VIGILANT

FP2000/FP2026 QE20 Controller Module Installation Instructions

1. General Description

This sheet describes installation of the QE20 Controller Module. The Controller Module may be used to provide an additional node in a networked QE20 system or as a replacement for an existing Controller Module.

The Controller is the brain of the QE20 system and provides:

- Four low-level balanced audio inputs for functions such as background music, paging, etc.
- One RS232 port for high-level zone alarm and triggering signals from a Simplex 4100ESi fire alarm panel.
- An RZDU port for connection to a compatible “Vigilant” fire alarm panel for high-level zone alarm and triggering signals.
- One QEComms port for connection to external “Vigilant” FP0539 paging consoles.
- One normally-energised Fault relay with change-over contacts.
- One normally-energised general purpose relay with change-over contacts.
- Four non-isolated inputs with 4-states for general purpose functions.
- Four non-isolated open-collector outputs with optional load supervision for programmable functions.
- Four Q-Bus connectors (2 x 4-way, 2 x RJ45) for connection to QBus modules in the QE20.
- One WIP RIGHT RJ45 connector for connecting to WIP/INPUT or RS485 Network Module.
- Four RJ45 Ethernet connectors for connection to the Master User Interface and RS485 Network Module.
- A micro-USB socket for connection of a computer for programming and diagnostics.
- A Modbus Slave RTU connection via RS232 or TTL – an add-on interface board will be needed.
- 4-way connector for the Speech Microphone.

The following are physically fitted but have no current functionality. They should not be used.

- MicroSD Card socket.
- Type A USB socket.

Two versions of the Controller Module are available to suit installation in the deep and shallow (SECP) cabinets.

- FP2000 QE20 Controller Module – for mounting in deep cabinets. Refer Figure 1A.
- FP2026 QE20 SECP Controller Module – for mounting in shallow (SECP) cabinets. Refer Figure 1B.

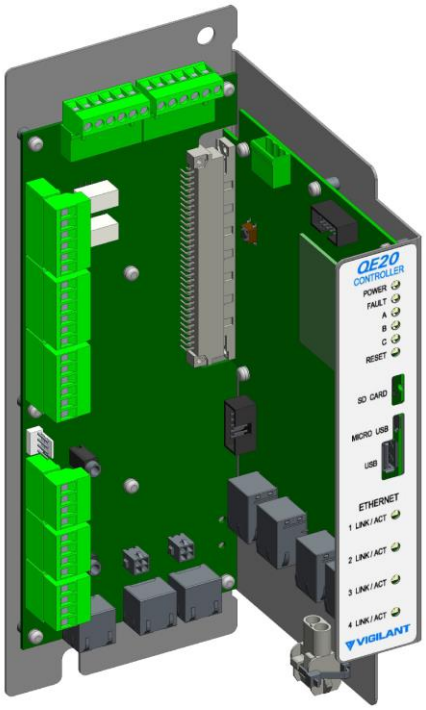


Figure 1A – FP2000 QE20 Controller Module

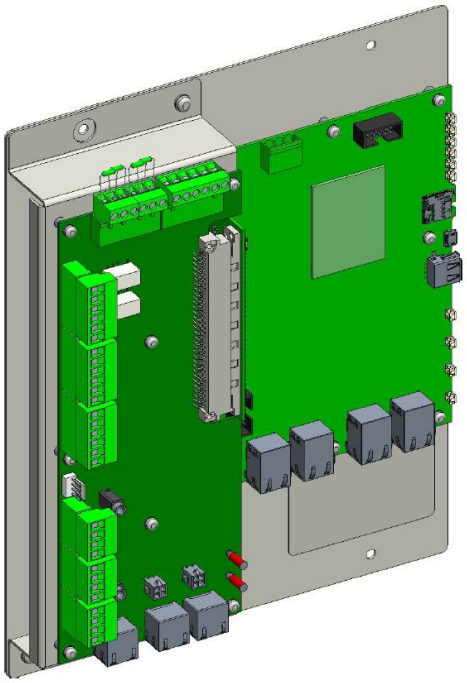


Figure 1B – FP2026 QE20 SCEP Controller Module

2. Kit Contents

Each kit contains:

1 x QE20 Controller Module
1 x LM0656 3-way 24V DC Distribution loom
2 x M6 x 10 screws (FP2000 only)
4 x M4 x 10 screws (FP2026 only)
1 x LT0696, these instructions.

3. Mounting the Controller Module

In deep cabinets the FP2000 QE20 Controller is usually positioned on the left-hand side of the 2nd to lowest QE20 mounting frame, occupying two of the 60mm positions as shown in Figure 2A.

It is secured to the frame using two M6 x 10 screws. Loosely fit a screw to the bottom hole of the desired position, then slide the open slot at the bottom of the Controller Module under the screw head and then fit the top screw to secure the module. Tighten all screws to secure the module into position.

In shallow SECP cabinets the FP2026 QE20 Controller is mounted on the gear plate in the lower left-hand side position, as shown in Figure 2B. It is secured to the gear plate using four M4 x 10 screws into the gear plate.

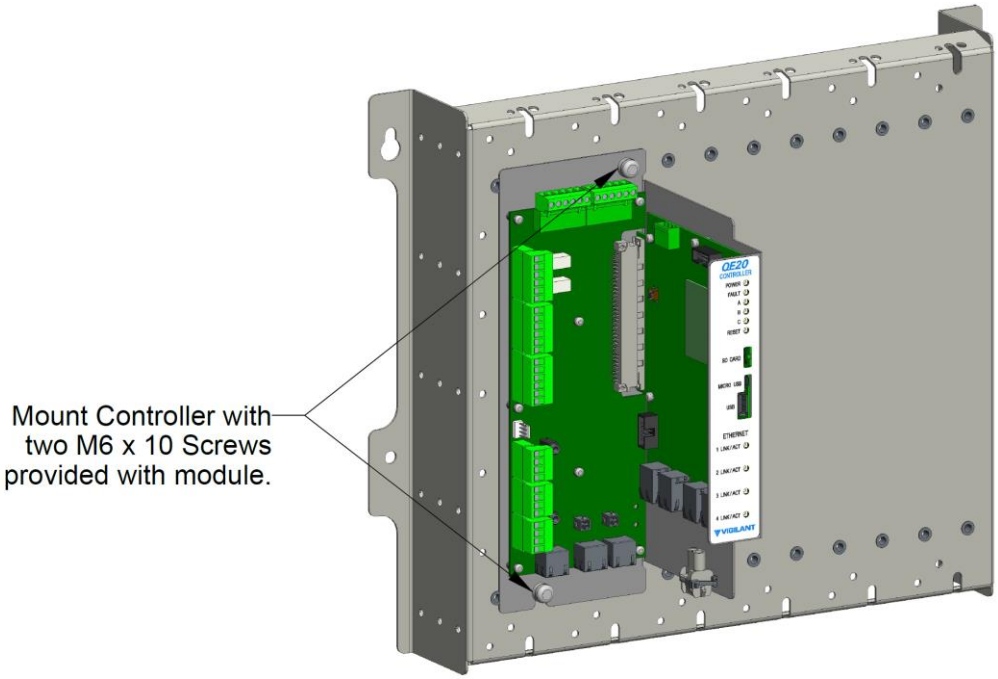


Figure 2A – QE20 Controller Module Mounting – Deep Cabinets

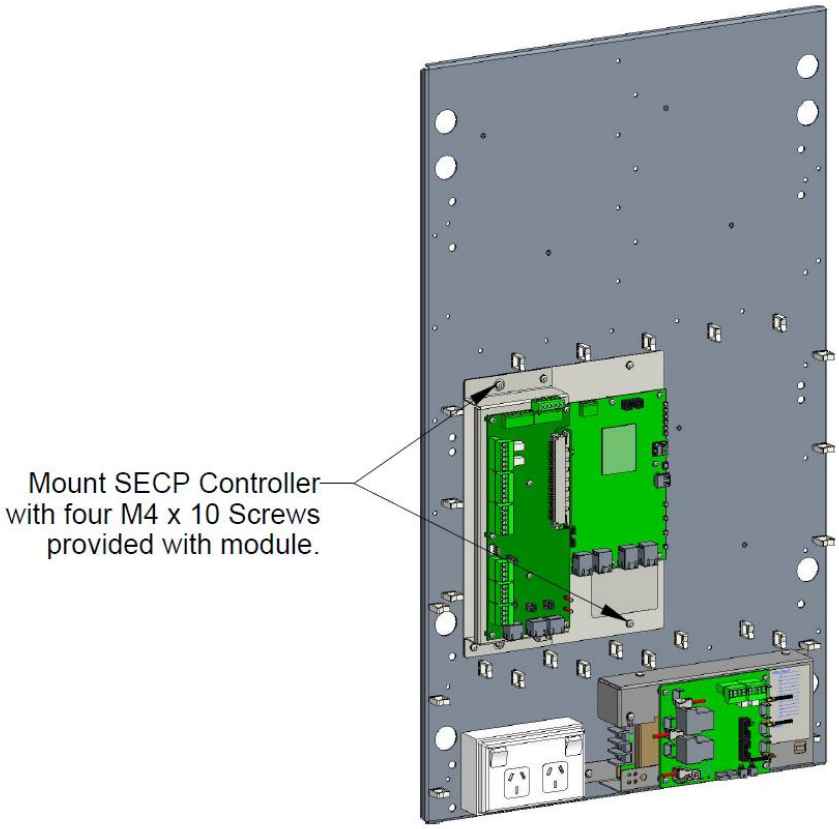


Figure 2B – QE20 SECP Controller Module Mounting – Shallow Cabinets

4. Replacing an Existing Controller

When replacing a Controller the existing site configuration will be needed so it can be downloaded into the new Controller. The configuration should be available separately, as it may not be possible to extract it from the existing Controller if the Controller is not operating.

To extract the configuration from the existing working Controller or download it to the new Controller requires:

- PC (laptop) with QE20Config installed, licenced, and operating,
- USB to MicroUSB cable,
- Username and Password of the existing configuration.

Refer to the instructions in QE20Config for extracting the configuration.

These steps can be used to replace the Controller.

Power down the QE20.

Label the existing wiring / connections to the Controller to identify where the internal and field wiring terminates.

Unplug the demountable connectors, Ethernet cables, and internal looms, where present.

Unplug the power lead to the Controller.

For a deep cabinet remove the top mounting screw and loosen the lower mounting screw. Lift the module clear of the frame.

For a shallow cabinet remove the four screws that hold the mounting plate on to the gearplate (not the two screws that hold the IO Board mounting bracket on the Controller mounting plate). Lift the Controller off the gear plate.

Set the links and DIP switch on the new Controller to match the removed one. Details are provided in Section 5 below.

Position the new Controller onto the frame / gear plate and secure with the mounting screws.

Reconnect the internal wiring and field wiring.

Power up the QE20, download the site configuration and check there are no faults. Check operation of the new Controller and the site configuration matches what is required for the site.

5. Adding a Controller

A second Controller may be added to an existing QE20 system in certain circumstances, usually because the capacity of the first Controller has been exceeded. The system will be arranged as a networked system, with each Controller as separate nodes on the network – even though they may be in the same or adjacent cabinets.

A separate site configuration will need to be prepared for the second Controller, and the node added to the original QE20 site configuration using QE20Config. Refer to the QE20Config help file for instructions on preparing and downloading the new configurations.

Set the links and DIP Switch on the Controller as follows.

Links on Controller IO Board

LK1 QBus EOL-A and LK2 QBUS EOL-D are to be left open (not fitted).

LK3 (RZDU/4100COMMS) needs to be fitted if the RZDU port is used to connect to a “Vigilant” fire panel in RZDU mode for a high-level link.

LK4 is not fitted.

Links on Controller CPU Board

LK1 (Service Mode) needs to be left open (not fitted).

LK2 (Earth Monitoring) needs to be fitted to enable earth fault monitoring (default position). If it is removed to disable earth fault monitoring, the site configuration will also need to have earth fault monitoring disabled. This will make the system non-compliant to AS 4428.16 and AS 1670.4. There is no warning if the link is removed, so a check that an earth fault can be detected must be included as the last stage of commissioning and after replacement of a Controller module.

DIP Switch on Controller CPU Board

The DIP switch SW2 currently has no function and the positions of each switch are don’t care.

RESET Button on Controller CPU Board

The CPU Board contains a pushbutton to reset the main CPU of the QE20. The button needs to be pressed for at least 5s until the RESET LED on the front panel turns on, then released.

Micro USB Socket

Plug in a USB to MicroUSB cable to connect the PC to use QE20Config to upload or download the site configuration, or perform diagnostics.

USB A Socket

Currently not used. Do not fit a USB memory stick.

MicroSD Card Socket

Currently no function. Do not fit a memory card.

Mounting of the Controller is described in Section 3 above. Internal wiring is described in Section 6 and field wiring is in Section 7 below.

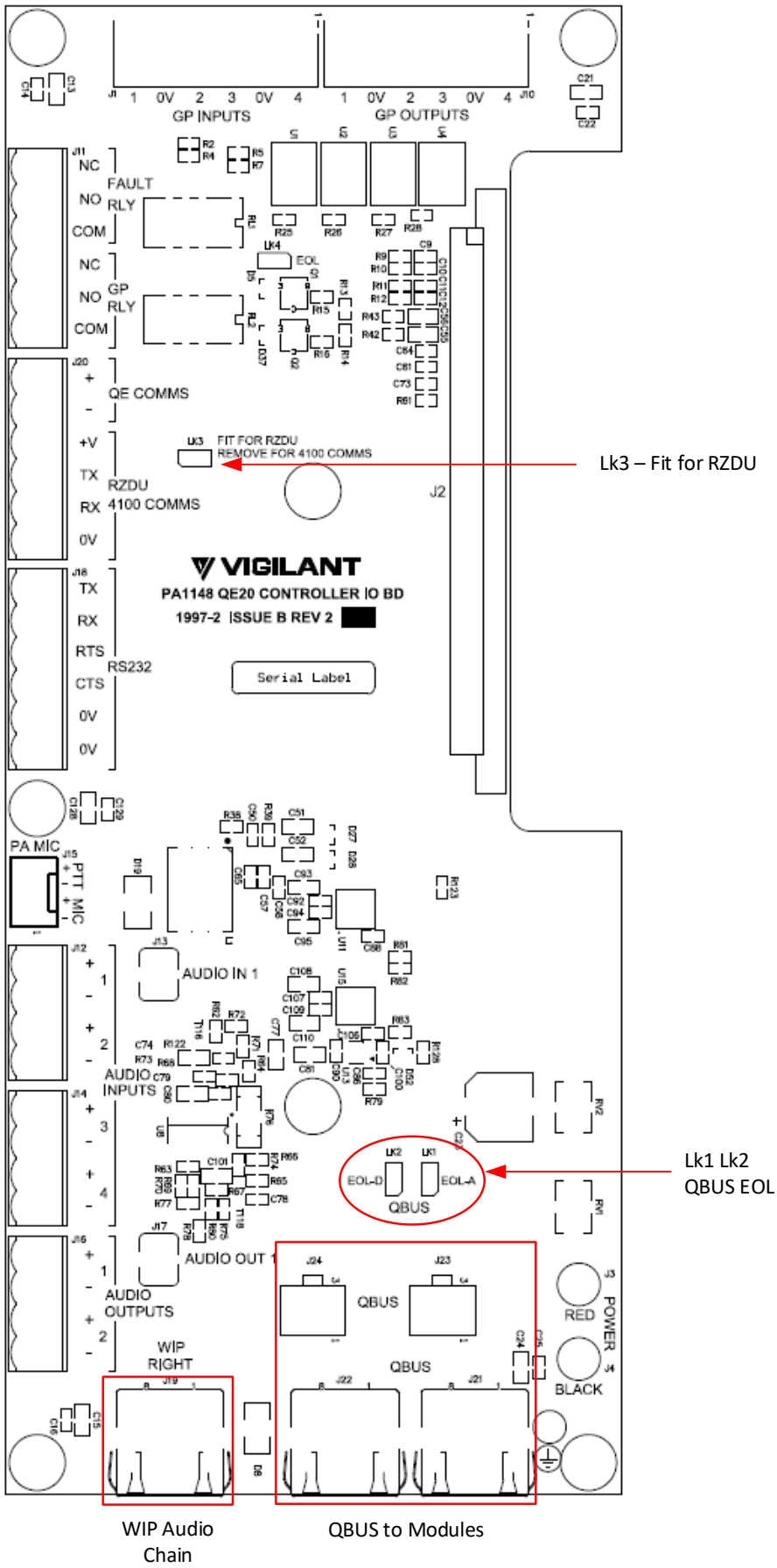


Figure 3 – Controller CPU Board Switch, Link and LED locations

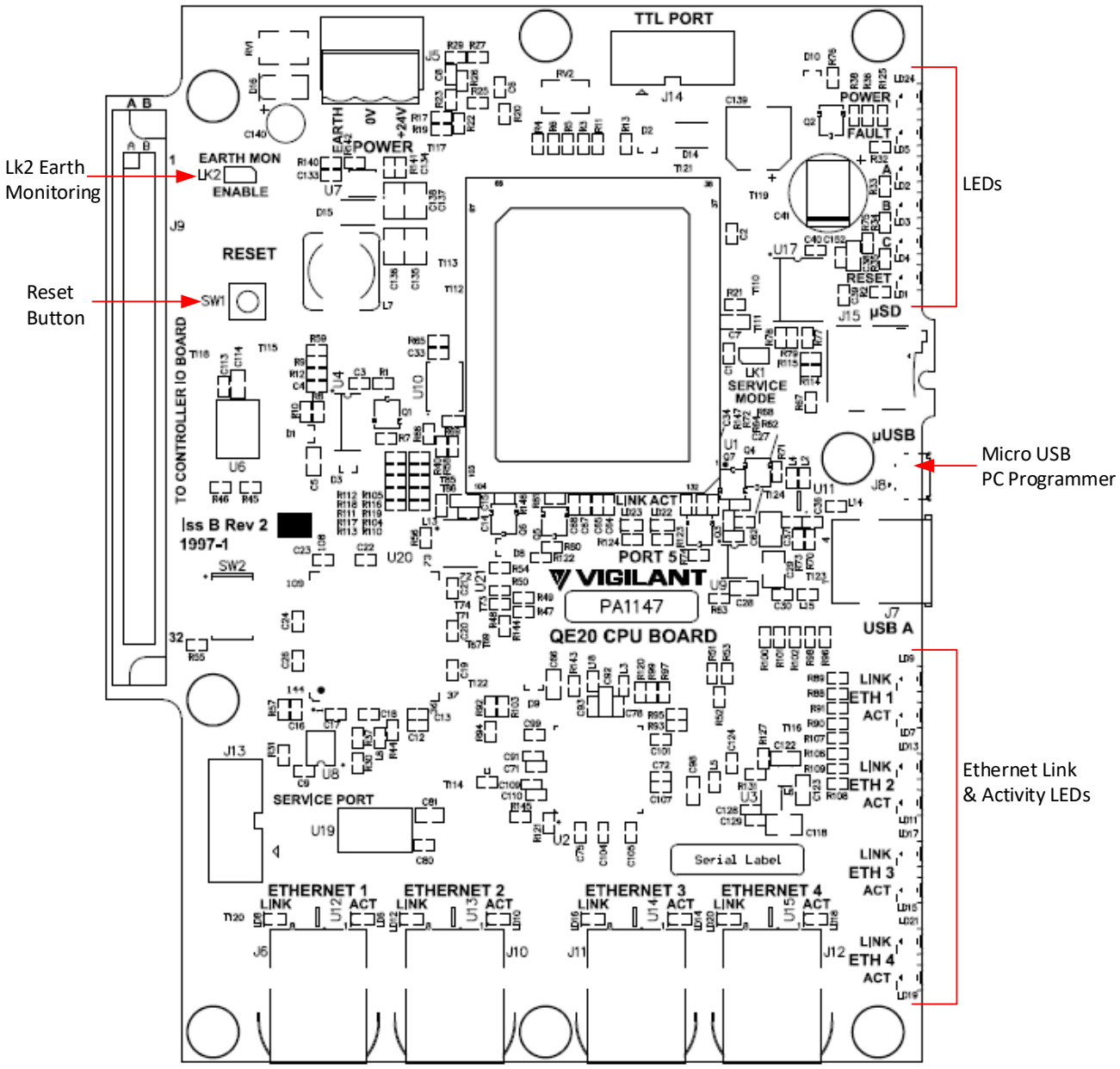


Figure 4 – Controller CPU Board Link locations

6. Internal Wiring

The QE20 Controller Module requires:

- 24V power loom to be connected. Use a connector of the 3-way distribution loom LM0656 to connect the 24 DC output of the PSE to the DC Input connector of the Controller.
- An RJ45 Q-Bus lead connected from the RJ45 QBus connectors J21 or J22 on the QE20 Controller to one of the QE20 Amplifier Modules and daisy-chained on to other Amplifier modules.
- A 4-way QBus loom from one of the two 4-way QBus connectors J23 or J24 to one of the 27A PSE modules, and daisy-chained on to other PSE modules.
- A 4-way QBus loom from one of the two 4-way QBus connectors J23 or J24 to one of the WIP/INPUT modules, and daisy-chained on to other WIP/INPUT and Relay Output Modules.
- An RJ45 lead from WIP RIGHT J19 of the Controller to WIP AUDIO CHAIN LEFT of the RS485 Network Module, if fitted, and daisy-chained on (RIGHT to LEFT) to the WIP/INPUT Modules. WIP/INPUT Module address 1 must be the last in the chain and its RIGHT port needs to be left open.
- An RJ45 lead from Ethernet Port 1 of the Controller to the Ethernet Port J3 on the LCD Board of the Master User Interface.
- The front panel Speech (PA) microphone lead plugged in to PA MIC J15.
- For a networked system an RJ45 cable from Ethernet Port 2 of the Controller to the RS485 Network Module Ethernet port. If a 2nd RS485 Network Module is fitted, connect its Ethernet port to Ethernet Port 3 of the Controller.

Table 1 Controller Ethernet Port Functions

Port	Function / Connection
1	Master User Interface Module
2	RS485 Network Module (if fitted)
3	2nd RS485 Network Module (if fitted)
4	Spare

7. Field Wiring

Refer to the specific QE20 site configuration for the assigned functionality and options for each of the inputs and outputs on the Controller.

AUDIO INPUT Wiring

The Controller provides 4 low-level balanced audio inputs suitable for audio functions such as background music, paging consoles, etc. Details for connecting to the Vigilant QE90 Paging Console are provided below.

Input 1 is transformer isolated and supports voltage levels up to 2.8V rms, although a nominal voltage of 315mV rms is required for full voltage output. A maximum offset voltage of 30V is supported. The input is available on screw terminals and via a 3.5mm jack: J13 AUDIO IN 1. J13 can be used for most single-ended audio outputs (headphone, line, etc) on devices like a music player, computer, or mobile phone.

Inputs 2-4 are capacitor coupled and support voltage levels up to 1.4V rms, although a nominal voltage of 315mV rms is required for full voltage output. The inputs have clamping at 5V to the QE20 0V, so minimal offset voltages are supported. The inputs are available on screw terminals only.

Wire the audio output of the audio source (music player, paging console, mic preamp, etc) to the audio input using screened cable preferably earthed at the QE20. Refer to drawing 2001-2 Sheet 201 for wiring of the Vigilant PA0688 Microphone PreAmp Module to provide a paging input from one or more microphones. This shows an optional connection to a GP INPUT on the Controller to activate the audio input when paging is required.

The output level of the audio source should be adjusted to give the correct volume. It is best to adjust the level at the source, but the volume can be adjusted down in the site configuration.

An ALIM9706 Audio Isolation Module may be required to provide transformer isolation or to reduce the signal level.

AUDIO OUTPUT Wiring

The Controller contains 2 single-ended audio outputs. Currently these are not functional and need to be left open.

AUDIO OUTPUT 1 is available on screw terminals and via a 3.5mm jack: J17 AUDIO OUT 1. AUDIO OUTPUT 2 is available on screw terminals only.

The nominal full volume output level is 315mV rms, with a maximum level of 1.4V rms. If a 4K7 resistor is fitted between the OUTPUT+ and – wires at the far end and the site configuration enables supervision, the connection to the external device can be supervised for earth and open and short circuit faults.

Wire the AUDIO OUPUT+ and – to the audio input of the external device using screened cable preferably earthed

at the QE20. Refer to drawing 2001-2 Sheet 202 for example wiring. Note an audio isolating transformer (e.g., ALIM9706) may be needed as the external device may earth the AUDIO OUTPUT wires, creating an earth fault. The transformer and EOL resistor should be located at the external device so that the wiring to the transformer is supervised.

GP INPUT Wiring

The GP INPUTs support connection of clean contact devices like switches, relay contacts, etc. for functions such as class change, time clocks, trial evacuation, and silence alarms. They support 4-band (open, normal = EOL device, alarm, shorted) operation, with tokens available for use in script equations. The EOL device is nominally a 10K resistor, although the 10V Zener diode from QE90 is supported.

Table 3 – General Purpose Input States, Resistance Bands and Tokens Available

Circuit Type	**State, Resistance Band, Logic Token**			
4 Band	Short < 270R CTIPSCx	Alarm 680R CTIPALx	Normal 10K CTIPNMx	Open > 20K CTIPOCx

Where x = GP input number 1 - 4.

Refer to drawing 2001-2 Sheet 207 for example wiring.

GP OUTPUT Wiring

The GP OUTPUTS are open-collector outputs that switch on (pull down to 0V) when activated. Any load needs to be wired between the output and a suitable supply.

The GP OUTPUTS could be used to turn on a sounder, LED, warning light, etc, or be connected to a 24V relay to provide isolated contacts, with suitable programming in the site configuration.

Optional load supervision is supported. In the off state, a fault is generated if the load is disconnected, the supply falls below 12V, or the output is shorted to 0V. This supervision requires the load supply to be at least 12V to appear normal. If a lower supply voltage needs to be used, then supervision must be disabled in the configuration.

Default operation for these 4 outputs, which will be overridden when script logic writes a state to the output, is:

GP Output 1: turns on for any zone Disabled OR Test Mode active.

GP Output 2: turns on for any zone Evac OR zone Alert.

GP Output 3: turns on for any group in manual.

GP Output 4: turns on for any group with Silenced Warning active.

Note each GP output contains a 100K pull down resistor for supervision. This means a current of up to 250uA may flow through the load in the off state. For most relays and other high current devices this won't be an issue. However, it may cause an LED to glow or a buzzer to sound quietly. A suitable resistor may need to be wired across the load to bleed off this supervision current.

RELAY OUTPUT Wiring

Two change-over relay outputs are provided: FAULT and GP. Both are normally energised and drop out on a fault or other programmed condition (e.g., Manual, Test, Disable).

Generally, the FAULT relay should be wired to a fault input of the fire alarm system so that a fault on the QE20 is displayed on the fire panel and transmitted to any connected monitoring centre. Refer to drawing 2001-2 Sheet 206 for example wiring. Note the QE20 Fault condition is transmitted by the QE20 when using an RZDU or Panel-Link connection. In this case the Fault relay could be used for another function by programming a different logic equation for the output.

RZDU Connection to Vigilant FIP

Alarm signals can be transmitted from an adjacent and compatible "Vigilant" fire alarm panel (*MX1*, MX4428, F3200) to the QE20 using RZDU. The fire panel needs to be adjacent, as this is a single RZDU connection and if there is a wiring fault on the connection all zone alarms could be lost.

If the RZDU port on the fire panel is connected to other equipment external to the fire panel, then the unprotected RZDU connection between the fire panel and the QE20 must be protected from wiring faults in the external wiring. In this case the FP1143 HLI Interface Board must be mounted and wired into the fire panel and the external RZDU wiring connected to the "RZDU TO FIELD" port on the HLI Board.

Refer to drawing 2001-2 Sheet 206 for wiring information. Note the fire panel needs to be programmed to send the correct information to the QE20 and receive any fault information from the QE20. If the fire panel receives the QE20 fault signal via RZDU, then a separate connection from the QE20 FAULT relay is not required.

Make sure LK3 is fitted on the Controller IO Board to enable RZDU communications.

Connection to Simplex 4100ESi

Alarm signals can be transmitted from an adjacent Simplex 4100ESi fire alarm panel (or earlier 4100ES or 4100U) to the QE20 using RS232. The 4100 needs to be adjacent, as this is a single connection and if there is a wiring fault on the connection all zone alarms could be lost.

Refer to drawing 2001-2 Sheet 204 for wiring and 4100 programming information. Note the 4100ESi needs to have an RS232 output (4100-6046 or 4100-0113 Dual RS232 Cards are suitable), which must be isolated from Earth, and be programmed to send the correct information to the QE20. To isolate the RS232 output from Earth the two mounting screws for the Dual RS232 Board must be plastic and nylon washers must be fitted between the Dual RS232 Module and its metal standoffs in the 4100 PDI bay/cabinet. Otherwise, an earth fault can be created on the QE20.

Although the 4100 will generate a fault if the connection to the QE20 is broken, the QE20 FAULT relay needs to be wired to a fault-causing input on the 4100, so that a fault on the QE20 is displayed on the fire panel as well and transmitted to any connected monitoring centre.

QECOMMS Wiring to Paging Console

One or more Vigilant Paging Consoles can be connected to allow non-emergency paging to selected zones, and/or control of WIPs, zone background music, or other functions.

Wiring connections are made from a QE20 AUDIO INPUT (Input 2 on the Controller is assigned the paging audio function by default), and the QECOMMS terminals on the Controller and a fused 24V supply output, to the paging consoles as shown on drawing 2001-2 Sheet 205. Note the audio and QECOMMS wiring needs to be separately screened. The 24V power supply from the QE20 needs to be separately fused and not wired to any internal function. This is usually achieved by fitting the FP2027 Fuse Board to a 27A PSE. Refer to the Fuse Board Mounting instructions LT0727 for details.

MODBUS Interface to Modbus Master

The QE20 can provide a Modbus RTU compatible serial connection to a Modbus Master (the QE20 is a slave RTU and responds to messages from the Modbus master).

Refer to Document 2104 QE20 Modbus Protocol Spec for full details for the Modbus interface and data available from the QE20.

The QE20 Modbus connection is available as RS232 on the Controller RS232 Port J18. The TXD and RXD signals are supported, along with the RTS signal asserted during transmission, which can be used to control an RS485 Transmitter. As electrical isolation is required between the QE20 and the Modbus Master, a suitable interface board will almost always be needed in the QE20.

Drawing 2001-2 Sheet 209 shows some wiring options – non-isolated RS232 to a PC for test purposes, and RS232 to isolated RS422 / RS485 using a Vigilant PA0712 RS232 RS485 Adaptor Board.

Alternatively, the TTL Port connector J14 on the Controller Main Board can be used. Drawing 2001-2 Sheet 210 shows some wiring options using the Vigilant PA0773 TTL RS485 Adaptor Board – 2-wire RS485 and 4-wire RS422.

Modbus over TCP can be supported by adding a third-party Modbus over TCP to Serial adaptor such as the Moxa MGate MB3180. This translates the Modbus over TCP messages to a serial port for connection to the QE20.

8. Programming and Diagnostics

Programming and diagnostics of the QE20 system is conducted using a computer (laptop) and a USB connection to the MicroUSB connector on the Controller. The computer needs to have QE20Config installed and licenced.

Plug the USB cable into the MicroUSB connector of the QE20 Controller and into the computer USB port.

Refer to the QE20Config Help file for information on using QE20Config to program or diagnose a QE20.

9. LED Indications

There are ten LED indicators on the QE20 Controller Module.

- **POWER** is on green when power is applied. Off means 24V power is not applied.
- **FAULT** will turn on yellow when there is a fault in the QE20 system – it matches the Fault Relay.
- **A** – Will turn on or off approximately every 1-2 seconds when the QE20 is running (assuming the default logic to flash the LED is included in the site configuration). This can be overridden by site programming.
- **B** – By default not used. Can be overridden by site programming.
- **C** – By default not used. Can be overridden by site programming.
- **RESET** is on yellow when the CPU on the Controller is being reset. It is normally off. If this flashes on it indicates the microprocessor is restarting.
- **LINK / ACT** indicators for each of the four Ethernet ports. These are green LEDs that are on if an Ethernet connection is present and blink with activity on the port.

10. Power On & Testing

Some suggested steps for the initial power up and testing of the QE20 Controller Module.

- Power up the QE20. Download site configuration. Check for any fault conditions and resolve these.
- Activate speech on a zone and check the front panel microphone generates the voice announcements to the selected zone's loudspeakers.
- If a high-level link to a fire alarm panel is configured, generate or simulate an alarm on each of the fire panel zones that are monitored by the QE20 and check that Alarm is shown on the correct emergency zone(s) of the QE20. Create a fault on the QE20 and check a fault is generated on the connected fire alarm panel. For an RZDU connection check that a field wiring fault to any external RZDU devices does not stop the alarms from being signalled to the QE20.
- Check each configured GP INPUT operates as per the site configuration. Activate each of the conditions on each of the inputs and check the QE20 performs the required function.
- Check each configured GP OUTPUT operates as per the site configuration. Generally, the output will be off (not conducting) and switch on when the programmed function is active.
- Check the configured AUDIO INPUTs are working by listening to the audio signal mapped to a zone's loudspeakers. Adjust the volume setting at the source to the desired level. The input level can be changed in the QE20 site configuration if changing the source is not possible.
- Check each configured RELAY OUTPUT operates as per the site configuration. Generally, the relay is energised and turns off when the programmed function is active.
- If "Vigilant" paging consoles are connected check that they activate paging to the required zones and that the audio sound level is appropriate. Adjust the overall volume at the paging console.
- If the Modbus port is configured check that the connection to the Modbus master is operating and that the required data is presented at the correct Modbus point addresses.
- As a last test check that an earth fault is generated when a field wiring 0V or –VE terminal is connected to the cabinet earth (metalwork).

11. Controller Module Specifications

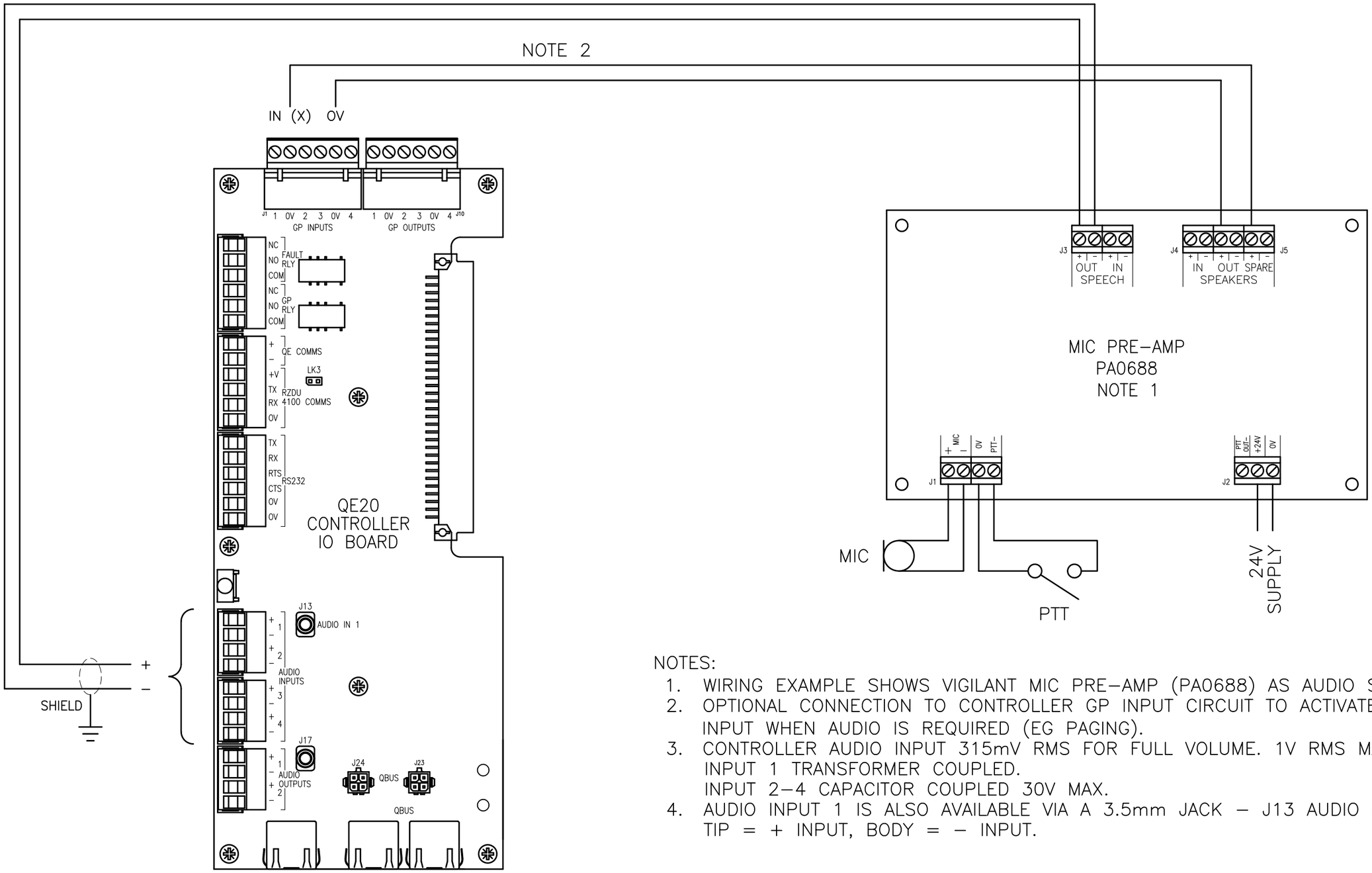
Power Requirements	18V – 32Vdc, 155mA typ @ 24V
Operating Temperature Range	-5°C to +45°C 10% to 93% RH non-condensing
AUDIO INPUTS	INPUT 1 – transformer isolated, 315mV rms nominal 2.8V rms Max. 30V offset max. 10K input impedance. INPUT 2-4 – capacitor coupled differential, 315mV rms nominal 1.4V rms Max. 5V offset max. 10K input impedance.
AUDIO OUTPUTS	Currently not functional.
RS232 Port	RS232 TXD, RXD, RTS, CTS signals on screw terminals. 4100ES Computer Port Protocol supported for FIP alarms or Modbus Slave RTU supported
RZDU / 4100 COMMS Port	Isolated "Vigilant" RZDU Port for adjacent fire panel. Requires FP1143 HLI Interface Board if external devices connected to fire panel.
QEComms Port	2-wire QE90 Communications compatible with up to 16 x "Vigilant" FP0539 Paging Consoles or PC Paging Console.
TTL Port	"Vigilant" TTL Port – can be used with compatible interface boards for Modbus

FAULT RELAY	Volt-free change-over relay 2A @ 30Vdc resistive. Normally energised
GP RELAY	Volt-free change-over relay 2A @ 30Vdc resistive. Normally energised
GP INPUTS (1 – 4)	>20K (Open), 10K (Normal), 680R (Alarm), <270R (E.g. Short) 10k pull-up to 24V supply
GP OUTPUTS (1 – 4)	100mA max < 1V on; 30V dc max off. >12V for load supervision normal 250uA supervision current
SD Card	Currently not supported.
Micro USB	Connect PC for programming/diagnostics using QEConfig
USB	Type A. Currently not supported.
Ethernet	4 x 10/100Base-T RJ45 Ethernet Ports
QBus RJ45 x 2	QBus Data and Audio connection to QE20 Amplifier Modules
QBus 4-way x 2	QBus Data connection to QE20 WIP, ROM, PSE Modules. 24V @ 1A max
WIP RIGHT	WIP Audio Chain Right Port – connect to WIP AUDIO CHAIN LEFT on RS485 Network or WIP/Input Module

12. End User Licence Agreement, Privacy and Licensed Software

Please refer to the following web page for the Johnson Controls End User Licence Agreement (EULA), Open Source Software (OSS) licences and Privacy information related to this product - www.johnsoncontrols.com/techterms

© 2023. Johnson Controls. All rights reserved. All specifications and other information shown were current as of document revision date and are subject to change without notice.



NOTES:

1. WIRING EXAMPLE SHOWS VIGILANT MIC PRE–AMP (PA0688) AS AUDIO SOURCE.
2. OPTIONAL CONNECTION TO CONTROLLER GP INPUT CIRCUIT TO ACTIVATE AUDIO INPUT WHEN AUDIO IS REQUIRED (EG PAGING).
3. CONTROLLER AUDIO INPUT 315mV RMS FOR FULL VOLUME. 1V RMS MAX.
   INPUT 1 TRANSFORMER COUPLED.
   INPUT 2–4 CAPACITOR COUPLED 30V MAX.
4. AUDIO INPUT 1 IS ALSO AVAILABLE VIA A 3.5mm JACK – J13 AUDIO INPUT 1.
   TIP = + INPUT, BODY = – INPUT.

CONFIDENTIAL: THIS DOCUMENT MUST NOT BE COPIED NOR THE CONTENTS PASSED ON TO ANY THIRD PARTY WITHOUT THE CONSENT OF THE COMPANY.

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.	–	KJS	RC	MH	DC	14–4–20

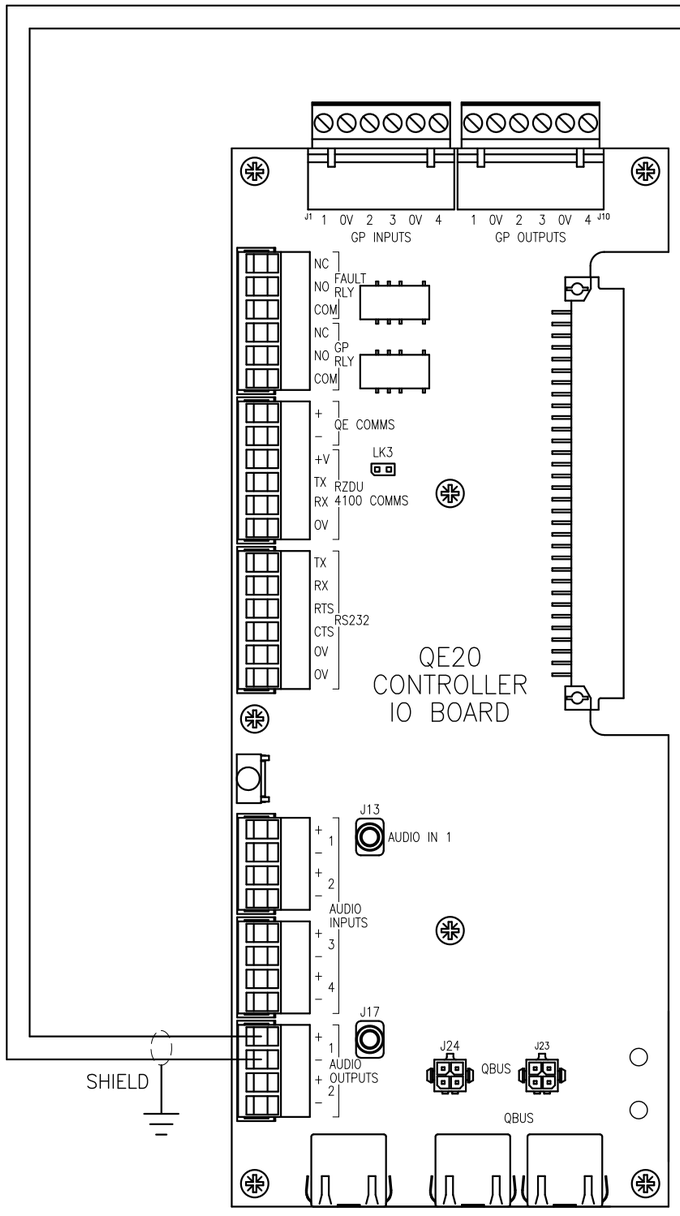
© 2020 Johnson Controls. All rights reserved. All specifications and other information shown were current as of document revision date and are subject to change without notice.

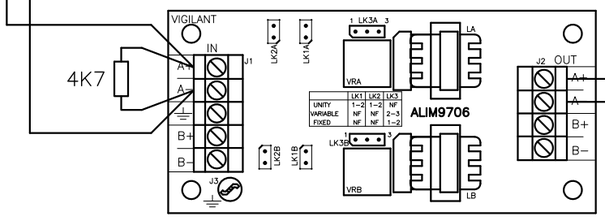
JOHNSON CONTROLS
17 MARY MULLER DRIVE
P.O. BOX 19545
CHRISTCHURCH, PH: +64 3 3895096
NEW ZEALAND. FAX:+64 3 3895938

QE20 CONTROLLER MODULE AUDIO INPUT / MIC PREAMP FIELD WIRING DIAGRAM

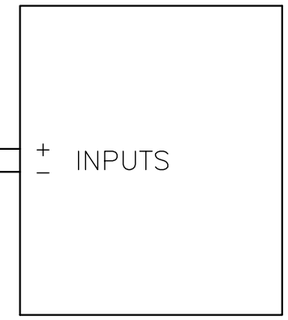
DRAWING No: 2001-2 SHEET 201 of N

A3 | ISS/REV A | PART No:





ALIM9706



AUDIO
AMPLIFIER

NOTES:

1. DRAWING SHOWS EXAMPLE WIRING TO EXTERNAL AMPLIFIER WITH ALIM9706 ISOLATING TRANSFORMER & EOL SUPERVISION.
2. FUNCTION OF AUDIO OUTPUTS IS DETERMINED BY SITE CONFIGURATION.
3. AUDIO OUTPUTS RATING: 315mV RMS FOR FULL VOLUME, 1.4V RMS MAX.
4. OUTPUTS ARE 0V REFERENCED ON –VE TERMINAL; +VE BIASED TO 5V DC WITH 4K7 RESISTOR.
5. OUTPUTS SUPPORT OPTIONAL EOL SUPERVISION WITH 4K7 RESISTOR AT FAR END. INPUT MUST BE CAPACITOR COUPLED.
6. OUTPUT 1 AVAILABLE ON SCREW TERMINALS AND 3.5MM DIA SOCKET – TIP = +VE; BODY = –VE.
7. OUTPUT 2 AVAILABLE ON SCREW TERMINALS ONLY.
8. SCREENED AUDIO CABLE FOR EXTERNAL WIRING RECOMMENDED.

CONFIDENTIAL: THIS DOCUMENT MUST NOT BE COPIED NOR THE CONTENTS PASSED ON TO ANY THIRD PARTY WITHOUT THE CONSENT OF THE COMPANY.

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.	–	KJS	RC	MH	DC	11-5-20

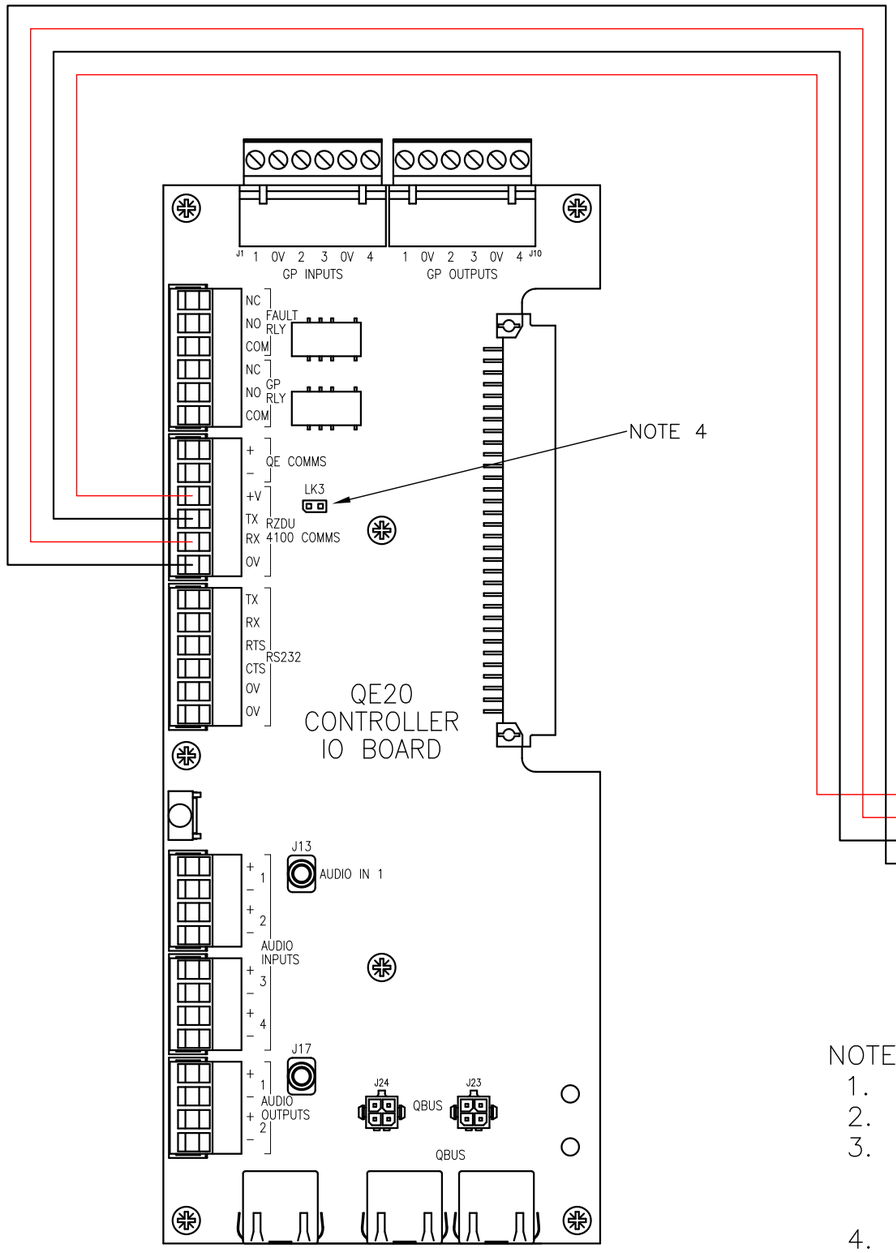
© 2020 Johnson Controls. All rights reserved. All specifications and other information shown were current as of document revision date and are subject to change without notice.

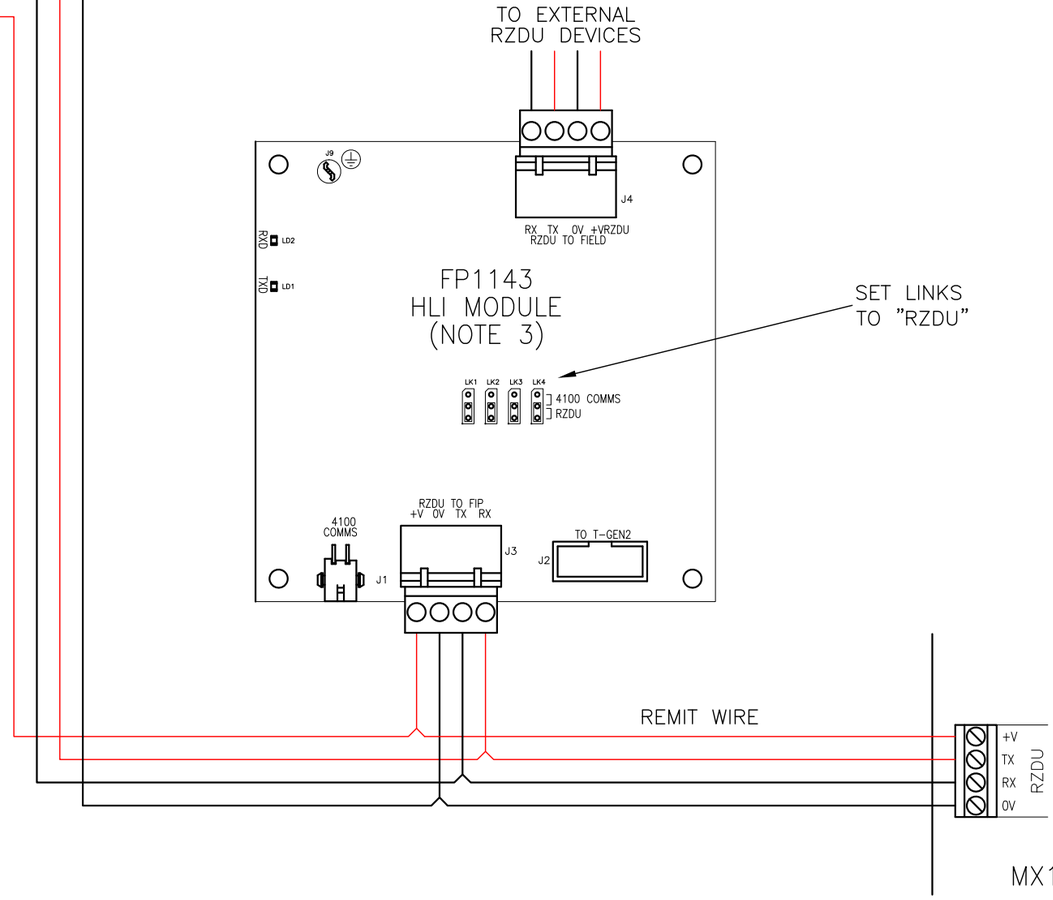
JOHNSON CONTROLS
17 MARY MULLER DRIVE
P.O. BOX 19545
CHRISTCHURCH, PH: +64 3 3895096
NEW ZEALAND. FAX:+64 3 3895938

QE20 CONTROLLER MODULE AUDIO OUTPUTS FIELD WIRING DIAGRAM

DRAWING No: 2001-2 SHEET 202 of N

A3 | ISS/REV A | PART No:





NOTES:

1. CONNECTION IS ISOLATED AT QE20 CONTROLLER RZDU INPUT.
2. FIRE PANEL & QE20 MUST BE ADJACENT OR COMBO PANEL.
3. IF RZDU WIRING CONNECTS TO EXTERNAL RZDU DEVICES FIT FP1143 HLI MODULE TO FIRE PANEL TO PROVIDE BUFFERED RZDU CONNECTIONS FOR FIELD WIRING.
4. LK3 ON QE20 CONTROLLER MUST BE FITTED.

CONFIDENTIAL: THIS DOCUMENT MUST NOT BE COPIED NOR THE CONTENTS PASSED ON TO ANY THIRD PARTY WITHOUT THE CONSENT OF THE COMPANY.

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.	–	KJS	RC	MH	DC	14-4-20

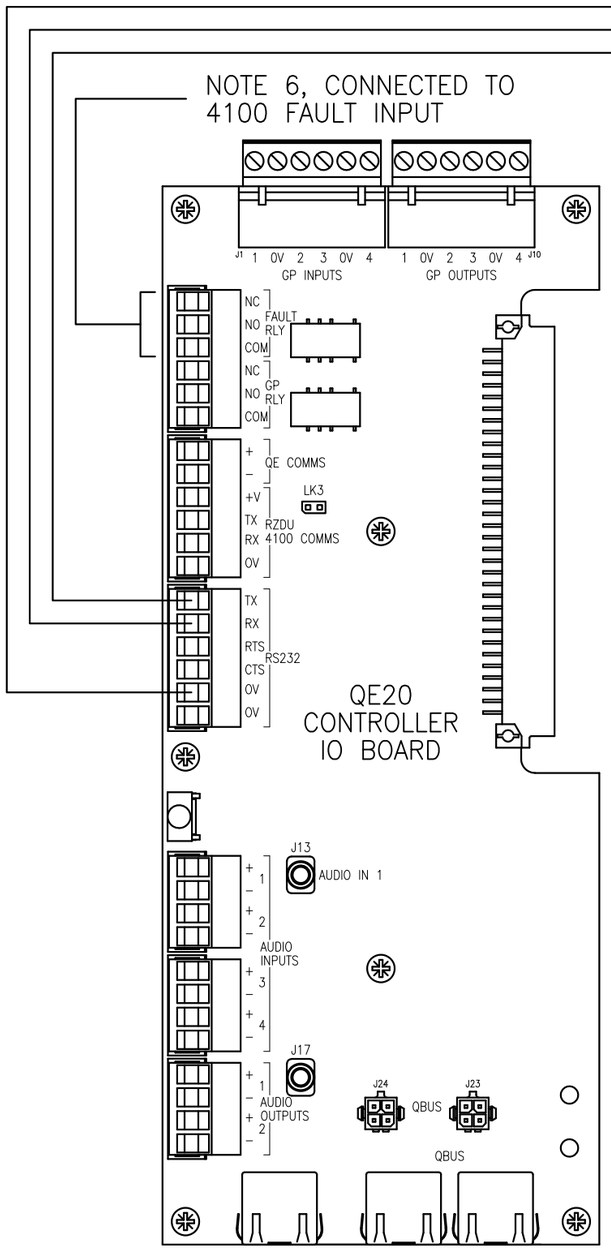
© 2020 Johnson Controls. All rights reserved. All specifications and other information shown were current as of document revision date and are subject to change without notice.

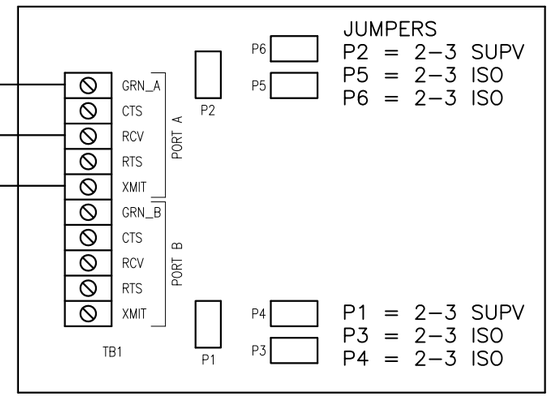
JOHNSON CONTROLS
17 MARY MULLER DRIVE
P.O. BOX 19545
CHRISTCHURCH, PH: +64 3 3895096
NEW ZEALAND. FAX:+64 3 3895938

QE20 CONTROLLER MODULE RZDU CONNECTION WIRING DIAGRAM

DRAWING No: 2001-2 SHEET 203 of N

A3 | ISS/REV A | PART No:

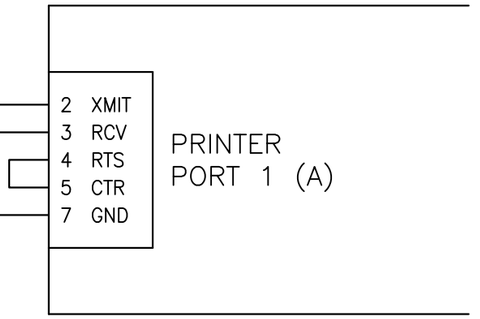




4100–6046
DUAL RS232
(NOTE 1)

OR

NOTE 4



4100–0113
DUAL RS232
(NOTE 1)

NOTES:

1. MUST ELECTRICALLY ISOLATE 4100 DUAL RS232 MODULE FROM EARTH. REFER TO LT0696 CONTROLLER INSTALL INSTRUCTIONS.
2. FIRE PANEL AND QE20 MUST BE COMBO OR ADJACENT PANELS.
3. ON 4100–6046 DUAL RS232 MODULE FIT LINKS: PORT A – P2 = 2–3 "SUPV", P5, P6 = 2–3 "ISO"; PORT B – P1 = 2–3 "SUPV", P3, P4 = 2–3 "ISO";
4. FOR 4100–0113 WIRE TO EITHER A DB–25 PLUG (PIN NUMBERS SHOWN) OR TO SCREW TERMINALS ON THE MOTHERBOARD USING PORT CONFIGURED IN 4100ESi PANEL.
5. ON 4100 CONFIGURE RS232 PORT AS FOLLOWS: PORT TYPE = RS232, COMMUNICATIONS SETTINGS TO 9600, EVEN PARITY, 8 DATA BITS, 1 STOP BIT.
   ON PORT DATA WINDOW, GEN INFO TAB, SET DEVICE TYPE AS COMPUTER AND PORT ID AS QE20.
   ON PORT OPTIONS TAB SET ALL OPTIONS OFF EXCEPT PROTOCOL, STATUS, BPREFIX, SUPV, POLL, ATTRIB, LF.
   IN PORT VECTORING WINDOW SELECT QE20 PORT, DISABLE ALL EVENT REPORTING EXCEPT PSEUDO EVENTS.
6. WIRE QE20 FAULT RELAY TO SUITABLE INPUT ON 4100 TO CAUSE FAULT.

CONFIDENTIAL: THIS DOCUMENT MUST NOT BE COPIED NOR THE CONTENTS PASSED ON TO ANY THIRD PARTY WITHOUT THE CONSENT OF THE COMPANY.

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.	–	KJS	RC	MH	DC	14–4–20
B	NOTE 1 UPDATED.	–	KJS	RC	MH	DC	2–3–23

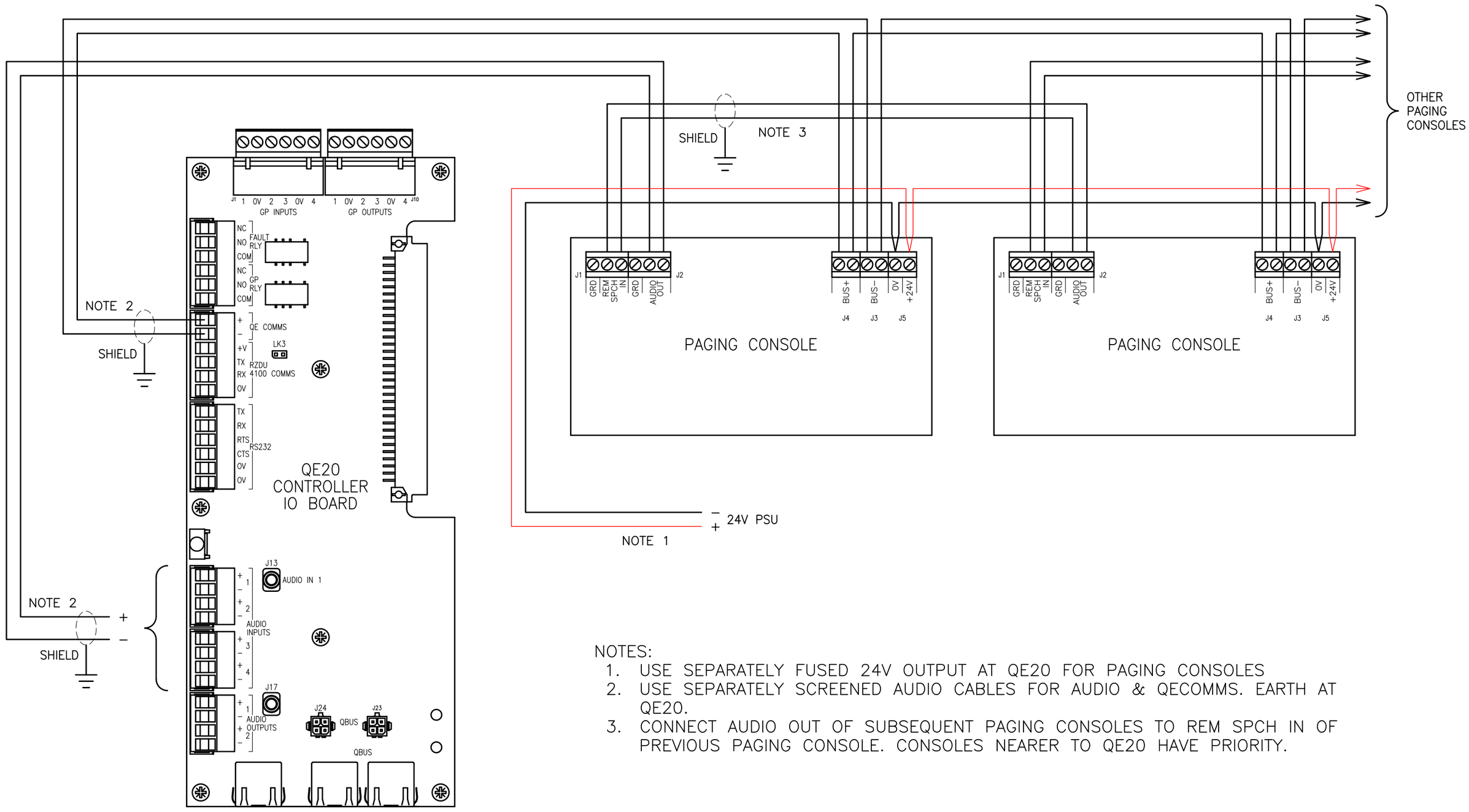
© 2023 Johnson Controls. All rights reserved. All specifications and other information shown were current as of document revision date and are subject to change without notice.

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

QE20 CONTROLLER MODULE SIMPLEX 4100ESi ON RS232 PORT FIELD WIRING DIAGRAM

DRAWING No: 2001-2 SHEET 204 of N

A3 | ISS/REV B | PART No:



NOTES:

1. USE SEPARATELY FUSED 24V OUTPUT AT QE20 FOR PAGING CONSOLES
2. USE SEPARATELY SCREENED AUDIO CABLES FOR AUDIO & QECOMMS. EARTH AT QE20.
3. CONNECT AUDIO OUT OF SUBSEQUENT PAGING CONSOLES TO REM SPCH IN OF PREVIOUS PAGING CONSOLE. CONSOLES NEARER TO QE20 HAVE PRIORITY.

CONFIDENTIAL: THIS DOCUMENT MUST NOT BE COPIED NOR THE CONTENTS PASSED ON TO ANY THIRD PARTY WITHOUT THE CONSENT OF THE COMPANY.

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.	–	KJS	RC	MH	DC	15–4–20

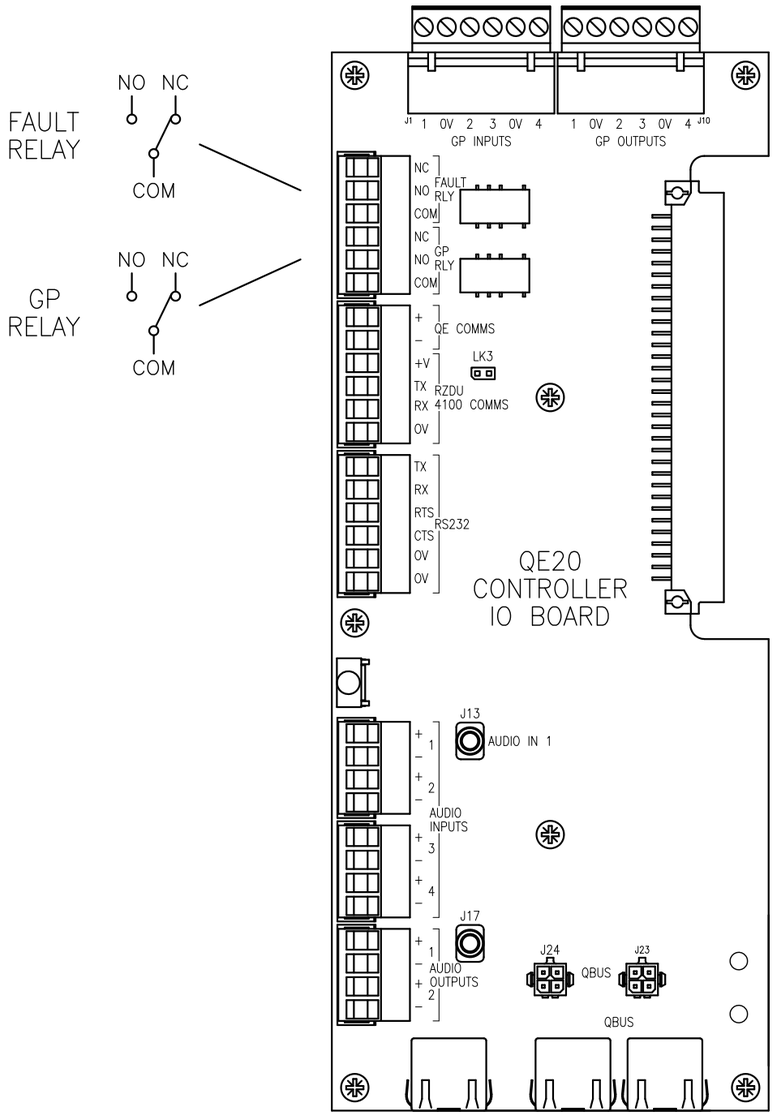
© 2020 Johnson Controls. All rights reserved. All specifications and other information shown were current as of document revision date and are subject to change without notice.

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

QE20 CONTROLLER MODULE PAGING CONSOLE FIELD WIRING DIAGRAM

DRAWING No: 2001-2 SHEET 205 of N

A3 | ISS/REV A | PART No:



NOTES:

1. RELAYS ARE NORMALLY ENERGISED & TURN OFF FOR FAULT/ACTIVATION.
2. RELAYS ARE LABELLED AND SHOWN IN DE-ENERGISED STATE.
3. RELAY RATINGS: 2A @ 30V DC RESISTIVE.
4. FUNCTION OF RELAYS IS DETERMINED BY SITE CONFIGURATION.

CONFIDENTIAL: THIS DOCUMENT MUST NOT BE COPIED NOR THE CONTENTS PASSED ON TO ANY THIRD PARTY WITHOUT THE CONSENT OF THE COMPANY.

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.	–	KJS	RC	MH	DC	11-5-20

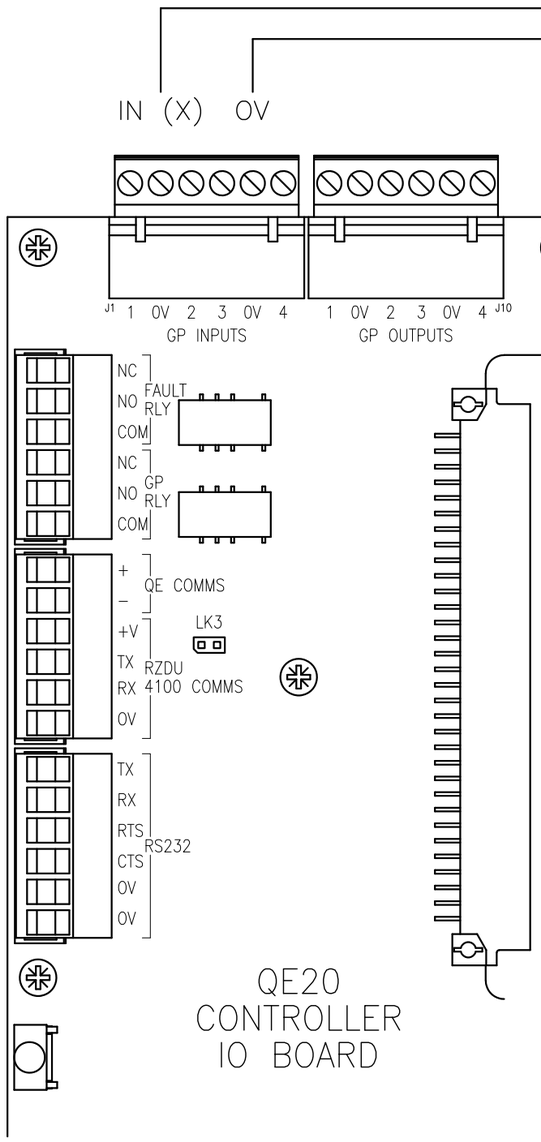
© 2020 Johnson Controls. All rights reserved. All specifications and other information shown were current as of document revision date and are subject to change without notice.

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

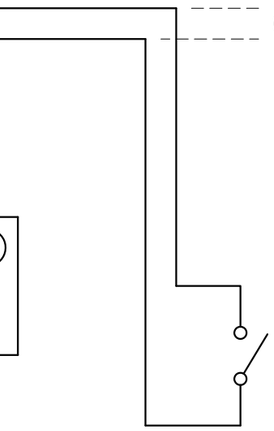
QE20 CONTROLLER MODULE FAULT & GP RELAYS FIELD WIRING DIAGRAM

DRAWING No: 2001-2 SHEET 206 of N

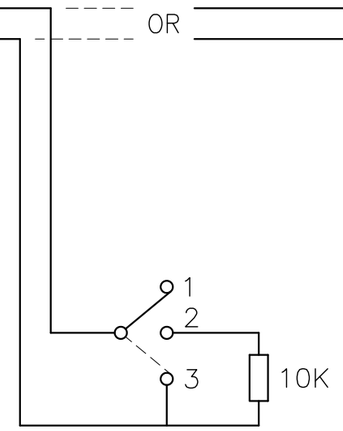
A3 | ISS/REV A | PART No:



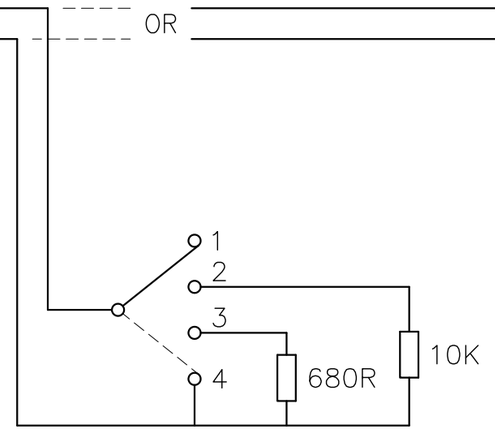
QE20 CONTROLLER IO BOARD



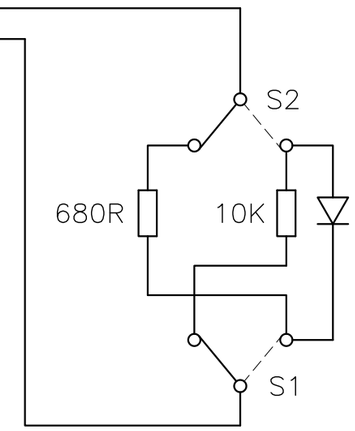
2 POSITION ON/OFF CONTACT (TABLE 1)



3 POSITION OPEN/NORMAL/ SHORT CONTACT (TABLE 2)



4 POSITION OPEN/NORMAL/ALARM SHORT SINGLE CONTACT (TABLE 3)



4 STATES FROM 2 ON/OFF CONTACTS (TABLE 3) S1, S2 SHOWN IN OFF POSITION

TABLE 1			
SWITCH POSITION	STATE	RESISTANCE	LOGIC TOKEN
OFF	OPEN	>20K	CTIPOCx
ON	SHORT	<270R	CTIPSCx

TABLE 2			
SWITCH POSITION	STATE	RESISTANCE	LOGIC TOKEN
1	OPEN	>20K	CTIPOCx
2	NORMAL	~10K	CTIPNMx
3	SHORT	<270R	CTIPSCx

TABLE 3					
SWITCH POSITION	S1	S2	STATE	RESISTANCE	LOGIC TOKEN
1	OFF	OFF	OPEN	>20K	CTIPOCx
2	OFF	ON	NORMAL	~10K	CTIPNMx
3	ON	OFF	ALARM	~680E	CTIPALx
4	ON	ON	SHORT	<270E	CTIPSCx

NOTES:
1. x = INPUT NUMBER 1–4.
2. 10K RESISTOR CAN BE 10V ZENER FROM QE90.
3. MUI BAND 1 IS S/C, ETC.

CONFIDENTIAL: THIS DOCUMENT MUST NOT BE COPIED NOR THE CONTENTS PASSED ON TO ANY THIRD PARTY WITHOUT THE CONSENT OF THE COMPANY.

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.	–	KJS	RC	MH	DC	12-3-20

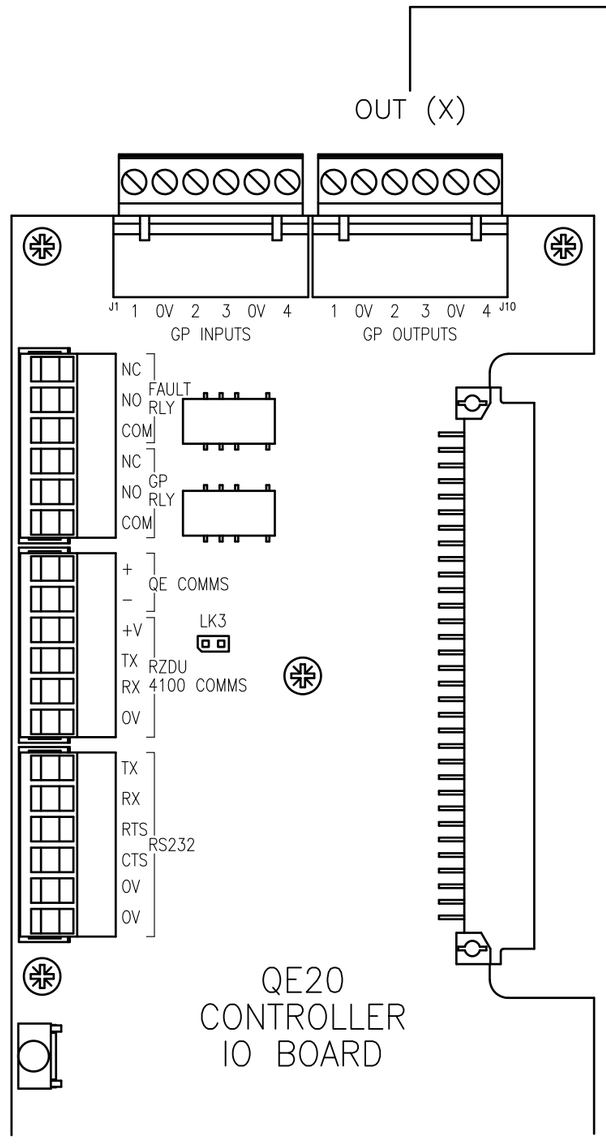
© 2020 Johnson Controls. All rights reserved. All specifications and other information shown were current as of document revision date and are subject to change without notice.

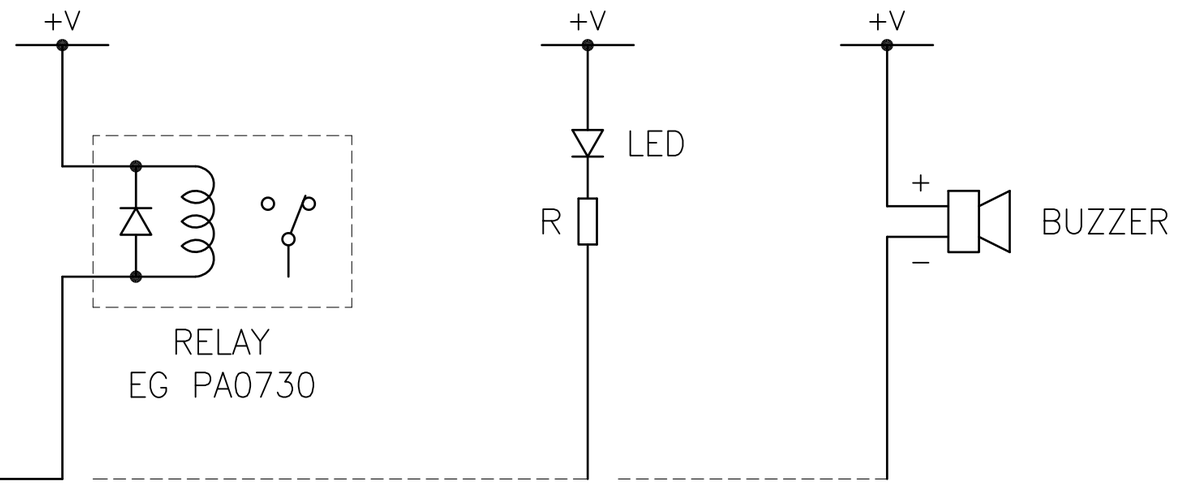
JOHNSON CONTROLS
17 MARY MULLER DRIVE
P.O. BOX 19545
CHRISTCHURCH, PH: +64 3 3895096
NEW ZEALAND. FAX:+64 3 3895938

QE20 CONTROLLER MODULE GP INPUTS, 2/3/4 WAY SWITCHES WIRING DIAGRAM

DRAWING No: 2001-2 SHEET 207 of N

A3 | ISS/REV A | PART No:





NOTES:

1. RATING OF OUTPUT DEVICE MUST MATCH SUPPLY VOLTAGE.
2. SELECT SERIES RESISTOR R FOR LED TO MATCH SUPPLY & REQUIRED CURRENT.
3. IF OUTPUT SUPERVISION CURRENT (250uA MAX) NOTICEABLE (EG ON LED) FIT 3K9 OR SIMILAR ACROSS LED.
4. OUTPUT RATINGS: 100mA MAX @ < 0.5V ON; 30V MAX OFF, 250uA SUPERVISION CURRENT.
5. LOAD SUPERVISION REQUIRES +V SUPPLY > 12V.

CONFIDENTIAL: THIS DOCUMENT MUST NOT BE COPIED NOR THE CONTENTS PASSED ON TO ANY THIRD PARTY WITHOUT THE CONSENT OF THE COMPANY.

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.	–	KJS	RC	MH	DC	30–4–20

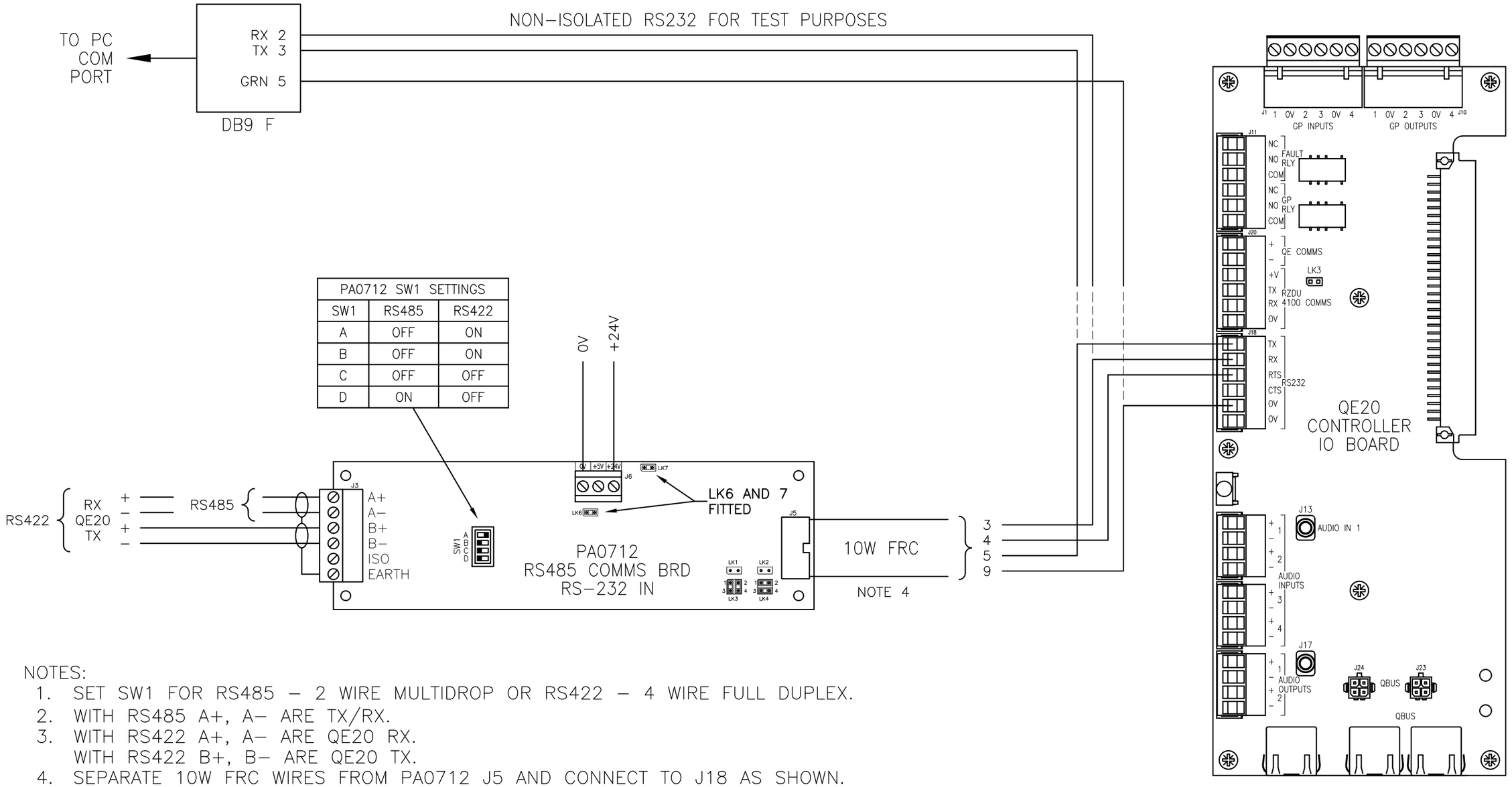
© 2020 Johnson Controls. All rights reserved. All specifications and other information shown were current as of document revision date and are subject to change without notice.

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

QE20 CONTROLLER MODULE GP OUTPUTS WIRING DIAGRAM

DRAWING No: 2001-2 SHEET 208 of N

A3 | ISS/REV A | PART No:



NOTES:

1. SET SW1 FOR RS485 – 2 WIRE MULTIDROP OR RS422 – 4 WIRE FULL DUPLEX.
2. WITH RS485 A+, A– ARE TX/RX.
3. WITH RS422 A+, A– ARE QE20 RX.
   WITH RS422 B+, B– ARE QE20 TX.
4. SEPARATE 10W FRC WIRES FROM PA0712 J5 AND CONNECT TO J18 AS SHOWN.

CONFIDENTIAL: THIS DOCUMENT MUST NOT BE COPIED NOR THE CONTENTS PASSED ON TO ANY THIRD PARTY WITHOUT THE CONSENT OF THE COMPANY.

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.	–	KJS	RC	MH	DC	21–11–22

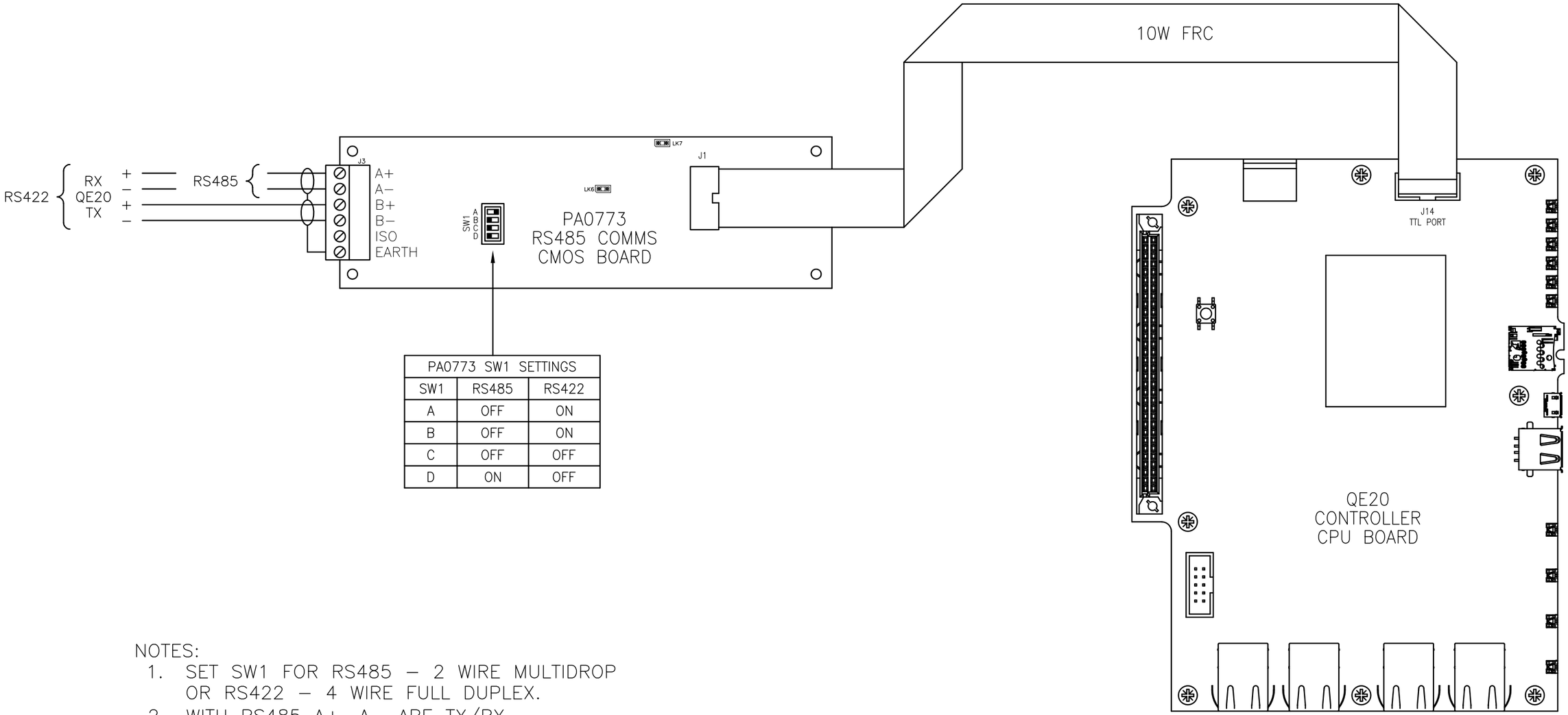
© 2020 Johnson Controls. All rights reserved. All specifications and other information shown were current as of document revision date and are subject to change without notice.

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

QE20 CONTROLLER MODULE RS232 PORT MODBUS I/F FIELD WIRING DIAGRAM

DRAWING No: 2001-2 SHEET 209 of N

A3 | ISS/REV A | PART No:



PA0773 SW1 SETTINGS		
SW1	RS485	RS422
A	OFF	ON
B	OFF	ON
C	OFF	OFF
D	ON	OFF

NOTES:
1. SET SW1 FOR RS485 – 2 WIRE MULTIDROP OR RS422 – 4 WIRE FULL DUPLEX.
2. WITH RS485 A+, A– ARE TX/RX.
3. WITH RS422 A+, A– ARE QE20 RX. WITH RS422 B+, B– ARE QE20 TX.

CONFIDENTIAL: THIS DOCUMENT MUST NOT BE COPIED NOR THE CONTENTS PASSED ON TO ANY THIRD PARTY WITHOUT THE CONSENT OF THE COMPANY.

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.	–	KJS	RC	MH	DC	18–11–22

© 2020 Johnson Controls. All rights reserved. All specifications and other information shown were current as of document revision date and are subject to change without notice.

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

QE20 CONTROLLER MODULE TTL PORT MODBUS I/F FIELD WIRING DIAGRAM

DRAWING No: 2001-2 SHEET 210 of N

A3 | ISS/REV A | PART No: