



CoolChip 1-Phase Fluid Network

In-Rack Manifold

User Manual

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Technical Support Site

If you encounter any installation or operational issues with your product, check the pertinent section of this manual to see if the issue can be resolved by following outlined procedures.

Visit <https://www.vertiv.com/en-us/support/> for additional assistance.

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1 Safety Instructions: CoolChip 1-Phase Fluid Network In-Rack Manifold

Save These Instructions

1.1 General

This manual contains important safety instructions that should be followed during the installation and maintenance of the Vertiv™ CoolChip 1-Phase Fluid Network. Read this manual thoroughly before attempting to install or operate this product.

Only skilled people should move, install or service this equipment.

Adhere to all warnings, cautions, notices, and installation, operating and safety instructions on the CoolChip 1-Phase Fluid Network and in this manual.

Follow all local and national codes.

This product can cause severe injury or death if used improperly. Never pressurize the product above 10 psig with compressible fluid. Pressurization above 10 psig must be done hydrostatically.

The CoolChip 1-Phase Fluid Network is mechanically isolated for thermal performance.

Avoid routing high or low voltage electrical wires near the CoolChip 1-Phase Fluid Network. Do not terminate any wires near the hoses.

Installing the CoolChip 1-Phase Fluid Network near any radiant heat source could cause accelerated aging of the hose and other non-metallic components.

1.2 Documentation

Operation and maintenance documentation together with commissioning, maintenance or service records must remain with the unit always.



WARNING! Risk of improper wiring, piping, moving, lifting, and handling. Can cause equipment damage, serious injury or death. Only skilled personnel wearing appropriate OSHA-approved personal protection equipment (PPE) should attempt to move, lift, remove packaging from or prepare the cabinet for installation.



WARNING! Relieve pressure before cutting into or making connections/disconnections to the piping system. Local building or plumbing codes may require installing a pressure relief device in the system. Consult local building and plumbing codes for installation requirements.



CAUTION: Risk of contact with sharp edges, splinters, and exposed fasteners. Can cause injury. Only professionally trained and qualified personnel wearing appropriate, OSHA-approved PPE should attempt to move, lift, remove packaging from or prepare the unit for installation.



CAUTION: This product is supplied with a 14 psig nitrogen holding charge in the fluid circuit, which will need to vented during the installation process – refer to [Installation](#) on page 23 in this document for more information.

NOTICE

Risk of water circuit leaks, which can cause expensive building and equipment damage. It is recommended to install an overflow drain pan under the unit with a monitored leak detection system. The overflow drain pan should have a drain line connected that flows to a floor drain. Additional protection can be provided by also installing actuated shutoff valves in the supply and return water lines that automatically close if water is detected by the leak detection system. Shutoff valves should be spring return and must be rated for a close-off pressure that is equal or greater than the supply water pressure. If it is not possible to install an overflow drain pan, then the monitored leak detection system should be installed in the base of the unit or under the unit.

NOTICE

This equipment is required to be installed only in locations not accessible to the general public. Installation, service, and maintenance work must be performed only by properly trained and qualified personnel and in accordance with applicable regulations and manufacturers' specifications.

For anything related to warranties for this product, please refer to CoolChip 1-Phase Fluid Network [SL-71201 Limited Warranty](#) .

2 Model Number Nomenclature for System

Vertiv™ CoolChip 1-Phase Fluid Network is an In-Rack Manifold and liquid cooling distribution from secondary fluid network to IT equipment in the rack. This product consists of stainless steel tube, hose assembly with quick disconnects, and brackets for the VR and VE Racks.

2.1 VertivModel Number Nomenclature

Table 2.1 Model Nomenclature

Model Nomenclature				
Parameter	Part Identifier	Medium	Coupling ID (Internal Diameter) mm (In)	Port quantity per manifold
Variable	RM	1	1-3	2-4
	RM -Vertiv™CoolChip 1-Phase Fluid Network	1 - Glycol/Water Mixture	1. 3mm (1/8") Low Flow 2. 6mm (1/4") Medium Flow 3. 9mm (3/8") High Flow	2- 48 3 - 42 4 - 36

2.2 Shipping Dimensions and Unit Weights

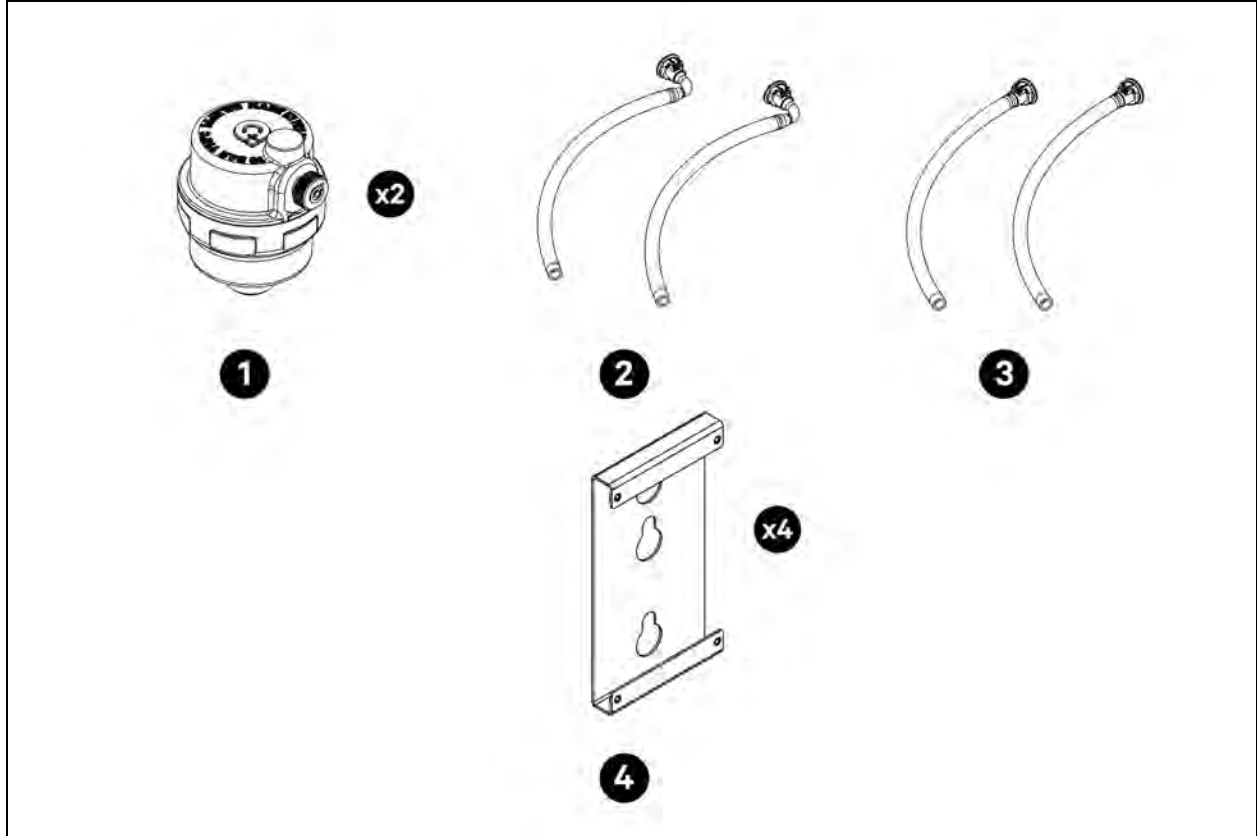
Table 2.2 Shipping Dimensions CoolChip 1-Phase Fluid Network

Model	Description	Shipping dimension (W x D x H) mm (In)	Operational Weight Kg (Lb)	Unit Dry Weight Kg (Lb)	Domestic Dry Shipping Kg (Lb)
RM112	Manifold Assy In-Rack 48 Ports 3mm ID SP	392 (15.4) x 2381 (93.7) x 194 (7.6)	53.8 (118.6)	38.9 (85.8)	44.4 (98)
RM113	Manifold Assy In-Rack 42 Ports 3mm ID SP	392 (15.4) x 2381 (93.7) x 194 (7.6)	48.1 (105.8)	34.4 (75.8)	40.1 (88.5)
RM114	Manifold Assy In-Rack 36 Ports 3mm ID SP	392 (15.4) x 1848 (72.7) x 194 (7.6)	42.2 (93.1)	29.8 (65.8)	34.3 (75.6)
RM122	Manifold Assy In-Rack 48 Ports 6mm ID SP	392 (15.4) x 2381 (93.7) x 194 (7.6)	65.6 (144.7)	49.2 (108.5)	55 (121)
RM123	Manifold Assy In-Rack 42 Ports 6mm ID SP	392 (15.4) x 2381 (93.7) x 194 (7.6)	58.4 (128.7)	43.4 (95.7)	49.1 (108.3)
RM124	Manifold Assy In-Rack 36 Ports 6mm ID SP	392 (15.4) x 1848 (72.7) x 194 (7.6)	51.1 (112.6)	37.5 (82.8)	42 (92.6)
RM132	Manifold Assy In-Rack 48 Ports 9mm ID SP	392 (15.4) x 2381 (93.7) x 194 (7.6)	88.1 (194.1)	69.3 (152.9)	75 (165)
RM133	Manifold Assy In-Rack 42 Ports 9mm ID SP	392 (15.4) x 2381 (93.7) x 194 (7.6)	77.9 (171.9)	61 (134.5)	67 (147.1)
RM134	Manifold Assy In-Rack 36 Ports 9mm ID SP	392 (15.4) x 1848 (72.7) x 194 (7.6)	67.9 (149.6)	52.6 (116.1)	57.1 (126)

2.3 Accessories

The accessories are illustrated in Figure 2.1 below.

Figure 2.1 Accessories for CoolChip 1-Phase Fluid Network



Item	Description	Quantity	SKU	Remark
1	Air Bleeder	1	RMKA	2 air bleeders included.
2	FD83 90° Whips	1	RMK190	Color coded: Red/ Return, Blue/ Supply- 1 FD83 90° whips supply and 1 FD83 90° whips return.
3	FD83 Whips	1	RMK100	Color coded: Red/ Return, Blue/ Supply- 1 FD83 whips supply and 1 FD83 whips return.
4	Installation Bracket for VE Rack	1	RMKBVE	4 brackets included. Please refer to QIG SL-71203.

NOTE: Please refer to Vertiv™ Quick Installation Guide (QIG) SL-71203 for details of installation in VE Racks.

2.4 Environmental Requirements

Table 2.3 Storage Conditions

Item	Requirement
Room Environment	Storing the unit in its original packing in a clean indoor environment free of dust
Ambient humidity	5 to 93%RH (non-condensing)
Ambient temperature: °F (°C)	-40 (-40) to 158 (70)

Table 2.4 Operating conditions

Item	Requirement
Room Environment	Storing the unit in its original packing in a clean indoor environment free of dust
Operating humidity	10 to 90% RH (non-condensing)

2.5 Humidity Requirements- In-Rack Manifold assembly

- 5 to 93%RH (non-condensing)
- 10 to 90 % RH (non-condensing) operational

2.6 Wetted Materials

During normal operation, coolant comes in contact with the following materials:

- 304 Stainless Steel
- EPDM
- Nickel-plated brass
- Brass

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3 Specifications

3.1 Secondary Fluid Network- Water Quality

CoolChip 1-Phase Fluid Network follows the water quality guidelines for liquid cooling equipment published by ASHRAE. ASHRAE recommends the following water quality for the secondary or technology cooling system loop.

Table 3.1 Water Quality Guidelines

Parameter	Secondary Loop
pH	8.0 to 9.5
Corrosion inhibitor(s)	Required
Biocide	Required
Sulfide	< 1 ppm
Sulfate	< 10 ppm
Chloride	< 5 ppm
Bacteria	< 100 CFUs/mL
Total Hardness (as CaCo3)	< 0 ppm
Conductivity	0.2 to 20 micromho/cm
Total suspended solids	< 3 ppm
Residue after evaporation	< 50 ppm
Turbidity	< 20 NTU (Nephelometric)

When using treated water as the cooling liquid in the secondary loop, CoolChip 1-Phase Fluid Network supports using deionized and distilled water. The use of reverse osmosis and demineralized water is not supported.

3.2 Secondary Fluid Network- Filtration Requirements

CoolChip 1-Phase Fluid Network recommends using a maximum 50-micron filter on the secondary or technology cooling system loop to remove any particulate within the secondary loop during operation. If smaller passage dimensions exist within the secondary loop, then a filter with a smaller passable media dimension can be selected to maintain the ½ to 1/10 passable media range.

Differential pressure should be monitored across the filter and tracked over the course of operation to determine if there is particulate build up in the filter. If the differential pressure indicates that there is build up on the filter, the filter should be removed and cleaned, and the particulate from the filter should be examined to determine the type of particulate in the system.

Table 3.2 In-Rack Manifold Dimensional Data

Document Number	Title
20000067	LC-In Rack Manifold Dimension Data 52U/ 48U/ 42U
20000068	LC-In Rack Manifold Dimension Data 52U/ 48U/ 42U Rack
20000073	LC-In Rack Manifold Supply and Return Hose Kit FD83

3.3 In-Rack Manifold

Table 3.3 In-Rack Manifold Specifications

Parameter	Ports								
	36			42			48		
Base Material	304 Stainless Steel			304 Stainless Steel			304 Stainless Steel		
Dry Weight without Hoses: Kg (lb)	21.16 (46.65)	21.67 (47.75)	24.88 (54.85)	24.25 (53.46)	24.86 (54.8)	28.6 (63.05)	27.34 (60.27)	28.02 (61.77)	32.30 (71.20)
Volume of 2 Rack Manifolds: mm3 (in3)	4,982,314 (304,039)	5,539,771 (338,057)	6,343,214 (387,086)	5,703,242 (348,033)	6,353,608 (387,720)	7,290,959 (444,921)	6,426,590 (392,174)	7,169,865 (437,532)	8,241,123 (502,904)
Max Operating Pressure: bar (psi)	8 (116)								
System Operation Temperature: °c (°F)	0 to 70 (32 to 158)								

NOTE: Wall thickness of manifold is 3.0 mm

NOTE: The 3 different hoses sizes have different nominal fluid sizes: 1/8" (3mm), 1/4" (6mm) and 3/8" (9mm).

NOTE: It is recommend to brought CoolChip 1-Phase Fluid Network to room temperature (may be warmed or cooled depending upon ambient) prior to installation to prevent damage to seals and hoses during handling.

3.4 Hoses

NOTE: The customer must provide a quick connect with a barbed fitting to install into each hose. The barbed fitting must be an appropriate diameter to match the I.D. of the fluid hose. The quick connect must be a make and model compatible with the quick connect on the IT equipment.

3.4.1 Hoses Specifications

Table 3.4 Hoses Specifications

Parameter	Hoses ID Sizes: mm (in)			
	6.4 (0.25)	9.5 (0.37)	12.7 (0.5)	25.4 (1)
Material	UL94 V0 Rating EPDM	UL94 V0 Rating EPDM	UL94 V0 Rating EPDM	UL94 V0 Rating EPDM
Length: m (ft)	0.4 (1.3)	0.4 (1.3)	0.4 (1.3)	1 (3.3)
Outside Diameter	15 (0.59)	18.5 (0.73)	22 (0.87)	36.5 (1.44)
Minimum Allowable Bend Radius	50 (2)	65 (2.5)	75 (3)	150 (6)

4 Product Configuration Selection

Refer to [Product Configuration Selection](#) above and Table 2.3 CoolChip 1-Phase Fluid Network Configurations to have a better understanding of the product and how can be installed into the rack.

Table 4.1 CoolChip 1-Phase Fluid Network Configurations

Manifold Configurations			
Manifold Size	Configurations	Positions	Rack Size on which can be installed
36 Ports	<ul style="list-style-type: none"> • Double • Single 	<ul style="list-style-type: none"> • Top Feed • Bottom Feed 	42U, 48U, 52U
42 Ports			48U, 52U
48 Ports			52U

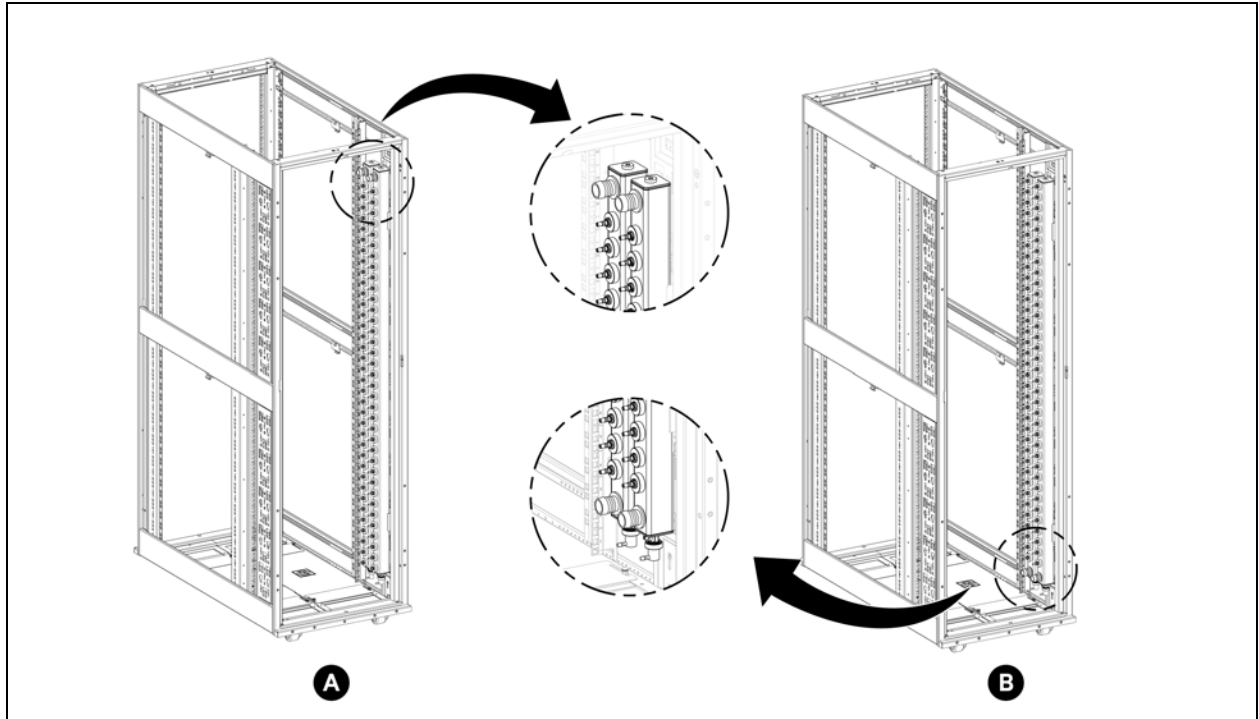
- The Double configuration refers to both manifolds installed in one side of the rack.
- Single configuration refers to one manifold installed in each side of the rack.
- The Top and Bottom feed configuration refers to which position the In-Rack Manifold will be fed from, through the hose barb, refer to **Figure 4.1** on the next page to have a better understanding of these configurations.

Table 4.2 Component Location Diagrams

Document Number	
20000228	LC-In Rack Manifold Component Location Diagram 52U/ 48U/ 42U

4.1 Double Configuration for CoolChip 1-Phase Fluid Network

Figure 4.1 CoolChip 1-Phase Fluid Network of 36 Ports in 42 U Rack Double Configuration



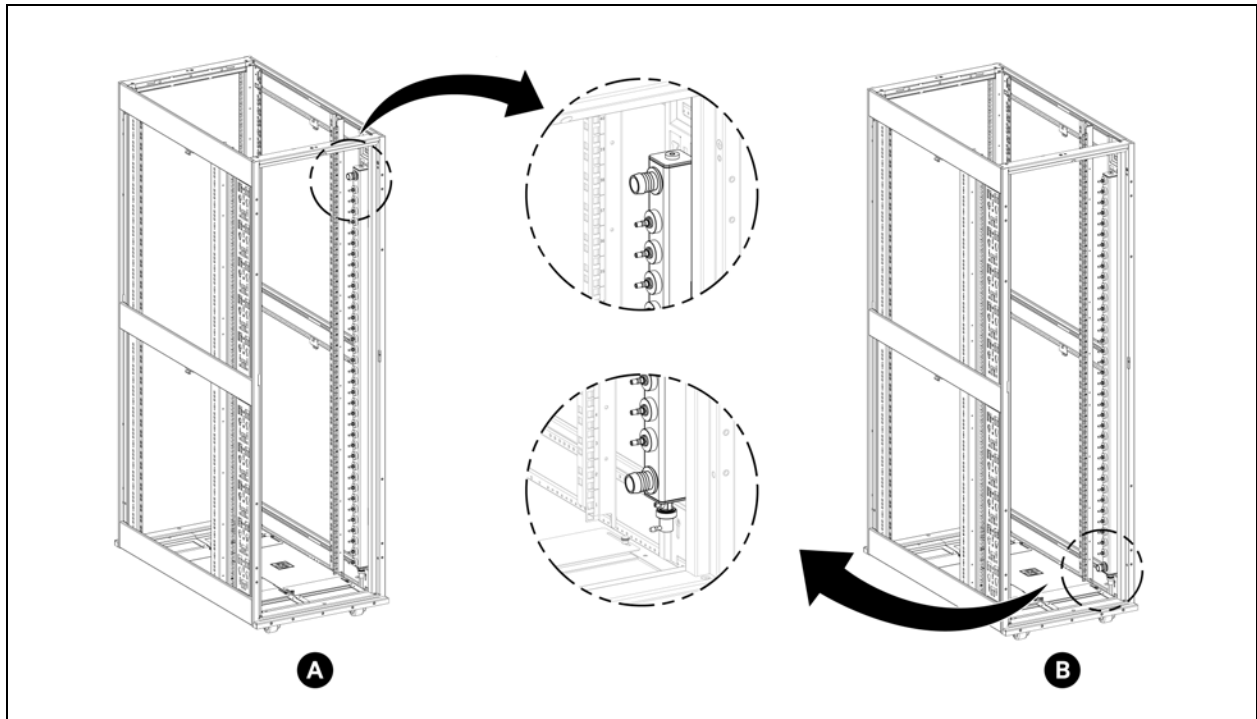
Item	Description
A	Top feed configuration
B	Bottom feed configuration

NOTE: Side panels and doors removed for visual clarity.

NOTE: The 42 and 48 Ports sizes of the CoolChip 1-Phase Fluid Network can also be installed in Top-Bottom positions and Double-Single configurations in their respective rack sizes.

4.2 Single Configuration for CoolChip 1-Phase Fluid Network

Figure 4.2 CoolChip 1-Phase Fluid Network of 36 Ports in 42 U Rack Single Configuration



Item	Description
A	Top feed configuration
B	Bottom feed configuration

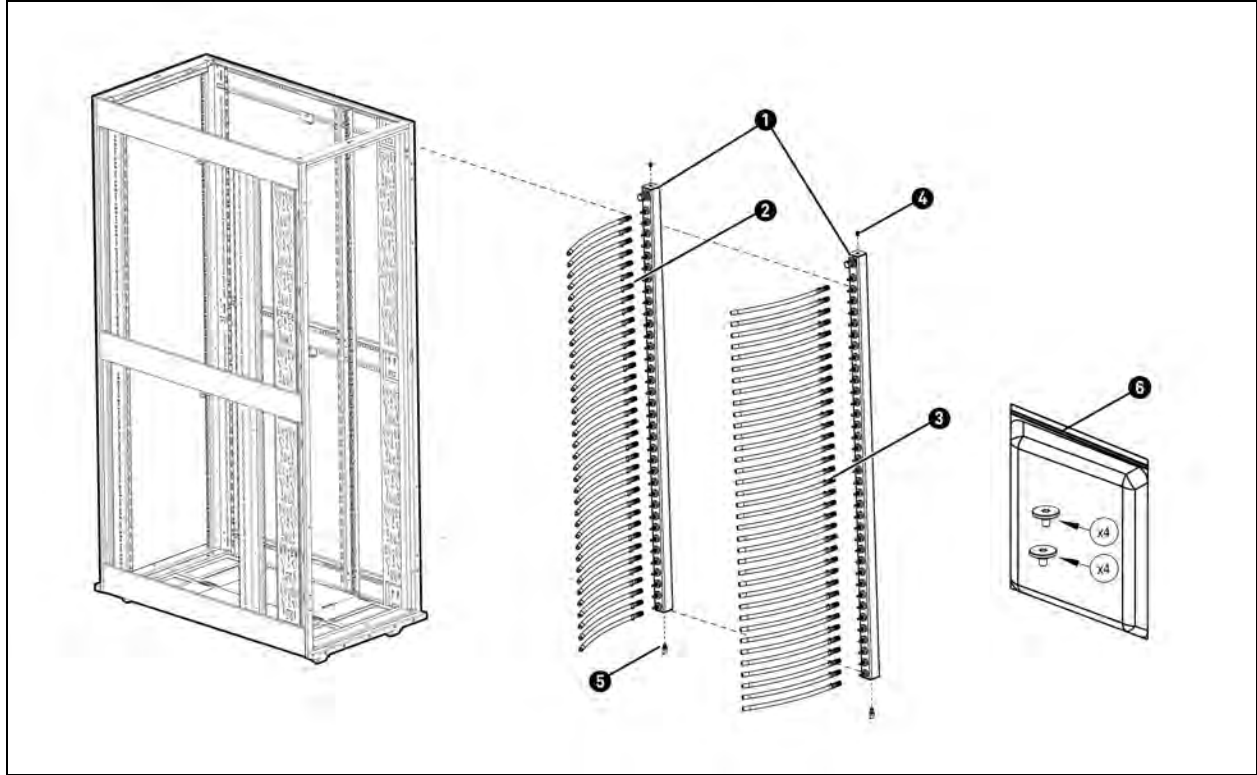
NOTE: Side panels and doors removed for visual clarity.

NOTE: The 42 and 48 Ports sizes of the CoolChip 1-Phase Fluid Network can also be installed in Top-Bottom positions and Double-Single configurations in their respective rack sizes.

4.3 CoolChip 1-Phase Fluid Network In-Rack Manifold and components

The main appearance and components of the CoolChip 1-Phase Fluid Network are depicted in Figure 2.3.

Figure 4.3 General View of the main components of CoolChip 1-Phase Fluid Network

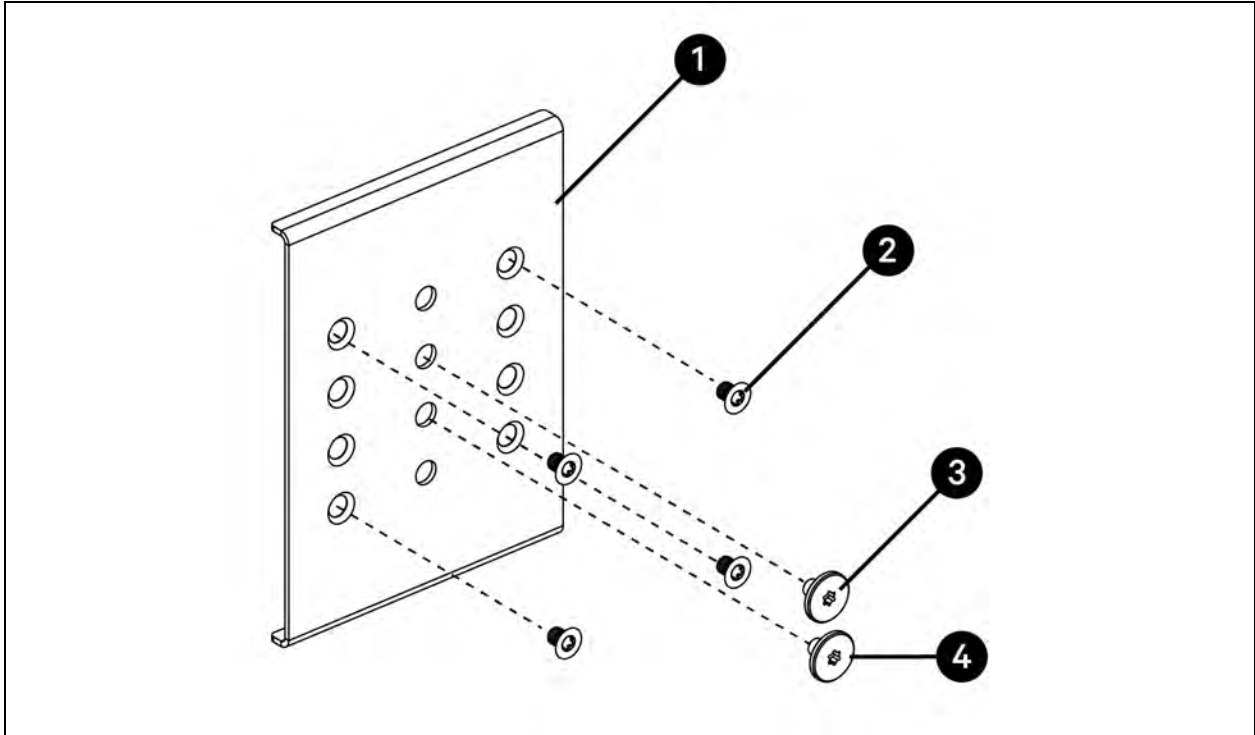


Item	Description	Item	Description
1	CoolChip 1-Phase Fluid Network Weldment Assembly	4	Plug G1/4
2	Return Hoses	5	Drain Valve
3	Supply Hoses	6	Hardware Bag

NOTE: This main appearance is a representation of Top Double Configuration. Figure 4.3 is only for visual support of the main components applied into the VR Racks.

Figure 4.4 Main Appearance of the Double CoolChip 1-Phase Fluid Network Mounting Bracket.

This Mounting Bracket is factory installed and only applies to the Double configuration for CoolChip 1-Phase Fluid Network



Item	Description	Quantity
1	Mounting Bracket for Double In-Rack Manifold Configuration	2
2	M6x8 Torx Screw	8
3	Button Retention	4
4	Button Hanger	4

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5 Pre-Installation Preparation

5.1 Equipment Inspection and Handling

NOTICE

Risk of improper storage. Keep the unit upright, indoors and protected from dampness, freezing temperatures and contact damage.

Upon arrival of the unit and before unpacking:

- Verify that the labeled equipment matches the bill of lading.
- Carefully inspect all items for visible or concealed damage.
- Report damage immediately to the carrier and file a damage claim with a copy sent to Vertiv™ or to your sales representative.



CAUTION: Once the In-Rack Manifold is unpackaged from to box, do not remove cardboard cover on the drain valve until the In-Rack Manifold is installed into the rack. Refer to Figure 5.for more instructions.

5.2 Installation Tools- Field provided

Prepare the following tools for the installation process:

- PPE defined by OSHA standards (gloves)
- T25 Torx Key
- M6 Torx Key
- Allen key 6mm
- Adjustable Wrench
- Manual Pincer (service)

NOTICE:

CoolChip 1-Phase Fluid Network is pressurized with 10-14 psig of Nitrogen from the factory . Vent the In-Rack Manifold via the drain valve before installing or moving the CoolChip 1-Phase Fluid Network.

5.3 Hose Inspection

Inspect all hoses for kinks, bulges or soft spots which might indicate broken or displaced reinforcement. If the hose is kinked upon receiving, inspect the kinked section, and do not use if there are signs of stress (discoloration) or cracks.

5.4 Internal Server Cabinet Clearance Requirements

Figure 5.1 Clearance Dimensions

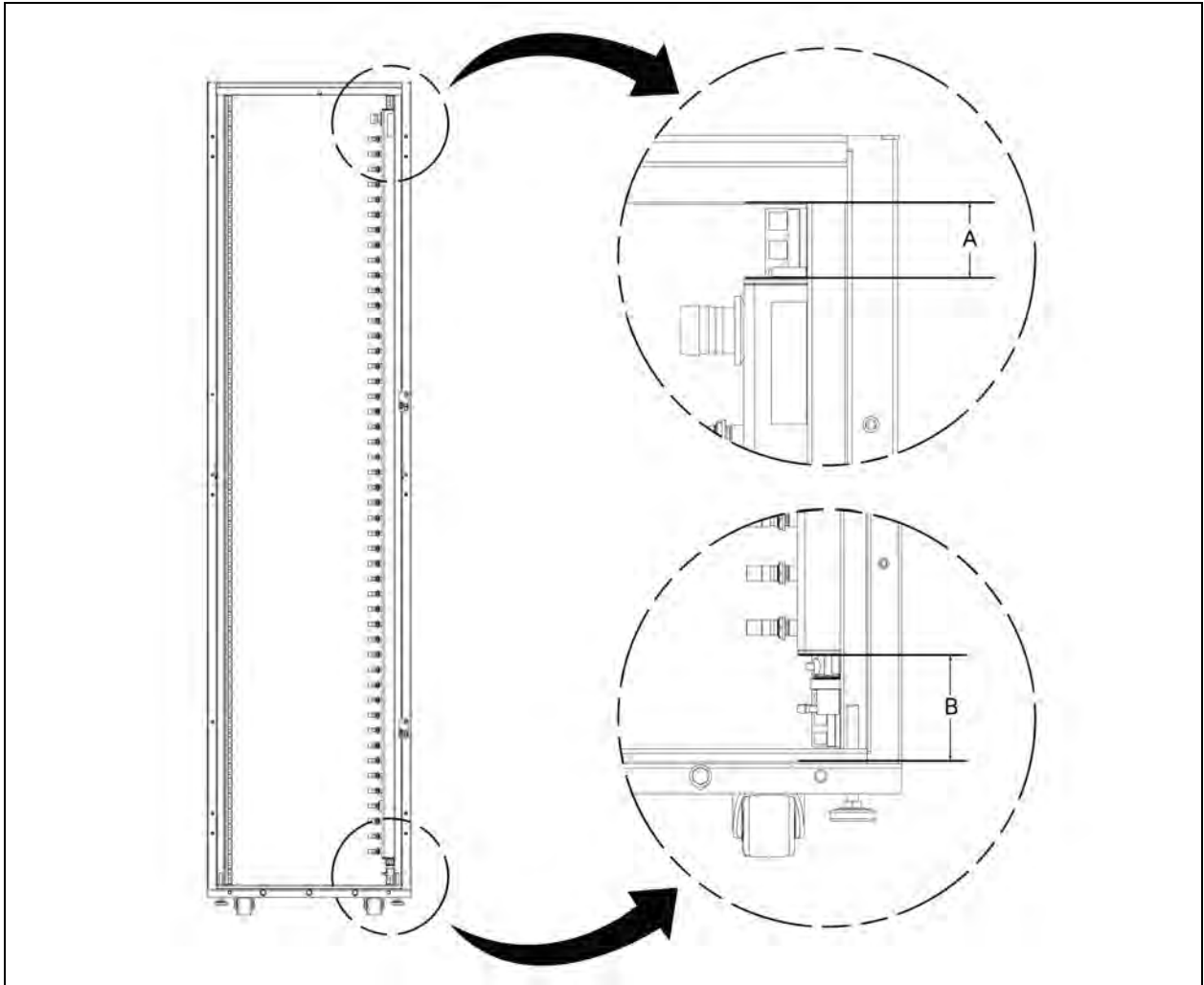


Table 5.1 CoolChip 1-Phase Fluid Network Clearance Specifications

U Rack Size/ Manifold Ports	Points of Reference to measure	Top and Bottom Configuration mm (in)
42/ 36	Cap Manifold to PDU Bracket (A)	127 (5)
	Cap Manifold to Bottom Panel (B)	108.9 (4.2)
48/42	Cap Manifold to PDU Bracket (A)	127 (5)
	Cap Manifold to Bottom Panel (B)	108.9 (4.2)
52/48	Cap Manifold to PDU Bracket (A)	60.28 (2.3)
	Cap Manifold to Bottom Panel (B)	87.53 (3.4)

NOTE: Keep space at least 915 mm (36 in.) from the rear of the rack to the wall or to other obstacles for service clearance.

Table 5.2 DLC Rack Manifold VE Rack

Document Number	Title
20000075	LC-In Rack Manifold VE Rack

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6 Installation

6.1 Precautions for Installation

Once the CoolChip 1-Phase Fluid Network is in its final location, refer to the following procedures to install accessories, adjust components, and load equipment into the rack.

6.2 Handling



CAUTION: Once the In-Rack Manifold is unpackaged from the box, do not remove cardboard cover on the drain valve until the In-Rack Manifold is installed into the rack. Refer to Figure 5.5 for more instructions.

Outside the carton, the CoolChip 1-Phase Fluid Network is best transported to the installation site with a cart. Do not carry or grab the In-Rack Manifold by the quick disconnects or hose whip. Do not drag the inlet/outlet hoses across the floor as this can damage the In-Rack Manifold or introduce debris to the inner seal.

Proper Hose Handling:

- Avoid crushing or kinking the hose. This can cause severe damage to the reinforcement that isn't always obvious when looking at the cover.
- Do not drag the hose or lift a large bore hose from the middle of its length with the ends hanging down. Doing so can cause kinking, cover cuts, hose reinforcement damage, and coupling damage.
- Limit the curvature of the hose to the minimum bend radius recommended by the manufacturer. Also avoid sharp bends at the end fittings and at manifold connections.



WARNING! Do not use damaged hose. Doing so could result in serious personal injury or death.



CAUTION: When handling the CoolChip 1-Phase Fluid Network to avoid damage to the rack and drain valve.



CAUTION: : All 3 CoolChip 1-Phase Fluid Network sizes have to be carried by at least 2 people for safe installation.

6.3 Depressurizing

The CoolChip 1-Phase Fluid Network is pressurized with 10-14 psig of Nitrogen from the factory . Depressurizing requires to open the drain valve to allow the manifold depressurize.

6.4 Hose Inspection

Inspect all hoses for kinks, bulges or soft spots which might indicate broken or displaced reinforcement. If the hose is kinked upon receiving, inspect the kinked section, and do not use if there are signs of stress (discoloration) or cracks.

6.5 Installation

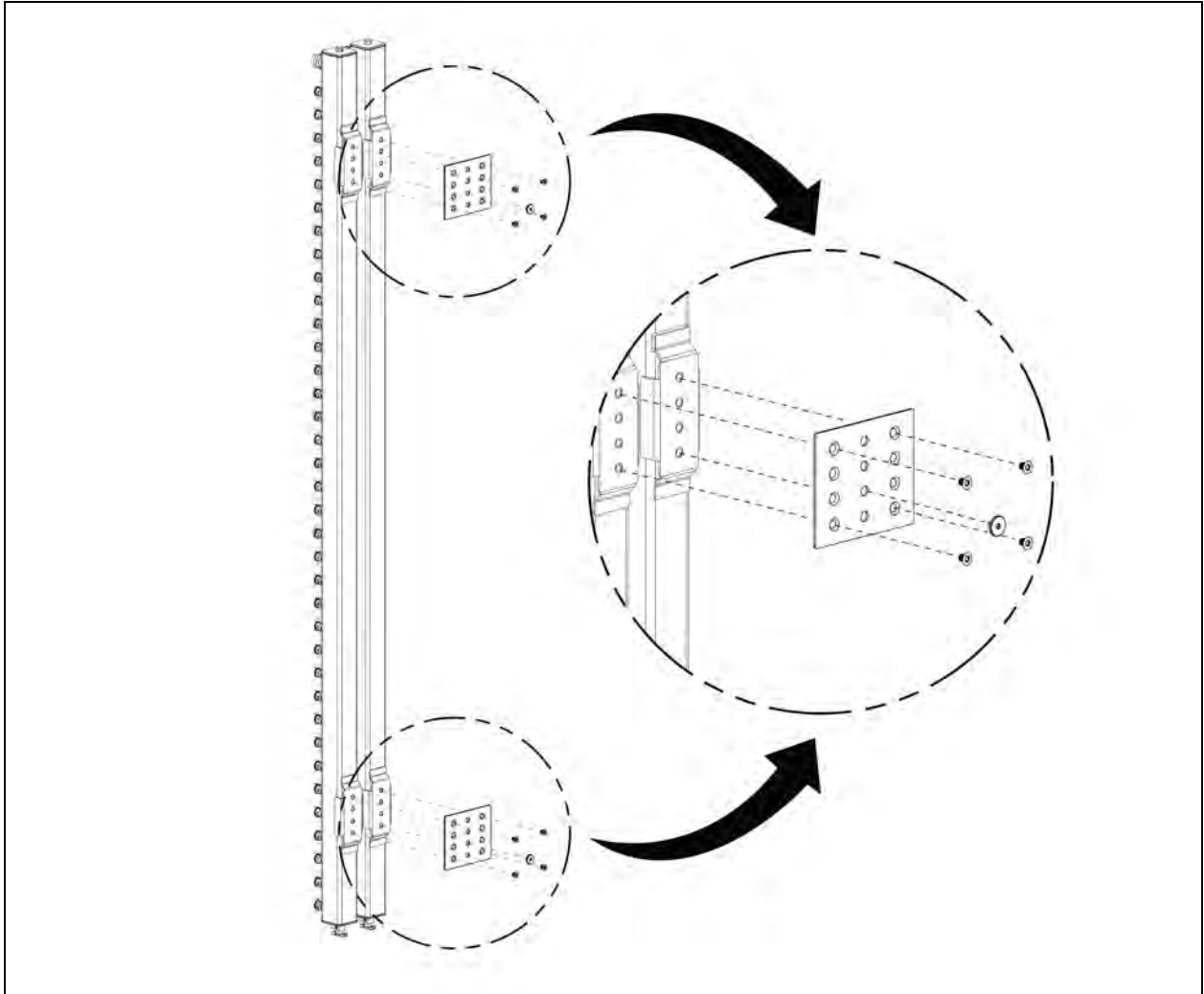
Once the CoolChip 1-Phase Fluid Network is in its final location, make sure that the product was properly handled, depressurized, and inspected before starting to install it into the rack.

The CoolChip 1-Phase Fluid Network can be installed in multiple configurations previously presented in the Model Number Nomenclature for System topic in the **Product Configuration Selection** subtopic. This topic will cover the Single and Double configuration installation process. The configuration in which CoolChip 1-Phase Fluid Network are shipped is the Top Feed Configuration, as will be shown in the following figures. This configuration can be adapted depending on the needs of the equipment and the user.

6.5.1 Single Configuration Installation

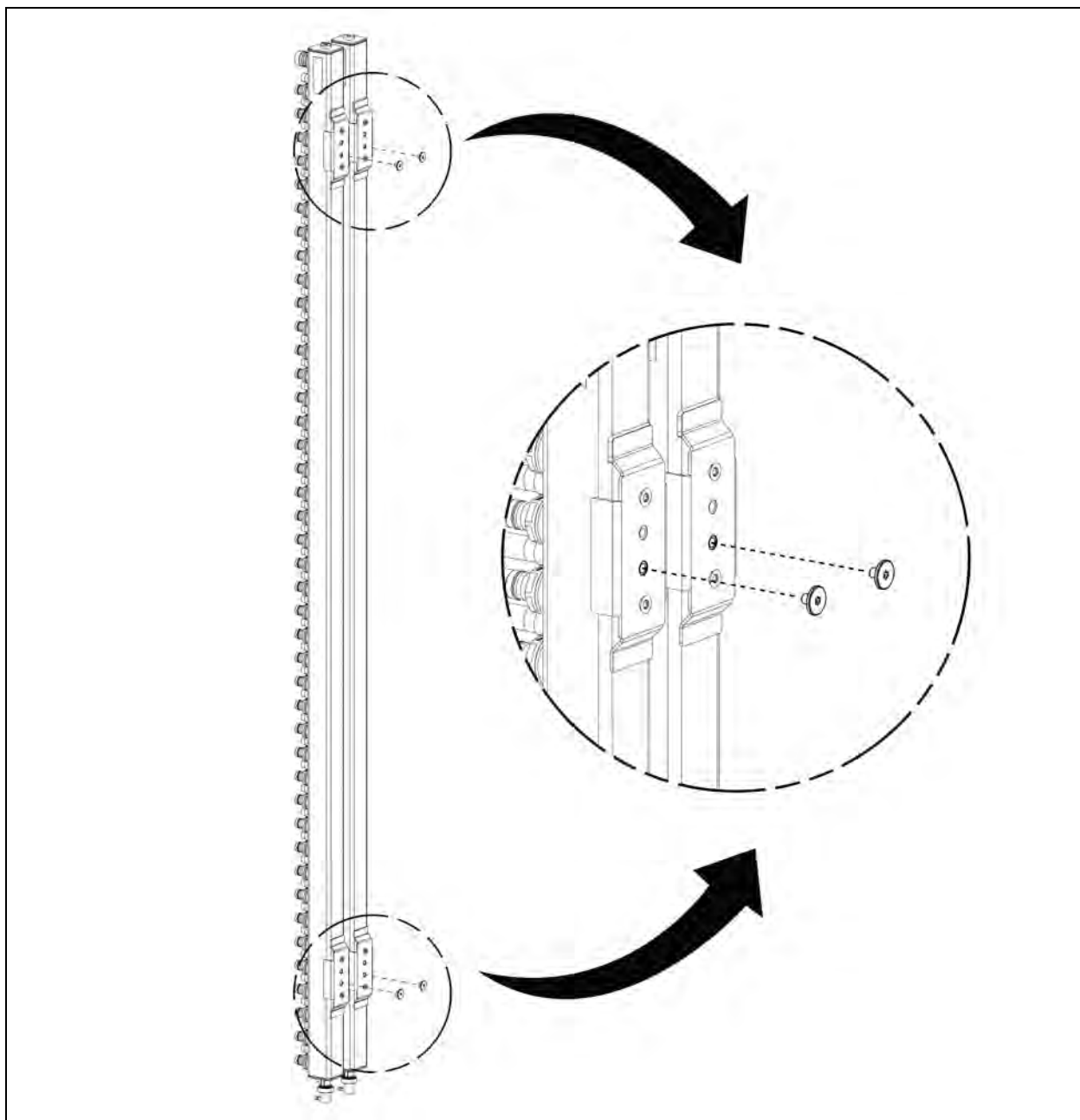
For this configuration it is necessary to remove both mounting brackets installed from factory of the In-Rack Manifold Weldment Assembly. Removing the M6 x 8 torx screws (8 screws) with the T30 torx key, will be enough to split the manifolds. For torque mounting hardware use 50lbs-In (5.6 N.M.)

Figure 6.1 Remove Mounting Brackets



Fix the button hangers screws in the port 3 from top to bottom as shown in the detail, of the weldment assembly bracket. Attach the 4 button hangers on the four brackets with the T25 torx key with 50 in-lbs (5.6 N.M.) torque.

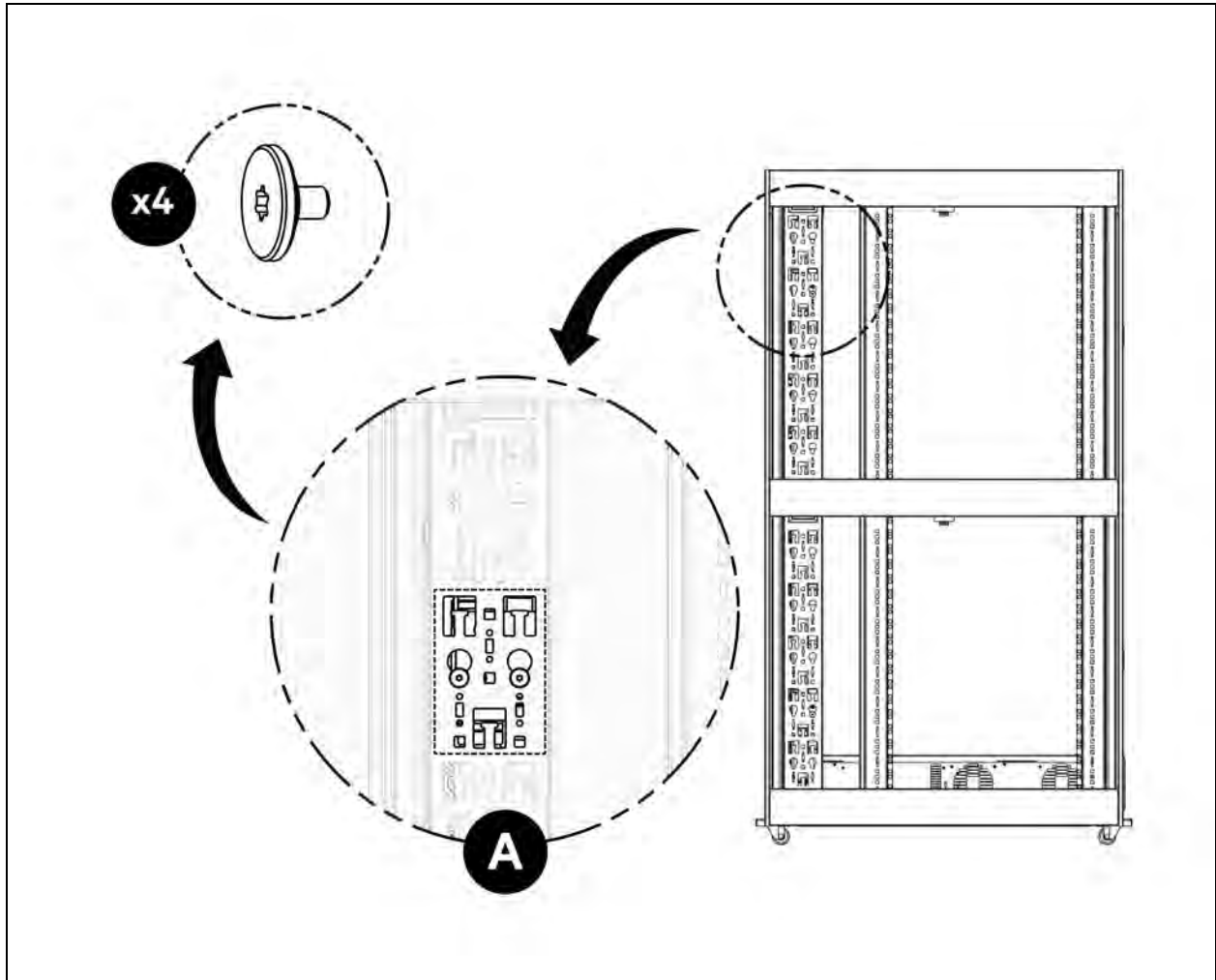
Figure 6.2 Fix the Hanger Button in the In-Rack Manifold Bracket



NOTE: For 48U Ports In-Rack Manifold the bottom hanger goes in the 4th Port of the In-Rack Manifold welded bracket.

Viewing the rack from the rear, on the right side, locate the second pattern on the PDU bracket and with caution, mount the return manifold (red coded) with the button hanger as show in the “A” Detail in the figure below. Ensure that the manifold’s button hanger screws are properly mounted on both the upper and lower seating points of the PDU Bracket. Follow the same process to install the supply manifold (blue coded) in the left side of the rack.

Figure 6.3 Mounting the CoolChip 1-Phase Fluid Network into the Rack



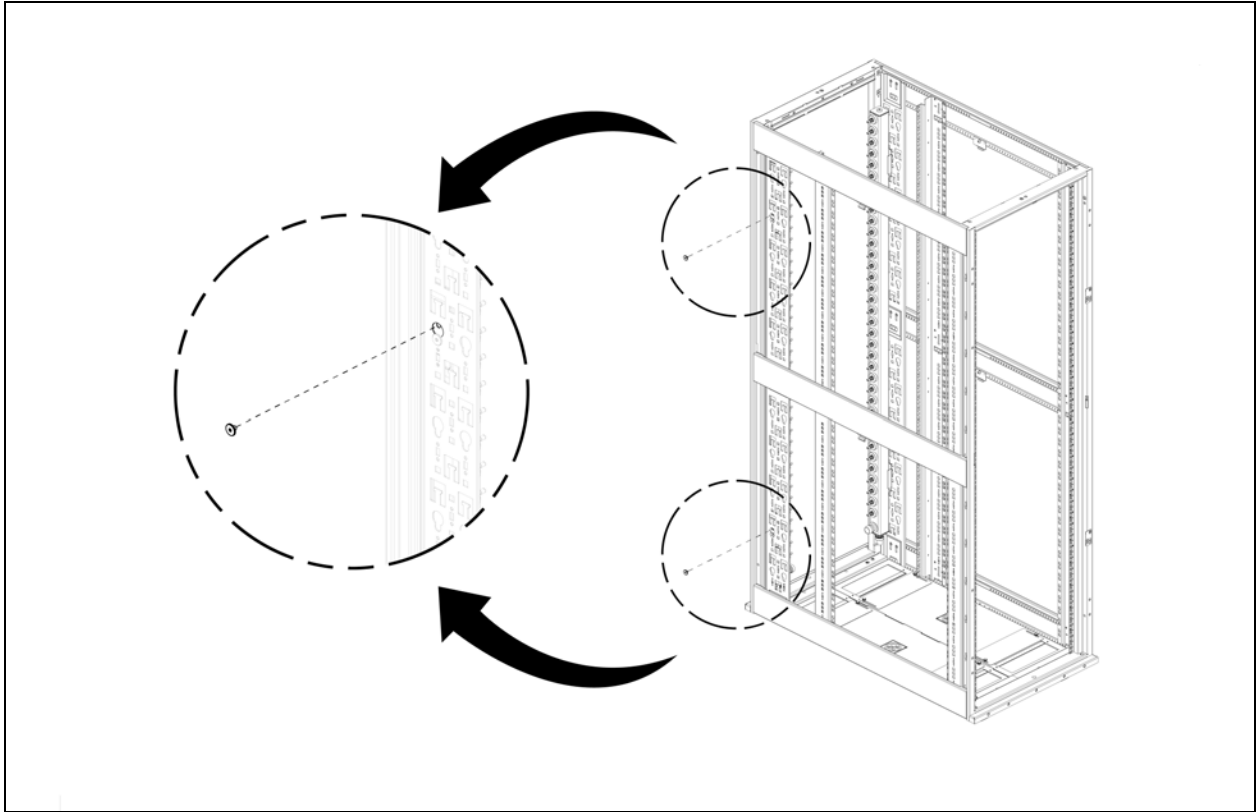
! CAUTION: When handling the CoolChip 1-Phase Fluid Network to avoid damage to the rack and the drain valve.

! CAUTION: All 3 CoolChip 1-Phase Fluid Network sizes have to be carried by at least 2 people for safe installation.

NOTE: For the 48 Ports In-Rack Manifold in the 52U Rack the button hanger needs to be installed in the 3rd pattern of the PDU bracket.

Once the In-Rack Manifold is properly hanged into the PDU Bracket secure it to rack with the button retention screw using a T25 torx key with 50in-lbs (5.6 N.M.) torque, as shown in the figure below.

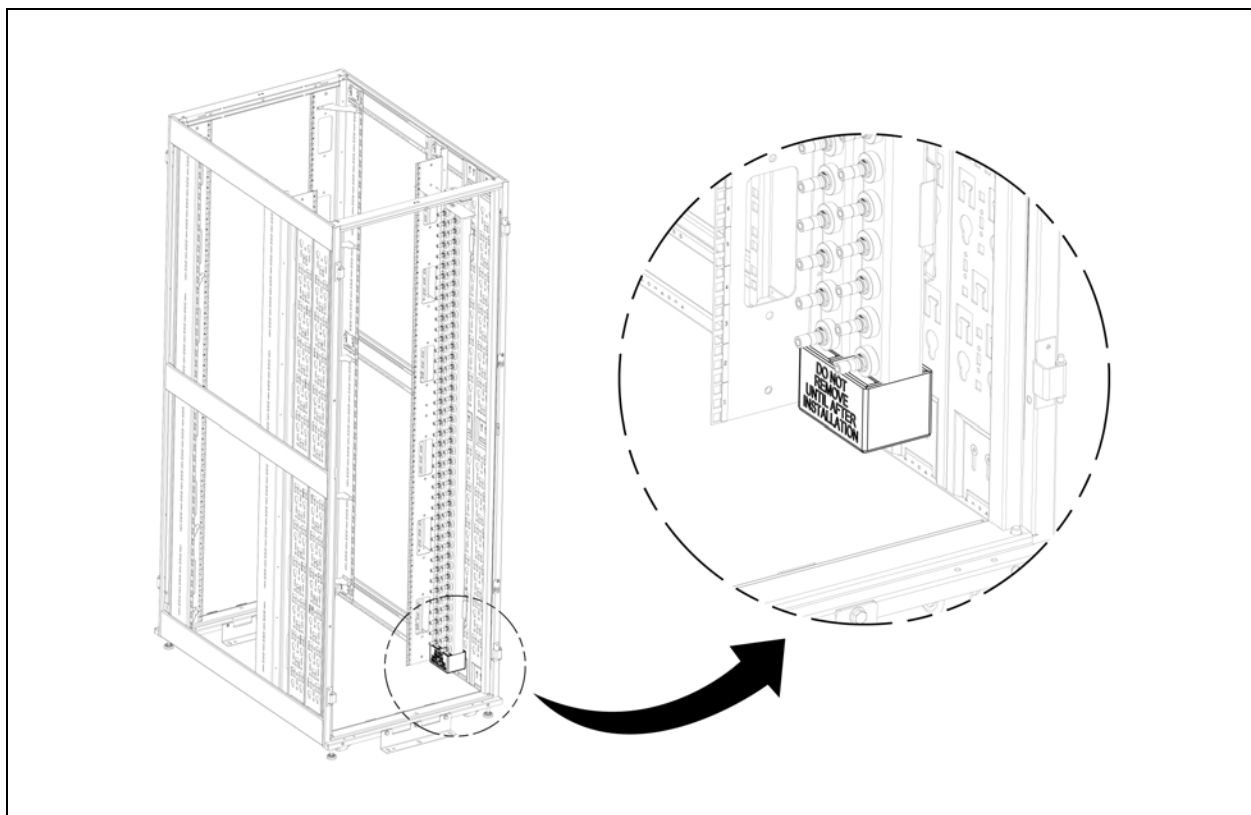
Figure 6.4 Attach the CoolChip 1-Phase Fluid Network into the Rack



NOTE: For the 48U Ports In-Rack Manifold in the 52U Rack the button retention screw needs to be installed in the 3rd pattern of the PDU bracket.

Figure 6.5 Remove cardboard covers from the Drain Valve

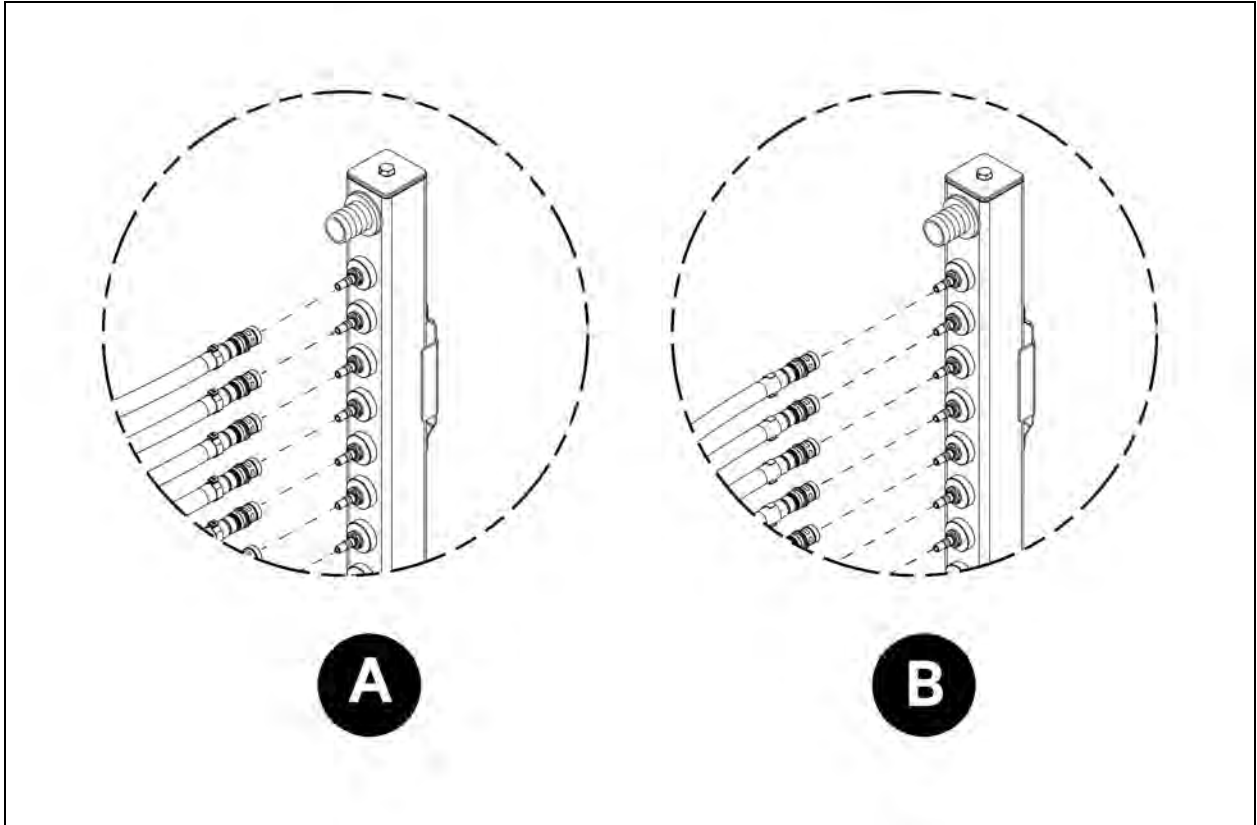
Once the In-Rack Manifold is installed, remove the preservation sealing tape and remove the cardboard box in the drain valve, see image below.



CAUTION: For the 48U In-Rack Manifold configuration on the 52U rack, clearance space may be tighter, but installation is possible, handle the In-Rack Manifold with caution.

With the CoolChip 1-Phase Fluid Network mounted into the Rack, install the supply, and return hoses in the respective ports of the In-Rack Manifold. Prior to connection, check the cleaning of the sockets and plugs. Always maintain firmly the two moving halves when connecting or disconnecting. After connection make sure that the locking is done properly. The color from the manifolds and the couplings/ hoses need to match.

Figure 6.6 Installing Supply or Return hoses on a CoolChip 1-Phase Fluid Network



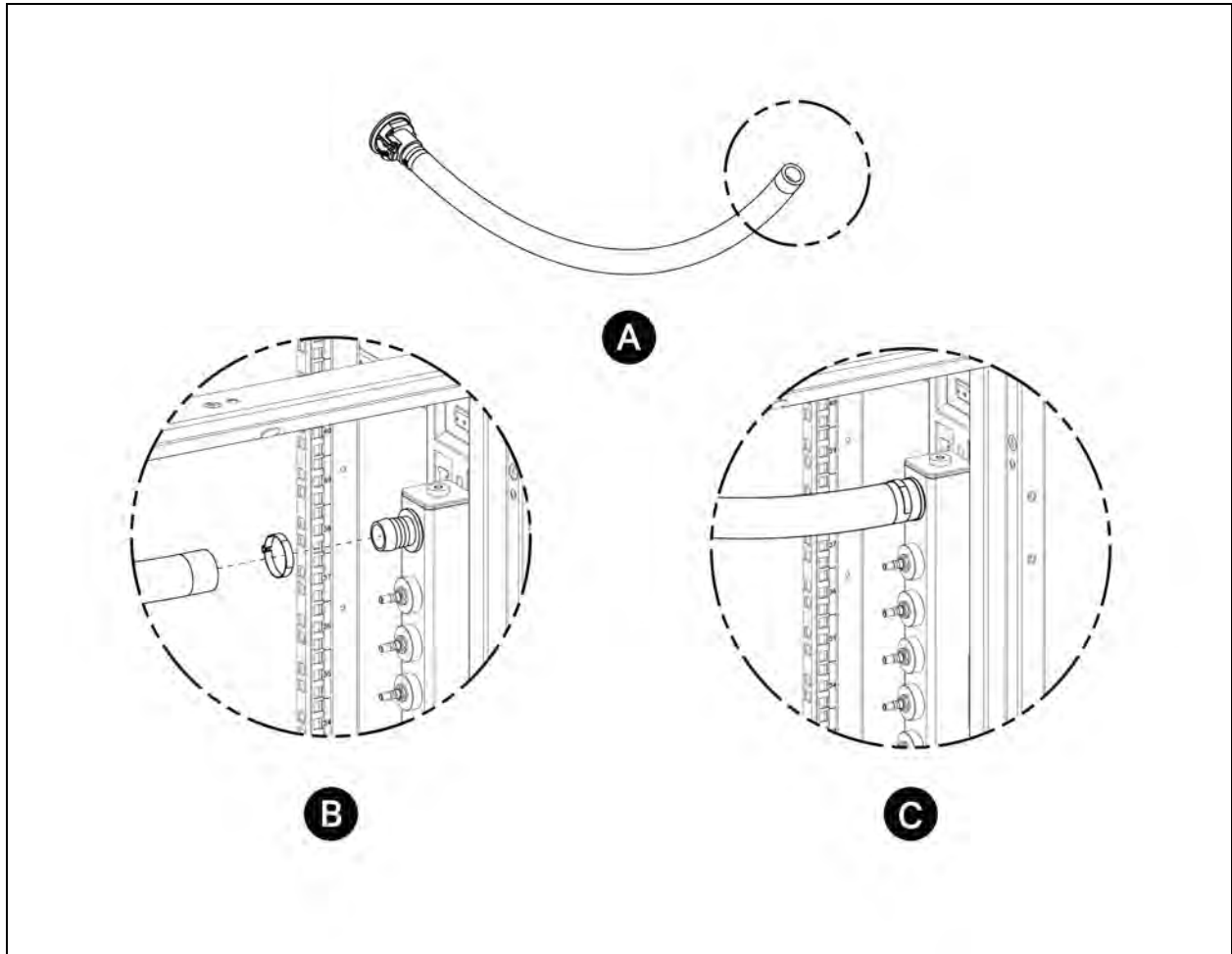
Item	Description
A	Supply Hose Installation (Blue Coded)
B	Return Hose Installation (Red coded)

NOTE: The customer must provide a quick connect with a barbed fitting to install into each hose. The barbed fitting must be an appropriate diameter to match the I.D. of the fluid hose. The quick connect must be a make and model compatible with the quick connect on the IT equipment.

Installation steps:

1. Use the adjustable wrench to remove the plug from the hose barb.
2. To install the hose on the hose barb use the manual pincer to lock the hose with the clamp.

Figure 6.7 Install the hose on the hose barb.



Item	Description
A	RMK 100 and/or RMK 190
B	RMK 100 and/or RMK 190 installation position in hose barb
C	RMK 100 and/or RMK 190 installed in hose barb

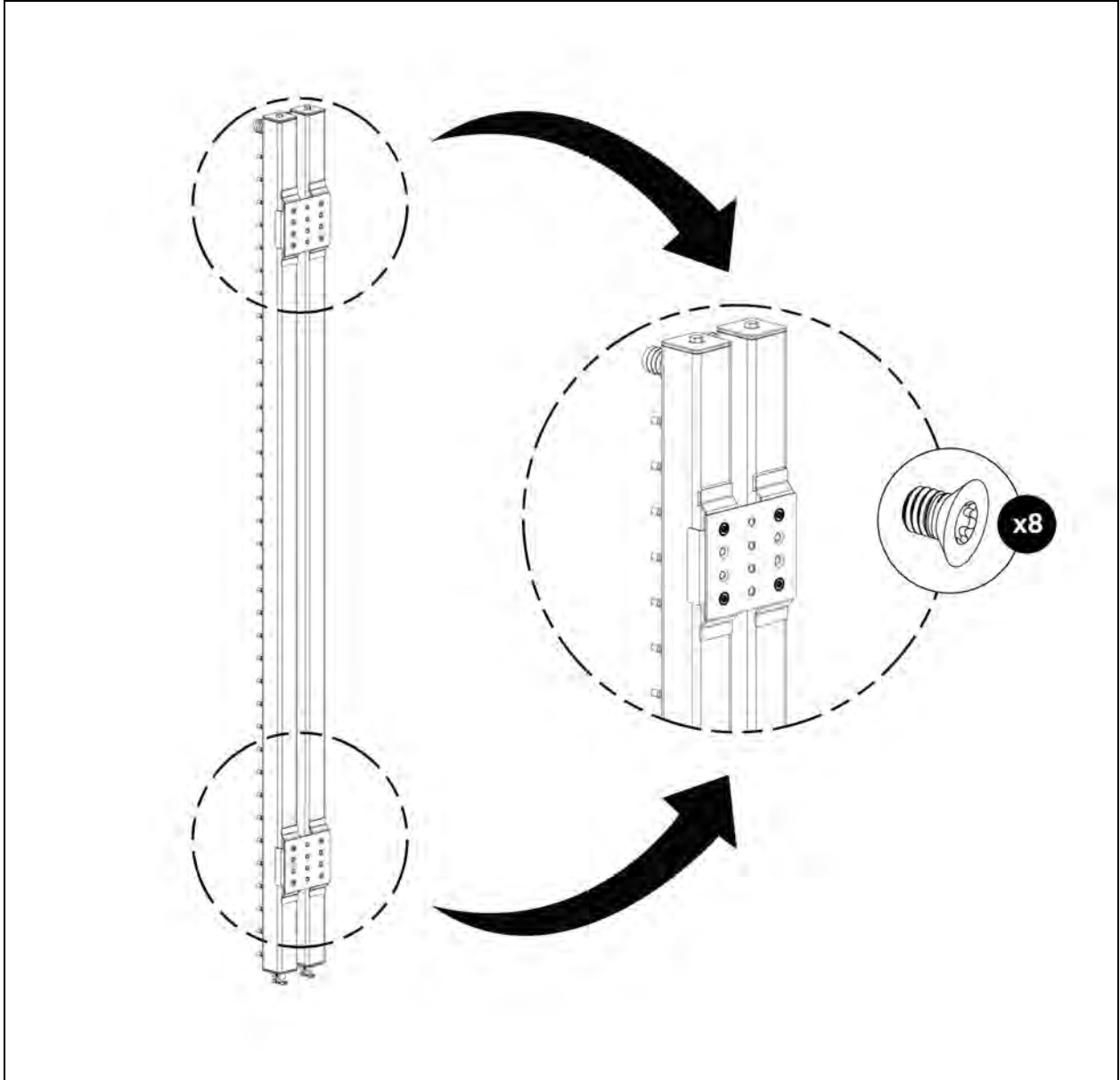
NOTE: To have a better understanding of the opened and closed flow position of the coupling. See [Figure 4.1](#) and [Figure 4.2 Specifications](#)

6.5.2 Double Configuration Installation

The next figures are representations of the standard applications of the double configuration.

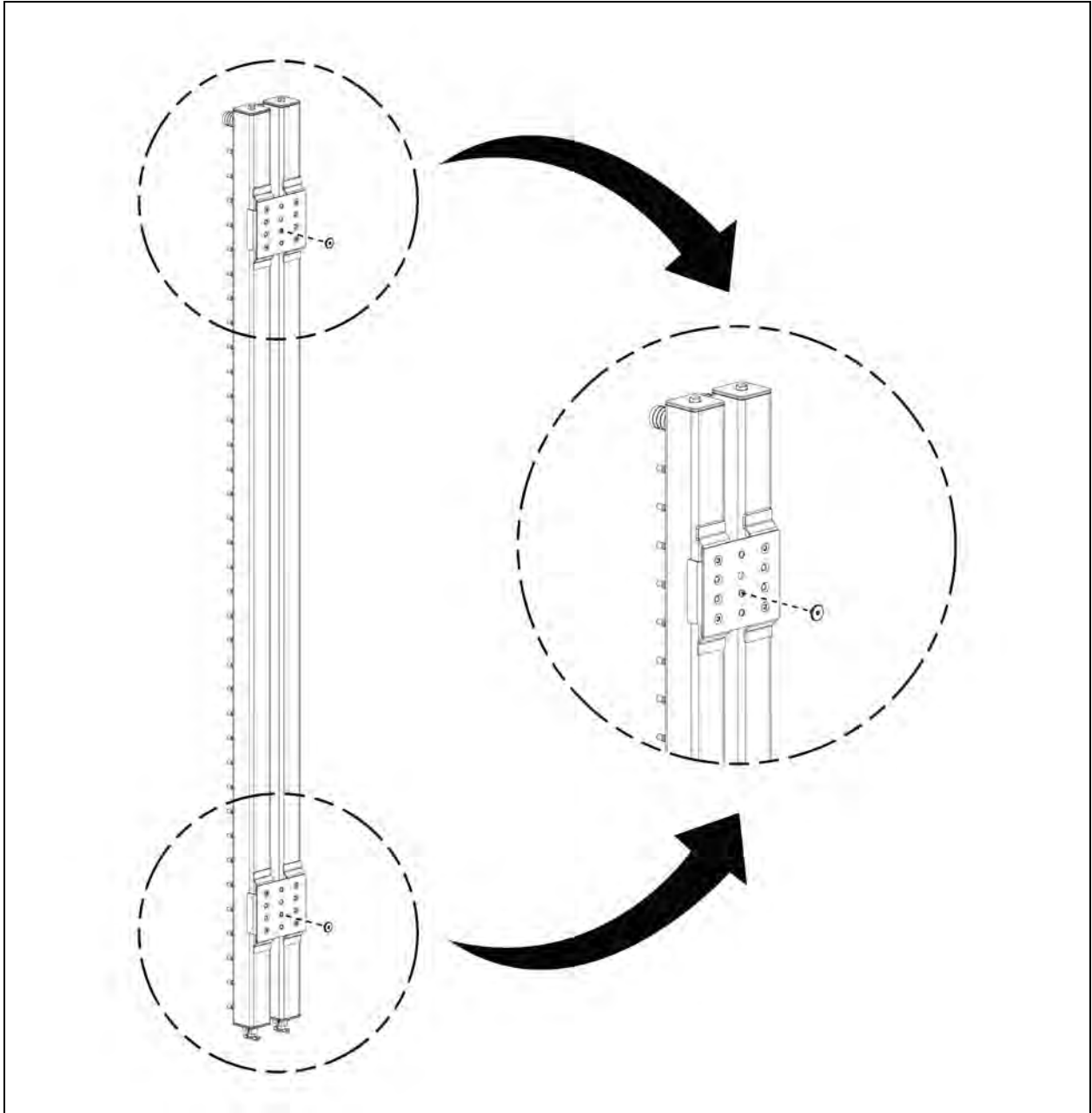
Inspect the M6x8 torx screws to insure they are fixed to the mounting bracket, if not, use the T30 torx key to tighten them. For this double configuration, the mounting bracket will not have to be removed.

Figure 6.8 Inspect the M6 Screws from the Mounting Bracket



Fix the button hangers in the third port, from top to bottom as shown in the detail, of the mounting bracket on the two brackets with the T25 torx key with 50 in-lbs torque (5.6 N.M.)

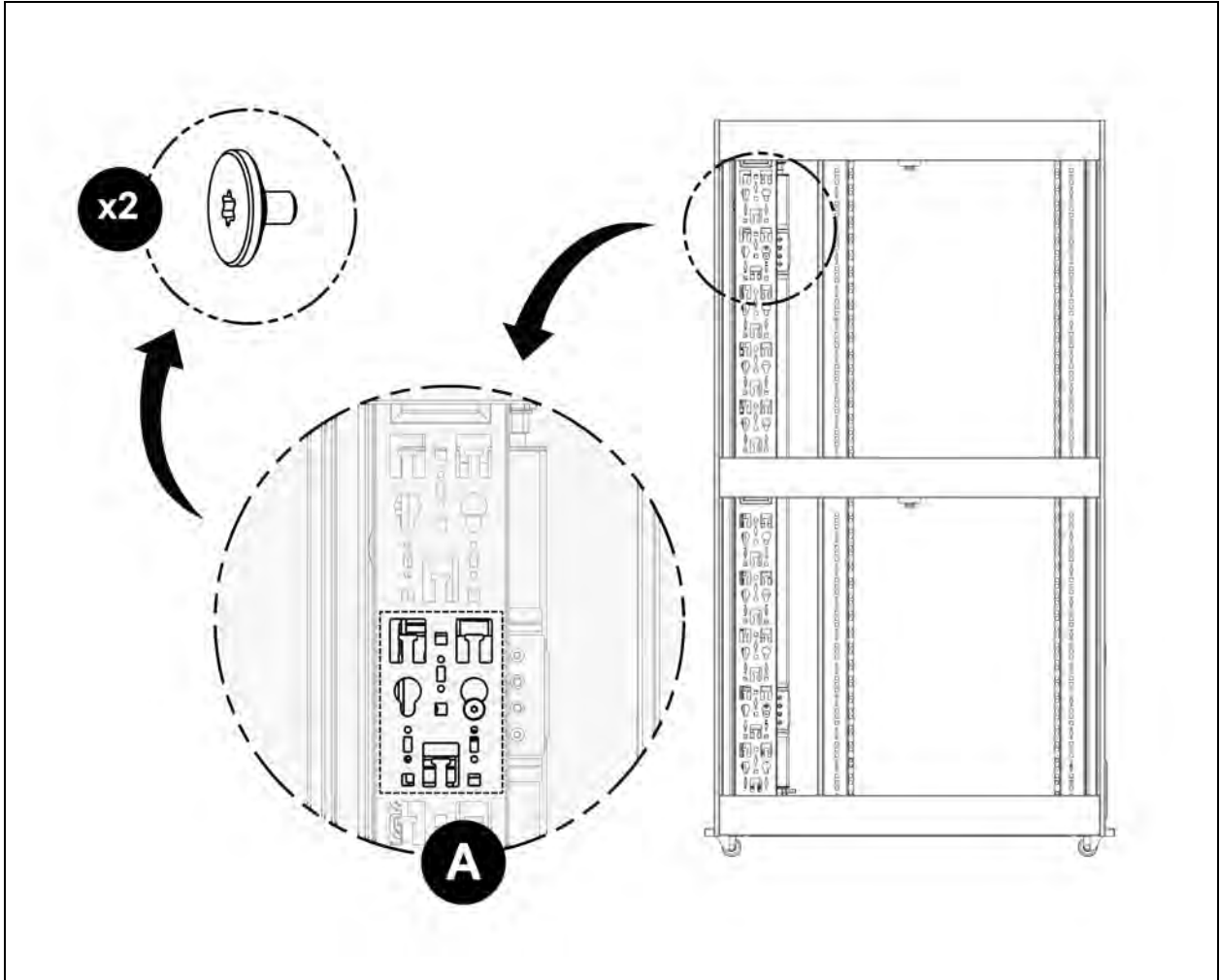
Figure 6.9 Install the Button Hanger in the Mounting Bracket



NOTE: For 48U Ports In-Rack Manifold the bottom hanger goes in the 4th Port of the In-Rack Manifold welded bracket.

Viewing the rack from the rear, on the right side, locate the second pattern on the PDU bracket and with caution, mount the double In-Rack Manifold assembly with the button hanger as show in the “A” Detail in the figure below. Ensure that the manifold’s button hanger screws are properly mounted on both the upper and lower seating points of the PDU Bracket.

Figure 6.10 Mounting the CoolChip 1-Phase Fluid Network into the Rack



CAUTION: When handling the CoolChip 1-Phase Fluid Network to avoid damage to the rack and drain valve.

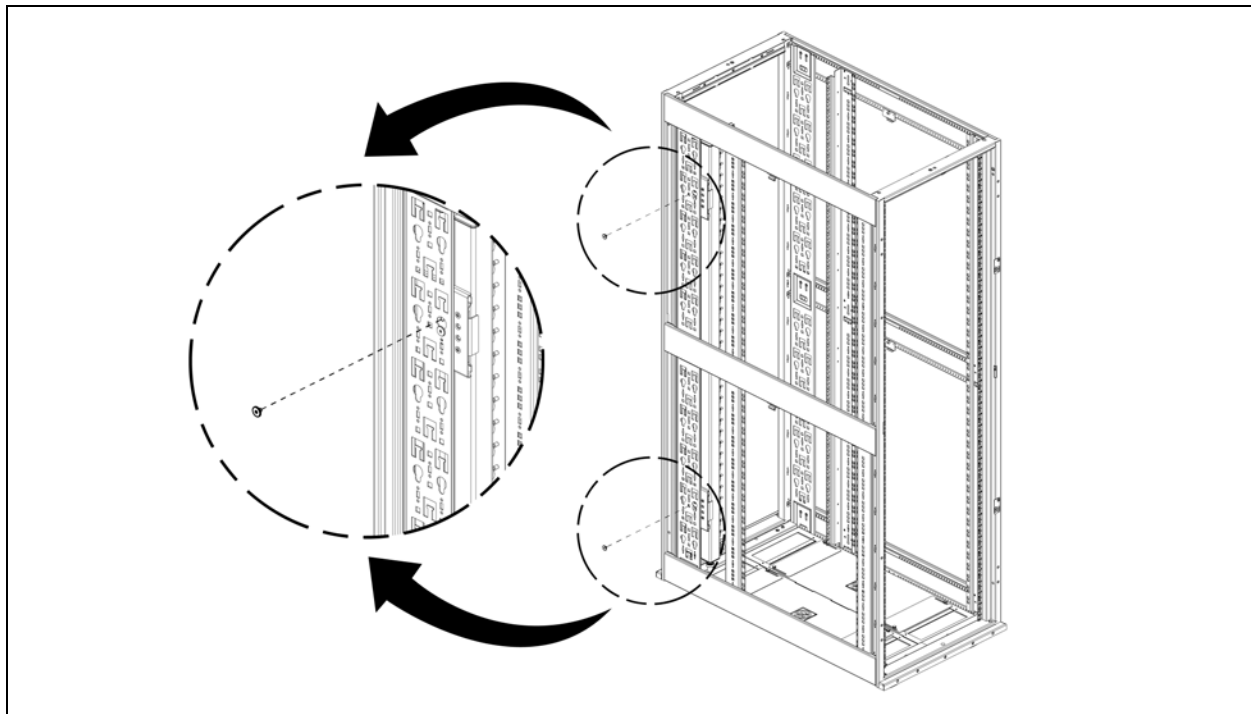


CAUTION: All 3 CoolChip 1-Phase Fluid Network sizes have to be carried by at least 2 people for safe installation.

NOTE: For the 48 Ports In-Rack Manifold in the 52U Rack the button hanger needs to be installed in the 3rd pattern of the PDU bracket.

Once the CoolChip 1-Phase Fluid Network is properly hanged into the PDU Bracket attach it to rack with the Button Retention Screw using a T25 torx key with 50in-lbs torque (5.6 N.M.) as shown in the figure below.

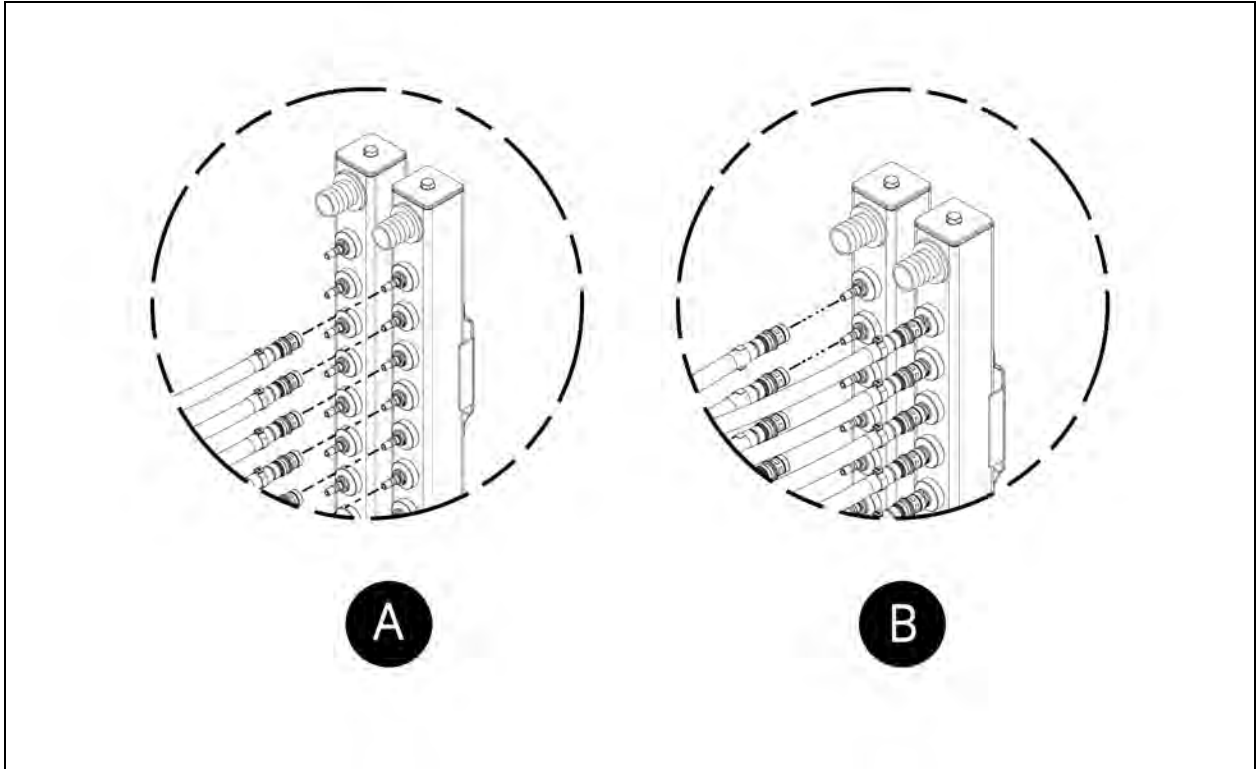
Figure 6.11 Attach the CoolChip 1-Phase Fluid Network into the Rack



NOTE: For the 48U Ports In-Rack Manifold in the 52U Rack the button retention screw needs to be installed in the 3rd pattern of the PDU bracket.

With the CoolChip 1-Phase Fluid Network mounted into the Rack, install the supply, and return hoses in the respective ports of the In-Rack Manifold. Prior to connection, check the cleaning of the sockets and plugs. Always maintain firmly the two moving halves when connecting or disconnecting. After connection make sure that the locking is properly done. The color from the manifolds and the couplings/ hoses need to match.

Figure 6.12 Install the Hoses in the CoolChip 1-Phase Fluid Network Assembly

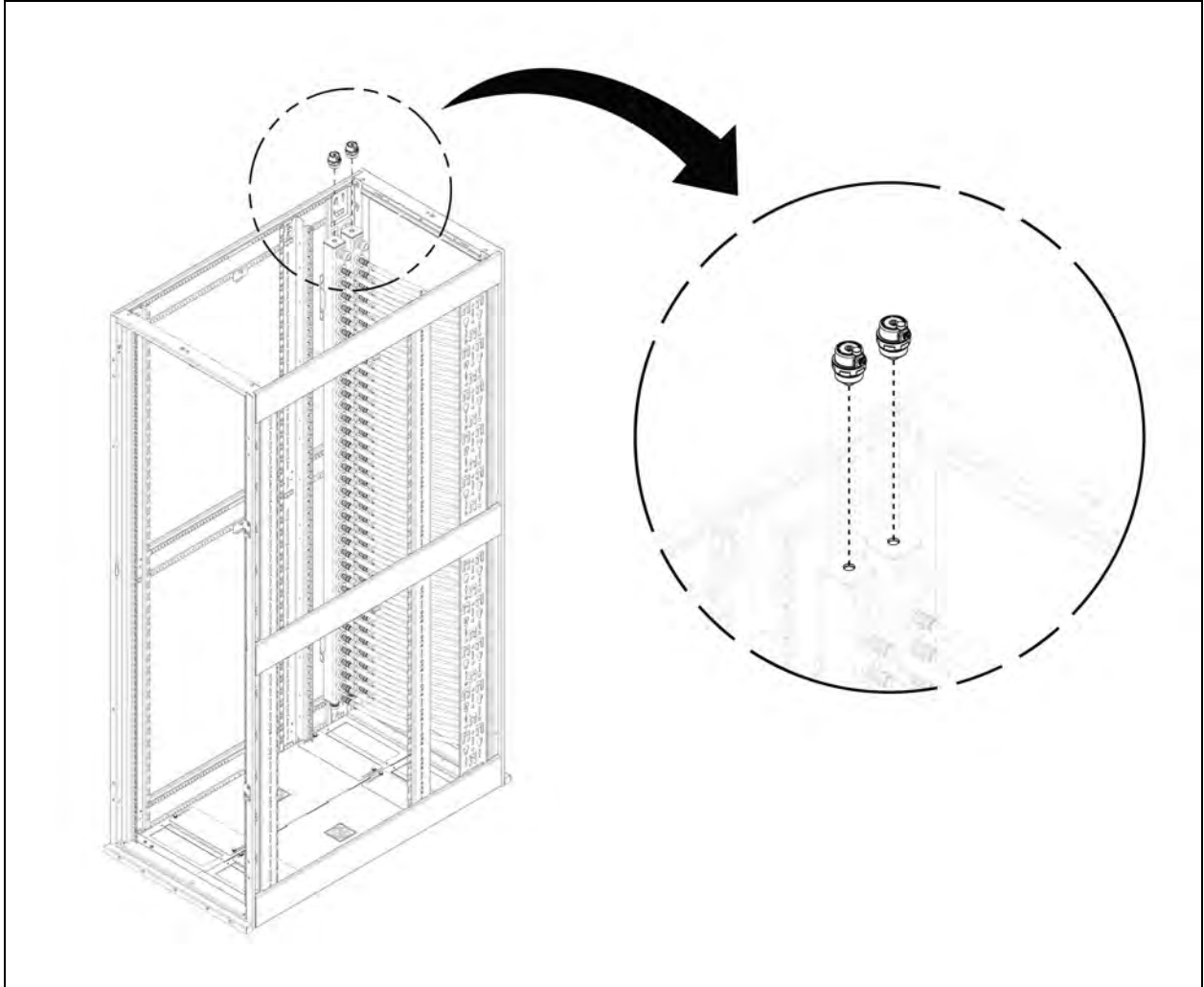


Item	Description
A	Supply Hose Installation (Blue Coded)
B	Return Hose Installation (Red coded)

NOTE: The customer must provide a quick connect with a barbed fitting to install into each hose. The barbed fitting must be an appropriate diameter to match the I.D. of the fluid hose. The quick connect must be a make and model compatible with the quick connect on the IT equipment.

Remove the Plug G1/4 with the allen key 6mm (7/32) and install the air bleeder with the adjustable wrench as shown in the figure below.

Figure 6.13 Air Bleeder Kit Installation



NOTE: The same process applies for the single configuration in both manifolds.

NOTE: The torque for the Air Bleeder and plugs is 70 lbs-in (8 N.M.)

Table 6.1 In-Rack Air Bleeder Valve

Document Number	Title
20000074	LC-In-Rack Manifold Air Bleeder Valve

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7 Commissioning

7.1 Flushing

Flushing of the Secondary Fluid Network including In-Rack Manifold and hose whips must be conducted before servers are connected to the system.

7.1.1 Connecting Quick Disconnects

Prior to connection, check the cleaning of the sockets and plugs. Always maintain firmly the two moving halves when connecting or disconnecting. After connection make sure that the locking is properly done. The color from the manifolds and the couplings/ hoses need to match.

When connecting quick disconnects, the force to connect increases as the internal pressure of the system increases. It is recommended to support the manifold while inserting quick disconnects.

7.1.2 Purging Air

It is important to purge all air from the cooling infrastructure before commissioning any system.

The Air Bleeder accessory kit will automatically purge all the air in the CoolChip 1-Phase Fluid Network.

In the case of the secondary manifold system is above the CoolChip 1-Phase Fluid Network the air should be purged from the highest point.

Option without the Air Bleeder:

- Remove the top plug and install a G $\frac{1}{4}$ male hose (field supply) on the top.
- Then fill the In-Rack Manifold through the hose barb to fill the manifold with same fluid use for secondary system.
- Purge all the air.

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8 Maintenance

CoolChip 1-Phase Fluid Network should be cleaned and checked for leaks, hoses kinks, inspect that the manifolds are not loosened and is properly mounted within the rack and malfunctions of the accessories.

Maintenance should only be carried out by personnel qualified to work on this type of equipment once per year. During Preventive Maintenance check for leaks and/or damage at the drain, air vent, couplings and ports. Test the air vent to make sure there is no blockage.

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Appendix A: Quick Release Couplings

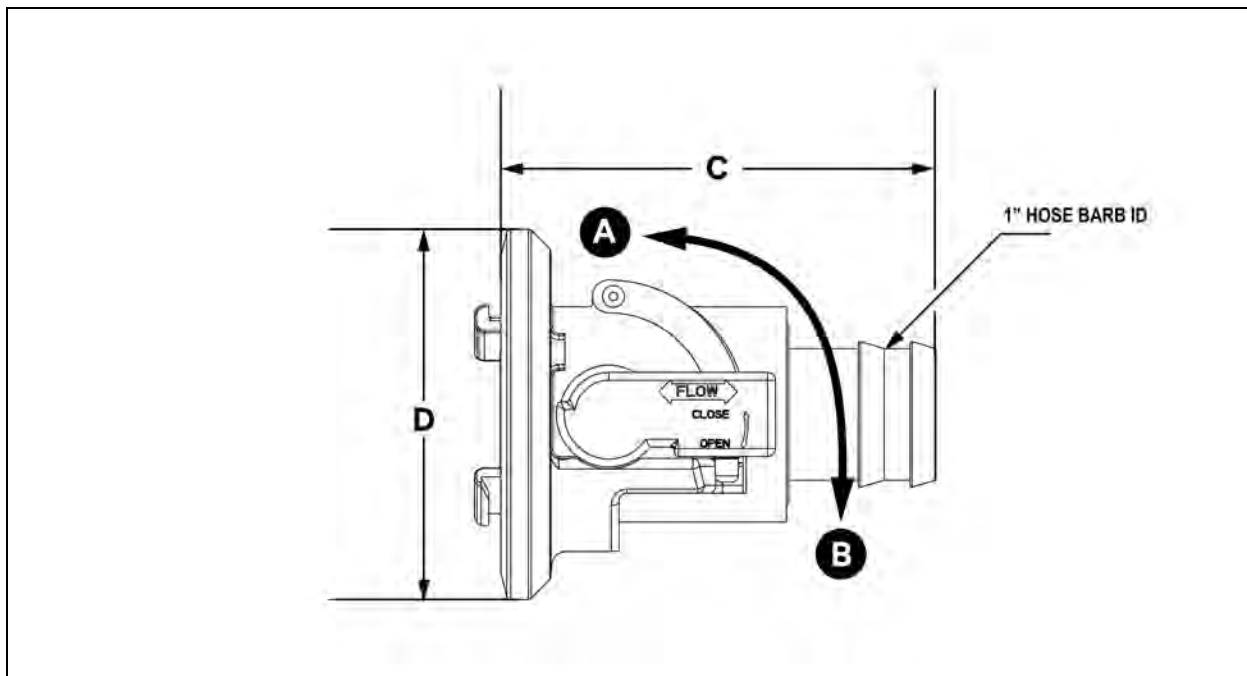
A.1 Coupling Socket for Hose Barb

FD83 coupling is designed for fluid transfer and electronics cooling applications where full flow, fluid compatibility and safety are essential. The FD83 identical halves include two interlock features to eliminate spills and ensure maximum safety. Valve can be opened when the coupling halves are mated and coupling halves cannot be disconnected until both halves are closed.

NOTE: The FD83 valves are included only with accessories RMK100 and RMK190.

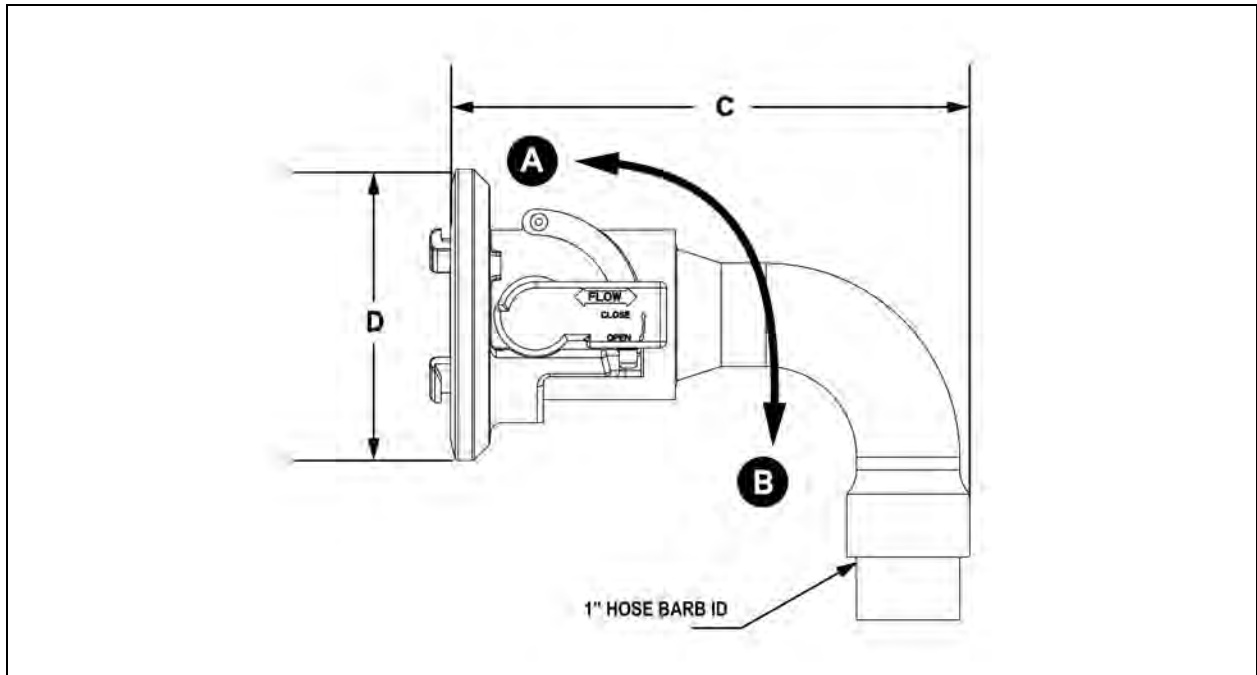
Coupling connection at the CoolChip 1-Phase Fluid Network to either a In-Rack CDU or Secondary Fluid Row Manifold

Figure 9.1 FD83



Item	Description: mm (In)
A	Closed flow position
B	Open flow position
C	84 (3.31)
D	71.6 (2.82) connects to row manifold

Figure 9.2 FD83 90°

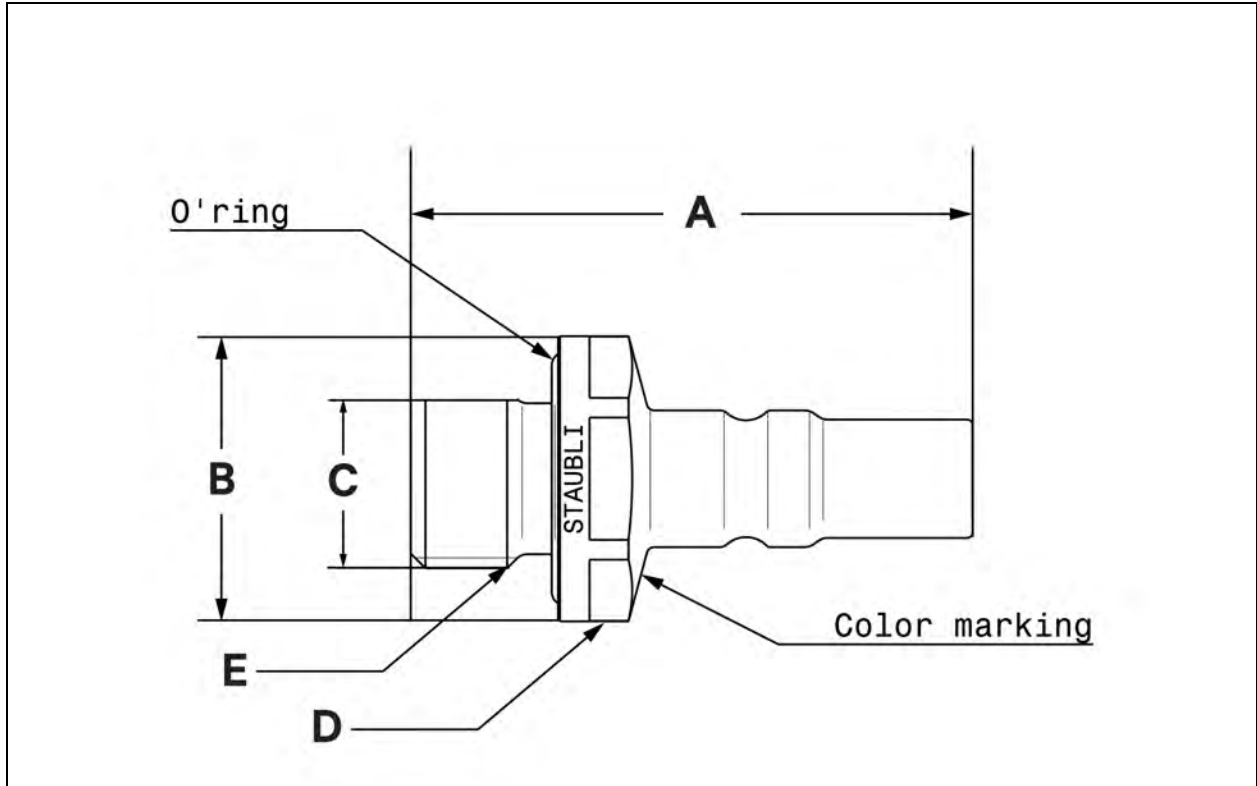


Item	Description: mm (in)
A	Closed flow position
B	Open flow position
C	125 (4.92)
D	71.6 (2.82) connects to row manifold

A.2 Male Plug connection at the CoolChip 1-Phase Fluid Network

Material: Nickel-plated brass

Figure 9.3 SCG Male Plug Dimensions

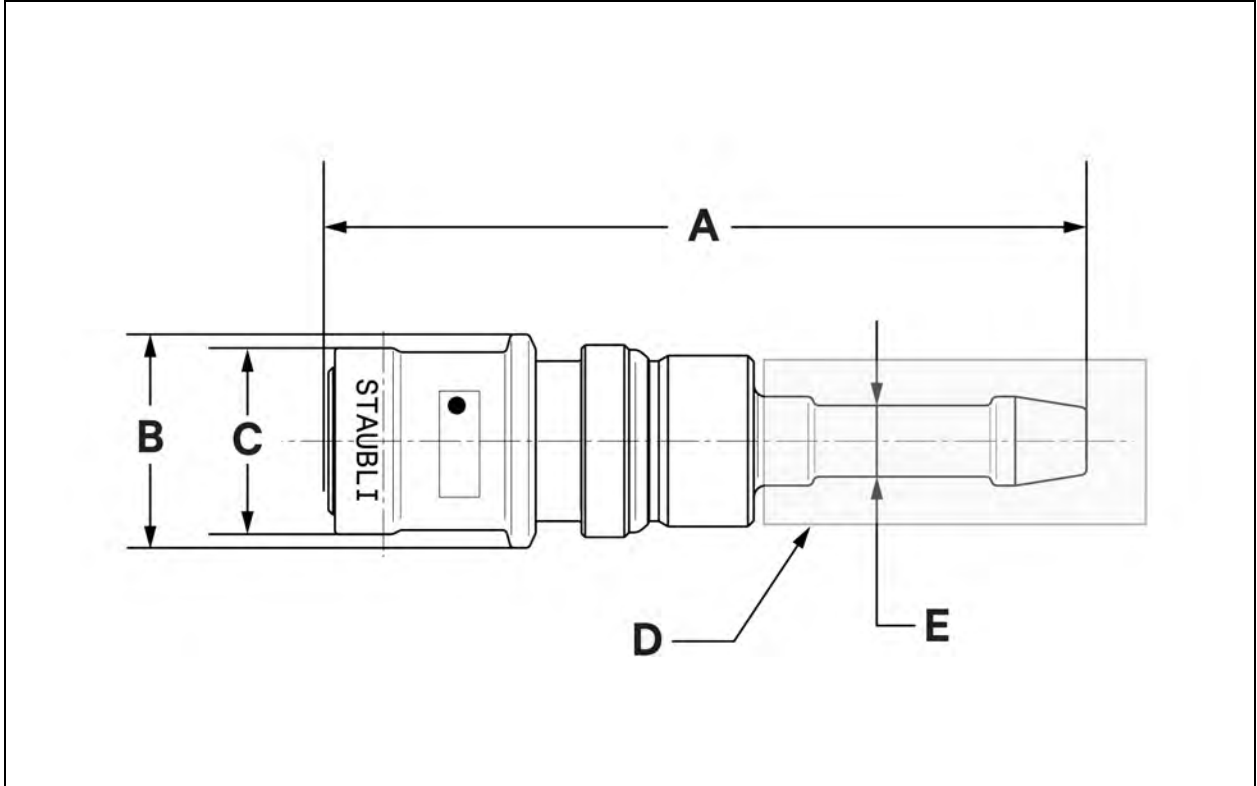


Item	Description: mm (In)		
	Ø 3mm	Ø 6mm	Ø 9mm
A	30.5 (1.2)	42.5 (1.6)	57 (2.2)
B	15.5 (0.6)	19.5 (0.7)	29.7 (1.1)
C	G 1/8	G 1/4	G 1/2
D	Hex: 14	Hex: 17	Hex: 27
E	Factory installed into the Manifold		
Color Marking	<ul style="list-style-type: none"> • Blue for Supply • Red for Return 		

A.3 Female Socket connection on the CoolChip 1-Phase Fluid Network hose

Material: Nickel-plated brass

Figure 9.4 SCG Female Socket Dimensions



Item	Description: mm (in)		
	Ø 3mm	Ø 6mm	Ø 9mm
A	63.8 (2.5)	79.6 (3.1)	95.2 (3.7)
B	18 (0.7)	27 (1)	32.6 (1.2)
C	15.7 (0.6)	24 (0.9)	28.3 (1.1)
D	Connected hose		
E	6 (0.2)	10 (0.4)	13 (0.5)

Appendix B: Submittal Drawings

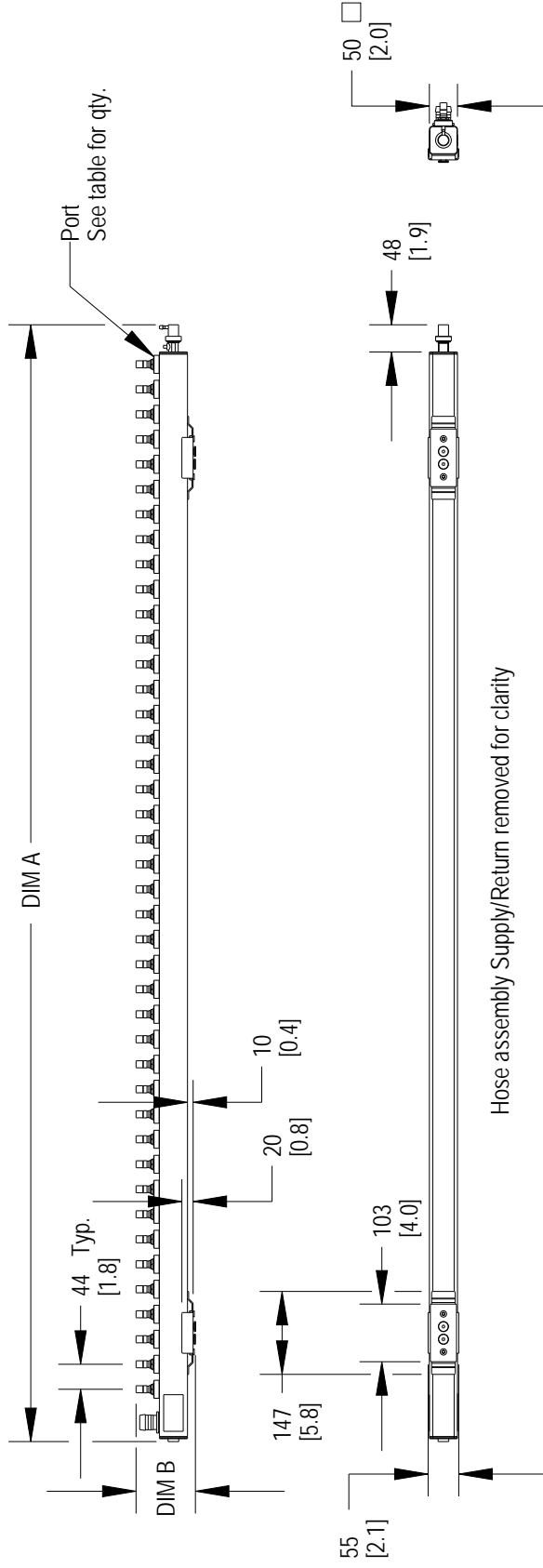
Document Number	Title
20000067	LC In-Rack Manifold Dimension Data 52U/48U /42U
20000068	LC In-Rack Manifold Dimension Data 52U/48U /42U Rack
20000073	LC In-Rack Manifold Supply and Return Hose Kit FD83
20000074	LC In-Rack Manifold Air Bleeder Valve
20000075	LC In-Rack Manifold VE Rack
20000228	LC In-Rack Manifold Component Location Diagram 52U/ 48U/ 42U



CoolChip 1-Phase Fluid Network-In-Rack Manifold

DIMENSIONAL DATA SINGLE PHASE LIQUID COOLED RACK MANIFOLD

Single CoolChips 1-Phase Fluid Network-In-Rack Manifold
Installed With Hose Barb on Top Option.



Hose assembly Supply/Return removed for clarity

Vertiv Part Number	Coupling ID mm (in)	Port Qty per Manifold	DIM A mm [in]	DIM B mm [in]
RM114	3 (1/8)	36	1719 [67.7]	97[3.8]
RM124	6 (1/4)	36	1719 [67.7]	106[4.2]
RM134	9 (3/8)	36	1719 [67.7]	119[4.7]
RM113	3 (1/8)	42	1986 [78.2]	97[3.8]
RM123	6 (1/4)	42	1986 [78.2]	106[4.2]
RM133	9 (3/8)	42	1986 [78.2]	119[4.7]
RM112	3 (1/8)	48	2252 [88.7]	97[3.8]
RM122	6 (1/4)	48	2252 [88.7]	106[4.2]
RM132	9 (3/8)	48	2252 [88.7]	119[4.7]

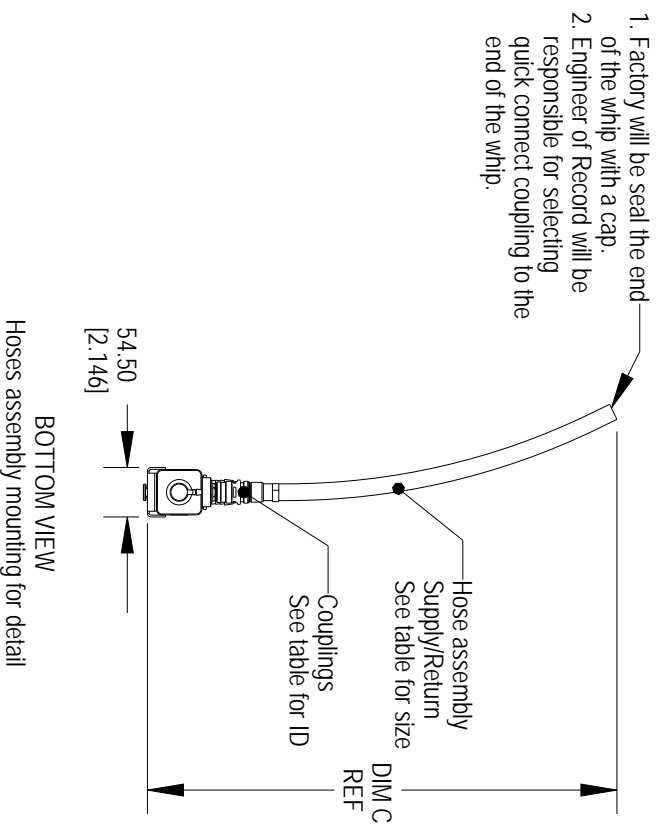
- NOTE:
- Each CoolChips 1-Phase Fluid Network-In-Rack Manifold kit includes (1) assembly supply and return manifold and hardware bag for manifold installation in rack.
 - CoolChips 1-Phase Fluid Network-In-Rack Manifold is compatible with PDU bracket, uses 1 PDU bracket for manifolds and half a PDU bracket for single manifold option.
 - Each CoolChips 1-Phase Fluid Network In-Rack Manifold is compatible with air bleeder accessory RMKA which may be installed at the highest point of the manifold, see page 3 for detail.
 - The factory installed plug G1/4 SST can be removed to installed in-rack manifold air bleeder, see detail A and B in page 3. Also look at drawing RMKA.
 - Engineer of record is responsible for selecting drain hose and external shut off valve.
 - The CoolChips 1-Phase Fluid Network-In-Rack Manifold is only rated for single phase coolant: glycol/ water.
 - See product documentation for further information.
 - All dimensions are in millimeters [inches] unless otherwise specified.



VERTIV™ CoolChip 1-Phase Fluid Network-In-Rack Manifold

DIMENSIONAL DATA SINGLE PHASE LIQUID COOLED RACK MANIFOLD

Vertiv Part Number	Hose Minimum Bend Radius mm [in]	DIM C mm [in]
RM114	50 [2.0]	499 [19.7]
RM124	65 [2.5]	518 [20.4]
RM134	75 [3.0]	533 [21.0]
RM113	50 [2.0]	499 [19.7]
RM123	65 [2.5]	518 [20.4]
RM133	75 [3.0]	533 [21.0]
RM112	50 [2.0]	499 [19.7]
RM122	65 [2.5]	518 [20.4]
RM132	75 [3.0]	533 [21.0]



VERTIV™ CoolChip 1-Phase Fluid Network-In-Rack Manifold

DIMENSIONAL DATA SINGLE PHASE LIQUID COOLED RACK MANIFOLD

Double CoolChips 1-Phase Fluid Network-In-Rack Manifold
Installed With Hose Barb on Top option

SEE DETAIL B

SEE DETAIL A

2X Plug G1/4 sst

2X Drain valve

DETAIL A

DETAIL B

DIM D

DIM E

12 [0.5]

22 [0.9]

23 [0.9]

129 [5.1]

161 [6.3]

124 [4.9]

Hose assembly supply

Hose assembly return

BOTTOM VIEW
Hoses assembly mounting for detail

Hose assembly Supply/Return removed for clarity

Vertiv Part Number	DIM D	DIM E	DIM F
RM114	99[3.9]	200 [7.9]	222 [8.8]
RM124	108[4.3]	200 [7.9]	222 [8.8]
RM134	121[4.7]	200 [7.9]	222 [8.8]
RM113	99[3.9]	177 [7.0]	199 [7.9]
RM123	108[4.3]	177 [7.0]	199 [7.9]
RM133	121[4.7]	177 [7.0]	199 [7.9]
RM112	99[3.9]	288 [11.3]	355 [14.0]
RM122	108[4.3]	288 [11.3]	355 [14.0]
RM132	121[4.7]	288 [11.3]	355 [14.0]

20000067
PAGE: 3 OF 3

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REV DATE: 2024/1/21

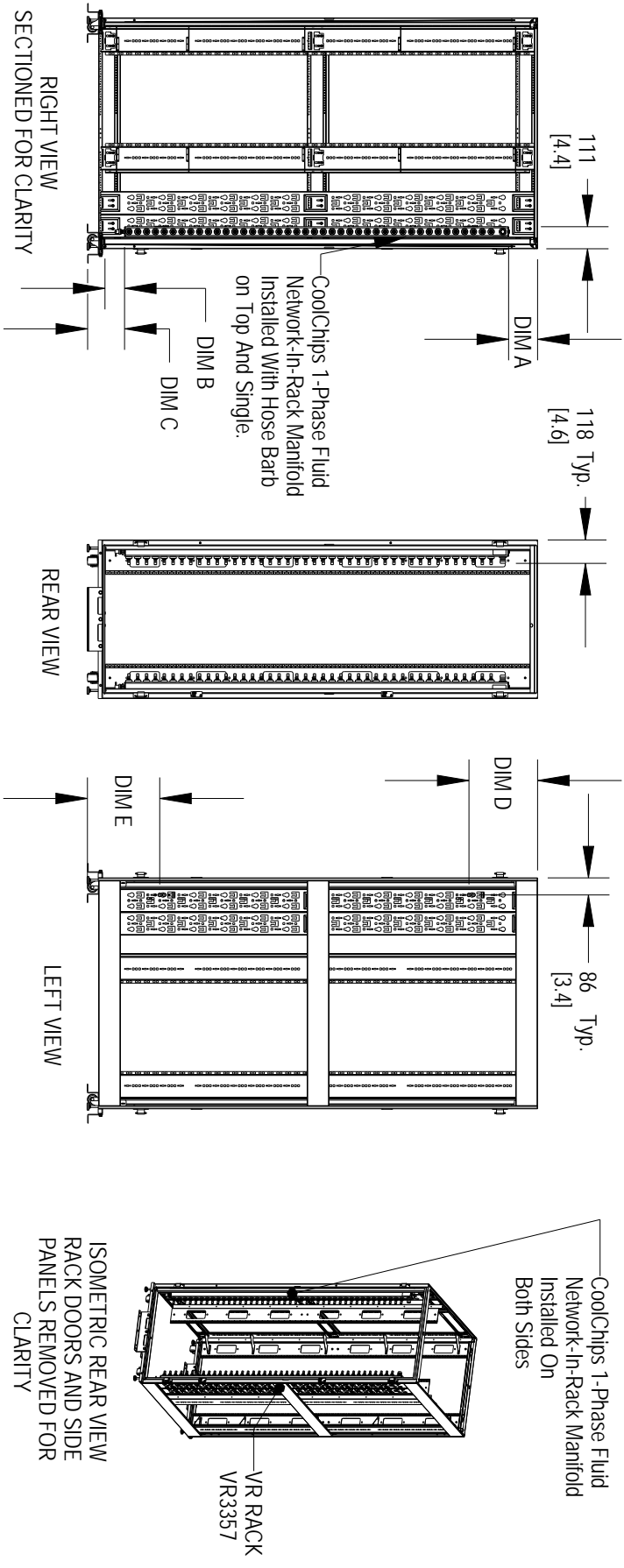


VERTIV™ CoolChips 1-Phase Fluid Network-In-Rack Manifold

Installation of In-Rack Manifold - Server Cabinet Height 42U/48U/52U

Single CoolChips 1-Phase Fluid Network-In-Rack Manifold.

CoolChips 1-Phase Fluid Network-In-Rack Manifold Installed On Either Side of The Rack



Rack Reference	Server Rack	Rack Height	Rack Width	Rack Depth	CoolChips 1-Phase Fluid Network-In-Rack Manifold	CoolChips 1-Phase Fluid Network-In-Rack Manifold Installation requirements mm [inch]				
VR Rack Cabinets	Height	RH	RW	RD	Part Number	A	B	C	D	E
VR3100	42U	1998	599	1115	RM114/RM124/RM134	146 [5.8]	109 [4.3]	186 [7.3]	369 [14.5]	386 [15.2]
VR3357	48U	2264	799	1308	RM113/RM123/RM133	146 [5.7]	109 [4.3]	186 [7.3]	345 [13.6]	363 [14.3]
VR3309	52U	2444	599	1308	RM112/RM122/RM132	79 [3.1]	89 [6.5]	166 [6.5]	434 [17.1]	454 [17.9]

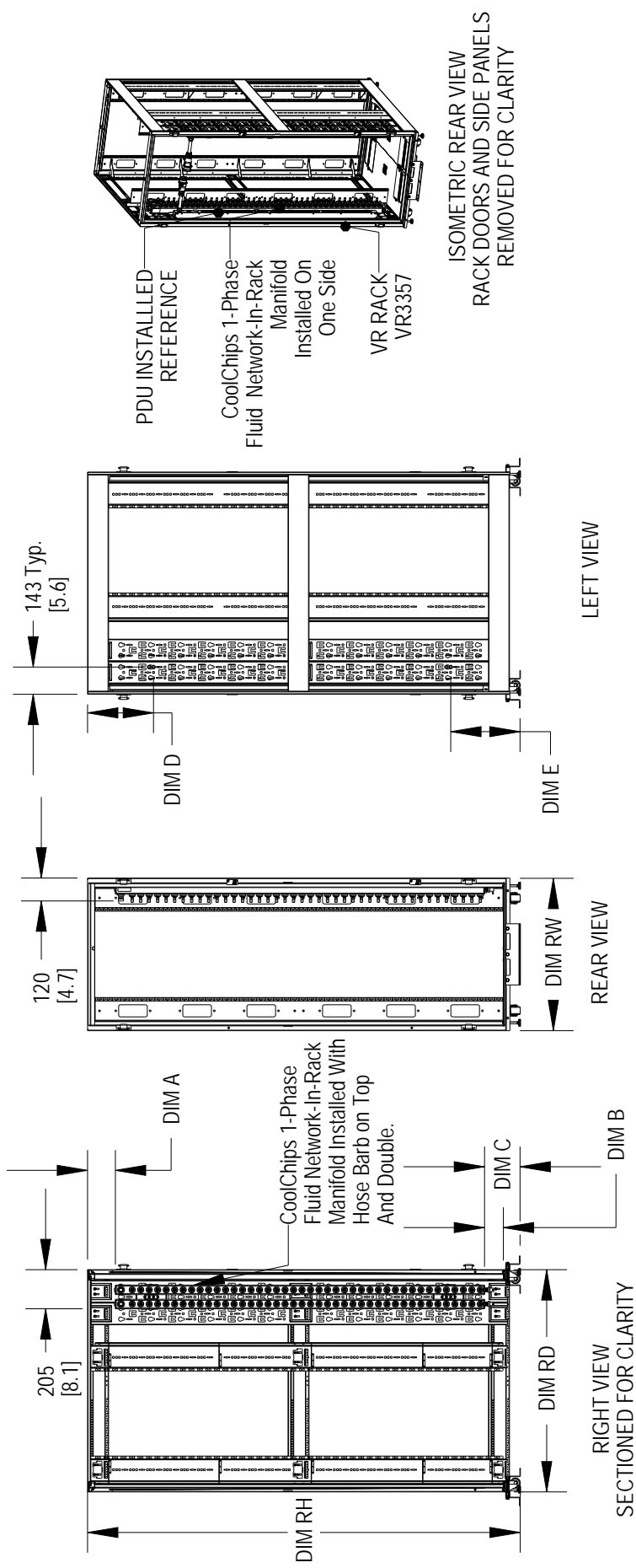


VERTIV CoolChips 1-Phase Fluid Network-In-Rack Manifold

Installation of In-Rack Manifold - Server Cabinet Height 42U/48U/52U

Dual CoolChips 1-Phase Fluid Network-In-Rack Manifold.

CoolChips 1-Phase Fluid Network-In-Rack Manifold Installed On One Side of The Rack.



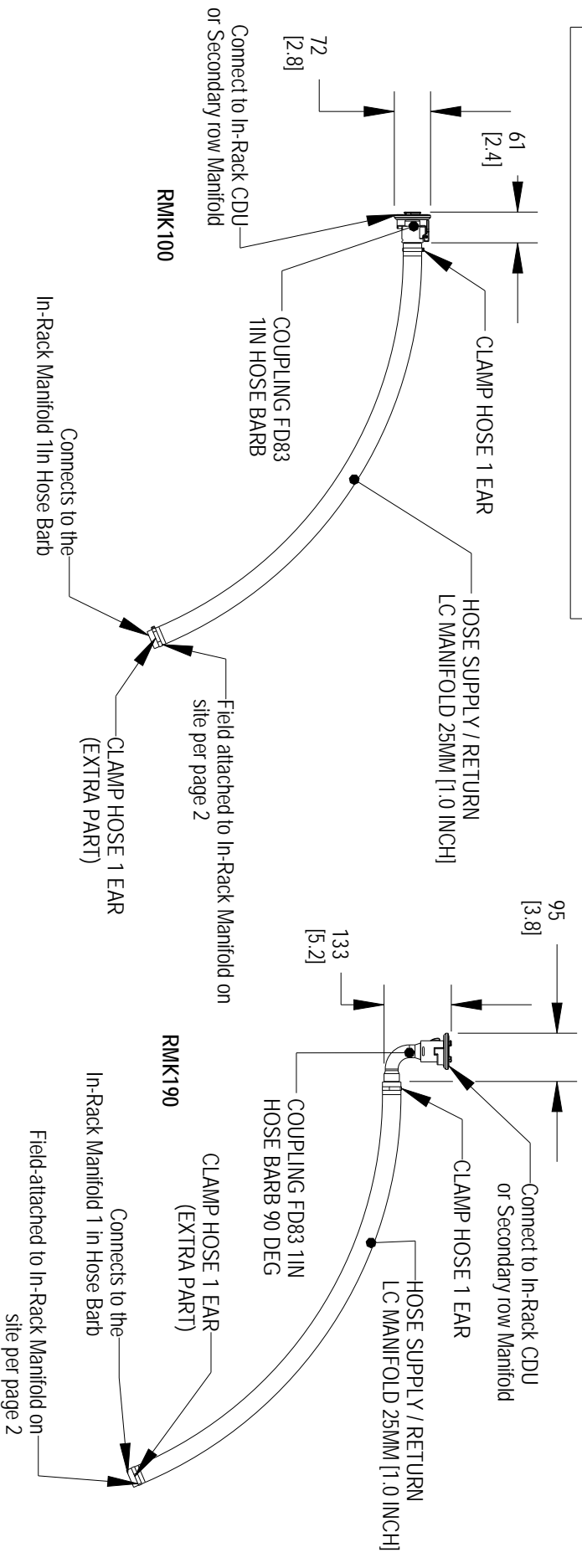
Rack Reference	Server Rack Height	Rack Height	Rack Width	Rack Depth	CoolChips 1-Phase Fluid Network-In-Rack Manifold	CoolChips 1-Phase Fluid Network-In-Rack Manifold Installation requirements mm [inch]				
VR Rack Cabinets	Height	RH	RW	RD	Part Number	A	B	C	D	E
VR3100	42U	1998	599	1115	RM114/RM124/RM134	146 [5.8]	109 [4.3]	186 [7.3]	369 [14.5]	386 [15.2]
VR3357	48U	2264	799	1308	RM113/RM123/RM133	146 [5.7]	109 [4.3]	186 [7.3]	345 [13.6]	363 [14.3]
VR3309	52U	2444	599	1308	RM112/RM122/RM132	79 [3.1]	89 [6.5]	166 [6.5]	434 [17.1]	454 [17.9]



VERTIV™ CoolChips 1-Phase Fluid Network-In-Rack Manifold

Dimensional Data Supply and Return Hose Kit with FD83 for In-Rack CDU or Secondary row Manifold

ITEM	MINIMUM BEND RADIUS	LENGTH
HOSE SUPPLY / RETURN LC MANIFOLD 25.4MM	150 [5.9]	1000 [39.3]
ALL UNITS ARE IN MILLIMETERS [INCHES]		



- Note:
- EACH KIT INCLUDES:
 - HOSE ASSEMBLY SUPPLY (BLUE) AND (1) RETURN (RED)
 - EXTRA CLAMPS HOSE FOR FD83 ASSEMBLY VALVE INSTALLATION IN MANIFOLD.
 - THE IN-RACK MANIFOLD IS ONLY RATED FOR SINGLE PHASE COOLANT, GLYCOL/WATER INSTALLATION.
 - SEE PRODUCT DOCUMENTATION FOR FURTHER INFORMATION.
 - ALL DIMENSIONS ARE IN MILLIMETERS [INCHES] UNLESS OTHERWISE SPECIFIED.

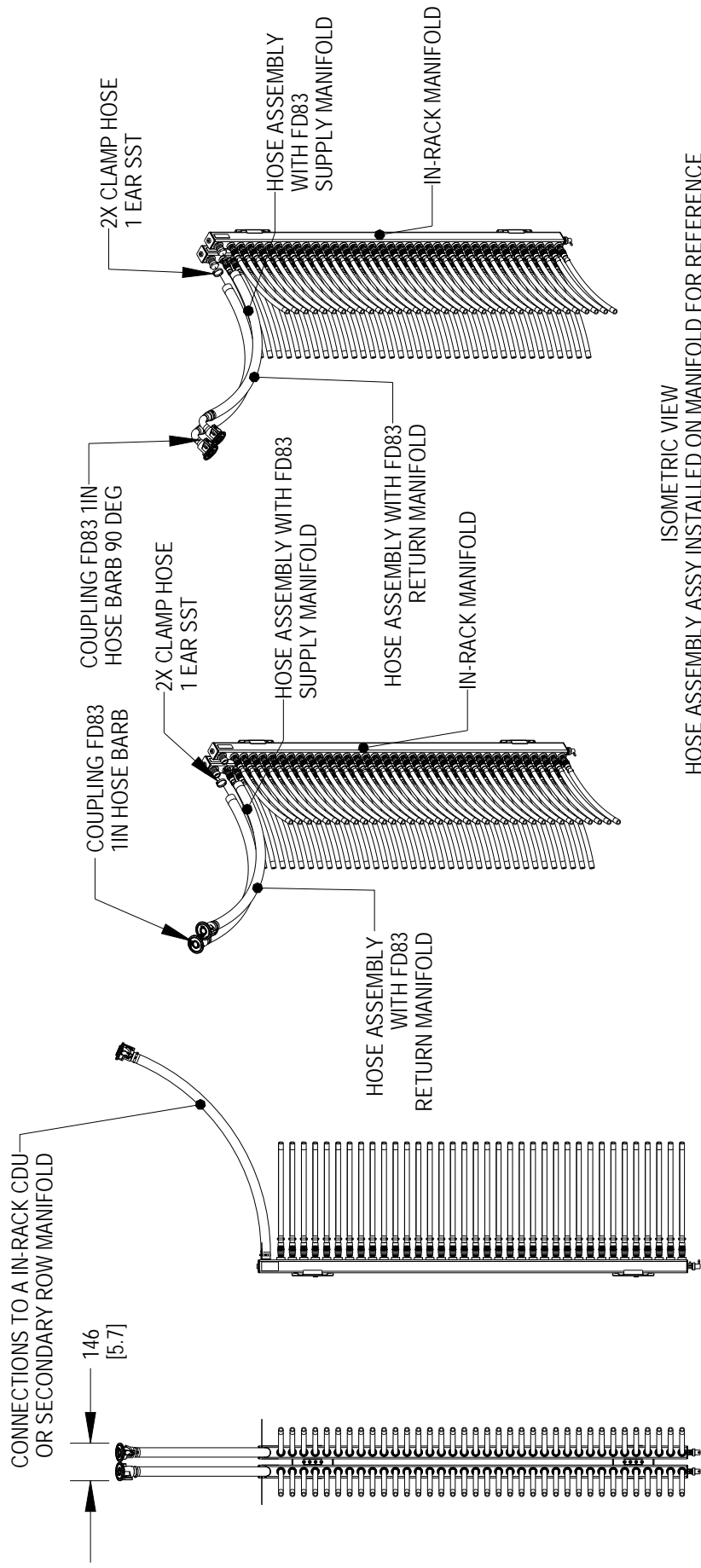


CoolChips™ 1-Phase Fluid Network-In-Rack Manifold

Supply and Return Whip with FD83

Note:

- EACH KIT INCLUDES:
 - HOSE ASSEMBLY SUPPLY (BLUE) AND (1) RETURN (RED)
 - EXTRA CLAMPS HOSE FOR FD83 ASSEMBLY VALVE INSTALLATION IN MANIFOLD.
- THE IN-RACK MANIFOLD IS ONLY RATED FOR SINGLE PHASE COOLANT, GLYCOL/WATER INSTALLATION.
- SEE PRODUCT DOCUMENTATION FOR FURTHER INFORMATION.
- ALL DIMENSIONS ARE IN MILLIMETERS [INCHES] UNLESS OTHERWISE SPECIFIED.

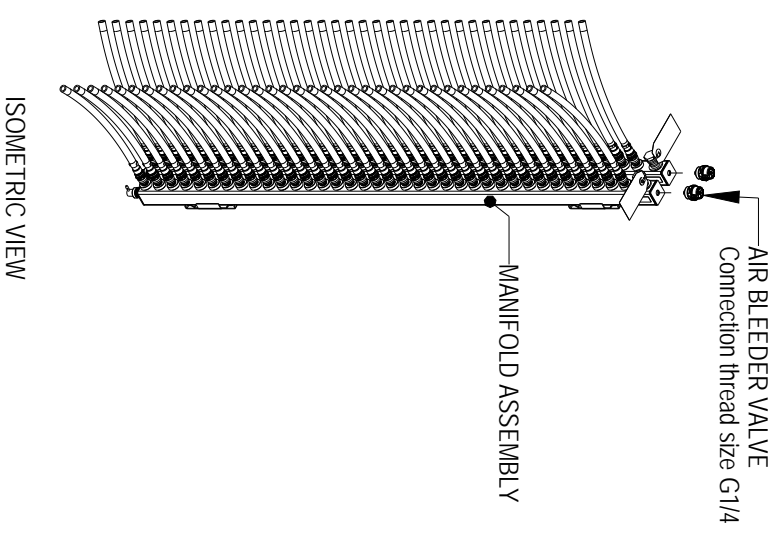
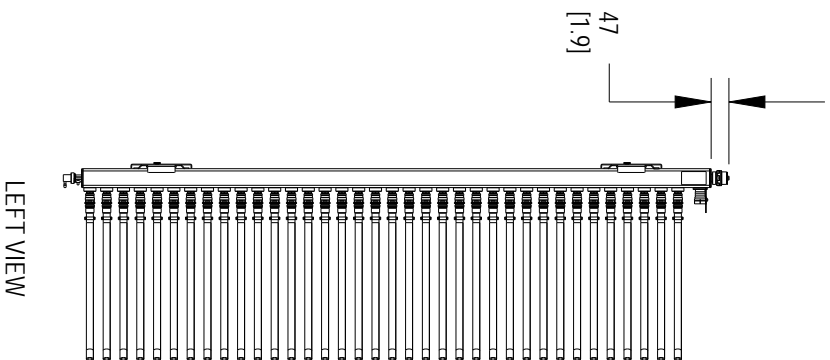
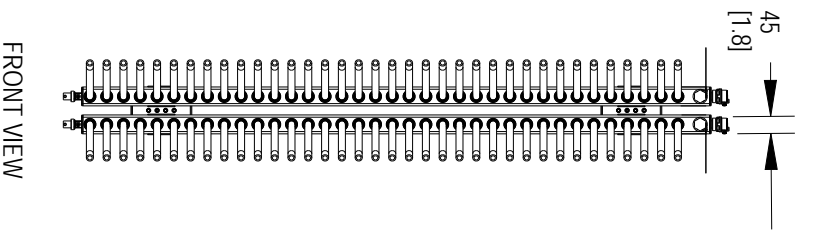




VERTIV™ CoolChips 1-Phase Fluid Network-In-Rack Manifold

AIR BLEEDER VALVE

- NOTES:
1. SEE PRODUCT DOCUMENTATION FOR FURTHER INFORMATION.
 2. ALL DIMENSIONS ARE IN MILLIMETERS [INCHES] UNLESS OTHERWISE SPECIFIED.
 3. EACH SKU INCLUDES (2) AIR BLEEDER VALVE.
 4. AIR BLEEDER VALVE CAN BE USED TO INSTALL IT BOTH SIDE MANIFOLD OPTION ON MANIFOLD THE TOP.





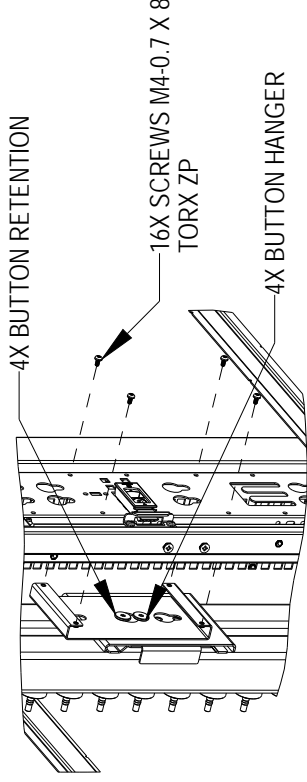
VERTIV™ CoolChips 1-Phase Fluid Network-In-Rack Manifold

Liquid Cooling Supply and Return Manifold Installation VE Server Cabinet Height 42U/48U/52U

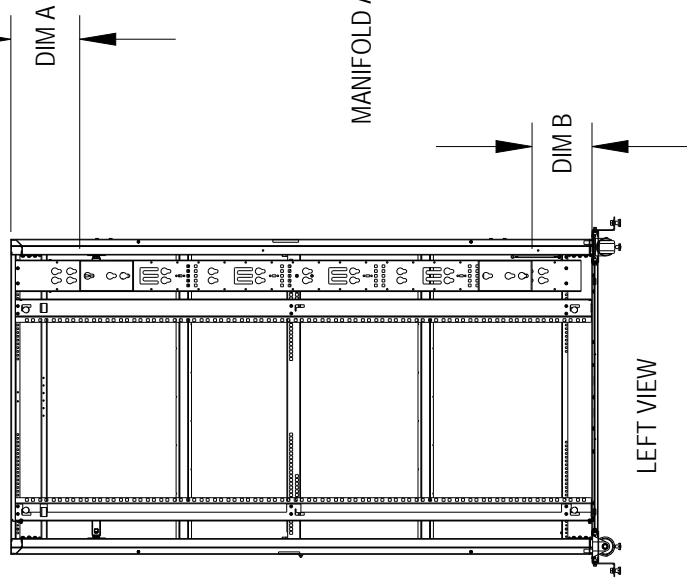
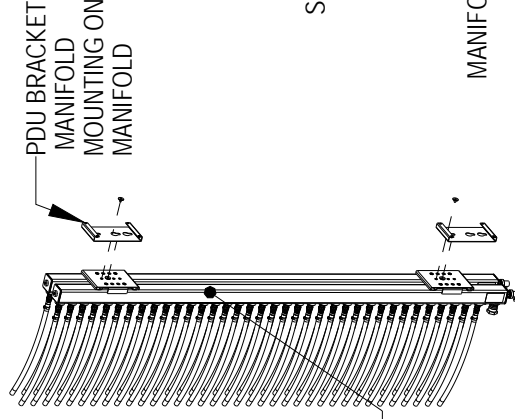
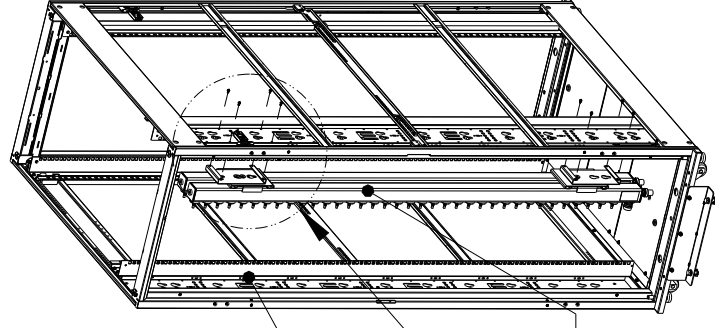
NOTES:
 1. SEE PRODUCT DOCUMENTATION FOR FURTHER INFORMATION.
 2. ALL DIMENSIONS ARE IN MILLIMETERS [INCHES] UNLESS OTHERWISE SPECIFIED.
 3. EACH SKU INCLUDES (4) PDU BRACKETS MANIFOLD MOUNTING ASSEMBLY AND HARDWARE BAG FOR MANIFOLD INSTALLATION IN RACK.
 4. DOUBLE MANIFOLD BRACKET CAN BE USED TO INSTALL IT BOTH SIDE MANIFOLD OPTION.

VERTIV RACK HEIGHT	DIM A	DIM B
42U	228 [9.0]	197 [7.8]
48U	228 [9.0]	141 [5.6]

ALL DIMENSIONS ARE IN MILLIMETERS [INCHES]



DETAIL A
TWO MANIFOLDS OPTIONS

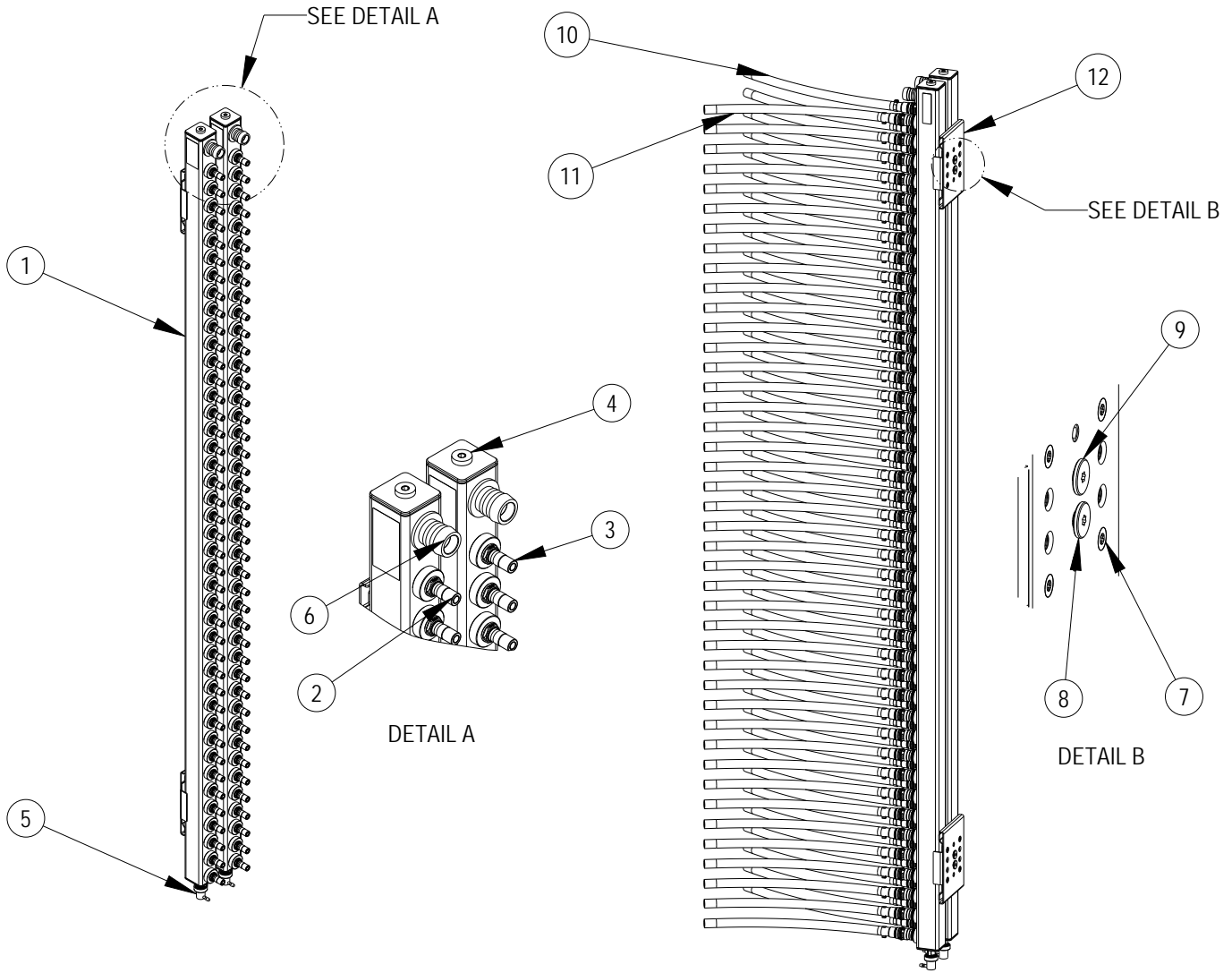


ISOMETRIC BACK VIEW RACK DOORS AND SIDE PANELS REMOVED FOR CLARITY



VERTIV COOLCHIPS 1-PHASE FLUID NETWORK

COMPONENT LOCATION DIAGRAM



South-West Isometric
Hoses removed for clarity

North-West Isometric
Hoses installed

Item	Description	Item	Description
1	WELD ASSEMBLY MANIFOLD	7	SCREW M6X8 FH TORX
2	COUPLING PLUG THD SUPPLY	8	BUTTON HANGER PDU
3	COUPLING PLUG THD RETURN	9	BUTTON RETENTION PDU
4	PLUG 1/4 STAINLESS STEEL	10	HOSE ASSEMBLY SUPPLY
5	DRAIN VALVE & ADAPTER 1/4	11	HOSE ASSEMBLY RETURN
6	HOSE BARB PLUG	12	BRACKET MOUNTING DOUBLE

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