



Service Manual

TOP DCI Series

| Indoor Units | Outdoor Units |
|--------------|---------------|
| TOP 25 | DCI 25 |
| TOP 35 | DCI 35 |



REFRIGERANT

R410A

HEAT PUMP

SM TOPSDCI 1-E.1 GB

NOVEMBER – 2008

LIST OF EFFECTIVE PAGES

Note: Changes in the pages are indicated by a “Revision#” in the footer of each effected page (when none indicates no changes in the relevant page). All pages in the following list represent effected/ non effected pages divided by chapters.

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* Due to constant improvements please note that the data on this service manual can be modified with out notice.

** Photos are not contractual.

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1. INTRODUCTION

1.1 General

The new **TOP DCI Inverter** split wall mounted range comprise the **RC** (heat pump) models, as follows:

- **TOP 25 DCI**
- **TOP 35 DCI**

The indoor **TOP DCI** units are available as LED display types, featuring esthetic design, compact dimensions, and low noise operation.

1.2 Main Features

The **TOP DCI** series benefits from the most advanced technological innovations, namely:

- DC Inverter technology.
- R410A models.
- Microprocessor control.
- Precharge refrigerant.
- Infrared remote control with liquid crystal display.
- Indoor centrifugal fan.
- High COP.
- DC Brush less fan motor.
- Networking system connectivity.
- Connection to Multisplit outdoor units
- A dry contact for clock or power shedding functions (configurable).
- Cooling operation at outdoor temperature down to -10°C.
- Heating operation at outdoor temperature down to -15°C.
- Low indoor and outdoor noise levels.
- Easy installation and service.

1.3 Indoor Unit

The indoor unit is a wall mounted, and can be easily fitted to many types of residential and commercial applications.

It includes:

- Casing with air inlet and outlet grills.
- A large-diameter centrifugal fan.

- Coil with treated aluminum fins.
- Motorized flaps.
- Multi-speed motor with internal protection.
- DC motor with internal protection.
- Advanced electronic control box assembly.
- Interconnecting wiring terminal block.
- Mounting plate.

1.4 Filtration

The **TOP DCI** series presents one type of air filters:

- Easily accessible, and re-usable pre-filters (mesh).

1.5 Control

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

1.6 Outdoor Unit

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

It includes:

- Compressor mounted in a soundproofed compartment :
- Axial fan.
- Outdoor coil with hydrophilic louver fins for RC units.
- Outlet air fan grill.
- Service valves" flare" type connection.
- Interconnecting wiring terminal block.

- **DCI 25 R410A**

- **DCI 35 R410A**

1.7 Tubing Connections

Flare type interconnecting tubing to be produced on site.

For further details please refer to the Installation Manual, APPENDIX A.

1.8 Accessories

Remote Control

RCW Wall Mounted Remote Control

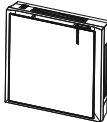
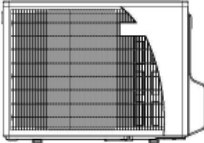
The RCW remote control is mounted on the wall (RC-2,RC-3,RC-4), and controls the unit either as an infrared remote control or as a wired controller. The wired controller can control up to 10 Indoor units with the same program settings and adjustments. For further details please refer to Optional Accessories.

1.9 Inbox Documentation

Each unit is supplied with its own installation, operation and remote control manuals.

1.10 Matching Table

1.10.1 R410A

| OUTDOOR UNITS | | | INDOOR UNITS | |
|---|--------|-----------|--|--------|
| | | |  | |
|  | MODEL | REFRIGER. | TOP 25 | TOP 35 |
| | DCI 25 | R410A | √ | |
| | DCI 35 | R410A | | √ |

2. PRODUCT DATA SHEET

2.1 TOP 25 DCI

| Model Indoor Unit | | | TOP 25 DCI | | |
|--|-------------------------------------|-------------|--------------|---|------------------|
| Model Outdoor Unit | | | DCI 25 R410A | | |
| Installation Method of Pipe | | | Flared | | |
| Characteristics | | | Units | Cooling | Heating |
| Capacity ⁽⁴⁾ | | | Btu/hr | 8530(4780-11600) | 8530(5120-15360) |
| | | | kW | 2.5(1.4-3.4) | 2.5(1.5-4.5) |
| Power input ⁽⁴⁾ | | | kW | 0.658(0.45-0.98) | 0.625(0.48-1.53) |
| EER (Cooling) or COP(Heating) ⁽⁴⁾ | | | W/W | 3.8 | 4.0 |
| Energy efficiency class | | | | A | A |
| Power supply | | | V | 220-240 | |
| | | | Ph | 1 | |
| | | | Hz | 50 | |
| Rated current | | | A | 2.9 | 2.8 |
| Power factor | | | | 0.97 | 0.97 |
| Prated (IDU) | | | W | 30 | |
| Prated (IDU+ODU) | | | W | 1600 | |
| Starting current | | | A | 10.5 | |
| Circuit breaker rating | | | A | 15 | |
| INDOOR | Fan type & quantity | | | Helicoid x 1 | |
| | Fan speeds | H/M/L | RPM | 520/490/450 | |
| | Air flow ⁽¹⁾ | H/M/L | m3/hr | 390/370/330 | |
| | External static pressure | Min | Pa | 0 | |
| | Sound power level ⁽²⁾ | H/M/L | dB(A) | 55/-/- | |
| | Sound pressure level ⁽³⁾ | H/M/L | dB(A) | 38/35/32 | |
| | Moisture removal | | l/hr | 1 | |
| | Condensate drain tube I.D | | mm | 16 | |
| | Dimensions | WxHxD | mm | 570*570*160 | |
| | Net Weight | | kg | 13.5 | |
| | Package dimensions | WxHxD | mm | 700*700*255 | |
| | Packaged weight | | kg | 15.5 | |
| | Units per pallet | | units | 16 | |
| | Stacking height | | units | 8levels | |
| OUTDOOR | Refrigerant control | | | Electronical Expansion Valve | |
| | Compressor type,model | | | Single Rotary DC Inverter,Panasonic 5RS102XAB | |
| | Fan type & quantity | | | Propeller x 1 | |
| | Fan speeds | H | RPM | 830 | |
| | Air flow | H | m3/hr | 1780 | |
| | Sound power level | H | dB(A) | 61 | |
| | Sound pressure level ⁽³⁾ | H | dB(A) | 51 | |
| | Dimensions | WxHxD | mm | 795x610x290 | |
| | Net Weight | | kg | 38 | |
| | Package dimensions | WxHxD | mm | 970x650x394 | |
| | Packaged weight | | kg | 42 | |
| | Units per pallet | | Units | 9 | |
| | Stacking height | | units | 3 levels | |
| | Refrigerant type | | | R410A | |
| | Standard charge | | kg(7.5m) | 1.1 | |
| | Additional charge | | | No need | |
| | Connections between units | Liquid line | In.(mm) | 1/4"(6.35) | |
| Suction line | | In.(mm) | 3/8"(9.53) | | |
| Max.tubing length | | m. | Max.20 | | |
| Max.height difference | | m. | Max.10 | | |
| Operation control type | | | | Remote controll | |
| Heating elements (Option) | | | kW | | |
| Others | | | | | |

⁽¹⁾ Airflow in ducted units;at nominal external static pressure.

⁽²⁾ Sound power in ducted units is measured at air discharge.

⁽³⁾ Sound pressure level measured at 1-meter distance from unit.

⁽⁴⁾ Rating conditions in accordance to ISO 5151 and ISO 13253 (for ducted units).

2.2 TOP 35 DCI

| Model Indoor Unit | | | TOP 35 DCI | | |
|--|-------------------------------------|---|-------------------|------------------------------|--|
| Model Outdoor Unit | | | DCI 35 R410A | | |
| Installation Method of Pipe | | | Flared | | |
| Characteristics | | Units | Cooling | Heating | |
| Capacity ⁽⁴⁾ | Btu/hr | | 11940(4780-14000) | | |
| | kW | | 3.5(1.4-4.1) | | |
| Power input ⁽⁴⁾ | kW | | 1.09(0.5-1.31) | | |
| | W/W | | 3.21 | | |
| EER (Cooling) or COP(Heating) ⁽⁴⁾ | | A | | A | |
| Power supply | V | | 220-240 | | |
| | Ph | | 1 | | |
| | Hz | | 50 | | |
| Rated current | A | | 4.9 | | |
| Power factor | | | 0.97 | | |
| Prated (IDU) | W | | 30 | | |
| Prated (IDU+ODU) | W | | 1800 | | |
| Starting current | A | | 10.5 | | |
| Circuit breaker rating | A | | 15 | | |
| INDOOR | Fan type & quantity | | Helicoid x 1 | | |
| | Fan speeds | H/M/L | RPM | | |
| | Air flow ⁽¹⁾ | H/M/L | m3/hr | | |
| | External static pressure | Min | Pa | | |
| | Sound power level ⁽²⁾ | H/M/L | dB(A) | | |
| | Sound pressure level ⁽³⁾ | H/M/L | dB(A) | | |
| | Moisture removal | | | l/hr | |
| | Condensate drain tube I.D | | | mm | |
| | Dimensions | WxHxD | mm | | |
| | Net Weight | | | kg | |
| | Package dimensions | WxHxD | mm | | |
| | Packaged weight | | | kg | |
| | Units per pallet | | | units | |
| | Stacking height | | | units | |
| | OUTDOOR | Refrigerant control | | Electronical Expansion Valve | |
| Compressor type,model | | Single Rotary DC Inverter,Panasonic 5RS102XAB | | | |
| Fan type & quantity | | Propeller x 1 | | | |
| Fan speeds | | H | RPM | | |
| Air flow | | H | m3/hr | | |
| Sound power level | | H | dB(A) | | |
| Sound pressure level ⁽³⁾ | | H | dB(A) | | |
| Dimensions | | WxHxD | mm | | |
| Net Weight | | | | kg | |
| Package dimensions | | WxHxD | mm | | |
| Packaged weight | | | | kg | |
| Units per pallet | | | | Units | |
| Stacking height | | | | units | |
| Refrigerant type | | | | R410A | |
| Standard charge | | kg(7.5m) | | 1.2 | |
| Additional charge | | | | No need | |
| Connections between units | | Liquid line | In.(mm) | 1/4"(6.35) | |
| | Suction line | In.(mm) | 3/8"(9.53) | | |
| | Max.tubing length | m. | Max.20 | | |
| | Max.height difference | m. | Max.10 | | |
| Operation control type | | Remote control | | | |
| Heating elements (Option) | | kW | | | |
| Others | | | | | |

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

3. RATING CONDITIONS

Standard conditions in accordance with ISO 5151, 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

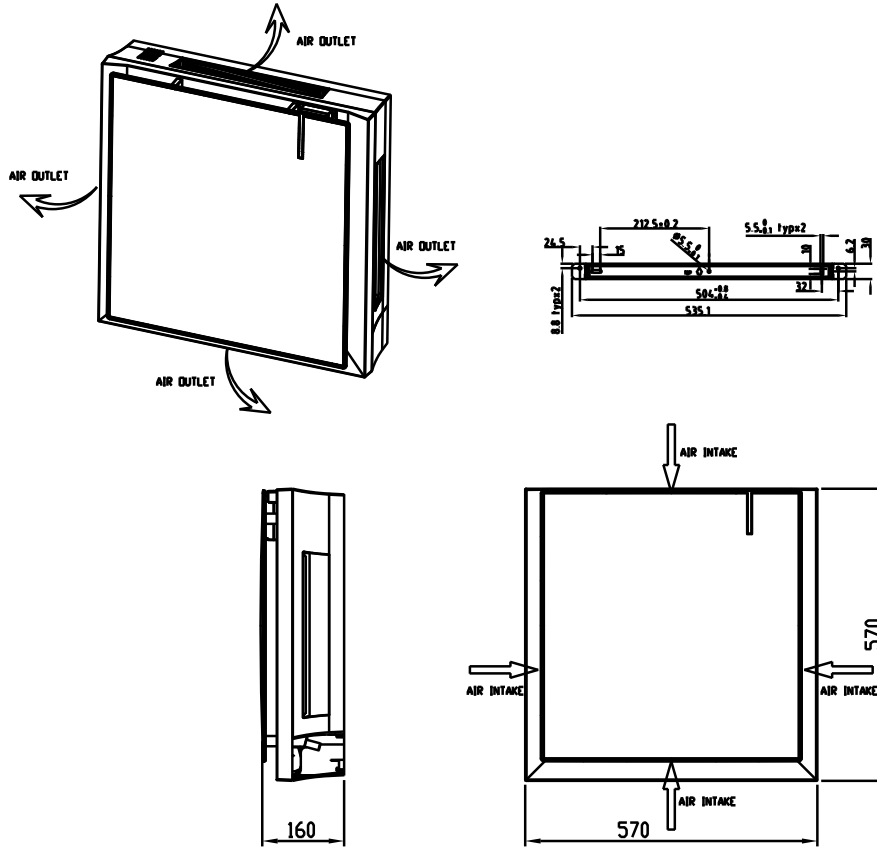
3.1 Operating Limits

3.1.1 R410A

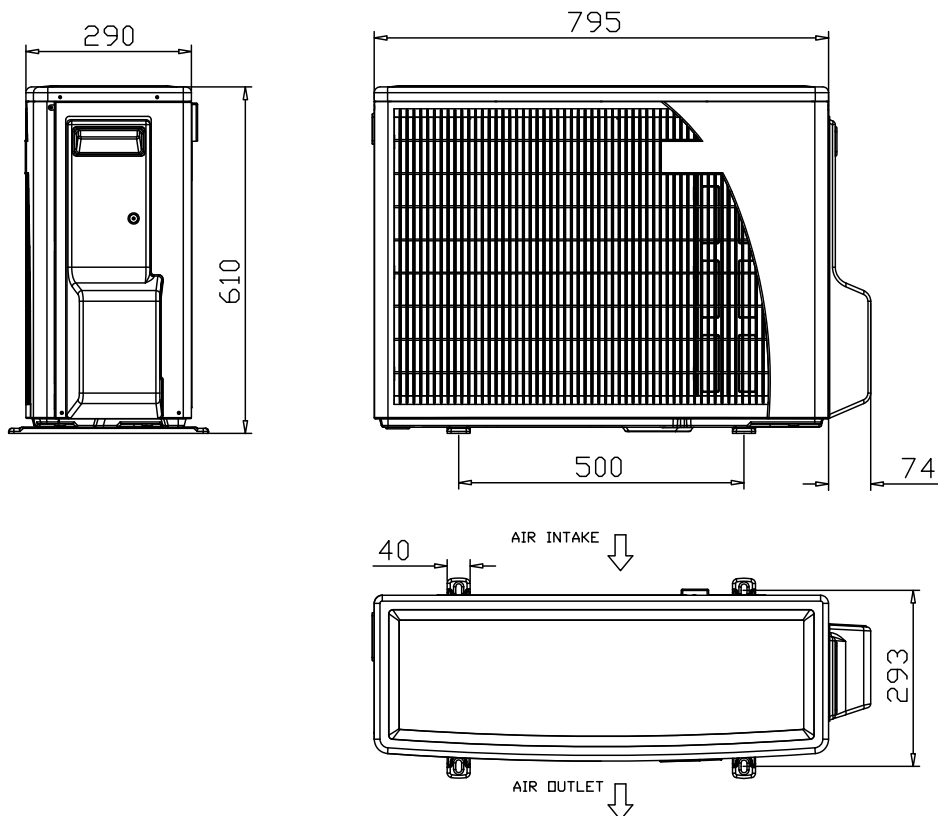
| | | Indoor | Outdoor |
|----------------|-------------|-----------------|-------------------|
| Cooling | Upper limit | 32°C DB 23°C WB | 46°C DB |
| | Lower limit | 21°C DB 15°C WB | -10°C DB |
| Heating | Upper limit | 27°C DB | 24°C DB 18°C WB |
| | Lower limit | 10°C DB | -15°C DB -16°C WB |
| Voltage | 1PH | 1PH 198 ÷ 264 V | |

4. OUTLINE DIMENSIONS

4.1 Indoor Unit: TOP 25 DCI, TOP 35 DCI



4.2 Outdoor Unit: DCI 25, DCI 35



5. PERFORMANCE DATA & PRESSURE CURVES

5.1 TOP 25 DCI / DCI 25 R410A

5.1.1 Cooling Mode at 7.5m Tubing Connection.

230V : Indoor Fan at High Speed.

| Entering Air DB OD Coil(°C) | Data | Entering Air WB/DB ID Coil(°C) | | | | |
|--------------------------------|------|--------------------------------|-------|-------------|-------|-------|
| | | 15/21 | 17/24 | 19/27 | 21/29 | 23/32 |
| 15 | TC | 2.58 | 2.73 | 2.86 | 2.99 | 3.09 |
| | SC | 1.89 | 2.00 | 2.11 | 2.06 | 2.09 |
| | PI | 0.47 | 0.48 | 0.48 | 0.48 | 0.48 |
| 20 | TC | 2.56 | 2.71 | 2.83 | 2.96 | 3.06 |
| | SC | 1.82 | 1.94 | 2.05 | 1.99 | 2.03 |
| | PI | 0.51 | 0.52 | 0.52 | 0.52 | 0.52 |
| 25 | TC | 2.45 | 2.63 | 2.78 | 2.91 | 3.01 |
| | SC | 1.83 | 1.96 | 2.08 | 2.04 | 2.09 |
| | PI | 0.55 | 0.56 | 0.56 | 0.57 | 0.57 |
| 30 | TC | 2.30 | 2.48 | 2.68 | 2.78 | 2.88 |
| | SC | 1.74 | 1.88 | 2.03 | 1.99 | 2.07 |
| | PI | 0.60 | 0.61 | 0.61 | 0.62 | 0.62 |
| 35 | TC | 2.13 | 2.30 | 2.53 | 2.66 | 2.76 |
| | SC | 1.64 | 1.78 | 1.95 | 1.93 | 2.01 |
| | PI | 0.65 | 0.66 | 0.67 | 0.66 | 0.68 |
| 40 | TC | 1.92 | 2.10 | 2.33 | 2.45 | 2.56 |
| | SC | 1.52 | 1.68 | 1.84 | 1.82 | 1.90 |
| | PI | 0.70 | 0.71 | 0.72 | 0.73 | 0.73 |
| 46 | TC | 1.67 | 1.85 | 2.07 | 2.20 | 2.30 |
| | SC | 1.38 | 1.54 | 1.73 | 1.70 | 1.78 |
| | PI | 0.77 | 0.78 | 0.79 | 0.80 | 0.81 |

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

(1) Marked area is below standard operating limits. For operating in low ambient conditions, refer to Optional Accessories (Chapter 15).

5.1.2 Heating Mode at 7.5m Tubing Connection.

230V : Indoor Fan at High Speed.

| ENTERING WB OD COIL(°C) | ENTERING AIR DB ID COIL(°C) | | | | | |
|----------------------------|-----------------------------|------|-------------|-------------|------|------|
| | 15 | | 20 | | 25 | |
| | TH | PI | TH | PI | TH | PI |
| -10 | 1.32 | 0.53 | 1.27 | 0.56 | 1.22 | 0.59 |
| -7 | 1.42 | 0.54 | 1.37 | 0.57 | 1.32 | 0.60 |
| -2 | 1.51 | 0.55 | 1.46 | 0.58 | 1.41 | 0.61 |
| 2 | 1.83 | 0.57 | 1.76 | 0.61 | 1.68 | 0.65 |
| 6 | 2.59 | 0.62 | 2.51 | 0.66 | 2.42 | 0.70 |
| 10 | 2.81 | 0.65 | 2.74 | 0.70 | 2.66 | 0.74 |
| 15 | 3.04 | 0.68 | 2.96 | 0.73 | 2.89 | 0.78 |
| 20 | 3.20 | 0.70 | 3.12 | 0.76 | 3.04 | 0.82 |

* the above chart includes the weighted deicing influence.

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 Capacity Correction Factor Due to Tubing Length

5.2.1 Cooling

| TOTAL TUBING LENGTH (One Way) | | | | | | | | |
|-------------------------------|-------------|-------|-------|-----|-----|-----|-----|-----|
| 3m | 7.5m | 10m | 15m | 20m | 25m | 30m | 40m | 50m |
| 1.02 | 1 | 0.961 | 0.950 | --- | --- | --- | --- | --- |

* Minimum recommended tubing length between indoor and outdoor units is 3m.

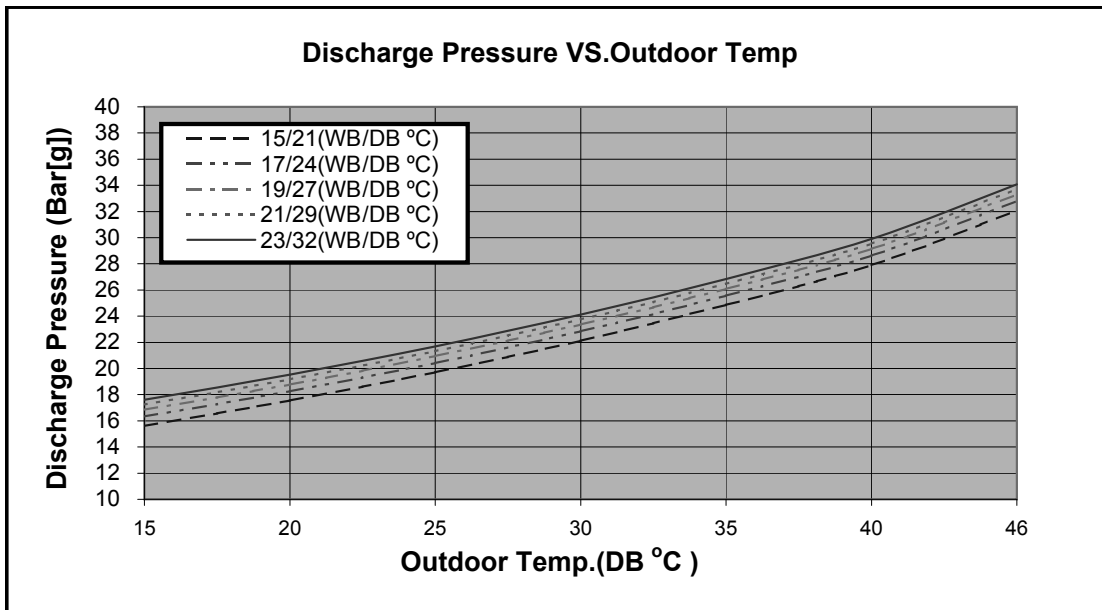
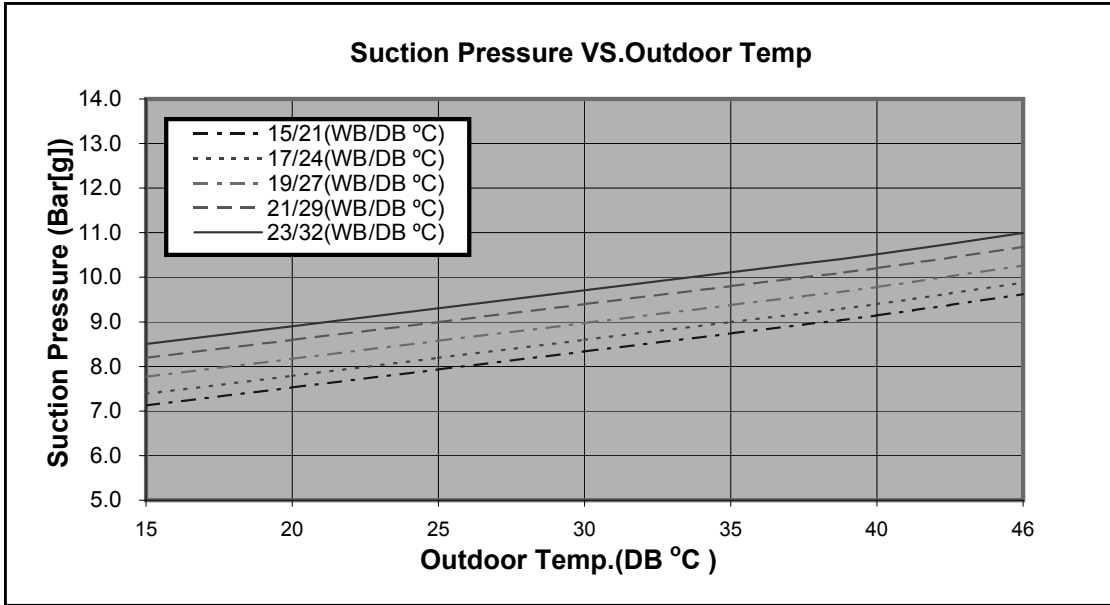
5.2.2 Heating

| TOTAL TUBING LENGTH (One Way) | | | | | | | | |
|-------------------------------|-------------|-------|-------|-----|-----|-----|-----|-----|
| 3m | 7.5m | 10m | 15m | 20m | 25m | 30m | 40m | 50m |
| 1.05 | 1 | 0.975 | 0.961 | --- | --- | --- | --- | --- |

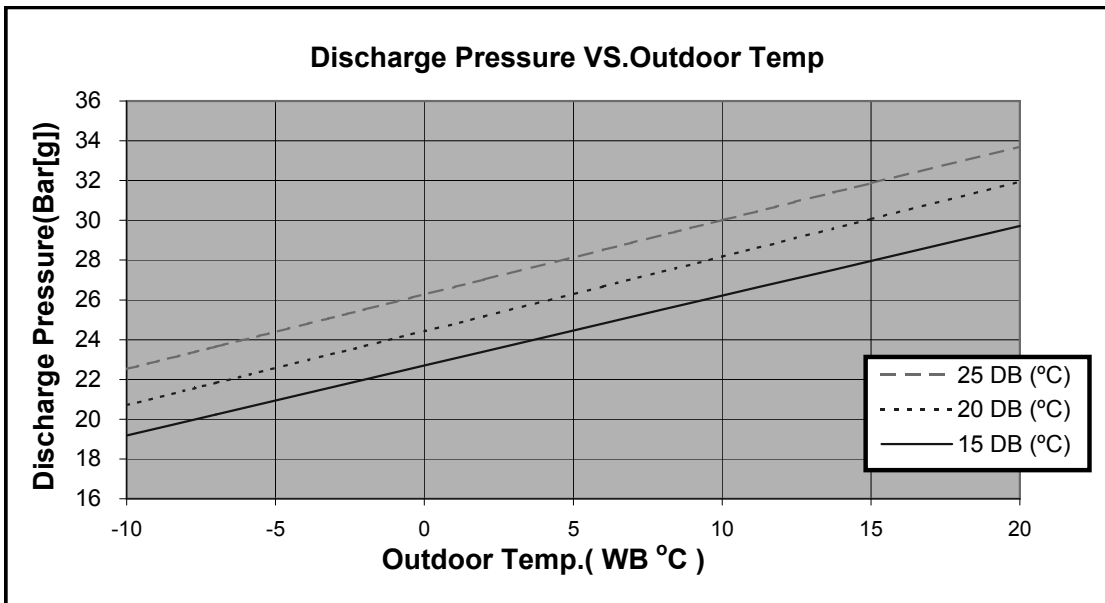
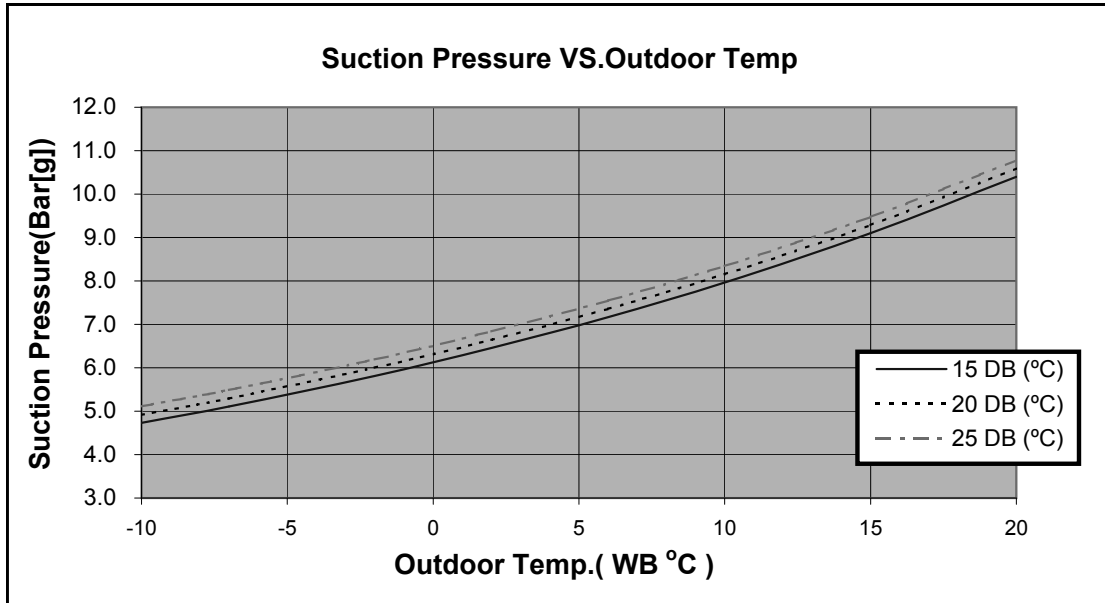
* Minimum recommended tubing length between indoor and outdoor units is 3m.

5.3 Pressure Curves.

5.3.1 Cooling.



5.3.2 Heating.



5.4 TOP 35 DCI / DCI 35 R410A

5.4.1 Cooling Mode at 7.5m Tubing Connection.

230V : Indoor Fan at High Speed.

| Entering Air DB OD Coil(°C) | Data | Entering Air WB/DB ID Coil(°C) | | | | |
|--------------------------------|------|--------------------------------|-------|-------------|-------|-------|
| | | 15/21 | 17/24 | 19/27 | 21/29 | 23/32 |
| 15 | TC | 3.43 | 3.64 | 3.80 | 3.97 | 4.11 |
| | SC | 1.73 | 1.83 | 1.93 | 1.89 | 1.92 |
| | PI | 0.77 | 0.77 | 0.78 | 0.78 | 0.78 |
| 20 | TC | 3.40 | 3.60 | 3.77 | 3.94 | 4.07 |
| | SC | 2.42 | 2.58 | 2.72 | 2.64 | 2.70 |
| | PI | 0.84 | 0.84 | 0.84 | 0.85 | 0.85 |
| 25 | TC | 3.27 | 3.50 | 3.70 | 3.87 | 4.01 |
| | SC | 1.68 | 1.80 | 1.90 | 1.87 | 1.92 |
| | PI | 0.90 | 0.91 | 0.92 | 0.93 | 0.93 |
| 30 | TC | 3.06 | 3.30 | 3.57 | 3.70 | 3.84 |
| | SC | 1.60 | 1.72 | 1.86 | 1.82 | 1.90 |
| | PI | 0.98 | 0.99 | 1.00 | 1.01 | 1.01 |
| 35 | TC | 2.83 | 3.06 | 3.37 | 3.53 | 3.67 |
| | SC | 1.50 | 1.63 | 1.79 | 1.77 | 1.84 |
| | PI | 1.06 | 1.07 | 1.09 | 1.10 | 1.10 |
| 40 | TC | 2.56 | 2.79 | 3.10 | 3.27 | 3.40 |
| | SC | 1.40 | 1.54 | 1.69 | 1.66 | 1.74 |
| | PI | 1.14 | 1.16 | 1.18 | 1.19 | 1.20 |
| 46 | TC | 2.22 | 2.46 | 2.76 | 2.93 | 3.06 |
| | SC | 1.27 | 1.41 | 1.58 | 1.55 | 1.63 |
| | PI | 1.25 | 1.27 | 1.29 | 1.31 | 1.32 |

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

(1) Marked area is below standard operating limits. For operating in low ambient conditions, refer to Optional Accessories (Chapter 15).

5.4.2 Heating Mode at 7.5m Tubing Connection.

230V : Indoor Fan at High Speed.

| ENTERING WB OD COIL(°C) | ENTERING AIR DB ID COIL(°C) | | | | | |
|----------------------------|-----------------------------|------|-------------|-------------|------|------|
| | 15 | | 20 | | 25 | |
| | TH | PI | TH | PI | TH | PI |
| -10 | 1.75 | 0.76 | 1.69 | 0.81 | 1.62 | 0.85 |
| -7 | 1.89 | 0.78 | 1.82 | 0.82 | 1.75 | 0.87 |
| -2 | 2.00 | 0.79 | 1.94 | 0.84 | 1.87 | 0.88 |
| 2 | 2.44 | 0.83 | 2.34 | 0.88 | 2.24 | 0.93 |
| 6 | 3.44 | 0.89 | 3.34 | 0.95 | 3.22 | 1.01 |
| 10 | 3.74 | 0.94 | 3.64 | 1.00 | 3.54 | 1.07 |
| 15 | 4.04 | 0.98 | 3.94 | 1.05 | 3.84 | 1.12 |
| 20 | 4.25 | 1.01 | 4.15 | 1.09 | 4.04 | 1.18 |

* the above chart includes the weighted deicing influence.

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 Capacity Correction Factor Due to Tubing Length

5.5.1 Cooling

| TOTAL TUBING LENGTH (One Way) | | | | | | | | |
|-------------------------------|----------|-------|-------|-----|-----|-----|-----|-----|
| 3m | 7.5m | 10m | 15m | 20m | 25m | 30m | 40m | 50m |
| 1.02 | 1 | 0.961 | 0.948 | --- | --- | --- | --- | --- |

* Minimum recommended tubing length between indoor and outdoor units is 3m.

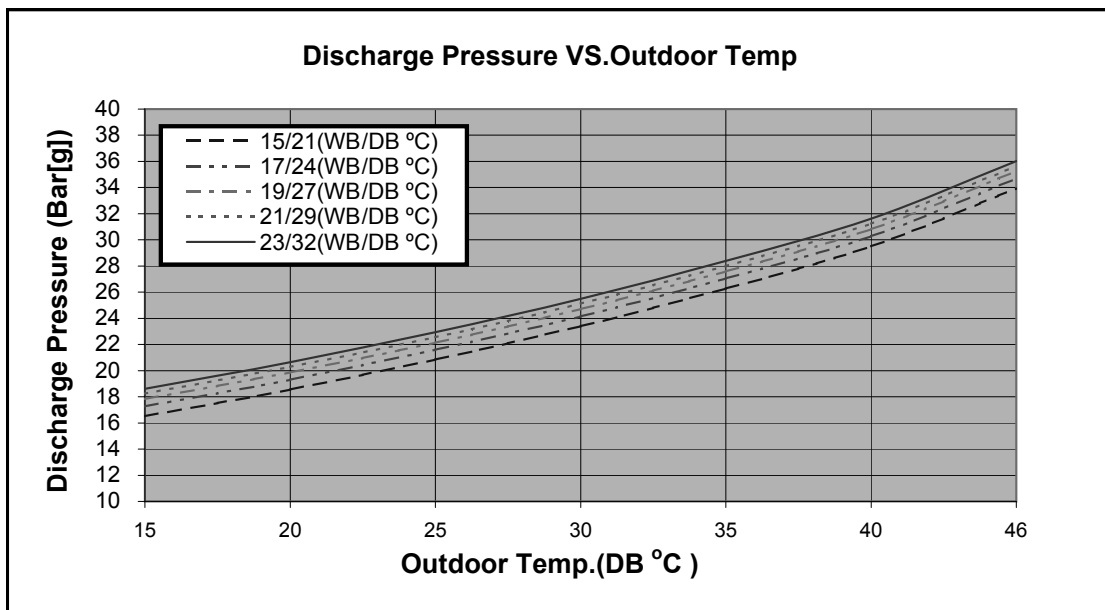
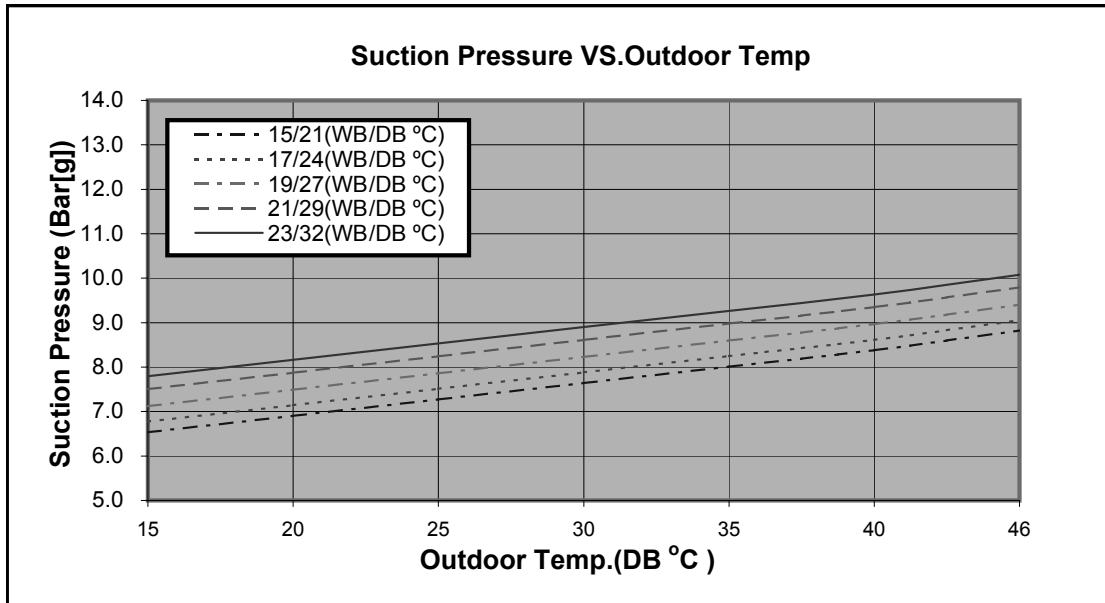
5.5.2 Heating

| TOTAL TUBING LENGTH (One Way) | | | | | | | | |
|-------------------------------|----------|-------|-------|-----|-----|-----|-----|-----|
| 3m | 7.5m | 10m | 15m | 20m | 25m | 30m | 40m | 50m |
| 1.05 | 1 | 0.975 | 0.963 | --- | --- | --- | --- | --- |

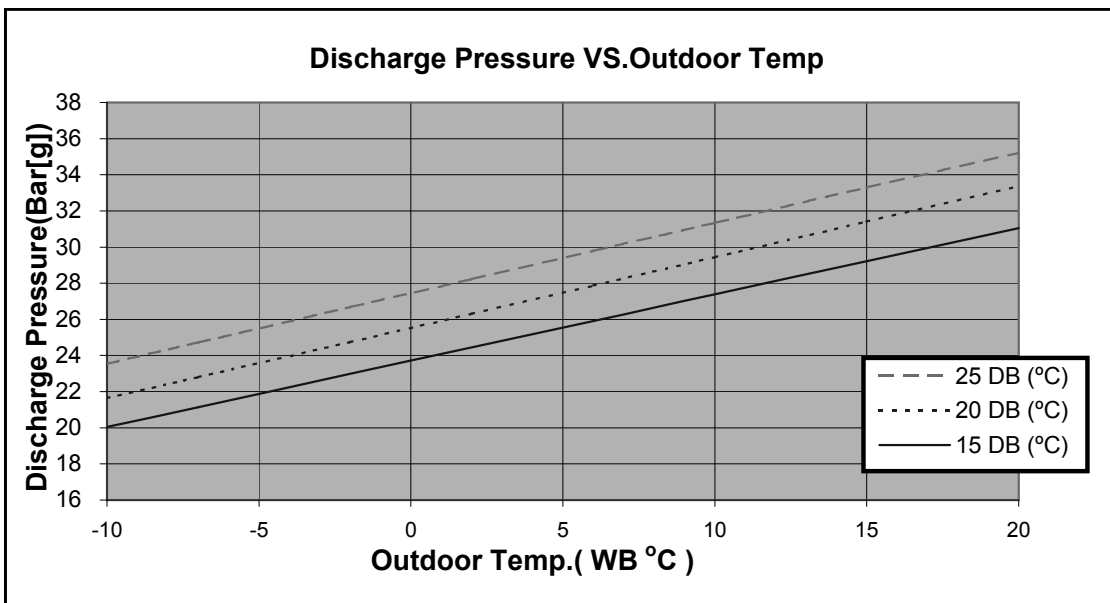
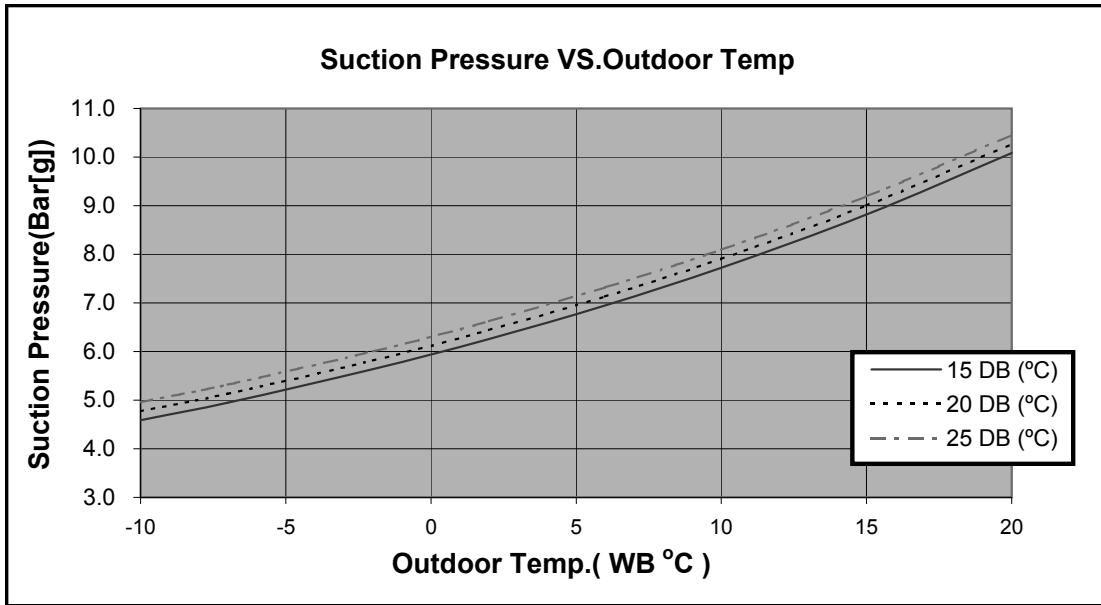
* Minimum recommended tubing length between indoor and outdoor units is 3m.

5.6 Pressure Curves.

5.6.1 Cooling.



5.6.2 Heating.



6. SOUND LEVEL CHARACTERISTICS

6.1 Sound Pressure Level

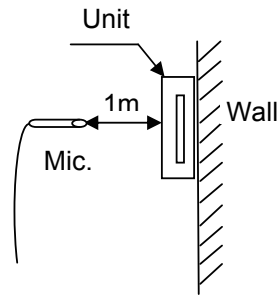
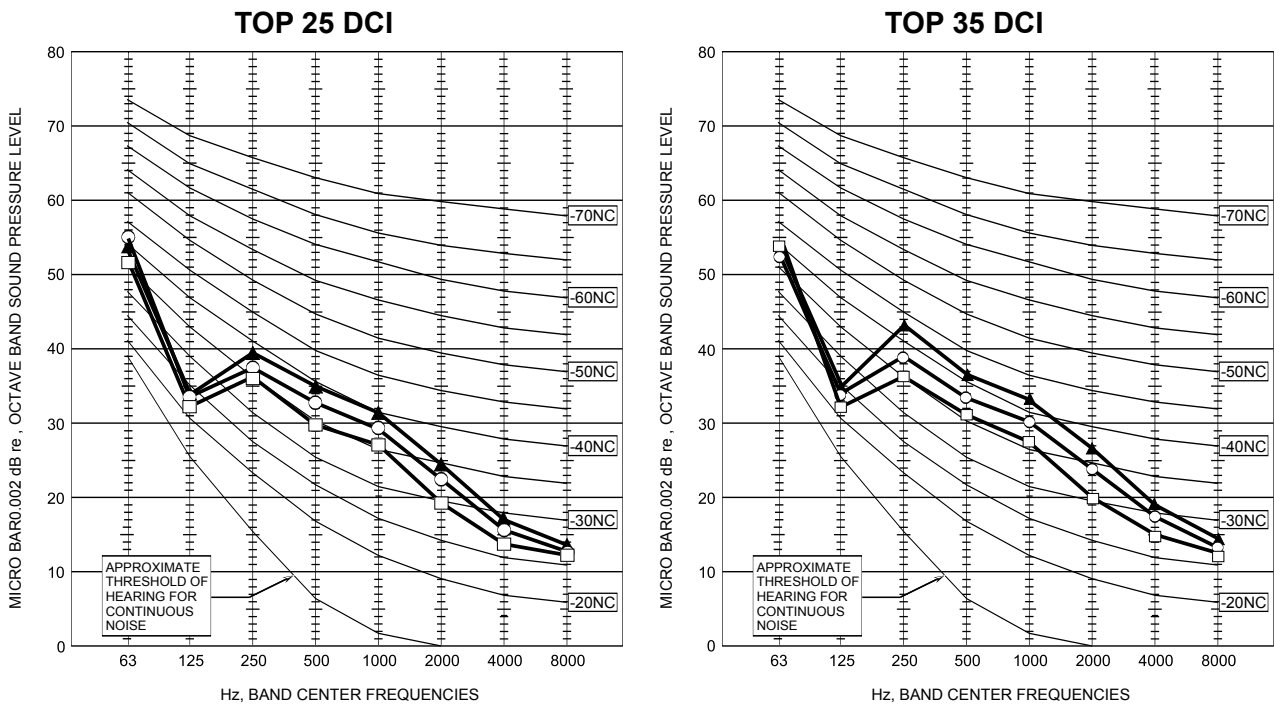


Figure 1

6.2 Sound Pressure Level Spectrum (Measured as Figure 1)



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

6.3 Outdoor units

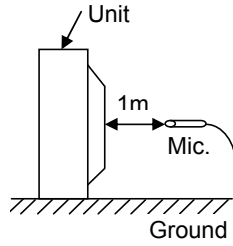
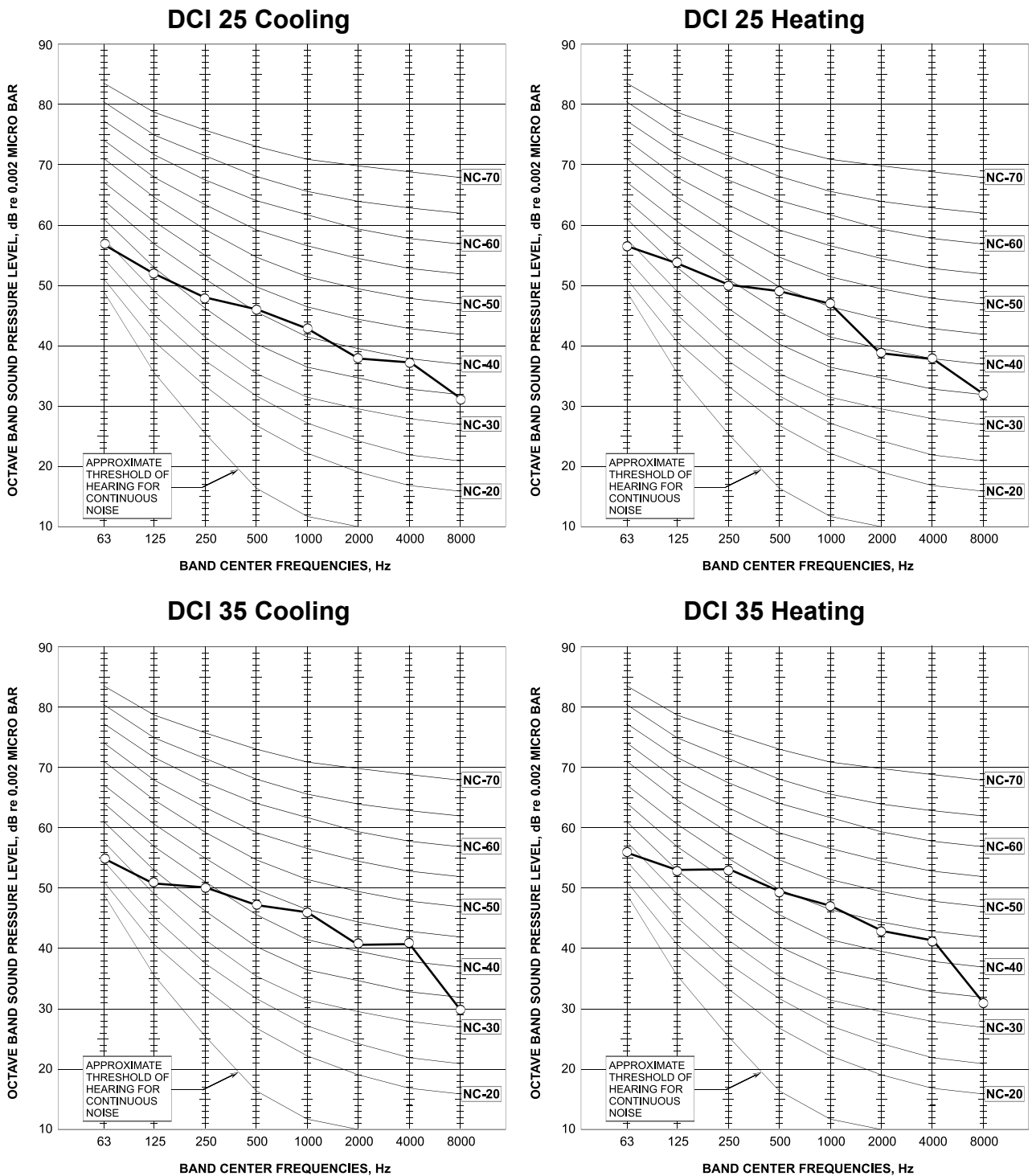


Figure 2

6.4 Sound Pressure Level Spectrum (Measured as Figure 2)



7. ELECTRICAL DATA

7.1 Single Units

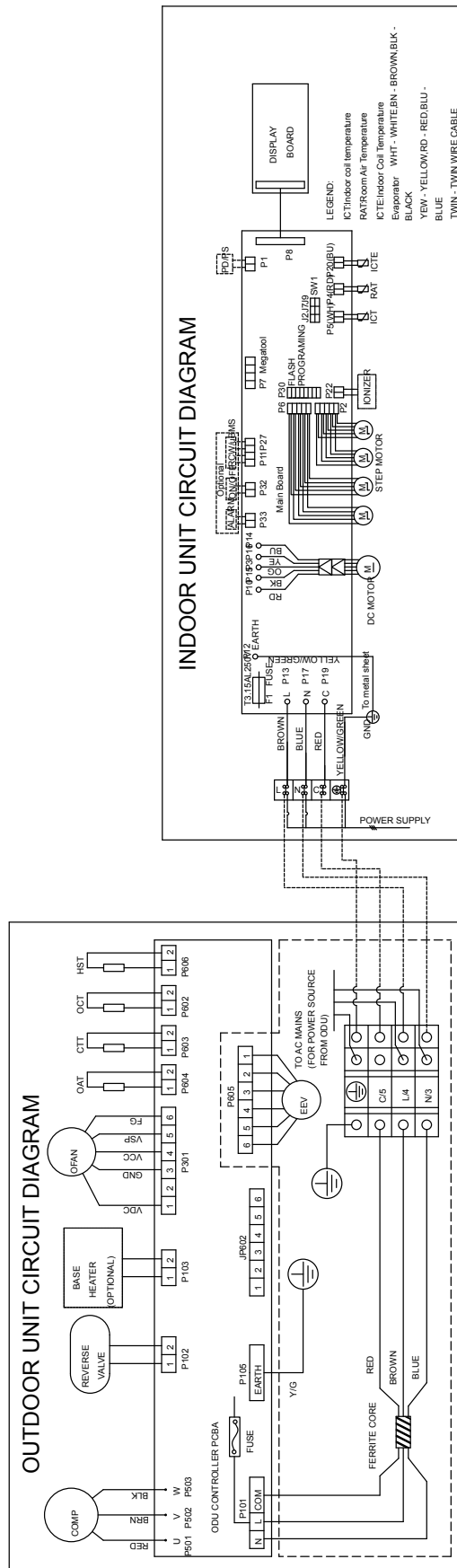
| MODEL | TOP 25 DCI | TOP 35 DCI |
|--|-------------------------|-------------------------|
| Power Supply | To indoor | To indoor |
| | 1PH-230V-50Hz | 1PH-230V-50Hz |
| Max Current, (A) | 10.0 | 10.0 |
| Circuit Breaker,(A) | 15.0 | 15.0 |
| Power Supply Wiring. (No. x Cross Section mm ²) | 3 x 1.5 mm ² | 3 x 1.5 mm ² |
| Interconnecting Cable ST Model (No. x Cross Section mm ²) | 4 x 1.5 mm ² | 4 x 1.5 mm ² |

NOTE

Power wiring cord should comply with local laws and electrical regulations requirements.

8. WIRING DIAGRAMS

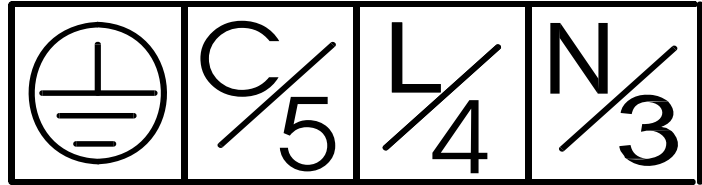
8.1 Units: TOP 25 DCI, TOP 35 DCI / DCI 25, DCI 35 R410A



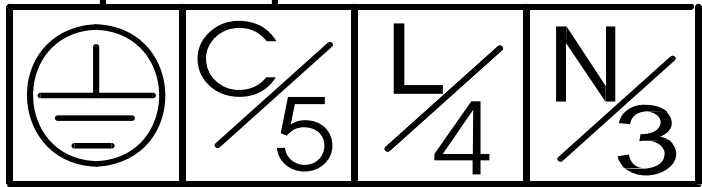
9. ELECTRICAL CONNECTIONS

9.1 TOP 25 / DCI 25, TOP 35 / DCI 35 R410A

Indoor unit



Outdoor unit

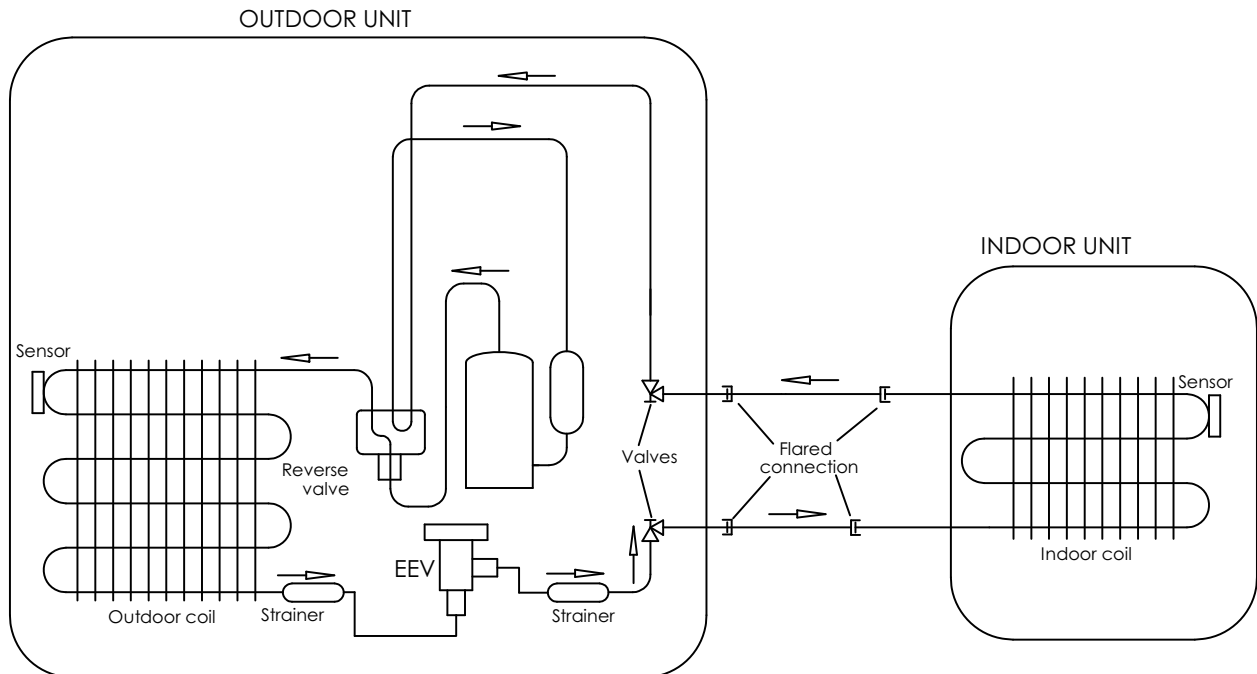


10. REFRIGERATION DIAGRAMS

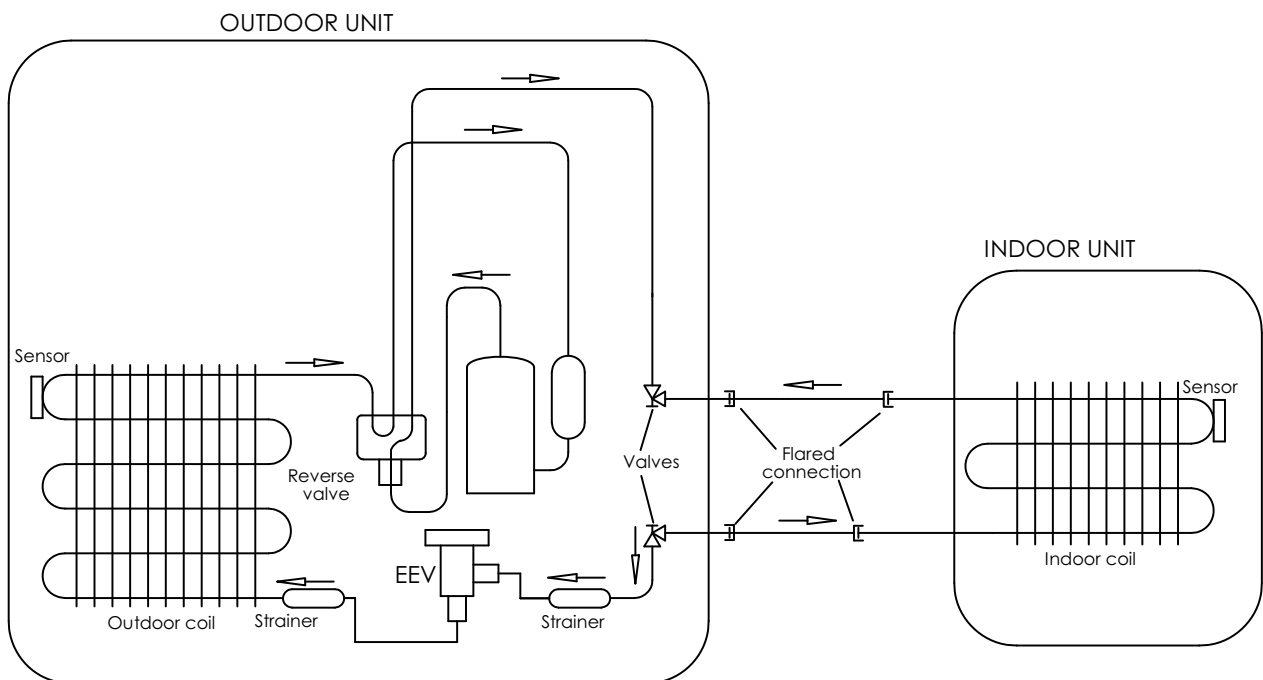
10.1 Heat Pump Models

10.1.1 TOP 25 DCI, TOP 35 DCI R410A

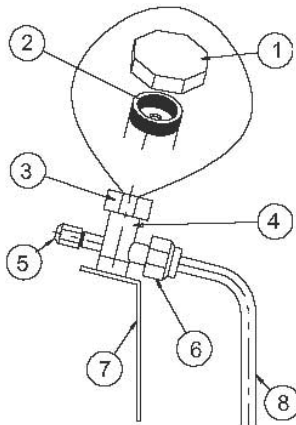
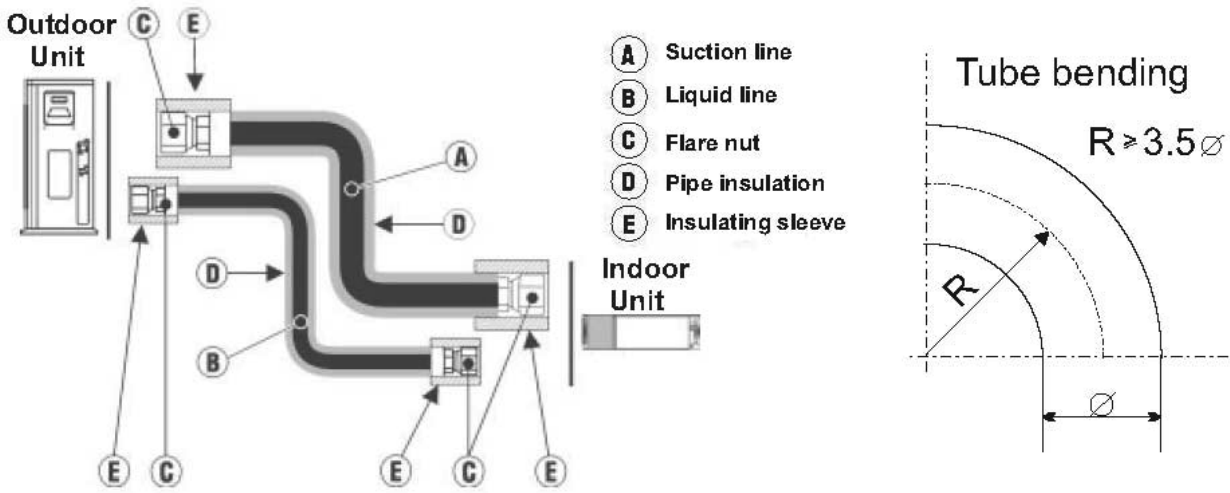
10.1.1a Cooling Mode



10.1.1b Heating Mode



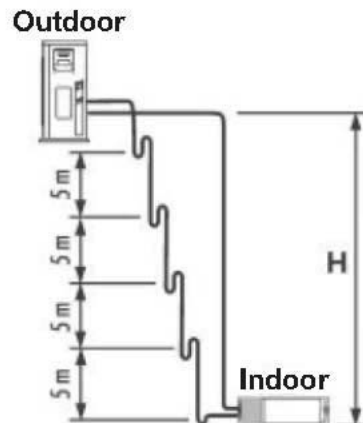
11. TUBING CONNECTIONS



| TUBE (Inch) | 1/4" | 3/8" | 1/2" | 5/8" | 3/4" |
|-------------------------|-------|-------|-------|-------|-------|
| TORQUE (Nm) | | | | | |
| Flare Nuts | 11-13 | 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

When the outdoor unit is installed above the indoor unit an oil trap is required every 5m along the suction line at the lowest point of the riser. In case the indoor unit is installed above the outdoor, no trap is required.



12 CONTROL SYSTEM

12.1 General Functions and Operating Rules*The DCI software parametric.*

All the model dependent parameters are shown in Blue color and with Italic style [*parameter*]. The parameters values are given in the last section of this control logic chapter of the service manual.

System Operation Concept

The control function is divided between indoor and outdoor unit controllers. Indoor unit is the system ‘Master’, requesting the outdoor unit for cooling/heating capacity supply. The outdoor unit is the system ‘Slave’ and it must supply the required capacity unless it enters into a protection mode avoiding it from supplying the requested capacity.

The capacity request is transferred via indoor to outdoor communication, and is represented by a parameter called ‘NLOAD’. NLOAD is an integer number with values between 0 and 127, and it represents the heat or cool load felt by the indoor unit.

Compressor Frequency Control

NLOAD setting

The NLOAD setting is done by the indoor unit controller, based on a PI control scheme. The actual NLOAD to be sent to the outdoor unit controller is based on the preliminary LOAD calculation, the indoor fan speed, and the power shedding function.

NLOAD limits as a function of indoor fan speed:

Indoor Fan Speed Maximum NLOAD Cooling Maximum NLOAD Heating

| Indoor Fan Speed | Maximum NLOAD Cooling | Maximum NLOAD Heating |
|-------------------------|------------------------------|------------------------------|
| Low | <i>MaxNLOADIF1C</i> | <i>MaxNLOADIF1H</i> |
| Medium | <i>MaxNLOADIF2C</i> | <i>MaxNLOADIF2H</i> |
| High | <i>MaxNLOADIF3C</i> | <i>MaxNLOADIF3H</i> |
| Turbo | <i>MaxNLOADIF4C</i> | <i>MaxNLOADIF4H</i> |
| Auto | <i>MaxNLOADIF5C</i> | <i>MaxNLOADIF5H</i> |

NLOAD limits as a function of power shedding:

| Mode | Power Shedding OFF | Power Shedding ON |
|----------------|---------------------------|--------------------------|
| Cooling | No limit | Nominal Cooling |
| Heating | No limit | Nominal heating |

Target Frequency Setting

Target Frequency Setting for DCI 25 / 35

The compressor target frequency is a function of the NLOAD number sent from the indoor controller and the outdoor air temperature.

Basic Target Frequency Setting:

| NLOAD | Target Frequency |
|--------------|--|
| 127 | Maximum Frequency |
| 10<NLOAD<127 | Interpolated value between minimum and maximum frequency |
| 10 | Minimum frequency |
| 0 | Compressor is stopped |

Target frequency limits as a function of outdoor air temperature (OAT):

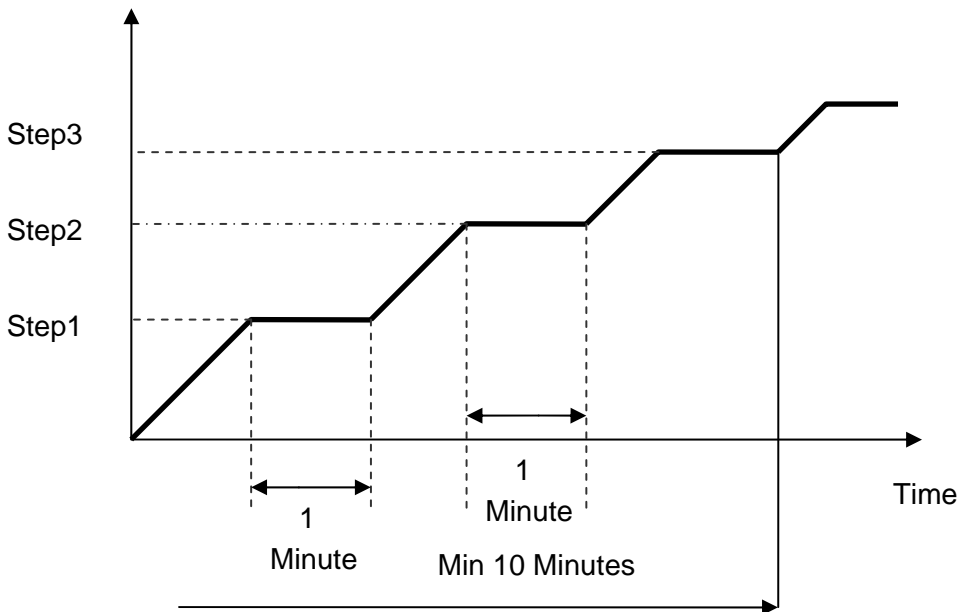
| OAT Range | Cooling Mode limits | Heating Mode limits |
|---------------|----------------------|-----------------------|
| OAT < 6 | <i>MaxFreqAsOATC</i> | No limit |
| 6 ≤ OAT < 15 | | <i>MaxFreqAsOAT1H</i> |
| 15 ≤ OAT < 28 | | <i>MaxFreqAsOAT2H</i> |
| 28 ≤ OAT | No limit | |

Frequency Changes Control

When the unit is running normally , the compressor frequency change rate is 1 Hz/sec.

Compressor Starting Control

Compressor starting control for DCI 25 / 35



Minimum On and Off Time

3 minutes

Indoor Fan Control

8 Indoor fan speeds are determined for each model. 4 speeds for cool/dry/fan modes and 4 speeds for heat mode.

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 unit controller can operate in all speeds. The actual speed is set according to the cool/heat load.

Turbo Speed

The Turbo speed is activated during the first 30 minutes of unit operation when auto fan speed is selected and under the following conditions:

Difference between set point and actual room temperature is bigger than 3 degrees.

Room temperature > 22 for cooling, or < 25 for heating.

Outdoor Fan Control

Outdoor Fan Control for DCI25/35

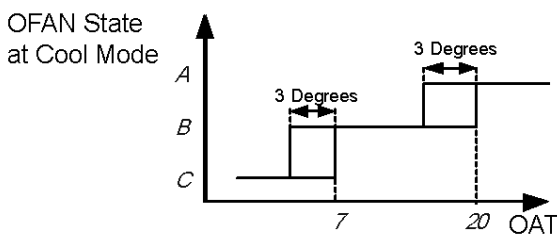
7 outdoor fan speeds are determined for each model. 3 speeds for cool and dry modes, and 3 speeds for heat mode, and a very low speed.

Outdoor fan speed is a function of compressor frequency and outdoor air temperature (OAT).

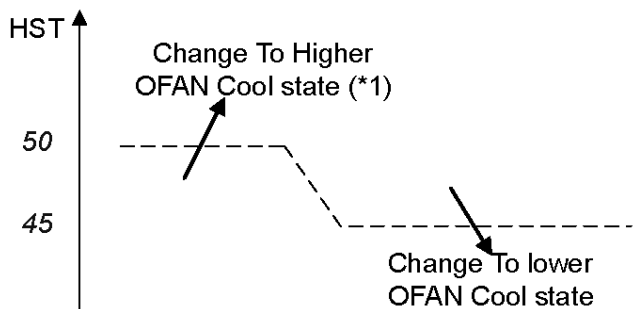
4 routines for fan control are determined. The control routine selection depends on operation mode, compressor speed, outdoor air temperature (OAT) and heat sink temperature (HST).

| Routine | Conditions |
|----------|---|
| A | Heating with OAT < 15 or Cooling with OAT > 20, or Faulty OAT |
| B | Cooling with 20 > OAT > 7 |
| C | Cooling with 7 > OAT |
| D | Heating with OAT > 15t |

| | OFAN Speed | | | |
|------------------------------|------------|----------|----------|----------|
| Compressor Target Frequency | Routin A | Routin B | Routin C | Routin D |
| Freq=0 | OFF | OFF | OFF | OFF |
| 10 ≤ Freq < OFLowFreq | Low | Low | VL | Low |
| OFLowFreq ≤ Freq < OFMedFreq | Medium | Low | VL | Low |
| OFMedFreq ≤ Freq | High | Low | Low | Medium |



Note: Periorities A > B > C



(*1) If State C, change to B
If State B, change to A

When compressor is switched to OFF and the heat sink temperature is above 55 degrees, the outdoor fan will remain ON in low speed for up to 3 minutes.

EEV (Electronic Expansion Valve) Control

EEV Control for DCI25/35

EEV opening is defined as $EEV = EEV_{OL} + EEV_{CV}$

EEV_{OL} is the initial EEV opening as a function of the compressor frequency, operation mode, unit model and capacity.

EEV_{CV} is a correction value for the EEV opening that is based on the compressor temperature.

During the first 5 minutes of compressor operation $EEV_{CV} = 0$.

Once the first 5 minutes are over, the correction value is calculated as follow: $EEV_{CV}(n) = EEV_{CV}(n-1) + EEV_{CTT}$

EEV_{CTT} is the correction based on the compressor temperature. A target compressor temperature is set depending on frequency and outdoor air temperature, and the actual compressor temperature is compared to the target temperature to set the required correction to the EEV opening.

RV(Reversing Valve) Control

Reversing valve is on in heat mode.

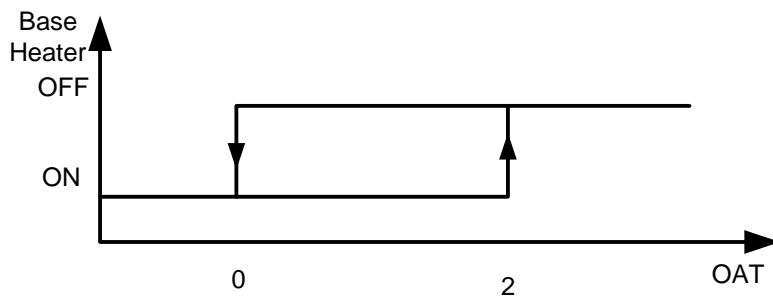
Switching of RV state is done only after compressor is off for over 3 minutes.

Ionizer Control

Ionizer is on when unit is on ,AND indoor fan is on ,AND Ioniser power switch is on.

Base Heater Control

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.

Fan Mode

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 difference between actual room temperature and user set point temperature.

Cool Mode

NLOAD is calculated according to the difference between actual room temperature and user set point temperature by fuzzy 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 NLOAD.

Heat Mode

NLOAD is calculated according to the difference between actual room temperature and user set point temperature by *fuzzy* 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 NLOAD.

Temperature Compensation

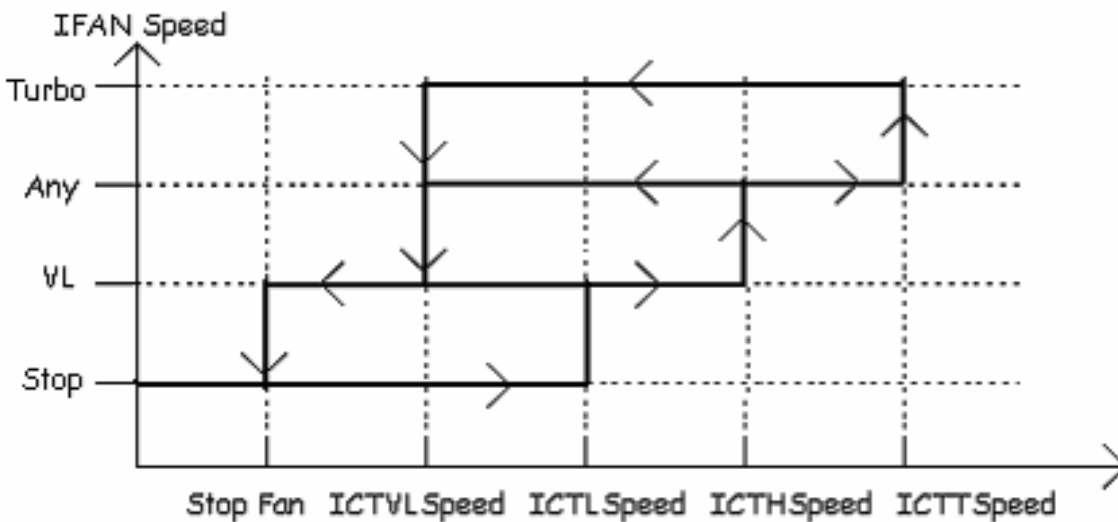
In wall mounted, ducted, and cassette models, 3 degrees are reduced from room temperature reading (except when in I-Feel mode), to compensate for temperature difference between high and low areas in the heated room, and for coil heat radiation on room thermistor.

The temperature compensation can be enabled/disabled by shortening of J2 on the indoor unit Controller

| Model | J2 Shorted(ON) | J2 Opened(OFF) |
|---------------|-----------------------|-----------------------|
| Wall mounted | Compensation Disabled | Compensation Enabled |
| Cassette | Compensation Enabled | Compensation Disabled |
| Ducted | Compensation Enabled | Compensation Disabled |
| Floor/Ceiling | Compensation Disabled | Compensation Enabled |

Indoor Fan Control in Heating Mode

Indoor fan speed depends on the indoor coil temperature:



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 (.T).

Unit will switch from cool to heat when compressor is off for 3 minutes, and .T < -3.

Unit will switch from heat to cool when compressor is off for 5 minutes, and .T < -3.

Dry Mode

As long as room temperature is higher than the set point, indoor fan will work in low speed and compressor will work between 0 and *MaxNLOADIF1C* Hz.

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.

Protections

There are 5 protection codes.

Normal (Norm) – unit operate normally.

Stop Rise (SR) – compressor frequency can not be raised but does not have to be decreased.

HzDown1 (D1) – Compressor frequency is reduced by 2 to 5 Hz per minute.

HzDown2 (D2) – Compressor frequency is reduced by 5 to 10 Hz per minute.

Stop Compressor (SC) – Compressor is stopped.

Indoor Coil Defrost Protection

| Min(ICT,ICTE) | Trend | | | | |
|---------------|-----------------|------------|-----------|------------|-----------------|
| | Fast Increasing | Increasing | No Change | Decreasing | Fast Decreasing |
| < -2 | SC | SC | SC | SC | SC |
| [-2, 0) | D1 | D1 | D2 | D2 | D2 |
| [0, 2) | SR | SR | D1 | D2 | D2 |
| [2, 4) | SR | SR | SR | D1 | D2 |
| [4, 6) | Norm | Norm | SR | SR | D1 |
| [6, 8] | Norm | Norm | Norm | SR | SR |
| > 8 | Norm | | | | |

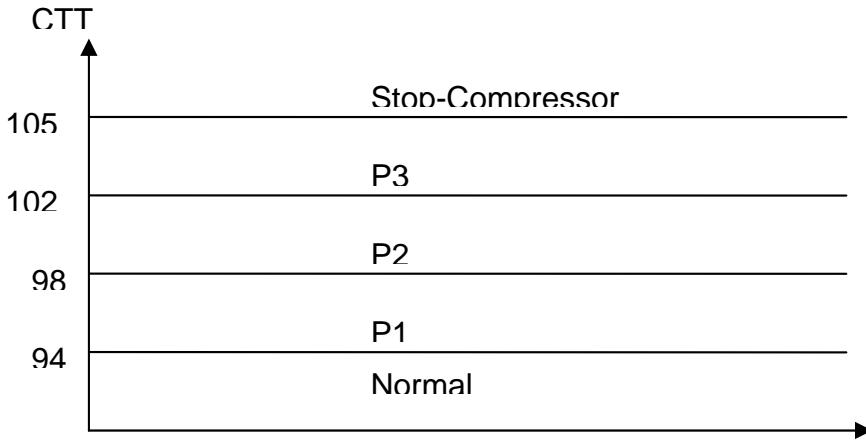
Indoor Coil Overheating Protection

| ICT | ICT Trend | | | | |
|----------|-----------------|------------|-----------|------------|-----------------|
| | Fast Decreasing | Decreasing | No Change | Increasing | Fast Increasing |
| >62 | SC | SC | SC | SC | SC |
| [60, 62) | D1 | D1 | D2 | D2 | D2 |
| [55, 60) | SR | SR | D1 | D2 | D2 |
| [52, 55) | SR | SR | SR | D1 | D2 |
| [48, 52) | Norm | Norm | SR | SR | D1 |
| [45, 48) | Norm | Norm | Norm | SR | SR |
| I<45 | Norm | | | | |

Compressor Overheating Protection

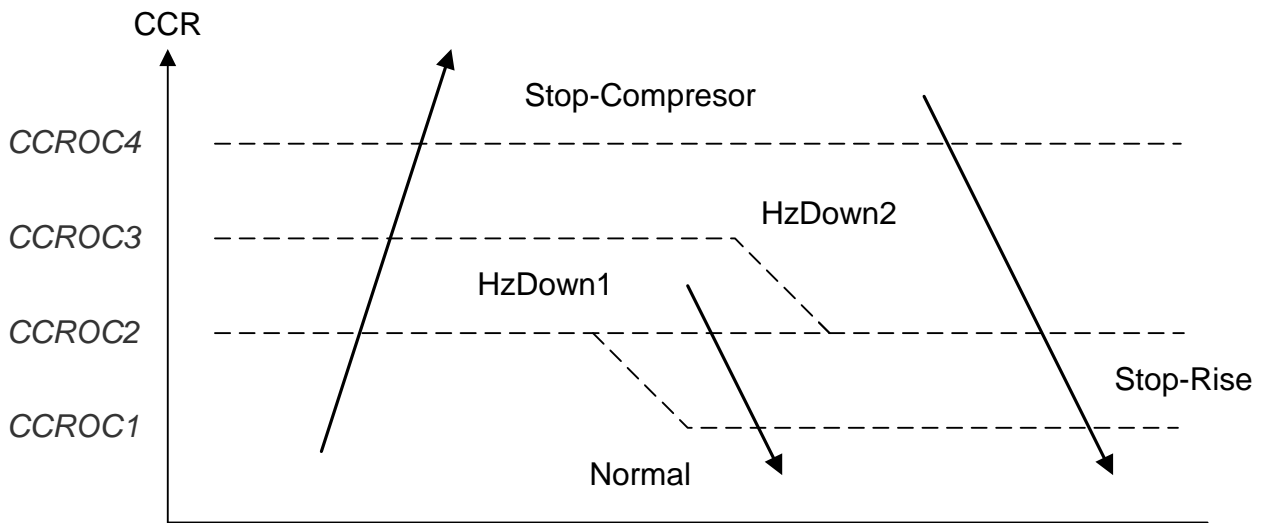
Compressor Overheating Protection for DCI 25 / 35

Compressor temperature can be in one of 5 control zones (4 in protection, and 1 normal), according to the following chart.



| Control Status | Compressor Temperature Increases | Else |
|-----------------|----------------------------------|-----------|
| P1 | Normal | Stop Rise |
| P2 | HzDown 1 | Stop Rise |
| P3 | HzDown 2 | HzDown 1 |
| Stop Compressor | Stop Compressor | |

Compressor Over Current Protection Only For DCI 25 / 35



Heat Sink Overheating Protection

Heat Sink Overheating Protection For DCI 25 / 35

| HST | HST Trend | | | | |
|-----------|-----------------|------------|-----------|------------|-----------------|
| | Fast Decreasing | Decreasing | No Change | Increasing | Fast Increasing |
| ≥ 90 | SC | SC | SC | SC | SC |
| [85, 90) | D1 | D1 | D2 | D2 | D2 |
| [82, 85) | SR | SR | D1 | D2 | D2 |
| [80, 82) | SR | SR | SR | D1 | D1 |
| [78, 80) | Norm | Norm | Norm | SR | SR |
| < 78 | Norm | | | | |

Outdoor Coil Deicing Protection

Outdoor coil Deicing Protection For DCI 25 / 35

- **Entering Deicing Conditions**

Deicing operation will start when either one of the following conditions exist:

Case 1: $OCT < OAT - 8$ AND $TLD > DI$

Case 2: $OCT < OAT - 12$ AND $TLD > 30$ minutes.

Case 3: OCT is Invalid AND $TLD > DI$

Case 4: Unit is just switched to STBY AND $OCT < OAT - 8$

Case 5: $NLOAD = 0$ AND $OCT < OAT - 8$

Case 6: $OCT < -19$ AND $TLD > 60$ minutes

All this condition will exist during 10 seconds

OCT – Outdoor Coil Temperature

OAT – Outdoor Air Temperature

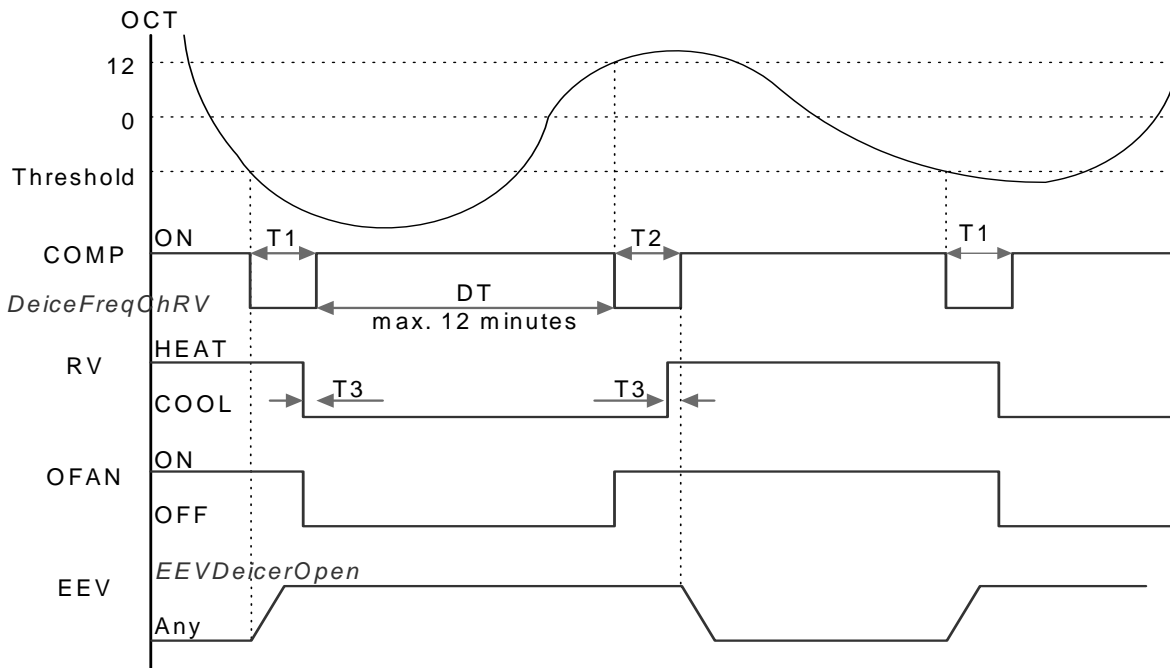
TLD – Time from Last Deicing

DI – Deicing Interval (Time Interval Between Two Deicing)

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. If deicing time is shorter than former deicing time, the deicing interval time will be increased. If deicing time is longer than former deicing time, the deicing interval time will be decreased.

• **Deicing Operation Procedure**



T1=60 secondes;T2=36 secondes;T3=6 secondes

T1=50 secondes;T2=36 secondes;T3=6 secondes

Operating the Unit from Mode Button (On displayer)

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 |
| Heating | 28 |

On Unit Controls and Indicators

Indoor Unit controller Controls and Indicators for All Models Except for Floor/ Ceiling model

During OFF, Fan, Cool, Heat, Dry, and Auto modes (for operation in other modes, see at the relevant spec paragraph):

STAND BY
INDICATION

- Lights up when the Air Conditioner is connected to power and ready to receive the R/C commands
- STBY will be indicated by the following illumination (purple color):

| LED | Duty Cycle (%) |
|--|----------------|
| 'Unit Mode' Heat (Red) | 50 |
| 'Unit Mode' Cool (Blue) | 50 |
| The combined color is purple (it's not red and not blue) | |

OPERATION INDICATION

- 'Unit Mode' Cool Lights up in blue color during Cool, Dry, Fan, or Auto modes. Even though the mode can be changed automatically from Auto Cool to Auto Heat, the 'Unit Mode' Cool will light on.
- 'Unit Mode' Heat Lights up in Red color during heat mode. It will not light up during Auto Heat mode.
- Blinks continuously during protections (according to the relevant spec section). During heating the 'Unit Mode' Heat blinks. In cool, Dry, Fan, or Auto modes the 'Unit Mode' Cool blinks. The duty cycle illumination in protection mode 100%.

- The Red or Blue LEDs illuminate according to the following Profile each time receiving an RC command.

| Time (sec) | Duty Cycle (%) |
|------------|----------------|
| 0-2 | 100 |
| 2-4 | 90 |
| 4-6 | 80 |
| 6-8 | 70 |
| 8-10 | 60 |
| >10 | 50 |

- The 'Unit Mode' LED will indicate the relevant mode (heat and Cool/Dry/Fan/Auto) under any system Trigger for mode change:

Internal timer

Timer-to-on command

- Presence detector
- Remote controller
- ICOM-X command
- Mode Button
- ESF/INOIZER INDICATOR**
 - Lights up during ESF/ ionizer operation.
- TIMER INDICATOR**
 - Lights up during Timer and Sleep operation.
- FILTER INDICATOR**
 - The filer LED never lights up(even when the filer needs to be cleaned).
- COOLING INDICATOR**
 - Lights up only during diagnostics (changing mode be pressing the Mode Button does not turn on this LED).
- HEATING INDICATOR**
 - Lights up only during diagnostics (changing mode by pressing the Mode Button does not turn on this LED).
- MODE BUTTON(COOL/HEAT/OF F)**
 - Every short pressing , the next operation mode is selected, in this order : SB → Cool Mode → Heat Mode → SB → ...
 - In long pressing the system enters into diagnostic mode.
- RESET BUTTON**
 - For short pressing enables/disables the buzzer announcer: enable →disable...where the default value is enable.
 - In long pressing system enters set up mode (if in SB).

Outdoor Unit controller Indicators

Unit has three LED's.

SB LED is ON when power is ON (230 VAC, even when no communication).

STATUS LED is ON when COMP is ON, and Blinks according to diagnostics mode definitions when either fault or protection occurs.

FAULT LED Blinks according to diagnostics mode definitions when either fault or protection occurs.

Jumper Settings

Indoor Unit Controller

Definations:

| Logic Input | Jumper (J) | DIP switch (D) |
|-------------|--------------------|----------------|
| 0 | Open(Disconnected) | OFF |
| 1 | Close(Connected) | ON |

Self Test Jumper(J1)

Jumper for production line check.

DIP Switch Settings

- **Compensation setting**

This setting activates the compensation to the return air temperature in heating mode. For indoor unit like cassette, the DIP switch J2 should be ON.

| Compensation | J2(DIP1) |
|------------------------------|----------|
| Activated (factory setting)- | ON |
| Deactivated | OFF |

- **Unit model setting (Factory setting)**

The unit model setting should be in accordance with the unit model on the nameplate. The unit operating parameters will be improper with wrong settings.

| Unit model(Capacity) | J7(DIP2) |
|----------------------|----------|
| 2.5kW model | OFF |
| 3.5kW model | ON |

- **Presence Detector/Power Shedding Selection**

Select the functions of dry contact PD/PS by setting the Dip switch J9

| Selection | J9(DIP3) |
|-------------------|----------|
| Presence Detector | OFF |
| Power Shedding | ON |

Dry Contacts

- **Alarm Output**

The Alarm Output dry contact will be on (closed), when a predefined set faults occur.

The fault set is defined under diagnostics section.

The alarm output will be off (open), when the predefined fault is cleared.

The indoor alarm outputs are defined according to the following table:

| No | Problem | AO | 5 | 4 | 3 | 2 | 1 |
|-----|--|-----|---|---|---|---|---|
| 1 | ICT is disconnected | Yes | 0 | 0 | 0 | 0 | 1 |
| 2 | ICT is shorted | Yes | 0 | 0 | 0 | 1 | 0 |
| 3 | RAT is disconnected | Yes | 0 | 0 | 0 | 1 | 1 |
| 4 | RAT is shorted | Yes | 0 | 0 | 1 | 0 | 0 |
| 5 | Reserved (for MSMP used as RGT fault) | No | 0 | 0 | 1 | 0 | 1 |
| 6 | ICTE shorted/disconnected (when enabled) | Yes | 0 | 0 | 1 | 1 | 0 |
| 7 | Undefined IDU family/model | Yes | 0 | 0 | 1 | 1 | 1 |
| 8 | No Communication | Yes | 0 | 1 | 0 | 0 | 0 |
| 9 | No Encoder | No | 0 | 1 | 0 | 0 | 1 |
| 10 | Reserved | No | 0 | 1 | 0 | 1 | 0 |
| 11 | Outdoor Unit Fault | No | 0 | 1 | 0 | 1 | 1 |
| ... | Reserved | No | | | | | |
| 17 | Defrost protection | No | 1 | 0 | 0 | 0 | 1 |
| 18 | Deicing Protection | No | 1 | 0 | 0 | 1 | 0 |
| 19 | Outdoor Unit Protection | No | 1 | 0 | 0 | 1 | 1 |
| 20 | Indoor Coil HP Protection | No | 1 | 0 | 1 | 0 | 0 |
| 21 | Overflow Protection | Yes | 1 | 0 | 1 | 0 | 1 |
| 22 | Reserved | No | | | | | |
| 24 | EEPROM Not Updated | No | 1 | 1 | 0 | 0 | 0 |
| 25 | Bad EEPROM | No | 1 | 1 | 0 | 0 | 1 |
| 26 | Bad Communication | No | 1 | 1 | 0 | 1 | 0 |
| 27 | Using EEPROM data | No | 1 | 1 | 0 | 1 | 1 |
| 28 | Model A | No | 1 | 1 | 1 | 0 | 0 |
| 29 | Model B | No | 1 | 1 | 1 | 0 | 1 |
| 30 | Model C | No | 1 | 1 | 1 | 1 | 0 |
| 31 | Model D | No | 1 | 1 | 1 | 1 | 1 |

Notes:

1. Only one code is shown. Order of priority is lower to the higher number. Diagnostics is continuously ON as long power is on.
2. The following case describes the LEDs used to present diagnostics and the indication:

| TOP DCI | Cool LED (Diagnostics) Replaced BY | Heat LED (Diagnostics) Replaced BY | Indoor Diagnostics indicated by | Outdoor Diagnostics indicated by |
|---------|------------------------------------|------------------------------------|--|---|
| | Use Cool LED (Do not replace) | Use Heat LED (Do not replace) | 'Unit Mode' cool is on (100%) during indoor diagnostics. | 'Unit Mode' heat blinks during Outdoor diagnostics. |

The outdoor alarm outputs are defined in the following way:

| No | Problem | AO | 5 | 4 | 3 | 2 | 1 |
|----|-------------------------------------|-----|---|---|---|---|---|
| 1 | OCT is disconnected | Yes | 0 | 0 | 0 | 0 | 1 |
| 2 | OCT is shorted | Yes | 0 | 0 | 0 | 1 | 0 |
| 3 | CTT is disconnected | Yes | 0 | 0 | 0 | 1 | 1 |
| 4 | CTT is shorted | Yes | 0 | 0 | 1 | 0 | 0 |
| 5 | HST is disconnected (when enabled) | Yes | 0 | 0 | 1 | 0 | 1 |
| 6 | HST is shorted (when enabled) | Yes | 0 | 0 | 1 | 1 | 0 |
| 7 | OAT is disconnected (when enabled) | Yes | 0 | 0 | 1 | 1 | 1 |
| 8 | OAT is shorted (when enabled) | Yes | 0 | 1 | 0 | 0 | 0 |
| 9 | TSUC is disconnected (when enabled) | Yes | 0 | 1 | 0 | 0 | 1 |
| 10 | TSUC is shorted (when enabled) | Yes | 0 | 1 | 0 | 1 | 0 |
| 11 | IPM Fault | Yes | 0 | 1 | 0 | 1 | 1 |
| 12 | Bad EEPROM | No | 0 | 1 | 1 | 0 | 0 |
| 13 | DC under voltage | Yes | 0 | 1 | 1 | 0 | 1 |
| 14 | DC over voltage | Yes | 0 | 1 | 1 | 1 | 0 |
| 15 | AC under voltage | Yes | 0 | 1 | 1 | 1 | 1 |
| 16 | Mismatch between IDU & ODU models | Yes | 1 | 0 | 0 | 0 | 0 |
| 17 | No Communication | Yes | 1 | 0 | 0 | 0 | 1 |
| 18 | Reserved | No | 1 | 0 | 0 | 1 | 0 |
| 20 | Heat sink Over Heating | No | 1 | 0 | 1 | 0 | 0 |
| 21 | Deicing | No | 1 | 0 | 1 | 0 | 1 |
| 22 | Compressor Over Heating | No | 1 | 0 | 1 | 1 | 0 |
| 23 | Compressor Over Current | No | 1 | 0 | 1 | 1 | 1 |
| 24 | No OFAN Feedback | No | 1 | 1 | 0 | 0 | 0 |
| 25 | OFAN locked | Yes | 1 | 1 | 0 | 0 | 1 |
| 26 | Compressor Lock | Yes | 1 | 1 | 0 | 1 | 0 |
| 27 | Bad Communication | No | 1 | 1 | 0 | 1 | 1 |
| 28 | Missing ODU configuration | Yes | 1 | 1 | 1 | 0 | 0 |
| 29 | Undefined ODU Model | Yes | 1 | 1 | 1 | 0 | 1 |
| 30 | For future use | No | 1 | 1 | 1 | 1 | 0 |
| 31 | Operation condition is exceeded | Yes | 1 | 1 | 1 | 1 | 1 |

- **Unit ON Output**

The 'On/Off status' dry contact will be on (closed), when the indoor mode is not STBY. If the indoor mode is STBY mode, the 'On/Off status' will be off (open).

- **PD/PS(Presence Detector/Power Shedding) ther**

| | Function | Contact=open | Contact=short |
|--------|------------------------------|--------------|---------------|
| J9=OFF | Presence Detector Connection | No limit | Force to STBY |
| J9=ON | Power Shedding Function | No limit | Limit NLOAD |

Outdoor Unit Controller

JP9 Dip switch setting

ODU Model Selection

| ODU3(DIP1) | ODU2(DIP1) | ODU1(DIP1) | ODU0(DIP1) | ODU Model |
|------------|------------|------------|------------|-------------------|
| OFF | OFF | OFF | OFF | Reserved |
| OFF | OFF | OFF | ON | A (Single DCI 25) |
| OFF | OFF | ON | OFF | B (Single DCI35) |

Test Mode

Entering Test Mode

System can enter Test mode in two ways:

Automatically when the following conditions exists for 30 minutes continuously:

Mode = Cool, Set point = 16, Room temperature = 27(+1/-2), Outdoor temperature = 35(+2/-1) Or

Mode = Heat, Set point = 30, Room temperature = 20±1, Outdoor temperature = 7±(+1/-2) Manually

when entering diagnostics with the following settings:

Mode = Cool, Set point = 16

Mode = Heat, Set point = 30

Unit Operation in Test Mode

In test mode, the unit will operate in fixed settings according to the indoor fan speed setting:

| Indoor FAN Speed Setting | Unit Setting |
|---------------------------------|--------------------------|
| Low | Minimum Capacity Setting |
| Turbo | Nominal Capacity Setting |
| Auto | Maximum Capacity Setting |

During test mode, protections are disabled, except for stop compressor status.

SW Parameters

Indoor Units SW Parameters

Model dependent parameters

TOP DCI Family

| | A (TOP 25 DCI) | B (TOP 35 DCI) | C (Reserved) | D (Reserved) |
|--------------------|----------------|----------------|-----------------|-----------------|
| IFVLOWC | 400 | 400 | | |
| IFLOWC | 450 | 450 | | |
| IFMEDC | 490 | 510 | | |
| IFHIGHC | 520 | 540 | | |
| IFTURBOC | 570 | 590 | | |
| IFVLOWH | 400 | 400 | | |
| IFLOWH | 450 | 450 | | |
| IFMEDH | 490 | 510 | | |
| IFHIGHH | 520 | 590 | | |
| IFTURBOH | 620 | 820 | | |
| Cap .Group | 0 | 1 | | |
| NomLoadC | 46 | 69 | | |
| NomLoadH | 43 | 56 | | |
| MaxNLOADIF1C | 47 | 42 | | |
| MaxNLOADIF2C | 70 | 59 | | |
| MaxNLOADIF3C | 127 | 127 | | |
| MaxNLOADIF4C | 127 | 127 | | |
| MaxNLOADIF5C | 127 | 127 | | |
| IFAN_SPEED_COMP0_C | 0 | 0 | | |
| IFAN_SPEED_COMP1_C | 0 | 0 | | |
| IFAN_SPEED_COMP2_C | 0 | 0 | | |
| IFAN_SPEED_COMP3_C | 0 | 0 | | |
| IFAN_SPEED_COMP0_H | 0 | 0 | | |
| IFAN_SPEED_COMP1_H | 0 | 0 | | |
| IFAN_SPEED_COMP2_H | 0 | 0 | | |
| IFAN_SPEED_COMP3_H | 0 | 0 | | |
| ModelEnable | 1 | 1 | | |

Outdoor Units SW Parameters

Model dependent parameters for DCI25/DCI35

| | Name | A Single DCI-25 | B Single DCI-35 |
|----|-------------------|-----------------|-----------------|
| 1 | MinFreqC | 30 | 33 |
| 2 | MaxFreqC | 64 | 80 |
| 3 | MaxFreqCRunPhase | 64 | 80 |
| 4 | MinFreqH | 30 | 35 |
| 5 | MaxFreqH | 81 | 93 |
| 6 | MaxFreqHRunPhase | 81 | 93 |
| 7 | LoadDeadZoneC | 90 | 95 |
| 8 | LoadDeadZoneH | 127 | 127 |
| 9 | NormAccel | 1 | 1 |
| 10 | NormDecel | 1 | 1 |
| 11 | Step1Freq | 60 | 60 |
| 12 | Step2Freq | 70 | 70 |
| 13 | Step3Freq | 90 | 90 |
| 14 | OFVL | 20 | 20 |
| 15 | OFLOWC | 55 | 55 |
| 16 | OFMEDC | 70 | 70 |
| 17 | OFMAXC | 83 | 83 |
| 18 | OFLOWH | 55 | 55 |
| 19 | OFMEDH | 70 | 70 |
| 20 | OFMAXH | 83 | 83 |
| 21 | OFANTESTMODEC | 83 | 83 |
| 22 | OFANTESTMODEH | 83 | 83 |
| 23 | OFDelTestMode | 20 | 20 |
| 24 | CTTOH1 | 94 | 94 |
| 25 | CTTOH2 | 98 | 98 |
| 26 | CTTOH3 | 102 | 102 |
| 27 | CTTOH4 | 105 | 105 |
| 28 | CCROC1 | 7.1 | 7.1 |
| 29 | CCROC2 | 7.5 | 7.5 |
| 30 | CCROC3 | 7.9 | 7.9 |
| 31 | CCROC4 | 8.3 | 8.3 |
| 32 | DEICT1 | 60 | 60 |
| 33 | DEICT2 | 36 | 36 |
| 34 | DEICT3 | 6 | 6 |
| 35 | ProtFreqLimit | 60 | 60 |
| 36 | EEVDeicerOpen | 180 | 180 |
| 37 | OptimDeicFreq | 90 | 90 |
| 38 | OCTExuDeicer | 12 | 12 |
| 39 | MaxDeicerTime | 12 | 12 |
| 40 | EEVMinOperOpenC | 50 | 50 |
| 41 | EEVMaxOperOpenC | 380 | 380 |
| 42 | EEVMinOperOpenH | 50 | 50 |
| 43 | EEVMaxOperOpenH | 300 | 300 |
| 44 | EEVNormRate | 33 | 33 |
| 45 | EEVHighRate | 12 | 12 |
| 46 | EEVMaxOpen | 500 | 500 |
| 47 | OFLowFreqC | 45 | 45 |
| 48 | OFMedFreqC | 57 | 57 |
| 49 | OFLowFreqH | 45 | 45 |
| 50 | OFMedFreqH | 57 | 57 |
| 51 | HeaterDisableFlag | 0 | 0 |
| 52 | DeiceFreqChRV | 0 | 0 |
| 53 | OATRefC | 35 | 35 |
| 54 | SUCT Enable | 0 | 0 |
| 55 | HST Enable | 0 | 0 |
| 56 | OAT Enable | 1 | 1 |
| 57 | OATRefH | 7 | 7 |
| 58 | MinTargCTTC | 30 | 30 |
| 59 | MaxTargCTTC | 95 | 95 |
| 60 | MinTargCTTH | 40 | 40 |
| 61 | MaxTargCTTH | 95 | 95 |
| 62 | DST | 8 | 8 |
| 63 | DSTF | 12 | 12 |
| 64 | OATLimitC | 24 | 24 |
| 65 | OATLimit1H | 6 | 6 |
| 66 | OATLimit2H | 15 | 15 |
| 67 | MaxFreqAsOATC | 50 | 50 |
| 68 | MaxFreqAsOAT1H | 65 | 75 |
| 69 | MaxFreqAsOAT2H | 60 | 60 |

13. TROUBLESHOOTING

13.1 Models: TOP 25 / DCI 25, TOP 35 / DCI 35

ELECTRICAL & CONTROL TROUBLESHOOTING

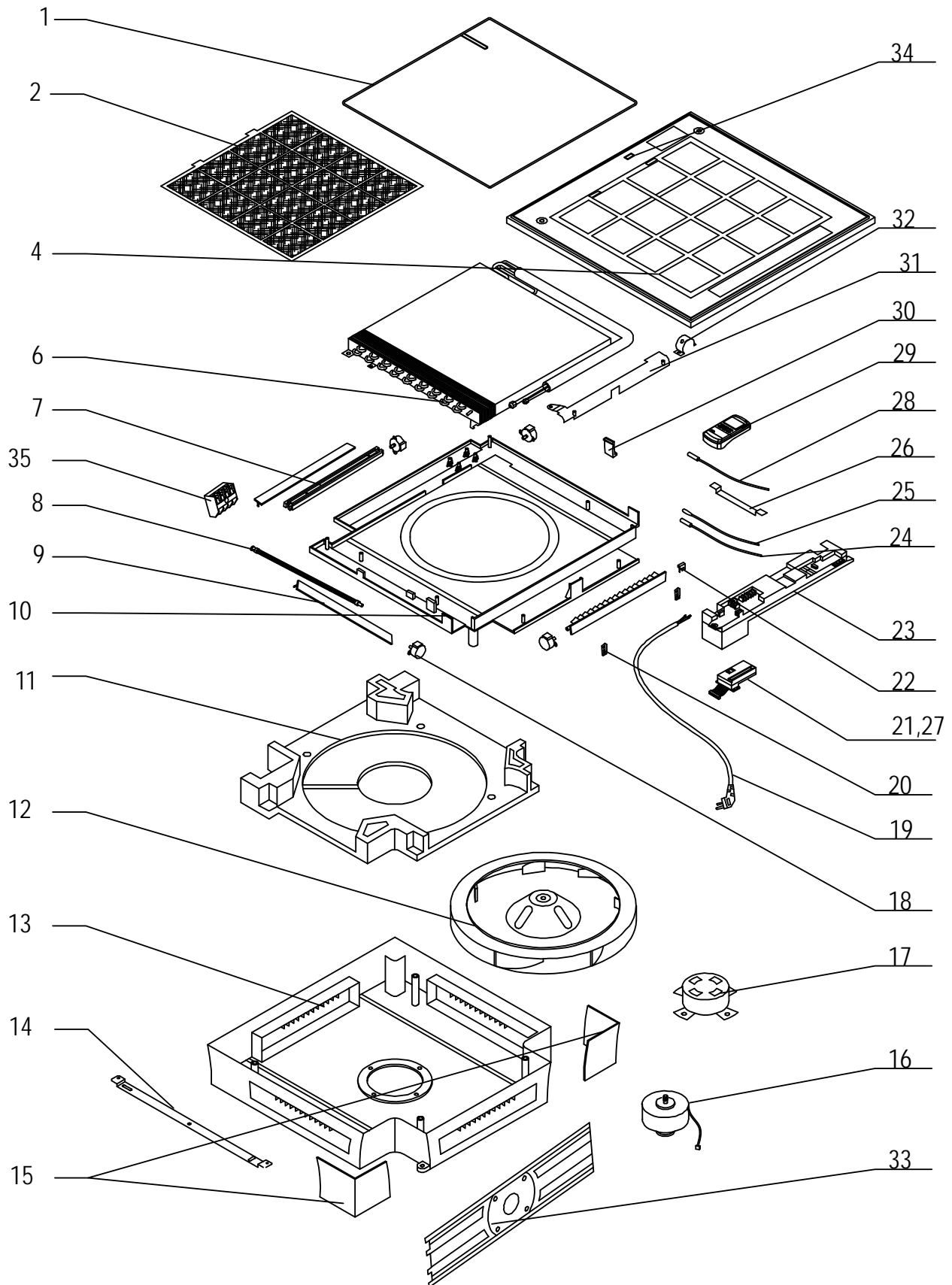
ATTENTION: check for broken or loose cable lugs first.

| Problem | Cause | Remedy |
|--|---|--|
| Unit does not operate. Stand-by indicator does not light up | Unit not connected to power Power failure | Plug in the power cord Check main fuse |
| Unit does not operate. Stand-by indicator lights. | Remote control malfunctions The remote control is locked | Check remotecontrol batteries Try to operate from a closer distance Start from on-unit controls Unlock the remote control |
| Unit does not respond properly to remote control command | IR signal does not reach unit Distance between remote control and unit too large or aimed at from improper angle IR receiver on-unit exposed to strong light source | Check for obstruction between unit and remote control. Clear if needed. Get closer to unit. Dim lights, fluorecents especially |
| Air does not blow out from indoor unit | De-icing protection mode is activated Unit in AUTO FAN mode Over cooling in DRY | Normal operation in HEATING mode Normal operation in DRY mode |
| COOLING, DRY or HEATING does not start immediately | 3-min. Compressor delayed start | Normal operation for these modes |
| Unit functions but does not perform sufficiently | Improper temperature setting Unit capacity in sufficient for load or room size | Reset temperature Consult your dealer |

14. EXPLODED VIEWS AND SPARE PARTS LISTS

14.1 R410A

14.1.1 Indoor Unit: TOP 25 DCI, TOP 35 DCI



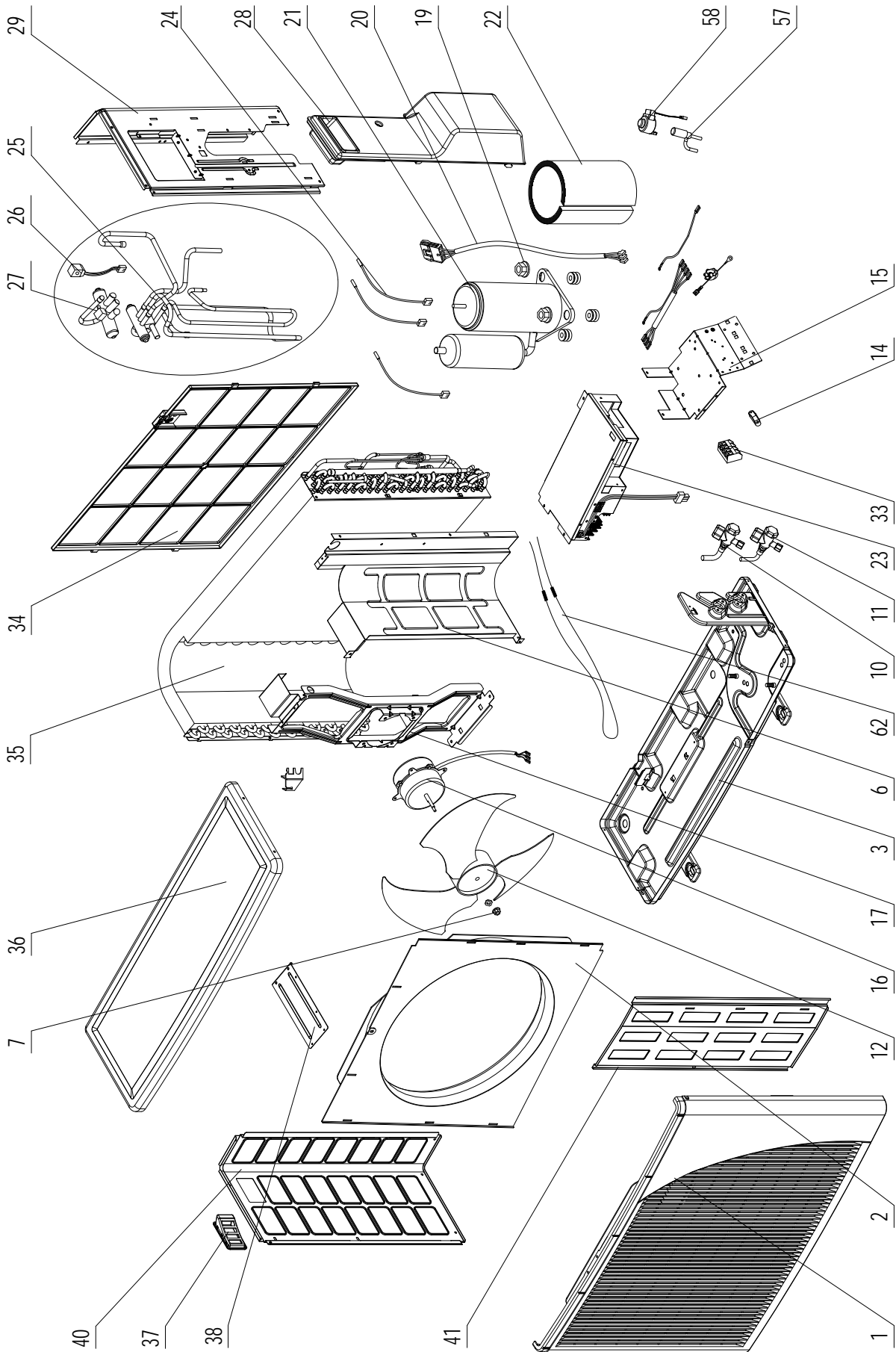
14.1.2 Indoor Unit: TOP 25 DCI

| NO. | P/N | Description | Quan. |
|-----|------------|------------------------------------|-------|
| 1 | 465720088 | Front Panel Assy. (Electra) | 1 |
| | 465720090 | Front Panel Assy. (Airwell) | 1 |
| | 465720091 | Front Panel Assy./silver (Electra) | 1 |
| | 465720092 | Front Panel Assy. /silver(Airwell) | 1 |
| | 465720162 | Front Panel Assy. /silver(Johnson) | 1 |
| | 465720099 | Front Panel Assy. (Elco) | 1 |
| 2 | 433007 | Air Filter | 1 |
| 4 | 465020128 | Front Frame / Silver | 1 |
| | 465020127 | Front Frame / White | 1 |
| 6 | 470680014 | Evaporator Assy | 1 |
| 7 | 465800023 | Air Outlet Frame Assy./Silver | 4 |
| | 465800041 | Air Outlet Frame Assy./White | 4 |
| 8 | 437562 | Draining Hose | 1 |
| 9 | 465160006 | Flap / Silver | 4 |
| | 465160007 | Flap / White | 4 |
| 10 | 465810000 | Coil Support Assy. | 1 |
| 11 | 433040 | UNIT BASE INS. | 1 |
| 12 | 433011 | Fan | 1 |
| 13 | 465320009 | Base / Silver | 1 |
| | 465320010 | Base / White | 1 |
| 14 | 433031 | Installation Plate | 1 |
| 15 | 465340025 | CORNER COVER LEFT / Silver | 1 |
| | 465340026 | CORNER COVER RIGHT / Silver | 1 |
| | 465340029 | CORNER COVER LEFT / White | 1 |
| | 465340030 | CORNER COVER RIGHT / White | 1 |
| 16 | 466130017R | Motor | 1 |
| 17 | 433033 | Motor Cover | 1 |
| 18 | 433050 | Step Motor | 4 |
| 19 | 455013300R | Power Wire | 1 |
| 20 | 433020 | Cable locker | 2 |
| 21 | 467300248R | Display / White | 1 |
| | 467300249R | Display / Silver | 1 |
| 22 | 4516263 | Sensor base | 1 |
| 23 | 467300211R | Control Box Assy | 1 |
| 24 | 438082 | Thermistor indoor coil | 1 |
| 25 | 467400025 | Thermistor Room | 1 |
| 26 | 433032 | Wires Cover | 1 |
| 27 | 433027 | Display Connect wire | 1 |
| 28 | 467400034 | Termistor indoor coil | 1 |
| 29 | 453042500R | Remote control / RC4i-1 | 1 |
| 30 | 433008 | LATCH | 3 |
| 31 | 465320005 | Tube Bracket | 1 |
| 32 | 433034 | Tube Lock | 1 |
| 33 | 433030 | BACK HOLDER | 1 |
| 34 | 468240005 | Film/display lamp/white | 1 |
| | 468240006 | Film/display lamp/silver | 1 |
| 35 | 467420021 | 4 Poles terminal block | 1 |

14.1.3 Indoor Unit: TOP 35 DCI

| NO. | P/N | Description | Quan. |
|-----|------------|------------------------------------|-------|
| 1 | 465720088 | Front Panel Assy. (Electra) | 1 |
| | 465720090 | Front Panel Assy. (Airwell) | 1 |
| | 465720091 | Front Panel Assy. (Electra) | 1 |
| | 465720092 | Front Panel Assy. (Airwell) | 1 |
| | 465720162 | Front Panel Assy. /silver(Johnson) | 1 |
| | 465720099 | Front Panel Assy. (Elco) | 1 |
| 2 | 433007 | Air Filter | 1 |
| 4 | 465020128 | Front Frame / Silver | 1 |
| | 465020127 | Front Frame / White | 1 |
| 6 | 470680013 | Evaporator Assy | 1 |
| 7 | 465800023 | Air Outlet Frame Assy./Silver | 4 |
| | 465800041 | Air Outlet Frame Assy./White | 4 |
| 8 | 437562 | Draining Hose | 1 |
| 9 | 465160006 | Flap / Silver | 4 |
| | 465160007 | Flap / White | 4 |
| 10 | 465810000 | Coil Support Assy. | 1 |
| 11 | 433040 | UNIT BASE INS. | 1 |
| 12 | 433011 | Fan | 1 |
| 13 | 465320009 | Base / Silver | 1 |
| | 465320010 | Base / White | 1 |
| 14 | 433031 | Installation Plate | 1 |
| 15 | 465340025 | CORNER COVER LEFT / Silver | 1 |
| | 465340026 | CORNER COVER RIGHT / Silver | 1 |
| | 465340029 | CORNER COVER LEFT / White | 1 |
| | 465340030 | CORNER COVER RIGHT / White | 1 |
| 16 | 466130017R | Motor | 1 |
| 17 | 433033 | Motor Cover | 1 |
| 18 | 433050 | Step Motor | 4 |
| 19 | 455013300R | Power Wire | 1 |
| 20 | 433020 | Cable locker | 2 |
| 21 | 467300248R | Display / White | 1 |
| | 467300249R | Display / Silver | 1 |
| 22 | 4516263 | Sensor base | 1 |
| 23 | 467300211R | Control Box Assy | 1 |
| 24 | 438082 | Thermistor indoor coil | 1 |
| 25 | 467400025 | Thermistor Room | 1 |
| 26 | 433032 | Wires Cover | 1 |
| 27 | 433027 | Display Connect wire | 1 |
| 28 | 467400034 | Termistor indoor coil | 1 |
| 29 | 453042500R | Remote control / RC4i-1 | 1 |
| 30 | 433008 | LATCH | 3 |
| 31 | 465320005 | Tube Bracket | 1 |
| 32 | 433034 | Tube Lock | 1 |
| 33 | 433030 | BACK HOLDER | 1 |
| 34 | 468240005 | Film/display lamp/white | 1 |
| | 468240006 | Film/display lamp/silver | 1 |
| 35 | 467420021 | 4 Poles terminal block | 1 |

14.1.4 Outdoor Unit DCI 25, DCI 35 R410A



14.1.5 Outdoor Unit DCI 25, DCI 35 R410A

| No. | Part No. | Description | Qty |
|-----|------------|---|-----|
| 1 | 433218 | A Front Panel A | 1 |
| 2 | 4526340 | Air inlet ring-420 | 1 |
| 3 | 4523060 | Base Painting Assy. | 1 |
| 6 | 4526299 | Partition | 1 |
| 7 | 4519300 | Nut M5 L | 1 |
| 10 | 463300505 | Standard Valve Connect Pipe/Gas Valve/ TP2M 9.53*0.8/CON GCN ONG3 | 1 |
| 10 | 461010004 | Gas Valve 3/8" R410A | 1 |
| 11 | 463300510 | Standard Valve Connect Pipe/Liquid Valve/ TP2M 6.35*0.8/RC/GCN ONG3 | 1 |
| 11 | 461000004 | Liquid Valve 1/4" R410A | 1 |
| 12 | 4526476 | Axial fan OD=401 | 1 |
| 14 | 204107 | Cable clip Nylon | 1 |
| 15 | 4526300 | Therminal sheet | 1 |
| 16 | 4527092R | DC MOTOR for DCI 25/35 | 1 |
| 17 | 433215 | Motor Support | 1 |
| 20 | 4526221 | Compressor wire | 1 |
| 21 | 4526204 | DC INVERTER Compressor Assy 5RS102XAB | 1 |
| 22 | 4526433 | 1Comp. Insulation1 | 1 |
| 23 | 467300037R | Controller/Outdoor Units(DCI 1.8kW) EHK:906A099-03 | 1 |
| 24 | 467400023 | OCT Outdoor Coil Temperature Sensor | 1 |
| 24 | 4526775 | Compressor top thermistor(CTT) | 1 |
| 24 | 467400026 | OAT Outdoor Air Temperature Sensor | 1 |
| 25 | 461600058 | 4-Way Valve Assy./DCI 25 | 1 |
| 26 | 4522509 | 4-Way valve coil | 1 |
| 27 | 4518951 | 4-W valve SHF-4H for R410A | 1 |
| 28 | 433229 | Valve Cover | 1 |
| 29 | 4519606 | Right side panel (painting plate) | 1 |
| 33 | 4519188 | 4 poles terminal block | 1 |
| 34 | 433228 | Back Side Net | 1 |
| 35 | 4526368 | Condensor Soldering assy | 1 |
| 36 | 4519614 | Painting Top Cover | 1 |
| 37 | 433225 | Handle | 1 |
| 38 | 4526298 | Bridge | 1 |
| 40 | 4519607 | Left Side Panel Painting Plate | 1 |
| 41 | 464860054 | Painting Insulation Plate Assy/ONG | 1 |
| 57 | 4526827 | Electronical expansion valve CAM-BD15 FKS-1 | 1 |
| 58 | 452682802 | EEV coil CAM-MD12FKS-2 (White connector, 530mm) | 1 |
| 62 | 467100004 | Heater/Base Plate | 1 |

APPENDIX A

INSTALLATION AND OPERATION MANUAL

- ▶ OPERATION MANUAL TOP 25 / DCI 25, TOP 35 / DCI 35
- ▶ INSTALLATION MANUAL TOP 25 / DCI 25, TOP 35 / DCI 35