



CLIMATEWORX  
INTERNATIONAL

MISSION CRITICAL Air Conditioning Systems

# Series 8, Vertical Floor-Mount Units

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*Installation Manual*



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## Site Preparation

In order to maximize operating efficiency and performance, the following areas should be observed at the site-planning stage:

- The room should be surrounded with a vapor seal to eliminate moisture migration through the building structure. Windows should be sealed and at least double-glazed to prevent sweating. All door jambs should fit tightly and should not have any grilles in them. Polyethylene film type ceiling, vinyl wallpaper or plastic based paint on the walls and slabs are recommended to minimize absorption and transmission of moisture into the room.
- Owing to a generally small population, a typical room should have fresh air kept at only about 5% of the re-circulated air. This provides enough ventilation for personnel and pressurizes the room to prevent dust from entering through leaks. The incoming fresh air must be filtered very closely, and preferably pretreated. Otherwise heating, cooling, humidifying and dehumidifying loads of the incoming fresh air should be taken into account in determining total loading requirements.
- All cables and piping should be carefully routed to lower resistance to the distribution of conditioned air and to avoid the blockage of air-paths to any portion of the room. As a good practice, all cables and piping running under the raised floor should be mounted horizontally and whenever possible, routed to run in parallel with the air-path.
- In order to obtain the most effective air distribution, units should not be located too close together. Attention should be taken to avoid locating the units in an alcove or an extreme end of a long narrow room.

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## **Location Consideration**

### **Positioning of Indoor units**

The Series 8 units are designed to be free standing on an accessible raised flooring system provided with sufficient pedestal supports underneath. A minimum raised floor height of 12" (300mm) is required. However, it is highly recommended to use a separate floor stand as a support, which is independent of the raised floor system. This allows the unit to be installed prior to erecting the raised flooring system thus providing much easier access to piping and electrical connections. The floor stand or unit should be isolated using a suitable isolation method.

ClimateWorx OEM floor stands use a two-nut system for the floor stand feet. Use both nuts, the top nut for leveling and the bottom nut to lock the leveling nut in place.

The room layout should provide 36-1/2" (900mm) service clearance, in front of the unit and the two sides, for routine service and maintenance.

### **Positioning of Outdoor Heat Rejection Devices**

The outdoor heat rejection devices such as air-cooled condensers and glycol coolers should be located as close to the indoor unit as possible. From a security and environment standpoint, the outdoor heat rejection devices should be installed away from public access and occupied spaces where low ambient sound level is required.

In order to avoid short circuiting and inter unit re-circulation, outdoor heat rejection devices should be located at least 4 ft. (1.2m) away from any walls, obstructions or 8 ft (2.4 m) from adjacent units. To ensure maintenance-free operation, outdoor heat rejection devices should be located away from the areas that are continuously exposed to loose dirt and foreign materials that may clog the coil.

The outdoor heat rejection devices should be firmly secured on steel supports or concrete plinths.

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## **Dimensional Details**

The following tables summarize the dimensional detail drawing numbers for Series 8 units with standard options. Please refer to Appendix “A” for the dimensional detail drawings.

For units with a special option or configuration, please consult factory for details.

- Downflow Systems

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Model	06-10
8AD	S8DD102

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- Upflow Systems

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Model	06-10
8AU	S8DD101

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## Electrical Installation

### Power Feeding

All models are fitted with a 3-pole main isolator, neutral and earth terminal, which are located at the upper right corner of the power panel.

The isolator and terminals will accept cables up to #2 AWG (35mm<sup>2</sup>). The power cables should be sized in accordance with local and national codes. Refer to the "*Electrical Data*" section in the *Technical Data Manual* for current requirements.

### Interconnecting Wiring

Internal wiring for all Series 8 is completed and tested prior to delivery. Numbered terminal blocks for field installed control wiring are provided next to the main power isolator.

The numbered terminal blocks will accept control wiring up to #12 AWG (4mm<sup>2</sup>). The terminal assignments are listed as follows:

<u>Terminal</u>	<u>Function</u>	<u>Requirement</u>
11-12	Standby enable	25VA max. normally open triac output
13-14	Common alarm	25VA max. normally open dry contact output (NA only) or triac
15-16	Remote on / off	Normally open dry contact input
17-18	Standby start	Normally open dry contact input
19-20	Fire alarm	Normally closed dry contact input
23-24-25	Condenser interlock	10A max. normally open contact output
31-32	Chiller ready	Normally open dry contact input
33-34	Compressor Disable	Normally open dry contact input

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## Refrigerant Pipework Installation

Good practice should always be followed when connecting refrigerant piping in direct expansion systems.

As many of the operational problems encountered in a refrigeration system can be traced back to improper design and installation of refrigerant piping, it is essential that the following guidelines be observed:

- Use clean and dehydrated refrigeration quality tubing with both ends sealed.
- Cut and form tubes carefully to avoid getting dirt or metal particles into the refrigeration lines. Never use a hacksaw to cut the tubing.
- Once the system is open, complete the work as quickly as possible to minimize ingress of moisture and dirt into the system. Always put caps on ends of tubes and parts not being worked on.
- To prevent scaling and oxidation inside the tubing, pass an inert gas such as nitrogen through the line while carrying out brazing, silver soldering or any other welding processes.
- It is recommended that quality refrigeration solder (95% tin, 5% silver) be used for its excellent capillary action.
- Use minimum amount of solder flux to prevent internal contamination of the piping. Use flux with care as it is usually acidic in nature.
- Install a trap at the bottom of the vertical riser of a hot gas line and a trap for every 20ft. (6m) in elevation to collect refrigerant and lubrication oil during off cycle.
- Insulate liquid lines that may be subjected to high heat gains. Insulate low level discharge lines to avoid burning due to accidental contact.
- Design and arrange refrigerant piping for the remote condenser in such a way so that adequate velocity of refrigerant can be maintained to prevent oil trapping. Recommended pipe sizes are tabulated as follows:



## Recommended Pipe Size for Remote Condenser

### Hot Gas Line

Model - 8AD / 8AU		-06	-07	-08	-10
50 ft. equivalent pipe length	in.	$\frac{7}{8}$	$1\frac{1}{8}$	$1\frac{1}{8}$	$1\frac{1}{8}$
100 ft. equivalent pipe length	in.	$1\frac{1}{8}$	$1\frac{1}{8}$	$1\frac{1}{8}$	$1\frac{3}{8}$
150 ft. equivalent pipe length	in.	$1\frac{1}{8}$	$1\frac{3}{8}$	$1\frac{3}{8}$	$1\frac{3}{8}$
200 ft. equivalent pipe length	in.	$1\frac{1}{8}$	$1\frac{3}{8}$	$1\frac{3}{8}$	$1\frac{3}{8}$

### Liquid Line

Model - 8AD / 8AU		-06	-07	-08	-10
50 ft. equivalent pipe length	in.	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{7}{8}$
100 ft. equivalent pipe length	in.	$\frac{5}{8}$	$\frac{7}{8}$	$\frac{7}{8}$	$\frac{7}{8}$
150 ft. equivalent pipe length	in.	$\frac{5}{8}$	$\frac{7}{8}$	$\frac{7}{8}$	$\frac{7}{8}$
200 ft. equivalent pipe length	in.	$\frac{5}{8}$	$\frac{7}{8}$	$\frac{7}{8}$	$\frac{7}{8}$

## Evacuation

The procedure for leakage testing and evacuation of the system is as follows:

1. Disconnect all line voltage fuses except the fuses for control transformers. Using the test mode, energize fan and all solenoid valves. (See M52 User's Guide) Open liquid line hand valve.
2. Connect a gauge manifold to the compressor suction and discharge rotalock valve.
3. Close the compressor discharge and suction ports and open all service valves.
4. Charge the system with dry nitrogen to approximately 150 psig.
5. Leave pressure in system for at least 12 hours. If pressure holds, continue with next step. If the pressure drops detect and seal leak before continuing.
6. Release all pressure.
7. Connect a vacuum pump to the compressor suction and discharge rotalock valves with refrigerant or high vacuum hoses. Provide an isolating valve and a pressure gauge for pressure checking.
8. Evacuate the system to an absolute pressure not exceeding 1500 microns. Break the vacuum to 2psig with dry nitrogen. Repeat the evacuation process and then re-break the vacuum with dry nitrogen.

9. Open the compressor discharge and suction ports. Evacuate to an absolute pressure not exceeding 500 microns. Let the vacuum pump run without interruption for minimum two hours.
10. Stop the vacuum pump. Break the vacuum and weigh in the system charge with vapor R22/R407C (see nameplate for operating gas) through the discharge side of the compressor.
11. Allow the pressure to equalize.

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## **Fan Speed Control System**

The fan speed control system maintains not only a constant condensing pressure over a wide range of climatic conditions but also high sensible cooling for the evaporator so that re-humidification is rarely required throughout the year.

A pressure-sensitive fan speed controller is employed in the fan speed control system. It regulates the condenser head pressure at low ambient temperatures by varying the airflow volume through the condenser.

Upon engaging the interlock contact in the indoor unit, the fan speed controller will directly sense the changes in the refrigerant head pressure and vary the output voltage from 15% to 97% of the applied voltage.

### **Charging**

Proper performance of the system depends largely on proper charging. Adhere to the following guidelines for charging:

1. Open the main isolator and insert the fuses for the fans, control transformers and the compressor.
2. Close the main isolator and allow the compressor crankcase heater to operate for at least one hour.
3. Connect the gauge manifold to both discharge and suction rotalock valves, with a common connection to the refrigerant cylinder. Purge the lines and open the refrigerant cylinder vapor valve.
4. Start the compressor using the test mode to energize the main fan and compressor.
5. Open the suction connection on the gauge manifold. Modulate the rate of charging with the gauge manifold valve. Watch the discharge pressure closely during the charging operation to ensure that the system is not overcharged.
6. Charge the system until the sight glass is just clear of bubbles. It is good practice to weigh the amount of gas added.
7. Compare the temperature of the liquid line leaving the condenser with the saturation temperature equivalent to the condensing pressure. Continue charging until the liquid line temperature is approximately 5°F below the condensing temperature.

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## Head Pressure Control System

For condensers possibly subjected to extremely low ambient temperatures, it is recommended that a head pressure control system be installed to avoid starving the evaporator coil resulting in oil logging; short cycling by low pressure control, reduction of the system capacity and erratic expansion valve operation.

A drop in the condensing pressure often occurs in air-cooled systems as a result of low ambient conditions encountered during fall-winter-spring operation. Head pressure control renders part of the condenser surface inactive. The reduction of active condensing surface results in a rise in condensing pressure and hence provides a sufficient liquid line pressure for normal system operation. The head pressure control system allows operation at extremely low ambient temperature down to -40°F.

CliateWorx uses a two-valve head pressure control, with a heated receiver for factory ordered condensers. The ORI is located in the liquid drain line between the condenser and the receiver, and the ORD is located in a hot gas line bypassing the condenser.

During periods of low ambient temperature, the condensing pressure falls until it approaches the setting of the ORI valve. The ORI then throttles, restricting the flow of liquid from the condenser. This causes refrigerant to back up in the condenser thus reducing the active condenser surface. This raises the condensing pressure. Since it is really the receiver pressure that needs to be maintained, the bypass line with the ORD is required.

The ORD opens after the ORI has offered enough restriction to cause the differential between condensing pressure and receiver pressure to exceed 20psi. The hot gas flowing through the ORD serves to heat up the cold liquid being passed by the ORI. Thus the liquid reaches the receiver warm and with sufficient pressure to assure proper expansion valve operation. As long as sufficient refrigerant charge is in the system, the two valves modulate the flow automatically to maintain proper receiver pressure regardless of outside ambient.

### **Charging**

When head pressure control is utilized, there must be enough refrigerant to flood the condenser at the lowest expected ambient and still have enough charge in the system for proper operation. After completing the evacuation procedures as in the fan speed control system, follow the following guidelines for charging:

1. Open the main isolator and insert the fuses for the fans, control transformers and the compressor.
2. Close the main power and allow the compressor crankcase heater to operate for at least one hour.
3. Connect the gauge manifold to both discharge and suction rotalock valves, with the common connection to the refrigerant drum. Purge the lines and open the refrigerant drum vapor valve.
4. Start the compressor using the test mode to energize the main fan and compressor.

5. Open the suction connection on the gauge manifold. Modulate the rate of charging with the gauge manifold valve. Watch the discharge pressure closely during the charging operation to ensure that the system is not overcharged. It is a good practice to weigh the amount of gas added.
6. Charge the system until the sight glass is just clear of bubbles. The system is now correctly charged for operating under head pressure control at the ambient temperature charging is being carried out.
7. If the system is designed to operate at ambient below the ambient that exists during charging, additional charge will have to be added now.
8. Read from the following table the percentage of condenser to be flooded at charging and that at the expected minimum ambient temperature, then calculate the difference:

Ambient Temperature in °F	Percentage of Condenser to be Flooded
70	0
65	0
60	10
55	24
50	33
45	41
40	46
35	52
30	55
25	59
20	62
10	66
0	70
-10	73
-20	76
-30	77
-40	79

9. Read the charge required for flooding the complete condenser to the required minimum ambient temperature from the condenser technical data manual.
10. Multiply the value found in Step 9 by the difference in percentages calculated in Step 8; this gives the additional charge required.
11. Fill in the required charge to the receiver.

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## Chilled-water / Water / Glycol Pipework Installation

The Chilled-water / Water / Glycol pipework should be installed in accordance with the following recommendations :

- A manual shut-off valve should be installed at the supply and return pipes of each indoor unit for routine service and emergency isolation of the unit.
- Joints installed inside the room must be kept to a minimum. The system drain discharge point should be installed outside the room.
- Piping inside the building should be insulated to eliminate the possibility of condensation under low ambient conditions.
- Always use the reverse return system when two or more indoor units are served by the same source.
- For condensing water supplied from a cooling tower which is located in a poor environment or when water quality is poor, adequate filtration and an inhibitor should be added in correct quantities to prevent the formation of scale and corrosion.
- Only ethylene glycol containing a corrosion inhibitor should be used. Automotive anti-freeze is unacceptable and must not be used in the Glycol system.
- Concentration of glycol required depends on the minimum ambient temperature. The following glycol concentration is recommended:

% of ethylene glycol by weight	Minimum operating temperature °C (°F)
10	0 (32)
20	-5 (23)
30	-11.6 (11)
40	-20 (-4)
50	-32.2 (-26)

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## Piping Connection Size:

Model no. suffix		06	07	08	10
Liquid line	-odm	5/8	5/8	5/8	5/8
Hot gas line	-odm	7/8	7/8	1-1/8	1-1/8
Humidifier Drain	-odm	3/4	3/4	3/4	3/4
Humidifier water in	-odm	1/4	1/4	1/4	1/4
Condensate Drain	-odm	3/4	3/4	3/4	3/4
Condensing water (when req'd)	-odm	1-1/8	1-1/8	1-1/8	1-1/8
Glycol solution (when req'd)	-odm	1-1/8	1-1/8	1-3/8	1-3/8
Chilled Water (when req'd)	-odm	1-1/8	1-1/8	1-1/8	1-5/8
Hot water	-odm	7/8	7/8	7/8	7/8
Steam	-odm	7/8	7/8	7/8	7/8

Odm – Outside diameter of copper pipe in inches for soldering





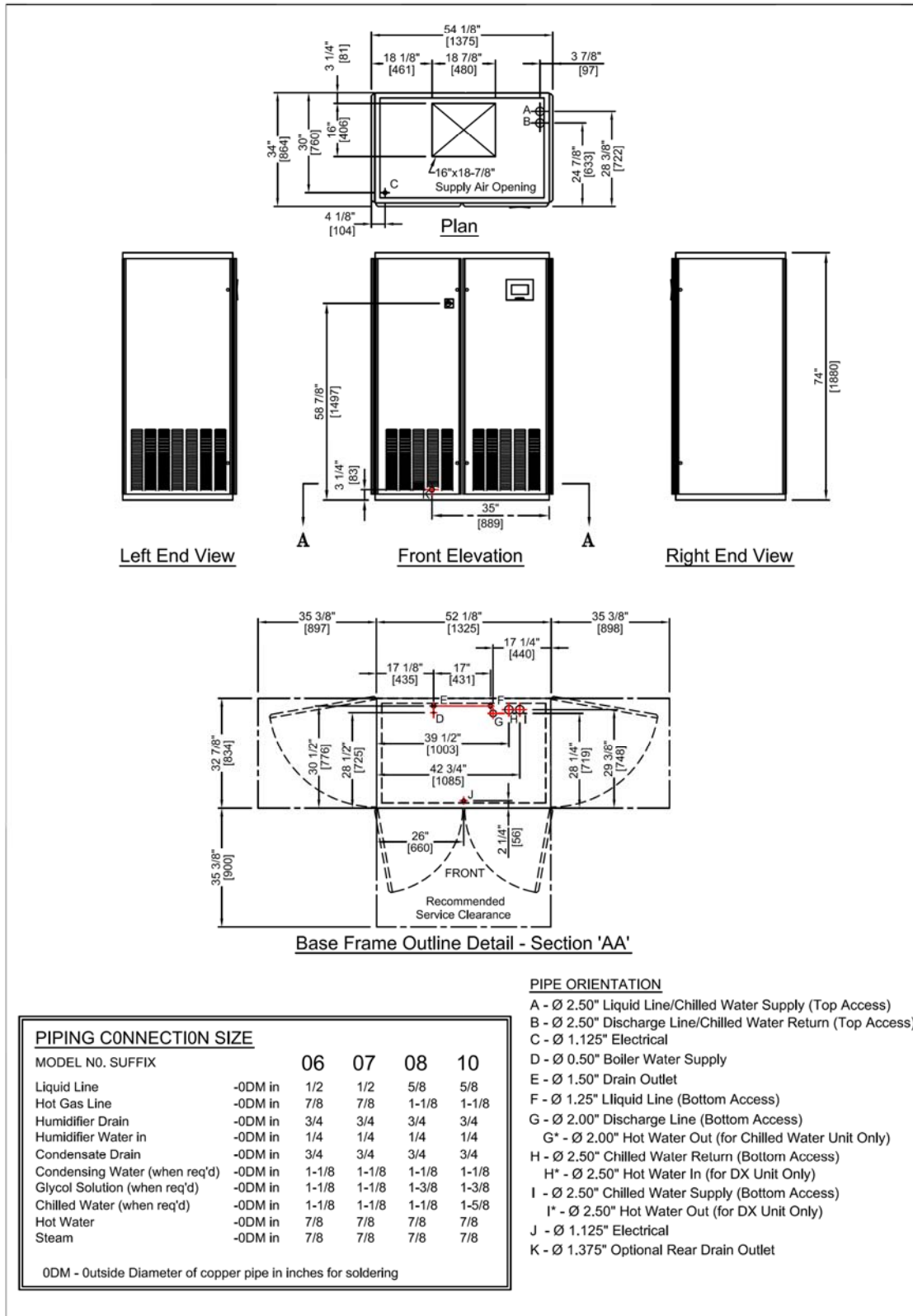
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## **Appendix A : Dimensional Drawings**

<u>Drawing Title</u>	<u>Drawing No.</u>
SERIES 8 - Upflow System Dimensional Details	S8DD101
SERIES 8 - Downflow Systems Dimensional Details	S8DD102
SERIES 8 - Upflow Systems Dimensional Detail with Rear Return	S8DD103
SERIES 8 - Special Drawing: Upflow Systems Dimensional Detail with Optional Rear Drain Outlet (only for units with top piping access and condensate Pumps)	S8DD101 SPECIAL

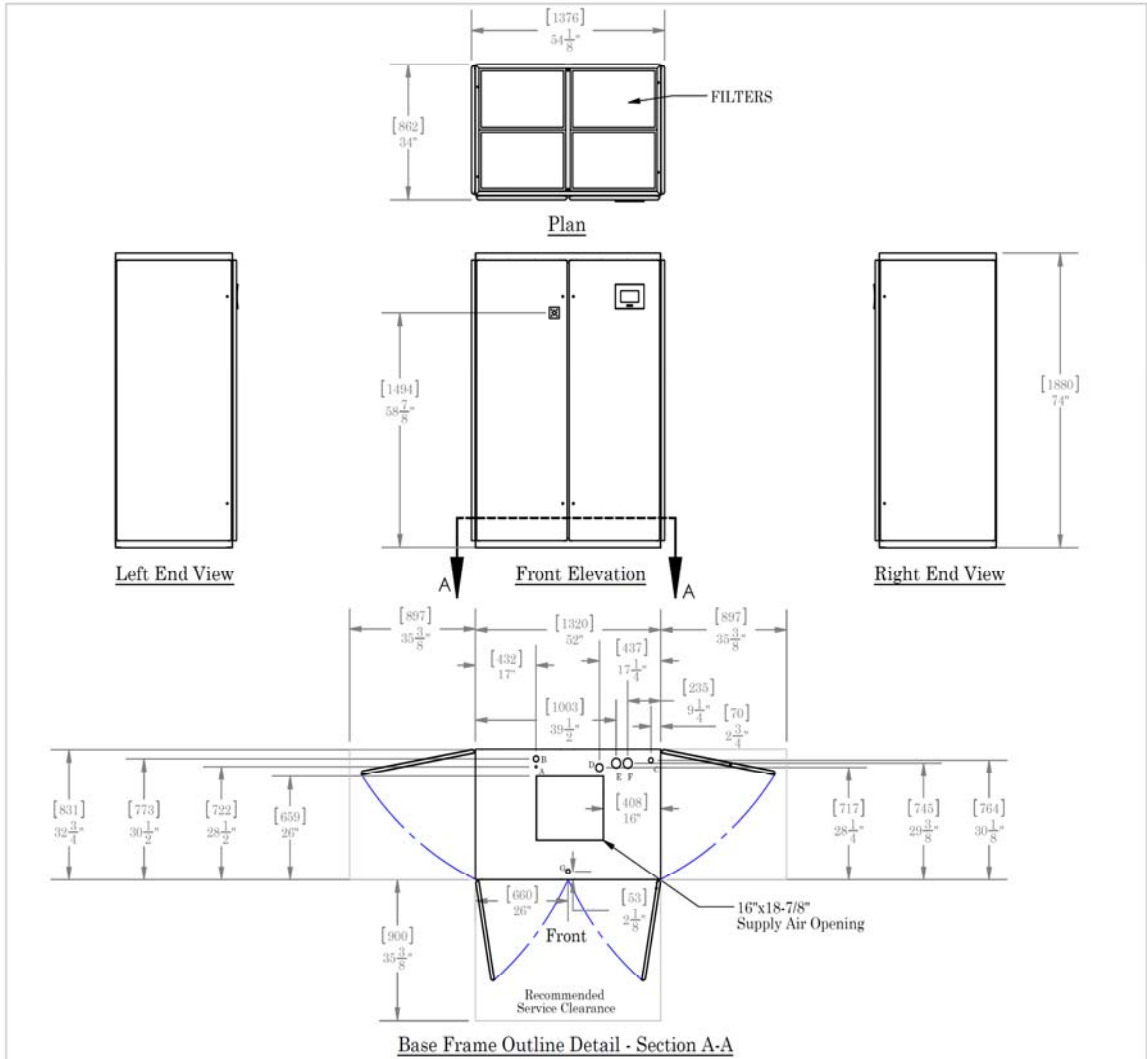


SERIES 8- VERTICAL FLOOR MOUNT UPFLOW UNIT  
DIMENSIONAL DETAIL





**SERIES 8 - VERTICAL FLR. MOUNT DOWNFLOW UNIT  
DIMENSIONAL DETAIL**



**PIPE CONNECTION SIZE**

MODEL NO. SUFFIX		06	07	08	10
Liquid Line	-ODM in	5/8	5/8	5/8	5/8
Hot Gas Line	-ODM in	7/8	7/8	1-1/8	1-1/8
Humidifier Drain	-ODM in	3/4	3/4	3/4	3/4
Humidifier Water In	-ODM in	1/4	1/4	1/4	1/4
Condensate Drain	-ODM in	3/4	3/4	3/4	3/4
Condensing Water (when req'd)	-ODM in	1-1/8	1-1/8	1-1/8	1-1/8
Glycol Solution (when req'd)	-ODM in	1-1/8	1-1/8	1-3/8	1-3/8
Chilled Water (when req'd)	-ODM in	1-1/8	1-1/8	1-1/8	1-5/8
Hot Water	-ODM in	7/8	7/8	7/8	7/8
Steam	-ODM in	7/8	7/8	7/8	7/8

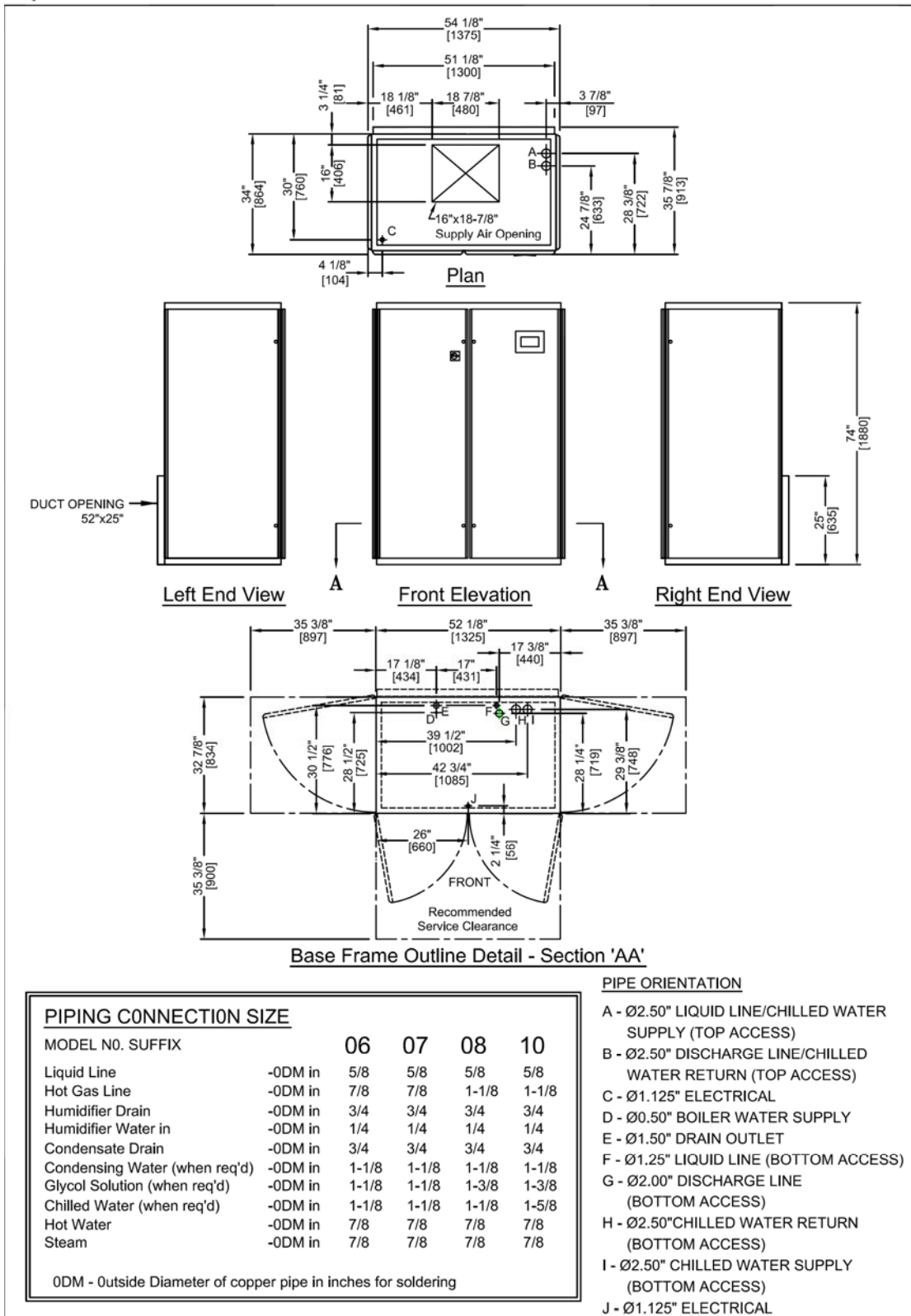
ODM - Outside Diameter of copper pipe in inches for soldering

**PIPE ORIENTATION**

A-	Ø 0.50" Boiler Water Supply
B-	Ø 1.50" Drain Outlet
C-	Ø 1.25" Liquid Line (Bottom Access)
D-	Ø 2.00" Discharge Line (Bottom Access)
E-	Ø 2.50" Chilled Water Return (Bottom Access)
F-	Ø 2.50" Chilled Water Supply (Bottom Access)
G-	Ø 1.125" Electrical



**SERIES 8- VERTICAL FLOOR MOUNT UPFLOW UNIT  
REAR RETURN DIMENSIONAL DETAIL**

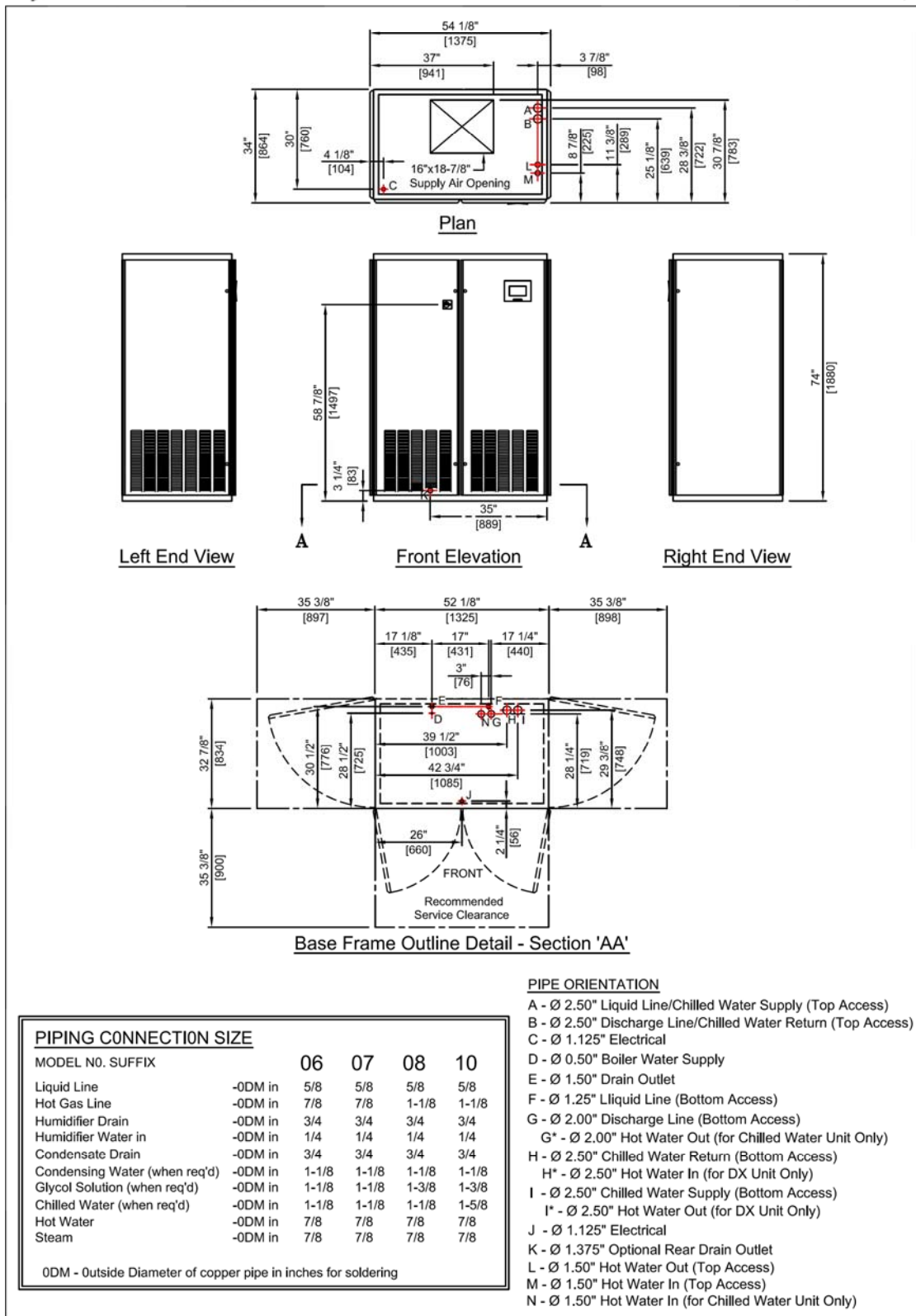


PIPING CONNECTION SIZE					
MODEL NO. SUFFIX		06	07	08	10
Liquid Line	-ODM in	5/8	5/8	5/8	5/8
Hot Gas Line	-ODM in	7/8	7/8	1-1/8	1-1/8
Humidifier Drain	-ODM in	3/4	3/4	3/4	3/4
Humidifier Water in	-ODM in	1/4	1/4	1/4	1/4
Condensate Drain	-ODM in	3/4	3/4	3/4	3/4
Condensing Water (when req'd)	-ODM in	1-1/8	1-1/8	1-1/8	1-1/8
Glycol Solution (when req'd)	-ODM in	1-1/8	1-1/8	1-3/8	1-3/8
Chilled Water (when req'd)	-ODM in	1-1/8	1-1/8	1-1/8	1-5/8
Hot Water	-ODM in	7/8	7/8	7/8	7/8
Steam	-ODM in	7/8	7/8	7/8	7/8

ODM - Outside Diameter of copper pipe in inches for soldering



**SERIES 8- VERTICAL FLOOR MOUNT UPFLOW UNIT  
DIMENSIONAL DETAIL (SPECIAL)**



S8DD101E - SPECIAL

SEPTEMBER 09, 2003

NOT TO SCALE

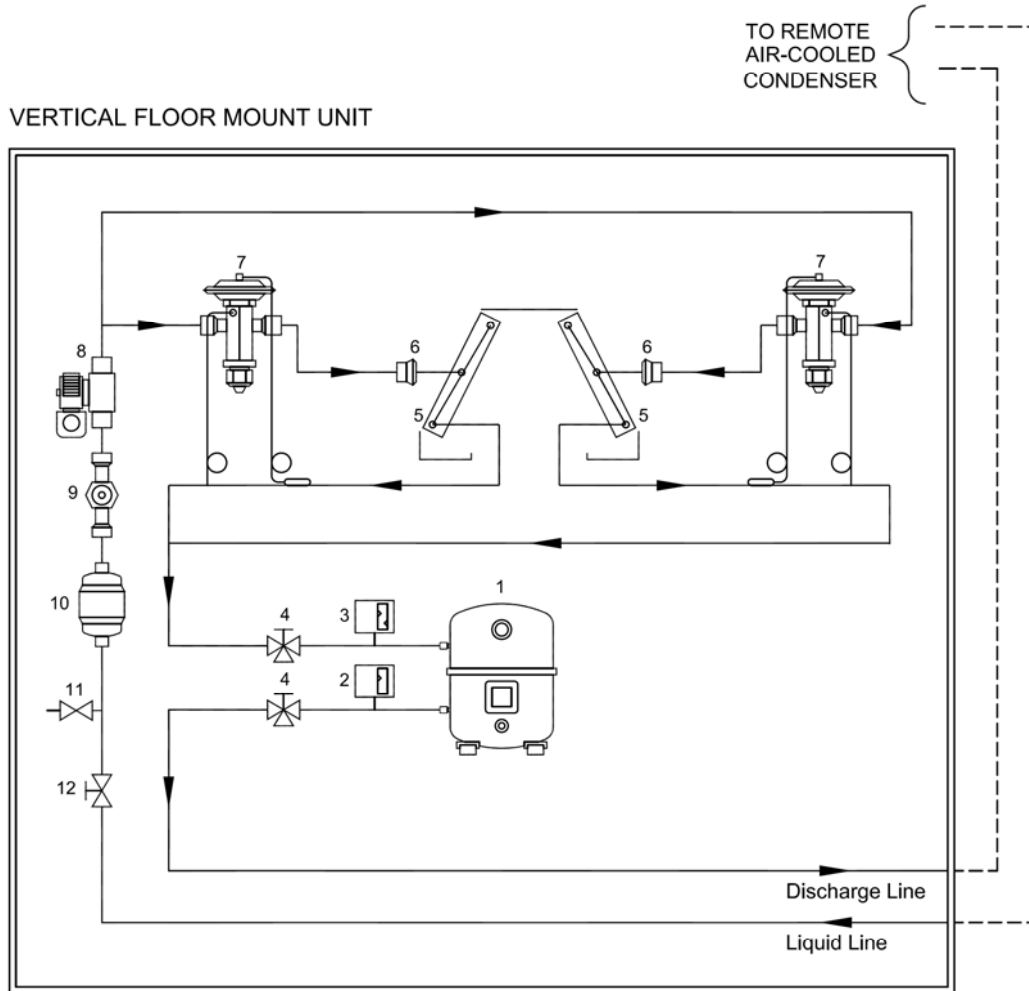
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## **Appendix B : Piping Schematic Diagrams**

<u>Drawing Title</u>	<u>Drawing No.</u>
SERIES 8 - Air-cooled System Schematic	S8DS101
SERIES 8 - Air-cooled System Schematic with Hot Gas Bypass	S8DS102
SERIES 8 - Chilled-water System Schematic	S8DS401
SERIES 8 - Water-cooled System Schematic	S8DS201
SERIES 8 - Water-cooled System Schematic with Hot Gas Bypass	S8DS202
SERIES 8 - Glycol-cooled System Schematic	S8DS301
SERIES 8 - Glycol-cooled System Schematic with Hot Gas Bypass	S8DS302



SERIES 8 - PIPING SCHEMATIC DIAGRAM  
AIR-COOLED SYSTEM

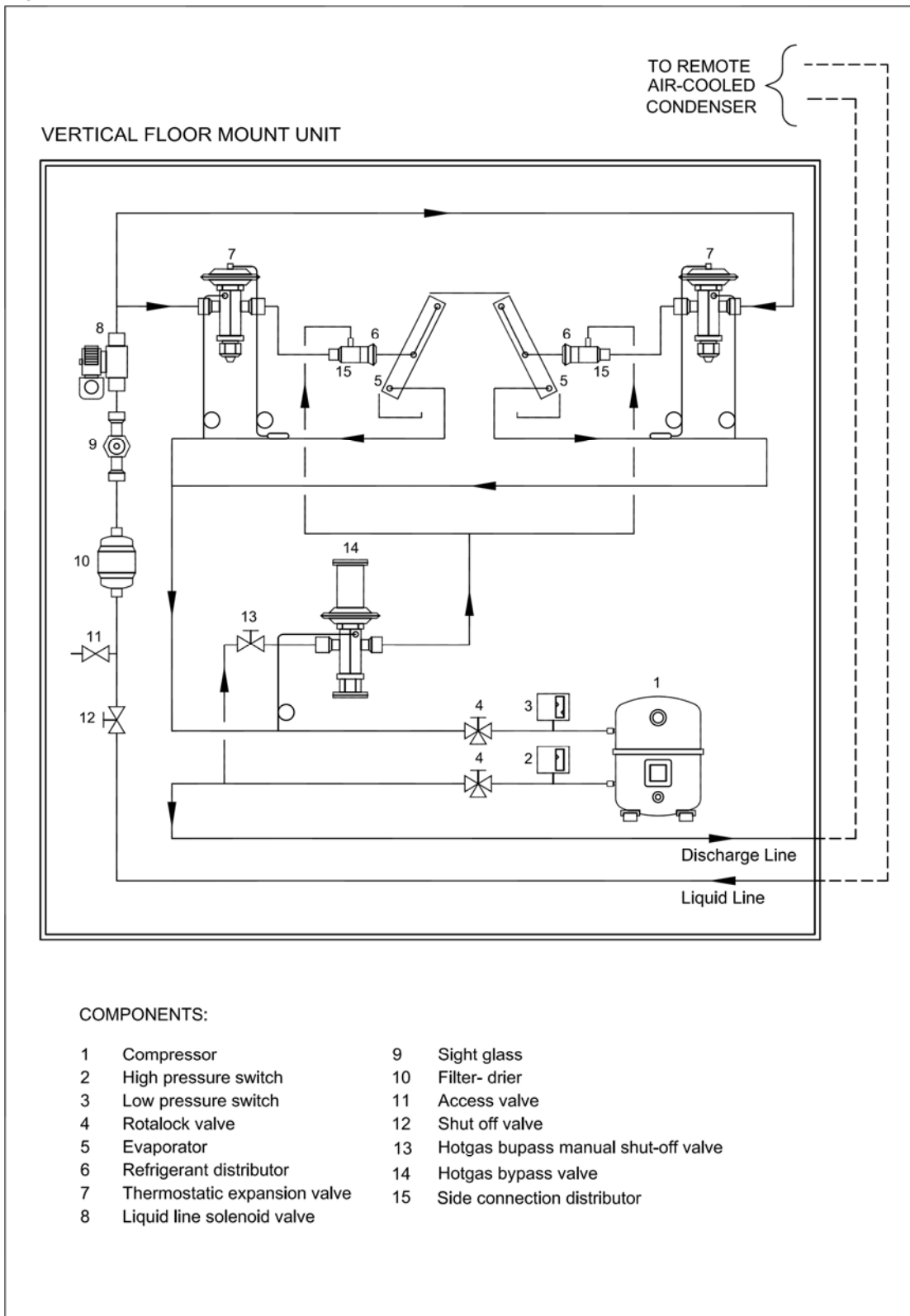


COMPONENTS:

- |   |                              |    |                |
|---|------------------------------|----|----------------|
| 1 | Compressor                   | 9  | Sight glass    |
| 2 | High pressure switch         | 10 | Filter- drier  |
| 3 | Low pressure switch          | 11 | Access valve   |
| 4 | Rotalock valve               | 12 | Shut off valve |
| 5 | Evaporator                   |    |                |
| 6 | Refrigerant distributor      |    |                |
| 7 | Thermostatic expansion valve |    |                |
| 8 | Liquid line solenoid valve   |    |                |



SERIES 8 - PIPING SCHEMATIC DIAGRAM  
AIR-COOLED SYSTEM WITH HOTGAS BYPASS

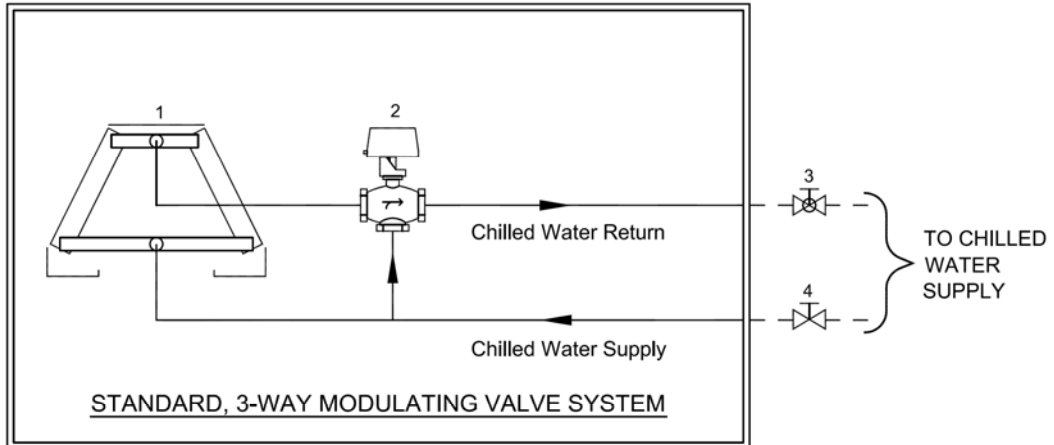






SERIES 8 - PIPING SCHEMATIC DIAGRAM  
CHILLED WATER SYSTEM

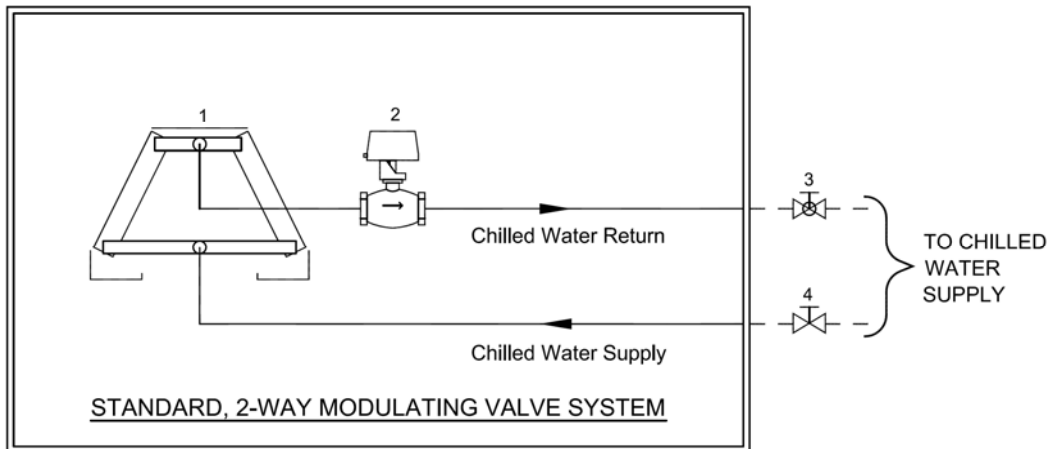
VERTICAL FLOOR MOUNT UNIT



COMPONENTS:

- 1 Cooling coil
- 2 3-way modulating valve
- 3 Globe valve (Supplied by others)
- 4 Gate valve (Supplied by others)

VERTICAL FLOOR MOUNT UNIT

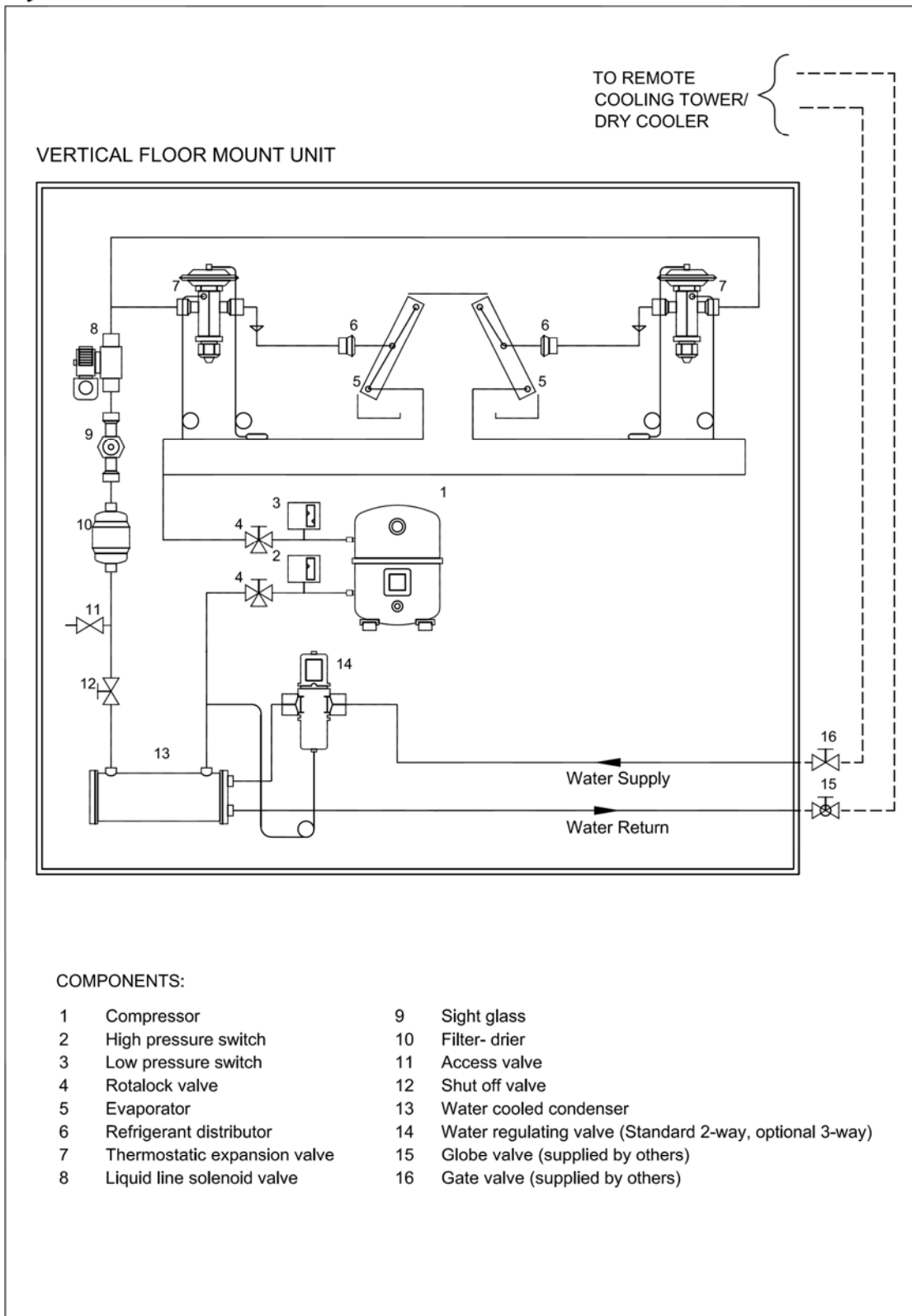


COMPONENTS:

- 1 Cooling coil
- 2 2-way modulating valve
- 3 Globe valve (Supplied by others)
- 4 Gate valve (Supplied by others)



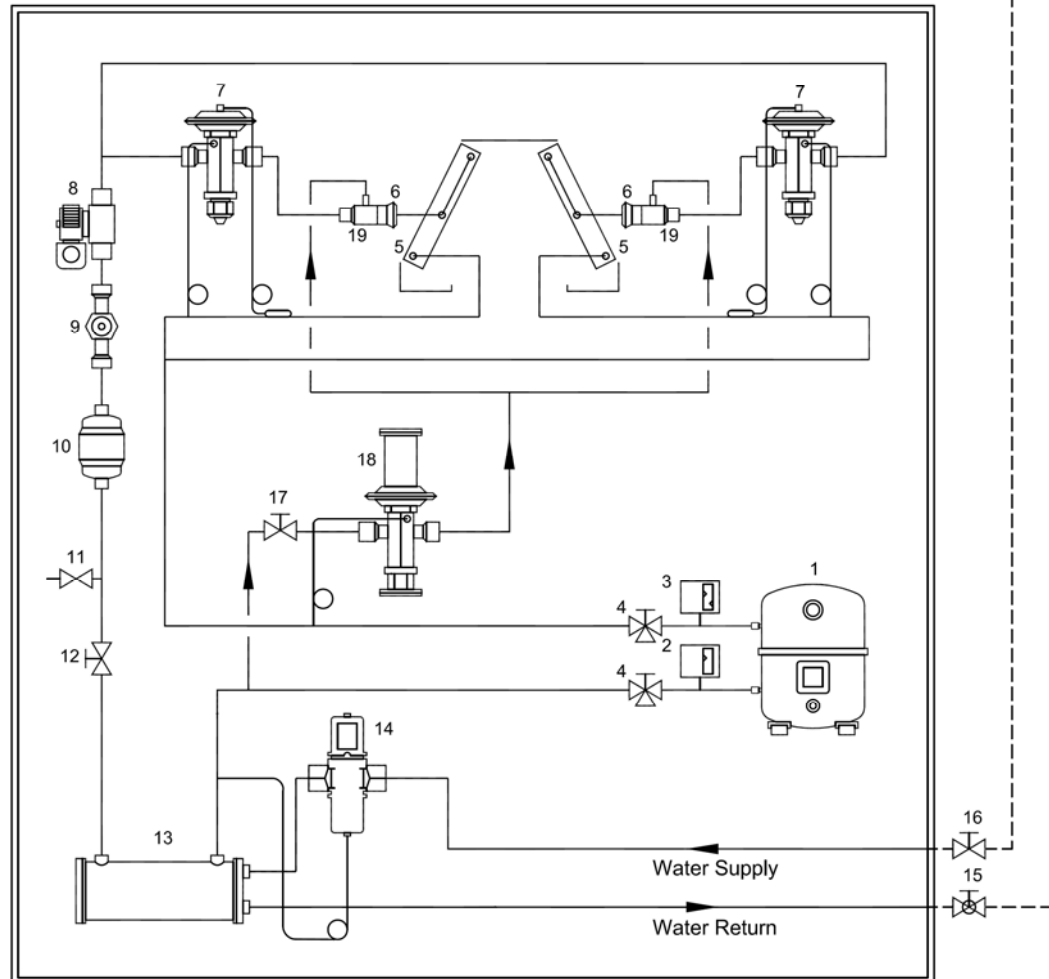
SERIES 8 - PIPING SCHEMATIC DIAGRAM  
WATER COOLED SYSTEM (2-WAY VALVE)





**SERIES 8 - PIPING SCHEMATIC DIAGRAM**  
**WATER COOLED SYSTEM WITH HOTGAS BYPASS (2-WAY VALVE)**

VERTICAL FLOOR MOUNT UNIT

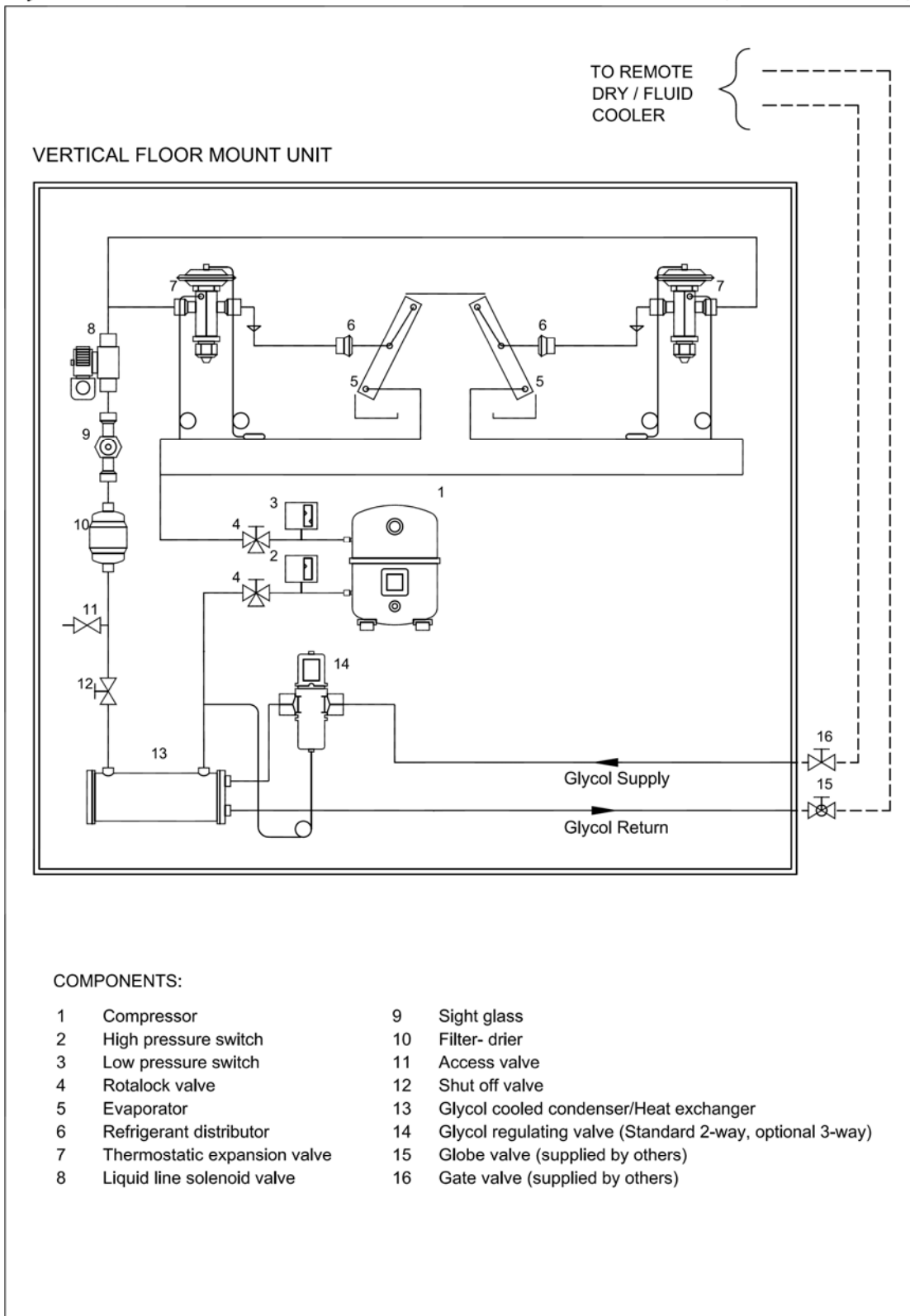


**COMPONENTS:**

- |                                |  |
|--------------------------------|--|
| 1 Compressor                   | 11 Access valve  |
| 2 High pressure switch         | 12 Shut off valve  |
| 3 Low pressure switch          | 13 Water cooled condenser                                  |
| 4 Rotalock valve               | 14 Water regulating valve (Standard 2-way, optional 3-way) |
| 5 Evaporator                   | 15 Globe valve (supplied by others)                        |
| 6 Refrigerant distributor      | 16 Gate valve (supplied by others)                         |
| 7 Thermostatic expansion valve | 17 Hotgas bypass manual shut-off valve                     |
| 8 Liquid line solenoid valve   | 18 Hotgas bypass valve                                     |
| 9 Sight glass                  | 19 Side connection distributor                             |
| 10 Filter- drier               |  |

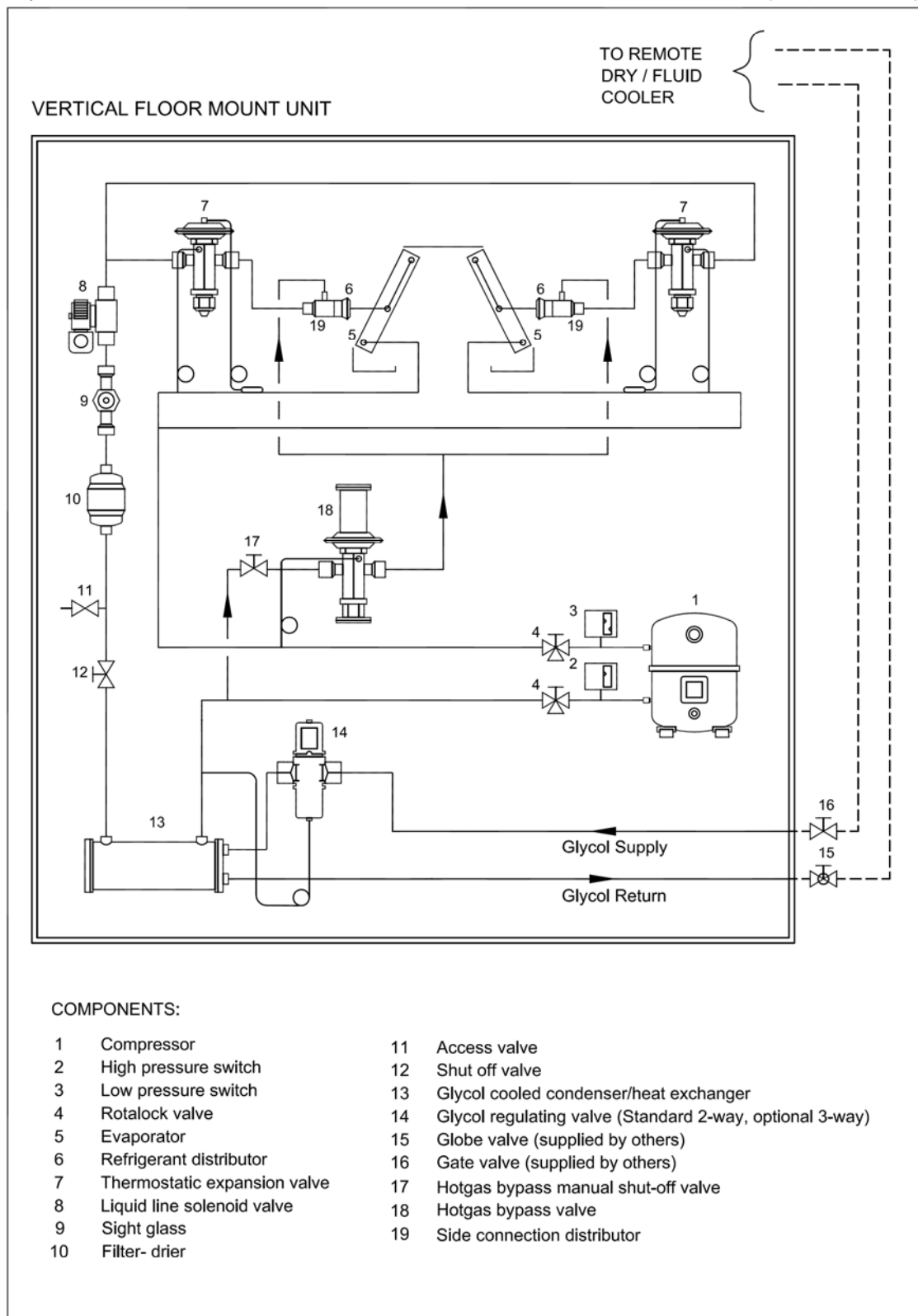


SERIES 8 - PIPING SCHEMATIC DIAGRAM  
GLYCOL COOLED SYSTEM (2-WAY VALVE)





**SERIES 8 - PIPING SCHEMATIC DIAGRAM**  
**GLYCOL COOLED SYSTEM WITH HOTGAS BYPASS (2-WAY VALVE)**



S8DS302F

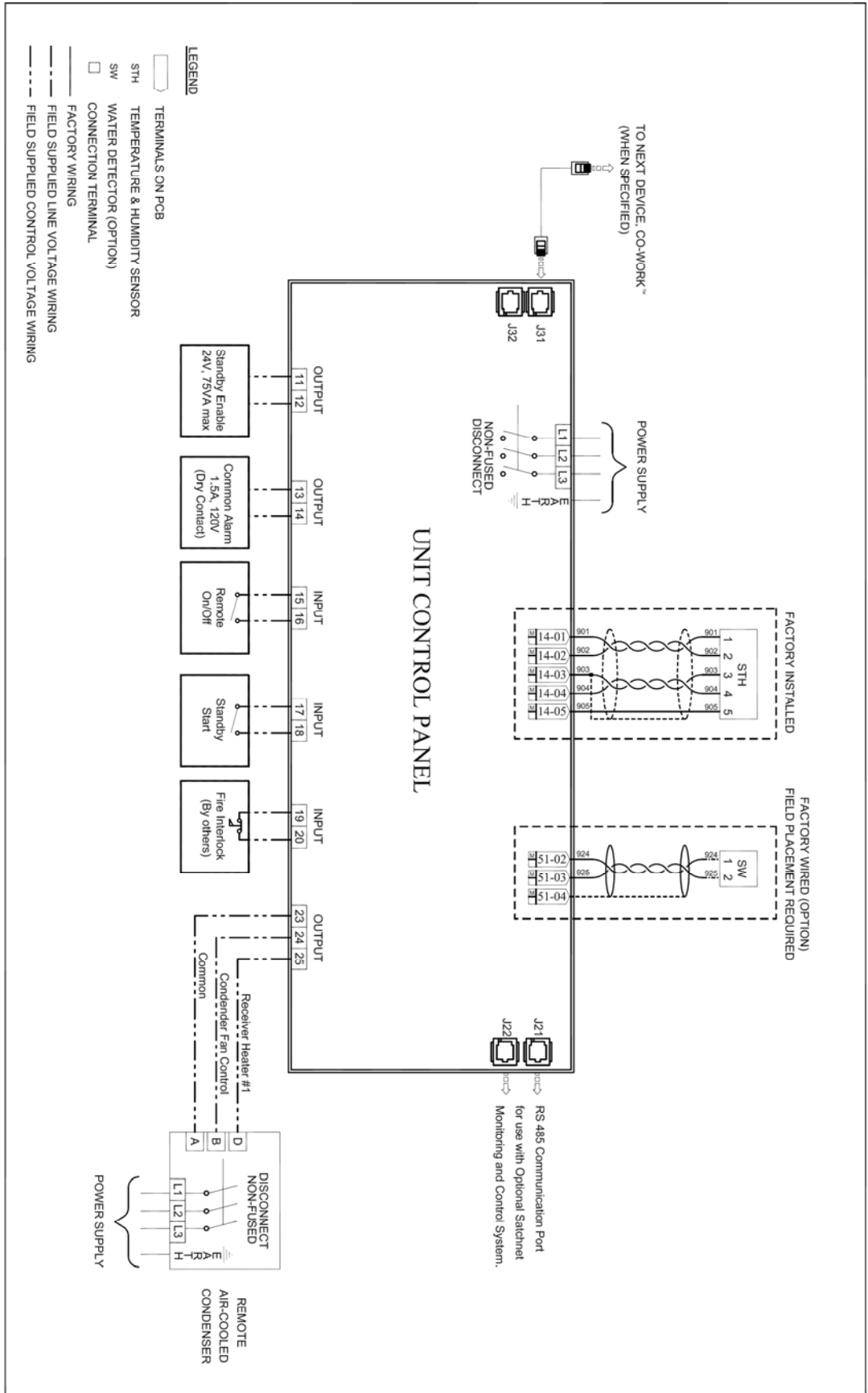
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NOT TO SCALE

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## Appendix C : Electrical Schematic Diagrams

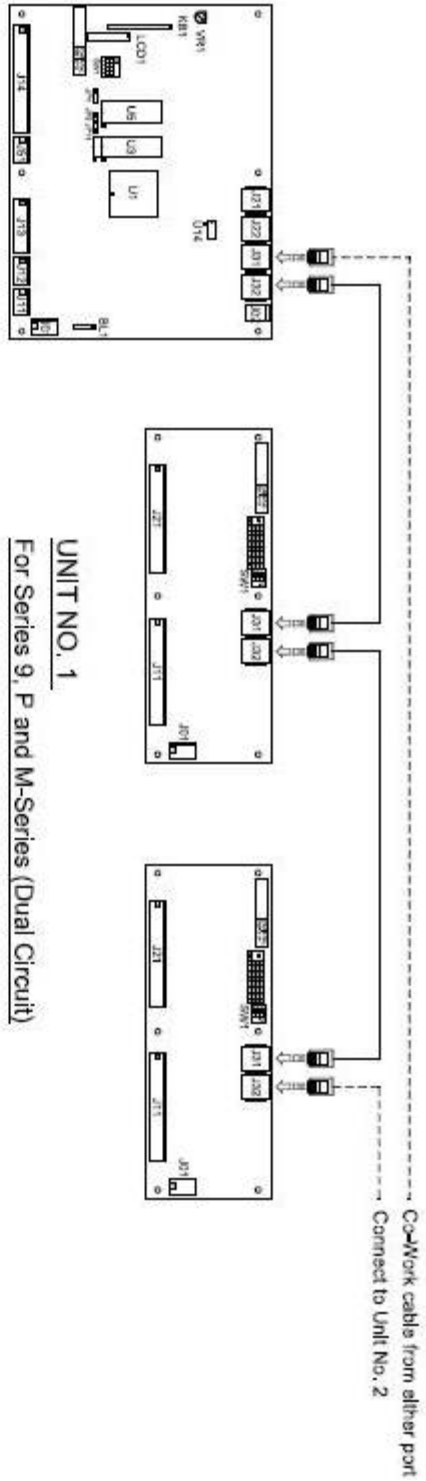
<u>Drawing Title</u>	<u>Drawing No.</u>
SERIES 8 - Electric Schematic Air-Cooled – General, Master	S8EDN101
SERIES 8 - Electric Schematic – Co-Work I2C Interconnection Link	M52ES13
SERIES 8 – Electric Schematic – Field Wiring Standby Start/ Standby Enable, For automatic change over	M52ES05
SERIES 8 - Electric Schematic – Embedded Web Browser Connection, Serial to Ethernet Communication Link	M52ES20
SERIES 8 - Electric Schematic – Embedded Connection, Serial to Ethernet Communication Link	M52ES25
SERIES 8 - Electric Schematic – Embedded Connection, Serial to Ethernet (Lonworks) Communication Link	M52ES26
SERIES 8 - Electric Schematic – Embedded Connection, Serial to Serial Communication	M52ES27



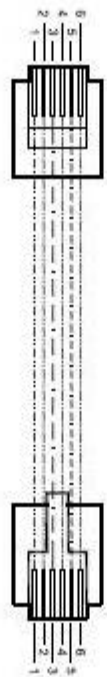
S8EDN101C

7 MAY 2002

NORTH AMERICA

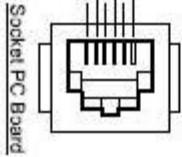


**UNIT NO. 1**  
For Series 9, P and M-Series (Dual Circuit)



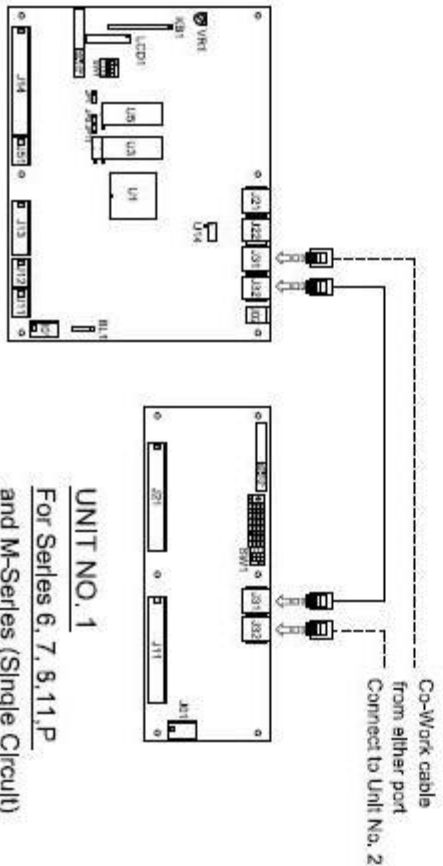
J31 and J32 (12C)	Signal
1	GRD
2	SDA
3	GRD
4	SCL
5	GRD
6	PWR

Note :  
1. J31 and J32 are RJ42 socket.



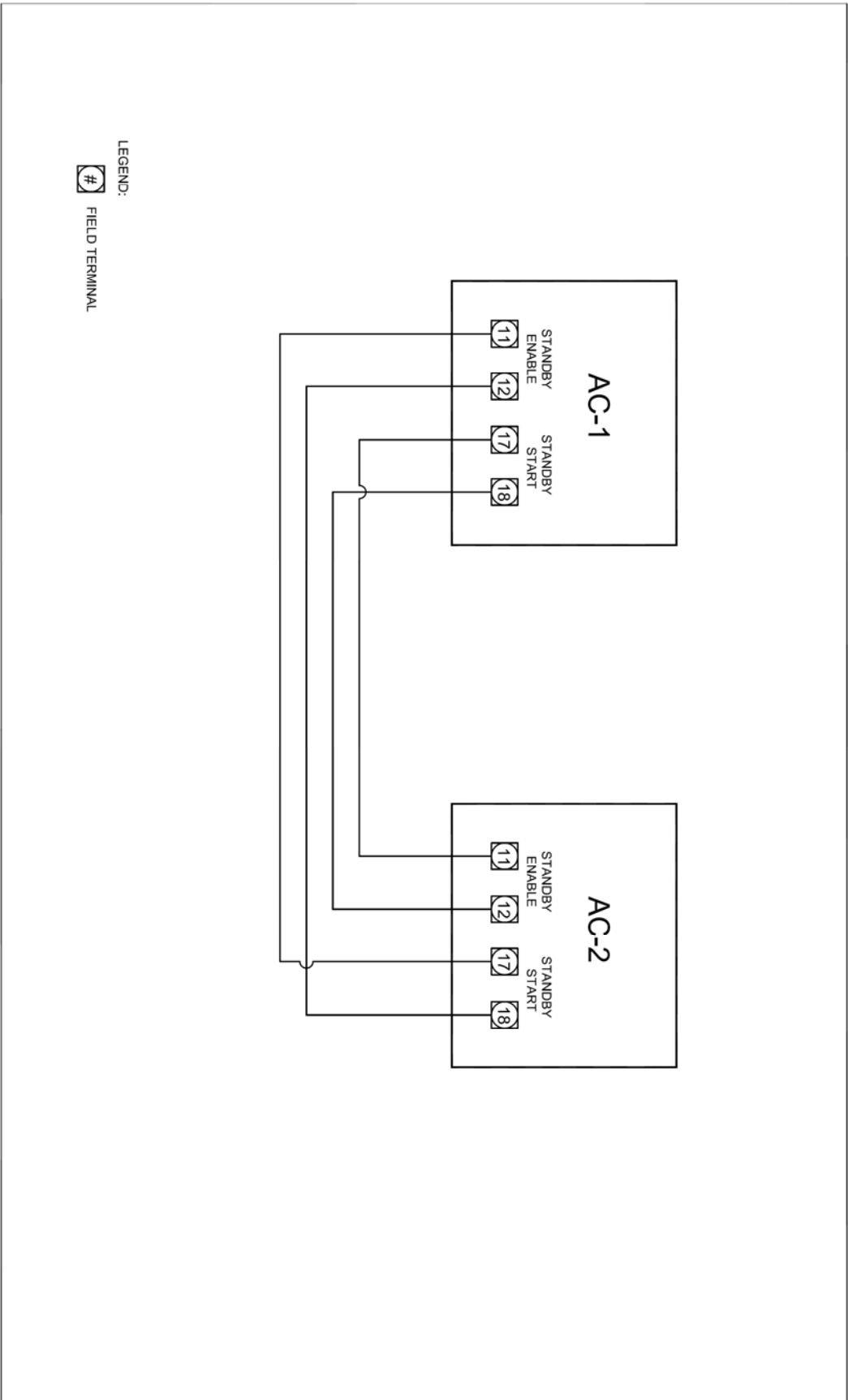
Communication Cable Specification ClimateWorkX P/N 20100196:  
Four twisted pair, Category 5, 24 AWG (0.2 m<sup>2</sup>) run in dedicated EMT or flexible metal BX conduit which is properly connected to the unit electrical box at both ends. Using approved strain relief.

Note :  
The use of an EMI filter such as a broad band EMI Ferrite is recommended for each end of the cable. ClimateWorkX P/N 20400990



**UNIT NO. 1**  
For Series 6, 7, 8, 11, P  
and M-Series (Single Circuit)

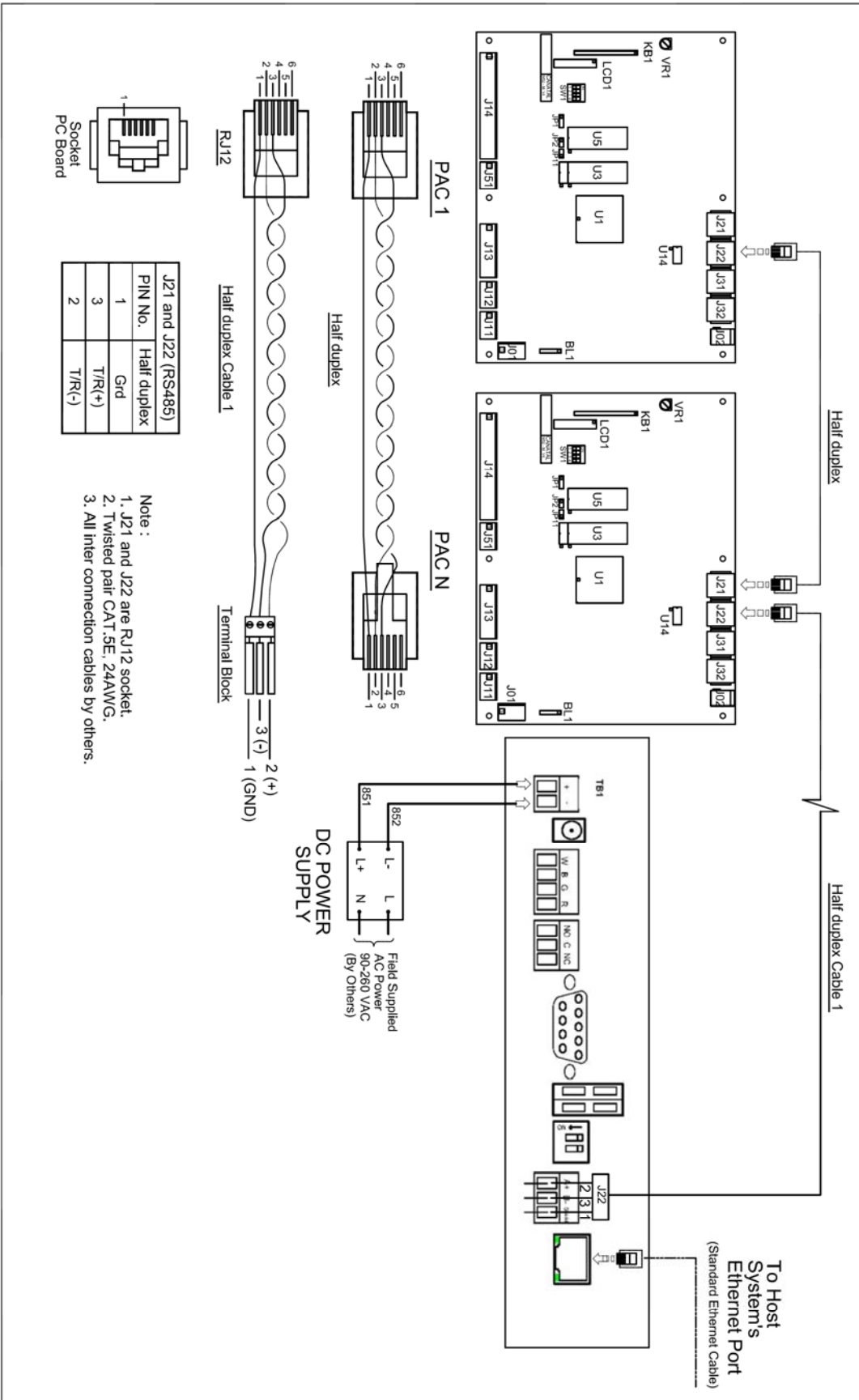




MS2ES05C

29 MAY 2002

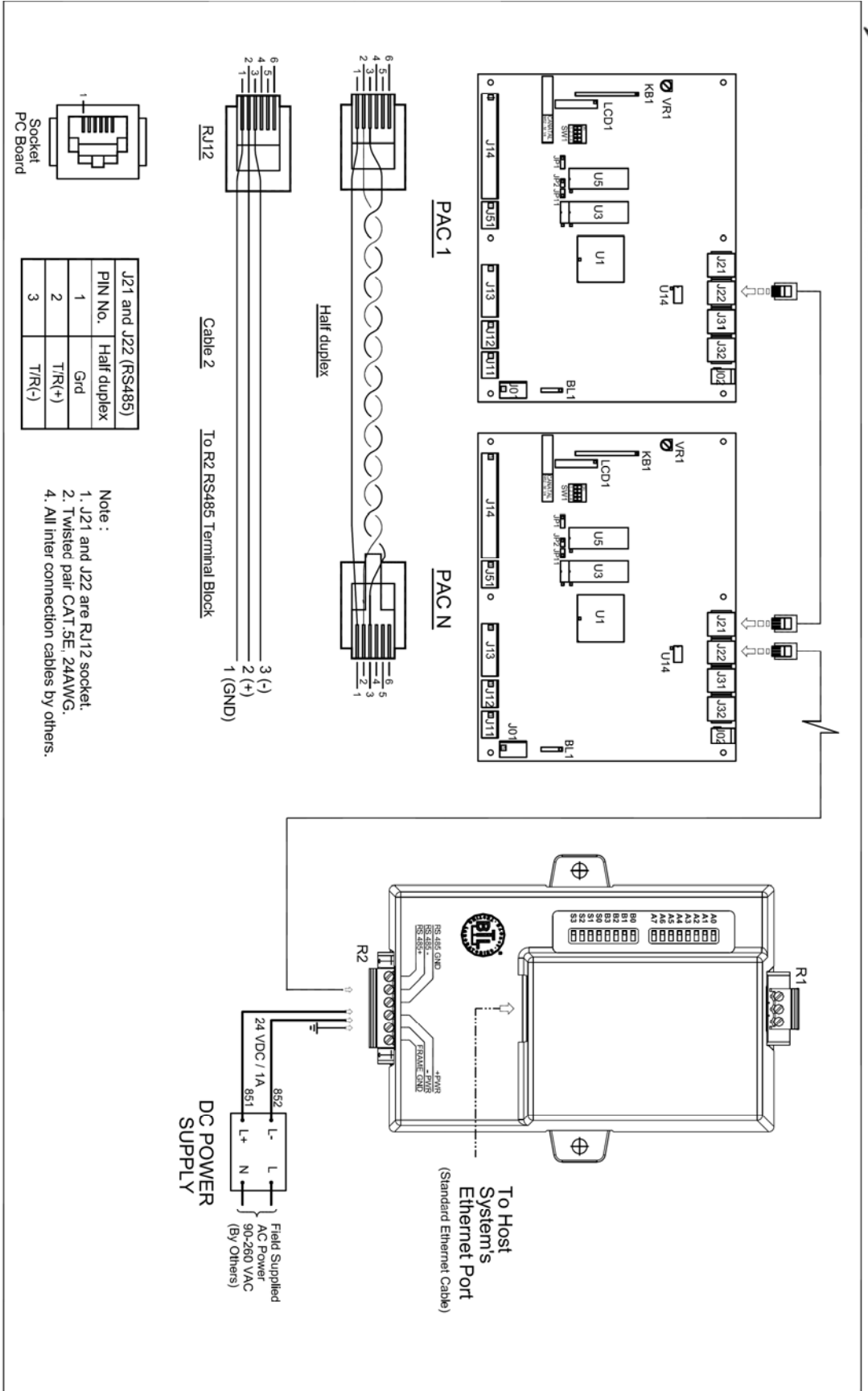
**EMBEDDED WEB BROWSER CONNECTION  
SERIAL TO ETHERNET**



M52ES20G

MAR 14, 2011

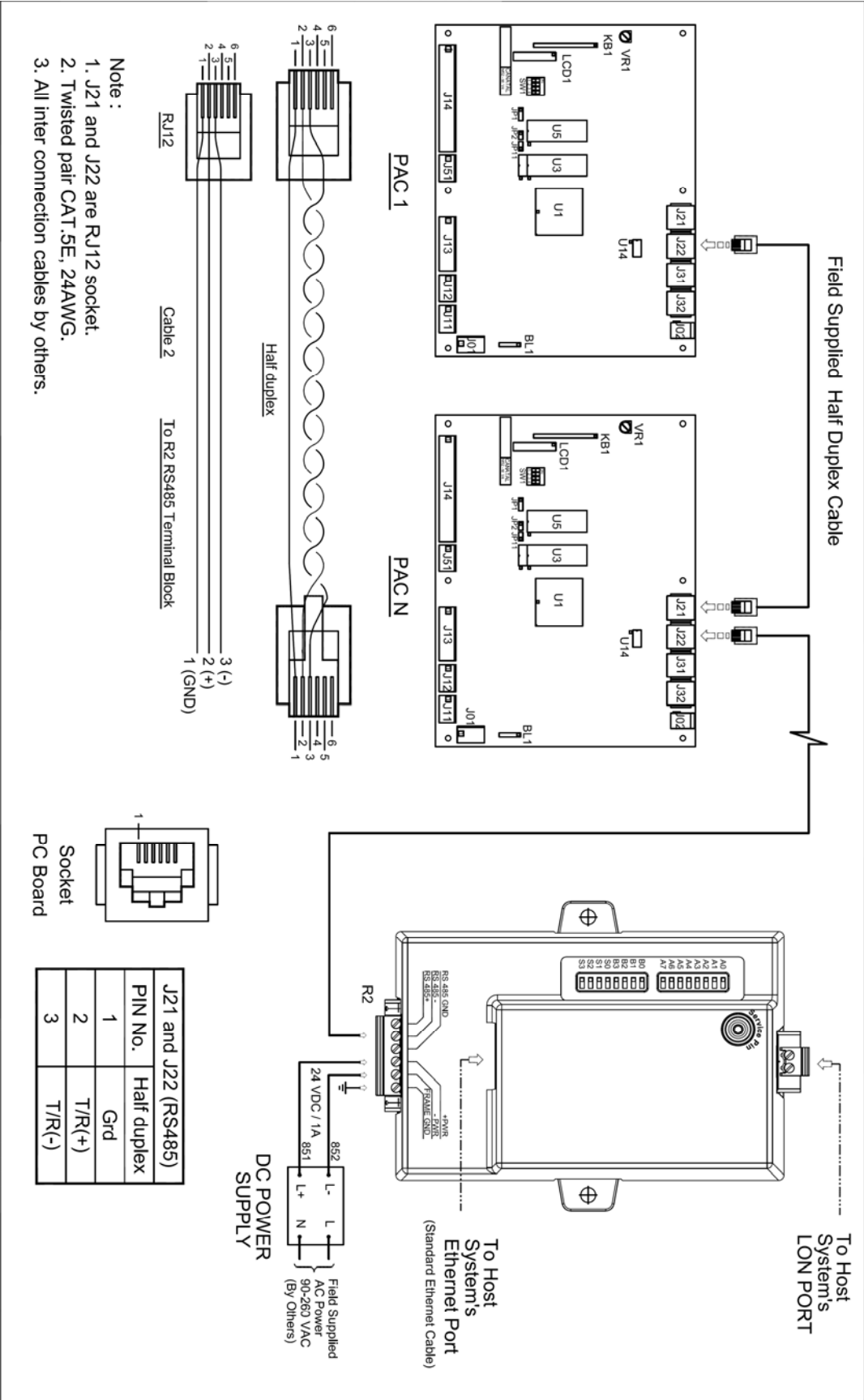
Dimension: Not to scale



M52ES25A

30 APR 2012

Dimension: Not to scale

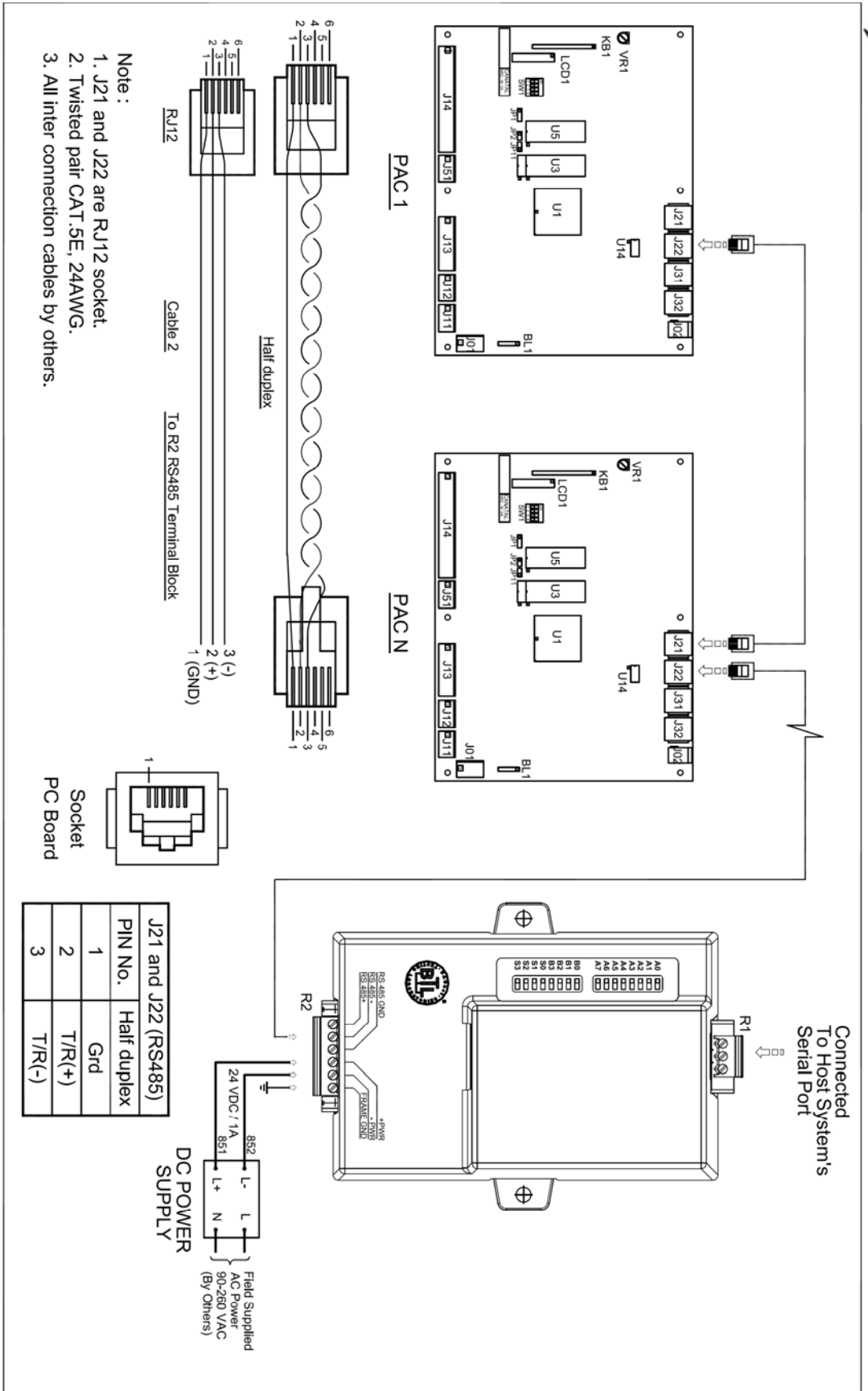


M52ES26B

30 APR 2012

Dimension: Not to scale

EMBEDDED CONNECTION  
SERIAL TO SERIAL



- Note :
1. J21 and J22 are RJ12 socket.
  2. Twisted pair CAT.5E, 24AWG.
  3. All inter connection cables by others.

M52ES27B

30 APR 2012

Dimension: Not to scale