



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

*R410A - VRF Range of equipment
Addressing / Commissioning*



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

The range covers three variants.

- 1) – Mini-SMMS/SMMS_e Two pipe heat pump single phase (Either / or, Heating / Cooling), 12.5, 16 & 18kW (Heating)
- 2) – SMMS/SMMS_i/SMMS_e Two pipe heat pump three phase (Either / or, Heating / Cooling), from 25kW to 178kW, (Heating)
- 3) – SHRM/SHRM_i/SHRM_e Three pipe heat recovery three phase, (Simultaneous Heating / Cooling), from 25kW to 132kW, (Heating)

The information within this pocket guide is applicable to all three variants.

Please Note:

When “Modularizing” outdoor SMMS/SMMS_i/SMMS_e or SHRM/SHRM_i/SHRM_e, units all the outdoor units, which are electrically connected together via terminals U5 & U6, **MUST** be of the same generation (*i* with *i*, *e* with *e*).

SMMS+SMMS = OK, SHRM+SHRM=OK, SMMS+SHRM=NO.
SMMS+SMMS_i=NO, SHRM+SHRM_i=NO, SMMS_i+SHRM_i=NO.
SMMS+SMMS_e=NO, SHRM+SHRM_e=NO, SMMS_i+SMMS_e=NO.
SHRM_i+SHRM_e=NO.



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Pre-commissioning. Electrical

- 1) Confirm that the power supply at each outdoor unit is correct, three phase and neutral 380 – 400 volts 50 Hz AC, SMMS/SMMSi/SMMSe & SHRM/SHRMi/SHRMe (Fig 1).
Single phase 220 – 240 50 Hz AC, Mini-SMMS/SMMSe (Fig 2).
Fuse sizes are dependent on unit size and current electrical regulations, (IET 17th edition).

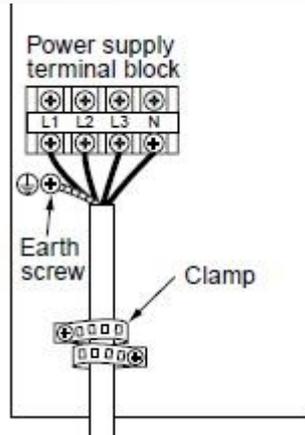


Fig 1

(Terminal block)

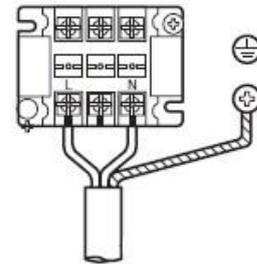


Fig2

- 2) On modulated systems, (SMMS/SMMSi/SMMSe/SHRM/SHRMi/SHRMe) outdoor units are electrically joined together via a 1.5mm two core screened cable connected on terminals U5 & U6
- 3) (Not applicable to Mini-SMMS/SMMSe), (Fig 3)

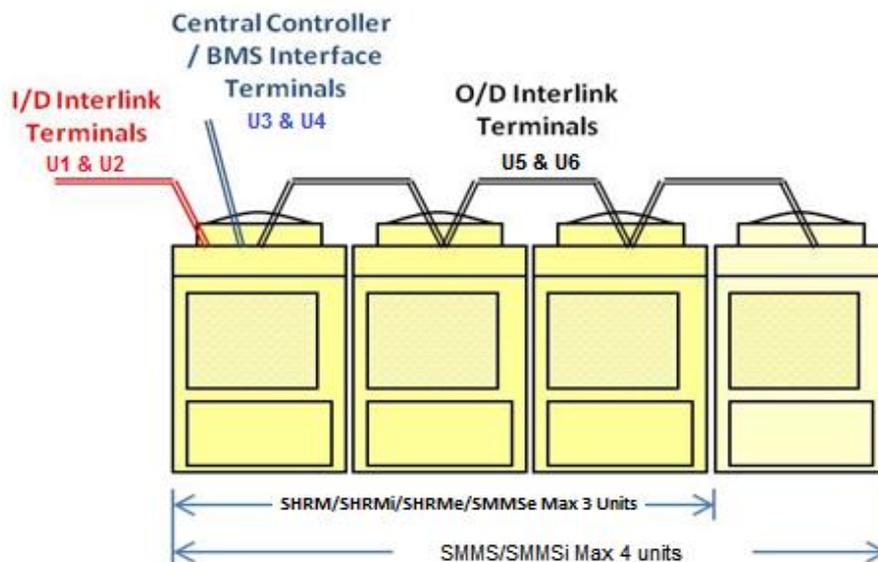


Fig 3

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4) Indoor to outdoor connection, 1.5mm two core screened cable connected to terminals U1 & U2 of the LEAD outdoor unit and “daisy chained around ALL relevant indoor units, (Fig 3), (To speed up commissioning, leave these terminals disconnected at the outdoor unit until all other works are complete. By these cores being disconnected premature addressing cannot be carried out, but the crankcase heaters can be operated, more on this later.)

5) Central / BMS connections, 1.5mm two core screened cable connected to terminals U3 & U4 at each LEAD outdoor unit. (Fig 3)

Make sure that the “Plug and Socket” connection between terminals

U1, U2 & U3, U4 is Disconnected, (Factory default DISCONNECTED) (Fig 4)

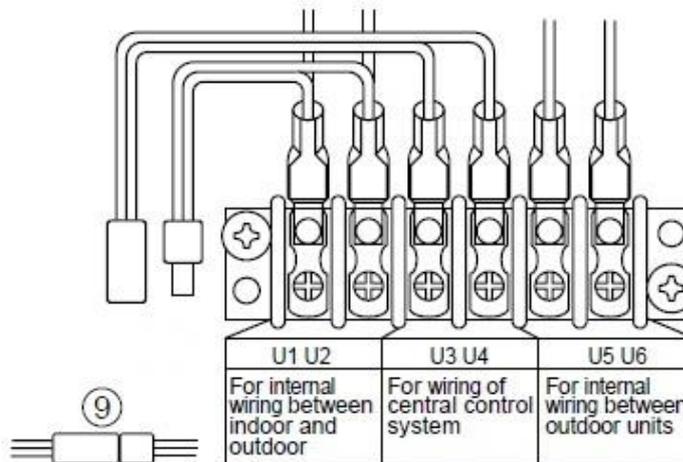


Fig 4

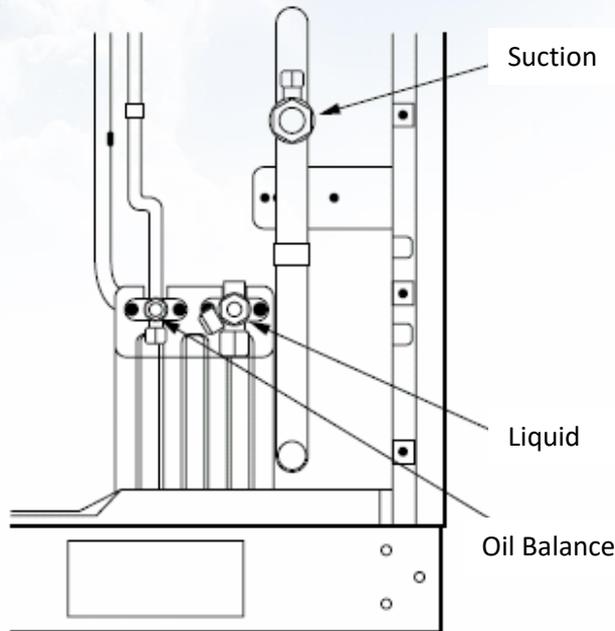


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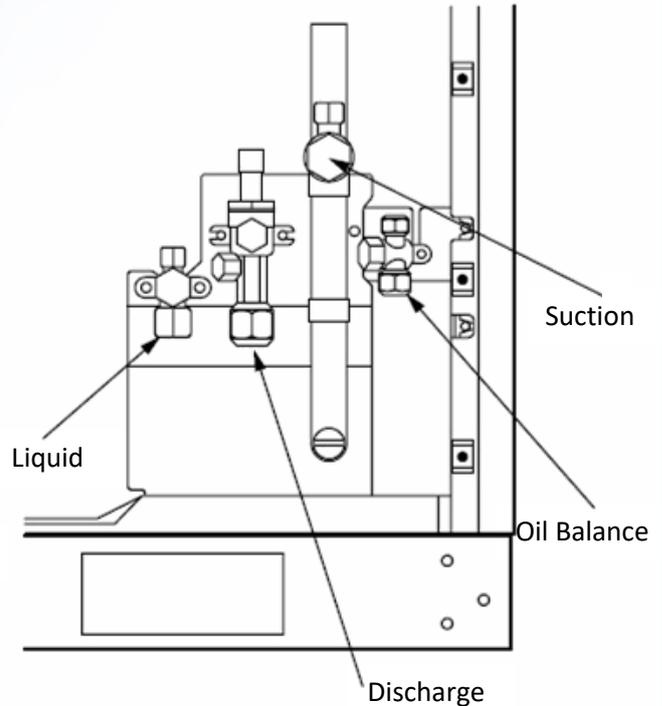
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Refrigeration.

Prior to carrying out any pressure testing or evacuation, make sure that the Liquid, Discharge (SHRM/SHRMi/SHRMe only); Suction and oil balance valves are **FULLY CLOSED**.



SMMS/SMMSi/SMMSe



SHRM/SHRMi/SHRMe

Confirm that the oil balance line has been suitable insulated, for full details please refer to the Toshiba VRF Installation manual which accompanied the equipment.

- 1) Connect a suitable R410A refrigerant manifold to ALL service valves, Liquid, Discharge, Suction and Oil balance.
- 2) Carry out a complete pressure test using suitable oxygen free nitrogen, across ALL lines in accordance with current F-Gas regulations and "IOR Good Refrigeration Practices" Manufacturers minimum strength test to be 550 psig / 38 Bar, duration dependant on pipe lengths, minimum requirement 15 minutes, recommended duration minimum 1 hour, reduce the pressure to between 450psig/31 Bar and 500 psig/35 Bar and hold "Leak Test" for a minimum duration of 1 hour, manufacturers recommendation would be for a 24 hour period.

However, if there is a difference between the ambient temp, when pressure has been applied and when 24 hours has passed, pressure changes by approx. 0.01MPa (0.1kg/cm²G) per 1°C. Correct the pressure.

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- 3) Close off manifold gauge valves and disconnect the Oxygen Free Nitrogen cylinder.
- 4) Replace Oxygen free nitrogen cylinder with a suitably sized vacuum pump, (6cfm or better)
- 5) Connect suitable vacuum gauge.
- 6) Evacuate the system to the best vacuum weather conditions will allow, ideally between 2 Torr (2.7 mb) to 4 Torr (5.5 mb). duration 2 – 3 hours.
- 7) Once a vacuum is achieved, close the valve at the vacuum pump and turn off the vacuum pumps power supply, leave the vacuum gauge connected. Leave the system to stand for 1 hour, check vacuum gauge if there is no loss move on, if there is a pressure loss, identify the potential cause rectify and repeat.
- 8) Replace the vacuum pump with suitable virgin R410A refrigerant cylinder.
- 9) Charge the system with the calculated quantity of R410A refrigerant.

How to calculate the refrigerant charge required.

Please refer to CDL “Pocket Quick Reference Guide Calculating the Refrigerant Charge for SMMSe equipment” and the “Pocket Quick Reference Guide R410A- Heat Recovery VRF Systems SHRMe”

The above publications are available for download from our web site;

<http://www.cdlweb.info/library-headings/library/>



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Refrigeration.

Keeping the valves of the outdoor unit closed, charge the liquid refrigerant, (By Weight) into the service port of the liquid line valve.

If the required amount of refrigerant cannot be charged into the liquid line with the valves closed, fully open the liquid and suction valves at the outdoor unit, (**Keep the discharge –SHRM/SHRMi/SHRMe only, valve CLOSED**) operate the air conditioner in the **COOLING** mode¹, part seat (Partially close), the suction gas valve and then charge liquid refrigerant into the suction line service port.

Whilst inserting refrigerant in this method, “choke” the refrigerant slightly by operating the valve of the refrigerant cylinder or charging manifold to maintain a liquid refrigerant flow, always charge refrigerant gradually.

1 In order to run the system in COOLING mode, the system would need to be “Addressed”

Addressing the system.

Prior to addressing the system for the first time carry out the following;

- 1) Turn ON the power to the indoor units
- 2) Turn ON the power to the outdoor unit/s, (making sure that electrical terminals U1 & U2 are connected to the indoor units), starting with the last in the line and finishing with the first, the “lead” unit
- 3) The lead outdoor unit is the unit located nearest to the indoor units and is electrically connected to the indoor units via U1 & U2 terminals.
- 4) Confirm that the “White Link Plug & Socket” connected between U1 & U3 / U2 & U4 on the “Lead” outdoor unit is **DISCONNECTED**. Refer to Fig 4
- 5) When setting up multiple systems for connection to a central remote controller or BMS system, confirm that the “Systems” are unequally addressed. Factory system setting is number 1. System addressing is carried out on the “Lead” unit of each system via dip switches SW13 bits 1 to 4 and SW14 bits 1 to 4. (Fig 11 & Fig 12).

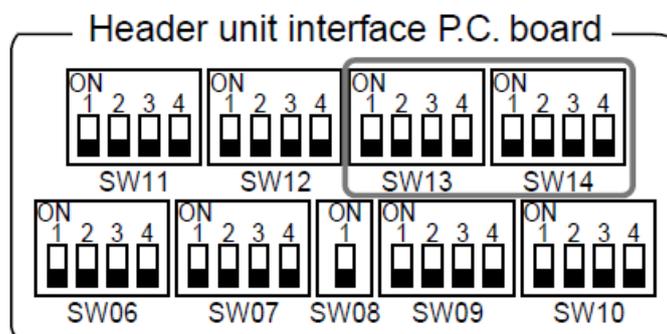


Fig 11

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Line address switch on outdoor interface P.C. board

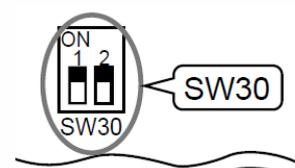
(O : Switch ON, X : Switch OFF)

Line address	SW13				SW14			
	1	2	3	4	1	2	3	4
1				X	X	X	X	X
2				X	O	X	X	X
3				X	X	O	X	X
4				X	O	O	X	X
5				X	X	X	O	X
6				X	O	X	O	X
7				X	X	O	O	X
8				X	O	O	O	X
9				X	X	X	X	O
10				X	O	X	X	O
11				X	X	O	X	O
12				X	O	O	X	O
13				X	X	X	O	O
14				X	O	X	O	O

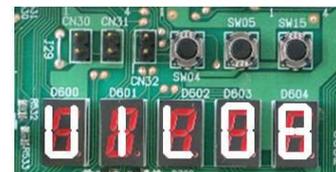
Line address	SW13				SW14			
	1	2	3	4	1	2	3	4
15				X	X	O	O	O
16				X	O	O	O	O
17				O	X	X	X	X
18				O	O	X	X	X
19				O	X	O	X	X
20				O	O	O	X	X
21				O	X	X	O	X
22				O	O	X	O	X
23				O	X	O	O	X
24				O	O	O	O	X
25				O	X	X	X	O
26				O	O	X	X	O
27				O	X	O	X	O
28				O	O	O	X	O

Fig 12

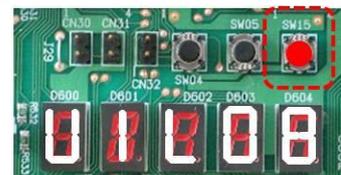
- 6) Confirm that the “End of line resistor” SW30 bit 2 is in the “ON” position on each unit.



- 7) Check the LED display of the “Lead” unit the display should read U1 LO8; the display will be “flashing”



- 8) Press and “Briefly Hold” SW15. The display will clear and the display will automatically scroll from “Auto 1→Auto 2→Auto 9” (Max. 10 minutes for 1 line (Usually, approx. 5 minutes))



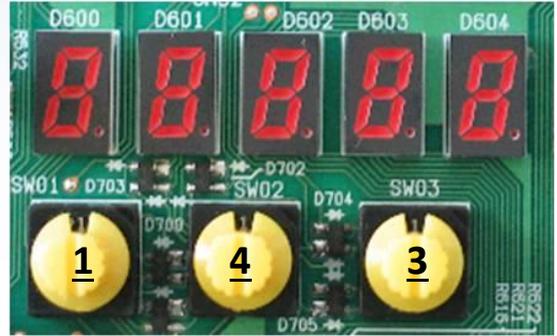
- 9) On completion the display will briefly clear and be replaced with a U1 - - - .



Addressing is complete.

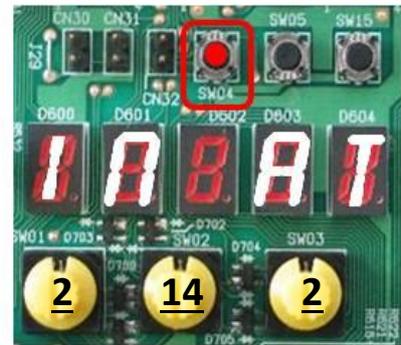


- 10) Set data retrieval switches, SW01, to **1**, SW02 to **4** & SW03 to **3** to check the quantity of indoor units the system has addressed. Compare this against what has been installed, both figures should be the same, if the systems quantity is lower than the quantity installed, check that all indoor units have power applied and that there is a good electrical connection on U1 + U2.



- 11) If the systems quantity was lower than the actual and a problem with the power or the communication was identified and corrected, then an “ADD” unit function can be used.

- 12) Set data retrieval switches, SW01 to **2**, SW02 to **14** and SW03 to **2**, display should read “In At”, push and hold SW04 for 5 seconds. The display will auto scroll through the “Auto 1→Auto 2→Auto 9”, when display returns to “U1 - - -” setup operation is complete.

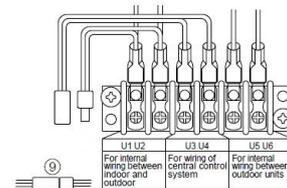


- 13) Repeat step 10 above.

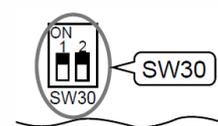
- 14) Power down the indoor/outdoor units. Return the rotary switches to 1 – 1 – 1



- 15) If a central controller or BMS system is to be used, Connect the “relay connector” on terminals U3 & U4 at the lead outdoor unit, refer to fig 4 above.



- 16) Set SW30 bit two to the off position on all outdoor lead units, excluding system 1 (Or the system with the lowest number).



- 17) Turn power on indoor unit’s first, outdoor units second.



- 18) Run the system in **TEST COOLING** mode, set SW01 to **2**, SW02 to **5** and SW03 to **1**, push and hold SW04 for 2 seconds. All connected indoor units will now operate in the cooling mode.
(Note: The units will operate in a restricted / limited mode, NOT full load)
LED display will read “C -C”, allow the system to run for 15 / 30 minutes.
Return SW01 to **1**, SW02 to **1** and SW03 to **1** to return to normal operation.
- 19) Run the system in **TEST HEATING** mode, set SW01 to **2**, SW02 to **6** and SW03 to **1**, push and hold SW04 for 2 seconds. All connected indoor units will now operate in the heating mode.
(Note: The units will operate in a restricted / limited mode, NOT full load)
LED display will read “H -H”, allow the system to run for 15 / 30 minutes.
Return SW01 to **1**, SW02 to **1** and SW03 to **1** to return to normal operation.

Useful common data from outdoor unit.

SW01	SW02	SW03	Description
1	1	1	Fault codes
1	1	2	Discharge pressure (Mpa) (1 Mpa =10 Bar)
1	2	2	Suction pressure (Mpa) (1 Mpa =10 Bar)
1	3	2	Liquid line pressure (Mpa) (1 Mpa =10 Bar)
1	2	3	System capacity
1	2	16	Latest error code of follower unit No. 2 (Outdoor)
1	3	3	Number of outdoor units
1	3	16	Latest error code of follower unit No. 3 (Outdoor)
1	4	1	Outdoor unit size in HP
1	4	3	Number of indoor units + how many operating in cooling mode
1	5	3	Number of indoor units + how many operating in heating mode
2	1	1	Circuit test – Cooling
2	2	1	Circuit test – Heating
2	1	2	Clearing system address
2	2	2	Clearing central addresses
2	4	1	Remote controller identification function
2	5	1	System test – cooling, when underway press SW04 to scroll through, Suction pressure & temperature, discharge pressure & temperature, sub-cooled liquid temperature.
2	6	1	System test – heating, when underway press SW04 to scroll through, Suction pressure & temperature, discharge pressure & temperature, sub-cooled liquid temperature.
2	14	2	Adding additional indoor units
2	11	1	Pump down function

For a more detailed listing please refer to the Installation Manual of the Equipment installed or via the TOSHIBA Technical Handbook, available from our web site www.cdlweb.info



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Common Questions

- Q1) When powering up the outdoor unit, the LED display shows “U – - - ”
- A1) Check interconnecting two core cables on U1 & U2.
- Q2) When powering up the outdoor unit, the LED display shows “U – E19”
- A2) Incorrect sequence of power application, correct sequence, indoor units first followed by outdoor units. Power down both indoor and outdoor sections, re-apply power in sequence indoor unit’s first, outdoor unit’s follower/s then lead unit second.
- Q3) Outdoor LED displays “U1E15”
- A3) No power to indoor units, check power supplies.
- Q4) Outdoor LED displays “U1E06”
- A4) Communication failure, check electrical continuity of U1 & U2 cable.
- Q5) Outdoor unit registers less Indoor units than installed (1-4-3 on lead outdoor PCB rotary switches)
- A5) Confirm that mains power is available to ALL indoor units, follow item 12 on previous page.

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

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Wiring and setting up multiple indoor units from one flow selector box on SHRM/SHRMi/SHRMe systems.

Up to a maximum of 8 indoor units, (code 0.8 each), can be “Connected” to one singular flow selector box the quantity of indoor units is dependent on the unit sizes selected.

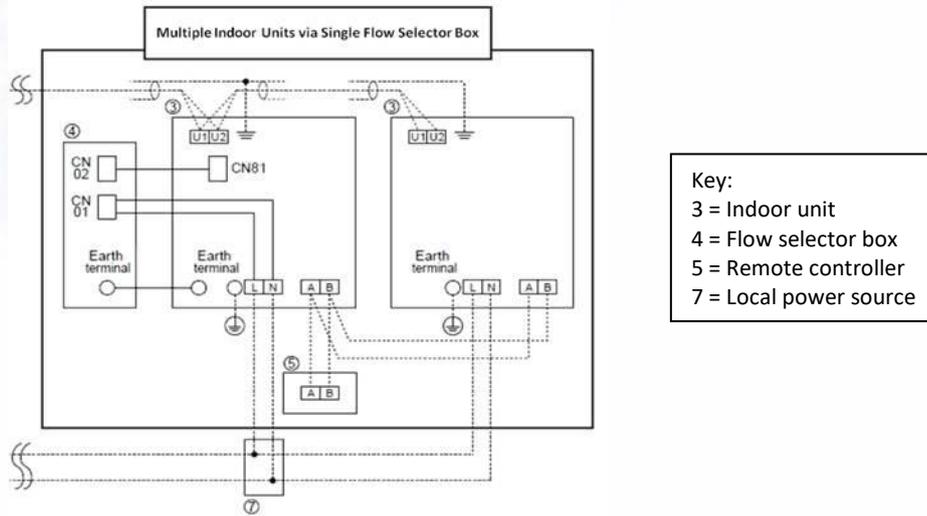


Fig 13

Wiring;

Each indoor unit needs its own fused power supply, (Suggested 10amp fuse) No independent power supply required for the 3-series flow selector box, (4-series flow selector boxes require an independent power supply), power is obtained from the lead indoor unit, via supplied cables, (4-series flow selector boxes do **NOT** come with power or data cable.) power from L&N lead indoor unit to CN01 at flow selector box, communications via CN81 at lead indoor unit to CN02 at flow selector box.

Each indoor unit to be connected to the systems U1 & U2 “daisy chain”, no connection to flow selector box required.

All units “connected” to a single 3 series flow selector box must be “Group Controlled”, with a two core 0.5mm cable from remote controller using terminals A & B to lead indoor unit, “daisy chained” via A & B to each indoor unit within the group, (Maximum of 8 units).

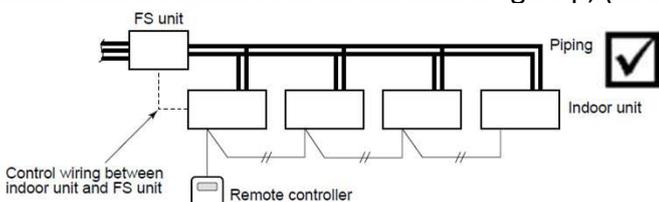


Fig 14

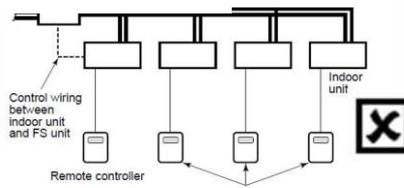


Fig 16

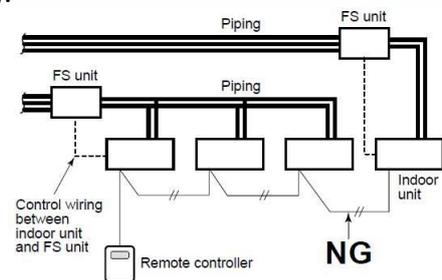


Fig 15

Figures 14, 15 & 16 are some examples, fig 14 is correct, fig 15 & 16 are incorrect (3 Series flow selector boxes ONLY).



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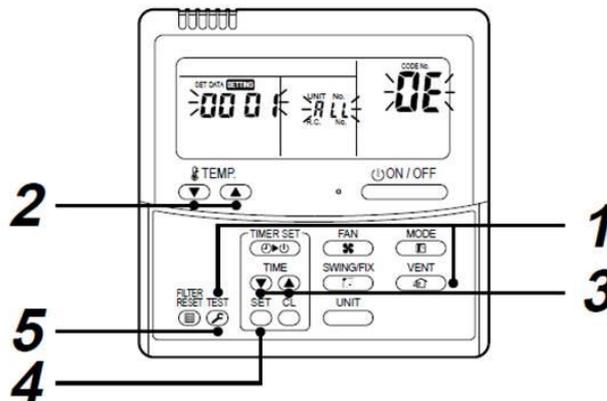
Configuring the system.

In order for the system to recognise that multiple indoor units are operating from one flow selector box, the system will need configuring. This is carried out via a standard remote controller, type RBC-AMT32/AMS41 or AMS51/AMS54, configuration cannot be carried out via, infra-red remote controllers, RBC-AS21 simplified remote or central remote controllers.

The sequence is the same for AMT32/AMS41 remotes.

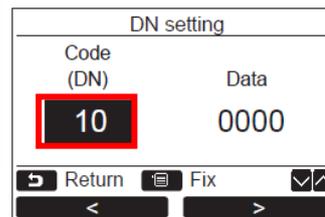
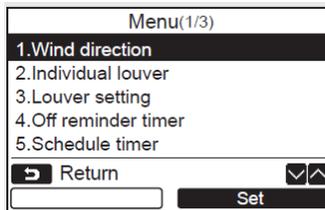
How to set up Item code

- 1 Push + buttons simultaneously for 4 seconds or more.
 - ALL is displayed in the UNIT No. window.
 - In this time, the fans of all the indoor units in the group control start the fan operation.
- 2 Using the set temperature buttons / , select the Item code "0E".
- 3 Change SET DATA to "01" by the timer buttons / .
- 4 Push button.
- 5 Push button. Then the setup finished.



The sequence for the RBC-AMS51/AMS54 remote is slightly different, but carries out the same function.

- 1) Press the "[MENU]" button to display the "Menu screen"
- 2) Press and hold the "[MENU]" button and the "[]" button at the same time for more than 4 seconds to display the "Field setting menu"
- 3) Scroll down to item "5" using the [] button.
- 4) Press "F2" Code (DN) 10 will be highlighted on the left of the display.



5) Scroll the Code (DN) to "OE" using the "[↑][↑]/[↓][↓]" buttons.

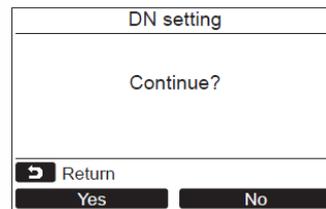


6) When Code (DN) "OE" is highlighted on the left press "[>][F2]" to highlight "Data" on the right.



7) Change "Data" from "0000" to "0001" by pressing the "[↑][↑]/[↓][↓]"

8) Press "[☰]" "follow on screen instructions.



Note:

If the system is to be controlled by local remote controllers ONLY, a remote controller MUST be electrically connected to the indoor unit or "Lead Unit" of a group at ALL times.

If a central controller or BMS interface is connected then local remote controllers DO NOT need to be permanently connected.

More information on 4-series and multi-port flow selector boxes is available via our "Pocket Quick Reference Guide on R410A-Heat Recovery (SHRMe)"



Notes

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Contact details:

Cool Designs Ltd Technical Support

07590 775 510

Monday – Friday 07.30 to 19.30



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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