armcor
air solutions

Installation and Operation Manual

HTC – Humidity Temperature Control Unit

HTC400-20P3 – HTC5400-270P3

AUSTRALIAN MADE

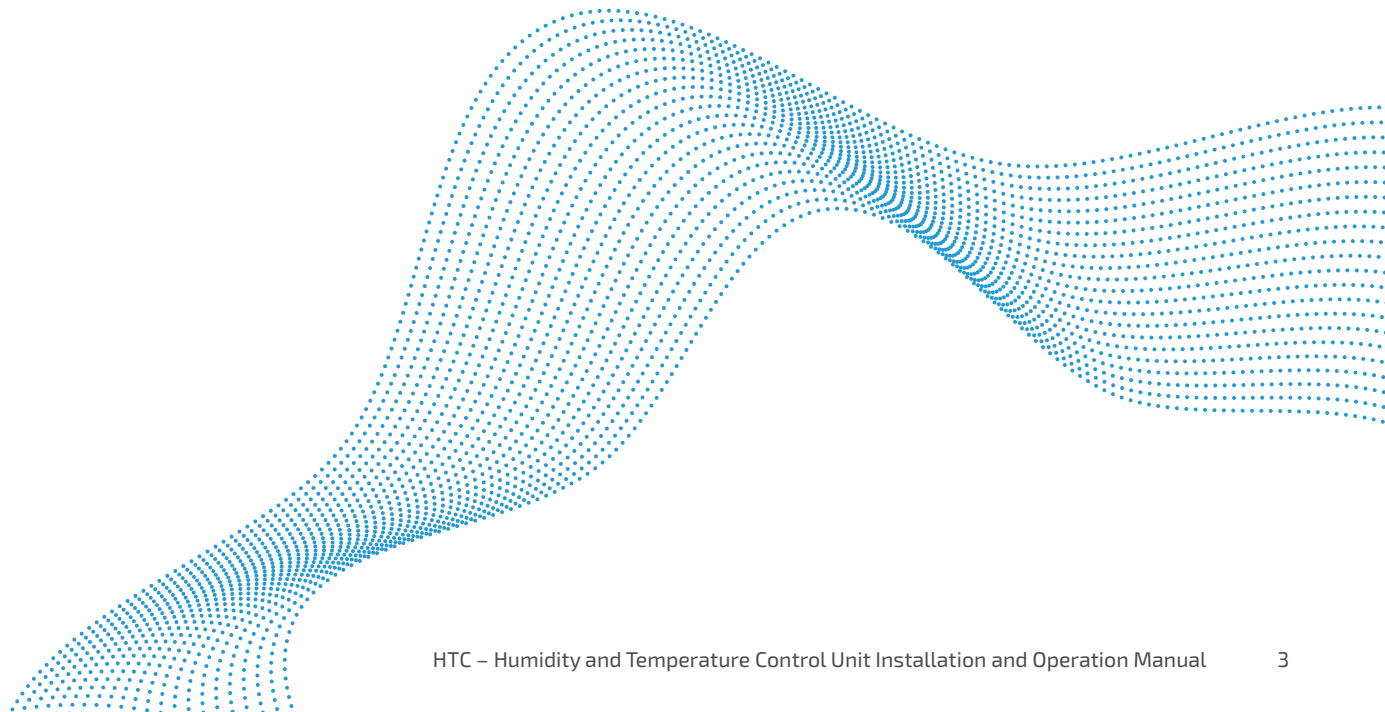
Manufactured by Armcor

Contents

Equipment Application

The **HTC** series are packaged Humidity and Temperature Control units designed to provide a practical solution for temperature and humidity control where there is a significant requirement for fresh air. The reduction of moisture content is achieved through the careful design of compressor capacity, coil capacity and air flow to cater for the specific ambient conditions. Where standard airconditioning systems cope well with recirculated return air temperatures up to 24°C, the HTC can be designed to cope with much higher 'air on' conditions.

Humidity control involves reducing the temperature below dew point, which is usually too cold for supply air temperatures. To offset this the HTC incorporates a condenser reheat coil so that the outlet air can be tempered after the humidity control process. Standard equipment configuration includes EC plug fans, stainless steel drain tray and associated controls.



Safety

WARNING

Improper installation, service, maintenance, or use can cause explosion, fire, electrical shock, or other conditions, which may cause personal injury or property damage and will void the warranty.

Check with Armcor Air Solutions for any information required on this equipment.

DANGER

Electrical shock can cause personal injury or death. Before performing any work on this equipment, the electrical supply must be electrically isolated to avoid the possibility of shock, injury, or damage to the equipment. There may be more than one power supply circuit to the unit.

Installation by Authorised Personnel

- Only trained and qualified personnel should install, repair or service heat recovery and/or air handling equipment.
- Installing and servicing equipment can be hazardous due to electrical and mechanical components.
- When working on equipment, observe precautions in all literature, tags and labels attached to or shipped with the unit. Follow all safety codes and guidelines. Wear work gloves, safety goggles and protective clothing.
- All work must comply with relevant SAA Wiring Rules and local authority codes. Installers must ensure that all statutory regulations and by laws have been addressed.
- Installers must ensure that the structures built to support the equipment have been suitably constructed for the purpose, all safety precautions have been applied prior to installation, and all preparation work has been suitably sized and installed for its purpose.

Location of Equipment

It is important that the selected location for the equipment is suitable and can adequately accommodate the unit's physical size, the unit weight and has safe and suitable access for correct operation and future maintenance requirements.

Minimum Access Requirements for Maintenance

- The unit must be mounted so that sufficient space is allowed for installation and service access.
- Maintenance personnel need to gain access to all parts of the unit and be able to remove components such as fans and filters via access doors as required.
- Unless otherwise specified the following minimum access should be available:
  - 800mm clearance for electrical connections
  - 1200mm for all access doors on the unit or if no access door is provided 1200mm from the front of the unit.

Noise Levels

- Do not locate equipment adjacent to sleeping quarters unless background noise levels have been checked and permitted by the appropriate authority.
- It is recommended that rubber supporting or vibration absorbing pads be used to support the unit to minimise any vibration being transmitted into the building structure. We recommend waffle pad to be used under the base frame and flexible couplings be fitted to the supply and return ducts to reduce any vibration transfer.

Fresh Air Inlet

- The location of the fresh air inlets must adhere to the Australian Standards AS 1668.2.
- The fresh air intake should be positioned clear of any objects which could obstruct the airflow and be a minimum distance of 6 metres from any exhaust discharge ducts from the unit or any other adjacent equipment. Refer to Australian Standards AS 1668.2.
- The fresh air inlet should be fitted with a cowl or other suitable means of weatherproofing.

Drainage

- Equipment should be installed with a positive fall to ensure water drains away freely through drain outlets. Drain lines must be as large as or larger than the fitting to which the line is being connected. Each drain should be separately trapped.
- All condensate drains must have a 'P" Trap fitted and have a minimum fall of 20mm per metre length.
- If drain lines are to be extended from the inside to the outside of the building they must be extended beyond walls of the building to eliminate the possibility of damage caused by drain water running down the exterior surface of the building wall.
- When a drain is exposed to freezing temperatures or subject to the formation of condensation, the drain should be insulated.

IMPORTANT: ALL UNITS LOCATED IN PLANT ROOMS MUST HAVE DRAIN TRAYS UNDER THE COMPLETE UNIT.

Installation Instructions

Unpacking and Inspection

- The unit should be inspected upon delivery for possible external damage incurred during transport. If damage is evident, it should be noted on the freight docket and contact is to be made with the Armcor Air Solutions sales office. A claim should be lodged with the shipping company within 3 days if goods are damaged or incomplete. No claims will be recognised after this date.
- **IF MAJOR DAMAGE IS APPARENT, DO NOT LIFT UNIT ON TO SITE WITHOUT PRIOR APPROVAL FROM ARMCOR.**
- The unit was tested and inspected prior to packing and was in perfect condition at the time of dispatch.
- Check unit rating plate to ensure the correct unit matches the job specifications.

Unit Handling

- Protective crating or packaging and the pallets should not be removed until the unit is at the point of installation.
- When removing packaging or crating, be careful not to damage, scratch or dent the unit.
- After removal of packaging, all removable access panels should be opened to inspect for unit internal damage.

Lifting with a Crane

- **SAFETY** – when installing or working on equipment, always adhere to safety codes and guidelines. Wear safety goggles, work gloves, work boots and protective clothing.
- All external units are provided with substantial lifting lugs on each corner at the base frame. **NOTE** – All units should be lifted into position using **SLINGS** and **NOT CHAINS**. (Chains may damage exterior finish on the fan unit).
- Where units have to be craned into position, installers must check that the unit weight is within the safe tolerance of the working capacity of the crane.
- Prepare for lifting with spreaders as you would do with lifting air conditioning equipment.
- When lifting equipment never stand under the load.
- Beware of lifting equipment onto roof areas in windy conditions. Only lift when weather conditions are favourable.

Lifting with a Forklift

- Exercise extreme caution when lifting with a forklift. Do not exceed the height limit of the forklift and never allow the forklift forks to make contact directly with the bottom panel of the unit.
- Make careful consideration of the unit's centre of gravity and distribute the weight equally on both forks. Test load to see if the weight is equally distributed. Do this by lifting the unit a few centimetres off the ground level and checking stability before lifting any further or before transporting the unit.

Equipment Connections

Ductwork

- Air distribution ductwork must be designed to allow for the specified air flow without excessive pressure levels. The unit should be situated as close as possible to the point of use to prevent unnecessary long runs of ductwork.
- Sheetmetal ductwork is recommended for use with all Armcor Air Solutions equipment.
- Ducts should be insulated in accordance with BCA Section J-5.
- Fan inlet conditions can affect the fan performance, particularly where duct bends cause a non-uniform flow and swirl at the inlet. To reduce losses due to fan systems effect, adequate length of straight duct between any elbow and the fan inlet should be provided or turning vanes used in the elbow.
- Poor fan outlet conditions will also affect the fan performance. Armcor recommends a minimum of 1000mm of straight duct directly after the fan outlet.

Filters

- 50mm panel filters are a minimum recommendation for all equipment.
- Filters **MUST** be fitted to the fresh air inlet. Where there is no provision for filters within the unit, the installing contractor is responsible to incorporate filters in the ductwork system external to the unit.
- It is recommended that temporary disposable filters are used during construction & commissioning.
- Where a Heat Exchanger is incorporated in the equipment, warranty will be void if filters are not fitted.

IMPORTANT: NEVER OPERATE A UNIT WITHOUT FILTERS FITTED TO THE FRESH AIR INTAKE.

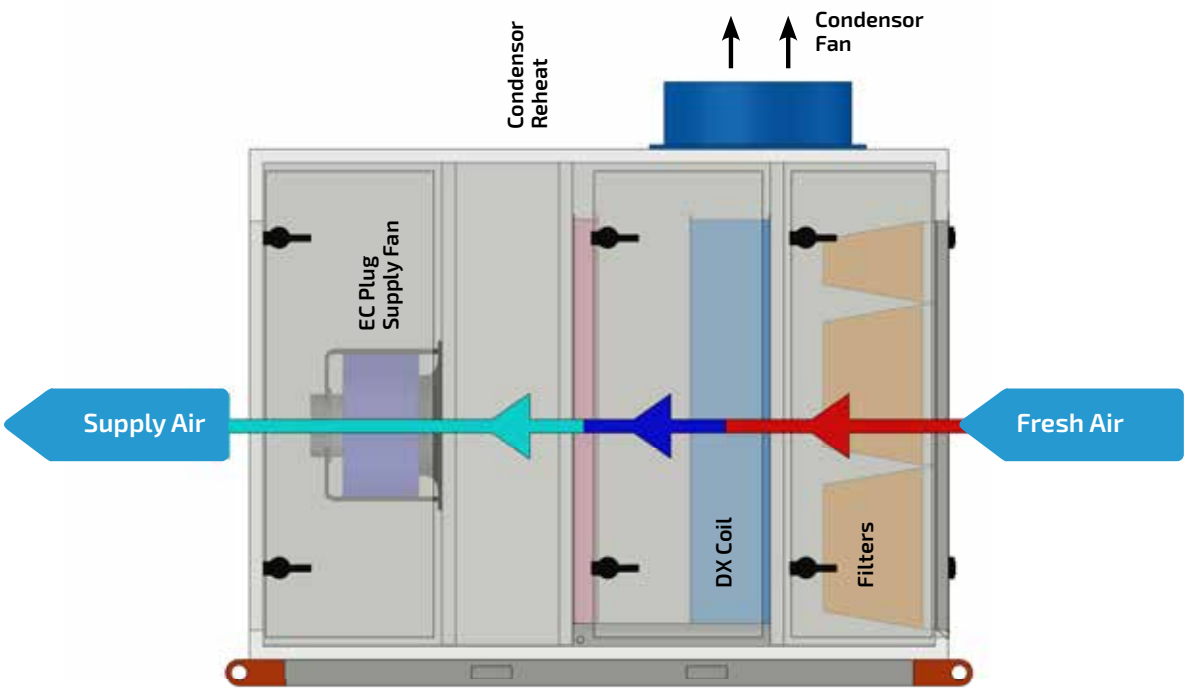
Electrical Requirements

- The power requirement and voltage are detailed on the equipment technical specifications (available at **armcor.com.au**) and are on the identification/serial number plate attached to each unit.
- An electrical diagram is attached to the electrical box on the unit.

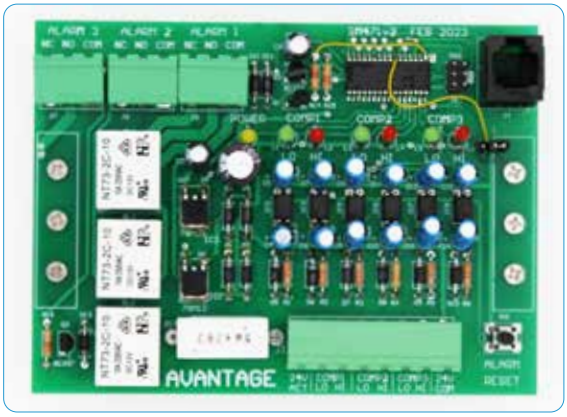
Mains Power Supply and Fusing

- A single-phase power supply rated at 240v (+/- 5%) 50Hz or a 3-phase power supply rated at 415 volts is required to operate the unit within manufacturer's tolerance. Check the name plates for correct voltage.
- We recommend an isolator be mounted externally to the unit (not supplied) and a suitably sized circuit breaker mounted back at the distribution board to provide local isolation during service and maintenance periods.
- Main cables and control circuit wires are to be connected as per wiring diagram.
- All wiring must comply with relevant local wiring regulations.
- The unit requires a main circuit breaker capable of handling the full load of the unit and selected in accordance with SAA Wiring Rules.
- All wiring is to be independently colour coded.
- Single phase fan motors are internally protected and there is no need for external overloads.

Standard Equipment Layout



The SM 471 controls constantly tripping of the HP/LP Compressor. If after 5 sequential tripping incidents within one hour the SM 471 it will lock out the control circuit and can only be reset by pushing the small black alarm reset button located on the right-hand corner of the card. The solid lights will indicate which compressor and HP or LP is tripping the refriferation circuit.



Solid Green Lights in LP Lockout.

Solid Red Light is HP lockout.

Features

Oil Sight Glass
Oil should be visible during operation after the unit has stabilised.

TX Valve
All TX valves have adjustment for super heat settings. 8-11K is acceptable for R407C and R4100 gases.

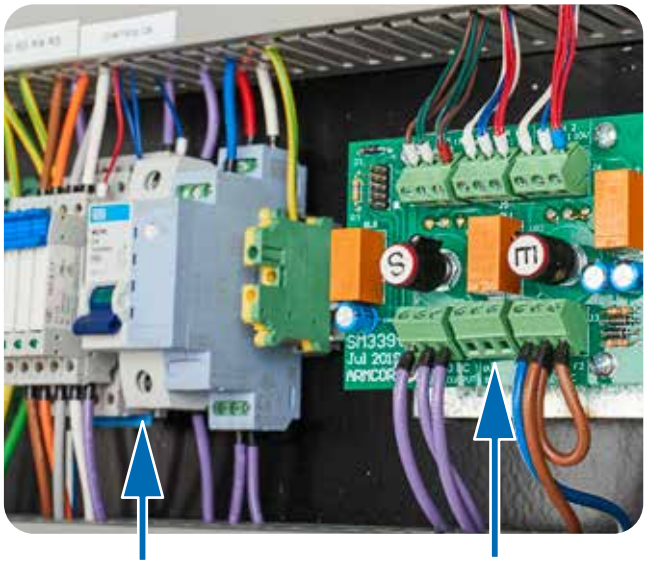
Compressor Control Board

Filter Dryer (Biflow type)
Must be replaced if the system is opened.

Drip Tray Drains
All drains should be trapped externally to the unit.

Compressor Bracket
Do not remove compressor bracket, this bracket is for transport and for the operation of the compressor.

Electrical Connection
Tighten all electrical connections before starting and commissioning unit.



Phase Failure Relay

Fan Control Card. Adjust pots for speed control of supply & exhaust fans

Pipe Clamps
Tighten all pipe clamps before starting. These clamps may loosen in transport.

General Maintenance

General

- All Armcor equipment is designed for easy maintenance.
- Preventative maintenance programs will vary according to actual operating conditions and location and hours of usage by the client.
- Armcor Air Solutions are pleased to provide expert advice on special service maintenance requirements for particular installations.

IMPORTANT: Failure to carry out regular maintenance with a licensed and reputable service company may render warranty claims invalid if faults have been caused by lack of proper maintenance.

Armcor Air Solutions may request to see the maintenance schedule carried out.

Monthly Maintenance Schedules

- Monthly maintenance is usually focused on air filters and visual checks to monitor any operational deficiencies. The type of filter and frequency of cleaning should be addressed by the installing contractor to suit the customer's requirements.
- Filters should be inspected immediately after installation to confirm the frequency of cleaning needed for the particular location. Regular change/clean of filters is necessary to ensure normal operating conditions.
- Check condensate drain (if applicable) for free drainage.

Guide to How Frequency According to Usage is Established

- **Disposable Corrugated Filters.**
  Ordinary disposable corrugated filters should last approximately one month in normal commercial use, or longer depending on usage.
- **Cleanable Filters.**
  If filters are cleanable, they should be cleaned once a month and the filter media should be replaced every 12 months.

Three Monthly Checks Maintenance Schedules

- Repeat the monthly schedule.
- Check blower wheels for dirt build-up.
- Check all cabinet panels for correct fitting, alignment and seals, and clean cabinets as required. Ensure no insulation has been detached from the panels.
- All electrical terminals should be checked for tightness.
  IMPORTANT – Ensure the main switch is turned off.
- Check and clean heat exchangers, heating/cooling coils, drain trays and outlets. (If applicable). Vacuum or brush clean as necessary.

Annual Maintenance Schedules

- Repeat monthly and three-monthly checks.
- Check cabinet for any paint chips or abrasions and treat accordingly.
- Check and record the available voltage and amperage of each phase.
- Check and record the amperage of each motor against nameplate details.
- Check and record refrigerant gas pressures (if applicable).

SM 471v3 - Alarm Relay Board

Method of Operation

The alarm relay board is designed to prevent compressor failure by limiting the auto reset, high-pressure and low-pressure cut-out switches to 5 cut-outs per hour. If the high-pressure or low-pressure cut-out exceeds 5 cut-outs per hour the corresponding relay contacts will open indefinitely and disable the control circuit of the compressor. The SM 471v3 board needs to be reset manually via the reset switch or the 24v control circuit is briefly interrupted.

Features of the Alarm Relay Board

Operates up to 3 compressors each with separate alarm contacts.

The power supply to the module is 24vac.

LED yellow power light is solid when 24v power is present.

Low Pressure LED's are a green solid light the when lockout is activated.

High Pressure LED's are a red solid light when lockout is activated.

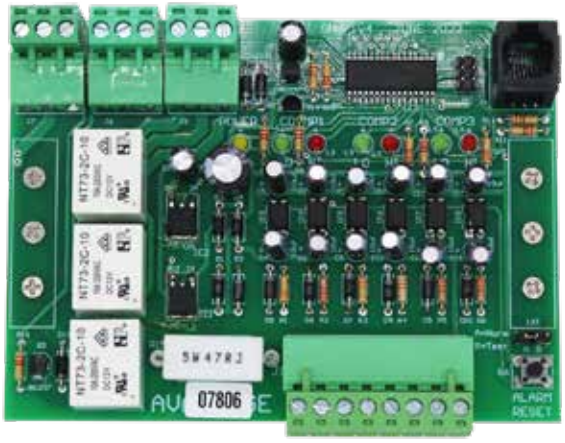
Isolated Alarm Relays contacts up to 240v/3 amps with NO and NC contacts.

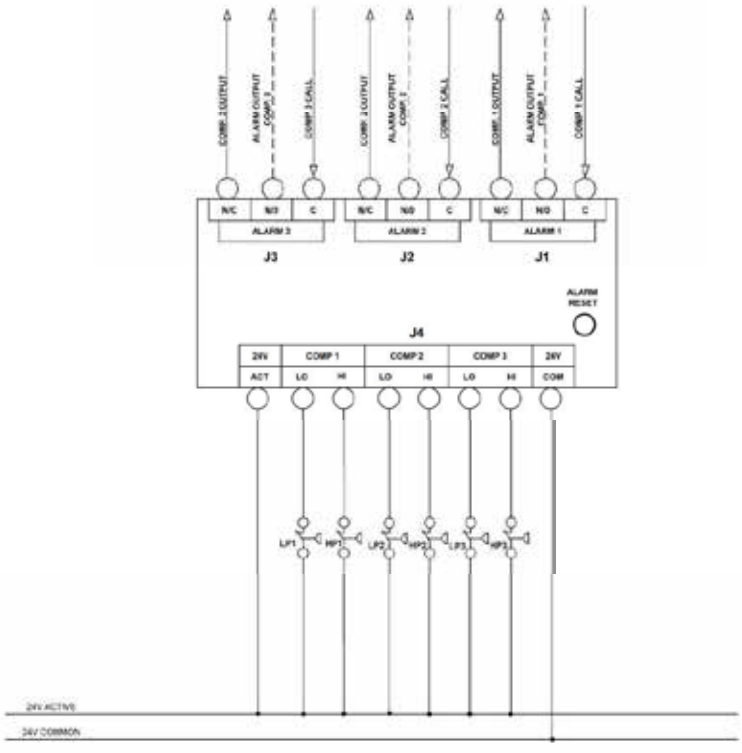
Din Rail mounted board.

Manual Reset button.

2 position option link bar, A is normal operation, B is testing over 60 sec period.

Compressor enable/disable.





SM420 – Condenser Fan Controller

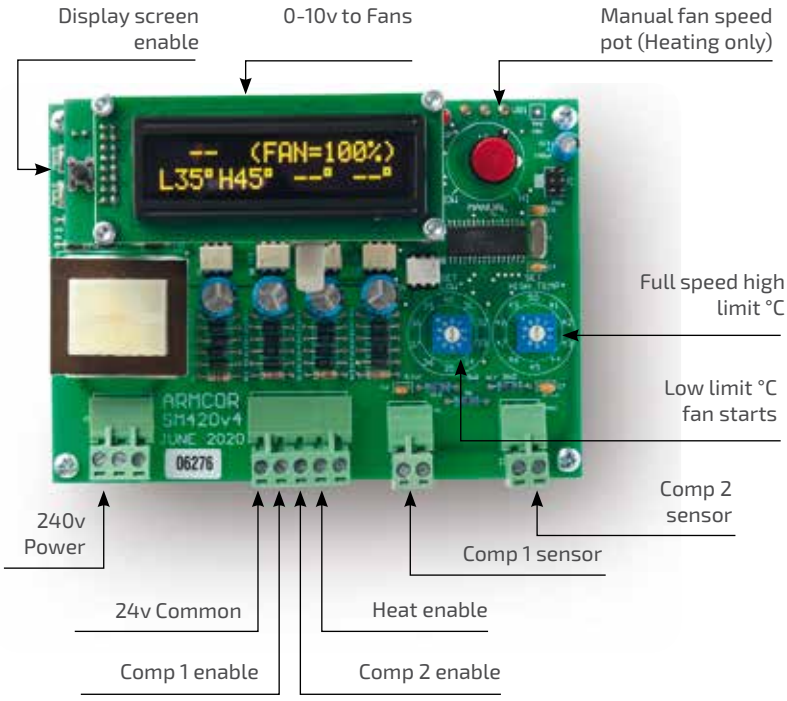
The SM420 module, designed by Armcor for control of EC condenser fans which is regulated by the temperature probes on the liquid line.

Operation Description

Once the controller makes a call for cooling, a 24v signal is sent to the SM420 which starts the condenser fan at 70% fan speed for one minute. After one minute of operation and the refrigeration circuit has stabilized, the controller will sense from the temperature probe on the liquid line. Once the temperature of the liquid line is above the low limit the fan will then modulate through the 0-10v dc output until it reaches the full speed temperature limit. The temperature dials for the start low temperature and the full speed high temperature are adjustable using a small screwdriver for fine tuning during commissioning.

If compressor two is called for, the SM420 operates from sensor two which is connected to the liquid line of compressor two.

When the heating is enabled, the SM420 switches to heating mode and the fan will operate from the speed pot where the fan will run at a fixed speed. Adjustment of this speed pot should be made at commissioning with gauges attached to the refrigeration circuit to maintain the bests possible refrigeration pressures during the heating cycle. The manual pot is set at commissioning in our factory and should not require adjustment on site.



Pre-start Checklist

Unit Installation and Connections	
Check that equipment is fully installed in accordance with the installation instructions	
Visually check that air flows will not be obstructed	
Electrical	
Visually check all field wiring	
Tighten all electrical connections including all factory wiring connections	
Ensure supply cable is the correct size	
Check that required supply voltage is available on all phases	
Check overload settings are correct (if applicable)	
Filters	
Check that the fresh air inlet has adequate filters before starting unit	
Refrigeration	
Ensure all access caps are tight	
Check pipework is not rubbing against other pipes due to movement during transport	
Leak test all caps and pressure connections after commissioning	
Starting Unit	
Check fans and Air Flow	
Turn on all circuit breakers	
Turn on control circuit and activate fans	
Turn on supply fan, run and conduct an air balance (fans do not require phase rotation)	
Check fan current draw for each fan individually	
Check Compressor and Refrigeration System Operation	
Crankcase heaters must be activated for 24 hours before operation (if fitted)	
WARNING - Check correct rotation for compressors	
Turn on Compressor 1, run for 5 minutes	
Turn on Compressor 2 (if applicable)	
Record amp readings for each compressor	
Superheat should be between 8-11°C on Cooling (R407C)	
If superheat is high, add refrigerant slowly using liquid into the suction line. Do not flood liquid into the suction line.	

Commissioning Checklist

General		
Air Filters: Overall Size and Number		
Drain Pipe Traps and Vents fitted to Indoor Unit as per Installation Instructions	Y / N	
Drain is Clearing Water Properly	Y / N	
Check Vibration of Outdoor Unit	OK / EXCESSIVE	
Check Vibration of Indoor Unit	OK / EXCESSIVE	
Belt Tensioning Adjusted	Y / N	
Paint Finish Checked and Repaired	Y / N	
Ducting		
Total Air Flow (Total of all inlets) (L/s)		
Total System external resistance (Pa) Measured downstream of fan outlets plus upstream of Coil(s)		
Estimate of Fresh Air Make Up (% or L/s)		
Electrical		
Supply Voltage		
Compressor Amps		
Overload Settings		
Compare with published Compressor Amps		
Outdoor Fan Motor Amps		
Indoor Fan Motor Amps		
Boost Heater Element Amps		
Total Unit Amps		
Thermostat Settings (°C)		
Thermostat Operating Correctly	Y / N	
Contactors & Relays Operating Correctly	Y / N	
All Terminals Checked for Tightness and Label signed	Y / N	
Refrigeration		
Pipe sizes: Suction / Liquid (mm)	Suction:	Liquid:
Line Lengths: Horizontal / Vertical / Total (m)	H + V	= Total
Oil Traps in riser if condenser is above evaporator	Y / N	
Evacuation done (minimum hold 500 microns for 15min)	Y / N	
Refrigerant Type		
Amount of oil (ml) Added to System if Line Lengths over 30m (where units are allowed beyond this length)		
Superheat setting (°C) (refer Installation Instructions)		
Refrigerant Discharge Pressure on Cooling (kPa)	Suction:	Discharge:
Refrigerant Pressure on Heating (kPa)	Suction:	Discharge:
Refrigerant Leak Check	Y / N	
Performance		
1 Fresh Air Temperature	_____ °C DB	_____ °C WB
2 Air off Heat Exchanger	_____ °C DB	_____ °C WB
3 Air off Cooling Coil	_____ °C DB	_____ °C WB
4 Air off Heat Exchanger (Supply Air)	_____ °C DB	_____ °C WB

Warranty

The Armcor Air Solutions Warranty Policy should be read in conjunction with the Terms and Conditions of Sale. These are available on our website armcor.com.au

What The Warranty Policy Covers

The standard Armcor warranty policy is a parts only warranty for a 12-month period. If any defect in your Armcor equipment is caused by **FAULTY MATERIALS** within the warranty period, starting from the date of original purchase it will be rectified or replaced without cost.

Additional labour warranty is available and must be purchased at the time of ordering in accordance with the warranty policy.

What The Warranty Policy Does Not Cover

- Consequential damage.
- Failure to start due to voltage conditions, blown fuses or other damage caused by inadequate or interrupted electricity supply.
- Damage caused by accident, misapplication, abuse, alteration, tampering or servicing by anyone other than an authorised person.
- Damage resulting from incorrect installation, commissioning or use other than in accordance with the installation and operating instructions issued by Armcor Air Solutions.
- Damaged caused by using equipment being located in a corrosive atmosphere or by filter neglect.
- Replacement of any worn drive belts if applicable.
- Costs incurred for regular maintenance services.
- The original service call costs in identifying a warranty claim.
- Freight and travel changes for work performed or parts supplied outside of all capital cities in Australia.
- Field wiring, refrigerant pipe run between units, the condensation drainpipe, or other accessories.
- Any warranty work performed by Armcor Air Solutions outside of Melbourne metro area will require the installing contractor to provide free of charge: Oxy/Acetylene Equipment, Dry Nitrogen, Vacuum Pump, Refrigerant Gas, Reclaim Bottles, Recovery Unit, and any other associated refrigerant tools.

The Warranty Will Not Apply If;

- Any appliance plate is altered or removed.
- Armcor Air Solutions has not been notified within 48 hours of any fault occurring which may require warranty work.
- Any unauthorized modification has been made to the equipment or any part has been substituted or replaced with non-original items.
- Regular service has not been carried out by an appropriate, Armcor approved, licenced installer.
- The unit is used other than for the heating and cooling of air for human comfort – unless approved by Armcor Air Solutions.
- The system is installed in a mobile application (e.g., caravan, boat, crane).

How to Make a Warranty Claim

Complete a warranty form available on our website **armcor.com.au** and return the Armcor Warranty Request Form to: **service@armcor.com.au**

Contact us direct by email service@armcor.com.au

Important Information for Warranty Approval

To ensure our parts warranty on the compressors is valid this document must be submitted to service@armcor.com.au within 7 days of commissioning.

Information is required for each compressor. Run compressors for 10 minutes before taking photos.

Replace access valve caps and leak test after commissioning.

Date	
Project Name	
Installing Contractor	
Technician Signature	
Serial number	
Model number	

Step 1- Take photos of points 1 to 8

1. Compressor model number
2. Manifold gauge readings with compressor operating after 10 minutes
3. Superheat reading on TX controller screen
4. VSD screen readings.
5. Fan card SM 339 (shows pot positions)
6. Oil sight glass photo
7. Photo of the electrical board, showing power and control connections
8. Drain connection and trap

Step 2- Fill out page 17 and

Step 3- Email information and photographs from step 1 to

service@armcor.com.au for warranty approval and you will receive written confirmation from Armcor.

Notes

Fresh Air Indoors

For more information
W: armcor.com.au
E: sales@armcor.com.au
P: (03) 8301 9200

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03/2024 | Version 3