

Source PCB

Part Number:	700005356 700010022	Where Used:	Xevo TQ-S
---------------------	------------------------	--------------------	-----------

Functional description

The source PCB controls the following functions and components:

- Desolvation, cone, collision gas flow rate, nebulizer and NanoFlow pressure gas settings/readbacks
- Capillary, corona, and detector voltages/readbacks
- Source and probe heater temperatures
- Fluidics: Divert and select valves, IDEX pump, and leak detector, all via the fluidics PCB
- API solenoid and isolation valves in the gas handling assembly
- Probe and source interlock status
- Automated source pressure test
- APPI probe lamp
- User analog outputs



CAUTION: Follow suitable anti-static precautions at all times. Ensure the instrument electronics are switched off before removing/installing this PCB. Do not remove or install any cables to the source PCB with the electronics switched on.

There are two versions of the source PCB, 4258205DC4 (700005356) and 4258240DC1 (700010022), each containing specific firmware. The source PCB will not function correctly if the incorrect firmware is loaded. See [Source PCB firmware](#) for more information.

Location

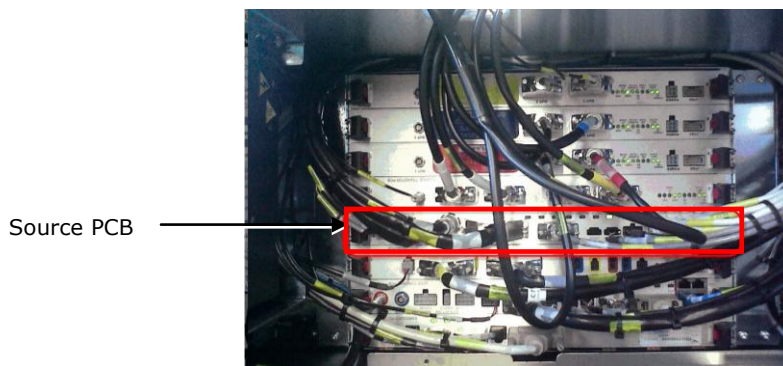
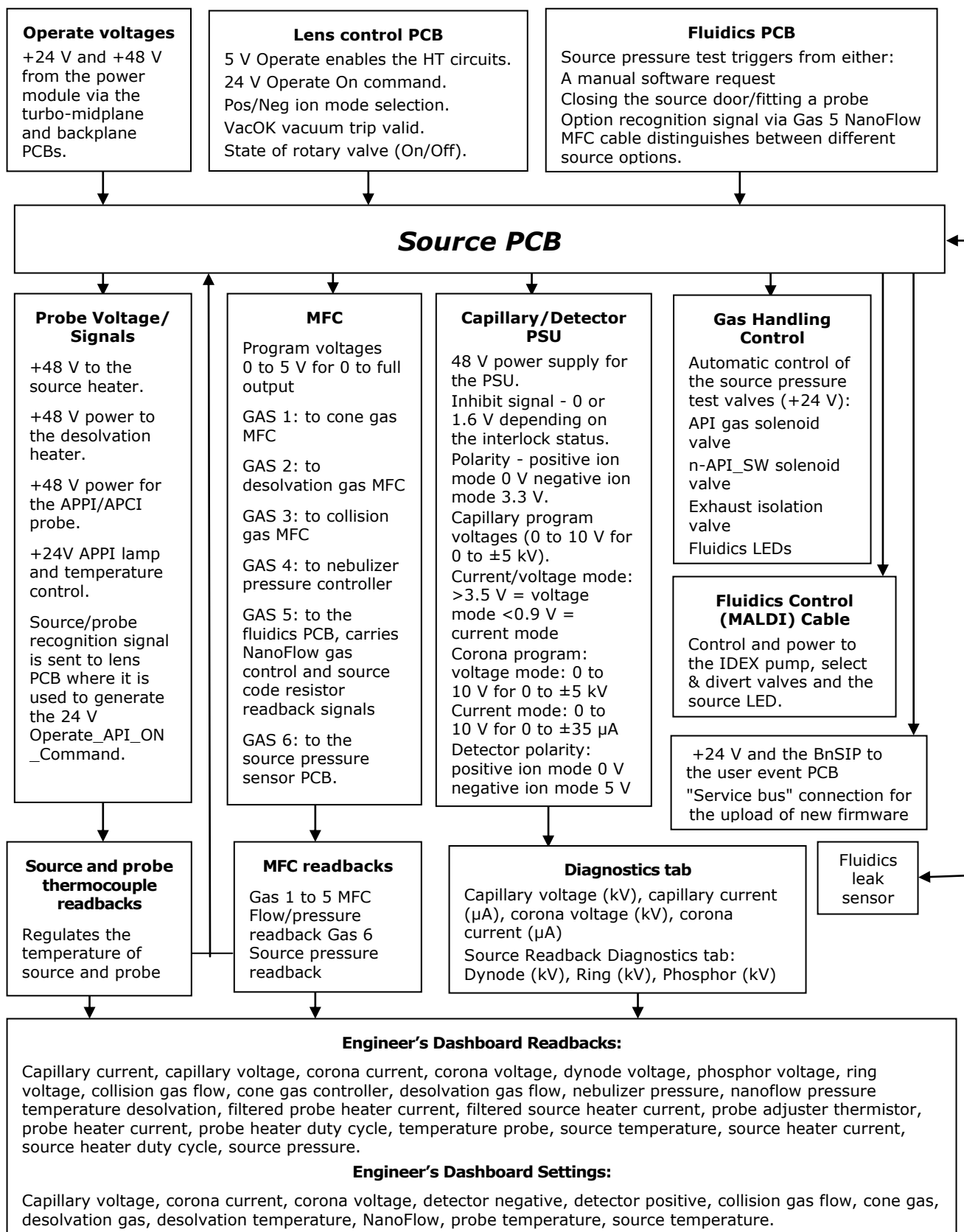
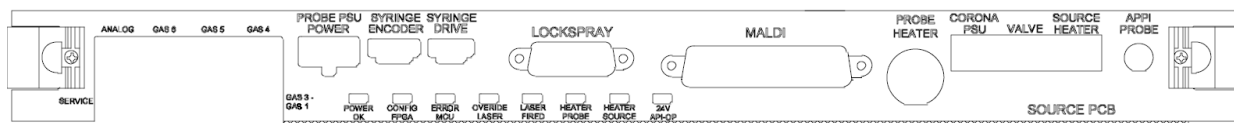


Figure 1 - Top view of the instrument with covers removed

Inputs/outputs



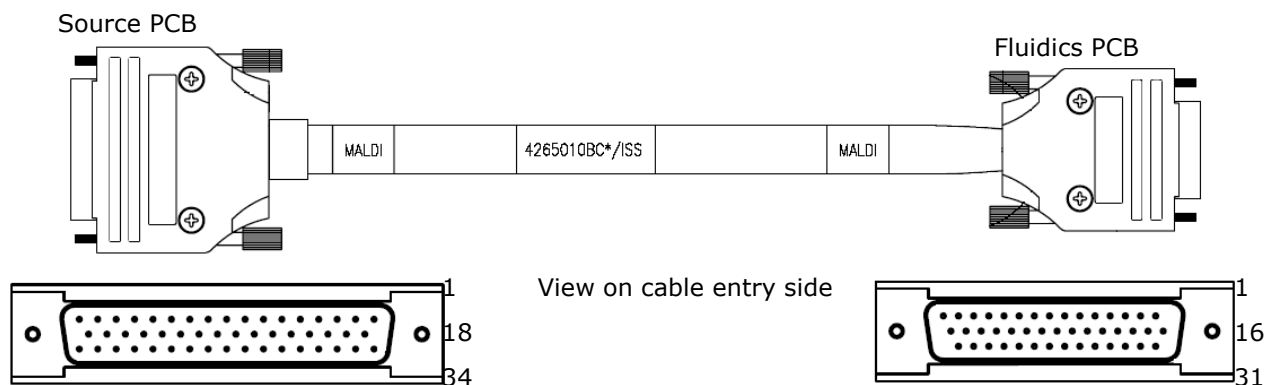
Cable locations on the source PCB



Source PCB MALDI cable to the fluidics PCB - 4265010BC1 (700004225)

The source PCB provides signals via the MALDI cable and fluidics PCB to control the select valve, divert valve, IDEX syringe pump, and the source/camera LED(s).

NOTE: Voltages on this cable cannot be measured.

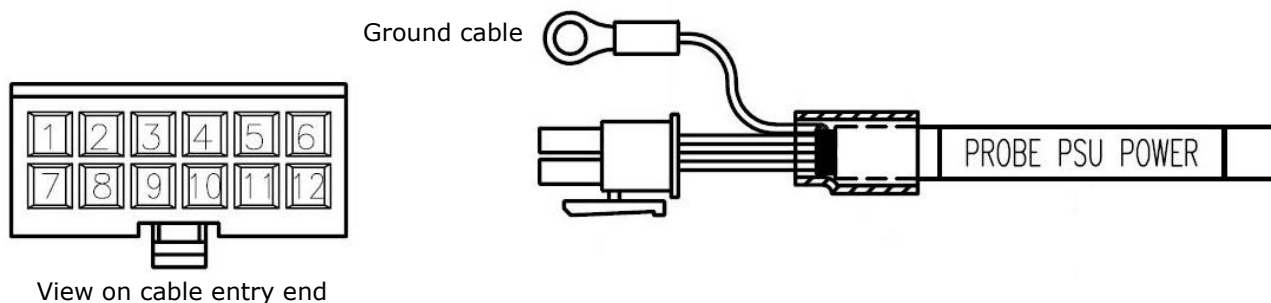


NOTE: See the [Fluidics/Options Interface Assembly Technical Reference Sheet](#) (p/n 715002748) for more information on these components.

Source PCB probe PSU power cable to the Spellman HV PSU - 4300033BC1 (700005376)

The source PCB provides 48 V power and program voltages to the Spellman HV PSU and receives readbacks from the Spellman HV PSU.

A 2.5 A resettable fuse protects the 48 V output to the HV PSU.



12-way Micro-fit	Color	Description	Function
1	Orange	Analog readback dependent on capillary voltage, probe position, etc.	Readback (I) current
2	Yellow	Digital command. Positive ion mode 0 V, negative ion mode 3.3 V.	Polarity
3	Blue	48 V return.	0 V signal
4	Violet	Digital command. Voltage mode >3.5 V, current mode <0.9 V.	Constant voltage/constant current
5	Gray	Digital command. 0 V = system OK. 1.6 V = HV PSU will not turn on as the system detects a problem.	Inhibit
6	Black	48 V return	48 V return
7	Green	0 to 4 V for 0 to ± 5 kV	Readback (V) voltage
8	White	0 to 4 V for 0 to 10 kV 3.6 V for the 9 kV used in this system	Phosphor readback
9	Yellow	0 to 10 V for 0 to ± 5 kV	Program
10	Blue	0 to 4 V for 0 to 10 kV. 3.2 V for the 8 kV used in this system	Dynode voltage readback
11	Violet	0 to 4 V for 0 to -9 kV ~ 2 V for the -4.5 kV used in this system	Ring dynode readback
12	Red	48 V supply	48 V

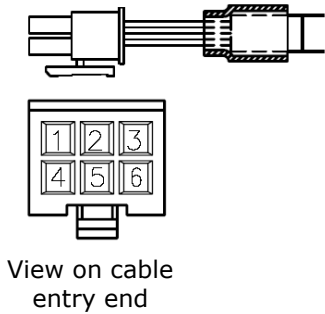
NOTE: See the [Spellman HV MX5 Power Supply Technical Reference sheet](#) (p/n 715002777) for pin positions on the other end of this cable.

In normal use the capillary voltage and capillary length must be set so that the capillary current is <250 μ A.

WARNING: The ground cable must be attached to the source PCB faceplate with a screw.

Source PCB corona PSU cable to the Spellman HV PSU - 4265066BC1 (700004303)

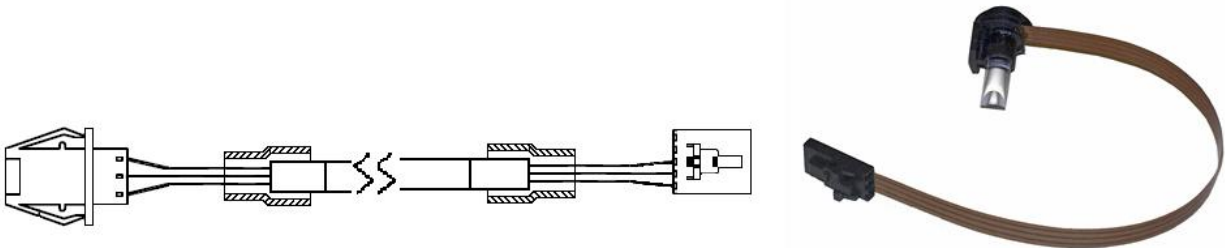
The source PCB provides the corona program and detector polarity signals to the HV PSU and receives the corona current and voltage readbacks from the HV PSU along this cable.



6-way Micro-fit	Color	Description	Function
2	Red	Voltage mode: 0 to 10 V for 0 to ± 5 kV Current mode: 0 to 10 V for 0 to ± 35 μ A	Corona program
1	Black	Positive ion mode 0 V Negative ion mode 5 V	Detector polarity
3	White	0 to 4 V for 0 to ± 35 μ A	Corona current readback
4	Green	0 to 4 V for 0 to ± 8 kV	Corona voltage readback
6	Black	~ 0 V	EGND

NOTE: See the [Spellman HV MX5 Power Supply Technical Reference sheet](#) (p/n 715002777) for pin positions on the other end of this cable.
The corona pin voltage does not shut down after arcing or short circuit.

Source PCB syringe encoder cable to the optical fluidics leak sensor - 4265039BC1 (700004243)

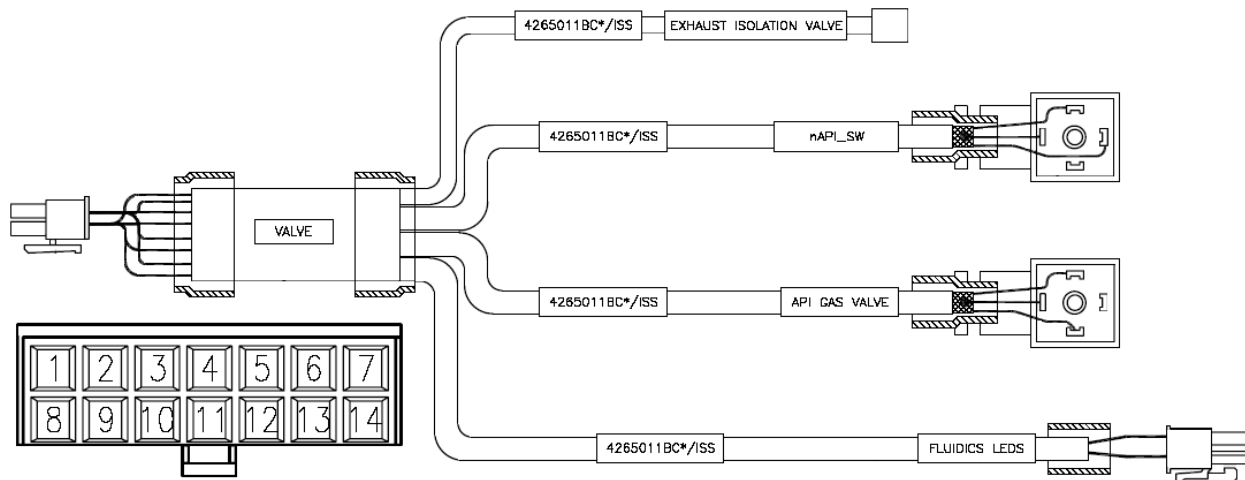


Syringe Encoder 3-way Micro-fit	Color	Leak Detector 5-way Micro-fit	Function
1	Black	1	Cathode
2	Red	4	5 V
3	White	2	Emitter

NOTE: An MCU fault will be registered if a leak is detected or if the cable is unplugged; the fluidics will be set to "aborted" and both ports diverted to waste.

Source PCB valve cable to the gas handling valves and fluidics LEDs - 4265011BC4 (700005398)

This cable carries signals to/from the nitrogen API gas solenoid, the nitrogen API gas pressure transducer, the exhaust isolation valve, and the fluidics LEDs.



Valve 14-way Micro-fit	Color	Function
1	Red	API
8	Black	24VR
-	Screen	Screen
7	Red	nAPI GAS SW
14	Black	24VR
-	Screen	Screen
2	Red	LEDA Anode
9	Black	LEDA Cathode
3	White	LEDB Anode
10	Black	LEDB Cathode
5	Green	LEDC Anode
12	Black	LEDC Cathode
4	Red	Exhaust Iso
11	Black	24VR

NOTE: See the API Gas Handling Assembly Technical Reference Sheet for details about the exhaust isolation and API gas valves.

See the Fluidics PCB Technical Reference Sheet for details about the fluidics LEDs.

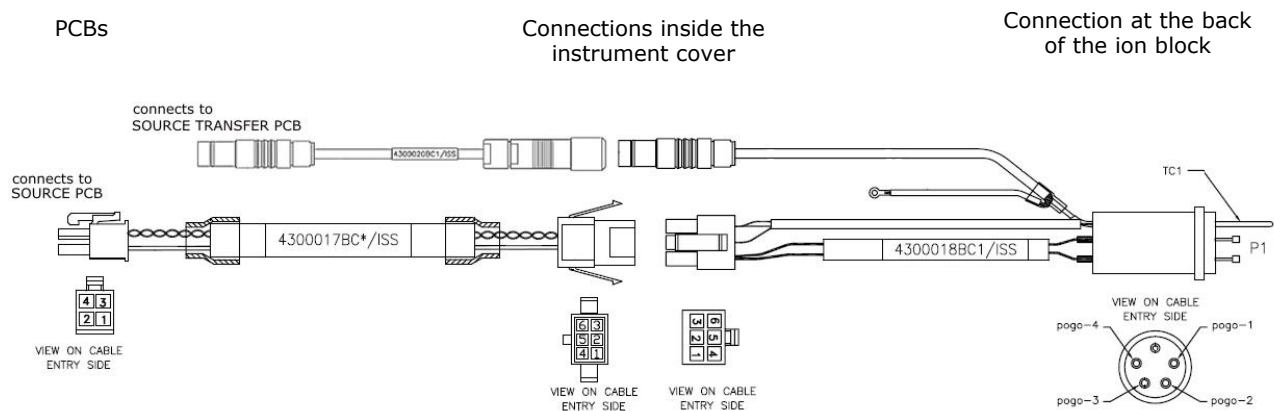
**Source PCB source heater cables to the source heater -
4300017BC1 (700005373) + 4300018BC1 (700005353), and source transfer
PCB cable from ion block assembly 4300020BC1 (700005375)**

The source heater cable provides power to the source heater and returns the thermocouple signals from the source heater.

The heater supply is governed by a pulse width modulator; the % duty cycle of the heater output is proportional to the demand.

The signals pass from the source PCB (CON1) to the source heater via the feedthrough on the ion block assembly.

The source offset voltage is passed from the ion block assembly via a Fischer connector to cable 4300020BCI to the source transfer PCB.



Function	4-pin Molex	Fischer coax	6-pin Molex	Color	Ion block connector
SOURCE_TC+	1		6	Yellow	TC+
SOURCE_TC-	2		3	Red	TC-
-	-	-	-	n/c	Pogo-1
+48 V SOURCE HEATER	3		4	Yellow	Pogo-3
+48 V SOURCE HEATER RETURN	4		1	White	Pogo-2
SOURCE OFFSET V		Inner			Pogo-4
EGND		Body	2		Braid+solder tag

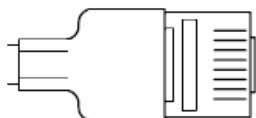
Gas 1, 2, 3, 4 and 5 source PCB to the mass flow controllers

The mass flow controllers all respond to a 0 to 5 V program voltage for the flow range/pressure over which the MFC operates, and provide a 0 to 5 V readback to the source PCB.

The cone, desolvation, and collision gas cables go directly to their corresponding mass flow controllers, and the nebulizer cables go directly to the nebulizer pressure controller, see the [API Gas Handling System Technical Reference Sheet](#) (p/n 715002756) and the [Collision Gas Handling System Technical Reference Sheet](#) (p/n 715002757) for further details.

The NanoFlow cable is connected to the fluidics PCB; program and voltage signals pass to the NanoFlow MFC (on the NanoFlow source enclosure) when the NanoFlow options cable is connected to the front panel of the instrument.

NOTE: *The NanoFlow cable also provides the source PCB with the door interlock status and the probe resistor signal (these signals are collectively termed "Option recognition").*



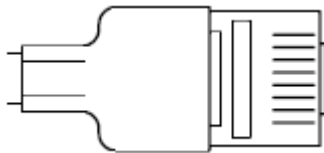
Pin	Gas 1 = Cone Gas 4237013BC11	Gas 2 = Desolvation Gas 4237013BC10	Gas 3 = Collision Gas 4237013BC12	Gas 4 = Nebulizer Gas 4237013BC19	Gas 5 = NanoFlow Gas 4237021BC9	Description
1	-	-	-		-	-
2	0 to 5 V for 0 to 300 L/Hr	0 to 5 V for 0 to 1200 L/Hr	0 to 5 V for 0 to 1 mL/min	0 to 5 V for 0 to 10 bar	0 to 5 V for 0 to 2 bar	Readback
3	0 to 5 V for 0 to 1200 L/Hr	0 to 5 V for 0 to 1200 L/Hr	0 to 5 V for 0 to 1 mL/min	0 to 5 V for 0 to 10 bar	0 to 5 V for 0 to 2 bar	Program
4	0 V	-	-		-	EGND
5	-	-	-		Option recognition	-
6	-	-	-		-	-
7	24 V	24 V	24 V	24 V	24 V	+24 V
8	0 V	0 V	0 V	0 V	0 V	EGND

NOTE: *The cone gas setting on the Tune page is limited to between 150 and 900 L/hour.*

The nebulizer setting on the Tune page is limited to between 3 and 7 bar.

Gas 6 source pressure sensor cable to the pressure sensor PCB - 4237021BC8 (700004284)

The source PCB receives signals (pressure bridge + and -) from the pressure sensor PCB via this cable.



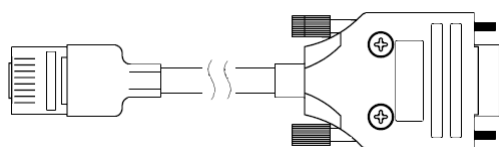
RJ45	Color	Description
1	White/orange	Bridge Drive
2	Orange	GAS_6_RB
3	White/green	GAS_6_PRG
4	Blue	EGND
5	White/blue	Pressure Bridge +
6	Green	Pressure Bridge -
7	White/brown	AGND
8	Brown	EGND

NOTE: The cable is labelled "GAS 6" at the source PCB end and "PRES SENSE" at the pressure sensor.

The source pressure test triggers either from a manual software request (**Gas > Run Source Pressure test** on the Tune page) or from activating an interlock on the source door or probe. See the [API Gas Handling System Technical Reference Sheet](#) (p/n 715002756) for more information on the automated API source pressure test.

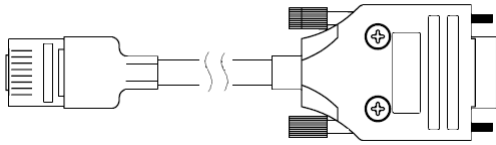
Source PCB service cable to the back panel (service bus) - 4237022BC3 (700004543)

The service bus cable is used to load firmware onto the instrument electronics PCBs.



RJ45	Color	9-way D-type	Function
2	Orange	5	GND
3	White/Green	3	TX
6	Green	2	RX

Source PCB analog cable to the user events PCB - 4237020BC3 (700004301)

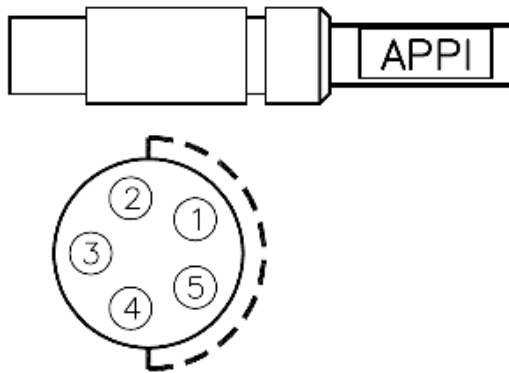


RJ45	Color	Description
1	White/Orange	+24 V
2	Orange	24 V Return
4	Blue	BnSIP
8	Brown	BnSIP_RTN

Source PCB APPI cable to the fluidics PCB - 4265059BC1 (700004288)

The source PCB supplies +24 V power (fused at 3.15 A), control, and feedback status for the APPI probe.

The signals pass from the source PCB via the fluidics PCB and options cable to the APPI source.



APPI (5-way Fischer)	Color	Function
2	Black	24VR
3	Yellow	Lamp on/off (24 V)
4	Blue	Lamp status
5	White	Lamp error
N/C	Red	N/A

Source PCB probe heater cable to the ESI or APCI probe - 4265043BC1 (700004241)

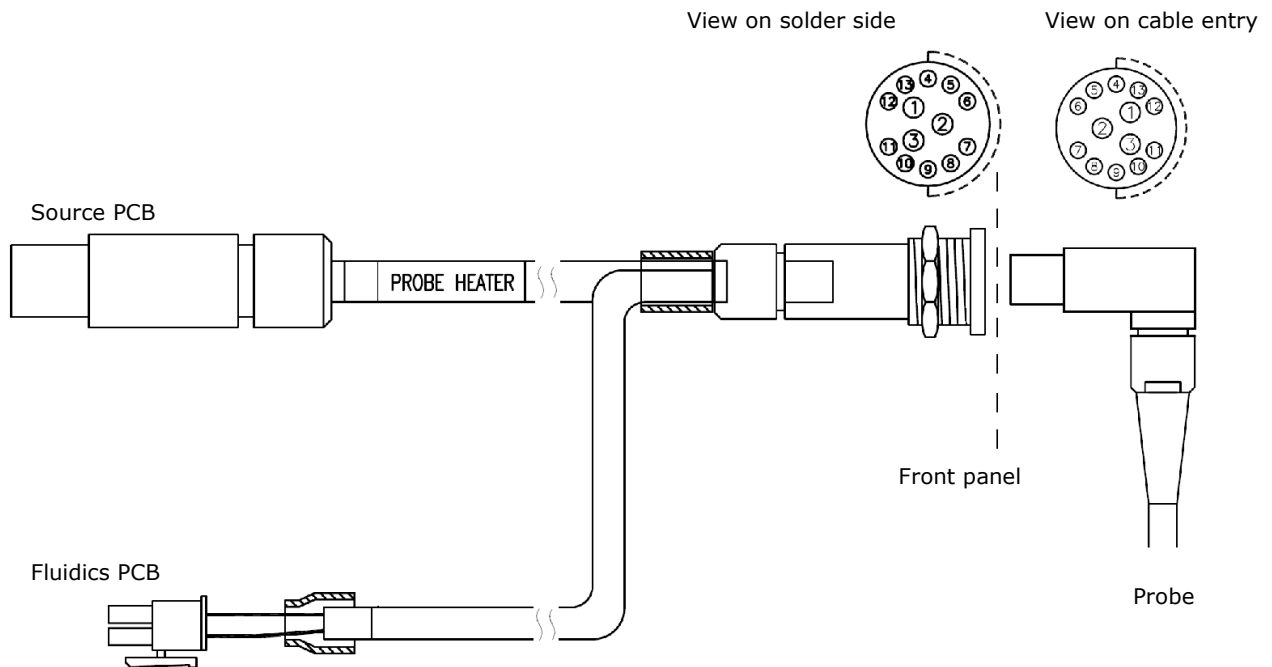
The probe heater cable carries power to the ESI or APCI probe from the source PCB, and thermocouple readbacks from the probe back to the source PCB.

The source PCB supplies 48 V power to the probe heater. The power is provided as a square wave pulse. The maximum pulse width modulation is 77%, so the maximum voltage readback on a DVM will be ~37 V.

With an ESI probe attached a thermocouple (inside the desolvation heater) provides a readback for the temperature of the desolvation heater.

With an APCI probe attached two thermocouples are present. One thermocouple is used to regulate the temperature of the probe heater. A second thermocouple is located near the top of the probe and monitors the temperature of the shaft. If the probe gets too hot the probe heater voltage is stopped.

A thermistor on the probe adjuster PCB is used to provide an interlock for the operation of the probe and probe heater; the signals are stopped if the PCB gets too hot. The thermistor operates in both ESI and APCI modes. See the [ESI/APCI/ESCI Source Enclosure Assembly Technical Reference Sheet](#) (p/n 715002758) for more information on probes and probe heaters.

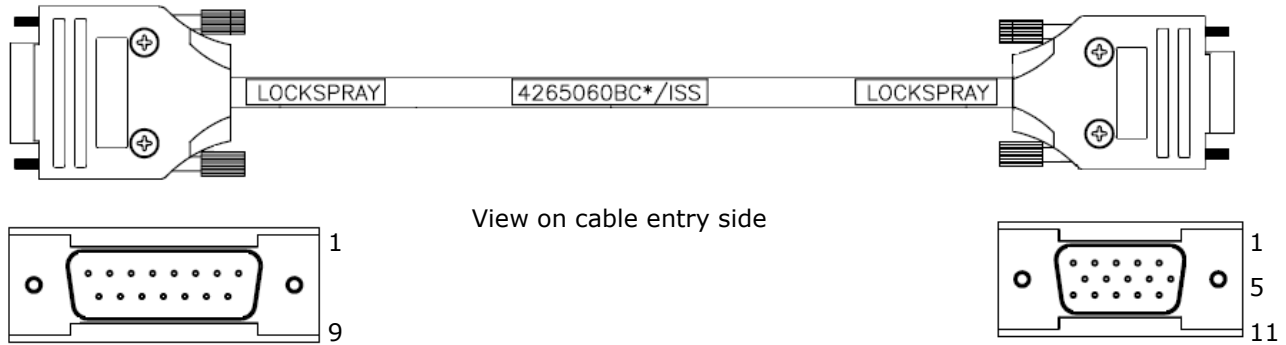


Probe Heater on Source PCB (13-way Fischer)	Color	Probe Heater on Front Panel (13-way Fischer)	Function
2	Black	2	Heater rtn
3	Red	3	Heater out
4	Black	4	Source code rtn
6	Yellow	6	Probe TC+
7	Green	7	Probe TC-
8	Red	8	Shaft TC+
9	Orange	9	Shaft TC -
12	Blue	12	Thermistor rtn
13	Violet	13	Thermistor

NOTE: The signal indicating the activation state of the source door interlock is taken via cable 4265043BC1 to the fluidics PCB; see the [Fluidics/Options Interface Assembly Technical Reference Sheet](#) (p/n 715002748) for more information.

Source PCB LockSpray cable To the fluidics PCB - 4265060BC1 (700004291)

The source PCB does not send any signals through the LockSpray cable; if used, the signals are passed from the source PCB, via the fluidics PCB, to the options port at the front of the instrument.



Diagnostic procedures

Indicator LEDs on the top of the source PCB, Tune page readbacks, and the Engineers Dashboard can all be used for diagnostic purposes.

Indicator LEDs on source PCB

LEDs on the top panel are used to identify errors.

Table 1: Indicator LED features

Feature	Controlled from	Color	Note
Power OK	MCU	Green 	On when all rails voltage within $\pm 5\%$
FPGA Config	FPGA	Green 	On when FPGA configuration successful
MCU error	MCU	Red 	On with an error
Source heater voltage	-	Green 	Flashes when voltage (current) to heater
Probe heater voltage	-	Green 	Flashes when voltage (current) to heater
24Voperate_API	Hardware/Software	Green 	On when source interlock OK and API gas on and in Operate mode

NOTE: *The source and probe heater LEDs flash at different rates depending on the amount of current required to drive the heater.*

Causes of an MCU error include: nitrogen gas failure, source pressure test failure, source pressure trip, source door open, probe withdraw, probe connector disconnected, probe thermal trip activated, source or probe temperature failed to regulate, fluidics leak, fluidics leak detector unplugged, or the user stopping the fluidics during a purge/wash action.

Source Readback Diagnostics tab

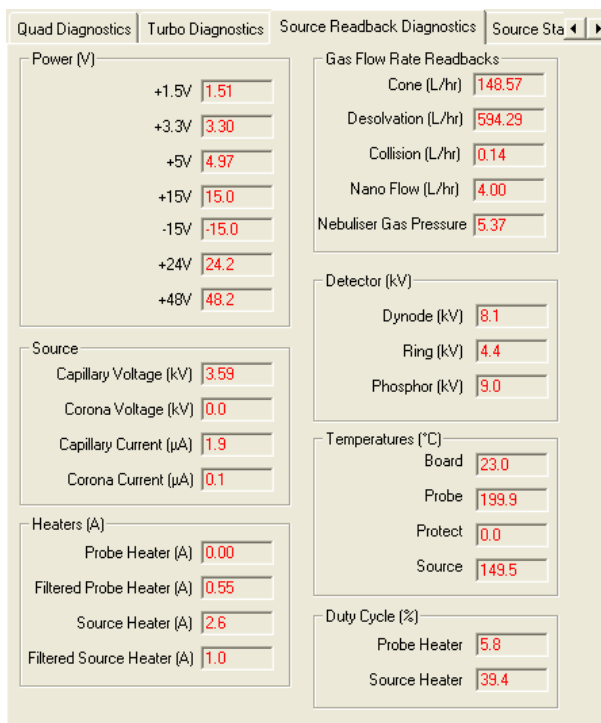


Figure 2 - Source Readback Diagnostics tab

Table 2: Readbacks on the Source Readback Diagnostics tab

Readback	Function
Power (V)	48 V from the power module PCB is used on the source PCB to power the heater circuits. +24 V from the power module PCB is passed through DC/DC converter(s) to produce +5 V, +15 V, -15 V voltage supplies; the +5 V is used to generate the +3.3 V and +1.5 V.
Source	Capillary voltage: 0 to 10 V for 0 to ±5kV. Capillary current depends on capillary voltage, probe position etc. Corona voltage: 0 to 4 V for 0 to ±8 kV. Corona current: 0 to 4 V for 0 to ±35 μA.
Heaters (A)	Probe and source heater current will show zero when the heaters are not heating. Filtered probe or filtered source current will be zero if the probe or source heater fuse has blown – see below for more details.
Gas Flow Rate Readbacks	Reflect the settings on the ES+ Source page. The flow controllers have a common resettable 900 mA fuse.
Detector (kV)	The readbacks must be ±10% of 8.0 kV (dynode), 4.5 kV (ring), and 9.0 kV (phosphor).
Temperatures (°C)	Board: typically ~25 °C; an error will be logged if the board temperature exceeds 40 °C. Probe: reflects the Tune page setting for probe temperature. Protect: is the shaft temperature on the APCI probe; must be <84 °C or the probe heater will be turned off. Source: reflects the Tune page setting for the ion block; typically 150 °C.
Duty Cycle (%)	Proportional to heater demand.

Additional source heater diagnostics

The instrument must be in vacuum with functional 48 V and ± 15 V power supplies for the source heater to work. The heater is activated when the following criteria are met:

- Source temperature setpoint is <170 °C but greater than the thermocouple readback
- Source fuse is not blown

If the source heater fuse is blown:

- The source temperature will not reach the specified value on the Advanced tab.
- The source (filtered) readback on the Source Diagnostics tab will read 0, see [Figure 3](#).
- The indicator on the Source Status Diagnostics tab will change from green to red, see [Figure 4](#).
- The source heater LED on the top of the source PCB will not be flashing green.

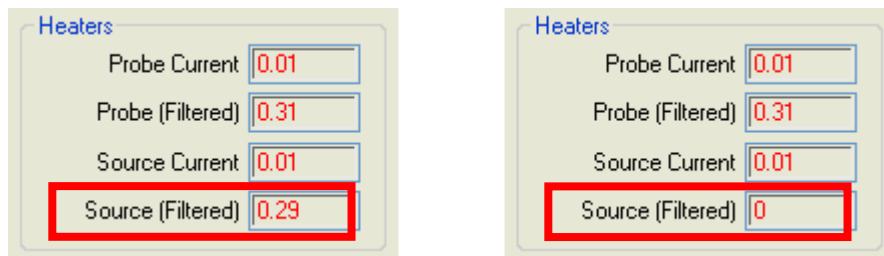


Figure 3 - Source heater fuse ok (left) and blown source heater fuse (right)



Figure 4 - Probe Interlock LEDs

NOTE: If the source fuse is OK but the heater does not work, then check the heater resistance. If the circuit is open then the heater is at fault.

Additional probe heater diagnostics

The instrument must be in Operate with functional 48 V and ± 15 V power supplies for the probe heater to work. If these conditions are met but the probe heater does not work, perform the following procedure:

1. Ensure that the probe heater fuse has not blown by confirming the following:
 - The desolvation temperature will not reach the specified value.
 - The probe (filtered) readback on the Source Diagnostics tab will read 0, see [Figure 5](#).
 - The indicator on the Source Status Diagnostics tab will change from green to red, see [Figure 6](#).
 - The probe heater LED on the top of the source PCB will not be flashing green.

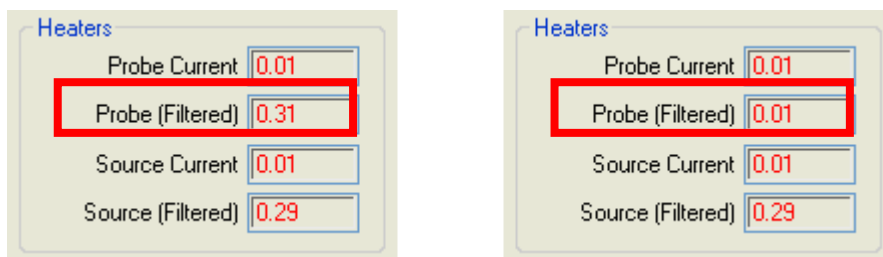


Figure 5 - Probe heater fuse ok (left) and blown probe heater fuse (right)



Figure 6 - Probe Interlock LEDs

2. If APCI mode is enabled check the "Protect" temperature.
3. Check the heater resistance. If the circuit is open then the heater is at fault.

Diagnostics tab

The screenshot shows the 'Diagnostics' tab of a software interface. The tab is selected, and the 'Source' section is expanded. The 'Source' section contains the following parameters and their readbacks:

- Capillary Voltage (kV): 3.58
- Capillary Current (μA): 1.49
- Corona Voltage (kV): 0.00
- Corona Current (μA): 0.16
- Cone (V): 100
- Extractor (V): 7.8
- Aperture (V): 8.1
- Repeller Voltage (kV): 3.58
- Repeller Current (μA): 1.49

The 'Collision Cell' section contains the following parameters and their readbacks:

- Entrance (V): -0.5
- Exit (V): -1.7

The 'Detector' section contains the following parameter and its readback:

- Multiplier (V): 513

The 'Source Recognition' section contains the following parameter and its readback:

- Source ID (V): 2.58

The 'Temperatures' section contains the following parameters and their readbacks:

- Source (°C): 150
- Desolv/APCI Prb (°C): 200.1
- Instrument (°C): 23

The 'Gas Flow Rates' section contains the following parameters and their readbacks:

- Cone Gas (L/h): 148
- Desolvation (L/hr): 594

The 'Vacuum' section contains the following parameters and their readbacks:

- Source Turbo Speed (%): 103
- Analyser MS1 Turbo Speed (%): 103
- Analyser MS2 Turbo Speed (%): 103

The 'Pressures' section contains the following parameters and their readbacks:

- Collision Cell Pressure (V): 3.53
- Analyser Pressure (V): 1.89
- Ion Guide 2 Pressure (V): 3.68

The 'Fluidics' section contains the following parameters and their readbacks:

- Syringe Rate: 25.00
- State: Idle

The 'Pump' section contains the following parameter and its readback:

- Pump Override: Active

The 'Turbo' section contains the following parameters and their readbacks:

- Motor Temp (°C): 48
- Controller Temp (°C): 37
- Link Power (w): 109
- Turbo 1: 48
- Turbo 2: 43
- Turbo 3: 46

Figure 7 - Diagnostics tab

Table 3: Readbacks on the Diagnostics tab

Readback	Function
Source Recognition	~2.64 V with the ESI probe or NanoFlow enclosure correctly fitted to the instrument. ~4.78 V with the APCI probe correctly fitted to the instrument. 10 V with no probe fitted to the instrument or if the probe adjuster assembly Fischer connector is not connected.

Source Status Diagnostics tab

The screenshot shows the 'Source Status Diagnostics' tab. It includes a 'Board Statuses' section with indicators for Probe Supervise (4 green), Probe Interlock (7 green), Syringe (1 green, 1 grey, 1 blue), Fuses (6 green), Misc (4 blue, 2 grey, 1 blue), Miscellaneous (2 grey, 4 green, 2 grey), and Valve (1 green, 1 grey, 1 blue, 1 grey, 1 grey, 1 green). The 'Probe Identification' section shows 'Probe Source' as 'ESI' and 'Probe Cover Status' as 3 green, 1 blue. The 'Fluidics' section shows 'Syringe Rate' as 25.00, 'State' as 'Idle', 'Previous State' as 'Initialising', 'Select Valve State' as 'Position 1', and 'Divert Valve State' as 'Position 1'.

Figure 8 - Source Status Diagnostics tab

The colors on the board statuses and each function are described in the following tables.

Table 4: Probe Supervise LEDs

LED	Feature	Color	Meaning
1	Probe fuse OK	Green 	OK
		Red 	Failed
2	Source fuse OK	Green 	OK
		Red 	Failed
3	MCU - source heater enabled	Green 	MCU has updated the output value within the expected time
		Red 	MCU has not updated the output value within the expected time
4	MCU - probe heater enabled	Green 	MCU has updated the output value within the expected time
		Red 	MCU has not updated the output value within the expected time

Table 5: Probe Interlock LEDs

LED	Feature	Color	Meaning
1	Source heater regulator	Green 	Limited
		Red 	Unlimited
2	Probe heater regulator	Green 	Limited
		Red 	Unlimited
3	MCU - source heater enabled	Green 	MCU has updated the output value within the expected time
		Red 	MCU has not updated the output value within the expected time
4	MCU - probe heater enabled	Green 	MCU has updated the output value within the expected time
		Red 	MCU has not updated the output value within the expected time
5	Source heater enabled	Green 	Enabled
		Red 	Disabled
6	Probe heater enabled	Green 	Enabled
		Red 	Disabled
7	± 15 V	Green 	OK
		Red 	Failed
8	Secondary thermocouple APCI only	Green 	OK
		Red 	Failed

Table 6: Syringe LEDs

LED	Feature	Color	Meaning
1	Not empty	Green 	OK
		Red 	Failed
2	Not used	Gray 	-
3	Moving	Dark blue 	Moving
		Light blue 	Stationary

Table 7: Fuses LEDs

LED	Feature	Color	Meaning
1	Motor 1 (divert valve)	Green 	OK
		Red 	Failed
2	Motor 2 (select valve)	Green 	OK
		Red 	Failed
3	Motor 3 (IDEX syringe)	Green 	OK
		Red 	Failed
4	Motor 4	Green 	OK
		Red 	Failed
5	Motor 5	Green 	OK
		Red 	Failed
6	APPI fuse	Green 	OK
		Red 	Failed
7	Laser fuse	Green 	OK
		Red 	Failed

Table 8: Misc LEDs

LED	Feature	Color	Meaning
1	APPI lamp	Light blue 	Lamp off
		Dark blue 	Lamp on
2	Lock vent status	Light blue 	APPI not present
		Dark blue 	APPI source fitted
3 to 6	Not used	Gray 	-
7	Leak detector	Light blue 	Fluidics leak clear
		Dark blue 	Fluidics leak detected
8	Source/ camera LED	Light blue 	Camera LED off
		Dark blue 	Camera LED on

Table 9: Miscellaneous LEDs

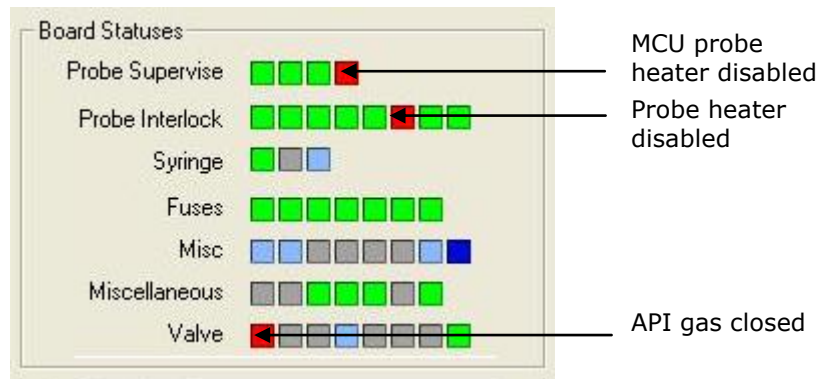
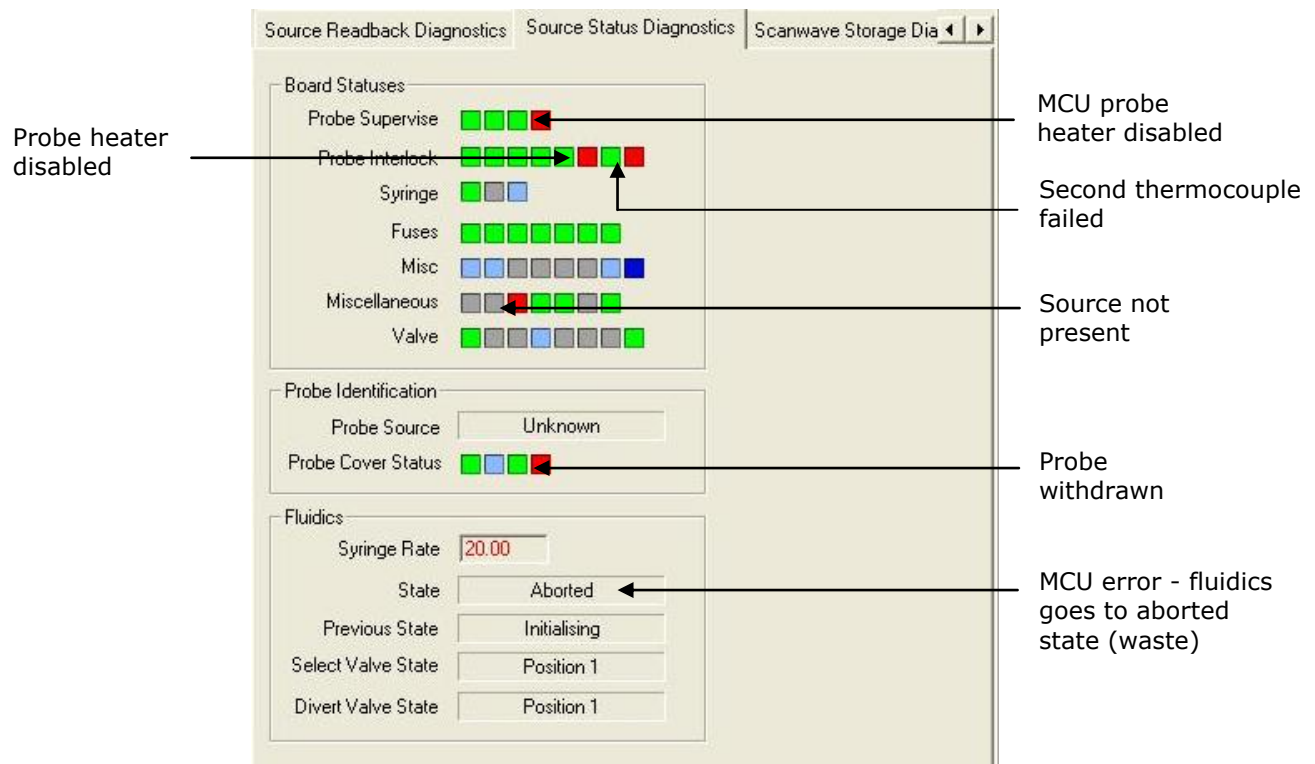
LED	Feature	Color	Meaning
1 and 2	Not used	Gray 	-
3	Source present	Green 	OK
		Red 	Failed
4	System vented	Green 	Pumped
		Red 	Vented
6	Vacuum OK	Green 	OK
		Red 	Turbos <80%
7	Not used	Gray 	-
8	5 V Operate OK	Green 	OK
		Red 	Failed

Table 10: Valve LEDs

LED	Feature	Color	Meaning
1	API gas open	Green 	OK
		Red 	Turbos less than 80%
2	Not used	Gray 	-
3	Source present	Light blue 	Pilot valve closed
		Dark blue 	Pilot valve closed
4	API gas pressure good	Green 	API gas pressure <10 mbar
		Red 	API gas pressure between 10 and 100 mbar

Table 11: Probe Cover Status LEDs

LED	Feature	Color	Meaning
1	Probe adjuster connected	Green 	Fitted
		Red 	Not fitted
2	Options connector	Light blue 	Not fitted
		Dark blue 	Fitted
5	Source closed	Green 	Closed
		Red 	Open
6	Probe inserted	Green 	Probe inserted
		Red 	Probe withdrawn

Common fault state – API gas off in Operate*Figure 9 - Gas off fail state in Operate***Common fault state - probe withdrawn in Operate***Figure 10 - Probe withdrawn in Operate*

Engineer's Dashboard

If the software voltage readbacks are abnormal then the Engineer's Dashboard can be used to monitor the related readbacks and settings (a list of useful readbacks and settings to monitor is given on the "[Inputs/outputs](#)" section).

1. Install the Engineers Dashboard (SCN 659) onto the host PC.

NOTE: See Service Note "[Software - SCN 659 Engineer Dashboard](#)" for more information.

2. Once installed, Rio instrument readbacks can be displayed and logged.
3. Ensure the Engineers Dashboard is removed from the host PC after service work has been completed.

Other relevant information

Voltage routes and PCB fuses

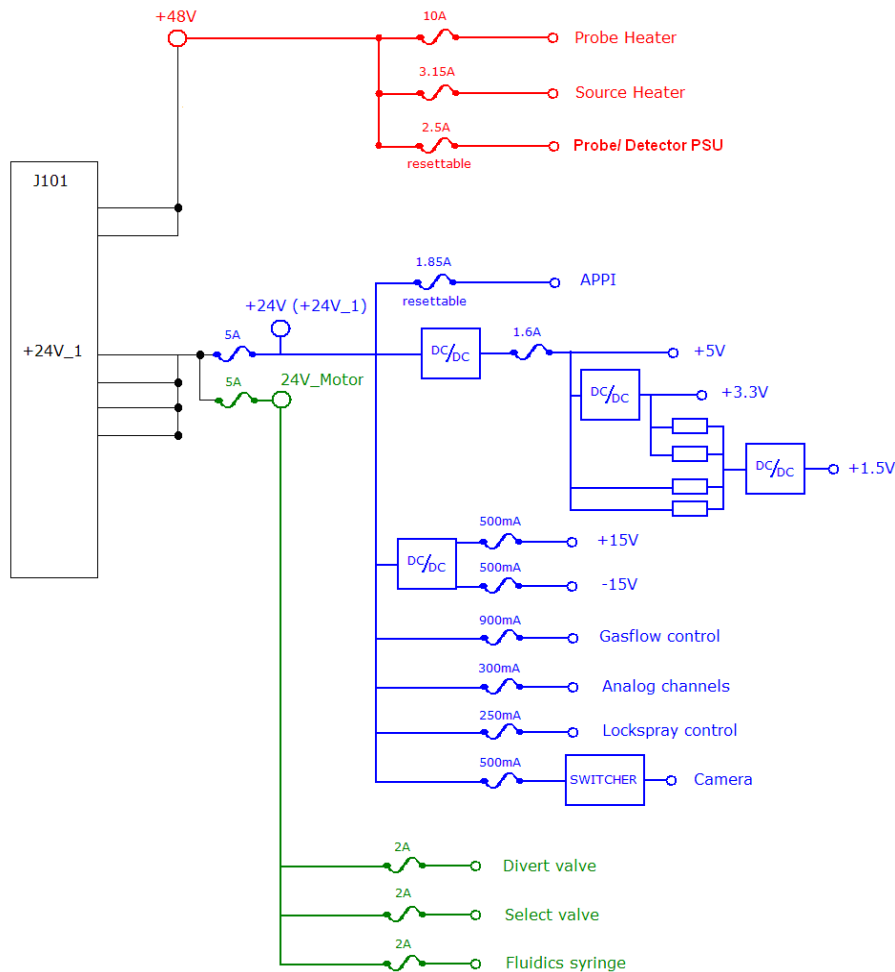


Figure 11 - Source PCB fuses

Replaceable fuses are shown in [Table 12](#). The remaining fuses on the source PCB are resettable (they are reset cycling the instrument electronics).

NOTE: Broken fuses are indicated by a red square in the Tune page Source Status Diagnostics tab.

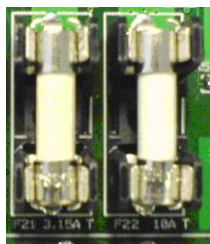


Figure 12 - Source PCB replaceable fuses

Table 12: Replaceable fuses

Fuse number (source PCB)	Function	Part number	Fuse rating	Description
F21	Source heater	1340217-S	3.15 A	Fuse 3.15 A antisurge T20-mm HRC ceramic
F22	Probe heater	1340226-S	10 A	Fuse 10 A antisurge T20-mm HRC ceramic
F9	Divert valve	1340379-S	2 A	Fuse SMT omni-block 2 A Very fast acting 154.002
F7	Select valve	1340379-S	2 A	Fuse SMT omni-block 2 A Very fast acting 154.002
F10	Fluidics syringe	1340379-S	2 A	Fuse SMT omni-block 2 A Very fast acting 154.002

Source PCB firmware

CAUTION: There are two versions of the source PCB, and each contains specific firmware. Neither source PCB will function correctly if the incorrect firmware is loaded.

The source PCB can be identified by the engineering code ([Table 13](#)):

Table 13: Source PCB identification

Engineering code	Part number
4258205DC4	700005356
4258240DC1	700010022

NOTE: See the [Service Notes](#) for more information about source PCB firmware.

Removing a source PCB

CAUTION: *Follow suitable anti-static precautions at all times.*

Ensure the instrument electronics are switched off before removing/fitting this PCB.

1. Turn off MassLynx.
2. Switch the pump override switch at the rear of the power distribution unit into the override (down) position.
3. Switch off the electronics breaker and ensure that all the PCB LEDs are off.
4. Remove and retain the screw securing the ground cable to the faceplate of the source PCB.
5. Remove all the cables connected to the source PCB.
6. Simultaneously press the red tabs of the card ejector clips on either side of the board, and swing the ejector clips outwards (Figure 13).
7. Gently pull out the PCB to remove.



Figure 13 - Card ejector

Installing a source PCB

CAUTION: *To avoid damage to the loom wiring, ensure no wiring is trapped when installing the PCB into the electronics unit.*

1. Align the sides of the PCB with the red spacer supports at either side.
2. Slowly insert the PCB and guide and lock into place with the card ejector clips.
3. Reconnect all the cables.
4. Use the screw to secure the ground cable to the faceplate of the source PCB.

Testing after replacing the source PCB

Perform the following checks if the source PCB is replaced:

1. Ensure that communications are established.

NOTE: Refer to the [Service Notes](#) database for the latest firmware information.

2. Run the MS SWAT software to ensure the PCB firmware is current.
3. Check the source and probe heaters.
4. Set the source temperature to 80 °C, allow it to heat up, and ensure that it stabilizes at 80 ±2 °C.
5. Switch the instrument into Operate.
6. Open MassLynx and switch on the API gas from the Tune page.
7. Set the desolvation temperature to 150 °C, allow it to heat up, and check that it stabilizes at 150 ±2 °C.
8. Switch off the API gas and check that the desolvation temperature starts to drop.
9. Switch the instrument into Standby.