

FIRE

4100ES-S1 Fire Indicator Panel

Installation & Maintenance



Australian
Installation &
Maintenance
Manual

LT0394
Issue 1.9

Simplex

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Approvals

Australian Standard AS 4428.1
ActivFire Listing Number afp1682

Manufacture

The 4100ES-S1 is a Fire Indicator Panel manufactured by Tyco Fire Protection Products for:

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Name	
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The 4100ES-S1 Fire Indicator Panel provides a configuration programming facility, which may be accessed via a programming computer using a "dongle". Because this programming facility allows the user to define in detail the operation of the 4100ES-S1 System being customised, changes may be made by the user that prevent this installation from meeting statutory requirements.

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Model Number & Firmware Revision

This manual applies to product with the following:

Model number : 4100ES-S1

Firmware revision : 1.02.04 and on

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Amendment Log

5 July 2006	Issue 1.0	Original based on LT0350 1.0.7
6 October 2006	Issue 1.1	References to LT0432 and 1976-181 Wiring Diagrams added.
30 Nov. 2006	Issue 1.2	Updated drawings 1976-181 Sheets 102, 203, 500.
23 Jan. 2007	Issue 1.3	Changes to T-GEN connection, checking system wiring.
21 Feb. 2007	Issue 1.4	Changes to AIU/PPU Brigade Interface mounting
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3 June 2014	Issue 1.7	Drg 1976-174 sheet 4 removed.
29 Jan 2015	Issue 1.8	Battery charger adjustment updated.
24 Feb 2015	Issue 1.9	Updated drawing 1976-181 Sheet 411.

Cautions, Warnings, and Regulatory Information

READ AND SAVE THESE INSTRUCTIONS. Follow the instructions in this installation manual. These instructions must be followed to avoid damage to this product and associated equipment. Product operation and reliability depends upon proper installation.



DO NOT INSTALL ANY SIMPLEX® PRODUCT THAT APPEARS DAMAGED.

Upon unpacking your Simplex product, inspect the contents of the carton for shipping damage. If damage is apparent, immediately file a claim with the carrier and notify your Simplex product supplier.

SAFETY HAZARD - The 4100ES-S1 CPU Card includes a lithium battery. There is danger of explosion if the battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.



ELECTRICAL HAZARD - Disconnect electrical field power when making any internal adjustments or repairs. All repairs should be performed by a representative or authorized agent of your local Simplex product supplier.



STATIC HAZARD - Static electricity can damage components. Therefore, handle as follows:

- Ground yourself before opening or installing components (use a suitable wrist-strap and cable clipped to the frame or an earth connection of the 4100ES-S1).
- Prior to installation, keep components wrapped in anti-static material at all times.



EYE SAFETY HAZARD - Under certain fibre optic application conditions, the optical output of this device may exceed eye safety limits. Do not use magnification (such as a microscope or other focusing equipment) when viewing the output of this device.



RADIO FREQUENCY ENERGY - This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual, may cause interference to radio communications. It has been tested and found to comply with the limits defined in AS 4428.0-1997 and Amendment 1:2002.

SYSTEM REACCEPTANCE TEST AFTER SOFTWARE CHANGES - To ensure proper system operation, this product must be tested in accordance with AS 1670 after any programming operation or change in site-specific software. Reacceptance testing is required after any change, addition or deletion of system components, or after any modification, repair or adjustment to system hardware or wiring.

IMPORTANT: Verify 4100ES Programmer, Executive, and Slave Software compatibility when installing or replacing system components. Refer to the relevant Product Bulletins from Simplex Fire Products Australia (www.simplexfire.com.au) for compatibility information.

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Chapter 1

Introduction to the 4100ES-S1 Fire Alarm System

Introduction

The 4100ES-S1 is a compact version of the 4100ES fire alarm, which is intended for use in applications requiring only one or two loops of addressable devices.

This chapter is an overview of basic system concepts.
{xe "4100 Fire Alarm System"}

In this Chapter

Refer to the page number listed in this table for information on a specific topic.

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Basic Configuration

Overview

The basic version of the 4100ES-S1 is used for smaller or single-building applications. It is ideally placed in a small building that requires a limited number of notification appliances and initiating devices.

{xe "4100 Fire Alarm System: standalone (overview)"}{xe "Standalone 4100 Fire Alarm System"}

If a small building is being expanded, or if other buildings are being constructed in the same general area (as in a campus application), the basic 4100ES-S1 can be expanded via networking into one of the larger systems described in Chapter 3.

System Design

The basic 4100ES-S1 is a single cabinet containing these items: CPU, System Power Supply, and optional slave cards.

As standard, the 4100ES-S1 has one IDNet addressable loop that can support up to 250 devices. A second IDNet addressable loop can be added by fitting a 4100-3101AU IDNet module to the expansion bay in the cabinet (see Chapter 6).

The basic 4100ES-S1 can be expanded with a limited number of 4100-type legacy card/modules or newer 4" x 5" 4100ES modules.

All appliances and devices are connected to this one cabinet, as shown in Figure 1-1.

{xe "Basic 4100 Fire Alarm System: system design"}

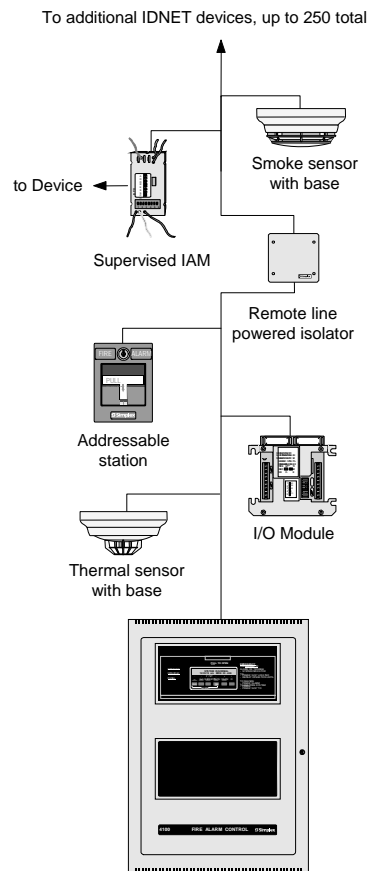


Figure 1-1. Basic 4100ES-S1 System

4100ES-S1 Part Codes

Overview

This section lists the parts that are supported by the 4100ES-S1 Fire Alarm System.

Assemblies, Cards & Modules

The following is a list of assemblies, cards and modules used in 4100ES-S1:

These parts are included in the base 4100ES-S1:

- 742-516 CPU Motherboard (566-227)
- 4100-7158 CPU Card (566-719)
- 4100-9848AU System Power Supply, Australian version
- 4100-6033 Alarm Relay Card (566-058) plugged onto the SPS and used to supply the Brigade I/F relays.
- PA0915 Fuse Distribution Board, connected to the Auxiliary Power terminals of the System Power Supply
- 4100-2300 Expansion Bay Assembly (includes the metalwork with the PDI back-plane)
- 4100-1288 64 LED/64 Switch Controller module with mounting plate
- 4100-1282 8 SW/16 LED red/yellow module (2 off)

These parts may be used to expand a 4100ES-S1:

- 4100-1282 8 SW/16 LED red/yellow module
- 4100-3101AU IDNET Module – 250 point capacity
- 4100-3107AU IDNet+ Module – 246 point capacity, four loops
- 4100-3204 4 Point Relay Module
- 4100-3206 8 Point Relay Module
- 4100-1289 64 LED/64 Switch Controller module
- 4100-1287 24 Switch/24 red LED module
- 4100-1284 8 Switch 16 red/green LED module
- 4100-1281 8 Switch 8 yellow LED module
- 4100-0160 Internet Interface Module (566-355).
- ME0456 Fan Control Module

Kits

The following kits are available to install in a base 4100ES-S1:

Brigade Interfaces

- FP0935 ASE Door Kit (ASE not included)
- FP0937 PPU/AIU Door Kit (PPU/AIU not included)

Other

- 4100-KT0448 Fused DC Distribution Bd, XSPS AU Mounting
- 4100-KT0468 4100 Motherboard to 4100U Bay, Mounting Kit
- 4100-0766K T-GEN 50 and 4100U Mounting Bracket Kit
- ME0460 T-GEN 50 Evacuation Control Switch and Label
- ME0490 T-GEN 50/4100U Dynamic Microphone and lead

Continued on next page

4100ES-S1 Part Code, Continued

Labels (expansion/spares)	• LB0602	Operator I/F ISO/Test Card
	• LB0605	Fan Control Zone Insert Card
	• 526-873	Slide In Label, LED Switch Module, 1 Sheet of 6
	• 4100-1294	LED Module Slide In Labels, Panel Set
Looms (expansion/spares)	• LM0309	4100U Mains Lead With Filter
	• LM0310	4100U Battery Lead Set, 18U-21U
	• 734-008	Harness, Power Comms, 4 Way, 2ft Length
	• 734-075	Harness, Power Comms, 4 Way, 8ft Length
	• 116-226	Sw/LED Module Ribbon Cable, 26 Way, 2in
	• 116-227	Sw/LED Module Ribbon Cable, 26 Way, 6in

4100 Part Codes (Non-4100ES)

The following is a list of existing 4100+/A/U cards and modules that may be used with 4100ES-S1.

- 4100-5004 8 AZF Monitor Zone
 - 4100-0113 Dual RS232 Modem Interface
 - 4100-3003 8 Relay Module
 - 4100-4321 6 Supervised Relays
 - 4100-3024 24 Relay Module
 - 4100-0302 24 I/O Module
 - 4100-0111 Quad Isolator Module
 - 4100-6078 Modular Network Card (requires 2 media cards)
 - 4100-6056 Wired Media Card RS485
 - 4100-6057 Fibre Optic Media Card
 - 4100-0154 VESDA High Level Interface
-

Glossary

AZF	Alarm Zone Facility – means of grouping multiple detectors or devices, and providing common indication and control.
Class A Wiring	Method of connecting multiple devices or units in a loop. This requires up to twice as much wire but means that a short or open circuit in any one section will not prevent communication with every device.
Class B Wiring	Connection of multiple devices sequentially, or with spurs, uses the minimum amount of cable, but a single wiring fault can affect all devices at once.
FIP	Fire Indicator Panel – usually abbreviated to “panel”.
GPO	General Power Outlet – mains power socket.
IDNet	Individual Device Network – latest generation of Simplex analogue addressable devices and the 2-wire loop that connects them.
MAPNet	Multi-Application Peripheral Network – an earlier version of addressable device communication superseded by IDNet. Some MAPNet devices can be used on IDNet loops.
NAC	Notification Appliance Circuit – switched DC output, usually with supervision for powering notification appliances and warning system devices.
NIC	Network Interface Card – provides network communications between multiple 4100/4100ES panels.
PDI	Power Distribution Interface – the backplane power distribution system used in 4100ES.
PID	Product Identification (part number).
RUI	Remote Unit Interface – 2-wire communications loop used to connect 4100/4100ES master panels with slave transponders.
SPS	System Power Supply – the main 4100ES power supply and battery charger module. Also includes an IDNet loop port, three NAC outputs, and the brigade relay card.

Chapter 2

Installing 4100ES-S1 Components

Introduction

This chapter describes how to mount the 4100ES-S1 cabinet to a wall, and how to mount system card bays into the cabinets, modules to bays, etc.

Most of a 4100ES-S1 is already assembled within the factory. Steps 2 to 6 below are therefore not typically required in the field, but are included for reference.

The assembly drawings are included in the appendix of this manual for reference.

In this Chapter

Refer to the page number listed in this table for information on a specific topic.

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Introduction to 4100ES-S1 Cabinet

Overview

The 4100ES-S1 cabinet contains the CPU, operator interface, system power supply (SPS), backup batteries, and any additional modules that the panel requires.

Bays

These items are organized into sub-assemblies called bays or card frames, each with a swing-down front door. The 4100ES-S1 has two bays: the CPU bay and one expansion bay.

In the standard 4100ES-S1, the CPU bay contains the SPS and the CPU Motherboard with CPU Daughter card. The front of the bay holds the Operator Interface, consisting of the LCD, keyboard, and fault sounder. Older 4100-style motherboards can be mounted in the CPU bay.

The expansion bay has a PDI (Power Distribution Interface) backplane into which can be plugged a number of 4" x 5" 4100ES modules. Older 4100-style motherboards can also be mounted in the expansion bay.

Continued on next page

Introduction to 4100ES-S1 Cabinet, *Continued*

CPU Motherboard

The 4100ES CPU motherboard (see Figure 2-1) holds the CPU card, which is central to the 4100ES-S1 system. It is mounted in the CPU bay, occupying two slots of space immediately beside the power supply. This board does not have a card address DIP switch (the CPU is always address 0).

{xe "CPU motherboard: about"}{xe "4100U: CPU motherboard"}

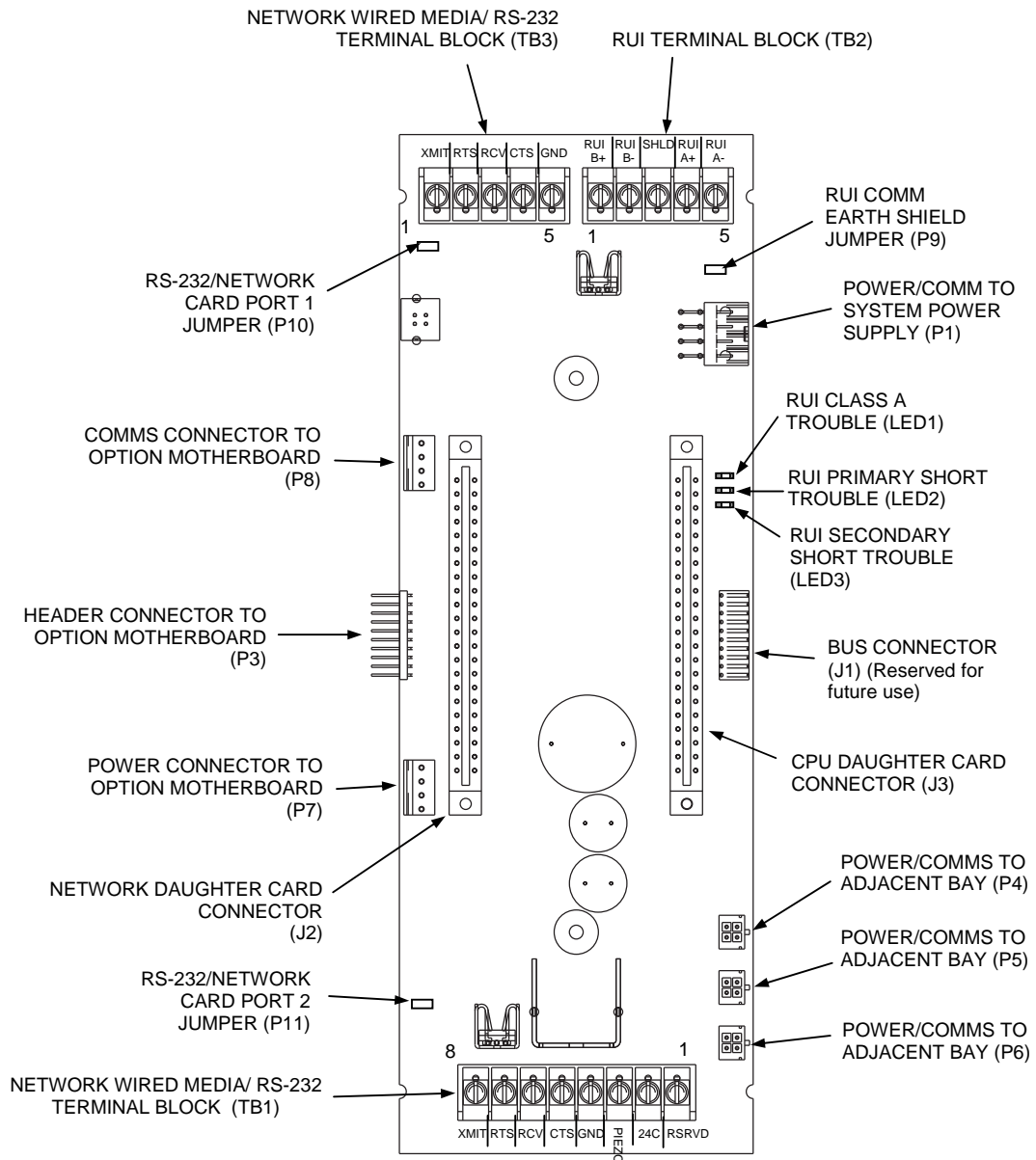


Figure 2-1. CPU Motherboard (566-227)

Continued on next page

Introduction to 4100ES-S1 Cabinet, *Continued*

CPU Card

The CPU card (see Figure 2-2) mounts onto the CPU motherboard. The CPU card contains an Ethernet service port, a direct drive user interface connection, and a serial port for a service modem.

{xe "CPU daughter card: about"}{xe "4100U: CPU daughter card"}

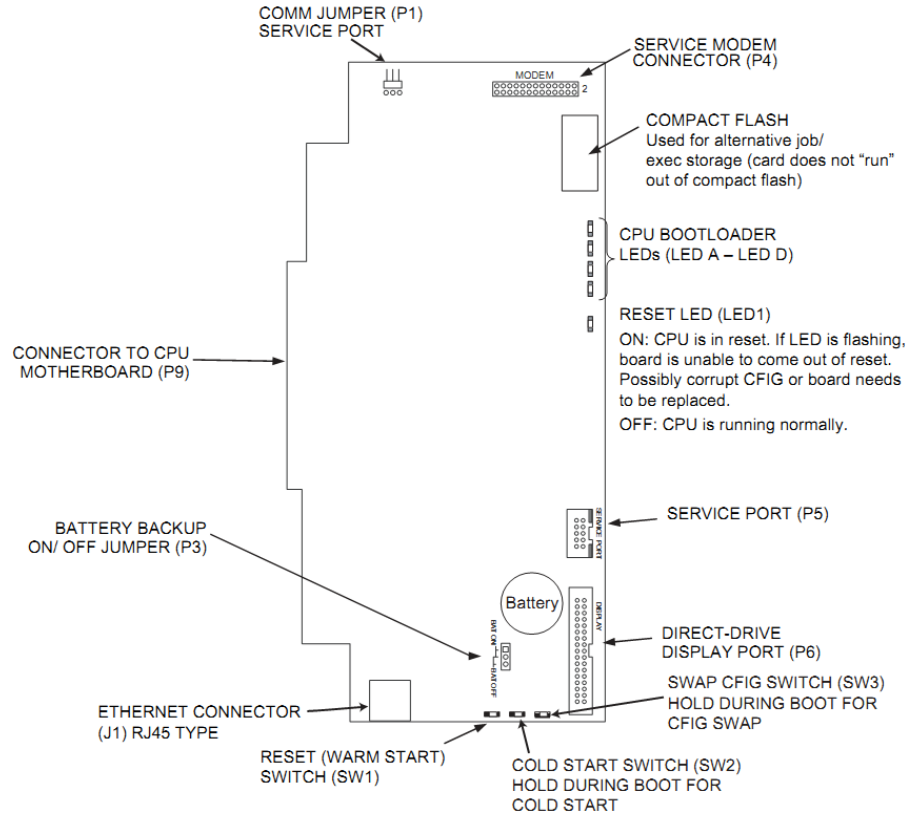


Figure 2-2. CPU Card (566-719)

Continued on next page

Introduction to 4100ES-S1 Cabinet, *Continued*

CPU Card LEDs

The CPU card LEDs indicate Bootloader status as shown in Table 2-1.

Table 2-1. CPU Card LEDs 1 through 4

Status Condition	LED D	LED C	LED B	LED A
Bootloader Initialization	On (0.25s), Off (0.25s)	On (0.25s), Off (0.25s)	On (0.25s), Off (0.25s)	On (0.25s), Off (0.25s)
Bad Master CRC or No Master Present	On	Off	Off	Off
Diagnostic Fail – RAM	On	Off	Off	On
Diagnostic Fail – Bootloader CRC	On	Off	On	Off
Downloading Master	On	Off	On	On
Downloading CFG	On	On	Off	Off
Downloading MsgLib	On	On	Off	On
Downloading BootLoader	On	On	On	Off
Download Successful	On	On	On	On

Continued on next page

Introduction to 4100ES-S1 Cabinet, *Continued*

Operator Interface

The operator interface (see Figure 2-3) lets a user operate the panel. It provides alarm, fault, and isolate status alerts, and lets the user review historical logs and perform diagnostics.



Figure 2-3. Operator Interface

Additional CPU Motherboard Modules

4100-6014 Modular Network Interface Card (NIC). A daughter card that mounts to the CPU motherboard. Performs 4100 networking operations. May be installed with 4100-6056 Wired Media Cards and/or the 4100-6057 Fibre Media Cards.

System Power Supply (SPS)

The 4100ES-S1 is powered by the SPS (System Power Supply), which gets its primary power from the AC mains and its secondary power from the backup batteries.

The SPS in the 4100ES-S1 has hardware and software that are specific to Australian requirements.

The system power supply is mains powered and has backup batteries that get switched in on mains failure. It is the initial power source for the CPU and the host cabinet. The SPS provides 24V card power to the CPU motherboard and the other cards. It also supplies 24V power on a separate bus to the outputs, e.g. Notification Appliance Circuits (NACs).

The SPS also has three on-board NACs that support reverse polarity supervision. {xe "system power supply (SPS): about"}{xe "4100U: system power supply (SPS)} It provides an IDNet channel, auxiliary power, an auxiliary relay, and it mounts and drives the Alarm Relay Card.

The SPS performs functions such as brownout detection, battery transfer, battery recharge, earth fault detection, and power limiting of outputs. It provides voltage and current information to the CPU card, which can then be displayed at the user interface.

The 24VDC bulk power on the SPS is unregulated, and is divided into three feeds: 24V Card, 24V Signal, and 24V Aux Power. 24V Card, which supplies the cards, and Aux Power, which is accessible on screw terminals, are each rated at 2A and protected by a PTC. The 27.3V regulated battery charger is powered from the bulk supply and is switched off during alarm. The charger has two programmable options of rating: 1.4A for 6-18Ahr batteries, and 3.3A for batteries above 18Ahr.

The “heavy” 24V Signal feed is only accessible via the NACs on the SPS. {xe "4100U: power connections"}{xe "system power: 4100U"}

Continued on next page

Introduction to 4100ES-S1 Cabinet, *Continued*

The basic 4100ES-S1 has a Fuse Distribution Board mounted on the SPS chassis and connected to the Auxiliary Power terminals. See Figure 2-4. This provides four sets of supply terminals, each individually fused at 1A, but the collective capacity is still limited to 2A from the Auxiliary Power supply. The fuses are not directly supervised.

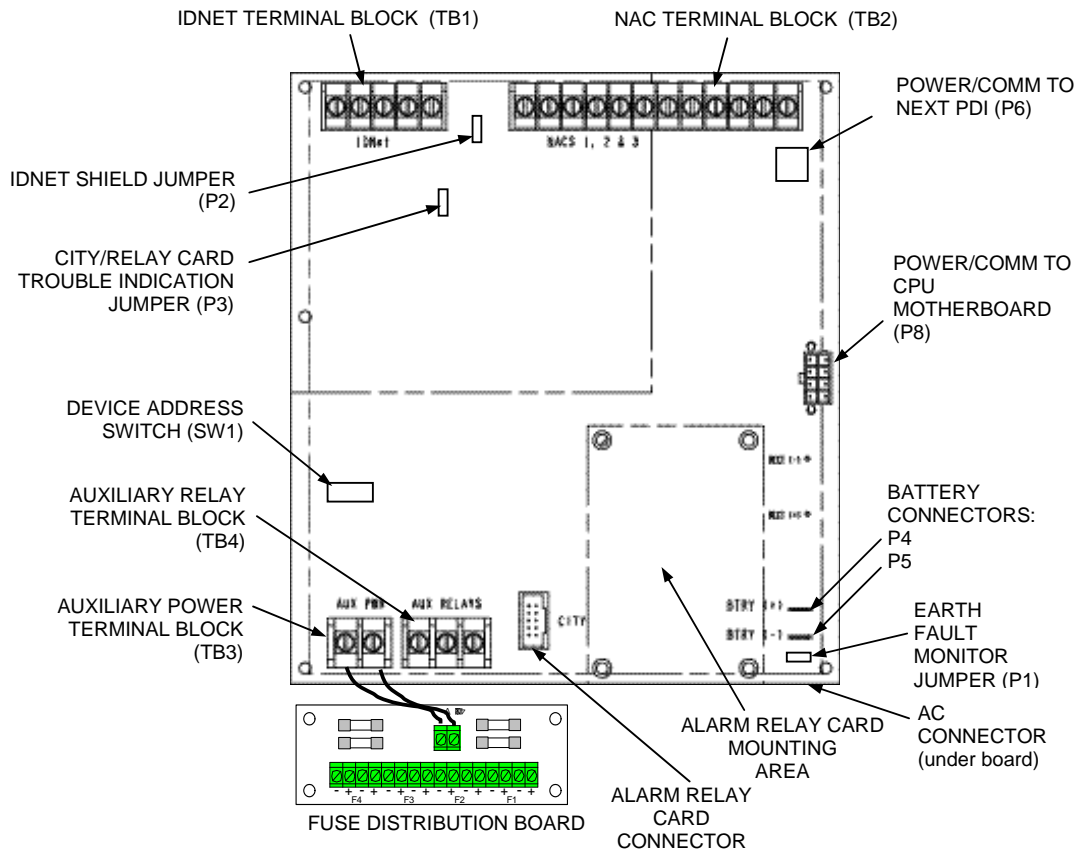


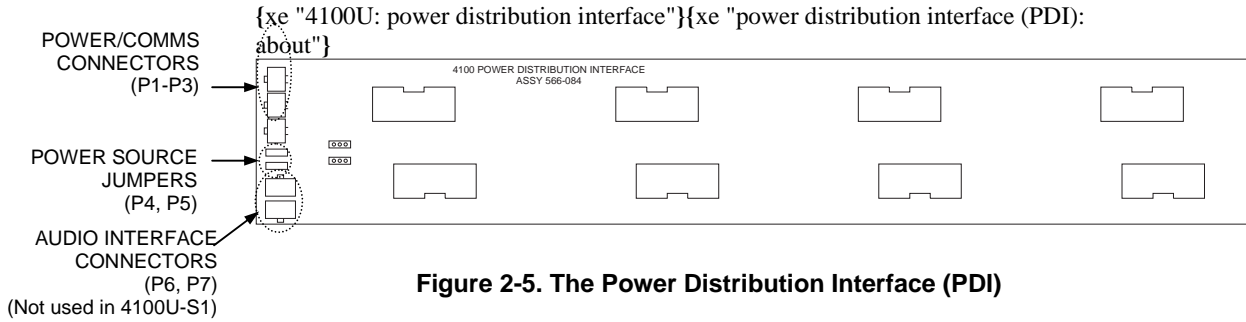
Figure 2-4. System Power Supply

Continued on next page

Introduction to 4100ES-S1 Cabinet, *Continued*

The Power Distribution Interface (PDI)

In the expansion bay, power and data are distributed via the power distribution interface (PDI). The PDI is a wiring board (see Figure 2-5) with eight card slots, each of which can accommodate a 4-inch (102 mm) x 5-inch (127 mm) slave card. If 4100-style motherboards are used, they must be mounted over the PDI using a kit of metal standoffs (part number 4100-KT0468).



Mains Outlet

The rightmost 2" slot in the expansion bay is occupied by a mounting bracket holding a single switched General Power Outlet (GPO). The fixed AC power wiring must be installed to this GPO by a suitably qualified electrician.

IMPORTANT: AC power must be provided to the 4100ES-S1 from a dedicated branch circuit.

The SPS plugs into this GPO, and can be switched off or unplugged for servicing.

Step 1. Mounting Cabinets

Overview

The important aspects of mounting the cabinet are:

- Access for the operator;
- Height of displays and controls;
- Free space for door opening;
- Cable entry for field wiring.

Refer to AS 1670.1 for the height requirement and minimum access requirements.

In general, 4100ES-S1 cabinets will be wall mounted. There are four dimpled mounting holes in the rear of the cabinet. These are accessible from the inside of the cabinet with the equipment bays still fitted, but it may be more convenient to remove the CPU bay. See the instruction in the next section about this procedure.

Mounting hole and cabinet dimensions are shown in drawing 1976-176, in the appendix to this manual.

Door opening is to the left as standard.

Step 2. Mounting Card Bays to Cabinets

Overview

The CPU Bay and the Expansion Bay are both attached to the rear of the cabinet by four 8/32" screws. The bays are prevented from movement during transit by locking screws fitted just below the upper mounting screws.

To remove a bay, remove the locking screws, loosen the mounting screws, then lift the bay up and out. Disconnect any wiring from the bay before lifting it free. Assembly is the reverse of this procedure. The transit locking screws do not have to be re-fitted to an installed cabinet.

Step 3. Configuring Cards

{xe "4100U: card configuration"}

Overview

The CPU, SPS, and all other modules to be mounted in the 4100ES-S1 cabinet must be configured to operate correctly in the system via their DIP switch and jumper ports. This section describes the hardware configuration for the CPU and SPS, since they will always be used in the CPU bay.

CPU Motherboard Configuration

The CPU motherboard must be jumpered as follows:

{xe "card configuration: CPU"}{xe "CPU motherboard: configuring"}

P9 determines whether the RUI SHIELD signal is connected to 24 C or Earth.

- Position 1 – 2: SHIELD to 24 C (default). Set to this position **unless** the system uses a TrueAlert Power Supply. Use this setting for 4100ES-S1.
 - Position 2 – 3: SHIELD to Earth. Set to this position **only if** the system uses a TrueAlert Power Supply.
-

Continued on next page

Step 3. Configuring Cards, *Continued*

Note: Some devices that connect to RUI have inherently grounded shield terminals, in which case 24 C cannot be used. If 24 C is used, a Negative Ground Fault will occur.

P10/P11: P10 is associated with Port 1 and P11 is associated with Port 2. P10 and P11 are used to set the CPU motherboard up to be attached to either a network card or a RS-232/2120 card.

- Position 1 – 2: Network card (NIC) plugged into CPU motherboard (default).
 - Position 2 – 3: RS-232/2120 card plugged into CPU motherboard.
-

CPU Daughter Card Configuration

The CPU daughter card must be jumpered as follows:

{xe "card configuration: CPU (4100U)"}{xe "CPU motherboard: configuring"}

P1 is used for engineering diagnostics (COMLAB). Normally has no link fitted.

- Position 1 – 2 : Download or no connection.
- Position 2 – 3 : Diagnostic mode.

P3 configures the RAM battery as ON or OFF.

- Position 1 – 2 : ON – move to this position for normal operation.
 - Position 2 – 3 : OFF – factory setting.
-

SPS Configuration

The SPS must be configured as follows:

{xe "card configuration: SPS"}{xe "system power supply (SPS): configuring"}

SW1: Using DIP switch SW1, set the SPS card address to 1. Use the address table in Appendix A for the switch settings.

P2: P2 configures the IDNet shield connection.

- Position 1 – 2 (bottom) : Connects the shield to 0 V (default). Use this setting for 4100ES-S1.
- Position 2 – 3 (top) : Connects the shield to earth ground.

P3 configures relay 3 on the 4100-6033 Alarm Relay Card.

- Position 1 – 2 (top) : Removes fault monitoring on Relay 3 (default). Use this setting for 4100ES-S1.
- Position 2 – 3 (bottom) : Makes Relay 3 activate when there is a fault.

P1: Earth connect jumper.

- Position 1 – 2 (rhs): Enables Earth fault monitoring. Set to this position **unless** the system uses a TrueAlert Power Supply under common 0 V. Use this setting for 4100ES-S1.
 - Position 2 – 3 (lhs): Disables Earth fault monitoring. Set to this position **only if** the system uses a TrueAlert Power Supply under common 0 V.
-

PDI Configuration

P4/P5: The PDI can be configured to draw its power from different sources via P4 and P5. For 4100ES-S1 both links should be in position 1-2.

Configuring Other Cards

Refer to the appropriate installation instructions to configure other cards that are located in the CPU and expansion bays. The common 4100ES cards and modules are included in this manual. Refer to Appendix D for a list of publications.

Step 4. Interconnecting Modules and Bays

{xe "4100U: card configuration"}

Overview

Each card has to be interconnected with every other card in its bay. At the same time, bays in the 4100ES-S1 also have to be connected together. Read this section to ensure that cards and bays are interconnected correctly. Refer also to drawings 1976-136 and 1976-137.

The basic 4100ES-S1 will have all necessary interconnection wiring already fitted, but additional wiring may be necessary if expansion modules are fitted.

Guidelines

Review the following guidelines before interconnecting modules and bays.

- The SPS provides 24 V power to the CPU motherboard.
 - The CPU motherboard provides 8 V (3 A capacity) for use by legacy 4100 slave cards. 24 V Card power is routed through the motherboard for slave card use.
 - 4100 internal comms and power are harnessed to other bays. Do not connect the 8 V at P7 to an 8 V converter on a Goldwing or remote interface card.
 - 24 V Card power from the SPS is rated at 2 A maximum.
 - The 4-wire comms and power harness carries only the 24 V Card supply to a PDI, and not the 24V Signal supply.
 - Some of the wire harnesses supplied with add-on cards may not be required. These spare harnesses should be stored in case of future requirements.
-

Card Interconnections in the CPU Bay

Connect P8 on the SPS to P1 on the CPU motherboard using the 8 wire harness with eight-position Molex minifit connector (provided).

Card Interconnections Within Expansion Bay

{xe "mounting: cards onto the PDI"}The power distribution interface (PDI) mounted to the back of the expansion cabinet carries 24V Card power and data to each 4"x 5" card.

Refer to "Step 5: Installing Modules into Expansion Bays for instructions on mounting 4"x 5" cards to the PDI. Also bear in mind that legacy 4100 motherboards require non-PDI interconnections to each other and to the CPU Motherboard.

Basic Bay-To-Bay Interconnections

The 4 wire harness 734-008 is used to carry 24V Card power and coms from the CPU bay to the expansion bay. Connector P1 on the PDI receives power from P6 on the SPS or P7 or P8 on the CPU Motherboard. P2 on the PDI is used to connect power and comms to a 64/64 Controller. In a larger system, P3 on the PDI is used to carry power and comms to the next PDI, but is not used in 4100ES-S1.

Continued on next page

Step 4. Interconnecting Modules and Bays, *Continued*

Connecting to Motherboards

Panels with legacy motherboards in the expansion bay require some non-PDI connections. If you need to connect a harness to a motherboard, refer to Figure 2-6 and follow these steps. Make sure to route the power and communication wiring on the left side of the bay.

1. Connect one end of the 733-525 Harness to a motherboard in the CPU bay.
 - If the CPU bay has no additional motherboards (the usual case), connect the harness to the P8 and P7 connectors of the CPU motherboard.
 - Insert the harness connector with the blue wire into the P8 connector. Note that the P8 connector has eight pins. Insert the harness connector on either the top four pins or the bottom four pins, not in the middle.
 - Insert the harness connector with the white wire into the P7 connector. Note that the P7 connector has eight pins. Insert the harness connector on either the top four pins or the bottom four pins, not in the middle.
2. Connect the other end of the harness to the leftmost motherboard in the next bay, as described below.
 - Insert the harness connector with the blue wire into the P2 connector. Note that the P2 connector has eight pins. Insert the harness connector on either the top four pins or the bottom four pins, not in the middle.
 - Insert the harness connector with the white wire into the P3 connector. Note that the P3 connector has eight pins. Insert the harness connector on either the top four pins or the bottom four pins, not in the middle.

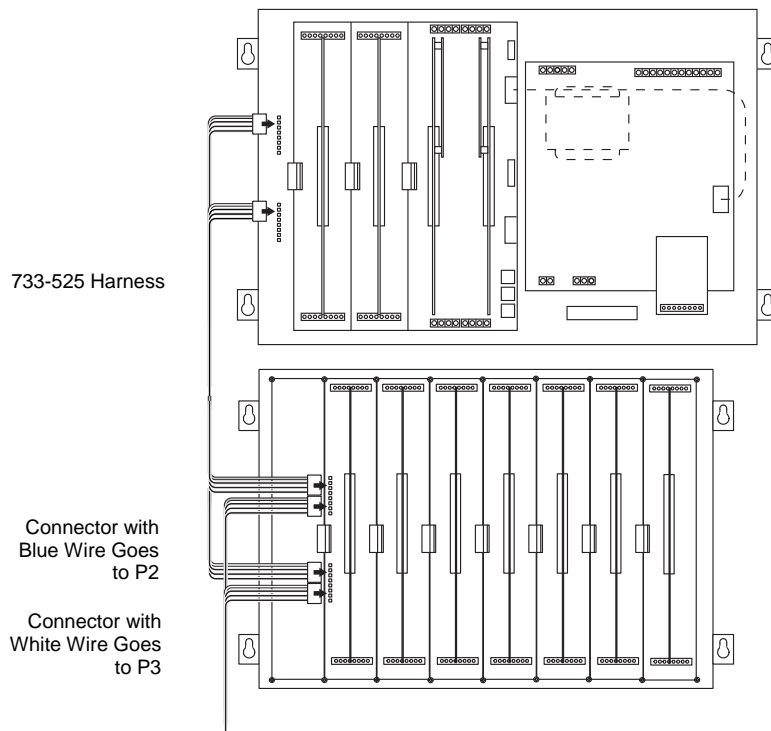


Figure 2-6. Power and Communication Wiring for Motherboards (note that there are limitations of where motherboards can be placed – see next section)

Step 5. Installing Modules into Expansion Bays

Overview

This section contains guidelines and instructions on installing 4" x 5" cards and traditional motherboards into the 4100ES-S1 expansion bay.

IMPORTANT: This section applies to aftermarket modules for expansion bays only. If you do not need to install any aftermarket modules at all, you have completed the panel installation and can apply AC power.

Placement Guidelines

Refer to the following guidelines before mounting 4" x 5" cards and/or motherboards to the expansion bay.

- The expansion bay assembly includes a chassis, two end supports, one LED/switch frame, and a power distribution interface (PDI) board.
- An expansion bay holds up to four 4" x 5" modules if a T-GEN 50 is fitted, or up to six modules if not. See Figure 2-7.

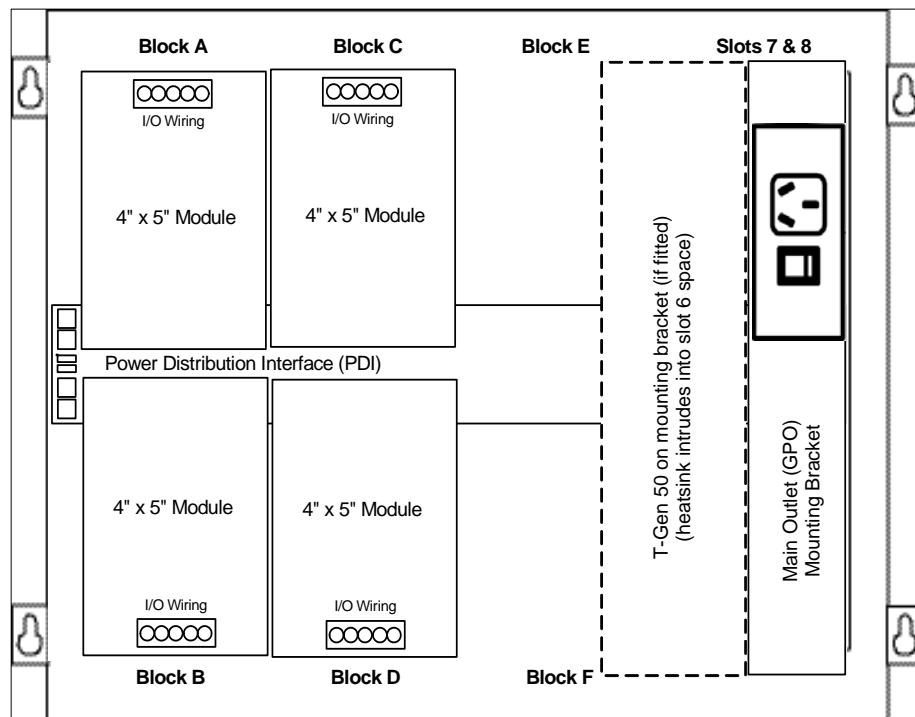


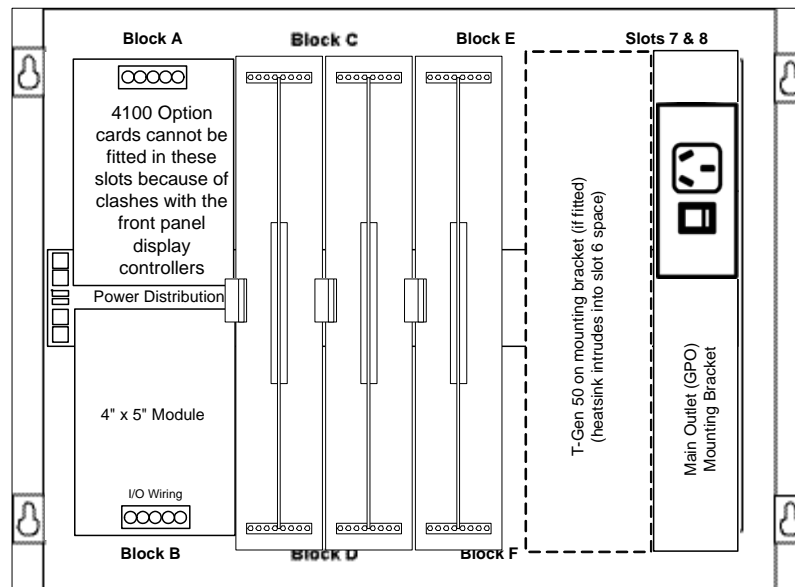
Figure 2-7. Expansion Bay 4" x 5" Card Placement

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Step 5. Installing Modules into Expansion Bays, *Continued*

Placement Guidelines (continued)

- Motherboards can be installed on top of the PDI in expansion bays. The data and power that would normally be bussed via the PDI are routed across the motherboards via their left and right connectors (J1 and P1).
- Up to four 2" (51 mm) x 11 1/2" (292 mm) motherboards can be installed in an expansion bay **if the pins on the left connector (usually P1) on the leftmost motherboard are removed.** See Figure 2-8.
- Motherboards should be added from left to right, starting in slot 3.
- Relay motherboards must be the rightmost motherboards.
- The CPU motherboard generates the 8V supply required for 4100A motherboards. It also has the 4100A style Molex connectors to which a harness can be fitted as in Figure 2-6.



Up to four 2" x 11 1/2" motherboards can be mounted in the expansion bay. Three motherboards fit into Slots 3 through 5; the fourth can be added in Slot 6 if a T-GEN 50 is not fitted.

Figure 2-8. Expansion Bay Motherboard Placement

Continued on next page

Step 5. Installing Modules into Expansion Bays, *Continued*

{xe "mounting: modules to 4100U back boxes"}

Installing 4" X 5" Cards

The power distribution interface (PDI) is mounted to the back of the expansion bay. See Figure 2-9. The PDI contains slots for up to eight 4"x 5" slave cards. Since the PDI carries power and data across the entire bay, it solves most interconnection issues, especially between 4"x 5" cards.

Use the following instructions and the figure below to mount 4"x 5" slave cards to the expansion cabinet.

1. Screw two standoffs and washers to the appropriate holes in the back of the cabinet. These holes must line up with the screw holes in the 4"x 5" card. See Figure 2-9.
2. Plug the 4"x 5" card into the appropriate blind mating connector. Seat the card firmly onto the PDI when installing to ensure complete insertion of the power connector into the PDI.
3. Secure the other end of the card to the standoffs with two 6/32" x 1/4" torx screws and washers.

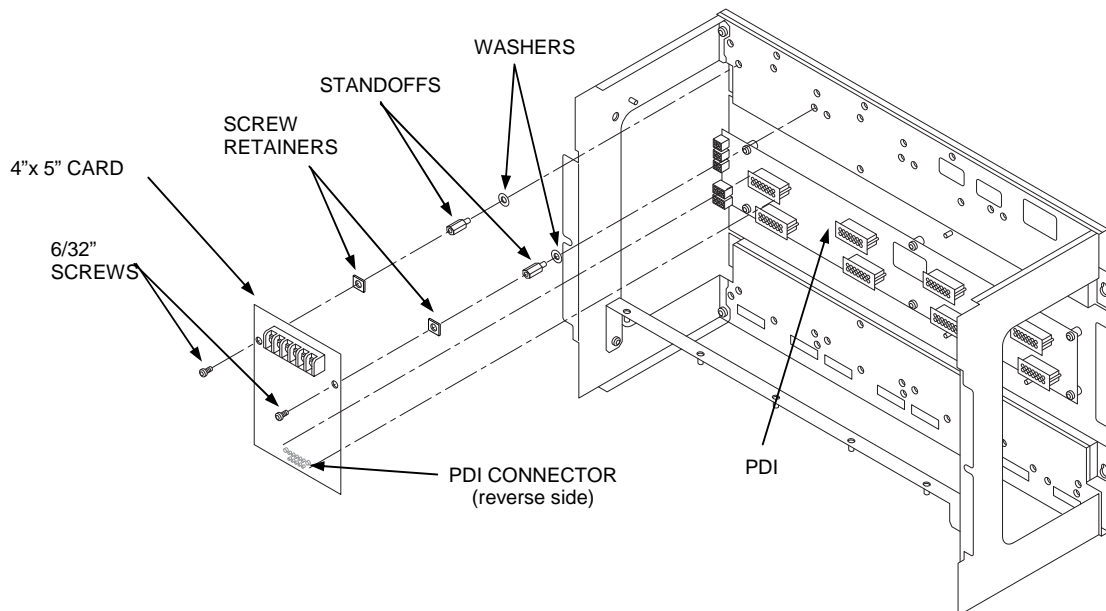


Figure 2-9. Slave Card/PDI Connection

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Step 5. Installing Modules into Expansion Bays, *Continued*

{xe "mounting: motherboards to 4100U back boxes"}

Installing Motherboards

Use the following procedure when installing motherboards in an expansion bay. Start with the third slot from the left and fill to the right. The mounting items are available as kit 4100-KT0468.

1. Orient the motherboard with the connector labeled J1 on the right and the header labeled P1 on the left.
2. Attach four metal threaded standoffs and lockwashers into the screw holes on the chassis.
3. Attach two grey plastic standoffs to the motherboard socket mounting screws.
4. Secure the motherboard to the standoffs using four #6 torx screws as shown below.

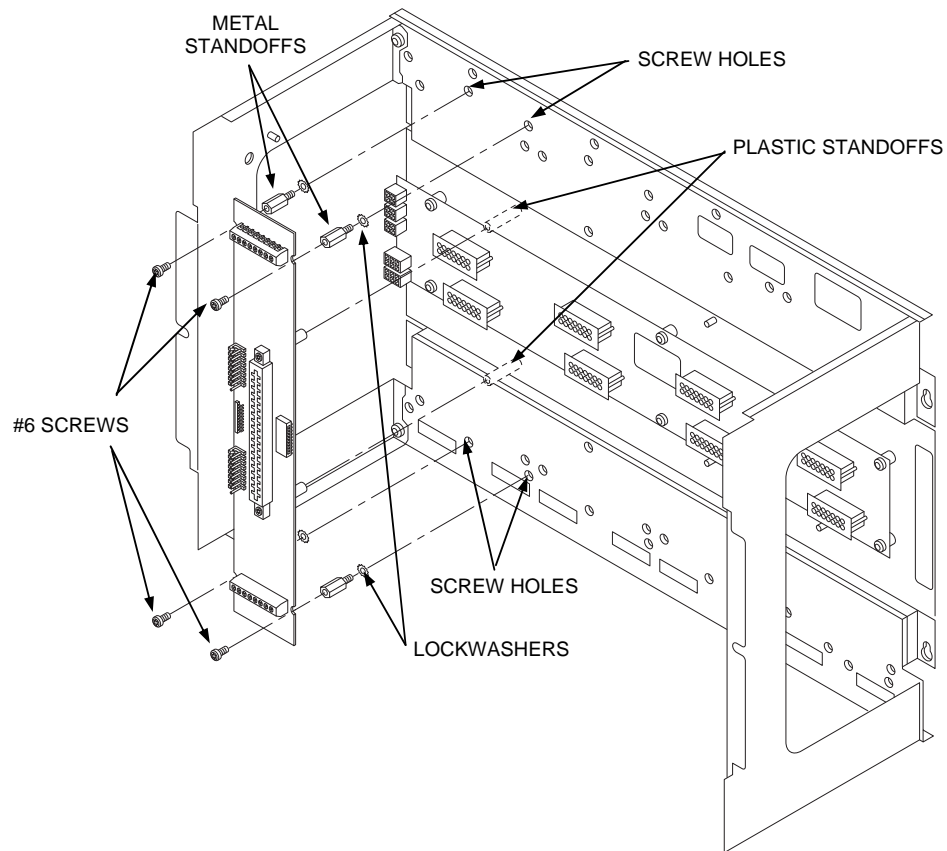


Figure 2-10. Installing the Motherboard in a 4100ES-S1 Expansion Bay

Figure 2-10 shows the motherboard being fitted to slot 2. In 4100ES-S1, slots 1 and 2 can't be used for motherboards.

Step 6. Installing LED/Switch Modules into Expansion Bays

Overview

The LED/switch user interface consists of a variety of modules, mounted to the front of an expansion bay, which are configured via the 4100ES Programmer. Each display module contains between 8 and 24 switches and LEDs, each one separately configurable.

User interface functionality is driven by the 64/64 LED/Switch Controller Card, which mounts behind two of the display modules (in positions 1 and 2). The types of modules typically used in 4100ES-S1 are as follows:

- 4100-1288 LED/Switch Controller Card with mounting plate.
- 4100-1289 LED/Switch Controller Card (no mounting plate; it mounts on the expansion space of 4100-1288).
- 4100-1282 Display Card. With one red and one yellow LED per switch, this is used for Alarm Zone Facility displays.
- 4100-1294 Slide-In Label Kit - one per 4100ES-S1 cabinet
- ME0456 Fan Control Module

Each 4100-1288 or 4100-1289 LED/switch controller supports up to 64 LED indicators and 64 switch controls. Using the 4100-1282 Display Card for zone displays, this corresponds to 32 zones per controller.

Other display cards are available for special display functions. Special configuration is required to use other display cards. Contact your Simplex dealer for guidance.

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Step 6. Installing LED/Switch Modules into Expansion Bays, *Continued*

The LED/Switch User Interface

Figure 2-11 shows an LED/switch bay from the user's perspective.

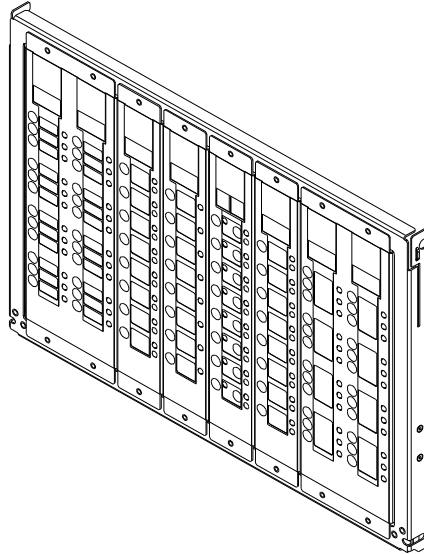


Figure 2-11. LED/Switch Modules

LED/Switch Controller Card

The LED/switch controller card is a 4100 slave that mounts behind two LED/switch modules. Each LED/switch controller handles up to 64 switches and 64 LEDs on the modules and communicates their status to the 4100ES CPU. This is sufficient for 32 zones.

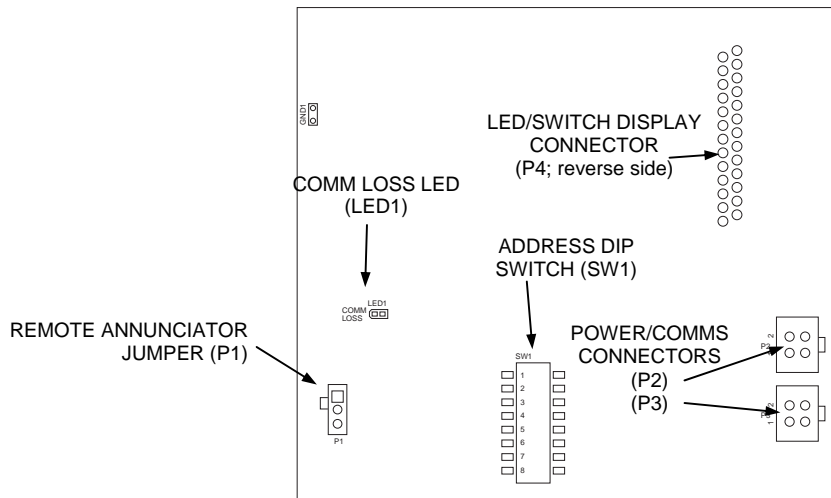


Figure 2-12. LED/Switch Controller

The standard configuration of 4100ES-S1 uses 4100-1282 cards for zone displays, with programming so that pressing any switch toggles the Isolate state of the corresponding zone.

Continued on next page

Step 6. Installing LED/Switch Modules into Expansion Bays, *Continued*

LED/Switch Controller Card, *(continued)*

If more than 32 zones are required, a second controller (4100-1289) will be required.

Note that an ME0456 fan control module counts as 8 zones when adding up the controller requirements.

LED 1. This LED illuminates if communication loss between the controller and the CPU occurs. It is independent of jumper P1 (which configures different communication loss features).

Configuring the LED/Switch Controller Card

The 64/64 LED/switch controller requires physical configuration, but the LED/Switch modules do not. Switch controller configuration consists of setting jumper P1 and setting the card address. See Figure 2-12. In the 4100ES-S1, the first display controller is address 3 and the second has address 4. Card addressing is covered in Appendix A.

Mounting LED/Switch Modules to the Expansion Bay

Refer to Figure 2-13 to mount the display cards to the front of the expansion bay.

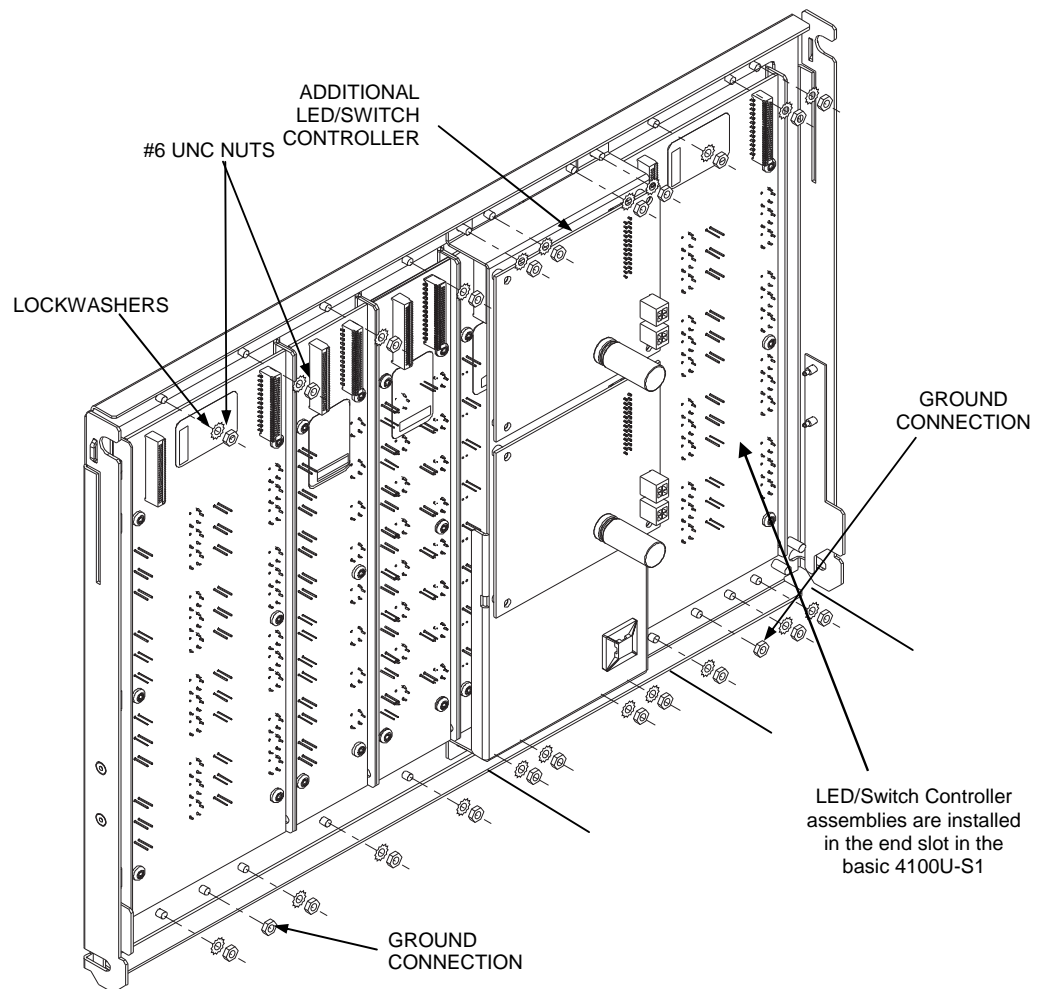


Figure 2-13. LED/Switch Card Mounting

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Step 6. Installing LED/Switch Modules into Expansion Bays, *Continued*

Mounting the Additional LED/ Switch Controller Card

Refer to Figure 2-14 and the instructions below to mount the LED/switch controller card assembly to the back of one of the LED/switch cards.

1. Use four 322-123 nuts and four 268-009 bay washers to secure the 637-141 bracket to the inside front of the expansion bay. Note that there is only one location where the bracket can be mounted, as shown in Figure 2-13.
2. Attach the header connector on the back side of the controller (P4) to the P1 (In) connector on the back side of the first LED/switch modules.
3. Secure the controller card to the board using four 6/32" x 1/4" Torx screws, as shown in Figure 2-14.

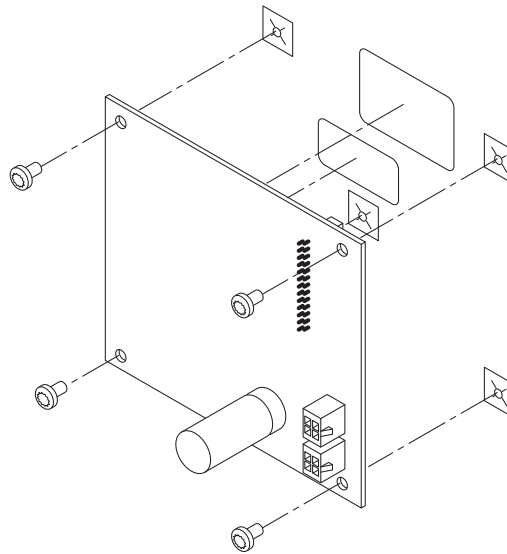


Figure 2-14. Controller Card Mounting

The second Controller Card (4100-1289) is mounted in the spare space on the same bracket.

Continued on next page

Step 6. Installing LED/Switch Modules into Expansion Bays, *Continued*

LED/Switch Modules

All types of modules are mounted to the front of a bay, and are connected to each other via a ribbon cable. Each module operates by the same rules: when a button is pressed, the controller card sends the CPU the information, and the action programmed for that button occurs.

Wiring Instructions

To interconnect display cards and connect the controller card to a power source:

1. Use harness 734-008 to connect P2 on the controller card to one of the 4-pin connectors on the PDI. See Figure 2-15.
2. If there are two controller cards, use harness 734-036 to connect P3 on the first controller card to P2 on the second controller card. The order does not matter.

Connect P4 of the controller to P1 of the left-most display module, with the ribbon cable provided (the first two display modules are fitted in the factory). Connect P2 of this display module to P1 of the next module, up to a maximum of four modules. Repeat for the second controller, if fitted.

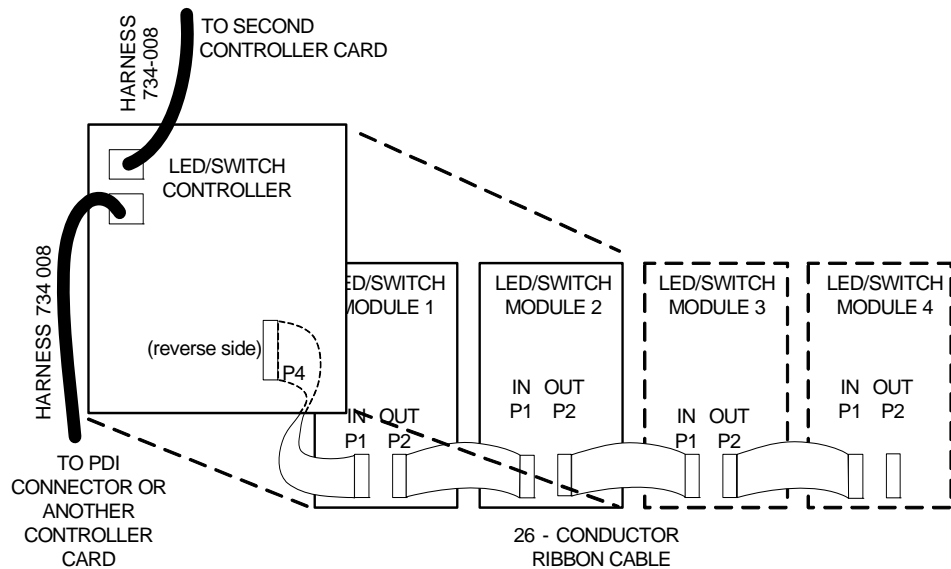


Figure 2-15. LED/Switch Controller Wiring
(approximately as viewed on the rear of the open bay door)

4100ES Fan Control Module

{xe "service port: software modes"}{xe "software modes"}

Overview

The ME0456 is a 4100ES style Switch/LED display module designed specifically for fan control. It complies with the requirements of AS 1668.1:1998. It has rotary switches and LEDs for 4 sets of fans. In order to accommodate the required rotary switches, the front plate is joggled forward so that it protrudes through the trim.

{xe "service port: software modes"}{xe "software modes"}

Labelling

The Fan Control switch positions of ON, AUTO and OFF, are permanently marked on the faceplate label, as required by AS 1668. The name area accommodates 3 rows of 6 letters at 5mm.

The labelling of the LEDs, ON, FLT, and OFF is marked on the removable fan name label card, LB0605, supplied with the module.

The card may be reversed and different LED labelling used, e.g. for damper controls.

A template version of this label is available as LB0605. This template allows entry of the fan name on a PC for local printing. LED names may also be revised.

Mounting & Connection

The Fan Control module mounts to the frame of the 4100ES-S1 Expansion bay door from the front, in a similar fashion to display modules. Mounting nuts and washers are provided.

Connection from “Out” of the adjacent Switch/LED module (or 64/64 Controller if it is the first module on that Controller) to “In” on the module is by the flat flexible cable provided (166-226).

{xe "service port: software modes"}{xe "software modes"}

Programming

The module is programmed as a standard 8 Switch/16 LED module. Up to four modules can be driven by one 64/64 Switch/LED Controller.

Each fan control with one rotary switch uses two of the 8 “switches”, and 3 of the 16 LEDs of an 8 Switch/16 LED module as per Table 2-2. The other 4 LEDs are not fitted so must not be programmed, since it serves no purpose.

Table 2-2. Switch/LED Format

Fan Control	Switches	LEDs		
		ON	FLT	OFF
1	SW1, SW2	LD1	LD2	LD3
2	SW3, SW4	LD5	LD6	LD7
3	SW5, SW6	LD9	LD10	LD11
4	SW7, SW8	LD13	LD14	LD15

The switch functions for Fan Control 1 are shown in Table 2-3. The state of having both switches closed is not physically achievable.

Table 2-3. Switch Status

SW1	SW2	Fan Control Status
Closed (up)	Open (centre)	On
Open (centre)	Closed (up)	Off
Open (centre)	Open (centre)	Auto

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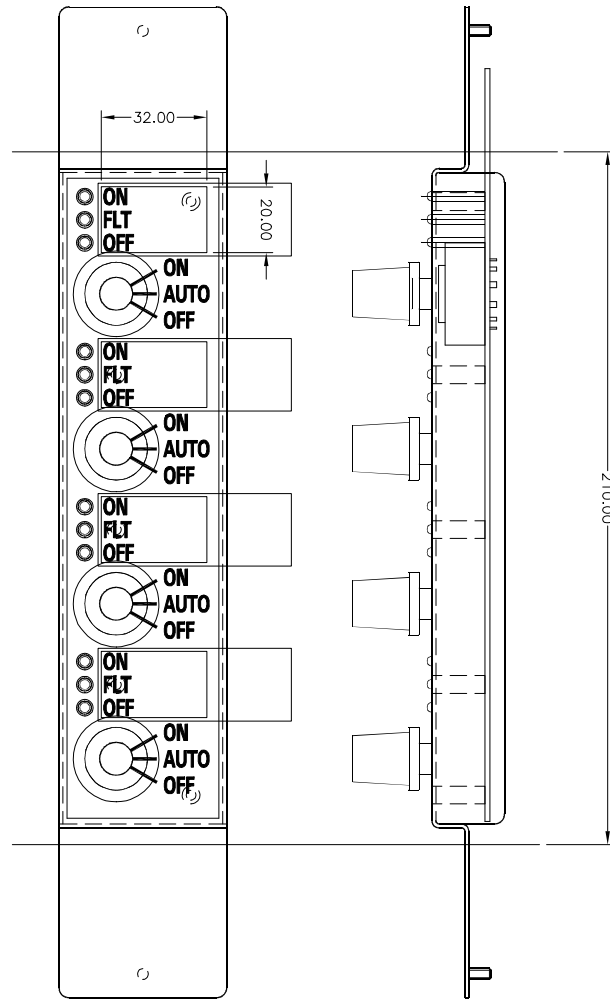


Figure 2-16. ME0456 Fan Control Module

Installing Other Modules

Detailed installation instructions for these modules can be found in these instruction documents. A copy of the appropriate document is supplied in the kit with each module.

Table 2-4. Module Installation Documents for 4100ES-S1

Part Code	Description	Installation Instruction
4100-3101AU	IDNET module provides an additional IDNET loop, with up to 250 devices. This is a PDI card.	574-800
4100-3107AU	IDNET+ module provides 1, 2, 3 or 4 additional IDNET loops with independent fault isolation. The total number of devices on these loops can be up to 246. This is a PDI card.	579-786
4100-3003	8 point relay module with 8 input points as well. Relay outputs are each a single changeover contact rated at 3A at 30V. This is a legacy card.	579-220
4100-3204	4 point relay module with 4 input points as well. Relay outputs are each a pair of changeover contacts rated at 2A at 30V. This is a PDI card.	
4100-3206	8 point relay module. Relay outputs are each a pair of changeover contacts rated at 3A at 30V. There are no feedback inputs. This is a PDI card.	
4100-5004	8 zone module providing 8 conventional detector circuit interfaces. This is a legacy card.	579-205
4100-0113	Dual RS-232 serial interface, providing two independent serial ports for connection printers, modems, or other 3 rd party equipment. This is a legacy card.	572-221
4100-0154	VESDA High Level Interface. This is a dual serial interface customized to connect to a VESDA and communicate compatible status and control messages. This is a legacy card.	574-050
4100-0302	24 point Graphic I/O module provides 24 configurable inputs or outputs for direct connection, e.g., zone displays. This is a legacy card.	LT0298
4100-3024	24 point Graphic I/O module provides 24 configurable inputs or outputs with relay isolation, e.g., fan controls, BMS interfaces. This is a legacy card.	

Chapter 3

Networking

{xe "Network 4100 Fire Alarm System"}

Introduction

A basic 4100ES-S1 system becomes a network node when a Network Interface Card (NIC) or other compatible network card is installed and connected to another network node. How network cards connect to each other depends on the type of media cards being used.

In this Chapter

Refer to the page number listed in this table for information on a specific topic.

Topic	See Page #
Network Configuration	3-2
Introduction to the 4100 Network Interface Card (NIC)	3-4
Step 1. Configuring Network Cards	3-7
Step 2. Mounting Media Cards to the NIC	3-9
Step 3. Mounting Network Cards in the 4100ES-S1	3-9
Step 4. Wiring Network Cards	3-10

Network Configuration

Overview

Multiple 4100ES-S1 panels can be connected together into a network system by using network interface cards (NICs). When a NIC is installed into a 4100ES-S1, it is used to connect to other network nodes. Nodes may consist of other 4100ES-S1 or 4100ES panels, or they may be other types of node such as Graphic Command Centre (TSW), or Visual Command Centers (VCCs). A node is a self-sufficient CPU that controls appliances and devices, and which also has the capability of controlling and communicating with other nodes.

4100 Fire Alarm System: network (overview) Network 4100 Fire Alarm System: about

Network 4100 Fire Alarm System: hub configuration Network 4100 Fire Alarm System: ring configuration Network 4100 Fire Alarm System: star configuration hub configuration ring configuration star configuration The network configuration supports two common architectures or wiring configurations: **ring** or **star**. A networked system can also use a combination of the two.

Ring and Star Configurations

The ring configuration consists of a number of nodes connected in a closed loop. The star configuration consists of several nodes connected directly to one common node. Physical bridge cards are used for the star configuration. Physical bridges reduce the amount of wire that would otherwise be needed to connect all nodes in a loop, and therefore cut down on system response time. However, the ring configuration is more secure against cabling faults. A combination of the two styles is illustrated in Figure 3-1.

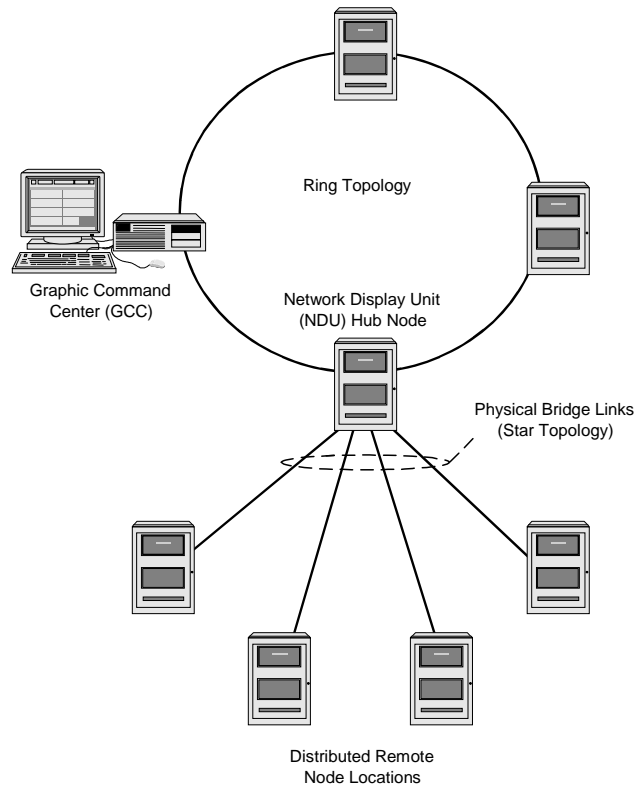


Figure 3-1. Ring/Star Configuration Example

Continued on next page

Network Configuration, *Continued*

Connecting Loops

Network rings or loops can be joined via physical bridge cards. There may be no more than two network loops connected in tandem. For every two loops that are interconnected (using one physical bridge), there can be a maximum of three other physical bridges used in a star configuration. See Figure 3-2.{{xe "Network 4100 Fire Alarm System: physical bridge (overview)"}}{{xe "physical bridge: connecting loops with"}}{{xe "Network 4100 Fire Alarm System: loops"}}

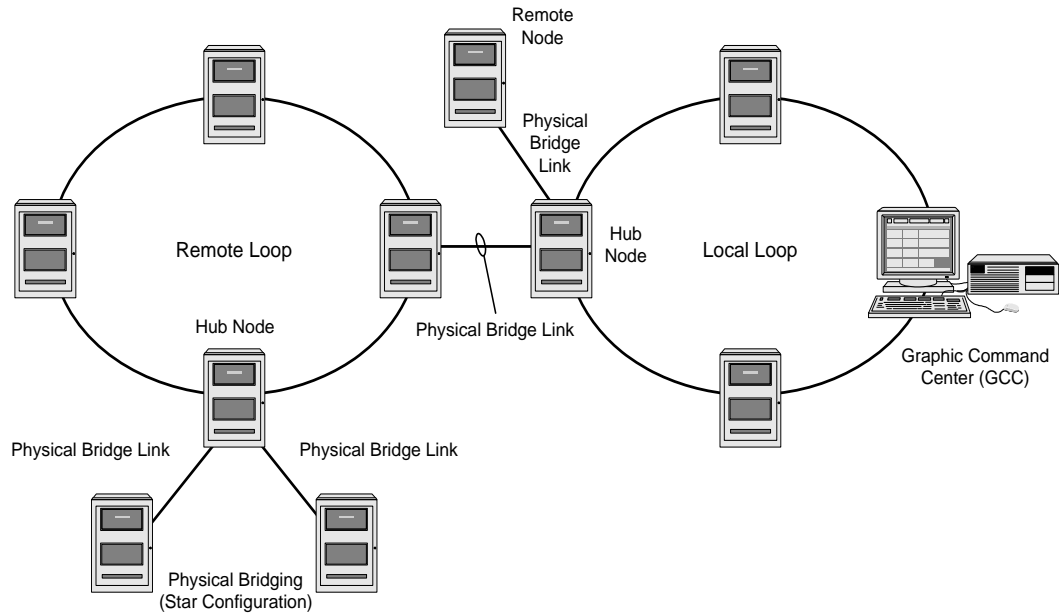


Figure 3-2. Interconnected Loop Configuration

System Design

To be used as a network node, a 4100ES-S1 panel must contain the following:

- CPU{{xe "Network 4100 Fire Alarm System: system design"}}
- System Power Supply
- 4100-6014 Network Interface Card plus two Media Cards

Getting Started

Overview

This chapter describes how to turn a basic 4100ES-S1 into a network node. This process consists of the following:

Step 1. Mounting media cards to the network interface card (NIC)

Step 2. Mounting the network cards in the panel

Step 3. Wiring between panels

Each step is described in this chapter. Before beginning the installation, review the next few pages for a detailed description of network cards and the media cards that mount onto them.

Introduction to the 4100 Network Interface Card (NIC)

Overview

The Network Interface Card (NIC) is a slave card that uses the standard 4100 serial bus to communicate with the CPU. The NIC connects 4100ES-S1 and other panels in a network, providing communication between each panel via fibre or shielded twisted pair cable.

The NIC is designed to be connected in a loop or ring arrangement, so that a single cable fault does not cause the entire system to fail. The ring arrangement provides the most secure and fault-tolerant wiring possible.

Two types of media boards can be used with the NIC card.

- The Fibre optic Media Card uses multimode optical fibres to connect network nodes. This can be used for electrically noisy environments or for connecting externally to other buildings.
- The Wired Media Card is used in all other types of applications. This uses ordinary screened paired cable to connect network nodes.

Up to two media boards can be plugged onto each NIC. The same NIC can use a combination of two types of media boards (for example, a NIC may have a wired media card connected to port 1 and a fibre optic media card connected to port 2).

Continued on next page

Introduction to the 4100 Network Interface Card (NIC), *Continued*

Network Module Illustrations

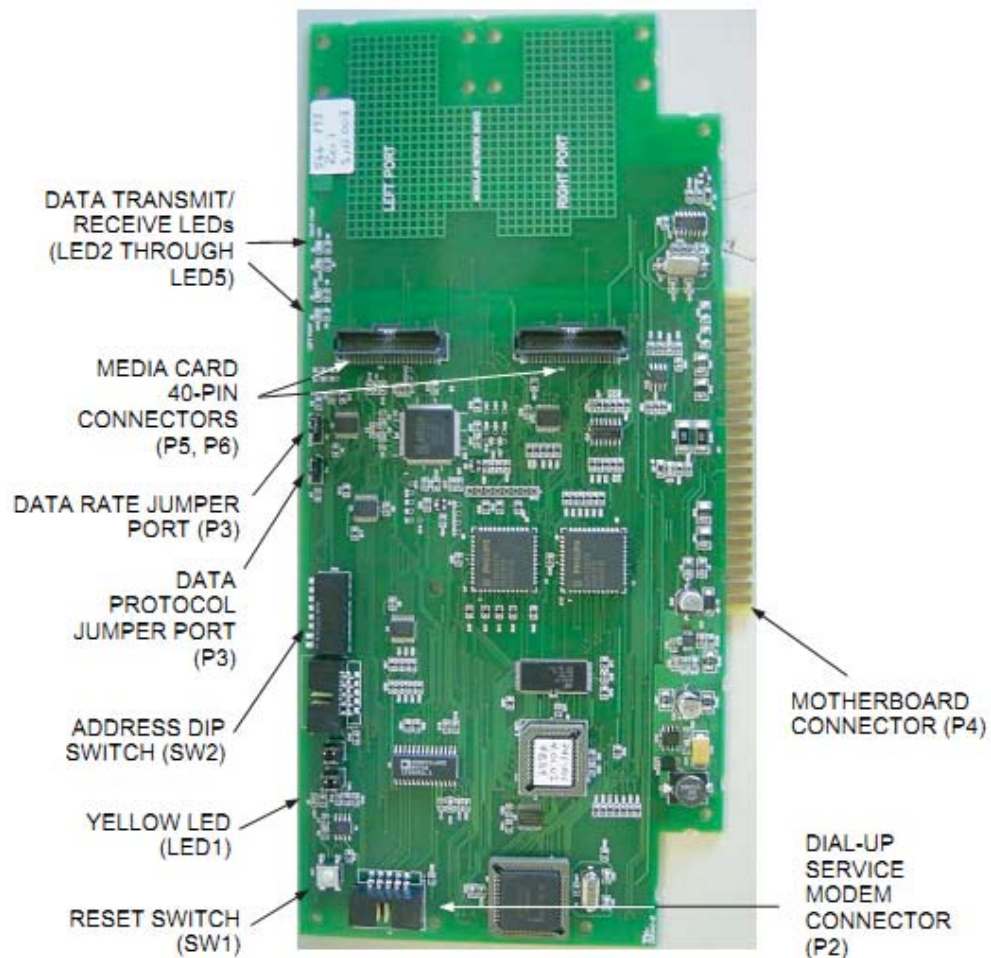


Figure 3-3. 4100-6014 Network Interface Card

{xe "network interface card (NIC): LEDs"}

NIC Card LED Indications

The 4100-6014 NIC has the following LEDs:

LED1 (yellow). Illuminates when

- The host CPU requests it to illuminate
- A transmission fails
- It is off-line with the host CPU
- It needs to be configured

LED2 (red). Illuminates when a data '0' is received at the right port.

LED3 (green). Illuminates when a data '0' is transmitted at the right port.

LED4 (red). Illuminates when a data '0' is received at the left port.

LED5 (green). Illuminates when a data '0' is transmitted at the left port.

Continued on next page

Introduction to the 4100 Network Interface Card (NIC), *Continued*

NIC Media Cards

There are two media cards that can be plugged into the 4100-6014 NIC:

- 4100-6057 Fiber-Optic Media Card (565-261)
- 4100-6056 Wired Media Card (565-413)

{xe "media cards"}{xe "fiber-optic media card"}{xe "wired media card"}
Each module is shown below.

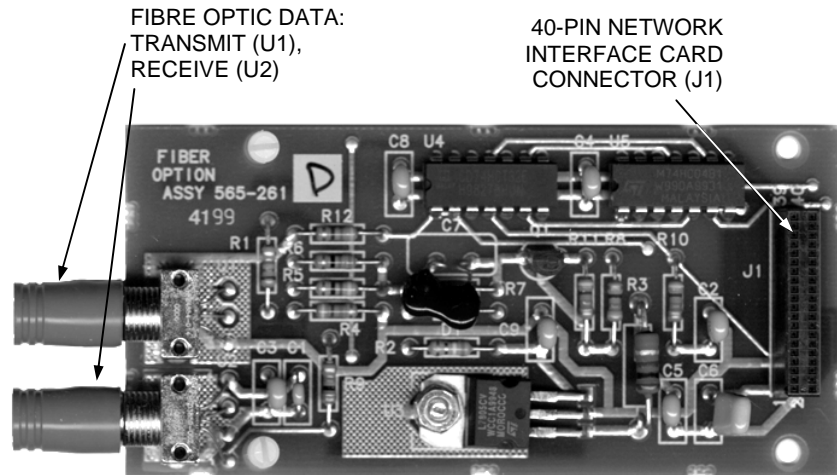


Figure 3-4. The 4100-6057 Fiber-Optic Media Card

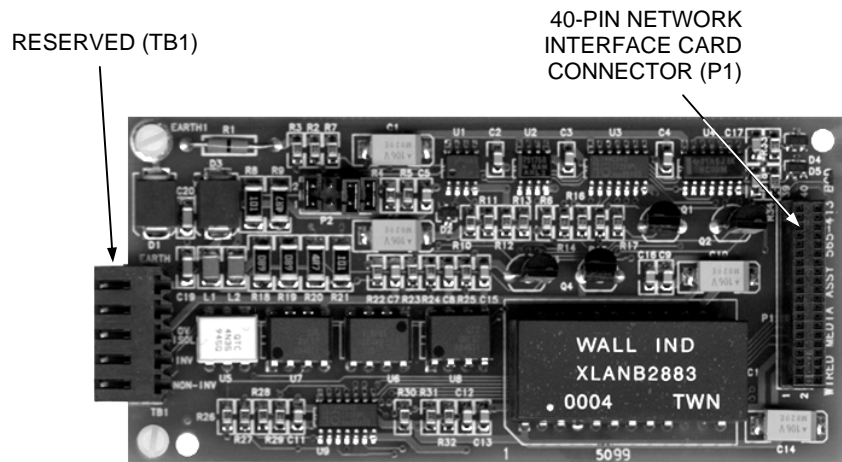


Figure 3-5. The 4100-6056 Wired Media Card

{xe "wired media card: about"}

Continued on next page

Introduction to the 4100 Network Interface Card (NIC), *Continued*

{xe "wired media card: specifications"}{xe "fiber-optic media card: specifications"}{xe "network interface card: specifications"}{xe "modem media card: specifications"}

Requirements and Limitations

Table 3-1. 4100 NIC & Media Cards - Electrical and Environmental Specifications

Electrical Specifications	
Network Interface Card	Startup, no media cards: 8 VDC @ 110 mA Nominal, no media cards: 20 to 32 VDC @ 0 mA
Fiber Media Card	Using 24 V power supply: 20 VDC @ 140 mA max. Using 5 V power supply (GCC/NPU): 5 VDC @ 130 mA max.
Wired Media Card	4.75 to 5.25 VDC @ 170 mA max.
Environmental Specifications (All Modules)	
Operating Temperature	32° to 120° F (0° to 50° C)
Humidity	10% to 93% relative humidity at 32°C

Step 1. Configuring Network Cards

{xe "network interface card (NIC): configuring"}{xe "modem media card: configuring"}{xe "card configuration: network interface card (NIC)"}{xe "card configuration: modem media card"}{xe "wired media card: configuring"}{xe "card configuration: wired media card"}

Overview

The NIC card, along with each media card, all have jumpers that must be set as shown below.

CPU Motherboard Jumper Settings

NIC-compatible jumper settings on CPU motherboards depend on which motherboard is used.

Motherboard 566-227 (normally used in 4100ES-S1):

P10: Port 1 settings.

P11: Port 2 settings.

- P10/P11 position 1 – 2: Network card (NIC) attached to CPU motherboard (default).
- P10/P11 position 2 – 3: RS-232/2120 card attached to CPU motherboard.

Motherboard 565-274:

- JW1 and JW2 must be installed.
- Jumper plugs P5-P8 must not be installed.

NIC Card Address Setting

Use **SW2** to set the NIC card address. Refer to Appendix A for the address table.

{xe "wired media card: about"}

Continued on next page

Step 1. Configuring Network Cards, *Continued*

NIC Card Jumper Settings

There are two jumper settings on the NIC card: P3 and P4.

P3: Determines the NIC data transmission rate, 57.6 kbits/second or 9600 bits/second.

- Position 1 – 2 (the right two pins) *or* no pins jumpered: 57.6 kbits/second (default for 4100ES-S1).
- Position 2 – 3 (the left two pins): 9600 bits/second.

P4: Determines the data protocol, 8-bit or 9-bit, that the NIC card is using.

- Position 1 – 2 (the right two pins) *or* no pins jumpered: 9-bit (default for 4100ES-S1).
- Position 2 – 3 (the left two pins): 8-bit.

All settings are labelled on the card.

Wired Media Card Jumper Settings

P2: Tells the system which wire type is to be used.

- Positions 1 – 2, 5 – 6, and 7 – 8: 0.8mm shielded, twisted pair wiring.
- Remove all jumpers to specify 0.2mm unshielded twisted pair telephone cable wiring.

IMPORTANT: When using the wired media card, the Earth fault detection is performed on the left port only. Remove R1 (1 Ohm resistor) from the wired media card on the right port.

Step 2. Mounting Media Cards to the NIC

{xe "network interface card (NIC): mounting media cards to"}{xe "modem media card: mounting to NIC"}{xe "mounting: fiber-optic media card to NIC"}{xe "mounting: modem media card to NIC"}{xe "mounting: wired media card to NIC"}{xe "fiber-optic media card: mounting to NIC"}{xe "wired media card: mounting to NIC"}

Overview

The 4100-6014 Network Interface Card (NIC) uses media cards to connect to other NICs. This section describes how the media cards are mounted onto NICs.

Media Card Mounting

NICs connect to each other via the two types of media cards. The types of media cards in the right and left ports are determined by the type of wiring that is being used between cards.

Connect P1 on the wired media card, *or* J1 on the fibre media cards, to P5 (the left port) on the NIC.

To connect a second media card to the same NIC, connect it as described above, but use P6 (the right port) on the NIC. Note that any two types of media cards can be connected to the same NIC.

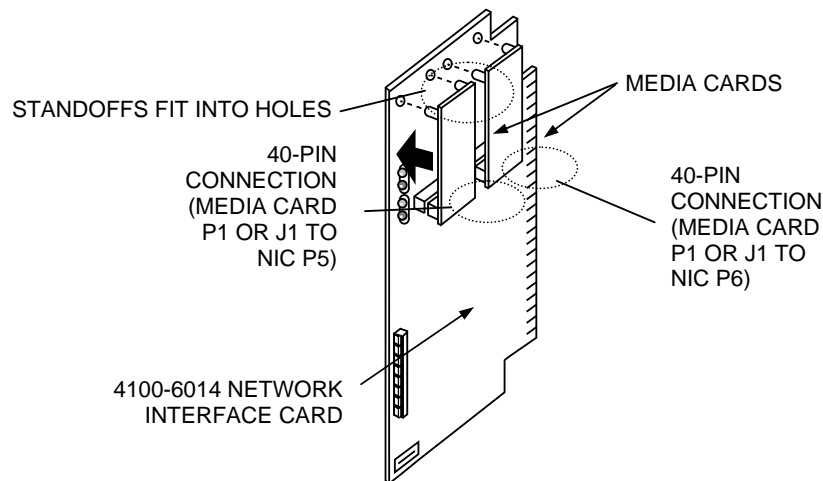


Figure 3-6. Media Card Mounting

Step 3. Mounting Network Cards in the 4100ES-S1

The 4100 NIC daughter card inserts into motherboards as follows:

- If the 566-227 CPU Motherboard (default for 4100ES-S1) or 565-275 CPU Motherboard is used, the NIC daughter card is inserted into connector J2.
 - If the 565-274 CPU Motherboard is being used, the NIC daughter card is inserted into connector J1.
-

Step 4. Wiring Network Cards

Overview

The nodes in the network now have to be wired together, so that the NIC in one host panel connects to the NIC in the next panel.

Wiring Guidelines

Refer to the following guidelines field wiring

General

- Network nodes must be wired from right port to left port, regardless of the media type selected.
- Best protection is achieved by wiring the nodes in a loop fashion. A single fault (except an Earth fault) will cause the network to reconfigure for degraded operation. A second fault (except an Earth fault) will result in the network dividing into two separate networks.
- It is permissible to use mixed media in a network. For example, some spans may be wired media while others are optical fibre.
- Each NIC has a jumper for selecting between network data rates of 57.6 kbps and 9.6 kbps. All cards in the network must be set for the same rate. When physical bridging is used, the data rate must be set to 9.6kbps.
- Each NIC has a jumper for selecting between 8- and 9-bit network protocols. All cards in the network must be set for the same network protocol. When physical bridging is used, the protocol must be set to 9-bit.

Wired Media

- Earth fault detection is performed on the left port only. When a network Earth fault occurs, the trouble is reported on the node whose left port is connected to the earthed section.
- All 0.8mm² wiring used Wired Media Cards must be shielded twisted-pair. All 0.2mm² (telephone cable) used must be twisted pair. When shielded cable is used, the shield must be terminated to chassis Earth on the left port only.
- All network wiring except the shield is supervised and power limited.
- When wiring leaves the building, 2081-9044 Overvoltage Protectors should be connected at the entry point. One overvoltage protector is installed where wiring leaves the building; another is installed where wiring enters the next building.

Fibre optic

- All fibre cables must be multimode, graded index type. ST style connectors must be used. No physical strain should be put on the cables. There must be no cable bends of less than a 50mm radius.
- Two methods are available for joining fibre cable. Splices provide a permanent, very low loss, fibre-to-fibre connection. Couplers provide temporary connection between two ST style connectors with a loss of 1.2dB. Both methods are permitted on a fibre network.
- Maximum line lengths for 50/125 and 62.5/125 cable are shown in Table 3-2.

Step 4. Wiring Network Cards, *Continued*

Wiring Distances

Maximum wiring distances are shown in Table 3-2.

Table 3-2. Wiring Distances

Media Type	Size	Data Rate	Max Distance
Wired	0.2 mm ² unshielded twisted pair	57.6 kbps	2,100m
		9.6 kbps	3,600m
	0.8 mm ² shielded twisted pair	57.6 kbps	3,000m
		9.6 kbps	5,200m
Optical Fibre	50/125 um (4dB/km loss)	57.6 or 9.6 kbps	3,000m
	50/125 um (3dB/km loss)		4,500m
	62.5/125 um (4dB/km loss)	57.6 or 9.6 kbps	4,000m
	62.5/125 um (3.75dB/km loss)		4,600m

Notes:

- 0.8 mm² fire-rated shielded twisted pair cable must not have more than 190nF/km capacitance or 21Ω/km resistance.
- 0.2 mm² unshielded twisted-pair telephone cable must not have more than 72nF/km capacitance or 84Ω/km resistance.
- Between any two connected network nodes, L+ of one node connects to R+ of the other, and L- connects to R-.

Continued on next page

Step 4. Wiring Network Cards, *Continued*

Fibre-Optic Wiring

Connectors U1 (transmitter) and U2 (receiver) on the 4100-6057 Fiber-Optic Media Card are used to connect 4100-6014 NICs across parts of a network.

{xe "network interface card (NIC): wiring, fiber-optic"}{xe "wiring: fiber-optic media card"}{xe "fiber-optic media card: wiring"}

Note: ST connectors with long strain relief boots must be used with the fibre optic cable.

Fibre Optic Connection Types

Dual Fibre Optic Cable Connections. The standard fibre optic connection between network nodes uses two fibre optic cables, one for transmit and the other for receive. This connection allows for optimum communications distance.

The available communications distance is determined by the properties of the specific fibre cable used. Distances can be determined using the information and examples shown below in Table 3-3.

Between any two connected network nodes, U1 (transmit) on the Fibre Media card of one node is connected to U2 (receive) of the Fibre Media card of the other node, i.e., the fibres “cross over” between nodes.

Single Fibre Optic Cable Connections. For applications where a single fibre cable is available, or where use of a single cable is desired, using a model 4190-9010 Bi-Directional Coupler at each node combines the separate transmit and receive signals into a single path (refer to the requirements list).

This connection allows use of a single fibre cable, but it does reduce communications distance as indicated in the information and examples shown below in Table 3-4.

At each node, U1 (transmit) of the Fibre Media card must be connected to the transmit port of the coupler, and U2 (receive) to the receive port of the coupler.

Continued on next page

Step 4. Wiring Network Cards, *Continued*

4190-9010 Coupler Requirements

The 4190-9010 Coupler is used with the 4100-6057 Fibre Optic Media Board, revision "C" or higher. Two 4190-9010 Bi-Directional Couplers are required per connection, one at each node.

{xe "fiber-optic media card: wire distances"}{xe "fiber-optic media card: coupler requirements"}

The 4190-9010 is equipped with type ST connectors. To make type ST to type ST connections, an ST to ST coupler, by others, is required. ST to ST Couplers are available from:

Black Box, part # FO200
 Fiber Instrument Sales, part # F1-8101
 Newark Electronics, part # 95F2097
 (or equivalent)

Table 3-3. Dual Fibre Optic Cable Communications Distance Examples

Fibre Type ¹	MIFL ²	Power Margin	Distance ³	Budget ³
50/125 numerical aperture = 0.2	4 dB/km	4 dB	3 km	17 dB
	3 dB/km	3 dB	4.6 km	
62.5/125 numerical aperture = 0.275	4 dB/km	4 dB	4.0 km	21.4 dB
	3.75 dB/km	3 dB	4.6 km	

*See notes at bottom of page.

Table 3-4. Single Fibre Optic Cable Communications Distance Examples Using 4190-9010 Bi-Directional Couplers

Fibre Type ¹	MIFL ²	Power Margin	Distance ³	Budget ³	4190-9010 Coupler Loss	ST to ST Coupler Loss
50/125 numerical aperture = 0.2	3 dB/km	2 dB	2.33 km	21.4 dB	9.4 dB	3 dB
62.5/125 numerical aperture = 0.275	3.2 dB/km		2.5 km			2 dB

Notes for Tables Above:

- Cable specifications are for 50 or 62.5 um core with 125 um cladding, multi-mode graded index fibre. Wavelength = 850 nm.
- MIFL = Maximum Individual Fibre Loss. Numbers shown are for example reference only, refer to specific cable for exact specification.
- Maximum cable length is determined by distance listed or by reaching budget value, whichever is shorter. Maximum distances listed for dual fibre cable are shorter than would be calculated. Budget using 4190-9010 Bi-Directional Coupler is the same with either size cable because the coupler input cables are 62.5/125 um fibre allowing launch power to be the same.

Continued on next page

Step 4. Wiring Network Cards, *Continued*

4190-9010 Coupler Requirements (*continued*)

The illustration below shows coupler wiring.{{xe "fiber-optic media card: coupler requirements"}}{{xe "wiring: coupler for fiber-optic media"}}

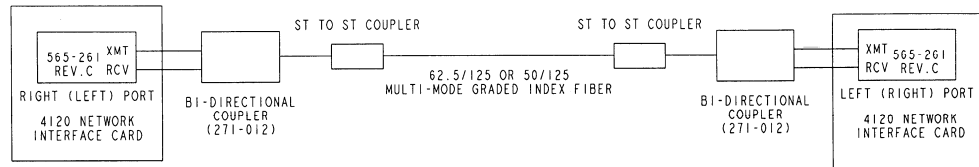


Figure 3-7. Coupler Wiring

Wiring with the Wired Media Card

Refer to the guidelines and figures in this topic to use wired media cards.

{{xe "network interface card (NIC): wiring, with wired media"}}{{xe "wiring: wired media card"}}{{xe "wired media card: wiring"}}

IMPORTANT: TB1 on the wired media card must not be used when it is connected to the 4100-6014 NIC.

- When the 4100-6056 (565-413) Interface Card is used with the 4100-6014 Network Card, TB1 on the Interface Card **cannot** be used. Network wiring must be connected to the motherboard as shown.
- The shield should only be connected at one end of the line. The shield is connected to the left port.
- Each cable requires two ferrite beads, one at each end. Refer to Figure 5-1 for bead wiring. Beads can be ordered as 4100-5129 (set of three).
- When wiring leaves the building, 2081-9044 Overvoltage Protectors are required. One overvoltage protector is installed where wiring leaves the building; another is installed where wiring enters the next building.

Table 3-5. 566-227 CPU Motherboard Wired Media Connections

CPU Motherboard Port for Media Card Connected to P5	Wired Media Card Connection (Left Port)
TB1-4	0 V
TB1-5	Earth ground
TB1-6	INV (-)
TB1-7	None
TB1-8	NONINV (+)
CPU Motherboard Port for Media Card Connected to P6	Wired Media Card Connection (Right Port)
TB3-1	NONINV (+)
TB3-2	Reserved
TB3-3	INV (-)
TB3-4	Earth ground
TB3-5	0 V

Continued on next page

Step 4. Wiring Network Cards, *Continued*

Wiring with the Wired Media Card (continued)

Figure 3-8 shows how to connect between two CPU motherboards with wired media network cards. The right port terminals (TB3) on one 4100ES-S1 are connected to the left port terminals (TB1) of the other 4100ES-S1. Table 3-5 details the screw terminals on the CPU motherboard.

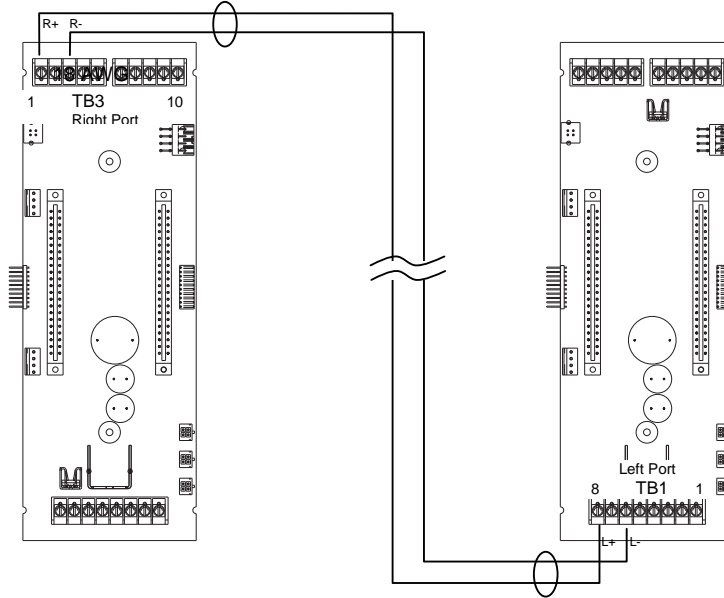


Figure 3-8. Wired Media Interconnection between CPU Motherboards in different panels

Continued on next page

Step 4. Wiring Network Cards, *Continued*

Loop Wiring, mixed Fibre and Cable

{xe "wiring: fiber-optic media card"}{xe "fiber-optic media card: wiring"}Figure 3-9 shows an example of loop network cabling using a mixture of fibre optical cable and twisted pair. Note that the left port of any network card is connected to the right port of the next network card regardless of whether the connection is fibre or copper.

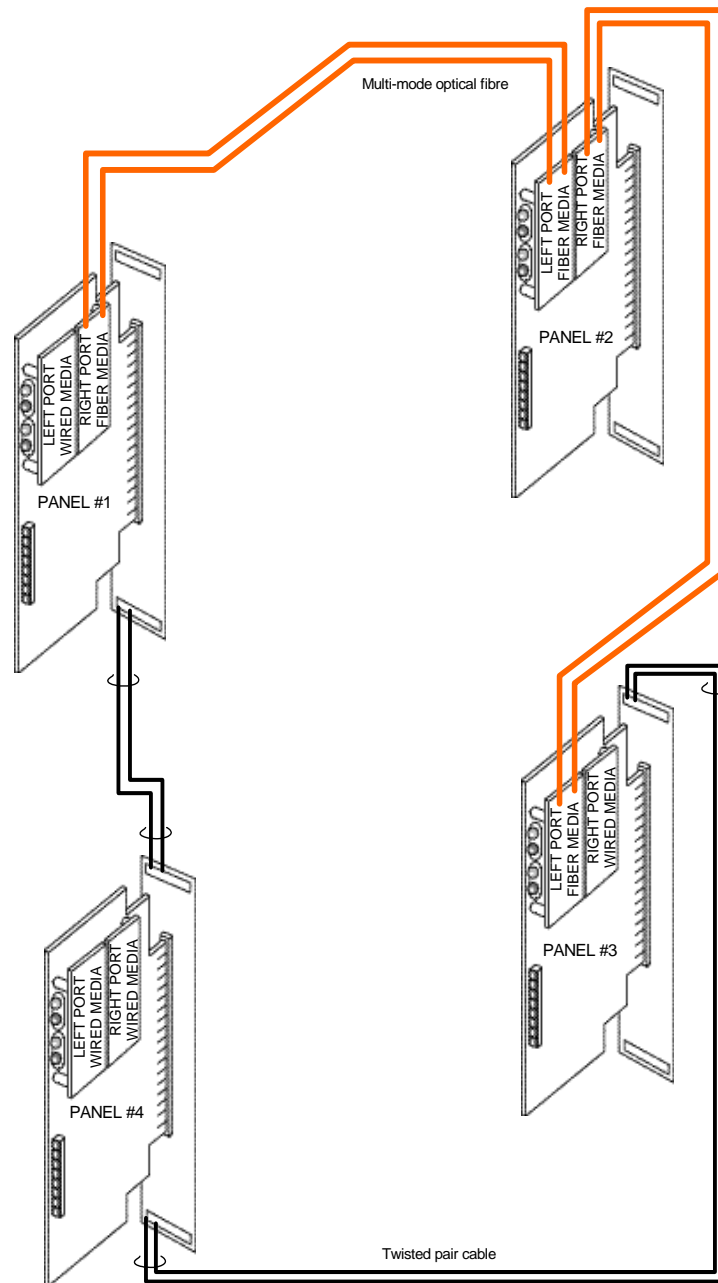


Figure 3-9. Example of Ring/Loop Network Wiring

Chapter 4

The System Power Supply & Alarm Relay Card

Introduction

The system power supply (SPS) is described in Chapter 2. A picture of it is shown in Figure 2-4.

This chapter has the current and voltage ratings of the SPS and describes how it is installed and configured by the factory. It also describes the Alarm Relay Card that mounts onto the SPS to provide three extra relays.

Field wiring of the SPS is covered in Section 5.

In this Chapter

Refer to the page number listed in this table for information on a specific topic.

Topic	See Page #
SPS Specifications	4-2
SPS Adjustments	4-4
SPS LED Indications	4-5
Troubleshooting an SPS	4-6
The Alarm Relay Card	4-7
Brigade Interfaces	4-9

SPS Specifications

Input/Output/Battery Specifications

Table 4-1 summarizes the specifications for the SPS. {xe "system power supply (SPS): specifications"}

Table 4-1. SPS Input and Output Specifications

AC Input Specifications	
SPS in Basic 4100ES-S1 (4100-9848AU)	240 VAC + 6% -10% @ 50 Hz 2 A Maximum
DC Output Specifications	
Voltage	Nominal 28VDC Minimum: 19.5 VDC Maximum: 32 VDC Ripple: 2 VDC p-p @ full load (9A)
Total Current (max)	9A alarm load. Includes: NACs; +24V Card; +24V Aux; SPS card including on-board IDNet. 5A non-alarm load. Includes the above allowances, and allows for battery charging at high rate.
24V Card 24V Aux	2A max. See note. 2A max
Each NAC (total A+B)	3A max alarm load 2A max non-alarm load (when used as AUX 24V power).
SPS IDNet Output	30 V or 35 V (see note below)
Battery Charger Specifications	
Input Voltage Range	21-33 VDC
Output Float Voltage	27.3 VDC ±200 mV @ 20°C, temperature compensated at approximately -36mV/°C (0° C to 50° C)
Supervision Voltages (nominal at 20°C)	Charger High 28.4Vdc Charger Low 26.2Vdc Battery Low 24.3Vdc Battery Depleted 19.4Vdc
Output Current Limit	1.4 A (For 6.2 – 18 Ah battery) 3.3 A (Default; for 18-110 Ah battery)

Notes:

- AC power must be provided to the 4100ES-S1 from a dedicated AC branch circuit. The AC input is supervised wiring.
- The AC branch is terminated in the cabinet in the general power output (GPO) mounted in the expansion bay. The SPS plugs into the GPO via a 3-pin plug and mains lead.
- A mains fail fault is generated when the DC voltage drops below 20.3V (nominally at mains voltage 204VAC).

Continued on next page

SPS Specifications, *Continued*

- The bulk supply (rated at 9A max) which feeds 24V Sig, 24V Card, 24V Aux also supplies the SPS Card including the on board IDNet, and the battery charger. The charger is disabled during alarms so as to make the 9A available on the other busses. (See Table 4-2 for the SPS current).
- +24V Sig is used to supply the NACs. It can be made accessible for other use by configuring a NAC as an auxiliary power output (normally energized).
- The battery circuit is checked every 29 seconds. The battery test is programmed via custom control for a 1 hour test once per week.
- The battery is connected to the charger but is normally disconnected from the bulk supply. During mains fail or the 1 hour battery test, the battery gets connected to the bulk supply.
- The IDNet output is 30V in the normal condition so as to prolong battery standby. When it is necessary to activate large numbers of output devices on IDNet peripherals (such as piezo sounders), the output voltage is increased to 35V to provide sufficient voltage at the end of line to activate piezo sounders. The higher voltage state is an alarm condition for the purpose of standby battery calculation.

SPS Current Consumption

Table 4-2 summarizes battery standby capabilities for the SPS. Voltage assumed is 24 V, which is the rated battery voltage for lead-acid type batteries. {xe "system power supply (SPS): specifications, current "}{xe "remote power supply (RPS): specifications, current "}

Table 4-2. SPS Current Specifications

Standby Conditions	Current
<ul style="list-style-type: none"> • No alarms (NACs normal) • IDNet LED ON, no IDNet devices connected 	175 mA
Add to above for each additional set of 50 IDNet devices in standby, with IDNet at 30 V	40 mA
Total current for fully loaded IDNet channel (250 devices) in standby	375 mA
Alarm Conditions	Current
<ul style="list-style-type: none"> • 3 NACs ON • IDNet LED ON, no IDNet devices connected 	185 mA
Add to above for each set of 50 IDNet devices in alarm, 20 LEDs ON	80 mA
Add to above for each set of 50 IDNet devices in alarm, LEDs OFF	50 mA
Total current for a fully loaded IDNet channel (250 devices) in alarm, 20 LEDs ON	475 mA

Notes:

- **Additional *standby* conditions:** Trouble relay activated, power trouble LED on, IDNet LED on, battery charger off, auxiliary power load = 0 mA
- **Additional *alarm* conditions:** Trouble relay activated, power trouble LED on, IDNet LED on, battery charger off, auxiliary power load = 0 mA, NAC alarm load = 0 mA, IDNet = 35 V

SPS Adjustments

{xe "system power supply (SPS): configuring "}{xe "remote power supply (RPS): configuring "}{xe "card configuration: system power supply (SPS)"}{xe "card configuration: remote power supply (RPS)"}

Adjusting Voltages

There are two 4mm (i.e. small) potentiometers on the 4100-9848AU SPS, situated below the centre of the PCB. These are adjusted in the factory and typically will not need adjusting in the field.

If it is necessary to adjust them, turning the potentiometer clockwise increases the corresponding voltage.

R341 Battery Charger Voltage

Adjust this potentiometer to achieve a charger voltage of $27.3V \pm 0.1V$ at $20^{\circ}C$. (Allow $-36mV/^{\circ}C$ for temperatures different to $20^{\circ}C$). Disconnect the battery while making this adjustment, and measure the charger output at the SPS terminals. Reconnect the battery after making the adjustment.

R342 Voltage Measurement Calibration

Adjust this potentiometer to match the measurement of charger voltage on the panel LCD with that on a calibrated voltmeter measuring the charger output. Use the "Card Status" option of the menu. Match the two readings to within 0.1V.

Setting Jumpers and DIP Switches

See Chapter 2 "Step 3. Configuring Cards" for details of setting jumpers and DIP switches.

SPS LED Indications

Status LEDs

The SPS has the following LEDs:

{xe "system power supply (SPS): LEDs"}{xe "remote power supply (RPS): LEDs"}

LED1 (yellow). Illuminates when NAC 1 is ON or in Fault.

LED2 (yellow). Illuminates when NAC 2 is ON or in Fault.

LED3 (yellow). Illuminates when NAC 3 is ON or in Fault.

LED4 (yellow). Illuminates to indicate a communications loss with the system CPU; normally off.

LED5 (yellow). Indicates IDNet status. Normally off.

- Slow blink: Class A open circuit Fault.
- Fast blink: Short circuit Fault.
- On steady: No devices detected/ channel failure.

LED6 (yellow). Indicates power supply status. Normally off.

- Single blink: Positive earth fault.
- Double blink: Negative earth fault.
- Triple blink: Battery Fault.
- Quadruple blink: Charger Fault.
- On steady: Overcurrent fault.

LED7 (green). Illuminates when the power supply is powered from the AC line. Off when the power supply is de-energized, or when it is using battery backup power.

Troubleshooting an SPS

{xe "system power supply (SPS): troubleshooting"}{xe "remote power supply (RPS): troubleshooting"}{xe "troubleshooting: SPS"}{xe "troubleshooting: RPS"}

Overview	This section contains explanations of fault messages associated with the SPS that may appear on the 4100ES-S1 display. Heading text in the left margin shows the error message, while the paragraph next to it describes the likely cause of the message.
“IDNet Power Monitor Trouble”	There is no output voltage from the power supply. Refer to Chapters 2 and 5 for information on power supplies.
“Extra Device”	One or more extra devices, i.e., devices that have not been configured on the IDNet channel, are on the system. Only one message appears, regardless of the number of extra devices found.
“Class A Trouble”	There is an open circuit on the IDNet channel. A hardware reset of the system is required to reset the fault.
“Earth Fault Search”	Comes up during the Earth Fault Search diagnostic function. Once the search is initiated, the front panel display indicates how far the search process has progressed (10%, 25% ... 75%), and then shows the results of the search. The result either identifies the offending circuit or indicates that the earth fault could not be found. SPS circuits (IDNet, NAC, and aux power) are searched. System alarm and trouble processing is suspended during the search.
“Short Circuit”	Appears when a short circuit is detected on the IDNet channel. This status clears automatically when the short circuit is removed.
“Channel Fail”	Appears when at least one device on the IDNet channel has been configured, but no devices are communicating on the channel. This message does not appear if there are no configured devices on the IDNet channel.
“No Answer/ Bad Answer”	Occurs when the 4100ES-S1 is put into a diagnostic mode and finds a device not responding, or responding unreliably.
“Output Abnormal”	Occurs when 24 V is not present on TrueAlarm devices or when TrueAlarm sensor bases with relay driver outputs are not properly supervised or when isolator devices are in isolation mode.
Noisy Buzz from the SPS	If the SPS frame is held together with #6 screws, these may have loosened over time. Tighten these screws as required, taking care to avoid damage to any part of the panel. If cards need to be removed for access to the screws, power the panel down first (mains and battery).

The Alarm Relay Card

{xe "system power supply (SPS): troubleshooting"}{xe "remote power supply (RPS): troubleshooting"}{xe "troubleshooting: SPS"}{xe "troubleshooting: RPS"}

Overview

The Alarm Relay Card mounts on, and is driven by, the SPS. It has 3 relays, each providing one set of voltage-free contacts. It is fitted to the basic 4100ES-S1 as standard.

The relays are able to be configured under custom control, but the default operation is for system status, i.e. Fault (Trouble), Isolate (Supervisory), and Alarm, respectively. These are commonly used to drive the Brigade signalling device (ASE or PPU/AIU). See the next section for more details about Brigade Devices.

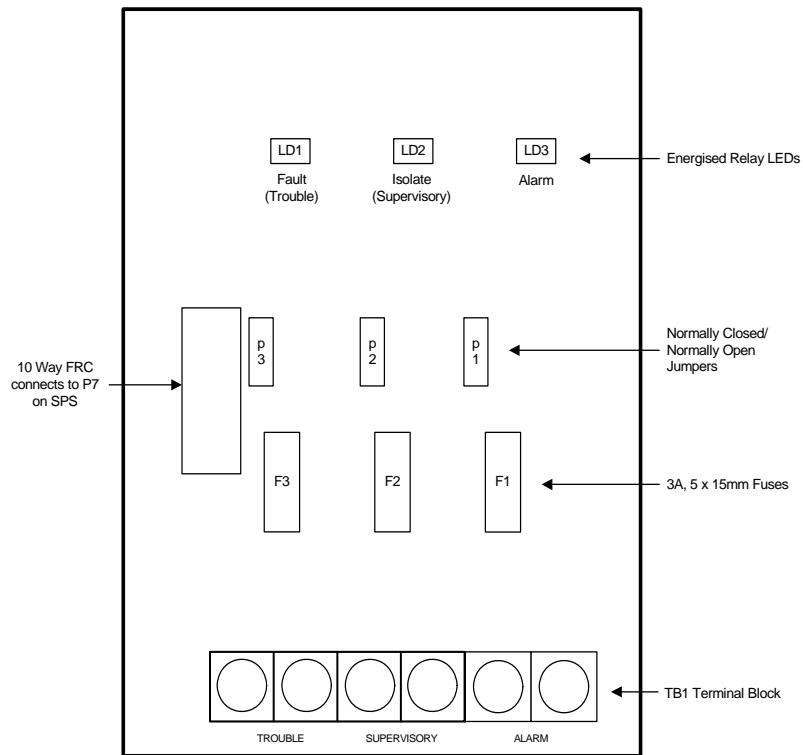


Figure 4-1. The Alarm Relay Card

Mounting (factory installed)

The Alarm Relay Card mounts on the SPS adjacent to the largest relay K3. With the power disconnected, fit the card using the three plastic stand-offs and one Torx screw with plastic sleeve.

Connect P4 on the relay card to P7 on the SPS with the 10 way FRC provided.

The Alarm Relay Card, *Continued*

Configuration

The relays have one set of voltage-free contacts (see note below) connected to one pair of terminals via a header. The two terminals are configured for normally closed or normally open by positioning a jumper on the relay card. Refer to Table 4-3.

Table 4-3. Alarm Relay Card Jumper Positions

Relay	Header	Normally Closed	Normally Open
Alarm	P1	1-2 (top)	2-3 (bottom)
Isolate (Supervisory)	P2	1-2 (top)	2-3 (bottom)
Fault (Trouble)	P3	1-2 (top)	2-3 (bottom)

Notes

- The common contact of each relay has a transient suppressor to earth, and must not be used to switch voltages greater than its rating of 40V.
- The common contact is protected with a 3A fuse (5 x 15mm type).
- For the default configuration, the relays are normally de-energised and energise on Fault/Isolate/Alarm.
- The corresponding LED illuminates when the relay is energized.
- The relays may be configured under custom control to operate other than the default actions.

Warning

If relay RL3 is configured for operation other than Fault (Trouble), jumper P3 on the SPS must be shifted to positions 1-2 (top).

Specification

CARD	
Input Voltage	20-32Vdc
Input Current	15mA @ 24V, quiescent
(nominal)	37mA @ 24V, all relays on
RELAYS	
Form	Voltage-free changeover, suppressors to earth
Voltage	30Vac, 32Vdc
Current	2A, resistive load
FUSE	
F1, F2, F3	5 x 15mm, Glass Cartridge, 3A

Brigade Interfaces

{xe "service port: software modes"}{xe "software modes"}

Overview

The Alarm Relay Card is typically used to provide a Brigade Interface. The def{xe "service port: software modes"}{xe "software modes"}ault configuration is for the three relays to operate on Fault (Trouble), Isolate (Supervisory) and Alarm, respectively.
{xe "service port: software modes"}{xe "software modes"}

Format

These relays are normally de-energised{xe "service port: software modes"}{xe "software modes"} and energise on the respective status. They have voltage-free contacts that are connected to two terminals and can be configured as normally open or normally closed by the positioning of links. Refer to the previous section for details.

If a normally energized relay is required to provide activation on complete loss of system power (Standby), the Aux Relay on the SPS can be programmed as normally on and its contacts connected in series/parallel with the contacts of the Fault (Trouble) relay as is applicable, i.e., series for normally closed, parallel for normally open. Where the Brigade interface is powered from the 4100ES-S1 and monitored by the central station, this is not typically required.

Note that if the Aux relay is programmed as normally energised, de-energising on Fault, it cannot be used to replace the Fault relay on the Alarm Relay Card as the latter is link connected to a hardware signal of "SPS CPU Fault", and signals "Fault" when the SPS loses communications with the CPU.

{xe "service port: software modes"}{xe "software modes"}

Applications

The 4100ES-S1 has specific mounting doors for several types of signalling device. The signalling devices must be obtained separately.

Kit Contents

FP0935 FP,4100ES-S1 1976-174,ASE DOOR KIT

- 1 x 4U hinged door, with ASE cover and barrel nuts already fitted
- 1 x 3 way connector and 1 x 2 way connector for connection to the ASE when it is fitted
- 1 x FP0740 FAS interface module with red, yellow, blue and white wires
- 1 x pair of red and black wires for connecting the ASE to the 4100ES-S1 DC supply
- 4 x M6 screws, washers and cage nuts for mounting the door
- 5 x Cable ties and adhesive cable tie holders for fastening the ASE wiring
- 1 x green earth lead + nut and washers to earth the door to the expansion bay
- 2 x M4 x 16 screws and crinkle washers to mount the ASE to the door

FP0937 FP,4100ES-S1 1976-174,PPU/AIU DOOR KIT

- 1 x 4U hinged door with spacer bracket, connector strip, label and wiring already fitted
 - 4 x M6 screws, washers and cage nuts for mounting the door
 - 5 x Cable ties and adhesive cable tie holders for fastening the PPU/AIU wiring
 - 1 x green earth lead + nut and washers to earth the door to the expansion bay
 - 4 x 3/8" PK screws for mounting the PPU on the spacer bracket
 - 4 x 25mm male/female barrel nuts for PPU mounting
-

Door Mounting

Both types of brigade doors mount in the 4 unit space at the bottom of the 4100ES-S1 cabinet, using 4 x M6 screws, washers and cage nuts. Cage nuts should already be fitted to the 4100ES-S1 and screws supplied with it, but there are spare screws, washers and cage nuts supplied with each kit in case the others have been lost.

Brigade Interfaces, *Continued*

General Wiring

The ASE or AIU/PPU should be powered from the fused DC distribution board on the power supply. It is recommended that the brigade device does not share its fuse protection with any other equipment, for reliability.

The wiring between the brigade device and the 4100ES-S1 should be routed neatly as shown in the following drawings, and secured in place with the cable ties and adhesive tie holders supplied with the kits.

Fit the protective earth lead between the quick-connect tap on the brigade interface door and an unused stud in the lower right end of the expansion bay, using the nut and washers supplied with this kit.

AIU/PPU Mounting

The AIU or PPU must be obtained separately. The FP0937 brigade interface door is supplied assembled ready to take an AIU, which is fastened directly to the spacer bracket by four screws supplied with the AIU.

To mount a PPU, the spacer bracket must be removed and reassembled using the extra supplied 25mm male/female barrel nuts according to drawing 1901-267 sheet 2 (21U cabinet option). The PPU is fastened directly to the spacer bracket using four PK screws supplied with this kit.

AIU/PPU Wiring

The pre-fitted wiring must be connected to the Alarm Relay Card terminals as shown in 1901-267 sheet 2. Set the three links on the Alarm Relay card to the NO positions for an AIU and the NC positions for a PPU. Note: the red wire has some extra length, for use in linking the terminals together as shown. Both AIU and PPU require extra wire links on the Alarm Relay terminals, and the PPU requires extra wire links on the connector strip on the door.

ASE Mounting

The ASE must be obtained separately. If it is supplied complete with a body, this must be removed before fitting the ASE to the door. The ASE is fastened to the brigade interface door with the two M4 screws and crinkle washers in the kit. The antenna socket should be fitted to the tab on the door below the ASE position. See drawing 1976-174 sheet 1 and the ASE installation instructions for details.

ASE Wiring

The FP0740 ASE FAS module must be connected to the Alarm Relay Card terminals and the 2 way ASE connector as shown in 1976-174 sheet 1. Set the three links on the Alarm Relay card to the NC positions.

Chapter 5

SPS Field Wiring (4100ES-S1)

Introduction

This chapter shows how various devices are wired to an SPS. It includes connection to NACs, IDNet, relays, and power circuits.

In this Chapter

Refer to the page number listed in this table for information on a specific topic.

Topic	See Page #
General Field Wiring Guidelines	5-2
SPS NAC Field Wiring Guidelines	5-3
Power Supply Wiring Distances	5-6
Using T-GEN 50 with 4100ES-S1	5-8
SPS Auxiliary Power Wiring	5-16
SPS Relay Wiring	5-18
SPS IDNet Wiring	5-19

General Field Wiring Guidelines

General Guidelines

- All field wires must be 0.75 mm² or greater cross section and comply with AS 1670.1 and the wiring code.
- Conductors must test free of all earth leakage.
- All wiring must be done using copper conductors only, unless noted otherwise.
- If shielded wire is used,
 - the metallic continuity of the shield must be maintained throughout the entire cable length.
 - the entire length of the cable must have a resistance greater than 1 Megohm to earth ground.
- Underground wiring must be free of all water.
- Wires that run in plenum should be in conduit.
- A system ground must be provided for earth detection and lightning protection devices. This connection must comply with approved earth detection.
- Only system wiring should be run together in the same conduit.
- Use supplied ferrite beads with all SPS field wiring including the Aux 24V. Loop wires twice through the supplied ferrite bead(s) as shown in Figure 5-1. (Extra can be ordered as 4100-5129 – 3 beads).

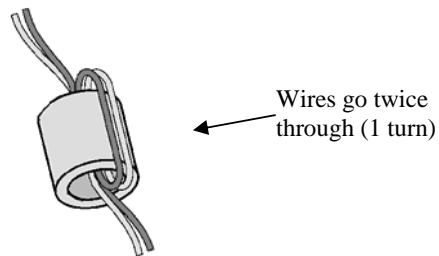


Figure 5-1. The Ferrite Bead

Continued on next page

SPS NAC Field Wiring Guidelines

{xe "wiring: distances, Class A (NAC)"}{xe "NACs: wiring distances (Class A)"}{xe "Class A wiring: distances (NAC)"}

Overview

Each of the three NACs on the SPS has two pairs of driven outputs (A+/A-, B+/B-) which operate together.

NAC B outputs have polarity reversal supervision and expect a 10k EOLR. Each connected device must have a suitably rated blocking diode. EOLRs are supplied fitted to the NAC terminals.

NAC A outputs have an integral 10k to accommodate Class A (loop) wiring. Class A wiring is not mandatory under AS 1670.1.

Class B (string) wiring can only have one branch.

The 3A max rating applies to each NAC, B + A outputs combined under alarm conditions. NAC load current may be displayed on the LCD.

The Australian SPS has extra decoupling capacitors fitted to the NAC outputs, and cannot be used to drive the Simplex range of addressable appliances (Strobes).

NACs may be programmed to be normally on to allow the terminals to be used as power supply outputs. See the SPS Auxiliary Power Wiring section following.

{xe "guidelines for wiring: NACs"}{xe "NACs: guidelines for wiring"}{xe "wiring: guidelines (NACs)"}{xe "NACs: guidelines for wiring"}

Guidelines

Review the following guidelines for NACs before you begin NAC field wiring.

- All wiring must be 0.75 mm² to 4 mm².
- All wiring is supervised and power-limited.
- The maximum alarm current is 3 A per circuit. The supervisory current is 2 mA at 24 VDC.
- The nominal supply voltage rating is 24 VDC, 2 V p-p ripple (maximum).
- The total available current from the SPS is 9A. Any current used for card power by modules plugged into the PDI, as well as any auxiliary 24 VDC current, must be deducted from the total 9A available current.
- Terminal designations “+” and “-” are for the Alarm state (ON), not the supervision state.

{xe "guidelines for wiring: NACs"}{xe "NACs: guidelines for wiring"}{xe "wiring: guidelines (NACs)"}{xe "NACs: guidelines for wiring"}

Allocations

The configuration templates supplied for use with the 4100ES-S1 all have these default assignments of the NAC outputs, with corresponding Custom Control equations.

- NAC 1 : Ancillary Control Facility (ACF), to control ancillary devices during an Alarm. This output can be isolated using the ACF Isolate control on the keyboard.
- NAC 2 : Fire Bell, to operate a bell as required by AS 4428.1. This output can be isolated using the Bells Isolate control on the keyboard.
- NAC 3 : Warning System to operate devices such as T-GEN 50. This output can be isolated using the Warning System Isolate control on the keyboard.

Continued on next page

SPS NAC Field Wiring Guidelines, *Continued*

Some or all of these output functions could be implemented using addressable devices or other relay modules instead, in which case the corresponding NAC output could be reassigned to other uses. The new configuration would require full testing of these functions to ensure compliance with AS 4428.1.

Class A (loop) NAC Wiring

To connect the SPS to reverse-polarity, non-addressable notification appliances using Class A wiring, read the following instructions and refer to the figure below. `{xe "wiring: Class A (NAC)"}``{xe "Class A wiring: NACs"}``{xe "NACs: wiring (Class A)"}`

1. Route wire from the “B+”, “B-”, outputs on TB2 of the SPS to the appropriate inputs on a peripheral notification appliance. Use NAC1, NAC2, or NAC3 as required.
2. Route wire from the first appliance to the next one. Repeat for each appliance.
3. Route wire from the last appliance to the A+ and A- inputs on the same NAC circuit of TB1 of the SPS.
4. Repeat steps 1 through 3 for each NAC output you want to use.
5. Leave the 10 K, $\frac{1}{2}$ W, brown/black/orange resistor (378-030) on each the “B+” to “B-” terminals of each unused NAC. No external end-of-line resistor is needed for circuits in use.
6. If the appliance/device to be used does not have an integral diode, a sufficiently rated blocking diode must be fitted between the incoming +ve wire and the +ve terminals of the device with cathode (stripe) to the device.

Important: Conductors must test free of all grounds.

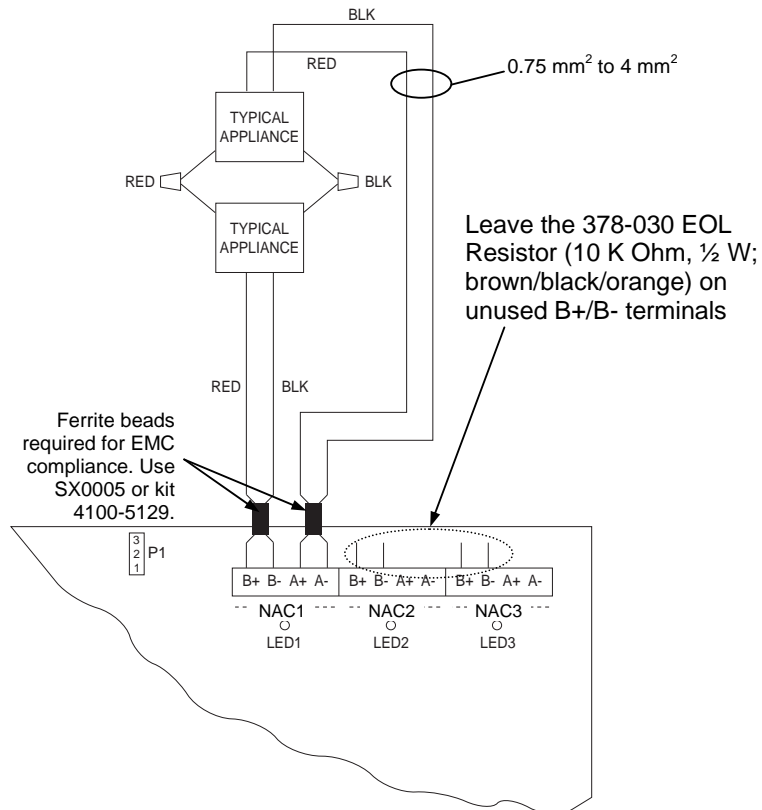


Figure 5-2. Class A (loop) NAC Wiring

Continued on next page

SPS NAC Field Wiring Guidelines, *Continued*

{xe "wiring: Class B (NAC)"}{xe "Class B wiring: NACs"}{xe "NACs: wiring (Class B)"}

Class B (string) NAC Wiring

To connect the SPS to appliances using Class B wiring, read the following instructions and refer to the figure below.

1. Route wire from the B+, B- outputs on TB2 of the SPS to the appropriate inputs on a peripheral notification appliance. Use NAC1, NAC2, or NAC3, as required.
2. Route wire from the first appliance to the next one. **“T” tapping is not allowed since the spur will not be supervised.** Repeat for each appliance.
3. Route wire from the last appliance to the supplied EOLR or a 4081-9008 EOL Harness (10 K Ohm, ½ W; brown/black/orange).
4. Repeat steps 1 through 3 for each NAC output you want to use.
5. Leave the 378-030 EOL Resistor (10 K Ohm, ½ W; brown/black/orange) on each unused circuit. The circuit must connect “B+” to “B-” terminals.
6. If the appliance/device to be used does not have an integral diode, a blocking diode must be fitted between the incoming +ve wire and the +ve terminal of the device with the diode’s cathode (stripe) connected to the device.

The illustration below shows Class B wiring.

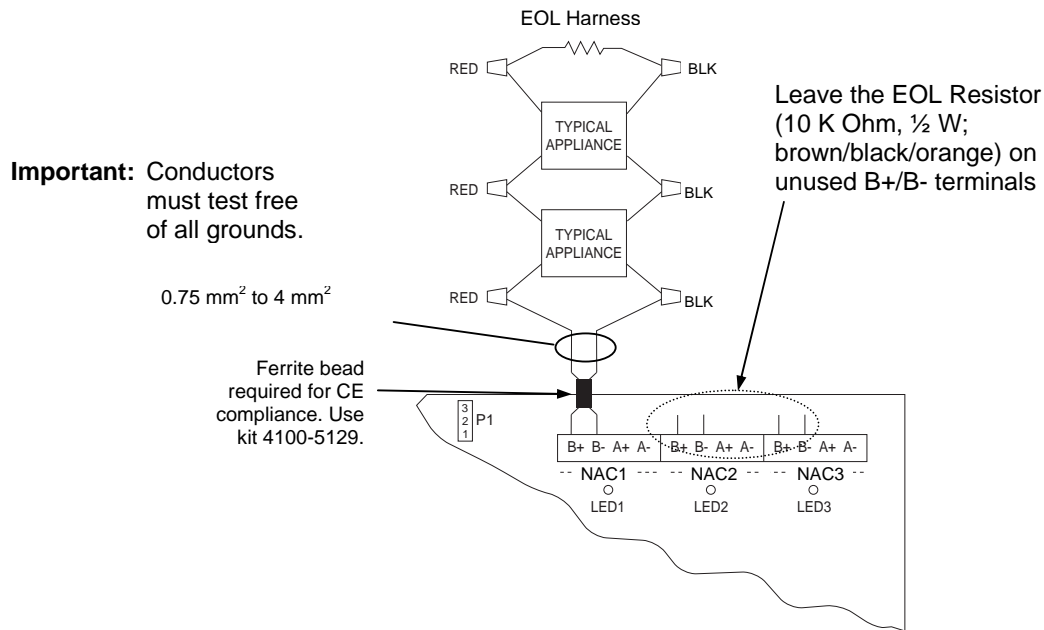


Figure 5-3. Class B (string) Wiring

Power Supply Wiring Distances

{xe "wiring: distances, Class A (NAC)"}{xe "NACs: wiring distances (Class A)"}{xe "Class A wiring: distances (NAC)"}

Overview

Before wiring from any type of power supply to notification appliances, check Tables 5-1 and 5-2 for wiring distances.

Class A NAC Wiring Table

Table 5-1 lists the maximum distances from the NAC terminal block to the last appliance in a Class A (loop) configuration, depending on wire gauge and current. Use Table 5-1 to calculate wire distances for your application if you are using Class A wiring.

Table 5-1. Class A (Loop) Wiring Distances

Alarm Current @ 24V	0.75 mm ²	1.00 mm ²	1.50 mm ²	2.50 mm ²	4.00 mm ²	DC Resistance
0.25A	120m	150m	230m	380m	620m	6.0 ohms
0.50A	58m	77m	120m	190m	310m	3.0 ohms
0.75A	38m	51m	77m	130m	210m	2.0 ohms
1.00A	29m	38m	58m	96m	150m	1.5 ohms
1.25A	23m	31m	46m	77m	120m	1.2 ohms
1.50A	19m	26m	38m	64m	100m	1.0 ohms
1.75A	16m	22m	33m	55m	88m	0.86 ohms
2.00A	14m	19m	29m	48m	77m	0.75 ohms
2.25A	13m	17m	26m	43m	68m	0.67 ohms
2.50A	12m	15m	23m	38m	62m	0.60 ohms
2.75A	10m	14m	21m	35m	56m	0.55 ohms
3.00A	10m	13m	19m	32m	51m	0.50 ohms

Notes:

- Max Distance = distance from SPS to last appliance.
- This table is calculated at 49 degrees Centigrade.
- Distances are based on a 3V drop, and take into account the worst-case panel output voltage. These distances are based on the worst case of having one single load at the furthest point.
- If circuit integrity wire is used instead of housing cable in a fire-rated enclosure, reduce wiring distances by 12 m for every 3 m of potential exposure.

Continued on next page

Power Supply Wiring Distances, *Continued*

{xe "wiring: distances, Class B (NAC)"}{xe "NACs: wiring distances (Class B)"}{xe "Class B wiring: distances (NAC)"}

Class B NAC Wiring Table

Table 5-2 lists the maximum distances from the NAC terminal block to the last appliance in a Class B (string) configuration, depending on wire gauge and current. Use Table 5-2 to calculate wire distances for your application if you are using Class B wiring.

Table 5-2. Class B (string) Wiring Distances

Alarm Current @ 24V	0.75 mm ²	1.00 mm ²	1.50 mm ²	2.50 mm ²	4.00 mm ²	DC Resistance
0.25A	230m	310m	460m	770m	1200m	12.0 ohms
0.50A	120m	150m	230m	380m	620m	6.0 ohms
0.75A	77m	100m	150m	260m	410m	4.0 ohms
1.00A	58m	77m	120m	190m	310m	3.0 ohms
1.25A	46m	62m	92m	150m	250m	2.4 ohms
1.50A	38m	51m	77m	130m	210m	2.0 ohms
1.75A	33m	44m	66m	110m	180m	1.7 ohms
2.00A	29m	38m	58m	96m	150m	1.5 ohms
2.25A	26m	34m	51m	85m	140m	1.3 ohms
2.50A	23m	31m	46m	77m	120m	1.2 ohms
2.75A	21m	28m	42m	70m	110m	1.1 ohms
3.00A	19m	26m	38m	64m	100m	1.0 ohms

Notes:

- Max Distance = distance from SPS to last appliance.
- This table is calculated at 49 degrees Centigrade.
- Distances are based on a 3V drop, and take into account the worst-case panel output voltage. These distances are based on the worst case of having one single load at the furthest point.
- If circuit integrity wire is used instead of housing cable in a fire rated enclosure, reduce wiring distances by 12 m for every 3 m of potential exposure.

Using T-GEN 50 with 4100ES-S1

Overview

AS 1670.1 requires fire alarm warning systems to produce sounds complying with ISO 8201. One way of meeting this requirement in a 4100ES system is to use a T-GEN 50 tone generator, which is capable of driving up to 50W of load on a 100V speaker line.

The recommended version of the T-GEN 50 for use in 4100ES-S1 is available as part 4100-0766K (see PID information in Chapter 1). This consists of a T-GEN 50 mounted on a metal bracket which is mounted into the expansion bay in the same way as a legacy 4100 motherboard. This part code includes the necessary mounting hardware.

The best place to mount this bracket is in the right-most free slot in the expansion bay, next to the mains socket bracket. The bracket should be installed with the T-GEN 50 facing to the left - this is “upside down” compared to some other uses of this bracket. Note also that the heat sink of the T-GEN 50 intrudes slightly into the space above the next slot to the left. This will probably clash with other motherboards or modules and make this slot unusable.

Powering the T-GEN 50

The T-GEN 50 must be continuously powered from nominal 24VDC, i.e., not just during Alarm conditions, so that it can supervise the 100V speaker line.

The recommended method is to power the T-GEN 50 from the AUX POWER terminals of the SPS power supply. This output is rated at 2A, which is just sufficient to drive one fully loaded T-GEN 50. However, this leaves no reserve for any other equipment to be powered from these terminals, e.g., a brigade signalling device.

If 24V DC is required for other ancillary devices as well, this can be supplied from one of the NAC outputs via the Fused Distribution Board PA0915. The wiring for this is shown in Figure 5-4.

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Using T-GEN 50 with 4100ES-S1, *Continued*

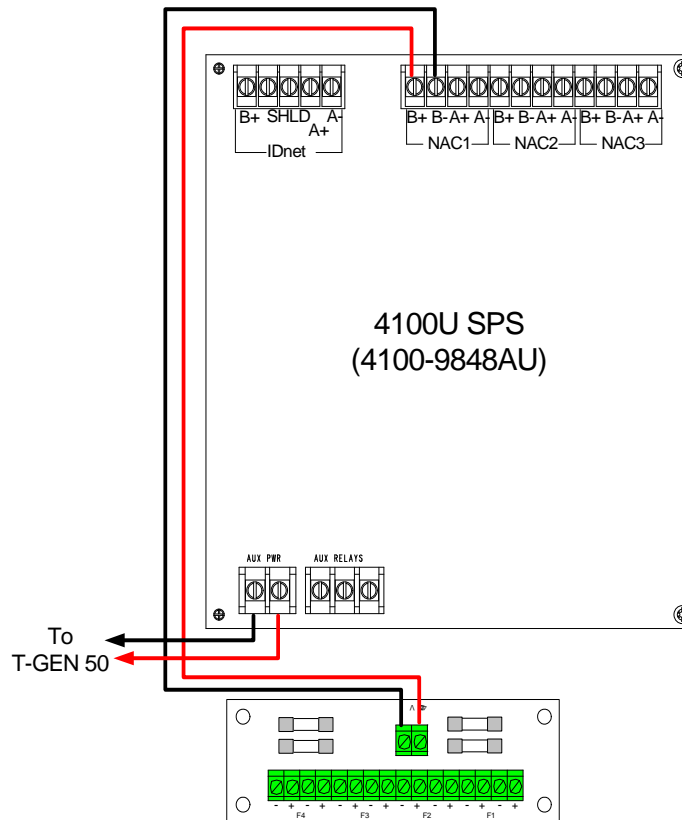


Figure 5-4. Taking Ancillary Power from NAC1

To make this work, NAC1 must be programmed as AUXPWR to make it turn on continuously without supervision. The NAC output capacity is 2A overall.

In the current AS 4428 configuration template (SF0369), NAC1 is normally assigned to the Ancillary Control Facility (ACF). If NAC1 is used for an ancillary supply, and an ACF output is required, the AUX RELAY contacts on the SPS can be used. These provide a single clean set of changeover contacts, with no supervision or power. To make this work, the 4100ES configuration must be amended to control the Auxiliary Relay from ACF.

The T-GEN 50 should not be powered from a NAC output. T-GEN 50 draws a large in-rush current when it is first turned on, which produces an “SPS Over Current” fault in the system that can only be cleared by pressing the 4100ES System Reset button. This is not acceptable operation.

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Using T-GEN 50 with 4100ES-S1, *Continued*

Controlling a T-GEN 50 with a Relay Module

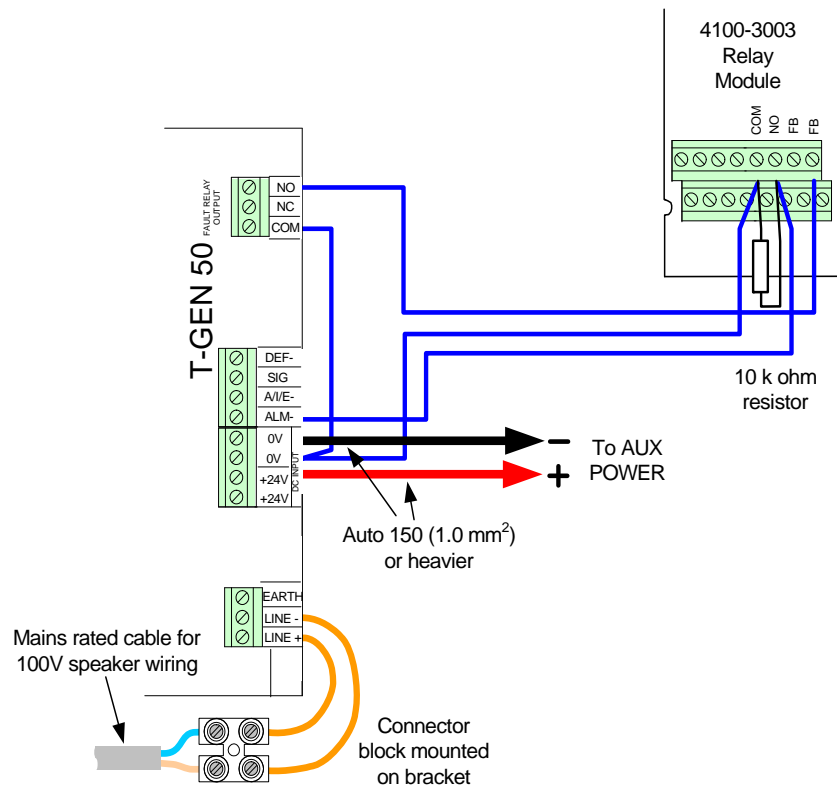


Figure 5-5. Relay Module Connection to a T-GEN 50

A T-GEN 50 can be operated and supervised using a 4100-3003 or 4100-3204 relay module. The relay module is used to control the ALM- input to the T-GEN 50 and to monitor the state of its Fault relay. The T-GEN 50 is configured to supervise the ALM- wiring from the relay module and the 100V wiring to the loudspeakers.

Figure 5.5 shows the wiring between the T-GEN 50 and a 4100-3003 relay module. The detail of the 24V supply is not shown, but the T-GEN 50 0V **MUST** be common with the 4100ES 0V (this will always be the case when using the AUX POWER supply, as described earlier).

Continued on next page

Using T-GEN 50 with 4100ES-S1, *Continued*

T-GEN 50 Setting for Relay Operation

Table 5-3 shows the switch and link settings for T-GEN 50 software version 1.7 when controlled from a relay output.

Table 5-3. T-GEN 50 Settings

Alert to Evacuate Change-Over Time			
SW1 (T0)	SW2 (T1)	SW3 (T2)	Setting on T-GEN 50
OFF	OFF	OFF	0 sec
ON	OFF	OFF	30 sec
OFF	ON	OFF	1 min
ON	ON	OFF	1.5 min
OFF	OFF	ON	3 min
ON	OFF	ON	5 min
OFF	ON	ON	10 min
ON	ON	ON	Alert Only

SWITCH	Name	Setting on T-GEN 50
SW4	ALM I/P Supervision	ON (Supervision enabled)
SW5	ALM I/P	OFF (Non-latching)
SW6	Evac Tone	OFF
SW7		OFF for AS 2220 tone ON for ISO 8201 + Keywords
SW8	Evac Message	OFF for Evac Message 1 or Field Recorded message, ON for Evac Message 2 or Keywords only in ISO 8201

Link	Name	Setting on T-GEN 50
1	BIAS	FITTED if PA or Background Music not required.
2	MASTER	FITTED
3	REC EN	Fit to record message.
4	TEST	Fit for test tone during installation
5	SLAVE	NOT FITTED
6	SLAVE / MASTER	MASTER
7	FAULT=DEF-/RELAY	RELAY

Continued on next page

Using T-GEN 50 with 4100ES-S1, *Continued*

Controlling a T-GEN 50 from a NAC Output

A T-GEN 50 can be controlled and supervised using a NAC output. The NAC is used to control the ALM- input to the T-GEN 50 and to supervise its Fault relay output. The T-GEN 50 is configured to supervise the 100V wiring to the loudspeakers.

Figure 5-6 shows the wiring between the T-GEN 50 and the NAC terminals.

The detail of the 24V supply is not shown, but the T-GEN 50 0V MUST be common with the 4100ES 0V (this will always be the case when using the AUX POWER supply as described earlier).

The NAC output must be programmed as a SIGNAL point type, so that it automatically operates on Alarm, and provides reverse polarity supervision to the 10kΩ EOLR.

The configuration templates already have NAC3 programmed as a suitable output to drive the T-GEN 50.

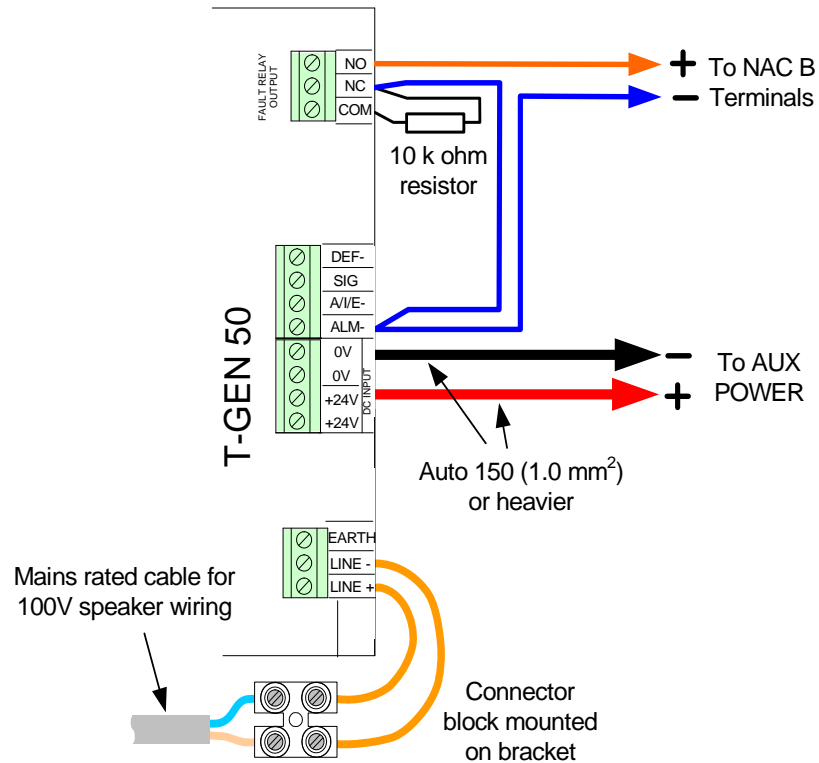


Figure 5-6. NAC Connection to a T-GEN 50

Continued on next page

Using T-GEN 50 with 4100ES-S1, *Continued*

T-GEN 50 Settings for NAC Operation

Table 5-4 shows the switch and link settings for T-GEN 50 software version 1.7 when controlling from a NAC output.

Table 5-4. T-GEN 50 Settings

Alert to Evacuate Change-Over Time			
SW1 (T0)	SW2 (T1)	SW3 (T2)	Setting on T-GEN 50
OFF	OFF	OFF	0 sec
ON	OFF	OFF	30 sec
OFF	ON	OFF	1 min
ON	ON	OFF	1.5 min
OFF	OFF	ON	3 min
ON	OFF	ON	5 min
OFF	ON	ON	10 min
ON	ON	ON	Alert Only

SW1 to SW3 settings have no effect on Slave T-GEN 50s.

SWITCH	Name	Setting on T-GEN 50
SW4	ALM I/P Supervision	OFF (Supervision disabled)
SW5	ALM I/P	OFF (Non-latching)
SW6	Evac Tone	OFF
SW7		OFF for AS 2220 tone ON for ISO 8201 + Keywords
SW8	Evac Message	OFF for Evac Message 1 or Field Recorded message, ON for Evac Message 2 or Keywords only in ISO 8201

Link	Name	Setting on T-GEN 50
1	BIAS	Can be FITTED if PA or Background Music not required
2	MASTER	FITTED
3	REC EN	Fit to record message.
4	TEST	Fit for test tone during installation
5	SLAVE	NOT FITTED
6	SLAVE / MASTER	MASTER
7	FAULT=DEF-/RELAY	RELAY

Continued on next page

Using T-GEN 50 with 4100ES-S1, *Continued*

Fitting an Evacuation Control

An optional three-position control ME0460 (see part numbers in Chapter 1) allows the T-GEN 50 to be switched from the front panel between automatic operation, being Isolated, or producing Evacuation tone, regardless of the state of other control inputs.

With the control in the ISOLATE position, the T-GEN 50 will not respond to the ALM-input, nor activate its FAULT output if a fault is present. Note that this condition is not indicated on the 4100ES-S1 operator interface, so care must be taken when using this facility.

With the control in the EVAC position, the T-GEN 50 will immediately produce Evacuation tone.

Figure 5-7 shows how to connect an Evacuation Control to a T-GEN 50.

The control can be fitted to an FP0935 or FP0937 4U Brigade Interface door as used in 4100ES-S1, or fitted to a 4100-1279 blank display module (requires a 9.5mm hole to be drilled in the display module – the ME0460 includes an installation guide with drilling details). See Figure 5-8 for example.

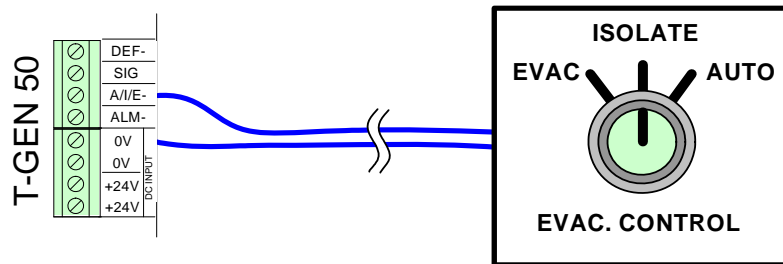


Figure 5-7. Wiring an Evacuation Controller to a T-GEN 50

Fitting a PA Microphone

The T-GEN 50 can be fitted with a compatible PA microphone, to allow voice announcements via the warning system. ME0490 is a suitable part for the 4100ES-S1 (see part numbers in Chapter 1)

A suitable recess or cavity is required for storing the microphone while not in use. The FP0935 and FP0937 4U Brigade doors have a suitable recess. See Figure 5-7 to see how the microphone fits and how its lead is routed inside the cabinet.

Continued on next page

Using T-GEN 50 with 4100ES-S1, *Continued*

100V Speaker Wiring

Refer to the T-GEN 50 Installation and Operating Guide (LT0186) for details about the wiring of speakers and end-of-line resistor requirements for the T-GEN 50.

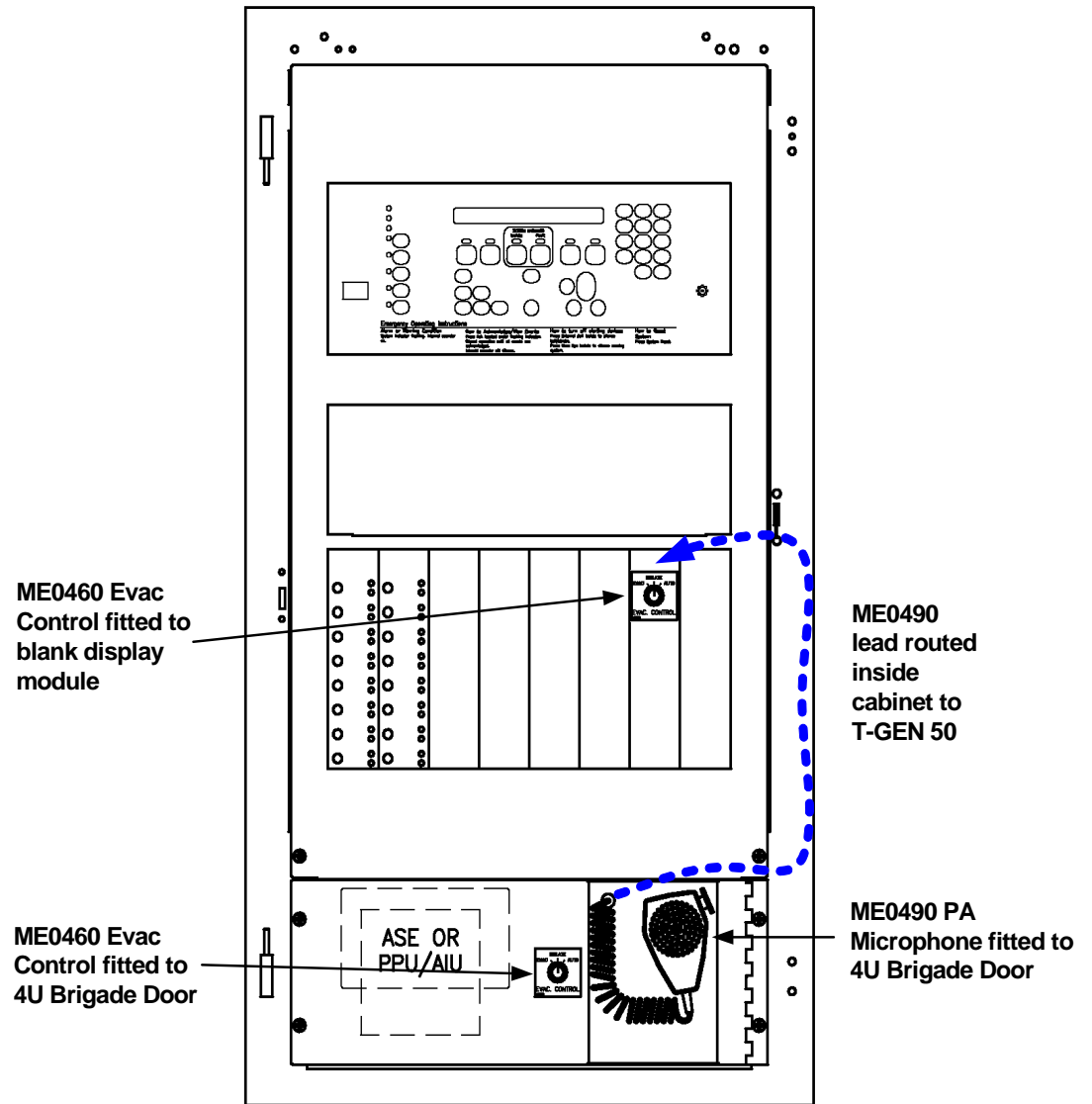


Figure 5-8. Examples of Evacuation Controls and PA Microphone

SPS Auxiliary Power Wiring

Overview

The panel, battery-backed, unregulated dc bulk power is available from the SPS via the NAC and the 24V Aux power terminals. NACs can be configured as auxiliary power point type in the 4100ES Programmer. All of these are power-limited.

Guidelines

Review the following guidelines before using the SPS for auxiliary power.

{xe "wiring: SPS auxiliary power"}{xe "system power supply (SPS): wiring, auxiliary power"}{xe "auxiliary power: SPS"}

- Voltage rating: 24 VDC (nominal), 2 V P-P ripple (maximum).
- The total auxiliary current available for non-alarm loads is 5A. The total current available for the entire SPS is 9A, including NAC, auxiliary, and card power.
- The Auxiliary Power output is rated at 2A DC. Programming is required to activate this supply output.
- A Fuse Distribution board is fitted to the SPS bracket and wired to the Auxiliary Power output as standard. Each output from this board is protected by a 1A fuse. Do not fit heavier fuses than 1A since this may defeat the fuse protection. The combined output from the DC Distribution board is limited to 2A.
- All wiring is 0.75 mm² to 4 mm².
- All SPS powered field wiring requires a ferrite bead fitted (refer Figure 5.1).
- All wiring that leaves the building requires overvoltage protection. Install module 2081-9044 wherever wire enters or exits the building. A maximum of four 2081-9044 Modules may be connected to one channel.
- When a NAC is configured as an auxiliary power circuit, no end-of-line resistor is used.
- External power wiring is not supervised unless an end-of-line relay is wired, coil to auxiliary power, and Normally Open contacts are monitored by a system power point. Relay current must be considered as part of the load.

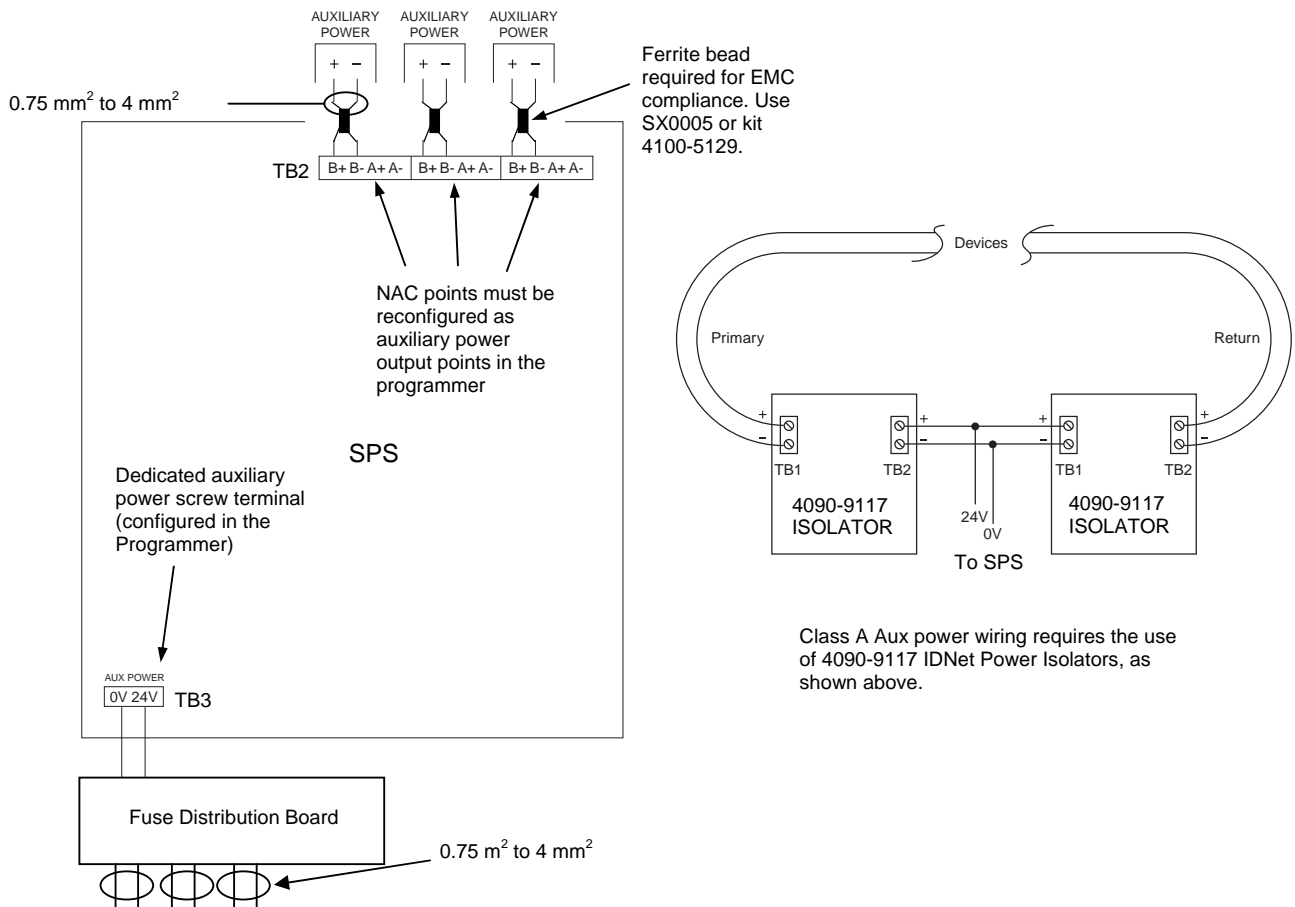
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SPS Auxiliary Power Wiring, *Continued*

{xe "auxiliary power: isolators and"}{xe "IDNet power isolator"}{xe "isolators"}{xe "power isolators"}

Wiring

The SPS can connect to auxiliary power appliances via the dedicated auxiliary power tap (TB3). See Figure 5-9. If more power is needed, any of the three NAC outputs can be used for auxiliary power.



- Maximum load per NAC: 3A alarm, 2A non-alarm load
- Maximum load per Fuse Distribution Board output: 1A, limited to 2A collectively.
- Class A wiring is possible only if 4090-9117 Power Isolators are used.
- Ferrite beads must be fitted on NAC wiring. Use kit 4100-5129 (3 beads).

Figure 5-9. Auxiliary Power Wiring

SPS Relay Wiring

{xe "wiring: SPS auxiliary relay"}{xe "system power supply (SPS): wiring, auxiliary relay"}{xe "wiring: auxiliary relay"}{xe "auxiliary relay"}

Overview

The SPS has one programmable relay, Aux 1, with one set of voltage-free contacts (see below).

The Alarm Relay 4100-6033 is fitted as standard to 4100ES-S1. This has 3 relays, each with one set of normally open (or normally closed) contacts available on a screw terminal block (see Chapter 4).

Aux 1 Relay

- The relay must be configured in the Programmer.
 - The relay circuit is rated to switch 2A resistive or 1A inductive at 30VAC or 32VDC.
 - Relay contacts are Form C (change-over) voltage-free contacts (but with a 40V transorb from common to Earth). Do not switch voltages greater than this rating, or damage may result.
 - When power through the relay contacts is provided by the SPS Auxiliary Power output, wiring is power-limited.
 - The relay circuit is not supervised.
-

Alarm Relay Card

The three relays have default functions of Fault (trouble), Isolate (supervisory) and Alarm, and are typically used for Brigade Signalling (refer to Chapter 4 for jumper settings and other Brigade device information).

SPS IDNet Wiring

{xe "guidelines for wiring: IDNet"}{xe "IDNet: guidelines for wiring"}{xe "wiring: guidelines (IDNet)}{xe "remote power supply (RPS): wiring guidelines (IDNet)}{xe "system power supply (SPS): wiring guidelines (IDNet)}

Overview

This section describes how the IDNet Channel on the SPS connects to addressable devices/detectors.

The guidelines governing IDNet wiring guidelines are covered in Chapter 6, IDNet Installation.

IDNet Wiring

Up to 250 IDNet initiating devices are supported on the SPS IDNet channel. The SPS supports both Class A (loop) and Class B (string) wiring. Class A wiring is mandatory for connection to more than 40 devices.

Class A wiring allows IDNet appliances to continue to communicate with the SPS even in the event of an open circuit somewhere in the loop. Class A wiring requires that two wires are routed from the SPS to each IDNet appliance, and then back again to the SPS.

Class B wiring allows "T" tapping, and therefore requires less wiring distance per installation than Class A.

Note that IDNet wiring does not require end-of-line resistors, because each IDNet appliance communicates directly to the SPS.

Guidelines

Ferrite beads are required on the SPS IDNet cables (refer Figure 5.1).

- Shielded cable is recommended in electrically noisy environments.
 - IDNet cabling should not be run adjacent to other cabling, especially non-fire system cabling, such as mains.
 - The limiting factors on the length of the twin core cable connecting the IDNet devices to the IDNet card are cable capacitance (attenuates the superimposed coms signal) and resistance (causes voltage drop of the supply voltage and comms signals).
 - The maximum capacitance of 0.58uF core to core must also include the mutual capacitance of core to earth. Shielded cable has a much higher capacitance to earth.
 - Rather than do voltage drop calculations, Figure 6-4 can be used to check that cable limits have not been reached. For a Class A (loop) circuit, cable distance refers to the full distance around the loop. For a Class B (spur) circuit, cable distance refers to the distance from the panel to the furthest end of the cable.
 - Sounder bases and 6 point I/O modules do not draw the alarm load from the loop, but are powered from separate 24V terminals.
 - Where devices, e.g. sounder bases, are wired from a 24V source (e.g. supplied by 24V Aux Power or a NAC), and are in more than 1 zone, the power cable must also be isolated between zones by a 4090-9117AU Power Isolator Module.
-

Continued on next page

SPS IDNet Wiring

, Continued

Notes

1. The current allowance per device on the loop is 0.5mA with the LED off, 2mA with the LED on. A maximum of 20 LEDs will be turned on at any time by the IDNet Card, e.g. in alarm.
2. The minimum voltage allowed at the furthest device to guarantee operation is 24.9Vdc. The IDNet boosts its output voltage from 30V to 35V during alarm.

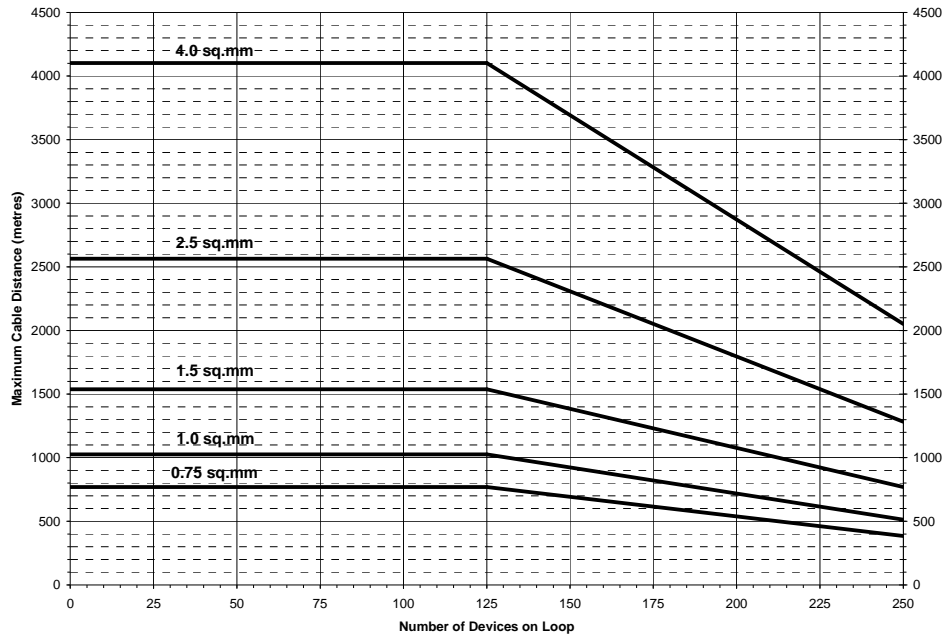


Figure 5-10. Cable Distance & Device Limits for Common Cable Sizes

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SPS IDNet Wiring

, Continued

Class A (loop) Wiring

To connect addressable devices/detectors to the SPS IDNet using Class A wiring, read the following instructions.

1. Ferrite beads are required on the SPS IDNet cables (refer Figure 5.1).
2. Route wire from the B+, B- outputs on TB1 of the SPS to the appropriate inputs on a peripheral IDNet device.
3. Route wire from the first IDNet device to the next one. Repeat for each device.
4. Route wire from the last IDNet device to the A+ and A- inputs on TB1 of the SPS.

{xe "wiring: Class A (IDNet)"}{xe "Class A wiring: IDNet"}{xe "IDNet: wiring (Class A)"}{xe "remote power supply (RPS): wiring, (IDNet Class A)"}{xe "system power supply (SPS): wiring (IDNet Class A)"}

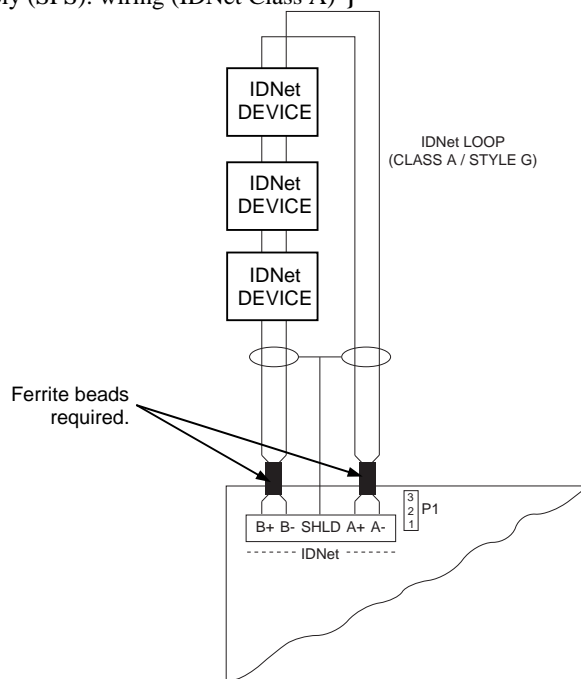


Figure 5-11. Class A (loop) Wiring

Continued on next page

SPS IDNet Wiring

, *Continued*

{xe "wiring: Class B (IDNet)"}{xe "Class B wiring: IDNet"}{xe "IDNet: wiring (Class B)"}{xe "remote power supply (RPS): wiring (IDNet Class B)"}{xe "system power supply (SPS): wiring (IDNet Class B)"}

Class B (string) Wiring

To connect addressable devices/detectors to the SPS IDNet using Class B wiring, read the following instructions.

1. Under AS 1670.1 Class B wiring is allowed only for a maximum of 40 addressable devices.
2. A ferrite bead is required on the SPS IDNet cable.
3. On TB1, jumper B+ to A+, and jumper B- to A-.
4. Route wire from the B+, B- terminals to the devices.

The illustration below shows Class B wiring.

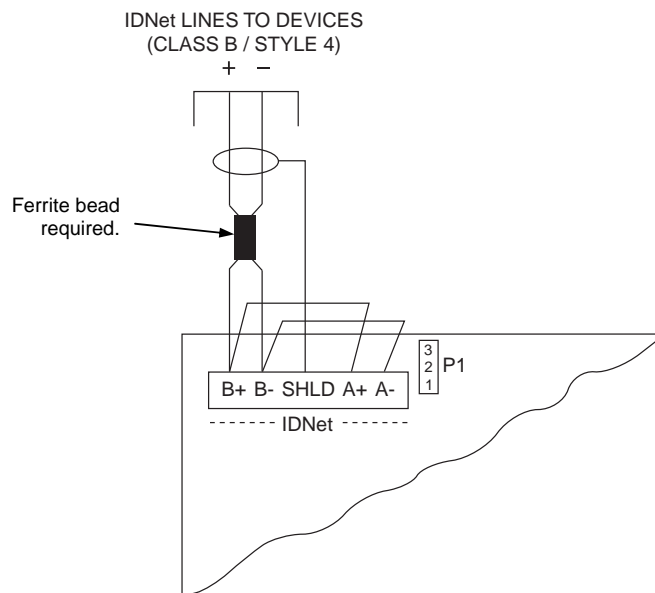


Figure 5-12. Class B (string) Wiring

Chapter 6

Using Install Mode

Introduction

Install Mode is a 4100ES facility which is useful during panel installation.

While a 4100ES panel is being installed and commissioned, there will often be periods when many internal modules or external devices are not yet connected, or are not in a normal state for some reason.

With the full configuration loaded in the 4100ES, each missing or off-normal device gives rise to a fault. Having the fault list full of faults from devices that are known to be missing or off-normal can make it difficult to work with the faults from devices that are actually present.

Install Mode provides a means to hide “known” faults from being displayed.

Any internal module or external device can be added to the Install Mode list, using the front panel interface. If there is any device in the Install Mode list, there will be a single fault indication “Install Mode Active”. However, the devices in the Install Mode list will not produce fault indications, even if they are missing or faulty. All the individual device faults are hidden behind a single Install Mode Active fault.

As modules and devices are progressively added to the system and normalised, they can be removed from the Install Mode list. When the system is fully commissioned, the Install Mode list should be empty.

This chapter describes how to add and remove devices from Install Mode.

In this Chapter

Refer to the page number listed in this table for information on a specific topic.

Topic	See Page #
Adding Devices to Install Mode	6-2
Viewing and Removing Devices in Install Mode	6-3

Adding Devices to Install Mode

Adding a Single Device to Install Mode

Devices can be added individually to the Install Mode list.

NOTE: this requires being logged in at Level 3. Refer to the Operator Manual, if necessary, to do this.

1. Press the <**Fault Ack**> key and step through the list with the Next/Previous arrows to find the device.
2. Press the <**More Info**> key.
3. Step through the list of options with the Next/Previous arrows to find the **Add to Install Mode?** option.
4. Press <**Enter**> to select this. The action happens immediately.

If this is the first item being added to the Install Mode list, the Fault light will start flashing. Pressing the <**Fault Ack**> key will show the Fault List, now with a single fault point INSTALL MODE ACTIVE entry.

Adding Multiple Devices to Install Mode

Where there are many missing devices, or devices not connected to field wiring, all producing faults, there are simple ways to quickly add these to the Install Mode list in bulk.

NOTE: this requires being logged in at Level 3. Refer to the Operator Manual, if necessary, to do this.

1. Press the <**Menu**> key.
2. Use the Next/Previous arrows to step through the menu to the **Diagnostic Functions?** option. Press <**Enter**> to select this.
3. Use the Next/Previous arrows to step through the menu to the **View/Modify Install Mode List?** option. Press <**Enter**> to select this.
4. Step through to either the **Move NO ANSWER devices to install mode list** option or the **Move ALL OPEN CIRCUITS to install mode** option.
5. Press <**Enter**> to select.

The panel will take a few seconds to search for all the selected devices and add them to the Install Mode list. The single remaining fault is the Install Mode fault.

Viewing and Removing Devices in Install Mode

Viewing Contents of Install Mode list

To view the devices and other contents currently in Install Mode:

1. Press the <Menu> key.
 2. Use the Next/Previous arrows to step through the menu to the **Diagnostic Functions?** option. Press <Enter> to select this.
 3. Use the the Next/Previous arrows to step through the menu to the **View/Modify Install Mode List?** option. Press <Enter> to select this.
 4. The first option is **View Install Mode list?** Press <Enter> to select.
 5. Use the Next/Previous arrows to step through the Install Mode list.
-

Removing Individual Devices from Install Mode

If you are logged at Level 3, you can remove individual devices from the Install Mode list.

1. Display the Install Mode list as in the previous section.
2. Step through the list to device to be removed.
3. Press the <More Info> key.
4. Step through the list of options with the Next/Previous arrows to find the **Remove from Install Mode?** option.
5. Press <Enter> to select this. The action happens immediately.

If the device is still in fault, the system fault count will increase and the Fault indicator will flash for a new fault.

Removing Many Points from Install Mode

Just as many missing devices can be added to the Install Mode list quickly, so can many devices be removed from the list.

1. Press the <Menu> key.
2. Use the Next/Previous arrows to step through the menu to the **Diagnostic Functions?** option. Press <Enter> to select this.
3. Use the Next/Previous arrows to step through the menu to the **View/Modify Install Mode List?** option. Press <Enter> to select this.
4. Step through to either the **Move ALL NORMAL devices from install mode** option or the **Move ALL DEVICES from install mode** option.
5. Press <Enter> to select.

The panel will take a few seconds to remove them from the Install Mode list.

If there are devices is still in fault, the system fault count will increase and the Fault indicator will flash for new faults.

Chapter 7

PC Software Connections

{xe "service port"}

Introduction

The service port on the door with the Operator Interface enables the 4100ES-S1 to connect to a PC running important utilities, such as diagnostics, programming, CPU firmware downloading, and channel monitoring.

In this Chapter

Refer to the page number listed in this table for information on a specific topic.

Topic	See Page #
Software Modes	7-2
Ethernet Service Port and Serial Service Port	7-4

Software Modes

{xe "service port: software modes"}{xe "software modes"}

Overview

The 4100ES-S1 can connect to a PC running important utilities, such as diagnostics, programming, CPU firmware downloading, and channel monitoring. It connects to the PC running all of these utilities via the service port on the CPU card.

Software Modes

There are three basic software modes that the service port or service modem can be used to connect to:

- Service and Diagnostics Mode
- Data Transfer Interface Mode
- Master Bootloader Interface Mode

Each mode is described below.

{xe "diagnostics"}

Service and Diagnostics Mode.

This is the default functionality when a PC is connected to the panel. On a PC, this mode provides application startup messages, an ASCII interface to a UI command set for diagnostics, and event reporting. A pre-configured terminal emulator is part of the 4100ES software and can be launched from the Programmer. The connection to a PC is made either through the serial port, through the service modem, or through the Ethernet port.

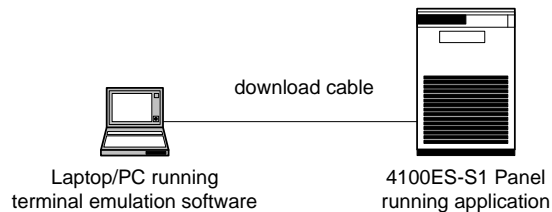


Figure 7-1. Service and Diagnostic Interface

Data Transfer Interface Mode. In this mode, the 4100ES Programmer is used. This allows for slave downloading, as well as downloading a configuration and audio messages to the 4100ES-S1, and uploading a configuration or history log. Connection to a PC is made via serial port or service modem or through the Ethernet port. {xe "data transference"}

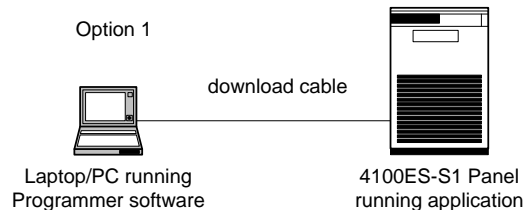


Figure 7-2. Data Transfer Interface

Continued on next page

Software Modes, *Continued*

Software Modes (*continued*)

Master Bootloader Interface Mode. This mode is used to download the Master CPU Exec firmware and the CFG.TXT file to the CPU via the serial port or through the Ethernet port.

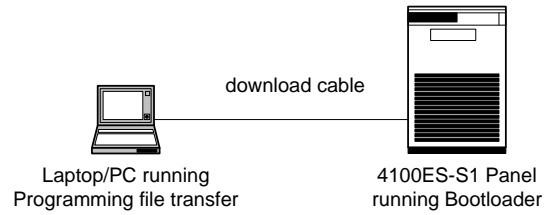


Figure 7-3. Bootloader Interface

Ethernet Service Port and Serial Service Port

Ethernet Service Port Overview (0566-719 only)

The Ethernet service port J1 on the CPU card (0566-719) is used to connect the panel to a local PC. See Figure 7-4 for the port location.

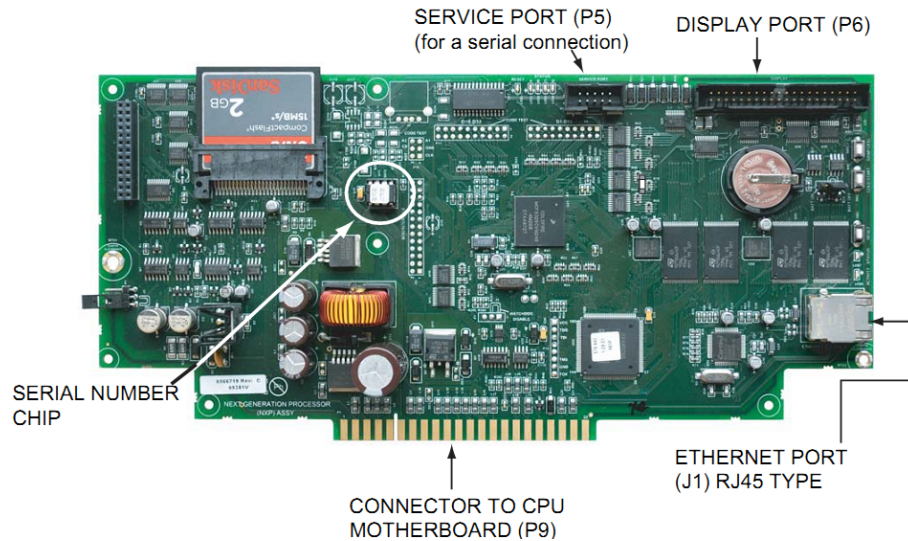


Figure 7-4. CPU card ports

The Ethernet service port connects to the front panel Ethernet connection through a standard straight (non-crossover) Ethernet Patch Cable. The service technician should connect the PC to the CPU card through this front panel connection with a standard straight Ethernet cable (see Figure 7-5). If this connection is not available, you may plug directly into the CPU Card connector J1 to the PC with a standard straight Ethernet cable.

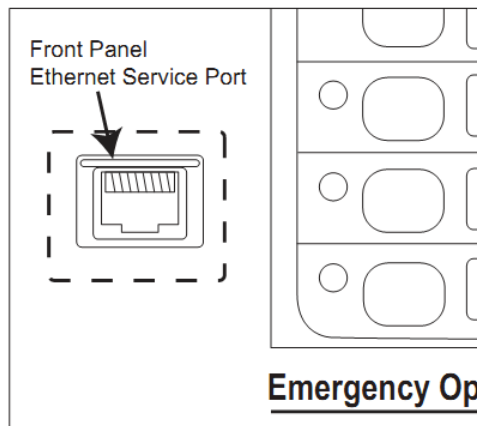


Figure 7-5. Front Panel Ethernet Service Port

Serial Service Port Overview

The Serial Service Port P5 on the CPU card (0566, 149, 0566-692 and 0566-719) can also be used to connect the Panel to a local PC. See Figure 7-4 for the port location. To use this port, the technician must connect the serial service port cable on the PC directly to the serial Service Port (P5) on the card.

Chapter 8

Installation Checklist, Commissioning & Maintenance

{xe "service port"}

Introduction

The 4100ES-S1 is tested in the factory and is loaded with a basic configuration.

When the panel arrives on site the installer must unpack and check the panel, mount the cabinet, any additional cards, and check the configuration before applying power.

A registered electrician must connect the mains. The panel should then be powered up and checked for correct operation.

With the mains turned off and the batteries disconnected, the field wiring is checked and connected to the field terminals on the various cards.

The panel should then be powered up and re-programmed to accommodate all the connected field devices. Faults in the field wiring, misaddressed detectors / devices and mismatched detectors / devices will be displayed on the LCD. These should be cleared one at a time and then the system (panel plus connected devices) should be commissioned.

In this Chapter

Refer to the page number listed in this table for information on a specific topic.

Topic	See Page #
Alignment & Adjustment	8-2
Power Up & Placing into Operation	8-3
Maintenance	8-4

Alignment & Adjustment

Overview

All the 4100ES-S1 cards and modules in the base panel are tested and aligned in the factory before being supplied to the customer. The only field adjustment that may be necessary is to set the battery charger voltage. (Note this has been set and should not need re-adjusting).

R341 Battery Charger Voltage

Should the battery charger voltage need adjusting, the method is as follows:

1. Run the system with the batteries connected and the door closed for at least 30 minutes to allow components to "warm up" (the longer the better).
2. Calculate the required no-load battery charging voltage by taking 27.3V for 20°C and subtracting 0.1V for every 3°C above 20°C, or adding 0.1V for every 3°C below 20°C.
3. With the system not in Alarm, disconnect the batteries.
4. Measure the voltage at the battery terminals on the SPS and adjust this to the voltage calculated in Step 2 by turning pot R341 on the SPS.
5. Re-connect the batteries.

Power Up & Placing into Operation

To place the 4100ES-S1 into operation, perform the following steps:

- STEP 1 Ensure that the Mains Switch is OFF.
- STEP 2 Ensure that 240 VAC is connected to the panel from the mains distribution switchboard.
- STEP 3 Ensure that the Lithium battery is fitted to battery holder on the CPU card, and link P3 is fitted to the BAT ON position.

 Turn the Mains Switch ON.
- STEP 4 Check that the green "MAINS ON" LED indicator is on.
 The Controller performs tests on its memory, electronics, and the LCD.
- STEP 5 Check that the buzzer sounds and the LCD display "CPU Serial Number".
- STEP 6 Check that the LCD has good visibility. Adjust the LCD Contrast control on the inside of the keyboard door, if necessary.
- STEP 7 Install and connect the batteries.
 Take care not to short the battery leads or connect in reverse polarity when connecting.
- STEP 8 Press the Lamp Test key on the control panel and check that all LEDs turn on, and the LCD shows all black squares.
- STEP 9 Clear any faults one at a time.

A full commissioning test must be carried out as per the requirements of AS 1670.1. Refer to the appendix in this manual for detail on checking wiring, and earth fault detection. Refer to the 4100ES-S1 Operator Manual LT0395 for detail of the walk test that may be used for verifying correct detector operation.

Maintenance

The 4100ES-S1 system must be kept free from faults and tested on a weekly, monthly and annual basis to verify that it is operating correctly. The tests required by part 8 of the standard AS 1851 *Maintenance of Fire Protection Equipment* are detailed in the 4100ES-S1 Operator Manual, LT0395.

The Operator manual also provides detail of report printing and performing tests that are useful for checking the system.

Appendix A

Card Address DIP Switch

{xe "addresses: setting, for 4100U modules"}{xe "card configuration: address setting"}

Overview

Addressable cards include a bank of eight DIP switches. From left to right (see Figure A-1, below) these switches are designated as SW_x-1 through SW_x-8. The function of these switches is as follows:

- **SW_x-1.** This switch sets the data rate for the internal 4100ES communications line running between the card and the CPU. Set this switch to ON.
- **SW_x-2 through SW_x-8.** These switches set the card's address within the 4100ES-S1. Refer to Table A-1 for a complete list of the switch settings for all of the possible card addresses.

Note: You must set these switches to the value assigned to the card by the 4100ES Programmer.

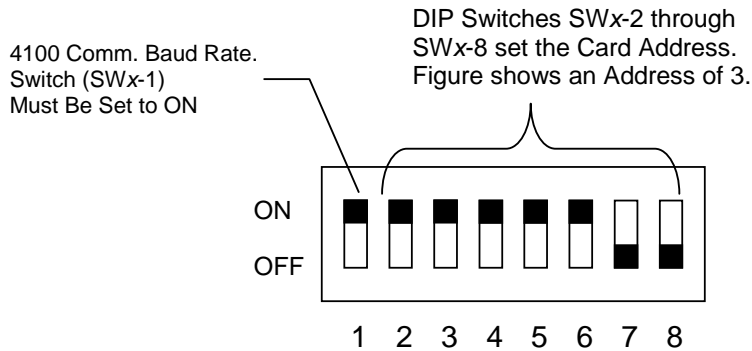


Figure A-1. DIP Switch SW_x

Continued on next page

Overview,
(continued)

Table A-1. Card Addresses

Address	SW 1-2	SW 1-3	SW 1-4	SW 1-5	SW 1-6	SW 1-7	SW 1-8	Address	SW 1-2	SW 1-3	SW 1-4	SW 1-5	SW 1-6	SW 1-7	SW 1-8
1	ON	ON	ON	ON	ON	ON	OFF	61	ON	OFF	OFF	OFF	OFF	ON	OFF
2	ON	ON	ON	ON	ON	OFF	ON	62	ON	OFF	OFF	OFF	OFF	OFF	ON
3	ON	ON	ON	ON	ON	OFF	OFF	63	ON	OFF	OFF	OFF	OFF	OFF	OFF
4	ON	ON	ON	ON	OFF	ON	ON	64	OFF	ON	ON	ON	ON	ON	ON
5	ON	ON	ON	ON	OFF	ON	OFF	65	OFF	ON	ON	ON	ON	ON	OFF
6	ON	ON	ON	ON	OFF	OFF	ON	66	OFF	ON	ON	ON	ON	OFF	ON
7	ON	ON	ON	ON	OFF	OFF	OFF	67	OFF	ON	ON	ON	ON	OFF	OFF
8	ON	ON	ON	OFF	ON	ON	ON	68	OFF	ON	ON	ON	OFF	ON	ON
9	ON	ON	ON	OFF	ON	ON	OFF	69	OFF	ON	ON	ON	OFF	ON	OFF
10	ON	ON	ON	OFF	ON	OFF	ON	70	OFF	ON	ON	ON	OFF	OFF	ON
11	ON	ON	ON	OFF	ON	OFF	OFF	71	OFF	ON	ON	ON	OFF	OFF	OFF
12	ON	ON	ON	OFF	OFF	ON	ON	72	OFF	ON	ON	OFF	ON	ON	ON
13	ON	ON	ON	OFF	OFF	ON	OFF	73	OFF	ON	ON	OFF	ON	ON	OFF
14	ON	ON	ON	OFF	OFF	OFF	ON	74	OFF	ON	ON	OFF	ON	OFF	ON
15	ON	ON	ON	OFF	OFF	OFF	OFF	75	OFF	ON	ON	OFF	ON	OFF	OFF
16	ON	ON	OFF	ON	ON	ON	ON	76	OFF	ON	ON	OFF	OFF	ON	ON
17	ON	ON	OFF	ON	ON	ON	OFF	77	OFF	ON	ON	OFF	OFF	ON	OFF
18	ON	ON	OFF	ON	ON	OFF	ON	78	OFF	ON	ON	OFF	OFF	OFF	ON
19	ON	ON	OFF	ON	ON	OFF	OFF	79	OFF	ON	ON	OFF	OFF	OFF	OFF
20	ON	ON	OFF	ON	OFF	ON	ON	80	OFF	ON	OFF	ON	ON	ON	ON
21	ON	ON	OFF	ON	OFF	ON	OFF	81	OFF	ON	OFF	ON	ON	ON	OFF
22	ON	ON	OFF	ON	OFF	OFF	ON	82	OFF	ON	OFF	ON	ON	OFF	ON
23	ON	ON	OFF	ON	OFF	OFF	OFF	83	OFF	ON	OFF	ON	ON	OFF	OFF
24	ON	ON	OFF	OFF	ON	ON	ON	84	OFF	ON	OFF	ON	OFF	ON	ON
25	ON	ON	OFF	OFF	ON	ON	OFF	85	OFF	ON	OFF	ON	OFF	ON	OFF
26	ON	ON	OFF	OFF	ON	OFF	ON	86	OFF	ON	OFF	ON	OFF	OFF	ON
27	ON	ON	OFF	OFF	ON	OFF	OFF	87	OFF	ON	OFF	ON	OFF	OFF	OFF
28	ON	ON	OFF	OFF	OFF	ON	ON	88	OFF	ON	OFF	OFF	ON	ON	ON
29	ON	ON	OFF	OFF	OFF	ON	OFF	89	OFF	ON	OFF	OFF	ON	ON	OFF
30	ON	ON	OFF	OFF	OFF	OFF	ON	90	OFF	ON	OFF	OFF	ON	OFF	ON
31	ON	ON	OFF	OFF	OFF	OFF	OFF	91	OFF	ON	OFF	OFF	ON	OFF	OFF
32	ON	OFF	ON	ON	ON	ON	ON	92	OFF	ON	OFF	OFF	OFF	ON	ON
33	ON	OFF	ON	ON	ON	ON	OFF	93	OFF	ON	OFF	OFF	OFF	ON	OFF
34	ON	OFF	ON	ON	ON	OFF	ON	94	OFF	ON	OFF	OFF	OFF	OFF	ON
35	ON	OFF	ON	ON	ON	OFF	OFF	95	OFF	ON	OFF	OFF	OFF	OFF	OFF
36	ON	OFF	ON	ON	OFF	ON	ON	96	OFF	OFF	ON	ON	ON	ON	ON
37	ON	OFF	ON	ON	OFF	ON	OFF	97	OFF	OFF	ON	ON	ON	ON	OFF
38	ON	OFF	ON	ON	OFF	OFF	ON	98	OFF	OFF	ON	ON	ON	OFF	ON
39	ON	OFF	ON	ON	OFF	OFF	OFF	99	OFF	OFF	ON	ON	ON	OFF	OFF
40	ON	OFF	ON	OFF	ON	ON	ON	100	OFF	OFF	ON	ON	OFF	ON	ON
41	ON	OFF	ON	OFF	ON	ON	OFF	101	OFF	OFF	ON	ON	OFF	ON	OFF
42	ON	OFF	ON	OFF	ON	OFF	ON	102	OFF	OFF	ON	ON	OFF	OFF	ON
43	ON	OFF	ON	OFF	ON	OFF	OFF	103	OFF	OFF	ON	ON	OFF	OFF	OFF
44	ON	OFF	ON	OFF	OFF	ON	ON	104	OFF	OFF	ON	OFF	ON	ON	ON
45	ON	OFF	ON	OFF	OFF	ON	OFF	105	OFF	OFF	ON	OFF	ON	ON	OFF
46	ON	OFF	ON	OFF	OFF	OFF	ON	106	OFF	OFF	ON	OFF	ON	OFF	ON
47	ON	OFF	ON	OFF	OFF	OFF	OFF	107	OFF	OFF	ON	OFF	ON	OFF	OFF
48	ON	OFF	OFF	ON	ON	ON	ON	108	OFF	OFF	ON	OFF	OFF	ON	ON
49	ON	OFF	OFF	ON	ON	ON	OFF	109	OFF	OFF	ON	OFF	OFF	ON	OFF
50	ON	OFF	OFF	ON	ON	OFF	ON	110	OFF	OFF	ON	OFF	OFF	OFF	ON
51	ON	OFF	OFF	ON	ON	OFF	OFF	111	OFF	OFF	ON	OFF	OFF	OFF	OFF
52	ON	OFF	OFF	ON	OFF	ON	ON	112	OFF	OFF	OFF	ON	ON	ON	ON
53	ON	OFF	OFF	ON	OFF	ON	OFF	113	OFF	OFF	OFF	ON	ON	ON	OFF
54	ON	OFF	OFF	ON	OFF	OFF	ON	114	OFF	OFF	OFF	ON	ON	OFF	ON
55	ON	OFF	OFF	ON	OFF	OFF	OFF	115	OFF	OFF	OFF	ON	ON	OFF	OFF
56	ON	OFF	OFF	OFF	ON	ON	ON	116	OFF	OFF	OFF	ON	OFF	ON	ON
57	ON	OFF	OFF	OFF	ON	ON	OFF	117	OFF	OFF	OFF	ON	OFF	ON	OFF
58	ON	OFF	OFF	OFF	ON	OFF	ON	118	OFF	OFF	OFF	ON	OFF	OFF	ON
59	ON	OFF	OFF	OFF	ON	OFF	OFF	119	OFF	OFF	OFF	ON	OFF	OFF	OFF
60	ON	OFF	OFF	OFF	OFF	ON	ON								

Appendix B

Programming Requirements

{xe "ULC programming requirements"}

Introduction

This appendix briefly summarises the programming that is required to comply with AS 4428.1.

It does not provide equations or detail of programming. Refer to LT0400 4100ES-S1 Programming Guide for descriptions of the AS 4428.1 programming. The separate 4100ES Programming Manual tells how to use the PC-based 4100ES Programmer.

Required Features

The following is a list of functions that must be programmed under custom control. Functionality must comply with AS 4428.1, and be as described in the Operator Manual LT0395.

- Individual zone alarm indication, flashing until isolated, steady when isolated.
- Common Zone Alarm indication, flashing when any zone in alarm is un-isolated, steady when all zones in alarm are isolated.
- Individual zone isolate pushbutton and indication.
- Zone Alarm Test pushbutton and indication.
- Zone Fault Test pushbutton and indication.
- Warning System Isolate pushbutton and indication.
- External Bells Isolate pushbutton and indication.
- Ancillary Control Function and Isolate pushbutton and indication as required.
- Weekly 1 hour battery test.
- Fault indication after 8 hours of isolate.

The configuration templates for the 4100ES-S1 all contain the necessary Custom Control equations for these functions. These settings should not be altered except under advice from Simplex.

Notes

- The US options for power supply and AVF are selected, not the Canadian ones.
 - Features that do not comply with AS 4428.1 must not be enabled, e.g. Alarm cut-out times.
 - Features that are statutory in AS 4428.1 must not be pass-code protected, e.g. zone isolate, zone test (Fault and Alarm).
-

Appendix C

Checking System Wiring

{xe "wiring: troubleshooting"}{xe "troubleshooting: wiring"}{xe "volt-Ohm meter usage"}

Overview

This appendix contains instructions on how to use a volt/ohm meter to check system wiring.

Using the Volt/Ohm Meter

When using the volt/ohm meter to check each circuit, make sure to adhere to the notes and instructions below.

Notes:

- For these tests, the mains connection to the panel must be in place, but the mains must be switched off and the battery must be disconnected. All other internal panel wiring must be properly connected (terminal blocks, LED/switch module ribbon cables, etc.).
- Use the earth stud in the control panel as the earth connection for all measurements to ground.
- Measuring resistances between 4100ES terminals or from terminals to ground will give meaningless results.

Use the volt/ohm meter as described in the steps below to check each circuit type.

1. Disconnect Wires: At the 4100ES panel, disconnect the wires for each circuit from the terminals before testing it. If it is a Class A (loop) type of circuit, e.g., IDNet loop, ensure that both ends of the loop are disconnected from the 4100ES.
2. Test for AC: Check each circuit for extraneous voltage by setting the volt/ohm meter to a 300VAC range. Place the meter probes so that the black probe is on the “-“ wire and the red probe is on the “+” wire. Meter readings must show less than 1V.
3. Test for DC: Set the volt/ohm meter to a 60VDC range and keep the probes placed as in step 2. The meter must read less than 0.5V.
4. Test Resistance: Set the volt/ohm meter to OHMS and place the meter probes as described in step 2. Check the circuits using the resistance measurements in Table C-1.
Shift the meter probes so that one probe is on both the “+” and “-“ wires, and the other probe is on the earth terminal in the panel. The meter should read an open circuit.
Locate and correct any abnormal conditions at this time.
Note 1: If the reading indicates an open circuit in a conventional detector circuit, make sure the smoke detector heads are properly mounted and seated. The circuit may also be open if smoke detector power is not present, and if separately powered 4-wire devices are used.
Note 2: IDNet addressable loops can give a good reading even when certain wiring faults are present, due to the effect of channel isolators in the loop. The 4100ES-S1 can perform live testing on an IDNet loop for earth faults. See Appendix D for details about how to do this.
5. Repeat for Next Circuit: Reconnect the circuit wiring to the correct terminals, and move to the next circuit to be tested.
Repeat steps 1-4 for all field wiring, to verify that each circuit is free of grounds and extraneous voltages.

Appendix C: Checking System Wiring, *Continued*

Meter Readings

Table C-1 lists the correct meter readings for different circuit types. Remember, these readings must be made with the field wiring disconnected from the 4100ES terminals.

Table C-1. Acceptable Zone and Signal Circuit Meter Readings

Circuit Type	Meter Reading
Class B (spur) Detector Circuit (each circuit)	
From zone + wire to zone – wire (each zone)	3.3k Ω (EOLR)
From zone + wire to ground	Open circuit
From zone – wire to ground	Open circuit
Class B (spur) Notification Appliance Circuit (each circuit)	
From B+ wire to B- wire: In one direction In the opposite direction	10 k Ω (EOLR) Low resistance (Load)
From B+ wire to ground	Open circuit
From B– wire to ground	Open circuit
Shielding	
Shield to ground	Open circuit
Shield to – wire	Open circuit
Shield to + wire	Open circuit
IDNet Loop	
From IDNet B+ wire to ground	Open circuit
From IDNet B- wire to ground	Open circuit
From IDNet A+ wire to ground	Open circuit
From IDNet A- wire to ground	Open circuit
Note: measuring from IDNet B+ to A+ wires, or B- to A- wires will read as a high resistance or open circuit due to the channel isolators in the loop.	

Appendix D

Earth Fault Detection

{xe "wiring: Earth Fault Search"}{xe "Earth Fault Search"}

Overview

This appendix contains instructions on how to use the Earth Fault Search feature of the 4100ES-S1 diagnostics menus.

Earth Fault Search is a diagnostic search of external field wiring that assists in locating circuits with earth faults. An earth fault occurs when an electrical circuit is shorted to ground. Although most circuits operate with a single earth fault, multiple earth faults can disable communications. Because of this, earth faults must be located and repaired.

Earth Fault Search is conducted by the 4100ES-S1. The diagnostic may be activated using either the front panel interface or the Computer Port Protocol via a service port.

The 4100ES-S1 supports two types of Earth Fault Searches:

- **Location Search.** Searches all circuits at a location, such as the main panel.
 - **IDNet Channel Search.** Selectively enables channel isolators and repeaters to detect which segment of the channel wiring has a fault.
-

General Guidelines

Review the guidelines below before initiating an Earth Fault Search.

- The Detect Earth Fault jumper must be installed at the SPS for earth fault detection to occur.
- Only one power supply per location is configured to detect earth faults.
- For more reliable earth fault searching:
 - Use IDNet channel isolators to isolate channel faults to a specific segment of channel wiring.
 - Set IDNet channel isolator addresses to the lowest IDNet device addresses, increasing with communication distance from the IDNet card.
- If an earth fault is suspected on the IDNet channel with multiple isolators, start an IDNet Channel Search before doing a Location Search. If the Location Search is done first, it may not yield the correct location (this is a by-product of the extended amount of time required for the IDNet channel to initialize during a Location Search).
- Earth Fault Search detects only one fault at a time. Multiple faults require fixing the first fault and then repeating the search.
- The 4100ES-S1 suspends normal operation for the duration of the Earth Fault Search. Alarm processing will be stopped.
- Location Earth Fault Searches optionally allow exclusion of auxiliary power circuits from the search, so that modules connected to the 24 V auxiliary outputs can remain in operation during the search.
- The option to exclude auxiliary power circuits does not apply to IDNet devices, because the entire IDNet communication channel is isolated during each search.
- During the search, all related troubles are suppressed and a single trouble pseudo-point is activated (P438).
- At the completion of the search, all slaves are restarted and normal panel operation resumes.
- Earth Fault Search is only supported by new 4100ES modules. 4100 Legacy (slot format) modules are not supported, with the following exceptions:
 - IPS for earth fault detection (not recommended). The Earth Fault Search may fail because the isolation circuits of some 4100ES slaves do not support IPS.

IMPORTANT: The fire panel cannot provide fire protection during an Earth Fault Search.

Earth Fault Searching from the Front Panel

Overview

This section describes how to conduct an Earth Fault Search, from selecting the appropriate access code to correcting the fault.

Access Level Selection

The panel must be at the appropriate access level (1, 2, 3, or 4) in order to run diagnostics. To get to the correct access level:

1. Press the Menu button. The following message comes up (press the Next or Previous buttons, if necessary, to display it).

```
Press <NEXT> or <PREVIOUS> to scroll
Change Access Level?
```

1. Press the Enter button. Now you are prompted to log in or log out.

```
1=Login    2=Logout
CURRENT ACCESS LEVEL = x
```

2. Press the "1" key on the numeric keypad to log in, so that the passcode prompt comes up.

```
Enter a Passcode followed by <ENTER>
```

3. Enter the passcode and press the Enter button. ACCESS GRANTED displays briefly on the LCD, and then the display goes back to:

```
1=Login    2=Logout
CURRENT ACCESS LEVEL = y
```

You can now open the diagnostic menu as described in the next topic.

Starting the Earth Fault Search

To start an Earth Fault Search,

1. If necessary, press the Menu button to access the menus.
4. Press the Previous or Next buttons until the diagnostic functions option appears:

```
Press <NEXT> or <PREVIOUS> to scroll
Diagnostic Functions?
```

5. Press the Enter button. Then press Next or Previous buttons until the Earth Fault Search option appears:

```
Press <NEXT> or <PREVIOUS> to scroll
Earth Fault Search?
```

Continued on next page

Earth Fault Searching from the Front Panel, *Continued*

Starting the Earth Fault Search, Continued

6. Press the Enter button. The following options become available when you press the Next and Previous buttons:

Press <NEXT> or <PREVIOUS> to scroll Location Search
Press <NEXT> or <PREVIOUS> to scroll IDNet Channel Search
Press <NEXT> or <PREVIOUS> to scroll Last Search Result

The search types are described below. When you have determined what kind of search to initiate, display its option (one of the three shown above) and press the Enter button. Each option has its own topic, below.

Search Option A: Select Location

If you select the Location Search menu item, a list of cards to search becomes available. Use the Next and Previous buttons to scroll through the list.

If you find a card that you suspect is connected to a circuit with an earth ground, press the Enter button when that circuit is shown.

Before you can start the search, the Aux Power Select option comes up.

1=Exclude 2=Include Exclude AUXPWR circuits from search?
--

The number you select, 1 or 2, determines whether the auxiliary power circuit on the selected board is searched for earth grounds. If you exclude the auxiliary power circuit from the search, the circuit will continue to operate normally.

Press 1 (or just press the Enter button) to exclude the card's auxiliary power circuits from the search, or press 2 to remove auxiliary power circuits from normal operation and search them for earth grounds.

Now you are prompted to start the search. When the location you want to search is shown and "Press <ENTER> to start search" displays, the search is ready to start. A sample is shown below.

CARD 1, SYSTEM POWER SUPPLY Press <ENTER> to start search
--

NOTE: The 4100ES-S1 suspends normal operation for the duration of the search.

Press the Enter button to start the search.

As the search progresses, watch the display for an indication of how much of the search has been completed. The search can be aborted at any time if you press the Clear button.

Earth Search In-Progress, Please Wait...
--

Earth Search In-Progress, Please Wait... 40%

Skip ahead to the "Completing the Search" topic.

Continued on next page

Earth Fault Searching from the Front Panel, *Continued*

Search Option B: Select Channel

If you select the IDNet Channel Search menu item, a list of IDNet channels to search becomes available. Use the Next and Previous buttons to scroll through the list. When the IDNet channel you want to search is shown and "Press <ENTER> to start search" displays, the search is ready to start. A sample screen is shown below.

```
IDNET CHANNEL M12
Press <ENTER> to select for search
```

NOTE: The 4100ES-S1 suspends normal operation for the duration of the search.

Press the Enter button to start the search.

As the search progresses, watch the display for an indication of how much of the search has been completed. The search can be aborted at any time if you press the Clear button.

```
Earth Search In-Progress, Please Wait...
```

```
Earth Search In-Progress, Please Wait...
                               40%
```

Skip ahead to the "Completing the Search" topic.

Search Option C: Last Search Result

This option simply displays the last Earth Fault Search result. If there has been no search since the last system startup, or if the last search was aborted, the panel displays "RESULT NOT AVAILABLE."

Completing the Search

When a Location or IDNet Channel Search completes, all of the following occurs:

- All slaves automatically reset.
- The 4100ES-S1 turns off the Earth Fault Search trouble pseudo-point.
- The panel displays the specific fault information.

The panel can return only one Earth Fault Search result at a time. If another fault exists, it can only be found using the diagnostics after the first fault is cleared. Faults will continue to appear, one by one, until each one has been found and corrected.

IMPORTANT: Once you have been directed to an earth fault and corrected it, it is recommended that you restart the system (warm- or cold-start).

Continue to the next topic for a list of search results and their required actions.

Search Results

Overview

There are several types of results that can display at the end of an Earth Fault Search. This section covers all types of results.

IMPORTANT: Once you have been directed to an earth fault and corrected it, it is recommended that you restart the system (warm- or cold-start).

Non-Point Faults

A non-point fault indicates a ground that cannot be traced to an addressable point (for example, a shield or an audio riser). The earth fault in this example is not occurring at the audio controller but somewhere in the riser:

```
CARD 17, ANALOG AUDIO CONTROLLER
AUDIO RISER 1                      EARTH FAULT
```

Non-point faults can be displayed for each of the following items:

- Channel Output (IDNet Card; MAPNET Interface Card)
 - RUI Channel (Master Controller Card). (Not used in 4100ES-S1).
 - Channel 1 to 3 (TrueAlert Power Supply). (Not used in 4100ES-S1).
-

Point Faults

A point fault indicates an earth fault at a specific addressable point. The example below is a location earth fault search result, where 3 is the card address, 10 is the point number, and 0 is the sub-point number (not used):

```
CARD 003, FLEX 50 AMPLIFIER
3-10-0                      EARTH FAULT
```

Point faults can be found at any point in the system that connects to field wiring.

Some IDNet channel point fault examples are illustrated below.

Fault not cleared. The message below shows that an IDNet channel that has been isolated for fault detection still has the earth fault:

```
CARD 2, IDNET CARD (250 POINTS)
M1, EARTH FAULT SEARCH  FAULT CLEAR FAIL
```

Fault between channel output and first isolator. The message below shows a fault between the IDNet channel output and the first isolator on the line:

```
CARD 2, IDNET CARD (250 POINTS)
M1, CHANNEL OUTPUT          EARTH FAULT
```

Continued on next page

Search Results, *Continued*

Point Faults, Continued

IDNet isolator fault. The message below shows a fault detected after the IDNet isolator was turned on:

CARD 2, IDNET CARD (250 POINTS)
M1-3, IDNET ISOLATOR EARTH FAULT

Fault Not Found

If the message in the lower right corner of the LCD reads **FAULT NOT FOUND** (for a Location Earth Fault Search) or **FAULT CLEAR FAIL** (for an IDNet Channel Earth Fault Search), it means the search could not locate the fault, but it acknowledges that a fault exists.

There are three main possibilities behind this message:

- There are one or more internal wiring earth(s) in the system.
- There are system defects (hardware or software, such as a failed isolation circuit).
- An intermittent earth exists in the system (it occurs inconsistently and is therefore difficult to track via diagnostics).
- The cable to the service port may be grounded due to the remote PC's 3-pin plug. Run the laptop on batteries only, or, use an isolating transformer to the PC to get rid of this earth.
- The fault is on an auxiliary output that was excluded from the search.

The problem may have to be found manually and then corrected in some of the above scenarios.

No Fault

If the message in the lower right corner of the LCD reads **NO FAULT**, it means the IDNet channel search could not locate any earth faults on that channel.

Result Not Available

If the message in the lower right corner of the LCD reads **RESULT NOT AVAILABLE**, it means there is no result to view. This message comes up only when you have selected "Last Search Result" on the menu.

Appendix E

Related Documentation

{xe "documentation set"}

The following manuals are relevant to the 4100ES-S1.

Book Part Number	Title
LT0395	4100ES-S1 AS4428 FIP OPERATOR MANUAL A5
LT0393	4100ES-S1 ASE & AIU/PPU DOOR INSTALL INSTRUCTIONS
LT0400	4100ES-S1 PROGRAMMING AND CONFIGURATION GUIDE
LT0307	4100 Field Wiring Diagrams (see LT0432 also)
LT0432	4100ES Australian Wiring Diagrams
LT0298	24 POINT GRAPHIC I/O Module Installation
574-800	4100ES IDNet Card Installation Instructions
579-786	4100ES IDNet+ Cards Installation Instructions
579-220	4100/4120-Series Relay Modules Installation Instructions
579-205	4100/4120-Series Class A / Class B Zone Modules Installation Instructions
579-221	4100/4120-Series Dual RS-232/2120 Modules Installation Instructions
574-050	4100/4120-Series VESDA Interface Cards Installation Instructions

The following is a listing of US documentation that may be relevant to 4100ES-S1.

Book Part Number	Title
574-674	4100/4120-Series MAPNET Isolator Modules Installation Instructions
574-772	4100U XPS and XNAC Installation Instructions
574-839	4100U City and Relay Cards Installation Instructions
574-848	4100U Fire Alarm System/ System Installation Guide (US version)
574-849	4100ES PC Programmer Programming Manual

Continued on next page

Appendix E: Related Documentation, *Continued*

Book Part Number (cont.)	Title (cont.)
579-182	4100/4120-Series NIC and Media Modules Installation Instructions
579-184	4100/4120-Series Physical Bridges and 4100/4120-Series Media Modules Installation Instructions
579-246	4100U SPS/RPS Installation Instructions
579-248	4100-0632 Terminal Block Utility Module Installation Instructions

Appendix F

Compatible Actuating Devices

Introduction

This appendix describes the following:

- Devices that have been approved as compatible devices for use with the 4100ES-S1.
- Devices approved for use with the IDNet and shows the number allowed per loop.

In this Chapter

Refer to the page number listed in this table for information on a specific topic.

Topic	See Page #
List of Approved Devices	F-1
Compatible Detectors, IDNET	F-4
Compatible Addressable Field Devices, IDNet	F-5

List of Approved Devices

Simplex Range - Conventional Detectors

4098-9413	Heat detector Type A
4098-9414	Heat detector Type B
4098-9415	Heat detector Type C
4098-9416	Heat detector Type D
2098-9201	Photoelectric smoke detector
2098-9576	Ionisation smoke detector

Detector Type	4100-5001/2/4 8 Zone Module	2190-9156 Monitor ZAM	4090-9101 Monitor ZAM
4098-9601EA Photoelectric *	30	20	20
4098-9603EA Ionisation *	30	20	20
4098-9618EA Heat Type A *	30	20	20
4098-9619EA Heat Type B *	30	20	20
4098-9621EA Heat Type D *	30	20	20

* Remote indicator output cannot be wired in common with Tyco 614 series or the Minerva M614 series (and most other Tyco/Olsen) detectors.

Tyco Range - Conventional Detectors

Detector Type	4100-5001/2/4 8 Zone Module	2190-9156 Monitor ZAM	4090-9101 Monitor ZAM
614CH CO/Heat Detector	37	25	25
614I Ionisation Detector	40	29	29
614P Photoelectric Detector	28	19	19
614T Heat Detectors - Type A, B, C, D	30	20	20
T614 Heat Detectors – Mk2 Type A, B, C, D	30	20	20

Continued on next page

System Sensor Range - Conventional Detectors

Detector Type	4100-5001/2/4 8 Zone Module	2190-9156 Monitor ZAM	4090-9101 Monitor ZAM
885WP-B Weatherproof Heat Detector Type B *	40	40	40

* Remote indicator output cannot be wired in common with Tyco 614 series or the Minerva M614 series (and most other Tyco/Olsen) detectors.

Hochiki Range - Conventional Detectors

DCA-B-60R MK V	Type A heat detector
DCC-A	Heat Type A
DCC-C	Heat Type C
DCD-A	Heat Type A
DCD-C	Heat Type C
DFE-60B	Type B heat detector
DCA-B-90R MK 1	Type C heat detector
DFE-90D	Type D heat detector
DFG-60BLKJ	Type B heat detector
DFJ-60B	Heat Type B
DFJ-90D	Heat Type D
SPA-AB	Beam type smoke detector
SIH-AM	Ionisation smoke detector
SIF-A MK 1	Smoke
SIJ-ASN	Smoke
SLK-A	Photoelectric smoke detector
SLG-A MK 1	Smoke
SLG-AM MK 1	Photoelectric smoke detector
SLR-AS	Smoke
HF-24A MK 1	Ultraviolet smoke detector
YBC-R/3A	Plain - non indicating base
YBF-RL/4AH4	LED Indicating base

Olsen Range - Conventional Detectors

B111B	Beam type smoke detector
C24B	Ionisation smoke detector
C29BEX	Ionisation smoke detector
FW81B	Heat detector cable, Type E
P24B	Photoelectric smoke detector
P29B	Photoelectric smoke detector
R23B	Infrared flame detector
R24BEX	Dual spectrum infrared flame detector
T54B	Probe type heat detector type E
T56B	Heat detector types A,B,C,D with Z55B base
T56B	Heat detector types A,B,C,D with Z54B base
V41B/V42B	Ultraviolet flame detector

Continued on next page

Apollo Range - Conventional Detectors

Series 60 Heat detector Type A
Series 60 Heat detector Type B
Series 60 Heat detector Type C
Series 60 Heat detector Type D
Series 60 55000-310 Aus Photoelectric smoke detector
Series 60 55000-240 Aus Ionisation smoke detector

Brooks Range - Conventional Detectors

PFS-A	Heat detector Type A
PFS-B	Heat detector Type B
PFS-C	Heat detector Type C
PFS-D	Heat detector Type D
PFS-P	Photoelectric smoke detector
PFS-P MK II	Photoelectric smoke detector
PFS-I	Ionisation smoke detector
PFS-I MK II	Ionisation smoke detector

Cerberus Range - Conventional Detectors

D01191A	Beam
DL01191A	Beam

Simplex MAPNET 2 Range – Addressable Field Devices

2190-9156	Mapnet 2 Monitor ZAM
2190-9162	Mapnet 2 Signal ZAM
2190-9164	Mapnet 2 Control ZAM
2190-9169	Mapnet 2 Line Powered Short Circuit Isolator
2190-9172	Mapnet 2 Supervised IAM
2190-9173	Mapnet 2 Loop powered 2 Point Input / Output Module
4099-9032NL	Mapnet 2 Addressable Manual Call Point

Compatible Detectors, IDNET

The following lists the detectors approved for use with IDNet and shows current rating and numbers allowed per loop.

Device Type	Operating Current mA	Maximum Number Allowed Per Loop	Maximum Number Allowed Per Line
4098-9714E Analogue Photoelectric Smoke Detector	0.5 (2 with LED on)	250	40*
4098-9717E Analogue Ionisation Smoke Detector	0.5 (2 with LED on)	250	40*
4098-9733E Analogue Heat Type A & B Detector	0.5 (2 with LED on)	250	40*
4098-9754E Analogue Multi (Heat/Photo) Detector	0.5 (2 with LED on)	250	40*

* Maximum allowed by AS 1670.1.

The 9714E, 9717E and 9733E detectors use a (4098-) 9789E addressable base or 9794E addressable sounder base, or 9793 addressable isolator base. The 9754E uses a 9796E addressable base or 9795E sounder base.

The maximum specified loop/line resistance is 40Ω.

The maximum number of LEDs switched on during Alarm on an IDNet loop is 20.

Compatible Addressable Field Devices, IDNet

The following lists the addressable devices approved for use with IDNet and shows current rating and numbers allowed per loop.

Device Type	Operating Current mA	Maximum Addressable Point On Analogue Loop	Maximum Addressable Points on Analogue Line
4090-9116 IDNet Comms Isolator	0.5 (2 with LED on)	250	40*
4090-9118 Relay IAM with T-sense	0.5 (2 with LED on)	250	40*
4090-9117 Addressable Power Isolator	0.5 (2 with LED on)	250	40*
4090-9119 Relay IAM with unsupervised Input	0.5 (2 with LED on)	250	40*
4090-9120 6 Point I/O	0.5	250	40*
4090-9001 or 4090-9051 Supervised IAM	0.65 (2.8 with LED on)	250	40*
4090-9007 Signal IAM	0.5 (2 with LED on)	250	40*
4090-9101 Monitor ZAM	0.65 (2.8 with LED on)	250	40*
4099-9032 Manual Call Point	0.65 (2.8 with LED on)	250	40*

* Maximum allowed by AS 1670.1.

The maximum specified loop/line resistance is 40Ω.

The maximum number of LEDs switched on by an IDNet in alarm is 20.

The 6 Point I/O LED is powered from the external 24V supply, not from the loop.

Note: The relays on the 6 Point I/O are not approved for switching field loads, i.e. the contacts may only be used to switch loads within an earthed cabinet.

Appendix G

4100ES-S1 Specifications

General

System Capacity	500 points of addressable devices, plus 500 points of annunciation.
Expansion	up to 4 x 4100 legacy cards up to 4 x 4" x 5" PDI cards
Cabinet Size	1050H x 550W x 280D (mm)
Cabinet Material	1.2mm Zintec
Cabinet Finish	Powder coated
Cabinet Colour	Cream Wrinkle external, flat black internal trim
Mounting	Wall mount
Mains Input	240V AC, +6%, -10%, 50Hz
Internal Power Supply	24V DC @ 9A
Standby Battery	24V sealed lead acid type up 40Ah
Battery Charger	27.3V DC (nominal)
PSU Supervision	Charger high/low, Battery low/fail
Temperature	-5°C to 45°C
Humidity	10% to 90% RH non-condensing

Refer to Table 4-1 and 4-2 for full SPS specifications.

Fuses

Alarm Relay Card:
F1 Alarm, 3A, 15 x 5mm, Glass Cartridge
F2 Supervisory, 3A, 15 x 5mm, Glass Cartridge
F3 Trouble, 3A, 15 x 5mm, Glass Cartridge

Fused Distribution Board:
F1 24V Out, 1A 20 x 5mm Glass Cartridge
F2 24V Out, 1A 20 x 5mm Glass Cartridge
F3 24V Out, 1A 20 x 5mm Glass Cartridge
F4 24V Out, 1A 20 x 5mm Glass Cartridge

Firmware Features

- WALK TEST System Test
 - 4 Operator Access Levels
 - Event Historical Logging
 - Device selectable Alarm Verification
 - Individual Zone Isolate
 - Addressable device disable/enable
 - Non-volatile Flash EPROM for field editable program changes
 - Expansion cards firmware upgraded via download to flash EPROMs
-

Voltage & Current Ratings of Modules & Assemblies

The DC input voltage range of the following modules is 18-33Vdc. The current listed is nominal for 24Vdc, and may be used for battery capacity calculations.

Module	Name	Quiescent	Alarm
N/A	Master Controller Assembly (includes SPS, CPU, CPU Motherboard with RUI I/F, Operator Interface with LCD)	373mA	470mA
4100-6035	Alarm Relay Card	15mA	37mA
4100-3101AU	IDNet Module without Devices - per device add - with 250 devices add	75mA 0.8mA 200mA	115mA 1mA 250mA
4100-3107AU	IDNet+ Module without Devices - per device add - with 250 devices add		
4100-1288 4100-1289	64/64 Controller plus Switch LED Modules - no LED on - per LED on add - with 64 LEDs on add	20mA 3mA 210mA	3mA 210mA
4100-0620	Transponder Interface, Basic Unit	87mA	87mA
4100-0625	Transponder Interface, Local Mode	112mA	112mA
4100-6014	Network Interface Card	28mA	28mA
4100-6056	Wired Media Module	55mA	55mA
4100-6057	Fibre Optic Media Module	25mA	25mA
4100-6038	Dual RS232 Interface	132mA	132mA

Appendix H

Power Supply & Battery Capacity Calculations

Power Supply

Part of the system design includes calculating that the quiescent load and the alarm load are each less than the rating of the power supply.

Note that the quiescent load includes devices such as door holders that are normally energized, but get switched off during alarm.

The SPS rating is included in the specifications in Chapter 6.

Note that the system current for both the quiescent and the alarm state can be viewed on the front panel by use of the System Current status point under Card Status for the SPS.

Refer to AS 1670.1 Section 8.2.3 for a definition of the loads to be calculated.

Battery Capacity

Battery capacity requirements are specified in AS 1670.1, 2004, Section 3.16.4 with an example shown in Appendix C1.

To calculate the necessary capacity for the 4100ES-S1 system:

- Fill out the table on the next page with the quantities of each type of module or device.
- For each device, calculate the standby current and alarm current.
- Sum the standby and alarm columns to get the total standby current (I(S)) and alarm current (I(A)).

Calculate the required battery capacity from this equation:

$$\text{Battery Capacity (Ahr)} = (I(S) \times 24 + 0.5 \times I(A)) \times 1.2$$

Note: I(A) allows for two zones in Alarm (including Ancillary loads).
The factor of 1.2 in Battery Capacity equation allows for battery efficiency reduction.

Take the calculated value of Battery Capacity and choose the next largest standard size of battery. The 4100ES-S1 cabinet can accommodate 2 x 40Ahr batteries.

The following batteries are compatible with the 4100ES-S1.

- Power Sonic PS12 Series
 - Century Power Sonic PS12 series
 - Sonnenschein A200 Series
 - Sonnenschein A300 Series
 - Century Yuasa NP Series
 - Auscell CJ12 series
 - Power Block PB12 series
-

Module	Description	Qty	Standby Current (A)		Alarm Current (A)	
			each	Subtotal	each	Subtotal
FP0934	4100ES-S1 Basic Panel		0.373		0.47	
4100-1288	64/64 LED Switch Controller (1st controller per bay)		0.02		0.26	
4100-1289	64/64 LED Switch Controller (2nd controller per bay)		0.02		0.26	
4100-3101	IDNET module with 250 addressable devices		0.275		0.365	
4100-0113	RS232 Modem Interface		0.13		0.13	
4100-0154	VESDA HLI		0.13		0.13	
4100-3003	8XSPDT,3A,24VDC Relay module		0.03		0.28	
4100-3024	24 I/O Relay Motherboard + (4100-0302)		0.08		0.3	
4100-4321	6 Supervised Relays		0.02		0.07	
4100-5004	8 AZF Monitor Zone		0.08		0.2	
4100-6014	Modular Network Card (Requires 2 media cards)		0.028		0.028	
4100-6056	Wired Media Card RS485		0.055		0.055	
4100-6057	Fibre Optic Media Card		0.025		0.025	
4100-0160	Fire Panel Internet Interface Module		0.115		0.115	
4100-0766	T-GEN 50 on Amplifier Bracket Voice (2 Slots)		0.05		2.2	
4100-0895	MiniGen on Amplifier Bracket		0.00		0.9	
4100-2895	2nd MiniGen on same Amplifier Bracket		0.00		0.9	
2190-9156	ZAM Monitor - Mapnet 2		0.02		0.09	
2190-9162	ZAM Signal - Mapnet 2		0.015		0.065	
2190-9164	ZAM Control - Mapnet 2		0.01		0.04	
4090-9101	Mapnet / IDNet Monitor ZAM		0.016		0.072	
4090-9117AU	Addressable IDNet Power Isolator		0.01		0.01	
4090-9120AU	IDNet 6 Point I/O Module (4 I/Ps + 2 relay O/Ps)		0.03		0.03	
4090-9050	ZAM 4-20mA Analog - Mapnet 2		0.03		0.03	
4098-9794E	Sounder Base - TrueAlarm				0.015	
4907-0012	Evac Tone Sounder - 24VDC				0.018	
	Other Loads					
	Other Loads					
	Total Power Supply Capacity		I (S) =		I(A) =	

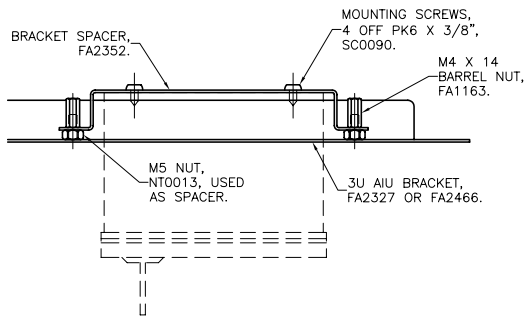
Appendix I

List of Drawings

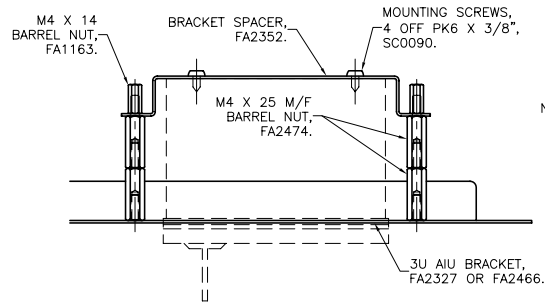
The following drawings are included since they are referred to in this manual or are relevant.

1922-96	WA ASE and Cube ASE to Fire Panel Wiring Details
1976-176	4100ES-S1 Presentation Drawing
1976-174	4100ES-S1 Brigade Door Assembly, Sheet 1 ASE, Sheet 3 PPU/AIU/Cube ASE
1976-181	4100ES Australian Wiring Diagrams (collected in LT0432)

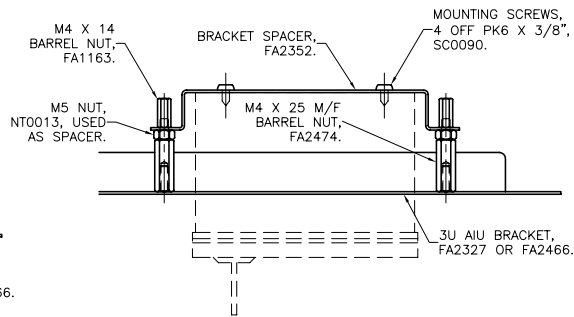




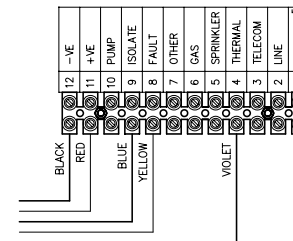
AIU BRACKET ASSEMBLY FOR
18U, 28U AND 40U RACK CABINETS



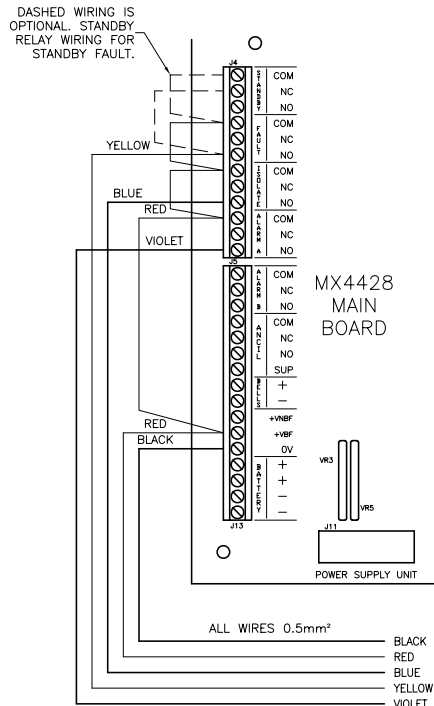
AIU BRACKET ASSEMBLY FOR
15U RACK CABINETS



AIU BRACKET ASSEMBLY FOR
21U RACK CABINETS

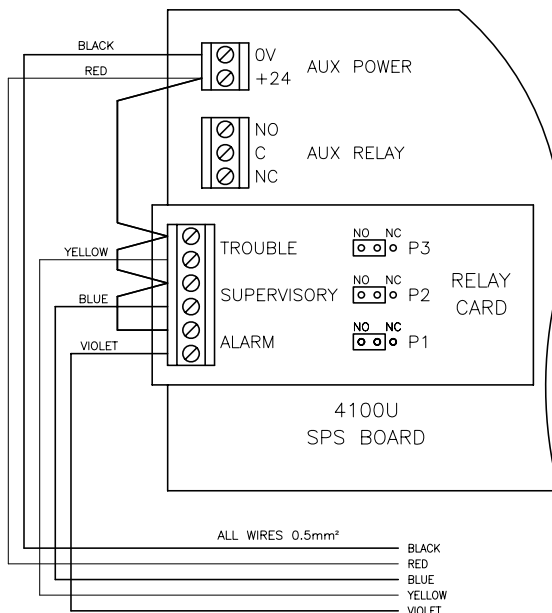


TERMINAL BLOCK ON
BRACKET

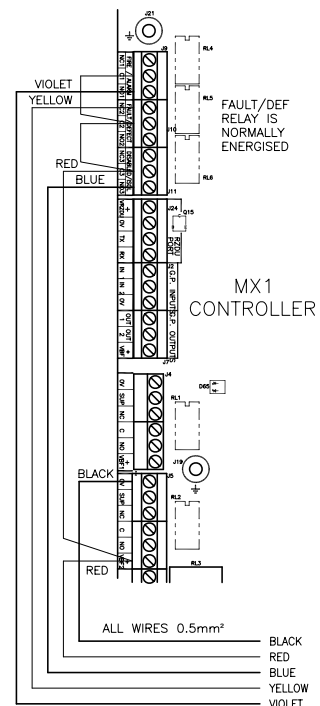


MX4428
MAIN BOARD

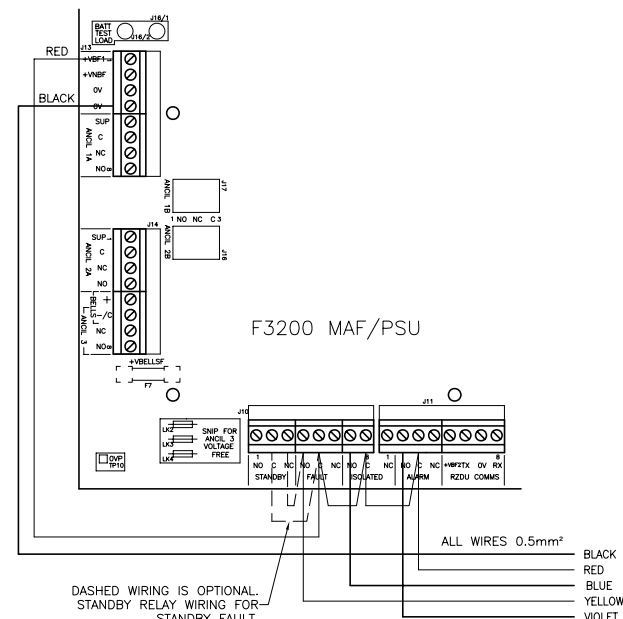
ON RELAY CARD
FIT THE LINKS P1, P2, P3 TO THE NO POSITION
FOR NORMALLY OPEN CONTACTS.
TROUBLE = FAULT
SUPERVISORY = ISOLATE
THE RELAYS ARE NORMALLY DE-ENERGISED
AND ENERGISE ON THE RESPECTIVE STATUS.



4100U
SPS BOARD



MX1
CONTROLLER



F3200 MAF/PSU

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3rd ANGLE PROJECTION

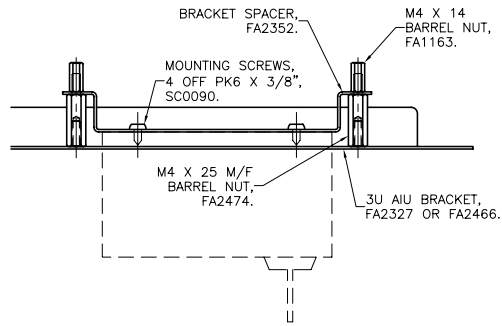
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A	ORIGINAL	ESC1309	KJS	GEL	LSC	DP	15-9-08

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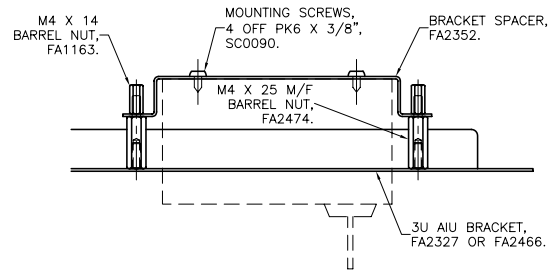
WESTERN AUSTRALIAN
AIU TO FIRE PANEL
WIRING AND MOUNTING DETAILS

DRAWING No: 1922-96 SHEET 1 of 2

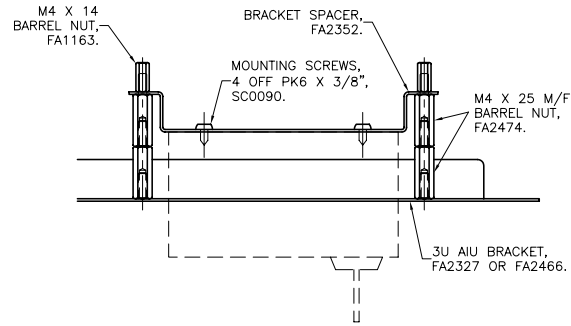
A2 ISS/REV A PART No: LT0316



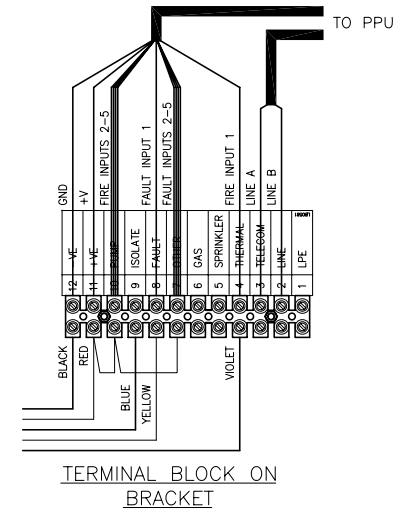
PPU BRACKET ASSEMBLY FOR
18U, 28U AND 40U RACK CABINETS



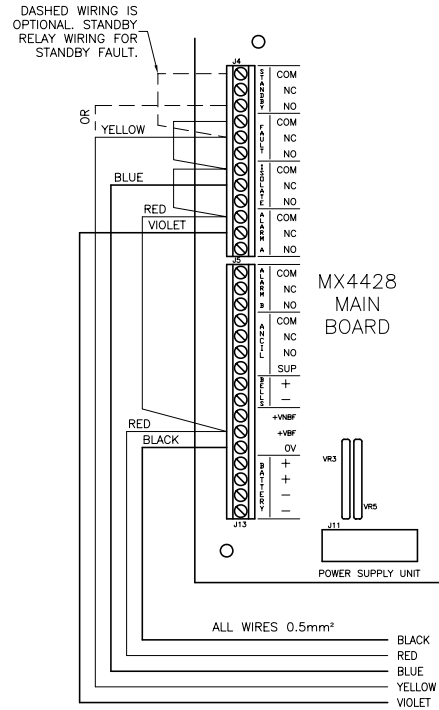
PPU BRACKET ASSEMBLY FOR
15U RACK CABINETS



PPU BRACKET ASSEMBLY FOR
21U RACK CABINETS

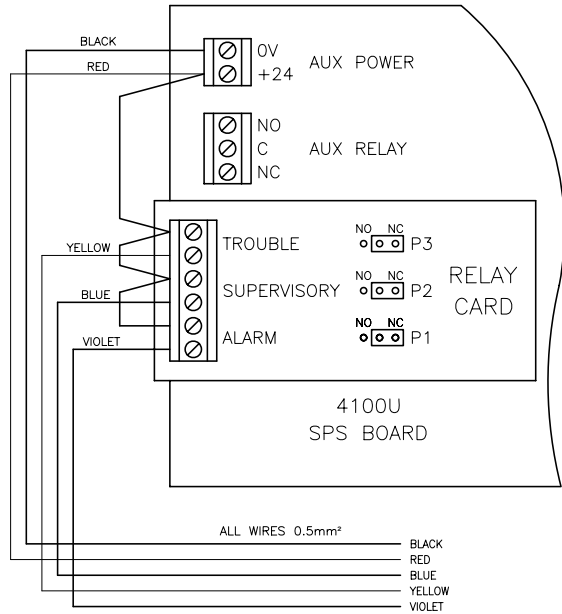


TERMINAL BLOCK ON
BRACKET

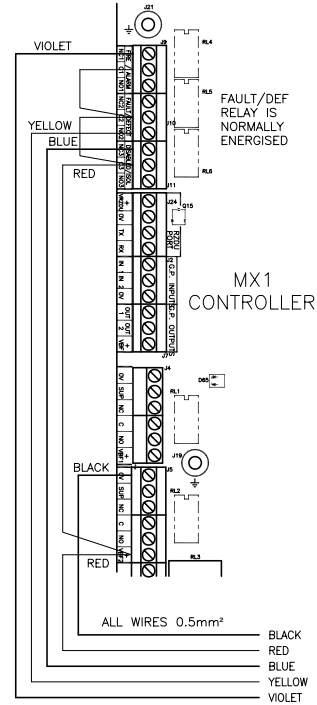


MX4428
MAIN
BOARD

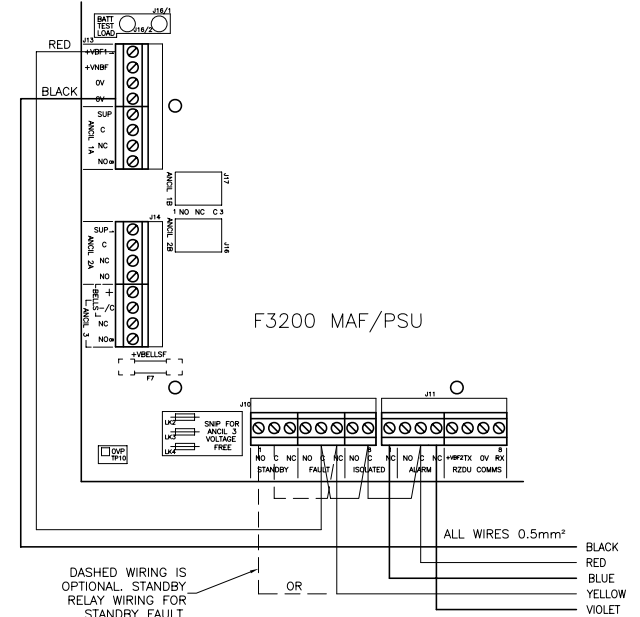
ON RELAY CARD
FIT THE LINKS P1, P2, P3 TO THE NC POSITION
FOR NORMALLY CLOSED CONTACTS.
TROUBLE = FAULT
SUPERVISORY = ISOLATE
THE RELAYS ARE NORMALLY DE-ENERGISED
AND ENERGISE ON THE RESPECTIVE STATUS.



4100U
SPS BOARD



MX1
CONTROLLER



F3200 MAF/PSU

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3rd ANGLE PROJECTION

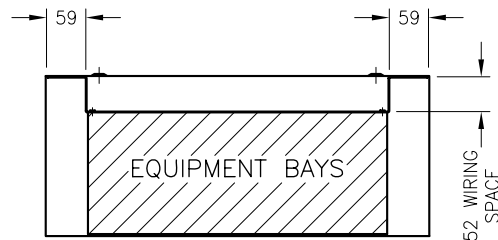
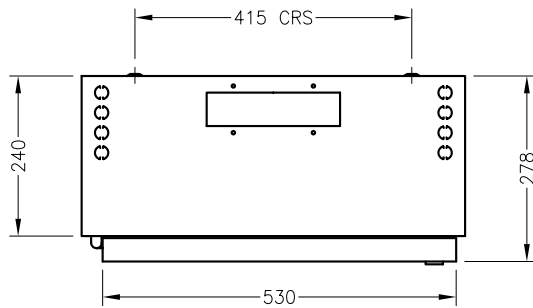
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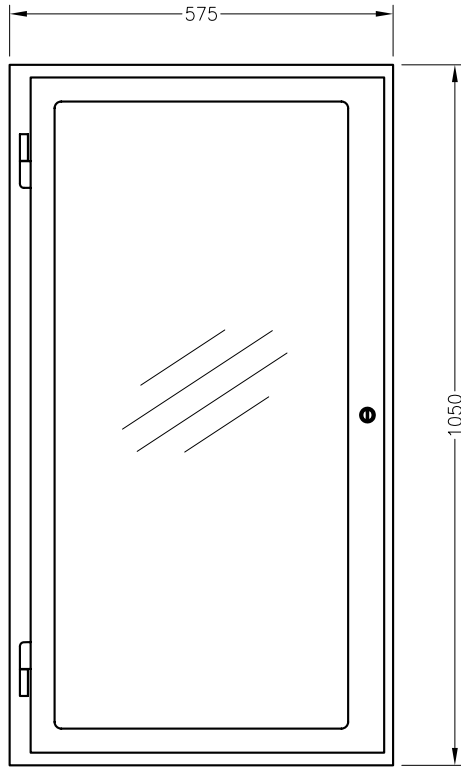
QUEENSLAND
PPU TO FIRE PANEL
WIRING AND MOUNTING DETAILS

DRAWING No: 1922-96 SHEET 2 of 2

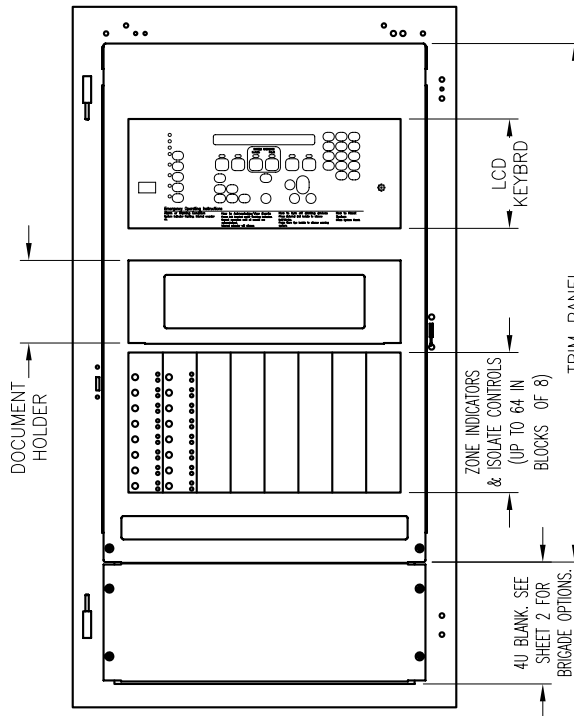
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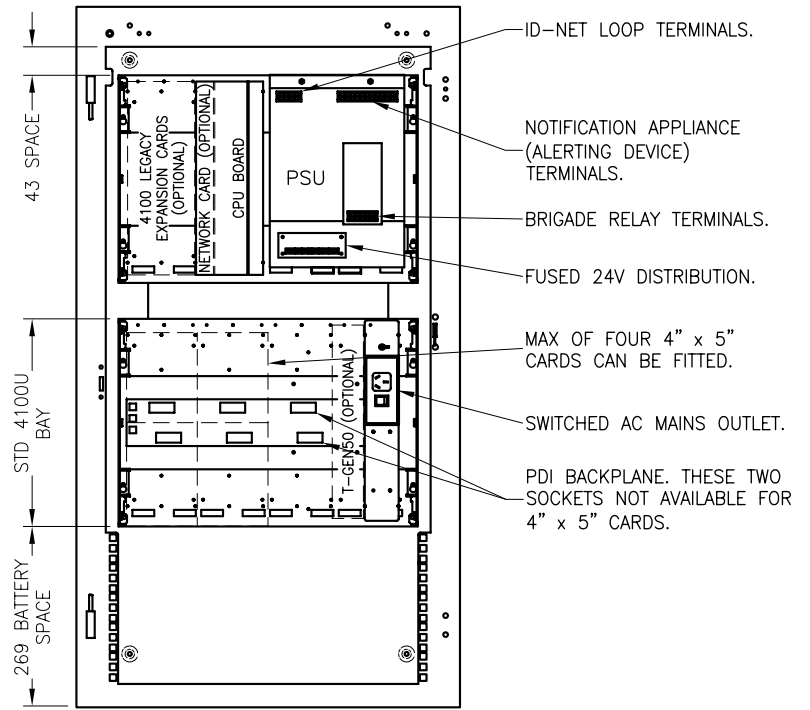
HORIZONTAL CROSS-SECTION
SHOWING WIRING SPACE



FRONT VIEW



FRONT VIEW
OUTER DOOR REMOVED



INSIDE CABINET VIEW
TRIM & BLANK PANEL REMOVED

GENERAL SPECIFICATION

CASE: 1.2mm ZINC COATED MILD STEEL.

FINISH: POWDERCOATED.

COLOUR: CABINET IS CREAM WRINKLE (IPT MR8096), TRIM IS MATT BLACK (IPT DY5069).

WINDOW: 3.0mm ACRYLIC.

MOUNTING: SURFACE MOUNTING OR IN CAVITY WITH FLUSH SURROUND.

SERVICE CLEARANCE: 550mm IN FRONT FOR OPENING OF DOOR.

LOCK: STANDARD 003 KEYED.

CABLE ENTRY: 8 x 20mm KNOCK-OUTS IN TOP OF CASE OR GLAND PLATE TOP.

OUTER DOOR HINGING: LEFT AS STANDARD, (CAN BE CHANGED OVER ON SITE).

BATTERY CAPACITY: ACCOMMODATES 2 x 40Ahr BATTERIES, (197mm L x 170mm H x 165mm D).

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3rd ANGLE PROJECTION

ISS/REV	AMENDMENTS	ECO	DRN	CHKD	AUTH	APVD	DATE
A	ORIGINAL	-	KJS	LSC	RAC	DP	9-2-06
B	4U BLANK ADDED	3740	KJS	RH	LSC	DP	17-4-06
C	FA2488 LABEL OUTLINE ADDED	3846	PAA	LSC	LSC	DSCP	28-5-07
D	DRG TITLE BLOCK UPDATED. PRODUCT WAS 4100U S1.	4352	KJS	LSC	RC	DP	12-4-12

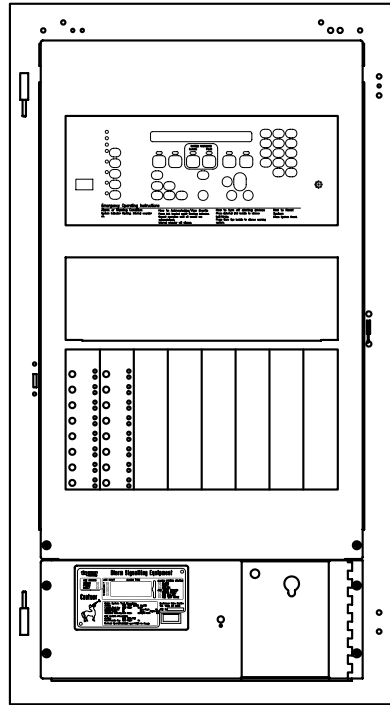
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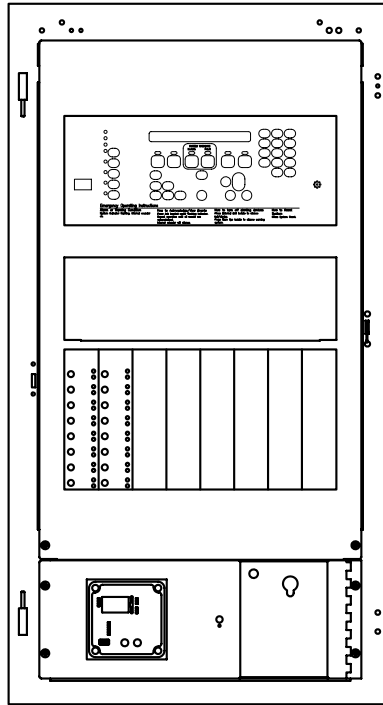
4100ES - S1
21U X 240 DEEP CABINET
PRESENTATION DRAWING

DRAWING No: 1976-176 SHEET 1 of 2

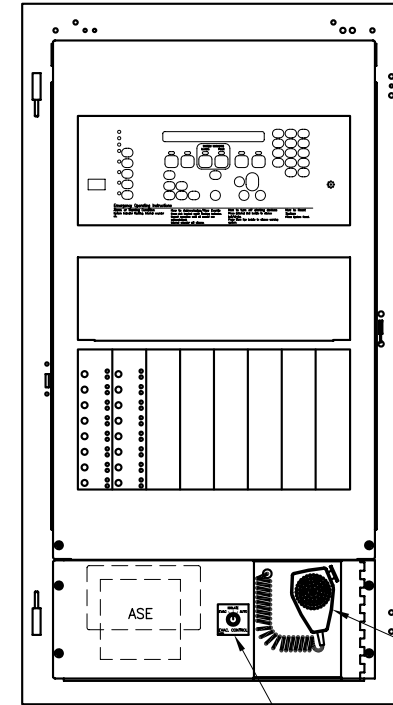
A3 ISS/REV D PART No: FP0934



ASE DOOR



CUBE ASE/WA ASE



T-GEN ACCESSORIES
(FIT EITHER DOOR TYPE)

EVAC. CONTROL
PA MICROPHONE

NOTE: BRIGADE DOORS MUST BE ORDERED SEPARATELY.

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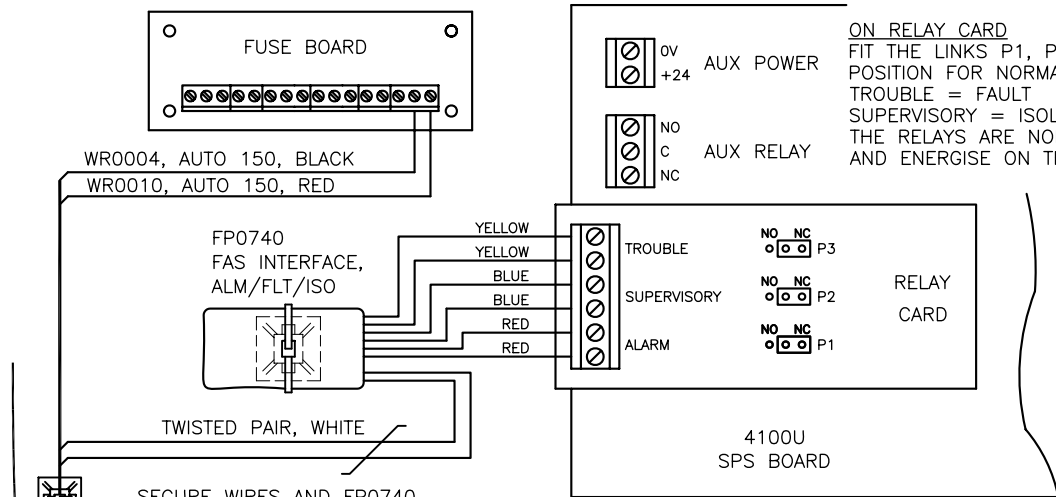
3rd ANGLE PROJECTION

ISS/REV	AMENDMENTS	ECO	DRN	CHKD	AUTH	APVD	DATE
A	ORIGINAL	-	KJS	LSC	RAC	DP	9-2-06
B	DRG TITLE BLOCK UPDATED. PRODUCT WAS 4100U S1.	4352	KJS	LSC	RC	DP	12-4-12

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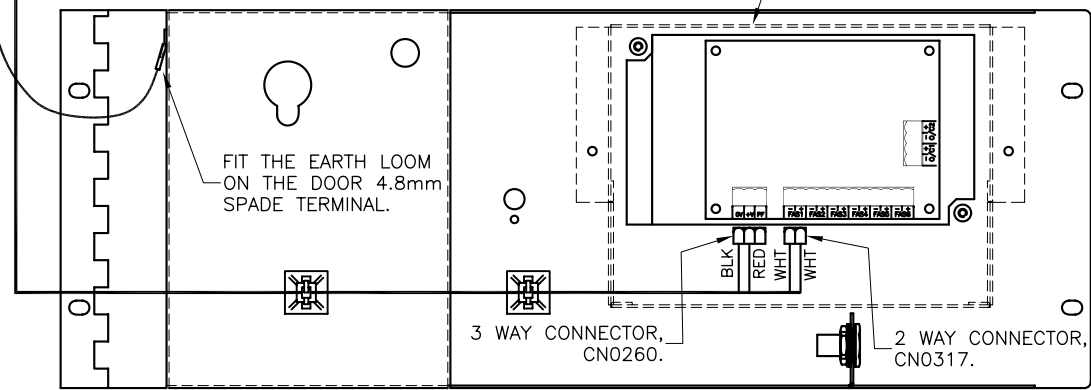
4100ES - S1 21U X 240 DEEP CABINET PRESENTATION DRAWING			
DRAWING No: 1976-176 SHEET 2 of 2			
A3	ISS/REV B	PART No: FP0934	



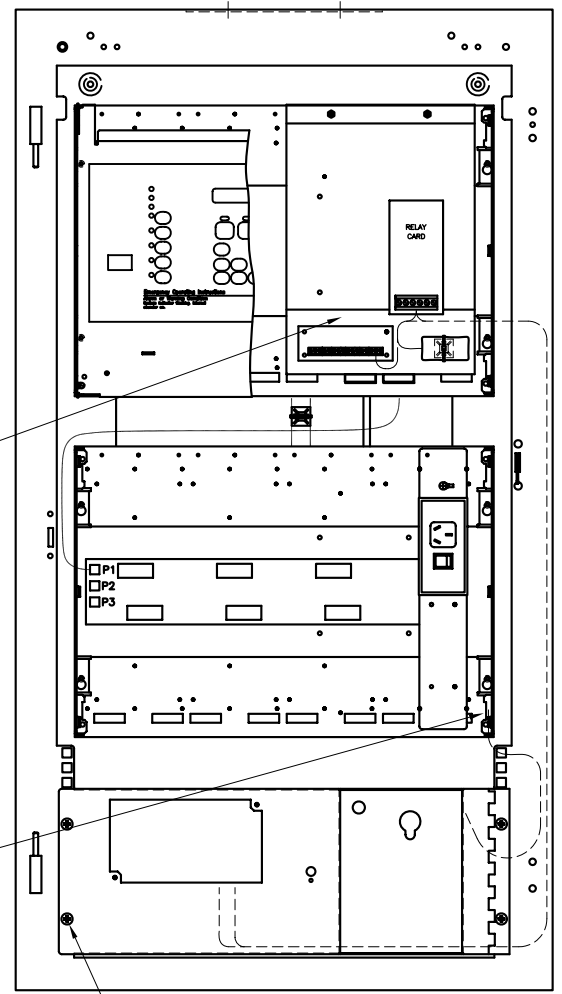
ON RELAY CARD
 FIT THE LINKS P1, P2, P3 TO THE NC POSITION FOR NORMALLY CLOSED CONTACTS.
 TROUBLE = FAULT
 SUPERVISORY = ISOLATE
 THE RELAYS ARE NORMALLY DE-ENERGISED AND ENERGISE ON THE RESPECTIVE STATUS.

SECURE WIRES AND FPO740 AS NECESSARY USING SU0020 & SU0099.

FIX M4 LUG END OF THE DOOR EARTH LOOM TO BAY WITH 6/32 UNC NUT AND M4 SHAKEPROOF WASHERS SUPPLIED.



INSTALLATION WIRING



WIRE 4U ASE/MIC DOOR AND FAS INTERFACE TO SPS BRD AND RELAY BRD AS SHOWN.

FIT 4U DOOR EARTH LOOM TO BAY 6/32 UNC STUD.

MOUNT ASE/MIC DOOR WITH
 4 OFF M6 X 12 SCREW, (SC0058)
 4 OFF FLAT M6 WASHER, (WA0008)
 4 OFF M6 CAGE NUT, (NT0030).

CABINET INSTALLATION

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3rd ANGLE PROJECTION

ISS/REV	AMENDMENTS	ECO	DRN	CHKD	AUTH	APVD	DATE
A	ORIGINAL	-	KJS	LSC	RC	DP	21-12-05
B	SHEET 5 ADDED. THIS WAS SHT 1 OF 4	ECS1309	GEL	LSC	LSC	DSCP	03-12-08

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**4100U-S1
 FAS INTERFACE ALM/FLT/ISO
 WIRING DETAILS**

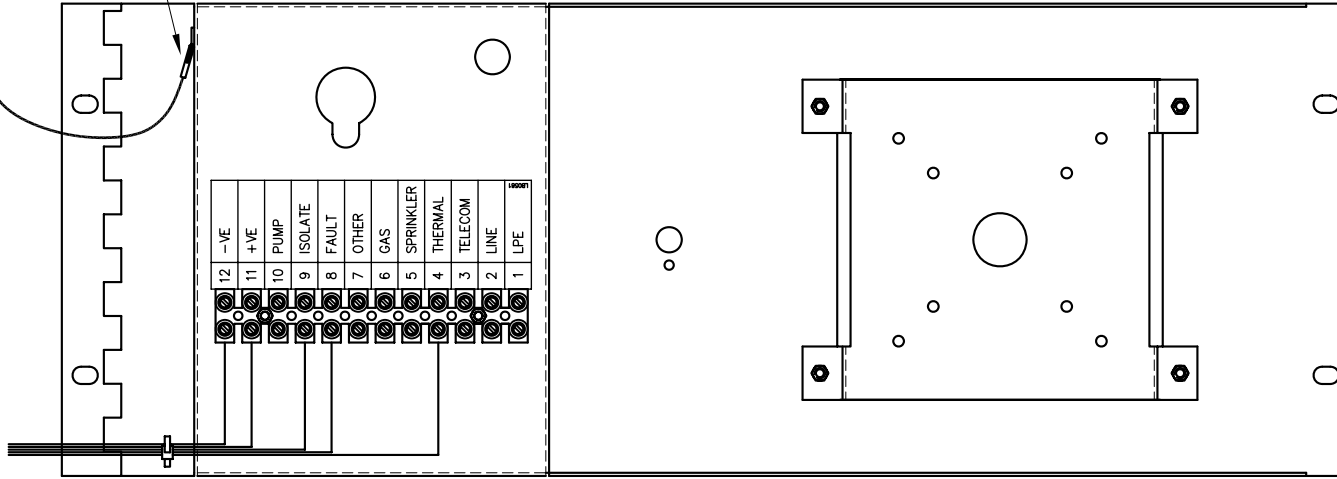
DRAWING No: 1976-174 SHEET 1 of 5

A3	ISS/REV B	PART No: FP0935
----	-----------	-----------------

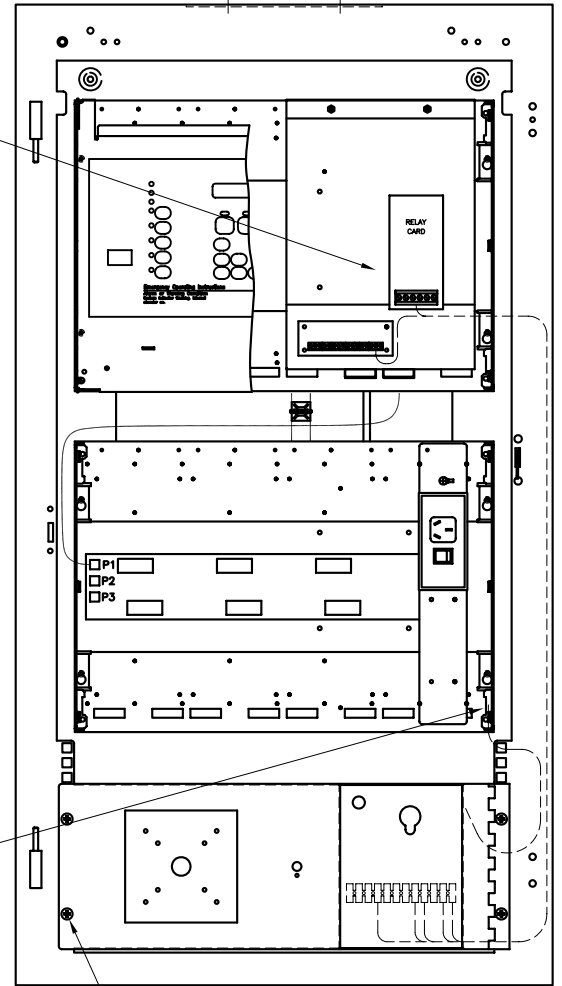
FIX M4 LUG END OF THE DOOR EARTH LOOM TO BAY 6/32 UNC STUD WITH 6/32 NUT AND M4 SHAKEPROOF WASHERS SUPPLIED.

FIT THE EARTH LOOM ON THE DOOR 4.8mm SPADE TERMINAL.

WIRE 4U AIU/PPU DOOR TO SPS BRD AND RELAY BRD AS PER DRAWING 1922-96 SHEETS 1 & 2.



INSTALLATION WIRING



FIT 4U DOOR EARTH LOOM TO BAY 6/32 UNC STUD.

MOUNT AIU/PPU DOOR WITH 4 OFF M6 X 12 SCREW, (SC0058) 4 OFF FLAT M6 WASHER, (WA0008) 4 OFF M6 CAGE NUT, (NT0030).

CABINET INSTALLATION

NOTES:

1. REFER TO LITERATURE LT0316 (DRAWING 1922-96 SHEETS 1 AND 2) FOR MORE WIRING DETAILS.

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3rd ANGLE PROJECTION

ISS/REV	AMENDMENTS	ECO	DRN	CHKD	AUTH	APVD	DATE
A	ORIGINAL	-	KJS	LSC	RC	DP	21-12-05
B	AIU BRACKET UPDATED	3810	KJS	LSC	LSC	DP	12-2-07
C	NOTE 1 UPDATED. REF TO DRG 1901-267 REMOVED.	ESC1309	KJS	GEL	RC	DP	19-11-08
D	SHEET 5 ADDED. THIS SHEET WAS SHT 3 OF 4.	ESC1309	GEL	LSC	LSC	DSCP	03-12-08

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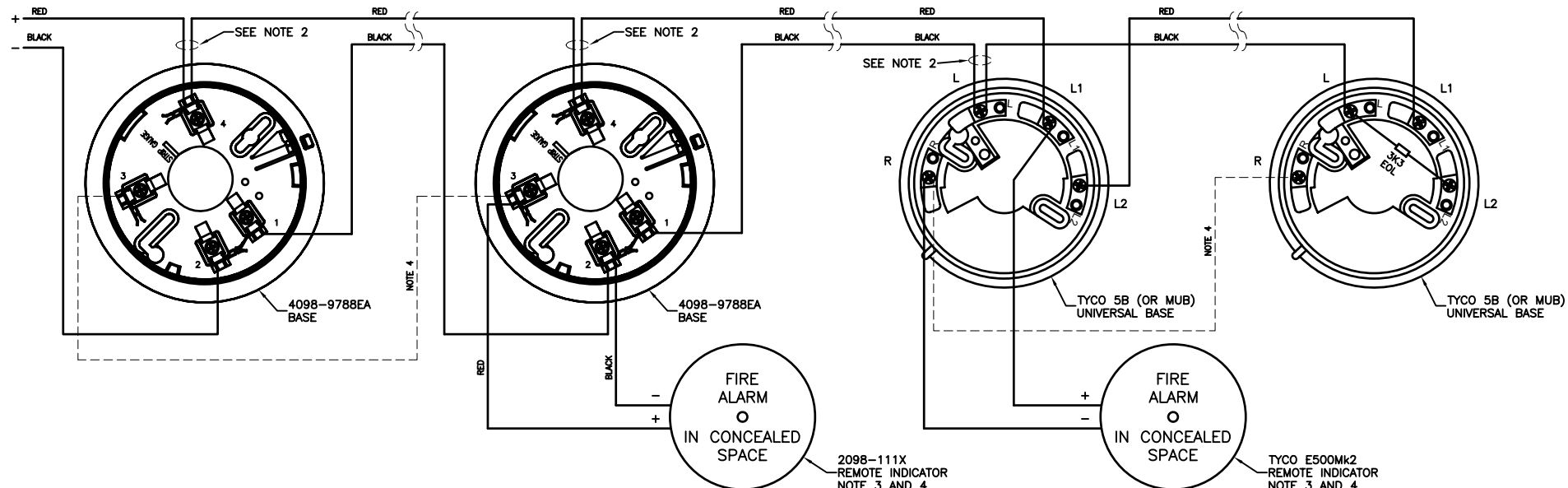
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**4100U-S1
AIU/PPU 4U DOOR
WIRING DETAILS**

DRAWING No: 1976-174 SHEET 3 of 5

A3	ISS/REV D	PART No: FP0937
----	-----------	-----------------

DETECTOR CIRCUIT
SEE SHEET 200, 201,
202 FOR MONITOR
DEVICE WIRING



MAX QTY OF DETECTORS PER CIRCUIT (SEE NOTE 5)				
DETECTOR MODEL	DETECTOR TYPE	4100-5001/2/4 8 ZONE MODULE	2190-9156 MONITOR ZAM	4090-9101 MONITOR ZAM
4098-9601EA	PHOTOELECTRIC	30	20	20
4098-9603EA	IONISATION	30	20	20
4098-9618EA	HEAT TYPE A	30	20	20
4098-9619EA	HEAT TYPE B	30	20	20
4098-9621EA	HEAT TYPE D	30	20	20
USED IN 4098-9788EA BASES				

MAX QTY OF DETECTORS PER CIRCUIT (SEE NOTE 5)				
DETECTOR MODEL	DETECTOR TYPE	4100-5001/2/4 8 ZONE MODULE	2190-9156 MONITOR ZAM	4090-9101 MONITOR ZAM
614CH	CO AND HEAT	37	25	25
614I	IONISATION	40	29	29
614P	PHOTOELECTRIC	28	19	19
614T	HEAT	30	20	20
USED IN 5B OR MUB BASES				

NOTES:

- IF USED, REMOTE INDICATORS ARE POLARIZED; OBSERVE COLOUR-CODED WIRING.
- BREAK WIRES BEFORE CONNECTING TO TERMINAL 4 OR L TO MAINTAIN SUPERVISION. DO NOT LOOP WIRE UNDERNEATH TERMINAL 4 OR L.
- 2098-111X REMOTE INDICATOR CANNOT BE USED WITH TYCO BASES, AND E500 REMOTE INDICATOR CANNOT BE USED WITH 4098-9788EA BASES.
- MULTIPLE BASES OF THE SAME TYPE CAN DRIVE A COMMON REMOTE INDICATOR BY LINKING BASES AS SHOWN. HOWEVER, DO NOT INTERCONNECT REMOTE INDICATOR OUTPUTS OF 4098-9788EA BASES WITH 5B (OR MUB) BASES, OR THE DETECTOR CIRCUIT WILL BE SHORT CIRCUITED.
- WHEN USING MULTIPLE DETECTOR TYPES ON ONE CIRCUIT, THE SUM OF EACH TYPE'S QUANTITY AS A PROPORTION OF ITS MAXIMUM MUST NOT EXCEED 1, E.G. 22 X 614I AND 16 X 4098-9603EA ARE NOT PERMITTED ON 4100-5001 AS 22/40 + 16/30 IS GREATER THAN 1.

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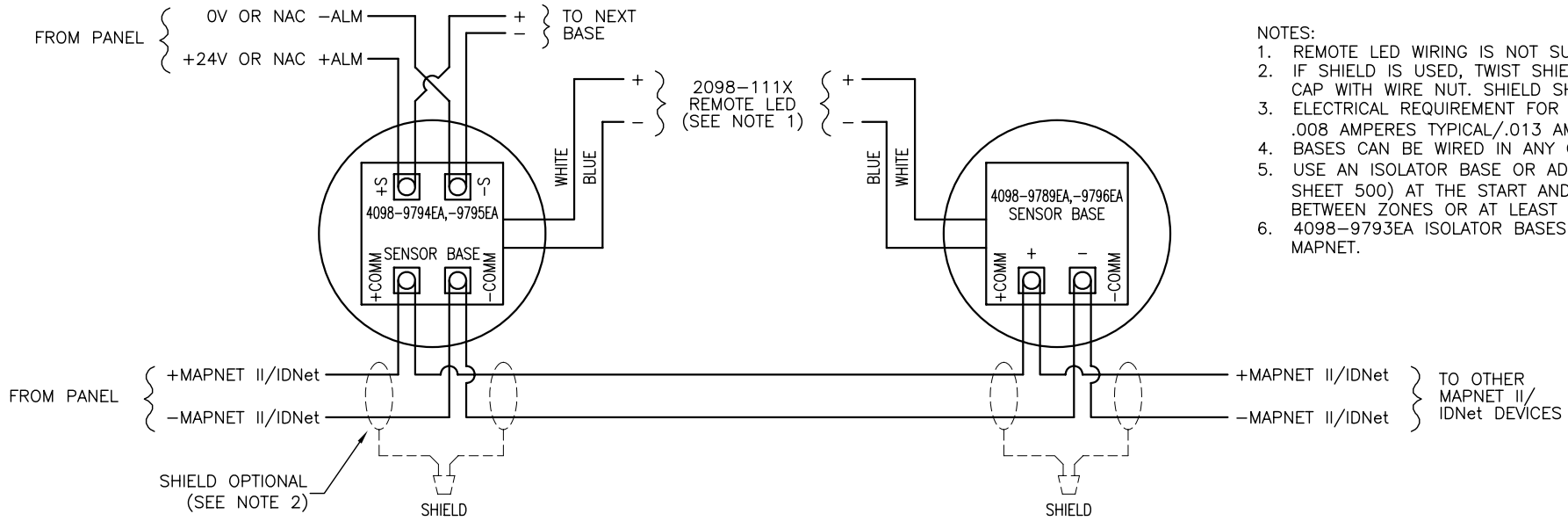
3rd ANGLE PROJECTION

ISS/REV	AMENDMENTS	ECO	DRN	CHKD	AUTH	APVD	DATE
A	ORIGINAL	-	KJS				21-7-06

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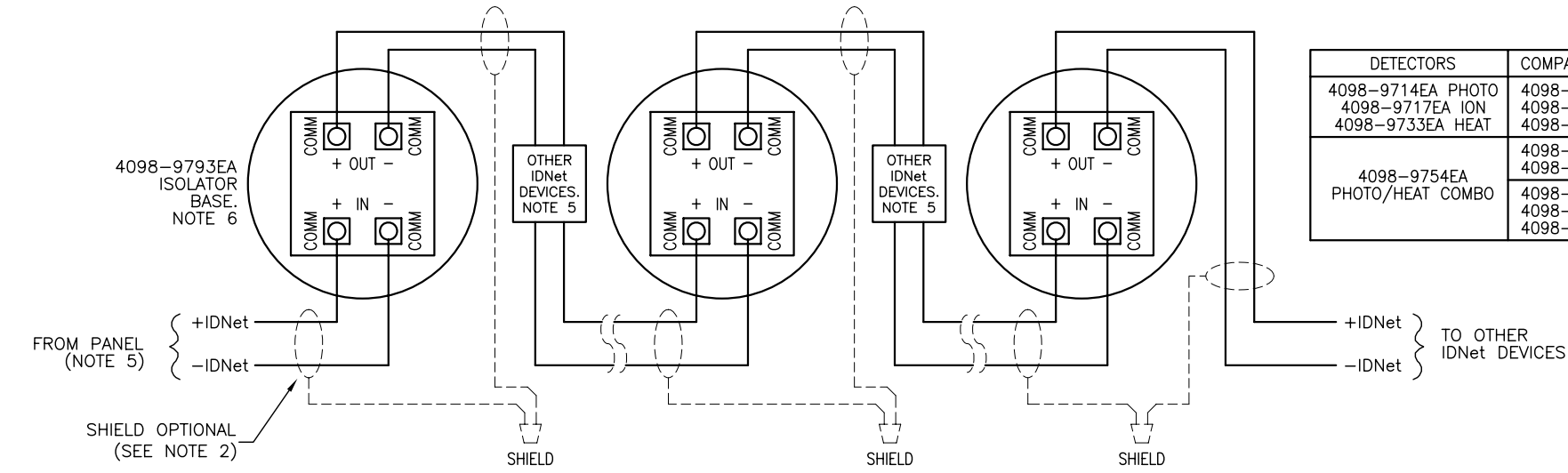
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4100U 2 WIRE DETECTOR BASES - CONVENTIONAL DETECTORS WIRING DIAGRAM			
DRAWING No: 1976-181 SHEET 101 of N			
A3	ISS/REV A	PART No:	



NOTES:

1. REMOTE LED WIRING IS NOT SUPERVISED.
2. IF SHIELD IS USED, TWIST SHIELD WIRES TOGETHER AND CAP WITH WIRE NUT. SHIELD SHOULD BE INSULATED.
3. ELECTRICAL REQUIREMENT FOR EACH BASE: 18 TO 32VDC, .008 AMPERES TYPICAL/.013 AMPERES MAX.
4. BASES CAN BE WIRED IN ANY ORDER.
5. USE AN ISOLATOR BASE OR ADDRESSABLE ISOLATOR (SEE SHEET 500) AT THE START AND END OF EACH LOOP AND BETWEEN ZONES OR AT LEAST EVERY 40 DEVICES.
6. 4098-9793EA ISOLATOR BASES CANNOT BE USED WITH MAPNET.



DETECTORS	COMPATIBLE BASES	
4098-9714EA PHOTO 4098-9717EA ION 4098-9733EA HEAT	4098-9789EA 4098-9793 ISOLATOR, NOTE 6 4098-9794EA SOUNDER	MAPNET OR IDNet
4098-9754EA PHOTO/HEAT COMBO	4098-9795EA SOUNDER 4098-9796EA	MAPNET ONLY
	4098-9789EA 4098-9793EA ISOLATOR 4098-9794EA SOUNDER	IDNet ONLY

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3rd ANGLE PROJECTION

ISS/REV	AMENDMENTS	ECO	DRN	CHKD	AUTH	APVD	DATE
A	ORIGINAL	-	KJS				21-7-06
B	NOTE 5 - ISOLATOR AT START AND END ADDED.	3809	KJS	PA	LSC	DP	20-11-06

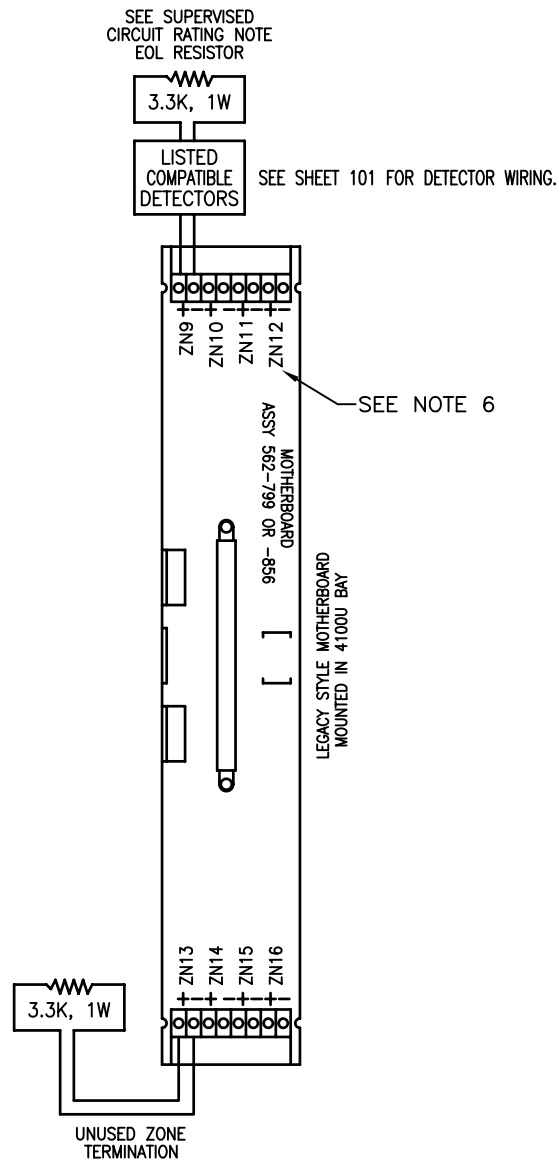
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4100U
TRUEALARM ADDRESSABLE DETECTOR BASES
WIRING DIAGRAM

DRAWING No: 1976-181 SHEET 102 of N

A3	ISS/REV B	PART No:
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SUPERVISED CIRCUIT RATING

STANDBY VOLTAGE RANGE AT DETECTOR...16.5 – 32VDC
 MAXIMUM DETECTOR STANDBY LOAD CURRENT...3.0mA
 MAXIMUM ALARM (SHORT) CIRCUIT CURRENT...60mA
 MAXIMUM LINE RESISTANCE...50 OHMS
 EOL RESISTANCE.....3300 OHMS

NOTES:

1. IF ZONE IS NOT USED, CONNECT A 3.3K, 1W RESISTOR ACROSS ZONE TERMINALS AS SHOWN ON ZONE 13.
2. WIRE MUST BE 0.75 SQ.mm OR GREATER.
3. ALL DEVICE WIRING TO BE TERMINATED TO THE APPROPRIATE ZONE AS SHOWN ON ZONE 9.
4. CONDUCTORS MUST TEST FREE OF ALL GROUNDS.
5. EACH ZONE IS MARKED WITH ITS CIRCUIT NUMBER, ZN1,ZN2,ZN3,...ZN128. REFER TO "4100U PROGRAMMER REPORT" WHICH REFERENCES THE EXACT WIRES CONNECTED, PER JOB.
6. FOR ZONES THAT CONNECT TO CLEAN CONTACTS ONLY, MAX LINE RESISTANCE IS 800 OHMS.

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3rd ANGLE PROJECTION

ISS/REV	AMENDMENTS	ECO	DRN	CHKD	AUTH	APVD	DATE
A	ORIGINAL	-	KJS				21-7-06

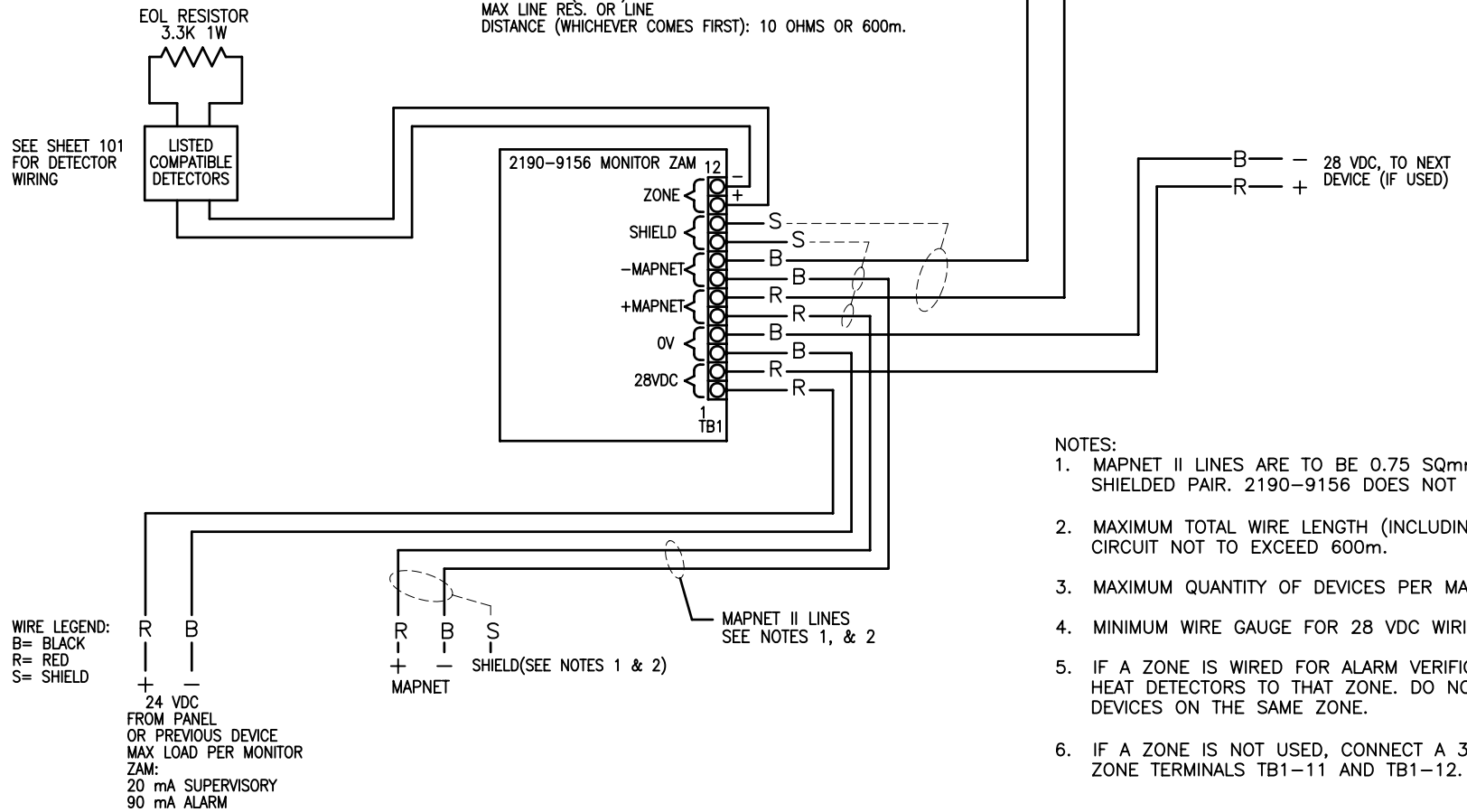
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4100U 8 ZONE MODULE - CONVENTIONAL DETECTORS WIRING DIAGRAM			
DRAWING No: 1976-181 SHEET 200 of N			
A3	ISS/REV A	PART No:	

EACH ZONE

CIRCUIT VOLTAGE RATING: 28 VDC
 LINE SUPERVISION CURRENT: 7.5 mA
 DETECTOR IDLE CURRENT: 2.0 mA
 TOTAL SUPERVISION CURRENT: 9.5 mA
 VOLTAGE SUPPLIED: 15.9 TO 23V
 MAX ALARM (SHORT) CIRCUIT CURRENT: 70 mA
 MAX LINE RES. OR LINE DISTANCE (WHICHEVER COMES FIRST): 10 OHMS OR 600m.



NOTES:

1. MAPNET II LINES ARE TO BE 0.75 SQmm OR GREATER TWISTED SHIELDED PAIR. 2190-9156 DOES NOT WORK WITH IDNET.
2. MAXIMUM TOTAL WIRE LENGTH (INCLUDING ALL BRANCHES) ON CIRCUIT NOT TO EXCEED 600m.
3. MAXIMUM QUANTITY OF DEVICES PER MAPNET CIRCUIT: 127.
4. MINIMUM WIRE GAUGE FOR 28 VDC WIRING IS 0.75 SQmm.
5. IF A ZONE IS WIRED FOR ALARM VERIFICATION, WIRE ONLY SMOKE OR HEAT DETECTORS TO THAT ZONE. DO NOT USE ANY OTHER TYPE OF DEVICES ON THE SAME ZONE.
6. IF A ZONE IS NOT USED, CONNECT A 3.3K 1/2W RESISTOR ACROSS ZONE TERMINALS TB1-11 AND TB1-12.

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3rd ANGLE PROJECTION

ISS/REV	AMENDMENTS	ECO	DRN	CHKD	AUTH	APVD	DATE
A	ORIGINAL	-	KJS				21-7-06

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4100U
 MAPNET MONITOR ZONE ADDRESSABLE MODULE (2190-9156)
 WIRING DIAGRAM

DRAWING No: 1976-181 SHEET 201 of N

A3	ISS/REV	A	PART No:
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WIRE LEGEND:

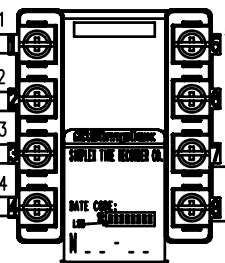
B= BLACK
R= RED
S= SHIELD

MAX LOAD PER MONITOR
ZAM:
16 mA NORMAL
72 mA ALARM
@ 24V

24 VDC FROM PREVIOUS DEVICE
+ RED
- BLACK

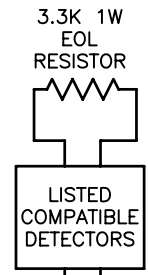
R B S
+ - OPTIONAL SHIELD
IDNet OR MAPNET FROM PREVIOUS DEVICE

4090-9101



DETECTOR CIRCUIT

SUPERVISED CIRCUIT
NOMINAL VOLTAGE 24 VDC
LINE SUPERVISION CURRENT: 7.5 mA
DETECTOR IDLE CURRENT: 2.0 mA
TOTAL SUPERVISION CURRENT: 9.5 mA
VOLTAGE SUPPLIED: 15.4 TO 32V
MAX ALARM (SHORT) CIRCUIT CURRENT: 72 mA
MAX LINE RES. OR LINE DISTANCE (WHICHEVER COMES FIRST): 10 OHMS OR 600m



SEE SHEET 101 FOR DETECTOR WIRING.

RED + } 24V TO NEXT DEVICE (IF USED)
BLACK - }

RED + } TO NEXT DEVICE (IF USED)
BLACK - }

NOTES:

1. MAPNET II OR IDNET LINES ARE TO BE 0.75 SQmm OR GREATER TWISTED SHIELDED PAIR.
2. MAXIMUM TOTAL WIRE LENGTH (INCLUDING ALL BRANCHES) ON CIRCUIT NOT TO EXCEED 600m.
3. MAXIMUM QUANTITY OF DEVICES PER MAPNET CIRCUIT: 127.
4. MINIMUM WIRE GAUGE FOR 28 VDC WIRING IS 0.75 SQmm.
5. IF A ZONE IS WIRED FOR ALARM VERIFICATION, WIRE ONLY SMOKE OR HEAT DETECTORS TO THAT ZONE. DO NOT USE ANY OTHER TYPE OF DEVICES ON THE SAME ZONE.
6. IF A ZONE IS NOT USED, CONNECT A 3.3K 1/2W RESISTOR ACROSS ZONE TERMINALS 7 AND 8.

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3rd ANGLE PROJECTION

ISS/REV	AMENDMENTS	ECO	DRN	CHKD	AUTH	APVD	DATE
A	ORIGINAL	-	KJS				21-7-06

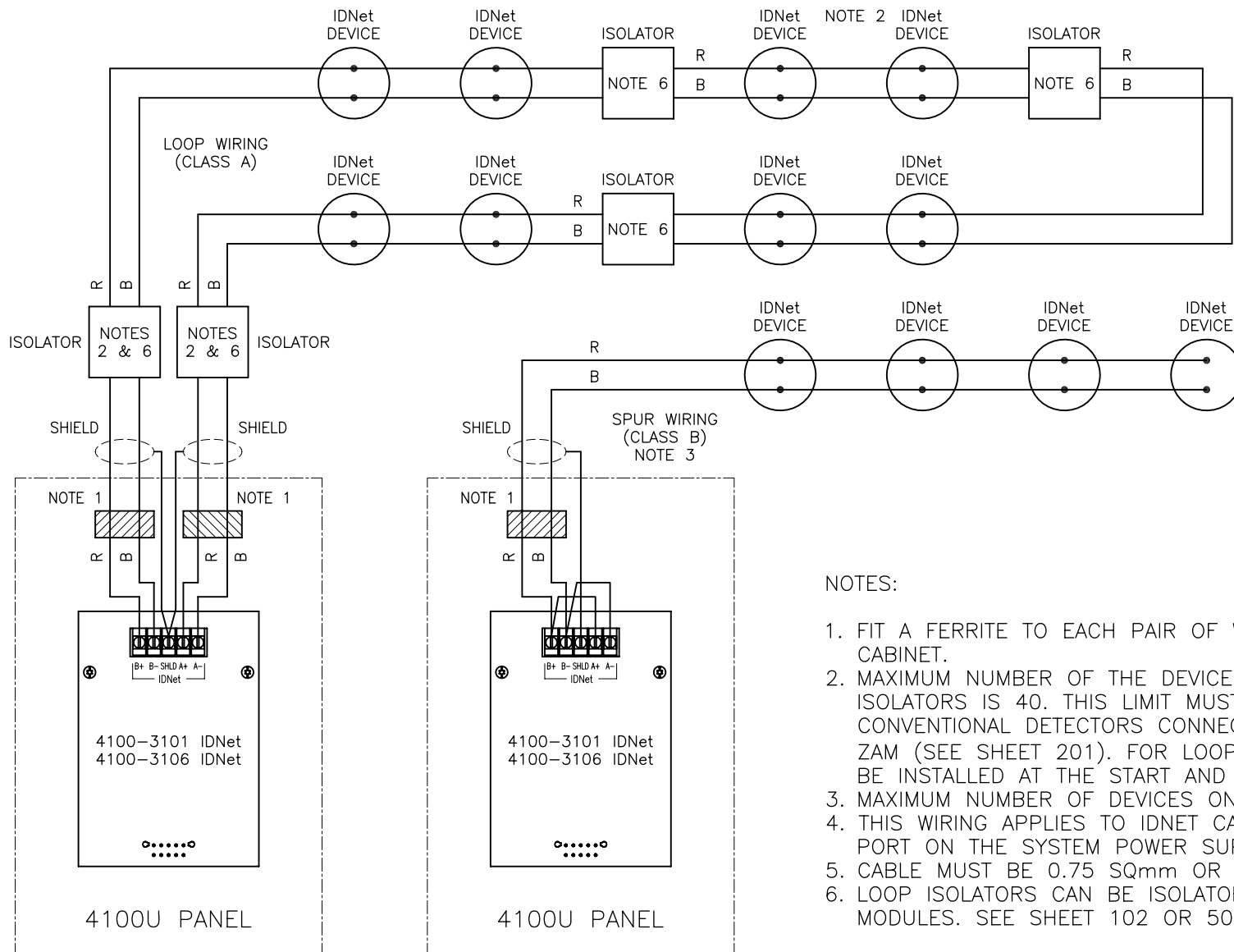


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4100U
ZONE ADDRESSABLE MODULE (4090-9101)
WIRING DIAGRAM

DRAWING No: 1976-181 SHEET 202 of N

A3	ISS/REV A	PART No:
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NOTES:

1. FIT A FERRITE TO EACH PAIR OF WIRES LEAVING THE 4100U CABINET.
2. MAXIMUM NUMBER OF THE DEVICES BETWEEN PAIRS OF ISOLATORS IS 40. THIS LIMIT MUST INCLUDE ANY CONVENTIONAL DETECTORS CONNECTED TO AN ADDRESSABLE ZAM (SEE SHEET 201). FOR LOOP WIRING, AN ISOLATOR MUST BE INSTALLED AT THE START AND END OF THE LOOP.
3. MAXIMUM NUMBER OF DEVICES ON A WIRING SPUR IS 40.
4. THIS WIRING APPLIES TO IDNET CARDS AND TO THE IDNET PORT ON THE SYSTEM POWER SUPPLY.
5. CABLE MUST BE 0.75 SQmm OR HEAVIER.
6. LOOP ISOLATORS CAN BE ISOLATOR BASES OR ISOLATOR MODULES. SEE SHEET 102 OR 500 FOR ISOLATOR WIRING.

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3rd ANGLE PROJECTION

ISS/REV	AMENDMENTS	ECO	DRN	CHKD	AUTH	APVD	DATE
A	ORIGINAL	-	KJS				30-8-06
B	NOTE 2 UPDATED. ISOLATORS AT START AND END.	3809	KJS	PA	LSC	DP	10-11-06
C	FIXED TYPOS	4352	KJS	LSC	RC	DP	13-4-12

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4100U
IDNET LOOP CARD WIRING
WIRING DIAGRAM

DRAWING No: 1976-181 SHEET 203 of N

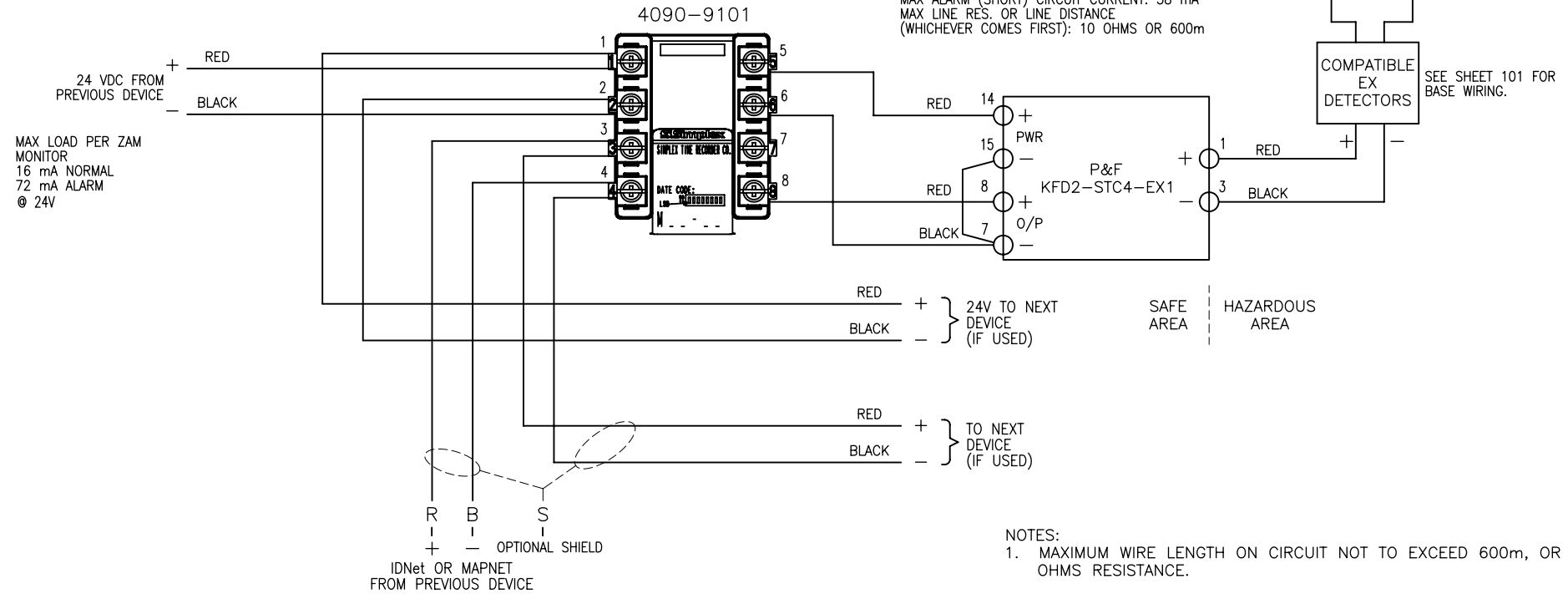
A3 ISS/REV C PART No:

WIRE LEGEND:

B= BLACK
R= RED
S= SHIELD

DETECTOR CIRCUIT

NOMINAL VOLTAGE: 22 VDC
LINE SUPERVISION CURRENT: 7.5 mA
DETECTOR IDLE CURRENT: 1.0 mA
MAX ALARM (SHORT) CIRCUIT CURRENT: 38 mA
MAX LINE RES. OR LINE DISTANCE
(WHICHEVER COMES FIRST): 10 OHMS OR 600m



NOTES:

1. MAXIMUM WIRE LENGTH ON CIRCUIT NOT TO EXCEED 600m, OR 10 OHMS RESISTANCE.
2. MAPNET II OR IDNET LINES ARE TO BE 0.75 SQmm OR GREATER TWISTED SHIELD PAIR.
3. MAXIMUM QUANTITY OF DEVICES PER MAPNET CIRCUIT: 127.
4. MINIMUM WIRE GAUGE FOR 24 VDC WIRING IS 0.75 SQmm.
5. 24V SUPPLY AT ZAM 20.0-33V DC.
6. IF A ZONE IS NOT USED, CONNECT A 3.3K 1/2W RESISTOR ACROSS ZONE TERMINALS 7 AND 8.

COMPATIBLE "Ex" DETECTORS		QTY/CCT
MD601Ex	(HEAT)	20
MDU601Ex	(HEAT & CO)	15
MF601Ex	(ION)	20
MR601TEx	(PHOTO)	9
MU601Ex	(CO)	15
601FEx	(FLAME)	1
SHORT CIRCUIT DEVICE	(T54 ETC)	40

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3rd ANGLE PROJECTION

ISS/REV	AMENDMENTS	ECO	DRN	CHKD	AUTH	APVD	DATE
A	ORIGINAL	-	PAA	RAC	RAC	DSCP	18-7-07

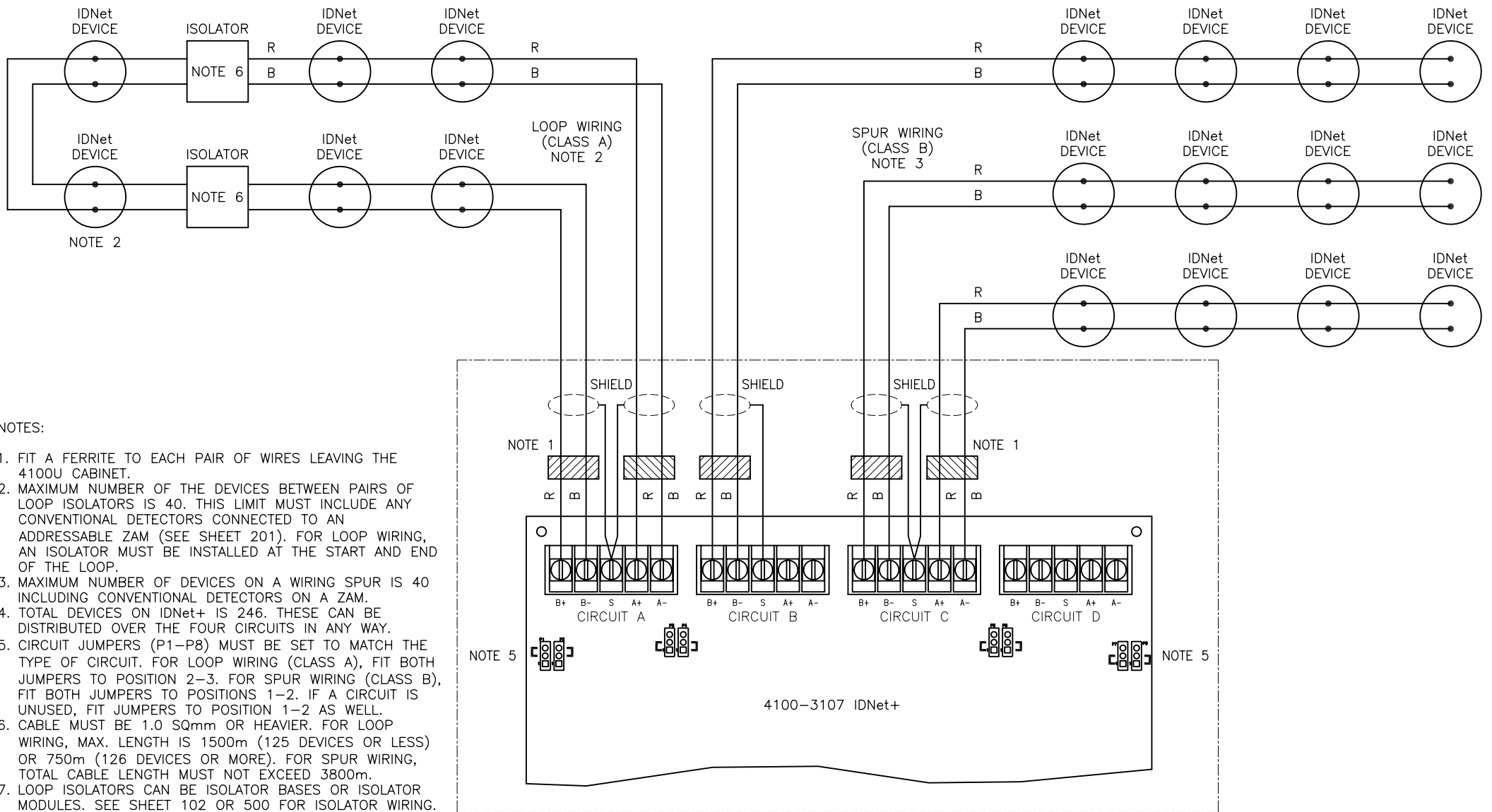
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4100U
4090-9101 ZAM & "Ex" DETECTORS
WIRING DIAGRAM

DRAWING No: 1976-181 SHEET 205 of N

A3	ISS/REV A	PART No:	
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3rd ANGLE PROJECTION

ISS/REV	AMENDMENTS	ECO	DRN	CHKD	AUTH	APVD	DATE
A	ORIGINAL	-	KJS	LSC	RC	DP	13-4-12

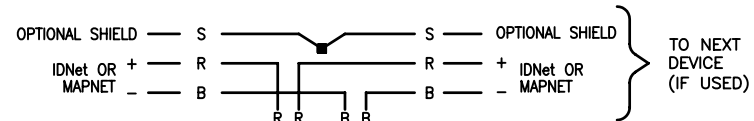
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**4100U
IDNET+ LOOP CARD
WIRING DIAGRAM**

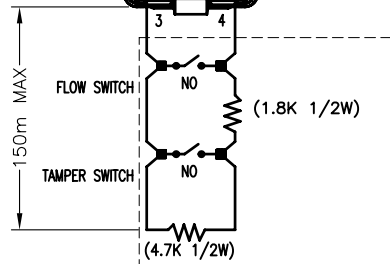
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A3	ISS/REV A	PART No: LT0432
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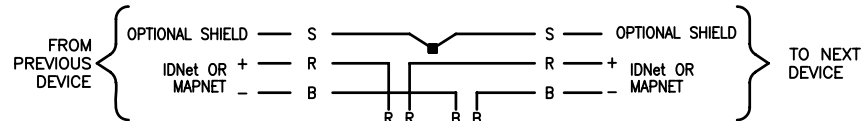


WIRE LEGEND:
R=RED
B=BLACK
S=SHIELD

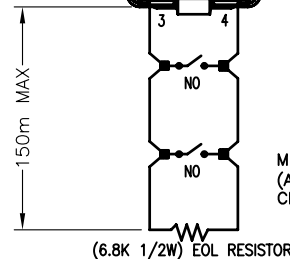
4090-9001
OR
4090-9051



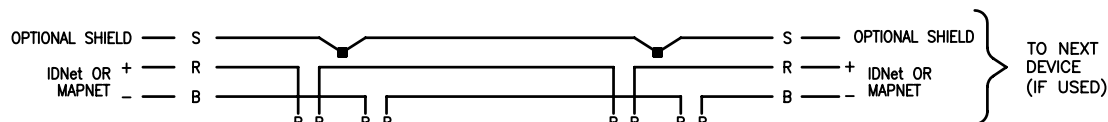
EXAMPLE OF SEPARATE CONTACTS ON ONE IAM.
"FLOW SWITCH" CONTACT OPERATION OVERRIDES "TAMPER SWITCH" CONTACT.



4090-9001
OR
4090-9051



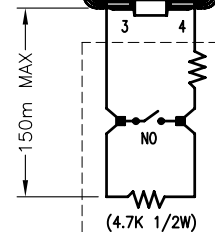
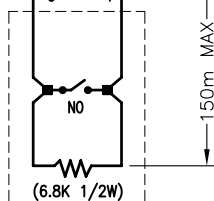
MULTIPLE CLEAN CONTACTS (ANY NUMBER). NO SHORT CIRCUIT SUPERVISION.



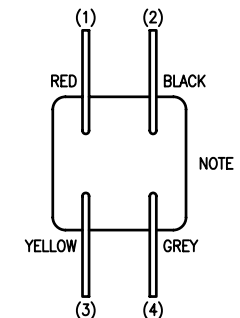
4090-9001
OR
4090-9051

- NOTES:
1. 4090-9051 ENCAPSULATED IAM DOES NOT HAVE LED.
2. IAM CONTACT WIRING MUST MATCH PANEL PROGRAMMING.

SINGLE CONTACT WITHOUT SHORT CIRCUIT SUPERVISION



SINGLE CONTACT WITH SHORT CIRCUIT AND OPEN CIRCUIT SUPERVISION



EQUIVALENT CONNECTION ON 4090-9051 ENCAPSULATED IAM FLYING LEADS

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3rd ANGLE PROJECTION

ISS/REV	AMENDMENTS	ECO	DRN	CHKD	AUTH	APVD	DATE
A	ORIGINAL	-	KJS				21-7-06

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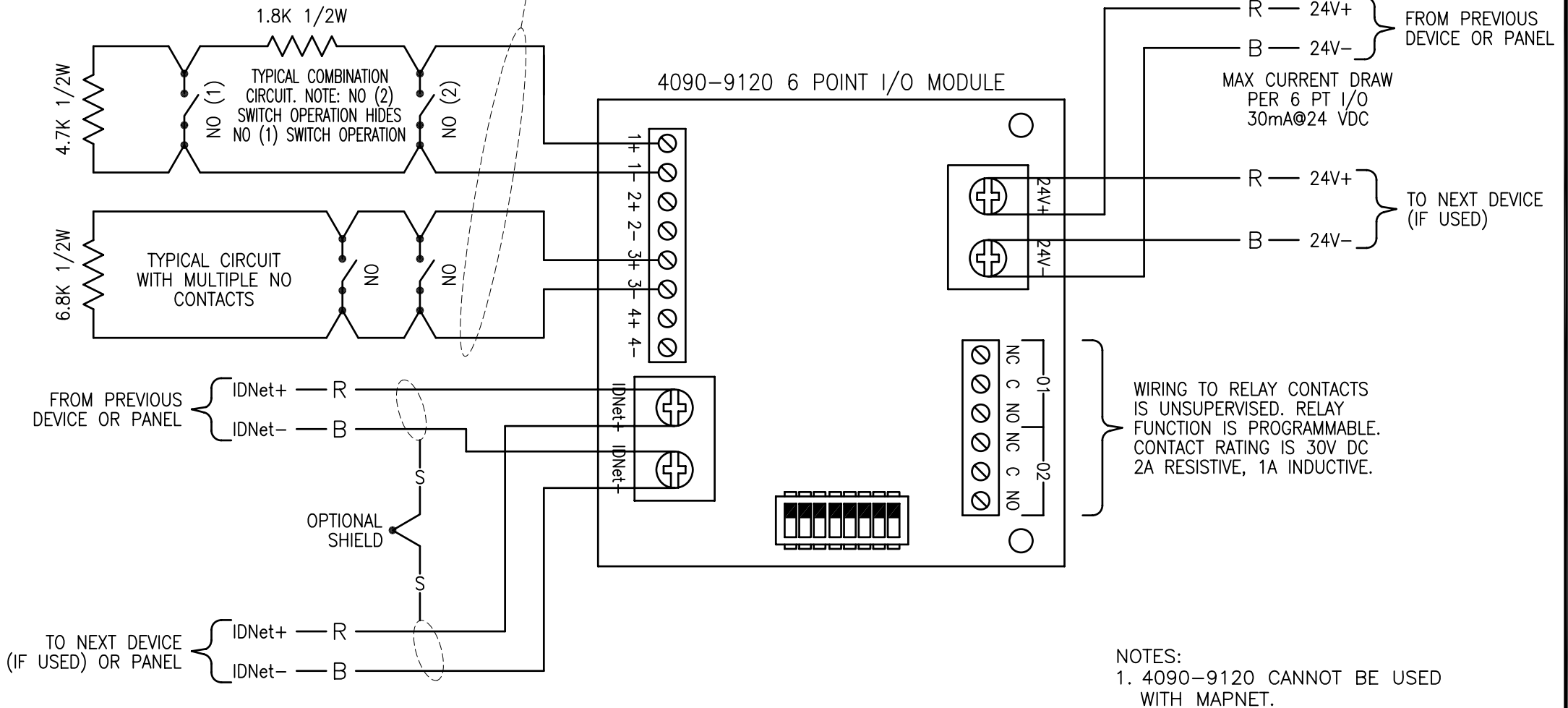
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4100U
SUPERVISED IAM (4090-9001, 4090-9051)
WIRING DIAGRAM

DRAWING No: 1976-181 SHEET 301 of N

A3 | ISS/REV A | PART No:

INPUT CIRCUIT LENGTHS
ARE NOT TO
EXCEED 150m



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3rd ANGLE PROJECTION

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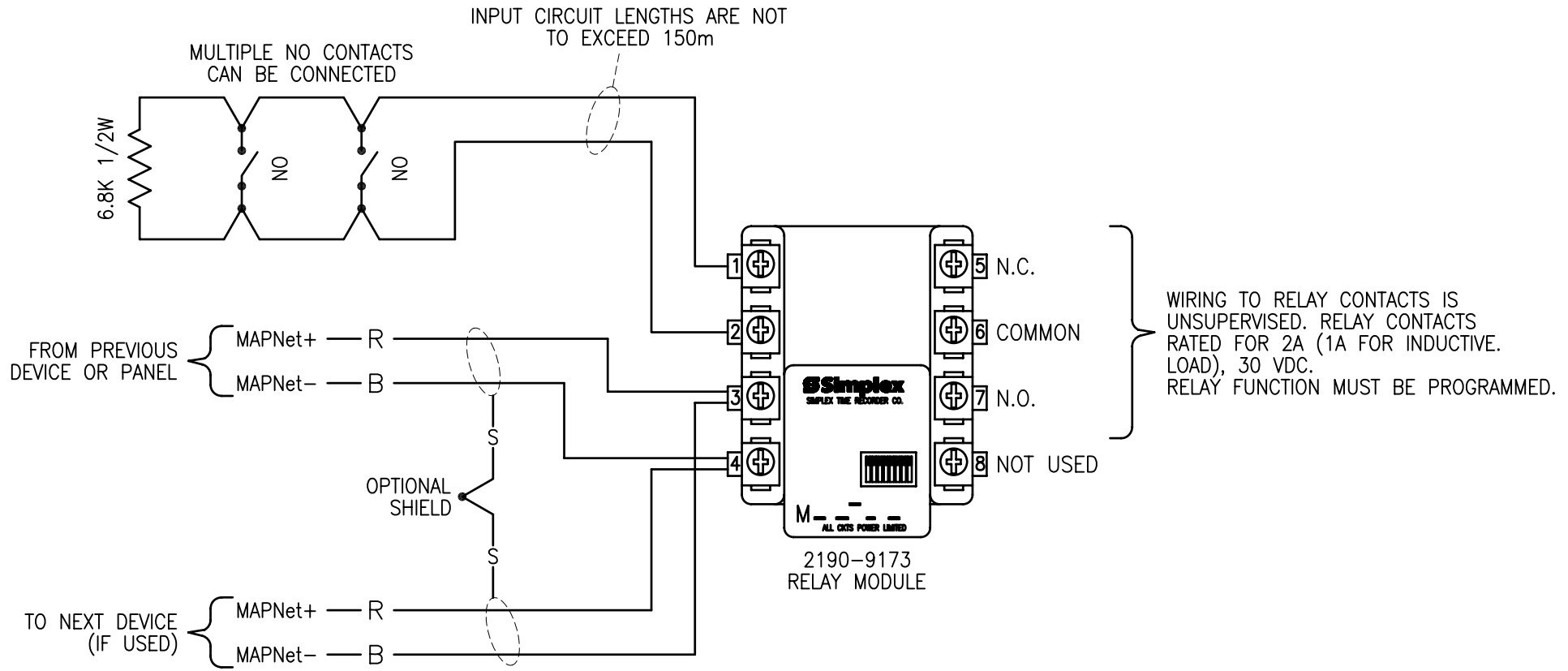
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4100U
IDNET 6 POINT I/O MODULE (4090-9120)
WIRING DIAGRAM

DRAWING No: 1976-181 SHEET 400 of N

A3 | ISS/REV A | PART No:



NOTES:

- DO NOT MOUNT DEVICE WHERE IT WILL EXPERIENCE SHOCKS GREATER THAN 60G, VIBRATION GREATER THAN 2.5mm (10 TO 55 Hz DOUBLE AMPLITUDE), OR MAGNETIC FIELD GREATER THAN 7000A/m.
- 2190-9173 CANNOT BE USED WITH IDNet.

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3rd ANGLE PROJECTION

ISS/REV	AMENDMENTS	ECO	DRN	CHKD	AUTH	APVD	DATE
A	ORIGINAL	-	KJS				21-7-06

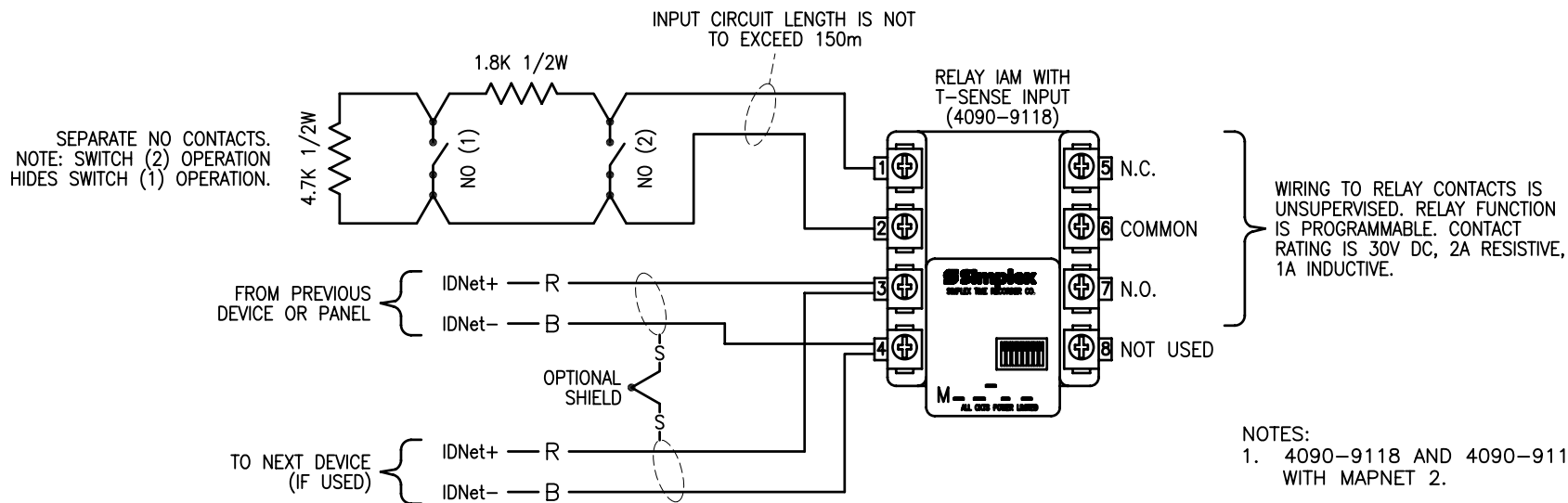
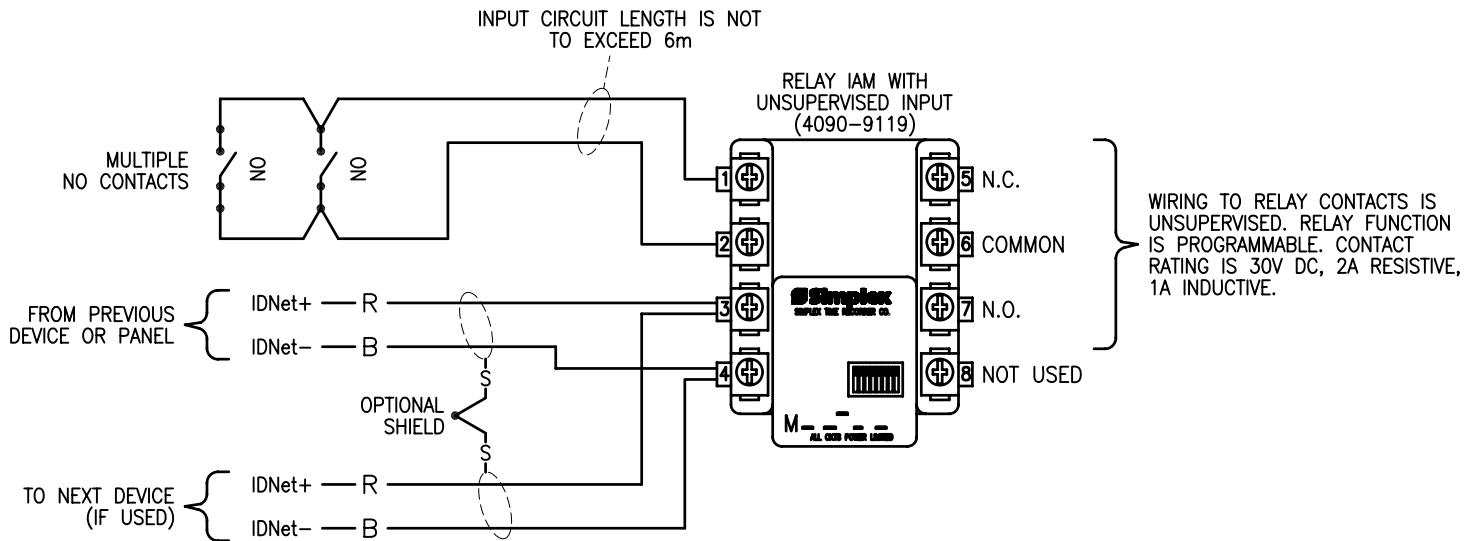
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4100U
MAPNET RELAY MODULE WITH SUPERVISED INPUT
(2190-9173) WIRING DIAGRAM

DRAWING No: 1976-181 SHEET 401 of N

A3 | ISS/REV A | PART No:



- NOTES:
- 4090-9118 AND 4090-9119 CANNOT BE USED WITH MAPNET 2.

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3rd ANGLE PROJECTION

ISS/REV	AMENDMENTS	ECO	DRN	CHKD	AUTH	APVD	DATE
A	ORIGINAL	-	KJS				21-7-06
B	IAM PART NUMBERS CORRECTED.	-	KJS				6-10-06

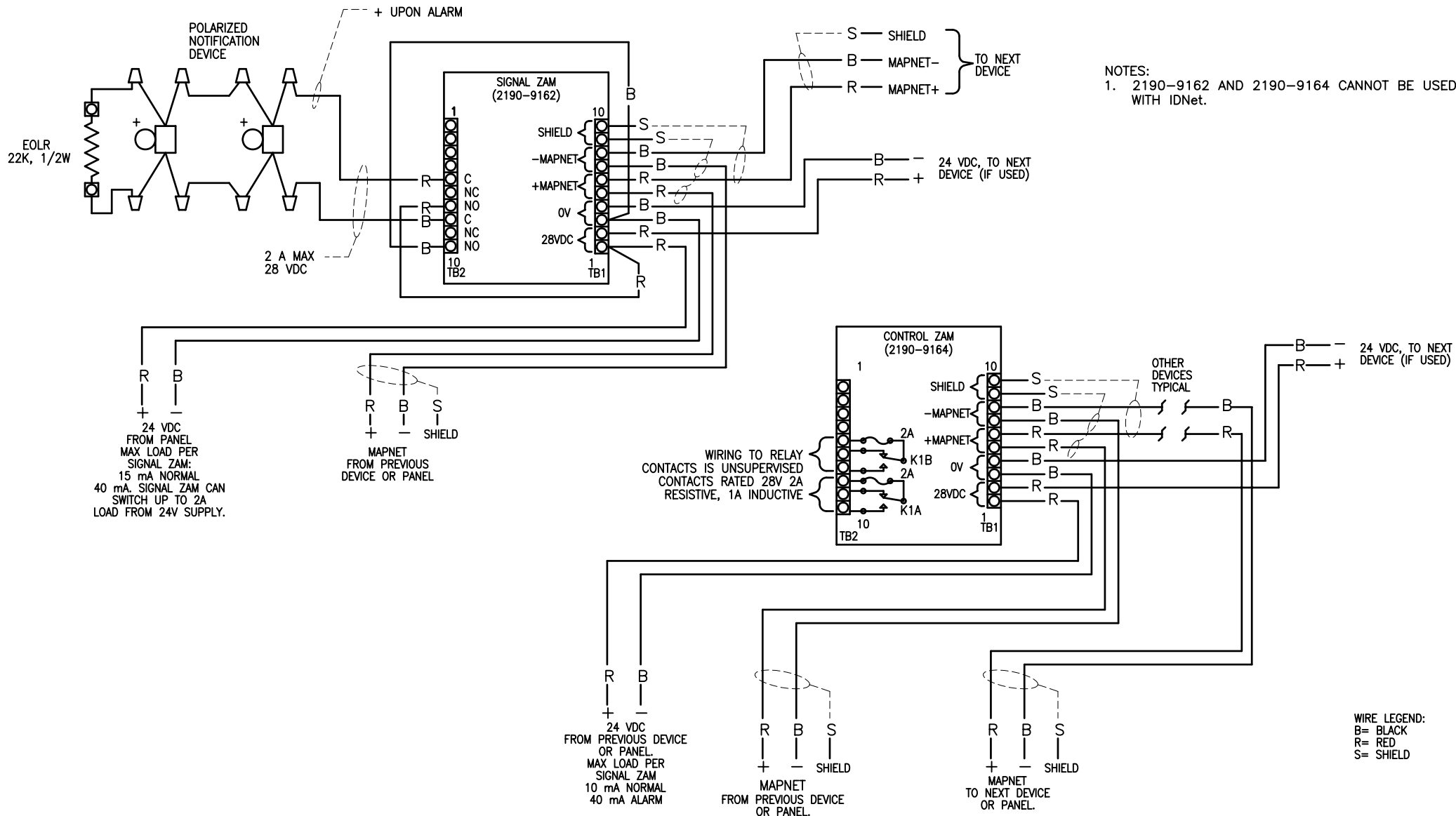
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4100U
IDNET RELAY IAMs WITH INPUTS (4090-9118, 4090-9119)
WIRING DIAGRAM

DRAWING No: 1976-181 SHEET 402 of N

A3	ISS/REV B	PART No:
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3rd ANGLE PROJECTION

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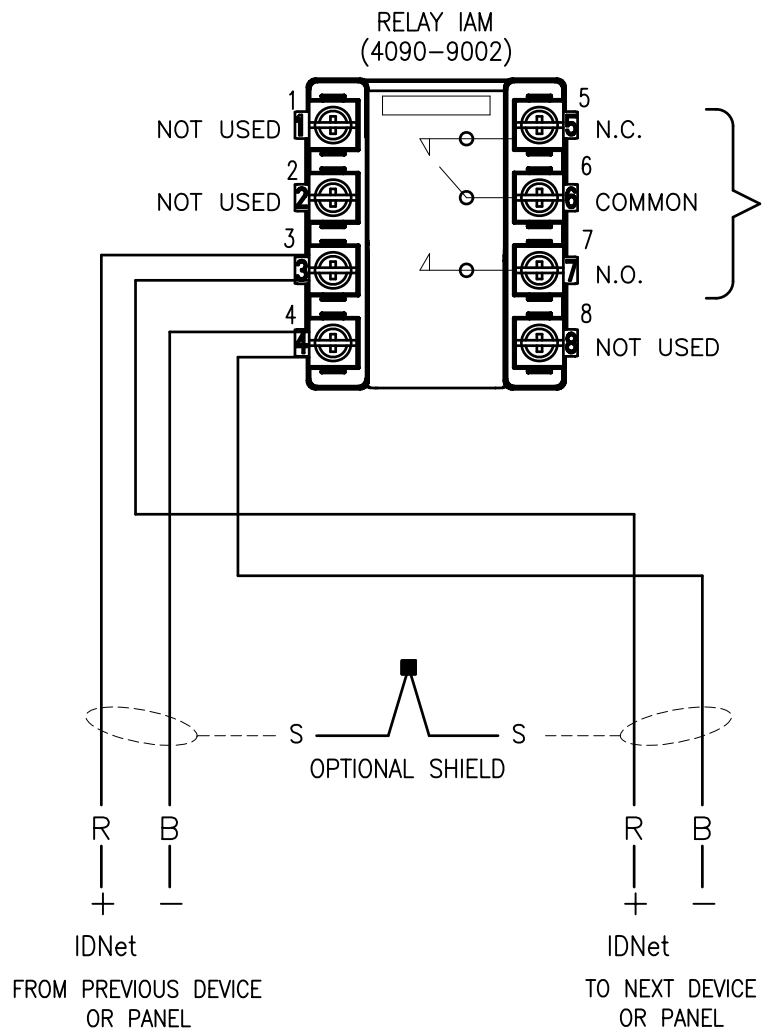
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4100U
MAPNET 2 SIGNAL ZAM (2190-9162) AND CONTROL ZAM (2190-9164) WIRING DIAGRAM

DRAWING No: 1976-181 SHEET 403 of N

A3	ISS/REV A	PART No:
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WIRING TO RELAY CONTACTS IS UNSUPERVISED.
RELAY CONTACTS RATED AT 2A, 30 VDC.
(1A FOR INDUCTIVE LOAD).
THE OPERATION OF THE RELAY IS PROGRAMMABLE.

NOTES:

1. IF SHIELD IS PRESENT, IT SHOULD BE CONNECTED TO THE OUTGOING IDNet SHIELD TO PROVIDE A CONTINUOUS SHIELD OVER THE LENGTH OF THE IDNet CIRCUIT. DO NOT CONNECT THE SHIELD TO ANY METALWORK AT THE ZAM.
2. 4090-9002 CANNOT BE USED WITH MAPNET.

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3rd ANGLE PROJECTION

ISS/REV	AMENDMENTS	ECO	DRN	CHKD	AUTH	APVD	DATE
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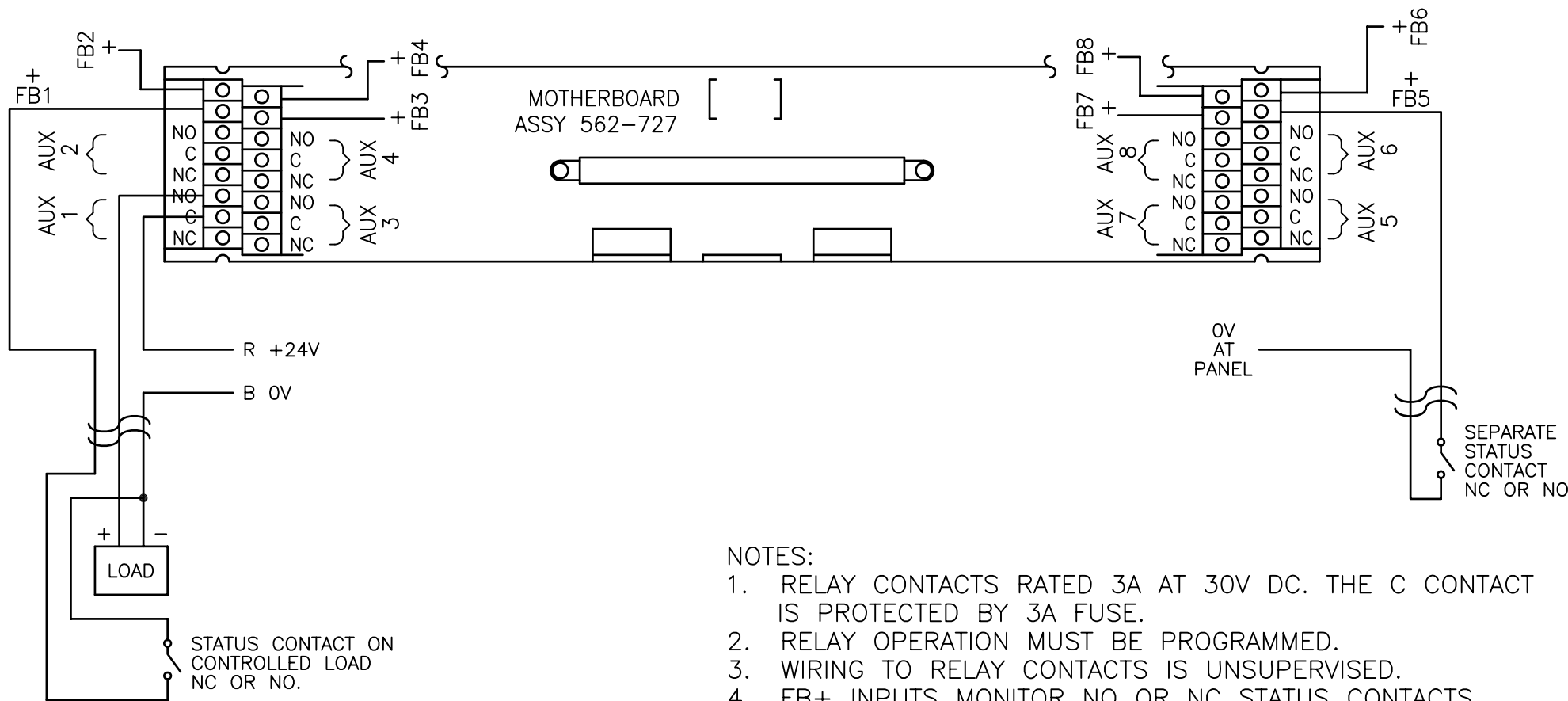
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4100U
IDNET RELAY IAM (4090-9002)
WIRING DIAGRAM

DRAWING No: 1976-181 SHEET 404 of N

A3	ISS/REV A	PART No:
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NOTES:

1. RELAY CONTACTS RATED 3A AT 30V DC. THE C CONTACT IS PROTECTED BY 3A FUSE.
2. RELAY OPERATION MUST BE PROGRAMMED.
3. WIRING TO RELAY CONTACTS IS UNSUPERVISED.
4. FB+ INPUTS MONITOR NO OR NC STATUS CONTACTS FROM CONTROLLED DEVICES WITHOUT SUPERVISION. STATUS CONTACT CIRCUIT MUST RETURN TO PANEL 0V AS IN THE EXAMPLES. FB1 EXAMPLE USES THE LOAD 0V WIRING TO RETURN.

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3rd ANGLE PROJECTION

ISS/REV	AMENDMENTS	ECO	DRN	CHKD	AUTH	APVD	DATE
A	ORIGINAL	-	KJS				21-7-06

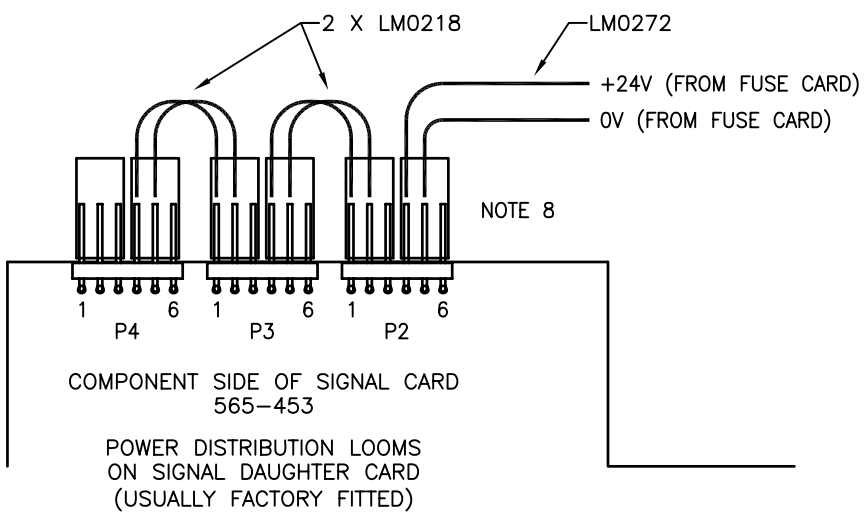
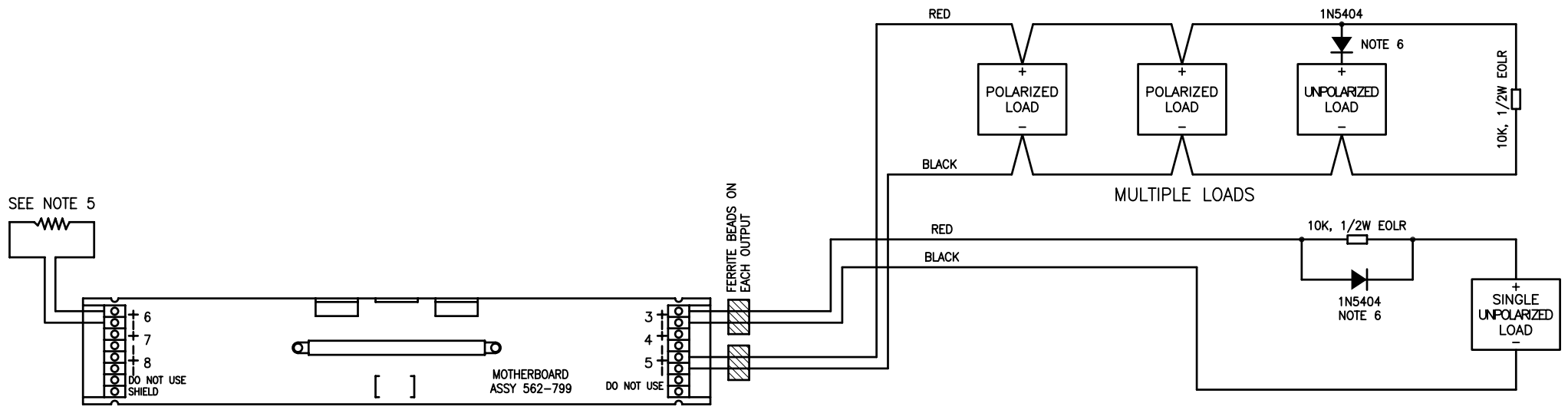
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4100U
8 POINT AUXILIARY RELAY CARD (4100-3003)
WIRING DIAGRAM

DRAWING No: 1976-181 SHEET 405 of N

A3	ISS/REV A	PART No:	
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NOTES:

1. ALL WIRING MUST BE 1.5 SQ.mm SHIELDED PAIR OR TO LOCAL CODE.
2. CONDUCTORS MUST BE FREE OF ALL GROUNDS.
3. ALL WIRING IS SUPERVISED UNLESS OTHERWISE NOTED. SUPERVISORY POWER: 2.4 mA @ 24V DC.
4. ALL SIGNAL PORTS HAVE IDENTICAL CHARACTERISTICS: CAPACITY IS AT 30V DC.
5. IF A CIRCUIT IS NOT USED, CONNECT 10K, 1/2W EOLR FROM SIG+ TO SIG- TERMINALS.
6. BLOCKING DIODE - (1N5404, 3A) - REQUIRED WHEN SWITCHING NON-POLARIZED LOADS.
7. OUTPUT OPERATION MUST BE PROGRAMMED. THERE IS NO DEFAULT BEHAVIOUR.
8. DISTRIBUTION LOOMS AND CONNECTORS:
 - P2 CONNECTS TO THE FIRST TWO POINTS (SIGNAL 3 AND 4)
 - P3 CONNECTS TO THE NEXT TWO POINTS (SIGNAL 5 AND 6)
 - P4 CONNECTS TO THE FIRST TWO POINTS (SIGNAL 7 AND 8)
 - PINS 1 AND 4 CONNECT TO +24V.
 - PINS 2 AND 5 CONNECT TO 0V.
 - PINS 3 AND 6 ARE TO LOOP SHIELD THROUGH (IF USED).
 - JUMPERS P5 TO P10 ON SIGNAL CARD ARE IN "S" POSITION.

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3rd ANGLE PROJECTION

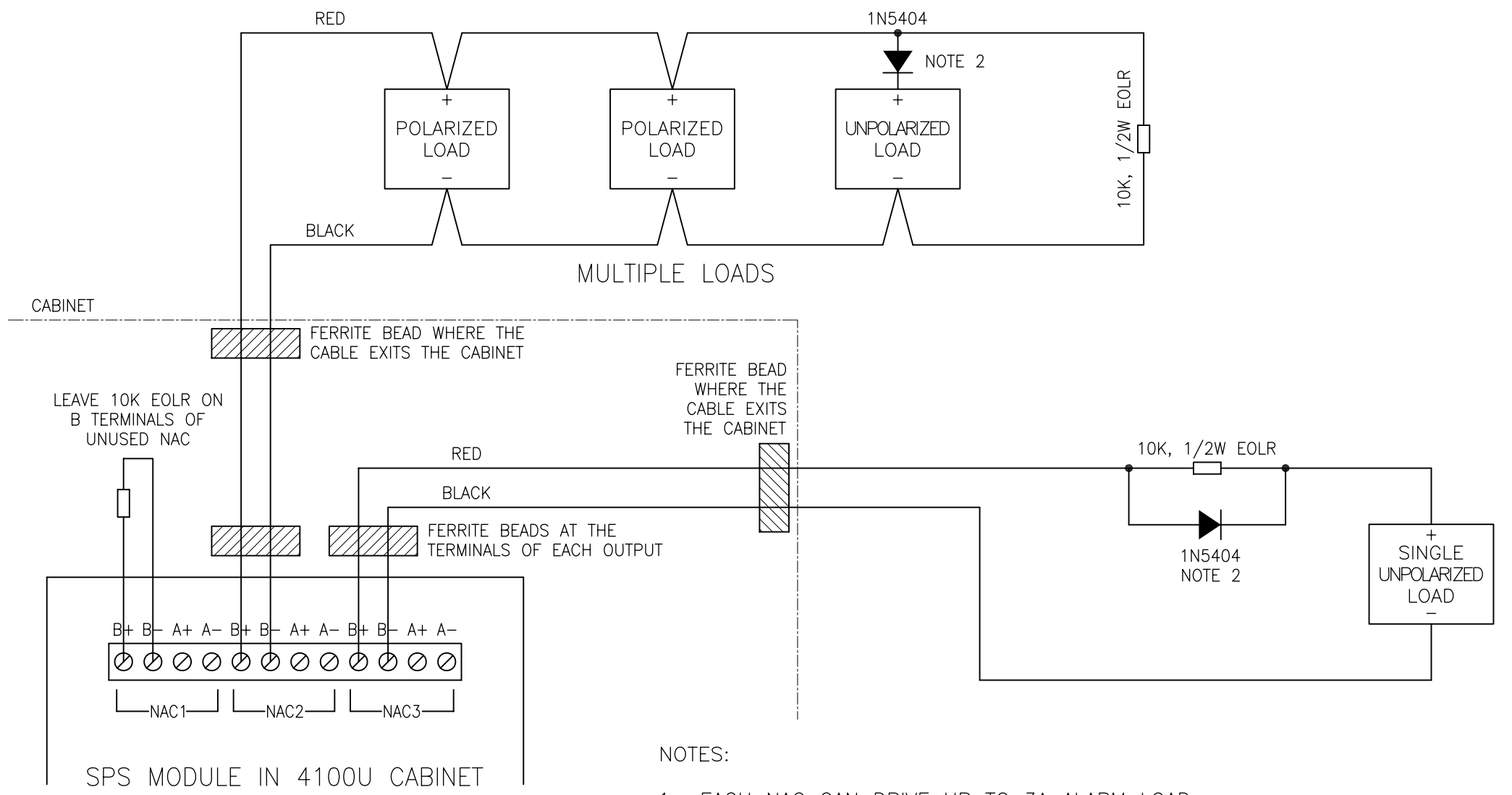
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A	ORIGINAL	-	KJS				20-9-06

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4100U
 6 POINT SIGNAL CARD (4100-4321)
 WIRING DIAGRAM

DRAWING No: 1976-181 SHEET 406 of N

A3	ISS/REV	A	PART No:
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- NOTES:
1. EACH NAC CAN DRIVE UP TO 3A ALARM LOAD.
 2. 1N5404 DIODES ARE SUITABLE FOR LOADS UP TO 3A.

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3rd ANGLE PROJECTION

ISS/REV	AMENDMENTS	ECO	DRN	CHKD	AUTH	APVD	DATE
A	ORIGINAL	-	KJS				22-8-06
B	ADDED FERRITE AT CABINET EXIT	4352	KJS	LSC	RC	DP	13-4-12

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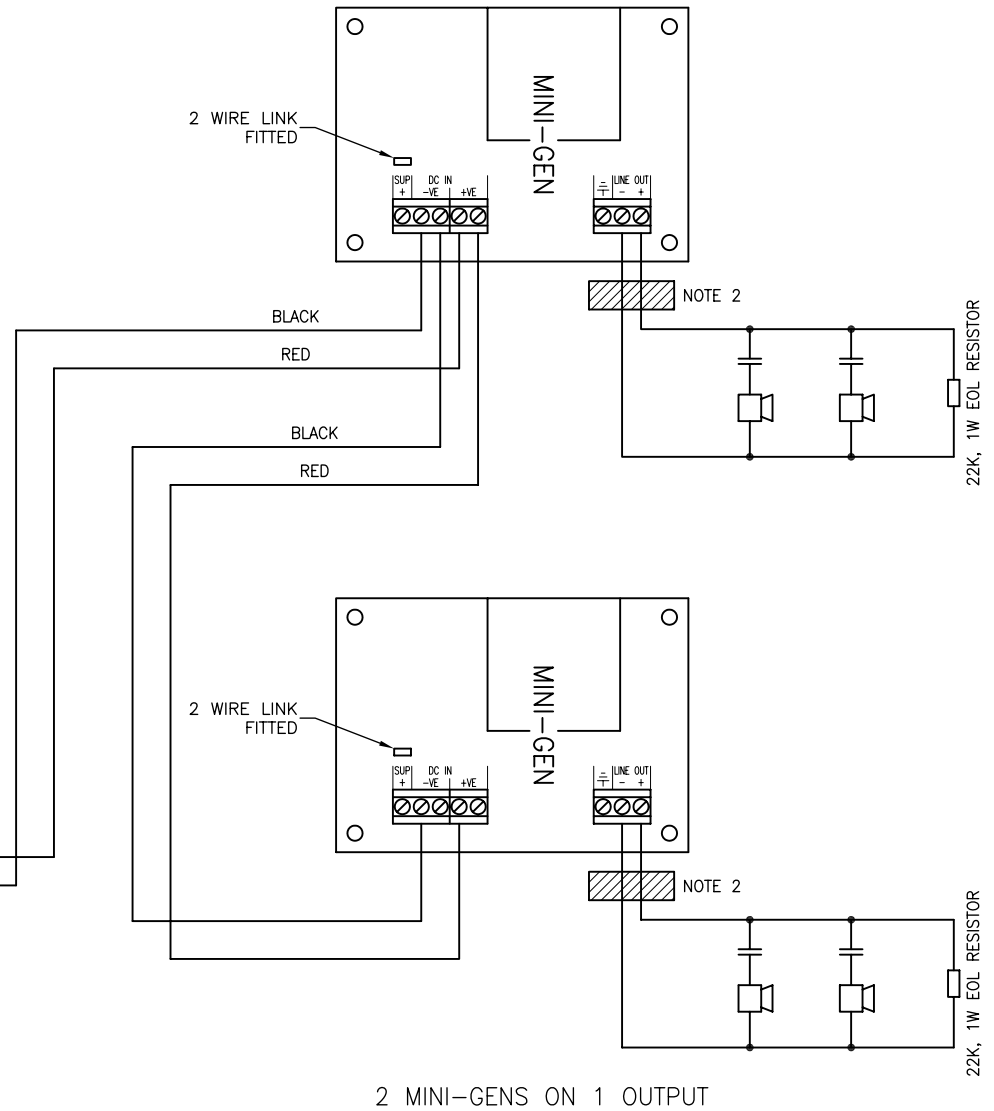
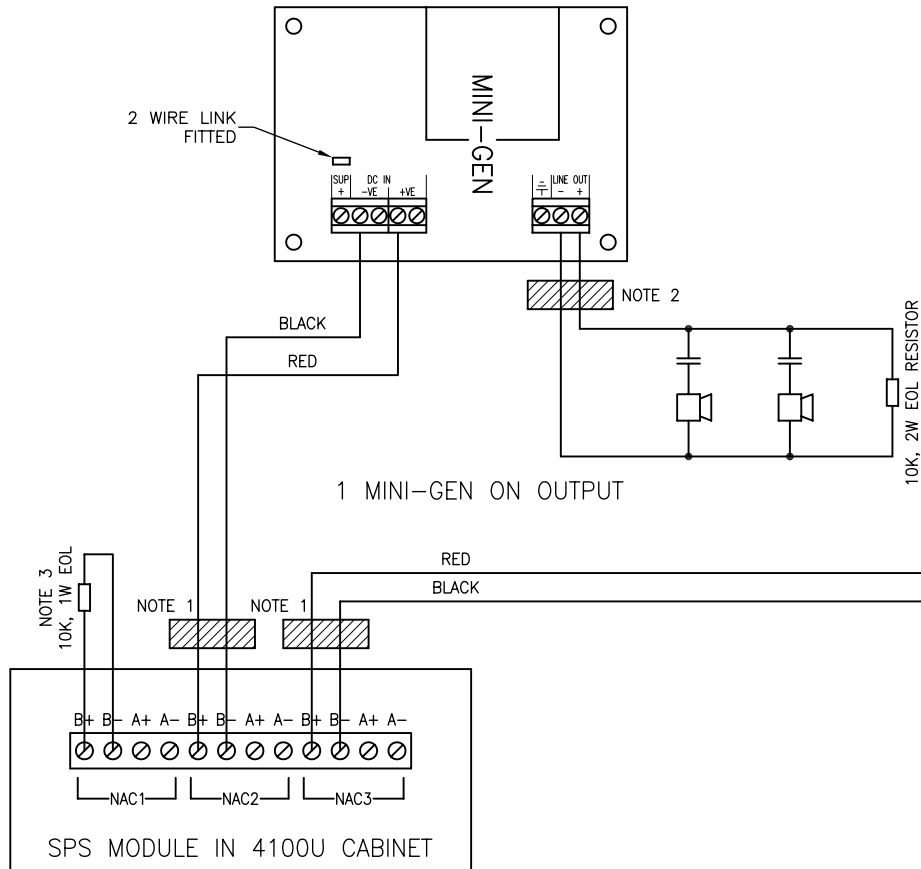
**4100U
 SPS NAC LOADS
 WIRING DIAGRAM**

DRAWING No: **1976-181** SHEET 407 of N

A3	ISS/REV B	PART No:	
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NOTES:

1. FIT FERRITE BEAD TO EACH NAC CIRCUIT AT THE TERMINALS.
2. FIT FERRITE BEAD TO EACH MINI-GEN OUTPUT.
3. LEAVE 10K BETWEEN B+ AND B- OF UNUSED NAC OUTPUTS.
4. NAC WIRING TO MINI-GENS SHOULD BE 1.00 SQ mm OR HEAVIER.
5. ALLOW 1W LOSS OF POWER FROM EACH MINI-GEN IN THE EOL RESISTOR.
6. THIS WIRING IS APPLICABLE TO ALL VERSIONS OF MINI-GEN.



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3rd ANGLE PROJECTION

ISS/REV	AMENDMENTS	ECO	DRN	CHKD	AUTH	APVD	DATE
A	ORIGINAL	-	KJS				22-8-06
B	ADDED FERRITE ON MINI-GEN OUTPUTS	4352	KJS	LSC	RC	DP	13-4-12

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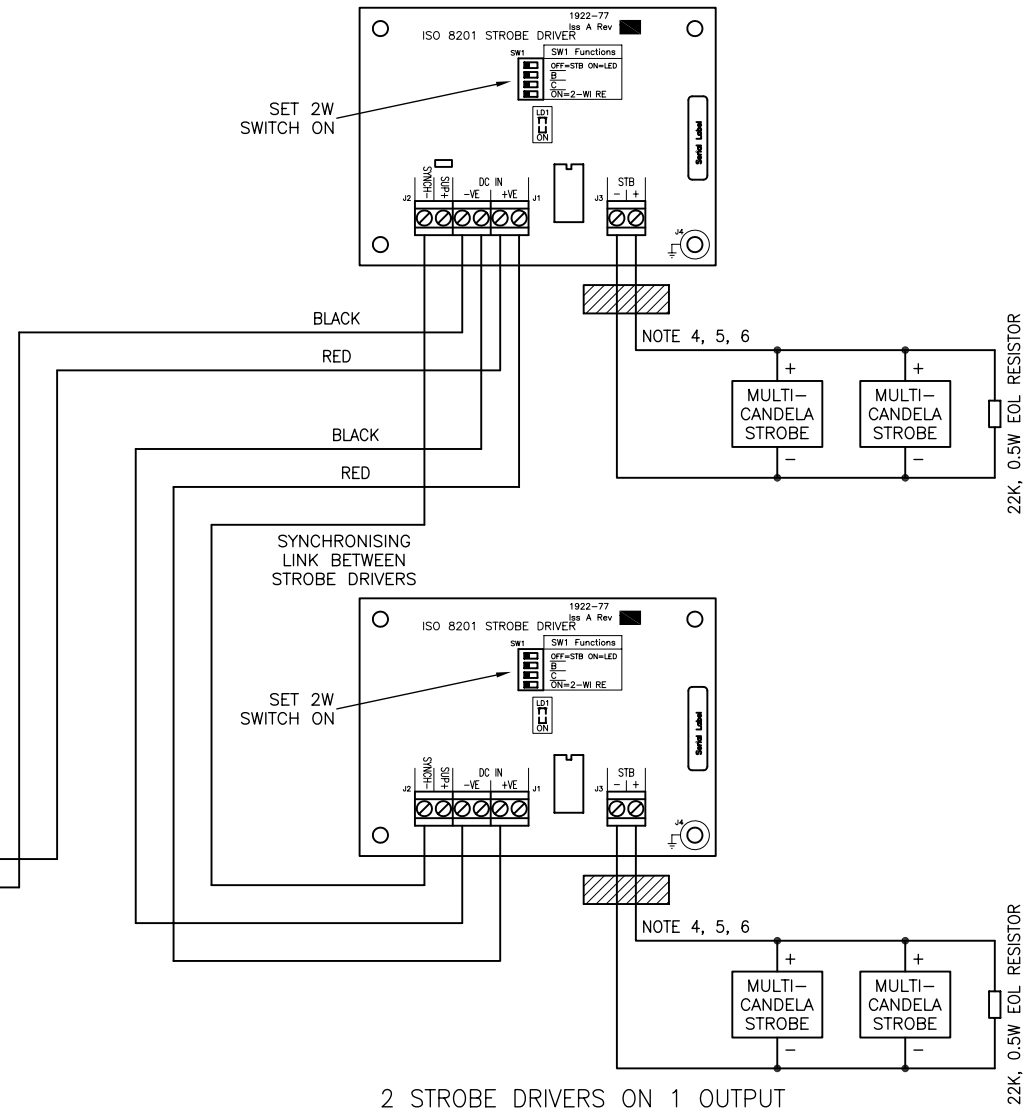
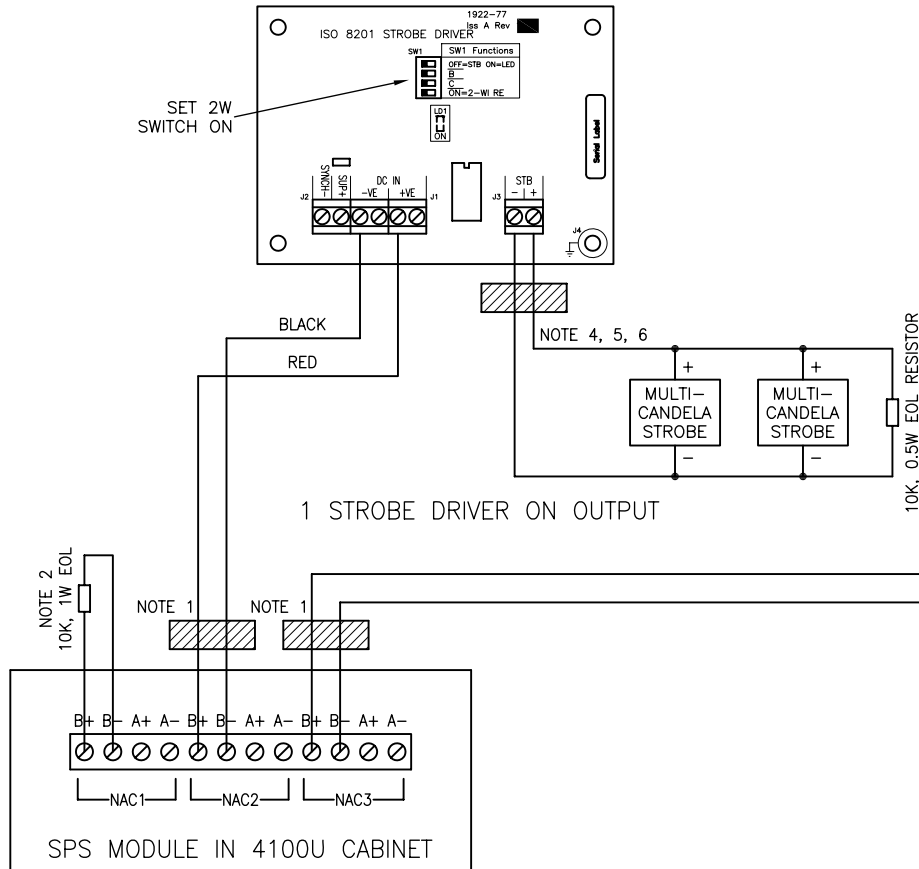
4100U
SPS NAC WIRING TO MINI-GEN TONE GENERATOR
WIRING DIAGRAM

DRAWING No: **1976-181** SHEET **409** of **N**

A3	ISS/REV B	PART No:	
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NOTES:

1. FIT FERRITE BEAD TO EACH NAC CIRCUIT.
2. LEAVE 10K BETWEEN B+ AND B- OF UNUSED NAC OUTPUTS.
3. NAC WIRING TO STROBE-DRIVERS SHOULD BE 1.00 SQ mm OR HEAVIER.
4. EACH STROBE DRIVER IS RATED AT 2A MAXIMUM. EACH NAC OUTPUT IS RATED AT 3A MAXIMUM.
5. MULTICANDELA STROBES AND LED BEACONS CANNOT BE MIXED ON THE SAME CIRCUIT.
6. FIT FERRITE BEAD TO EACH STROBE DRIVER OUTPUT.



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3rd ANGLE PROJECTION

ISS/REV	AMENDMENTS	ECO	DRN	CHKD	AUTH	APVD	DATE
A	ORIGINAL	-	KJS				24-8-06
B	ADDED FERRITE ON STROBE DRIVER OUTPUTS	4352	KJS	LSC	RC	DP	13-4-12

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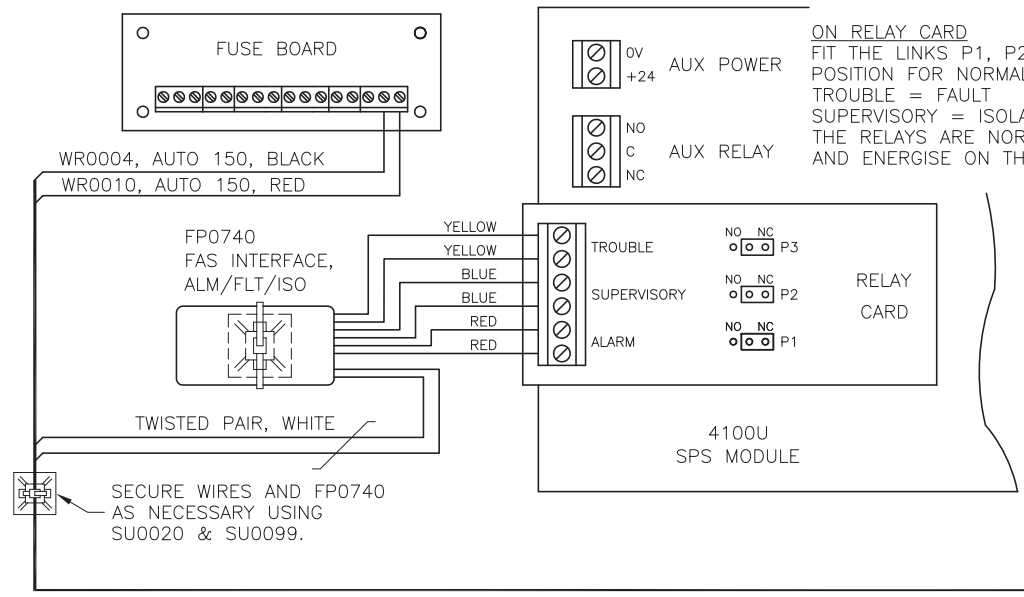
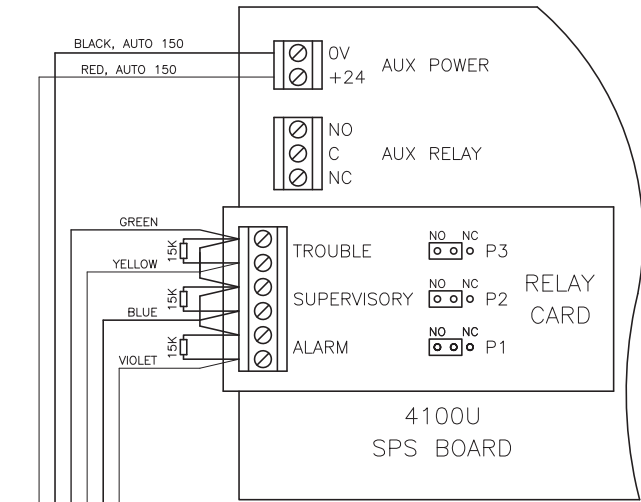
4100U
SPS NAC WIRING TO STROBE DRIVER
WIRING DIAGRAM

DRAWING No: 1976-181 SHEET 410 of N

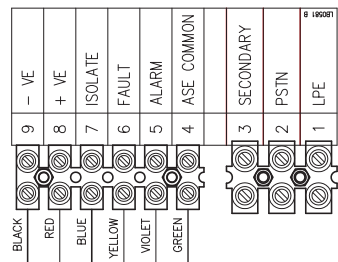
A3 ISS/REV B PART No:

ON RELAY CARD
 FIT THE LINKS P1, P2, P3 TO THE NO POSITION FOR NORMALLY OPEN CONTACTS.
 TROUBLE = FAULT
 SUPERVISORY = ISOLATE
 THE RELAYS ARE NORMALLY DE-ENERGISED AND ENERGISE ON THE RESPECTIVE STATUS.

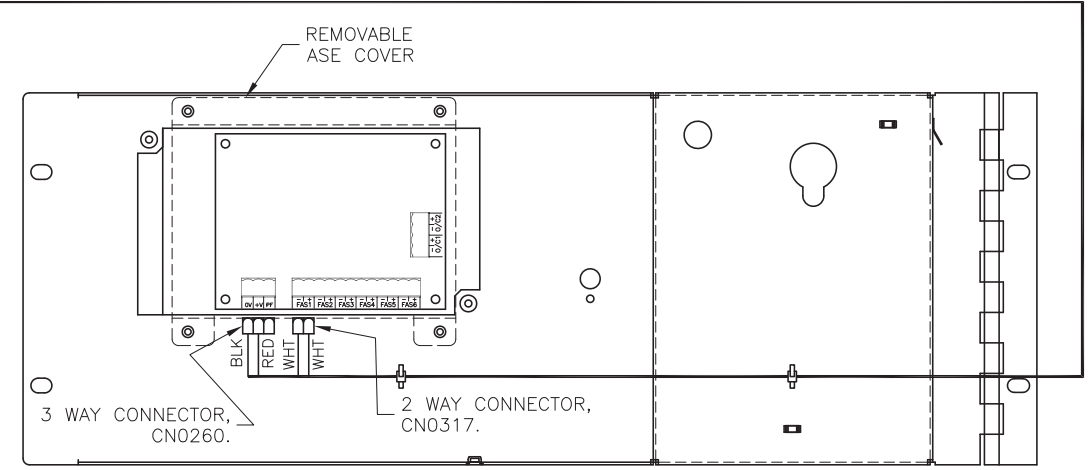
ON RELAY CARD
 FIT THE LINKS P1, P2, P3 TO THE NC POSITION FOR NORMALLY CLOSED CONTACTS.
 TROUBLE = FAULT
 SUPERVISORY = ISOLATE
 THE RELAYS ARE NORMALLY DE-ENERGISED AND ENERGISE ON THE RESPECTIVE STATUS.



ALL WIRES 0.5mm²



TERMINAL BLOCK ON 3U BRACKET



WESTERN AUSTRALIA ASE WIRING

ASE FAS INTERFACE ALM/FLT/ISO

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3rd ANGLE PROJECTION

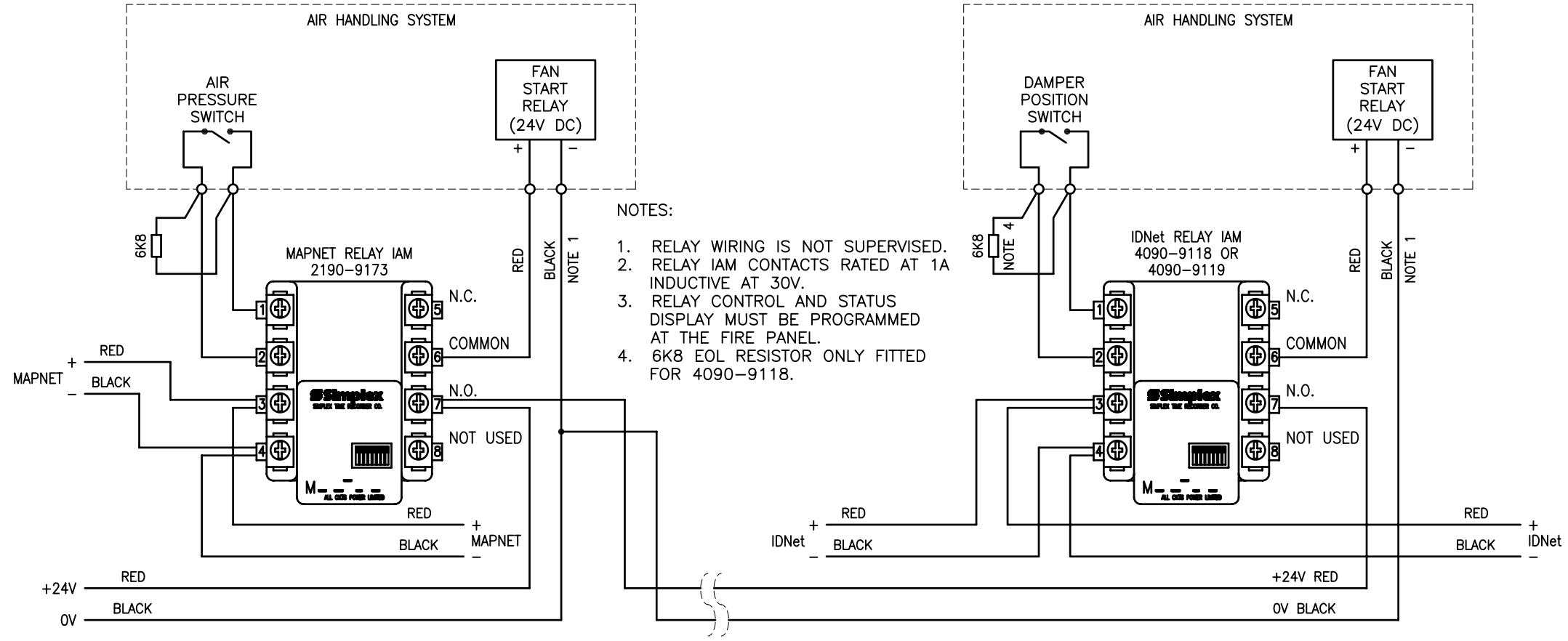
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A	ORIGINAL	-	KJS				29-8-06
B	UPDATED FOR NEW WA ASE.	4333	KJS	YZH	RC	DP	8-3-13
C	3U ASE DOOR HINGING CHANGED.	4704	KJS	LSC	LSC	DP	24-2-15

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**4100U
 SPS BRIGADE RELAY (4100-6033)
 WIRING DIAGRAM**

DRAWING No: **1976-181** SHEET **411** of **N**

A3	ISS/REV C	PART No:
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- NOTES:
1. RELAY WIRING IS NOT SUPERVISED.
 2. RELAY IAM CONTACTS RATED AT 1A INDUCTIVE AT 30V.
 3. RELAY CONTROL AND STATUS DISPLAY MUST BE PROGRAMMED AT THE FIRE PANEL.
 4. 6K8 EOL RESISTOR ONLY FITTED FOR 4090-9118.

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3rd ANGLE PROJECTION

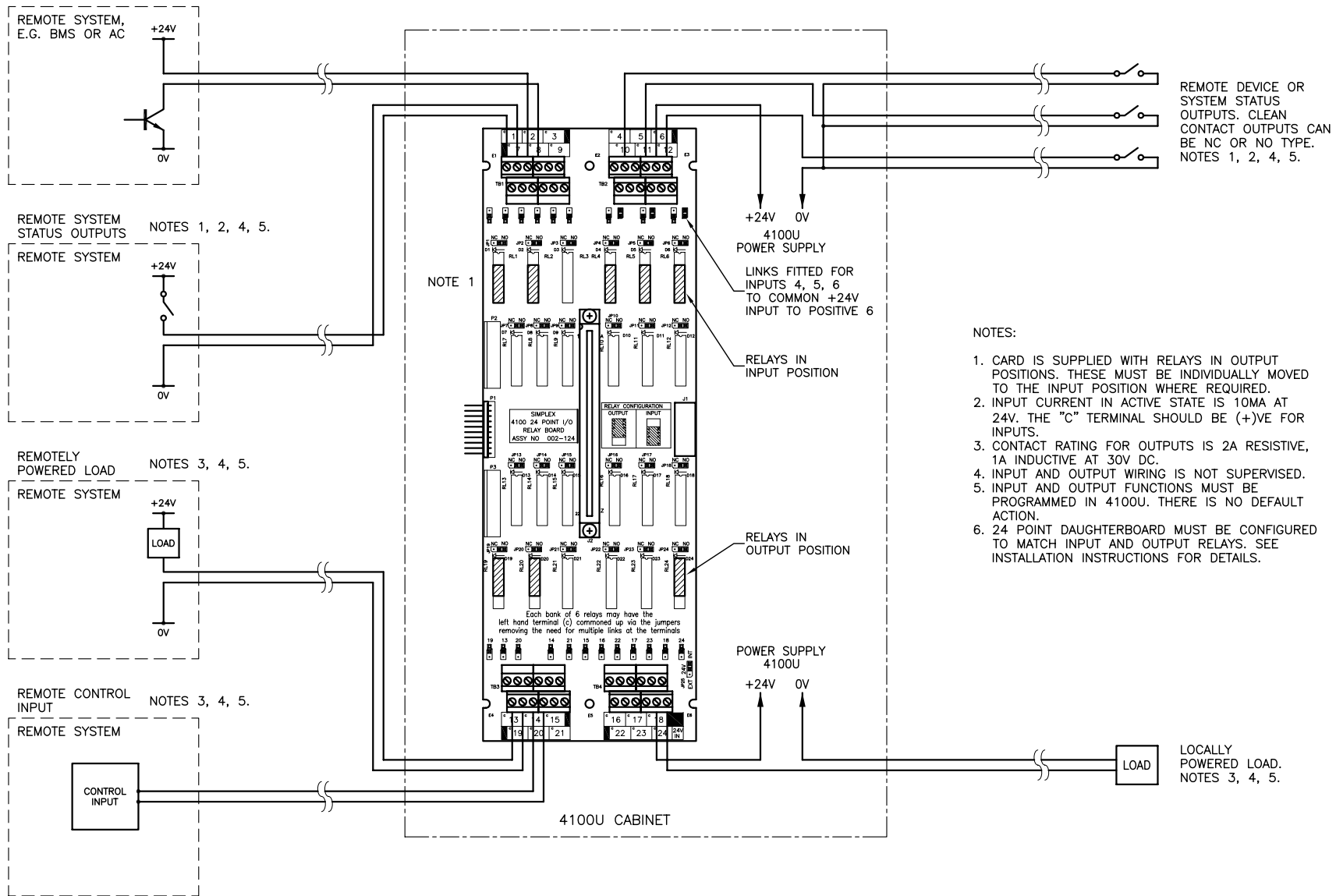
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B	NOTE 4 ADDED	-	KJS				5-10-06

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4100U
EXAMPLES - FAN CONTROLS WITH RELAY IAMS
WIRING DIAGRAM

DRAWING No: 1976-181 SHEET 412 of N

A3	ISS/REV B	PART No:
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3rd ANGLE PROJECTION

ISS/REV	AMENDMENTS	ECO	DRN	CHKD	AUTH	APVD	DATE
A	ORIGINAL	-	KJS				7-9-06
B	"OV" 2 PLACES WAS "+24C"	ECS1371	KJS				10-7-09

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4100U
24 POINT I/O CARD (002-124)
WIRING DIAGRAM

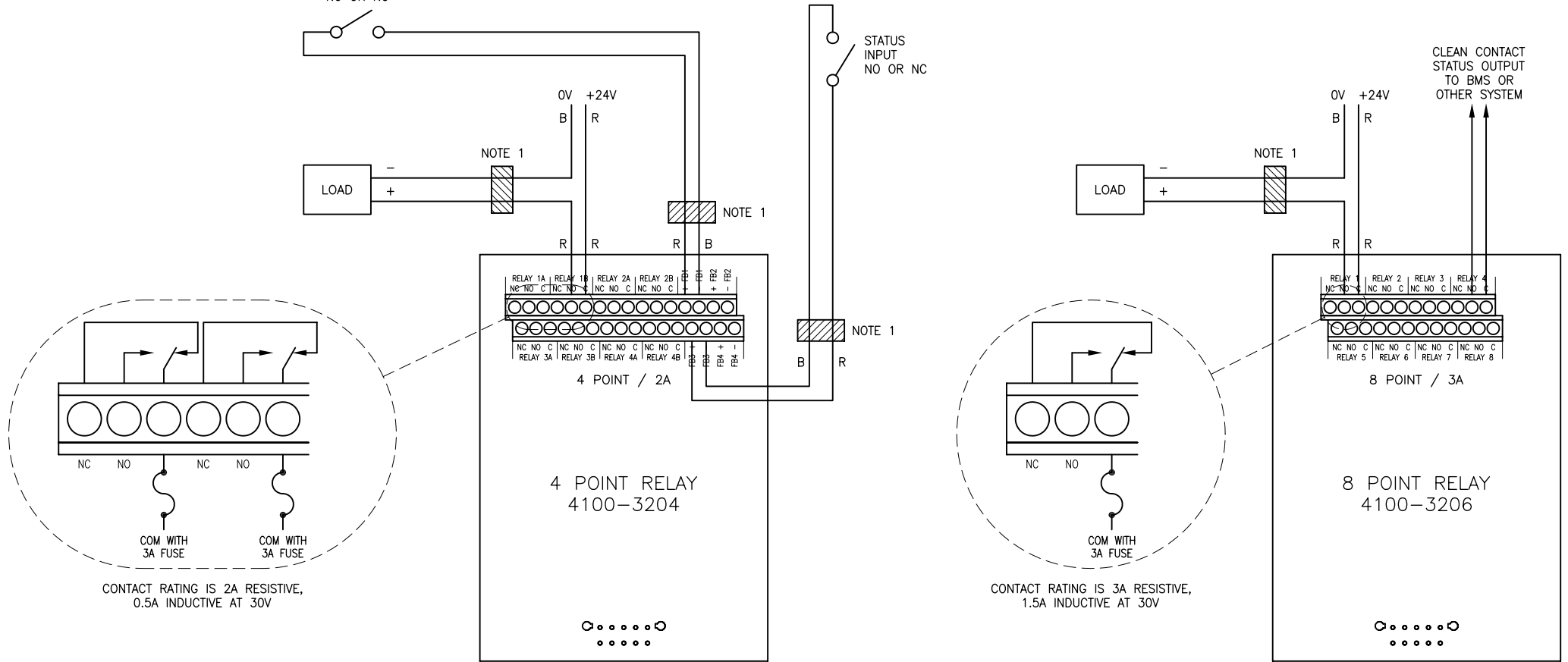
DRAWING No: 1976-181 SHEET 413 of N

A3 ISS/REV B PART No:

STATUS CONTACT
ON CONTROLLED LOAD
NO OR NC

STATUS
INPUT
NO OR NC

CLEAN CONTACT
STATUS OUTPUT
TO BMS OR
OTHER SYSTEM



NOTES:

1. FIT A FERRITE TO EACH PAIR OF WIRES LEAVING THE 4100U CABINET.
2. RELAY OPERATION MUST BE PROGRAMMED.
3. FIELD WIRING IS UNSUPERVISED.
4. FB+ INPUTS MONITOR NO OR NC STATUS CONTACTS FROM CONTROLLED DEVICES WITHOUT SUPERVISION.

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3rd ANGLE PROJECTION

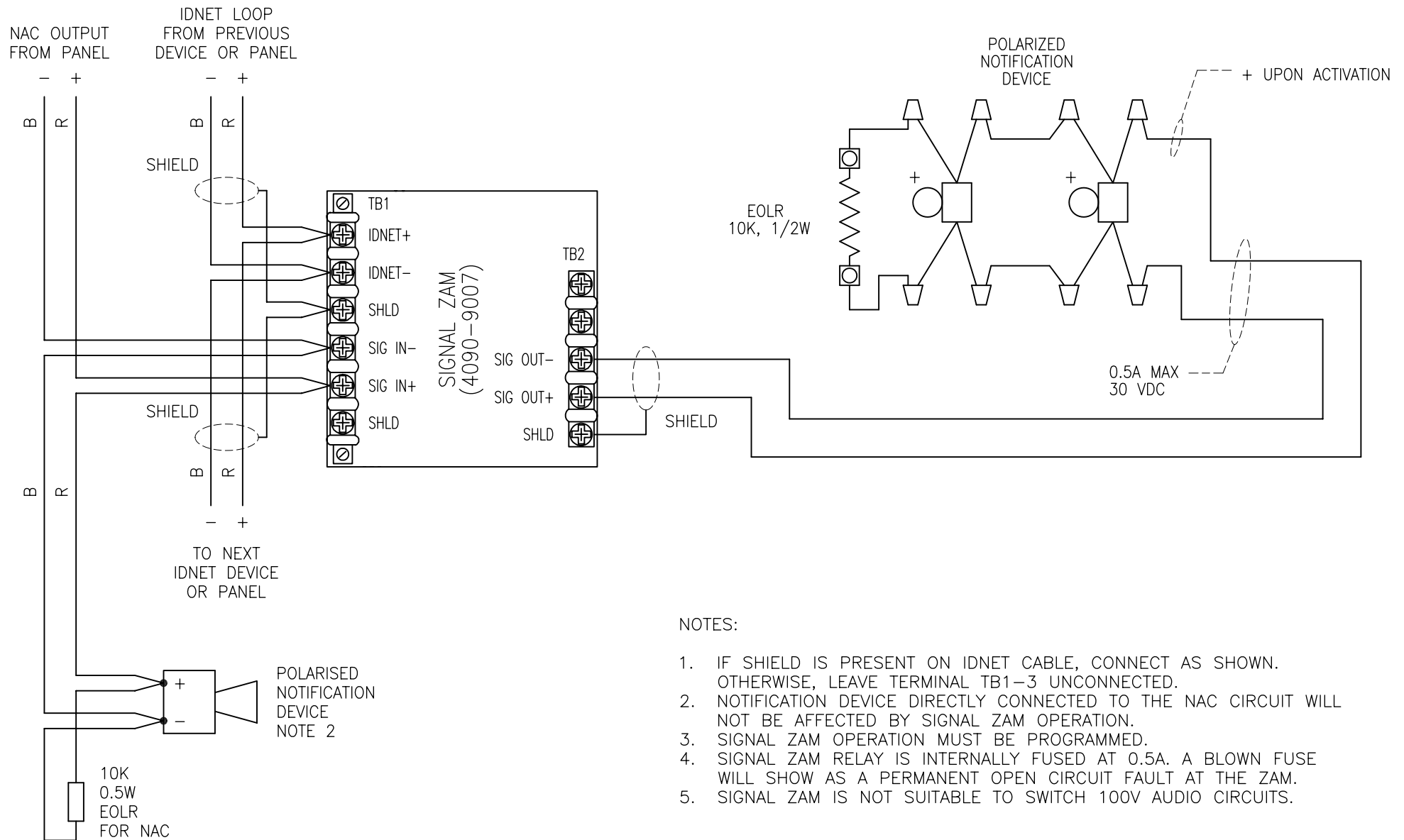
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A	ORIGINAL	-	KJS	LSC	RC	DP	13-4-12

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**4100U
PDI RELAY MODULE
WIRING DIAGRAM**

DRAWING No: **1976-181** SHEET **414** of **N**

A3	ISS/REV A	PART No:
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NOTES:

1. IF SHIELD IS PRESENT ON IDNET CABLE, CONNECT AS SHOWN. OTHERWISE, LEAVE TERMINAL TB1-3 UNCONNECTED.
2. NOTIFICATION DEVICE DIRECTLY CONNECTED TO THE NAC CIRCUIT WILL NOT BE AFFECTED BY SIGNAL ZAM OPERATION.
3. SIGNAL ZAM OPERATION MUST BE PROGRAMMED.
4. SIGNAL ZAM RELAY IS INTERNALLY FUSED AT 0.5A. A BLOWN FUSE WILL SHOW AS A PERMANENT OPEN CIRCUIT FAULT AT THE ZAM.
5. SIGNAL ZAM IS NOT SUITABLE TO SWITCH 100V AUDIO CIRCUITS.

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3rd ANGLE PROJECTION

ISS/REV	AMENDMENTS	ECO	DRN	CHKD	AUTH	APVD	DATE
A	ORIGINAL	4352	KJS	LSC	RC	DP	16-4-12

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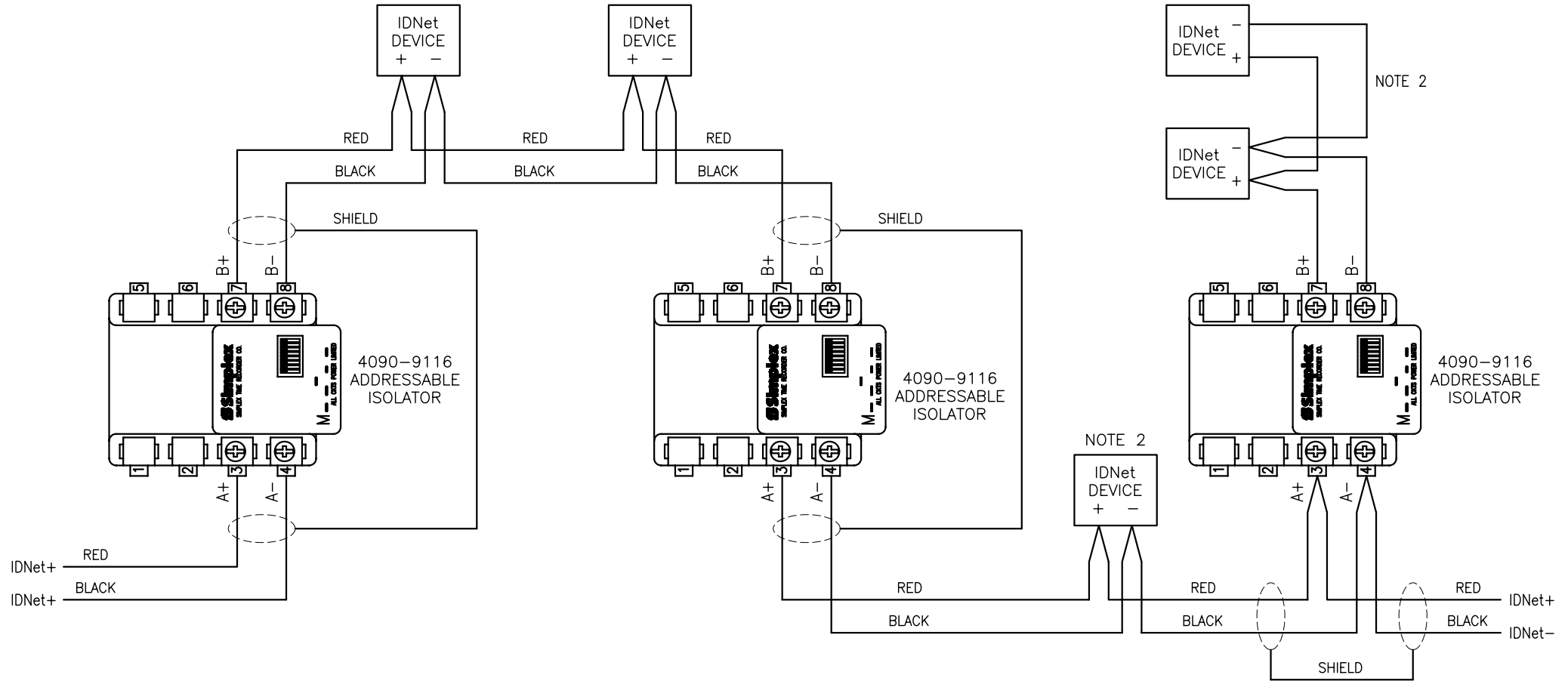
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4100U
SIGNAL ZAM (4090-9007) WIRING
WIRING DIAGRAM

DRAWING No: **1976-181** SHEET **415** of **N**

A3	ISS/REV A	PART No: LT0432
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NOTE 2



NOTES:

1. ISOLATORS ARE SYMMETRICAL A-B, BUT OBSERVE POLARITY.
2. NUMBER OF DEVICES BETWEEN ISOLATORS OR ON A WIRING SPUR IS RESTRICTED TO 40. ISOLATOR BASES ALSO COUNT AS ISOLATORS. SEE SHEET 102 FOR BASE WIRING.
3. 4090-9116 CANNOT BE USED WITH MAPNET.
4. AN ADDRESSABLE ISOLATOR OR ISOLATOR BASE (SEE SHEET 102) MUST BE INSTALLED AT THE START AND END OF EACH LOOP.

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3rd ANGLE PROJECTION

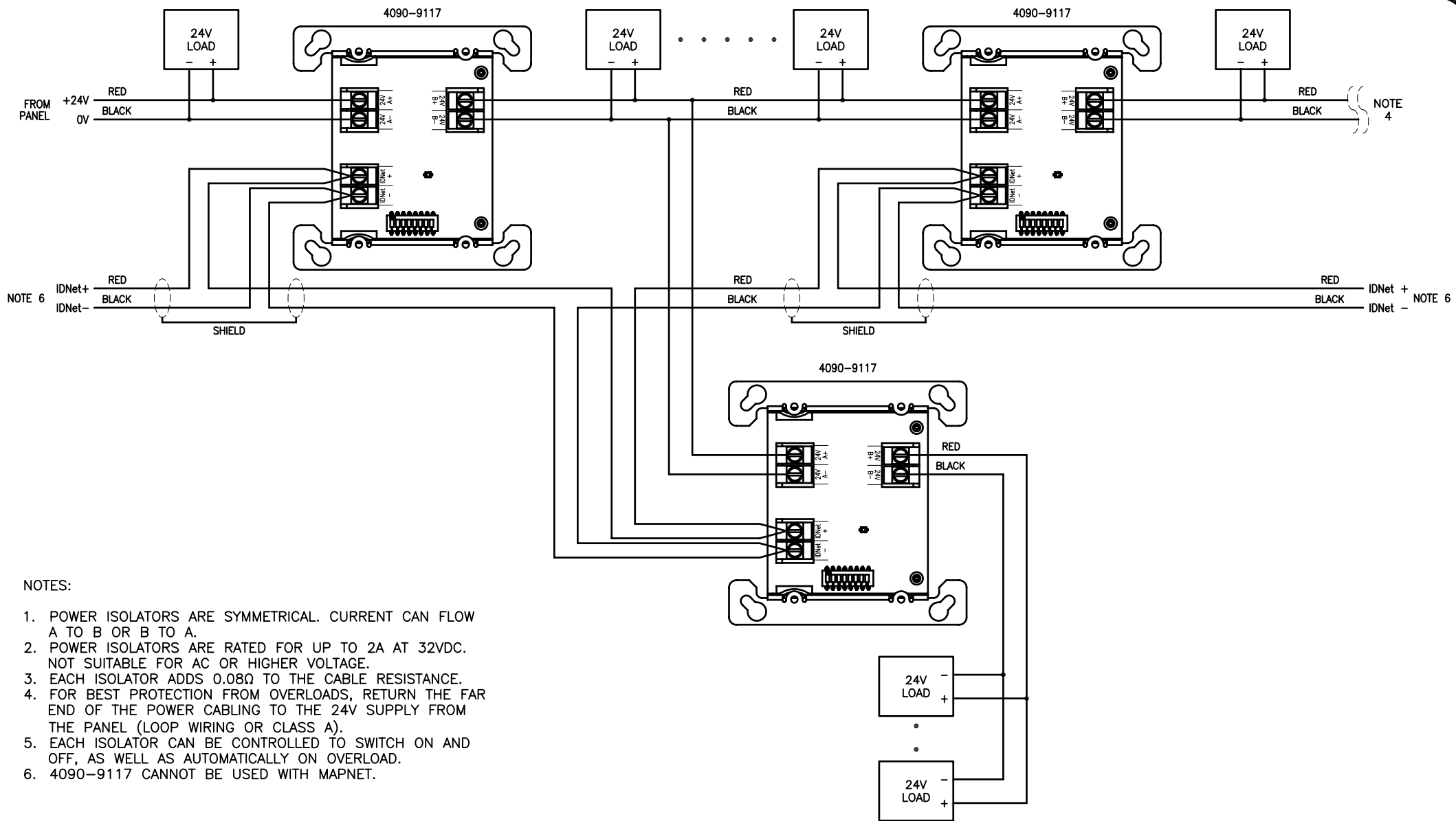
ISS/REV	AMENDMENTS	ECO	DRN	CHKD	AUTH	APVD	DATE
A	ORIGINAL	-	KJS				30-8-06
B	NOTE 4 ADDED.	3809	KJS	PA	LSC	DP	20-11-06

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4100U
ADDRESSABLE IDNET ISOLATOR (4090-9116)
WIRING DIAGRAM

DRAWING No: 1976-181 SHEET 500 of N

A3	ISS/REV B	PART No:
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- NOTES:
1. POWER ISOLATORS ARE SYMMETRICAL. CURRENT CAN FLOW A TO B OR B TO A.
 2. POWER ISOLATORS ARE RATED FOR UP TO 2A AT 32VDC. NOT SUITABLE FOR AC OR HIGHER VOLTAGE.
 3. EACH ISOLATOR ADDS 0.08Ω TO THE CABLE RESISTANCE.
 4. FOR BEST PROTECTION FROM OVERLOADS, RETURN THE FAR END OF THE POWER CABLING TO THE 24V SUPPLY FROM THE PANEL (LOOP WIRING OR CLASS A).
 5. EACH ISOLATOR CAN BE CONTROLLED TO SWITCH ON AND OFF, AS WELL AS AUTOMATICALLY ON OVERLOAD.
 6. 4090-9117 CANNOT BE USED WITH MAPNET.

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3rd ANGLE PROJECTION

ISS/REV	AMENDMENTS	ECO	DRN	CHKD	AUTH	APVD	DATE
A	ORIGINAL	-	KJS				29-7-06

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4100U
 ADDRESSABLE POWER ISOLATOR (4090-9117)
 WIRING DIAGRAM

DRAWING No: 1976-181 SHEET 501 of N

A3	ISS/REV A	PART No:
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NOTES:

1. FIT FERRITE BEAD TO EACH PAIR OF WIRES LEAVING THE CABINET.
2. LOOP MODE (CLASS A) PROVIDES BEST SECURITY SINCE A FAULT IN ONE SECTION WILL NOT PREVENT COMMUNICATION. IF LOOP MODE IS NOT USED, LINK B+ TO A+ AND B- TO A- ON CPU MOTHERBOARD.
3. IF WIRES LEAVE THE BUILDING, FIT 2081-9044 OVERVOLTAGE PROTECTOR AT EXIT AND ENTRY POINTS.

4. THE CONSTRAINTS ON RUI CIRCUIT CABLING ARE:

A. CABLE USED MUST BE 0.75 SQmm OR HEAVIER (AS 1670.1 REQUIREMENT).

B. THE TOTAL CABLE CAPACITANCE AND RESISTANCE MUST BE NO MORE THAN 0.58µF AND 36Ω RESPECTIVELY. IF VOLTAGE TRANSIENT SUPPRESSORS ARE USED, THE ADDED CAPACITANCE AND RESISTANCE FROM THESE DEVICES MUST BE CONSIDERED.

C. FOR CLASS B/SPUR WIRING,

i. THE CABLE DISTANCE FROM THE MASTER 4100U TO ANY SLAVE RTU IS NO MORE THAN 760M, AND THE COLLECTIVE DISTANCE OF ALL SPURS ON THE RUI CIRCUIT IS NO MORE THAN 3000M.

ii. THE TOTAL NUMBER OF DETECTION DEVICES SERVED BY THE RUI WIRING IS LIMITED TO 40 (AS 1670.1 REQUIREMENT).

D. FOR CLASS A/LOOP WIRING,

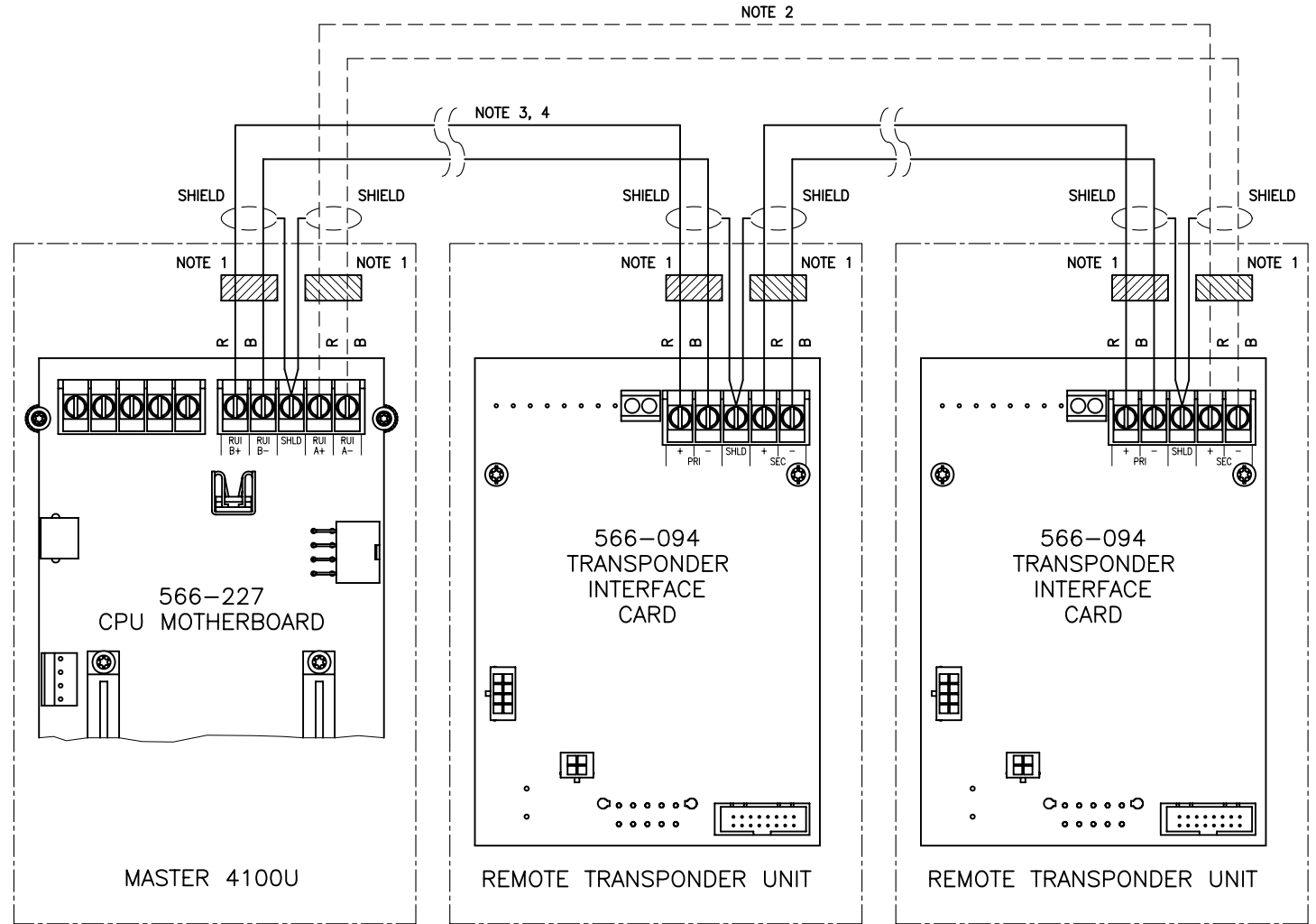
i. THE TOTAL CABLE DISTANCE AROUND THE LOOP IS NO MORE THAN 760M.

ii. THERE IS NO SPECIFIC LIMIT FOR DETECTION DEVICES CONNECTED TO RTUS FORMING PART OF THE LOOP.

iii. RTUS SERVED BY A SPUR FROM THE LOOP ARE LIMITED TO 40 DETECTION DEVICES (AS 1670.1 REQUIREMENT).

E. RUI CABLING MUST NOT BE RUN CLOSER THAN 50MM TO 240V MAINS CABLING, OR CLOSER THAN 150MM TO HIGHER MAINS VOLTAGES (AS S009 REQUIREMENT).

F. IF RUI CABLING AND MAPNET/IDNET CABLING ARE RUN IN CLOSE PARALLEL, E.G., IN CONDUIT, EITHER THE RUI OR THE MAPNET/IDNET CABLING MUST BE SCREENED.



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3rd ANGLE PROJECTION

ISS/REV	AMENDMENTS	ECO	DRN	CHKD	AUTH	APVD	DATE
A	ORIGINAL	-	KJS				24-8-06
B	ADDED RUI CABLE REQUIREMENTS (FROM PBS0027).	4070	KJS	LSC	RC	DP	15-10-09

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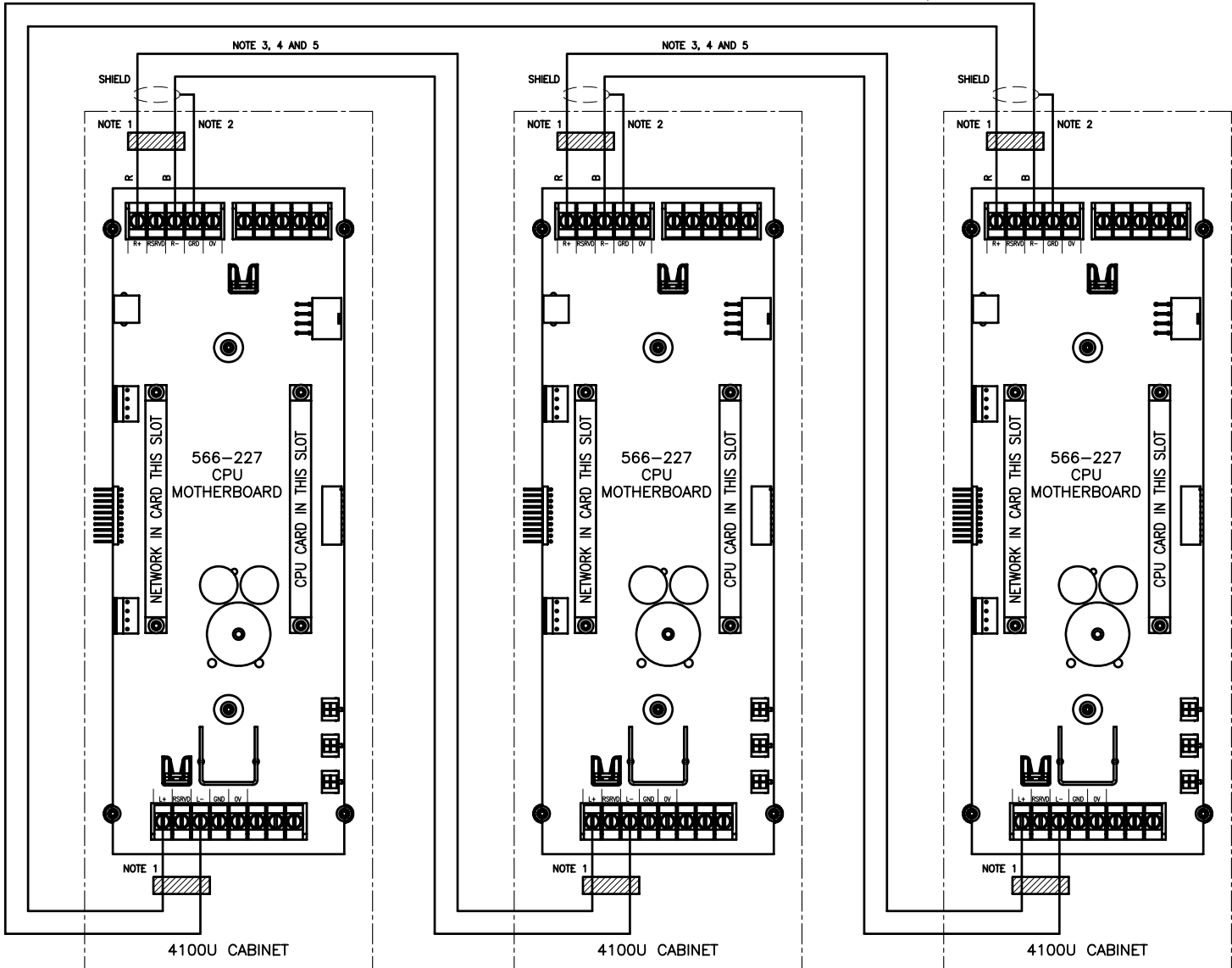
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4100U
TRANSPONDER INTERFACE (4100-0620)
WIRING DIAGRAM

DRAWING No: 1976-181 SHEET 600 of N

A3 ISS/REV B PART No:

NOTE 3, 4 AND 5



NOTES:

1. FIT FERRITE BEAD TO EACH PAIR OF WIRES LEAVING THE CABINET.
2. ONLY CONNECT SHIELDS TO GROUND AT "RIGHT" PORTS.
3. THE "RIGHT" PORT OF ONE PANEL IS ALWAYS CONNECTED TO THE "LEFT" PORT OF THE NEXT PANEL. THE LAST PANEL MUST BE CONNECTED BACK TO THE FIRST PANEL TO FORM A CLOSED LOOP.
4. WIRE TO BE 0.75 SQ.mm SHIELDED TWISTED PAIR (3000m MAX) OR 0.2 SQ.mm SHIELDED OR UNSHIELDED TWISTED PAIR (2000m MAX).
5. IF WIRES LEAVE THE BUILDING, FIT 2081-9044 OVERVOLTAGE PROTECTORS AT EXIT AND ENTRY POINTS.

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3rd ANGLE PROJECTION

ISS/REV	AMENDMENTS	ECO	DRN	CHKD	AUTH	APVD	DATE
A	ORIGINAL	-	KJS				7-9-06

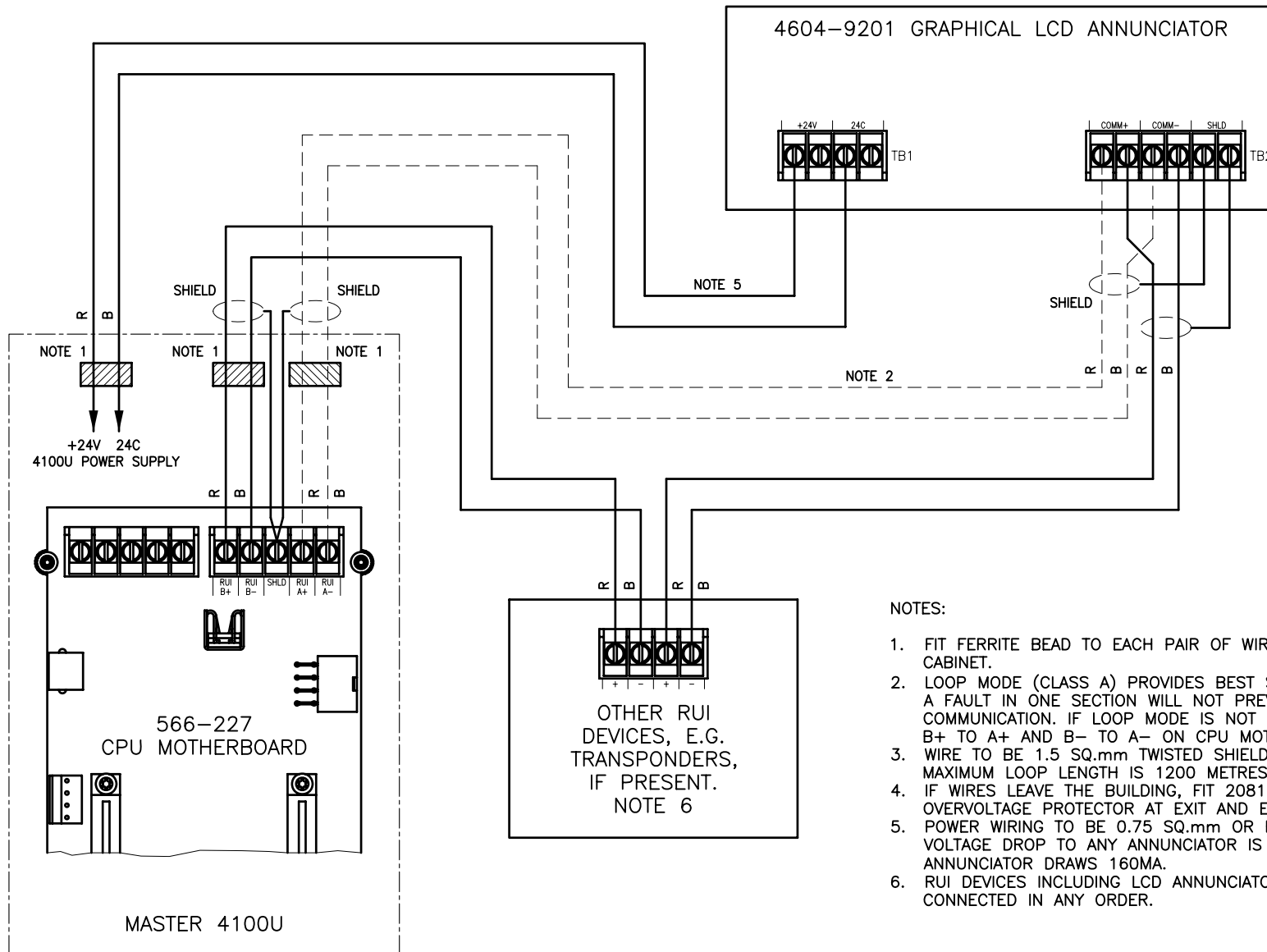
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4100U
 NETWORK INTERFACE (WIRED MEDIA) (4100-6014)
 WIRING DIAGRAM

DRAWING No: 1976-181 SHEET 601 of N

A3	ISS/REV A	PART No:
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3rd ANGLE PROJECTION

ISS/REV	AMENDMENTS	ECO	DRN	CHKD	AUTH	APVD	DATE
A	ORIGINAL	-	KJS				8-9-06

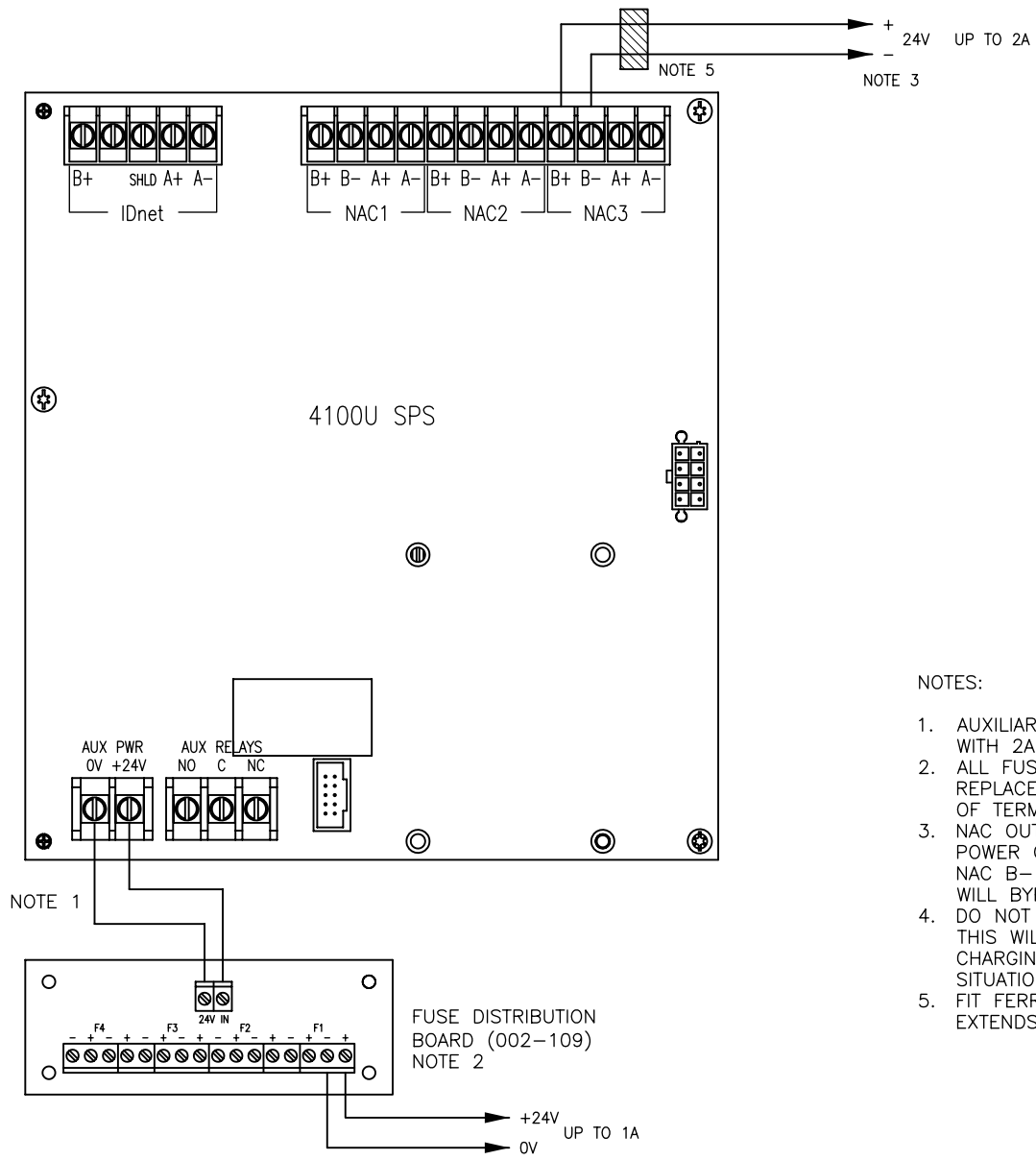
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4100U
LCD ANNUNCIATOR (4604-9201)
WIRING DIAGRAM

DRAWING No: 1976-181 SHEET 606 of N

A3 ISS/REV A PART No:



NOTES:

1. AUXILIARY POWER OUTPUT FROM SPS IS PROTECTED BY A PTC WITH 2A RATING.
2. ALL FUSES ON THIS BOARD ARE 1A 20 X 5mm TYPE. DO NOT REPLACE WITH HIGHER RATINGS. EACH FUSE FEEDS TWO SETS OF TERMINALS.
3. NAC OUTPUTS CAN BE INDIVIDUALLY PROGRAMMED AS AUXILIARY POWER OUTPUTS. EACH NAC OUTPUT IS RATED AT 2A MAXIMUM. NAC B- TERMINAL MUST NOT BE LINKED TO 0V SINCE THIS WILL BYPASS CURRENT LIMITING CIRCUITRY IN THE SPS.
4. DO NOT CONNECT LOADS DIRECTLY TO THE STANDBY BATTERIES. THIS WILL CONFUSE 4100U SYSTEM MANAGEMENT OF BATTERY CHARGING AND MAY LEAD TO BATTERY DISCHARGE IN SOME SITUATIONS.
5. FIT FERRITE BEAD TO NAC OUTPUT AT TERMINALS IF WIRING EXTENDS OUTSIDE THE CABINET.

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3rd ANGLE PROJECTION

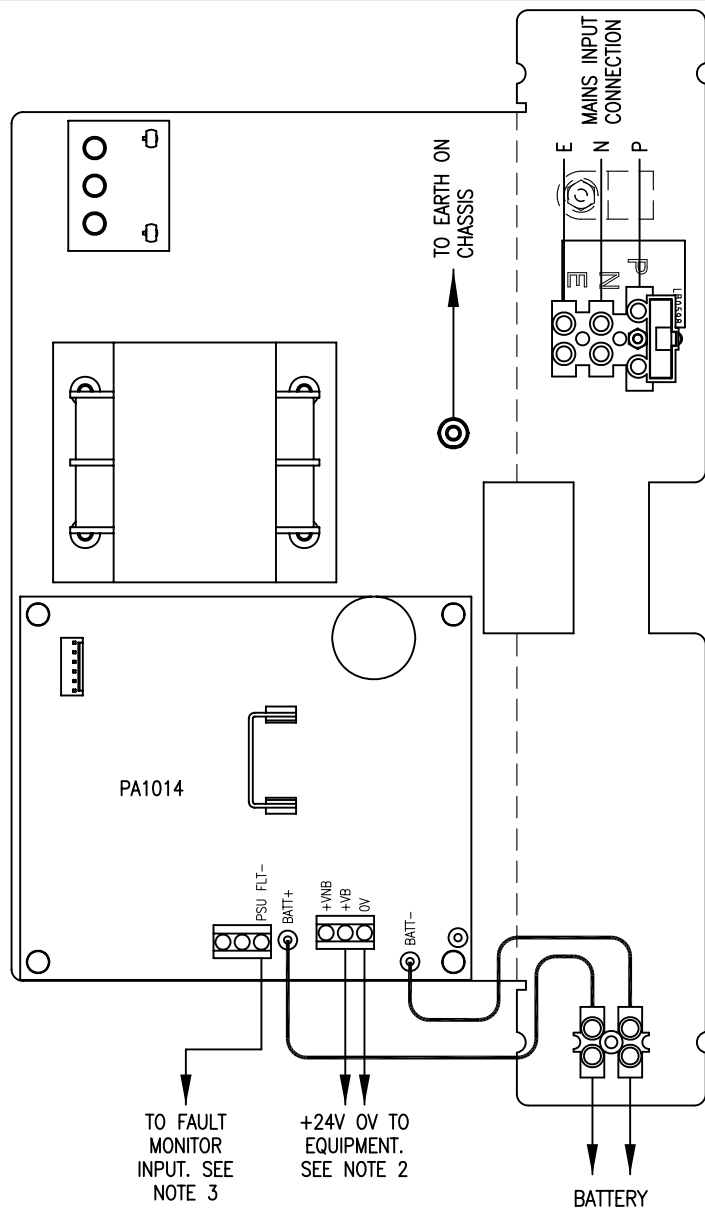
ISS/REV	AMENDMENTS	ECO	DRN	CHKD	AUTH	APVD	DATE
A	ORIGINAL	-	KJS	SC			20-9-06
B	NOTE 2 CHANGED.	-	KJS				5-10-06
C	FERRITE ADDED TO NAC OUTPUT	4352	KJS	LSC	RC	DP	16-4-12

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**4100U
 SPS POWER OUTPUTS
 WIRING DIAGRAM**

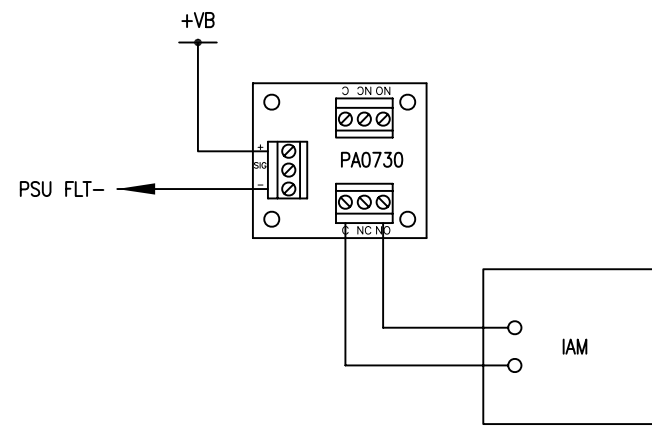
DRAWING No: **1976-181** SHEET **700** of **N**

A3	ISS/REV C	PART No:	
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NOTES:

1. PSU IS MOUNTED ON 4 X 202-090 SUPPORT POSTS SUPPLIED WITH THE KIT.
2. THE +VB OUTPUT FROM THE PSU IS BATTERY BACKED. THE +VNB OUTPUT MUST ONLY BE USED FOR EQUIPMENT NOT REQUIRING BATTERY BACK UP. REFER TO LT0232 FOR PSU CONFIGURATION DETAILS.
3. THE PSU FLT- OUTPUT MUST BE MONITORED BY THE FIRE PANEL, USING A FEEDBACK INPUT OR SIMILAR. IF AN IAM IS USED, AN ISOLATING RELAY, SUCH AS PA0730, MUST BE WIRED BETWEEN THE PSU FLT- OUT AND IAM INPUT. THE RELAY OPERATES ON A FAULT.



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3rd ANGLE PROJECTION

ISS/REV	AMENDMENTS	ECO	DRN	CHKD	AUTH	APVD	DATE
A	ORIGINAL	4070	KJS	LSC	RC	DP	15-10-09

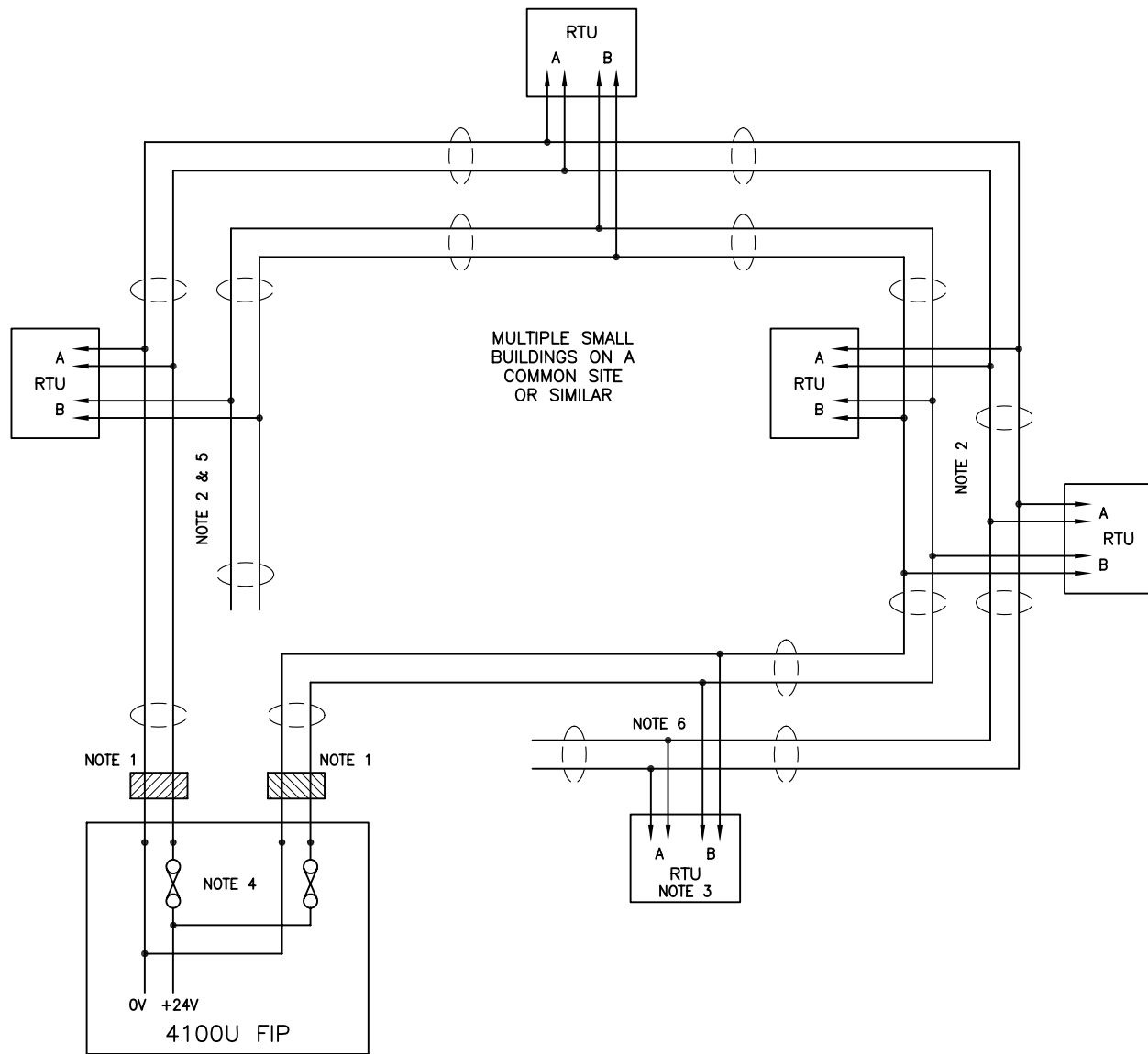
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4100U
 1948 2A PSU POWER OUTPUTS
 WIRING DIAGRAM

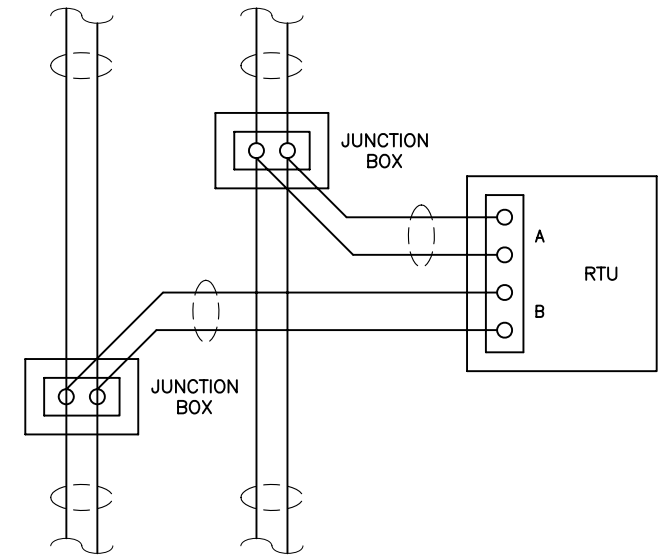
DRAWING No: 1976-181 SHEET 701 of N

A3	ISS/REV A	PART No: LT0432
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NOTES:

1. FIT FERRITE BEAD TO EACH PAIR OF WIRES LEAVING THE FIP CABINET.
2. THE CLOCKWISE AND ANTI CLOCKWISE POWER FEED CIRCUITS MUST BE PHYSICALLY SEPARATED FOR REDUNDANCY, UNLESS RUN UNDERGROUND, OR PROTECTED TO LEVEL WSX3 (AS/NZS 3013). (AS1670.1 REQUIREMENT).
3. EACH RTU HAS A COMBINING CIRCUIT AND SUPERVISION FOR THE DUAL DC FEED. SUPPLY FAULTS ARE MONITORED BY THE TRANSPONDER INTERFACE CARD (TIC).
4. THE DC FEEDS FROM THE FIP MUST BE SEPARATELY FUSED OR PROTECTED AGAINST OVERLOAD.
5. MINIMUM CABLE SIZE MUST BE DETERMINED BASED ON TOTAL RTU LOAD. REFER TO SHEET 600 FOR REQUIREMENTS ON THE RTU COMMUNICATIONS WIRING.
6. SUGGESTED WIRING AT THE TAP-OFF TO EACH RTU IS SHOWN HERE.



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3rd ANGLE PROJECTION

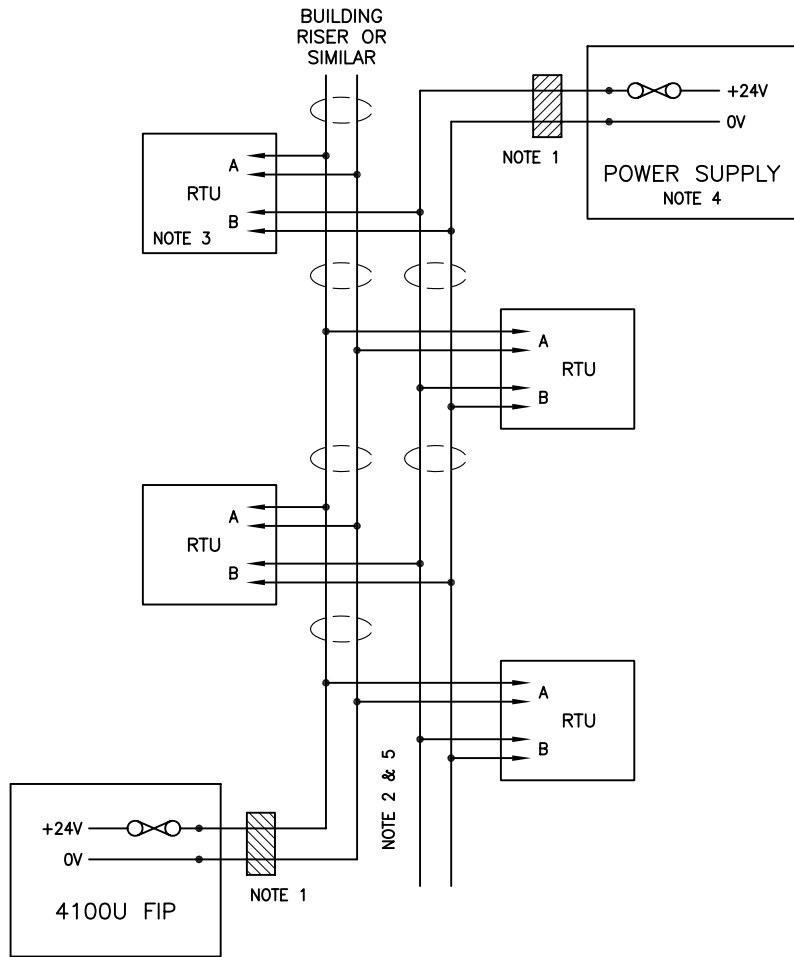
ISS/REV	AMENDMENTS	ECO	DRN	CHKD	AUTH	APVD	DATE
A	ORIGINAL	4070	KJS	LSC	RC	DP	16-10-09

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**4100U
 RTU - RING FEED DC POWER
 WIRING DIAGRAM**

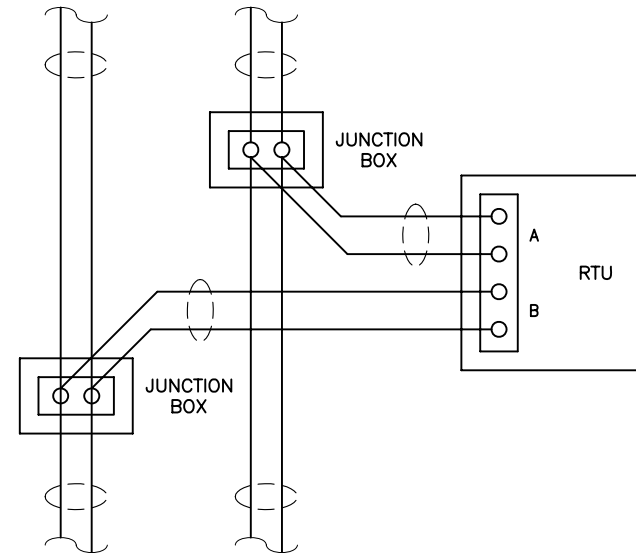
DRAWING No: 1976-181 SHEET 703 of N

A3	ISS/REV A	PART No:
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NOTES:

1. FIT FERRITE BEAD TO EACH PAIR OF WIRES LEAVING THE FIP AND PSU CABINET.
2. THE UP AND DOWN POWER FEED CIRCUITS MUST BE PHYSICALLY SEPARATED FOR REDUNDANCY, UNLESS RUN UNDERGROUND, OR PROTECTED TO LEVEL WSX3 (AS/NZS 3013). (AS1670.1 REQUIREMENT).
3. EACH RTU HAS A COMBINING CIRCUIT AND SUPERVISION FOR THE DUAL DC FEED. SUPPLY FAULTS ARE MONITORED BY THE TRANSPONDER INTERFACE CARD (TIC).
4. THE TOP POWER MAY BE FROM A MAINS POWERED RTU OR STANDALONE POWER SUPPLY. A STANDALONE SUPPLY MUST BE MONITORED FOR FAULTS.
5. NECESSARY WIRING MINIMUM CABLE SIZE MUST BE DETERMINED BASED ON TOTAL RTU LOAD. REFER TO SHEET 600 FOR REQUIREMENTS ON THE RTU COMMUNICATIONS WIRING.
6. SUGGESTED WIRING AT THE TAP-OFF TO EACH RTU IS SHOWN HERE.



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3rd ANGLE PROJECTION

ISS/REV	AMENDMENTS	ECO	DRN	CHKD	AUTH	APVD	DATE
A	ORIGINAL	4070	KJS	LSC	RC	DP	16-10-09

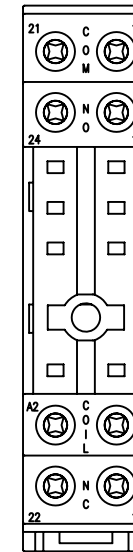
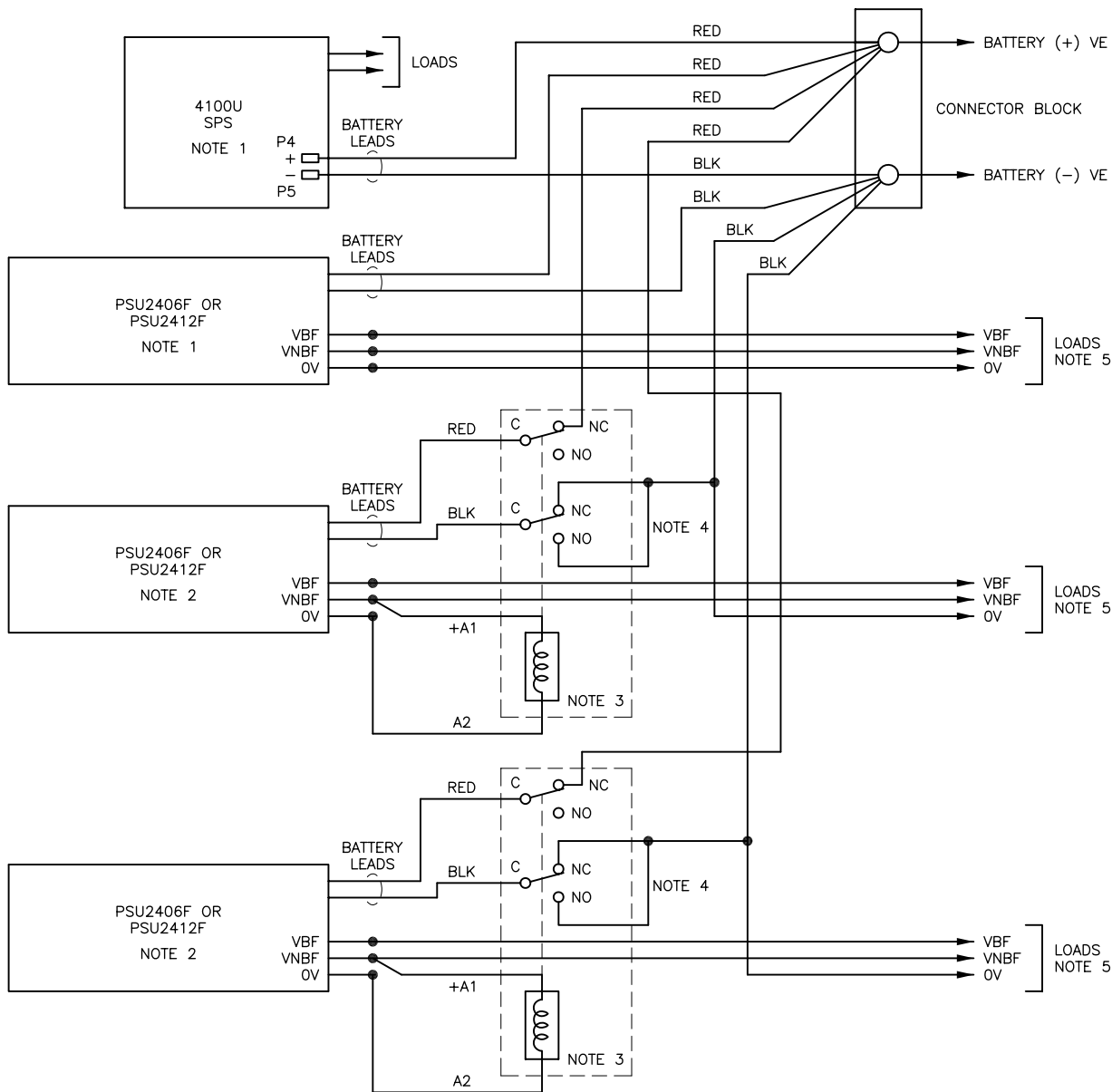
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**4100U
 RTU - LINEAR FEED DC POWER
 WIRING DIAGRAM**

DRAWING No: 1976-181 SHEET 704 of N

A3	ISS/REV A	PART No:
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FINDER RELAY BASE 95.65
SOCKET TERMINALS (NOTE 3)

NOTES

1. 4100U SPS MUST BE CONFIGURED TO DISABLE BATTERY CHARGING. THE FIRST VIGILANT PSU DOES ALL THE BATTERY CHARGING.
2. THE SECOND AND SUBSEQUENT VIGILANT PSUS CANNOT CONTRIBUTE TO THE BATTERY CHARGING. IF MAINS FAILS THE VBF LOADS ARE SWITCHED OVER TO THE SYSTEM BATTERY.
3. RELAY IS 24V DC DPDT TYPE WITH CONTACT RATING AT LEAST 10A. A SUITABLE TYPE IS FINDER 44.62.7.024.4000 IN A 95.65 OR 95.75 DIN RAIL SOCKET (SEE ABOVE).
4. CONNECTING THE 0V SUPPLY THROUGH A CONTACT IS A CHECK THAT THE RELAY IS ACTUALLY FITTED IN THE SOCKET. IF RELAY IS NOT PLUGGED IN, THE PSU OUTPUT IS INTERRUPTED.
5. FROM EACH PSU, VNBF LOAD MUST NOT EXCEED 5A, AND TOTAL OF VBF AND VNBF LOAD MUST NOT EXCEED 5A FOR PSU2406F OR 10A FOR PSU 2412F.

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3rd ANGLE PROJECTION

ISS/REV	AMENDMENTS	ECO	DRN	CHKD	AUTH	APVD	DATE
A	ORIGINAL	4352	KJS	LSC	RC	SP	16-6-11

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4100U VIGILANT PSUS INTERCONNECTION WIRING DIAGRAM			
DRAWING No: 1976-181 SHEET 705 of N			
A3	ISS/REV	A	PART No: LT0432



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