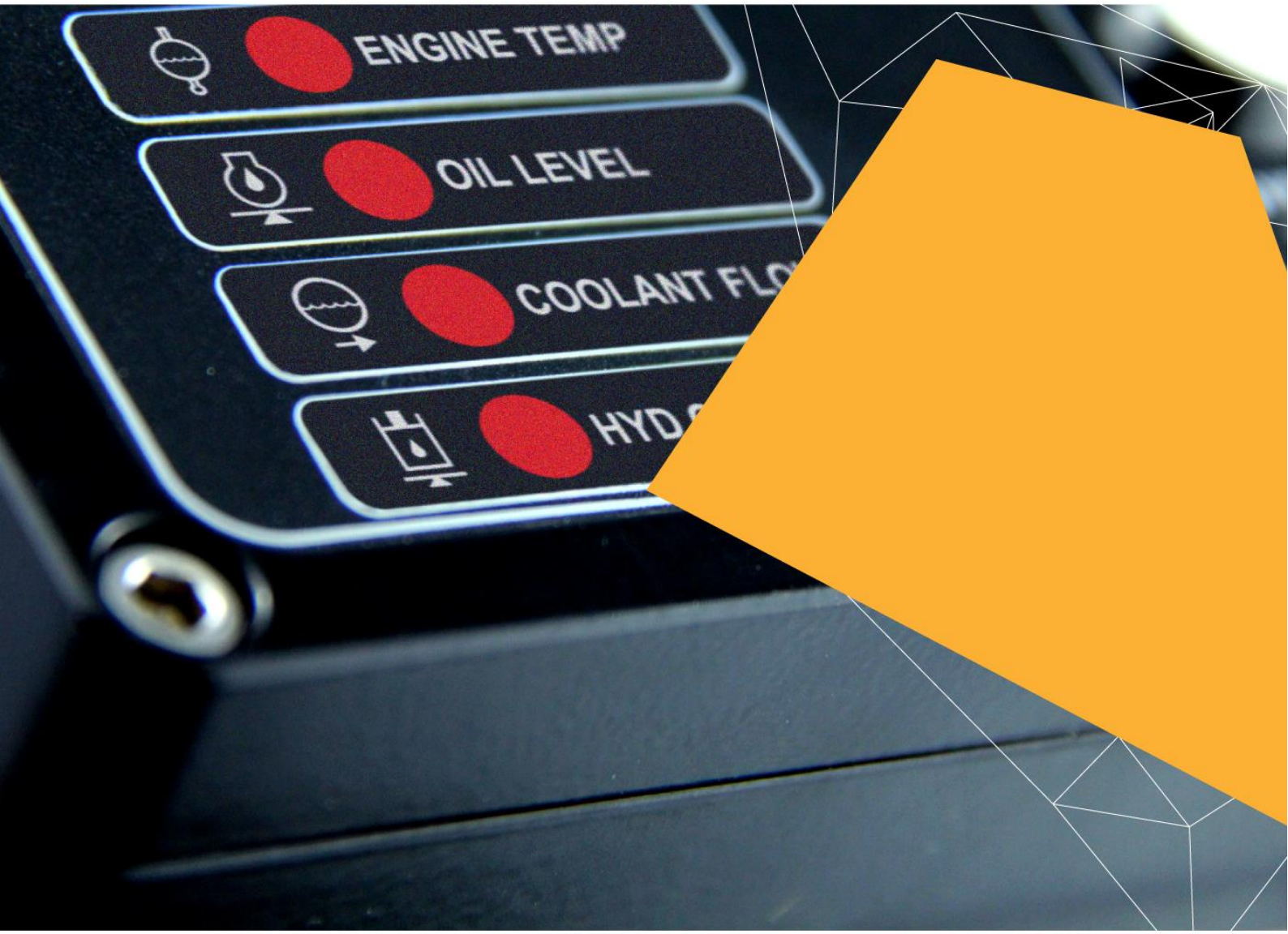
MUIRHEAD®
SMART PROTECTION SYSTEMS BY RCT

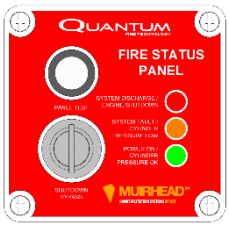
PRODUCT MANUAL

COMPACT FIRE SYSTEM STATUS PANEL

Part No. 16936



www.rct-global.com



LEGAL NOTICE

1. You acknowledge that this document is protected under copyright law and Remote Control Technologies Pty Ltd or its related bodies corporate ('**RCT**') owns the copyright in this document or otherwise have permission or licence from the relevant owner to use certain specific works.
2. You must not make any changes, amendments, variations, alterations, or modifications to the document.
3. You must not reproduce this document in any form or by any means, or to make copies of this document without RCT's prior written consent.
4. The contents in this document constitute confidential information of RCT. You must not circulate, distribute, or otherwise allow the document to be available in the public domain, or to disclose or share the document with any third party, without RCT's prior written consent.
5. RCT provides the document to you on an '*as is*' basis. RCT is not required to provide any updates to this version of the document. RCT may make any change, amendment, or modification to the contents in this document without notice to you.
6. RCT takes a best endeavour basis to ensure that the contents in this document are accurate, complete, and reliable. RCT does not warrant that the document will continue to be reliable, relevant, accurate or complete due to RCT's continuous efforts in product development, innovation, and technology.
7. Any trademarks used in this document belongs to RCT or is used under a licence. The trademarks are not to be used for any purposes, without RCT's prior written consent.
8. Any illustrations used in this document are for illustration purposes only. Illustrations are intended as aids to facilitate your understanding of the subject matter or issue.
9. RCT disclaims all liability, loss or damage that you suffer as a result of your reliance on this document.
10. If this document has been translated into a language other than English, the English version will be used for the purposes of interpreting the meaning of the document.
11. By your conduct of using or reading this document, you agree to and accept the terms in this notice.

Contents

General Safety Warnings 4
Personal Safety 4
Machine 4
Product 4

Product Overview 5

Features and Functions 5

Operation and Use 6

Installation Guide 7
Wiring Connections 7
Diagrams 8
- External Wiring Diagram (750e) 8

Calibration 9
Calibration (CAL) Mode 9
No Extension Mode 9

Service Information 10
Service Schedule 10
Service Procedure 10

Parts List 10

Technical Specifications 11

Compliance and Standards 11

Troubleshooting 12

Glossary 13

Warranty 14

Revision History 15

Table of Figures

Figure 1 Muirhead® Light Vehicle Fire System Status panel, part number 16936 5
Figure 2 Drawing 750e – External wiring diagram 8
Figure 3 Flowchart FC0107 – Troubleshooting flowchart..... 12

General Safety Warnings

Personal Safety

- Everyone is responsible for safety.
- The installer/service personnel should be trained and authorized to complete the required work.
- Ensure that the machine is safely isolated during installation and testing to protect all personnel.
- Complete all required risk assessments and job safety analysis (JSA) before commencing work.
- Observe all site specific and machine OEM procedures regarding the following:
  - working at heights
  - working in heat
  - working in confined spaces
  - all other site specific occupational health and safety (OH&S) procedures

Machine

- Carry out all pre-start operations as per site and machine OEM procedures.
- Ensure the machine is safely isolated during installation and testing to protect the machine and other equipment in the area.
- Do not operate any machine with a known fault and report all findings to the supervisor in writing.
- Test and operate machine as per machine OEM and site procedures.
- Read and understand machine and site specific operational and testing instructions.

Product

Before applying power to the equipment, the user/repairer/ installer must read all product instructions. If in doubt, seek assistance.

- Ensure electrical connections are made as per RCT's recommendations. Test circuits prior to connecting power to any component.
- The equipment contains no user serviceable parts inside. Return the unit to RCT for repairs.
- Retain product and installation instructions for future use.
- Ensure that RCT's recommended service procedures are included in the machine's service routine.
- Observe all machine, site and RCT product warnings.
- Follow all machine, site and RCT product operating procedures at all times.

The application of safety should not be limited to the above recommendations.

M1374.docx | Rev 1.0 | Modified on 31/03/2022 | © Remote Control Technologies Pty Ltd

Product Overview

The Muirhead® Light Vehicle Fire System Status Panel, part number 16936, is a unique product that incorporates the following features:



Figure 1 Muirhead® Light Vehicle Fire System Status panel, part number 16936

No.	Function	Description
1.	Cylinder Pressure Correct	■ The alert indicator is green when the cylinder pressure is correct, above 1200 kPa.
2.	Cylinder Pressure Low	■ The alert indicator is amber and will flash when the cylinder pressure is below 1200 but above 900 kPa (the audible alarm will pulse on for one second every 30 seconds).
3.	System Fault	■ The alert indicator is red when the cylinder is discharged or the pressure is below 900 kPa. (On initial discharge, the audible alarm will be on constantly before a two-second pre-shutdown warning period indicated by the alarm switching from continuous to pulsing.) ■ The ETR output deactivates whilst the auxiliary output activates. ■ The red alert indicator flashes when the override is activated.
4.	Panel Test / 1 Shot Override	■ When the cylinder pressure is correct, the panel test button acts as a test button. When the button is pressed, the system will simulate that the fire system has been set off. ■ When the cylinder pressure is discharged, the button acts as an extension to the six-second delay. When the button is pressed, the delay will increase by 20 seconds (only once).
5.	Key Override Shutdown Bypass	■ The key switch override will bypass the control unit to allow for machine operation. This switch is to be used in situations where the control unit requires bypassing, e.g. to move the machine after the fire system has discharged or when the fire system is empty.

Features and Functions

- Supply voltage 12 to 24 Vdc
- Compact and robust design
- Environmentally sealed – IP65
- Audio and visual indication

Operation and Use

The control unit does not operate while the ignition is not active.

After ignition is applied, the unit pulses the alert indicators and alarm twice to show that they are operating. The control unit state is displayed by the alert indicators as follows:

- If the cylinder pressure is correct (input 1 closed) and not low (input 2 closed), the green alert indicator illuminates.
- If the cylinder pressure is okay (input 2 closed) but the low pressure is active (input 1 open), the amber alert indicator illuminates.
- If the cylinder pressure is discharged (input 2 open), the red alert indicator illuminates. It will then remain active until the battery power (pin 8) is cycled—cycling power to the ignition input (pin 4) does NOT clear the red alert indicator.

If the control unit detects that the cylinder pressure is discharged (input 2 open), a timing cycle is initiated. At the end of the time period (default setting of six seconds), the alarm pulses for two seconds and then the ignition ETR output is turned off.

The shutdown delay may be adjusted to 15 or 20 seconds.

- If the panel test button is pressed during the six-second cycle, the time delay period is extended by 20 seconds.
- The red alert indicator flashes for this extended period and then the ignition output is turned off.
- This extension can only be applied once.
- If the control unit is shut down after the six-second cycle, the 20-second extension is still available once only.

The panel test button then has no further effect except that the amber alert indicator illuminates for up to two seconds to confirm operation.

Note

The test only can be initiated when there is no fault and will illuminate the amber alert indicator for two seconds. Then, perform a normal shutdown sequence after the programmed time period—the ignition and the green alert indicator are restored when the panel test button is released.

 © Remote Control Technologies Pty Ltd

Installation Guide

1 Install the control unit in a suitable location near the operator.

2 Refer to the wiring table below and the wiring diagram/s in this manual to connect the control unit. It is recommended that the wiring is installed alongside the OEM wiring ensuring that it is secured at regular intervals; this will provide protection from heat and abrasion, and any other excess damage that may occur with extended vehicle operation. When securing the wiring to the OEM wiring, ensure that the loom is away from moving vehicle parts which could lead to loom damage.

Wiring Connections

No.	Colour	Function	Description
1	Black	Earth	0 V
2	Grey	Input 1	Cylinder pressure okay (normally closed; the circuit opens when pressure is low). Amber alert indicator illuminates when input opens.
3	White	Input 2	Cylinder pressure discharge (normally closed; the circuit opens when the cylinder loses pressure, indicating cylinder pressure discharge) red alert indicator.
4	Orange	Input 3	Ignition input.
5	Purple	Output 2	Aux output (operates opposite to ignition output). 1 A continuous.
6	Green	Output 3	Fault alarm. 1 A continuous.
7	Yellow/Blue	Output 1	ETR ignition output for run solenoid. 5 A continuous.
8	Red	Battery +VE	Power (8 to 32 V).

External Wiring Diagram (750e)

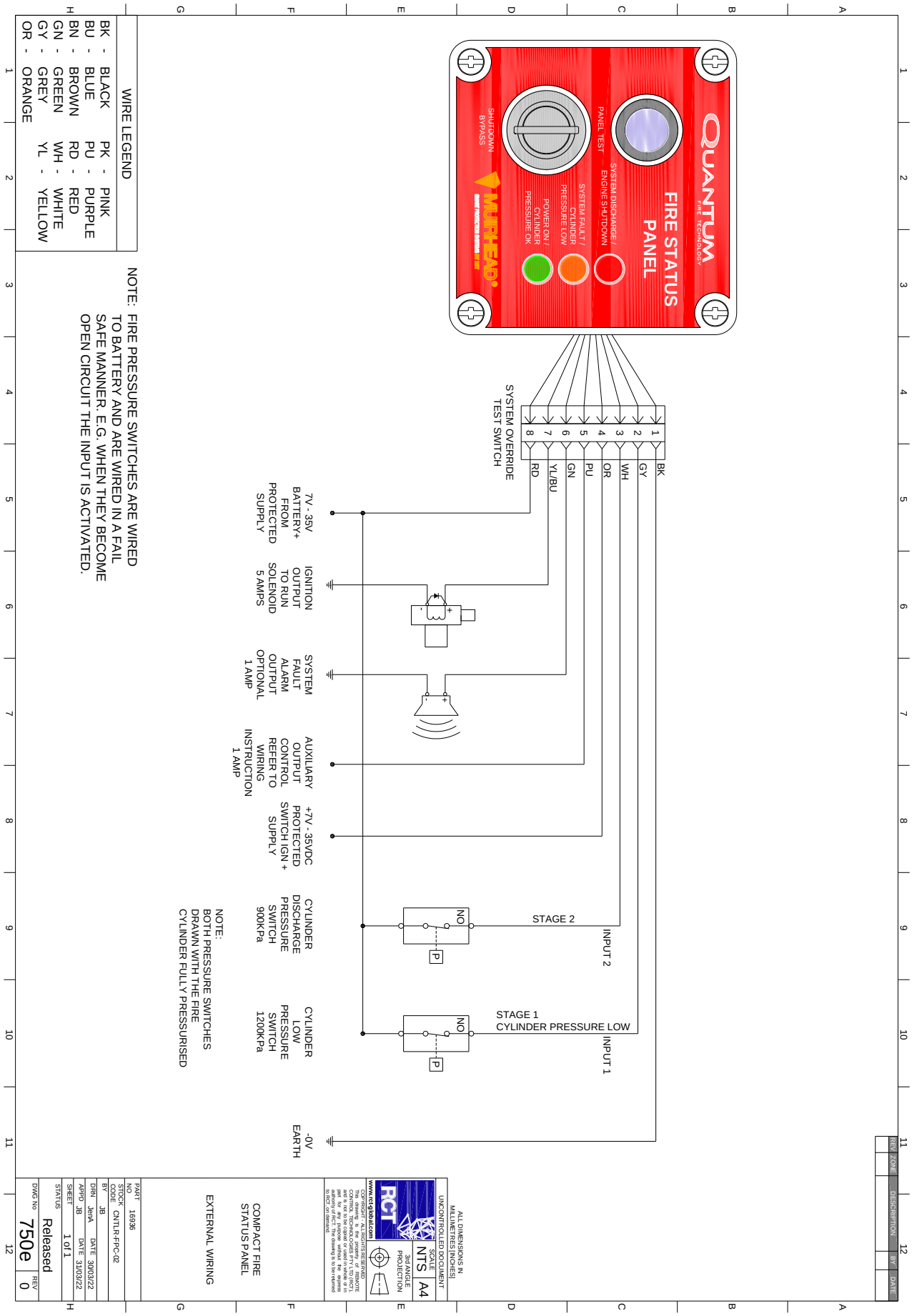


Figure 2 Drawing 750e – External wiring diagram

 © Remote Control Technologies Pty Ltd

Calibration

Calibration (CAL) Mode

1 To enter CAL mode, press and hold the panel test button and apply power to the control unit. After six seconds, all the alert indicators will flash.

2 Release the panel test button.

3 All alert indicators will be off, except for the one displaying the current shutdown delay period. The alert indicators display the delay period as outlined below:

   a) Green – delay is 6 seconds
   b) Amber – delay is 15 seconds
   c) Red – delay is 25 seconds

4 Activate and release the panel test button to change the periods required. Turn off the power to the control unit when complete to save settings.

Note

The alarm will activate while in CAL mode and whenever the panel test button is pressed.

Special Note

1. When the 6-second delay to shut down is selected, the override operates for 20 seconds.
2. When the 15-second delay to shut down is selected, the override operates for 15 seconds.
3. When the 25-second delay to shut down is selected, the override operates for 10 seconds.

No Extension Mode

The 16936 can also be configured for no extension on shutdown. The process for setting this function is below.

1 Press and hold the control unit panel test push button once in calibration mode for more than 10 seconds and then release it. You should now be in NO EXTEND mode (denoted by the flashing alert indicator):

   a) Green – Flashing: 6 seconds + no extend
   b) Amber – Flashing: 15 seconds + no extend
   c) Red – Flashing: 20 seconds + no extend

2 Activate and release the panel test button to change the periods required. Turn off the power to the control unit when complete to save settings.

Service Information

Service Schedule

The manufacturer recommends that the following service procedure should be performed at each machine's scheduled service interval.

Service Procedure

1. Perform a visual inspection; include the following:
   a) Control unit
   b) Wiring connections and looms
   c) Fire suppression tank pressure switch (low)
   d) Fire suppression tank pressure switch (discharge)
2. Perform a system test as per the following:
   a) Turn the ignition key to the on position and with the cylinder pressure correct, the alert indicator will illuminate green. The output to the ETR circuit will be activated.
   b) Turn the ignition key to the off position and with the cylinder pressure correct, the green alert indicator and ETR output will turn off. The auxiliary output will turn on.
   c) Push and hold the panel test button. The green alert indicator will turn off and the amber alert indicator will turn on for two seconds. The red alert indicator will switch on after the pre-set period. The ETR output will turn off and the auxiliary output will turn on. The alarm will be active in this state. When the panel test button is released, the system will revert to the run state.
   d) To check the low cylinder pressure circuit, open circuit the wire at input 1 pressure switch (1200 kPa). When open, the green alert indicator will switch off, the amber alert indicator will switch on and the alarm will pulse on and then off. In this state, the alarm will pulse every 30 seconds.
   e) To check the cylinder discharged circuit, open circuit the wire at input 2 cylinder discharged pressure switch. The red alert indicator will switch on and the alarm will be active and pulse for last two seconds prior to shutdown. Once the shutdown has occurred, the alarm will stay active.
   f) Repeat part (e) but push the panel test button during the six-second cycle. This will extend the shutdown for 20 seconds. During this override period, the alarm will stay active. The delay extension will only operate once.
   g) Once part (f) is performed, insert the key into the key switch and turn to activate it. This will override the ETR circuit only. The alarm will stay active.

Note

1. Once the system test has been completed, turn the key switch off and ensure all wiring is reconnected to the original position. Refer to the external wiring diagram in this manual.
2. Once the following has been completed;
   a) system has been discharged, or
   b) a discharged test has been carried out, AND the ETR output has switched off (shutting down the machine), then,

   the battery power to the unit must be cycled to reset the system.

   Turning the ignition on and off **WILL NOT RESET** the system.

Parts List

Part No.	Description
16936	Fire system status panel
0475	Tank pressure switch low warning 1200 kPa (not supplied with unit)
2348	Tank pressure switch discharge 900 kPa (not supplied with unit)

M1374.docx | Rev 1.0 | Modified on 31/03/2022 | © Remote Control Technologies Pty Ltd

Technical Specifications

Dimensions, control unit only:	Length: 120 mm | Width: 80 mm | Height/Depth: 55 mm
Dimensions, boxed for freight:	Length: 235 mm | Width: 130 mm | Height/Depth: 127 mm
Weight, control unit only:	0.5 kg
Weight, including loom/packaging for freight:	0.7 kg
Input nominal voltage:	12/24 Vdc
Operating temperate range:	−40 to +80 °C
Connection types:	8-pin Deutsch receptacle
Inputs:	Earth, ignition, battery
Min & max input voltage:	7 to 35 Vdc
Current draw (device only):	12 V – Fire system Idle : 14 mA – Fire system faulting : 21 mA 24 V – Fire system Idle : 22 mA – Fire system faulting : 31 mA
Output current rating:	8 A continuous
Enclosure type:	ABS
Environmental protection IP rating:	IP65
Programming/Adjustment:	Yes

Compliance and Standards

1. **AS/NZS CISPR 22:2009 Class B**. Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement.
2. **AS/NZS CISPR 25:2008, Vehicles, boats, and internal combustion engines** – Radio disturbance characteristics - Limits and methods of measurement for the protection of on-board receivers.
3. **ISO 7637-2:2011 Road vehicles** – Electrical disturbances from conduction and coupling - Part 2: Electrical transient conduction along supply lines only (Test Pulses 1, 2a, 2b, 3a and 3b).
4. **ISO 16750-2:2012 Road vehicles** – Environmental conditions and testing for electrical and electronic equipment - Part 2: Electrical loads. Section 4.6.3 - Starting Profile (Test Pulse 4).
5. **ISO 16750-2:2012 Road vehicles** – Environmental conditions and testing for electrical and electronic equipment - Part 2: Electrical loads. Section 4.6.4.2.3 - Load Dump, Central Suppression (Test Pulse 5b).
6. **ISO 7637-2:2011 Road vehicles** – Electrical disturbance by conduction and coupling, Part 2: Electrical transient conduction along supply lines only. Subpart 4.3 Voltage Transient Emissions Test 5.
7. **ISO 11452-2:2004 Road vehicles** – Component test methods for electrical disturbances from narrowband radiated electromagnetic energy – Part 2: Absorber - lined shielded enclosure methods (ALSE).
8. **ISO 11452-4:2011 Road vehicles** – Component test methods for electrical disturbances from narrowband radiated electromagnetic energy – Part 4: Harness excitation methods (BCI).
9. **ISO 10605:2008 Road vehicles** – Test methods for electrical disturbances from electrostatic discharge, Section 8, Component immunity test method (Powered-up test).

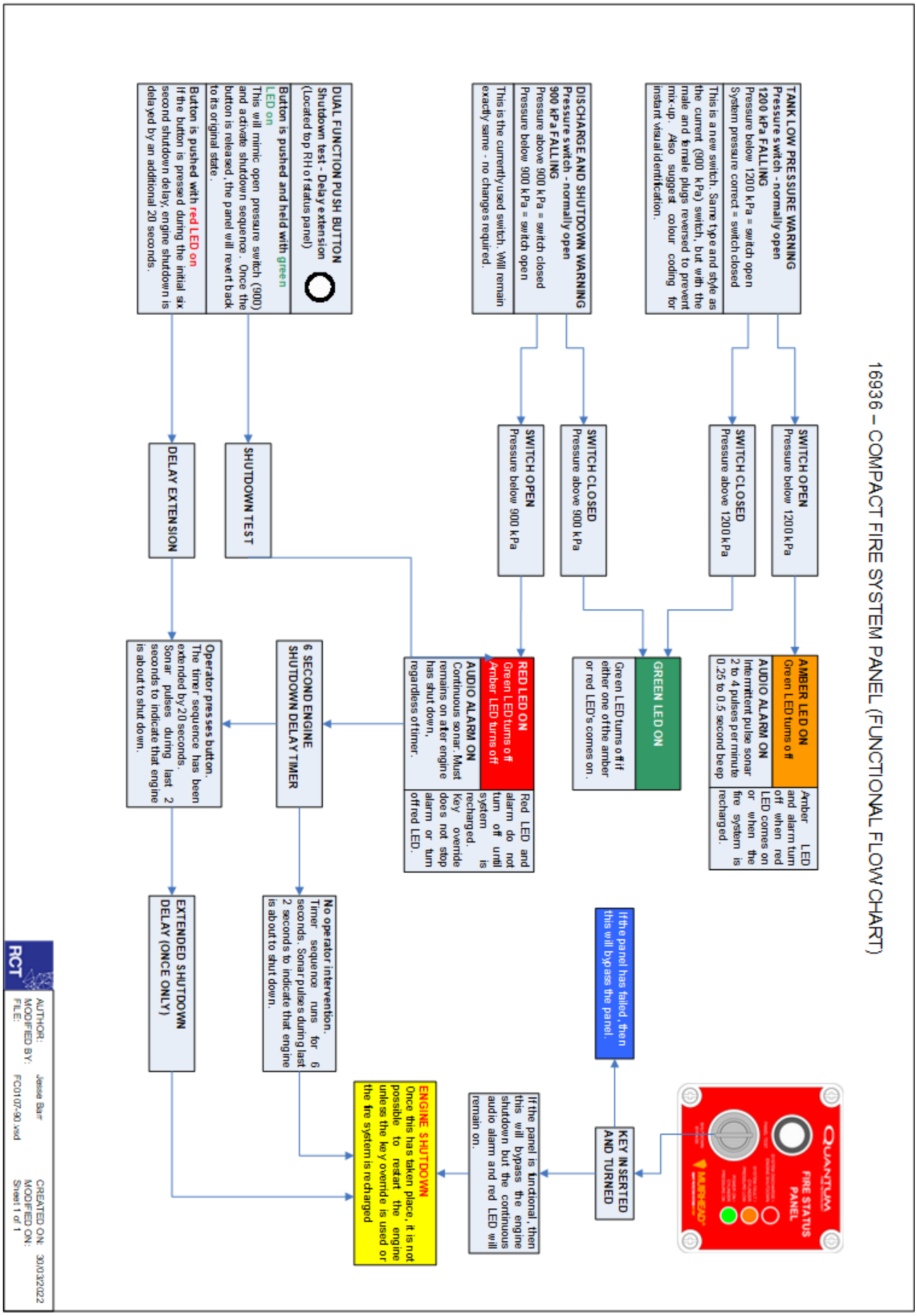


Figure 3 Flowchart FC0107 – Troubleshooting flowchart

 © Remote Control Technologies Pty Ltd

Glossary

A	Amp (Ampere)
ac	alternating current
AMS	Advanced Management System
Aux	Auxiliary Output
CAN	Controller Area Network
CMIO	ControlMaster® Input Output PCB
CMR	ControlMaster® Receiver
CMT	ControlMaster® Transmitter
CM2200	ControlMaster® 2200 Remote Set
COMMS	Communications
CPU	Central Processor Unit
dc	direct current
E.G.	For example
ETR	Energised To Run
ETS	Energised To Stop
ESD	Engine Shutdown
FET	Field Effect Transistor
GND	Ground
H	Hours
HEX	Hexadecimal Numbering System
ID	Identity
i.e	that is
In	Input
IP	Ingress Protection
kg	Kilogram
km/h	Kilometres Per Hour
LCD	Liquid Crystal Display
LED	Light Emitting Diode
LK	Link
M	Minutes
mA	Milliamps
MAX	Maximum
MCU	Multi-Control Unit
MFU	Multi-Function Unit
MHz	Mega Hertz (million(s) cycles per second)
MIN	Minimum
mm	millimetres
mW	Milliwatts
N/A	Not Applicable
N/C	Normally Closed
N/O	Normally Open
OEM	Original Equipment Manufacturer
O/P	Outputs
Out	Output
PB	Push Button
PC	Personal Computer
PCB	Printed Circuit Board
PIN	Personal Identification Number
PLC	Programmable Logic Controller
POT	Potentiometer
PPM	Pulses Per Metre
PWM	Pulse Width Modulation
PWR	Power
Rev	Revision
RF	Radio Frequency
RH	Relative Humidity
rpm	Revolutions per minute
Rx	Receiver
RS232	Recommended Standard (number 232) for serial data transfer
SYS	System
ToV	Text On Video
Tx	Transmitter
USB	Universal Serial Bus
V	Volts
°C	Degrees Centigrade
#	Number
<	Less Than
>	Greater Than
%	Percentage

Warranty

Please see the RCT standard warranty, available on our website - www.rct-global.com.

 © Remote Control Technologies Pty Ltd

Revision History

Rev	Date	By	Details of change
1.0	31/03/2022	JB	Initial document draft and approval

Discover more: www.**rct-global**.com

sales@rct-global.com

AUSTRALIA:	+61 (0) 8 9353 6577
AFRICA:	+27 (0) 83 292 4246
CANADA:	+1 705 590 4001
RUSSIA / CIS:	+7 (910) 411 11-74
SOUTH AMERICA:	+56 3 5229 9409
USA:	+1 801 938 9214

CONTROLMASTER® SMART AUTOMATION & CONTROL TECHNOLOGY BY RCT
MUIRHEAD® SMART PROTECTION SYSTEMS BY RCT
EARTHTRACK® SMART INFORMATION SYSTEMS BY RCT
AUSPROTEC™ SMART SPECIALISED ELECTRICAL EQUIPMENT BY RCT
SMARTRACK® SMART FLEET CONTROL BY RCT

Manufactured or distributed by RCT. Copyright© Remote Control Technologies Pty Ltd