# Installation Instructions

# Procon

## MS-FRT-TCB

## CM-FRT-TCB

## MS-FRT-TCB-TEMP



**MITSUBISHI ELECTRIC (UK)**

**Product Overview**

The MS-FRT-TCB / MS-FRT-TCB-TEMP and CM-FRT-TCB units supersede the FRT02 and 03 products for use with 'A' Control and City-Multi equipment respectively.

Common features of the units are as follows:

Relay indication of unit running (c/o contacts)
Relay indication of unit in fault (c/o contacts)
Pulsed On/Off operation.
Remote On/Off operation using 3-wire loom. (CN32)
Semi-Remote On/Off using 3-wire loom (as TCB1)

Additional features on the MS-FRT-TCB-TEMP :

External Operational Settings for PLC control
Setpoint (0-10v DC = 19°C to 28°C)
Mode, Fan Vane, Louver ( By Switches )

The units have terminals equivalent to the **TB1, TB2** etc terminals of the FRT02 / FRT03 units – see Appendix A.

**Interconnections:**

Two wiring looms are provided with the equipment. Loom C is always supplied. Loom A or Loom B is supplied depending on the unit type

**MS-FRT-TCB , MS-FRT-TCB-TEMP**

A) A seven wire loom with seven bare ends at one end and two connectors (9-pin and 4-Pin) at the other.

**CM-FRT-TCB**

B) A five wire loom with five bare ends at one end and a 5-Pin connector at the other.

**All Units**

C) A three wire loom with three bare ends at one end and a 3-Pin connector at the other.

Wiring connections must be made before the unit is mounted.

Disconnect all supplies to the air conditioner unit before installation.

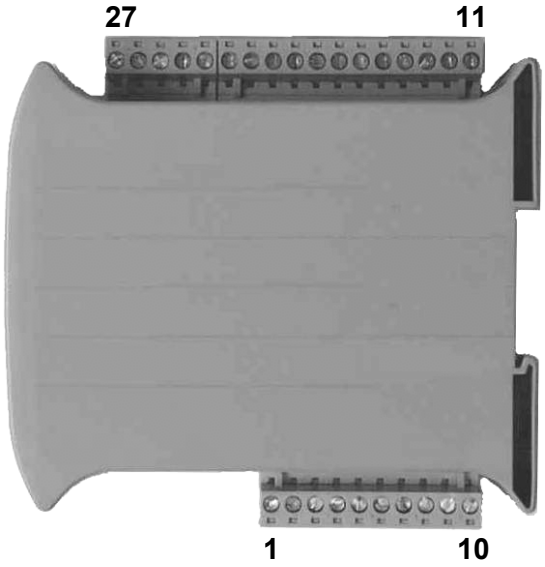


**Fig 1 : Terminal Numbers**

**MS-FRT-TCB , MS-FRT-TCB-TEMP**

Connect the bare ends of loom A to the following pins on the MS-FRT-TCB :

| MS-FRT-TCB Pin | (Air-con connector) |
|---|---|
| 1 | CN90-5 |
| 2 | CN90-4 |
| 3 | CN90-6 |
| 4 | CN90-3 |
| 5 | CN90-9 |
| 6 | CN41-1 |
| 7 | CN41-2 |

**CM-FRT-TCB**

Connect the bare ends of loom B to the following pins on the CM-FRT-TCB :

| CM-FRT-TCB Pin | (Air-con connector) |
|---|---|
| 3 | CN51-5 |
| 4 | CN51-4 |
| 5 | CN51-3 |
| 6 | CN51-1 |
| 7 | CN51-2 |

**1) Run /Fault Monitoring**

Terminals 11,12 & 13 provide indication of the Running status.
(13 = common, 11 = n/o, 12 = n/c)

Terminals 14,15 & 16 provide indication of the Fault status.
(16 = common, 14 = n/o, 15 = n/c)

Maximum switching capacity for terminals 11 to 16 is 40 V d.c. at 50mA.

**2) Remote On/Off**

Terminals 17 & 18 are a volt free input which mimics the operation of the on/off push button on the wall controller. Successive contact closures will toggle the unit on and off.

**Using the 3-wire loom (CN32)**

Connecting the 3-wire loom (SAP 141637) between CN32 and terminals 10(orange), 9(red) and 8(brown) will activate remote On/Off. With no connections to terminals 19 to 24 the unit will then be forced to the OFF state.

Two ON modes are possible as follows:

a) By joining terminals 19 & 20 and joining terminals 21 & 22 the unit will be forced to the ON state.

b) By connecting 12v DC to terminals 23(+ve) & 24(-ve) the unit will turn ON but the remote will be released after approx 3 seconds allowing further on/off control via the wall controller.
In this mode, as an alternative to the wall controller the pulsed On/Off feature of CN41 may be used by pulsing a connection across Terminals 17 & 18.

**3) Periodic Setpoint Adjustment ( MS-FRT-TCB-TEMP only )**

The setpoint of the 'A' control unit may be set using a DC voltage (eg. from a PLC).
To enable this feature it is necessary to apply a DC voltage of 8 -24v to terminals 26(-ve) and 27(+ve). The MS-FRT-TCB-TEMP will recognise this voltage and illuminate LED4.
The required setpoint is now set by applying a DC voltage to terminals 26(-ve) and 25(+ve). The voltage / setpoint relationship is as follows:

| Voltage | Setpoint | |
|---|---|---|
| <0.75 | 19 | Between the ranges either value may be sent |
| 1.25-1.75 | 20 | e.g. 2.0 volts may give 20 or 21 degrees |
| 2.25-2.75 | 21 | The general recommendation would be to |
| -- through -- | | use 0.5, 1.5, 2.5… etc…7.5, 8.5, 9.5 volts |
| 8.25-8.75 | 27 | |
| 9.25-10 | 28 | |

Together with the setpoint the MS-FRT-TCB-TEMP also sends other parameters (mode, fan speed etc). These parameters may be set on bit switches which are accessible through a gap adjacent to terminal 1.
The functions of these switches are shown in appendix B

When enabled, the parameter message is sent every 5 minutes or on setpoint change but only when the unit is ON and not in fault. LED3 will perform a brief double 'blip' to indicate that the message has been received.

**Calibration**

The calibration of the external setpoint is set at the factory. If it is necessary to re-calibrate the unit follow the details in appendix C

**LED indications on the unit –** *LED1 is the top LED, LED4 the bottom one.*

LED1 : illuminated when the unit is running (or in fault)

LED2 : illuminated when the unit is in fault

LED3 : (MS-FRT-TCB, MS-FRT-TCB-TEMP only)
indication of the fault signal line.

LED4 : (MS-FRT-TCB-TEMP only)
provides an indication that setpoint transmission is enabled.
(this LED is also used in the setpoint calibration sequence)

## Appendix A FRT0x terminal equivalences

**TB1** Terminals 11,12,13

**TB2** Terminals 14,15,16

**TB3** Terminals 17,18

**TB4** Terminals 19,20

**TB5** Terminals 21,22

## Appendix B Bit Switch Settings (MS-FRT-TCB-TEMP only)

Switches are accessible through the lower side of the unit.
SW1 is towards the front.

| **Mode** | Fan | Cool | Heat | Auto | |
|---|---|---|---|---|---|
| SW1 | OFF | ON | OFF | ON | |
| SW2 | OFF | OFF | ON | ON | |
| **Fan Speed** | Low | Mid 2 | Mid 1 | High | |
| SW3 | OFF | ON | OFF | ON | |
| SW4 | OFF | OFF | ON | ON | |
| **Vane** | 100% | 80% | 60% | Horiz | Swing |
| SW5 | OFF | ON | OFF | ON | OFF |
| SW6 | OFF | OFF | ON | ON | OFF |
| SW7 | OFF | OFF | OFF | OFF | ON |

## Appendix C Calibration (MS-FRT-TCB-TEMP only)

To calibrate the external setpoint – if required.

Remove CN90 and fit the link adjacent to the LEDs (under front cover).
Apply an external setpoint voltage of 5.0V
Replace CN90
LED4 will flash 3 times and should then become steady.
Unit is calibrated – remove CN90 and the link – replace CN90.

If the unit continues to flash then calibration has not been achieved. Check the setpoint voltage to ensure that it is 5.0V.