
JPDM Power Distribution

Functional Description

The Power Distribution (JPDM) board receives 28 V dc input power from external ac/dc or dc/dc converters and distributes power to the control system. JPDM provides fuse protection for all outputs. JPDM integrates into the PDM system feedback through the PPDA I/O pack.

JDPM is designed to maintain three separate power buses for R, S, and T applications. Jumpers can be used to provide a single bus with redundant supplies. Two adjacent JPDM boards can be wired together.

Compatibility

The IS200JPDM board is compatible with the feedback signal P1/P2 connectors on JPDB, JPDE, and JPDE leading to a PPDA I/O pack. The DC-62 connector on JPDM is compatible with the IS220PPDA I/O pack.

Installation

The JPDM is base-mounted vertically on a metal bracket in a cabinet used by the PDM. Refer to the wiring diagrams for power input and output. There is a 50-pin diagnostic connector, P1/P2, mounted on the top and bottom of the board.

Grounding

The IS200JPDM board is grounded through the sheet metal bracket to the underlying back base. In most cases, this is the system FE.

Physical Arrangement

JPDM accepts power from cables and distributes it to the JR, JS, and JT connectors. JPDM, when hosting a PPDA I/O pack, will be mounted so indicator lights on the pack are easily visible. Two JPDM boards, when used together, will be mounted so that all terminal board connections are easily accessible. The location of JPDM is not critical in a panel. Connector P1 transmits feedback signals to a board hosting a PPDA I/O pack. Connector P2 optionally receives feedback from another power distribution board and passes the signals out of P1 towards the PPDA. If a feedback cable connection from JPDM P2 to another power distribution board is used, consideration should be given to the feedback cable routing.

Application Notes

The internal wiring is designed so that three independent 28 V dc power buses can be maintained, or all three can be combined into a single internal bus. Each bus is sized to handle 25 A. They share a common ground sized for 75 A. With three supplies, it is possible to operate R, S, and T controllers and their I/O from separate power supplies. Failure of a supply can cause its controller and I/O to go offline while not affecting the other two channels. There is a dedicated 28 V power output for the PPDA I/O pack ensuring power system feedback is available in the event of a channel power failure.

A second method of operation has jumpers placed between the R, S, and T 28 V bus connection screws on TB1 and TB2. The board then provides a single highly reliable source of 28 V. Up to three supplies could power this bus with parallel operation capability designed into the external supplies.

The screw terminals can be used to parallel the power buses from two adjacent JPDM boards. Features offered by two boards include:

- Two sets of control rack output for Duplex or TMR applications using redundant supplies in the control racks, or systems where more than three supplies are to be paralleled
- Six JPDP outputs instead of three
- Separated R, S, and T power can have two input power supplies providing supply redundancy on each bus.

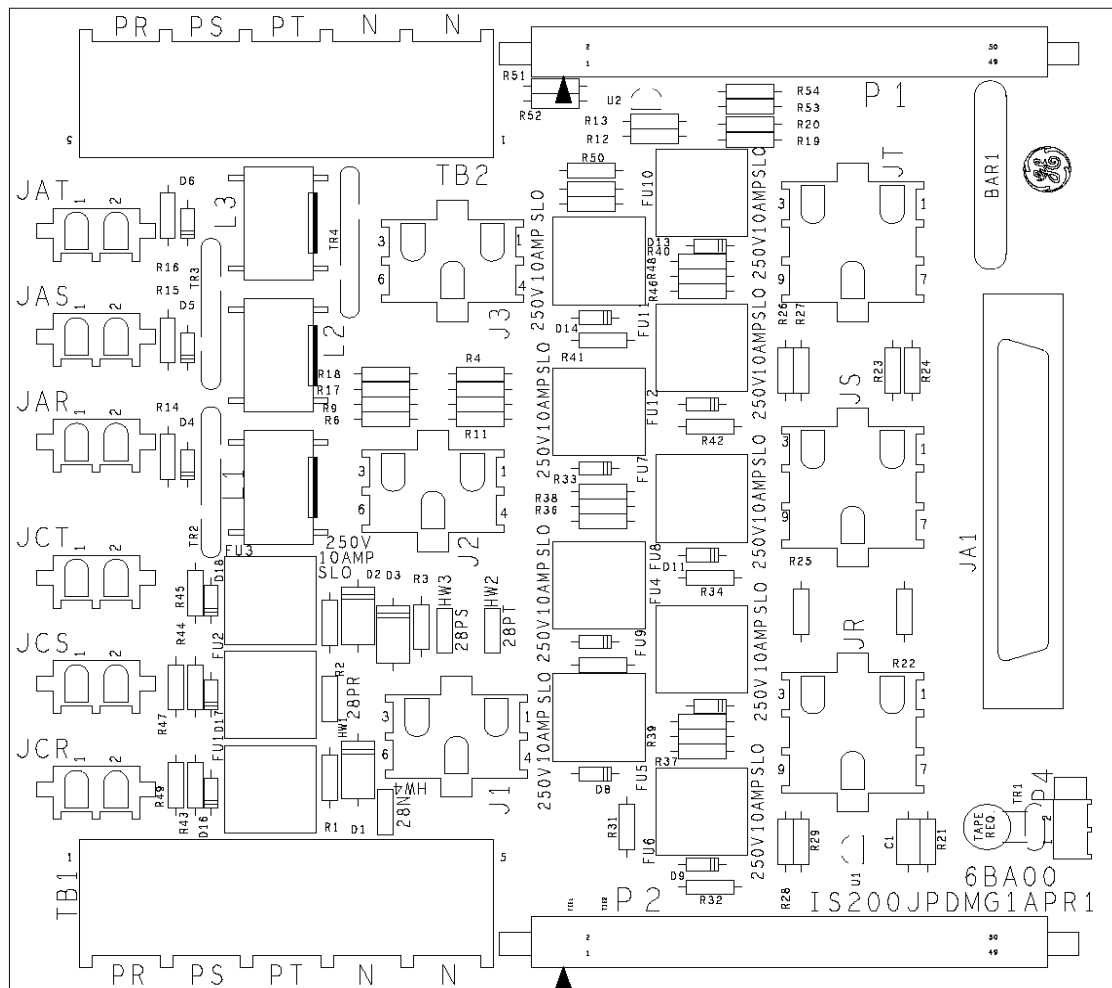
In some applications, it could be desirable to apply a battery bus as a power backup. It is possible to use a grounded battery system as input to this board using the screw terminals on the end of the board. This requires diodes not on JPDM to provide isolation between the battery and internal bus, because the JPDM is not designed to function as a battery charger.

During installation or repair, any configuration performed through the barrier terminal strips must match system documentation.

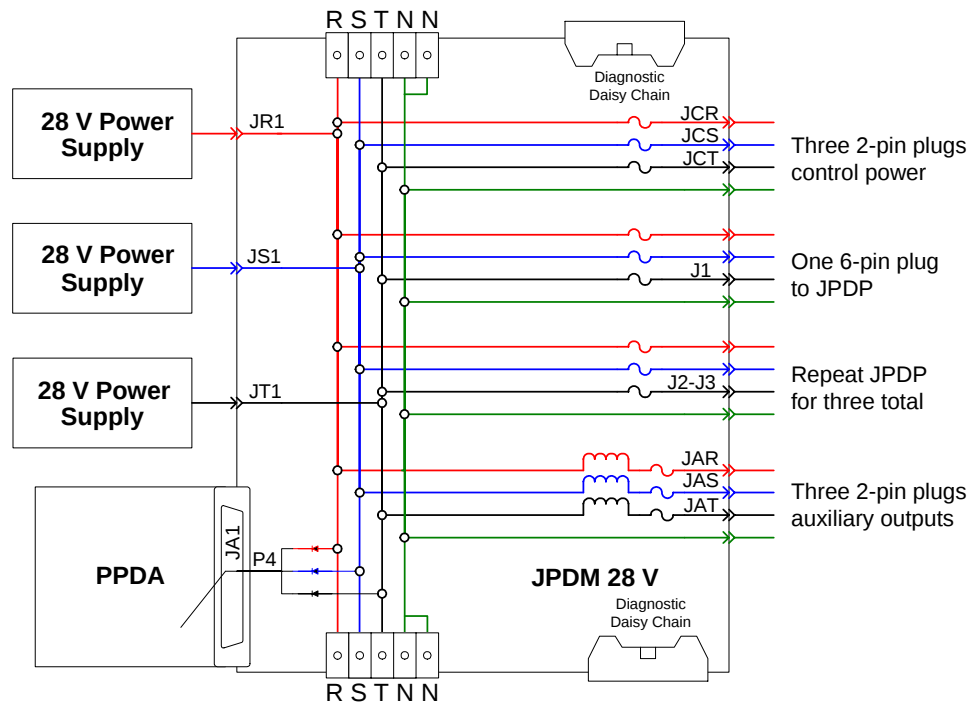
Operation

The following I/O characteristics apply to the JPDM module:

- JPDM supplies three power supply inputs on JR, JS, and JT. Each connector uses pins 8 and 9 for positive 28 V dc and pins 1-3 for 28 V dc return providing 24 A steady state capacity. These connectors include low-level signals capable of monitoring status switches on each supply and sending feedback signals to PPDA. Pin 4 provides +10 V dc wetting to the status switch and return is on pin 5.
- Terminal boards TB1 and TB2 at the bottom and top of the board provide access to the three power buses. Jumpers can be used to parallel the bus between TB1 and TB2 when more than one JPDM board is used. Jumpers can also be used between terminals PR, PS, and PT to tie the positive bus terminals together when a single power bus is fed by redundant power supplies.
- Three fused two-pin Mate-N-Lok[®] connectors, JCR, JCS, JCT power controllers, and other loads. Pin 1 is +28 V dc and pin 2 is the return. A 10 A fuse protects the circuit.
- Three fused Mate-N-Lok connectors, J1, J2, and J3 have six pins each are provided to supply R, S, and T power to remote JPDP boards. They can also supply JPDL boards when using the proper wire harness. Pins 1 – 3 are 28 V dc return, pin 4 is +28R, pin 5 is +28S, and pin 6 is +28T. Each positive output is fused for 15 A to protect the circuits.
- A DC-62 connector, JA1, is for connecting to a PPDA I/O pack. The pack contains status feedback signals for up to six core power distribution boards.
- P4 supplies power to the PPDA I/O pack. It uses R, S, and T power using a diode-or arrangement in addition to a self-resetting fuse. This ensures the pack receives power if any of the three power buses are active.
- Two 50-pin diagnostic ribbon cable connectors, P1 and P2, are supplied on the top and bottom of the board. Connector P1 transmits feedback signals to a board hosting a PPDA I/O pack. Connector P2, when connected, receives feedback from another power distribution board and passes the signals out of P1 towards the PPDA.



JPDM Mechanical Board Layout



JPDM Simplified Circuit Diagram

Specifications

Item	Description	
Inputs	Three 9-pin connections for 28 V dc Power Supply inputs	25 A max each
	5-screw terminal block for daisy chaining power distribution boards	35 A max per screw
Outputs	J1-J3 connections for either JPDP or JPDL boards	10 A 250 V fuse per circuit, Bussmann® MDA-10 typical.
	JCR, JCS, JCT connections for controller power	10 A 250 V fuse per circuit, Bussmann MDA-10 typical.
	JAR, JAS, JAT connections, filtered and fused, for auxiliary devices	3.75 A self-resetting fuse per circuit
	P4 connection for PPDA I/O pack power	0.25 A max
	JA1 connection for PPDA power diagnostic pack	±5 V max
Temperature	-30 to +65°C (-22 to +149 °F)	
Agency Approval	Class 1 Division 2 explosive atmosphere	
Board Size	16.51 cm High x 17.8 cm Wide (6.5 in x 7.0 in)	
Mounting	DIN-rail mounting	
	Base mounted steel bracket	

Diagnostics

The feedback wiring on JPDS and JPDM is different from the other PDM core boards. One JPDS or JPDM can host the PPDA I/O pack using the JA1 connector. The P1 connector is not used in this configuration because the output signals are going directly to PPDA. When a second JPDS or JPDM board is used, the P1 connector on the second board can be used for feedback into P2 of the board hosting PPDA. In both configurations, the P2 connector provides feedback signals from other core PDM boards. The following signals are created by JPDM:

- An electronic ID identifying the board type, revision, and serial number
- Three analog 28 V dc readings for the R, S, and T bus power supplies. Separate analog feedback signals are used. Accuracy is specified at ± 1% of full scale.
- Each power supply connector (JR1, JS1, JT1) has provisions for a dry contact indicating power supply status. JPDS conditions these signals and places them in the feedback signal set.
- Auxiliary Supply status feedback from downstream of the fuses provides three feedback signals to PPDA.
- Three control output fuse status signals plus nine J1 – J3 fuse output signals provide 12 feedback signals to PPDA

Due to a large signal count present on JPDM (15 fuses, 3 contacts and 3 bus voltages), a single set of board feedback signals is not adequate to transmit the signals to a PPDA I/O pack. Each JPDM consumes two sets of feedback signals out of the six available sets.

JPDS contains test rings for 28 V dc power from the three internal circuits, 28PR, 28PS, and 28PT. Each test ring has a series 10 k resistor to isolate the ring, and there is a single grounded ring 28N for the return path. These can be used to measure the 28 V dc power voltage using external test equipment.

Configuration

There are no jumpers or hardware settings on the board.