XO 4 & XO FLEX
TROUBLE SHOOTING GUIDE

YB-907

CONTENTS

FOREWORD

This XO4 and XO Flex Unit Maintenance, Diagnostics and Troubleshooting Manual contains detailed procedures:
- Schematic diagrams illustrating PCBs, sensors, instruments etc. and their locations.
- Information about PCBs, sensors, instruments etc. functionalities and their use.
- Description on how to remove and replace a part in the unit (Reference numbers are also mentioned.
- Information concerning specific measuring points in the unit (Voltage, Ampere. Frequency etc.).

This manual also includes information on how to operate and maintain the unit.

It is intended only for qualified and XO-certified technicians who have completed and received technical training, are experienced in troubleshooting and equipment replacement.
If you are in doubt about any of the procedures described in this manual, contact your XO technician.

Some minor hardware and software failures involve troubleshooting techniques beyond the scope of this document. Qualified technicians trained in troubleshooting will be better able to resolve them. Your XO Technician can provide this type of service.

Related Documentation

The following documents are available online at the address below:
https://www.xo-care.com/technical-service/

	***DANGER!*** ***Failure to observe the instructions contained in this troubleshooting guide could result in personal injury and property damage and may void the warranty.*** ***Read this troubleshooting guide carefully before servicing and testing the Unit.*** ***If you do not understand the instructions described in this troubleshooting guide, contact an XO technician.***

	***Unit XO4 and XO Flex must be serviced in accordance with the instructions in this troubleshooting manual.***

START UP		
Failure description	**Reason**	**Solution**
No "welcome" message on display. **No light on the main switch (early model)**	Main switch OFF	Activate the main switch
	Main switch ON	Check LED D1 and D3 on Mains PCB are "ON"
		Check the mains supply voltage at J4 on Mains PCB, 230VAC.
		Replace fuse(s) on the Mains PCB if necessary.
		Check the mains switch.
No light in the display	If the unit is ON and the Mains fuses are ok	After removing the instrument bridge top cover, check the following
		Check that diodes D800, D191 and D110 at Bridge PCB are ON.
	If LED D110 (3.3VDC) is ON	Check CA-103 Display cable for visible defects
		Check that CA-103 at J12 connector is properly connected.
		Check for corrosion at Display PCB from leaking water
		Measure voltage on J12: Between pin 1 and 5 = 5 V Between pin 9 and 10 = 3.3 V
		Replace the Display PCB
	If LED D110 is OFF.	Replace Bridge PCB.
	No "Welcome" message on the display and no sound during start up.	Check LED D1, D2, D4 and D6 on the Power supply PCB (replace fuses if necessary)
		Verify all connections in CA-004 – Bridge power cable
		For more information, click on the following link "Bridge PCB" on page 19, "Power Supply PCB" page 14 and "Mains PCB" page 13.

ERROR MESSAGES		
Failure description	**Reason**	**Solution**
"NETWORK FAIL !!" "CALL SERVICE"	Displayed after the unit is switched ON. Occurs when RS485 communication between the "Foot control" and the "Bridge PCB" fails. RS-485 communication: Brown cable White cable	The footswitch is equipped with the RS485 driver and the Powerdriver PCB AO-137 is equipped with the RS485 receiver: The RS-485 communication bus is established between the cable Brown and white. Connector J1 on the Foot control and J14 Bridge com
		Check the CA-003 communication cable is properly connected between J14 "Bridge PCB" and J32 Bridge Comm on "Backplane PCB" in the unit.
		A ground loop. A ground loop can interfere with data by distorting the RS485 signal resulting in a network fail. If one of the cable insulations is damaged and one of the conductors accidentally touches a grounded metal object it can cause a ground loop. Check that the brown and white communication cable on CA-009 "Foot control" and/or on CA-003 "Bridge Comm" cable are not damaged.
		Change the cables if damaged
		If the cable is not damaged and the message persists, either the "PCB Foot control AN-373" or the "Powerdriver PCB AO-137" is defective.
		Re-calibrate the Foot control. Watch the How-to video on XO CARE website
		Consult a XO technician.
"FOOT CONTROL FAIL" "CALL SERVICE"	Displayed after the unit is switched ON. Occurs when RS485 communication between the "Foot control" and the "Bridge PCB" fails.	Check that the CA-009 Foot control cable connector is properly connected to J14 "XO Foot control" on the "Backplane PCB" and that the cable is connected properly to the foot control.
		Check that the cable is not damaged.
		Consult page 15 "Backplane PCB" for more details

		Visually: Check the LED D4 on the foot control PCB. The LED should blink fast.
		Consult XO technician.
“POWER DRIVER FAIL!!” **“CALL SERVICE”**	Displayed after the unit is switched ON. Occurs when CA-017 RS485 communication between the “Power driver” and the “Bridge PCB” fails.	Check the connectors of the CA-017 RS-485 communication cable connected to J6 on the “Power driver” PCB and J3 on the “Bridge PCB”.
		Check the LED D6 on the power driver PCB. Replace power driver if necessary. See page 22 for further details.
		Consult XO technician.
“STAND CONTROL FAIL !!” **“CALL SERVICE”**	Displayed after the unit is switched ON. Occurs when RS485 communication between the “Stand Controller PCB” and the “Bridge PCB” fails.	Check if the "Stand Controller PCB” is properly connected to J16 on the "Backplane PCB".
		Verify the fuse F1 on “Stand Controller PCB” by checking the yellow LED D29 is ON. For more info go to page 16.
		Replace “Stand Controller PCB” if necessary
		Consult XO technician.
“WATER LEAK” **“CALL SERVICE”**	Overflow in the water reservoir (bottom of the unit)	Determine the cause of the leak and overflow. In general, the leak is due to overflow from the mixing cups indicating that the V27 and V39 valves do not close properly.
		Disassemble and clean the valves V27 and V39, replace the plunger gasket MR-150. Remove the water from the overflow reservoir and dry the S33 water leak sensor.
“UNIT NOT READY”	One of the instruments is activated upon unit start up.	On the bridge: Check that all instruments are in the rest position.
		Remove the instrument bridge cover: Check the magnet on the suspension roller AN-011 and the hall sensor on the suspension PCB is aligned.
		Check the LED D110 on the suspension PCB is OFF when the instrument is in the rest position. LED ON= Instrument active LED OFF= Instrument inactive

"NO WATER FLOW"	Displayed when the "backflow prevention" mixing cup takes more than 90 seconds to fill.	Check waterflow through the water softener filter and the water regulator and adjust if necessary, to 2.3 bar.
		See page 58 for more details on the Mixing Cup Sensor PCB functionality
		Check function of the valve V27. If necessary, disassemble, clean, and replace gasket MR-150.
		Check the main water valve V10.
"CHAIR SYNC FAILED"	Displayed when the chair synchronization fails	Recalibrate the chair according to the instruction "YB-755 - chair synchronization"
		Chair motors are powered by 230V from the "Mains PCB". See page 14 for further details.
		Check the hall sensors for the chair lift motor and back rest motor. See page 74 for more details.
		If calibration fails, replace "Stand controller PCB".
"CODE BLOCK REQUIRED" "CALL SERVICE"	Displayed when unit with firmware v2.00 or higher has no code block installed. This message can't be removed and unit not operable in this mode.	Consult a XO technician.
"CS ERROR"	Displayed if the unit's firmware is not complete or fails during update.	Run a new firmware update. Read carefully "YB-945 Update XO4 and Flex firmware" before performing the update.
		Replace the Bridge PCB if firmware update does not solve the issue.
"MISSING DMX PCB"	Displayed if there is an error in the MX motor circuit on the unit.	Verify that the "DMX PCB" located on top of the Power Driver PCB is not missing or defective.
		Verify that the cable CA-073/CA-112 is connected correctly.
		Verify that the Green LED on the "Power Supply AO-136"is on. Units from 11/2018 has no green LED on the Power Supply".
		Check the output voltage on the Power Supply is 32V +/- 0.5V.
		See page 36 "Micro motor MX2" for more information.
"WRONG INSTRUMENT"	Displayed if the menu's "SUSP X" and "SPCB X" (technician menu) are not configured correctly according to the active	Verify that the instrument is positioned on the correct suspension.
		Verify the configuration of "SUSP

	instrument.	X" and "SPCB X" in the technician menu. See page 23 for further details.
"WRONG SUSP PCB"	Displayed if the active instrument is not compatible with the suspension PCB, or if the "SPCB" menu is not configured correctly.	Configure "SPCB 1-6" in the technician menu.
"CHECK WHITE BOTTLE"	Displayed when the Water disinfection bottle (white handle) in the service hatch is empty.	Check that the parameter "WATER CL" is set correctly according to the unit configuration. Consult the "Technician menu" on page 26.
		Replace the white bottle "XO Water Disinfection" AO-980.
	If the bottle is full...	Verify if the bottle is positioned correctly.
		Verify LED on the bottle detection PCB is OFF. LED OFF= Bottle full LED ON= Bottle empty/missing
		Verify connections on the cable CA-033.
		Check that the rubber part on the sensor is not damaged or squeezed. Replace if necessary, part no. MG-880
		More information can be found "Water Disinfection System" on page 49 and 50.
"CHECK YELLOW BOTTLE"	Displayed when the Suction disinfection bottle (yellow handle) in the service hatch is empty.	Check that the parameter "SUCTION CL" is set correctly according to the unit configuration. Consult the "Technician menu" on page 26.
		Replace the yellow bottle "XO Suction Disinfection". AN-354.
	If the bottle is full.	Follow the instructions explained in the chapter "CHECK WHITE BOTTLE" above.
"SUCTION CLEAN FAIL" **"CALL SERVICE"**	Displayed when the Suction disinfection procedure fails. The error can be caused when the filling of the mixing cup takes more than 90 seconds or takes more than 4 minutes to empty	Check the function of the "Sensor PCB" located in the mixing cup. See page 58
		Check the water supply to the mixing cup.
		Check that suction is available
		Check that the yellow tubes are reaching the bottom of the mixing cup.
		Check that the yellow tubes on the service hatch is not clogged.
		Consult a XO technician.

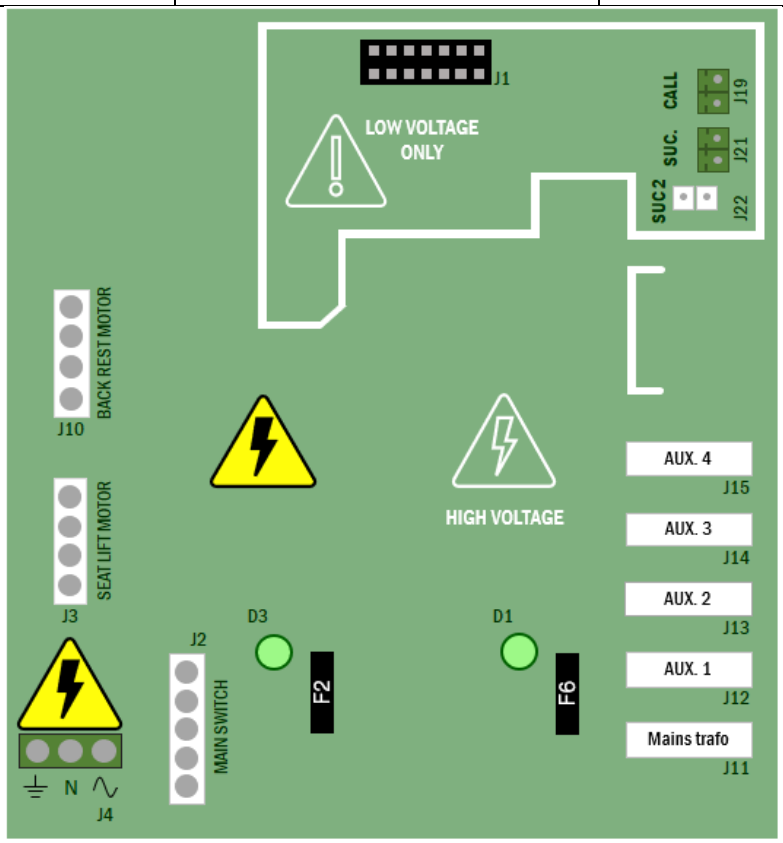
"MAINS PCB"

The "MAINS" PCB board purpose:

1. 230V general power supply connector.
2. Transformer power supply connectors.
3. Power supply for the lifting motor and the backrest motor of the chair
4. Halogen OP light connector power supply. (Only on AN-378)
5. Calling an assistant connector (relay)
6. Starting the suction motor (relay)

Units produced **before September 2017** are equipped with an "**AN-378**" PCB board
Units produced **after September 2017** equipped with the separate EMI filter are equipped with an **"AP-005"** PCB board.
See Service Note dated 02 September 2017 on the XO Site page "Technical Service".

Failure description	Reason	Solution
LED D3 is off (Power supply chair)	Verify fuse F1 and/or F2 (fuse F1 removed from 10/2017)	Change fuse F1 and/or F2
LED D2 is off	Verify fuse F3 and/or F4 (F3, F4 & D2 removed from Mains PCB 10/2017)	Change fuse F3 and/or F4
LED D1 is off (transformer and power supply)	Verify fuse F5 and/or F6 (fuse F6 removed from 10/2017)	Change fuse F5 and/or F6
LED D1 and D3 are OFF	Mains switch turned off Fault in mains voltage supply Fault in mains switch or mains switch cable	Check that the voltage is reaching the unit. Check the clinic Mains switch.



"POWER SUPPLY PCB"

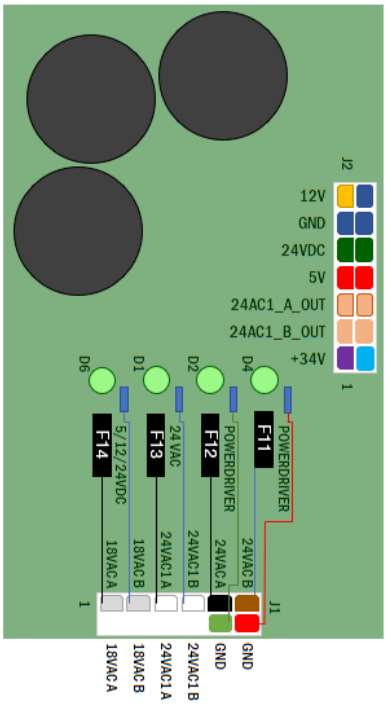
The "Power Supply PCB AN-371" transforms and manages the secondary voltages of the transformers into precision voltages necessary for the operation of the unit. The secondary outputs are connected to pin J1 and the precision voltage outputs are connected to pin J2.
Fuses F11 F12 F13 F14 protect the secondary outputs. LEDs D1, D2 D4 D6 indicate whether the secondary output voltage is present. A set of fuses is available AN-305

Failure description	Reason	Solution
D1 LED is OFF (24VAC)	Fault on 24VAC power supply.	Verify / Change fuse F13.
D2 LED is OFF ±34VDC	Fault on 24VAC power supply.	Verify / Change fuse F12.
D3 LED is OFF ±34VDC	Fault on 24VAC power supply.	Verify / Change fuse F11.
D6 LED is OFF 5V, 12V, 24VDC	Fault on 18VAC power supply.	Verify / Change fuse F14.
	All fuses OK, no light in LED	Replace transformer MH-650
	If one of the fuses blows after replacement	Track the overload or short circuit
All LEDs on the "Power supply PCB" are OFF and LED's on "Mains PCB" are ON	Problem with the transformer power supply.	Check that the transformer connector is inserted properly into J11 on the Mains PCB board.
		Check that transformer output connector is inserted properly into J1 on Power supply PCB
		Replace Power supply PCB

Precision voltage measurement:

On **"J2"** on **"Power Supply AN-371"** See picture and explanation down below

Concerning the mentioned precision voltage on **"J1 Stand"** on **"Bridge PCB AN-368"**, consult page 23 for picture and explanations.



PIN	Volt	Explanations.
1	+34V	LED D2 & D4 indicates ±34V is available. ±34V is transformed by the "power driver AO-137" placed in the bridge Used for the rotation of the micromotor MC3 and for the functionality of the curing lamp. Check the ±34V on the "J1 stand" located on the "Bridge PCB AN-368"
8	-34V	
2	24VAC	LED D1 indicates that 24VAC is available. LED D800 located on the "Bridge AN-368" indicates the presence of 24VAC.
9		
3	24VAC	
10		
4	5VDC	Consult the 5V Surge Protection session on page 17
11		
5	24VDC	LED D6 indicates that 24 VDC is available. LED D191 located on the "Bridge PCB AN-368" indicates the presence of 24VDC. The fuse F1 on the "Bridge PCB AN-368" protects the 24VDC on the "Bridge PCB AN-368".
12		
6	GND	0V
13		
14		
7	12V	Available - Not used

5V OVERVOLTAGE PROTECTION		
Protection against transient overvoltage's that could damage or destroy electronic components and PCB. It has a faster reaction than a fuse		
NB: Only concerns the 5V of the unit generated on the "Power Supply PCB AN-371". The "Bridge PCB AN-368" is equipped with its own 5V DC/DC converter.		
5V overvoltage protection affects : See the complete list in: "Backplane PCB" - 5V Connections		
Control Pedal	"Foot Control Fail – Call service" "Network Fail – Call service"	Displayed during start-up phase
Joystick	Not possible to operate the chair	No message displayed
XO Operating light	Operating light does not switch on	No message displayed
"Water clean" and "suction clean" sensors .	Sensors does not light	No message displayed

Procedure:

- Check the LED D6 situated on the "Power Supply PCB AN-371" is lit. When the LED is OFF indicates that either the fuse F14 is blown, or the transformer is defective
-

Remove the control pedal cover

- Measure the 5V on pin J1 of cable CA-009 - Pin 3 (Yellow +5V) and Pin 4 (Green GND)

If 5V is present, see other symptoms connected with the displayed message.

If the 5V is not present, switch off the unit:

- Disconnect all the cables mentioned in the list "BACKPLANE - 5V Connections" below, from the "Backplane AN-369".
- Disconnect also the cable connecting the "Power supply PCB AN-371" **J2** to the "Backplane PCB AN-369" **J30**
- Measure if the 5 Volt on J2 "Power Supply AN-371" is present between on the pins
  1. +5V: Pin 4 et 11
  2. GND: Pin 6, Pin 13, Pin 14.

If the 5 volts is **not** present change the "Power Supply AN-371".

When the 5 Volt is present:

- Reconnect the cables one by one while checking that the 5V is still present.
- Beware: Switch off the Unit off between each single cable connection.
- It is suggested to reconnect the following cables first as they are the most exposed to the risk of short circuit.
  3. Control pedal.
  4. Joystick
  5. "Water clean" and "Suction Clean" system cable

See the list below for more information on measurement points and checks to be performed.

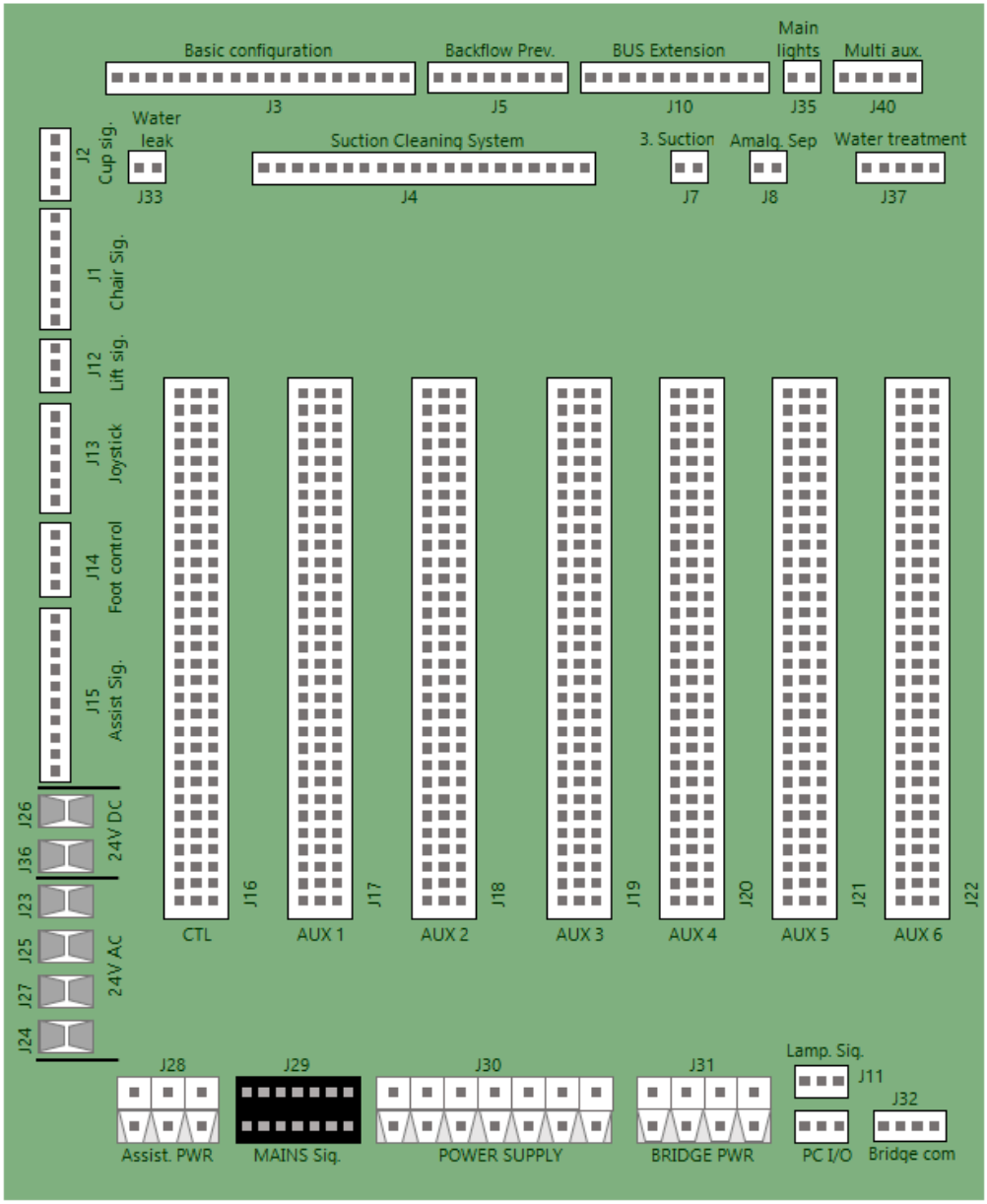
<table>
<tr><td colspan="3">Cause:</td></tr>
<tr><td colspan="3">Control Pedal</td></tr>
<tr><td rowspan="2">Check the “CA-009 Foot control” cable connected from J14 “Backplane AN-369” to J1 in the control pedal.</td><td>Pédale J1:</td><td>Pin 3: 5V (Yellow)
Pin 4: GND (Green)</td></tr>
<tr><td colspan="2">Cause: Trapped when the seat moves when the chair is raised or lowered.</td></tr>
<tr><td colspan="3">XO Operating light</td></tr>
<tr><td rowspan="2">Check the “CA-012 Lamp Signal” cable connected from J11 “Backplane AN-369” the connector located in the Operating light arm.</td><td>CA-012:</td><td>Pin 2: 5V (Brown)
Pin 3: GND (Green)</td></tr>
<tr><td colspan="2">Cause: Damaged cable connection, 5V is in contact with the ground.
Preferably measure on the connector located in the arm of the XO operating light</td></tr>
<tr><td colspan="3">Joystick Base chair</td></tr>
<tr><td rowspan="2">Check the “CA-010 Joystick” cable connected from J13 “Backplane AN-369” to J1 in the joystick</td><td>Joystick J1:</td><td>Pin 1: 5V
Pin 6: GND</td></tr>
<tr><td colspan="2">Cause: Trapped when the seat moves when the chair is raised or lowered.</td></tr>
<tr><td colspan="3">“Water Clean” and “Suction Clean” system</td></tr>
<tr><td rowspan="2">In the service panel.
Check the “CA-008 S15” cable connected on J1 on the AN-374 “Suction Clean dispenser level sensor” PCB

Same for the “CA-033 S14” cable connected on J1 of the AN-374 “Water treatment dispenser level sensor” PCB”</td><td>CA-008:</td><td>Pin 1: 5V
Pin 4: GND</td></tr>
<tr><td colspan="2">Cause: The cable may be damaged if the cable clamps are too tight and the 5V is in contact with the metallic part of the service panel.
Measure directly on the connector J1</td></tr>
</table>

“BACKPLANE”– 5V Connections		Cables	Measure	
J4	Suct. Clean. System	CA-008	5V:	Pin 6, 12, 16
			GND:	Pin 2, 3, 5, 11
J5	Backflow Prev.	CA-007	5V :	Pin 4
			GND	Pin 3
J11	Lamp signal	CA-012	5V :	Pin 2
			GND :	Pin 3
J12	Lift Sig.	CA-047	5V :	Pin 2
			GND :	Pin 3
J13	Joystick	CA-010	5V :	Pin 1
			GND :	Pin 6
J14	Foot control	CA-009	5V :	Pin 3
			GND :	Pin 4
J29	Mains PCB Control	CA-011	5V :	Pin 1
			GND :	Pin 13
J30	Power Supply	CA-005	5V :	Pin 4, 11
			GND :	Pin 6, 13, 14
J33	Water detection	CA-029	5V :	Pin 2
J37	Water Treatment	CA-033	5V :	Pin 3, 6
			GND :	Pin 4

"BACKPLANE PCB"

The backplane is used as a support backbone structure for connecting PCB such as the "Stand controller PCB", "Peristaltic Pump controller PCB", "Screen Power supply PCB" and cable connection configuration.



Connections	Cables
J1 Chair signal	CA-001
J3 Basic config.	CA-006
J4 Suct. Clean. System	CA-008
J5 Backflow prev.	CA-007
J8 Amalgam Separator	CA-035
J11 Lamp signal	CA-012
J12 Lift signal	CA-047
J13 Joystick	CA-010
J14 Foot control.	CA-009

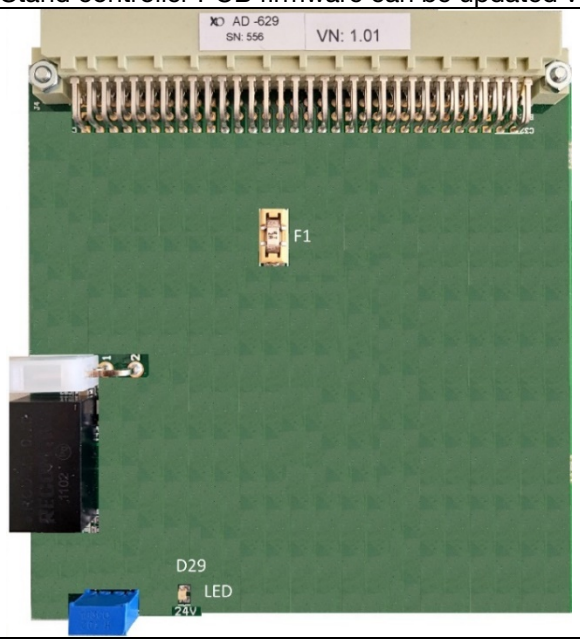
Connections	Cables / PCB
J15 Assist signal	
J16 CTL	"Stand Controller PCB"
AUX 1-6	"PC communication PCB"
	"Screen Power supply PCB"
	"Peristaltic pump PCB"
J30 Power Supply.	CA-005 Backplane Power cable.
J31 Bridge Power.	CA-004 Power cable
J32 Bridge Comm.	CA-003 Signal cable
J24 to J26	CA-049 24V AC/DC cable XO4 & Flex

“STAND CONTROLLER PCB”

The "Stand Controller PCB" controls all valves, level sensors, pumps, suction and patient chair signals of the XO unit. Converts and manages all incoming / outgoing signals transmitted from or to the Bridge PCB.

"Stand Controller PCB":

- Can only be positioned in the leftmost position on the Backplane PCB
- Equipped with a fuse F1 (ML-600).
- Yellow LED D29 indicates that 24VDC is available in the unit stand
- Provides power to the LED XO OP Light
- Stand controller PCB firmware can be updated via RS-485 bus



Failure description	Reason	Solution
D29 LED is OFF (24VDC)	Fuse F1 on Stand Controller is blown	Replace fuse F1, 2A Nano type fuse ref. ML-600.

SENSORS			VALVES AND PUMPS	
S5	LEVEL DETECTOR FOR BACKFLOW PREVENTION		V4	CUP FILLER
S5B	LEVEL DETECTOR FOR WATER CLEAN		V7	CUSPIDOR FLUSH
S11B	MIXING CUP LOW LEVEL DETECTOR FOR SUCTION CLEAN		V39	WATER FLUSH / SUCTION CLEAN
S11T	MIXING CUP HIGH LEVEL DETECTOR FOR SUCTION CLEAN		V10	MAIN WATER VALVE
S14	LEVEL DETECTOR FOR WATER CLEAN		V12	MAIN AIR VALVE
S15	LEVEL DETECTOR FOR SUCTION DISINFECTION		V16	SMALL SUCTION Ø11
S33	WATER LEAK SENSOR		V17	LARGE SUCTION Ø16
S37C	CUP FILLER SWITCH		V22	SUCTION CLEAN VALVE
S37F	CUSPIDOR SWITCH		V27	WATER CLEAN
S38	SUCTION CLEAN SWITCH		V30	PRESSURISATION CONTAINER VALVE
S41	CUSPIDOR FLUSH SWITCH		V31	WATER CLEAN PUMP
			V35	SUCTION CLEAN PUMP

Before replacing the “Stand Control AO-891”, always check the fuse F1 state.
Check and probe the cables controlling the 24V to detect any short circuits.
Below is a list of the faults connected to the “Stand Control PCB AO-891”.

Chair	
Failure description	**Control**
The following table shows failures connected to “Stand Controller PCB” and where it is needed to be replaced. Always verify that the fuse F1 is not blown	
The chair does not work properly (Lifting or lowering)	Try to calibrate the chair
	Replace motor capacitor, MH-659.
	For other failure, go to page 70 “Patient chair”.
Chair synchronize fails	See page 12 “CHAIR SYNC FAILED”
	Replace Stand Controller PCB

Liquid sensors	
Liquid sensors do not work	Replace Stand Controller
	For other failure, go to page 56 “Liquid sensor AP-869”

Valves (air & water)	
Valves in unit stand do not work.	Replace Stand Controller ONLY if all the valves are not working

OP Light	
The OP Light does not work	Before replacing the Stand Controller PCB always verify OP Light and/or the cable are not defect or settings not activated in “Dentist menu”
	Refer to page 72 “XO Operation Light” for other failures or page 26 for defining parameters in the “Technician menu”.

Joystick Base (Chair position)	
Base joystick does not work	Before replacing the “Stand Controller” always verify if the connector on J13 (Backplane PCB) and the connector J1 on Chair joystick PCB are properly connected
	Check that the cable CA-010 is in proper condition.
	Check Chair joystick PCB for corrosion and replace if necessary.
	Replace Stand Controller (PCB).

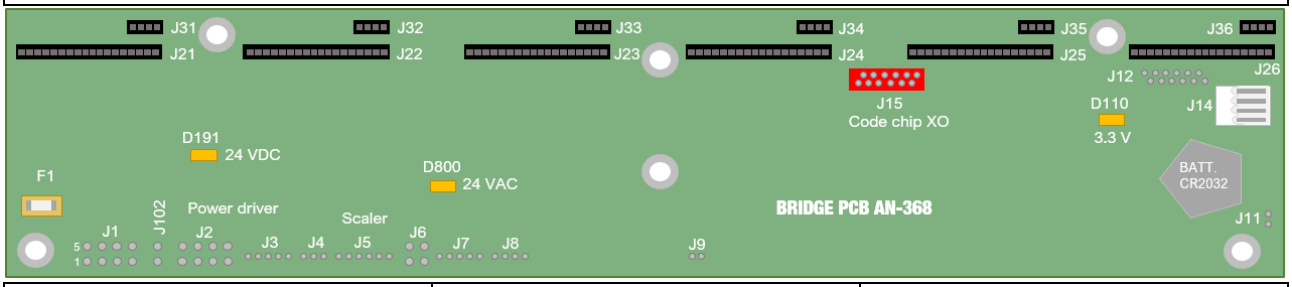
Water Disinfection system	
Water disinfection system does not work properly.	Replace “Stand Controller PCB” ONLY if entire water disinfection system is not working
	Refer to page 58 “Water Disinfection System” for other failures.

Suction disinfection system	
Suction disinfection system does not work properly	Replace “Stand Controller PCB” ONLY if entire suction disinfection system is not working.
	Refer to page 62 “Suction Disinfection System” for other failures.

"BRIDGE PCB":

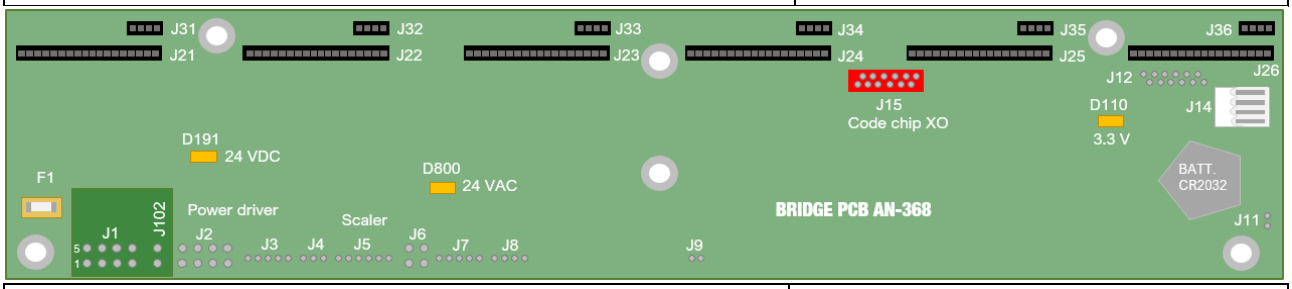
Purpose:

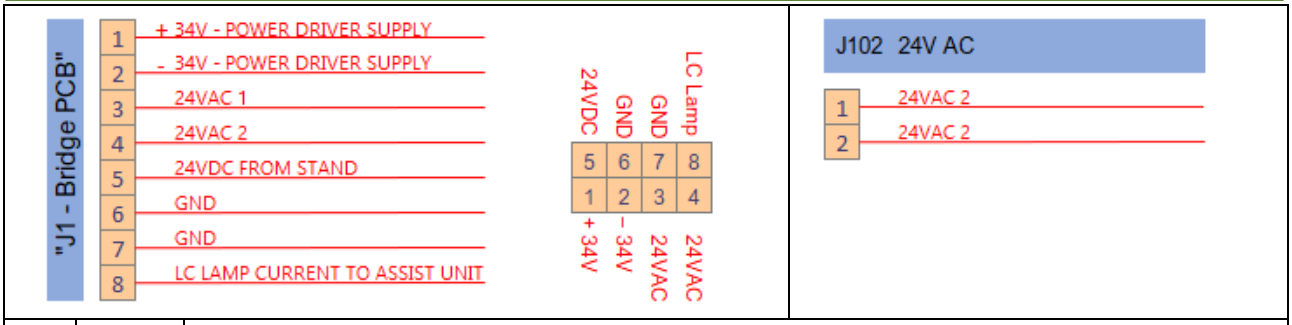
The "bridge PCB AN-368" is the XO 4 Unit's mainboard, controls all functions of the Unit. Internal communication with peripherals is established via an RS-485 communication BUS. A computer can be connected to the Unit via the serial port located behind the stand. Communication between the "Bridge PCB AN-368" and the computer is established via an RS-432 chipset. It can be used for updates, maintenance and uploading or backing up the unit configuration. The Unit's firmware is uploaded in a flash RAM . The 24 VDC and the 24 AC are generated on the "Power Supply PCB AN-371" located in the stand. The 5 VDC and 3.3 VDC are generated by a chipset located on the Bridge PCB.



D800 LED is OFF (24VAC)	No power supply from the UNIT 24VAC	The Precisions voltage is generated from the "Power Supply AN-371"
		Check that the CA-004 power cable is properly connected on J1 "Bridge PCB AN-368" to J31 "Backplane PCB AN-371".
D191 LED is OFF (24VDC)	Fuse F1 on Bridge PCB is blown	Replace fuse F1, (Nano 3A part no. ML-601)
	No power supply from Unit 24VDC	Check that the CA-004 power cable is properly connected
	On the "Power supply PCB AN-371"	Check LED D6 (5,12, 24VDC) is lid. Refer to Power supply PCB on page 14.
	On the "Bridge PCB AN-368"	Check the following
		Measure the 24VDC on J1 pins 5 (24VDC) and 6 (GND).
		Check the fuse "F1"
		If the fuse continues to blow, check for short circuit on the valves in the instrument bridge (water & air)
D110 LED, 3.3V is OFF (3.3VDC is generated from 5VDC on the Bridge PCB)	No power supply from Unit 24VDC.	Verify that 24VDC is available (LED D191 24VDC is ON).
	Failure on Bridge PCB	If 24VDC is available, replace Bridge PCB.

BRIDGE PCB - CONNECTORS J1 – J102	Point of measurement

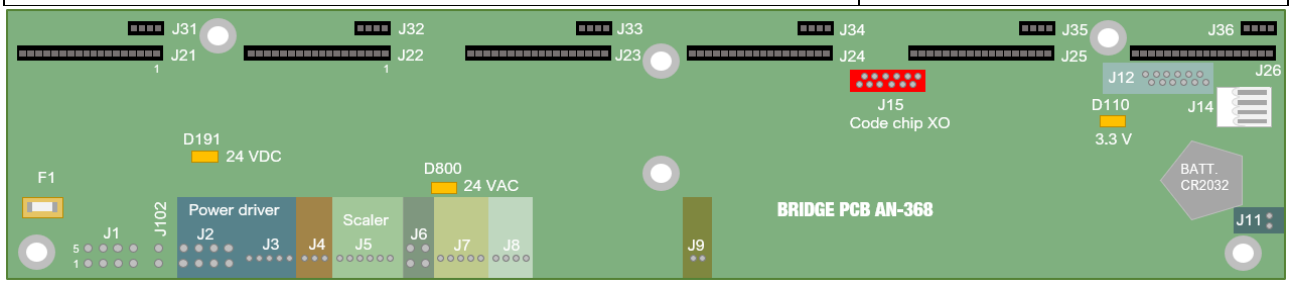




PIN	Volt.	Explications
1	+34V	There is no indicator LED for +34V and -34V on “Bridge PCB AN-368”. The indicator LEDs are in the terminal on the “Power Supply PCB AN-371”. LEDs D2 & D4 indicate the presence of -34 and +34V before modulation. for more information, please refer to chapter “Power Supply PCB AN-371”. These voltages are distributed on the “power driver AO-137” and are used for the rotation of the MC3 micromotor and the functionality of the curing lamp. If the fuses burn directly when the unit is switched on, always check that the cable CA-004 is not damaged first. +34V is measured between pin 1 and 6. -34V is measured between pin 2 and 6
2	-34V	
3	24VAC	The LED D800 located on the "Bridge PCB AN-368" indicates the presence of 24VAC. instruments on 24AC - Scaler - Syringe
4		
5	24VDC	The LED D191 located on the “Bridge PCB AN-368” indicates the presence of 24VDC. Fuse F1 protects the 24VDC, always check the condition of the fuse. The 24VDC is modulated on the “Power Supply PCB AN-371”. On “Power Supply PCB”, LED D6 indicates that the 24VDC is available. The +34V is measured between pin 1 and 6 or 7. If the fuses F1 continue to blow, measure the resistance of the solenoid valves for any short circuit.
6	GND	0V
7		
8		Available - Not used

BRIDGE PCB - CONNECTORS J2 TO J36

Point of measurement



J2 - J3 POWER DRIVER

1	+ POWER BUS 2
2	PGND (Power)
3	+ POWER BUS
4	+ VMOTOR +34V
5	+ 24VDC
6	- VMOTOR -34V
7	AGND (Analog)
8	+ 5V

1	RS-485 1
2	RS-485 2
3	HALL FEEDBACK 1
4	HALL FEEDBACK 2
5	ANALOG MUX 1 OUT

J4 PROP. VALVE SPRAY AIR

+ 24V

1	
2	PROP. VALVE SPRAY AIR
3	

J5 SCALER ELECTRONICS

1	POWER OUTPUT 2
2	POWER OUTPUT 1
3	
4	ANALOG CONTROL
5	POWER INPUT 1
6	POWER INPUT 2

J6 ODONTOSURGE

1	
2	CUT / COAG / GAIN
3	24VAC 2
4	24VAC 1

J7 FLOW TRANSDUCER

+ 5V

1	
2	WATER FLOW / NOT FLOW
3	WATER FLOW SENSOR ON/ OFF
4	ANALOG FLOW SENSOR OUTPUT
5	

J8 SUCTION HOSE DETECTION

+ 5V

1	SUCTION HOSE 1
2	SUCTION HOSE 2
3	
4	

J9 LOUD SPEAKER

3	
4	

J31 - J36 SUSPENSION POWER

1	24VAC 2
2	24VAC 2
3	24VAC 1
4	24VAC 1

J12 DISPLAY

+ 5V

VDD

1	SCK
2	
3	
4	DISP-CS2
5	
6	DISP-CS1
7	
8	SDI
9	
10	

J14 RS232 /RS485 INTERFACE

1	RS-485 1
2	RS-485 2
3	RS-232 TxD
4	RS-232 RxD
5	

J21 - J26 SUSPENSION CONNECTION

1	SUPPLY 1
2	SUPPLY 1
3	SUPPLY 2
4	SUPPLY 2
5	GND
6	GND
7	GND
8	+ 5V
9	+ 24V
10	DRIVE AIR VALVE PWM OPH-1
11	FIBERLIGHT PWM OPH-1
12	COOLING AIR VALVES OPH-1
13	WATER VALVE OPH-1
14	POWER CONNECT OPH-1
15	INSTRUMENT DETECT OPH-1
16	ONE WIRE EEPROM 1
17	HALL FEEDBACK 2
18	HALL FEEDBACK 1

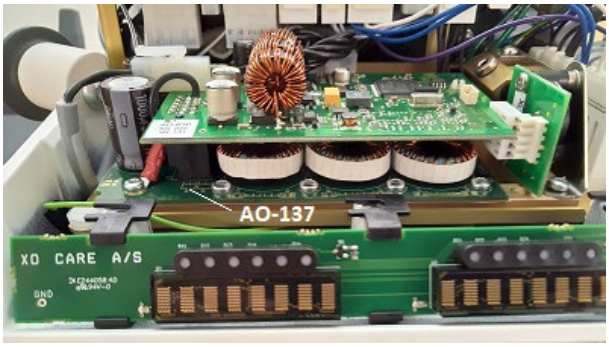
"POWER DRIVER PCB":

Purpose:

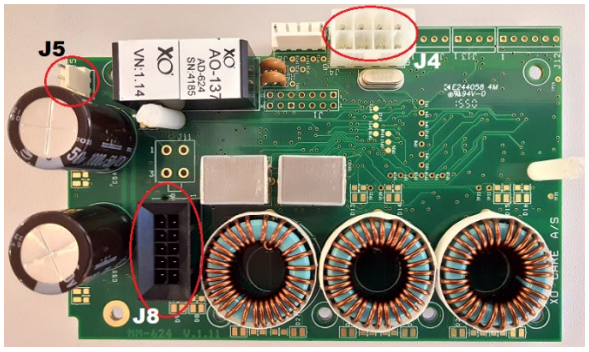
The "Power driver PCB" is an advanced power supply with its own microprocessor programmed to provide the required power and voltages, generates also the PWM signal to the water proportional valve.
Also controls AC motors type OSSEO but not brushless motor type MX2

Failure description	Reason	Solution
D6 LED is OFF.	Failure on the 5V supply from AN-368	Check the CA-017 Power Driver cable. For voltage measurements on J2, refer to "Jumpers disposition" page 21.
	D6 is placed on the opposite side of the PCB. The reflection of LED D6 is visible on the plate as shown in the picture	

AO-137 PCB in the bridge



AO-137 connections sockets



J4 Connection to J2 on AN368
J5 PWM connection for proportional valve
J8 Connection AO-134 PCB MX2 control Board

J4 XO BRIDGE POWER

1	+ POWER BUS_2
2	PGND (Power Ground)
3	+ POWER BUS
4	+ 36V (VMOTOR)
5	+ 24VDC
6	- 36V (VMOTOR)
7	AGND (Analog Ground)
8	+ 5V

J8 BIEN AIR DMX

1	DMX OUTPUT PHASE C
2	DMX OUTPUT PHASE C
3	PGND (Power Ground)
4	PGND (Power Ground)
5	+ 36V (VMOTOR)
6	+ 3.3v
7	SIGNAL
8	SIGNAL
9	SIGNAL
10	SIGNAL

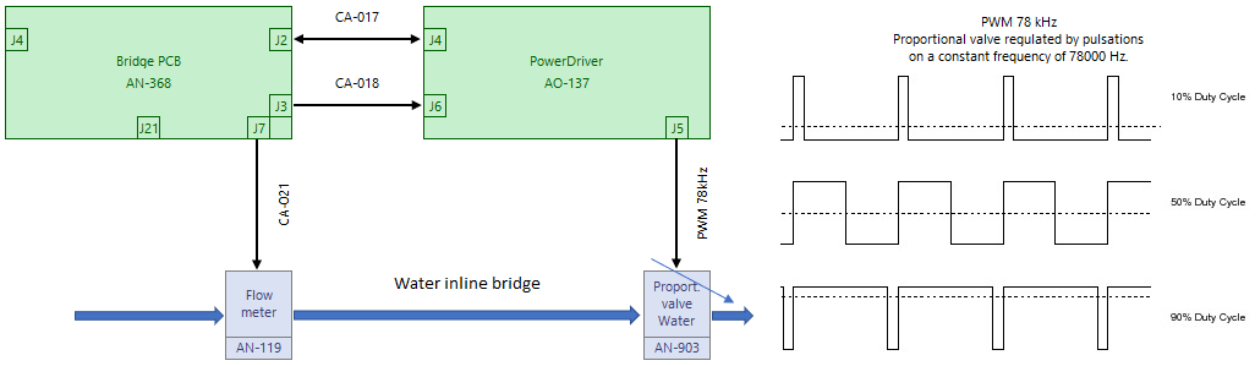
J5 WATER PROPORTIONAL VALVE

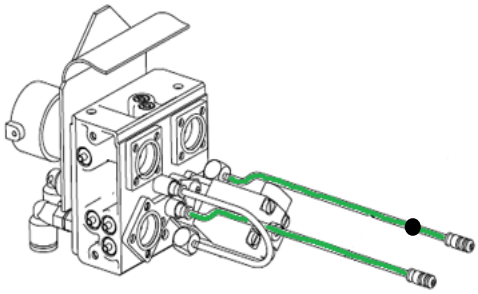
1	PGND (Power Ground)
2	+ VENTIL (PWM 78KHz)
3	- VENTIL (PWM 78 KHz)

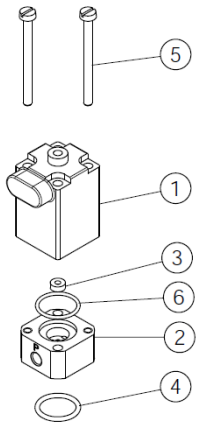
"PROPORTIONAL VALVE", AN-903:

Purpose:

The proportional valve controls the amount of water distributed to all instruments except the syringe. The proportional valve is fully controlled by PWM pulse on a constant frequency of 78 kHz by the "Power driver" AO-137 PCB on J5.







Spare parts for AN-903

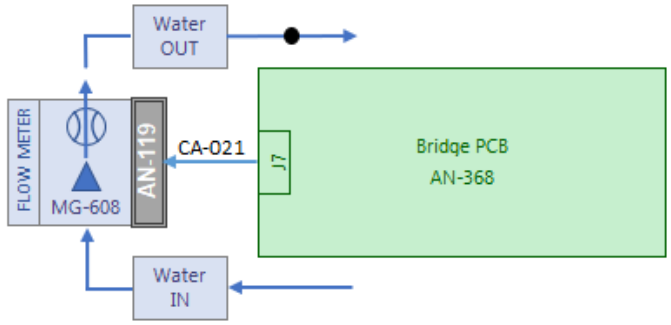
3	Gasket	MR-150
4	O-ring,12 x 1,5 B Viton	SD-307
	Green tube dental.	FS-078

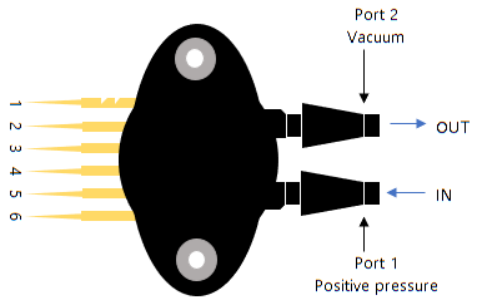
Failure description	Reason	Solution
No water on instruments.	No water. Fault on waterline (instrument bridge)	Check if the water reaches the syringe 3F/6F
	The flow meter nozzle is obstructed	Replace the flow meters nozzle (MG-608)
		For more information, go to Page 23 "Flow meter".
	The "Power driver" is defect.	Change "Power driver" AO-137 on page 21
	The coil of the proportional valve is defective	Change the proportional valve AN-903
	The proportional valve is obstructed	Disassemble and clean the proportional valve.
	The flow meter is defective	Change the "Flow meter" AN-119
	The AN-368 PCB is defective	Change the "Bridge PCB AN-368".

"FLOWMETER", AP-921:

Purpose:

The flowmeter is equipped of a high viscosity monolithic silicon pressure sensor measuring the current amount of water passing through the nozzle. The differential piezo-resistive transducer transmits the data to the microprocessor on the "Bridge PCB AN-368".
The proportional valve opens completely if the flow meter does not send signals to the microprocessor. Max water quantity.
The flow meter is very sensitive to the reversal of the water passage which may damage it, the water must flow in the direction indicated in the diagram below. A black dot for this purpose is located on the green tube indicating the return of water.

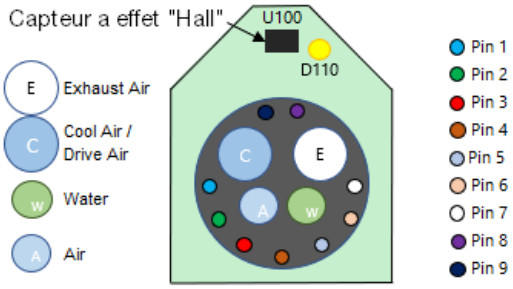


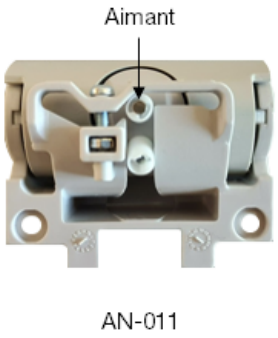


Failure description	Reason	Solution
Water arrives on the syringe but not distributed on the other instruments	The nozzle on the flow meter is obstructed.	Remove and clean the nozzle on the flow meter. Follow the instructions in the manual "YB-910 Instruction cleaning Flow meter".
		Check if the proportional valve AN-903 is working properly (not obstructed)
It is not possible to adjust the flow rate on the instruments.	The microprocessor does not receive a signal from the flow meter and the proportional valve is open at maximum.	Check that the CA-021 cable is correctly mounted. Change it if defective.
		Check that the flow meter is working properly.
Point of measurement:		
In case the water flow cannot be regulated (always 100%) - Either the flow meter is defective - Or the microprocessor doesn't convert the signals from the flowmeter		
	J7 Pin 4 (Analog Flow Output) J7 Pin 5 (GND) Stand-by = 321mV When activating an instrument (But syringe) 100 ml = 2,49 V 50 ml = 1,20 V 35 ml = 0,80 V	J3 Pin 5 (Analog MUX Out) J4 Pin 3 (GND) Stand-by = 297mV When activating an instrument (But syringe) 100 ml = 1,70 V 50 ml = 0,90 V 10 ml = 0,34 V
	If no variation, change the "Flowmeter AP-921"	If no variation, change the "Bridge PCB AN-368".

“SUSPENSION PCB”, AD-605.

Different board designs based on AO-605:
The board function provides the voltages required to operate the instruments (voltage, water and air), supplies the voltage to the optical fibre and via the Hall effect sensor to detect if the instrument is activated.





Failure description	Reason	Solution
LED D110 remains OFF when the instrument is pulled forward.	Suspension cable is not properly mounted or is defect.	Check suspension cable is firmly connected Replace suspension cable.
	Suspension PCB defect	Replace Suspension PCB.
Wrong instrument.	Displayed if the instrument in hand does not match the suspension configuration or is placed on the wrong connection	Before entering the technician menu. Verify that the instrument is properly connected.
		Verify that the instrument is inserted on the correct connector.
		Verify the number behind the connector.
		In the technician menu, Verify the configuration in the “SUSP 1-6” and set the correct item. Consult the “Technician menu” on page 26 for more information.
		If the parameters described above are correct: Measure the 3.3V on pin 15 J2x (J22 to J26) when the instrument is activated. If the 3.3V is not present, the main board "AN-368" is defective, change it. If the 3.3V is present it indicates that the Suspension PCB is defective, change it.
Wrong Susp. PCB.	Displayed if the instrument being handled is not compatible with the suspension PCB.	Before configuring the SPCB, check the table “Suspension Configuration” under “to be selected in SPCB 1-6” to find the correct PCB.
		Configure “SPCB 1-6” in the technician menu.

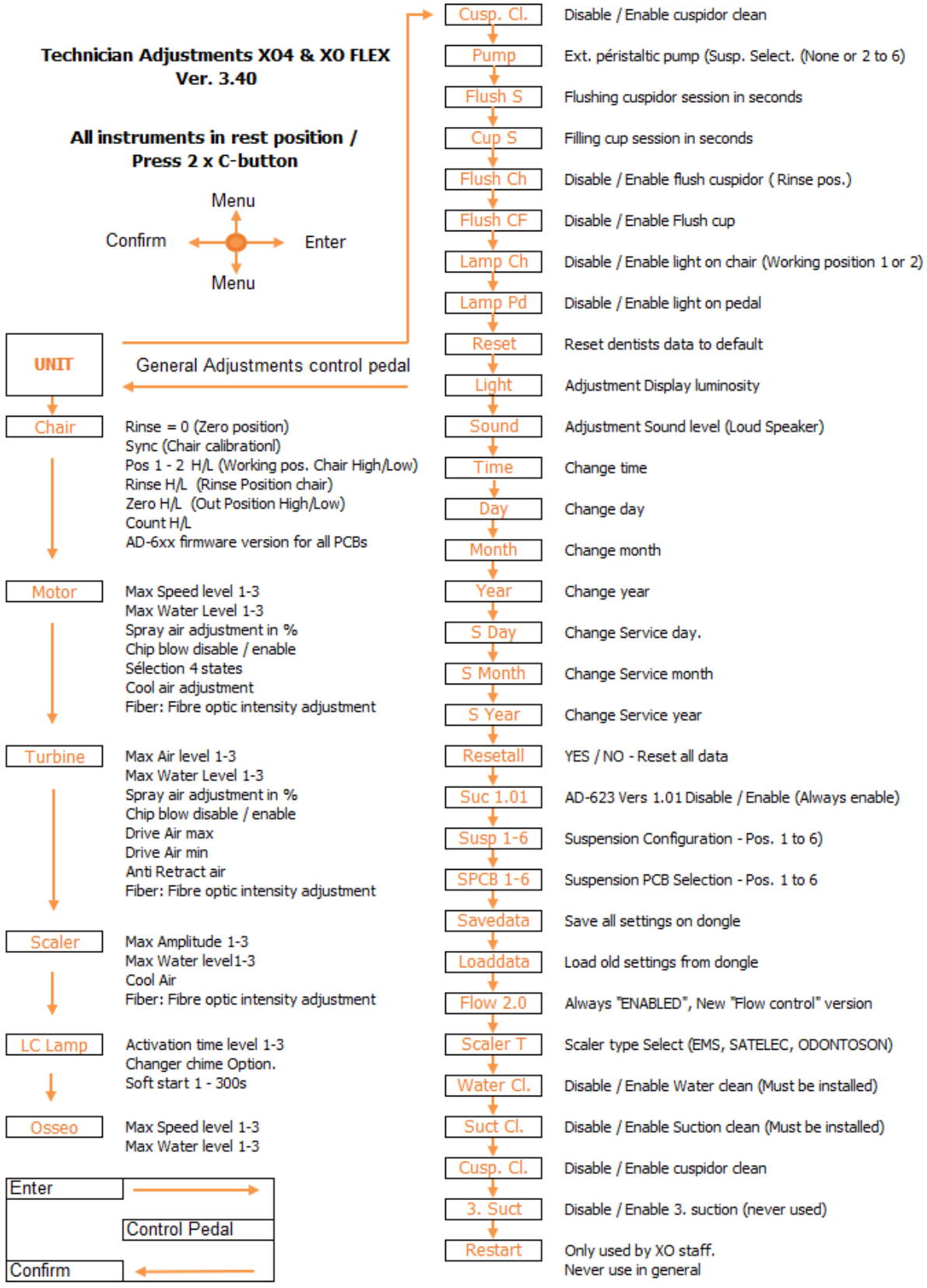
Information:

"**WRONG SUSP PCB**" also occurs after an update of the unit's firmware or after a "**Reset All**" has been performed and is especially relevant for MX2 micromotors.
The MX2 micromotor does not work if the parameter "**AD-605**" in the "**SPCB 1-6**" menu is selected; "**WRONG SUSP PCB**" will be displayed when the instrument is activated.
After an update of the Unit or a "**Reset All**", the "**AD-654**" settings are reset to "**AD-605**".
To reconfigure the parameter, enter the "**SPCB 1-6**" menu, select the correct position where the micromotor is located and select "**AD-654**" from the menu.
The turbine and/or the MC3 type micromotor operates correctly when the parameter **"AD-605"** in the "**SPCB 1-6**" menu is selected.
However, if the MC3 micromotor or turbine is equipped with an LED and the parameter is set to "**AD-605**", this may have an impact on the life of the LED.
Reconfigure the parameters in the **"SPCB 1-6"** menu and select **"AD-654"**
Setting AD-654 will set max Voltage to 3.0V
MC3 micromotors and/or turbines equipped with halogen lamps. Works perfectly under the parameter **"AD-605"** in the menu **"SPCB 1-6"**. It is also possible to set the parameter to **"AD-654"**
NB: The LED light intensity on the MX2 motor cannot be modified Always 3.0V
It is possible to vary the halogen light intensity in the menu "**FIBER**" by setting the parameter from 0V to 3.3V when configured "**AD-605**" and 0V to 3.0V when configured "**AD-654**"

Voltage measurement on the suspension PCB connector (CA-100, CA-101...)

J21 - J26	Suspension Connection	J21 - J26	Measurements Pin# / GND
1	SUPPLY 1	1	+ 21V
2	SUPPLY 1	2	+ 21V
3	SUPPLY 2	3	+ 21V
4	SUPPLY 2	4	+ 21V
5	GND	5	GND
6	GND	6	GND
7	GND	7	GND
8	+ 5V	8	+ 5V
9	+ 24V	9	+ 24V
10	DRIVE AIR VALVE PWM OPH-1	10	+ 3.3V PWM: 77Khz - Susp & Instr. Actif
11	FIBERLIGHT PWM OPH-1	11	+ 3.3V PWM: 200Hz - Suspension Active
12	SPRAY / COOLING AIR VALVE OPH-1	12	+ 3.3V PWM: 77Khz - Susp. & Instr. Actif
13	WATER VALVE OPH-1	13	+ 3.3V Suspension & Instrument actif
14	POWER CONNECT OPH-1	14	
15	INSTRUMENT DETECT OPH-1	15	+ 3.3 V Suspension Active
16	ONE WIRE EEPROM 1	16	+ 5V
17	HALL FEEDBACK 2	17	
18	HALL FEEDBACK 1	18	4.9V Suspension active

"TECHNICIAN MENU" — Configuration & Adjustments



SUSPENSION CONFIGURATION

Parts in configuration	To be selected in Technician menu "SPCB 1-6"	Instrument: Motor: MX	Motor: MX2	Motor: MC3/MC3LED/M40LED	Motor: OSSEO	Scaler: Odontoson	Scaler: Satelec	Scaler: Satelec w. light	Scaler: EMS "No Pain" w.& wo. light	Scaler: EMS Piezon w. light	Scaler: EMS Piezon wo. light	Other: Odontosurge	Other: LC lamp Lysta	Other: LC lamp Odontocure	Other: Camera Vistacam HD Smart	Other: Camera Vistacam iX HD	Other: Camera Vistacam iX	Other: Turbine	Other: Syringe
Suspension PCBs																			
AN-510	AD-605				a	x			x	x	x		a						x
AN-511	AD-605				x								x						
AO-318	AD-654	x		a	a	a	a		a	a	a		a					a	a
AO-319	AD-655											x							
AO-328	AD-654		x	x	a	a	a		a	a	a		a					x	
AO-329	AD-655																x		
AO-347	AD-655															b			
AO-348	AD-655														x	c			
AO-988	AD-605						x	x											
AP-866	AD-605													x					
Valves																			
Spray air		x	x	x						x								x	*
Spray water		x	x	x		x	x		x	x	x							x	*
Drive/cooling air		x	x	x														x	*
Suspension cables																			
CA-100																			x
CA-101		x	x	x	x	x				x	x	x	x	x	x	x	x	x	
CA-109							x	x	x										
Instruments "SUSP 1-6"																			
Syringe																			x
Motor		x	x	x	x														
Turbine																		x	
OSU/Video												x			x	x	x		
LC Lamp													x	x					
Scaler						x	x		x	x	x								
"SCALER T"																			
OSO 7						x													
EMS C51									x		x								
EMS C51L										x									
SATELEC							x	x											

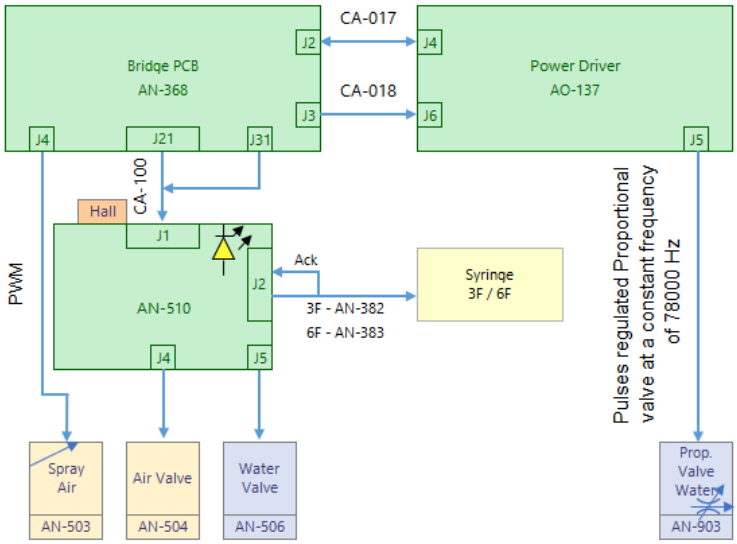
x: factory mounted **a:** also OK for spare part ***:** start block, always configured with four valves

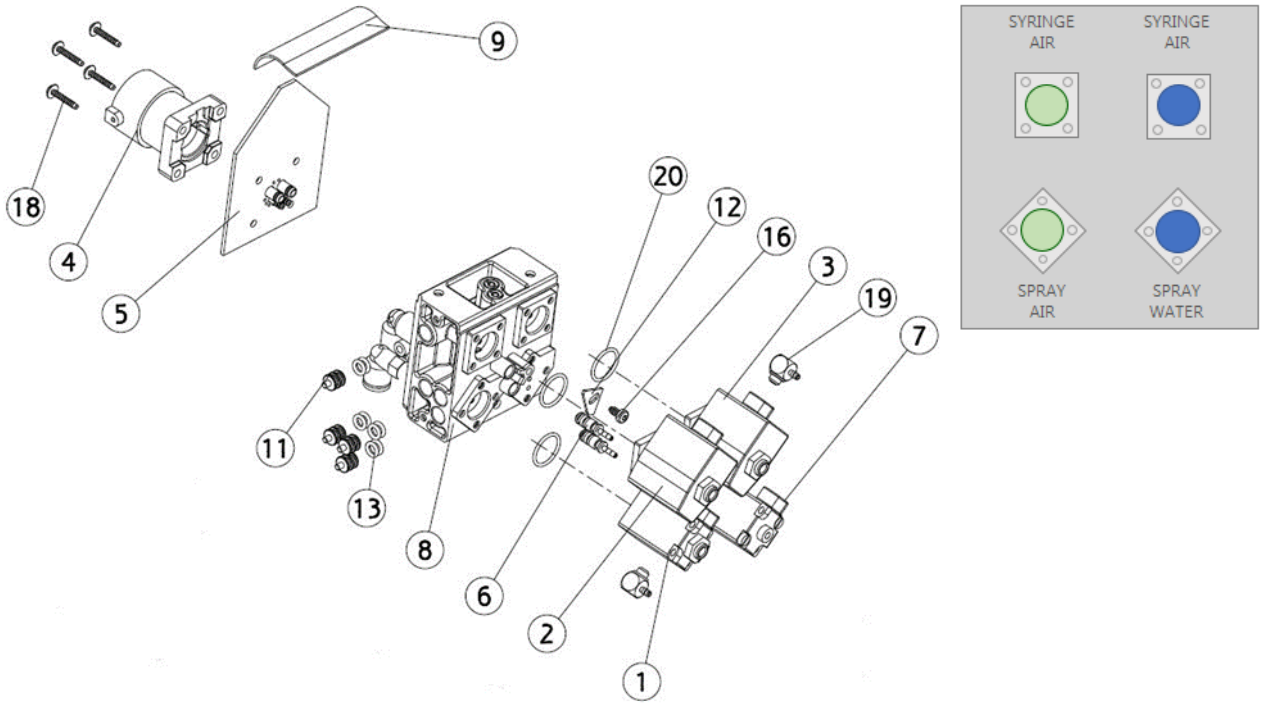
b: version wo. USB connector in bayonet **c:** version with USB connector in bayonet

INSTRUMENTS:

SYRINGE:

The syringe block is the main water and air inlet block on the instrument holder.
The function of the syringe plate provides the voltages required for the operation of the 3F / 6F syringe, controls the lighting of the optical fiber.
The Hall effect sensor detects if the instrument is activated.





1	Prop. Spray air valve	AN-503		7	proportional valve	AN-903
2	Air valve 2/2	AN-504		8	Main block	AP-040
3	Spray air valve 3/2	AN-507		9	Connection cable	CA-100
5	Suspension PCB	AN-510		10	Green tubes Prop. Valve	FS-078

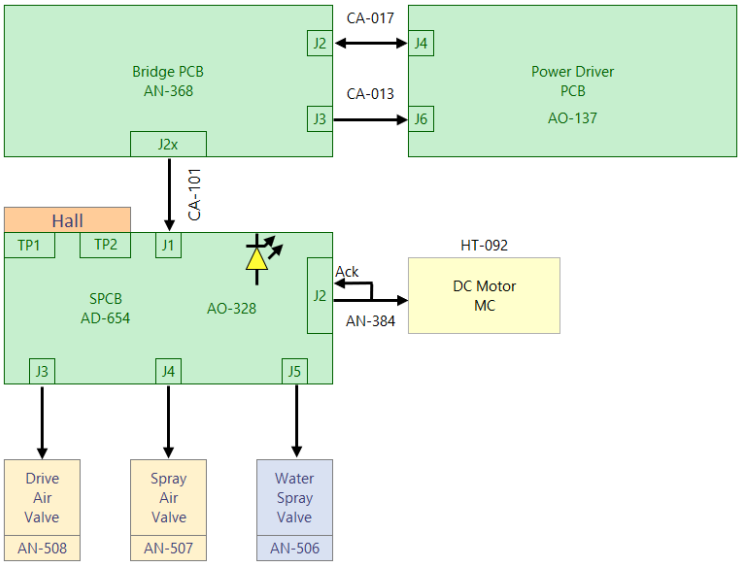
BLOCK SYRINGE, AN-510 :		
Failure description	**Reason**	**Solution**
No water or air on the syringe block	Fault in water or/and air pressure line to bridge.	Check that the air or/and water reach the syringe. If there is no air or/and water refer to "water/air XO4 & XO Flex" on page 54.
No spray air on the syringe module	Information.	Check the spray air works correctly on another instrument to determine if the failure is connected directly to the AN-503 Spray main valve on the main block or the AN-507 Spray valve on the instrument block.
	Air flow rate too low.	Check the configuration of the "AIR" air flow rate in the technician menu. Set it to 100%, see page 26 "Technician menu"
	Obstructed by plastic swarf or grease deposits.	Remove the suspension from the connector the and check that it is not obstructed by grease residue or plastic swarf.
	Spray air solenoid valve is defective.	Check the resistance of the valve coil
		Remove the coil, disassemble the valve and clean or replace the valve piston/gasket
		Replace the proportional spray air valve if defective.
		Check the voltage on the AN-503 solenoid valve on J4 "Prop. Valve Spray Air" Measuring point between: Pin 1 - 3 = +24V
		The Spray Solenoid Valve AN-503 is connected and receives the signals from the AN-368 main board on the J4. See page 20 for more information. Measuring point between: Pin 2 - 3 (PWM) 22.22kHz
	The bridge PCB AN-368 is defective	If no 24V or no pulse modulation signal, change the "Bridge PCB AN-368"

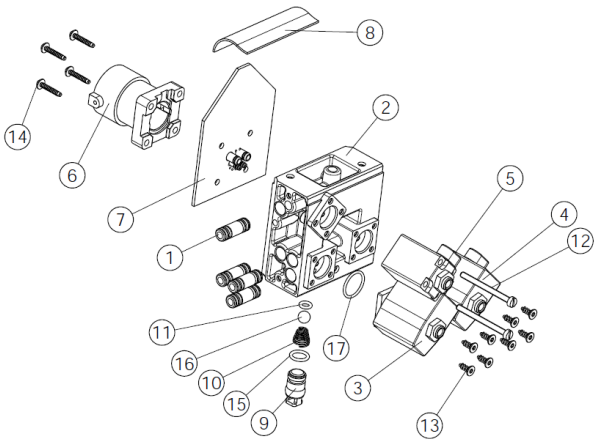
SYRINGE 3F / 6F		
Failure description	**Reason**	**Solution**
Syringe not activated when the suspension is pulled	Cable not properly inserted.	Check if the CA-100 connecting the Bridge PCB AN-368 to the Suspension PCB is properly inserted Replace CA-100 cable if defective.
	The suspension PCB is defective.	Replace Suspension PCB Verify LED lights on when the suspension is activated.
	The main PCB is defective.	Replace the “bridge PCB AN-368”.
Syringe activated when not pulled	The magnet not aligned or not correctly placed in the field of the hall contact	Align the suspension.
		Check that the magnet is present and properly aligned. If the magnet is missing, change the AN-011.
		If not aligned, check that the screws on the suspension bearing bracket are secure.
	The suspension cable is not properly mounted or is defective	Check that the CA-100 cable connecting the “Bridge PCB” to the “suspension PCB” is properly connected.
		Replace CA-100.
No Water	Fault in waterline to bridge. Water shutdown at the main inlet	Check if water is present on another instrument.
		If not, refer to section “Water/air Instrument Bridge” on page 54.
	Verify ON/OFF water valve on the syringe block.	Check if the water valve coil clicks when activated. Use a voltmeter to check the voltage on the valve connectors.
		Replace if defective (AN-506)
		If the valve clicks when turned on and no water, clean the plunger.
	The main PCB is defective.	Replace the “bridge PCB AN-368”.
No air	Fault in air pressure line to bridge.	Check if air is present on another instrument.
		If not, refer to section “Water/air Instrument Bridge” on page 54
	Verify ON/OFF air valve on the syringe block.	Check if the air valve coil clicks when activated. Use a voltmeter to check the voltage on the valve connectors.
		Replace if defective (AN-504).
		If the valve clicks when turned on and no air, check and clean the plunger.
	The main PCB is defective.	Replace the “Bridge PCB AN-368”.

SYRINGE 6F		
No hot water/air	Contact not switch on	Check that the contact is activated, can be controlled by the small green light
	Fault in the 24V AC power supply	Check if the D800 24VAC control LED on the “Bridge PCB AN-368” is lit. If LED D800 is off, check LED D1 on the “Power supply AN-371” is on. If off, check and replace fuse F13. (Page 14)
	Suspension cable is not mounted properly or is defective	Check that the CA-100 cable connecting the “Bridge PCB AN-368” to the “Suspension PCB” is properly connected.
	Syringe is defective	Replace the syringe.
	Suspension cord is defective	Replace the suspension cord AN-384.
	The main PCB is defective.	Replace the “Bridge PCB AN-368”.

MICROMOTOR MC3 BIEN AIR

The Bien-Air MC3 micromotor is a 24VDC brush micromotor.
The MC3 micromotor is powered directly by the 24VDC of the “Bridge PCB AN-368”.
The “Powerdriver PCB AO-137” controls rotation and speed variation.





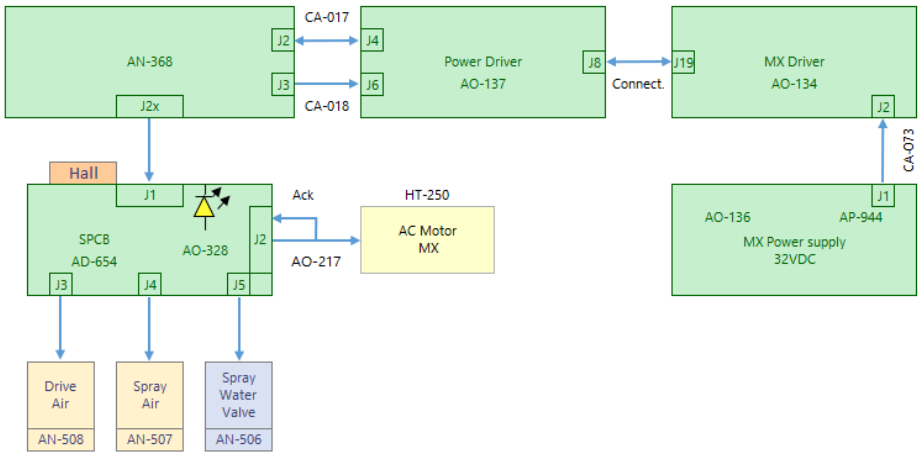
2	Block AN-501	AN-501
3	Water Valve 2/2	AN-506
4	Spray Air valve 3/2	AN-507
5	Proportional Valve drive Air	AN-508
6	Connector	AN-509
7	PCB	AO-328
8	Cable	CA-101

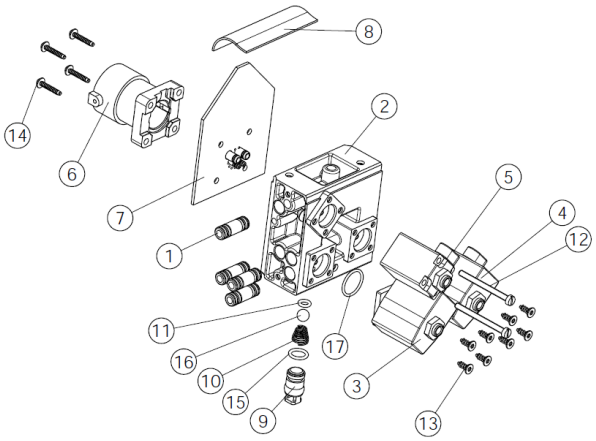
Failure description	Reason	Solution
Micromotor not activated when the suspension is pulled	Suspension cable is not mounted properly or is defective	Check that the CA-101 cable connecting the “Bridge PCB” to the “Suspension PCB AO-328” board is properly connected.
	The suspension PCB is defective.	Check if the LED D110 on the suspension AO-328 PCB lights on when the suspension is pulled.
		Before replacing the AO-328, make sure that the suspension works properly.
	The suspension cord is defective	A little preprogrammed chipset is placed in the cord. When water infiltrates the cord, it damages the chipset causing the loss of the suspension driver. Some of the new suspension cord has not been programmed properly from factory, resulting at the new cord will not be detected after installation.
		Change the suspension when all the above has been verified.
	The instrument bridge PCB is defective.	Change “Bridge PCB AN-368”.
Micromotor is active while the suspension cord is not pulled	The magnet not aligned or not correctly placed in the field of the hall contact	Align the suspension.
		Check that the magnet is present and properly aligned. If the magnet is missing, change the AN-011.
		If not aligned, check that the screws on the suspension bearing bracket are secure.
	Suspension cable is not mounted properly or is defective	Check that the CA-101 cable connecting the AN-368 PCB to the AO-328 board is properly connected.
The motor does not run when the pedal is activated	The “Powerdriver PCB” is defective	The µmotor rotation is controlled by the power driver. Before changing the “Powerdriver PCB AO-137” make the following verification
		Check if the LED D2 & D4 situated on the “Power supply PCB AN-371”, are lit. if not verify the fuse 11 & F12 For more details, review the session “Power supply PCB AN-371” on page 16.
		If all above is working: Check on the “bridge PCB AN-368” if the “Power driver AO-137” is modulating properly. Measure on J2 between

		Pin 3: Power bus 1 Pin 2: PGND At 0 RPM: 2.04VDC Set the µmotor rotation to max 40000 RPM when activating the µmotor Pin 3 & 2: 23,8VDC Set the µmotor rotation to max 10000 RPM Pin 3 & 2: 7,06VDC
		Change the Powerdriver PCB AO-137 if 0V
	The foot control switch is defective	Refer to section: “XO Foot control”. (only if it is not possible to change the speed setting on the screen by moving the throttle to the left or right).
	Suspension cable is not mounted properly or is defective	Check that the CA-101 cable connecting the AN-368 PCB to the AO-328 board is properly connected.
	Micromotor is defective.	Replacer micromotor MC3. (HT-092)
No light	Low voltage or no voltage (Only for halogen lamp)	Control that the voltage is correctly set in the “technician menu” 0 to 3.3V Increase the value to obtain the correct luminosity.
		Refer to the “technician menu” on page 26.
	LED is defective	Change LED
	Suspension PCB is defective.	Check by testing the optical fiber with another instrument (if possible).
		Change the suspension PCB AO-328
	The instrument bridge PCB is defective.	Change Bridge PCB AN-368.
No Water	No water on the instrument bridge.	Check the water at the syringe. If no water, refer to “water/air in XO4 & XO Flex”.
	The water flow is set to zero in the software.	Check in the "technician menu" that the water flow configuration is >0.
		Refer to "technician menu" on page 26 for configuration
	The nozzle in the “flow meter” block is obstructed.	Clean the flow regulator properly. Read document YB-910.
	The “Powerdriver” is defective.	The “Power driver” power up the proportional valve
		Measure output PWM between pin 2 and 3 on J5 on “Power driver”. (68KHz)
		Replace "power driver" PCB AO-137 if no output

	The proportional water valve defective.	Even if Output OK on the “power driver” the valve AN-903 still does not work. Change proportional valve
	The flow meter is defective.	Check by configuring to MAX water flow 100ml/min in the "technician menu". If still no water flow, Replace the Flow meter AN-119
		Verify the Flow meter return voltage on Jumper J7 - Pin 4 and 5 on the bridge PCB AN-368 No flow if the voltage <0.5V
	The instrument bridge PCB is defective.	Change “Bridge PCB AN-368”
No air spray	Fault in the air supply line to the instrument bridge (inlet block)	Check the air reaches the syringe. If no air, refer to “water/air in XO4 & XO Flex”.
	The air flow is set too low	Check the air flow configuration “AIR” in the technician menu. Set it to 100% during the test Info regarding “technician menu” refer to page 26.
	Obstructed by plastic swarf or grease deposit	Dismount the suspension connector and check at the connector are not obstructed by grease residue or plastic swarf.
	Defective proportional air spray valve	Replace proportional air spray valve, AN-503 on the syringe block.
	The instrument bridge PCB is defective.	Change Bridge PCB AN-368.
No “cool air”	Fault in the air supply line to the instrument bridge (inlet block)	Check the supply of air spray at the syringe. If not, refer to “water/air in XO4 & XO Flex”.
	The configuration of “Cool air” is too low.	Verify that the “COOLAIR” parameter in the unit menu is set properly >0 in the “technician menu”. Refer to page 13 under “motor”.
	The “cool air” proportional valve is defective.	Replace the “cool air” proportional valve.
	The suspension PCB is defective.	Replace the suspension PCB AO-328
	The instrument bridge PCB is defective.	Change “Bridge PCB AN-368”

MICROMOTOR MX2 BIEN AIR

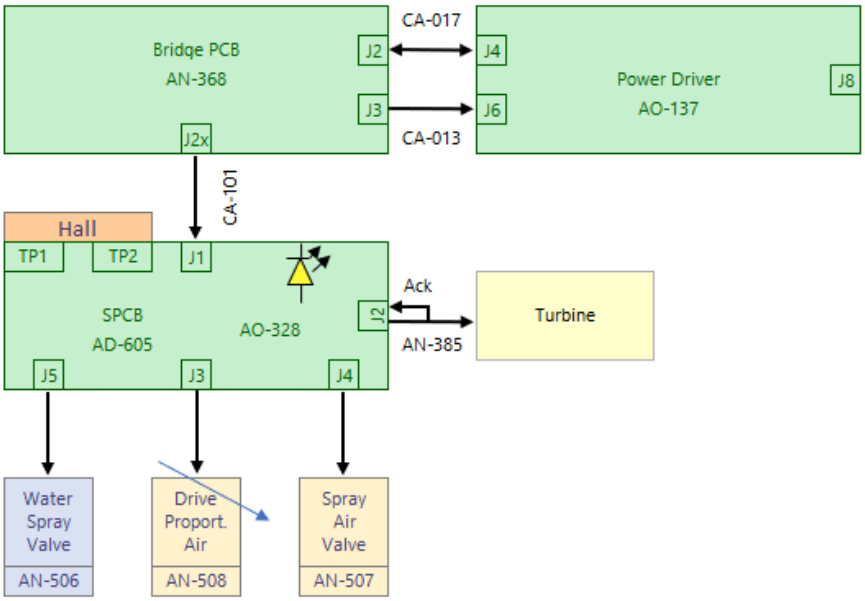


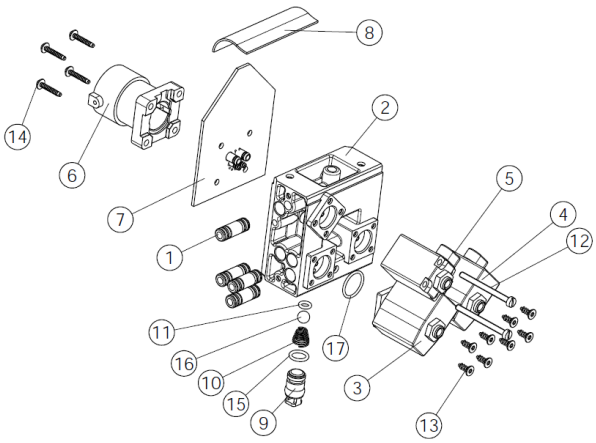


2	Block	AN-501
3	Water Valve 2/2	AN-506
4	Spray air valve 3/2	AN-507
5	proportional valve drive air	AN-508
6	Connector	AN-509
7	PCB	AO-328
8	Cable	CA-101

Failure description	Reason	Solution
Information		
Compare to the MC3 LED the Bien-Air Micromotor MX 2 is a brushless micro motor. The micromotor MX2 needs both an “Smart-Logic electronic control” board and a 32V power in addition. The “Smart Logic Electronic board also called DMX board (AO-134) is placed on the top of the Power Drive PCB (AO-137) in the instrument bridge. The DMX power Supply (AO-136) is place in the stand (electronic side) The cable CA-073 DMX power interconnects the DMX board to the DMX power supply. Down below:		
Specific error connected with Micromotor type MX2		
The motor does not run when the pedal is activated	Micromotor is defective.	Refer to MC3 for complete trouble shooting.
		If the micromotor MX2 is defective, use the following reference (HT-250).
“Missing DMX PCB”	DMX Power supply not connected or defective.	Check that the LED on the DMX control board (AO-134) is lit if not check the following points.
		Check that the green LED on the +32V DMX power supply AO-136 is lit.
		If the green LED is on, check that the CA-073 cable is connected correctly.
		If the green LED is off, check that the cable J12 - J15 connecting the DMX motor power supply to the AN-378 hand board is correctly connected.
	The “Power driver” is defective.	If the yellow LED on the DMX control board AO-136 is lit, replace the “Power driver PCB AO-137”.
“DMX AO-134” Porte-instrument		Power Supply DMX AP-944
		

TURBINE





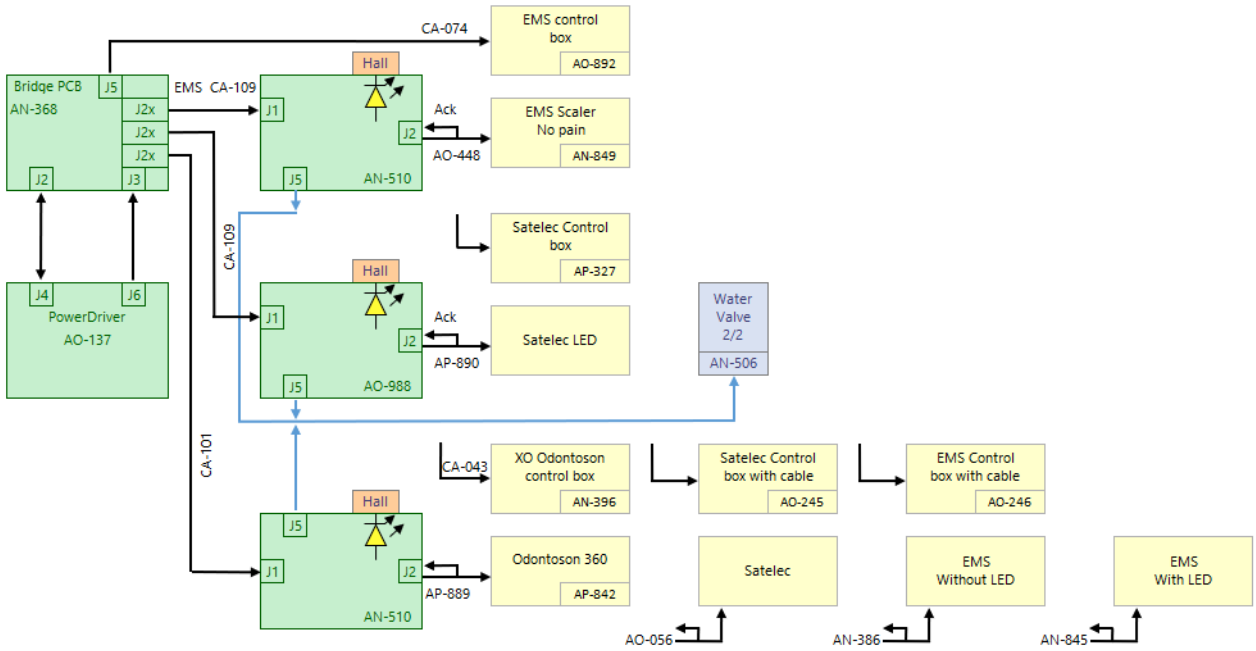
2	Block	AN-501
3	Water valve 2/2	AN-506
4	Spray air valve 3/2	AN-507
5	Proportional valve. Drive air	AN-508
6	Connector	AN-509
7	PCB	AO-328
8	Cable	CA-101

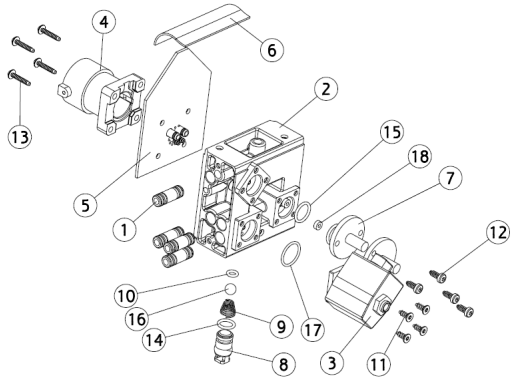
Failure description	Reason	Solution
The turbine is not activated when the suspension is pulled	Suspension cable is not mounted properly or is defective.	Check that the CA-101 cable connecting the AN-368 PCB to the AO-328 board is properly connected.
	The suspension cord is defective.	A little preprogrammed chipset is placed in the cord. When water infiltrates the cord, it damages the chipset causing the loss of the suspension driver. Some of the new suspension cord has not been programmed properly from factory, resulting at the new cord will not be detected after installation.
		Change the suspension when all the above has been verified.
	The suspension PCB is defective.	Check if the LED D110 on the suspension PCB lights on when the suspension is pulled.
		Replace AN-510 PCB.
	The instrument bridge PCB is defective.	Change Bridge PCB AN-368.
The turbine is active while the suspension cord is not pulled	The magnet not aligned or not correctly placed in the field of the hall contact	Align the suspension.
		Check that the magnet is present and properly aligned. If the magnet is missing, change the AN-011.
		If not aligned, check that the screws on the suspension bearing bracket are secure.
	The suspension cable is not mounted properly or is defective	Check that the CA-101 cable connecting the AN-368 PCB to the AN-510 board is properly connected.
The turbine does not run when the pedal is activated	The foot control switch is defective (only if it is not possible to change the speed setting on the screen by moving the throttle to the left or right).	Refer to section: Foot control.
	The suspension cable is not mounted properly or is defective	Check that the CA-101 cable connecting the AN-368 PCB to the AO-328 board is properly connected.
	No air line on the bridge.	Check the pray air on the syringe. If no inlet or air pressure, refer to "Water/air Instrument bridge" page 52.
	Suspension PCB AN-510 is defective.	Check the voltage on the PWM valve pilot pin 10 (3.3V) on connectors J21 to J26 by activating the pedal slider to the left.

	PWM driver signal failure.	the PWM signal is generated by the AN-368 microcontroller (Control PWM pilot on water valves).
		Replace the AN-368.
No light.	Low voltage or no voltage	Control that the voltage is correctly set in the “technician menu” 0 to 3.3V Increase the value to obtain the correct luminosity.
		Refer to the “technician menu” on page 26.
	LED is defective	Change LED
	Suspension PCB is defective.	Check by testing the optical fiber with another instrument (if possible).
		Change the suspension PCB AO-328
	The instrument bridge PCB is defective.	Change Bridge PCB AN-368
No water.	No water on the instrument bridge.	Check the water at the syringe. If no water, refer to "water/air ".
	Water on the instrument bridge but not on other instruments	Check the following:
	The nozzle in the "flow meter" block is obstructed.	Clean the flow regulator properly. Read document YB-910.
	The "Powerdriver » is defective.	The “Power driver” power up the proportional valve
		Measure output PWM between pin 2 and 3 on J5 “Power driver”. (68KHz)
		Replace “Power driver” PCB AO-137 if no output
	Proportional water valve defective	Even if Output OK on the “power driver” the valve AN-903 still does not work. Change proportional valve
	Flow meter is defective	Check by configuring to MAX water flow 100ml/min in the "Technician menu". If still no water flow; Replace AN-119 Flow meter
		Verify the Flow meter return voltage on Jumper J7 - Pin 4 and 5 on the bridge PCB AN-368 No flow if the voltage <0.5V
	If water on syringe and all other instruments.	Check the following:
	The water flow is set to zero in the software.	Check in the "Technician menu" that the water flow configuration is >0.
		Refer to "Technician menu" on page 13 for configuration
	If the water flow is properly configured.	Check if the electrical connection between the valve and the

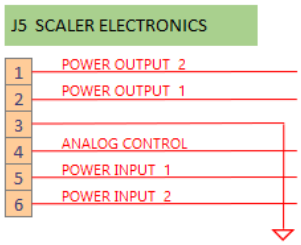
		suspension PCB is properly inserted.
		Check it the power on J5 “water valve” is 24V
		Check the resistance of the coil if R=0Ω, change the valve. AN-506
	The instrument bridge PCB is defective.	Change Bridge PCB AN-368
No air spray	Fault in the air supply line to the instrument bridge (inlet block)	Check the air reaches the syringe. If no air, refer to "Water/air in the instrument Bridge"
	The air flow is set too low	Check the air flow configuration "AIR" in the technician menu. Set it to 100% during the test Info regarding “technician menu” refer to page 26.
	Obstructed by plastic swarf or grease deposit	Dismount the suspension connector and check at the connector are not obstructed by grease residue or plastic swarf.
	Defective proportional air spray valve	Replace proportional air spray valve, AN-503 on the syringe block.
	The instrument bridge PCB is defective.	Change “Bridge PCB AN-368”.

SCALER





2 Block	AN-501
3 Water Valve 2/2	AN-506
4 Connector	AN-507
5 PCB	AN-510
6 Cable	CA-101

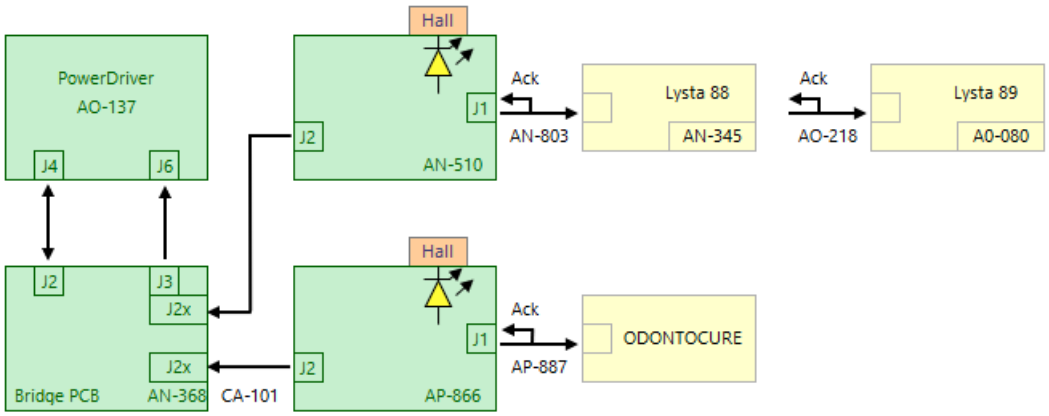
Configuration	Information	Measurement point
	Configuration menu (technician) - “SUSPx”: Select « Scaler » - “SPCB”: Select “AD-605” - « Scaler T »: Select scaler type (EMS, Satelec, Odontoson).	

Failure description	Reason	Solution
The scaler is not activated when the suspension is pulled	The suspension cable is not mounted properly or is defective	Check that the CA-101 cable connecting the AN-368 PCB to the suspension PCB is properly connected.
	The suspension cord is defective.	A little preprogrammed chipset is placed in the cord.
		Change the suspension when all the above has been verified.
	The suspension PCB is	Check if the LED D110 on the

	defective.	suspension PCB lights on when the suspension is pulled.
		Replace AN-510 PCB or AO-988 for Satelec with Light.
	The instrument bridge PCB is defective.	Change “Bridge PCB AN-368”.
The scaler is active while the suspension cord is not pulled	The magnet not aligned or not correctly placed in the field of the hall contact.	Align the suspension.
		Check that the magnet is present and properly aligned. If the magnet is missing, change the AN-011.
		If not aligned, check that the screws on the suspension bearing bracket are secure.
	Suspension cable is not mounted properly or is defective.	Check that the CA-101 cable connecting the AN-368 PCB to the AN-510 board is properly connected.
The scaler does not run when the pedal is activated	The foot control switch is defective (only if it is not possible to change the speed setting on the screen by moving the throttle to the left or right).	Refer to section: Foot control.
	Suspension cable is not mounted properly or is defective.	Check that the CA-101 or CA-109 (EMS No Pain) cable connecting the AN-368 PCB to the AN-510 board is properly connected.
	The suspension PCB is defective.	Replace the “Suspension” PCB (AO-318 / AO-328) AO-988 for Satelec with LED.
		Set the scaler to maximum amplitude in the dentist menu
		Activate the pedal to the left, measure the voltage is approx. 24VAC between pin 5 and 6 on J5.
		Still on Jumper J5, measure voltage between pin 4 “analog control” and 3 “GND”. By activating the pedal, the voltage varies from 0 to 5V. 5V at most. If the voltage remains at 0V, replace the generator.
		If the 24VAC and analog control are working correctly. Measure the frequency between pin 1 and 4 (still on J5); it can be measured correctly with a voltmeter with the option (Hz). Activate the scaler by pulling on the cord. Activate the pedal to the left to check that the frequency is increasing. The frequency for EMS: between 28KHz 32KHz

		Satelec: 28KHz to 36KHz Odontoson: 42KHz.
		If no frequency variation, change the generator.
		If variation, and no vibration verify that the scaler tip is properly tied to handpiece.
No water.	No water on the instrument bridge.	Check the water at the syringe. If no water, refer to “water/air in XO 4 & XO Flex”.
	Water on the instrument bridge but not on other instruments	Check the following:
	The nozzle in the "flow meter" block is obstructed.	Clean the flow regulator properly. Read document “YB-910 Clean the flow meter”.
	The "Powerdriver » is defective.	The "Powerdriver" power up the proportional valve.
		Measure output PWM between pin 2 and 3 on J5 "power driver". (68KHz).
		Replace "power driver" PCB AO-137 if no output.
	Proportional water valve defective	Even if Output OK on the “power driver” the valve AN-903 still does not work. Change proportional valve.
	Flow meter is defective	Check by configuring to MAX water flow 100ml/min in the “technician menu”. If still no water flow; Replace AN-119 Flow meter.
		Verify the Flow meter return voltage on Jumper J7 - Pin 4 and 5 on the bridge PCB AN-368 No flow if the voltage <0.5V
	If water on syringe and all other instruments.	Check the following:
	The water flow is set to zero in the software.	Check in the "technician menu" that the water flow configuration is >0.
		Refer to "technician menu" on page 13 for configuration
	Water flow properly configured	Check if the electrical connection between the valve and the suspension PCB is properly inserted.
		Check it the power on J5 “water valve” is 24V.
		Check the resistance of the coil if R=0Ω, change the valve. AN-506.
	The instrument bridge PCB is defective.	Change the “ bridge PCB AN-368”

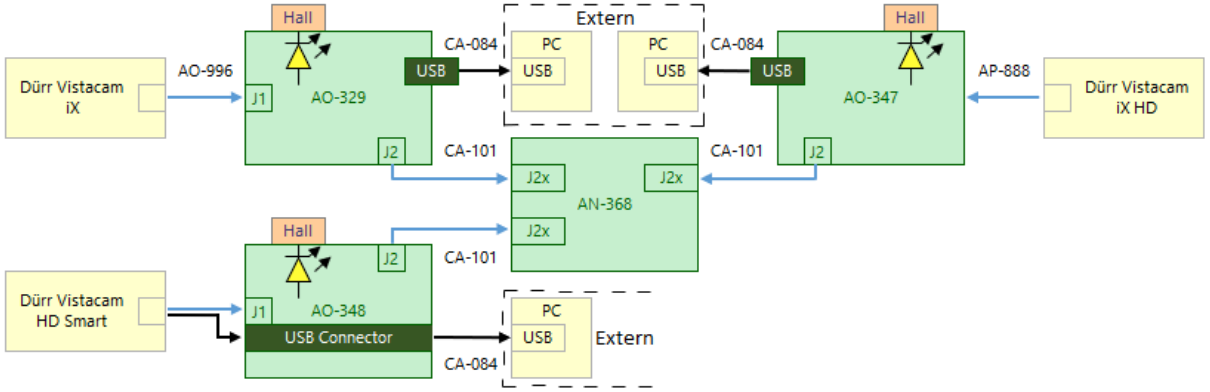
LIGHT CURING SYSTEM – LYSTA 88 / 89 & ODONTOCURE

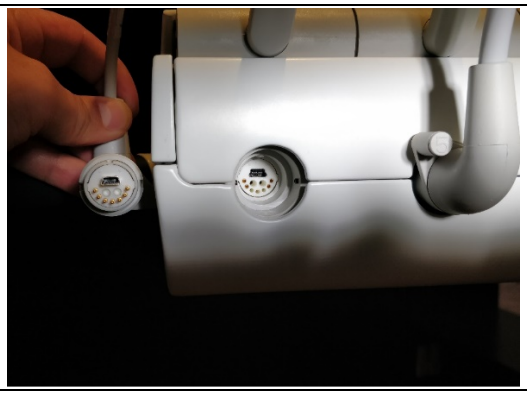


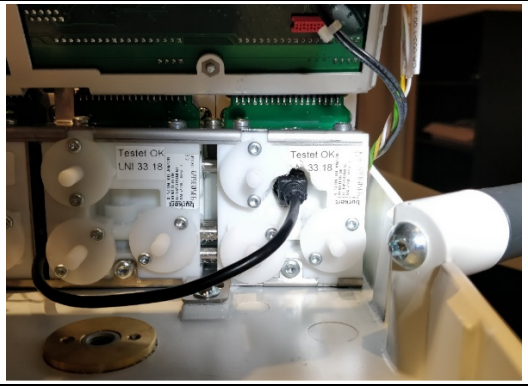
Failure description	Reason	Solution
Light curing lamp does not work when activated	Connection problem The cable is not mounted correctly or is defective.	The cable CA-101 connecting the “Bridge PCB AN-368” to the "Suspension PCB" is not mounted correctly or is defective.
	The curing lamp is controlled by the “Powerdriver PCB AO-137”. Before changing the lamp, the following checks should be carried out: Measurements are made on pin J2 located on the "Bridge PCB AN-368" see page 24 for more information. Pin 3: Power Bus 1 Pin 2: PGND	
	Power supply issue on the “Power Supply PCB”	Check if the LEDs D2 & D4 located on the “Power Supply PCB AN-371” are lit. If not, check fuses 11 & F12. View the session “Power Supply PCB AN-371” page 16.
	Power supply issue on the “Bridge PCB”	Check on J1, the presence of the +36V : between pins 1 & 6 -36V : between pins 2 & 6 24VDC : between pins 5 & 6 See the “bridge PCB” session on page 24.
		If all the above applies: Measure on J2 “bridge PCB” between Pin 3: Power Bus 1 Pin 2: PGND if the “Power Supply PCB AN-371” modules correctly. When the lamp is activated Pin 3 & 2 : **4,6VDC**
	Modulation issue on the "Power Supply PCB".	In case the measurement on J2 Pin 3 & 2 = 0VDC when the lamp is activated, replace the “Powerdriver PCB AO-137”
	LED is defective	In case the measurement on J2 Pin 3 & 2 = 4.6VDC when the lamp is activated and the LED does not light up, return the lamp to XO-care.

DÜRR CAMERA / VIDEO iX, iX HD, HD Smart:

Units manufactured before 08/04/2019 and sold with the iX HD camera are equipped either with the **AO-347** "DÜRR Vistacam IX-HD" or **AO-329** "DÜRR Vistacam IX" PCB with external mini USB connector as shown on page 28.
All units manufactured after 08/04/2019 and sold with the iX HD camera or HD Smart camera, are equipped with a new **AO-348** "Vistacam iX-HD Smart w. mini USB" block with USB connection.
See picture below
Testcable for Vistacam IX and IX HD with normal bajonet connector as shown on page 28: CA-220.
Testcable for Vistacam IX HD with mini USB in bajonet connector (illustrated below): AP-071 + CA-084.





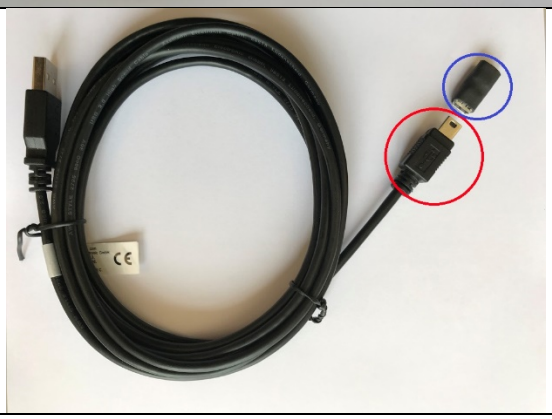


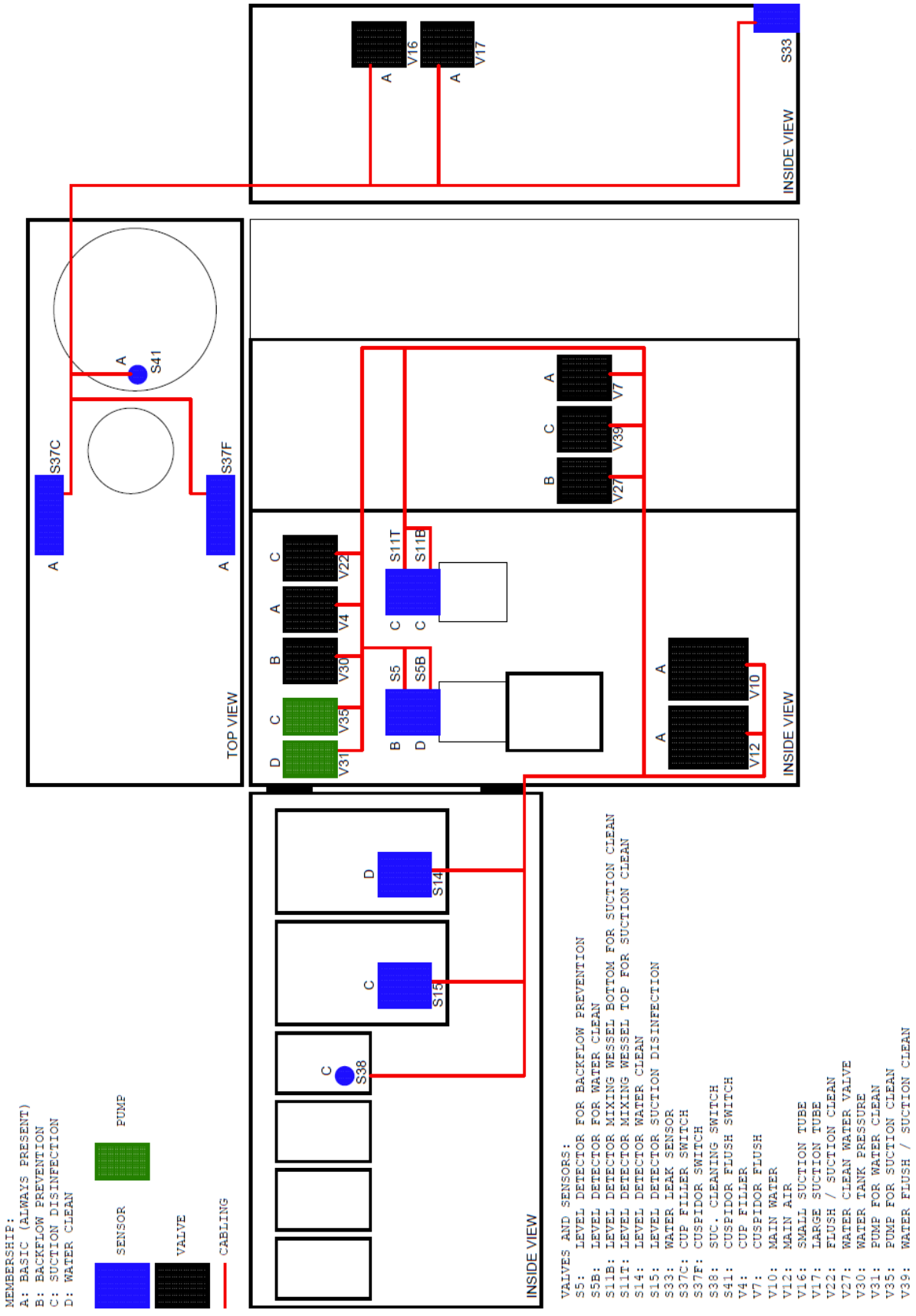
Failure description	Reason	Solution
The camera does not work when the suspension is activated	Suspension cable is not mounted properly or is defective	Check that the CA-101 cable connecting the AN-368 PCB to the AO-329 : iX or AO-347 : iX HD PCB is properly connected.
	Suspension cord is defective	Change the suspension when all the above has been verified.
		Replace the PCB suspension AO-329 for vistacam iX or AO-347 for iX HD
		Concerns only HD and HD Smart Cameras If the camera's LED is always on while the Unit is off, this indicates that the AO-348 PCB is defective
	The instrument bridge PCB is defective.	Change Bridge PCB AN-368
	Lack of signal strength	Most USB port groups in a computer share 500 mA power. If one USB device is connected, it will get all 500mA.

		If 2 USB devices are connected, they will get 250 mA each which is NOT sufficient for the Vistacam IX. Check the camera is getting 500 mA power supply. If the camera is connected to a USB group on the dental computer, the camera might be sharing the power supply which is insufficient.
		Connect the camera to a USB hub with external power supply. Requirements are: minimum 480mbit/s minimum 500 mA
	Missing image/connection	Bypass the unit and cables in the floor by, and check camera is working by connecting the camera directly to a computer. Use test cable CA-220 or AP-071 + CA-084.
		Check the camera and cables/connection by connecting a different computer to the unit.
		Bypass cables in the floor and check the camera is working by connecting a computer directly to the USB cable in the bridge arm.
	Missing image/connection due to too long cables	Use an active USB cable. CA-120 XO cable kit.
The camera is active when the suspension is at rest.	The magnet not aligned or not correctly placed in the field of the hall contact.	Align the suspension.
		Check that the magnet is present and properly aligned. If the magnet is missing, change the AN-011.
		If not aligned, check that the screws on the suspension bearing bracket are secure.
	Suspension cable is not mounted properly or is defective.	Check that the CA-101 cable connecting the AN-368 PCB to the AO-329 for vistacam iX or the AO-347 for iX HD PCB is properly connected.
No Light	Camera is defective	Replace the camera
	Suspension PCB is defective	Change Suspension PCB AO-329 : Vistacam iX AO-347 : Vistacam iX HD

All the following information is the property of Dürr dental. No data or indications have been modified. Those informative have been added to this guide to provide the necessary information to be able to quickly intervene on a failure related to the Vistacam iX or iX HD camera. For more information, please refer to the "Vistacam iX or iX HD - Installation and Operating Instructions" at http://www.durrdental.com/		
Image cloudy, Milky	The hygienic protective cover is not placed correctly on the optical window	Place the hygienic protective cover on the optical window correctly
	Optical element scratched	Replace the interchangeable head.
	The handpiece is defective	Send the handpiece for repair
	Lens above image sensor dirty	Clean lens image sensor
Image too dark	The LED is defective	Replace the interchangeable head
No image	USB connection cable not connected	Connect the USB connection cable
	USB connection cable too long	For long connection to the clinic PC, use an USB repeater
	Computer not switched on; software not started	Switch on the computer and start the software.
	Camera driver not correctly installed	Check the driver installation and software settings.
	Interchangeable head not placed on correctly, no contact between the handpiece and the interchangeable head	Ensure that the interchangeable head has been placed on to its fullest extent, no gap between the handpiece and the interchangeable head.
The camera vibrates when pressing the trigger button, but no picture is displayed	Interchangeable head not recognized by software	Replace the interchangeable head.
Moving image judders	Processor power of the computer is too low	Reduce image resolution. Use a computer in accordance with the system requirements (9000-618-148)
	Resolution not set correctly	Set resolution to: IX: 1024x768 IX HD:1280x1024

The image is blurred	Resolution set incorrectly	Go to VistaConfig > Camera configuration > Settings select a resolution with width-to height ratio 4:3. IX: 1024x768 IX HD:1280x1024
Camera not detected by the software	USB driver not up to date	Install an up to date USB driver
Camera is not correctly detected when PC runs Windows 7	Outdated chipset driver (especially for chipsets from Intel, type C216 or C220)	Download and install the Windows 7 chipset driver from the manufacturer. Not necessary for PC running Windows 8 and higher
Camera is recognized as Vistacam IX HD without the interchangeable head	TMMonitor.exe is open in the Task manager	Close this process
The trigger function is not working	The program ArcSoft Total Media 3.5 is blocking the HID driver	Uninstall the software. This solves the problem permanently
Interchangeable head not engaging	Defective O-ring on the handpiece	Replace the O-ring

Test cable for Dürr Vistacam	
CA-220: Test cable for Dürr Vistacam IX and IX HD with normal bayonet AO-329 : iX AO-347 : iX HD	
AP-071 + CA-084: Test cable for Vistacam IX HD with mini USB connector. Suspension PCB AO-348 : iX HD and HD Smart	


MEMBERSHIP:
A: BASIC (ALWAYS PRESENT)
B: BACKFLOW PREVENTION
C: SUCTION DISINFECTION
D: WATER CLEAN
SENSOR
PUMP
VALVE
CABLING
INSIDE VIEW
TOP VIEW
INSIDE VIEW
INSIDE VIEW
VALVES AND SENSORS:
S5: LEVEL DETECTOR FOR BACKFLOW PREVENTION
S5B: LEVEL DETECTOR FOR WATER CLEAN
S11B: LEVEL DETECTOR MIXING WESSEL BOTTOM FOR SUCTION CLEAN
S11T: LEVEL DETECTOR MIXING WESSEL TOP FOR SUCTION CLEAN
S14: LEVEL DETECTOR WATER CLEAN
S15: LEVEL DETECTOR SUCTION DISINFECTION
S33: WATER LEAK SENSOR
S37C: CUP FILLER SWITCH
S37F: CUSPIDOR SWITCH
S38: SUC. CLEANING SWITCH
S41: CUSPIDOR FLUSH SWITCH
V4: CUP FILLER
V7: CUSPIDOR FLUSH
V10: MAIN WATER
V12: MAIN AIR
V16: SMALL SUCTION TUBE
V17: LARGE SUCTION TUBE
V22: FLUSH / SUCTION CLEAN
V27: WATER CLEAN WATER VALVE
V30: WATER TANK PRESSURE
V31: PUMP FOR WATER CLEAN
V35: PUMP FOR SUCTION CLEAN
V39: WATER FLUSH / SUCTION CLEAN

CONNECTORS CONFIGURATION ON AN-369 “BACKPLANE”

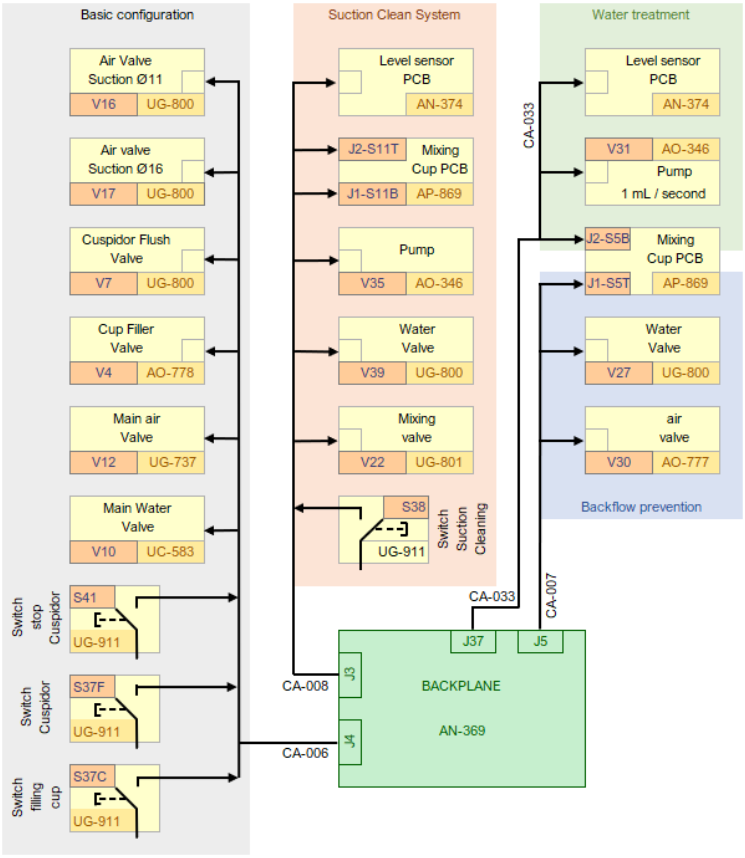
“Basic configuration”

“Suction Clean System”

“Water treatment”

“Backflow prevention”

Consult page 15 for more information regarding the connections on the “Backplane AN-369”.



J3 — Basic Configuration (CA-006)

1	Cup filler Switch - S37C
2	Cuspidor Switch - S37F
3	Cup filler Switch - S37C - GND
4	Cuspidor Switch - S37F - GND
5	Cusp. Tap Switch - S41- GND
6	Cusp. Tap switch - S41- 24V
7	Suction Ø11 Valve - V16 - GND
8	Suction Ø11 Valve - V16 - 24V
9	Suction Ø16 Valve - V17 - GND
10	Suction Ø16 Valve - V17 - 24V
11	Main Water Valve - V10 - GND
12	Main Water Valve - V10 - 24V
13	Main Air Valve - V12- GND
14	Main Air Valve - V12- 24V
15	Cuspidor Flush Valve - V7 - GND
16	Cuspidor Flush Valve - V7 - 24V
17	Cup Filler Valve - V4 - GND
18	Cup Filler Valve - V4 - 24V

J4 — Suction Clean System (CA-008)

1	Suc. Cl. Switch - S38 - Cl. Enable
2	Suc. Cl Switch - S38 - GND
3	Suct. Bottle level detect. - S15 - GND
4	Suct. bottle level detect. - S15 - Suc.
5	Suction bottle detect. - S15- GND
6	Suction bottle detect. - S15- +5V
7	Water Flush Valve - V39 - 24V
8	Water Flush Valve - V39 - GND
9	Suc. Cl. Level top - S11T - GND
10	Suc. Cl. Level top - S11T - TOP
11	Suc. Cl. Level top - S11T - GND
12	Suc. Cl. Level top - S11T - 5V
13	Suc. Cl. Level Bot. - S11B - GND
14	Suc. Cl. Level Bot. - S11B - Bottom
15	Suc. Cl. Level Bot. - S11B - GND
16	Suc. Cl. Level Bot. - S11B - 5V
17	Cup Filler Valve - V22 - GND
18	Cup Filler Valve - V22 - 24V
19	Pump Suction - V35 - GND
20	Pump Suction - V35 - 24V

J37 — Water treatment (CA-033)

1	Level detect. - S5B - GND
2	Level detect. - S5B - SUMP_BOTTOM
3	Level detect. - S5B - +5V
4	Level detect. - S14 - GND
5	Water Clean Valve - S14 - Chemi
6	Water Clean Valve - S14 - +5V
7	Pump Chemi - V31 - 24V
8	Pump Chemi - V31 - GND
9	

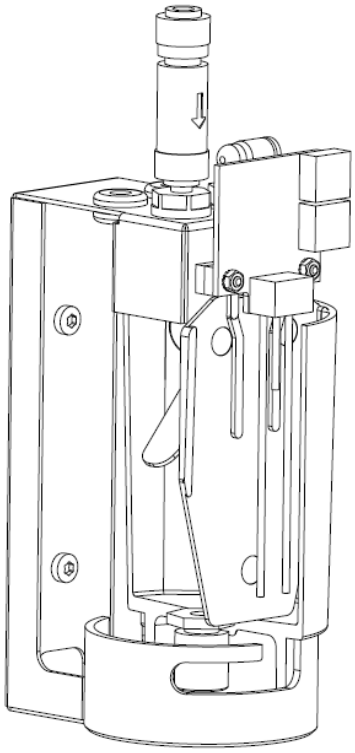
J5 — Backflow Prevention (CA-007)

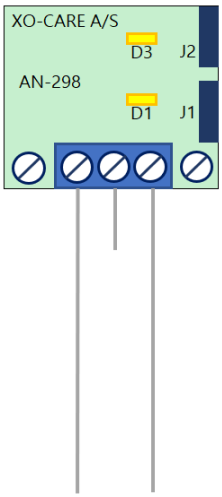
1	Level detect. - S5 - GND
2	Level detect. - S5 - SUMP_TOP
3	Level detect. - S5 - GND
4	Level detect. - S5 - +5V
5	Water Clean Valve - V27 - 24V
6	Water Clean Valve - V27 - GND
7	Water tank pressure - V30 - GND
8	Water tank pressure - V30 - 24 V

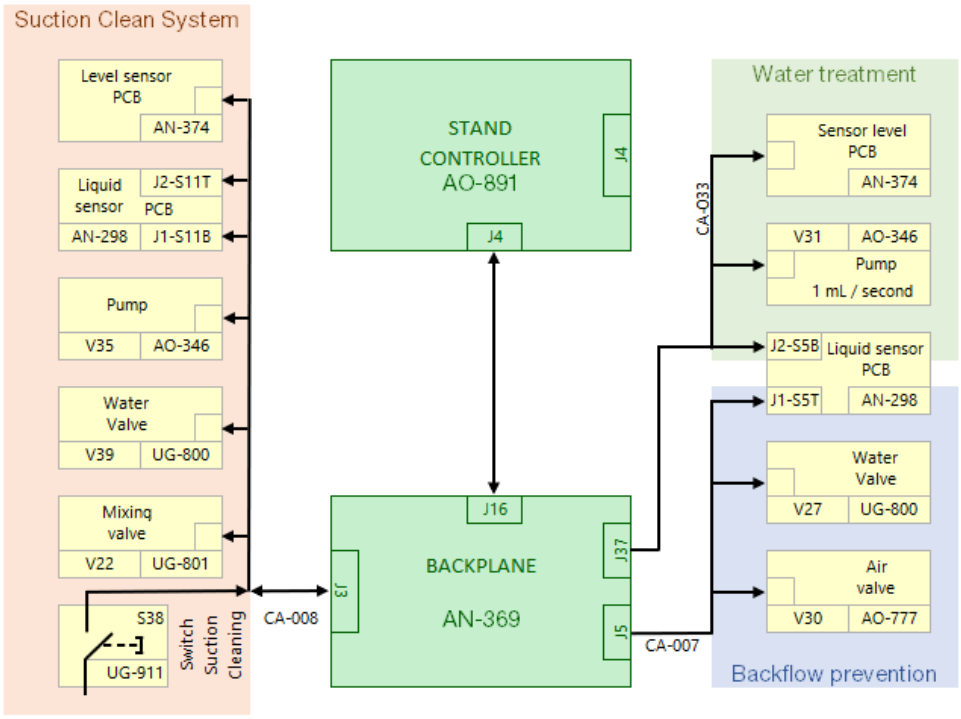
WATER/AIR X04 AND X0 FLEX		
Failure description	**Reason**	**Solution**
"WATER LEAK!!" "CALL SERVICE"	The water leak sensor has detected an overflow or leak and closes the water valve	Determine the reason for the overflow or leak.
		The valve filling the mixing cup either the "water treatment – backflow prevention" or the "suction clean" do not close properly. - V39 – Water valve for Suction clean system - V27 – Water valve for the backflow prevention. See diagram above for more information
		On the faulty valve: Remove coil, disassemble valve and clean or replace valve plunger.
		Clean and dry the water in the overflow tank and water leak sensor S33 if not done properly the following message "water leak!! Call service" will be displayed.
Water pressure failure on the instrument bridge	Fault in the main water valve V10 or in the valve control.	Check the voltage.
		Check the pressure before and after the valve.
		Check the resistance of the valve coil and replace it if it is defective.
		Disassemble the valve, clean, or replace the valve gasket.
	The "stand Controller" is defective	The "Stand Controller" AO-891 controls all valves, level sensors, pumps, suction and patient chair signals of the XO unit.
		For more information concerning the "Stand Control AO-891" and its function, consult page 20 & 21
		If the "Stand controller" is working, check the following
	The water pressure regulator is closed or defective	Check the water pressure setting and replace it if defective.
Air pressure failure on the instrument bridge.	Fault in the V12 main air valve or valve control (if pressure tank is present)	Measure the voltage on valve
		Check the pressure before and after the valve
		Check the valve coil resistance and replace it if defective
		Disassemble the valve, clean, or replace the valve gasket.
	The air pressure regulator is closed or defective.	Check the pressure setting and change it in case of failure.
	The "stand Controller" is defective	The "Stand Controller" AO-891 controls all valves, level sensors, pumps, suction and patient chair signals of the XO unit.
		For more information concerning the "Stand Control AO-891" and its function, consult page 20 & 21
		If the "Stand controller" is working

Fault in air pressure to instrument bridge	Main air valve V12 is defective	Check driver voltage.
		Check pressure before and after valve
		Measure valve coil resistance and replace if faulty, UC-584
		Remove coil, disassemble valve and clean or replace valve plunger.
	Air pressure reduction valve is closed or is defective.	Check pressure setting and change if defective
No Flush or Rinse	Cuspidor flush knob switch not activated.	Turn cuspidor knob must be turn clockwise to stop to have water flow.
	The cuspidor tap in the unit is closed.	Check if the water tap is not completely close in the unit. (place above V7 Valve)
	When chair reaches the preprogrammed “rinse position”.	Check that there is main water V10 is working properly
		Check that water flows when activating the “rinse/flushing” knob on the unit. If the water flows when pressing the knob and not when the chair reaches the preprogrammed “rinse position, execute a “reset” from the “technician menu”. Refer to page 13. If the “reset” does not solve the issue, do the following.
	The “stand Controller” is defective	The "Stand Controller" AO-891 controls all valves, level sensors, pumps, suction and patient chair signals of the XO unit.
		For more information concerning the “Stand Control AO-891” and its function, consult page 20 & 21
		If the “Stand controller” is working
	The cuspidor valve V7 is defective.	Measure the voltage on the valve V7
		Verify pressure before and after the valve V7
		Measure the valve coil resistance and replace if defective, UG-800
		Remove coil, disassemble valve and clean or replace valve plunger
	The cuspidor switch S37F is defective.	Measure the switch resistance in state - Switch ON - Switch OFF.
		Replace the switch if defective, CA-037
No cup filling.	The cup filler valve V4 is defective	Measure voltage on the valve
		Verify the pressure before and after the valve.
		Measure the valve coil resistance and replace it if defective, AO-778.

LIQUID SENSOR PCB, AP-869



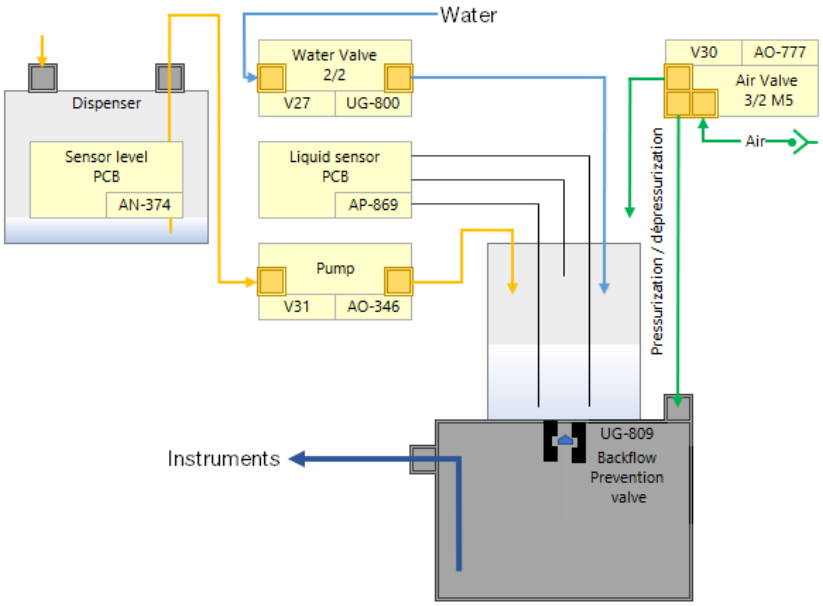


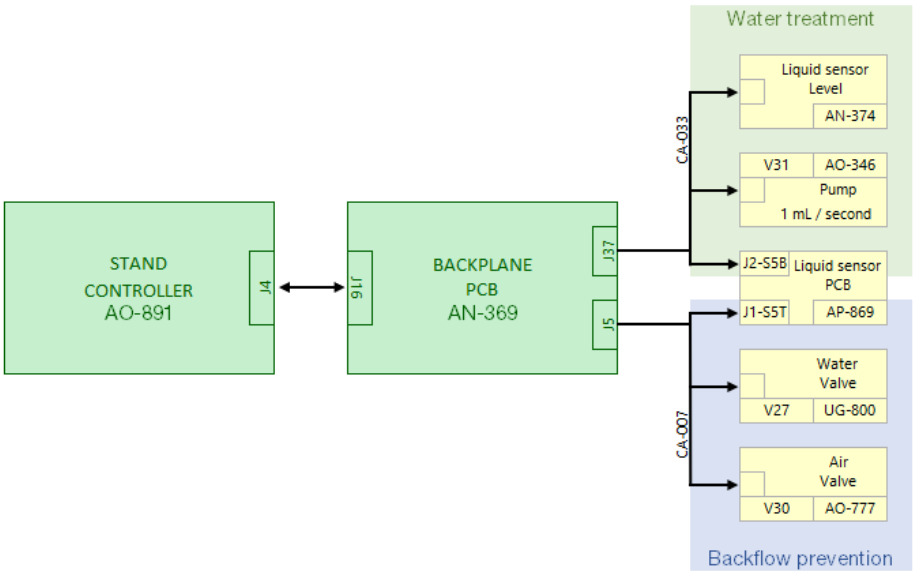


Failure description	Reason	Solution
The liquid detection sensor pins do not work properly.	It is important that the 3 sensor pins have no contact with the inner surface of the mixing cup or partition wall.	Correct the sensor probes to ensure that they do not touch the inner surface of the mixing cup.
		Check that the partition wall is inserted into the grooves of the cup
Lower LED off (Mixing cup filled)	Sensor PCB is defective or defective cable.	if the LED flashes it might indicate that the cable is defective, or has a short circuit change the cable. Check the connections of the "Water clean" cable CA-033 or “Suction Clean” cable CA-008.
		If it continues to flash change AP-869 PCB.
Upper LED remains off when water reaches the short liquid detector sensor probes.	Ether the sensor pins on PCB or the cable are defective.	if the LED flashes it might indicate that the cable is defective, or has a short circuit change the cable, Check the connections “Water clean” cable CA-007 or CA-008 for “Suction Clean” cable.
		If it continues to flash change AP-869 PCB.
Information:		
NOTE: It is important that the PCB is dry and clean. Do not touch the PCB if you have grease, suction system disinfection liquid on your fingers. The electronics of the AP-869 (AD-620) PCB is very sensitive.		
The sensors control the levels in the mixing cup. The filling of the liquid stops when the upper level is reached (short spindle). Filling starts again when the lower level is reached (no liquid between the two long spindles). The sensors are very sensitive and can be tested with a wet finger.		

WATER DISINFECTION SYSTEM

Water disinfection system is obtained by adding hydrogen peroxide (2,35%) to the water
When the mixing cup is empty, the sensor sends the signal to the Stand Controller, the V27 air valve opens to pressurize the tank and close the non-return valve. The V31 pump is activated for 2 seconds (1 ml per second) at the end of filling. The “Stand controller” opens the water solenoid valve (V30) which automatically stops the sensor probe (upper level). At the end of the filling process, the controller stand sends a signal to the V27 solenoid valve, which closes and releases the pressure inside the tank. This process allows the valve to be released and the tank to be filled. The cycle is repeated until the tank is full, an operation managed by the "controller stand AO-891".





Failure description	Reason	Solution
Water clean mixing cup is detected as empty when the cup is filled.	LED 1 switch off	One of the long liquid sensors is short-circuited or defective
	AP-869 PCB is defective	Change AP-869 PCB
	The cable CA-033 is damaged or not well inserted	Control that all connectors are well inserted,

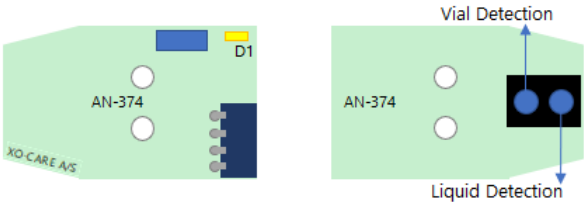
		Control the condition of the cable CA-033 and replace it if damaged
The "Water Clean" dispenser detected as "low" when full (white bottle).	The liquid sensor S14 measuring the water treatment fluid in the reservoir is not properly aligned, obturated or is defective	Measures the content of the suction clean dispenser located in the service panel
		Check that there is no gap between the sensor and the dispenser. If necessary, adjust the liquid sensor and secure that the dispenser is properly installed.
		Verify that the rubber support is good condition and does not obturate the 2 photos electric sensors. Replace the rubber support if damage
		Replace The liquid sensor PCB AN-374.
The liquid in the bottle does not circulate	The pump does not work properly.	Check if the pump is working properly, the session takes 2 seconds.
		Check that the liquid is flowing through the unit from the “Water Clean” bottle to the mixing cup.
		Measure the voltage at the pump V31 connections (+24 VDC)
		Change the pump (AO-346)
		Measure the pumps coil resistance.
		Disassemble and clean the valve at the piston. Change the seat gasket (MR-150) of the plunger

Information:

The peroxide tends to create crystals in the pump if the unit has not been in use for a certain period.
Procedure : How to activate the pump
Units produced before September 2018:
Disconnect the neutral and connect it to the ground on the chassis, the V31 pump will prime.

Units produced after September 2018: date of separation of earth and logic 0V
The procedure to prime the pump can be done with a cable CA-049 connected to the 24VDC Jumper J26 or J36 which is on the Backplane. For more information: see page 19 “Backplane AN-369”

AN-374 Level Sensor PCB



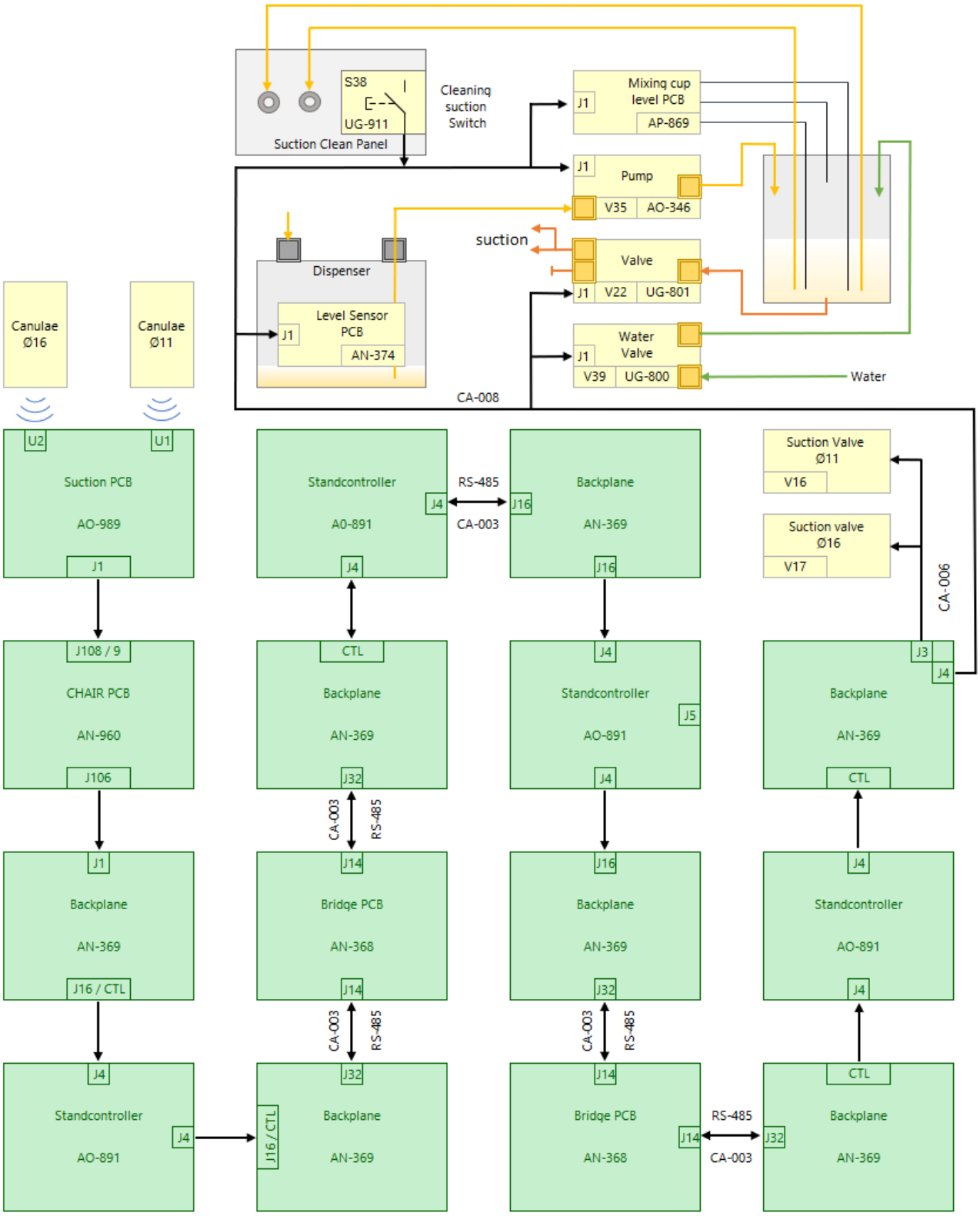
BACKFLOW PREVENTION

The backflow Prevention System is designed to avoid any risk of water contamination after mixing. The system is maintained the container under pressure after filling. The system consists of a mixing cup, a sensor, a backflow prevention tank equipped with non-return valve, air and water inlet pipes and two solenoid valves.

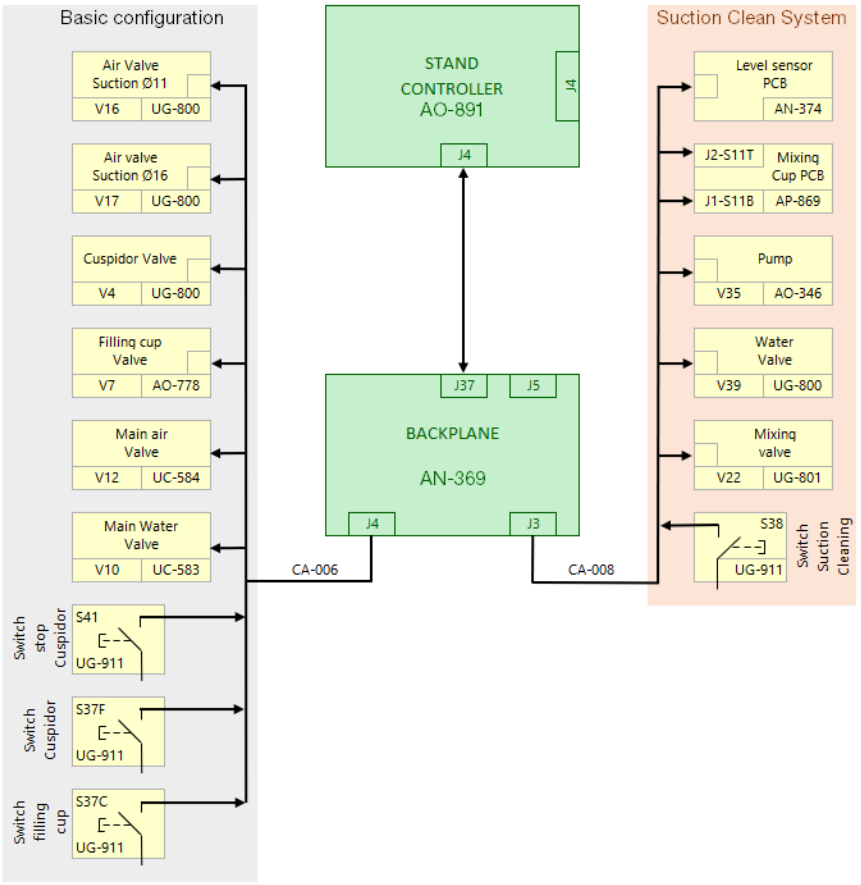
Failure description	Reason	Solution
No water in the container.	The check valve is defective.	Unscrew and remove the mixing cup from above the container to access the check valve. Unscrew the plug and clean or replace it (UG-809).
	Important:	It is very important that the check valve is mounted correctly to avoid any backflow into the bucket when the container is pressurized.
	Sensor pins are not properly placed in the mixing cup or are defective	Refer to chapter "Liquid sensor PCB" AP-869" on page 54
	The water supply valve V27 is defective	Verify that the connectors are properly inserted. Measure the voltage at the coil connectors 24VDC.
		Measure the coil resistance (≈100Ω).
		Disassemble and clean the valve at the piston. Change the plunger seat gasket (MR-150).
	The 3-way air supply valve V30 for pressurized air is defective	Check the voltage 24VDC on the valve connectors.
		Verify that the connectors are properly inserted.
		Measure the coil resistance (≈100Ω).
		Disassemble and clean the valve at the piston. Change the plunger seat gasket (MR-150).
		replace if faulty, AO-777
	The main water valve V10 (Ø3, 2-way, 1/8RG) is defective.	Refer to the chapter WATER/AIR XO4 and XO Flex Page 52 for explanation.
		Verify that the connectors are properly inserted. Measure the voltage at the coil connectors 24VDC
		Measure the coil resistance (≈100Ω). Change if defective UC-584.
		Disassemble and clean the valve at the piston. Change the plunger seat gasket (MR-150).

	The main air solenoid valve V12 (Ø2.5, 3-way, 1/8RG) is defective.	Refer to the chapter WATER/AIR XO4 and XO Flex Page 52 for explanation.
		Verify that the connectors are properly inserted. Measure the voltage at the coil connectors 24VDC
		Measure the coil resistance (≈100Ω). Change if defective UC-583
		Disassemble and clean the valve at the piston. Change the plunger seat gasket (MR-150)
Overflow (mixing Cup).	Sensor pins are not properly placed in the bucket or defective.	Refer to chapter “Liquid sensor PCB AP-869” on page 56
	The water supply valve V27 is defective	The piston of the solenoid valve does not close properly. Disassemble and clean the valve at the piston. Change the plunger seat gasket (MR-150).
Air bubbles “shoots” water out of mixing cup.	The check valve is defective or incorrectly mounted	It is very important that the check valve is mounted correctly to avoid any backflow into the mixing cup when the container is pressurized. Unscrew and remove the mixing bucket above the tank to access the check valve. Unscrew the plug and clean or replace it (UG-809).

SUCTION DISINFECTION SYSTEM



Valves & contacts connections in the "Basic configuration" and "suction cleaning".



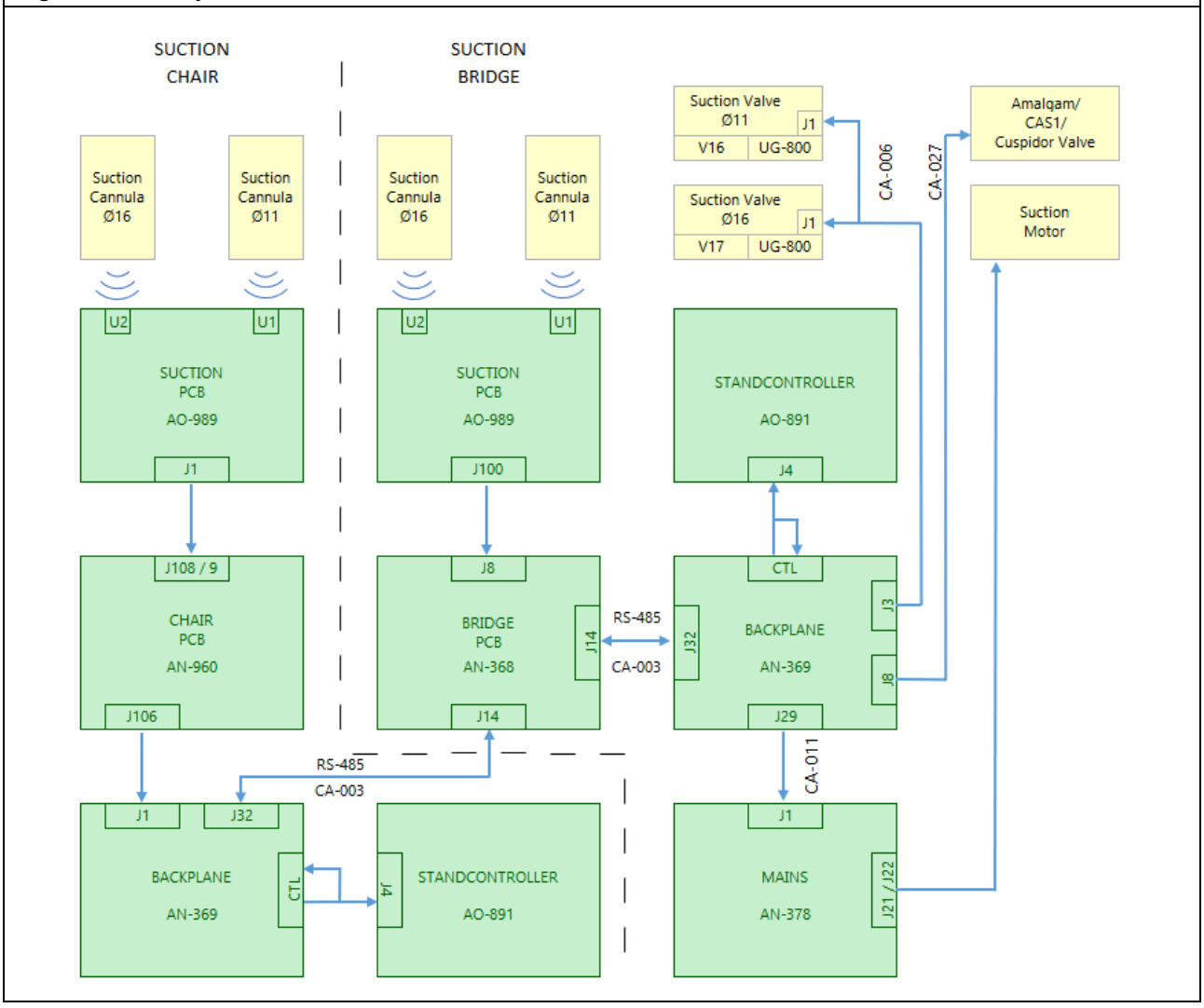
Failure description	Reason	Solution
Overflow (mixing cup)	The liquid sensor pins are misaligned or defective S11T	Measures the water treatment fluid in the reservoir
		Check that the pins do not touch the edges of the mixing cup or are short-circuited. Consult the chapter “Liquid Sensor PCB, AP-869” on page 56
		Replace Liquid Sensor PCB AP-869.
	The water supply valve V39 is defective	Verify that the connectors are properly inserted. Measure the voltage at the coil connectors 24VDC
		Measure the coil resistance (≈100Ω). Change if defective UC-584.
		Disassemble and clean the valve at the piston. Change the plunger seat gasket (MR-150).

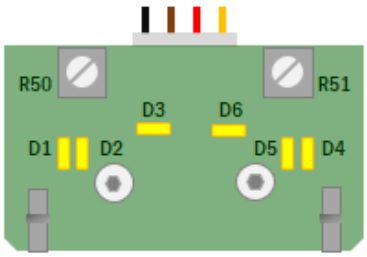
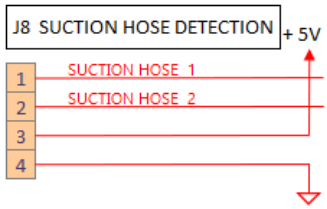
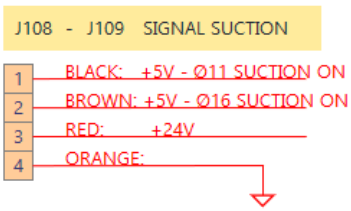
The Mixing cup is detected as empty when filled	Liquid sensor pins are misaligned or defective S11B	is assumed when no cleaning fluid is detected in mixing cup.
		Check that the pins do not touch the edges of the mixing cup or are short-circuited. Consult the chapter “Liquid Sensor PCB”, AP-869" on page 56
		Replace “Liquid Sensor PCB” AP-869
		Measure VCC 5V between Pin 1 (GDD) and Pin 4 (VCC)
	The pump V35 is defective.	Check if the pump V35 connections are properly inserted (CA-008 cable). Check if the Cable CA-008 is not damaged resulting to a short-circuit
		Measure the voltage at the coil connectors 24VDC.
		Measure the coil resistance (≈100Ω). Change if defective (AO-346)
		Disassemble and clean the valve at the piston. Change the plunger seat gasket (MR-150).
The suction cleaning liquid is detected as "low" while the bottle is full (Yellow bottle)	The photo sensor S15 measuring the suction clean fluid in the dispenser is not properly aligned, obturated or is defective.	Measures the content of the suction clean dispenser located in the service panel
		Check that there is no gap between the sensor and the dispenser. If necessary, adjust the liquid sensor and secure that the dispenser is properly installed.
		Verify that the rubber support is good condition and does not obturate the 2 photos electric sensors. Replace the rubber support if damage
		Replace the liquid sensor AN-374
		Check that the CA-008 cable is not defective or damaged. Changed the cable if defective
Unpleasant smells from the suction	The suction cleaning liquid dispenser is empty and the “check Yellow bottle” warnings are ignored.	Insert a new dispenser
	The liquid sensor pins are misaligned or defective S11B	Check that the pins do not touch the edges of the mixing cup or are short-circuited. Consult the chapter “Liquid Sensor PCB, AP-869” on page 56
		Measure the level of the cleaning liquid on the dispenser.
		To check that the liquid is extracted from the cartridge during the suction cleaning process, make a small mark on the cartridge at the current liquid level. After performing a suction cleaning session, check that the liquid level has dropped during the process. Otherwise, check the reasons described down below.

	The “suction clean” pump V35 is defective	If the liquid does not flow properly from the dispenser to the mixing cup.
		Check if the pump V35 connections are properly inserted (CA-008 cable). Check if the Cable CA-008 is not damaged resulting to a short-circuit
		Measure the voltage at the coil connectors 24VDC.
		Measure the coil resistance (≈100Ω). Change if defective (AO-346)
		Disassemble and clean the valve at the piston. Change the plunger seat gasket (MR-150).
	The liquid sensor pins are misaligned or defective S11T.	Measure the liquid level in the mixing cup.
		Check that the pins do not touch the edges of the mixing cup or are short-circuited. Consult the chapter “Liquid Sensor PCB, AP-869” on page 56.
		Replace the liquid sensor PCB (AP-869)
	The water valve V39 is defective	Fills the mixing cup with water.
		Check if the valve V39 connections are properly inserted (CA-008 cable). Check if the Cable CA-008 is not damaged resulting to a short-circuit.
		Measure the voltage at the coil connectors 24VDC.
		Measure the coil resistance (≈100Ω). Change if defective (UG-800)
		Disassemble and clean the valve at the piston. Change the plunger seat gasket (MR-150).
	The flush suction cleaning valves V22 is defective	When the suction changes from suction hose flushing to direct suction.
		Check if the valve V22 connections are properly inserted (CA-008 cable). Check if the Cable CA-008 is not damaged resulting to a short-circuit
		Measure the voltage at the coil connectors 24VDC.
		Measure the coil resistance (≈100Ω). Change if defective (UG-801)
		Disassemble and clean the valve at the piston. Change the plunger seat gasket (MR-150).

SUCTION ON BRIDGE OR CHAIR

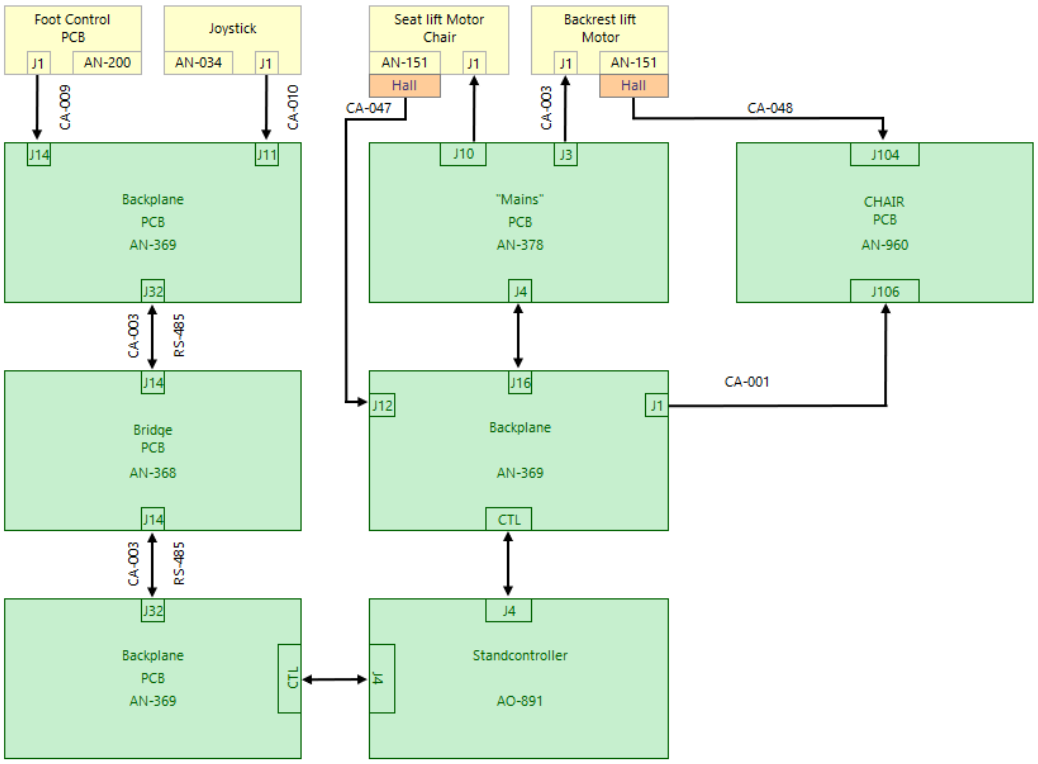
The XO units are equipped with 2 suction located either on the bridge or on the chair. Their functionalities are identical.
The suction system works as follows: when one of the two hoses is lifted, the suction system starts to work.
In the instrument holder, the PCB is connected directly to the “Bridge PCB AN-368” via the CA-045 cable. On the chair, the cable is connected to the AN-369 board on J1 “Signal chair”.
The communication is as follows
When one of the hoses is activated, it sends a signal to the “Stand Controller” board which opens valves V16 (suction hose Ø11) and/or V17 (suction hose Ø16). The “Stand Controller” activates at the same time, CAS1 (if installed via cable CA-027) and via cable CA-011 sends a signal to a relay that starts the suction motor J21 on “MAINS” AN-378.



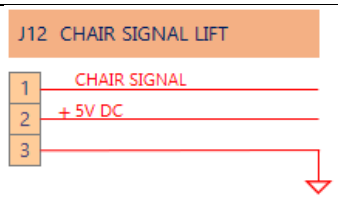
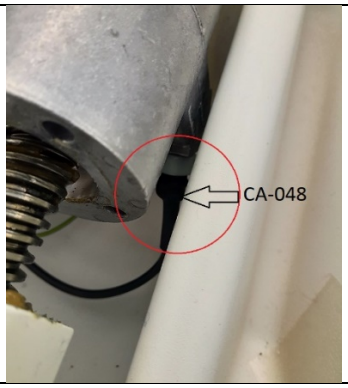
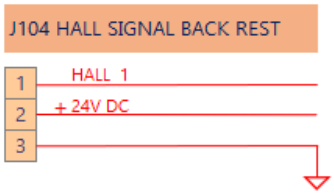
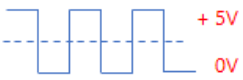
<table>
<tr><th>Failure description</th><th>Reason</th><th>Solution</th></tr>
<tr><td rowspan="4">Suction does not start when one of the suction hoses is lifted but suction motor starts.</td><td rowspan="4">The suction tubes are not place on the correct valve</td><td>In the instrument Bridge:
Check the connections on pin "J8 - Suction detection".</td></tr>
<tr><td>Suction Chair:
Check the connections on pin J100 in the chair.
See the diagram below.
"D100 - Signal Suction"</td></tr>
<tr><td>Lift the two suction hoses, if the suction starts, it indicates that the two blue tubes are not mounted on the correct valves V17 and V16. Place the tube from V17 on the valve V16 and vice versa.</td></tr>
<tr><td>Verify that the suction starts when lifting the hose.</td></tr>
<tr><td rowspan="3">Suction starts when the unit is switched on</td><td>Sensor detection range is not properly adjusted</td><td>Remove the cover from the suction holder and check that all 4 LEDs are lit. See table down below.
Adjust the sensitivity range by adjusting the potentiometers R50 and R51.</td></tr>
<tr><td>Not possible to adjust the detection properly</td><td>Defect potentiometers
Change AO-989 PCB</td></tr>
<tr><td>The “Stand Controller” PCB is defective</td><td>Following a polarity reversal or short circuit due to a cable break in the suction arm, the sensors burn; Change the “Stand Controller” PCB AO-981.</td></tr>
<tr><td rowspan="2">No suction: (Valves activated / spittoon valve / CAS1 / Amalgam separator activated)</td><td rowspan="2">The suction motor does not start</td><td>Check that the suction system motor is power properly</td></tr>
<tr><td>Check that the activation cable of the suction motor is correctly connected to pin J21</td></tr>
<tr><td>Connection Diagram
 
</td><td colspan="2"> 
</td><td colspan="2"> 
</td></tr>
<tr><td colspan="2">Suction – Not Active</td><td colspan="2">Suction – Active</td></tr>
<tr><td>D1</td><td>ON</td><td>D1</td><td>ON</td></tr>
<tr><td>D2</td><td>OFF</td><td>D2</td><td>ON</td></tr>
<tr><td>D3</td><td>ON</td><td>D3</td><td>ON</td></tr>
<tr><td>D4</td><td>ON</td><td>D4</td><td>ON</td></tr>
<tr><td>D5</td><td>OFF</td><td>D5</td><td>OFF</td></tr>
<tr><td>D6</td><td>ON</td><td>D6</td><td>OFF</td></tr>
</table>

XO CHAIR

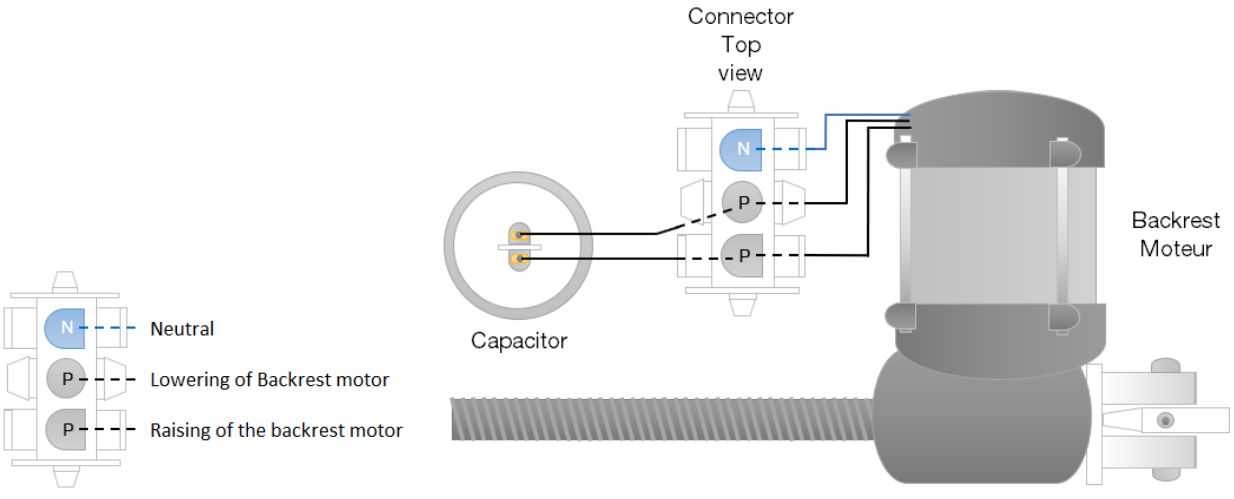
The chair movements are generated by two electrical motors and monitored by hall sensor devices that keeps the chair within the range of motion accommodated by the drive mechanisms controlling the chair. The Calibration Mode is a programmed routine of chair movements that locates the begin/end travel points. After calibration all the previous stored values in memory are erased. To reprogram them refer to the XO flex user guide.



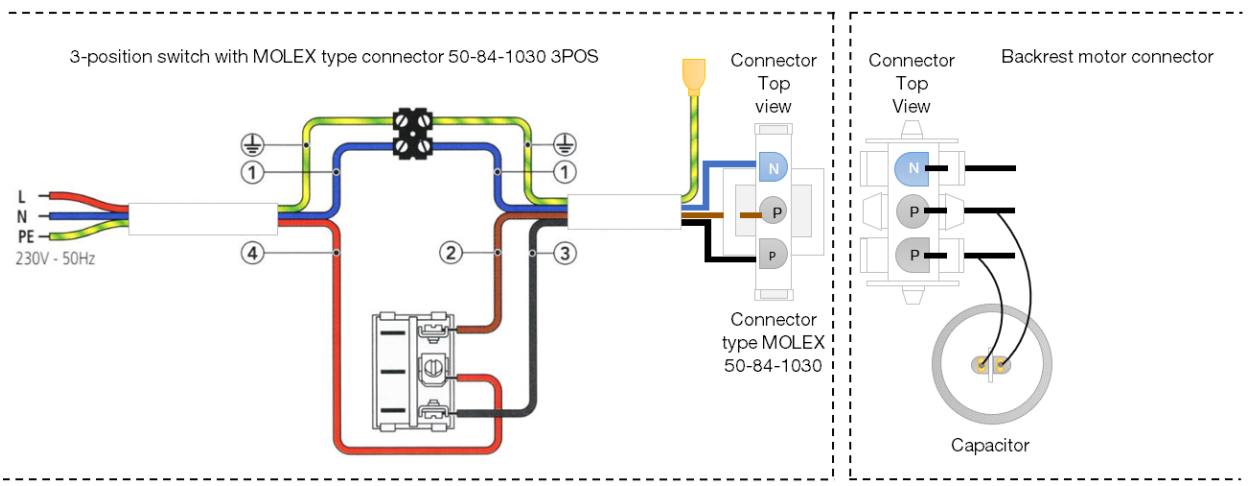
Failure description	Reason	Solution
The chair does not run properly (hacking while moving).	The chair is not calibrated or out of calibration.	Synchronize the chair according to the notice YB-755 “Chair synchronization”.
	The “stand controller” is defective	The “stand controller” AO-891 generates signal.
No movement of the chair when the joystick or control pedal is activated.	The lifting motor is overheating	In case of an overheating of the motor, a thermostatic sensor is activated. The cooling time is approximately 15 minutes.
	The Hall sensor is not close enough to the motor spindle.	Loosen the lock nut. Tighten the Hall effect sensor until the sensor touches the magnet. Loosen the tower Hall effect sensor from ¼ turn Tighten the lock nut and make sure the sensor is attached.
	The Hall sensor is defective.	Replace the Hall sensor Hall CA-047. Picture and instruction how to change the cable down below.

<table>
<tr><td rowspan="3"></td><td>The Hall sensor is defective.</td><td>Replace the Hall effect sensor, located in chair CA-048 connected to jumper J104 on AN-960. See picture and procedure down below</td></tr>
<tr><td>How to change the Hall sensor cable?
 
</td><td>Same procedure for both cable CA-047 and CA-048
Tighten the new Hall sensor until the sensor (not the lock nut) touches the magnet.
Loosen the Hall effect sensor by ¼ turn
Tighten the lock nut and make sure the sensor is properly fixed.</td></tr>
<tr><td> 
</td></tr>
<tr><td rowspan="2">The backrest motor does not work</td><td rowspan="2"> 
</td><td>Replace the Hall Effect sensor, located in the CA-048 chair connected to the J104 jumper on AN-960.</td></tr>
<tr><td> 
</td></tr>
<tr><td rowspan="2">The backrest motor locks up when going up.
  </td><td>Synchronization issues :
Exceptional case:</td><td>The motor of the backrest may jam when reaching the topmost position and remains stuck without interrupting the power to the motor or reverting the course. Danger of overheating.</td></tr>
<tr><td>Extremely dangerous manipulation</td><td>please contact your XO technician for assistance</td></tr>
<tr><td colspan="3">Major Cases:
J104 the 24V is generated by the board "Stand Controller AO-891". In case of absence of the 24V on the jumper J104 Controler that the LED on the "Stand Controller AO-891" is well lit. If there is no 24V on jumper J104 after changing the fuse, change the board "Stand Controller AO-891".
Hall sensors are very sensitive to reverse polarity and short circuit.
J12 Signal Chair Lift: The 5V it is generated by the "Power Supply PCB AN-371". In case of absence of the 5V on please refer to the chapter "+5V Overvoltage Protection".</td></tr>
<tr><td colspan="3">Signal Measurement:
Rectangular shaped signal
0V to 5V variation
 

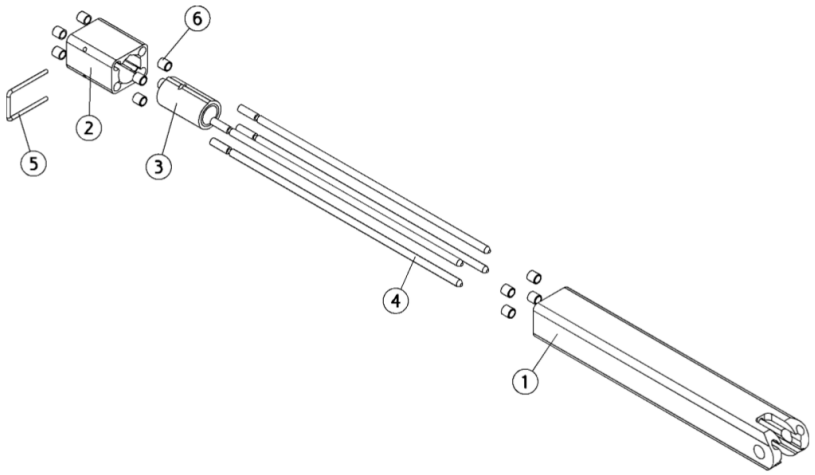
The signal measurement is done between pin 1 (flesh signal / hall signal) and pin 3 (GND) on either J104 (backrest motor) or J12 (chair motor).
The signal emitted is rectangular in shape, varying from 0V to 5V. When activating the seat or the base of the chair, the measurement is made in Volt Alternative mode varying from 2.2V to 2.4V.</td></tr>
</table>

<table>
<tr><th colspan="3">Special Case: The backrest motor does not stop when reaching topmost position</th></tr>
<tr><th>Failure description</th><th>Reason</th><th>Solution</th></tr>
<tr><td rowspan="3">Out of synchronisation
  </td><td rowspan="2">Synchronization problem :
The backrest motor jammed out of calibration range and needs to be initialized.</td><td>Execute a synchronization</td></tr>
<tr><td>To reverse the course and execute a synchronization, follow the instruction down below</td></tr>
<tr><td>Caution : The backrest motor is still powered.</td><td>Turn off the unit.
Danger of overheating.</td></tr>
<tr><td colspan="3">Electrical Safety Tips</td></tr>
<tr><td rowspan="2"> 
Task carried out under high voltage 230V</td><td colspan="2">It is essential that you fully understand all the necessary steps before you begin.
For your safety, please inform those present of your intervention:
- That no one can operate or reset any circuit breaker or switch without your permission.;
- That no one can interrupt your task before you're finished.
- Wear rubber gloves for high-voltage work and use tools with rubber handles.</td></tr>
<tr><td colspan="2">- Identify the dangers.
- Identify risk controls. Is the unit connected to an HFI relay?
- Estimate the risk. Are you sure you are qualified to perform this task?
- Decide on the risk tolerance and opt instead for the mechanical solution as provided below.
- Prepare a risk control action plan (if necessary); this task can be performed in collaboration with an experienced XO technician.</td></tr>
<tr><td colspan="3">Electrical work procedure:</td></tr>
<tr><td colspan="3">Reversal of the motor polarities.</td></tr>
<tr><td></td><td colspan="2">To reverse the rotation of a single-phase capacitor motor, you must reverse the polarity on the motor's MOLEX connector.</td></tr>
<tr><td colspan="3"> 
</td></tr>
</table>

Before proceeding:	Make sure the unit is turned off. Disconnect the CA-002 cable from the motor connector as shown in the diagram above. Insert the phase into the P connector. Choose the respective phase to raise or lower the backrest. The neutral must be inserted into the N connector. To increase safety, make an accessory as shown below using a 3-position switch and a connector type MOLEX 50-84-1030 3POS .084



Handling:	Lower the backrest until it reaches its lowest position. Once lowered, disconnect the connector from the motor and plug the CA-002 cable connector. When done, turn on the power to the Unit. The motor will immediately start and raise the backrest. Immediately perform a synchronization before the chair locks See procedure on page 77.
Advice:	To avoid too many tests, it is advisable to make several programming tests before switching on the motor.
Synchronization:	See instruction on page 73 Action a must be executed very rapidly before the backrest locks in the upmost position again.

Mechanical work procedure:	
Disassembling of the drive bearer:	The procedure can be carried out mechanically by releasing the drive shaft brackets: Important: Support the backrest during handling Remove the U-shaped locking pin ⑤ from the drive lock ② and extract the 4 guiding rods ④. Turn the drive lock ② till it reaches the bottom most position. Drive lock ② closest to the motor.
	
	Reassemble the 4 guiding rods correctly ④. Lock them ④ in the drive lock with U-shaped locking pin ⑤. Slide the backrest so that it rests on the lock nut. ②
Powering up the Unit:	When the backrest is correctly mounted, switch on the Unit, the motor will start and raise the backrest immediately. Enter the “technician's menu” by pressing C (configuration switch) twice without wasting time to perform a synchronization.
Advice:	To avoid too many tests, it is advisable to simulate several synchronization tests on the chair before switching on the motor.

Chair synchronisation:

It is mandatory to synchronize the chair.

- After replacing the AN-368 PCB situated in XO4 & XO FLEX bridge.
- After replacing the lithium battery.
- After a firmware update.

To synchronise the chair, proceed as follows:

1 Power the unit on and wait until it is ready. Continue with step 2 or see alternative procedure.

2 Press C (configuration switch) twice. Display shows **"LIGHT"**

3 Press foot control joystick west (left). Display shows **"UNIT"**

4 Press foot control joystick south (against yourself). Display shows **"CHAIR"**

5 Press foot control joystick east (right). Display shows **"RINSE=0"**

6 Press foot control joystick south. Display shows **"SYNC"**

7 Press foot control joystick east. Display shows **"NO"**

8 Press foot control pedal down. Display shows **"YES"**

9 Press foot control joystick west. Display shows **"SYNC"** and the chair moves.

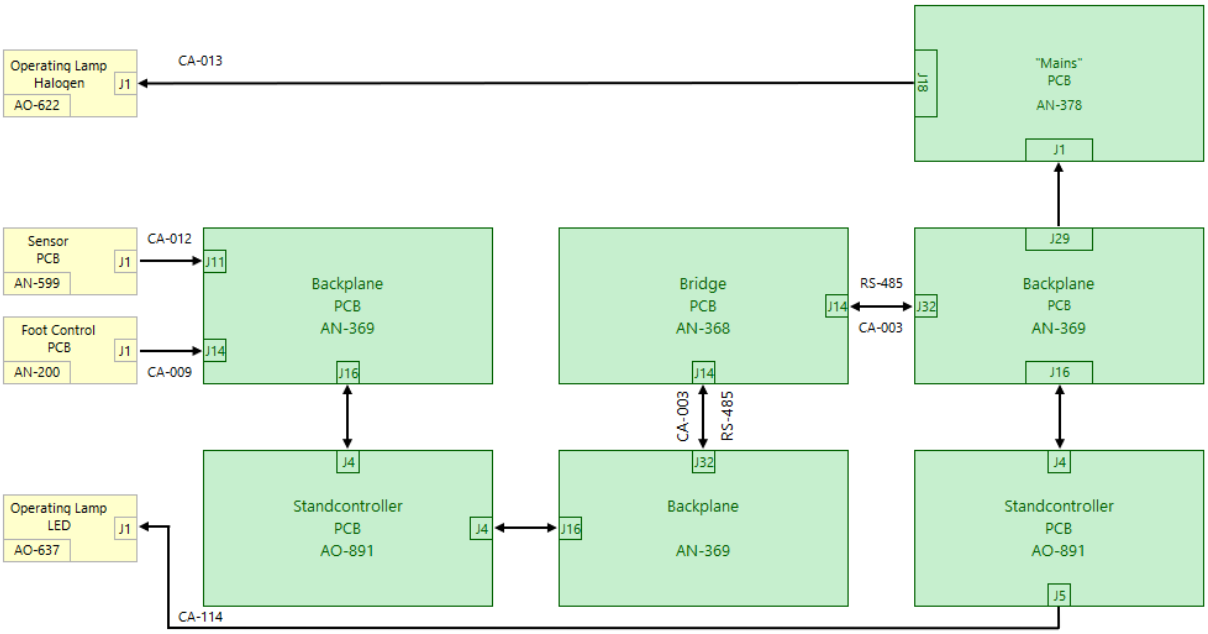
10 Press the configuration switch. Display shows same info as in 1, and calibration has ended when the chair stops.

Note that this description refers to firmware version 1.51 or later.

Alternative procedure:

Same as above, but after step 1 move the chair (even slightly) and execute step 2 quickly after. Display shows "SYNC". Continue from step 7.

XO OPERATING LAMP



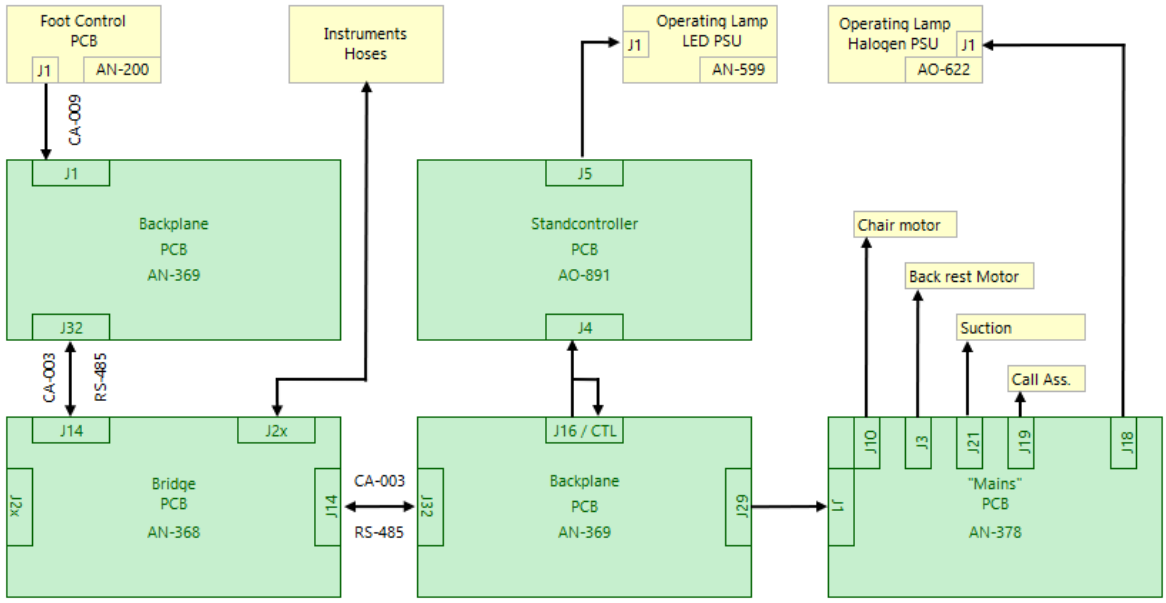
Information

Units produced **before September 2017** are equipped with an "**AN-378**" PCB board equipped with the connector **J20**. If the Unit is equipped with a Halogen Operating light and the Mains PCB must be replaced, order the following reference by "**AN-378**" PCB.
The halogen power cable has the reference **CA-013.**

Units produced **after September 2017** equipped with the separate EMI filter are equipped with an **"AP-005"** PCB board.
The LED power cable has the following reference **CA-114.**
See Service Note dated 02 September 2017 on the XO Site page "Technical Service".

Failure description	Reason	Solution
The XO operating lamp does not switch when it reaches working position 1 or 2	Parameter not defined in the “technician menu”	Check whether the operating light can be switched on by passing your hand under the sensor. If yes, check that the parameter under “Lamp/CH” is defined as “enable” in the technician menu. Refer to “technician menu” on page 26.
		if defined properly, and still no light do the following checks.
	LED	Check if the power cable of the OP light is correctly connected to the “Stand controller” AO-891. It supplies the OP Light with 24VDC.
		If the fuse on the “Stand Controller” card is not blown (LED on).
	Halogen	If the power cable CA-013 is correctly connected on the jumper J20 situated on “MAIN PCB” AN-378
		Check the transformer output voltage.
The OP lamp does not switch on when placing the hand under the sensor.	The PCB is defective	When the detection is made, a click is heard. If no click, change the sensor PCB
	No Power	Read statement above for the LED.
The OP lamp LED shines faintly.	The LED is defective	Change the LED Light AO-638
How to measure voltage output on OP light?	Measuring output voltages and current on the CA-013 cable	Disconnect the cable CA-013 and CA-066 situated in the OP lamp arm.
		In voltmeter Mode: Measure the output voltage of the CA-013 (between 24 and 25VDC).
		In Ampere mode (mA) Measure the intensity output on CA-013 (same contact) To dim the intensity, activate the sensor under the OP light or pedal. Expected output: • 624 mA: full • 380 mA: middle • 283 mA: low.

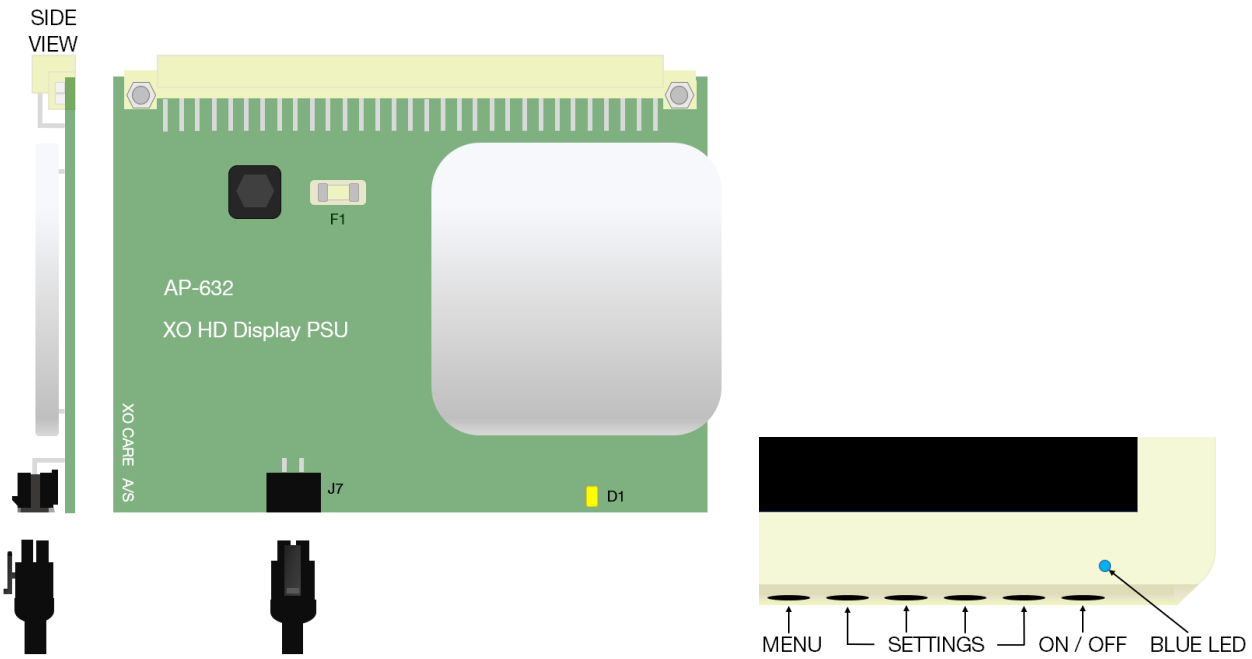
XO FOOT CONTROL



Failure description	Reason	Solution
Display shows « Foot control Error" during start-up	There is no BUS RS-485 communication between the foot control and the Unit	Verify that the foot control cable (CA-009) is not damaged.
		Measure with an ohmmeter from the Backplane J14 to the foot control J1 pin 1 to 4, if there a break on the cable CA-009 Value MΩ.
		Measure the resistance between Pin 1 and 2 (RS-485 communication BUS, the value should be around 120Ω.
		Measure the 5V voltage between Pin 1 (Yellow +) et Pin 4 (Green GND). If the +5V Voltage is missing : - Verify the fuses on "Power Supply AN-371" - Read "5V Overvoltage protection" chapter "Power Supply AN-371" on page 14
		If all the above is correct, then the foot control is defective.
		All defective foot control must be sent back to XO-care
"Network Fail!! "Call Service"	Displayed after switching on the unit if there is no communication between the "Stand Controller" A0-981 and the pedal. Either due to a cable break, a	Recalibrate the foot control.
		Check the CA-003 communication cable is properly connected between J14 (bridge) and J32 (Backplane) in the unit.

	bad connection from J14 to AN-368/AD-603 (Tablet Card) or a bad calibration.	Verify the foot control cable.
		Consult a XO technician.
Nothing happens when the pedal is activated.	Out of calibration	Calibrate the control pedal according to the instructions in YB-795.
	Pedal control PCB is defective.	Replace complete foot control: XO 4-1: AO-058 XO 4-2: AN-200 XO 4-6: AN-200 XO FLEX: AP-703
		NB: It is not possible to change the PCB AN-373 or other spare part on the pedal. Any defective pedal must be returned for repair and calibration.

XO HD SCREEN.



Failure description	Reason	Solution
No picture on the screen.	Connection problem :	Make sure that the display's power cord is properly connected at each end. Check that the screen is turned on. The blue LED at the bottom right of the screen serves as an indicator. To turn on the screen, press the right-most contact under the screen. See picture above
	Blue LED On but…	The following message “HDMI / Analog” appears at the top left of the screen, it indicates that the screen is not connected to a source (PC). Check that the HDMI cable is connected correctly at each end.
	Blue LED OFF	The “XO HD Display PSU PCB AP-632” display power supply is inserted on the “backplane AN-369” in the terminal of the Unit.
		Check that D1 is lit. If off, test fuse F1. If the fuse is blown it may indicate that the power cable is defective or damaged. Probe the cable.
		Measure the output voltage J7 is 15V If the voltage is present, check if the CA-086 cable is inserted correctly. See schematic side view above.

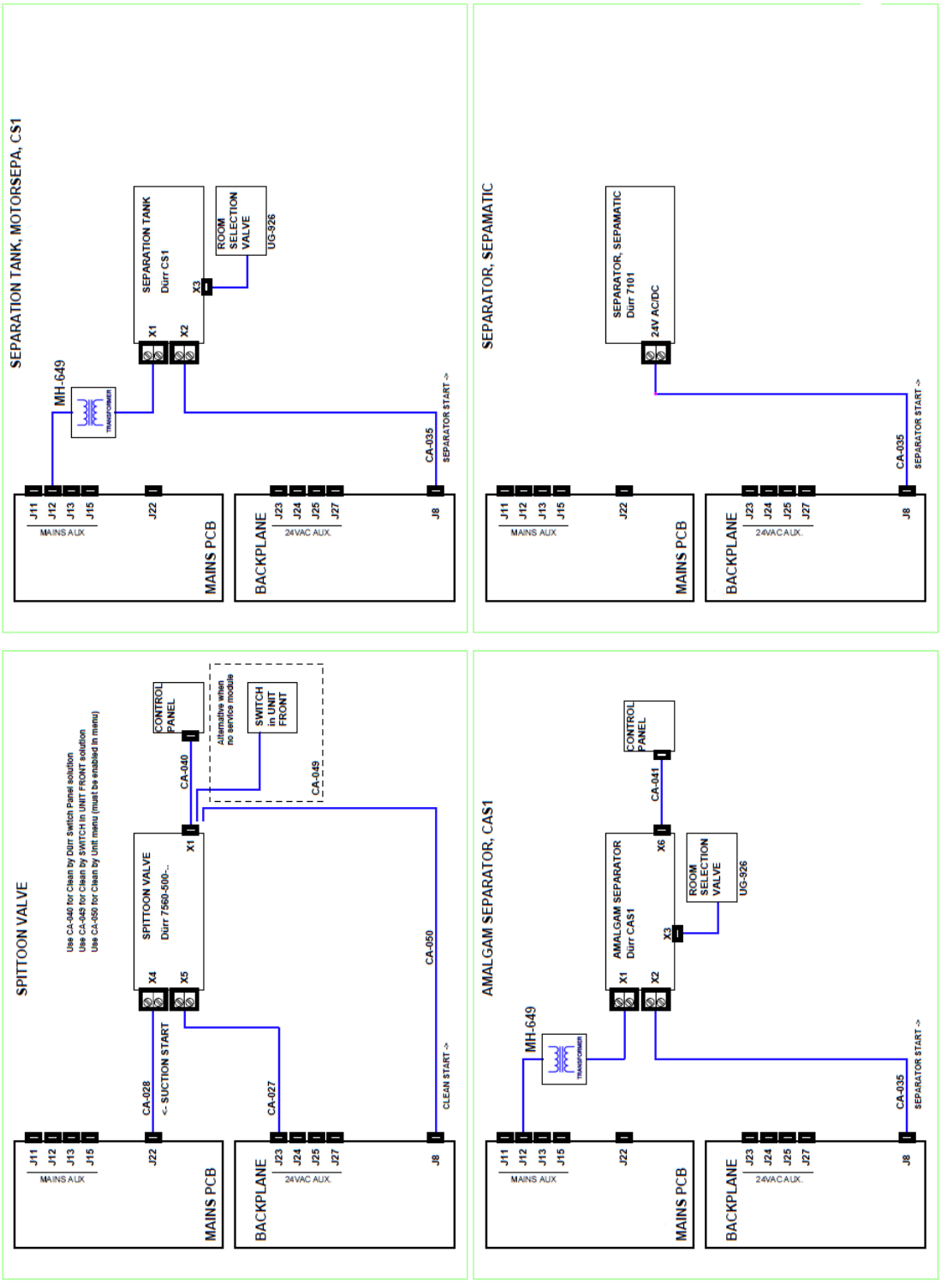
Image quality problem	L'image du fond d'écran n'est pas de bonne qualité.	The transmission quality deteriorates rapidly above 5 meters in length depending on the quality of the HDMI cable. HDMI signal quality is detected when shadows appear. HDMI amplifier adapters must be installed. For 10 meters lengths, XO offers a PA-120 cable set (USB - HDMI - Serial).
	The screen background is of good quality, but the image transmitted from the Dürr HD camera is greenish.	If the background is correct no distortion or shadows, but the image transmitted by the Dürr HD Camera has greenish, pinkish or yellowish reflections indicates in 90% of the cases that transmission problems are affecting the image quality. It is recommended to add a USB amplifier adapter between the camera's USB connector in the terminal and the PC's USB cable.
Screen problem.	The display turns off automatically after 5 or 10 minutes.	If the display turns off after a certain period, the next ECO setting may not have been disabled.
		Enter the configuration "menu" by pressing the left button below the screen. Enter the "Setup and Reset" menu. Make sure that the "Eco Saving" configuration is set to OFF.
	The image is only displayed for a split second.	The blue LED is on, but the image disappears shortly after switching on. Problem is related to the intern Screen Power PCB. The screen needs to be changed.
Advisory	Before replacing a screen.	it is always recommended to test the image quality with a pilot cable connected to a pilot source (A cable connected to a PC whose transmission is regularly tested).

ELECTRICAL CONNECTIONS FOR:

Spittoon Valves DÜRR

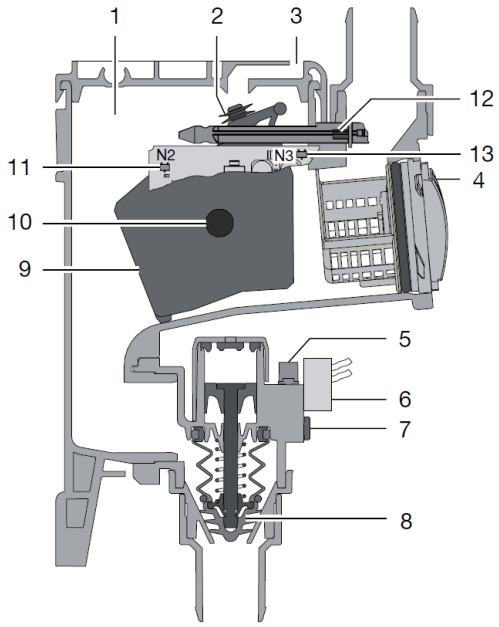
CAS 1 DÜRR

COMBI-SEPAMATIC CS 1



SPITTOON VALVE DÜRR

All the following information is the property of Dürr dental. No data or indications have been modified and have only been added to this guide to provide the necessary information to be able to quickly intervene on a failure related to the spittoon valve.
For more information, please refer to the "Installation and Operating Instructions" at http://www.durrdental.com/

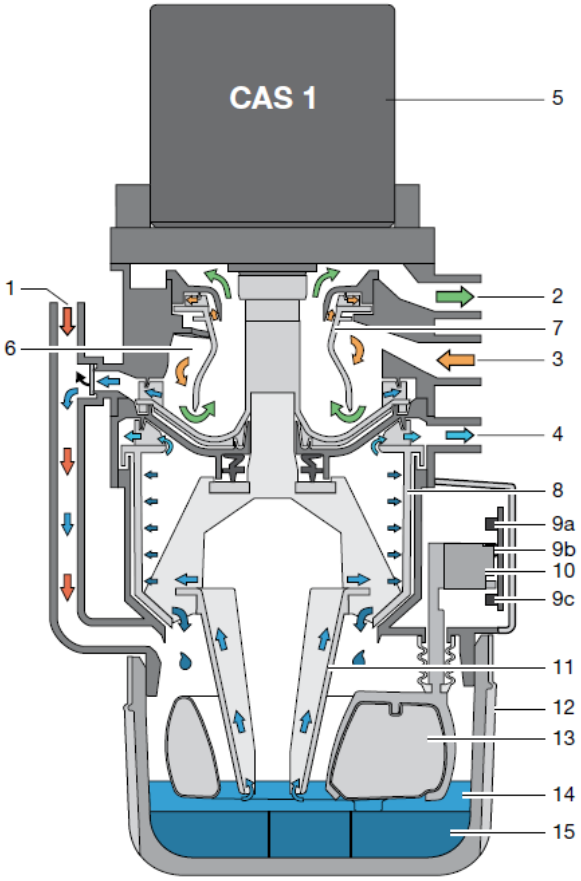


1 Fluid collector
2 Air extraction seal
3 Vent
4 Protective strainer
5 Exhaust air damper
6 Solenoid valve
7 Compressed air connection
8 Shut-off valve
9 Float sensor
10 Magnet in float sensor
11 Float sensor detection
12 Magnet in cleaning button
13 Cleaning button detection sensor

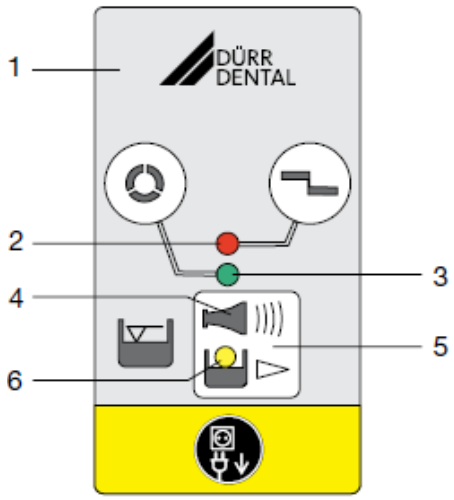
Failure description	Reason	Solution
Spittoon valve is not working.	No Power supply	Verify the power supply
		Check the connectors
	No air present	Check the compressed air supply on spittoon valve.
	Sensor is defective	Check the sensor function by pressing the switch.
		Check the function by manually moving the float sensor.
Suction unit does not start or run continuously.	The float sensor is blocked	Clean the housing and the float sensor.
		Insert the float sensor correctly.
The liquid does not flow through	The drain is blocked	Clean the drain line.
		Check if the filters. Clean them if clogged

CAS 1 DÜRR

All the following information is the property of Dürr dental. No data or indications have been modified and have only been added to this guide to provide the necessary information to be able to quickly intervene on a failure related to the Amalgam separator CAS1.
For more information, please refer to the “Installation and Operating Instructions” at http://www.durrdental.com/



1 Fluid intake
2 Vacuum, to suction unit
3 Aspiration input
4 Fluid output
5 Motor
6 Separation
7 Separation rotor
8 Centrifuge
9 Light barriers (3x)
10 Sensor enclosure
11 Cone pump
12 Amalgam collector vessel
13 Float sensor
14 Fluids
15 Amalgam particles



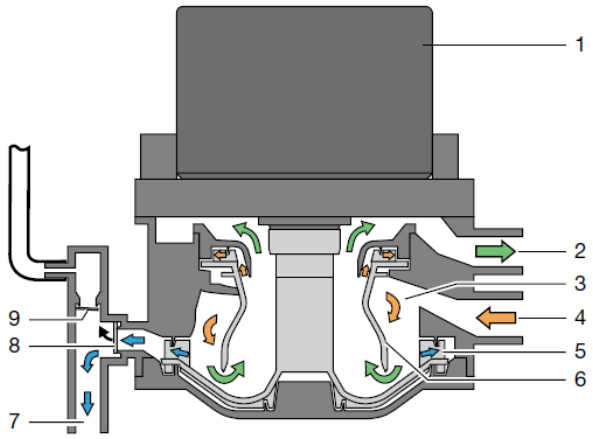
1 Display panel
2 RED display
3 GREEN LED
4 Audible signal/melody
5 Reset/service key
6 YELLOW LED

Failure description	Reason	Solution
CAS1 is not operational (display module off)	No Power supply	Check that the CAS 1 is correctly connected.
		Check the connectors and the connection
	The fuses have blown	Check the fuses
The yellow and green LEDs are lit, and a melody is emitted.	Amalgam collecting receptacle is 95% filled	Replace Amalgam collecting receptacle.
	Floater is clogged and/or blocked.	If the LED lights on repeatedly, after emptying the collecting vessel, check if the floater is moving freely.
The yellow LED is on, the red LED flashes and an acoustic signal is emitted.	Amalgam collecting receptacle is 100% filled.	Replace Amalgam collecting receptacle.
	Floater is clogged and/or blocked.	If the LED lights on repeatedly, after emptying the collecting vessel, check if the floater is moving freely
	Dirty sewage pipe / dirty siphon	Cleaned the wastewater evacuation pipe / siphon
The green and red LEDs flash alternately, and the acoustic signal is emitted	Dirty or defective motor	Check the flexibility of the motor. Replace the centrifuge if necessary.
		Replace the device.
	No signal on connector X9	Check if the connector is plug correctly.
		Replace the main PCB and the motor connector.
The orange light flashes, and the acoustic signal is emitted.		Stop the acoustic signal by briefly pressing the maintenance button
	The amalgam container is not placed correctly	Switch of the UNIT.
		Insert the amalgam collection container correctly
		Switch on the UNIT.
	Floater is missing	Insert the floater.
The water is not drain properly from the cuspidor	The sieve is clogged.	Clean the sieve.
Suction power is too weak or interrupted	The sieve is clogged at the inlet of the suction line	Clean floater and the sieve
	Selection valve does not open	Check the control voltage
		Clean the selection valve

Device is running continuously	The floater is blocked in open position	Clean the floater.
		Verify that the floater is moving freely
	Activation signal (X2)	Check the control voltage
	Dirty sewage disposal pipe / dirty siphon	Cleaned the wastewater evacuation pipe / siphon
Device is generating high vibrations	The pump cone is clogged	Clean or replace the pump cone.
	Centrifuge is clogged.	Clean or replace the centrifuge.
	Insufficient water supply	Pump water into the suction line.
		Check that rinse is working properly
Water is not drained out properly	Centrifuge is clogged	Clean or replace the centrifuge
	Dirty sewage disposal pipe / dirty siphon	Cleaned the wastewater evacuation pipe / siphon

COMBI-SEPAMATIC CS 1

All the following information is the property of Dürr dental. No data or indications have been modified and have only been added to this guide to provide the necessary information to be able to quickly intervene on a failure related to the Combi-sepamatic CS1.
For more information, please refer to the "Installation and Operating Instructions" at http://www.durrdental.com/



1 Motor
2 Vacuum, to suction unit
3 Separation
4 Aspiration input
5 Pump wheel
6 Separation rotor
7 Fluid output
8 Waste valve
9 Relief valve

Failure description	Reason	Solution
CS1 does not start	No power supply	Check if the CS1 is correctly connected.
	The fuse is blown	Check fuses and replace them if necessary. Read “Installation and Operating Instructions”
Suction line too weak or interrupted.	The sieve is clogged and/or blocked.	Clean the sieve.
	The selection valve does not open or does not open properly	Check the control voltage.
		Clean the selection valve.

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Subject to change.

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