



# 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	Normally open output
13-14	Common alarm (General)	Normally open output
21-22	Common alarm (Critical)	Normally open output
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 thru 28	Condenser/Pump interlock	Normally open dry contact output
31-32	Compressor disable ( <b>optional</b> )	Normally open dry contact input
35-36	Remote on/off Interrupt ( <b>optional</b> )	Normally open dry contact input
37-38	Unit Status ( <b>optional</b> )	Normally open dry contact output
39- 42	Custom Fault1/2 ( <b>optional</b> )	Normally closed dry contact input
43- 44	Liquid High Limit ( <b>optional</b> )	Normally closed dry contact input
49- 50	Hum/ Reheat disable ( <b>optional</b> )	Normally open dry contact input
57- 58	Damper Motor Interlock ( <b>optional</b> )	Normally open dry contact output
59- 60	Damper End Switch ( <b>optional</b> )	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 20 ft. (6m) in elevation to collect refrigerant and lubrication oil during off cycle. A discharge line trap is an important function both during the compressor on and during the compressor off cycle. During the on cycle, the trap collects oil droplets and carries them efficiently up the elevated discharge line. During the off cycle, the traps captures and retains oil residing on the pipe walls that would otherwise drain back to the compressor head, causing damage on startup.
- Install inverted trap whenever a condenser is located above the compressor. An inverted trap or check valve should be installed at the condenser inlet and outlet to prevent liquid refrigerant from flowing backwards into the compressor during off cycles.
- Insulate the suction line and 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. Under sizing discharge lines will reduce compressor capacity and increase compressor load. Over sizing discharge lines increases the initial cost of the project and can reduce the refrigerant gas velocity to a level where oil is not returned to the compressor. 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 (not to exceed 350 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. 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.
7. 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.
8. 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.

## 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 speed of the first fan only. On Condensers with additional fans these fans are controlled by pressure activation controls and should be set to cut in at the following pressures.

Stage 1	190 psi.
Stage 2	220 psi.

### Charging

Calculate the total charge required using this formula:

$$\begin{aligned} & \text{Indoor Unit Charge} + \text{Liquid Line Charge} + \text{Condenser Charge} \\ & + \text{Hot gas Line Charge} = \text{Total Charge} \end{aligned}$$

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 by opening the refrigerant cylinder vapor valve.
4. Connect the refrigerant cylinder to recovery unit and charge system with 90% of calculated amount.
5. Start the unit using the test mode to energize the main fan and compressor. Please make sure outdoor condenser (if any) is powered.
6. Add additional refrigerant to the system until the sight glass is clear of bubbles and subcooling is measured between 10-15 °F.
7. Run system to maintain a hot gas (discharge) pressure based on refrigerant used (R407C @240psi) then re-check subcooling, Add refrigerant if subcooling has dropped below 10 °F.
8. The system is now correctly charged for operating under fan speed control. It is a good practice to weigh the amount of additional refrigerant that was added and keep a record of the total charge in the system.

## Head Pressure Control System

For condensers possibly subjected to extremely low ambient temperature, it is recommended that a head pressure control system be installed. This avoids starving the evaporator coil, with the consequence of oil clogging; short cycling on 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.

ClimateWorx uses a two-valve head pressure control with 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.

On Condensers with multiple fans these additional fans are controlled by pressure activation controls and should be set to cut in at the following pressures.

Stage 1	190 psi.
Stage 2	220 psi.

### Charging

Calculate the total charge required using this formula:

$$\begin{aligned} & \textit{Indoor Unit Charge} + \textit{Liquid Line Charge} + \textit{Condenser Charge} \\ & + \textit{Hot gas Line Charge} + 20\% \textit{ of Receiver volume} = \textit{Total Charge} \end{aligned}$$

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 a common connection to the refrigerant cylinder. Purge the lines by opening the refrigerant cylinder vapor valve.
4. Connect the refrigerant cylinder to recovery unit and charge system with 90% of calculated amount.
5. Start the unit using the test mode to energize the main fan and compressor. Please make sure outdoor condenser (if any) is powered.
6. Add additional refrigerant to the system until the sight glass is clear of bubbles and subcooling is measured between 10-15 °F.
7. Run system to maintain a hot gas (discharge) pressure based on refrigerant used (R407C @240psi and R22 a @225psi) by adjusting ORI valve(s) then re-check subcooling, Add refrigerant if subcooling has dropped below 10 °F.
8. The system is now correctly charged for operating under head pressure control at the ambient temperature charging is being carried out. It is a good practice to weigh the amount of additional refrigerant that was added and keep a record of the total charge in the system.
9. If the system is designed to operate at ambient below the ambient that exists during charging, additional charge will have to be added now.

**Method to Determine Additional Refrigerant Charge to Operate to an Expected Minimum Ambient Temperature**

Ambient Temp (°F)	% 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

**Example for KS11-078-1 Ambient Temp at Time of Charging = 60°F to Operate to -30°F**

**Step 1. At the ambient temperature at the time of charging the system (e.g 60°F)  
Read from the table – % of Condenser to be Flooded (e.g - 10 %)**

**Step 2. At the expected minimum ambient Temperature (e.g - - 30 °F )  
Read from the table - % of the Condenser to be Flooded (e.g - 77 %)**

**Step 3. Calculate the difference of the above two values  
( 77 % - 10 % = 67 % )**

**Step 4. From the “ Air Cooled Condenser Guide” read Winter Flooded ( -40°F )  
Refrigerant Charge ( 6.4 lbs )**

**Step 5. Multiply the value found in Step 4 by the difference in %’s calculated in Step 3.**

**Additional Required Charge = 6.4 lb \* ( 67 % ) = 4.30 lb / Condenser  
( If Two (2) Circuit Condenser 2.15 lb / Ref Circuit**

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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)

## 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

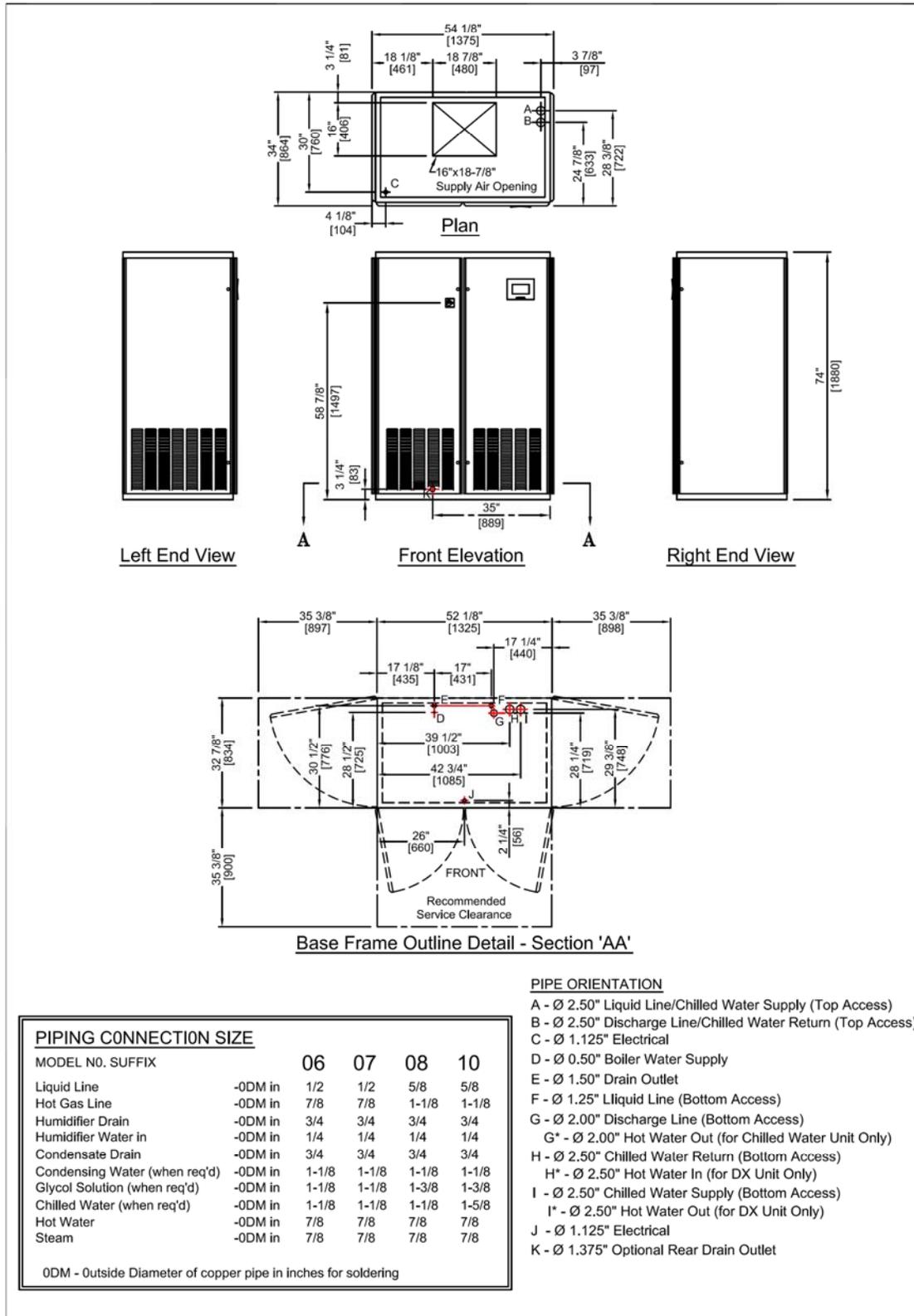
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## **Appendix A : Dimensional Drawings**

<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

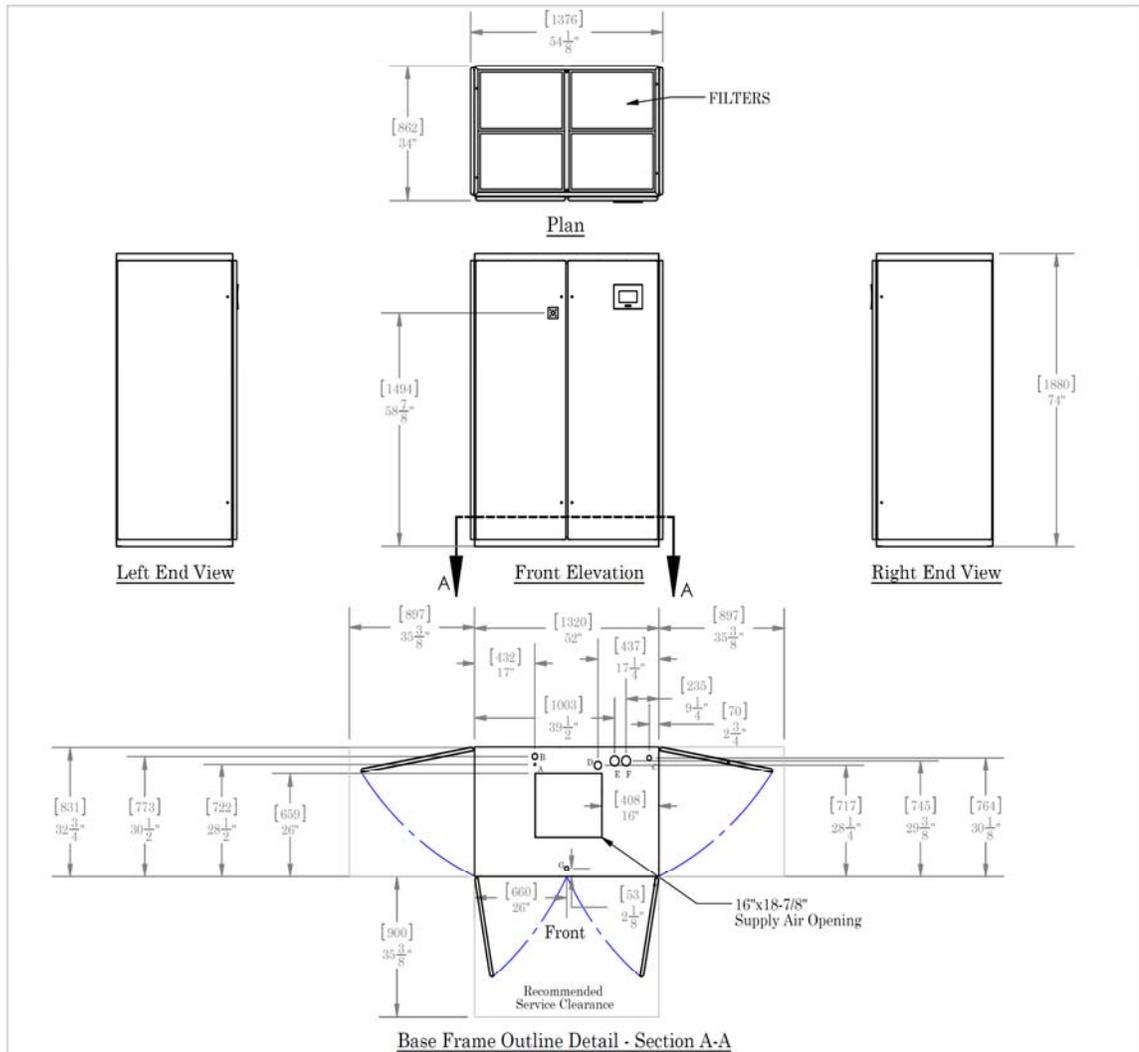


SERIES 8- VERTICAL FLOOR MOUNT UPFLOW UNIT  
DIMENSIONAL DETAIL





**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

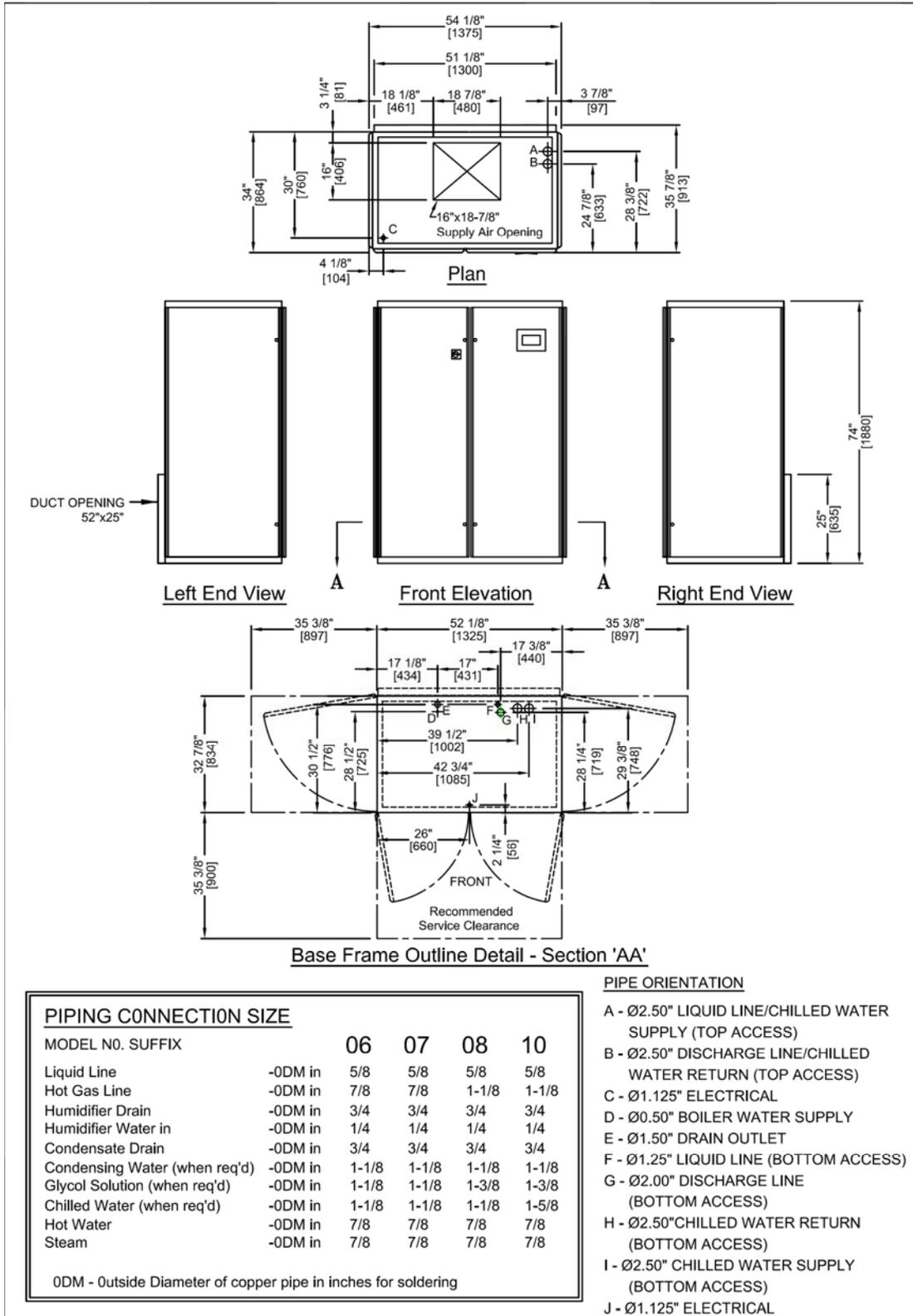
ODM - Outside Diameter of copper pipe in inches for soldering

**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

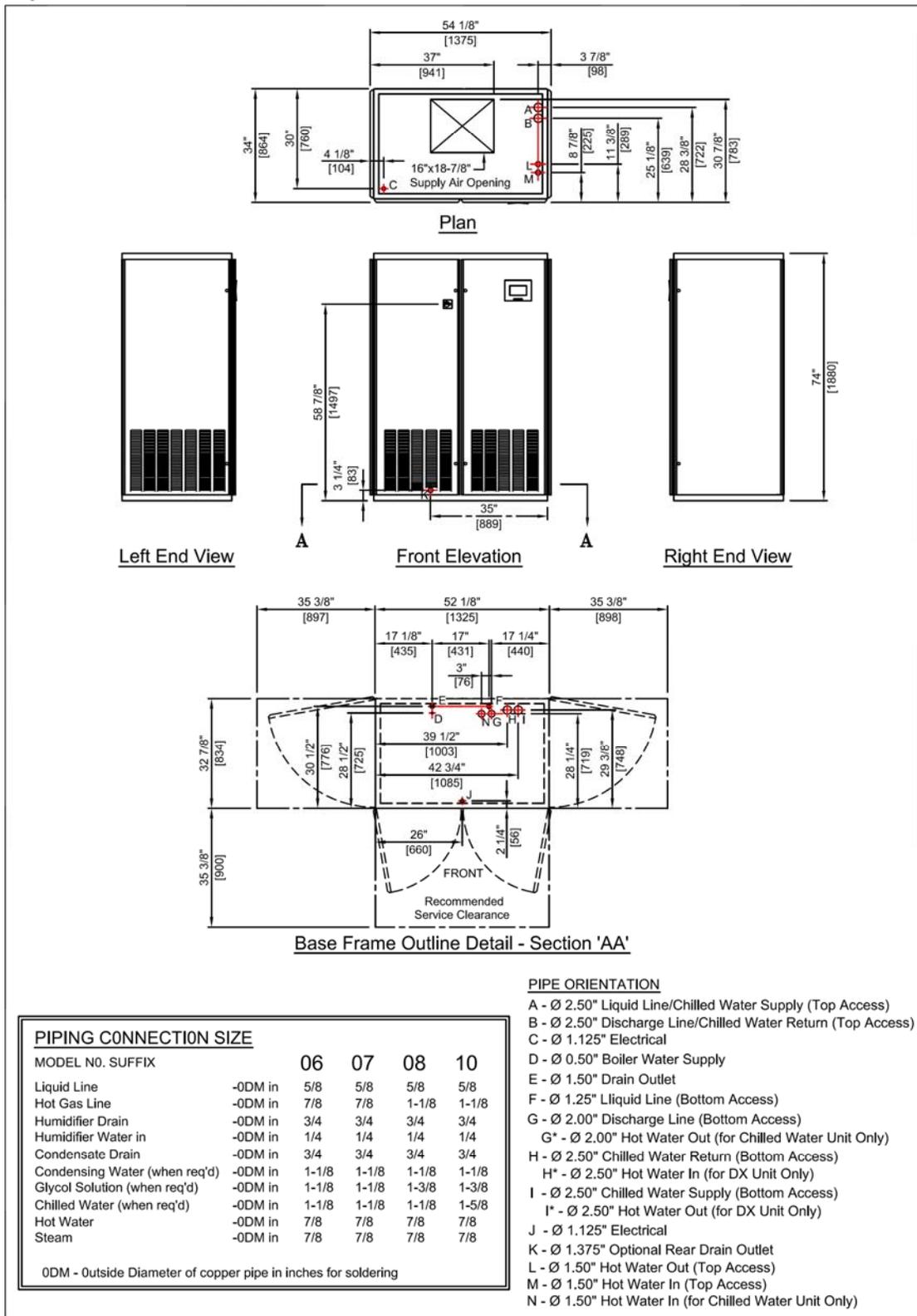


**SERIES 8- VERTICAL FLOOR MOUNT UPFLOW UNIT  
REAR RETURN DIMENSIONAL DETAIL**





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



S8DD101E - SPECIAL

SEPTEMBER 09, 2003

NOT TO SCALE

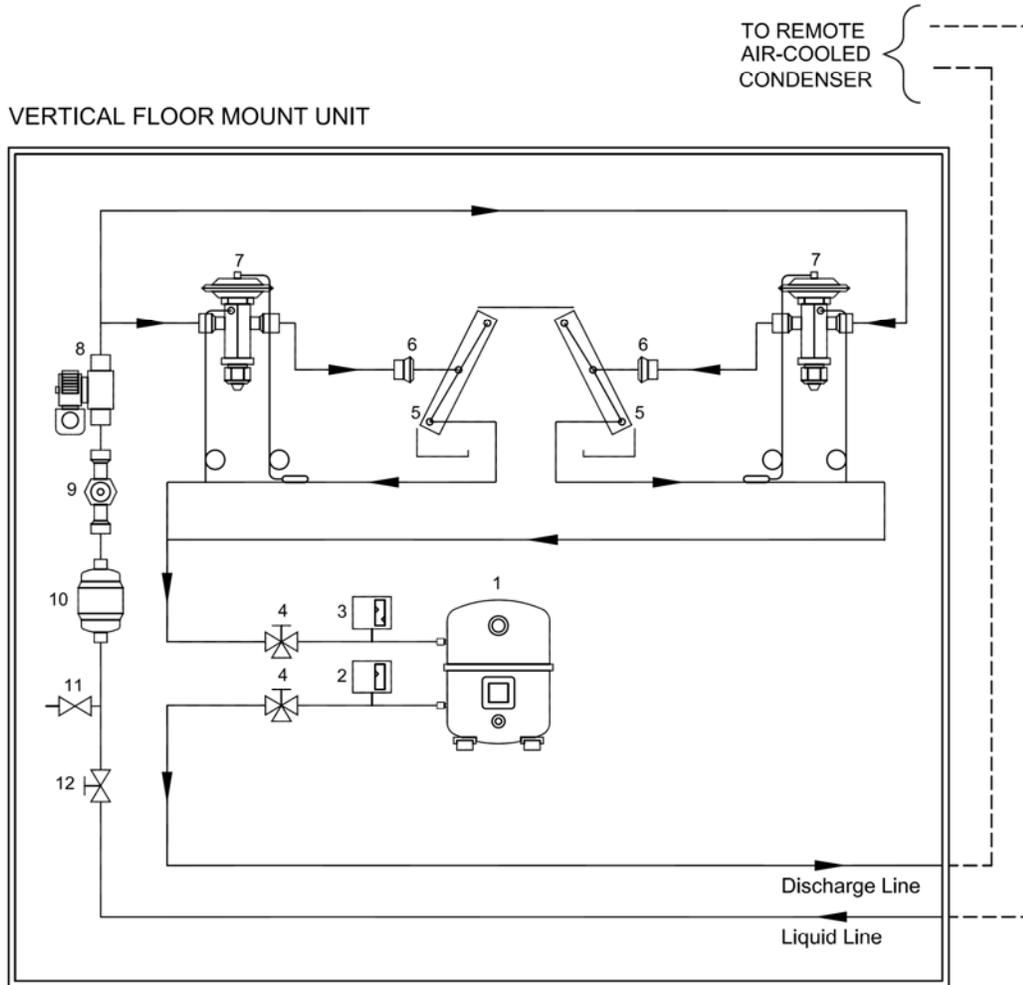
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## **Appendix B : Piping Schematic Diagrams**

<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

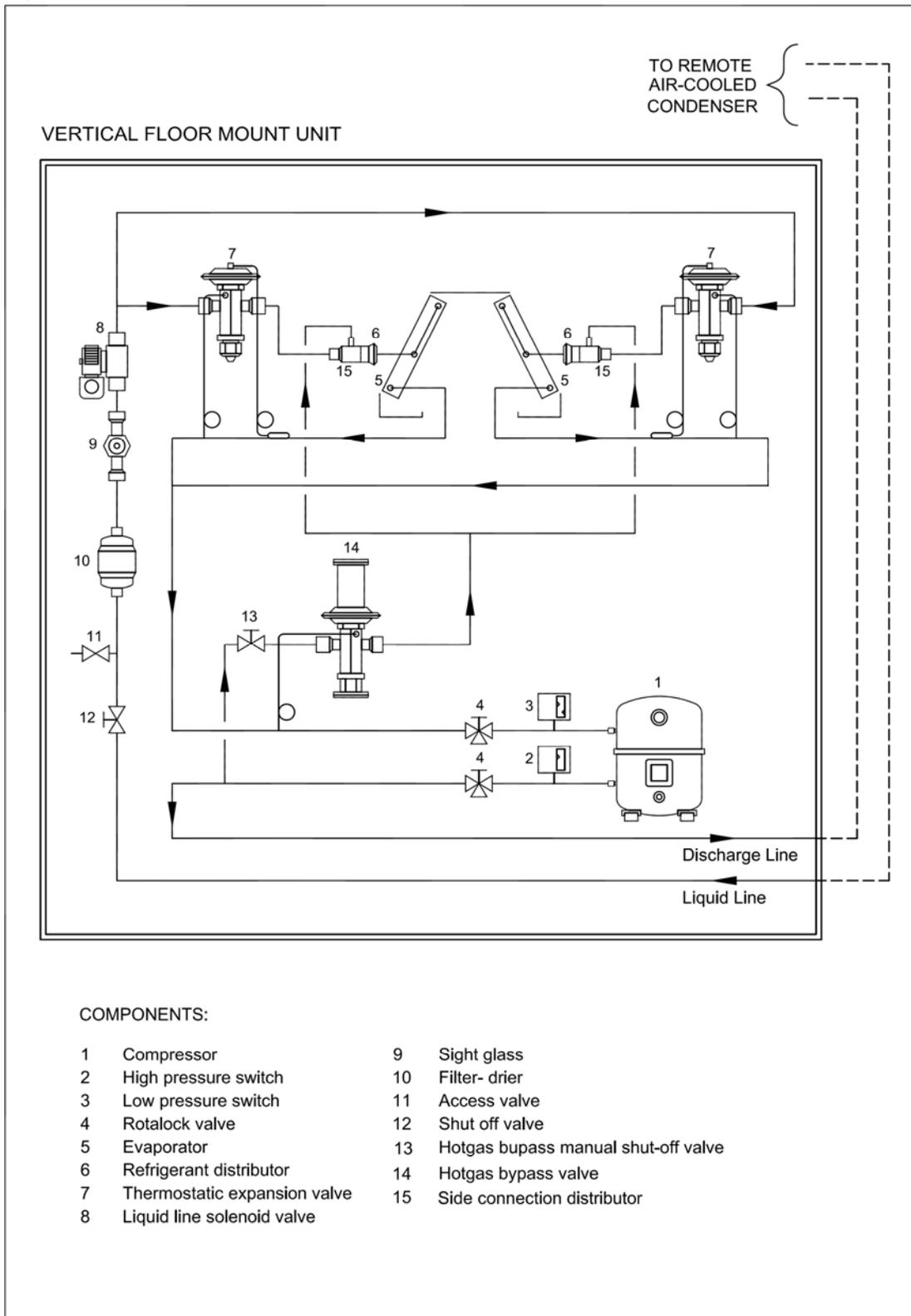


COMPONENTS:

- |   |                              |    |                |
|---|------------------------------|----|----------------|
| 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   |    |                |



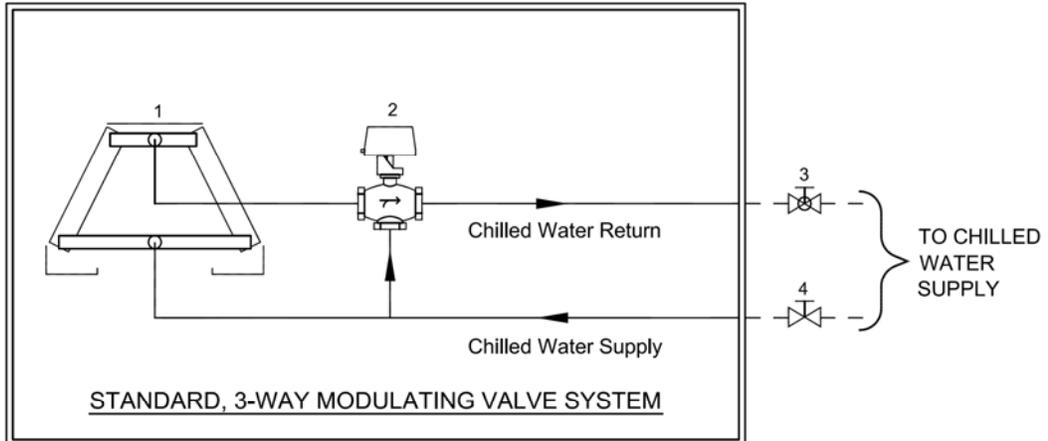
SERIES 8 - PIPING SCHEMATIC DIAGRAM  
AIR-COOLED SYSTEM WITH HOTGAS BYPASS





SERIES 8 - PIPING SCHEMATIC DIAGRAM  
CHILLED WATER SYSTEM

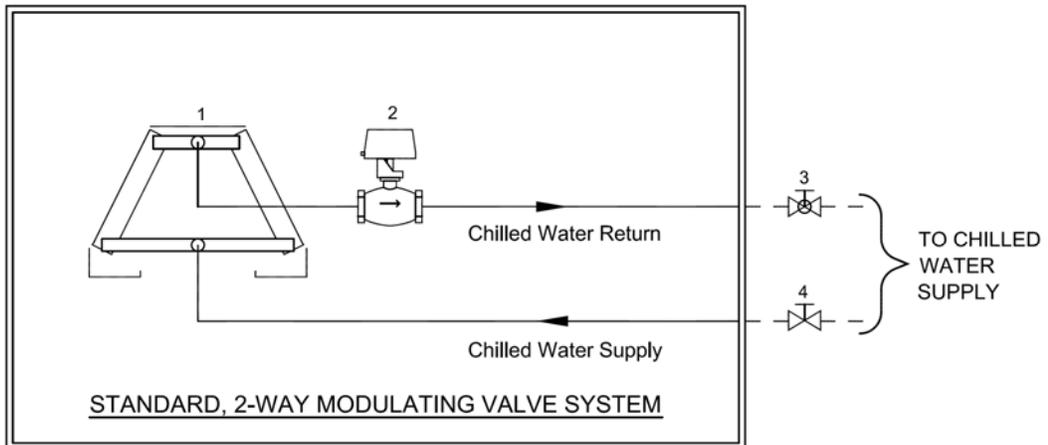
VERTICAL FLOOR MOUNT UNIT



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

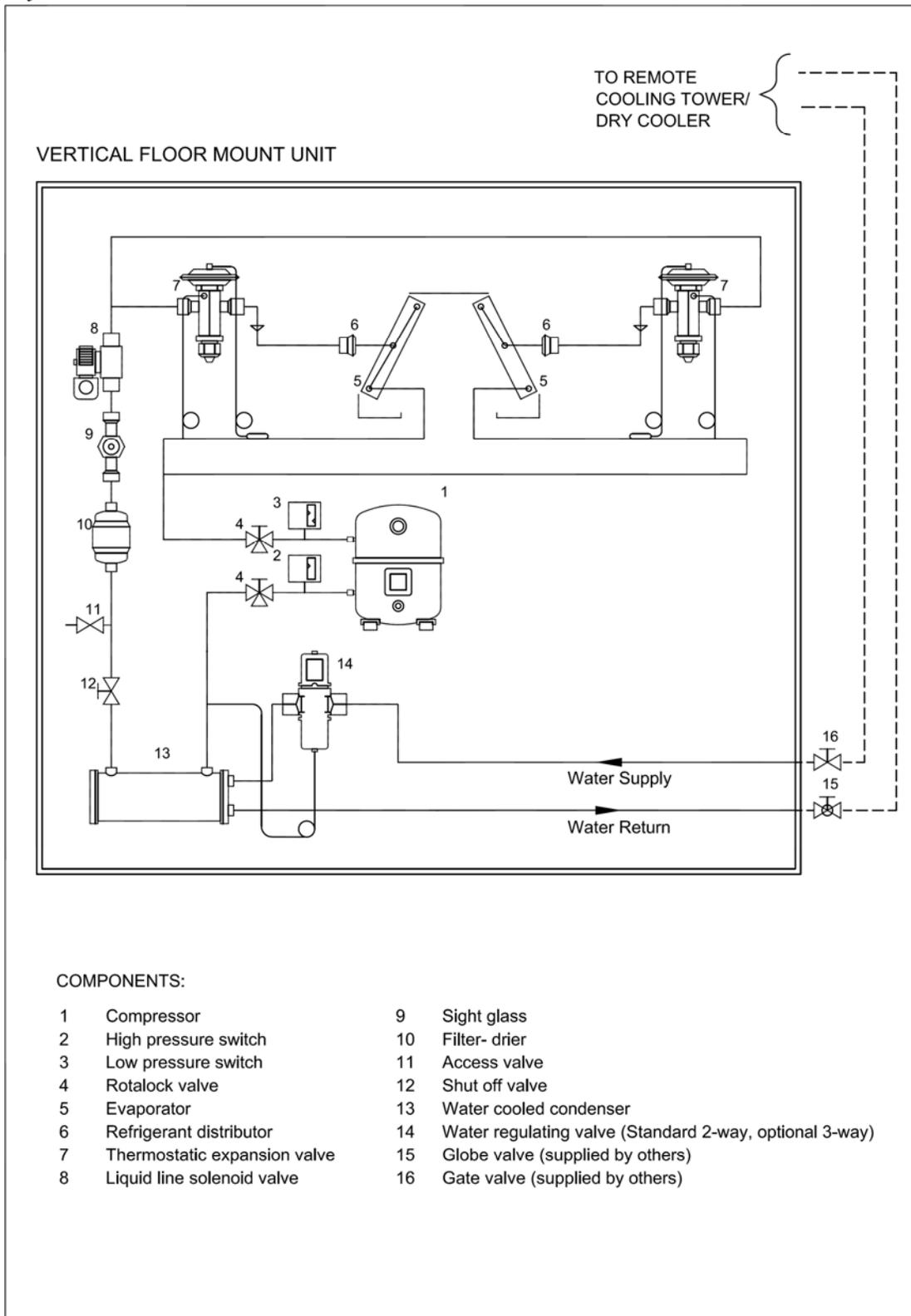


COMPONENTS:

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



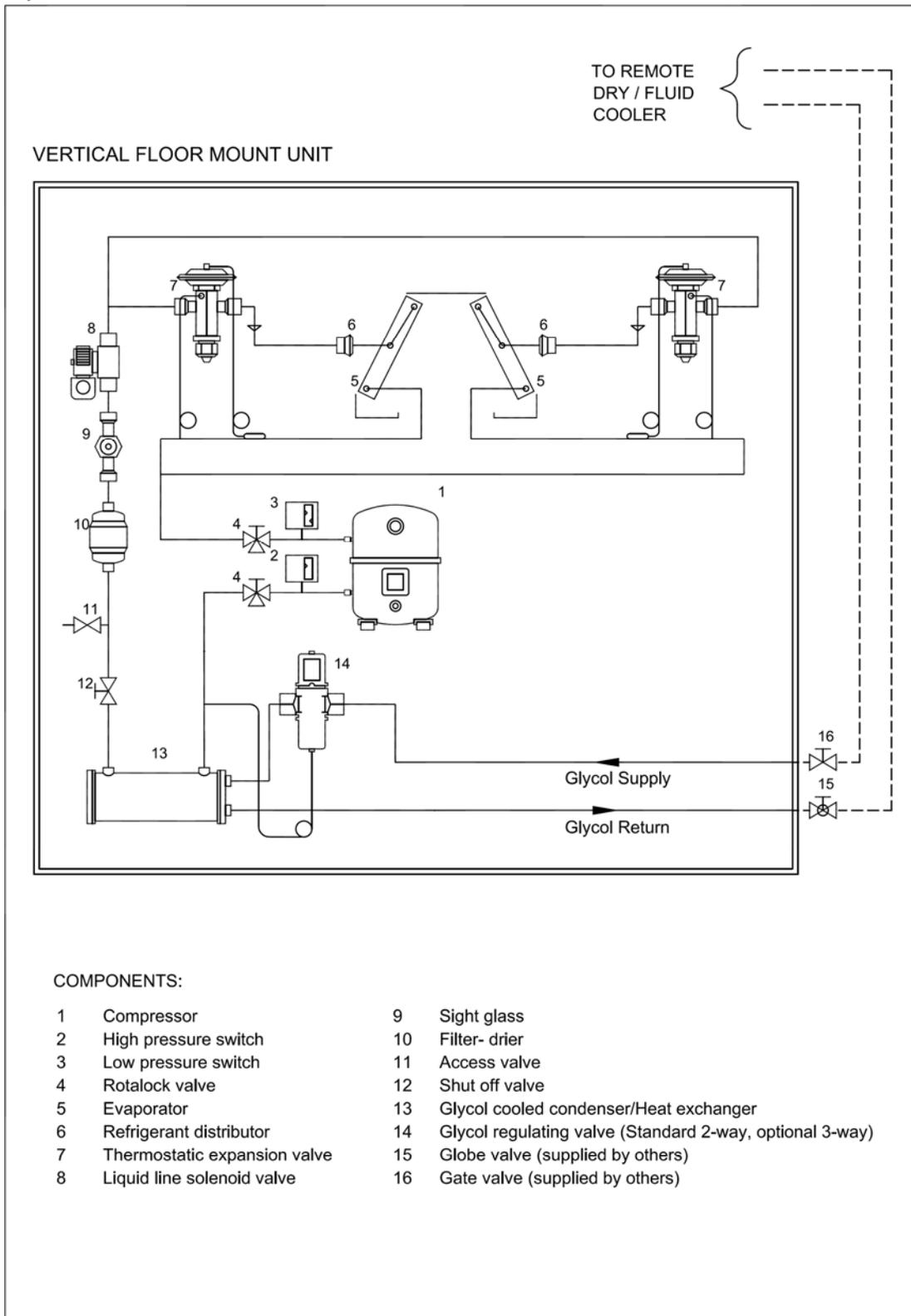
SERIES 8 - PIPING SCHEMATIC DIAGRAM  
WATER COOLED SYSTEM (2-WAY VALVE)





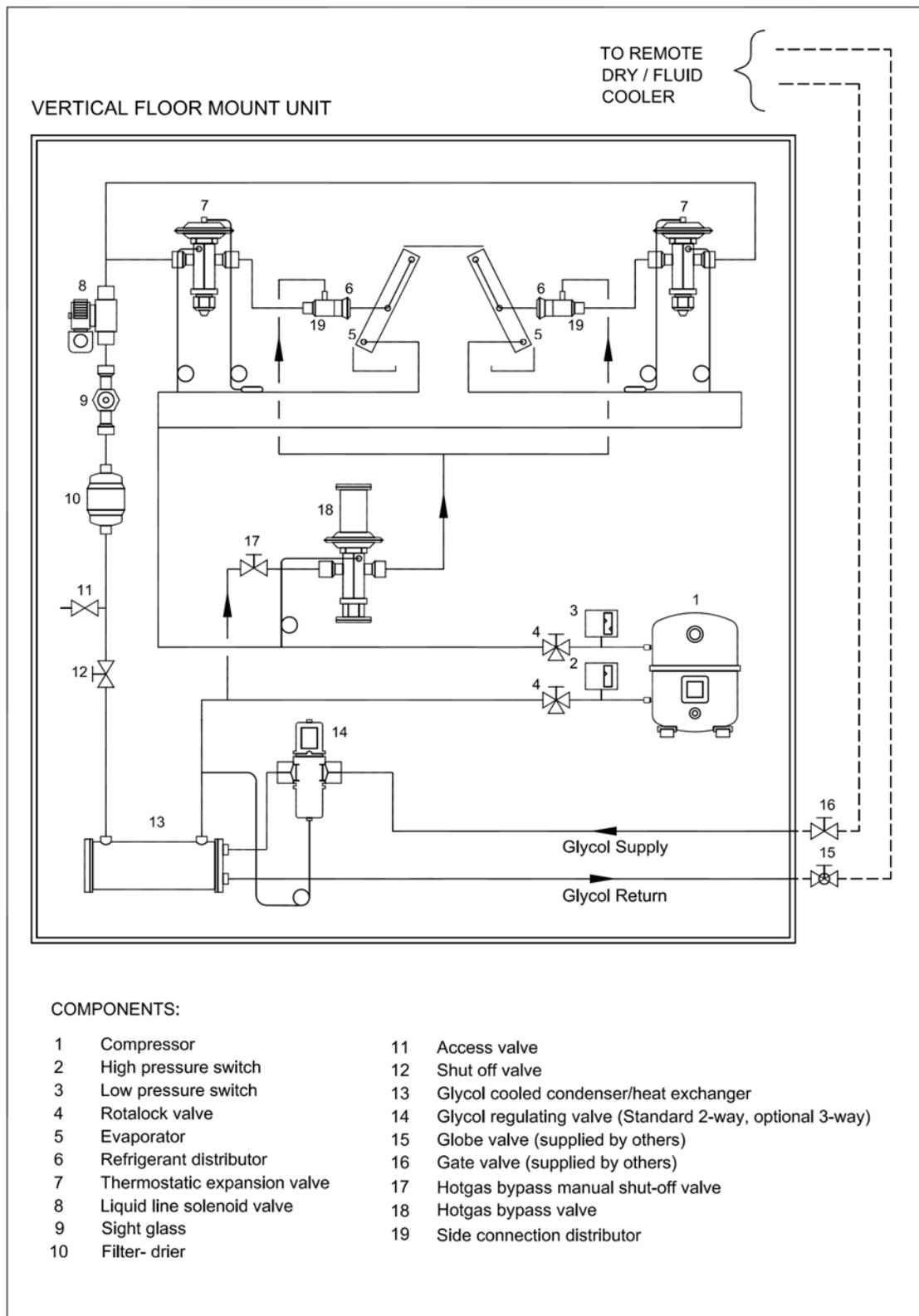


SERIES 8 - PIPING SCHEMATIC DIAGRAM  
GLYCOL COOLED SYSTEM (2-WAY VALVE)





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



S8DS302F

08 APRIL 2013

NOT TO SCALE

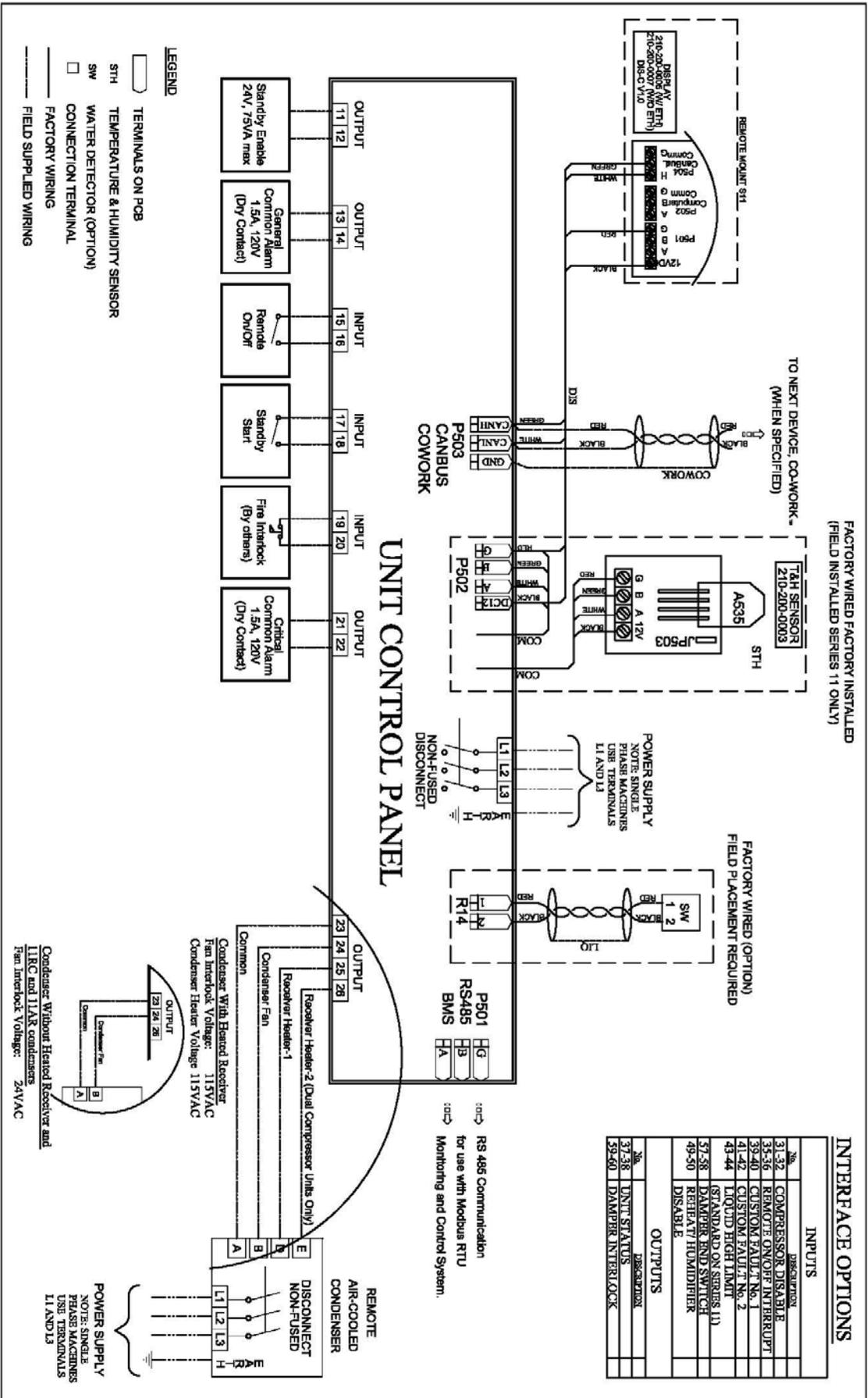
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## Appendix C : Electrical Schematic Diagrams

<u>Drawing Title</u>	<u>Drawing No.</u>
Electric Schematic Air-Cooled – General,	ES9030
Electric Schematic Water/ Glycol-Cooled – General,	ES9065
Electric Schematic Chilled Water – General,	ES9050
Electric Schematic – Field Wiring Standby Start/ Standby Enable, For automatic change over	M52ES05
Electric Schematic – Co-Work I2C Interconnection Link	M52ES1003
Electric Schematic – RS485 ModBus RTU Connection, Serial Communication Link	M52ES1004
Electric Schematic – Embedded Connection, Serial to Serial or Ethernet Communication Link remote power	M52ES1005
Electric Schematic – Embedded Connection, Serial to Serial or Ethernet Communication Link factory power	M52ES1006



# GENERAL ELECTRICAL CONTROL PANEL DIAGRAM UNITS WITH REMOTE AIR-COOLED CONDENSER



ISS9060

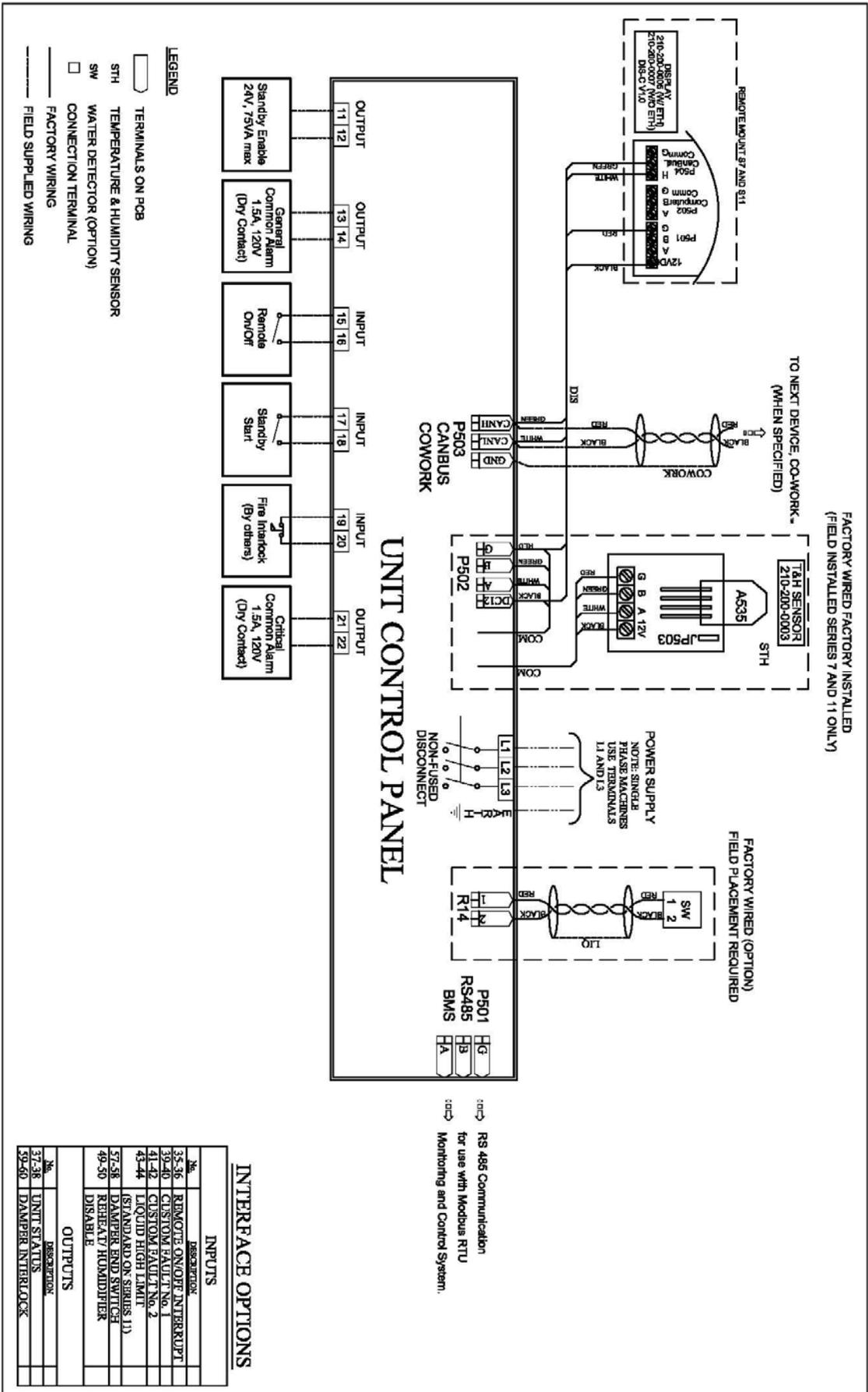
2016-02-24

NORTH AMERICA





GENERAL ELECTRICAL CONTROL PANEL DIAGRAM  
CHILLED WATER UNIT



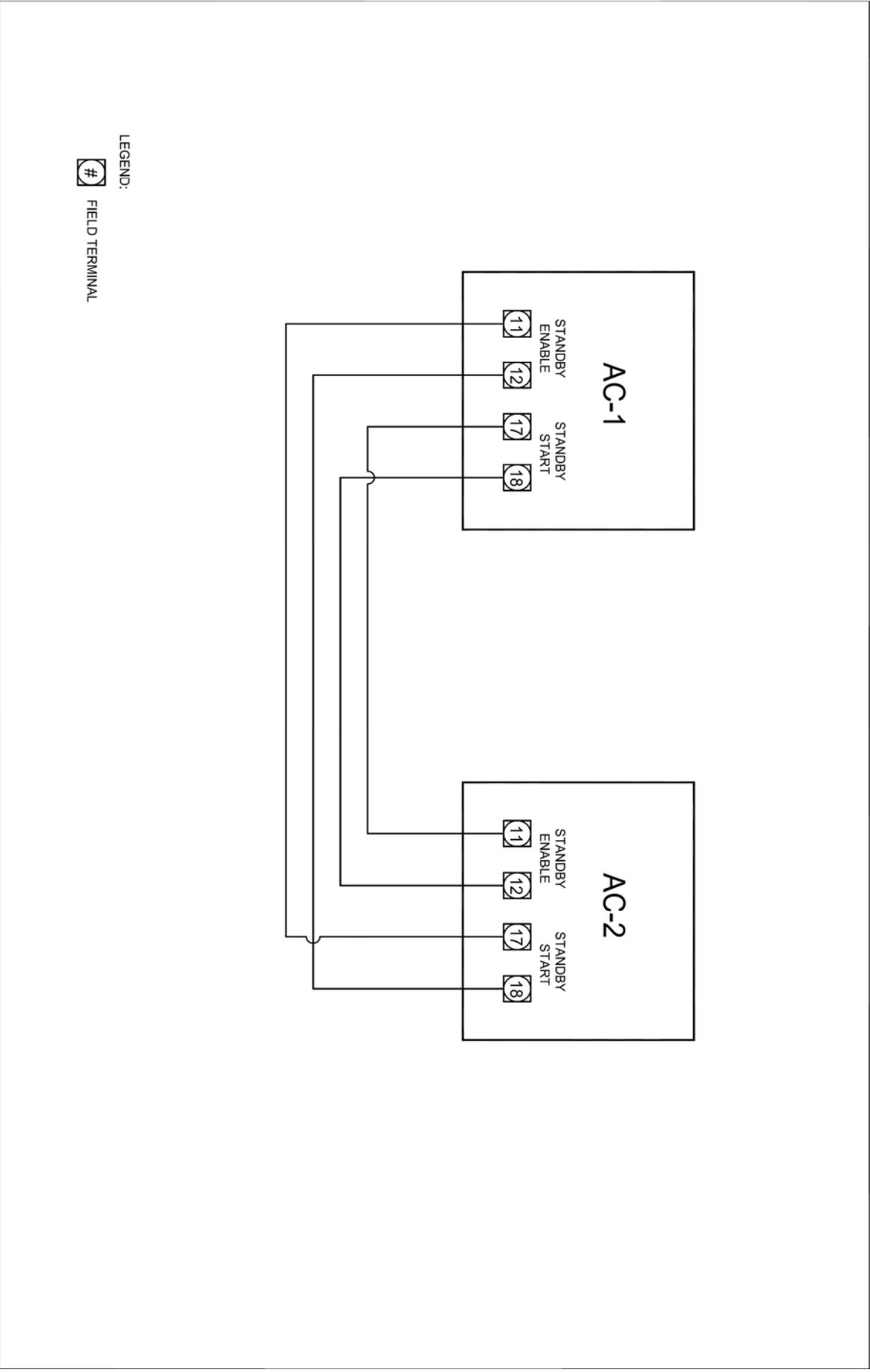
ES99050

2016-02-29

NORTH AMERICA

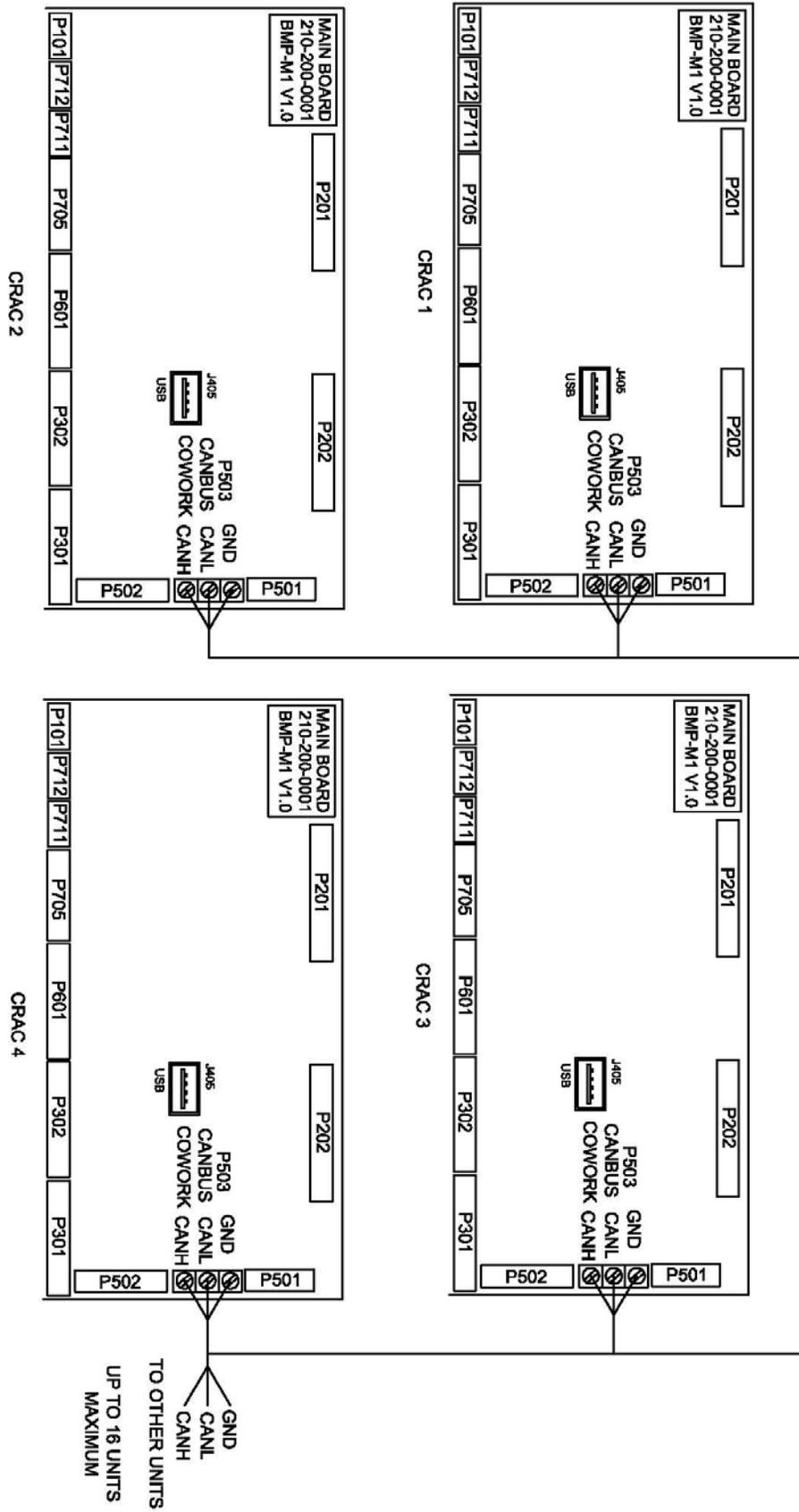


For Automatic Change Over  
Field Wiring Standby Start/Standby Enable





**ADVANCED M52 CONTROL SYSTEM**  
Electrical Schematic - Co-Work Link



NOTE: TWISTED PAIR CABLE SHOULD BE 24 AWG OR LARGER CONDUCTOR

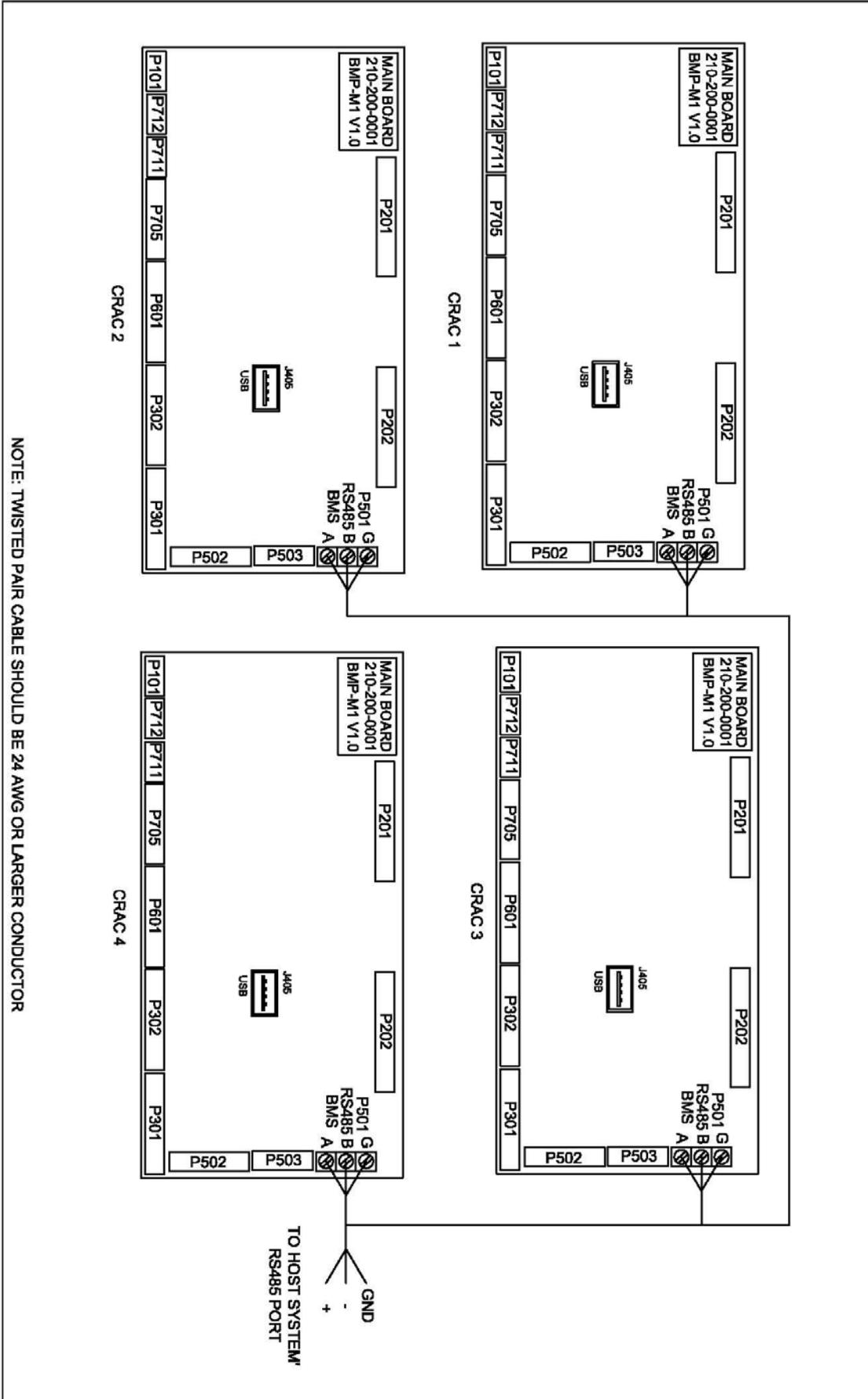
M52ES1003

2015-07-27

Dimension: Not to scale



ADVANCED M52 CONTROL SYSTEM  
Electrical Schematic - RS485 ModBus RTU to Serial Communication Link



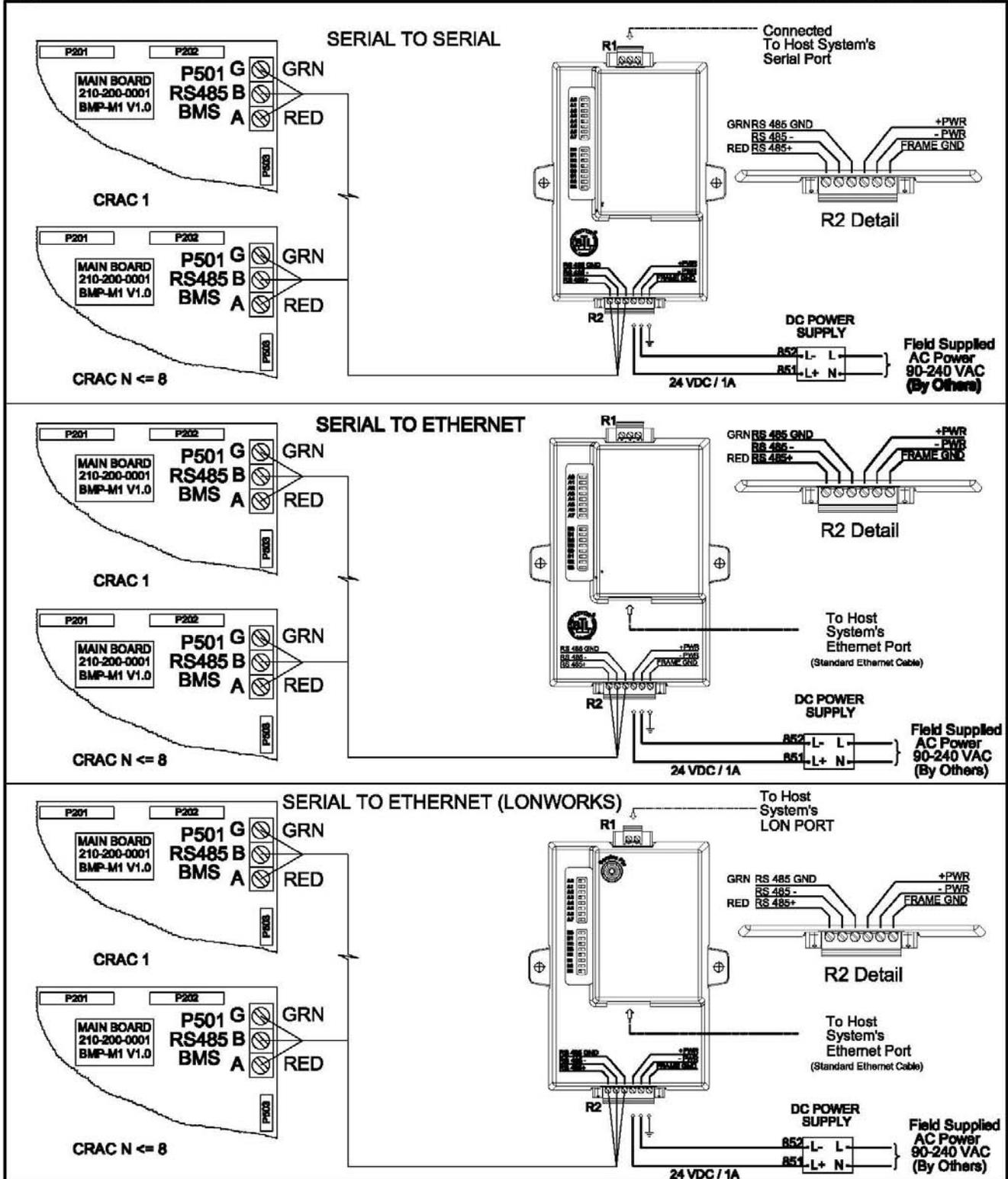
M52ES1004

2015-07-27

Dimension: Not to scale



## ADVANCED M52 CONTROL SYSTEM EMBEDDED CONNECTION



M52ES1005 REV A

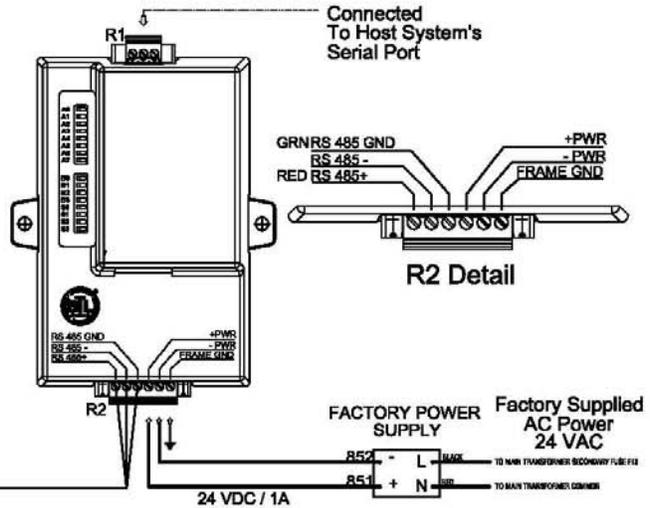
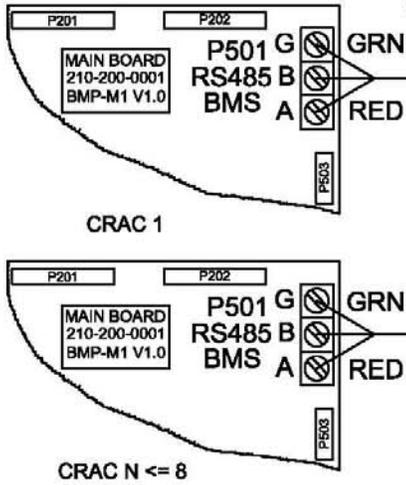
2015-09-23

Dimension: Not to scale

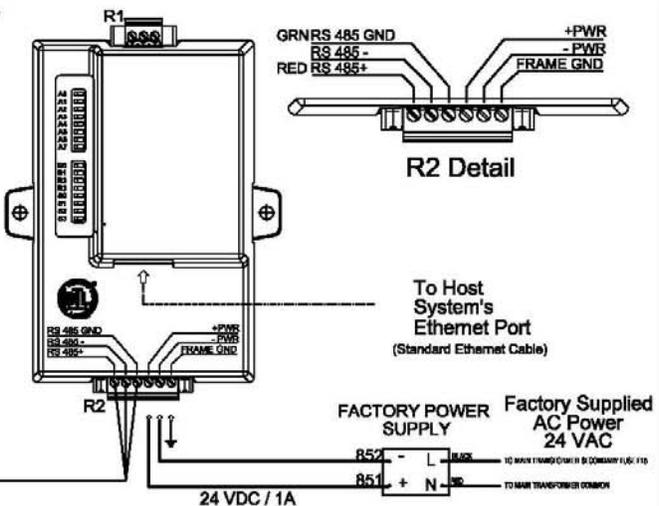
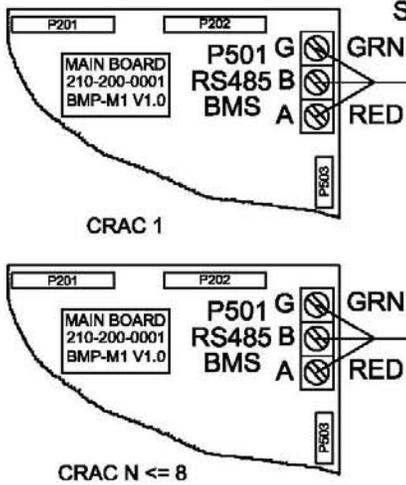


## ADVANCED M52 CONTROL SYSTEM EMBEDDED CONNECTION

### SERIAL TO SERIAL



### SERIAL TO ETHERNET



### SERIAL TO ETHERNET (LONWORKS)

