DIGITAL GAUGE THERMATIC® FAN & EWP® SWITCH INSTALLATION INSTRUCTIONS (Part #0500)

Congratulations on your purchase of the Davies, Craig Digital Gauge Thermatic® Fan/ EWP® Switch. The Digital Gauge Thermatic® Switch allows you to keep an eye on your cooling system's temperature whilst it automatically controls single or twin Thermatic® fans, or a combination of a Thermatic® fan and Electric Water Pump (EWP®) or Electric Booster Pump (EBP®) at independent target temperatures for those times when extra cooling is required.

> **PLEASE READ ALL THESE INSTRUCTIONS THOROUGHLY BEFORE YOU START WORK.**
> **DON'T RUSH - ENSURE YOU HAVE FULL UNDERSTANDING OF THE WORK AHEAD BEFORE**
> **YOU COMMENCE. ENSURE YOU HAVE ALL TOOLS AND COMPONENTS REQUIRED.**

COMPONENTS

- 1 x Digital Gauge Display
- 1 x Digital Gauge Stand
- 1 x Digital Gauge Wiring Loom
- 1 x Rubber Gauge Retainer
- 1 x U-Bracket Gauge Mount
- 1 x Double Sided Tape Disc
- 1 x Sensor Probe Mounting Kit
- 2 x 15 Amp Fuses
- 2 x 30 Amp Fuses

- 2 x 12v 40 Amp Relays
- 2 x Fan Wiring Harnesses
- 3 x Red 6mm Ring Terminals
- 2 x Blue 6mm Ring Terminals
- 2 x Blue Connectors
- 2 x Red Connectors
- 3 x Self-Tapping Screws

FUNCTIONS

KEY FEATURES:

- Temperature setting range.
  - 5°C → 110°C (41°F → 230°F).
  - Selectable °C & °F.
- 12v and 24v compatible.
- Universal 52mm Gauge design.
- Individual fan set temperature.
- Over temperature alarm with snooze function.
- LED temperature readout.
- LED status indicators.
- Extra-long temperature sensor wire.
- Display dimmer (optional).
- A/C override (optional).
  - Works as manual override.
  - Independent control of fan. overridden.
- Twin Fans can be wired for two (2) speed operation.

SPECIAL FEATURES:

- Manually turn off each fan's control by temperature functionality.
  - Disables (turns off) each fan.
- Upgradable and Replaceable Probe.
  - Replacement Probe #10460
  - ¼" NPT Sensor Upgrade #0465
  - ⅛" NPT Sensor Upgrade #0468
- Can detect coolant temperature.
  - Use #0409 for top radiator hose.
  - Use #0465 or #0486 for NPT port.
- Transmission fluid detection.
  - Requires the use of #0465 and a sensor adaptor.
  - Adaptor can be made using:
    - 1 x female tee ¼" NPT
    - 2 x barb fitting to ¼" NPT
    - Barb to fit transmission hose
    (Above parts sourced externally)

GAUGE MOUNTING

The Digital Gauge Thermatic® Fan & EWP® Switch is compatible with many 52mm Gauge stands and mounts.

- ⊕ The Digital Gauge Thermatic® Fan & EWP® Switch MUST be mounted inside the passenger compartment to minimise its ambient temperature and exposure to water.
  - ➢ For a neat installation, the Gauge Display can be mounted to the underside of the dash to avoid drilling holes in the dash or having exposed wiring.
- ⊕ Locate or drill a minimum 13mm hole in the dash and pass the wiring loom through leaving the **'loom connector'** free to plug into the Gauge.
  - ➢ **Thermal Sensor wire MUST NOT be cut in ANY circumstances.**
  - ➢ Ensure the mounting location allows easy access to the 3 set buttons.
  - ➢ If using an alternative mounting method, follow appropriate installation procedure.
- ⊕ Mount the Gauge Stand in position. This can be done using the two screw holes in the base of the stand or with the double-sided tape disc.
- ⊕ Pass the **'loom connector'** through the rectangular hole in the back of the Gauge Stand and plug into the socket of the Gauge.
- ⊕ Carefully push the Gauge Display into the Gauge Stand ensuring the rubber retainer ring is installed on the Gauge Display.
  - ➢ Be mindful of the orientation of Gauge Display as it can be hard to rotate once fully installed into the Gauge Stand.
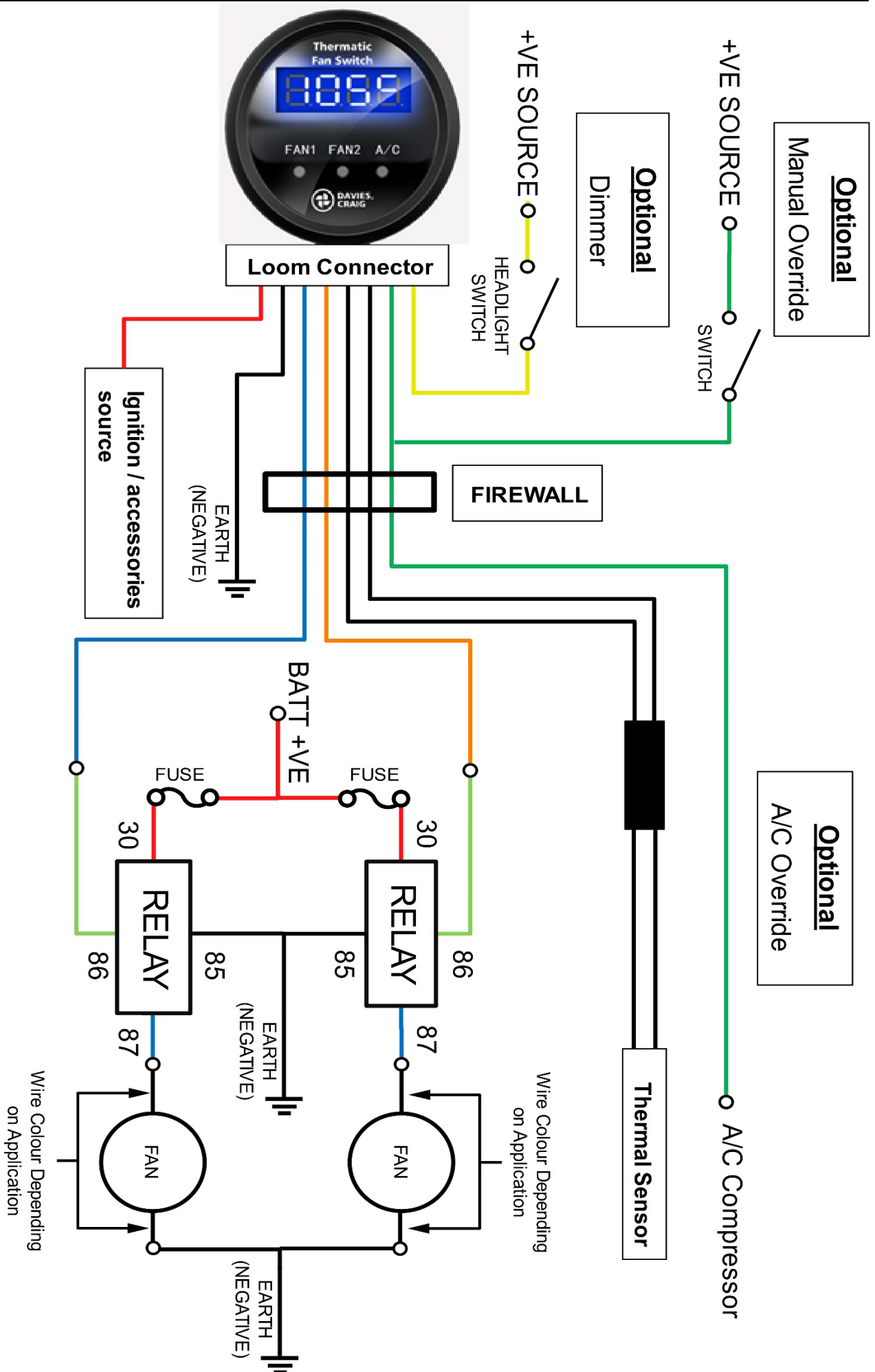
SWITCH WIRING

Ensure all wiring is protected from rubbing on bare metal or other sharp edges.

- ⊕ Locate a hole in the firewall (approx.15 mm in diameter) and pass the required wiring (below) through the firewall from the passenger cabin to the engine bay.
  - ➢ **Temperature probe** and wiring. – Install as per instructions.
  - ➢ **BLUE "FAN 1"** wire. – Connects to Pin 86 of Fan 1 Relay.
  - ➢ **ORANGE "FAN 2"** wire. – Connects to Pin 86 of Fan 2 Relay.
  - ➢ **GREEN "AIR CONDITIONER"** wire. – Connects to A/C Compressor.
    - ⊕ **OPTIONAL:** If using the **"AIR CONDITIONER"** wire as a manual override simply connect it to a positive source though toggle switch.
- ⊕ Locate a Positive ignition or accessories source within the passenger compartment and connect the **RED "IGNITION"** wire.
- ⊕ Connect the **BLACK "EARTH"** wire to the chassis or negative Earth supply.
- ⊕ If using the Dimmer function locate a positive source that is controlled by the headlight switch and connect the **YELLOW "DIMMER"** wire.
  - ➢ If an appropriate source cannot be located, you will need to run the **YELLOW "DIMMER"** wire through the firewall and connect it to the positive feed of one of the headlights.

*For positive earth systems, wire 'Earth' to battery negative not the chassis

DIGITAL GAUGE THERMATIC® FAN/EWP® WIRING DIAGRAM

Thermatic
Fan Switch

FAN1   FAN2   A/C

DAVIES CRAIG

Loom Connector

+VE SOURCE

+VE SOURCE

Optional
Manual Override

HEADLIGHT
SWITCH

Optional
Dimmer

SWITCH

Ignition / accessories
source

EARTH
(NEGATIVE)

FIREWALL

BATT +VE

FUSE   FUSE

30   30

RELAY   RELAY

86   85   85   86

EARTH
(NEGATIVE)

87   87

Wire Colour Depending
on Application

Wire Colour Depending
on Application

FAN   FAN

EARTH
(NEGATIVE)

Thermal Sensor

Optional
A/C Override

A/C Compressor

TEMPERATURE PROBE INSTALLATION

Requires access to the front and rear face of the radiator. Remove the radiator and/or condenser, if necessary.

The Temperature probe <u>MUST NOT</u> be installed under the radiator hose.

- ↻ Select a Temperature Probe mounting location that will not interfere with the fan/s.

  - ➢ For optimum performance, install the temperature probe as close to the hot coolant inlet as possible.

  - ➢ The temperature probe must <u>**not**</u> extend through the radiator core as this will affect the switch's operation.

- ↻ Remove the backing paper from foam pad. Slide the foam pad onto the quick mount rod so the pad adheres to the head of the quick mount rod.

- ↻ Gently separate the radiator fins where you propose to insert the temperature probe.

  - ➢ A small screwdriver can assist with this.

- ↻ Insert the quick mount rod between the separated fins. Push the locking button and sensor onto the quick mount rod to sit flush with the face of the radiator. Cut off excess quick mount rod.
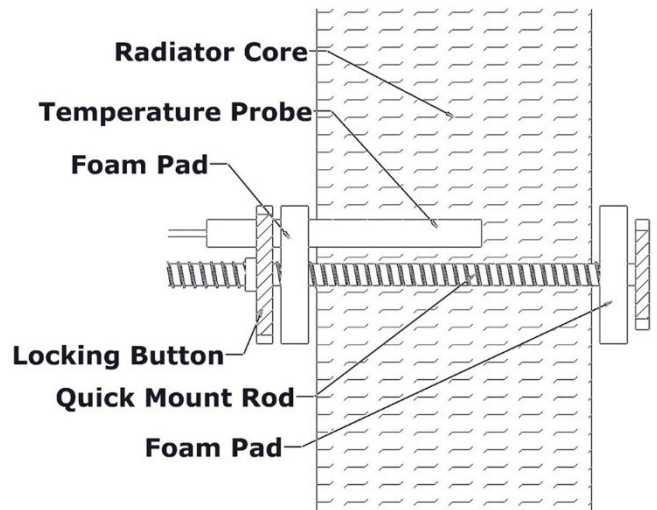
Installation directly into coolant requires part #0409, #0465 or #0468 (NOT SUPPLIED).

OPTIONAL THREADED PORT INSTALLATION

REQUIRES #0465, #0468 OR #0409

If you prefer to install the Temperature Probe in the top radiator hose, we recommend part #0409. To install follow instructions included in #0409.

If you would prefer to install the Thermal Sensor into the thermostat housing, engine block, or directly into the radiator, we recommend Part #0465 for ¼" NPT ports or #0468 for ⅛" NPT ports or adapters.

Part #0465: ¼" NPT Thermal Sensor Upgrade Kit ***Optional**

Part #0409: Temperature sensor Adapter Kit ***Optional**

- ↻ Unplug the Temperature Probe and plug in Part #0465 ¼ NPT Thermal Sensor (if applicable). Thread adapter fittings (not supplied) may be required.

  - ➢ You need to be mindful that the location of the Thermal Sensor can affect the temperature reading and adjustments may be needed when setting the set temperature.

  - ➢ When a port is not available, it is possible to drill and tap a hole for locating the Thermal Sensor. When tapping a custom port, you need to be certain there is minimum wall thickness of 3mm.

  - ➢ When tapping a hole is not possible, a weld-on ¼"NPT fitting can be installed.

- ↻ Install the Thermal Sensor into the port, making sure not to over tighten or damage the Thermal Sensor.

  - ➢ You may require some thread tape or sealant to achieve a watertight seal.

THERMATIC® FAN INSTALLATION AND WIRING

Although we always recommend the use of Davies, Craig Thermatic® Fans, our Fan Switch can control all single speed 12V or 24V electric cooling fan.

THERMATIC® FAN INSTALLATION

↻ Install your fan/s as per the instructions included with your fan/s.

↻ To wire your fan/s relay please follow wiring instructions provided below.

➢ For correct operation please ensure the fan/s blade is rotating in the correct direction.

THERMATIC® FAN WIRING CONNECTIONS – SINGLE SPEED

FAN Relay Pin	Wire colour	Connection location
85	**BLACK**	**Earth (Negative)**
86	**GREEN**	**BLUE OR ORANGE Fan wire**
30	**RED**	**Fused Battery Positive**
87	**BLUE**	**Fan wire**

Above wiring is only suitable for V1XXX model switches (model number located on the back of the gauge unit). To wire other models PIN 85 MUST go to the Fan wire from the switch and PIN 86 MUST got to ignition source.

THERMATIC® FAN WIRING DIAGRAM – SINGLE SPEED
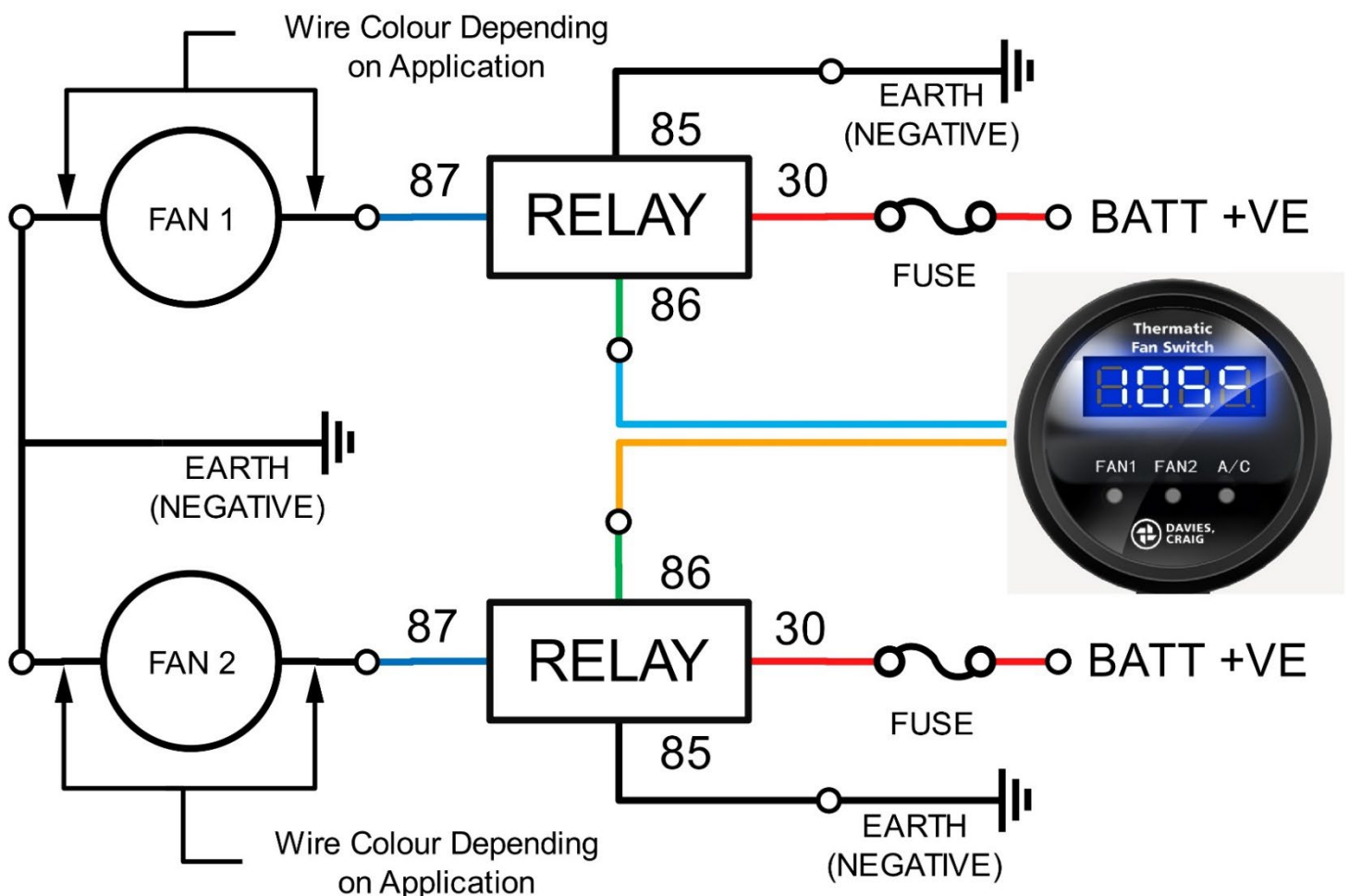
TWIN THERMATIC® FAN - DUAL SPEED WIRING CONNECTIONS

When wiring a twin fan setup for dual speed operation, an additional 5 pin relay is required.

Fan Wire	Connection Location	
Fan 1 Positive	Relay 1 – Pin 87	
Fan 1 Negative	Relay 3 – Pin 30	
Fan 2 Positive	Relay 2 – Pin 87 & Relay 3 – Pin 87	
Fan 2 Negative	Earth	
Relay Pin	**Wire colour**	**Connection location**
Relay 1 – Pin 85	BLACK	Earth (Negative)
Relay 1 – Pin 86	GREEN	BLUE Fan 1 wire
Relay 1 – Pin 30	RED	Fused Battery Positive
Relay 1 – Pin 87	BLUE	Fan 1 Positive wire
Relay 2 – Pin 85	BLACK	Earth (Negative)
Relay 2 – Pin 86	GREEN	ORANGE Fan 2 wire
Relay 2 – Pin 30	RED	Fused Battery Positive
Relay 2 – Pin 87	BLUE	Fan 2 Positive wire
Relay 3 – Pin 85	BLACK	Earth (Negative)
Relay 3 – Pin 86	GREEN	ORANGE Fan 2 wire
Relay 3 – Pin 30	RED	Fan 1 Negative wire
Relay 3 – Pin 87	BLUE	Earth (Negative)
Relay 3 – Pin 87A	ORANGE	Fan 2 Positive wire

TWIN THERMATIC® FAN - DUAL SPEED WIRING DIAGRAM
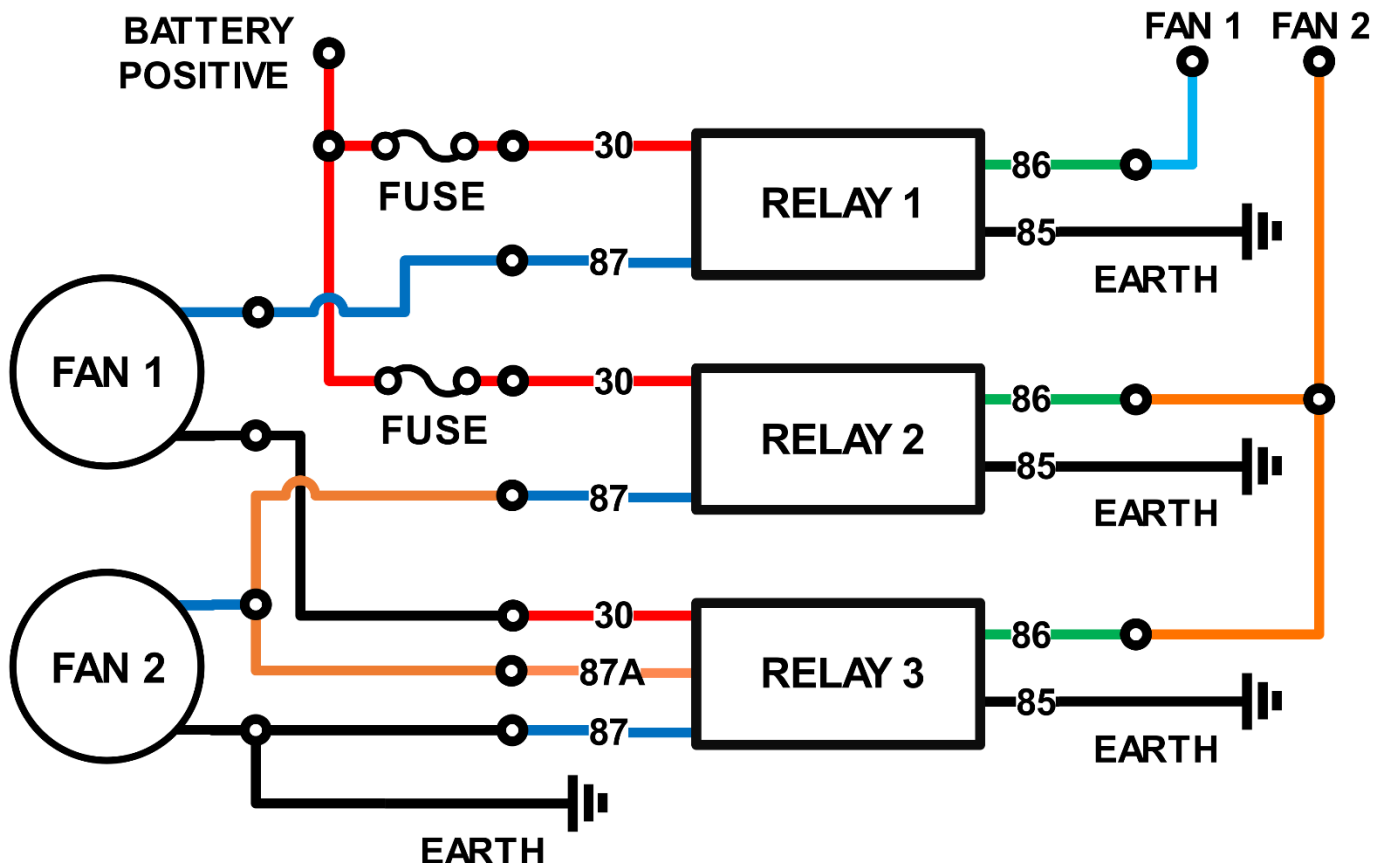
SWITCH OPERATION

SETTING TARGET TEMPERATURE factory set to 85°C (185°F)

↻ Push the **'Fan Button'** once to indicate the present temperature setting.

↻ **'Fan 1 Button'** adjusts Fan 1's set temperature.

↻ **'Fan 2 Button'** adjusts Fan 2's set temperature.

↻ Push the **'Fan Button'** again to increment set temperature by 1 unit.

 ➢ Push and hold the **'Fan Button'** down to scroll through the temperature range.

↻ Start the engine and allow the temperature to reach normal operating temperature.

↻ Once normal operating temperature is reached set **'Fan 1'** to 10°C (18°F) above temperature displayed.

↻ Once target temperature is reached release the button. The new target temperature will automatically be saved after 3 seconds unless the **'Fan Button'** is pressed again.

 ➢ If the other **'Fan Button'** is pressed the target temperature change is cancelled.

↻ It is recommended that **'Fan 2'** is set to at least 15°C (27°F) above normal operating temperature.

 ➢ When only **'Fan 1'** is being used **'Fan 2'** should be adjusted to match **'Fan 1'** target temperature.

CHANGING TEMPERATURE UNITS (°C ⇋ °F)

↻ Press and hold **'Fan 1 Button'** or **'Fan 2 Button'** to switch between °C & °F Units.

ADJUSTING A/C OVERRIDE CONTROL

↻ Push the **'A/C Button'** to select what fan is activated by the A/C override.

 ➢ Select from FAN 1, FAN 2, BOTH (shown as 1 – 2)

ACTIVATING MANUAL OVERRIDE FUNCTION

↻ Push the **'Fan 1 Button'** and **'A/C Button'** for 2 second to turn **OFF** Fan 1.

 ➢ Push the **'Fan 1 Button'** and **'A/C Button'** for 2 second to cancel override.

↻ Push the **'Fan 2 Button'** and **'A/C Button'** for 2 second to turn **OFF** Fan 2.

 ➢ Push the **'Fan 2 Button'** and **'A/C Button'** for 2 second to cancel override.

ALARM FUNCTION

↻ Over set temperature.

 ➢ Fan activated.

↻ Temperature + 10°C (18°F) over highest set temperature.

 ➢ Temperature display flashing.

 ➢ Manual override cancelled and audible alarm goes off once.

↻ Temperature + 20°C (36°F) over highest set temperature.

 ➢ Temperature display Flashing.

 ➢ Audible alarm goes continuously.

 ↻ Press **'Fan 1 Button'** or **'Fan 2 Button'** to turn off alarm for 5 minutes.

DIAGNOSTIC CHART

Condition		Troubleshooting
Unit does not operate		↻ Check all the wire connections
Display flashing		↻ Over temperature warning
FAN 1 LED and FAN 2 LED	**No colour**	↻ Fan in standby mode
	BLUE	↻ Fan triggered
	Flash RED	↻ Sensor Error
	Flash BLUE	↻ Fan override by A/C control
	RED	↻ Fan Manual overridden (FAN OFF)
A/C LED	**BLUE**	↻ A/C activated from external signal
	RED	↻ Manually overridden by independent control
Err 1 – Sensor Short Circuit		↻ Check sensor wiring for any short circuits
Err 2 – Sensor Open Circuit		↻ Check sensor wiring for any open circuits
Err 3 – Relay high current draw		↻ Check fan relay wiring or replace fan relay
Fans not activating		↻ Check all the wire connections. ↻ Check manual override is off
Alarm going off		↻ Temp > set + 10°C (18°F) – alarm sounds once. ↻ Temp > set + 20°C (36°F) – continuous alarm
Temperature does not increase or has constant high reading		↻ Thermal Sensor Open or Short circuit

These installation instructions will suit most applications but there are circumstances surrounding some engine designs, environments, and the nature of the system involved, which may require other installation arrangements not outlined here. Frequently Asked Questions (FAQ) are listed on our website www.daviescraig.com.au Emails can be directed to info@daviescraig.com.au or Telephone +61 (0) 3 9369 1234 during business hours.

WARRANTY

Davies, Craig Pty Ltd warrants for a period of three years or 2000 hours continuous running (whichever is the lesser) from the date of purchase. Davies, Craig shall carry out, free of cost, any repairs that are reasonably necessary to correct any fault in the operation of your Davies, Craig product provided that such a fault is directly attributable to a defect in the workmanship or materials used in the manufacture of the part(s). This warranty is void if the product is misused, altered, tampered with or is installed or used in a manner that is inconsistent with Davies, Craig's written recommendations and/or installation instructions. Labour and consequential costs are excluded. **DAVIES, CRAIG PTY. LTD.**

To make a warranty claim, go to: daviescraig.com.au/warranty