# Pocket Quick Reference Guide On the **TOSHIBA**

## Air to Air Heat Exchanger

## VN-M####HE

**Cool Designs Ltd**

Raising the Standards in Air Conditioning Distribution

Toshiba air conditioning has recently introduced a new range of
Air to Air Heat Exchangers the VN-M series.

This guide shows the general set-up procedures for the unit, associated controls and accessories.

Toshiba VN-M units are equipped with the TCC link controls logic, which allows the equipment to be controlled by a number of Toshiba control options currently available, i.e., standard control, one unit one remote via either the NRC-01HE, (dedicated remote for the air to air range), or via the RBC-AMS41-E (ON / OFF function ONLY) remote controller.

Units can be group controlled either specifically air to air, up to 8 units within a group, or air to air units can be incorporated into an air conditioning group.

The units can also be controlled via any of the Central control or BMS options.

In short all the options available for standard Toshiba air conditioning equipment are also available for air to air products.

## The range covers three variants.

1) Standard air to air units with an Air Volume range from 150 m3/hr to 2,000 m3/hr 9 products in total.

2) Air to Air with DX-Coil covering Fresh Air Loads of 4.10, 6.56 and 8.25 kW Cooling duty and Air Volumes of 500 m3/hr, 800 m3/hr and 950 m3/hr

3) Air to Air with DX-Coil and Humidifier, Fresh Air Loads of 4.10, 6.56 and 8.25kW Cooling duty, air volumes of 500 m3/hr, 800 m3/hr and 950 m3/hr, plus a Permeable Film Humidifier of 3, 5 and 6 kg/hr.

4) Dedicated remote controller, RBC-NRC01HE.

5) Ancillary Pre-Heaters #kW, ##kW, ###kW (RBC-VNMH1, 2, 3, 4.)

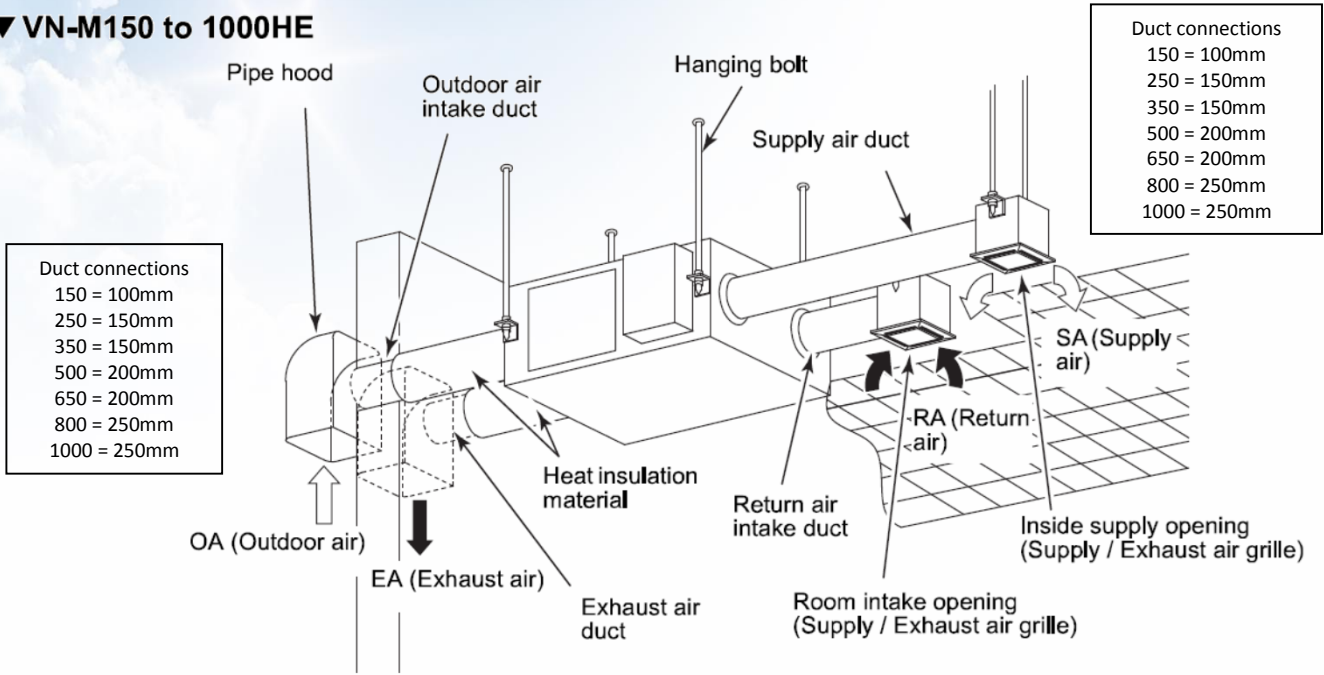6) Pre-Heater Control. (RBC-VNMC).

7) Remote Interface (RBC-VNL1).

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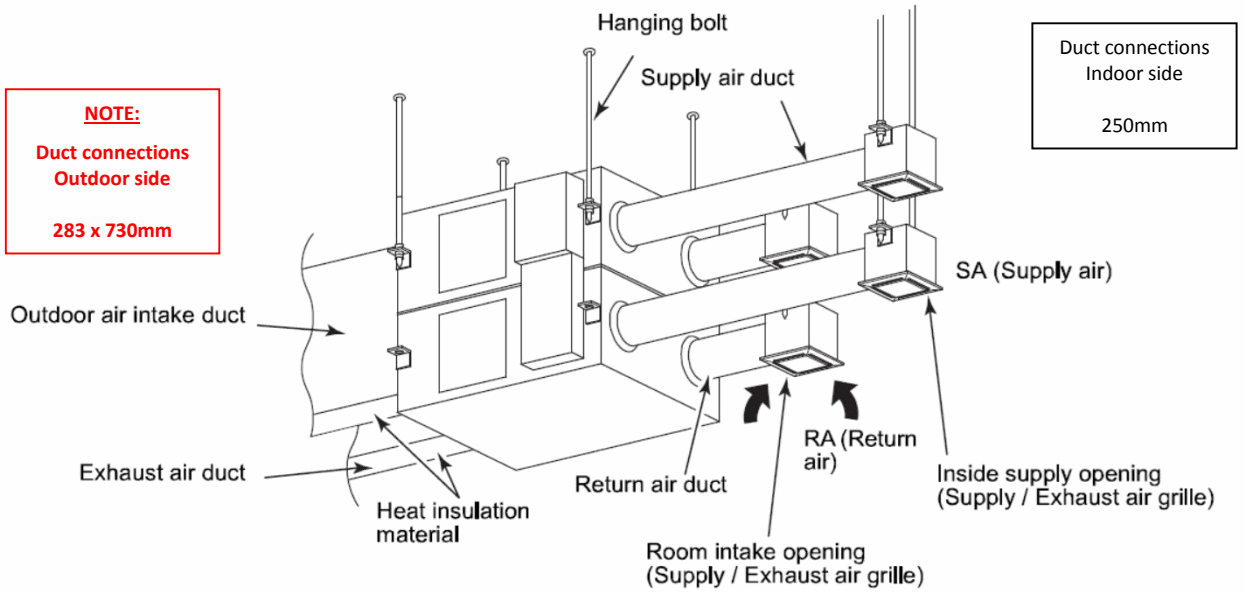Raising the Standards in Air Conditioning Distribution

# Installation.

## ▼ VN-M150 to 1000HE



Pipe hood

Outdoor air intake duct

Hanging bolt

Supply air duct

Duct connections
150 = 100mm
250 = 150mm
350 = 150mm
500 = 200mm
650 = 200mm
800 = 250mm
1000 = 250mm

SA (Supply air)

RA (Return air)

Heat insulation material

Return air intake duct

Inside supply opening (Supply / Exhaust air grille)

OA (Outdoor air)

EA (Exhaust air)

Exhaust air duct

Room intake opening (Supply / Exhaust air grille)

## ▼ VN-M1500 and 2000HE



Hanging bolt

Supply air duct

**NOTE:**

**Duct connections Outdoor side**

**283 x 730mm**

Duct connections Indoor side

250mm

Outdoor air intake duct

SA (Supply air)

Exhaust air duct

Return air duct

RA (Return air)

Inside supply opening (Supply / Exhaust air grille)

Heat insulation material

Room intake opening (Supply / Exhaust air grille)

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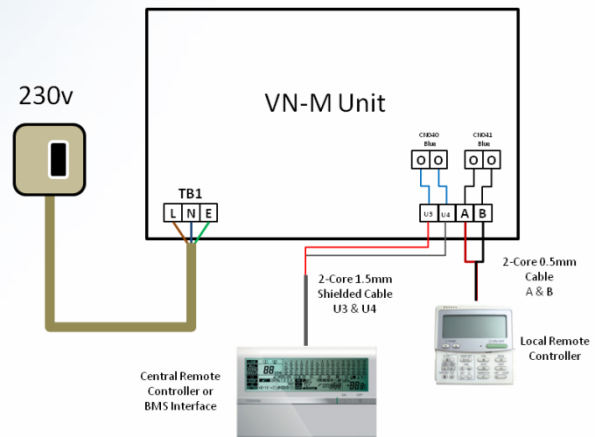Raising the Standards in Air Conditioning Distribution

# Wiring.

## Standard.

A 10 amp, 230 volt power supply is applied to terminals L, N & E

Local controllers are connected to terminals A & B

Central controllers / BMS gateways are connected to terminals U3 & U4

230v  VN-M Unit

TB1
L N E

2-Core 1.5mm Shielded Cable U3 & U4

2-Core 0.5mm Cable A & B

Central Remote Controller or BMS Interface

Local Remote Controller

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**When being used as an Individual unit, "bit" switch SW703 bit 4 must be turned to the ON position, factory default is OFF.**
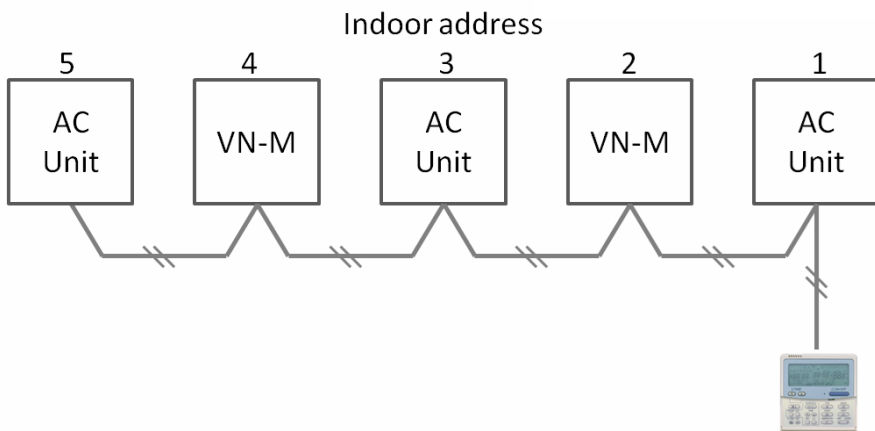
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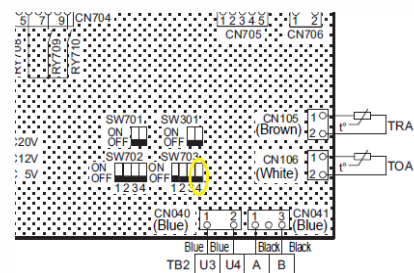
## Group Configuration.

Up to 8 units can be group controlled.

Using a 2-core 0.5mm cable

Connected to terminals A & B at each unit within the group.

VN-M   VN-M   VN-M   VN-M   VN-M
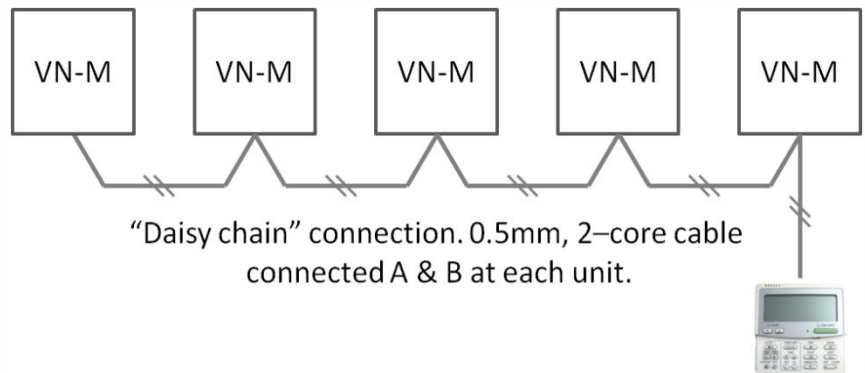
"Daisy chain" connection. 0.5mm, 2–core cable connected A & B at each unit.

Indoor address

| 5 | 4 | 3 | 2 | 1 |
|---|---|---|---|---|
| AC Unit | VN-M | AC Unit | VN-M | AC Unit |

A "group" can comprise of up to 8 units of any combination, RAV, VRF, VN-M indoor units.

Wiring is the same as above.

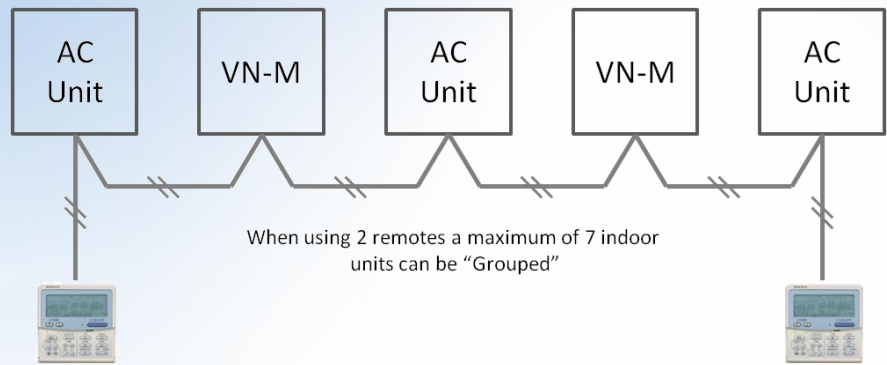When a "group" is controlled via two remote controllers, the quantity of units drops to a maximum of 7.

Wiring is the same as above.



When using 2 remotes a maximum of 7 indoor units can be "Grouped"

## Electrical "Dip Switches" and their purpose

There are 4 "Banks of "Dip Switches. Two banks of two and two banks of four.

SW301 - "Terminal – End of Line" resister. ON = 100Ω. **OFF = None**

SW701 – Pulse/Static    ON = Pulse. **OFF = Static**.

SW702 – (1 to 4) Indoor unit address. (See chart)
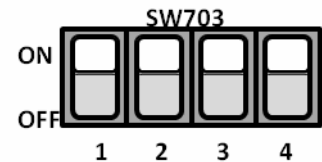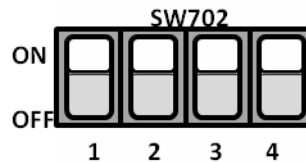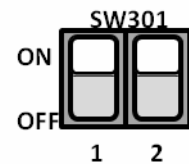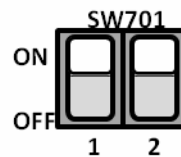
SW703 – (1 to 2) Indoor unit address.
**(Factory default ALL OFF indoor address No 1.)**
(3)  Central controller address.   ON = Fix, **OFF = Auto**
*(Leave value OFF)*
(4)  ON = Header (Individual)      **OFF = Follower**
*(Factory default follower)*



Indoor unit address switch (●: ON   —: OFF)

| Address | SW702 1 | 2 | 3 | 4 | SW703 1 | 2 | Address | SW702 1 | 2 | 3 | 4 | SW703 1 | 2 | Address | SW702 1 | 2 | 3 | 4 | SW703 1 | 2 | Address | SW702 1 | 2 | 3 | 4 | SW703 1 | 2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | — | — | — | — | — | — | 17 | — | — | — | — | ● | — | 33 | — | — | — | — | — | ● | 49 | — | — | — | — | ● | ● |
| 2 | ● | — | — | — | — | — | 18 | ● | — | — | — | ● | — | 34 | ● | — | — | — | — | ● | 50 | ● | — | — | — | ● | ● |
| 3 | — | ● | — | — | — | — | 19 | — | ● | — | — | ● | — | 35 | — | ● | — | — | — | ● | 51 | — | ● | — | — | ● | ● |
| 4 | ● | ● | — | — | — | — | 20 | ● | ● | — | — | ● | — | 36 | ● | ● | — | — | — | ● | 52 | ● | ● | — | — | ● | ● |
| 5 | — | — | ● | — | — | — | 21 | — | — | ● | — | ● | — | 37 | — | — | ● | — | — | ● | 53 | — | — | ● | — | ● | ● |
| 6 | ● | — | ● | — | — | — | 22 | ● | — | ● | — | ● | — | 38 | ● | — | ● | — | — | ● | 54 | ● | — | ● | — | ● | ● |
| 7 | — | ● | ● | — | — | — | 23 | — | ● | ● | — | ● | — | 39 | — | ● | ● | — | — | ● | 55 | — | ● | ● | — | ● | ● |
| 8 | ● | ● | ● | — | — | — | 24 | ● | ● | ● | — | ● | — | 40 | ● | ● | ● | — | — | ● | 56 | ● | ● | ● | — | ● | ● |
| 9 | — | — | — | ● | — | — | 25 | — | — | — | ● | ● | — | 41 | — | — | — | ● | — | ● | 57 | — | — | — | ● | ● | ● |
| 10 | ● | — | — | ● | — | — | 26 | ● | — | — | ● | ● | — | 42 | ● | — | — | ● | — | ● | 58 | ● | — | — | ● | ● | ● |
| 11 | — | ● | — | ● | — | — | 27 | — | ● | — | ● | ● | — | 43 | — | ● | — | ● | — | ● | 59 | — | ● | — | ● | ● | ● |
| 12 | ● | ● | — | ● | — | — | 28 | ● | ● | — | ● | ● | — | 44 | ● | ● | — | ● | — | ● | 60 | ● | ● | — | ● | ● | ● |
| 13 | — | — | ● | ● | — | — | 29 | — | — | ● | ● | ● | — | 45 | — | — | ● | ● | — | ● | 61 | — | — | ● | ● | ● | ● |
| 14 | ● | — | ● | ● | — | — | 30 | ● | — | ● | ● | ● | — | 46 | ● | — | ● | ● | — | ● | 62 | ● | — | ● | ● | ● | ● |
| 15 | — | ● | ● | ● | — | — | 31 | — | ● | ● | ● | ● | — | 47 | — | ● | ● | ● | — | ● | 63 | — | ● | ● | ● | ● | ● |
| 16 | ● | ● | ● | ● | — | — | 32 | ● | ● | ● | ● | ● | — | 48 | ● | ● | ● | ● | — | ● | 64 | ● | ● | ● | ● | ● | ● |

*VN-M units default to system number 31, this cannot be adjusted*

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# Examples

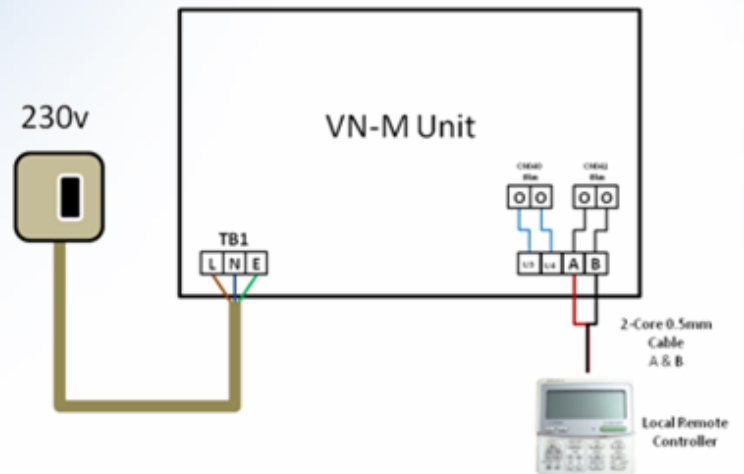**Single VN-M unit with local remote.**

**SW301 – (1 & 2) = OFF**
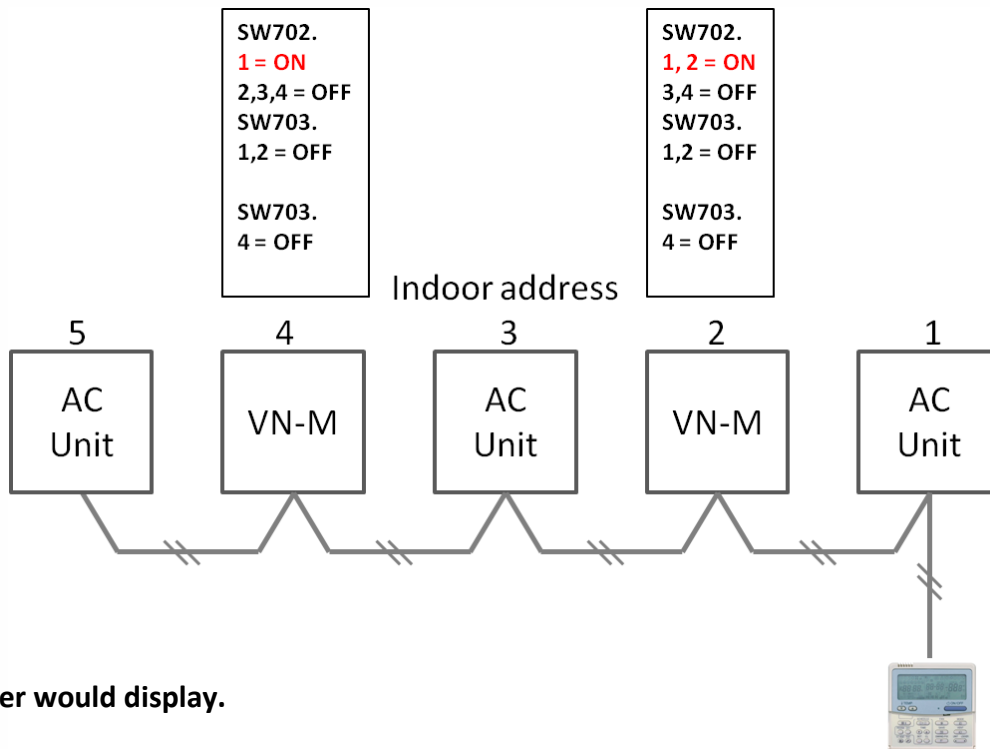
**SW701 – (1 & 2) = OFF**

**SW702 – (1 to 4) = OFF**

**SW703 – (1 to 2) = OFF**

**SW703 – (3) = OFF**

**SW703 – (4) = ON**



**Multiple units within a group.**



SW702.
1 = ON
2,3,4 = OFF
SW703.
1,2 = OFF

SW703.
4 = OFF

SW702.
1, 2 = ON
3,4 = OFF
SW703.
1,2 = OFF

SW703.
4 = OFF

Indoor address

5 — AC Unit
4 — VN-M
3 — AC Unit
2 — VN-M
1 — AC Unit

**Controller would display.**

**1 – 1, 31 – 2, 1 – 3, 31 – 4, 1 – 5**

**Red = System (i.e. Outdoor unit), Black indoor address,**

(Note: VNM units are locked to system address 31)

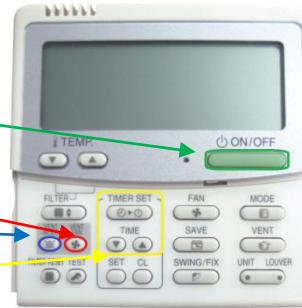# Control options and the functions associated with them.

**RBC-NRC01HE – Standard VNM remote controller, available functions;**

**ON / OFF**

**Fan Speed (High – Low)**

**Ventilation mode,**
**(Automatic, Heat Exchanger, Bypass.)**

**Timer (OFF, Repeat OFF, ON timer, 168 hours in ½ hr increments   NOT clock based NO day omit available. "Sleep Timer")**

This controller can also be used to control standard air conditioning units along with VNM units either singular or within a group of units, remaining functions are available for standard air conditioning units, were applicable.

**RBC-AMS41E – Enhanced remote, when used with VNM units the following functions are available;**

**ON / OFF**

**Scheduled Timer (7 Day Time Switch)**
**Clock based, with day omit.**
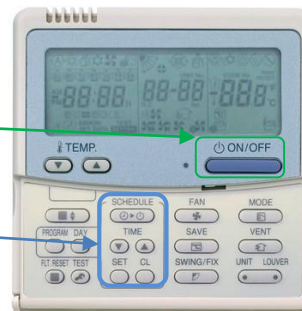
**The following remote controllers are not suitable for connecting on a "One to One" basis.**

RBC-AMS51                    RBC-AMT31/32                         RBC-AS21/41                              Infra-Red

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# Accessories.

## RBC-VML1 VN Unit Interface Lead

The lead will allow the VN unit to be controlled from volt free contact closures. Separate contacts are required for on/off, remote controller lock, increased fan speed and damper position.
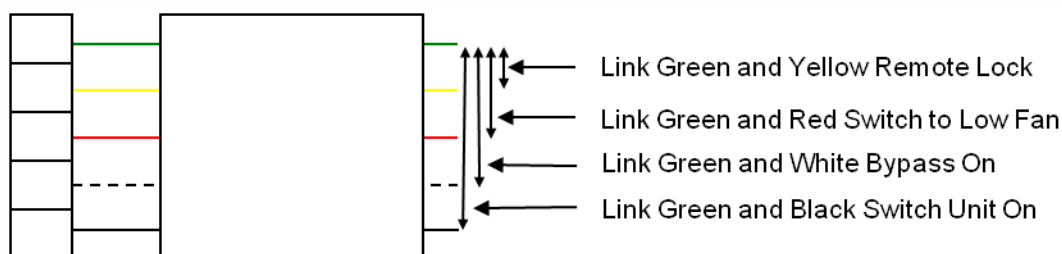
### Installation

The interface lead must be plugged into the CN705 connector on the VN unit PCB. If the lead is used with a remote controller it will operate in last one touched mode. If the VN units are grouped the lead can be connected to any VN unit in the group. Please see Installation manual supplied with the VN unit for details.

Remove the screws to expose the PCB pass the Interface cable from the Electrical box out through the provided bushes. Connect the ring crimp terminal to the provided earth screw inside the electrical box.

Ensure the VN unit is set to static input SW701 bit Sw1 OFF (This is set at unit shipment from the factory).

The links between the common (Green Cable) and the selected input are to be connected to a volt free contact.



Link Green and Yellow Remote Lock

Link Green and Red Switch to Low Fan

Link Green and White Bypass On

Link Green and Black Switch Unit On

# Pre-Heaters.

There are four options available

| Model | Heater Size | Duct Diameter | VN Model |
|-------|-------------|---------------|----------|
| RBC-VNMH1 | 1x1kW Heater | 100 | VN-M150HE |
| RBC-VNMH2 | 1x1kW Heater | 150 | VN-M250HE & VN-M350HE |
| RBC-VNMH3 | 2x1kW Heater | 200 | VN-M500HE & VN-M650HE |
| RBC-VNMH4 | 2x1kW Heater | 250 | VN-M800HE & VN-M1000HE |

*Currently there are NO Pre-Heater kits available for the VN-M1500HE or the VN-M2000HE units.*

**Each** heater option requires a controller (RBC-VNMC).
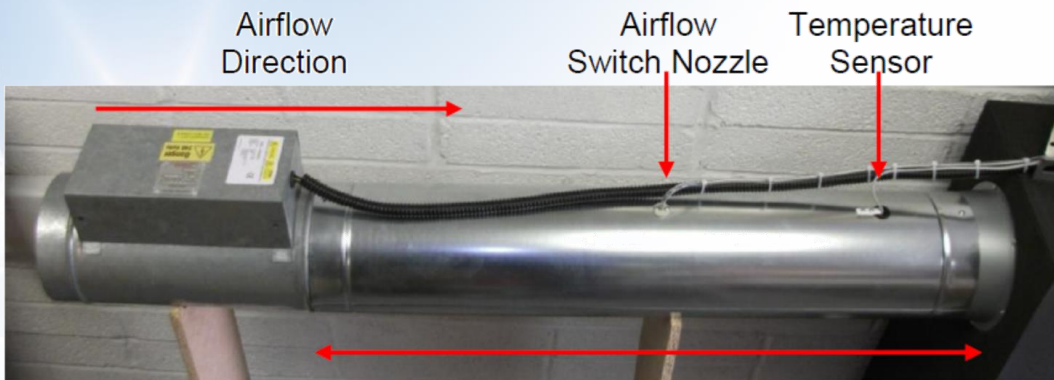The heater will only operate when the temperature of the air in the duct is below the pre-set value.

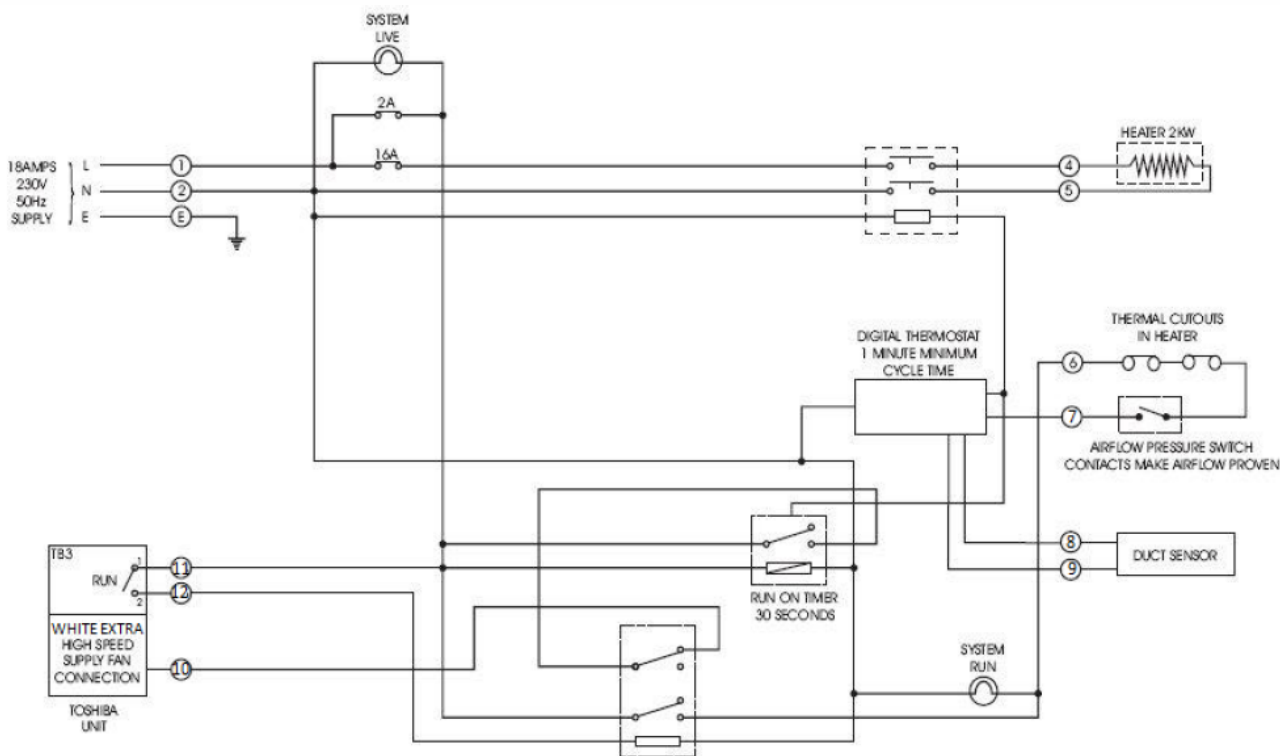The controller will also provide a run on when the unit stops

## General Layout.



Airflow Direction · Airflow Switch Nozzle · Temperature Sensor

One Meter Minimum

## Wiring.



**For full technical details please refer to the relevant manuals available for this product.**
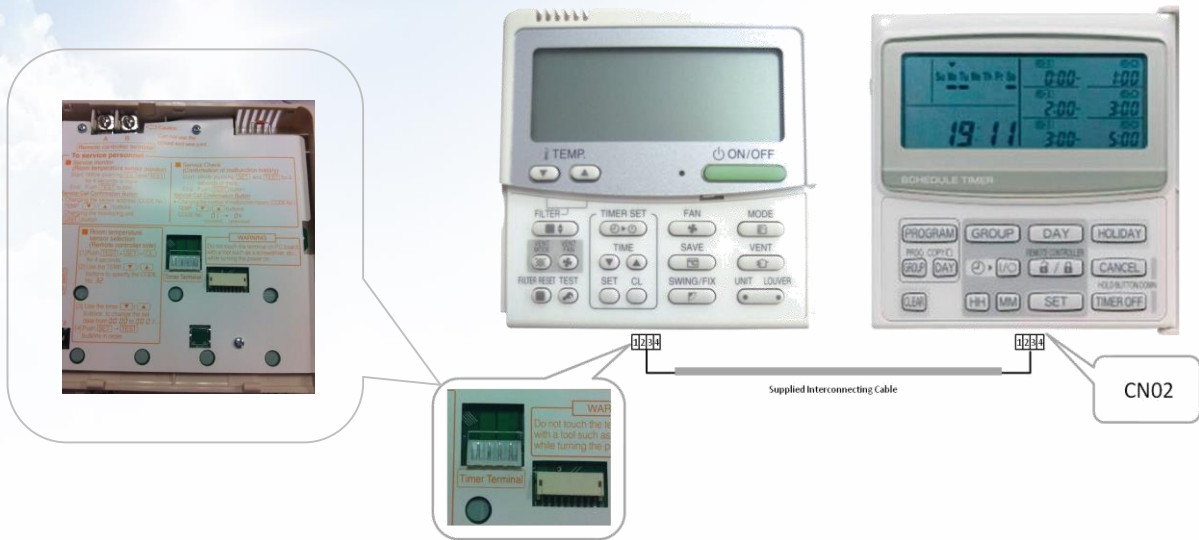
## Cool Designs Ltd
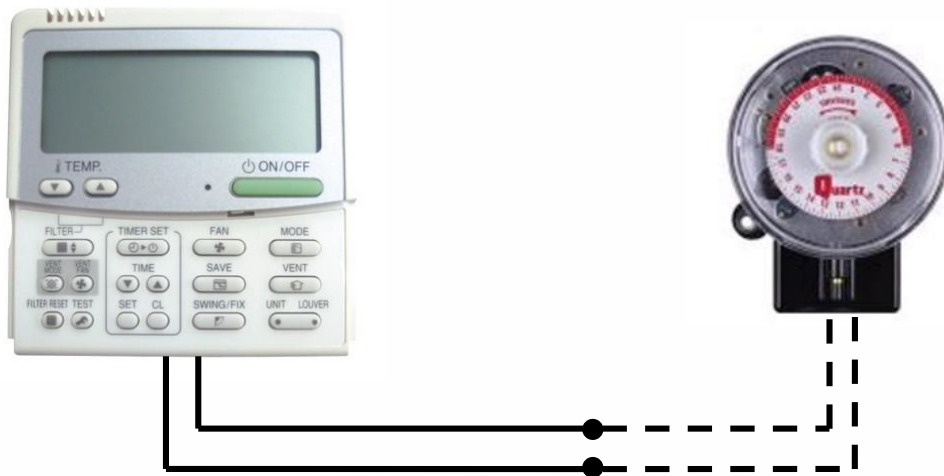Raising the Standards in Air Conditioning Distribution

# Time Switch Control

There are a number of options available for time switch control.

Option 1) TCB-EXS21TLE 7-day weekly / schedule timer complete with day omit, used in conjunction with the RBC-NRC01HE remote controller.



Option 2) RBC-SMT1 timer interface lead, connects in the rear of the RBC-NRC01HE via the CN02 connector and provides an external volt free switching circuit, for connection to a third party timer.



Option 3) RBC-VML1 VN Unit Interface Lead, electrical details available within this publication.
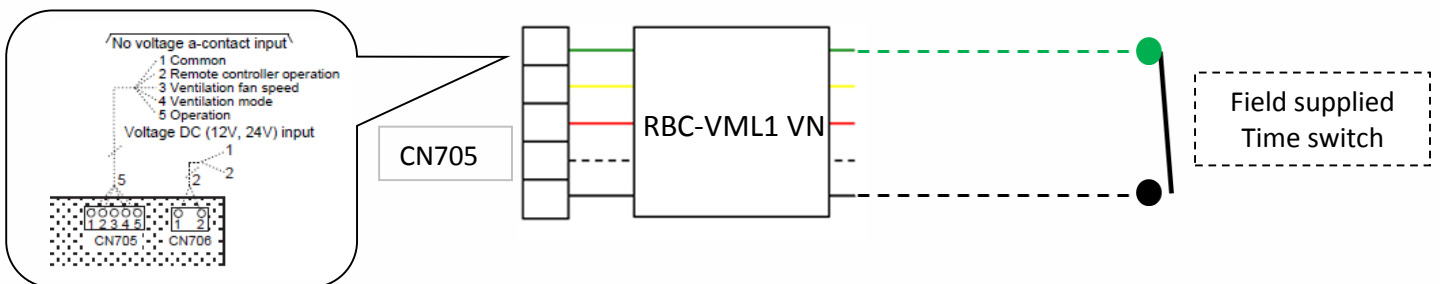
# Notes

# Contact details:

## Cool Designs Ltd Technical Support

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Web site: **www.cdlweb.info**

**Toshiba Air Conditioning**

**24/7 technical support**

**0870 843 0333 (Option 7)**

**Text back service**

**07624 803 017**

**(Type fault code in lower case no spaces)**

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