Pocket Quick Reference Guide On the TOSHIBA

Air to Air Heat Exchanger

VN-M####HE/HE1

Toshiba air conditioning
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 and Schedule Timer 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 2000 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).**
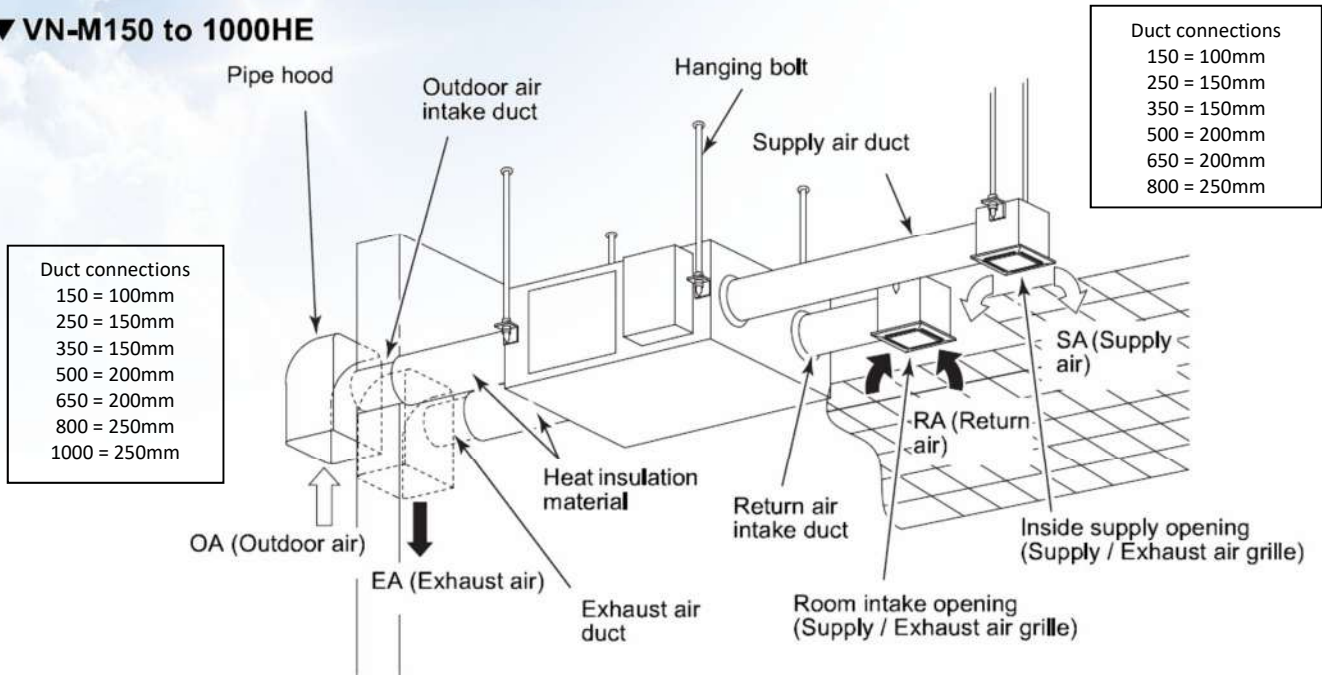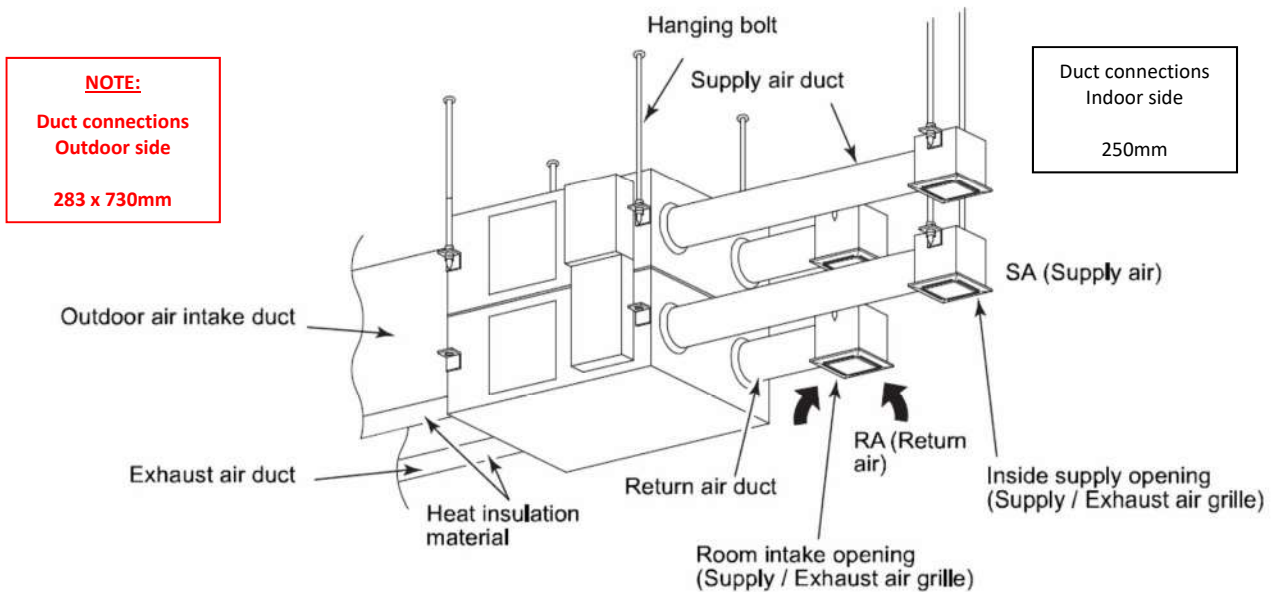
7) **Remote Interface (RBC-VNL1).**

Installation.

▼ VN-M150 to 1000HE

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

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

Pipe hood

Outdoor air intake duct

Hanging bolt

Supply air duct

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-M 1500 and 2000HE1

NOTE:

Duct connections
Outdoor side

283 x 730mm

Duct connections
Indoor side

250mm

Hanging bolt

Supply air duct

SA (Supply air)

Outdoor air intake duct

Exhaust air duct

Heat insulation material

Return air duct

Room intake opening (Supply / Exhaust air grille)

RA (Return air)

Inside supply opening (Supply / Exhaust air grille)

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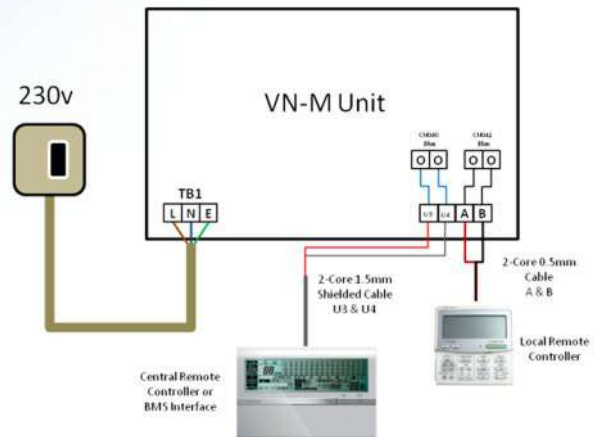
ACR NEWS AWARDS 2015 WINNER
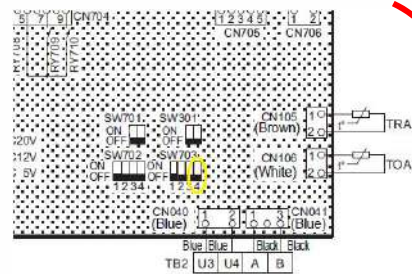
Wiring.

Standard.

A 10-amp, 230-volt power supply is applied to terminals L, N & E (Without heater kit.)

Local controllers are connected to terminals A & B

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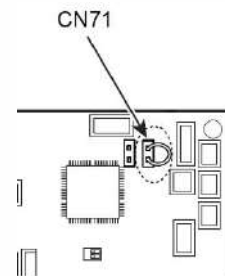

230v   VN-M Unit

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

Slightly different set-up for the HE1 models.

When being used as an individual unit, "Link CN71" must be "Unplugged" from the PCB.
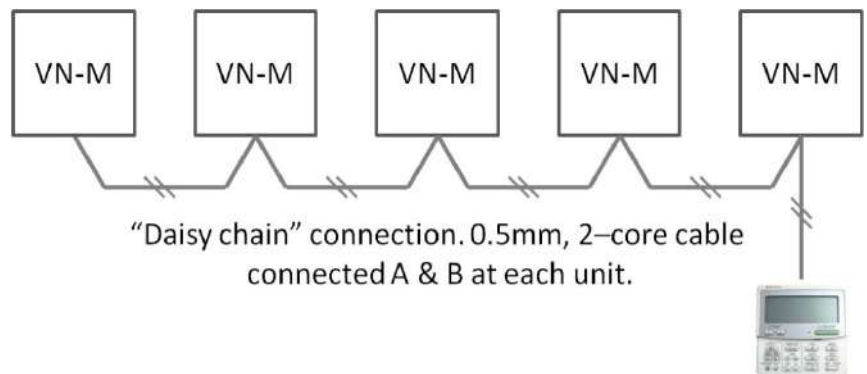
Factory default is link plugged in.

CN71

Group Configuration.
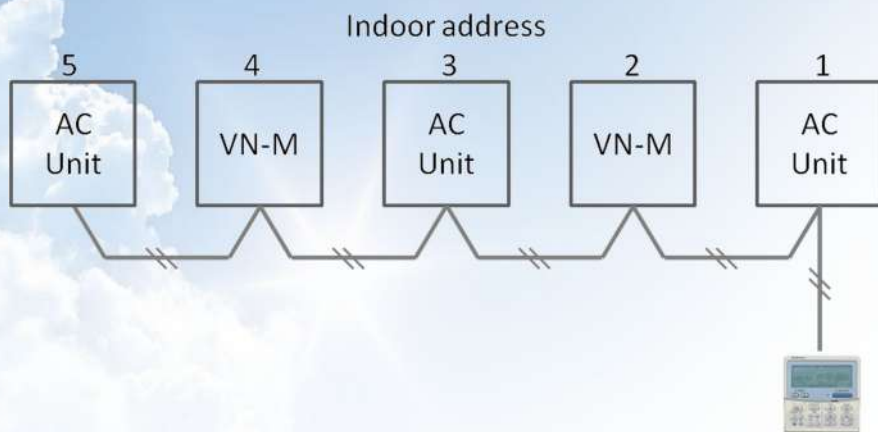
Up to 8 units can be group controlled.

Using a 2-core 0.5mm cable

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

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

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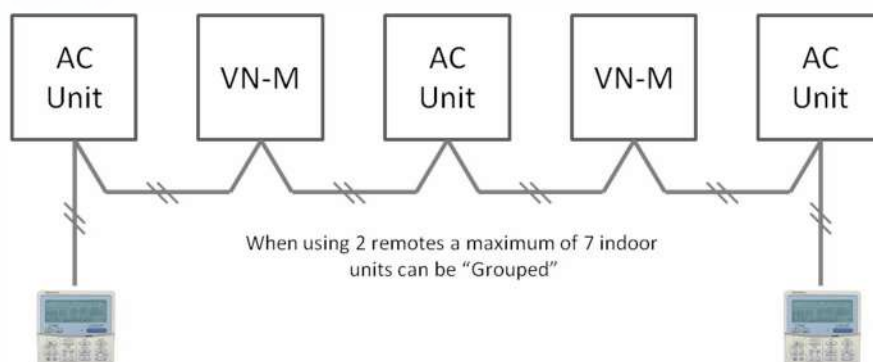
Indoor address

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.
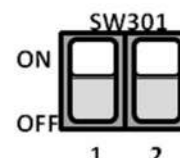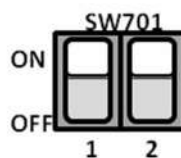
Wiring is the same as above.

When using 2 remotes a maximum of 7 indoor units can be "Grouped"
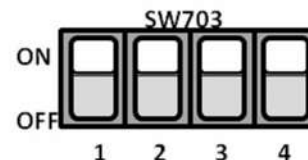
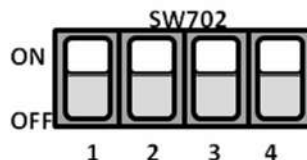## Electrical "Dip Switches" and their purpose HE Models

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)

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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

Examples

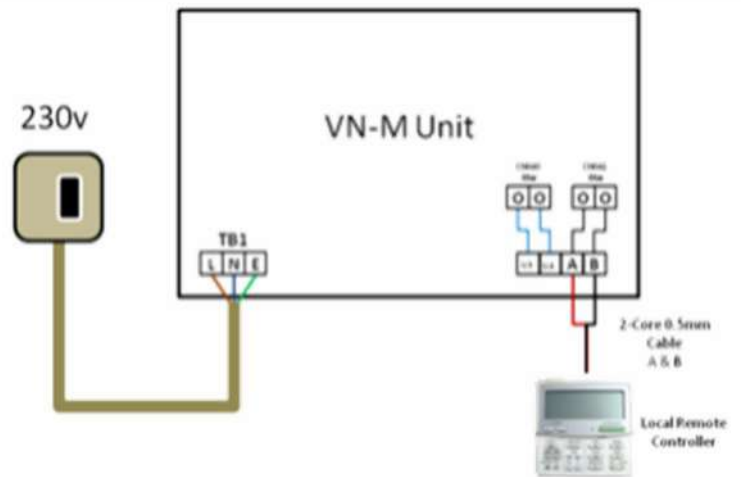### Single VN-M unit with local remote.

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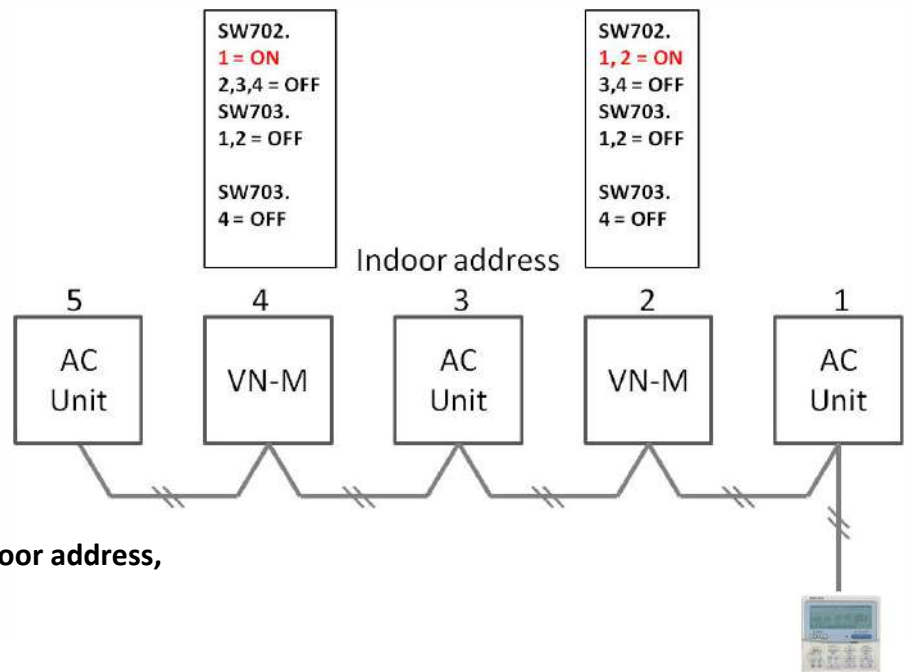
SW701 – (1 & 2) = OFF

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

Controller would display.

1 – 1, 31 – 2, 1 – 3, 31 – 4, 1 – 5

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

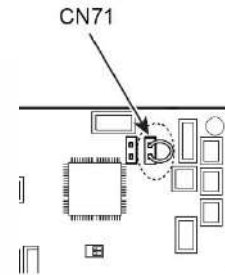(Note: VNM units are locked to system address 31)

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HE1 Models VN-M1000/1500/2000HE1.

HE1 models do not have the same "Dip Switches", configuration is very similar to standard Toshiba split systems.

On the "Header Unit" the "CN71" link needs removing.

The "CN71" link remains in position on follower units.

Configuration is generally automatic, with "CN71" link removed on the header, apply power to the units within the "Group", addressing will be carried out automatically.

If manual addressing is required.

Using the RBC-NRC01HE remote controller, with power on.

Press and HOLD, for 4 seconds; **"TEST, SET and CL".**

The controller will display "**10**" on the right-hand display.

Using the **Temp up/down** buttons, scroll **10** to **13**.

Change the left-hand display using the "**Time**" Up/down buttons

Selecting a unique number between 1 (Header) – 64 (Follower), Groups can comprise of up to 8 units.

Press "**SET**" then Press "**TEST**"

When you press the "**Unit**" button the middle window will Display, the system number, always fixed at 31, and the indoor unit number between 1 to 64, pressing the "**Unit**" button again will display the next unit in the group, 31 – 2 etc.

Control Options

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Control options and the functions associated with them.
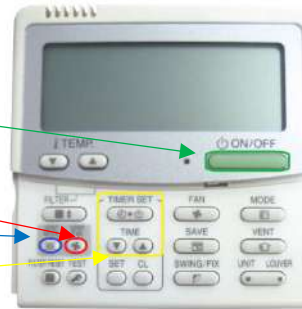
RBC-NRC01HE – Standard VNM remote controller, available functions;

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.
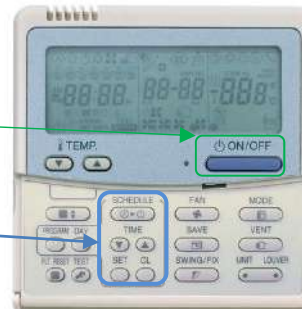
The following remote controllers are not suitable for connecting on a "One to One" basis.

RBC-AMS51/54/55   RBC-AMT32   RBC-AS21/41   Infra-Red

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Accessories.

RBC-VML1 VN-M Unit Interface Lead

The lead will allow the VN-M 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;

A) For the HE models CN705 connector on the main PCB.
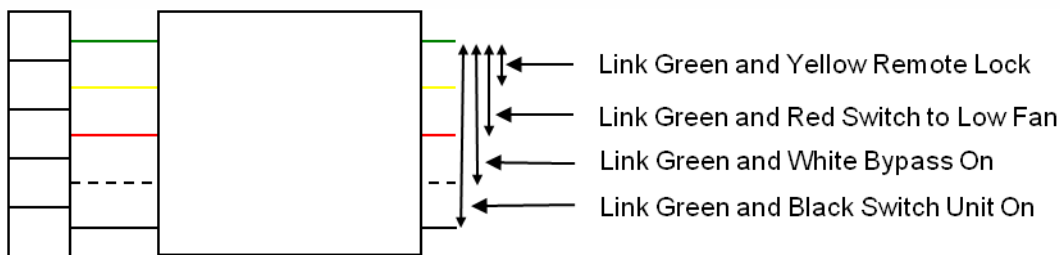B) For the HE1 model CN61 on the "Control PCB – A".

If the lead is used with a remote controller it will operate in last one touched mode. If the VN-M units are grouped the lead can be connected to any VN-M unit in the group. Please see Installation manual supplied with the VN-M unit for details.

When connected to the HE models, VN-M150, 250, 350, 500, 650 & 800HE

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-M 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.
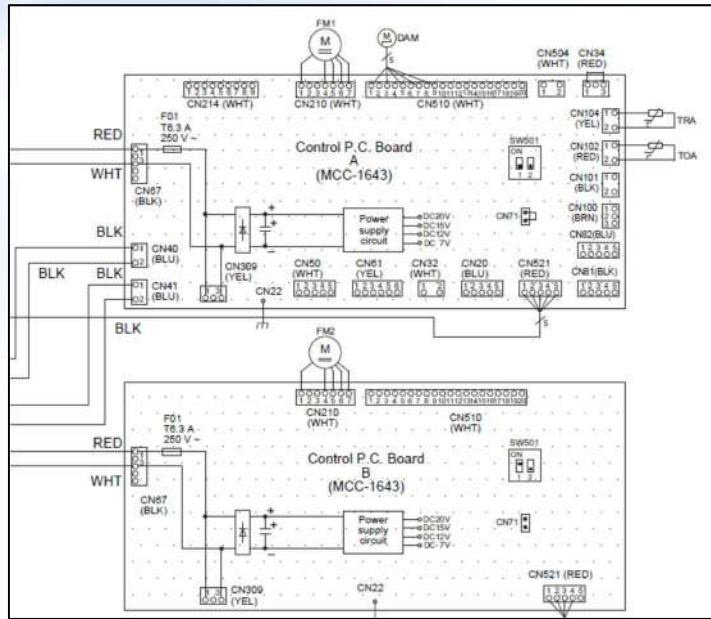

Link Green and Yellow Remote Lock
Link Green and Red Switch to Low Fan
Link Green and White Bypass On
Link Green and Black Switch Unit On

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This must be connected to the CN61 socket on "Control PCB – A, (MCC-1643), there are two "Control PCB's the A board has the temperature sensors connected to it.
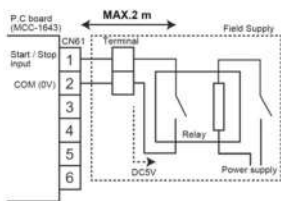

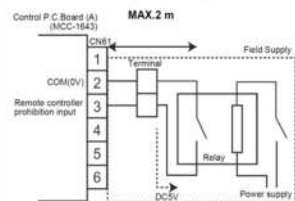The functionality of the VML1 interface is slightly different when used on the HE1 models.

The functions available are;

| Connector No.	Pin No.	Function	Note
CN61	1	Start / Stop input	Start/Stop input (pulse/static input changed by J01 Connect / Cut = Pulse input / Static input)
	2	COM (0V)	-
	3	Remote controller prohibition input	Remote controller prohibition input
	4	Operation signal output	Connecting an auxiliary fan or monitoring operation output
	5	12V	-
	6	Abnormal signal output	Monitoring an abnormal signal
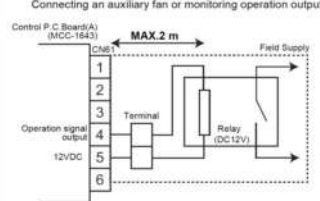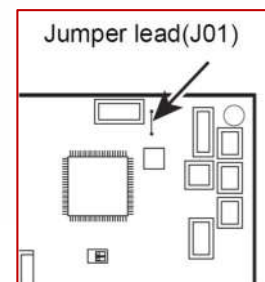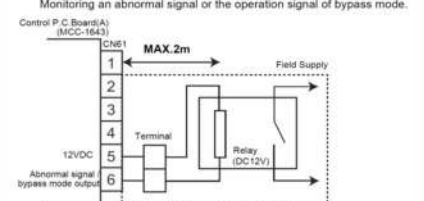
Note: The jumper lead on the "Control PCB – A" requires cutting.

Jumper lead(J01)

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Pre-Heater ONLY.

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-M1500HE1 or the VN-M2000HE1 units.
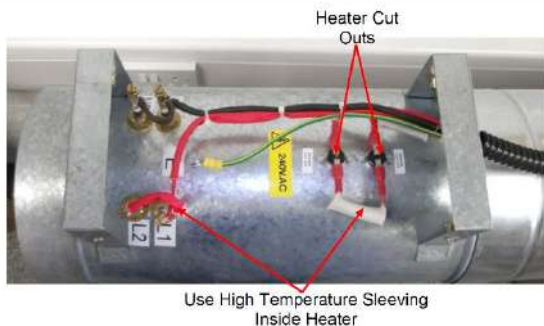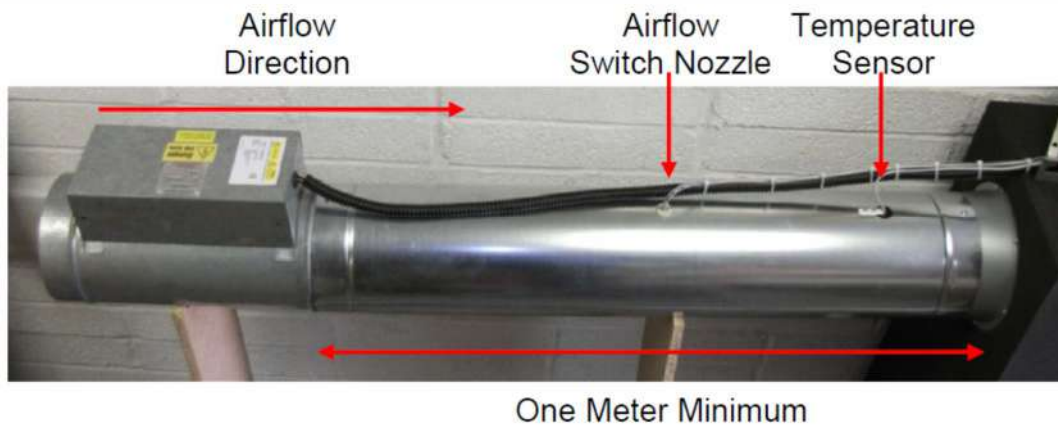
Each heater option requires a controller (RBC-VNMC).
The heater will only operate when the temperature
of the air in the duct is below the pre-set value.

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

The controller is class 1 and MUST be earthed.

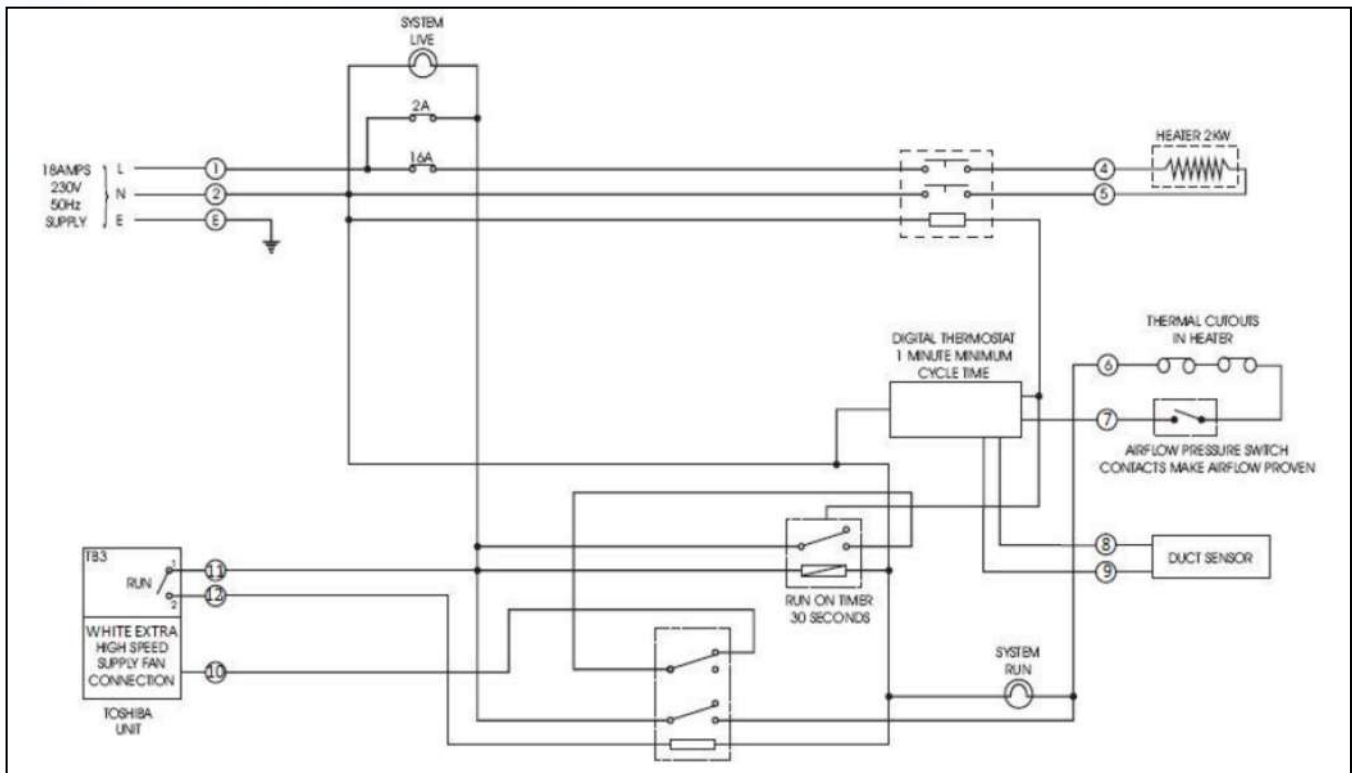**General Layout.**

For 2kW heaters link L1-L2 (Live) and N1-N2 (Neutral)
For 1kW heaters connect to L1 (Live) and N1 (Neutral)

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Wiring.

For full technical details please refer to the relevant manuals available for this product.

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.

CN02

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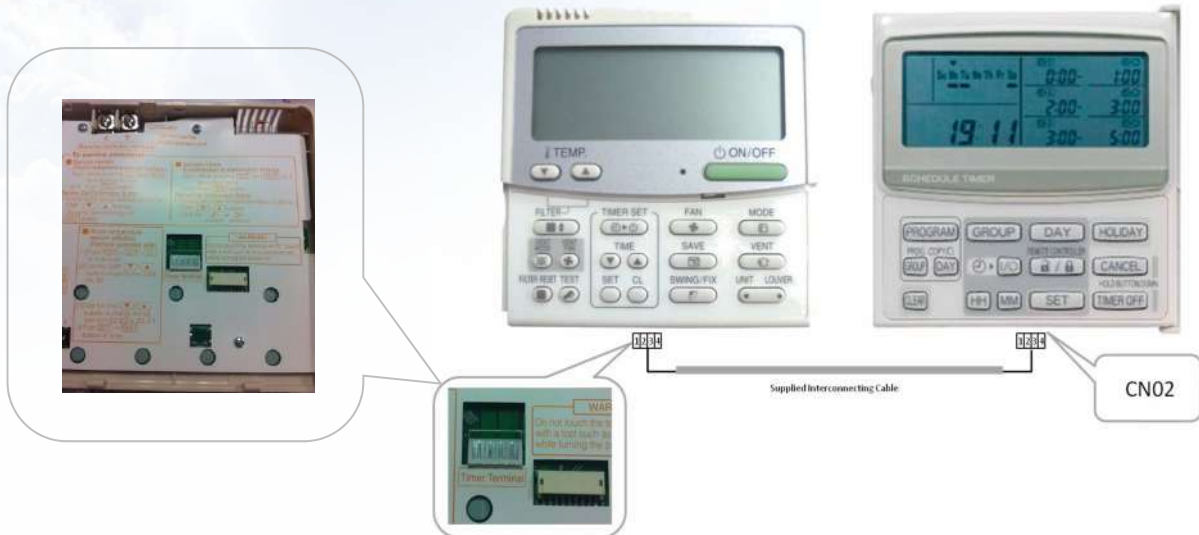
Option 2) RBC-SMT1 timer interface lead, connects in the rear of the RBC-NRC01HE via the CN02 connector and provides an external volt free switching circuit, for connection to a third-party timer.

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

No voltage a-contact input
1 Common
2 Remote controller operation
3 Ventilation fan speed
4 Ventilation mode
5 Operation
Voltage DC (12V, 24V) input

CN705

RBC-VML1 VN

Field supplied
Time switch

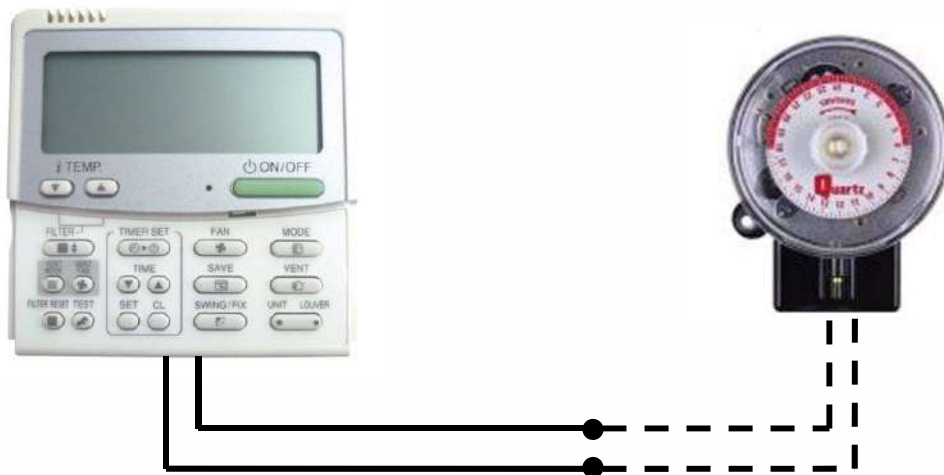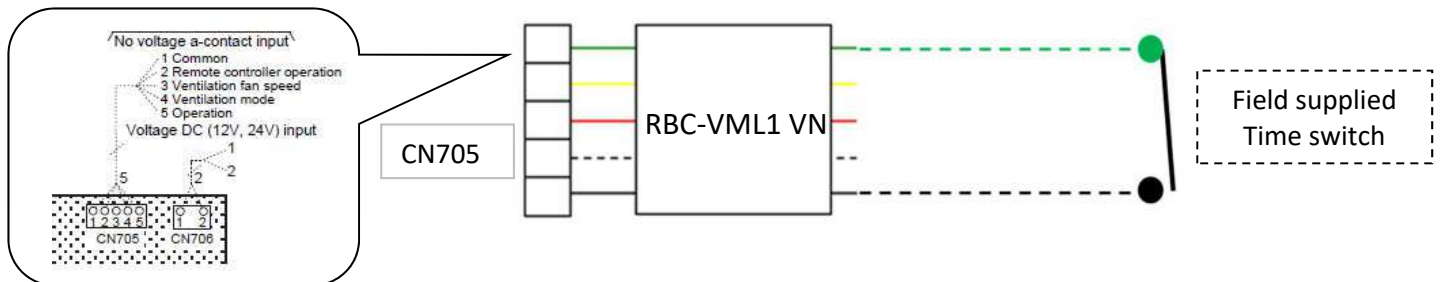## Cool Designs Ltd
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Advanced Functions

There are a number of advanced facility / functions which are available, configuration of these facilities/functions is carried out via the RBC-NRC01 local remote controller.

The facilities/functions available are;

Code	Description	SET DATA and description	Factory default	Note
01	Lighting-up hours of the Filter Sign	0000: None 0001: 150 H 0002: 2500 H 0003: 5000 H 0004: 10000 H	0002: 2500 H	Adjusting this setting is necessary for the header unit.
28	Auto recovery from a power failure	0000: Invalid 0001: Valid * Resumes the status just before the power failure	0000: Invalid	*1
31	Single operation of the fan	0000: Invalid 0001: Valid ON/OFF operation for the Air to Air Heat Exchanger only	0000: Invalid	Adjusting this setting is necessary for the header unit. (System equipped with the Air to Air Heat Exchanger and air conditioners)
48	Imbalanced Fan speed ventilation	0000: Normal 0001: SA (High) > EA (Low) active 0002: SA (Low) < EA (High) active * "High" may be "Extra High".	0000: Normal	Adjusting this setting is necessary for all the Air to Air Heat Exchangers in the group.
49	24-hour ventilation	0001: Invalid 0002: Valid	0001: Invalid	Adjusting this setting is necessary for all the Air to Air Heat Exchangers in the group.
4B	Delayed operation	0000: Invalid 0001-0006: [Setting value] x 10 minutes delay * Delaying the Air to Air Heat Exchanger operation to reduce the air-conditioning load when starting running the air conditioner	0000: Invalid	Adjusting this setting is necessary for all the Air to Air Heat Exchangers in the group. (System equipped with the Air to Air Heat Exchanger and air conditioners)
4C	Nighttime heat purge	0000: Invalid 0001-0048: Start after [Setting value] x 1 hour(s) * Setting for the time before the nighttime heat purge operation starts	0000: Nighttime heat purge OFF	Adjusting this setting is necessary for all the Air to Air Heat Exchangers in the group. (System equipped with the Air to Air Heat Exchanger and air conditioners)
4D	Setting of the exhausting fan operation below −15 °C (OA)	0000: Exhausting fan run 0001: Exhausting fan stop * The supplying fan stops when the temperature is below −15 °C. (OA)	0000: Exhausting fan run	Adjusting this setting is necessary for all the Air to Air Heat Exchangers in the group.
4E	Setting of the linked operation with external devices	0000: ON/OFF linked 0001: ON linked 0002: OFF linked * Specifies whether the ON/OFF operation of the Air to Air Heat Exchanger is linked with the external device operation	0000: ON/OFF linked	Adjusting this setting is necessary for a Air to Air Heat Exchanger to which an adapter for remote ON/OFF control (sold separately) is connected.
EA	Changing the ventilation mode	0001: Bypass mode 0002: Heat Exchange mode 0003: Automatic mode * Compatible with systems without a remote controller and RBC-AMT32E	0003: Automatic mode	*1
EB	Changing the ventilation Fan speed	0002: High 0003: Low 0004: Imbalanced * "High" may be "Extra High". * Compatible with systems without a remote controller and RBC-AMT32E	0002: High	*1

Code	Description	SET DATA and description	Factory default	Note
ED	Changing the operation output	0000: ON during normal operation 0001: ON during normal operation, 24-hour ventilation, or nighttime heat purge operation 0002: ON during 24-hour ventilation or nighttime heat purge operation 0003: ON when SA fan is running 0004: ON when EA fan is running	0000: ON during normal operation	Adjusting this setting is necessary for a Air to Air Heat Exchanger which transfers the operation output.
EE	Changing the abnormal signal / Bypass mode signal output	0000: ON when an abnormal signal is detected 0001: ON when the Bypass mode signal is detected	0000: ON when an abnormal signal is detected	Adjusting this setting is necessary for a Air to Air Heat Exchanger which transfers the operation output.

How to access the advanced facilities/functions, via an RBC-NRC01 remote controller.

1) Press "**TEST**" and the "**TEMP - DOWN** "button together and hold for 4 seconds.

   After a short delay the display will show "**DI**" on the right-hand side.

2) Using the "**TEMP UP/DOWN**" buttons scroll through to the code you require, this will be displayed on the right-hand side of the display.

3) If you wish to change the "Data – Displayed on the left-hand side of the display" use the "**TIME – UP/DOWN**" buttons.

4) Once you have the required data on the left-hand display, Press "**SET**".

5) If there are a number of units controlled via the same controller and you wish to change their "Data" then press the "**UNIT**" button, the middle window will change and the new indoor unit's reference will be displayed, (31-1 to 31-2 etc.) repeat step 3 above.

6) If you wish to change additional "Codes" Repeat steps 2 to 4 above.

7) Once all the required "Codes" have been set then press "**TEST**", this will lock in the new data.

8) The controllers display will show "Setting" flashing, then the display will clear and the system enters normal operation mode.

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Toshiba Air Conditioning

24/7 technical support

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07624 803 017

(Type fault code in lower case no spaces)

Try our on-line training videos on YouTube.

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