PL1100 Power Supply

General Description

The PL1100 is a linear power supply with a rated output of 1120W (80V/14A) for use with ViX and XL series drives. The supply requires a suitably rated transformer supplying 50V AC RMS for the HV and 20V AC RMS for the +24V DC. The use of the PL1100 offers the following benefits:

- Provides 80V HV and +24V DC output
- Single or three phase operation
- Built-in power dump switch
- Integral fusing

Physical Appearance

The supply is contained within an aluminium case as shown in Figure A-1. Mounting holes allow it to be attached to a panel using four 4mm screws. Alternatively, a DIN rail mounting option can be ordered.

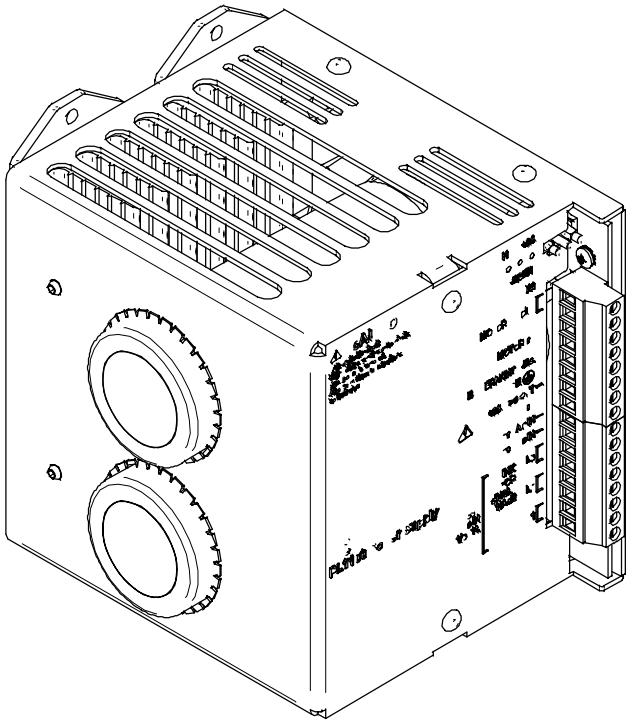

Figure A-1. PL1100 Power Supply

Accessories

The following accessories may be ordered with the PL1100:

- TO255 1000VA HV transformer
- TO256 120VA Logic supply transformer
- DIN rail mounting kits, two required

Dimensions

The overall dimensions of the supply are 143mm deep, 119mm wide and 145mm high. Refer to Figure A-2 for details.

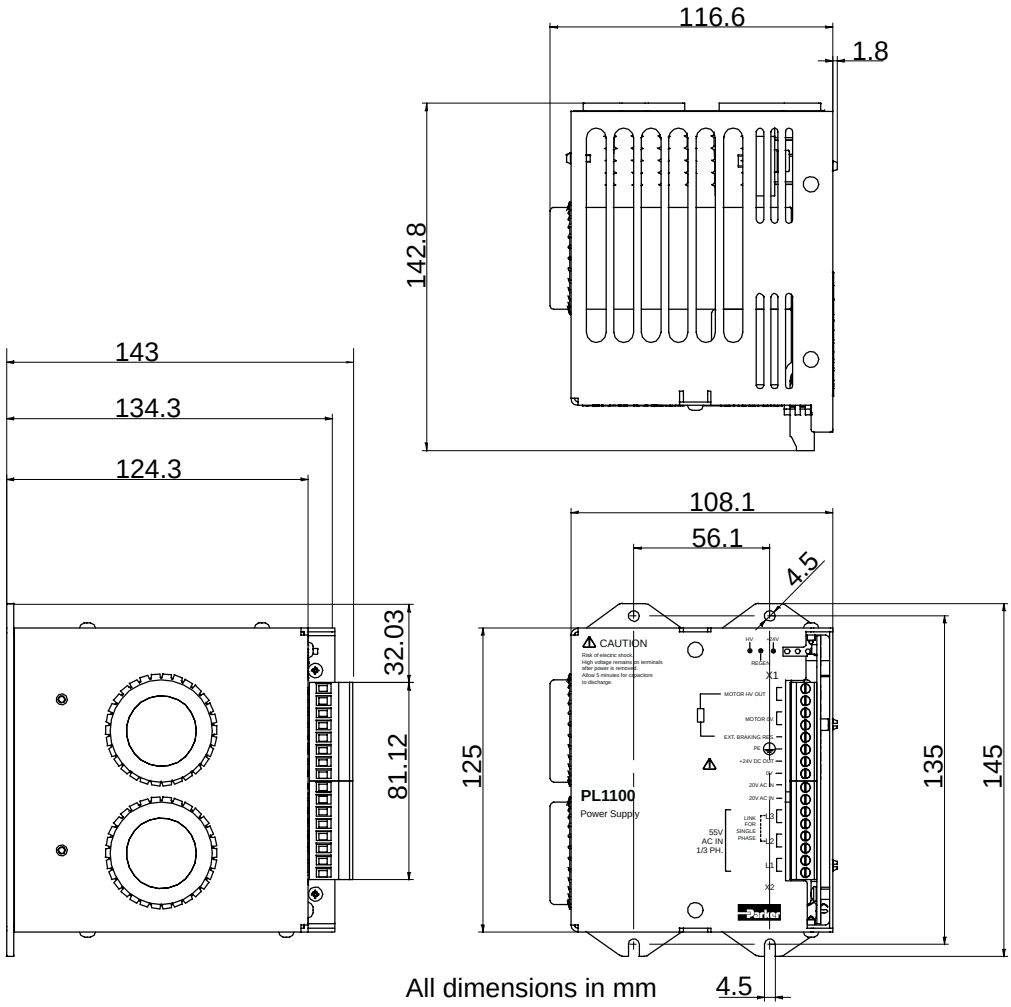

Figure A-2. Supply Dimensions

Mounting Information

Mount the supply vertically, near the drives it will supply. Both the top 4.5mm diameter fixing holes and the bottom two 4.5mm width fixing slots should be used.

Mount the supply with a minimum free space of 50mm both below and above its case. Allow a side clearance of 10mm free space on both sides.

Note, do not mount the supply above or close to other products which generate a significant amount of heat by radiation or convection.

Front Panel Layout

Figure A3 shows the location of connectors X1 and X2 and the three LEDs.

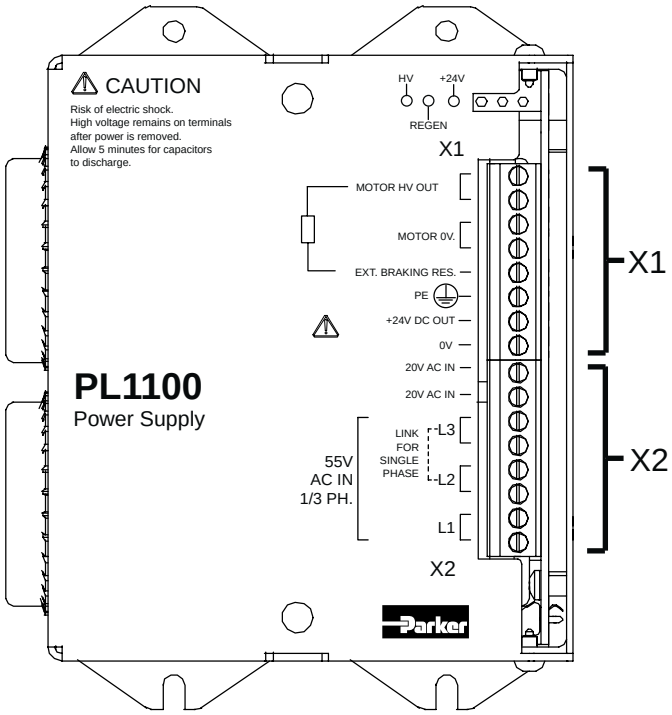

Figure A-3. PL1100 Front Panel

AC Input Connections

Make all AC input connections to X2, the lower eight-way screw connections.

The supply requires two AC input connections, a high current 50V AC RMS for the main HV output and a 20V AC RMS supply for the 24V DC logic supply. The main high current supply input connections allow the use of a single phase or three-phase transformer. If you are using a three-phase derived supply the secondary voltage required will depend upon the type of connection used, star or delta.

All the high current AC input connections share two connector positions giving two connection points for L1, L2 and L3. For a single-phase AC input, link L2 to L3.

Note: The front panel input voltage markings are no-load values, but the recommended transformer is specified at its full-load value. This accounts for the 18V secondary used to supply the 20V input and the 50V secondary used to supply the 55V input.

Main High Current Input

Single Phase Supply

Wire the secondary of the single-phase transformer to connection points L1 and L2 as shown in Figure A-4. Use approved cable, with a minimum wire size of 2.5mm^2.

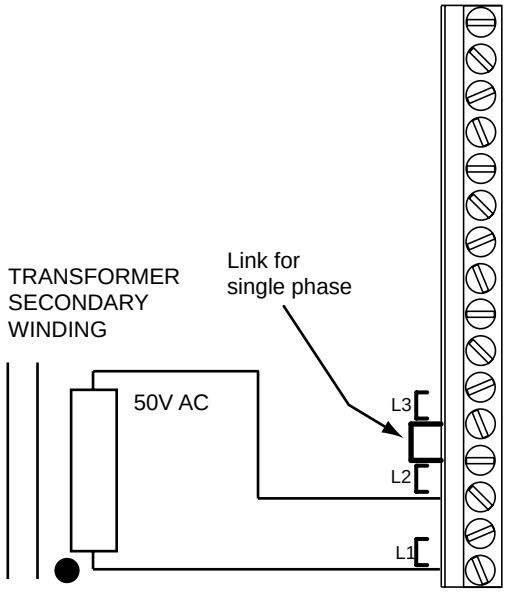

Figure A-4. Single-Phase AC Secondary Connection

Secondary Voltage

An AC secondary voltage of 50V RMS limits the upper AC voltage to a value below 61V max. Using a 230V AC RMS supply for the primary and assuming a transformer regulation of 5%, the maximum secondary AC voltage is given by:

50V +15%(AC supply upper tolerance) = 57.5V + 3.5%(transformer regulation) = 59.5V which is below the supplies maximum input limit of 61V.

Dual Secondary Windings

When using a dual secondary wired in parallel, use the connections shown in Figure A-5. This connection method takes advantage of the shared connection points available on X2. This is the connection method used with the TO255 1000VA transformer, shown in Figure A-5.

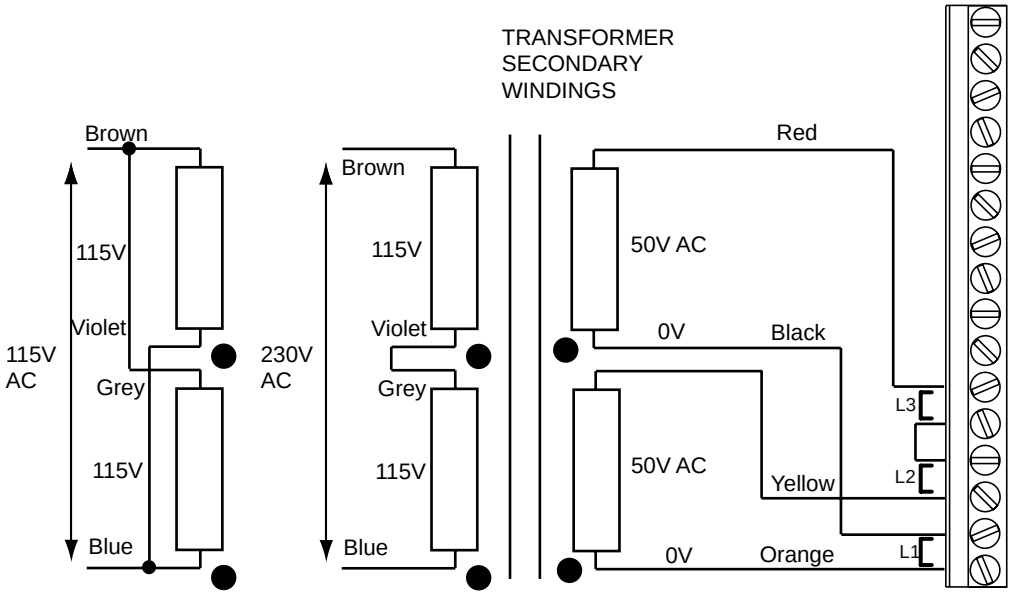

Figure A-5. Single-Phase AC Dual Secondary Connection

HV Transformer Specification (TO255)

Power rating	1000VA
Input voltage	230V +15% -10%
Output voltage	2 X 50V RMS full load voltage
Output current	2 X 10A RMS
Regulation	3.5%
Size	162mm diameter, 70mm height
Weight	6.5Kg
Mounting	resin filled centre, drilled to accept an 8mm mounting screw

Note:
A Neoprene insulating disc is included with the mounting kit to prevent the crushing of transformer windings. This disc provides a 5kV isolation barrier between the transformer and mounting panel.

Three Phase Supply

Depending upon the connection method used, star or delta, wire the three-phase secondary as shown in Figures A-6 and A-7. Use approved cable, with a minimum wire size of 2.5mm^2.

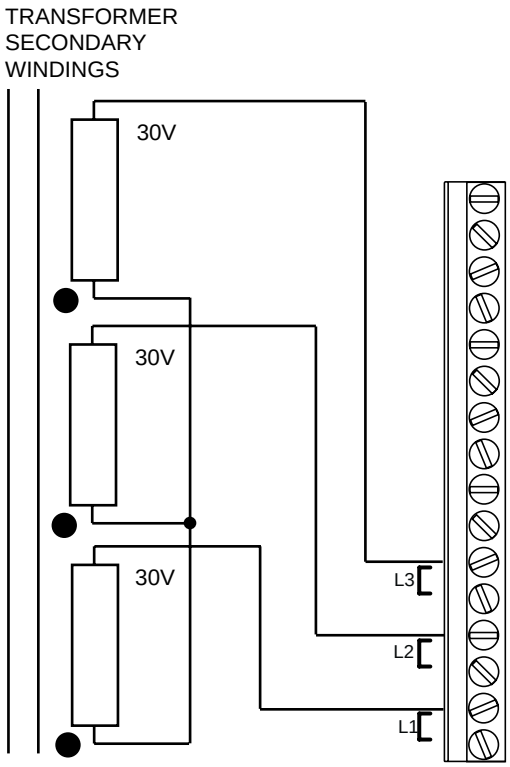

Figure A-6. Three-Phase Star Secondary Connection

Note: Make the star connection at the transformer.

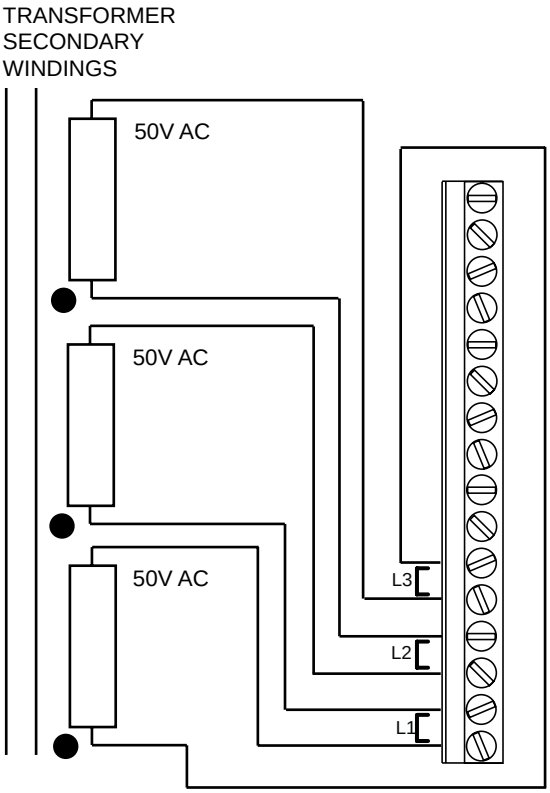

Figure A-7. Three-Phase Delta Secondary Connection

Input Supply Fuses

AC inputs L1, L2 and L3 are each internally fuse protected by circuit board mounted 32A time lag fuses in positions AC1, AC2 and AC3.

The fuse types are 32A TL HB 6.3 X 32mm.

Logic Supply Input

The logic supply AC input will require a single-phase 18V AC RMS input capable of supplying 6A. The supply is connected between the two '20V AC IN' connection terminals of X2. Alternatively, if a 24V DC supply is already present, route it directly to the drives.

Logic Supply Fuse

A 10A time lag fuse protects the AC input supply to the logic supply bridge rectifier. The fuse used is a 10A TL HB 5 X 20mm.

Suitable Transformer (TO256)

A +24V DC logic supply can use the TO256 120VA toroidal transformer (see Figure A-8), which has the following specification:

Power rating	120VA
Input voltage	230V +15% -10%
Output voltage	2 X 18V RMS full load voltage
Output current	2 X 3.3A RMS
Regulation	5.5%
Size	93mm diameter, 46mm height
Weight	1.2Kg
Mounting	resin filled centre, drilled to accept an 8mm mounting screw

Note:
A Neoprene insulating disc is included with the mounting kit to prevent the crushing of transformer windings. This disc provides a 5kV isolation barrier between the transformer and mounting panel.

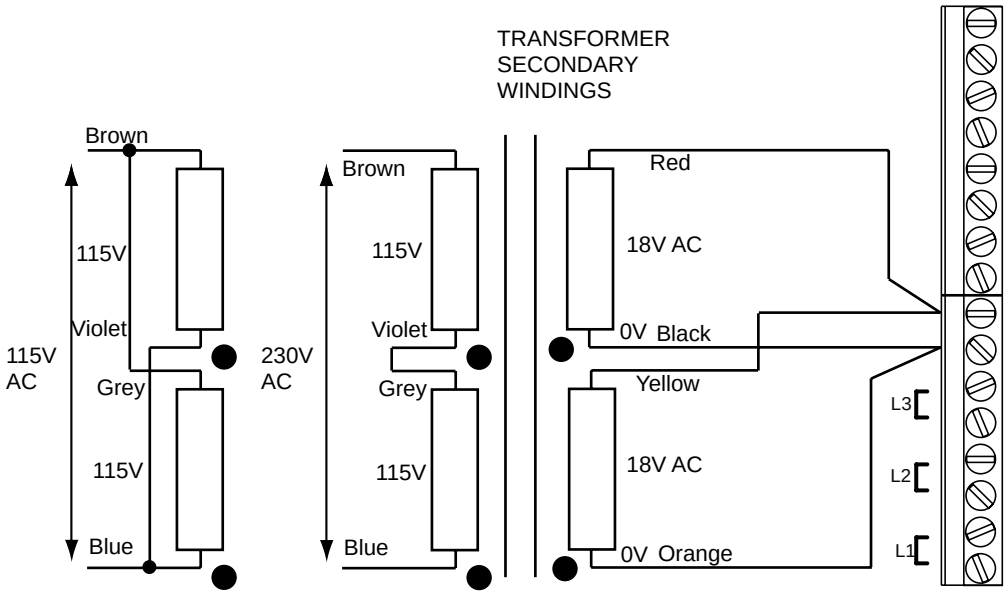

Figure A-8. PL1100 X1 Connections

DC Output Connections

Make all DC output connections to X1, the upper eight-way screw connections. Figure A-9 shows the detail of the PL1100‘s front panel, indicating the connection information for connector X1.

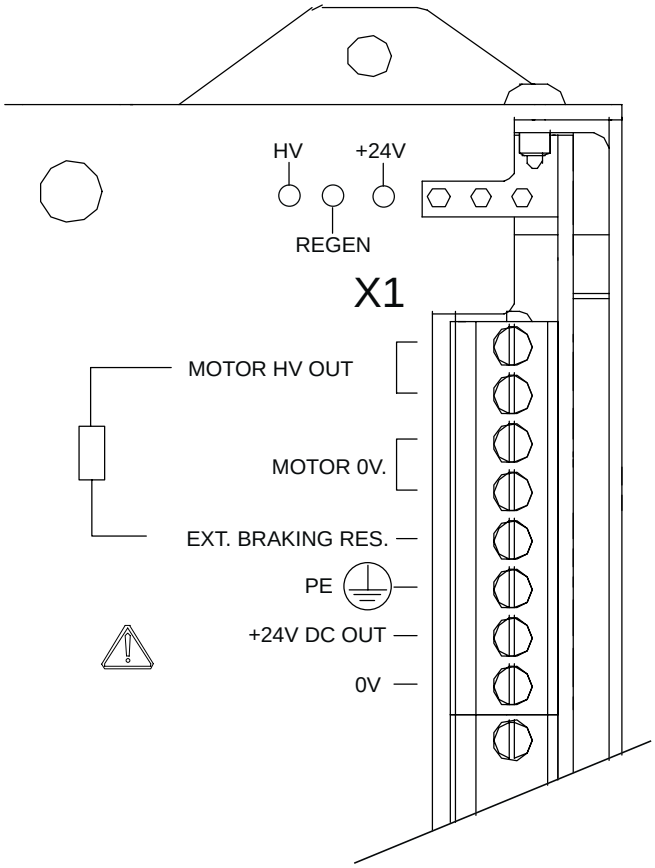

Figure A-9. PL1100 X1 Connections

The MOTOR HV OUT is the main HV positive output, shared between the top two screw terminal connectors. The return connections also share two screw terminal connectors marked as MOTOR 0V. Connect any brake or dump resistor between HV and the EXT. BREAKING RES. connection. Each terminal will accept a maximum wire size of 2.5mm^2.

Figure A-10 shows the PL1100 output wiring for two ViX drives. This illustrates how to route the main HV supply separately to each drive. The lower current requirements of the +24V logic/brake supply can allow the wiring to be linked between drives.

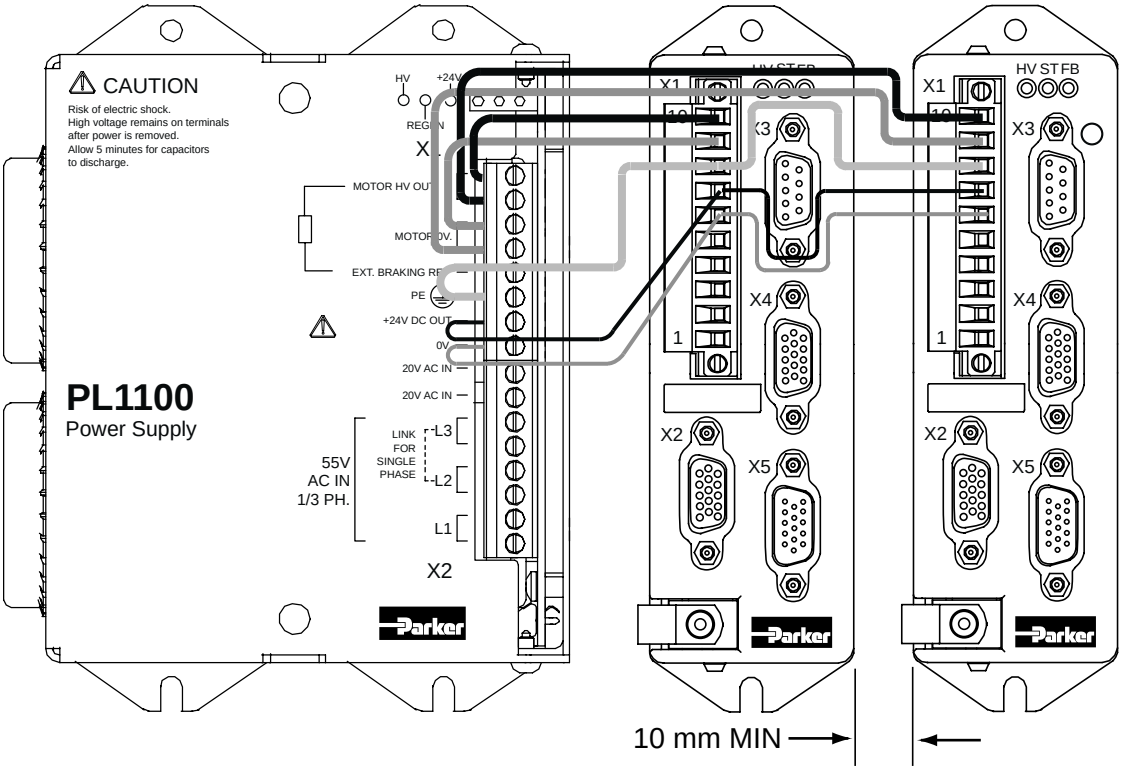

Figure A-10. PL1100 Output Connections for two ViX drives

EMC Installation Guidelines

These EMC installation recommendations are based on the expertise acquired during the development of compliant applications, which Parker believes are typical of the way, a PL1100 may be used. Provided you have no special installation requirements or untypical operating environment requirements, PL1100 power supplies will conform to current EMC Directives.

If you are using the recommended transformers (TO255 & TO256) both primaries can be fed from a single EMC filter. Use a CORCOM 12FC10 or its equivalent

Mount the supply on a conductive panel to which the EMC filter and the drive(s) are also attached. If the panel has a paint finish, it will be necessary to remove the paint in certain areas to ensure the filter and supply, make a good large-area metal to metal contact with the panel.

Position the PL1100 as close as possible to the drives it is to supply (less than one metre). Ideally, the EMC filter needs to be close to the transformers, which in turn, should be as close to the PL1100 as can be arranged. Assuming the use of an equipment cabinet, locate the EMC filter and transformers in the base of the cabinet and route AC supply cables up to the PL1100. Attempt to layout the wiring in a way that minimises cross coupling between filtered and non-filtered conductors. This means avoiding running wires from the output of a filter close to those connected to its input. Where you wish to minimise the cross coupling between wires avoid running them side-by-side one another, if they must cross, cross them at 90° to each other. Keep wiring supported and close to cabinet metalwork.

Power Dump/Braking Resistor Considerations

The power supply incorporates a regenerative power dumping circuit used to divert regenerated power into a dump or brake resistor. The need for such a circuit should ideally be determined during system design.

External Braking Resistor

If required by the application, fit an external braking resistor where shown to connector X1. The need for a braking resistor should be considered if the application requires large inertial loads to be decelerated quickly. During deceleration if the drive faults-out with over voltage or the braking resistor (middle LED) flashes orange - requesting power dumping, it is likely a brake resistor is required.

The internal dump switch has a peak rating of 1450W. The dump resistor used should be 5 Ohms (nominal) with a power rating of 100W. This circuit's output is protected by a 5A time lag fuse, used to limit power dissipation and to provide protection in the event of a dump resistor short-circuit. The dump fuse is a 5A TL LB 5 X 20mm.

The circuit used is a relative dump switch set to operate at nominal HV + 5V. This form of power dump circuit has the advantage of acting as a discharge path for the main supply smoothing capacitors at power-down.

Parker offers the "PL1100-DUMP". If any other form of resistor is used, take care to insulate all connections and to guard against it being touched when hot. Any alternative resistor should be wired using 16/02 0.5 mm^2 cable.

To protect the dump resistor from external wiring faults we recommend that a protection fuse is included between the HV connection and the dump resistor. A suitable value is 5A TL LB.

LED Indicators Function

Three tri-state LEDs are positioned on the front panel of the PL1100. Their function is described in Table A-1.

Position	Colour	Function
Left	Green	HV present
Middle	Green	HV power dump ready
	Orange	HV power dump switch closed (dump active)
Right	Green	24V present

Table A-1. LED Indicators Function

Electrical Specification

Parameter	Value
Input voltage	
Nominal	55V AC RMS (under no-load conditions)
Absolute maximum	61V AC RMS
Mains supply frequency range	50/60Hz +/- 2Hz
Output voltage	80V DC ±5% (no load)
On board capacitance	2 x 10,000µF/100V
Logic supply input voltage	20V RMS (under no-load conditions)
Mains supply frequency range	50/60Hz +/- 2Hz
+24V Logic Output	
No 24V load output	26.6V DC +/-5%
3A load output	23.3V DC +/-5%
On board capacitance	10,000µF/35V
Output cable length restriction	not to exceed 10m in length

Mechanical Specification

Parameter	Value
Housing	Aluminium case
Dimensions	
Depth	143 mm Max
Width	117 mm Max
Height	145 mm Max (excludes DIN rail mounting kit)
Weight	1.25 kg

Environment Specification

Parameter	Value
Pollution	Degree 2
Installation category	II* at transformer primary input
Operating temperature range	0 to 50°C ambient
Storage temperature range	-20° to 70°C
Humidity	5 to 95% non condensing within enclosure
Altitude	2000 metres
Ingress protection	IP20
Cooling	Natural convection. Operation at temperatures between 40° to 50°C will require an airflow through the module of 0.5m/s.

*Note: Installation category (also called Overvoltage Category) specifies the level of mains voltage surges that the equipment will be subjected to. The category depends upon the location of the equipment, and on any external surge protection provided.