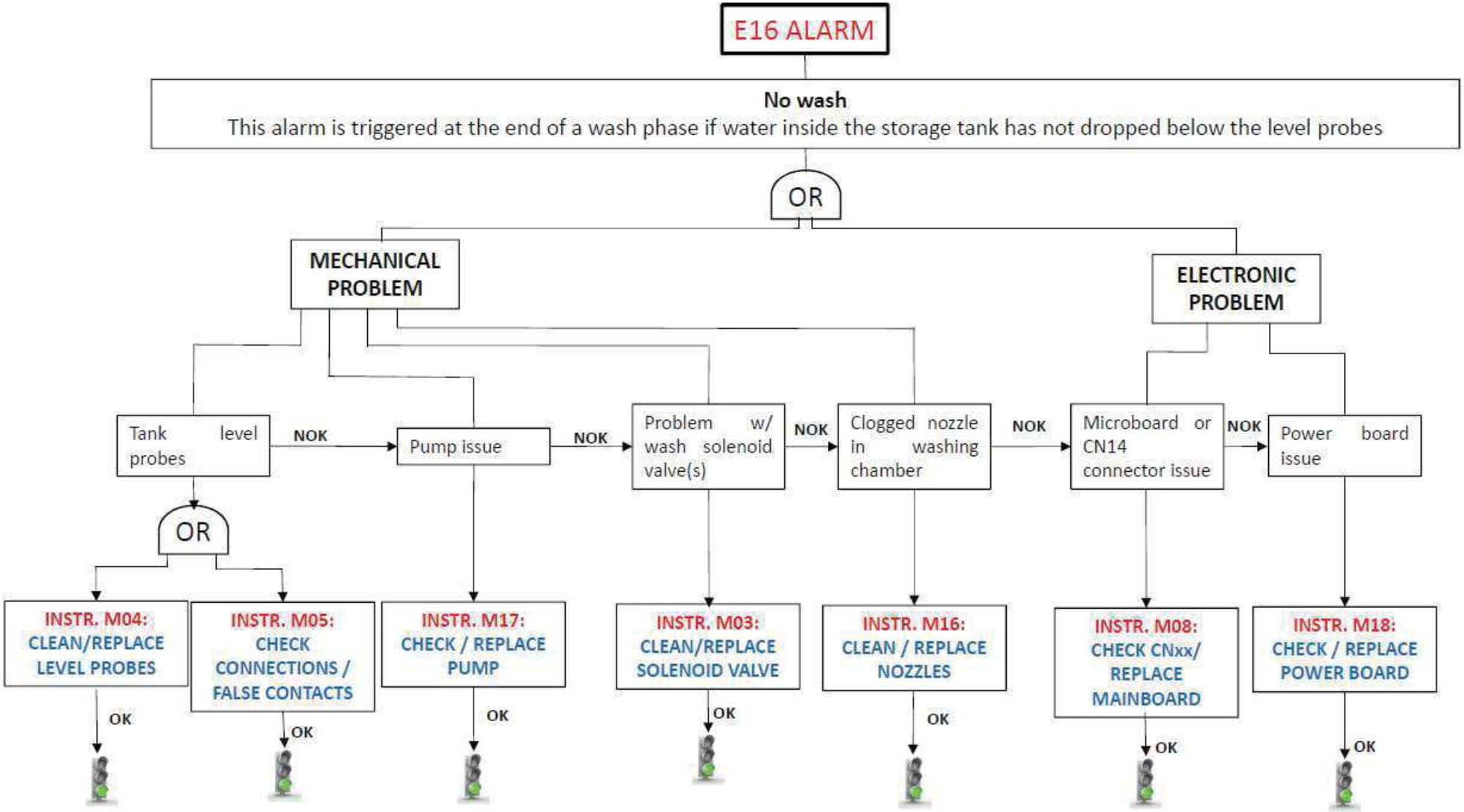

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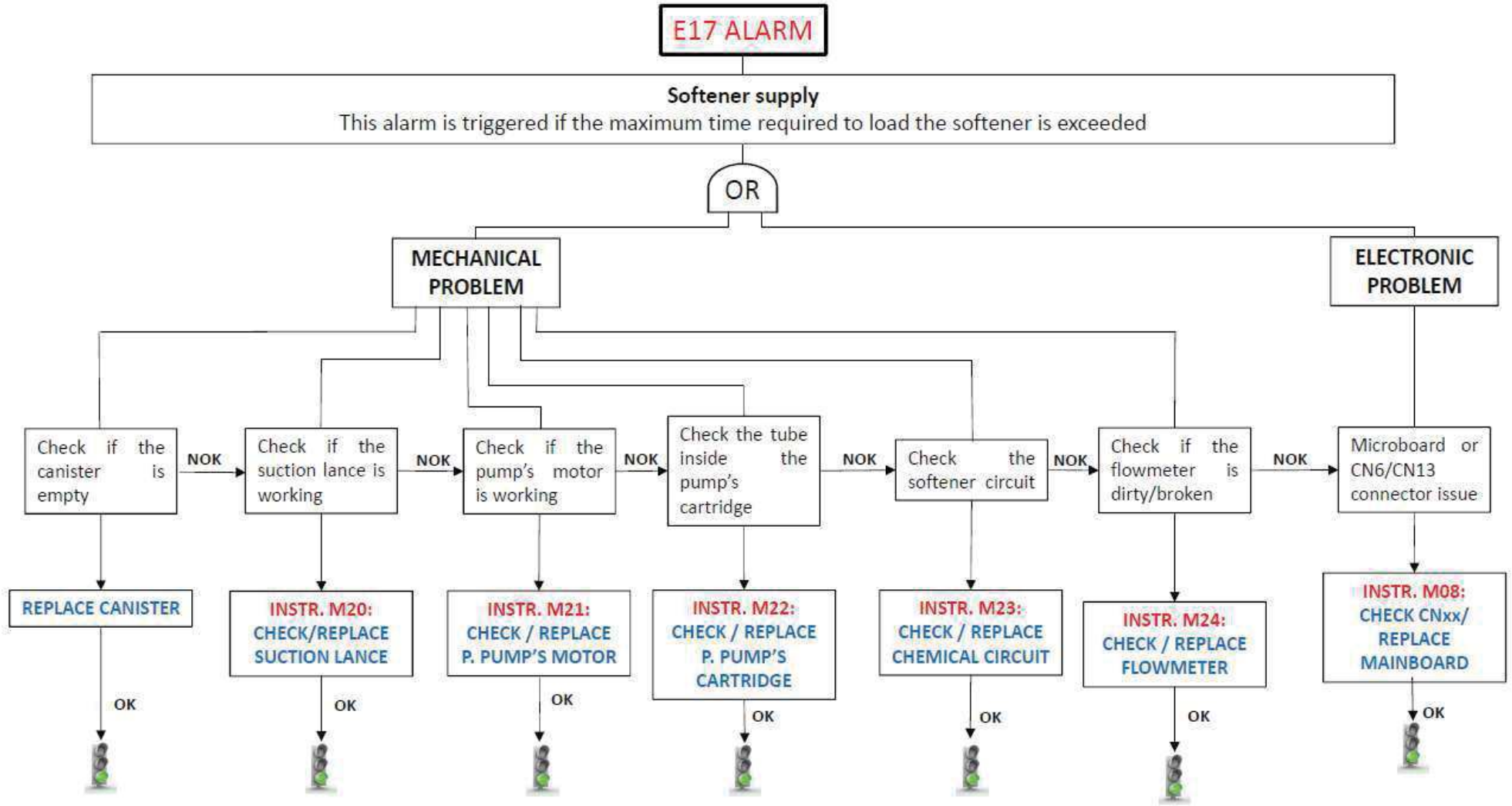

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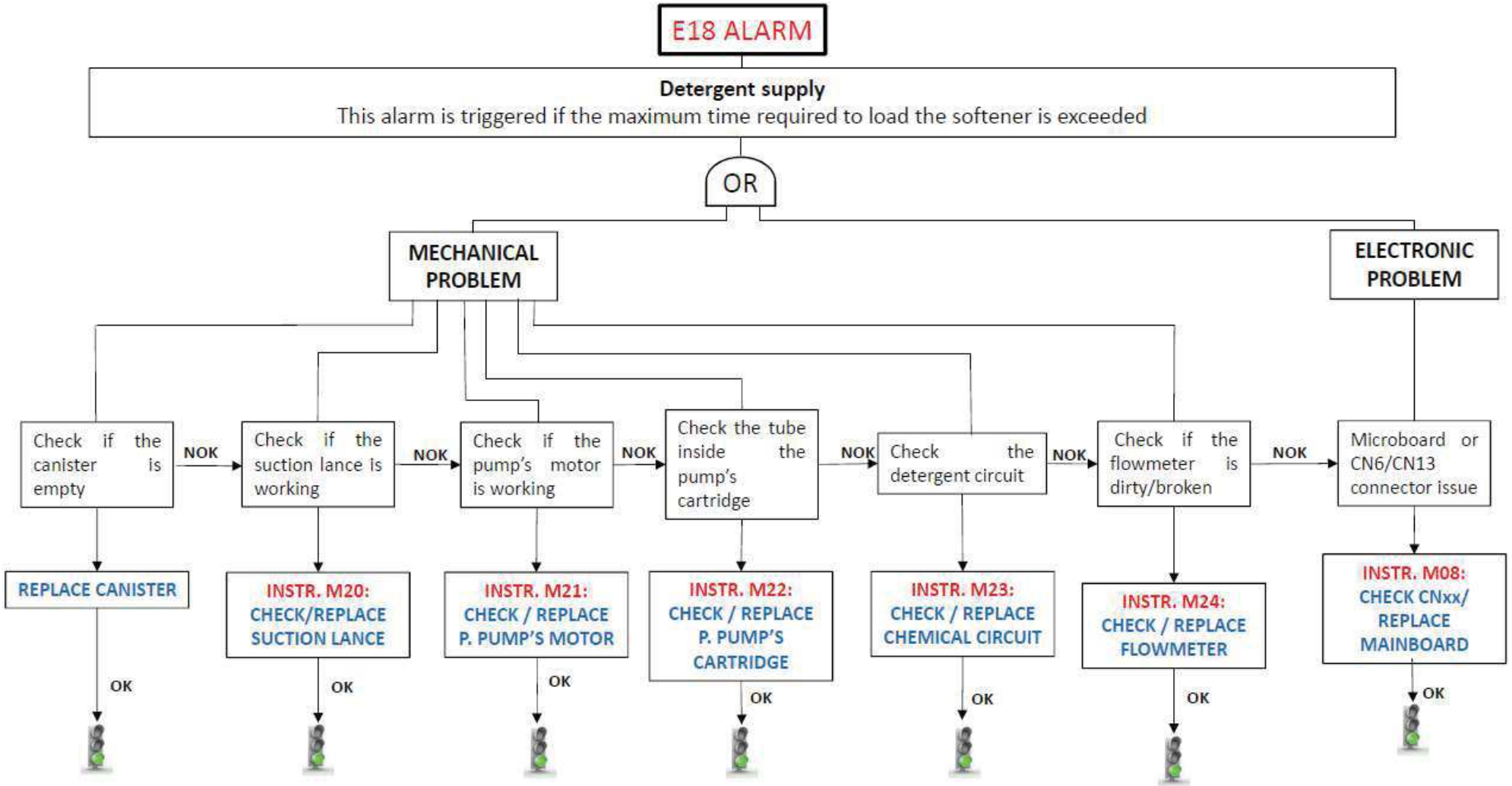

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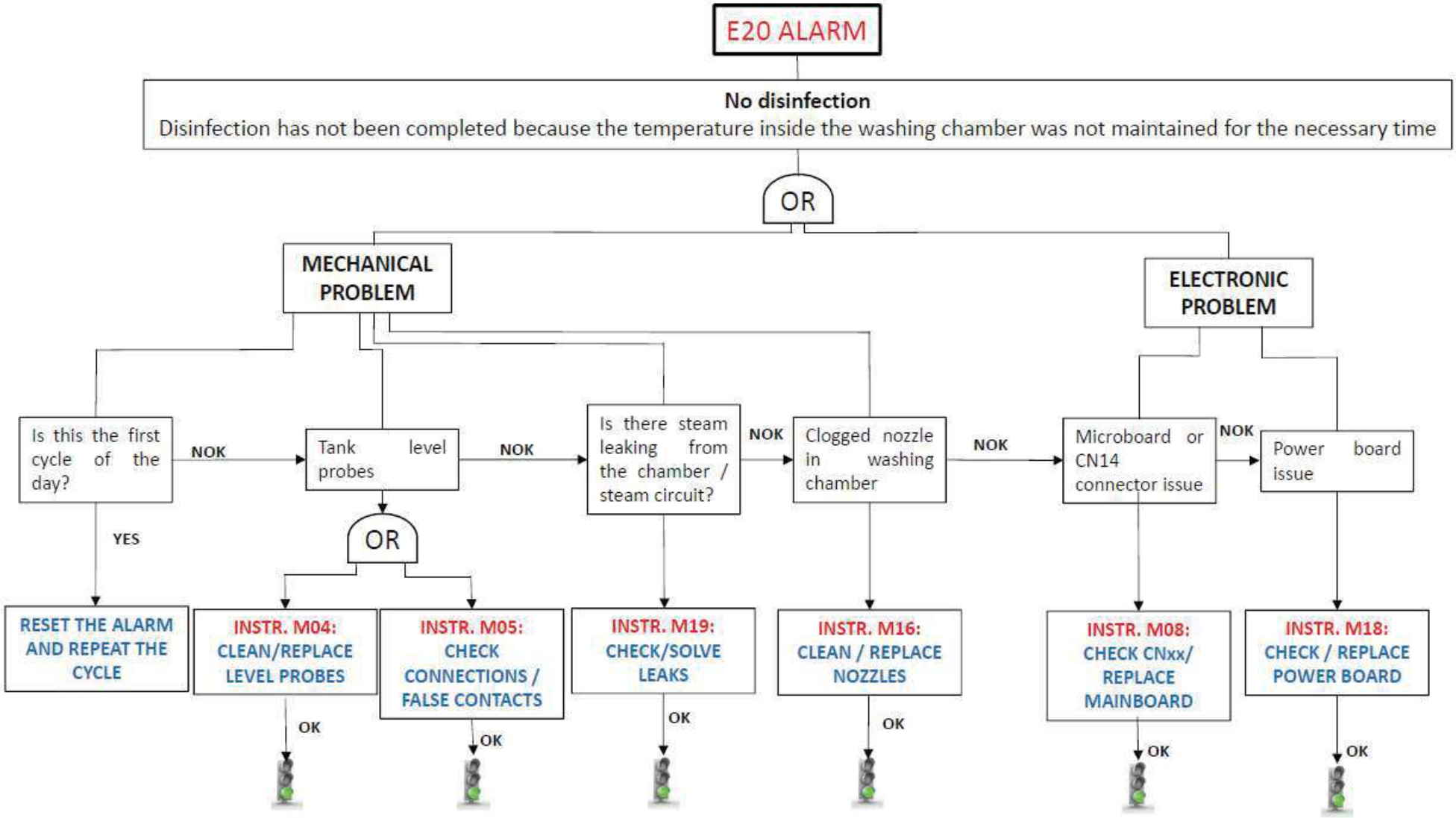

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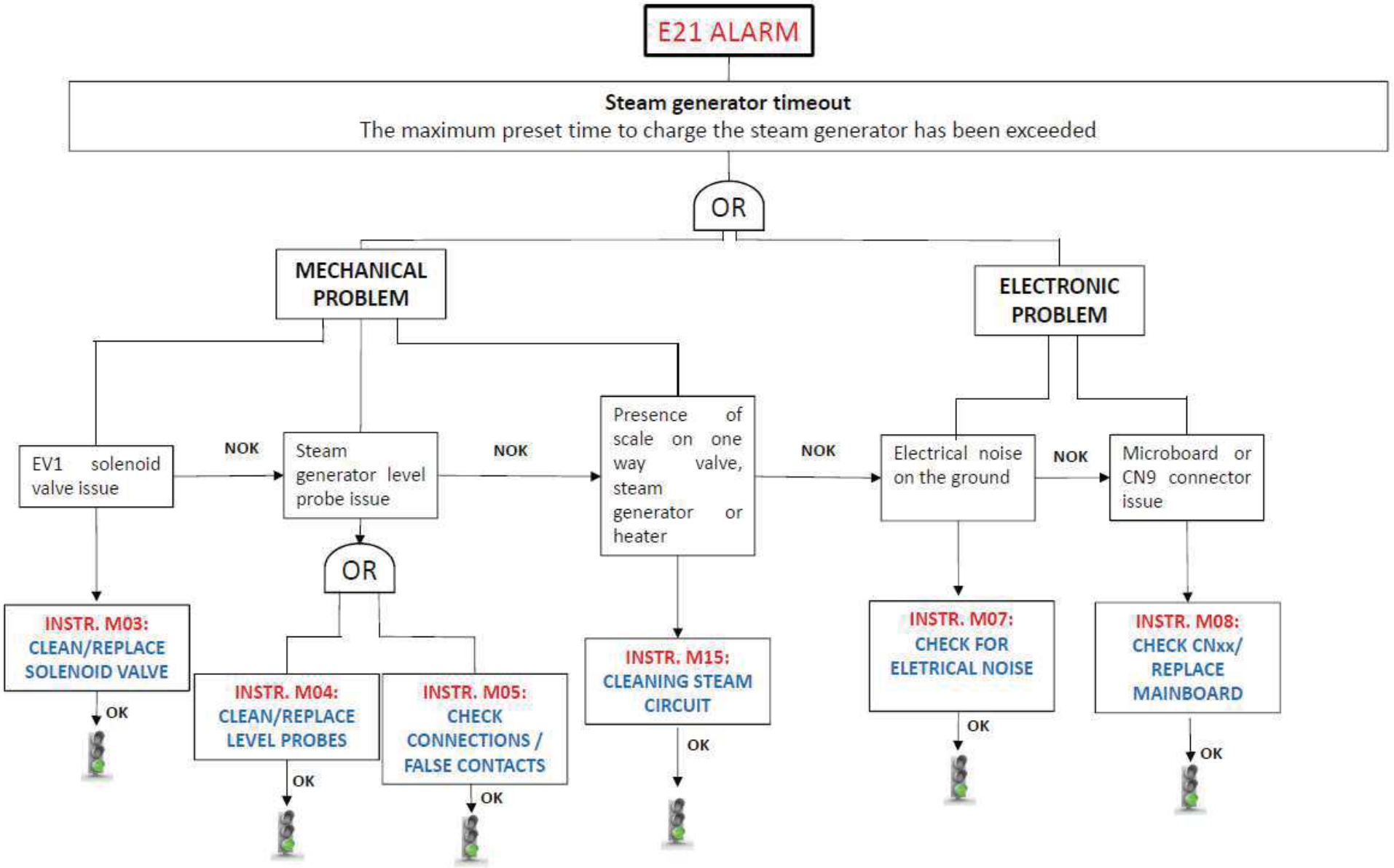

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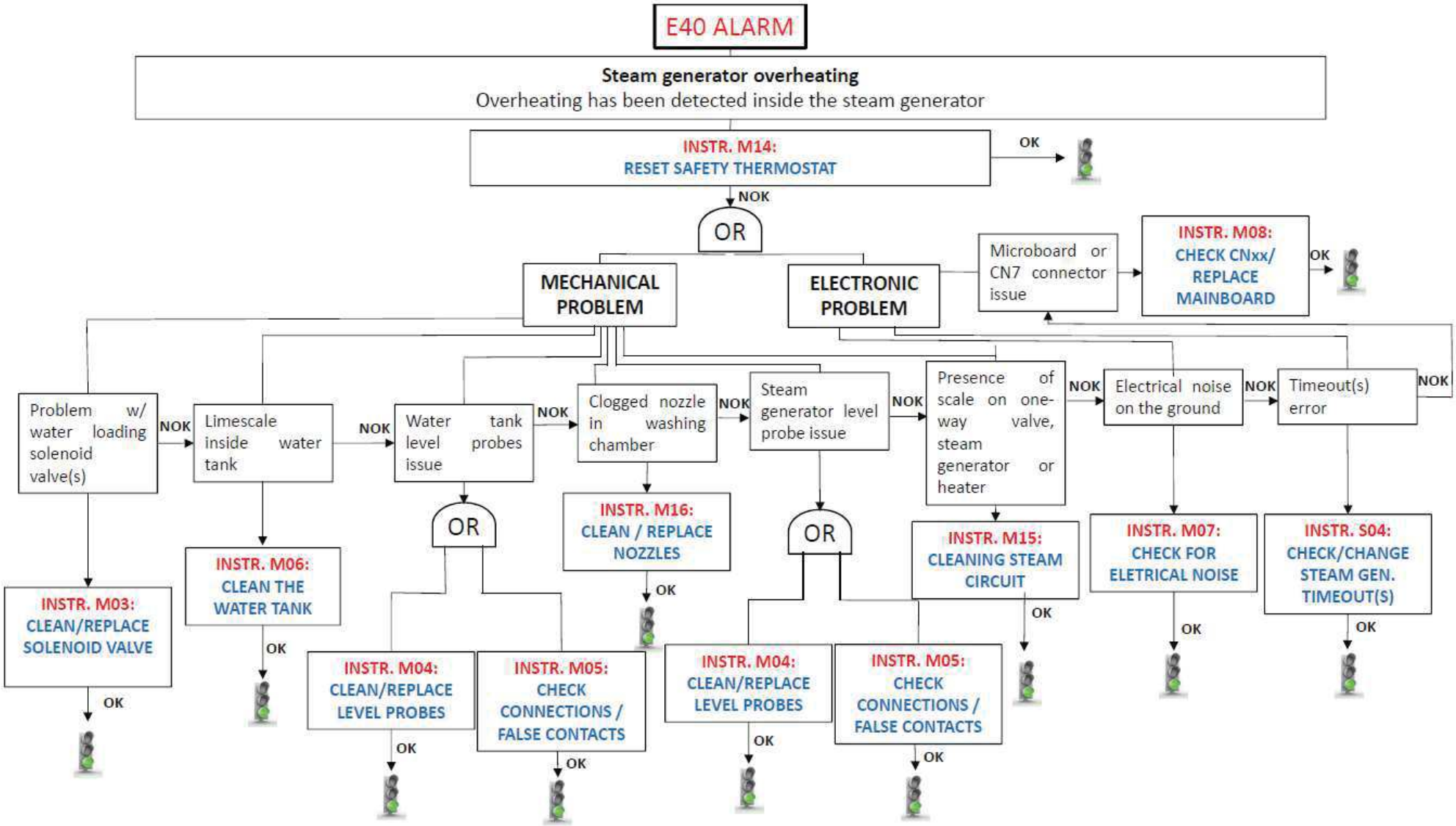

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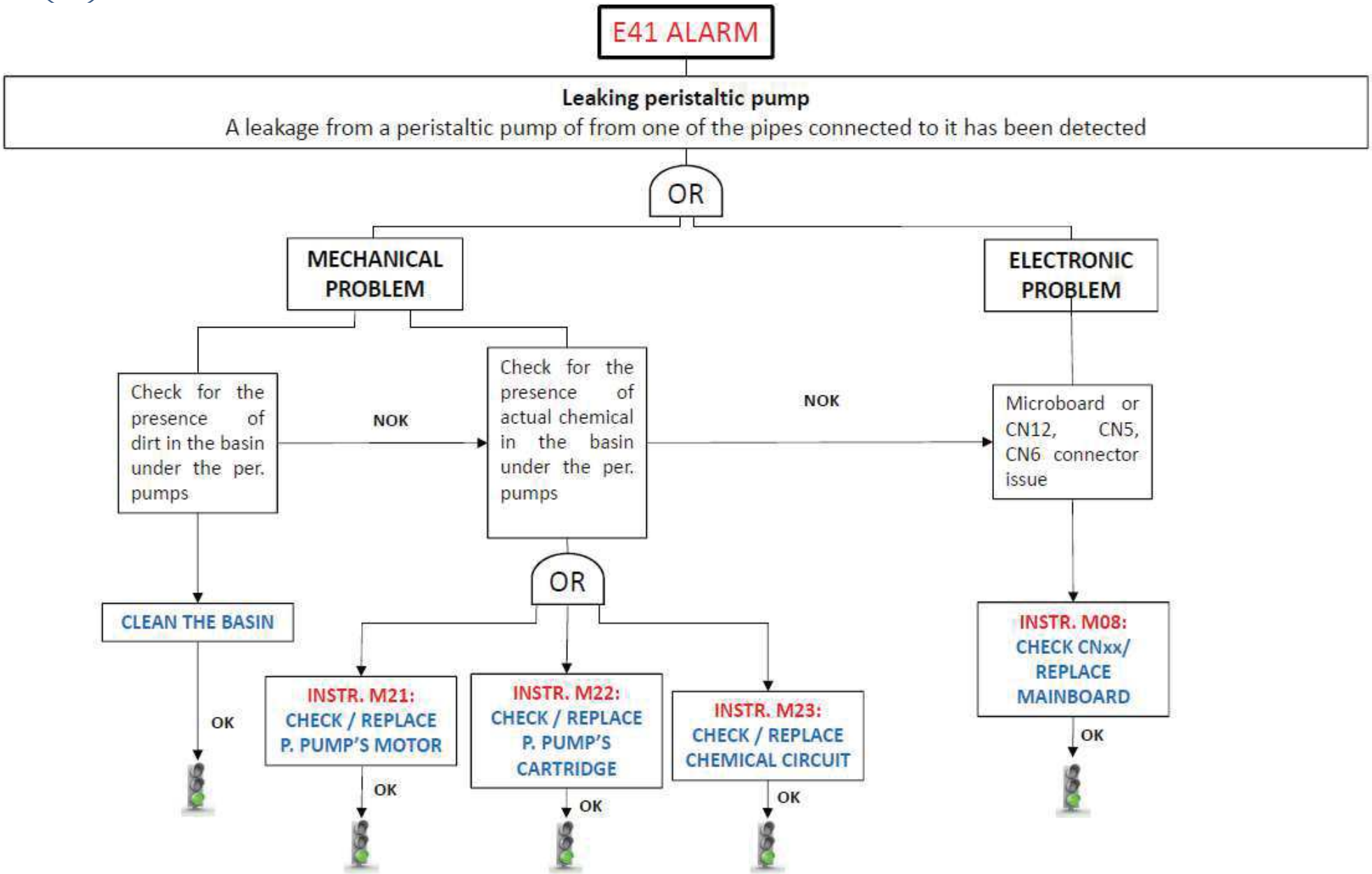
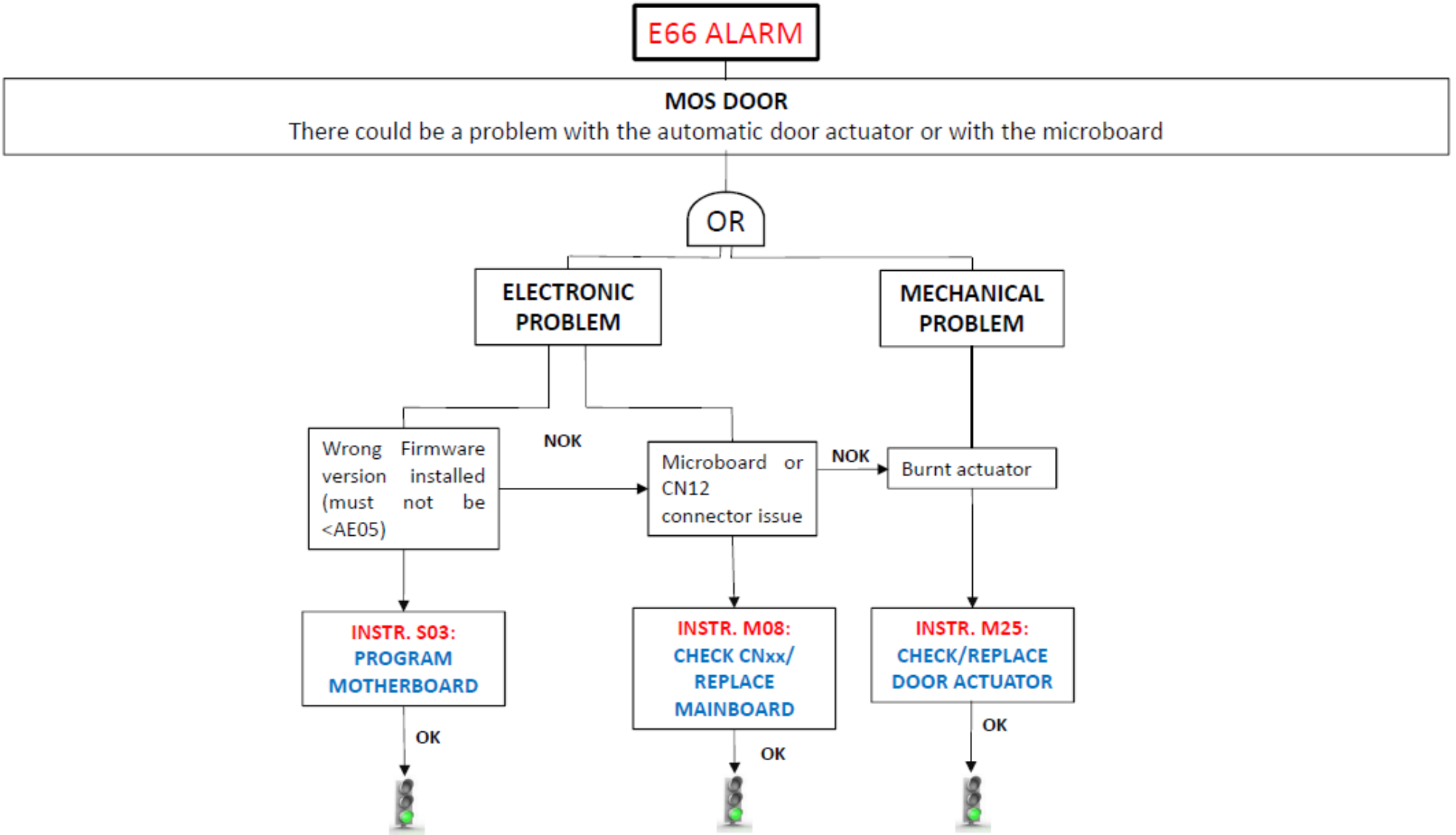

E41 ALARM
Leaking peristaltic pump
A leakage from a peristaltic pump of from one of the pipes connected to it has been detected
OR
MECHANICAL PROBLEM
ELECTRONIC PROBLEM
Check for the presence of dirt in the basin under the per. pumps
NOK
Check for the presence of actual chemical in the basin under the per. pumps
NOK
Microboard or CN12, CN5, CN6 connector issue
CLEAN THE BASIN
OK
OR
INSTR. M21: CHECK / REPLACE P. PUMP'S MOTOR
OK
INSTR. M22: CHECK / REPLACE P. PUMP'S CARTRIDGE
OK
INSTR. M23: CHECK / REPLACE CHEMICAL CIRCUIT
OK
INSTR. M08: CHECK CNxx/ REPLACE MAINBOARD
OK



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INSTRUCTION M01: DEMINERALIZED WATER

If water in the net is demineralized, the level probes will not be able to detect its presence.

To overcome this issue, please glue a coin or a screw or any metallic part to the bottom of the water tank. Please leave time for the glue to dry, in order to not drain the metallic component.

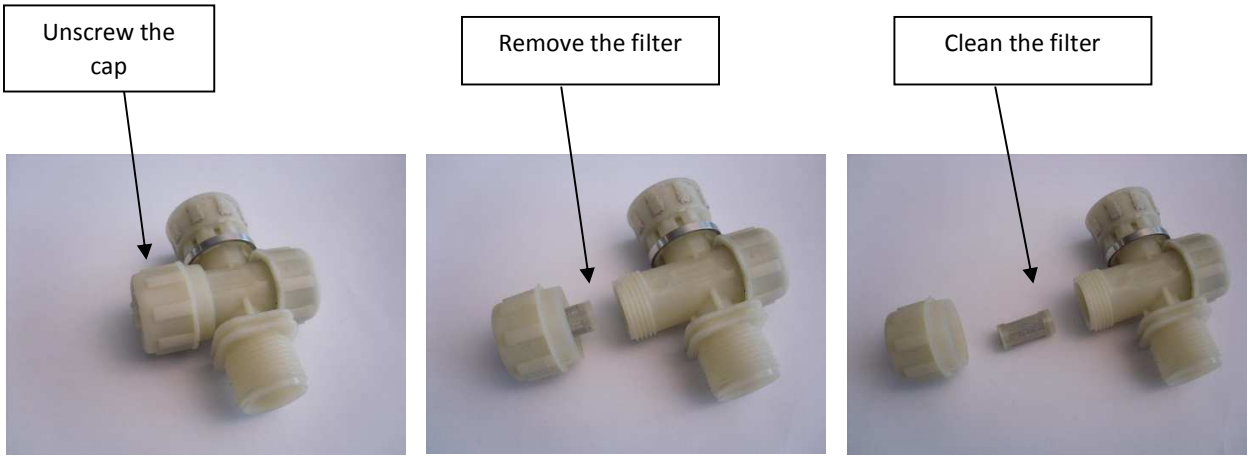
INSTRUCTION M02: FILTERS CLEANING (ACTION 77)

Cut the power of the machine off.

Close the water supply to the machine.

Open the lower compartment of the machine, inserting the plastic key into the lock on the bottom panel.

Reach the filters and unscrew the caps (see the relevant picture).



Extract the cylindrical filter inside the cap, clean it thoroughly (possibly using compressed air).

Clean the filter housing.

Place the cylindrical filter back in its housing, taking care to insert the closed side facing the cap (the open side should enable the steel rod to fit inside the filter).

Screw the cap on the housing and repeat for the other filter.

Place the bottom panel in its seat.

Open the taps supplying water to the machine and restore power.

If this is not enough, replace the filter **(ACTION 107)**

INSTRUCTION M03: CLEAN/REPLACE SOLENOID VALVE (ACTION 10 / 77)

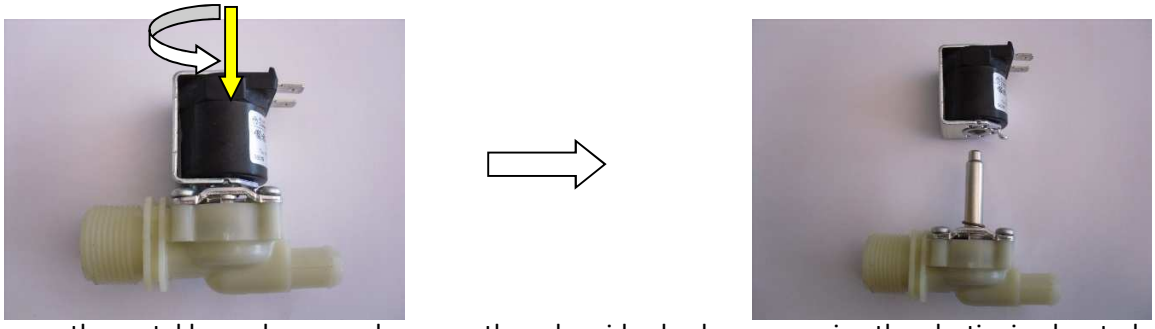
Cut the power of the machine off.

	**CAUTION! After switching off the device, wait 1 hour for the hot parts to cool down before working inside the machine.**

Close the water supply to the machine.

Check if the electrical connections are OK (no rust, no dirt, firmly inserted).

Press on the solenoid coil and rotate to release it from its support; remove it from the solenoid valve.



Loosen the metal hose clamps and remove the solenoid valve by unscrewing the plastic ring located on it.

Remove the solenoid valve, the 4 screws and metal mushroom paying attention to the pieces housed in the central cylinder; remove the rubber seal and clean it using compressed air.

Place the pieces in their seat and tighten the 4 screws all the way down (warning: mount the metal plate positioning the slot facing the seal holder).

Attach the solenoid valve to the plastic distributor.

Insert the lower pipe and pull the metal clamp.

Insert the spring and the coil on the central pin and, by pushing, rotate the coil to lock. Restore the electrical connections of the coil.

Restore power and water supply.

If this is not enough, replace the valve **(ACTION 10)**

INSTRUCTION M04: LEVEL PROBES CLEANING

PART 1: TANK LEVEL PROBES (ACTION 72)

Cut the power of the machine off.

Remove the upper panel of the device, using the provided key.

Disconnect the connector from the probes

Extract the probes from the water tank.

Clean the steel rods, possibly using softener liquid and being careful not to scratch them.

Reinsert the probes in their housing; restore the power to the device.

If this is not enough, replace the probes **(ACTION 42)**

PART 2: STEAM GENERATOR LEVEL PROBE

Cut the power of the machine off.

CAUTION! After switching off the device, wait 1 hour for the hot parts to cool down before working inside the machine.

Remove the lower panel of the device, using the provided key.

Disconnect the connector from the probe

Extract the probes from the steam generator, unscrewing it.

Clean the steel rods, possibly using softener liquid and being careful not to scratch them.

Reinsert the probe in its housing; restore the power to the device.

If this is not enough, replace the probe **(ACTION 41)**

INSTRUCTION M05: LEVEL PROBES' CONNECTIONS CHECKING

PART 1: TANK LEVEL PROBES

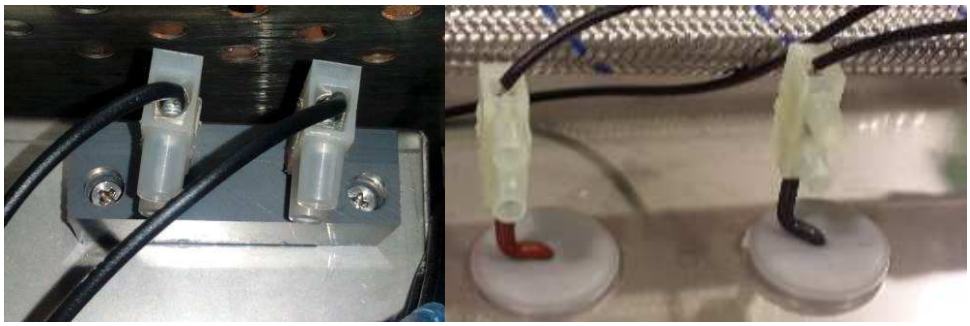
Cut the power of the machine off.

Remove the upper panel of the device, using the provided key.

Check if the connections are firm and in place, otherwise tighten them.

Check for any false contacts on the probes (using a multimeter, check if there's continuity between the probes and the chassis of the device)

Check for rust or dirt on the connections of the level probes



Disconnect the connectors (please be careful remembering the way they're connected to the probes) and check the conditions of the probes themselves.

Clean the last part of the probes and the connectors themselves.

Put everything back in place and restart the device.

PART 2: STEAM GENERATOR LEVEL PROBE

Cut the power of the machine off.

CAUTION! After switching off the device, wait 1 hour for the hot parts to cool down before working inside the machine.

Remove the lower panel of the device, using the provided key.

Disconnect the connector from the probe

Extract the probes from the steam generator, unscrewing it.

Clean the last part of the probes and the connectors themselves.

Put everything back in place and restart the device.

INSTRUCTION M06: CLEAN THE WATER TANK

Cut the power of the machine off.

Remove the upper panel of the device.

If the tank is encrusted with scale, remove it mechanically and finish using some softener. Please check the inlet manifolds that let water enter the tank, too.

It may be needed to increase the quantity of water softener, please refer to **INSTRUCTION S02: INCREASE SOFTENER**

INSTRUCTION M07: CHECK FOR ELECTRICAL NOISE

Using a multimeter, check that the tension is as follows:

- Phase – Phase: as stated;
- Phase – neutral= 0;
- Neutral – ground =0.

If this is not the case, a filter must be installed.

INSTRUCTION M08: CHECK CNxx CONNECTOR/REPLACE MAINBOARD

Check if connector CNxx is well inserted in the mainboard, if there's dirt and if the cables are OK (check continuity using a multimeter).

If all of the above is OK, the mainboard must be replaced **(ACTION 35)**.

Please proceed as follows:

1. Unplug every connector from the board to be replaced.
2. Remove the board to be replaced, paying attention not to break the plastic spacers on which the board is placed.
3. Place the new microboard on the spacers and plug the connectors in the correct position (the name on the connectors must match the name placed on the board's slots)
4. Place any additional module you may have bought. First place the plastic pins on the dedicated slots and then the module itself, matching the plastic pins with the slots on the module and the module's connector with the slot on the board itself

To program the mainboard, please refer to **INSTRUCTION S03: PROGRAM A NEW MAINBOARD**

INSTRUCTION M09: CHECK OBSTACLES ON DOOR PATH

Check for the presence of any obstacles on the door path and its gears that may prevent smooth door movement.

Check if the gasket is well inserted on its seat and if its conditions are good.

INSTRUCTION M10: CHECK SENSOR/ACTUATOR

Check if connector Xyy of the component is well inserted, if the faston/mate'n'lock are in good shape, if there's dirt/rust on the connection and if the cables are OK (check continuity using a multimeter).

Check if the signal read by the sensor is as it should:

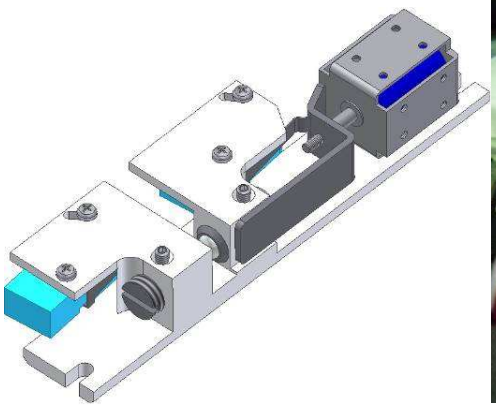
X3 microswitch: contact closed when the sensor is pressed

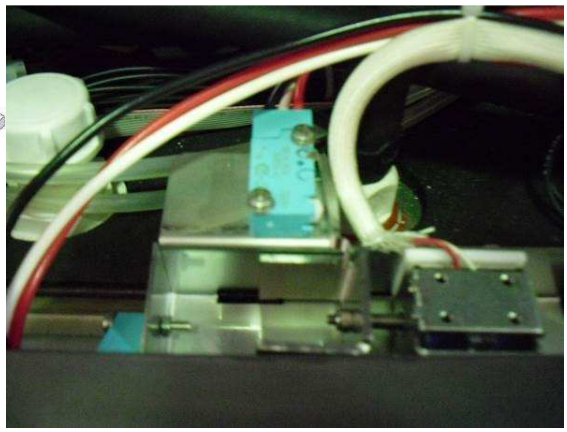
X7 microswitch: contact closed when the sensor is pressed

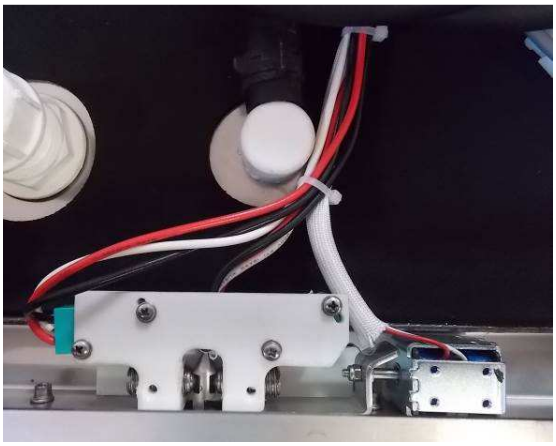
If the component is damaged, substitute it.

INSTRUCTION M11: CHECK DOOR LOCK SYSTEM ALIGNMENT

The door locking system has to be aligned so that the pin of the door does not interfere with the solenoid magnet in any way.

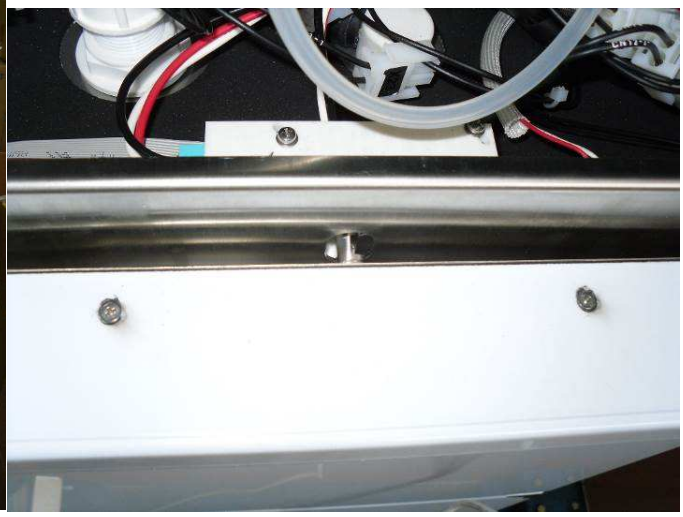






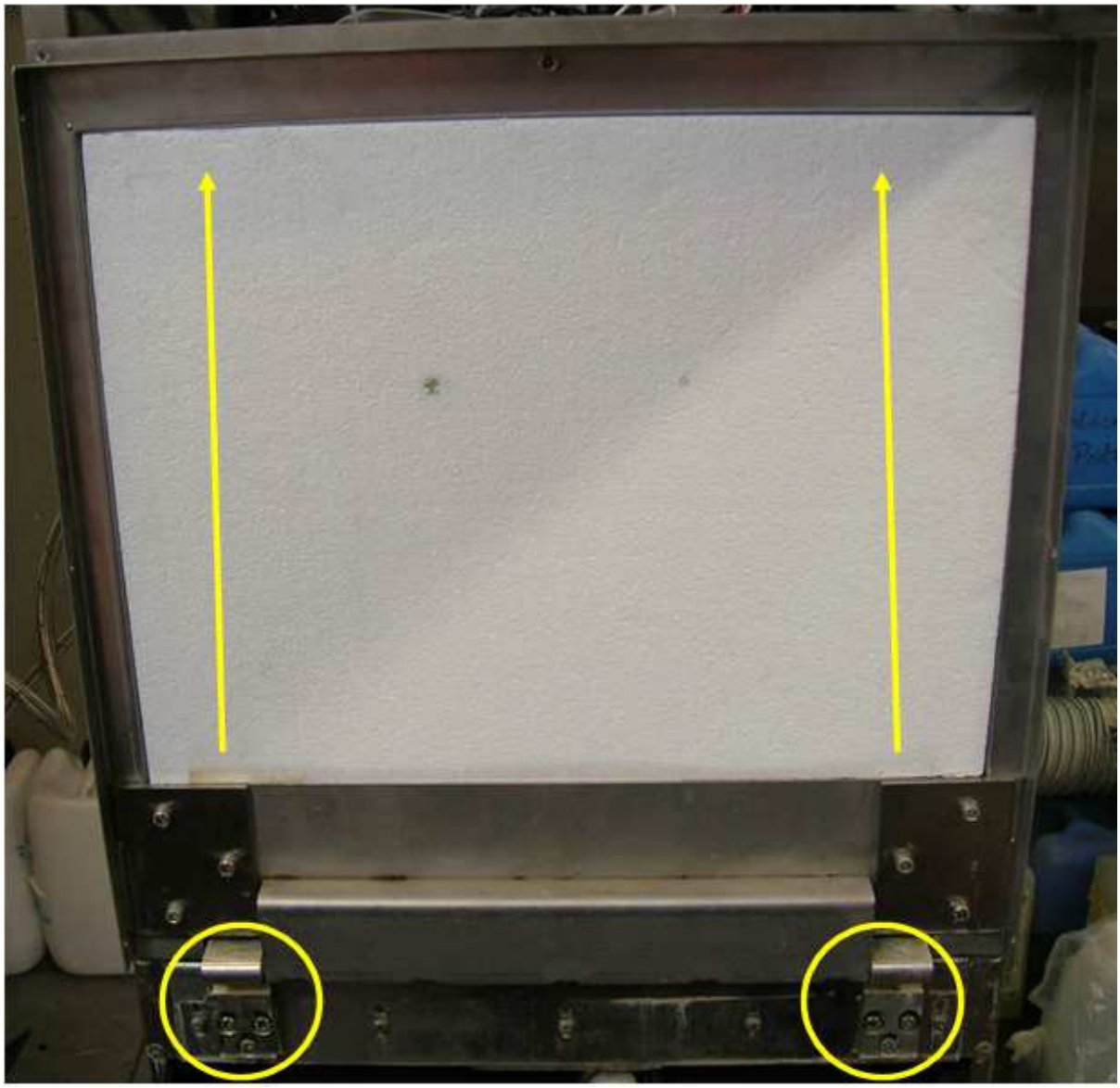
INSTRUCTION M12: CHECK DOOR CLOSING DURING DISINFECTION

The pressure of steam/water might be high enough to push on the door and block the solenoid magnet, not allowing it to unlock the pin of the door. If that's the case, the door locking system must be adjusted accordingly. On AF2.45/75 and AF2.45S/686 models, the screws inside the two sphered must be tightened, too.



INSTRUCTION M13: CHECK DOOR ALIGNMENT

Check if the door is hard when closing it. This might be caused by the wrong adjustment of the door, causing friction between the door and the lower gasket. This problem can be solved lifting the door a little higher. To do this, unscrew the lower hinges, move the door a little higher and tighten the hinges again.



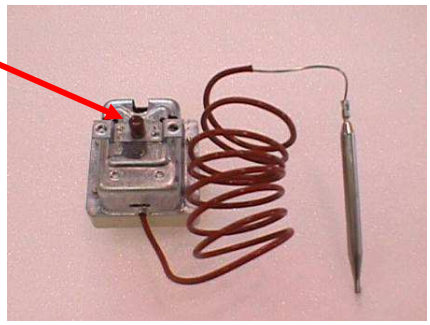
INSTRUCTION M14: RESET SAFETY THERMOSTAT (ACTION 65)

Cut the power of the machine off.

Remove the lower panel of the device.

The button to reset the thermostat will be found next to the ON/OFF switch of the device.

Push the button hard (helping yourself with a screwdriver) until a “click” sound is heard.



The thermostat is now reset. Please keep in mind that this component might need replacement **(ACTION 51)** after being triggered some times.

INSTRUCTION M15: CLEANING STEAM CIRCUIT

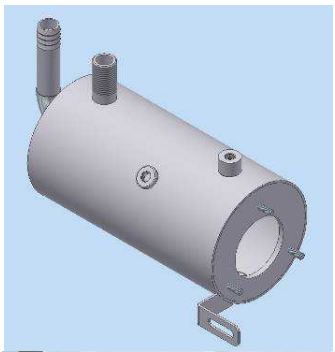
Check if the heater is covered in limescale. If that's the case, leave it for some time in a solution of water+softener and rinse it thoroughly **(ACTION 73)**.

If the scale is too much and/or the heater is damaged, replace it **(ACTION 31)**.

Follow instructions **M04 PART 2**

Check if the steam generator is covered in limescale and if the steam outlet is free. If that's the case, leave it for some time in a solution of water+softener and rinse it thoroughly **(ACTION 76)**.

If the scale is too much and/or the steam generator is damaged, replace it (**ACTION 12)**.



Check if the nozzles inside the washing chamber are covered in limescale. If that's the case, leave them for some time in a solution of water+softener and rinse thoroughly **(ACTION 75-76)**.

If the scale is too much and/or the nozzles are damaged, replace them **(ACTION 13-104)**.

Check if the one way valve is covered in limescale. If that's the case, leave it for some time in a solution of water+softener and rinse thoroughly **(ACTION 61)**.

If the scale is too much and/or the valve is damaged, replace it.

For all the above operations, it may also be needed to increase the quantity of water softener, please refer to **INSTRUCTION S02: INCREASE SOFTENER**

INSTRUCTION M16: CLEANING CHAMBER NOZZLES

Check if the nozzles inside the washing chamber are covered in limescale. If that's the case, leave them for some time in a solution of water+softener and rinse thoroughly **(ACTION 75-76)**.

If the scale is too much and/or the nozzles are damaged, replace them **(ACTION 13-104)**.

INSTR. M17: CHECK/REPLACE PUMP

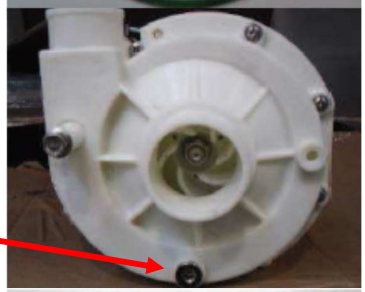
Check if the pump is working as expected.

If that's not the case, please check:

- the electrical connection on the pump and the integrity of the flat cable connecting the powerboard and the mainboard is OK.
- the capacitor capacity: replace it if broken.

- If the pump is free to rotate, using a screwdriver on the central pin **(ACTION 62)**. If it is not, that means the pump is covered in lamescale or some components are broken

- the condition of the impeller: clean or replace it as you see fit.
- the condition of the pump's gasket



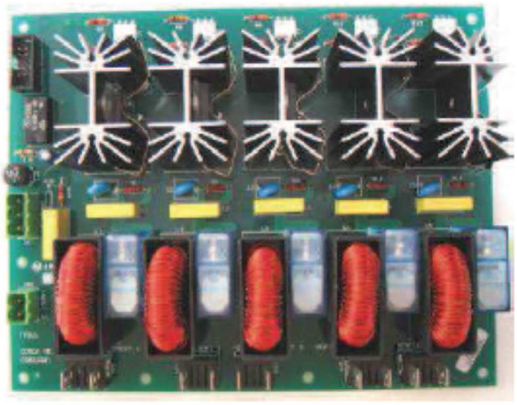
- the condition of the pump's shell
- the sealing of the water emptying outlet

- the condition of the pump's stuffing box.

If all the above is OK, please check the integrity of the power board (M18) and, if that's OK, too, replace the pump **(ACTION 24)**.

INSTR. M18: CHECK/REPLACE POWER BOARD

Start a cycle on the bedpan washer and check if, when the pump should be working, the cable are supplied with the correct tension.



Do the same for the heater cable (when they should be active).

If one of these two tests fails, replace the power board.

INSTR. M19: CHECK/SOLVE LEAKS

WATER LEAK

Start a cycle without any goods to be washed. When water runs inside the device, check visually and using a piece of paper (see if any drops are absorbed) that no water is leaking. This control should be performed on the whole hydraulic circuit (filters, solenoid valves connections, pump, connectors behind the device, steam generator, edges of the washing chamber etc.). Should any part need replacing, please proceed.

STEAM LEAK

Start a cycle without any goods to be washed. During disinfection check visually that no steam is leaking from the chamber or any other part of the hydraulic circuit (filters, solenoid valves connections, pump, connectors behind the device, steam generator, etc.). Should any part need replacing, please proceed.

INSTR. M20: CHECK / REPLACE SUCTION LANCE

Start a cycle. Check if the suction lance is inserted properly inside the canister.

Check if the silicon hose is not letting air in instead of liquid.

Check if the floater (the moving part of the lance) is working:

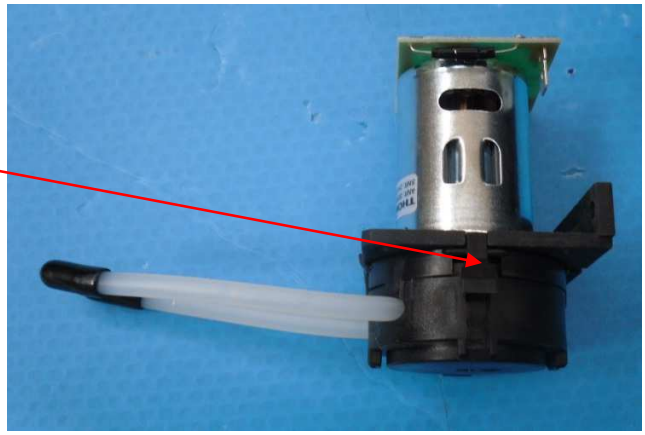
Extract the lance from the canister: a message should appear on the monitor alerting the user that the chemical is almost finished.

Hold up the floater and the message should disappear.

If this does not happen, replace the suction lance **(ACTION 16 (SOFTENER) / ACTION 17 (DETERGENT))**.

INSTR. M21: CHECK / REPLACE PERISTALTIC PUMP'S MOTOR

Start a cycle. Check if the peristaltic pump motor is operating properly: the pin should rotate.

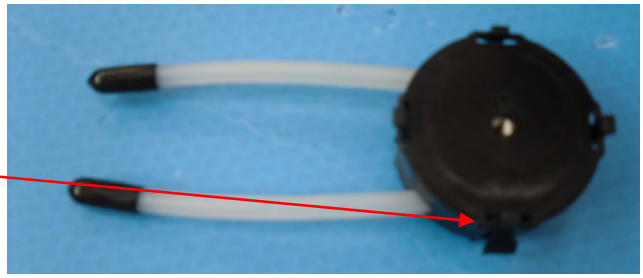


If this is not the case, replace the pump's motor **(ACTION25 (SOFTENER) / ACTION 26 (DETERGENT))**.

INSTR. M22: CHECK / REPLACE PERISTALTIC PUMP'S CARTRIDGE

Start a cycle. Check if the peristaltic pump motor is operating properly: the pin should rotate.

If the pin is rotate as it should but no liquid is flowing after the peristaltic pump, the problem might be inside the cartridge. Disassemble it from the pump, carefully acting on the wings with a flat screwdriver.



Open it and check the condition of the tube. If it is bend, try extracting it from its seat and massage it to see if the right shape can be reestablished.

If this is not possible, change the cartridge **(ACTION 85)**.

INSTR. M23: CHECK / REPLACE CHEMICAL CIRCUIT

The chemicals are stored in a compartment under the washing chamber (on its right for underbench models). A suction lance is placed inside the canister and it's connected to a peristaltic pump by a silicon hose. The peristaltic pump draws the chemical from the canister, calculates the quantity of chemical and pushes it towards a flowmeter via another silicon hose. The flowmeter double checks the quantity read by the peristaltic pump and the chemical drawn is let inside the water tank via the last silicon hose.

The silicon hoses must be checked for holes/bends/pinches/crystallized chemical. If a silicon hose is perforated, please replace it. If it is bent/pinched, try massaging it to regain a circular shape. If that's not possible, replace it.

If the chemical is crystallized inside the hose, the whole circuit must be replaced using 5x8mm silicon hose 506180052.

INSTR. M24: CHECK / REPLACE CHEMICAL FLOWMETER

The flowmeter can be opened turning the top part counterclockwise with respect to the lower part. Check if there's any crystallized liquid inside the flowmeter and try cleaning it if that's the case.

Check if the rotating element inside of it is free to rotate.

Replace the flowmeter if that's not the case.

INSTR. M25: CHECK / REPLACE DOOR ACTUATOR

Remove the lateral small panel on the left side of the device and open the lower panel

Remove the red highlighted screw

Remove the actuator from the brassk block unscrewing the yellow highlighted screw

Install the new actuator following these instructions in the reverse order: fix one end to the brass block and then fix the body of the actuator.

Keep the door slightly open during these operations

INSTRUCTION S01: INCREASE TANK FILLING TIMEOUT

WINATOSMONITOR

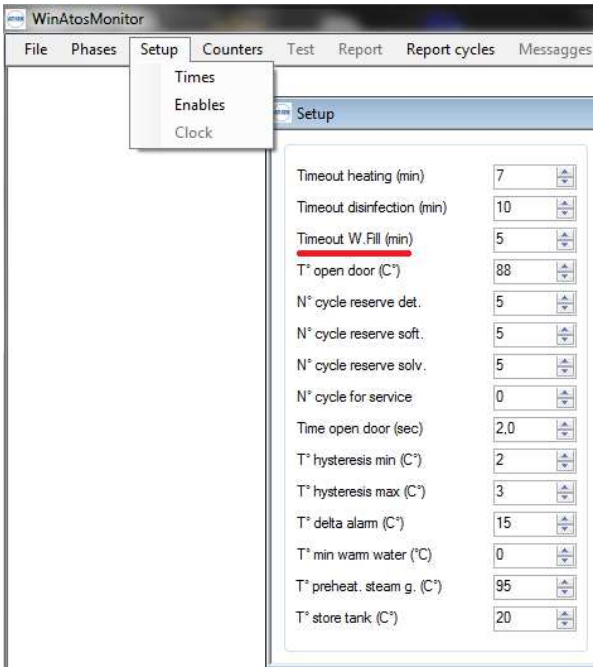
Connect to the device using a USB cable

Open “WinAtosMonitor” software.

Click on “File”→”Connect”

Click on “Setup”→”Times”

Augment the time of 20% and try again



AT-OS APP AF2

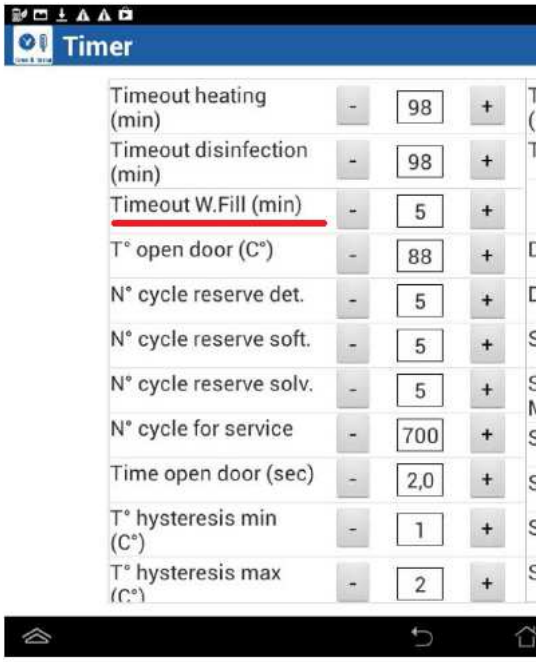
Enable Bluetooth connectivity

Open “AT-OS APP AF2”

Connect to the device

Click on “Settings”→”Time and Temp”

Augment the time of 20% and try again



INSTRUCTION S02: INCREASE TANK FILLING TIMEOUT

WINATOSMONITOR

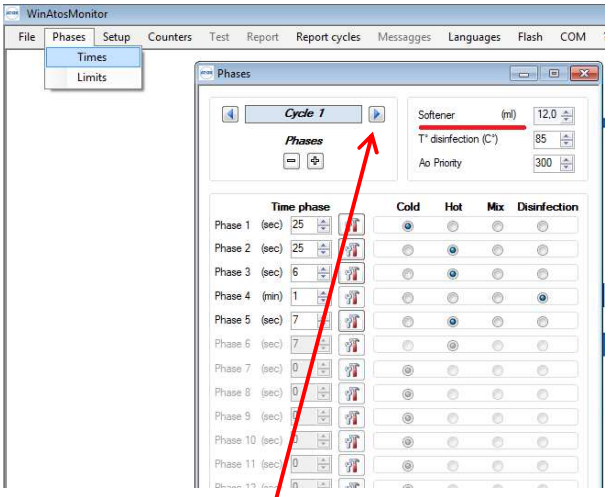
Connect to the device using a USB cable

Open “WinAtosMonitor” software.

Click on “File”→”Connect”

Click on “Phases”→”Times”

Augment the quantity of 20%



Repeat for every cycle

AT-OS APP AF2

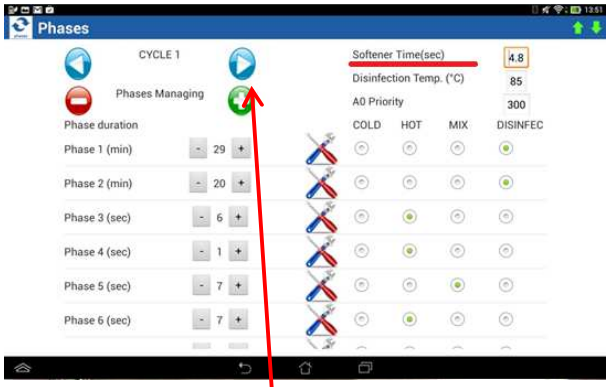
Enable Bluetooth connectivity

Open “AT-OS APP AF2”

Connect to the device

Click on “Phases”→”Time and Temp”

Augment the time of 20%



Repeat for every cycle

INSTRUCTION S03: PROGRAM A NEW MOTHERBOARD

WINATOSMONITOR

Connect to the device using a USB cable

Open “WinAtosMonitor” software.

Click on “Flash”

Another window will open.

Click on “File”→”Open”

Load the correct firmware file (.mhx extension)

Click on the green “START” button

Wait for the confirmation. Close the flash window.

On WinAtosMonitor, click on “File”→”Write”

Wait for the writing phase to end, then click on

“File”→”Write Default”

The new mainboard is now programmed and ready.

AT-OS APP AF2

Enable Bluetooth connectivity

Open “AT-OS APP AF2”

Connect to the device

Click on “Upload”→”Firmware”

Choose the right file to upload.

Go back and click on “Upload”→”Dataset”

Choose the right file to upload.

The new mainboard is now programmed and ready.

INSTRUCTION S04: CHECK/CHANGE STEAM GENERATOR TIMEOUT(S)

WINATOSMONITOR	AT-OS APP AF2
Connect to the device using a USB cable	Enable Bluetooth connectivity
Open “WinAtosMonitor” software.	Open “AT-OS APP AF2”
Click on “File”→”Connect”	Connect to the device
Click on “Setup”→”Times”	Click on “Setting”→”Time &Temp”
Check that “Timeout heating”=7 and	Check that “Timeout heating”=7 and
“Timeout disinfection”=10 or set these values accordingly.	“Timeout disinfection”=10 or set these values accordingly.
Run 2 cycles for test to check these settings comply with the installation.	Run 2 cycles for test to check these settings comply with the installation.

INSTRUCTION S05: CHECK/CHANGE “MACHINE TYPE” PARAMETER

WINATOSMONITOR	AT-OS APP AF2
Connect to the device using a USB cable	Enable Bluetooth connectivity
Open “WinAtosMonitor” software.	Open “AT-OS APP AF2”
Click on “File”→”Connect”	Connect to the device
Click on “Setup”→”Enables”	Click on “Setting”→”Enable”
Check that “Machine Type” on top right corner of the window is the right one or change it.	Check that “Machine Type” on top of the window is the right one or change it.