

# Installation and Maintenance Instructions

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## SAFETY CONSIDERATIONS

Improper installation, adjustment, alteration, service, maintenance, or use can cause explosion, fire, electrical shock, or other conditions which may cause death, personal injury or property damage. The qualified installer or agency must use factory authorized kits or accessories when modifying this product.

Follow all safety codes. Wear safety glasses, protective clothing, and work gloves. Use quenching cloth for brazing operations. Have fire extinguisher available. Read these instructions thoroughly and follow all warnings or cautions included in literature and attached to the unit. Consult local building codes and the current editions of the National Electrical Code (NEC) ANSI/NFPA (American National Standards Institute/National Fire Protection Association) 70. For Canada, refer to the current editions of the Canadian Electrical Code CSA (Canadian Standards Association) C22.1.

Understand the signal words — DANGER, WARNING, and CAUTION. DANGER identifies the most serious hazards which will result in severe personal injury or death. WARNING signifies hazards that could result in personal

injury or death. CAUTION is used to identify unsafe practices, which could result in minor personal injury or product and property damage.

Recognize safety information. This is the safety-alert symbol (⚠). When this symbol is displayed on the unit and in instructions or manuals, be alert for the potential of personal injury. Installing, starting up, and servicing the equipment can be hazardous due to system pressure, electrical components, and equipment location.

**⚠ WARNING**

Electrical shock can cause personal injury and death. Shut off all power to this equipment during installation. There may be more than one disconnect switch. Tag all disconnect locations to alert others not to restore power until work is completed.

**⚠ WARNING**

When installing the equipment in a small space, provide adequate measures to avoid refrigerant concentration exceeding safety limits due to refrigerant leak. In case of refrigerant leak during installation, ventilate the space immediately. Failure to follow this procedure may lead to personal injury.

**⚠ WARNING**

DO NOT USE TORCH to remove any component. System contains oil and refrigerant under pressure.

To remove a component, wear protective gloves and goggles and proceed as follows:

- a. Shut off electrical power to unit.
- b. Recover refrigerant to relieve all pressure from system using both high-pressure and low pressure ports.
- c. Traces of vapor should be displaced with nitrogen and the work area should be well ventilated. Refrigerant in contact with an open flame produces toxic gases.
- d. Cut component connection tubing with tubing cutter and remove component from unit. Use a pan to catch any oil that may come out of the lines and as a gage for how much oil to add to the system.
- e. Carefully unsweat remaining tubing stubs when necessary. Oil can ignite when exposed to torch flame.

Failure to follow these procedures may result in personal injury or death.

**⚠ CAUTION**

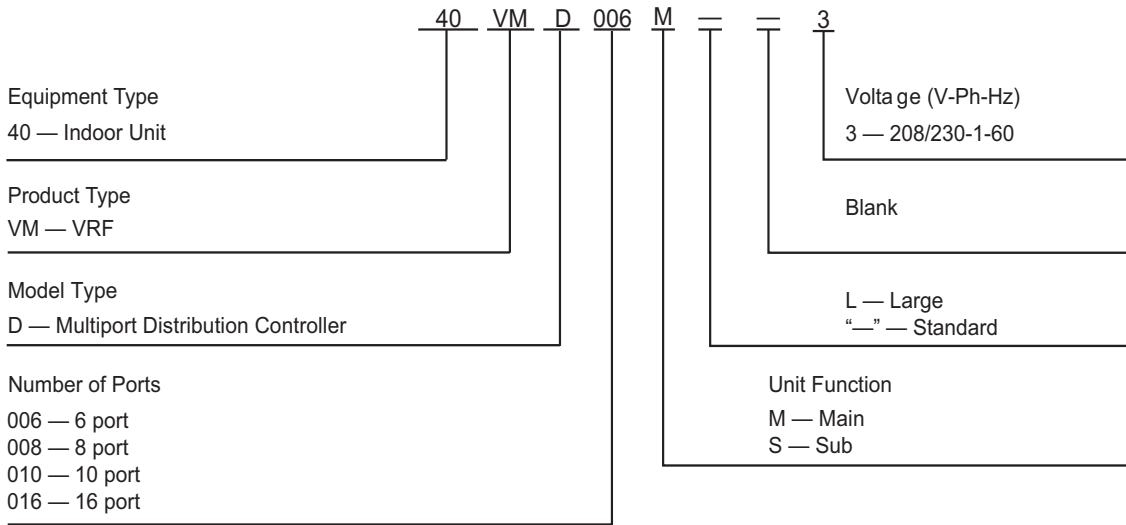
DO NOT re-use compressor oil or any oil that has been exposed to the atmosphere. Dispose of oil per local codes and regulations. DO NOT leave refrigerant system open to air any longer than the actual time required to service the equipment. Seal circuits being serviced and charge with dry nitrogen to prevent oil contamination when timely repairs cannot be completed. Failure to follow these procedures may result in damage to equipment. For information about replacement oil type and viscosity, see the Installation, Start-Up, and Service Instructions for the 38VMAR outdoor unit.

**GENERAL**

The 40VMD multiport distribution controller (MDC) is a distribution box for refrigerant to multiple indoor fan coil units installed in a given heat recovery system.

The equipment is initially protected under the manufacturer’s standard warranty; however, the warranty is provided under the condition that the steps outlined in this manual for initial inspection, proper installation, regular periodic maintenance, and everyday operation of the unit be followed in detail. This manual should be fully reviewed in advance before initial installation, start-up and any maintenance. Contact your local sales representative or the factory with any questions BEFORE proceeding.

See Fig. 1 for model number nomenclature. Figure 2 shows the unit dimensions. Table 1 lists physical data for each unit size. Table 2 shows components that may or may not be used for a particular installation.



**LEGEND**

**VRF** — Variable Refrigerant Flow

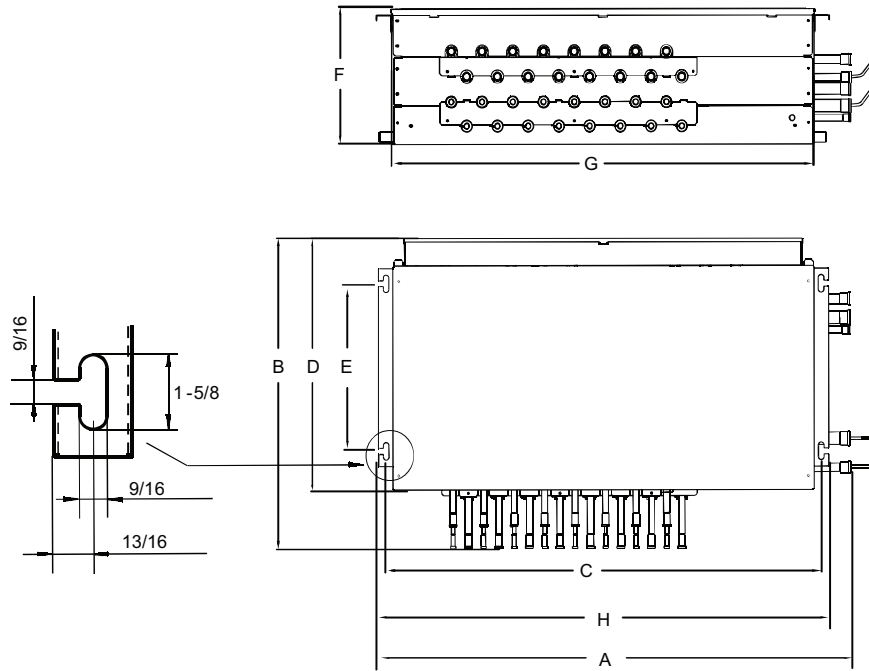
**Fig. 1 —Model Number Nomenclature**

**Table 1 — 40VMD MDC Physical Data**

UNIT 40VMD	006	008	010	016	016L
<b>POWER SUPPLY (V-Ph-Hz)</b>	208/230-1-60				
<b>NUMBER OF PORTS</b>	6	8	10	16	16
<b>UNIT</b>					
Unit Dimensions, W x H x D (in.)	37 x 12-3/4 x 22-5/8			46-1/2 x 12-3/4 x 22-5/8	
Packing Dimensions, W x H x D (in.)	44-1/2 x 18 x 33-1/8			53-7/8 x 18 x 33-1/8	
Main MDC Net/Gross Weight (lb)	132/205	137/209	143/216	190/269	196/273
Sub-MDC Net/Gross Weight (lb)	126/198	130/203	137/209	183/262	
<b>DESIGN PRESSURE, High/Low (psig)</b>	580/320				
<b>CONNECTING WIRING</b>					
Power Wiring	Sized per NEC and local codes based on nameplate electrical data				
Signal Wiring	2-core shielded twisted pair cable 20 AWG - 16 AWG				
<b>CONDENSATE DIAMETER, OD (in.)</b>	1				

**LEGEND**

**AWG** — American Wire Gage  
**NEC** — National Electrical Code  
**MDC** — Multiport Distribution Controller



40VMD MODEL SIZE	DIMENSIONS (in.)							
	A	B	C	D	E	F	G	H
006	39 1/4	27 1/2	35 3/8	22 5/8	13 7/8	12 3/4	33 7/8	37
008								
010								
016/016L	48 3/4		44 7/8				43 1/4	46 1/2

NOTE: All dimensions shown in inches.

**Fig. 2 — 40VMD Dimensional Drawing**  
**Table 2 — Components Shipped With Unit**

NAME	SHAPE	QUANTITY	FUNCTION
Adapter pipe for liquid line		Same as MDC ports	Use for indoor unit (capacity 05~15Btu/h)
Adapter pipe for gas line		Same as MDC ports	
Adapter pipe for liquid line		2	Use for the connecting between the main MDC and 1 sub MDC unit (available only with the sub MDC)
Adapter pipe for low pressure line		2	
Adapter pipe for high pressure line		2	
Clamp		2	To fasten the connector between flexible condensate pipe and MDC condensate
Condensate connection		2	Reducer for smaller pipe diameter (only for size 018 unit)
PQE connection wire		No. of Ports + 3	Connect outdoor unit, indoor unit and MDC
Adapter pipe (for High pressure line)		1	Only for 40VMD016ML-3; used for connection to 072-240 size outdoor unit.
Adapter pipe (for Low pressure line)		1	

LEGEND  
**MDC** – Multiport Distribution Controller

## INSTALLATION

**Step 1 — Unpack and Inspect Units** — Units are packaged for shipment to avoid damage during normal transit and handling. It is the receiving party's responsibility to inspect the equipment upon arrival. Any obvious damage to the carton and/or its contents should be reported on the bill of lading and a claim should be filed with the transportation company and the factory. Unit should always be stored in a dry place, and in the proper orientation as marked on the carton.

### CAUTION

To avoid equipment damage, do not lift unit by the drain pipe or refrigerant piping. Unit should be lifted using the mounting brackets.

After determining the condition of the carton exterior, carefully remove each unit from the carton and inspect for hidden damage. Any hidden damage should be recorded, a claim should be filed with the transportation company, and the factory should be notified. In the event a claim for shipping damage is filed, the unit, shipping carton, and all packing must be retained for physical inspection by the transportation company. All units should be stored in the factory shipping carton with internal packaging in place until installation.

### PROTECTING UNITS FROM DAMAGE

Do not apply force or pressure to the piping or drain stub-outs during handling. All units should be handled by the chassis or as close as possible to the unit mounting point locations.

The unit must always be properly supported. Temporary supports used during installation or service must be adequate to hold the unit securely. To maintain warranty, protect units against hostile environments (such as rain, snow or extreme temperature), theft, vandalism, and debris on jobsite. Equipment covered in this manual is not suitable for outdoor installations. Do not allow foreign material to fall into drain pan. Some units and/or job conditions may require some form of temporary covering during construction.

### PREPARING JOBSITE FOR UNIT INSTALLATION

To save time and to reduce the possibility of costly errors, set up a complete sample installation in a typical room at jobsite. Check all critical dimensions such as pipe and wire connection requirements. Refer to job drawings and product dimension drawings as required. Instruct all trades in their parts of the installation. Units must be installed in compliance with all applicable local code requirements.

### IDENTIFYING AND PREPARING UNITS

Be sure power requirements match available power source. Refer to unit nameplate and wiring diagram. In addition:

- Check all tags on unit to determine if shipping screws are to be removed. Remove screws as directed.

## Step 2 — Position the Unit

### DANGER

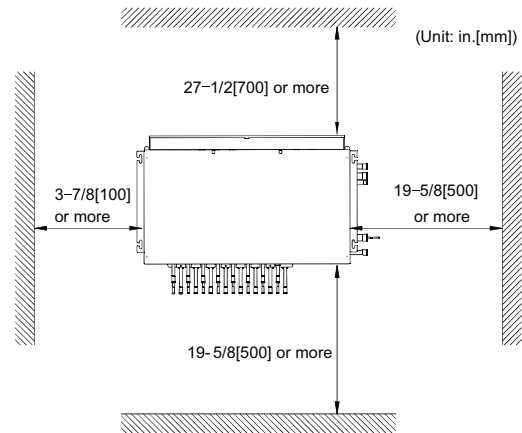
Units must not be installed where they may be exposed to potentially explosive or flammable atmosphere. If this instruction is not followed exactly, a fire or explosion may result, causing property damage, injury, or loss of life.

Install the unit in a location that meets the following requirements:

- Allow adequate space for installation, service clearance, piping, and electrical connections. For specific unit

dimensions, refer to Table 1 and Fig. 2. Allow clearance according to local and national codes.

- Confirm that the ceiling is able to support the weight of the unit. See Table 1 for nominal weight.
- There should be enough room within the false ceiling for installation and maintenance (see Fig. 3).
- The false ceiling should be horizontal and leveled.
- See Fig. 3 below.



**Fig. 3 — False Ceiling Required Clearance**

Select the unit position with the following points in mind:

- The unit should be installed in a position that is suitable to support the total weight of the unit, refrigerant piping and condensate.
- Proper access should be provided for maintenance for refrigerant piping. A 2-ft clearance is recommended all around the unit for service.
- The unit should not be positioned directly above any obstruction.
- The unit must be installed square and level.
- The condensate drain should have sufficient downward slope (1 in. per 100 in.) in any horizontal run between unit and drain.

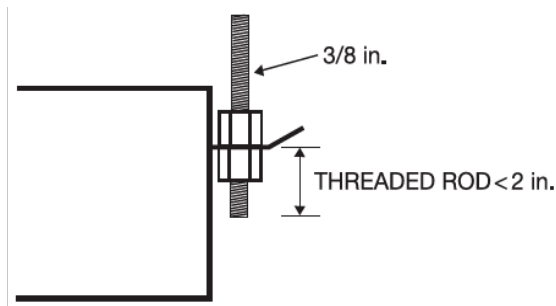
**IMPORTANT:** Be sure that the ceiling grid is supported separately from the unit. The ceiling grid must not be supported by any part of the unit or any associated wiring or piping work.

## Step 3 — Mount the Unit

**INSTALLING HANGER BOLTS** — Install the hanger bolts at the locations shown in Fig. 2, top view. Use 3/8-in. all-threaded rod. For unit weight, see Table 1.

**MOUNTING UNIT** — The unit can now be lifted on to the hanging rods for mounting.

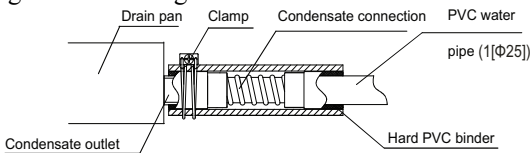
1. Use rods and fasteners to suspend the unit at the factory-provided mounting holes.
2. Adjust the height of the unit until the bottom is level with the false ceiling, with adequate space to provide enough pitch for the drain.
3. Secure the unit in position with locknuts and washers on both sides of the mounting bracket. Ensure that the threaded rod does not protrude more than 2 inches below the mounting brackets as shown in Fig. 4.



**Fig. 4 — Threaded Rod**

**Step 4 — Connect Piping**

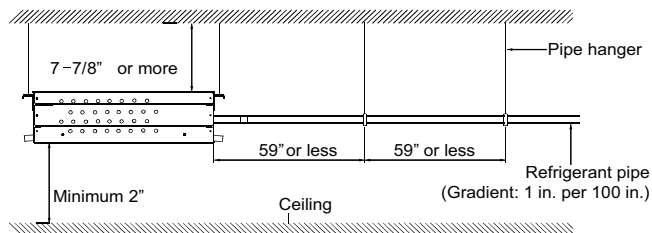
**CONDENSATE PIPING** — The unit is supplied with a 1 inches OD drain connection to connect copper or PVC drain piping as shown in Fig. 5.



**Fig. 5 — Connecting the Condensate Drain**

When installing condensate piping, follow these recommendations:

- Condensate piping should slope downward in the direction of condensate flow, with a minimum gradient of 1 in. per 100 inches.
- Condensate piping must not be installed where it may be exposed to freezing temperatures.
- Condensate pipe hangers should be spaced 59 in. or less between hangers.
- For additional recommendations see Fig. 6.



**Fig. 6 — Space Required for Condensate Drain Installation**

**REFRIGERANT PIPING**

**CAUTION**

Multipoint Distribution Controller’s (MDCs) are shipped from the factory with brazed caps on all lines and pressurized with nitrogen to keep the system clean. Cutting the tip relieves the pressure in the system. Cut all the tips on the MDC piping prior to removing any brazed caps. Failure to cut the tip before removing the brazed cap may cause equipment damage or personal injury.

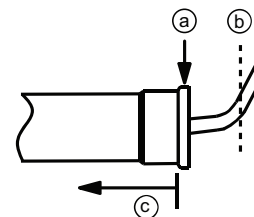
When connecting refrigerant piping follow these procedures:

- The refrigerant piping should be dry and free of dust and other impurities.
- The number of bends in the refrigeration piping must be fewer than 15.
- The bending angle of the refrigerant pipe should not exceed 90 degrees and the bending radius should be as large as possible to prevent any breakage in piping.
- Use a torque wrench for flare nuts. Refer to Table 3 for flare nut torque recommendations.

**Table 3 — Flare Nut Torque Recommendations**

Outside Diameter (in.)	Recommended Torque (ft-lb)
1/4	15
3/8	26
1/2	41
5/8	48

- Before connecting any piping to the MDC cut the tips off every gas and liquid pipe of the MDC unit to release the gas in the system as shown in Fig. 7, even if the pipe is not being used for this installation.



**LEGEND**  
 a — Brazed Cap  
 b — Cut Here  
 c — MDC Unit

**Fig. 7 — Cutting the Tip off the Gas and Liquid Lines**

**PIPING BETWEEN MDC AND INDOOR UNIT —**

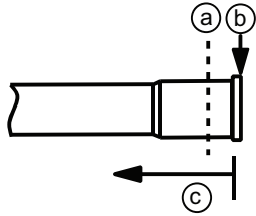
When connecting indoor units to an MDC follow these procedures:

- Check maximum height drop and length of refrigerant piping between the indoor units and MDC. To ensure the drop and length are acceptable, refer to the refrigerant piping allowable limits in the manual.
- Refrigerant piping connection between indoor units should be performed once the units are secured at their respective installation locations.
- The refrigeration piping starts at the indoor unit and ends at the MDC.
- Before insulating the suction and liquid refrigeration pipes, perform pressure and leak tests. For details, see the outdoor unit installation manual. Insulating both suction and liquid refrigerant pipes is mandatory.
- Vacuuming and charging of the system should be carried out as described in the outdoor unit installation manual.

**CAUTION**

MDCs are shipped from the factory with brazed caps on all lines and pressurized with nitrogen to keep the system clean. Failure to remove the brazed cap before connecting piping will result in equipment malfunction or damage.

- Before connecting piping between the indoor units and the MDC remove the brazed cap as shown in Fig. 8. Depending on the size of the connecting pipe the brazed cap may be left on or removed.



**LEGEND**

- a — Cut Here
- b — Brazed Cap
- c — MDC Unit

**Fig. 8 —Removing the Brazed Cup**

- Table 4 shows the piping diameters to use when connecting the indoor units and the MDC.
- Table 5 and 6 show how to connect the liquid and gas lines to the indoor units.
- Table 7 shows the number of indoor units that can be connected to the MDC and sub MDC.

**Table 4 — Piping Diameter Between MDC and Indoor Units**

INDOOR UNIT (kBtu/h)	LIQUID SIDE (in.)	GAS SIDE (in.)
5, 7, 9, 12, 15	1/4	1/2
18, 24, 30, 36, 48, 54	3/8	5/8
72	3/8	7/8
96	3/8	7/8

**Table 5 — Connecting Gas Pipes to the Indoor Unit**

INDOOR UNIT CAPACITY (kBtu/h)	CONNECTION DIAGRAM
5, 7, 9, 12, 15	
18, 24, 27, 30, 36, 48, 54	

**LEGEND**

- a — MDC Unit
- b — Pipe Accessory
- c — Pipe 1/2
- d — Pipe 5/8

**Table 6 — Connecting Liquid Pipes to the Indoor Unit**

INDOOR UNIT CAPACITY (kBtu/h)	CONNECTION DIAGRAM
5, 7, 9, 12, 15	
18, 24, 27, 30, 36, 48, 54	

**LEGEND**

- a — MDC Unit
- b — Pipe Accessory
- c — Pipe 1/4
- d — Pipe 3/8

**Table 7 — Combination Table**

MDC IMAGE	MAINMDC	MAX NUMBER OF INDOOR UNITS CONNECTED TO MAIN MDC	MAX NUMBER OF SUB MDC	MAX NUMBER OF INDOOR UNITS CONNECTED TO SUB MDC	MAX CAPACITY OF TOTAL INDOOR UNIT (kBtu/h)		
					MAIN MDC	SUB MDC (1)	SUB MDC (2)
	006	12	2	24	324	126	168
	008	16					
	010	20					
	016	32					
	016L	32					

## Nitrogen Purge for MDC Brazing —

- Expansion Valves (EXVA~C) in MDC units are shipped from factory opened to 120 pulses.
- Expansion valves for indoor units also have an initial opening from the factory. ②
- During brazing, purge with high-purity nitrogen from ODU high and low pressure service valves. Recommended nitrogen flow rate is approximately 1.76 ft<sup>3</sup>/h\*. This is brazing sequence for ① → ③

\* Note that the flow capacity through this system is limited, so you cannot “blow” through the lines with a high flow of nitrogen. The line can only be slowly purged according to the flow rate mentioned above.

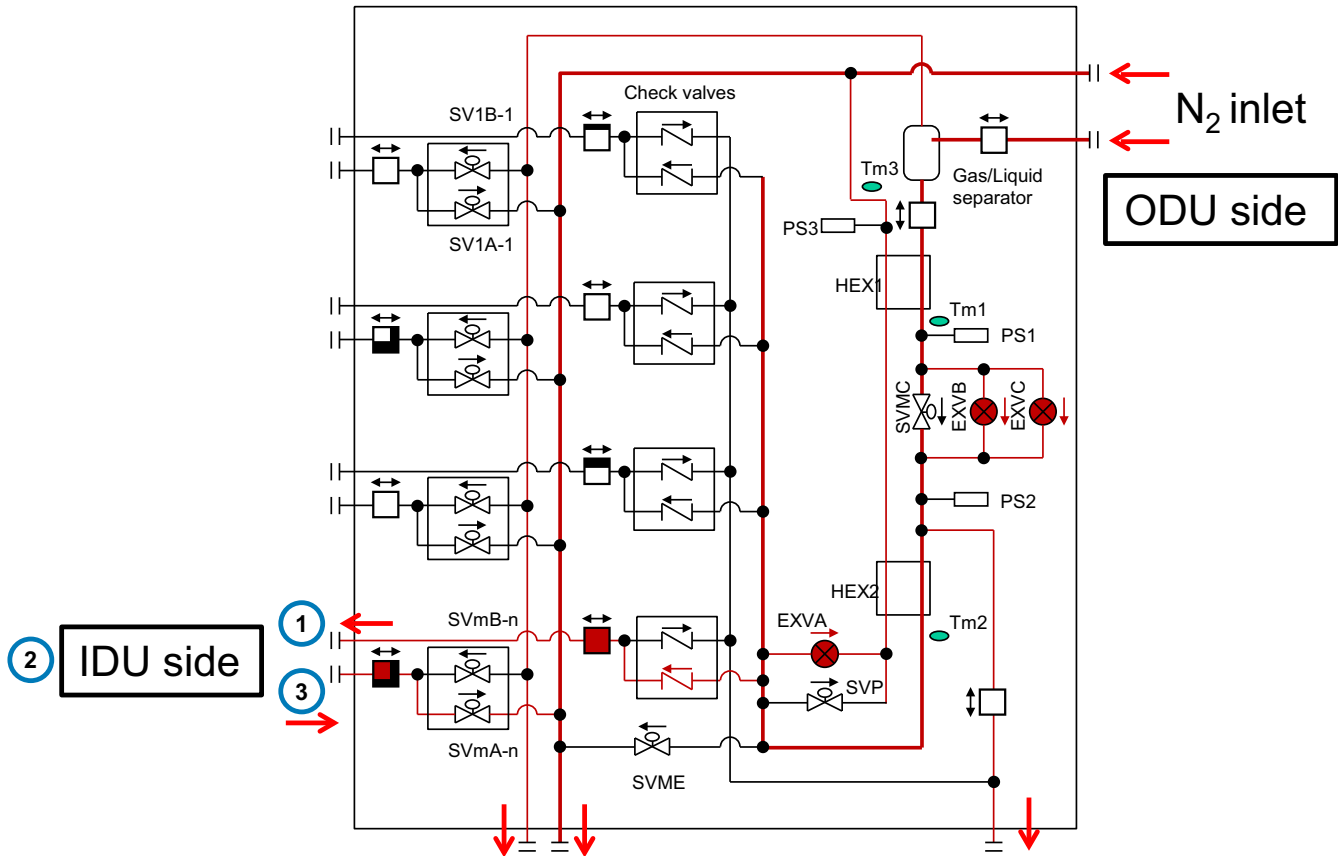


Fig. 9 —Nitrogen Purge for MDC Brazing

TWINNING MDC PORTS

**⚠ CAUTION**

Connecting an indoor unit with a capacity greater than 54 kBtu/h may result in damage to equipment.

For indoor units with capacities greater than 54 kBtu/h, two MDC ports must be twinned using the Y-joint to create a single port. The two ports to be paired should be next to each other. Refer to Y-joint “G” in the piping layout; see Fig. 10. The first port of the pair should have an odd number and second port should be the next sequential even number. For example: 1 and 2, 3 and 4, or 5 and 6 and so on. You cannot pair 2 and 3, 4 and 5, or 6 and 7.

Table 8 shows the pipe diameters to use when connecting the MDC and the Y-joint.

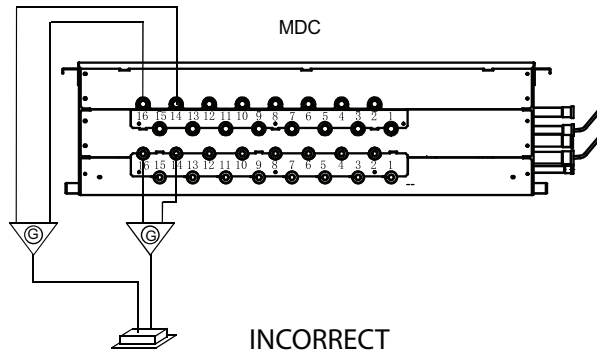
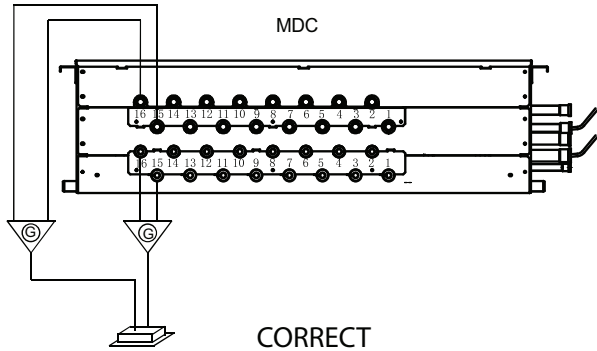
**Table 8 — Piping Between the MDC and Y-Joint**

TOTAL CAPACITY OF INDOOR UNITS (kBtu/h)	LIQUID PIPE (in.)	GAS PIPE (in.)
≥ 54	3/8	5/8

PIPING BETWEEN MDC AND SUB MDC — 3 pipes are used to connect the main MDC and the sub MDC. Selection of the Sub MDC should follow the requirements of Table 9. For connecting the sub MDC to main MDC, use the high pressure, low pressure and liquid pipes as shown in Fig. 10 and 11.

**Table 9 —Sub MDC Selection**

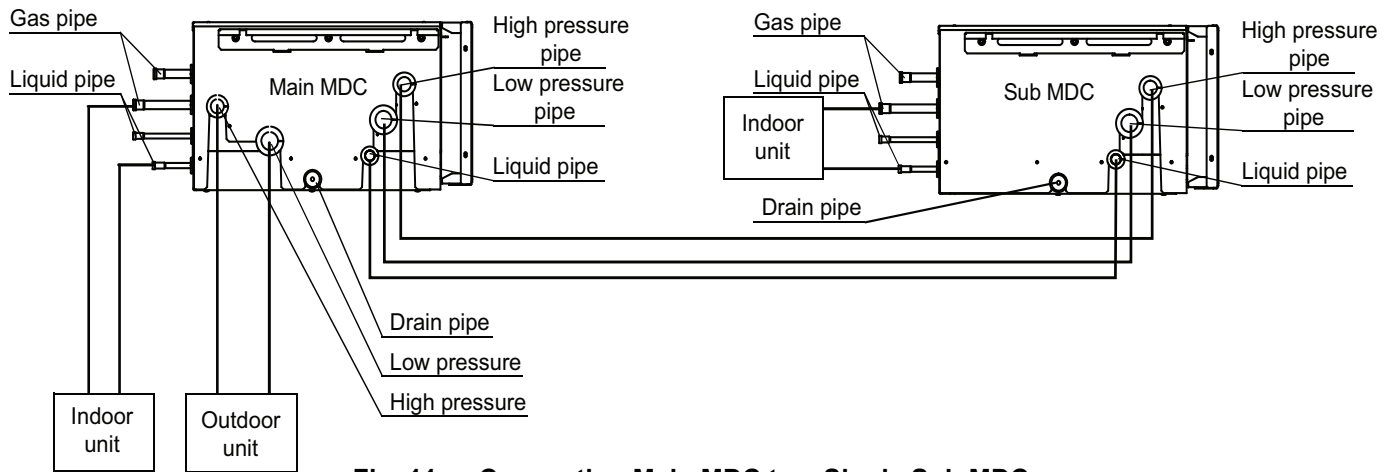
MAIN MDC MODEL	SUB MDC UNIT
006	006
008	006
	008
010	006
	008
	010
016/016L	006
	008
	010
	016



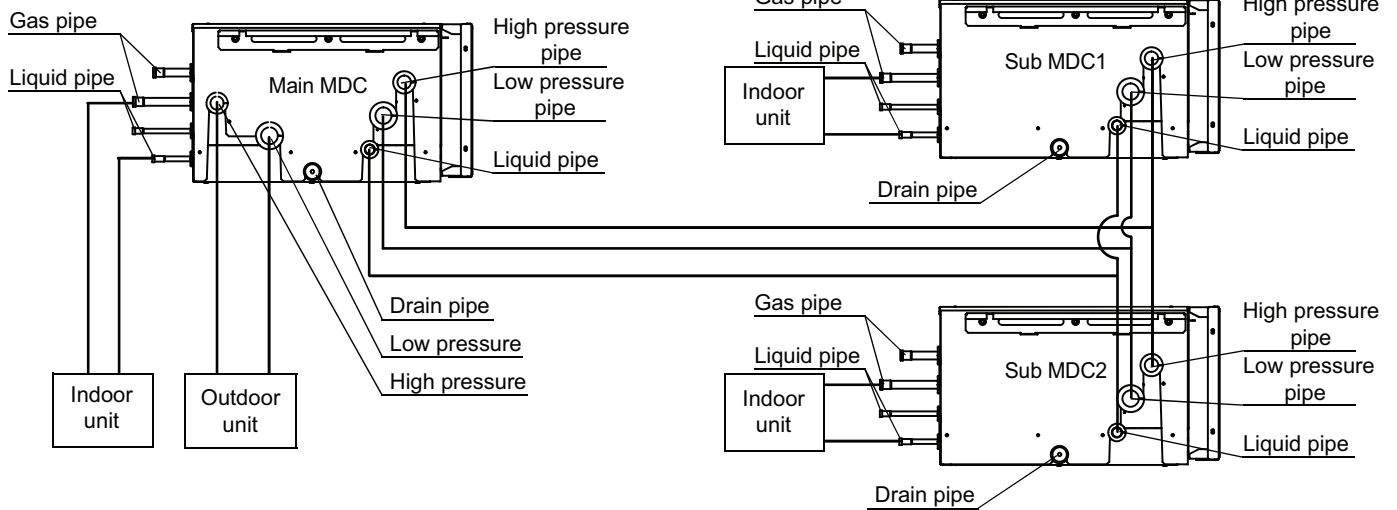
LEGEND  
G — Y-Joint

**Fig. 10 — Twinning Ports with the Y-Joint**





**Fig. 11 — Connecting Main MDC to a Single Sub MDC**



**Fig. 12 — Connecting Main MDC to Two Sub MDCs**

Refer to Table 10 for suggested pipe diameters. When connecting high pressure, low pressure, and liquid pipes between main MDC and sub MDC refer to Tables 11-13.

**Table 10 — Piping Between Main MDC and Sub MDC**

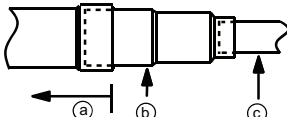
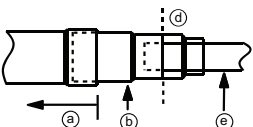
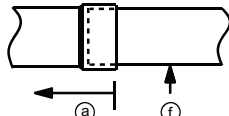
DOWNSTREAM TOTAL CAPACITY OF INDOOR UNITS (kBtu/h)	HIGH PRESSURE SIDE (in.)	LOW PRESSURE SIDE (in.)	LIQUID SIDE (in.)
~72	5/8	3/4	3/8
73~108	3/4	7/8	
109~126		7/8	1 1/8
127~144	5/8		
145~168			

**Table 11 — Connecting Liquid Pipes Between Main MDC and Sub MDC**

INDOOR UNIT CAPACITY (kBtu/h)	CONNECTION DIAGRAM
~108	
109~144	
145~168	

- LEGEND**
- a — MDC Unit
  - b — Sub MDC Pipe Accessory
  - c — Pipe 3/8
  - e — Pipe 1/2
  - f — Pipe 5/8

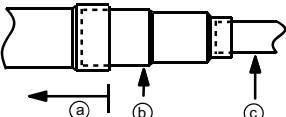
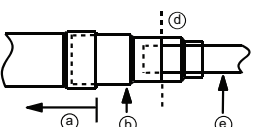
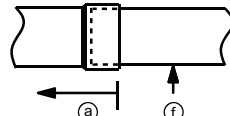
**Table 12 — Connecting Low Pressure Pipes Between Main MDC and Sub MDC**

INDOOR UNIT CAPACITY (kBtu/h)	CONNECTION DIAGRAM
72	
73~108	
109~168	

**LEGEND**

- a — MDC Unit
- b — Sub MDC Pipe Accessory
- c — Pipe  $\frac{3}{4}$
- d — Cut Here
- e — Pipe  $\frac{7}{8}$
- f — Pipe  $1\frac{1}{8}$

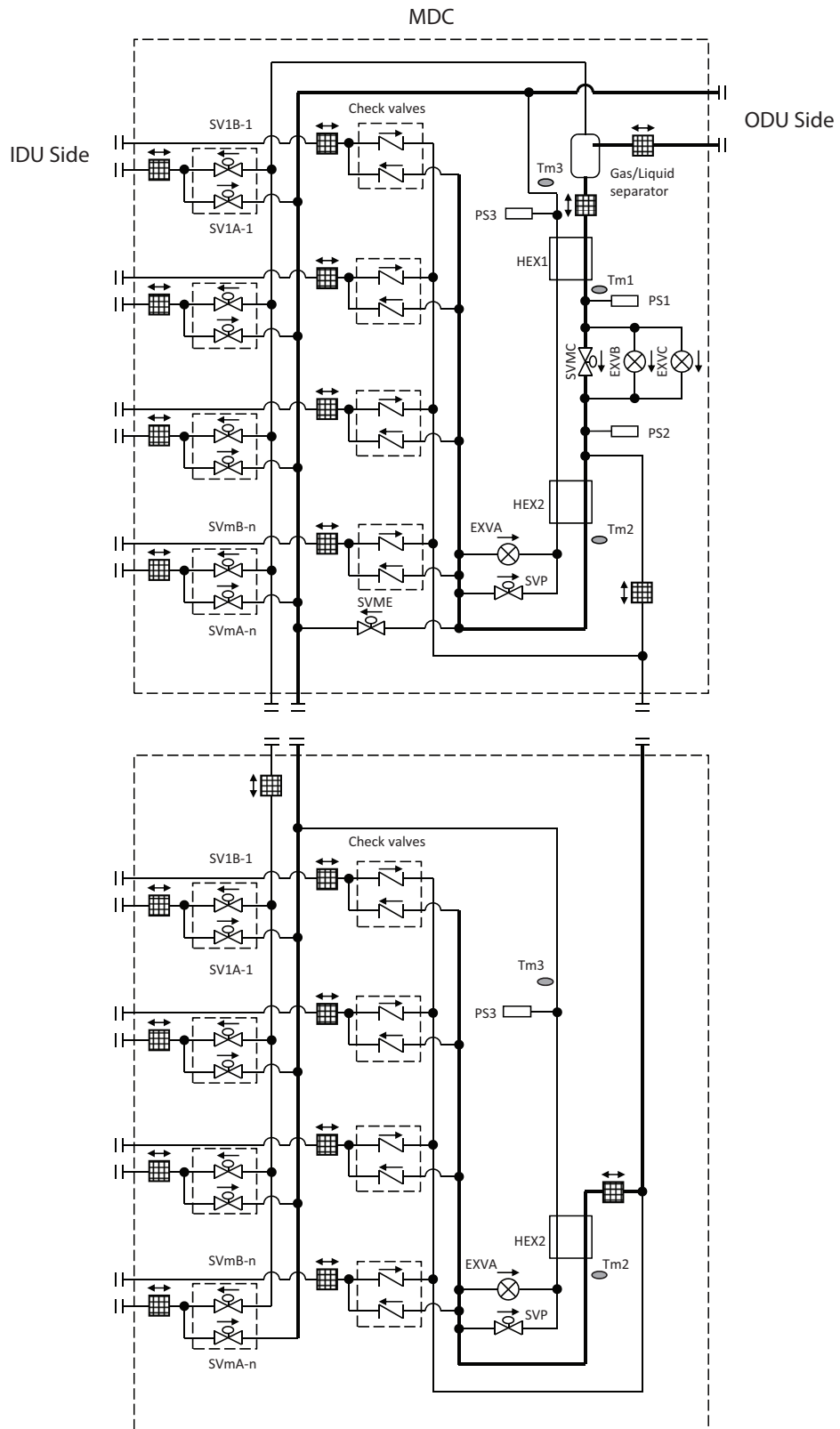
**Table 13 — Connecting High Pressure Pipes Between Main MDC and Sub MDC**

INDOOR UNIT CAPACITY (kbtu/h)	CONNECTION DIAGRAM
72	
73~126	
127~168	

**LEGEND**

- a — Sub MDC unit
- b — Pipe Accessory
- c — Pipe  $\frac{5}{8}$
- d — Cut here
- e — Pipe  $\frac{3}{4}$
- f — Pipe  $\frac{7}{8}$

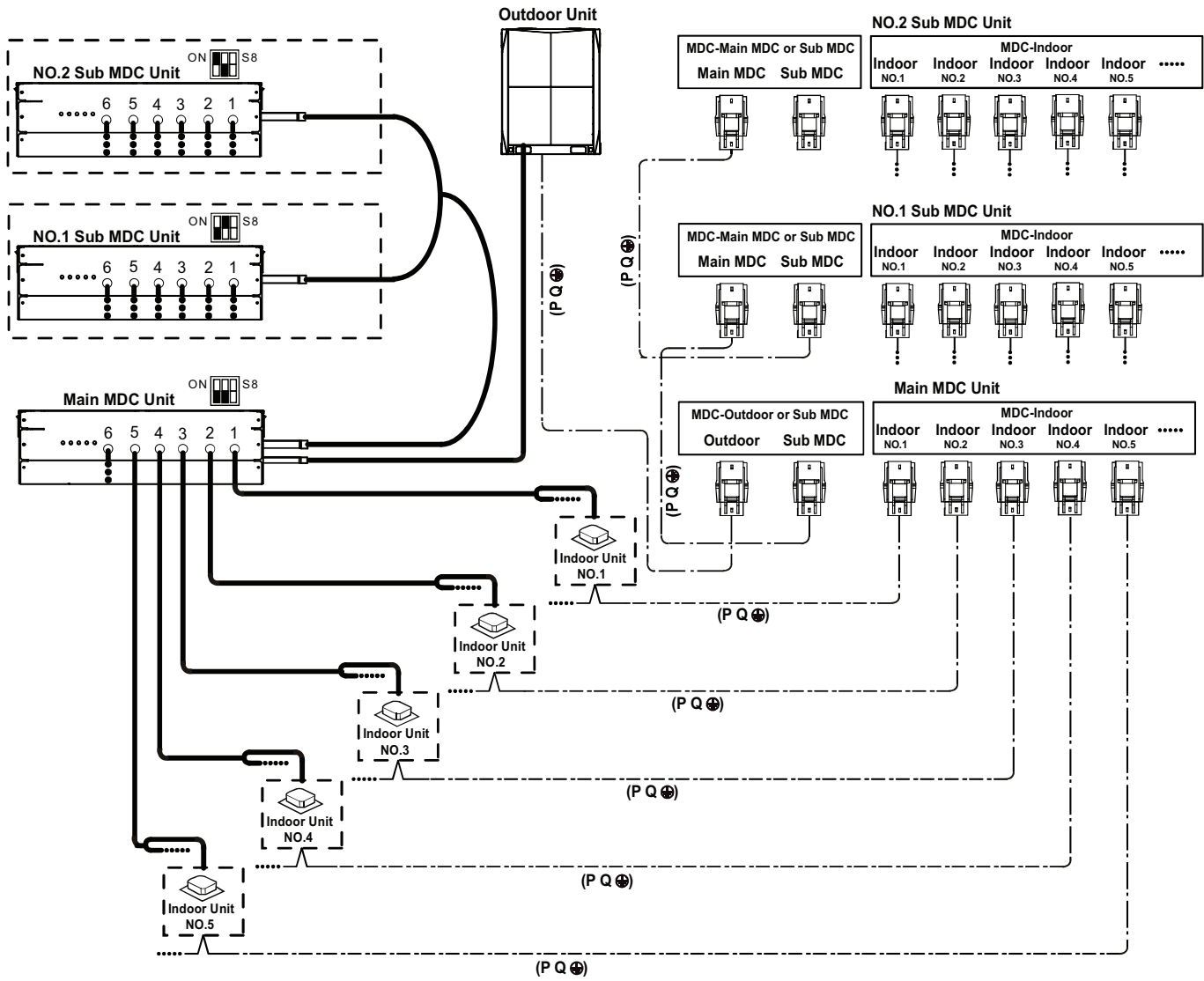
For typical wiring and piping see Fig. 13. For a typical example of running the refrigerant pipes see Fig. 14.



**LEGEND**

- EXV\*** — Expansion Valve
- HEX** — Heat Exchanger
- PS** — Pressure Sensor
- SV\*A-\*, SV\*B-\*, SVM\*, SVP** — Solenoid Valve
- Tm** — Temperature Sensor

**Fig. 13 —Typical Refrigerant Piping for MDC**



**LEGEND**

- MDC** — Multiport Distribution Controller
- Piping Line
- - - Control Wiring

NOTE: Field wiring must use copper conductors only.

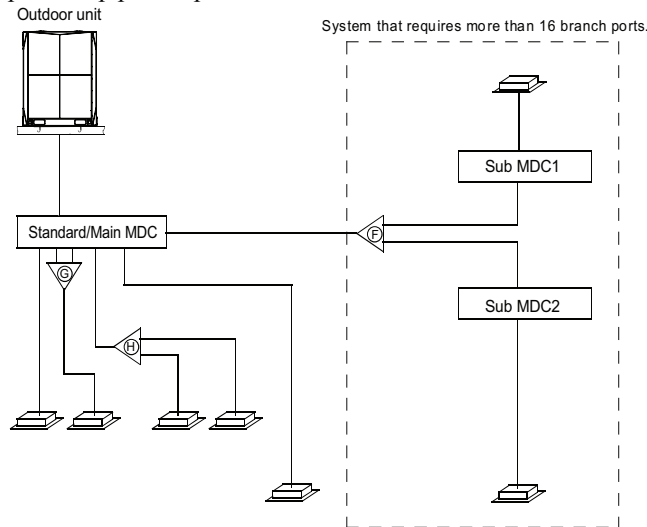
**Fig. 14 — Piping and Wiring Connections**

## PIPING BETWEEN MDC AND OUTDOOR UNIT

### CAUTION

When connecting from an indoor unit to an outdoor unit, the isolation valve at the outdoor unit should be in the closed position throughout the refrigerant piping process. Failure to follow this procedure may result in equipment damage.

Figure 15 shows the typical piping layout between the outdoor unit, MDC and sub MDC. Table 14 shows pipe diameters to use when connecting the outdoor unit and main MDC. Tables 15 and 16 show how to connect low and high pressure pipes to specific outdoor unit models.



#### LEGEND

G, H, Y — Y-Joint

**Fig. 15 — Typical Piping Layout Between Outdoor Unit and MDC**

**Table 14 — Main Piping Between Outdoor Unit and Main MDC**

OUTDOOR MODEL (kBtu/h)	HIGH PRESSURE SIDE (in.)	LOW PRESSURE SIDE (in.)
72	5/8	3/4
96	3/4	7/8
120		
145	7/8	1-1/8
168		
192		
216	1-1/8	1-3/8
240		
240L~288		
312~336		

**Table 15 — Connecting High Pressure Pipes with the Outdoor Unit**

OUTDOOR UNIT CAPACITY (kBtu/h)	CONNECTION DIAGRAM
72	
96~120	
144~192	
216~240	
240L~336	

#### LEGEND

- a — MDC Unit
- b — ODU Pipe Accessory
- c — Pipe 5/8
- d — Cut Here
- e — Pipe 3/4
- f — Pipe 7/8
- g — ODU Pipe Accessory
- h — Pipe 1 1/8

**Table 16 — Connecting Low Pressure Pipes with the Outdoor Unit**

OUTDOOR UNIT CAPACITY (kBtu/h)	CONNECTION DIAGRAM
72	
96	
120~216	
240	
240L~288	
312~336	

**LEGEND**

- a — MDC Unit
- b — ODU Pipe Accessory
- c — Pipe 3/4
- d — Cut Here
- e — Pipe 7/8
- f — Pipe 1-1/8
- g — ODU Pipe Accessory
- h — Pipe 1-3/8
- i — Pipe 1-3/8
- j — Pipe 1-5/8
- k — Pipe 1-5/8

**ELECTRICAL REQUIREMENT**

Installation of wiring must conform with local building codes and with National Electric Code ANSI/NFPA 70, current editions. Units must be electrically grounded in conformance with the code. In Canada, wiring must comply with CSA C22.1, Electrical Code.

**⚠ WARNING**

Electrical shock can cause personal injury and death. Disconnect power supply before making wiring connections. There may be more than one disconnect switch. Tag all disconnect locations to alert others not to restore power until work is completed.

**⚠ WARNING**

All units must be wired strictly in accordance with the wiring diagram furnished with the unit. Any wiring different from the wiring diagram could result in personal injury and property damage.

**⚠ CAUTION**

Any original factory wiring that requires replacement must be replaced with wiring material having a temperature rating of at least 105 C.

Ensure supply voltage to the unit, as indicated on the serial plate, is not more than 10% over the rated voltage or 10% under the rated voltage.

Failure to follow these recommendations may result in equipment damage.

This equipment in its standard form is designed for an electrical supply of 208/230-1-60. Any damage to or failure of units caused by incorrect wiring or voltage is not covered by warranty.

Electric wiring must be sized to carry the full load amp draw. See Table 17 for main unit electrical data and Table 18 for sub unit electrical data.

**Table 17 — 40VMD Main MDC Electrical Data**

40VMD MDC UNIT SIZE	POWER SUPPLY	
	MCA	MOPD
006	0.73	15
008	0.89	
010	1.05	
016/016L	1.54	

- MCA — Minimum Circuit Amps
- MOPD — Maximum Overcurrent Protective Device



**Table 18 — 40VMD Sub MDC Electrical Data**

40VMD SUB MDC UNIT SIZE	POWER SUPPLY	
	MCA	MOPD
006	0.69	15
008	0.85	
010	1.01	
016	1.49	

**LEGEND**

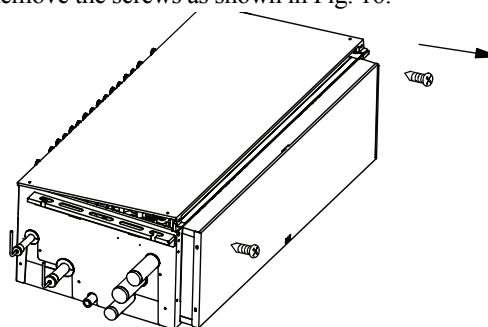
- MCA — Minimum Circuit Amps
- MOPD — Maximum Overcurrent Protective Device



**Opening the Electrical Control Box Cover —**

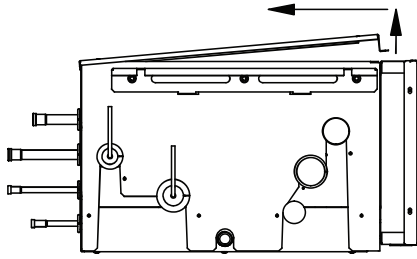
Follow the steps below when removing the top cover.

1. Remove the screws as shown in Fig. 16.



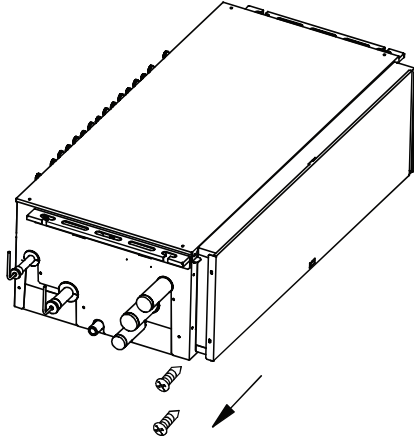
**Fig. 16 — Removing the Top Cover Screws**

- Lift up the top cover about  $1 \frac{5}{8}$  in. and then push it following the direction shown in Fig. 17.



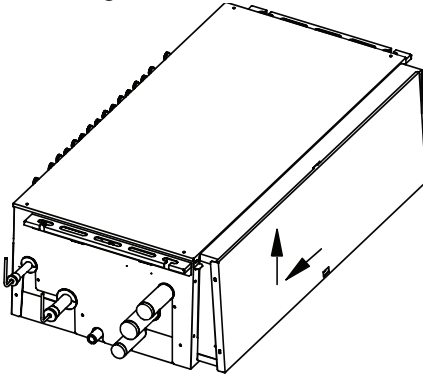
**Fig. 17 — Removing the Top Cover**

- Follow the steps below when removing the cover of electric control box:
- Remove the screws as shown in Fig. 18.



**Fig. 18 — Removing the Electronic Control Box Cover Screws**

- Push the cover about  $\frac{3}{8}$  in. and then lift up the cover as shown in Fig. 19.



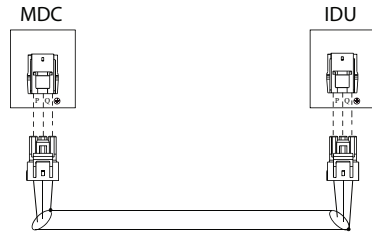
**Fig. 19 — Removing the Electronic Control Box Cover**

**Completing Electrical Connections** — After the pipe work is complete, the electrical supply can be connected by routing the cable through the appropriate casing holes or knockouts and connecting the supply and ground cables to the unit's power terminals.

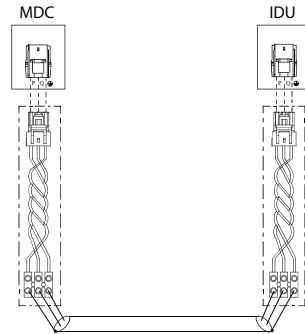
Be sure the power wiring and control wiring do not cross, as this might cause disturbance on the controls side.

Use 2-core stranded shielded twisted pair communication wire. Make sure the control wire does not form a closed loop. The control wire is polarity sensitive. Figures 20 and 21 show how to connect the control wiring between the MDC and the indoor unit. Wiring length limitations must be followed to avoid any communication interference.

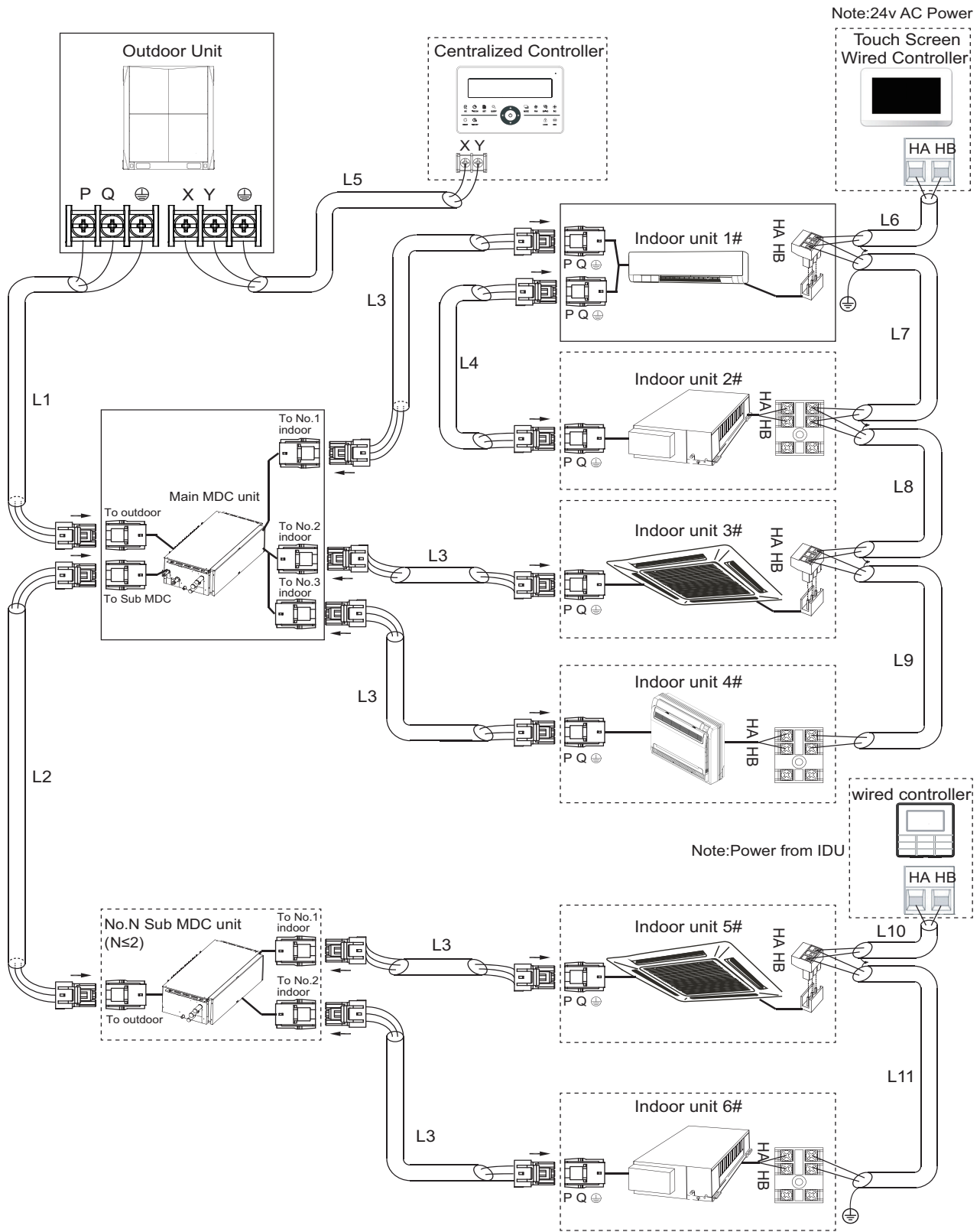
For typical communication wiring diagrams and MDC wiring see Fig. 22-24.



**Fig. 20 — 2-Core Stranded Shielded Twisted Pair Communication Wire (Available from Factory as an Accessory)**



**Fig. 21 — 2-Core Stranded Shielded Twisted Pair Communication Wire (Field-Supplied)**



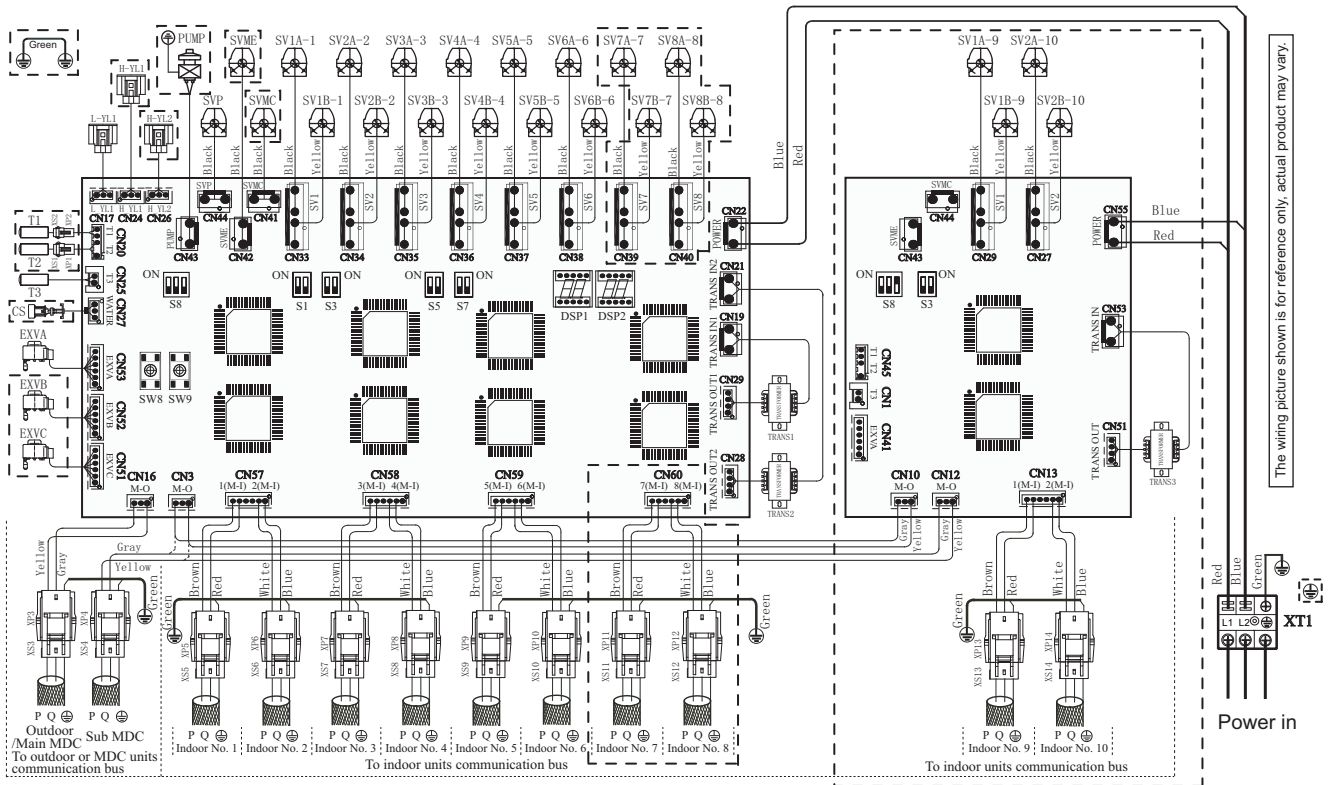
**LEGEND**

**MDC** — Multiport Distribution Controller

NOTE: Field wiring must use copper conductors only.

**Fig. 22 — Heat Recovery Communication Wiring Diagram**





CODE	NAME
XT1	Terminal block
XS1~XS20	Plug
XP1~XP20	Jack
H-YL1	High pressure sensor
H-YL2	Intermediate pressure sensor
L-YL1	Low pressure sensor
T1~T3	Temperature sensor
SV4A~*, SV8B~*	Solenoid valve
EXVA~EXVC	Electronic expansion valve
TRANS1~TRANS4	Transformer
PUMP	Pump motor
CS	Float switch

CODE	NAME
S E0	Comm. error with outdoor unit
S E1	T1 temperature sensor error
S E2	T2 temperature sensor error
S E3	T3 temperature sensor error
S E4	High pressure sensor error
S E5	Intermediate pressure sensor error
S E6	Low pressure sensor error
S P1	High pressure protection
S EP	Float switch failure
SC ER	Commissioning test failure
no Id	No indoor unit under Indoor No. 1
no A0	Faulty address for MDC
CS x	Indoor capacity overload under Indoor No. y (y=x+1)

Fig. 23 —006, 008, 010 Typical Wiring Diagram

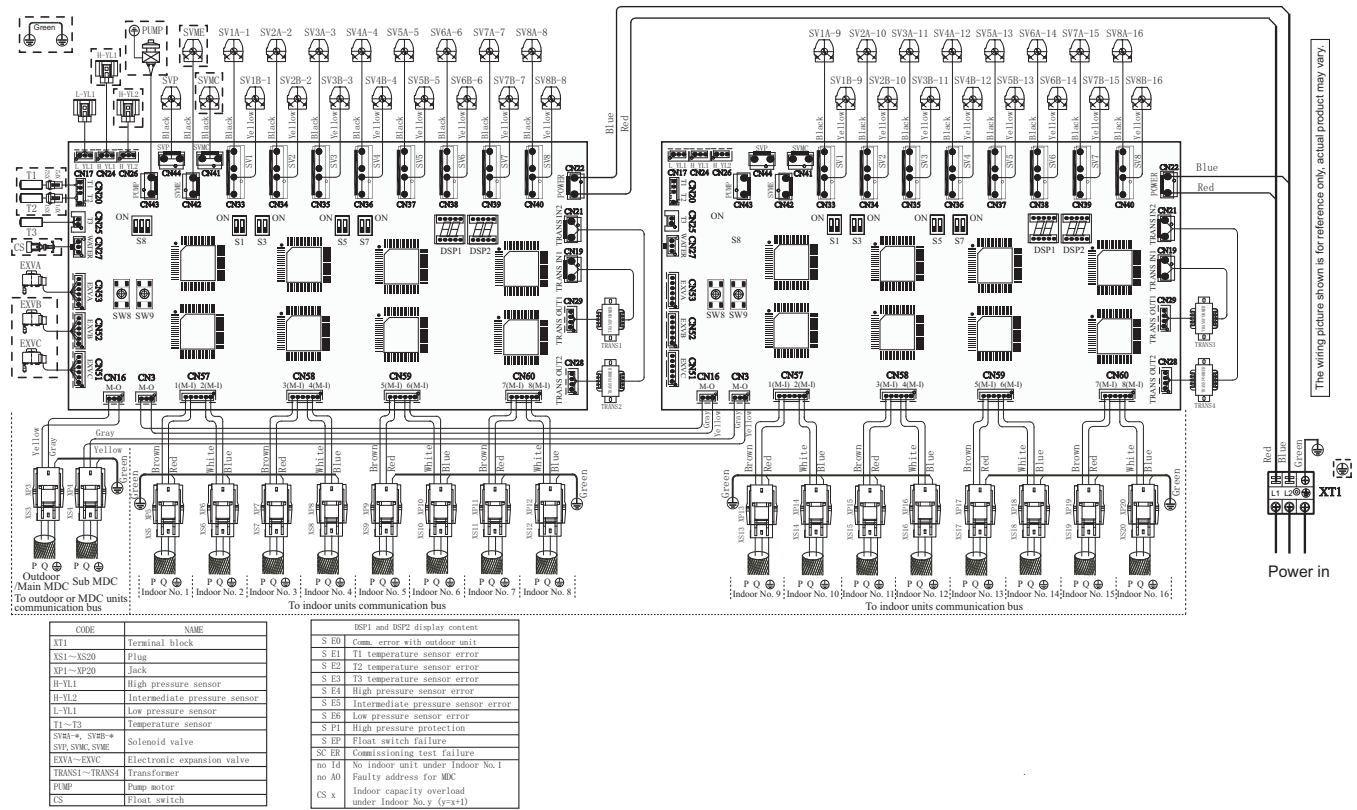


Fig. 24 — Size 016/016L Typical Wiring Diagram

### MDC UNIT ADDRESSING

**Setting the Unit Address** — The address switch [S8] of each MDC unit is set to “00” when the unit is shipped from the factory.

- Set the address of the main MDC to “000”.
- Set the address of sub MDC to “000” or “010”

**Merged Port Setting** — When two ports are merged to connect a larger indoor unit (> 54 kBTU/h), the following switches should be set to the “ON, ON” position.

- S1: Port 1 and 2 pipes are merged, set to “ON, ON” position
- S3: Port 3 and 4 pipes are merged, set to “ON, ON” position
- S5: Port 5 and 6 pipes are merged, set to “ON, ON” position
- S7: Port 7 and 8 pipes are merged, set to “ON, ON” position

The indoor unit communication cable is connected to one of the two ports.

### TROUBLESHOOTING

**LED Indication Lamp Instructions** — When the LED indication lamp is intermittent flashing it means communication error. Table shows a description of what the flashing LED lights mean.

Table 19 — LED Light Description

LED	NORMALLY ON	SLOW FLASH	FLASH
LED1 Lamp (Red)	Outdoor unit ON	Outdoor unit standby	Communication error with outdoor unit
LED2 Lamp (Blue)	Indoor unit ON under this micro processor	Indoor unit OFF under this micro processor	Communication error with indoor unit

**Error Code** — MDC error codes are displayed on the units display (DSP1 and DSP2) as shown in Fig. 23 and 24. Table 20 shows display code definitions. Table 21 shows MDC query codes.

**Table 20 — Display Code Definitions**

DISPLAY	DSP1 AND DSP2 DISPLAY DEFINITION
S E0	Communication error with outdoor unit
S E1	T1 temperature sensor error
S E2	T2 temperature sensor error
S E3	T3 temperature sensor error
S E4	High pressure sensor error
S E5	Intermediate pressure sensor error
S E6	Low pressure sensor error
S P1	High pressure protection
SC ER	Commissioning test failure
no ID	No indoor unit under Indoor Unit 1
CS x	Indoor capacity overload under Indoor No.y (y=X+1)

**SW8/SW9 Query Instructions** — When you press either SW8 or SW9, the MDC’s LED display will show a query code. Press SW8 to move up in number. Press SW9 to move down in number (i.e., 00) and then it will display the corresponding value. See Table 21 for an explanation of these display codes.

**NOTE:** The main MDC and sub MDC have the same query instructions. If the sub MDC does not have this parameter it displays the value of the main MDC unit.

**Table 21 — MDC Query Codes**

DISPLAYED	DESCRIPTION		COMMENT
	First and Second Digit	Third and Fourth Digit	
--00	Number of online micro-processors	Number of online indoor units	Actual value
--01	Number of open micro processors	Number of open indoor units	Actual value
--02	Number of cooling indoor units	Number of heating indoor units	Actual value
--03	Outdoor unit operation mode		--
--04	Opening of EXVA		Actual value
--05	Opening of EXVB		Actual value
--06	Opening of EXVC		Actual value
--07	Liquid inlet temperature (T1)		Actual value (degrees C)
--08	Liquid refrigerant temperature (T2)		Actual value (degrees C)
--09	Bypass outlet temperature (T3)		Actual value (degrees C)
--10	High pressure (H-YL1)		Actual value= display value x 0.1 MPa
--11	Intermediate pressure (H-YL2)		Actual value= display value x 0.1 MPa
--12	Low pressure (L-YL1)		Actual value= display value x 0.01 MPa
--13	Version of software		--
--14	----		Check end

**TEST RUN**

Before commencing a test run please check the following:

1. Ensure the MDC unit, indoor unit and outdoor unit are installed correctly.
2. Ensure the piping and wiring are completed correctly.
3. Ensure there are no refrigerant leaks.
4. Ensure the drain is not clogged.
5. Ensure the piping is insulated.
6. Ensure the ground wiring is connected correctly.
7. Ensure the added refrigerant amount and added is correct, based on the actual pipe length.
8. Ensure the supplied power voltage matches the voltage on the unit nameplate.
9. Ensure the connected indoor unit quantity during the quick check MDC query is the same as the actual quantity.

## APPENDIX A — DIP SWITCH SETTINGS

There are 2 sets of DIP switches on the main board. One set is for twinning ports; the other set is for MDC identification. Figures A and B show the settings for each parameter controlled by a switch. Switches are shown in the default settings. For switches S1, S3, S5, and S7 the switch must be set to OFF, OFF or ON, ON.



### POSITION 1, 2 — S1 IDU PIPES SETTING

- OFF, OFF** — Normal Mode (default)
- ON, ON** — 2 Ports Twinned Together

### POSITION 1, 2 — S3 IDU PIPES SETTING

- OFF, OFF** — Normal Mode (default)
- ON, ON** — 2 Ports Twinned Together

### POSITION 1, 2 — S5 IDU PIPES SETTING

- OFF, OFF** — Normal Mode (default)
- ON, ON** — 2 Ports Twinned Together

### POSITION 1, 2 — S7 IDU PIPES SETTING

- OFF, OFF** — Normal Mode (default)
- ON, ON** — 2 Ports Twinned Together

**Fig. A — S1, S3, S5, and S7 Settings**



### POSITION 1, 2 — MDC IDENTIFICATION

- OFF, OFF** — Main MDC (default)
- ON, OFF** — Sub MDC Box
- OFF, ON** — Sub MDC Box
- ON, ON** — Reserved



### POSITION 3 — MDC BOARD IDENTIFICATION

- ON** — Second MDC Board  
(This is set by the factory and cannot be changed)
- OFF** — Primary MDC Board

**Fig. B — S8 Settings**