



XDU070 Coolant Distribution Unit (Liquid to Air)

Application and Planning Guide

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Vertiv recommends installing a monitored fluid detection system that is wired to activate the automatic closure of field-installed coolant fluid supply and return shut off valves, where applicable, to reduce the amount of coolant fluid leakage and consequential equipment and building damage. Refer to local regulations and building codes relating to the application, installation, and operation of this product. The consulting engineer, installer, and/or end user is responsible for compliance with all applicable laws and regulations related to the application, installation, and operation of this product.

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Technical Support Site

If you encounter any installation or operational issues with 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 Important Safety Instructions

Save These Instructions

This manual contains important instructions that should be followed during operation and maintenance of the Vertiv™ Coolant Distribution Unit (Liquid to Air).



WARNING! Arc flash and electric shock hazard. Can cause serious injury or death. Building and equipment damage may also result. Disconnect all local and remote electric power supplies and wear appropriate, OSHA approved personal protective equipment (PPE) per NFPA 70E before working within the electric control enclosure. Customer must provide earth ground to unit, per NEC, CEC and local codes, as applicable.

Verify with a voltmeter that power is Off. The controller does not isolate power from the unit, even in the Unit Off mode. Some internal components still require and receive power even during the Unit Off mode of the controller. The factory supplied, disconnect switch is inside the unit. The line side of this switch contains live high voltage. The only way to ensure that there is NO voltage inside the unit is to install and open a remote disconnect switch. Refer to unit electrical schematic.

Before proceeding with installation, read all instructions, verify that all the parts are included and check the nameplate to be sure the voltage matches available utility power. Follow all local codes.



WARNING! Risk of electric shock. Can cause serious injury or death. Building and equipment damage may also result. Open all local and remote electric power supply disconnect switches and verify that power is off with a voltmeter before working within any electric connection enclosures. The controller does not isolate power from the unit, even in the Unit Off mode. Some internal components require and receive power even during the unit off mode of the controller.

Installation, service, and maintenance work must be performed only by properly trained and qualified personnel and in accordance with applicable regulations and manufacturers' specifications. Opening or removing the covers to any equipment may expose personnel to lethal voltages within the unit even when it is apparently not operating and the input wiring is disconnected from the electrical source.



WARNING! Risk of short circuits and electric shock. Can cause serious injury or death. Building and equipment damage can result from cut insulation or damaged wires. Can cause overheated wiring, smoke, fire, activation of fire suppression systems and EMS personnel, and loss of power to fans. Verify that all wiring connections are tight and that all wiring is contained within the junction box prior to closing and securing the cover.

Insert CSA certified or UL listed bushings into holes and/or knockouts used to route wiring through metal panels to protect the wire insulation from contact with sheet metal edges.



WARNING! Risk of improper wire sizing/rating and loose electrical connections causing overheated wire and electrical connection terminals resulting in smoke or fire. Can cause serious injury or death. Building and equipment damage may also result. Use correctly sized copper wire only and verify that all electrical connections are tight before turning power On. Check all electrical connections periodically and tighten as necessary.



WARNING! Risk of improper wiring, piping, moving, lifting and handling. Can cause serious injury or death. Building and equipment damage may also result. Installation and service of this equipment should be done only by qualified personnel who have been specially trained in the installation of air conditioning equipment and who are wearing appropriate, OSHA approved PPE.



WARNING! Risk of improper moving. Can cause serious injury or death. Building and equipment damage may also result. Use only lifting equipment that is rated for the unit weight by an OSHA certified rating organization. The center of gravity varies depending on the unit size and selected options. The slings must be equally spaced on either side of the center of gravity indicator. Shipping weights and unit weights are listed in the tables in **Table 4.1** on page 15. Use the center of gravity indicators on the unit to determine the position of the slings.



WARNING! Risk of top heavy unit falling over when improperly lifted or moved. Can cause serious injury or death. Building and equipment damage may also result. Read all of the following instructions and verify that all lifting and moving equipment is rated for the weight of the unit before attempting to move, lift, remove packaging from or prepare the unit for installation. Unit weights are specified in **Table 4.1** on page 15.



WARNING! Risk of unsecured unit rolling off pallet. Can cause serious injury or death. Building and equipment damage may also result. The unit is on casters. Ensure that the unit and pallet are located on a flat surface before loosening the hardware securing the unit to its shipping pallet.



CAUTION: Risk of contact with extremely hot or cold surfaces. Can cause injury. Verify that all components have reached a temperature that is safe for human contact or wear appropriate, OSHA approved PPE before working with the electric connection enclosures or unit cabinet. Perform maintenance only when the system is de-energized and component temperatures have become safe for human contact.



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



CAUTION: Risk of improper handling heavy and lengthy parts. Can cause injury. Building and equipment damage may also result. Cabinet panels can exceed 5 ft. (1.5 m) in length and weigh more than 35 lb. (15.9 kg). Follow relevant OSHA lifting recommendations and consider using a two person lift for safe and comfortable removal and installation of cabinet panels. Only properly trained and qualified personnel wearing appropriate, OSHA approved PPE should attempt to remove or install cabinet panels.



CAUTION: Risk of improper piping installation, leak checking, fluid chemistry and fluid maintenance. Can cause injury. Building and equipment damage may also result. Installation and service of this equipment should be done only by qualified personnel who have been specially trained in the installation of air conditioning equipment and who are wearing appropriate, OSHA approved PPE.

NOTICE

Risk of improper power supply connection. Can cause equipment damage and loss of warranty coverage.

Prior to connecting any equipment to a main or alternate power source (for example backup generator systems) for startup, commissioning, testing, or normal operation, ensure that these sources are correctly adjusted to the nameplate voltage and frequency of all equipment to be connected. In general, power source voltages should be stabilized and regulated to within $\pm 5\%$ of the load nameplate nominal voltage. Also, ensure that no three phase sources are single phased at any time.

See transformer label for primary tap connections. Installer will need to change transformer primary taps if applied unit voltage is other than pre wired tap voltage.

NOTICE

Risk of improper electrical connection of three phase input power. Can cause backward pump rotation and unit damage. Service technicians should use a gauge set on the system during the initial startup to verify that the three phase power is connected properly. Three phase power must be connected to the unit line voltage terminals in the proper sequence so that the pump rotates in the proper direction. Incoming power must be properly phased to prevent pump from running backward. We recommend checking the unit's phasing with proper instrumentation to ensure that the power connections were made correctly. We also recommend verifying discharge and suction pressures during startup to ensure that the pumps are running in the correct direction.

NOTICE

Risk of piping system corrosion and freezing fluids. Can cause leaks resulting in equipment and very expensive building damage. Heat exchangers and piping systems are at high risk of freezing and premature piping corrosion. Fluids in these systems must contain the proper antifreeze and inhibitors to prevent freezing and premature piping corrosion. When the cooling unit or piping may be exposed to freezing temperatures, charge the system with coolant fluid based on the coldest ambient design temperature. Automotive antifreeze is unacceptable and must NOT be used in any fluid system. Use only coolant fluid solution that meets the requirements of recommended industry practices. Do not use galvanized pipe.

The system coolant fluid must be analyzed by a competent fluid treatment specialist before startup to establish the inhibitor and antifreeze solution requirement and evaluated at regularly scheduled intervals throughout the life of the system to determine the pattern of inhibitor depletion.

The fluid complexity and variants of required treatment programs make it extremely important to obtain the advice of a competent and experienced fluid treatment specialist and follow a regularly scheduled coolant fluid system maintenance program.

Fluid chemistry varies greatly as do the required additives, called inhibitors, that reduce the corrosive effect of the fluids on the piping systems and components.

The chemistry of the coolant fluid used must be considered, because some sources may contain corrosive elements that reduce the effectiveness of the inhibited formulation. Sediment deposits prevent the formation of a protective oxide layer on the inside of the coolant system components and piping. The coolant fluid must be treated and circulating through the system continuously to prevent the buildup of deposits and/or growth of sulfate reducing bacteria. Proper inhibitor maintenance must be performed to prevent corrosion of the system.

Consult fluid manufacturer for testing and maintenance of inhibitors.

Commercial grade coolant fluid is generally less corrosive to the common metals of construction than water itself. It will, however, assume the corrosivity of the coolant fluid from which it is prepared and may become increasingly corrosive with use if not properly inhibited.

Vertiv recommends installing a monitored fluid detection system that is wired to activate the automatic closure of field installed coolant fluid supply and return shut off valves to reduce the amount of coolant fluid leakage and consequential equipment and building damage. The shut off valves must be sized to close off against the maximum coolant fluid system pressure in case of a catastrophic fluid leak.

NOTICE

Risk of no flow condition. Can cause equipment damage. Do not leave the water/coolant fluid supply circuit in a no flow condition. Idle fluid allows the collection of sediment that prevents the formation of a protective oxide layer on the inside of the tubes. Keep unit switched On and water/coolant fluid supply circuit system operating continuously.

NOTICE

Risk of leaking coolant fluid lines. Can cause equipment and building damage. Lines and joints must be inspected regularly. Improper installation, application and service practices can result in water leakage from the unit. Water leakage can result in severe property damage and loss of critical data center equipment. Do not locate unit directly above any equipment that could sustain water damage.

Vertiv recommends installing monitored leak detection equipment for the unit and supply and return lines.

NOTICE

Risk of a catastrophic water circuit rupture. Can cause expensive building and equipment damage.

Install an overflow drain pan under the unit with a monitored leak detection system in the pan and shutoff valves in the supply and return water lines that automatically close if water is detected by the leak detection system. The shutoff valves should be spring return and must be rated for a close off pressure that is the same as or higher than the supply water pressure. If it is not possible to install an overflow drain pan, then a monitored leak detection system should be installed in the base of the unit or under the unit to actuate the shutoff valves immediately on a leak detection signal.

The overflow drain pan should have a drain line connected to it that flows to a floor drain or maintenance sink in case of a shutoff valve or leak detection system malfunction.

NOTICE

Risk of passageway interference. Can cause unit and/or structure damage. The unit may be too large to fit through a passageway while on or off the skid. Measure the unit and passageway dimensions, and refer to the installation plans prior to moving the unit to verify clearances.

NOTICE

Risk of damage from forklift. Can cause unit damage. Keep tines of the forklift level and at a height suitable to fit below the skid and/or unit to prevent exterior and/or underside damage.

NOTICE

Risk of improper storage. Can cause unit damage.

Keep the unit upright, indoors and protected from dampness, freezing temperatures and contact damage.

NOTICE

Risk of improper control circuits. Can cause equipment damage.

When using jumpers for troubleshooting, always remove jumpers when maintenance is complete. Jumpers left connected could override controls and cause equipment damage.

1.1 General

WARNING! This product is supplied with a 21.7 psi (1.5 bar) nitrogen holding charge in the fluid circuit. This needs to be vented during the installation process.

Mechanical and electrical equipment such as coolant distribution units (CDUs) present potential mechanical and electrical hazards. All safety, installation, operation, and maintenance instructions must be adhered to. Any work on or use of the equipment must only be carried out by technically competent personnel who are fully trained. This product is designed to minimize all potential hazards by restricting access through unit casings, doors and covers while equipment is operational. Before carrying out maintenance work, ensure that:

1. Equipment is switched OFF.
2. Equipment and controls are disconnected from the electrical supply.
3. All rotating parts such as pumps and 3-way valves have come to rest.

If there is a doubt concerning safety, installation, operation, or maintenance instructions, contact Vertiv for clarification and advice. See [Technical Support/Service in the United States](#) on page 25.

1.2 Installation and Handling

Installation and operation must be conducted in accordance with local and national regulations and normal codes of good practice. When moving or lifting the product, caution must be observed to ensure the safety of personnel. Use only appropriate lifting equipment.

1.3 Application

This product is to be used indoors only and must be only used for the application it was designed for. This product must not be used in a hazardous environment.

1.4 Warranty

Failure to comply with Vertiv's installation, maintenance and operation instructions may affect the reliability and performance of the unit and invalidate any warranty.

1.5 Electrical Connection



WARNING! This unit is powered by high voltage. Serious injury or death can occur. Power supplied to this product must be provided with an external means of isolation.

Electrical connections must be carried out in accordance with local and national regulations by a qualified electrician. Never make any electrical connections inside the unit or to the unit unless the electricity supply has been switched OFF at the disconnect (isolator).

1.6 Replacement Parts

Any parts replaced during maintenance or servicing must be the same specification as those being replaced. The use of incorrect replacement parts may affect the operation or reliability of the unit and invalidate any warranty. See [Warranty Details](#) on page 27.

1.7 Waste Disposal

Any waste or single use materials must be disposed of in a responsible manner and in strict adherence to local and national environmental regulations. For details, consult local environmental agencies.

1.8 Documentation

Operation and maintenance, maintenance, and installation and commissioning documentation as well as maintenance and service records must always remain with the unit.

2 Agency

2.1 Product Standards and Approvals

Vertiv products installed and operated in compliance with this document, the operation and maintenance guide and installation and commissioning guide conform to the low voltage Directive 2014/35/EU, the EMC directive 2014/30/EU and the pressure equipment directive 2014/68/EU. As manufactured, Vertiv products are designed to comply with an IP21 rating. This product is cULus listed for the appropriate voltage models and certificates will be made available on request (cULus certificate pending).



2.2 RoHS 3 Compliance

The manufacturer certifies that all products manufactured and supplied are fully RoHS compliant in accordance with EU RoHS Directive EU 2015/863.



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3 Product Description

3.1 General

This document describes the physical and electrical characteristics of the Vertiv™ XDU070 for application and planning purposes.

The XDU070 contains a secondary closed loop circuit that provides a supply of cooling fluid to IT equipment. The cooling supply is done by direct cooling (such as cold plates at chip level).

The fluid circuit is a low pressure sealed system with the heat removed from the high heat density areas of IT equipment rejected to ambient air via a low pressure drop cooling coil heat exchanger, arranged in a V-format with fan assistance provided by 7 axial fans.

The fluid circuit ensures that the cooling fluid in a data center environment can be kept to a minimum volume, is closely controlled for flow, pressure and temperature and can be accurately maintained for fluid quality (with included filtration).

The primary cooling source is ambient air of the data center, and final heat transfer depends on the air temperature and flow rate.

- Maximum secondary fluid flow rate of 32 gpm (120 l/m).
- 60 kW to 100 kW capacity dependent on ambient operating conditions (approach temperature difference), fan speed, and fluid type.
- 1.5 in. hygienic outlet and inlet connections, compatible with PG25 or water.
- Expansion tank and integrated air vents within fluid circuit.
- Approved wetted materials for direct to chip applications.
- Fan redundancy (N+1), pump redundancy, and field replaceable.
- Designed to ASHRAE liquid cooling class W4.
- Designed to ASHRAE air cooling class A2 upper limits.
- Top and bottom fluid connection, 10 liter stainless steel fluid reservoir and integrated fill pump.
- Integrated 50 micron filters (with hot swap function).
- Maximum airflow approaching 6,533 CFM (11,100 CMH).
- Ability to implement liquid cooling solutions without the need for a primary water supply or other related infrastructure.
- Easy installation, maintenance, and retrofit pipework parts.
- Small footprint: 2300 mm x 600 mm x 1200 mm (91 in. x 24 in. x 48 in.).
- Black textured finish to blend in with computer room environment.
- International service team to provide professional and all in one services from installation to maintenance and troubleshooting.

3.2 Vertiv™ XDU070 Model Number Nomenclature

The Vertiv™ XDU070 can be configured for voltage options to suit:

- Any global location
- Secondary filtration
- Secondary top/bottom connections

Table 3.1 below describes each digit of the model number.

Table 3.1 XDU070 Model Number Base Digit Definitions

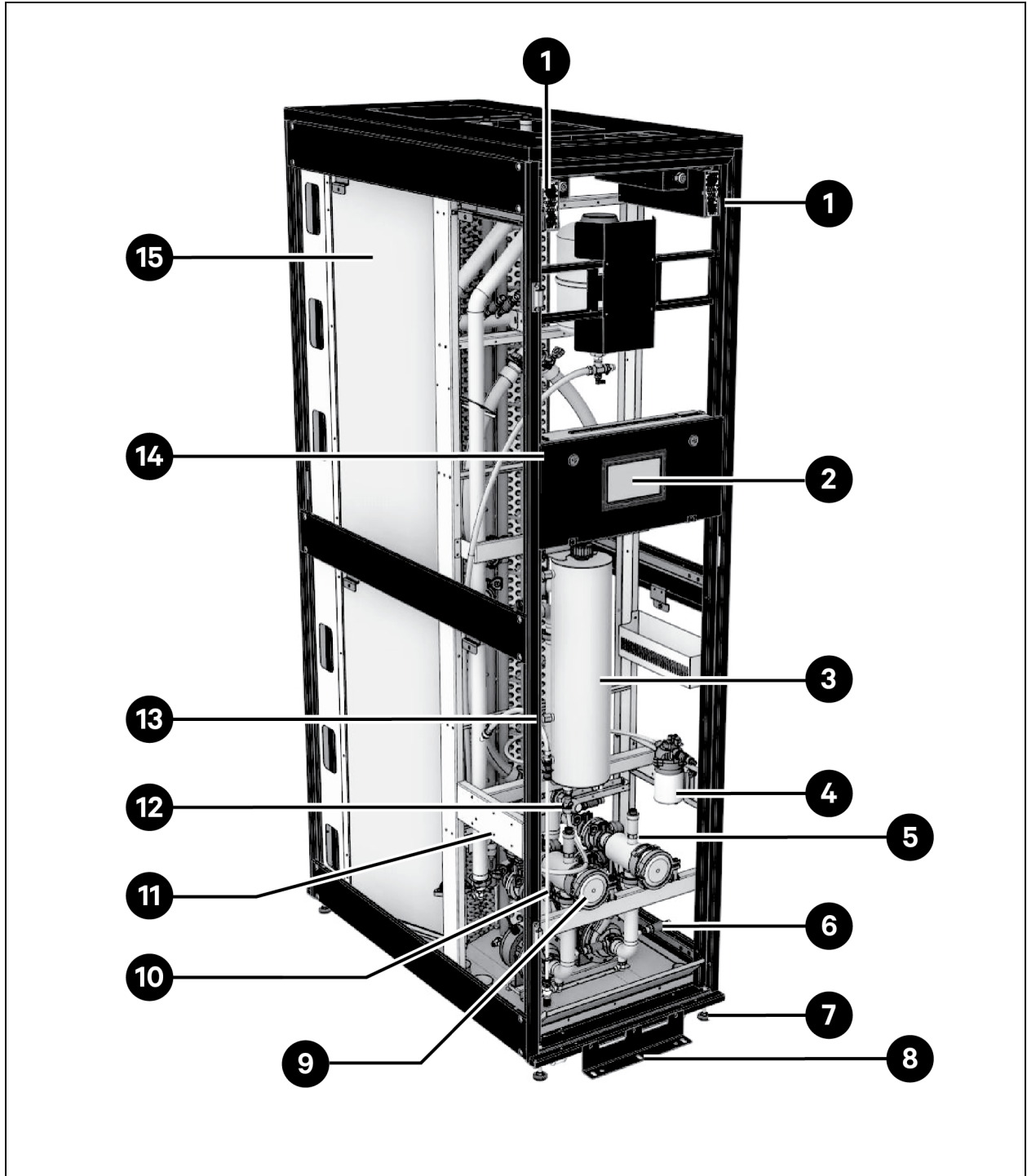
Digit	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Model	X	D	U	0	7	0	A	0	K	3	1	0	2	0	A

Table 3.2 XDU070 Nomenclature Detail

Digit	Feature	Value	Description
1,2,3	Family Name	XDU	Product family
4,5,6	Unit Model	070	Model
7	Cooling Type	A	Liquid to air
8	Place Holder	0	None
9	Voltage Selection	K	120 V - 1 PH - 60 Hz
		S	220 V - 1 PH - 50 Hz
10	PRV	3	3 bar
		4	4 bar
11	Monitoring	1	Standard
12	Connection Adapter	0	None
13	Secondary Filtration	1	Factory fitted (25 micron)
		2	Factory fitted (50 micron)
14	Placeholder	0	None
15	Configuration	A - Z	Standard configuration
		S	Special feature authorization

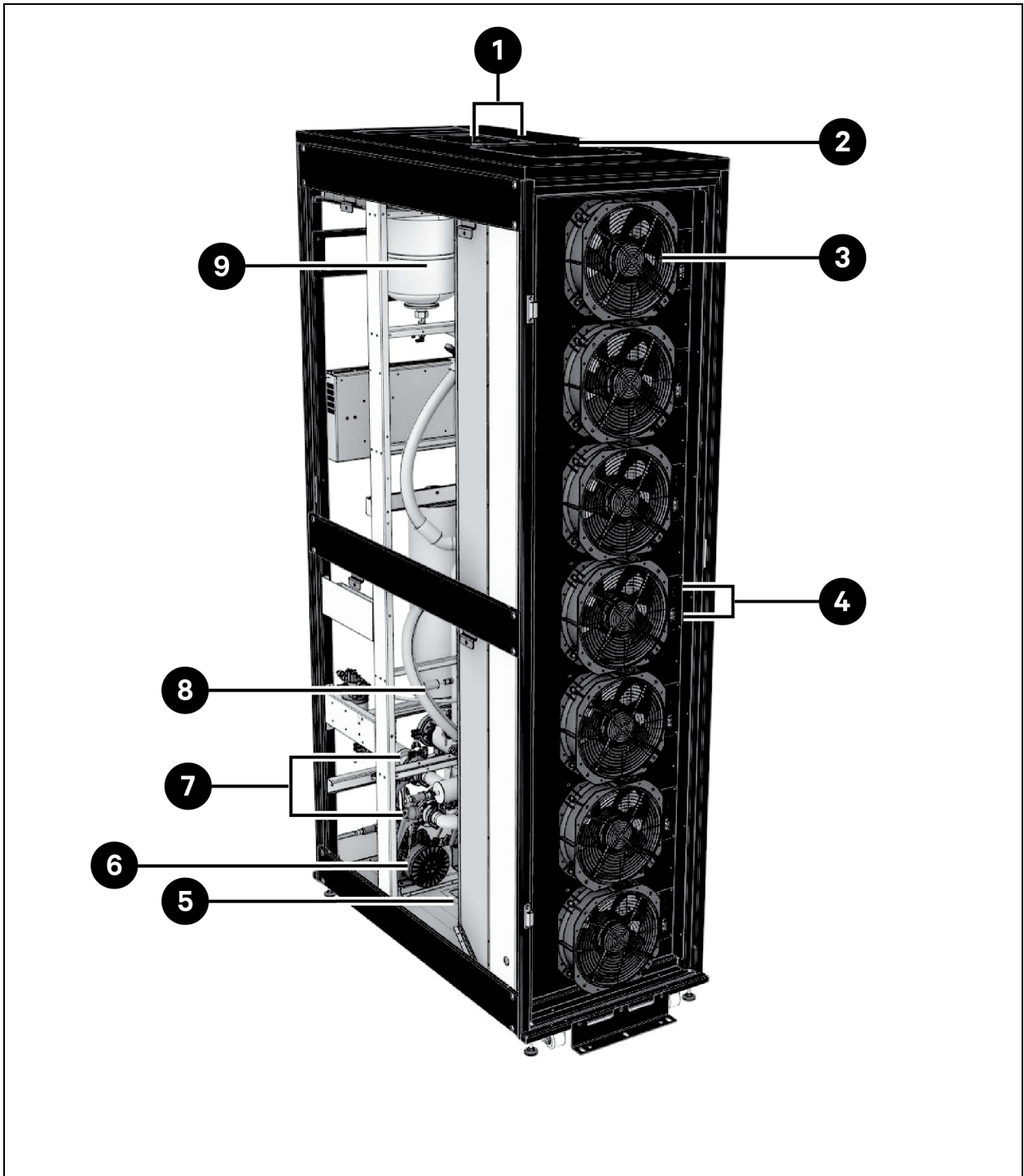
3.3 Product Views

Figure 3.1 Front View of Vertiv™ XDU070 (Doors and Side Panels Removed)



Item	Description
1	Redundant 48 VDC power supply (A and B)
2	Touchscreen display
3	Reservoir tank (2.16 gal/10 liter)
4	Fill pump P4 (reservoir tank)
5	Automatic air vents on filter
6	Pressure sensors (quantity is 7)
7	Wheels and adjustable feet
8	Tie down bracket (front and back)
9	Secondary fluid filters 50 micron
10	Filling wand
11	Fill pump P3 (System)
12	Pressure relief valve—43.5 psig (3 bar)
13	Level sensors (3 Sensors in reservoir tank) (1 Sensor in pipework)
14	Control panel
15	Cooling coil

Figure 3.2 Rear View of Vertiv™ XDU070 (Doors and Side Panels Removed)



Item	Description
1	Automatic air vents (on coil headers)
2	Access panel to 48 VDC distribution busbar and fuses
3	Axial fans 48 VDC (quantity is 7)
4	Fan fuse and connector
5	Dip tray with float switch
6	Secondary fluid circuit pumps P1 and P2 (with built in speed control)
7	Filter/pump isolation valves
8	Flow sensor
9	Expansion vessel

3.4 Spare Parts

It is recommended that the end user holds a kit of essential spare parts to enable the Vertiv™ XDU070 to be kept running with minimum downtime. Any parts replaced during maintenance or servicing must be the same specification as those being replaced and should only be obtained from Vertiv. Contact local Vertiv representative for Vertiv engineered parts, see <https://www.Vertiv.com/en-us/support/> or refer to [Technical Support/Service in the United States](#) on page 25.

The use of incorrect replacement parts may affect the operation or reliability of the unit and invalidate any warranty.

4 Technical Data

4.1 Weights and Dimensions

Table 4.1 Vertiv™ XDU070 Specifications

Nominal cooling capacity	See Figure 4.4 on page 19 and Figure 4.5 on page 20					
Maximum airflow (6X fan performance)	10,100 m ³ /h (5,945 CFM), based on Figure 4.3 on page 18					
Maximum flow (7X fan performance)	11,100 m ³ /h (6,533 CFM). See Figure 4.3 on page 18					
Maximum fluid circuit flow	120 l/m (32 gpm) at 4 psi (0.3 bar), based on Figure 4.1 on page 17					
Coolant type	Water, water/glycol or any compatible sensible phase liquid					
Pump redundancy	Single pump (N) or dual pump run mode					
Secondary coolant temperature range	50 °F to 131 °F (10 °C to 55 °C) with dew point control standard					
Maximum power consumption	1.7 kW at maximum flow and external pressure drop					
Dimensions	Width		Height		Depth	
Unit	in.	mm	in.	mm	in.	mm
Standard cabinet	23.6	600	90.6	2,300	47.2	1,200
Shipping	39.4	1,000	94.5	2,400	55.1	1,400
Weight	Dry		Operating		Shipping	
Unit	lbs.	kg	lbs.	kg	lbs.	kg
Standard Cabinet	899	408	1,007	457	1234	560
Fluid Circuit Data	Gallons			Liters		
Base unit	10.3			39		
Reservoir tank capacity	2.6			10		
Piping connection top or bottom	1.5 in. sanitary flange					
Water filtration	50 micron					
Fan Data	CFM			CMH		
Maximum air flow 6 fan operation (N+1)	5,945			10,100		
Maximum airflow 7 fan operation (N)	6,533			11,100		
Noise level at 10 ft (3 m)	< 72 dBA (sound pressure)					

Table 4.2 Operating and Storage Conditions

Operating conditions	0 °F to 104 °F (0 °C to 40 °C) ambient 10% to 90% RH (non-condensing)
Storage conditions	-40 °F to 158 °F (-40 °C to 70 °C) 5% to 93% RH (non-condensing)

4.2 Pipe Connections

Pipe connections for the fluid circuit are made in either the top or bottom of the cabinet.

The Vertiv™ XDU070 pipe connections are 1.5 in (38.1 mm) sanitary flanges located on the top and bottom of the unit. Flanges are fitted with stainless steel blanking caps to ensure that the pipework remains contaminant free during transit and for retention of the nitrogen holding charge during transit. The blanking caps need to be removed for installation.

See the **Vertiv™ XDU070 Coolant Distribution Unit Installation and Commissioning Guide SL-71110** for further detail on piping, including schematics indicating location of the sanitary flanges and blanking caps.

4.3 Electrical Data

Table 4.3 Vertiv™ XDU070 Specifications

Electric Data	FLA	MCA	OPD
115 V/1 PH/60 Hz	16	24	40
230 V/1 PH/50 Hz	8	20	32
Dual power feeds (ATS)	Standard feature		
Maximum installed load	3.91 kVA		
Agency approvals and certification	CE, cULus, RoHS		

Table 4.4 Supported Electrical Supplies

Single/Dual Pump Run Mode			
	Full Load Current (FLC)	Minimum Circuit Ampacity (MCA)	Maximum Overcurrent Protection (MOP)
230 V/1 PH/50 Hz	8 A	20 A	32 A
115 V/1 PH/60 Hz	16 A	24 A	40 A

4.4 Noise

Maximum sound power level is 72 dBA.

4.5 Fluid Circuit

Figure 4.1 on the facing page shows the pressure/flow differential available at the fluid supply and return connections of the XDU070 based on water for single pump operation.

Figure 4.1 Available Fluid External Pressure vs Flow

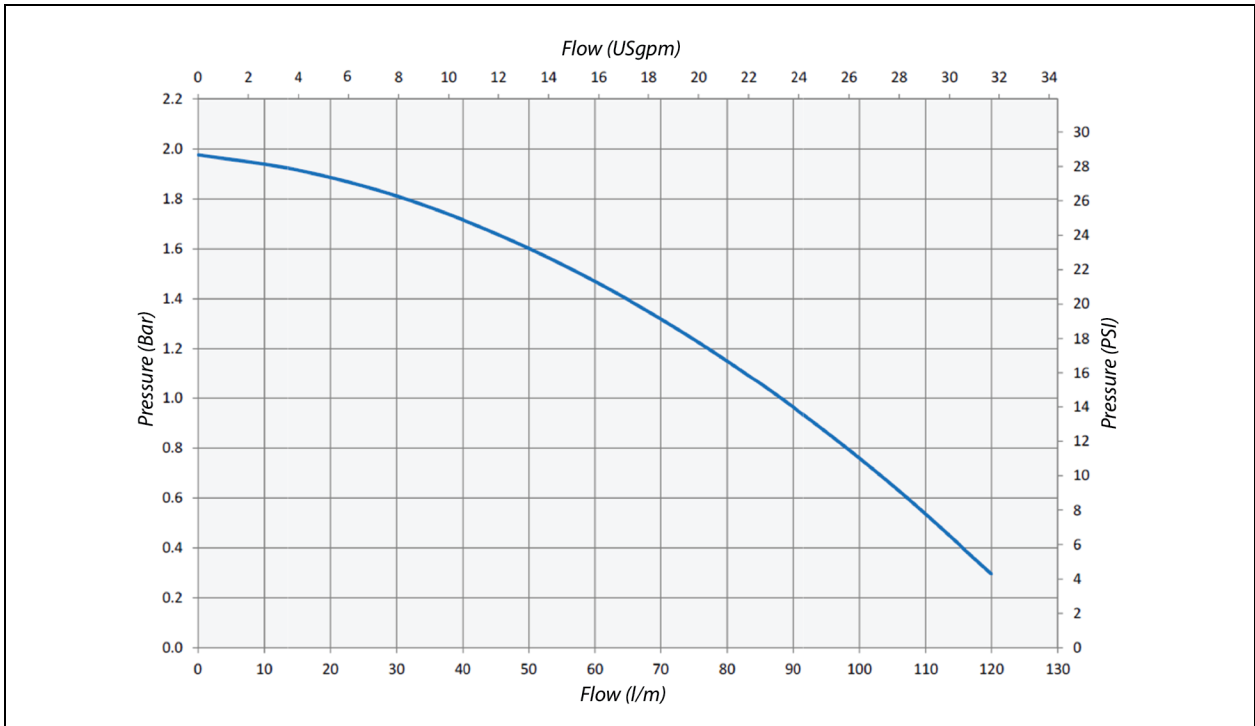
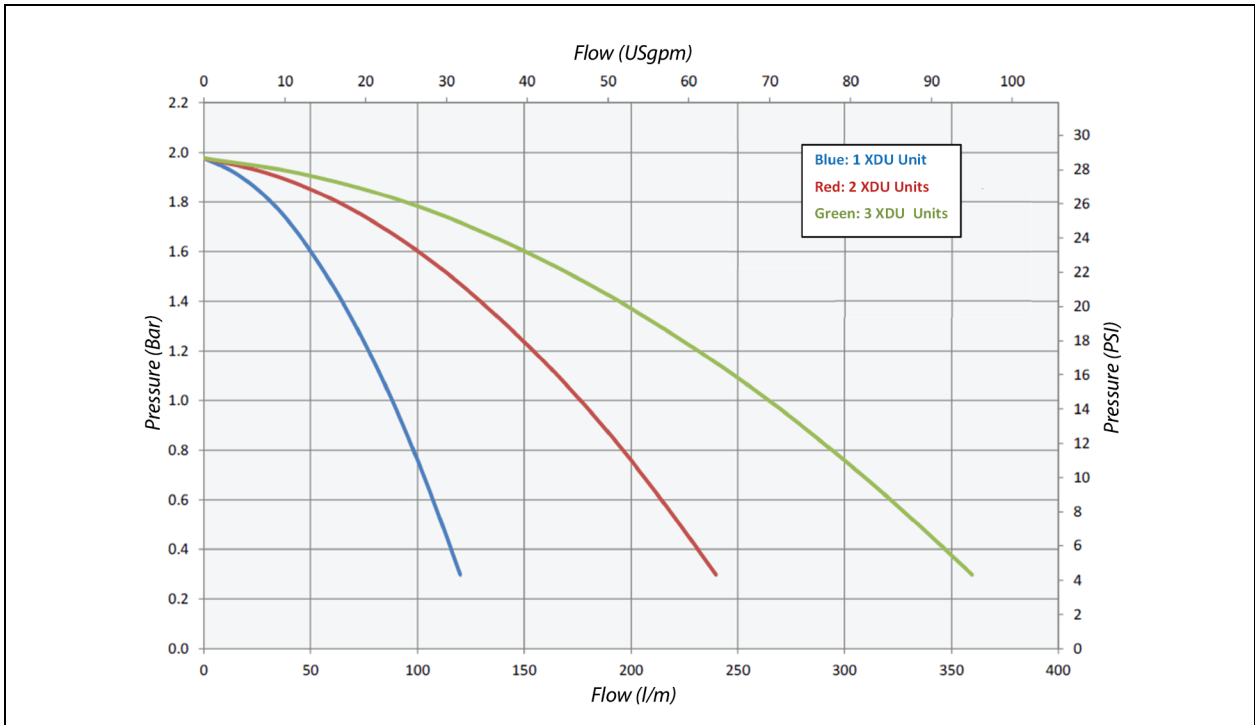


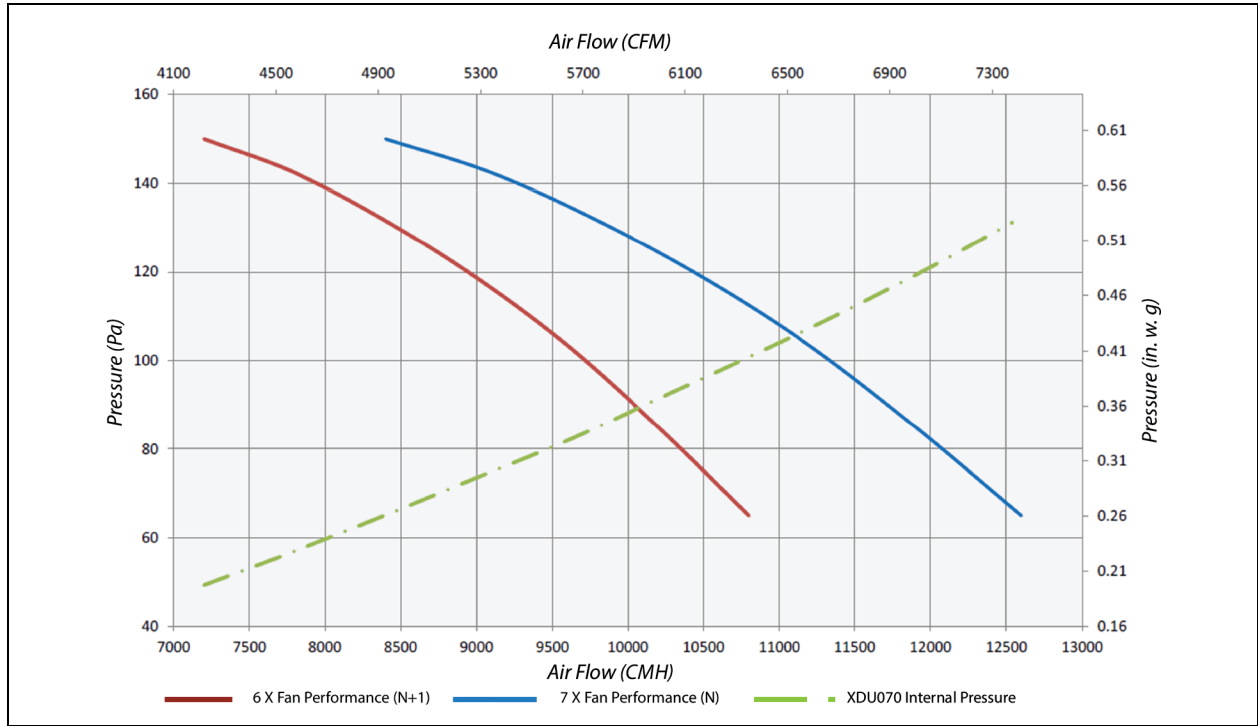
Figure 4.2 Pressure vs Flow Graph for Multiple Units in Parallel



4.6 Airside

Figure 4.3 below shows the airflow performance for 6 fans operating (N+1) and 7 fans operating (N). The usable area is that shown above the green internal pressure drop curve.

Figure 4.3 Fan Performance with Internal Pressure Drop Curve



4.7 Thermal Performance

Figure 4.4 below shows the cooling capacity performance of the Vertiv™ XDU070 unit based on 104 °F (40 °C) fluid supply temperature, at three alternative fluid flow rates for a range of air inlet temperatures (room air) from 68 °F to 95 °F (20 °C to 35 °C), equating to approach temperature differences (ATDs) 68 °F to 41 °F (20 °C to 5 °C).

The lowest 15.85 gpm (60 l/m) fluid flow shows shortened graph lines as cooling capacities beyond this point results in fluid return temperatures in excess of 149 °F (65 °C), which is deemed to be the maximum limit for the IT load.

Figure 4.4 Thermal Performance for 40 °C Fluid—Provisional

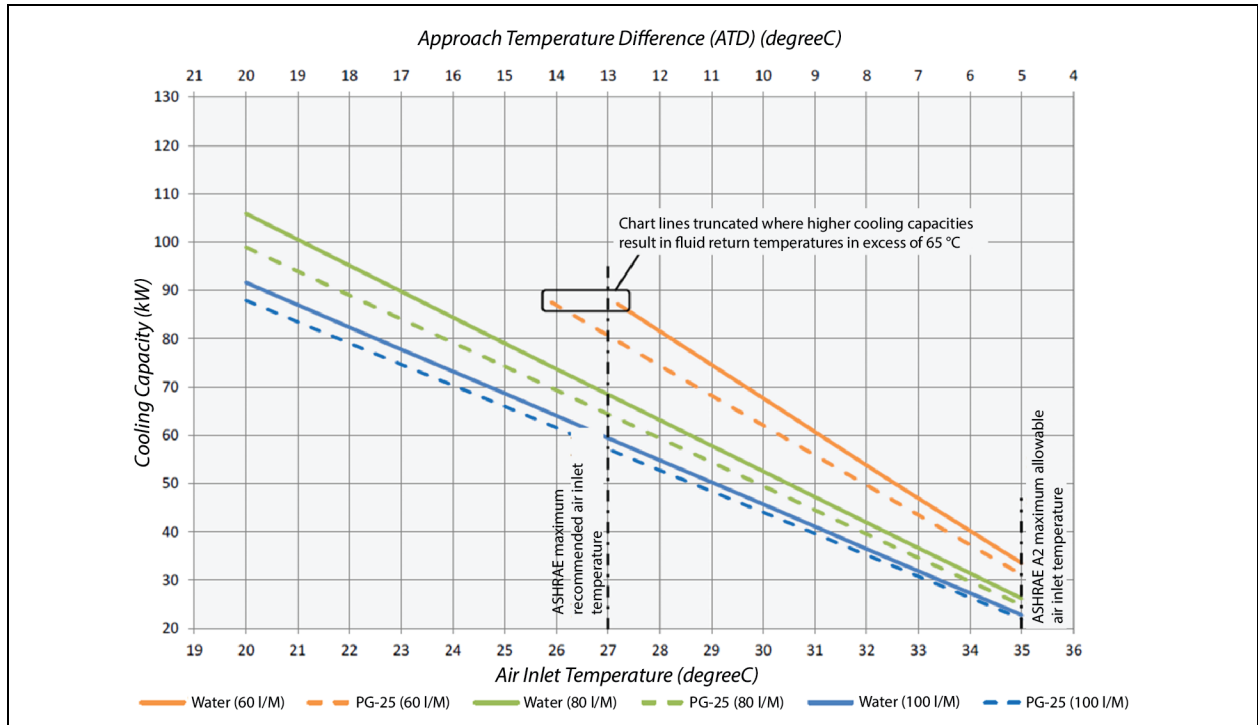
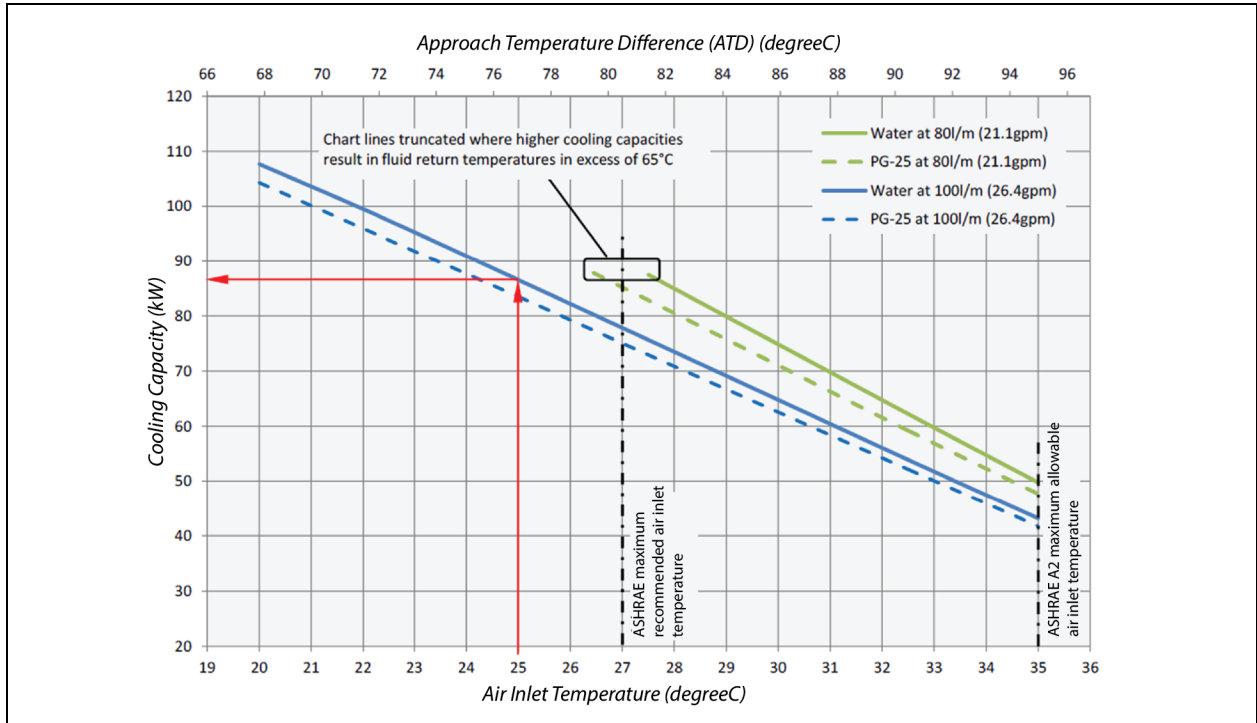


Figure 4.5 below shows the cooling capacity performance of the Vertiv™ XDU070 unit based on 113 °F (45 °C) fluid supply temperature, at two alternative fluid flow rates for a range of air inlet temperatures (room air) from 68 °F to 95°F (20 °C to 35 °C), equating to ATDs from 77 °F to 55 °F (25 °C to 10 °C).

The 21.1 gpm (80 l/m) fluid flow shows shortened graph lines as cooling capacities beyond this point results in fluid return temperatures in excess of 149 °F (65 °C), which is deemed to be the maximum limit for the IT load and the 15.85 gpm (60 l/m) graph lines have been omitted altogether as not viable.

Figure 4.5 Thermal Performance for 45 °C (ASHRAE W4) Fluid Supply Temperature



For example, as shown in **Figure 4.5** above, for a fluid supply temperature of 113 °F (45 °C), with an air inlet temperature of 25 °C (20 °C ATD) and plain water as the operating fluid at 26.4 gpm (100 l/m), the achievable heat transfer will be 86.5 kW provisional.

Both **Figure 4.4** on the previous page and **Figure 4.5** above are based on 10,000 CMH airflow, 6 fans running (N+1) provisional data.

IMPORTANT! For thermal performance at more specific conditions not covered in this document, contact the Vertiv sales representative.

4.8 Wetted Materials

For fluid compatibility purposes, all component materials in the fluid circuit are listed in **Table 4.5** below.

Table 4.5 Wetted Materials

Fluid Circuit	
Component	Materials
Hygienic fittings	<ul style="list-style-type: none"> 316 Stainless steel, EPDM seals
Butterfly hygienic valves	<ul style="list-style-type: none"> 316 St. steel EPDM seals
Hygienic seals	<ul style="list-style-type: none"> EPDM
Pipe work	<ul style="list-style-type: none"> 316 Stainless steel
Reservoir tank	<ul style="list-style-type: none"> 316 Stainless steel
Machined pipe fittings	<ul style="list-style-type: none"> 304 Stainless steel
Main pumps	<ul style="list-style-type: none"> 316 Stainless steel (housing and impeller) 304 Stainless steel (canned rotor cup) Ceramic (shaft and thrust washer) Tecapeek (bush) EPDM (O-ring seals)
Insert nonreturn valve (main pumps)	<ul style="list-style-type: none"> Acetal (body and valve) EPDM (O-ring seals) St. steel (spring)
Fill pump	<ul style="list-style-type: none"> Polyamide (body) EPDM (diaphragm) Polypropylene (collector plate)
Coil heat exchangers	<ul style="list-style-type: none"> Copper 304 Stainless steel
Coil hoses	<ul style="list-style-type: none"> 316 Stainless steel (convoluted hose) 304 Stainless steel (fittings)
Schrader valves	<ul style="list-style-type: none"> 316 Stainless steel (body and valve insert)
Pressure sensors	<ul style="list-style-type: none"> 17-4PH (630) Stainless steel
Flow meter	<ul style="list-style-type: none"> 316 Stainless steel 316 Stainless steel (compression fitting)
Filter	<ul style="list-style-type: none"> 304 and 316 Stainless steel EPDM (O-ring seals)
Drain valves	<ul style="list-style-type: none"> Nickel plated brass Nylon 6 EPDM (O-ring seal)

Table 4.5 Wetted Materials (continued)

Fluid Circuit	
Component	Materials
Automatic air vent	<ul style="list-style-type: none"> Nickel plated brass (body) St. steel (spring) Polypropylene (float) Nitrile (seals)
Pressure relief valve	<ul style="list-style-type: none"> Chrome plated brass (body) EPDM (seal)
Expansion vessel	<ul style="list-style-type: none"> 304 Stainless steel (connector) EPDM (membrane)
Expansion vessel hose	<ul style="list-style-type: none"> EPDM (hose) St. steel (connections)
Fill quick coupler and hose	<ul style="list-style-type: none"> Chrome plated brass (body) Polysulfone (valve) EPDM (seal) St. steel (spring)
Fill nonreturn valve	<ul style="list-style-type: none"> 304 Stainless steel (shell) 304 Stainless steel (valve) Viton (seal) 304 Stainless steel (spring)
Fill pump hose barb fittings	<ul style="list-style-type: none"> Nickel plated brass
Fill pump hose	<ul style="list-style-type: none"> Reinforced PVC
Push fit fittings (filling wand)	<ul style="list-style-type: none"> Acetal copolymer (body) Nitrile (seal) Stainless steel (tube grip)
Ultrasonic level sensor	<ul style="list-style-type: none"> 316 Stainless steel (body) EPDM (O-ring seal)

5 Communications

5.1 Remote Monitoring Control

The Vertiv™ XDU070 provides a RS-485 and 2 off 10/100 Ethernet communication ports for external and remote monitoring and control via customer BMS/DCIM/supercomputer control nodes.

RS-485 CONNECTION

MODBUS RTU is supported. The MODBUS register table includes all the important XDU070 data points and values. See [MODBUS Register Tables](#) on page 31.

10/100 ETHERNET PORTS

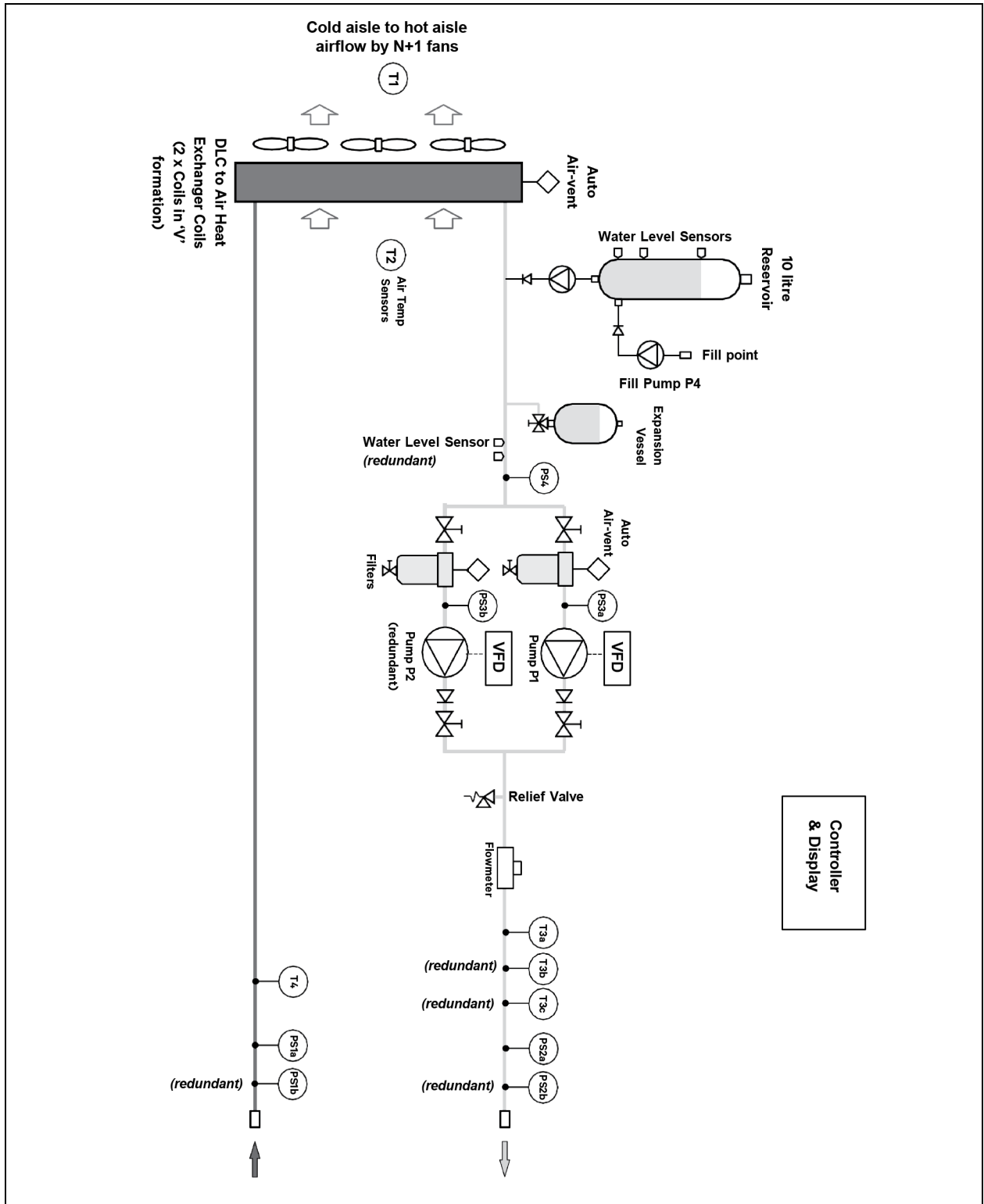
Each port can be configured with its own IP address to enable simultaneous communications with the facility BMS/DCIM and/or supercomputer control nodes.

Standard TCP/IPv4 and IPv6 secure application protocols and services are supported, including:

- SNMPv2/3 (Simple Network Management Protocol)
- HTTP/HTTPS (Web Server)
- SFTP (File Server)
- SSH (Command Line Interface)
- SMTP (Alarm Retransmission via Email)
- NTP (Network Time Protocol)
- BACnet

5.2 Pipe Schematic

Figure 5.1 Pipe Schematic



Appendices

Appendix A: Technical Support/Service in the United States

Vertiv Group Corporation

24x7 dispatch of technicians for all products.

1-800-543-2378

Liebert® Thermal Management Products

1-800-543-2378

Liebert® Channel Products

1-800-222-5877

Liebert® AC and DC Power Products

1-800-543-2378

A.1 Locations

United States

Vertiv Headquarters
505 N Cleveland Ave
Westerville, OH 43082

Europe

Via Leonardo Da Vinci 8 Zona Industriale Tognana
35028 Piove Di Sacco (PD) Italy

Asia

7/F, Dah Sing Financial Centre
3108 Gloucester Road, Wanchai
Hong Kong

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Appendix B: Warranty Details

B.1 Limited Product and Service Warranty

Extended warranties, service, and maintenance programs are available in most locations, details available upon request. To obtain further details of limited warranty, also after sales service offerings, contact local sales representative or technical support if you have any questions or problems during unit installation.

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Appendix D: MODBUS Register Tables

D.1 Discrete Inputs

Table D.1 Vertiv™ XDU070 Discrete Inputs

Register Number	Register Description	Alarm Code
1	Alarm (0 = Inactive, 1 = Active)	-
2	Alarm : T1 Temperature Sensor Fault	A01
3	Alarm : T2 Temperature Sensor Fault	A02
4	Alarm : T3a Temperature Sensor Fault	A03
5	Alarm : T3b Temperature Sensor Fault	A04
6	Alarm : T3c Temperature Sensor Fault	A05
7	Alarm : T4 Temperature Sensor Fault	A06
8	Alarm : PS1a Pressure Sensor Fault	A07
9	Alarm : PS1b Pressure Sensor Fault	A08
10	Alarm : PS2 Pressure Sensor Fault	A09
11	Alarm : PS3a Pressure Sensor Fault	A10
12	Alarm : PS3b Pressure Sensor Fault	A11
13	Alarm : Flow Sensor Fault	A12
14	Alarm : microSD Card Fault	A13
15	Alarm : Reservoir Tank Fluid Required	A14
16	Alarm : Reservoir Tank Empty	A15
17	Alarm : Pump 1 Fault Alarm : Pump 1 Fault	A16
18	Alarm : Pump 2 Fault	A17
19	Alarm : Sec Pump Flow Shutdown	A18
20	Alarm : Secondary Water Low Temp	A19
21	Alarm : Secondary Water High Temp	A20
22	Alarm : Fluid Detected – Drip Tray	A21
23	Alarm : Secondary Over Pressure	A22
24	Alarm : Secondary Over Pressure Shutdown	A23
25	Alarm : System Low Pressure	A24
26	Alarm : Insufficient Water Level	A25
27	Alarm : Level Sensor – No Water Detected	A26
28	Alarm : Illegal Water Sensor Condition	A27
29	Alarm : Sec Temp T3a Diff Fault	A28

Table D.1 Vertiv™ XDU070 Discrete Inputs (continued)

Register Number	Register Description	Alarm Code
30	Alarm : Sec Temp T3b Diff Fault	A29
31	Alarm : Sec Temp T3c Diff Fault	A30
32	Alarm : Pump 1 Communications Fault	A31
33	Alarm : Pump 2 Communications Fault	A32
34	Alarm : Pump 1 Low Flow	A33
35	Alarm : Pump 2 Low Flow	A34
36	Alarm : Fan 1 Fault	A35
37	Alarm : Fan 2 Fault	A36
38	Alarm : Fan 3 Fault	A37
39	Alarm : Fan 4 Fault	A38
40	Alarm : Fan 5 Fault	A39
41	Alarm : Fan 6 Fault	A40
42	Alarm : Fan 7 Fault	A41
43	Alarm : Group Control – Network Fault	A42
44	Alarm : Group Control – Insufficient Units Available	A43
45	Alarm : PS1 Difference Out of Limits	A44
46	Alarm : Fluid Detected - Rope	A45
47	Alarm : Pump 1 Filter Dirty	A46
48	Alarm : Pump 2 Filter Dirty	A47
49	Alarm : PSU A AC Fault	A48
50	Alarm : PSU A DC Fault	A49
51	Alarm : PSU B AC Fault	A50
52	Alarm : PSU B DC Fault	A51
53	Alarm : Leak Unit (Tray + Rope)	A52
54	Status: Fill Required	--

Access to the Discrete Inputs table is provided by MODBUS function code 02 – Read Input Status.
For all discrete input registers which contain an alarm status, a value of 1 indicates the presence of the alarm condition, whilst a value of 0 indicates the healthy (no alarm) condition.

Table D.2 Input Registers

Register Number	Description	Units	Scaling	Data Type
1	Mode 0 = not configured 1 = shutdown – remote start/stop 2 = shutdown - network 3 = full manual control 4 = standby 5 = online (running) 6 = online (filling) 7 = filling 8 = shutdown – fault 9 = group standby	n/a	1	Unsigned
2	Group Control Mode 0 = Standalone 1 = Primary 2 = Secondary 3 = Independent (due to network fault)	n/a	1	Unsigned
3	Pump 1 Speed	%	1	Unsigned
4	Pump 2 Speed	%	1	Unsigned
5	Fan Speed	%	1	Unsigned
6	Cooling Demand	%	1	Unsigned
7	Air Exit Temperature T1	°C	0.1	Unsigned
8	Air Inlet Temperature T2	°C	0.1	Unsigned
9	Fluid Supply Temperature T3a	°C	0.1	Unsigned
10	Fluid Supply Temperature T3b	°C	0.1	Unsigned
11	Fluid Supply Temperature T3c	°C	0.1	Unsigned
12	Fluid Supply Temperature T3	°C	0.1	Unsigned
13	Fluid Return Temperature T4	°C	0.1	Unsigned
14	Fluid Return Pressure PS1a	Bar	0.01	Unsigned
15	Fluid Return Pressure PS1b	Bar	0.01	Unsigned
16	Fluid Return Pressure PS1	Bar	0.01	Unsigned
17	Fluid Supply Pressure PS2	Bar	0.01	Unsigned
18	Unit Differential Pressure (PS2 – PS1)	Bar	0.01	Unsigned
19	Pump 1 Filter Inlet Pressure PS3a	Bar	0.01	Unsigned
20	Pump 2 Filter Inlet Pressure PS3b	Bar	0.01	Unsigned

Table D.2 Input Registers (continued)

Register Number	Description	Units	Scaling	Data Type
21	Pump 1 Filter Differential Pressure (PS3a – PS2)	Bar	0.01	Unsigned
22	Pump 2 Filter Differential Pressure (PS3b – PS2)	Bar	0.01	Unsigned
23	Secondary Flow Rate	l/m	1	Unsigned
24	Secondary Duty	kW	1	Unsigned
25	Pump P1 Runtime	Hours	1	Unsigned
26	Pump P2 Runtime	Hours	1	Unsigned
27	Controller Uptime	Mins	1	Unsigned
28	System (Group) Average Secondary Differential Pressure	Bar	0.01	Unsigned
29	System (Group) Total Secondary Flow Rate	l/m	1	Unsigned
30	Controller Software Version Number Format is x.yy where x = major version number, yy = minor version number	n/a	0.01	Unsigned

Access to the Input Register table is provided by MODBUS function code 04 – Read Input Registers.

Table D.3 Coils

Register Number	Description
1	Remote Shutdown To switch on the XDU070 write OFF. To switch off the XDU070 write ON.

By default, the coil table is read-only. Read-write access may be enabled via P072 Write Access parameter, accessible via the touchscreen UI.

Read access to the Coil table is provided by MODBUS function code 01.

Write access to the Coil table is provided by MODBUS function code 05.

Table D.4 Holding Registers

Register Number	Description	Units	Scaling	Data Type
1	Secondary Temperature Setpoint (P301)	°C	0.1	Unsigned
2	Secondary DP Setpoint (P203)	Bar	0.1	Unsigned
3	Secondary Flow Setpoint (P202)	l/m	1 l/m	Unsigned

By default, the holding register table is read-only. Read-write access may be enabled via the P072 Write Access parameter, accessible via the touchscreen UI.

Read access to the Holding Register table is provided by MODBUS function code 03 – Read Holding Registers.

For write access, MODBUS function code 06 - Preset Single Register is supported.

An attempt to write a holding register value when read-only access is active will result in an exception code being returned.

Appendix E: Disposal Procedure

Waste materials must be disposed of in a responsible manner in line with environmental regulations.

Decommissioning and disposal of this product should be undertaken by qualified personnel in adherence to local and national safety regulations, particularly for protection of lungs, eyes, and skin from chemicals, dust etc. Approved lifting gear and power tools should be used and access to the work area must be restricted to authorized personnel. The following steps are a guide only and should be adjusted to take into account local site conditions:

1. Disconnect unit from electrical supply.
2. Drain and dispose of any heat transfer fluid through an approved recycling facility.
3. Remove unit to an approved recycling facility.

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