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SHEVTEC PSU PANEL

Technical information and operating instructions

SE CONTROLS

Introduction:

The SE Controls range of control systems are built and tested control panels specifically for Smoke and/ or Environmental Ventilation Systems and for use with SE Controls supplied equipment.

They must not be used for any other application or in conjunction with other manufacturers' products without prior consultation with SE Controls.

Installation of this equipment must only be carried out by competent and qualified persons.

The Installer and user are requested to read, understand and retain this information pack with the panel for future reference.

This information pack must be retained for future reference by the client and be made available for reference by persons installing, servicing or modifying the panel.

Application:

The SHEVTEC PSU Panel is a powerful 24 Volt DC control system designed for 2-wire 24V DC actuators in a smoke control and/or environmental ventilation system.

Operating from a 230VAC supply, the SHEVTEC PSU Panel can deliver up to 30/60/90 Amps to drive 24 Volt motorised actuators.

The SHEVTEC PSU Panel can be mounted in a centralised plant room location. Each SHEVTEC PSU Panel can operate independently or be linked to others to produce a networked control system. The networked control system in turn can operate standalone or be linked to a building management system.

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Contents

Important Notices

- This equipment has no mains on/off switch and is intended for permanent connection only.
- Do NOT allow abuse or mishandling of the device.
- Do NOT adjust or alter the device or its enclosure including labelling/marking.
- Do NOT use this controller for any other purpose other than that intended by the manufacturer.
- Do NOT allow installation of this equipment by persons not electrically qualified.
- Damage to the equipment due to failure to test the electrical integrity of external wiring will invalidate any warranties.
- Failure to install the device in accordance with the manufacturer's instructions will invalidate any warranties.
- Failure to follow current electrical regulations governing the installation of fixed equipment can lead to prosecution and may invalidate any warranties.
- Unless otherwise indicated, you must not adjust or remove existing manufacturers cabling or use terminal outputs or inputs for purposes other than their design without written authorization from SE Controls.
- Consumable items e.g. fuse & batteries where replacement is needed must be replaced with parts of equivalent manufacturing standard/ compliance and rating.

SE Controls accepts no liability for failure to comply with the above statements or the installation and operation guidance in the following sections of this guide and reserves the right to invalidate the warranty of the controller

SE Controls reserves the right to introduce any modifications and improvements to the contents of this publication without the obligation of giving prior notice.

1. General Information

1.1. General Safety Information

Read and observe the information contained in these instructions.

Please keep these safety instructions for future reference and maintenance. Reliable operation and the prevention of damage and risks are only granted if the equipment is assembled carefully and the settings are carried out according to these instructions and to the operating instructions of the drives.

Please observe the exact terminal assignment, the minimum and maximum power ratings (see technical data) and the installation instructions.

1.2. Health and Safety

Electrical Safety: Warning 230 V AC mains supply can cause death, serious injury or considerable material damage. Disconnect the equipment from the power supply at all poles before opening, assembling or carrying out any work.

Electrical safety of batteries: Short circuiting of the lead acid batteries can cause high currents to flow which can cause rapid heating and a fire risk. Take care to avoid this when transporting and handling batteries. Keep batteries disconnected during installation and modification of the installation.

Competence: This equipment is designed for professional installation only by qualified, trained and safety conscious electricians or skilled and trained staff with considerable knowledge of electrical equipment installation. These instructions must be followed and retained for future reference.

Application: this equipment is designed exclusively for the purposes of controlling automatically opening smoke and environmental ventilation equipment.

Personal Protective Equipment: It is recommended that suitable PPE is worn at all times during the installation and connection of actuator products in accordance with a recommended safe system of work.

Handling and storage: This equipment is heavy. Care must be taken in transportation to the installation location and during fitting. The equipment must not be dropped, impacted, allowed to get wet or abused in any other way. Mishandling can result in serious damage to the housing and the components therein.

Risk of crushing: this equipment can automatically close windows and other appliances without warning. Beware risk of serious injury from crushing of hands or fingers.

1.3. Environment

This equipment is fitted with a pair of lead acid batteries which contain a corrosive gel. These batteries must be regularly inspected for damage and condition. Lead acid batteries are classified as hazardous waste and must be disposed by an authorised and licensed recycler. They must not be disposed of in household waste or 'general waste' skips.

Redundant electronic products are classified as hazardous waste under the WEEE regulations (Waste Electrical and Electronic Equipment). Electronic parts must be disposed by an authorised and licensed recycler. They must not be disposed of in household waste or 'general waste' skips.

If recycling facilities are not locally available, contact SE Controls who can arrange for recycling and disposal of old electronic products.

1.4. User Responsibilities

United Kingdom Only: BS 7346-8:2013 is a British Standard code of practice for the planning, design, installation, commissioning and maintenance of smoke control systems. Section 9 of the standard (Maintenance and Servicing) states that frequent inspection of the system should be undertaken by a named suitably-trained member of the premises management team.

Routine inspection of the system should be carried out in accordance with BS 9999:2008, Annex V.

For countries outside the United Kingdom: Please check with the local the fire authority in your area regarding smoke control legislation, different user responsibilities may apply.

Smoke control equipment should only be maintained by a competent person with specialist knowledge of smoke control systems and sufficient information regarding the system.

1.5. Maintenance

A smoke control system should be checked and serviced periodically in accordance to local smoke control legislation.

Smoke control systems have to be serviced and checked for defects at least once per year by an authorised, trained and competent person.

Within the UK a suitable service contract with SE Controls is recommended for this purpose (see page 7 for contact information).

All batteries need to be checked to see if they are within specification and in good condition at least once a year and replaced at least every FOUR YEARS (please observe the battery commissioning label).

Ensure that supply voltage and batteries are disconnected before any maintenance work or mechanical/ electrical alterations are made.

The system must be protected against unintentional start-up!

After maintenance, modification or repair the system must be functionally retested.

Compatibility; this equipment should only be used to operate with motors and other products approved by SE Controls. No liability will be accepted and neither guarantee nor service is provided if unapproved products are used in conjunction with this equipment.

1.6. Installation and Connection

Installation should be carried out by an authorised, trained and competent electrician.

Ensure correct cable type is used throughout the installation. All low voltage cables are to be routed separately from mains voltage cables and other electrically noisy cables. Flexible cables must not be plastered over and freely suspended cables must be provided with strain relief. Cables must be installed in such a way that they cannot be sheared, twisted, pierced or otherwise damaged during installation or use. Junction boxes should be accessible for inspection and maintenance.

Do not attempt to install or alter the installation of the panel whilst connected to the power supply.

1.7. Fault Finding

In the unlikely event that a problem occurs with the control panel, users are urged to contact SE Controls for assistance.

If the system operates from mains power but when mains power is removed will not operate from batteries, it is possible that the batteries will require replacement.

There are no user repairable parts. Fault rectification must only be carried out by authorised and competent persons.

1.8. Contact Information

For sales, technical support and maintenance please contact:

SE Controls
Lancaster House
Wellington Crescent
Fradley Park
Lichfield
Staffordshire
WS13 8RZ

Tel: 01543 443060

Fax: 01543 443070

Website: www.secontrols.com

1.9. Certification

SE Controls hereby certify that the parts and services detailed hereon have been manufactured, inspected, tested and supplied in accordance with the conditions and requirements of the procedures as documented in the Company Quality Assurance System to ensure conformance with SE Controls' specifications, and with the contract or order conditions of our BS EN ISO9001:2008 registration.

1.10. EN12101-10:2005 Certification

Our equipment is built and tested in accordance with EN12101-10:2005 requirements.

Certification can be provided upon request.

2. Specification

2.1. Device Overview

Part numbers	30A SHEVTEC Panel FCS12001030
	60A SHEVTEC Panel FCS12001060
	90A SHEVTEC Panel FCS12001090
Dimensions	30A (600 X 400 X 250) (W x D x H)
	60A (600 X 600 X 250) (W x D x H)
	90A (800 X 800 X 300) (W x D x H)
Mass Approx.	30A 20 KG
	60A 25 KG
	90A 35 KG
Supply	Range 1 – 230Vac +/- 10% 12.5A max per PSU at 50hz
	Range 2 – 110Vac +/- 20% 7.0A max per PSU at 60hz**
Output	Nominal 24VDC 4-channels combined output 8 Amps each
Battery Backup	(30A) 2 x 12VDC 22.0Ah sealed lead-acid
	(60A) 4 x 12VDC 22.0Ah sealed lead-acid
	(90A) 6 x 12VDC 22.0Ah sealed lead-acid
Expected Battery Life	3+ Years @ 25 C
Real Time Clock Battery Life	10 Years
Cable Entries	Cable entries are via up to 32 20mm cable glands
IP Rating	IP32
Humidity Range	10 to 90% Non-Condensing
Storage	– 20°C to 50°C
Operating Temp	– 5°C to 40°C
Battery Standby Time	72Hours with maximum 100mA standby drain current *

***Standby drain current comprises enabled fire inputs, communication cards, and other loads.**

****Use at 110Vac has not been approved to EN12101-10.**

2.2. PSU LED Status

LED	Colour	Detail
LD1 Batt Connected	Green	Battery connected; this LED will be ON if the battery is connected.
LD2 Charged	Red	Battery charged, this LED will be ON if the battery is charged.
LD3 Charging	Yellow	This LED will be ON whilst the battery is charging.
LD4 Mains OK	Green	This LED will be ON if there is mains present.

2.3. PSU Jumper links

Jumper	Jumper Detail
LK1	Fitting a jumper link to the right hand side connects E and G together, with the link on the left hand side E and G are not connected.
LK2	Fitting a jumper link to the right hand side connects M and 0 together, with the link on the left hand side M and 0 are not connected
LK3	Fitting a jumper link to the right hand side connects C and E together, with the link on the left hand side C and E are not connected
LK4	Fitting a jumper link to the right hand side connects K and M together, with the link on the left hand side K and M are not connected.
LK5	Fitting a jumper link to the right hand side connects A and C together, with the link on the left hand side A and C are not connected.
LK6	Fitting a jumper link to the right hand side connects I and K together, with the link on the left hand side I and K are not connected.

2.4. PSU Volt free relay contacts

VFC	Contact Open	Contact Close
Fault	Not in Fault	In fault
Mains OK	Mains detected	Mains failed

Power and control board Indication and fuses

2.5. PNC Fuse Chart

Fuse		Function	If open circuit
1	16 A	24V AC Input	Not Used with SHEVTEC PSU.
2	1 A	PER - Battery backed supply	Standby LED goes out; PER supply terminals off; If external alarm connected will set off.
3	500 mA	AUX - Auxiliary supply	Not Used with SHEVTEC PSU.
4	16 A	Battery	Power and control board will power down.
5	10 A	Actuator1	When open circuit Actuator relay 1 will not function
6	10 A	Actuator 2	When open circuit Actuator relay 2 will not function

Note: If a fuse clears, check wiring / external devices for damage and incorrect termination / earth faults before replacement.

2.6. PNC Internal Control Board Indicators

LED	Colour	Detail
LD1 POW	Green	Not Used with SHEVTEC PSU.
LD2 WINK	Red	Reserved communication cards use - Illuminated when SERV Pressed
LD3 HEALTHY	Green	Healthy Lamp - Lit when controller has no faults
LD4 ACTIVATED	Red	Lit when the controller is activated by a fire input or via the Manual Control Point Does not respond to NV demands
LD5 MAINTENANCE	Yellow	Lit when maintenance input is active
LD6 WDG	Yellow	Watchdog - Flashes at 1Hz to indicate embedded firmware is loaded and running.
LD7 PSU	Green	On when power supply ok
LD8 BAT	Red	Lit when controller is powered from SHEVTEC PSU.
LD9	Green	Lit when actuator (1) is closing
LD10	Red	Lit when actuator (1) is opening
LD11	Green	Lit when actuator (2) is closing
LD12	Red	Lit when actuator (2) is opening

2.7. Recommended Cables Types

Cabling For	Minimum number of cores	Recommended Cable Type
Mains Supply Cable	2c + Earth	FP Plus
OS2 MCP	4c + Earth	FP Plus
24VDC actuator	2c + Earth	FP Plus
OS2 Smoke detector	3c + Earth	FP Plus
OSlink Network Cable	2c + Earth	FP Plus
SHEVTEC Repeater Panel	4c + Earth	FP Plus
Day to Day switch	3c + Earth	Any Appropriate Cable Type
Rain sensor	3c + Earth	Any Appropriate Cable Type
Thermostat	2c + Earth	Any Appropriate Cable Type
PIR sensor	3c + Earth	Any Appropriate Cable Type

All cabling should be in accordance with relevant standards and regulations for electrical Installation such as BS8519:2010 and BS7671.

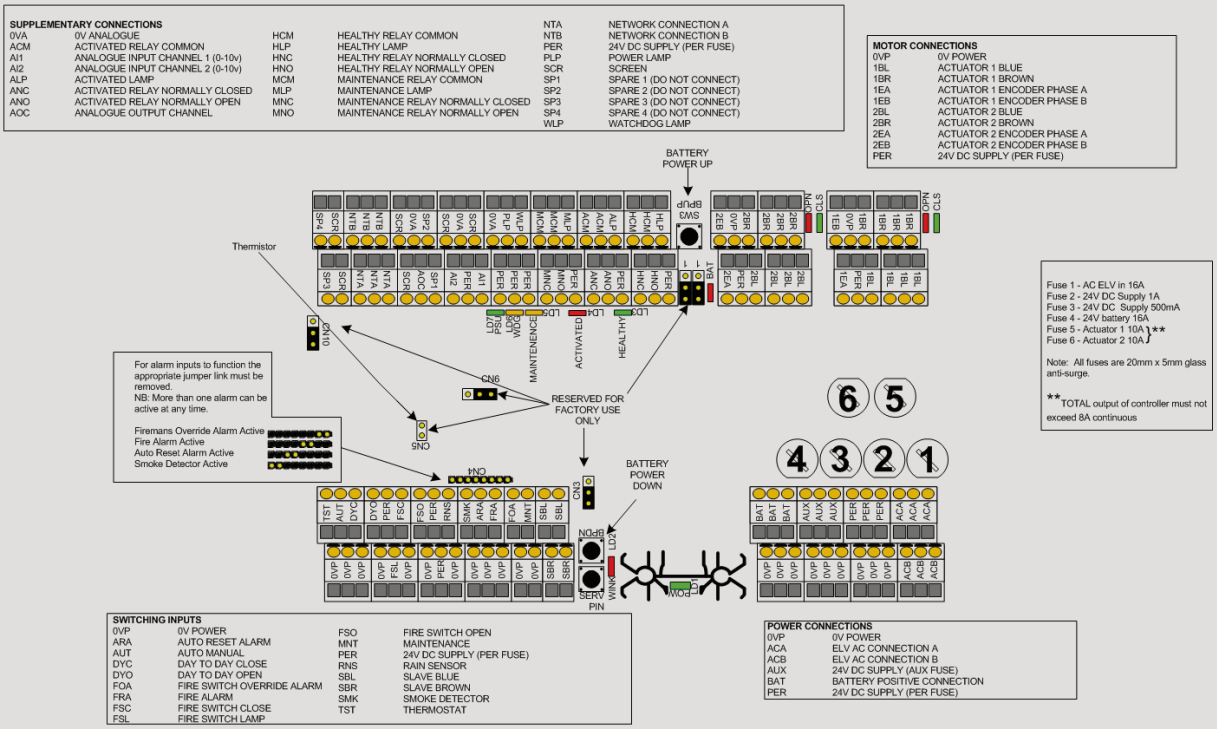
2.8. Hierarchy of Functions

In operation, the control inputs are organised in a strict hierarchical priority order.

1. Maintenance (highest priority)
2. Override alarm
3. Manual Control Point (close demand)
4. Manual Control Point (open demand)
5. Fire alarm
6. Auto Reset Fire Alarm
7. Smoke Detector
8. Slave (Follower) demand
9. Mains Failure
10. Rain Sensor
11. Thermostat / 0-10V / Day to day switch (lowest priority)

3. Connections

3.1. Power and control connections



All terminals have a cable capacity of 2.5mm2 stranded or 4mm2 solid. Each terminal is identified with a 3 letter code which is expanded on the terminal label.

Do not interfere with fixing or location of the thermistor.

The following sections are to be used for guidance only and are subject to change.

All external switch contacts are to be volt-free and capable of carrying 24VDC at low currents.

The maximum cable length for digital control input signals is 500M.

0-10 Volt signals must remain stable and 'spike' free for a period of 2 seconds before the controller will respond to them. In 10% step mode, the controller only responds to 0-10V signals in steps of whole volts ±250mV. In 5% step mode, each step is half a volt.

Environmental ventilation accessories (e.g. rain sensors) should be powered from the AUX supply. Essential smoke accessories (e.g. smoke detectors) should be powered from the PER supply.

Strip the outer sheath of all cables back to the entry point of the enclosure. Ensure enough sheath is left to provide mechanical protection against cable movement over time.

Inner cable cores should be dressed under the edges of the power and control board. This provides a neater and more ordered solution. Only strip inner cores sufficiently to make a good electromechanical contact with the terminal blocks.

Where multiple actuator leads are to be connected to the controller, it is advisable to use an external junction box to reduce the number of cable glands required, if using screw-terminal joints ensure they are of the enclosed type.

The default controller settings have been chosen to cater for the majority of applications. If alternate settings are required please contact SE Controls.

3.2. Actuator connections

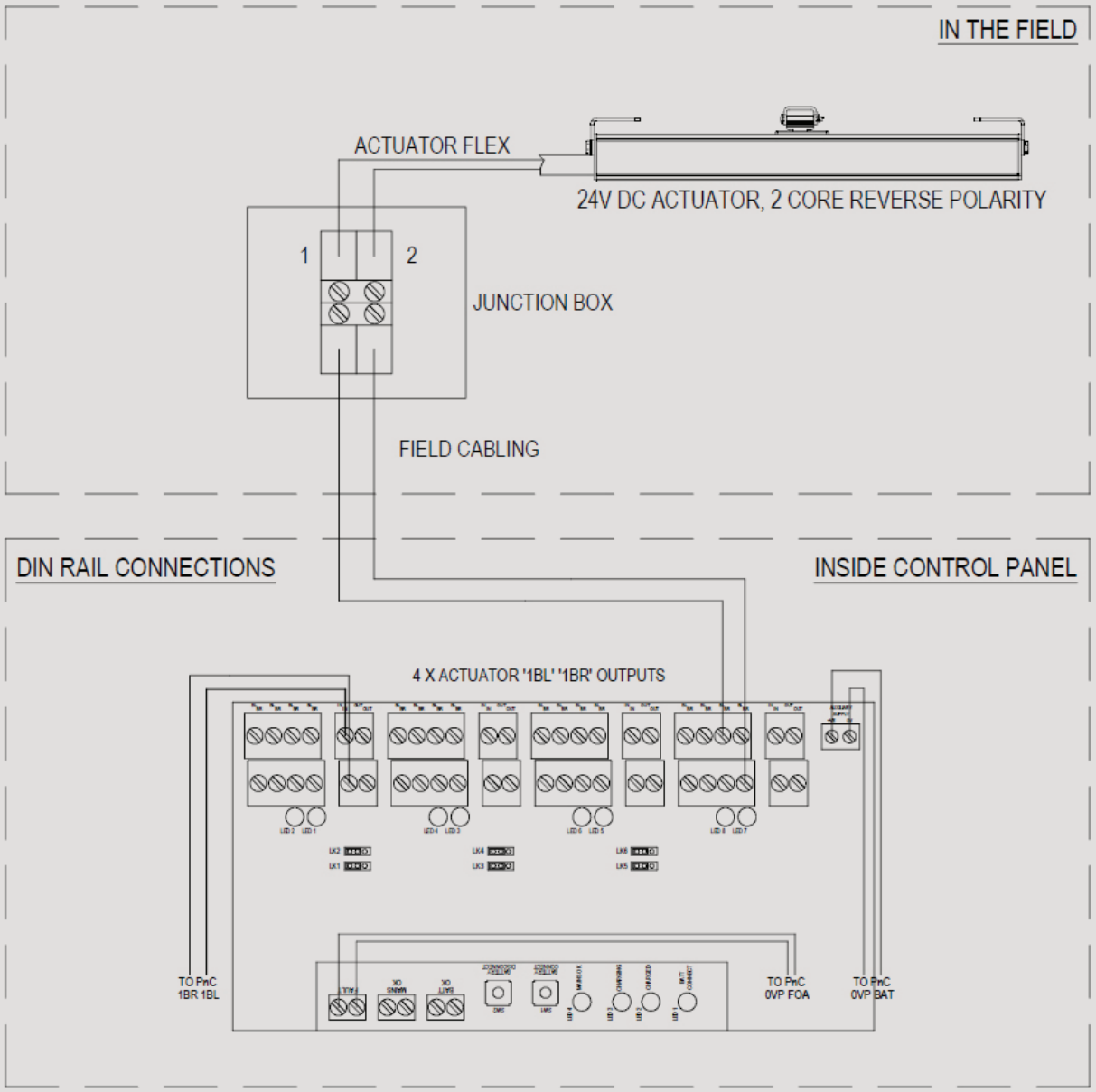
The 30A PSU has four separately fused 24VDC actuator output channels. Each output channel has terminals for connecting up to 4 actuators.

The default mode of operation of these outputs is timed off, reversing polarity and is intended for use with linear and chain actuators. Locking catches, magnetic catches and rotary dampers can be used but require changes to the default settings of the controller by SE Controls.

Output mode - timed off, reversing polarity

Actuator Full Stroke Period (Environmental Ventilation) - 40 seconds

Alarm Full Stroke Period (Smoke Vent) - 180 seconds



3.3. Manual Control Points

These switches are used to manually open and close actuators in a smoke control system. There is a set lock-out period of 5 seconds between successive operations. The actuators open full stroke in response to a transitory operation of the Manual Control Point. However, to prevent finger trapping issues, the actuators only close whilst the Reset button on the Manual Control Point is maintained.

Note that the default Manual control point close mode can be changed by SE Controls to close fully in response to a brief press of the reset button. This mode change is only recommended where the activated vent is at least 2.5M above ground level to minimise finger trapping issues.

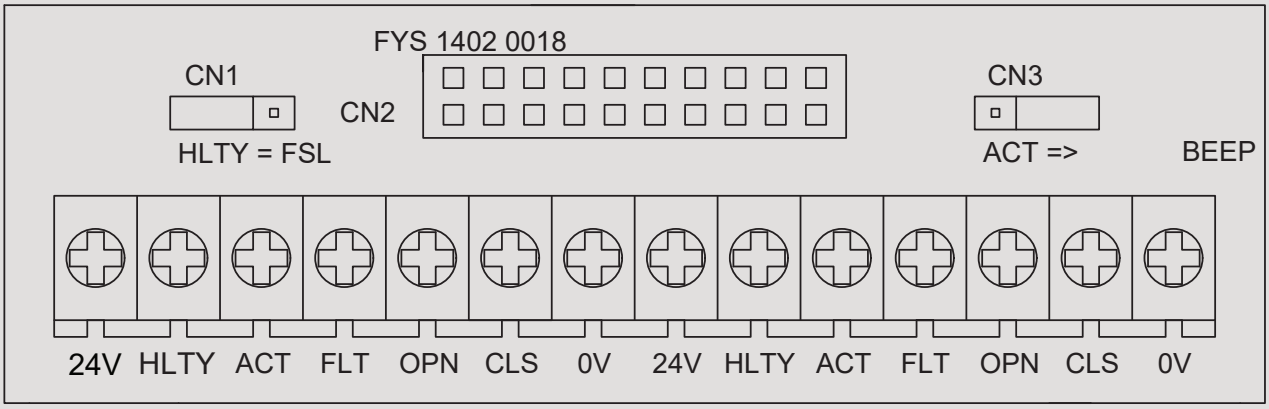
OS2 MCP **Part Number FCS00200016**

OS2 Tamperproof MCP **Part Number FCS00200034**

OS2 MCP Adaptor Plate **Part Number FCS00200017**

All connections to the OS2 MCP are made via the connection PCB mounted within the adapter plate assembly. (See diagram below.)

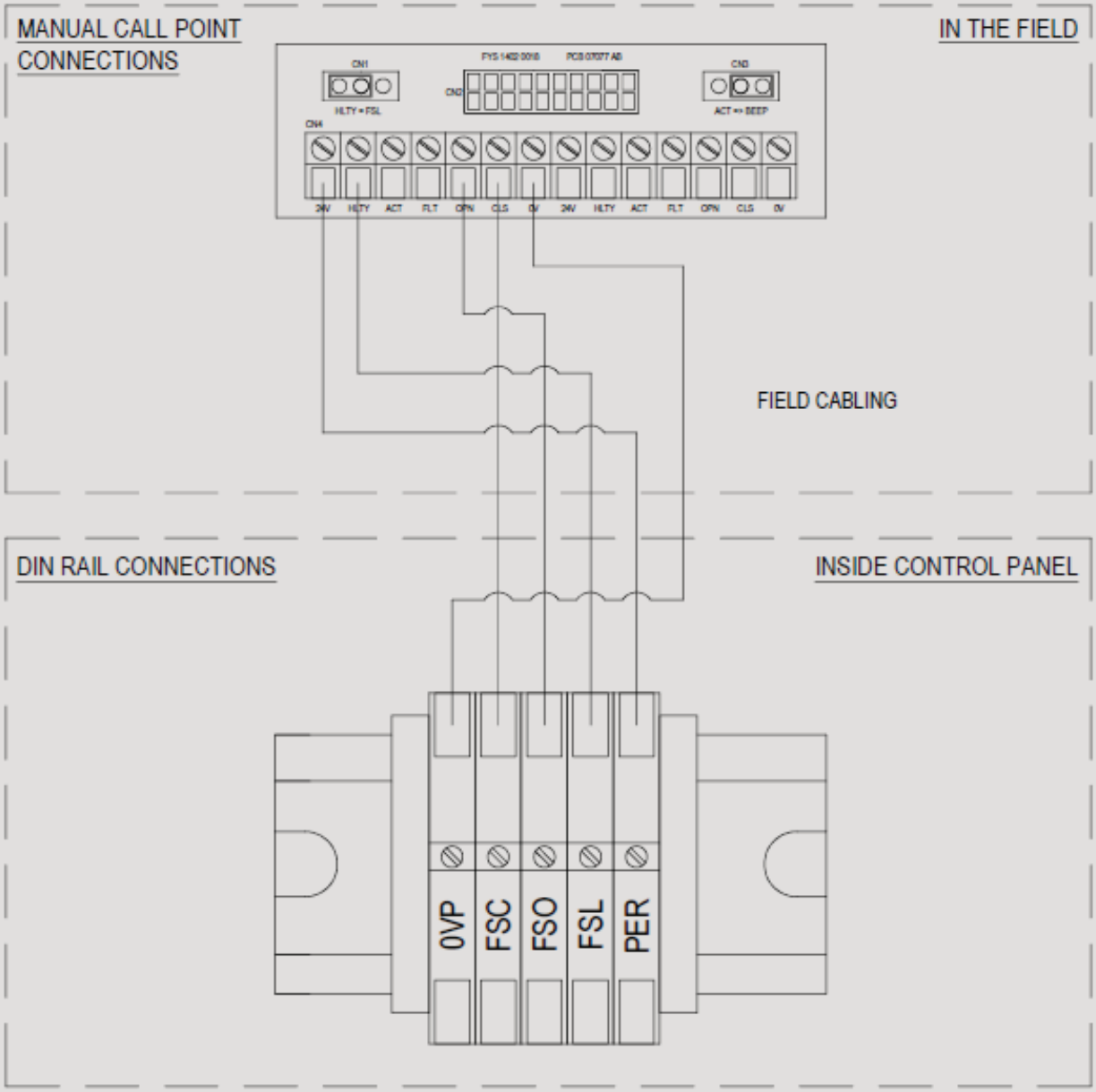
The connection PCB has 14 terminals, consisting of 2 pairs of 7 connections. For OS2 products, it is only necessary to connect to 5 of these signals as follows:



MCP Terminal	OS2 Terminal	Description
24V	PER	24VDC power supply rail from OS2 controller.
HLTY	FSL	Healthy indicator – from OS2 controller.
ACT	--	No connection required/ made for OS2 systems.
FLT	--	No connection required/ made for OS2 systems.
OPN	FSO	Open demand – from Manual control point
CLS	FSC	Close demand – from Manual control point
0V	0VP	0V power supply rail from OS2 controller.

Note that each pair of connections are interconnected within the PCB assembly. The second set of terminals may be used to daisy-chain multiple MCPs to one zone of the control panel.

The jumper CN1 must be fitted in the left hand (“HLTY=FSL”) position.



The jumper CN3 enables and disables the sounder. The default position is disabled (right)

The PSU must have both battery and mains power removed before installing the MCP to the adapter plate.

The MCP must be secured using the two fixing screws (Torx-T8) on the underside of the MCP module.

Important; for instructions on installation and operation of the MCP refer to the user guide accompanying the device or contact SE Controls.

3.4. Fire Alarm Inputs (FRA, ARA, SMK)

All fire alarm input signals require a Normally Closed volt-free-contact which opens on fire signal initiation. The unit comes with all alarms hardware disabled via jumper links. To enable an alarm input, refer to the figure below.

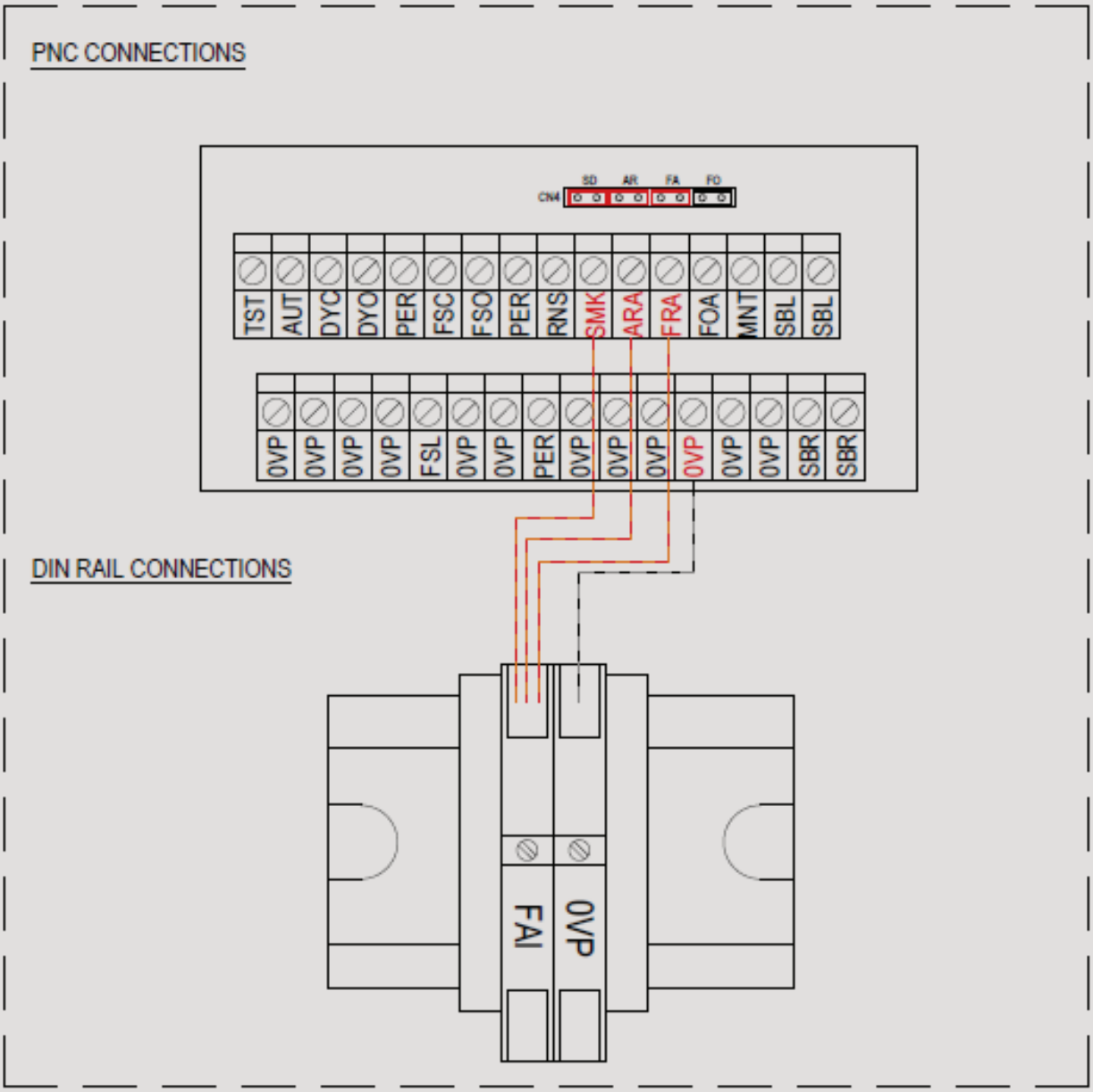
Each fire alarm input has different functionality. It is not mandatory to connect a particular type of device to a particular fire alarm input, but to the one(s) that provide the required functionality.

Fire Alarm - Opens on activation; Use of reset from Manual control is allowed.

Auto reset Fire Alarm - Opens on activation; Use of reset from Manual control is allowed; 30 second lock-out period after activation before reset; 120 second lock-out following reset before subsequent re-activation.

Smoke Detector Input - Opens on activation- Does not allow use of reset from Manual control until alarm has been reset.

The alarm activation direction, Manual control point's Switch reaction mode and lock-out periods can be configured by S E Controls.



3.5. Smoke Detectors (SMK)

Smoke detector heads are required to provide a normally closed volt-free contact. Smoke detectors should be powered from the PER supply rail. The recommended maximum number of Smoke detectors is 5 connected to a single SHEVTEC PSU PANEL.

It is important that the quiescent current of the smoke detectors is kept to a minimum as their current draw will greatly impact on standby times. The peak current draw on the PER permanent supply should never exceed 1Amp.

Intelligent Optical smoke detector ADA55000318 (Head) ADA45681245 (Base)

This smoke detector is an exclusive S E Controls product and has been specifically designed to operate as part of SE Controls SHEVTEC systems. It has been marked as such to aid in identification for servicing and replacement.

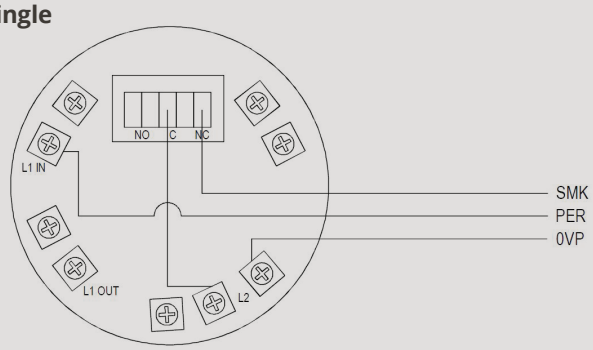
Other models / types are not suitable products for use in SHEVS and are not compatible.

The new detector is a 2 part assembly comprising a head and a base which clip together. To prevent interference by unauthorized persons the base incorporates a locking mechanism which then prevents disassembly without a tool.

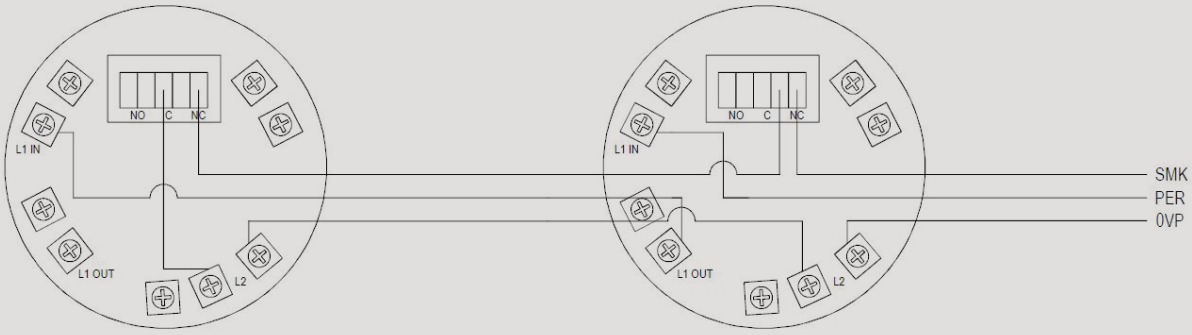
The detector head has an LED indicator to provide status information. Distinctive markings on the head set it apart from other standard types of detector, and each unit is supplied with a clip-on dust cover which should be removed at commissioning stage.

Important Notes:

Single



Test using Canned Smoke or other approved smoke generating method. No other method is acceptable.



Multi

Removal of the head **DOES NOT** cause activation of the system. Once installation is complete,

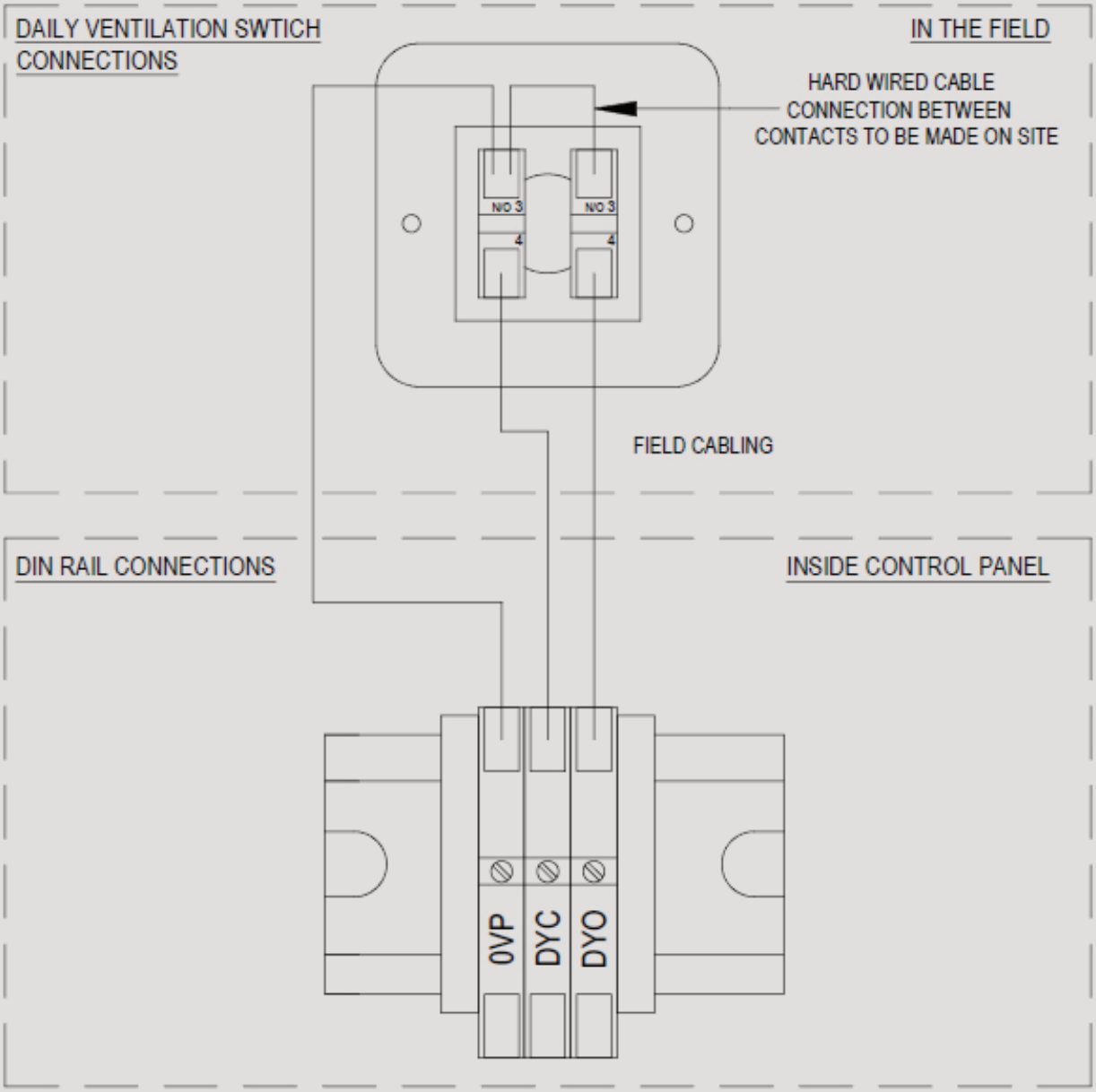
ensure lock is engaged to prevent unauthorised removal of detector head

The current model is NOT suitable for use with SHEVTEC PSU PANEL Auto Reset alarm functions. Please seek further advice from SE Controls if this facility is required.

3.6. Day to Day Switch (DYO, DYC)

Connecting terminals DYO and DYC to 0VP will open and close the vent in environmental ventilation mode. The default mode requires a spring centre 3 position switch having 2 normally open contacts. The actuator will only move whilst the input demand is in force and the total movement time in the requested direction is less than 18 seconds (default). Releasing the switch will stop the movement.

The day-to-day inputs only operate whist the controller is in manual operational mode.



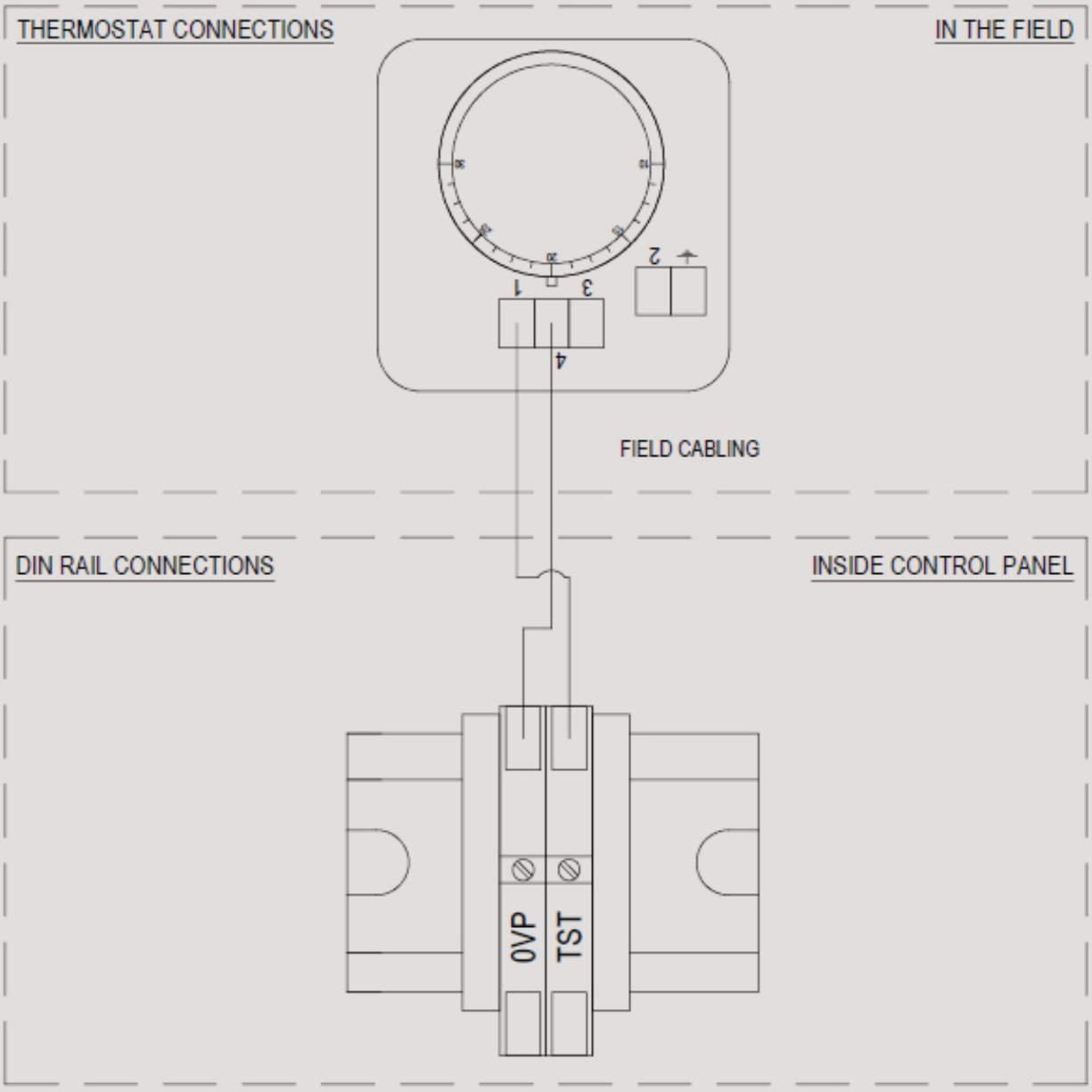
3.7. Thermostat (TST)

A simple volt free room thermostat can be used to operate the SHEVTEC PSU PANEL. The output contact is required to close when a demand to open a vent is required.

When the demand is received, power is applied to the actuator outputs for 40 seconds in the open direction.

When the demand is removed, power is applied to the actuator outputs for 40 seconds in the close direction.

Both of these movements are subject to a 180 second lockout period which prevents frequent unwanted operation.

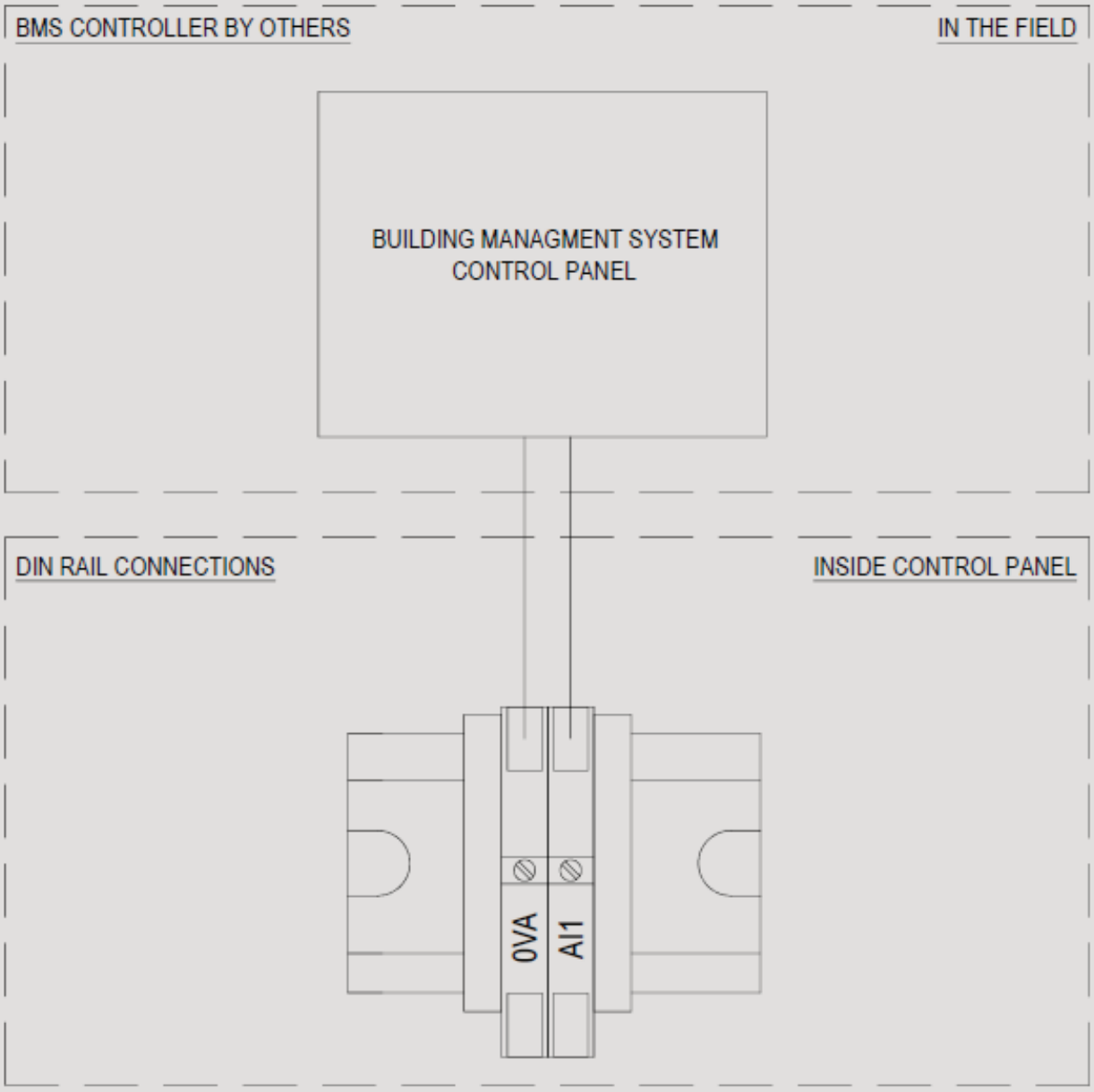


3.8. BMS Analogue Input (AI1)

A 0-10V BMS analogue demand input channel is provided. It has a 100K input impedance plus a 50ms anti-aliasing filter. By default, the input is configured to set the actuator position in 10% steps based on a scaling of 1V==10%,where 100% is the natural ventilation maximum run time (default 40 seconds).

Other input scaling is available. Please refer to SE Controls for details.

A second analogue input, AI2, having the same characteristics as AI1 is available. This is not used in the default system configuration.

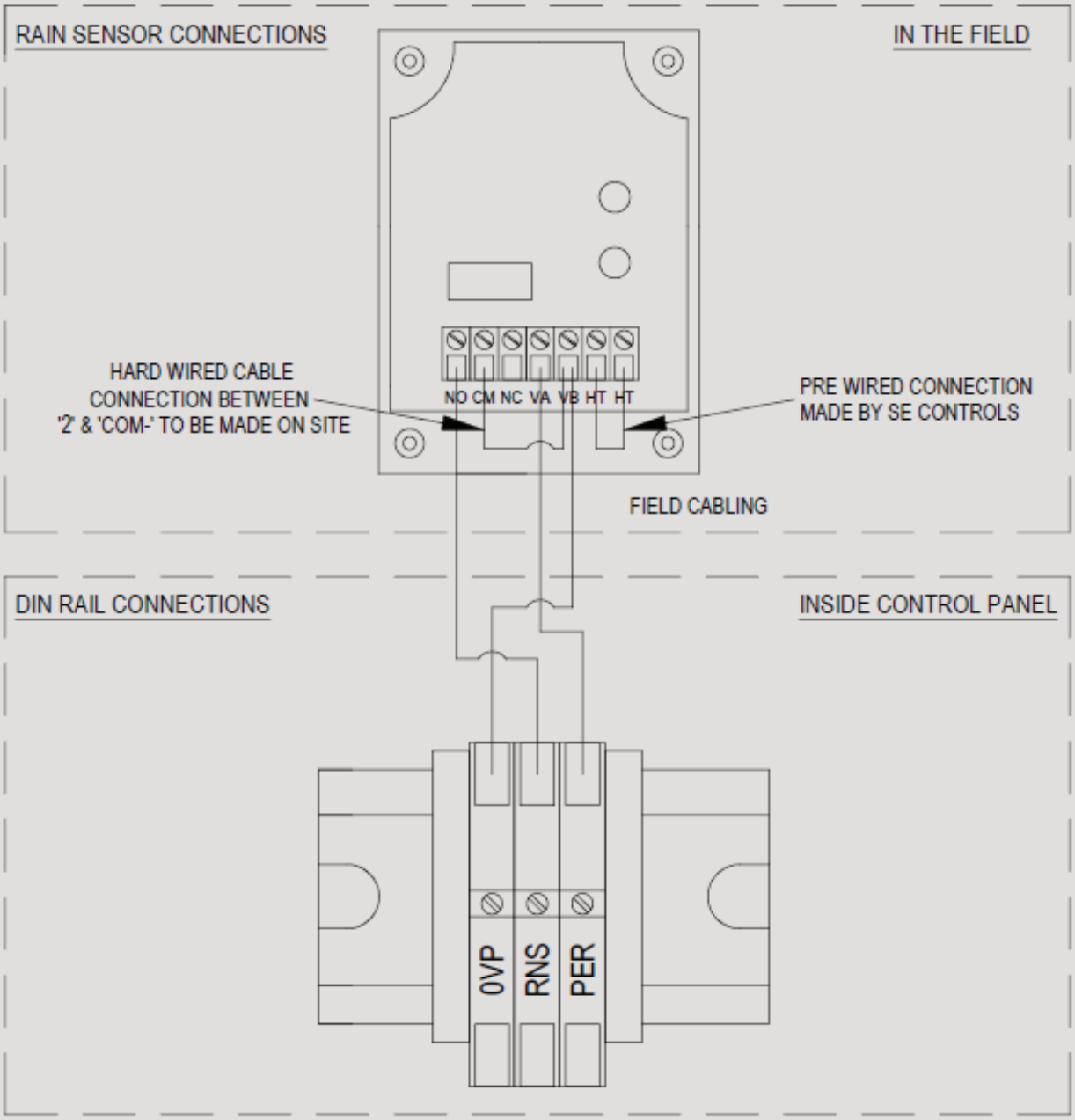


3.9. Rain Sensor (RNS)

An input for the connection of a volt free normally open rain sensor is provided. When the contact closes, power is applied at the actuator outputs in the close direction for a period of 180 seconds.

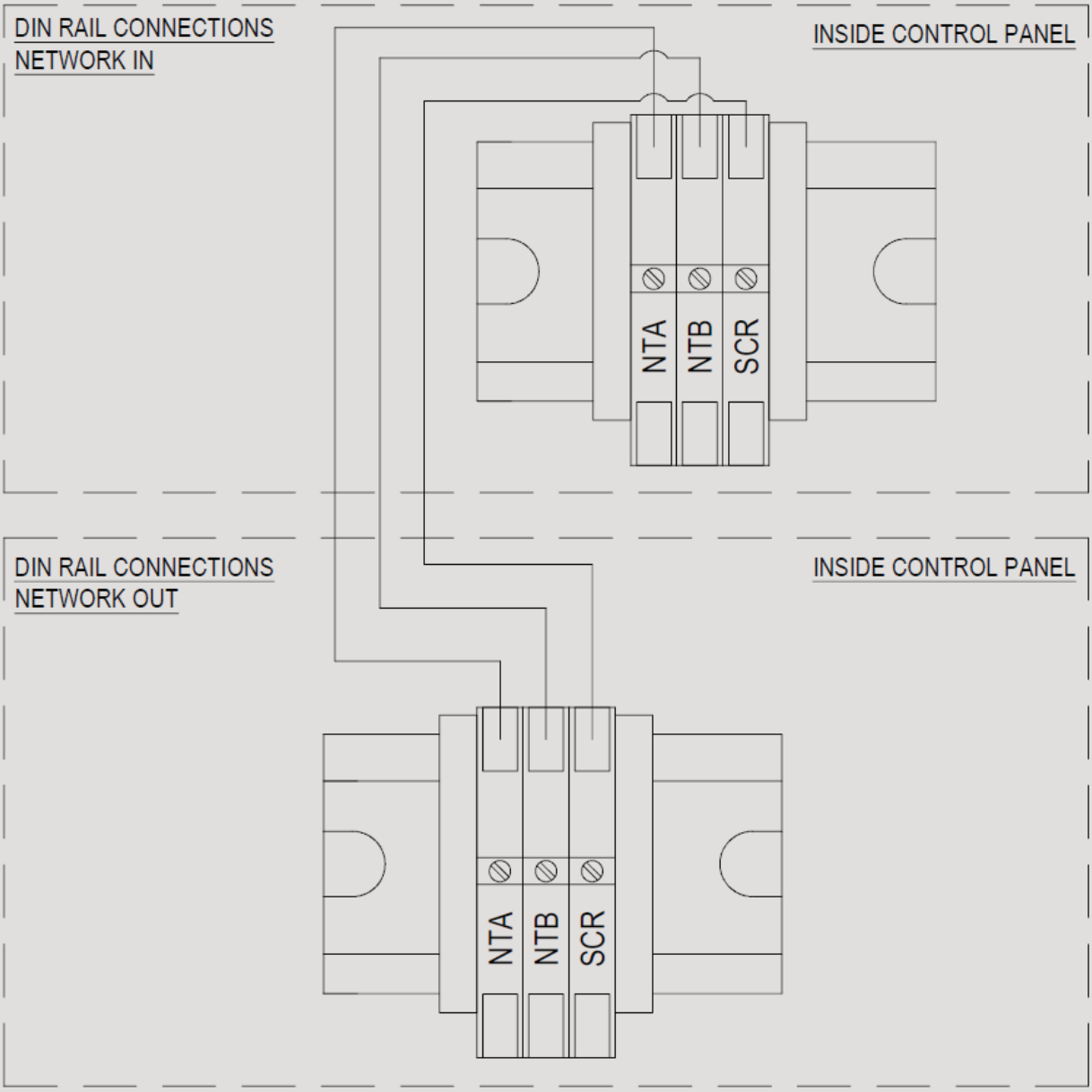
At the same time, a 180 second lock-out timer is started. If either the rain sensor remains wet or the lock-out timer is running, the environmental ventilation controls are ignored. Once the rain sensor dries out and the lock-out timer times out, the environmental ventilation controls are re-enabled. However, note that the position of the vent is not automatically reset to the last known position prior to the rain sensor activation.

The rain sensor input can also be used to close the vents from a centralised control point, by the use of a 7 day timer or a caretaker switch.



3.10. Network Connection (NTA, NTB, SCR)

Connections NTA and NTB are used for network connection with network interface plug in boards. The use of these devices is outside the scope of this document. Please make reference to the individual product user manuals where necessary.



4. System Design

4.1. System Design

Design of a smoke and heat control scheme is a technically complex task and needs to consider both national legal requirements and local fire/ building regulations. This is beyond the scope of this document. If in doubt, consult SE Controls or approved agents who can give further guidance.

The system design documentation should include a 'Cause and Effect' list or similar to identify the essential smoke control functions of the system.

Before installation of any system, the following should be considered and documented where necessary.

4.2. Design checklist for each PSU Panel:

- Location: Installation is in a clean, dry and secure location, accessible for maintenance.
- Location: Not installed in sealed enclosure.
- Location: Distance to the actuators. Cable voltage drop is proportional to cable length, so locating the panel far from the load may require heavier gauge of cable.
- Environment: The equipment must not be subject to very cold or excessively warm ambient temperatures.
- Electrical Load: Maximum total actuator current is within specification (<30A for 30A PSU).
- Electrical Load: Standby current on PER less than 100mA if 72Hour standby time is required.
- Electrical : Provision of locally fused, isolatable mains power supply
- Communication options: OSLon for LonWorks, OSLink card for OSLink networks or stand-alone
- Smoke ventilation function: None/open on fire/ close on fire/top-of-smoke-stack/stairwell.
- Smoke activation source: smoke detectors / fire alarm interface / none / MCP.
- Smoke activation reset: Automatic or manual reset. MCP required for reset.
- Environmental ventilation function: Day-to-day switch required.
- Environmental ventilation function: Thermostat, NVLogiq, building management system (BMS).
- Environmental ventilation function: Rain Sensor (Local / Networked)
- Special Parameter settings: Actuator run times, service due indication
- Special requirements.

4.3. Design checklist for each MCP:

MCPs are fitted to OS2 Shevtec systems to indicate the fire state and allow control of the vent at high priority.

- Is an MCP is needed on each OS2 and where it might best be installed - The MCP control may or may not need to be accessible by fire service personnel. For Environmental ventilation systems, MCPs are often not required
- Vent finger trap risk. Is it required for vent to be visible from the MCP position.
- Type of MCP: Standard MCP (reset + open function) or tamperproof (reset only) MCP.
- Access to fixing screws and memory key slot. Allow a minimum of 150mm away from any obstruction below.
- Number of reset keys supplied to customer.
- Top of smoke shaft vents normally automatically reset, so often do not require an MCP.
- Where the MCP is solely used to reset or test the system, the MCPs can be located in a hidden or secure place.

4.4. Design checklist for each actuator/vent

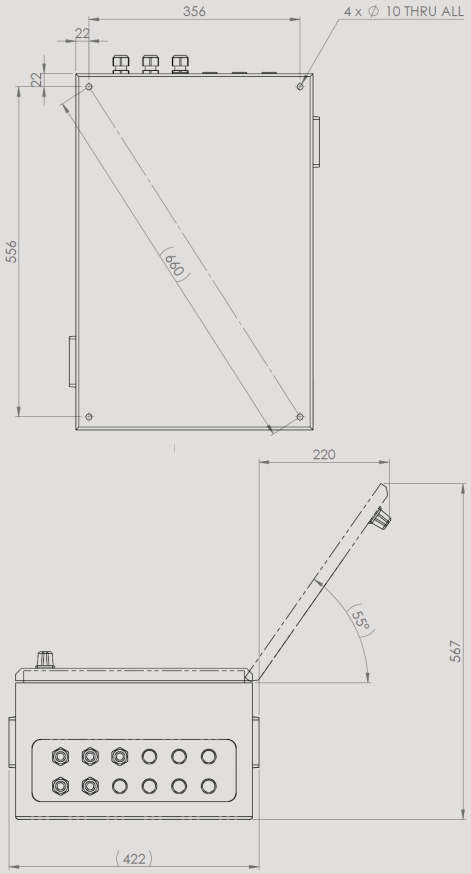
- Risk of crushing; this equipment can automatically close windows and vents without warning. Risk of serious injury from crushing of hands or fingers. Consider if additional protection (e.g. PIR proximity sensors, physical guarding or controlled force actuators) might be required.
- Compatibility: OS2 motor drive has considerable voltage ripple at heavy loads. Consult SE Controls when using non-SE Controls approved actuators.
- Cable voltage drop: Calculation of acceptable voltage drop may be required for heavy loads or long cables.

5. Installation, Commissioning and Fault finding

5.1. Fixing

Hold the panel against the surface to which it is to be fixed. Mark through the holes. Drill appropriate sized pilot/fixing holes and use plastic plugs/cavity fixings where appropriate. Use 4 10mm bolts to secure the panel firmly.

- Installation of the panel in very warm locations (e.g. boiler rooms, hot plant rooms) should be avoided as high temperatures will reduce battery life. Temperatures should generally be below 35°C and never exceed 40°C. Avoid installation adjacent to boilers, hot water pipes, etc.
- The PSU has been tested at -5°C and may be operated down to this temperature.
- The panel must be firmly fixed to a solid surface. The panel can be mounted on any vertical surface such as a wall.
- The panel must be accessible for maintenance.
- Locating the panel a long distance from the actuator will increase cable voltage drops on long cables, and may require use of more expensive cables with greater cross-section.
- In exceptional circumstances, charging the batteries can liberate gases. The panel must not be installed in a sealed cabinet or un-ventilated space.



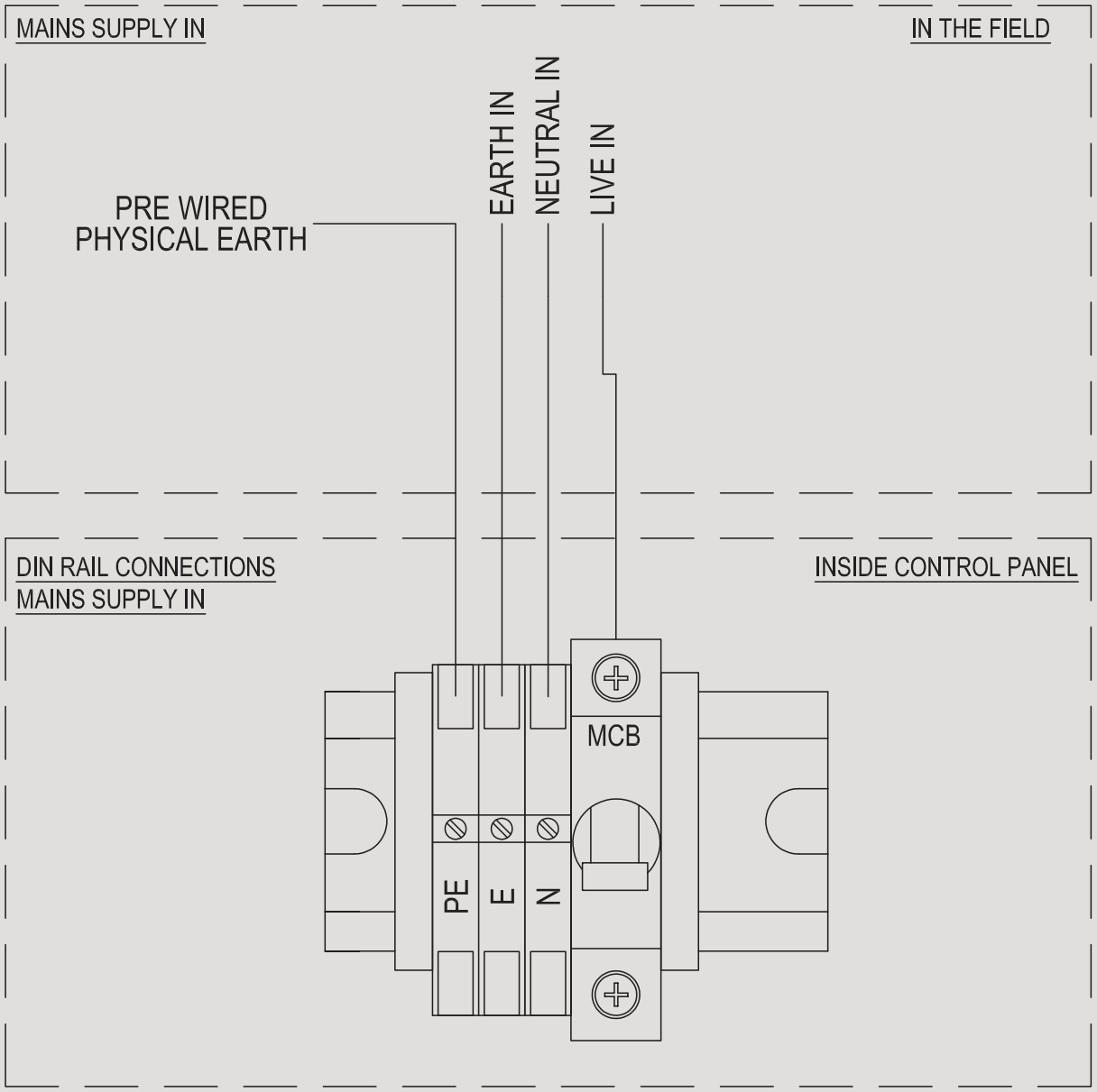
5.2. Low voltage connections

Make connections to the power and control board or PSU as detailed in section 3.

5.3. Mains Connection

Ensure the supply is securely isolated before connecting. Connect to the L; E and N screw terminals of the mains input. Ensure that it is fused to an unswitched mains outlet, using flexible 1.5mm² 3 core cable. Note that the terminal entries have openings suitable for use with up to 2.5mm2 cable.

If no further wiring is to be connected at this time, remove the 13A fuse from the mains outlet to ensure the panel cannot be prematurely powered.



Please note that the 30A PSU will be installed with a 10A MCB, the 60A PSU with a 16A MCB and the 90A PSU with 3 x 10A MCB's.

5.4. Battery installation

Once all other connection to the panel has been made and the installation is ready for commissioning, fit the batteries.

The PSU panel will not power up from just batteries until the main power is first applied or the 'battery power up' button is pressed.

Connect the red lead to the red terminal of one battery and the black lead to the black terminal of the other battery. Complete the circuit by connecting the black link wire between the batteries using the unused battery terminals.

Take care to never short circuit batteries as a hazardous high current will result.

If the system is not to be commissioned/ used for some time, ensure the system is left in the disconnected power-down state.

5.5. First power-up tests.

Before powering up a system for the first time, ensure the actuator and vent installation is complete and operation of the actuators will not cause a hazard.

Full commissioning of a new system requires the availability of mains electrical supply.

If activation is via a fire alarm controlled relay, ensure the fire alarm system is reset.

With mains power removed, use a multimeter to measure the open circuit voltage on each battery. Check that the voltage is more than 10.5V for a new discharged battery, and more than 12.6V for batteries that are fully charged. Where batteries have been left connected and deep discharged, there is the risk of internal damage to the batteries and should be replaced.

Reconnect the batteries and connect the mains supply. The battery charging should start within 30 seconds and may be checked by measuring an increase in battery voltage.

For networked systems, an unbound, faulty or disconnected OSlink card may cause a fault indication. For OSLink, Check the green status led of the network, and if necessary re-initialise the network by pressing the 'learn' button on the OSLink card.

Test the operation of the actuator by activation of the system. Ensure the actuator operates smoothly and adjust if necessary.

Where a 'Cause and Effect' functional specification is available, this will document a complete list of the required functions which must all be verified in turn. If this specification detail is not available, the commissioning engineer must ensure that each input is tested. This may require triggering of smoke detectors and simulating of fire alarm inputs.

If the system is not to be used for some time, ensure the system is left in the disconnected power-down state. If necessary, press the disconnect button on the PSU.

5.6. Basic Fault Finding

If the system operates from mains power but when mains power is removed will not operate from batteries, it is possible that the batteries will require replacement.

There are no user repairable parts. **Fault rectification must only be carried out by authorised and competent persons.**

1. Mains power: Incoming mains supply in the range 230 ±10% V.A.C must be present.
2. Fuses: Refer to section 2.6 – Do not replace fuses without investigating the cause of the failure. Blown fuses must be replaced with fuses of the correct type and current rating.
3. Battery open circuit voltage; the voltage on each battery when not on charge should be above 12.6 V.D.C.
4. Cable connections; all connections to be secure and show no sign of damage or shorting
5. MCPs; All controllers have green 'healthy' indicators –refer to section 2.3 and 2.4

Symptom	Possible cause
Standby LED off, fault flash (50/50) at MCP	Mains supply failed – check supply, ensure the electrical breaker has not tripped. Battery Failed. Disconnect the battery and check the open circuit voltage of each battery is >12.6V (fully charged) or >10.5V (uncharged). Replace pair of batteries if either is low. Disconnecting and reconnecting the battery while mains power is applied can cause a battery fault to be wrongly detected even with a good battery. This fault is only cleared at the end of the fast-charge period so make take minutes or hours to clear. To avoid this, connect batteries before connecting mains power.
Standby LED on, brief fault blinks every 10 seconds at MCP controller. System remains operational.	Service due indication (where enabled). Resetting a service due warning requires an engineer with a SCEPTRE tool.
No operation, No Leds illuminated.	Mains supply lost and battery low.
	Check battery voltage >10.5V each battery. Try 'battery power up' button. Check fuses. Restore the mains supply.
No actuator operation but actuator LEDs on PSU illuminated.	Check connection to the actuator and operation of the actuator.
No actuator operation and actuator LEDs on PSU not illuminated.	For smoke stacks and similar networked systems, check that another vent elsewhere is not open and interlocking operation. Check fuses at PSU and on Power and control board
No response to Environmental ventilation controls, but fire controls operate O.K.	Check mains supply is present – Environmental ventilation functions can be disabled on mains failure. Check the rain-sensor input is not active. Allow time for rain sensors delays to timeout. Wait for internal timers to timeout, e.g. If day-to-day controls are operated, the thermostat input is disabled for the occupancy time. As some lockout timers can be lengthy, it can be useful to reset the system by removing and re-applying all power to the system.
No power on PER permanent output	Check all fuses

5.7. Battery Replacement

Batteries must always be replaced as a pair with batteries of equivalent construction, size and capacity (2 x 12V SLA 22.0AH).

Replacing these with batteries that do not meet the charging voltage based on temperature (see graph) will invalidate the panel's compliance to EN12101-10. See Section 1.10.

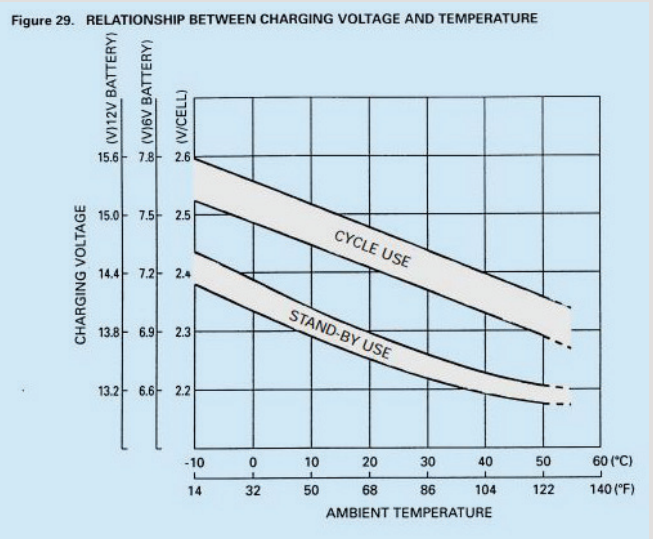
It is highly recommended that mains power is isolated before changing batteries.

Disconnect the batteries and take care not to short-circuit the battery terminals when removing them. Fit the new batteries.

Remove the protective covers on the battery output terminals and connect the battery red lead to the red terminal of one battery and the black lead to the black terminal of the other battery. Complete the circuit by connecting the orange link wire between the batteries using the unused battery terminals.

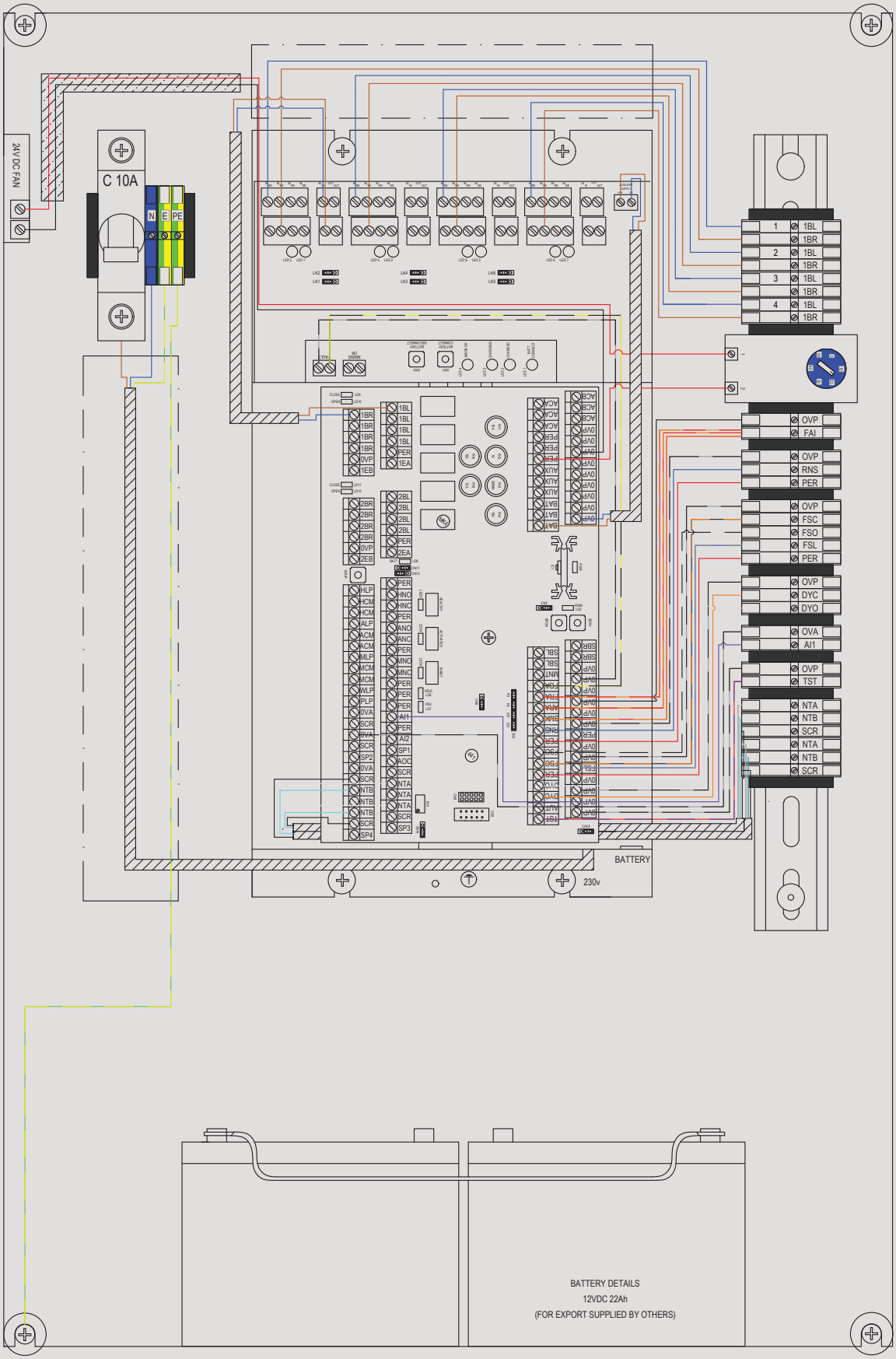
Replace the enclosure cover and reconnect the mains supply. Check for green indication of the standby LED, and no fault indication at any MCP.

Figure 29. RELATIONSHIP BETWEEN CHARGING VOLTAGE AND TEMPERATURE

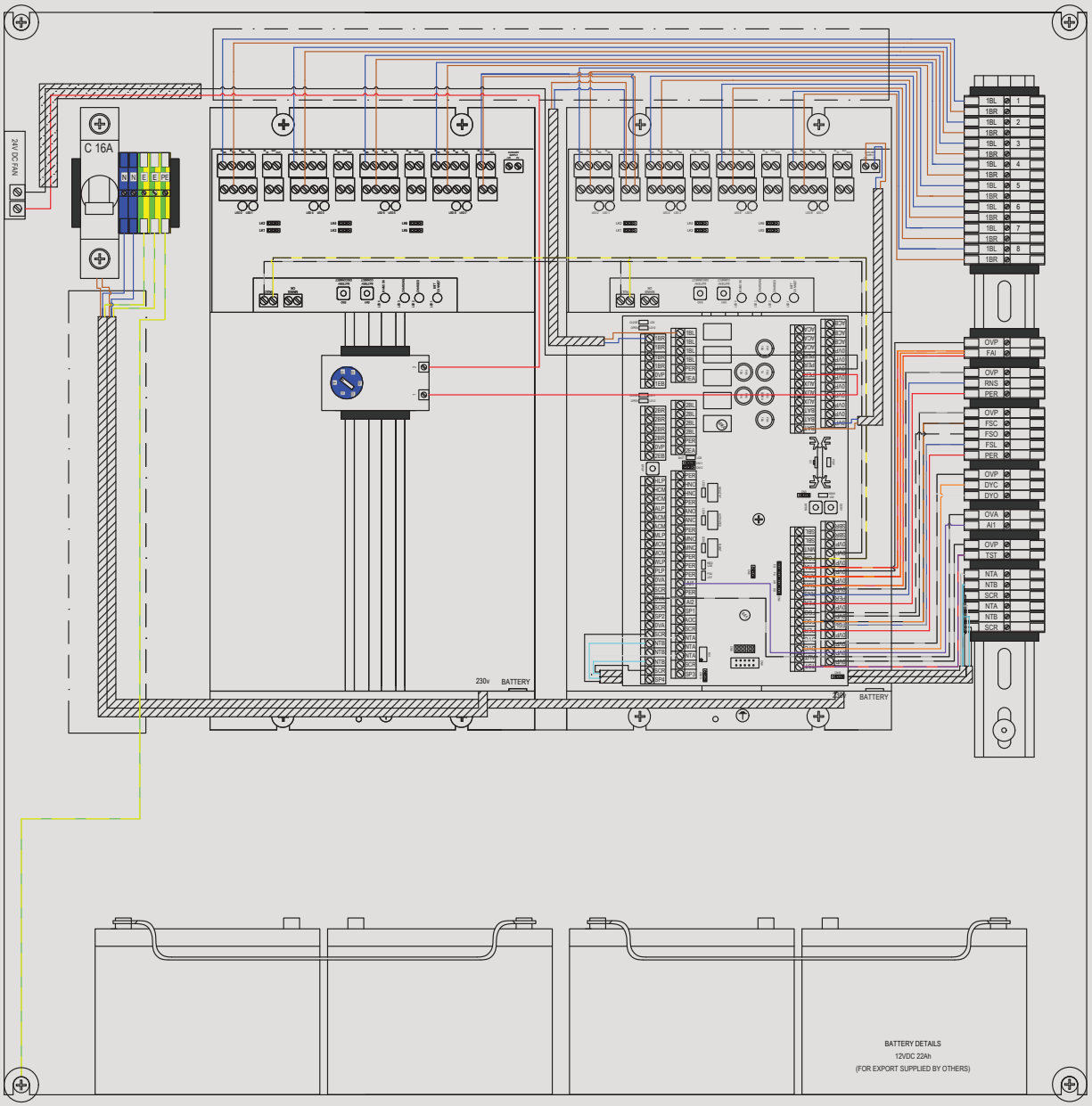


6. Wiring Schematics

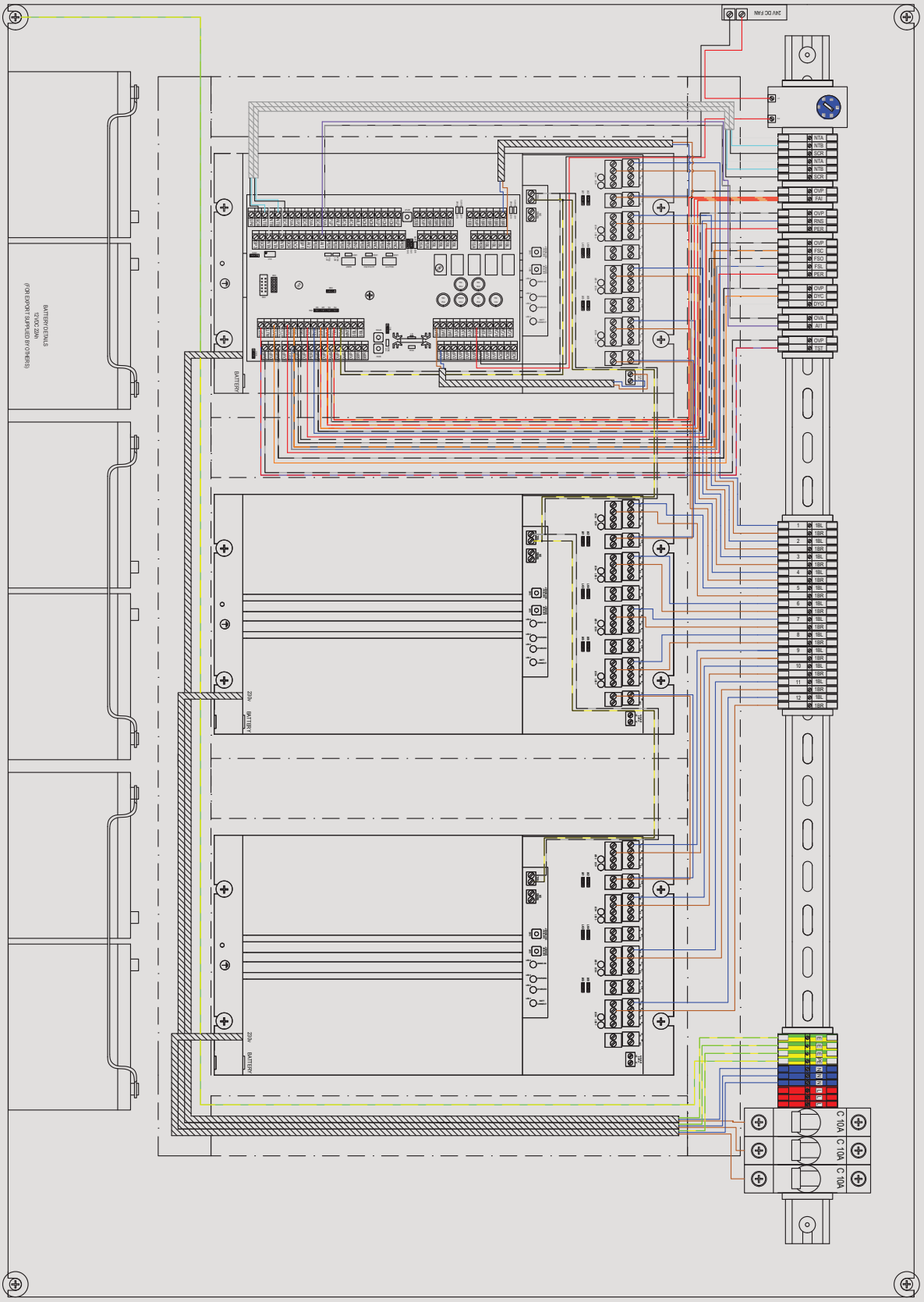
6.1. 30A PSU Panel



6.2. 60A PSU Panel



6.3. 90 PSU Panel



NOTES:

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