
FGS[®] For LAM Alliance PTX Systems



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1 Introduction

1.1 Greetings from Galiso

Galiso Inc. would like to extend our thanks to you for considering our products. Our collective goal is to provide our customers with the product and support they need to optimize the benefits they can receive from Galiso. We have found the best way to help our customers is to serve our Lord Jesus Christ, as loving, humble servants doing His will. The love of God is our first consideration in meeting the needs of you, our customer. We pray that we will continue to learn and grow closer to Christ for His glory.

Please feel free to contact us with your concerns, or questions.

Galiso toll free: 1-800-854-3789

Galiso Web-Site: www.galiso.com

1.2 Overview of HGS[®]

The Galiso Inc. **Hot Gas Sweep (HGS[®])** is an effective solution to the issue of chamber vacuum acquisition, and removal of process chamber by-product. The patented **HGS[®]** system utilizes a viscous flow approach to reducing moisture, and particulate chamber contaminants. There are many benefits that reveal **HGS[®]** as a total tool management system for increased efficiency, resulting in a more productive tool, ready for processing wafers.

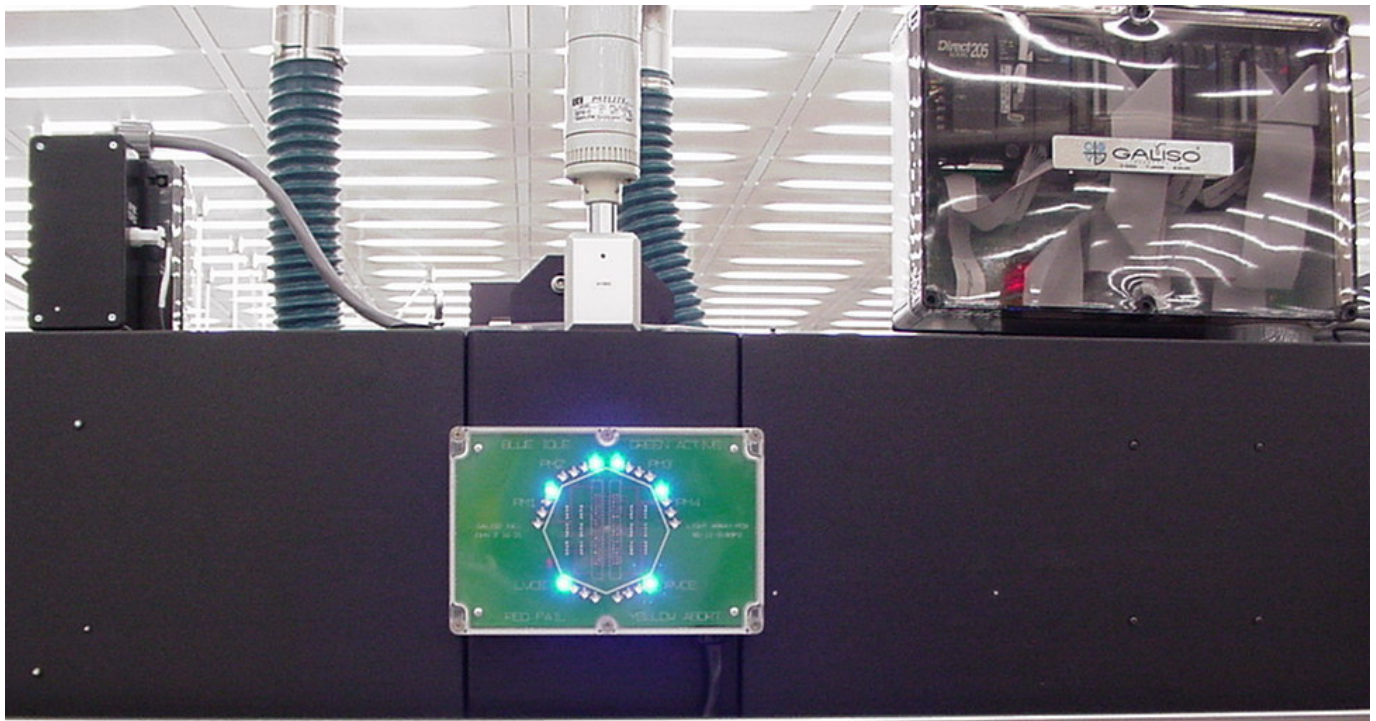


Figure 1-1 Galiso Process Logic Control for Lam Alliance PTX

1.3 Scope of Manual

This manual includes part listings and descriptions with part numbers for the primary top level assemblies required for HGS® implementation on the Lam Alliance PTX Etch tool. Also included are the installation and operation instructions for the Galiso HGS system.

The HGS installation kit includes all of the necessary components for automated operations on the Lam Alliance PTX tool.

1.4 HGS Compatibility

The HGS Alliance kit is configured for the PTX 9400 Poly, and 9600 Metal tools.

Figure 1-2 Plan Perspective

2 HGS System Components:

2.1 Top Level Galiso Part Numbers

Galiso Part Number	Description
200-51-3056	HGS-101 Unit
200-41-3060	HGS Process Logic Controller
200-41-3065	HGS Isolation Valve
200-41-3083	HGS Heaters and Process Piping
200-41-3084C	Gas Supply Manifold w/Regulator
200-41-3130	Process Module Relay Box
200-41-3132	Transport Module Relay Box
200-41-3133	HGS Process Status Light Array
200-41-3134	HGS Control Relay Box
200-41-3135	Heater Controller for RVCE/HGS Process Piping
200-41-3187	Gas Panel Relay Box
200-41-7017	24VDC Breaker Panel
200-41-7020	208VAC 3 Phase Breaker Panel
200-41-7037	Heater Controller for LVCE/TM

Table 2-1: HGS Top Level Component List with Part Numbers

3.0 Safety

Read all instructions before attempting to install or operate the **HGS** System.

GALISO INCORPORATED IS NOT RESPONSIBLE FOR DAMAGE OR INJURY CAUSED BY UNSAFE USE, IMPROPER MAINTENANCE OR IMPROPER APPLICATION OF THIS EQUIPMENT.

Contact your Galiso Incorporated representative for guidance if unsure of the proper safety precautions to be taken when installing or operating this equipment.

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- Installation of the **HGS** interface equipment requires manipulation of the PTX tool controls. The PTX tool must be shut off and in lockout/Tagout prior to commencement of PTX **HGS** interface equipment installation.
- Take all necessary precautions to ensure that installation personnel are not exposed to corrosive, flammable, volatile or toxic materials or gases.
- Take all necessary precautions to ensure that installation personnel are not exposed to electrical shock during PTX tool **HGS** interface cable installation.
- Interface equipment installation, **HGS** system adjustment or troubleshooting must be performed only by authorized, properly trained, and qualified personnel.

Any employer allowing use of the **HGS** System in a designated field of work, must distribute this manual to all users. The employer must also ensure all users read, understand and follow the instructions, safety warnings, labels, etc. as described in the manual.

3.1 HGS Power

Galiso Inc. has designed the Alliance PTX **HGS** installation kit to minimize the need to install or maintain equipment that is energized and to minimize work that must be performed on components near exposed circuits. **There may be instances when work must be performed while electrical equipment is energized. It is the responsibility of PTX tool owners to ensure that the necessary electrical connections can be made safely within the Semi-S2 Guidelines during **HGS** Tool Control System installation.**

4.0 HGS POWER CONNECTIONS

The following instructions must be performed after a wet-clean. Do not condition the process chamber, until after the HGS Kit has been installed and cycle tested.

4.1 208VAC Power Wiring

Connections to the Alliance tool are at the power panel on the Left/Rear Side of tool.

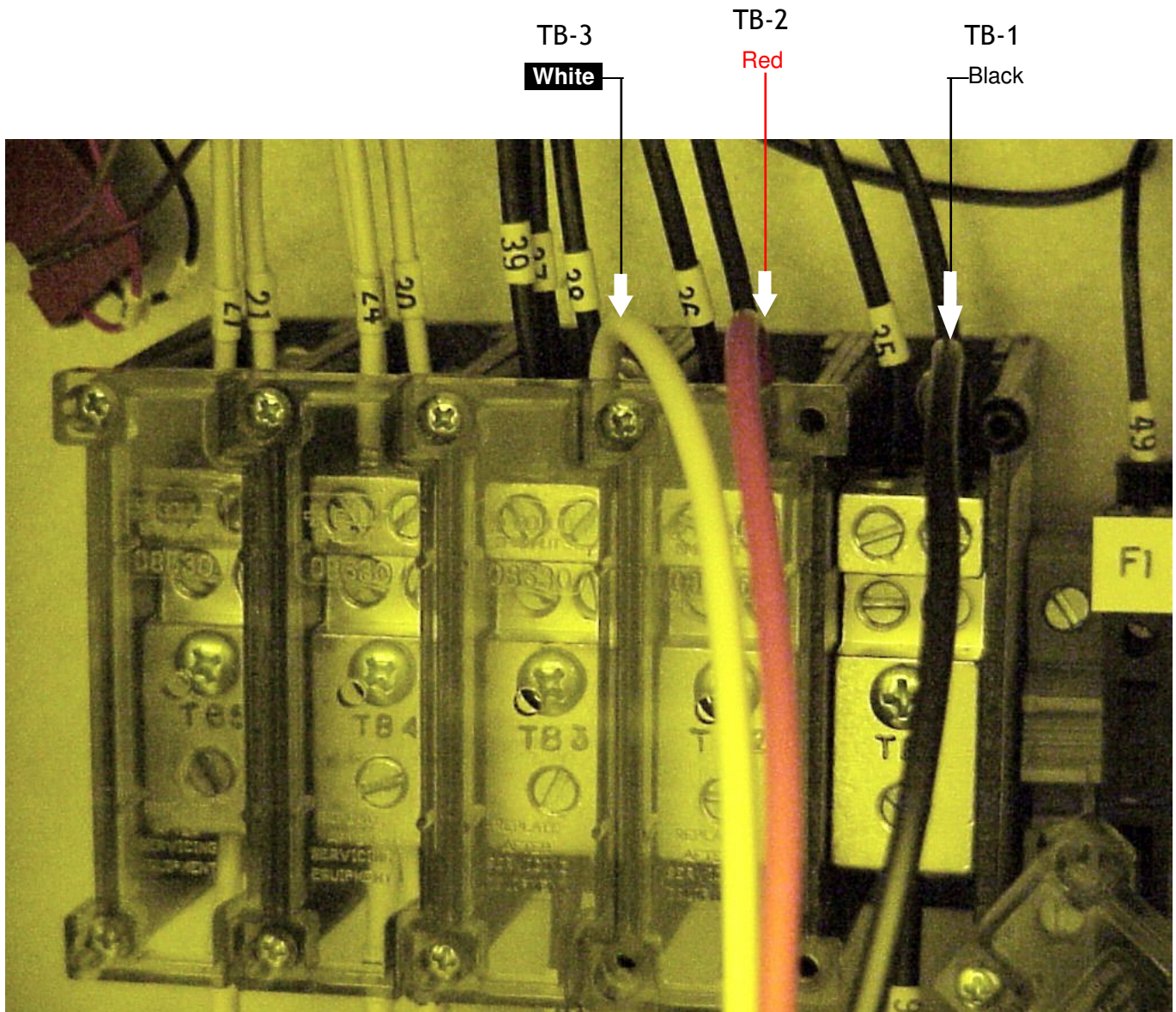


Fig. 4-1 Alliance 208V Power Panel

Galiso 208V Power Wiring to the Alliance tool TB1: T1=Black, T2=Red, T3=White

Connect the Green ground wire to the Ground Buss Bar on bottom of the Power Panel.

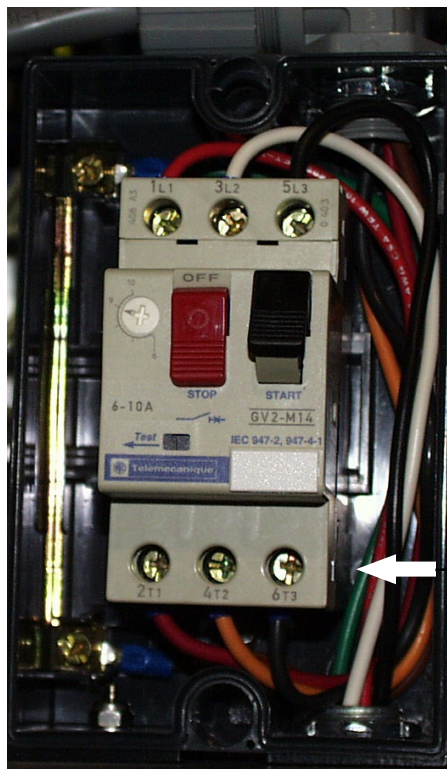
4.1 Electrical - 208 VAC Main Power (continued)



Take All Necessary Precautions To Ensure That Installation Personnel Are Not Exposed To High Voltage Electrical Shock During HGS Power Cable Installation. Tool must be in the idle state, turbos ramped down, & Lockout/Tagout.

Remove the right side cover plate on the Alliance AC panel. Route the main HGS 208V power cable conductors. Start from the top of the panel, to the Alliance 208V terminal block and terminate the wires. The 208V HGS power cable connection must be made, on the output side of the K1 contactor. See Figure 4-1.

Use the Galiso Inc. phase monitor to check for correct phasing. Hook it to the end of the HGS Power Connector. The arrow on the monitor should be pointing to the 210 selection. Turn on the power switch on the HGS Main Power Switch Enclosure. When it is hooked up correctly, the light on the Phase Monitor will come on. If it does not come on, switch any 2 wires on the bottom row of 3 in the Galiso 208V Power Breaker Box. Be sure to turn off power to the box first, & check the voltage with a DVM to ensure there is no voltage present on the terminals you are servicing. The bottom row, or “T” marked screws, are COLD when the Red “OFF” switch is depressed. Check the HGS Power Connector again with the phase monitor after making the change.



To change phase, swap any 2 wires from the **BOTTOM “T”** side of contactor here.

Fig. 4-2 Galiso 208VAC Power Breaker Box Wiring

4.2 24 VDC Power Connections

PTX tools have different types of power cabinets.

1. Type with vent holes: Remove the vent hole cover, and mount the Galiso 24V Power Breaker Box on top of panel.
2. Type without vent holes: Use the Galiso supplied stick-on label to locate the hole. Follow instructions on the label.

Feed the red and black wires with the ferrule terminal ends through the hole and secure the I/O Breaker Box with the ring nut provided. Connect the red (+24V) and black (24V Common) wires to the +24 and 24V Common terminals respectively and secure the terminals. Turn on the I/O switch and verify a green light ON the breaker box. Install the Alliance DC Panel back onto the enclosure. Check box output voltage for polarity. Pin 1 = Red +24V . Connect the 2 Pin Mate-n-Lock connector to the receptacle on breaker box and route the cable to the HGS Controller.

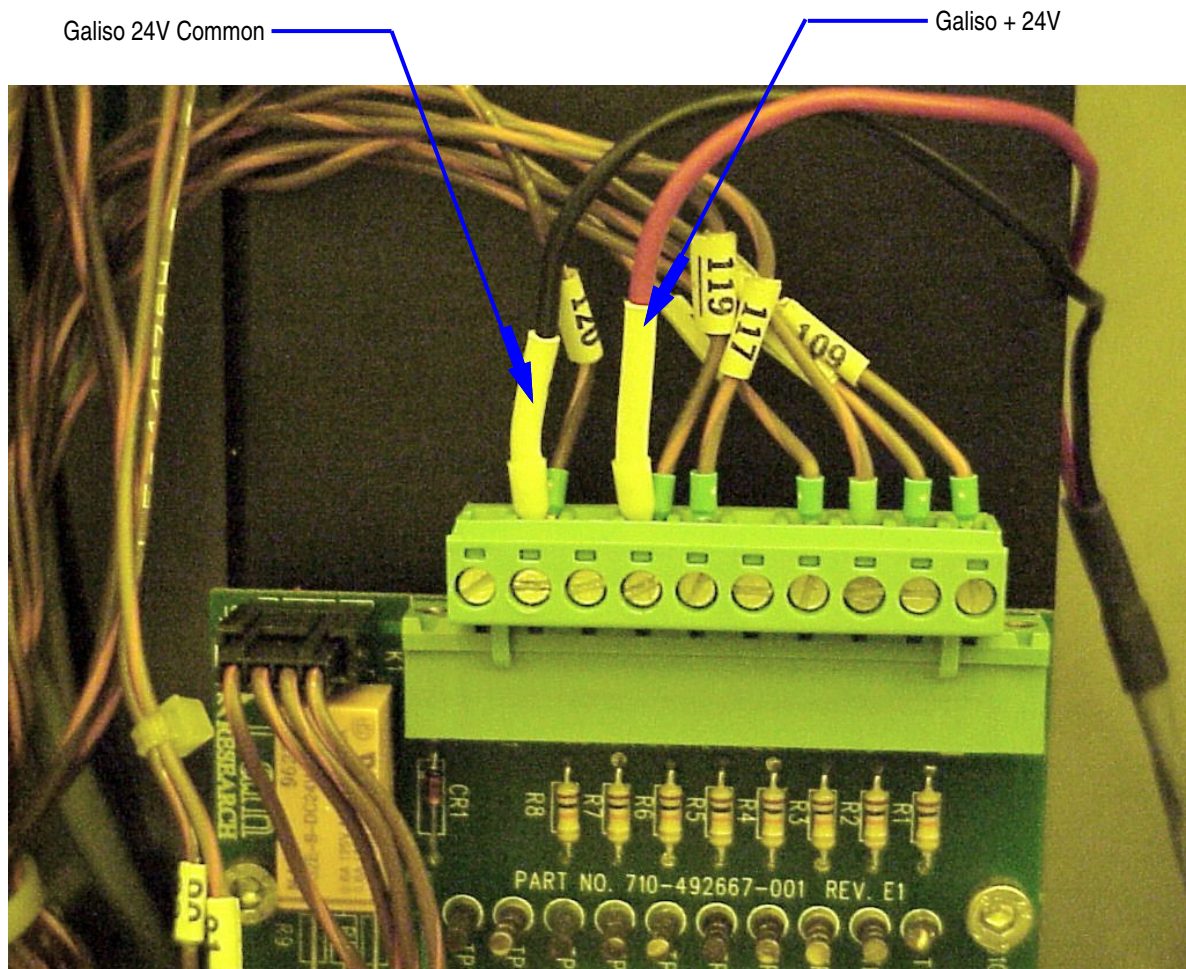


Fig. 4-3 24VDC Power Connections

5.0 HGS Equipment Installation

5.1 Galiso Cable Labeling Scheme

This section covers the installation of top level process components. Note that all Galiso control cabling is clearly labeled on each end of the cable.

Example:

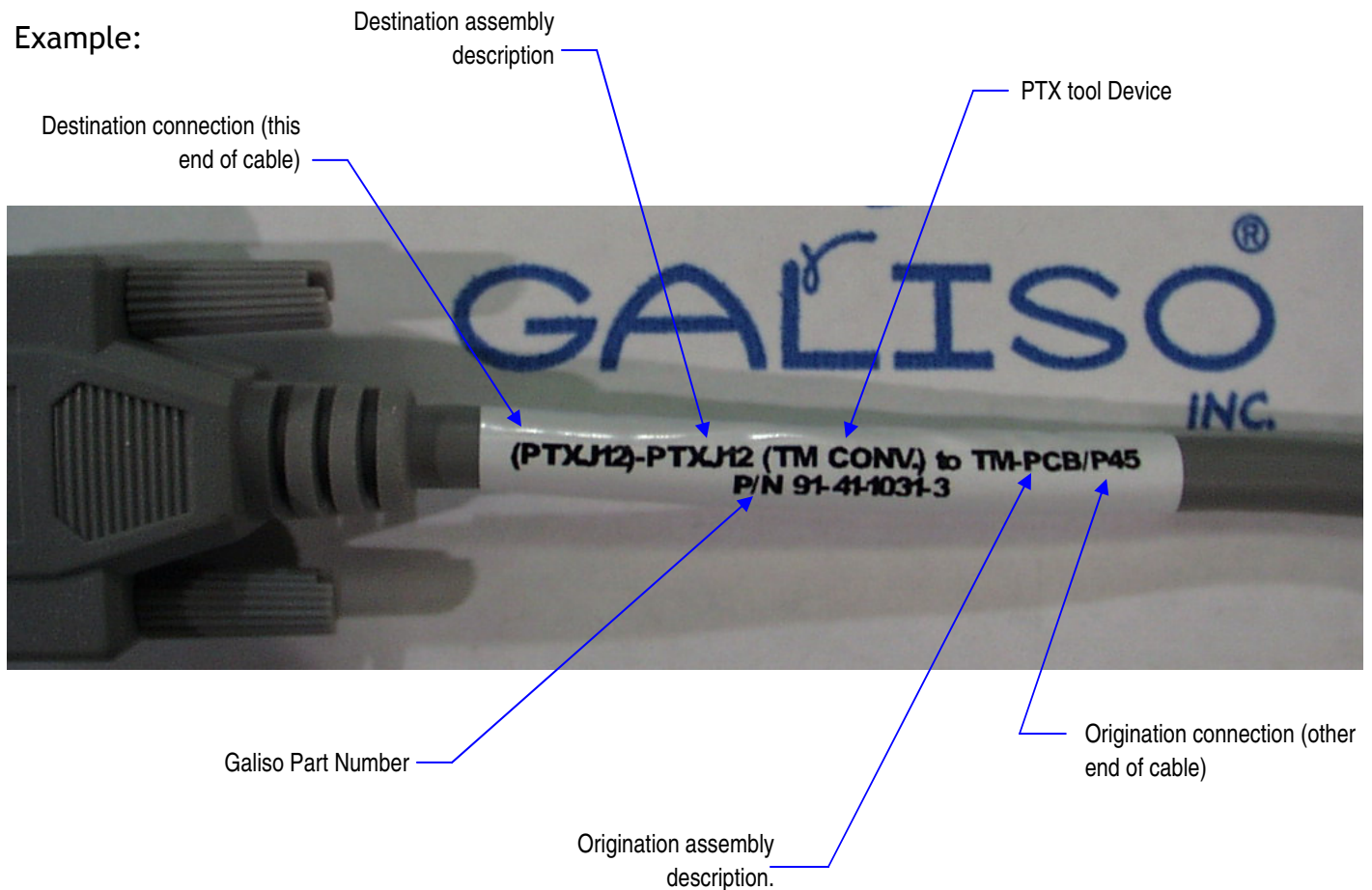


Fig. 5-1 Galiso Cable Label Layout

5.2 HGS Docking

The HGS-101 Unit is docked to the PTX mainframe as shown below in figure 5-2.

Install the Mounting bracket, spacer, and wheels to the HGS unit. Install the Gas Supply Manifold to the HGS unit as described in Section 5.2 of this manual.

Dock the HGS unit to the Alliance tool mainframe, using the 3/8" bolts supplied.

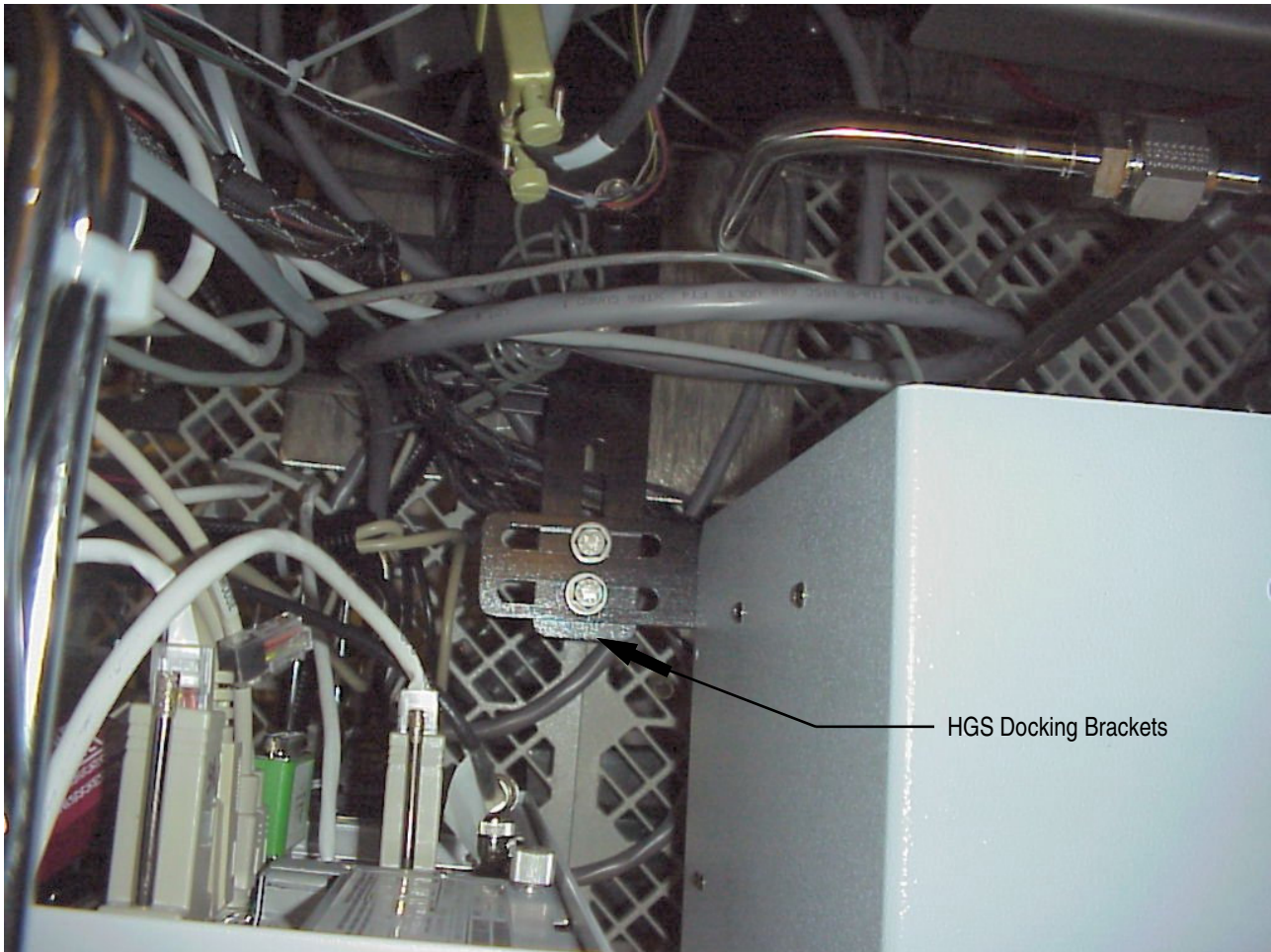


Fig. 5-2 HGS Docked to PTX Mainframe

5.3 Gas Supply Control Manifold Connections

Install the Gas Supply Manifold onto the front of the HGS -101 unit. Connect a 1/2" stainless steel facility gas supply line to the VCR-8 connection provided. The high purity Nitrogen (or Argon) supply should be at 80-100 PSI, and a maximum of 135 PSI at <150PPB, measure 5-9's. The only facility valve requirement is a 90° shut-off valve close to the tool. There is no need for a one way trap, or a regulator.

Note that the gas control manifold includes a pneumatic control supply to the HGS unit.

Facility volume required is 10CFM through the 1/2" line for 28 minutes per day.

Connect the 5/32" Poly Tube from the pneumatic supply connector on the E/P regulator to the quick connect on the HGS.

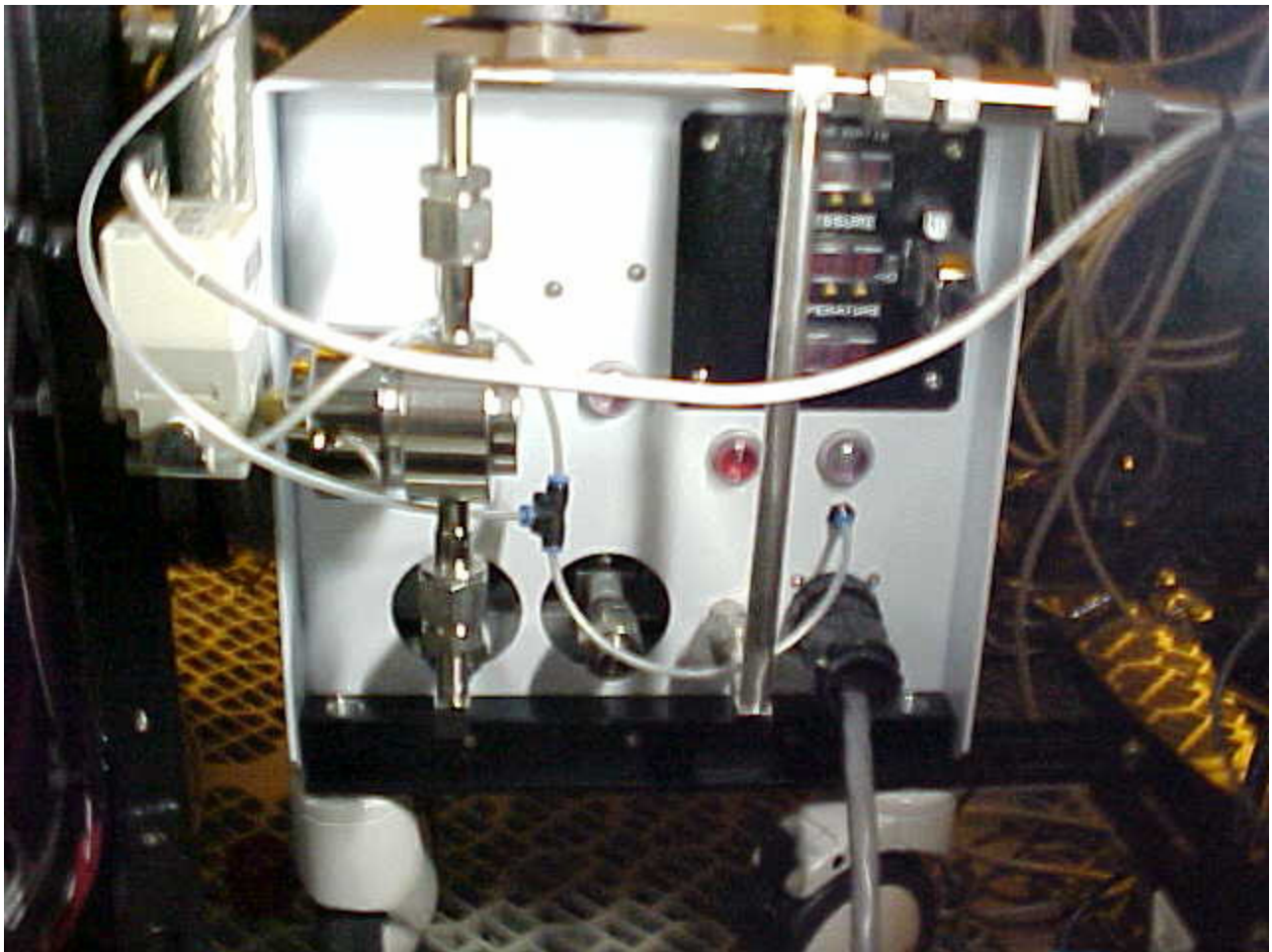


Fig. 5-3 Regulated Gas Supply Manifold

5.4 Heated HGS Process Piping

All sealed connections must be cleaned using Isopropyl Alcohol (IPA). They must be free of all residue and foreign material. Remove the seals from the centering rings to wipe clean if necessary.

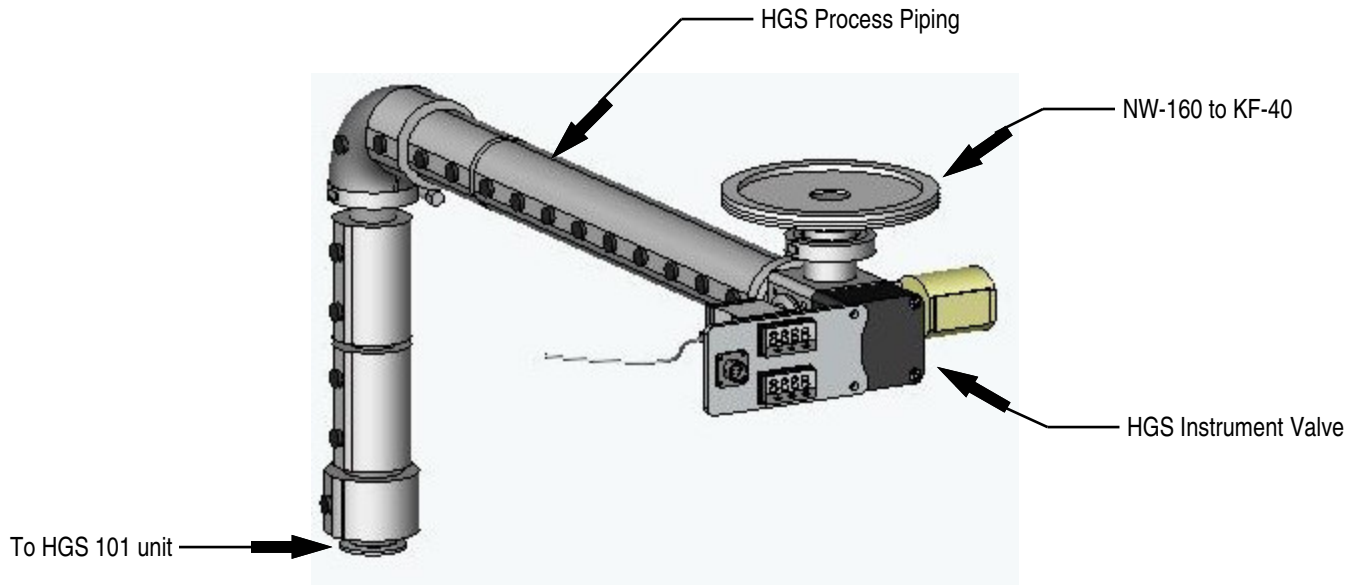


Fig. 5-4 Heated Process Pipe Mounting

Installation steps:

1. Mount the NW-160 to KF-40 Adapter Plate.
2. Mount the Galiso Instrument Valve to the Adapter Plate as shown. Leave it loose for now.
3. Mount the HGS Process Piping to the Instrument Valve as shown. Leave it loose for now too.
4. Attach the Process Piping to the HGS-101 Unit. The HGS may need moved slightly to accommodate the location of the piping. Leave it loose for now.
5. Tighten the HGS Docking Bracket to the PTX tool mainframe.
6. Go back and tighten the KF-40 Flanges, in line, one by one. Start at either end of the HGS process pipe, and work back to the other end, until all Clamps are tight.

Note: All Centering Rings, and KF-40 Clamps are Galiso supplied.

5.5 PLC Controller Mounting

Mount the controller as shown. Use the Galiso supplied, stick-on template and drill 2, 3/16" holes.

Use the brass screw and nut supplied, to attach the PLC ground wire to the right mounting hole.

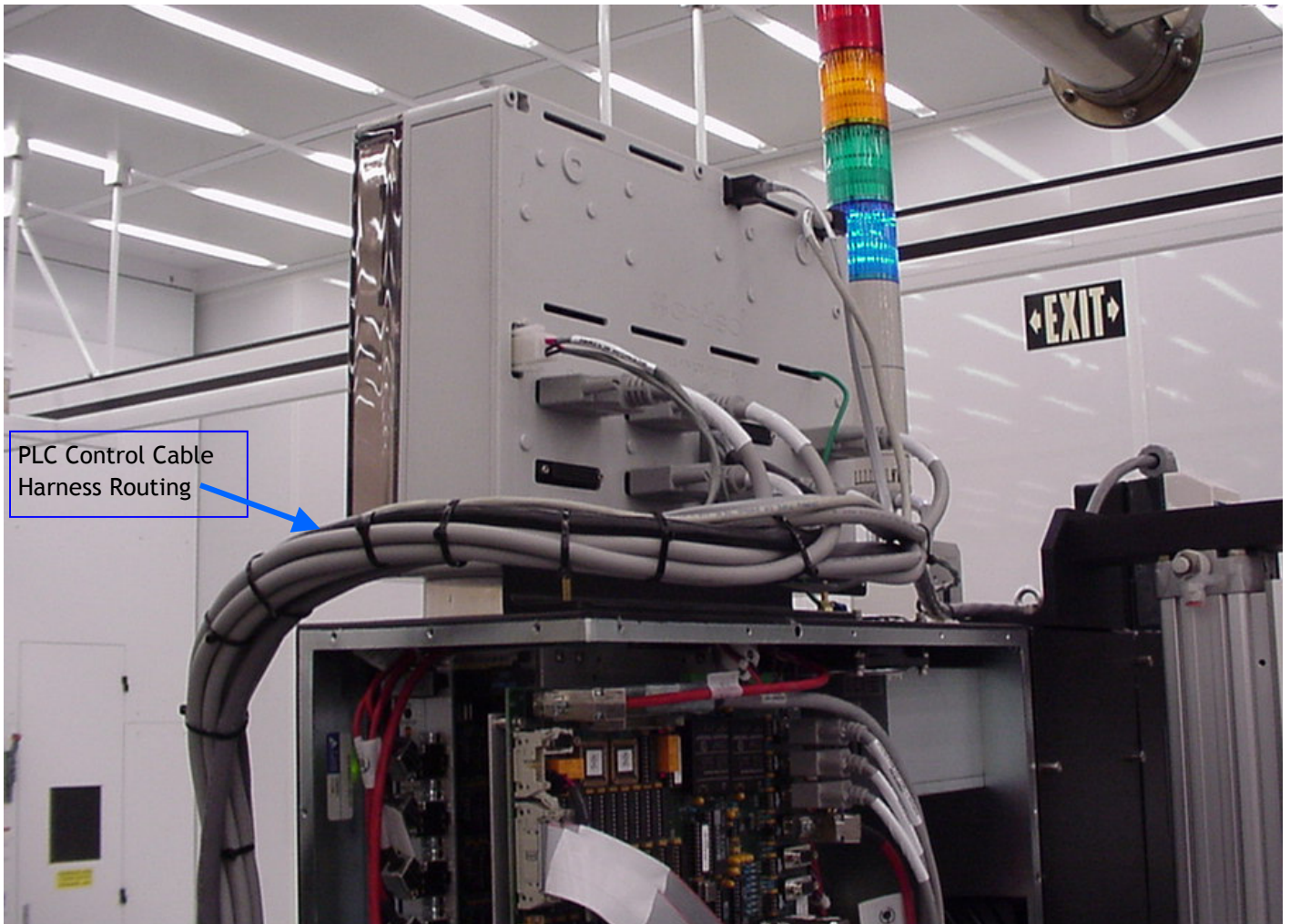


Fig. 5-5 PLC Controller Mounting

5.6 Transport Module (TM) Relay Box

Remove the cover panel from the Alliance Mux Controller Cabinet. Remove center chase panel between the Mux Cabinet, and tool power supply cabinet.

Install the Galiso TM cables to the Galiso TM Relay Box. Place the box in the center chase area. Galiso intercepts 5 cables on the Alliance MUX PCB. Use the labeling on the Galiso cables and TM Relay Box. Remove the cables from the Alliance MUX PCB, and connect them to the Galiso TM Relay Box. Connect the Galiso cabling from the TM Relay Box to the Alliance MUX PCB. Route the cables from the MUX PCB through the right side opening of the MUX Panel near the center chase. Route the Galiso cables through the same right side opening.



Fig. 5-6 Galiso TM Relay Box

5.6 Transport Module Relay Box (continued)

VCE cable connections:

One harness for VCE with right and left breakouts. Remove both VCE covers. Follow the cable labeling for correct termination points. Be careful to not pinch wires with cover.

P15 on Both R & L VCE

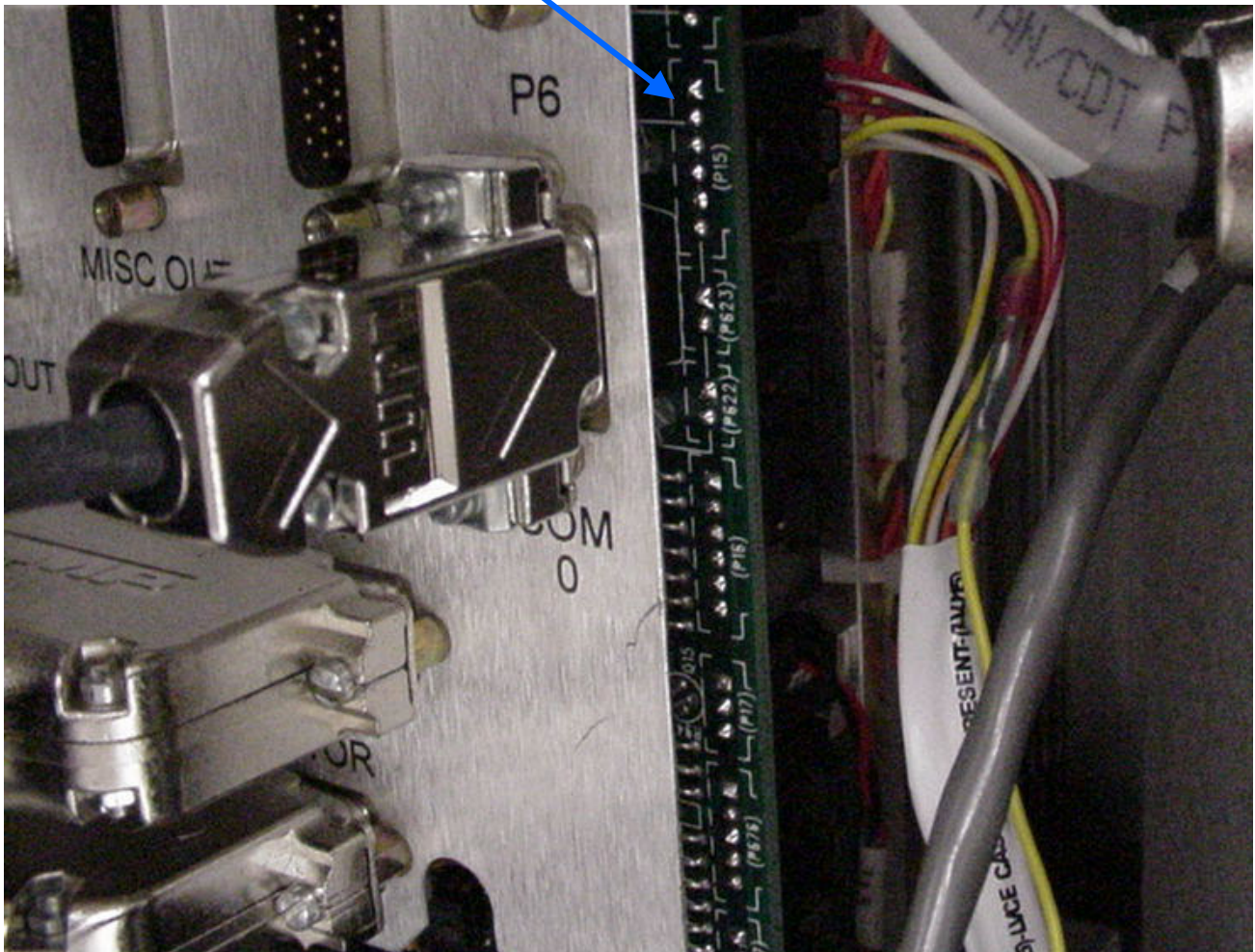


Fig. 5-7 Galiso TM Relay Box, VCE Cable connections

5.6 Transport Module Relay Box (continued)

VCE cable connections:

SOV #1: Unclamp on Both
R & L VCE

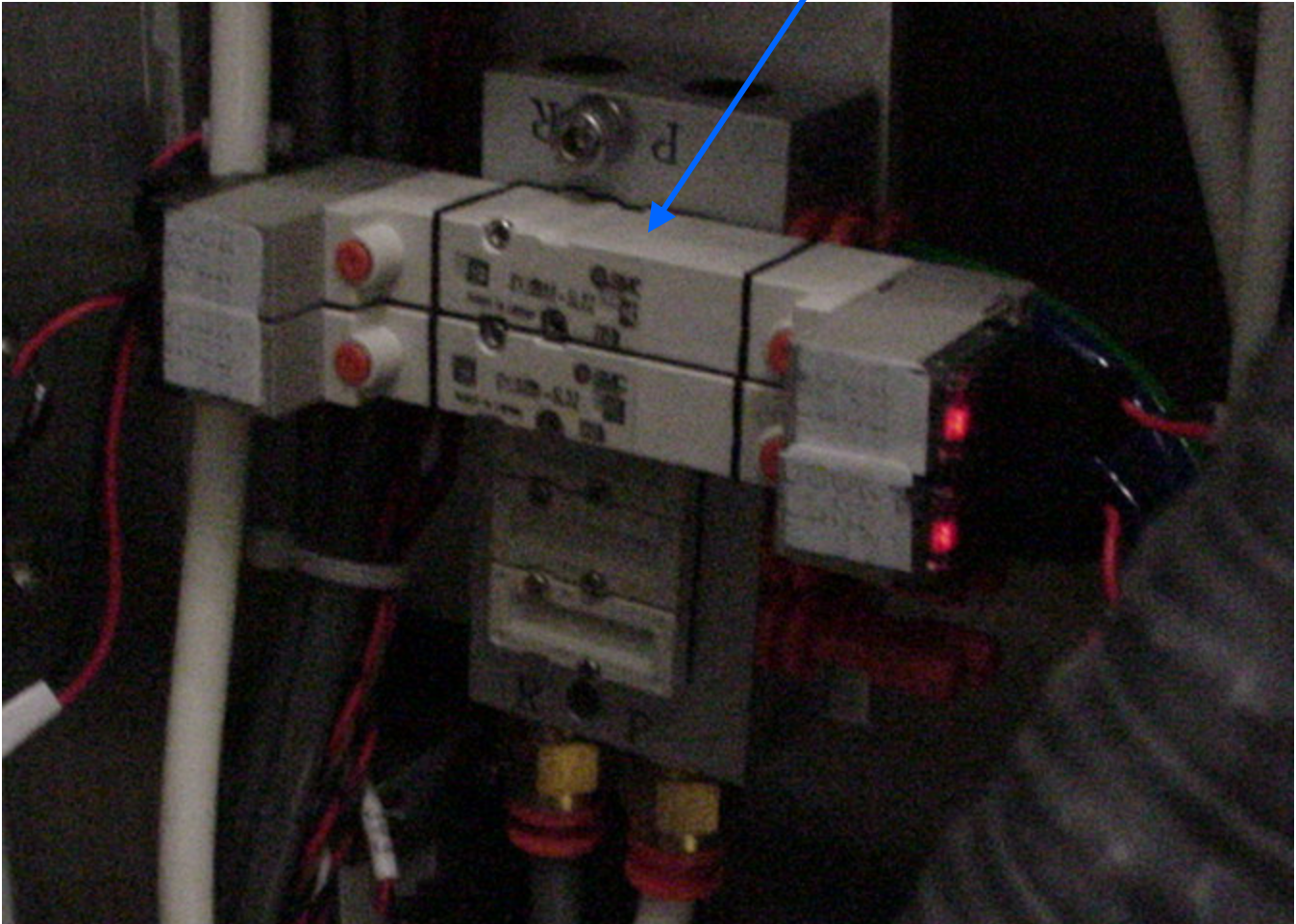


Fig. 5-8 Galiso TM Relay Box, Left and Right VCE–EV Cable connections

5.7 HGS Status Indicator Light Array Display Box

Use the double sided sticky foam tape to mount the Light Array Box centered on the operator side of the tool.

Blue light = Idle HGS is in an idle state of waiting for a start signal.

Green Light = Active HGS has received a start signal, and is running the process.

Yellow Light = Abort HGS has encountered an abnormal event, and has stopped running the process.

Red Light = Fail HGS has failed to complete the process, and needs the PLC manually reset before tool control operation can resume.

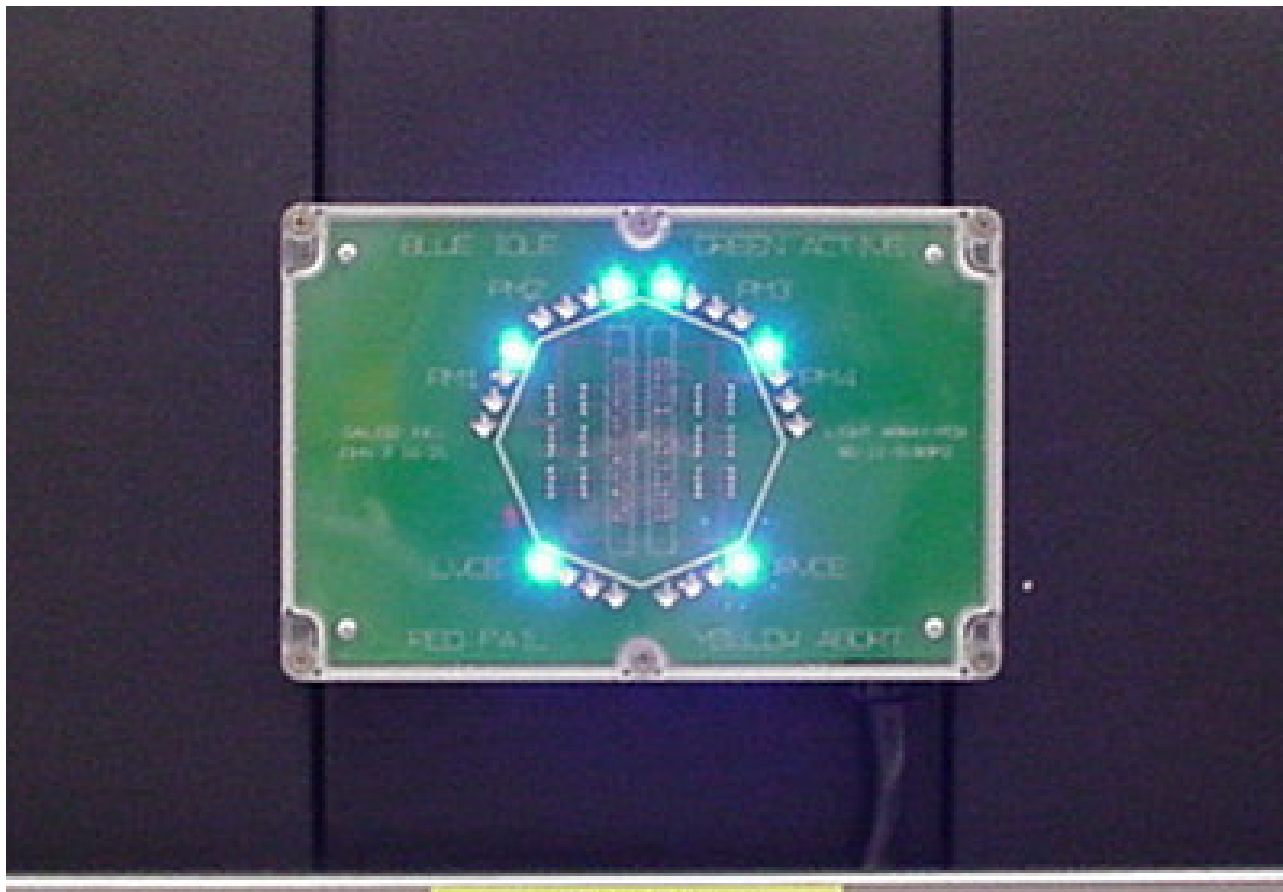


Fig. 5-9 Light Array Display Box

5.8 Process Module Relay Box

There is one Galiso PM Relay box per etch PM. Route the cables from the Galiso PLC Controller as shown in figure 5-4. Route them under the tool maintenance platform, to each Galiso PM Relay Box, and mount as shown in Figure 5-10.

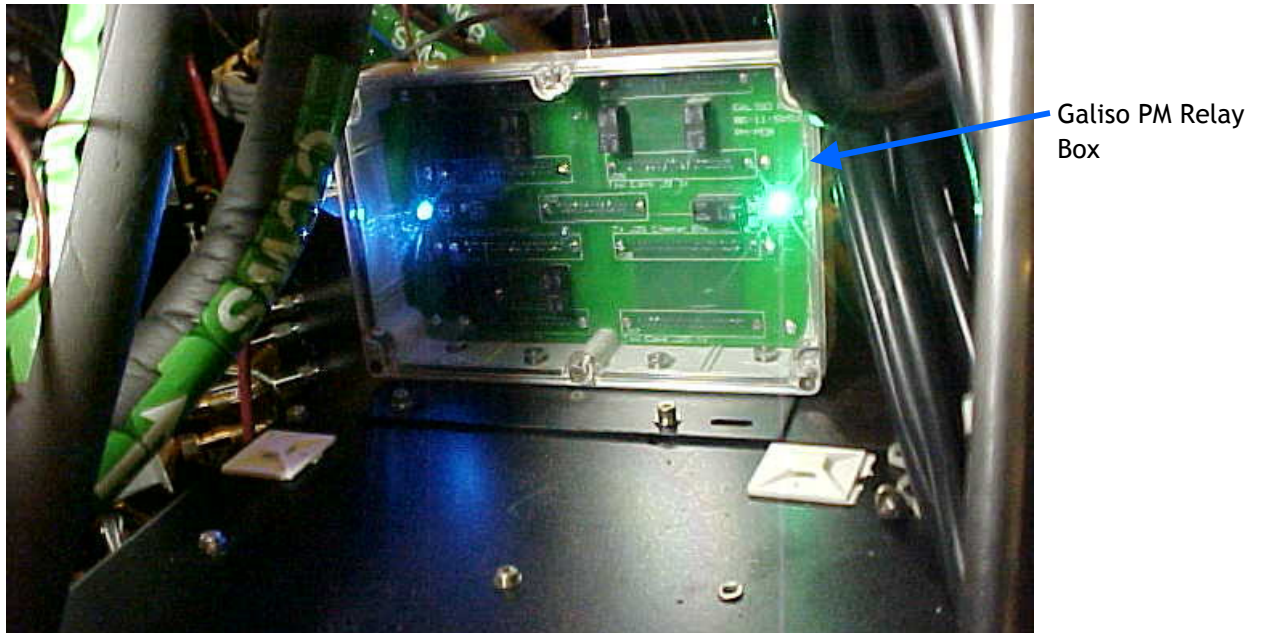


Fig. 5-10 Galiso PM Relay Box Mounting

Cut the PM Chamber cabling tie-wraps all the way down the harness as shown in Fig 5-11. Route the cables from the Etch PM to the Galiso PM Relay Box as shown in Fig 5-11.

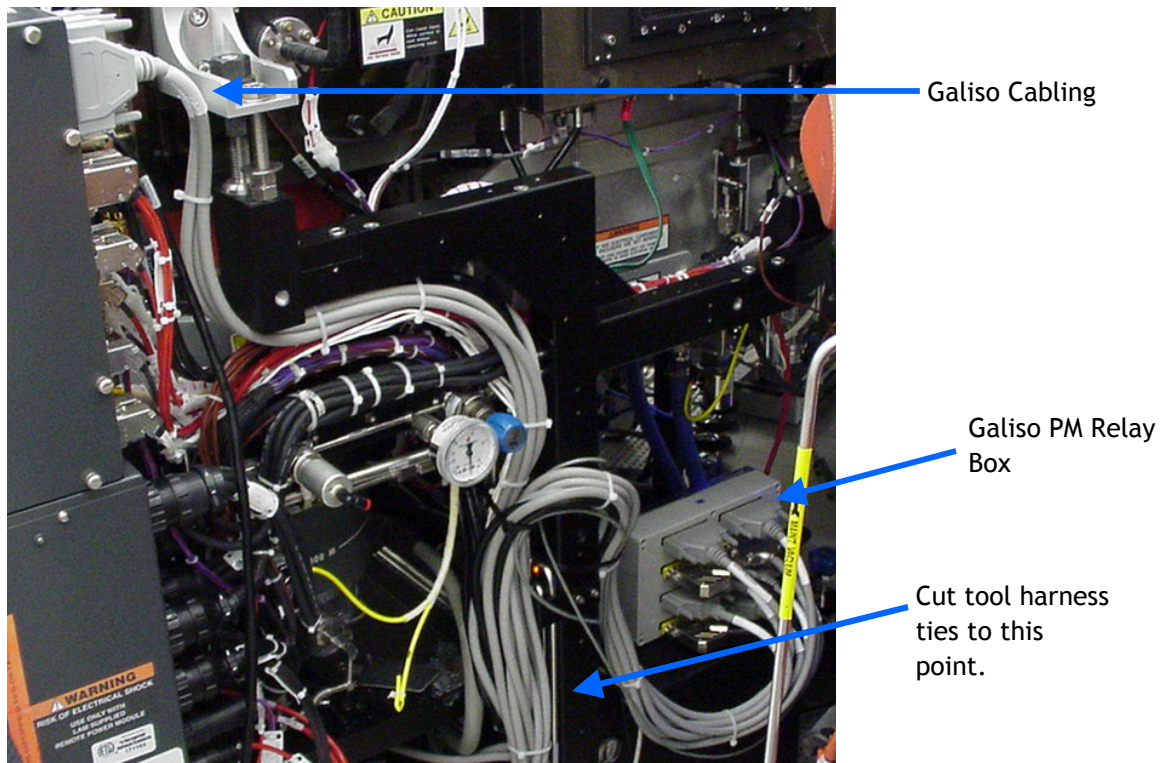


Fig. 5-11 Galiso PM Relay Box Cable Harnessing

5.8 Process Module Relay Box (continued)

5.8.1 Abatement System Signal

If the customer facility requires the PM to receive or send a 24V signal to it for operation, the Galiso PM Relay Box abatement switch can be made to do either one. It can receive 24V and send it back to the abatement pump, or the Galiso PM Relay Box can supply the 24V signal entirely. The Galiso PM Relay Box is shipped to receive a 24V signal from the abatement pump, and send the signal back for pump operation. If the abatement pump simply waits for the 24V signal, without sending it out first, then the Galiso PM Relay Box can supply the voltage too. To supply the 24V signal to the abatement pump, switch the PM PCB abatement switch to reflect that position.

5.9 Gas Relay Box

There is one Galiso Gas Relay Box for every Galiso PM Relay Box. The Gas Relay Box is located at the corresponding PM gas cabinet module. Mount the Galiso Gas Relay Box to flat surface of tool gas cabinet, close to gas module SOV & PSH locations.

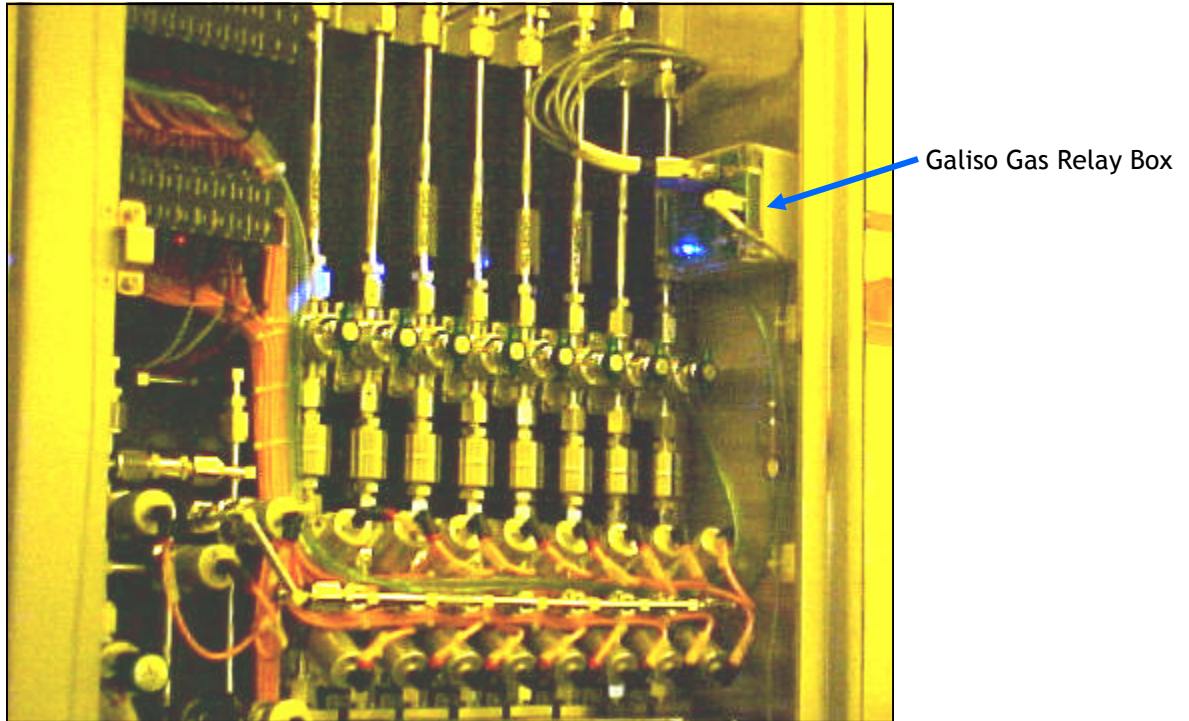


Fig. 5-12 Gas Relay Box

5.10 HGS Control Relay Box

The HGS Control Relay Box is mounted no higher than 24” along the outer vertical framework of the Right VCE. Mount the HGS box close to the general vicinity as shown in Fig 5-12. Route the HGS PLC Control cabling vertically along the frame and in the direction as shown below in Fig 5-13, by the double arrow. The cables need harnessed together with wire ties, and routed to the HGS PLC.

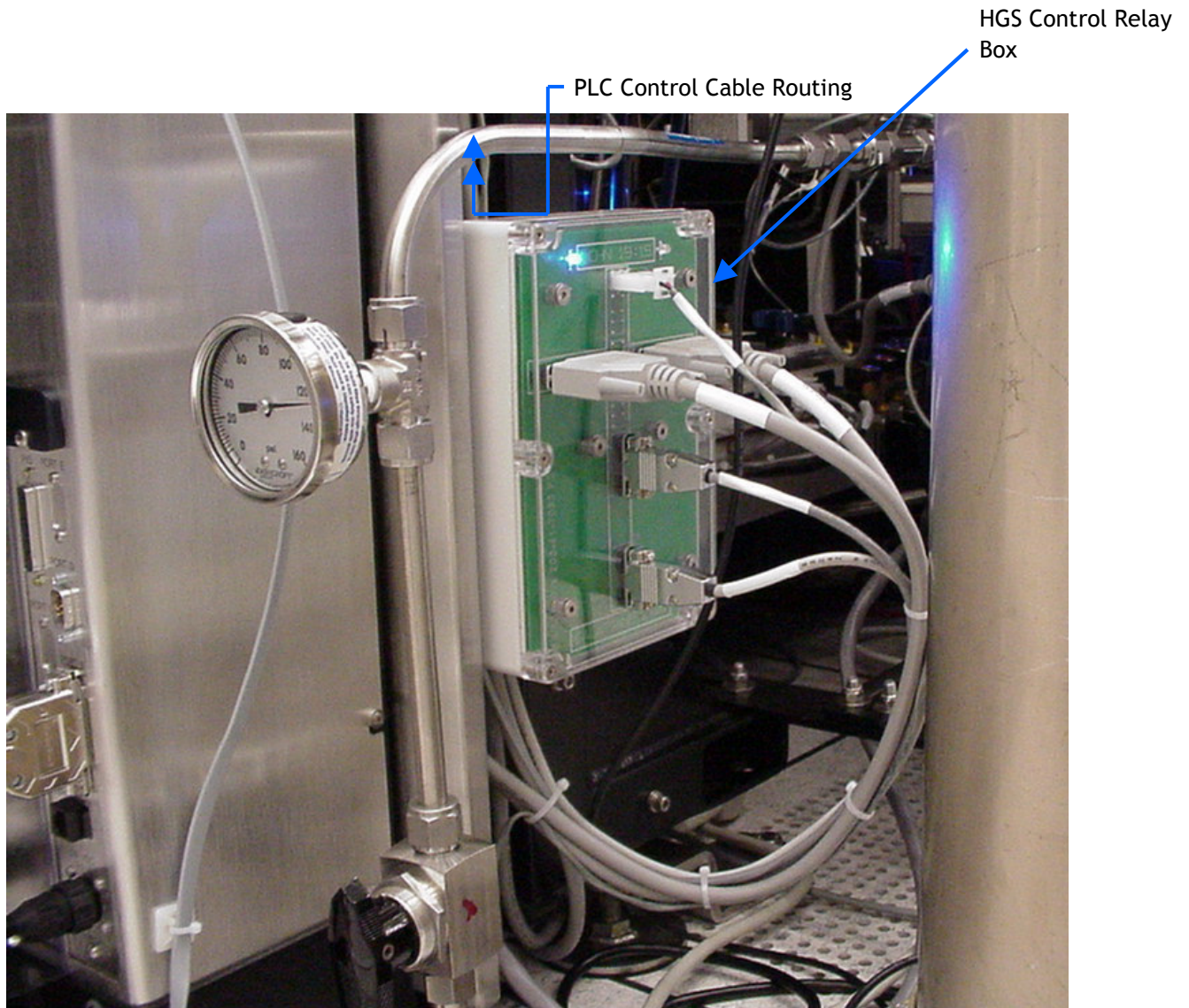


Fig. 5-13 HGS Control Relay Box next to RVCE

5.11 Alcatel Turbo Difference:

If the PM has an Alcatel turbo, keep the LAM adapter cable connected to the controller. Connect the Galiso Turbo control cable between the LAM adapter cable, and the standard LAM turbo control cable.

The Galiso Gas Panel Relay Box wiring to the small electro-pneumatic solenoid valves may change as far as which “V” number designation they go to. You may need to match the function of the Galiso wiring to the function of the solenoid. Due to different configurations of the LAM wiring, the Gas Cabinets are different.

The Galiso Hot Gas Logic Controller Program is altered to include a vent purge for faster breaking of the Alcatel turbo.

5.12 Galiso MFC PCB:

Galiso uses 2 gas signal locations to start the HGS process. Each start signal location needs an MFC PCB. If the LAM PCB is not on the chosen gas location, the Galiso MFC PCB must be installed. This only applies if the HGS Start Signal is taken from a PTX Gas Stick, with no MFC Board installed.

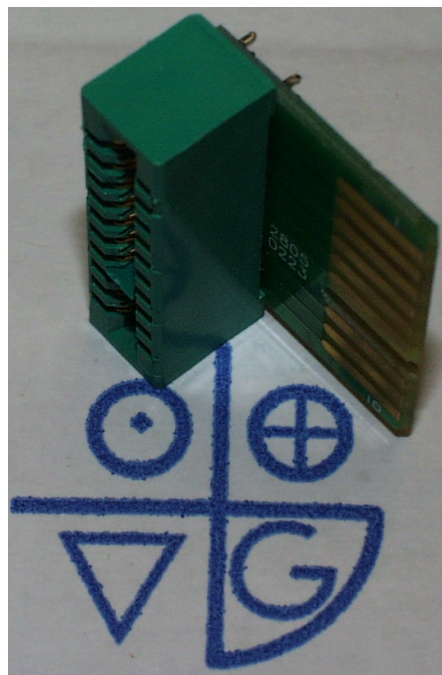


Fig. 5-14 Galiso MFC PCB

6.0 Temperature Control

On the standard Galiso Alliance Kit, Galiso controls the temperature in the VCE, TM, and HGS Process Piping. End Point Window Heaters are optional.

6.1 Heaters

There are 2 types of heaters, standard on all HGS systems for the Alliance PTX tool. Blanket style heaters are affixed to the left and right VCE, & the Transport Module. Galiso Process Piping uses fitted heater jacketing. Galiso packages the jackets on the piping for ease of install. The VCE and TM heaters are packaged in kits for each area, and numbered for the cable connectors. One kit for the right VCE, one kit for the left VCE, and one kit for the TM. Locations for each blanket are shown in the figures. Mount them as shown, taking note of the “Peel-&-Stick” thermocouple locations. Alcohol wipe the surfaces before mounting the blankets and thermocouples. If the tool configuration is different and does not allow for placing the heaters in the exact same location, then place them as near to the same location as possible. Omitting one heater is permissible on VCE heaters only, such as if there is a port hole viewer on the VCE. You should not need to omit more than one heater for each area.

6.2 Controller Boxes and Wiring

There are 2 Galiso Heater Controller boxes. The boxes are set-up differently for the area of control. They are clearly labeled for each area. One controller box for Left VCE, and TM. One controller box for Right VCE, and HGS Process Piping. One digital controller for each area of heaters (2 per box).

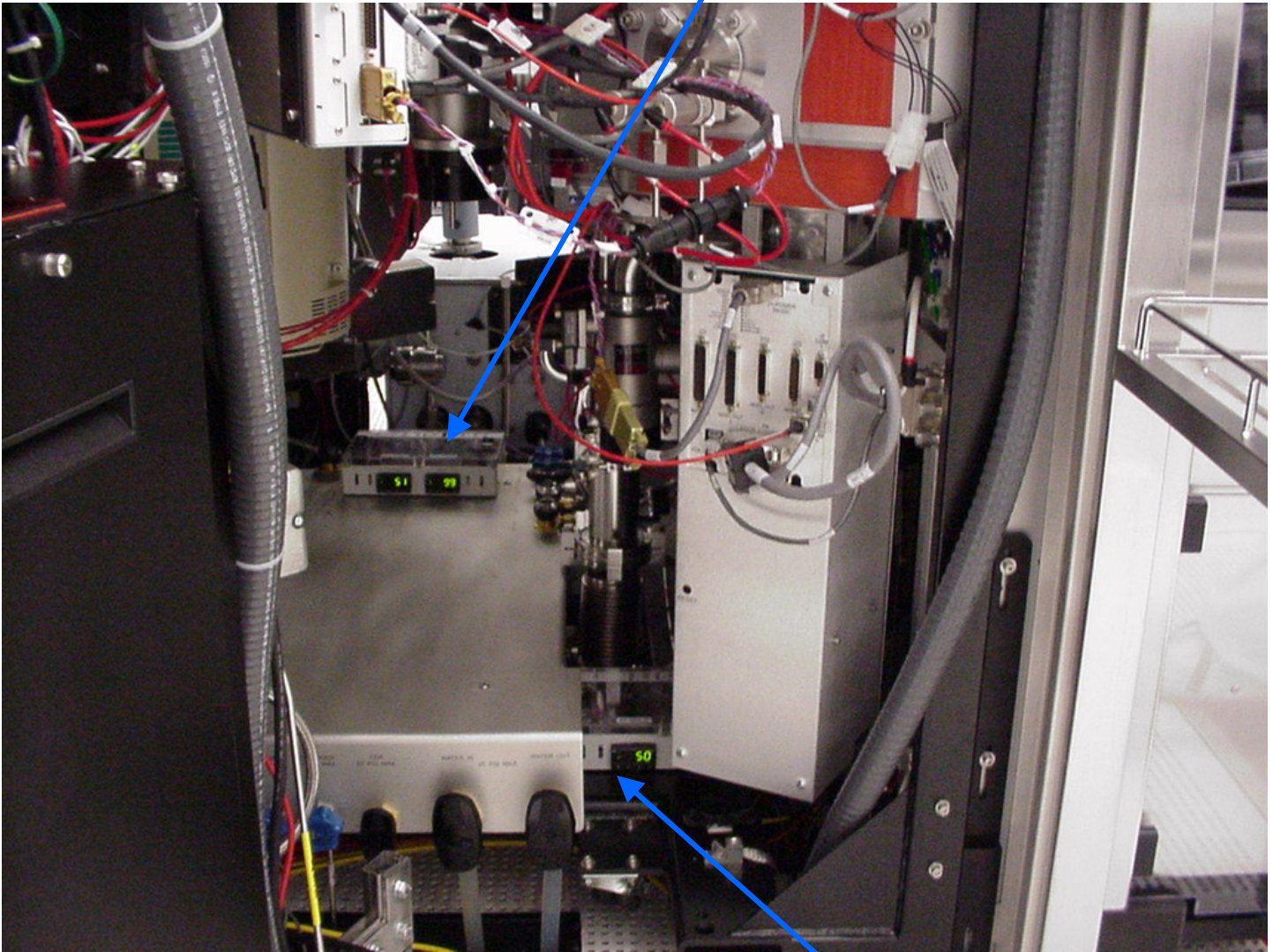
There is one power cable and one thermocouple for each digital controller (2 per box). There are 4 power cables, and 4 thermocouples total. These cables are also packaged in the kit for each area. Wiring is best done in a methodical fashion, i.e. one at a time from beginning to end. Use the TM wire chase on the bottom of the TM as much as possible. Tuck and tie all power and thermocouple wires out of the way neatly. The thermocouple wire is very delicate, and must be handled with care to prevent breakage. Do not make sharp bends on the Thermocouple wires. It is important for the wire to be neatly tucked away so it does not get accidentally damaged during normal tool maintenance procedures.

Mount the controller boxes as shown in Fig 6-1, on both sides. Mount the thermocouples for each area as shown in the area Figures.

6.3 Optional End Point Window Heaters

There is one Galiso Heater Controller Box for 4 windows. One digital controller per PM (2 per controller box). One Thermocouple (TC) Probe on each PM End Point Window only. The viewport window heater does not use a TC. All window heaters have an integral TC. Be sure to only use the one from the End Point Window, not the viewport window.

HGS Process Pipe, & RVCE
Heater Controller



TM & LVCE
Heater Controller

Fig. 6-1 Galiso Heater Controller Locations

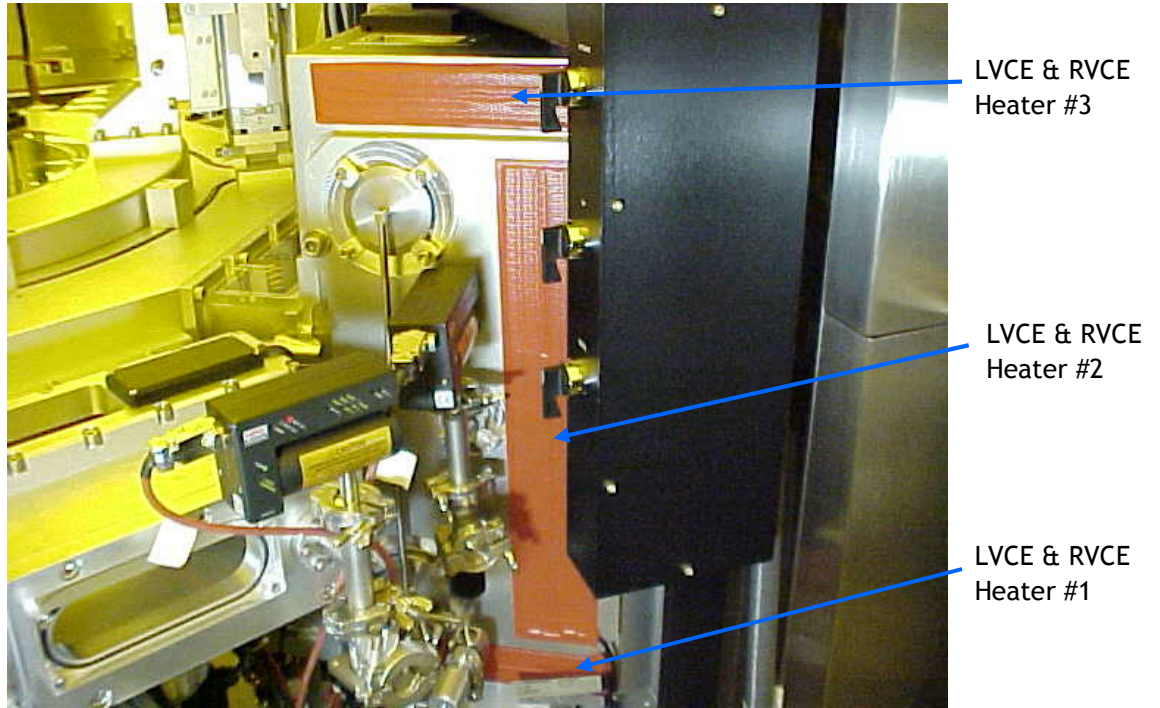


Fig. 6-2 VCE Heaters01: Side View

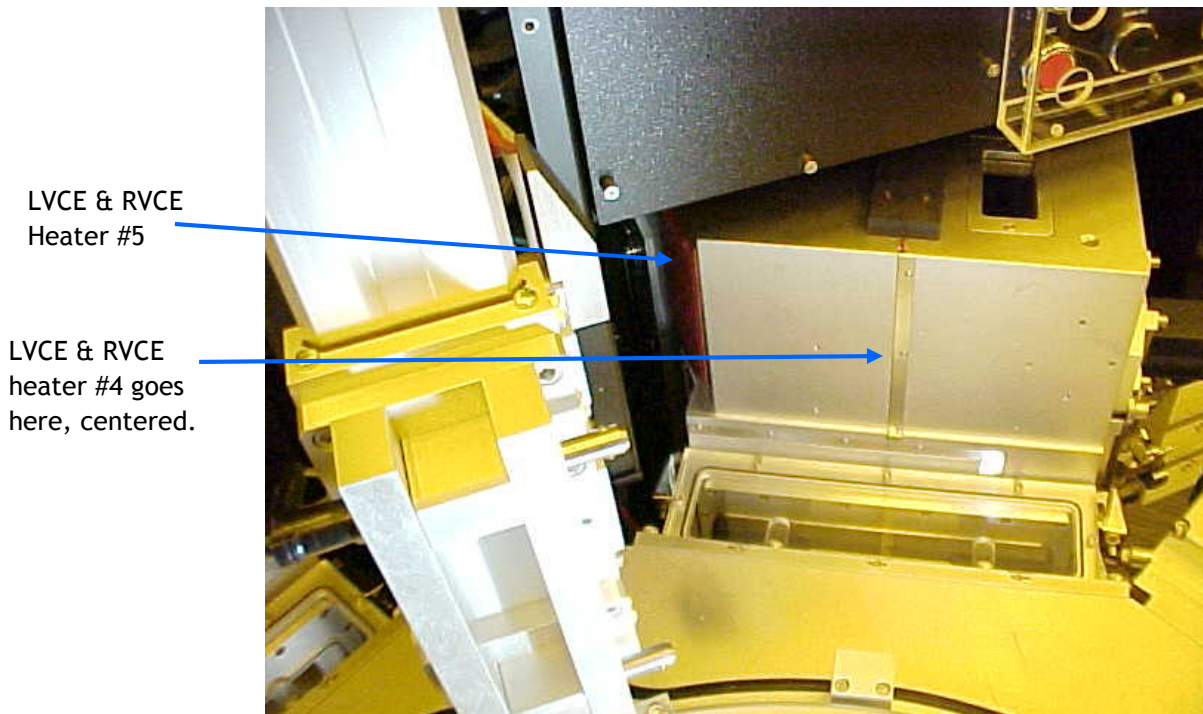
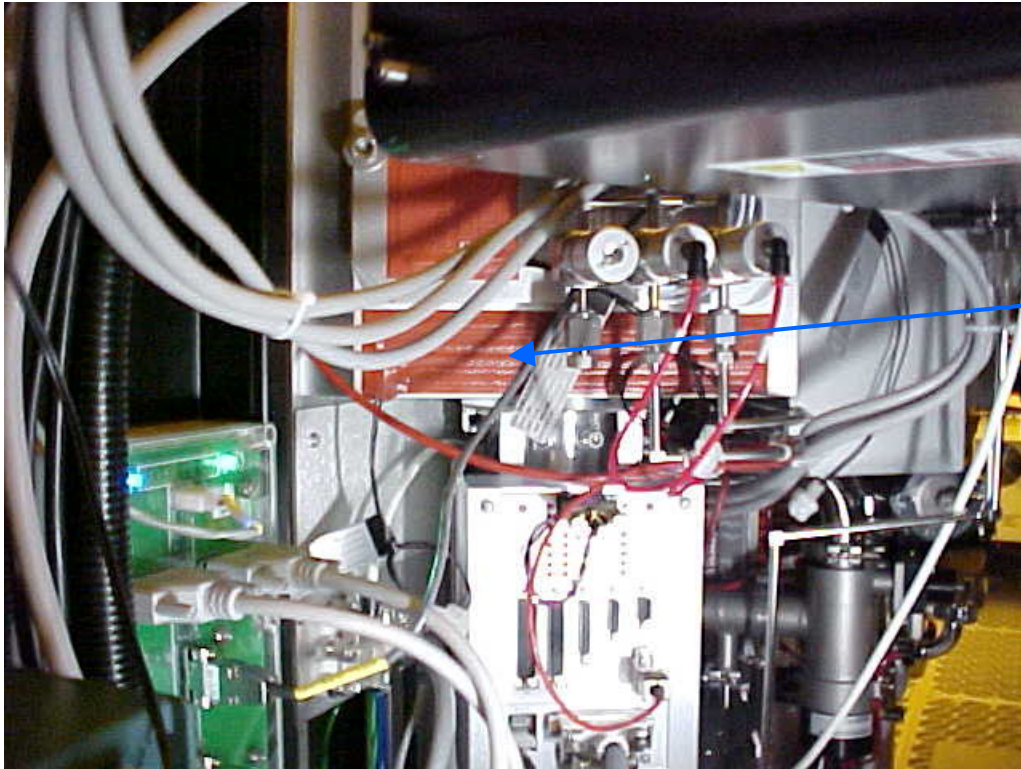


Fig. 6-3 VCE Heaters02: 5 heaters total



RVCE Heater #1

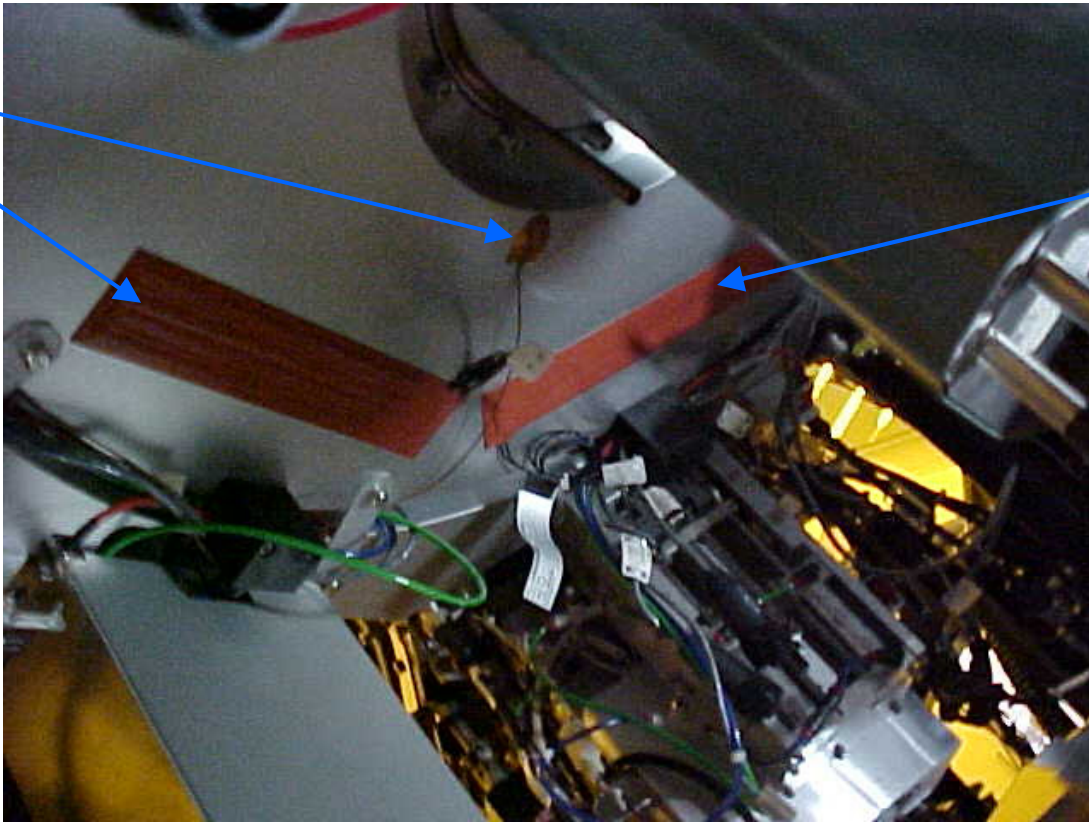
Fig. 6-4 VCE Heaters03: Below TM



Fig. 6-5 TM Heaters01: Between VCE and Robot

TM controller
Thermocouple
location

TM Heater #2

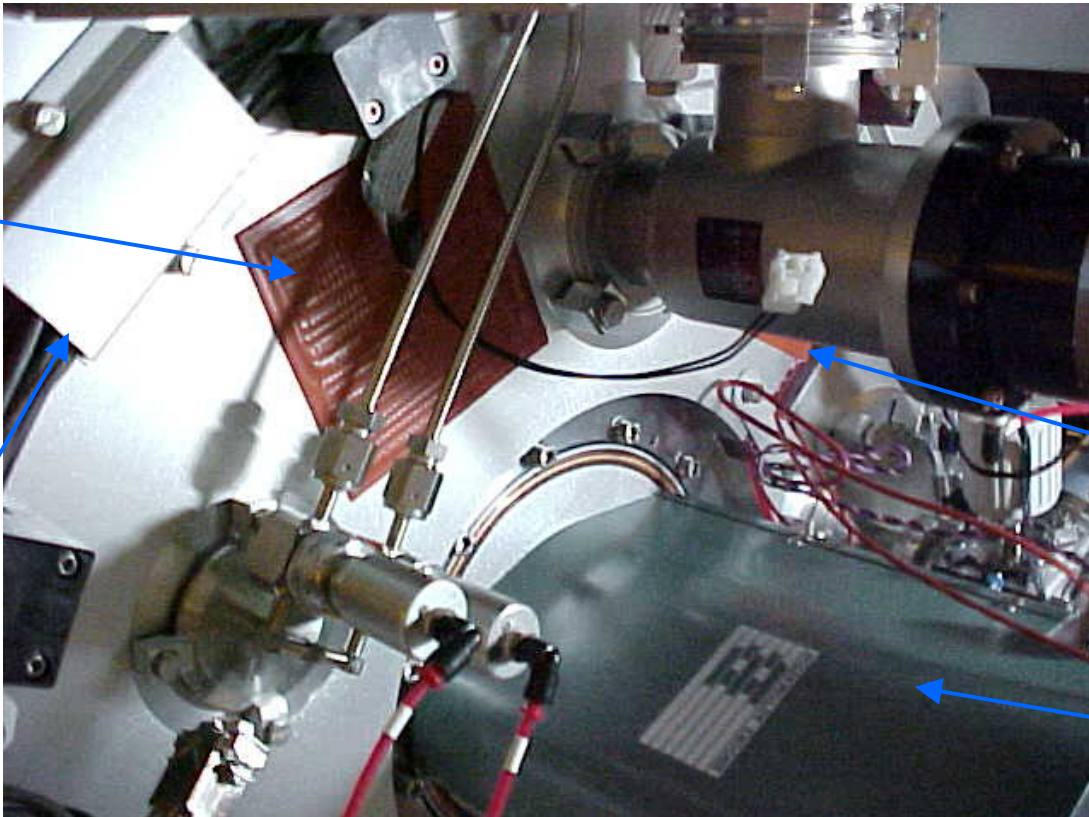


TM Heater #3

Fig. 6-6 TM Heaters02: Between VCE and Robot Motor

TM Heater #1

Route cables
in chase.



TM Heater #4

Robot Motor

Fig. 6-7 TM Heaters03: Between PM-2 and Robot Motor

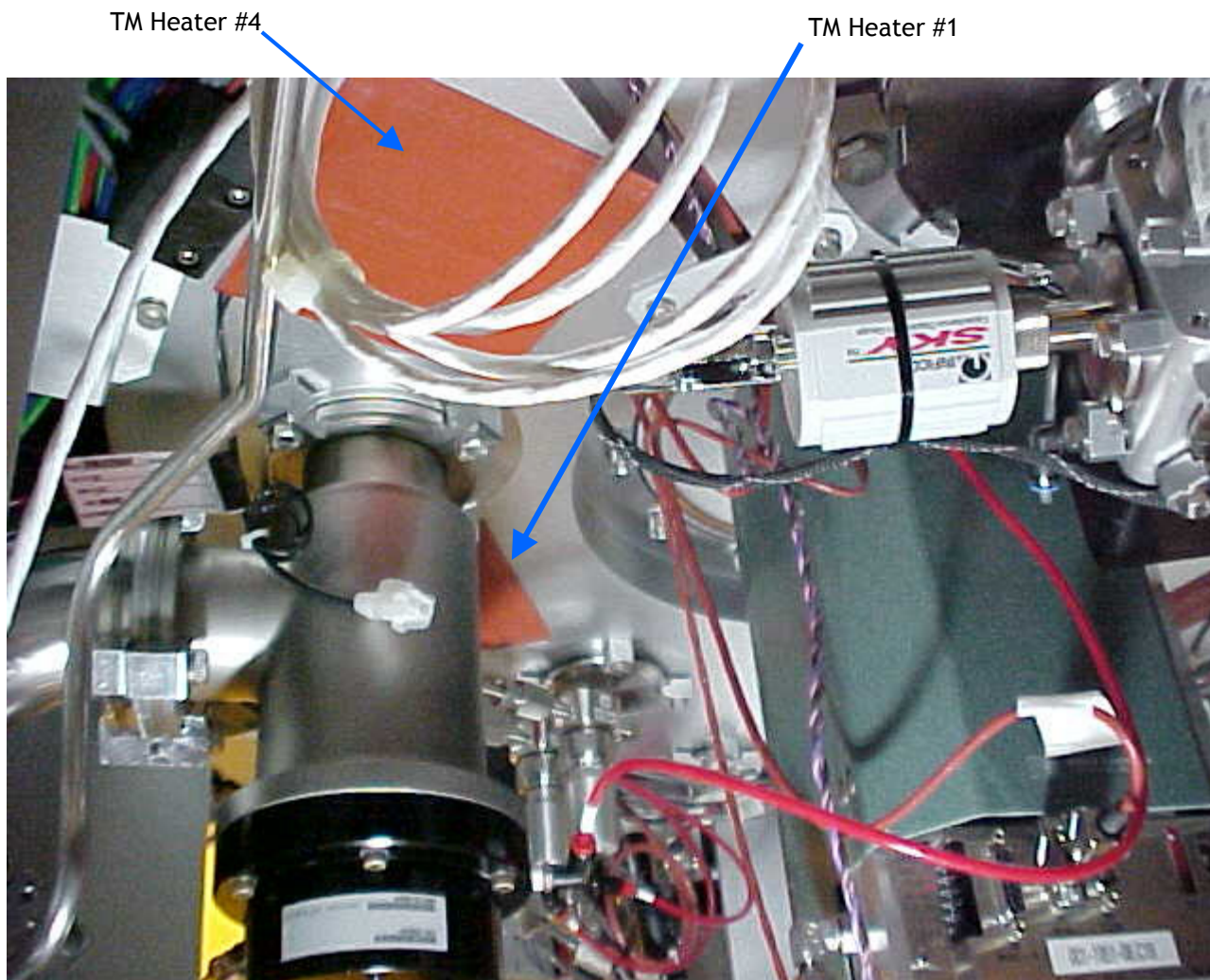


Fig. 6-8 TM Heaters04 Between PM-3 and Robot Motor

Heater Controller Settings for HGS/RVCE, and TM/LVCE controllers.

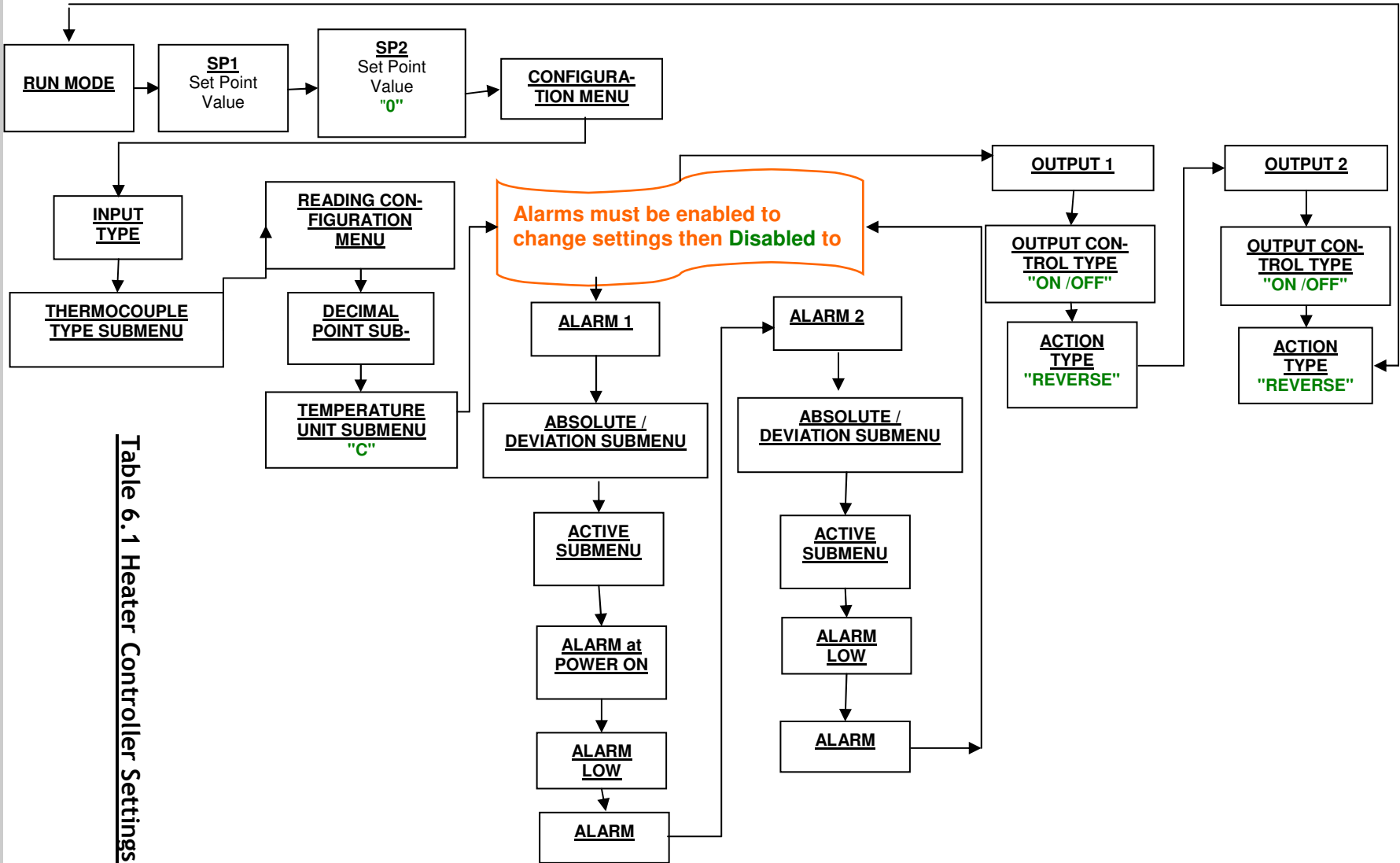


Table 6.1 Heater Controller Settings Flowchart

The above settings are Galiso factory for HGS/RVCE, and TM/LVCE heater controllers.
 All other settings are the default of the controller manufacturer.

6.4 Heater Controller Temp adjust procedure

All four heater controller temperature settings are set to 30°C from the Galiso factory. After installing the heaters, controllers, thermocouples, and heater power cables, reset the controller temp settings to their area temperatures as described below.

How to adjust the temperature set-point:

1. Press the clockwise circle arrow button once. **SP1** should display.
2. Press the Enter key once. (↵) The current temp set-point should display. The right number will be flashing.
3. Press either ▲ (Up) or ▼ (down) to raise or lower the temp set-point.
4. Press the Enter key to go back to the actual heater blanket temperature display.

6.5 Heater Controller Warning Display

An amber display means the temperature is not close enough to the set-point, and is a warning to check the Thermocouple, power wires, and blankets to make sure everything is intact and installed correctly.

An Amber **OPN** display indicates that the T-Couple wire is not making it's circuit back to the controller. The T-Couple is either unplugged, or the wire is cut, etc...

It is essential that the Thermocouple be firmly attached to the surface on the Peel-N-Stick end of the cable. If it becomes unstuck, it will allow the temperature to skyrocket to the highest temperature possible. This can cause the PTX tool to malfunction, so it is imperative that the T-Couple stays firmly attached.

6.6 Process Piping Temperature setting instructions

1. Set the temperature to run at 50°C.
2. Monitor the temperature for 10 minutes to ensure it stabilizes at 50°C.
3. After the temperature stabilizes at 50°C, Increase the value to 100°C.
4. Monitor the temperature for 10 minutes to ensure it stabilizes at 100°C.

6.7 TM & VCE Temperature setting instructions:

1. Set the temperature to run at 50°C.
2. Monitor the temperature for 3 hours to ensure it stabilizes at 50°C.

6.7 TM/LVCE Controller Settings

TM/LVCE TEMPERTURE CONTROLLER			
PARAMETER	ACCESS LEVEL	SETTING	FUNCTION
SP1	0	30	SETPOINT 1
SP2	0	0	SETPOINT 2
CNFG	0	0	CONFIGURATION
INPT	INPUT	0	INPUT TYPE
TC	INPUT	J	THERMOCOUPLE TYPE
RDG	RDG	N/A	READING CONFIGURATION
DEC	RDG	FFFF	DECIMAL POINT
TEMP	RDG	C	TEMPURTURE UNIT
ALR1	ALARM 1	ENBL	ALARM 1 LEVEL. MUST BE RE-SET TO DSBL TO ENBL OUTPUT
ABSO	ALARM 1	DEV	ABSOLUTE/DEVIATION
LTCH	ALARM 1	UNLT	LATCHED TYPE
CT.CL	ALARM 1	N.O.	CONTACT CLOSURE
ACTV	ALARM 1	ABOVE	ALARM ACTIVE
A.P.ON	ALARM 1	ENBL	ALARM ON @ POWER UP
ALR.L	ALARM 1	0	ALARM LOW DEVIATION
ALR.H	ALARM 1	2	ALARM HIGH DEVIATION
ALR2	ALARM 2	ENBL	ALARM 2 LEVEL. MUST BE RE-SET TO DSBL TO ENBL OUTPUT
ABSO	ALARM 2	DEV	ABSOLUTE/DEVIATION
LTCH	ALARM 2	UNLT	LATCHED TYPE
CT.CL	ALARM 2	N.O.	CONTACT CLOSURE
ACTV	ALARM 2	ABOVE	ALARM ACTIVE
ALR.L	ALARM 2	2	ALARM LOW DEVIATION
ALR.H	ALARM 2	0	ALARM HIGH DEVIATION
OUT1	OUTPUT 1	N/A	OUTPUT 1 MENU
CTRL	OUTPUT 1	ON/OFF	OUTPUT CONTROL
ON/OFF	OUTPUT 1	RVRS	ACTION TYPE
DB	OUTPUT 1	0	DEAD BAND
OUT2	OUTPUT 2	N/A	OUTPUT 2 MENU
CTRL	OUTPUT 2	ON/OFF	OUTPUT CONTROL
ON/OFF	OUTPUT 2	RVRS	ACTION TYPE
DB	OUTPUT 2	0	DEAD BAND

Table 6-2 TM/LVCE Galiso Heater Controller Settings

6.8 HGS/RVCE Controller Settings

HGS/RVCE TEMPERTURE CONTROLLER			
PARAMETER	ACCESS LEVEL	SETTING	FUNCTION
SP1	0	30	SETPOINT 1
SP2	0	0	SETPOINT 2
CNFG	0	0	CONFIGERATION
INPT	INPUT	0	INPUT TYPE
TC	INPUT	J	THERMOCOUPLE TYPE
RDG	RDG	N/A	READING CONFIGURATION
DEC	RDG	FFFF	DECIMAL POINT
TEMP	RDG	C	TEMPURTURE UNIT
ALR1	ALARM 1	ENBL	ALARM 1 LEVEL. MUST BE RESET TO DSBL TO ENBL OUTPUT
ABSO	ALARM 1	DEV	ABSOLUTE/DEVIATION
LTCH	ALARM 1	UNLT	LATCHED TYPE
CT.CL	ALARM 1	N.O.	CONTACT CLOSURE
ACTV	ALARM 1	ABOVE	ALARM ACTIVE
A.P.ON	ALARM 1	ENBL	ALARM ON @ POWER UP
ALR.L	ALARM 1	0	ALARM LOW DEVIATION
ALR.H	ALARM 1	2	ALARM HIGH DEVIATION
ALR2	ALARM 2	ENBL	ALARM 2 LEVEL. MUST BE RESET TO DSBL TO ENBL OUTPUT
ABSO	ALARM 2	DEV	ABSOLUTE/DEVIATION
LTCH	ALARM 2	UNLT	LATCHED TYPE
CT.CL	ALARM 2	N.O.	CONTACT CLOSURE
ACTV	ALARM 2	ABOVE	ALARM ACTIVE
ALR.L	ALARM 2	2	ALARM LOW DEVIATION
ALR.H	ALARM 2	0	ALARM HIGH DEVIATION
OUT1	OUTPUT 1	N/A	OUTPUT 1 MENU
CTRL	OUTPUT 1	ON/OFF	OUTPUT CONTROL
ON/OFF	OUTPUT 1	RVRS	ACTION TYPE
DB	OUTPUT 1	0	DEAD BAND
OUT2	OUTPUT 2	N/A	OUTPUT 2 MENU
CTRL	OUTPUT 2	ON/OFF	OUTPUT CONTROL
ON/OFF	OUTPUT 2	RVRS	ACTION TYPE
DB	OUTPUT 2	0	DEAD BAND

Table 6.3 HGS/RVCE Galiso Heater Controller Settings

7.0 HGS Recipe Settings:

Use this table for recipe writing parameters.

Alliance Tool Settings for HGS					
Item	Software Device	Discription	Tool Settings	Tool HGS Set	Issues
		Transport Config. Auto Pump			
1	Close LL Door Option	Transport Config. Auto Pump	Do not Close (Off)	Close Afer Timeout (On)	
2	Close LL Door Time out	Transport Config. Auto Pump	5 mins.	5 mins?	
3	Auto Pump LL Option	Transport Config. Auto Pump	No Not Pump	Pump After Timeout	
4	Auto Pump LL Timeout	Transport Config. Auto Pump	10 mins.	10 mins?	
5					
6		Loadlock Pressure Status			
7	VCE Pump Timeout		20 mins.	60 mins	
8	VCE Vent Timeout		10 mins.	10 mins	
	Notes	Alliance HGS recipes			
	First use Small N2 50ccm mfc	Gas One Flow set point	Gas # 0	Gas # 1	Flow 1 scccm
	First use Large N2 500ccm mfc.	Gas Two Flow set point	Gas # 0	Gas # 1	Flow 10 sccm
		Gas One Tol	10.00%	99.00%	
		Gas two Tol	10.00%	99.00%	
		Gas One pressure set point			
		Gas Two pressure set point			
		Gas One pressure Tol	Soft 10%/Hard 10%	To Soft 99.0-%/Hard 99.0%	
		Gas Two pressure Tol			
		(Completion)Time step one	Time / 999	Add to Time	to all steps
		Time step two	Time / 860	Add to Time	to all steps
		Time step three	Time / ?	Add to Time	to all steps
		He Flow	0		
		Vat Pos Act	PTX03	Step1=259 Step2=209	
		N2 Purge	Closed		
		About Options	Next Step	Last Step End Recipe	
		RF set point	0		
		Recipe name #1	HGS		
		Recipe name #2	HGS1		
		Recipe name #3			
		Recipe name #4			
		Recipe name #5			
		Recipe Parameters			
		Middle Cham Temp	70c.		
		Lower Elec Temp	40c.		
		Chiller Temp	40c.		

Table 7-1 Recipe Writing Information

			Recipe Types by Tool name			
Name	recipe	Tool time	LL pressure / time / PSI / Watt /Temp	Ch 1 Pres / Time / PSI / Watt / Temp	Ch 2 Pres / Time / PSI / Watt	Ch 3 Pres / Time / PSI / Watt
Poly 04	HGS One	1998 sec	300 / 6.2 / ? / ? / Temp	170 / 9.3 / ? / 18 / ? /	170 / 9.3 / ? / 18 / ? /	170 / 9.3 / ? / 18 / ? /
Poly 04	HGS Two	2198 sec	300 / 6.2 / ? / ? / Temp	170 / 9.3 / ? / 18 / ? /	170 / 9.3 / ? / 18 / ? /	170 / 9.3 / ? / 18 / ? /
Poly 04	HGS Three	2748 sec	300 / 6.2 / ? / ? / Temp	170 / 9.3 / ? / 18 / ? /	170 / 9.3 / ? / 18 / ? /	170 / 9.3 / ? / 18 / ? /
Metal PTX 01	HGS	1858	410 / 6.6 / 50+? / ?		410 / 6.6 / 50 / 2850	410 / 6.6 / 50 / 2850
Metal PTX 01	HGS1	1996	410 / 6.6 / 50+? / ?		410 / 6.6 / 50 / 2850	410 / 6.6 / 50 / 2850
Metal PTX 02	HGS	1858	410 / 6.6 / 50+? / ?		410 / 6.6 / 50 / 2850	410 / 6.6 / 50 / 2850
Metal PTX 02	HGS1	1996	410 / 6.6 / 50+? / ?		410 / 6.6 / 50 / 2850	410 / 6.6 / 50 / 2850
Metal PTX 03	HGS	1859 sec	320 / 5.2 / ? / ?		320 / 9.3 / 39 / ?	320 / 9.3 / 39 / ?
Metal PTX 03	HGS1	1449 sec			320 / 9.3 / 39 / ?	320 / 9.3 / 39 / ?

7.1 RS232 Interface:

Technical Description:

Beginning with Alliance software version “AliaP3A2”, the Alliance HGS PLC will communicate with a factory automation network via the RS232 connection labeled J31 on the back of the PLC enclosure. The interface allows the HGS process to be started and stopped by the factory automation network and sends HGS status data to the factory automation network.

Connecting Cable:



A 25' RJ12 Connecting Cable is supplied with one Female DB9 Adapter and one Male DB9 Adapter. When connecting the RJ12 cable without the DB9 Adapters the following cable pin out should be evaluated for compatibility as this connection includes 0v and 5v on pins 1 and 2 and could cause damage to either the PLC or the factory automation network. The pin out for the RJ12 cable is:

Pin 1 (Blue) Power 0v

Pin 2 (Yellow) Power 5v

Pin 3 (Green) TXD Transmit Data (RS232C)

Pin 4 (Red) RXD Receive Data (RS232C)

Pin 5 (Black) RTS Request to Send

Pin 6 (White) 0v Signal Ground

The supplied DB9 Female to RJ12 Modular Adapter will adapt the above pins to a configuration that is compatible with a typical PC 9 pin serial port. The DB9 adapter pin out is:

Pin 1 NC

Pin 2 PC/FAN RXD Receive Data to (Green) PLC TXD Transmit Data **RJ12 Pin 3**

Pin 3 PC/FAN TXD Transmit Data to (Red) PLC RXD Receive Data **RJ12 Pin 4**

Pin 4 NC

Pin 5 (White) 0v Signal Ground **RJ12 Pin 6**

Pin 6 NC

Pin 7 NC

Pin 8 NC

Pin 9 NC

7.1 RS232 Interface (continued)

Interface Parameters:

The settings for the HGS PLC serial port are:

9600kbs, 8 data bits, no parity, 1 stop bit, no hardware handshake

Interface Command:

The command structure from the FAN to the HGS PLC is as follows: **101111<cr>**

The leftmost ASCII character sets the state of the remote start. 1=on, 0 = off.

This bit must be set to “1” to override the recipe start and launch HGS operation from the HGS-PLC serial port. If the bit changes to a “0” during remote operation the process will abort.

The next character in this string sets the TM only HGS process. 1=on, 0 = off.

If the TM only start bit is set to a “1” this bit will launch the TM only HGS process. If this bit changes to a”0” during the process run the process will abort. This bit should be set to “0” when HGS processing any or all PM chambers.

The next character sets the state of the PM1 HGS. 1=on, 0 = off.

If this start bit is set to a “1” this bit will launch the HGS process in PM1 providing that this chamber is enabled by the PM1Installed flag in the PLC program. The HGS process is designed for metal and poly etch chambers. Alliance Metal etch tools typically have a strip chamber in this position and the PM4 position. Alliance Poly etch tools will often have an etch chamber in this position. If this bit changes to a”0” during the process run the process will abort. In order to launch a subsequent HGS process this bit and the other 3 PM HGS start bits must change to a “0” after this HGS process has finished. Detecting the finish of the HGS process is discussed in section 5.

The next character sets the state of the Pm2 HGS. 1=on, 0 = off.

The operation of the remaining Pm HGS start bits is the same as the above description for Pm1.

The next character sets the state of the Pm3 HGS. 1=on, 0 = off.

The next character sets the state of the Pm4 HGS. 1=on, 0 = off.

The 7 character ASCII interface command string must be terminated by a carriage return

5. HGS PLC Output

The ASCII output from the HGS PLC to the factory automation network is as follows:

101111,1,010000,124,320,21,2700,09/14/2003,14:44:21,760,098,098,098,098,760<cr>

Characters 1-6 represent the PLC’s interpretation of the input command if present.

If the remote bit is not set, the TM only bit will be set to “0” and the last four characters represent the status of the gas input signals.

The 7th is a comma delimiter.

The 8th character represents the state of the Run flag.

The 9th is a comma delimiter.

7.1 RS232 Interface (continued)

Characters 10-15 represent the state of the HGS process.

This group of bits starts with the LvceHgs flag, then the Pm1Hgs flag, Pm2Hgs flag, Pm3Hgs flag, Pm4Hgs flag, and RvceHgs flag. The location of the HGS process can be tracked with these bits. If the HGS process is started in all process chambers the first bit in this group will change to a “1” while the HGS process is active in the LVCE. Next the “1” will move to the second bit while the HGS process is active in Pm1. This will continue through the remaining positions as the HGS process moves through the remaining chambers ending in the RVCE. If the TM only process is launched the first and last bits in this group will track the status of the HGS process (first Lvce then Rvce). If the HGS process runs correctly these bits will remain either “1” or “0”. If the HGS process is aborted or fails the position bit that the process was aborted or failed will change to “A” or “F”.

The 16th is a comma delimiter.

Characters 17-19 are the HGS gas temperature in C. The 20th is a comma delimiter.

Characters 21-23 are the HGS gas pressure in torr. The 24th is a comma delimiter.

Characters 25-26 are the dome pressure of the HGS inlet gas regulator in psi.

The 27th is a comma delimiter.

Characters 28-31 are the HGS motor current in watts. The 32nd is a comma delimiter.

Characters 33-42 are the current date. The 43rd is a comma delimiter.

Characters 44-51 are the current time. The 52nd is a comma delimiter.

Characters 53-55 are the Lvce vacuum reading. The 56th is a comma delimiter.

Characters 57-59 are the Pm1 .1torr vacuum reading. The 60th is a comma delimiter.

Characters 61-63 are the Pm2 .1torr vacuum reading. The 64th is a comma delimiter.

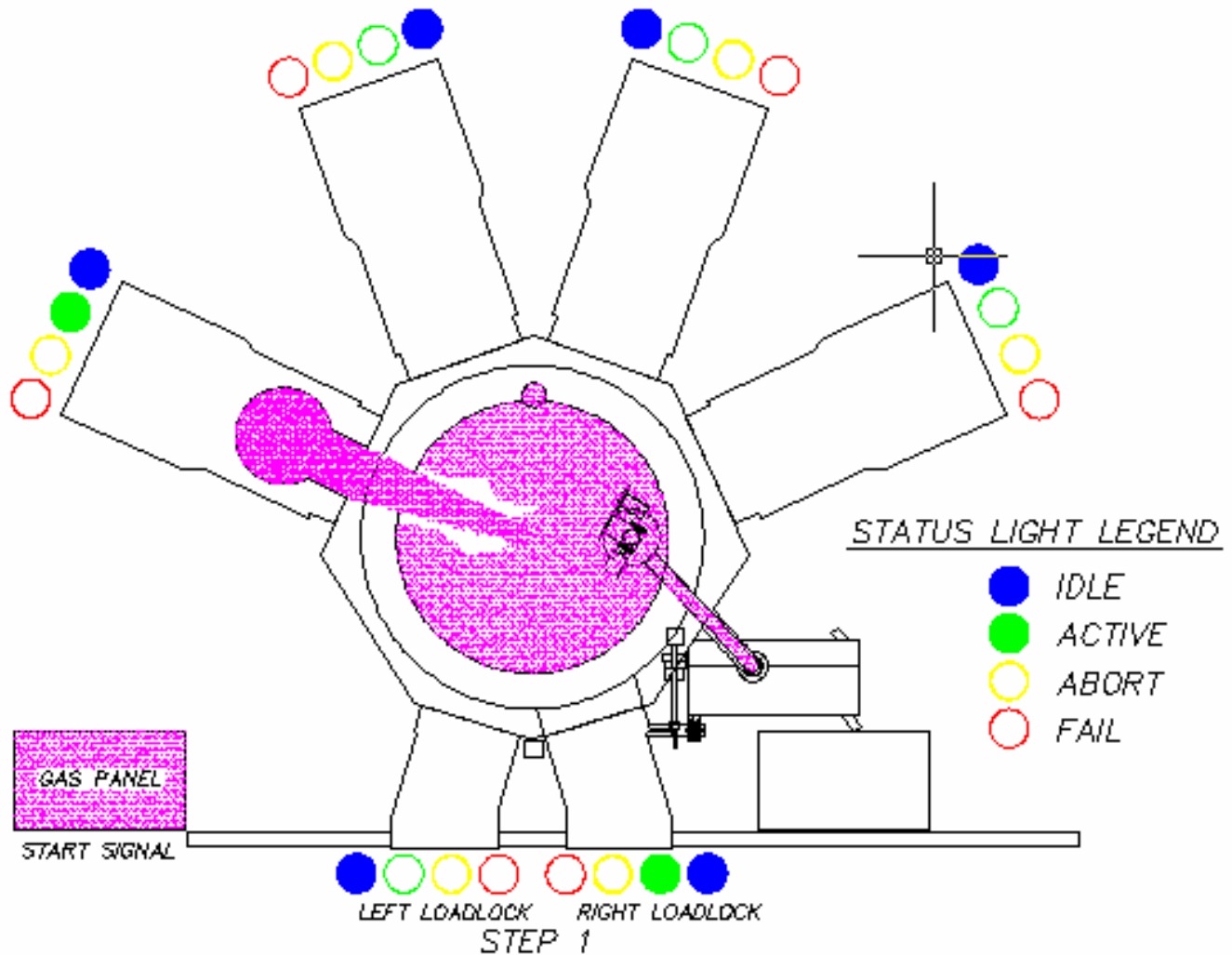
Characters 65-67 are the Pm3 .1torr vacuum reading. The 68th is a comma delimiter.

Characters 69-70 are the Pm4 .1torr vacuum reading. The 71st is a comma delimiter.

Characters 72-74 are the Rvce vacuum reading. The 75th is a comma delimiter.

The 76th character in the output string is a carriage return as a termination character.

6.0 HGS Process Sequence



1. HGS PLC Start signal from Alliance Recipe.
2. HGS PLC Take control of Alliance Tool.
3. PTX Turbos ramp down.

Fig 8-1 Sequence Step 1

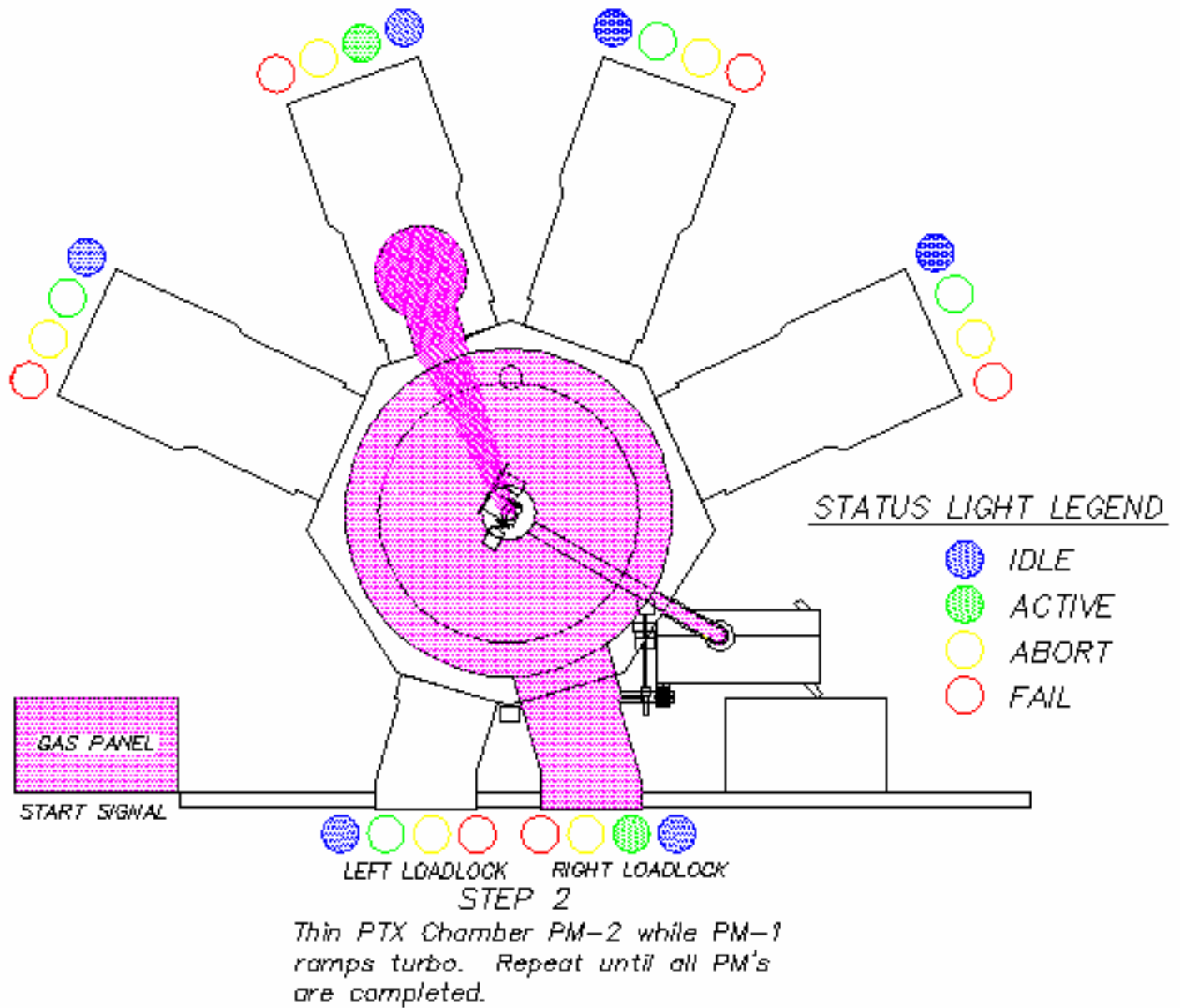
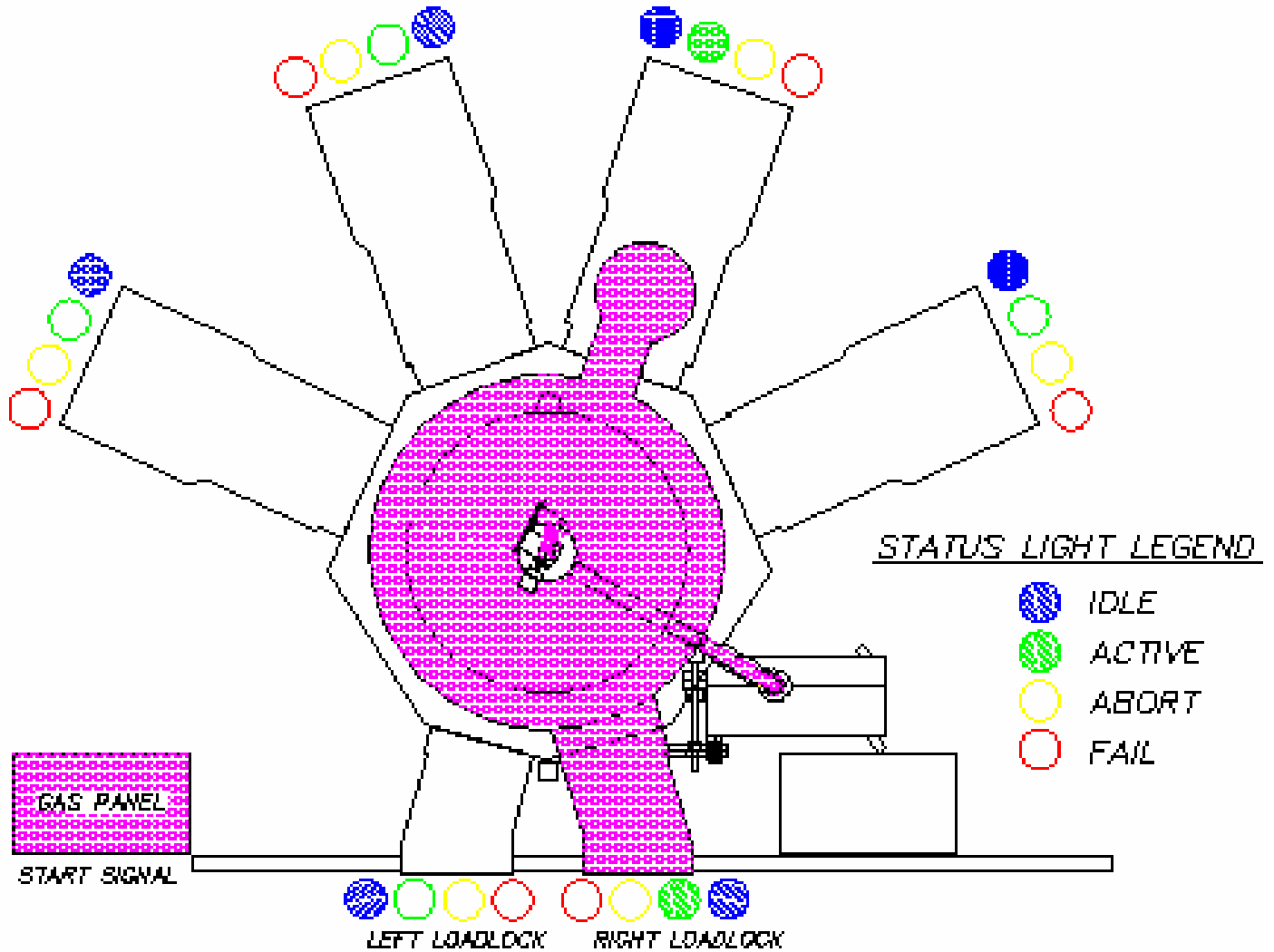


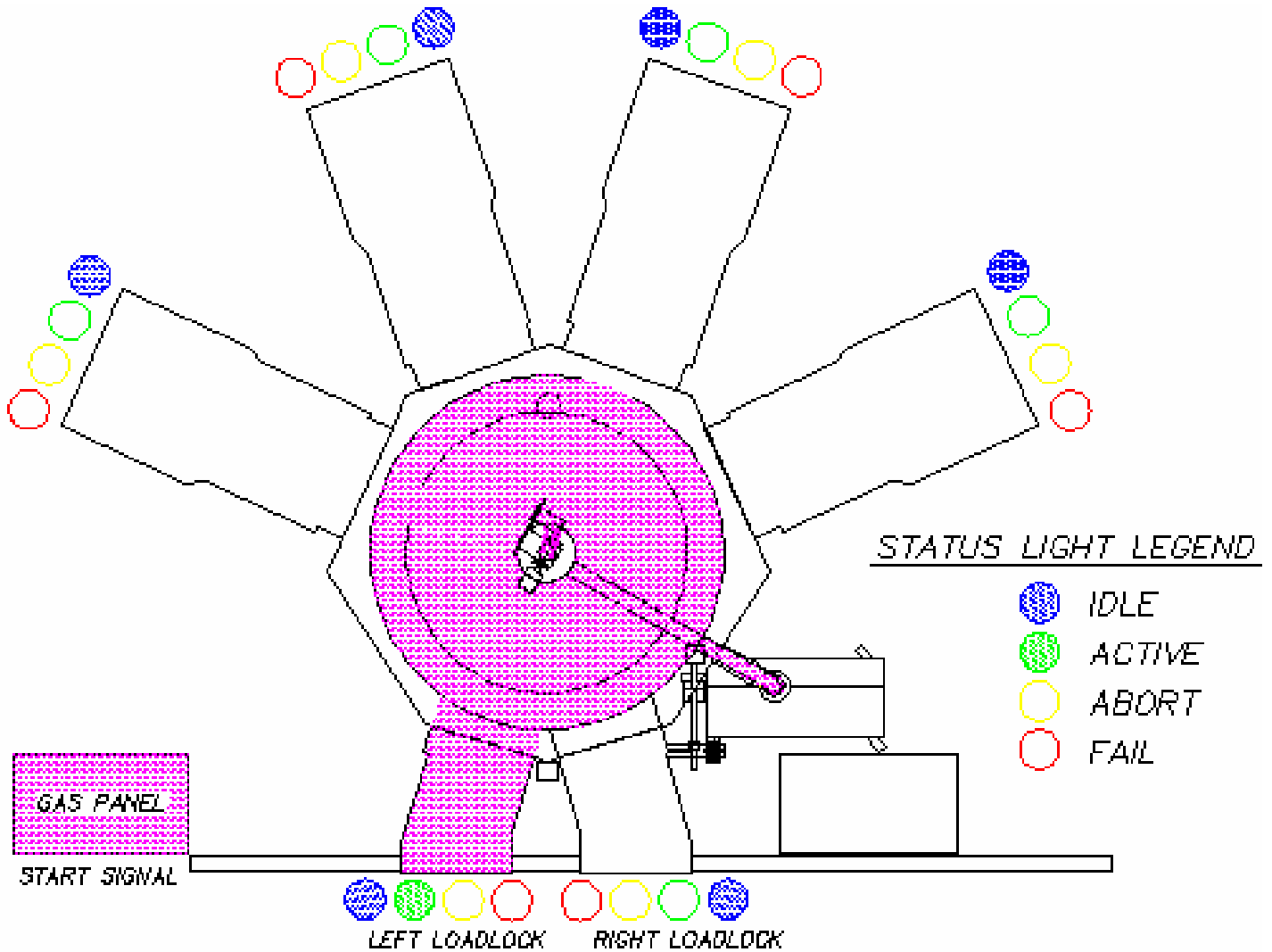
Fig 8-2 Sequence Step 2



STEP 3

- > Tool pumps down and PTX Gate opens to TM; TM N₂ purge is on high. PTX N₂ purge turns on.
- > HGS runs for 7 minutes on one PTX per cycle.
- > HGS PTX process cycles through PTX3, PTX2, PTX4 and PTX1.
- > After each PTX chamber is completed, the Turbo of that chamber will ramp back to normal speed.

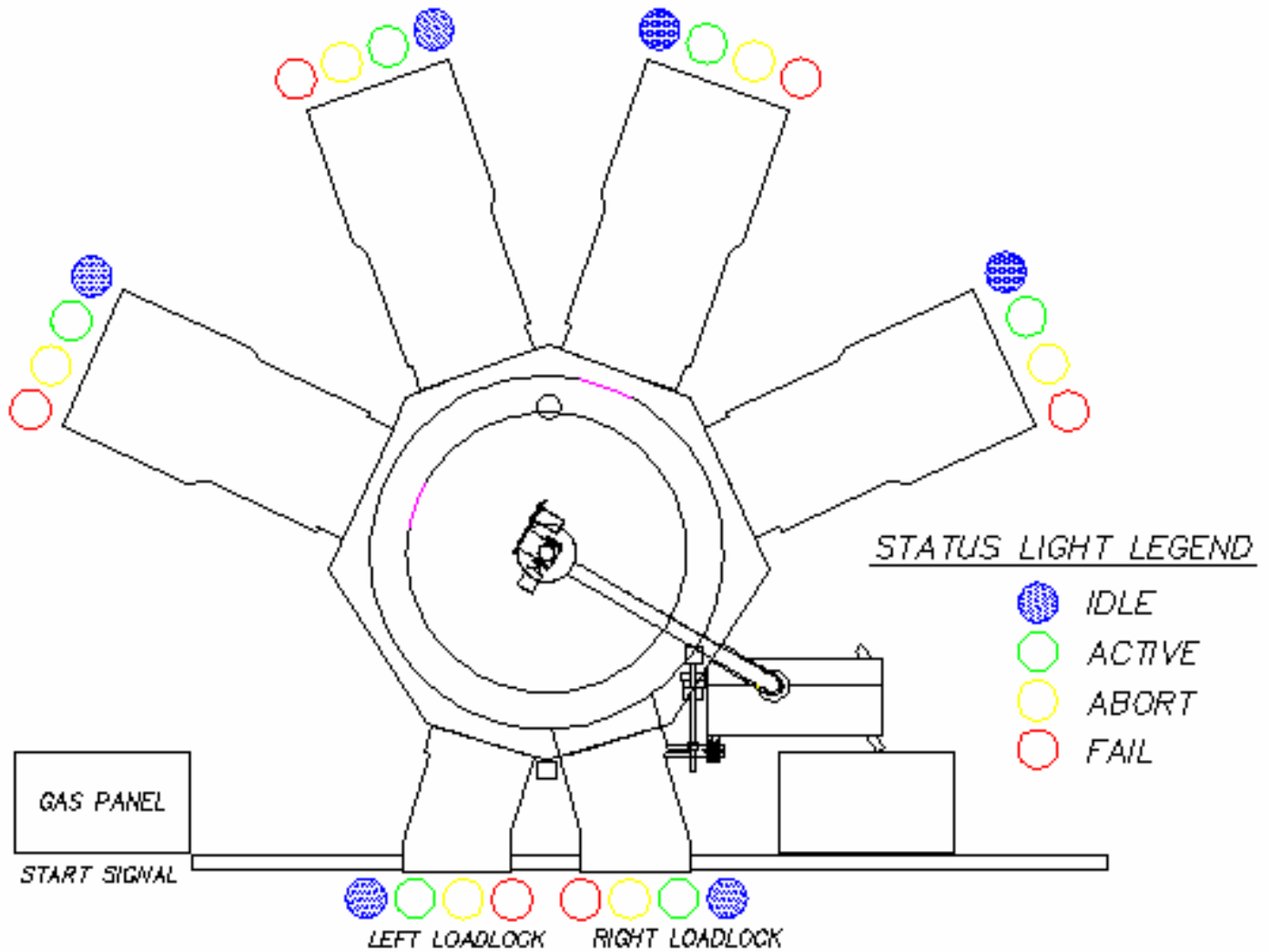
Fig 8-3 Sequence Step 3



STEP 4

> After last PTX chamber cycle, HGS will run through the TM and process the left load-lock.

Fig 8-4 Sequence Step 4



STEP 5

> The HGS PLC returns the tool to normal state, ready for product with the turbos at speed.

Fig 8-5 Sequence Step 5

Return of Equipment

Service Exposure Report - CERA97 Procedure



INTRODUCTION:

Before you return your equipment, you must notify your Galiso supplier if the substances you used and/or produced in the equipment can be dangerous. You must do this to comply with health and safety at work laws.

You must complete the Declaration on the back of this page and send it to your Galiso supplier BEFORE you dispatch the equipment.

If you do not, your Galiso supplier will assume that the equipment is dangerous and will refuse delivery.

If the Declaration is not completed correctly, there may be a delay in processing your equipment.

CONSIDERATIONS:

- 1- It is specifically stated in the equipment operators manual that Galiso equipment is designed to be used only for Clean Atmospheric Air, Nitrogen, Argon, and inert gas applications.
- 2- Your equipment may be considered UNCONTAMINATED if it has not been used or if it has only been exposed to the substances specified in #1 above.
- 3- Your equipment is CONTAMINATED if it has been exposed to any substances other than those specified in #1 above.
- 4- If your equipment is contaminated, you must decontaminate it before you return it to your supplier. You must send independent proof of decontamination (for example, a certificate of analysis) to your supplier with the completed Declaration. Contact your supplier for additional information.
- 5- Your Galiso supplier will refuse delivery of any equipment that is contaminated as defined above.

PROCEDURE:

- 1- Complete the Declaration. All sections must be completed.
- 2- Send a copy of the completed Declaration to your Galiso supplier.
- 3- Retain the original completed Declaration to be included in the shipping documents.
- 4- Contact your Galiso supplier for a Return Authorization (RA) number for your equipment. Customer is responsible for all shipping. Please provide return instructions.
- 5- Remove any accessories or attachments that are not standard components of your equipment.
- 6- Seal all inlets and outlets on the equipment with blanking flanges or heavy gauge PVC tape.
- 7- Package the equipment in its original shipping container. If the original container is not available, use a suitable box or crate. Use sufficient packing material to avoid damage to the equipment during transit.
- 8- Seal the original Declaration in an envelope and attach securely to the OUTSIDE of the equipment package.
- 9- Write your Return Authorization Number clearly on the OUTSIDE of the equipment package.

CONTACTS:

If you have any questions regarding the return of Galiso equipment, contact us at:

Galiso Inc.

Phone: (970) 249-0233

22 Ponderosa Ct.

Fax: (970) 249-0607

Montrose, CO 81401

Tech Support: (800) 854-3789

Service Exposure Report - CERA97 Declaration

To return equipment, you must:

- > Read the procedure (CERA97) on the back of this form before you complete this Declaration.
- > Know about all of the substances which have been used and/or produced in the equipment.
- > Complete all sections of this Declaration and send a copy to your Galiso supplier before returning equipment.
- > Contact your Galiso supplier to obtain an Return Authorization Number.

SECTION 1: Equipment Identification

Equipment Model: _____ Serial Number: _____

Has the equipment been used, tested, or operated? YES NO

FOR SEMICONDUCTOR APPLICATIONS ONLY:

Tool Reference # : _____ Process: _____

Malfunction Date: _____ Replacement Unit S/N: _____

SECTION 2: Equipment Exposure

Were any of the substances used or produced in the equipment-

- > Radioactive YES NO > Biologically active YES NO > Dangerous to human health and safety YES NO

SECTION 3: List of Substances

You must give complete information on all substances that have been used and/or produced in the equipment. All substances must be listed. Attach additional page if necessary.

Substance Name	Chemical Symbol	CAS Number	OSHA PEL (mg/m3)	MSDS Attached
				Y / N
				Y / N
				Y / N
				Y / N

If your equipment is contaminated, you must decontaminate it before you return it to your NUVAC supplier. You must send independent proof of decontamination (for example, a certificate of analysis) to your Galiso supplier with the completed Declaration. Contact your supplier for additional information.

SECTION 4: Return Information

Reason for return: _____

Malfunction Symptoms: _____

FOR EQUIPMENT BEING RETURNED FOR WARRANTY EVALUATION:

Name of Supplier: _____ Supplier's Invoice Number: _____

SECTION 5: Declaration

Your name: _____ Your job title: _____

Your Company: _____ Telephone # : _____

Address: _____ Fax # : _____

I have made reasonable inquiry and I have supplied accurate information in this Declaration. I have not withheld any information. I have followed the Galiso Equipment Return-CERA97 procedure on the back of this form.

igned: _____ Date: _____



PRODUCT WARRANTY

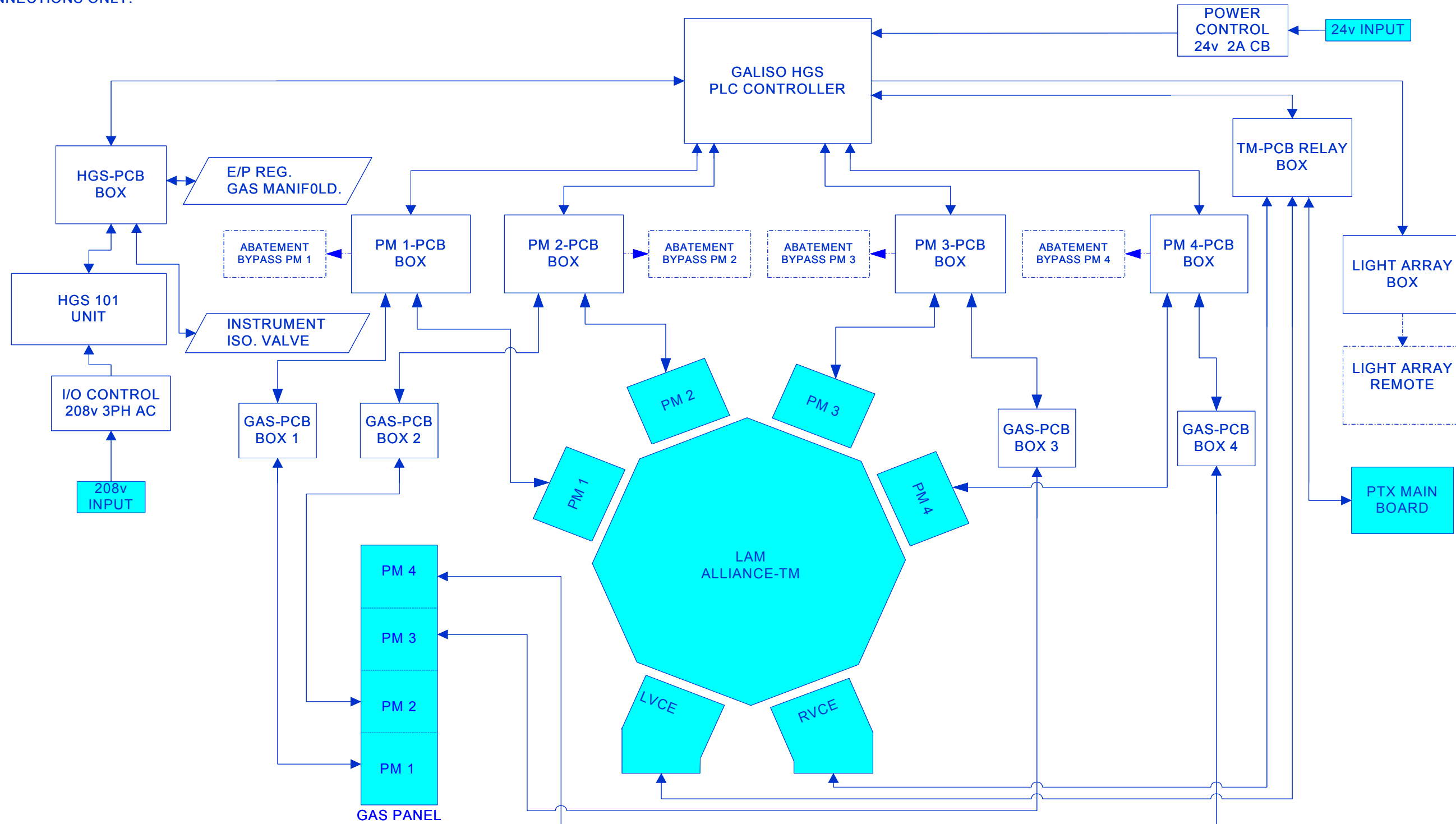
1. **DURATION:** Galiso extends a one-year warranty from date of purchase, to the original purchaser, for all its manufactured products. For all spare parts purchases, Galiso extends the manufacturer's warranty or 90 days, whichever is longer. Soft goods parts, such as speed seals, washers, and O-rings, which are subject to wear in the normal course of operation, are not covered under this warranty. Collar Tooling products are warranted for six months.
2. **COVERAGE:** Galiso manufactured equipment is warranted against defective materials or workmanship. THIS WARRANTY IS VOID IF:
 - A) THE EQUIPMENT HAS BEEN DAMAGED BY ACCIDENT OR UNREASONABLE USE, IMPROPER SERVICE/MAINTENANCE, IMPROPER INSTALLATION, ABNORMAL OPERATING CONDITIONS, NEGLIGENCE, REPAIR BY ANY PERSON NOT AUTHORIZED BY GALISO, INC. OR OTHER CAUSES NOT RELATED TO MATERIAL DEFECTS OR WORKMANSHIP.
 - B) THE SERIAL NUMBER HAS BEEN ALTERED OR DEFACED.
3. **PERFORMANCE:** Galiso reserves the right to make warranty determination only after inspecting the item at the Galiso manufacturing facility. If the warranty determination indicates that the defective item is covered under warranty, the item will be repaired or replaced with same parts/items or parts/items of equivalent quality, at the option of Galiso. In the event of replacements, the replacement unit will continue under the original equipment warranty or carry a 90-day warranty, whichever is longer. No charge will be made for warranty repairs, and/or replacements. All freight charges are the responsibility of the customer requesting warranty service.

If the warranty determination indicates that the item is not covered by warranty, a repair/replacement cost estimate will be submitted to the purchaser for approval prior to initiating any repair work.
4. **CLAIMS:** In the case of equipment malfunction, notify Galiso (1-800-854-3789) and provide the Model Name, Model Number, Serial Number and a description of the problem. Return Authorization Number, shipping and/or service information will be provided on receipt of the required information.
5. **SERVICE EQUIPMENT:** Galiso attempts to make available, whenever possible, a limited amount of service equipment at a minimal use charge, plus freight expense, for those customers wishing to avoid downtime during repair of their equipment. Such items are available on a first come, first served basis and are billable at the specific service charge applying with a one-month minimum.
6. **MODEL CHANGES:** Galiso reserves the right to make changes in materials and specifications, without notice. Galiso may offer, for a stipulated fee, the opportunity to upgrade your equipment to the latest configuration.
7. **DISCLAIMERS:** Galiso provides technical data and assistance to aid customers in the selection and use of our products. There are no implied warranties of merchantability nor suitability for a particular purpose associated with the transmittal of technical data and/or customer assistance.

Galiso does not assume liability for any consequential, incidental, or special damages. Liability under this warranty is limited to repairing, or replacing Galiso equipment items returned to the factory or an authorized facility.

REV.	AUTHORITY	DATE	BY
P4	R&D	04-08-04	DPW

NOTE:
1. THIS CHART TO
SHOW SINGLE
COMPONENT
CONNECTIONS ONLY.



REVISION STATUS OF SHEETS																							
SHEET	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
REVISION	P4	P3	P3	P3	P3	P3	P3	P4	P4	P4	P3	P3	P3	P3	P3	P3	P3	P3	P3	P3	P3	P3	P3

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GALISO
GAS LIQUIDS SOLIDS
MONTROSE, CO
(970) 249-0233 PHONE
(970) 249-0607 FAX

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GALISO, INCORPORATED

UNLESS OTHERWISE SPECIFIED,
DIMENSIONS ARE IN INCHES.
TOLERANCES:
.X ± —
.XX ± —
.XXX ± —
ANGLES ± —
SURFACE ROUGHNESS √

APPROVAL	
SIGNATURE	DATE
DENNIS W.	01-29-04
PRODUCTION	
ENGINEERING	
QUAL. ASSURANCE	

TITLE: SCHEMATIC, HGS/ ALLIANCE PTX INTERCONNECTION DIAGRAM			
DRAWING # 200-91-3200	BUILD #	REV. P4	EXT. SLDDRW
SHEET 1 OF 23			

DRAWING # 200-91-3200

BUILD #

NOTE:
1. PLC MODULES WITHIN () INDICATE SLOT DESIGNATIONS.

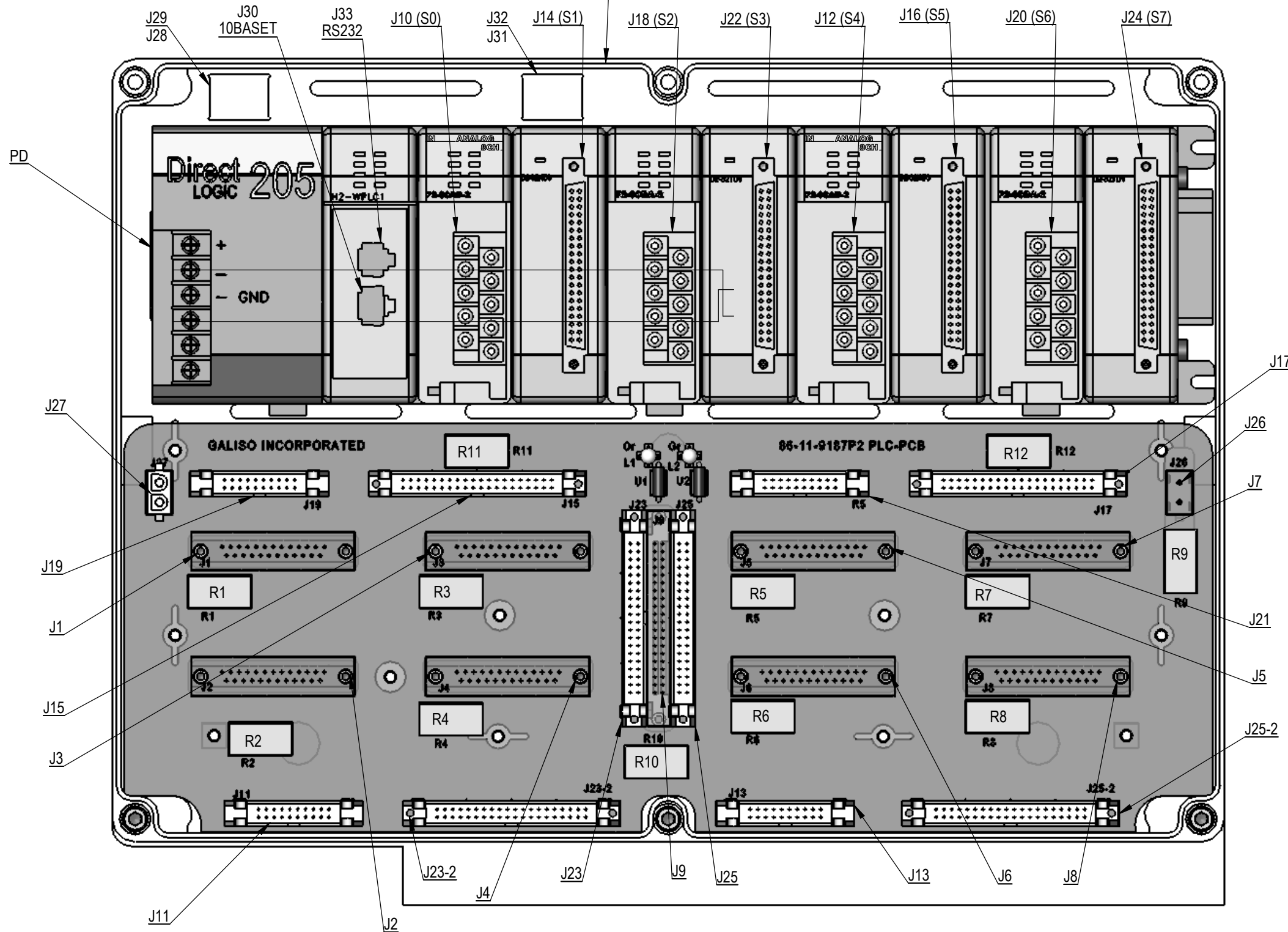
P/N 200-41-7026

IDENTIFICATION/ FUNCTION

- J1- HGS I/O
- J2- LVCE I/O
- J3- PM 1 I/O
- J4- PM 2 I/O
- J5- TM I/O
- J6- RVCE I/O
- J7- PM 3 I/O
- J8- PM 4 I/O
- J9- LIGHT ARRAY
- J10- ANALOG INPUT 1 PLC
- J11- ANALOG INPUT 1 PCB
- J12- ANALOG INPUT 2 PLC
- J13- ANALOG INPUT 2 PCB
- J14- DIGITAL INPUT 1 PLC
- J15- DIGITAL INPUT 1 PCB
- J16- DIGITAL INPUT 2 PLC
- J17- DIGITAL INPUT 2 PCB
- J18- ANALOG OUTPUT 1 PLC
- J19- ANALOG OUTPUT 1 PCB
- J20- ANALOG OUTPUT 2 PLC
- J21- ANALOG OUTPUT 2 PCB
- J22- DIGITAL OUTPUT 1 PLC
- J23- DIGITAL OUTPUT 1 PCB
- J23-2 DIGITAL OUTPUT 1 PCB
- J24- DIGITAL OUTPUT 2 PLC
- J25- DIGITAL OUTPUT 2 PCB
- J25-2 DIGITAL OUTPUT 2 PCB
- J26- INPUT, 24v
- J27- PD-24v INPUT
- J28- ETHERNET PC PATCH
- J29- ETHERNET DATA LINK CROSSOVER
- J30- PLC ETHERNET DATA LINK
- J31- RS232 TO FACTORY AUTOMATION
- J32- RS232 DATA LINK OUTPUT
- J33- PLC RS232 DATA LINK
- PD- PLC BASE, POWER DISTRIBUTION

RELAY IDENTIFICATION/ FUNCTION

- R1 J1 ANALOG ISOLATION
- R2 J2 ANALOG ISOLATION
- R3 J3 ANALOG ISOLATION
- R4 J4 ANALOG ISOLATION
- R5 J5 ANALOG ISOLATION
- R6 J6 ANALOG ISOLATION
- R7 J7 ANALOG ISOLATION
- R8 J8 ANALOG ISOLATION
- R9 POWER ISOLATION
- R10 TAKE CIRCUIT
- R11 S1 INPUT POLARITY
- R12 S5 INPUT POLARITY



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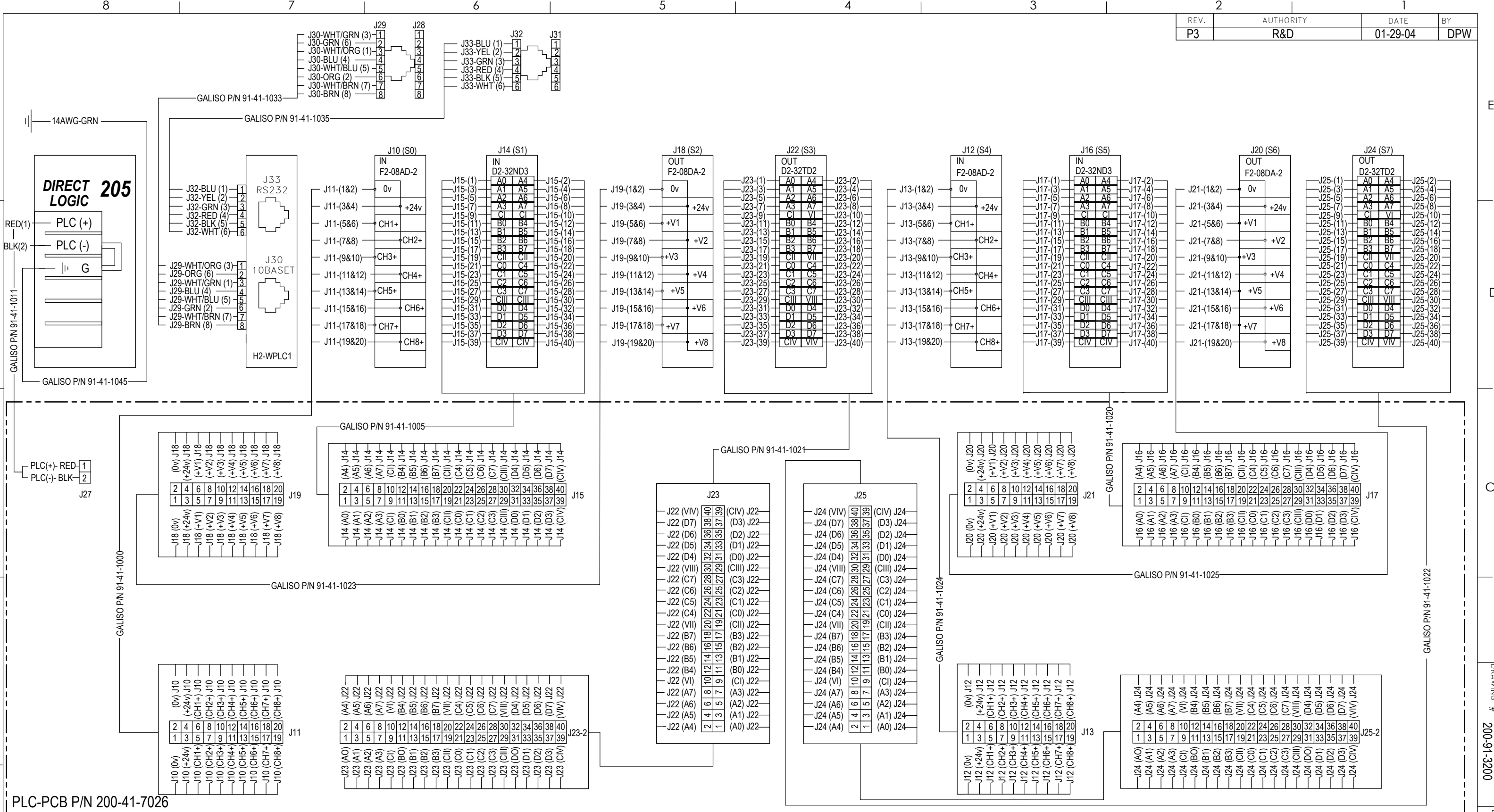
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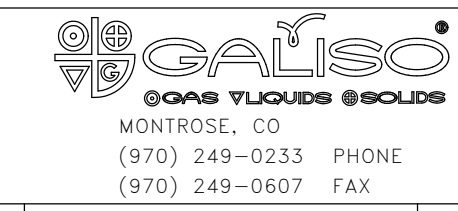
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TITLE: SCHEMATIC, HGS/ ALLIANCE PTX PLC, IDENTIFICATION & FUNCTION			
DRAWING # 200-91-3200	BUILD #	REV. P3	EXT. SLDDRW
		SHEET 2 OF —	

REV.	AUTHORITY	DATE	BY
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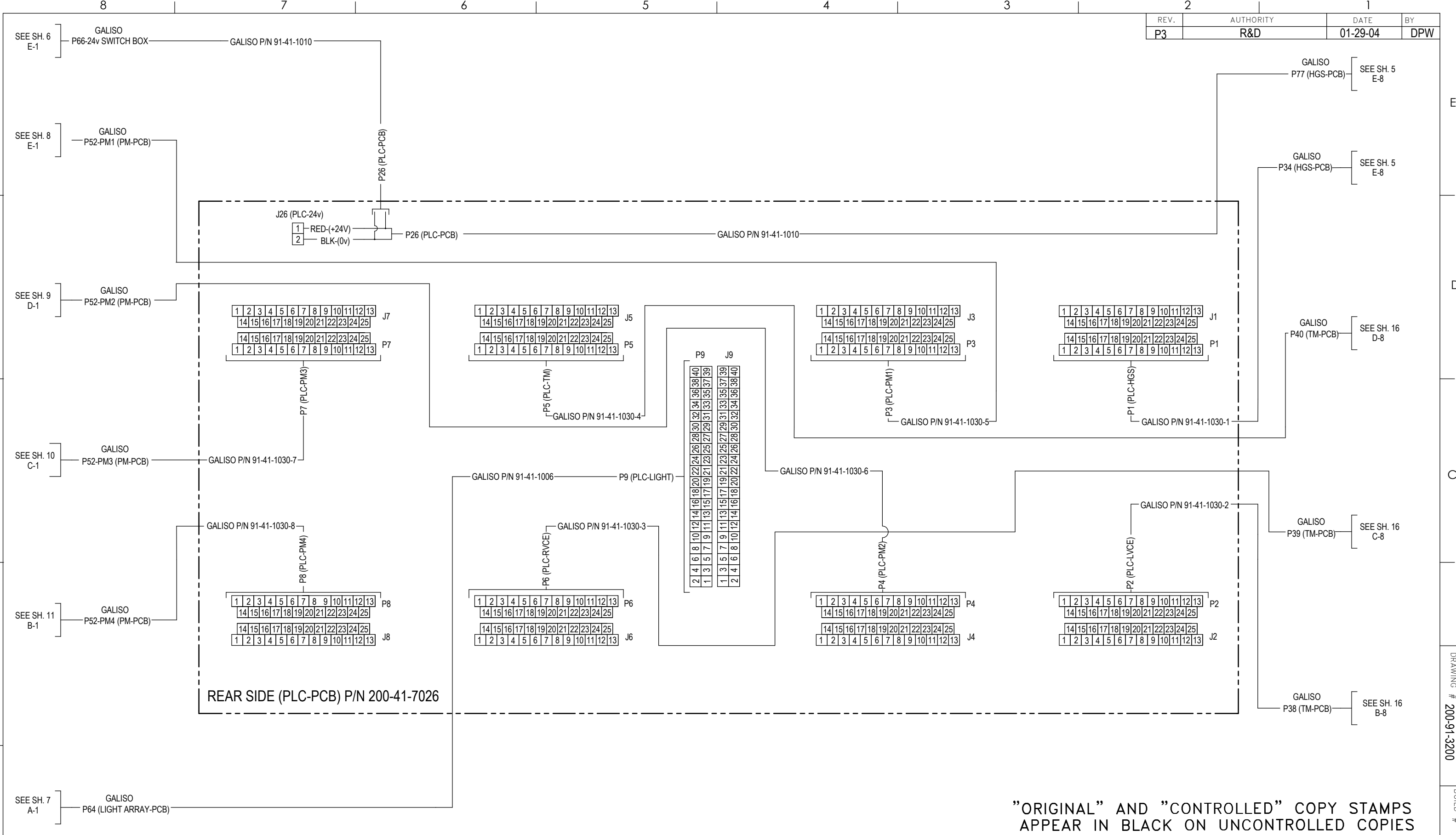
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TITLE:		DRAWING #		BUILD #		REV.		EXT.		SHEET	
SCHEMATIC, HGS/ ALLIANCE PTX PLC CONTROLLER INNER-WIRING		200-91-3200				P3		SLDDRW		3 OF —	

DRAWING # 200-91-3200 BUILD # A

REV.	AUTHORITY	DATE	BY
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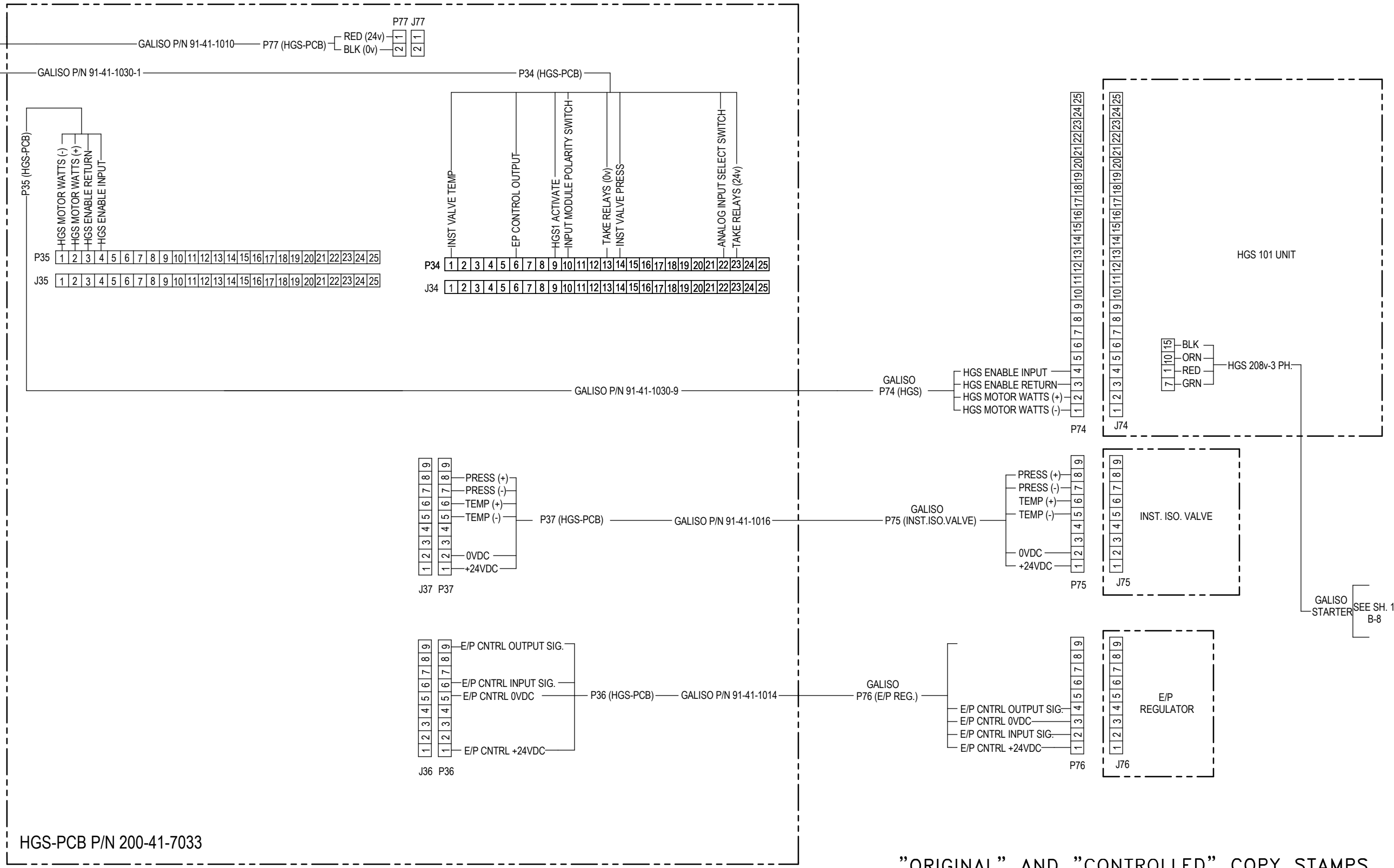
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TITLE: SCHEMATIC, HGS/ ALLIANCE PTX PLC CONTROLLER, REAR SIDE			
DRAWING #	BUILD #	REV.	EXT.
200-91-3200		P3	SLDDRW
SHEET	4 OF —		

DRAWING # 200-91-3200
BUILD #

REV.	AUTHORITY	DATE	BY
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HGS-PCB P/N 200-41-7033

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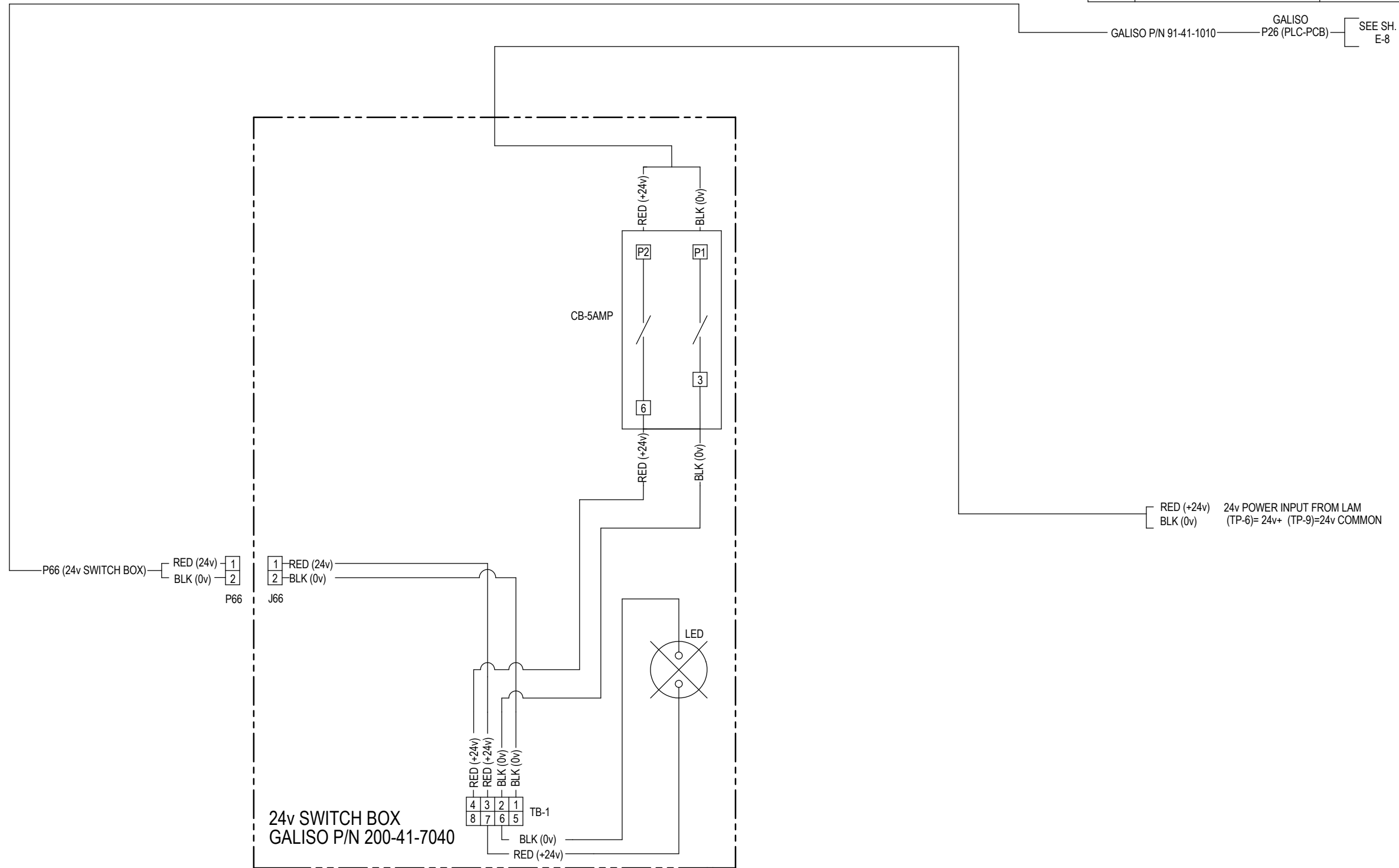
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DRAWING # 200-91-3200	BUILD #
REV. P3	EXT. SLDDRW
SHEET 5	OF —

DRAWING # 200-91-3200

BUILD #

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GALISO P/N 91-41-1010 GALISO P26 (PLC-PCB) SEE SH. 4 E-8



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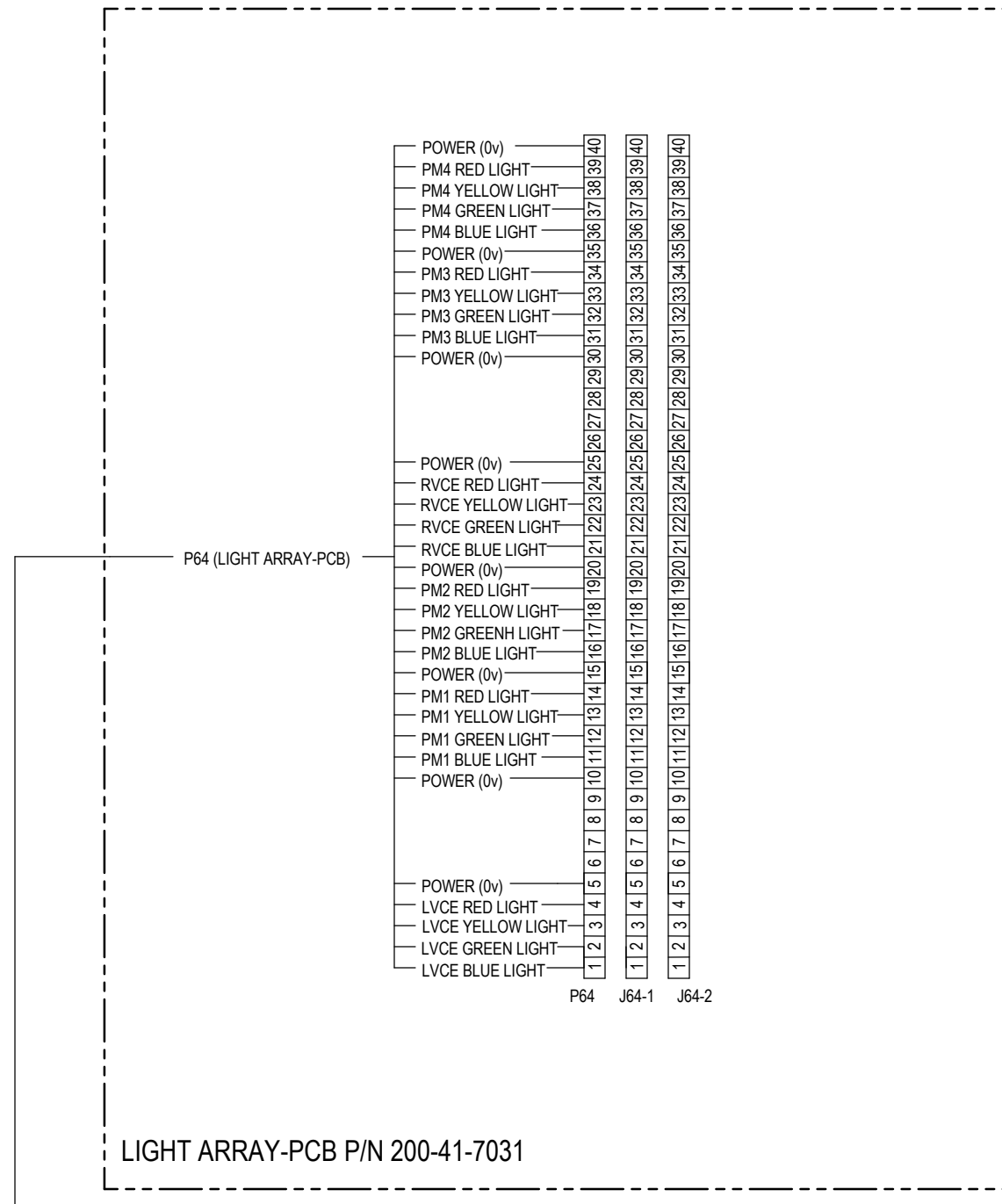
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TITLE: SCHEMATIC HGS/ ALLIANCE PTX SWITCH BOX, 24VDC			
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SHEET 6	OF		

DRAWING # 200-91-3200
BUILD #

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GALISO P9 (PLC-PCB) SEE SH. 4 A-8

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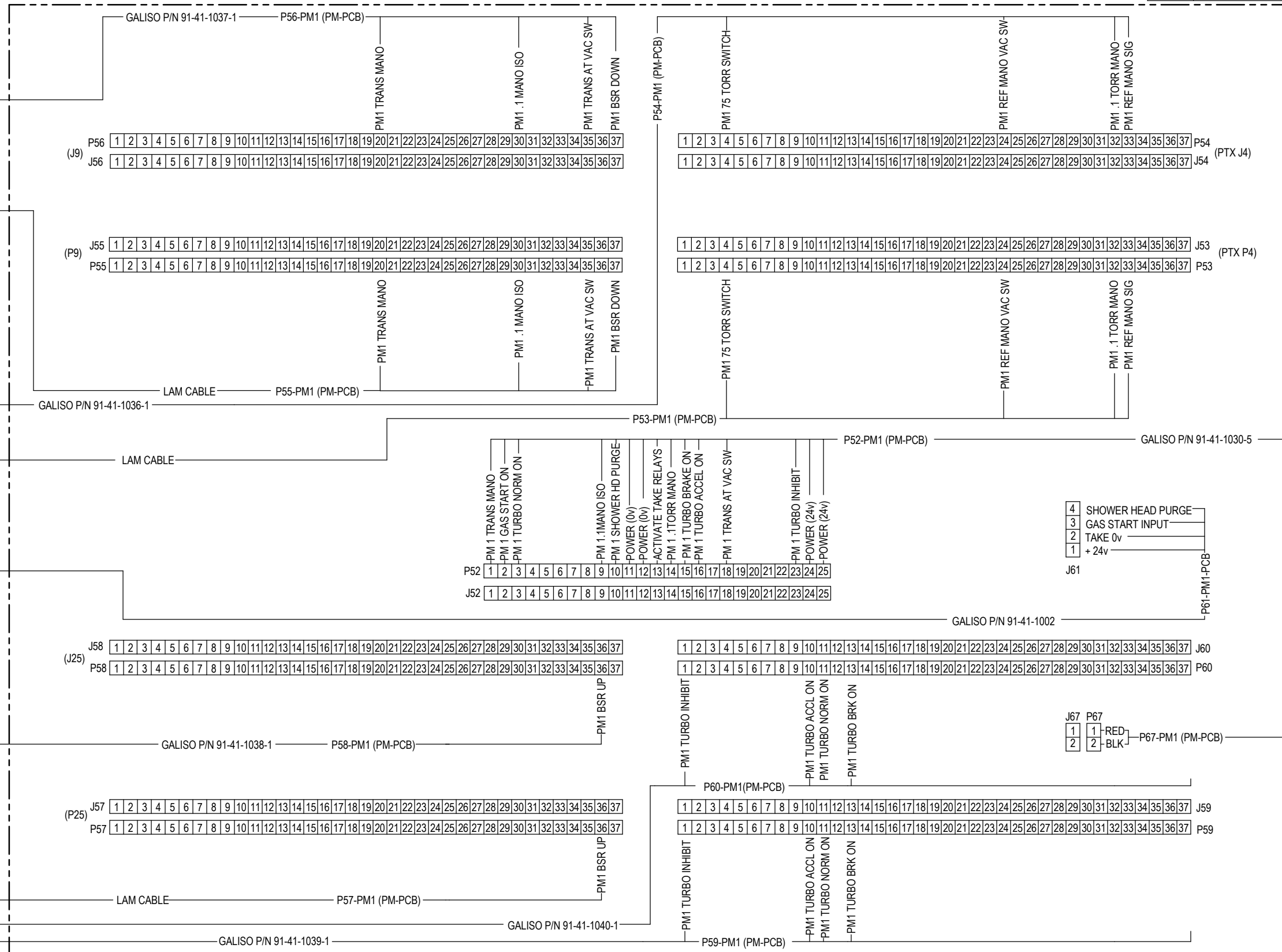
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TITLE: SCHEMATIC, HGS/ ALLIANCE PTX LIGHT ARRAY PCB			
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SHEET 7 OF —			

DRAWING # 200-91-3200

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SCHEMATIC, HGS/ ALLIANCE PTX PM1-PCB		200-91-3200				P4		SLDDRW		8 OF 8	

DRAWING # 200-91-3200 BUILD # A

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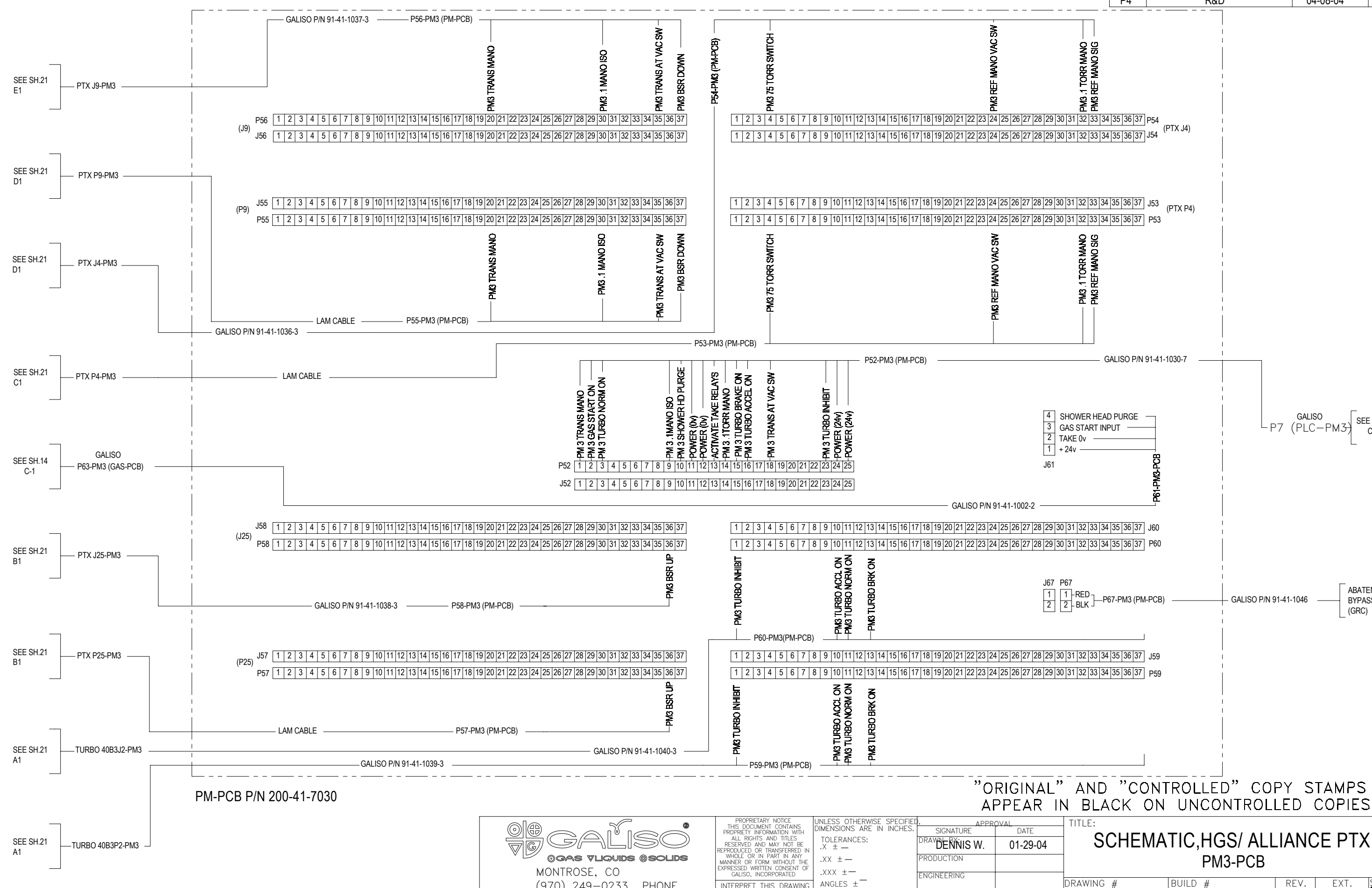
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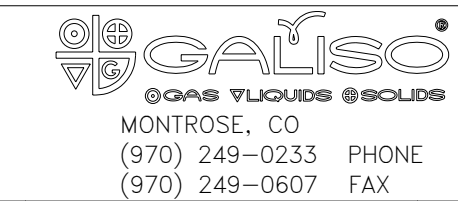
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EXT. SLDDRW	SHEET OF	

DRAWING # 200-91-3200
BUILD #

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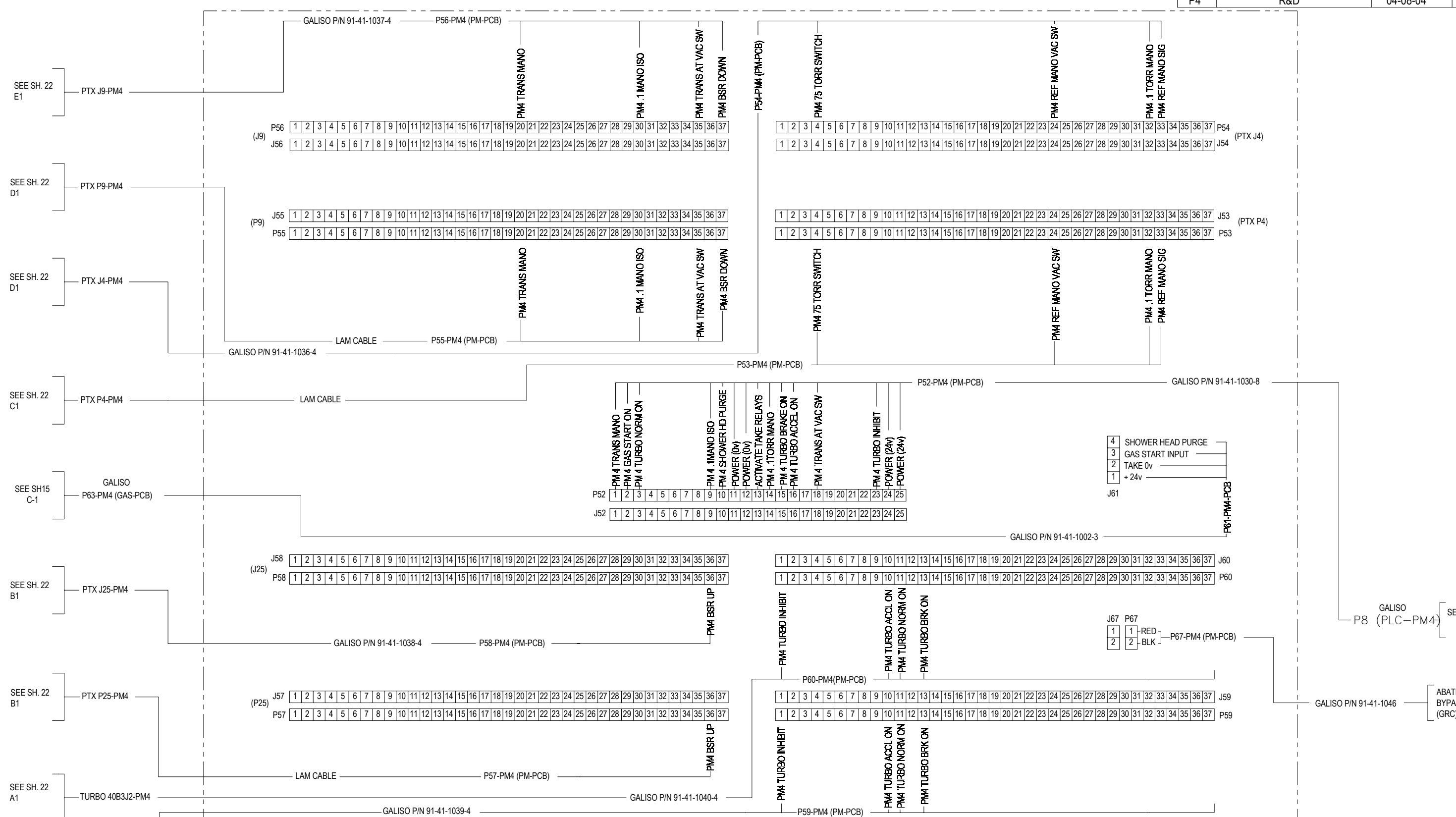
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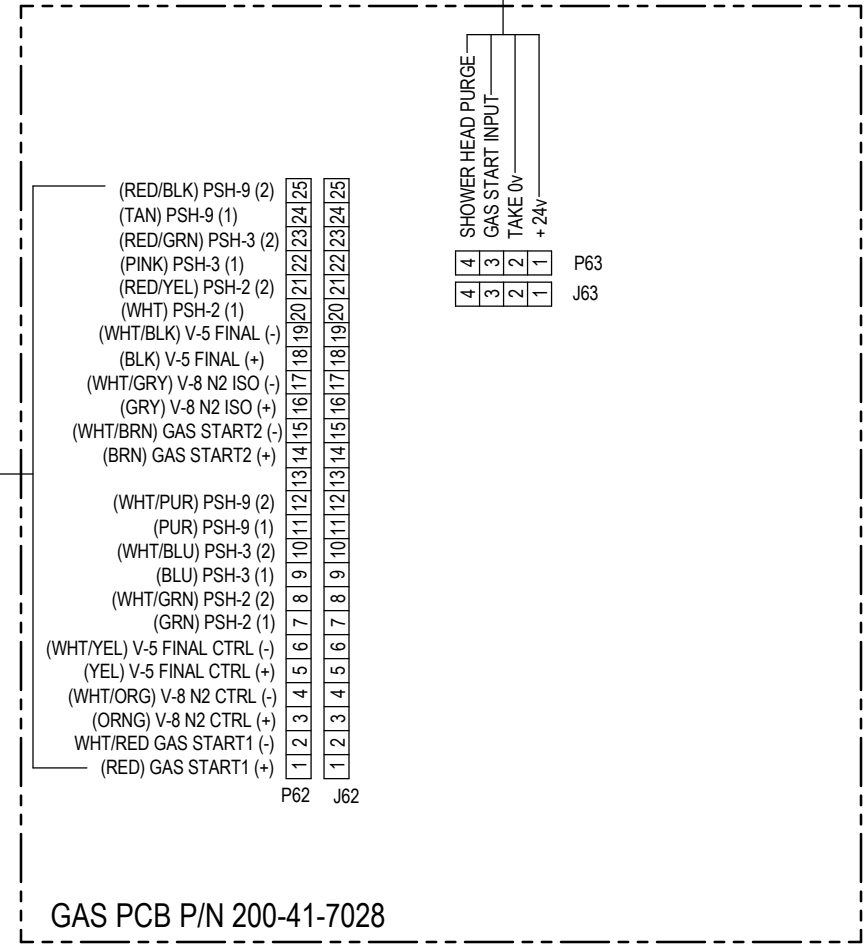
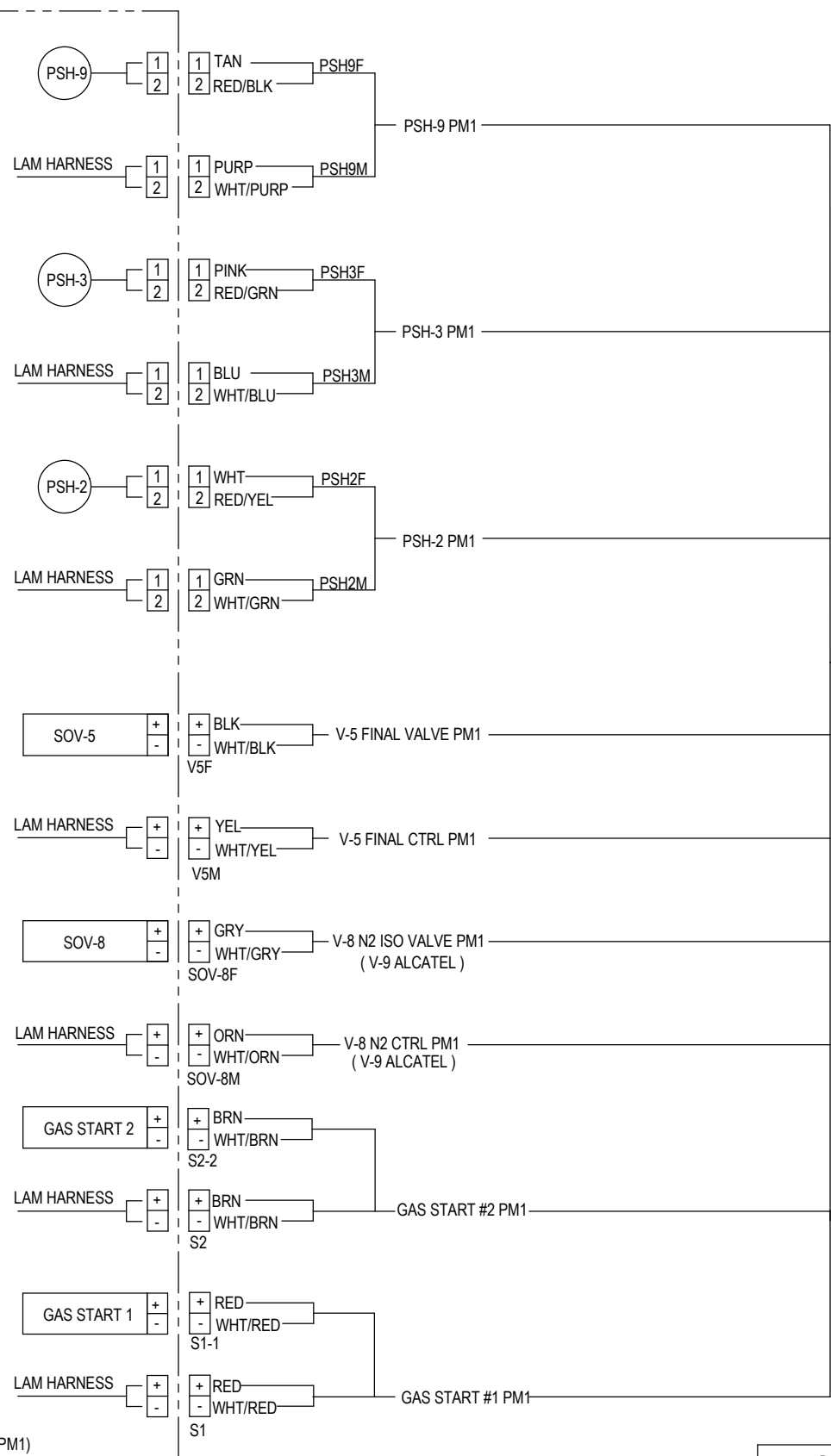
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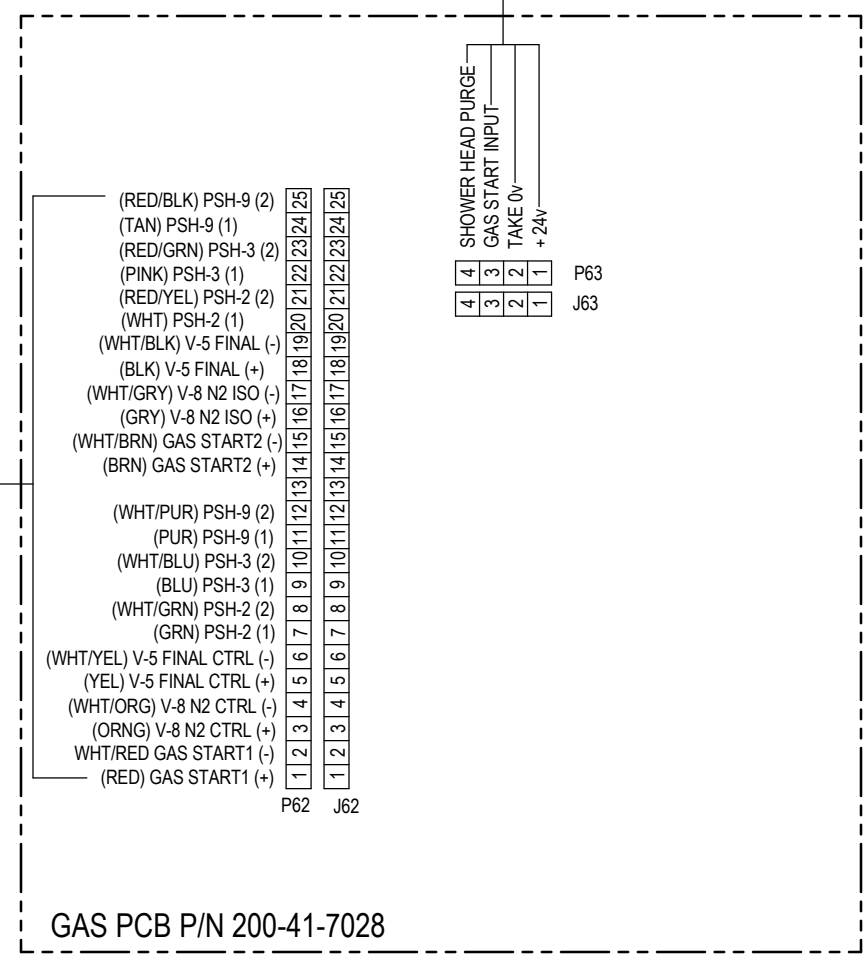
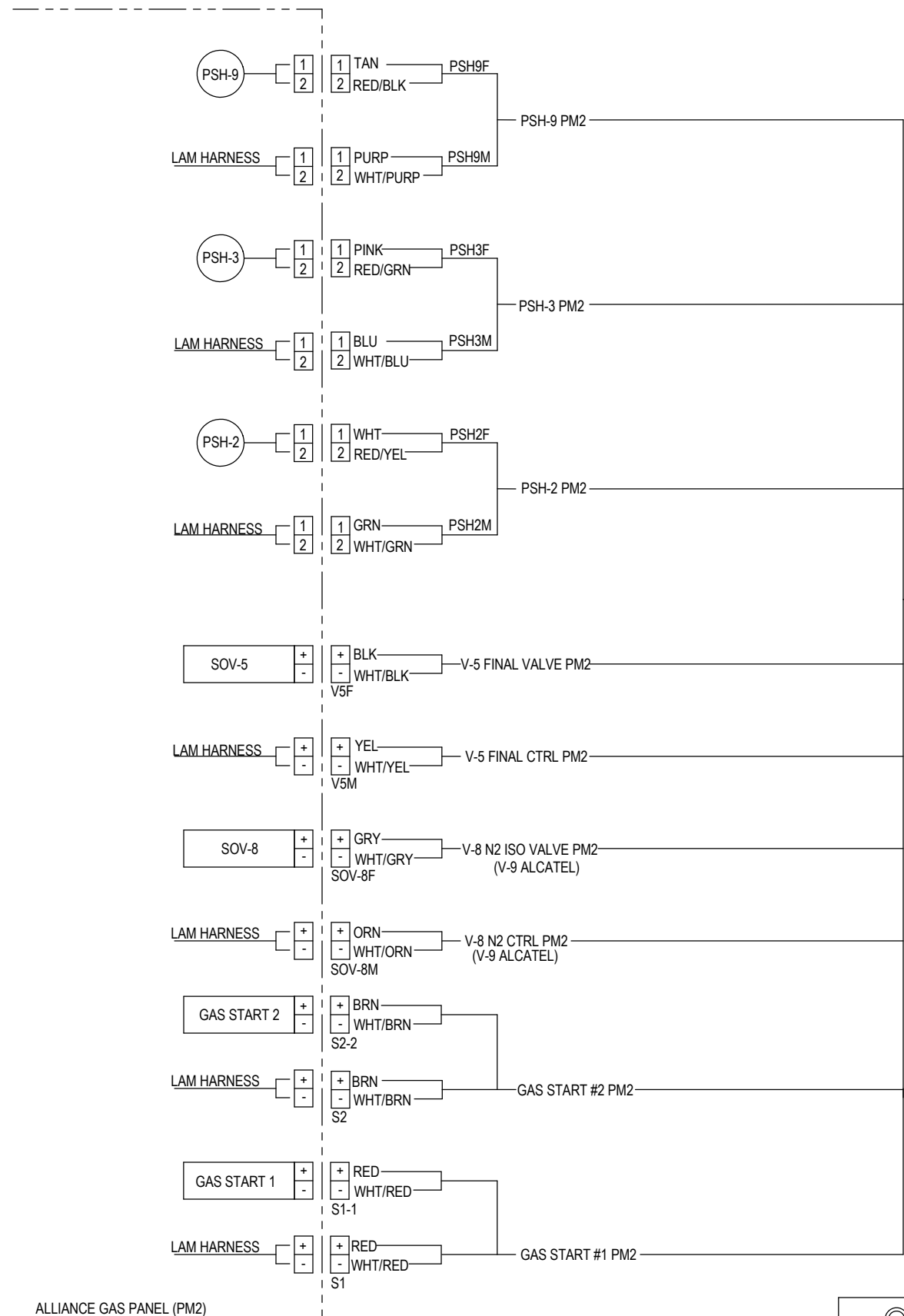
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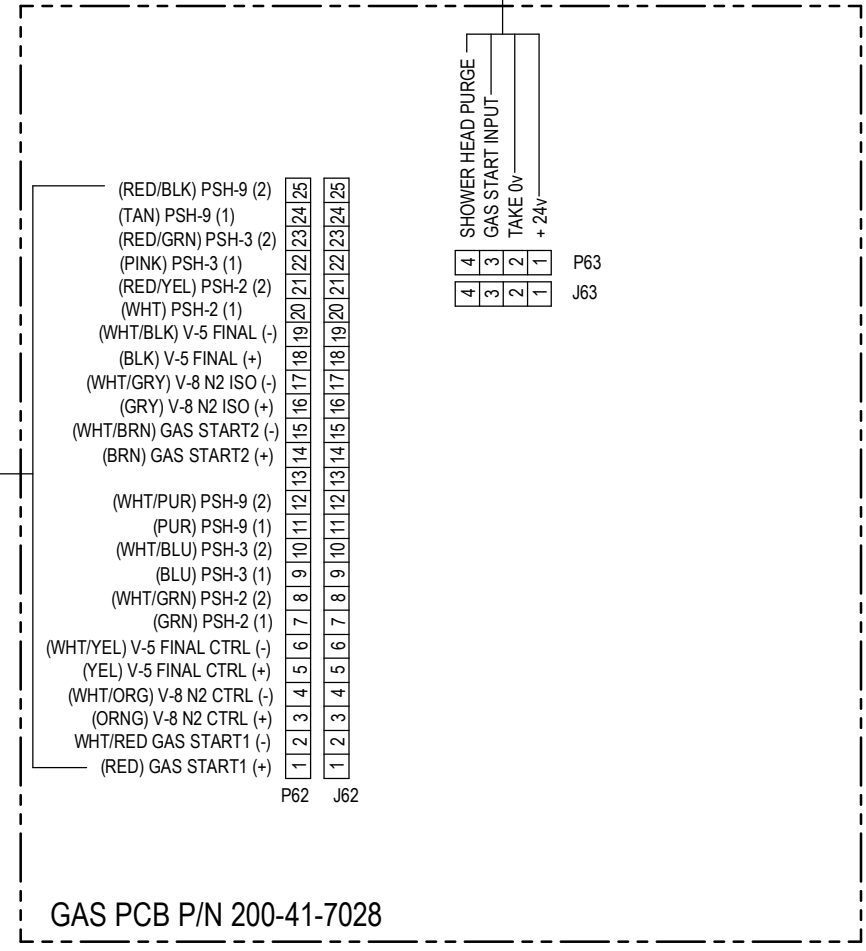
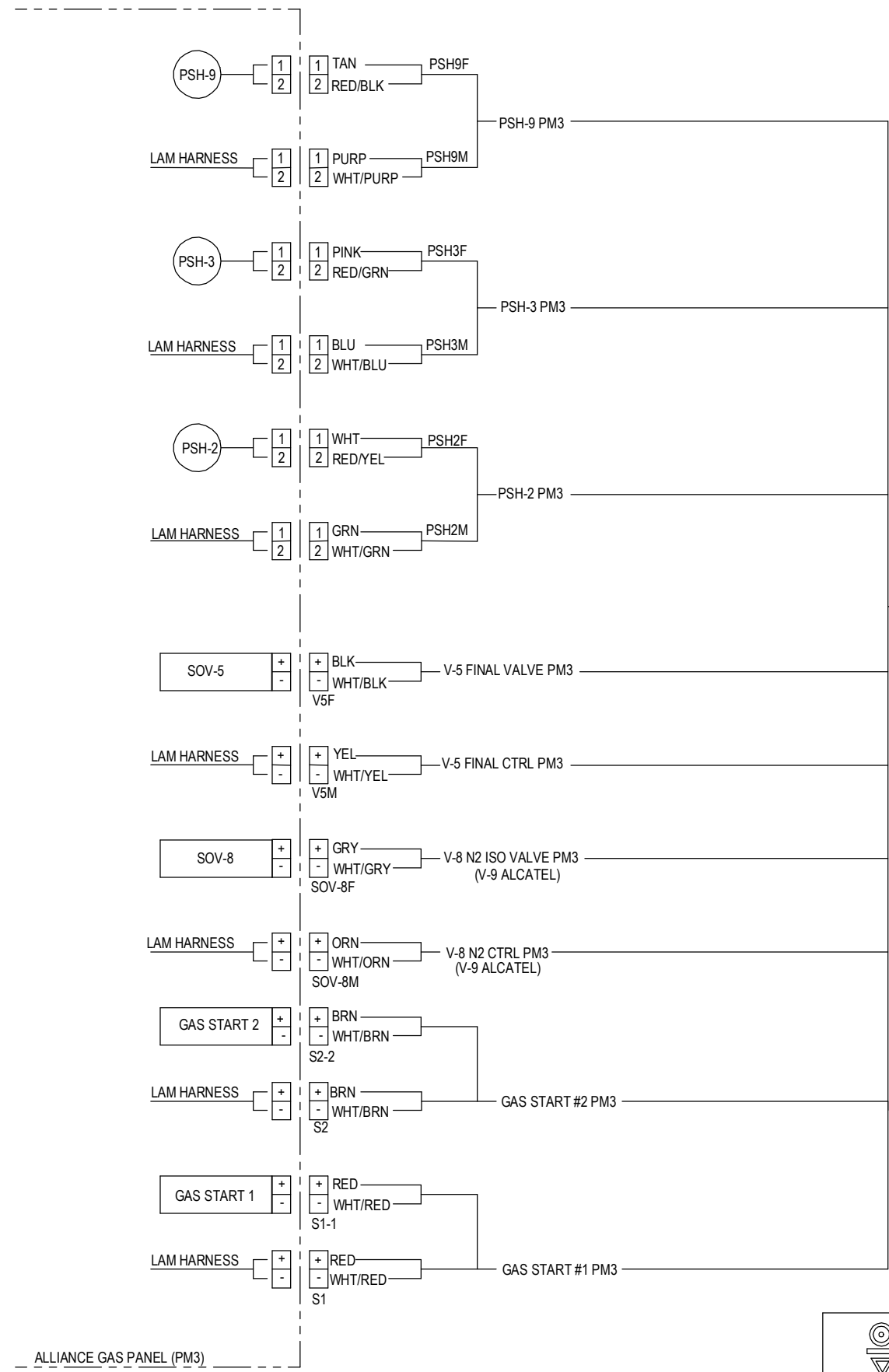
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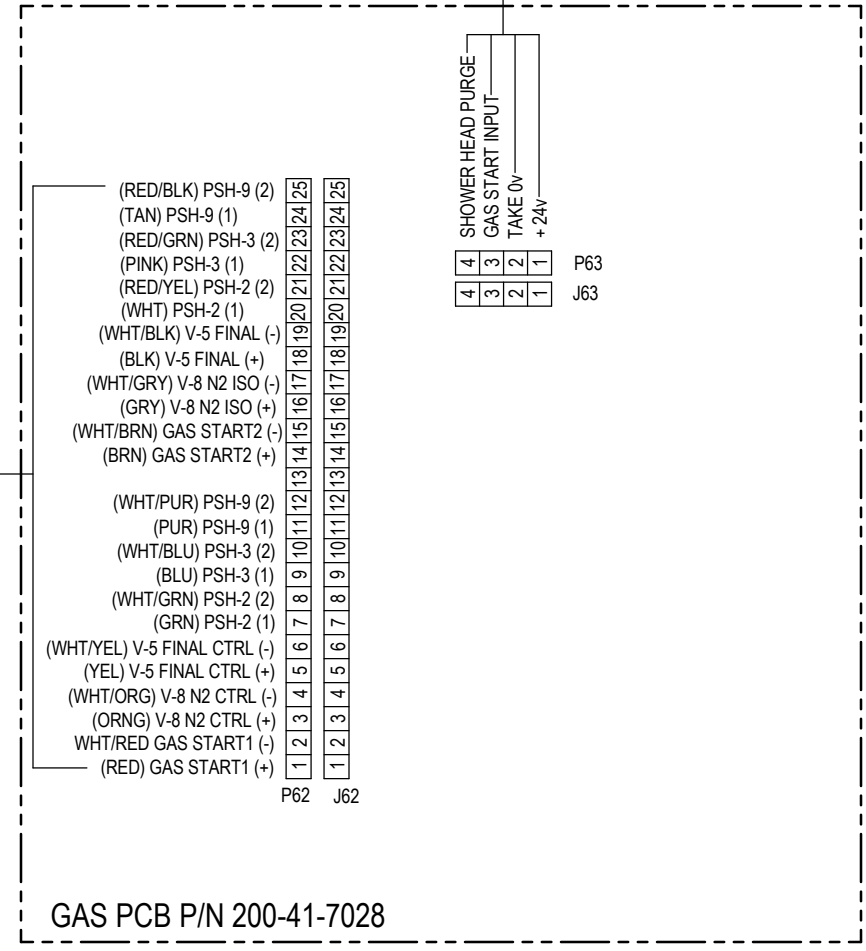
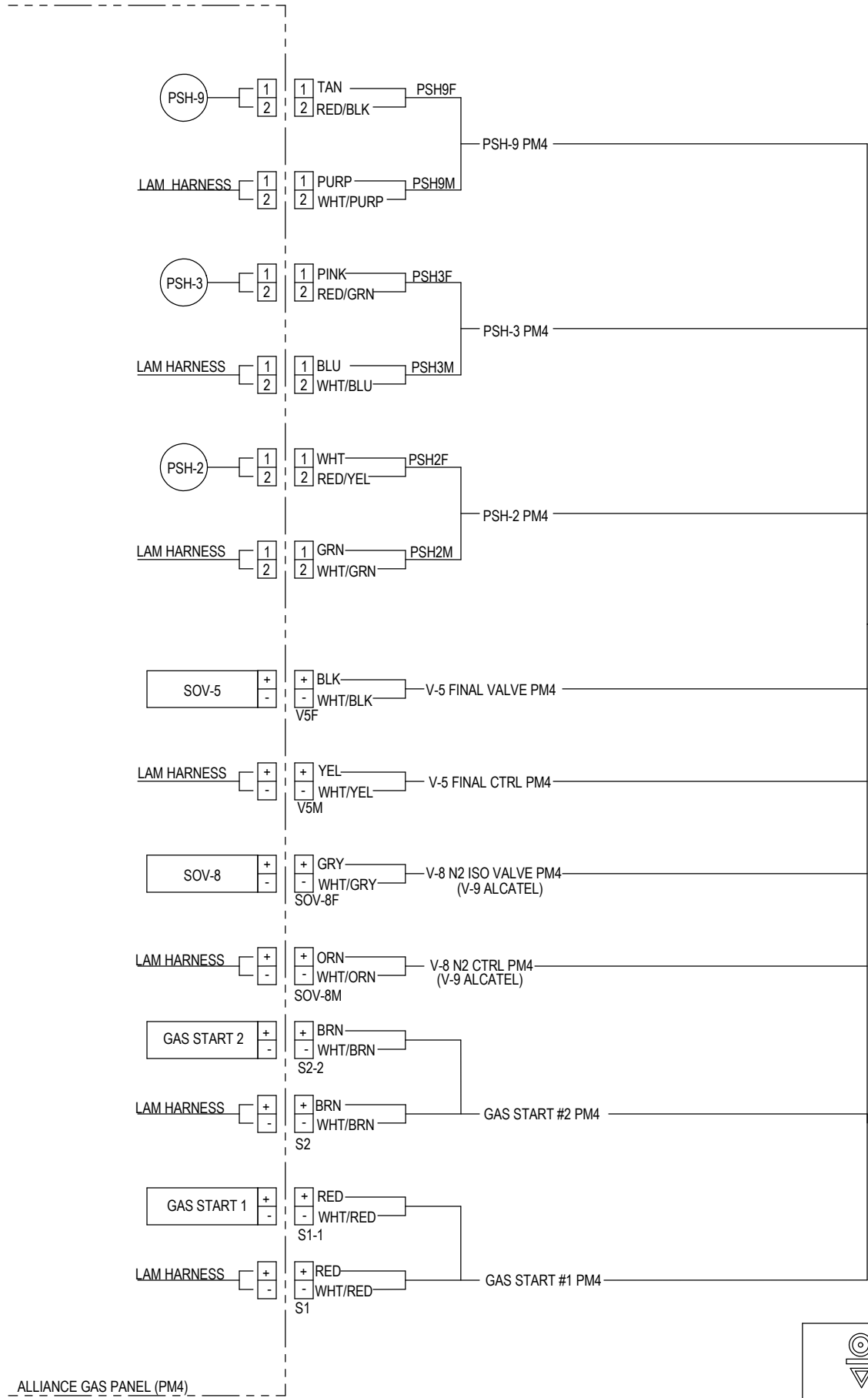
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ALLIANCE GAS PANEL (PM4)



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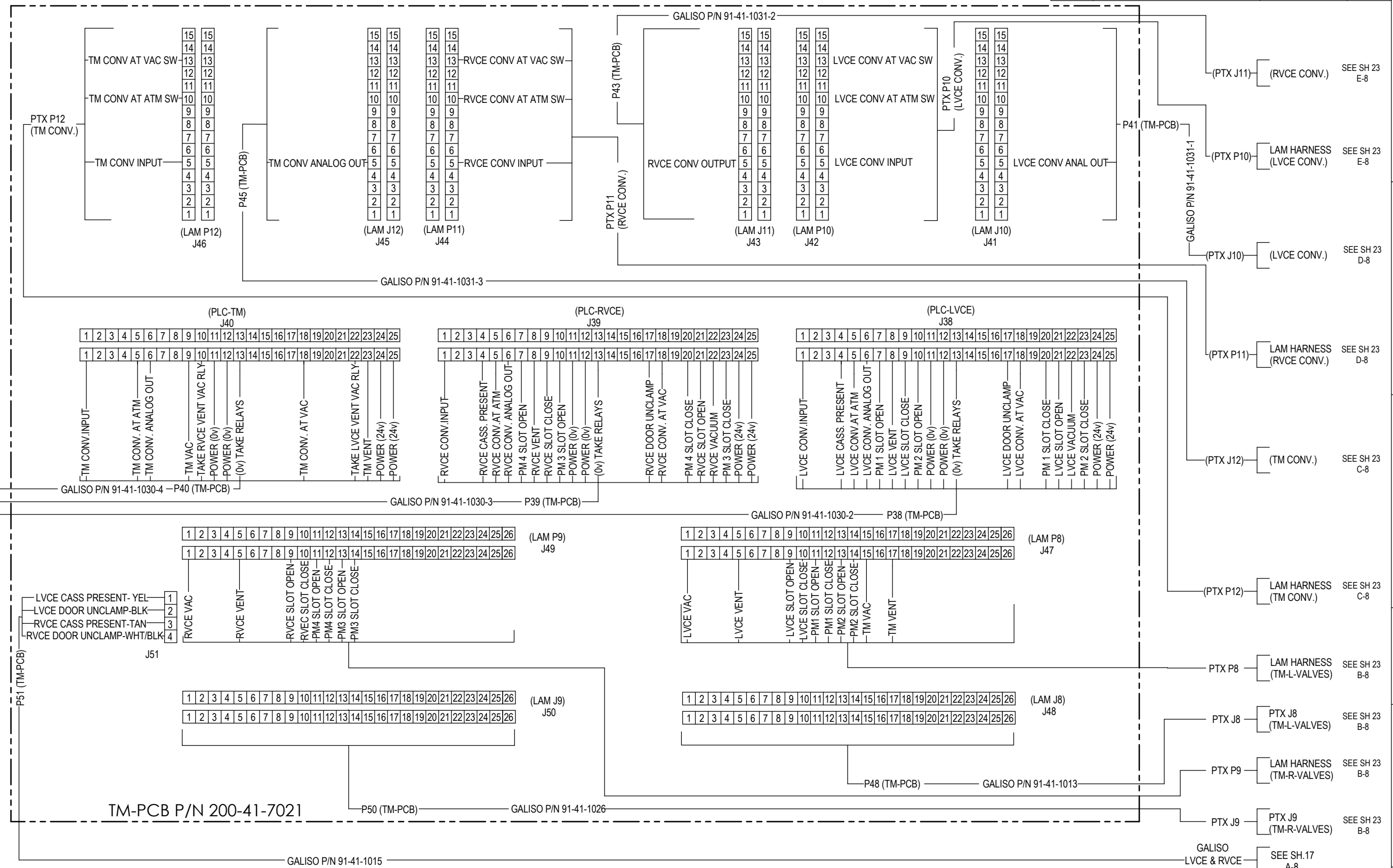
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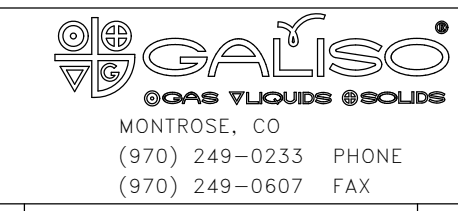
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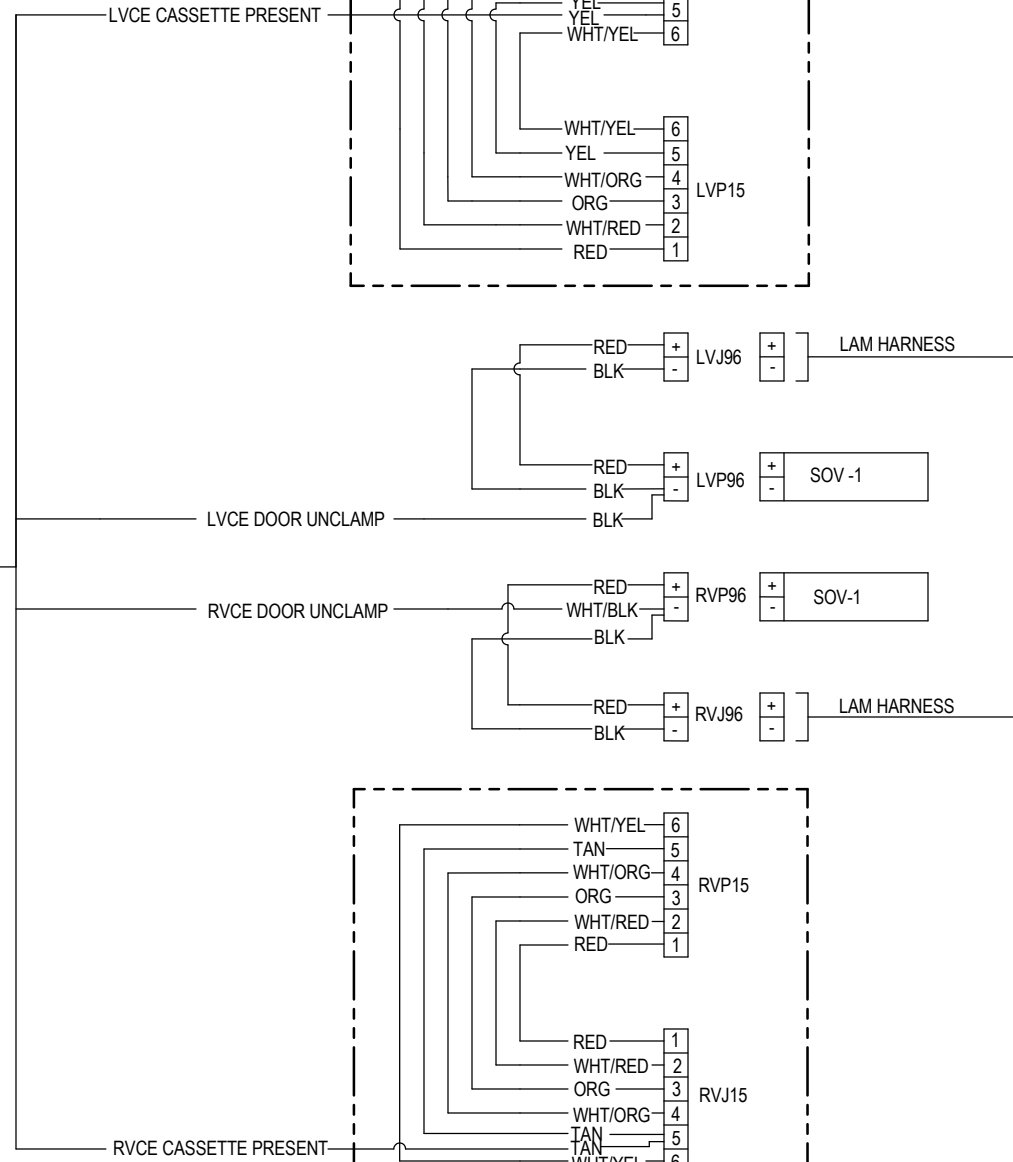
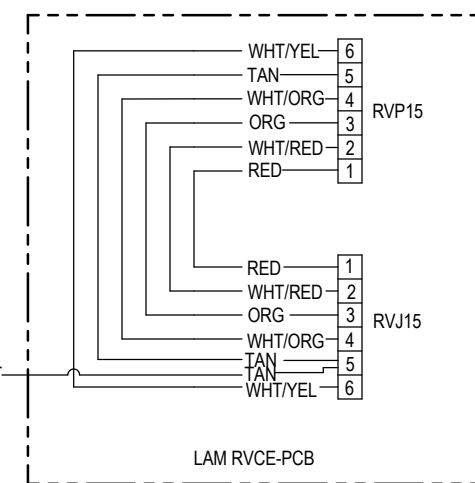
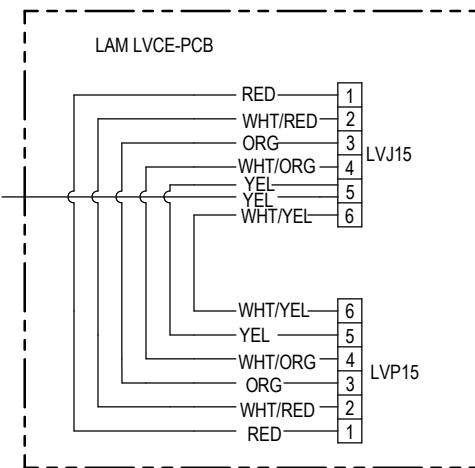
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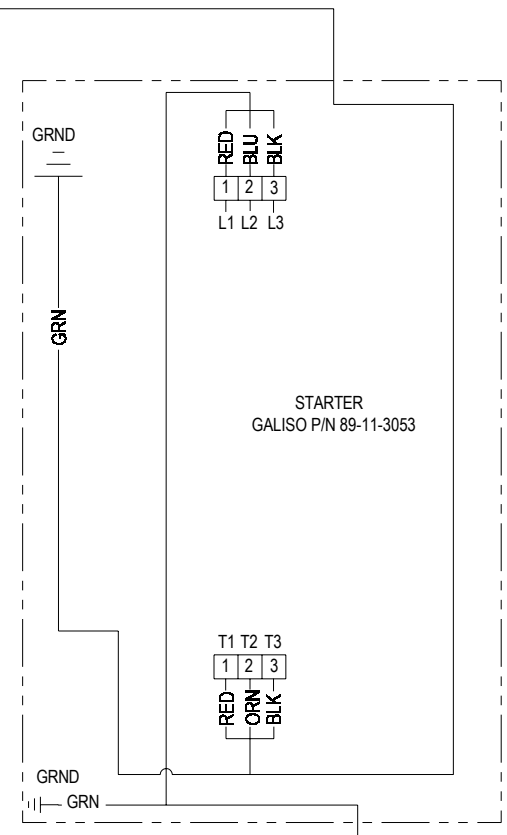
SEE SH.16 A-1 GALISO P51 (TM-PCB)

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			QUAL. ASSURANCE		
			REV. P3	EXT. SLDDRW	SHEET 17 OF —

DRAWING # 200-91-3200 BUILD #

REV.	AUTHORITY	DATE	BY
P3	R&D	01-29-04	DPW



SEE SH.5 B-1
 GALISO
 HGS 208v 3PH

RED } 208v 3PH POWER INPUT
 BLU } FROM LAM (TB-1) (TB-2) (TB-3)
 BLK }
 GRN — GRND

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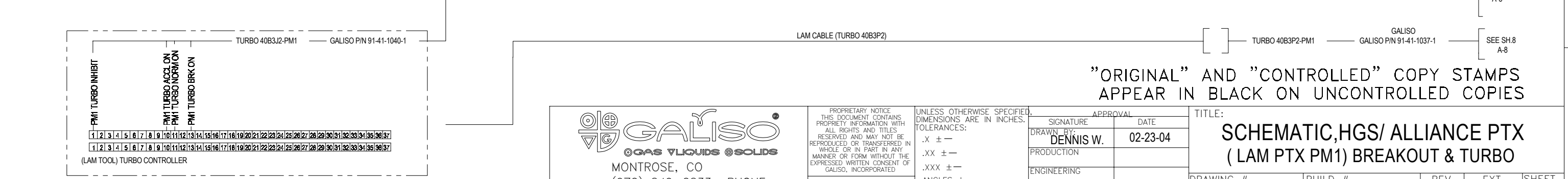
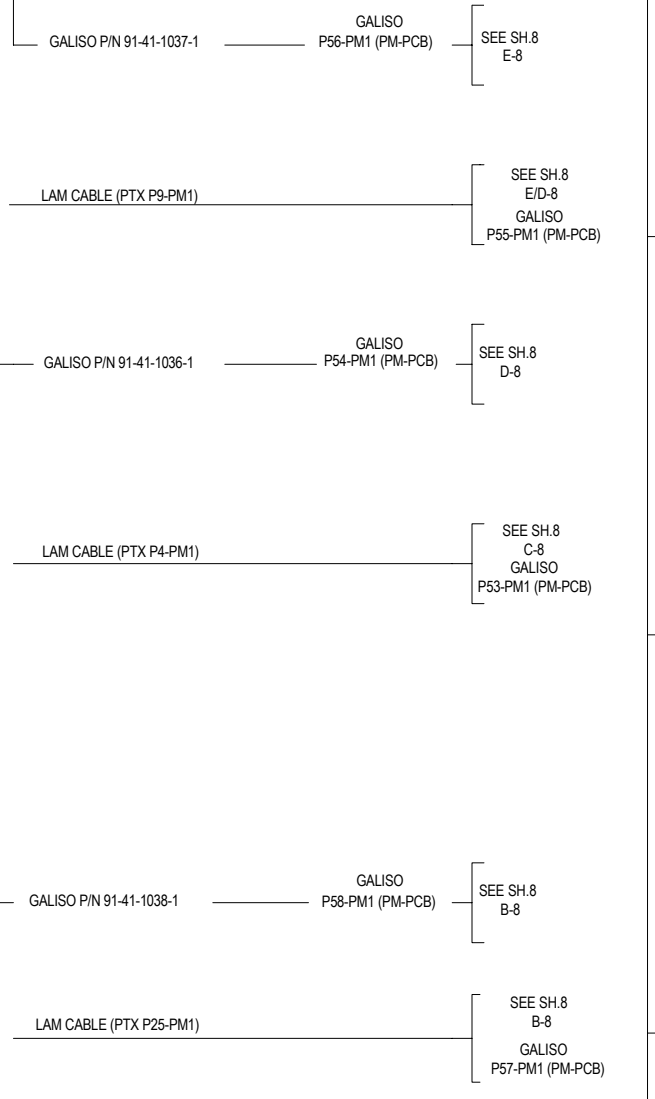
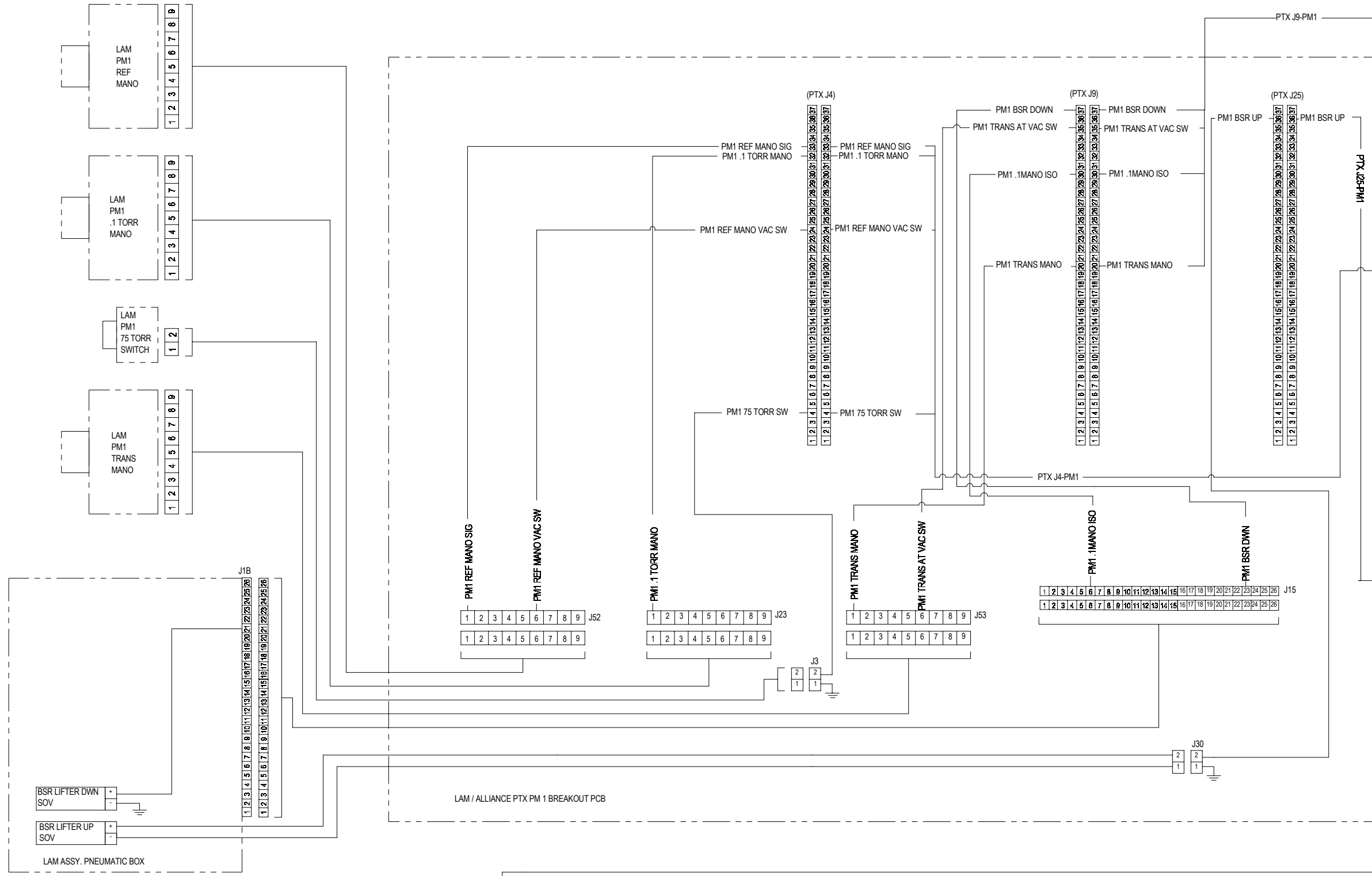
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DENNIS W.	01-29-04
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TITLE: SCHEMATIC,HGS/ ALLIANCE PTX HGS SWITCH BOX, 208VAC 3PHASE.				
DRAWING # 200-91-3200	BUILD #	REV. P3	EXT. SLDDRW	SHEET 8 OF

DRAWING # 200-91-3200
 BUILD #

REV. P3	AUTHORITY R&D	DATE 02-23-04	BY DPW
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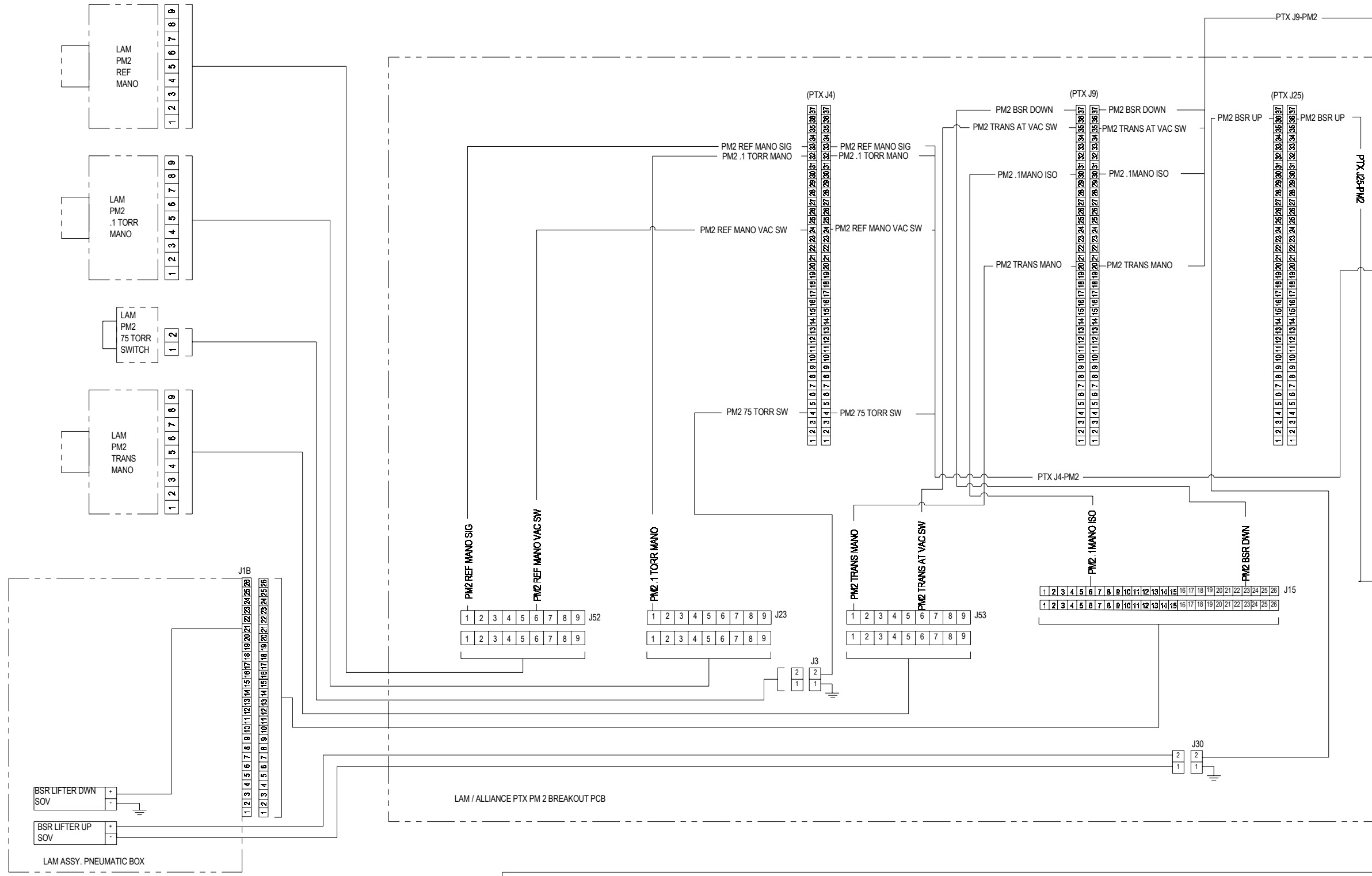
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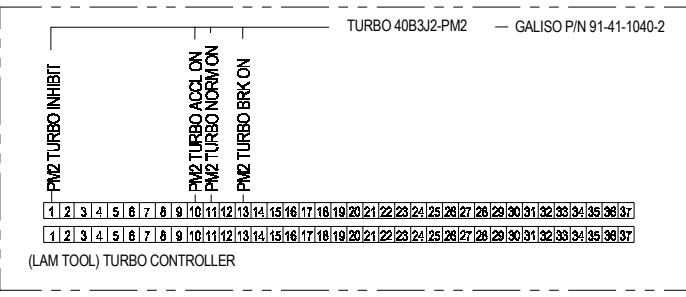
TITLE: SCHEMATIC,HGS/ ALLIANCE PTX (LAM PTX PM1) BREAKOUT & TURBO	
DRAWING # 200-91-3200	BUILD #
REV. P3	EXT. SLDDRW
SHEET 19	OF

DRAWING # 200-91-3200
BUILD #

REV. P3	AUTHORITY R&D	DATE 02-23-04	BY DPW
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GALISO P/N 91-41-1037-2	GALISO P56-PM2 (PM-PCB)	SEE SH.9 E-8
LAM CABLE (PTX P9-PM2)		SEE SH.9 E/D-8 GALISO P55-PM2 (PM-PCB)
GALISO P/N 91-41-1036-2	GALISO P54-PM2 (PM-PCB)	SEE SH.9 D-8
LAM CABLE (PTX P4-PM2)		SEE SH.9 C-8 GALISO P53-PM2 (PM-PCB)
GALISO P/N 91-41-1038-2	GALISO P58-PM2 (PM-PCB)	SEE SH.9 B-8
LAM CABLE (PTX P25-PM2)		SEE SH.9 B-8 GALISO P57-PM2 (PM-PCB)
GALISO P60-PM2 (PM-PCB)		SEE SH.9 A-8
TURBO 40B3P2-PM2	GALISO P/N 91-41-1037-2	SEE SH.9 A-8




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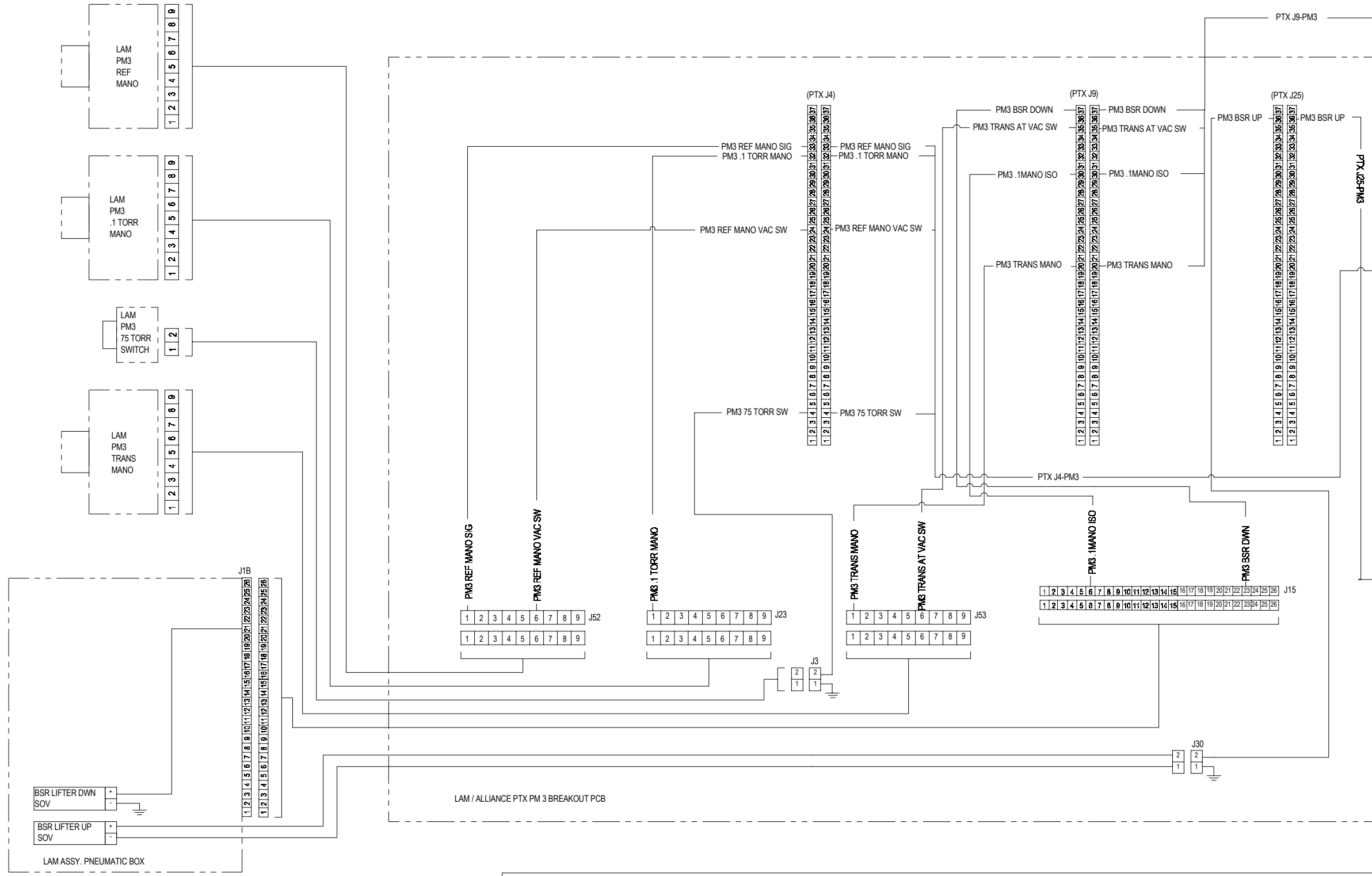
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SIGNATURE	DATE
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ENGINEERING	
QUAL. ASSURANCE	

TITLE: SCHEMATIC,HGS/ ALLIANCE PTX (LAM PTX PM2) BREAKOUT & TURBO		
DRAWING # 200-91-3200	BUILD #	REV. P3
EXT. SLDDRW	SHEET 20	OF

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DRAWING # 200-91-3200
 BUILD #

REV.	AUTHORITY	DATE	BY
P3	R&D	02-23-04	DPW



GALISO P/N 91-41-1037-3	GALISO P56-PM3 (PM-PCB)	SEE SH.10 E-8
LAM CABLE (PTX P9-PM3)		SEE SH.10 E/D-8 GALISO P55-PM3 (PM-PCB)
GALISO P/N 91-41-1036-3	GALISO P54-PM3 (PM-PCB)	SEE SH.10 D-8
LAM CABLE (PTX P4-PM3)		SEE SH.10 C-8 GALISO P53-PM3 (PM-PCB)
GALISO P/N 91-41-1038-3	GALISO P58-PM3 (PM-PCB)	SEE SH.10 B-8
LAM CABLE (PTX P25-PM3)		SEE SH.10 B-8 GALISO P57-PM3 (PM-PCB)
GALISO P60-PM3 (PM-PCB)		SEE SH.10 A-8
TURBO 40B3P2-PM3	GALISO P/N 91-41-1037-3	SEE SH.10 A-8

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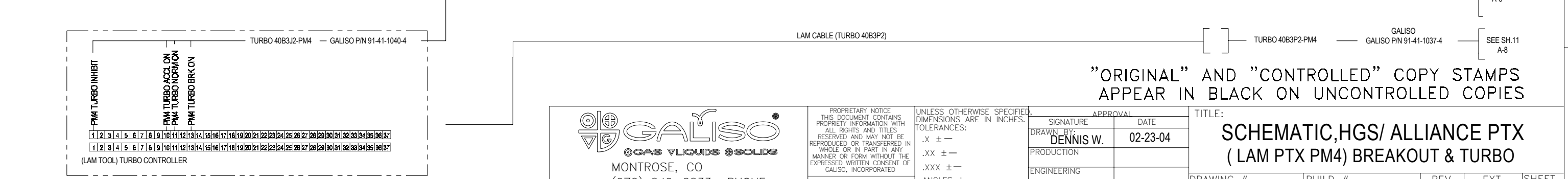
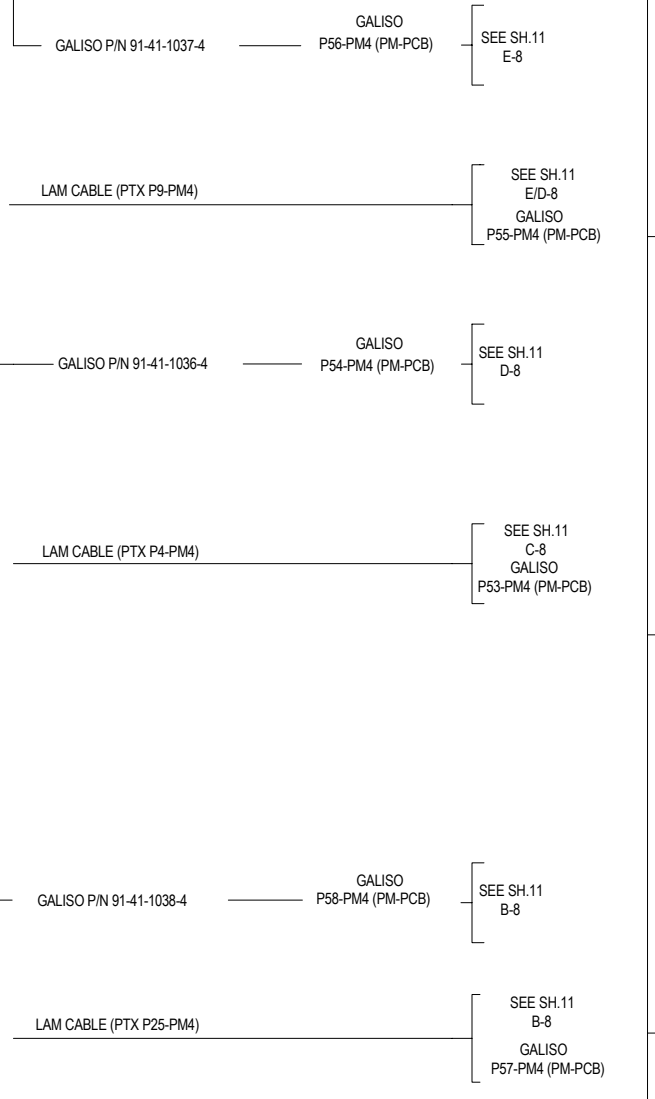
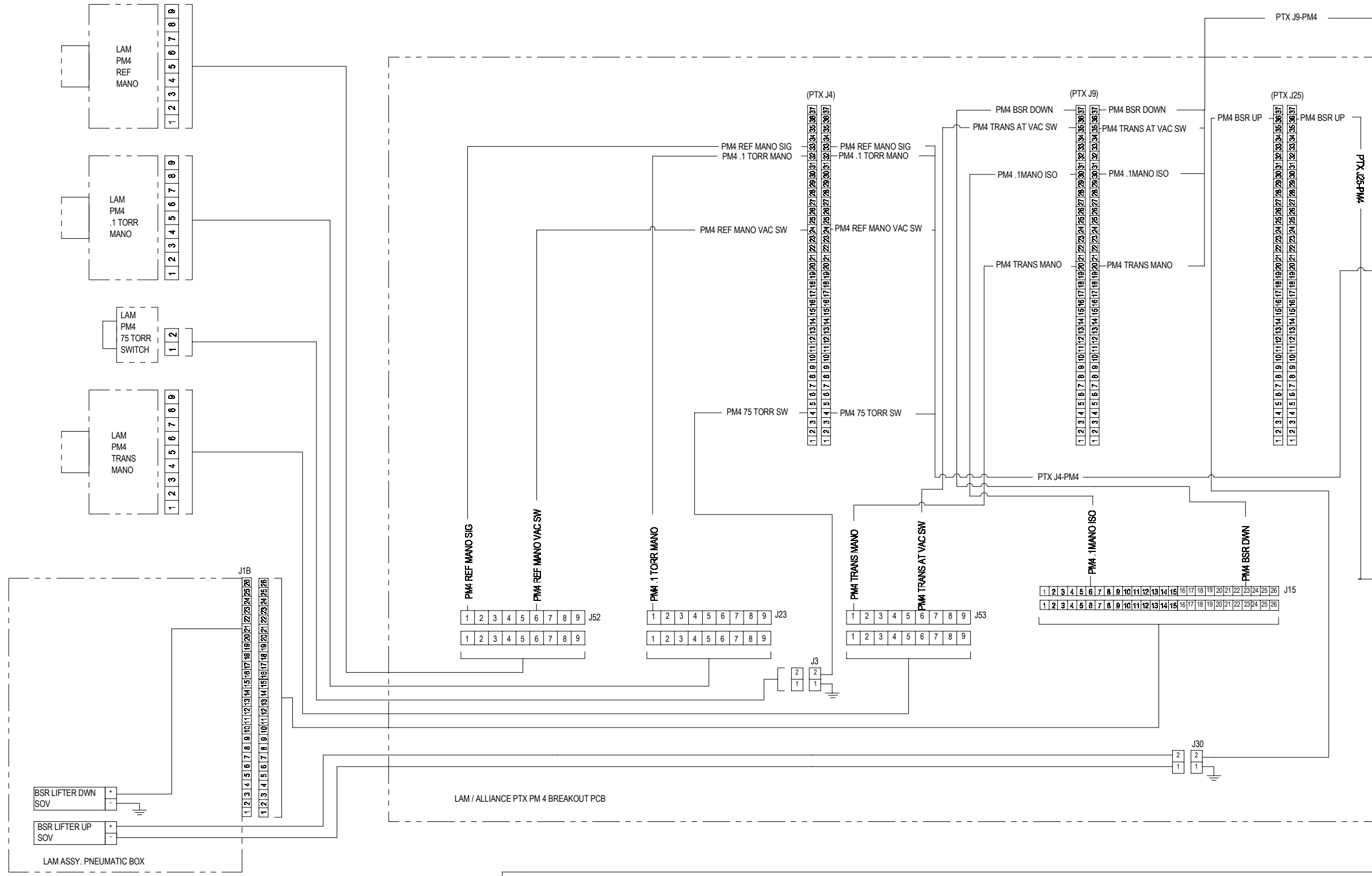
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TITLE: SCHEMATIC,HGS/ ALLIANCE PTX (LAM PTX PM3) BREAKOUT & TURBO		
DRAWING # 200-91-3200	BUILD #	REV. P3
EXT. SLDDRW	SHEET 21	OF 1

DRAWING # 200-91-3200
BUILD #

REV. P3	AUTHORITY R&D	DATE 02-23-04	BY DPW
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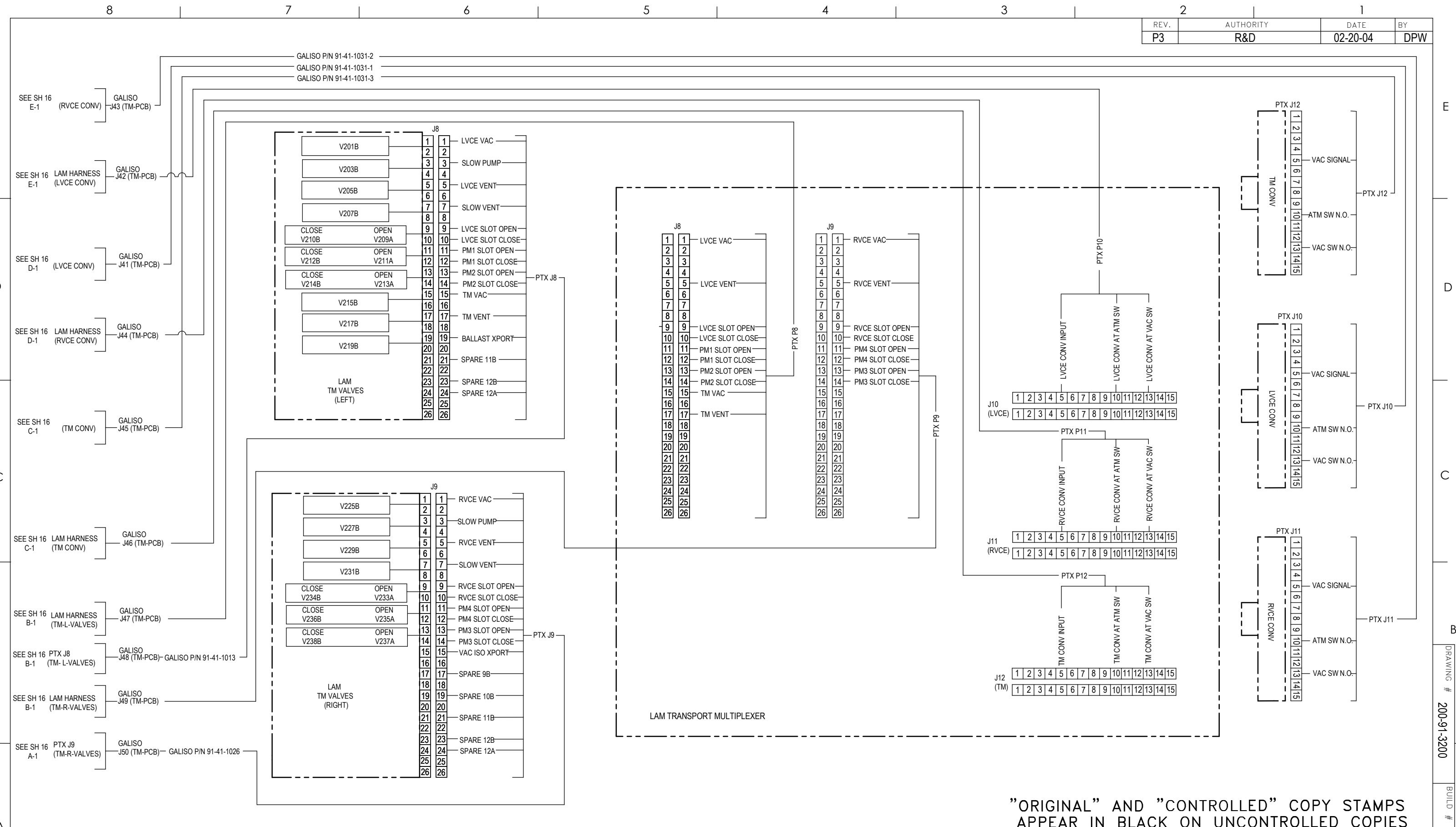
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TITLE: SCHEMATIC,HGS/ ALLIANCE PTX (LAM PTX PM4) BREAKOUT & TURBO		
DRAWING # 200-91-3200	BUILD #	REV. P3
EXT. SLDDRW	SHEET 22	OF 22

DRAWING # 200-91-3200
BUILD #



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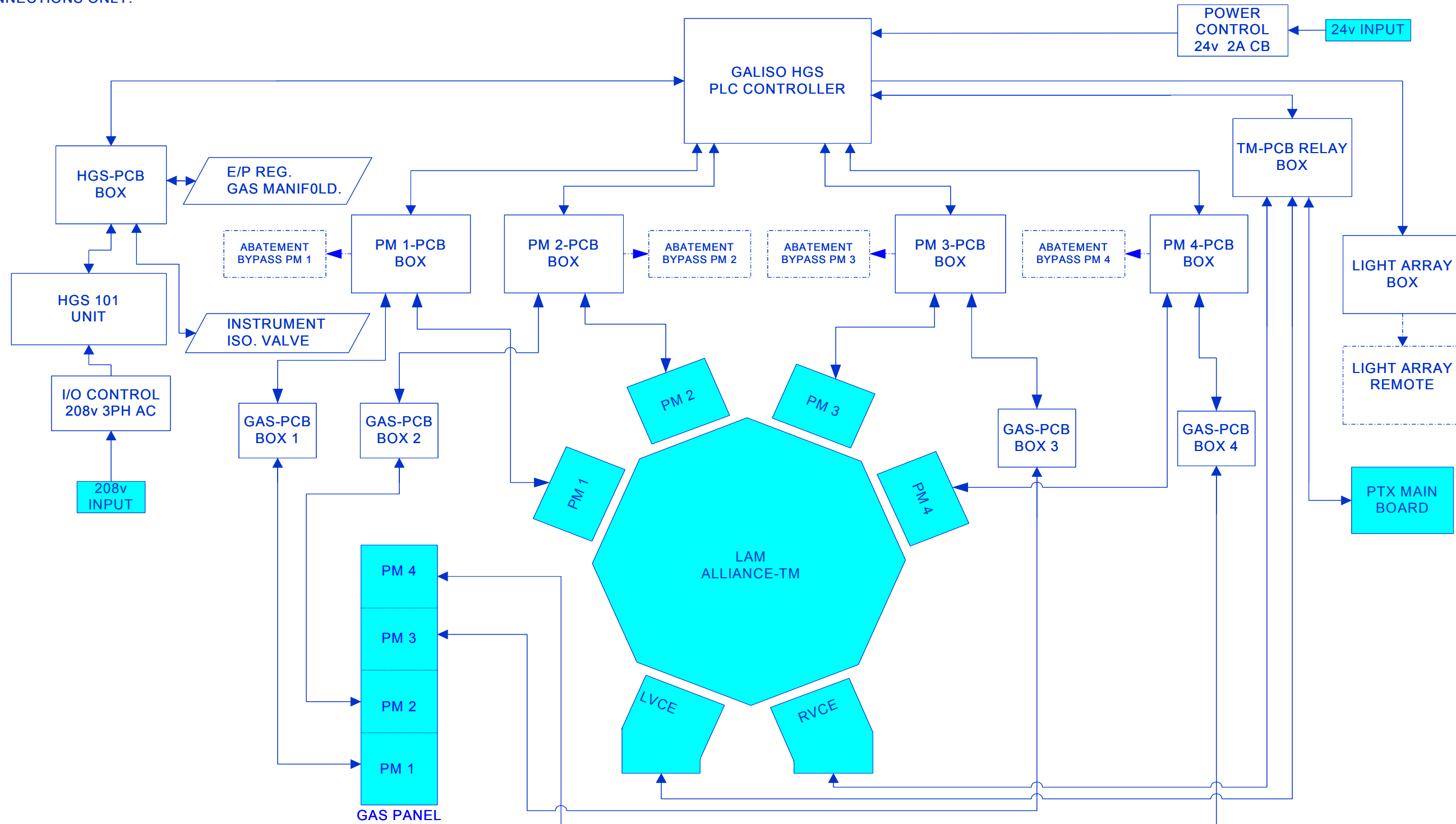
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TITLE:		DRAWING #		BUILD #		REV.		EXT.		SHEET	
SCHEMATIC, HGS/ALLIANCE PTX LAM TRANSPORT MULTIPLEXER		200-91-3200				P3		SLDDRW		23 OF 23	

DRAWING # 200-91-3200
BUILD #

REV.	AUTHORITY	DATE	BY
P4	R&D	04-08-04	DPW

NOTE:
1. THIS CHART TO
SHOW SINGLE
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REVISION STATUS OF SHEETS																							
SHEET	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
REVISION	P4	P3	P3	P3	P3	P3	P3	P4	P4	P4	P3	P3	P3	P3	P3	P3	P3	P3	P3	P3	P3	P3	P3

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TITLE: SCHEMATIC, HGS/ ALLIANCE PTX INTERCONNECTION DIAGRAM			
DRAWING # 200-91-3200	BUILD #	REV. P4	EXT. SLDDRW
			SHEET 1 OF 23

DRAWING # 200-91-3200

BUILD #

NOTE:
1. PLC MODULES WITHIN () INDICATE SLOT DESIGNATIONS.

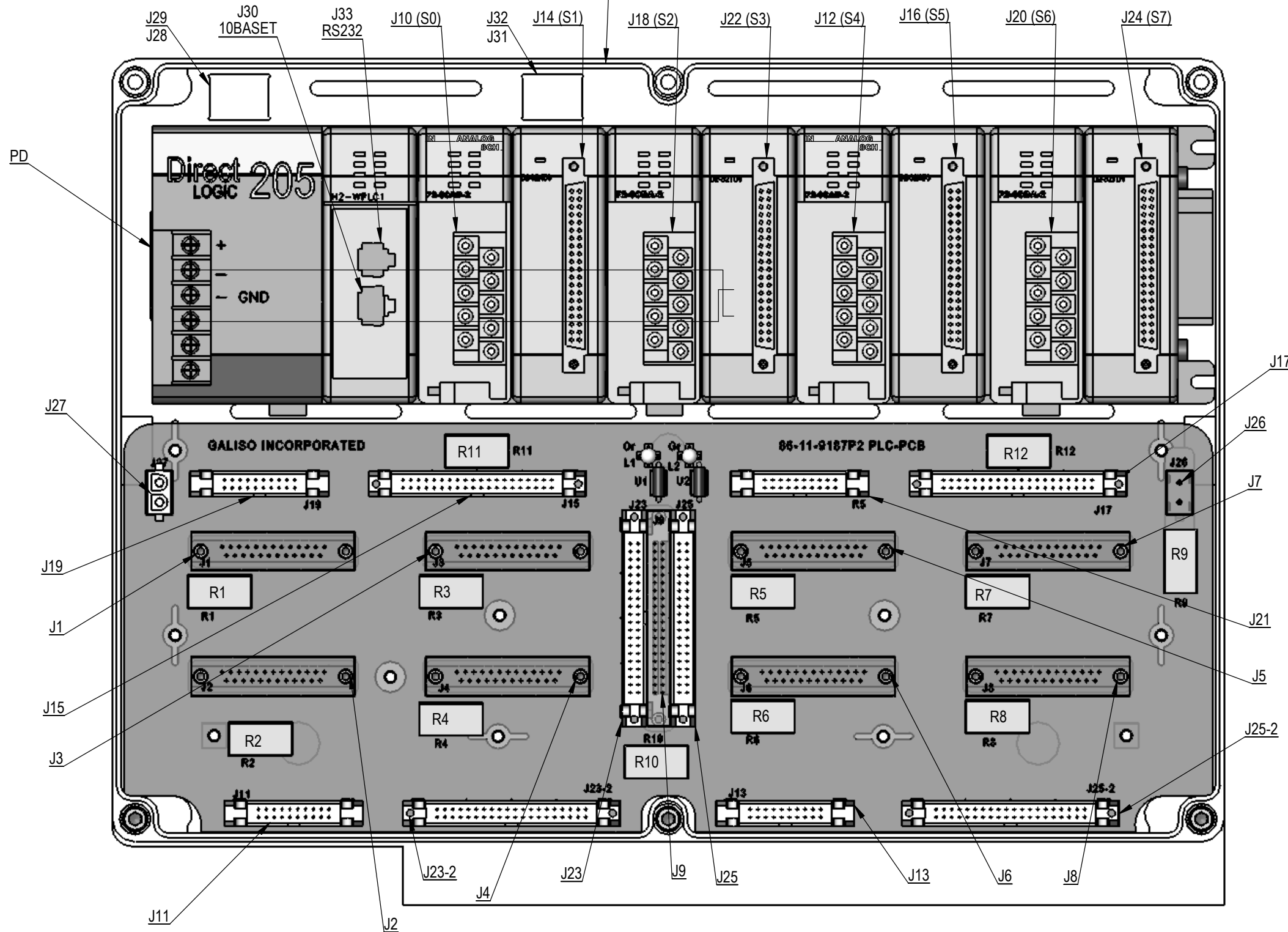
P/N 200-41-7026

IDENTIFICATION/ FUNCTION

- J1- HGS I/O
- J2- LVCE I/O
- J3- PM 1 I/O
- J4- PM 2 I/O
- J5- TM I/O
- J6- RVCE I/O
- J7- PM 3 I/O
- J8- PM 4 I/O
- J9- LIGHT ARRAY
- J10- ANALOG INPUT 1 PLC
- J11- ANALOG INPUT 1 PCB
- J12- ANALOG INPUT 2 PLC
- J13- ANALOG INPUT 2 PCB
- J14- DIGITAL INPUT 1 PLC
- J15- DIGITAL INPUT 1 PCB
- J16- DIGITAL INPUT 2 PLC
- J17- DIGITAL INPUT 2 PCB
- J18- ANALOG OUTPUT 1 PLC
- J19- ANALOG OUTPUT 1 PCB
- J20- ANALOG OUTPUT 2 PLC
- J21- ANALOG OUTPUT 2 PCB
- J22- DIGITAL OUTPUT 1 PLC
- J23- DIGITAL OUTPUT 1 PCB
- J23-2 DIGITAL OUTPUT 1 PCB
- J24- DIGITAL OUTPUT 2 PLC
- J25- DIGITAL OUTPUT 2 PCB
- J25-2 DIGITAL OUTPUT 2 PCB
- J26- INPUT, 24v
- J27- PD-24v INPUT
- J28- ETHERNET PC PATCH
- J29- ETHERNET DATA LINK CROSSOVER
- J30- PLC ETHERNET DATA LINK
- J31- RS232 TO FACTORY AUTOMATION
- J32- RS232 DATA LINK OUTPUT
- J33- PLC RS232 DATA LINK
- PD- PLC BASE, POWER DISTRIBUTION

RELAY IDENTIFICATION/ FUNCTION

- R1 J1 ANALOG ISOLATION
- R2 J2 ANALOG ISOLATION
- R3 J3 ANALOG ISOLATION
- R4 J4 ANALOG ISOLATION
- R5 J5 ANALOG ISOLATION
- R6 J6 ANALOG ISOLATION
- R7 J7 ANALOG ISOLATION
- R8 J8 ANALOG ISOLATION
- R9 POWER ISOLATION
- R10 TAKE CIRCUIT
- R11 S1 INPUT POLARITY
- R12 S5 INPUT POLARITY



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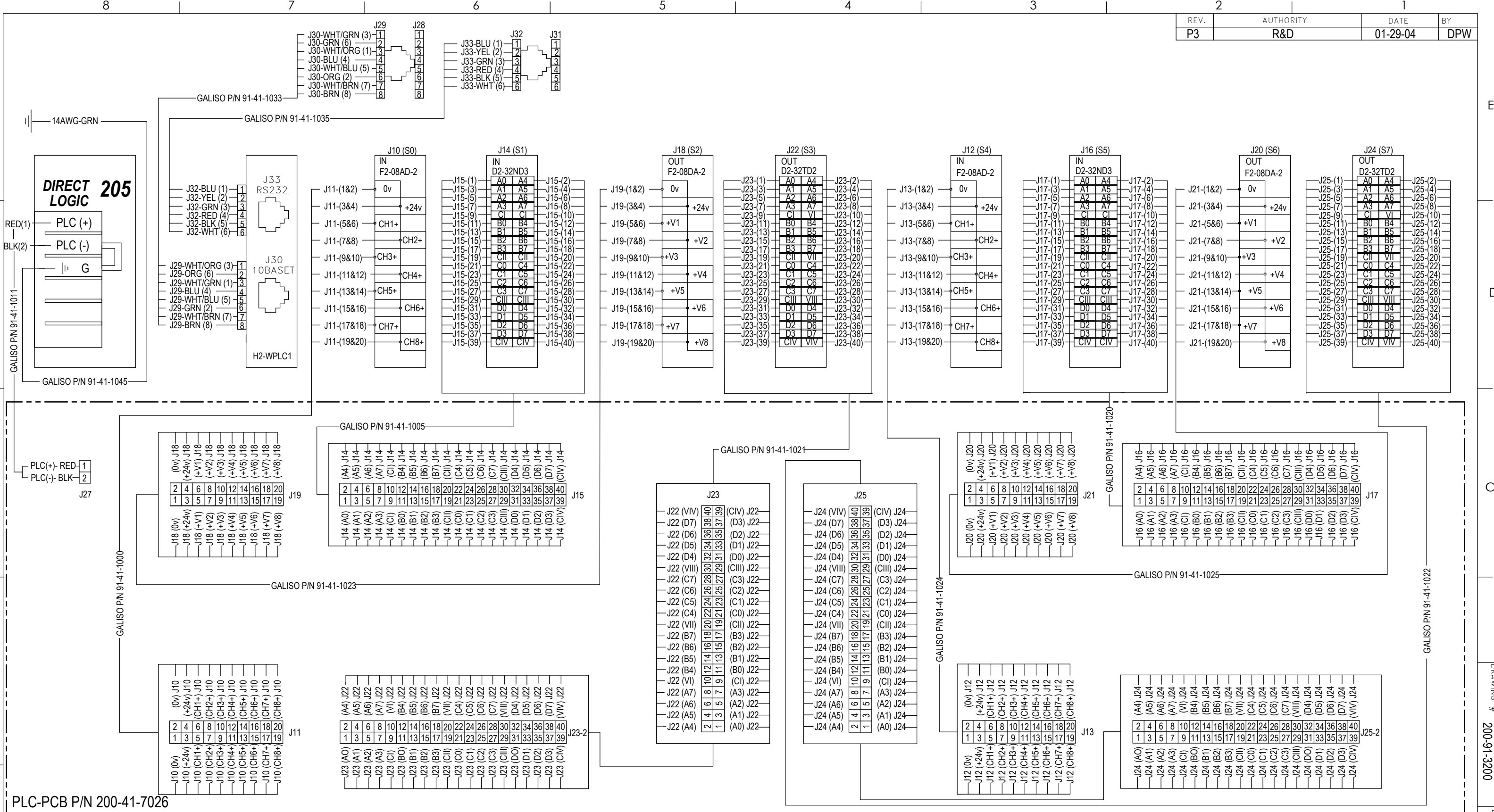
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TITLE: SCHEMATIC, HGS/ ALLIANCE PTX PLC, IDENTIFICATION & FUNCTION			
DRAWING #	BUILD #	REV.	EXT.
200-91-3200		P3	SLDDRW
SHEET	2 OF 2		

DRAWING # 200-91-3200 BUILD #

REV.	AUTHORITY	DATE	BY
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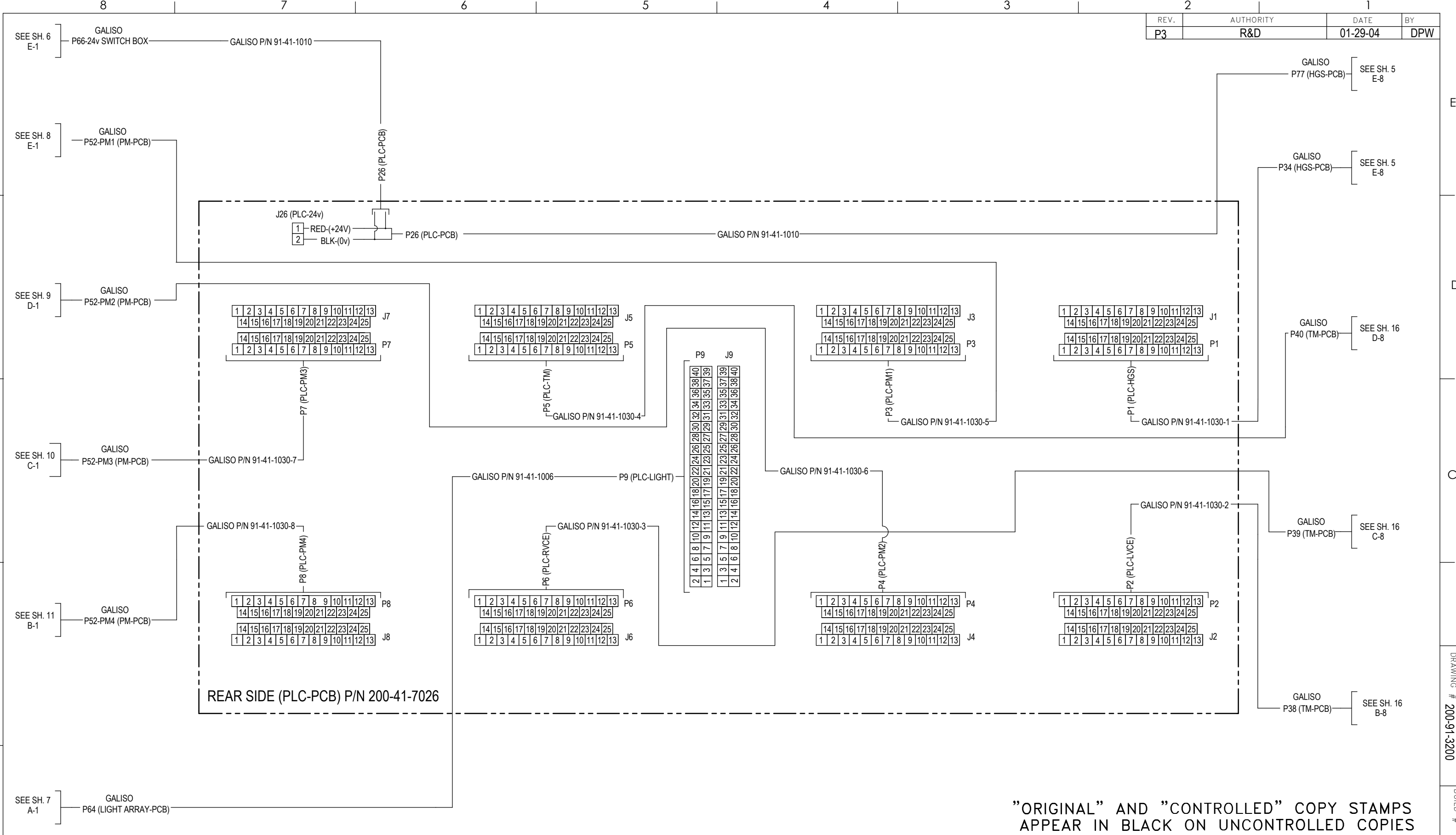
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TITLE: SCHEMATIC, HGS/ ALLIANCE PTX PLC CONTROLLER INNER-WIRING	
DRAWING # 200-91-3200	BUILD #
REV. P3	EXT. SLDDRW
SHEET 3	OF —

DRAWING # 200-91-3200
BUILD #

REV.	AUTHORITY	DATE	BY
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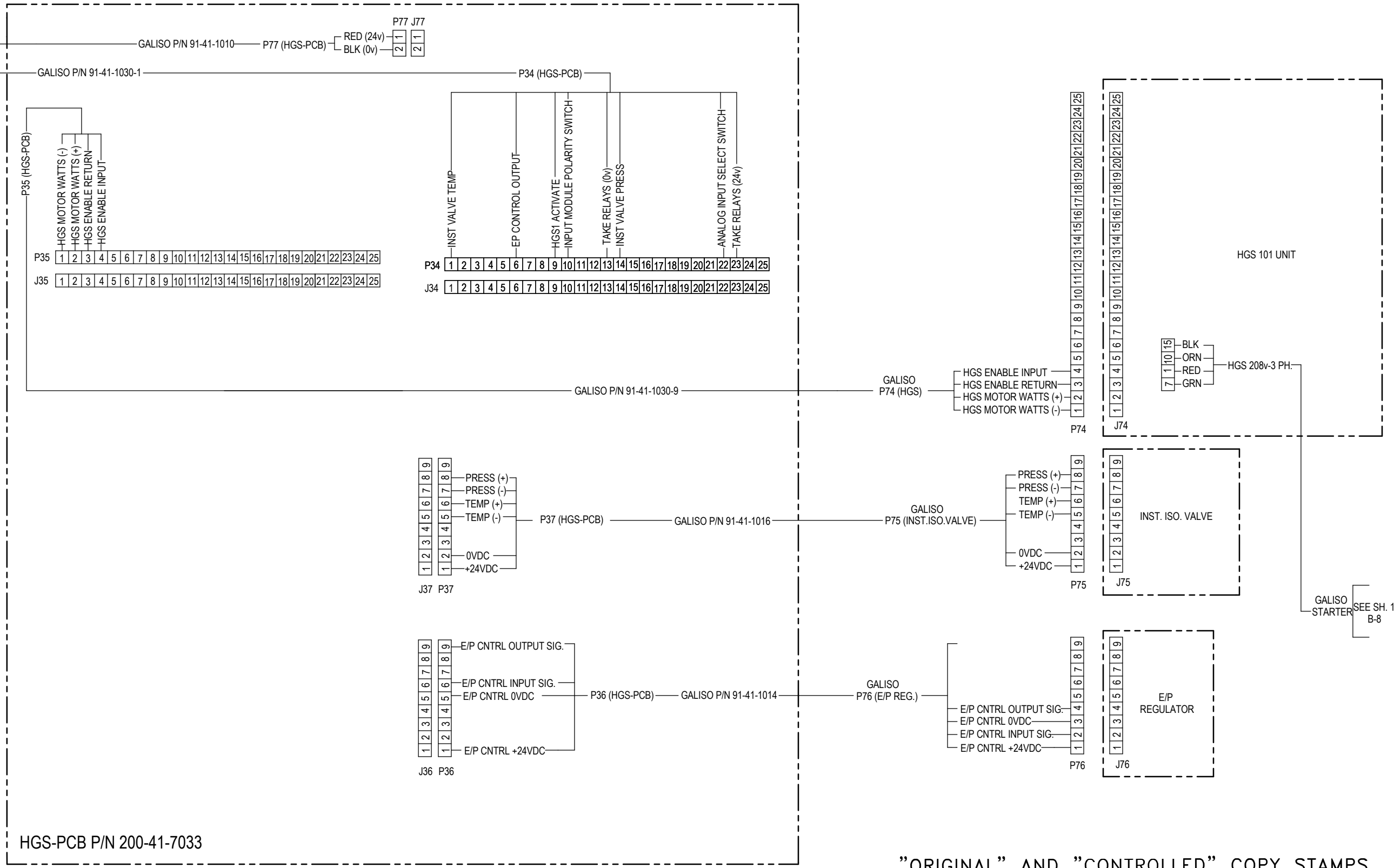
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TITLE: SCHEMATIC, HGS/ ALLIANCE PTX PLC CONTROLLER, REAR SIDE		
DRAWING # 200-91-3200	BUILD #	REV. P3
EXT. SLDDRW	SHEET 4 OF 4	

DRAWING # 200-91-3200
BUILD #

REV.	AUTHORITY	DATE	BY
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HGS-PCB P/N 200-41-7033

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SIGNATURE	DATE
DENNIS W.	01-29-04
PRODUCTION	
ENGINEERING	
QUAL. ASSURANCE	

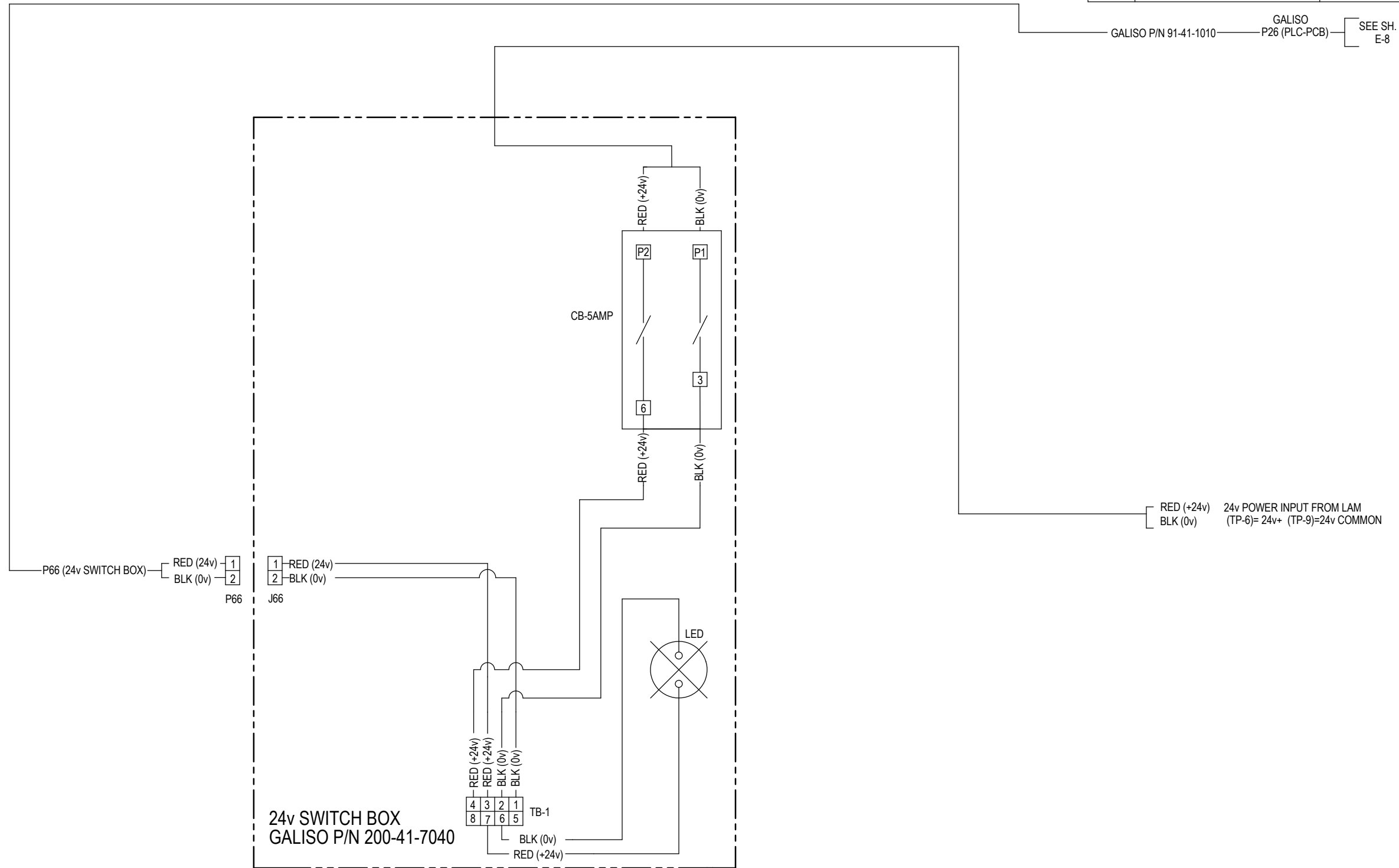
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DRAWING # 200-91-3200	BUILD #
REV. P3	EXT. SLDDRW
SHEET 5	OF —

DRAWING # 200-91-3200

BUILD #

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GALISO P/N 91-41-1010 GALISO P26 (PLC-PCB) SEE SH. 4 E-8



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ENGINEERING	
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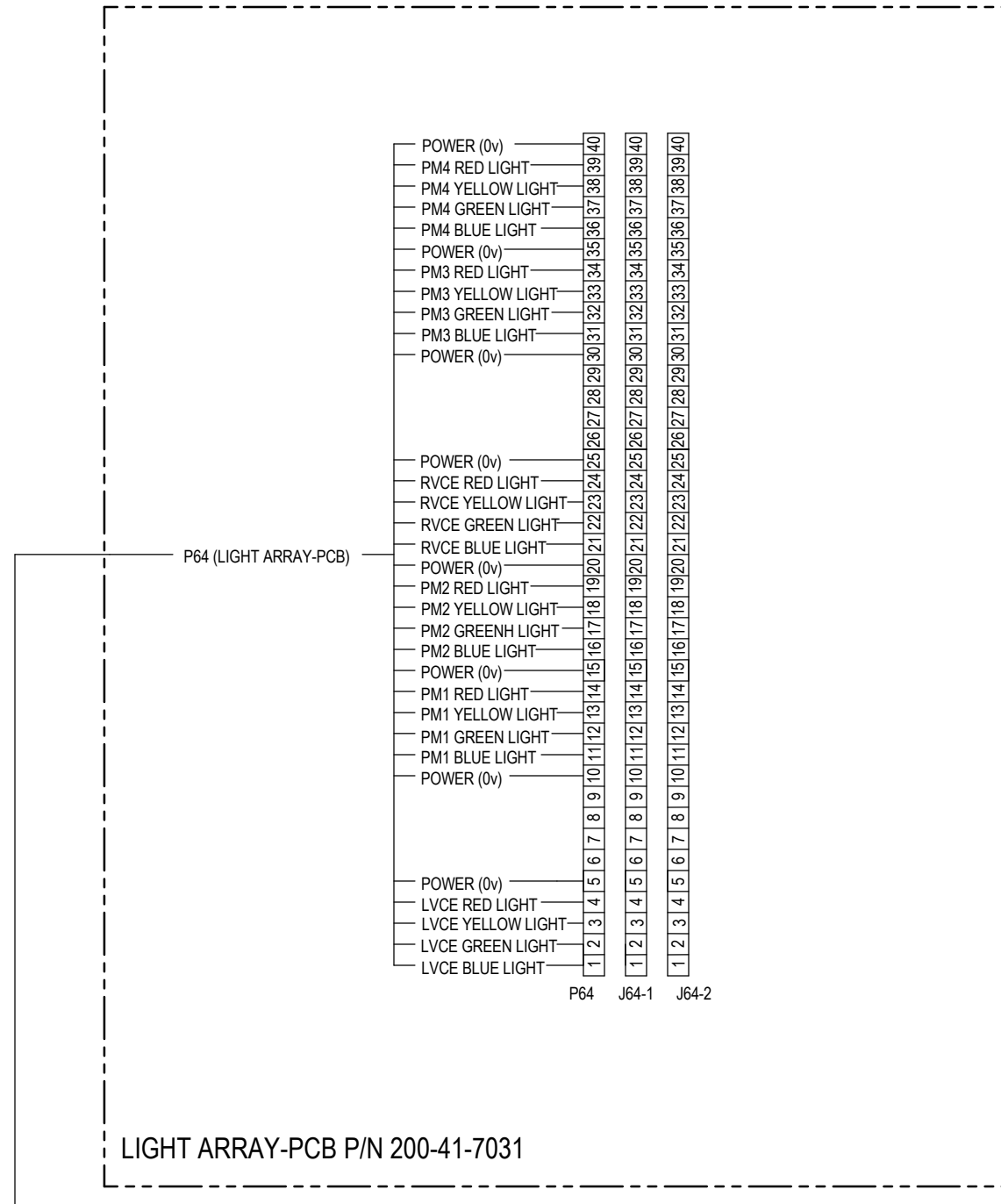
TITLE:
**SCHEMATIC HGS/ ALLIANCE PTX
SWITCH BOX, 24VDC**

DRAWING # 200-91-3200	BUILD #	REV. P3	EXT. SLDDRW	SHEET 6 OF 6
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DRAWING # 200-91-3200

BUILD #

REV.	AUTHORITY	DATE	BY
P3	R&D	01-29-04	DPW



GALISO P/N 91-41-1006

GALISO P9 (PLC-PCB) SEE SH. 4 A-8

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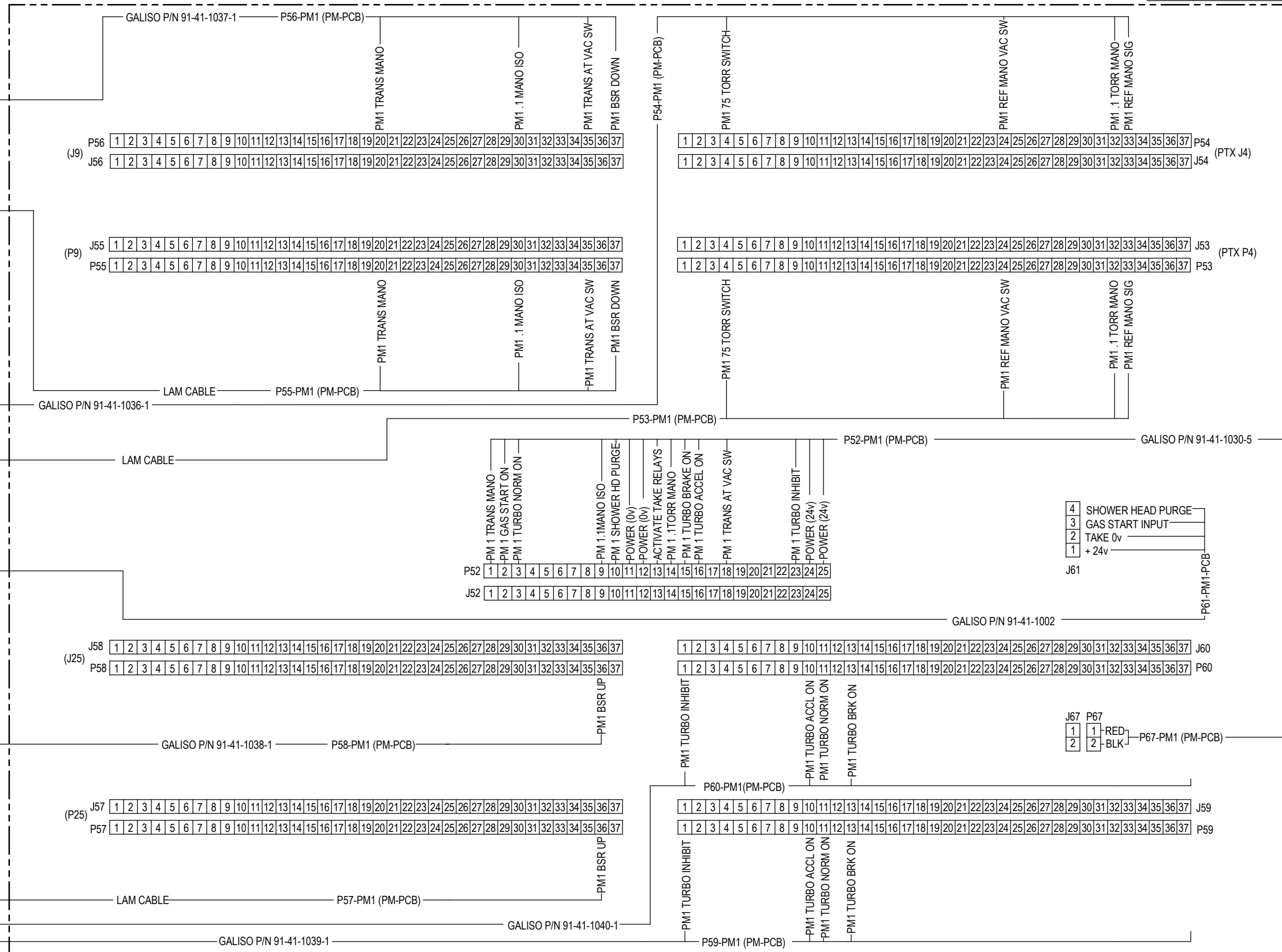
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TITLE: SCHEMATIC, HGS/ ALLIANCE PTX LIGHT ARRAY PCB			
DRAWING # 200-91-3200	BUILD #	REV. P3	EXT. SLDDRW
SHEET 7 OF 7			

DRAWING # 200-91-3200

BUILD #



PM-PCB P/N 200-41-7030

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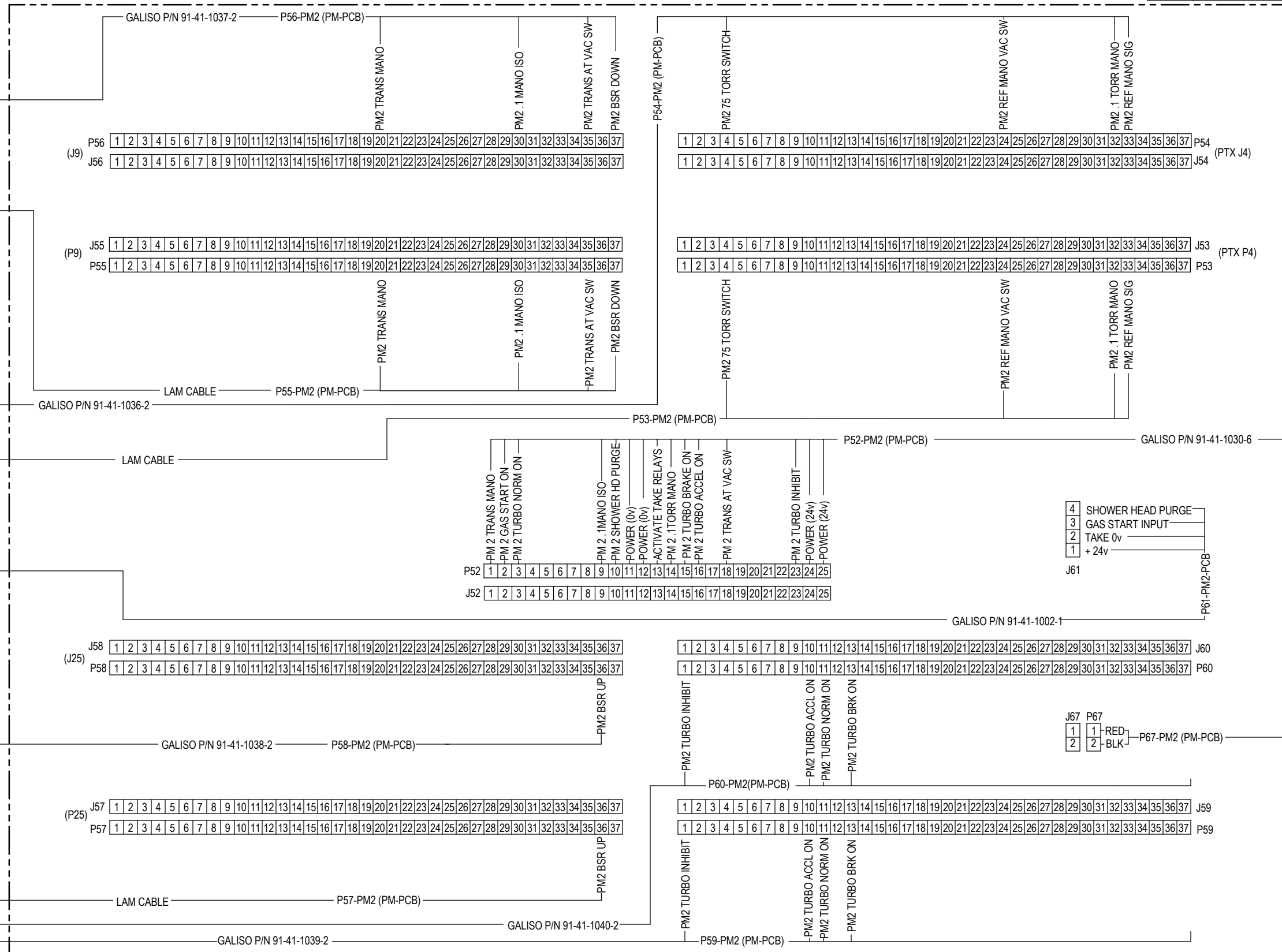
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ANGLES ±
SURFACE ROUGHNESS √

APPROVAL	
SIGNATURE	DATE
DENNIS W.	01-29-04
PRODUCTION	
ENGINEERING	
QUAL. ASSURANCE	

TITLE: SCHEMATIC, HGS/ ALLIANCE PTX PM1-PCB	
DRAWING # 200-91-3200	BUILD #
REV. P4	EXT. SLDDRW
SHEET 8	OF —

DRAWING # 200-91-3200 BUILD # A



PM-PCB P/N 200-41-7030

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.XXX ± —
ANGLES ± —
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DENNIS W.	01-29-04
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ENGINEERING	
QUAL. ASSURANCE	

TITLE: SCHEMATIC, HGS/ ALLIANCE PTX PM2-PCB		
DRAWING #	BUILD #	REV.
200-91-3200		P4
EXT.	SHEET	
SLDDRW	9 OF —	

DRAWING # 200-91-3200
BUILD #

E

E

D

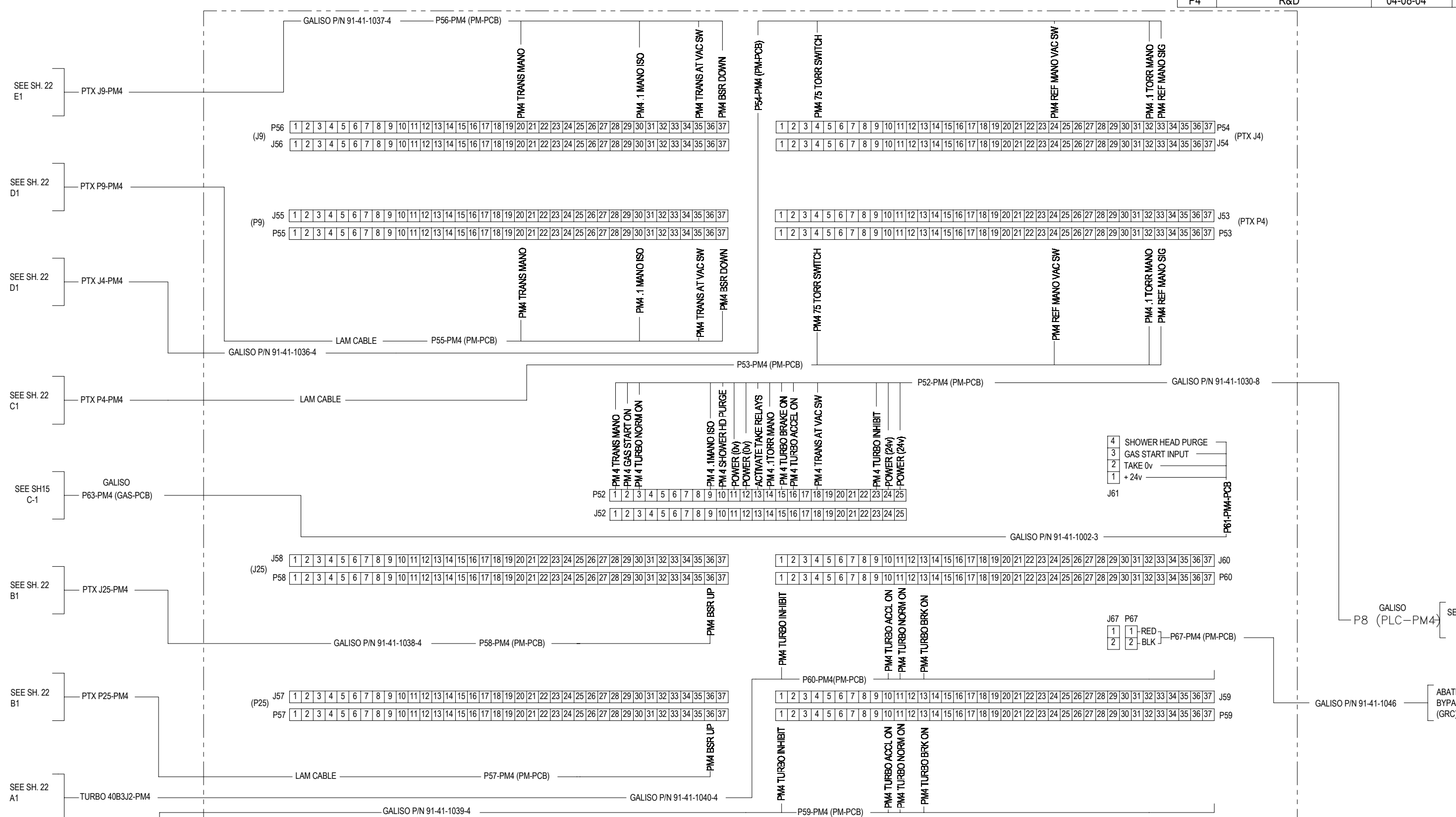
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A

A



PM-PCB P/N 200-41-7030

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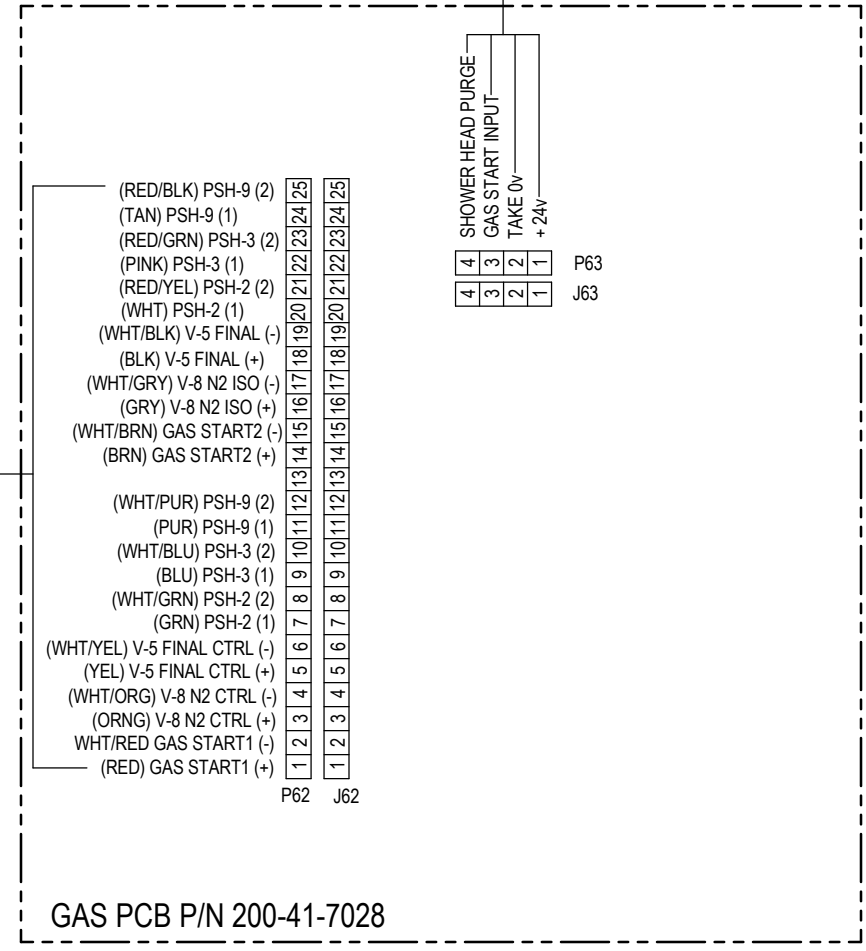
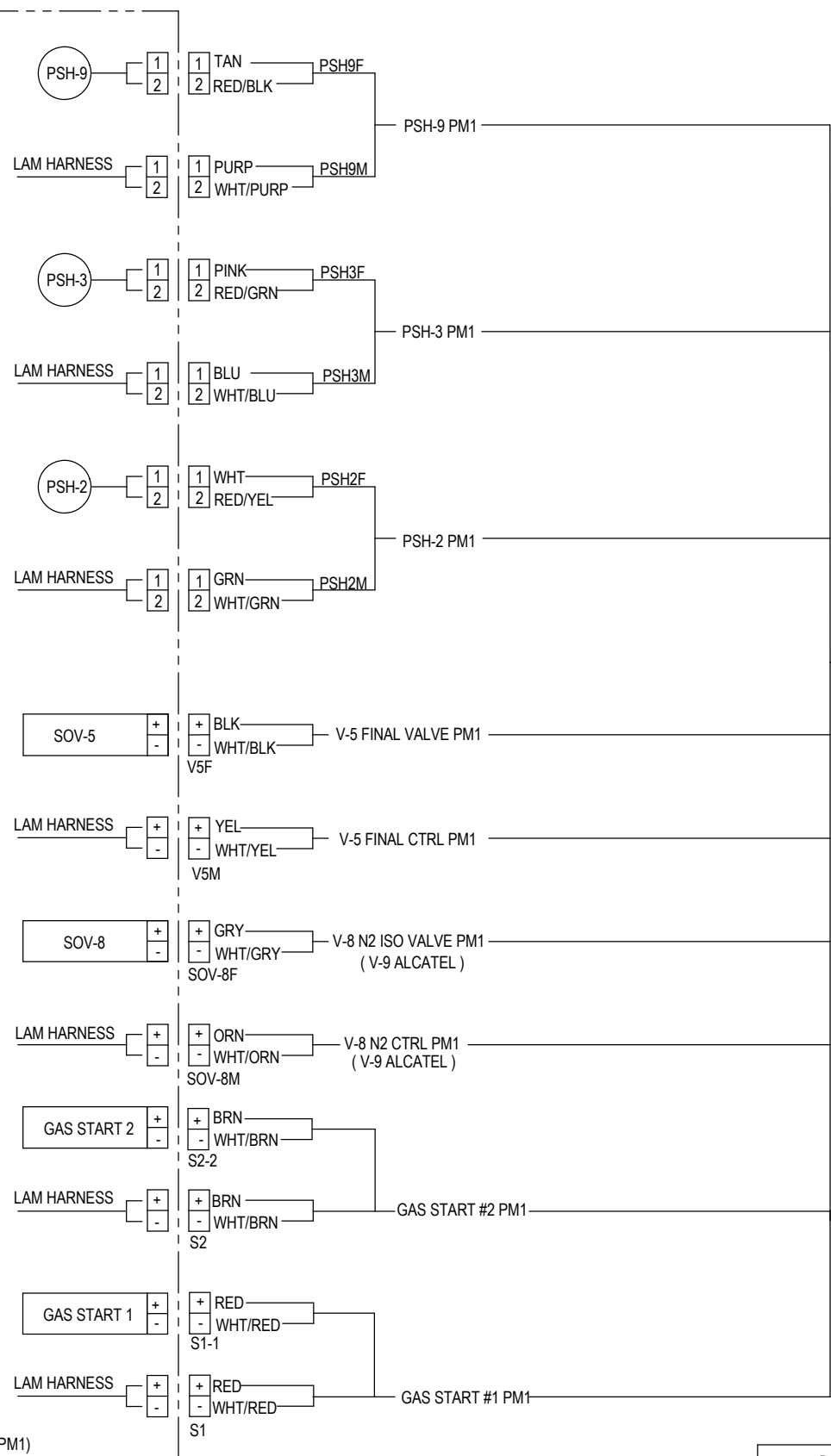
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.XX ±
.XXX ±
ANGLES ±
SURFACE ROUGHNESS ✓

APPROVAL	
SIGNATURE	DATE
DENNIS W.	01-29-04
PRODUCTION	
ENGINEERING	
QUAL. ASSURANCE	

TITLE: SCHEMATIC,HGS/ ALLIANCE PTX PM4-PCB		
DRAWING # 200-91-3200	BUILD #	REV. P4
EXT. SLDDRW	SHEET 6 OF	

DRAWING # 200-91-3200
BUILD #

REV.	AUTHORITY	DATE	BY
P4	R&D	06-08-04	DPW



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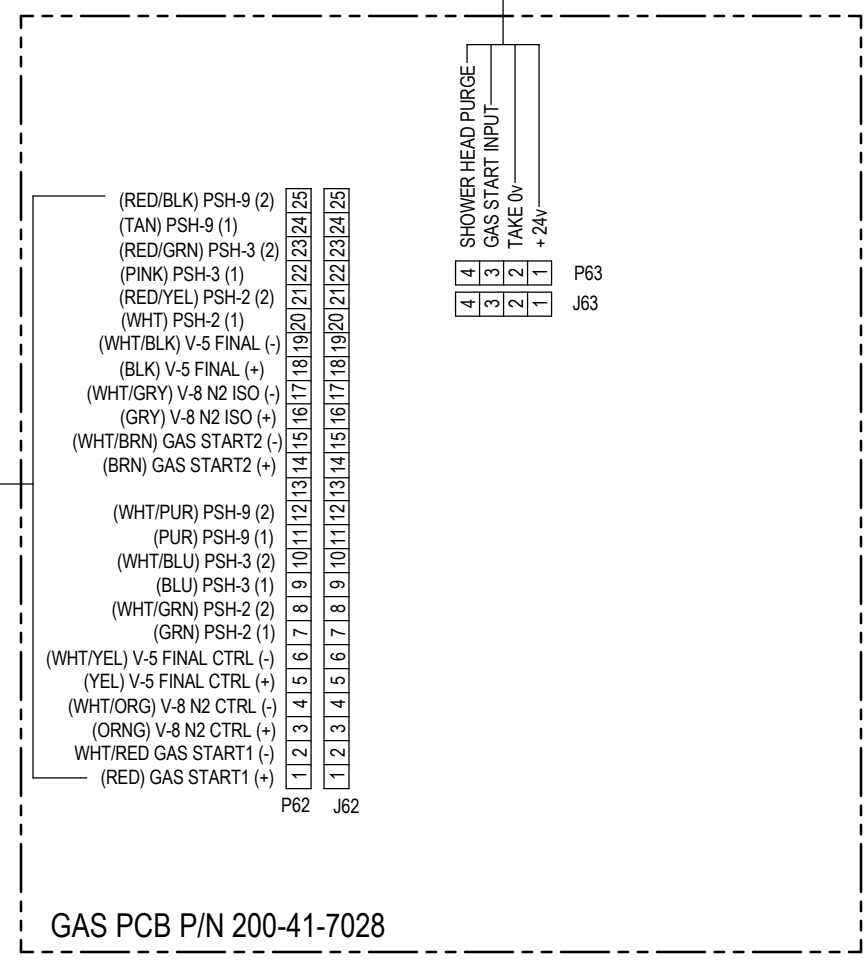
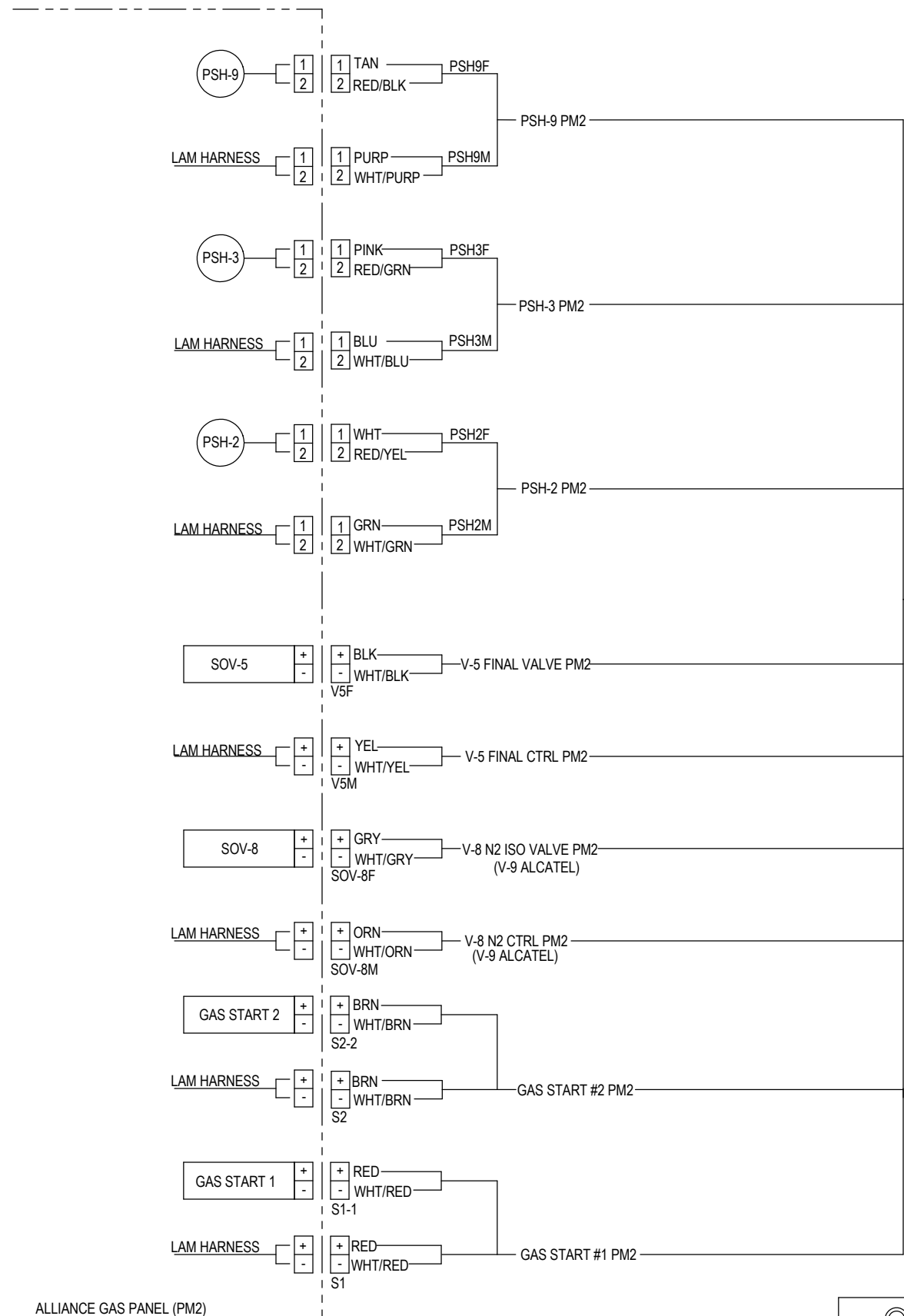
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ANGLES ± —
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TITLE: SCHEMATIC, HGS/ ALLIANCE PTX GAS PCB-PM1			
DRAWING #	BUILD #	REV.	EXT.
200-91-3200		P4	SLDDRW
SHEET	OF		
12	OF		

DRAWING # 200-91-3200 BUILD #

REV.	AUTHORITY	DATE	BY
P4	R&D	06-08-04	DPW



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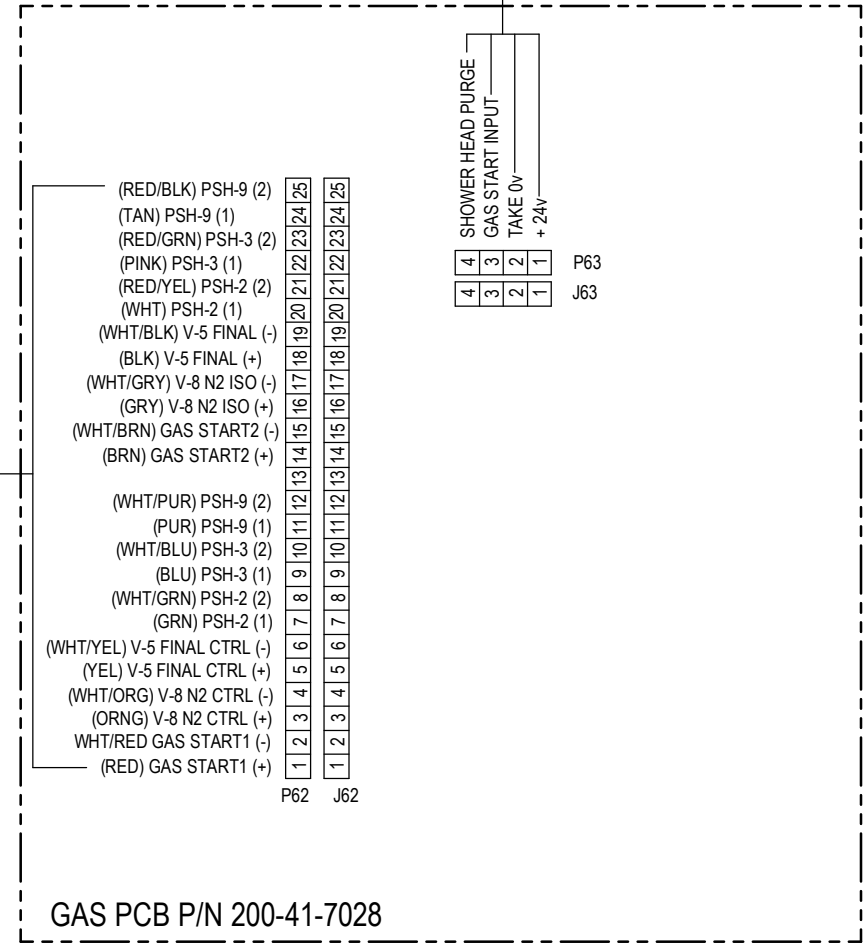
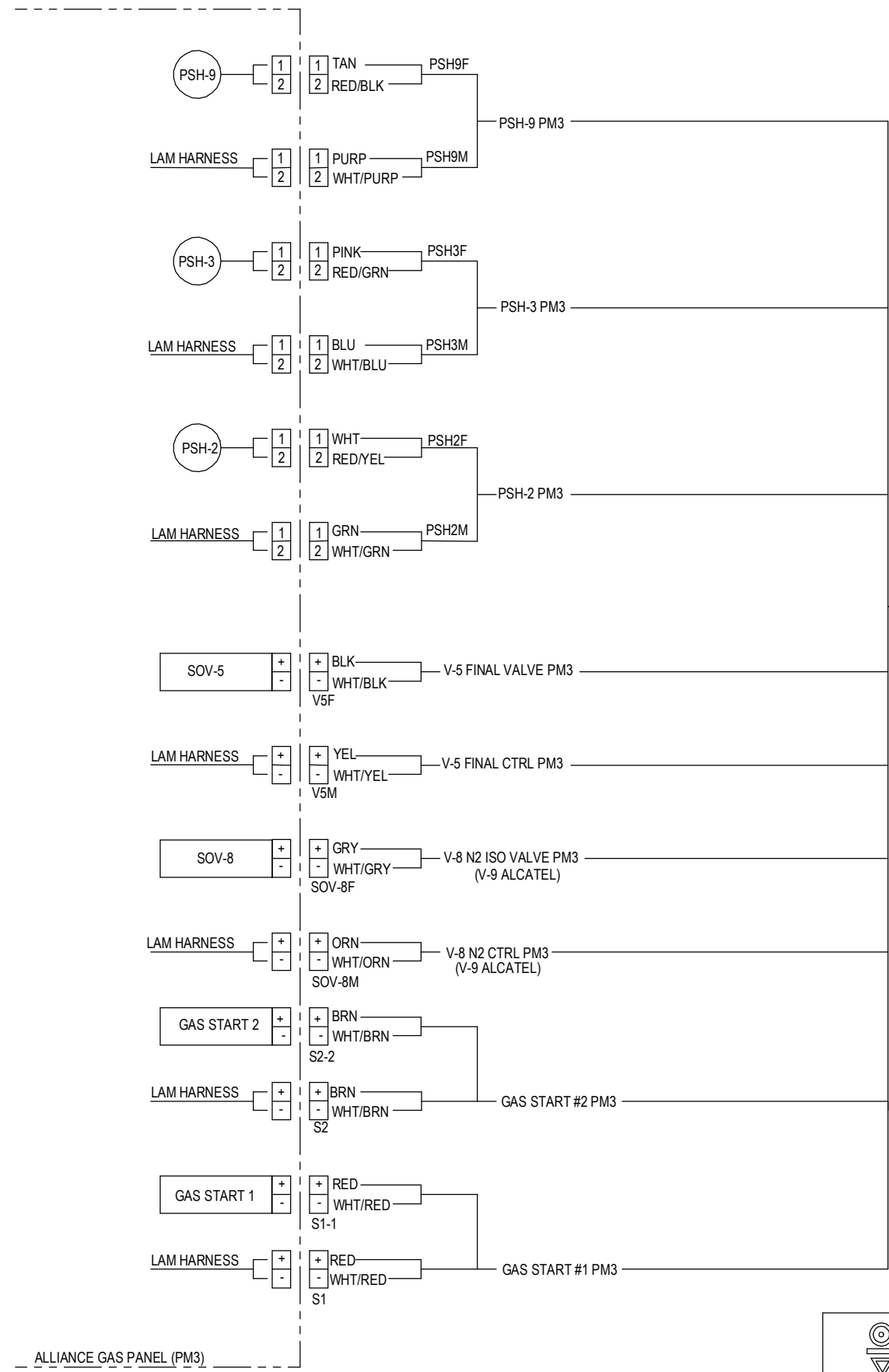
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DENNIS W.	01-29-04
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TITLE: SCHEMATIC, HGS/ ALLIANCE PTX GAS PCB-PM2			
DRAWING #	BUILD #	REV.	EXT.
200-91-3200		P4	SLDDRW
SHEET	OF		
13	OF		

DRAWING # 200-91-3200
BUILD #

REV.	AUTHORITY	DATE	BY
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SIGNATURE	DATE
DENNIS W.	01-29-04
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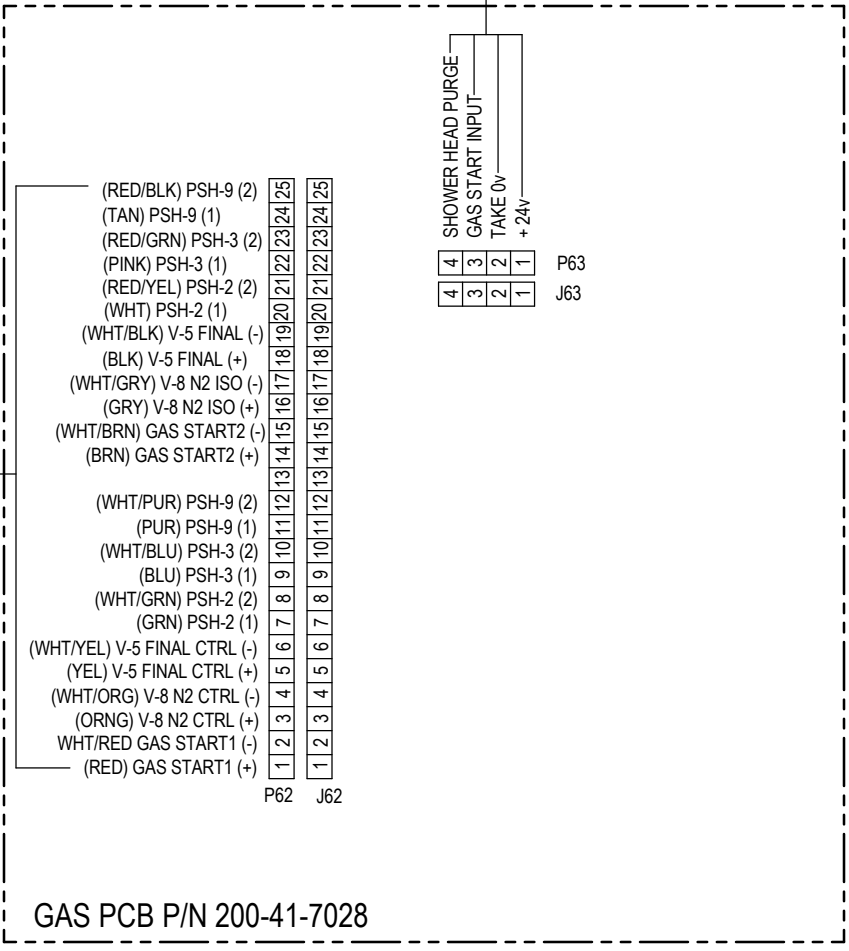
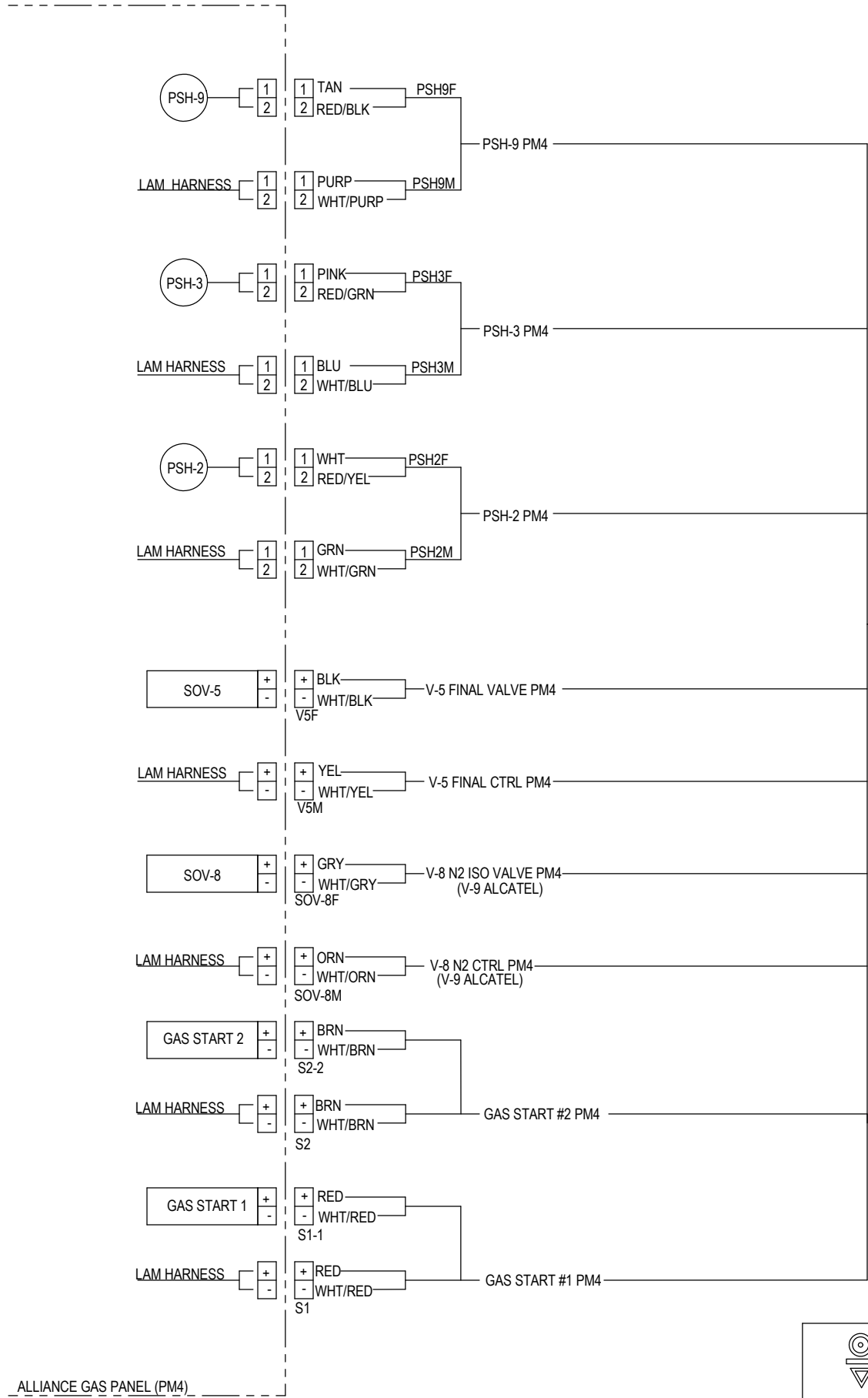
TITLE: SCHEMATIC, HGS/ ALLIANCE PTX GAS PCB-PM3			
DRAWING # 200-91-3200	BUILD #	REV. P4	EXT. SLDDRW
SHEET 14	OF		

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DRAWING # 200-91-3200
 BUILD #

ALLIANCE GAS PANEL (PM3)

REV.	AUTHORITY	DATE	BY
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ALLIANCE GAS PANEL (PM4)



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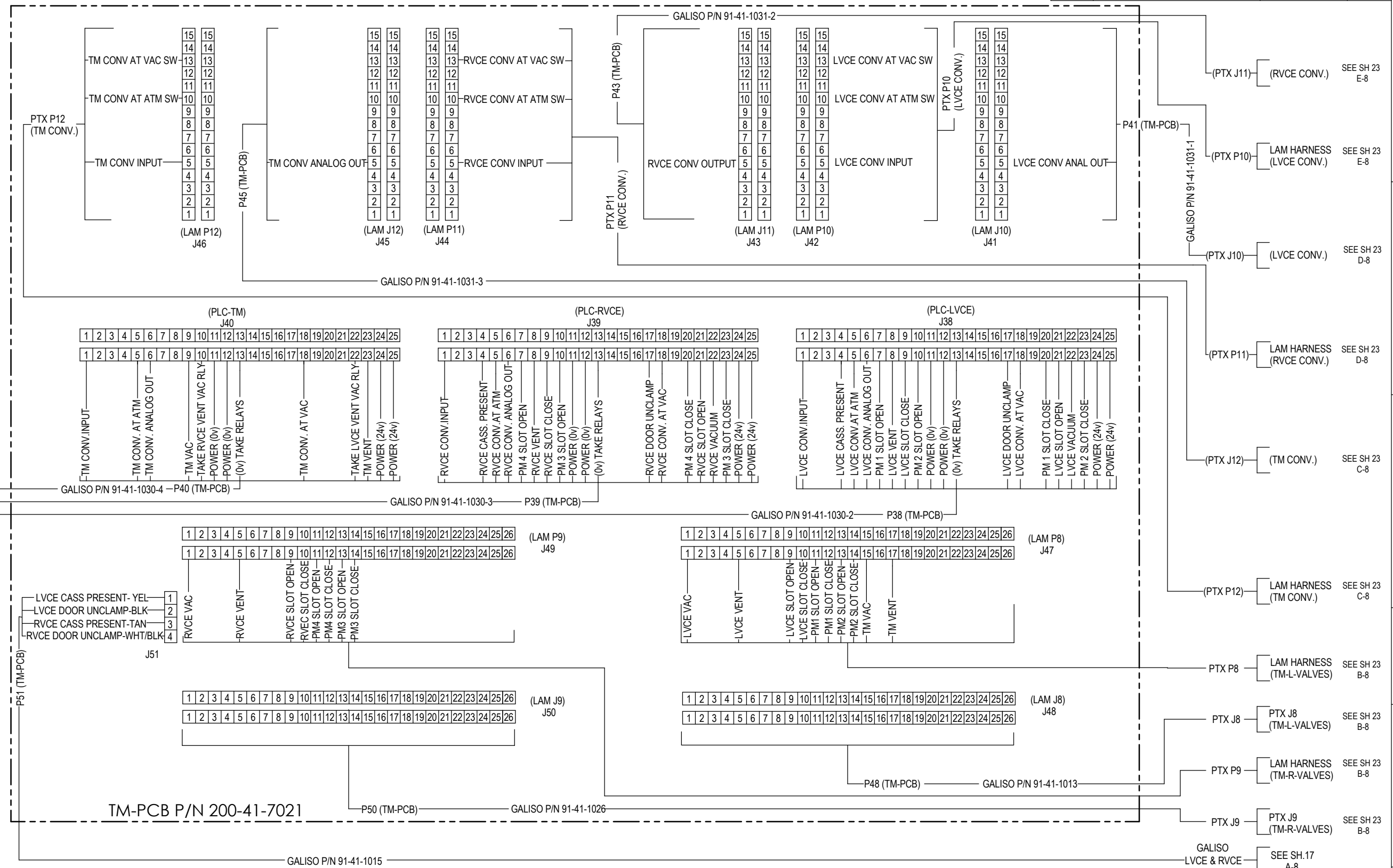
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DENNIS W.	01-29-04
PRODUCTION	
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TITLE: SCHEMATIC, HGS/ ALLIANCE PTX GAS PCB-PM4			
DRAWING #	BUILD #	REV.	EXT.
200-91-3200		P4	SLDDRW
SHEET	OF		
15	OF		

DRAWING # 200-91-3200
BUILD #

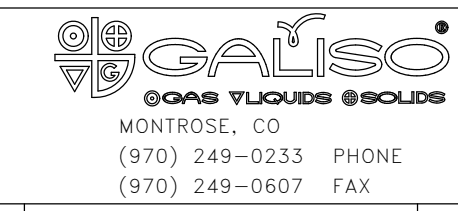


SEE SH.4 D-1
GALISO P5 (PLC-TM)

SEE SH.4 C-1
GALISO P6 (PLC-RVCE)

SEE SH.4 B-1
GALISO P2 (PLC-LVCE)

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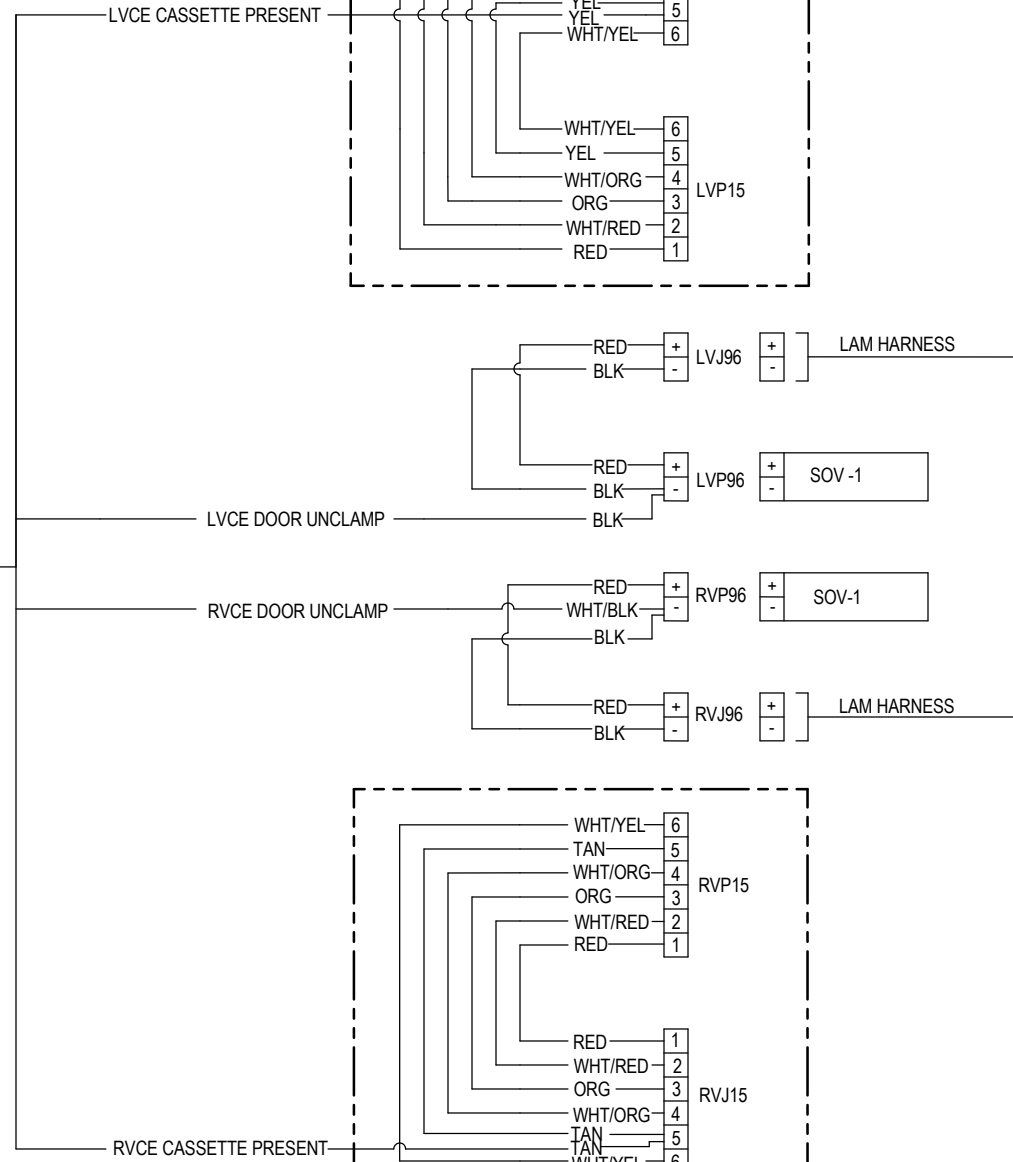
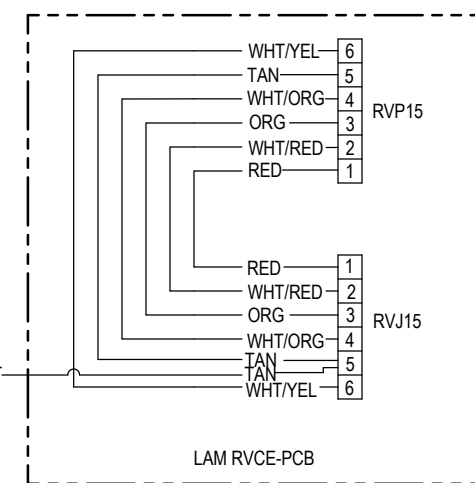
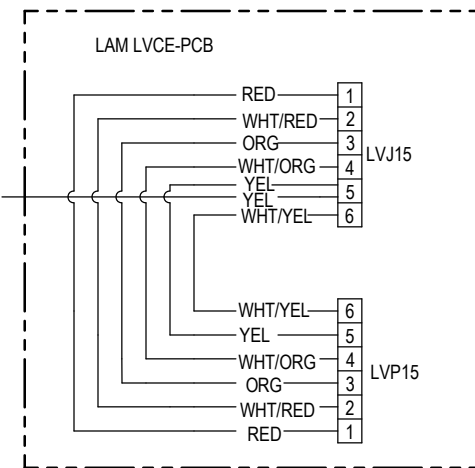
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SIGNATURE	DATE
DENNIS W.	01-29-04
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TITLE: SCHEMATIC, HGS/ ALLIANCE PTX TM PCB		
DRAWING # 200-91-3200	BUILD #	REV. EXT. SHEET P3 SLDDRW 16 F

DRAWING # 200-91-3200
 BUILD #

REV.	AUTHORITY	DATE	BY
P3	R&D	01-29-04	DPW



SEE SH.16 A-1 GALISO P51 (TM-PCB)

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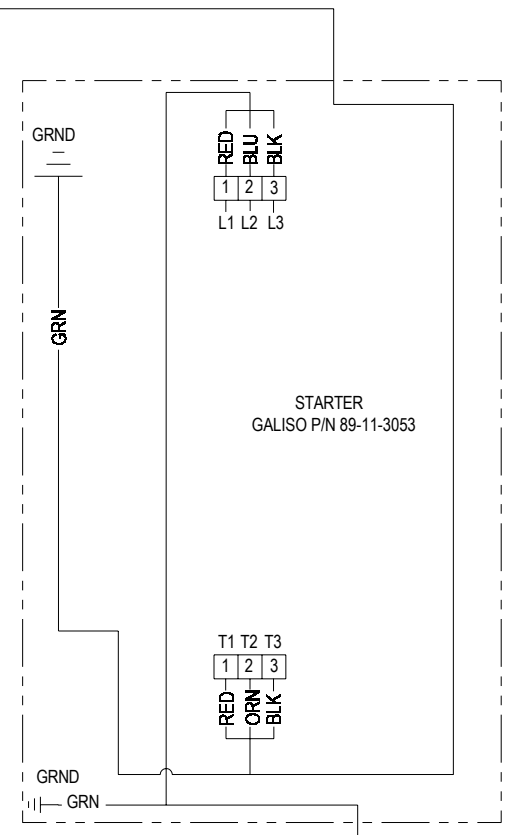
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			SIGNATURE	DATE	
			DRAWN BY: DENNIS W.	01-29-04	
			PRODUCTION		DRAWING # 200-91-3200 BUILD # REV. P3 EXT. SLDDRW SHEET 17 OF —
			ENGINEERING		
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DRAWING # 200-91-3200

BUILD #

A

REV.	AUTHORITY	DATE	BY
P3	R&D	01-29-04	DPW



SEE SH.5
B-1

GALISO
HGS 208v 3PH

RED } 208v 3PH POWER INPUT
BLU } FROM LAM (TB-1) (TB-2) (TB-3)
BLK }
GRN — GRND

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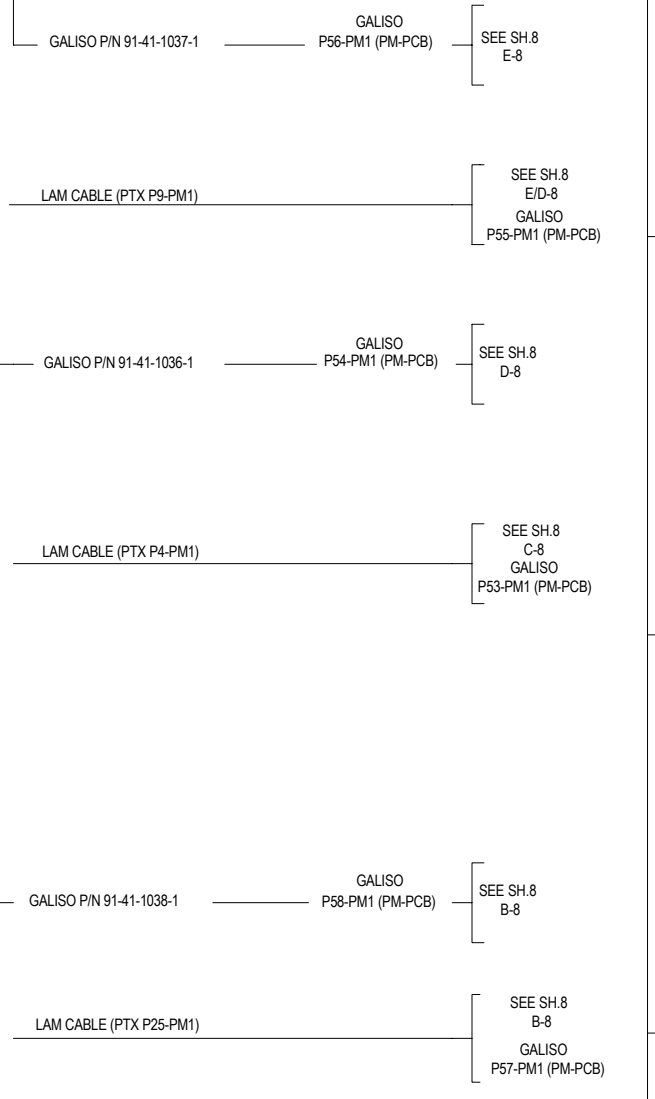
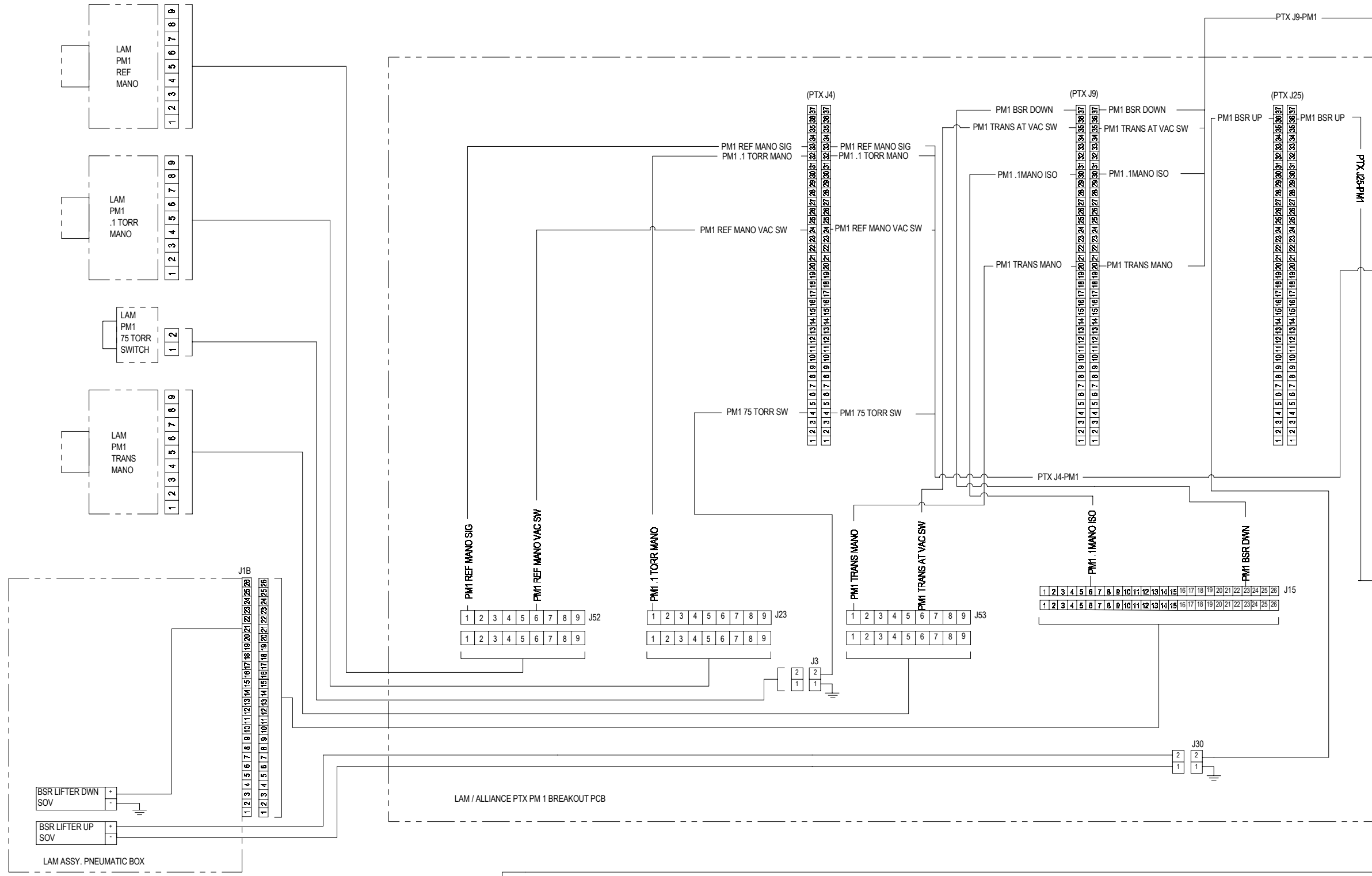
TOLERANCES:
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ANGLES ±—
SURFACE ROUGHNESS ✓

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DENNIS W.	01-29-04
PRODUCTION	
ENGINEERING	
QUAL. ASSURANCE	

TITLE: SCHEMATIC,HGS/ ALLIANCE PTX HGS SWITCH BOX, 208VAC 3PHASE.				
DRAWING # 200-91-3200	BUILD #	REV. P3	EXT. SLDDRW	SHEET 8 OF

DRAWING # 200-91-3200
BUILD #

REV. P3	AUTHORITY R&D	DATE 02-23-04	BY DPW
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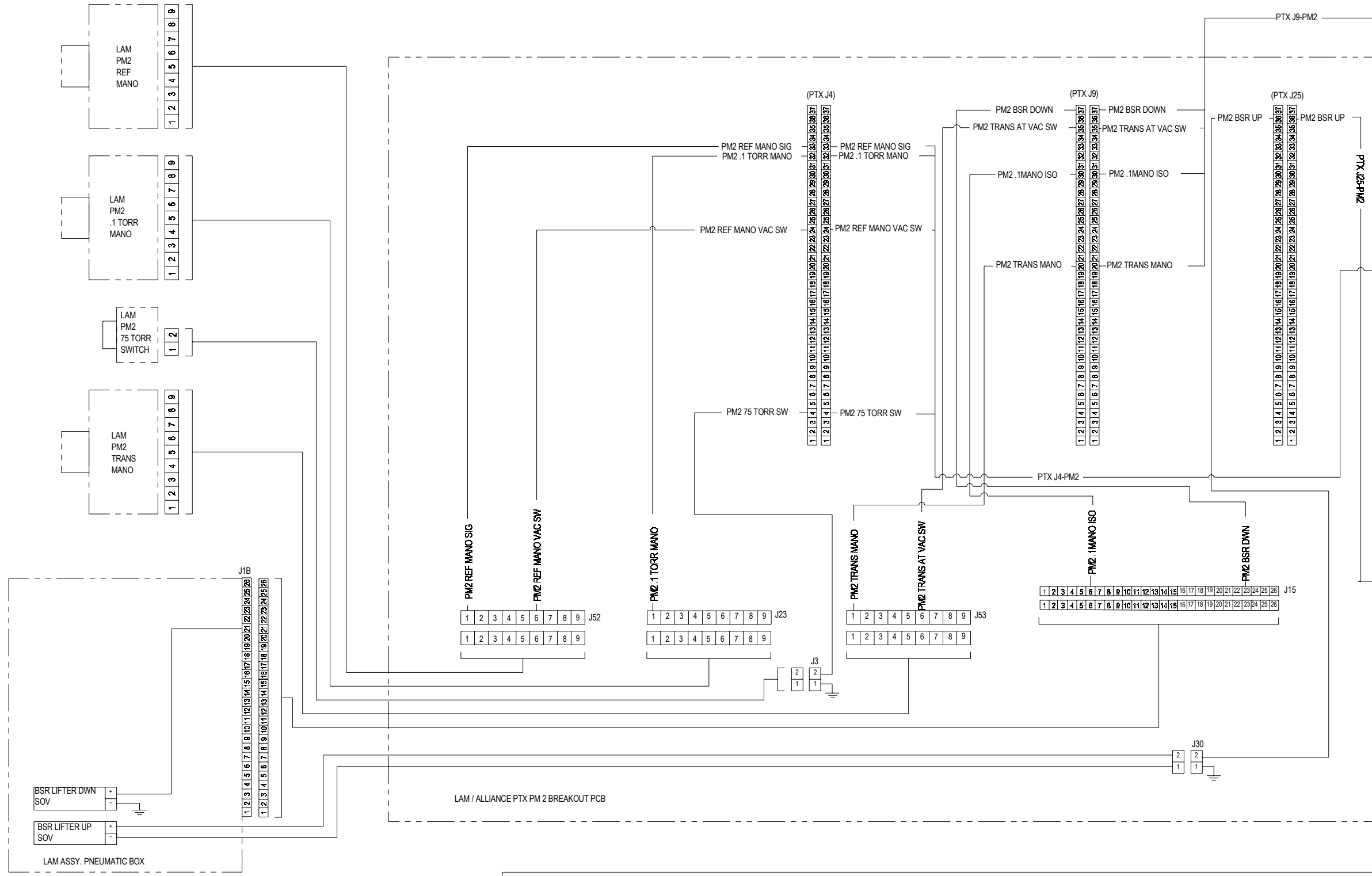
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DRAWING # 200-91-3200	BUILD #	REV. P3
EXT. SLDDRW	SHEET 19	OF 19

DRAWING # 200-91-3200
BUILD #

REV. P3	AUTHORITY R&D	DATE 02-23-04	BY DPW
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GALISO P/N 91-41-1037-2	GALISO P56-PM2 (PM-PCB)	SEE SH.9 E-8
LAM CABLE (PTX P9-PM2)		SEE SH.9 E/D-8 GALISO P55-PM2 (PM-PCB)
GALISO P/N 91-41-1036-2	GALISO P54-PM2 (PM-PCB)	SEE SH.9 D-8
LAM CABLE (PTX P4-PM2)		SEE SH.9 C-8 GALISO P53-PM2 (PM-PCB)
GALISO P/N 91-41-1038-2	GALISO P58-PM2 (PM-PCB)	SEE SH.9 B-8
LAM CABLE (PTX P25-PM2)		SEE SH.9 B-8 GALISO P57-PM2 (PM-PCB)
GALISO P60-PM2 (PM-PCB)		SEE SH.9 A-8
TURBO 40B3P2-PM2	GALISO P/N 91-41-1040-2	SEE SH.9 A-8

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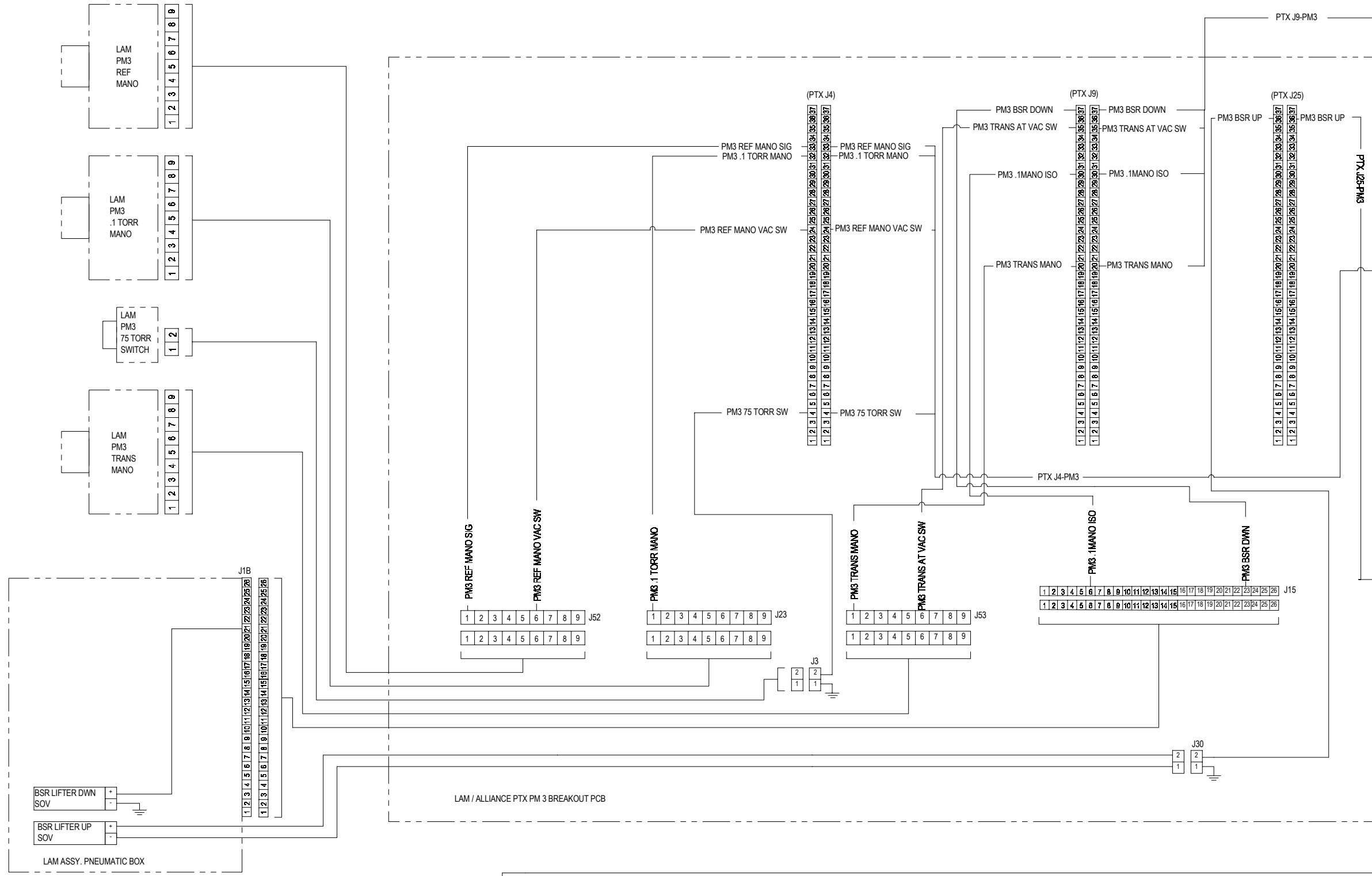
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DRAWING # 200-91-3200	BUILD #	REV. P3
EXT. SLDDRW	SHEET 20	OF

DRAWING # 200-91-3200
BUILD #

REV.	AUTHORITY	DATE	BY
P3	R&D	02-23-04	DPW



GALISO P/N 91-41-1037-3	GALISO P56-PM3 (PM-PCB)	SEE SH.10 E-8
LAM CABLE (PTX P9-PM3)		SEE SH.10 E/D-8 GALISO P55-PM3 (PM-PCB)
GALISO P/N 91-41-1036-3	GALISO P54-PM3 (PM-PCB)	SEE SH.10 D-8
LAM CABLE (PTX P4-PM3)		SEE SH.10 C-8 GALISO P53-PM3 (PM-PCB)
GALISO P/N 91-41-1038-3	GALISO P58-PM3 (PM-PCB)	SEE SH.10 B-8
LAM CABLE (PTX P25-PM3)		SEE SH.10 B-8 GALISO P57-PM3 (PM-PCB)
GALISO P60-PM3 (PM-PCB)		SEE SH.10 A-8
TURBO 40B3P2-PM3	GALISO P/N 91-41-1037-3	SEE SH.10 A-8

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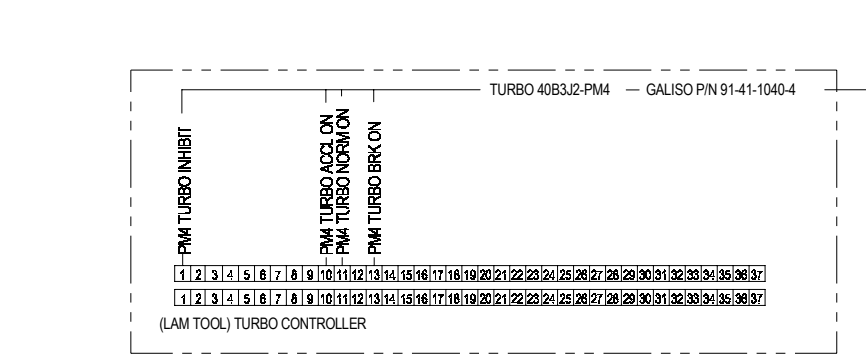
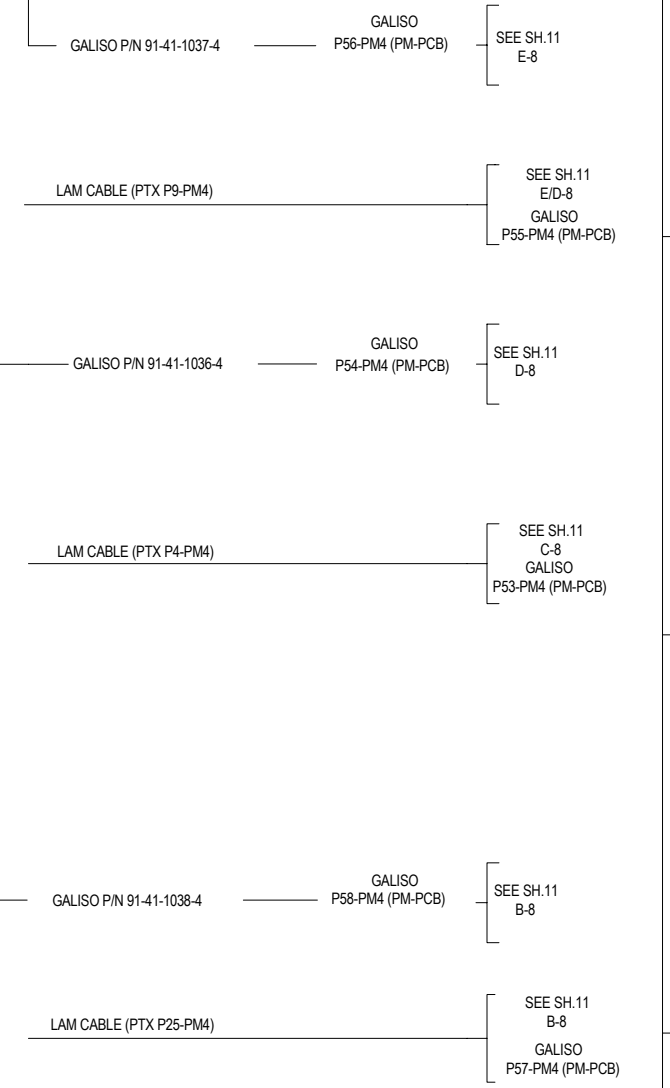
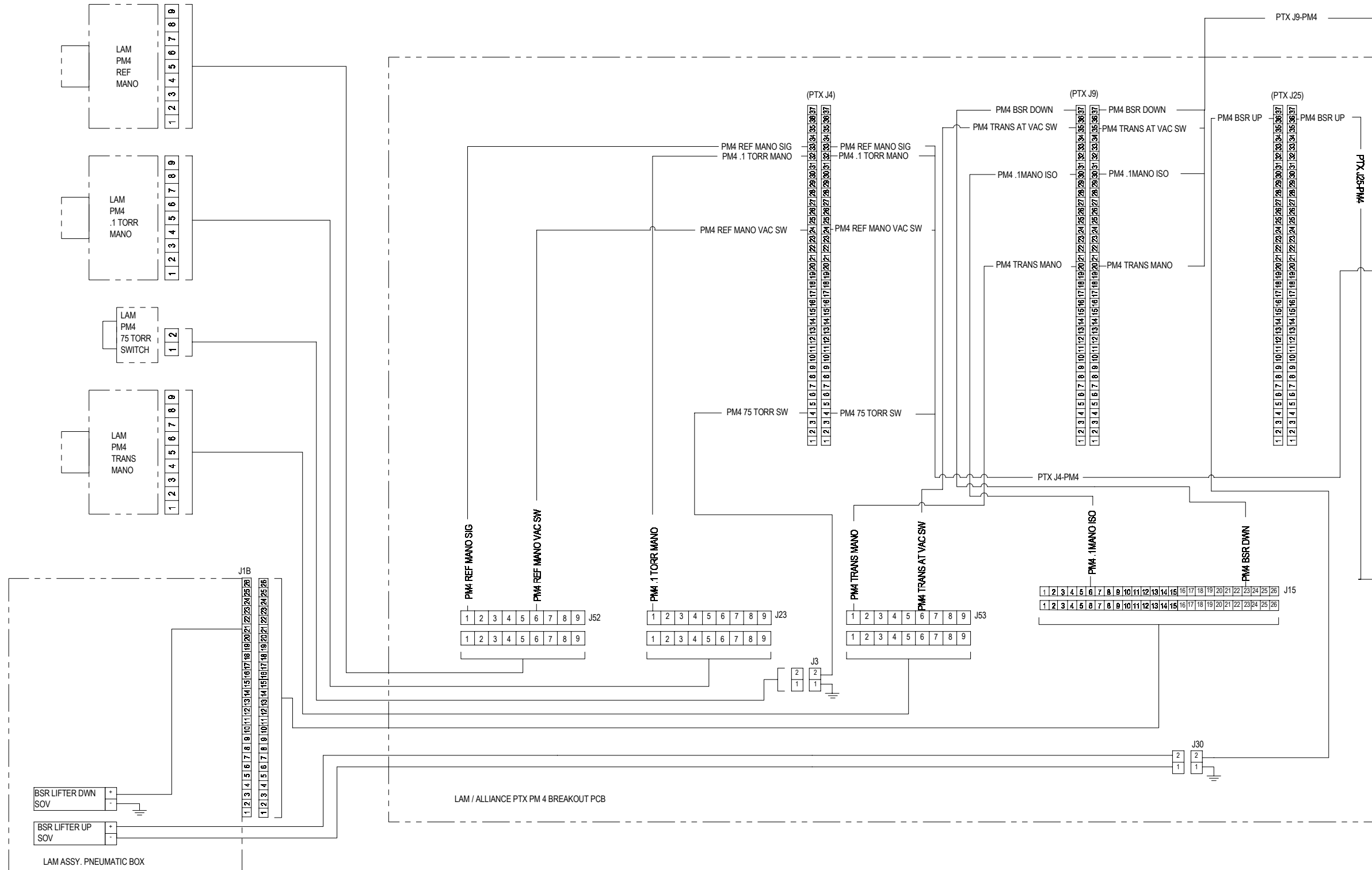
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TITLE: SCHEMATIC,HGS/ ALLIANCE PTX (LAM PTX PM3) BREAKOUT & TURBO		
DRAWING # 200-91-3200	BUILD #	REV. P3
EXT. SLDDRW	SHEET 21	OF 1

DRAWING # 200-91-3200
 BUILD #

REV. P3	AUTHORITY R&D	DATE 02-23-04	BY DPW
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SIGNATURE	DATE
DENNIS W.	02-23-04
PRODUCTION	
ENGINEERING	
QUAL. ASSURANCE	

TITLE: SCHEMATIC,HGS/ ALLIANCE PTX (LAM PTX PM4) BREAKOUT & TURBO		
DRAWING # 200-91-3200	BUILD #	REV. P3
EXT. SLDDRW	SHEET 22	OF 22

DRAWING # 200-91-3200
BUILD #