TOSHIBA

FILE NO. A90-0028

SERVICE MANUAL

ACCESSORY

16:1 SUPER MULTI DUAL INTERFACE

RBC-16DIF1-PE

HFC

R407C

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CONTENTS

SUMMARY

- The units referred to within this manual conform with the protection requirements of Directives 89/336/EEC Electromagnetic Compatibility and 73/23/EEC Low voltage.

Note 1: For details on the Outdoor unit installation, the Indoor units or Remote Controllers refer to the relevant literature, i.e. Installation Instructions supplied with the units or Service Manuals relevant to the Indoor units.

Note 2: Operatives handling refrigerants must be suitably qualified in accordance with local and national codes of practice and statutory requirements.

Note 3: Electrical work should be in accordance with all relevant codes of practice and should be carried out by suitably qualified personnel.

Note 4: Metric / Imperial pipe conversions.

Diameter (mm)	6.4	9.5	12.7	15.9	19.0	22.0	28.6
Nominal diameter (inch)	1/4	3/8	1/2	5/8	3/4	7/8	1 1/8

Note 5: Within this manual, O/D = Outdoor unit, M/C = Multi controller, I/D = Indoor unit, R/C = Remote Controller, DIF = Dual Interface.

1. 16:1 SUPER MULTI SYSTEM BASIC COMPONENTS

1.1 16:1 Super Multi Systems

The three systems which can be used with the 16:1 Dual Interface are:

- 2-Pipe Cooling only (R407C)
- 2-Pipe Heat Pump (R407C)
- 3-Pipe Heat Pump with simultaneous heating and cooling (R407C)

1.1.1 2-Pipe Cooling Only

This system allows operation of each indoor unit in cooling.

1.1.2 2-Pipe Heat Pump

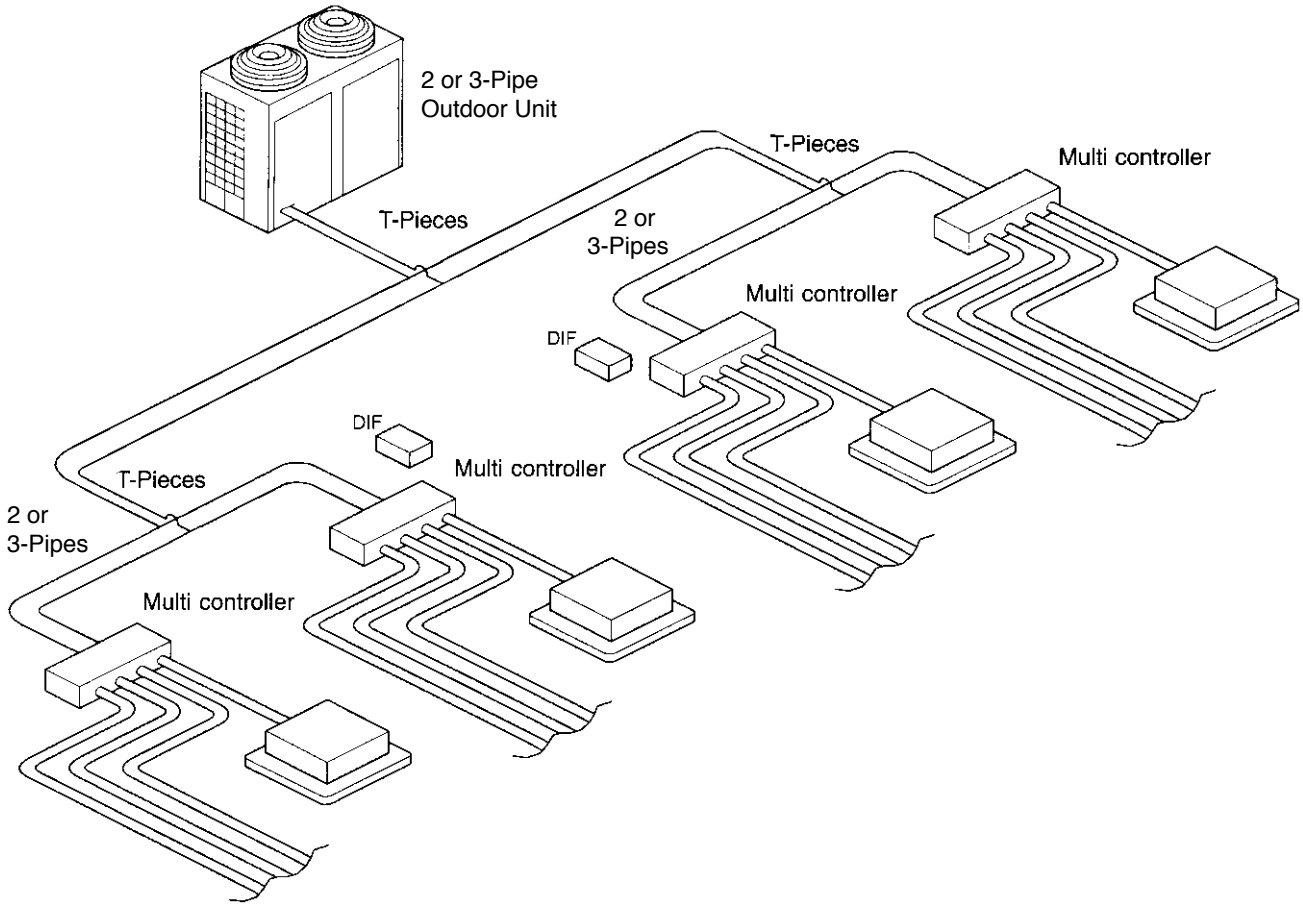
This system allows separate operation of each indoor unit in heating or cooling.

Heating operation has priority over cooling. In the event of an indoor unit requesting cooling operation when another is in heating mode, "STANDBY" will be displayed on the remote controller.

1.1.3 3-Pipe Heat Pump with simultaneous heating and cooling

This system allows separate operation of each indoor unit in either heating or cooling simultaneously.

1.2 System Diagram



2. OUTLINE OF THE CONTROL SYSTEM

The refrigerant and electrical systems of the Super Multi air conditioner are controlled by the Multi Controller and the outdoor unit microprocessors.

All RAV Heat Pump, R407C, 4 series indoor units are compatible with the Super Multi system, i.e. 1 ~ 5 HP.

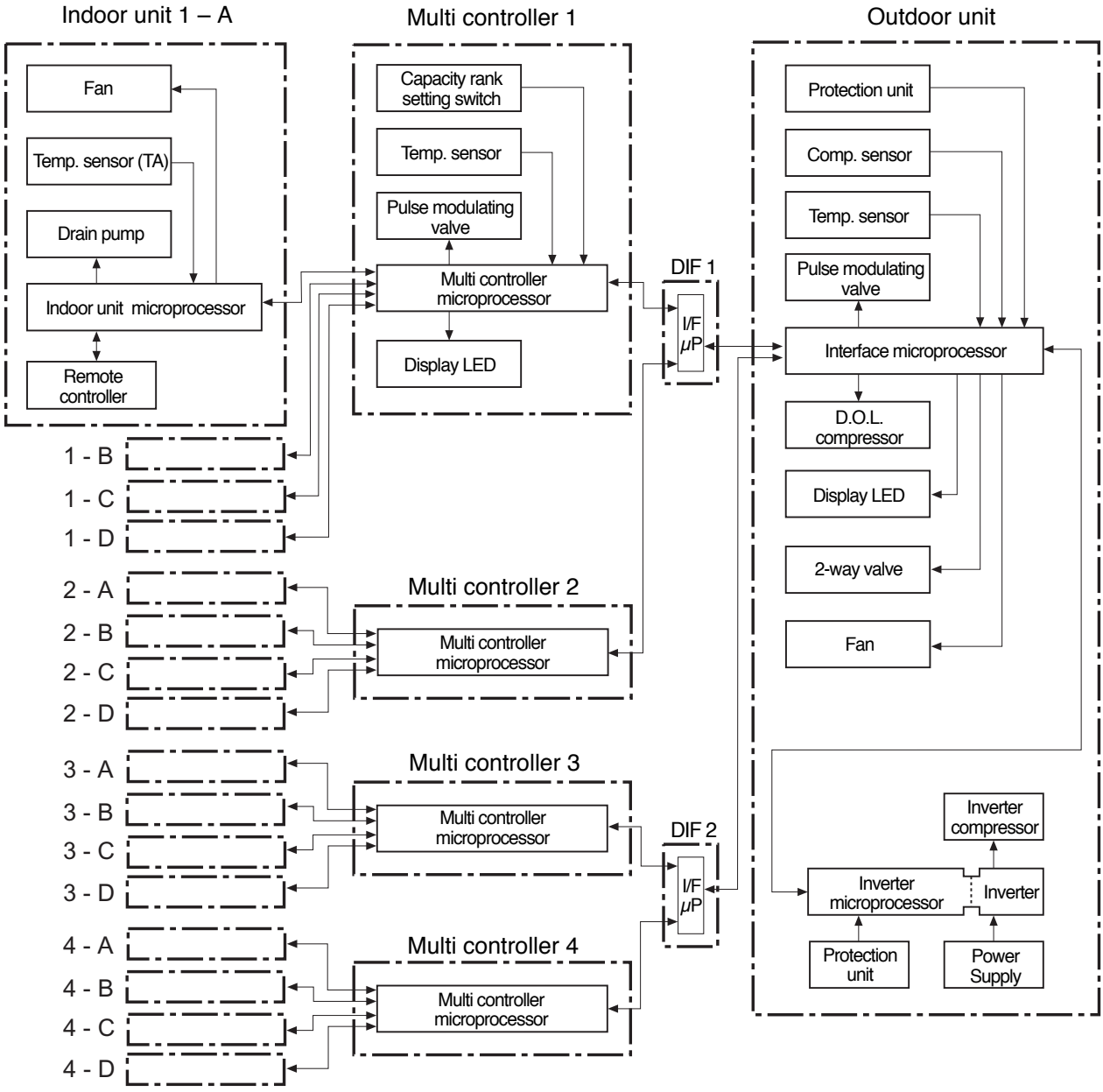
For system operation, initially the microprocessor in each indoor unit calculates the difference between the current room temperature (TA) and the requested temperature which has been set on the remote controller. A demand signal is determined and transmitted to the Multi Controller microprocessor in the form of operation commands, (i.e. ON/OFF, cooling or heating operation mode, operation demand).

The Multi Controller microprocessor receives operation commands from all the indoor units connected, then calculates the accumulative operation command and transmits this information to the Dual Interface microprocessor.

The Dual Interface microprocessor receives the accumulative operation commands from both the Multi Controllers, then combines these signals and transmits this information to the outdoor unit Interface microprocessor.

The Interface microprocessor calculates the capacity required for cooling and/or heating and determines the operation mode of the outdoor unit and the actual frequency of the compressor.

2.1 Control System Diagram



2.2 Combination of Multi Controllers and Indoor Units

Each Indoor unit is allocated a code number according to its capacity rank. Refer to the table below.

Capacity Rank of Indoor unit	Code No.
No connection	0
10	2
13	3
16	4
26	6
36	8
46	10

Example: Indoor unit model RAV-364UH-PE, capacity rank = 36, therefore code No. = 8.

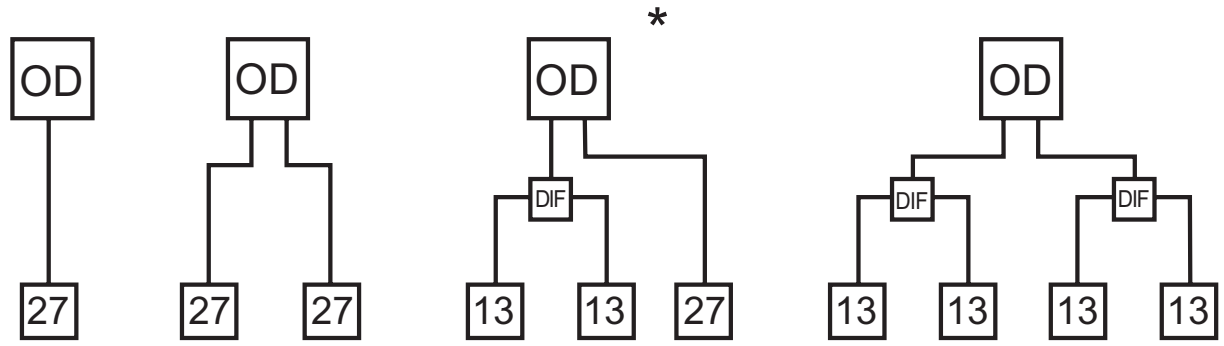
Each indoor unit's capacity rank must be registered on the Multi Controller by the capacity rank setting switches. If the capacity code number is not set correctly, the desired cooling or heating capacity will not be obtained. This could cause the system to malfunction. If the total of the capacity codes exceeds 32 (10HP outdoor unit), the air conditioner will not function.

Multiple indoor units may be connected to each outdoor unit, providing the total indoor code does not exceed the limits shown below.

Number of Multi Conrollers	Maximum No. of Connected Units	Minimum Code No.	Maximum Code No. Per M/C	Maximum System Code No.
1-2	8	2	27	27
3	12	2	13/27*	32
4	16	2	13	32

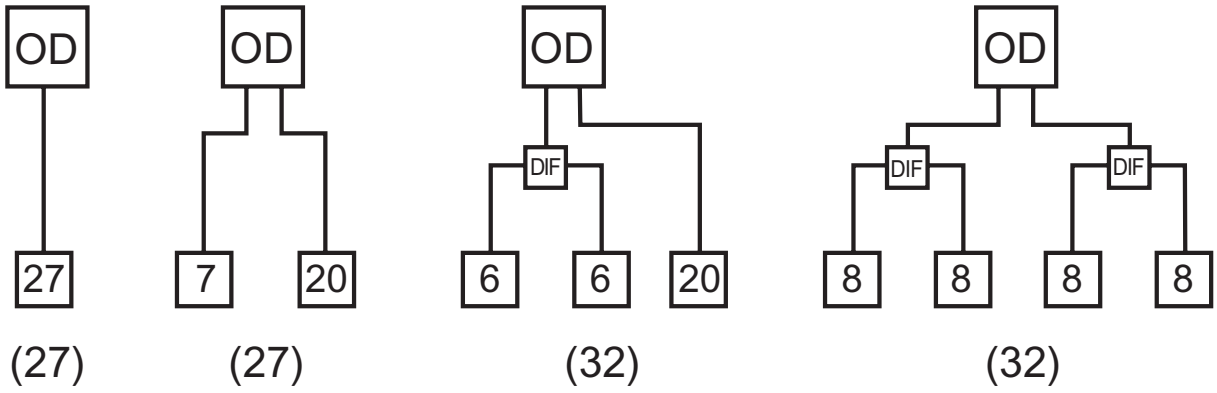
Maximum Codes Possible for **each** Multi Controller

Ensure maximum system code is less than or equal to the stated value.



This accessory is only required if more than 8 indoor units are to be connected.

Example of Maximum System Codes



The numbers of Multi Controllers and Interface kits required for more than 8 units are shown below.

Number of units	Number of 3-Way M/C	Number of 4-Way M/C	Number of kits RBC-16DIF1-PE
1 – 8	Existing System		0
9	3	0	1
10	2	1	1
11	1	2	1
12	0	3	1
13	3	1	2
14	2	2	2
15	1	3	2
16	0	4	2

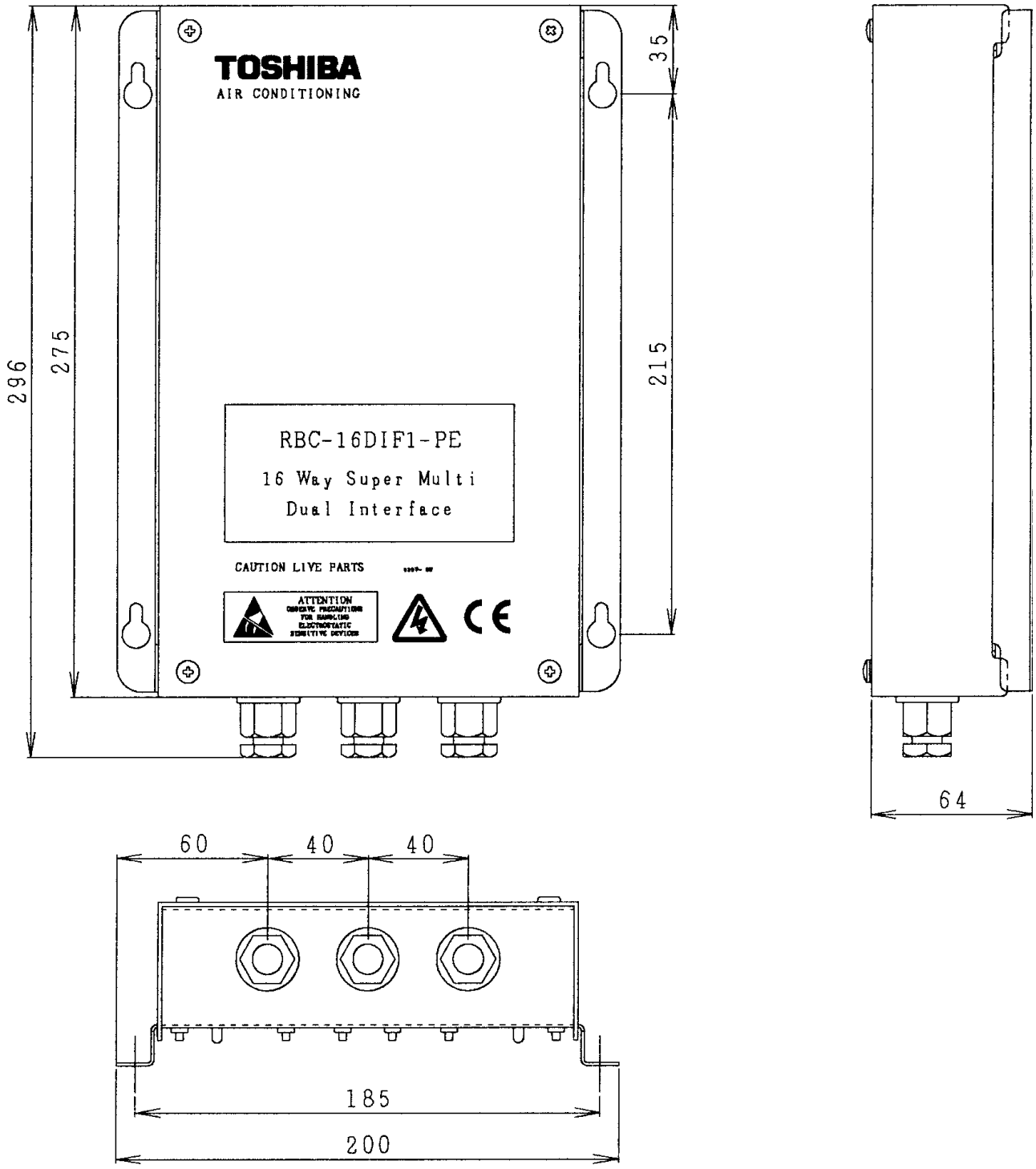
3. SPECIFICATIONS

3.1 Specification of the Dual Interface

Model Name	RBC-16DIF1-PE
System Compatibility	MAR-C104M8-PE
	MAR-M104HTM8-PE
	MAR-F104HTM8-PE
Power Supply	220-240V, 1 Phase 50Hz
Power Consumption	8W
Dimensions	296 x 200 x 64 mm
Net Weight	2.0kg
Colour	White

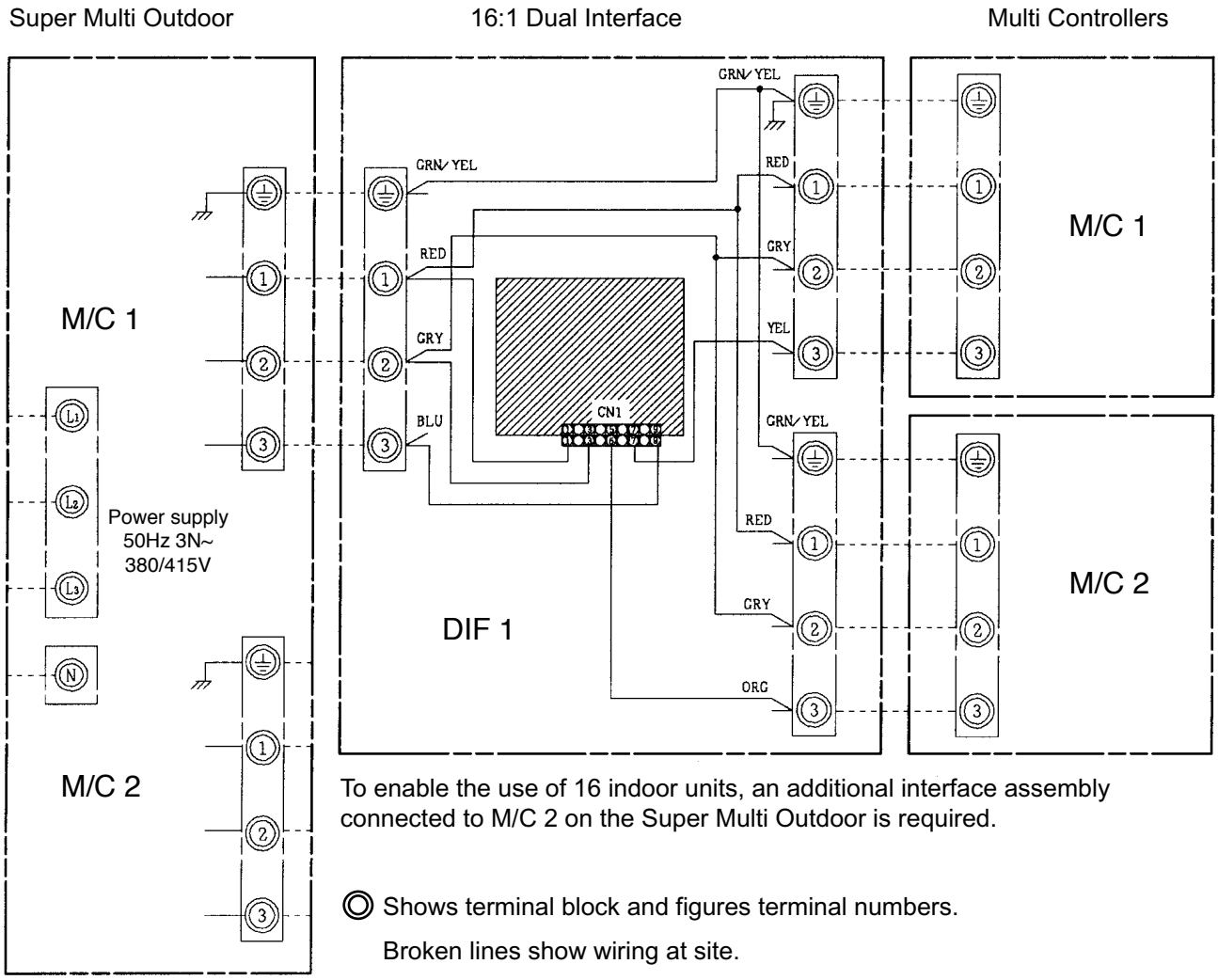
Specifications are subject to change without notice.

4. CONSTRUCTION VIEWS



5. WIRING DIAGRAM

WIRING DIAGRAM – SUPER MULTI 16:1 DUAL INTERFACE



To enable the use of 16 indoor units, an additional interface assembly connected to M/C 2 on the Super Multi Outdoor is required.

◎ Shows terminal block and figures terminal numbers.

Broken lines show wiring at site.

6. PCB SELF TESTING PROCEDURE

Built into the DIF microprocessor is a self testing programme. This can be used to determine if there is any faults with the PCB.

6.1 Procedure

(i) Ensure system is electrically isolated.

(ii) Disconnect connector CN1.

(iii) Set DSW1 as follows; 1 & 3 = ON, 2 & 4 = OFF.

(iv) Connect 230V AC supply to CN1-1 and CN1-3.

(v) Connect CN1-5 and CN1-9 together.

(vi) Apply power, and press SW1 for 2 seconds.

(vii) Check LED1, it should repeatedly flash 3 times at 2.5Hz.

(viii) Disconnect power.

(ix) Disconnect CN1-5 and reconnect it to CN1-7.

(x) Apply power, and press SW1 for 2 seconds.

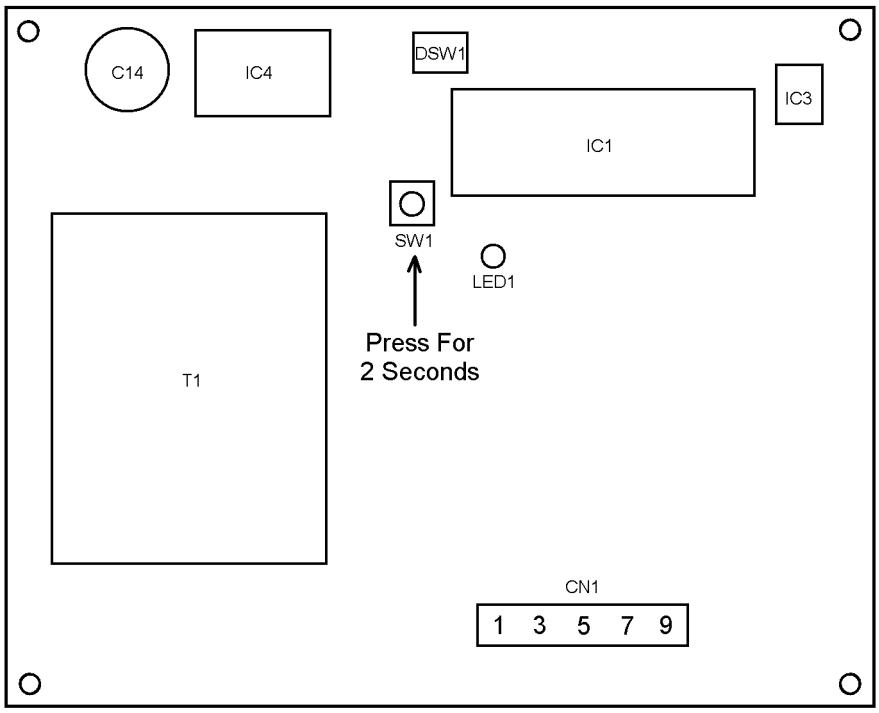
(xi) Check LED1, it should repeatedly flash 4 times at 2.5Hz.

(xii) If any other number of flashes are displayed, then the PCB is faulty.

(xiii) Disconnect power, set DSW1 as follows; 1 – 4 = OFF.

(xiv) Remove all connections to CN1 and replace original connector to CN1.

6.2 PCB Layout



7. FAULT CODE DISPLAY INFORMATION

The remote controller, Multi Controller, Dual Interface and the outdoor unit have the facility to display fault codes which are used to determine any malfunction of the system.

- The remote controller is provided with a "check" button and a check display.
- The Multi Controllers and outdoor units are provided with display switches and LED displays.
- The Dual Interface is provided with an LED display .

Initially malfunctions can be identified from the remote controller check display.

Further details can be obtained from the Multi Controller, Dual Interface and outdoor unit control PCB's.

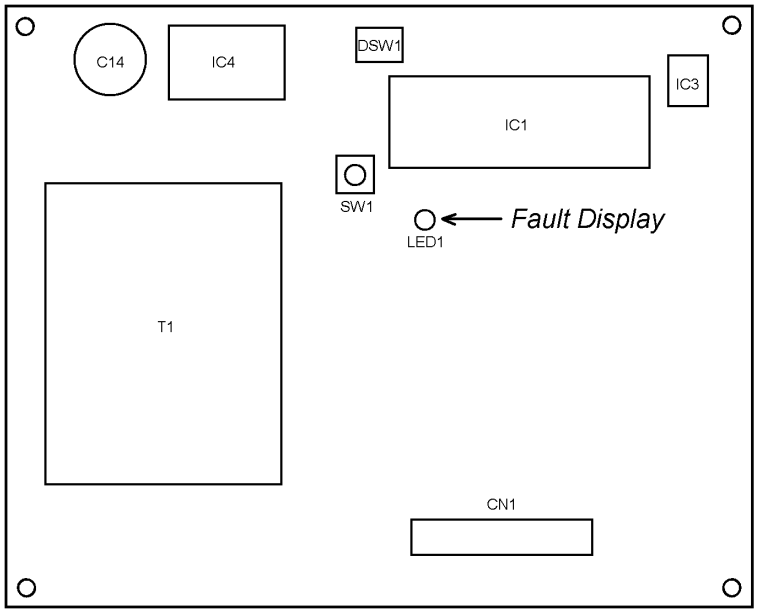
For details on all the codes generated from either the remote control, Multi Controller or the outdoor unit, please refer to the relevant Super Multi Service Manual.

7.1 Dual Interface Fault Codes

The dual interface has a LED which is used to display fault codes, see diagram below. This then can be used to trace the system error.

The table below shows the meaning of the faults which can be displayed. If two or more faults are detected, then only the fault with the highest priority will be displayed.

Fault Description	Number of Flashes	Priority
Power supply sag ~ temporary voltage drop	1	1
Communication type error ~ DSW1 setup incorrect	2	2
Received error from M/C 1	3	3
Received error from M/C 2	4	4
Received error from Outdoor Unit	5	5
(None)	6	6
(None)	7	7
Error receiving signal from Outdoor Unit	8	8



7.2 DSW1 Setup

Switch	Function
DSW1-1	Communication Time Base
DSW1-2	Priority Select (Heating – 2-Pipe Heat Pump Only)
DSW1-3	Communication Type
DSW1-4	Communication Type

7.2.1 DSW1-1

This switch in normal operation should remain OFF. It is only required to be set ON for the PCB self test procedure.

7.2.2 DSW1-2

System priority affects only the 2-Pipe Heat Pump system. Heating has priority over cooling, therefore DSW1-2 should be always set in the OFF position.

7.2.3 DSW1-3 & 4

The type of system can be set using these switches, see table below:

DSW1-4	DSW1-3	System Type Select
OFF	OFF	Auto
OFF	ON	Self Test
ON	OFF	2-Pipe
ON	ON	3-Pipe

7.2.4 Factory Default Settings

Switch	Default
DSW1-1	OFF
DSW1-2	OFF
DSW1-3	OFF
DSW1-4	OFF

8. ADDITIONAL REFRIGERANT

Set the service valves to the fully open position.

The Super Multi outdoor units contain sufficient refrigerant to operate an installation having 5 metres of pipework (factory refrigerant charge).

Refer to the diagram below, when calculating the amount of additional refrigerant required, use only HFC 407C.

The total refrigerant charge must be calculated by weight, and within a tolerance of ±50g.

Prolonged operation with either an overcharge or deficiency in refrigerant will lead to loss of performance, increased running costs and will cause damage to the system. Warranty will be void.

Always record the amount of additional refrigerant , the piping length and the head drop onto the label situated on the cover of the electrical box.

The piping length is the actual one way length of the liquid pipe.

The initial charge is:

Description	Model	Refrigerant Charge	Maximum Gas Charge
10HP 2-Pipe Cooling Only	MAR-C104M8-PE	9.0kg	26.6kg
10HP 2-Pipe Heat Pump	MAR-M104HTM8-PE	16.0kg	36.3kg
10HP 3-Pipe Simultaneous	MAR-F104HTM8-PE	19.0kg	34.3kg

To calculate the additional refrigerant volume, follow the steps below:-

1. The Main Pipe length is taken as the addition of pipes X, Y and Z.
2. The additional gas charge for the "Main Pipes" is dependant on which outdoor unit is installed, only use the line which matches your particular outdoor unit.
3. The Sub pipe length is taken as the addition of the two longest of the four (if 4 Multi Controllers).
4. The Branch pipe lengths must be individually calculated using the 8 longest pipes.
5. Do not attempt to add gas above the maximum shown in the table above.
6. For systems with 2 or less Multi Controllers refer to the additional gas charge section of the Installation Manual supplied with the Super Multi Outdoor Unit.

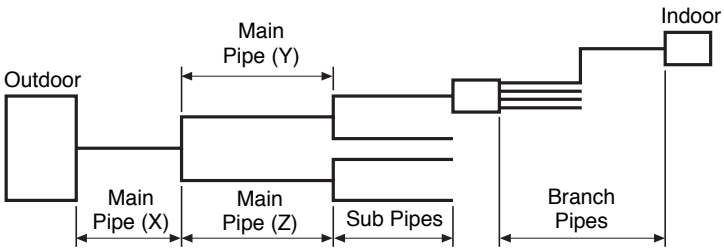


Table 1 – Branch Pipes

RAV-10* : 0.030 kg/m
RAV-13* : 0.030 kg/m
RAV-16* : 0.030 kg/m
RAV-26* : 0.045 kg/m
RAV-36* : 0.045 kg/m
RAV-46* : 0.045 kg/m

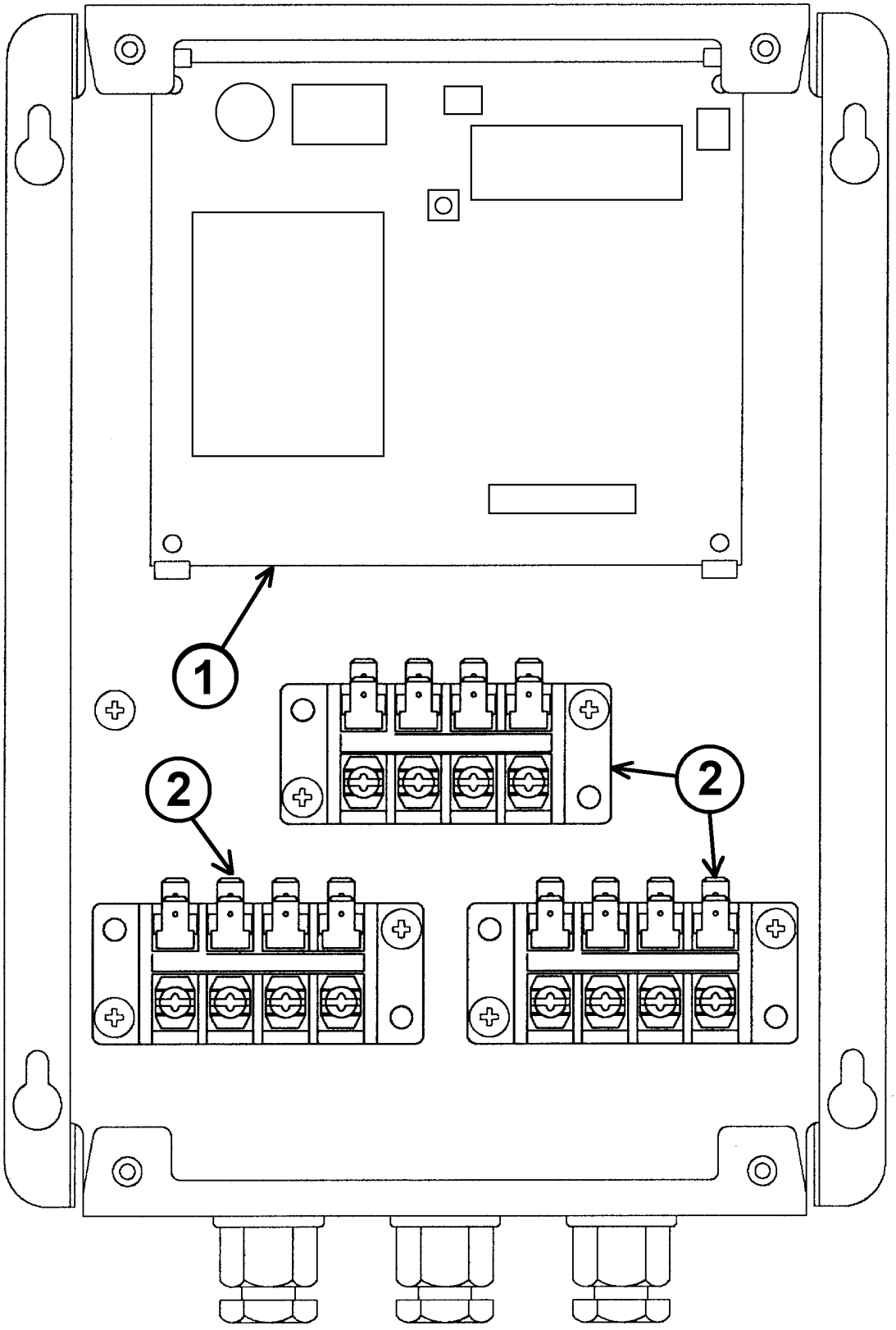
Example:
RAV-464CH-PE ⇨ RAV-46*

Pipe		Additional Gas / Metre		Additional Gas
MAR-C104 ~ Main Pipe (X+Y+Z) (minus 2m)	x	0.140 kg/m	=	
MAR-M104 ~ Main Pipe (X+Y+Z) (minus 2m)	x	0.190 kg/m	=	
MAR-F104 ~ Main Pipe (X+Y+Z) (minus 2m)	x	0.140 kg/m	=	
1st Longest Sub Pipe (minus 1m)	x	0.125 kg/m	=	
2nd Longest Sub Pipe (minus 1m)	x	0.125 kg/m	=	
1st Longest Branch Pipe (minus 2m)	x	Refer to Table 1	=	
2nd Longest Branch Pipe (minus 2m)	x	Refer to Table 1	=	
3rd Longest Branch Pipe (minus 2m)	x	Refer to Table 1	=	
4th Longest Branch Pipe (minus 2m)	x	Refer to Table 1	=	
5th Longest Branch Pipe (minus 2m)	x	Refer to Table 1	=	
6th Longest Branch Pipe (minus 2m)	x	Refer to Table 1	=	
7th Longest Branch Pipe (minus 2m)	x	Refer to Table 1	=	
8th Longest Branch Pipe (minus 2m)	x	Refer to Table 1	=	
		Total Additional Gas Charge	=	_____ kg

9. SERVICE PARTS LIST

Only the parts listed below are available as service items.

Reference Number	Service Part Number	Description
1	43A69015	Dual Interface PCB
2	43A60001	4 Pole Terminal Block



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