

WATERBOOK

TRi - Ei - pH regulation



Technical dealer guide



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1. TRi salt water chlorinator

1) Fault diagnosis

a) Hidden functions and menus

TRi salt water chlorinator integrates hidden functions to modify several internal settings and/or to assist in diagnosing faults with the unit.

These hidden functions are accessible via to the 'Select' service switch.

→ Service switch

'Select' switch is also a service button dedicated to several other functions, other than for normal use. It could :

- **erase some error codes** (see part b) / 'Meaning of warning lights and error codes')
- **check polarity reversal**
- **access to secret menu.**

→ Polarity reversal test

This test is done to check the reliability and operation of automatic polarity reversal. It's consequently possible to determine the cause of a scaled electrode for example (mainly linked to a high calcium level and/or high total alkalinity into pool's water).

→ *Polarity reversal testing procedure :*

- Remove TRi control box from the wall – without disconnecting it from mains supply – and put it face down.
- Switch the TRi unit on.
- Adjust chlorine generation to 100% (this ensures that TRi will always produce chlorine).
- Press and hold 'Select' switch for 4 seconds.
- TRi unit will stop chlorine production and reverse its polarity. The fan will stop briefly and start again in few seconds (see arrow on image below). This behaviour shows that polarity has reversed.



Remark : If this test fails, try the same procedure again to be sure. If the fan doesn't stop, it means that polarity reversal is defective. Power PCB consequently needs to be replaced (see chapter 2) / 'Repair Procedure'.

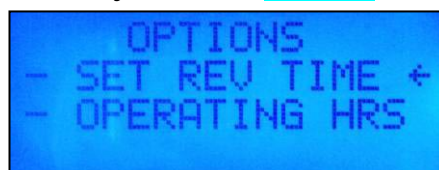
→ Hidden menu

This hidden menu called 'OPTIONS' gives access to 2 parameters :

- > **polarity cycles** also called reversing period (could be adjusted)
- > **control box and electrode operating hours** (different times)

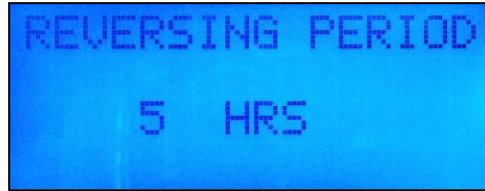
→ *Procedure to access the 'OPTIONS' hidden menu and change settings:*

- Ensure that TRi unit is connected to mains supply (LCD display on).
- Press and hold 'Select' switch for 10 seconds until you see the **OPTIONS** secret menu on the display :



- By using the 'Scroll' switch, select the required option (either 'SET REV TIME' or 'OPERATING HRS').
- Select the needed menu by pressing the 'Select' switch.

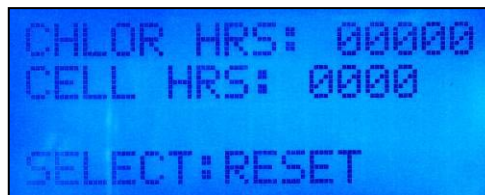
'REVERSING PERIOD' menu :



- Standard setting for reversing period is 5 hours. Press the 'Scroll' switch to change the reversing period to 2,5 hours. Press the 'Select' switch to validate the choice.
- Press the 'Menu' switch to return to default LCD display.

Remark : Standard reversing period (5 hours cycles) is adapted to most cases (TH < 400 ppm). Choosing 2,5 hours cycles improves self cleaning effect but decrease electrode's lifespan by 15% (use calcium catcher product rather than short reversing period).

'OPERATING HRS' menu :



- TRi unit retains all operating hours in its memory. That means control box total running time ('CHLOR HRS') and electrode operating hours ('CELL HRS'). Times are different because cell operating time is only "real chlorine generation time".
- If TRi electrode has been replaced, press the 'Select' switch to reset cell operating hours.
- If not (just for a normal control), press the 'Menu' switch to come back to default LCD display.

Nota : It's not possible to reset control box total running hours ('CHLOR HRS'), except if control PCB has been replaced (all memories and setting are consequently reset to zero).

b) Meaning of warning lights and error codes

TRi salt water chlorinator is able to highlight an operating fault to the end user thanks to warning lights and/or error codes displayed on the default LCD screen.

Warning : This does not necessarily mean the unit is faulty. It could only be due to poor operating conditions (lack of salt or cold water temperature for example).

→ Meaning of warning lights :

Cases	Causes	Solutions
'Salt' orange led	<ul style="list-style-type: none"> > Lack of salt (< 3 g/L, required = 4 g/L) > Cold water (T°C < 18 °C, depends on water mineral level) > Electrode is scaled, worn or damaged 	<ul style="list-style-type: none"> > Add salt to reach required level > Reduce chlorine output or add salt to compensate water mineral level > Clean or replace electrode (also check TH and polarity reversal)
'Flow' red led	<ul style="list-style-type: none"> > No flow through pipework (filtration stopped) > Air bubbles in pipework > Flow switch is damaged or disconnected 	<ul style="list-style-type: none"> > Switch on the filtration > Check pump, filter and pipework to ensure there is no air in the system > Reconnect or replace the flow switch
'Power' blue led blinking	<ul style="list-style-type: none"> > TRi running failure, chlorine generation is on hold 	<ul style="list-style-type: none"> > Check all working conditions (water flow, electrode, water quality...) > Check all external and internal electrical connections
'Boost' blue led	<ul style="list-style-type: none"> > 'Boost' mode is activated ('BOOST' is displayed on the default LCD screen) 	<ul style="list-style-type: none"> > No problem : Boost mode will automatically stop after 24 cumulative hours > Press the 'Boost' switch to stop the Boost mode
'Low' blue led	<ul style="list-style-type: none"> > 'Low' mode is activated ('LOW MODE' is displayed onto default LCD screen) > Electrical pool cover is closed (pool cover is connected to TRi unit) 	<ul style="list-style-type: none"> > Leave it like that or press the 'Low' switch to stop the Low mode (manual use) > Open the pool cover to stop the 'Low' mode
All leds off	<ul style="list-style-type: none"> > TRi unit is off > Mains supply is off > Internal fuses are damaged 	<ul style="list-style-type: none"> > Run the filtration > Check mains supply > Check fuses

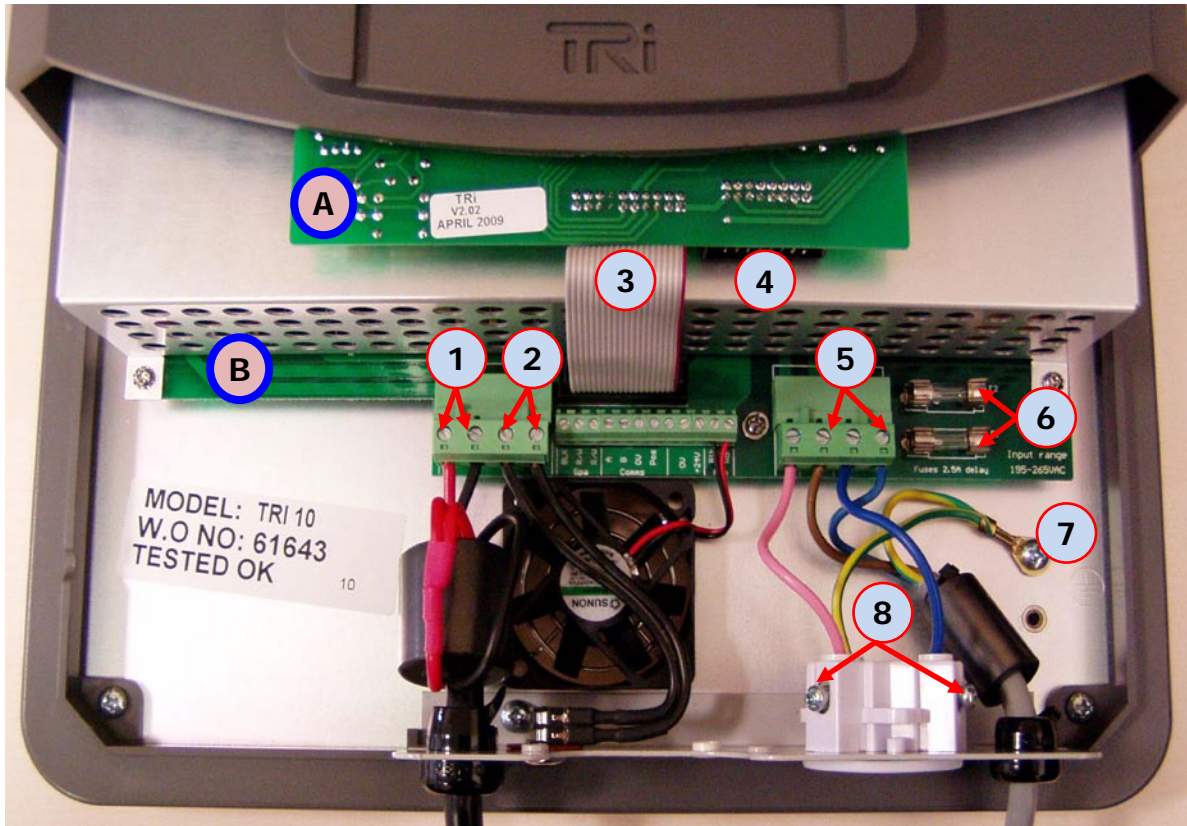
→ Meaning of error codes :

Error code	Causes	Solutions
CHECK SALT (+ 'Salt' led)	<ul style="list-style-type: none"> > Lack of salt (< 3 g/L, required = 4 g/L) > Cold water (T°C < 18 °C, depends on water mineral level) > Electrode is scaled, worn or damaged 	<ul style="list-style-type: none"> > Add salt to reach required level > Reduce chlorine generation or add salt to compensate water mineral level > Clean or replace electrode (also check TH and polarity reversal)
NO FLOW (+ 'Flow' led)	<ul style="list-style-type: none"> > No flow through pipework (filtration stopped) > Air bubbles in pipework > Flow switch is damaged or disconnected 	<ul style="list-style-type: none"> > Switch on the filtration > Check pump, filter and pipework to ensure there is no air in the system > Reconnect or replace the flow switch
REVERSING	TRi unit is reversing its polarity (≈ 10 minutes, 5 h or 2,5 h cycles)	<ul style="list-style-type: none"> > Wait for the end of the procedure (automatic) > Check polarity reversal with service switch ('Select')
CHECK CELL	<ul style="list-style-type: none"> > Electrode is scaled > Total cell operating hours has reached a high value (6000 h < time < 9000 h) 	<ul style="list-style-type: none"> > Clean the electrode and check polarity reversal > Check TRi unit and erase the error code by pressing and holding the service switch for 3 seconds ('Select')
OUTPUT FAULT	<ul style="list-style-type: none"> > Cell cable is not connected correctly > Power supply problem (power PCB) 	<ul style="list-style-type: none"> > Check all electrical connections > Check cell amperage (see testing procedure) > Replace the whole power supply assembly

Nota : Press and hold the 'Select' switch for 3 seconds to erase **CHECK CELL** and **OUTPUT FAULT** error codes when it appears.

2) Repair procedure

a) Electrical readings for after sales



A = Control PCB

B = Power supply assembly (power PCB + fan + aluminium chassis + cover)

1 = Cell supply

2 = Flow switch connection (dry contact)

3 = Control PCB connection belt

4 = Optional TRI pH module connection socket

5 = Mains supply connection (220-240 V AC)

6 = Fuses (2,5 A T)

7 = Earth connection

8 = Filter pump optional socket (220-240 V AC – 8 A max)

Readings	TRi 10	TRi 18	TRi 22	TRi 35
Mains supply (5)	220-240 V AC 50 Hz			
Filter pump supply (8)	220-240 V AC 50 Hz			
Cell output voltage (1)	21-24 V DC			
Cell output nominal amperage (1)	2,2 A	3,6 A	4,5 A	7,2 A
Flow switch contact (2)	< 1 Ω with flow (contact closed) ; insulated without flow (contact opened)			

b) TRi testing procedure

IMPORTANT : TRi salt water chlorinator is a « new generation » unit which is able to highlight poor working conditions with error codes. It's important to ensure that all possible external problems have been eliminated before opening and checking TRi unit.

Also ensure the fault is not due to a worn or damaged electrode (must be clean).

If you're sure that it's an internal problem, please follow the procedure hereafter.

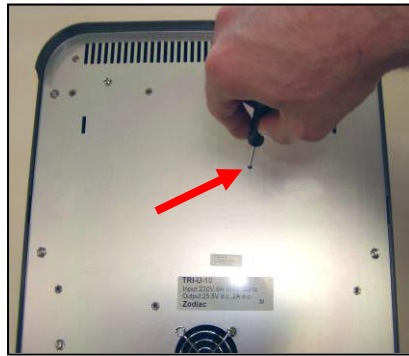
1. Unit disconnected, check the 2,5 A T fuses (mark #6). These are "upstream" fuses; which means that the power PCB may be damaged if fuses are blown (house protection in case of power PCB damage). Please go to the procedure '(II)' for power supply assembly replacement.
2. Unit disconnected, check earth connection (mark #7).
3. Unit disconnected, check the flow switch dry contact (mark #2) by removing it from its holder and activating it by hand. If contact is always opened, check the "jack" socket of flow switch cable and/or replace the whole flow switch.
4. Connect the TRi unit to mains supply and ensure that LCD display comes on (chlorine generation is off). Firmware will be displayed a few seconds. Mains supply reading should be 220-240 V AC (mark #5).
If TRi unit doesn't come on, switch the unit off and replace the control PCB then do the same test again. To do this, you've got to disconnect the connection belt of the control PCB (mark #3) and connect a new control PCB to the power supply assembly (hold the new control PCB by hand). There are 2 possible cases :
 - TRi unit comes on and operates correctly = problem is solved, see procedure '(I)'
 - TRi unit stays off = replace the whole power supply assembly, see procedure '(II)'.
5. Switch on chlorine production on the TRi unit ('On/Off' switch) and set chlorine output at 100% ('Scroll' switch). Ensure that the fan at the back of the control box is running. Check cell supply (mark #1). There are 2 possible cases :
 - Cell voltage is between 21 and 24 V DC = no problem with TRi unit
 - Cell voltage is out of those previous values = nominal amperage problem, go to next step.
6. Check nominal cell amperage with an amp-meter (0-10 A DC caliber) **in line on the black wire of the cell cable** (either onto mark #1, or onto cell connectors as showed onto the picture).



Remarks :

- Disconnect TRi unit from mains supply during amp-meter connection onto cell cable. Then ensure that **chlorine output is set to 100% for testing**.
- If reading is made on the cell connectors (as in the picture above), use a « crocodile wrench » to maintain the black amp-meter wire to the black cell connector.
- **Only take the reading from black wire of the cell cable**, not from red wires !

If output amperage is not correct (see readings table above), adjust it by using the small potentiometer at the back of the TRi control box (arrow on picture) while checking amperage value on the amp-meter.



(I) Control PCB replacement procedure :

- Disconnect the connection belt of the control PCB.
- Remove the TRi top cover held by 4 screws (external silver cover and bottom module are already removed).
- Unscrew the 2 control PCB fixing screws and carefully remove the faulty control PCB.
- Proceed in opposite way to install the new control PCB.

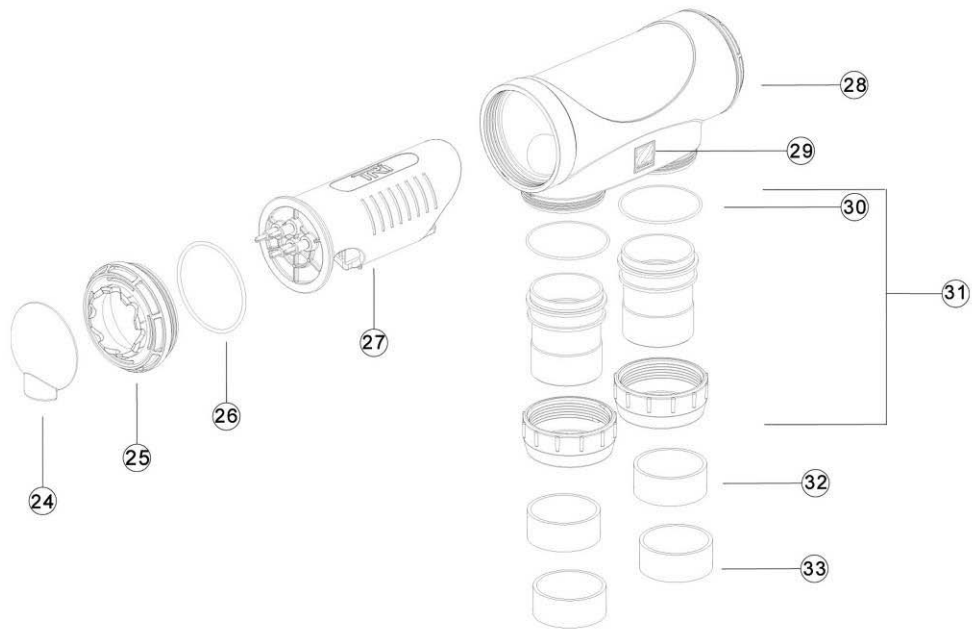
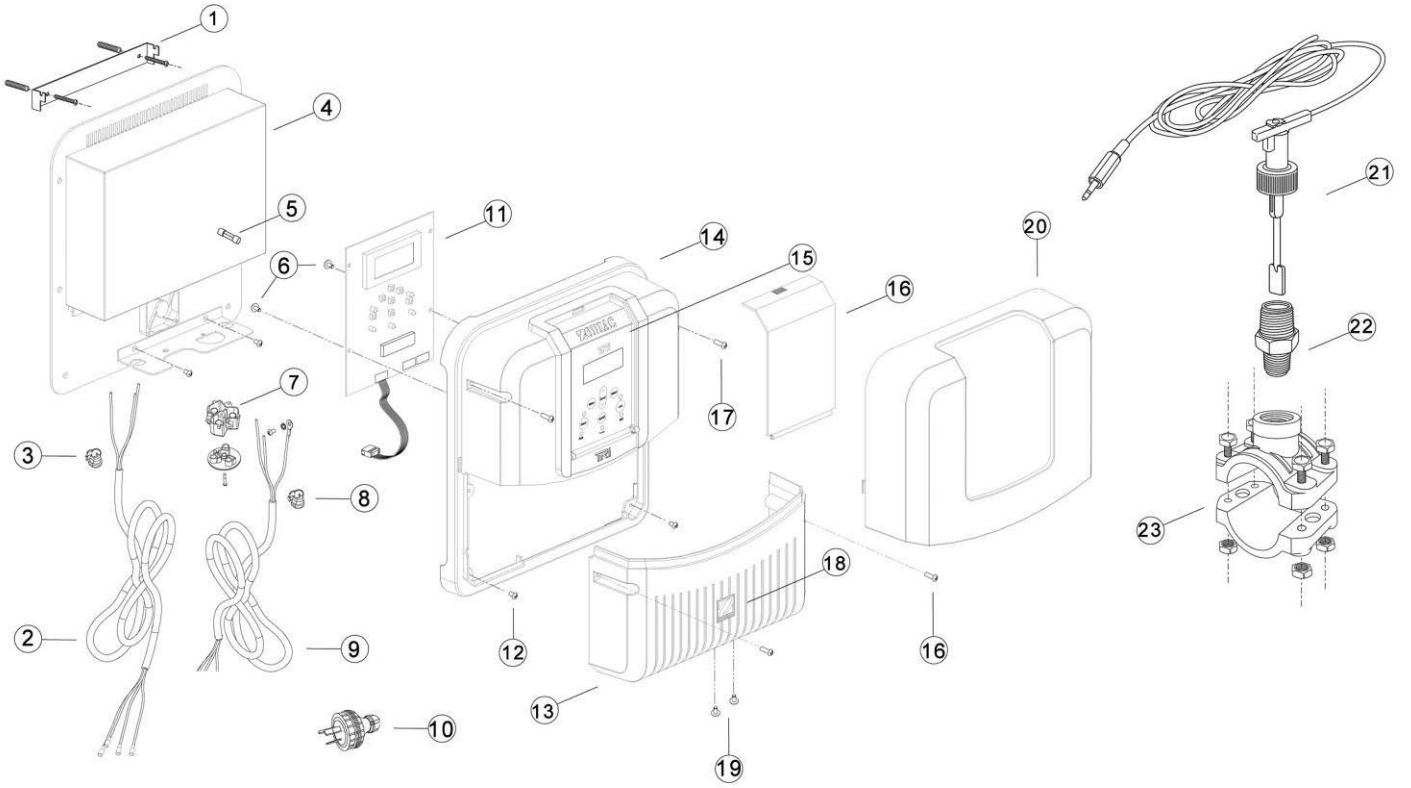
(II) Power supply assembly replacement procedure :

- Disconnect the 2 green connectors on the power PCB (mains supply and cell supply).
- Unscrew the earth connection then the 2 fixing screws of the bottom metallic plate to remove all cables (mains supply cable and cell cable).
- Disconnect the control PCB connection belt.
- Remove the TRi top cover containing control PCB by unscrewing its 4 screws.
- Replace the whole power supply assembly (power supply PCB + fan + aluminium chassis + cover)
- Proceed in opposite way to re-assemble the TRi control box.
- Adjust the nominal amperage by following the procedure of step « 6. » (see above).

!!!! VERY IMPORTANT !!!! : When power supply assembly has been replaced, nominal amperage adjustment is MANDATORY. As spare parts, power supply assemblies are provided with the maximal amperage setting for TRi 35 models (7,2 A). Nominal amperage must be adjusted to the correct value (see part a) / 'Electrical readings for after sales' to get the correct amperage).

Nota : Do not remove the aluminium cover of the power supply assembly to try to repair the power PCB (power PCB as "stand-alone" part is not available).

3) TRi spare parts



Mark	Part number	Description
1	W012575	Wall mount with attachment kit
2	W195591	Tri cell cable complete (with connectors)
3	W001401	Cord grip for TRi cell cable
4	W082981	TRi power supply assembly (power PCB + fan + aluminium chassis + cover)
5	W111110	Fuse M205 2,5 A T
6	W001400	4x1/4" screw for TRi PCB fixing
7	W120381	Female socket (« AUS » format)
8	W000021	Cord grip for mains supply cable
9	W052510	EU mains supply cable
10	W120131	3 pin plug (« AUS » format)
11	W082991	TRi control PCB
12	W000201	M4x6 mm screw for TRi chassis plastic cover bottom fixing
13	W043240	TRi standard bottom cover (bottom module empty)
14	W043210	TRi chassis plastic cover
15	W176741	TRi control panel label
16	W043220	TRi clear protective screen
17	W001421	M4x20 mm screw TRi cover fixing (chassis plastic cover & bottom cover)
18	W176801	« TRi » sticker for TRi standard bottom cover
19	W001461	M3x5 mm screw for bottom metallic plate
20	W043230	TRi external silver cover
21	W197172	Sika VKL05M complete flow switch (with cable and 3,5 mm male « jack »)
22	W043560	3/4"x1/2" flow switch adaptor
23	W013010	DN50 mm - 1/2" saddle clamp (also fit 1 1/2" pipes)
23	W013011	DN63 mm - 1/2" saddle clamp (also fit 2" pipes)
24	W043340	TRi cell connector cap
25	W043290	TRi cell locking ring
26	W150031	TRi electrode O'ring
27	W197401	TRi 10 electrode packed
27	W197412	TRi 18 electrode packed
27	W197432	TRi 22 electrode packed
27	W197442	TRi 35 electrode packed
28	W043280	TRi cell housing
29	W197790	« Zodiac » sticker for TRi cell (3 per cell)
30	W151271	TRi barrel union O'ring
31	W197780	TRi barrel unions assembly (DN63 mm / 2")
32	W041321	Reducing bush, EU version DN50 mm
33	W041101	Reducing bush, UK version 1 1/2 "

2. Ei salt water chlorinator

1) Fault diagnosis

a) Hidden functions and menus

Ei salt water chlorinator has hidden functions to modify several internal settings and/or to assist with understanding and diagnosing faults with the unit.

These hidden functions can be accessed via several control panel switches.

→ **Service switch**

'Minute' switch is also a service button dedicated to several other functions other for normal use. It could :

- **erase some error codes** (see part b) / 'Meaning of warning lights and error codes')
- **check polarity reversal**
- **access to operating hours.**

→ **Polarity reversal test**

This test is done to check the reliability and operation of automatic polarity reversal. It makes it possible to determine the source of a scaled electrode for example (mainly linked to a high calcium level and/or high total alkalinity into pool's water).

→ *Polarity reversal testing procedure :*

- Remove Ei control box from the wall – without disconnecting it from mains supply – and put it face down.
- Switch the Ei unit on.
- Adjust chlorine production to 100% (this ensures that Ei will always produce chlorine).
- Press and hold 'Minute' switch for 6 seconds.
- Ei unit will stop chlorine production and reverse its polarity. The fan will stop briefly and start again in few seconds (see arrow on the image below). This behaviour shows that polarity has reversed.



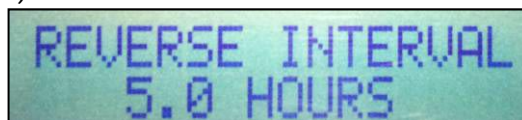
Remark : If this test fails, try the same procedure again to be sure. If the fan doesn't stop, it means that polarity reversal is defective. Power PCB consequently needs to be replaced (see chapter 2) / 'Repair Procedure'.

→ **Polarity reversal testing**

It's possible to modify polarity cycles (or reverse interval) through a hidden access (default setting is 5 hours).

→ *Procedure to change reverse interval :*

- Ensure that Ei unit is connected to mains supply (LCD display is on, chlorine generation is off).
- Press simultaneously 'Hours' and 'Minutes' switches to change the **REVERSE INTERVAL**. The new selected value will be displayed for a few seconds (see picture).



- It's possible to go to the 2 different settings (5 hours which is default setting and 2,5 hours) by pressing simultaneously on these 2 switches.
- Ei unit automatically returns to default LCD display after several seconds.

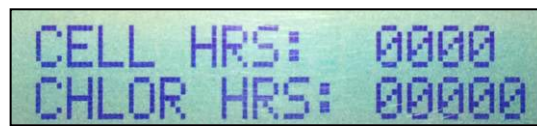
Remark : Default reverse interval (5 hours cycles) is adapted to most cases (TH < 400 ppm). Choosing 2,5 hours cycles improves self cleaning effect but decrease electrode's lifespan by 15% (use calcium catcher product rather than short reversing period).

➔ **Operating hours menu**

Ei salt water chlorinator retains all operating hours in its memory. This means control box total running time and electrode operating hours. Times are different because cell operating time is only "real chlorine generation time".

➔ *Procedure to access operating hours menu :*

- Ensure that Ei unit is connected to mains supply (LCD display on).
- Press and hold the 'Minute' switch for 10 seconds until you see the operating hours menu.
- Ei will display electrode operating hours ('CELL HRS') and total running time ('CHLOR HRS').



- If Ei electrode has been replaced, press the 'Hours' switch to reset cell operating hours.
- If not (just for a normal control), press the 'Clock' switch to come back to default LCD display.

Nota : It's not possible to reset control box total running hours ('CHLOR HRS'), except if control PCB has been replaced (all memories and setting are consequently reset to zero).

b) Meaning of warning lights and error codes

Ei salt water chlorinator is able to highlight a potential fault thanks to warning lights and/or error codes displayed on the default LCD screen.

Warning : This does not necessarily means the unit is faulty. It could be due to poor operating conditions (lack of salt or cold water temperature for example).

➔ *Meaning of warning lights :*

Cases	Causes	Solutions
'Salt' orange led	<ul style="list-style-type: none"> > Lack of salt (< 3 g/L, required = 4 g/L) > Cold water (T°C < 18 °C, depends on water mineral level) > Electrode is scaled, worn or damaged 	<ul style="list-style-type: none"> > Add salt to reach required level > Reduce chlorine generation or add salt to compensate water mineral level > Clean or replace electrode (also check TH and polarity reversal)
'Flow' red led	<ul style="list-style-type: none"> > No flow through pipework (filtration stopped) > Air bubbles in pipework > Flow switch is damaged or disconnected 	<ul style="list-style-type: none"> > Switch on the filtration > Check pump, filter and pipework to ensure there is no air in the system > Reconnect or replace the flow switch
All leds off	<ul style="list-style-type: none"> > Ei unit is off > Mains supply is off > Internal fuses are damaged 	<ul style="list-style-type: none"> > Run the filtration > Check mains supply > Check fuses

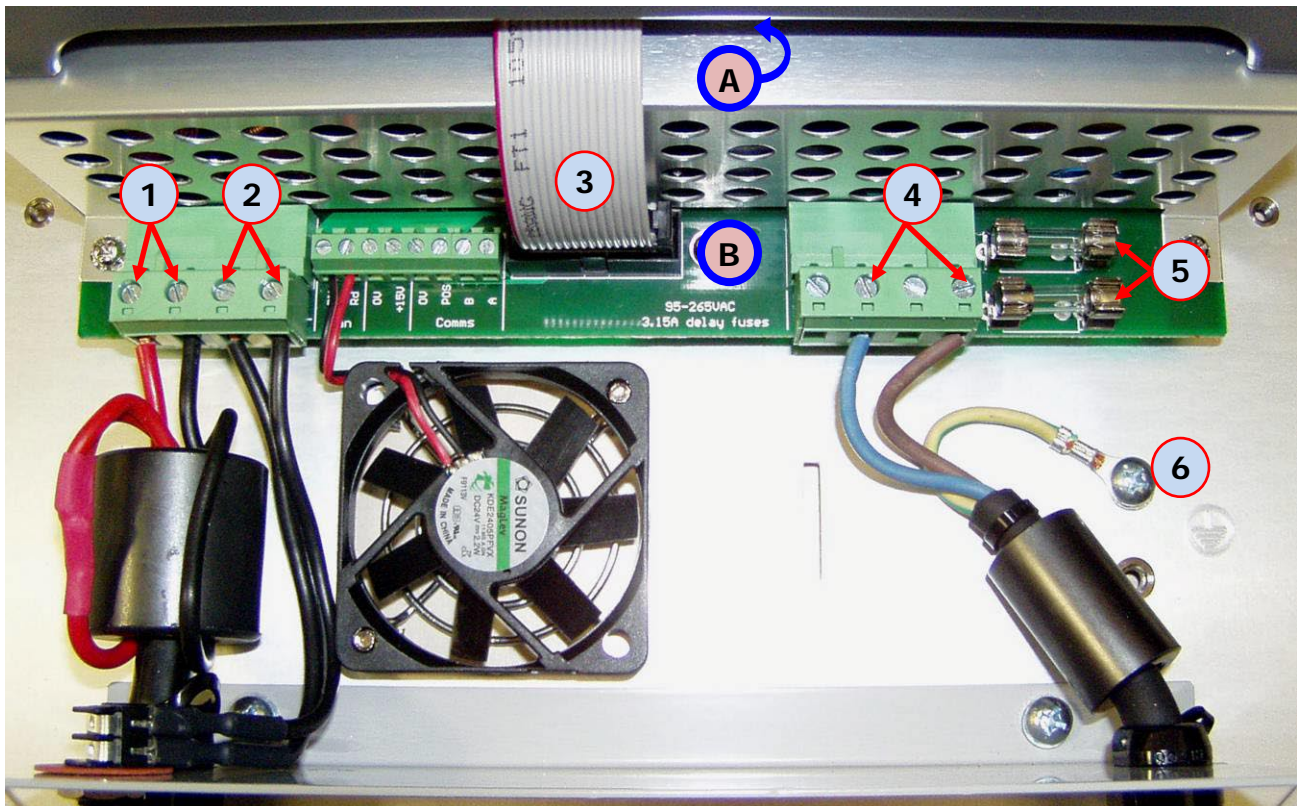
→ Meaning of error codes :

Error code	Causes	Solutions
CHECK SALT (+ 'Salt' led)	<ul style="list-style-type: none"> > Lack of salt (< 3 g/L, required = 4 g/L) > Cold water (T°C < 18 °C, depends on water mineral level) > Electrode is scaled, worn or damaged 	<ul style="list-style-type: none"> > Add salt to reach required level > Reduce chlorine generation or add salt to compensate water mineral level > Clean or replace electrode (also check TH and polarity reversal)
NO FLOW ! (+ 'Flow' led)	<ul style="list-style-type: none"> > No flow through pipework (filtration stopped) > Air bubbles in pipework > Flow switch is damaged or disconnected 	<ul style="list-style-type: none"> > Switch on the filtration > Check pump, filter and pipework to ensure there is no air in the system > Reconnect or replace the flow switch
REVERSING	Ei unit is reversing its polarity (≈ 10 minutes, 5 h or 2,5 h cycles)	<ul style="list-style-type: none"> > Wait for the end of the procedure (automatic) > Check polarity reversal with service switch ('Minute')
CHECK CELL	<ul style="list-style-type: none"> > Electrode is scaled > Total cell operating hours has reached a high value (6000 h < time < 9000 h) 	<ul style="list-style-type: none"> > Clean the electrode and check polarity reversal > Check Ei unit and erase the error code by pressing and holding the service switch for 3 seconds ('Minute')
OUTPUT FAULT	<ul style="list-style-type: none"> > Cell cable is not connected correctly > Power supply problem (power PCB) 	<ul style="list-style-type: none"> > Check all electrical connections > Check cell amperage (see testing procedure) > Replace the whole power supply assembly

Nota : Press and hold the 'Minute' switch for 3 seconds to erase **CHECK CELL** and **OUTPUT FAULT** error codes when it appears.

2) Repair procedure

a) Electrical readings for after sales



- A** = Control PCB (under grey cover)
B = Power supply assembly (power PCB + fan + aluminium chassis + cover)
1 = Cell supply
2 = Flow switch connection (dry contact)
3 = Control PCB connection belt
4 = Mains supply connection (220-240 V AC)
5 = Fuses (3,15 A T)
6 = Earth connection

Readings	Ei 10	Ei 17	Ei 25
Mains supply (4)	220-240 V AC 50 Hz		
Cell output voltage (1)	21-24 V DC		
Cell output nominal amperage (1)	2,2 A	3,6 A	5,0 A
Flow switch contact (2)	< 1 Ω with flow (contact closed) ; insulated without flow (contact opened)		

b) Ei testing procedure

IMPORTANT : Ei salt water chlorinator is a « new generation » unit which is able to highlight poor working conditions with error codes. It's important to ensure that all possible external problems have been eliminated before opening and checking Ei unit.

Also ensure that the fault is not due to a worn or damaged electrode (must be clean).

If you're sure that it's an internal problem, please follow the procedure hereafter.

- Unit disconnected, check the 3,15 A T fuses (mark #5). These are "upstream" fuses; which means that the power PCB may be damaged if fuses are blown (house protection in case of power PCB damage). Please go to the procedure '(II)' for power supply assembly replacement.
- Unit disconnected, check earth connection (mark #6).
- Unit disconnected, check the flow switch dry contact (mark #2) by removing it from its holder and activating it by hand. If contact is always opened, check the "jack" socket of flow switch cable and/or replace the whole flow switch.
- Connect the Ei unit to mains supply and ensure that LCD display comes on (chlorine generation is off). Firmware will be displayed a few seconds. Mains supply reading should be 220-240 V AC (mark #4).
 If Ei unit doesn't come on, switch the unit off and replace the control PCB then run the same test again. To do this, you've got to disconnect the connection belt of the control PCB (mark #3) and connect a new control PCB to the power supply assembly (hold the new control PCB by hand). There are 2 possible cases :
 - Ei unit comes on and operates correctly = problem is solved, see procedure '(I)'
 - Ei unit stays off = replace the whole power supply assembly, see procedure '(II)'.
- Switch on chlorine production on the Ei unit ('On/Off' switch) and set chlorine output at 100% ('Output' switch, 4 green leds should be on). ensure that the fan at the back of the control box is running. Check cell supply (mark #1). There are 2 possible cases :
 - Cell voltage is between 21 and 24 V DC = no problem with Ei unit
 - Cell voltage is out of those previous values = nominal amperage problem, go to next step.
- Check nominal cell amperage with an amp-meter (0-10 A DC caliber) **in line on the black wire of the cell cable** (either onto mark #1, or onto cell connectors as showed onto the picture hereafter).



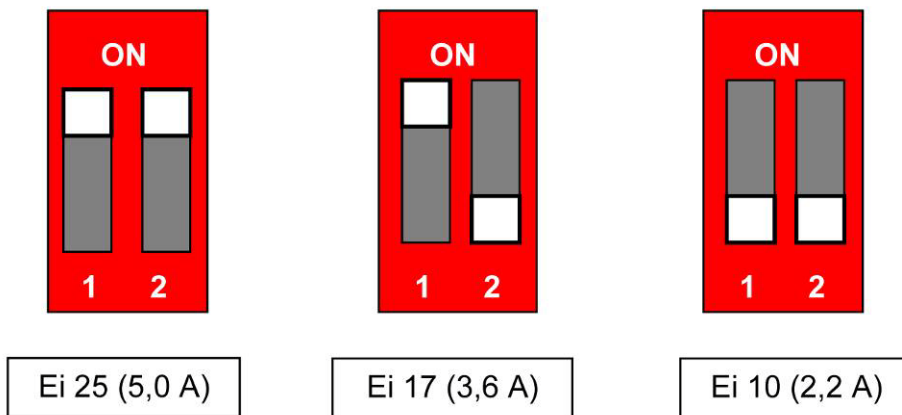
Remarks :

- Disconnect Ei unit from mains supply during amp-meter connection onto cell cable. Then ensure that **chlorine output is set to 100% for testing** (4 green leds).
- If reading is made on the cell connectors (as in picture above), use a « crocodile wrench » to maintain the black amp-meter wire to the black cell connector.
- **Only take the reading from black wire of the cell cable**, not from red wires !

If output amperage is not correct (see readings table above), adjust it thanks to the 2 white switches at the back of the Ei control box (arrow on the picture below) while checking amperage value on the amp-meter.



→ Ei switches position :



(1) Control PCB replacement procedure :

- Remove the Ei top cover held by 4 screws (external silver cover already removed).
- Disconnect the connection belt of the control PCB.
- Unscrew the 4 control PCB fixing screws and carefully remove the faulty control PCB.
- Proceed in opposite way to install the new control PCB.

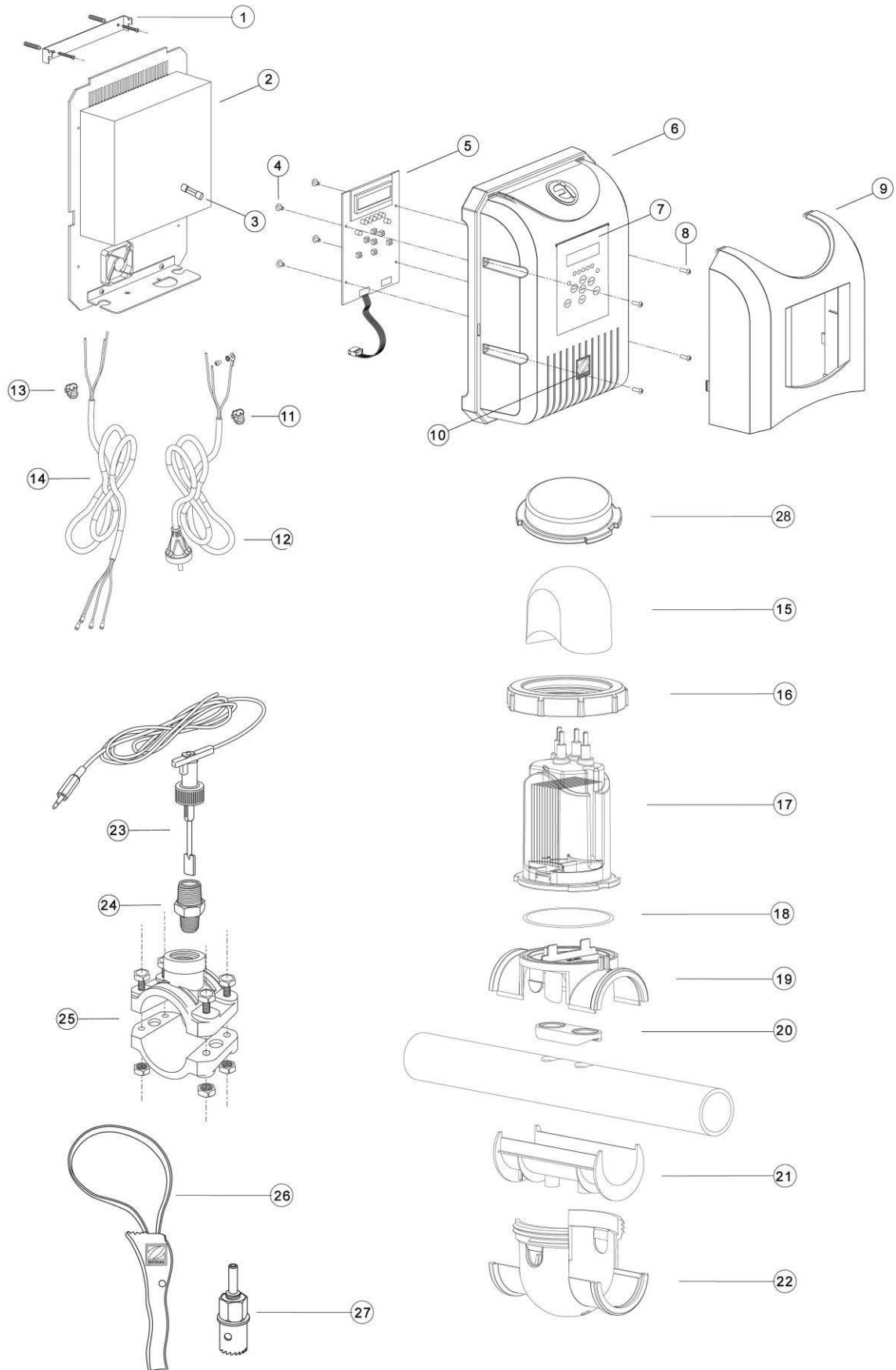
(II) Power supply assembly replacement procedure :

- Disconnect the 2 green connectors on the power PCB (mains supply and cell supply).
- Unscrew the earth connection then the 2 fixing screws of the bottom metallic plate to remove all cables (mains supply cable and cell cable).
- Remove the Ei top cover containing control PCB by unscrewing its 4 screws.
- Disconnect the control PCB connection belt.
- Replace the whole power supply assembly (power supply PCB + fan + aluminium chassis + cover)
- Proceed in opposite way to re-assemble the Ei control box.
- Adjust the nominal amperage by adjusting white switches and following the procedure of step « 6. » (see above).

!!!! VERY IMPORTANT !!!! : When power supply assembly has been replaced, nominal amperage adjustment is MANDATORY. As spare parts, power supply assemblies are provided with the minimal amperage setting for Ei 10 models (2,2 A). Nominal amperage must be adjusted to the correct value (see part 'Ei switches position' above).

Nota : Do not remove the aluminium cover of the power supply assembly to try to repair the power PCB (power PCB as "stand-alone" part is not available).

3) Ei spare parts



Mark	Part number	Description
1	W012575	Wall mount with attachment kit
2	W083071	Ei power supply assembly (power PCB + fan + aluminium chassis + cover)
3	W110091	Fuse M205 3,15 A T
4	W001400	4x1/4" screw for Ei PCB fixing
5	W083061	Ei control PCB
6	W043590	Ei chassis plastic cover
7	W177000	Ei control panel label
8	W001481	M3x12 mm screw Ei cover fixing
9	W043780	Ei external silver cover
10	W176801	"Zodiac" sticker for Ei chassis plastic cover and Ei terminal cap
11	W001371	Cord grip for mains supply cable
12	W052650	EU mains supply cable
13	W001401	Cord grip for Ei cell cable
14	W195590	Ei cell cable complete (with connectors)
15	W043800	Ei terminal cap
16	W043790	Ei electrode locking ring
17	W197601	Ei10 electrode packed
17	W197612	Ei17 electrode packed
17	W197621	Ei25 electrode packed
18	W151281	Ei electrode O'ring
19	W043640	Ei clamp top
20	W043700	Ei gasket UK (1½")
20	W043710	Ei gasket EU (DN50 mm & DN63 mm)
21	W043680	Ei pipe adaptor UK (1½")
21	W043690	Ei pipe adaptor EU (DN50 mm)
22	W043630	Ei clamp bottom
23	W197172	Sika VKL05M flow complete switch (with cable and 3,5 mm male "jack")
24	W043560	3/4"x1/2" flow switch adaptor
25	W013010	DN50 mm - 1/2" saddle clamp (also fit 1 ½" pipes)
25	W013011	DN63 mm - 1/2" saddle clamp (also fit 2" pipes)
26	W043750	22 mm hole saw
27	W043760	Ei strap wrench for electrode removal
28	W043870	Ei winterizing cap

3. TRi pH module

1) Fault diagnosis

Please see chapter 1. / 'TRi salt water chlorinator' to see all hidden functions indications.

→ Meaning of error codes

Error code	Causes	Solutions
PH LOW	<ul style="list-style-type: none"> > pH sensor is dirty or needs to be calibrated > pH is worn and/or defective > Pool size setting is too big > Set point is too high 	<ul style="list-style-type: none"> > Clean and calibrate pH sensor > Replace pH 7,5 buffer solution if necessary > Check selected pool size > Check set point > Replace pH sensor if necessary
PH HIGH	<ul style="list-style-type: none"> > pH sensor is dirty or needs to be calibrated > pH is worn and/or defective > Pool size setting is too small > Set point is too low 	<ul style="list-style-type: none"> > Clean and calibrate pH sensor > Replace pH 7,5 buffer solution if necessary > Check selected pool size > Check set point > Replace pH sensor if necessary
PH ERROR	<ul style="list-style-type: none"> > pH minus container is empty > pH sensor is dirty or needs to be calibrated > pH sensor is worn and/or defective > Pool size is too small > Peristaltic pump is defused 	<ul style="list-style-type: none"> > Replace pH minus container > Clean and calibrate pH sensor > Replace pH 7,5 buffer solution if necessary > Check selected pool size > Test the peristaltic pump ('TEST ACID' menu) > Replace pH sensor if necessary > Erase error code by pressing and holding the 'Select' switch during 3 seconds

→ Error codes explanation :

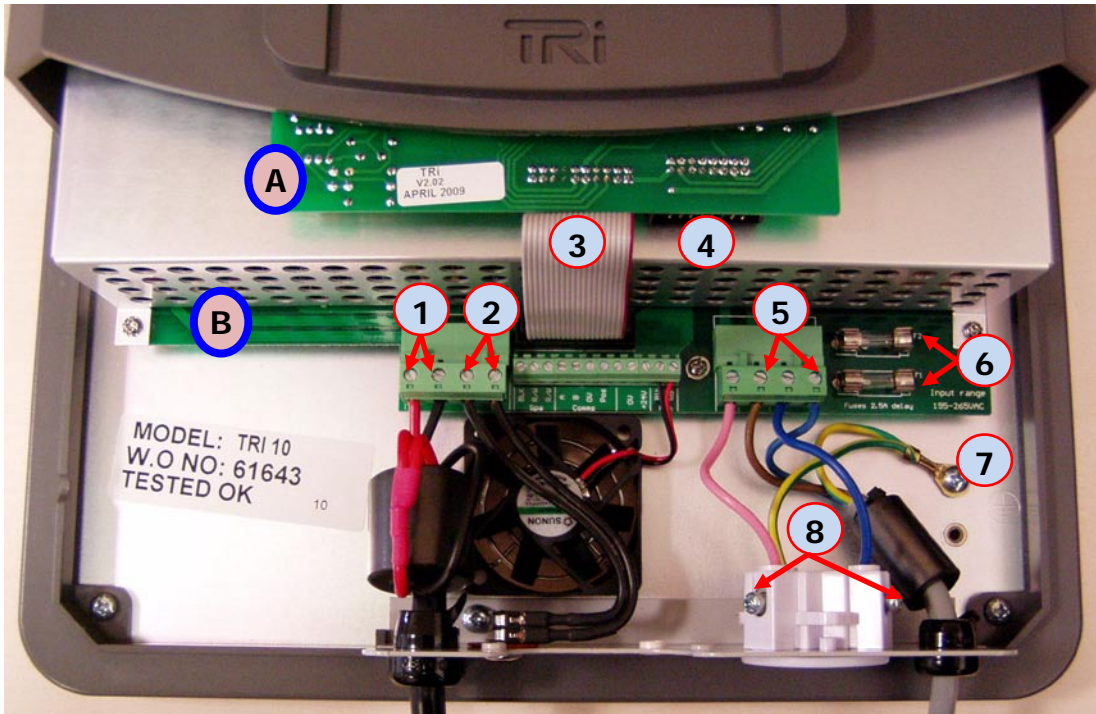
- > **PH LOW** : Pool pH is 0,4 pH lower than displayed set point. pH needs to be manually checked before proceeding.
- > **PH HIGH** : Pool pH is 0,4 pH higher than displayed set point. pH needs to be manually checked before proceeding.
- > **PH ERROR** :
 - TRi pH peristaltic pump has made 3 complete dosing cycles (6 hours) without reaching displayed set point.
 - TRi pH peristaltic pump has not been activated since more than 72 cumulative hours.

Nota : Press and hold the 'Select' switch for 3 seconds to erase 'PH ERROR' error code when it appears.

2) Repair procedure

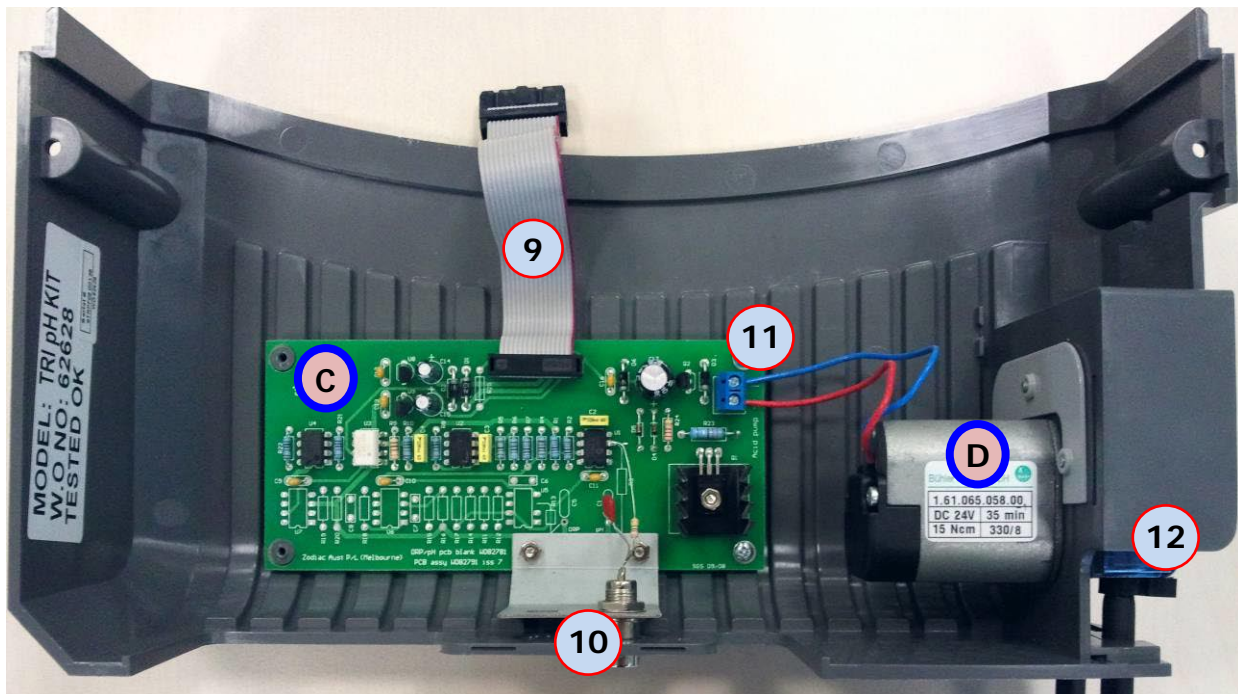
IMPORTANT : TRi salt water chlorinator with TRi pH module is a « new generation » unit which is able to highlight poor working conditions with error codes. It's important to ensure that all possible external problems have been eliminated before opening and checking TRi control box and/or TRi pH module.
 Also ensure that the fault is not due to a worn or damaged pH sensor (must be clean and recently calibrated).
 If you're sure that it's an internal problem, please follow the procedure hereafter.

→ *TRi control box internal view :*



- A** = Control PCB
- B** = Power supply assembly (power PCB + fan + aluminium chassis + cover)
- 1** = Cell supply
- 2** = Flow switch connection (dry contact)
- 3** = Control PCB connection belt
- 4** = Optional TRi pH module connection socket
- 5** = Mains supply connection (220-240 V AC)
- 6** = Fuses (2,5 A T)
- 7** = Earth connection
- 8** = Filter pump optional socket (220-240 V AC – 8 A max)

→ *TRi pH module internal view (PCB protective cover removed) :*



C = TRi pH module PCB
D = Peristaltic pump motor

9 = TRi pH PCB connection belt
10 = pH sensor BNC socket
11 = Peristaltic pump motor connection
12 = Peristaltic pump head assembly

→ Testing procedure

Important : TRi pH module works with an acid product (pH minus). Always wear adequate safety equipment before attempting work on the pipework (glasses, gloves, protective coat...). It's advisable to completely drain pH minus from the pipework with fresh water before any disassembling (thanks to **TEST ACID** menu).

1. Disconnect TRi unit from mains supply, then disassemble pH minus suction & injection piping and unplug pH sensor. Remove TRi pH module from TRi unit to access electrical connections. See chapter 1.2)b) / 'TRi testing procedure' to see how to disassemble a TRi unit.

2. Unit disconnected, check the 2,5 A T fuses (mark #6). These are "upstream" fuses; which means that the power PCB may be damaged if fuses are blown (house protection in case of power PCB damage). See chapter 1.2)b) / 'TRi testing procedure' to see how to disassemble a TRi unit.

3. Unit disconnected, check earth connection (mark #7).

4. Remove the TRi pH PCB protective cover (2 screws). Connect the TRi pH module connection belt (mark #9) to the dedicated connection socket on the TRi control PCB (mark #4). Put the TRi pH module face down as shown on the following picture.



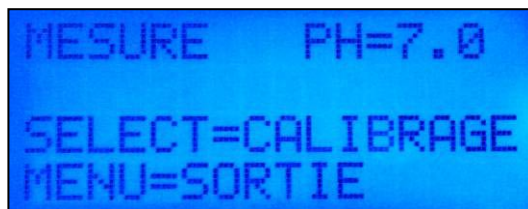
5. Shunt the BNC socket BNC (mark #10) with an old BNC plug welded at its end or with a "U shape" metallic wire (use a paper clip for example). Ensure that short-circuit is good onto BNC socket to get a correct reading (see pictures).



or



6. Connect the TRi unit to mains supply and press 'Menu' and 'Scroll' switches to access **PH SETUP** then **CALIBRATE PH** to get the real pH reading. If displayed value is unstable or outside 6,8 – 7,2 range, replace the TRi pH PCB (mark #C).



7. If displayed pH value is correct (between 6,8 and 7,2 pH), check the peristaltic pump thanks to the 'TEST ACID' function (From default LCD screen, pres the 'Menu' switch and use the 'Scroll' switch to access 'PH SETUP' then 'TEST ACID'). If rollers holder doesn't turn (check that it's not broken !), replace the peristaltic pump motor (mark #D).

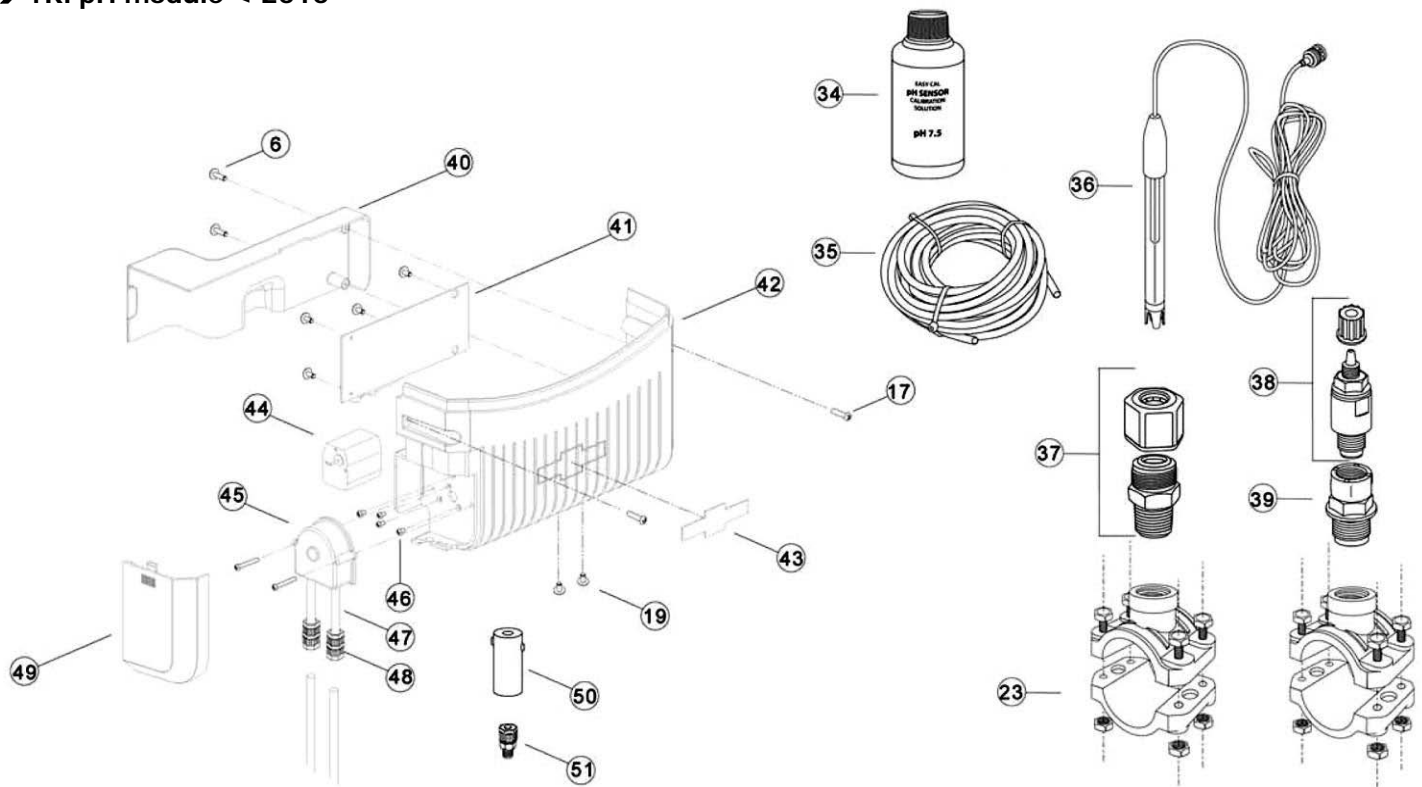
8. Ensure the rollers holder and actual peristaltic hose are OK. Replace it if necessary (mark #12). To remove the peristaltic pump head, remove the PCB protective cover, then unscrew the 2 fixing screws. Warning : To make it easy, remove the peristaltic pump head by using a small flat screw driver as a « lever » to lift up the whole blue casing (see picture).



9. After having checked and repaired the TRi pH module, calibrate the pH sensor by following the User Manual's procedure.

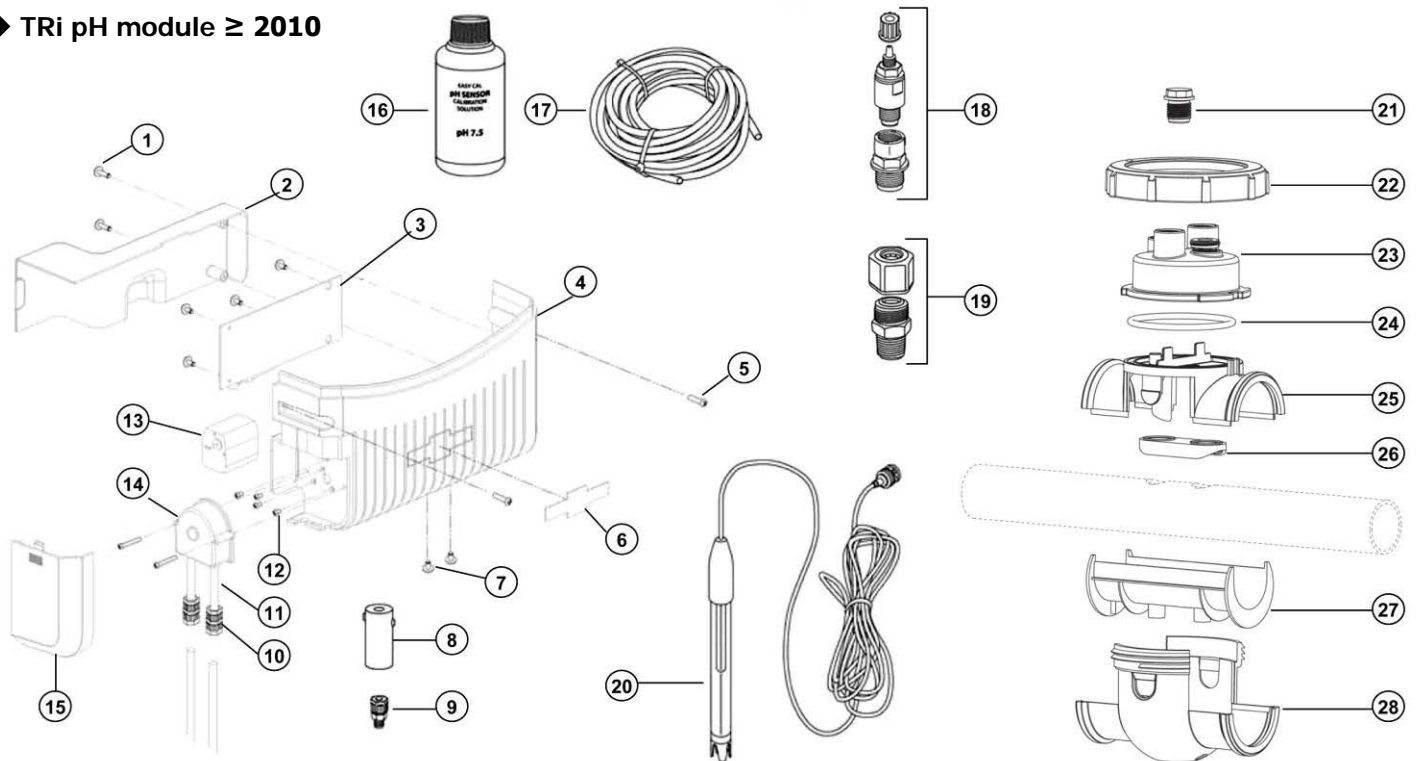
3) TRi pH module spare parts

→ TRi pH module < 2010



Mark	Part number	Description
6	W001400	4x1/4" TRi pH PCB fixing screw
17	W001421	M4x20 mm TRi pH module housing fixing screw
19	W001461	M3x5 mm fixing screw for BNC socket
23	W013010	DN50 mm – 1/2" saddle clamp (also fit 1 1/2" pipes)
	W013011	DN63 mm – 1/2" saddle clamp (also fit 2" pipes)
34	W500730	pH 7,5 buffer solution (200 mL)
35	W043450	6x4 mm polyethylene pH minus injection piping (per meter)
36	W013003A	pH sensor Z35H1P-17 (with 5 m armored cable & BNC plug)
37	W043730	pH sensor holder – 1/2"
38	W043440	One-way valve – 1/4"
39	W013015	One-way valve PVC reducer
40	W043260	TRi pH PCB protective cover
41	W083001	TRi pH module PCB
42	W043250	TRi pH module housing
43	W176751	« TRi pH » sticker for TRi pH module housing
44	W501201	Peristaltic pump motor
45	W501191	Peristaltic pump head assembly (with peristaltic tube, without connectors)
46	W001451	M3x6 mm peristaltic pump motor fixing screw
47	W501211	TRi pH peristaltic hose (without connectors)
48	W043420	Peristaltic pipe connector (2 per hose needed)
49	W043270	Peristaltic pump protective cover
50	W045121	Ceramic weight
51	W040451	Stop washer for ceramic weight

→ TRi pH module ≥ 2010



Mark	Part number	Description	
1	W001400	4x1/4" TRi pH PCB fixing screw	
2	W043260	TRi pH PCB protective cover	
3	W083001	TRi pH module PCB	
4	W043250	TRi pH module housing	
5	W001421	M4x20 mm TRi pH module housing fixing screw	
6	W176751	« TRi pH » sticker for TRi pH module housing	
7	W001461	M3x5 mm fixing screw for BNC socket	
8	W045121	Ceramic weight	
9	W040451	Stop washer for ceramic weight	
10	W043420	Peristaltic pipe connector (2 per hose needed)	
11	W501211	TRi pH peristaltic hose (without connectors)	
12	W001451	M3x6 mm peristaltic pump motor fixing screw	
13	W501201	Peristaltic pump motor	
14	W501191	Peristaltic pump head assembly (with peristaltic tube, without connectors)	
15	W043270	Peristaltic pump protective cover	
16	W500730	pH 7,5 buffer solution (200 mL)	
17	W043450	6x4 mm polyethylene pH minus injection piping (per meter)	
18	W043440	One-way valve – 1/4"	
19	W043730	pH sensor holder – 1/2"	
20	W013003A	pH sensor Z35H1P-17 (5 m armored cable & BNC plug)	
21	W043880	1/2" threaded cap	
22	W043790	POD locking ring	
23	W043850	POD (without adaptors and holders)	
24	W151281	POD O'ring	
25	W043640	POD clamp top	
26	W043710	POD gasket EU (DN50 mm & DN63 mm)	POD gasket UK 1 1/2" = W043700
27	W043690	POD pipe adaptor EU (DN50 mm)	POD pipe adaptor UK 1 1/2" = W043680
28	W043630	POD clamp bottom	
/	W043860	Flow switch threaded adaptor	
/	W151290	O'ring for flow switch threaded adaptor	

4. pH Perfect regulation

1) Fault diagnosis

→ *Meaning of alarms and error codes*

Alarm or Error code	Causes	Solutions
Level	<ul style="list-style-type: none"> > Corrective product container is empty > Intake pipe float is jammed > Intake pipe level sensor is damaged 	<ul style="list-style-type: none"> > Replace corrective product container > Check intake pipe float (should move easily) > Replace the whole intake pipe
OFA Alarm (*)	1 st OFA step activated (elapsed time > 70 %)	<ul style="list-style-type: none"> > Press the 'CAL/Enter' switch to stop alarm > Check pH sensor and/or pool's real pH
OFA Stop (*)	2 nd OFA step activated (elapsed time = 100 %)	<ul style="list-style-type: none"> > Press the 'CAL/Enter' switch to stop alarm > Check pH sensor and/or pool's real pH
Flow	<ul style="list-style-type: none"> > Filtration is stopped > Electrical connection is wrong 	<ul style="list-style-type: none"> > Switch the filtration on or check it > Check electrical connection
Quality Err or Error	<ul style="list-style-type: none"> > Worn buffer solution(s) > pH sensor is dirty > Ph sensor is defective 	<ul style="list-style-type: none"> > Replace buffer solutions > Clean pH sensor (10% hydrochloric acid solution) > Replace pH sensor
Error Parameter	Internal parameter fault	<ul style="list-style-type: none"> > Press the 'CAL/Enter' switch to erase error code > Replace pH Perfect PCB if necessary

(*) = OFA means "Over Feed Alarm". pH Perfect integrates a safety against corrective product over dosage.

→ *Hidden menu*

pH Perfect unit has a hidden menu to facilitate after sales diagnosis. Access to this 'Statistic' menu is only allowed to pool professionals.

Remark : 'Statistic' menu is always displayed in English languages.

→ *Procedure to access 'Statistic' menu :*

- Switch off the unit ('0-1' button).
- Switch on the unit while holding both 'CAL/Enter' & 'SET/Esc' switches (hold those switches until seeing 'Statistic' displayed onto LCD screen).



- Move around all values thanks to '▲' et '▼' switches.
- Switch off the pH Perfect to exit from 'Statistic' menu.

→ 'Statistic' menu could show 10 different values :

- '1.ProblemV' : Real pH value displayed in mV (useful to know if pH sensor is OK : pH7 ≈ 0 mV).
- '2.Power Nr' : Number of manual starts with '0-1' button.
- '3.Alarm Nr' : Number of 'OFA' alarms (a high value may indicate a wrong OFA time setting or a damaged pH sensor).
- '4.Motor H' : Peristaltic pump motor operating hours.
- '5.Motor Nr' : Number of peristaltic pump motor starts (equivalent to number of dosage cycles).
- '6.Flow H' : "Potential dosage mode" operating hours (equivalent to total filtration hours).
- '7.Calib.7pH' : Real pH sensor accuracy during last calibration procedure onto pH 7 (« display restraining » is overridden).
- '8.Calib.4pH' : Real pH sensor accuracy during last calibration procedure onto pH 4 (« display restraining » is overridden).
- '9.Revision' : pH Perfect software version.
- '10.Reset Value' : Values resetting (do not press any switch !)

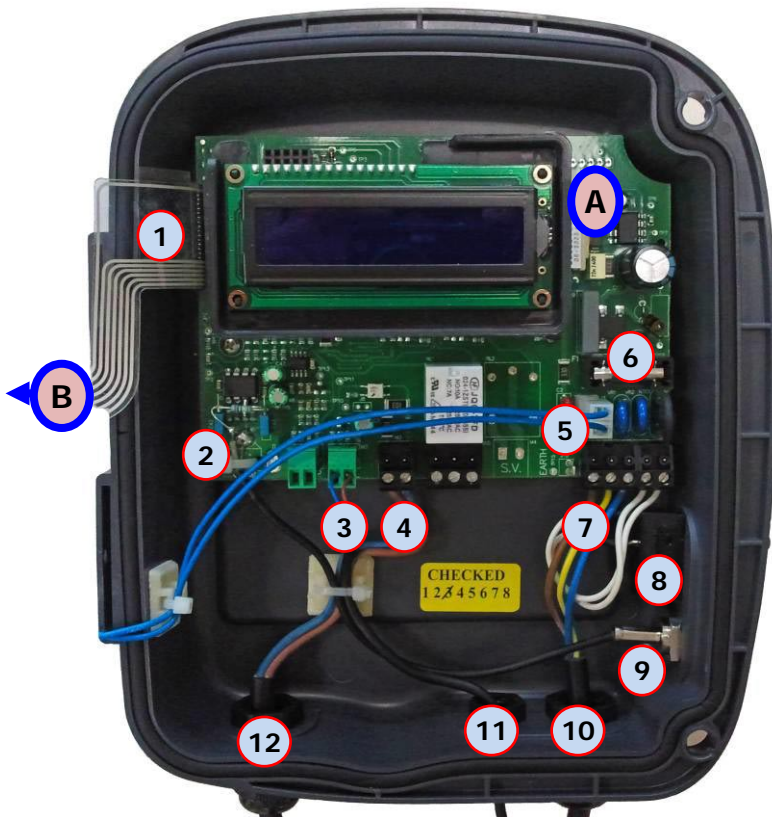
!! Warning !! NEVER press 'CAL/Enter' and/or 'SET/Esc' switches during 'Statistic' menu checking, this would completely erase pH Perfect memory and parameters ! Switch off the unit with '0-1' button to exit this menu.

2) Repair procedure

IMPORTANT : pH Perfect unit is a « new generation » unit which is able to highlight poor working conditions with alarms and error codes. It's important to ensure that all possible external problems have been eliminated before opening and checking pH Perfect control box.

Also ensure that the fault is not due to a worn or damaged pH sensor (must be clean and recently calibrated).
If you're sure that it's an internal problem, please follow the procedure hereafter.

→ pH Perfect internal view :



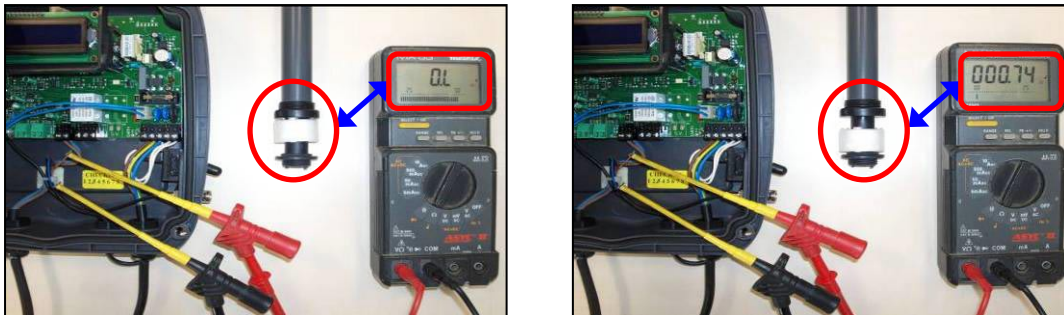
- A = pH Perfect PCB
- B = pH Perfect control panel (sticker + belt)
- 1 = Control panel connection belt
- 2 = pH sensor cable connection (armored cable)
- 3 = Intake pipe contact (dry contact)
- 4 = Filter pump detection connection
- 5 = Peristaltic pump motor connection (230 V AC)
- 6 = Fuse 500 mA T
- 7 = Mains supply connection (220-240 V AC)
- 8 = On/Off button ('0-1')
- 9 = BNC socket for pH sensor
- 10 = Mains supply cable (220-240 V AC)
- 11 = Intake pipe level sensor's cable
- 12 = Filtration control cable (220-240 V AC when filter pump is on)

Mains supply connection <i>Cable n°10, mark #7</i>	220-240 V AC
Filter pump detection connection <i>Cable n°12, mark #4</i>	220-240 V AC
Peristaltic pump motor connection (if activated) <i>Mark #5</i>	220-240 V AC
Max mains amperage <i>Mark #6</i>	500 mA
Filter pump detection voltage <i>Mark #4</i>	220-240 V AC <i>When filter pump is on</i>
Level sensor voltage (dry contact) <i>Mark #3</i>	≈ 5 V CC <i>Contact opened (float up)</i>
PCB testing with BNC socket shunted <i>Mark #9</i>	0 mV <i>Displayed pH value ≈ 7</i>

→ Testing procedure

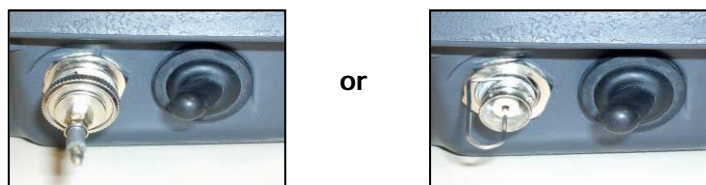
Important : pH Perfect unit works with a chemical product (pH minus or pH plus). Always wear adequate safety equipment before attempting work on the pipework (glasses, gloves, protective coat...). It's advisable to completely drain corrective product from the pipework with fresh water before any disassembling (use **Priming** mode with **▲** switch).

1. Disconnect the pH Perfect from mains supply, remove suction & injection piping and unplug pH sensor.
2. Unit disconnected, check 500 mA T fuse (mark #6). Replace it if necessary.
3. Unit disconnected, check intake pipe level sensor by removing its green connector (mark #3) and by checking continuity between blue and brown wires (no continuity if float is up and continuity if float is down). Test is also possible with unit connected to mains supply and green connector plugged by checking voltage between blue and brown wires (around 5 V DC when float is up and no voltage when float is up). Replace the whole intake pipe if this test fails.



4. Check filter pump detection by switching unit on and off several times while measuring voltage on its connector (mark #4, ensure that this function is activated into **Parameters** menu !). There should be 220-240 V AC when filter pump is on and no voltage when filter pump is off. Check electrical connections if this test fails. If **Flow** alarm still flashes on the LCD screen, replace the pH Perfect PCB.

5. Check pH Perfect PCB by shunting BNC socket (mark #9) with an old BNC plug welded at its end or with a "U shape" metallic wire (like a paper clip for example). Switch on the unit ('0-1' button) while ensuring that short-circuit is OK onto BNC socket (see pictures). LCD screen should display a stable pH value between 6,8 and 7,2. If this test fails, replace the pH Perfect PCB.



6. After having checked and repaired the pH Perfect, calibrate the pH sensor by following the User Manual's procedure.

3) pH Perfect spare parts



Mark	Part number	Description
1	W013001	One-way valve – ¼"
2	W013002	Buffer solutions kit (pH4, pH7 & H ₂ O)
3	W013003A	pH sensor Z35H1P-17 (5 m armored cable & BNC plug)
4	W013004	Peristaltic tube complete (with connectors)
5	W013005	Fuse 500 mA T
6	W013007	Rollers holder
7	W013008	Intake pipe complete (with cable & suction tube)
8	W013009	6x4 mm polyethylene corrective product piping (per meter)
9	W013010	DN50 mm – ½" saddle clamp (also fit 1 ½" pipes)
	W013011	DN63 mm – ½" saddle clamp (also fit 2" pipes)
10	W013015	One-way valve PVC reducer
11	W013016	pH sensor holder – ½"
	W013020	4 mm headless stainless screws (for control box hinges)
12	W013022	pH Perfect PCB (since 2008 models)
	W013023	Control panel label (with integrated switches and connection belt)
	W013024	Empty pH Perfect control box (without hinges and screws)
13	W013026	Peristaltic pump motor assembly
	W013029	Peristaltic pump protective cover



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www.zodiac-poolcare.com

ZODIAC POOL CARE EUROPE
Bd de la Romanerie B.P. 90023
49180 St Barthélemy d'Anjou Cedex
France

Phone : +33 2 41 21 17 30
Fax : +33 2 41 21 39 94

Zodiac Pool Care Europe - S.A.S.U. au capital de 517 200€ - 395 068 679

Global provider of innovative pool products and services