

A photograph of an industrial facility, likely a power plant or refinery, featuring three tall, white smokestacks with red horizontal bands. The facility is set against a dramatic sky with a large, bright sun low on the horizon, casting a warm orange glow. The foreground shows some greenery and a body of water.

# Watson MSS with 85 Probe Installation Guide

**Mercury Speciation System**

119545-00 • 8Mar2019

**LABELED ON END OF WIRES**

The rear panel of the HP Z440 workstation features a variety of ports and connectors. On the left side, there is a green Ethernet port, a USB 3.0 port, a FireWire 800 port, a Thunderbolt port, a Power FXL port, a Digital Input port, a Digital Output port, a Video In port, and a Video Out port. On the right side, there is a USB 3.0 port, a USB 2.0 port, a FireWire 800 port, a Thunderbolt port, a Power FXL port, a Digital Input port, a Digital Output port, a Video In port, and a Video Out port. The bottom of the panel includes a power button, a power switch, and a power connector. The HP logo is visible in the center of the panel.

The rear panel of the HP Z440 Workstation features a variety of ports and connectors. On the left side, there is a green power button, an external display port, an RS-232C port, a USB 2.0 port, an Ethernet port, a power jack, digital inputs, and an analog video input. The central section contains an exhaust fan, a front panel connector, a USB 2.0 port, a LAN port, and a USB 2.0 port. The right side features a large cooling fan and a USB 2.0 port. The panel is secured with screws and has a warning label near the power input.

[illegible]

The diagram shows a control panel with the following components from left to right:

- An AC power input port with a warning triangle and the text "AC 110V".
- A "LOAD OUT" port with a circular connector and a green arrow pointing down.
- A "TC ZONE 1" port with a yellow rectangular connector and four green LEDs.
- A "ZONE A1 UMB" port with a circular connector and four green LEDs.
- An "ALARM OUTPUT" port with a terminal block and a green arrow pointing up.
- A "220 VAC 16A 50 HZ" power input port with a circular connector.

Below the panel, two red boxes are connected to the "TC ZONE 1" and "ZONE A1 UMB" ports by lines:

- A red box labeled "A1 (TC ZONE 1)" with the text "UMB HOT LINE" below it.
- A red box labeled "A1 (TEMP CONTROLLER)" with the text "UMB HOT LINE" below it.

**LABELED ON END OF WIRES**



**SPARE  
(NOT USED)**

LABELED ON END OF WIRES



**UMBILICAL**  
(80i TEMP READING ONLY)

## UMBILICAL (COLD LINE)

PROBE SIDE - ALL ELECTRICAL CONNECTIONS

LABELLED ON END OF WIRES



80i I/O

(FOR 80i CONNECTIONS REFER TO FIG 4A)

NOT USED (CONN PIN: A)  
NOT USED (CONN PIN: B)  
29 (CONN PIN: E) (02 BOARD)  
30 (CONN PIN: C) (02 BOARD)  
NOT USED (CONN PIN: D)  
NOT USED (CONN PIN: F)  
NOT USED (CONN PIN: G)



B

(HEATERS)

11 (CONN PIN: A) (PROBE HEATER)  
15 (CONN PIN: C) (PROBE HEATER)  
16 (CONN PIN: D) (CONV HEATER)  
17 (CONN PIN: H) (CONV HEATER)  
18 (CONN PIN: E) (STINGER HEATER)  
19 (CONN PIN: G) (STINGER HEATER)  
20 (CONN PIN: F) (HOVACAL BLOCKS)  
28 (CONN PIN: B) (HOVACAL BLOCKS)  
PE (CONN PIN: I) (PROTECTIVE EARTH)



C

TRANSDUCE  
(OXYGEN  
POWER)

NOT USED 6 (CONN PIN: G) (SHIELD)  
NOT USED 7 (CONN PIN: F) (+24VDC)  
NOT USED 8 (CONN PIN: E) (-24VDC)  
9 (CONN PIN: C) (+24VDC)  
10 (CONN PIN: B) (-24VDC)  
NOT USED (CONN PIN: A)  
NOT USED (CONN PIN: D)



D

(VALVES)

1 (CONN PIN: D) (VALVE COMMON)  
2 (CONN PIN: G) (HG SPIKE VALVE)  
3 (CONN PIN: F) (NOT USED)  
4 (CONN PIN: C) (STINGER BB VALVE)  
5 (CONN PIN: E) (NOT USED)  
NOT USED (CONN PIN: A, B)



CONVERTER

- (WHITE)  
+ (GREEN)  
G (SHIELD)



HOVACAL  
BLOCKS



PROBE



THERMOCOUPLES



SPARE

## TEMPERATURE CONTROL BOX

TO TERMINAL (STINGER)



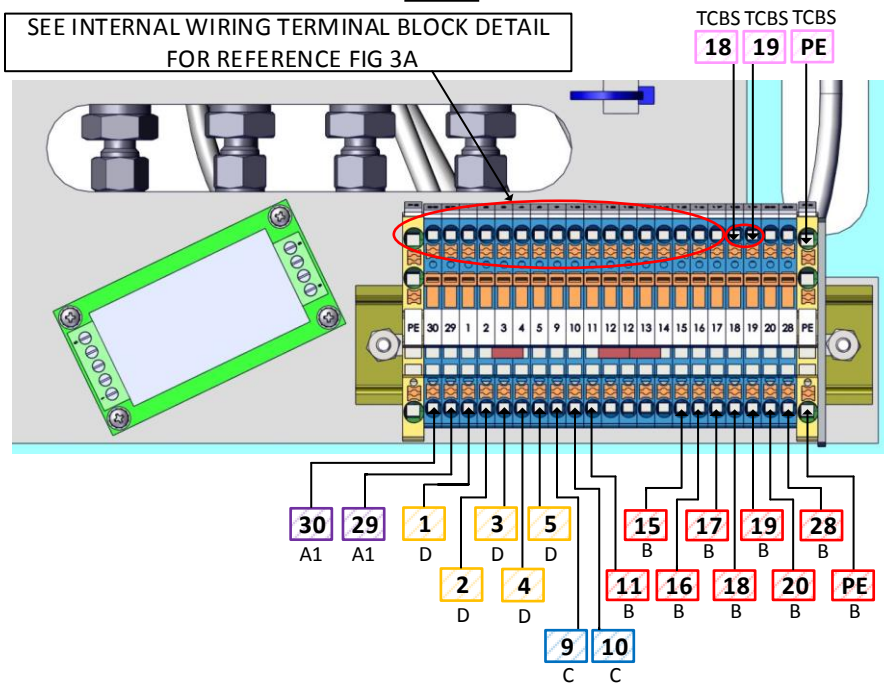
TCBS

18 (STINGER HEATER) TOP TERMINAL  
19 (STINGER HEATER) TOP TERMINAL  
PE (STINGER GROUND) TOP TERMINAL

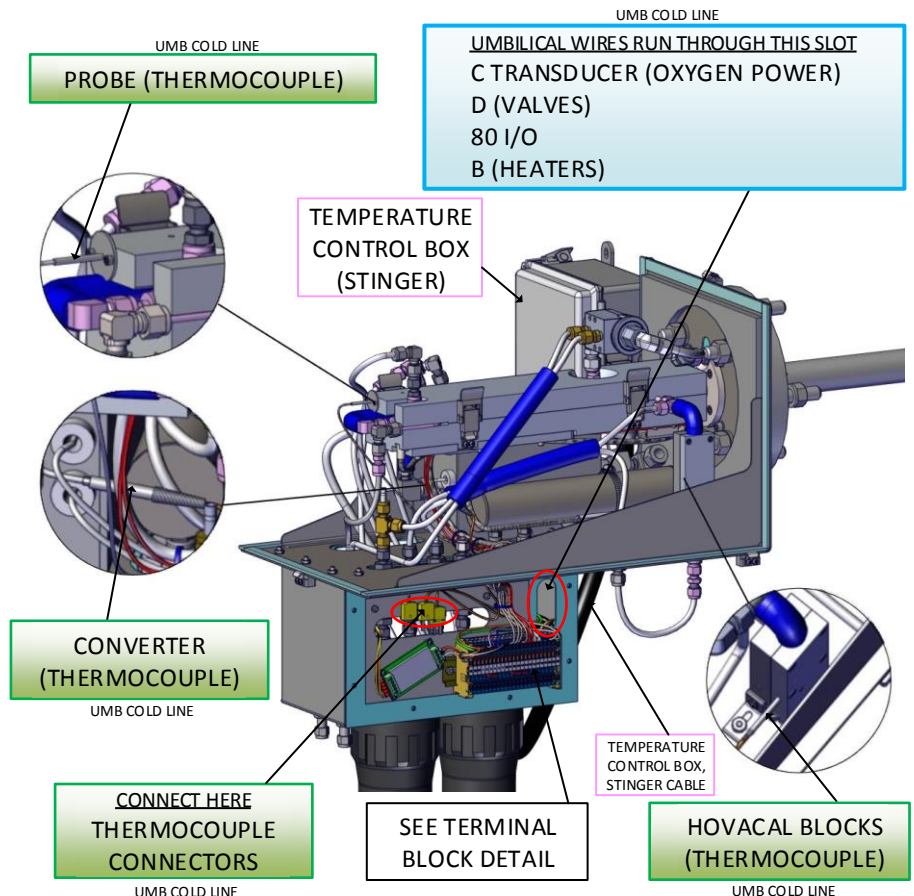
## FIG.2 UMBILICAL ELECTRICAL CONNECTIONS

AT 85

SEE INTERNAL WIRING TERMINAL BLOCK  
FOR REFERENCE FIG 3A



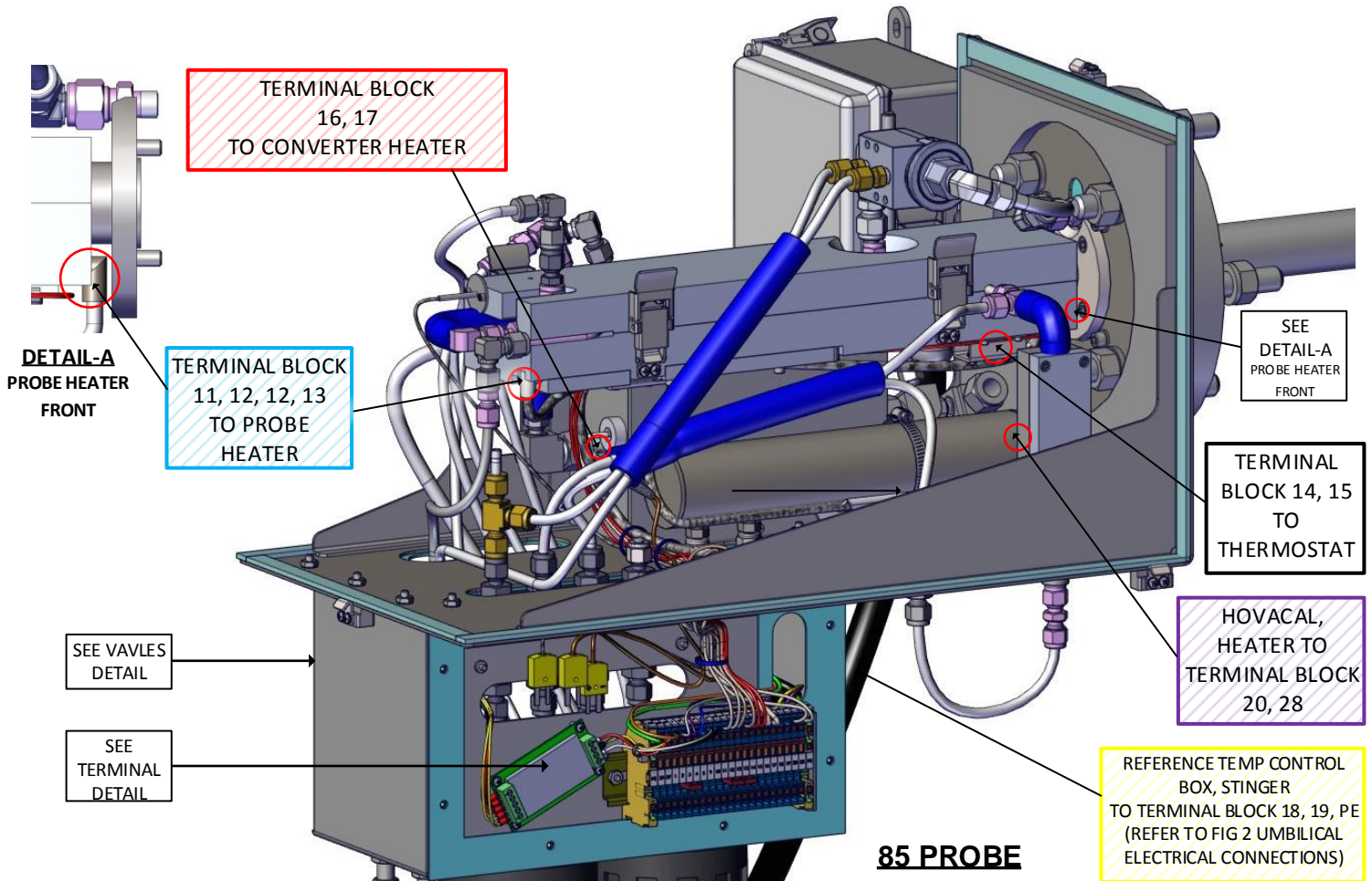
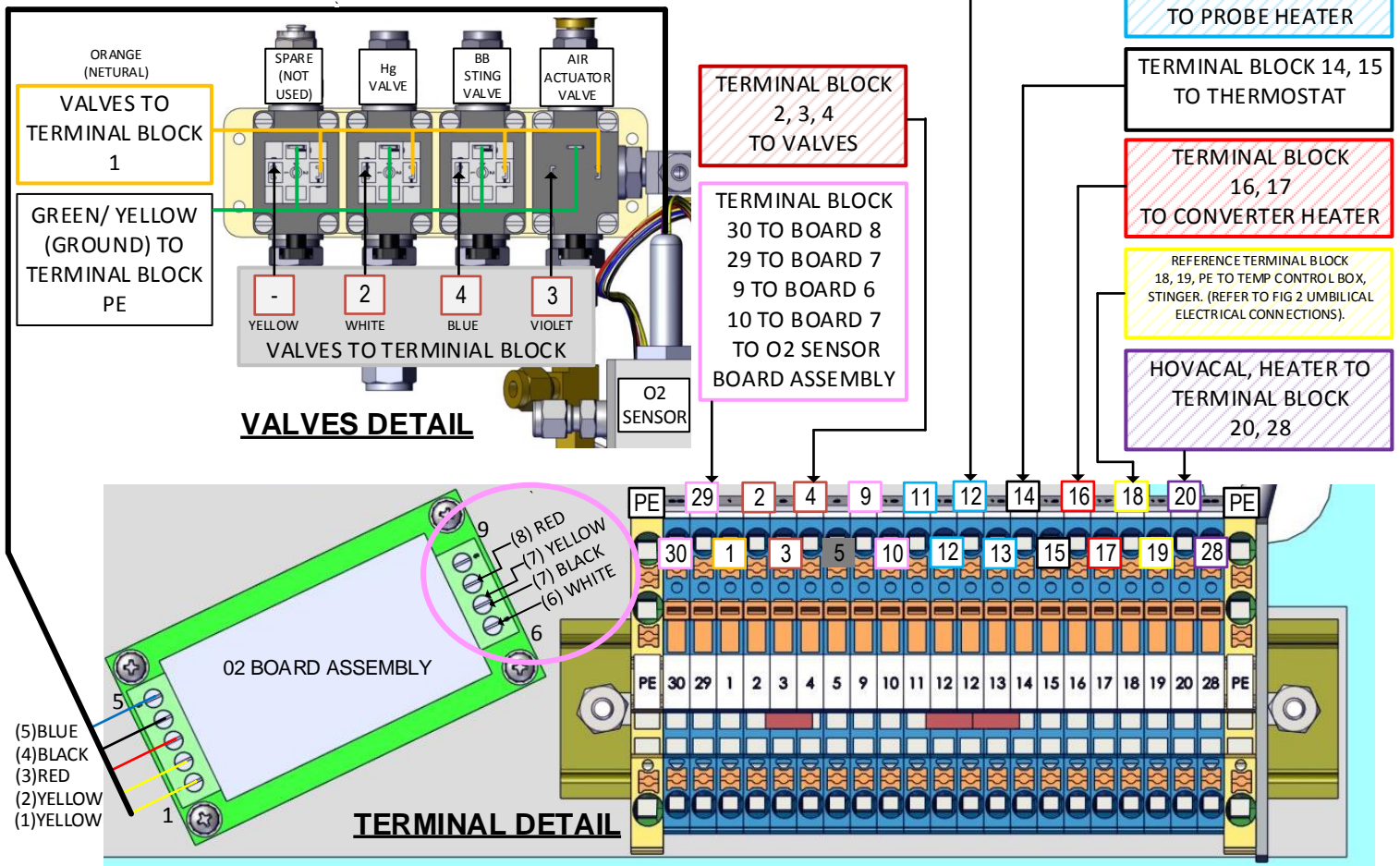
## TERMINAL BLOCK DETAIL



85  
PROBE

**FIG.3A INTERNAL WIRING TERMINAL BLOCK DETAIL**

(SIDE VIEW 85 PROBE)

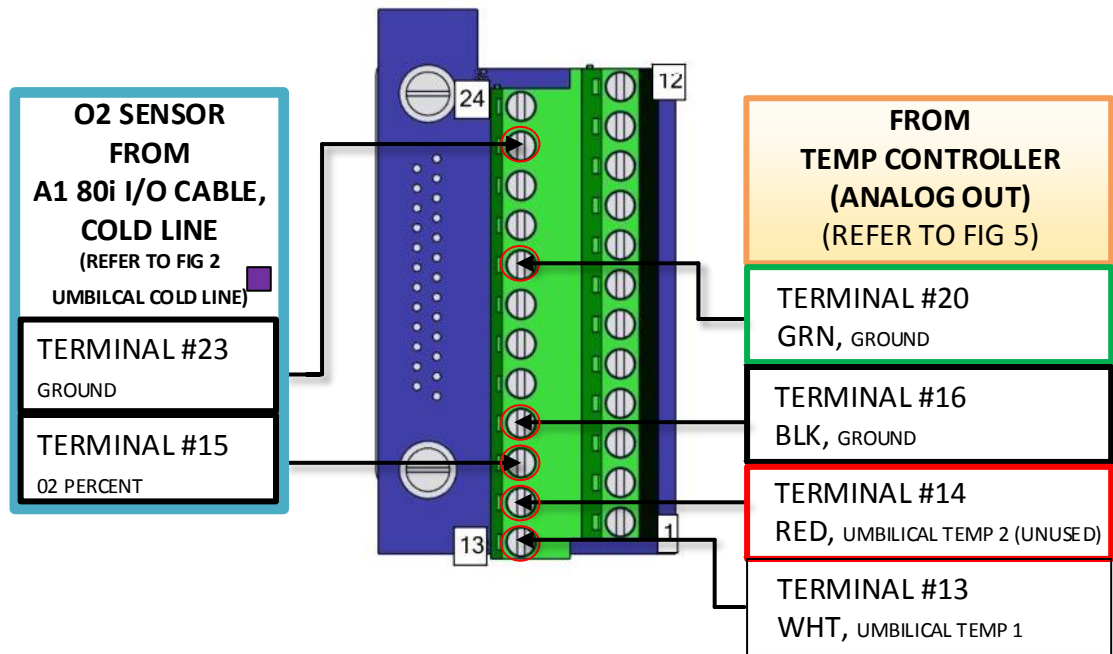


**FIG.3B 85 INTERNAL WIRING TERMINAL BLOCK**

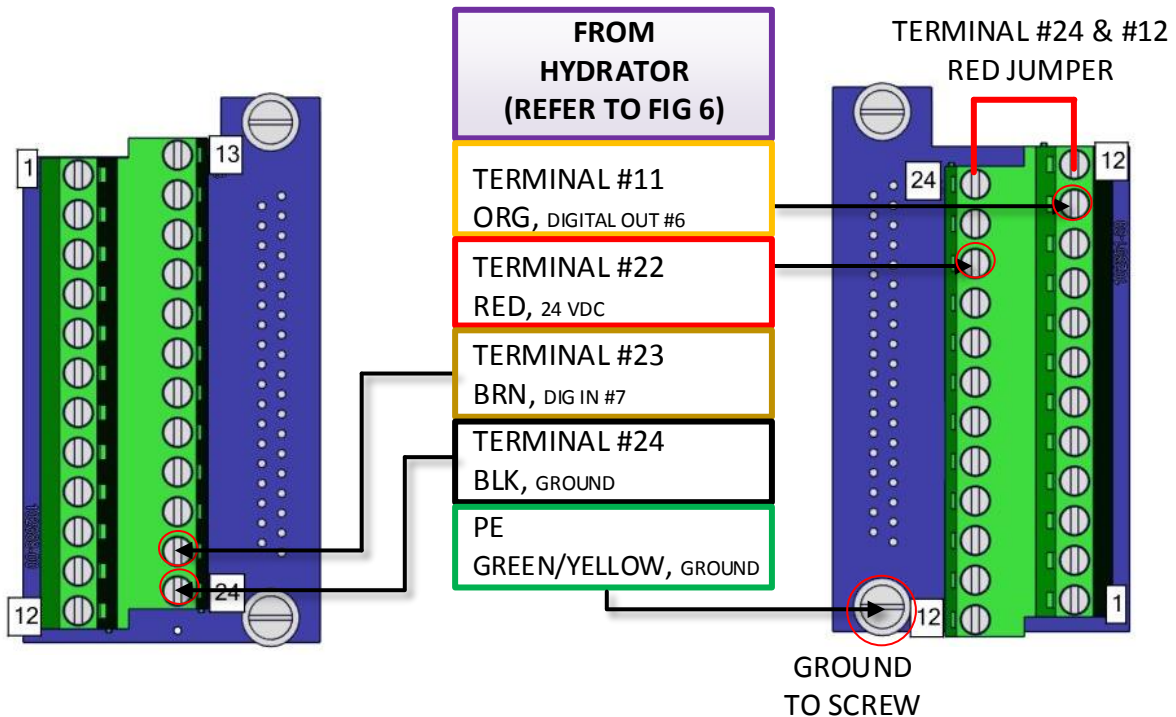
FROM CONNECTION	TERMINAL BLOCK	COLOR	FUNCTION
VALVES, ALL 4	PE1	GREEN/ YELLOW	GROUND
VALVES, ALL 4	1	ORANGE	NETURAL
VALVE, SPARE (NOT USED)	-	YELLOW	-
VALVE, Hg	2	WHITE	L1
VALVE, BB STING	4	BLUE	L1
VALVE, AIR ACTUATOR	3	VIOLET	L1
O2 SENSOR BOARD ASSEMBLY, CONN 6	9	WHITE	+24V
O2 SENSOR BOARD ASSEMBLY, CONN 7	10	BLACK	-24V
O2 SENSOR BOARD ASSEMBLY, CONN 7	29	YELLOW	GROUND
O2 SENSOR BOARD ASSEMBLY, CONN 8	30	RED	O2 PERCENT
PROBE HEATER	11	TAN	POWER
PROBE HEATER	12, 12	TAN	POWER
PROBE HEATER	13	TAN	POWER
THERMOSTAT	14	RED	SWITCH, OVER TEMP,
THERMOSTAT	15	RED	NORMALLY CLOSED
CONVERTER HEATER	16	TAN	POWER
CONVERTER HEATER	17	TAN	POWER
TEMP CONTROL BOX, STINGER HEATER	18	YELLOW	POWER
TEMP CONTROL BOX, STINGER HEATER	19	VIOLET	POWER
TEMP CONTROL BOX, STINGER HEATER	PE2	GREEN/YELLOW	GROUND
HOVACAL HEATER	20	TAN	POWER
HOVACAL HEATER	28	TAN	POWER
JUMPER, VALVE, Hg	2	RED	JUMPER
JUMPER, VALVE, AIR ACTUATOR	3	RED	JUMPER
JUMPER, PROBE HEATER	12	RED	JUMPER
JUMPER, PROBE HEATER	12	RED	JUMPER
JUMPER, PROBE HEATER	13	RED	JUMPER
JUMPER, THERMOSTAT	14	RED	JUMPER
NOT USED	5	NOT USED	NOT USED

**FIG.4A 80i REAR I/O PANEL CONNECTIONS**

**I/O EXPANSION**



**DIGITAL INPUT**  
REFER TO FIG 5



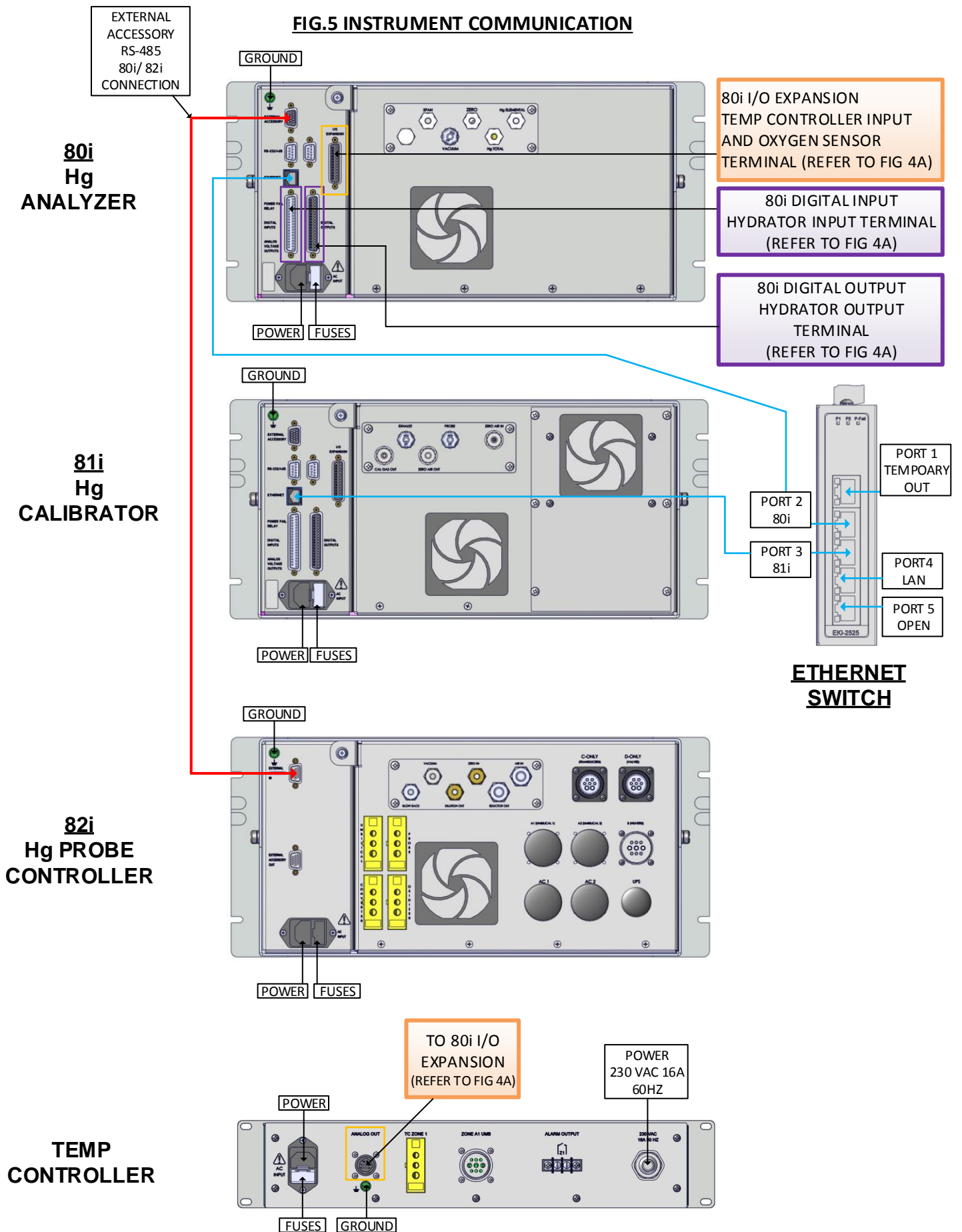
**FIG.4B 80i REAR I/O PANEL CONNECTIONS**

I/O Expansion Board, Terminal Board Pin Descriptions			
Pin	Signal Description	Pin	Signal Description
1	IOut1	13	Analog_In1 (Umbilical Temp 1)
2	GND_ISO	14	Analog_In2 (Umbilical Temp 1)
3	IOut2	15	Analog_In3 (Oxygen Sensor)
4	GND_ISO	16	GNDD (Umbilical Temp 1)
5	IOut3	17	Analog_In4
6	GND_ISO	18	Analog_In5
7	IOut4	19	Analog_In6
8	GND_ISO	20	GNDD (Umbilical Temp 2)
9	IOut5	21	Analog_In7
10	GND_ISO	22	Analog_In8
11	IOut6	23	GNDD (Oxygen Sensor)
12	GND_ISO	24	GNDD
Digital Inputs, Analog Voltage Output, I/O Terminal Board Pin Descriptions			
Pin	Signal Description	Pin	Signal Description
1	Analog1	13	Power_Fail_NC
2	Analog ground	14	Power_Fail_COM
3	Analog2	15	Power_Fail_NO
4	Analog ground	16	TTL_Input1
5	Analog3	17	TTL_Input2
6	Analog ground	18	TTL_Input3
7	Analog4	19	TTL_Input4
8	Analog ground	20	Digital ground
9	Analog5	21	TTL_Input5
10	Analog ground	22	TTL_Input5
11	Analog6	23	TTL_Input7 (Hydrator, Brown #7)
12	Analog ground	24	Digital ground (Hydrator, Black)
Digital Out, D/O Terminal Board Pin Descriptions			
Pin	Signal Description	Pin	Signal Description
1	Relay1-ContactA	13	Relay7-ContactA
2	Relay1-ContactB	14	Relay7-ContactB
3	Relay2-ContactA	15	Relay8-ContactA
4	Relay2-ContactB	16	Relay8-ContactB
5	Relay3-ContactA	17	Relay9-ContactA
6	Relay3-ContactB	18	Relay9-ContactB
7	Relay4-ContactA	19	Relay10-ContactA
8	Relay4-ContactB	20	Relay10-ContactB
9	Relay5-ContactA	21	Solenoid_Drive_Output1
10	Relay5-ContactB	22	+24V (Hydrator, Red)
11	Relay6-ContactA (Hydrator, Orange, #6)	23	Solenoid_Drive_Output2
12	Relay6-ContactB	24	+24V



Red Jumper (Hydrator)

**FIG.5 INSTRUMENT COMMUNICATION**



**FIG.6 RACK PLUMBING**

**PUMP**

**80i Hg ANALYZER**

**81i Hg CALIBRATOR**

**82i Hg PROBE CONTROLLER**

EXHAUST  
ATMOSPHERIC VENT  
INLET  
VACUUM  
SPAN  
ZERO  
UMB HOT LINE 1 (HGT)  
UMB HOT LINE 2 (HG0)  
CAL GAS OUT  
ATMOSPHERIC VENT  
PROBE, TO HYDRATOR  
ZERO AIR IN (N2)  
EXHAUST  
ATMOSPHERIC VENT  
ZERO AIR OUT  
8 (BLOW BACK)  
6 (VACUUM)  
7 (DILUTION AIR)  
5 (EDUCTOR)  
ZERO IN (N2)  
"AIR IN" FROM N2 GENERATOR (REFER TO FIG 8)

 3 / 8 O.D.  
**NOT USED  
(SPARE)**

 3 / 8 O.D.

Diagram illustrating the Hydrazine System components and connections:

- VENT PORT LEFT OPEN**: Located on the top of the Upper Canister.
- FILL USING DISTILLED WATER**: Instruction for filling the system.
- TO 80i SEE 80i REAR PANEL I/O (REFER TO FIG 4A, 4B)**: Connection point for the 80i system.
- FROM 81i, PROBE BULKHEAD**: Connection point for the 81i system.
- 3 (CAL/ ZERO)**: Label for the UMB HOT LINE.
- HYDRATOR**: The main component being filled.
- UPPER CANISTER**: The top storage vessel.
- LOWER CANISTER**: The bottom storage vessel.
- 2-WAY VALVE**: Valve controlling flow between the canisters.
- CHECK VALVE**: Valve preventing backflow.

**FIG.7 83i PROBE PLUMBING**

**UMBILICAL (COLD LINE)**

PROBE SIDE- ALL TUBES HAVE LABELS ON THE ENDS

1 / 4 O.D.  
**6 (VACUUM)**

1 / 4 O.D.  
**7 (DILUTION AIR)**

1 / 4 O.D.  
**8 (BLOW BACK)**

3 / 8 O.D.  
**5 (EDUCTOR)**

3 / 8 O.D.  
**NOT USED (SPARE)**

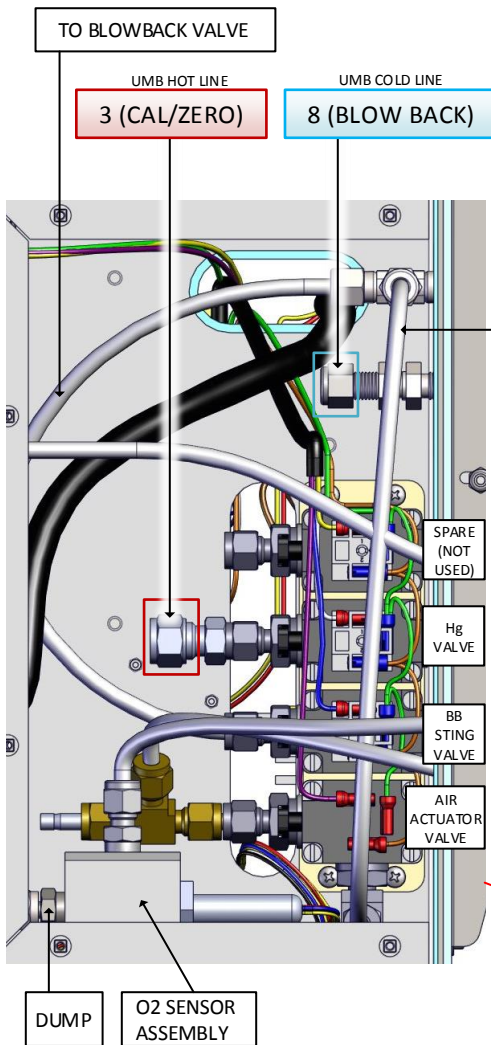
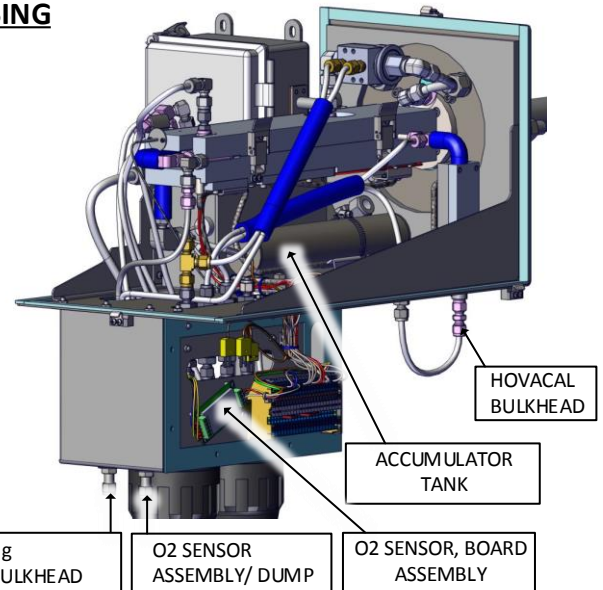
**UMBILICAL (HOT LINE)**

PROBE SIDE- ALL TUBES HAVE LABELS ON THE ENDS

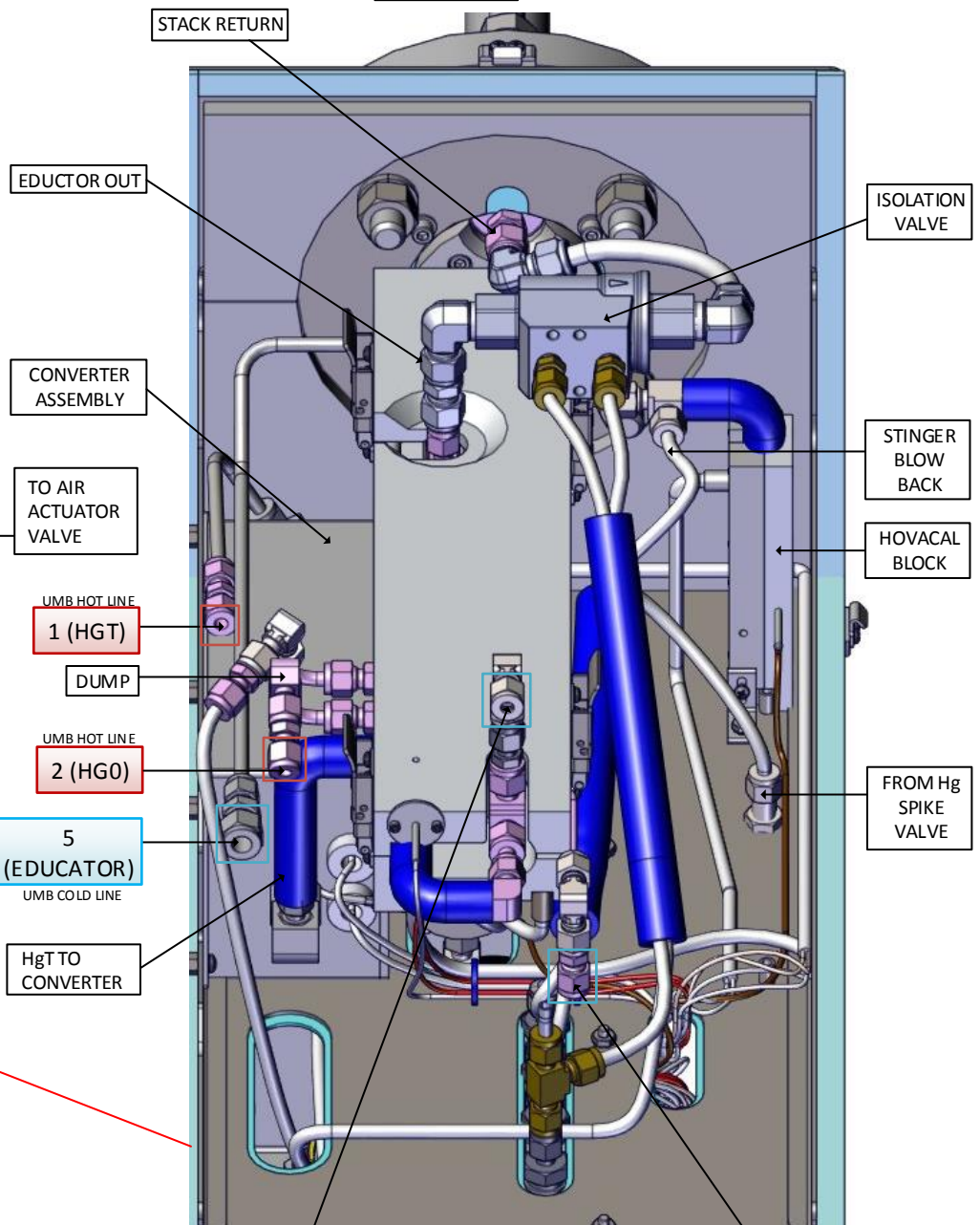
1 / 4 O.D.  
**1 (HGT)**

1 / 4 O.D.  
**2 (HG0)**

3 / 8 O.D.  
**3 (CAL/ZERO)**



**85 PROBE**  
(LEFT VIEW)



**85 PROBE**  
(TOP VIEW)

**FIG.8 NITROGEN GENERATOR DETAIL**

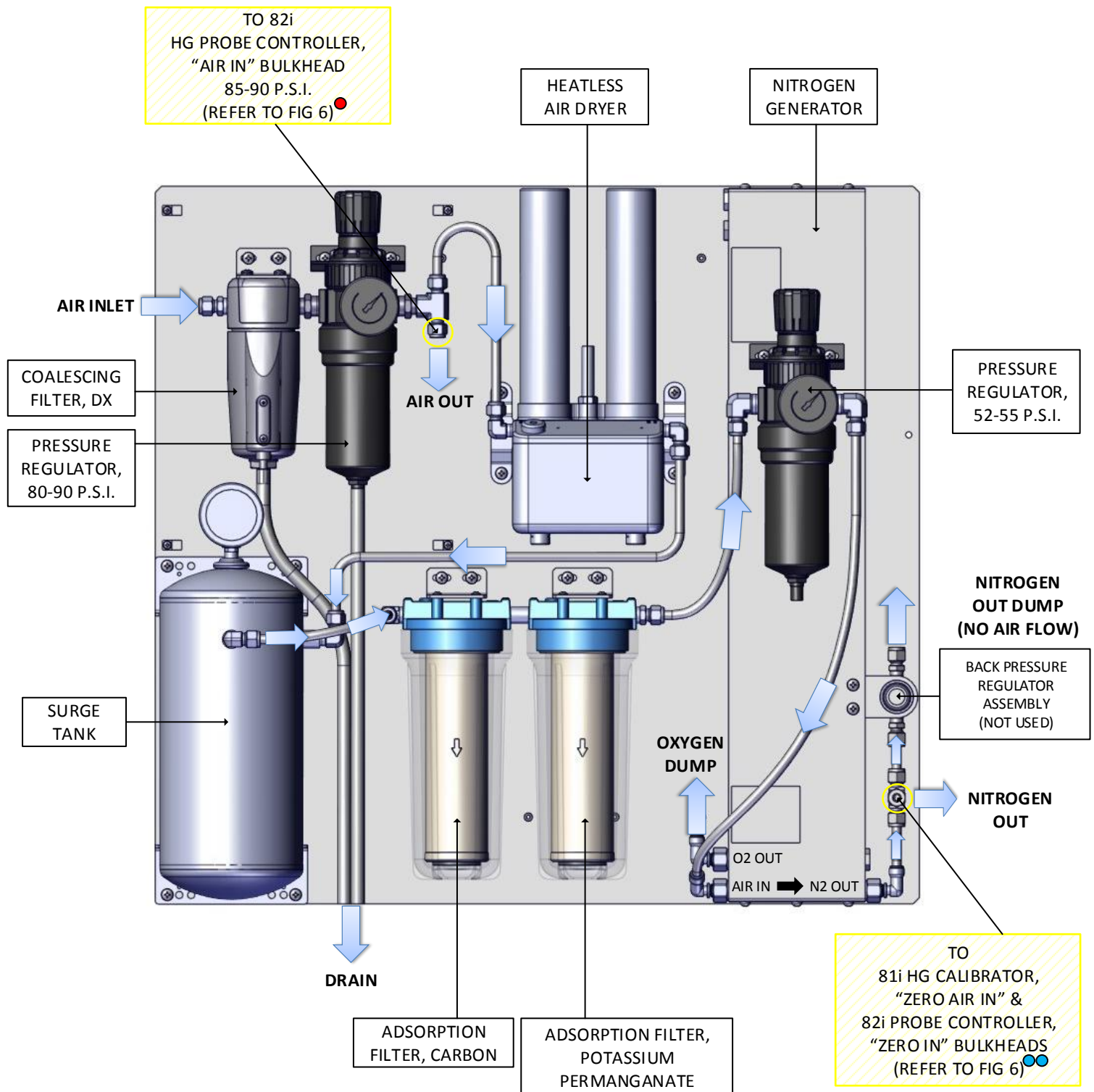
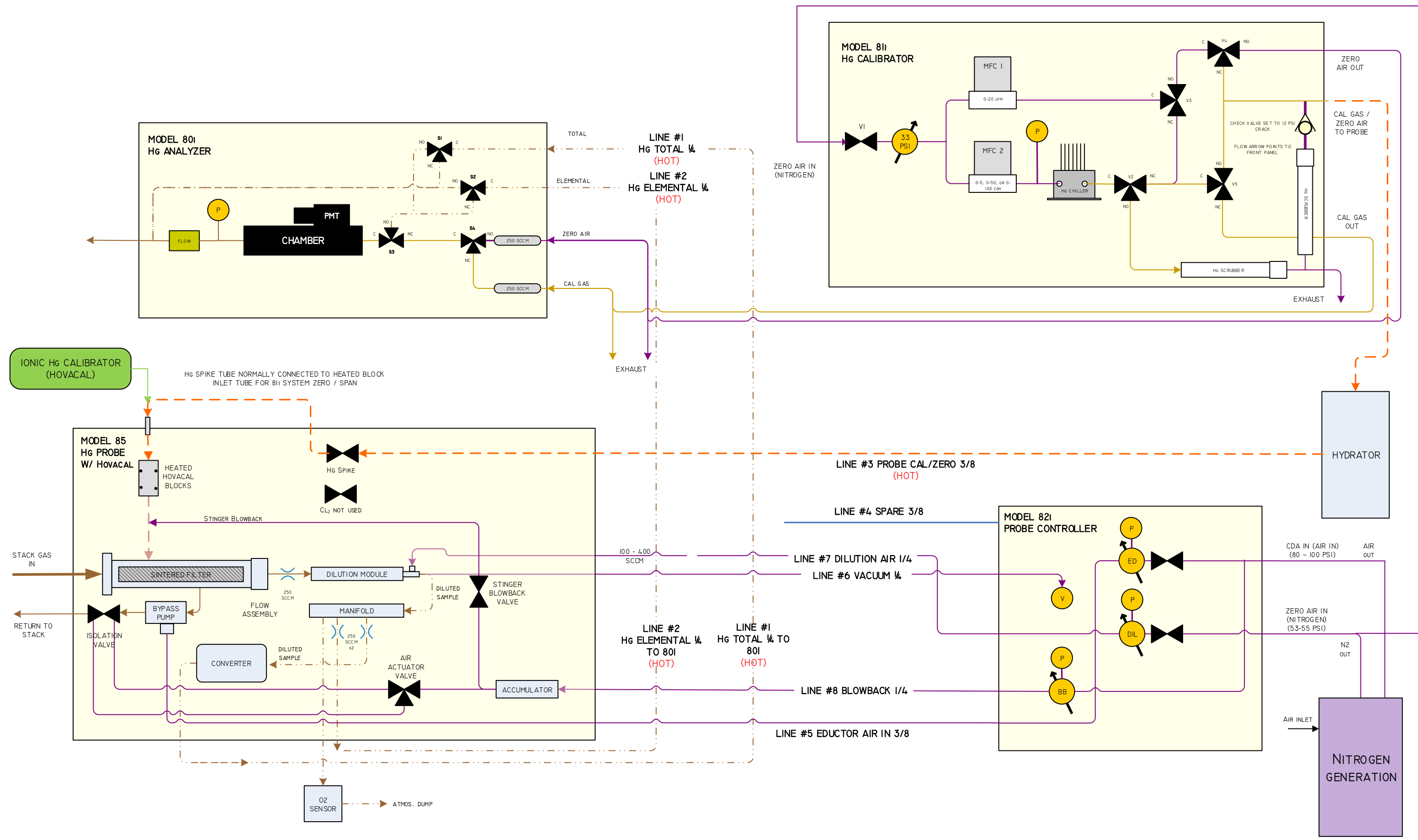


FIG.9 SYSTEM PLUMBING DIAGRAM  
WITH HOVACAL ATTACHMENT



**FIG.10 SYSTEM CALL OUTS**

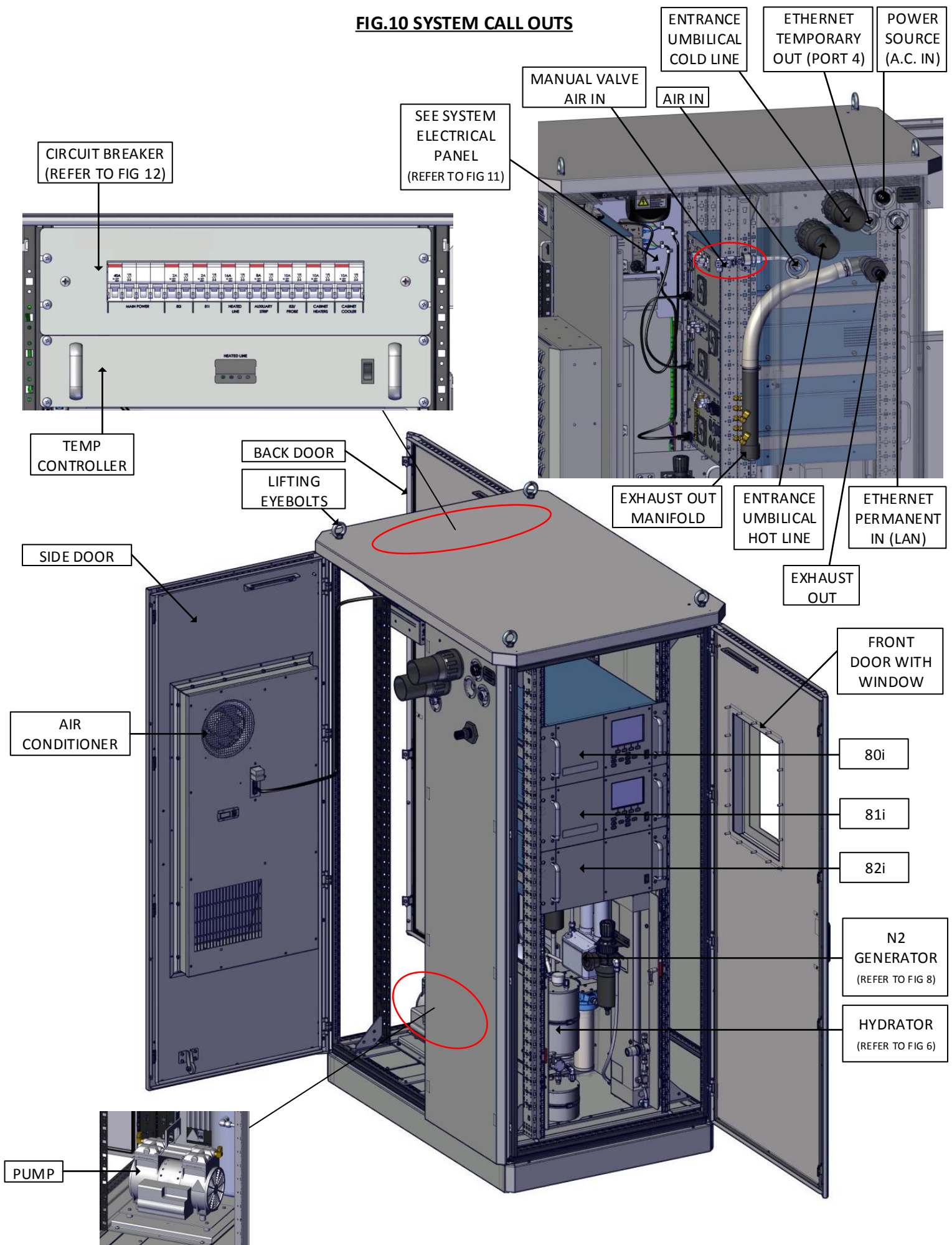
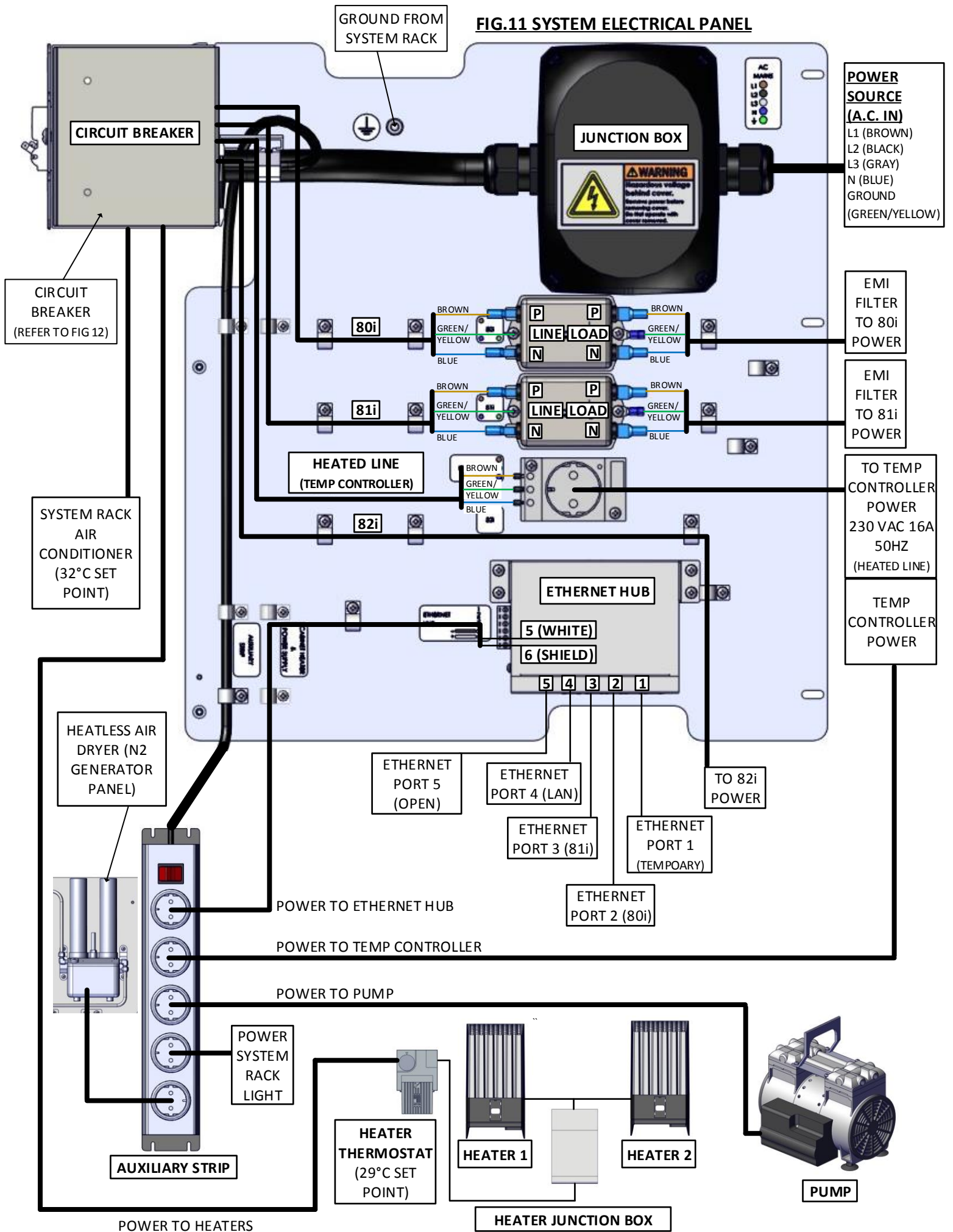
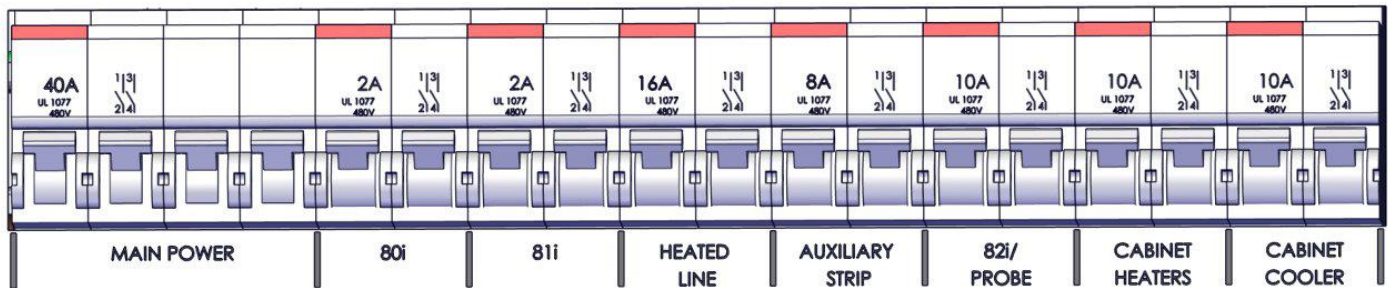
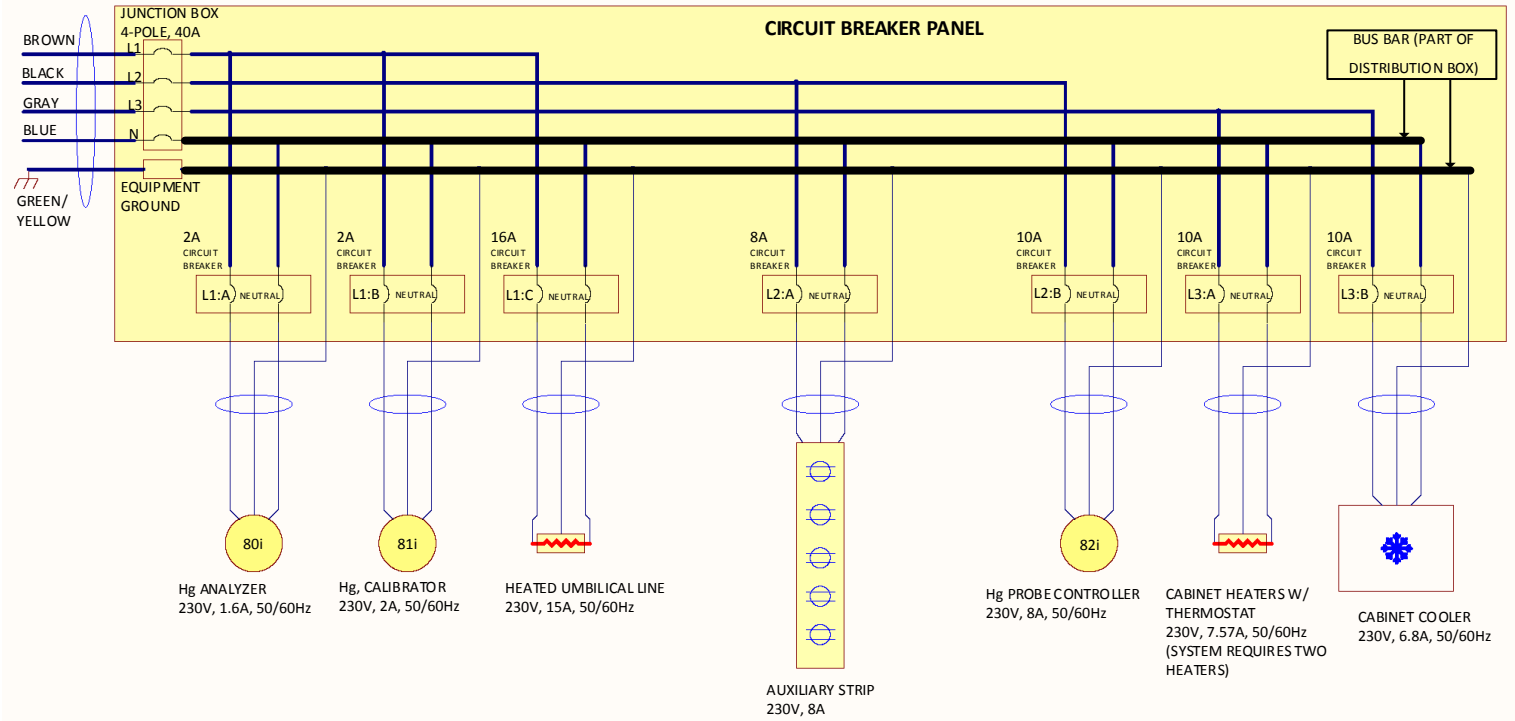


FIG.11 SYSTEM ELECTRICAL PANEL

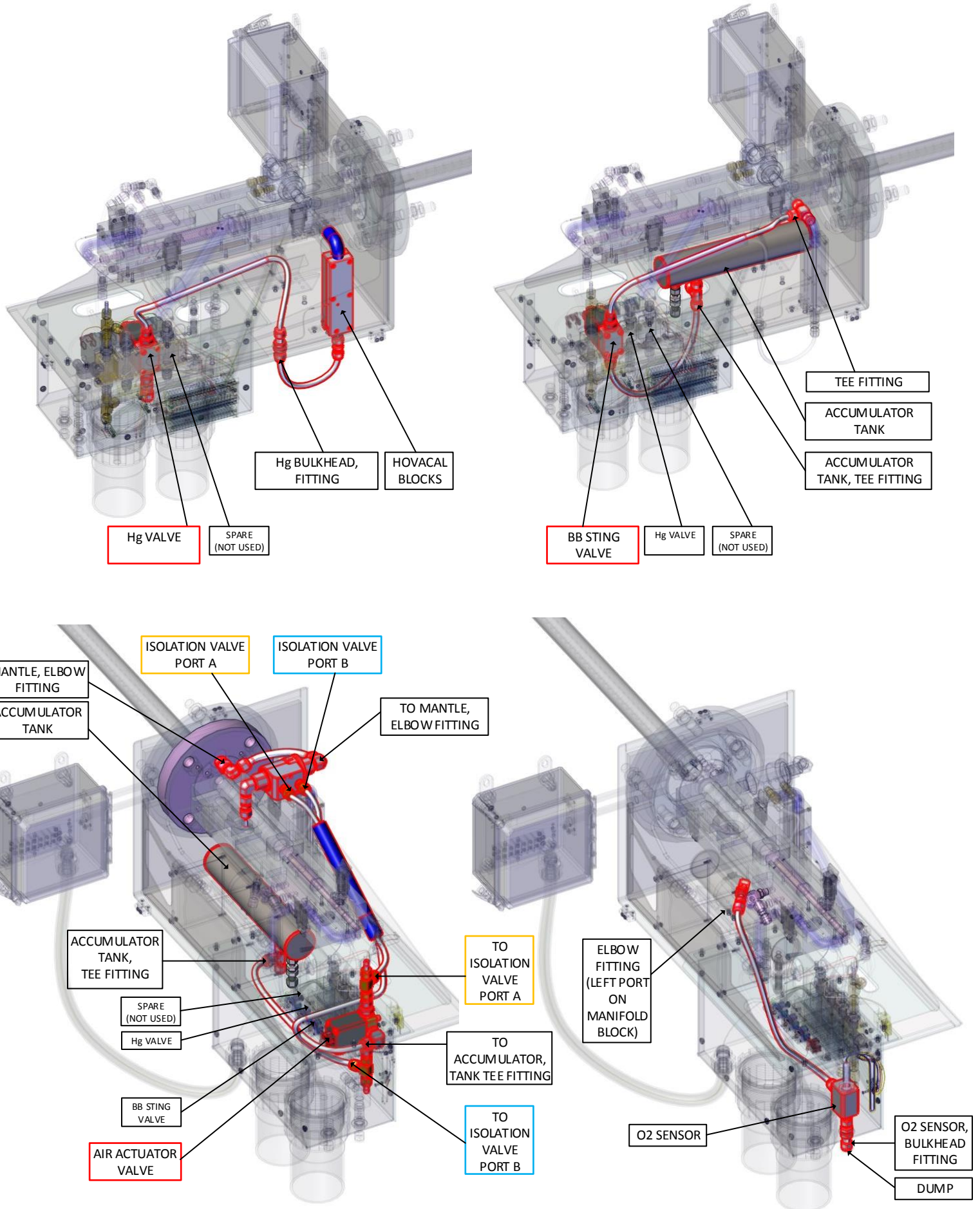


# FIG.12 SYSTEM CIRCUIT BREAKER DETAIL

3-PHASE, 230 VAC, 50Hz  
UTILITY INPUT POWER



**FIG.13 85 INTERNAL PROBE PLUMBING**





---

**USA**

27 Forge Parkway  
Franklin, MA 02038  
Ph: (508) 520-0430  
Fax: (508) 520-2800  
orders.aqi@thermofisher.com

**India**

C/327, TTC Industrial Area  
MIDC Pawane  
New Mumbai 400 705, India  
Ph: +91 22 4157 8800  
india@thermofisher.com

**China**

Beijing Silver Tower  
#2 DongSanHuan North Rd  
Beijing, China, 100020  
Ph: +86 10 84193588  
info.eid.china@thermofisher.com

**Europe**

Ion Path, Road Three,  
Winsford, Cheshire CW73GA UK  
Ph: +44 1606 548700  
Fax: +44 1606 548711  
sales.epm.uk@thermofisher.com

Find out more at [thermofisher.com/EUmercury](https://thermofisher.com/EUmercury)

**ThermoFisher**  
S C I E N T I F I C