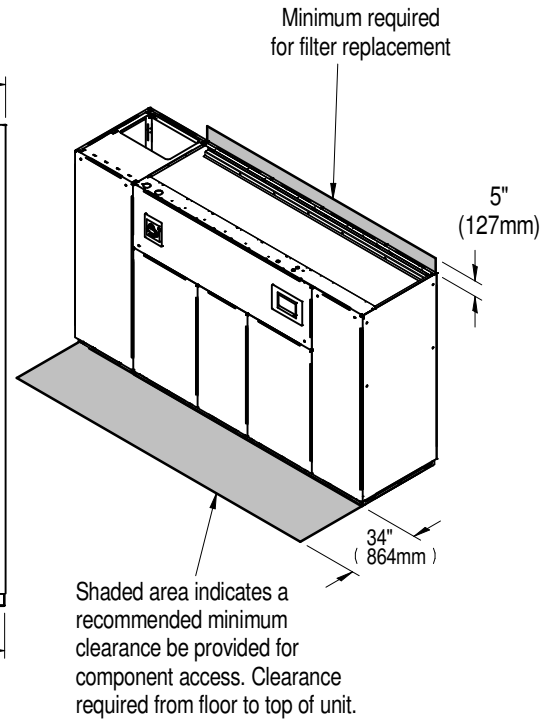
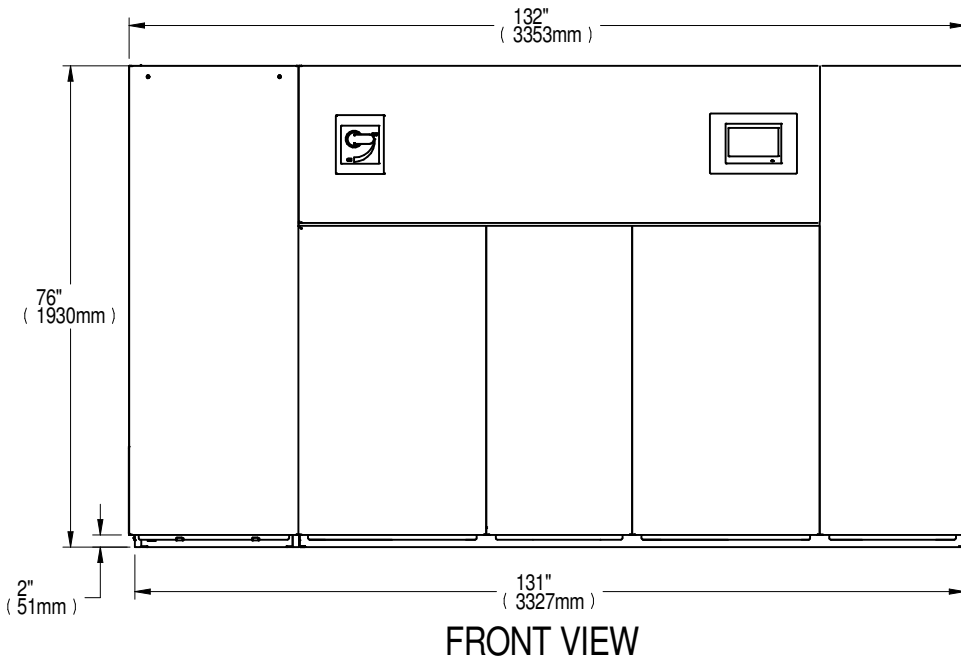
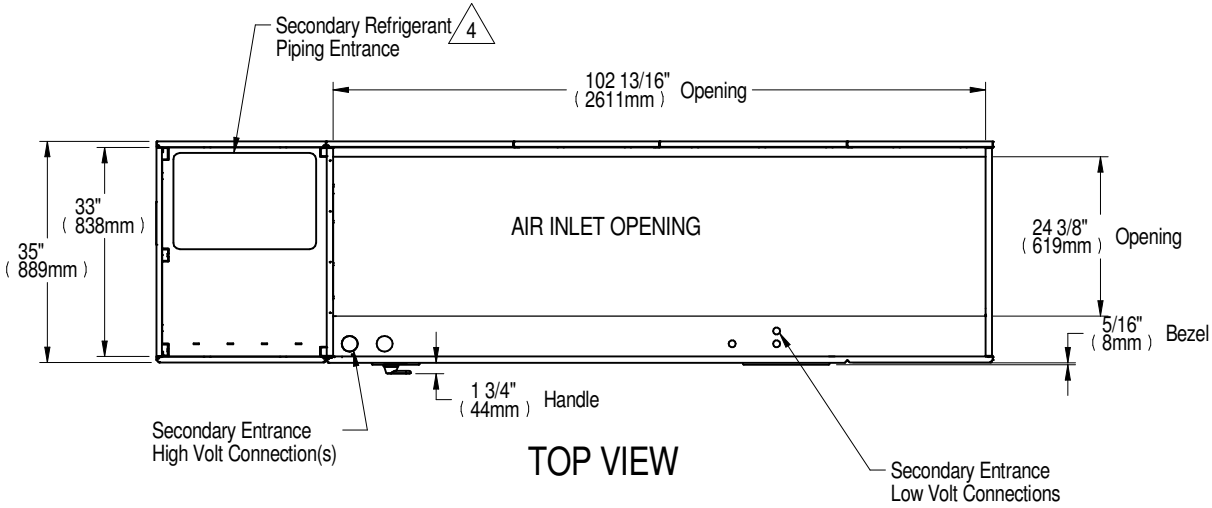




# LIEBERT® DS

## CABINET DIMENSIONAL DATA DOWNFLOW AIR COOLED 105kW (30 TONS) ALL COMPRESSOR MODELS



DRY WEIGHT lb(kg) APPROXIMATE <sup>3</sup>		
Unit with:	Model	DS105
	Fan type	EC Fans
Semi-Hermetic Compressors	Air Cooled	2780 (1261)
	Dual Cool	3135 (1422)
Scroll Compressors	Air Cooled	2660 (1207)
	Dual Cool	3015 (1368)

Notes:

- Filters are accessible through top of unit only.
- Downflow electrical connections can be made from top or bottom of unit.

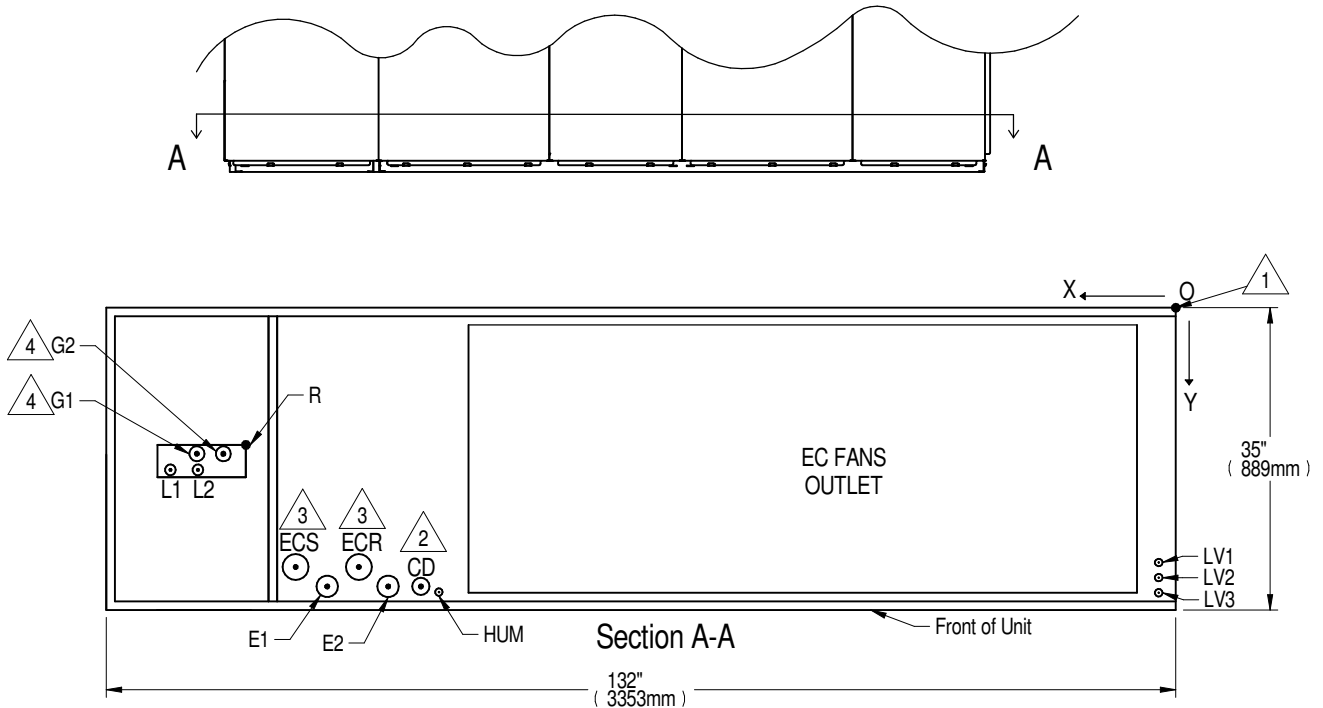
<sup>3</sup> Add 120lbs (54kg) for 575V transformer.

<sup>4</sup> When piping out of the top of the unit, field must install traps on the discharge lines in the bottom of the unit before running lines to the top.



# LIEBERT® DS

## PRIMARY CONNECTION LOCATIONS DOWNFLOW AIR COOLED 105kW (30 TONS) ALL COMPRESSOR MODELS



**Notes:**

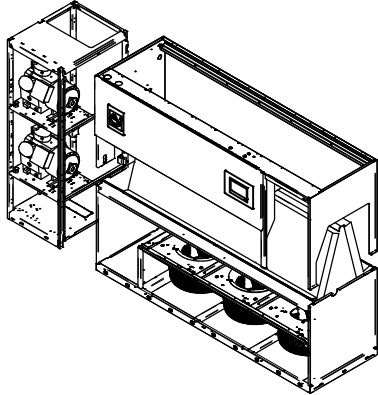
1. Drawing not to scale. All dimensions from rear corner of unit including panels, and have a tolerance of  $\pm 1/2"$  (13mm).
2. Field pitch Condensate Drain line a minimum of  $1/8"$  (3.2 mm) per foot (305 mm). All units contain a factory installed condensate trap. Do not trap external to the unit. Select appropriate drain system materials. The drain line must comply with all local codes.
3. Supplied on Dual Cooling systems only.
4. When piping out the top of the unit, field must install traps in the discharge lines in the bottom of the unit before running lines to the top.

POINT	DESCRIPTION	X in. (mm)	Y in. (mm)	CONNECTION SIZE / OPENING
R	REFRIGERANT ACCESS	109 (2769)	15-3/4 (400)	16-7/16" (418mm) X 4" (102mm)
L1	LIQUID LINE SYSTEM 1	121-3/4 (3092)	16-3/4 (425)	5/8" O.D. Cu
L2	LIQUID LINE SYSTEM 2	118-1/8 (3000)		
G1 <sup>4</sup>	HOT GAS DISCHARGE 1	118-1/4 (3004)	14-1/4 (362)	1-1/8" O.D. Cu
G2 <sup>4</sup>	HOT GAS DISCHARGE 2	115-5/8 (2937)		
CD <sup>2</sup>	CONDENSATE DRAIN (infrared humidifier or no humidifier)	87-3/8 (2219)	31 (787)	3/4" NPT FEMALE
	W/ OPTIONAL PUMP	83-13/16 (2129)	30 (762)	1/2" O.D. Cu
HUM	HUMIDIFIER SUPPLY LINE	85-5/16 (2167)	32-1/2 (826)	1/4" O.D. Cu
ECS <sup>3</sup>	LIEBERT® ECON-O-COIL SUPPLY	101-7/8 (2588)	29 (737)	2-5/8" O.D. Cu
ECR <sup>3</sup>	LIEBERT® ECON-O-COIL RETURN	94-9/16 (2402)		
E1	ELECTRICAL CONN. (HIGH VOLT)	98-1/8 (2492)	31 (787)	2-1/2"
E2	ELECTRICAL CONN. (HIGH VOLT)	91 (2311)		
LV1	ELECTRICAL CONN. (LOW VOLT)	2 (51)	29 (737)	7/8"
LV2	ELECTRICAL CONN. (LOW VOLT)		30-7/8 (784)	
LV3	ELECTRICAL CONN. (LOW VOLT)		32 (813)	

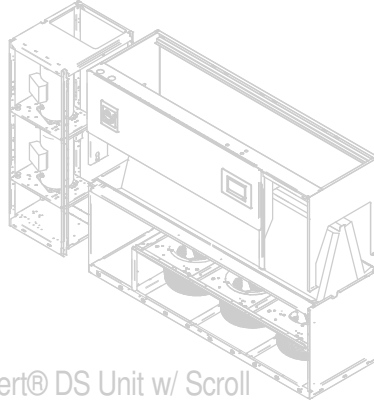


# LIEBERT® DS

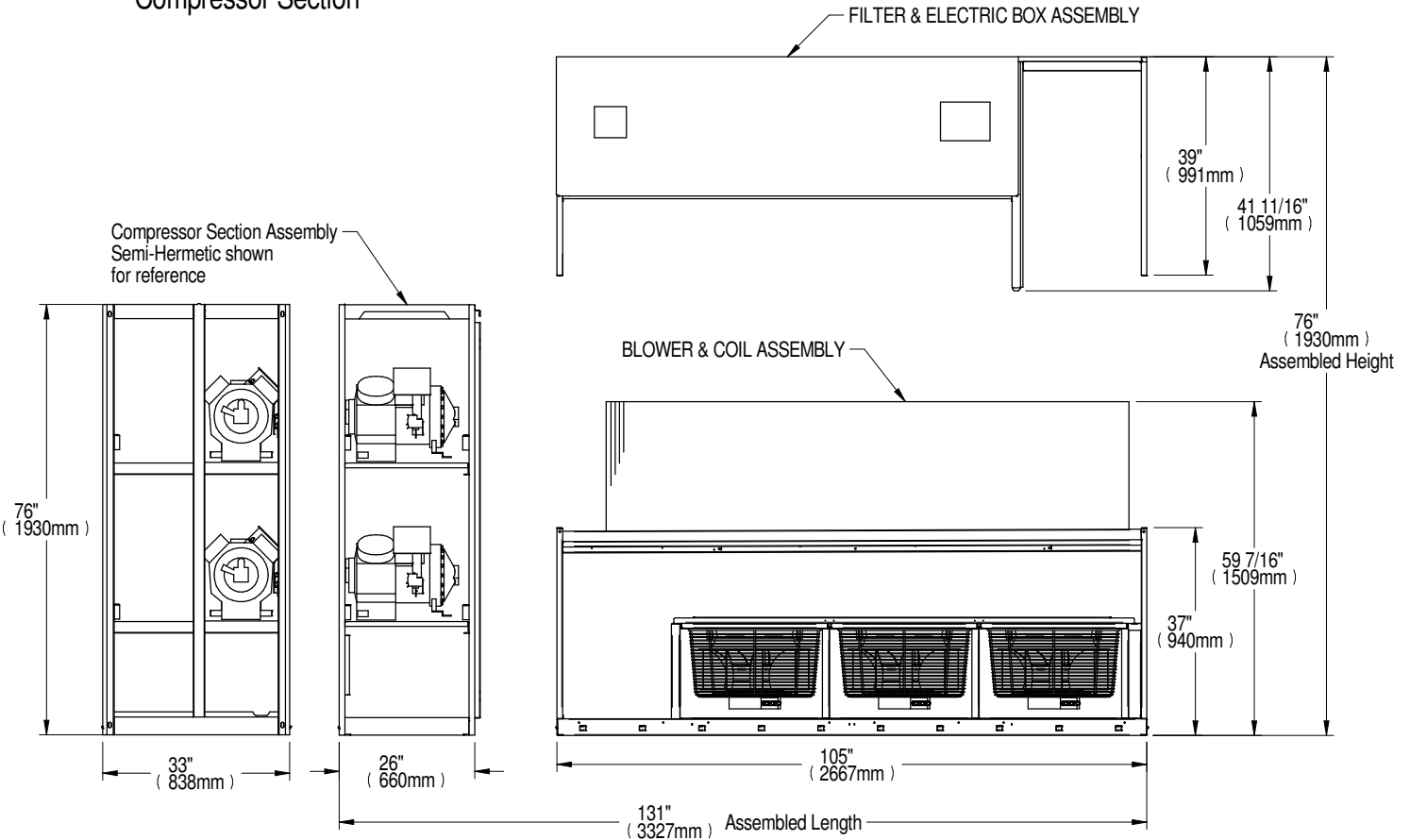
## DISASSEMBLY DIMENSIONAL DATA DOWNFLOW 105kW (30 TONS) MODELS



Liebert® DS Unit w/ Semi-Hermetic Compressor Section



Liebert® DS Unit w/ Scroll Compressor Section



Note: Drawing Views are simplified with panels removed to show overall dimensions. See disassembly and handling instructions in installation manual.

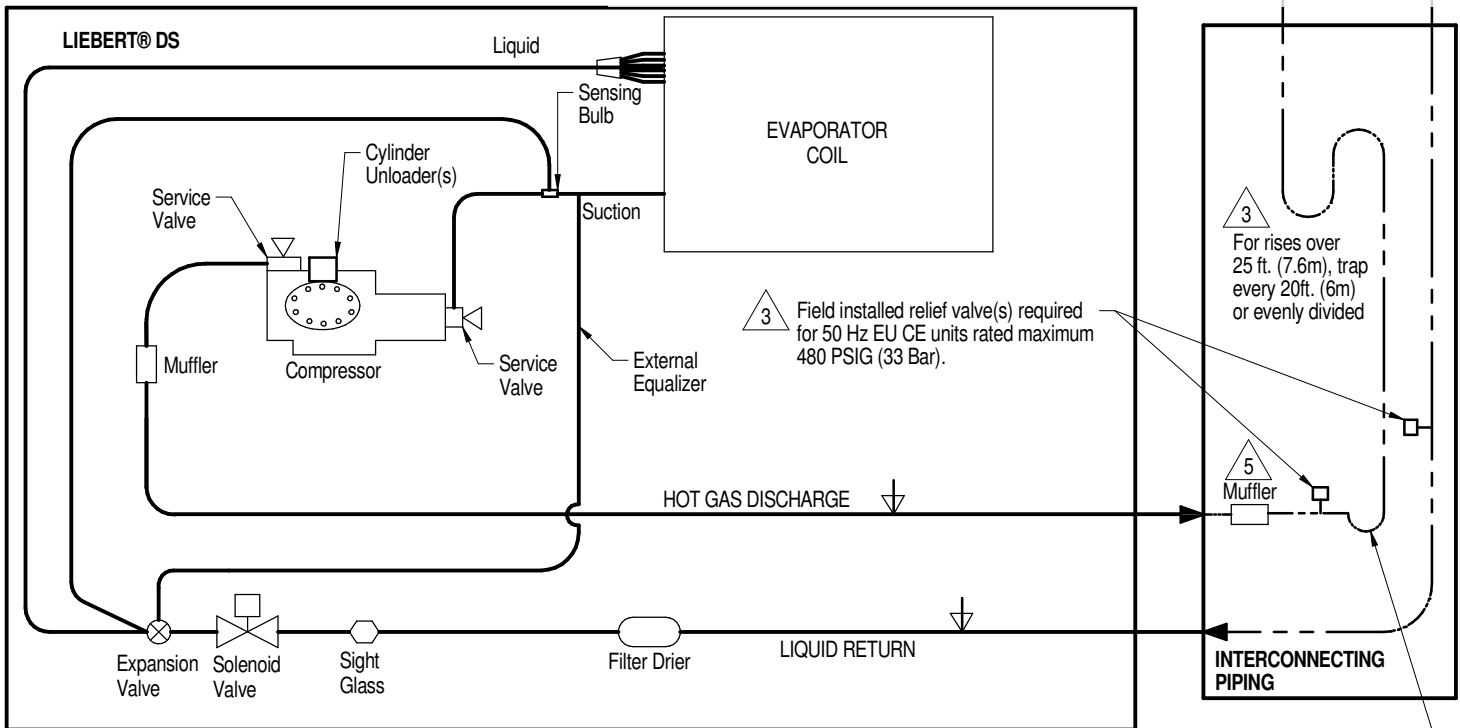
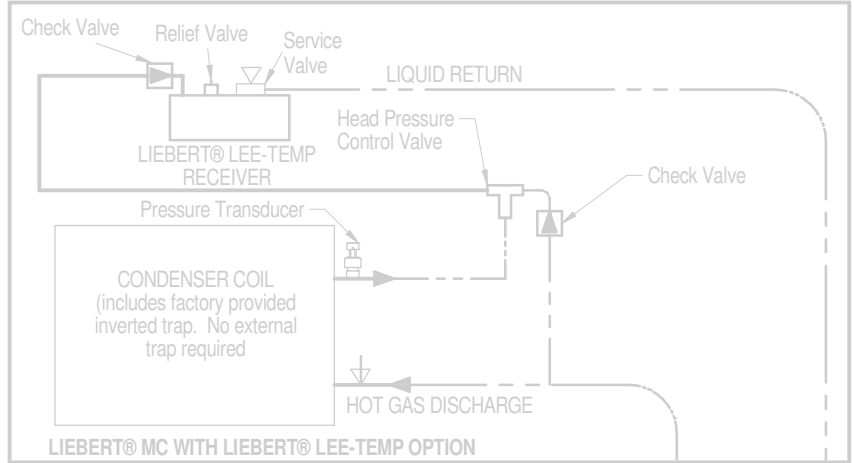
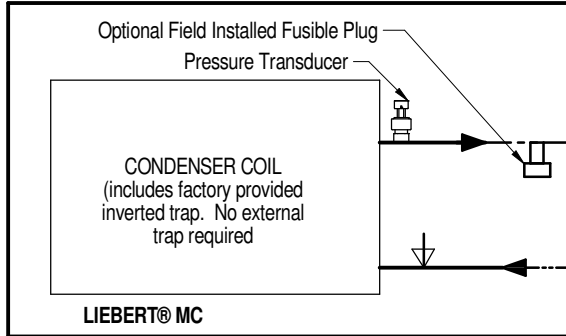
Assembly	DRY WEIGHT lb(kg) APPROXIMATE (Includes Panels)				
	Semi-Hermetic Compressor		Scroll Compressor	Semi-Hermetic Compressor	
	Air cooled	A/C w/dual cool	Air cooled	Water/Glycol	GLYCOOL/Dual Cool
Compressor Assembly	950 (432)	950 (432)	830 (377)	1320 (600)	1320 (600)
Filter & Electric Box Assembly	270 (123)	270 (123)	270 (123)	270 (123)	270 (123)
Blower & Coil Assembly	1560 (708)	1915 (870)	1560 (708)	1560 (708)	1915 (870)



# LIEBERT® DS

## PIPING SCHEMATIC W/ LIEBERT® MC

### AIR COOLED DS077-105kW SEMI-HERMETIC COMPRESSOR MODELS



- FACTORY REFRIGERANT PIPING
- - - FIELD PIPING
- ▽ SERVICE/SCHRADER (ACCESS) CONNECTION NO VALVE CORE
- ▽ SERVICE/SCHRADER (ACCESS) CONNECTION WITH VALVE CORE

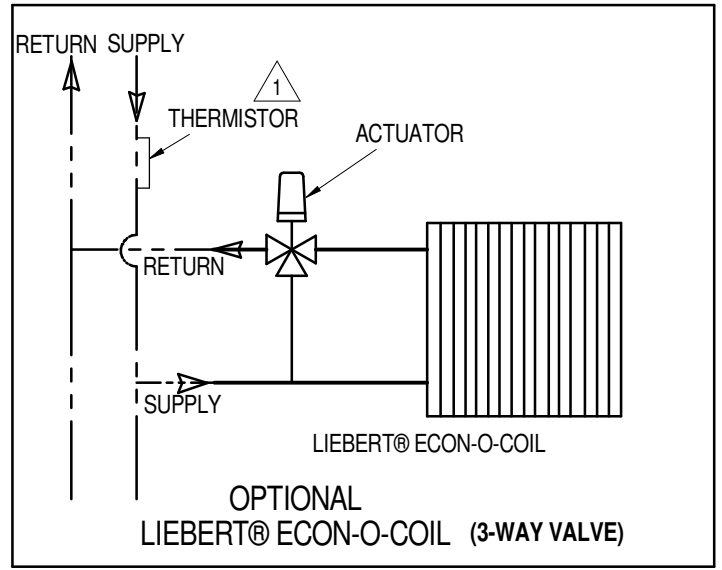
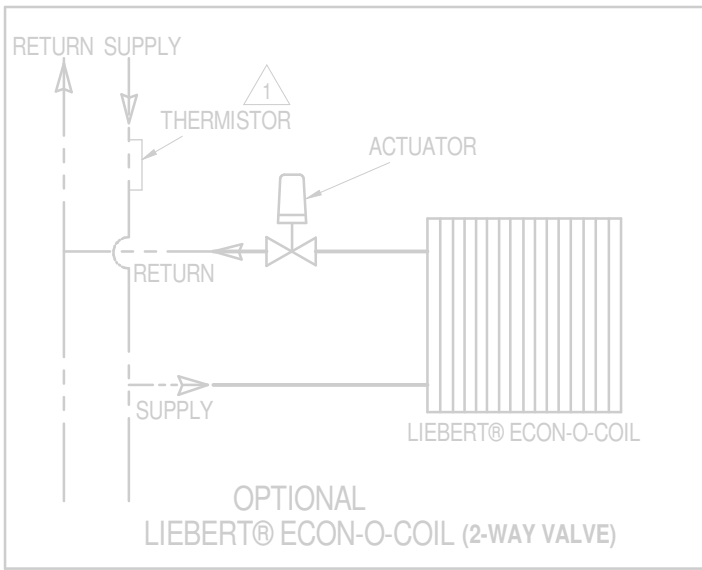
Notes:

1. Single refrigeration circuit shown for clarity.
2. Schematic representation shown. Do not use for specific connection locations.
3. Components are not supplied by Vertiv, but are required for proper operation and maintenance.
4. Traps must be installed and horizontal lines pitched to ensure proper oil return and to reduce liquid floodback to compressor. Pitch horizontal hot gas piping at a minimum of 1/2" per 10 feet (42mm per 10m) so that gravity will aid in moving oil in the direction of the refrigeration flow.
5. Component supplied by Vertiv and must be field installed.
6. Do not isolate any refrigerant circuits from over pressurization protection.



# LIEBERT® DS

## OPTIONAL PIPING SCHEMATIC LIEBERT® ECON-O-COIL MODELS



————— FACTORY PIPING  
- - - - - FIELD PIPING

1 SUPPLIED WITH 10 FEET EXTRA THERMISTOR WIRE FOR INSTALLATION ON FIELD SUPPLY LINE.

NOTE: 1) PLACE THERMISTOR IN LOCATION WHERE FLOW IS ALWAYS PRESENT.  
2) THERMISTOR MUST BE LOCATED OUT OF THE SUPPLY AIR STREAM.



# LIEBERT® DS

## ELECTRICAL FIELD CONNECTION DESCRIPTION UPFLOW AND DOWNFLOW MODELS

### STANDARD ELECTRICAL CONNECTIONS

- 1) **Primary high voltage entrance** - 2.50" (64mm); 1.75" (44mm); 1.375" (35mm) diameter concentric knockouts located in bottom of box
- 2) **Secondary high voltage entrance** - 2.50" (64mm); 1.75" (44mm); 1.375" (35mm) diameter concentric knockouts located in top of box
- 3) **Primary low voltage entrance** - Quantity (3) 1.375" (35mm) diameter knockouts located in bottom of unit
- 4) **Secondary low voltage entrance** - Quantity (3) 1.375" (35mm) diameter knockouts located in top of box
- 5) **Three phase electrical service** - Terminals are on main fuse block (disregard if unit has optional disconnect switch). Three phase service not by Vertiv.
- 6) **Earth ground** - Terminal for field supplied earth grounding wire. Earth grounding required for Vertiv units.
- 7) **Remote unit shutdown** - Replace existing jumper between terminals 37 & 38 with field supplied normally closed switch having a minimum 75VA, 24VAC rating. Use field supplied Class 1 wiring.
- 8) **Customer alarm inputs** - Terminals for field supplied, normally open contacts, having a minimum 75VA, 24VAC rating, between terminals 24 & 50, 51, 55, 56. Use field supplied Class 1 wiring. Terminal availability varies by unit options.
- 9) **Common alarm** - On any alarm, normally open dry contact is closed across terminals 75 & 76 for remote indication. 1 AMP, 24VAC max load. Use Class 1 field supplied wiring.
- 10) **Heat rejection interlock** - On any call for compressor operation, normally open dry contact is closed across terminals 70 & 71 (circuit 1), 230 (circuit 2) to heat rejection equipment. 1 AMP, 24VAC max load. Use Class 1 field supplied wiring. When Liebert® DS unit is paired with a Liebert® MC series condenser, remove jumper between terminal 71 and terminal 230. Three wires must connect terminals 70, 71 and 230 of the indoor unit to terminals 70, 71 and 230 of the Liebert® MC series condenser.
- 11) **Unit factory installed disconnect switch, Fuse Block and Main Fuses** – "Locking Type" consists of a non-automatic molded case switch operational from the outside of the unit. Access to the high voltage electric panel compartment can be obtained only with the switch in the "off" position. Units with fused disconnects are provided with a defeater button that allows access to the electrical panel when power is on. The molded case switch disconnect models contain separate main fuses.

### CANBUS ELECTRICAL CONNECTIONS

- 12) **CANbus Connector**– Terminal block with terminals 49-1 (CAN-H) and 49-3 (CAN-L) + SH (shield connection). The terminals are used to connect the CANbus communication cable (provided by others) from the indoor unit to the Liebert® MC –Optional Liebert® EconoPhase Unit.
- 13) **CANbus Cable** – CANbus cable provided by others to connect to the outdoor condenser, and optional PRE unit (DA units only). No special considerations are required when the total external cable connection between the indoor unit and outdoor unit(s) is less than 450FT (137M). For total external cable connections greater than 450FT (137M) but less than 800FT (243M) a CANbus isolator is required. Contact Factory.  
Cable must have the following specifications:
  - Braided shield or foil shield with drain wire
  - Shield must be wired to ground at indoor unit
  - 22-18AWG stranded tinned copper
  - Twisted pair (minimum 4 twists per foot)
  - Low Capacitance (15pF/FT or less)
  - Must be rated to meet local codes and conditions
  - EXAMPLES BELDEN 89207 (PLENUM RATED), OR ALPHA WIRE 6454 CATEGORY 5, 5E, OR HIGHER
- 14) Do not run in same conduit, raceway, or chase as high voltage wiring.
- 15) For CANbus network lengths greater than 450FT (137M) call Factory.



# LIEBERT® DS

## ELECTRICAL FIELD CONNECTION DESCRIPTION UPFLOW AND DOWNFLOW MODELS

### OPTIONAL ELECTRICAL CONNECTIONS

- 16) **Smoke sensor alarm - Factory** wired dry contacts from smoke sensor are 91-common, 92-NO, and 93-NC. Supervised contacts, 80 & 81, open on sensor trouble indication. This smoke sensor is not intended to function as, or replace, any room smoke detection system that may be required by local or national codes. 1 AMP, 24VAC max load. Use Class 1 field supplied wiring.
- 17) **Reheat and humidifier lockout** - Remote 24VAC required at terminals 82 & 83 for lockout of reheat and humidifier.
- 18) **Condensate alarm** (with condensate pump option) - On pump high water indication, normally open dry contact is closed across terminals 88 & 89 for remote indication. 1 AMP, 24VAC max load. Use Class 1 field supplied wiring.
- 19) **Remote humidifier** - On any call for humidification, normally open dry contact is closed across terminals 11 & 12 to signal field supplied remote humidifier. 1 AMP, 24VAC max load. Use Class 1 field supplied wiring.
- 20) **Auxiliary cool contact** - On any call for Liebert® Econ-o-Coil operation, normally open dry contact is closed across terminals 72 & 73 on dual cool units only. 1 AMP, 24VAC max load. Use Class 1 field supplied wiring.
- 21) **Analog Inputs**- Terminals 41, 42, 43, 44 are user configurable for 0-10V, 0-5V, or 4-20MA.

### OPTIONAL LOW VOLTAGE TERMINAL PACKAGE CONNECTIONS

- 22) **Remote unit shutdown** - Two additional contact pairs available for unit shutdown (labeled as 37B & 38B, 37C & 38C). Replace jumpers with field supplied normally closed switch having a minimum 75VA, 24VAC rating. Use field supplied Class 1 wiring.
- 23) **Common alarm** - On any alarm, two additional normally open dry contacts are closed across terminals 94 & 95 and 96 & 97 for remote indication. 1 AMP, 24VAC max load. Use Class 1 field supplied wiring.
- 24) **Main fan auxiliary switch** - On closure of main fan contactor, normally open dry contact is closed across terminals 84 & 85 for remote indication. 1 AMP, 24VAC max load. Use Class 1 field supplied wiring.
- 25) **Liqui-Tect shutdown and dry contact** - On Liebert® Liqui-Tect™ activation, normally open dry contact is closed across terminals 58 & 59 for remote indication (Liebert® Liqui-Tect™ sensor ordered separately). 1 AMP, 24VAC max load. Use Class 1 field supplied wiring.

### OPTIONAL COMMUNICATION CONNECTIONS

- 26) **Unit-To-Unit** – Plug 64 is reserved for U2U communication
- 27) **Site and BMS**- Plug 74 and terminal block 3 are reserved for Site and BMS connections. Plug 74 is an eight pin RJ45 for a Cat 5 cable. Terminal block 3 is a two position screw terminal block for use with twisted pair wires.

NOTE: Refer to specification sheet for total unit full load amps, wire size amps, and max overcurrent protective device size.

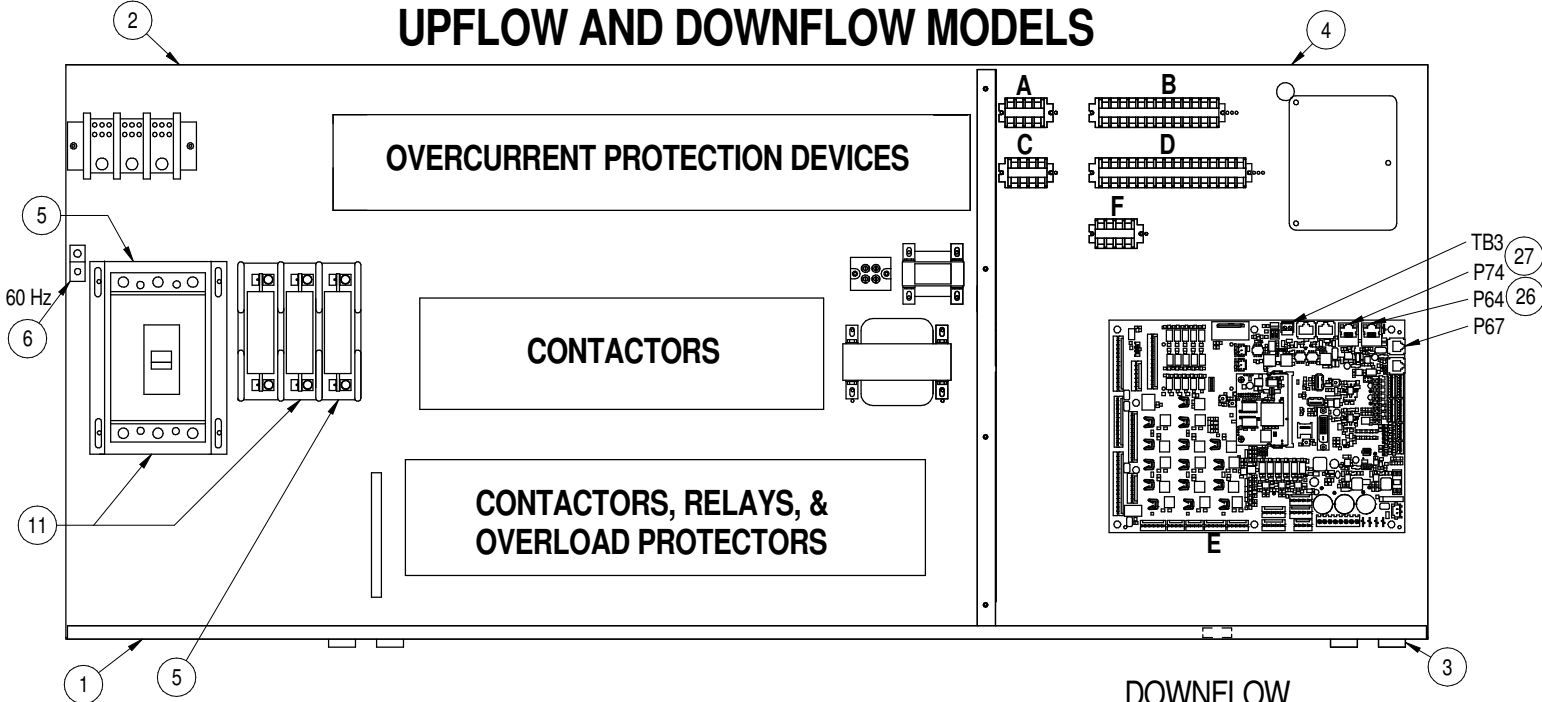
#### Power Requirements (460 Volt, 3-Phase):

- 30 Ton DS Unit (DS105D) = 83.7 FLA, 97.4 WSA, 110A OPD
- Matching Condenser (MCL110) = 5.6 FLA, 6.3 WSA, 15A OPD



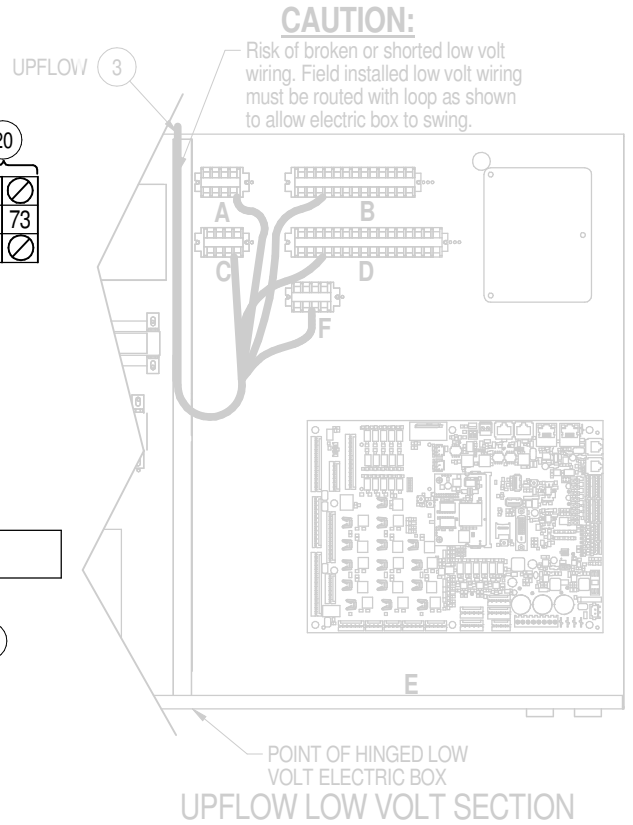
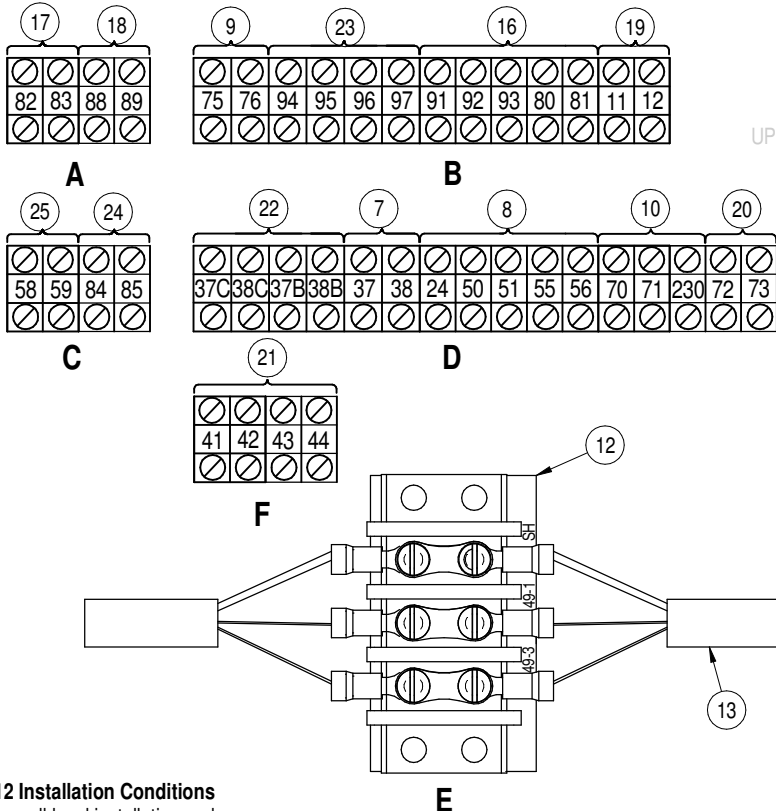
# LIEBERT® DS

## ELECTRICAL FIELD CONNECTION DESCRIPTION UPFLOW AND DOWNFLOW MODELS



Note: Typical orientation of components shown. Component location varies by option and unit size.

### DOWNFLOW LOW VOLT SECTION



#### Item 12 Installation Conditions

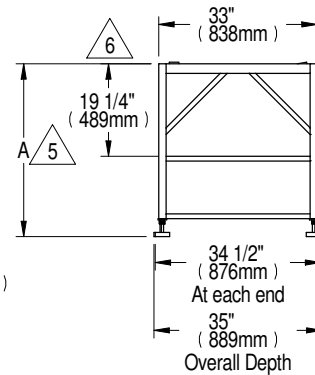
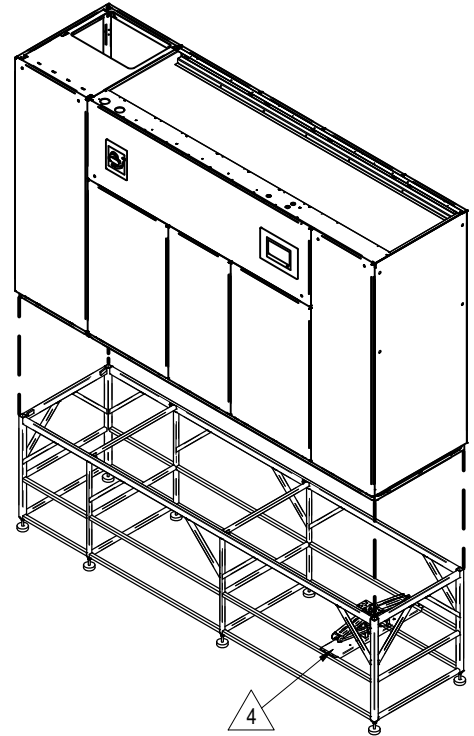
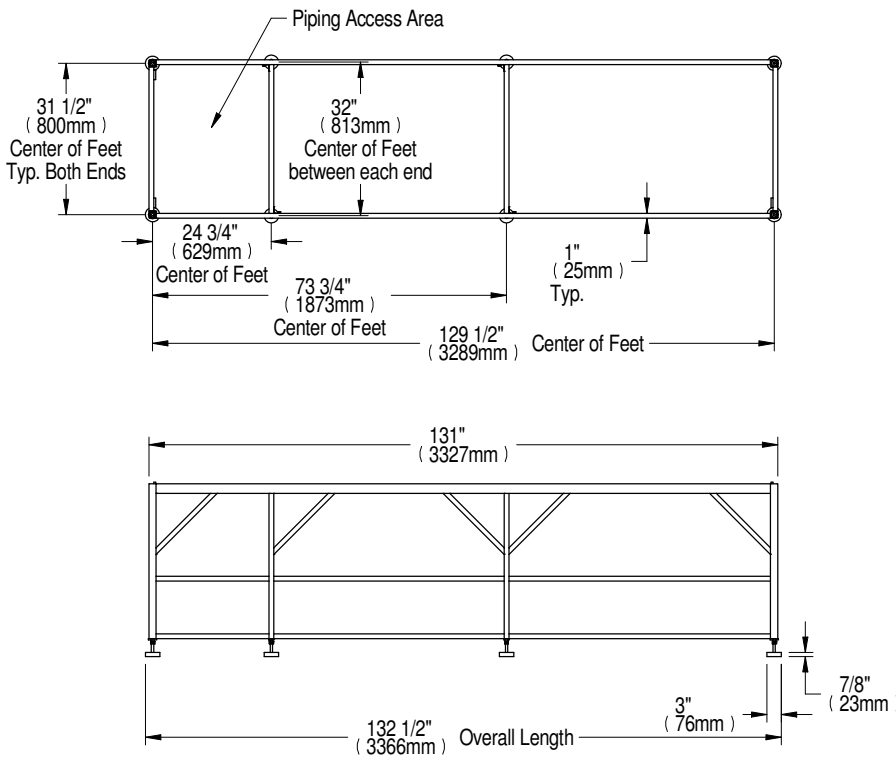
1. Follow all local installation codes.
2. Do not run CAN cables in same conduit, raceway, or chase as high voltage wires (120-600V).
3. Separate high volt wires from CAN wires by 12 inches.





# LIEBERT® DS

## FLOORSTAND DIMENSIONAL DATA 105kW (30 TONS) MODELS W/ EC FANS



**Notes:**

1. This floorstand should be used when EC fans are intended to be lowered under a raised floor.
2. Right side of paneled unit is flush with right side of floorstand. All other paneled sides overhang floorstand 1" (25mm).
3. The floorstand used with EC units is not symmetrical and its orientation to the Liebert® DS is critical for lowering the EC fans. Unless the floorstand is installed in the correct position, the blowers will not lower into the floorstand.

4. Jack and jack support are shipped loose and are intended to be placed into position under each fan and utilized to lower or raise that fan as needed for Downflow units.

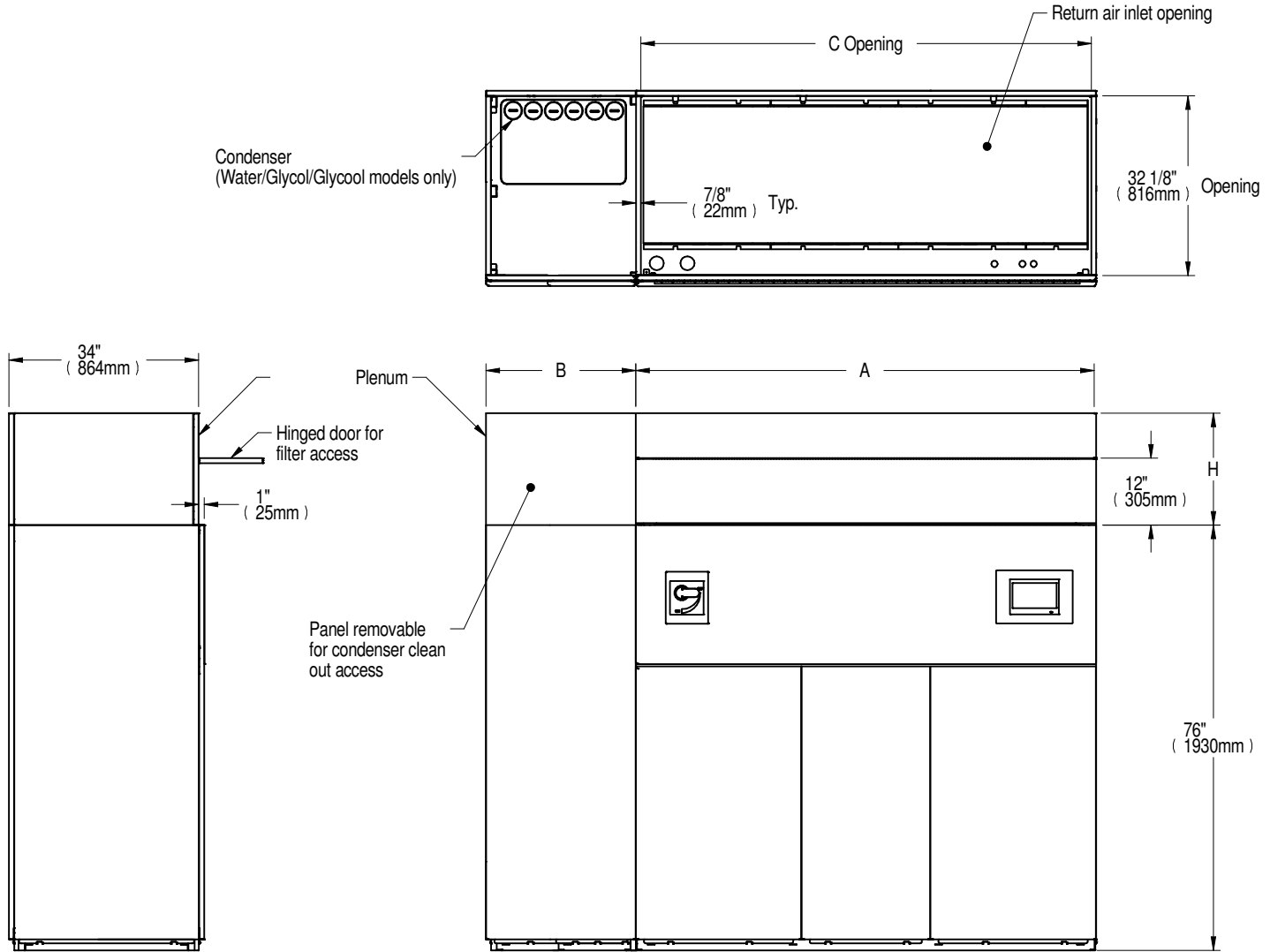
5. Leveling feet are provided with ± 1-1/2" (38mm) adjustment from nominal height "A".

6. Applies to 36", 42", & 48" Floorstands.

Height in ( mm )
A 5
24 (610)
30 (762)
36 (914)
42 (1067)
48 (1219)

18" Seismic-Rated Floorstand Specified as an Engineered-to-Order (ETO) Feature

## DOWNFLOW PLENUM DIMENSIONAL DATA 35kW-105kW (10-30 TONS) MODELS



Note: Typical 53-77kW (15-22 Tons) unit orientation shown. View varies by unit size

Plenum Dimensional Data in (mm)			
	A	B	C
35-42kW (10-12 Tons) Air-Cooled Scroll and Air-Cooled Digital Scroll Models	59-1/4 (1505)	13-3/4 (349)	57-1/2 (1461)
35-42kW (10-12 Tons) all Water/Glycol/GLYCOOL Models	59-1/4 (1505)	26-3/4 (679)	57-1/2 (1461)
53-77kW (15-22 Tons) Air-Cooled Scroll and Air-Cooled Digital Scroll Models	82-1/4 (2089)	15-3/4 (400)	80-1/2 (2045)
77kW (22 Tons) Semi-Hermetic & 53-77kW (15-22 Tons) Scroll & Digital Scroll Water/Glycol/GLYCOOL Models	82-1/4 (2089)	26-3/4 (679)	80-1/2 (2045)
105kW (30 Tons) All Models	105-1/4 (2673)	26-3/4 (679)	103-1/2 (2629)

Height in (mm)
H
20 (508)
24 (610)
36 (914)



# LIEBERT® iCOM™

## PRODUCT INFORMATION UNIT MOUNTED DISPLAY



The Liebert® iCOM™ display is a 7-inch capacitive, color-touchscreen display in an ergonomic, aesthetically pleasing housing. The display and housing will be viewable while the unit accent panels are open or closed. The display can be easily detached to view while the panel is open.

**Menu Layout-** The menus will be broken out into two main menu screens: User screen and Service screen. The User screen contains the menus to access parameters required for basic unit control and setup. The Service screen is designed for service personal and provides access to advanced control setup features and diagnostic information.

**Password Protection-** The display will contain two unique passwords to protect against unauthorized changes. An auto hide/show feature allows the user to see applicable information based on the login used. These four-digit passwords may be customized according to User preference.

**Unit Backup and Restore-** The user shall have the ability to create safety copies of important control parameters. The display has the ability for the user to automatically backup unit configuration settings to internal memory or USB storage drive. Configuration settings may be transferred to another unit for a more streamlined unit startup.

**Parameter Search-** The display has search fields for efficient navigation and parameter lookup.

**Parameter Download-** The Liebert® iCOM™ shall enable the user to download a report that lists parameter names, factory default settings, and the user programmed settings in .csv format for remote reference.

**Parameter Directory-** The Liebert® iCOM™ shall provide a directory that lists all parameters in the control. The list shall provide Line ID numbers, parameter labels, and current parameter values.



# LIEBERT® iCOM™

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## PRODUCT INFORMATION

### UNIT MOUNTED DISPLAY

**Context Sensitive Help-** The display will have an onboard help database. The database will provide context sensitive help to assist with setup and navigation of the menus.

**Display Setup-** The user has the ability to configure the display information based on the specific user's preference. Language, units of measure, screen contrast, home screen layout, back light timer and the hide/show of certain readouts will be configurable through the display.

**Additional Readouts-** The display has the ability for the user to configure custom widgets on the main screen. Widget options will include items such as fan speed, call for cooling, call for free cooling, maintenance status, call for hot water reheat, call for electric reheat, call for dehumidification, call for humidification, airflow, static pressure, fluid flow rate and cooling capacity.

**Status LEDs-** The display will provide the user with the unit's operating status using an integrated LED. The LED will indicate if the unit has an active alarm; if the unit has an active alarm that has been acknowledged; or if the unit is on, off, or in a standby status.

**Unit Alarms** – All unit alarms are annunciated through both audio and visual cues, clearly displayed on the screen, automatically recorded in the event log, and communicated to monitoring plug connections.

**Event Log** – The display will automatically store the last 400 unit-only events (messages, warnings, and alarms).

**Service Contact Information** – The display has the ability to store the local service or sales contact information.

**Upgradeable** –Display and Control Board software upgrades are performed through a USB connection.

**Unit-to-Unit (U2U) Communication** – Communication via private Ethernet network allows for advanced control functionality (Teamwork modes, sharing sensor data, Standby Rotation, Lead-Lag, and Cascade operation).

**Temperature Control-** Precision temperature control is maintained while maximizing efficiency based on a user entered setpoint and tolerance.

**Various Control Types-** Proportional, PI (proportional-integral), or Intelligent control types can be selected for supply or return temperature. These control types have been developed to maximize component life and maintain precise environmental control.

**Timers/Sleep Mode-** The menus shall allow various customer settings for turning the unit On or Off.

**Sensor Calibration-** The menus shall allow unit sensors to be calibrated with external sensors.

**Maintenance/Wellness Settings-** The menus shall allow reporting of potential component problems before they occur.



# LIEBERT® iCOM™

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## PRODUCT INFORMATION UNIT MOUNTED DISPLAY

**Options Setup-** The menus shall provide operation settings for the installed components.

**Auto Restart-** The unit will return to its previous operating status after loss of power. Units can be stagger started to minimize system current draw.

**Auxiliary Boards-** The menus shall allow setup of optional expansion boards.

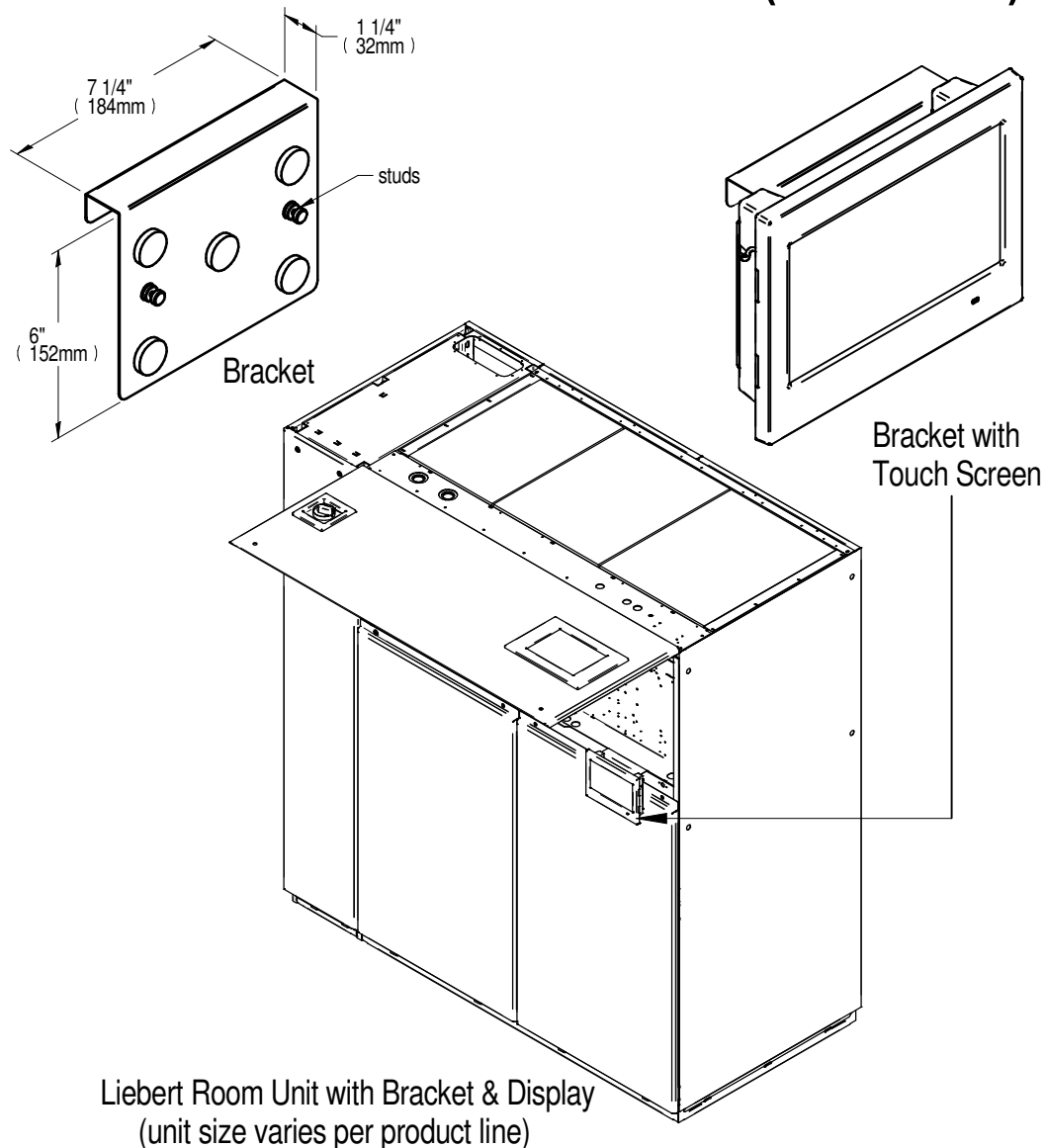
**Various Sensors:** The menus shall allow setup and display of optional custom sensors. The control shall include four customer accessible analog inputs for field-supplied sensors. The analog inputs shall accept a 4 to 20mA signal. The user shall be able to change the input to 0 to 5VDC or 0 to 10VDC. The gains for each analog input shall be programmable from the front display. The analog inputs shall be able to be monitored from the front display.

**Diagnostics/Service Mode-** The Liebert® iCOM™ control shall be provided with self-diagnostics to aid in troubleshooting. The microcontroller board shall be diagnosed and reported as pass/not pass. Control inputs shall be indicated as On or Off at the front display. Control outputs shall be able to be turned On or Off from the front display without using jumpers or a service terminal. Each control output shall be indicated by an LED on a circuit board.



# LIEBERT® iCOM™

## DISPLAY SERVICE BRACKET (OPTIONAL)



**PURPOSE:** Bracket with display assembly may be hand held for adjustments. Bracket enables hanging the display between service tasks.

### STEPS:

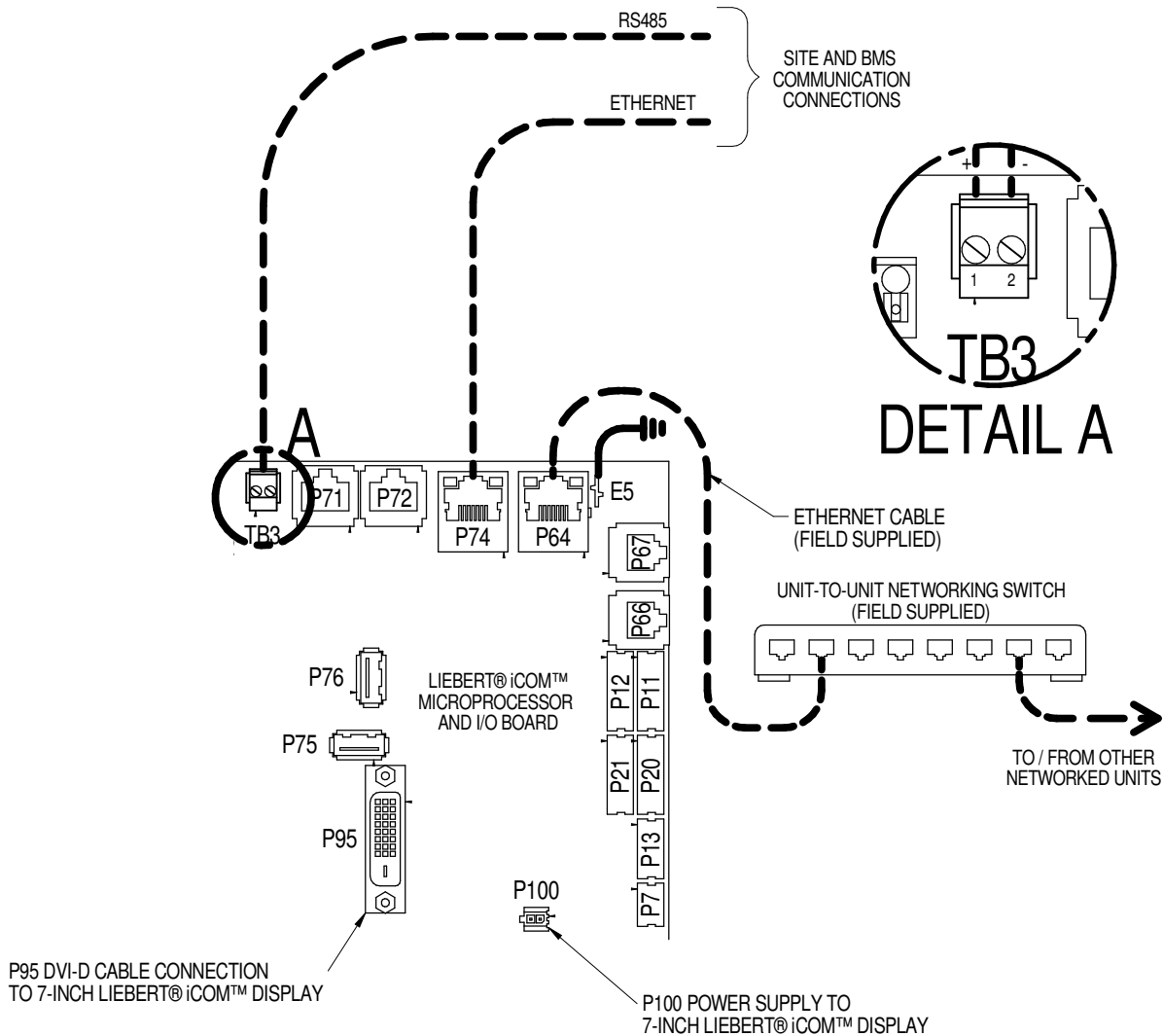
- 1) Verify that unit vertical panels are in place.
- 2) Unlatch display from cradle by pinching top tab while holding back of display - careful not to drop or let display hang by cables.
- 3) Align studs of bracket with keyholes on back of display.
- 4) Compress bracket and display at stud points together until bracket studs slide into slots of keyholes - careful not to pinch cables. There should be a tight fit once bracket is in place.
- 5) Hold display in hand to make adjustments.
- 6) Hang from lower edge of low voltage compartment between service tasks.
- 7) After use, remove and store bracket in tool box (do not store in electric panel).
- 8) Return Liebert® iCOM™ display to cradle/bezel assembly.



# LIEBERT® iCOM™

## UNIT TO UNIT NETWORK CONNECTIONS

LIEBERT® CW, LIEBERT® CWA, LIEBERT® DS, LIEBERT® DSE,  
LIEBERT® PDX, LIEBERT® PCW



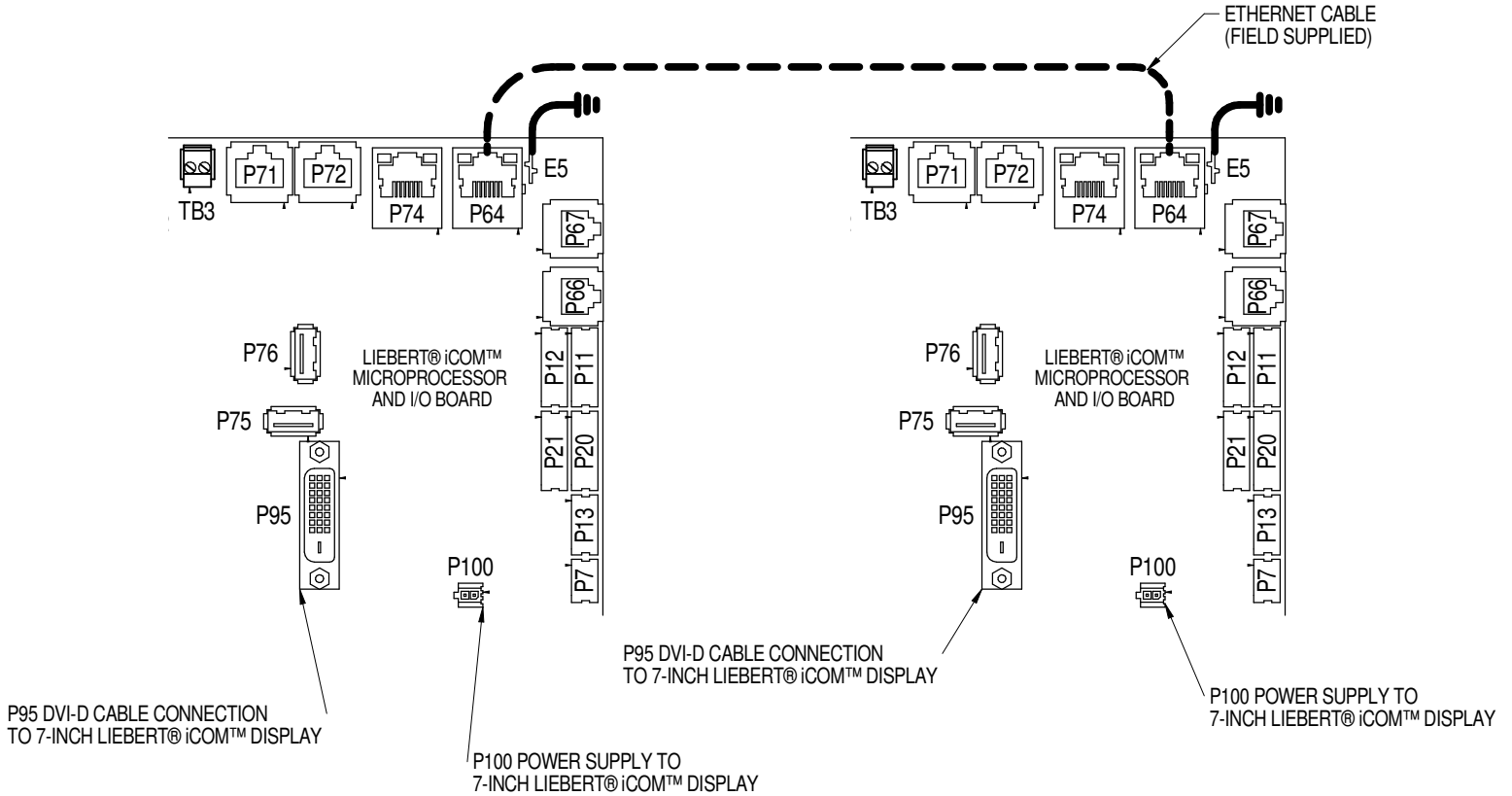
Form No.: DPN001040\_REV14



# LIEBERT® iCOM™

## UNIT TO UNIT NETWORK CONNECTIONS

### LIEBERT® CW, LIEBERT® CWA, LIEBERT® DS, LIEBERT® DSE, LIEBERT® PDX, LIEBERT® PCW



NOTE\* For dual-unit network configurations only



# LIEBERT® LIQUI-TECT™ 410 POINT LEAK DETECTION SENSOR

## Product Specification/Installation Guide



The Liebert® Liqui-Tect™ 410 (LT410) provides single-point detection of leaks. The point-detection sensor has two gold-plated sensing probes to prevent corrosion and to provide accurate readings. The LT410 constantly monitors for leaks, internal faults, and power failures and warns of any abnormal conditions. Mounting brackets allow for sensor height adjustment and leveling.

The LT410 is the ideal solution for sensing leaks under a raised computer floor or air conditioning drip pans. Two independent outputs provide added flexibility with the capacity to signal both a local alarm panel, Liebert cooling unit and a remote building management system or external equipment, such as motorized water shutoff valves.

### LT410 APPLICATIONS

The LT410 is ideally suited for:

- Glycol and chilled water cooling,
- Humidification supply water piping,
- Condensate pumps and drains,
- Unit and ceiling auxiliary drip pans,
- Overhead piping troughs.

### LOCATIONS/PLACEMENT

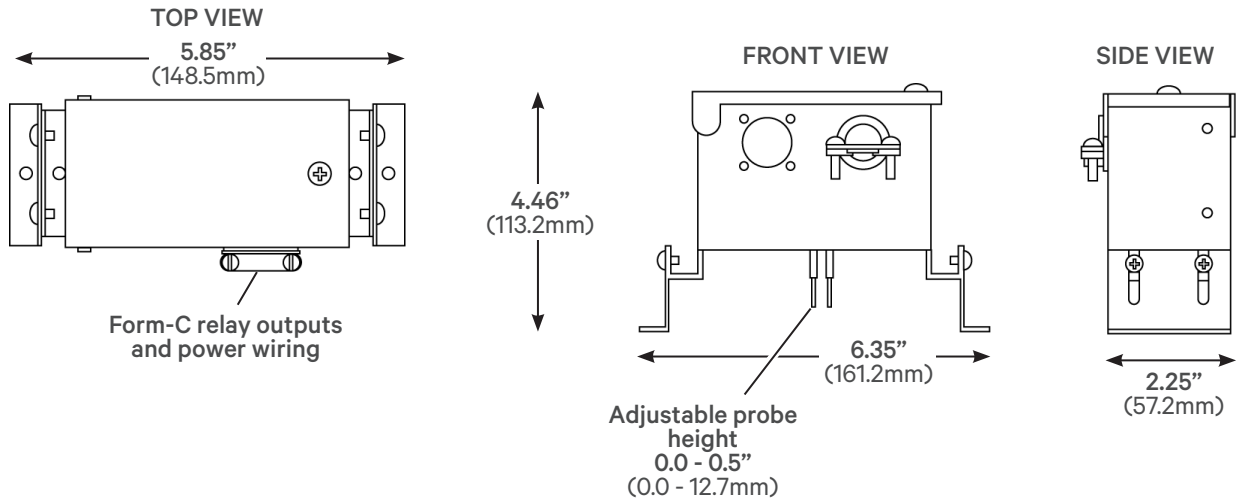
The LT410 is an excellent choice for:

- Large scale network control centers,
- Data centers,
- Server rooms and closets,
- Unattended, remote shelters,
- Mechanical equipment rooms,
- Sensitive areas with overhead piping,
- Industrial process control rooms.

### COMPONENTS OF THE LIQUI-TECT™ 410 MODULE

The LT410 consists of a metal enclosure with a hinged top door that provides access to the internal wiring termination. It includes side access through a box connector for installation of the power and contact wiring. The mounting brackets attach to the enclosure with adjustable slots to allow custom setting of the height of the sensing probes.

## DIMENSIONS - TOP, FRONT AND SIDE



## SPECIFICATIONS

Power Requirements	24 VAC 100 mA, 50/60 Hz, 3 VA (max.)
Dimensions, W x D x H	6.35 in. x 2.25 in. x 4.46 in. (161.2 mm x 57.2 mm x 113.2 mm)
Weight (assembled)	2.0 lb. (0.9 kg)
Metal Enclosure	NEMA 1, IP 30

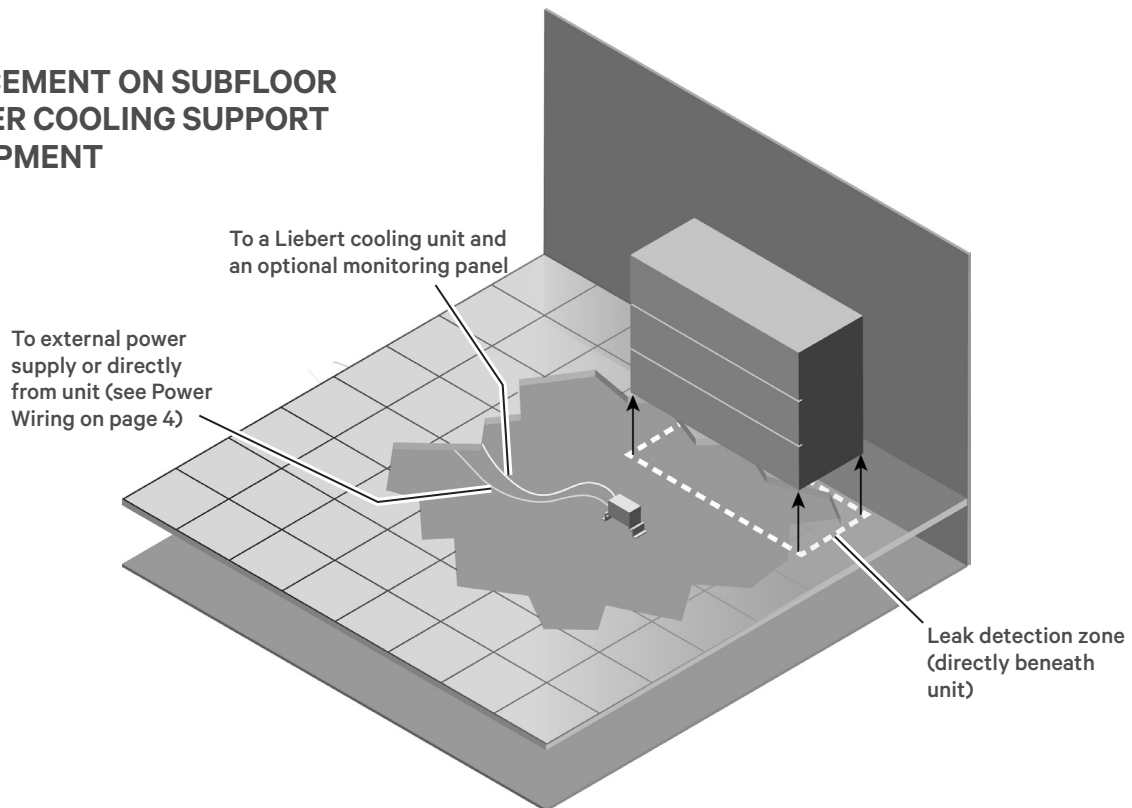
## ENVIRONMENTAL CONDITIONS

Operating Temperature	50°F to 104°F (10°C to 40°C)
Operating Humidity	10% to 95% relative humidity (non-condensing)
Operating Altitude	0 to 10,000 ft. (0 to 3,048 m)
Output Relay Contact Rating	2 Form-C; 3 A rating at 24 VAC

## AGENCY LISTINGS

UL	UL916
C-UL	C22.2, No. 205-M1983
CE	Yes
FCC Compliance	47 CFR, Part 15

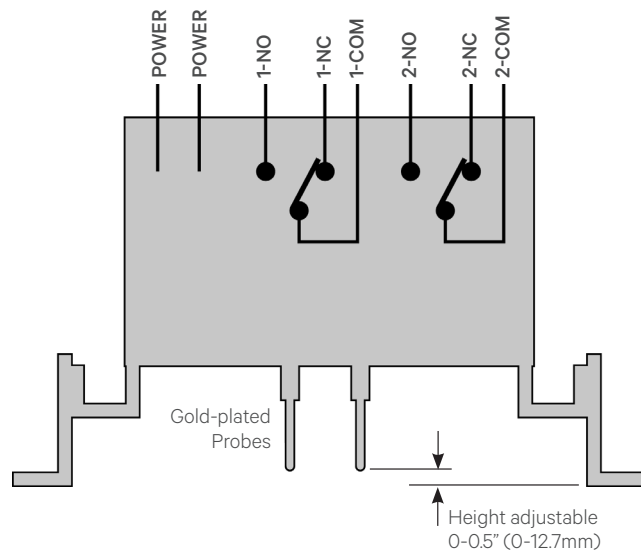
## PLACEMENT ON SUBFLOOR UNDER COOLING SUPPORT EQUIPMENT



## WIRING INTERCONNECTIONS

Circuits are shown in powered, non-alarm state.

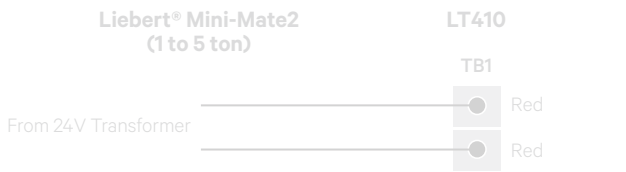
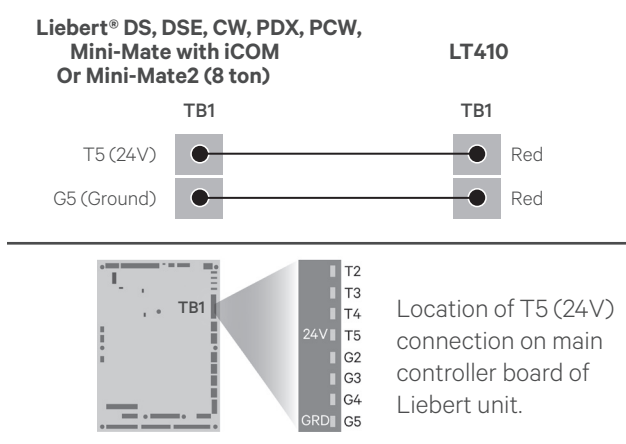
**NOTE:** All power and alarm connections must be Class 2 circuits.



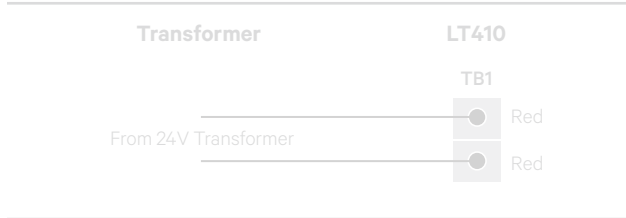
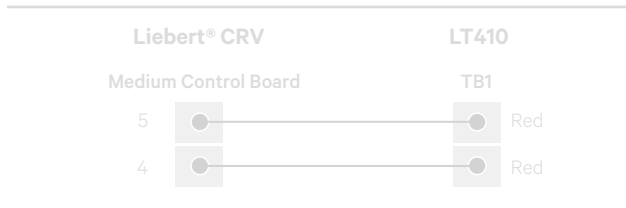
Red Wires	Orange Wires	Yellow Wires
24 V, AC/DC @ 0.10A, 50-60 Hz, DC Class 2 Circuit Only	Alarm Contact Rating 24 VAC @ 3A Class 2 Circuit Only	Alarm Contact Rating 24 VAC @ 3A Class 2 Circuit Only

## POWER WIRING

The LT410 is rated for 24 VAC, 50/60 Hz, and 0.10 A.

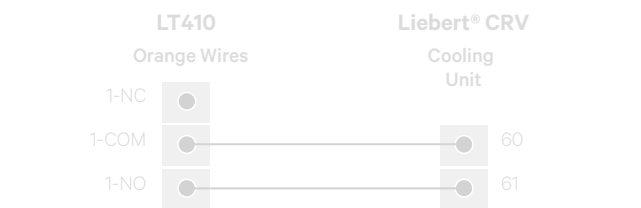
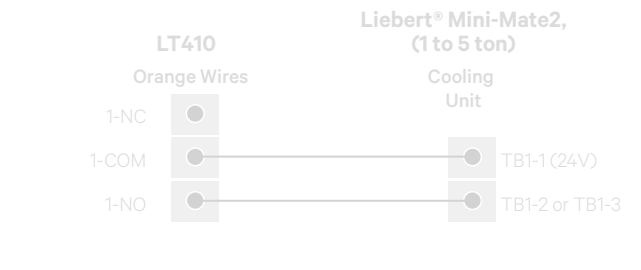
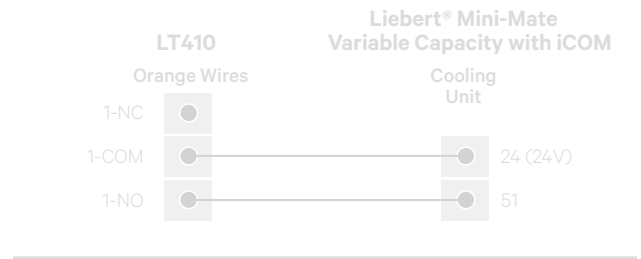
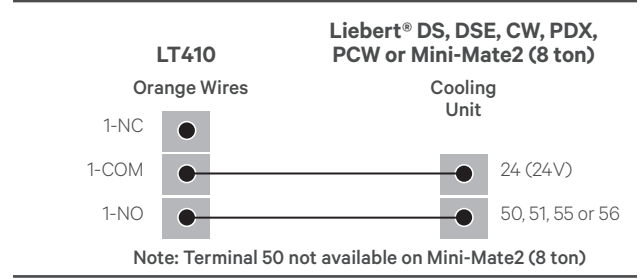


\* Requires external transformer (there are no designated terminal connections on the unit)

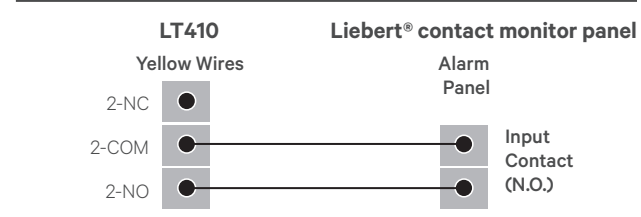


## WIRING TO AUXILIARY ALARM PANELS

The LT410 has two Form-C dry contact alarm output contacts: one orange wire and two yellow wires. Each contact is rated for 24 VAC at 3 amp.



NOTE: In Liebert® iCOM™, use the Service Options menu to add that the Liqui-Tect™ is installed.



# LIEBERT® LIQUI-TECT™ 460 KIT ZONE LEAK DETECTION SENSOR WITH CABLE

## Product Specification/Installation Guide



The Liebert® Liqui-Tect™ 460 (LT460) provides zone detection of leaks, protecting equipment by constantly monitoring the area for leaking liquids. The LT460 is the ideal solution for perimeter sensing or serpentine coverage of areas requiring up to 100 feet of cable.

Selectable modes of operation provide flexible alarming options and protection for the cable. The LT460 constantly monitors a zone for leaks, internal faults, and power failures and warns of any abnormal conditions. Top cover LEDs provide status indication and also ensure that the cable is properly installed and operational under raised floors.

Two independent outputs provide a signal to a local alarm panel, Liebert cooling unit, and a remote building management system, or external equipment, such as motorized water shutoff valves.

### LT460 APPLICATIONS

The LT460 is ideally suited for:

- Glycol and chilled water cooling,
- Humidification supply water piping,
- Condensate pumps and drains,
- Unit and ceiling auxiliary drip pans,
- Overhead piping troughs.

### LOCATIONS/PLACEMENT

The LT460 is an excellent choice for:

- Large scale network control centers,
- Data centers,
- MRI and CAT scan rooms
- Server rooms and closets,
- Unattended, remote shelters,
- Mechanical equipment rooms,
- Sensitive areas with overhead piping,
- Industrial process control rooms.

### COMPONENTS

#### Liqui-Tect™ 460 Module

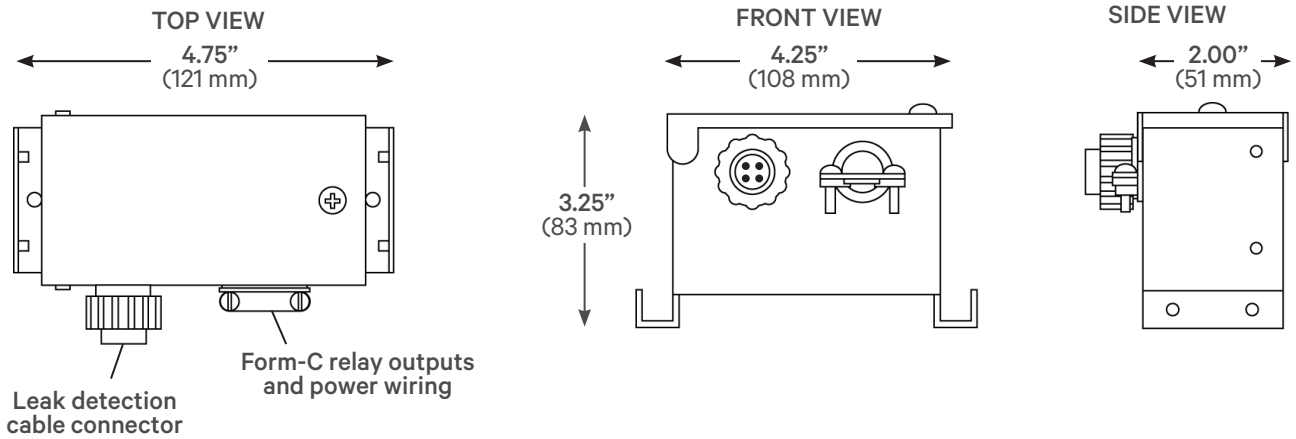
The LT460 consists of a metal enclosure with a hinged top door providing access to the internal circuit board for wiring termination and configuration of DIP switches. The LT460 will monitor up to 100 feet of connected LT500Y leak detection cable.

#### LT500Y Leak Detection Cable

The cable material and construction allow the cable to lie flat when used with hold down clips. The LT500Y is plenum-rated and UL listed for safe operation.

- If purchased separately, cables are available in lengths of 15, 35 and 50 feet. These cables can be connected incrementally to monitor from 15 feet up to 100 feet. An end terminator and hold-down clips (two clips required for each 6-8 feet of cable) must be ordered separately.
- If included in a kit, cables are available in lengths of 20, 25, 30, 35 and 45 feet. Cables in kits cannot be lengthened. Hold down clips are provided.

## DIMENSIONS - TOP, FRONT AND SIDE



## SPECIFICATIONS

Power Requirements	24 VAC 120 mA, 50/60 Hz, 3 VA (max.)
Dimensions, W x D x H	5.35 in. x 3.23 in. x 3.5 in. (135.9 mm x 82 mm x 88.9 mm) Mounting-holes require #8 screws.
Weight (assembled)	2.0 lb. (0.9 kg)
Leak-detection Cable Compatibility	All Liebert LT500 sensing cables
Maximum Leak-detection Cable Length	100 ft. (30.5 m)
Metal Enclosure	NEMA 1, IP 30

## ENVIRONMENTAL CONDITIONS

Operating Temperature	50°F to 104°F (10°C to 40°C)
Operating Humidity	10% to 95% relative humidity (non-condensing)
Operating Altitude	0 to 10,000 ft. (0 to 3,048 m)
Output Relay Contact Rating	2 Form-C; 3 A rating at 24 VAC

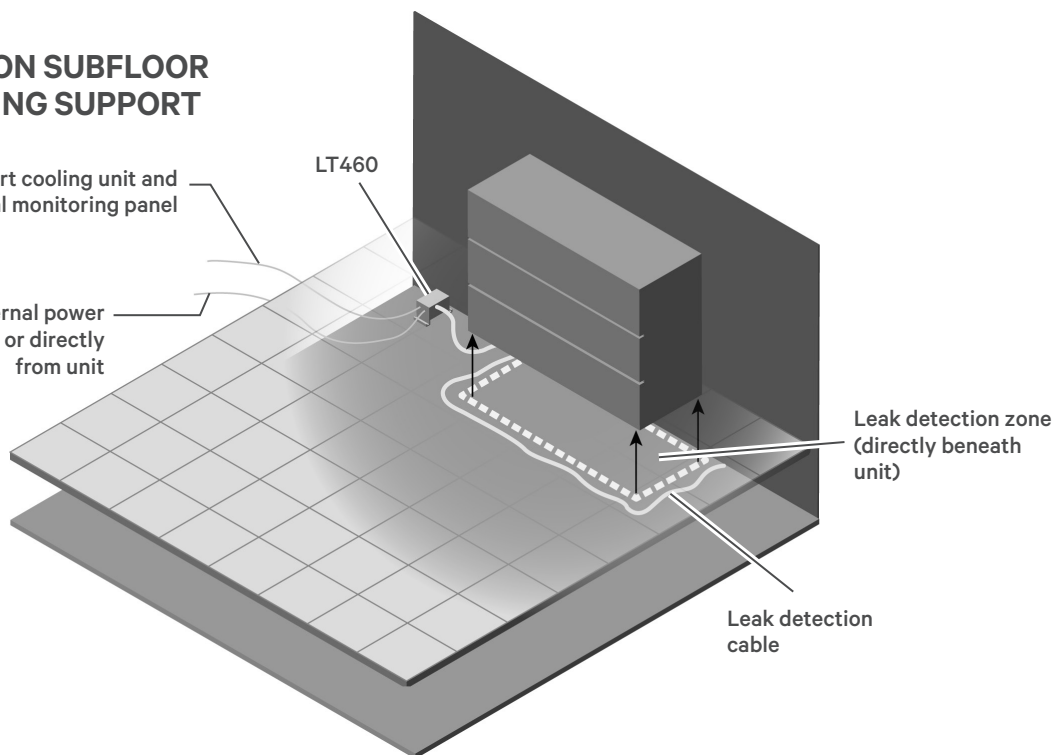
## AGENCY LISTINGS

UL	UL916
C-UL	C22.2, No. 205-M1983
CE	Yes
FCC Compliance	47 CFR, Part 15

## PLACEMENT ON SUBFLOOR UNDER COOLING SUPPORT EQUIPMENT

To a Liebert cooling unit and an optional monitoring panel

To external power supply or directly from unit



## CONFIGURATION-SWITCH SETTINGS

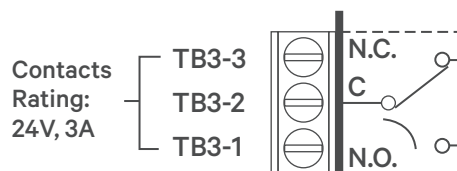
A four position DIP switch selects two alarm (filter) delays and three mutually exclusive alarm modes. The switches are located next to the wiring termination blocks.

### SWITCH SETTINGS

	OFF	ON
1. Leak Detect Filter	10 sec	2 min
2. Alarm Latch	No	Yes
3. Alarm Retest Delay	No	1 hr
4. Not Used	-	-

### ALL CIRCUITS: CLASS 2

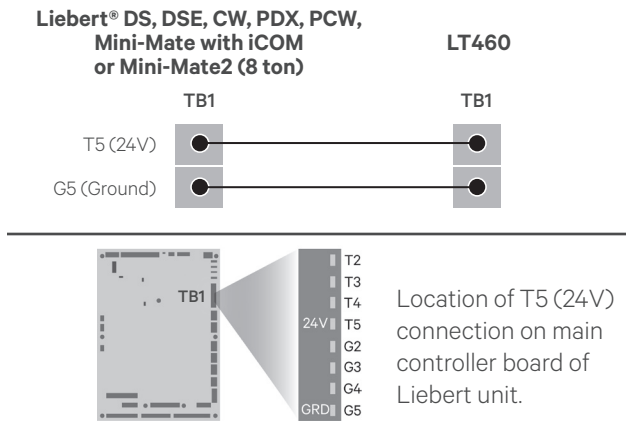
Contacts shown in POWERED, NON-ALARM state



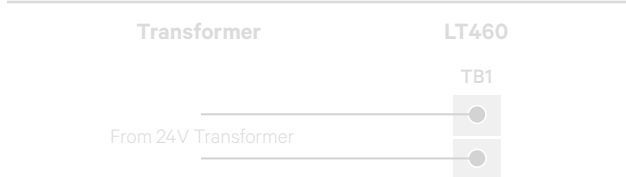
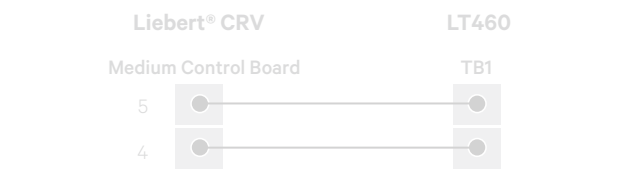
CONNECT ENCLOSURE TO EARTH GROUND

## POWER WIRING

The LT460 is rated for 24 VAC, 50/60 Hz, and 0.12 A.



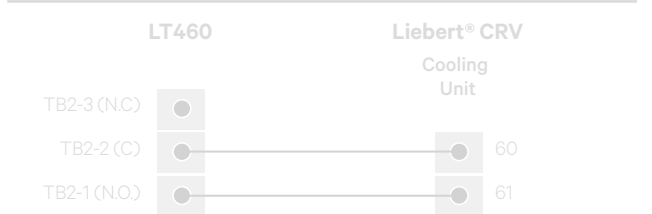
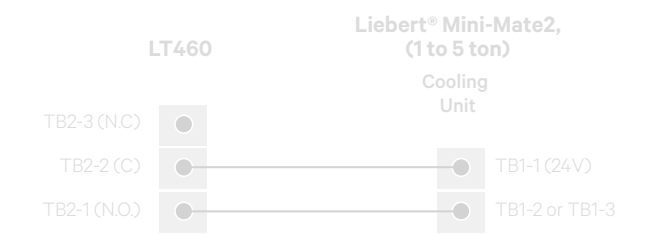
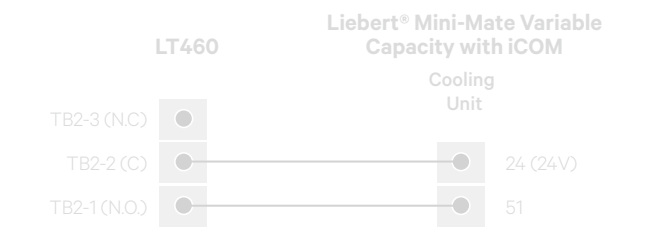
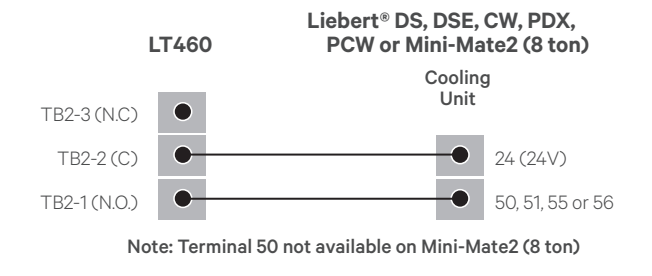
\* Requires external transformer (there are no designated terminal connections on the unit)



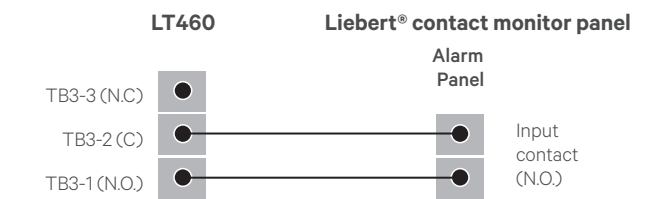
## WIRING TO COOLING UNIT

The LT460 has two Form-C dry-contact alarm-output contacts (TB2 and TB3). Each contact is rated for 24 VAC at 3 amp.

NOTE: In Liebert® iCOM™, use the Service Options menu to add that the Liqui-Tect™ is installed



## WIRING TO AUXILIARY ALARM PANELS

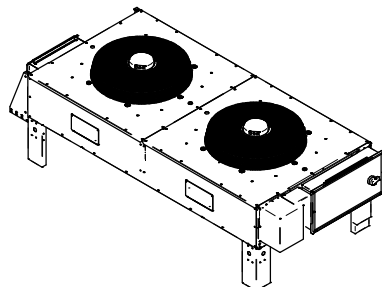






# LIEBERT® MC

## PREMIUM EFFICIENCY CONTROL STANDARD & OPTIONAL FEATURES



### STANDARD FEATURES

**COIL** Liebert® MC coils are all-aluminum construction. Tubes are created by extruding small parallel refrigerant flow paths into aluminum. Full-depth louvered aluminum fins fill spaces between the tubes. Tubes, fins and aluminum headers are oven-brazed to form a complete refrigerant-to-air heat exchange coil. Baffles are used in the headers to separate one coil slab into multiple passes as needed. Coils are factory leak tested at a minimum of 300 PSIG and dehydrated. Copper stub pipes are electric resistance welded to aluminum coils and joints are protected with polyolefin to seal joint from environmental corrosive elements. Hot gas and liquid lines are brazed to the stub pipes with spun closed ends for customer piping connections. Coil pipe assemblies are filled and sealed with a nitrogen holding charge for shipment. One coil is used per fan assembly.

**FAN/MOTOR ASSEMBLY** The fan/motor assembly is complete with external rotor motor, fan blades and fan/finger guard. Fan blades are constructed of stamped aluminum or steel extrusion coated with PP plastic. Fan guards are heavy gauge, close meshed, steel wire, coated with a black corrosion resistant finish. Fan terminal blocks located on the top of the fan guard with IP54 protection class. Fans are factory balanced and tested before shipment.

**FAN MOTORS** Fan motors are specifically designed for variable speed and have ball bearings. The EC fans provide internal overload protection through the built-in electronics. Each EC fan motor has built-in controller and communication module, linked via RS485 communication wire to each fan and the Premium Control Board. This allows each fan to receive and respond to precise fan speed inputs from the Premium control board.

**PREMIUM EFFICIENCY FAN CONTROL** The Liebert premium efficiency condenser control system is complete with control board, EC fan motor(s), refrigerant-pressure transducer(s), refrigerant-temperature thermistor(s), ambient-temperature thermistor, and motor overload protection in the factory wired control panel. The control board maintains EC fans on the same circuit to the same speed in order to maintain refrigerant head pressure. The control board receives a run signal from the compressor of the indoor unit via field-supplied low voltage interlock wires and field-supplied CANbus communication wires from the indoor unit Liebert® iCOM™. The control system provides refrigerant head pressure and system starting for outdoor ambient temperature as low as -30°F (-35 °C), provided the total temperature design range (from minimum to maximum) is 125°F (70°C) or less.

**HOUSING** The condenser housing is constructed of bright aluminum sheet and divided into individual fan sections by full width baffles. Internal structural support members, including coil support frame, are galvanized steel for strength and corrosion resistance. Panel doors are provided on two sides of each coil/fan section to provide for coil cleaning. Aluminum legs are provided with rigging holes for hoisting the unit into position.

**COMMUNICATION** The Premium Efficiency Control communicates with the Liebert® iCOM™ control of the indoor Liebert unit using field supplied CANbus wires. The communication link allows for condenser alarm condition communication to Liebert® iCOM™, communication of other measurable items on the condenser, and fan control features to improve efficiency, sound and wintertime operation based on Liebert® iCOM™ programming.

**UNIT DISCONNECT SWITCH** Locking unit disconnect switch is factory installed and wired in attached condenser control section.

### OPTIONAL FEATURES

**LIEBERT® LEE-TEMP LOW AMBIENT CONTROL** Liebert® Lee-Temp receiver kits can be added to achieve head pressure control down to minimum ambient temperatures of -30 °F (-34 °C). The premium efficiency fan control when used with the Liebert® Lee-Temp receiver kits runs the fan(s) at lower speeds during cold temperatures saving fan energy.

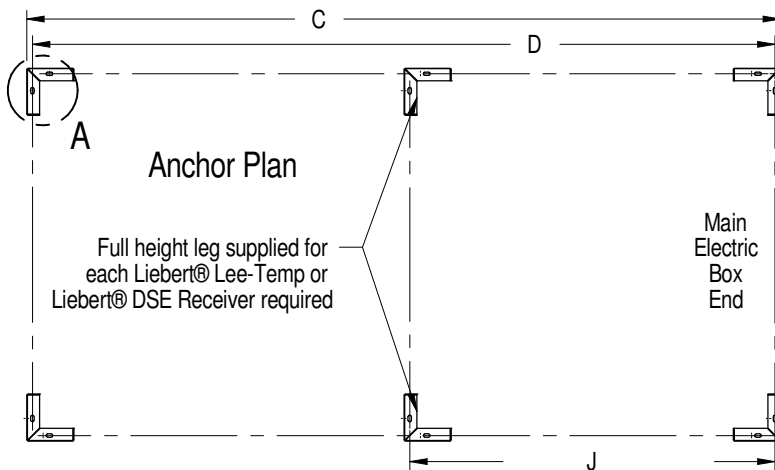
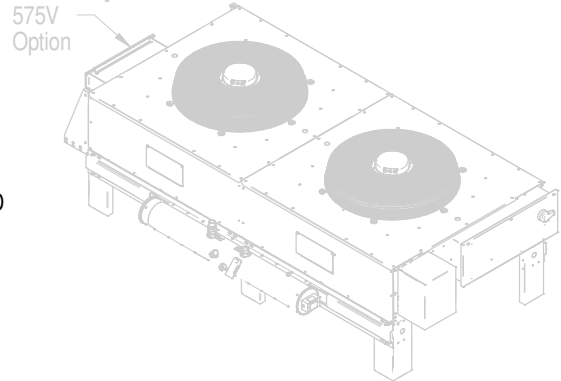
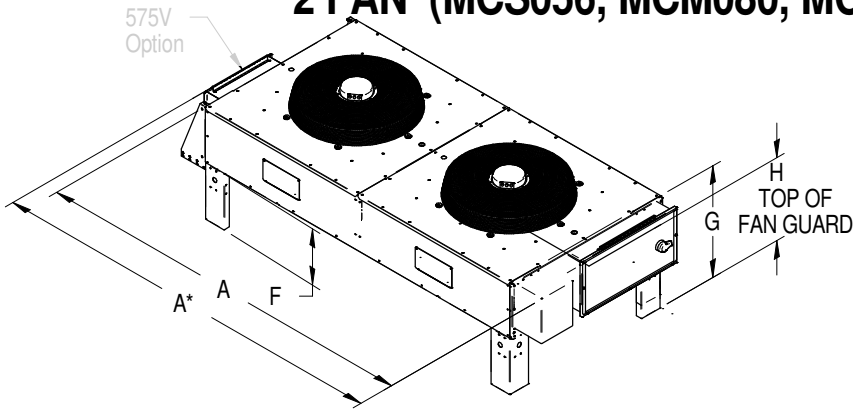
**575V POWER SUPPLY** The factory installed condenser option will include a secondary enclosure, a 575V-to-480V, 3 phase, step down transformer, secondary fuses for the transformer, and all wiring between the main and secondary electrical enclosures. Site power connections will be made in the main electrical enclosure and the secondary enclosure will be located on the condenser end opposite of the main electrical enclosure.

**E-COAT COIL PROTECTION** The aluminum microchannel coil is epoxy-coated for extended coil life in corrosive environments, such as coastal areas. Factory-applied E-coat using immersion and baking process provides a flexible epoxy-coating to all coil surfaces and ensures complete coil encapsulation. Coil color is black and a factory-applied UV topcoat protects the E-coat from solar UV ray degradation.

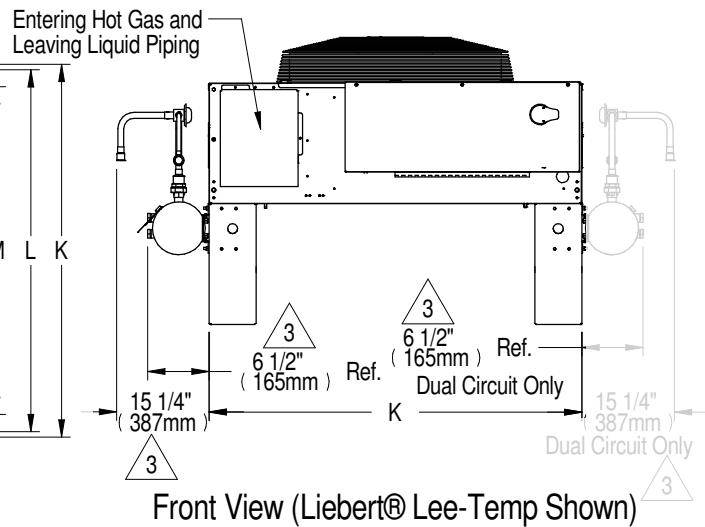


# LIEBERT® MC

## CABINET & ANCHOR DIMENSIONAL DATA 2 FAN (MCS056, MCM080, MCL110) DUAL CIRCUIT



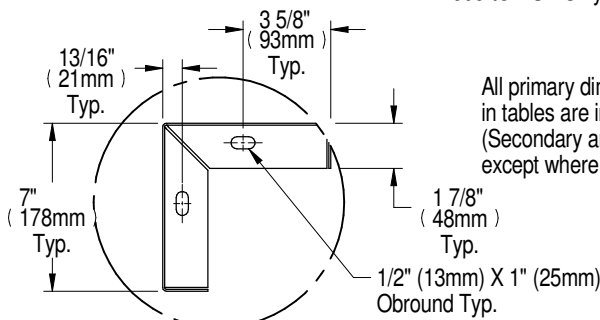
Liebert® Lee-Temp or Liebert® DSE Receiver



Left Side of Unit

Liebert® Lee-Temp or Liebert® DSE Only

Front View (Liebert® Lee-Temp Shown)



DETAIL A  
Typical All Legs

All primary dimensions in tables are in inches (Secondary are in mm) except where specified

MODEL NUMBER	F 2 (LEG HEIGHT DIMENSIONS)			
MCS056 MCM080	18 (457)	36 (914)	48 (1219)	60 (1524)
DIM "G"	31-5/8 (803)	49-5/8 (1260)	61-5/8 (1565)	73-5/8 (1870)
DIM "H"	39-5/8 (1006)	57-5/8 (1464)	69-5/8 (1768)	81-5/8 (2073)
MCL110				
DIM "G"	35-7/8 (911)	53-7/8 (1368)	65-7/8 (1673)	77-7/8 (1978)
DIM "H"	43-5/8 (1108)	61-5/8 (1565)	73-5/8 (1870)	85-5/8 (2175)

Note:

1. Vertiv recommends a clearance of 36" (915mm) on each side for proper operation and component access.

2 Cross bracing required for legs longer than 18" (457mm). Quantity varies per model & options selected.

3 For Liebert® DSE models only, 6-1/2" (165mm) dimension is 9-1/4" (235mm) and 15-1/4" (387mm) dimension is not applicable.

MODEL NUMBER	A	A* (575V ONLY)	C	D	J Liebert® Lee-Temp or Liebert® DSE Receivers Only	K	L	M
MCS056	94-7/8 (2411)	103-1/8 (2619)	88-3/8 (2245)	86-3/4 (2203)	42-1/2 (1079)	42-1/2 (1080)	40-7/8 (1038)	35-7/8 (910)
MCM080	105-1/4 (2674)	113-7/16 (2882)	96-1/16 (2440)	94-7/16 (2398)	46-5/16 (1177)	46 (1168)	44-3/8 (1127)	39-5/16 (999)
MCL110	124-1/8 (3152)	133-1/8 (3381)	112-1/8 (2848)	110-1/2 (2806)	54-3/8 (1381)	55-1/2 (1410)	53-7/8 (1368)	48-3/4 (1238)



# LIEBERT MC CONDENSER

## CONDENSER AND OPTION WEIGHT DATA, lb(kg)

Size		Small (MCS)		Medium (MCM)			
Condenser Model		MCS028	MCS056	MCM040	MCM080		MCM160
Refrigerant Circuits		1	2	1	1	2	2
Condenser Dry Weight	18" Leg	154 ( 70)	270 ( 122)	231 ( 105)	441 ( 200)	441 ( 200)	860 ( 390)
	36" Leg	286 ( 130)	419 ( 190)	363 ( 165)	590 ( 268)	590 ( 268)	1066 ( 484)
	48" Leg	318 ( 144)	451 ( 205)	395 ( 179)	622 ( 282)	622 ( 282)	1114 ( 505)
	60" Leg	349 ( 158)	482 ( 219)	426 ( 193)	653 ( 296)	653 ( 296)	1160 ( 526)
<b>Additional Weight for Options</b>							
PDX-EEV Receiver		45 ( 20)		45 ( 20)	45 ( 20)		
Lee-Temp		55 ( 25)	110 ( 50)	55 ( 25)	100 ( 45)	110 ( 50)	220 ( 100)
DSE Receiver DA050/080/085					45 (20)		90 (41)
DSE Receiver DA125/150/165					92 (42)		184 ( 83)
575V Transformer		55 ( 25)	65 ( 29)	60 ( 27)	70 ( 32)	70 ( 32)	80 ( 36)
Coated Coil		4 ( 2)	8 ( 4)	5 ( 2)	10 ( 5)	10 ( 5)	20 ( 9)
Seismic/Wind Bracing 18" legs		40 ( 18)	40 ( 18)	40 ( 18)	40 ( 18)	40 ( 18)	57 ( 26)

Size		Large (MCL)					
Condenser Model		MCL055	MCL110		MCL165	MCL220	
Refrigerant Circuits		1	1	2	1	1	2
Condenser Dry weight	18" Leg	344 ( 156)	602 ( 273)	602 ( 273)	891 ( 404)	1186 ( 538)	1186 ( 538)
	36" Leg	486 ( 220)	766 ( 347)	766 ( 347)	1136 ( 515)	1453 ( 659)	1453 ( 659)
	48" Leg	518 ( 235)	798 ( 362)	798 ( 362)	1184 ( 537)	1501 ( 681)	1501 ( 681)
	60" Leg	549 ( 249)	829 ( 376)	829 ( 376)	1230 ( 558)	1547 ( 702)	1547 ( 702)
<b>Additional Weight for Options</b>							
PDX-EEV Receiver		45 ( 20)					
Lee-Temp		60 ( 27)	115 ( 52)	120 ( 54)	175 ( 79)	215 ( 98)	240 ( 109)
DSE Receiver DA050/080/085				45 ( 20)	45 (20)	45 ( 20)	90 ( 41)
DSE Receiver DA125/150/165				94 ( 43)	94 ( 43)	94 ( 43)	188 ( 85)
575V Transformer		67 ( 30)	77 ( 35)	77 ( 35)	118 ( 54)	118 ( 54)	118 ( 54)
Coated Coil		8 ( 4)	16 ( 7)	16 ( 7)	24 ( 11)	32 ( 15)	32 ( 15)
Seismic/Wind Bracing 18" legs		40 ( 18)	40 ( 18)	41 ( 19)	57 ( 26)	57 ( 26)	57 ( 26)

Total weight is the sum of 'Condenser' + ('PDX-EEV Receiver' or 'Lee-Temp' or 'DSE Receiver 050/080/085' or 'DSE Receiver 125/150/165') + 'Coated Coil' + '575V Transformer' + 'Seismic/Wind Bracing'



# LIEBERT® MC

## SEISMIC ANCHORAGE DATA TWO FAN MODELS

WITHOUT RECEIVER

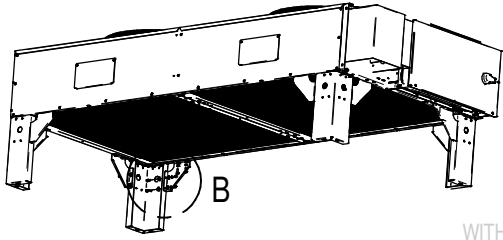


FIGURE 3

WITH RECEIVER  
(VIEWS SHOW RECEIVER BRACKET ONLY.  
RECEIVERS NOT SHOWN FOR CLARITY)

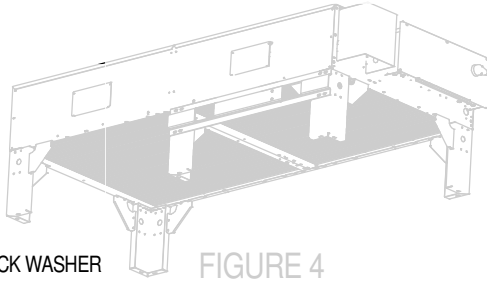
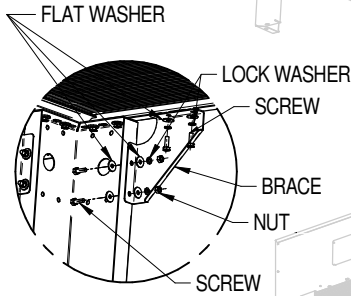


FIGURE 4



DETAIL B

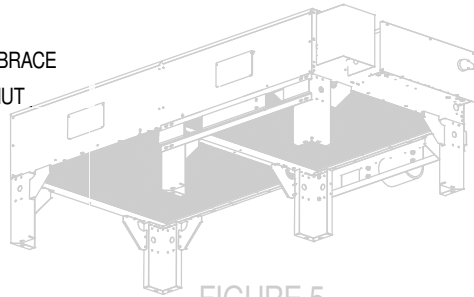


FIGURE 5

NOTES:

1. MOUNTING REQUIREMENT DETAILS SUCH AS ANCHOR BRAND, TYPE, EMBEDMENT DEPTH, EDGE SPACING, ANCHOR-TO-ANCHOR SPACING, CONCRETE STRENGTH, SPECIAL INSPECTION AND ATTACHMENT TO NON-BUILDING STRUCTURES MUST BE OUTLINED AND APPROVED BY THE ENGINEER OF RECORD FOR THE PROJECT OR BUILDING. STRUCTURAL FLOORS AND HOUSEKEEPING PADS MUST ALSO BE SEISMICALLY DESIGNED AND APPROVED BY THE PROJECT OR BUILDING STRUCTURAL ENGINEER OF RECORD TO WITHSTAND THE SEISMIC ANCHOR LOADS DEFINED IN THE TABLE BELOW. THE INSTALLING CONTRACTOR IS RESPONSIBLE FOR THE PROPER INSTALLATION OF ALL ANCHORS AND MOUNTING HARDWARE, OBSERVING THE MOUNTING REQUIREMENTS DETAILED IN THE SEISMIC INSTALLATION DRAWINGS AND ADDITIONALLY OUTLINED BY THE ENGINEER OF RECORD.
2. ALL BRACES AND FASTENERS ARE REQUIRED TO MAINTAIN IBC/OSHPD CERTIFICATION OF CONFORMITY.
3. USE WASHER, LOCK WASHER AND SCREW TO CONNECT BRACE TO CONDENSER BOTTOM BEAM (REFERENCE VIEW DETAIL B).
4. USE WASHER, LOCK WASHER, SCREW AND NUT TO CONNECT BRACE TO CONDENSER LEG (REFERENCE VIEW DETAIL B).
5. PLACE ANCHORAGE PLATE INSIDE EACH CONDENSER FOOT PRIOR TO FASTENING TO THE STRUCTURE. USE FLAT WASHER, LOCK WASHER AND NUT TO CONNECT CONDENSER TO THE CUSTOMER SUPPLIED ANCHOR ON THE SOLID SURFACE (SEE SHEET 1). AS A MINIMUM 3/8" GRADE ANCHORS WITH AMERICAN NATIONAL STANDARD SERIES W, TYPE A, PLAIN WASHERS (ANSI B18.22.1-1965, R1975) SELECTED TO MATCH THE NOMINAL ANCHOR DIAMETER MUST BE INSTALLED AT EACH ANCHOR LOCATION BETWEEN THE ANCHOR HEAD AND EQUIPMENT FOR TENSION LOAD DISTRIBUTION.

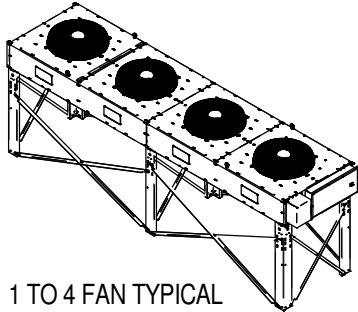
MODEL	FIGURE	IMPORTANCE FACTOR $I_p = 1.0$			IMPORTANCE FACTOR $I_p = 1.5$		
		MAXIMUM COMPRESSIVE REACTION Lbs.	MAX. ANCHOR LOADS (ASD)		MAXIMUM COMPRESSIVE REACTION Lbs.	MAX. ANCHOR LOADS (ASD)	
			TENSILE lbs.	SHEAR lbs.		TENSILE lbs.	SHEAR lbs.
MCS056							
WITHOUT RECEIVER	3	63	20	23	78	35	34
WITH RECEIVER	5	69	15	30	75	30	35
MCM080							
SINGLE OR DUAL CIRCUIT WITHOUT RECEIVER	3	94	30	34	116	53	50
SINGLE CIRCUIT WITH RECEIVER	4	87	34	38	99	59	57
DUAL CIRCUIT WITH RECEIVER	5	90	24	38	98	44	57
MCL110							
SINGLE OR DUAL CIRCUIT WITHOUT RECEIVER	3	146	42	55	179	76	82
SINGLE CIRCUIT WITH RECEIVER	4	131	47	53	158	83	80
DUAL CIRCUIT WITH RECEIVER	5	117	31	51	136	59	77

\* ALL LOADS ARE CALCULATED PER ASCE 7-05, CHAPTER 13.6  $S_{ds}=2.0$ ,  $R_p=6.0$ ,  $a=2.5$

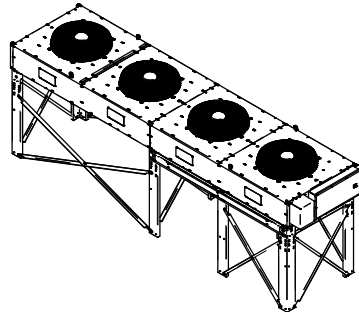


# LIEBERT® MC

## SEISMIC ANCHORAGE DATA 36" - 60" EXTENDED LEG



1 TO 4 FAN TYPICAL



1 TO 4 FAN WITH RECEIVER(S) TYPICAL  
RECEIVER MOUNTING BASE SHOWN

**INSTRUCTIONS:**

1. MOUNTING REQUIREMENT DETAILS SUCH AS ANCHOR BRAND, TYPE, EMBEDMENT DEPTH, EDGE SPACING, ANCHOR-TO-ANCHOR SPACING, CONCRETE STRENGTH, SPECIAL INSPECTION AND ATTACHMENT TO NON-BUILDING STRUCTURES MUST BE OUTLINED AND APPROVED BY THE ENGINEER OF RECORD FOR THE PROJECT OR BUILDING. STRUCTURAL FLOORS AND HOUSEKEEPING PADS MUST ALSO BE SEISMICALLY DESIGNED AND APPROVED BY THE PROJECT OR BUILDING STRUCTURAL ENGINEER OF RECORD TO WITHSTAND THE SEISMIC ANCHOR LOADS DEFINED IN THE TABLE BELOW.
2. ALL BRACES AND FASTENERS ARE REQUIRED TO MAINTAIN IBC/O SHPD CERTIFICATION OF CONFORMITY.
3. USE FLAT WASHER, LOCK WASHER AND NUT TO CONNECT CONDENSER TO THE CUSTOMER SUPPLIED BOLT ON THE SOLID SURFACE (SEE SHEET 1).
4. REFER TO DOCUMENT 308616 FOR ASSEMBLY INSTRUCTION DETAILS.

MODEL	IMPORTANCE FACTOR $I_p = 1.0$			IMPORTANCE FACTOR $I_p = 1.5$		
	MAXIMUM COMPRESSIVE REACTION Lbs.	MAX. ANCHOR LOADS (ASD)		MAXIMUM COMPRESSIVE REACTION Lbs.	MAX. ANCHOR LOADS (ASD)	
		TENSILE lbs.	SHEAR lbs.		TENSILE lbs.	SHEAR lbs.
<b>MCS028 and MCS056</b>						
Single Fan	189	127	31	260	197	46
Single Fan w/ Receiver	234	167	40	328	260	60
Two Fan	251	167	40	344	260	61
Two Fan w/ Receiver	240	175	44	337	273	66
<b>MCM040 Through MCM160</b>						
Single Fan	190	125	32	260	195	48
Single Fan w/ Receiver	238	164	40	329	255	61
<b>Two Fan Single or Dual Circuit</b>	<b>323</b>	<b>218</b>	<b>51</b>	<b>444</b>	<b>339</b>	<b>77</b>
Two Fan Single Circuit w/ Receiver	283	262	53	389	405	79
Two Fan Dual Circuit w/ Receiver	298	218	51	418	339	77
Four Fan Dual Circuit	397	267	62	544	414	93
Four Fan Dual Circuit w/ Receiver	397	276	60	544	428	90
<b>MCL055 Through MCL220</b>						
Single Fan	327	219	56	449	341	84
Single Fan w/ Receiver	372	254	64	514	396	95
Two Fan Single or Dual Circuit	446	287	80	607	448	119
Two Fan Single Circuit w/ Receiver	390	336	73	529	521	110
Two Fan Dual Circuit w/ Receiver	365	256	67	506	395	101
Three Fan Single or Dual Circuit	422	276	78	583	432	118
Three Fan Single Circuit w/ Receiver	370	303	79	506	473	118
Four Fan Single or Dual Circuit	543	351	93	739	548	140
Four Fan Single Circuit w/ Receiver	466	377	94	626	587	141
Four Fan Dual Circuit w/ Receiver	490	328	78	665	510	117

\* ALL LOADS ARE CALCULATED PER ASCE 7-05, CHAPTER 13.6  $S_d=2.0$ ,  $R_p=6.0$ ,  $a=2.5$



# LIEBERT® MC

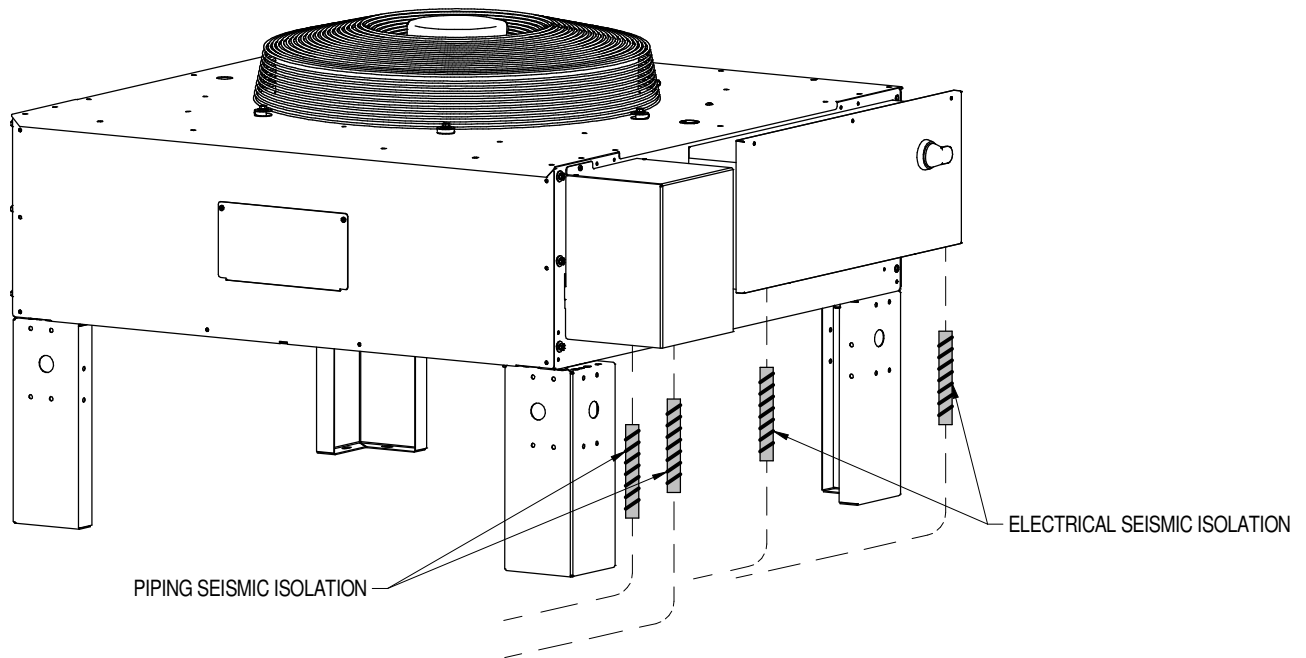
## SEISMIC ANCHORAGE DATA PIPING & ELECTRICAL WIRING CONSIDERATIONS

### SEISMIC PIPING CONSIDERATIONS

Condensers for seismic application, shall be attached to the piping system using field supplied flexible loops designed for seismic movement. Flexible loops shall be capable of movement in three dimensions and must isolate the condenser from field piping. The loops shall be suitable for an operating pressure and temperature of the system. Follow manufacturer's installation instructions for proper seismic application of flexible loops. The selection of isolation brand and type must be outlined and approved by the engineer of record for the project or building.

### SEISMIC ELECTRICAL WIRING CONSIDERATIONS

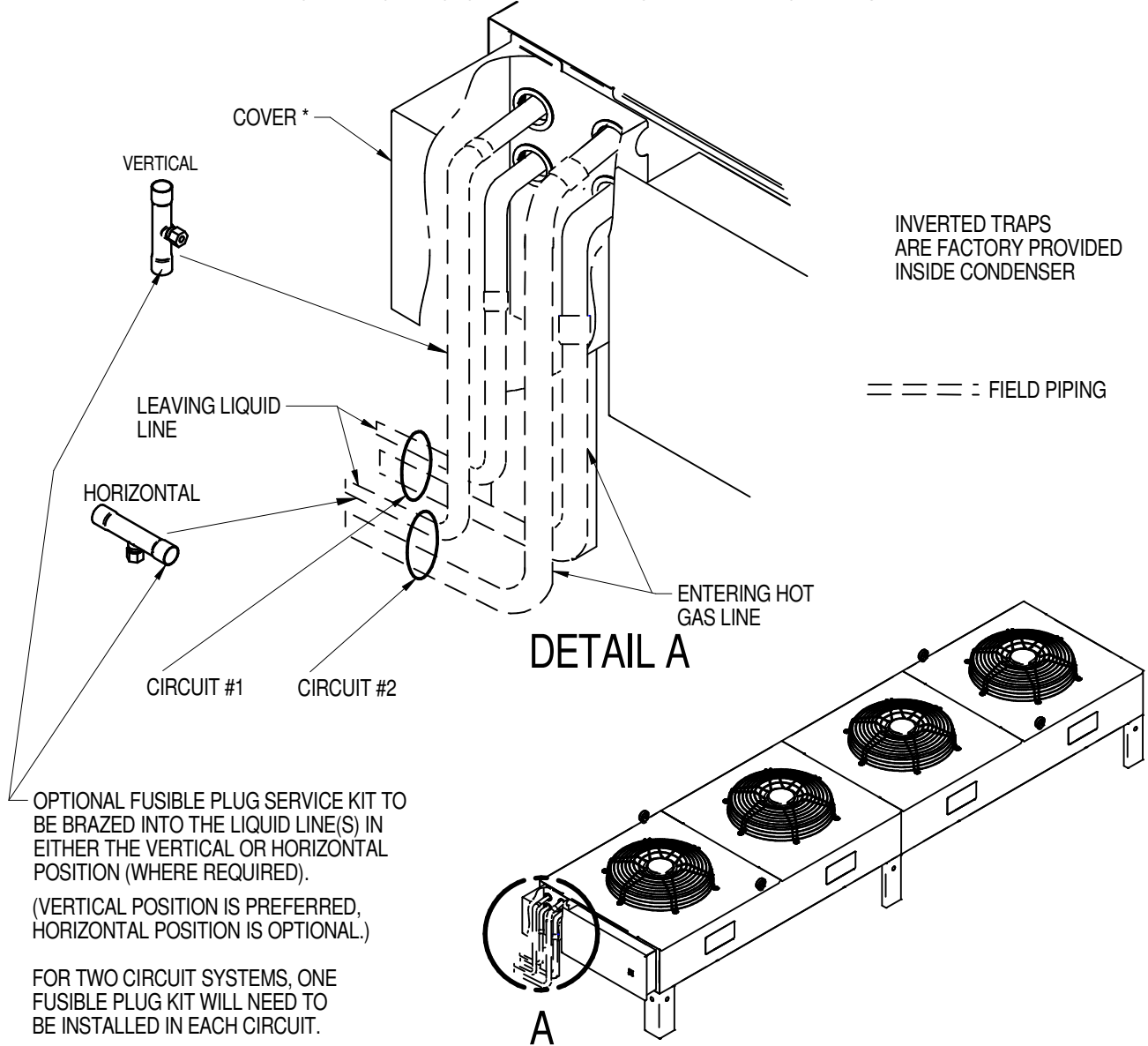
Condensers for seismic application, shall be connected to power and control circuits using field supplied flexible conduit and conductors to allow for movement of the condenser in three dimensions during a seismic event. The flexible conduit shall have at least one bend between the rigid connection at the unit cabinet and the connection to rigid conduit or foundation.





# LIEBERT® MC

## PIPING DIMENSIONAL DATA DUAL CIRCUIT 2 FAN & 4 FAN UNITS



MODEL NO.	NUMBER OF FANS	CONDENSER CIRCUITS	CONNECTION SIZES ,OD,IN	
			HOT GAS LINE	LIQUID LINE
MCS 056	2	2	7/8	5/8
MCM 080	2	2	7/8	5/8
MCL 110	2	2	1-1/8	7/8
MCM 160	4	2	1-1/8	7/8
MCL 220	4	2	1-3/8	1-1/8

\* SHIPPING COVER IS NOT NECESSARY FOR PROPER CONDENSER OPERATION AND MAY BE RECYCLED IF FIELD PIPING INTERFERES WITH PROPER REATTACHMENT.



# LIEBERT AIR COOLED SYSTEMS

## RECOMMENDED REFRIGERANT LINE SIZES CU, OD LIEBERT AIR-COOLED SYSTEMS USING R-407C

System Fluid : R-407C		Standard Scroll Models (Non-Digital Scroll)				4-Step Semi-Hermetic or Digital Scroll Models			
Indoor Model	Equivalent Length	50 ft (15m)	100 ft (30m)	150 ft (45m)	200 ft (60m)	50 ft (15m)	100 ft (30m)	150 ft (45 m)	
DS035	Hot Gas Line, in.	7/8	7/8	7/8		3/4	7/8	7/8	
	Liquid Line, in.	1/2	5/8	5/8		1/2	5/8	5/8	
DS042	Hot Gas Line, in.	7/8	7/8	7/8		7/8	7/8	1-1/8 <sup>2</sup>	
	Liquid Line, in.	1/2	5/8	5/8		5/8	5/8	5/8	
DS053	Hot Gas Line, in.	7/8	1-1/8	1-1/8		7/8	1-1/8 <sup>2</sup>	1-1/8 <sup>2</sup>	
	Liquid Line, in.	5/8	7/8	7/8		5/8	7/8	7/8	
DS070	Hot Gas Line, in.	1-1/8	1-1/8	1-1/8		1-1/8 <sup>2</sup>	1-1/8 <sup>2</sup>	1-1/8 <sup>2</sup>	
	Liquid Line, in.	7/8	7/8	7/8		7/8	7/8	7/8	
DS077 <sup>3</sup>	Hot Gas Line, in.	1-1/8	1-1/8	1-1/8		1-1/8	1-1/8	1-1/8	
	Liquid Line, in.	7/8	7/8	7/8		7/8	7/8	7/8	
DS105 <sup>3</sup>	Hot Gas Line, in.	1-3/8	1-3/8	1-3/8		1-3/8	1-3/8	1-3/8	
	Liquid Line, in.	7/8	7/8	1-1/8		7/8	7/8	1-1/8	
XDC160	Hot Gas Line, in.	1-1/8 <sup>4</sup>	1-1/8 <sup>4</sup>	1-3/8 <sup>4</sup>		1-3/8 <sup>4</sup>			
	Liquid Line, in.	7/8	1-1/8	1-1/8		1-1/8			

System Fluid : R-407C		Standard Scroll Models (Non-Digital Scroll)				
Indoor Model	Equivalent Length	50 ft (15m)	75 (23m)	100 ft (30m)	125 (38m)	150 ft (45m)
MMD12	Suction Line, in.	5/8	5/8	7/8	7/8	7/8
	Liquid Line, in.	3/8	3/8	3/8	3/8	3/8
MMD18 / DME020	Suction Line, in.	5/8	7/8	7/8	7/8	7/8
	Liquid Line, in.	3/8	3/8	3/8	1/2	1/2
MMD24 / DME027	Suction Line, in.	7/8	7/8	7/8	7/8	7/8
	Liquid Line, in.	3/8	3/8	1/2	1/2	1/2
MMD36/ MMD35 / DME037 / MMD96-3T / MMD95-3T	Suction Line, in.	7/8	7/8	1-1/8 <sup>2</sup>	1-1/8 <sup>2</sup>	1-1/8 <sup>2</sup>
	Liquid Line, in.	1/2	1/2	1/2	1/2	1/2
MMD60/ MMD59 / MMD96-5T /MMD95-5T	Suction Line, in.	1-1/8	1-1/8	1-1/8	1-3/8	1-3/8
	Liquid Line, in.	1/2	5/8	5/8	5/8	5/8

Note:

1. Consult factory for proper line sizing for runs longer than maximum equivalent length shown in tables above.
2. Downsize vertical riser one trade size (1-1/8" to 7/8").
3. Digital scroll not available on 077 and 105 models.
4. Double risers are required when hot gas vertical rise is 15 ft (4.6m) or more. Refer to Liebert® XDC user manual

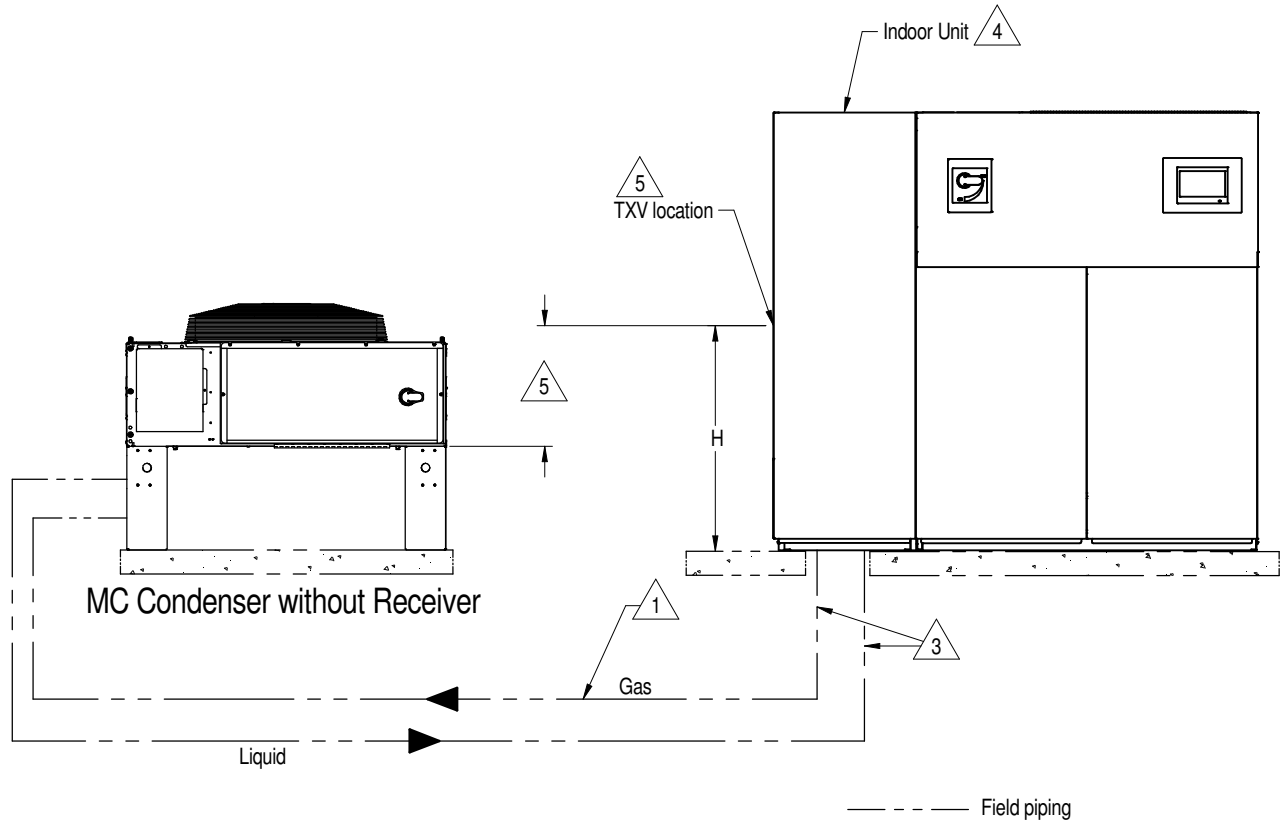






# LIEBERT MC CONDENSER

## AIR COOLED PIPING SCHEMATIC CONDENSER AND INDOOR UNIT AT SAME LEVEL



Notes:

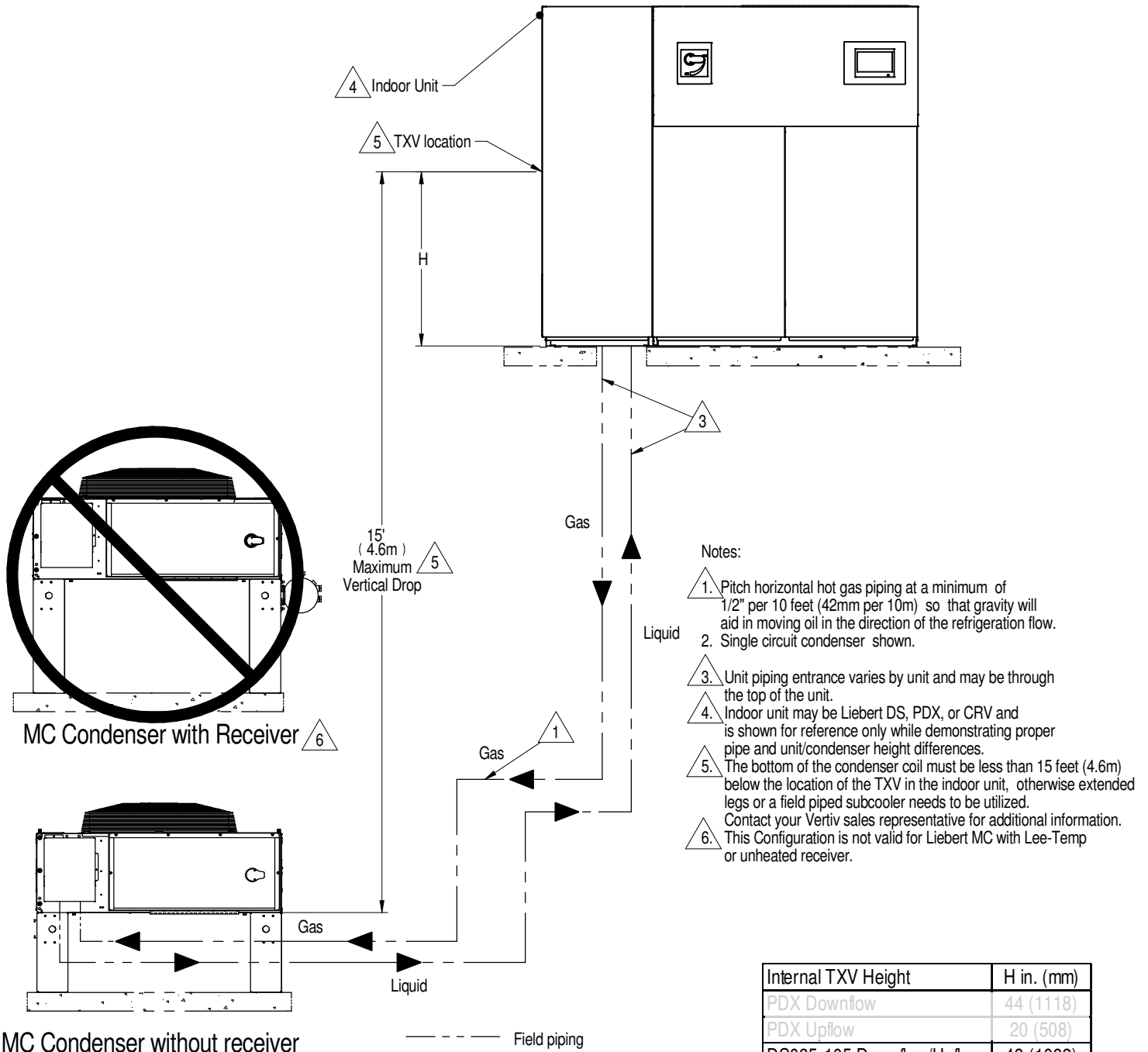
1. Pitch horizontal hot gas piping at a minimum of 1/2" per 10 feet (42mm per 10m) so that gravity will aid in moving oil in the direction of the refrigeration flow.
2. Single circuit condenser shown.
3. Unit piping entrance varies by unit and may be through the top of the unit.
4. Indoor unit may be Liebert DS, PDX, or CRV and is shown for reference only.
5. The bottom of the coil must be less than 15' (4.6m) below the elevation of the TXV inside the indoor unit.  
Contact your Vertiv sales representative for additional information.

Internal TXV Height	H in. (mm)
PDX Downflow	44 (1118)
PDX Upflow	20 (508)
DS035-105 Downflow/Upflow	43 (1092)
CRV - CR019	45 (1143)
CRV - CR020/CR035	27 (686)



# LIEBERT MC CONDENSER

## AIR COOLED PIPING SCHEMATIC CONDENSER BELOW INDOOR UNIT



- Notes:
1. Pitch horizontal hot gas piping at a minimum of 1/2" per 10 feet (42mm per 10m) so that gravity will aid in moving oil in the direction of the refrigeration flow.
  2. Single circuit condenser shown.
  3. Unit piping entrance varies by unit and may be through the top of the unit.
  4. Indoor unit may be Liebert DS, PDX, or CRV and is shown for reference only while demonstrating proper pipe and unit/condenser height differences.
  5. The bottom of the condenser coil must be less than 15 feet (4.6m) below the location of the TXV in the indoor unit, otherwise extended legs or a field piped subcooler needs to be utilized. Contact your Vertiv sales representative for additional information.
  6. This Configuration is not valid for Liebert MC with Lee-Temp or unheated receiver.

Internal TXV Height	H in. (mm)
PDX Downflow	44 (1118)
PDX Upflow	20 (508)
DS035-105 Downflow/Upflow	43 (1092)
CRV - CR019	45 (1143)
CRV - CR020/CR035	27 (686)

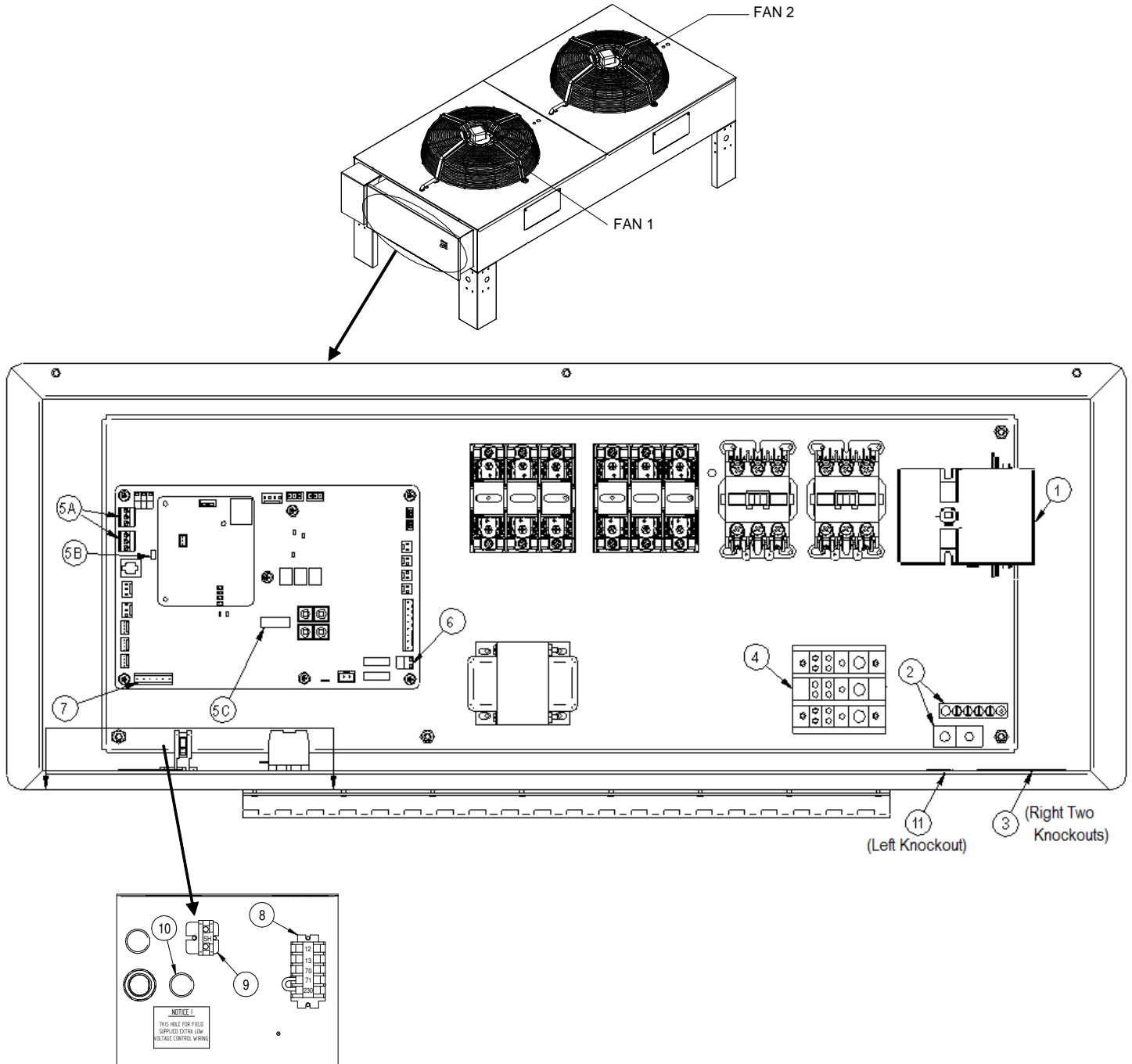
MC Condenser without receiver

----- Field piping



# LIEBERT® MC

## ELECTRICAL FIELD CONNECTIONS PREMIUM EFFICIENCY CONTROL



### KEY ELECTRICAL DETAILS:

- 1) **Three phase electrical service** – Terminals are on top of disconnect switch for one and two fan units. Terminals are on bottom of disconnect switch for three and four fan units. Three phase service not by Vertiv. See note 5.
- 2) **Earth ground** – Field lug terminal for earth ground connection. Ground terminal strip for fan motor ground connection.
- 3) **Primary high voltage entrance** – Two 7/8" (22.2mm) diameter knockouts located at the bottom of the enclosure.
- 4) **SPD field connection terminals** – High voltage surge protective device (SPD) terminals. SPD is an optional device.



# LIEBERT® MC

## ELECTRICAL FIELD CONNECTIONS PREMIUM EFFICIENCY CONTROL

- 5) **CANbus terminal connections** – Field terminals for CANbus cable connection.
- 5A is the CANbus connectors.
    - TB49-1 is the input terminal for CANbus high.
    - TB49-3 is the input terminal for CANbus low.
    - TB50-1 is output terminal for CANbus high.
    - TB50-3 is the output terminal for CANbus low.
    - Each CANbus cable shield is connected to terminal “SH”, item 9.
  - 5B is the “END OF LINE” jumper.
  - 5C is the CANbus “DEVICE ADDRESS DIP SWITCH”. CANbus cable not by Vertiv. See Note 2. (below)
- 6) **Remote unit shutdown** – Replace existing jumper between terminals TB38-1 and TB38-2 with field supplied normally closed switch having a minimum 75VA 24VAC rating. Use field supplied Class 1 wiring. (This is an optional feature that may be owner specified.)
- 7) **Alarm terminal connections** –
- a. Common Alarm Relay indicates when any type of alarm occurs. TB74-1 is common, TB74-2 is normally open, and TB74-3 is normally closed. 1 Amp 24VAC is the maximum load. Use Class 1 field supplied wiring.
  - b. Shutdown Alarm Relay indicates when condenser loses power, or when a critical alarm has occurred that shuts down the condenser unit. TB74-4 is common, TB74-5 is normally open, and TB74-6 is normally closed. 1 Amp 24VAC is the maximum load. Use Class 1 field supplied wiring.
- 8) **Indoor unit interlock and SPD alarm terminals** –
- a. On any call for compressor operation, normally open contact is closed across terminals 70 and 71 for Circuit 1, and normally open contact is closed across terminals 70 and 230 for Circuit 2 from indoor room unit.
  - b. During SPD alarm, normally open contact is closed across terminals 12 & 13. SPD is an optional device.
- 9) **CANbus shield terminal** – Terminal for field shield connection of the CANbus field supplied cables. The shield of CANbus field supplied cables must not be connected to ground at the condenser.
- 10) **Primary low voltage entrance** – One 7/8” (22.2mm) diameter knockout that is free for customer low voltage wiring.
- 11) **SPD entrance** – One 7/8” (22.2mm) diameter knockout hole located at the bottom of the enclosure. High voltage surge protective device (SPD) is optional.

### NOTES:

1. Refer to specification sheet for unit voltage rating, full load amp, and wire size amp ratings.
2. The CANbus wiring is field supplied and must be:
  - Braided shield or foil shield with drain wire
  - Shield must be wired to ground at indoor unit
  - 22-18AWG stranded tinned copper
  - Twisted pair (minimum 4 twists per foot)
  - Low Capacitance (15pF/FT or less)
  - Must be rated to meet local codes and conditions
  - EXAMPLES BELDEN 89207 (PLENUM RATED), OR ALPHA WIRE 6454 CATEGORY 5, 5E, OR HIGHER
3. Do not run in same conduit, raceway, or chase as high voltage wiring.
4. For CANbus network lengths greater than 450FT (137M) call Factory.



# LIEBERT® MC

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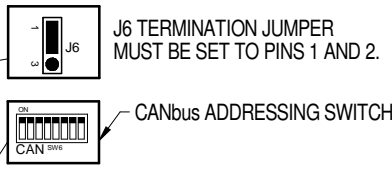
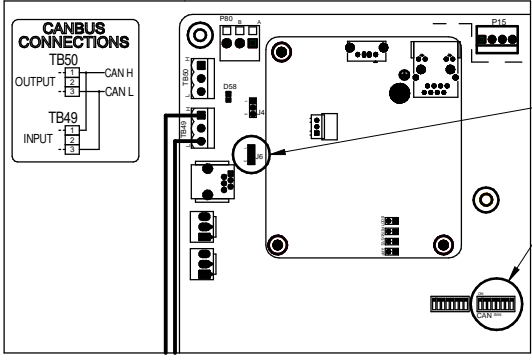
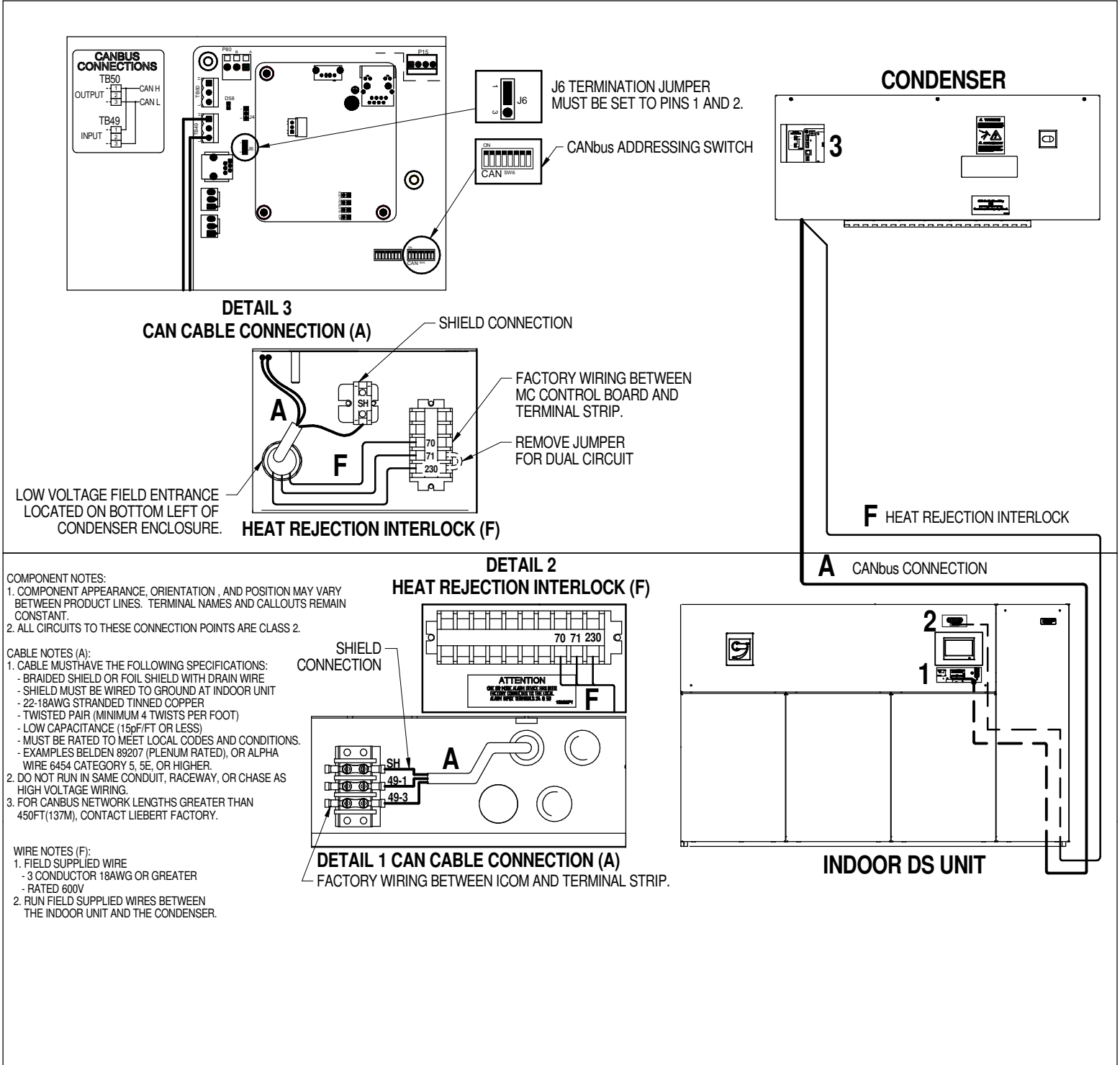
## ELECTRICAL FIELD CONNECTIONS PREMIUM EFFICIENCY CONTROL

5. All wiring must be sized and selected for insulation case per NEC and other local codes.
6. Do not bend cables to less than four times the diameter of the cable.
7. Do not deform cables when securing in bundles or when hanging them.
8. Avoid running the cables by devices that may introduce noise, such as machines, fluorescent lights, and electronics.
9. Avoid stretching cables.
10. The electrically commutated (EC) motors included in the Liebert® MC are suitable for connection to power supplies with a solidly grounded neutral or high resistance to ground or corner ground.
  - a. Acceptable power supplies for 208 to 575V nominal units:
    - 208V wye with solidly grounded neutral and 120V line to ground;
    - 380V wye with solidly grounded neutral and 220V line to ground;
    - 480V wye with solidly grounded neutral and 277V line to ground;
    - 575V wye with solidly grounded neutral and 332V line to ground (uses step-down transformer);
    - Wye with high resistance (or impedance) ground;
    - Delta with corner ground
  - b. Unacceptable power supplies for 208V to 575V nominal units:
    - Delta without ground or with floating ground;
    - Delta with grounded center tap.

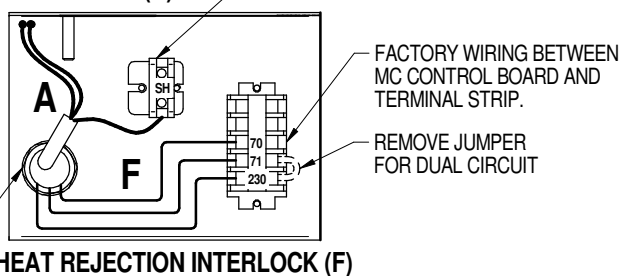


# LIEBERT DS

## CANbus & INTERLOCK CONNECTIONS BETWEEN LIEBERT DS & LIEBERT MC CONDENSER (PREMIUM)



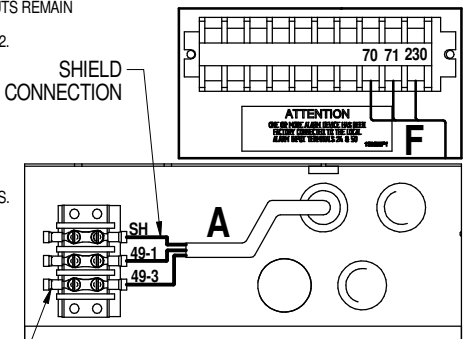
**DETAIL 3**  
CAN CABLE CONNECTION (A)



LOW VOLTAGE FIELD ENTRANCE  
LOCATED ON BOTTOM LEFT OF  
CONDENSER ENCLOSURE.

**HEAT REJECTION INTERLOCK (F)**

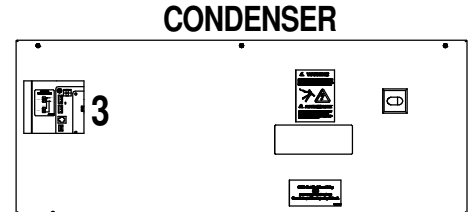
**DETAIL 2**  
HEAT REJECTION INTERLOCK (F)



**DETAIL 1 CAN CABLE CONNECTION (A)**  
FACTORY WIRING BETWEEN ICOM AND TERMINAL STRIP.

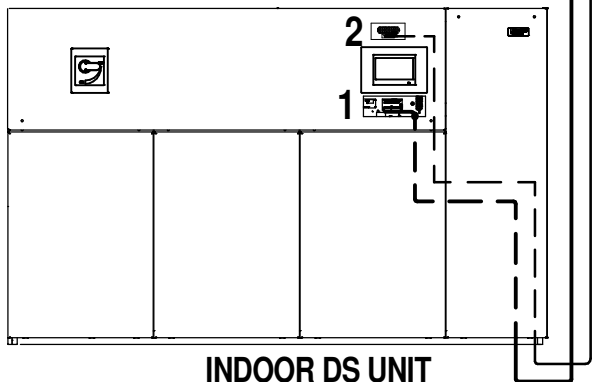
- COMPONENT NOTES:**
1. COMPONENT APPEARANCE, ORIENTATION, AND POSITION MAY VARY BETWEEN PRODUCT LINES. TERMINAL NAMES AND CALLOUTS REMAIN CONSTANT.
  2. ALL CIRCUITS TO THESE CONNECTION POINTS ARE CLASS 2.
- CABLE NOTES (A):**
1. CABLE MUST HAVE THE FOLLOWING SPECIFICATIONS:
    - BRAIDED SHIELD OR FOIL SHIELD WITH DRAIN WIRE
    - SHIELD MUST BE WIRED TO GROUND AT INDOOR UNIT
    - 22-18AWG STRANDED TINNED COPPER
    - TWISTED PAIR (MINIMUM 4 TWISTS PER FOOT)
    - LOW CAPACITANCE (15pF/FT OR LESS)
    - MUST BE RATED TO MEET LOCAL CODES AND CONDITIONS.
    - EXAMPLES BELDEN 89207 (PLENUM RATED), OR ALPHA WIRE 6454 CATEGORY 5, 5E, OR HIGHER.
  2. DO NOT RUN IN SAME CONDUIT, RACEWAY, OR CHASE AS HIGH VOLTAGE WIRING.
  3. FOR CANBUS NETWORK LENGTHS GREATER THAN 450FT(137M), CONTACT LIEBERT FACTORY.

- WIRE NOTES (F):**
1. FIELD SUPPLIED WIRE
    - 3 CONDUCTOR 18AWG OR GREATER
    - RATED 600V
  2. RUN FIELD SUPPLIED WIRES BETWEEN THE INDOOR UNIT AND THE CONDENSER.



**F** HEAT REJECTION INTERLOCK

**A** CANbus CONNECTION



**INDOOR DS UNIT**