

TECHNICAL DATA & SERVICE MANUAL

Euro-Line®

INDOOR UNIT: AW52AL
AW64AL

SPLIT SYSTEM AIR CONDITIONER

| Model No. | Product Code No. |
|-----------|------------------|
| AW52AL | 387030095 |
| AW64AL | 387030096 |
| | |



IMPORTANT! Please read before installation

This air conditioning system meets strict safety and operating standards.

For the installer or service person, it is important to install or service the system so that it operates safely and efficiently.

For safe installation and trouble-free operation, you must:

- Carefully read this instruction booklet before beginning.
- Follow each installation or repair step exactly as shown.
- Observe all local, state and national electrical codes.
- Pay close attention to all warning and caution notices given in this manual.
- The unit must be supplied with a dedicated electrical line.



WARNING

This symbol refers to a hazard or unsafe practice which can result in severe personal injury or death.



CAUTION

This symbol refers to a hazard or unsafe practice which can result in personal injury or product or property damage.

If necessary, get help

These instructions are all you need for most installation sites and maintenance conditions.

If you require help for a special problem, contact our sale/service outlet or your certified dealer for additional instructions.

In case of improper installation

The manufacturer shall in no way be responsible for improper installation or maintenance service, including failure to follow the instructions in this document.

SPECIAL PRECAUTIONS

- During installation, connect before the refrigerant system and then the wiring one; proceed in the reverse order when removing the units.

WARNING

When wiring



ELECTRICAL SHOCK CAN CAUSE SEVERE PERSONAL INJURY OR DEATH. ONLY A QUALIFIED, EXPERIENCED ELECTRICIANS SHOULD ATTEMPT TO WIRE THIS SYSTEM.

- Do not supply power to the unit until all wiring and tubing are completed or reconnected and checked, to ensure the grounding.
- Highly dangerous electrical voltages are used in this system. Carefully refer to the wiring diagram and these instructions when wiring. Improper connections and inadequate grounding can cause **accidental injury and death.**

- **Ground the unit** following local electrical codes.
- The Yellow/Green wire cannot be used for any connection different from the ground connection.
- Connect all wiring tightly. Loose wiring may cause overheating at connection points and a possible fire hazard.
- Do not allow wiring to touch the refrigerant tubing, compressor, or any moving parts of the fan.
- Do not use multi-core cable when wiring the power supply and control lines. Use separate cables for each type of line.

When transporting

Be careful when picking up and moving the indoor and outdoor units. Get a partner to help, and bend your knees when lifting to reduce strain on your back. Sharp edges or thin aluminium fins on the air conditioner can cut your fingers.

When installing...

... In a ceiling or wall

Make sure the ceiling/wall is strong enough to hold the unit-weight. It may be necessary to build a strong wooden or metal frame to provide added support.

... In a room

Properly insulate any tubing run inside a room to prevent "sweating", which can cause dripping and water damage to walls and floors.

... In moist or uneven locations

Use a raised concrete base to provide a solid level foundation for the outdoor unit.

This prevents damage and abnormal vibrations.

... In area with strong winds

Securely anchor the outdoor unit down with bolts and a metal frame. Provide a suitable air baffle.

... In a snowy area (for heat pump-type systems)

Install the outdoor unit on a raised platform that is higher than drifting snow. Provide snow vents.

When connecting refrigerant tubing

- Keep all tubing runs as short as possible.
- Use the flare method for connecting tubing.
- Apply refrigerant lubricant to the matching surfaces of the flare and union tubes before connecting them; screw by hand and then tighten the nut with a torque wrench for a leak-free connection.
- Check carefully for leaks before starting the test run.

NOTE:

Depending on the system type, liquid and gas lines may be either narrow or wide. Therefore, to avoid confusion, the refrigerant tubing for your particular model is specified as narrow tube for liquid, wide tube for gas.

When servicing

- Turn the power OFF at the main power board before opening the unit to check or repair electrical parts and wiring.
- Keep your fingers and clothing away from any moving parts.
- Clean up the site after the work, remembering to check that no metal scraps or bits of wiring have been left inside the unit being serviced.
- Ventilate the room during the installation or testing the refrigeration system; make sure that, after the installation, no gas leaks are present, because this could produce toxic gas and dangerous if in contact with flames or heat-sources.

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1. SPECIFICATIONS

1-1 Unit Specifications

AW52AL

| | |
|--------------|-------------------|
| Power source | 220 - 240V ~ 50Hz |
|--------------|-------------------|

| | |
|----------------|--------------|
| Voltage rating | 230V - 50 Hz |
|----------------|--------------|

| Performance | Cooling | Heating |
|------------------------|---|---------|
| Capacity | See catalogue with the requested matching | |
| Air circulation (High) | m³/h | 930 |

| Features | | | |
|--------------------------------|---------------|---------------------------------|--------------|
| Controls/Temperature controls | | Microprocessor/ I.C. thermostat | |
| Control unit | | Wireless remote control unit | |
| Timer | | ON/OFF 24 hours | |
| Fan speed | | 3 and Auto | |
| Airflow direction | Horizontal | Manual | |
| | Vertical | Auto | |
| Air Filter | | Washable, Anti-Mold | |
| Power noise level | High/Med./Low | dB-A | 56 / 53 / 50 |
| Refrigerant tubing connections | | Flare type | |
| Refrigerant tube diameter | Narrow tube | mm(in.) | 6,35 (1/4) |
| | Wide tube | mm(in.) | 12,7 (1/2) |
| Refrigerant | | R410A | |

| Dimensions & Weight | | | |
|---------------------|----------|----|------|
| Unit dimensions | Height | mm | 295 |
| | Width | mm | 1060 |
| | Depth | mm | 210 |
| Package dimensions | Height | mm | 360 |
| | Width | mm | 1125 |
| | Depth | mm | 280 |
| Weight | Net | kg | 14 |
| | Shipping | kg | 17 |
| Shipping volume | | m³ | 0,11 |

DATA SUBJECT TO CHANGE WITHOUT NOTICE

AW64AL

| | |
|---------------------|-------------------|
| Power source | 220 - 240V ~ 50Hz |
|---------------------|-------------------|

| | |
|-----------------------|--------------|
| Voltage rating | 230V - 50 Hz |
|-----------------------|--------------|

| Performance | Cooling | Heating |
|--|---|---------|
| Capacity | See catalogue with the requested matching | |
| Air circulation (High) m ³ /h | | |
| | | 990 |

| Features | | | |
|--------------------------------|---------------|---------------------------------|--|
| Controls/Temperature controls | | Microprocessor/ I.C. thermostat | |
| Control unit | | Wireless remote control unit | |
| Timer | | ON/OFF 24 hours | |
| Fan speed | | 3 and Auto | |
| Airflow direction | Horizontal | Manual | |
| | Vertical | Auto | |
| Air Filter | | Washable, Anti-Mold | |
| Power noise level | High/Med./Low | dB-A | |
| Refrigerant tubing connections | | Flare type | |
| Refrigerant tube diameter | Narrow tube | mm(in.) | |
| | Wide tube | mm(in.) | |
| Refrigerant | | R410A | |

| Dimensions & Weight | | | |
|--------------------------------|----------|----------------|------|
| Unit dimensions | Height | mm | 295 |
| | Width | mm | 1060 |
| | Depth | mm | 210 |
| Package dimensions | Height | mm | 360 |
| | Width | mm | 1125 |
| | Depth | mm | 280 |
| Weight | Net | kg | 15 |
| | Shipping | kg | 18 |
| Shipping volume | | m ³ | 0,11 |

DATA SUBJECT TO CHANGE WITHOUT NOTICE

1-2 Major Component Specifications

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| Controller PCB | |
|----------------------|----------------|
| Part No. | WNG |
| Controls | Microprocessor |
| Control circuit fuse | 250 V - 3,15 A |

| | |
|---------------------|-----------|
| Remote Control Unit | RC-7 (RC) |
|---------------------|-----------|

| Fan & Fan Motor | |
|--|-------------------------|
| Type | Cross - flow |
| Q'ty Dia. and lenght | mm |
| Fan motor model...Q'ty | RPS18M-2...1 |
| No. Of poles...rpm (230 V, Hi) | 4...1200 |
| Nominal output | W |
| Coil resistance (Ambient temp. 20 °C) | Ω |
| | --- |
| | --- |
| | --- |
| | --- |
| Safety devices | Type |
| | Operating temp. Open °C |
| | Close |
| Run capacitor | μF |
| | VAC |
| | thermal protector |
| | 110 |
| | automatic reclosing |
| | 2 |
| | 450 |

| Flap Motor | |
|--|--|
| Type | Stepping motor |
| Model | 24BYJ48 |
| Rating | DC 12 V |
| Coil resistance (Ambient temp. 20 °C) | Ω |
| | Each terminals (1-2, 1-3, 1-4, 1-5) 200 ± 7% |

| Heat Exch. Coil | |
|-----------------|-----------------------------------|
| Coil | Aluminium plate fin / Copper tube |
| Rows | 2 |
| Fin pitch | mm |
| face area | 1,2 |
| | 0,306 |

DATA SUBJECT TO CHANGE WITHOUT NOTICE

AW64AL

| Controller PCB | |
|----------------------|----------------|
| Part No. | WNG |
| Controls | Microprocessor |
| Control circuit fuse | 250 V - 3,15 A |

| | |
|---------------------|-----------|
| Remote Control Unit | RC-7 (RC) |
|---------------------|-----------|

| Fan & Fan Motor | |
|--|----------------------------|
| Type | Cross - flow |
| Q'ty Dia. and lenght | mm 1.... Ø 92 |
| Fan motor model...Q'ty | RPS30G-2...1 |
| No. Of poles...rpm (230 V, Hi) | 4...1300 |
| Nominal output | W 26 |
| Coil resistance (Ambient temp. 20 °C) | Ω --- --- --- --- |
| Safety devices | Type thermal protector |
| Operating temp. | Open °C 110 |
| | Close automatic reclosing |
| Run capacitor | μF 2 |
| | VAC 450 |

| Flap Motor | |
|--|--|
| Type | Stepping motor |
| Model | 24BYJ48 |
| Rating | DC 12 V |
| Coil resistance (Ambient temp. 20 °C) | Ω Each terminals (1-2, 1-3, 1-4, 1-5) 200 ± 7% |

| Heat Exch. Coil | |
|-----------------|-----------------------------------|
| Coil | Aluminium plate fin / Copper tube |
| Rows | 2 + additional part |
| Fin pitch | mm 1,2 |
| face area | 0,306 |

DATA SUBJECT TO CHANGE WITHOUT NOTICE

1-3 Other Component Specifications

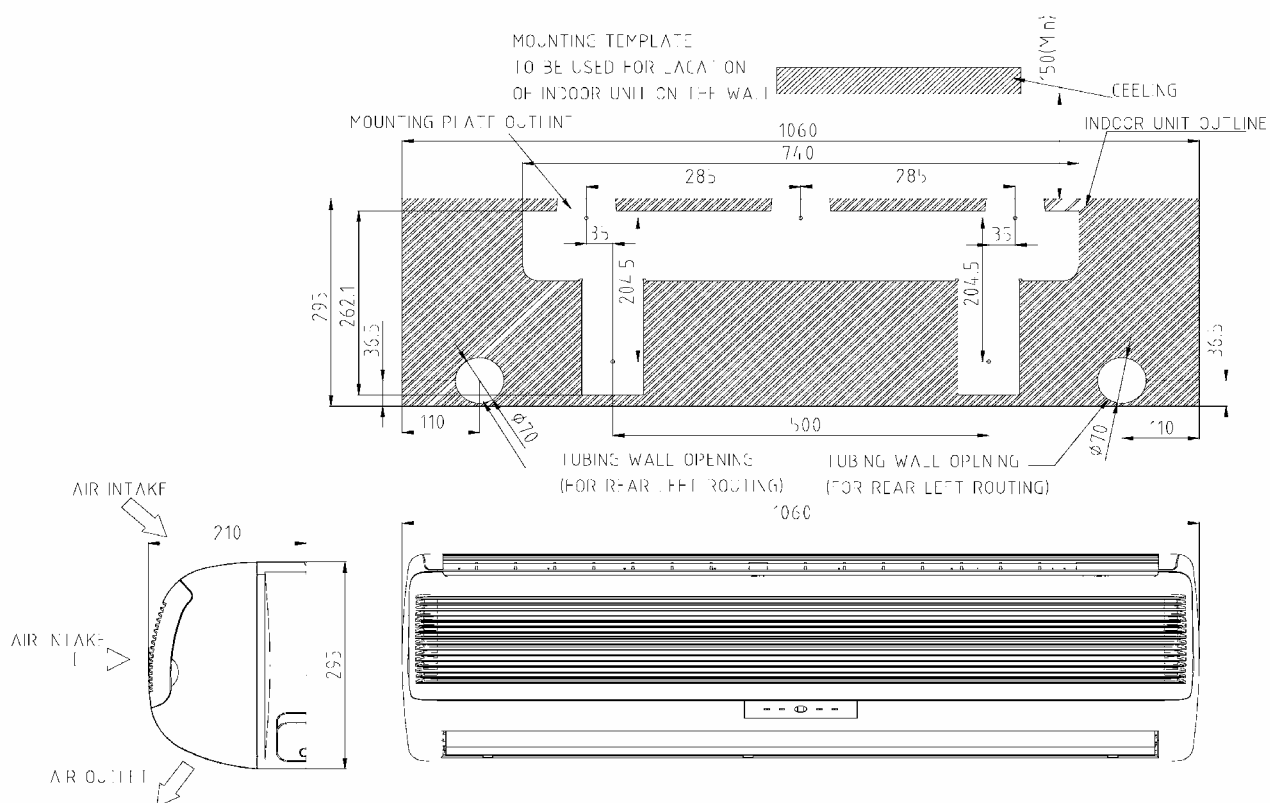
AW52AL

AW64AL

| | |
|-----------------------------------|-----------------------|
| Thermistor (Coil sensor) | NTC-THERMISTOR |
| Resistance $K\Omega$ | 10 at 25 °C |

| | |
|-----------------------------------|-----------------------|
| Thermistor (Room sensor) | NTC-THERMISTOR |
| Resistance $K\Omega$ | 10 at 25 °C |

2. DIMENSIONAL DATA



3. SOUND LEVEL CHARACTERISTICS

3.1 Sound Pressure Level

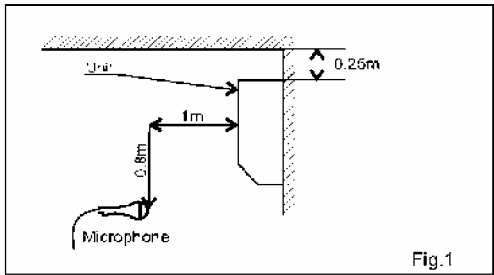


Figure 1. Wall Mounted

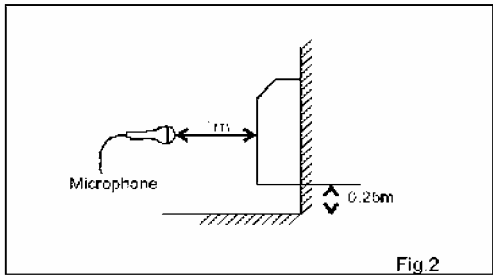


Figure 2. Floor Mounted

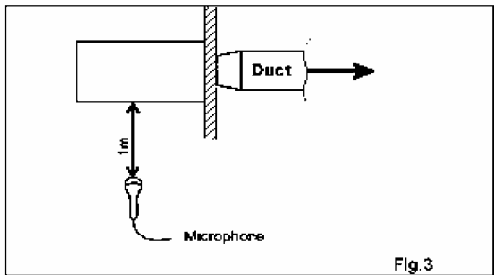


Figure 3. Ducted

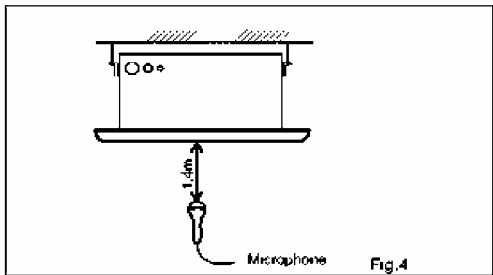
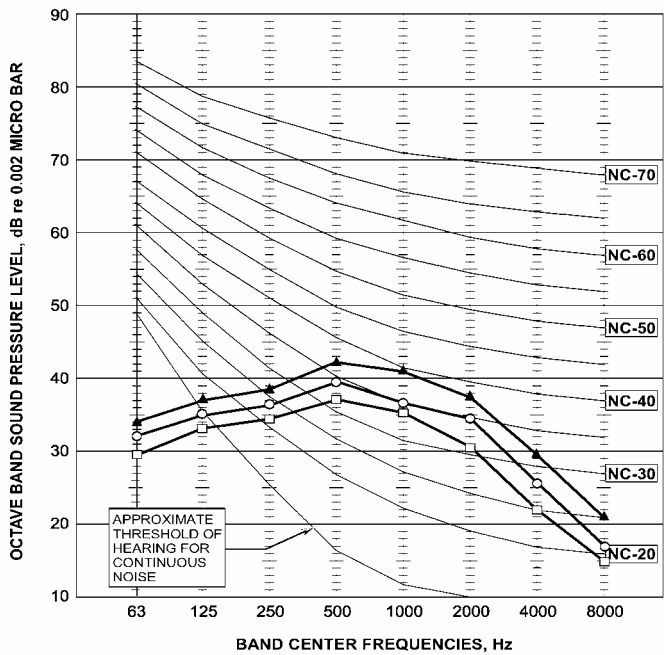


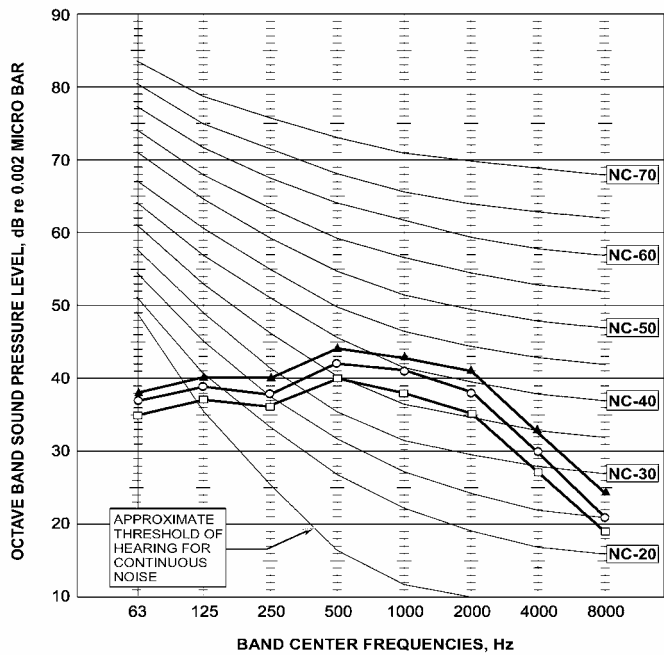
Figure 4. Cassette

3.2 Soud Pressure Level Spectrum (Measured as Figure 1)

AW52AL



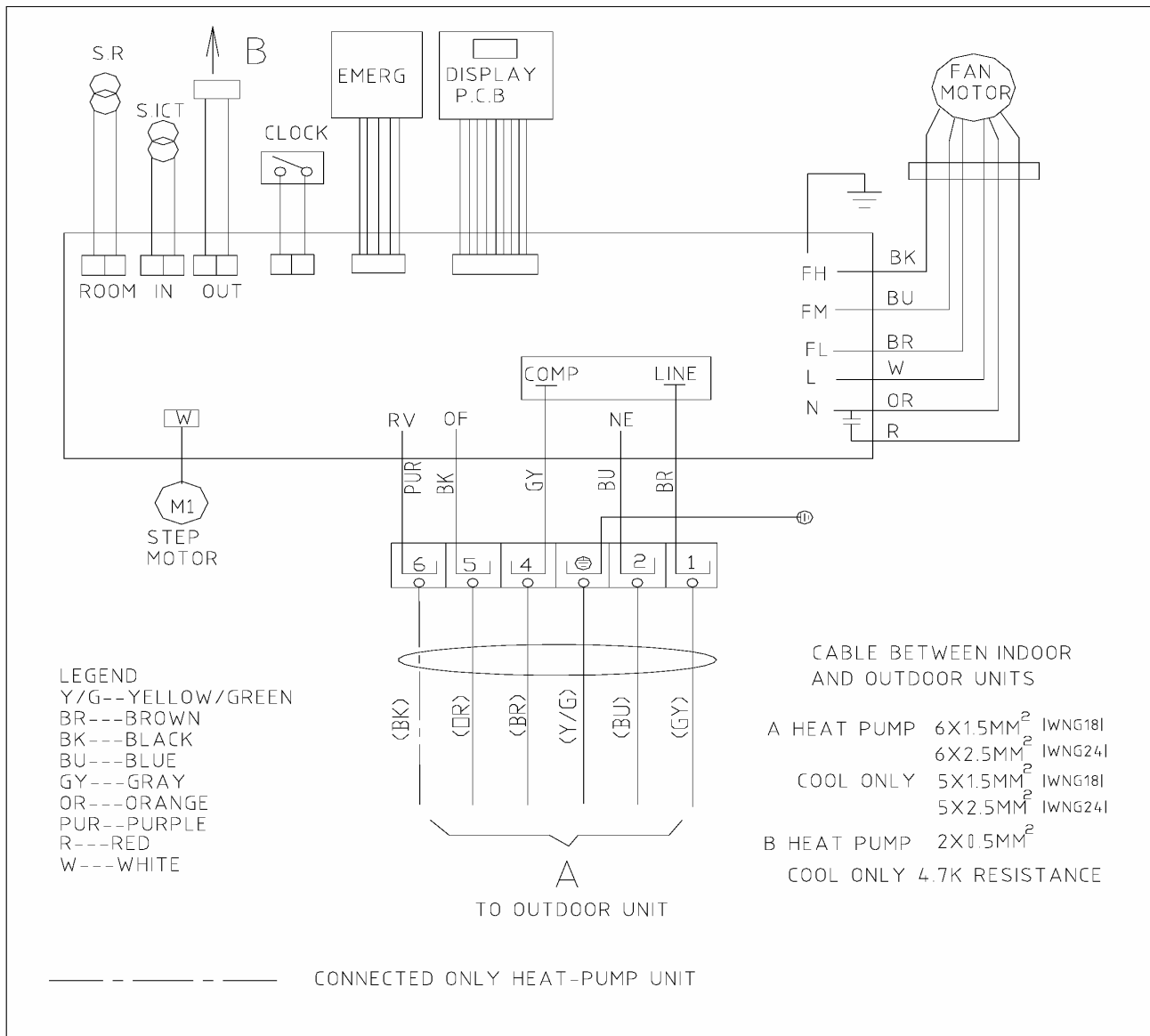
AW64AL



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

4. ELECTRICAL DATA

4-1 Electric Wiring Diagrams



5. CONTROL SYSTEM WNG LED TYPE UNITS

5.1 Electronic Control

5.1.1 Introduction

The electronic control information is designed for service applications, and is common to the following groups of air-conditioners:

- **ST/ RC group** -Cooling only / cooling and heating by heat pump.
- **SH group** -Cooling and heating by heat pump and supplementary heater.
- **RH group** -Cooling, heating by heaters only.

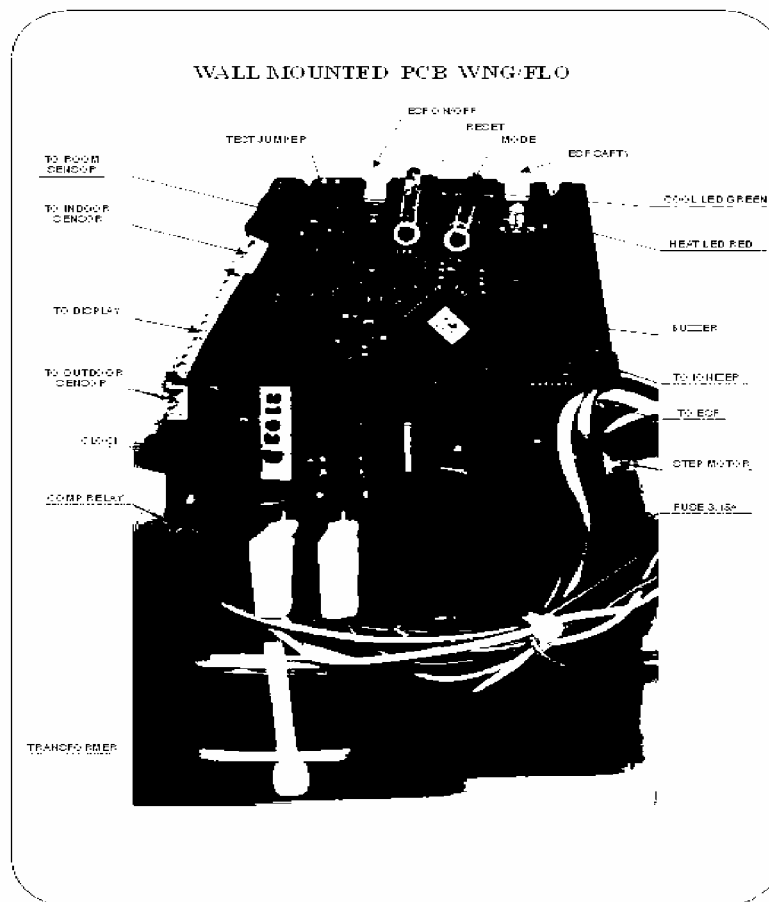
5.1.2 Jumpers Settings

| GROUP | J6 Setting | J2 Setting |
|---------|------------|------------|
| ST / RC | Open | Open |
| SH | Closed | Open |
| RH | Closed | Closed |

5.2 Legend

| | |
|--------------------------|--|
| AC | - Alternate Current |
| A/C | - Air-Conditioner |
| ANY | - ON or OFF status |
| CLOCK | - ON/OFF Operation Input, (dry contact) |
| COMP | - Compressor |
| CPU | - Central Processing Unit |
| ELUM | - Extended Louver Upward Movement (Software Jumper) |
| E ² PROM, EEP | - Erase Enable Programmable Read Only Memory |
| HE | - Heating Element |
| HPC | - High Pressure Control |
| H/W | - Hardware |
| ICP | - Indoor Condensation Pump |
| ICT | - Indoor Coil Temperature (RT2) sensor |
| IF, IFAN | - Indoor Fan |
| IR | - Infra Red |
| LEVEL1 | - Normal Water Level |
| LEVEL2/3 | - Medium/High Water Level |
| LEVEL4 | - Overflow Level |
| Max | - Maximum |
| Min | - Minimum |
| min | - Minute (time) |
| NA | - Not Applicable |
| OCP | - Outdoor Condensation Pump |
| OCT | - Outdoor Coil Temperature (RT3) sensor |
| OF, OFAN | - Outdoor Fan |
| OPER | - Operate |
| Para. | - Paragraph |
| RAT | - Return Air Temperature (RT1) sensor |
| RC | - Reverse Cycle (Heat Pump) |
| R/C | - Remote Control |
| RCT | - Remote Control Temperature |
| RH | - Resistance Heater |
| RT | - Room Temperature (i.e. RCT in IFEEL mode, RAT otherwise) |
| RV | - Reversing Valve |
| SB, STBY | - Stand-By |
| sec | - Second (time) |
| Sect | - Section |
| SH | - Supplementary Heater |
| SPT | - Set Point Temperature |
| ST | - Standard (a Model with Cooling Only) |
| S/W | - Software |
| TEMP | - Temperature |
| W/O | - Without |
| WVL | - Water Valve |
| ΔT | - The difference between SPT and RT. in Heat Mode: $\Delta T = SPT - RT$ in Cool/Dry/Fan Mode: $\Delta T = RT - SPT$ |

5.3 Main PCB Controller



5.3.1 LED Display WNG 7-14

OPR'(STBY'RED;ON:GREEN)

RECIVER



FRESH AIR

TIMER

FILTER LED

5.4 General functions

5.4.1 COMP operation

For each Mode including POWER OFF & SB, a Min time delay of 3 min before COMP restarting, excluding DEICING Mode

The Min operation time of COMP under different operating conditions is

| Operation Mode | Min operation time of COMP |
|--|----------------------------|
| Heat, Cool or Auto Modes | 3 min. |
| Fan, Dry, Overflow, Protection modes, or mode change | ignored |

5.4.2 IFAN operation

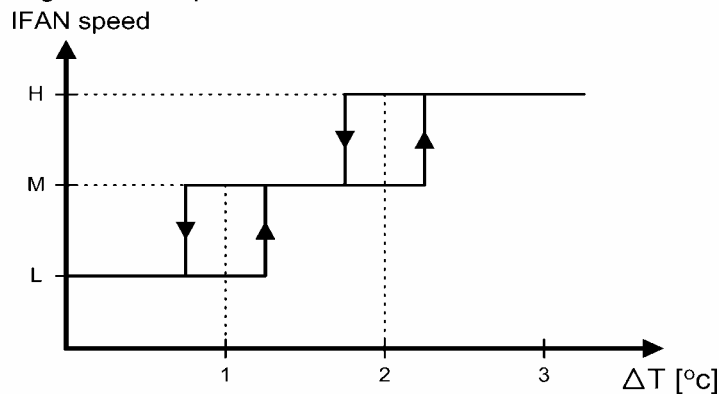
- Min time interval between IFAN speed change in AUTOFAN Mode, is 30 sec.
- Min time interval between IFAN speed change in H/M/L Mode is 1 sec.
- IFAN speed in Heat/Cool Autofan Mode is determined according to the following table:

| ΔT | IFAN Speed |
|--------------------------|------------|
| $\Delta T \geq 2$ | HIGH |
| $2 \geq \Delta T \geq 1$ | MED |
| $1 \geq \Delta T$ | LOW |

where in Heat Mode: $\Delta T = \text{SPT} - \text{RT}$
in Cool Mode: $\Delta T = \text{RT} - \text{SPT}$

Note:

- In Heat Mode, the rules in section 4.0.3 have the higher priority.
- The table above can be represent by a hysteresis curve which will minimize the switching of the IFAN relay and will minimize the change in IFAN speed:



5.4.3 OFAN operation

- Min time interval between OFAN ON/OFF state change is 30 sec.
- In general, OFAN starts together with COMP.

5.4.4 HE operation

- Minimum Heaters ON or OFF time is 30 sec.
- Heaters can be activated only if IFAN is on.

5.4.5 Protections

- High pressure protection is applicable to all operating modes.
- Deicing control is valid in Heat and Auto Heat Mode only.
- Defrosting control is valid in Dry, Cool, Heat and Auto Modes.
- No reset after protection modes.

5.4.6 Thermistors operation

- Return air Temp. is detected by RAT (RT1) in normal Mode, or by RCT (R/C sensor) in I-FEEL Mode.
- Indoor Coil Temp. is detected by ICT (RT2).

5.4.6.1 Definition of thermistor faults:

- a. Thermistor is disconnected -
The thermistor reading is below -30°C.
- b. Thermistor is shorted -
The thermistor reading is over 75°C.
- c. Thermistor Temp reading doesn't change (irrelevant for RT1) -
 - (i) This test is performed only once after a unit is switched from OFF/STBY to operation. At the first occurrence of 10 min continuous COMP operation, the current ICT & OCT are compared with those when the COMP was switched from OFF to ON 10 min before. If the ΔT is less than 3°C, the thermistor is regarded as defective.
 - (ii) The ICT and OCT no-change error can be disabled together by connecting a 4.7 kohm resistor (5%) to the OCT connector. These resistors are equivalent to a thermistor at 43±1°C and 48±1°C respectively.
 - (iii) Connecting a 4.7k resistor to the ICT connector will disable the ICT no-change error only.

5.4.6.2 Cases for disabling thermistor short/disconnected detection

- i. The detection of thermistor faults (a) and (b) above, are disabled when Deicer Protection is started. The detection will be enabled again only after (1) the deicing is completed, and (2) COMP has been restarted and operated for 30 sec.
- ii. When all the following conditions are fulfilled:
 - a. 4.7K Ohm resistor is connected on the OCT
 - b. IFAN is OFF
 - c. Compressor is ON
 - d. $ICT < -30$ (disconnected)This condition come to detect and prevent IFAN operation in Deicer in multi split units.

5.4.6.3 Handling the thermistor faults in a COMP unit

- i. ICT/OCT thermistor is disconnected or shorted -
The invalid thermistor temperature is replaced by 43°C, so that the unit can continue the normal operation. All protections related to that faulty thermistor will be disabled. For example, in case of any ICT fault, the ICT high pressure protection in Heat Mode and ICT defrost protection in Cool Mode will not operate anymore. The same is also applied to the OCT fault.

- ii. RAT thermistor is disconnected or shorted –
The RAT will be derived from the ICT by using the equations :
Heat Mode: $RAT = ICT / 2.3$
Cool Mode $RAT = ICT * 4$

Notes:

- In case of any thermistor failure, the STBY LED will be blinking until the fault condition is corrected.
- User can use the system diagnostics function to find out the nature of the thermistor faults.

- i. RAT thermistor is disconnected or shorted –
System will operate continuously in the last IFAN & WVL status when turned ON.

Notes:

- As in the COMP unit, the STBY LED will be blinking to indicate a thermistor fault. And, the user can use the system diagnostics function to find out the nature of the fault.

5.5 Cooling Mode - General

- 1) Room Temperature, RT, is detected by
 - RAT in normal operation, or
 - RCT (R/C sensor) in I-FEEL mode.
- 2) The resolution of RT is 1°C.
 - RT is activating COMP/WVL if (RT > SPT), and
 - RT is stopping COMP/WVL if (RT ≤ SPT).
- 3) Indoor Coil Temp is detected by ICT (RT2).
- 4) Outdoor Coil Temp is detected by OCT (RT3).
- 5) A WVL-RC/SH will work in Cooling Mode when
 - ICT < 16°C in general (see Sect 2.2.2 for details), and
 - Unit is not operating in Fan Mode.
- 6) OFAN OPERATIONS
 - OFAN starts together with COMP in general.

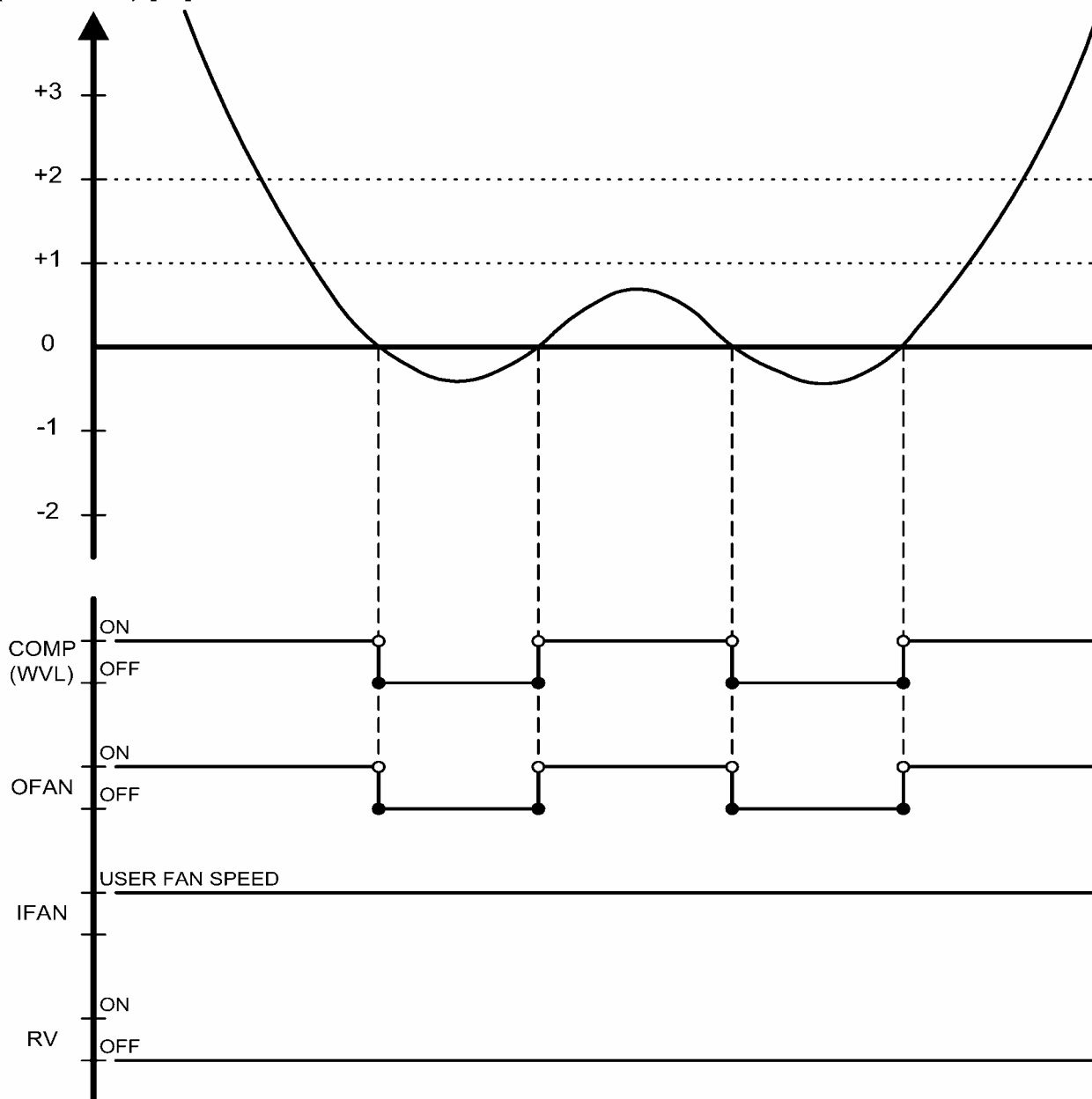
5.5.1 Cooling

Mode: Cool, Auto (at Cooling)
Temp: Selected desired temperature.
Fan: HIGH, MED, LOW
Timer: Any
I Feel: On or Off

Control function

Maintains room temp at desired level by comparing RT and SPT.

(RT - SPT) [°C]



Note:

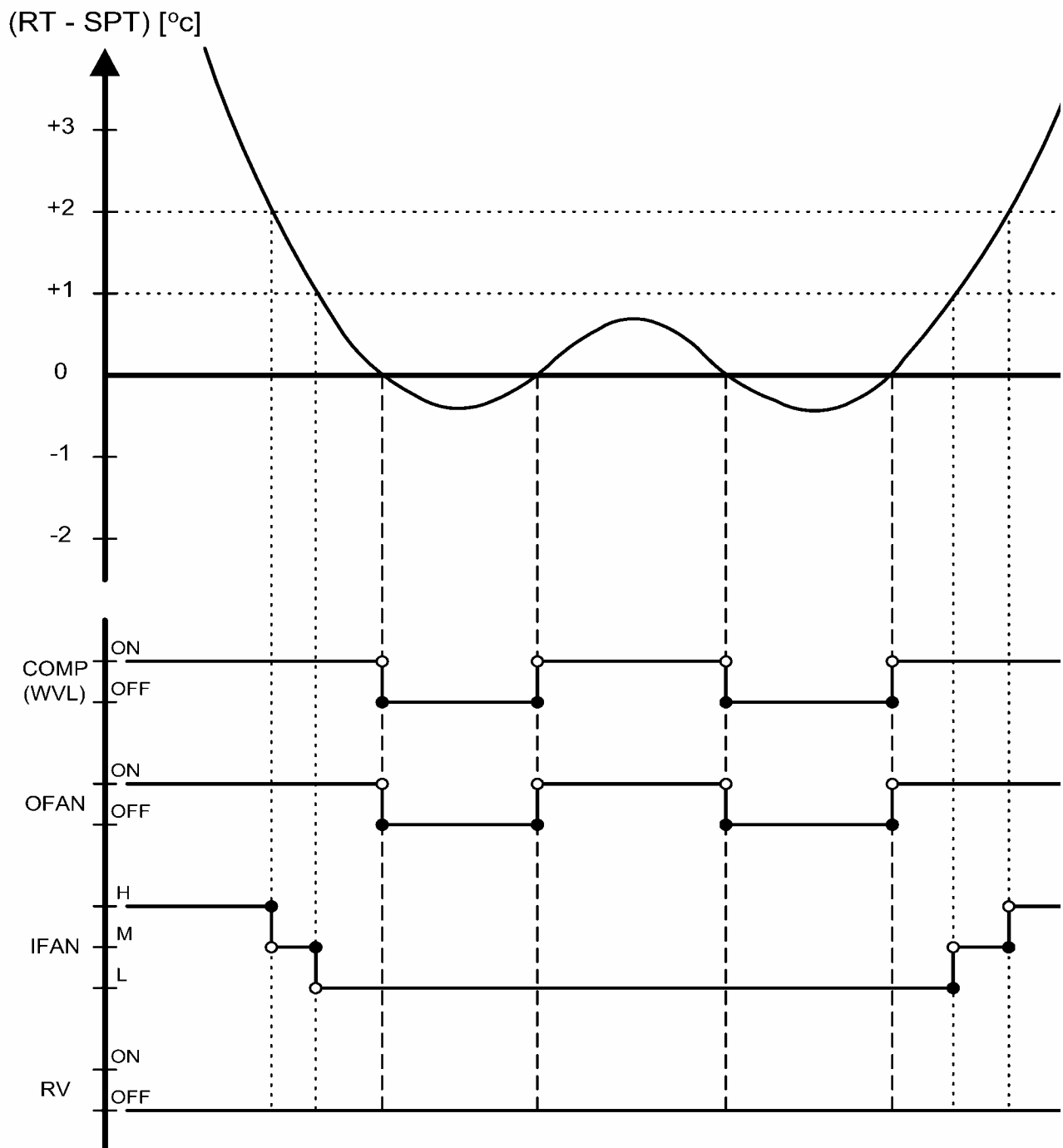
- 1) IFAN is always running at High, Medium or Low speed selected by user.
- 2) In IFEEL mode, the Room Temperature (RT) is the RCT from a R/C. Otherwise, the RT is the RAT from the Room Thermistor.

5.5.2 Cooling with Autofan

Mode: Cool, Auto (at cooling)
Temp: Selected desired temperature
Fan: Auto
Timer: Any
I Feel: On or Off

Control function

Maintains room temp at desired level and controls the IFAN speed for optimal comfort.



5.6 Heating Mode

5.6.1 Heating Mode - General

- In heating Mode, temp. compensation schedule will be activated for wall mounted units.

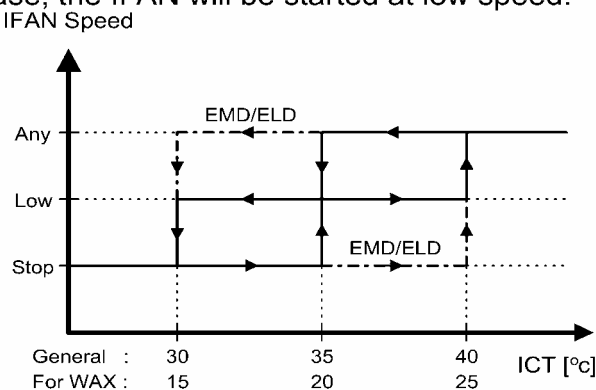
| SPT [°C] | Add to SPT | |
|------------------------------|------------|------------|
| | I-FEEL ON | I-FEEL OFF |
| $18 \leq \text{SPT} \leq 27$ | 0 °C | +2 °C |
| $27 < \text{SPT} \leq 30$ | 0 °C | +3 °C |

Notes :

- No compensation will be activated in Forced operation modes

5.6.2 IF operating rules

- As a general rule for **RC and SH groups**, when **COMP is ON**, excluding protection modes, IFAN will be switched ON if
- ICT > 35°C or
at the IFTC 30 sec after the COMP is switched ON. In this case, the IFAN will be started at low speed.

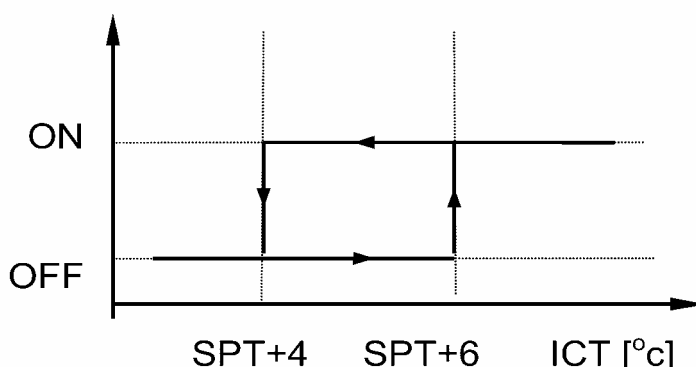


Notes :

- In **SH or RC group**, if HE is set to OFF due to low ICT, IFAN will be switched to LOW and will be turned OFF after 30 sec.
- An exception to this rule (4.0.3.a) is the Back-up mode for SH.
- In **RC and SH groups**, whenever **COMP & HE are both OFF**, excluding protection modes, IFAN operation will be according to the following:

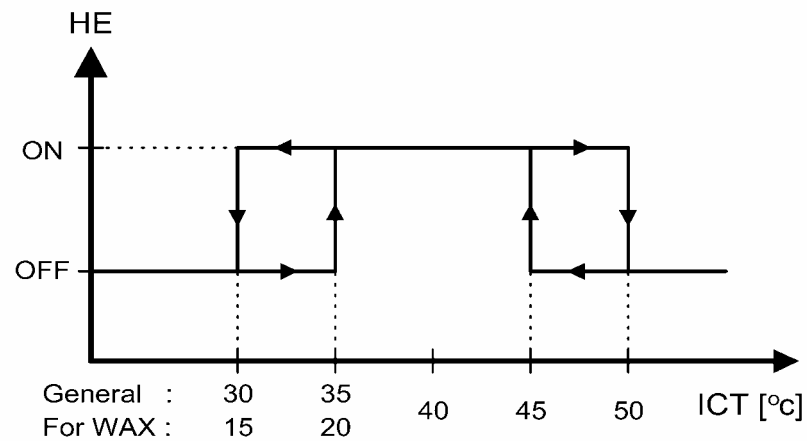
In **other models** IFAN will operate in low speed for 30 sec and then stop. If COMP is OFF for more than 3 minutes and IFEEL Mode is inactive, IFAN will operate in low speed according to the following graph:

IFAN (Low Speed)



5.6.3 HE operation

- For **all Groups**, HE can be ON only when IFAN is ON.
- For **all Groups**, HE switches to OFF when $ICT > 50\text{ }^{\circ}\text{C}$, and is activated again when $ICT \leq 45^{\circ}\text{C}$.
- In **SH or RC group**, HE operation is limited by the following graph:



- **Back-up mode for SH group**

After COMP has been working for 5 minutes, HE & IFAN are activated even if the ICT is still below 35°C. This situation is called Back-up Mode. Both HE & IFAN will work in Back-up Mode until the ICT reaches 35°C. Then, the operation goes on in the usual mode .

5.6.4 Heating, RC or SH Group

Mode: Heat, Auto (at heating)

Temp: Selected desired temperature

Fan: HIGH, MED, LOW

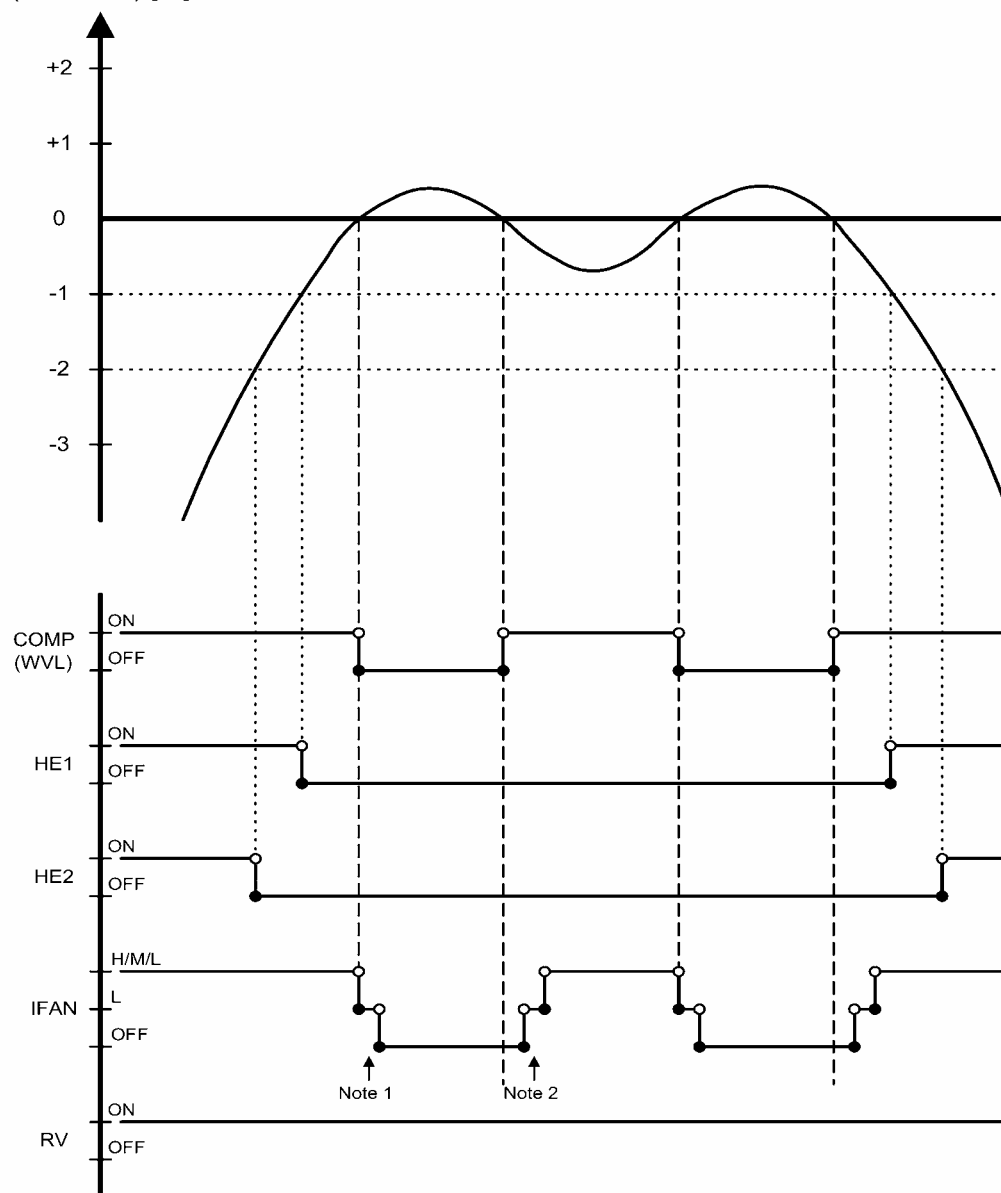
Timer: Any

I Feel: On or Off

Control function

Maintains room temp. at desired level by comparing RAT or RCT to SPT.

(RT - SPT) [°C]



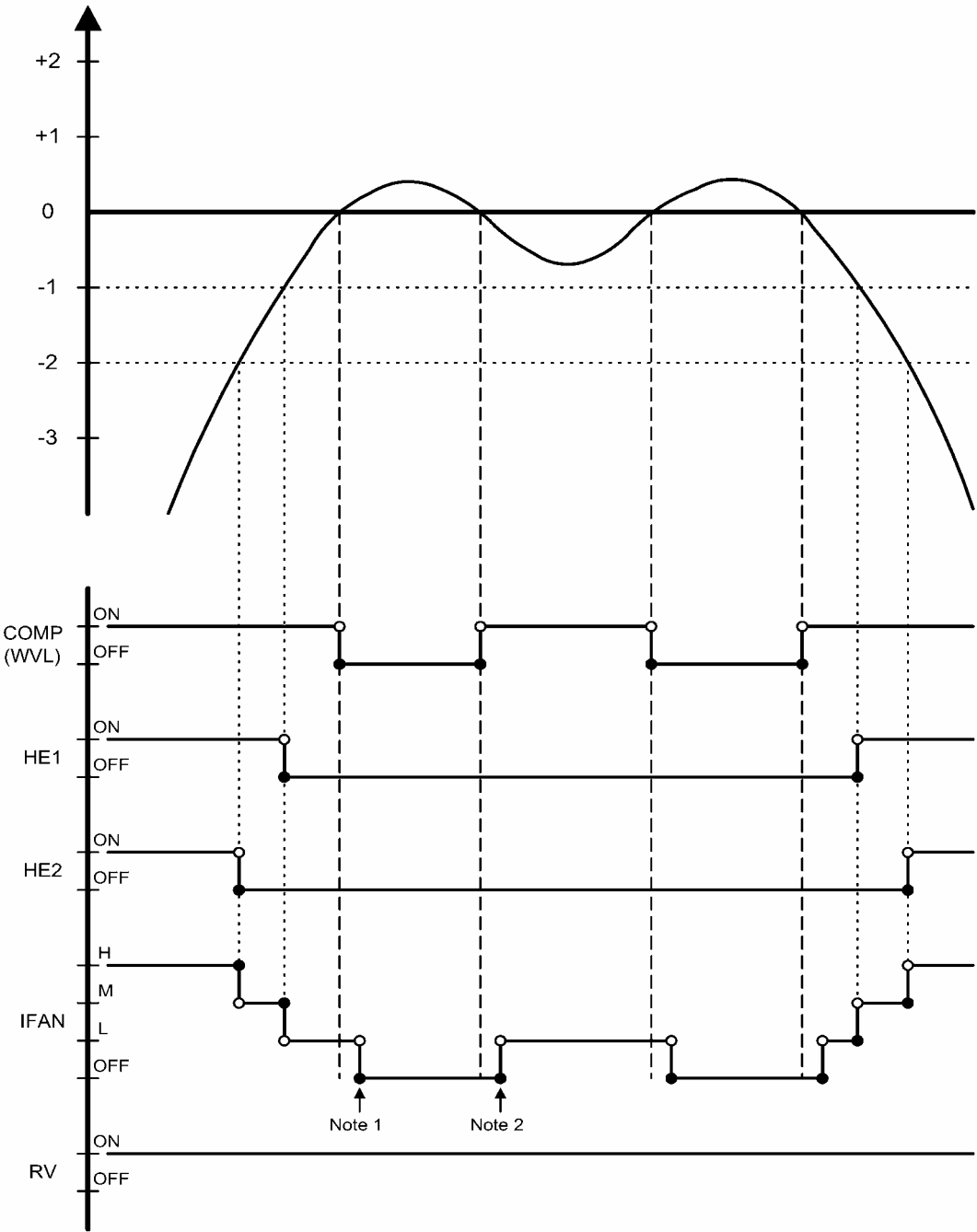
5.6.5 Heating, RC or SH Group with Autofan

Mode: Heat, Auto (at heating)
Temp: Selected desired temperature
Fan: Auto
Timer: Any
I Feel: On or Off

Control function

Maintains room temp at desired level by controlling COMP, IFAN and OFAN.

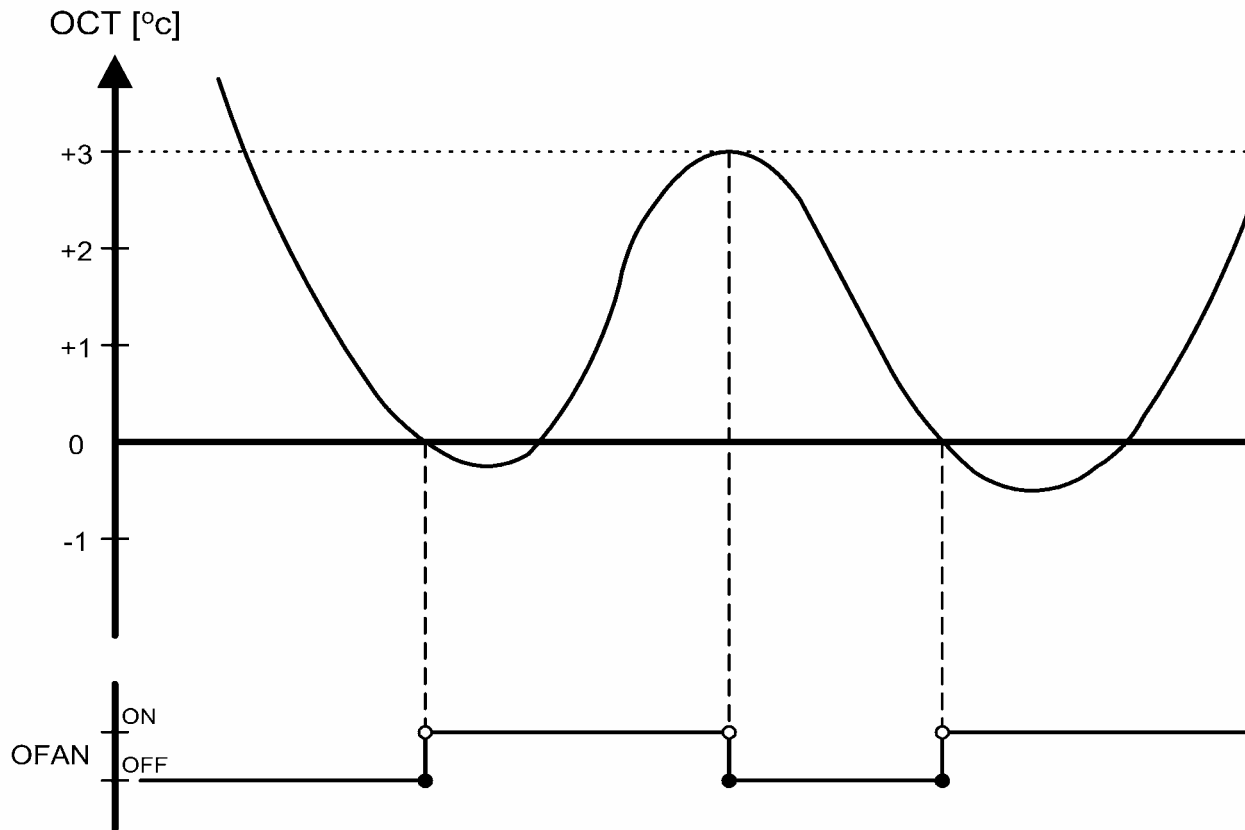
(RT - SPT) [°C]



5.6.6 OFAN operation is controlled by the graph below when

1. ($RAT \geq SPT - 2^{\circ}\text{C}$), AND
2. ($ICT \geq 45^{\circ}\text{C}$), AND
3. (COMP is ON)

Otherwise, OFAN runs together with COMP.



5.7 Automatic Cooling or Heating

5.7.1 Automatic Cooling or Heating - General

- Switching-temperature between Cooling and Heating is $SPT \pm 3^{\circ}\text{C}$.
- Autofan in Automatic Cooling and Heating Mode will activate “Cooling with Autofan Mode” and “Heating with Autofan Mode” respectively.
- When the Auto Mode is started with $SPT \pm 0^{\circ}\text{C}$, the unit will not select Auto Heat or Auto Cool mode immediately. Instead, the unit will be in a temporary Fan Mode with IFAN operating at low speed.
The proper Auto Heat mode or Auto Cool will be started whenever the RT reaches $SPT-1^{\circ}\text{C}$ or $SPT+1^{\circ}\text{C}$ respectively.
- For RC & SH units, Mode change between Auto Heat & Auto Cool Modes is possible only after the COMP has been OFF during the last T minutes.

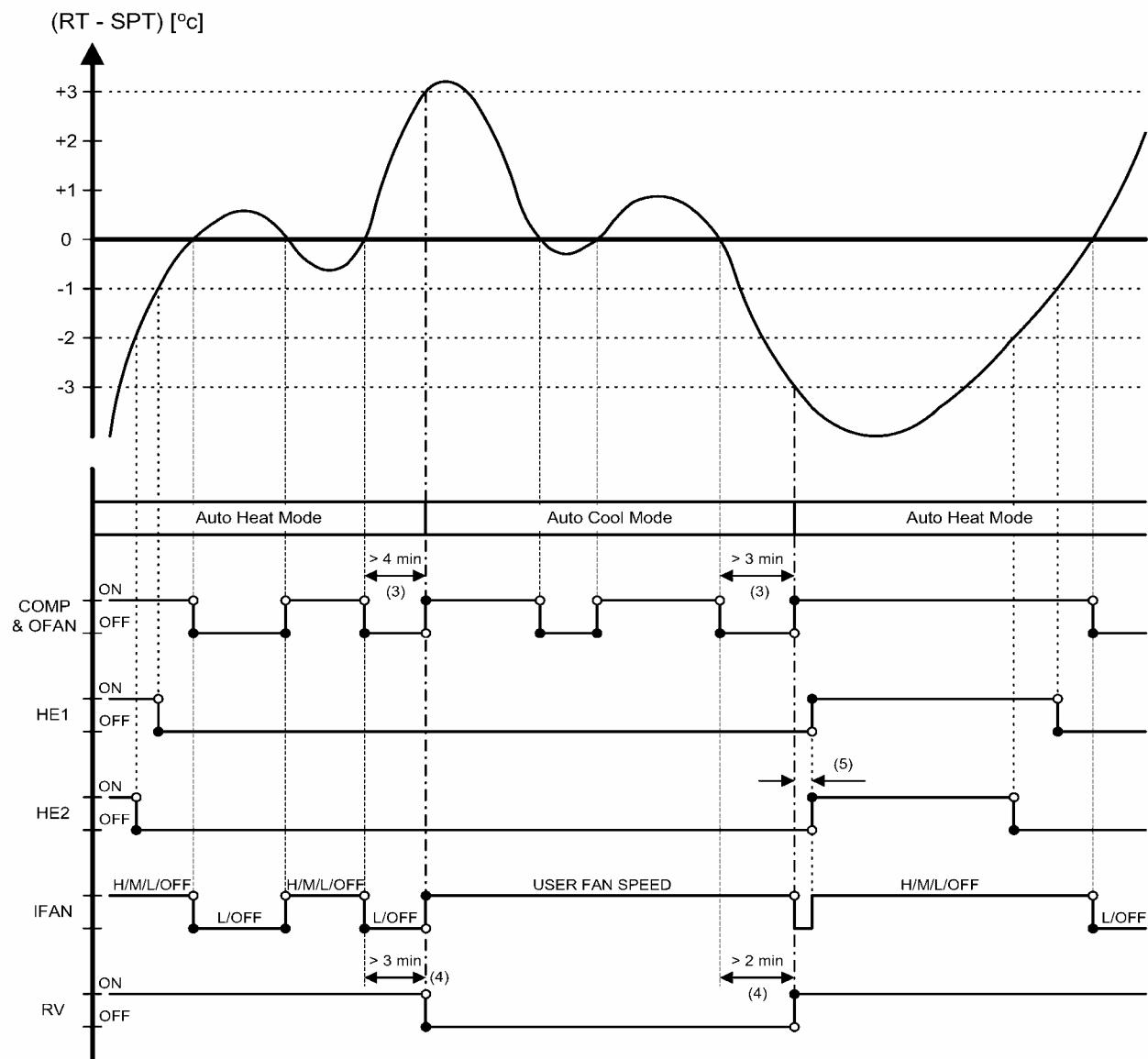
| Mode Change | time, T |
|------------------------|---------|
| Auto Cool to Auto Heat | 3 min |
| Auto Heat to Auto Cool | 4 min |

- When unit is changed from Cool/Dry mode to Auto Mode, the unit will continue to operate at (Auto) Cool Mode until the conditions for switching from Auto Cool to Auto Heat are satisfied.
Similarly, when unit is changed from Heat Mode to Auto Mode, the unit will continue to operate at (Auto) Heat Mode until the conditions for switching from Auto Heat to Auto Cool are satisfied.

5.7.2 Auto Cooling or Heating, RC or SH Groups

- Mode: Auto
- Temp: Selected desired temperature
- Fan: Any
- Timer: Any
- I Feel: On or Off

Control function
Maintains room temp at desired level by selecting between cooling and heating modes.



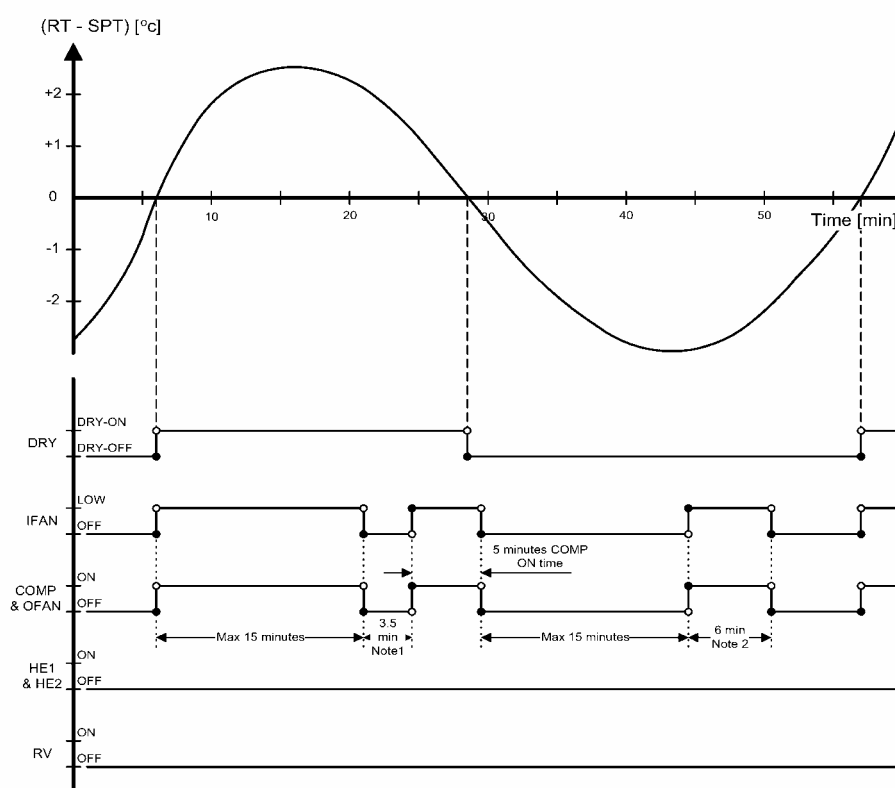
5.8 Dry Mode

5.8.1 Dry, ST or RC group

Mode: Dry
Temp: Selected desired temp
Fan: Low (automatically selected by software)
Timer: Any
I FEEL: Any

Control function

Reduce room humidity with minimum temp. fluctuations by operating in Cool Mode with low speed IFAN.



Notes :

- When Dry is ON, the COMP is forced OFF for 3.5 min (longer than the 3 min Min COMP-Off time) after every 15 min of continuous COMP operation.
- When Dry is OFF, the COMP is forced ON for 6 min (longer than the 3 min Min COMP-On time) after every 15 min of continuous COMP OFF time.
- When Dry is changed from ON to OFF or vice versa, the limits mentioned in (1) & (2) are ignored. The COMP operation is only controlled by the 3 min Min OFF time and 1 min Min ON time.
- In Dry Mode, IFAN is LOW when COMP is ON, and is OFF when COMP is OFF.

5.9 Protection

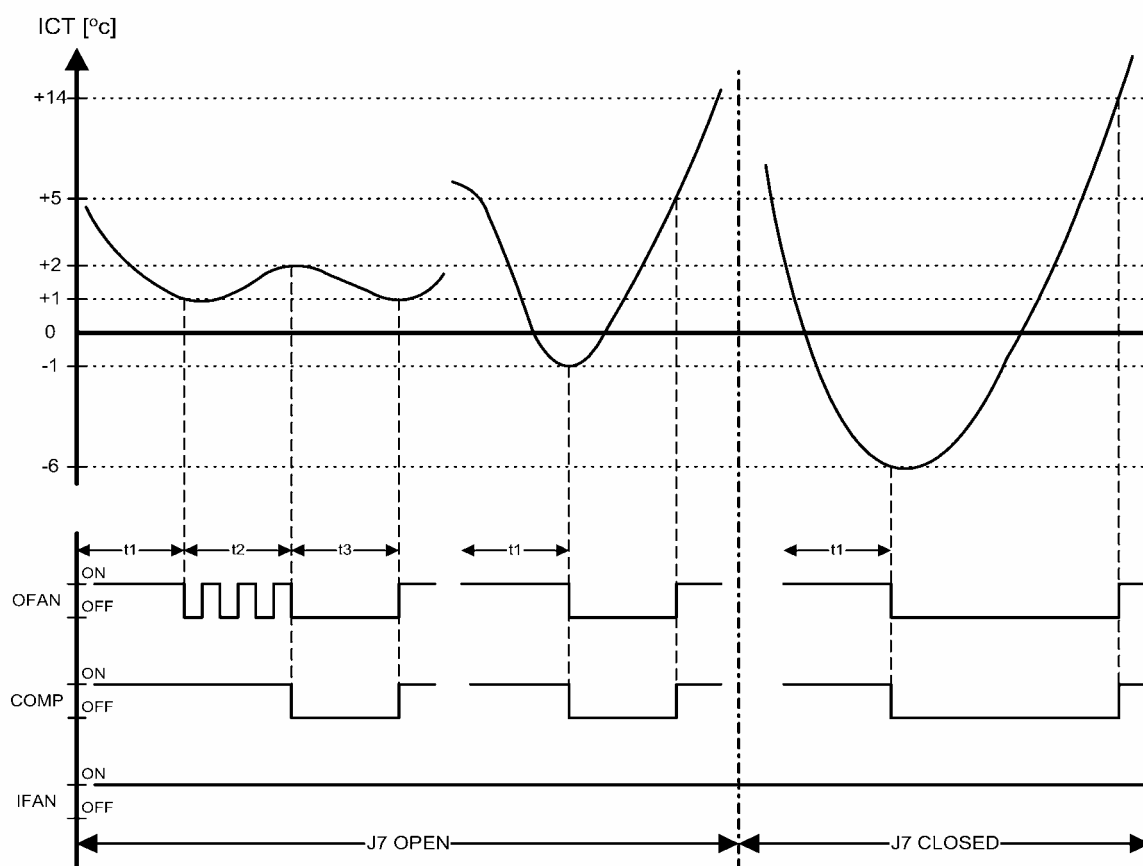
5.9.1 Cooling Mode Protections

Indoor Coil Defrost

Mode: Cooling, Dry, Auto
Temp: Selected desired temp.
Fan: Any
Timer: Any
I Feel: On or Off

Control Function

Protect the indoor coil from ice formation at low ambient temperature.



t1 = 5 min minimum for each COMP starting

t2 = OFAN cycling (alternate between ON and OFF every 30 sec) for 20 min maximum

t3 = COMP and OFAN stop for 10 min minimum

Notes:

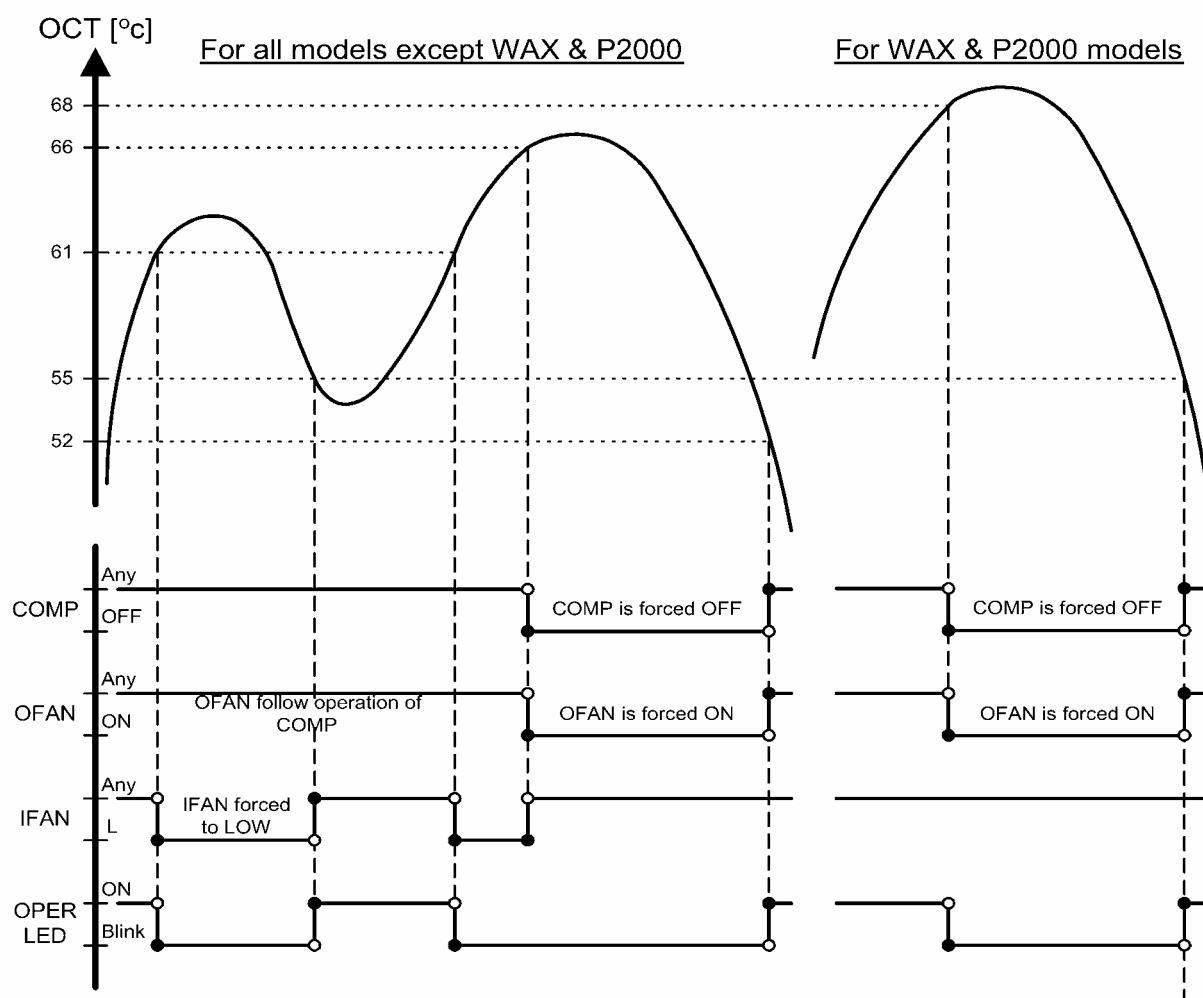
- When J7 is closed (connected), OFAN cycling is cancelled and the set temperature for COMP & OFAN cut-out and cut-in are changed. COMP & OFAN are forced OFF when $ICT \leq -6^{\circ}\text{C}$, and are kept OFF until $ICT > 14^{\circ}\text{C}$.
- For WAX model, the defrost processes is simpler. When J7 is open, COMP & OFAN are forced OFF when $ICT \leq -1^{\circ}\text{C}$, and are kept OFF until $ICT > 5^{\circ}\text{C}$. When J7 is closed, the WAX defrosting process is the same as that of the other models (R.H.S. of the graph above). In both cases, the ICT checking in t2 and t3 are not applied.

5.3.2 High Pressure Protection

Mode: (Auto) Cooling or Dry
 Temp: Selected desired temp.
 Fan: Any
 Timer: Any
 I Feel: On or Off

Control Function

To protect the COMP from the high pressure built-up in the outdoor coil during normal cooling operation, by switching OFF the IFAN and COMP.



Note:

- The ICT is also monitored during Cool and Dry mode, in case the RV control circuit is faulty. Whenever ICT reaches 70°C, which indicates a high pressure in the indoor coil, the COMP will be forced off automatically. The COMP can be turned on again only after the ICT is under 70°C again and after the 3 min COMP ON delay time. The OPER LED will not blink in this case.

5.9.3 Heating Mode Protections

Outdoor coil Deicing (excluding RH Group)

Mode: Heating, Auto (at heating)

Temp: Selected desired Temp

Fan: Any

Timer: Any

I FEEL: Any

Control function

Protects the Outdoor coil from ice formation by controlling COMP & RV operation.

Scope

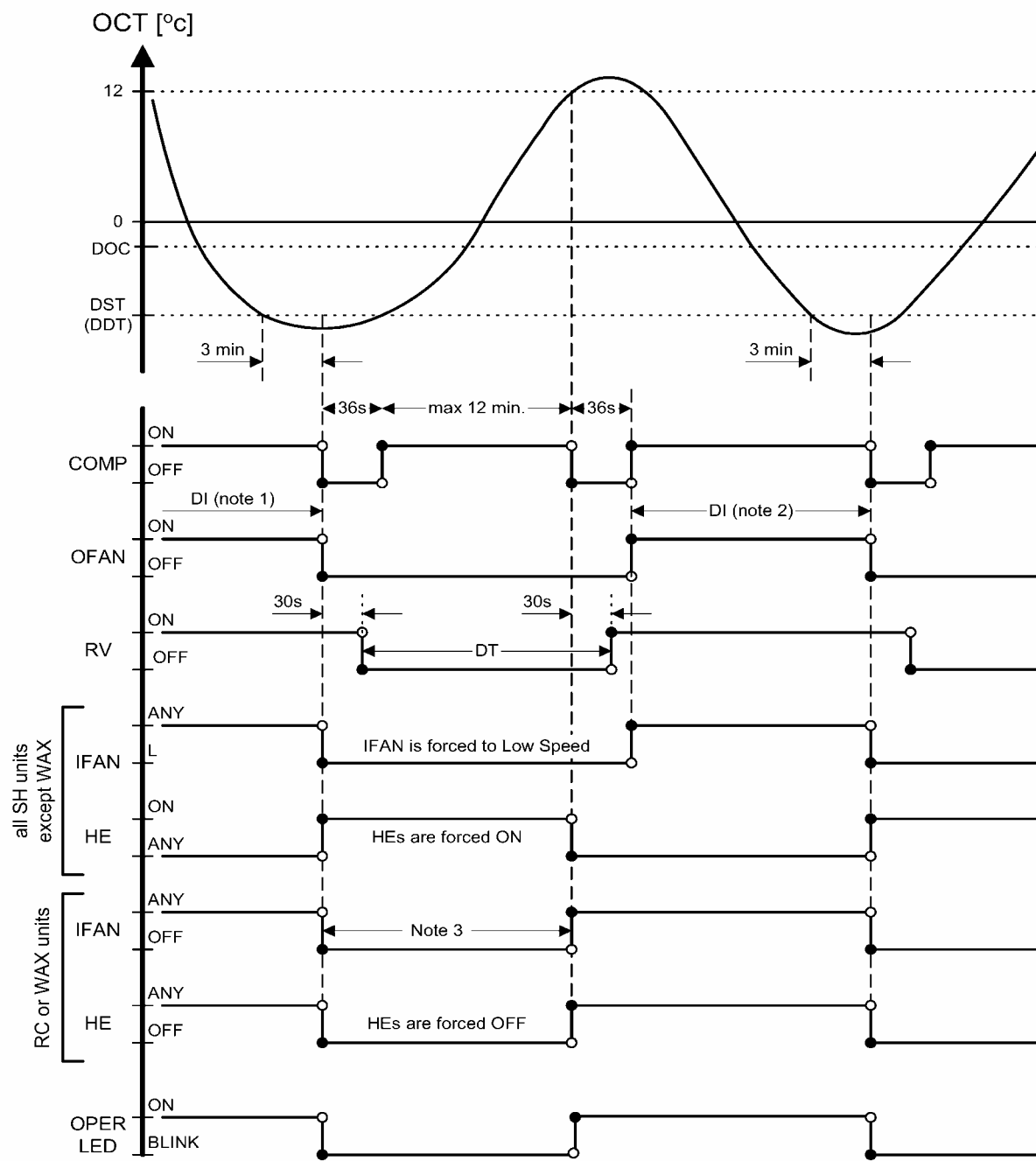
This new deicer is designed to operate at extreme temp conditions. The deicing cycle could be triggered from:

1. OCT temp and time between two consecutive deicing cycles.
2. Detection of ice forming by change of the OCT temp.

Both algorithms adjust the time between deicing cycles to optimize the A/C performance. The algorithm will automatically increase the time between deicing cycles and reduce the deicing cycle as needed.

The algorithm uses EEPROM data to operate.

Deicing procedure



Notes :

- At the first COMP activation after SB or OFF, if ($OCT < 0^{\circ}C$), then $DI = 10$ min, else $DI = 40$ min.
- In the following Deicing cycles, the time interval between two Deicing cycles activation is between 30 to 80 min (refer to the flow chart).
- For RC group, HEs are forced OFF. IFAN operation is as in Heat Mode, Sect 4.0.3.a, i.e. IFAN will be set to OFF when $ICT < 30^{\circ}C$. For WAX, the IFAN is simply forced OFF.
- For SH group, HEs are forced ON and IFAN is forced to operate in Low speed, regardless of the ICT and difference between RAT & SPT.

5.9.4 High pressure protection (excluding RH Group)

Mode: (Auto) Heating

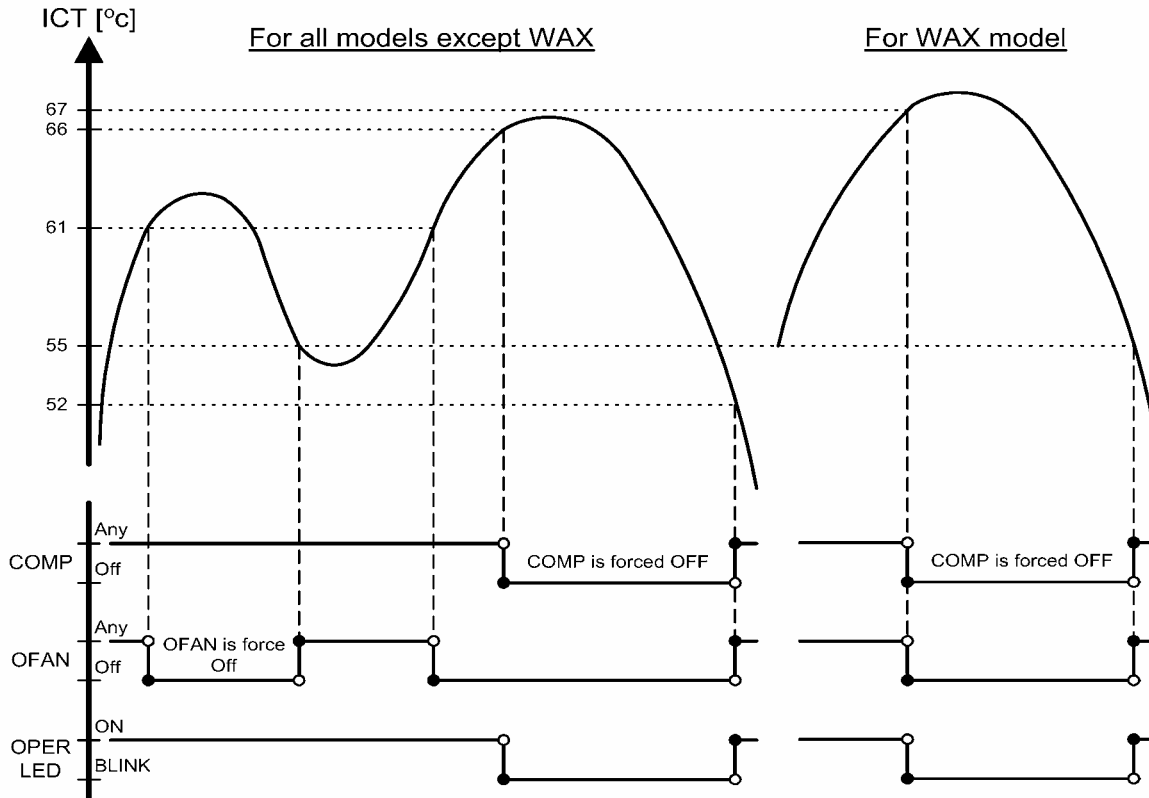
Fan: Any

Timer: Any

I Feel: On or Off

Control Function

Protect the Compressor from high pressure by switching OFF the OFAN and COMP.



Notes:

- IFAN, HE1 and HE2 will be activated according to the relevant Heating Mode Sect.
- In case of any malfunction in the relay control circuit, the OCT is also monitored during heating mode. Whenever OCT reaches 70°C, which indicates a high pressure in the outdoor coil, the COMP will be forced off automatically. The COMP can be turned on again only after the 3 min COMP ON delay and the OCT is under 70°C. The OPER LED will not blink in this case.

5.10 Timer

Mode: Any
Temp. Selected desired temp
Fan: Any
Timer: Timer On, Timer Off
I Feel: On or Off

Control function

- Starts or stops the unit operation after pre-set time. If RC-1 is used, the timer setting will be (0.5 - 24 Hr) from the moment the timer is set. The minimum resolution is 30 minutes.

If RC-2 or later version of remote controls is used, the timer setting will be (0:00 - 23:50) real time with 10 minutes resolution.

- After power failure, all pre-set timers are cleared. The system is forced to STBY mode and the Timer LED indicator is blinked to indicate the situation. The LED keeps blinking until the timer settings can be reloaded from a R/C message.

Note: If all timers are inactive, the system will not be forced OFF after the power failure. The last OPER/STBY status will be loaded from the EEP instead.

- When the A/C receives any valid message from a R/C, the current ON/OFF timer settings will be replaced by the new timer settings in the R/C message.

Note: The following timer related operations will not affect the A/C operating mode (Heat/Cool/Auto/Dry/Fan) setting.

- Set ON/OFF timer
- Clear ON/OFF timer
- R/C ON Timer is time-up
- R/C OFF Timer is time-up

E.g. When a STBY A/C unit (with Cool Mode setting in its EEP) is turned on by the ON-TIMER of a R/C with heat mode setting, the A/C will start in Cool Mode.

5.11 Forced Operation

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

| Forced operation mode | Pre-set Temp for : WMF, WMN, WNG models |
|-----------------------|--|
| Cooling | 22°C |
| Heating | 28°C |

Note:

- While under the forced operation, the temperature compensation schedule.
- The forced operation is activated when the mode button on the Display Board is used to switch the unit to Cool or Heat mode.
- The IFAN is always set to Autofan Speed in forced operation.

5.12 Sleep Mode

Mode: Any

Temp: Set – desired temperature selected

Fan: Any

Timer: Interact with Sleep Timer as described in sect 12.2

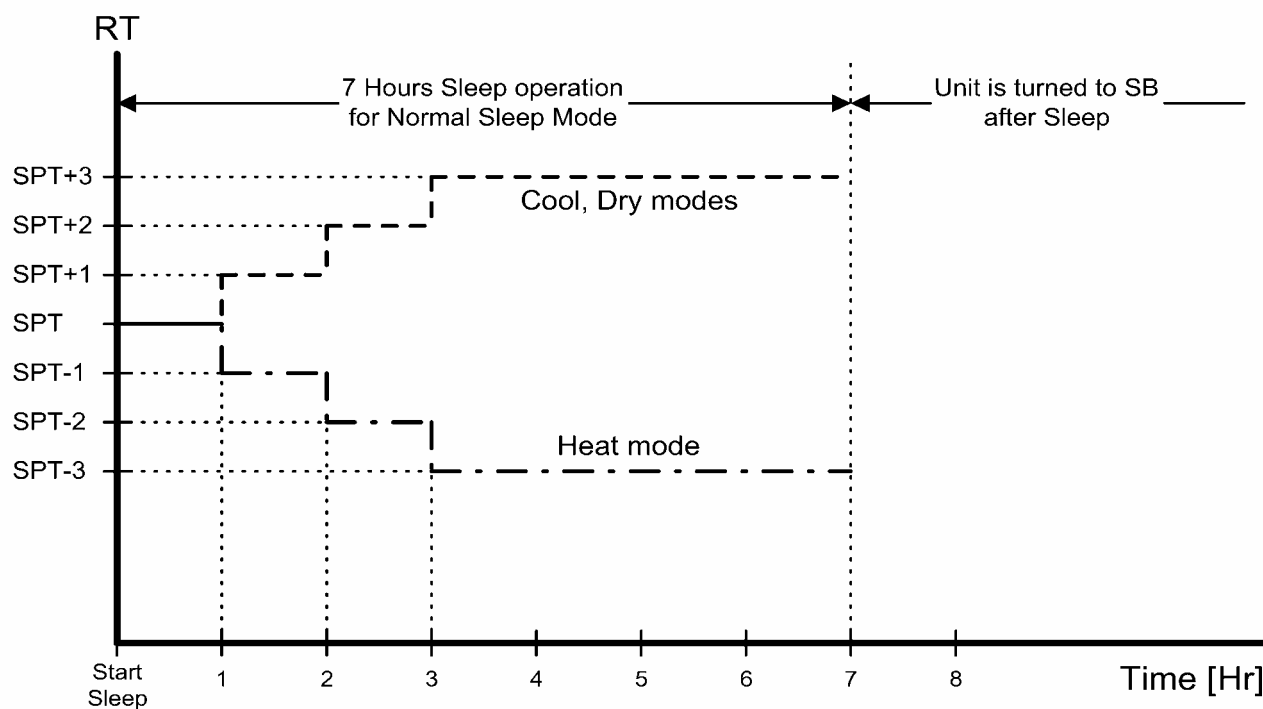
I Feel: On or Off

The Sleep mode is activated by using the sleep button on the R/C. In Sleep Mode, the unit will automatically adjust the SPT to turn up/down the room temperature (RT) gradually to provide maximum comfort to the user in sleep.

Sleep is treated as TIMER function. Therefore, the TIMER LED is activated similar to TIMER function.

5.12.1 Adjustment in Sleep Mode

1. in cool, auto cool or dry modes, the SPT adjustment is positive (from 0 to +3°C).
2. In heat or auto heat modes, the SPT adjustment is negative (from 0 to -3°C).
3. In other modes, there is no SPT adjustment.
4. The SPT adjustment is cancelled when the Sleep mode is cancelled.



Note: If Off-timer is active, the unit may go to SB before or after 7 hours of sleep operation.

5.12.2 Time adjustment in Sleep Mode

The user can make use of the Off-Timer to extend the Sleep Time from 7 hours to 12 hour (max). The operation of the new “Extended Sleep Mode” is illustrated by the graphs below.

Case 1 is the Standard Sleep Mode, which is the only sleep mode in previous version of MCU. The A/C unit simply works for 7 hours, then goes to SB.

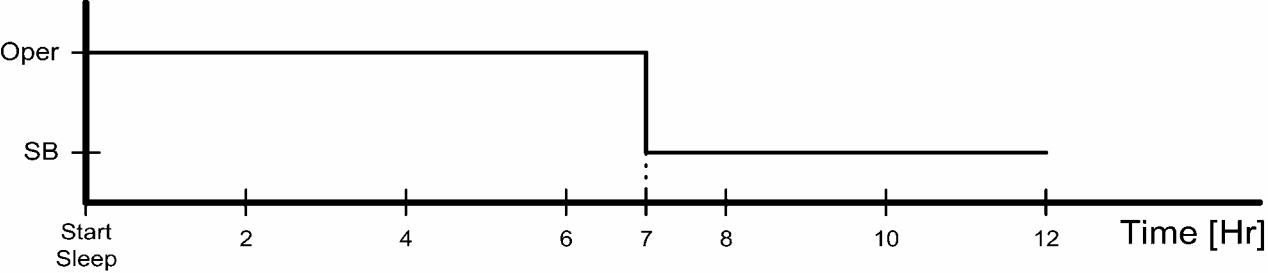
Case 2 is the new Extended Sleep Mode. If an active Off-Timer is set to turn off the A/C between 7-12 hour, relative to the starting of Sleep, the Sleep time is extended.

And, instead of going to SB at the 7th hour, the A/C will work until reaching the Off-time.

Case 3 is an exception to case 2. The Sleep Mode will not be extended to the Off-Time when the Off-Timer is preceded by an On-Timer, which is also between 7-12 hour.

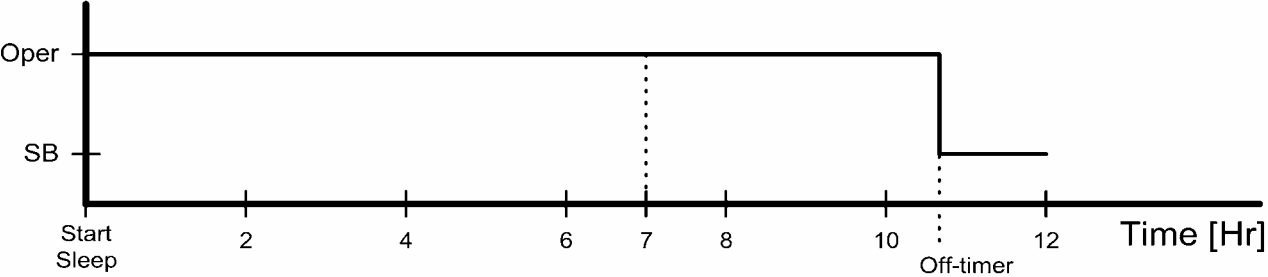
Case 1 : Standard Sleep Mode

Condition : Off-timer is not set or is beyond 12 hour.



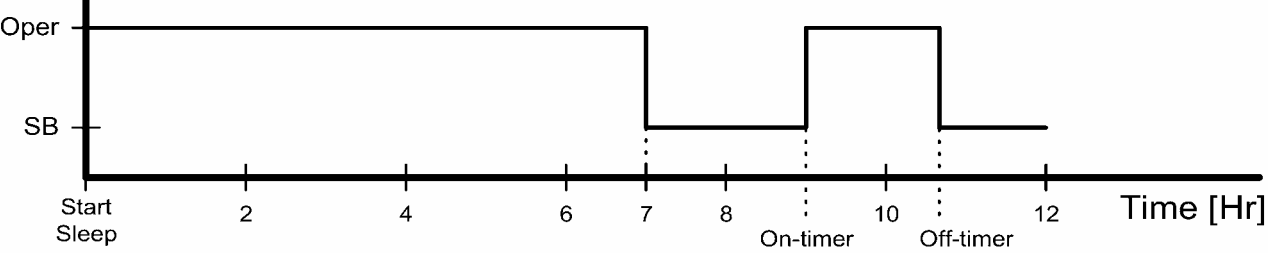
Case 2 : Extended Sleep Mode

Condition : Off-timer is set at 7-12 hour.



Case 3 : Exception to Case 2

Condition : Off-timer is set at 7-12 hour
On-timer is set at 7-12 hour and before Off-timer



5.13 Clogged Air Filter

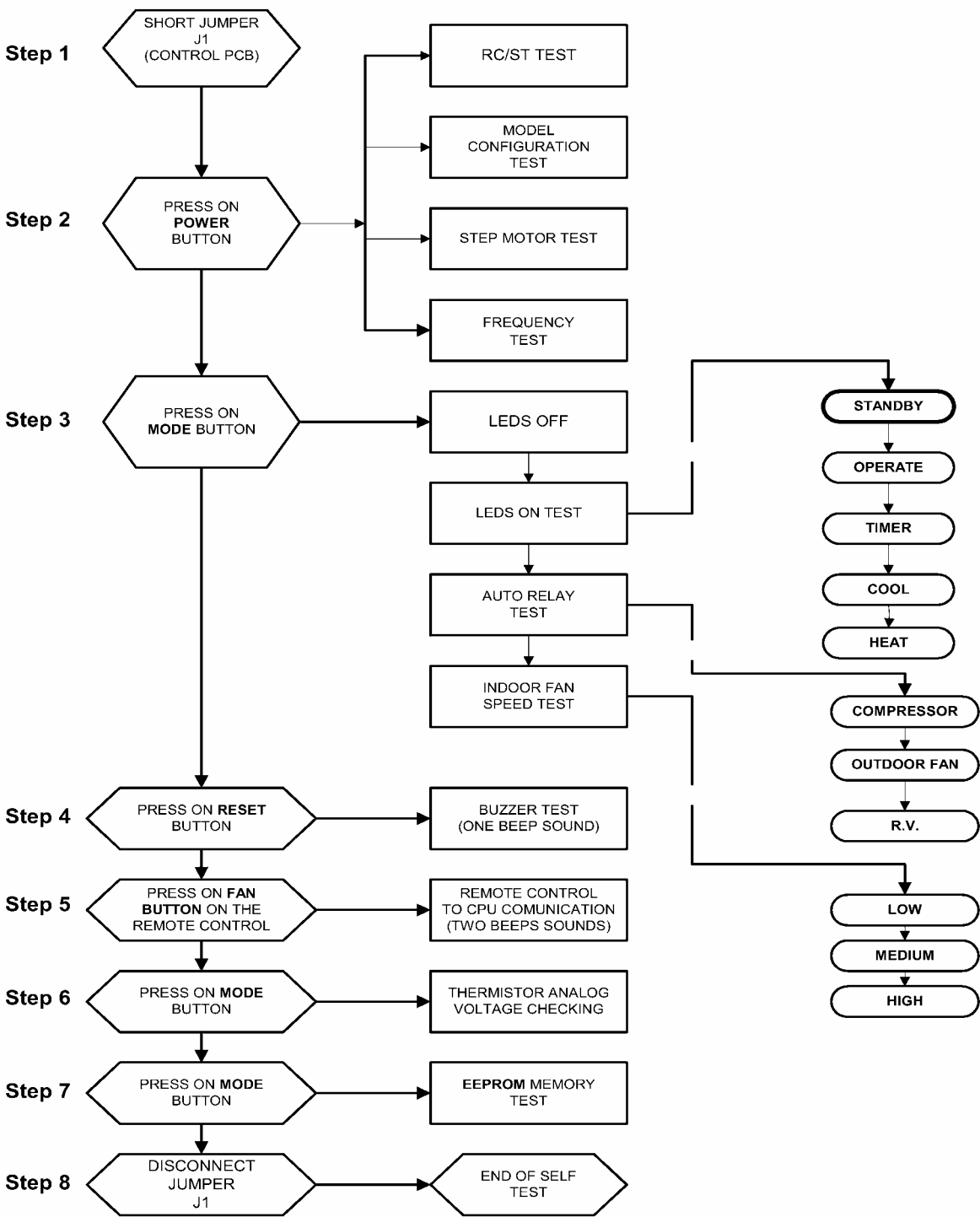
Filter LED ON after 512 HR.

Filter LED is turned OFF, and the Filter Timer is restarted by pressing the reset button.

5.14 Controller Self-Test Procedure

5.14.1 By Shorting Test Jumper J1

SELF-TEST FLOW CHART
FOR CONTROLLER (VERSION 4V5 OR HIGHER)



5.14.2 By Remote Control Settings:

- a. 1: TURNING ON THE POWER.
Turn ON the power, make sure that the unit is in operation.
- b. STEP 2 : ENABLE SELF-TEST MODE
 - Use the remote control to send the first settings to display / indoor unit HEAT mode, HIGH IFAN, set temperature to 16 °C, no I-FEEL Sleep or any other timer settings are needed.
 - Cover the IR transmitter components in the remote control so that it will not transmit the signals to the indoor unit display.
 - Use the remote control to send the second settings to display / indoor unit COOL mode, LOW IFAN, no I-FEEL Sleep or any other timer settings.
 - Uncover the remote control IR transmitter and change the temperature settings. If the display/indoor unit receive the settings properly the following steps will start:
- c. STEP 3: MODEL SETTING CONFIRMATION
 - The STAND-BY and COOL LEDS will indicate the operation mode as follows:

| OPERATION MODE | STAND-BY LED | COOL LED |
|----------------|--------------|----------|
| ST | ON | OFF |
| RC | OFF | OFF |
| SH | OFF | ON |
| RH | ON | ON |

- Testing the Model configuration. Selected by the COMP, STAND-BY, TIMER LEDS and FILTER will indicate the model configuration as follows (the relevant line for this manual is highlighted):

| MODEL | COMP | OPERATE LED | TIMER LED | FILTER LED |
|----------|------|-------------|-----------|------------|
| WNG | ON | OFF | OFF | OFF |
| WMN1 | ON | ON | OFF | ON |
| WMN4 | OFF | OFF | ON | OFF |
| WMN2/WHX | OFF | ON | OFF | ON |
| WMN3 | OFF | ON | ON | ON |

In this term the step motor will turn to HOME POSITION.

d. STEP 4 : AUTO LED WALK TEST.

- All the LEDS will turn OFF.
- All the LEDS will turn ON for 1 second one by one in the following sequence:
STAND-BY ⇒ OPERATE ⇒ TIMER ⇒ FILTER ⇒ COOL ⇒ HEAT.
- In PRX all the LEDS will turn ON for 1 second one by one in the following sequence : 18 °c ⇒ 20 °c ⇒ 22 °c ⇒ 24 °c ⇒ 26 °c ⇒ 28 °c ⇒ 30 °c ⇒ High IFAN ⇒ Auto IFAN ⇒ Med IFAN ⇒ Low IFAN ⇒ STAND-BY⇒ TIMER ⇒ FILTER ⇒COOL⇒ HEAT.

e. STEP 5: AUTO REALY WALK TEST:

- All relays will energize one by one in the following sequence:
COMPRESSOR ⇒ OUTDOOR FAN⇒R. V. ⇒ HEATER 1 ⇒ HEATER 2
⇒ INDOOR WATER PUMP ⇒ SWING or OUTDOOR WATER PUMP ⇒ INDOOR FAN: LOW ⇒ MID ⇒ HIGH.
- When the relay walk test is completed, the next test will start automatically.

f. STEP 6: FREQUENCY TESTING:

- If the frequency measuring process fails the COOL LED will turn ON.
In order to move to the next step, press ON/OFF button on the remote control.

g. STEP 7: INPUT TEST.

- The test purpose is to check the analog real time indicators (thermistors, LEVEL and clock) according to the table below.

| LED Indicator | Condition for LED to be ON |
|---------------|--------------------------------|
| STBY LED | Room thermistor ≠ 25°C |
| OPER LED | Indoor coil thermistor ≠ 25°C |
| TIMER LED | Outdoor coil thermistor ≠ 25°C |
| FILTER LED | Clock |
| COOL LED | LEVEL 2&3 |
| HEAT LED | LEVEL 4 |

h. STEP 8: TIMING RESET TEST (WATCH DOG).

- The test purpose is to verify that the CPU rise time after power failure is between 1 to 3 sec, test results are indicated on the LEDS : STAND-BY,OPER, TIMER and FILTER turning ON one by one.
- The results of the test are coded as follows:
Pass condition:
1 sec - STAND-BY and OPER are turned ON
2 sec - STAND-BY, OPER and TIMER are turned ON

Fail condition:

0 sec - STAND-BY is turned ON

3 sec - STAND-BY, OPER, TIMER and FILTER are turned ON

- When the timing reset test is completed, the next test will start automatically.

i. STEP 9: MEMORY TEST (EEPROM)

- The test purpose is to check if the memory is functioning correctly. The test result is reported by using the STAND-BY and FILTER LEDs:

| LED Indicator | Condition for LED to be ON |
|---------------|----------------------------|
| STAND-BY LED | Test passed |
| FILTER LED | Test failed |

AT THIS POINT THE SELF-TEST IS COMPLETED.

In order to terminate Self-Test mode the User can change the unit setting from COOL Mode, LOW FAN to COOL Mode, MED FAN or to wait without using the remote control for 60 sec.

Values of Sensors Temperature VS. Voltage (DC)

| Temp. (*C) | Voltage (V) | Temp. (*C) | Voltage (V) | Temp. (*C) | Voltage (V) | Temp. (*C) | Voltage (V) |
|------------|-------------|------------|-------------|------------|-------------|------------|-------------|
| -20 | 4.554 | 2 | 3.744 | 24 | 2.555 | 46 | 1.487 |
| -19 | 4.529 | 3 | 3.695 | 25 | 2.5 | 47 | 1.447 |
| -18 | 4.502 | 4 | 3.646 | 26 | 2.445 | 48 | 1.409 |
| -17 | 4.475 | 5 | 3.595 | 27 | 2.391 | 49 | 1.371 |
| -16 | 4.446 | 6 | 3.544 | 28 | 2.338 | 50 | 1.334 |
| -15 | 4.417 | 7 | 3.492 | 29 | 2.284 | 51 | 1.298 |
| -14 | 4.386 | 8 | 3.439 | 30 | 2.232 | 52 | 1.263 |
| -13 | 4.354 | 9 | 3.386 | 31 | 2.18 | 53 | 1.228 |
| -12 | 4.322 | 10 | 3.332 | 32 | 2.128 | 54 | 1.195 |
| -11 | 4.287 | 11 | 3.278 | 33 | 2.077 | 55 | 1.162 |
| -10 | 4.252 | 12 | 3.223 | 34 | 2.027 | 56 | 1.13 |
| 9 | 4.216 | 13 | 3.168 | 35 | 1.978 | 57 | 1.099 |
| -8 | 4.178 | 14 | 3.113 | 36 | 1.929 | 58 | 1.069 |
| -7 | 4.14 | 15 | 3.058 | 37 | 1.881 | 59 | 1.04 |
| -6 | 4.1 | 16 | 3.002 | 38 | 1.834 | 60 | 1.011 |
| -5 | 4.059 | 17 | 2.946 | 39 | 1.798 | 61 | 0.983 |
| -4 | 4.017 | 18 | 2.89 | 40 | 1.742 | 62 | 0.956 |
| -3 | 3.974 | 19 | 2.833 | 41 | 1.698 | 63 | 0.929 |
| -2 | 3.93 | 20 | 2.777 | 42 | 1.654 | 64 | 0.904 |
| -1 | 3.885 | 21 | 2.722 | 43 | 1.611 | 65 | 0.879 |
| 0 | 3.839 | 22 | 2.666 | 44 | 1.569 | 66 | 0.854 |
| 1 | 3.792 | 23 | 2.61 | 45 | 1.527 | 67 | 0.831 |

5.15 On Unit Indicators and Controls

| | |
|-------------------------------------|--|
| STAND BY INDICATOR | Lights up when the Air Conditioner is connected to power and ready to receive the R/C commands Blinks continuously in case of any thermistor failure. |
| OPERATION INDICATOR | Lights up during operation. Blinks for 300 ms, to announce that a R/C infrared signal has been received and stored. Blinks continuously during <ul style="list-style-type: none"> • OCT High Pressure Protection Mode • ICT High Pressure Protection Mode • Deicing in Heating Mode • Water Over Flow in ECC Model |
| TIMER INDICATOR | Lights up during Timer and Sleep operation. |
| FILTER INDICATOR | Lights up when Air Filter needs to be cleaned. Blinks during Water Over Flow in MBX/P2000 models. |
| COOLING INDICATOR | Lights up when system is switched to Cool Mode by using the Mode Switch <u>on the unit</u> . Show the thermistor status in Diagnostic Mode |
| HEATING INDICATOR | Lights up when system is switched Heat Mode by using the Mode Switch <u>on the unit</u> . Show the thermistor status in Diagnostic Mode. |
| MODE BUTTON (Cool, Heat, SB) | Use to cycle the operation mode of the A/C unit among COOL, HEAT and SB modes, without using the R/C. Every time this switch is pressed, the next operation mode is selected, in this order : SB → Cool Mode → Heat Mode → SB → ... Press this button continuously for 5 sec or more to start the Diagnostic Mode. |
| RESET / FILTER BUTTON | When the Filter LED is ON, press to turn off the Filter LED after a clean filter has been reinstalled. When the Filter LED is OFF, use this button to enable/disable the buzzer announcer. |

5.2 System Diagnostics

Pressing Mode button for 5-10 seconds in SB or any other operation mode will activate diagnostic mode by the acknowledgment of 3 short beeps and lighting of COOL and HEAT LEDs.

In diagnostic mode, system problems will be indicated by blinking of Heat & Cool LEDs.

The coding method will be as follow:

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 | Problem | ○ | ○ | ○ | ○ | ○ |
|----|---------------------------------------|---|---|---|---|---|
| 1 | RT1 is disconnected | ○ | ● | ● | ● | ● |
| 2 | RT1 is shorted | ○ | ● | ● | ● | ○ |
| 3 | (Reserved) | ○ | ● | ● | ○ | ● |
| 4 | RT2 is disconnected | ● | ○ | ● | ● | ● |
| 5 | RT2 is shorted | ● | ○ | ● | ● | ○ |
| 6 | (Reserved) | ● | ○ | ● | ○ | ● |
| 7 | RT2 temp reading doesn't change | ● | ○ | ● | ○ | ○ |
| 8 | RT3 is disconnected | ● | ● | ○ | ● | ● |
| 9 | RT3 is shorted | ● | ● | ○ | ● | ○ |
| 10 | (Reserved) | ● | ● | ○ | ○ | ● |
| 11 | RT3 temp reading doesn't change | ● | ● | ○ | ○ | ○ |
| 12 | RT2 & RT3 temp reading doesn't change | ● | ○ | ○ | ○ | ○ |

○ - ON, ● - OFF

Notes:

1. If faults occur in more than one thermistor (except case number 12 on table above), only one fault will be indicated according to the following order: RT3, RT2, RT1.

2. A/C will jump out to normal mode if sending a command by the R/C in system diagnostics mode. If this command from the R/C contain a Group ID, this ID will become the new Group ID of the ELCON unit.

6. TROUBLESHOOTING

| NO | SYMPTON | PROBABLE CAUSE | CORRECTIVE ACTION |
|----|---|--|---|
| 1. | The stand-by indicator (red led) on the central control display panel doesn't light up. | There is no correct voltage between the line and neutral terminals on main P.C.B | -If the voltage is low repair power supply. -If there is no voltage repair general wiring. -If there is correct voltage replace main or display P.C.B'S |
| 2. | The operation indicator (green led) on the central control display panel does not light up. | The remote control batteries are discharged | -Replace batteries of the remote control. |
| 3. | The operation indicator (green led) does not light up when starting from unit. | Check main P.C.B and display P.C.B | -Replace P.C.B if necessary. |
| 4. | The indoor fan does not function correctly. | Check the voltage between indoor fan terminals on the main P.C.B | -If there is voltage replace capacitor or motor. |
| 5. | The outdoor fan does not function correctly. | Check the voltage between outdoor fan terminals on the main P.C.B There is voltage between outdoor fan terminals on the outdoor unit. There is no voltage between outdoor fan terminals on the outdoor unit. | -If there is no voltage replace main P.C.B -Replace capacitor or motor. -Check and repair electrical wiring between indoor and outdoor units. |
| 6. | The compressor does not start up. | Check voltage on compressor terminals on the outdoor unit. (with ammeter) Check if there is correct voltage between compressor terminals on the outdoor unit. | -If no voltage replace main P.C.B -If low voltage repair power supply. -If the voltage correct replace capacitor or compressor. -If there is no voltage repair electrical wiring between indoor and outdoor units. |
| 7. | The refrigeration system does not function correctly. | Check for leaks or restrictions. With ammeter. Pressure gauge or surface thermometer. | -Repair refrigeration system and charge refrigerant if necessary. |

| NO | SYMPTON | PROBABLE CAUSE | CORRECTIVE ACTION |
|-----|--|--|---|
| 8 | No cooling or heating only indoor fan works. | Outdoor fan motor faulty or other fault caused, compressor overload protection cut out. | -Replace P.C.B. -Outdoor fan blocked remove obstructions. |
| 9. | Only indoor fan and compressor working. | Outdoor fan blocked. | -Remove obstructions. |
| 10. | Only indoor fan working. | -Run capacitor of outdoor fan motor faulty. -Windings of outdoor fan are shorted. | -Replace capacitor. -Replace motor. |
| 11. | No cooling or heating takes place, indoor fans working. | -Overload safety device on compressor is cut out (low voltage or high temperature). -Compressor runs capacitor faulty. -Compressor windings are shorted. | -Check for proper voltage, switch off power and try again after one hour. -Replace compressor capacitor. -Replace compressor. |
| 12. | No air supply at indoor unit, compressor operates. | -Indoor fan motor is blocked or turns slowly. -Indoor fan run capacitor faulty. -Motor windings are shorted. | -Check voltage, repair wiring if necessary. -Check fan wheel if it is tight enough on motor shaft, tighten if necessary. |
| 13. | Partial, limited air supply at indoor unit. | Lack of refrigerant (will accompanied by whistling noise) cause ice formation on indoor unit coil in cooling mode. | -charge the unit after localizing leak. |
| 14. | Water accumulates and over flow from indoor unit section. | Drain tube or spout of drain pan clogged. | -Disassemble plastic drain tube from spout of indoor unit drain pan. |
| 15. | Water dripping from outdoor unit base, (in heating mode). | Water drain outlet is clogged. | -Open outdoor unit cover clean out water outlet clean the base inside thoroughly. |
| 16. | Freeze-up of outdoor coil in heating mode, poor heating effect in room, indoor fan operates. | -Faulty outdoor thermistor. -Faulty control cable. -Outdoor temperature is below design conditions. -Outdoor unit air outlet is blocked. | -Replace thermistor. -Repair control cable. -Shut unit off, it cannot work properly. -Remove obstructions. |
| 17. | Unit is in heat mode but operating in cooling. | -Faulty RV coil. -RV coil is ok valve is stuck position. | -Replace RV coil. -Replace the reversing valve. |

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