VIGILANT

14A PSE Installation Instructions (FP1139)

Installation Instructions

1. General Description

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

The 14A PSE can mount on various gear plates.

These instructions cover the fitting and connection of the 14A PSE in a 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, or other hardware are not covered here.

The 14A PSE includes all the required hardware to mount the PSE in a T-Gen2 EWS and cabling to wire to the T-Gen2 and batteries. To mount it in a 4100ESi PDI bay a FP1142 bracket is required.

The 14A PSE can also be used as a spare part to replace a faulty PSE in the 15U EWS.

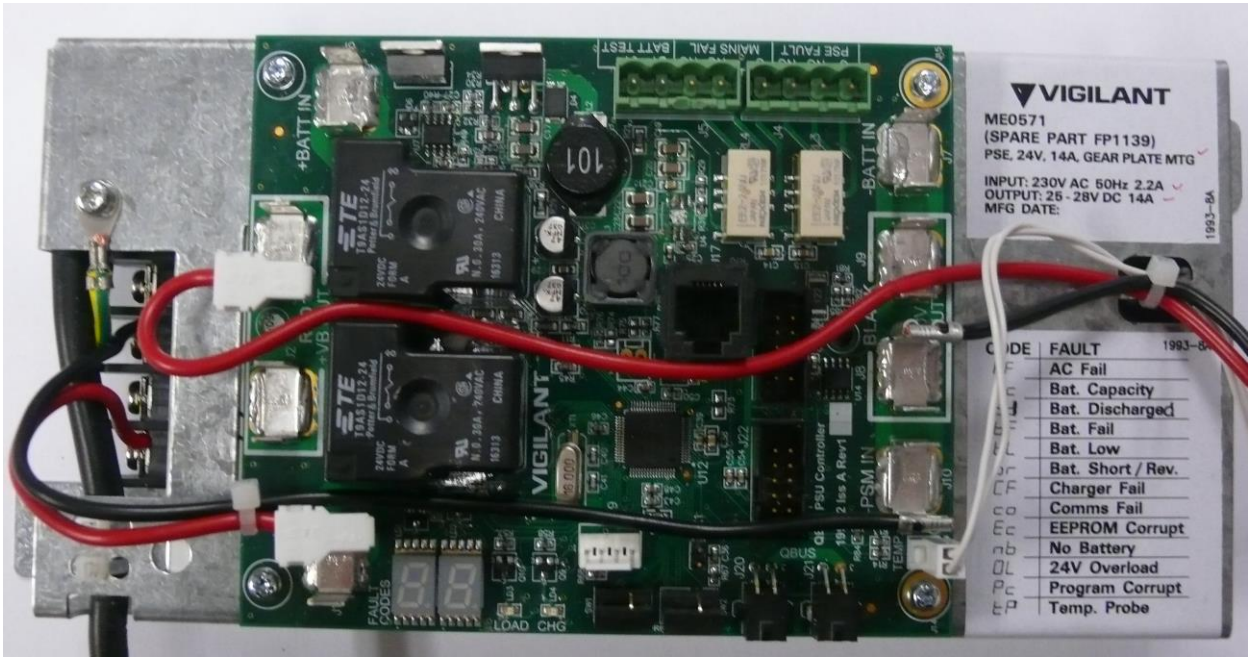


Figure 1 – FP1139 14A PSE

2. Checking the Kit

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

Qty	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	KT0576 Bag of M5/M6 Battery Fasteners (for wiring to batteries)
2	SC0176 M4 X 10 Screw (for mounting PSE)
1	LM0571 Battery Joining Lead c/w M6 lugs, 20A fuse, spare 20A fuse

3. Mounting the 14A PSE

Before installing the PSE ensure all wiring is connected and any address/link settings are made as once the PSE is installed it may not be practical to make changes.

Mounting in a 15U Grade 2 EWS Panel

The 14A PSE can be mounted 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 will normally have a PSE factory fitted, and a second PSE can be fitted in the lower position.

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. Fit the other M4 screw in the bottom left hand fastening point and tighten both screws.

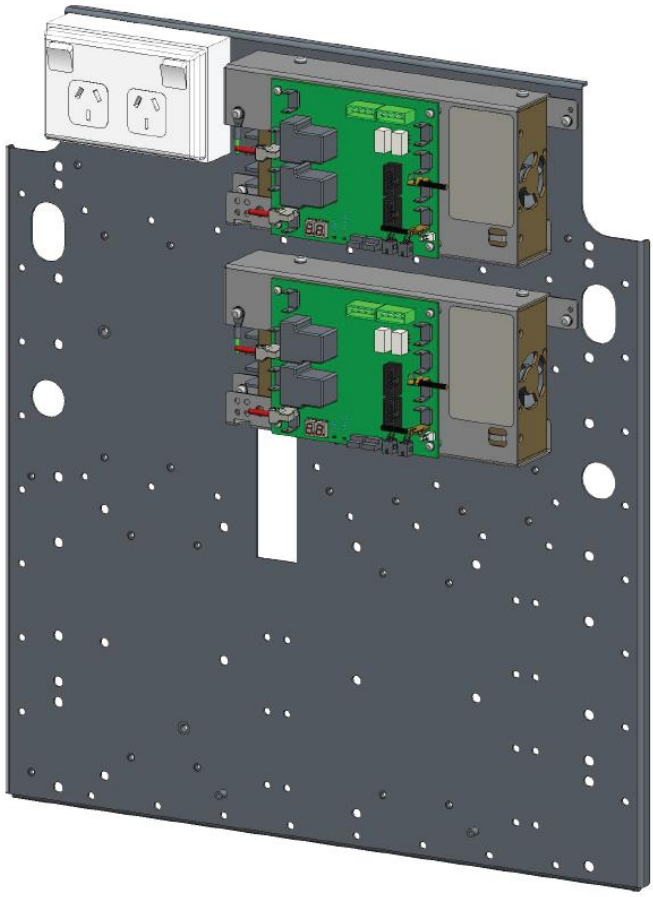


Figure 2 – 14A PSE Mounting on T-Gen2 Grade 2 Gearplate

Mounting in a Simplex 4100ESi Fire Panel PDI Equipment Bay

To mount the 14A PSE in a Simplex 4100ESi fire panel PDI equipment bay an FP1142 14A PSE mounting bracket will also be required. This includes mounting instructions (LT0690) and all the required hardware to mount the PSE in the PDI bay. Usually the 14A PSE (on the FP1142 bracket) will be mounted 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.

4. Wiring a 14A PSE

Mains Wiring

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

Equipment Wiring

In the Grade 2 T-Gen2 the 14A PSE is connected to (refer Figure 3):

- T-Gen 60/120 QBus (J32), from the 14A PSE QBus connector (J20) using the QBus loom 734-008 provided. Additional QBus Slaves can be connected to the QBus out connector J21 on the PSE.
- T-Gen 60/120 24V In (J20), using the 14A PSE 24V 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 20A blade fuse.
- Mains GPO, from the 14A PSE mains lead.

Also refer to Drawing 1956-38 in this document 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/DISCONNECT THE QBUS LEADS WITH POWER APPLIED – THIS CAN DAMAGE THE EQUIPMENT.

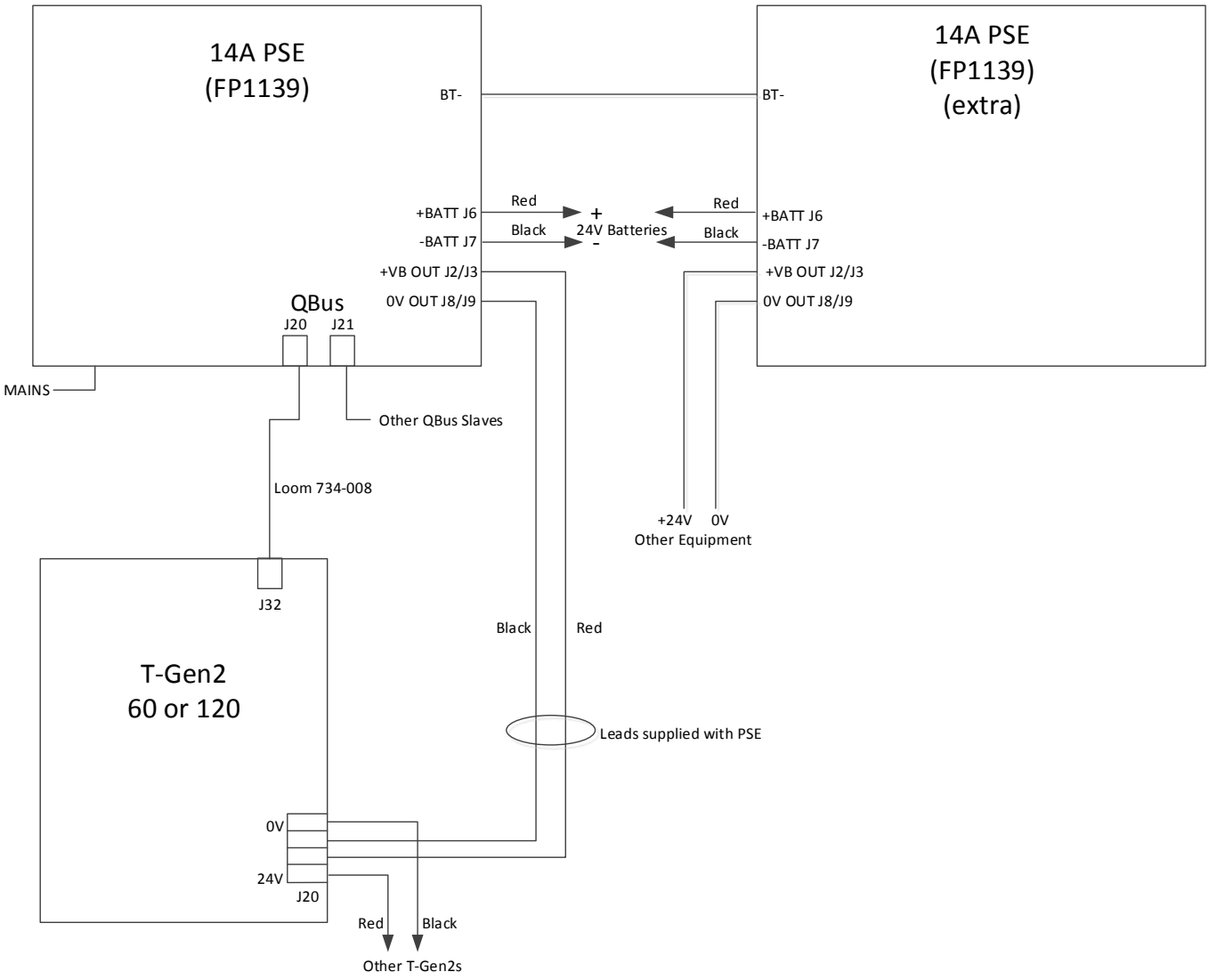


Figure 3 – 14A PSE Interconnection

5. Configuration

The T-Gen2 will need to be configured to support and monitor the 2nd (or subsequent) PSE. This is done on the PSE Slaves table in SmartConfig. Enable the PSE at the required address and select if the battery charger is enabled.

The 14A PSE needs to be configured for being controlled by a host device – do NOT fit Lk1. Set the Address rotary switches SW1 (TENS) and SW2 (ONES) to the slave address (01…09) the PSE is assigned to in the T-Gen2 configuration.

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

6. 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 will not flash at all.

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

Communications

When the PSE is communicating correctly with the host (e.g., T-Gen2), the decimal point on the seven-segment display will flash approximately once a second.

Fault Codes

The two digit 7-segment display labelled **FAULT CODES** (LD1 and LD2) will light when the PSE detects a fault condition. When multiple conditions are present, the codes will be displayed sequentially. The codes and their meanings are:

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 21.6V). May take up to 30 seconds to detect.
Battery Low	**bL**	Battery Low fault (below 24.2V)
Battery Shorted or Reversed	**br**	May take up to 30 seconds to detect.
Charger Fault	**cF**	Charger output is low (<24.5V) 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 24V 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**) will be displayed, followed by a "walking segment" display test. System power is usually available before this start-up display pattern is complete.

7. Power On and Testing

Turning PSE On/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 plug(s) 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 without a battery. Once this is confirmed a battery can be connected. The T-Gen2 and PSE will need to be configured and connected properly.

- Power on and wait for the T-Gen2 to start up (<10s).
- Check the POWER and AUTO LEDs on the T-Gen2 User Interface turn on and that no faults are generated. If faults are generated refer to the T-Gen2 Instructions (LT0667) to use the OLED display to determine the faults that are present.
- After 30 seconds a battery not connected (**nb**) fault code will be shown on the PSE and the Power Fault LED on the User Interface will turn on.
- Connect the batteries and check the fault is cleared after 30 seconds.

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 ≈10V repeat the process until a valid reading (≈27.3V) is obtained. (Every 30 seconds the PSE turns off the charger to sample the battery voltage. With no battery connected, the charger will not turn on again.

8. PSE Operation

The Power Supply Equipment (PSE) is made up of two parts:
- OEM Module – takes 230VAC mains and converts this to 27Vdc.
- 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 230VAC to 27VDC.

After mains power is turned on and a delay (approx. 5 seconds) the 27V is connected to “+VB OUT” supplying the system with power.

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

The 27VDC from the OEM module is monitored and on failure the PCC switches the battery (if connected) to supply the DC voltage out (thus 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 ≈21V 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 (13-18V) 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 20^{o}C and decreased for temperatures above 20^{o}C.

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 will start a battery test after 5 seconds.

The test will end 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 will automatically start a one-hour battery test every 24 hours after that. Any external battery test signal on the BT- input will over-ride 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).

A successful test will need to be completed to clear this fault.

9. Specifications (@ 20ºC unless specified)

Dimensions	260mmW x 106mmH x 75mmD excluding leads
	Mounting Points 245 x 80mm spacing 4.5mm holes
Leads	Battery Leads - +24V, 0V, 1.5m long with M5 lugs fitted
	DC Output - +24V, 0V 1.5m long
Environmental	
Temperature Operating	0-45ºC ambient to cabinet
Humidity Operating	0-95% RH non-condensing
Input Voltage	230-240VAC ± 15%, 50-60Hz
Input Current	<2A / 230V
Power Factor	>0.95 @ 230VAC
Mains Fail Output	Clean C/O contacts (MAINS FAIL)
Heat Dissipation	80W max
Output Voltage AC On	27.3VDC ± 0.2V
Output Voltage AC Off	Battery Voltage
Output Current	
Maximum (ex Mains)	14A @ 30% duty cycle *Note 1
Continuous (ex Mains)	8A continuous *Note 1
Limits At (ex Mains)	16A (typical)
Battery Supplied	Limited by battery/fuse
Battery Charger	
Battery Load with AC Off	90-120mA @ 25V
Float Charge Volts	27.3V
Maximum Charge Current	2.5A nominal
Temperature Compensation	-35mV/ºC
Charger Fault Threshold	Battery < 24.5V and charge current < 100mA
Battery Fault Thresholds	Refer Table 1
Power Supply Faults Output	Clean C/O Contacts (PSE FLT)

*Note 1: Higher loads may cause thermal shutdown at high ambient temperatures.

Battery Voltage Fault Thresholds

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

10. Supplemental Terms and Licensed Software

These Supplement Terms ("Supplemental Terms") are in addition to any Terms and Conditions of Sale ("Agreement") entered into between the End-user ("You") of the Grade 2 14A PSE ("Product") and Johnson Controls ("Johnson Controls") regarding your purchase of the Product and use of the Licensed Software (as defined below). To the extent of any conflict between the terms of the Agreement and any Supplemental Terms, the Supplemental Terms will apply. Your acceptance of the Product will constitute acceptance of these Supplemental Terms.

Title and Copyright. It is hereby understood and agreed that as between Johnson Controls and You, all information and intellectual property relating to the Product and Licensed Software including but not limited to patents, designs, drawings, instruction booklets, specifications, circuit drawings, componentry, trade secrets, trade marks and copyright in such information and intellectual property, and all right, title and interest therein, are the sole property of or licensed by Johnson Controls and You shall gain no right, title or interest in such information whatsoever. You do not acquire any rights to the Products except for the sole purpose for which the Product was supplied to You.

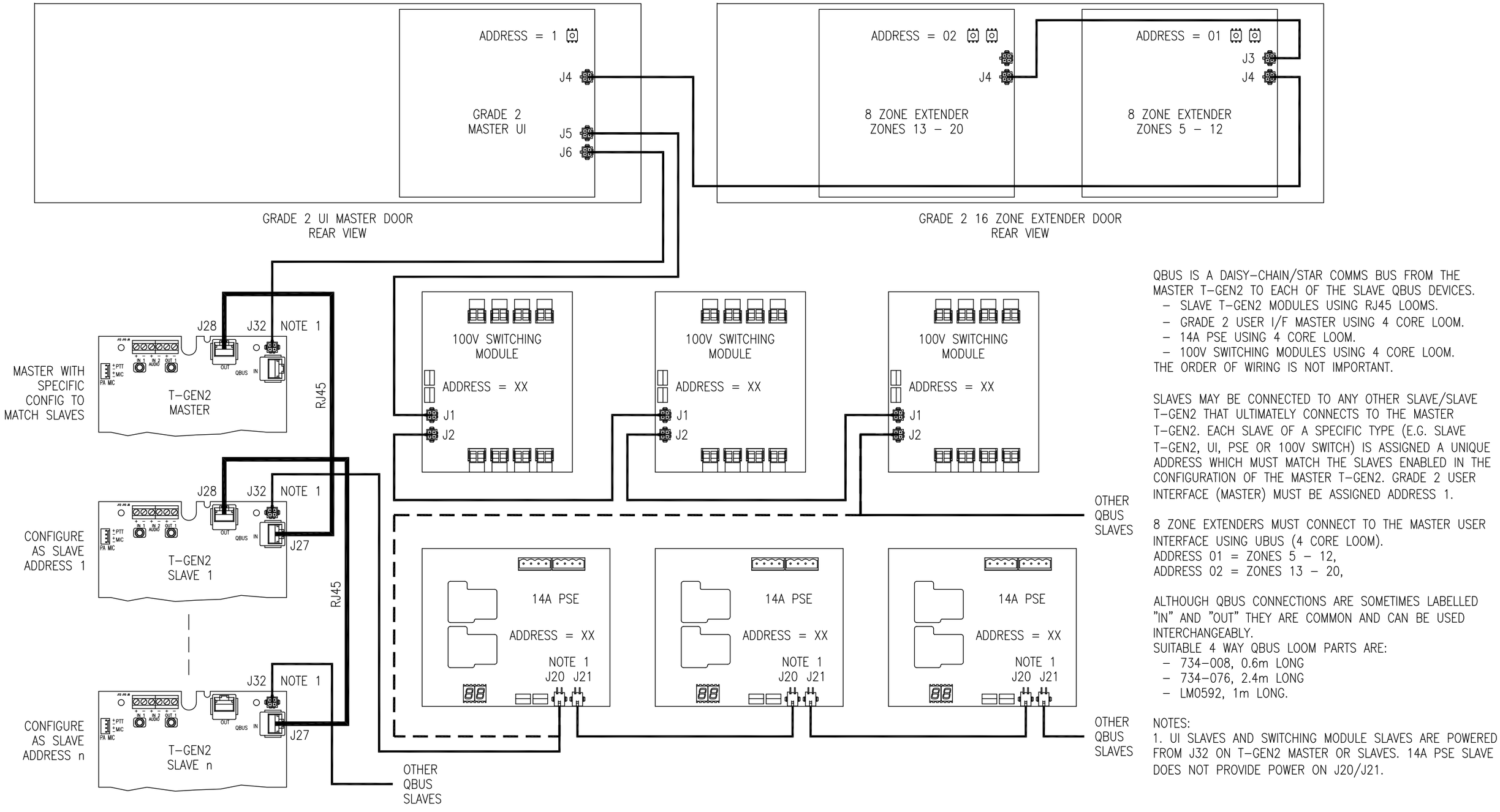
Licensed Software. The Product may contain incorporation of "Open Source" and other Third Party Software ("Licensed Software"). You must not, and must not permit any person reasonably within your control nor procure any person to reverse engineer, decompile, or disassemble the Licensed Software, and any attempt to do so shall be a breach of these Supplemental Terms and the Agreement except and only to the extent that such activity may be expressly permitted, notwithstanding this limitation, either by applicable law or, in the case of open source software, the applicable open source licence. You must not make any changes or modifications to any portion of the Licensed Software, or create any derivative works, without the written permission of an officer of Johnson Controls except as provided with respect to "open source" software. Any reverse engineering shall be at Your sole risk and Johnson Controls accepts no liability for any loss or damage howsoever incurred by You or any third party as a result of or arising out of any modifications made or any reverse engineering.

Portions of the Licensed Software may be subject to certain third party licence agreements governing the use, copying, modification, redistribution and warranty of those portions of the Licensed Software, including what is commonly known as "open source" software. Such portions of the Licensed Software are governed solely by the terms of such other licence, and no warranty is provided under the Agreement for open source software. By using the Licensed Software You are also agreeing to be bound to the terms of such third party licences. If provided for in the applicable third party licence, You may have a right to reverse engineer such software or receive source code for such software for use and distribution in any program that You create, so long as You in turn agree to be bound to the terms of the applicable third party licence, and Your programs are distributed under the terms of that licence. If applicable, a copy of such source code may be obtained by contacting your Johnson Controls representative.

Limitation of Liability. You acknowledge and agree that, to the extent permitted by law, Johnson Controls has no liability in contract, tort (including negligence or breach of statutory duty), by statute or otherwise for loss or damage (whether direct or indirect) of profits, opportunity, revenue, goodwill, bargain, production, contracts, business or anticipated savings, corruption or destruction of data or for any indirect, special or consequential loss or damage whatsoever except to the extent that such losses are caused by or contributed to by Johnson Controls' Wilful Misconduct or fraud, where "Wilful Misconduct" means any wilful or intentional breach, act or omission done by Johnson Controls with the intent to cause You material harm or where Johnson Controls was aware that material harm would result from such wilful or intentional breach, act or omission. Johnson Control's total liability under any contract and the Agreement shall not exceed the total dollar amount of the Products purchased by You from Johnson Controls.

Additional Copyright notices

; Copyright © 2017, Microchip Technology Inc. and its subsidiaries ("Microchip")
; All rights reserved.
;
; This software is developed by Microchip Technology Inc. and its subsidiaries ("Microchip").
;
; Redistribution and use in source and binary forms, with or without modification, are
; permitted provided that the following conditions are met:
;
; 1. Redistributions of source code must retain the above copyright notice, this list of
; conditions and the following disclaimer.
;
; 2. Redistributions in binary form must reproduce the above copyright notice, this list
; of conditions and the following disclaimer in the documentation and/or other
; materials provided with the distribution.
;



QBUS IS A DAISY–CHAIN/STAR COMMS BUS FROM THE MASTER T–GEN2 TO EACH OF THE SLAVE QBUS DEVICES.
- SLAVE T–GEN2 MODULES USING RJ45 LOOMS.
- GRADE 2 USER I/F MASTER USING 4 CORE LOOM.
- 14A PSE USING 4 CORE LOOM.
- 100V SWITCHING MODULES USING 4 CORE LOOM.

THE ORDER OF WIRING IS NOT IMPORTANT.

SLAVES MAY BE CONNECTED TO ANY OTHER SLAVE/SLAVE T–GEN2 THAT ULTIMATELY CONNECTS TO THE MASTER T–GEN2. EACH SLAVE OF A SPECIFIC TYPE (E.G. SLAVE T–GEN2, UI, PSE OR 100V SWITCH) IS ASSIGNED A UNIQUE ADDRESS WHICH MUST MATCH THE SLAVES ENABLED IN THE CONFIGURATION OF THE MASTER T–GEN2. GRADE 2 USER INTERFACE (MASTER) MUST BE ASSIGNED ADDRESS 1.

8 ZONE EXTENDERS MUST CONNECT TO THE MASTER USER INTERFACE USING UBUS (4 CORE LOOM).
ADDRESS 01 = ZONES 5 – 12,
ADDRESS 02 = ZONES 13 – 20,

ALTHOUGH QBUS CONNECTIONS ARE SOMETIMES LABELLED "IN" AND "OUT" THEY ARE COMMON AND CAN BE USED INTERCHANGEABLY.
SUITABLE 4 WAY QBUS LOOM PARTS ARE:
- 734–008, 0.6m LONG
- 734–076, 2.4m LONG
- LM0592, 1m LONG.

NOTES:
1. UI SLAVES AND SWITCHING MODULE SLAVES ARE POWERED FROM J32 ON T–GEN2 MASTER OR SLAVES. 14A PSE SLAVE DOES NOT PROVIDE POWER ON J20/J21.

UNLESS OTHERWISE STATED: ALL DIMENSIONS IN MILLIMETRES. DO NOT SCALE. TOLERANCES ARE TO BE:
1 DECIMAL PLACE ±0.5, 2 DECIMAL PLACES ±0.3, 3 DECIMAL PLACES ±0.1

3rd ANGLE PROJECTION

ISS/REV	AMENDMENTS	ECO	DRN	CHKD	AUTH	APVD	DATE
A	ORIGINAL	5140	KJS	RC	RC	DC	29–5–18

JOHNSON CONTROLS
17 MARY MULLER DRIVE
P.O. BOX 19545
CHRISTCHURCH, PH: +64 3 3895096
NEW ZEALAND. FAX: +64 3 3895938

T-GEN2 QBUS CONNECTION WIRING DIAGRAM

DRAWING No: 1956-38 SHEET 1 of 1

A3 | ISS/REV A | PART No:

THIS PAGE INTENTIONALLY LEFT BLANK