Powerlink RTU Installation Guide

Refer to individual Module Documentation for complete product details

Mounting

Powerlink Modules comprise a front mounted 19-inch rack 1U high modular RTU system. Comms, power and I/O connections are made directly to terminals on the rear panel of each module.

Power

24VDC nominal (18.0V to 32.0VDC). Power must be supplied to each module.

Intermodule Connection

The intermodule bus is a ten-way ribbon cable bus which carries data between modules in a Power*link* RTU.

Module	Part #	Load at 24 VDC
PLCOMM	B06-020/R	80mA
PLDI	B06-001	<100mA input dependant
PLDO	B06-002	<415mAoutput dependant
PLAI	B06-003	150mA
PLSIO	B06-005	150mA
PLPI	B06-007	40mA
PLIC	B06-008	100mA injecting

Table 1 Power requirements

Important! When adding a module always connect Power FIRST followed by the Intermodule Bus. When removing a module always unplug the intermodule bus FIRST and power LAST.

Front Panel Indicators

READY indicator shows the state of the watchdog circuit, and indicates one of the following conditions:

- Green — Normal operation
- Red (briefly) — Module is resetting or powering up
- Red (continuous) — Module is faulty
- Unlit — Module is not receiving power

DISPLAY turns the displays of the modules at the installation on and off and if held for 5 seconds tests the LEDs.

B06-020/R Remote Communications Controller PLCOMM

Connections

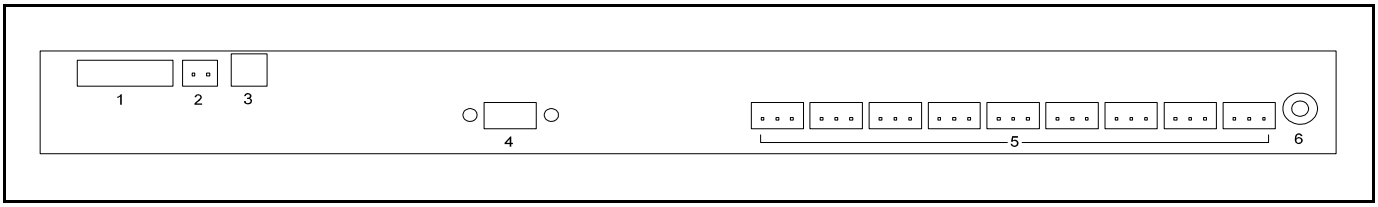

Fig. 1 Power*link* Communications Controller module rear panel

1 Intermodule Bus Connector (present on all modules)

2 24V DC Power Input Connector (2-pin Phoenix Combicon socket. Present on all Powerlink modules)

3 Serial Port

Used for direct local (on site) interrogation of the RTU's inputs and outputs, using a PC or laptop running Powerlink Local Master software.

4 Comms Connector CN1

Female 9-pin D-sub connector CN1 interfaces to a communication bearer which may be two-wire line, four-wire line or radio, or any electrically equivalent bearer. Comms is at 1200 or 2400 bits per second (bps) using FFSK modulation in the audio band 300Hz to 3kHz.

Pin	Signal (2-wire / radio)	Signal (4-wire)
1	⇦⇨ Line	⇨ Tx line
2	⇦⇨ Line	⇨ Tx line
3	⇨ Tx Audio	⇦ Rx line
4	⇦ LC/Radio	⇦ LC/Radio
5	⇦ Power	⇦ Power
6	⇦ Rx Audio	⇦ Rx line
7	⇨ PTT	⇨ PTT
8	⇦ Ch. busy	⇦ Ch. busy
9	Ground	Ground

Table 2 CN1 pin allocation

JP-7, 8 Position	Bearer(s) supported	Termination
Left (default)	2-wire line / radio	600-ohm txfmr isolated
Right	4-wire line	600-ohm txfmr isolated

5 Field I/O

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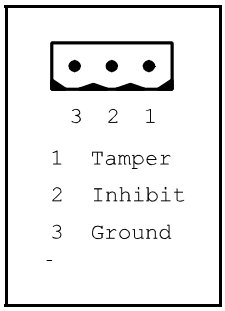
CN2	**Inhibit**	Defaults to the 'off' state. While 'on' (closed) prevents alarms from being generated while maintenance is being carried out at the RTU.
	Tamper	Connect to a N/C switch or ground if unused.
CN3	**Acknowledge**	N/O contact. Closing acknowledges all active alarms at RTU**.**
	Select	Not used at RTU. Leave open circuit
CN4, CN5		Optional timesynch (1pps or IRIG-B unmodulated) input and output.
CN6	**Defect**	Output goes active in the case of internal hardware or software failure of the module The contact rating is 0.3A at 120VAC and 1.25A at 24VDC (resistive loads).
CN7	**Comms Fail**	Output goes active if the module does not receive communication from a Master site and its timeout period expires, or due to unsuccessful RIM, either because the Master does not respond or because the radio channel is continuously busy. Default timeout is one minute on a line bearer and 30 minutes on a radio**.** Fig 5 shows the output in the non alarm state.



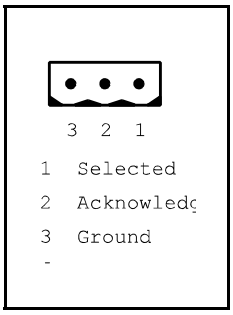


Fig. 2 CN2 pinouts **Fig. 3** CN3 pinouts

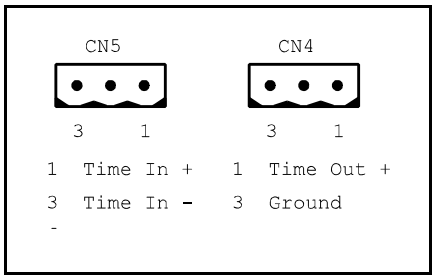


Fig. 4 CN5 and CN4 pin allocation

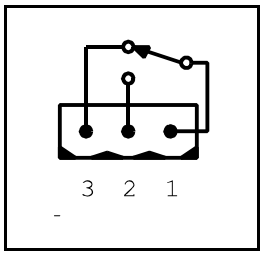


Fig. 5 CN6-CN7 Alarm outputs

6 Module Earthing Stud

Front Panel Indicators

I M Bus Indicators	**OK**	Valid response from a bus slave module (the indicator may blink if intermodule bus activity is sparse),
	Err	Bus slave module response is incorrect or missing.
MISC	**Select**	CN3 input state displayed.
	Sync	Time synchronised. Not used.
SECURITY	**Tamper & Inhibit**	CN2 input states displayed.

B06-005 Serial IO Module PLSIO

Connections

CN1-8, serial port connectors (RJ-45 for RS-232, 3-pin Phoenix Combicon for RS-485)

RS-232 Port Connector

Pin s1 and 2 may be used as "always active" flow control. External devices must not be powered from these pins.

All RS-232 signal lines are protected by bipolar surge suppressors. Ensure that the attached RS-232 device does not generate voltages more than 12V positive or negative on its outgoing flow control and data lines, as this would cause current to flow in these suppressors.

Pin	Dir	Name	Function
1	⇨	VUNR	Unregulated power rail
2	⇨	VCC	+5V power rail
3		N/C	No connection
4	⇨	COUT	Flow control output
5	⇦	CIN	Flow control input
6	⇨	DOUT	Data output
7	⇦	DIN	Data input
8		GND	Port ground (isolated)

Table 3 RJ-45 (RS-232) serial port pin out

RS-485 Port Connector

In the idle line state, pin 1 is high and pin 2 is low. Because RS-485 is a multi-drop interface, resistors are included to pull the data lines into the idle state when they are not driven.

Both RS-485 data lines are protected by surge suppressors and zener diodes. The normal operating voltage range for both data lines is 0V to +5V (with respect to port ground). Ensure that attached RS-485 devices do not generate voltages outside this range, as this would cause current to flow in these suppressors.

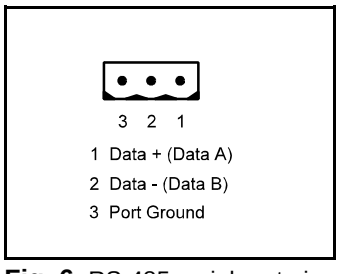


Fig. 6 RS-485 serial port pin outs

Display

The state of each of the four serial ports is indicated by a group of six LED indicators.

- OK (green) Illuminated when the port is operating correctly,
- Err (red) Illuminated when some error occurred on the port,
- C.IN (yellow) Shows the incoming flow control signal state,
- C.OUT (yellow) Shows the outgoing flow control signal state,
- D.IN (yellow) Illuminated when the PLSIO is receiving data,
- D.OUT (yellow) Illuminated when the PLSIO is sending data.

B06-001 Digital Input Module PLDI

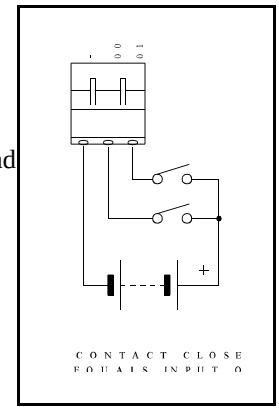


Fig. 7 Example field wiring

Input Voltage

The input voltage range is jumper selectable but normally ordered from the factory with the required voltage range preset. All inputs should be configured for the same input voltage to avoid confusion and possible damage.

Voltage	Jumper position
12/24V	JP1 - 40 closed
110/120V	JP1 - 40 open

Display

RAW Display button toggles between Processed (default after denounce, inversion, dibit pairing) and Raw (actual electrical value).

B06-002 Digital Output Module PLDO

Output Contacts 5A 30VDC Non Inductive load
5A 250VAC Non Inductive load

An "ON" output is electrically energised (i.e. contact closed).

Digital Outputs have protection against inadvertent output operation during power-up, power-down or failure of the module and to preserve output states if the module goes into a Defect state while running. An output test is performed every time power is applied to the module.

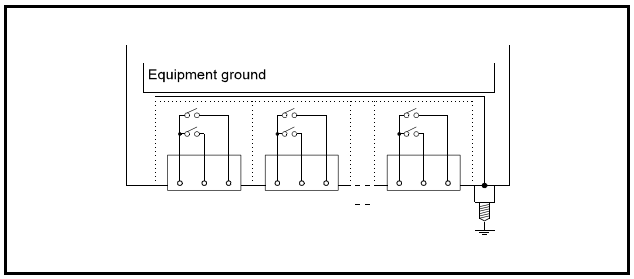


Fig. 8 Isolation barriers and protective earth arrangement

B06-003 Analog Input Module PLAI

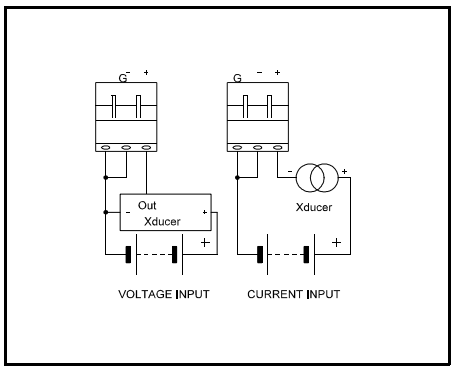


Fig. 10 Example field wiring

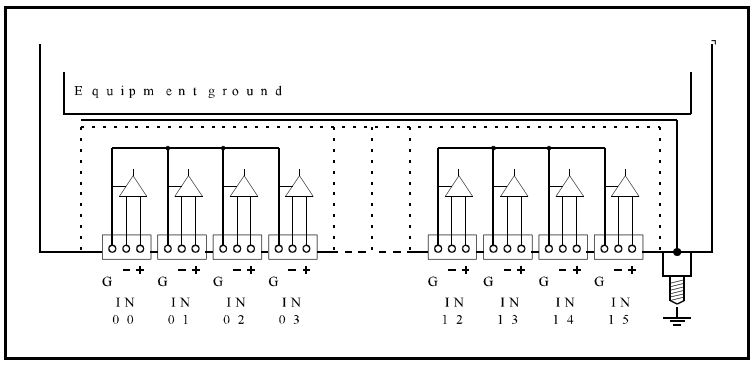


Fig. 9 Isolation barriers, input grouping and protective earth arrangement

Inputs

Accepts 16 Analog Inputs per module in three input ranges - 10 mA, 20 mA and 5V selectable on the main PCB. All ranges in a module should be set to the same range to avoid confusion and possible damage. Each input is independently differential. The '+' and '-' pins must be no more than 32.0V positive or negative with respect to the isolated ground (G) pin . To ensure that the input pins stay within the 32V input common mode range, the isolated ground ('G') pin is generally connected to the common or negative side of the field supply which powers the analog field circuits .

B06-007 Pulse Input Module PLPI

Inputs

Accepts voltages directly from the field for eight independently isolated pulse inputs (numbered 0 to 7).

Inputs are activated by an externally supplied DC voltage, applied between positive (centre pin of the three-pin connector) and negative (the end pins, which are internally connected together). Electrical isolation is provided between inputs, and between each input and the earth stud and equipment supply.

DC voltage range	8.0 to 36.0 volts,	
Current drawn	12VDC	5mA
	24VDC	10mA
Sample rate	one millisecond	
Debounce	refer table 2	
Pulse width	>= Debounce time	

Reverse polarity protection.
AC voltage protection of 36V RMS.

Top-of-scale frequency	Debounce time
0.5 Hz	20 ms
1 Hz	20 ms
2 Hz	15 ms
5 Hz	6 ms
10 Hz	3 ms
20 Hz	2 ms
50 Hz	2 ms

Table 4 Top of scale values and debounce times

B06-008 Injection Control Module PLIC

A specialised module to communicate with Injection Control equipment for Load Management Systems. Please refer to the module documentation for further details. Relay Outputs are for all control outputs except the signal connection.

Relay Outputs 5A at 30V DC or 250V AC Non Inductive Load

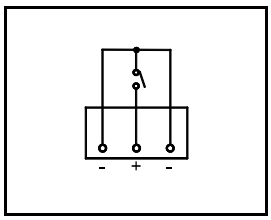


Fig. 11 Relay outputs

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