ELECTRA

# Service Manual

## DC Inverter 10.0 / 12.5 / 14.0 kW

| Outdoor Units | Indoor Units |
|---|---|
| OU12 4HP DCI | DNG 100 |
| | EMD 100 |
| OU12 5HP DCI | DNG 125 |
| | EMD 125 |
| OU12 6HP DCI | CD 140 |

REFRIGERANT R410A

HEAT PUMP

SM OU12HP 2-E.2 GB

NOVEMBER – 2008

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## LIST OF EFFECTIVE PAGES

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Dates of issue for original and changed pages are:

Original ..... 0 ..... February 2007

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# 1. INTRODUCTION

## 1.1 General

The new **4-5-6HP DC INVERTER** ducted split unit range comprises the following RC (heat pump) models:

- **DNG 100**
- **DNG 125**
- **EMD 100**
- **EMD 125**
- **CD 140**

Remote control compatibility

The units are compatible with remote controls RC3, RC4, RCW1, RCW2, RC7.

Inverter description

Unlike standard units (fix RPM) that are selected according to their nominal capacity to overcome the maximum required load, DC Inverter units can be selected to a smaller nominal capacity range unit.
It made possible due to the ability of inverters to reach a much higher capacity level (indicated as Maximum Capacity) which is around 115-130% of the nominal capacity.

## 1.2 Main Features

**High Technology**

- Sine wave DC Compressor drive.
- DC-BL-SL (DC Brush-Less Sensor less) Inverter Compressor.
- DC-BL Inverter Outdoor Fan.
- Fuzzy Logic Adaptive Control.

**System Features**

- Variable cooling and heating capacity from 30% to 115% (of rated capacity).
- High COP “A-B” class energy rating (Most units).
- Low noise levels.
- Pre-charged system up to 30m.
- Tubing up to 70m length / 30m height difference.
- Networking connectivity.
- Current limitation setting for circuit breaker size reduction (if required).
- Dry contact inputs:
  - ♦ Standby.
  - ♦ Night mode (for silent operation in cooling).
  - ♦ Power Shedding (to control maximum power consumption).
- Dry contact output:
  - ♦ Alarm
  - ♦ Base Heater
  - ♦ Crank Case Heater

- HMI Display consists of 7-segments shows system diagnostics and setup.
- Monitoring software (PC port for high level service).
- Cooling operation at outdoor temperature down to -10°C.
- Heating operation at outdoor temperature down to -15°C.
- Up to 100Pa (4-5HP) and 200Pa (6HP) External static pressure.

## 1.3 Indoor Unit

The **DNG DCI** indoor unit is a low silhouette ducted unit, and can be easily fitted to many type of residential and commercials applications.

- Low silhouette units 300 mm height.
- High technology plastic fan and fan housing.
- Drain pool at bottom of unit with internal downward slope.
- Over-flow switch, stops compressor operation in case of a blocked drainage.
- Bended coil hydrophilic coated aluminum fins.
- 3-speed fan motor and an extra speed in case a higher external static pressure required.
- Tubing connections at the back of the unit to allow easy outlet to both sides of the unit.
- Easy installation and service access.
- Infrared remote control with liquid display unit (LCD).
- **Field options:**
  (1) External water pump.
  (2) Airconet connection.
  (3) Plenum kit for connection of flexible duct hoses at air outlet.

## 1.4 Filtration

- The unit is equipped with pre filters.
- Easy and versatile access, rear or bottom, can be easily adjusted by the installer.

## 1.5 Control

The micro processor indoor controller, and an infrared remote control, supplied as standard, provides complete operating function and programming.
For further details, please refer to the Operation Manual, Appendix A.

## 1.6 Outdoor Unit

The **DCI** outdoor units can be installed as floor or wall mounted units by using a wall-supporting bracket. The metal sheets are protected by anti- corrosion paint work allowing long life resistance. All outdoor units are pre-charged. For further information, please refer to the Product Data Sheet, Chapter 2.

- Compressor mounted in a soundproofed compartment.
- Improved 3-blades axial fans for noise reduction.
- Outdoor coil with hydrophilic fins optimized for operation with R410A refrigerant.

- Fan grill air outlet.
- Service valves" flare" type connection.
- Service ports for high/ low pressure measurement.
- Interconnecting wiring terminal blocks.

## 1.7 Tubing Connections

Flare type-interconnecting tubing to be produced on site.
Units can be installed with 70-meter pipe length and 30 meter height difference without oil traps.
For further details, please refer to the Installation Manual, Chapter 17.

## 1.8 Accessories

| No. | Item |
|---|---|
| 1. | RCW Wall Mounted Remote Control |
| 2. | RCW2 (µBMS) Wall Mounted Remote Control |
| 3. | Base Heater |
| 4. | Crank case Heater |
| 5. | Room thermostat |

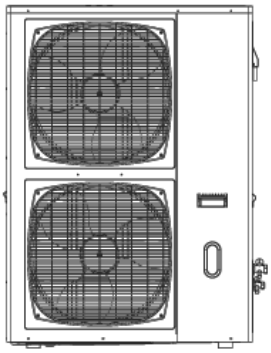
For further details, please refer the Optional Accessories, Chapter 16.

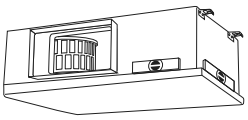
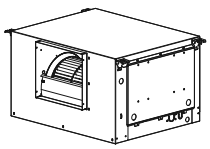
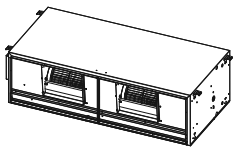
## 1.9 Inbox Documentation

Each unit includes its own installation and operation manuals.

## 1.10 Matching Table

### 1.10.1 R410A



| OUTDOOR UNITS | INDOOR UNITS | | | | |
|---|---|---|---|---|---|
| |  | |  | |  |
| **MODEL** | **DNG 100 DCI** | **DNG 125 DCI** | **EMD 100 DCI** | **EMD 125 DCI** | **CD140 DCI** |
| **DCI 4HP** | √ | | √ | | |
| **DCI 5HP** | | √ | | √ | |
| **DCI 6HP** | | | | | √ |

# 2. PRODUCT DATA SHEET

## 2.1 DNG 100 DCI / OU12 4HP DCI

| | | | | | | |
|---|---|---|---|---|---|---|
| Model Indoor Unit | | | | | **DNG 100 DCI** | |
| Model Outdoor Unit | | | | | **OU12 4HP DCI** | |
| Installation Method | | | | | DUCTED | |
| **Characteristics** | | | | **Units** | **Cooling** | **Heating** |
| Capacity - Nominal (Minimum ~ Maximum) (1) | | | | Btu/hr | 34100(10900÷39200) | 38200(9200 ÷ 42650) |
| | | | | kW | 10.0(3.8 ÷ 11.5) | 11.2(2.6 ÷ 12.5) |
| Power input - Nominal (Minimum ~ Maximum)(1) | | | | kW | 3.125(1.400 ÷ 4.400) | 3.390(1.000 ÷ 4.450) |
| EER (Cooling) or COP(Heating) (1) | | | | W/W | 3.2 | 3.3 |
| Energy Efficiency Class | | | | | "A" | "C" |
| Power supply | | | | V/Ph/Hz | 230 / 1 / 50 | |
| Rated current (Nominal) | | | | A | 14.0 | 15.2 |
| Starting current | | | | A | 10 | |
| Circuit breaker rating | | | | A | 25 | |
| INDOOR | Fan type & quantity | | | | Centrifugal x 1 | |
| | Fan speeds | | H/M/L | RPM | 890 / 800 / 670 | |
| | Air flow (2) | | H/M/L | m3/hr | 2170 / 1880 / 1440 | |
| | External static pressure | | Min-Max | Pa | 20 -100 | |
| | Sound power level (3) | | H/M/L | dB(A) | 71 / 67 / 62 | |
| | Sound pressure level (4) | | H/M/L | dB(A) | 52 / 49 / 47 | |
| | Moisture removal (Nominal) | | | l/hr | 3.3 | |
| | Condensate drain tube I.D | | | mm | 19 | |
| | Dimensions | | WxHxD | mm | 854/297/816 | |
| | Weight | | | kg | 33 | |
| | Package dimensions | | WxHxD | mm | 1010/342/917 | |
| | Packaged weight | | | kg | 38 | |
| | Units per pallet | | | units | 6 | |
| | Stacking height | | | units | 6 | |
| OUTDOOR | Refrigerant control | | | | Electronic Expansion Valve | |
| | Compressor type, model | | | | Scroll | |
| | Motor type | | | | DCBL Inverter | |
| | Fan type & quantity | | | | Axial 2 x 493 Ømm | |
| | Fan speeds | | H/L | RPM | 900 – 100 (Continuous) | |
| | Airflow | | Max | m3/hr | 5.200 | |
| | Sound power level(3) | | Nom C/H | dB(A) | 67 / 69 | |
| | Sound pressure level(4) | | Nom C/H | dB(A) | 56 / 57 | |
| | Dimensions | | WxHxD | mm | 900 / 1255 / 340 | |
| | Weight | | | kg | 110 | |
| | Package dimensions | | WxHxD | mm | 985 / 1395 / 435 | |
| | Packaged weight | | | kg | 120 | |
| | Units per pallet | | | Units | 1 | |
| | Stacking height | | | units | 1 | |
| | Refrigerant type | | | | R410A | |
| | Refrigerant charge(standard connecting tubing length) | | | Kg(m) | 2.9 / 30 | |
| | Additional charge per 1 meter | | | g/m | 38 | |
| | Connections between units | Liquid line | | In.(mm) | 3/8" (9.52) | |
| | | Suction line | | In.(mm) | 5/8" (15.875) | |
| | | Max.Tubing Length | | m. | 70 | |
| | | Max.Height Difference | | m. | 30 | |
| Operation control type | | | | | LCD Remote control | |
| Heating elements | | | | kW | — | |
| Others | | | | | | |

(1) Rating conditions in accordance with ISO 5151 and ISO 13253 (for ducted units).
(2) Airflow in ducted units; at nominal external static pressure.
(3) Sound power in ducted units is measured at air discharge.
(4) Sound pressure level measured at 1.0 meter distance from unit.



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## 2.2 DNG 125 DCI / OU12 5HP DCI

| | | | | | |
|---|---|---|---|---|---|
| Model Indoor Unit | | | | **DNG 125 DCI** | |
| Model Outdoor Unit | | | | **OU12 5HP DCI** | |
| Installation Method | | | | Ducted | |
| **Characteristics** | | | **Units** | **Cooling** | **Heating** |
| Capacity - Nominal (Minimum ~ Maximum) (1) | | | Btu/hr | 42650(16050÷47750) | 47750(15000÷54600) |
| | | | kW | 12.5 (4.7 ÷ 14.0) | 14.0 (4.4 ÷ 16.0) |
| Power input - Nominal (Minimum ~ Maximum) (1) | | | kW | 4.170 (1.500 ÷ 5.700) | 4.300 (1.100 ÷ 5.500) |
| EER (Cooling) or COP(Heating) (1) | | | W/W | 3.0 | 3.25 |
| Energy efficiency class | | | | "B" | "C" |
| Power supply | | | V/Ph/Hz | 230 / 1 / 50 | |
| Rated current (Nominal) | | | A | 19.7 | 19.0 |
| Starting current | | | A | 10 | |
| Circuit breaker rating | | | A | 32 | |
| INDOOR | Fan type & quantity | | | Centrifugal x 1 | |
| | Fan speeds | H/M/L | RPM | 935 / 855 / 760 | |
| | Air flow (2) | H/M/L | m3/hr | 2160 / 1950 / 1620 | |
| | External static pressure | Min-Max | Pa | 30-100 | |
| | Sound power level (3) | H/M/L | dB(A) | 71 / 67 / 62 | |
| | Sound pressure level (4) | H/M/L | dB(A) | 52 / 49 / 47 | |
| | Moisture removal (Nominal) | | l/hr | 4.6 | |
| | Condensate drain tube I.D | | mm | 19 | |
| | Dimensions | WxHxD | mm | 854 / 297 / 816 | |
| | Weight | | kg | 33 | |
| | Package dimensions | WxHxD | mm | 1010 / 342 / 917 | |
| | Packaged weight | | kg | 38 | |
| | Units per pallet | | units | 6 | |
| | Stacking height | | units | 6 | |
| OUTDOOR | Refrigerant control | | | Electronic Expansion Valve | |
| | Compressor type, model | | | Scroll | |
| | Motor type | | | DCBL Inverter | |
| | Fan type & quantity | | | Axial 2 x 493 Ømm | |
| | Fan speeds | H/L | RPM | 900 – 100 (Continuous) | |
| | Air flow | H/L | m3/hr | 5,700 | |
| | Sound power level(3) | Nom C/H | dB(A) | 69 / 70 | |
| | Sound pressure level(4) | Nom C/H | dB(A) | 56 / 58 | |
| | Dimensions | WxHxD | mm | 900 / 1255 / 340 | |
| | Weight | | kg | 110 | |
| | Package dimensions | WxHxD | mm | 985 / 1395 / 435 | |
| | Packaged weight | | kg | 120 | |
| | Units per pallet | | Units | 1 | |
| | Stacking height | | units | 1 | |
| | Refrigerant type | | | R410A | |
| | Refrigerant charge(standard connecting tubing length) | | Kg(m) | 3.1 / 30 | |
| | Additional charge per 1 meter | | g/m | 38 | |
| | Connections between units | Liquid line | In.(mm) | 3/8" (9.52) | |
| | | Suction line | In.(mm) | 3/4" (19.0) | |
| | | Max.Tubing Length | m. | 70 | |
| | | Max.Height Difference | m. | 30 | |
| Operation control type | | | | LCD Remote control | |
| Heating elements | | | kW | | |
| Others | | | | | |

(1) Rating conditions in accordance with ISO 5151 and ISO 13253 (for ducted units).
(2) Airflow in ducted units; at nominal external static pressure.
(3) Sound power in ducted units is measured at air discharge.
(4) Sound pressure level measured at 1.0 meter distance from unit.



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## 2.3 EMD 100 DCI / OU12 4HP DCI

| | | | | | |
|---|---|---|---|---|---|
| Model Indoor Unit | | | | **EMD 100 DCI** | |
| Model Outdoor Unit | | | | **OU12 4HP DCI** | |
| Installation Method | | | | DUCTED | |
| **Characteristics** | | | **Units** | **Cooling** | **Heating** |
| Capacity - Nominal (Minimum ~ Maximum) (1) | | | Btu/hr | 34,100 (10,250-40,950) | 39,250 (12,000-42,650) |
| | | | kW | 10.0 (3.0-12.0) | 11.5(3.5-12.5) |
| Power input - Nominal (Minimum ~ Maximum) (1) | | | kW | 3.05 (1.30-4.20) | 3.10 (1.10-3.60) |
| EER (Cooling) or COP(Heating) (1) | | | W/W | 3.30 | 3.70 |
| Energy efficiency class | | | | "A" | "A" |
| Power supply | | | V/Ph/Hz | 230 / 1 / 50 | |
| Rated current (Nominal) | | | A | 14.0 | 14.2 |
| Starting current | | | A | 10 | |
| Circuit breaker rating | | | A | 25 | |
| INDOOR | Fan type & quantity | | | Centrifugal x 1 | |
| | Fan speeds | H/M/L | RPM | 1060 / 1000 / 840 | |
| | Air flow (2) | H/M/L | m3/hr | 1980 / 1820 / 1390 | |
| | External static pressure | Min-Max | Pa | 20-100 | |
| | Sound power level (3) | H/M/L | dB(A) | 73 / 71 / 65 | |
| | Sound pressure level (4) | H/M/L | dB(A) | 52 / 50 / 45 | |
| | Moisture removal (Nominal) | | l/hr | 3.1 | |
| | Condensate drain tube I.D | | mm | 19 | |
| | Dimensions | WxHxD | mm | 790X400X600 | |
| | Weight | | kg | 36 | |
| | Package dimensions | WxHxD | mm | 825X425X610 | |
| | Packaged weight | | kg | 38 | |
| | Units per pallet | | units | 8 | |
| | Stacking height | | units | 4 | |
| OUTDOOR | Refrigerant control | | | Electronic Expansion Valve | |
| | Compressor type, model | | | Scroll | |
| | Motor type | | | DCBL Inverter | |
| | Fan type & quantity | | | Axial 2 x 493 Ømm | |
| | Fan speeds | H/L | RPM | 900 – 100 (Continuous) | |
| | Airflow | Max | m3/hr | 5,200 | |
| | Sound power level(3) | Nom C/H | dB(A) | 67 / 69 | |
| | Sound pressure level(4) | Nom C/H | dB(A) | 56 / 57 | |
| | Dimensions | WxHxD | mm | 900X1255X340 | |
| | Weight | | kg | 110 | |
| | Package dimensions | WxHxD | mm | 985X1395X435 | |
| | Packaged weight | | kg | 120 | |
| | Units per pallet | | Units | 1 | |
| | Stacking height | | units | 1 | |
| | Refrigerant type | | | R410A | |
| | Refrigerant charge(standard connecting tubing length) | | Kg(m) | 2.9 / 30 | |
| | Additional charge per 1 meter | | g/m | 38 | |
| | Connections between units | Liquid line | In.(mm) | 3/8" (9.52) | |
| | | Suction line | In.(mm) | 5/8" (15.875) | |
| | | Max.tubing length | m. | 70 | |
| | | Max.height difference | m. | 30 | |
| Operation control type | | | | LCD Remote control | |
| Heating elements | | | kW | — | |
| Others | | | | | |

(1) Rating conditions in accordance with ISO 5151 and ISO 13253 (for ducted units).
(2) Airflow in ducted units; at nominal external static pressure.
(3) Sound power in ducted units is measured at air discharge.
(4) Sound pressure level measured at 1.0 meter distance from unit.

## 2.4 EMD 125 DCI / OU12 5HP DCI

| | | | | | |
|---|---|---|---|---|---|
| Model Indoor Unit | | | | **EMD 125 DCI** | |
| Model Outdoor Unit | | | | **OU12 5HP DCI** | |
| Installation Method | | | | DUCTED | |
| **Characteristics** | | | **Units** | **Cooling** | **Heating** |
| Capacity - Nominal (Minimum ~ Maximum)(1) | | | Btu/hr | 42,650 (11,940-47,770) | 47,770 (12,280-54,590) |
| | | | kW | 12.5 (3.5-14.0) | 14.0 (3.6-16.0) |
| Power input - Nominal (Minimum ~ Maximum)(1) | | | kW | 4.1 (1.65-5.5) | 4.1 (1.1-5.2) |
| EER (Cooling) or COP(Heating) (1) | | | W/W | 3.05 | 3.4 |
| Energy efficiency class | | | | B | B |
| Power supply | | | V/Ph/Hz | 230 / 1 / 50 | |
| Rated current | | | A | 18.8 | 18.6 |
| Starting current | | | A | 10 | |
| Circuit breaker rating | | | A | 32 | |
| INDOOR | Fan type & quantity | | | Centrifugal x 1 | |
| | Fan speeds | H/M/L | RPM | 930 / 830 / 740 | |
| | Air flow (2) | H/M/L | m3/hr | 2500 / 2100 / 1600 | |
| | External static pressure | Min-Max | Pa | 20-100 | |
| | Sound power level (3) | H/M/L | dB(A) | 72 / 68 / 64 | |
| | Sound pressure level (4) | H/M/L | dB(A) | 54 / 51 / 45 | |
| | Moisture removal (Nominal) | | l/hr | 3.8 | |
| | Condensate drain tube I.D | | mm | 19 | |
| | Dimensions | WxHxD | mm | 1150X400X700 | |
| | Weight | | kg | 46 | |
| | Package dimensions | WxHxD | mm | 1195X440X730 | |
| | Packaged weight | | kg | 50 | |
| | Units per pallet | | units | 8 | |
| | Stacking height | | units | 4 | |
| OUTDOOR | Refrigerant control | | | Electronic Expansion Valve | |
| | Compressor type, model | | | Scroll | |
| | Motor type | | | DCBL Inverter | |
| | Fan type & quantity | | | Axial 2 x 493 Ømm | |
| | Fan speeds | H/L | RPM | 900 – 100 (Continuous) | |
| | Air flow | Max | m3/hr | 5,700 | |
| | Sound power level(3) | Nom C/H | dB(A) | 69 / 70 | |
| | Sound pressure level(4) | Nom C/H | dB(A) | 56 / 58 | |
| | Dimensions | WxHxD | mm | 900X1255X340 | |
| | Weight | | kg | 110 | |
| | Package dimensions | WxHxD | mm | 985X1395X435 | |
| | Packaged weight | | kg | 120 | |
| | Units per pallet | | Units | 1 | |
| | Stacking height | | units | 1 | |
| | Refrigerant type | | | R410A | |
| | Refrigerant charge(standard connecting tubing length) | | Kg(m) | 3.3 / 30 | |
| | Additional charge per 1 meter | | g/m | 38 | |
| | Connections between units | Liquid line | In.(mm) | 3/8" (9.52) | |
| | | Suction line | In.(mm) | 3/4" (19.0) | |
| | | Max.tubing length | m. | 70 | |
| | | Max.height difference | m. | 30 | |
| Operation control type | | | | LCD Remote control | |
| Heating elements | | | kW | — | |
| Others | | | | | |

(1) Rating conditions in accordance with ISO 5151 and ISO 13253 (for ducted units).
(2) Airflow in ducted units; at nominal external static pressure.
(3) Sound power in ducted units is measured at air discharge.
(4) Sound pressure level measured at 1.0 meter distance from unit.

## 2.5 CD 140 DCI / OU12 6HP DCI

| | | | | | | |
|---|---|---|---|---|---|---|
| Model Indoor Unit | | | | **CD 140 DCI** | | |
| Model Outdoor Unit | | | | **OU12 6HP DCI** | | |
| Installation Method | | | | **DUCTED** | | |
| Characteristics | | | **Units** | **Cooling** | **Heating** | |
| Capacity - Nominal (Minimum ~ Maximum)(1) | | | Btu/hr | 47,770 (15,700 - 56,300) | 54,600 (12,600 – 63,100) | |
| | | | kW | 14.0 (4.6 – 16.5) | 16.0 (3.7 – 18.5) | |
| Power Input - Nominal (Minimum ~ Maximum)((1) | | | W | 4,200 (1,500 - 6,000) | 4,400 (1,200 - 5,500) | |
| COP(1) | | | W/W | 3.3 | 3.6 | |
| Energy Efficiency Class | | | - | A | A | |
| Power Supply | | | V/Ph/Hz | 220-240/1/50 | | |
| Rated Current (Nominal) | | | A | 21.6 | 20.3 | |
| Starting Current | | | A | <10 | | |
| Circuit Breaker Rating | | | A | 32 | | |
| INDOOR | Fan Type & Quantity | | | CENTRIFUGAL x2 | | |
| | Fan Speed | H/M/L | RPM | 1,160 | 1,120 | 1,000 |
| | Airflow(2) | H/M/L | $m^3/hr$ | 3,300 | 2,900 | 2,000 |
| | External Static Pressure | Min-Nom-Max | Pa | 80-140-200 | | |
| | Sound Power Level(3) | H/M/L | dB (A) | 73 | 71 | 66 |
| | Sound Pressure Level (4) | H/M/L | dB (A) | 58 | 55 | 50 |
| | Moisture Removal (Nominal) | | L/hr | 4.0 | | |
| | Condensate Drain Tube I.D. | | mm | 19 | | |
| | Dimensions | W/H/D | mm | 1350 | 400 | 640 |
| | Weight | | kg | 75 | | |
| | Package Dimensions | W/H/D | mm | 1510 | 440 | 785 |
| | Packaged Weight | | kg | 82 | | |
| | Units per Pallet | | Units | 5 | | |
| | Stacking Height | | Units | 5 | | |
| OUTDOOR | Refrigerant Control | | | Electronic Expansion Valve | | |
| | Compressor Type, Model | | | Twin-Rotary | | |
| | Motor type | | | DCBL Inverter | | |
| | Fan Type & Quantity | | | Axial 2x 493Φmm | | |
| | Fan Speed | | RPM | 900-100 (continuous) | | |
| | Airflow | Max | $m^3/hr$ | 5,700 | | |
| | Sound Power Level | Nom | dB (A) | 68 | 70 | |
| | Sound Pressure Level (4) | Nom | dB (A) | 56 | 58 | |
| | Dimensions | W/H/D | mm | 900 | 1255 | 340 |
| | Weight | | kg | 110 | | |
| | Package Dimensions | W/H/D | mm | 985 | 1395 | 435 |
| | Packaged Weight | | kg | 120 | | |
| | Units per Pallet | | Units | 1 | | |
| | Stacking Height | | Units | 1 | | |
| | Refrigerant Type | | | R410A | | |
| | Refrigerant Chargeless Distance | | kg/m | 3.8 / 30 | | |
| | Additional Charge Per 1 Meter | | g/m | 80 | | |
| | Connections Between Units | Liquid Line | In | 3/8” | | |
| | | Suction Line | In | 3/4” | | |
| | | Max. Tubing Length | m | 70 | | |
| | | Max. Height Difference | m | 30 | | |
| Operation Control Type | | | | LCD Remote Control | | |
| Heating Elements | | | kW | BH 70W - optional | | |
| Others | | | | | | |

(1) Rating conditions in accordance with ISO 5151 and ISO 13253 (for ducted units).
(2) Airflow in ducted units; at nominal external static pressure.
(3) Sound power in ducted units is measured at air discharge.
(4) Sound pressure level measured at 1.0 meter distance from unit.

# 3. RATING CONDITIONS

Standard conditions in accordance with ISO 5151 and ISO 13253 (for ducted units) and EN 14511.

**Cooling:**
Indoor: 27°C DB 19°C WB
Outdoor: 35 °C DB

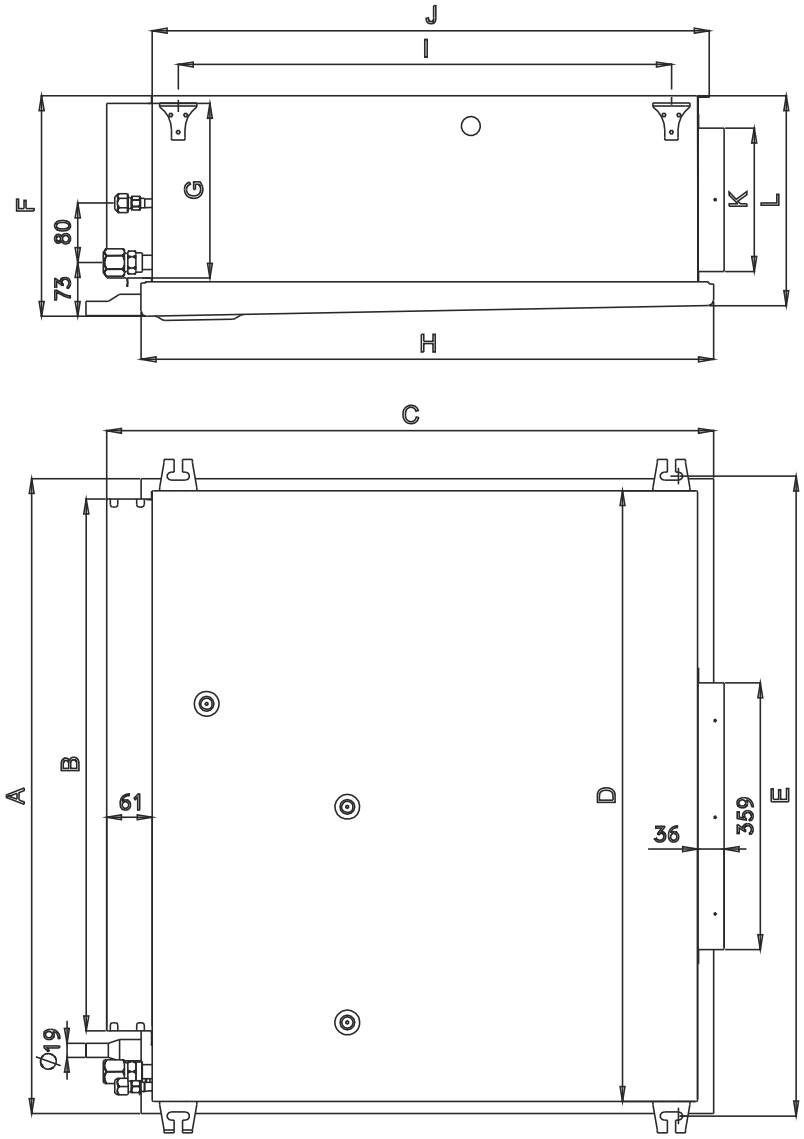
**Heating:**
Indoor: 20°C DB
Outdoor: 7°C DB 6°C WB

## 3.1 Operating Limits

| | | Indoor | Outdoor |
|---|---|---|---|
| **Cooling** | Upper limit | 32°C DB 23°C WB | 46°C DB |
| | Lower limit | 21°C DB 15°C WB | -10°C DB |
| **Heating** | Upper limit | 27°C DB | 24°C DB 18°C WB |
| | Lower limit | 10°C DB | -15°C DB -16°C WB |
| **Voltage** | 1PH | 198 – 253V | |

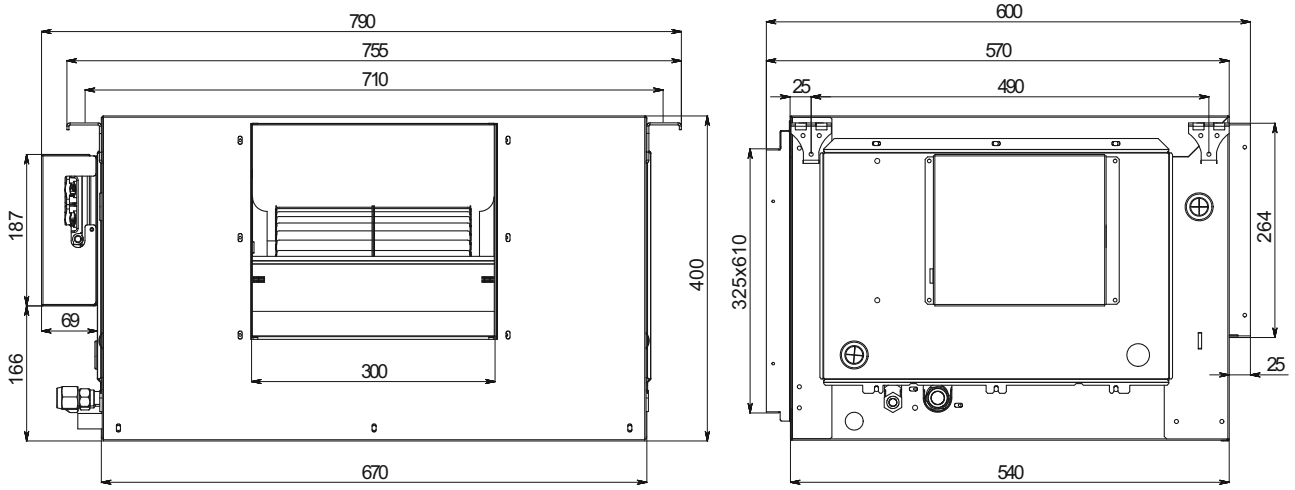
# 4. OUTLINE DIMENSIONS

## 4.1 Indoor Unit: DNG 100, DNG 125 DCI

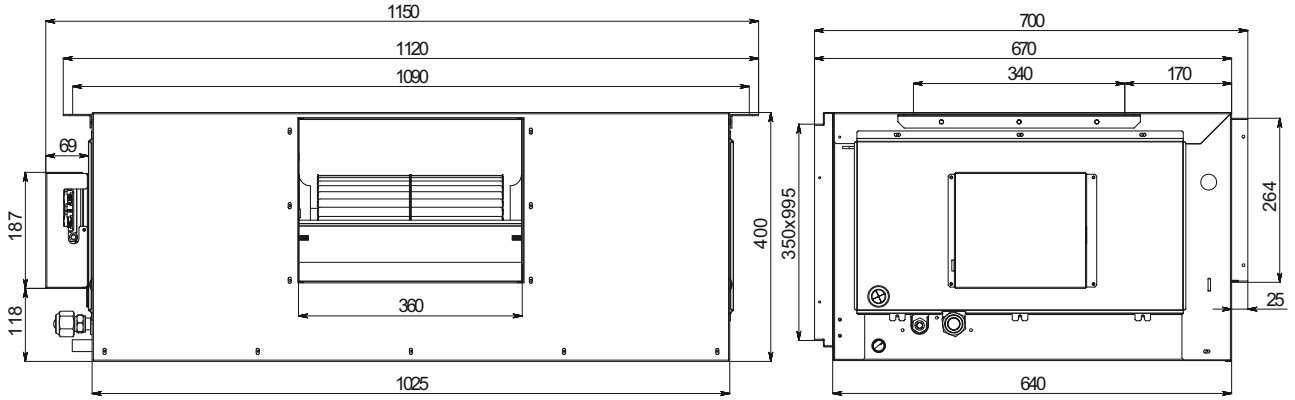



| Model | A | B | C | D | E | F | G | H | I | J | K | L |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **DNG 100, 125** | 854 | 715 | 815 | 822 | 861 | 297 | 235 | 770 | 663 | 749 | 193 | 282 |

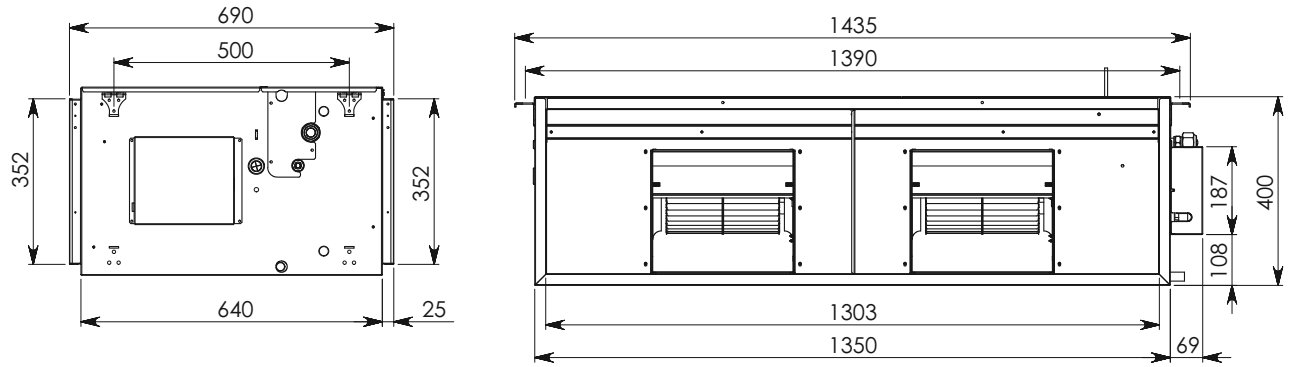
## 4.2 Indoor Unit: EMD 100 DCI



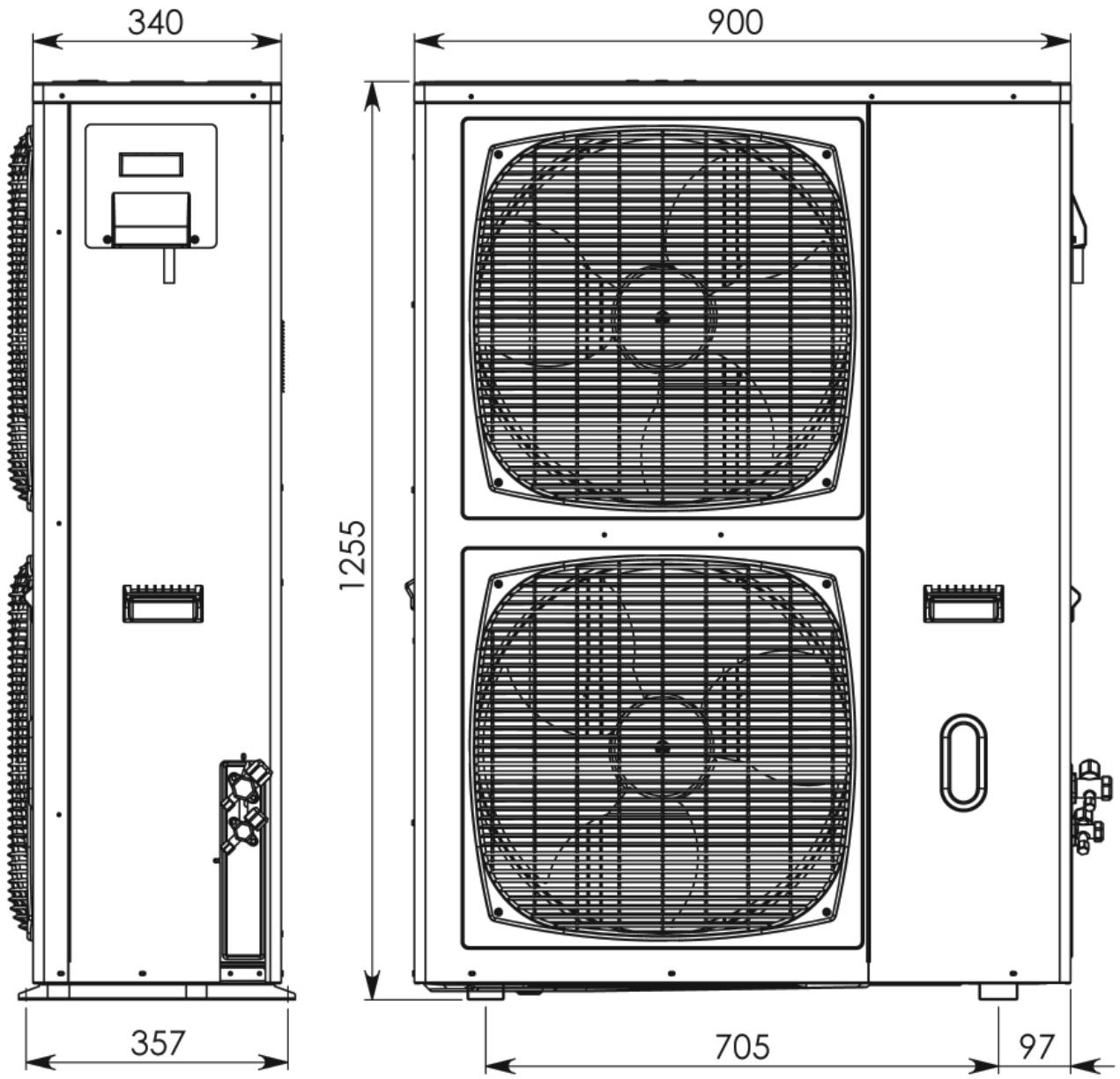

## 4.3 Indoor Unit: EMD 125 DCI




## t4.4 Indoor Unit: CD 140 DCI



## 4.4 Outdoor Unit: DCI 100 / 125 / 140 (OU12 DCI 4-5-6HP)



# 5. PERFORMANCE DATA & PRESSURE CURVES

## 5.1 DNG 100 DCI

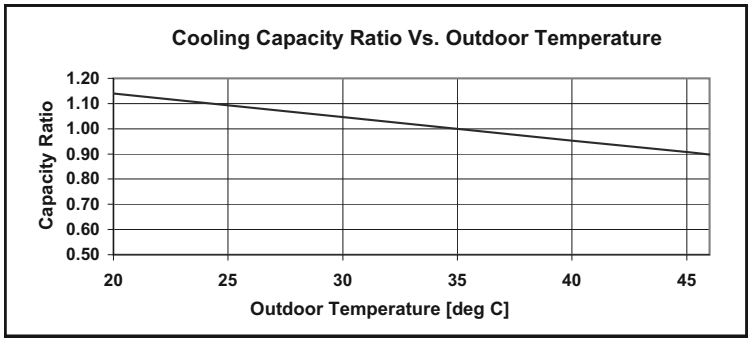
### 5.1.1 Cooling Capacity (kW)

| OD COIL ENTERING AIR DB TEMPERATURE [°C] | DATA | ID COIL ENTERING AIR DB/WB TEMPERATURE [°C] 22/15 | 24/17 | 27/19 | 29/21 | 32/23 |
|---|---|---|---|---|---|---|
| -10 – 20 (protection range) | TC | 80 - 110 % of nominal | | | | |
| | SC | 80 - 105 % of nominal | | | | |
| | PI | 25 - 50 % of nominal | | | | |
| 25 | TC | 9.67 | 10.30 | 10.93 | 11.56 | 12.19 |
| | SC | 7.67 | 7.83 | 7.99 | 8.14 | 8.30 |
| | PI | 2.46 | 2.50 | 2.55 | 2.60 | 2.64 |
| 30 | TC | 9.20 | 9.83 | 10.47 | 11.10 | 11.73 |
| | SC | 7.48 | 7.64 | 7.79 | 7.95 | 8.11 |
| | PI | 2.74 | 2.79 | 2.84 | 2.88 | 2.93 |
| 35 | TC | 8.74 | 9.37 | **10.00** | 10.63 | 11.26 |
| | SC | 7.29 | 7.44 | **7.60** | 7.76 | 7.91 |
| | PI | 3.03 | 3.08 | **3.13** | 3.17 | 3.22 |
| 40 | TC | 8.27 | 8.90 | 9.54 | 10.17 | 10.80 |
| | SC | 7.09 | 7.25 | 7.41 | 7.56 | 7.72 |
| | PI | 3.32 | 3.37 | 3.41 | 3.46 | 3.51 |
| 46 | TC | 7.71 | 8.35 | 8.98 | 9.61 | 10.24 |
| | SC | 6.86 | 7.02 | 7.17 | 7.33 | 7.49 |
| | PI | 3.66 | 3.71 | 3.76 | 3.80 | 3.85 |

**LEGEND**

TC – Total Cooling Capacity, kW
SC – Sensible Capacity, kW
PI – Power Input, kW
WB – Wet Bulb Temp., (°C)
DB – Dry Bulb Temp., (°C)
ID – Indoor
OD – Outdoor

### 5.1.2 Capacity Correction Factors (Cooling)



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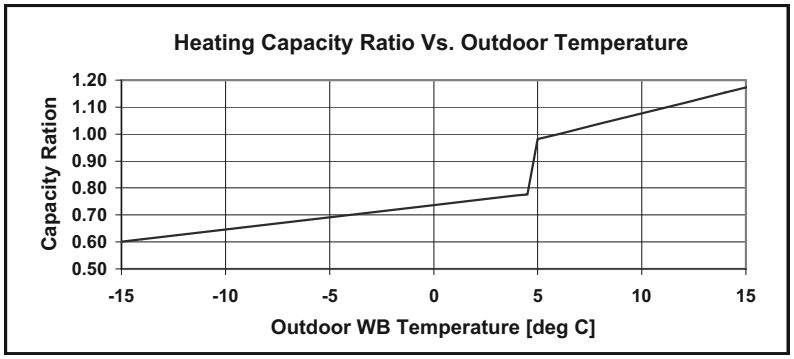
### 5.1.3 Heating Capacity

| OD COIL ENTERING AIR DB/WB TEMPERATURE [°C] | DATA | ID COIL ENTERING AIR DB TEMPERATURE [°C] | | |
|---|---|---|---|---|
| | | 15 | 20 | 25 |
| -15/-16 | TC | 7.13 | 6.63 | 6.13 |
| | PI | 2.03 | 2.24 | 2.45 |
| -10/-12 | TC | 7.94 | 7.44 | 6.94 |
| | PI | 2.45 | 2.66 | 2.87 |
| -7/-8 | TC | 8.54 | 8.04 | 7.54 |
| | PI | 2.77 | 2.97 | 3.18 |
| -1/-2 | TC | 8.84 | 8.34 | 7.85 |
| | PI | 2.92 | 3.13 | 3.34 |
| 2/1 | TC | 9.04 | 8.55 | 8.05 |
| | PI | 3.03 | 3.23 | 3.44 |
| 7/6 | TC | 11.70 | **11.20** | 10.70 |
| | PI | 3.18 | **3.39** | 3.60 |
| 10/9 | TC | 12.34 | 11.85 | 11.35 |
| | PI | 3.37 | 3.58 | 3.79 |
| 15/12 | TC | 12.99 | 12.49 | 11.99 |
| | PI | 3.56 | 3.77 | 3.98 |
| 15-24 (Protection Range) | TC | 85 - 105 % of nominal | | |
| | PI | 80 - 120 % of nominal | | |

**LEGEND**

TH – Total Heating Capacity, kW
PI – Power Input, kW
WB – Wet Bulb Temp., (°C)
DB – Dry Bulb Temp., (°C)
ID – Indoor
OD – Outdoor

### 5.1.4 Capacity Correction Factors (Heating)



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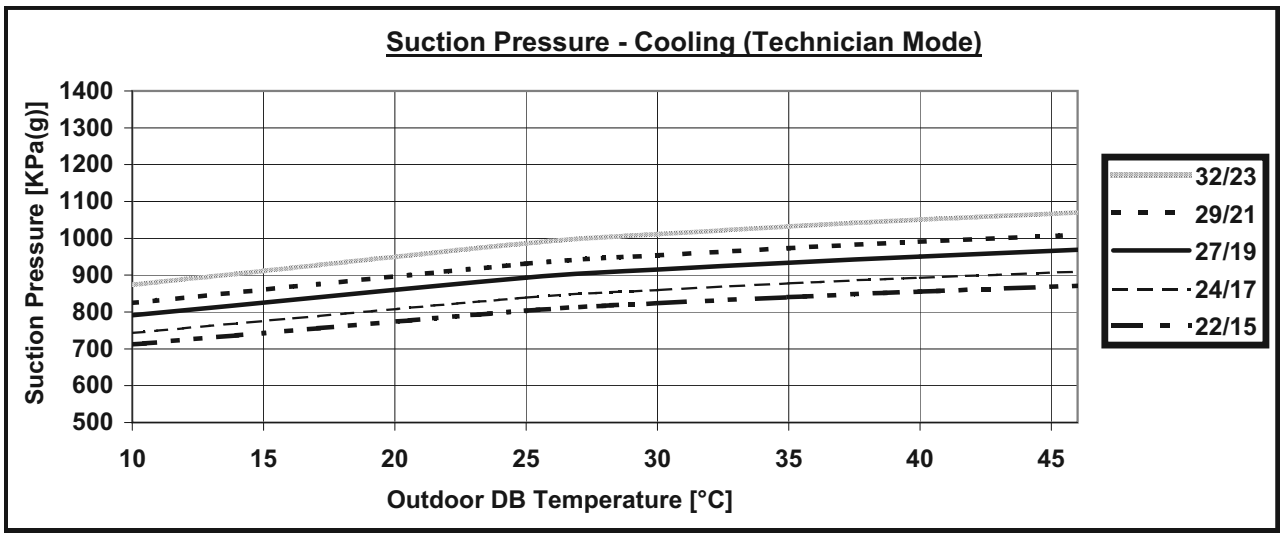
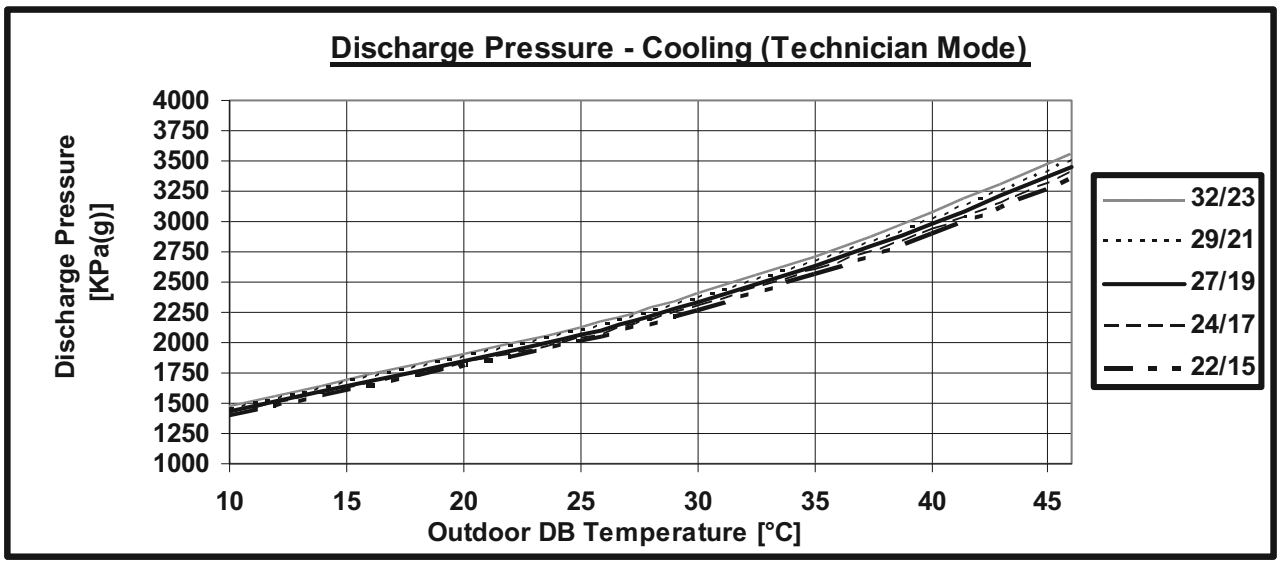
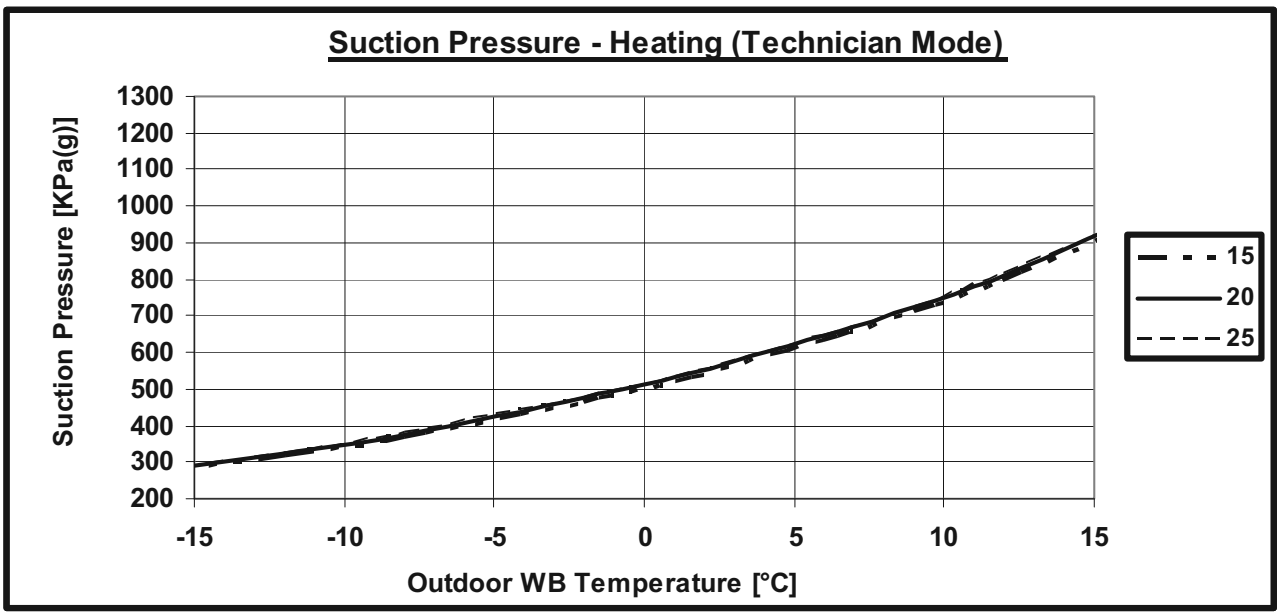
## 5.1.5 Pressure Curves (Cooling – Technician Mode)

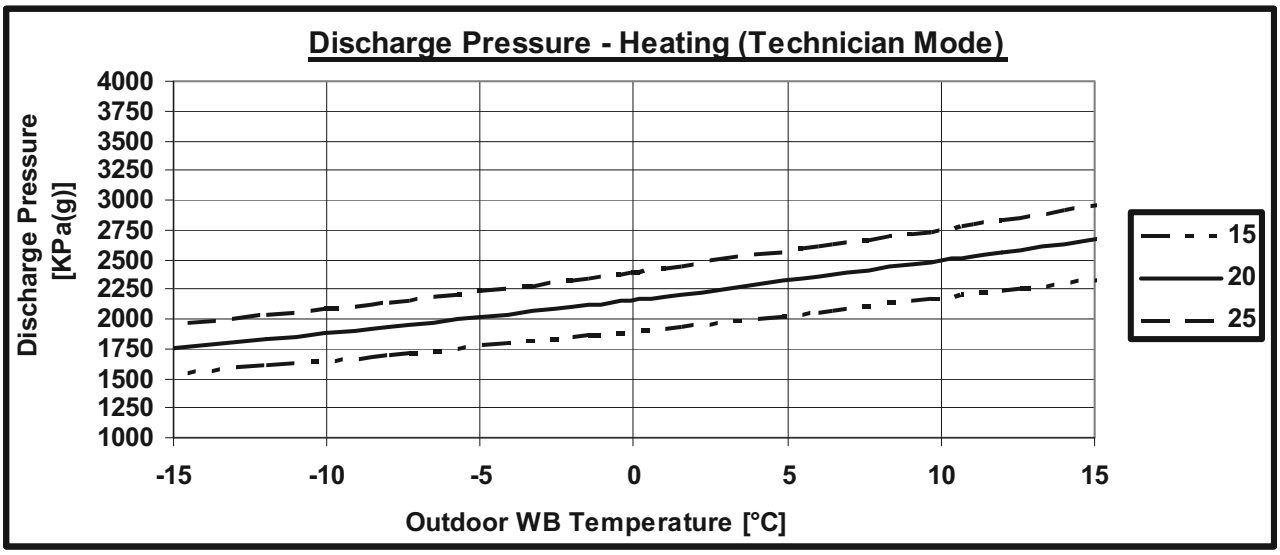
### 5.1.5.1 *Cooling*



#### 5.1.5.2 *Heating*



## 5.2 DNG 125 DCI

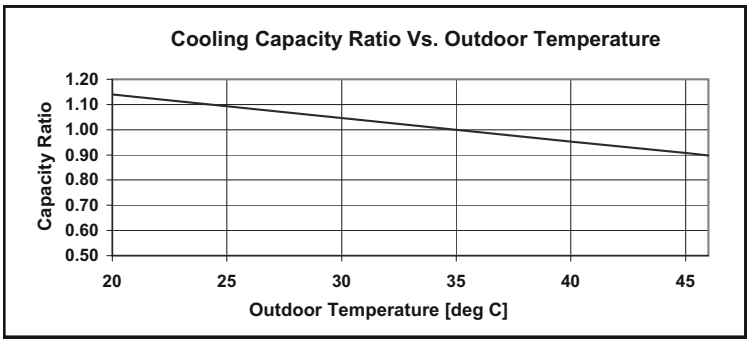
### 5.2.1 Cooling Capacity (kW)

| OD COIL ENTERING AIR DB TEMPERATURE [°C] | DATA | ID COIL ENTERING AIR DB/WB TEMPERATURE [°C] 22/15 | 24/17 | 27/19 | 29/21 | 32/23 |
|---|---|---|---|---|---|---|
| -10 – 20 (protection range) | TC | 80 - 110 % of nominal | | | | |
| | SC | 80 - 105 % of nominal | | | | |
| | PI | 25 - 50 % of nominal | | | | |
| 25 | TC | 12.08 | 12.87 | 13.66 | 14.45 | 15.24 |
| | SC | 9.59 | 9.79 | 9.98 | 10.18 | 10.38 |
| | PI | 3.28 | 3.34 | 3.40 | 3.47 | 3.53 |
| 30 | TC | 11.50 | 12.29 | 13.08 | 13.87 | 14.66 |
| | SC | 9.35 | 9.55 | 9.74 | 9.94 | 10.13 |
| | PI | 3.66 | 3.72 | 3.79 | 3.85 | 3.91 |
| 35 | TC | 10.92 | 11.71 | **12.50** | 13.29 | 14.08 |
| | SC | 9.11 | 9.30 | **9.50** | 9.70 | 9.89 |
| | PI | 4.04 | 4.11 | **4.17** | 4.23 | 4.30 |
| 40 | TC | 10.34 | 11.13 | 11.92 | 12.71 | 13.50 |
| | SC | 8.87 | 9.06 | 9.26 | 9.45 | 9.65 |
| | PI | 4.43 | 4.49 | 4.55 | 4.62 | 4.68 |
| 46 | TC | 9.64 | 10.43 | 11.22 | 12.01 | 12.80 |
| | SC | 8.58 | 8.77 | 8.97 | 9.16 | 9.36 |
| | PI | 4.89 | 4.95 | 5.01 | 5.08 | 5.14 |

**LEGEND**

TC – Total Cooling Capacity, kW
SC – Sensible Capacity, kW
PI – Power Input, kW
WB – Wet Bulb Temp., (°C)
DB – Dry Bulb Temp., (°C)
ID – Indoor
OD – Outdoor

### 5.2.2 Capacity Correction Factors (Cooling)



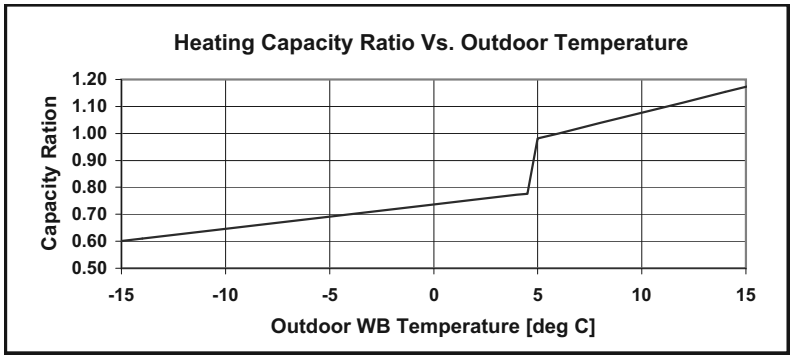
### 5.2.3 Heating Capacity

| OD COIL ENTERING AIR DB/WB TEMPERATURE [°C] | DATA | ID COIL ENTERING AIR DB TEMPERATURE [°C] | | |
|---|---|---|---|---|
| | | 15 | 20 | 25 |
| -15/-16 | TC | 8.91 | 8.20 | 7.67 |
| | PI | 2.58 | 2.84 | 3.11 |
| -10/-12 | TC | 9.92 | 9.30 | 8.67 |
| | PI | 3.11 | 3.37 | 3.64 |
| -7/-8 | TC | 10.68 | 10.05 | 9.43 |
| | PI | 3.51 | 3.77 | 4.03 |
| -1/-2 | TC | 11.05 | 10.43 | 9.81 |
| | PI | 3.71 | 3.97 | 4.23 |
| 2/1 | TC | 11.31 | 10.68 | 10.06 |
| | PI | 3.84 | 4.10 | 4.36 |
| 7/6 | TC | 14.62 | **14.00** | 13.38 |
| | PI | 4.04 | **4.30** | 4.56 |
| 10/9 | TC | 15.43 | 14.81 | 14.18 |
| | PI | 4.28 | 4.54 | 4.80 |
| 15/12 | TC | 16.24 | 15.61 | 14.99 |
| | PI | 4.52 | 4.78 | 5.04 |
| 15-24 (Protection Range) | TC | 85 - 105 % of nominal | | |
| | PI | 80 - 120 % of nominal | | |

**LEGEND**

TH – Total Heating Capacity, kW
PI – Power Input, kW
WB – Wet Bulb Temp., (°C)
DB – Dry Bulb Temp., (°C)
ID – Indoor
OD – Outdoor

### 5.2.4 Capacity Correction Factors (Heating)



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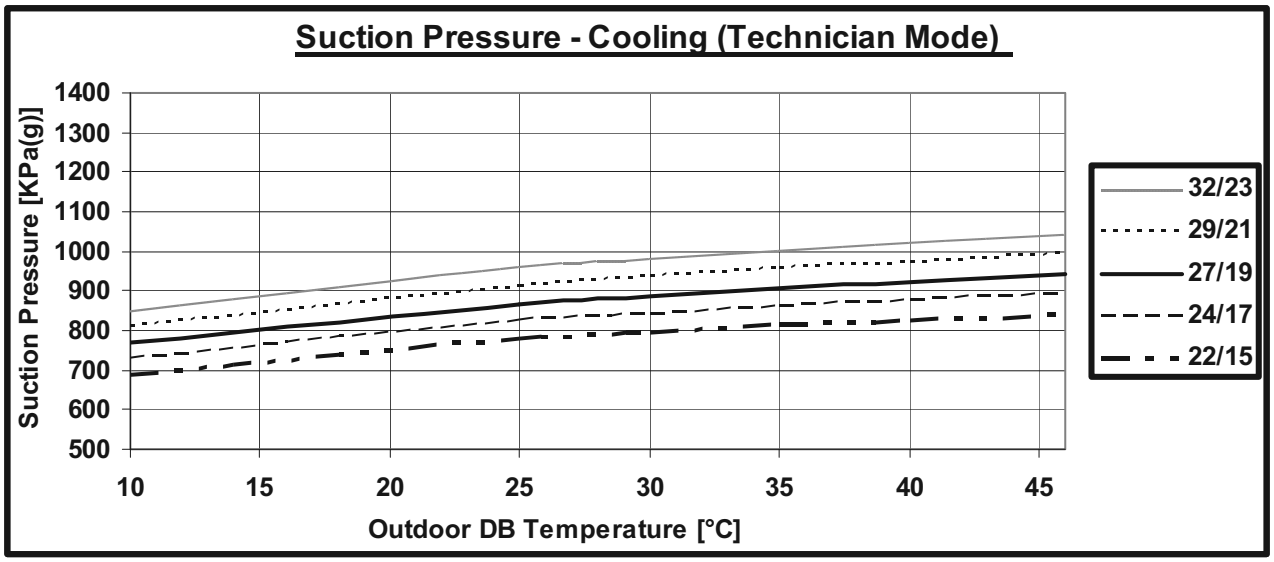
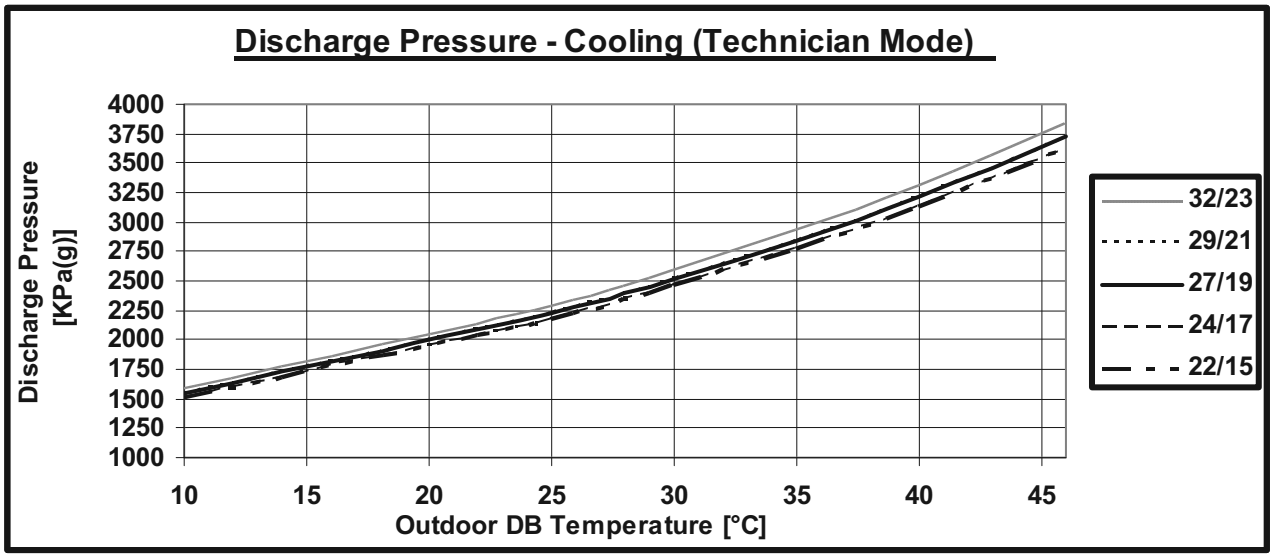
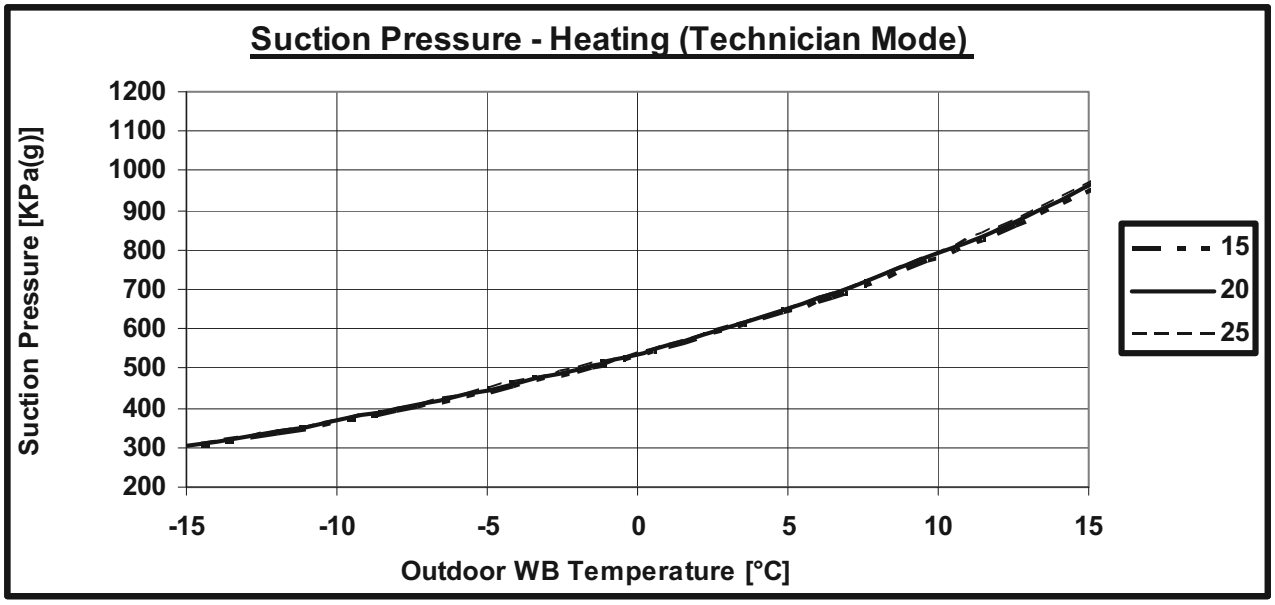
## 5.2.5 Pressure Curves (Cooling – Technician Mode)

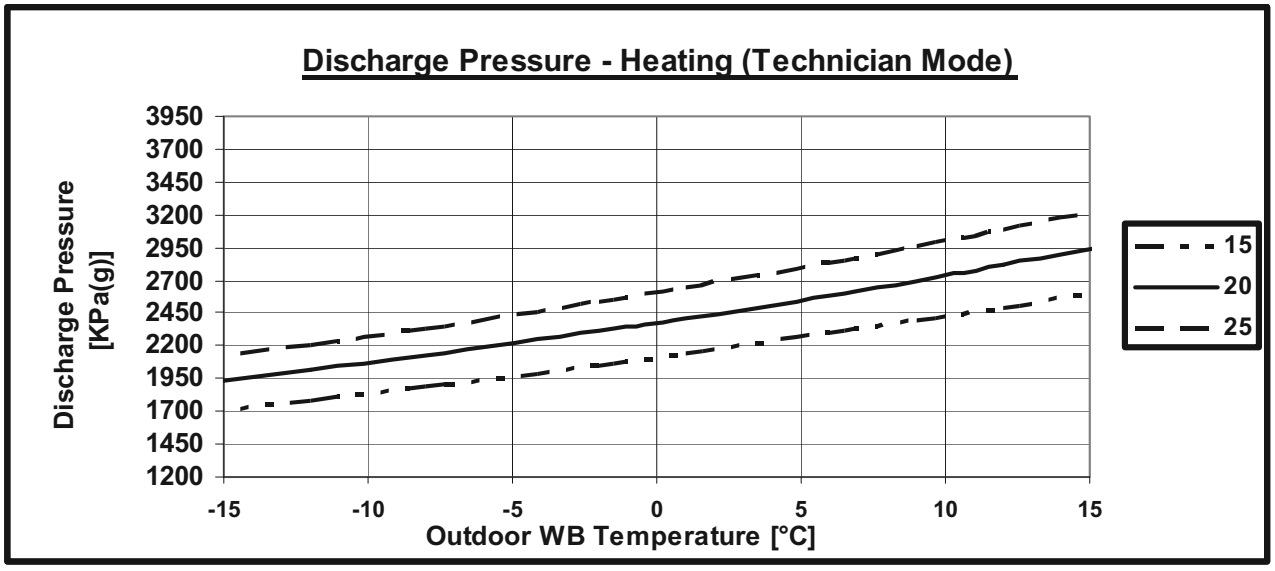
### 5.2.5.1 *Cooling*



#### 5.2.5.2 *Heating*



## 5.3 EMD 100 DCI

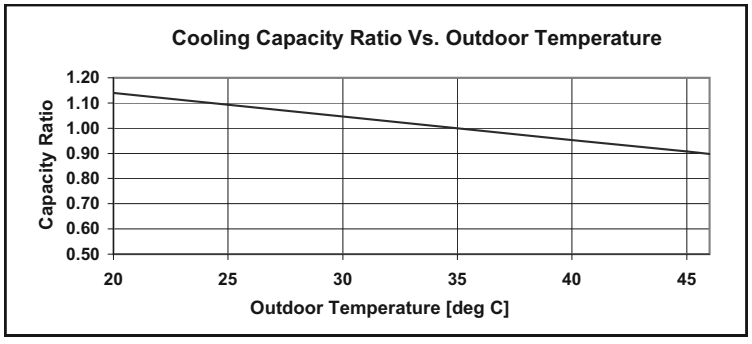
### 5.3.1 Cooling Capacity (kW)

| OD COIL ENTERING AIR DB TEMPERATURE [°C] | DATA | ID COIL ENTERING AIR DB/WB TEMPERATURE [°C] 22/15 | 24/17 | 27/19 | 29/21 | 32/23 |
|---|---|---|---|---|---|---|
| -10 – 20 (protection range) | TC | 80 - 110 % of nominal | | | | |
| | SC | 80 - 105 % of nominal | | | | |
| | PI | 25 - 50 % of nominal | | | | |
| 25 | TC | 9.67 | 10.30 | 10.93 | 11.56 | 12.19 |
| | SC | 7.96 | 8.12 | 8.28 | 8.44 | 8.61 |
| | PI | 2.40 | 2.44 | 2.49 | 2.53 | 2.58 |
| 30 | TC | 9.20 | 9.83 | 10.47 | 11.10 | 11.73 |
| | SC | 7.76 | 7.92 | 8.08 | 8.24 | 8.41 |
| | PI | 2.68 | 2.72 | 2.77 | 2.82 | 2.86 |
| 35 | TC | 8.74 | 9.37 | **10.00** | 10.63 | 11.26 |
| | SC | 7.56 | 7.72 | **7.88** | 8.04 | 8.20 |
| | PI | 2.96 | 3.00 | **3.05** | 3.10 | 3.14 |
| 40 | TC | 8.27 | 8.90 | 9.54 | 10.17 | 10.80 |
| | SC | 7.35 | 7.52 | 7.68 | 7.84 | 8.00 |
| | PI | 3.24 | 3.28 | 3.33 | 3.38 | 3.42 |
| 46 | TC | 7.71 | 8.35 | 8.98 | 9.61 | 10.24 |
| | SC | 7.11 | 7.28 | 7.44 | 7.60 | 7.76 |
| | PI | 3.58 | 3.62 | 3.67 | 3.71 | 3.76 |

**LEGEND**

TC – Total Cooling Capacity, kW
SC – Sensible Capacity, kW
PI – Power Input, kW
WB – Wet Bulb Temp., (°C)
DB – Dry Bulb Temp., (°C)
ID – Indoor
OD – Outdoor

### 5.3.2 Capacity Correction Factors (Cooling)



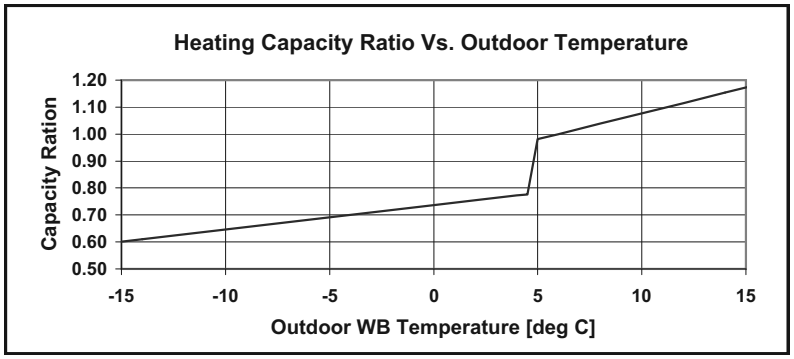
### 5.3.3 Heating Capacity

| OD COIL ENTERING AIR DB/WB TEMPERATURE [°C] | DATA | ID COIL ENTERING AIR DB TEMPERATURE [°C] | | |
|---|---|---|---|---|
| | | 15 | 20 | 25 |
| -15/-16 | TC | 7.32 | 6.81 | 6.30 |
| | PI | 1.86 | 2.05 | 2.24 |
| -10/-12 | TC | 8.15 | 7.64 | 7.12 |
| | PI | 2.24 | 2.43 | 2.62 |
| -7/-8 | TC | 8.77 | 8.26 | 7.75 |
| | PI | 2.53 | 2.72 | 2.91 |
| -1/-2 | TC | 9.08 | 8.57 | 8.06 |
| | PI | 2.67 | 2.86 | 3.05 |
| 2/1 | TC | 9.29 | 8.77 | 8.26 |
| | PI | 2.77 | 2.96 | 3.15 |
| 7/6 | TC | 12.01 | **11.50** | 10.99 |
| | PI | 2.91 | **3.10** | 3.29 |
| 10/9 | TC | 12.67 | 12.16 | 11.65 |
| | PI | 3.08 | 3.27 | 3.46 |
| 15/12 | TC | 13.34 | 12.82 | 12.31 |
| | PI | 3.26 | 3.45 | 3.64 |
| 15-24 (Protection Range) | TC | 85 - 105 % of nominal | | |
| | PI | 80 - 120 % of nominal | | |

**LEGEND**

TH – Total Heating Capacity, kW
PI – Power Input, kW
WB – Wet Bulb Temp., (°C)
DB – Dry Bulb Temp., (°C)
ID – Indoor
OD – Outdoor

### 5.3.4 Capacity Correction Factors (Heating)



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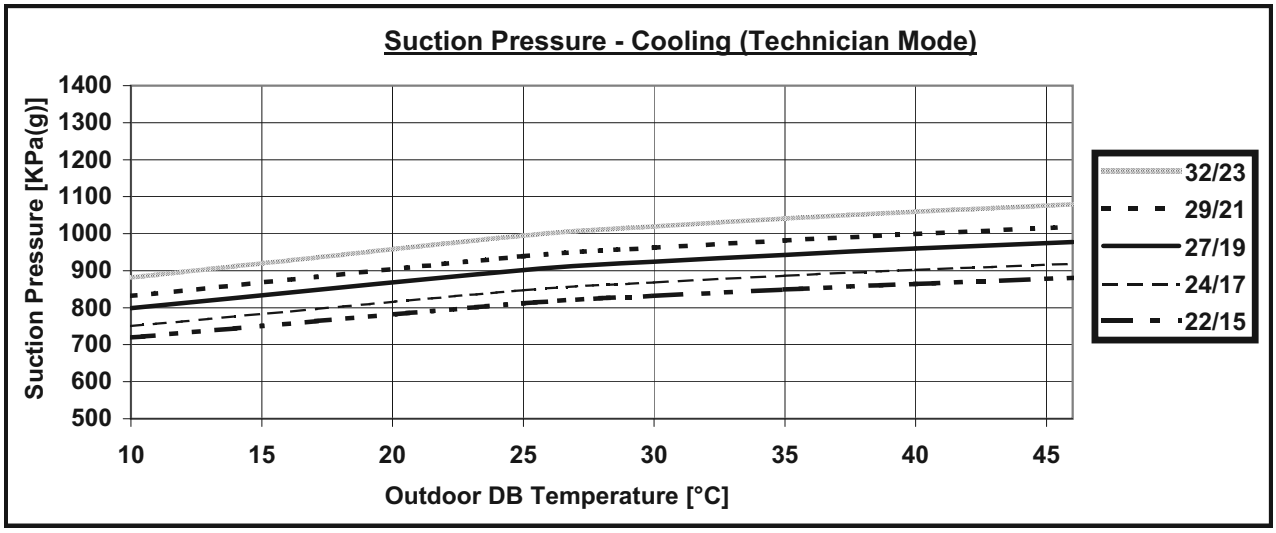
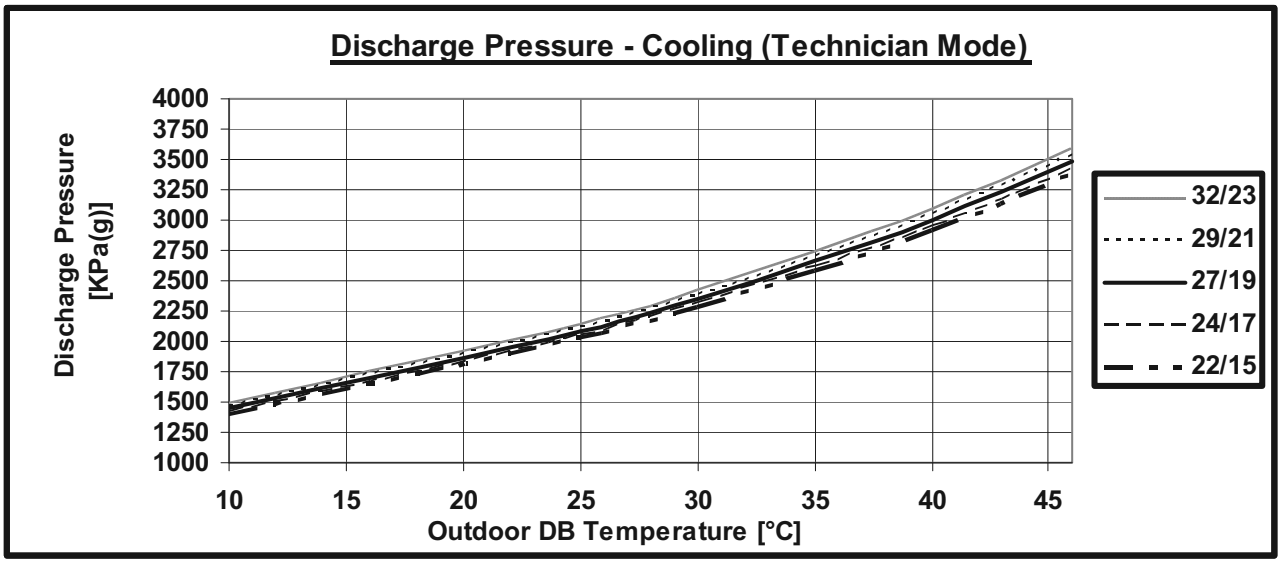
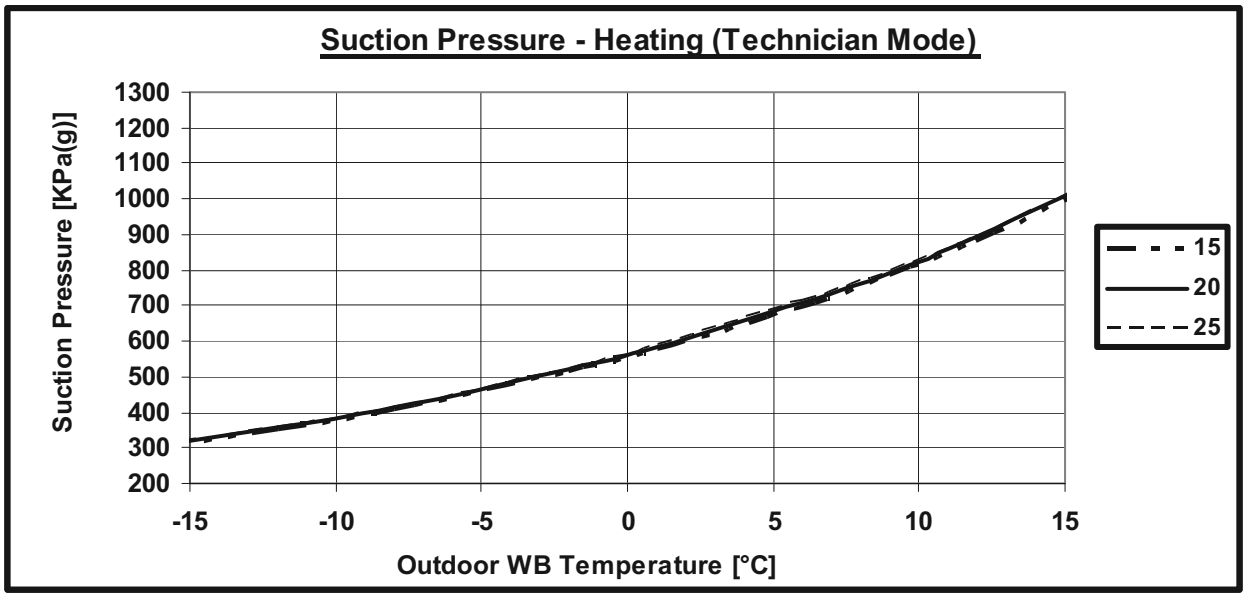
## 5.3.5 Pressure Curves (Cooling – Technician Mode)

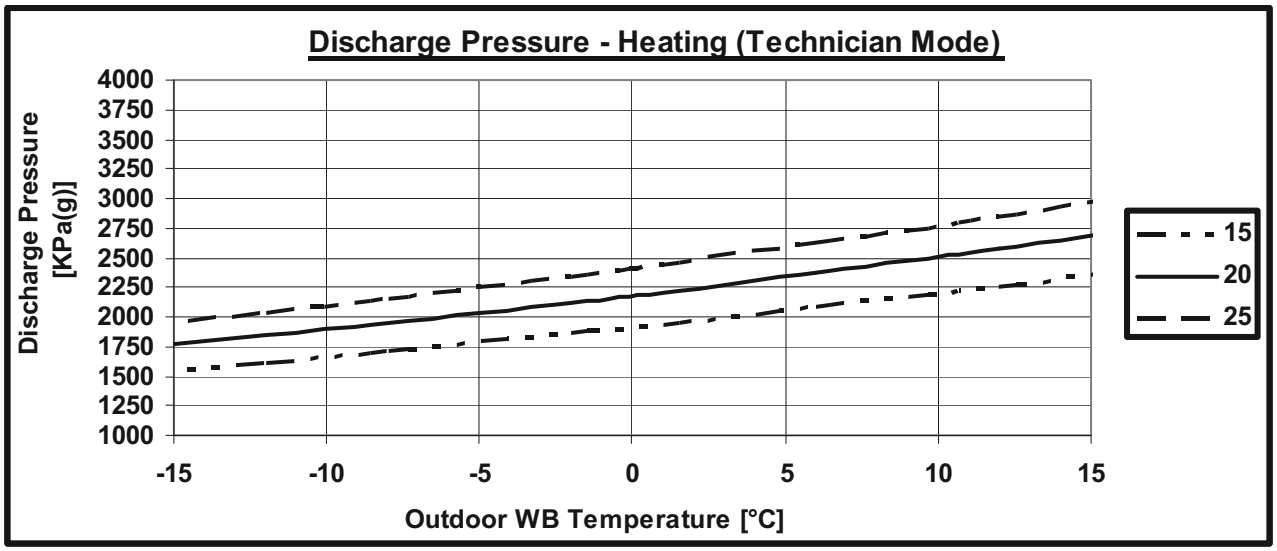
### 5.3.5.1 *Cooling*



#### 5.3.5.2 *Heating*



## 5.4 EMD 125 DCI

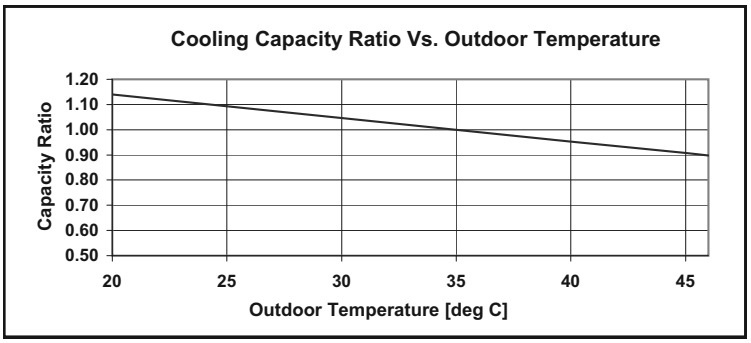
### 5.4.1 Cooling Capacity (kW)

| OD COIL ENTERING AIR DB TEMPERATURE [°C] | DATA | ID COIL ENTERING AIR DB/WB TEMPERATURE [°C] 22/15 | 24/17 | 27/19 | 29/21 | 32/23 |
|---|---|---|---|---|---|---|
| -10 – 20 (protection range) | TC | 80 - 110 % of nominal | | | | |
| | SC | 80 - 105 % of nominal | | | | |
| | PI | 25 - 50 % of nominal | | | | |
| 25 | TC | 12.08 | 12.87 | 13.66 | 14.45 | 15.24 |
| | SC | 9.87 | 10.07 | 10.27 | 10.47 | 10.68 |
| | PI | 3.22 | 3.28 | 3.35 | 3.41 | 3.47 |
| 30 | TC | 11.50 | 12.29 | 13.08 | 13.87 | 14.66 |
| | SC | 9.62 | 9.82 | 10.02 | 10.23 | 10.43 |
| | PI | 3.60 | 3.66 | 3.72 | 3.78 | 3.85 |
| 35 | TC | 10.92 | 11.71 | **12.50** | 13.29 | 14.08 |
| | SC | 9.37 | 9.57 | **9.78** | 9.98 | 10.18 |
| | PI | 3.98 | 4.04 | **4.10** | 4.16 | 4.22 |
| 40 | TC | 10.34 | 11.13 | 11.92 | 12.71 | 13.50 |
| | SC | 9.12 | 9.32 | 9.53 | 9.73 | 9.93 |
| | PI | 4.35 | 4.42 | 4.48 | 4.54 | 4.60 |
| 46 | TC | 9.64 | 10.43 | 11.22 | 12.01 | 12.80 |
| | SC | 8.82 | 9.03 | 9.23 | 9.43 | 9.63 |
| | PI | 4.71 | 4.87 | 4.93 | 4.99 | 5.05 |

**LEGEND**

TC – Total Cooling Capacity, kW
SC – Sensible Capacity, kW
PI – Power Input, kW
WB – Wet Bulb Temp., (°C)
DB – Dry Bulb Temp., (°C)
ID – Indoor
OD – Outdoor

### 5.4.2 Capacity Correction Factors (Cooling)



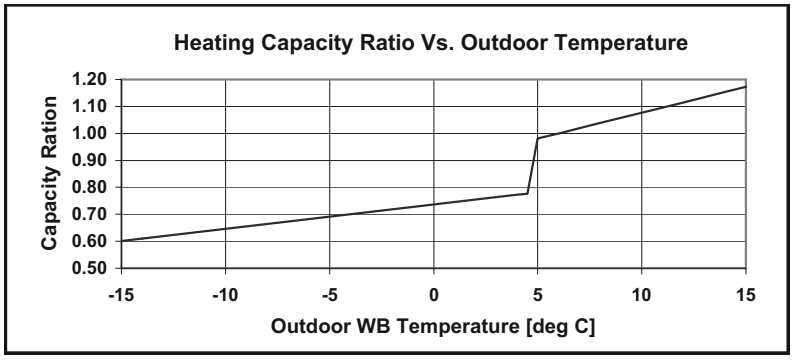
### 5.4.3 Heating Capacity

| OD COIL ENTERING AIR DB/WB TEMPERATURE [°C] | DATA | ID COIL ENTERING AIR DB TEMPERATURE [°C] | | |
|---|---|---|---|---|
| | | 15 | 20 | 25 |
| -15/-16 | TC | 8.91 | 8.29 | 7.67 |
| | PI | 2.47 | 2.72 | 2.97 |
| -10/-12 | TC | 9.92 | 9.30 | 8.67 |
| | PI | 2.97 | 3.22 | 3.47 |
| -7/-8 | TC | 10.68 | 10.05 | 9.43 |
| | PI | 3.35 | 3.60 | 3.85 |
| -1/-2 | TC | 11.05 | 10.43 | 9.81 |
| | PI | 3.54 | 3.79 | 4.04 |
| 2/1 | TC | 11.31 | 10.68 | 10.06 |
| | PI | 3.67 | 3.92 | 4.17 |
| 7/6 | TC | 14.62 | **14.00** | 13.38 |
| | PI | 3.86 | **4.11** | 4.36 |
| 10/9 | TC | 15.43 | 14.81 | 14.18 |
| | PI | 4.09 | 4.34 | 4.59 |
| 15/12 | TC | 16.24 | 15.61 | 14.99 |
| | PI | 4.32 | 4.57 | 4.82 |
| 15-24 (Protection Range) | TC | 85 - 105 % of nominal | | |
| | PI | 80 - 120 % of nominal | | |

**LEGEND**

TH – Total Heating Capacity, kW
PI – Power Input, kW
WB – Wet Bulb Temp., (°C)
DB – Dry Bulb Temp., (°C)
ID – Indoor
OD – Outdoor

### 5.4.4 Capacity Correction Factors (Heating)

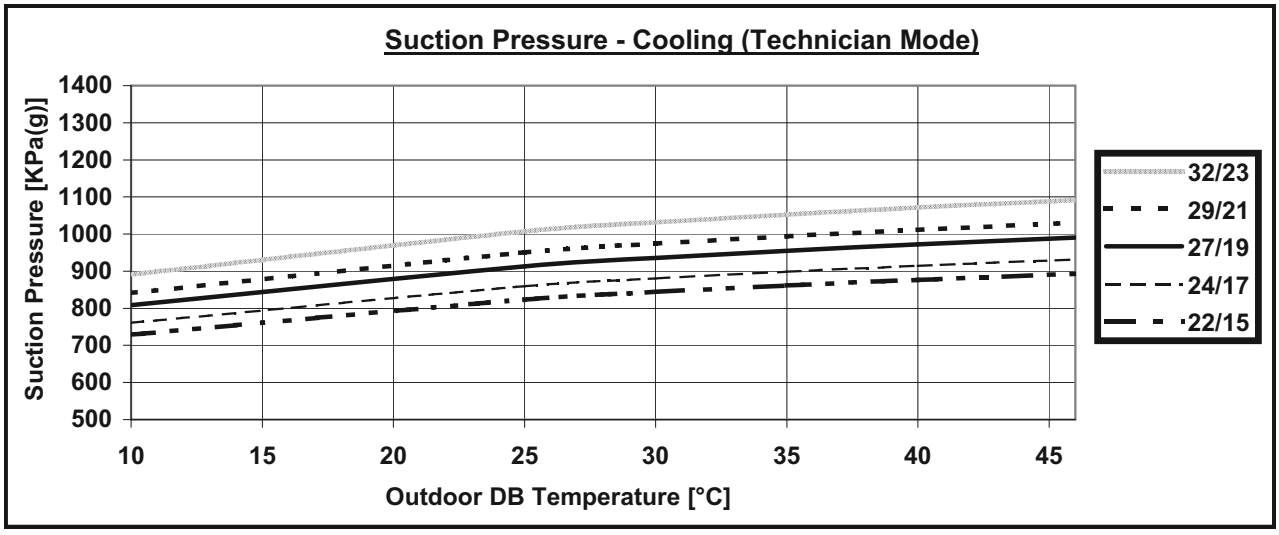


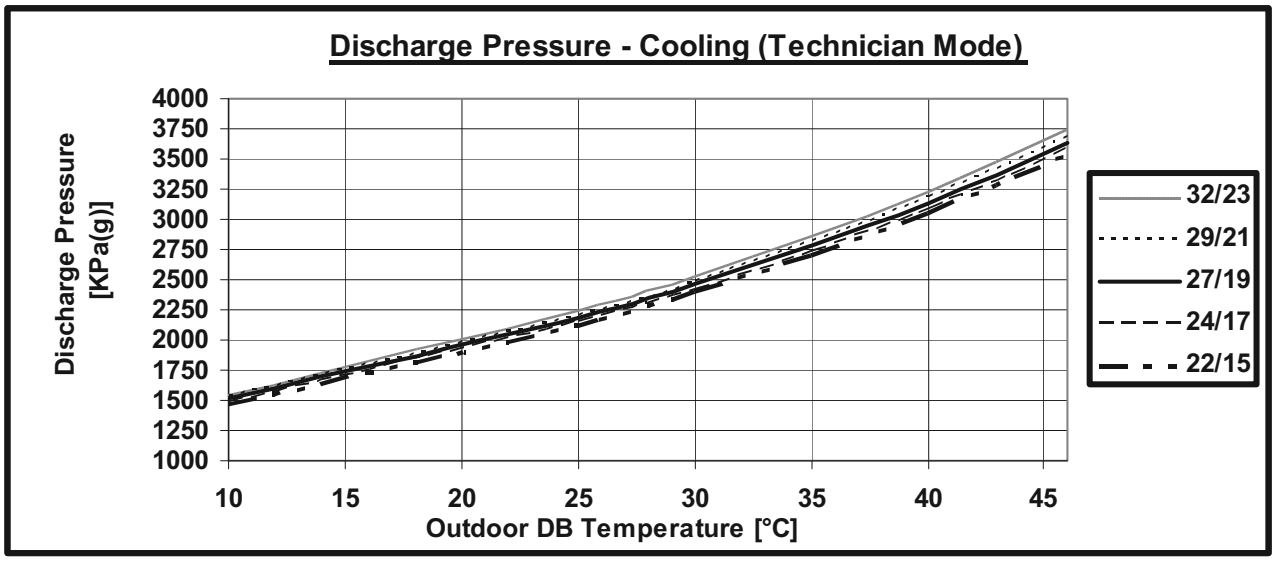



CONTENTS

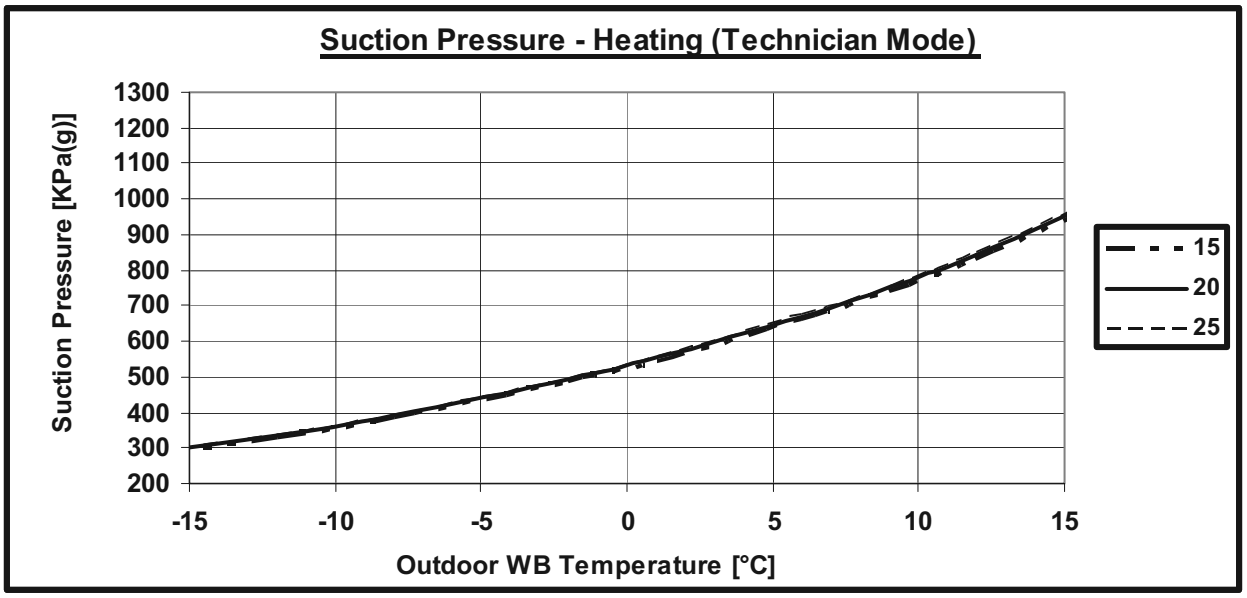
## 5.4.5 Pressure Curves (Cooling – Technician Mode)

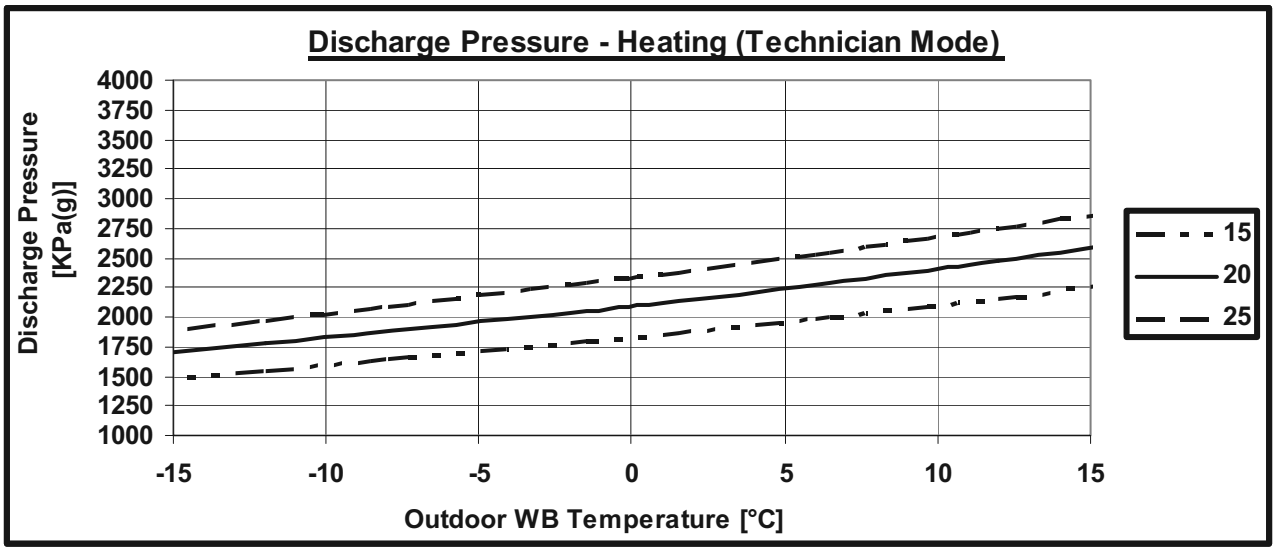
### 5.4.5.1 *Cooling*



#### 5.4.5.2 *Heating*



## 5.5 CD 140 DCI

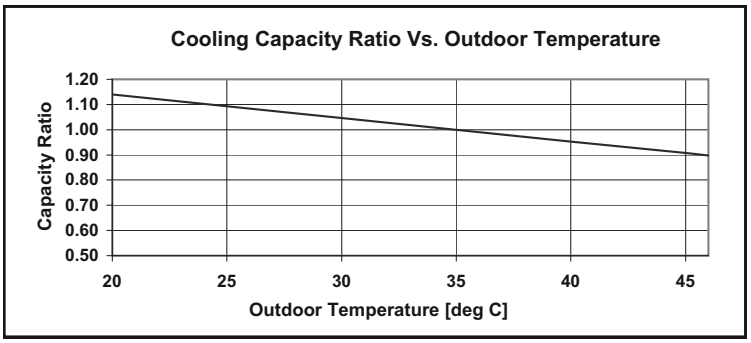
### 5.5.1 Cooling Capacity (kW)

| OD COIL ENTERING AIR DB TEMPERATURE [ºC] | DATA | ID COIL ENTERING AIR DB/WB TEMPERATURE [ºC] 22/15 | 24/17 | 27/19 | 29/21 | 32/23 |
|---|---|---|---|---|---|---|
| -10 - 20 (protection range) | TC | 80 - 110 % of nominal | | | | |
| | SC | 80 - 105 % of nominal | | | | |
| | PI | 25 - 50 % of nominal | | | | |
| 25 | TC | 13.53 | 14.42 | 15.30 | 16.19 | 17.07 |
| | SC | 11.31 | 11.54 | 11.77 | 12.00 | 12.23 |
| | PI | 3.30 | 3.36 | 3.43 | 3.49 | 3.55 |
| 30 | TC | 12.88 | 13.77 | 14.65 | 15.54 | 16.42 |
| | SC | 11.02 | 11.25 | 11.49 | 11.72 | 11.95 |
| | PI | 3.69 | 3.75 | 3.81 | 3.88 | 3.94 |
| 35 | TC | 12.23 | 13.12 | **14.00** | 14.88 | 15.77 |
| | SC | 10.74 | 10.97 | **11.20** | 11.43 | 11.66 |
| | PI | 4.07 | 4.14 | **4.20** | 4.26 | 4.33 |
| 40 | TC | 11.58 | 12.46 | 13.35 | 14.23 | 15.12 |
| | SC | 10.45 | 10.68 | 10.91 | 11.15 | 11.38 |
| | PI | 4.46 | 4.52 | 4.59 | 4.65 | 4.71 |
| 46 | TC | 10.80 | 11.68 | 12.57 | 13.45 | 14.34 |
| | SC | 10.11 | 10.34 | 10.57 | 10.80 | 11.03 |
| | PI | 4.92 | 4.99 | 5.05 | 5.11 | 5.18 |

**LEGEND**

TC – Total Cooling Capacity, kW
SC – Sensible Capacity, kW
PI – Power Input, kW
WB – Wet Bulb Temp., (ºC)
DB – Dry Bulb Temp., (ºC)
ID – Indoor
OD – Outdoor

### 5.5.2 Capacity Correction Factors (Cooling)



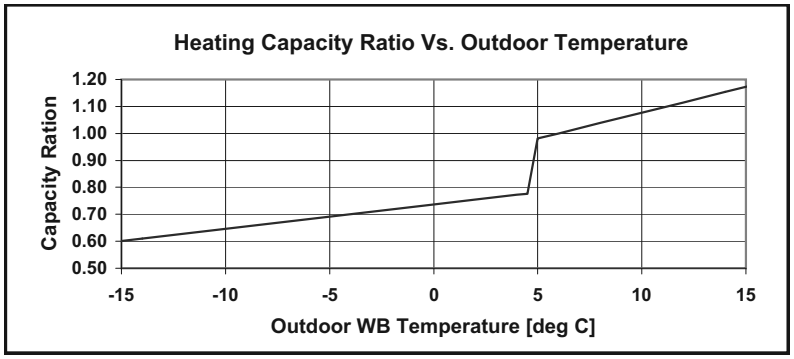
### 5.5.3 Heating Capacity

| OD COIL ENTERING AIR DB/WB TEMPERATURE [°C] | DATA | ID COIL ENTERING AIR DB TEMPERATURE [°C] | | |
|---|---|---|---|---|
| | | 15 | 20 | 25 |
| -15/-16 | TC | 10.18 | 9.47 | 8.76 |
| | PI | 2.64 | 2.91 | 3.18 |
| -10/-12 | TC | 11.34 | 10.62 | 9.91 |
| | PI | 3.18 | 3.45 | 3.72 |
| -7/-8 | TC | 12.20 | 11.49 | 10.78 |
| | PI | 3.59 | 3.86 | 4.13 |
| -1/-2 | TC | 12.63 | 11.92 | 11.21 |
| | PI | 3.79 | 4.06 | 4.33 |
| 2/1 | TC | 12.92 | 12.21 | 11.50 |
| | PI | 3.93 | 4.20 | 4.47 |
| 7/6 | TC | 16.71 | **16.00** | 15.29 |
| | PI | 4.13 | **4.40** | 4.67 |
| 10/9 | TC | 17.63 | 16.92 | 16.21 |
| | PI | 4.38 | 4.65 | 4.92 |
| 15/12 | TC | 18.56 | 17.84 | 17.13 |
| | PI | 4.63 | 4.89 | 5.16 |
| 15-24 (Protection Range) | TC | 85 - 105 % of nominal | | |
| | PI | 80 - 120 % of nominal | | |

**LEGEND**

TH – Total Heating Capacity, kW
PI – Power Input, kW
WB – Wet Bulb Temp., (°C)
DB – Dry Bulb Temp., (°C)
ID – Indoor
OD – Outdoor

### 5.5.4 Capacity Correction Factors (Heating)



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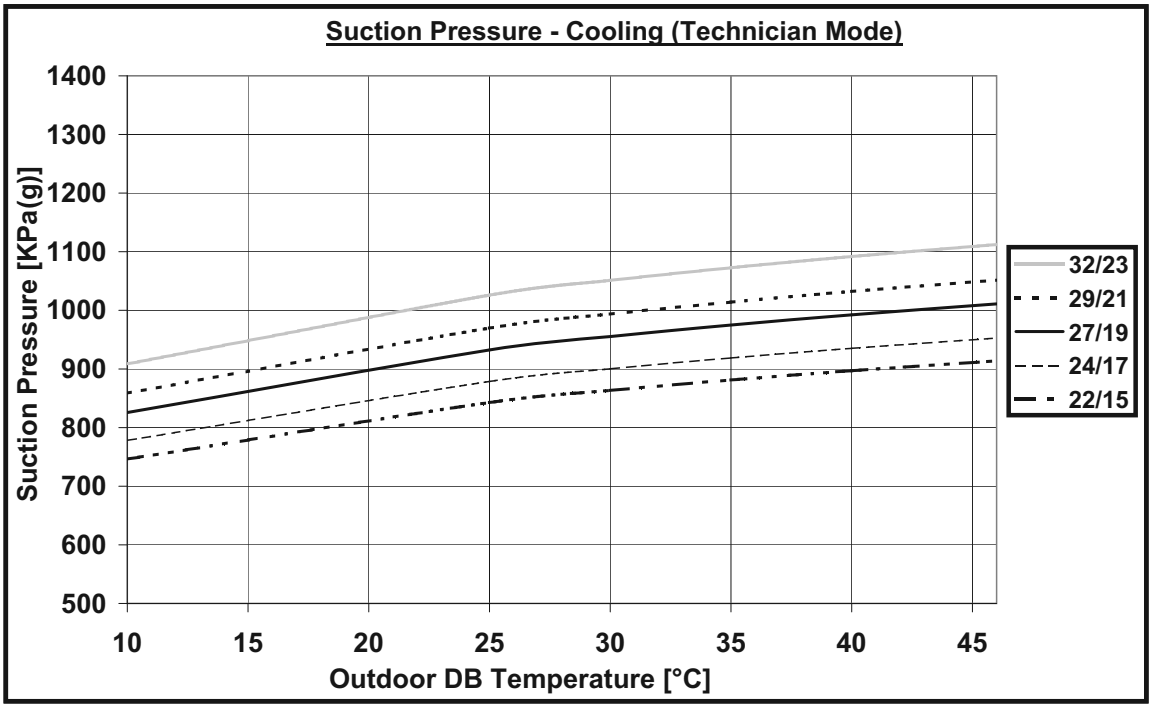
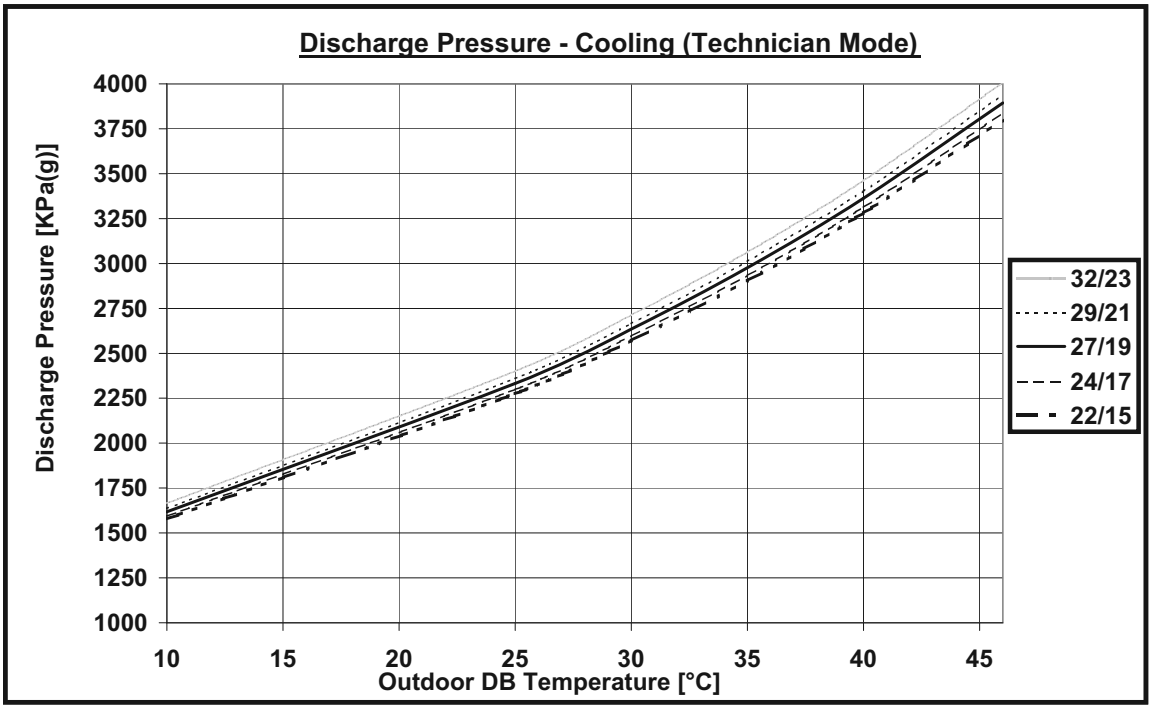
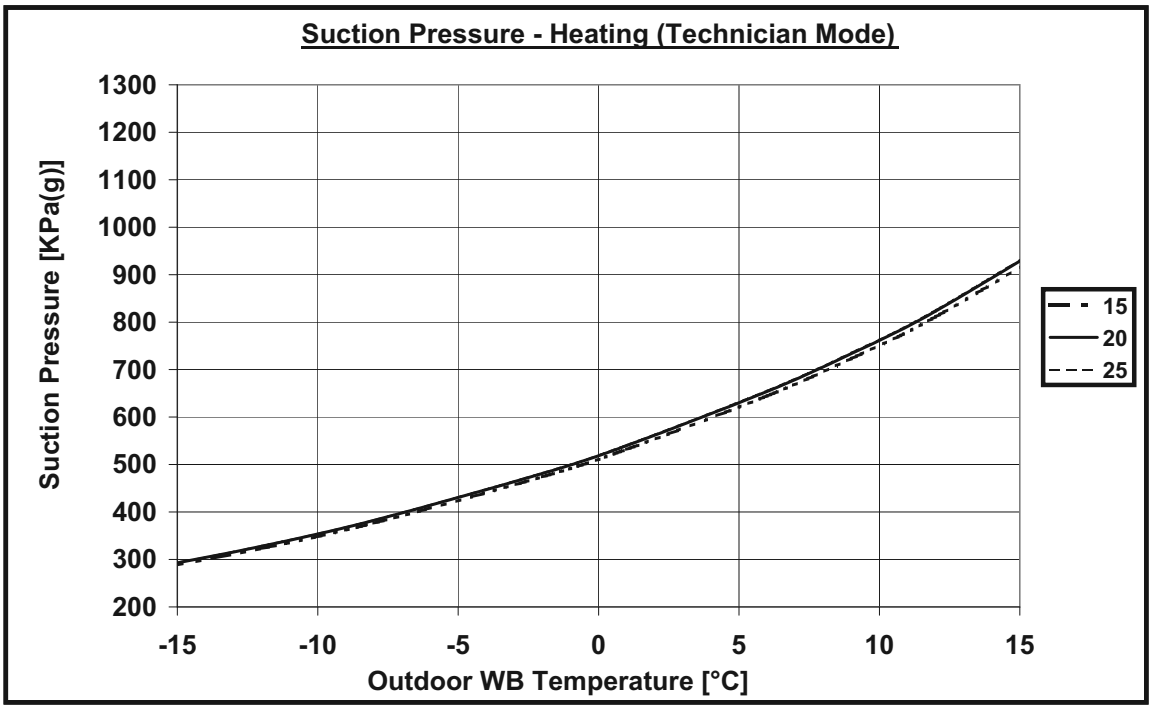
## 5.5.5 Pressure Curves (Cooling – Technician Mode)

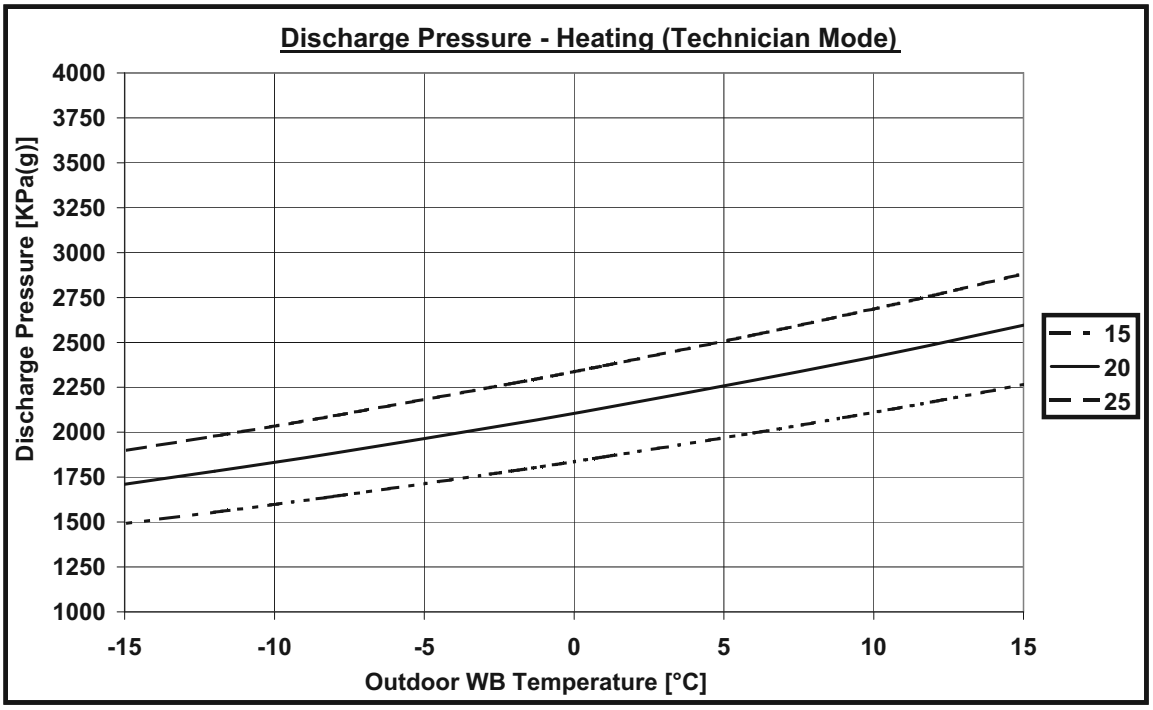
### 5.5.5.1 *Cooling*



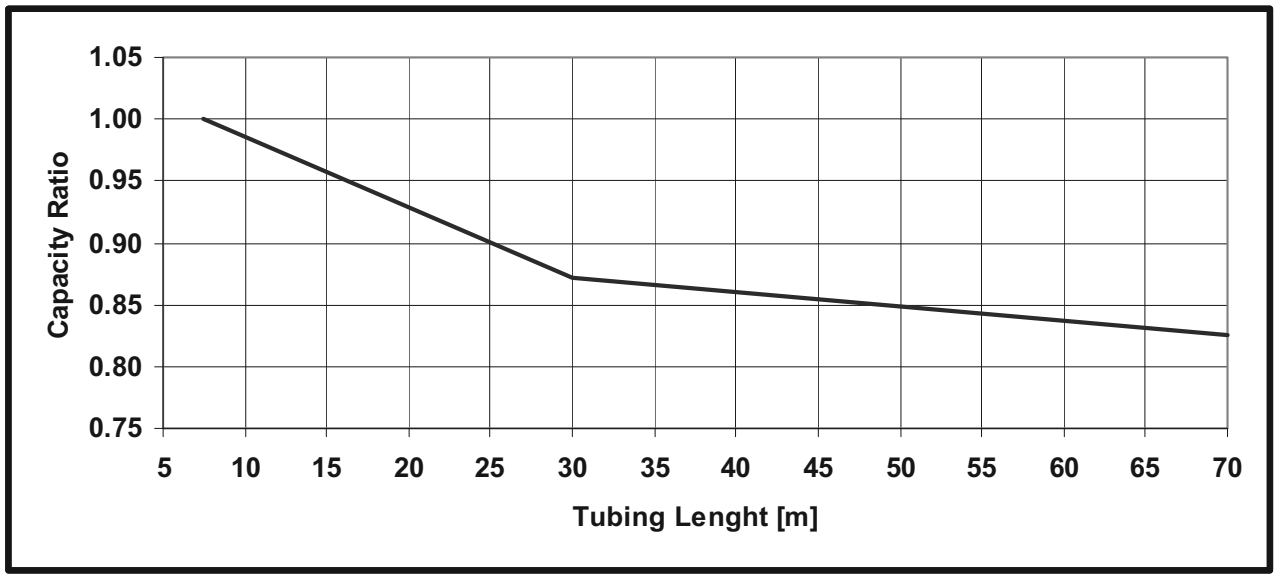
#### 5.5.5.2 *Heating*



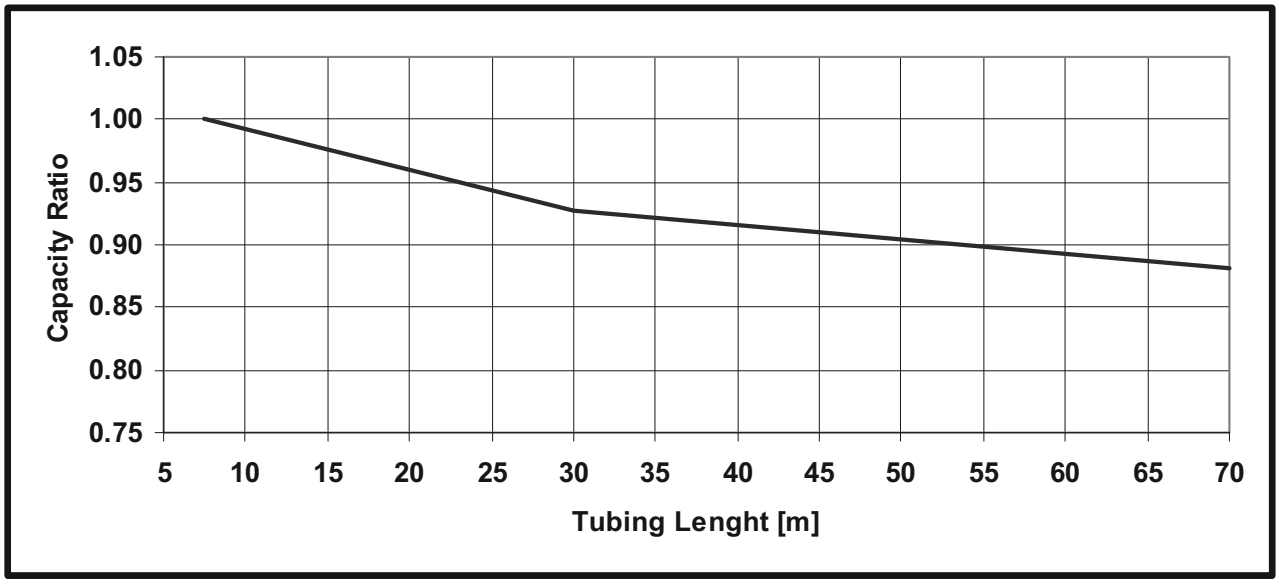



## 5.6 Capacity Correction Factor for Tubing Length

### 5.6.1 Cooling

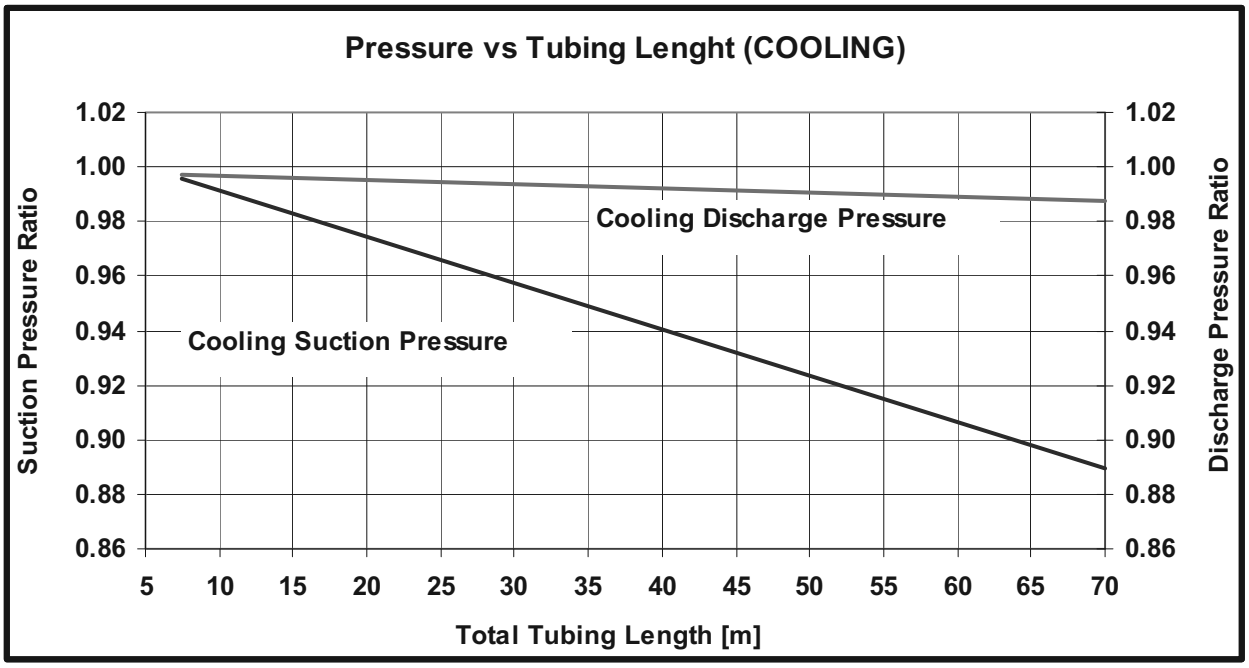



### 5.6.2 Heating

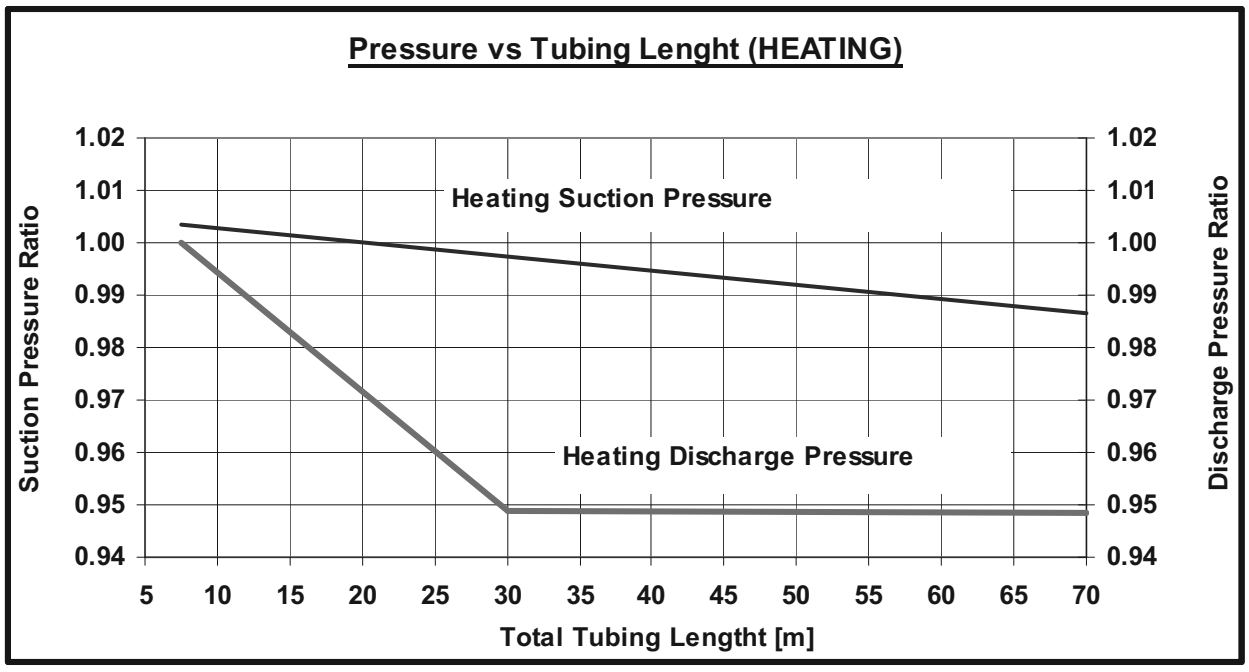


## 5.7 Pressure Correction Factor for Tubing Length

### 5.7.1 Cooling




### 5.7.2 Heating



## 5.8 Calculation Example

| | |
|---|---|
| **Outdoor Unit** | OU12 5HP DCI |
| **Indoor Unit** | DNG 125 DCI |
| **Operation Mode** | Cooling Mode |
| **Conditions Indoor** | 22°CDB/15°WB |
| **Conditions Oudoor** | 30°CDB |
| **Tubing length** | 50m |

**Cooling Capacity calculation:**
Total Cooling Capacity (TC) [KW] = Capacity in conditions table x $F_T$

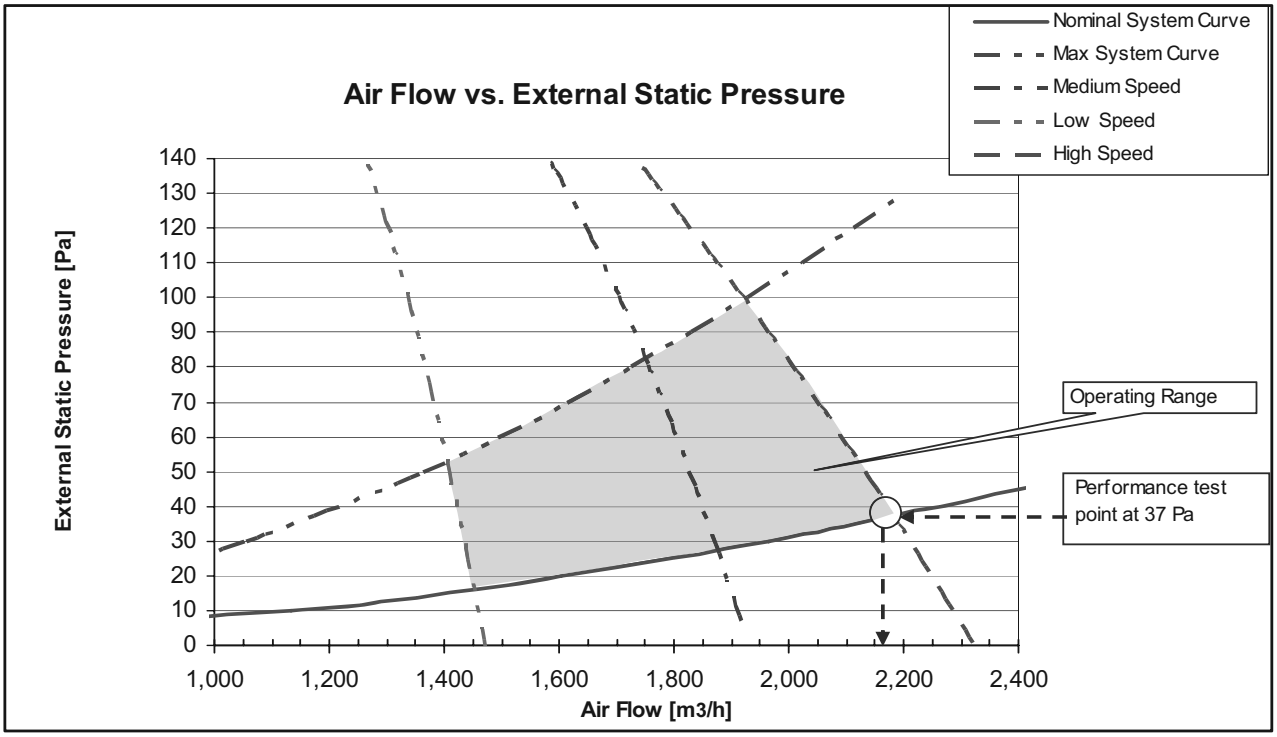
| Cooling Capacity in table [KW] | Tubing Length Factor ($F_T$) | Corrected Capacity [KW] |
|---|---|---|
| 11.5 | 0.85 | **TC** = 11.5x0.85=**9.775** |

**Cooling Pressure calculation:**
Pressure [KPa(g)] = Nominal Pressure (at 7.5m) x $F_T$

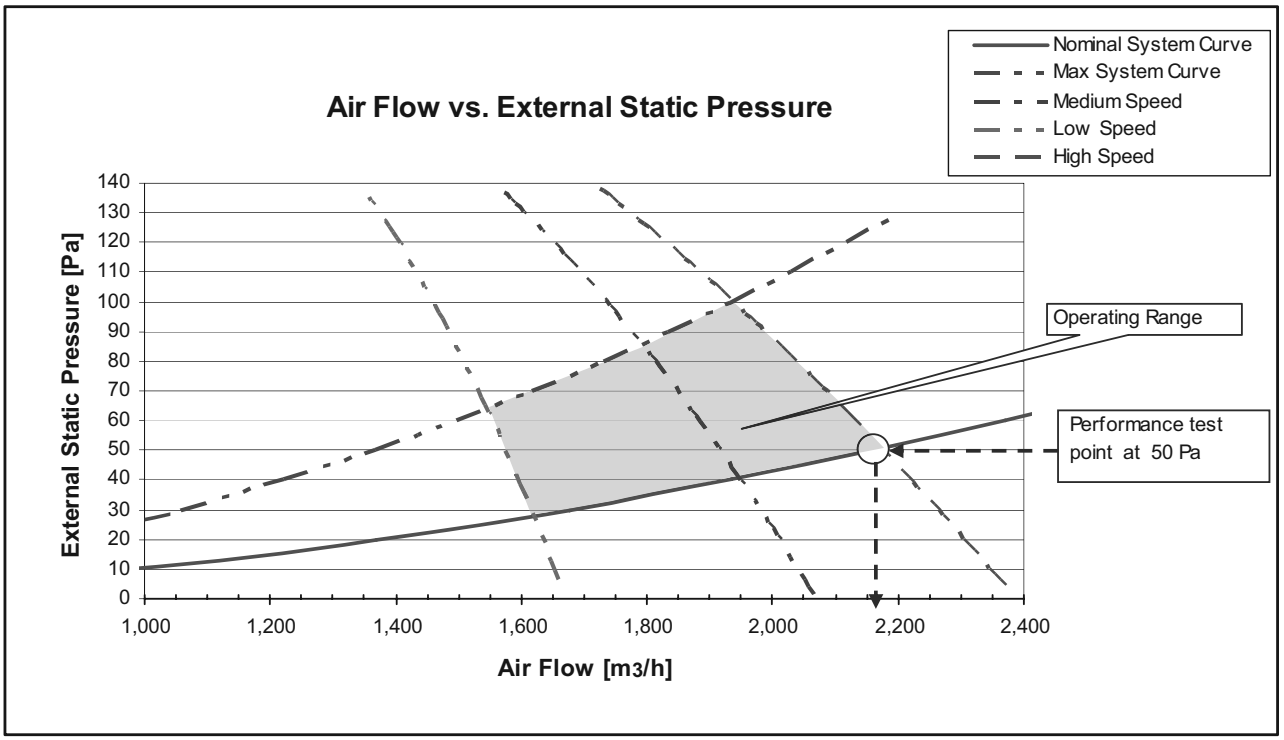
| Nominal Pressure [KPa(g)] | | Tubing Length Factor ($F_T$) | Corrected Pressure [KPa(g)] |
|---|---|---|---|
| Discharge | 2500 | 0.99 | **Pd**= 2500 x 0.99 = **2475** |
| Suction | 800 | 0.925 | **Ps**= 800 x 0.925 = **740** |

# 6. AIRFLOW CURVES

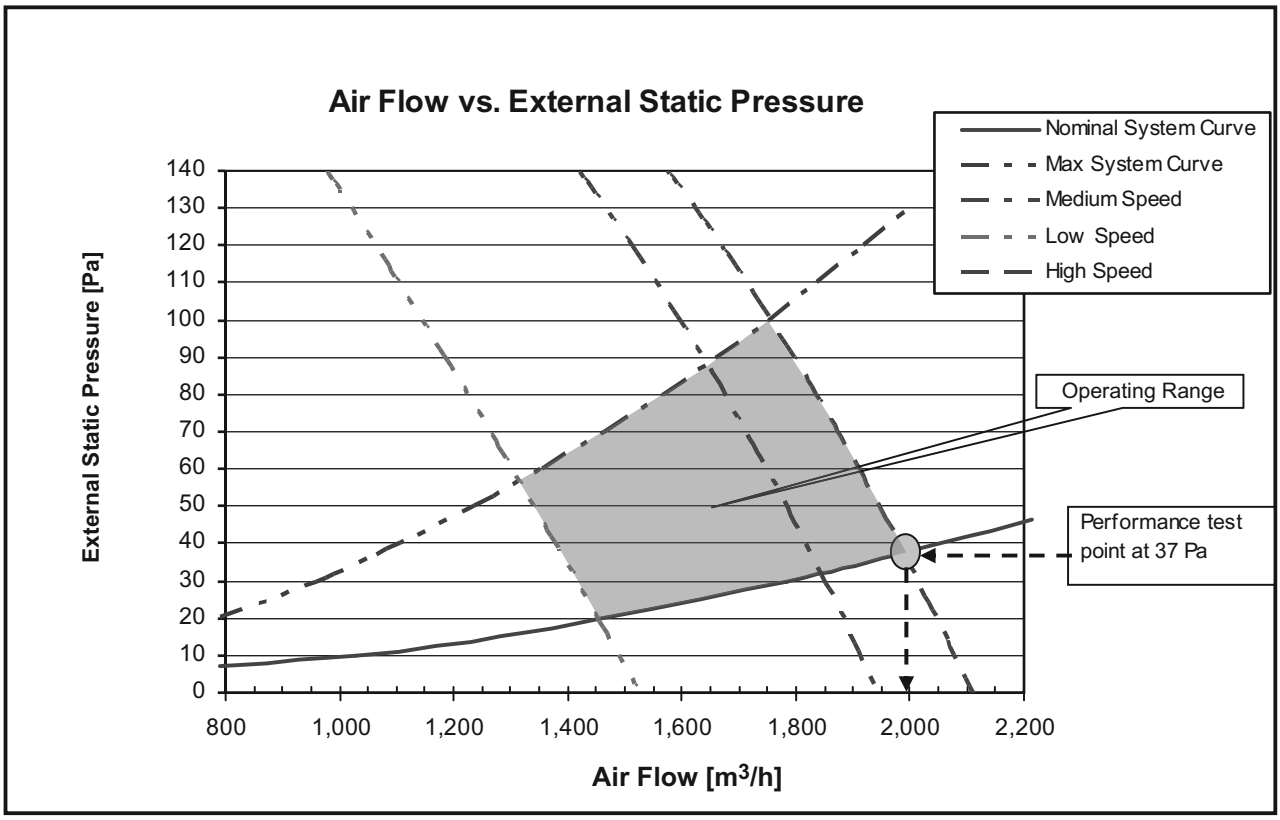
## 6.1 Model: DNG 100 DCI



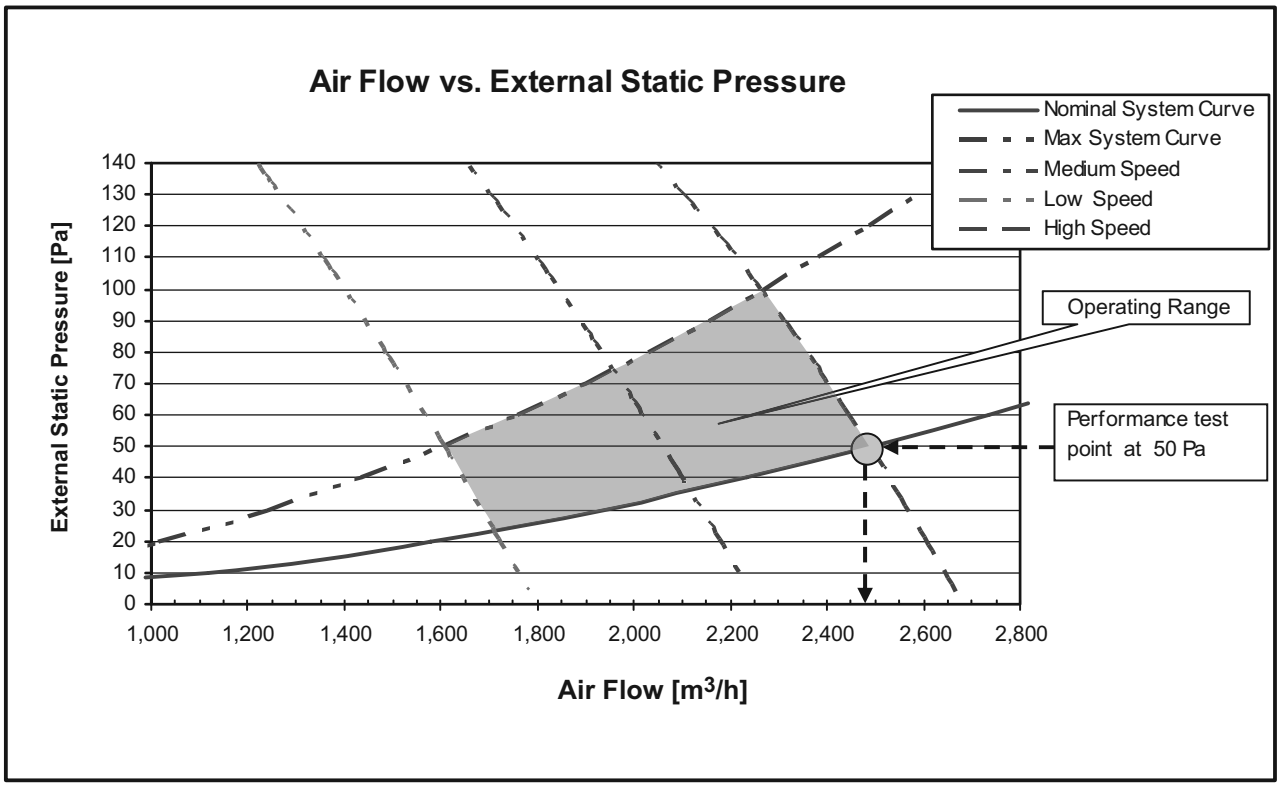

## 6.2 Model: DNG 125 DCI



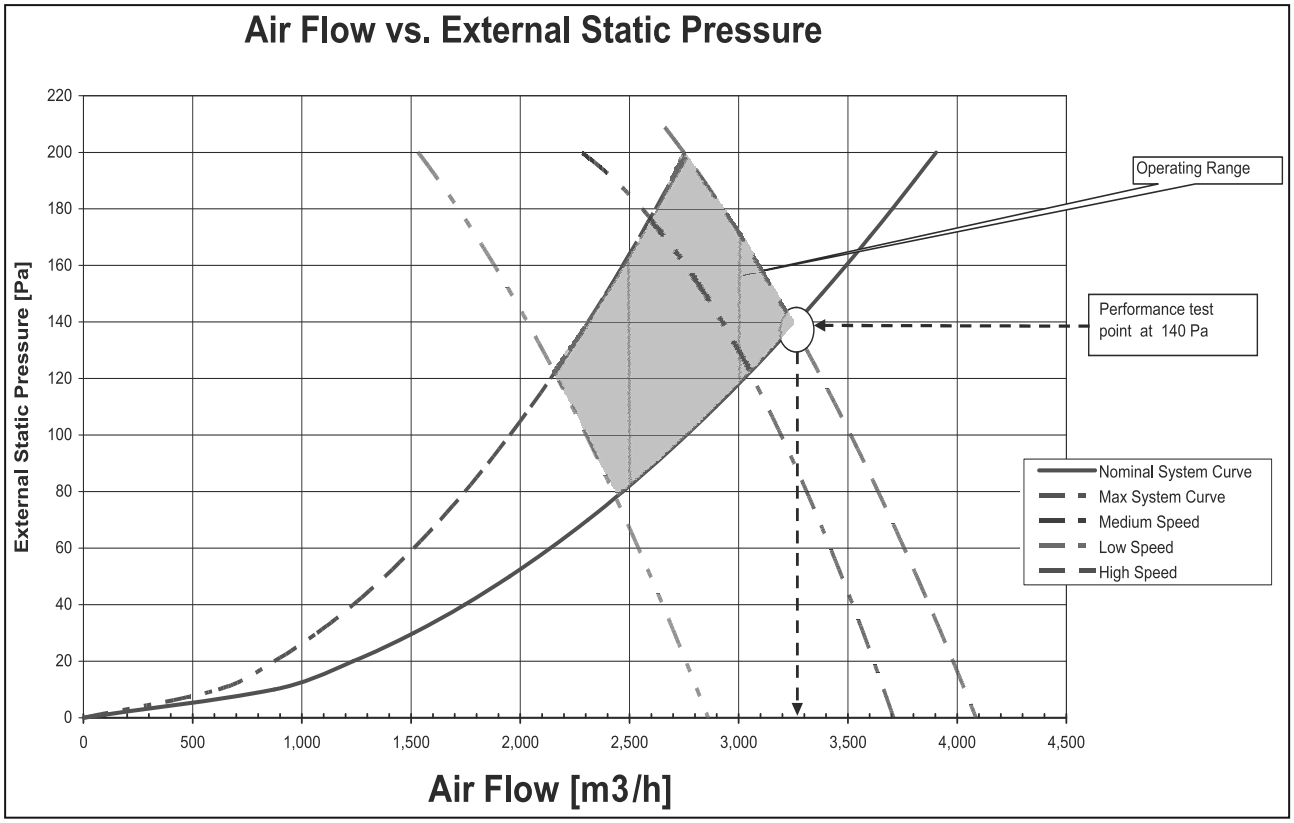
## 6.3 Model: EMD 100 DCI




## 6.4 Model: EMD 125 DCI



## 6.5 Model: CD 140 DCI




## 6.6 DNG / EMD / CD UNITS RANGE AIR FLOW CORRECTION FACTORS

**(at nominal rating conditions — Test mode).**

| | | Air Flow Rate [% of nominal] | | | | |
|---|---|---|---|---|---|---|
| | | 60% | 70% | 80% | 90% | 100% |
| Cooling | TC | 0.88 | 0.91 | 0.94 | 0.97 | 1 |
| | SC | 0.78 | 0.84 | 0.89 | 0.95 | 1 |
| | PI | 0.95 | 0.97 | 0.98 | 0.99 | 1 |
| Heating | PI | 1.07 | 1.05 | 1.03 | 1.02 | 1 |
| | TC | 0.90 | 0.92 | 0.95 | 0.97 | 1 |

* Permissible Air flow Rate - according to model Air Flow Curves

# 7. SOUND LEVEL CHARACTERISTICS

## 7.1 Indoor Units Test Scheme

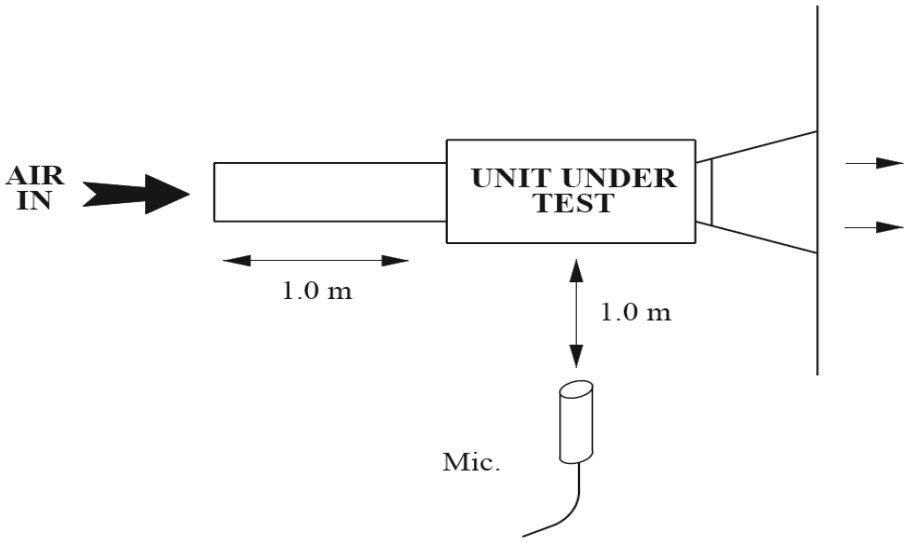
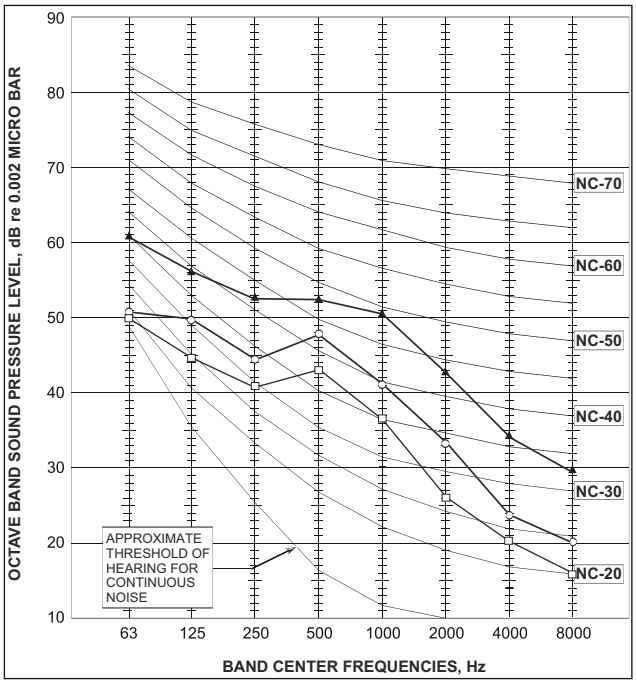


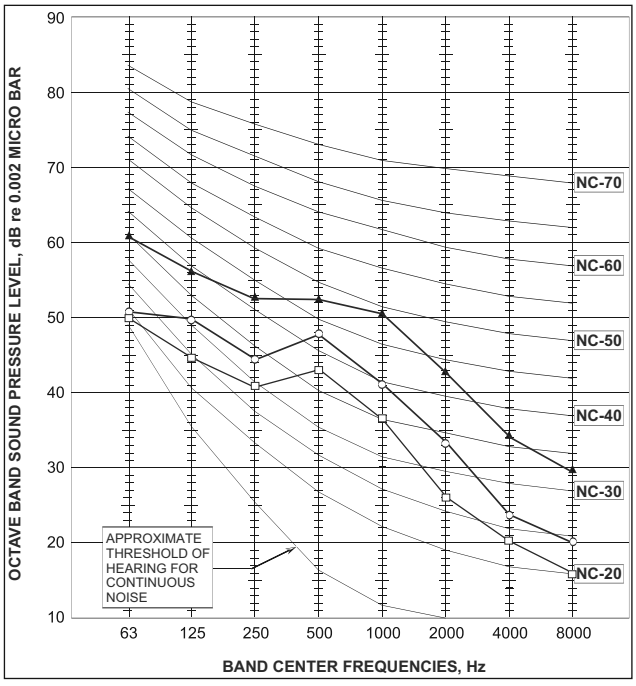

Figure 1

## 7.2 Sound Pressure Level Spectrum (Measured as Figure 1)

**DNG 100**

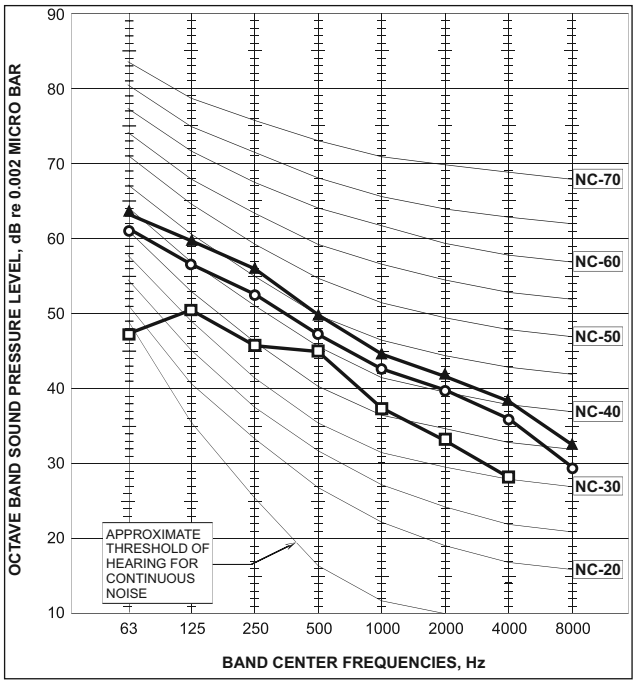



**DNG 125**

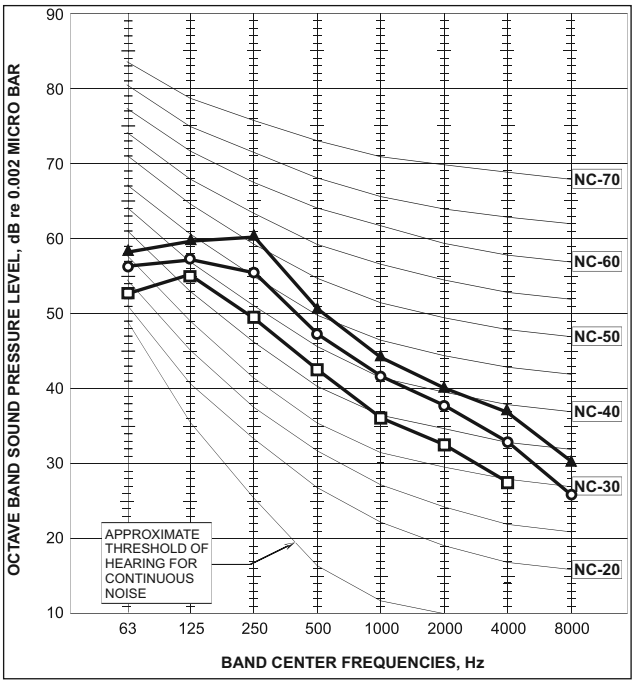



| FAN SPEED | LINE |
|---|---|
| HI | ▲ |
| ME | ○ |
| LO | □ |

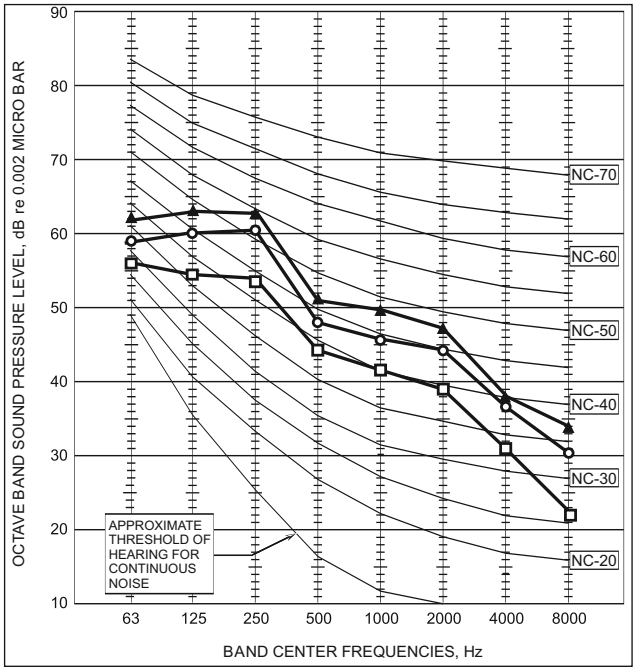
## EMD 100




## EMD 125




## CD 140




| FAN SPEED | LINE |
|---|---|
| HI | ▲ |
| ME | ○ |
| LO | □ |

## 7.3 Outdoor Units

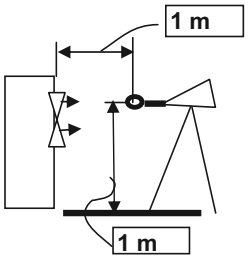
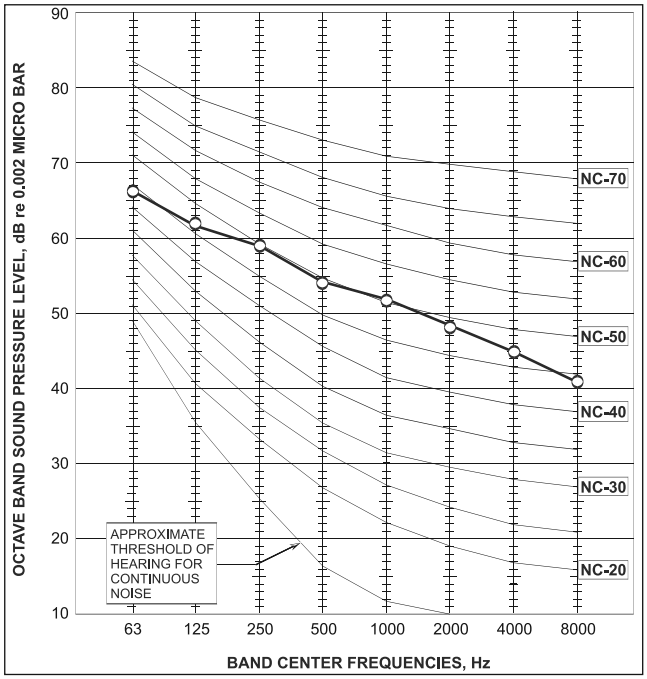


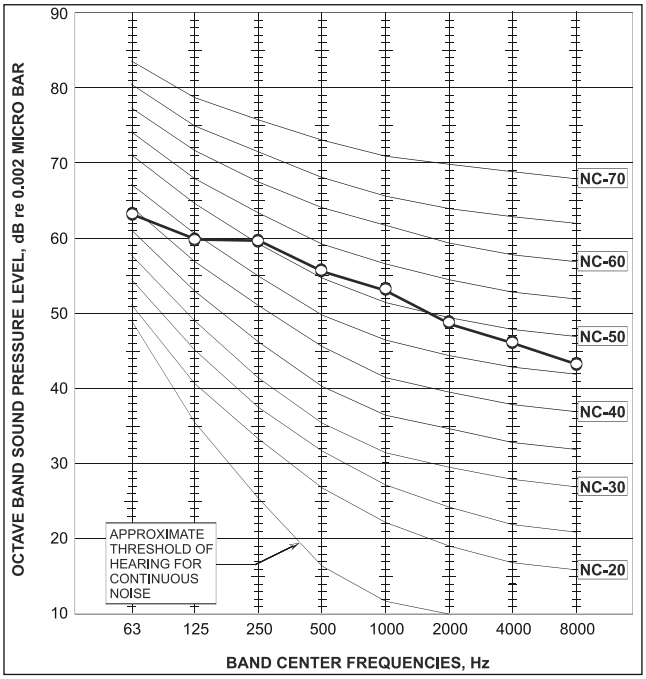

Figure 2

## 7.4 Sound Pressure Level Spectrum (Measured as Figure 2)

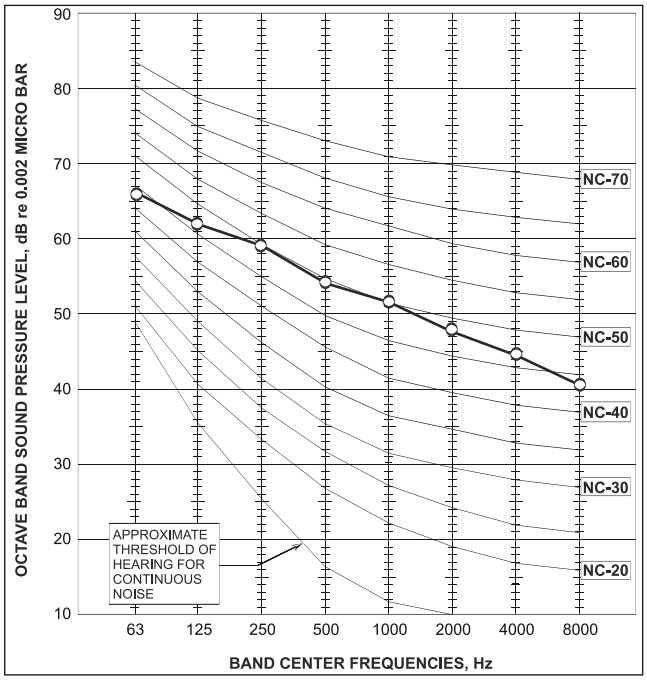
### OU12 4HP DCI Cooling



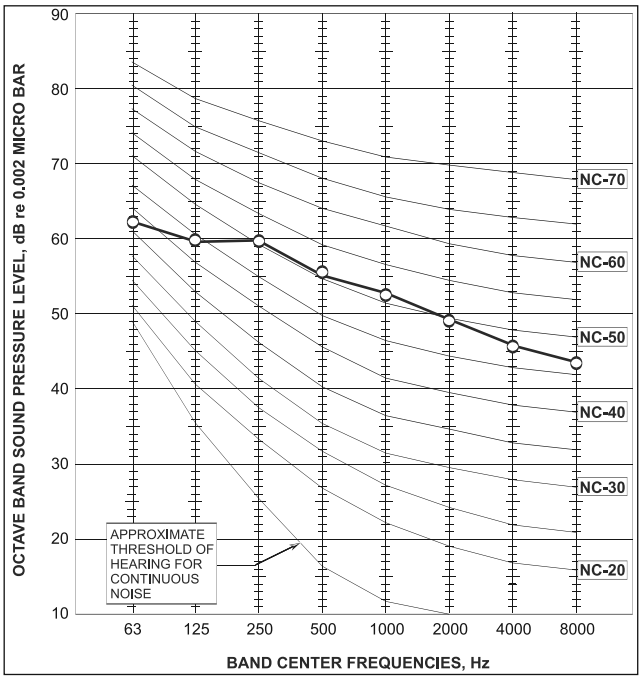

### OU12 4HP DCI Heating



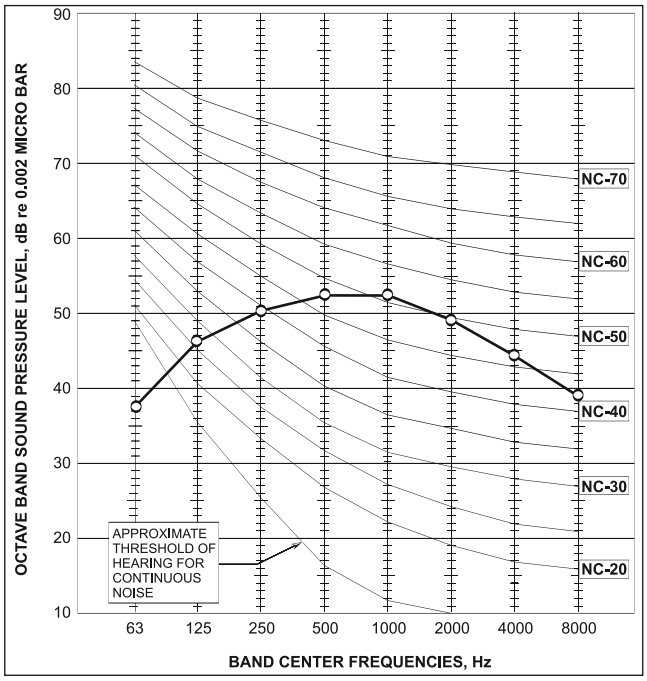

### OU12 5HP DCI Cooling



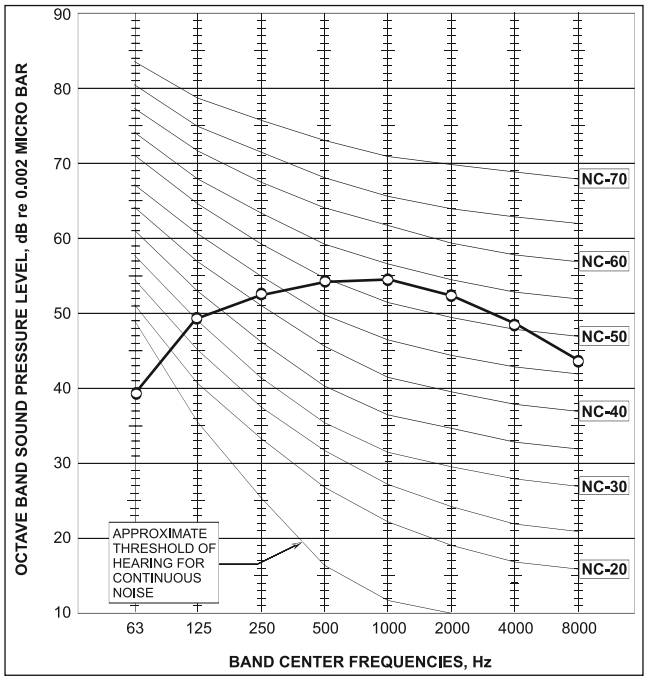

### OU12 5HP DCI Heating



## OU12 6HP DCI Cooling




## OU12 6HP DCI Heating



# 8. ELECTRICAL DATA

## 8.1 Single Phase Units

| MODEL | OU12 4PH DCI | | OU12 5-6PH DCI | |
|---|---|---|---|---|
| Power Supply | 1PH – 230V – 50 Hz | | | |
| Connected to (a) | Outdoor | Indoor | Outdoor | Indoor |
| Max Current | 23A | 5A | 28A | 5A |
| Inrush Current (c) | 30A | | | |
| Starting Current (d) | 10A | | | |
| Circuit Breaker | 25A | 10A | 32A | 10A |
| Power Supply Wiring No. X Cross Section | 3 X 4.0 $mm^2$ | 3 X 1.5 $mm^2$ | 3 X 6.0 $mm^2$ | 3 X 1.5 $mm^2$ |
| Interconnecting Cable No. X Cross Section (b) | 3 X 1.5 $mm^2$ + 2 X 0.75 $mm^2$ (Communications) | 2 X 0.75 $mm^2$ (Communications) | 3 X 1.5 $mm^2$ + 2 X 0.75 $mm^2$ (Communications) | 2 X 0.75 $mm^2$ (Communications) |

(a) Power supply can be connected in both ways:
- ❖ To outdoor unit to supply both outdoor and indoor unit.
- ❖ To outdoor unit and to Indoor unit separately.

(b) Communication wires must be separated from the power wires and should be shielded type, earth connectedat both ends.

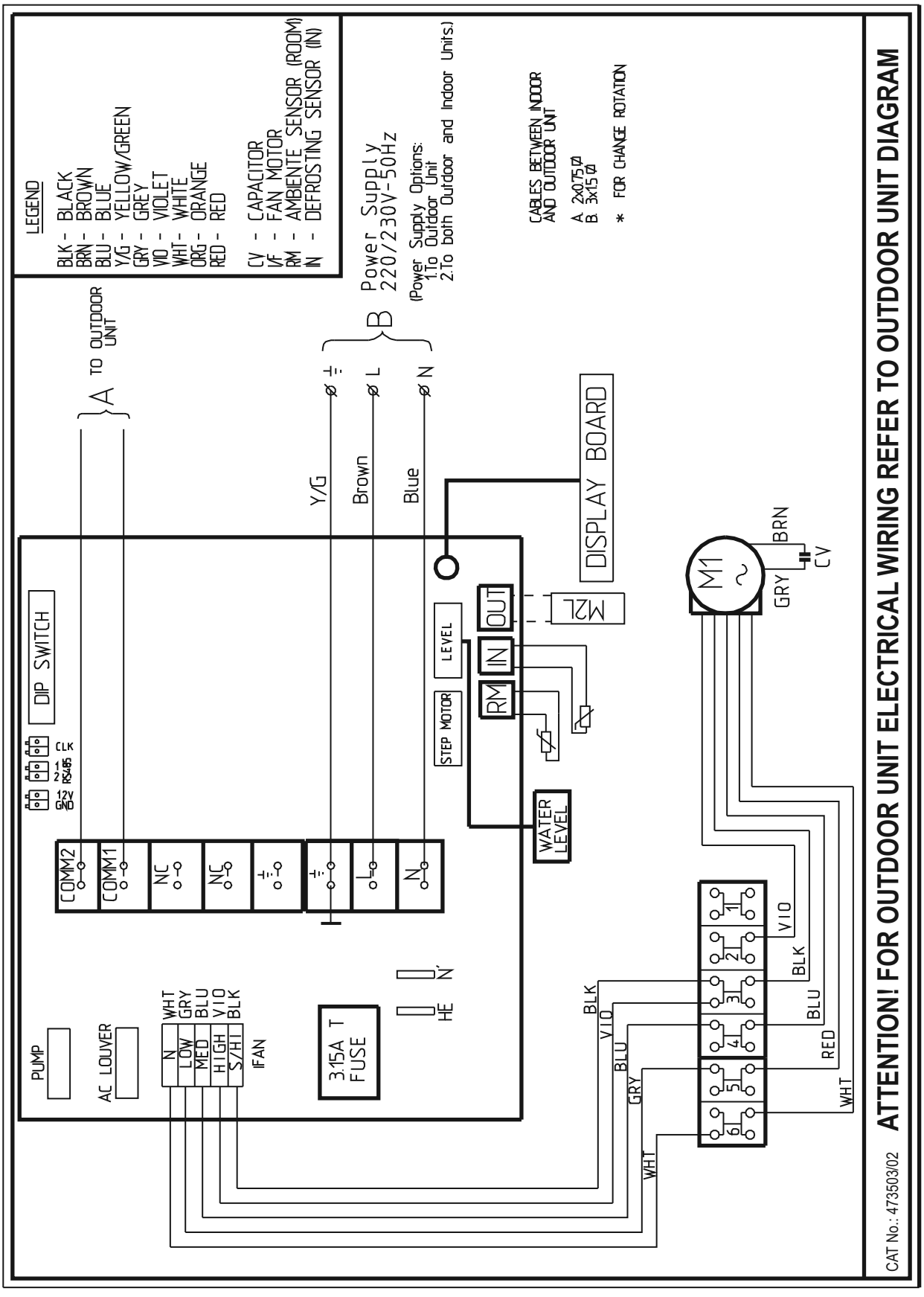
(c) Inrush current is the current when power is up (charging the DC capacitors at outdoor unit controller).

(d) Starting current is the current peak when starting the compressor.

**NOTE:**
Power wiring cord should comply with local lows and electrical regulations requirements.

# 9. WIRING DIAGRAMS

## 9.1 Indoor Unit: DNG 100, DNG 125 DCI



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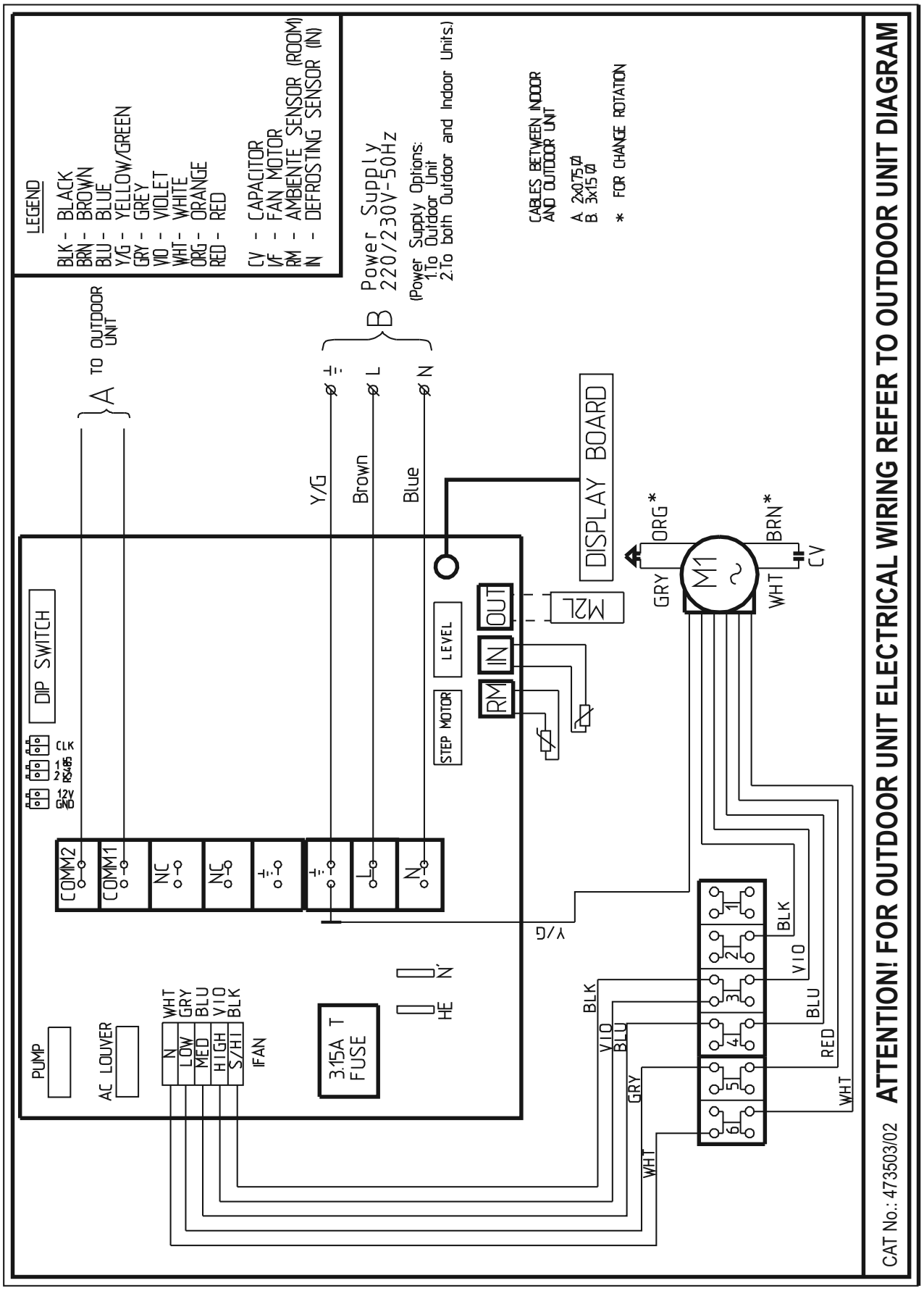
## 9.2 Indoor Unit: EMD 100, EMD 125 DCI



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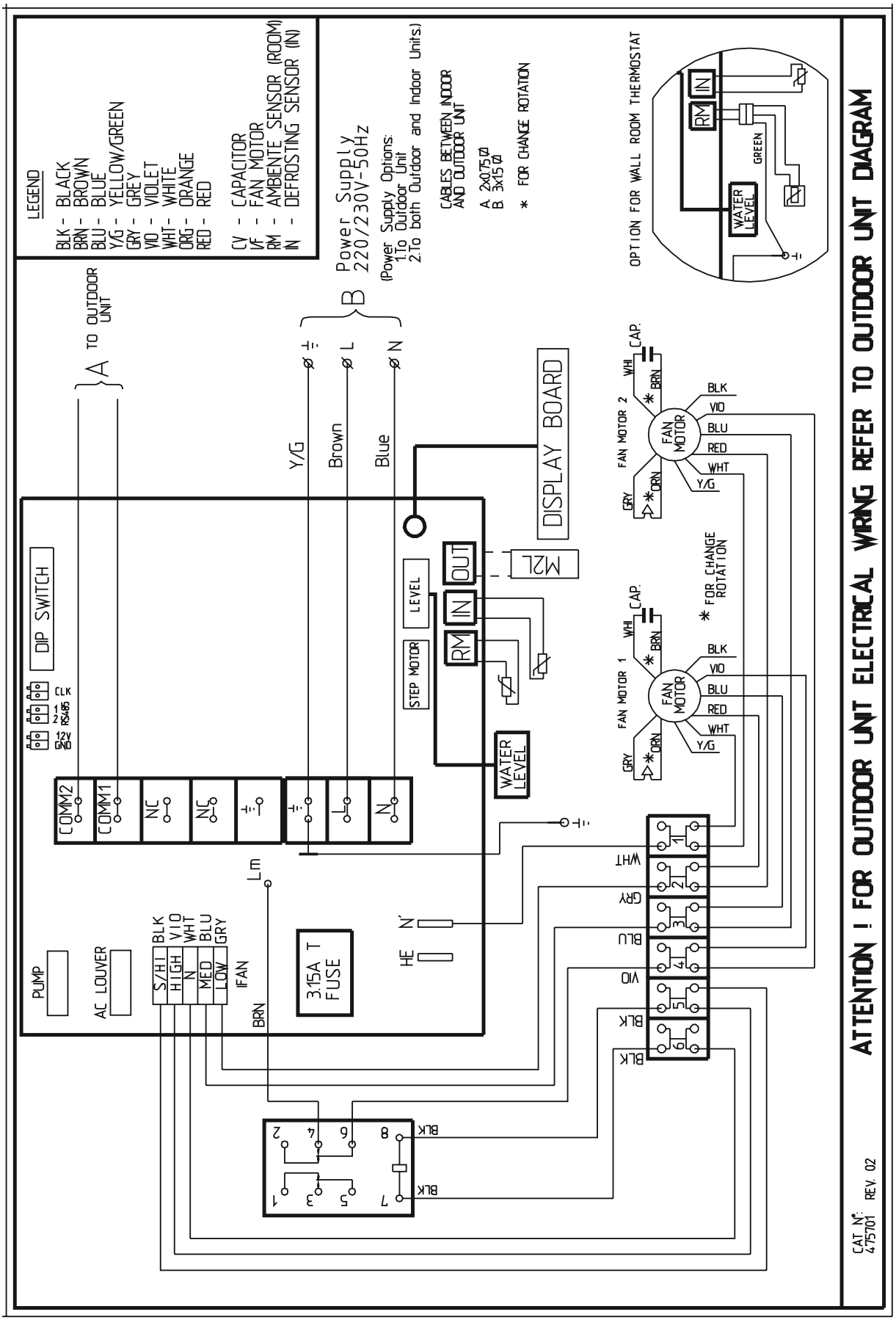
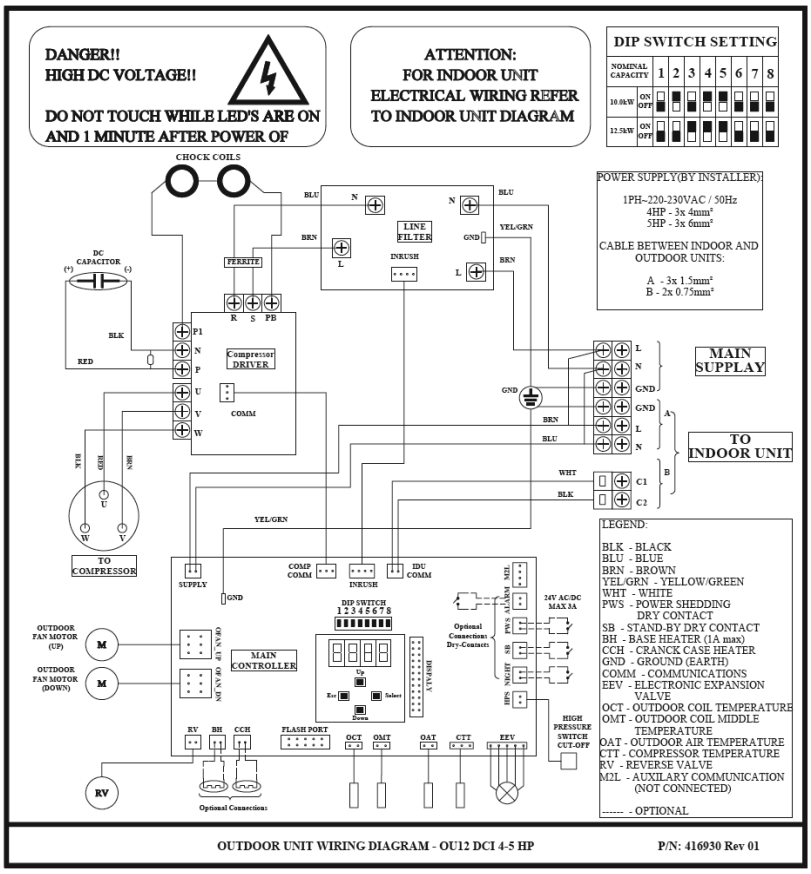
## 9.3 Indoor Units: CD 140 DCI



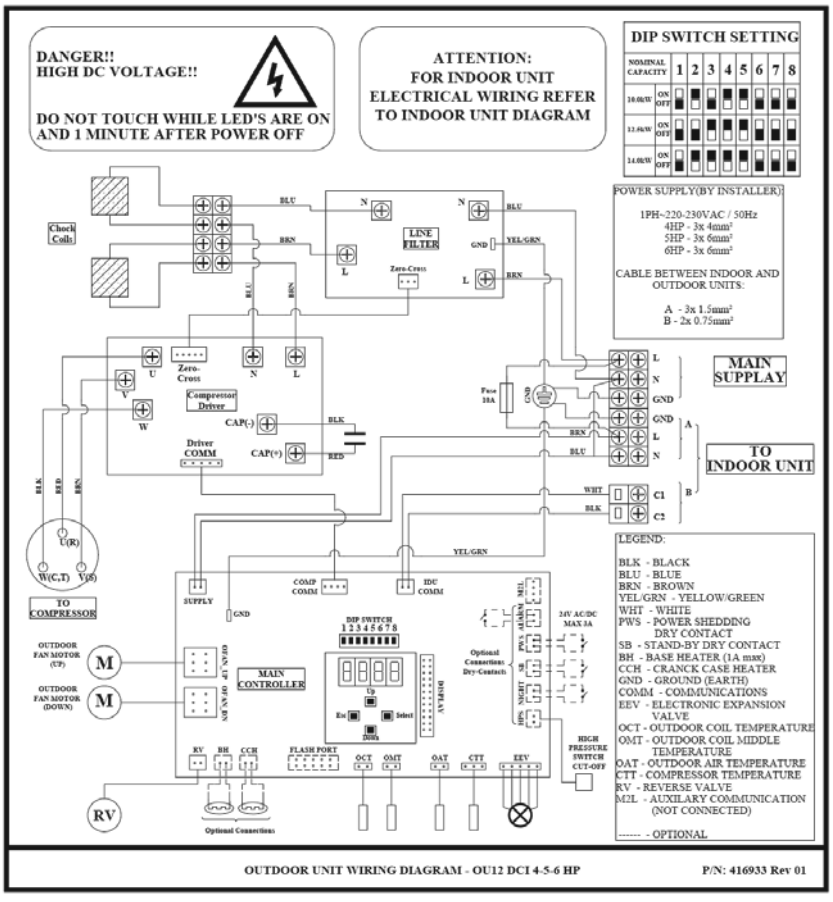



CONTENTS

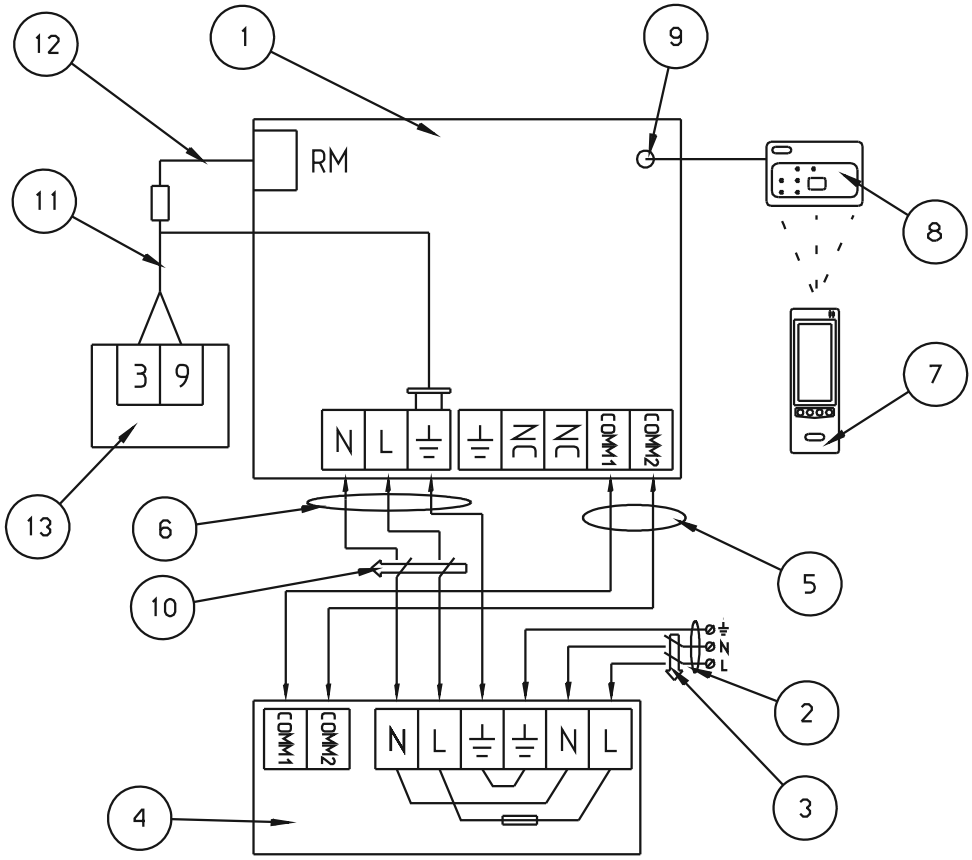
## 9.4 Outdoor Units: OU12 4-5HP DCI




## 9.5 Outdoor Units: OU12 6HP DCI



## 9.6 1PH UNITS POWER SUPPLY TO OUTDOOR (10.0, 12.5 Kw units)

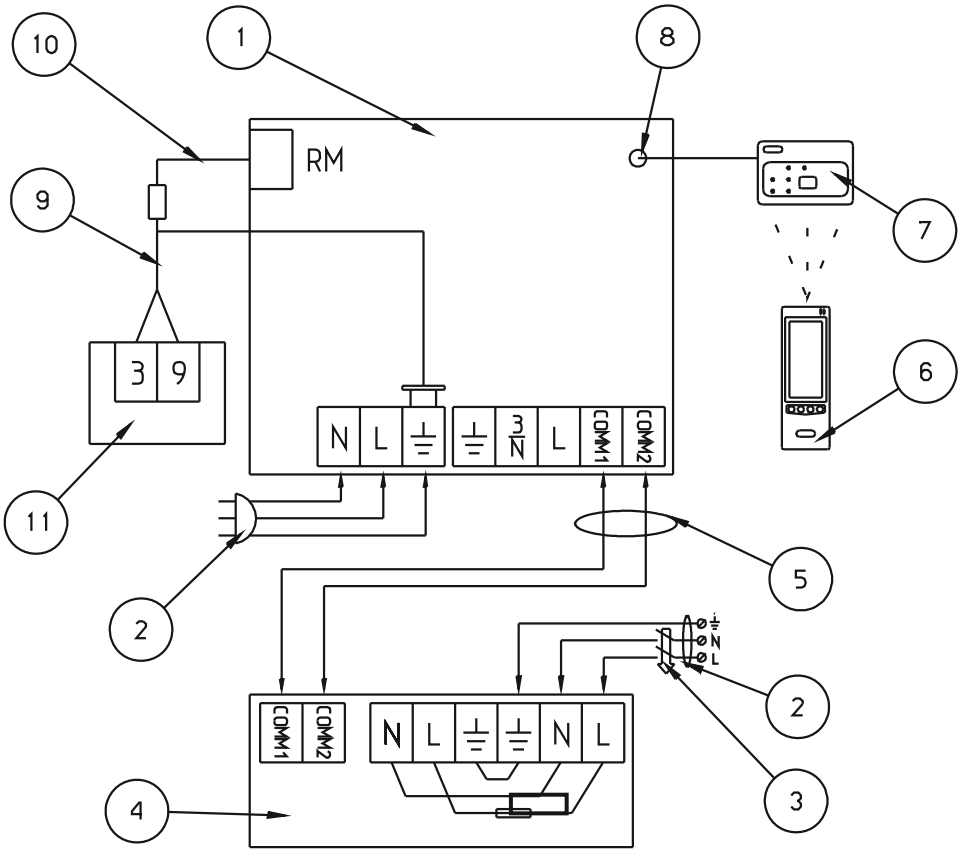



1. Indoor Unit
2. Power Supply Cable
3. Main Power Breaker
4. Outdoor Unit
5. Interconnecting cable (2x0.75mm$^2$)**
6. Power Interconnecting Cable (3x1.5mm$^2$)
7. Wireless remote Control
8. Display Unit
9. Display Connector
10. Power Breaker (*by installer)
11. Control Cable**
12. Sensor Wire with connector
13. Room Temperature Sensor

* The power breaker must be of type that disconnects all poles with 3 mm contact opening.
** Use shielded cable and connect the shield to earth point

## 9.7 1PH UNITS POWER SUPPLY TO OUTDOOR and INDOOR UNIT SEPERATELY

### (10.0, 12.5 Kw units)




1. Indoor Unit
2. Power Supply Cable
3. Main Power Breaker
4. Outdoor Unit
5. Interconnecting cable (2x0.75mm$^2$)*
6. Wireless remote Control
7. Display Unit
8. Display Connector
9. Control Cable*
10. Sensor Wire with connector
11. Room Temperature Sensor

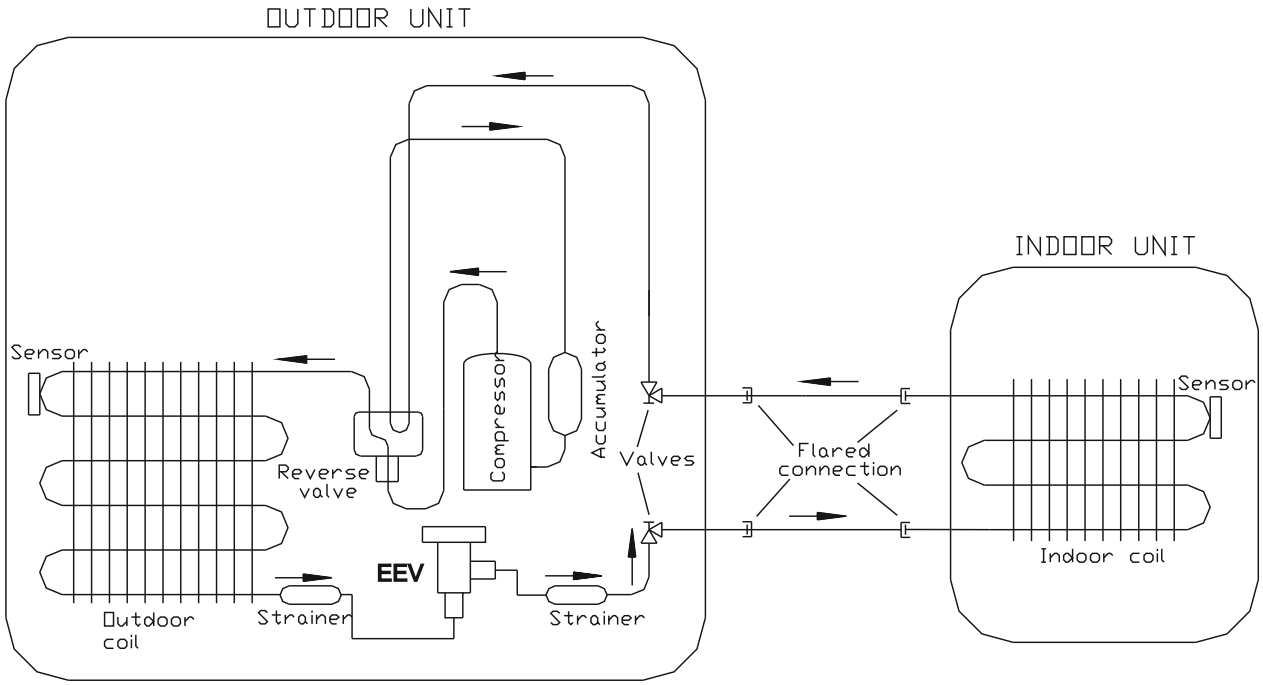
* Use shielded cable and connect the shield to earth point.

# 10. REFRIGERATION DIAGRAMS

## 10.1 Heat Pump Models

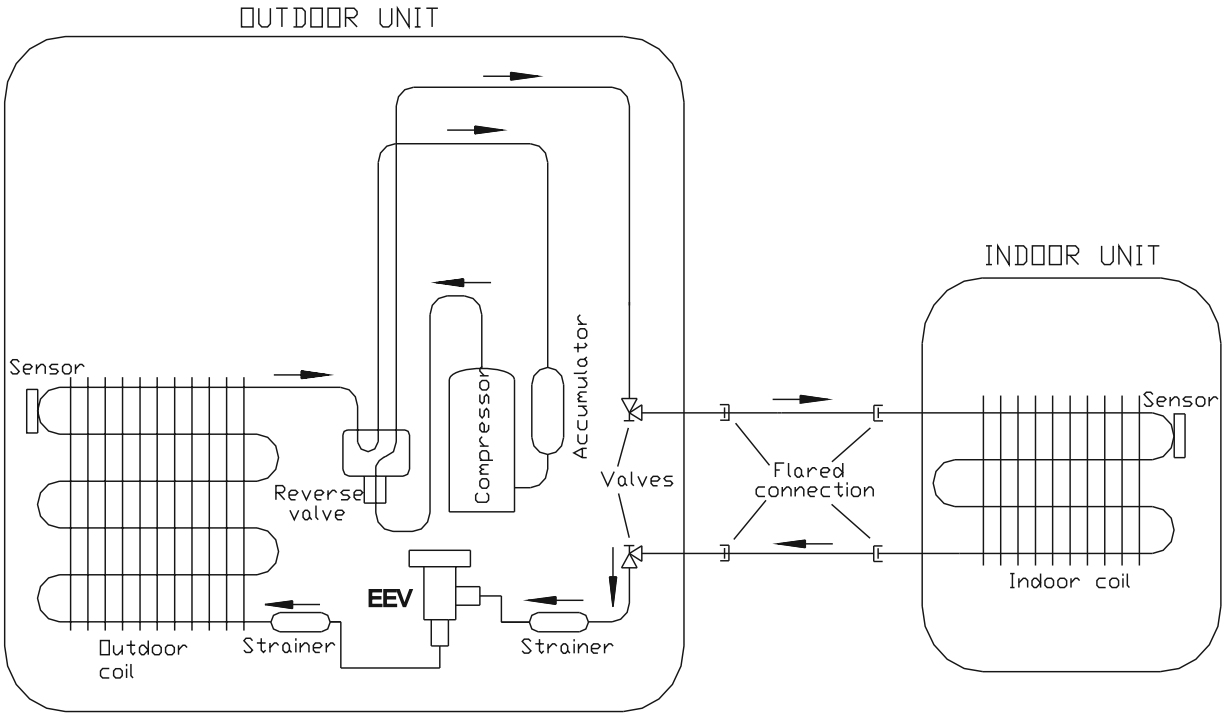
### 10.1.1 DNG 100 / 125 DCI, EMD 100 / 125 DCI, CD 140 DCI

**Cooling mode**



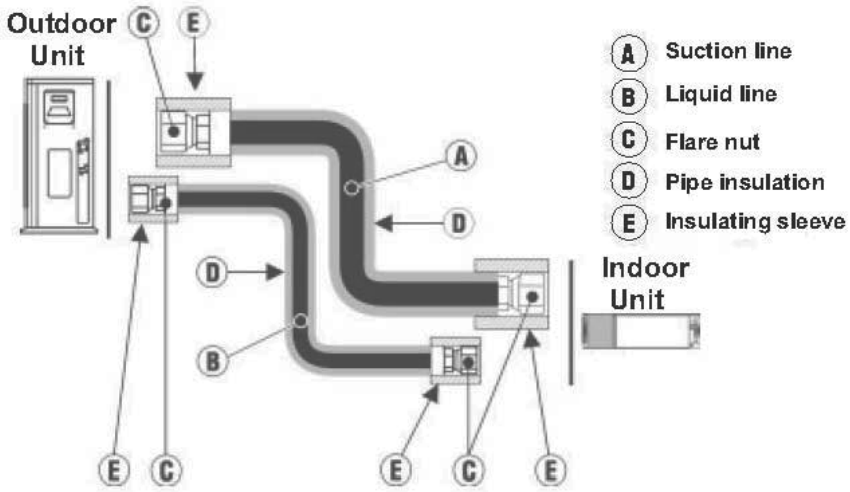

COOLING & DRY MODE

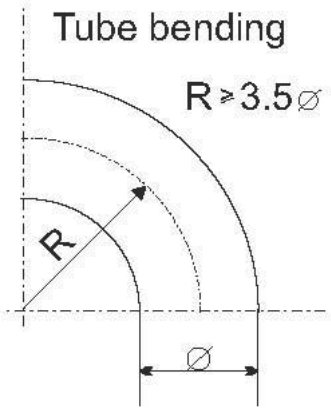
**Heating mode**

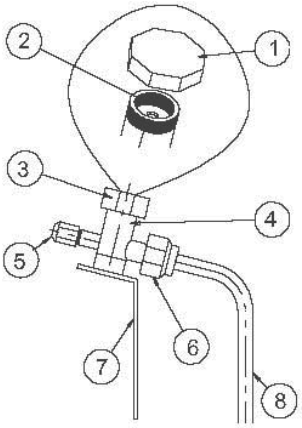



HEATING MODE

# 11. TUBING CONNECTIONS




| TUBE (Inch) / TORQUE (Nm) | 1/4" | 3/8" | 1/2" | 5/8" | 3/4" |
|---|---|---|---|---|---|
| **Flare Nuts** | 15-18 | 40-45 | 60-65 | 70-75 | 80-85 |
| **Valve Cap** | 13-20 | 13-20 | 18-25 | 18-25 | 40-50 |
| **Service Port Cap** | 11-13 | 11-13 | 11-13 | 11-13 | 11-13 |

1. Valve Protection Cap-end
2. Refrigerant Valve Port (use Allen wrench to open/close)
3. Valve Protection Cap
4. Refrigerant Valve
5. Service Port Cap
6. Flare Nut
7. Unit Back Side
8. Copper Tube

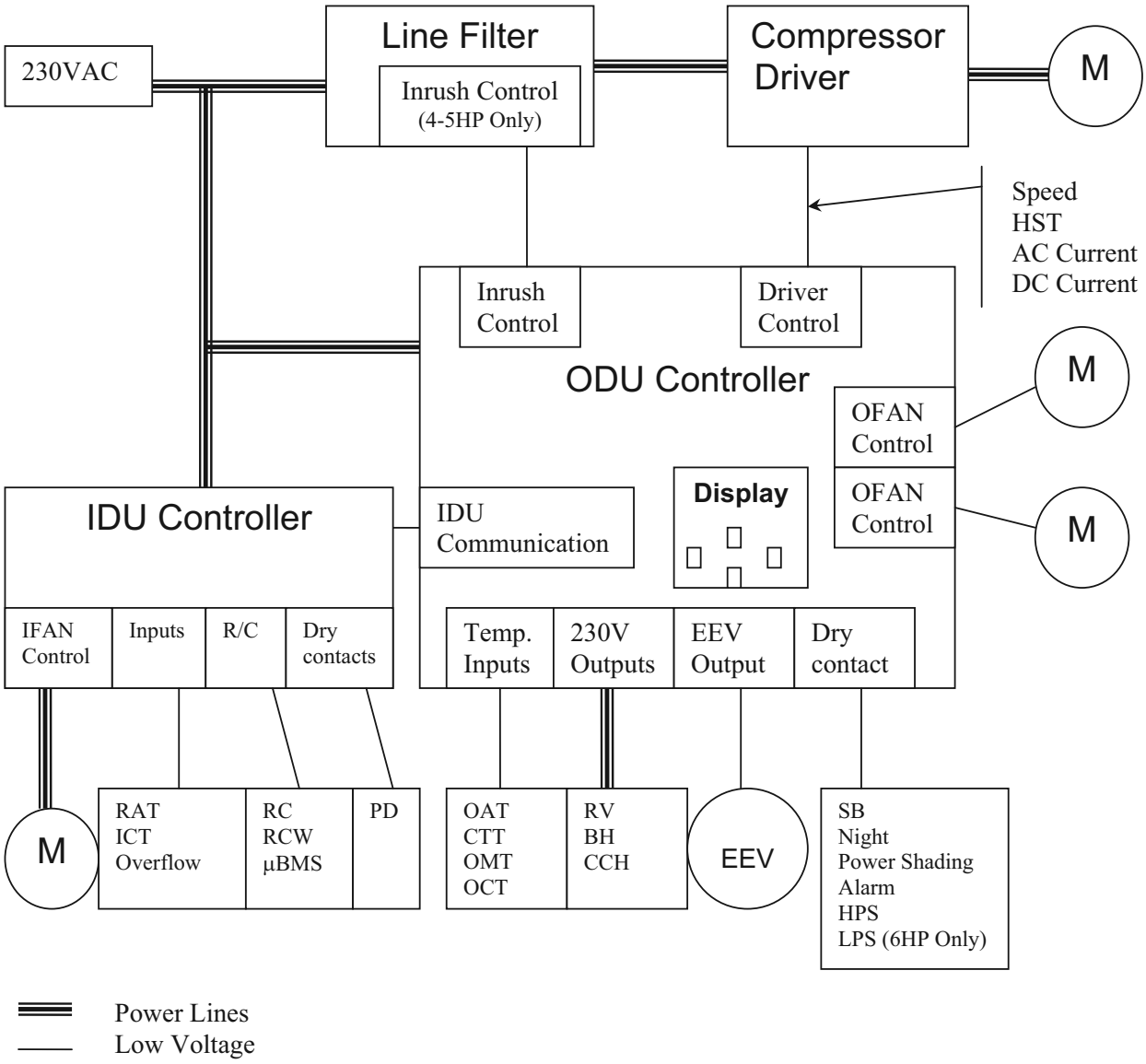
# 12. CONTROL SYSTEM

## 12.1 Abbreviations

| Abbreviation | Definition |
|---|---|
| **A/C** | Air Conditioner |
| **BMS** | Building Management System |
| **CCR** | Compressor Current |
| **CCH** | Crankcase Heater |
| **COMP** | Compressor |
| **CTT** | Compressor Top Temperature sensor |
| **DCI** | DC Inverter |
| **E²PROM, EEP** | Erase Enable Programmable Read Only Memory |
| **EEV** | Electronic Expansion Valve |
| **HE** | Heating Element |
| **HMI** | Human Machine Interface |
| **HST** | Heat Sink Temperature sensor |
| **Hz** | Hertz (1/sec) – electrical frequency |
| **ICT** | Indoor Coil Temperature (RT2) sensor |
| **IDU** | Indoor Unit |
| **IFAN** | Indoor Fan |
| **M2L** | Mega Tool (Monitoring SW) |
| **MCU** | Micro Controller Unit |
| **NA** | Not Applicable |
| **OAT** | Outdoor Air Temperature sensor |
| **OCT** | ODU Coil Temperature sensor |
| **OMT** | Outdoor middle coil temperature |
| **ODU** | Outdoor Unit |
| **OFAN** | Outdoor Fan |
| **PFC** | Power Factor Corrector |
| **RAC** | Residential A/C |
| **RC** | Reverse Cycle (Heat Pump) |
| **RPS** | Rounds per second (mechanical speed) |
| **RV** | Reverse Valve |
| **SB,STBY** | Stand By |
| **SH** | Superheat |
| **SUCT/SCT** | Compressor Suction Temperature sensor |
| **S/W** | Software |
| **TBD** | To Be Defined |
| **TEMP** | Temperature |
| **TMR** | Timer |

## 12.2 Product Overview

### 12.2.1 Block Diagram




### 12.2.2 Compressor

DC brush less and sensor less motor inverter driven compressor.

### 12.2.3 Compressor Drive

DC inverter module to drive compressor.

### 12.2.4 Outdoor Fan

DC brush less motor.

### 12.2.5 RV

Reverse Valve set the direction of refrigerant flow in the system, thus setting the operation mode for cooling or heating.
When the solenoid is powered, system will work in heat mode.

### 12.2.6 EEV

Expansion valve operated by step motor which controls the size of the orifice.

### 12.2.7 HMI

Consists of Four “7-Segments” + four Push buttons for display, monitoring and setup features.

### 12.2.8 Dry Contacts

Dry contacts are used to interface the system with an external building management system (BMS).

#### 12.2.8.1 ODU Dry Contacts

- **Night** input. Switches the system to night mode when closed. During night mode, the outdoor unit speed will be reduced in order to reduce the system noise level.
- **SB** input. System will be turned to Stand-by when the contact is closed.
- **Power Shedding** input. Limits the maximum power consumption when closed.
- **Alarm** output indicates a failure in the system.

Alarm output will be activated when there in the following ODU Faults/Protections 1 to 11, 13 to 20, 22 to 26, 28 to 29.
Alarm output will be OFF when the Fault/Protection is cleared.

#### 12.2.8.2 IDU Dry Contacts

Presence detecter input.

### 12.2.9 Temperature Sensors

CTT – Compressor Top Temperature
OAT – Outdoor Air Temperature
OCT – Outdoor Coil (heat exchanger inlet) Temperature
OMT – Outdoor Coil (heat exchanger) Temperature
HST – Heat Sink Temperature
ICT – Indoor Coil (heat exchanger) Temperature
RAT – Return Air Temperature (Indoor Unit)

### 12.2.10 Base Heater

Heating element designed to melt any ice that is accumulated on the outdoor unit base during low heating operation.

### 12.2.11 Cranck case Heater

Heating element designed to heat up the compressor oil cranck case during low heating operation.

### 12.2.12 Internal coil heater

Only exists in 6HP unit. The compressor is equiped with built-in heating coils designed to heatup the compressor oil cranck case during low heating operation.

## 12.3 General Operating Rules

### 12.3.1 Communication with Indoor Unit

#### 12.3.1.1 Communication Failures Definition

##### 12.3.1.1.1 'Bad Communication' fault

The system keeps a balance of a good/bad communication packet ratio. When the ratio becomes high the system enters 'Bad Communication' fault. The system recovers from that fault when the ratio reduced below the threshold.
When in 'Bad Communication' fault, system continues its normal operation and fault code is shown in diagnostics.

##### 12.3.1.1.2 'No Communication' fault

If no legal transmission or no message received for 30 seconds, system enters 'No Communication' fault.
When in 'No Communication' fault, the fault code will be shown in diagnostics. In this case, the system will force the compressor to off.
The system will recover from 'No Communication' fault when counter is below 10 and legal massage is received

### 12.3.2 Temperature Measurements

#### 12.3.2.1 Thermistor failures definition

| Thermistor | Thermistor is Disconnected | Thermistor is Shorted |
|---|---|---|
| OCT | Temp < -35 °C | Temp > 75 °C |
| OAT | Temp < -30 °C | Temp > 75 °C |
| CTT | Temp < -30 °C | Temp > 130 °C |
| OMT | Temp < -30 °C | Temp > 75 °C |
| ICT | Temp < -30 °C | Temp > 75 °C |
| RAT | Temp < -30 °C | Temp > 75 °C |

#### 12.3.2.2 System responses for different thermistor failure

| Thermistor | Default value | | System Reaction |
|---|---|---|---|
| | COOL | HEAT | |
| OCT | 1°C | 1°C | (1) |
| OAT | 43°C | 6°C | |
| CTT | 43°C | 43°C | Forced compressor to OFF |
| HST | 75°C | 75°C | |
| OMT | 43°C | 43°C | Replaced by OCT (1) |
| ICT | 43°C | 43°C | |
| RAT | SPT+4°C | SPT-4°C | |

Notes:
(1) Whenever both OCT and OMT are faulty the compressor will be forced to OFF.

(2) Thermistor is defined as faulty (shorted/disconnected) if it's faulty for more than 10 seconds continuously. During this time, the system uses the last valid temperature.

## 12.4 Indoor Unit Control

### 12.4.1 Indoor Fan Control

When user sets the indoor fan speed to a fixed speed (Low/ Medium/ High), unit will operate constantly at set speed.
When Auto Fan is selected, indoor fan will operate in all speeds according to the cool/heat load.

### 12.4.2 Load calculation

LOAD is calculated according to the difference between actual room temperature and user set point temperature by PI control.
In high/ medium/ low indoor fan user setting, unit will operate fan in selected speed.
In AutoFan user setting, fan speed will be adjusted automatically according to the calculated LOAD.

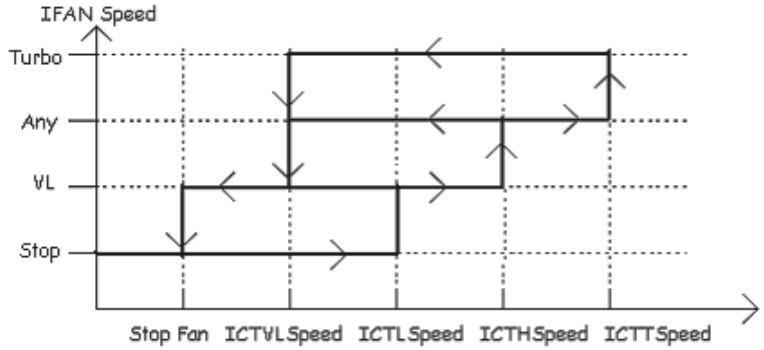
### 12.4.3 Heat Mode

#### 12.4.3.1 Temperature Compensation

A compensation value of 2-4 degrees is reduced from room temperature reading (except when in I-Feel mode), to compensate for temperature difference between high and low areas in the heated room, and for coil heat radiation on room thermistor.
The temperature compensation can be enabled/disabled by closing/opening J2 on the indoor unit controller.

#### 12.4.3.2 Indoor Fan Control in Heat Mode

When in heat mode, including protections and except Deicing, and when the conditions in the table below are fulfilled, IFAN will be working according to the graph below.



### 12.4.4 Auto Cool/Heat Mode

When in auto cool heat mode unit will automatically select between cool and heat mode according to the difference between actual room temperature and user set point temperature (ΔT).
Unit will switch from cool to heat when compressor is off for 3 minutes, and ΔT < -3.
Unit will switch from heat to cool when compressor is off for 5 minutes, and ΔT < -3.

### 12.4.5 Dry Mode

As long as room temperature is higher then the set point, indoor fan will work in low speed and compressor will work between 0 and maximum frequency in cooling.
When the room temperature is lower than the set point, compressor will be switched OFF and indoor fan will cycle 3 minutes OFF, 1 minute ON.

### 12.4.6 Heating Element Control

Heating element can be turn on if high LOAD is more then 80% and Indoor Coil temperature is less then 45°C.
The heating element will be off when LOAD is less then 50% OR if Indoor Coil temperature is more then 50°C.

### 12.4.7 Indoor Unit Dry Contact

“Presence Detector” feature in the indoor unit is done for cases that external SB (Stand-By) is required via a presence detector sensor or others such as window closed detector, etc.

The dry contact can be set to operate if the contacts are shorted as follows:

| Function | Contact = Open | Contact = Short |
|---|---|---|
| Presence Detector Connection | No Action – normal operation (Default) | Forced to STBY |

**Notes:**

- When the A/C is forced to STBY mode, all R/C commands are ignored, and the operation LED blinks with 1 seconds cycle time.
- Any change in the Presence Detector state during the first 6 sec after the system reset is ignored.

### 12.4.8 Operating the Unit from the Mode Button

Forced operation allows to start, stop and operate in Cooling or Heating, in pre-set temperature according to the following table:

| Forced operation Mode | Pre-set Temperature |
|---|---|
| Cooling | $20^0$C |
| Heating | $28^0$C |

### 12.4.9 On Unit Controls and Indicators

Indications during OFF, Fan, Cool, Heat, Dry, and Auto modes are shown below. For operation in other modes, check the relevant paragraphs.

| | |
|---|---|
| **STANDBY INDICATOR** | Lights up when the Air Conditioner is connected to power and is ready for operation |
| **OPERATE INDICATOR** | 1. Lights up during operation.<br>2. Blinks for 300 msec to announce that a R/C infrared signal has been received and stored.<br>3. Blinks continuously during protections (according to the relevant spec section). |
| **TIMER INDICATOR** | Lights up during Timer and Sleep operation. |
| **COOLING INDICATOR** | Lights up when system is switched to Cool Mode by using the Mode Switch on the unit. |
| **HEATING INDICATOR** | Lights up when system is switched to Heat Mode by using the Mode Switch on the unit. |
| **Mode SWITCH (COOL/HEAT/OFF)** | Every short pressing , the next operation mode is selected, in this order : SB → Cool Mode → Heat Mode → SB → …<br>In long pressing system enters diagnostic mode. |

## 12.5 Run Mode

Run mode is the default operation mode of the system. This is the standard operation mode that is active in field application (at customer site).
System can go from run mode to other operation modes through keyboard or serial ports.

### 12.5.1 Mode Setting

Mode defines the ODU operation mode. There are three possible operation modes:

1. STBY – standby mode
2. COOL - the unit operating at cooling cycle
3. HEAT - the unit operating at heat pump cycle

SB mode can be set also by dry-contact.

#### 12.5.1.1 ODU Protections

There are 4 ODU protections:

- Compressor overheating
- Heat sink overheating
- AC over current
- DC Over curren – not in 6HP unit

### 12.5.2 Compressor Speed Control

#### 12.5.2.1 Compressor Min On/Off time

Compressor minimum OFF time is 3 minutes except during Deicing protection.
Compressor minimum ON time is 3 minutes, minimum ON time is ignored during protections, and when unit is turned to STBY.

#### 12.5.2.2 Compressor Startup

When started, compressor speed reaches 40 RPS and will not go below that during the first 5 minutes of compressor operation except when compressor forced OFF.

#### 12.5.2.3 Compressor start up fail

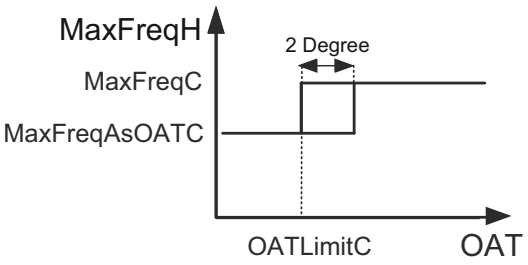
If the compressor does not succeed to complete the startup procedure, it will report a compressor-lock fault code.
It than retries the startup procedure for 3 times on every 10 seconds and enter a 3 minutes wait condition before starting the next compressor startup sequence.

#### 12.5.2.4 *Compressor operation while OFAN Error*

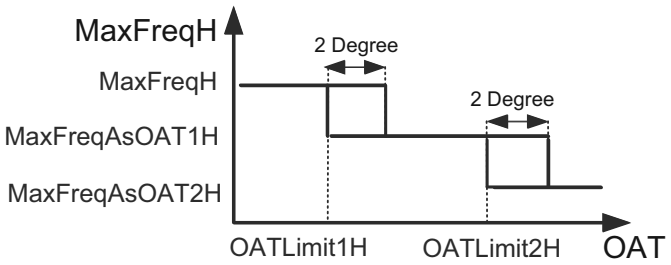
In case an OFAN error a cured for 10 continues seconds and the compressor is on, the compressor will be set to OFF until OFAN error will recover.

#### 12.5.2.5 *Maximum allowed speed limitation*

For cool mode:




For Heat mode:




**Note**: If OAT is faulty, there will be no limits.

#### 12.5.2.6 Speed Change Limitations

When rising or lowering speed within the allowed operating range, the acceleration or deceleration will be 1 RPS/sec.

#### 12.5.2.7 Compressor Speed calculation

During normal operation (excluding protections) the compressor target speed is set according to the NLOAD number received from the indoor unit and CompFac. CompFac is an indoor-outdoor matching parameter, once it is 0, the compressor will be forced off, if it is number between 0.01 to1, the compressor target frequency is set by the following table.

| NLOAD | Target Speed [Hz] |
|---|---|
| <10 | 0 |
| 10 | MinFreqC in cool OR MinFreqH in heat mode |
| 11– 126 | NLOAD*CompFac |
| 127 | MaxFreqC in cool OR MaxFreqH in heat mode |

#### 12.5.2.8 Speed Step Limitations

The compressor speed have some step limitations which it will not go above them for few minuits after startup.

#### 12.5.2.9 Compressor shutdown Procedure

There are 2 procedures for compressor shutdown:

1. Immediate shutdown – compressor is stopped on the spot.
2. Gradual shutdown – compressor speed is reduced gradually to the minimum speed by NormAccel Hz/sec and then stops.

| # | Shutdown Reason | Shutdown procedure | |
|---|---|---|---|
| 1 | IDU NLOAD=0 (or IDU protections) | Gradual | Minimum On time is kept. |
| 2 | IDU Shutdown (idle) | Immediate | |
| 3 | Deicing | Immediate | |
| 4 | ODU Protections | Gradual | |
| 5 | Sensor faulty (CTT or OCT+OMT) | Immediate | |
| 6 | HPS protection | Immediate | |
| 7 | LPS protection | Gradual | (Only in 6HP units) |

## 12.5.3 EEV Control

### 12.5.3.1 EEV General Rules

The EEV is controlled to keep the discharge superheat temperature within preset control values.

### 12.5.3.2 EEV initialization procedure

After power up the EEV performs initialization procedure while it closed completly and reopened to predefind position. During initialization, the compressor is forced to off.

### 12.5.3.3 Balance time

During the first minutes after SB the correction is not calculated. After that the correction value is updated every *EEVCVTConst* seconds.

### 12.5.3.4 Operation Range

The EEV operation range is defined according to the operation mode as following

| ODU Mode | Normal operation | Notes |
|---|---|---|
| SB | *450* | *May change according to model* |
| COOL | *60* to *480* | |
| HEAT | *60* to *480* | |

### 12.5.3.5 EEV initial value determination ($EEV_{OL}$)

The EEV initial value (open loop) is determined according to the operation mode, the actual frequency and ODU model. The values are determined according to the "$EEV_{OL}$ Parameters Table".

### 12.5.3.6 EEV opening determination in normal run mode

The target EEV value is the sum of open loop value (OL) and a result of the accumulative correction values (CV). The EEV corrections are calculated every *EEVCVTConst* seconds.

$$EEV = EEV_{OL} + \sum EEV_{CV}$$

## 12.5.4 Outdoor Fan Speed Control

### 12.5.4.1 Speed Definition

The outdoor fans can work in 16 speed states controlled by OMT sensor in cool mode and ICT sensor in heat mode in ralation to outdoor conditions.

#### 12.5.4.2 General Rules

- ❖ The fans will be off when the compressor is off unless HST>55 or faulty and than OFAN_up will remain ON.
- ❖ Min time for speed change between speed states is 60 seconds.
- ❖ The fan speed is also related to protections.
- ❖ Whenever OFAN fault occurs the compressor will be stopped.

#### 12.5.4.3 Night mode

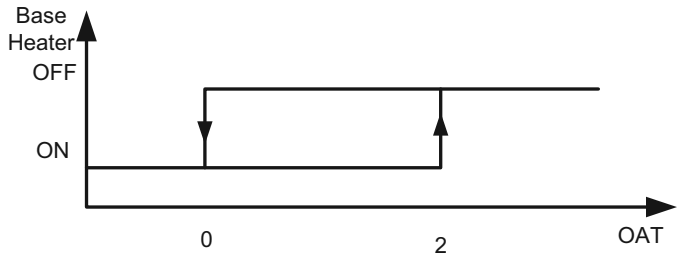
During night mode, the OFAN and the compressor will be limited to lower speeds (Cool model only).

### 12.5.5 RV State Setting

During heat mode (except during Deicing) RV is ON.
During cool/SB mode RV is OFF.
RV status will be changed only if COMP is OFF for 3 minutes or more.

### 12.5.6 Base Heater Setting

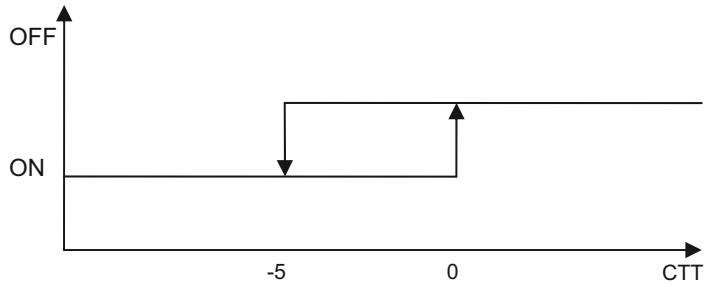
The base heater will be working only when RV is “ON” according to the following graph:




When OAT is faulty the base heater will be “ON” continuously in HEAT mode.

### 12.5.7 Crank case heater Operation

The crank case heater operates only when compressor is off and according to CTT as following:




### 12.5.8 Compressor internal heating coil Operation

Only in 6HP unit.
The crank case heater operates only when compressor is off and according to CTT and OAT.

## 12.5.9 Thermodynamic Protections

### 12.5.9.1 Protection level definition

Five protection levels are defined:
**Normal** – No protection status.
**Stop-Rise (SR*)* –** Compressor not allowed raise speed.
**D1** - Compressor speed reduced.
**D2** - Compressor speed reduced rapidly.
**Stop-Compressor (SC*)*** – Compressor stops.

### 12.5.9.2 IDU Protections

| ICT Value | | ICT Trend | | | | |
|---|---|---|---|---|---|---|
| **Indoor Coil Defrost Protection** | **Indoor Coil Over Heating Protection** | **Fast Increasing** | **Increasing** | **No change** | **Decreasing** | **Fast Decreasing** |
| ICT < -2 | ICT > 62 | SC | SC | SC | SC | SC |
| -2 ≤ ICT < 0 | 60 < ICT ≤ 62 | D1 | D1 | D2 | D2 | D2 |
| 0 ≤ ICT < 2 | 55 < ICT ≤ 60 | SR | SR | D1 | D2 | D2 |
| 2 ≤ ICT < 4 | 53 < ICT ≤ 55 | SR | SR | SR | D1 | D2 |
| 4 ≤ ICT < 6 | 51 < ICT ≤ 53 | Normal | Normal | SR | SR | D1 |
| 6 ≤ ICT < 8 | 49 < ICT ≤ 51 | Normal | Normal | Normal | SR | SR |
| 8 ≤ ICT | ICT ≤ 49 | Normal | | | | |

Operation logic of all protections is the same. The controlled input (CTT, HST, ACC, DCC) is controlled by changing the protection level using the fuzzy logic algorithm according the input level and the change rate.
The following table summarizes the basic levels of each protection:

| Protection level | Compressor Overheat (CTT) | Compressor AC Over current (ACC) | Compressor DC Over current (DCC) | Heat Sink (HST) |
|---|---|---|---|---|
| SC | *95* | *25.0* | *22.0* | *90* |
| D2 | *92* | *24.6* | *21.4* | *87* |
| D1 | *90* | *24.2* | *20.8* | *85* |
| SR | *87* | *23.6* | *20.0* | *83* |
| Normal | | | | *78* |

There are two sets of ACC values, the selection of the values are set according to the state of the Power-Shed dry contact input.
Power-Shed input open ACC
Power-Shed input short PSOC

### 12.5.9.3 Total Protection Level Definition

The total protection level is defined by the higher level of protection received.

## 12.5.10 Deicing

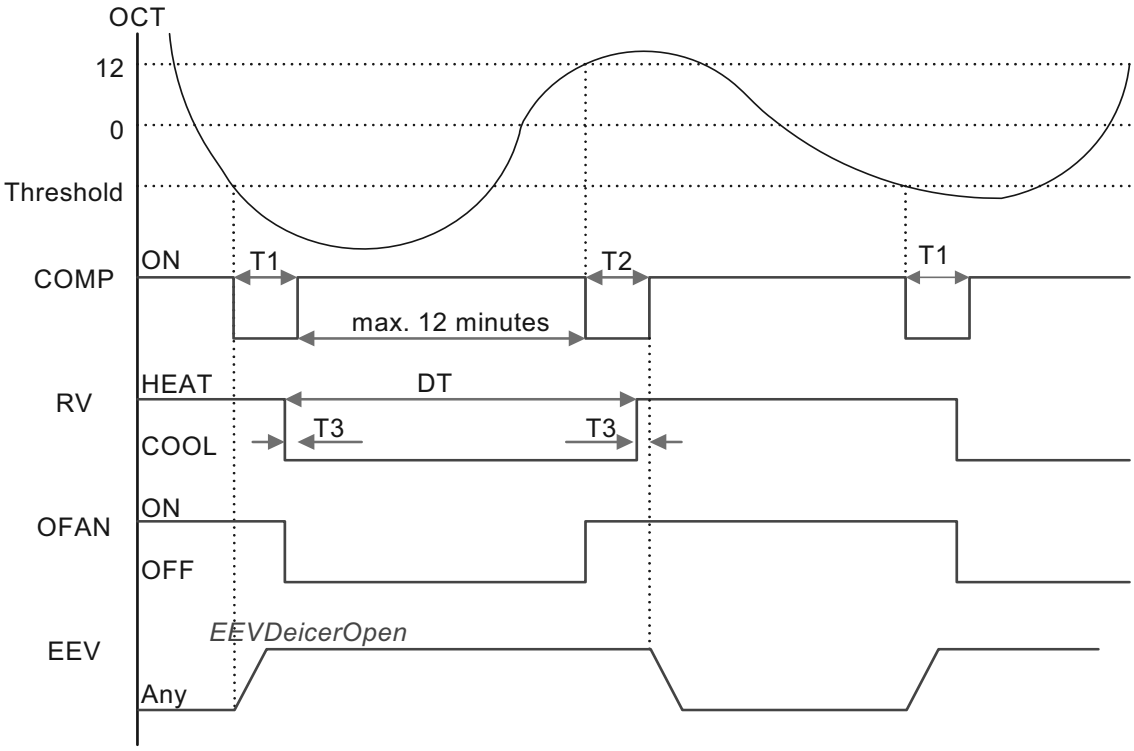
### 12.5.10.1 Deicing Starting Conditions

Deicing operation will start when either one of the following conditions exist:
Case 1: OCT is 8 degree lower then the ambiant temp and the minimum time from the last deicer is passed.
Case 2: OCT is 12 degree lower then the ambiant temp and 30 minutes from the last deicer wa passed.

OCT – Outdoor Coil Temperature

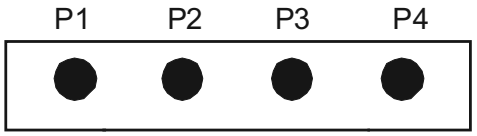
Deicing interval time when compressor is first started in heat mode, is 10 minutes if OCT < -2, and is 40 minutes in other cases.
Deicing interval time is changed (increased/ decreased in 10 minutes steps) as a function of deicing time.
In case one of the thermistors is bad the deicer will initiate in predefined intervals
Deicer may accure also when the unit switch to stanby and the OCT is 8 degree lower then ambiant temperature.

### 12.5.10.2 Deicing Protection Procedure




T1 = T2 = 36 seconds, T3 = 6 seconds

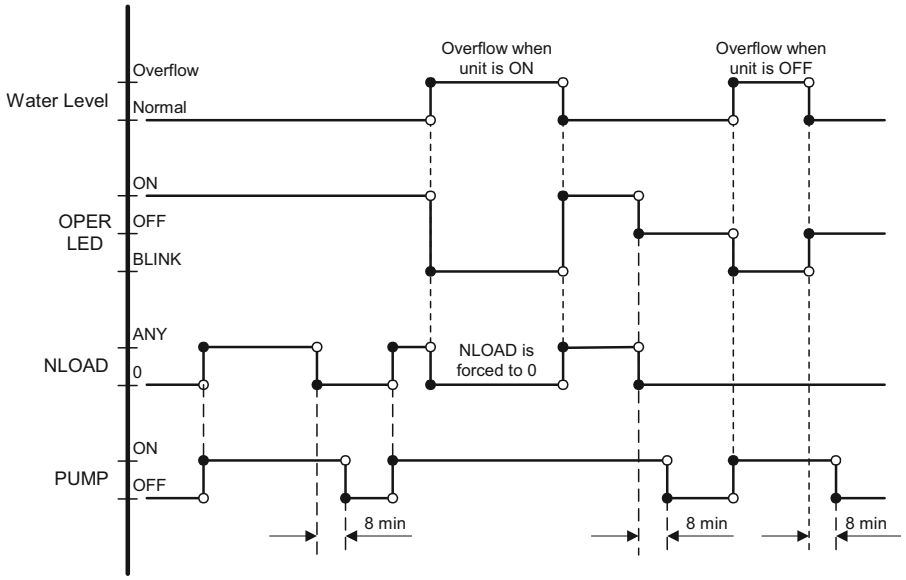
## 12.5.11 Condensate Water over Flow Protection




Each of the pins P1, P2, P3 can have two options:
1 – When it is shorted with P4
0 – When it is not shorted to P4

#### 12.5.11.1 1 Level Logic

| P2 | P3 | Level |
|---|---|---|
| Don't care | 1 | Normal |
| Don't care | 0 | Overflow |




### 12.5.12 High/Low Pressure Protection

Whenever high or low pressure accures in the system which extend beind the system pre-defined limits, the high and low pressure switchs turns on (short) and stops the compressor until these limits are redrawn.
Fault code error 28 (HPS) or 29 (LPS) will be shown until compressor will resume operation.

## 12.6 Technician Test Mode

This test is aimed for the technicians to check the system under a preset compressor and outdoor fan values while the expansion valves will function according to the normal running mode.

### 12.6.1 Entering technician mode

- This mode is entered through the outdoor unit using the HMI (refer to user interface section).
- It can be selected either for cool or heat.
- Technician test is not possible to enter during deicer.

#### Exiting technician mode

Technician mode will be terminated either when:

- Escaping by the HMI (exit from the ttC or ttH menus)
- 60 minutes are passed from entering

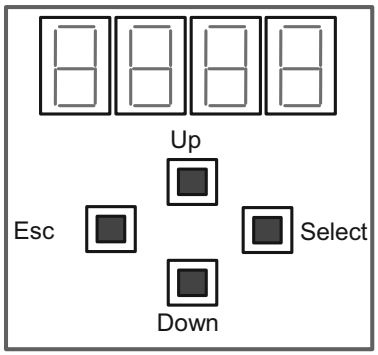
### 12.6.2 Technician mode procedure

- Indoor unit will enter technician test at high indoor fan speed.
- The outdoor unit will be working normally (according to the run mode control logic) except the following changes:
  - The dry contacts inputs will be ignored.
  - Protections will be operative for stop compressor only.
  - The compressor and the outdoor fan will be working in target preset values according to the following table:

| Technician Test | | | |
|---|---|---|---|
| Unit | Compressor Speed | | OFAN speed |
| | Cool | Heat | |
| 4HP | 54 | 64 | 800 |
| 5HP | 71 | 75 | 800 |
| 6HP | 55 | 63 | 800 |

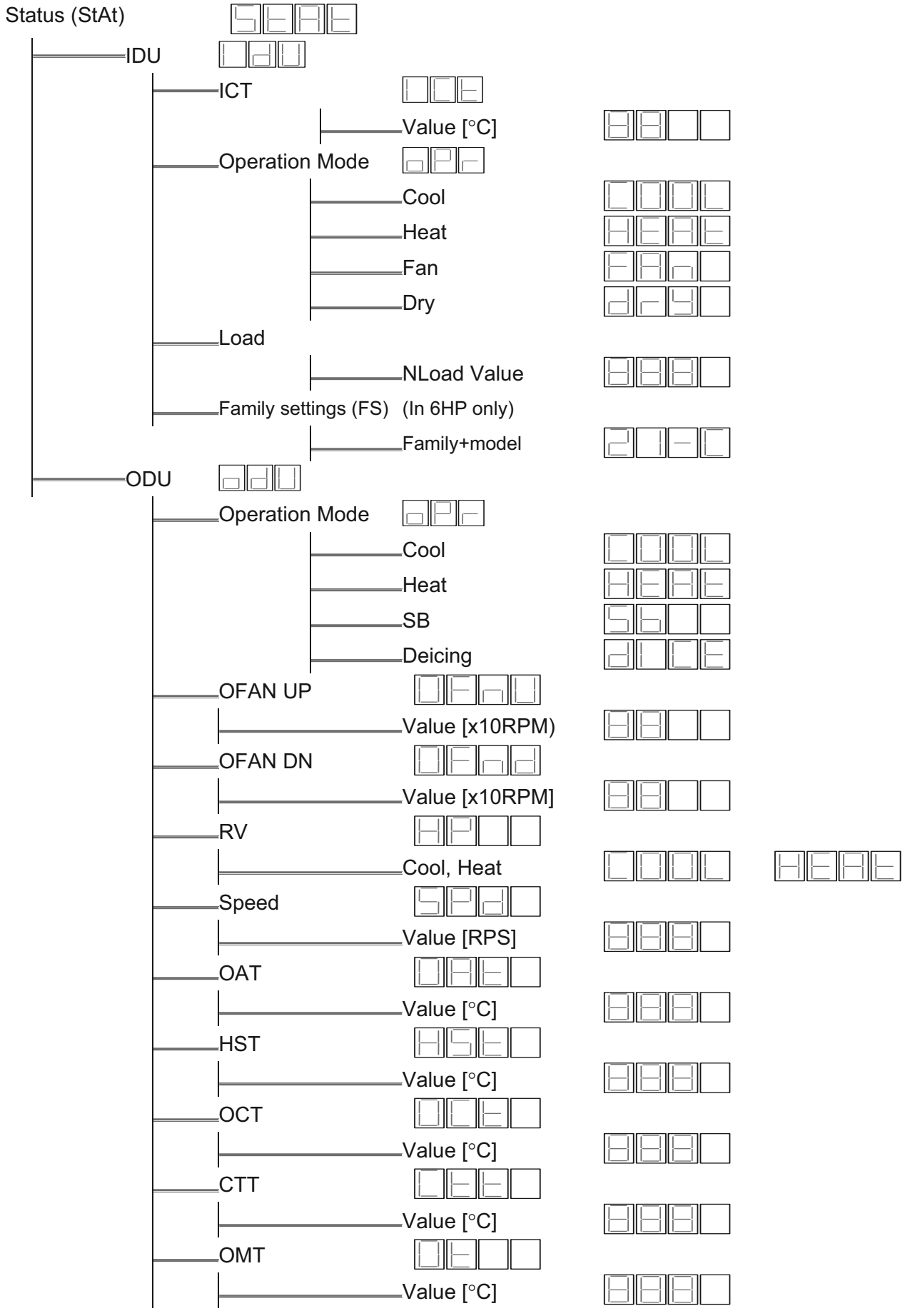
## 12.7 User Interface

### 12.7.1 User interface description



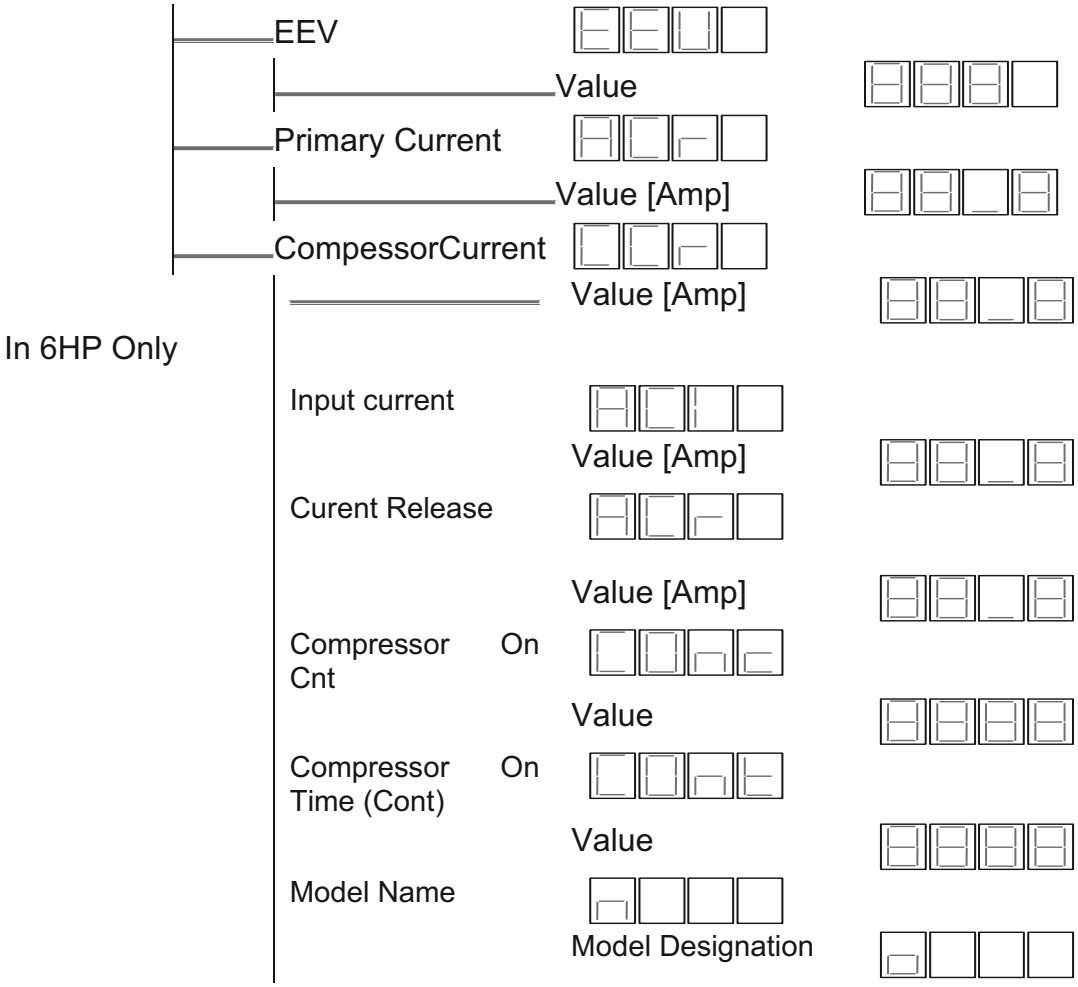

- The user interface uses four 7-segments, and 4 keys.
- The 4 keys are:
  - Scroll - used to scroll between options (up and down)
  - Select - use to select an option
  - Escape - Will go up one level in the menu
- The user interface concept is Tree menus.

#### 12.7.1.1 Status (Sub Menu)



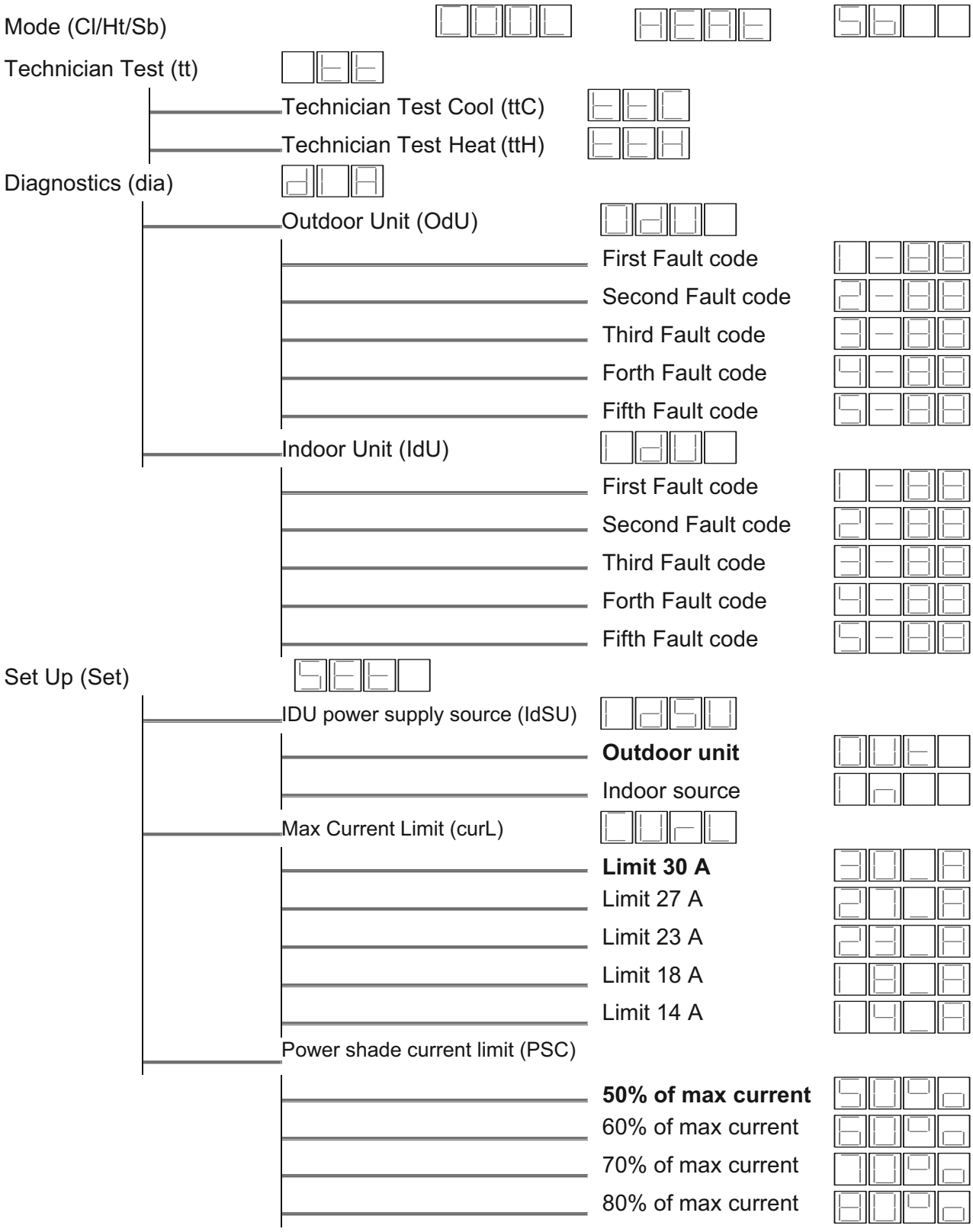


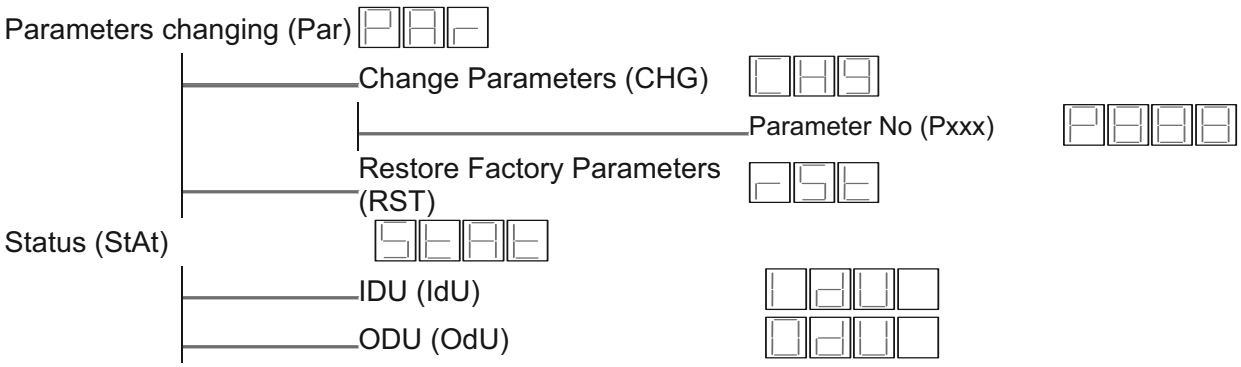

CONTENTS


EEV
Value
Primary Current
Value [Amp]
CompessorCurrent
Value [Amp]
In 6HP Only
Input current
Value [Amp]
Curent Release
Value [Amp]
Compressor On Cnt
Value
Compressor On Time (Cont)
Value
Model Name
Model Designation

## 12.7.2 Menus

### 12.7.2.1 Main Menu






Notes:

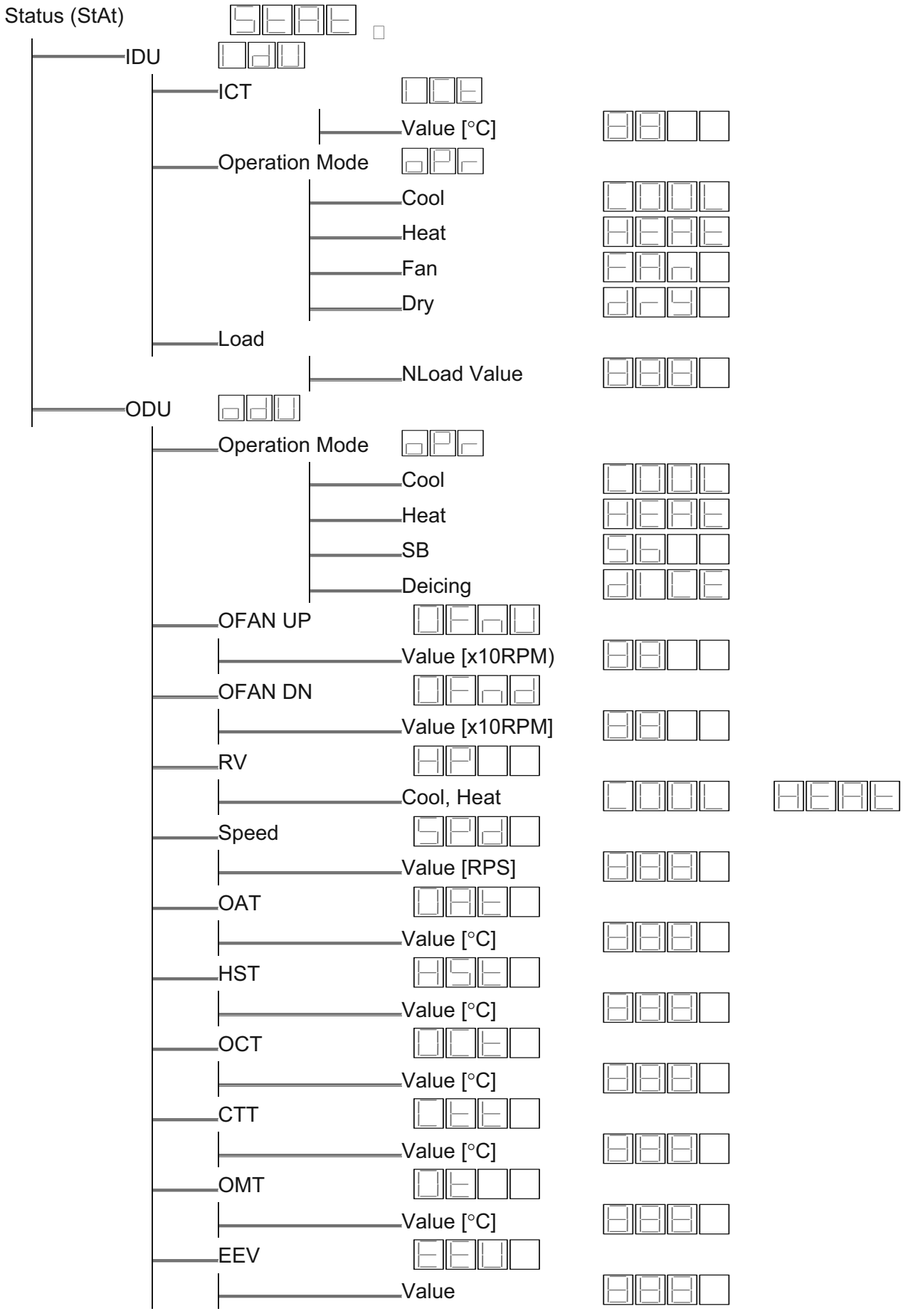
1. The default presentation will be the mode of the unit (Cool/Heat/Stby).
2. In diagnostics menu:
   - xx means failure code two numbers.
   - Maximum 5 faults are presented for each unit (each IDUs/ODU). When no faults, a "----" sign will be shown.
   - The active faults have higher priority for presentation than non active ones.
   - Active errors will blink on/off each sec.
   - Non active faults are presented according to their chronological order, starting from the latest one.
   - Whenever a new active fault occurs, it will be presented immediately.
3. The Parameters changing and Status menus (Technician menus) will be enabled to be presented and navigated, only by pressing select + escape together for more than 5 seconds under the main menu.
4. Exiting both 'Parameters Changing' and 'Status' menus and their sub-menus back to the main menu is done only by either pressing escape for more than 5 seconds or after continuous 10 minutes out of any press.
5. Technician Test mode is exited after 60 minutes from entry.
6. All the menus, except technician menus- Parameter changing, Status, Technician Test and their sub menus, are automatically exited to the main menu after 1 continuous minute out of any press.
7. When Technician test cool or heat menus are selected (operative), it will be blinking constantly until, this menu is escaped.
8. Pressing select and escape buttons together when in RST for more than 5 seconds will restore only the parameters of the factory settings. Acknowledge for restored parameters will be indicated by blinking RST for 3 seconds.
9. For the first 6 seconds after power is ON the display will show the current SW version. The display will show each 4 letters of the SW version at the time.
   Example – SW Version 361V1-A01:
   Will be displayed as:

| 361u | 1A01 |
|---|---|
| 3sec | 3sec |

#### 12.7.2.2 Parameter Change (Sub Menu)

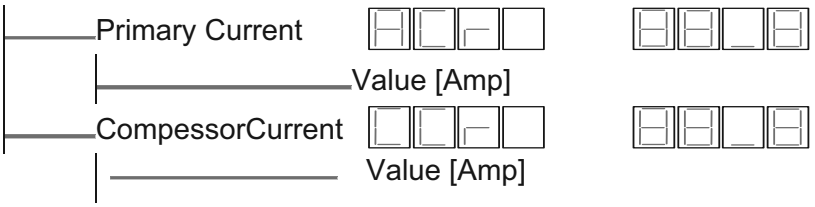
- The parameters names will be indicated by the sequence 001, 002,..,999.
- When a parameter is selected, the parameter's stored value is presented-aligned to the right.
- Scrolling changes the presented value, incrementing or decrementing, but does not store the value.
- Selecting a value, by pressing the selection key for 3 seconds, stores an updated value.

### 12.7.2.3 Status (Sub Menu)






CONTENTS




**Notes:**

- For the temperature display, when a thermistor is shorted or disconnected it shows FLT (FLt), when it is disabled it shows DIS (dis).
- It's possible to present a number between 999 and 99,999 by alternating between two numbers (each number is presented for 1 second). The two numbers format is "xx, yyy".
- Pressing select + escape together for 5 seconds will reset the counter to 0.
- The compressor time is measured in hours.

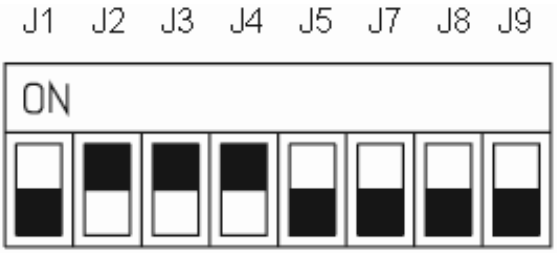
## 12.8 Jumper (DIP Switch) Setting

### 12.8.1. Jumper Definition

0 = Open (Disconnected)

1 = Close (Shorted)

### 12.8.2. IDU Jumpers




#### 12.8.2.1. Self test Jumper/DIP – J1

| Position | Status | Description |
|---|---|---|
| 0 | Open (Disconnected) | Normal Operation (Default) |
| 1 | Close (Shorted) | Self Test enabled |

#### 12.8.2.2. Compensation Jumper/DIP – J2

| Position | Status | Description |
|---|---|---|
| 0 | Open (Disconnected) | Compensation deactivated |
| 1 | Close (Shorted) | Compensation activated (Default) |

#### 12.8.2.3. Family selection Jumper/DIP – J3, J4, J5

| # / Family Name | J3 | J4 | J5 |
|---|---|---|---|
| DNG 4-5HP | 1 | 1 | 0 |
| EMD 4-5HP | 0 | 1 | 0 |
| CD 6HP | 1 | 0 | **1** |

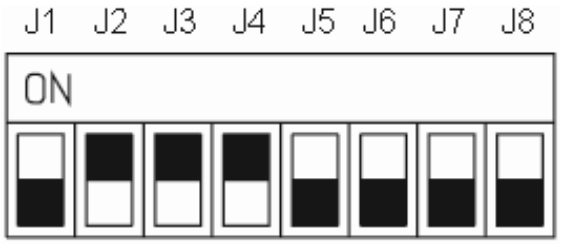
#### 12.8.2.4. Model selection Jumper/DIP – J7, J8

| Model | J7 | J8 |
|---|---|---|
| A – 4HP | 0 | 0 |
| B – 5HP | 1 | 0 |
| C – 6HP | 0 | 1 |

#### 12.8.2.5. Presence Detector/DIP – J9

| Position | Status | Description |
|---|---|---|
| 0 | Open (Disconnected) | Presence detector enabled (Default) |
| 1 | Close (Shorted) | NA (Not to be used) |

### 12.8.3. ODU Jumpers




#### 12.8.3.1. Self test Jumper/DIP – J1

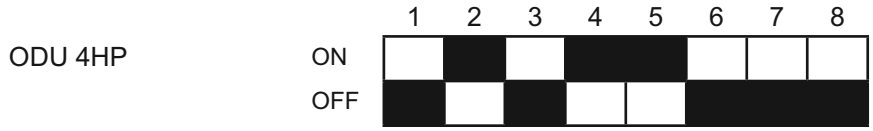
| Position | Status | Description |
|---|---|---|
| 0 | Open (Disconnected) | Normal Operation (Default) |
| 1 | Close (Shorted) | Self Test enabled |

#### 12.8.3.2. ODU Model Selection Jumper/DIP – J2, J3, J4, J5

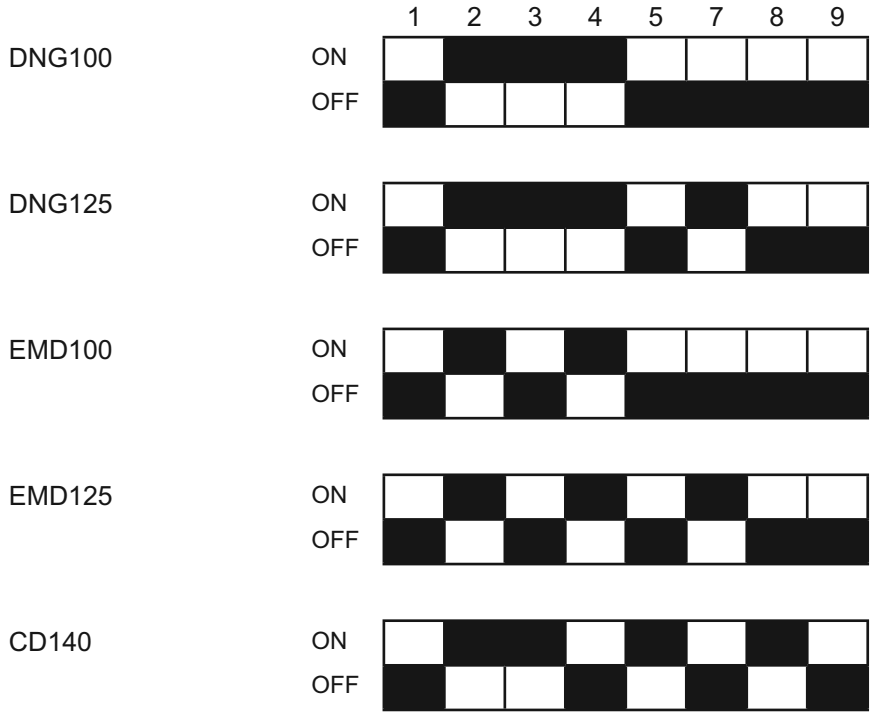
| ODU Model | J2 | J3 | J4 | J5 |
|---|---|---|---|---|
| M (DCI 100) | ON | OFF | ON | ON |
| N (DCI 125) | OFF | ON | ON | ON |
| O (DCI 140) | ON | ON | ON | ON |

### 12.8.4. Dip-Switch Setting table

**ODU**




**IDU**




***Note:*** in some cases where an external room thermostat kit is installed, the configuration of J2 in the indoor unit controller will be set to OFF.

## 12.9 System Parameters

### 12.9.1 General Parameters for All Models

#### 12.9.1.1 *4-5HP*

| Name | Default Value | Units |
|---|---|---|
| *MinOFFTime* | 3 | minute |
| *MinONTime* | 3 | minute |
| *HzDown1* | 3 | Hz/min |
| *HzDown2* | 10 | Hz/min |
| *DImin* | 30 | minute |
| *DImax* | 120 | minute |
| *TimeD* | 1 | minute |
| *DTmin* | 2 | minute |
| *DTmax* | 12 | minute |
| *DIT* | 10 | minute |
| *CTMRUP* | 15 | minute |
| *DIF* | 30 | minute |
| *TCT* | 10 | second |
| *HSTOH1* | 78 | °C |
| *HSTOH2* | 83 | °C |
| *HSTOH3* | 85 | °C |
| *HSTOH4* | 87 | °C |
| *HSTOH5* | 90 | °C |
| *HSTOHDelta1* | -1 | NA |
| *HSTOHDelta2* | 1 | NA |
| *EEVCVTConst* | 15 | second |
| *BalanceTime* | 1 | minute |
| *EEVInitOpen* | 300 | step |
| *DEICT1* | 60 | second |
| *DEICT2* | 36 | second |
| *DEICT3* | 6 | second |
| *EEVNormRate* | 33 | ms/pulse |
| *EEVHighRate* | 12 | ms/pulse |
| *EEVMaxOpen* | 500 | step |
| *DST* | 8 | °C |
| *DSTF* | 12 | °C |
| *DeiceFreqChRV* | 0 | Hz |
| *EEVDeiceTcnst* | 20 | second |
| *OFBlncTime* | 2 | minute |
| *OFTcnst* | 60 | second |
| *OFMinTimeReduce* | 60 | second |

#### 12.9.1.2 *6HP*

| Name | Default Value | Units |
|---|---|---|
| *MinOFFTime* | 3 | minute |
| *MinONTime* | 3 | minute |
| *HzDown1* | 3 | Hz/min |
| *HzDown2* | 10 | Hz/min |
| *DImin* | 30 | minute |
| *DImax* | 120 | minute |
| *TimeD* | 1 | minute |
| *DTmin* | 2 | minute |
| *DTmax* | 12 | minute |
| *DIT* | 10 | minute |
| *CTMRUP* | 15 | minute |
| *DIF* | 30 | minute |
| *TCT* | 10 | second |
| *HSTOH1* | 88 | °C |
| *HSTOH2* | 93 | °C |
| *HSTOH3* | 95 | °C |
| *HSTOH4* | 97 | °C |
| *HSTOH5* | 100 | °C |
| *HSTOHDelta1* | -1 | NA |
| *HSTOHDelta2* | 1 | NA |
| *EEVCVTConst* | 15 | second |
| *BalanceTime* | 1 | minute |
| *EEVInitOpen* | 300 | step |
| *DEICT1* | 60 | second |
| *DEICT2* | 36 | second |
| *DEICT3* | 6 | second |
| *EEVNormRate* | 33 | ms/pulse |
| *EEVHighRate* | 12 | ms/pulse |
| *EEVMaxOpen* | 500 | step |
| *DST* | 8 | °C |
| *DSTF* | 12 | °C |
| *DeiceFreqChRV* | 0 | Hz |
| *EEVDeiceTcnst* | 20 | second |
| *OFBIncTime* | 2 | minute |
| *OFTcnst* | 60 | second |
| *OFMinTimeReduce* | 60 | second |

### 12.9.2 ODU Model Dependent Parameters

| # | Name | M DCI112 | N DCI140 | O DCI160 | Unit |
|---|---|---|---|---|---|
| 1. | *MinFreqC* | *25* | *25* | *20* | Hz |
| 2. | *MaxFreqC* | *75* | *85* | *70* | Hz |
| 3. | *MinFreqH* | *25* | *25* | *20* | Hz |
| 4. | *MaxFreqH* | *90* | *100* | *75* | Hz |
| 5. | *Step1Freq* | *40* | *40* | *40* | Hz |
| 6. | *Step2Freq* | *90* | *90* | *90* | Hz |
| 7. | *Step3Freq* | *120* | *120* | *120* | Hz |
| 8. | *NightRPM* | *60* | *60* | *60* | *10RPM |
| 9. | *CTTOH1* | *87* | *87* | *87* | °C |
| 10. | *CTTOH2* | *90* | *90* | *90* | °C |
| 11. | *CTTOH3* | *92* | *92* | *92* | °C |
| 12. | *CTTOH4* | *95* | *95* | *95* | °C |
| 13. | *ACCOC1* | *16.6* | *23.6* | *23.0* | A |
| 14. | *ACCOC2* | *17.2* | *24.2* | *23.8* | A |
| 15. | *ACCOC3* | *17.6* | *24.6* | *24.4* | A |
| 16. | *ACCOC4* | *18.0* | *25.0* | *25.0* | A |
| 17. | *DCCOC1* | *20.0* | *20.0* | - | A |
| 18. | *DCCOC2* | *20.8* | *20.8* | - | A |
| 19. | *DCCOC3* | *21.4* | *21.4* | - | A |
| 20. | *DCCOC4* | *22.0* | *22.0* | - | A |
| 21. | *EEVMinOperOpenC* | *60* | *60* | *60* | step |
| 22. | *EEVMaxOperOpenC* | *400* | *400* | *480* | step |
| 23. | *EEVMinOperOpenH* | *60* | *60* | *60* | step |
| 24. | *EEVMaxOperOpenH* | *480* | *480* | *480* | step |
| 25. | *OATLimitC* | *25* | *25* | *25* | °C |
| 26. | *OATLimit1H* | *4* | *4* | *4* | °C |
| 27. | *OATLimit2H* | *15* | *15* | *15* | °C |
| 28. | *MaxFreqAsOATC* | *70* | *70* | *60* | Hz |
| 29. | *MaxFreqAsOAT1H* | *90* | *90* | *80* | Hz |
| 30. | *MaxFreqAsOAT2H* | *60* | *60* | *60* | Hz |
| 31. | *NormAccel* | *1* | *1* | *1* | Hz/s |
| 32. | *NormDecel* | *1* | *1* | *1* | Hz/s |
| 33. | *OCTExitDeicer* | *12* | *12* | *12* | °C |
| 34. | *MaxDeicerTime* | *12* | *12* | *12* | minute |
| 35. | *DryContactDis* | *1* | *1* | *1* | Byte |
| 36. | *NightRPS* | *60* | *60* | *55* | RPS |

### 12.9.3 Indoor Units SW Parameters

Parameters defining the indoor fan speed as a function of Indoor Coil temperature in heat mode (ICT):

#### 12.9.3.1 *Parameters for defrost protection:*

| | | |
|---|---|---|
| ICTST Speed | ICT to stop indoor fan | 25 |
| ICTVLSpeed | ICT to go down to very low speed | 28 |
| ICTLSpeed | ICT to start in very low speed | 30 |
| ICTHSpeed | ICT to start in increase speed from very low | 32 |
| ICTTSpeed | ICT to enable Turbo fan speed | 40 |
| ICTDef1 | ICT to go back to normal | 8 |
| ICTDef2 | ICT to 'stop rise' when ICT decrease | 6 |
| ICTDef3 | ICT to 'stop rise' when ICT is stable | 4 |
| ICTDef4 | ICT to 'Hz Down' when ICT decrease | 2 |
| ICTDef5 | ICT to 'Hz Down' when ICT is stable | 0 |
| ICTDef6 | ICT to stop compressor | -2 |

#### 12.9.3.2 *Parameters for indoor coil over heating protection:*

| | | |
|---|---|---|
| ICTOH1 | ICT to go back to normal | 49 |
| ICTOH2 | ICT to 'stop rise' when ICT increase | 51 |
| ICTOH3 | ICT to 'stop rise' when ICT is stable | 53 |
| ICTOH4 | ICT to 'Hz Down' when ICT increase | 55 |
| ICTOH5 | ICT to 'Hz Down' when ICT is stable | 60 |
| ICTOH6 | ICT to stop compressor | 62 |

# 13. TROUBLESHOOTING

## 13.1 Precaution, Advise and Notice Items

### 13.1.1 High voltage in Indoor and Outdoor unit electrical assembly

- Open the Outdoor unit controller assembly only after one minute from power off.
- Whole controller assembly, including the wires, connected to the Outdoor unit may have the potential hazard voltage when power is on.
- Touching the Outdoor unit controller assembly may cause an electrical shock.
- Do not touch the naked lead wire and don't insert finger, conductor or anything else into the controller when power is on.

### 13.1.2 Charged Capacitors

- Large capacity electrolytic capacitors are used in the outdoor unit controller and driver.
- Charging voltage (380VDC) remains after power is down.
- Discharging takes about one minute after turned off.
- Touching the outdoor unit electrical assembly before discharging may cause an electrical shock.
- Measure the electrolytic capacitors voltage to be below 50VDC before further checking electrical assembly parts.

### 13.1.3 Advisory Notes

- When open the Outdoor unit electrical assembly, don't touch the soldering pin by hand or by any conductive material.
- When connecting or disconnecting the connectors on the PCB, hold the whole housing, don't pull the wire.

**WARNING!!!**

- When Power Up – the outdoor and indoor unit electrical assemblies, including the wiring, are under HIGH VOLTAGE!!!
- Never open the outdoor or indoor units before turning off **ALL** Power sources!!!
- When turned off, the outdoor unit electrical assembly is still charged (400V)!!!
- DC capacitors are discharging for about 1 Minute after power is OFF.
- Touching the electrical before discharging may cause an electrical shock!!!

- **For safe handling of the electrical assembly please refer to section *13.1* above.**

## 13.2 General System Failures and Corrective Actions

| No. | SYMPTOM / PROBLEM | PROBABLE CAUSE | CORRECTIVE ACTION |
|---|---|---|---|
| **Indoor unit** | | | |
| 1. | Indoor unit power supply indicator (Red LED) does not light up. | No Power supply | Check supply voltage to main terminals L and N with volt meter. |
| | | No supply from outdoor | Check fuse at the connection wiring on outdoor unit terminals (see Electrical Scheme 9.4) |
| | | Miss-wiring | Check all supply wiring to controller and terminals according to wiring diagram |
| | | Loose connection | Check all power wiring connections |
| | | Display and display cable | Check continuity of each wire of the display wires/pins with Ohm meter |
| | | If still not OK | Check if fuse burnt |
| 2 | Fuse burned in indoor unit controller | Short Circuit between wires | Check for any cuts or exposed supply wires or miss-wiring |
| | | Failure of Indoor Unit Fan Motor | Check the motor and capacitor (***13.5.19***)<br>Check for any cuts or exposed wires |
| | | If still not OK | Replace fuse |
| 3 | Indoor unit does not respond to remote control message | Remote control message not reached the indoor unit | Check remote control batteries |
| | | | Check continuity of each wire of the display wires/pins with Ohm meter |
| | | If still not OK | Replace display box or indoor Electronic Assembly (***14.2.2, 14.2.3***) |
| 4 | Indoor unit responds to remote control message but Operate indicator (Green LED) does not light up | Problem with display PCB | Replace display PCB (***14.2.3***). |
| | | If still not OK | Replace indoor Electronic Assembly (***14.2.2***) |
| 5 | vIndoor fan does not start (louvers are opened and Green LED is ON) | Unit in heat mode and coil is still not warm | Change to Cool or Fan mode |
| | | Failure of Indoor Unit Fan Motor | Check the motor and capacitor (***13.5.19***)<br>Check for any cuts or exposed wires |
| | | Problem with controller or motor capacitor | Change to high speed and Check power supply to motor is higher than 220VAC |
| | | If still not OK | Replace indoor Electronic Assembly (***14.2.2***) |
| 6 | Indoor fan works when unit is OFF, and indoor fan speed is not changed by remote control command. | Controller problem | Replace indoor Electronic Assembly (***14.2.2)*** |

| No. | SYMPTOM / PROBLEM | PROBABLE CAUSE | CORRECTIVE ACTION |
|---|---|---|---|
| 7 | Water leakage from indoor unit | Indoor unit drainage tube is blocked | Check and open drainage tube |
| **Outdoor unit** | | | |
| 8 | Outdoor unit display board and leds are off | No power supply | Check supply voltage to main terminals L and N with volt meter. |
| | | Miss-wiring | Check all supply wiring to controller and terminals according to wiring diagram |
| | | Loose connection | Check all power wiring connections |
| | | Burnt fuse | Check fuse on the main board (***13.5.8***) |
| | | If still not OK | Replace main board (***14.1.13***) |
| 9 | Compressor does not start operation | One or some components are not operating well | Check for any fault code shown on display board and act accordingly (***13.4***) |
| | | Electronics control problem or protection | |
| | | PFC Chock coil | Check the PFC Chock coil (***13.5.6***) |
| | | Driver failure | Check if fault code #11, 18, 19 or 26 is shown on display board. If so, fix the problem according to ***(13.5.5)*** or replace driver (***14.1.15***). |
| | | If still not OK | Replace compressor (***14.1.10***) |

| No. | SYMPTOM / PROBLEM | PROBABLE CAUSE | CORRECTIVE ACTION |
|---|---|---|---|
| 10 | Cooling capacity is not sufficient | Unit size not match the load | Check if the size chosen for the complete room(s) load is enough or need bigger units |
| | | Piping size not matching system | Check if piping is installed correctly and proper diameter size and total length is according to unit specifications |
| | | Refrigerant leakage | Check refrigeration system (***13.3***) |
| | | Refrigerant over-charge | |
| | | Refrigerant clog | Check and repair clogging specially near the EEV |
| | | Electronics control problem or protection | Check for any fault code shown on display board and act accordingly (***13.4***) |
| | | Compressor failure | Check if fault code #11 or 26 is shown on display board. If so, fix the problem according to ***(13.5.10)*** or replace driver |
| | | Indoor coil block | Clean filters and/or remove block or air by-pass |
| | | Indoor fan malfunction | Check the motor and capacitor ***(13.5.19***) |
| | | Overflow | Check if the overflow switch is ON. Replace faulty switch or correct drain piping. |
| | | Outdoor coil block | Remove block and/or avoid air by-pass |
| | | Outdoor fan malfunction | Check outdoor fan motors (***13.5.9***) |
| | | Indoor fan malfuction | Check if the overflow switch is ON. Replace faulty switch or correct drain piping. |
| | | EEV malfunction | Check EEV (***13.5.12***) |
| | | Thermistor(s) malfunction | Check if any of fault codes #1-10 is shown on display board. Replace faulty thermistors (***14.1.11, 14.1.12***) |
| 11 | Heating capacity is not sufficient | Check all according to above cooling problem (***11***) | |
| | | Reverse valve | Check reversing valve operation (***13.5.11***) |
| | | Deicing not performed well (during low outdoors temperatures) | Check OCT and OAT thermistors fault codes (#1-2 and 7-8)<br>Check OCT thermistor if connected well to pipe<br>Check OAT thermistor if connected well<br>Check the thermistors operation (***13.5.13***) |

| No. | SYMPTOM / PROBLEM | PROBABLE CAUSE | CORRECTIVE ACTION |
|---|---|---|---|
| 12 | Compressor is over heated | Electronic control | Check for any fault code shown on display board and act accordingly (***13.4***) |
| | | EEV problem | Check EEV (***13.5.12***) |
| | | Refrigerant leakage | Check refrigeration system (***13.3***) |
| | | Indoor coil block | Clean filters and/or remove block |
| | | Indoor fan malfunction | Check indoor fan motor and capacitor (***13.5.19***) |
| | | Outdoor coil block | Remove block and/or avoid air by-pass |
| | | Outdoor fan malfunction | Check outdoor fan motors (***13.5.9***) |
| | | Compressor malfunction | Check the compressor (***13.5.10***) |
| 13 | Compressor stops many times during operation | Check all according to above problem (***13***) | |
| | | HP Switch | Check if HPS fault code (#28) is accruing frequently. If so, check the switch operation (***13.5.14***) |
| | | LP Switch | Check if LPS fault code (#29) is accruing frequently. If so, check the switch operation (***13.5.15***) |
| 14 | Unit is cooling while in heat mode | RV problem | Check RV operation (***13.5.11***) |
| | | IDU-ODU communication | Check the communication between outdoor and indoor units (***13.5.17***) |
| 15 | Compressor is generating abnormal noise | Phase order to compressor is wrong | Check compressor phase order |
| | | Compressor internal parts wearing | Replace compressor (***14.1.10***) |
| | | Vibration | Check all piping connections<br>Check compressor rubbers are fixed well<br>Check all screws on unit metal chassis are tightened<br>Check that no piping is in contact with each other or with other parts. |
| 16 | Freezing of outdoor unit coil in heat mode and outdoor unit base is blocked with ice | | Connect base heater |
| 17 | The unit stop suddenly during operation | EMC interference to the A/C unit | Check for EMC problems (***13.5.20.1***) |
| 18 | Indoor unit Indicator leds may flicker | | |

| No. | SYMPTOM / PROBLEM | PROBABLE CAUSE | CORRECTIVE ACTION |
|---|---|---|---|
| 19. | Other home appliances operation is faulty such as noise appears in the television picture, or the picture is distorted or static occurs in the radio sound | EMC interference by the A/C unit | Check for EMC problems (***13.5.20.2***) |
| 20. | All others | Specific problems of indoor or outdoor units | Check for any fault code shown on display board and act accordingly (***13.4***) |

## 13.3 Checking the refrigeration system

Checking system pressures and other thermodynamic measures should be done when system is in technician Mode where the system operates as in fixed settings. The performance curves given in this manual are given for unit performance in Technician mode when high indoor fan speed is selected.

For entering technician mode see ***12.6.***

## 13.4 Troubleshooting by Diagnostics Codes

### 13.4.1 Fault Code for Outdoor Unit

If any fault exists in the system, its fault will be shown according to the following coding method.

The 5 last fault occurred in the system will be stored in the EEPROM.

If no fault exist in the system, no fault code will be displayed during normal operation mode. STATUS LED is blinking 5 times in 5 seconds, and shut off for the next 5 seconds.

FAULT LED will blink during the same 5 seconds according to the following table

The LED coding method is as follow:

| No | Problem | 5 | 4 | 3 | 2 | 1 |
|---|---|---|---|---|---|---|
| 1 | **OCT is disconnected** | 0 | 0 | 0 | 0 | 1 |
| 2 | **OCT is shorted** | 0 | 0 | 0 | 1 | 0 |
| 3 | **CTT is disconnected** | 0 | 0 | 0 | 1 | 1 |
| 4 | **CTT is shorted** | 0 | 0 | 1 | 0 | 0 |
| 5 | **HST is disconnected (when enabled)** | 0 | 0 | 1 | 0 | 1 |
| 6 | **HST is shorted (when enabled)** | 0 | 0 | 1 | 1 | 0 |
| 7 | **OAT is disconnected** | 0 | 0 | 1 | 1 | 1 |
| 8 | **OAT is shorted** | 0 | 1 | 0 | 0 | 0 |
| 9 | **OMT is disconnected** | 0 | 1 | 0 | 0 | 1 |
| 10 | **OMT is shorted** | 0 | 1 | 0 | 1 | 0 |
| 11 | **IPM Fault** | 0 | 1 | 0 | 1 | 1 |
| 12 | **Bad EEPROM** | 0 | 1 | 1 | 0 | 0 |
| 13 | **DC under voltage** | 0 | 1 | 1 | 0 | 1 |
| 14 | **DC over voltage** | 0 | 1 | 1 | 1 | 0 |
| 15 | **AC under voltage** | 0 | 1 | 1 | 1 | 1 |
| 16 | **IDU/ODU Communication mismatch** | 1 | 0 | 0 | 0 | 0 |
| 17 | **No Communication to IDU** | 1 | 0 | 0 | 0 | 1 |
| 18 | **No Communication to Driver** | 1 | 0 | 0 | 1 | 0 |
| 19 | **Current sensor Fault** | 1 | 0 | 0 | 1 | 1 |
| 20 | **Heat sink Over Heating** | 1 | 0 | 1 | 0 | 0 |
| 21 | **Deicing** | 1 | 0 | 1 | 0 | 1 |
| 22 | **Compressor Over Heating** | 1 | 0 | 1 | 1 | 0 |
| 23 | **Compressor Over Current** | 1 | 0 | 1 | 1 | 1 |
| 24 | **OFAN_UP error** | 1 | 1 | 0 | 0 | 0 |
| 25 | **OFAN_DN error** | 1 | 1 | 0 | 0 | 1 |
| 26 | **Compressor Lock** | 1 | 1 | 0 | 1 | 0 |
| 27 | **Bad Communication** | 1 | 1 | 0 | 1 | 1 |
| 28 | **High pressure protection** | 1 | 1 | 1 | 0 | 0 |
| 29 | **Low pressure protection** | 1 | 1 | 1 | 0 | 1 |
| 30 | Reserved | 1 | 1 | 1 | 1 | 0 |
| 31 | Reserved | 1 | 1 | 1 | 1 | 1 |

**1 - ON, 0 - OFF**

Only one code is shown. Order of priority is lower to the higher number. Diagnostics is continuously ON as long power is on.

### 13.4.2 Outdoor unit diagnostics and corrective actions

| No | Fault Name | Fault Description | Corrective Action |
|---|---|---|---|
| 1 | OCT is disconnected | Thermistor not connected or damaged | Check Thermistor (***13.5.13***) |
| 2 | OCT is shorted | | |
| 3 | CTT is disconnected | | |
| 4 | CTT is shorted | | |
| 5 | HST is disconnected (when enabled) | | |
| 6 | HST is shorted (when enabled) | | |
| 7 | OAT is disconnected | | |
| 8 | OAT is shorted | | |
| 9 | OMT is disconnected | | |
| 10 | OMT is shorted | | |
| 11 | IPM Fault | Over current / IPM malfunction | Check no obstruction to electrical box and outdoor coil air inlet.<br>Check if the inrush wiring is connected and if the inrush circuitry is operating well (***13.5.4***)<br>Check Compressor (***13.5.10***)<br>Check Driver (***13.5.5***)<br>Check Capacitors ***(13.5.7)*** |
| 12 | Bad EEPROM | EEPROM parameters are corrupted | Reset the power. If problem still exist replace PCB only when change is required parameters |
| 13 | DC under voltage | DC voltage is lower than limit | Check if input voltage lower than limit (198VAC), if not and the problem persists, replace driver.<br>If voltage is low, recommend the customer to fix the power supply<br>Check driver (***13.5.5***)<br>Check DC capacitors (***13.5.7***) |
| 14 | DC over voltage | DC voltage exceeds its high - | Check if input voltage higher than limit (253VAC), if not and the problem persists, replace driver.<br>If voltage is high, shut off the power and recommend the customer to fix the power supply |
| 15 | AC under voltage | AC input voltage is lower than limit | Check if input voltage lower than limit (198VAC), if not and the problem persists, replace driver.<br>If voltage is low, recommend the customer to fix the power supply |
| 16 | IDU/ODU Communication mismatch | Mismatch between IDU and ODU models | Units are not designed to operate together as system. Check and replace the models installed. |
| 17 | No Communication to IDU | IDU-ODU communication | Check communication between indoor and outdoor units (***13.5.17***) |

| No | Fault Name | Fault Description | Corrective Action |
|---|---|---|---|
| 18 | No Communication to Driver | Driver fault | Check power supply to driver<br>Check driver communication (***13.5.16***) |
| 19 | Current sensor Fault | Driver fault | Replace Compressor Driver |
| 20 | Heat sink Over Heating | Compressor stopped due to heat sink protection | Check that the airflow around the ODU is free and the fan is running free<br>Check the screws connecting the driver to heat sink are tighten<br>Check outdoor fan motors (***13.5.9***) |
| 21 | Deicing | During deicing procedure | Normally no action is required<br>If the problem persists for more than twice on each hour, check for refrigerant leak and thermodynamic operation (***13.3***) |
| 22 | Compressor Over Heating | Compressor stopped due to over heat protection | Normally no action is required<br>If the problem persists for more than twice on each hour, check for refrigerant leak and thermodynamic operation (***13.3***)<br>Check the EEV (***13.5.12***)<br>Check the Outdoor fans (***13.5.9***)<br>Check the Indoor fans (***13.5.19***)<br>Check the Compressor ***(13.5.10***)<br>Check the CTT Thermistor ***(13.5.13***) |
| 23 | Compressor Over Current | Compressor stopped due to over current protection | Normally no action is required<br>If the problem persists for more than twice on each hour, check for refrigerant leak or clog and thermodynamic operation (***13.3***)<br>Check the EEV (***13.5.12***)<br>Check the Outdoor fans (***13.5.9***)<br>Check the Indoor fans ***13.5.19***)<br>Check the Compressor (***13.5.10***) |
| 24 | OFAN_UP error | Outdoor fan(s) does not rotate | Check no obstruction to outdoor unit coil air path<br>Check OFAN motor (***13.5.9***) |
| 25 | OFAN_DN error | | |
| 26 | Compressor Lock | Compressor does not rotate | Check if the inrush wiring is connected and if the if the inrush circuitry is operating well (***13.5.4***)<br>Check Compressor (***13.5.10***)<br>Check driver (***13.5.5***)<br>Check Zero-cross wiring from driver to Line Filter (6HP Only) |
| 27 | Bad Communication | Bad communication lines | Check communication between indoor and outdoor units (***13.5.17***) |

| No | Fault Name | Fault Description | Corrective Action |
|---|---|---|---|
| 28 | High pressure protection | Compressor stopped due to high pressure protection | Normally no action is required<br>If the problem persists for more than twice on each hour, check for refrigerant clog.<br>Check the switch operation (***13.5.14***)<br>Check the EEV (***13.5.12***)<br>Check the Outdoor fans (***13.5.9***)<br>Check the Indoor fans (***13.5.19***)<br>Check the Compressor ***(13.5.10***) |
| 29 | Low pressure protection | Compressor stopped due to low pressure protection | Normally no action is required<br>If the problem persists for more than twice on each hour, check for refrigerant leak.<br>Check the switch operation (***13.5.15***)<br>Check the EEV (***13.5.12***)<br>Check the Outdoor fans (***13.5.9***)<br>Check the Indoor fans (***13.5.19***)<br>Check the Compressor (***13.5.10***)<br>Check the CTT Thermistor ***(13.5.13***) |

### 13.4.3 Fault Code for Indoor unit

**Note**: Indoor unit diagnostics can be viewed by the outdoor unit display board ***(13.4***).
The below procedure is for viewing the indoor unit codes via the indoor unit led display.

Pressing Mode button for more than 5 seconds will activate diagnostic mode by the acknowledgment of 3 short beeps and lighting of COOL and HEAT LED's.
When Indoor diagnostics is displayed, all four LED's (STBY, Operate, Filter, TMR) are on.
Entering diagnostics in STBY mode allows only viewing of status (fault-display).
In diagnostic mode, system problems / information will be indicated by blinking of Heat & Cool LED's.

The coding method will be as follows:
Heat led will blink 5 times in 5 seconds, and then will be shut off for the next 5 seconds. Cool Led will blink during the same 5 seconds according to the following table:

| No | Fault Name | 5 | 4 | 3 | 2 | 1 |
|---|---|---|---|---|---|---|
| 1 | RT-1 is disconnected | 0 | 0 | 0 | 0 | 1 |
| 2 | RT-1 is shorted | 0 | 0 | 0 | 1 | 0 |
| 3 | RT-2 is disconnected | 0 | 0 | 0 | 1 | 1 |
| 4 | RT-2 is shorted | 0 | 0 | 1 | 0 | 0 |
| … | Reserved | 0 | 0 | 1 | 0 | 1 |
| 7 | Communication mismatch | 0 | 0 | 1 | 1 | 1 |
| 8 | No Communication | 0 | 1 | 0 | 0 | 0 |
| 9 | No Encoder | 0 | 1 | 0 | 0 | 1 |
| 10 | Reserved | 0 | 1 | 0 | 1 | 0 |
| 11 | Outdoor Unit Fault | 0 | 1 | 0 | 1 | 1 |
| … | Reserved | | | | | |
| 17 | Defrost protection | 1 | 0 | 0 | 0 | 1 |
| 18 | Deicing Protection | 1 | 0 | 0 | 1 | 0 |
| 19 | Outdoor Unit Protection | 1 | 0 | 0 | 1 | 1 |
| 20 | Indoor Coil HP Protection | 1 | 0 | 1 | 0 | 0 |
| 21 | Overflow Protection | 1 | 0 | 1 | 0 | 1 |
| … | Reserved | | | | | |
| 24 | EEPROM Not Updated | 1 | 1 | 0 | 0 | 0 |
| 25 | Bad EEPROM | 1 | 1 | 0 | 0 | 1 |
| 26 | Bad Communication | 1 | 1 | 0 | 1 | 0 |
| 27 | Using EEPROM data | 1 | 1 | 0 | 1 | 1 |
| 28 | Model A | 1 | 1 | 1 | 0 | 0 |
| 29 | Model B | 1 | 1 | 1 | 0 | 1 |
| 30 | Model C | 1 | 1 | 1 | 1 | 0 |
| 31 | Model D | 1 | 1 | 1 | 1 | 1 |

1 - ON,0 - OFF

Only one code is shown. Order of priority is lower to the higher number. Diagnostics is continuously ON as long power is on.

### 13.4.4 Indoor unit diagnostics and corrective actions

| No. | Fault | Probable Cause | Corrective Action |
|---|---|---|---|
| 1-4 | Sensor failures | Sensors not connected or damaged | Check Thermistor (***13.5.13***) |
| 7 | Communication mismatch | Mismatch between IDU and ODU models | Units are not designed to operate together as system. Check and replace the models installed. |
| 8 | No Communication | IDU-ODU communication | Check communication between indoor and outdoor units (***13.5.17***) |
| 9 | No Encoder | Indoor electronics or motor | Check motor wiring, if ok, replace motor |
| | | If still not ok | replace Indoor electronic assembly (***14.2.2***) |
| 11 | Outdoor Unit Fault | Outdoor controller problem | Check for any fault code shown on outdoor unit display board and act accordingly (***13.4***) |
| 17-18 | Protections | Indication | No action |

| No. | Fault | Probable Cause | Corrective Action |
|---|---|---|---|
| 19 | Outdoor Unit Protection | Compressor stopped due to outdoor unit protection | Normally no action is required<br>If the problem persists for more than twice on each hour, Check for any fault code shown on outdoor unit display board and act accordingly (***13.4***)<br>Check the EEV (***13.5.12***)<br>Check the Outdoor fans (***13.5.9***)<br>Check the Indoor fans (***13.5.19***)<br>Check the Compressor (***13.5.10***)<br>Check the CTT Thermistor (***13.5.13***) |
| 20 | Indoor Coil HP Protection | Compressor stopped due to high pressure (heating) protection | Normally no action is required<br>If the problem persists for more than twice on each hour, check for refrigerant leak and thermodynamic operation (***13.3***)<br>Check the EEV (***13.5.12***)<br>Check the Outdoor fans (***13.5.9***)<br>Check the Indoor fans (***13.5.19***)<br>Check the Compressor ***(13.5.10***)<br>Check the CTT Thermistor (***13.5.13***) |
| 21 | Overflow Protection | Compressor stopped due to water level overflow protection | Check the drainage tube for any clog.<br>Correct drain piping or float switch if needed.<br>It is highly recommended to install a siphon into the unit drainage point. |
| 24 | EEPROM Not Updated | System is using ROM parameters and not EEPROM parameters | No action, unless special parameters are required for unit operation. |
| 25 | Bad EEPROM | | No action, unless special parameters are required for unit operation. |
| 26 | Bad Communication | IDU-ODU communication | Check communication between indoor and outdoor units (***13.5.17***) |
| 27 | Using EEPROM data | No problem | |
| 28 | IDU model | Indoor unit model connected is shown: Model A - 4HP unit | No problem |
| 29 | | Indoor unit model connected is shown: Model B - 5HP unit | |
| 30 | | Indoor unit model connected is shown: Model C - 6HP unit | |
| 31 | | Not applicable | |

## 13.5 Procedures for checking Main Parts

### 13.5.1 Discharge DC Voltage

**WARNING**

**High voltage!!!**

**Wait for DC voltage to be discharged before touching any part of the driver to avoid electric shock.**

**Check to ensure that DC voltage has reduced to below 50VDC, if not, keep waiting until it does.**

### 13.5.2 Checking Line Mains Voltage

Confirm that the Mains voltage is between 198 and 253 VAC. If Mains voltage is out of this range, abnormal operation of the system is expected. If in range, check the Power (Circuit) Breaker and look for broken or loosed cable lugs or wiring mistakes.

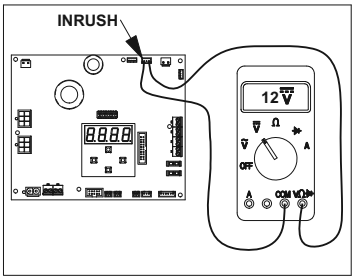
### 13.5.3 Checking Line Filter Board

1) Check for any burn signs on the filter board and its coils and relays, replace if any.
2) Check voltage at the inlet and outlet of the line filter. If no output voltage, replace line filter.

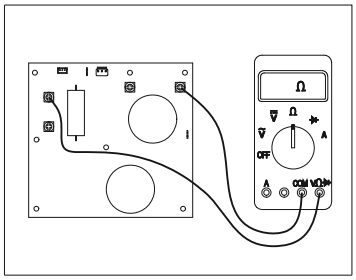
Replacing line filter - (***14.1.19***)

### 13.5.4 Checking Inrush Circuitry

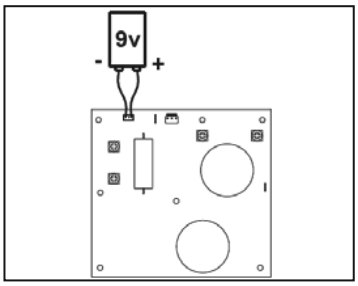
1) Check continuity of each wire on the inrush wiring cable – repair if needed.
2) Power ON the unit, check voltage between both of the inrush pins on the ODU main board – should be 0 at first and 12VDC after 1 minute. A click sound should also occur after 1 minute. If no voltage – replace ODU main Board.
3) While power is off check resistance between line input and line output in the filter board – should be 200Ω. Turn on the power and check again, after 1 minute (after the click should be 0Ω. If not, the resistor is burned - replace Line filter.
4) Disconnect the inrush connector (red) from the line filter controller and Connect 9V battery to pins 1 and 3 (Non-polarity). A click sound should occure. If not, the relay is burned - replace Line filter.




***2)*** Inrush connector pin check




***3)*** Inrush resistor check




***4)*** Inrush connector pin check

Replacing line filter - (***14.1.19***)
Replacing main board - (***14.1.13***)

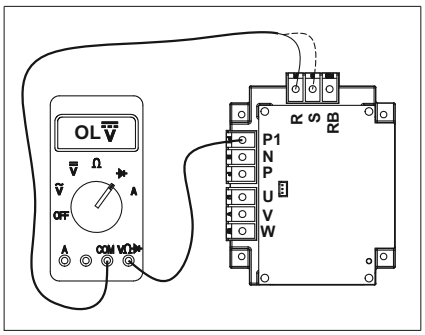
### 13.5.5 Checking Compressor Driver

#### 13.5.5.1 *4-5HP*

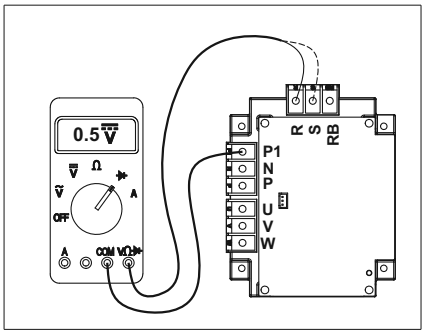
Remove all the terminals of the driver before checking.
If items ***1)*** to ***11)*** are performed and the results are satisfactory, driver is normal.

Use a digital multi meter in diode checking function

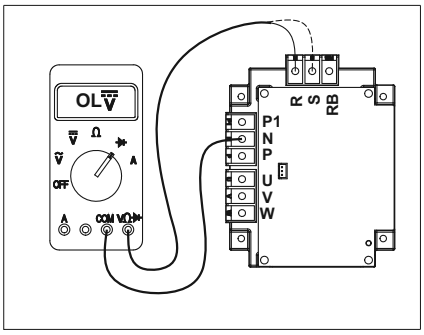
1) Connect the "VΩ" side of the tester to the "P1" terminal of driver and the "COM" side of the tester to "R" and "S" of driver, measure the diode voltage.
   Voltage should be "OL" (Over Load).



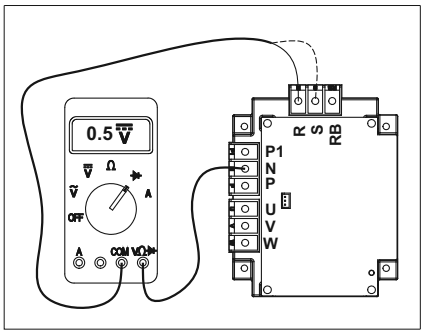

2) Connect the "COM" side of the tester to the "P1" terminal of driver and the "VΩ" side of the tester to "R" and "S" of driver, measure the diode voltage.
   Voltage should be 0.4~0.8VDC.



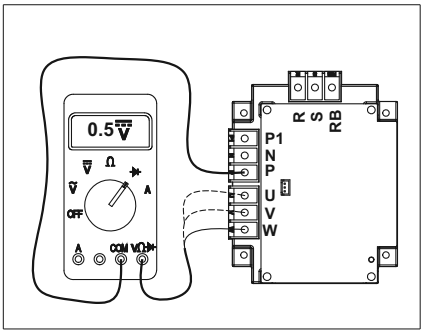

3) Connect the "COM" side of the tester to the "N" terminal of driver and the "VΩ" side of the tester to "R" and "S" of driver, measure the diode voltage.
   Voltage should be "OL" (Over Load).



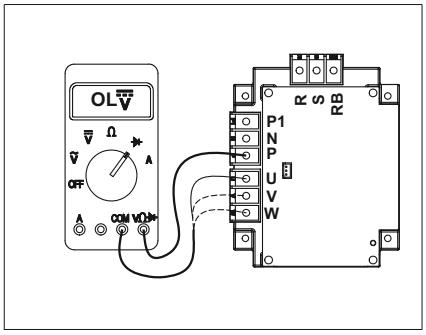

4) Connect the "VΩ" side of the tester to the "N" terminal of driver and the "COM" side of the tester to "R" and "S" of driver, measure the diode voltage.
   Voltage should be 0.4~0.8VDC.



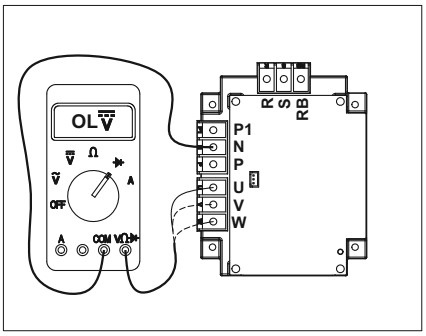

5) Connect the "COM" side of the tester to the "P" terminal of driver and the "VΩ" side of the tester to "U", "V" and "W" of driver, measure the diode voltage.
   Voltage should be 0.4~0.8VDC.



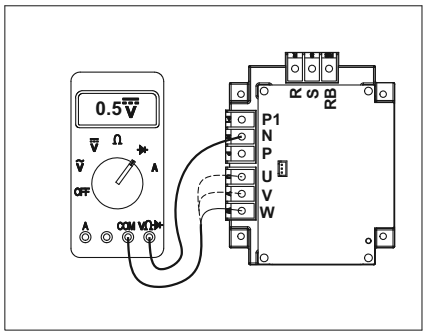
6) Connect the “VΩ” side of the tester to the “P” terminal of driver and the “COM” side of the tester to “U”, “V” and “W” of driver, measure the diode voltage.
Voltage should be “OL” (Over Load).



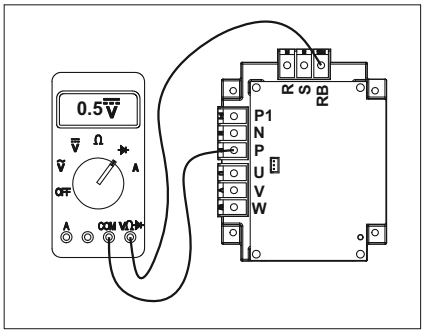

7) Connect the “COM“ side of the tester to the “N” terminal of driver and the “VΩ” side of the tester to “U”, “V” and “W” of driver, measure the diode voltage.
Voltage should be “OL” (Over Load).



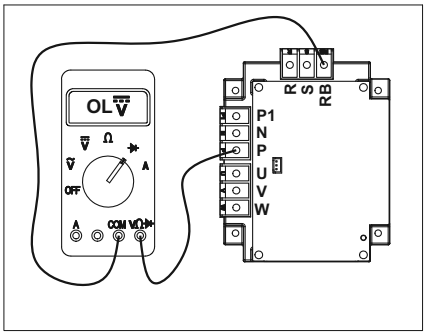

8) Connect the “VΩ” side of the tester to the “N” terminal of driver and the “COM” side of the tester to “U”, “V” and “W” of driver, measure the diode voltage.
Voltage should be 0.4~0.8VDC.



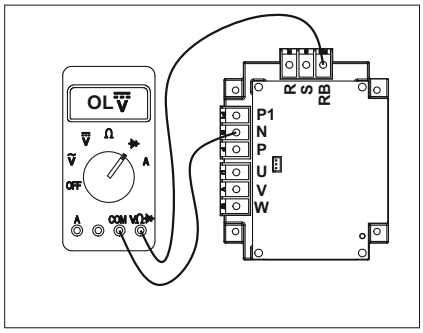

9) Connect the “COM“ side of the tester to the “P” terminal of driver and the “VΩ” side of the tester to “T/RB” of driver, measure the diode voltage.
Voltage should be 0.3~0.8VDC.




10) Connect the “VΩ” side of the tester to the “P” terminal of driver and the “COM” side of the tester to “T/RB” of driver, measure the diode voltage.
Voltage should be “OL” (Over Load).



11) Connect the “COM“ side of the tester to the “N” terminal of driver and the “VΩ” side of the tester to “T/RB” of driver, measure the diode voltage.
Voltage should be “OL” (Over Load).

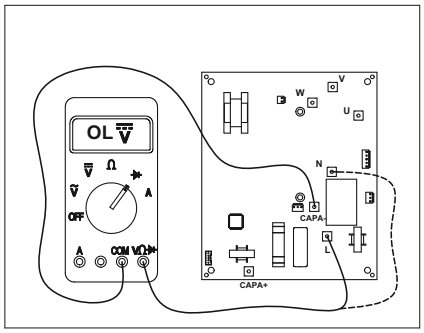



Replacing driver - (***14.1.15***)

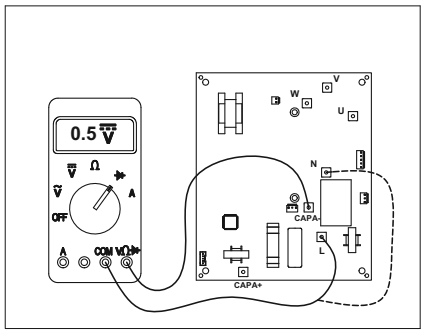
**13.5.5.2 *6HP***

Remove all the terminals of the driver before checking.
If items 1) to 8) are performed and the results are satisfactory, driver is normal.
Use a digital multi meter in diode checking function

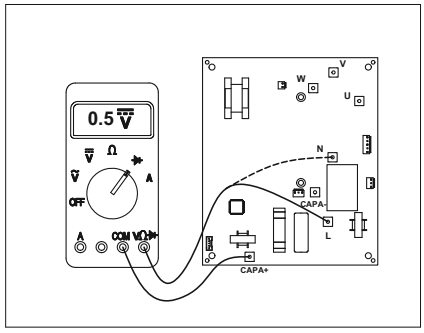
1) Connect the “COM“ side of the tester to the “CAPA-” terminal of driver and the “VΩ” side of the tester to “LIVE” and “NEUTRAL” of driver, measure the diode voltage.
Voltage should be “OL” (Over Load).



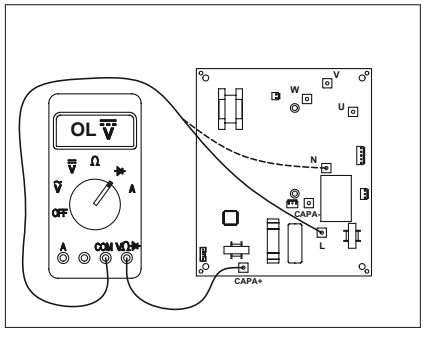

2) Connect the “VΩ” side of the tester to the “CAPA-” terminal of driver and the “COM” side of the tester to “LIVE” and “NEUTRAL” of driver, measure the diode voltage.
Voltage should be 0.4~0.8VDC.



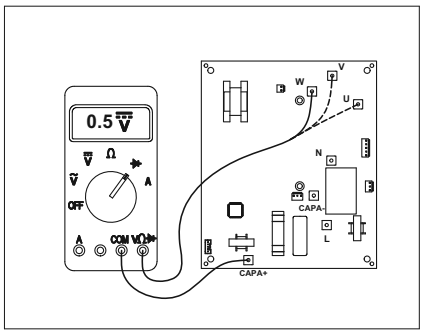

3) Connect the “COM“ side of the tester to the “CAPA+” terminal of driver and the “VΩ” side of the tester to “LIVE” and "NEUTRAL" of driver, measure the diode voltage.
Voltage should be 0.4~0.8VDC.



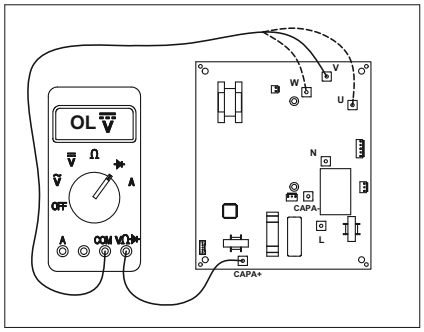

4) Connect the “VΩ” side of the tester to the “CAPA+” terminal of driver and the “COM” side of the tester to “LIVE” and "NEUTRAL" of driver, measure the diode voltage.
Voltage should be “OL” (Over Load).



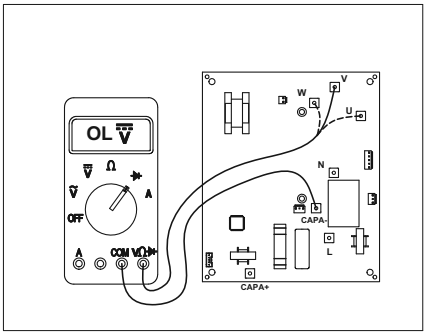
5) Connect the “COM“ side of the tester to the “CAPA+” terminal of driver and the “VΩ” side of the tester to “U”, “V” and “W” of driver, measure the diode voltage. Voltage should be 0.4~0.8VDC.



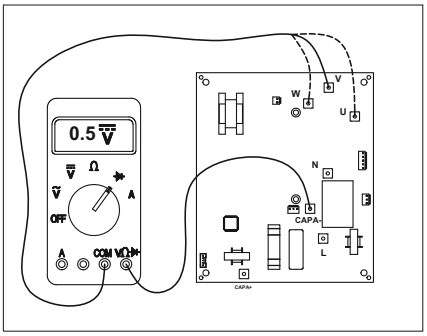

6) Connect the “VΩ” side of the tester to the “CAPA+” terminal of driver and the “COM” side of the tester to “U”, “V” and “W” of driver, measure the diode voltage. Voltage should be “OL” (Over Load).




7) Connect the “COM“ side of the tester to the “CAPA-” terminal of driver and the “VΩ” side of the tester to “U”, “V” and “W” of driver, measure the diode voltage. Voltage should be “OL” (Over Load).




8) Connect the “VΩ” side of the tester to the “CAPA-” terminal of driver and the “COM” side of the tester to “U”, “V” and “W” of driver, measure the diode voltage. Voltage should be 0.4~0.8VDC.




Replacing driver - ***(14.1.15.2)***

### 13.5.6 Checking PFC Chock coil

1) Check PFC chock connections – repair if needed.
2) Visually check to see any burn marks on the wires – replace the chock(s) if needed.
3) Disconnect the chock from the driver and check if the 2 ending wires of each chock are shorted (continuity check) – if they are NOT shorted replace the chock(s), if they are shorted – check the driver (***13.5.5***).

Replacing PFC chock - (***14.1.17***)

### 13.5.7 Checking DC Capacitors

1) Check visually for burn marks on the capacitor PCB and the capacitors for swelling casing – replace if needed.

2) Check capacitance between the + and – poles, should be 2820±560μF (4-5HP) or 4920±980μF (6HP) – replace if not.

Replacing DC Capacitor board - (***14.1.18***)

### 13.5.8 Checking fuse on Main Board

If the 3.15A fuse on the main Board is burnt check the outdoor fans or any other peripheral that can cause a short:

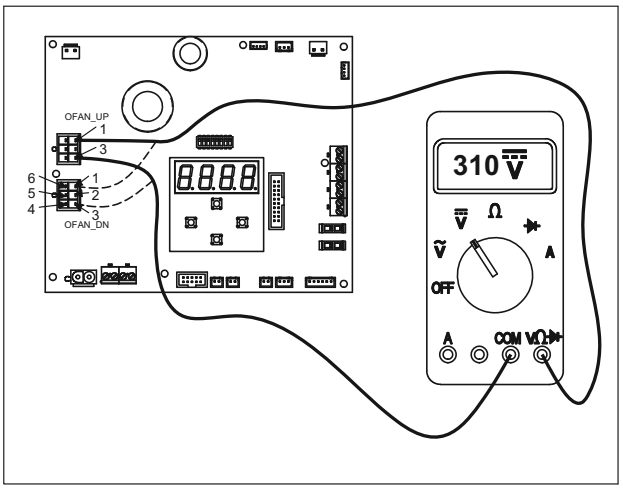
1) In case of a problematic peripheral - replace it.
2) In case no problematic peripheral replace the burnt fuse.
3) In case of frequent burning fuse, replace the controller.

Replacing main board - (***14.1.13***)

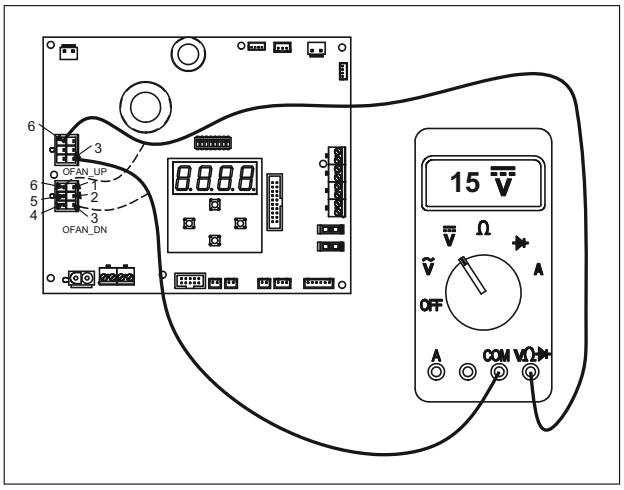
### 13.5.9 Checking Outdoor Fan Motor

An Outdoor fan motor fault message may occur during very high winds outdoors that may stop the fan rotation for short periods. If so, need to relocate the outdoor unit to a more protected place from winds or install measure of air deflection in front of the fan outlets.

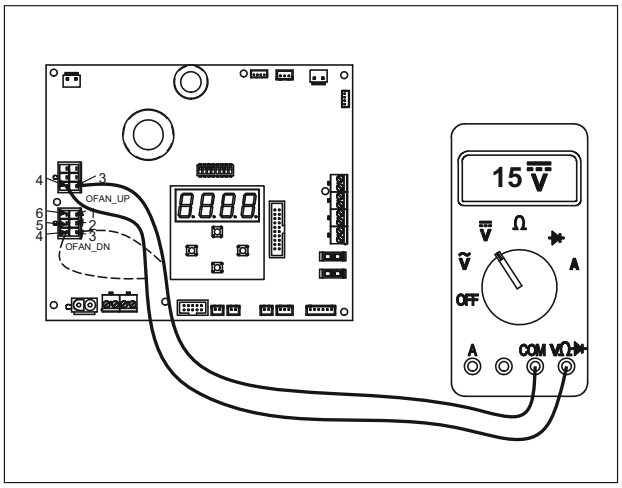
1) Check OFAN connections - Repair if needed.
2) Rotate the fan slowly by hand - If the fan does not rotate easily, check whether something is obstructing the fan preventing it from rotating – remove the obstruction if necessary. If no obstruction and still not operating - the fan motor bearings have seized - Replace the motor.
3) Disconnect the OFAN connector from the main board, switch ON the power and check the fan motor connector on the main board:
   a. Between 1 and 3 – should be 310VDC. If very low or 0VDC, replace main board.
   b. Between 3 and 4 – should be 15VDC. If very low or 0VDC, replace main board.
   c. Between 3 and 6 – should be 15VDC. If very low or 0VDC, replace main board.
4) Connect back the motor connector to the main board, switch ON the power and check the motor current while operating. Current should be around 1A - In case of abnormal current (no current or excessive current), replace fan motor.



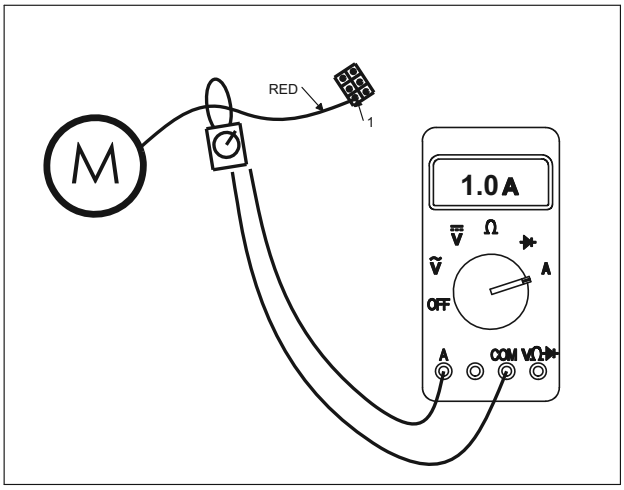

***3)a*** Check motor current




***3)c*** Check motor current




***3)b*** Check motor current

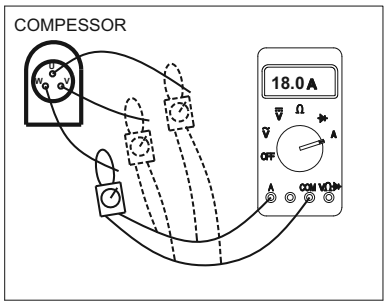



***4)*** Check motor current

Replacing outdoor unit fan motor - ***(14.1.6***)
Replacing main board - (***14.1.13***)

### 13.5.10 Checking Compressor

1) Check Compressor connections - Repair if needed.
2) Check the resistance between the three phases – all three coil resistances should be the same: around 0.188Ω.
3) Check the compressor current while operating to be the same on each wire - In case of abnormal current (no current or excessive current), the problem could be of driver or compressor – if driver is checked to be operating well (***13.5.5***), replace the compressor.




***3)*** Check Compressor motor current

Replacing compressor- (***14.1.10***)

### 13.5.11 Checking Reverse Valve (RV)

The RV has two parts, Solenoid and valve.

1) Disconnect the RV connector from the main board and operate the unit in heating mode, check the voltage between two pins of reverse valve connector on the controller, normal voltage is 230VAC - if no power supply to RV, replace outdoor main board.
2) Check RV operation with direct 230VAC power supply. If RV solenoid is OK (but still no heating operation while compressor is ON), replace the RV valve from the refrigeration system.if not, replace the RV coil.

Replacing RV Coil (***14.1.7***)

Replacing RV Valve - (***14.1.9***)

Replacing main board - (***14.1.13***)

### 13.5.12 Checking Electrical Expansion Valve (EEV)

The EEV has two parts, step motor and valve. Use additional set of valve and coil to check the system.

1) Check the impedance in the coil wires to be as following:
   Grey wire to each of the other wires – about 100Ω
   Other wires – each one to the others (except grey) – about 50Ω
2) When Outdoor unit is powered on, EEV shall have vibration and click sound. If not, replace the coil with the additional one and check again – turn OFF the unit and than turn it ON, vibration and click sound should be performed. If OK, the coil was damaged and require to be replaced.
3) Turn OFF the unit, insert a good coil onto an additional operating valve and turn the unit ON, vibration and click sound should be performed. If OK, replace EEV valve from the unit.
4) If both EEV coil and valve are still not operating, replace the ODU main board.

Replacing EEV Valve Coil - (***14.1.8***)

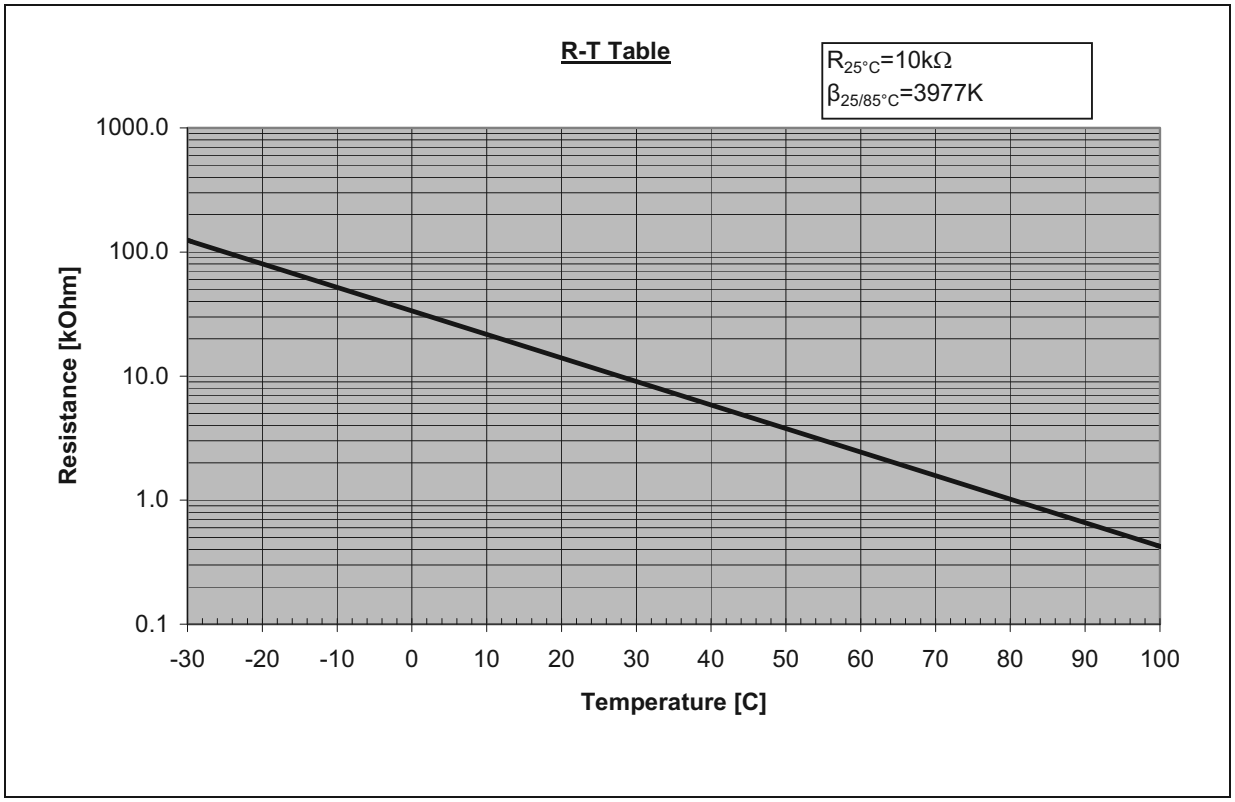
Replacing EEV Valve - ***(14.1.9***)

Replacing main board - ***(14.1.13***)

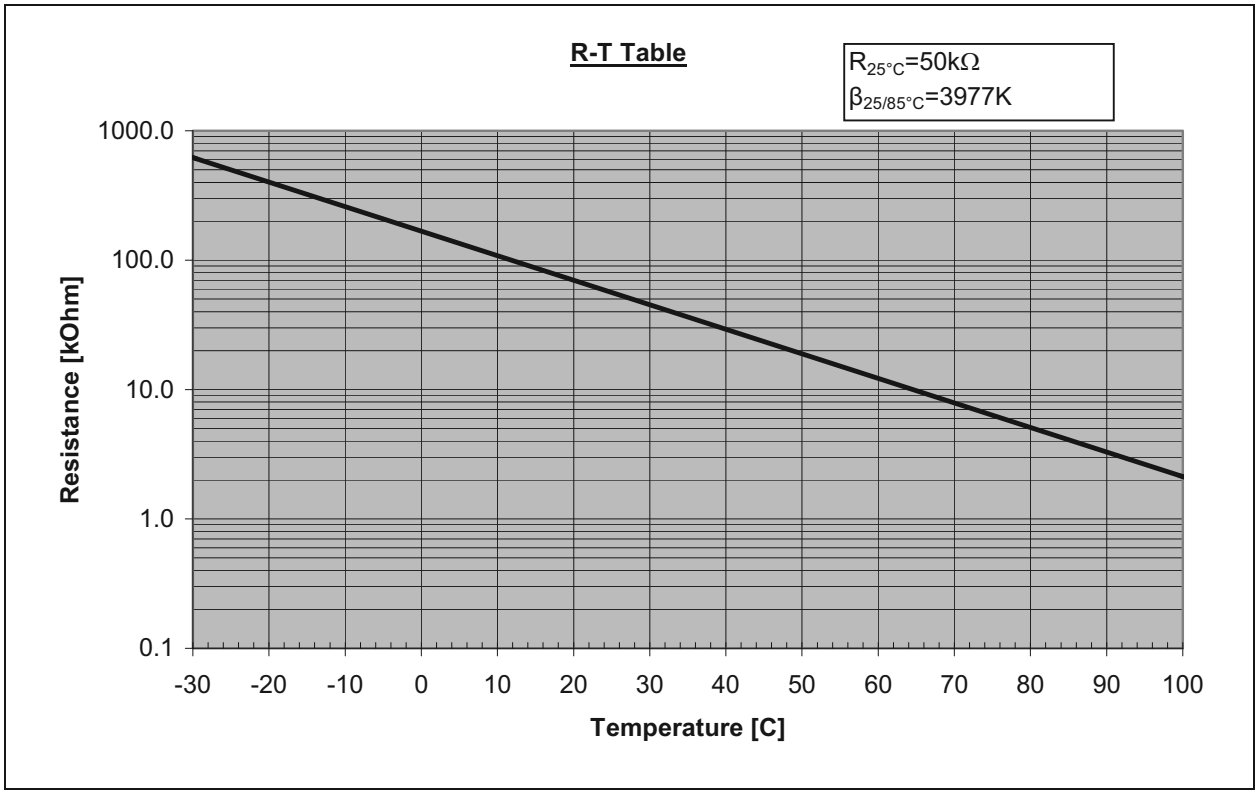
### 13.5.13 Checking Thermistors

1) Check Thermistor connections and wiring - Replace if needed.
2) Check sensor visually - Replace if needed.
3) Check thermistor sensor attachment to pipe (or other parts), specially pay attention to the spring holding the sensor towards its sensing part – repair if needed.
4) Disconnect the connector from the main board and check Thermistor resistance – should be according the charts below for each sensor. If not in range of 10%, replace thermistor.
5) If thermistor resistance check is OK but reading is still wrong, replace main board.

**OAT, OCT, OMT, ICT, RAT Chart**



**CTT Chart**




Replacing thermistor - (***14.1.11, 14.1.12, 14.2.9***)
Replacing main board - ***(14.1.13***)

### 13.5.14 Checking High Pressure Switch (HPS)

1) Disconnect HPS connector from the main board and check resistance between the 2 pins of the HPS connector – if shorted the HPS is OK, otherwise replace HPS.

Replacing HPS - (***14.1.9***)

### 13.5.15 Checking Low Pressure Switch (LPS)

1) Disconnect LPS connector from the main board and check resistance between the 2 pins of the HPS connector – if shorted the LPS is OK otherwise replace LPS.

Replacing LPS - (***14.1.9***)

### 13.5.16 Checking Compressor Driver Communications

1) Disconnect the wire cable from the connectors on both sides (driver and main board), check the wiring continuity – Repair or replace wiring if needed.
2) Turn power ON and check if the red led in the driver is lighted. If OK and still no communications, replace main board. If the led is OFF, replace driver.

Replacing Outdoor Unit main board - (***14.1.13***)
Replacing driver - ***(14.1.15***)

### 13.5.17 Checking Indoor-Outdoor Unit Communications

1) Disconnect the wire cable from the connectors on both sides (main board and terminal block), check the wiring continuity – Repair or replace wiring if needed.
2) Check the continuity of the connecting wiring between indoor and outdoor units – Repair or replace wiring if needed.
3) Problem could be either in outdoor unit main board or indoor unit controller. To verify which one is faulty use additional boards and replace the one which is faulty.

Replacing Outdoor Unit main board - (***14.1.13***)
Replacing Indoor unit electrical assembly - (***14.2.2***)

### 13.5.18 Checking Indoor Unit Fuse on Controller

If the 3.15A fuse on the main Board is burnt check the fan or any other peripheral that can cause a short:

1) In case of a problematic peripheral - replace it.
2) In case no problematic peripheral replace the burnt fuse.
3) In case of frequent burning fuse, replace the controller.

Replacing Indoor unit electrical assembly - (***14.2.2***)

### 13.5.19 Checking Indoor Unit Fan Motor

1) Check the motor wiring from the controller.
2) Check the motor capacitor for capacitance according to the capacitor name plate.
3) Check the resistance between each coil of the motor to be within normal range (30-300Ω).
4) Check resistance between each wire to ground to be above 5Ω.

Replacing Indoor unit Fan Motor - (***14.2.6***)
Replacing Indoor unit electrical assembly - (***14.2.2***)
Replacing motor capacitor - (***14.2.8***)

### 13.5.20 Checking for electromagnetic interference (EMC problems)

#### 13.5.20.1 *EMC interference to the A/C unit*

**Locations most susceptible to interference**

1) Locations near broadcast stations where there are strong electromagnetic waves.
2) Locations near amateur radio (short wave) stations.
3) Locations near electronic sewing machines and arc-welding machines.

**Problem:**

1) The unit may stop suddenly during operation.
2) Indicator lamps may flicker

Correction Actions:

The fundamental concept is to make the system less susceptible to noise by Insulation for noise or distance from the noise source.

1) Use shielded wires.
2) Move unit away from the noise source.

#### 13.5.20.2 *EMC interference to near by home appliances*

**Locations most susceptible to interference:**

1) A television or radio is located near the A/C and A/C wiring.
2) The antenna cable for a television or radio is located close to the A/C and A/C wiring.
3) Locations where television and radio signals are weak.

**Problem:**

1) Noise appears in the television picture, or the picture is distorted.
2) Static occurs in the radio sound.

**Correction Actions:**

1) Select a separate power source.
2) Keep the A/C and A/C wiring at least 1 meter away from wireless devices and antenna cables.
3) Change the wireless device's antenna to a high sensitivity antenna.
4) Change the antenna cable to a BS coaxial cable.
5) Use a noise filter (for the wireless device).
6) Use a signal booster.

# 14. SERVICING

## 14.1 Outdoor Unit

**WARNING**

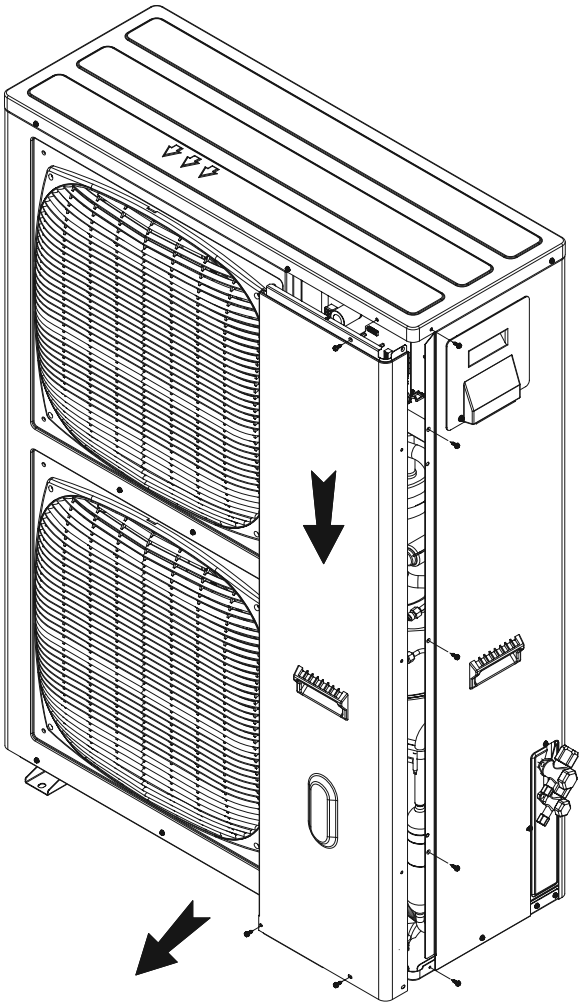
***Note*: To reassemble perform the procedures in reverse.**

### 14.1.1 Removing Service (front) panel

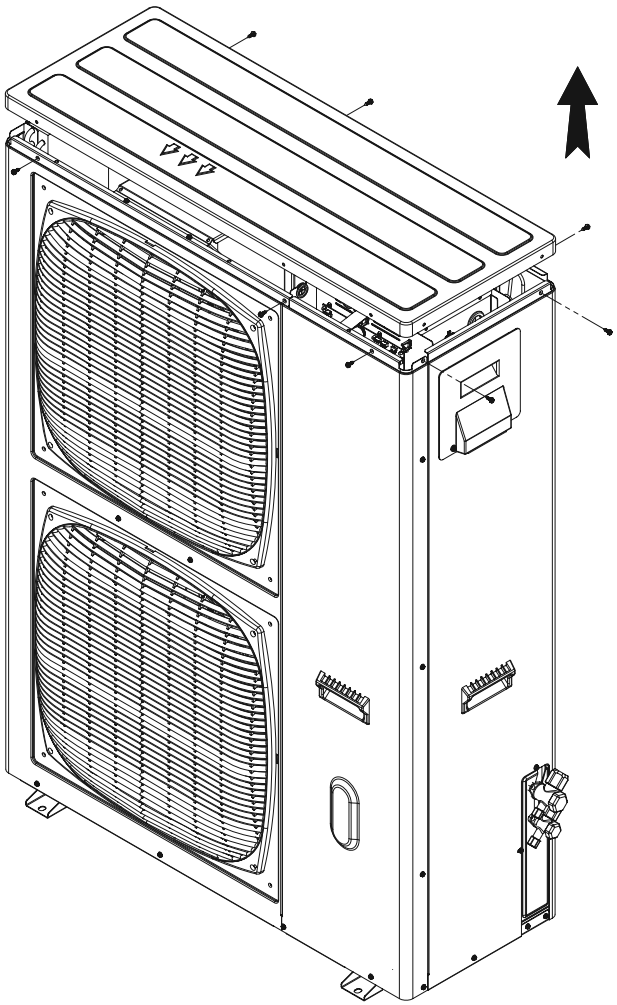
Remove the 8 fixing screws and slide the service (front) panel downwards to remove it.
***Note:*** *Do not flip the panel forward on the top side as not to damage the controller.*

### 14.1.2 Removing top panel

Remove the 8 fixing screws and take out the top cover.



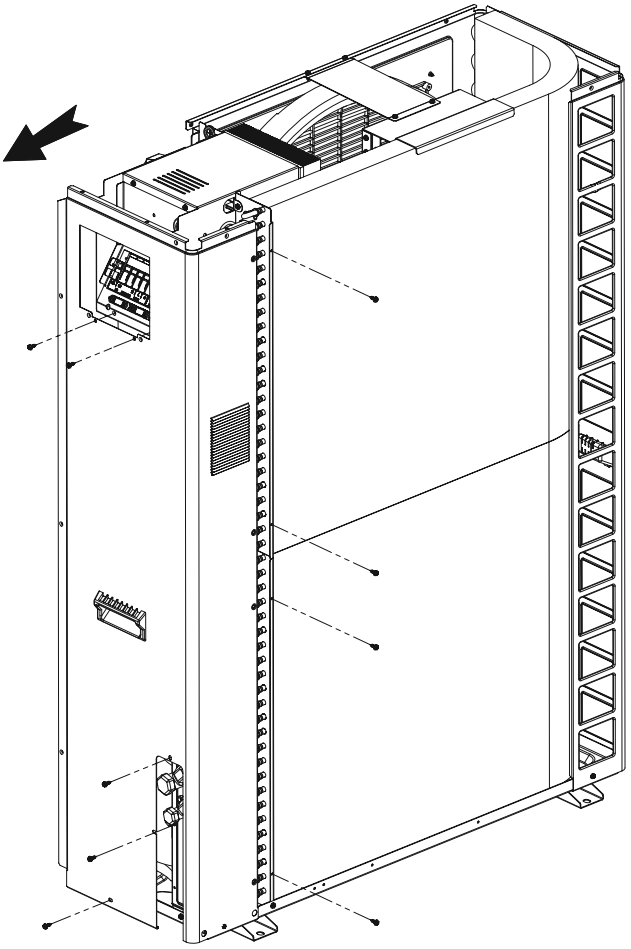
Removing Service (front) panel



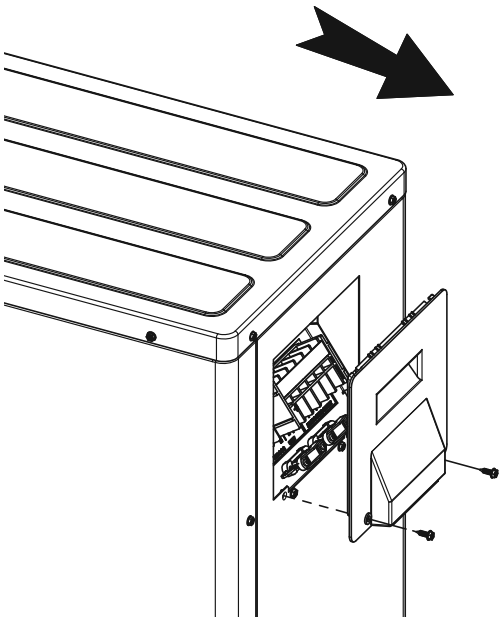
Removing Top panel

### 14.1.3 Removing side panel

1. Remove the top cover as in above ***14.1.2.***
2. Remove the 2 screws holding the electrical plastic cover and disconnect the power supply cords.
3. Remove the 9 fixing screws and take out the side panel.



Removing side panel



Removing Electrical Cover

### 14.1.4 Removing Air Outlet Grille(s)

Remove the 4 fixing screws of the each grille.

### 14.1.5 Removing Outdoor Fan

1. Remove the air outlet grille according to ***14.1.4***.
2. Remove the hex nut from the motor shaft. To ease the removal, use rubber hammer to hit on the hex nut while pulling out the fan.

***NOTES for re-assemble the fan:***

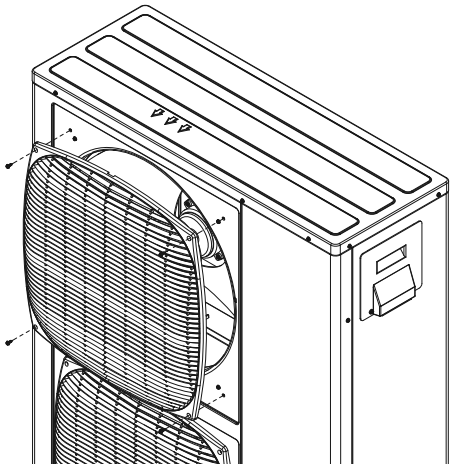
1. Insert the skidding protection part of fan boss in accordance with the cutting part of the motor shaft. Push hard until fan can no longer be inserted.
2. Fix the screw after with tightening Torque of 8.0 Nm (80kg.cm)

### 14.1.6 Removing Outdoor Fan Motor

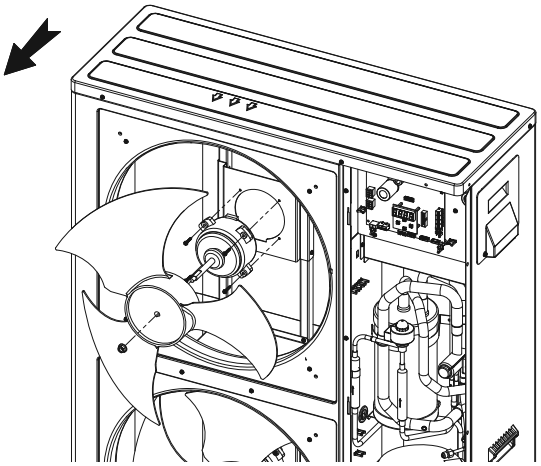
1. Remove the outdoor fan according to ***14.1.5.***
2. Disconnect the motor connector from the main board.
3. Cut the nylon ties holding the motor cable.
4. Remove the four (4) fixing screws for the motor.

***NOTES for re-assemble the motor:***

1. When mounting the motor, ensure the cables point downwards.
2. Fix the protection tube edge downward to ensure the water may not keep in it.
3. Fix the motor wires with a nylon ties to prevent them obstructing the propeller fan.
4. When connecting the motor wire, check to ensure that the labels on the connectors match the PCB connectors.
5. Fix back the air outlet grille.



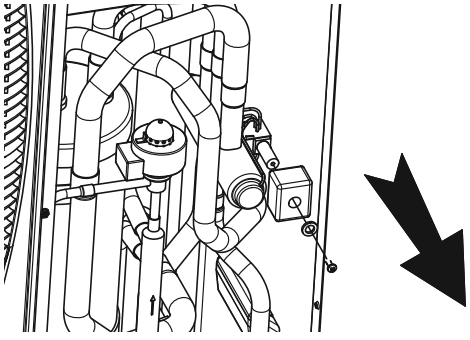
Removing Air Outlet Grille



Removing Outdoor Fan & Motor

### 14.1.7 Removing Reversing Valve coil

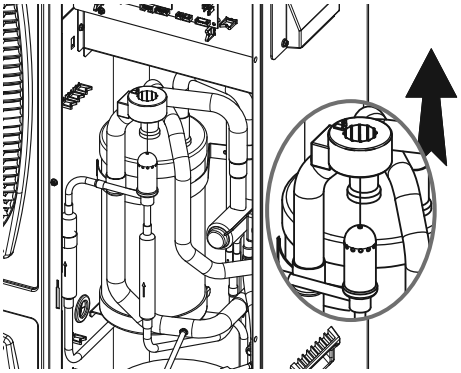
1. Remove the service front panel according to ***14.1.1***.
2. Check to ensure that LEDs and display board are OFF.
3. Disconnect the RV connector from the main board.
4. Remove the RV wires from the cable holders along the electronics box.
5. Remove the fixing screw from the reversing valve coil and take the coil out.



Removing Reversing Valve coil

### 14.1.8 Removing Expansion Valve coil

1. Remove the service front panel according to ***14.1.1***.
2. Check to ensure that LEDs and display board are OFF.
3. Disconnect the EEV connector from the main board.
4. Remove the EEV wires from the cable holders along the electronics box.
5. Pull up the EEV coil.



Removing Expansion Valve coil

### 14.1.9 Removing Refrigeration parts

Refrigeation parts: Expansion valve, Reversing valve, high pressure switch, etc.

1. Remove the refrigerant from the unit by a pumping machine via the 2 valves.

***Note**: open the valves gradually and leave them only partially open for as long as the refrigerant exerts from the unit. Do not open the valves fully as not to loose any oil.*

2. Remove the service front panel according to ***14.1.1***.
3. Check to ensure that LEDs and display board are OFF.
4. Remove the part connector from the main board.
5. Remove the part wires from the cable holders along the electronics box and or the partition.
6. Remove the part from its pipes using burner.

### 14.1.10 Removing Compressor

1. Remove the refrigerant from the unit by a pumping machine via the 2 valves.

***Note**: open the valves gradually and leave them only partially open for as long as the refrigerant exerts from the unit. Do not open the valves fully as not to loose any oil.*

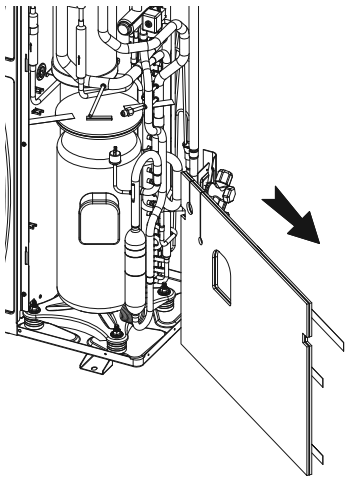
2. Remove the service front panel according to ***4.1.1***.
3. Remove the side and top panels according to ***14.1.2***, ***14.1.3.***
4. Check to ensure that LEDs and display board are OFF.
5. Take out the insulation surrounding the compressor and the cover.
6. Remove the compressor electrical cover. Use flat screw driver if required.
7. Remove the compressor wires from the terminals.
8. Remove the compressor wires from the cable holders along the partition and secure the wire on the top of the unit to avoid its burning by the burner.
9. Disconnect the suction pipe from the compressor.
10. Disconnect the discharge pipe from the compressor.

Remove the four nuts fixing the compressor and remove the compressor by lifting.

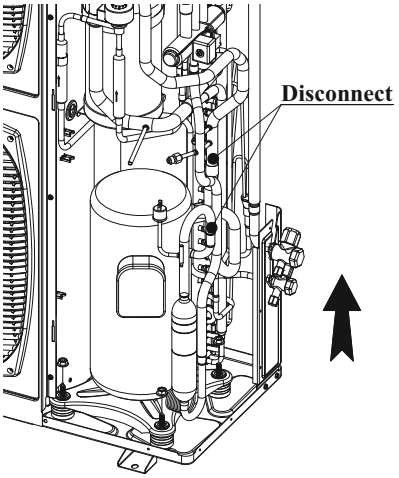
***NOTES for re-assembling new compressor:***

1. To prevent contamination of the refrigerant with water or foreign particles, do not expose open pipes to atmosphere for long periods. If necessary, seal pipe ends using caps or tape.
2. Remove the caps for the new compressor just before replacing the compressor. Seal suction and discharge pipe using tape when mounting to prevent the foreign particles entering the compressor.

Check to ensure each wire color goes to correct compressor terminal. If wrongly connected, the compressor may fail due to reverse rotation.



Removing Compressor Insulation



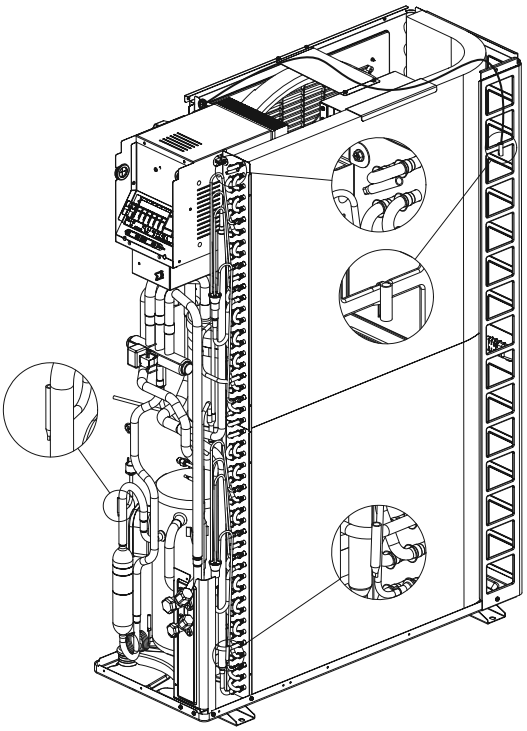

Removing Compressor

### 14.1.11 Removing Tubing Thermistors

1. Remove the service front panel according to ***14.1.1***.
2. Remove the side and top panels according to ***14.1.2***, ***14.1.3***
3. Check to ensure that LEDs and display board are OFF.
4. Disconnect the thermistor connector from the main board.
5. Remove the thermistor wires from the cable holders along the electronics box.
6. Cut the nylon ties holding the wires to the pipes.
7. Pull up the spring from the housing while pulling the thermistor.

***Notes for re-assemble the thermistor:***

1. Make sure the spring is inserted first and is facing the tube to be attched to.
2. hold the thermistor wires to the tube with nylon tie holding both the wires and the protective sleeve.



Removing Thermistors

### 14.1.12 Removing Outdoor Air Thermistor

1. Remove the service front panel according to ***14.1.1***.
2. Remove the top panel according to ***14.1.2***.
3. Check to ensure that LEDs and display board are OFF.
4. Disconnect the thermistor connector from the main board.
5. Remove the thermistor wires from the cable holders along the electronics box and the fan motor assembly.
6. Cut the nylon ties holding the wires to the metal chassis.

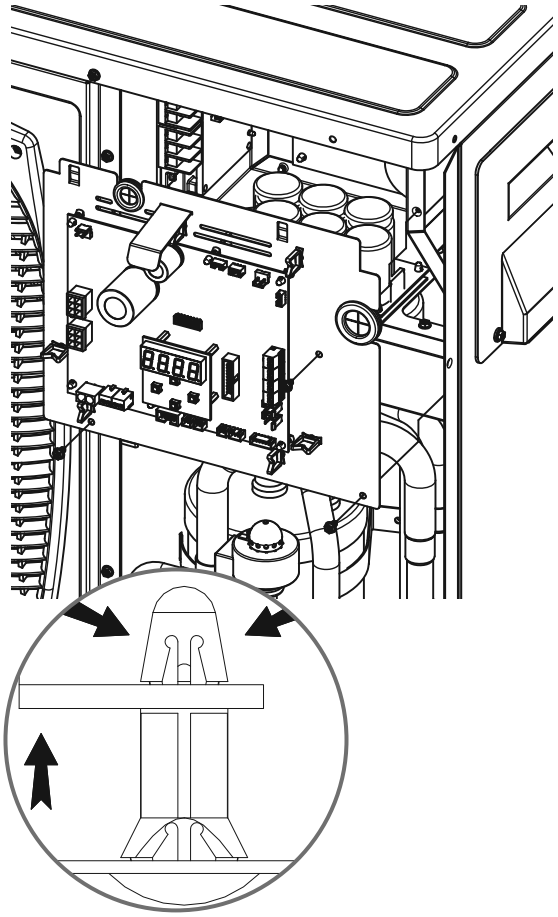
### 14.1.13 Removing main board

1. Remove the service front panel according to ***14.1.1***.
2. Check to ensure that LEDs and display board are OFF.
3. Disconnect all connectors from the main board.
4. Squeeze the 8 spacers head with Long-Nose Pliers and pull out the board.

***Note:*** *It might be easier to remove the main board panel first and than pull out the board from its spacers.*

***Notes for re-assemble the main board:***

1. Make sure to correct all the connectors into the connect locations. If incorrectly connected, malfunction or damage to the electrical parts may occur.
2. Hold the wires to the cable holders.
3. Ensure to set all the dip switches to the same configuration as the original.



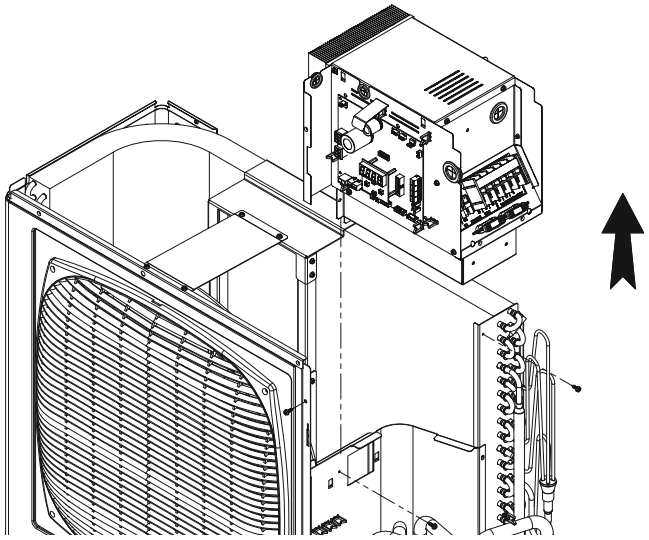
Removing main board Panel

### 14.1.14 Removing Electrical assembly

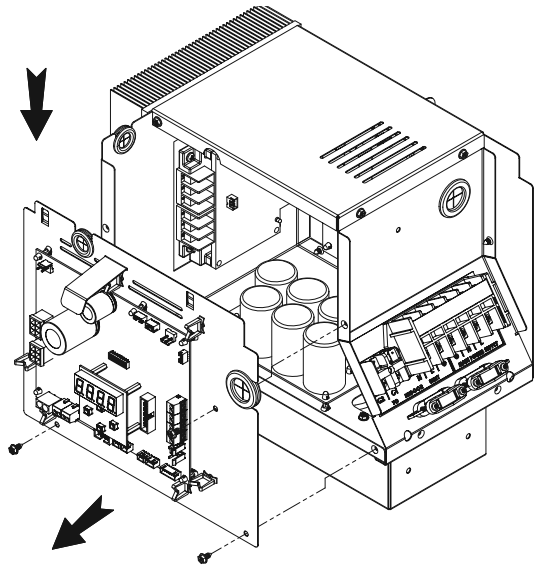
1. Remove the service front panel according to ***14.1.1***.
2. Remove the side and top panels according to ***14.1.2***, ***14.1.3***.
3. Check to ensure that LEDs and display board are OFF.
4. Disconnect the following connectors from the main board: RV, thermistors (4), HPS and EEV.
5. Remove the compressor electrical cover. Use flat screw driver if required.
6. Remove the compressor wires from the terminals.
7. Remove the three (3) screws fixing the electrical box to the front fan panel, the partition and the coil plate.
8. Pull up the box.

***Notes for re-assemble the Electrical assembly:***

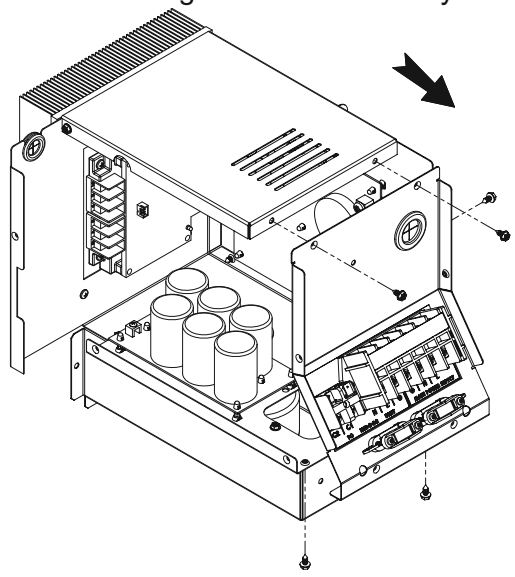
1. Make sure to connect all the connectors into the right locations. If incorrectly connected, malfunction or damage to the electrical parts may occur.
2. Hold the wires to the cable holders.



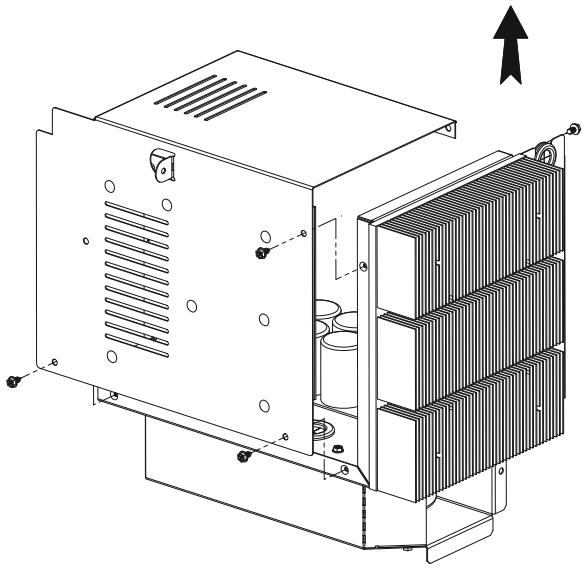
Removing Electrical assembly



Removing main board Panel



Removing Terminal Panel



Removing Electrical assembly Cover

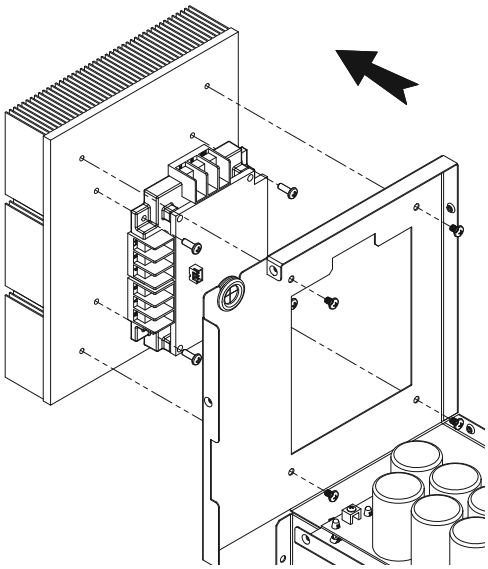
## 14.1.15 Removing driver module

### 14.1.15.1 *4-5HP*

1. Remove the electrical assembly according to ***4.1.14***.
2. Remove the three (3) screws fixing the main board panel to the assembly and take the panel out.
3. Remove the earth tab connection from the line filter.
4. Remove the five (5) screws fixing the terminal panel to the assembly and take the panel out.
5. Disconnect all the wires from the driver terminals and the communication connector.
6. Remove the five (5) screws fixing the line filter panel to the driver panel and take the panel out.
7. Remove the four (4) screws fixing the driver module to the heatsink.
8. Wipe out the grease paste with cloth soaked with alcohol.

***Notes:***

- Do not hold the PCB part of the driver module when removing the driver module.
- When handling the module, take care of not to use excessive force as this may cause damage.



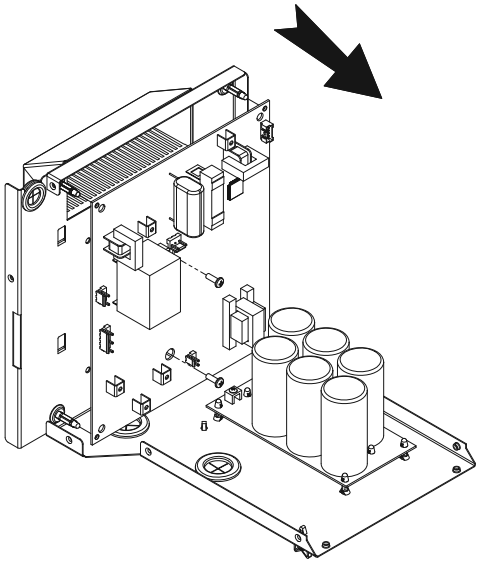
Removing driver module

### 14.1.15.2 *6HP*

1. Remove the electrical assembly according to ***14.1.14***.
2. Remove the three (4) screws fixing the main board panel to the assembly and take the panel out.
3. Remove the earth tab connection from the line filter.
4. Remove the five (5) screws fixing the terminal panel to the assembly and take the panel out.
5. Disconnect all the wires from the driver terminals and the communication connector.
6. Remove the five (5) screws fixing the back panel to the driver panel and take the panel out.
7. Remove the four (2) screws fixing the driver module to the heatsink.
8. Squeeze the 4 spacers head with Long-Nose Pliers and pull out the board.
9. Wipe out the grease paste with cloth soaked with alcohol.

***Notes:***

- Do not hold the PCB part of the driver module when removing the driver module.
- When handling the module, take care of not to use excessive force as this may cause damage.



Removing driver module

### 14.1.16 Re-assembling driver module

#### 14.1.16.1 *4-5HP*

1. Wipe out the heat sink and the driver plate with cloth soaked with alcohol. Wipe out the heat sink screw holes as well by inserting the cloth deeply into the holes but beware not to damage the screwing paths.
2. Spread thermal grease paste on the driver back plate. Grease thickness should be 0.1-0.15mm evenly spread.
3. Place the driver module according the picture and screw the 4 screws gently with torque meter of 0.25Nm by the following order: 1-3-4-2.
4. Further tighten the screw with torque meter of 1.2Nm, same order. Make 1 turn backward with each screw.
5. Wait for 1 hour and further tighten the screws with torque meter of 1.2 Nm, same order.
6. Perform the removal procedure in ***14.1.15*** backwards.

***Notes:***

- Do not hold the PCB part of the driver module when handling the driver module.
- When handling the module, take care of not to use excessive force as this may cause damage.

#### 14.1.16.2 *6HP*

1. Wipe out the heat sink and the driver plate with cloth soaked with alcohol. Wipe out the heat sink screw holes as well by inserting the cloth deeply into the holes but beware not to damage the screwing paths.
2. Spread thermal grease paste on the driver back plate. Grease thickness should be 0.1-0.15mm evenly spread.
3. Place the driver module according the picture and screw the 2 screws gently with torque meter of 0.25Nm.
4. Further tighten the screw with torque meter of 1.2Nm, same order. Make 1 turn backward with each screw.
5. Wait for 1 hour and further tighten the screws with torque meter of 1.2Nm.
6. Perform the removal procedure in ***14.1.15*** backwards.

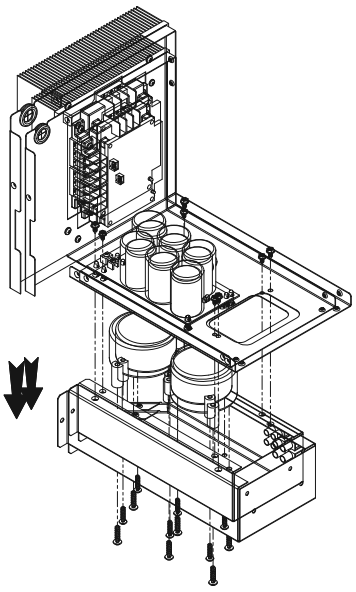
***Notes:***

- Do not hold the PCB part of the driver module when handling the driver module.
  When handling the module, take care of not to use excessive force as this may cause damage.

### 14.1.17 Removing Chocks Coils

#### 14.1.17.1 *4-5HP*

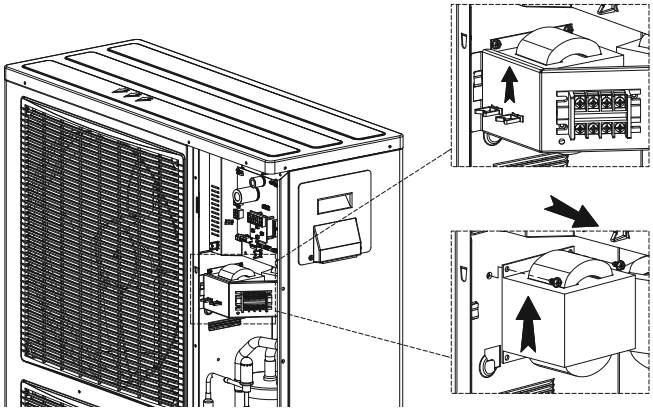
1. Perform the driver module removal procedure in ***14.1.15*** from 1 to 6.
2. Remove the 4 screws holding the chock coils box to the driver panel.
3. Take out the chock coils box while pulling the wires out through the rubber grommet.
4. Remove the chock coils wires from the terminal block.
5. Remove the 3 screws for each chock coil to release the chock coils from the box.



Removing Chocks Coils

#### 14.1.17.2 *6HP*

1. Remove the chock coils wires from the chock terminal block.
2. Remove the terminal block holde.
3. Remove the 2 screws for each chock coil to release the chock coils from the partition.



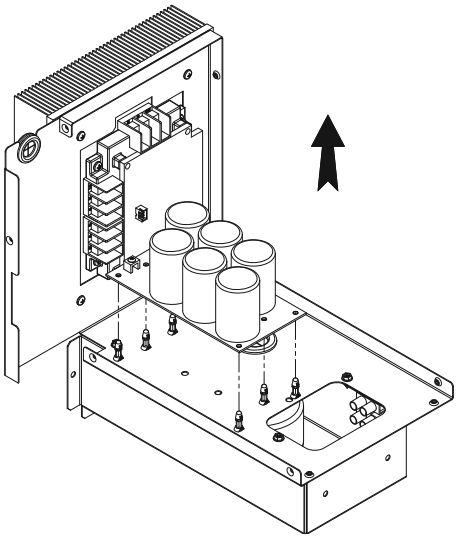
Removing Chocks Coils

### 14.1.18 Removing capacitor board

1. Perform the driver module removal procedure in ***14.1.15*** from 1 to 4. You may perform #6 as it will ease the board removal but first release N and L wires from the line filter.
2. Remove the capacitor wires from the board.
3. Squeeze the 6 spacers head with Long-Nose Pliers and pull out the board.

***Notes to re-assemble the capacitor board:***

- Capacitors has polarity (+ and -), check to ensure each terminal before connecting.

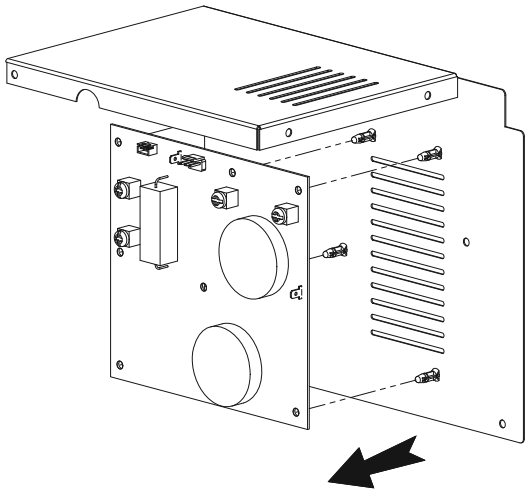


Removing capacitor board

### 14.1.19 Removing Line Filter board

#### 14.1.19.1 *4-5HP*

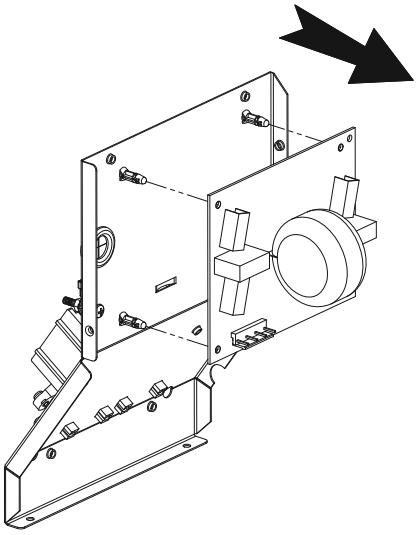
1. Perform the driver module removal procedure in ***14.1.15*** from 1 to 4 and #6 but first release N and L wires from the line filter.
2. Squeeze the 7 spacers head with Long-Nose Pliers and pull out the board.



Removing Line Filter board

#### 14.1.19.2 *6HP*

1. Perform the driver module removal procedure in ***14.1.15*** from 1 to 4.
2. Release all wires from the line filter.
3. Squeeze the 4 spacers head with Long-Nose Pliers and pull out the board.



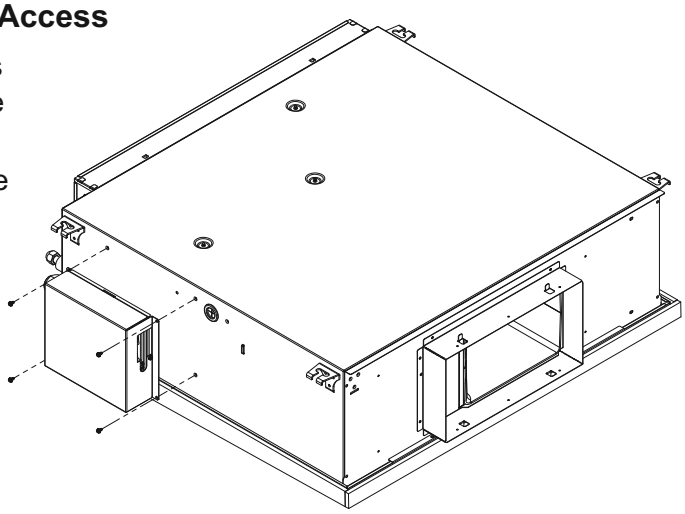
Removing Line Filter board

## 14.2 Indoor Unit: DNG

### 14.2.1 Electronics Assembly Remote Access

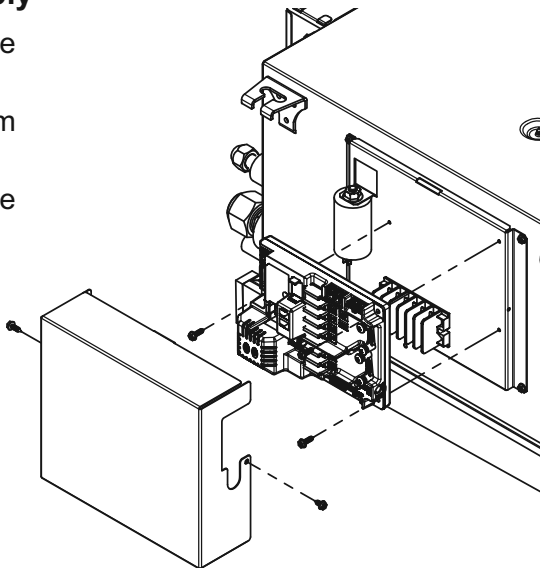
In cases of hard access to control assembly it is made possible to release the assembly from the indoor unit chassis.

1. Remove the 4 fixing screws and relocate the Electronics assembly .



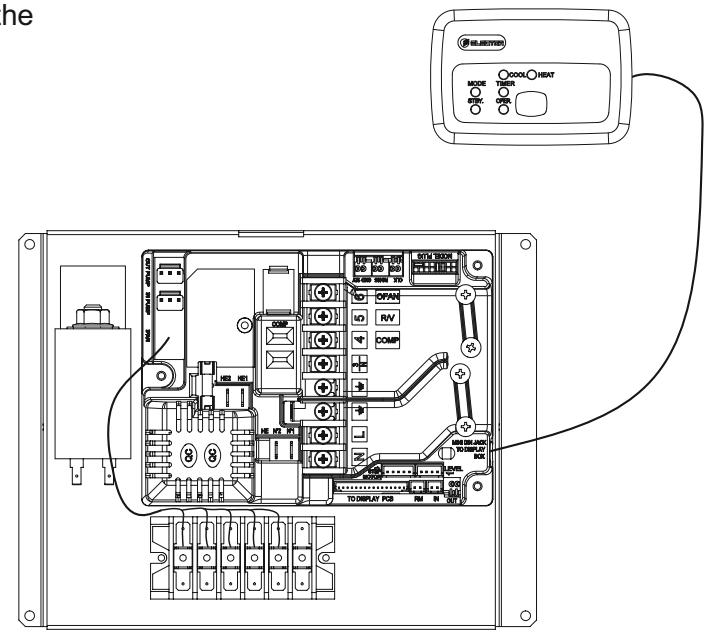
### 14.2.2 Removing Electronics Assembly

1. Remove the 2 fixing screws and take out the cover.
2. Disconnect all connectors and wires from the Electronics Board
3. Remove the 3 fixing screws and take out the Electronics Board.



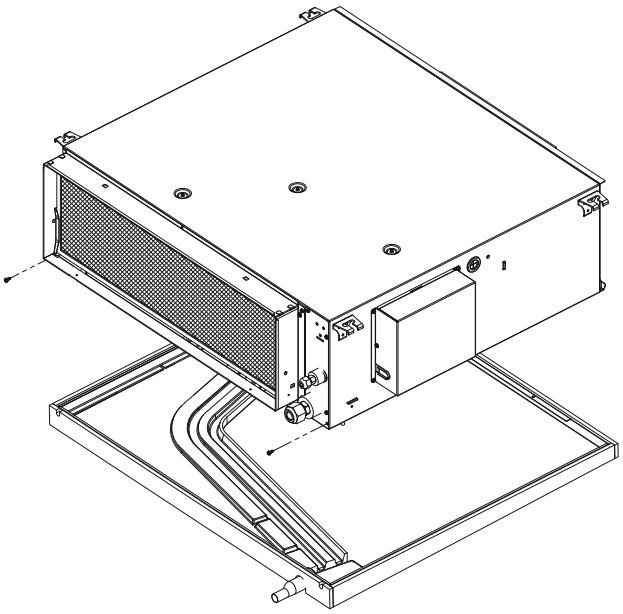
### 14.2.3 Removing Display unit

1. Take out the display connector from the electronics board.



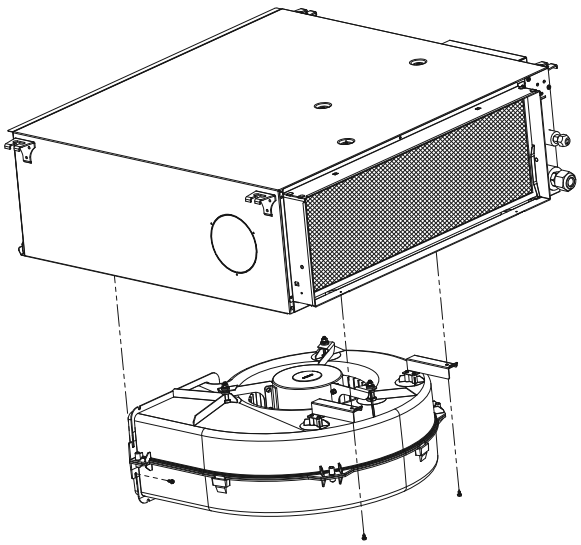
### 14.2.4 Removing Service Panel

1. Remove the 2 fixing screws from the filter side, push the service panel back and remove it.



### 14.2.5 Removing Fan Assembly

1. Remove the Service Panel according to ***14.2.4.***
2. Disconnect the motor connector inside the unit and cut off the nylon ties holding the motor cable.
3. Remove the 3 fixing screws and take out the Fan assembly.



### 14.2.6 Removing Fan Motor

**1.** Remove the Fan Assembly according to ***14.2.5***.

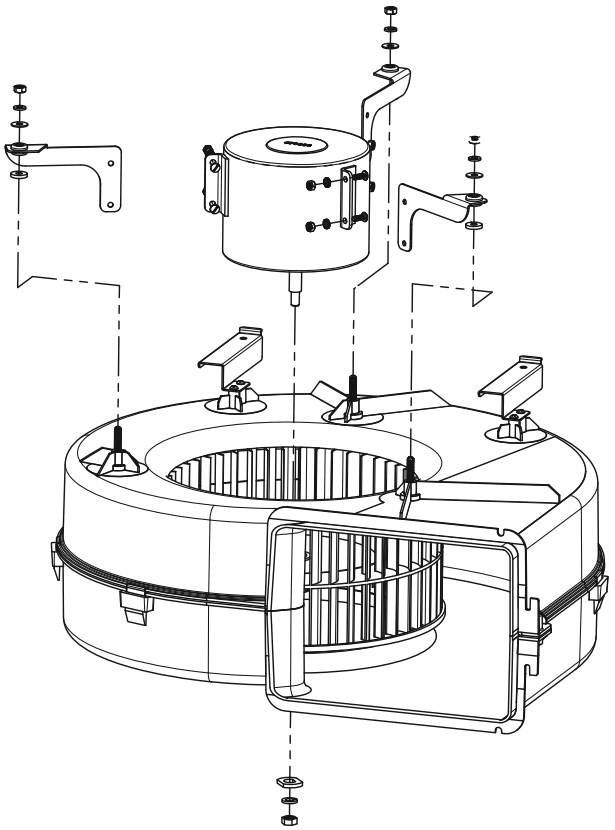
**2.** Remove the hex nut and the spring washer from the motor shaft.

**3.** Remove the 3 fixing hex nuts and the spring washers that connect the legs support to fan house and take out the motor with the 3 legs.

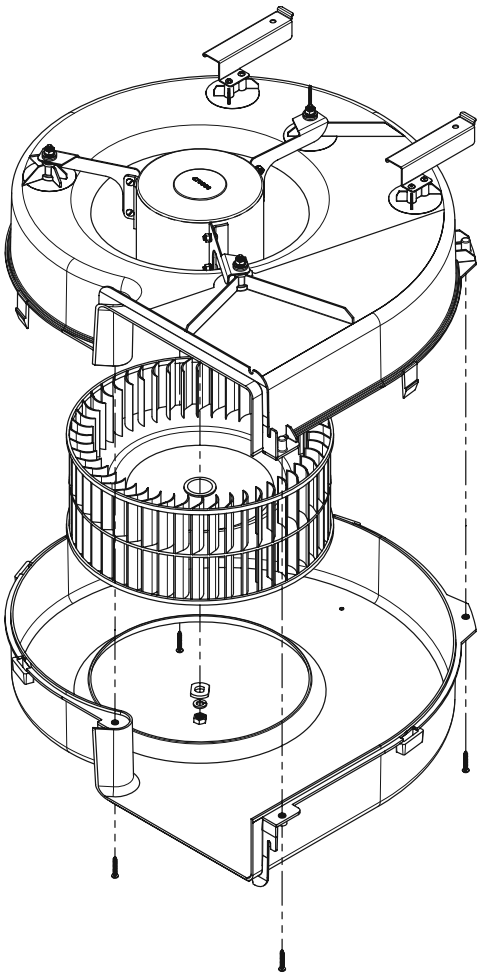
**4.** Remove the 6 fixing screw and nuts that connect the legs support with the fan motor and separate them.

### 14.2.7 Removing Fan

1. Remove the Fan Assembly according to ***14.2.6.***
2. Remove the 4 fixing screws and separate the fan house.
3. Remove the hex nut and the spring washer from the motor shaft and take out the fan.



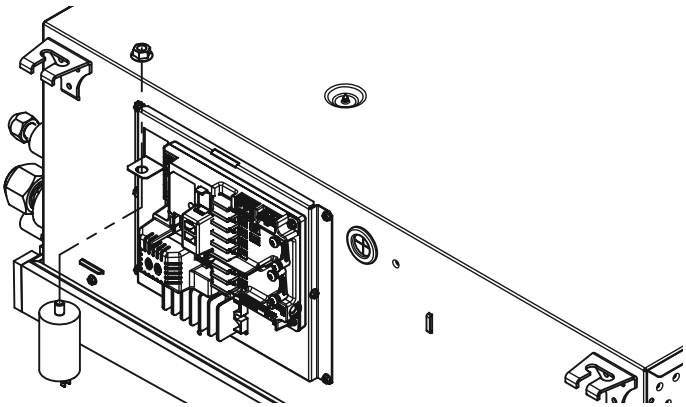
14.2.6 Removing Fan Motor



14.2.7 Removing Fan

### 14.2.8 Removing motor capacitor

1. Disconnect the tab connections from the to be capacitor.
2. Remove the nut holding the capacitor to be holder.



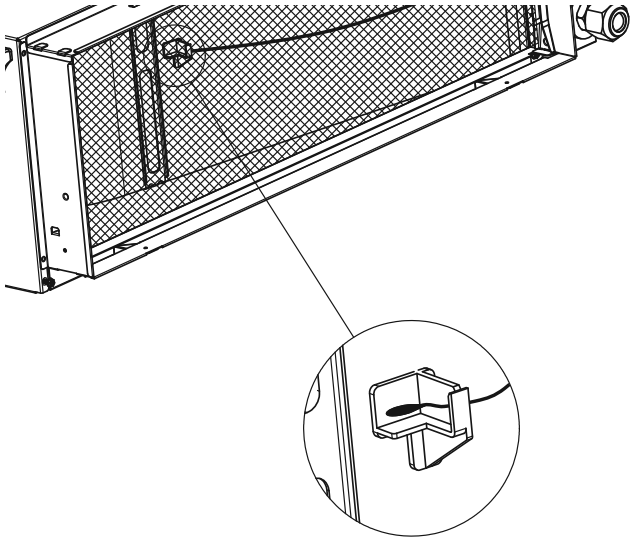
### 14.2.9 Removing Thermistors

1. Disconnect the thermistor connector from the main board.
2. Cut the nylon ties holding the wires to the pipes or chassis.

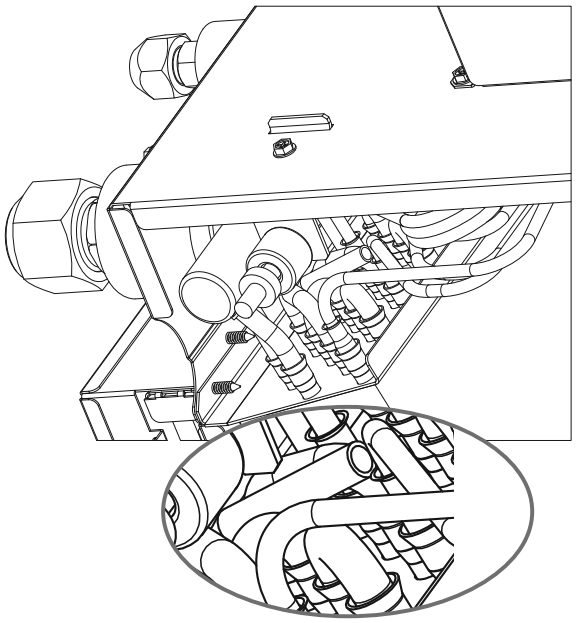
ICT thermistor only - Pull up the spring from the housing while pulling out the thermistor.

***Notes for re-assemble the ICT thermistor:***

1. Make sure the spring is inserted first and is facing the tube to be attched to. Hold the thermistor wires to the tube with nylon tie holding both the wires and the protective sleeve



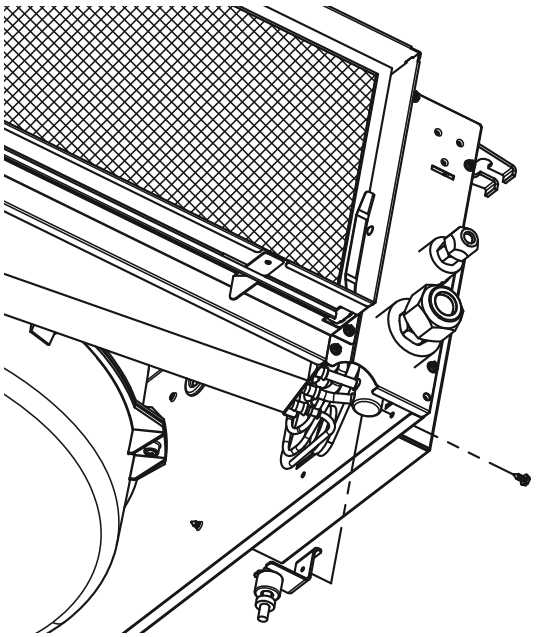
Indoor Air Thermistor (RAT)



Indoor Coil Thermistor (ICT)

### 14.2.10 Removing Float Switch

1. Disconnect the wire to wire float switch connector inside the unit.
2. Cut the nylon ties holding the wires to the pipes or chassis.
3. Remove the screw holding the switch holder to the unit chassis.
4. Use two open spanners to remove the nylon nuts of the switch and take out the switch.

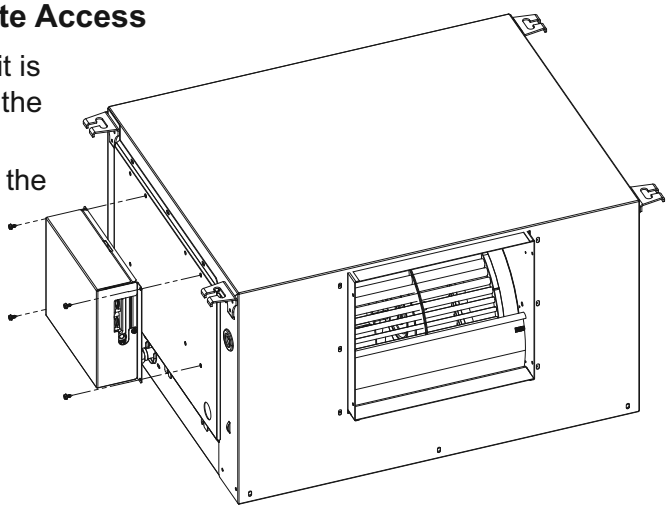


## 14.3 Indoor Unit: EMD

### 14.3.1 Electronics Assembly Remote Access

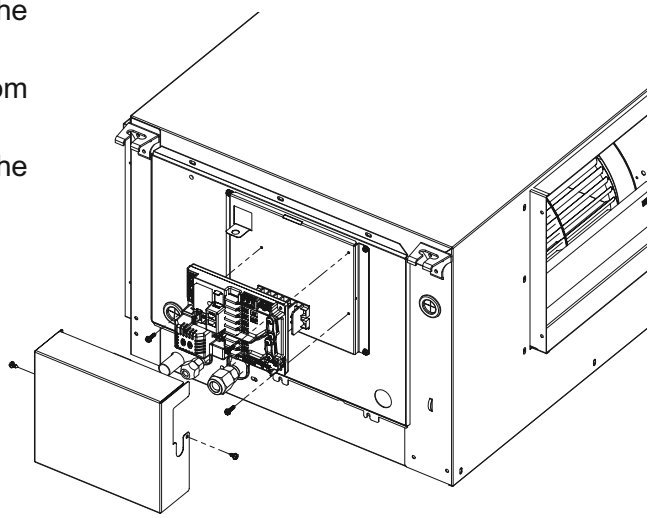
In cases of hard access to control assembly it is made possible to release the assembly from the indoor unit chassis.

1. Remove the 4 fixing screws and relocate the Electronics assembly .



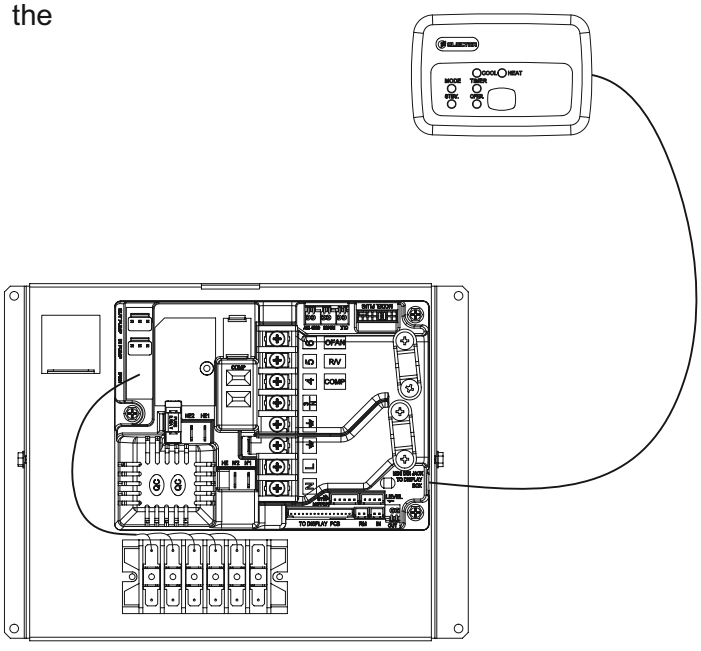
### 14.3.2 Removing Electronics Assembly

1. Remove the 2 fixing screws and take out the cover.
2. Disconnect all connectors and wires from the Electronics Board.
3. Remove the 3 fixing screws and take out the Electronics Board.



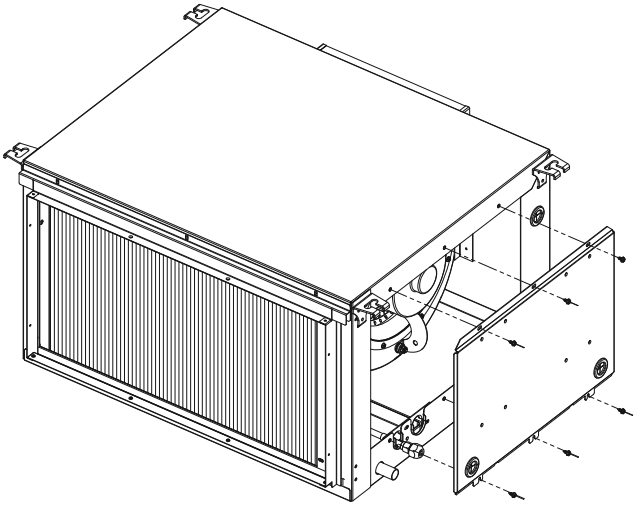
### 14.3.3 Removing Display unit

1. Take out the display connector from the electronics board.



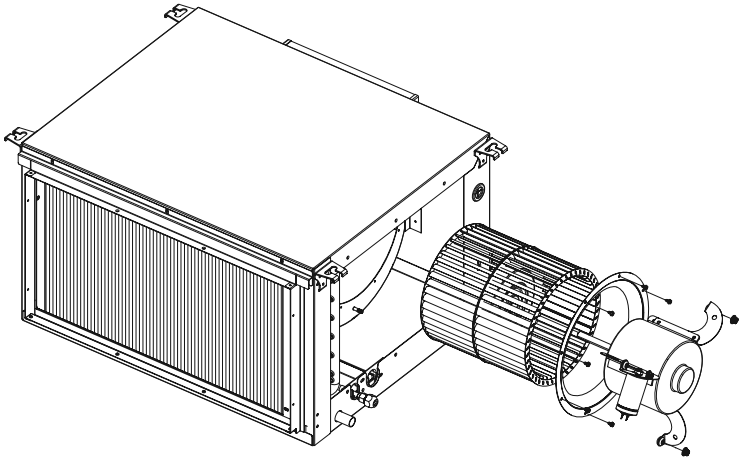
### 14.3.4 Removing Service Panel

1. Remove the 6 fixing screws and pull the service panel to remove it.



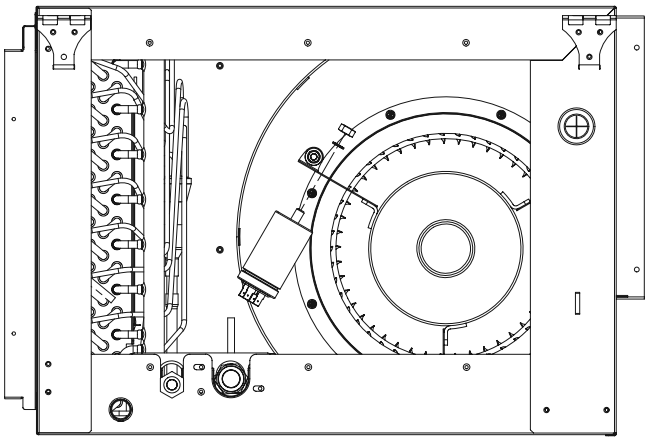
### 14.3.5 Removing Fan and Fan Motor

7. Disconnect the motor connector from the Electronics Board.
8. Remove the Service Panel according to ***14.3.4.***
9. Push the motor cable back into the unit through the grommet.
10. Remove the 6 fixing screw connecting the ring to the fan housing.
11. Remove the 3 fixing hex nuts and the spring washers that connect the legs support to fan house and take out the motor with the 3 legs.
12. Release the allen screw fixing the fan to fan motor axis and separate it.



### 14.3.6 Removing motor Capacitor

1. Remove the Service Panel according to ***14.3.4.***
2. Disconnect the tab connections from the capacitor.
3. Remove the nut holding the capacitor to the holder.



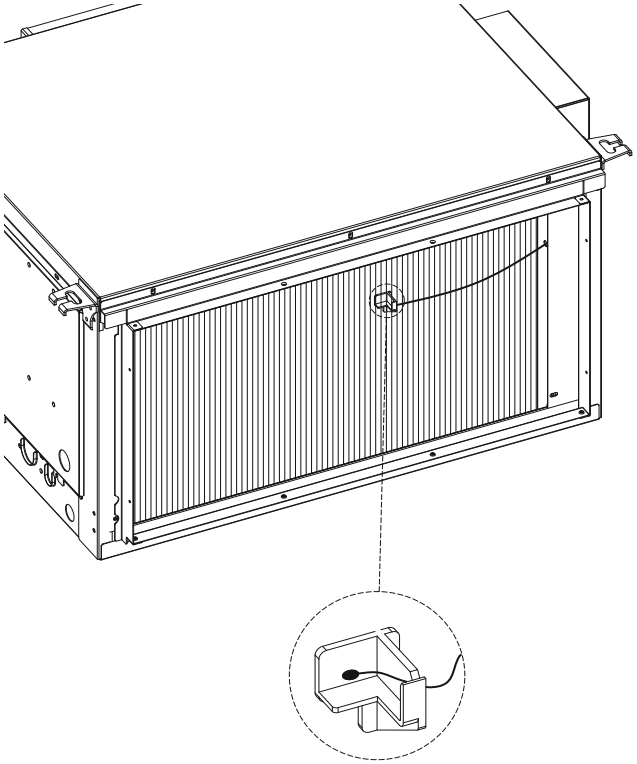
### 14.3.7 Removing Thermistors

1. Disconnect the thermistor connector from the main board.
2. Cut the nylon ties holding the wires to the pipes or chassis.

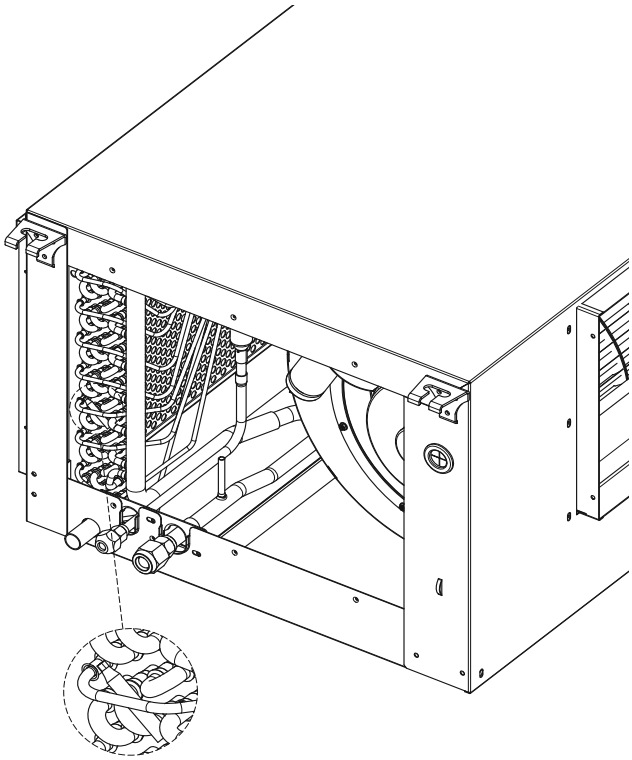
ICT thermistor only - Pull up the spring from the housing while pulling out the thermistor.

***Notes for re-assemble the ICT thermistor:***

1. Make sure the spring is inserted first and is facing the tube to be attched to. Hold the thermistor wires to the tube with nylon tie holding both the wires and the protective sleeve



Indoor Air Thermistor (RAT)



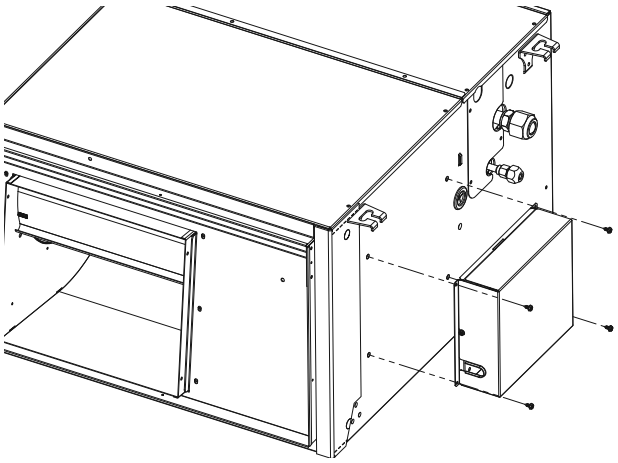
Indoor Coil Thermistor (ICT)

## 14.4 Indoor Unit: CD

### 14.4.1 Electronics Assembly Remote Access

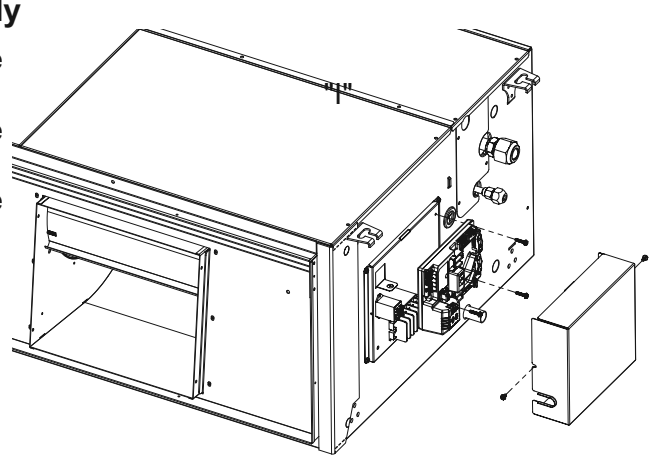
In cases of hard access to control assembly it is made possible to release the assembly from the indoor unit chassis.

1. Remove the 4 fixing screws and relocate the Electronics assembly .



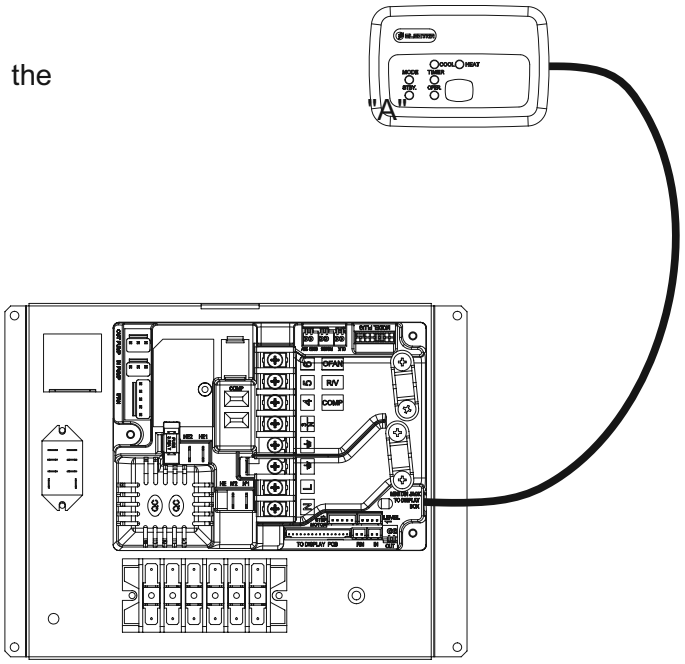
### 14.4.2 Removing Electronics Assembly

1. Remove the 2 fixing screws and take out the cover.
2. Disconnect all connectors and wires from the Electronics Board
3. Remove the 3 fixing screws and take out the Electronics Board.



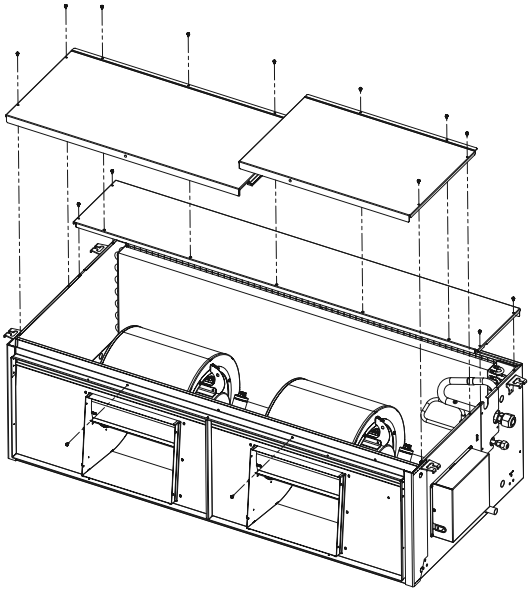
### 14.4.3 Removing Display Unit

1. Take out the display connector from the electronics board.



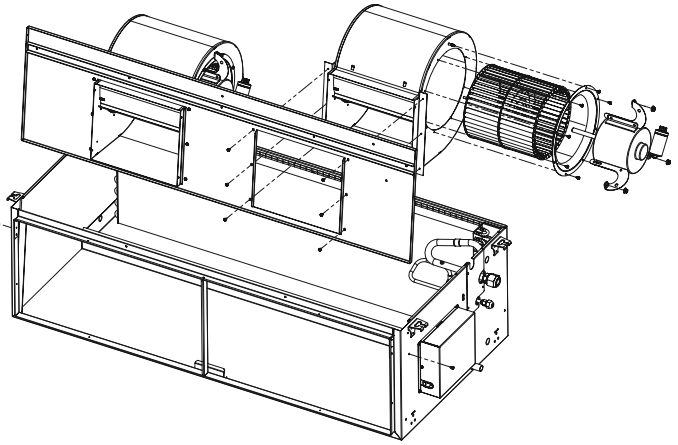
### 14.4.4 Removing Service Panels

1. Remove the 15 fixing screws and pull the service panel to remove it.



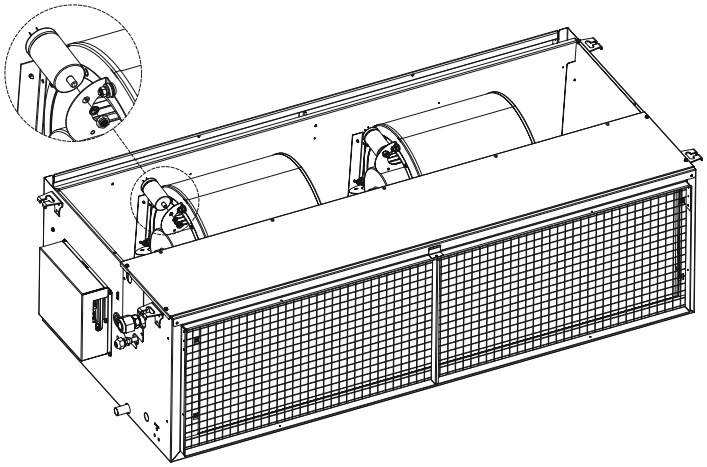
### 14.4.5 Removing Fan and Fan Motor

1. Disconnect the motor connectors from the Electronics Board.
2. Remove the Service Panel according to ***14.3.4.***
3. Push the motors cable back into the unit through the gromet.
4. Remove the 2 fixing screw connecting the fan housing assembly to base and pull it .
5. Remove the 6 fixing screw connecting the ring to the fan housing.
6. Remove the 3 fixing hex nuts and the spring washers that connect the legs support to fan house and take out the motor with the 3 legs.
7. Release the allen screw fixing the fan to fan motor axis and separate it.



### 14.4.6 Removing Motor Capacitor

1. Remove the Service Panels, from fans side only, according to **14.3.4.**
2. Disconnect the tab connections from the capacitor.
3. Remove the nut holding the capacitor to the holder.



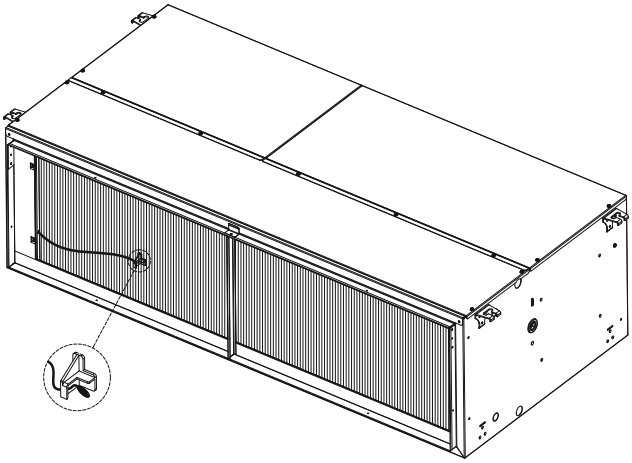
### 14.4.7 Removing Thermistors

1. Disconnect the thermistor connector from the main board.
2. Cut the nylon ties holding the wires to the pipes or chassis.

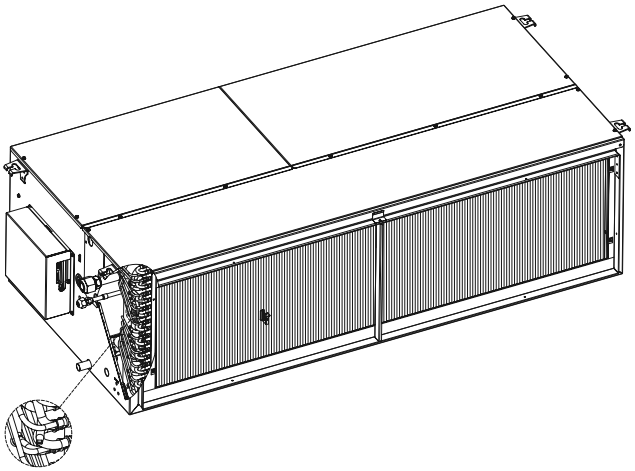
ICT thermistor only - Pull up the spring from the housing while pulling out the thermistor.

***Notes for re-assemble the ICT thermistor:***

1. Make sure the spring is inserted first and is facing the tube to be attched to. Hold the thermistor wires to the tube with nylon tie holding both the wires and the protective sleeve.



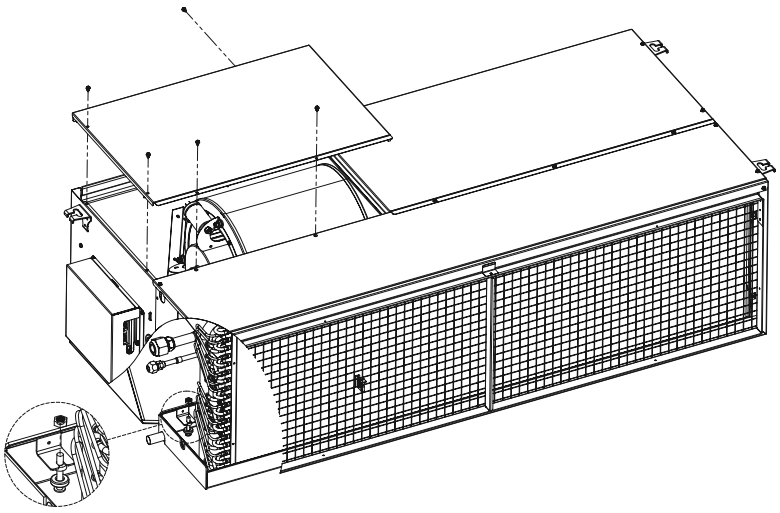
Indoor Air Thermistor (RAT)



Indoor Coil Thermistor (ICT)

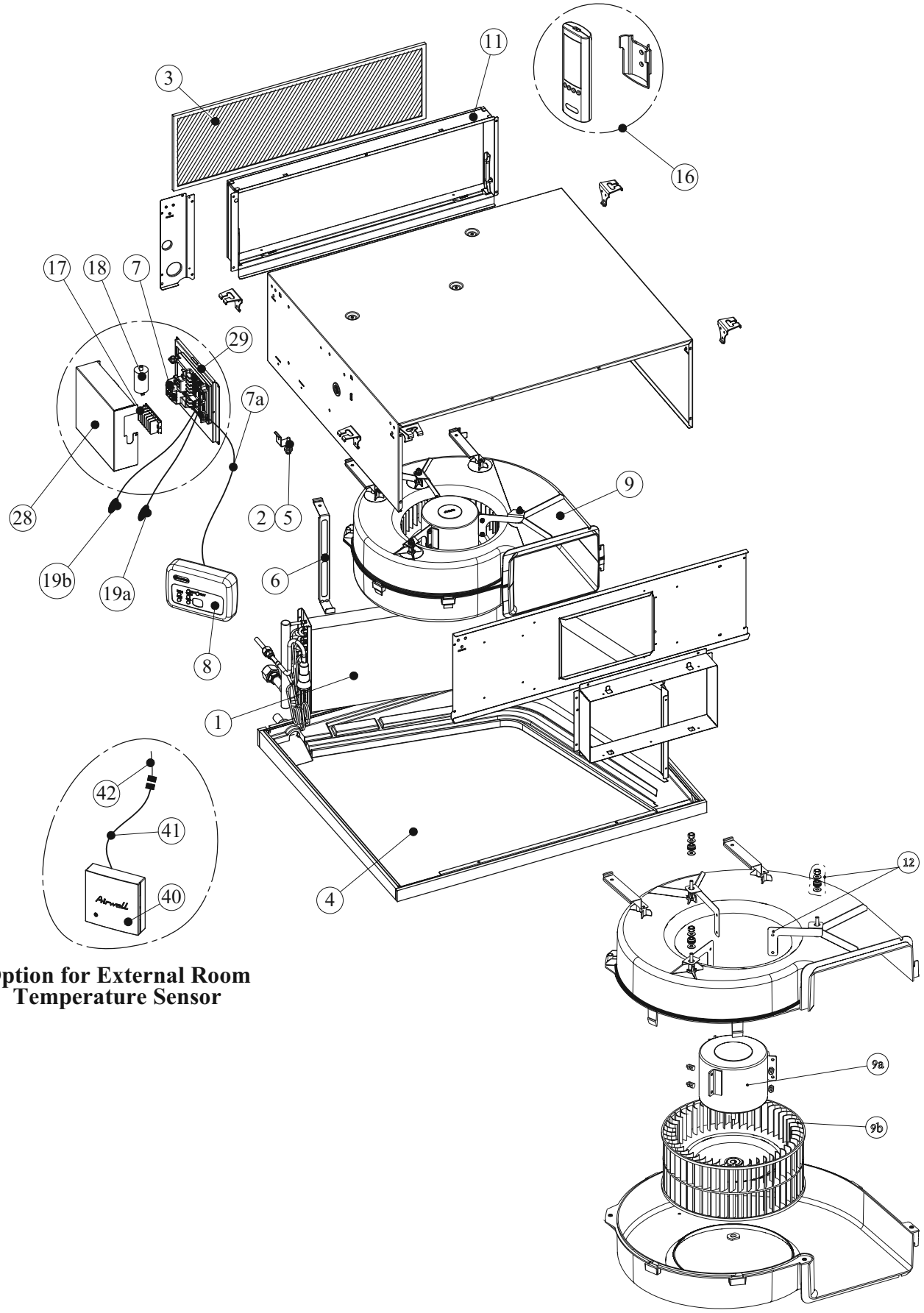
### 14.4.8 Removing Float Switch

1. Remove the Service Panel, from fan only, according to ***14.3.4.***
2. Disconnect the wire to wire float sv connector inside the unit.
3. Cut the nylon ties holding the wires to pipes or chassis.
4. Use 2 open spanners to remove the n nuts of the switch and take out the switcl



# 15. EXPLODED VIEWS AND SPARE PARTS LISTS

## 15.1 Indoor Unit: DNG 100, DNG 125 DCI - Exploded View




**Option for External Room Temperature Sensor**

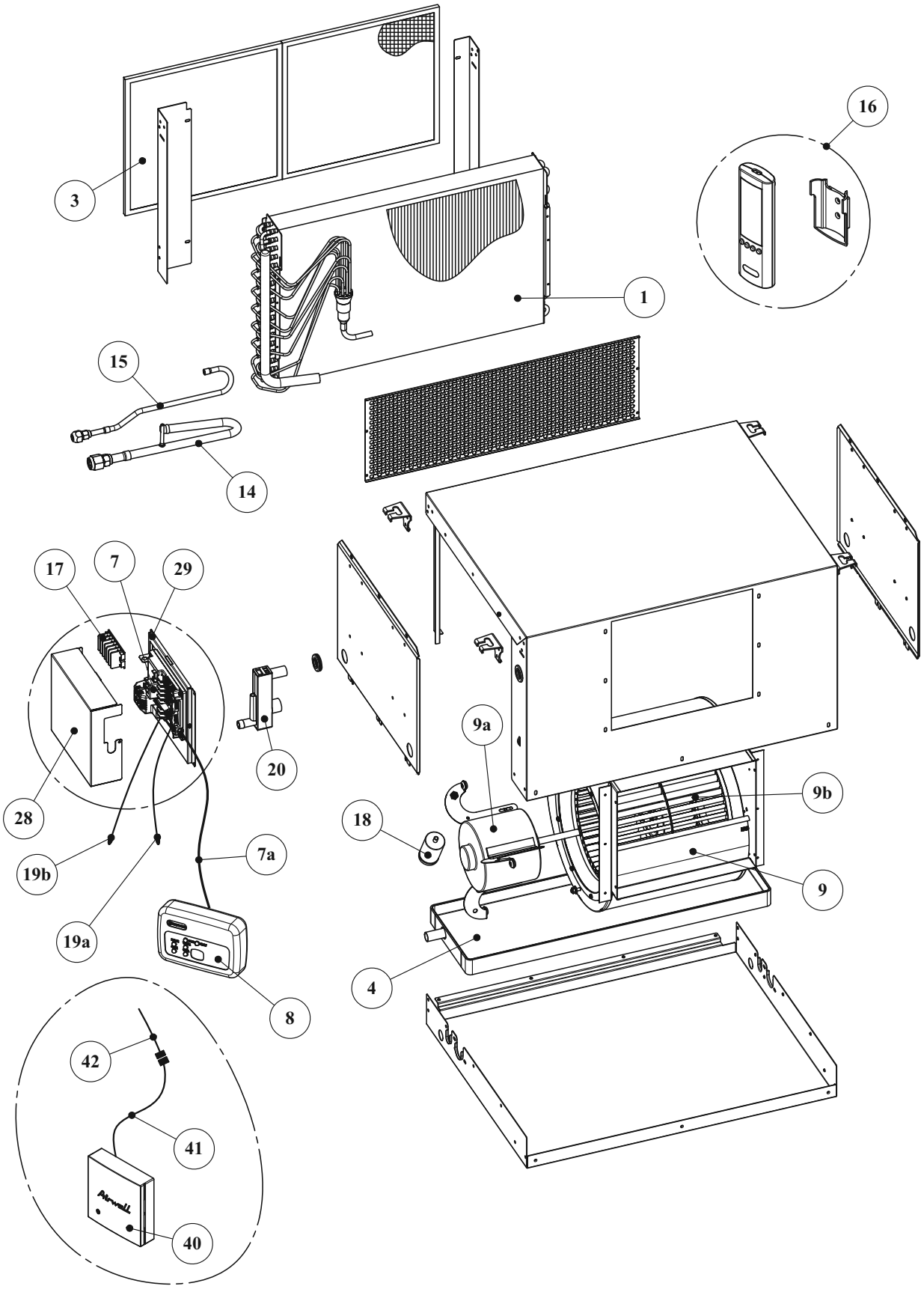
## 15.2 Indoor Unit: DNG 100 DCI - Spare Part List

| No. | Part No. | Description | Qty |
|---|---|---|---|
| 1 | 473525 | IU COIL GR/HDR DNG 100 DCI | 1 |
| 2 | 473231 | FLOAT SUPPORT DNG | 1 |
| 3 | 473902 | DNG METAL FILTER 37-44 | 1 |
| 4 | 473247 | INSULATED DRAIN POOL ASSY DNG | 1 |
| 5 | 473700 | DNG OVER FLOW SWITCH | 1 |
| 6 | 473211 | COIL SUPPORT DNG 44 | 1 |
| 7 | 467300107R | DCI 456 HP IDU STORM | 1 |
| 7a | 404020 | CABLE 8 WIRES 7M WTH CONNECTOR | 1 |
| 8 | 438778 | WIRED DISPLAY BOX EMD/ELD (RoHS) | 1 |
| 9 | 473906 | FAN HOUSING ASSY DNG 37-44 | 1 |
| 9a | 473006 | MOTOR DNG 37/44 | 1 |
| 9b | 473301 | CENTRIFUGAL FAN DNG 300/130 | 1 |
| 11 | 473249 | AIR FILTER FRAME ASSY DNG 37-4 | 1 |
| 12 | 473250 | MOTOR LEG ASSY DNG | 3 |
| 16 | 438783 | REMOTE CONTROL RC4/RC (RoHS) | 1 |
| 17 | 430535 | *TERMINAL BLOCK RW-52 P6/90 | 1 |
| 18 | 442019 | CAPACITOR 8mF 400V P1/P2 | 1 |
| 19a | 473720 | THERMISTOR+CAP WITH CONNECTOR | 1 |
| 19b | 473710 | THERMISTOR WITH CONNECTOR L235 | 1 |
| 28 | 473415 | ELECTRICAL COVER DNG DCI | 1 |
| 29 | 473416 | ELECTRICAL BASE PANEL DNG DCI | 1 |
| **Option for External Room Temperature Sensor** | | | |
| 40 | 442297 | THERMISTOR BOX AIRWELL | 1 |
| 41 | 467030054 | SHIELDED DEFROST CABLE | 1 |
| 42 | 442296 | ADAPTOR THERMISTOR WTH CONNE | 1 |

## 15.3 Indoor Unit: DNG 125 DCI - Spare Part List

| No. | Part No. | Description | Qty |
|---|---|---|---|
| 1 | 473532 | IU COIL GR/HDR DNG 125 DCI | 1 |
| 2 | 473231 | FLOAT SUPPORT DNG | 1 |
| 3 | 473902 | DNG METAL FILTER 37-44 | 1 |
| 4 | 473247 | INSULATED DRAIN POOL ASSY DNG | 1 |
| 5 | 473700 | DNG OVER FLOW SWITCH | 1 |
| 6 | 473245 | COIL SUPPORT DNG 37 | 1 |
| 7 | 467300107R | DCI 456 HP IDU STORM | 1 |
| 7a | 404020 | CABLE 8 WIRES 7M WTH CONNECTOR | 1 |
| 8 | 438778 | WIRED DISPLAY BOX EMD/ELD (RoHS) | 1 |
| 9 | 473906 | FAN HOUSING ASSY DNG 37-44 | 1 |
| 9a | 473006 | MOTOR DNG 37/44 | 1 |
| 9b | 473301 | CENTRIFUGAL FAN DNG 300/130 | 1 |
| 11 | 473249 | AIR FILTER FRAME ASSY DNG 37-4 | 1 |
| 12 | 473250 | MOTOR LEG ASSY DNG | 3 |
| 16 | 438783 | REMOTE CONTROL RC4/RC (RoHS) | 1 |
| 17 | 430535 | *TERMINAL BLOCK RW-52 P6/90 | 1 |
| 18 | 442019 | CAPACITOR 8mF 400V P1/P2 | 1 |
| 19a | 473720 | THERMISTOR+CAP WITH CONNECTOR | 1 |
| 19b | 473710 | THERMISTOR WITH CONNECTOR L235 | 1 |
| 28 | 473415 | ELECTRICAL COVER DNG DCI | 1 |
| 29 | 473416 | ELECTRICAL BASE PANEL DNG DCI | 1 |
| **Option for External Room Temperature Sensor** | | | |
| 40 | 442297 | THERMISTOR BOX AIRWELL | 1 |
| 41 | 467030054 | SHIELDED DEFROST CABLE | 1 |
| 42 | 442296 | ADAPTOR THERMISTOR WTH CONNE | 1 |

## 15.4 Indoor Unit: EMD 100 DCI - Exploded View

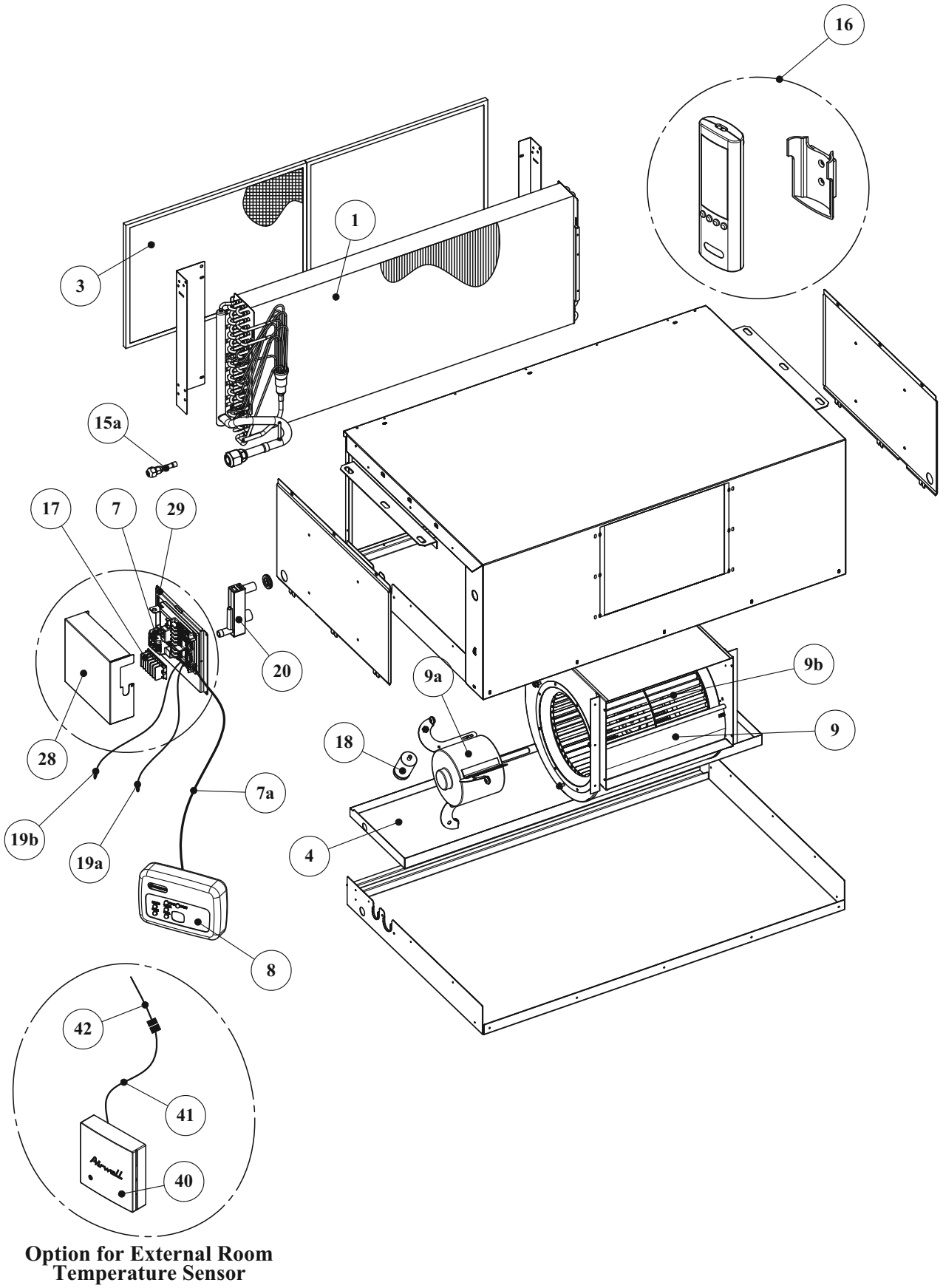



**Option for External Room Temperature Sensor**

## 15.5 Indoor Unit: EMD 100 DCI - Spare Part List

| No. | Part No. | Description | Qty |
|---|---|---|---|
| 1 | 439978 | IU COIL GR/HDR EMD 34/ 100 | 1 |
| 3 | 402347 | AIR FILTER EMD 775-1000 | 2 |
| 4 | 438032 | RT DRAIN PAN ASSY 3/4 EMDB 2 | 1 |
| 7 | 467300107R | DCI 456 HP IDU STORM | 1 |
| 7a | 404020 | CABLE 8 WIRES 7M WTH CONNECT | 1 |
| 8 | 438778 | WIRED DISPLAY BOX EMD/ELD (R | 1 |
| 9 | 182241 | RT FAN MOTOR DD9*9 CAP. P2 | 1 |
| 9a | 402003 | MOTOR 343W, 4S, EMD 1100 | 1 |
| 9b | 435413 | FAN 240*240 | 1 |
| 14 | 434762 | RT OUTLET ASSY EMD 24 R410A | 1 |
| 15 | 439980 | RIGHT INLET MANIFOLD ASSY EM | 1 |
| 16 | 4527178R | REMOTE CONTROL RC RC7 GRAY | 1 |
| 17 | 430535 | *TERMINAL BLOCK RW-52 P6/90 | 1 |
| 18 | 442015 | CAPACITOR 15mF 400V P1/P2 | 1 |
| 19a | 400275 | THERMISTOR+CAP WTH CONNECTOR | 1 |
| 19b | 402701 | THERMISTOR WTH CONNECTORS L1800 | 1 |
| 20 | 438056 | DRAIN SIPHON ASSY | 1 |
| 28 | 473415 | ELECTRICAL COVER DNG DCI | 1 |
| 29 | 473416 | ELECTRICAL BASE PANEL DNG DC | 1 |
| **Option for External Room Temperature Sensor** | | | |
| 40 | 442297 | THERMISTOR BOX AIRWELL | 1 |
| 41 | 467030054 | SHIELDED DEFROST CABLE | 1 |
| 42 | 442296 | ADAPTOR THERMISTOR WTH CONNE | 1 |

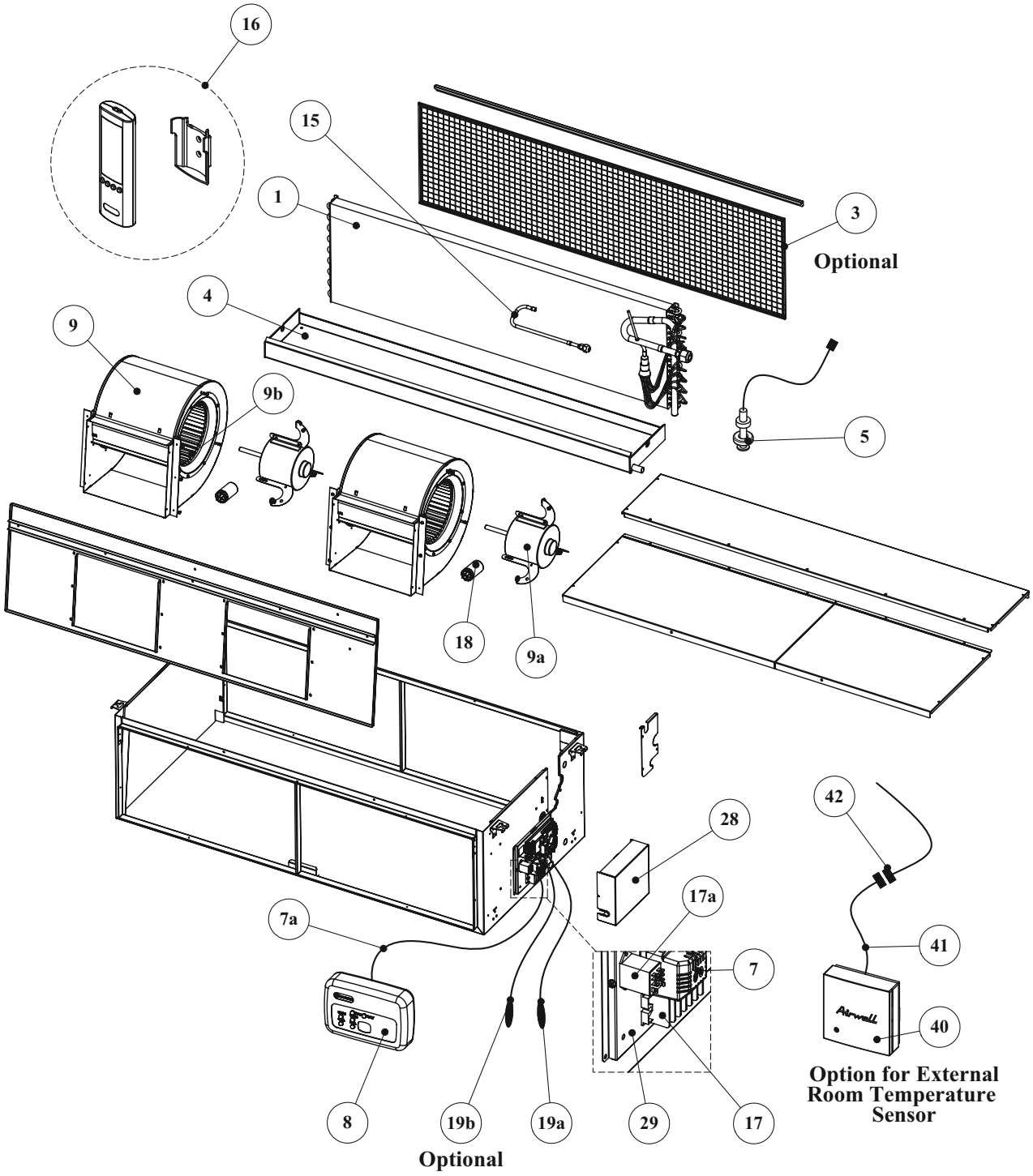
## 15.6 Indoor Unit: EMD 125 DCI - Exploded View



## 15.7 Indoor Unit: EMD 125 DCI - Spare Part List

| No. | Part No. | Description | Qty |
|---|---|---|---|
| 1 | 439991 | RT IU COIL GR/HDR EMD 125 DCI | 1 |
| 3 | 402083 | AIR FILTER EMD 1800 | 2 |
| 4 | 438069 | DRAIN PAN ASSY EMDB60 | 1 |
| 7 | 467300107R | DCI 456 HP IDU STORM | 1 |
| 7a | 404020 | CABLE 8 WIRES 7M WTH CONNECTOR | 1 |
| 8 | 438778 | WIRED DISPLAY BOX EMD/ELD (RoH | 1 |
| 9 | 182244 | RT FAN MOTOR DD9*11 CAP. P2 EM | 1 |
| 9a | 186320 | MOTOR 371W, 4S, EMD1400 | 1 |
| 9b | 435410 | FAN 253*298 | 1 |
| 15a | 433223 | SOCKET FLARE ASSY 3/8'' | 1 |
| 16 | 4527178R | REMOTE CONTROL RC RC7 GRAY | 1 |
| 17 | 430535 | *TERMINAL BLOCK RW-52 P6/90 | 1 |
| 18 | 442018 | CAPACITOR 10mF 400V P1/P2 | 1 |
| 19a | 400275 | THERMISTOR+CAP WTH CONNECTOR L | 1 |
| 19b | 402701 | THERMISTOR WTH CONNECTORS L1800 | 1 |
| 20 | 438056 | DRAIN SIPHON ASSY | 1 |
| 28 | 473415 | ELECTRICAL COVER DNG DCI | 1 |
| 29 | 473416 | ELECTRICAL BASE PANEL DNG DCI | 1 |
| **Option for External Room Temperature Sensor** | | | |
| 40 | 442297 | THERMISTOR BOX AIRWELL | 1 |
| 41 | 467030054 | SHIELDED DEFROST CABLE | 1 |
| 42 | 442296 | ADAPTOR THERMISTOR WTH CONNECT | 1 |

## 15.8 Indoor Unit: CD 140 DCI - Exploded View

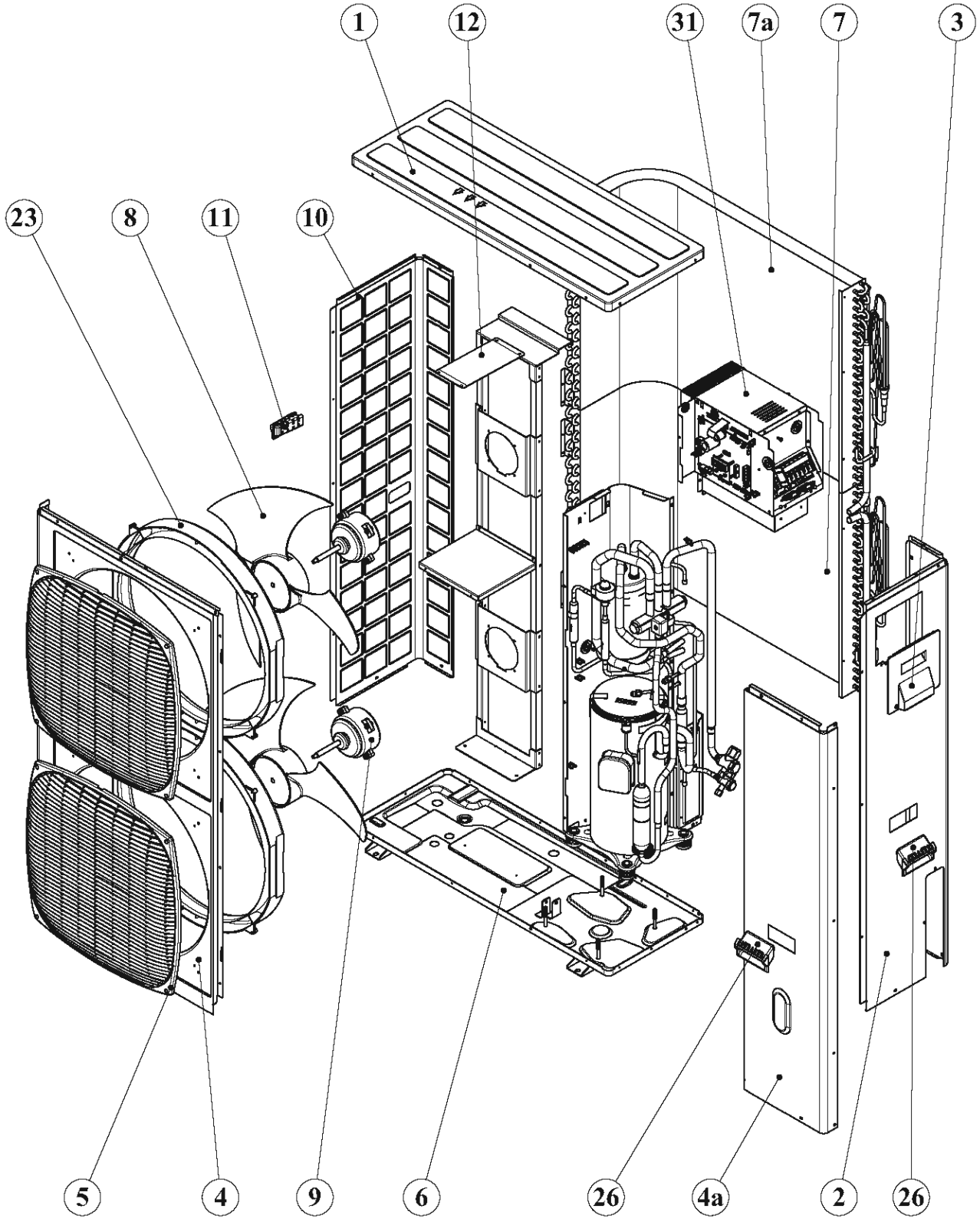


## 15.9 Indoor Unit: CD 140 DCI - Spare Part List

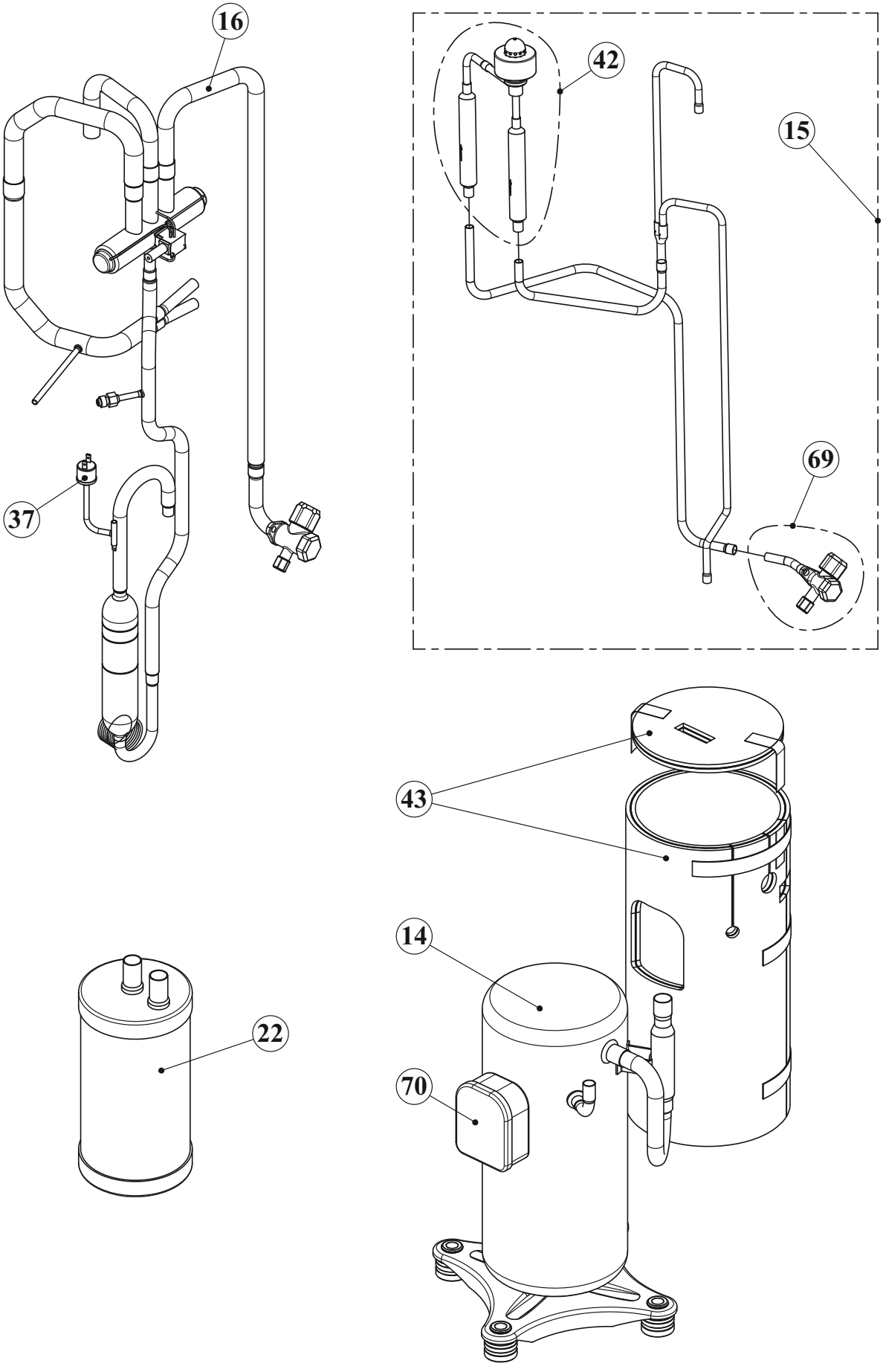
| No. | Part No. | Description | Qty |
|---|---|---|---|
| 1 | 475530 | Indoor Coil 3Rows 7mm CD60 DCI | 1 |
| 3 | 221546 | AIR FILTER CD 60 | 1 |
| 4 | 475015 | INSULATED DRAIN PAN ASSY CD 60 | 1 |
| 5 | 473700 | DNG OVER FLOW SWITCH | 1 |
| 7 | 467300208R | STORM DCI 6HP | 1 |
| 7a | 404020 | CABLE 8 WIRES 7M WTH CONNECTOR | 1 |
| 8 | 438778 | WIRED DISPLAY BOX EMD/ELD (RoHS) | 1 |
| 9 | 182241 | RT FAN MOTOR DD9*9 CAP. P2 | 2 |
| 9a | 402003 | MOTOR 343W, 4S, EMD 1100 | 2 |
| 9b | 435413 | FAN 240*240 | 2 |
| 15 | 475536 | Right Inlet Manifold Assembly | 1 |
| 16 | 438783 | REMOTE CONTROL RC4/RC (RoHS) | 1 |
| 17 | 430535 | TERMINAL BLOCK RW-52 P6/90 | 1 |
| 17a | 192106 | RELAY 230V 10A | 1 |
| 18 | 442015 | CAPACITOR 15mF 400V P1/P2 | 2 |
| 19a | 400275 | THERMISTOR+CAP WTH CONNECTOR | 1 |
| 19b | 402701 | THERMISTOR WTH CONNECTORS | 1 |
| 28 | 473415 | ELECTRICAL COVER DNG DC | 1 |
| 29 | 473416 | ELECTRICAL BASE PANEL DNG DCI | 1 |
| Option for External Room Temperature Sensor | | | |
| 40 | 442297 | THERMISTOR BOX AIRWELL | 1 |
| 41 | 467030054 | SHIELDED DEFROST CABLE | 1 |
| 42 | 442296 | ADAPTOR THERMISTOR WTH CONNECTORS | 1 |

## 15.10 OU12 4-5HP DCI - Exploded View

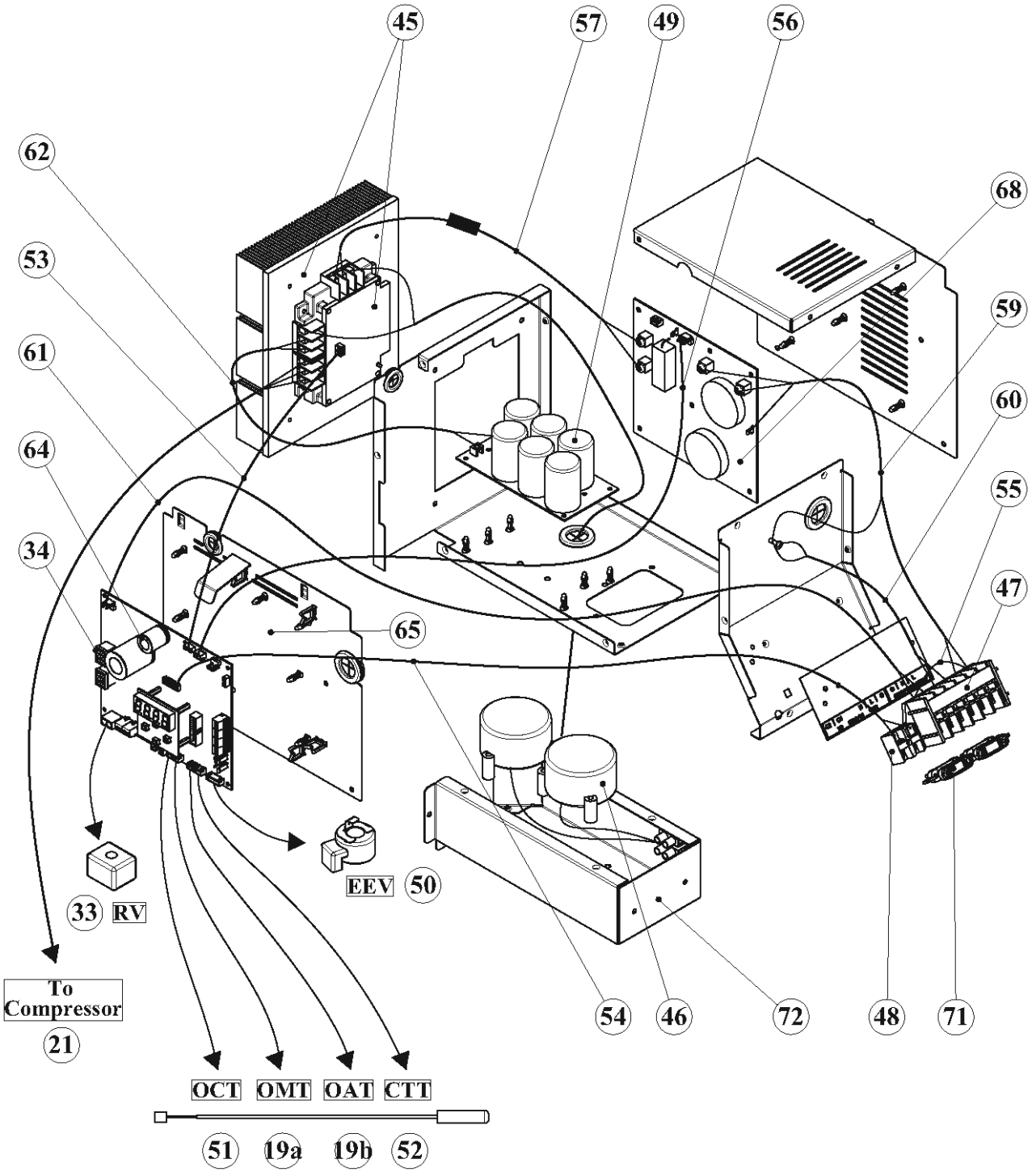
### 15.10.1 Outdoor Unit General Assembly



### 15.10.2 Outdoor Unit Tubing Assembly



### 15.10.3 Outdoor Unit Electronics Assembly



## 15.11 Outdoor Unit: OU12 4HP DCI - Spare Part List

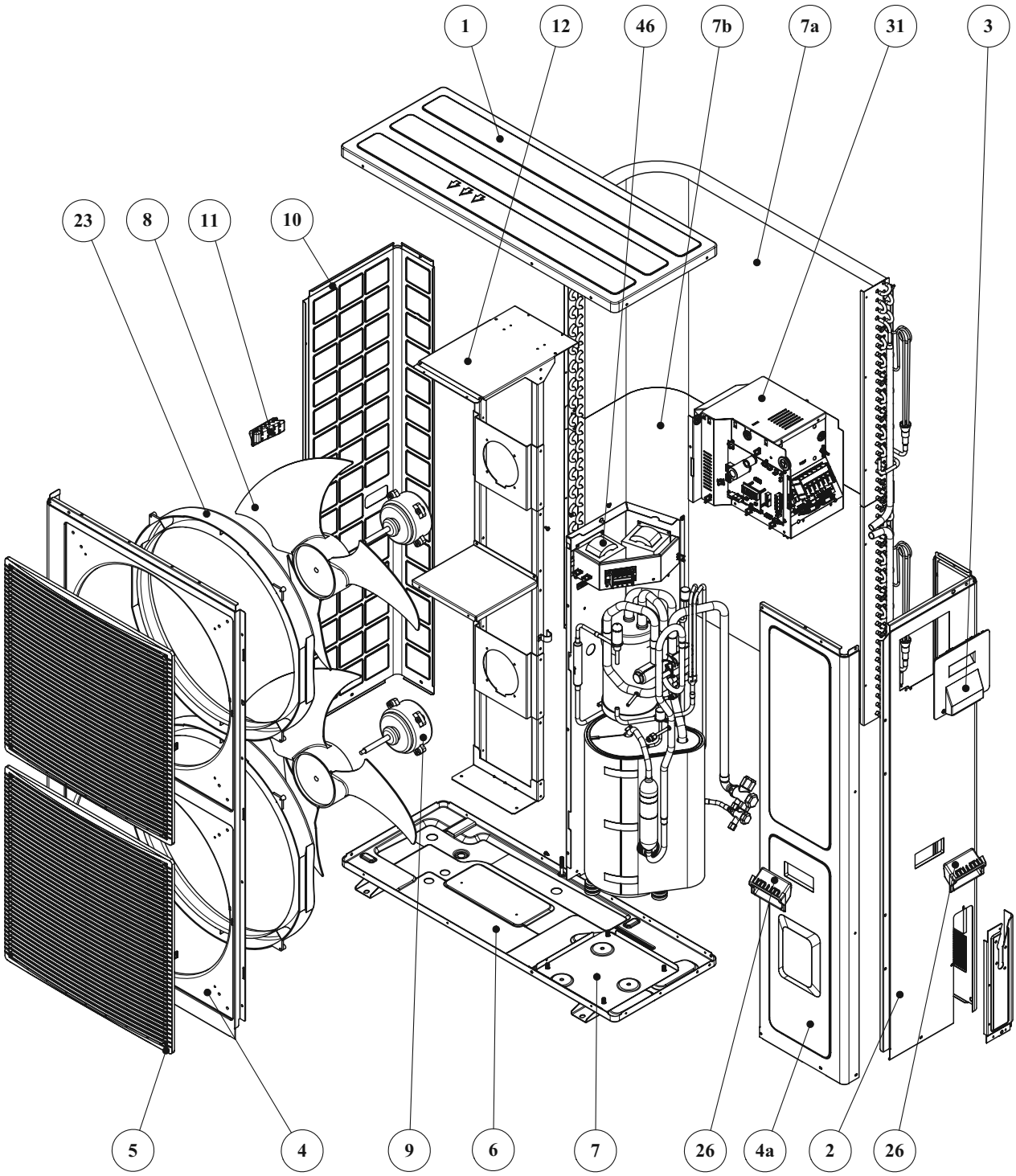
| No. | PN | Description | Qty |
|---|---|---|---|
| 1 | 437045 | UPPER COVER EL13 OU LARGE | 1 |
| 2 | 416217 | SIDE PANEL OU12 DCI 4-5HP | 1 |
| 3 | 436356 | LARGE ELECTRICAL COVER OU/WMQ | 1 |
| 4 | 416215 | FRONT COVER OU12 DCI 4-5HP | 1 |
| 4a | 416216 | FRONT Panel OU12 DCI 4-5HP | 1 |
| 5 | 437091 | OU SQUARE FAN GUARD | 2 |
| 6 | 416213 | NEW BASE ASSY OU12 DCI 4-5HP | 1 |
| 7 | 416400 | LOWER COIL GR HDR OU12 DCI R41 | 1 |
| 7a | 416401 | UPPER COIL GR HDR OU12 DCI R41 | 1 |
| 8 | 4529604 | AXIAL FAN D493*143 | 2 |
| 9 | 416310 | DC MOTOR 70W OU12 DCI 4-5HP | 2 |
| 10 | 416218 | SIDE GUARD OU12 DCI 4-5HP | 1 |
| 11 | 436358 | OU LEADING HANDLE | 1 |
| 12 | 416222 | MOTOR SUPPORT ASSEMBLY OU12-DC | 1 |
| 14 | 416300 | COMPRESSOR ANB33FBDMT | 1 |
| 15 | 416534 | Tubing Assembly EEV OU12 DCI | 1 |
| 16 | 416543 | Tubing Assembly 4-Way OU12 4HP DCI | 1 |
| 19a | 413712 | THERMISTOR+CAP WITH CONNECTOR | 1 |
| 19b | 402741 | THERMISTOR WTH CONNECTOR L1250 | 1 |
| 21 | 416760 | COMPRESSOR WIRING L1300 | 1 |
| 22 | 402284 | SUCTION ACCUMULATOR 5" x 3/4" | 1 |
| 23 | 439928 | OUTLET PLASTIC RING OU8 | 2 |
| 26 | 436352 | RAISING HANDLE OU10 | 2 |
| 31 | 416230 | ELECTRONICS BOX DCI 4-5HP | 1 |
| 33 | 442466 | VALVE COIL L700 MOLEX-SANHUA | 1 |
| 34 | 416712 | DCI 456 HP ODU Main Board (SPL) | 1 |
| 37 | 416740 | HP Switch 4.2/3.7 Mpa(g) | 1 |
| 42 | 416550 | EEV Assembly OU12 4-5HP DCI (SPL) | 1 |
| 43 | 416602 | COMPRESSOR INSULATION DCI 4-5HP Assembly (SPL) | 1 |
| 45 | 416711 | DRIVER 4-5HP DCI Assembly (SPL) | 1 |
| 46 | 416715 | PFC Chocks 4-5HP | 2 |
| 47 | 416724 | Terminal Block 6P | 1 |
| 48 | 416726 | Terminal block 2P DCI | 1 |
| 49 | 416713 | 456 HP ODU Capacitor Board (SPL) | 1 |
| 50 | 416730 | EEV COIL VKV MOZS348E0 | 1 |
| 51 | 416751 | OCT-THERMISTOR+CAP WTH CONNECT | 1 |
| 52 | 416752 | CTT-THERMISTOR+CAP WTH CONNECT | 1 |
| 53 | 416762 | Cable Driver Communication | 1 |
| 54 | 416763 | Cable IDU Communication | 1 |
| 55 | 416764 | CABLE INDOOR INPUT | 1 |
| 56 | 416766 | Cable Inrush Communication | 1 |
| 57 | 416767 | Cable Line filter-Driver | 1 |
| 59 | 416769 | Cable Terminals-Line filter | 1 |
| 60 | 416770 | Cable Terminal Ground | 1 |
| 61 | 416774 | CABLE CONTROLLER INPUT -OUT | 1 |
| 62 | 416776 | CABLE CAPACITOR DRIVER (EHK) | 1 |
| 64 | 416906 | *P.C SPACER RS-10 | 21 |
| 65 | 416910 | CABLE HOLDER KWS-1 | 4 |
| 68 | 416714 | 456 HP ODU Filter Board (SPL) | 1 |
| 69 | 416542 | Tubing Assembly LIQUID VALVE O | 1 |
| 70 | 416921 | TERMINAL COVER DCI MITSUBISHI | 1 |
| 71 | 438551 | SUPPLY CORD CLAMP 20mm | 2 |
| 72 | 762245 | TERMINAL BLOCK N0.3 | 2/12 |

## 15.12 Outdoor Unit: OU12 5HP DCI - Spare Part List

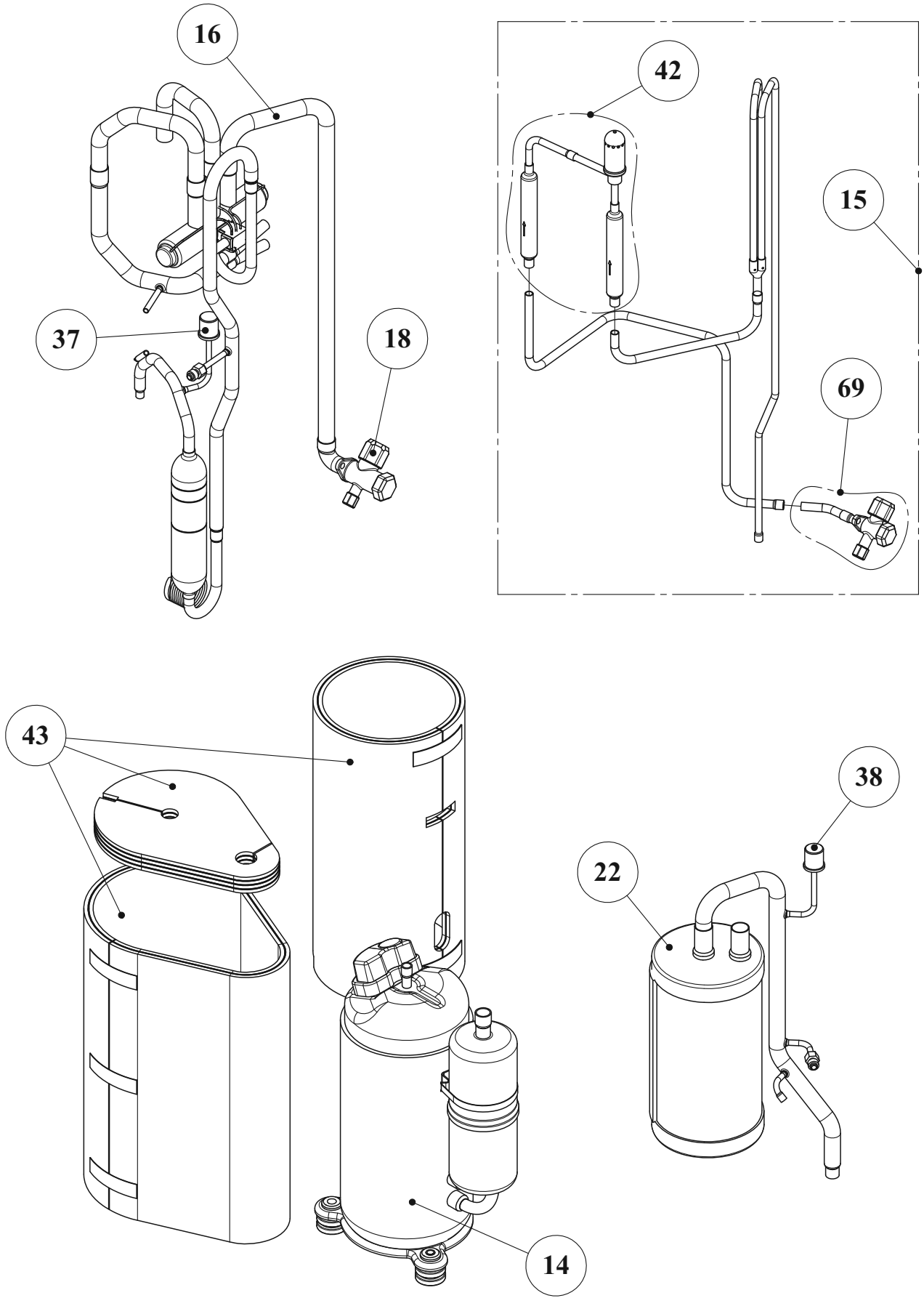
| No. | PN | Description | Qty |
|---|---|---|---|
| 1 | 437045 | UPPER COVER EL13 OU LARGE | 1 |
| 2 | 416217 | SIDE PANEL OU12 DCI 4-5HP | 1 |
| 3 | 436356 | LARGE ELECTRICAL COVER OU/WMQ | 1 |
| 4 | 416215 | FRONT COVER OU12 DCI 4-5HP | 1 |
| 4a | 416216 | FRONT Panel OU12 DCI 4-5HP | 1 |
| 5 | 437091 | OU SQUARE FAN GUARD | 2 |
| 6 | 416213 | NEW BASE ASSY OU12 DCI 4-5HP | 1 |
| 7 | 416400 | LOWER COIL GR HDR OU12 DCI R41 | 1 |
| 7a | 416401 | UPPER COIL GR HDR OU12 DCI R41 | 1 |
| 8 | 4529604 | AXIAL FAN D493*143 | 2 |
| 9 | 416310 | DC MOTOR 70W OU12 DCI 4-5HP | 2 |
| 10 | 416218 | SIDE GUARD OU12 DCI 4-5HP | 1 |
| 11 | 436358 | OU LEADING HANDLE | 1 |
| 12 | 416222 | MOTOR SUPPORT ASSEMBLY OU12-DC | 1 |
| 14 | 416300 | COMPRESSOR ANB33FBDMT | 1 |
| 15 | 416534 | Tubing Assembly EEV OU12 DCI | 1 |
| 16 | 416527 | Tubing Assembly 4-Way OU12 5HP DCI | 1 |
| 19a | 413712 | THERMISTOR+CAP WITH CONNECTOR | 1 |
| 19b | 402741 | THERMISTOR WTH CONNECTOR L1250 | 1 |
| 21 | 416760 | COMPRESSOR WIRING L1300 | 1 |
| 22 | 402284 | SUCTION ACCUMULATOR 5" x 3/4" | 1 |
| 23 | 439928 | OUTLET PLASTIC RING OU8 | 2 |
| 26 | 436352 | RAISING HANDLE OU10 | 2 |
| 31 | 416230 | ELECTRONICS BOX DCI 4-5HP | 1 |
| 33 | 442466 | VALVE COIL L700 MOLEX-SANHUA | 1 |
| 34 | 416712 | DCI 456 HP ODU Main Board (SPL) | 1 |
| 37 | 416740 | HP Switch 4.2/3.7 Mpa(g) | 1 |
| 42 | 416550 | EEV Assembly OU12 4-5HP DCI (SPL) | 1 |
| 43 | 416602 | COMPRESSOR INSULATION DCI 4-5HP Assembly (SPL) | 1 |
| 45 | 416711 | DRIVER 4-5HP DCI Assembly (SPL) | 1 |
| 46 | 416715 | PFC Chocks 4-5HP | 2 |
| 47 | 416724 | Terminal Block 6P | 1 |
| 48 | 416726 | Terminal block 2P DCI | 1 |
| 49 | 416713 | 456 HP ODU Capacitor Board (SPL) | 1 |
| 50 | 416730 | EEV COIL VKV MOZS348E0 | 1 |
| 51 | 416751 | OCT-THERMISTOR+CAP WTH CONNECT | 1 |
| 52 | 416752 | CTT-THERMISTOR+CAP WTH CONNECT | 1 |
| 53 | 416762 | Cable Driver Communication | 1 |
| 54 | 416763 | Cable IDU Communication | 1 |
| 55 | 416764 | CABLE INDOOR INPUT | 1 |
| 56 | 416766 | Cable Inrush Communication | 1 |
| 57 | 416767 | Cable Line filter-Driver | 1 |
| 59 | 416769 | Cable Terminals-Line filter | 1 |
| 60 | 416770 | Cable Terminal Ground | 1 |
| 61 | 416774 | CABLE CONTROLLER INPUT -OUT | 1 |
| 62 | 416776 | CABLE CAPACITOR DRIVER (EHK) | 1 |
| 64 | 416906 | *P.C SPACER RS-10 | 21 |
| 65 | 416910 | CABLE HOLDER KWS-1 | 4 |
| 68 | 416714 | 456 HP ODU Filter Board (SPL) | 1 |
| 69 | 416542 | Tubing Assembly LIQUID VALVE O | 1 |
| 70 | 416921 | TERMINAL COVER DCI MITSUBISHI | 1 |
| 71 | 438551 | SUPPLY CORD CLAMP 20mm | 2 |
| 72 | 762245 | TERMINAL BLOCK N0.3 | 2/12 |

## 15.13 OU12 6HP DCI - Exploded View

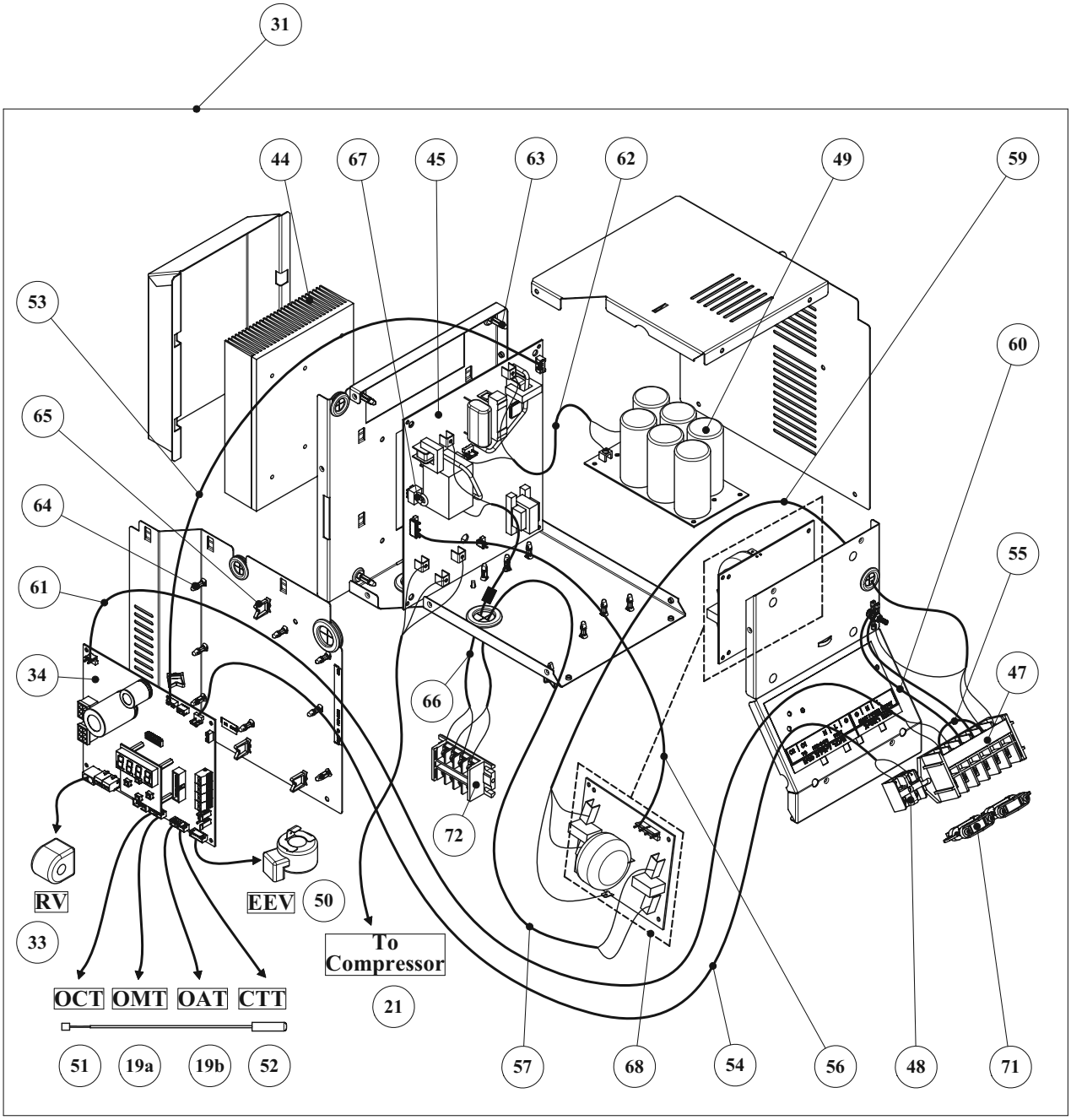
### 15.13.1 Outdoor Unit General Assembly



### 15.13.2 Outdoor Unit Tubing Assembly



### 15.13.3 Outdoor Unit Electronics Assembly



### 15.13.4 Outdoor Unit Spare Part List

| No. | Item | Description | Quantity |
|---|---|---|---|
| 1 | 416246 | UPPER COVER ASSY OU12 DCI 4-5H | 1 |
| 2 | 417218 | SIDE PANEL ASSY OU12 6HP DCI | 1 |
| 3 | 436356 | LARGE ELECTRICAL COVER OU/WMQ | 1 |
| 4 | 416215 | FRONT COVER OU12 DCI 4-5HP | 1 |
| 4a | 417219 | FRONT PANEL ASSY OU12 6HP DCI | 1 |
| 5 | 437091 | OU SQUARE FAN GUARD | 2 |
| 6 | 417200 | NEW BASE ASSY OU12 6HP DCI | 1 |
| 7 | 417201 | Compressor Base Plate ASSY OU1 | 1 |
| 7a | 417401 | UPPER COIL GR HDR OU12 6HP DCI | 1 |
| 7b | 417400 | LOWER COIL GR HDR OU12 6HP DCI | 1 |
| 8 | 4529604 | AXIAL FAN D493*143 | 2 |
| 9 | 416310 | DC MOTOR 70W OU12 DCI 4-5HP | 2 |
| 10 | 416218 | SIDE GUARD OU12 DCI 4-5HP | 1 |
| 11 | 436358 | OU LEADING HANDLE | 1 |
| 12 | 416222 | MOTOR SUPPORT ASSEMBLY OU12-DC | 1 |
| 14 | 417300 | COMPRESSOR DA420A3F-20M | 1 |
| 15 | 417528 | Tubing Assembly OU12 6HP DCI | 1 |
| 16 | 417518 | Tubing Assembly OU12 6HP DCI | 1 |
| 18 | 434549 | SERVICE VALVE ASSY 3/4F 3 WAY R410A | 1 |
| 19a | 413712 | THERMISTOR+CAP WITH CONNECTOR | 1 |
| 19b | 402741 | THERMISTOR WTH CONNECTOR L1250 | 1 |
| 21 | 416760 | COMPRESSOR WIRING L1300 | 1 |
| 22 | 402284 | SUCTION ACCUMULATOR 5” x 3/4” | 1 |
| 23 | 439928 | OUTLET PLASTIC RING OU8 | 2 |
| 26 | 436352 | RAISING HANDLE OU10 | 1 |
| 26 | 436352 | RAISING HANDLE OU10 | 1 |
| 31 | 417230 | CONTROLLER ASSEMBLY DCI 6HP | 1 |
| 33 | 442466 | VALVE COIL L700 MOLEX-SANHUA | 1 |
| 34 | 417713 | DCI 6 HP ODU Main Board ASSY | 1 |
| 37 | 416740 | HP Switch 4.2/3.7 Mpa(g) | 1 |
| 38 | 417742 | LP Switch 0.15/0.2 Mpa(g) | 1 |
| 42 | 417531 | EEV Assembly OU12 6HP DCI | 1 |
| 43 | 417603 | COMPRESSOR INSULATION DCI 6HP | 1 |
| 44 | 417711 | HS DCI 6HP COATED | 1 |
| 45 | 417712 | DRIVER 6HP DCI Assembly | 1 |
| 46 | 417715 | PFC Chocks 6HP | 2 |
| 47 | 416724 | Terminal Block 6P | 1 |
| 48 | 416726 | Terminal block 2P DCI | 1 |
| 49 | 417714 | 6 HP ODU Capacitor Board ASSY | 1 |
| 50 | 416730 | EEV COIL VKV-MOZS330E0(N-KV-13 | 1 |
| 51 | 416751 | OCT-THERMISTOR+CAP WTH CONNECT | 1 |
| 52 | 416752 | CTT-THERMISTOR+CAP WTH CONNECT | 1 |
| 53 | 417781 | Cable Driver Communication | 1 |
| 54 | 416763 | Cable IDU Communication | 1 |
| 55 | 416764 | CABLE INDOOR INPUT | 1 |
| 56 | 417782 | CABLE ZERO CROSS | 1 |
| 57 | 417784 | CABLE LF-CHOCK | 1 |
| 59 | 417785 | Cable Terminals-Line filter | 1 |
| 60 | 416770 | Cable Terminal Ground | 1 |
| 61 | 416774 | CABLE CONTROLLER INPUT -OUT | 1 |
| 62 | 417783 | CABLE CAPS DRIVER | 1 |
| 63 | 417914 | P.C SPACER RS-14 | 4 |
| 64 | 416906 | P.C SPACER RS-10 | 4 |
| 65 | 416910 | CABLE HOLDER KWS-1 | 4 |
| 66 | 417787 | CABLE DRIVER-CHOCK | 1 |
| 67 | 417788 | Cable Thermo Switch Shorted | 1 |
| 68 | 417716 | 6 HP ODU Filter Board ASSY | 1 |
| 69 | 416542 | Tubing Assembly LIQUID VALVE O | 1 |
| 71 | 438551 | SUPPLY CORD CLAMP 20mm | 2 |
| 72 | 417720 | Terminal Block 4P | 1 |

# 16. OPTIONAL ACCESSORIES

## 16.1 RCW Wall Mounted Remote Control

**16.1.1** The RCW wall mounted remote control can be fitted to a large range and models, It can be used as IR (wirless mode) or wired controler.the RCW can control up to15 indoor units using the same settings (on its wired aplication).

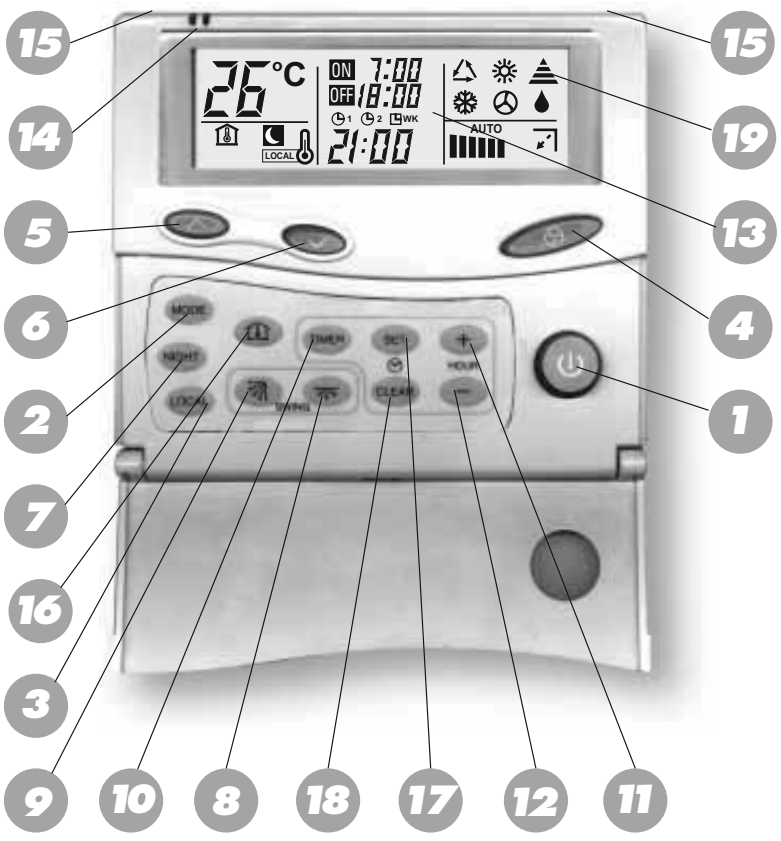
The max wiring length between the controller to the last indoor unit is 300m. for application on WNG LED indoor units an additional interface PCB is needed.

Ordering code no':

RCW – 436195
WNG add' PCB - SP000000290.

### *REMOTE CONTROL*

*1. START / STOP button*
*2. Operation mode selection button COOLING, HEATING, AUTO COOL / HEAT, DRY, FAN.*
*3. LOCAL temperature sensing button*
*4. FAN SPEED and AUTO FAN button*
*5. Room temperature UP button*
*6. Room temperature DOWN Button*
*7. NIGHT button*
*8. Airflow direction MANUAL positioning cor*
*9. Airflow direction AUTO-CONTROL buttor*
*10. TIMER button*
*11. TIMER UP button*
*12. TIMER DOWN button*
*13. LCD operation display*
*14. LOCAL sensor*
*15. Infrared signal transmitter*
*16. ROOM temperature button*
*17. TIMER SET button*
*18. TIMER CLEAR button*
*19. Transmission sign*





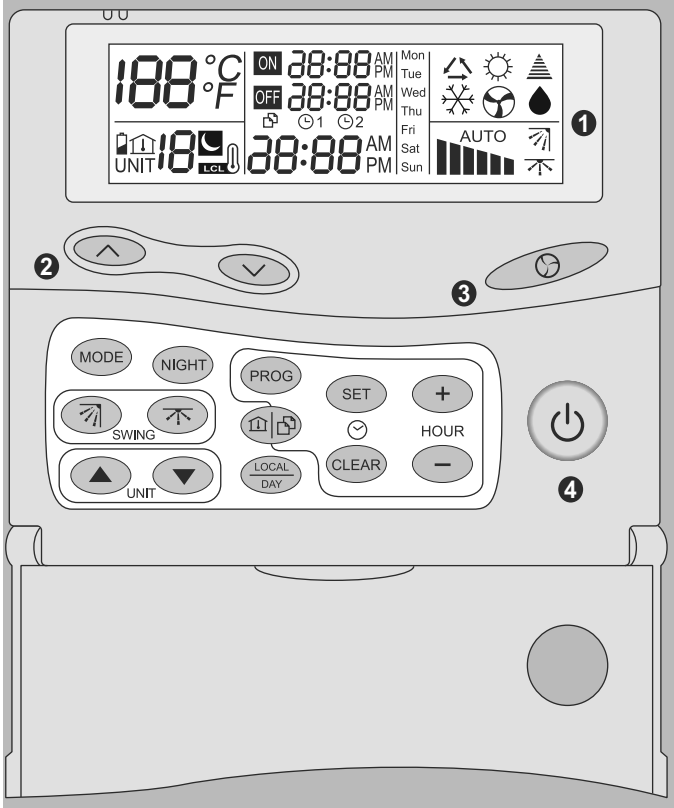

CONTENTS

## 16.2 RCW2 Wall Mounted Remote Control

**16.2.1** The RCW2 wall mounted remote controler is a wired controler that can provide affective controling management up to 15 different settings and temp' zones.

The RCW2 can be connected up to a max' of 32 units,allowing a max wiring length of 1000m for application on WNG LED indoor units an additional interface PCB is needed.

Ordering code no':
RCW2 – SP000000081
WNG add' PCB - SP000000290




1. Display screen.
2. Keys for raising and lowering the set temperature.
3. Ventilation mode selection :
   - Low speed.
   - Medium speed.
   - High speed.
   - AUTO : Automatic speed selection.
4. ON / Standby.

(SET) Accessing the time setting mode.
(+) Advancing the time setting.
(–) Retarding the time setting.
(CLEAR) Clearing memory of programmed time settings in programming mode.
(LOCAL DAY) Day of the week selection key or sending "I feel" local temperature setting.
(PROG) Programming mode key.
"Copy" key, enabling zone parameters to be duplicated for other zones.
(MODE) Operating mode selection.
(NIGHT) Day /Night key.
Current zone setting: zone above.
Current zone setting: zone below.
Louver : step by step or horizontal.
Louver : vertical.

## 16.3 Base Heater

PN: 439878

**Before starting the heaters connection verify that the unit is disconnected from main power supply!!**

# *BASE HEATERT INSTALLATION INSTRUCTIONS*

**Check the installation manual for further information**

The kit includes:

1. One 70W PT heating element.
2. One Heater holder.
3. Two magnets for assemble of heater to outdoor base.
4. 4 Strips.

Instructions:

1. Open the outdoor unit electrical cover and service panel.
2. Connect the base heater wires to connections marked as “BH” on the main controller (refer to Figure 1).
3. Route the wires into the cable holders and through the grommet and attach the wires with strips to other wires as per Figure 1 & 2.
4. Locate the heater under the outdoor base with the magnets according to Figure 3.
5. Attach with strips the wires to the pipes and the base unit.
6. Close the outdoor electrical cover and service panel.

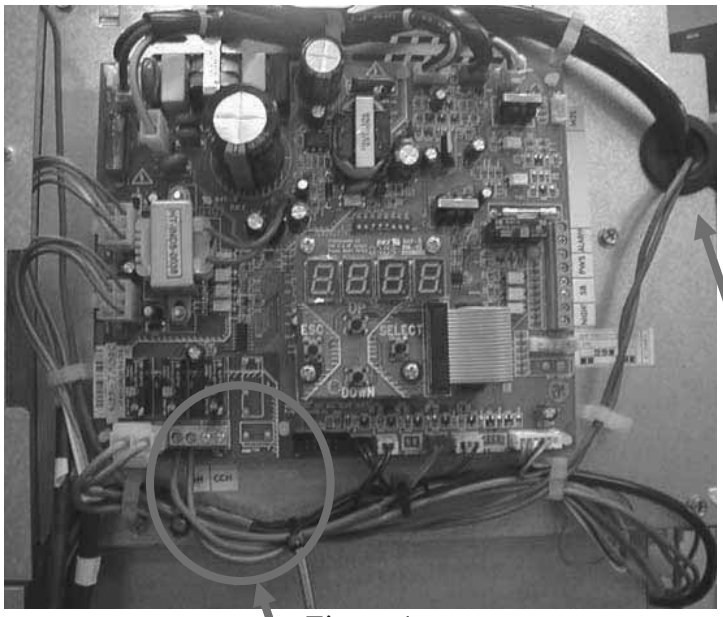



Figure 1

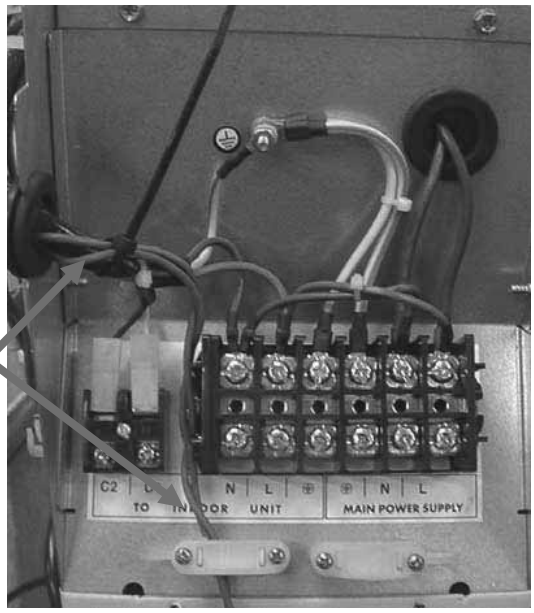



Figure 2

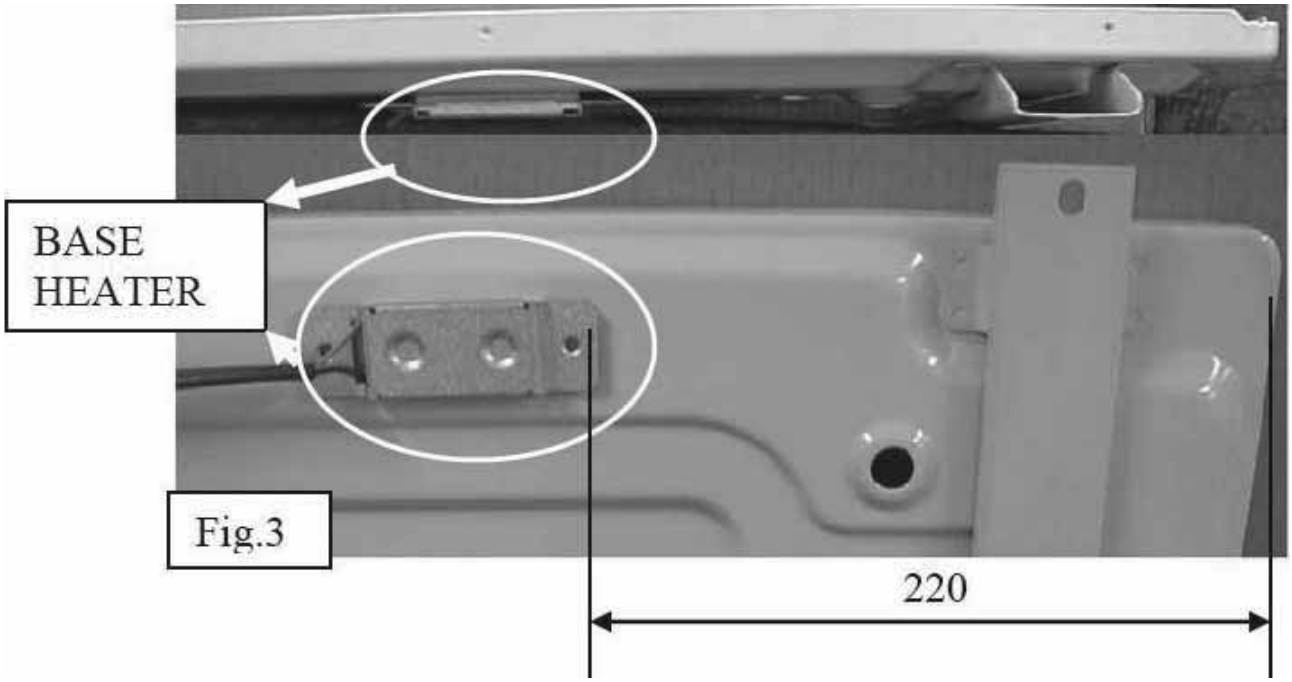



Fig.3

## 16.4 Crank Case Heater

PN: 190443

**Before starting the heaters connection verify that the unit is disconnected from main power supply!!**

# *CRANK CASE HEATERS INSTALLATION INSTRUCTIONS*

**Check the installation manual for further information**

The kit includes:

1. One 50W heating element.
2. One spring holder.

Instructions:

1. Open the outdoor unit electrical cover and service panel.
2. Remove the compressor insulation layers.
3. Locate the heater around the compressor and close with the spring according to Figure 1.
4. Route the wires into the cable holders as per Figure 2.
5. Connect the heater wires to connections marked as “CCH” on the main controller (refer to Figure 3).
6. Attach the wires with strips to other wires as per Figure 3.
7. Put back the compressor insulation layers.
8. Close the outdoor electrical cover and service panel.

Figure 1

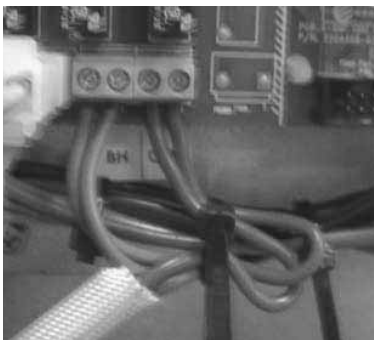


Figure 3

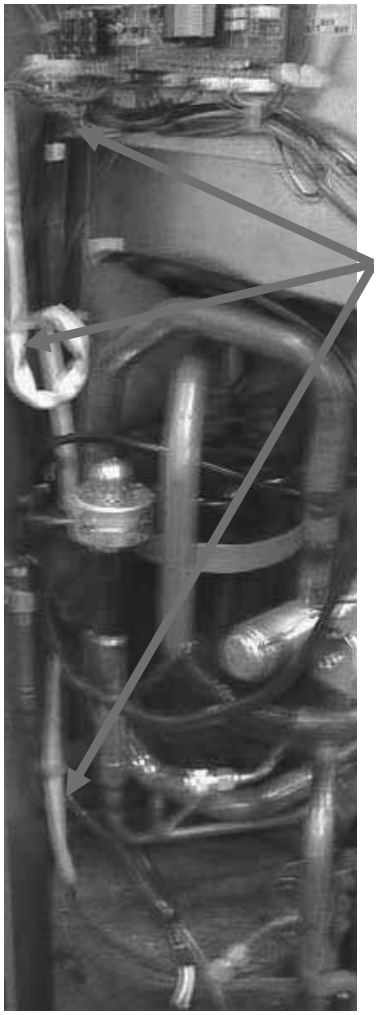


Figure 2

## 16.5 Room Thermostat

Room Thermostat kit PN: 442298
Thermistor with connector PN: 442296

**Before starting the connection verify that the unit is disconnected from main power supply!!**

# *ROOM THERMOSTAT INSTALLATION INSTRUCTIONS*

**Check the installation manual for further information**

Supplied components list:

| No. | Item | QTY | PN |
|---|---|---|---|
| 1 | Thermostat box | 1 | 442298 |
| 2 | Shielded cable | 1 | |
| 3 | Screws and plugs | 2 | |
| 4 | LABEL | 1 | |
| 5 | BAG | 1 | |

| | | | |
|---|---|---|---|
| 1 | Extension cable with connector | 1 | 442296 |

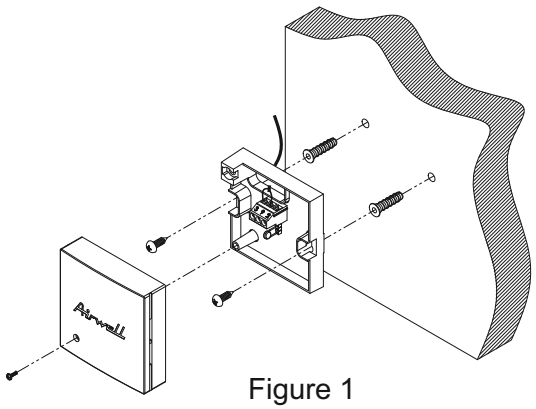



Figure 1

Choosing location of installation:

- Away from air drafts
- Away from direct sun light rays
- Average height – 1.5 meters above floor
- Away from any heat source

1. Install the thermostat box on the wall according the above location preferences. See figure 1.
2. Connect the shielded cable supplied to the thermostat box into points 3 and 9 (non polarity).
3. Disconnect the existing “RM” sensor from the indoor unit main controller.
4. Connect the other end of “RM” extension cable to the the sheilded cable. Also connect the grounding fork terminal into the grounding terminal point.
5. In the indoor unit main controller, move the dip switch #2 to OFF position.

# APPENDIX A

## INSTALLATION AND OPERATION MANUALS

- ► **INSTALLATION INSTRUCTION DNG DCI**
- ► **INSTALLATION INSTRUCTION EMD DCI**
- ► **INSTALLATION INSTRUCTION CD DCI**
- ► **INFRARED REMOTE CONTROL RECEIVER**
- ► **OPERATION MANUAL RC-3**
- ► **OPERATION MANUAL RC-4**
- ► **OPERATION MANUAL RC-7**