

Uponor Clean 1 - fault codes E040-E045: how it works, diagnosis and repair

Updated 27 October 2026

Fault codes E040-E045 mean that the control unit does not detect current in the sensing circuit of one of its outputs. The unit may still work normally. This guide first explains how control and sensing work, then how to find the fault and finally how to repair it. The example used throughout is E044, the pump-in valve MV4.

The parts for the other outputs are listed in the [channel table](#).

How valve control and sensing work

Each valve has two separate circuits on the control board: one switches the valve on, the other checks that the valve is connected and intact. E044 comes from the sensing circuit, not from the control circuit.

Control: valve on and off. The small computer on the control board, the microcontroller, decides which valve is open at any time. Its command is a weak signal that passes through a driver to an optocoupler (TLP3063). On its other side the optocoupler fires a triac, an electronic switch that lets 230 V through to the valve coil. At the same time an indicator light on the lid comes on, for example Pump in.

Sensing: is the valve connected. When the valve is closed, the triac does not conduct. Mains voltage is then across it, and a small sensing current flows through the valve coil, four resistors (R54-R57) and a second optocoupler (A814). The resistors limit the current to about 1.5 milliamperes, so the valve does not open. The current lights a small light inside the A814, which tells the microcontroller that the coil is in place. If the coil or a wire is broken, the light stays off. The light also stays off if the triac is short-circuited, because then there is no voltage across it. In that case the valve is open all the time and the display shows E044.

Self-test: where the fault code comes from. Every time the process moves to a new phase, the control unit briefly switches off all outputs and checks the channels one at a time. This happens many times in every treatment cycle and also between each step of the test cycle. A selector switch, the multiplexer, connects each channel's A814 in turn to the same input of the microcontroller. If the light does not come on within about 30 attempts, the display shows the channel's code: compressor E040 and valves MV1-MV5 codes E041-E045. The next time the test passes, the code clears by itself.

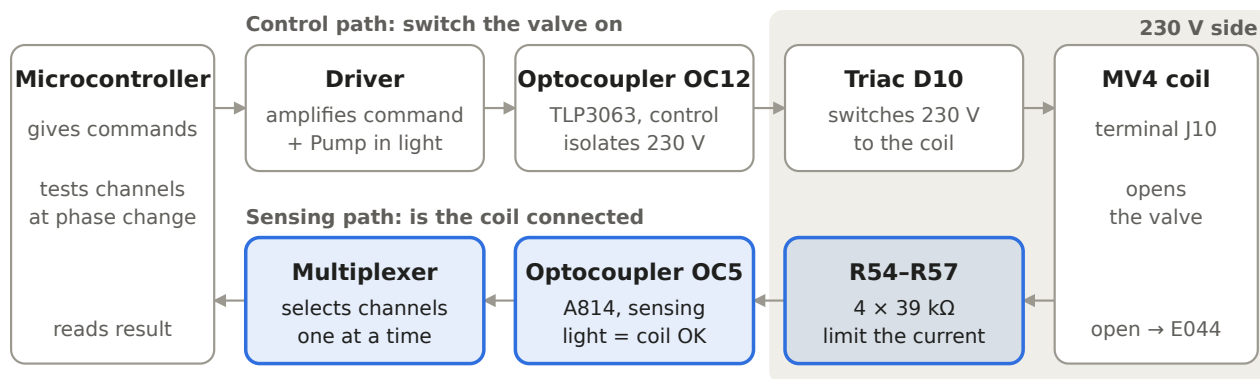
Why the valve works but E044 is shown. Control and sensing take different paths. If a sensing resistor, the optocoupler or the connection to the microcontroller is broken, the control unit thinks the valve is faulty even though it opens normally. That is why replacing the coil does not always clear the code.

The same symptom has been described several times on a Finnish discussion forum with both E044 and E045: the coil was replaced, the valve worked, but the code stayed on the display (lampopumpput.info, [page 5](#), [page 6](#)).

A Swedish forum describes an E044 case where the cause was found. The coil measured normally (about 2.5 kΩ) and the valve worked, but the resistors in the sensing chain had overheated so much that their solder joints and pads had come loose from the board (Byggahus.se). The chain resistors are warm whenever the valve is closed, and years of temperature cycling fatigue the solder joints.

The valve opens via the control path; E044 comes from the sensing path

☐ Highlighted = sensing parts where the fault is when the valve still opens



The optocouplers isolate the 230 V side (shaded) from the microcontroller low voltage.

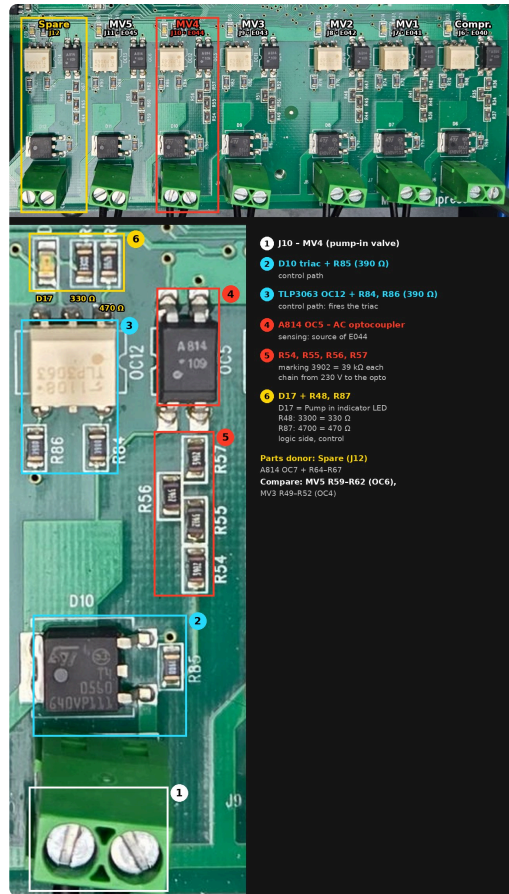
MV4 channel · control and sensing paths

The top row runs from left to right and opens the valve. The bottom row runs back and tells the microcontroller whether the coil is in place. When the valve opens but E044 is shown, the fault is in one of the highlighted parts of the bottom row.

Term	What it means
Microcontroller	The small computer on the control board (MC9508) that runs the program and makes the decisions.
Optocoupler	A part in which current lights an invisible light inside the package, and the light switches the other side. It isolates 230 V from the safe low voltage. The TLP3063 controls, the A814 senses.
Triac	An electronic switch with no moving parts. Switches 230 V to the valve.
Resistor	A part that limits current. Its value is marked with a code: 3902 = 39,000 ohms (39 kΩ).
Multiplexer	A selector switch that connects one channel at a time to the microcontroller.
Channel	The control and sensing circuit of one device on the board, for example MV4.
Pin	A leg of a part, soldered to the board. Numbered starting from the marking on the part.
Collector and emitter	The two output pins of the A814. When the light is on, current flows between them.
Spare	An unused reserve channel with the same parts as the other channels.

Parts on the board

MV4, the pump-in valve, is on connector J10, the third connector from the left. From left to right the connectors are Spare, MV5, MV4, MV3, MV2, MV1 and compressor.



MV4 channel parts: connector J10, triac D10, control optocoupler OC12, sensing optocoupler OC5, resistors R54-R57 and indicator LED D17

Number in picture	Part	What it does
1	Connector J10	Screw terminal for the valve wires
2	Triac D10, resistor R85 (390 Ω)	Switches 230 V to the coil
3	Optocoupler OC12 (TLP3063), resistors R84 and R86 (390 Ω)	Drives the triac
4	Optocoupler OC5 (A814)	Senses whether the coil is in place
5	Resistors R54-R57 (39 kΩ)	Limit the sensing current
6	Indicator LED D17, resistors R48 (330 Ω) and R87 (470 Ω)	The light shows through the Pump in window on the lid

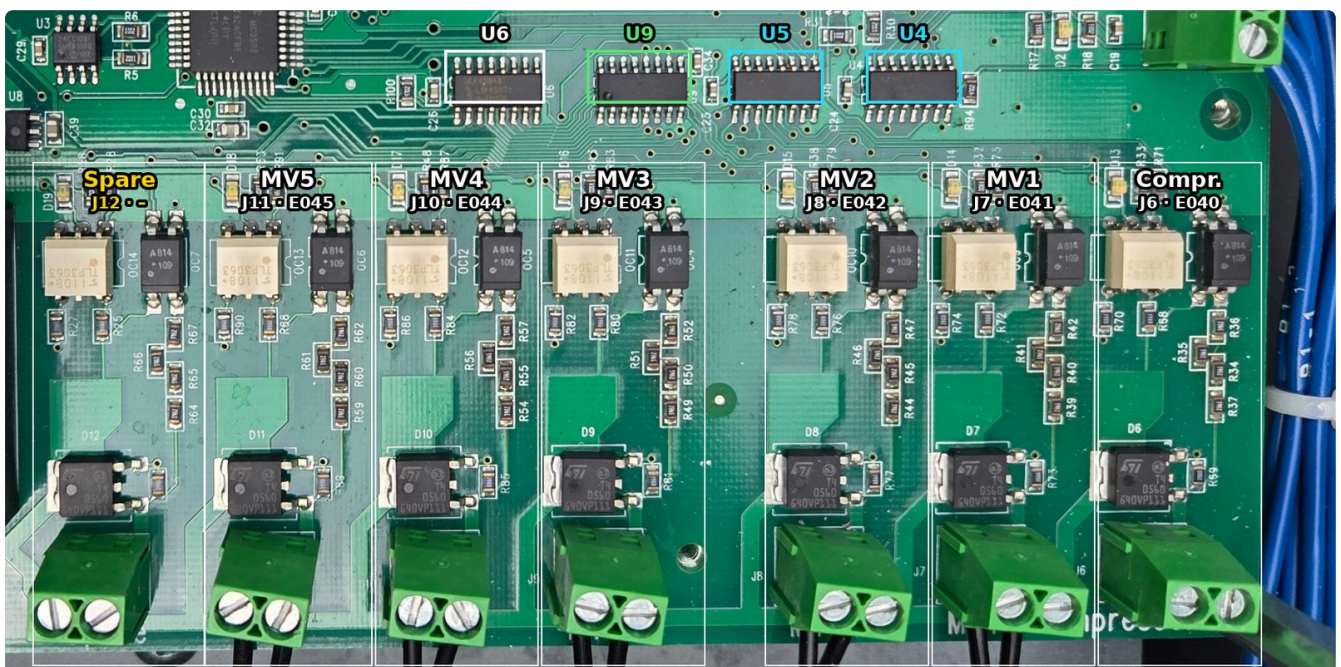
The indicator lights on the enclosure lid show what the control unit is commanding. They do not show whether current actually flowed through the valve.



Enclosure lid: the MV4 indicator is the Pump in window

Channel table

All seven outputs are built from the same parts. The examples in this guide are for MV4. If your fault code is a different one, replace the parts in the guide with the parts on the same row of the tables below and use the neighbouring channel for comparison.



All seven channels with their connectors and fault codes, plus ICs U6, U9, U5 and U4

Code	Device	Connector	Lid light	Test cycle step	Load
E040	Compressor	J6	Compressor	almost all	air pump, 55 W
E041	MV1, chemical dosing	J7	Dosing	S404-S405	coil 8 VA, 2.5-2.7 kΩ
E042	MV2, sludge return	J8	Sludge removal	S402	coil 8 VA, 2.5-2.7 kΩ
E043	MV3, pump out	J9	Pump out	S403	coil 8 VA, 2.5-2.7 kΩ
E044	MV4, pump in	J10	Pump in	S401	coil 8 VA, 2.5-2.7 kΩ
E045	MV5, aeration	J11	Aeration	S407-S408	coil 30 VA, 400-450 Ω
no code	Spare	J12	no light	not used	no load

Sensing parts

Device	Sensing opto A814	Resistor chain 4 × 39 kΩ	Multiplexer pin
Compressor	OC1	R34-R37	13
MV1	OC2	R39-R42	14
MV2	OC3	R44-R47	15
MV3	OC4	R49-R52	12
MV4	OC5	R54-R57	1
MV5	OC6	R59-R62	5
Spare	OC7	R64-R67	2

Control parts

Device	Control opto TLP3063 and 390 Ω resistors	Triac and 390 Ω resistor	Indicator LED and 330 Ω, 470 Ω resistors	U9 output pin
Compressor	OC8, R68, R70	D6, R69	D13, R33, R71	16
MV1	OC9, R72, R74	D7, R73	D14, R32, R75	15
MV2	OC10, R76, R78	D8, R77	D15, R38, R79	14
MV3	OC11, R80, R82	D9, R81	D16, R43, R83	13
MV4	OC12, R84, R86	D10, R85	D17, R48, R87	12
MV5	OC13, R88, R90	D11, R89	D18, R53, R91	11
Spare	OC14, R25, R27	D12, R26	D19, R58, R28	10

The multiplexer and U9 pins have been deduced from the firmware and the IC datasheets and have not been measured. Check them with the continuity tester before soldering. The sensing multiplexer is most likely U5, and U4 reads the sensors. The OC3 designator has been inferred from the numbering, and the designators of the MV1 and compressor indicator resistors were read from a blurry photo.

Diagnosis

Five checks will find the fault. Do them in order and stop when you find it. In step 1 the power is on; in all the others it is not.

The steps are written for MV4. If your fault code is a different one, use the parts, light and test cycle step on the same row of the channel table.

Safety. The lower part of the board carries 230 V. Only open the enclosure and measure with the plug pulled out, and wait a minute before touching the board. In the step 1 test cycle you only watch the lights and the valve; you do not touch the board.

Tools: a multimeter with resistance, diode and continuity ranges, and for step 4 a 3 V battery and a 1 kΩ resistor.

1. Does the control work

Start the test cycle by holding the Test button on the control unit for 5–10 seconds and release it when the display shows S__5. The first step, S401, lasts 20 seconds and runs pump-in.



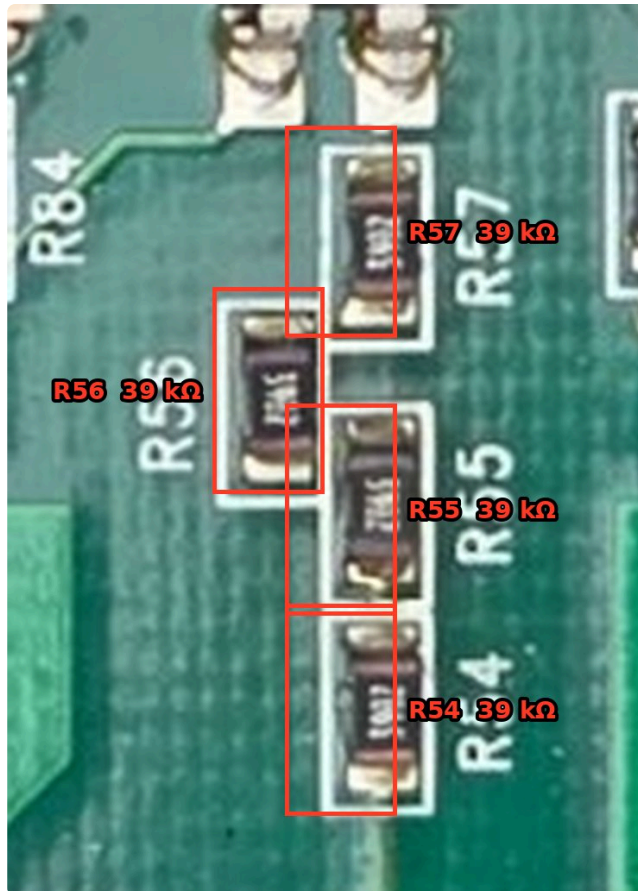
The Pump in light on the lid is on during the first step of the test cycle

- The Pump in light comes on, the valve opens (a hiss or air flow in the tank) and closes when the light goes off: the control works and the fault is in sensing. Go on to step 2.
- The light comes on but the valve does not open, or the light does not come on at all: the fault is in the control circuit. Go to [If the fault is in the control circuit](#).
- Pump-in continues even though the light has gone off: the triac is probably short-circuited, which also gives E044. Go to [If the fault is in the control circuit](#).

2. Measure resistors R54-R57

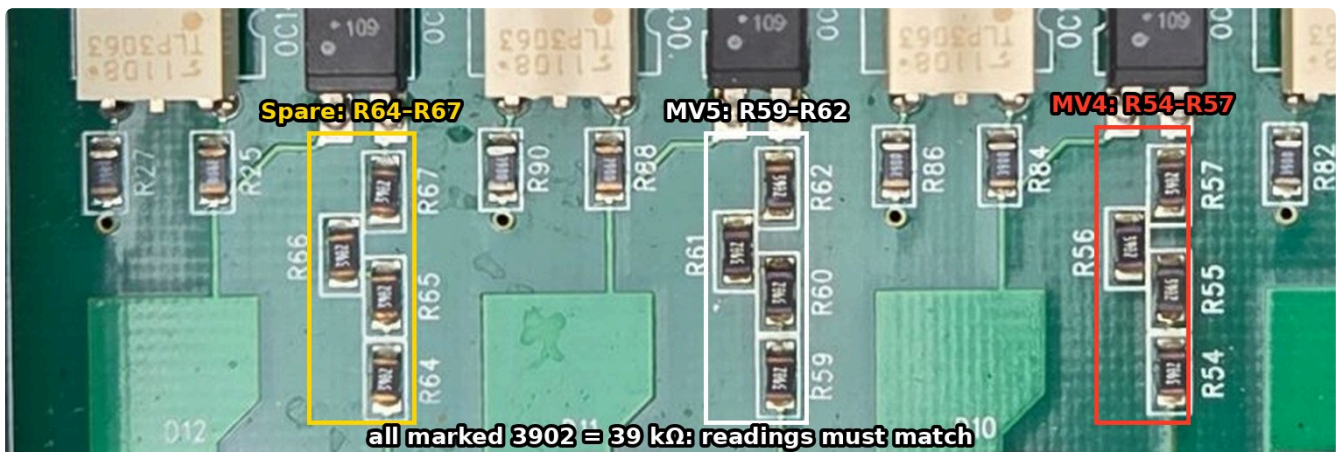
Set the meter to resistance and measure each resistor end to end, with the probes on the silver pads of the resistor.

First inspect the resistors and their solder joints with a torch and a magnifying glass. A dull or cracked joint, darkened board under a resistor, or a resistor that moves when pushed lightly indicates a fault. A loose joint may briefly show the correct value when measured, so press lightly with the probes and watch whether the reading jumps.



Resistors R54, R55, R56 and R57, each 39 k Ω

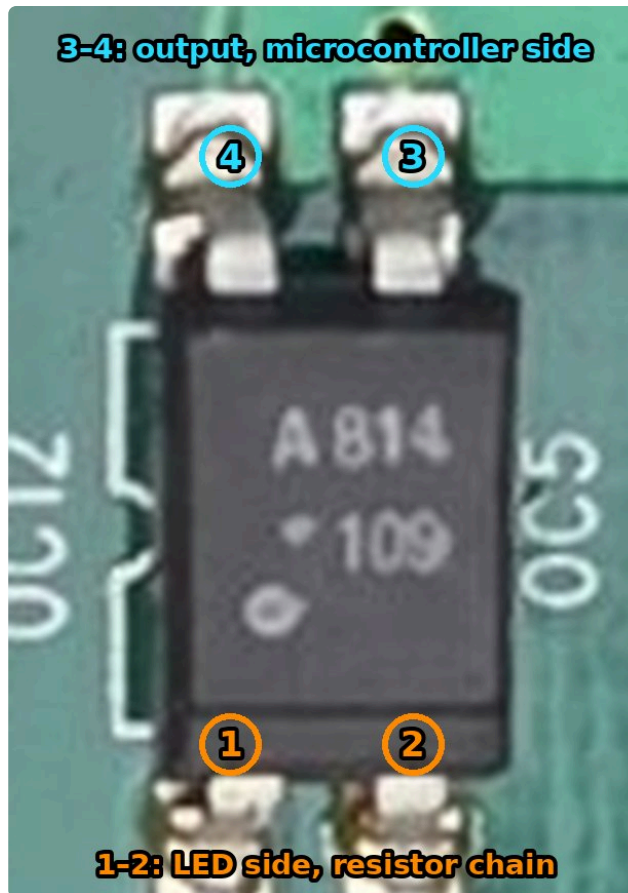
Each should read about 39 k Ω (38.6–39.4 k Ω). The measurement is reliable on the board because the meter's small voltage does not light the optocoupler. Compare with the corresponding resistors of the neighbouring channels:



Comparison: Spare R64–R67, MV5 R59–R62 and MV4 R54–R57

3. Measure the light side of OC5

Set the meter to diode mode. Put the probes on the lower pins 1 and 2 of OC5, then the other way round. Pin 1 is the lower pin on the side of the small round mark on the package.



OC5 pins: 1-2 at the bottom on the light side, 3-4 at the top on the microcontroller side

Inside the package there are two lights connected back to back, so the reading should be about 1.0–1.2 V in both directions. Compare with OC6 on the neighbouring channel.

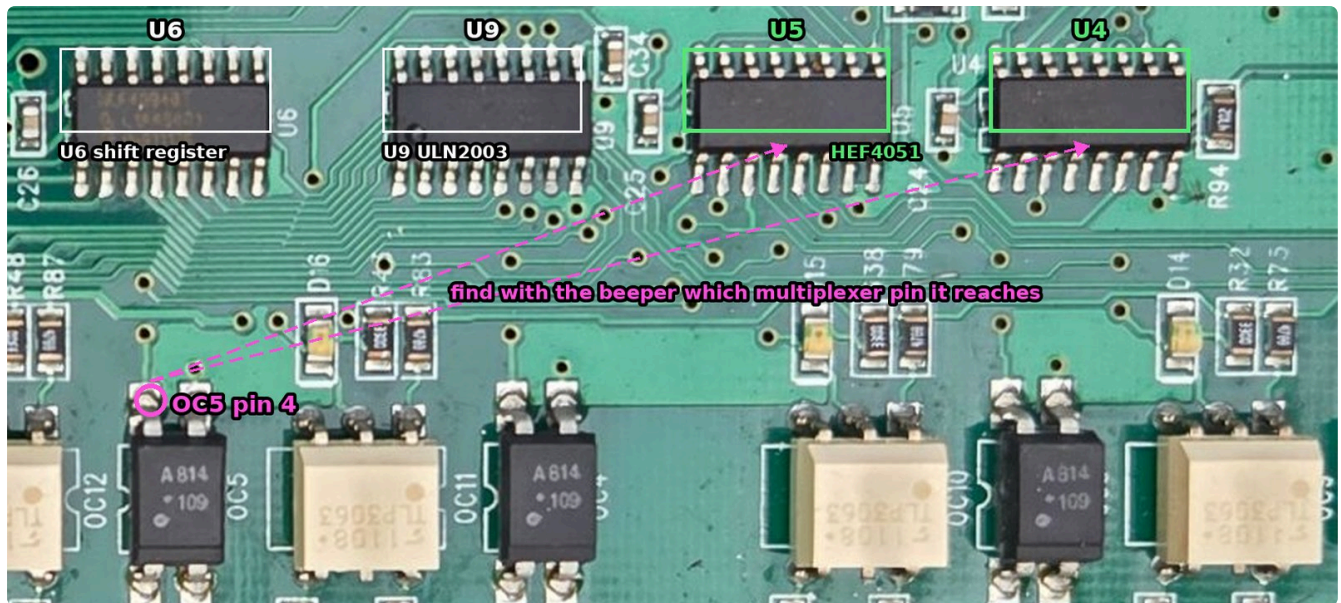
4. Test OC5 with a battery

This tells you whether the light switches the other side of the optocoupler.

1. Connect a 3 V battery and a 1 k Ω resistor in series to pins 1 and 2 of OC5. Polarity does not matter.
2. Set the meter to resistance and connect it to pins 4 (red) and 3 (black).
3. Without the battery the reading is high: hundreds of kilohms or OL.
4. With the battery connected the reading should drop clearly, to hundreds of ohms or a few kilohms. Do the same on OC6 for comparison.

5. Check the connection to the multiplexer

Set the meter to continuity. Hold one probe on pin 4 of OC5 and use the other to find which pin of U5 or U4 it beeps to. Both are HEF4051BT multiplexers. The expected pin for each channel is in the channel table.



The connection from OC5 pin 4 goes to multiplexer U5 or U4

Do the same for OC4 and OC6. Most likely OC4 goes to multiplexer pin 12, OC5 to pin 1 and OC6 to pin 5. Pin 1 is in the corner on the side of the dot marking on the IC. If pin 4 of OC5 does not beep to anything, the connection is broken.

What the results mean

Find the first row in the table that matches your measurement. The last column tells you which repair option fits.

Measurement	Fault	Repair option
One of R54–R57 reads clearly above 39 kΩ or OL	Resistor, its solder joint or pad has come loose	1 or 3
Resistors OK, OC5 shows OL or nearly 0 V in diode mode	The optocoupler light is broken	2 or 3
Resistors and diode test OK, but the reading does not drop in the battery test	The receiver side of the optocoupler is broken	2 or 3
OC5 OK, but pin 4 has no connection to multiplexer U5 or U4	Track or solder joint broken	4
Everything above OK	Fault in the multiplexer or microcontroller	5

If a result is borderline, for example a resistor reads 45 kΩ while the neighbouring channels read 39 kΩ, treat it as faulty.

Repair options

Choose an option based on the diagnosis. Options 1 and 2 restore the original design; option 3 bypasses the fault using the parts of the Spare channel. Do all work with the plug pulled out.

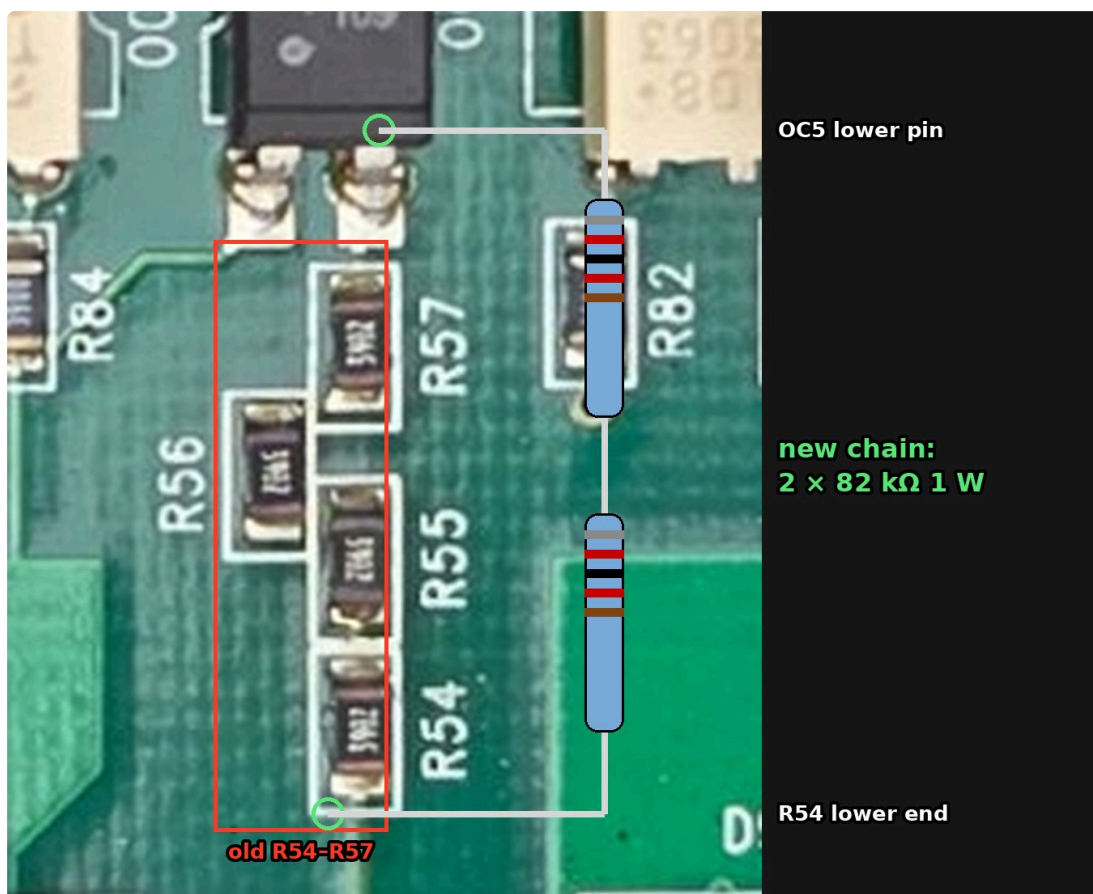
The instructions are written for MV4. For other channels, use the parts and connectors on the same row of the channel table. The Spare channel can be used to repair only one channel.

These options repair the sensing circuit. If step 1 of the diagnosis showed a fault in the control circuit, see [If the fault is in the control circuit](#).

Option	When	Work	Difficulty
1. New resistor chain with leaded resistors	A resistor or its joint in R54-R57 is broken	Two leaded resistors, two solder joints	Easy
2. Replace the optocoupler	OC5 broken	Remove and solder a 4-pin part	Medium
3. Move sensing to the Spare channel	OC5 or a resistor broken, and surface-mount soldering is not an option	Remove one part, add two wires	Medium
4. Jumper wire across the broken connection	Connection from OC5 to the multiplexer broken	One thin wire	Medium
5. New control board	Fault in the multiplexer or microcontroller	Board replacement by service	Easy, but expensive

Option 1: New resistor chain with leaded resistors

When one of R54-R57 or its solder joint is broken, the whole chain is replaced with leaded resistors soldered between the ends of the chain. The old resistors do not need to be removed. Leaded resistors dissipate heat better than small surface-mount resistors, so the same fault is less likely to recur.



New resistor chain soldered from the lower pin of OC5 to the lower end of R54

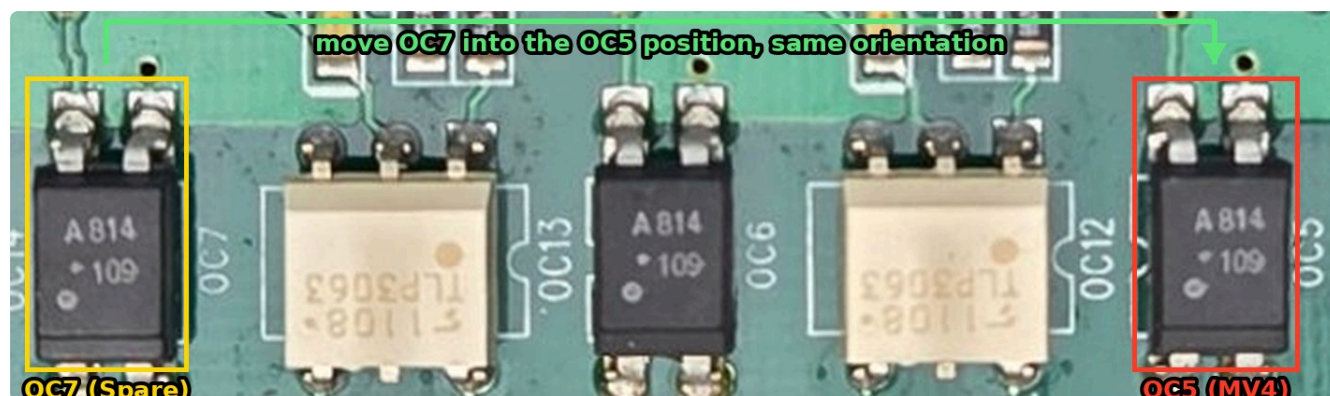
1. Get two 82 kΩ 1 W metal film resistors. Together they make 164 kΩ, close to the original 156 kΩ, so the optocoupler current stays the same. Four 39 kΩ 0.6 W resistors also work.
2. Find the ends of the chain with the continuity tester: the upper end of R57 connects to one of the lower pins of OC5, and the lower end of R54 connects to a terminal of triac D10.

3. Solder the ends of the new chain to the OC5 pin and to the pad at the lower end of R54. If the pad has come off, solder to the leg of triac D10 that the lower end of R54 beeps to.
4. Keep the resistors a few millimetres above the board so that heat can escape, and make sure the leads do not touch other parts. Fix them with hot glue.
5. Measure about 160 kΩ between the ends of the chain.

If only one resistor is broken and its pads are intact, a single leaded 39 kΩ resistor soldered across it is enough.

Option 2: Replace the optocoupler

The broken OC5 is replaced with the identical OC7 from the Spare channel. The Spare channel is not monitored, so removing its optocoupler does not cause a fault code. A new part also works: LTV-814S or EL814S.



OC7 is moved to the place of OC5 in the same orientation

1. Take a photo of OC5 before removing it. The round pin 1 mark is in the lower left corner of the package, and the new part must be in the same orientation.
2. Add fresh solder to the pins of OC5. Heat the two pins on the same side at once with a wide tip and lift that side with tweezers. Repeat on the other side.
3. Clean the pads with desoldering braid.
4. Remove OC7 the same way.
5. Place OC7 where OC5 was, round mark at the lower left. Solder one corner pin first, check the alignment and solder the rest.
6. Repeat diagnosis steps 3 and 4 on the new part.

Option 3: Move sensing to the Spare channel

In this option the MV4 sensing is moved to the unused Spare channel with two wires. No surface-mount parts need to be fitted; only one part is removed.

Before you start

Valve control stays as it is. E044 clears if the fault is in resistor chain R54-R57 or in optocoupler OC5.

Measure first. Only make the change once the diagnosis has shown a fault in OC5 or the resistor chain. If the fault is a single broken resistor, option 1 is easier.

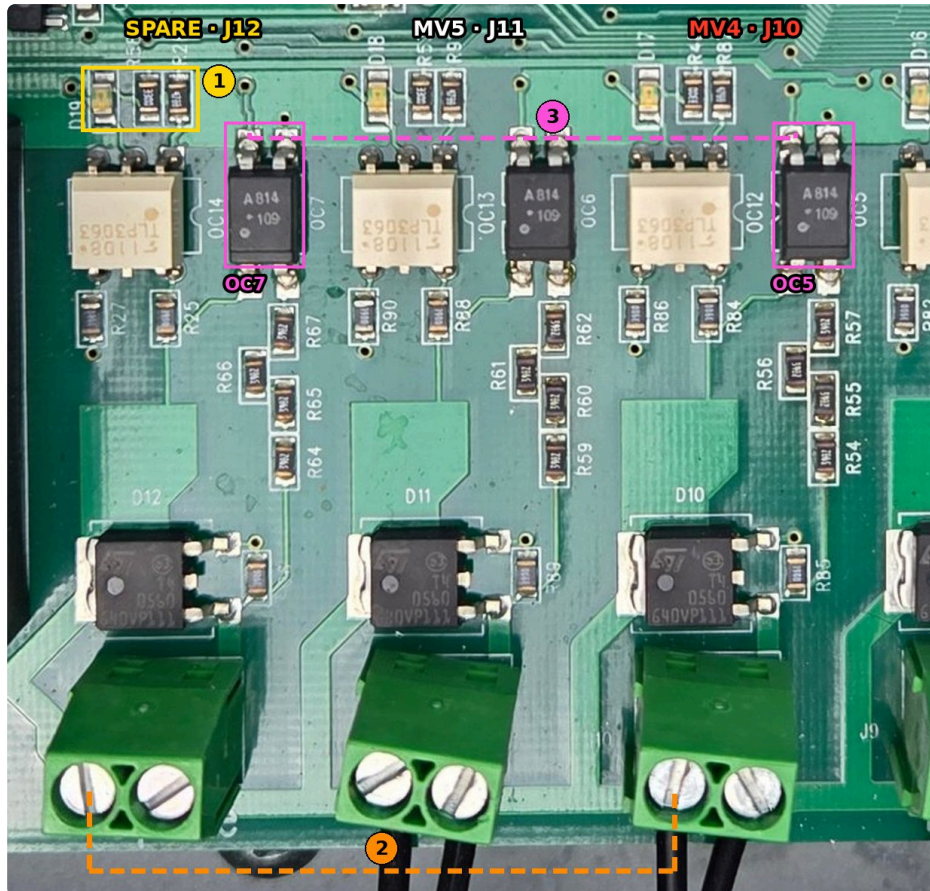
Safety. The lower part of the board carries 230 V. Do all work and measurements with the mains disconnected: plug out and wait a minute. The modification departs from the manufacturer's design, so you do it at your own risk.

Materials

- multimeter with continuity, resistance and diode ranges
- soldering iron, thin solder and a desoldering pump or braid
- thin insulated wire for the logic side, e.g. 0.25 mm wire-wrap wire
- mains-rated wire for the jumper, e.g. 0.75 mm², similar to the valve wires
- hot glue or Kapton tape to secure the wire

Work locations

The change is made at three points on the left edge of the board: the Spare channel (J12) and the MV4 channel (J10). MV5 in between is left untouched.



Work locations on the board: 1 Spare control off, 2 jumper wire J12-J10, 3 wire OC7-OC5

1. **Spare control off** (yellow): Spare triac D12 can no longer switch on.
2. **Jumper wire J12 → J10** (orange): the Spare sensing parts R64-R67 and OC7 see the MV4 coil.
3. **Wire OC7 → OC5** (purple): the OC7 signal goes to multiplexer channel 4, which the self-test reads for E044.

The picture is from above the board with the display at the top left. "Left" and "right" in this guide refer to this orientation.

Step 1: Identify the pins by measuring

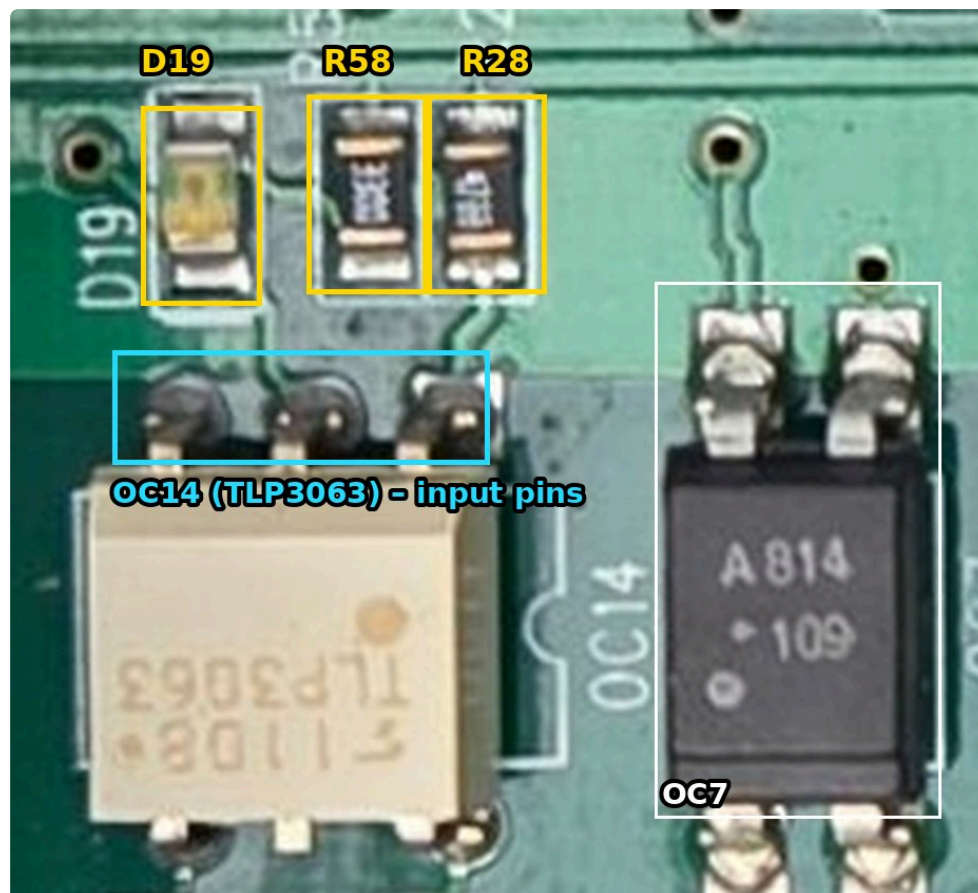
Find out three things with the continuity tester before connecting anything. The board stays disconnected from the mains the whole time. Write down the results.

What to find	How	Result
Switched pin of the connectors (J10 and J12)	Measure from pins a and b of J10 to the same pin of the neighbouring connector J9. Repeat for J12 and J11.	The common pin beeps to the same pin of the neighbour; the switched pin does not. The switched pin connects to a terminal of its own triac (D10 or D12).
Collector of the optocouplers (OC5 and OC7)	Measure from the upper pins of OC5 to the upper pins of OC7.	The emitters (pin 3) are common ground and beep to each other. The other upper pin is the collector (pin 4).
Series part in the Spare control chain (D19, R58, R28)	Measure from both ends of each part to the three upper pins (input pins) of OC14.	A part where only one end beeps to an OC14 input pin is in series: it is removed in step 2. If both ends of a part beep to OC14 pins, it is in parallel: do not remove it.

In the pictures the jumper wire is drawn between the a pins as an example, and the collector is the upper left pin of the optocoupler. Always go by your own measurements, however.

Step 2: Disconnect the Spare control

Remove the series part found in step 1 from the Spare control chain. After that, Spare triac D12 cannot switch on even if the firmware commands it. This matters because after step 3 D12 is in parallel with the MV4 coil and could otherwise open the valve unexpectedly.



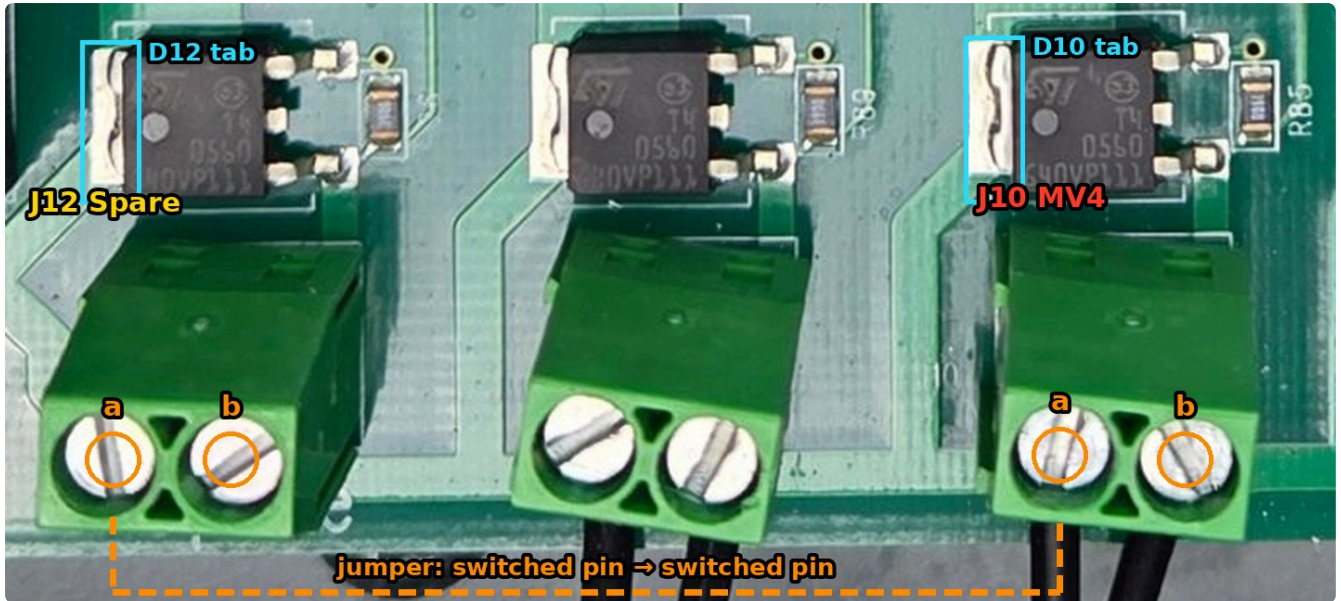
Spare control chain: D19, R58 (330 Ω), R28 (470 Ω) and the input pins of OC14

1. Add a little fresh solder to both ends of the part to be removed.
2. Heat the ends alternately and quickly, or use a wide tip that touches both ends, and push the part aside. Do not pull, so the pad does not lift from the board.
3. Clean the pads with desoldering braid and keep the part in case you want to restore the original circuit later.

4. Check with the meter that there is no connection where the part was (OL).

Step 3: Jumper wire J10 → J12

Connect the switched pin of J10 to the switched pin of J12. The Spare resistor chain R64-R67 and OC7 then see the MV4 coil. Only the sensing current of about 1.5 mA flows in the wire, because the Spare triac was disconnected in step 2.

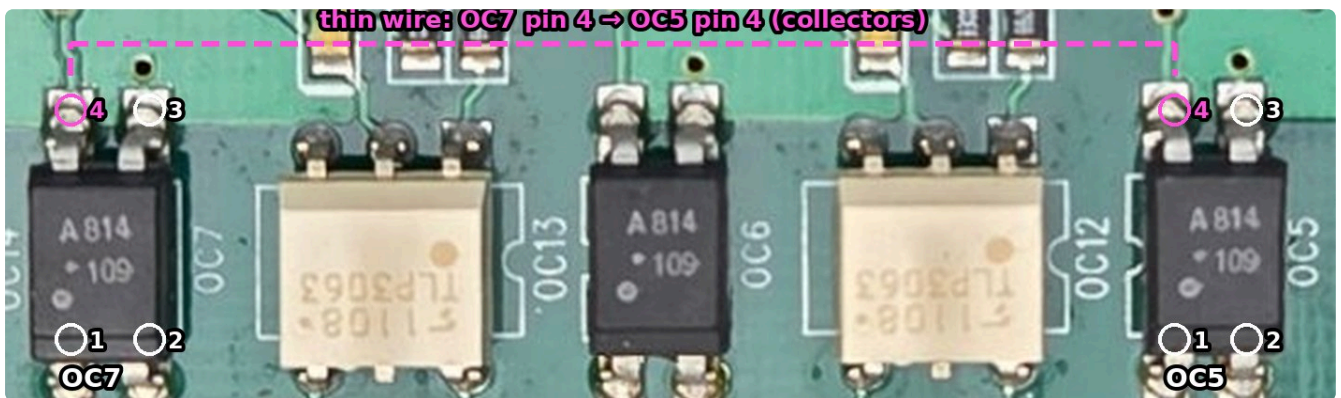


Screw terminals J12 and J10: pins a and b, triac tabs and the jumper wire route

1. Cut about 25 cm of mains-rated wire (0.75 mm²) and strip 6–7 mm from the ends. Ferrules are recommended: a twin ferrule for J10, because it already holds the valve wire.
2. Loosen the screw of the switched pin of J10, put the jumper wire next to the valve wire in the same hole and tighten. Pull gently to check that both wires are held.
3. Fit the other end to the switched pin of J12. The common pin of J12 stays empty.
4. Route the wire along the bottom edge of the board with the other wires, clear of the triacs, and secure it with a cable tie.
5. Check with the continuity tester: the switched pins of J10 and J12 beep to each other, and the switched pin of J12 does not beep to the common pin.

Step 4: Wire OC7 → OC5

Connect the collector of OC7 (pin 4) to the collector of OC5. Multiplexer channel 4 then gets the OC7 signal. The broken OC5 does not interfere, because both optos can only pull the line low.



Optocouplers OC7 and OC5: pins 1–4 and the wire route on the logic side

1. Cut about 12 cm of thin insulated wire, strip 2 mm from the ends and tin them.
2. Solder one end to the pin 4 leg of OC7 with a brief touch (iron at about 330 °C).
3. Route the wire above the optocouplers, across the MV5 channel, to OC5. Do not route it below the optocouplers, where there is mains voltage.
4. Solder the other end to the pin 4 leg of OC5.
5. Secure the wire in a few places with hot glue or Kapton tape so it cannot move.
6. Check with the continuity tester: pins 4 of OC7 and OC5 beep to each other, but not to ground (pin 3) or to the neighbouring legs.

Step 5: Testing

E044 clears by itself the next time the self-test passes. The code does not need to be acknowledged.

1. Check visually that there are no solder splashes or loose wire ends on the board. Fit the lid and switch on the power.
2. Start the test cycle by holding the Test button for 5–10 seconds. Release it when the display shows S__5.
3. In the first step, S401 (pump-in, 20 s), the Pump in light on the lid must come on and the valve must open.
4. The self-test runs at every phase change, also between the steps of the test cycle, so E044 should clear during the test cycle.
5. If E044 is still on after the test cycle, check the wires from steps 3 and 4 with the continuity tester. If they are fine, the break is probably between pin 4 of OC5 and the multiplexer. Option 4 is then needed.

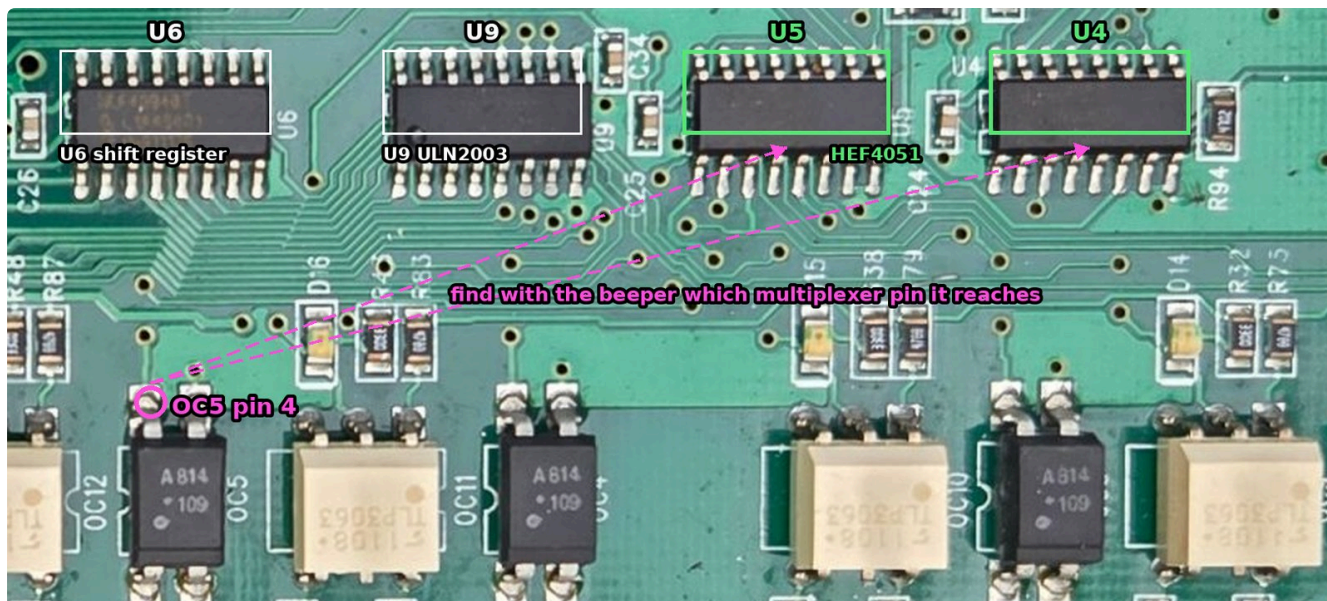
Caveats and reversal

After the change, MV4 sensing still works: if the coil or its wire breaks, OC7 stays dark and E044 appears as normal.

- The change bypasses the OC5 fault but does not repair it. From now on sensing uses the Spare channel parts R64–R67 and OC7.
- The firmware conclusions are based on the firmware of the board in the GitHub repository. Your board has the same design, but its firmware version (2.1.2) may differ.
- Tell the service company about the change and mark it, for example with a sticker inside the enclosure.
- **Restoring the original:** remove the jumper wire J10–J12 and the logic wire OC7–OC5, and solder the part removed in step 2 back in place.

Option 4: Jumper wire across the broken connection

If there is no connection from pin 4 of OC5 to the multiplexer, the break is in the copper track or a solder joint on the board. The connection can be replaced with a thin wire.



Jumper wire from OC5 pin 4 to the U5 or U4 multiplexer pin you found in diagnosis step 5

1. Find the correct multiplexer pin. If OC4 beeps to pin 12 of the IC and OC6 to pin 5, the place for OC5 is pin 1 of the same IC. If the result is different, do not solder.
2. Solder a thin insulated wire from pin 4 of OC5 to the pin you found. The IC pins are close together, so use a fine tip and little solder.
3. Check with a magnifying glass that solder does not bridge neighbouring pins.
4. Secure the wire with hot glue and check with the continuity tester.

Option 5: New control board

If all measurements are fine and E044 is still on, the fault is probably in the multiplexer or the microcontroller. They cannot be repaired at home. Order a new control board from an Uponor service partner and give them your measurement results so that the service can confirm the diagnosis.

If the fault is in the control circuit

A control fault shows up differently from a sensing fault: the valve does not open, does not close, or the Pump in light does not come on. Only a short-circuited triac gives E044 directly. Other control faults show up later as the high water alarm E031, because water is not transferred to the process tank.

This section is written for MV4. For other channels, use the control parts in the channel table and compare with the neighbouring channel.

Symptoms in the test cycle

Start the test cycle as in diagnosis step 1 and watch what happens in step S401 and after it.

Symptom	Probable fault	Fault code
Pump in light does not come on	Indicator circuit, light side of OC12, driver or microcontroller	Not at once, later E031
Light comes on, but the valve does not open	Coil, its wires, triac D10, optocoupler OC12 or resistors R84-R86	Not at once, later E031

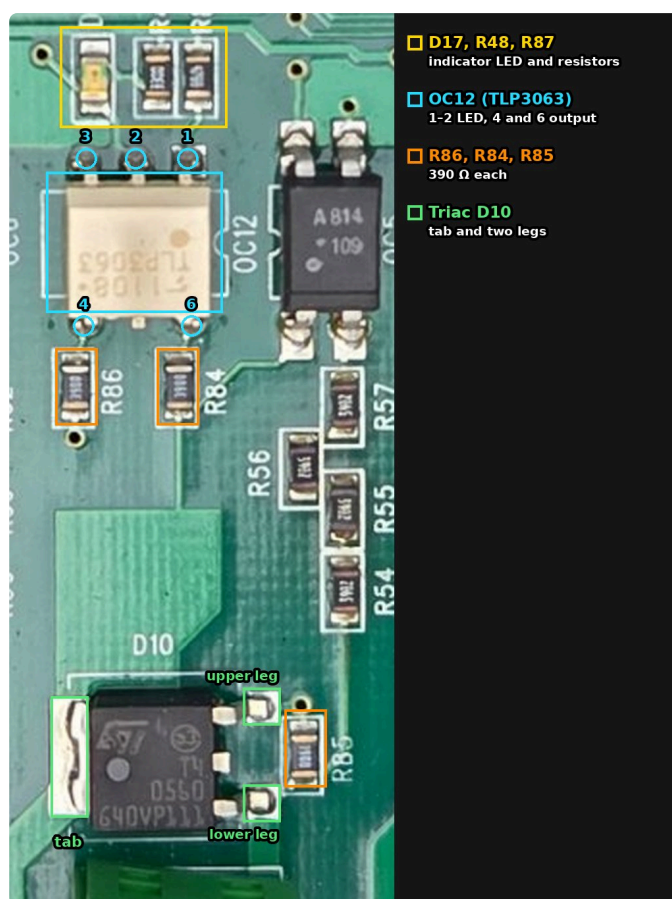
Symptom	Probable fault	Fault code
Pump-in continues even though the light has gone off	Triac D10 or OC12 output short-circuited	E044

When a coil burns out into a short circuit, it often damages parts on the control board at the same time. The Finnish forum describes one case where the triac and a 390 Ω resistor failed along with the coil, and another where at least five parts on the aeration channel failed ([page 3](#), [page 4](#)). So always check the triac and resistors when a coil has burnt out.

Measurements

Measure with the plug pulled out and compare each reading with the same part on the MV3 channel (J9). The channels are identical, so a clear difference from the neighbour indicates a fault even if the exact in-circuit ohm value differs from the part's marking.

First look at the board with a torch. A darkened or burnt spot around triac D10 or resistors R84–R86 indicates a control fault. In one E044 case described on the forum, the burnt spot was next to an ant nest, and the fault was fixed by replacing the triac.



MV4 channel control parts: OC12 pins, resistors R84–R86 and triac D10

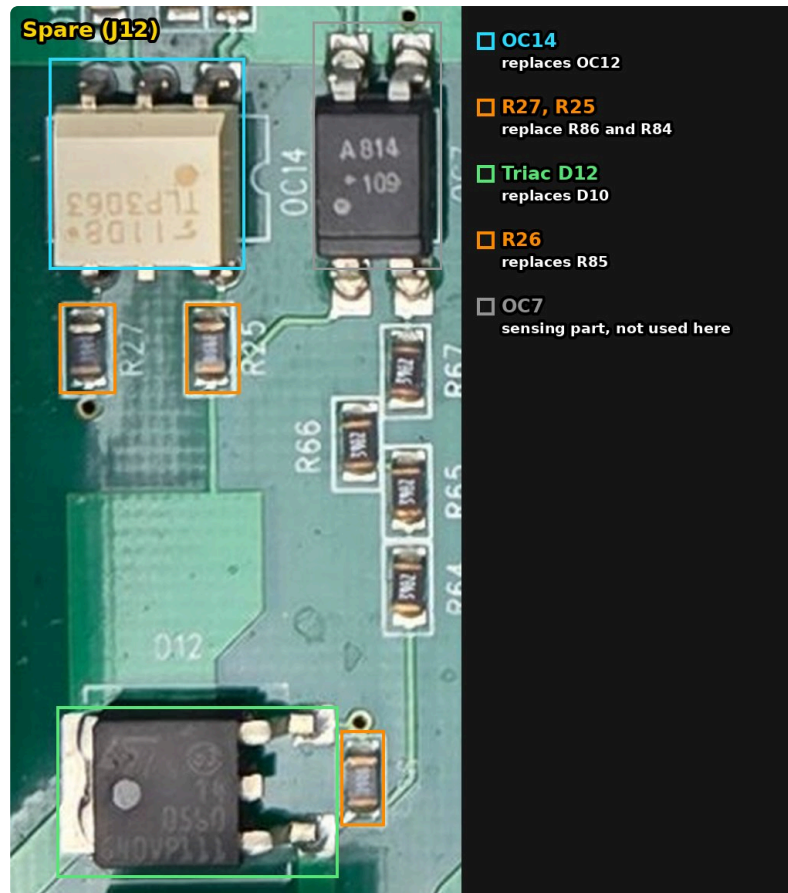
- Coil.** Disconnect the coil wires from J10 and note their positions. Measure resistance between the wire ends. The small 8 VA coils (MV1–MV4) read about 2.5–2.7 k Ω and the large 30 VA aeration coil (MV5) about 400–450 Ω . OL means an open coil. A reading clearly lower than these means a short circuit inside the coil.
- Triac D10.** Leave the coil wires disconnected. Measure resistance on three pairs: tab–upper leg, tab–lower leg and upper–lower leg. Make the same measurements on the MV3 triac D9. In a healthy triac one pair reads tens or hundreds of ohms and the others read high. If any pair reads nearly 0 Ω and D9 does not, D10 is short-circuited.

3. **Resistors R84, R85 and R86.** Marking 3900 = 390 Ω . Compare with the corresponding MV3 resistors R80, R81 and R82. On the board the reading may be below 390 Ω , but it must match the neighbour.
4. **Optocoupler OC12.** Set the meter to diode mode on pins 1 and 2, then the other way round. There is one light inside, so the reading should be about 1.1–1.3 V in one direction and OL in the other. Compare with OC11 on MV3. Pin 1 is the upper right pin, because the text on the package is upside down. The output side of the optocoupler cannot be tested reliably with a multimeter.
5. **If the light does not come on.** Measure D17 in diode mode and R48 (330 Ω) and R87 (470 Ω) in resistance mode, and compare with D16 on MV3 and its resistors. If they are fine, the fault is in the driver or the microcontroller, and only a new control board will help (option 5).

Live measurements at the terminals are a job for a qualified electrician.

Repair

Fault	Repair	Spare part from the Spare channel
Coil open or short-circuited	New coil: small ACL 30E185 (8 VA), aeration ACL 52E1C5 (30 VA)	No
Triac D10 broken	Replace the triac. Forum users have used the MAC4DLM (4 A, 600 V) as a replacement	D12
Optocoupler OC12 broken	Replace the optocoupler	OC14
R84, R85 or R86 open	Leaded 390 Ω resistor soldered across the old one	R27, R26 or R25
Light does not come on, D17 and resistors OK	New control board, option 5	No



Spare channel spare parts: OC14, R25, R27, triac D12 and R26

Replacing the triac. The wide tab of the triac is soldered to a large copper area, which makes it the hardest part on the board to remove. Use a hot air gun or a large chisel tip and plenty of solder.

1. Take a photo of the orientation: tab on the left, legs on the right.
2. Remove D12 intact from the Spare channel: heat the tab and the legs until all the solder is molten and lift it with tweezers.
3. Remove D10 the same way. You can also cut its legs first with side cutters, so only the tab is left to heat.
4. Clean the pads, tin the tab pad thinly, place D12 and solder one leg first, then the tab and the other leg.
5. Repeat the measurement from step 2 on the new part.

Replacing the optocoupler. OC12 is replaced with OC14 from the Spare channel in the same way as in option 2, but the part has five soldered legs. Fit the new part so that its text is upside down like the old one. OC12 and OC14 are through-hole parts, so their legs are soldered from the underside of the board, and the board must be removed from the enclosure. A new TLP3063 (DIP-6) also fits.

Can the Spare channel be used

Yes, as a source of spare parts. The Spare channel is not monitored, so removing its parts does not cause a fault code. The control parts (OC14, D12, R25–R27) and the sensing parts (OC7, R64–R67) are different parts, so both can be used at the same time, also together with option 3.

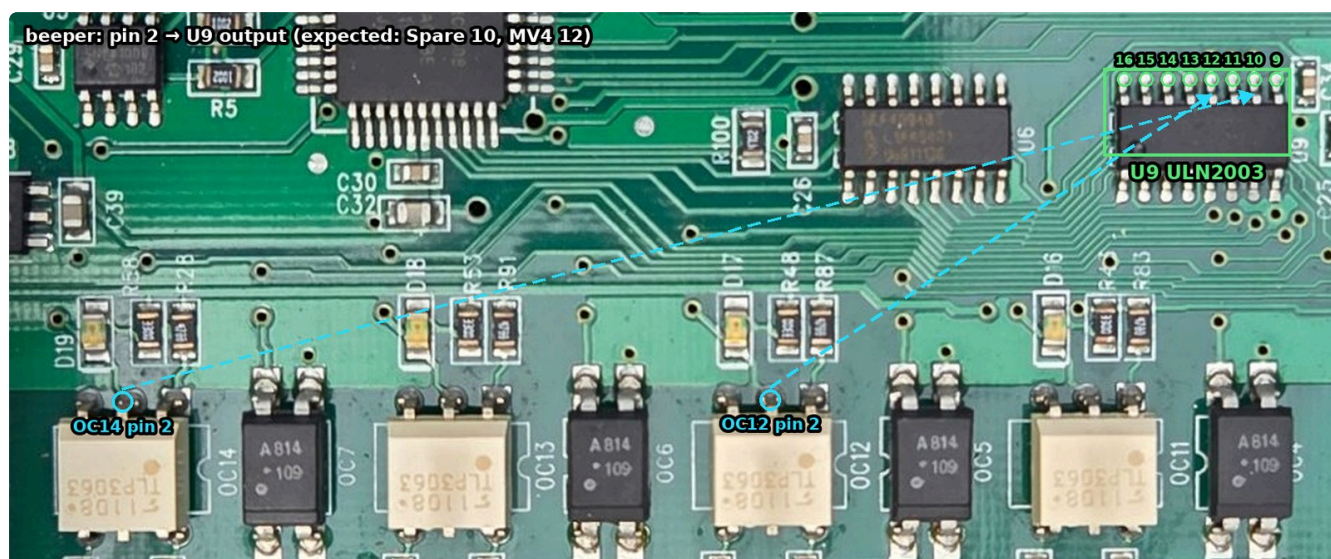
Moving the whole channel to the Spare channel

Another approach is to move the whole channel: the coil is connected to Spare connector J12, and the Spare channel's control and sensing are linked to MV4 with two thin wires. No parts need to be removed. The move fixes all faults after the driver: triac D10, optocoupler OC12, resistors R84–R86 and indicator LED D17 with its resistors. If the fault is in driver U9 or before it, the move does not help. The move works the same way for any channel using the parts in the channel table. The compressor draws about 0.25 A, which Spare triac D12 handles easily.

Why this works. Driver U9 switches the valve on by connecting pin 2 of the control optocoupler to ground. When pins 2 of OC14 and OC12 are connected, the MV4 command lights both optocouplers, and the Spare channel's triac D12 drives the coil. In normal operation the program never switches the Spare output on: all of its phases use only the compressor and valves MV1–MV5. Only the output test started with a service tool also steps through Spare, in which case MV4 would open for a second. That is harmless.

1. Verify the wiring by measuring

This option assumes that pin 2 of the control optocoupler connects directly to driver U9. Check this before soldering anything.

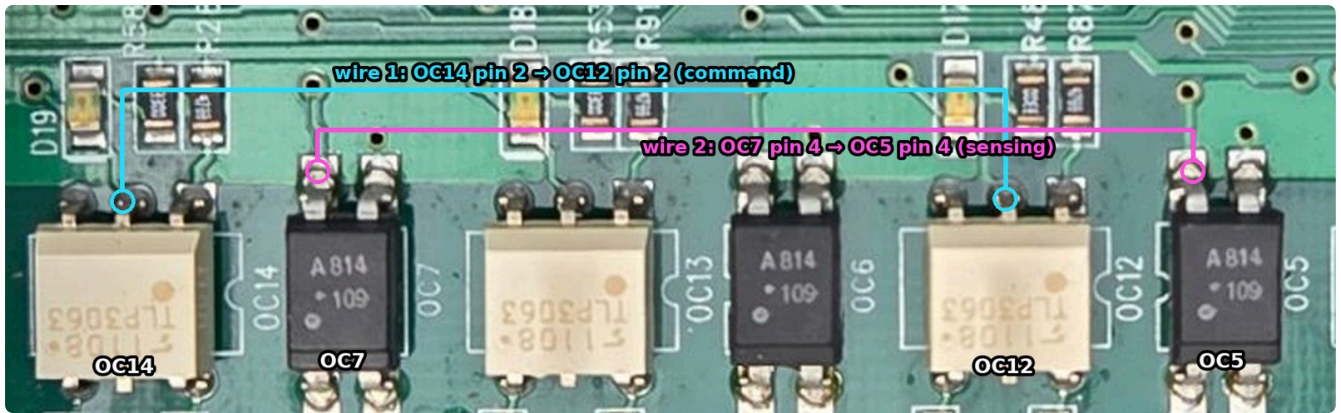


Pin 2 of OC14 and OC12 and output pins 16–10 of driver U9

1. Check that U9 is marked ULN2003. On the board in this guide it reads UTC ULN2003L, and U6 next to it is the HEF4094BT shift register.
2. Set the meter to diode mode. Put the red probe on the upper right leg of OC12 and the black probe on the middle upper leg. The reading should be about 1.1–1.3 V, and OL the other way round. The middle leg is then pin 2. Do the same for OC14.
3. Set the meter to continuity. Check that pin 2 of OC12 beeps to pin 12 of U9 and pin 2 of OC14 to pin 10. If not, find the right pins in the range 10–16. They must be different pins.
4. Make sure that neither pin 2 beeps to ground, for example to the GND pin of the BDM connector.

If any result differs from this, the wiring is different from what is assumed here. In that case do not make the move; replace the parts instead.

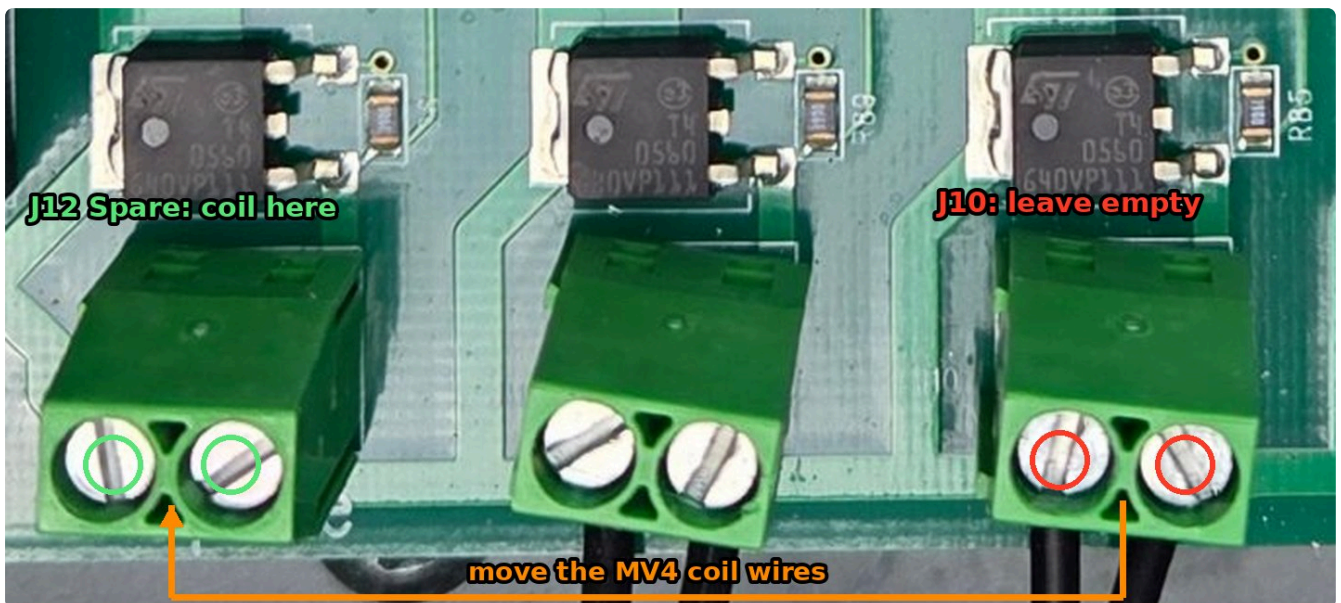
2. Solder two wires



Wire 1 from OC14 pin 2 to OC12 pin 2 and wire 2 from OC7 pin 4 to OC5 pin 4

1. Pull the plug. If you have previously done option 3, solder back the part removed in its step 2 and remove the jumper wire J10-J12.
2. Solder a thin insulated wire from pin 2 of OC14 to pin 2 of OC12. These optocouplers are through-hole parts, so solder the wire to the leg in the gap between the package and the board with a brief touch.
3. Solder a second thin wire from pin 4 of OC7 to pin 4 of OC5, as in step 4 of option 3.
4. Route both wires above the optocouplers. Do not route them below the optocouplers, where there is mains voltage. Secure the wires with hot glue.
5. Check with the continuity tester that each wire beeps end to end but not to neighbouring legs.

3. Move the coil



The MV4 coil wires are moved from connector J10 to connector J12

Disconnect the MV4 coil wires from connector J10 and fit them to connector J12. J10 is left empty.

4. Test

1. Switch on the power and start the test cycle. In step S401 the valve must open. The Pump in light comes on, unless the fault is in indicator LED D17 itself.
2. Check that the valve closes when the test cycle moves to the next step.
3. E044 should clear during the test cycle, because the self-test runs between every step.

Restoring: move the coil back to J10 and remove both wires.

Protect the board with fuses

A fuse in each coil wire prevents a coil that burns out into a short circuit from destroying the triac and resistors. The Finnish forum recommends slow-blow (T) 5×20 mm glass fuses in their own holders ([page 6](#)).

Coil	Rating	Fuse
MV1–MV4, small coils	8 VA	T 100–160 mA
MV5, aeration coil	30 VA	T 315–500 mA

If you want to use one size for all coils, T 400 mA is a good compromise. It does not blow on the coils' inrush current and is still small enough to protect the triac and resistors from a coil short circuit.

Connect the fuse between one of the coil wires and the connector, and use a holder rated for 230 V. If the fuse blows, sensing sees the coil as open and the display shows the channel's E04x code. Have the wiring done by a qualified electrician if you are unsure.

A ceramic sand-filled fuse (marked H) breaks a hard short circuit more reliably than a glass fuse and fits the same 5×20 mm holder. A fuse does not protect against lightning surges or against the sensing resistors heating up.

Sources

- [Uponor Clean I – installation and operating manual \(Swedish, 03/2026\)](#): fault codes, test cycle
- [andy778/UClean1 \(GitHub\)](#): analysis of the control board and firmware
- [Firmware decompilation, mc9s08gt32_full.c](#): self-test and how the fault codes are generated
- [lampopumput.info: Uponor clean 1 ongelma, page 3](#) (Finnish): burnt aeration coil and board damage
- [same thread, page 4](#): coil resistances, replacing the triac and the 390 Ω resistor
- [same thread, page 5](#): E044 and the MAC4DLM triac, E045 cases
- [same thread, page 6](#): fuse recommendations, coil types
- [Byggarhus.se: Uponor Clean 1 – Felkod E045](#) (Swedish): E044 case, overheated sensing resistors and lifted pads