

FSM-ES / FSM-S

Fire System Monitoring Panels



Installation, Operation and Maintenance Manual

Publication Information

Development

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Pre-Face

Document History:

Version	Summary of Change
1.0	Original draft submitted for comment
1.1	Minor changes to formatting
1.2	Removed Company Confidential Fixed Figure 13.

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About this manual:

This manual is written for those who perform tasks associated with the installation, operation and maintenance of fire suppression systems intended for use in mobile and transportable equipment.

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Warranty:

Chubb warrants to the Customer that each panel is free from defects in material and workmanship under normal use for a period of twelve (12) months from the date of commissioning of PEFS. Chubb agrees to repair or replace, as its option, any inherently defective panel. This warranty does not cover damage resulting from the Customer’s negligence, fault, misuse, neglect or incorrect use of the product, abuse or fair wear and tear. In addition, the warranty does not cover work required to be done to repair a defect or damage caused by vandalism, fire, water, damage, power surge or other circumstance outside of Chubb’s control. The warranty provided hereunder is conditional upon documented evidence of proper maintenance by the Customer performed in accordance with the Owner’s Manual and Maintenance and Parts List Manual, by qualified, trained personnel, using replacement parts that conform to original design specifications. This warranty will be voided upon modification of the (i) installed and commissioned system; (ii) use, condition and environment of the Customer’s equipment.

Nothing in this warranty excludes, restricts or modifies the application of the provisions of any statute (including the *Trade Practices Act 1974 (Cth)* where to do so would contravene that statute or cause any part of this warranty to be void.

Where Chubb breaches its obligations under this warranty, Chubb agrees at its sole discretion to elect to re-supply a panel again or to the replacement or repair of a panel

Intended use:

A Fire System Monitoring panel is installed as part of a fire risk reduction strategy, as defined in a Fire Risk Assessment.

1: FSM-S and FSM-ES panels

Introduction

The FSM-S (Standard model) and FSM-ES (Engine shutdown model) panels comprise a combination indicator panel and user interface. The indicator panel provides visual and audible indication of system status, alarms, and faults and the user interface incorporates a RESET, TEST (LED's and Buzzer), DIM (LED Brightness) and ACK (Acknowledge/Silence Buzzer) features. The interface of the FSM-ES model also allows manual extension of the equipment shutdown delay.

To minimize the effects of electromagnetic emissions from high energy sources the input cables should **NOT** be run parallel, or in close proximity to any cables or equipment that may produce high RF (radio frequency) energy, e.g. cabling for RF transceiver antennas, inverters, motors etc.

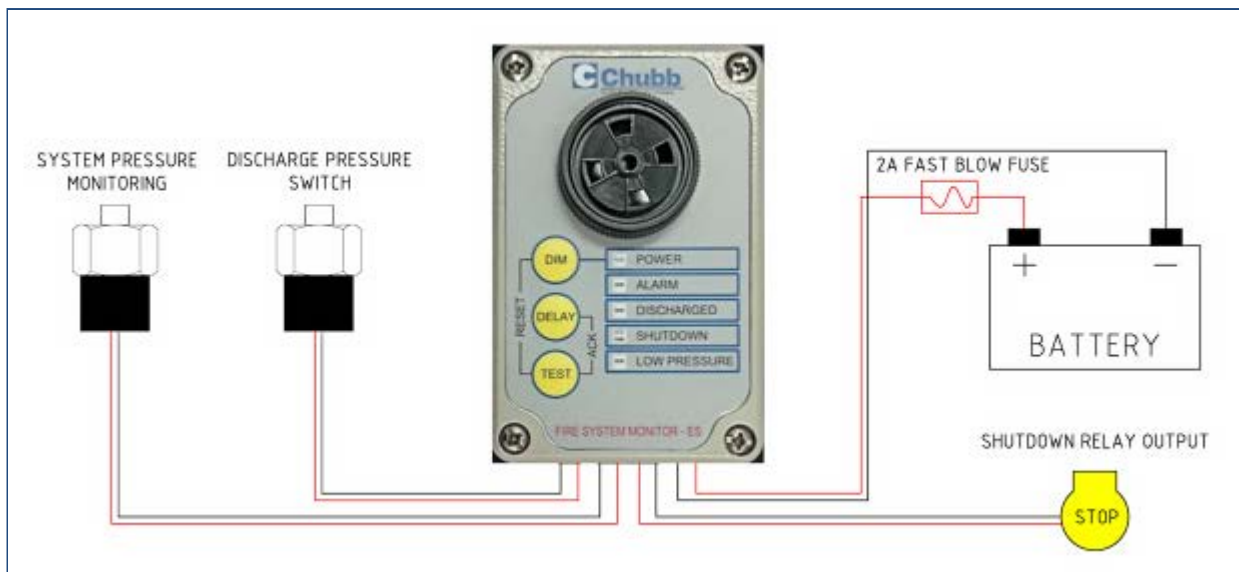


Figure 1 – FSM-ES Typical installation

All wiring and electrical connections must be installed in accordance with the customer's requirements and/or the equipment manufactures specifications. Power supply and equipment shutdown connections should either be completed by the Customer/OEM or an approved contractor.

Standard features

1. IP 65 rated enclosure and Deutsch connector on 300mm fly lead
2. 8 to 35 volts operating range (nominal 12 or 24 volts)
3. Cylinder low pressure switch 2 pole
4. Buzzer output 85 dBA at 1 metre
5. Discharge pressure switch 2 pole
6. Ultrabrite mini LED's
7. 2 Amp Equipment shutdown relay 3 pole output (FSM-ES model only)
8. Variable engine shutdown delay periods 0, 15, 30 and 60 seconds (FSM-ES model only)
9. AS 5062 compliant features
10. Manual dim push button
11. Discharged confirmation LED

Models

Fire System Monitor – ES (Engine Shutdown)
Part Number: 001-924

Fire System Monitor – S (Standard)
Part Number: 001-924.1



Figure 2 – FSM-ES



Figure 3 – FSM-S

Power Supply

Both panels operate on a 8 to 35 volts operating range (nominal 12 or 24 volts) and the preferred power supply arrangement for is through a battery isolator or ignition circuit (Fig. 4).

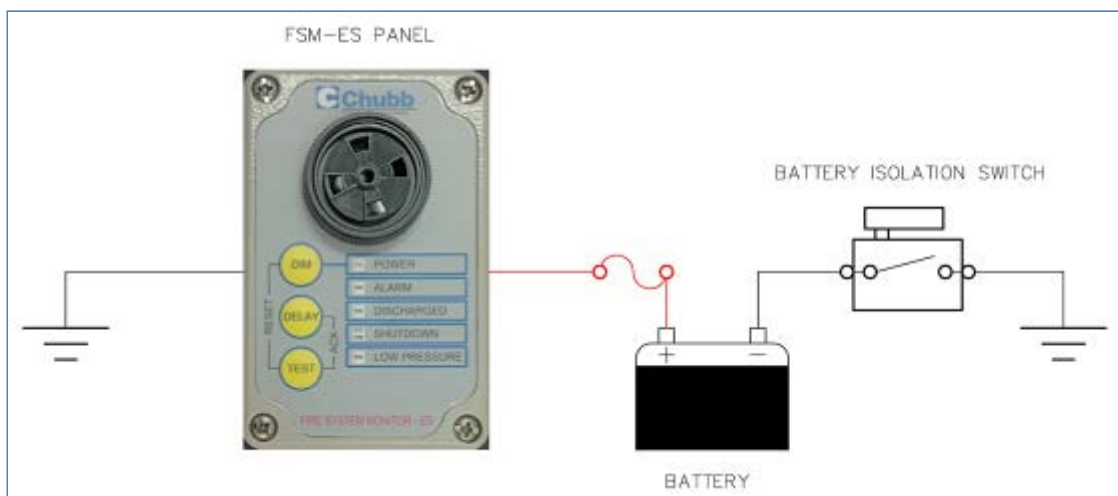


Figure 4 – Power supply arrangement

If continuous monitoring is required, the panels can be wired direct to the vehicle battery provided that the minimum specified circuit protection of a 2 amp fast blow fuse is provided on the positive supply.

Field Wiring

The panels comprise of an IP65 rated enclosure and IP69 rated Deutsch DT series connectors. The pin out configuration of each panel is displayed in Figure 5 & 6

Inputs

- **Power** input
- **Low pressure** switch input
- **Discharge pressure** switch input

Note: The default configuration for both pressure switches is N/C (contacts closed = normal operation, contacts open = fault/discharge).

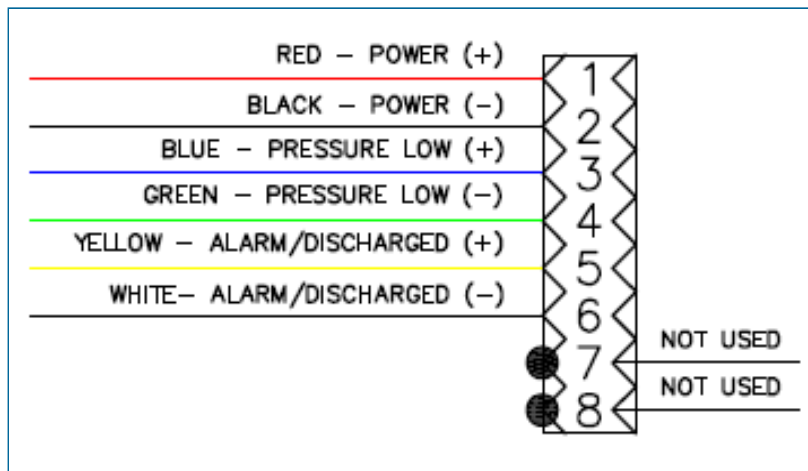


Figure 5 – FSM-S pin-out configuration

Outputs (FSM-ES)

- **Shutdown output.** Selectable contacts, N/O or N/C (default N/O), latching 3 pole relay clean contact capable of switching 2A @ 30V DC.

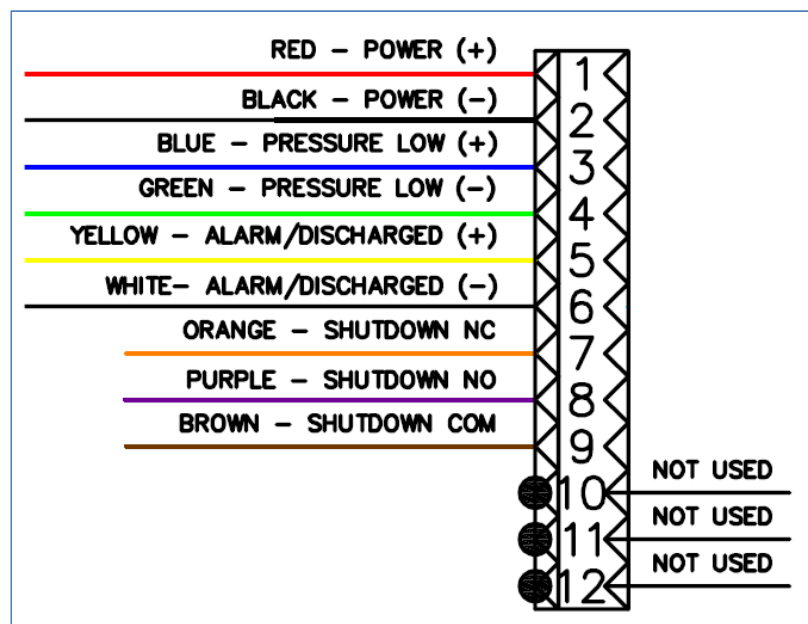


Figure 6 - FSM-ES pin-out configuration

2: Installation

Before installing a FSM panel, the equipment and the operators cabin should be surveyed to ensure that the intended mounting location will;

- be visible and accessible to the operator in their normal position;
- provide reasonable access for maintenance purposes;
- provide a high degree protection from potential damage, and;
- be compliant with manufacturer specifications and customers requirements.

The panel can be secured using four mounting holes (Fig 7 & 8.). Use bolts that have thread diameter no greater than 4.5mm and a head diameter no greater than 9.5mm.



Figure 7 - Panel mounting holes

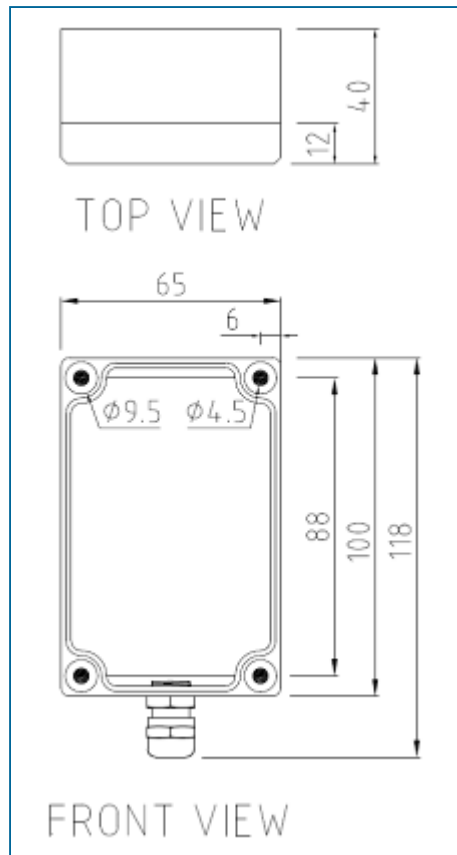


Figure 8 - Panel dimensions(mm)

The recommended wire gauge size for all power, inputs and outputs is detailed in table 1;

Diameter	AWG size	Amp Capacity
0.75mm	18	6

Table 1 – Wire gauge

FSM-ES – Configuring shutdown delay period

A shutdown time delay is incorporated in the FSM-ES to allow the equipment operator to safely bring the equipment to rest before the shutdown is activated. A **'DELAY'** button is provided for the operator on the display panel (Fig. 9).

The default setting for the shutdown delay (the time it takes for the shutdown relay to operate after a fire alarm) is 30 secs.

Four (4) different shutdown delay times (Table 2) can be configured using the dipswitches located inside the panel on the PCB (Fig 10).

Shutdown Delay	Switch 1	Switch 2
0 Second	OFF	OFF
15 Seconds	ON	OFF
30 Seconds(default)	OFF	ON
60 Seconds	ON	ON

Table 2 – Shutdown delays



Figure 9 - Shutdown delay button

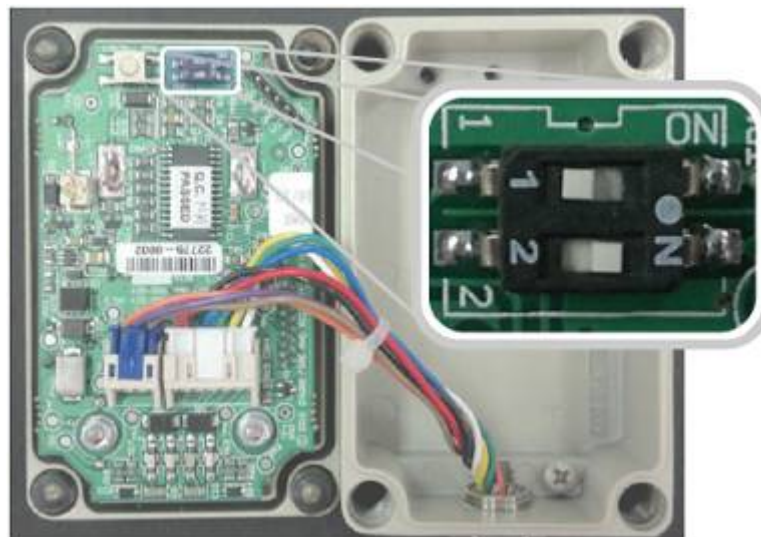


Figure 10 - FSM-ES shutdown delay dipswitches

Interfacing

Once the panel has been installed, connection to power, pressure switches and engine shutdown (if applicable) can be made via the Deutsch connector (Fig 11).

For field wiring purposes, each panel is kitted with the mated plug (**DETAIL A** in Fig 11) and a pin diagram (See Figure 12 & 13) which is located inside the panel. Ensure that blanking plugs are fitted to openings that are not in use.

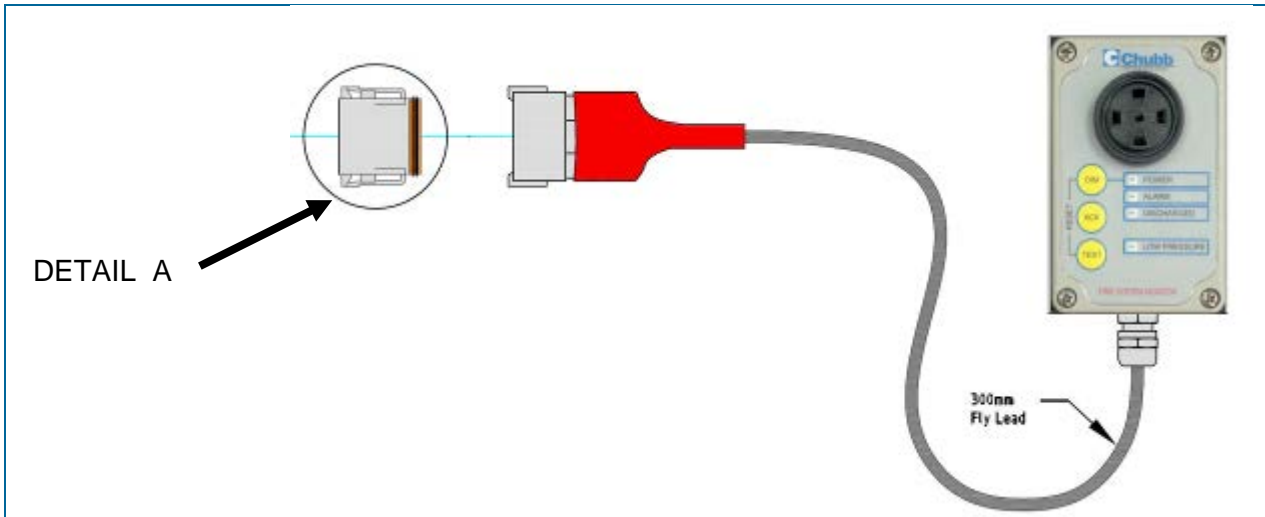


Figure 11 - Deutsch Connector

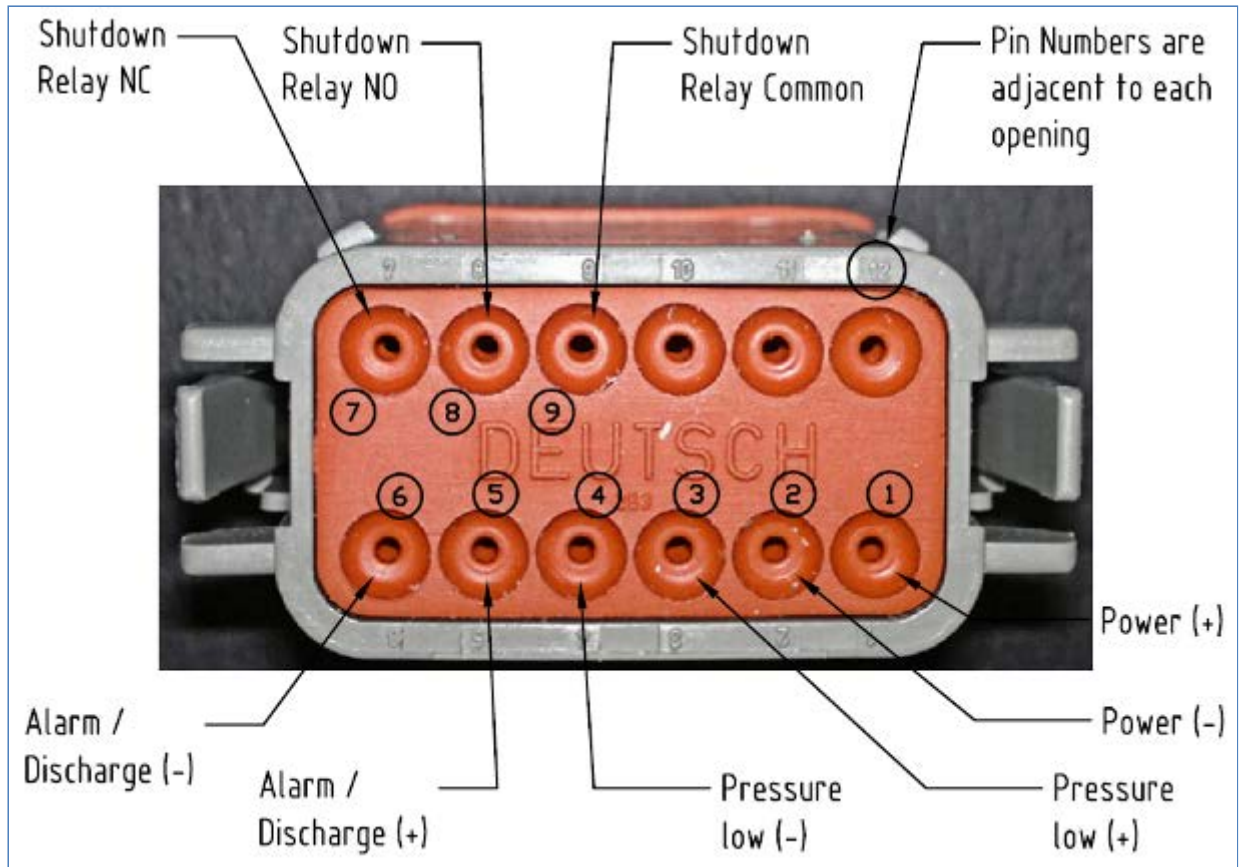


Figure 12 - Detail A, FSM-ES Field Wiring

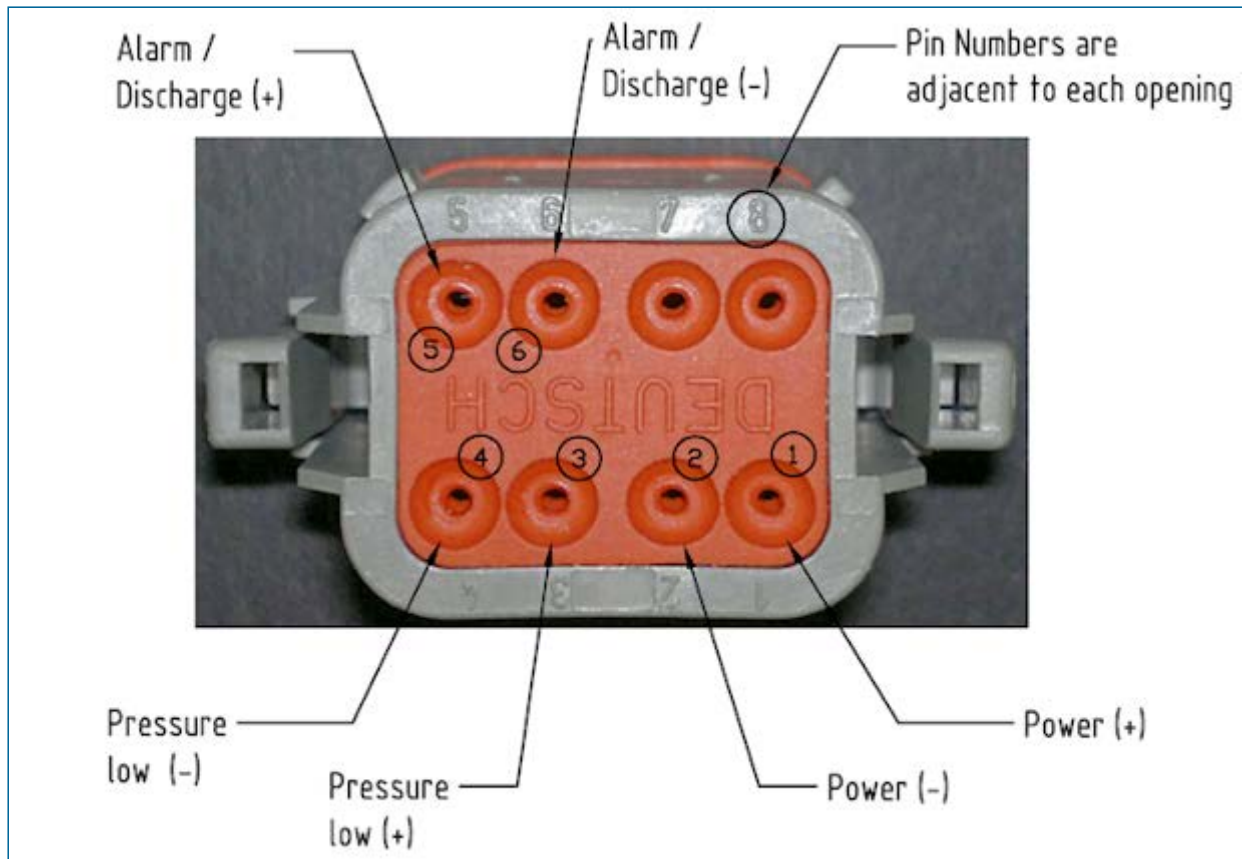


Figure 13 - Detail A, FSM-S Field Wiring

Pressure switches

Two pressure switches inputs are available for use with the FSM panels. If the panels are being installed in conjunction with Chubb PEFS systems, the switches that are specified for use are;

1. "Pressure Low", 1,200kPa setting (part number 87042)
2. "Discharge", 200kPa setting (part number 87041)

Both switches have a 1/8"NPT thread connection and are kitted with an IP65 rated Deutsch DTM series connector. The pressure switch inputs on the panels are configured for 'Normally Closed' (N/C) i.e. contacts closed = normal operation, contacts open = low pressure/discharge.



Figure 14 - PEFS pressure switch

Pressure low switch

The pressure low switch will open circuit if the suppression system develops a leak or if the system discharges. The open circuit condition will cause the '**LOW PRESSURE**' LED to illuminate and the audible alarm to sound once every ten 10 seconds.

Discharge pressure switch

When the suppression system is actuated, the discharge pressure switch(s) are used to confirm that agent has been released from the cylinder(s) by illuminating and latching both the '**ALARM**' and '**DISCHARGED**' LEDs. In this state, the audible alarm will sound once per second.

In the case of the FSM-ES panel, the '**ALARM**' condition will also illuminate the '**SHUTDOWN**' amber LED and initiate the countdown timer. See page 17 ' Engine Shutdown (FSM-ES) for more information.

For PEFS systems, pressure switches should be installed in the cylinder valves as depicted in Figure 15.

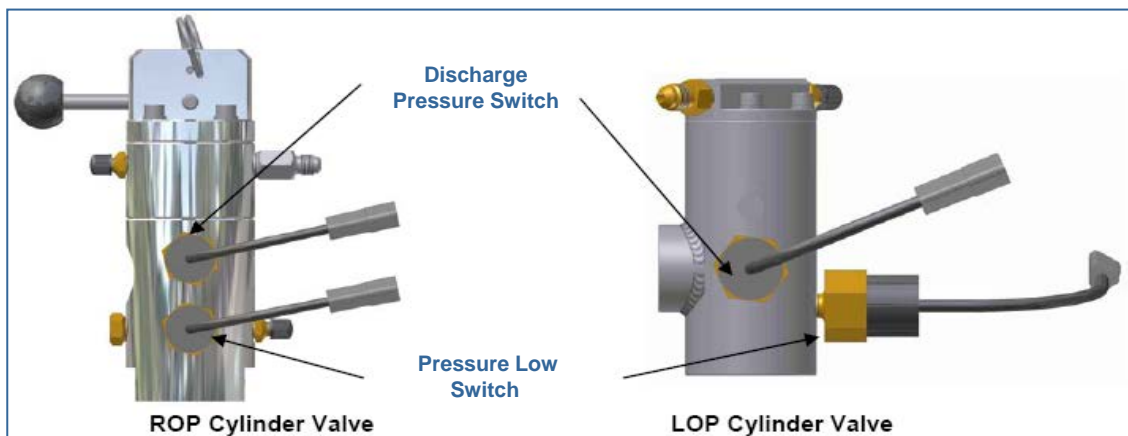


Figure 15 - PEFS pressure switch arrangements

Switches for multiple PEFS Cylinder Installations

Pressure Low switch

For multiple LOP cylinder installations, which have a common LOP actuation system, a single cylinder low pressure switch may be fitted either to:

- one of the cylinder valves' low pressure switch ports
- at any suitable point in the LOP actuation system

For multiple ROP cylinder installations, a cylinder low pressure **MUST** be fitted to each cylinder valve and wired in series (Fig 16).

Discharge Pressure Switch

For multiple LOP and ROP cylinder installations a discharge pressure switch **MUST** be fitted to each cylinder valve and wired in series (Fig 16) to allow redundancy in shutdown should a valve fail to operate correctly.

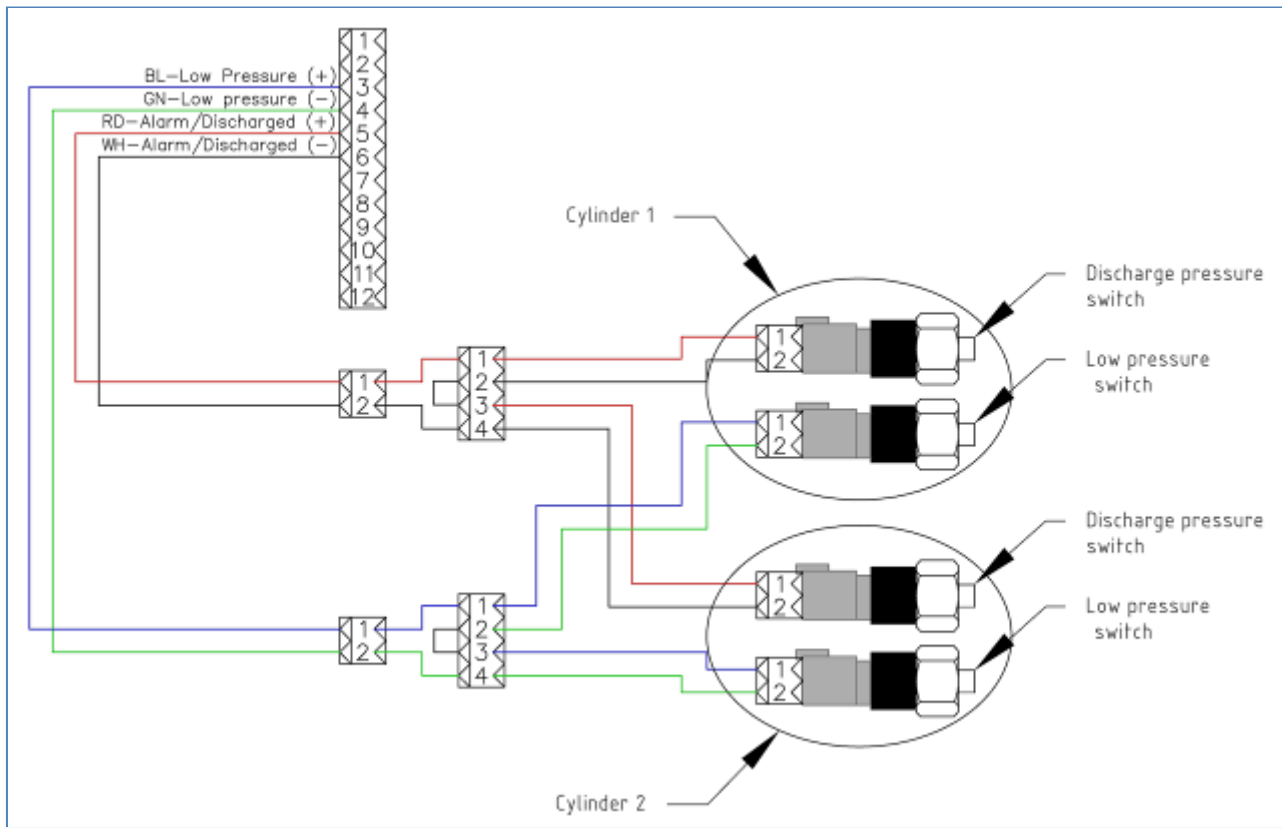


Figure 16 – Field Wiring for Multiple PEFS cylinders

3: Manual Controls

DIM button

This button control brightness of LED indicators on both panels. Hold the '**DIM**' button down until the desired level is reached (Fig 17).

Test button

This button will test all indicators on both panels by illuminating all LEDs and sounding the audible alarm. The test mode will operate when the '**TEST**' button is pressed and held down (Fig 17).

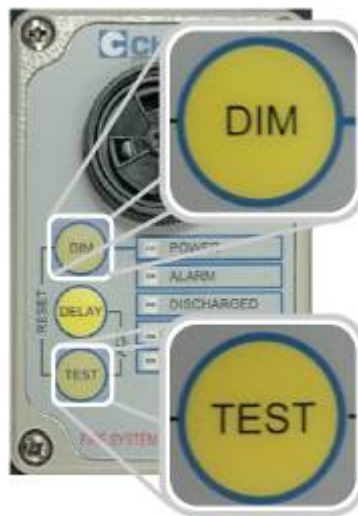


Figure 17 – DIM & TEST buttons on FSM-ES Model

Reset function

The reset function allows the panel to be reset after an alarm, discharge and shutdown (if applicable) event. To reset the panel, press and hold the '**DIM**' and '**TEST**' buttons simultaneously.



Figure 18 – FSM-ES Reset

Acknowledge function

An acknowledgement function is provided on both panels to suppress the audible alarm unit for a period of one (1) hour. Only a '**LOW PRESSURE**' fault can be acknowledged (silenced). The acknowledge function is activated by;

1. FSM-ES panel - Press the '**DELAY**' and '**TEST**' buttons simultaneously (Fig. 19).
2. FSM-S panel - Press the "**ACK**" button (Fig. 20).

The panel will sound two short beeps to confirm that the low pressure alarm has been silenced.

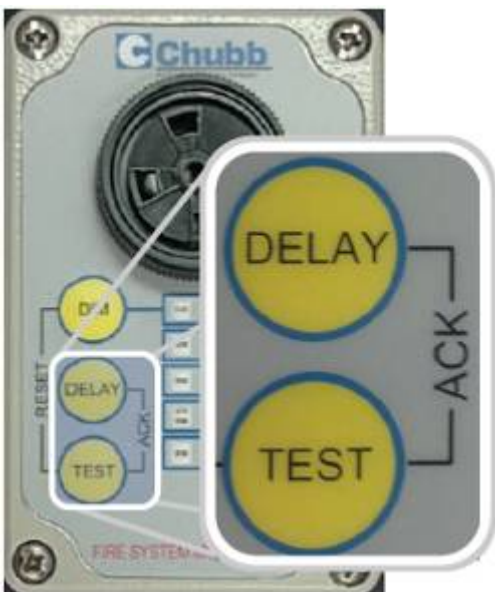


Figure 19 – FSM-ES Acknowledge feature



Figure 20 – FSM-S Acknowledge feature

4: Operation

Alarm / Discharge

An alarm/discharge condition is initiated when an open circuit occurs on the discharge pressure switch input (Pins 5 & 6). An alarm/discharge condition will cause:

- The '**ALARM**' and '**DISCHARGED**' LED's to illuminate and latch on.
- The audible alarm to sound once per second

This condition will continue until the panel is reset, see page 15, 'Reset function' for instructions.

Engine Shutdown (FSM-ES)

The engine shutdown timer is initiated by an alarm/discharge condition. When activated:

- The amber '**SHUTDOWN**' LED will illuminate, and,
- the shutdown timer will begin to countdown.
- At **10 seconds from the end** of the set countdown period:
 - the amber '**SHUTDOWN**' LED will begin to flash, and;
 - the audible alarm will begin to sound continuously.
 - the "**DELAY**" button is enabled and can be either;
 - **pressed repetitively** – each press of the button will restart the countdown timer (for the set period).
 - **held indefinitely** – to pause the countdown. When the 'DELAY' button is released, the countdown will restart for the set period.

At the end of engine shutdown countdown period:

- Shutdown output relay will change state
- '**SHUTDOWN**' LED will change to **RED** (Latched)
- The audible alarm will beep once every 10 seconds
- This condition will continue until the panel is reset, see page 15, 'Reset function' for instructions.

Low pressure

A Low pressure condition is initiated when an open circuit occurs on the low pressure switch input (Pins 3 & 4). A pressure low condition will cause;

- '**LOW PRESSURE**' LED to illuminate
- Audible alarm will sound once every 10 seconds

The '**LOW PRESSURE**' indication will automatically clear when the suppression system pressure returns to normal.

3: Commissioning

A full commissioning test in accordance with AS5062-2006, Fire protection for Mobile and Transportable Equipment, must be completed in order to ensure that the panel is installed correctly and is fully functional.

The outcomes of the test should be recorded as part of the fire suppression system commissioning report and completion documentation provided to the customer.

4: Troubleshooting

Failure of a fire system monitoring panel to function properly will likely be caused by one or more of the following conditions:

1. Failure of the power supply
2. Incorrect installation
3. Damaged wiring or corrosion
4. Component failure

When a failure occurs and the cause is not known, check as many of these items as is practical before starting a detailed check.

If possible, obtain information about any changes taking place that may have affected the system. When troubleshooting, the fault may often be discovered through visual inspection alone. Some faults, such as burned out relay tracks or wiring can be located by sight or smell. Check for smoke or the odour of burned or overheated parts. Look for loose connections. Visual inspection is also useful in avoiding damage to the system which could occur through improper servicing methods. Many faults on the system can be caused by problems with power. Ensure battery and line voltages are checked prior to troubleshooting the system.

The effectiveness of the following tables is greatly increased by first reading the entire manual. A service technician must have a sure understanding of the functionality of system before attempting corrective maintenance. These tables contain instructions to aid a technician in the causes of common system faults.

Power supply

Symptom	Probable Cause	Corrective Action
No LED's on	1. No power to panel	1. Check fuses, power supply and connections. 2. Check equipment isolation switches

Table 3 - Power supply

Alarm

Symptom	Probable Cause	Corrective Action
Green Power LED, Red Alarm LED, Red Discharged LED, Red Shutdown LED, Amber Low pressure LED all on. Buzzer sounding once every 10 seconds.	1. Discharge Pressure Switch operated 2. Manual release initiated by operator. 3. Automatic release by detection device.	1. Investigate cause of discharge (manual, automatic or both) 2. Service system. 3. Check Discharge pressure switch for correct operation. 4. Check that the pressure switch Deutsch pins are in the correct position:

Table 4 - Alarm

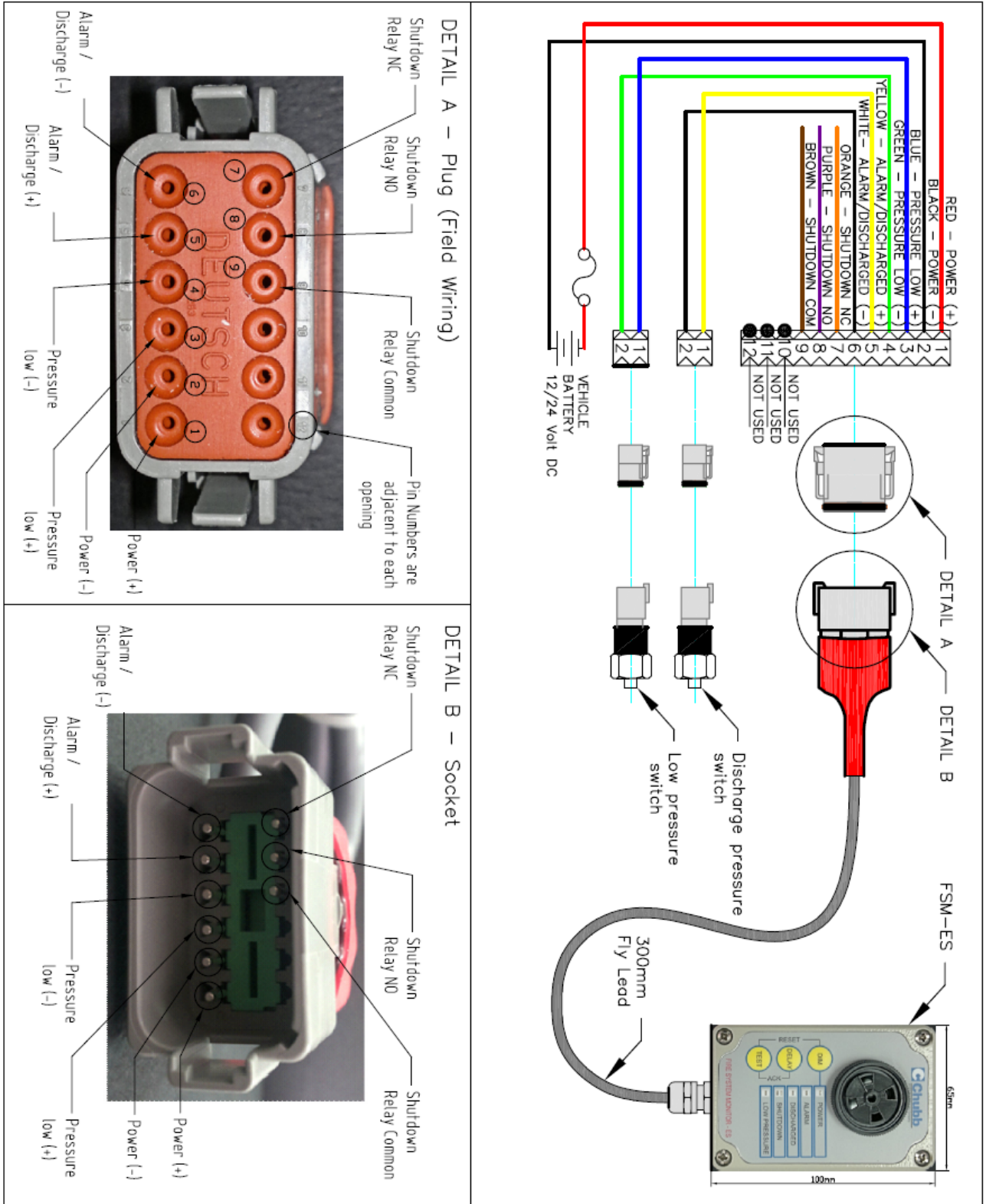
Fault

Symptom	Probable Cause	Corrective Action
Green Power LED on and, Low pressure LED, Amber on. Buzzer sounding once every 10 seconds.	1. Low Pressure Switch operated	1. Investigate cause of pressure loss 2. Service system. 3. Check Low pressure switch for correct operation 4. Check that the panel and pressure switch Deutsch pins are in the correct position:

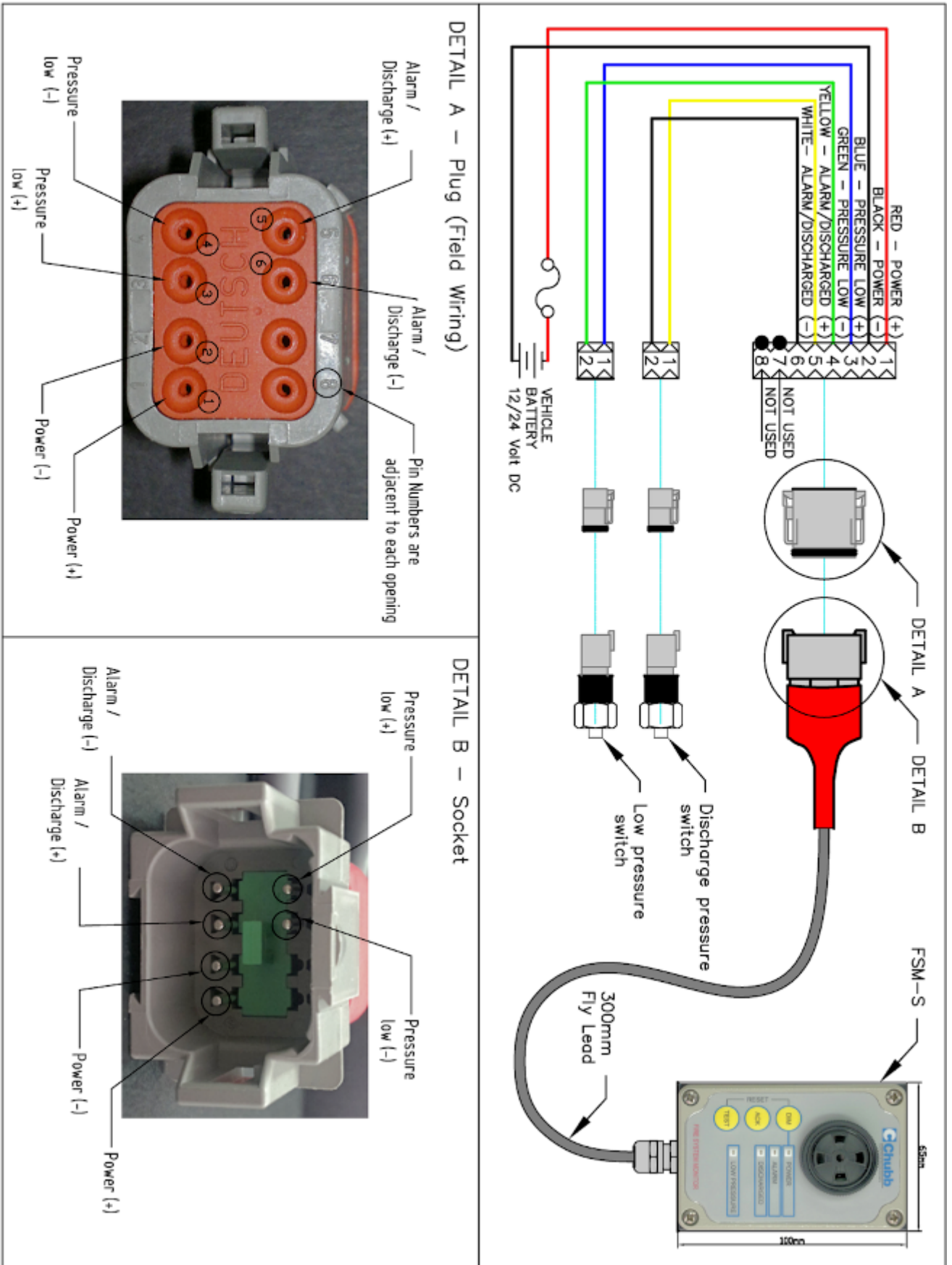
Table 5 - Fault

5: Wiring Diagrams

FSM-ES



FSM-S



Feedback Form

We welcome feedback regarding this manual. If you have any recommendations for improvement please provide details using this form.

Fax to: [Craig Hafey, +61 \(2\) 9581-6364](tel:+61295816364)

Email: Craig.Hafey@chubb.com.au

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