

A photograph of an industrial facility, likely a power plant or refinery, with three prominent tall smokestacks in the foreground. The sky is a vibrant orange and yellow, indicating a sunset or sunrise. The sun is a large, bright yellow circle in the center of the sky. The industrial structures are silhouetted against the bright sky, with some lights visible on the right side of the facility.

# Watson MSS with 83*i* Probe Installation Guide

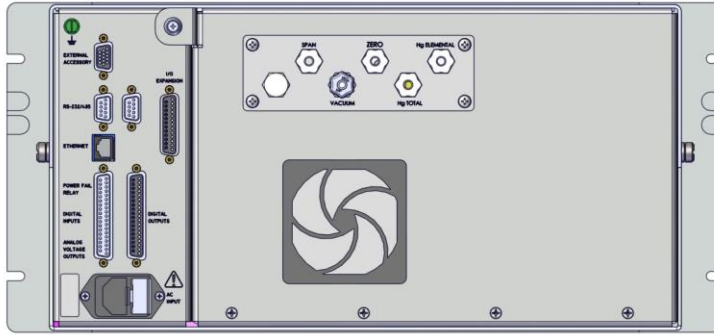
**Mercury Speciation System**

119431-00 • 26Oct2018

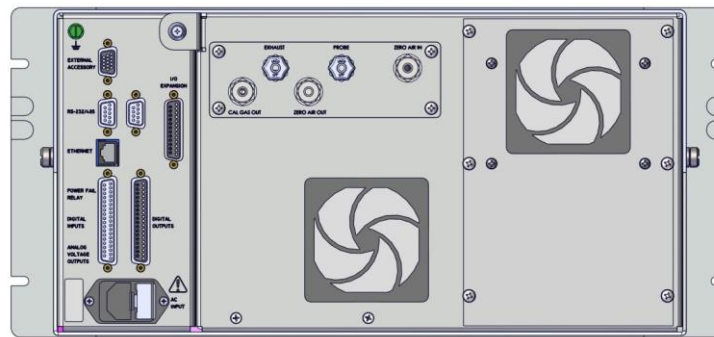


**FIG.1 UMBILICAL ELECTRICAL CONNECTIONS  
AT RACK**

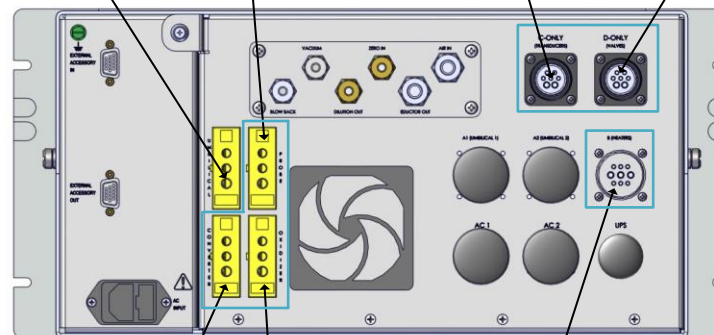
**80i  
Hg  
ANALYZER**



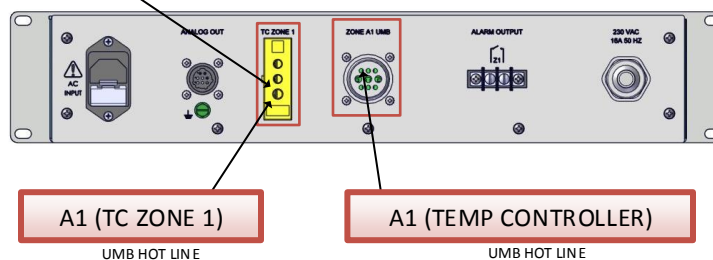
**81i  
Hg  
CALIBRATOR**



**82i  
Hg PROBE  
CONTROLLER**



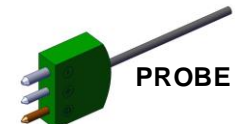
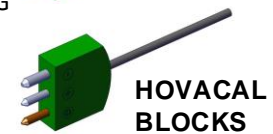
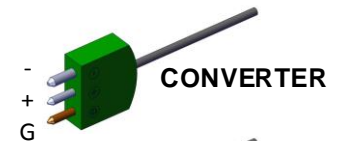
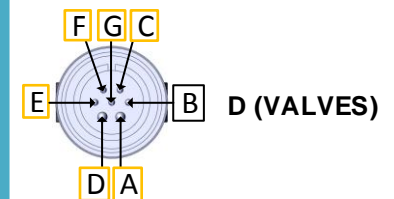
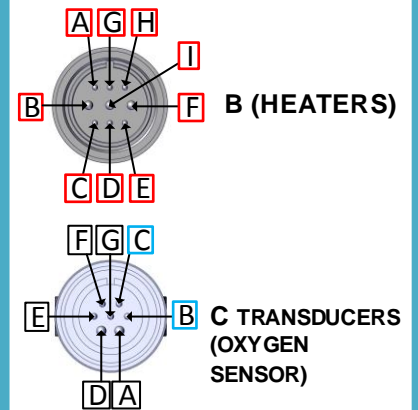
**TEMP  
CONTROLLER**



**UMBILICAL (COLD LINE)**

SYSTEM SIDE - ALL ELECTRICAL CONNECTIONS

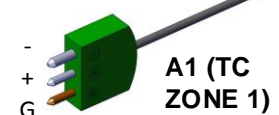
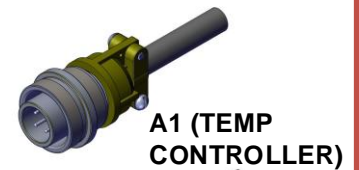
LABELLED ON END OF WIRES



**UMBILICAL (HOT LINE)**

SYSTEM SIDE - ALL ELECTRICAL CONNECTIONS

LABELLED ON END OF WIRES





## UMBILICAL (COLD LINE)

PROBE SIDE - ALL ELECTRICAL CONNECTIONS

LABELLED ON END OF WIRES



**A1 (80i)**

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) (HOVA BLOCKS)  
28 (CONN PIN: B) (HOVA BLOCKS)  
PE (CONN PIN: I) (PROTECTIVE EARTH)



**C (OXYGEN  
XDUCER)  
80i**

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) (CAL/ZERO VALVE)  
4 (CONN PIN: C) (STINGER BB VALVE)  
5 (CONN PIN: E) (SYSTEM BB VALVE)  
26 (CONN PIN: A) (ACTUATOR VALVE)  
NOT USED (CONN PIN: B)



**CONVERTER**

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



**HOVACAL  
BLOCKS**



**PROBE**



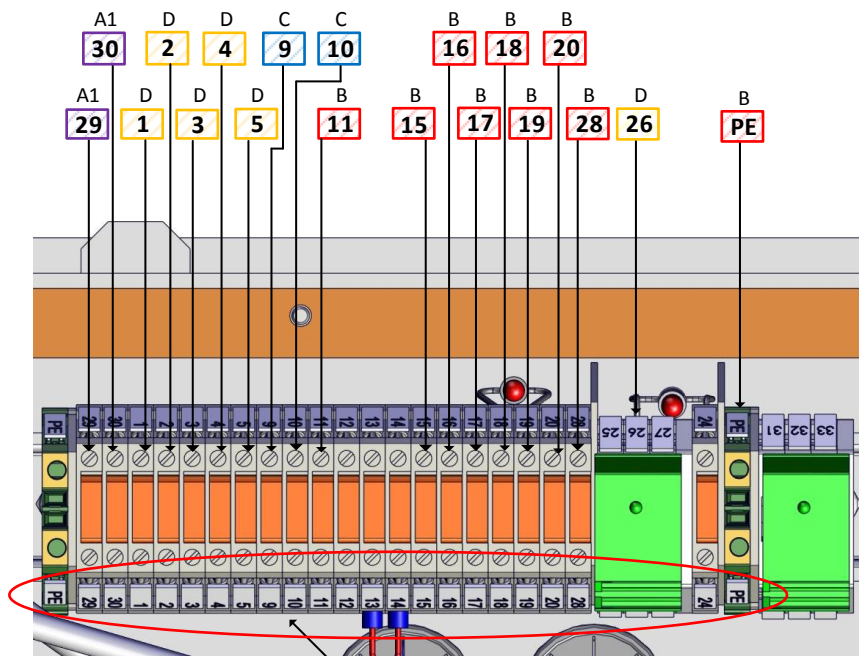
**THERMOCOUPLES**



**SPARE**

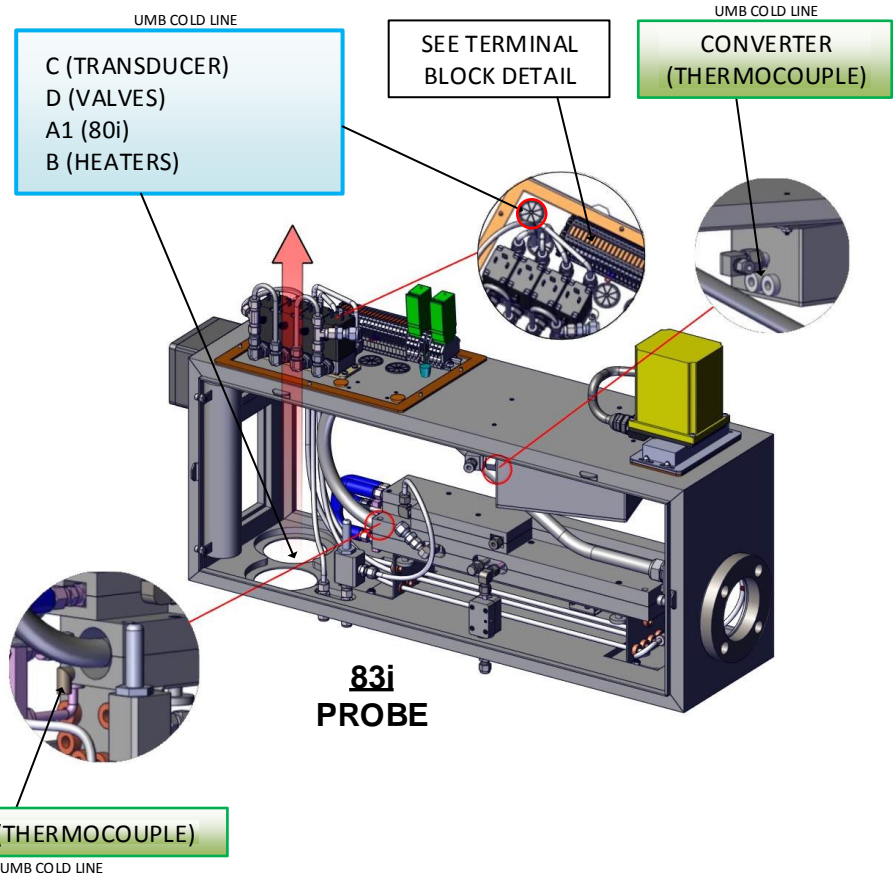
## FIG.2 UMBILICAL ELECTRICAL CONNECTIONS

**AT 83i**



SEE INTERNAL WIRING TERMINAL BLOCK DETAIL  
FOR REFERENCE

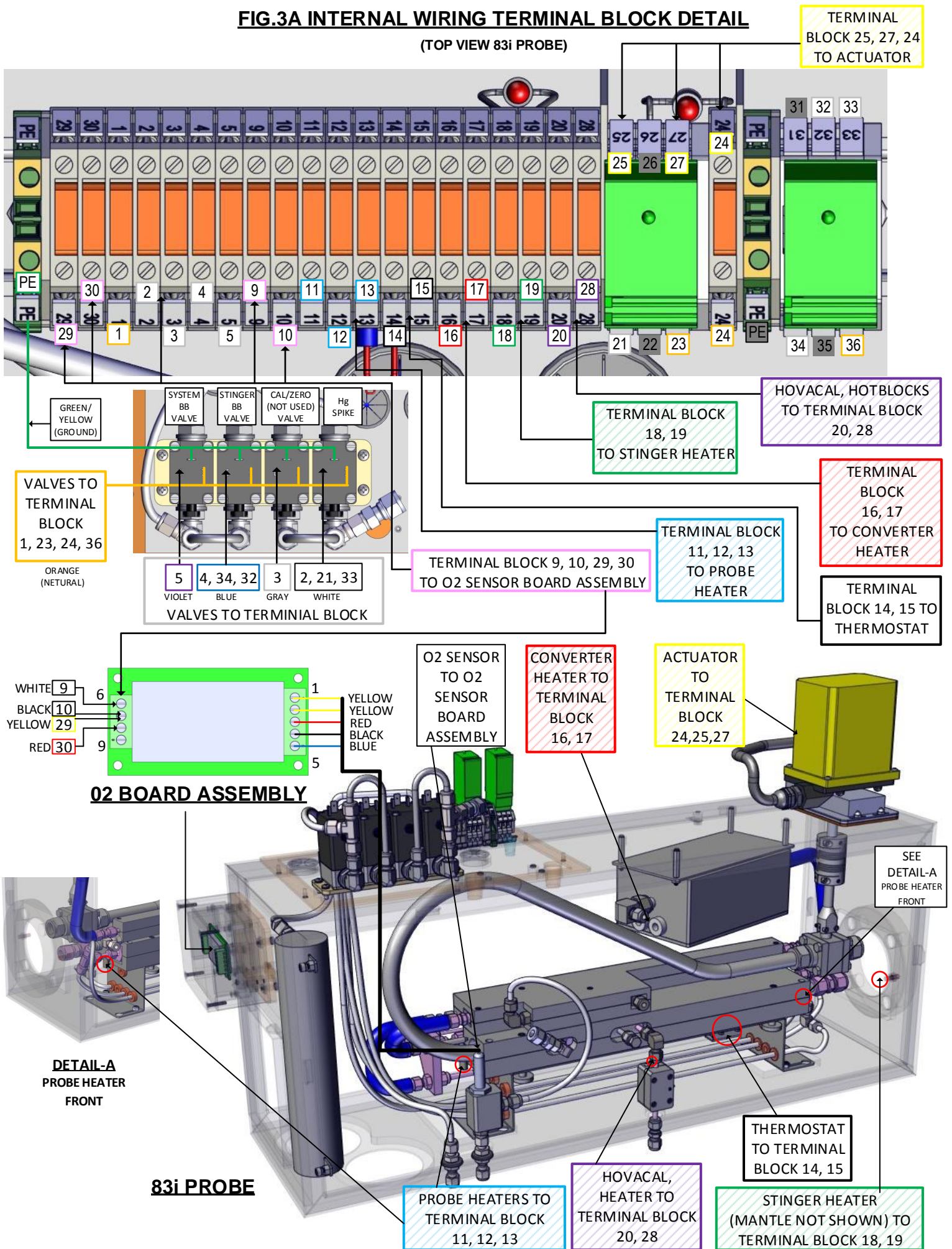
## TERMINAL BLOCK DETAIL





# FIG.3A INTERNAL WIRING TERMINAL BLOCK DETAIL

(TOP VIEW 83i PROBE)





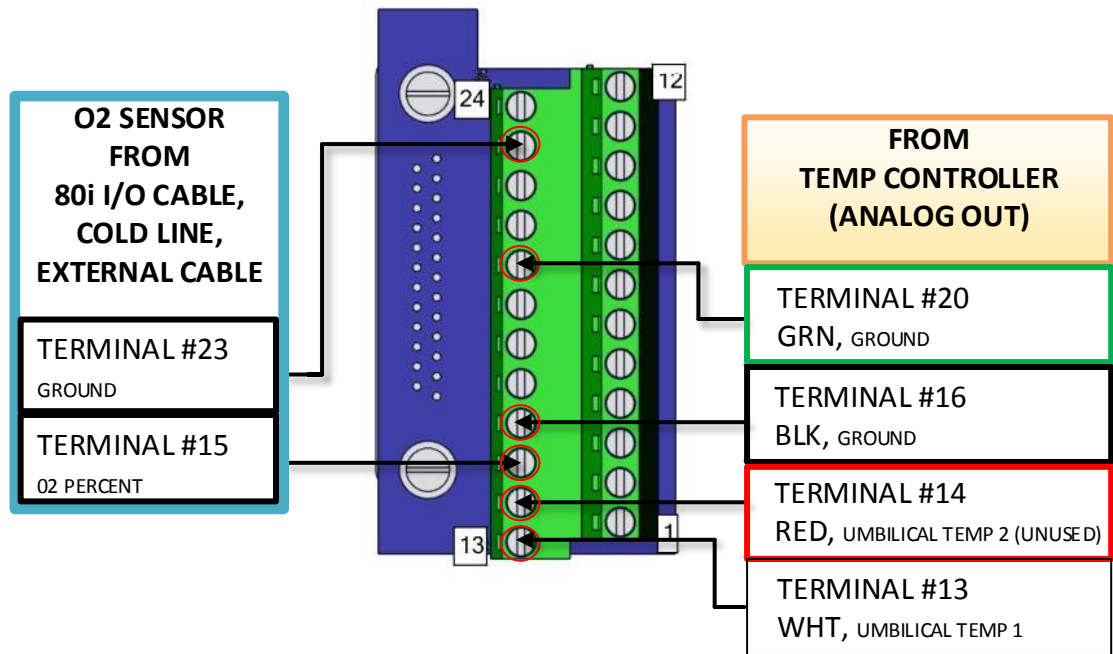
**FIG.3B 83i INTERNAL WIRING TERMINAL BLOCK**

FROM CONNECTION	TERMINAL BLOCK	COLOR	FUNCTION
VALVES, ALL 4	PE	GREEN/ YELLOW	GROUND
VALVES, ALL 4	1, 23, 24, 36	ORANGE	NETURAL
VALVE, SYSTEM BB	5	VIOLET	L1
VALVE, STINGER BB	4, 34, 32	BLUE	L1
VALVE, CAL, ZERO (NOT USED)	3	GRAY	L1
VALVE, Hg SPIKE	2, 21, 33	WHITE	L1
O2 SENSOR BOARD ASSEMBLY, CONN 6	9	WHITE	+24V POWER
O2 SENSOR BOARD ASSEMBLY, CONN 7	10	BLACK	-24V POWER
O2 SENSOR BOARD ASSEMBLY, CONN 7	29	YELLOW	O2 PERCENT GROUND
O2 SENSOR BOARD ASSEMBLY, CONN 8	30	RED	O2 PERCENT SIGNAL
ACTUATOR	24 (TOP)	GREEN	GROUND
ACTUATOR	25	BLACK	L1
ACTUATOR	27	WHITE	L2
HOVACAL HEATER	20	TAN	POWER
HOVACAL HEATER	28	TAN	POWER
STINGER	18	TAN	POWER
STINGER	19	TAN	POWER
CONVERTER HEATER	16	TAN	POWER
CONVERTER HEATER	17	TAN	POWER
PROBE HEATER	11	TAN	POWER
PROBE HEATER	12	TAN	POWER
PROBE HEATER	13	TAN	POWER
THERMOSTAT	14	RED	SWITCH, OVER TEMP,
THERMOSTAT	15	RED	NORMALLY CLOSED
JUMPER	13	RED	JUMPER
JUMPER	14	RED	JUMPER
LED, STINGER	18	BLACK	LED
LED, STINGER	19	BLACK	LED
LED, ACTUATOR	26	BLACK	LED
LED, ACTUATOR	24	BLACK	LED

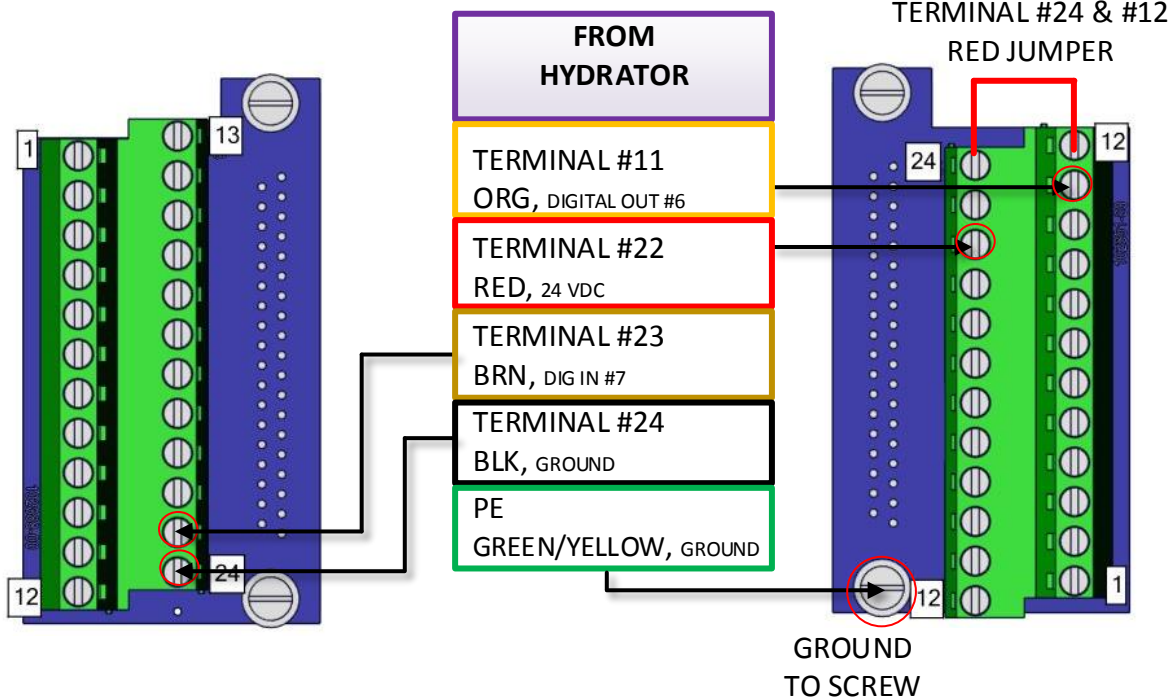


**FIG.4A 80i REAR I/O PANEL CONNECTIONS**

**I/O EXPANSION**



**DIGITAL INPUT**





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

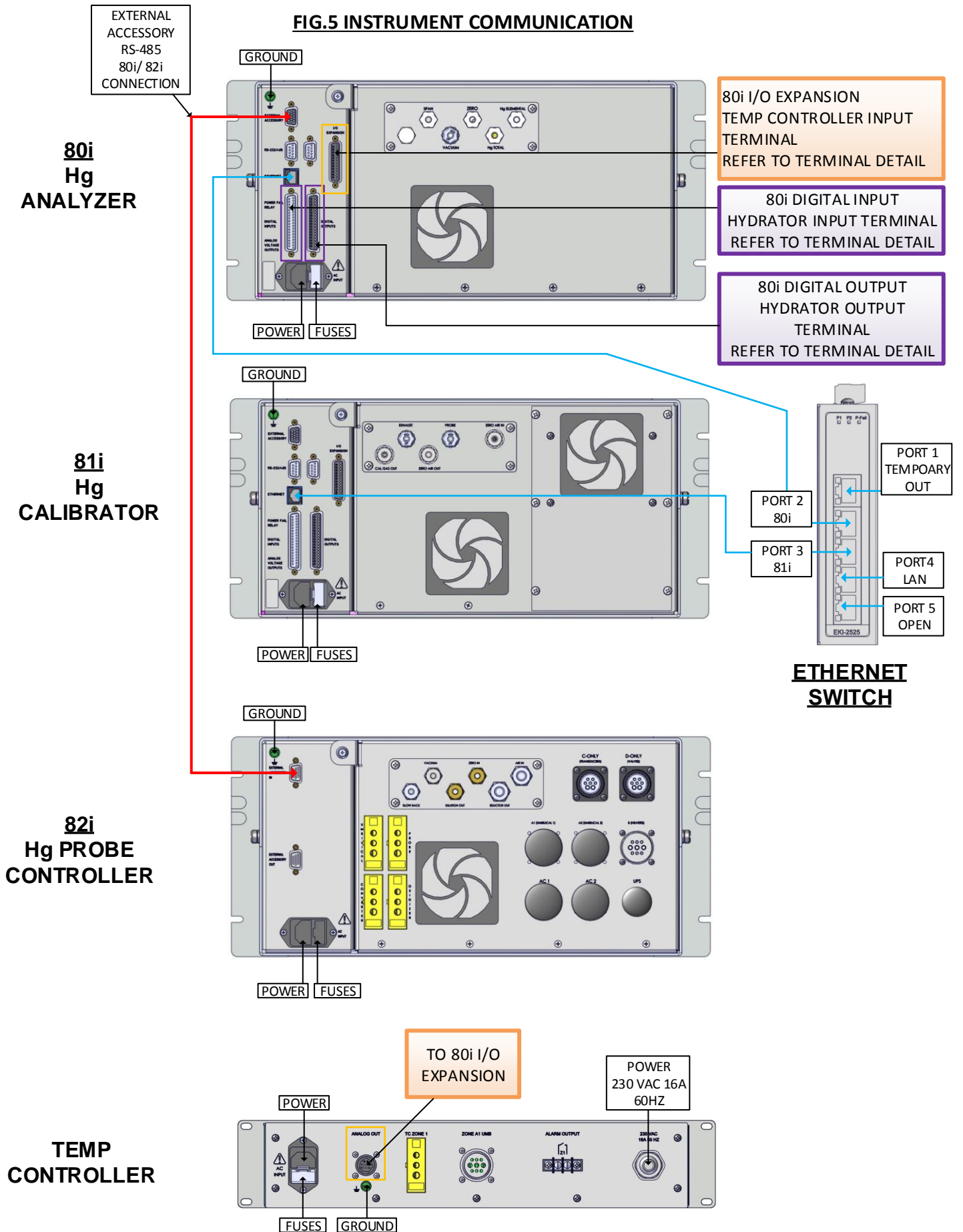
I/O Expansion Board, Terminal Board Pin Descriptions			
Pin	Signal Description	Pin	Signal Description
1	IOut1	13	Analog_In1 (Umbilical Temp 1)
2	GND_ISO	14	Analog_In2 (Umbilical Temp 1)
3	IOut2	15	Analog_In3 (Oxygen Sensor)
4	GND_ISO	16	GNDD (U.T. 1)
5	IOut3	17	Analog_In4
6	GND_ISO	18	Analog_In5
7	IOut4	19	Analog_In6
8	GND_ISO	20	GNDD (U.T.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)

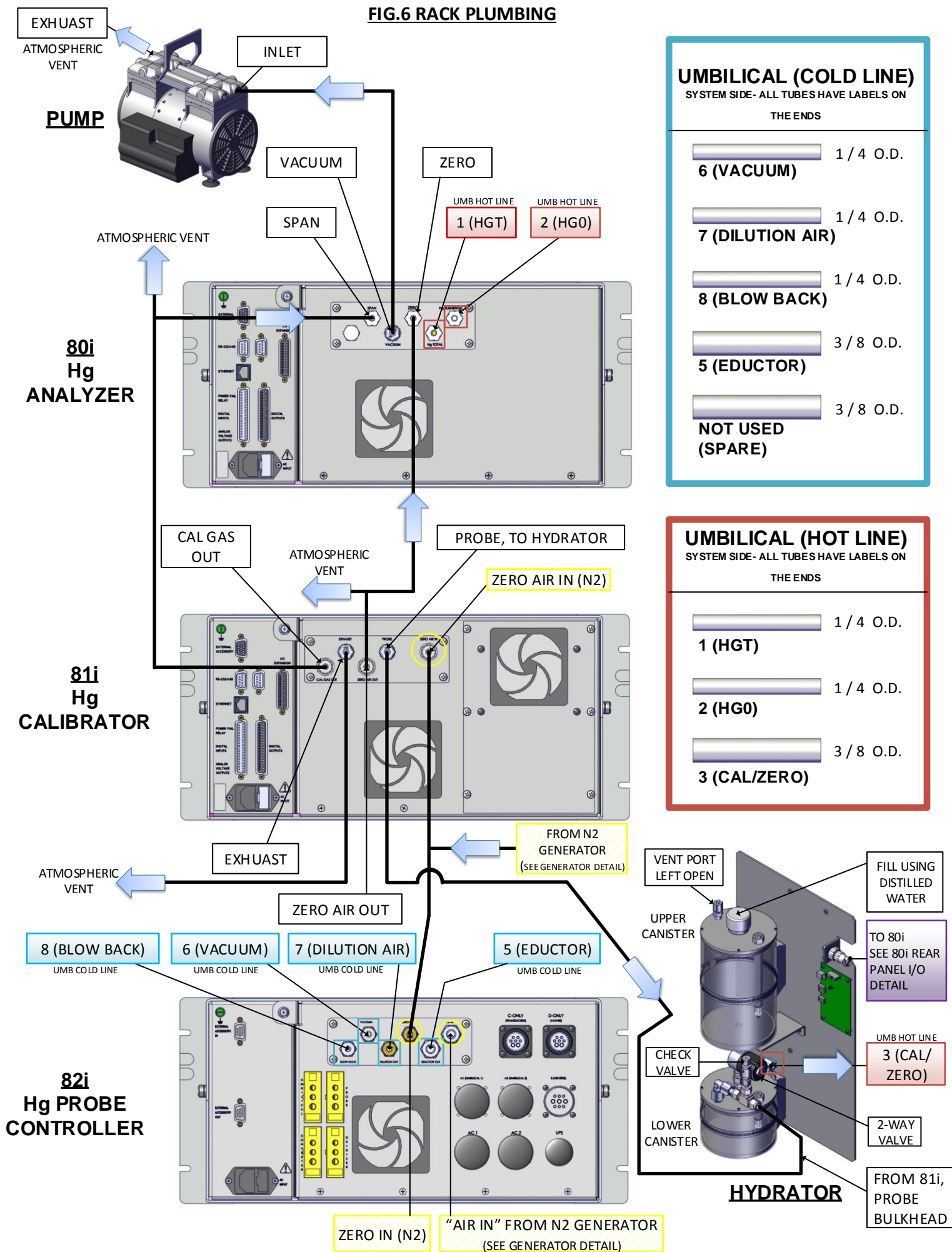


**FIG.5 INSTRUMENT COMMUNICATION**





**FIG.6 RACK PLUMBING**





**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)**

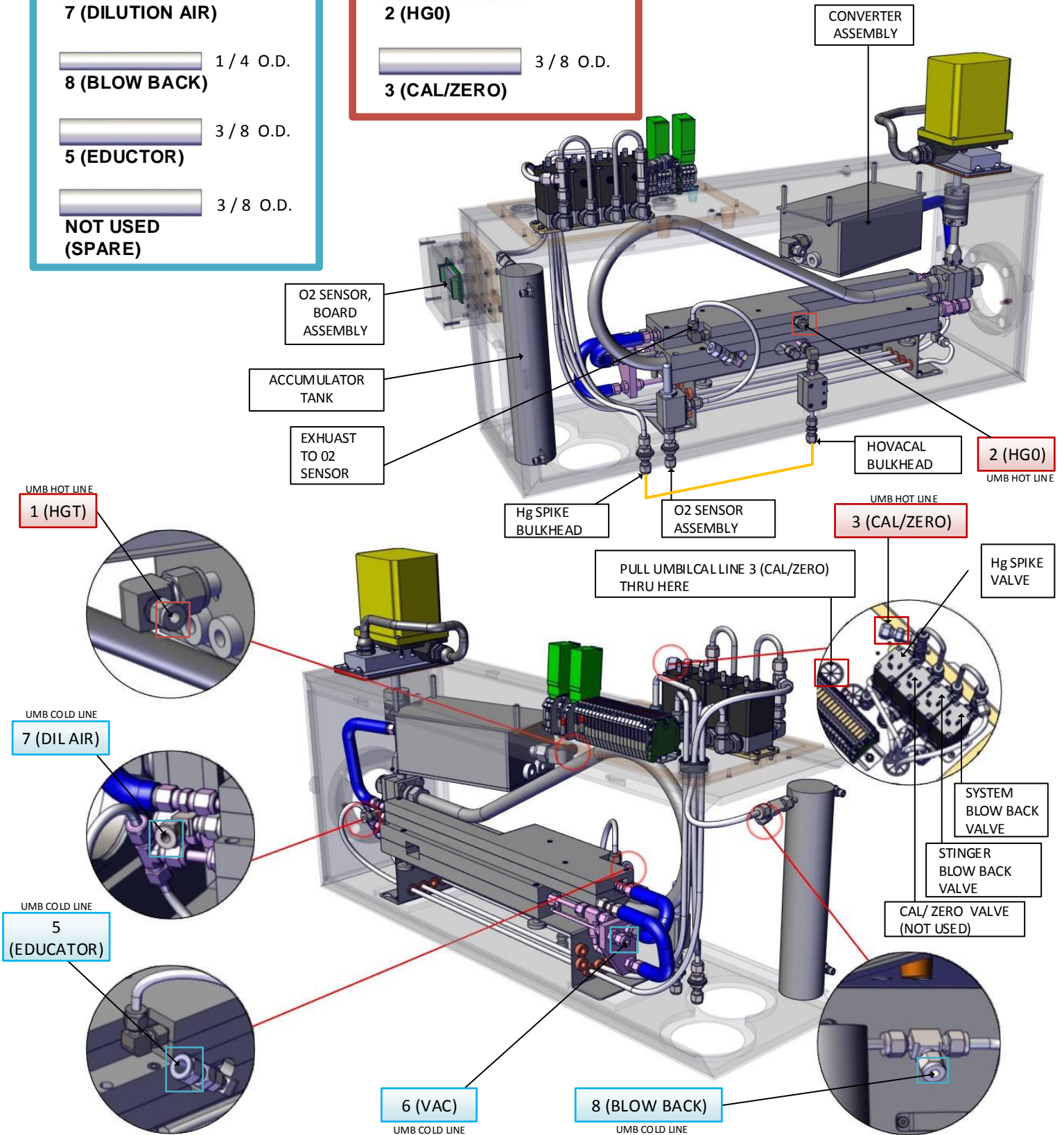
**UMBILICAL (HOT LINE)**

PROBE SIDE- ALL TUBES HAVE LABELS ON THE ENDS

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

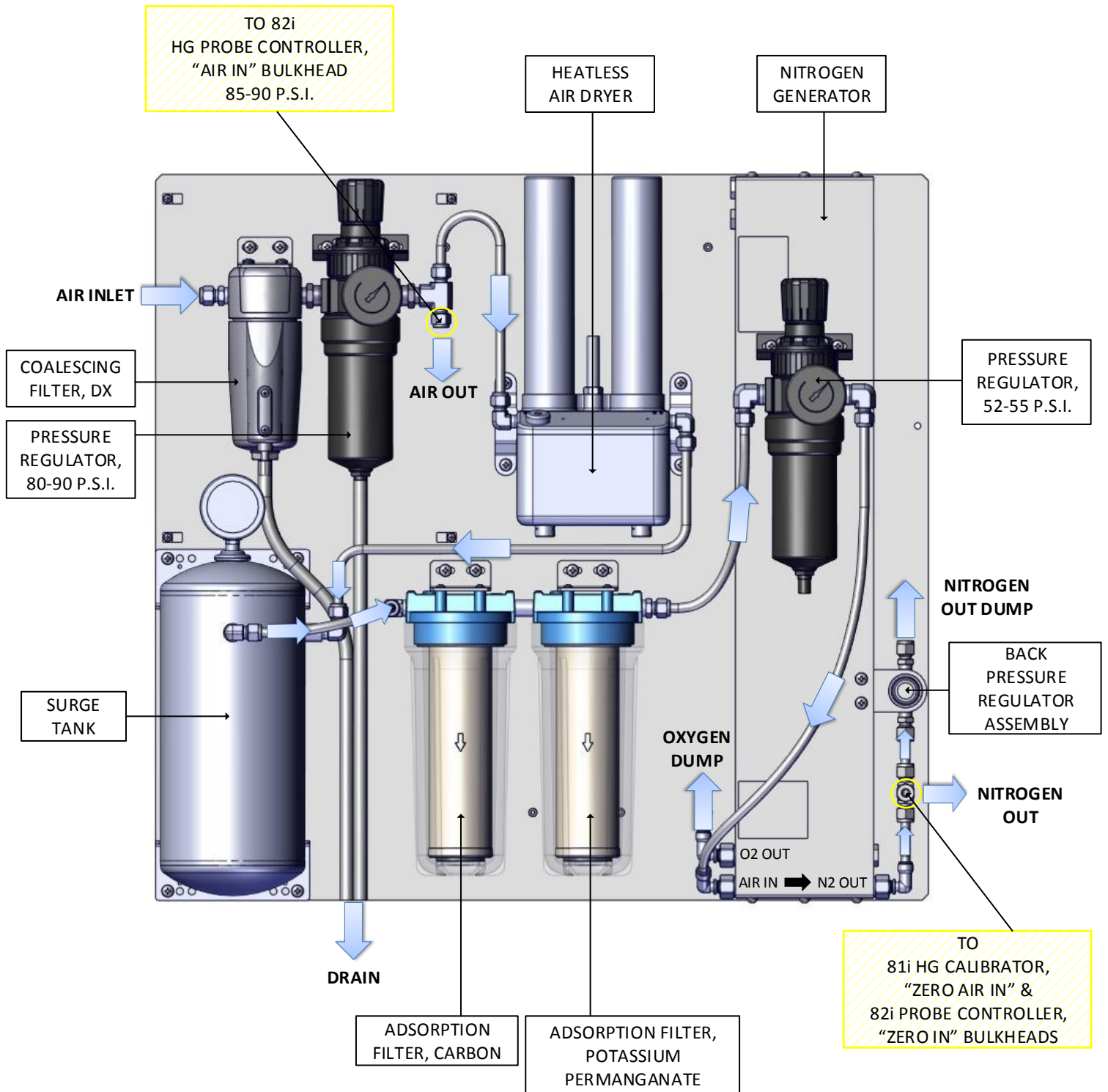
1 / 4 O.D.  
**2 (HG0)**

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





**FIG.8 NITROGEN GENERATOR DETAIL**





**MODEL 81i Hg CALIBRATOR**

ZERO AIR IN (5 - 75 PSI)

V1

33 PSI

MFC 1 0-20 LPM

MFC 2 0-5, 0-50, or 0-100 ccm

P

Hg CHILLER

V2 V3 V4 V5

C NO NC

CHECK VALVE SET TO 1/2 PSI CRACK

FLOW ARROW POINTS TO FRONT PANEL

Hg SCRUBBER

Hg SCRUBBER

ZERO AIR OUT

CAL GAS / ZERO AIR TO PROBE

CAL GAS OUT

EXHAUST

**MODEL 82i PROBE CONTROLLER**

LINE #3 PROBE CAL/ZERO 3/8 (HOT)

LINE #4 SPARE 3/8

LINE #5 EDUCTOR AIR 3/8

ED

DIL

BB

P

V

P

P

HYDRATOR

CLEAN AIR OUT

CDA IN (AIR IN) (80 - 100 PSI)

AIR INLET

ZERO AIR IN (NITROGEN) (65 - 75 PSI)

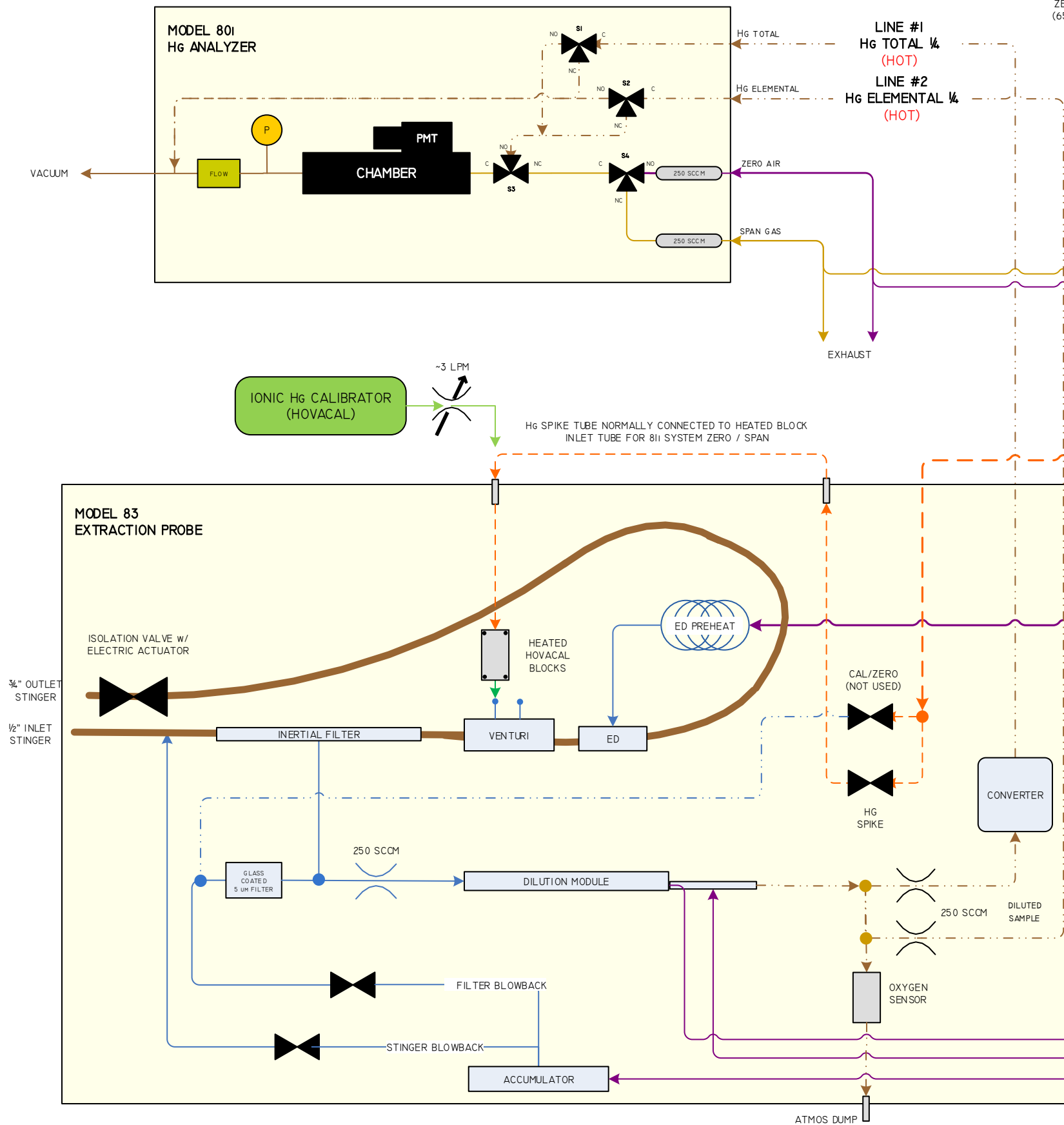
NITROGEN GENERATION

N2 OUT

LINE #6 VACUUM 1/4

LINE #7 DILUTION AIR 1/4

LINE #8 BLOWBACK 1/4

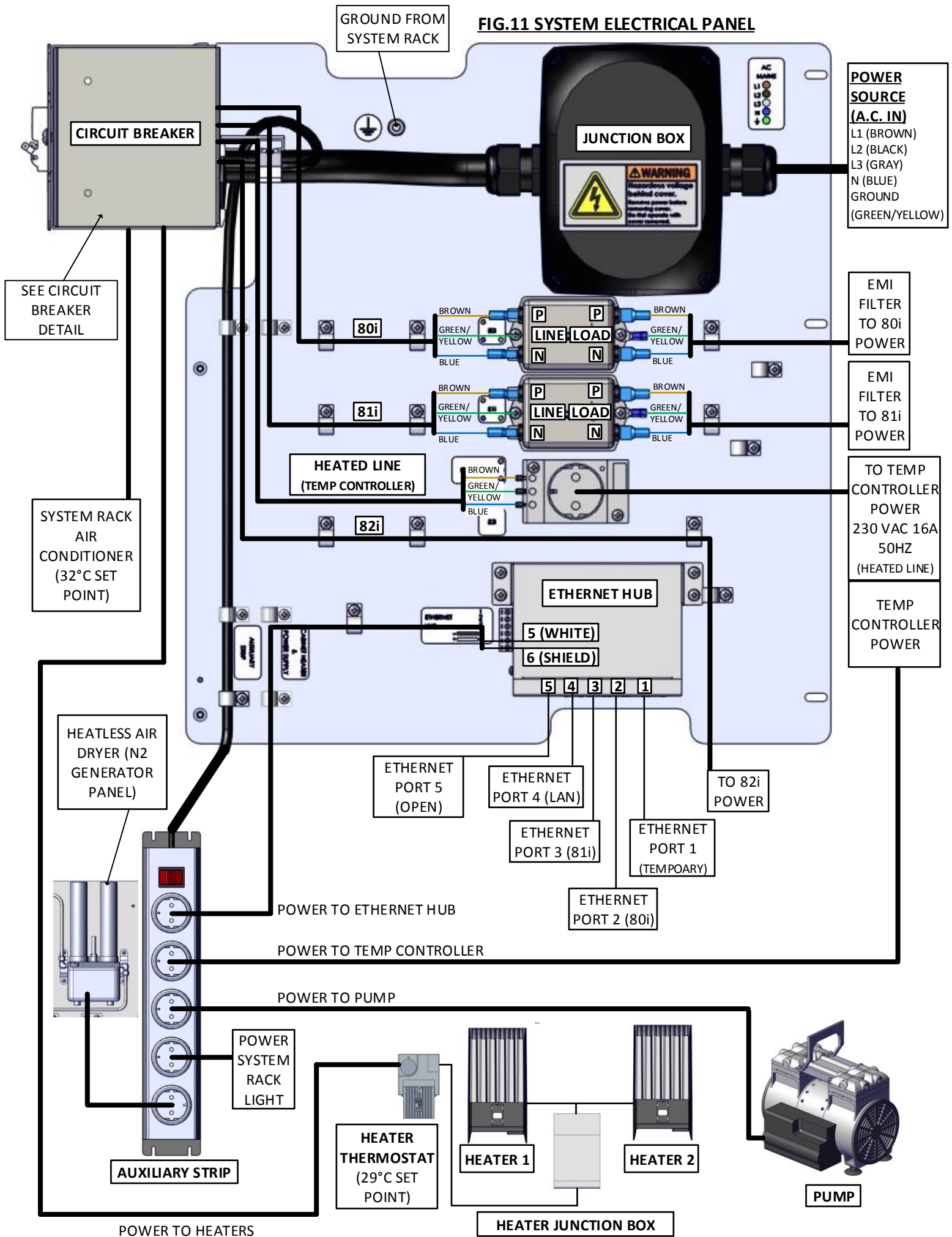








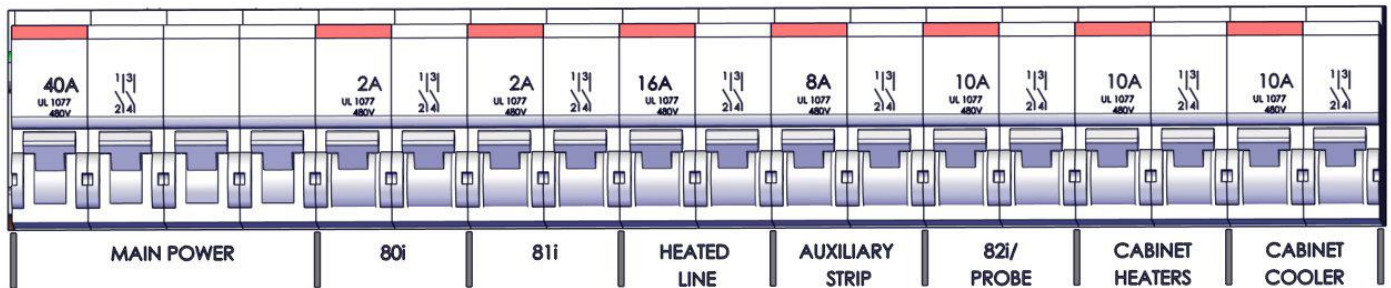
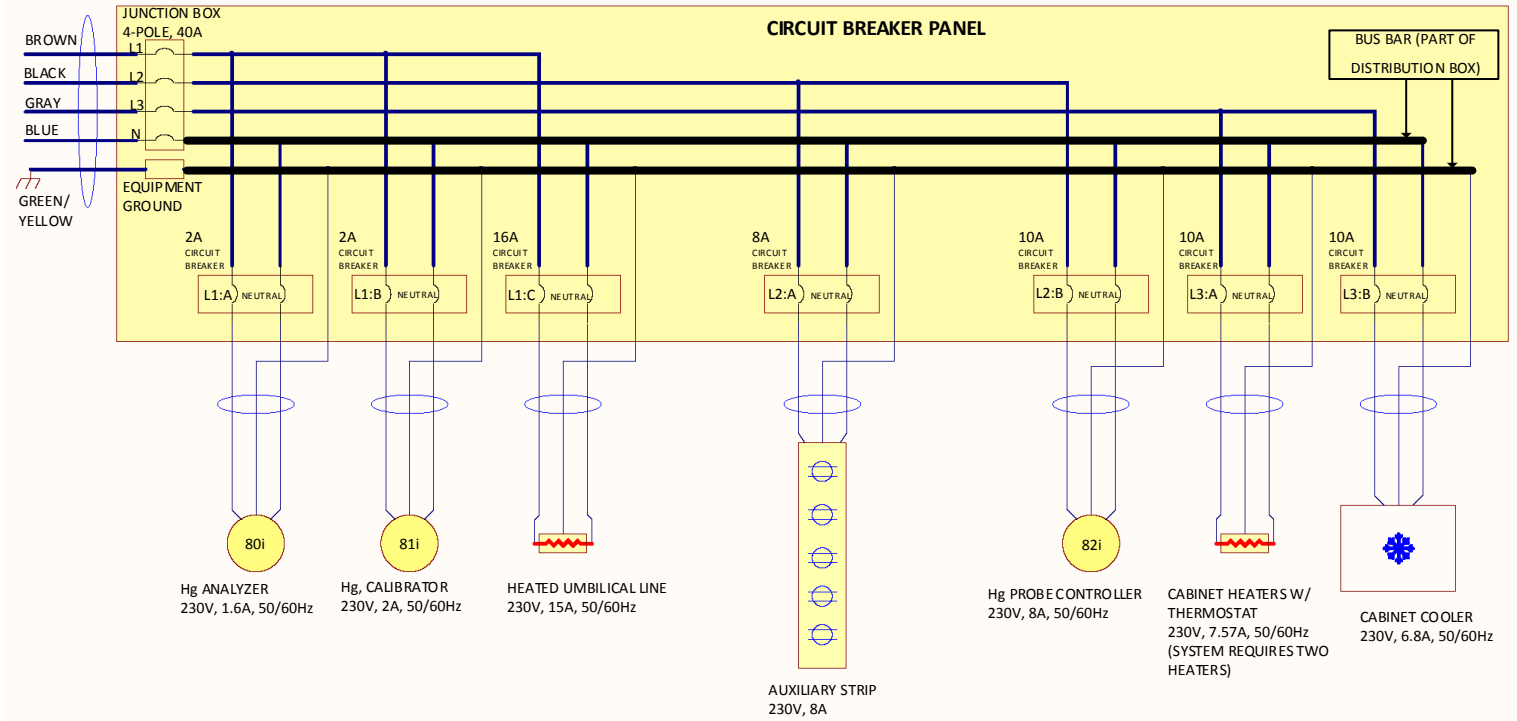
**FIG.11 SYSTEM ELECTRICAL PANEL**





**FIG.12 SYSTEM CIRCUIT BREAKER DETAIL**

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

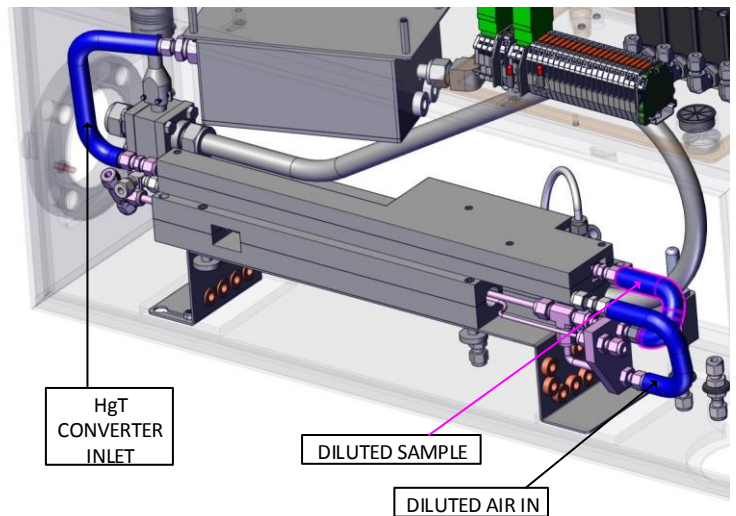
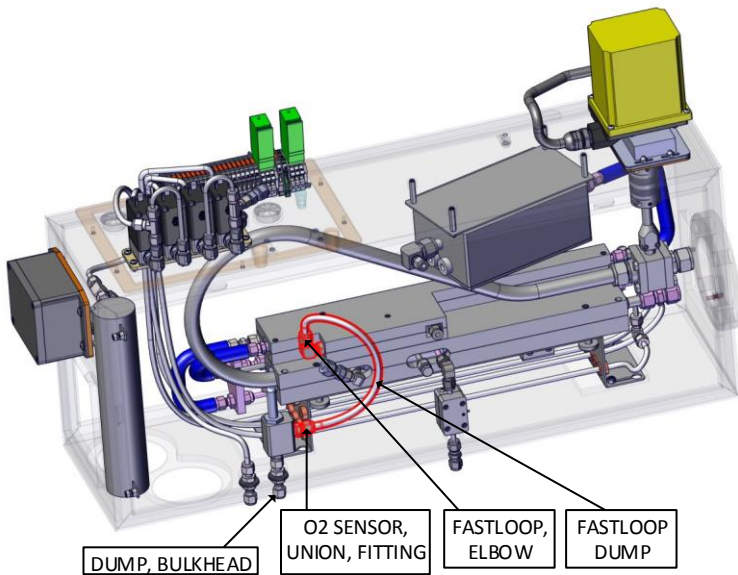
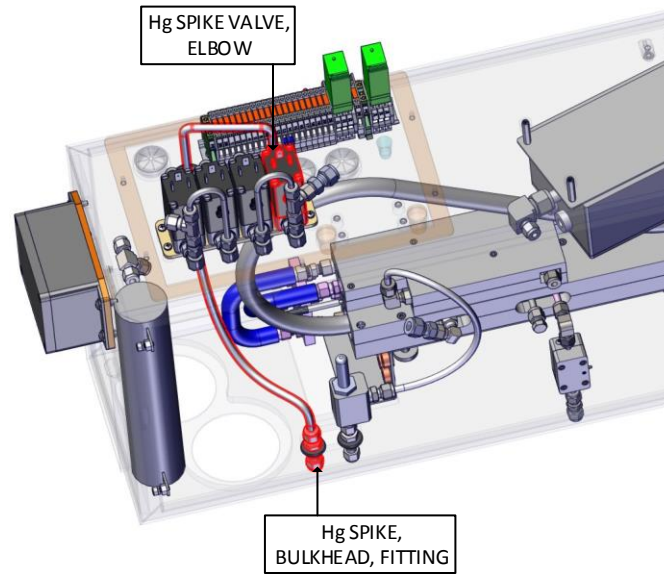
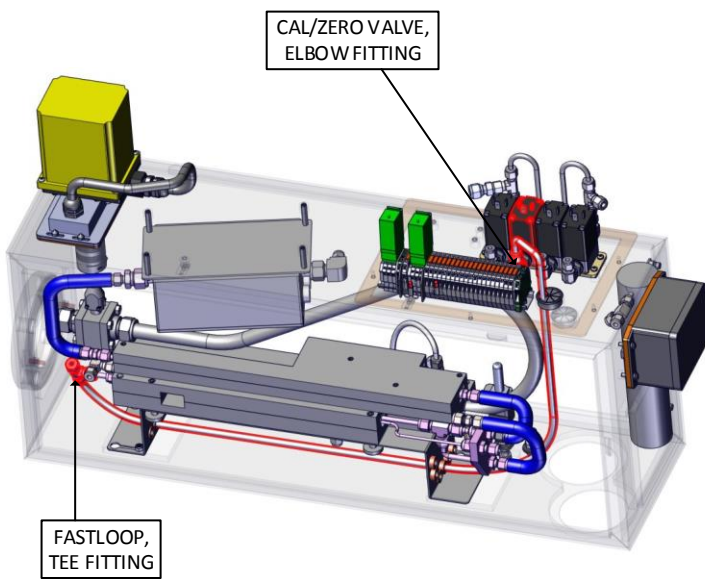
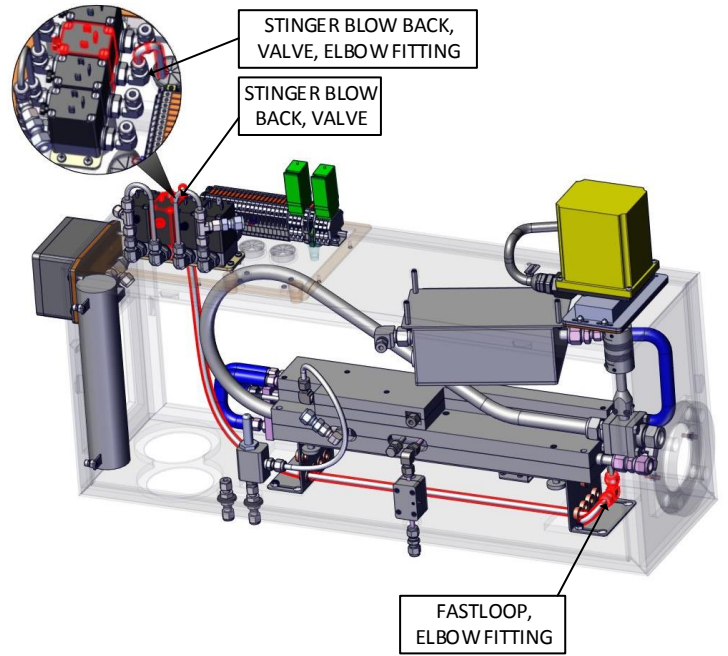
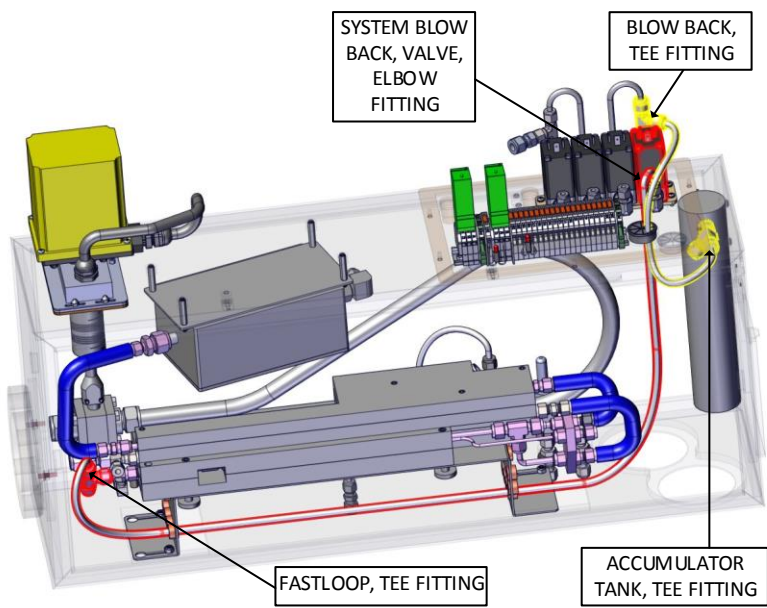


**CIRCUIT BREAKER PANEL**

FRONT VIEW



**FIG.13 83i INTERNAL PROBE PLUMBING**







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