VIGILANT

14A PSE Installation Instructions (FP1139)

Installation Instructions

1. General Description

The FP1139 14A Power Supply Equipment (PSE) is designed for use with the MX1 BTO Panel, MX1 14A Standalone PSE, and T-Gen2 Emergency Warning System. It provides mains power, battery connection, battery charging and fault supervision of the various conditions.

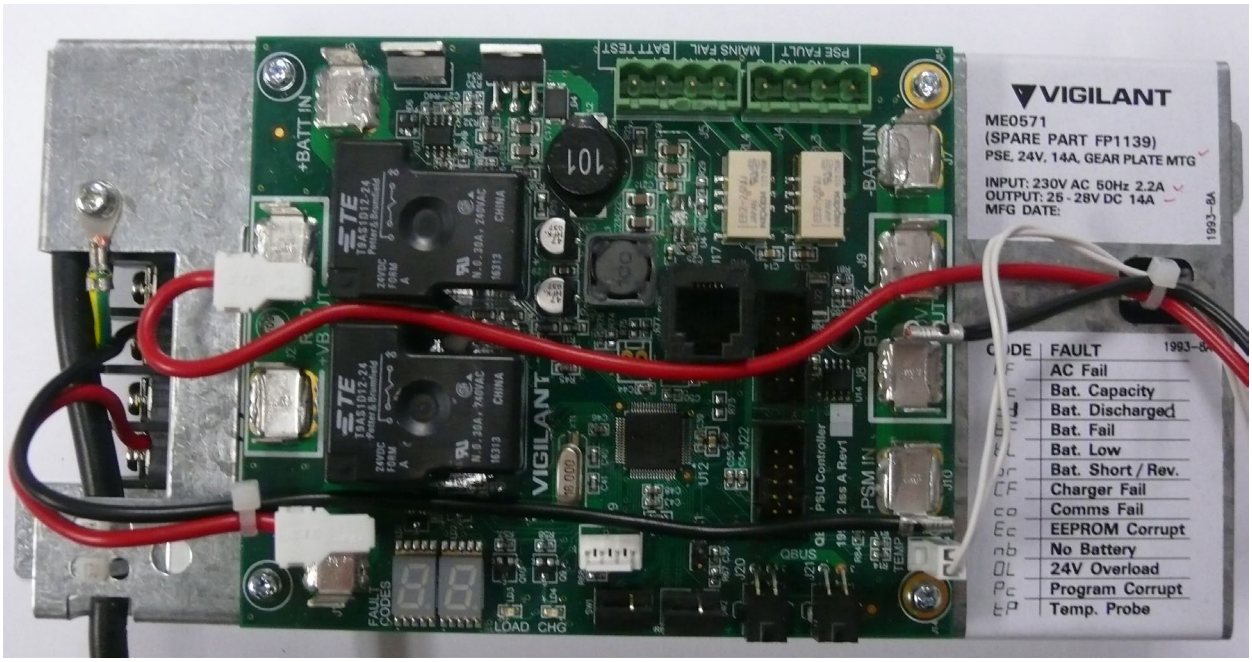
You can mount the 14A PSE on various gear plates.

Use these instructions for the fitting and connection of the 14A PSE in the MX1 BTO Panel, MX1 14A Standalone PSE, T-Gen2 EWS panel, and a Simplex 4100ESi PDI equipment bay for use with T-Gen2. The details of any necessary changes to the T-Gen2, MX1 BTO Panel, MX1 14A Standalone PSE, or other hardware are not covered here.

The 14A PSE includes all the required hardware to mount the PSE in the MX1 BTO Panel, MX1 14A Standalone PSE, T-Gen2 EWS and cabling to wire to the T-Gen2, MX1 BTO Panel, MX1 14A Standalone PSE, and batteries. To mount it in a 4100ESi PDI bay a FP1142, you need a bracket.

You can also use the FP1139 14A PSE as a spare part to replace a faulty PSE in the 15U EWS, MX1 BTO Panel, MX1 14A Standalone PSE, or the 14A PSE in a QE20 SECP in a shallow cabinet.

Figure 1 – FP1139 14A PSE



2. Checking the Kit

Before you install a 14A PSE, check that all items in the kit are present and undamaged.

Table 1: Kit description

Quantity	Description
1	14A PSE module
1	734-008 Q-BUS Loom 600mm (for wiring to the T-Gen2 board)
1	LM0635 Black Battery Lead 2m (for wiring to batteries)
1	LM0636 Red Battery Lead 2m (for wiring to batteries)
1	LM0571 Battery Joining Lead c/w M6 lugs, 20A fuse, spare 20A fuse
1	LM0685 Power Loom from 14A PSE to MX1 Controller
1	KT0576 Bag of M5/M6 Battery Fasteners (for wiring to batteries)
2	SC0176 M4 X 10 Screw (for mounting PSE)

3. Mounting the 14A PSE

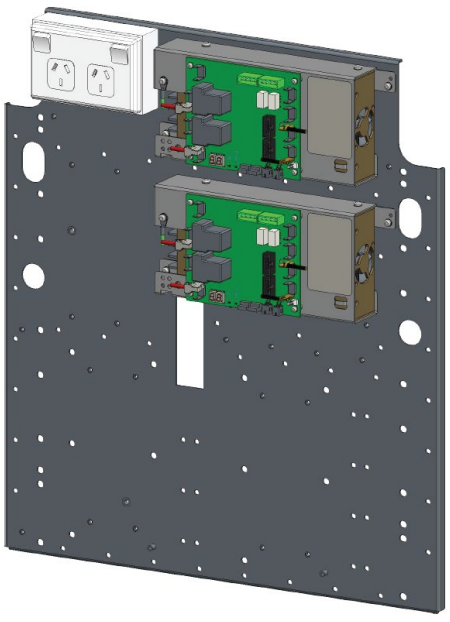
Before you install the PSE in EWS, ensure that the mains wiring is connected to the PSE input and link LK1 is removed on the PSE controller. It may not be practical to make changes after you install the PSE.
To install the 14A PSE in the panel, mount the LK1.

Mounting in a 15U Grade 2 EWS Panel

You can mount the 14A PSE in either of two positions on the 15U Grade 2 EWS gear plate of FP1129/ FP1130. See Figure 2 for the locations. The top position normally has a PSE factory fitted, and a second PSE can be fitted in the lower position.

1. Position the PSE where required and fit one of the M4 screws from the kit in the top right hand fastening point but do not tighten it.
2. Fit the other M4 screw in the bottom left hand fastening point and tighten both screws.

Figure 2 – 14A PSE Mounting on T-Gen2 Grade 2 Gear plate



Mounting in a Simplex 4100ESi Fire Panel PDI Equipment Bay

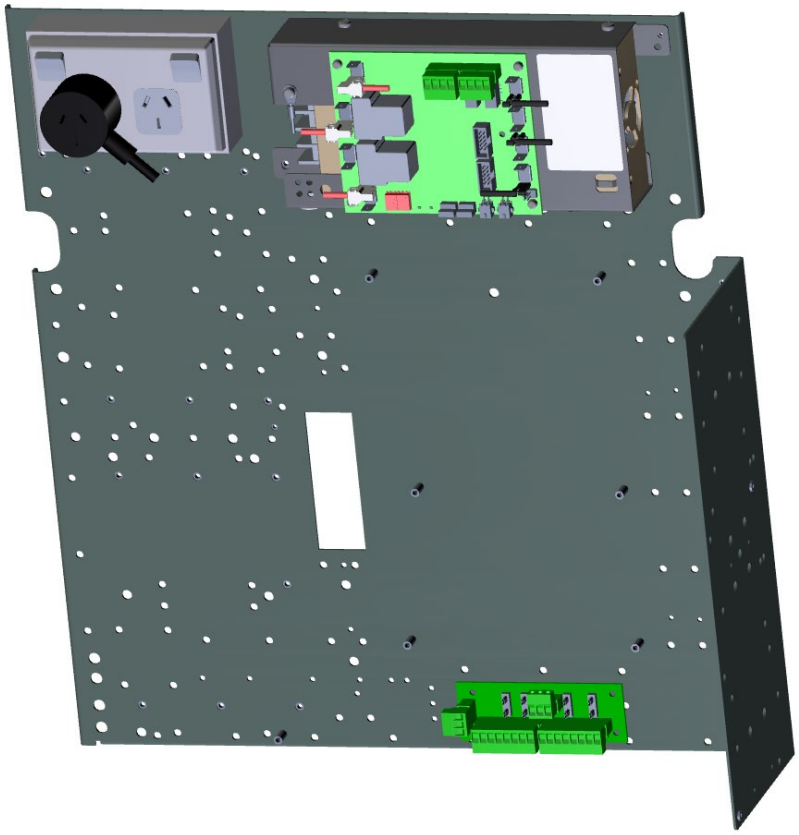
To mount the 14A PSE in a Simplex 4100ESi fire panel PDI equipment bay, you need an FP1142 14A PSE mounting bracket. This includes mounting instructions *(LT0690)* and all the required hardware to mount the PSE in the PDI bay. Usually, you mount the 14A PSE, on the FP1142 bracket, in the right-hand side position of the same PDI bay with the T-Gen2 units it powers, so it can reach the mains GPO in the bay above or below.

Mounting in MX1 BTO PANEL OR MX1 14A Standalone PSE

You can mount the 14A PSE on the MX1 BTO Panel and MX1 14A Standalone PSE (FP1197) gear plate.
See Figure 3 for the location of 14A PSE mounting. Normally, you fit the PSE at the position specified by the factory.
If you need to replace the PSE in the panel:

- Fit one of the M4 screws from the kit in the top right hand fastening point, but do not tighten it.
- Fit the other M4 screw in the bottom left hand fastening point and tighten both screws.

Figure 3 – 14A PSE Mounting on MX1 BTO Panel or Standalone PSE Gear plate



4. Wiring a 14A PSE

Mains Wiring

The panel, or EWS, is supplied with a dedicated mains feed direct from a main switchboard, refer to AS/NZS 3000.
A 10 A circuit breaker is required for a system with up to three 14 A PSE units.
A 16 A circuit breaker is required for a system with four or five 14 A PSE units.
A circuit breaker of more than 16 A rating should not be used.

Equipment Wiring for T-Gen2

In the Grade 2 T-Gen2 the 14A PSE is connected, see Figure 4, to the following:

- T-Gen 60/120 QBus (J32), from the 14A PSE QBus connector (J20) using the QBus loom 734-008 provided. Additional QBus subordinates can be connected to the QBus out connector J21 on the PSE.
- T-Gen 60/120 24 V In (J20), using the 14A PSE 24 V supply leads fitted (from J2/3, J8/9 on the PSE).
- Batteries, from the 14A PSE BATT IN QC tabs (J6 and J7) using the battery leads LM0635, LM0636 and fasteners provided. The battery joining lead (LM0571) needs to include a 20 A blade fuse.
- Mains GPO, from the 14A PSE mains lead.

Also refer to *T-Gen2 60/120 Installation and Operating Instructions (LT0667)* for the QBus wiring.

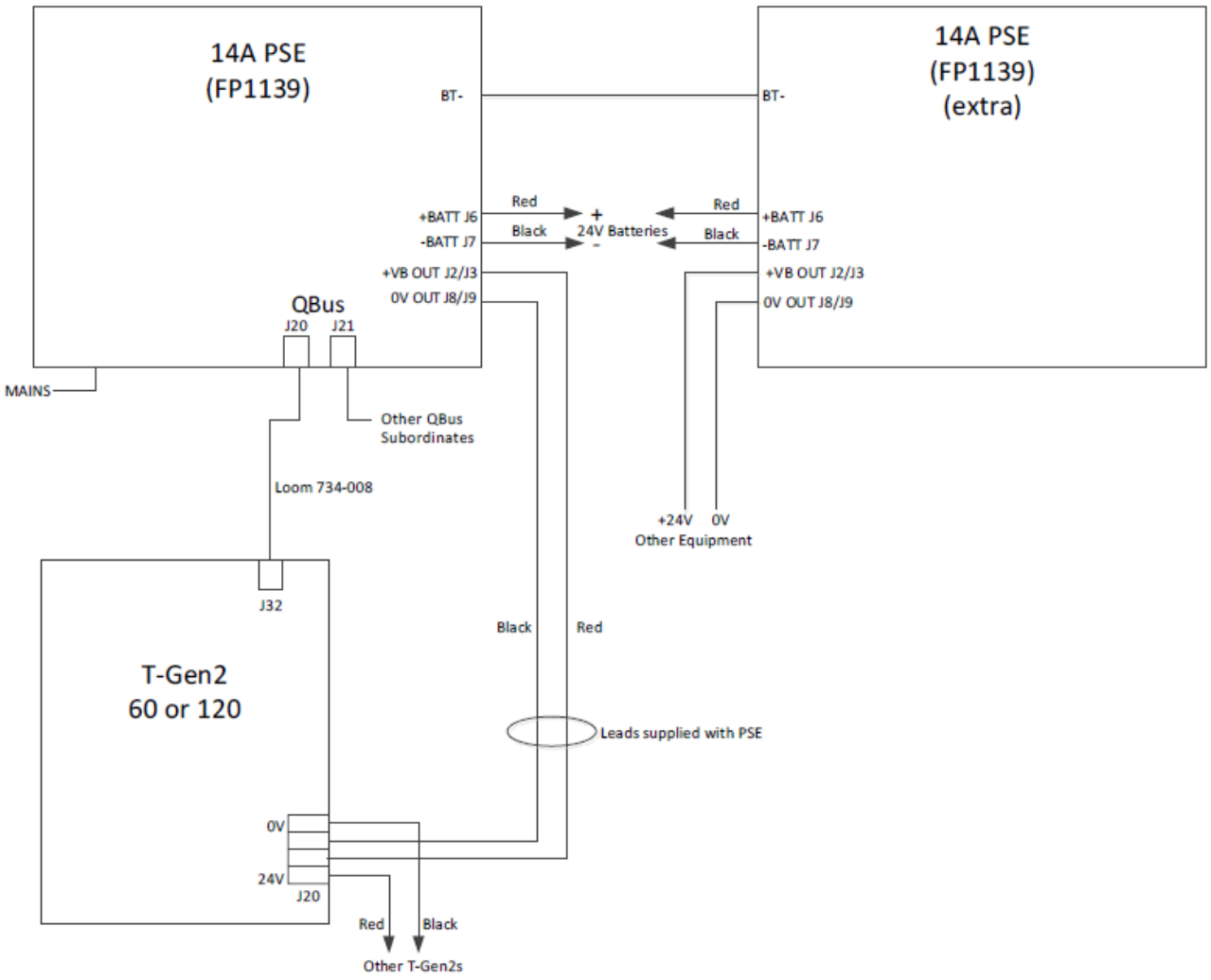
Multiple PSEs may be connected to the same set of batteries. The battery chargers can be configured for one or several PSE to be enabled, to provide sufficient charge current.

When multiple PSE units are sharing a common battery, the battery test BT- terminals (J4) on these PSE must be linked together. This allows them to synchronise the battery connection and other tests.

WARNING: Do not power the PSE unless it is mounted correctly in the equipment, otherwise mains terminals may be exposed.

WARNING: Do not connect or disconnect the GBUS leads with power applied because this can damage the equipment.

Figure 4 – 14A PSE Interconnection for T-GEN2



Equipment Wiring in MX1 BTO Panel or MX1 14A Standalone PSE

WARNING: Do not power the PSE unless it is mounted correctly in the equipment, otherwise, mains terminals may be exposed.

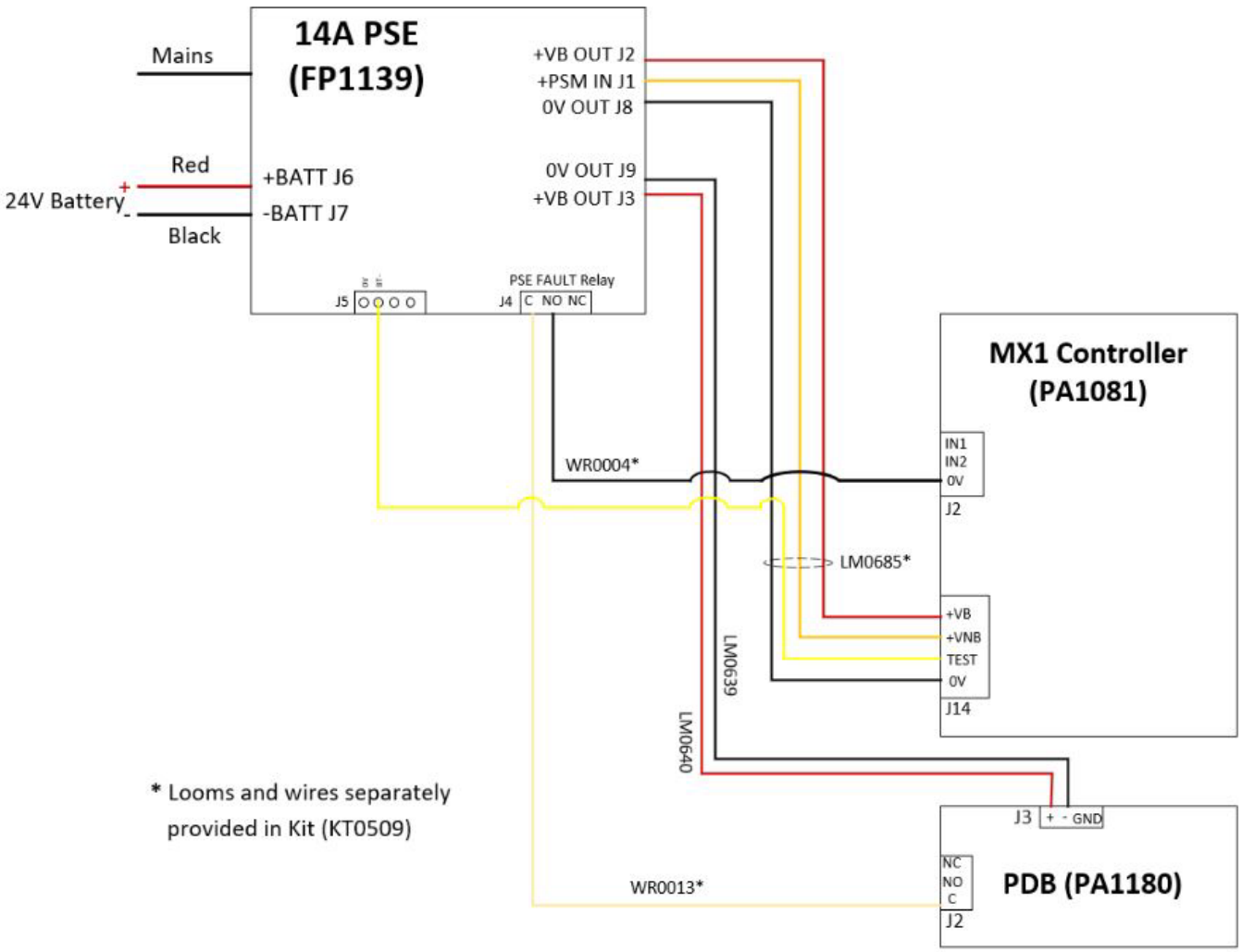
In the MX1 BTO Panel or MX1 14A Standalone PSE the 14A PSE is connected, see Figure 5, to the following:

- For the MX1 BTO Panel, use the loom LM0685 to connect the 14A PSE (J2,J1,J8) and J5 (BT-) to the J14 terminal of the MX1 Controller board.

Note: The LM0685 Loom is not used in the MX1 14A Standalone PSE.

- 14A PSE (J9,J3) is connected to J3 Terminal of Power Distribution board using the loom LM0639 (BLK) & LM0640 (RED).
- 14A PSE Fault Relay (J4) common contact is connected to common contact of J3 Terminal of Power Distribution board using yellow wire.
- For MX1 BTO Panel 14A PSE Fault Relay (J4) Normally open contact is connected to J2 Terminal (0 V) of MX1 Controller board using black wire.
- Batteries, from the 14A PSE BATT IN QC tabs (J6 and J7) using the battery leads LM0635, LM0636 and fasteners provided. The battery joining lead (LM0571) needs to include a 20A blade fuse.
- Mains GPO, from the 14A PSE mains lead.

Figure 5 – 14 A PSE connection inside MX1



5. Configuration

The T-Gen2, MX1 BTO Panel, or MX1 14A Standalone PSE need to be configured to support and monitor the 2nd, or subsequent, PSE. This is done on the PSE subordinates table in SmartConfig. Enable the PSE at the required address and select if the battery charger is enabled.

You must configure the 14A PSE, MX1 BTO Panel, or MX1 14A Standalone PSE to be controlled by a host device. Do not fit Lk1. Set the address rotary switches SW1 (TENS) and SW2 (ONES) to the subordinate address (01–09) when you use multiple PSEs with T-GEN2.

If you use a single PSE within the MX1 BTO panel OR MX1 14A Standalone PSE, you can configure it with SW1 (TENS) set to 0 and SW2 (ONES) to 1, this is usually set at factory.

Refer to the *T-Gen 2 Installation Instructions (LT0667)* and the *SmartConfig Programming Manual (LT0332)* for instructions on configuring the T-Gen2.

6. Replacing a QE20 SECP PSE

The FP1139 14A PSE is used in a QE20 SECP, shallow cabinet, as the power supply.

To replace a faulty QE20 SECP PSE:

1. Power down the QE20. Turn off mains and unplug the mains lead at the GPO. Disconnect the batteries.
2. Disconnect the 24V DC output leads (LM0654) from J2/J3 and J8/J9 and the battery leads from J6 and J7 on the existing PSE in the SECP.
3. Disconnect the QBus 4-way lead from J20/J21. Remove the existing PSE.
4. On the replacement PSE remove any DC output leads on J2/J3 and J8/J9 and battery leads on J6 and J7.
5. Set the Address rotary switches to 01, or according to the removed PSE, and make sure Lk1 is not fitted.
6. Fit the new PSE.
7. Connect the existing battery leads to J6 (red) and J7 (black). Connect the existing DC Output leads (LM0654) to J2/J3 (red) and J8/J9 (black).
8. Plug the 4-way QBus lead into J20. Plug the mains lead into the GPO and power up on mains.
9. Check the SECP is working correctly – the only fault present should be no batteries.
10. Connect the batteries and check there is no fault present.

7. Status LEDs

System Load Current

This green LED indicator labelled **LOAD** (LD3) flashes at a rate determined by the system current, averaged over the last few seconds. With no load, the flash rate is 0.5Hz. As the load increases, so does the flash rate, up to 10Hz at full capacity.

Charge Current

This green LED indicator labelled **CHG** (LD4) flashes at a rate determined by the battery charging current. With no load, the flash rate is 0.5Hz. As the load increases, so does the flash rate, up to 10Hz at full capacity.

If charging is disabled, the indicator does not flash.

If the system load is being supplied by the battery, this indicator is continuously on.

Communications

When the PSE is communicating correctly with the host, for example the MX1 BTO Panel, MX1 14A Standalone PSE, or T-Gen2, the decimal point on the seven-segment display flashes approximately once a second.

Fault Codes

The two digit seven-segment display labelled **FAULT CODES** (LD1 and LD2) light when the PSE detects a fault condition. When multiple conditions are present, the codes appear sequentially. The codes and their meanings are as follows:

Table 2: Fault codes

Fault	Display Code	Detail
Mains Fail	**AF**	AC Fail
Battery Capacity Low	**bc**	From a failed long term battery test.
Battery Discharged	**bd**	Representing the state of a terminally discharged battery, which the PSE has disconnected to protect it. The rest of the system is likely dead when this code is presented. May take up to 30 seconds to detect.
Battery Fail	**bF**	Battery Fail fault (below 21.6 V). May take up to 30 seconds to detect.
Battery Low	**bL**	Battery Low fault (below 24.2 V)
Battery Shorted or Reversed	**br**	May take up to 30 seconds to detect.
Charger Fault	**cF**	Charger output is low (<24.5 V) with no charging load
Comms failure	**co**	No messages received from the host controller. Does not apply in autonomous operation (when Lk1 is fitted).
EEPROM Corrupt	**Ec**	Failed self test on the non-volatile storage areas in the PSE controller
Battery not connected	**nb**	No battery. May take up to 30 seconds to detect.
24V output overload	**OL**	Peak 24 V output current has exceeded the nominal capacity too often in the last 30 seconds.
Program corrupt	**Pc**	Failed self test on the firmware memory in the PSE controller.
Temperature probe wiring fault	**tP**	The temperature probe is disconnected or shorted.

At initial power on, the software version (**A.B**) appear, followed by a **walking segment** display test. System power is usually available before this start-up display pattern is complete.

8. Power On and Testing

Turning the PSE on or off

The mains power to the system can be switched off using the switch on the General Purpose Outlet inside the cabinet. To completely isolate the mains supply from the system, remove the PSE mains plugs from the mains outlet.

The battery power to the system can be isolated by removing the fuse in the lead connecting the two batteries.

For the first tests apply mains power only to check the operation of the PSE and T-Gen2, MX1 BTO Panel, or MX1 14A Standalone PSE, without a battery. After you confirm this, you can connect a battery. You need to configure and connect the T-Gen2, MX1 BTO Panel, MX1 14A Standalone Panel, and PSE properly.

Power on and wait for the T-Gen2 to start up (<10 s)

1. Check the POWER and AUTO LEDs on the T-Gen2 User Interface turn on and that no faults are generated. If faults are generated, see Fault Codes to use the LED display to determine the faults that are present.
2. After 30 seconds a battery not connected (nb) fault code appears on the PSE and the Power Fault LED on the user interface turns on.
3. Connect the batteries and check the fault clears after 30 seconds.

Power on and wait for the MX1 BTO Panel to start up (<10 s)

1. Check that the POWER LEDs on the MX1 BTO Panel user interface turn on and no faults generate.
2. If faults generate, it could be a mains fault or Ext PSU/PDB fault on the user interface.
    a. Open the panel door and check LED Display on PSE. See Fault Codes to determine the faults that are present.
3. After 30 seconds a battery not connected (**nb**) fault code appears on the PSE and the General Fault LED on the user interface turns on.
4. Connect the batteries and check the fault is cleared after 30 seconds.

Power on and wait for the MX1 14A Standalone PSE Panel to start up (<10 s)

The faults do not appear on the user interface, so you must complete the following actions:

1. Open the door of MX1 14A Standalone PSE and check the 14A PSE LED Display to confirm that no faults are generated.

After 30 seconds a battery not connected (**nb**) power fault code appears on the PSE.

2. After 30 seconds a battery not connected (**nb**) power fault code appears on the PSE.

Checking Battery Charger Voltage

To check the open circuit battery charger voltage the following procedure can be used:

1. Operate the PSE from mains with a good battery connected. No fault is shown.
2. Disconnect the battery and measure the open circuit charger voltage from the PSE within 30 seconds. If the voltage drops to approximately 10 V repeat the process until a valid reading, approximately 27.3 V, is obtained. Every 30 seconds the PSE turns off the charger to sample the battery voltage. With no battery connected, the charger does not turn on again.

9. PSE Operation

The Power Supply Equipment (PSE) is made up of two parts:
- OEM Module – takes 230 VAC mains and converts this to 27 VDC.
- PSE Controller Charger (PCC) – the printed circuit board that is mounted on the OEM module and controls the whole unit.

AC Operation

When 230VAC is applied the OEM module converts the 230 VAC to 27 VDC.

After mains power is turned on, there is a short delay of approximately 5 seconds, then the 27 V connects to +VB OUT supplying the system with power.

Note the PSE DC output voltage when the PSE is operating off mains is 27 VDC.

The 27 VDC from the OEM module is monitored and on failure the PCC switches the battery, if connected, to supply the DC voltage out, so the voltage may change due to the different voltage on the batteries.

Battery Operation

The battery is connected to +BATT IN and -BATT IN terminals on the PCC.

Battery voltage is monitored and when the battery voltage drops below 18 volts it is disconnected from the system. A battery voltage greater than approximately 21 V is required to power the system up again.

Battery Charging

The PCC provides battery charging when a battery is connected, if the battery voltage is low (13-18 V) a reduced charge current is provided.

The PCC senses the battery voltage every 30 seconds.

During normal charging the charger is turned off every 30 seconds to measure the open circuit battery voltage. The float charge voltage is temperature compensated using the temperature probe. The charge voltage is increased for temperatures below 20ºC and decreased for temperatures above 20ºC.

Battery Testing

Charging is disabled and the system load is transferred to the battery (if connected) – under control of the host system (or in standalone mode) to perform a long-term battery test.

In standalone mode, a long-term battery test can be initiated by an external signal to the BT- input (or the linked inputs for multiple PSE). Pulling this input to 0V with a contact or open collector signal from an external source starts a battery test after 5 seconds.

The test ends when the BT- input is released.

In standalone mode, if no external long term battery test is initiated via the BT- input for 72 hours, the PSE automatically starts a one-hour battery test every 24 hours after that. Any external battery test signal on the BT- input over-rides this fall back test sequence.

If during the test the battery voltage drops below the Battery Long Term Test Fail threshold (nominally 24.5V during the test) a Battery Capacity Low Fault is generated (bc shown on 7 segment display).

You need to complete a successful test to clear this fault.

11. Specifications (at 20ºC unless specified)

Table 3: Specifications

Dimensions		260 mm W x 106 mm H x 75 mm D excluding leads
		Mounting Points 245 x 80 mm spacing 4.5 mm holes
Leads		Battery Leads - +24 V, 0 V, 1.5 m long with M5 lugs fitted
		DC Output - +24 V, 0 V 1.5 m long
Environmental	Temperature Operating	0-45ºC ambient to cabinet
	Humidity Operating	0-95% RH non-condensing
Electrical	Input Voltage	230-240 VAC ± 15%, 50-60 Hz
	Input Current	<2 A / 230 V
	Power Factor	>0.95 @ 230 VAC
	Mains Fail Output	Clean C/O contacts (MAINS FAIL)
	Heat Dissipation	80 W max
	DC Operating Voltage (At ambient)	16.8 V to 27.3 V
	Output Voltage (AC On)	27.3 VDC ± 0.2 V
	Output Voltage Range (AC Off)	Battery Voltage – 0.2 V down to 16.8 V (when discharging)
	Maximum (ex Mains)	14 A @ 30% duty cycle (See note 1)
	Continuous/Limits At (ex Mains)	8 A continuous/Limits at 16 A (See note 1)
	Note 1: Higher loads may cause thermal shutdown at high ambient temperatures.	
	Pa_{max}	309.4 W (See note 2)
	Pb_{max}	364 W (See note 2)
	Note 2: These maximum values define the maximum loading conditions for this PSE.	
	Pc_{max}	309.4 W (See note 3)
	Note 3: This maximum value is based on fully charged battery voltage and the same current loading as Pa maximum.	
	Battery Specifications	2 x 12 V, Rechargeable Valve Regulated Sealed Lead Acid Batteries. Limited by in-line ATQ 20 A Blade Fuse on Battery Connecting Leads, supplied with the panel
	P_{min}	9.1 W (See note 4)
	Note 4: The minimum power consumed by a base panel in a 'System Normal' state and quiescent load on one MX Loop.	
Battery Charger	Battery Load with AC Off	90-120 mA @ 25 V
	Float Charge Volts	27.3 V
	Maximum Charge Current	2.5 A nominal
	Temperature Compensation	-35 m V/ºC
	Charger Fault Threshold	Battery < 24.5 V and charge current < 100 mA
	Battery Fault Thresholds	See Table 4: Battery voltage fault thresholds
	Power Supply Faults Output	Clean C/O Contacts (PSE FLT)

Table 4: Battery voltage fault thresholds

Battery Voltage	Meaning	Fault Code
Above 24.5 V	Normal	-
Below 24.5 V	Test Fail during a long term Battery Test	bc
Below 24.2 V	Battery Low – about 50% discharged	bL
Below 21.6 V	Battery Fail – practically no capacity remaining	bF
Below 18 V	Battery Discharged (and system load may be disconnected)	bd
Below 13 V	Battery is not connected – no battery	nb
Below 1 V	Battery is shorted or reversed	br

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