

REVERSE CYCLE DUCTED SPLIT SYSTEMS R32 (Up to 35kW c/w UC8/IUC)

Installation & Maintenance

1. GENERAL

Temperzone ISD Indoor units are designed to be coupled to the matching OSA outdoor unit. Follow these instructions to ensure the optimum performance, reliability and durability.

Units must be installed in accordance with all national, regional and local regulations and bylaws eg any local regulations on maximum boundary noise need to be considered when positioning the unit.

National Health and Safety regulations must be followed to avoid personal injuries.

The appropriate permits must be acquired and adhered to. Seismic restraints must be fitted if required.

This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety. Children should be supervised to ensure that they do not play with the appliance.

The accompanying 'R32 Handling Ducted Splits' pamphlet forms part of these Installation & Maintenance instructions.

⚠ WARNING.

These units use R32 refrigerant (Class A2L) which is mildly flammable.

The system shall be installed, operated and stored in a well ventilated space. If the refrigerant gas comes into contact with fire, a poisonous gas may occur. Be aware that R32 does not contain an odour.

The appliance shall be stored in a room:

- without continuously operating open flames (for example an operating gas appliance) and ignition sources (for example an operating electric heater).
- away from other potential continuously operating sources known to cause ignition of R32 refrigerant.

2. INSTALLATION

2.1 Indoor unit – ISD

2.1.1 Positioning & Mounting

Clearances for servicing are shown in the Dimension diagrams on the supplied Specifications Sheet.

Separable Indoor Units (ISD 171/211/251):

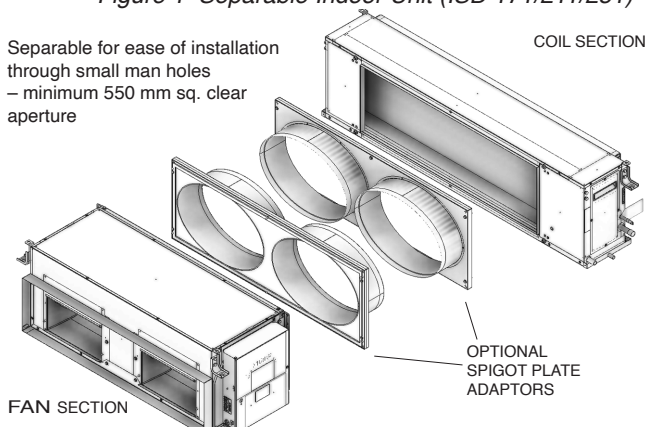
If splitting the Indoor unit into Coil section and Fan section for ease of manoeuvrability:

- Unplug the Yellow and Black sensor wires from electrical board and retract.
- Undo the 4 nuts and separate the two halves.

Installing the split sections:

- Use the 'L' shape brackets to hang both components
- Mount coil section level as drain tray has a built-in slope (not important for the fan section)
- Re-connect sensor wires correctly to the electrical board.
- Optional: Fit Spigot Plate Adaptors; refer Fig.1.
- Fit insulated ducting to suit.

Figure 1 Separable Indoor Unit (ISD 171/211/251)



Installing the complete Indoor unit.

- Use 'L' shape brackets supplied to hang the unit on threaded rods or suspension wires.
- Optional: Fit Spring Mount Kit for anti-vibration mounting, if required.
- Mount unit level as drain tray has a built-in slope.

2.1.2 Drains

Main drain tray drain pipe to be installed as per figure 2 diagram below.

Fit Safety Drain tray drain pipe to slope away from unit to building drain also.

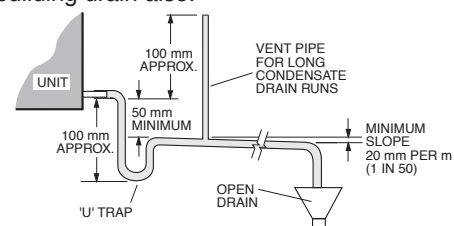


Figure 2 Condensate Drain

Note: The Safety Drain Tray does not require trapping.

2.1.3 Air Ducts, Filters and Grilles

Rigid Ducting:

- Use appropriately sized insulated ducting with consideration for noise transmission through the ducting. See recommendations at www.temperzone.biz; model search 'application'.
- Ensure rigid ducting is self-supported – not by the Indoor unit hangers.

Flexible Ducting:

- Use correctly sized flexible insulated ducting and install according to the best practice

recommendations at www.temperzone.biz; model search 'application'.

- b. The optional Supply Air Plenum, has round spigots to assist with the flexible connection if required.
- c. The optional Return Air Plenum, has round spigots for flexible duct connections.
- d. If regular access to the Indoor unit is easy, the optional Filter Box with filter could be fitted.
- e. If the Indoor unit is inaccessible install a return air grille, with filter incorporated, in the ceiling.
- f. Supply air grilles should be selected and installed to avoid draughts and noise but give good air distribution.

2.2 Outdoor unit – OSA

2.2.1 Positioning.

- a. Clearances for optimum airflow and access for servicing are shown in the Dimension diagram on the supplied Specifications Sheet.
- b. Consideration should be given to the piping route to the Indoor unit as well as power and control cabling.
- c. The Outdoor unit noise levels need to be considered in respect to boundary noise limits. Change the Outdoor unit position if necessary or erect an acoustic barrier.

- d. *OSA 171/211/251 models:* Avoid installing the unit where the fan blades face into prevailing winds, and one unit does not blow air toward the inlet of another unit. A wind deflector is recommended on sites exposed to strong winds.
- e. Units are designed to be sited outdoors. If siting in a plant room or enclosed space, ensure discharge air is not forced to recirculate back through the coil/s, reducing performance.

2.2.2 Mounting.

- a. For base mounting, fasten the unit to a solid level base using the four mounting points in the feet.
- b. Some commercial rubber pads between the Outdoor unit feet and the base can minimise transmission of vibration. The optional Anti-vibration Mounts (060-000-170) can be used to isolate the Outdoor unit from the base structure.
- c. An optional Wall Mounting Kit (526-061-007) is available, if required.

2.2.3 Drains

The optional Drain Connection Adaptors, can be used to assist in the drainage of water and condensate from the base of the Outdoor unit if necessary. For a totally drip free installation (eg plant room) mount the unit in a separate drain tray.

3. REFRIGERATION

3.1 General

All refrigeration pipe brazing, evacuation and charging shall be performed by a technician with a current Refrigerant Handling Licence.

⚠ IMPORTANT. Read the additional 'R32 Refrigerant Handling' instructions accompanying this product.

Hot Work Permits should be acquired where necessary before work commences.

Follow the Refrigerant Handling Code of Practice guidelines.

3.2 Piping and Brazing

- a. The Outdoor unit has shut off valves and uses swaged pipe connections. It is shipped with a precharge of R32 refrigerant.
- b. The Indoor unit is shipped from the factory with pressured nitrogen.
- c. Immediately before removing the brazed pipe seals from the Indoor and Outdoor units, relieve the pressure to atmosphere after first ensuring the Outdoor unit shut off valves are closed.
- d. Refer to supplied Specification Sheet for pipe sizing.
- e. Use clean sealed refrigeration grade piping designed for R32.
- f. Before brazing any pipe connections, ventilate the pipe concerned with low pressure nitrogen.
- g. Use pipe cutters to avoid swarf.
- h. Use long radius bends (2x pipe dia.).
- i. **Insulate both suction (gas) and liquid lines; seal all insulation joints.**
- j. Ensure open pipe ends are sealed until the final connection is made.
- k. If the outdoor unit is to be installed above the indoor unit, then the suction riser should be trapped at the bottom of the vertical rise and then again at 8 m (maximum) intervals. This is to ensure oil return to the compressor. The trap should be a 'swan-neck' curve in the pipe, with no change in the pipe size. Refer figure 3.

3.3 Evacuation and Charging

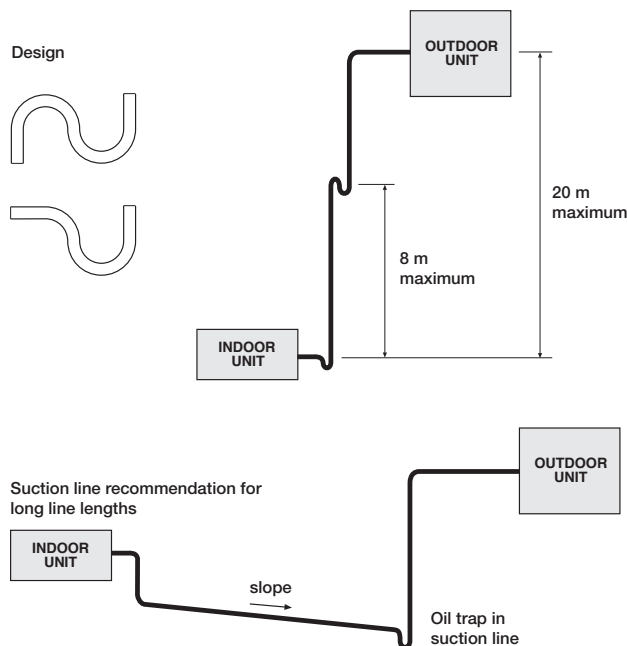
- a. Evacuate Indoor Unit and interconnecting pipework to a vacuum pressure of 500 microns and hold for 15 minutes.
- b. The OSA Outdoor unit is supplied with R32 refrigerant sufficient for: OSA 171–251:15m line length, OSA 351:10m line length.
- c. Calculate additional refrigerant to suit your line length; refer supplied Specification Sheet.
 - Do not exceed the maximum refrigerant charge specified
 - Ensure minimum floor area is not breached.
 - For line lengths less than the precharge distance stated above, deduct excess refrigerant at the rate specified, or coil excess pipe out of sight.
- d. If needed, add refrigerant via the Schraeder connection on the smaller of the Outdoor unit's two service valves.

Note: Refrigerant can cause suffocation in high concentrations. Increasing the refrigerant charge, increases the minimum room size to be served by the system. Refer Specification Sheet for minimum floor area. Options to reduce concentration may include: leak detection sensors, forced ventilation, safety shut-off valves and/or overflow rooms.
- e. Record the total amount of refrigerant on the label provided on the electrical box.
- f. Open the service valve at the Outdoor unit to allow refrigerant to flow throughout the system.
- g. For long line lengths, oil (of the correct type) should be added to the refrigerant system at the rate shown in the Specification Data table.
- h. Leak check all brazed and fitted joints.

⚠ WARNING.

Under no circumstances shall potential sources of ignition be used in the searching for or detection of refrigerant leaks.

Figure 3 Oil Traps.



4. WIRING

4.1 General

Electrical power wiring must be fitted and certified by persons with appropriate qualifications and certification.

A signed electrical 'Certificate of Compliance' must be left with the unit for insurance purposes.

DO NOT install wiring in contact with refrigeration piping. See figures 4 & 6 on page 6 for power wiring and control wiring schematics and positioning.

4.2 Power to Outdoor Unit – OSA

All power wiring is to be done to the appropriate electrical standard of the country in which the unit is being installed.

The person installing the wiring is responsible for the correct selection of wiring size and auxiliary components. See the Specification Sheet for supply voltage range, frequency, phase, maximum operating current and RCD type. Wire the outdoor unit directly from the Electrical Distribution Board.

The unit shall have its own dedicated circuit breaker on the Distribution Board.

A lockable Isolator Switch shall be fitted adjacent to but not on the outdoor unit (as per AS/NZS 3000).

4.3 Power to Indoor Unit – ISD

Single phase mains power wiring to the indoor unit shall be taken from the connection on the outdoor unit.

4.4 Control

4.4.1 Indoor – Outdoor

- The Outdoor unit is fitted with a unit controller (UC8) which communicates with an Indoor Unit Controller (IUC) in the Indoor unit.
- Communication wiring between indoor and outdoor unit shall be shielded twisted pair cable, wire gauge 22 to 26 AWG (optional Temperzone part).
- Communications wiring shall be connected to the indoor and outdoor units as per diagram, refer fig.4 page 6.
- It is recommended that communications cabling not be laid directly adjacent to any high voltage

230 or 400 VAC power cables for more than 1m.

To minimise signal interference, it is preferable to keep the communication cable at least 300mm away from the mains cable as much as possible and only coming together through wall penetrations and other narrow passages.

Note: Use the clips provided to keep cables clear of the Gas line and Carel Power+ driver.

4.4.2 Room Temperature Controller

Various options are available to control the air conditioning unit operation.

a. Temperzone TZT-100 Wall Thermostat.

Refer to www.temperzone.biz for features and installation details; model search 'TZT-100'. Separate 'Installer' and 'User' instructions are supplied with the TZT-100 for installation and operation.

b. The Temperzone SAT-3 Wall Thermostat with optional Six Zone Control expansion kit.

Refer to www.temperzone.biz for features and installation details; model search 'SAT-3'. Separate instruction booklets come with the SAT-3 for installation and operation. Temperzone Six Zone Control kit consists of PC board, 24V transformer and Instructions. This kit transforms the SAT-3 wall thermostat into a fully functional room Zone controller. This Six Zone Controller enables the SAT-3 Wall Thermostat to control six separate zones through the addition of zone temperature sensors and duct dampers. Zone temperature sensors are available separately and can be installed to enhance the Temperzone Six Zone Board functionality.

- BMS Control via dry contact and analog inputs: both the Outdoor unit controller (UC8) and the Indoor unit controller (IUC) offer facilities to connect a BMS system via a series of no-voltage contacts and 0-10V dc analog signals.
- BMS control via Modbus over RS485. For a full list of the Modbus control setup, settings and read/write parameters. Contact Temperzone for details, or visit www.temperzone.biz; model search 'BMS'.

5. START-UP PROCEDURE

5.1 Refrigerant

- Check the refrigerant charge size is in accordance with the minimum room size (refer .Section 3.3).
- The ventilation machinery and outlets are operating adequately and are not obstructed.

5.1 Power

- Check the units are electrically connected in accordance with the wiring diagrams.
- Check all wiring connection and terminal tightness.
- Switch ON the Main distribution board circuit breaker and the local isolator.
- Ensure the thermostat is OFF. Leave the unit off for 4 hours to drive the refrigerant out of the compressor. Failure to do so may cause liquid slugging and could damage the compressor at start-up.
- Check the supply voltage.

5.2 Indoor Fan

- 5.2.1 The Indoor fans can be switched ON through the thermostat or BMS by selecting High, Medium or Low fan speed. This can be done without starting the compressor.
- 5.2.2 Check the operation of the indoor fan for noise and vibration.
- 5.2.3 Check if the High speed airflow is to specification. Beware, in tropical (high humidity) conditions care must be taken to select an air flow which does not create water carry-over problems.
- 5.2.4 Check if the Low speed is sufficiently low yet without risk of frost on the indoor coil.
- 5.2.5 Refer Indoor unit wiring diagram for the factory default setting of the maximum fan speed and the fan speed range High – Low.
- 5.2.6 Various options are available if either High speed or Low speed need adjusting:
 - If a SAT-3 wall thermostat is fitted:-
Set DIP switch 5 on the UC8 to ON, then reset the controller by cycling mains power to the unit off and on again.
The maximum and minimum fan speed can be adjusted through the SAT-3 key-pad. Refer to the Installation instructions supplied with the SAT-3.
 - To use the Indoor unit control board (IUC) in the Indoor Unit to adjust the indoor fan speed :-
The IUC has two sets of DIP switches:
 - DS1: 8 switches,
 - DS2: 4 switches (do not adjust)
 On DS1 switches 1, 2 and 3 are used to select the fan 'High' speed setting.
Switches 4 and 5 are used to select the difference (or 'range') between the 'High' and 'the Low' speed settings.
Refer to Indoor unit wiring diagram. The shaded cells indicate the factory default settings.
If a change is made to the DIP switch settings the new selection comes into effect after cycling power to the unit off and on again.
Example: The factory default settings (shaded cells) are 8V for fan High speed and 3V for the range. This provides $8 - 3 = 5V$ for fan low speed.
Note: Minimum output voltage for low speed is 2.3V in order to ensure the fan will always start.

- To use the UC8 in the Outdoor unit to adjust the indoor fan speed (applies only when the SAT-3 thermostat is NOT used):-
 - Set DIP switch 5 on the UC8 to ON, then reset the controller by cycling mains power to the unit off and on again.
 - Ensure the compressor is off and the thermostat or BMS does not request for the compressor to start.
 - Press and hold down the SW3 push button on the UC8 circuit board until the display shows the letter 'H', then release the push button.
 - The indoor fan will start and run at the 'High' speed setting (factory default setting is 8.0V). The display will show the value ('8.0') and the indoor fan will run at the selected speed.
 - Each following press on the SW3 push button increases the indoor fan control voltage in steps of 0.5V, up to a maximum of 10.0V. Pressing the push button again when value 10.0 is shown returns the fan control voltage down to the minimum value for 'High' fan speed (3.0V).
 - When the desired setting for high fan speed is selected then wait for 30 seconds. The controller will save the selected value in its memory and return to normal operation.
 - To adjust the indoor fan 'Low' speed repeat the above procedure but wait until the display shows the letter 'L' before releasing the push button. The factory default value for low speed is 5.0V.

5.3 Starting the Compressor

- On the UC8 in the Outdoor unit, press and hold the SW3 push button until the display shows:
'0' [release] → '1' [long press] → repeat [short press] to find 'c' → [long press] to select.
This Commissioning mode 'c' reduces the waiting times at start-up and between cycles.
- The unit is equipped with high and low pressure transducers (these connect to inputs HPT and LPT on the UC8 circuit board), therefore refrigerant pressures, temperatures and superheat can be read from the UC8 display (or using optional WiFi Service Utility).
- Set the thermostat to cooling and wait until the compressor starts.
- For 3 phase systems only:**
Check for correct rotation of the compressor. If rotation is incorrect the compressor will not pump, be noisy and will draw low current. To correct motor rotation, swap two phases at the mains power terminals.
- Use a clip-on current meter to record compressor and indoor unit amps during stable operation.
- Check the readings against the specified values on Specification Sheet and record these values on the Commissioning Check List on page 7.
- Use the SW3 push button on the UC8 to cycle through the pressures and temperatures of the system; refer display message list on the Commissioning Check List or UC8 unit label.
- Record the Cooling cycle pressures, temperatures and superheat on the Commissioning Check List.
- For reverse cycle systems:**
Switch the thermostat to Heating Cycle. The reversing valve should engage with a click and the compressor start.
 - Let the system stabilise. Note: During commissioning the time between cycles is

considerably reduced; if the indoor coil still holds moisture this may evaporate and temporary 'steam' may enter the room. This is not a fault but a result of commissioning mode.

- ii. Use the SW3 push button on the UC8 to cycle through the pressures and temperatures of the system
- iii. Record the Heating cycle pressures, temperatures and superheat on the Commissioning Check List.
- j. If superheat on either cycle is too high at normal operating ambient conditions (and the Electronic Expansion Valve [EEV] is fully open), check that the refrigerant charge in the unit is correct taking into account the pipe line length between Indoor and Outdoor unit.
- k. Add refrigerant if necessary.

5.4 General Checks

- a. Check that the air flow over the Outdoor unit's coil is not restricted and that the fan is running smoothly.
- b. Check Indoor unit's condensate drain and safety drain tray for free drainage by:
 - i. first ensuring all access panels are on,
 - ii. running the unit at its maximum design fan speed, and
 - iii. pouring some water into each tray
- c. Check the supply air flow at each outlet.
- d. Check the operation of the thermostat or BMS.
- e. Touch up any outdoor unit paintwork damage to prevent corrosion.
- f. Ensure all penetrations through the building from outside are weather tight.
- g. Refrigerant leak check prior to leaving the site.
- h. Leave all relevant documentation of the unit with the unit

6. MAINTENANCE

Read the additional 'R32 Handling' instructions accompanying this product.

6.1 Weekly For First Four Weeks

- a. Check air conditioning system air filters; vacuum or wash clean as necessary.
- b. Check condensate drains for free drainage.
- c. Check compressor compartment for oil stains indicating refrigerant leaks.

⚠ WARNING.

Under no circumstances shall potential sources of ignition be used in the searching for or detection of refrigerant leaks.

If a leak is suspected, all naked flames shall be removed/extinguished.

If a leakage of refrigerant is found which requires brazing, all of the refrigerant shall be recovered from the system, or isolated (by means of shut-off valves) in a part of the system remote from the leak.

- d. Check tightness of electrical connections.

6.2 Monthly

Check air conditioning system air filters; vacuum or wash clean, or replace as necessary.

6.3 Six Monthly

- a. Check tightness of all fan and motor mountings.
- b. Check tightness of electrical connections.
- c. Check that fan motors are free running.
- d. Check condensate drains and safety drain tray for free drainage.
- e. Check the indoor heat exchanger coil; vacuum or brush clean as necessary.
- f. Check air supply at diffuser outlets.

6.4 Yearly

- a. Check all refrigerant piping for chafing and vibration.
- b. Check air supply at all diffusers.
- c. Check for excessive noise and vibration and correct as necessary.
- d. Check for insulation and duct damage and repair as necessary.
- e. Check and remove as necessary any lint and dust accumulation from outdoor coil fins. In corrosive environments, the checking and cleaning frequency should be increased.
- f. Touch up any outdoor unit paintwork damage to prevent corrosion.

7. TROUBLESHOOTING

7.1 Room temperature varies significantly from its setting

- Unit may have been incorrectly sized for the building.
- Drafts from wrongly placed supply air diffusers or from the back of the wall plaque could be affecting the temperature sensor built into the wall plaque.
- Bad air circulation in the room can cause incorrect temperature readings.
- If using a BMS, check it has been correctly wired to control the compressor capacity (Fig. 5).

7.2 Air conditioner does not seem to deliver the heating when most needed

- Heating capacity at design conditions may be incorrect. As the outside temperature falls, heat losses through the walls, floor and ceiling increase.
- Check the unit's brochure for information on the minimum/ maximum operating temperatures.

7.3 When heating, units have de-icing cycles built in to remove ice on the outdoor coil.

This usually means reversing the cycle for a few minutes during which time there is no heating and in fact a little cooling can occur. Do not use any potential ignition source to accelerate the defrosting process.

7.4 In a new building, why does it take some days before the air conditioning heat pump unit seems to work properly

- Many new buildings, especially a commercial buildings, have a large amount of concrete and other structural materials that are generally cold and full of moisture. This is most evident in the winter when trying to heat the building from scratch.
- Units need some nursing through this period and should not be left to their own devices.

7.5 Indoor unit is spitting or leaking water

- Poor drain trapping (most likely cause).
- Check the drain trap/vent/slope before moving on to other possible issues.

- Water carry-over : Reduce the maximum fan speed to the factory default setting.

7.6 Air conditioner runs excessively – the temperature remains too hot in summer or too cold in winter.

- Windows or doors may be opened to non-conditioned areas.
- Keep doors to unconditioned areas (eg laundries, bathrooms etc.) closed. Note that any doorways on the return air path will need to be kept open, which may mean for example that doors to an unconditioned hallway will need to be kept open.
- Leaves, papers or other items blocking air flow over the outdoor unit coil. Clear all debris away from the outdoor unit.

- Location of wall controller or remote temperature sensor is wrong.
- Check for leaks in supply or return air ductwork.

7.7 Outdoor unit displays an error code:

Refer to UC8 Controller label on the unit for operation & fault diagnostics information; or visit www.temperzone.biz and model search 'UC8'.

If replacing UC8 Controller, please contact Temperzone Technical Support to set-up correct compressor selection prior to starting the unit.

8 WARRANTY

Please refer to the separate warranty document supplied with the unit, or visit www.temperzone.biz for details.

Figure 4. CONNECTION WIRING

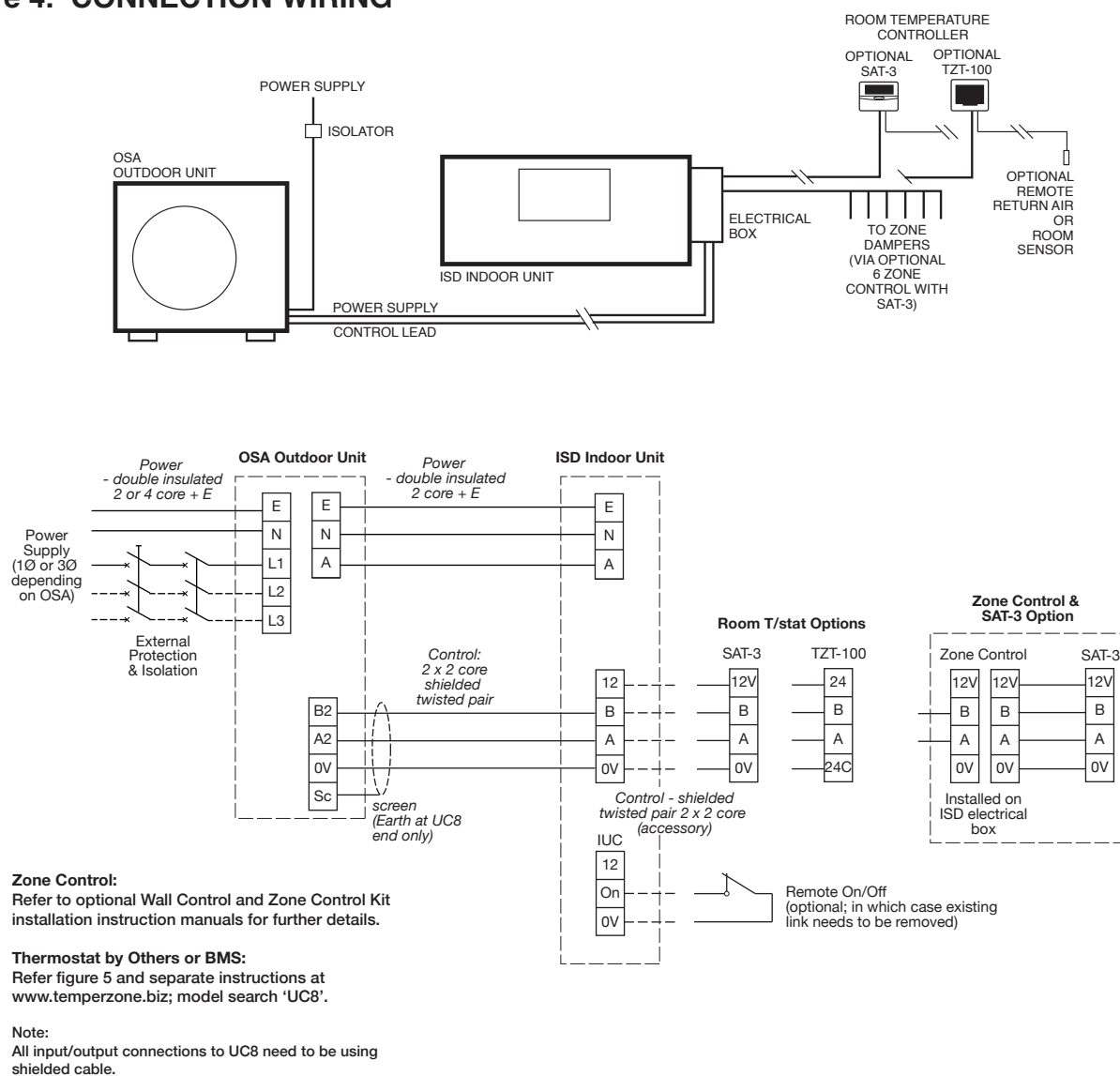


Figure 5. CONNECTING ALTERNATIVE THERMOSTATS or BMS

A non-Temperzone alternative thermostat (non-communicating contact switching type) can be connected to:

1. UC8 on the outdoor unit, or
2. IUC on the indoor unit, or
3. A communicating BMS via Modbus over RS485.

NOTE: DO NOT try to connect an alternative thermostat to both the IUC on the indoor unit and the UC8 on the outdoor unit. It is one or the other, not both.

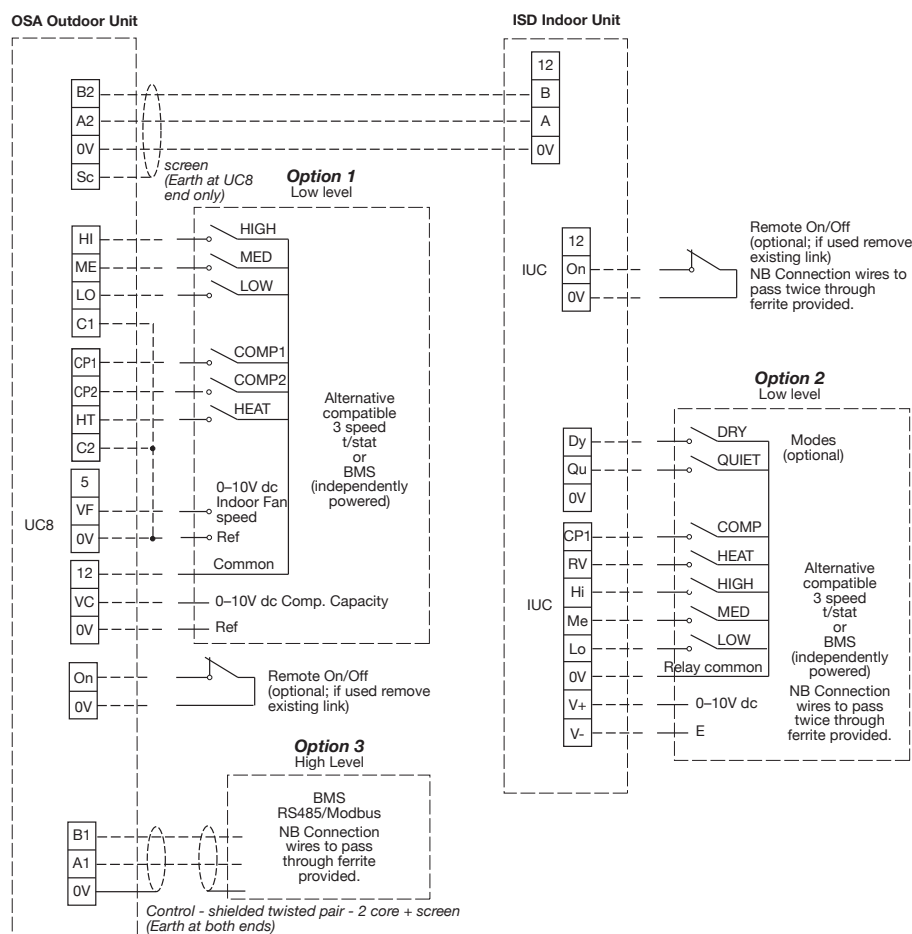


Figure 6. OSA 171-251 CONNECTION WIRING PATH

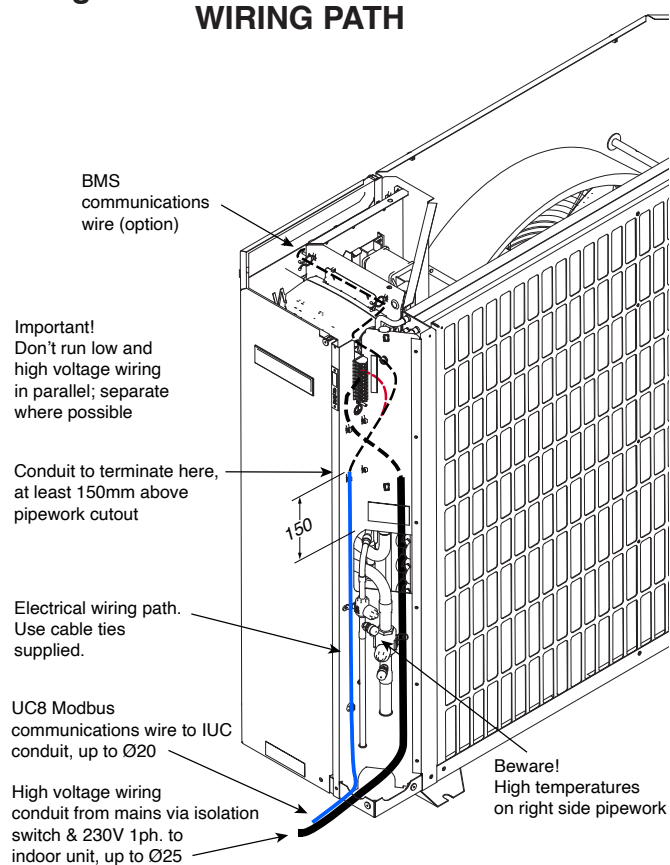
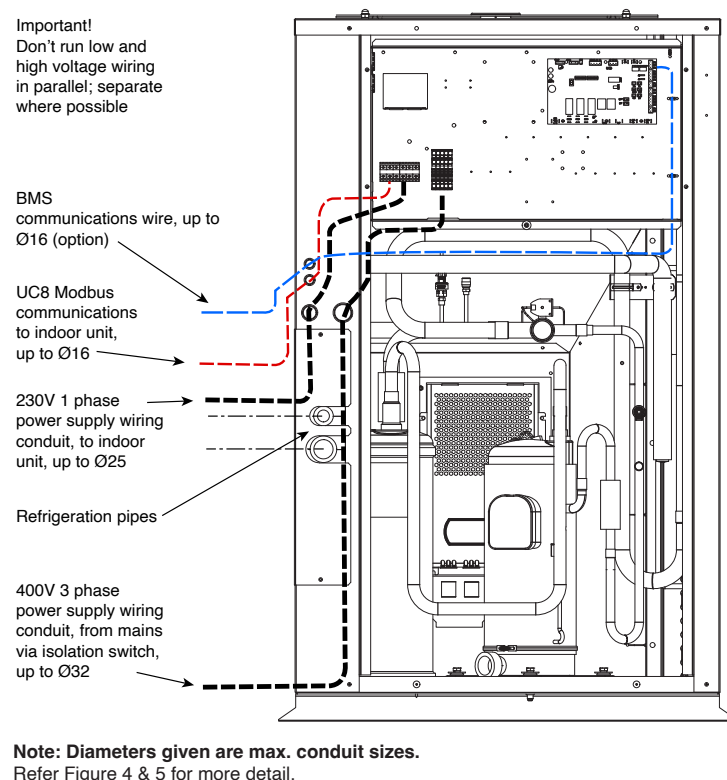


Figure 7. OSA 351 CONNECTION WIRING PATH



Commissioning Check List

Site Name/address:

Installing Company Date:

Serviceman: Tel:

Indoor Unit Model Serial No.....

Outdoor Unit Model..... Serial No.....

Both units are level?	Y / N	Return air filter fitted?	Y / N
Indoor unit drain trap fitted?	Y / N	Certificate Of Compliance issued?	Y / N
Water drains tested okay?	Y / N	Pipe insulation okay?	Y / N
Interconnecting pipes supported?	Y / N	Refrigerant leak checked?	Y / N
Do units have adequate safe access?	Y / N	Is indoor air flow set and balanced? (Max.V)	Y / N
All electrical terminals are tight?	Y / N	External electrical isolator fitted?	Y / N
Interconnecting pipe sizes?	/	Vertical pipe length?	m
Vacuum held? (microns/minutes)	/	Total pipe length?	m
Quantity of additional R32 added?	g	Extra oil added (if req'd)?	g
Floor area of area being airconditioned	m ²	Are controller parameters set?	Y / N
Floor to ceiling height of supply air diffuser	m	Has client had controls demo?	Y / N
Thermostat type:	BMS / SAT-3 / TZT-100 / Other? (name):		

Mark UC8 dip switch positions with an 'X'

	SW1									SW2							
	1	2	3	4	5	6	7	8		9 (1)	10 (2)	11 (3)	12 (4)	13 (5)	14 (6)	15 (7)	16 (8)
On									On								
Off									Off								

Record the following UC8 monitored conditions using push button SW3 (repeat to scroll through list):

Cool Cycle:

Low Pressure:	SLP	kPa
Evap temperature:	Et	°C
Suction Line temperature:	SLt	°C
Suction Superheat:	SSH	K
Discharge Line Pressure:	dLP	kPa
Condensing temperature:	Ct	°C
Discharge Line temperature:	dLt	°C
Discharge Superheat:	dSH	K
De-ice Sensor temperature:	ICEt	°C
Required Capacity:	CAP	%
Expansion Valve 1:	EE1	%
Expansion Valve 2:	EE2	%

Outdoor unit Ambient temperature:	°C
Indoor unit Return air temperature:	°C
Indoor unit Total amps:	A
Outdoor unit Total amps:	A

Heat Cycle:

Low Pressure:	SLP	kPa
Evaporating temperature:	Et	°C
Suction Line temperature:	SLt	°C
Suction Superheat:	SSH	K
Discharge Line Pressure:	dLP	kPa
Condensing temperature:	Ct	°C
Discharge Line temperature:	dLt	°C
Discharge Superheat:	dSH	K
De-ice Sensor temperature:	ICEt	°C
Required Capacity:	CAP	%
Expansion Valve 1:	EE1	%
Expansion Valve 2:	EE2	%

Outdoor unit Ambient temperature:	°C
Indoor unit Return air temperature:	°C
Indoor unit Total amps:	A
Outdoor unit Total amps:	A

Note: An optional WiFi Service Utility (201-000-700) is available to display this UC8 data.