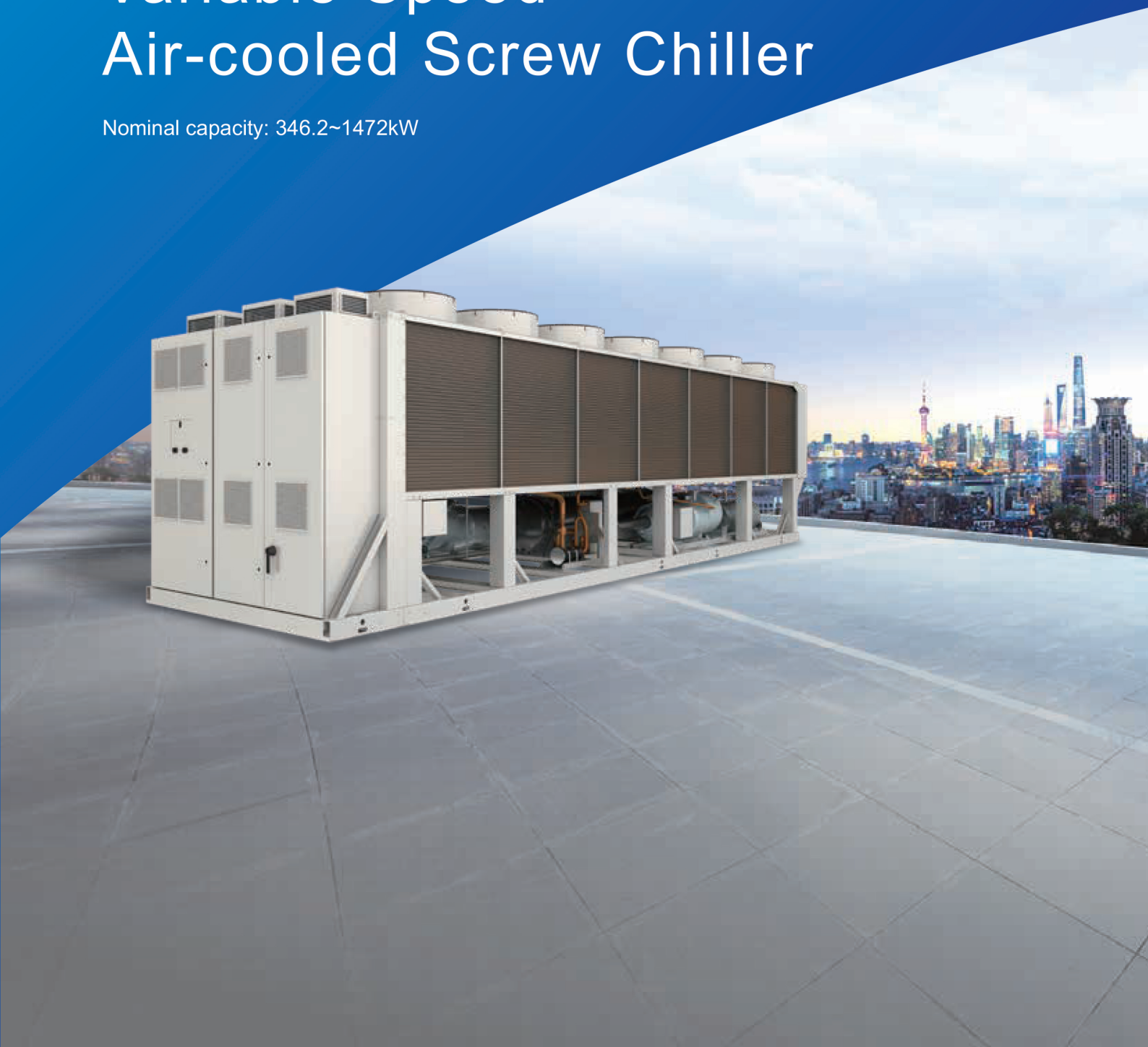
Carrier

greenspeed AQUAFORCE™

30KAV
Variable Speed
Air-cooled Screw Chiller

Nominal capacity: 346.2~1472kW





In 1998, Time magazine named Dr. Carrier one of its 20 most influential builders and titans of the 20thcentury.

Carrier is a leading global provider of innovative HVAC, refrigeration, fire, security and building automation technologies. Supported by the iconic Carrier name, the company's portfolio includes industry-leading brands such as Carrier, Kidde, Edwards, LenelS2 and Automated Logic. Carrier's businesses enable modern life, delivering efficiency, safety, security, comfort, productivity and sustainability across a wide range of residential, commercial and industrial applications.



Nomenclature

30KAV1100 A PT002B

Unit option

PT001	Cu/Cu coil
PT002B	Blygold PoluAL
PT003A	Pretreated Coating (Gold Fin)
PT005	Brine option (part models*)
PT303	Pretreated Coating (Blue Fin)
PT010F	Fixed speed fan
PT012	High Static Fan
PT015	Hard sound insulation cover (part models)
PT015S	Low noise level (Compressor sound jacket)
PT015LS	Ultra-low noise option (part models)
PT020A	IP54 Control Box
PT041A	Evaporator Anti-Freeze Protection
PT050	Total heat recovery option (part models**)
PT060	460V-3Ph-60Hz
PT061	380V-3Ph-60Hz
PT071	High efficiency
PT093A	Compressor discharge valves
PT104	1.6Mpa evporatior
PT107	Reversed Evaporator Connection
PT148B	J-Bus Gateway
PT148C	Bacnet Gateway
PT148D	LonTalk Gateway
PT156	Energy Management Module
PT275	Remote controller
PT281	Evaporator with aluminum jacket
PT282	EMC Classification C2
PT299	38mm Evaporator Insulation
PT301	Lead/lag control
PT305A	Spring damping
PT309D	Isolate valve for saftey valve(dual safety valve)
PT312A	Australian PV code

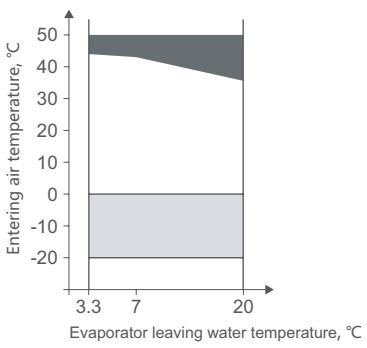
Design Series

Unit Model Air-cooled Variable Speed Screw chiller 30KAV0351A-1500A

*single circuit: 30KAV0351-0901 dual circuit:30KAV0550-1100
**30KAV0351 30KAV0551 30KAV0751 30KAV1000

Operating Range

Evaporator		Min. temperature	Max. temperature
Entering water temperature (at start)	℃	-	45
Entering water temperature (operating)	℃	6.8	26
Leaving water temperature (operating)	℃	3.3	20
Condenser		**Min. temperature**	**Max. temperature**
Outdoor air temperature	℃	-20	50



Below 0℃ air tempature the unit must either be equipped with evaporator frost protection option (PT041A), or the water loop must be protected against frost by using a frost protection solution (by the installer).

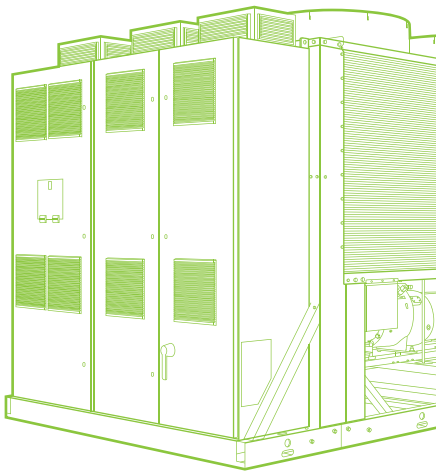
Part load average.

Introduction

- The Aquaforce chillers that apply zero ozone depletion potential HFC-134a refrigerant with Greenspeed™ Intelligence are the premium solution for commercial and industrial applications where installers, consultants and building owners require superior reliability and optimal performances, especially at part load.

- 30KAV are designed to meet current and future requirements in terms of energy efficiency, versatility and operating sound levels. Through the optimised combination of proven best-in-class technologies that include:
  - Exclusive new screw compressors with Greenspeed™ Intelligence.
  - Carrier® Smartvu™.
  - Condenser fans with Greenspeed™ Intelligence.

Low Energy Consumption

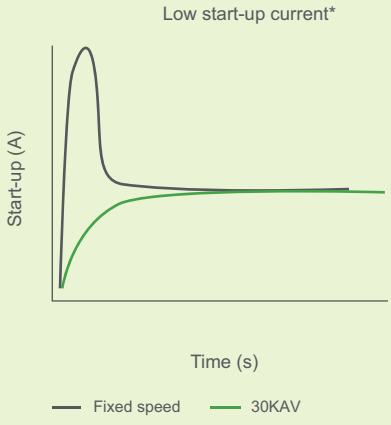


- The air conditioning system could use 30%~40% of anual buidling engery consumption, 30KAV helps customer involved in green building certification with Greenspeed® inveter - driven technology.

- With advanced unit mounted inverter-driven technolgy, the 30KAV is designed for high performance both at full load and at part load. Exceptional efficiency performance at part load which is up to 5.8, customer even can select PT071 (high efficiency) to achieve high performance and energy saving.

- Cooperating with primary viarable flow system, the system efficiency would be further enhanced by synchronized control of chillers and pumps.

- The high energy efficiency is reached thanks to:
  - Inverter driven twin-rotor screw compressors allowing precise capacity matching of buliding load and reducing unit power input, especially at part-load.
  - Inverter driven fan motors minimizing power consumption while granting optimum air flow.
  - Electronic expansion device permitting operation at a lower condensing pressure and improved utilization of the evaporator heat exchange surface.
  - Economizer system with electronic expansion device increases cooling capacity by 10% and efficiency by 4%.



*Based on Carrier data fitting



AHRI C
ww
Air-Cooled Chillers
AHRI Standards 550/590

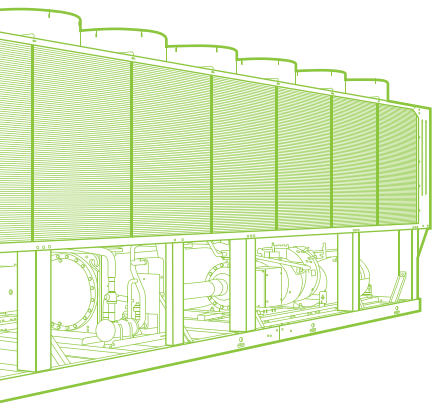
Absolute Reliability

- Screw compressors with Greenspeed™ Intelligence:
  - Industrial-type screw compressors with oversized bearings and motor cooled by suction gas.
  - Specifically sized inverter for each compressor motor ensures reliable operation and easy maintenance.
  - All compressor components assembly are easily accessible on site minimising down-time.

- Fans with Greenspeed™ Intelligence.
  - Fans equipped with inverter-driven asynchronous motors.
  - Specifically sized inverter optimize air flow management reducing cost.
  - Easily accessible inverter of fan speed control for easy service.

- Brine option design:
  - Apply certain concentration of ethylene glycol or propylene glycol and evaporator leaving water temperature can reach -6℃
  - Reducing tubes in evaporator increase flow rate to ensure chiller stable operation even when the evaporator leaving water temperature is less than 0℃.

- Exceptional endurance tests.
  - Partnerships with specialised laboratories and use of limit simulation tools (finite element calculation) for the design of critical components.
  - Transport simulation test equivalent to 2000 km by truck under harsh conditions.
  - Salt mist corrosion resistance test in the laboratory for increased corrosion resistance.



Total Heat Recovery Application

- Carrier total heat recovery chillers can provide both cooling and hot water which can be widely used by customers like hotel, factory and etc.

- Both the evaporator and condenser of total heat recovery chiller which are designed in series and the multi-function valve ensures chiller stably producing hot water even under low ambient temperature.

- Fan stops running to reduce noise and improve chiller efficiency under total heat recovery module.

- Cost saving during lifetime with high integrated efficiency .
  - Saving investment of boiler and auxiliary equipment .
  - Free hot water and the fan stops to reduce consumption.

- One chiller can meet cooling and sanitary water demand simultaneously to save more useful space for user.

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and 551/591

Minimised Operating Sound Levels

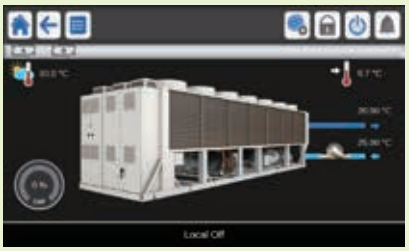
- The inverter technology used for the compressor and fan motors minimises noise levels at part load operation. When the unit is delivering 25% for example, compressors and fans are running at minimum speed which implies lower noise.

- Standard unit features include:
  - Discharge dampers integrated in the oil separator (Carrier patent).
  - Condenser coils in W-shape with an open angle, allowing quieter air flow across the coil.
  - Low-noise fans made of a composite material (Carrier patent) do not generate intrusive low frequency noise.

General Features

- New innovative smart control features:
  - An intuitive and user-friendly, 7" colored interface.
  - Screen-shots with concise and clear information in local languages.
  - Complete menu, customized for different users (end user, service personnel and Carrier-factory technicians).
  - Easy access to the controller box with touch screen mounting to ensure legibility under any lighting conditions.
  - Safe operation and unit setting: password protection ensures that unauthorized people cannot modify any advanced parameters.
  - Simple and “smart” intelligence uses data collection from the constant monitoring of all machine parameters to optimise unit operation.
  - Night-mode: Cooling capacity management for reduced noise level.
  - Multiple protocols: BACnet IP & MSTP, Modbus IP & RTU, LON Talk, J-Bus are supported (BAcnet IP/Modbus IP as standard).







Economical operation

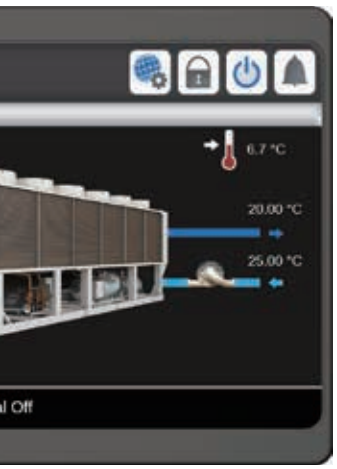
- Energy management:
  - Internal time schedule clock controls chiller on/off times and opera tion at a second set-point.
  - The DCT (Data Collection Tool) records the alarms history to simplify and facilitate service operations.

Remote Management (Standard)

- Units with Carrier® SmartVu™ control can be easily accessed from the internet, using a PC with an Ethernet connection. This makes remote control quick and easy and offers significant advantages for service operations.
- Equipped with an RS485 serial port that offers multiple remote control, monitoring and diagnostic possibilities. When networked with other Carrier equipment through the CCN (Carrier Comfort Network - proprietary protocol), all components form a HVAC system fully-integrated and balanced through one of the Carrier’s network system products, like the Chiller System Manager or the Plant System Manager (optional). also communicates with other building management systems viaoptional communication gateways.

Quiet operation

- The following commands/visualizations are possible from remote
  - Start/Stop of the machine.
  - Dual set-point management: Through a dedicated contact is possible to activate a second set-point (example: unoccupied mode).
  - Demand limit setting: To limit the maximum chiller capacity to a predefined value.
  - Water pump control: These outputs control the contactors of one/two evaporator water pumps.
  - Operation visualization: Indication if the unit is operating or if it's in stand-by (no cooling load).
  - Alarm visualization.



Absolute reliability

- The Energy Management Module (EMM) offers extended remote control possibilities:
  - Room temperature: Permits set-point reset based on the building indoor air temperature (if Carrier thermostat are installed).
  - Set-point reset: Ensures reset of the cooling set-point based on a 4-20 mA or 0-10 V signal.
  - Demand limit: Permits limitation of the maximum chiller power or current based on 0-10 V signal.
  - Demand limit 1 and 2: Closing of these contacts limits the maximum chiller power or current to two predefined values.
  - User safety: This contact can be used for any customer safety loop; opening the contact generates a specific alarm.
  - Ice storage end: When ice storage has finished, this input permits return to the second set-point (unoccupied mode).
  - Time schedule override: Closing of this contact cancels the time schedule effects.
  - Out of service: This signal indicates that the chiller is completely out of service.
  - Chiller capacity: This analogue output (0-10 V) gives an immediate indication of the chiller capacity.
  - Alert indication: This volt-free contact indicates the necessity to carry out a maintenance operation or the presence of a minor fau.
  - Compressors running status : Set of outputs (as many as the compressors number) indicating which compressors are running.

Performance data-standard chiller

Model		30KAV	0550A	0660A	0700A	0800A	0900A	1000A	1100A
Nominal cooling capacity*		kW	546.3	664.8	712.9	798.3	887.9	986.2	1068
Compressor power input		kW	158.1	202.6	211.5	244.0	274.7	298.2	333.4
Total power input		kW	170.7	215.8	226.1	260.0	292.1	317.0	353.6
Compressor			VFD Semi-hermetic screw compressor						
CircuitA			1	1	1	1	1	1	1
CircuitB			1	1	1	1	1	1	1
CircuitC			-	-	-	-	-	-	-
CircuitD			-	-	-	-	-	-	-
Minimum capacity		%	10%	10%	10%	10%	10%	10%	10%
Refrigerant			R134a						
CircuitA		kg	85	92	92	100	100	125	125
CircuitB		kg	80	85	90	90	95	95	125
CircuitC		kg	-	-	-	-	-	-	-
CircuitD		kg	-	-	-	-	-	-	-
Control			Carrier® SmartVu™ system						
Condenser			Cu/Al heat exchanger						
Fans			Axial fan						
Quantity			8	9	10	11	12	13	14
Total air flow		l/s	40080	45100	50110	55120	60130	65140	70150
Fan speed		rpm	950						
Evaporator			Flooded multi-pipe						
Water content		l	79	93	93	127	127	146	157
Nominal water flow		l/s	26.04	31.69	33.98	38.05	42.32	47.01	50.92
Nominal water pressure drop		kPa	47.2	53.4	46.3	31.1	45.9	46.3	44.4
Max. water-side pressure (without hydronic module)		kPa	1000						
Water connection			Victaulic						
Nominal Diameter		DN	125	150	150	150	150	200	200
Electrical data									
Nominal power supply			400V-3Ph-50Hz						
Control power supply			VFD start						
Start-up method			24V via internal transformer						
Fan and control power		kW	12.6	13.2	14.6	16.0	17.4	18.8	20.2
Nominal unit current draw	Circuit A+B	A	267	339	356	404	452	497	550
	Circuit C+D	A	-	-	-	-	-	-	-
Maximum uint current draw	Circuit A+B	A	343	425	450	517	585	610	682
	Circuit C+D	A	-	-	-	-	-	-	-
Maximum start-up current	Circuit A+B	A	343	425	450	517	585	610	682
	Circuit C+D	A	-	-	-	-	-	-	-
Max operation power	Circuit A+B	kW	221	274	290	333	377	393	439
	Circuit C+D	kW	-	-	-	-	-	-	-
Unit length		mm	5399	6475	6475	7555	7555	8635	8635
Unit width		mm	2253						
Unit height		mm	2379						
Shipping weight		kg	5368	5825	5981	6800	7284	7624	7812
Operating weight (Standard)		kg	5235	5626	5796	6620	7104	7428	7627

Performance data-standard chiller

Model		30KAV	0351A	0451A	0551A	0651A	0751A	0901A	1160A	1230A	1300A	1350A	1400A	1500A
Nominal cooling capacity*		kW	346.2	430.2	537.3	614.1	738.1	875.1	1162	1224	1300	1348	1408	1472
Compressor power input		kW	101.9	129.5	161.4	191.5	229.7	269.4	364.0	383.2	407.1	423.2	440.1	461.2
Total power input		kW	110.9	138.5	173.2	203.3	244.3	286.8	387.0	406.2	432.9	449.0	468.7	489.8
Compressor			VFD Semi-hermetic screw compressor											
CircuitA			1	1	1	1	1	1	1	1	1	1	1	1
CircuitB			-	-	-	-	-	-	-	-	-	-	-	-
CircuitC			-	-	-	-	-	-	1	1	1	1	1	1
CircuitD			-	-	-	-	-	-	-	-	-	-	-	-
Minimum capacity		%	20%	30%	20%	30%	30%	20%	15%	15%	15%	15%	15%	15%
Refrigerant			R134a											
CircuitA		kg	95	100	160	170	180	200	160	170	160	170	160	180
CircuitB		kg	-	-	-	-	-	-	-	-	-	-	-	-
CircuitC		kg	-	-	-	-	-	-	170	170	180	180	200	180
CircuitD		kg	-	-	-	-	-	-	-	-	-	-	-	-
Control			Carrier® SmartVu™ system											
Condenser			Cu/Al heat exchanger											
Fans			Axial fan											
Quantity			6	6	8	8	10	12	16	16	18	18	20	20
Total air flow		l/s	30060	30060	40080	40080	50110	60130	80170	80170	90190	90190	100200	100200
Fan speed		rpm	950											
Evaporator			Flooded multi-pipe											
Water content		l	44	84	84	101	101	127	185	202	185	202	211	202
Nominal water flow		l/s	16.50	20.51	25.61	29.27	35.19	41.71	55.40	58.34	61.96	64.25	67.12	70.16
Nominal water pressure drop		kPa	26.4	30.7	41.3	44.8	52.2	55.8	49.7	51.4	61.1	62.8	63.7	66.6
Max. water-side pressure (without hydronic module)		kPa	1000											
Water connection			Victaulic											
Nominal Diameter		DN	100	125	125	150	150	150	200	200	200	200	200	200
Electrical data														
Nominal power supply			400V-3Ph-50Hz											
Control power supply			VFD start											
Start-up method			24V via internal transformer											
Fan and control power		kW	9.0	9.0	11.8	11.8	14.6	17.4	23.0	23.0	25.8	25.8	28.6	28.6
Nominal unit current draw	Circuit A+B	A	174	218	272	319	383	450	272	319	272	319	272	383
	Circuit C+D	A	-	-	-	-	-	-	319	319	383	383	450	383
Maximum uint current draw	Circuit A+B	A	230	286	352	399	485	550	352	399	352	399	352	485
	Circuit C+D	A	-	-	-	-	-	-	399	399	485	485	550	485
Maximum start-up current	Circuit A+B	A	230	286	352	399	485	550	352	399	352	399	352	485
	Circuit C+D	A	-	-	-	-	-	-	399	399	485	485	550	485
Max operation power	Circuit A+B	kW	148	184	227	257	312	355	227	257	227	257	227	312
	Circuit C+D	kW	-	-	-	-	-	-	257	257	312	312	355	312
Unit length		mm	4325	4325	5405	5405	6485	7565	10775	10775	11855	11855	12970	12935
Unit width		mm	2253											
Unit height		mm	2379											
Shipping weight		kg	4233	4398	4798	5276	5658	6373	10074	10552	10456	10934	11171	11316
Operating weight (Standard)		kg	4065	4265	4665	5165	5496	6198	9830	10330	10161	10661	10863	10992

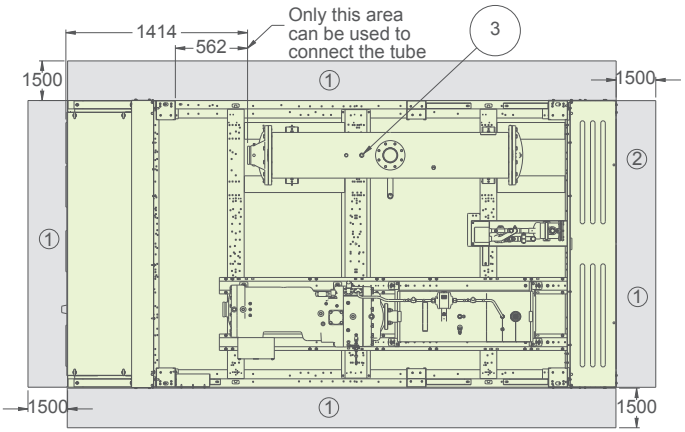
Notes: * Nominal conditoins - evaporator entering/leaving water temperature=12/7˚C, outdoor air temperature = 35˚C Evaporator fouling factor = 0.018m^2K/kW

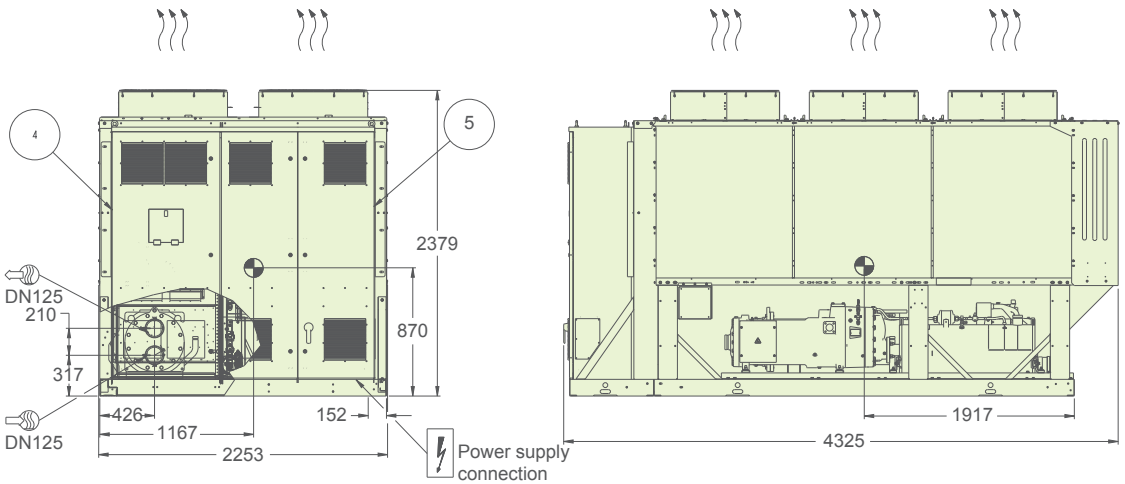
* IPLV Calculations according to standard performances (in accordance with AHRI 550-590)

* Voltage range ±10% nominal voltage.

Dimension Drawing

30KAV0351A



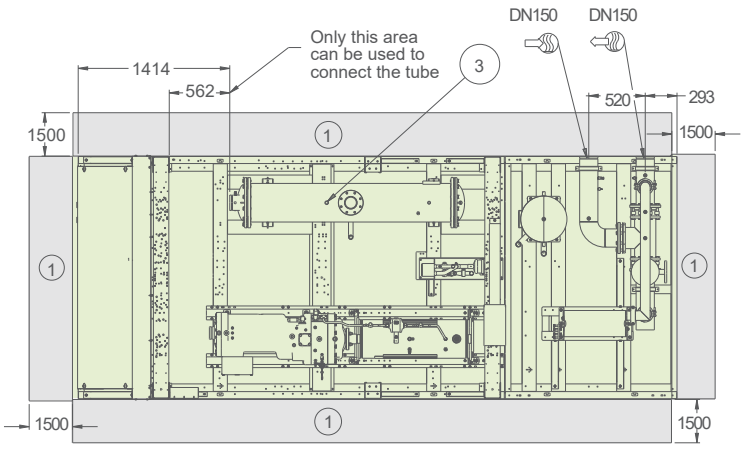


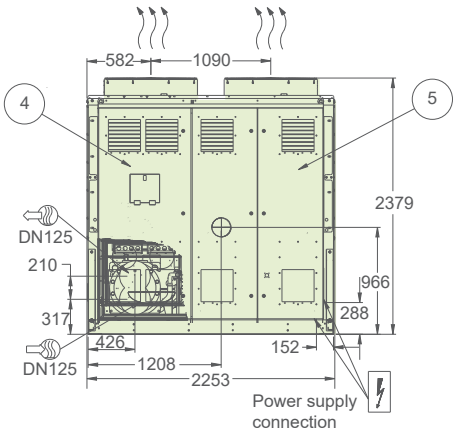
① Required clearances for maintenance
② Recommended space for evaparator tube removal
③ Safety valve
④ Fan drive cabinet
⑤ Comp drive cabinet

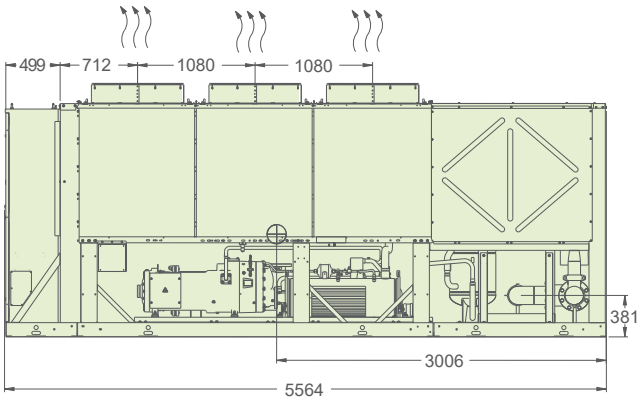
Water inlet
Water outlet
Air outlet
Power supply connection
Center gravity

Dimension Drawing

30KAV0351APT050





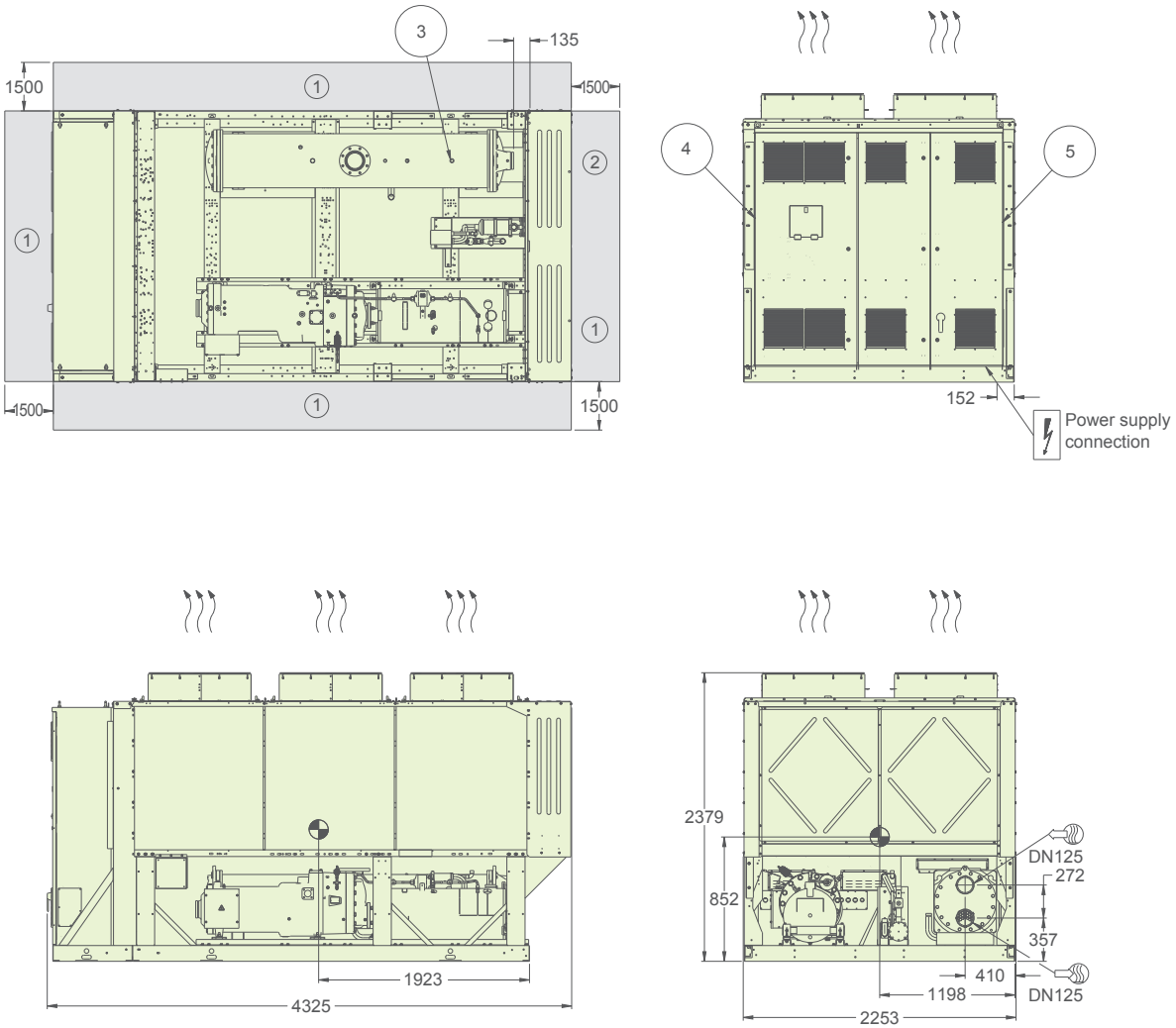


① Required clearances for maintenance
② Recommended space for evaparator tube removal
③ Safety valve
④ Fan drive cabinet
⑤ Comp drive cabinet

Water inlet
Water outlet
Air outlet
Power supply connection
Center gravity

Dimension Drawing

30KAV0451A

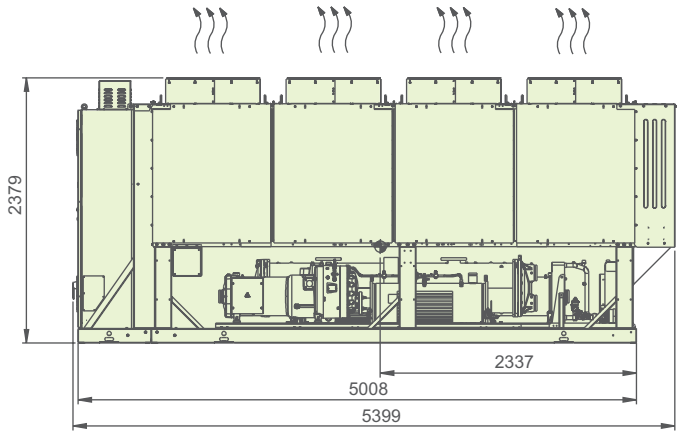


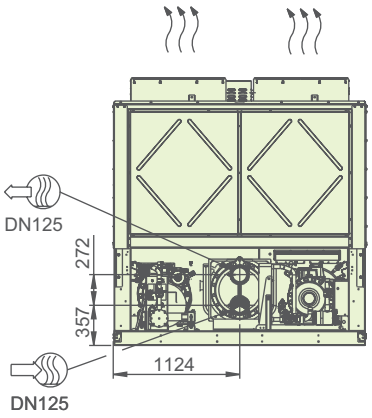
① Required clearances for maintenance
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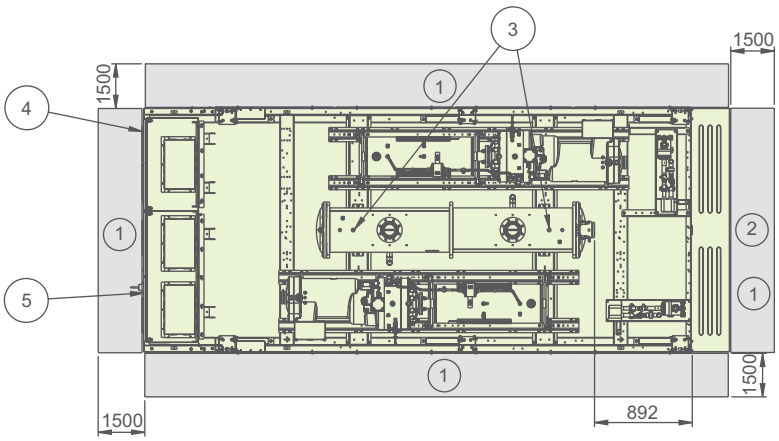
Water inlet
Water outlet
Air outlet
Power supply connection
Center gravity

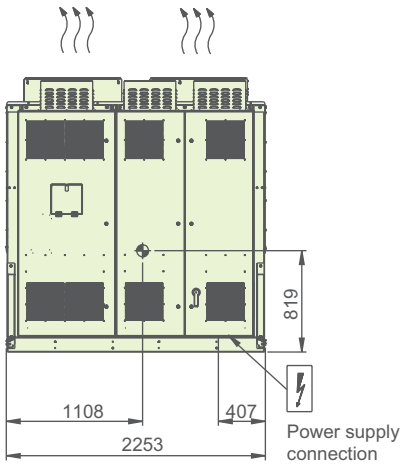
Dimension Drawing

30KAV0550A







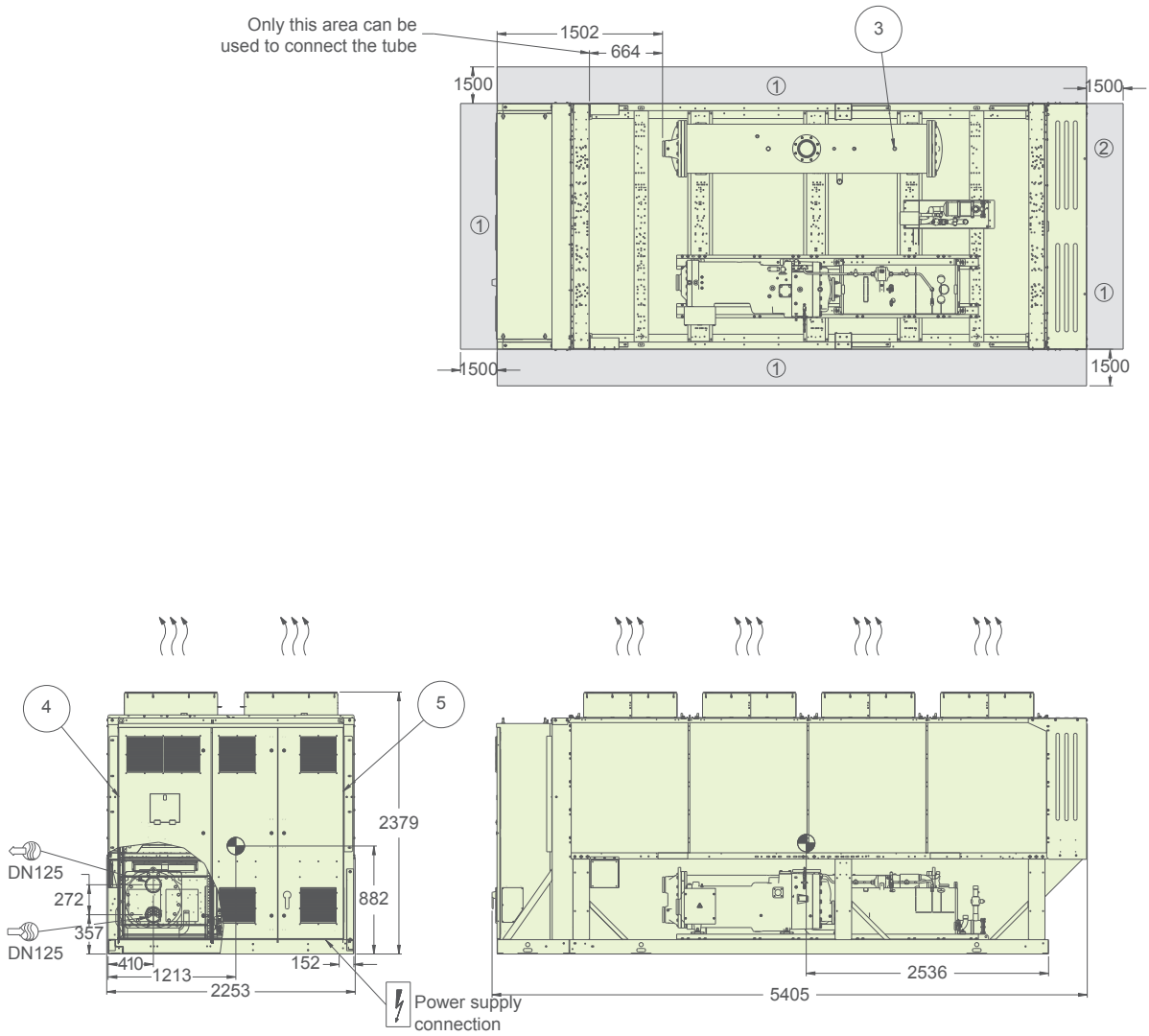


① Required clearances for maintenance
② Recommended space for evaparator tube removal
③ Safety valve
④ Fan drive cabinet
⑤ Comp drive cabinet

Water inlet
Water outlet
Air outlet
Power supply connection
Center gravity

Dimension Drawing

30KAV0551A

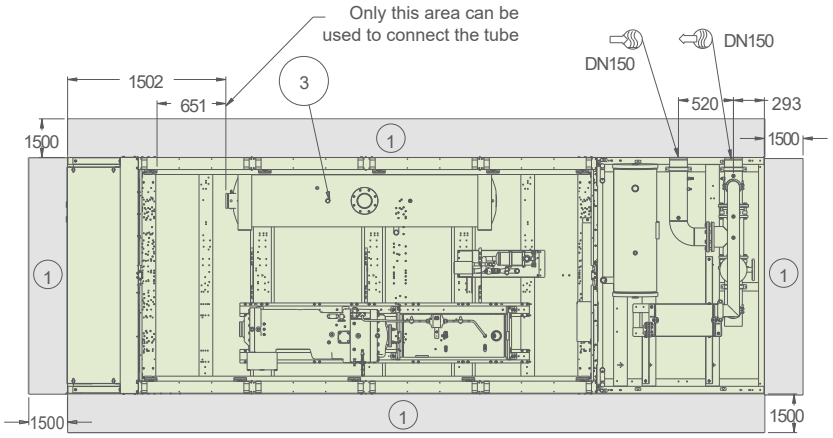


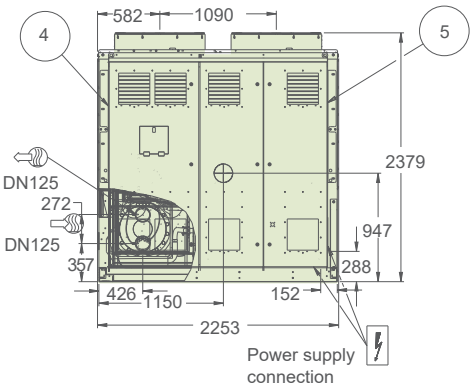
① Required clearances for maintenance
② Recommended space for evaparator tube removal
③ Safety valve
④ Fan drive cabinet
⑤ Comp drive cabinet

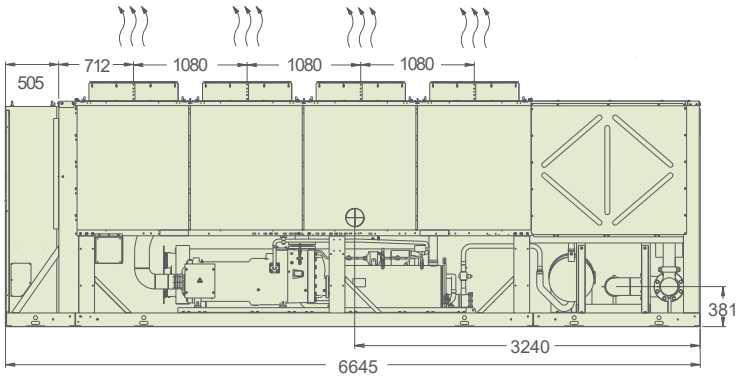
Water inlet
Water outlet
Air outlet
Power supply connection
Center gravity

Dimension Drawing

30KAV0551APT050





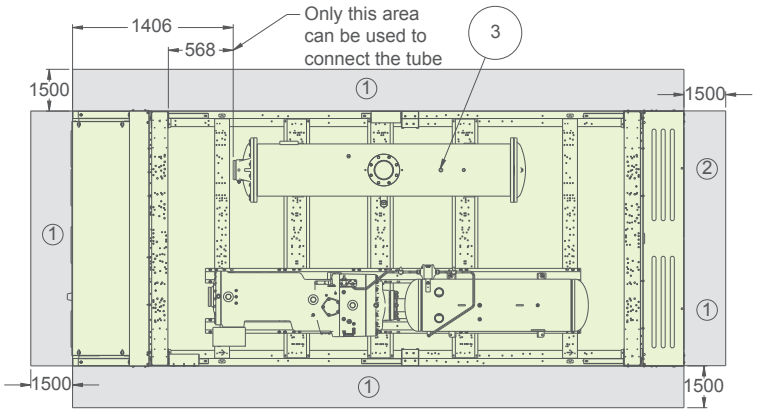


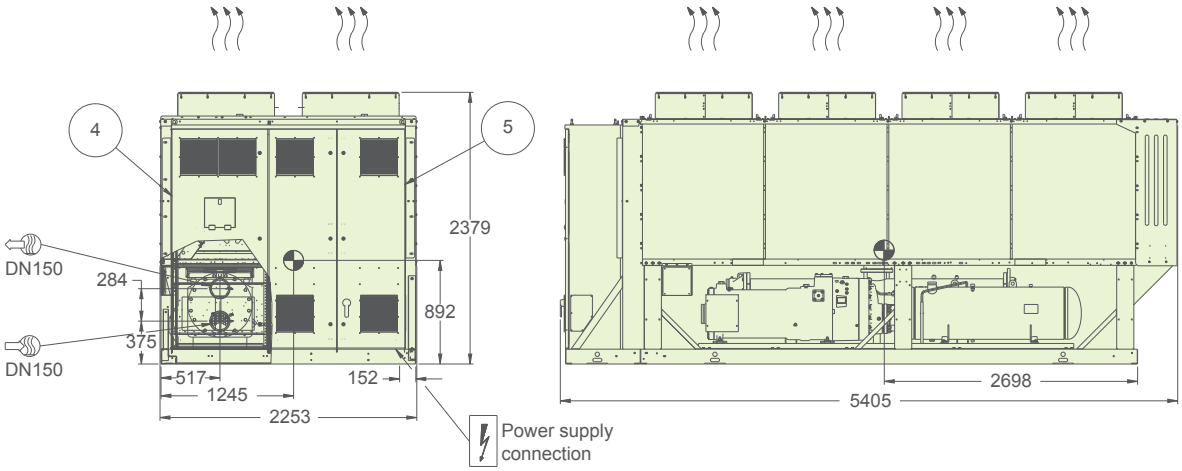
① Required clearances for maintenance
② Recommended space for evaparator tube removal
③ Safety valve
④ Fan drive cabinet
⑤ Comp drive cabinet

Water inlet
Water outlet
Air outlet
Power supply connection
Center gravity

Dimension Drawing

30KAV0651A



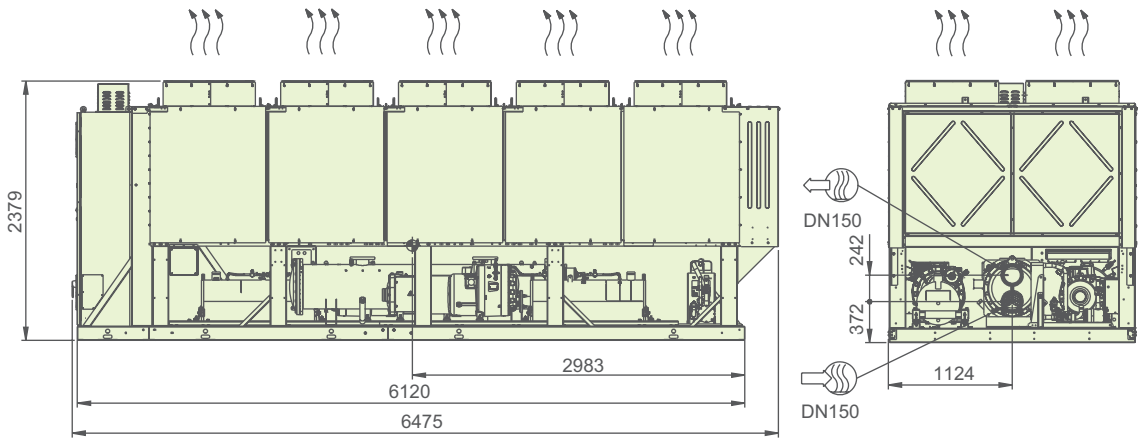


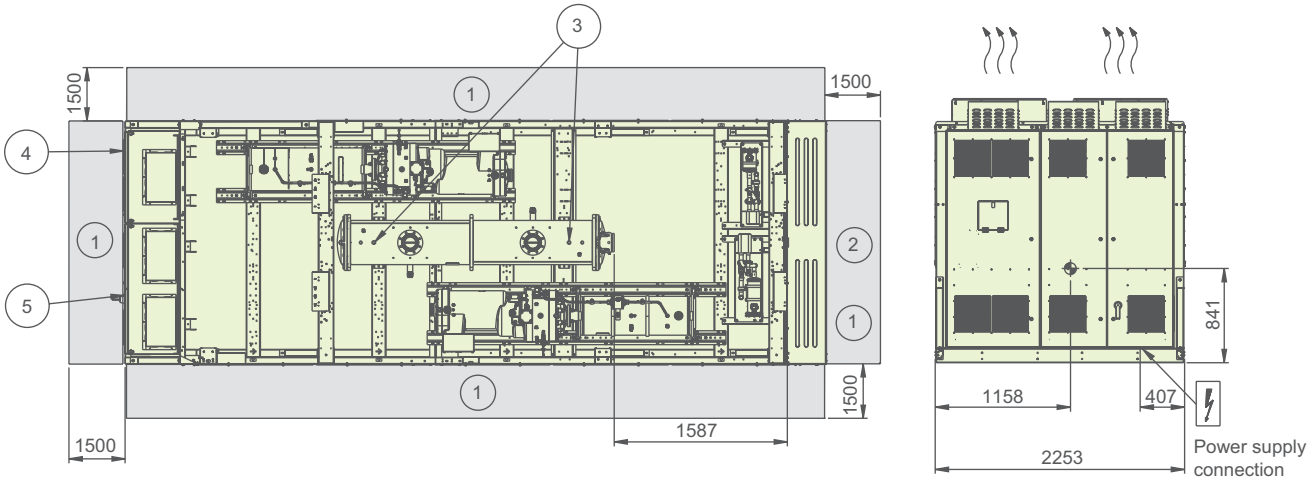
① Required clearances for maintenance
② Recommended space for evaparator tube removal
③ Safety valve
④ Fan drive cabinet
⑤ Comp drive cabinet

Water inlet
Water outlet
Air outlet
Power supply connection
Center gravity

Dimension Drawing

30KAV0660A



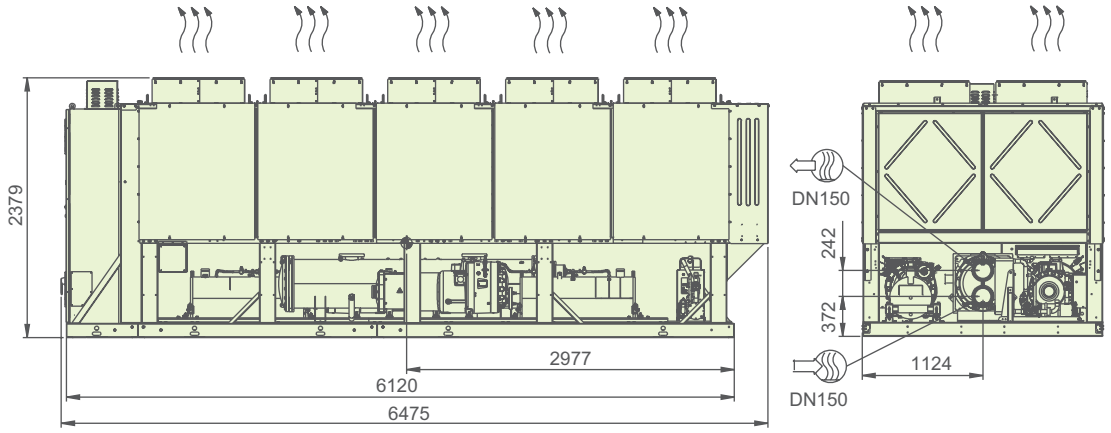


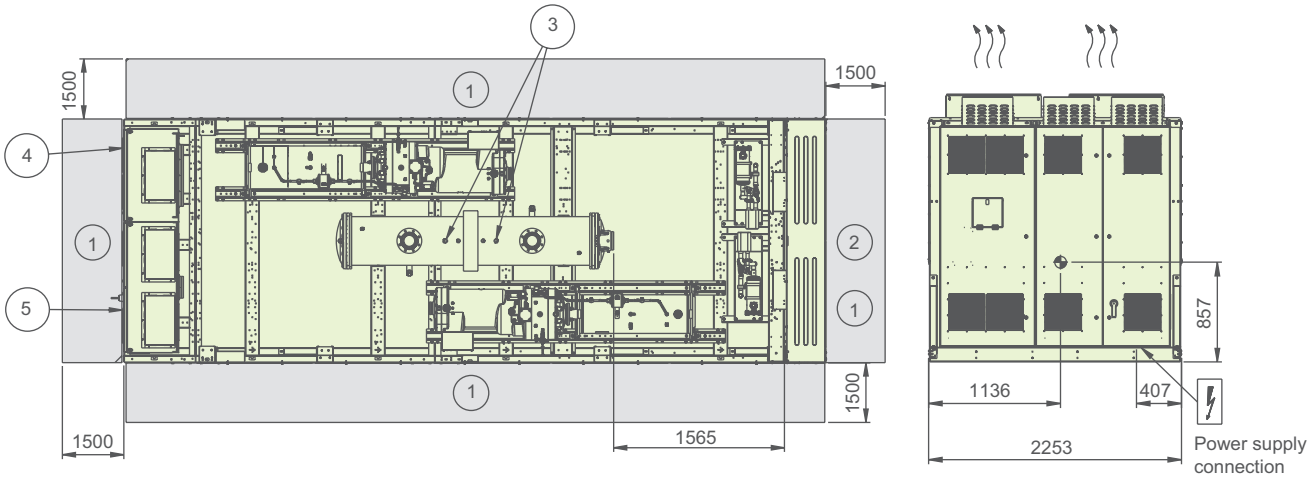
① Required clearances for maintenance
② Recommended space for evaparator tube removal
③ Safety valve
④ Fan drive cabinet
⑤ Comp drive cabinet

Water inlet
Water outlet
Air outlet
Power supply connection
Center gravity

Dimension Drawing

30KAV0700A



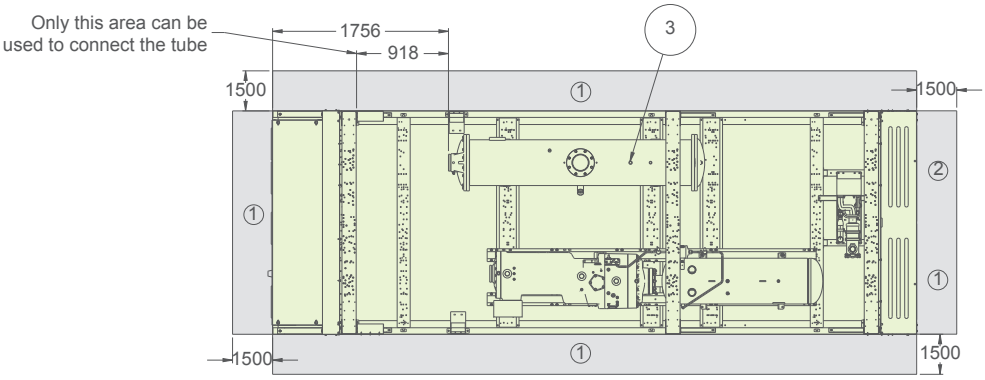


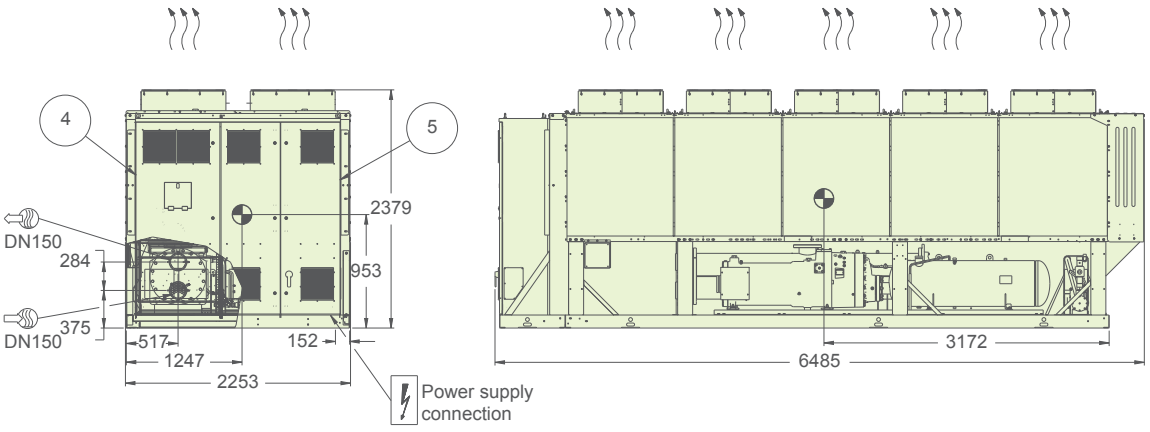
① Required clearances for maintenance
② Recommended space for evaparator tube removal
③ Safety valve
④ Fan drive cabinet
⑤ Comp drive cabinet

Water inlet
Water outlet
Air outlet
Power supply connection
Center gravity

Dimension Drawing

30KAV0751A



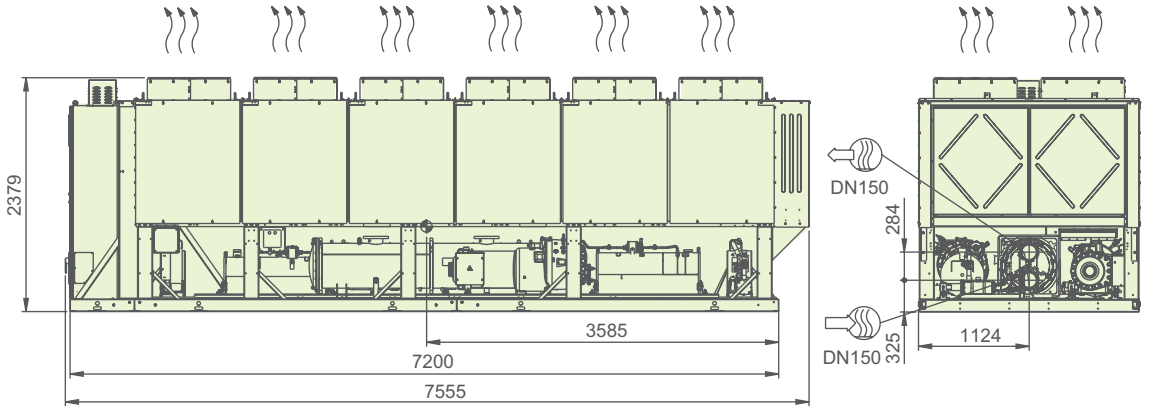


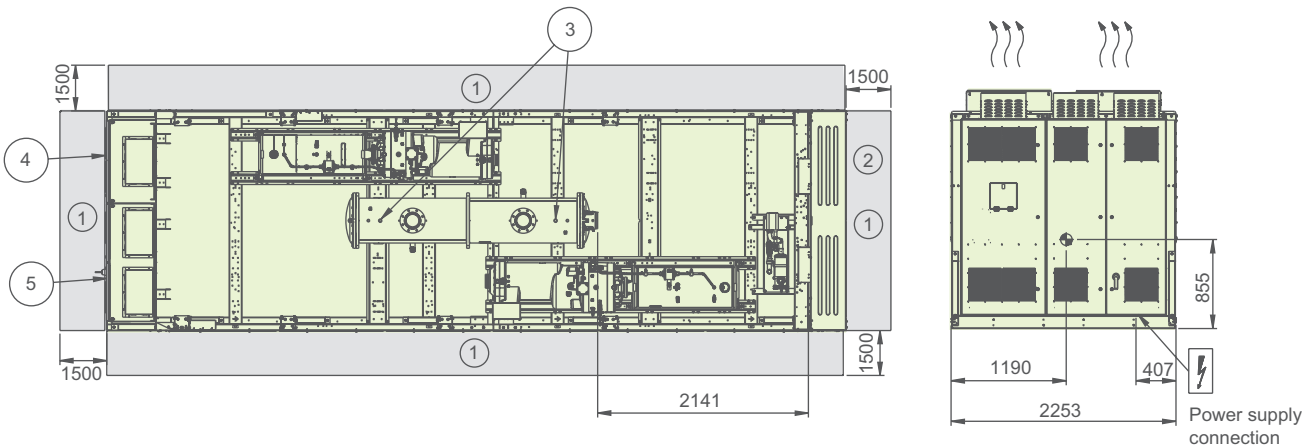
① Required clearances for maintenance
② Recommended space for evaparator tube removal
③ Safety valve
④ Fan drive cabinet
⑤ Comp drive cabinet

Water inlet
Water outlet
Air outlet
Power supply connection
Center gravity

Dimension Drawing

30KAV0800A



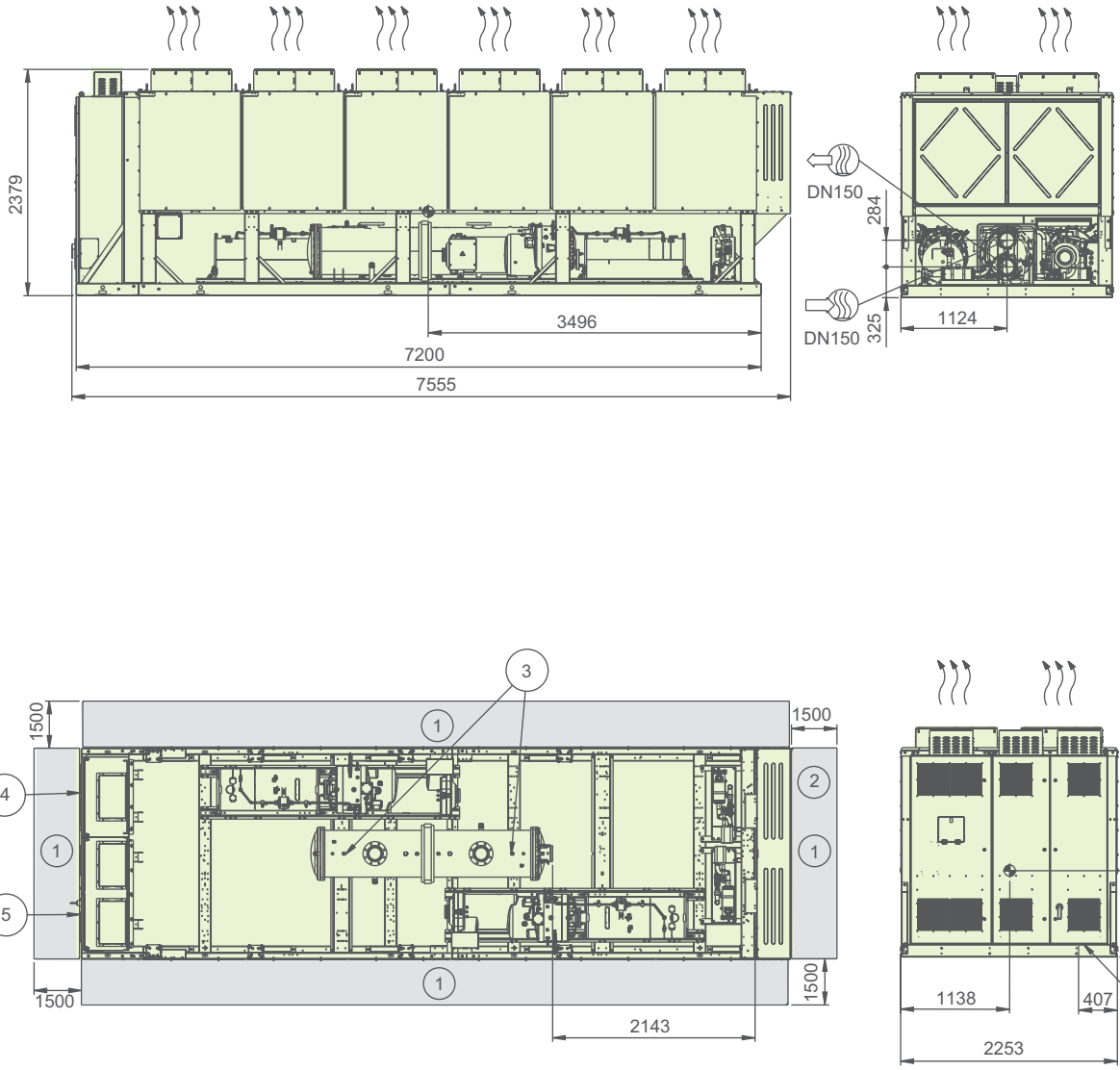


① Required clearances for maintenance
② Recommended space for evaparator tube removal
③ Safety valve
④ Fan drive cabinet
⑤ Comp drive cabinet

Water inlet
Water outlet
Air outlet
Power supply connection
Center gravity

Dimension Drawing

30KAV0900A

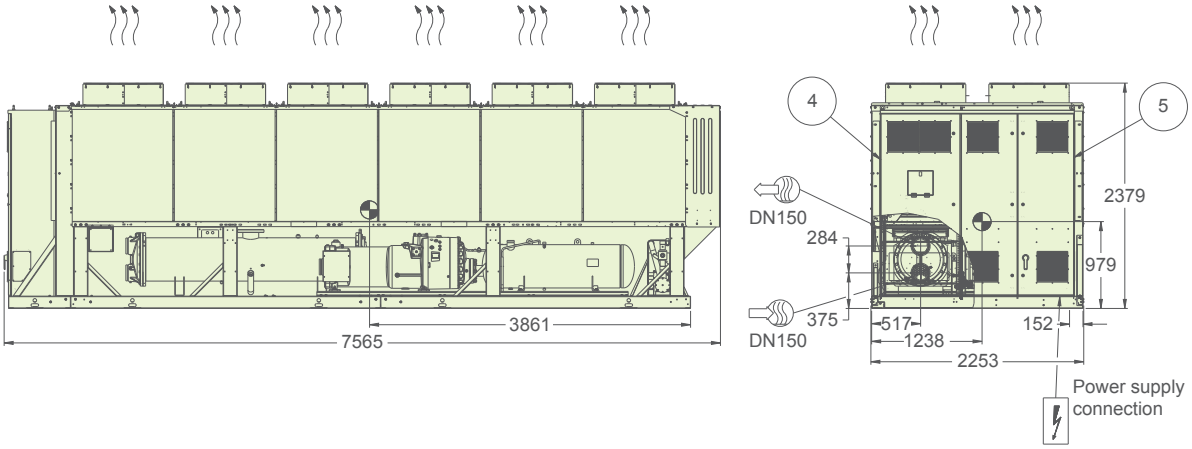


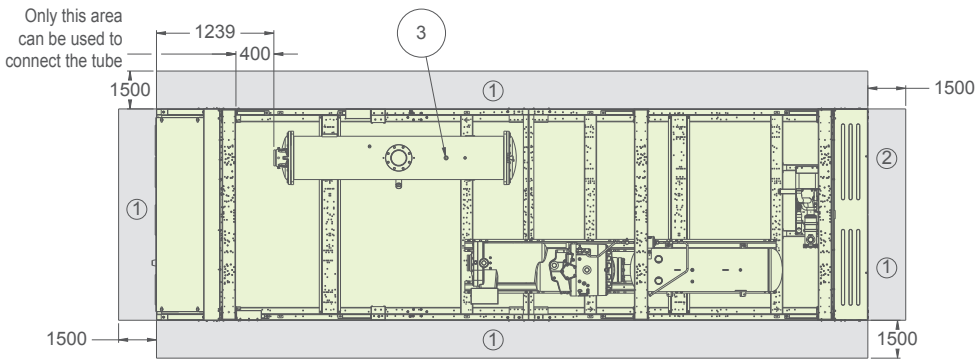
① Required clearances for maintenance
② Recommended space for evaporator tube removal
③ Safety valve
④ Fan drive cabinet
⑤ Comp drive cabinet

Water inlet
Water outlet
Air outlet
Power supply connection
Center gravity

Dimension Drawing

30KAV0901A



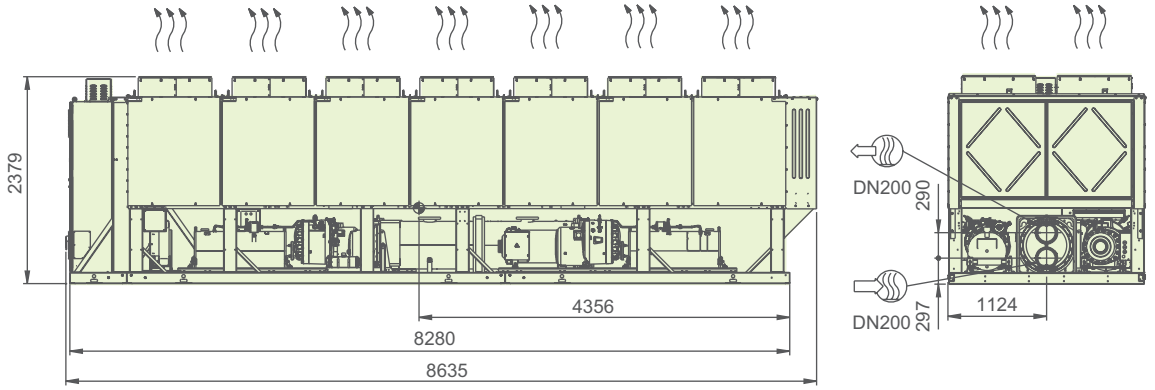


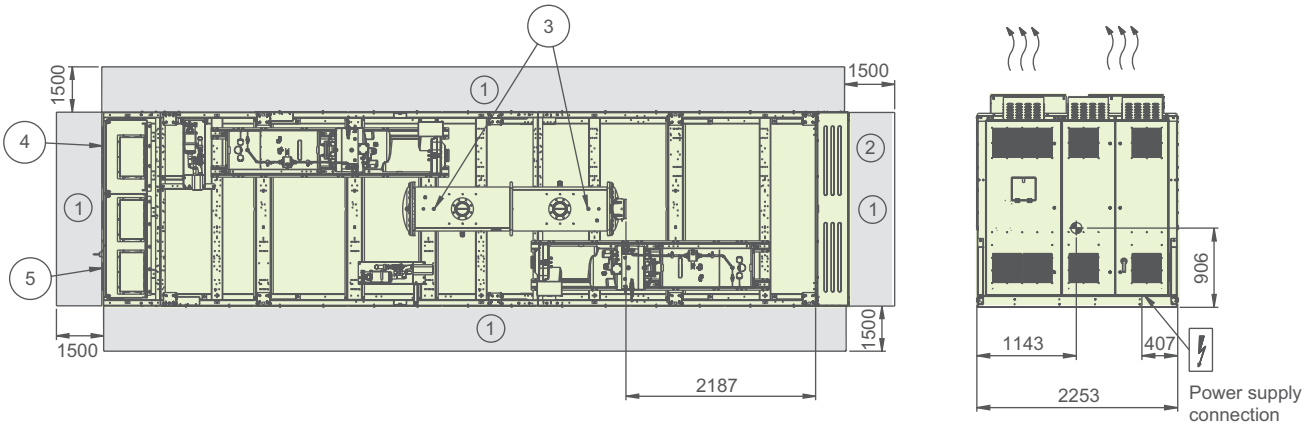
① Required clearances for maintenance
② Recommended space for evaparator tube removal
③ Safety valve
④ Fan drive cabinet
⑤ Comp drive cabinet

Water inlet
Water outlet
Air outlet
Power supply connection
Center gravity

Dimension Drawing

30KAV1000A



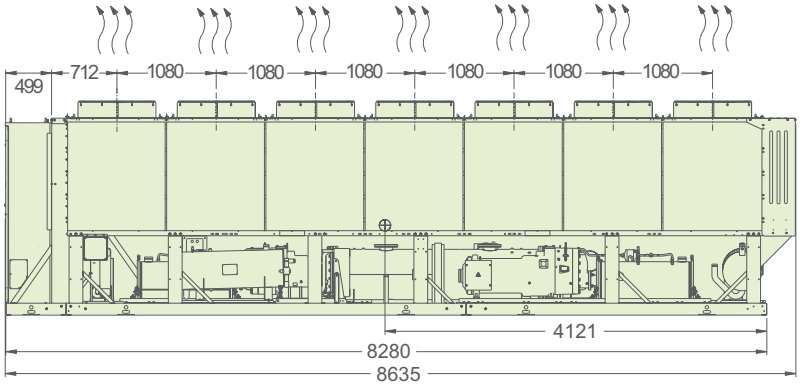


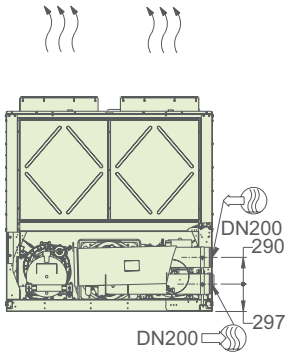
① Required clearances for maintenance
② Recommended space for evaparator tube removal
③ Safety valve
④ Fan drive cabinet
⑤ Comp drive cabinet

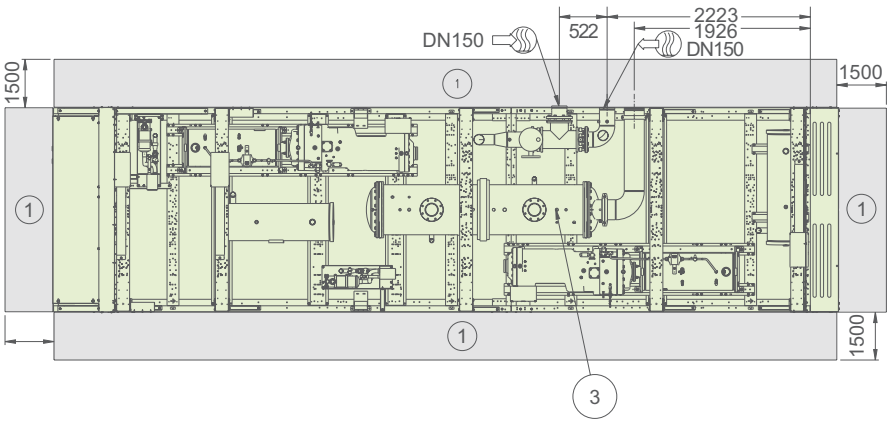
Water inlet
Water outlet
Air outlet
Power supply connection
Center gravity

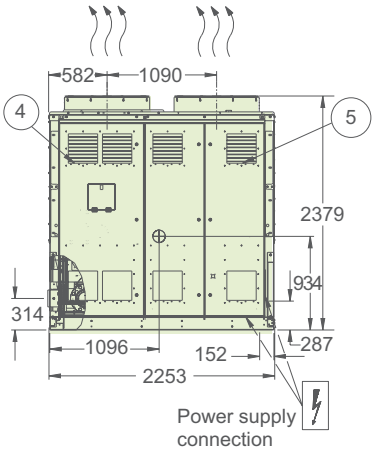
Dimension Drawing

30KAV1000APT050







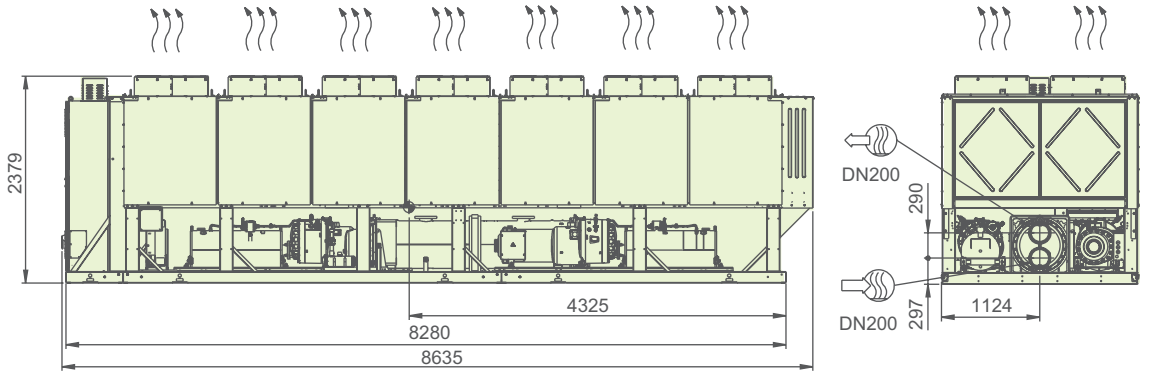


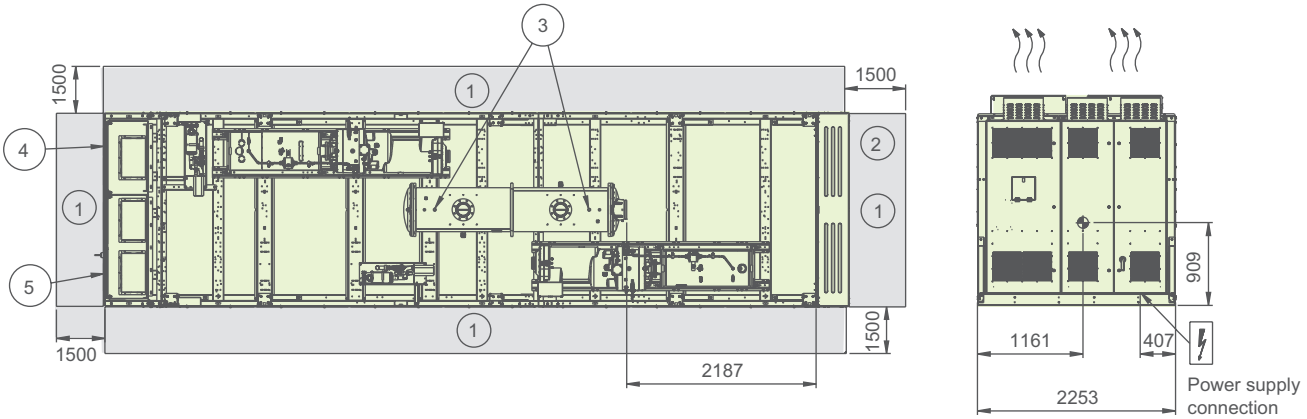
① Required clearances for maintenance
② Recommended space for evaparator tube removal
③ Safety valve
④ Fan drive cabinet
⑤ Comp drive cabinet

Water inlet
Water outlet
Air outlet
Power supply connection
Center gravity

Dimension Drawing

30KAV1100A



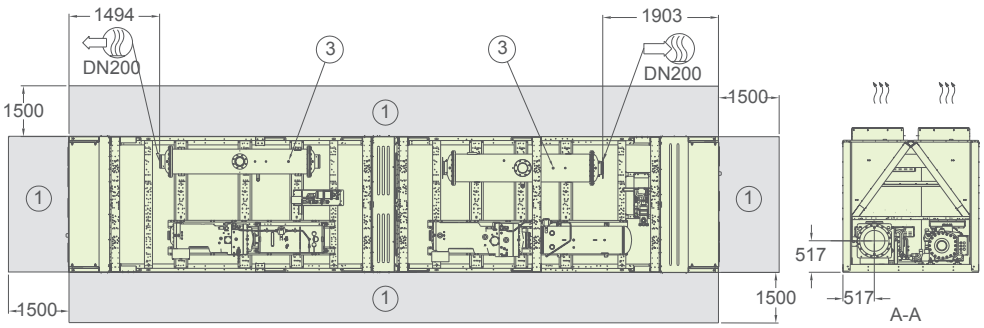


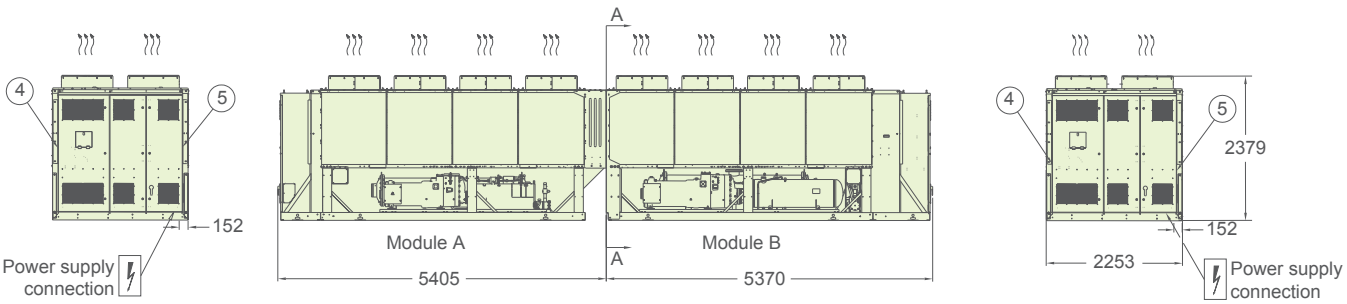
① Required clearances for maintenance
② Recommended space for evaparator tube removal
③ Safety valve
④ Fan drive cabinet
⑤ Comp drive cabinet

Water inlet
Water outlet
Air outlet
Power supply connection
Center gravity

Dimension Drawing

30KAV1160A



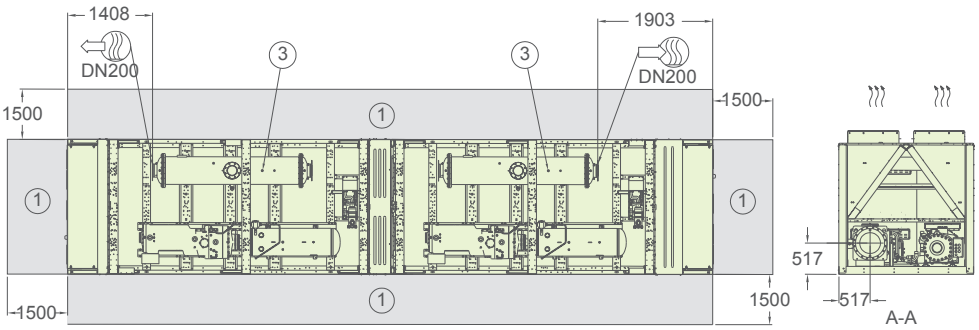


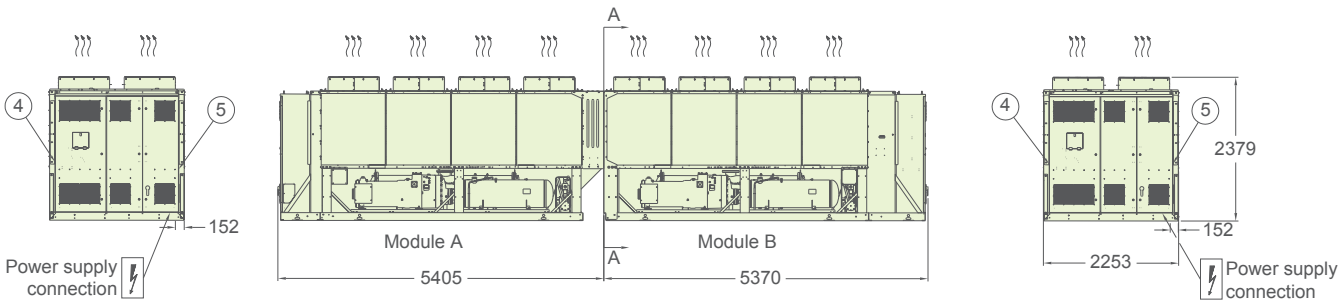
① Required clearances for maintenance
② Recommended space for evaparator tube removal
③ Safety valve
④ Fan drive cabinet
⑤ Comp drive cabinet

Water inlet
Water outlet
Air outlet
Power supply connection
Center gravity

Dimension Drawing

30KAV1230A



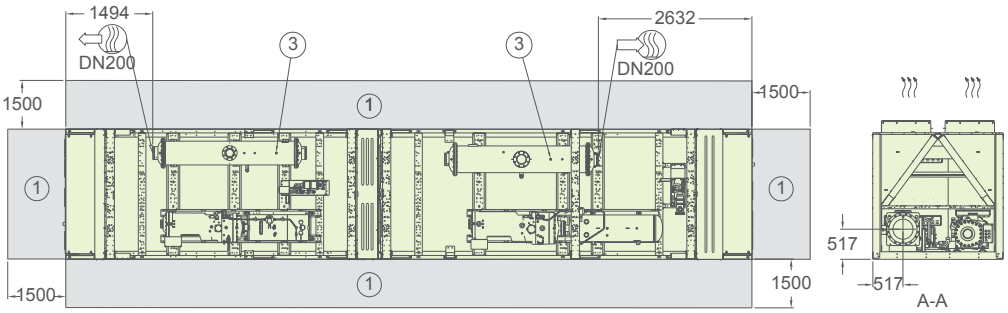


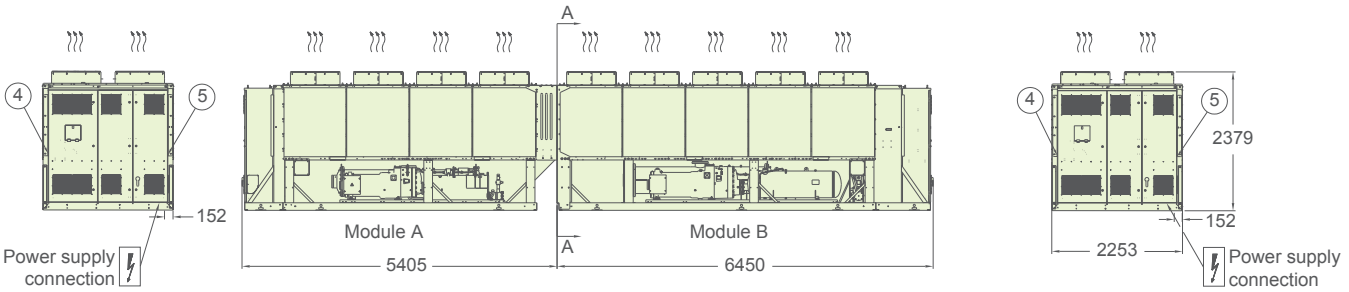
① Required clearances for maintenance
② Recommended space for evaparator tube removal
③ Safety valve
④ Fan drive cabinet
⑤ Comp drive cabinet

Water inlet
Water outlet
Air outlet
Power supply connection
Center gravity

Dimension Drawing

30KAV1300A



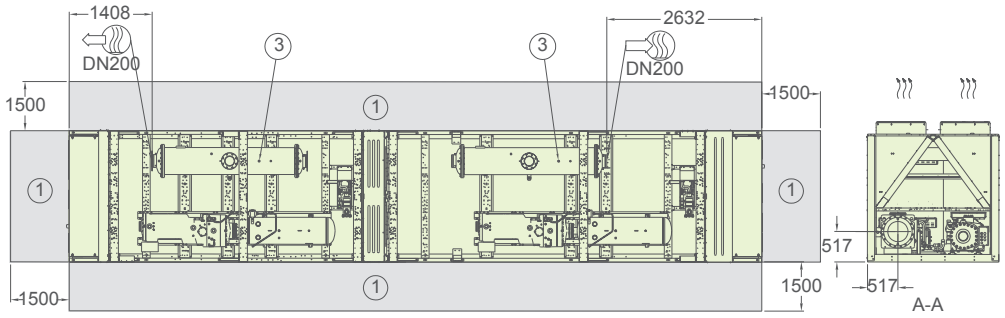


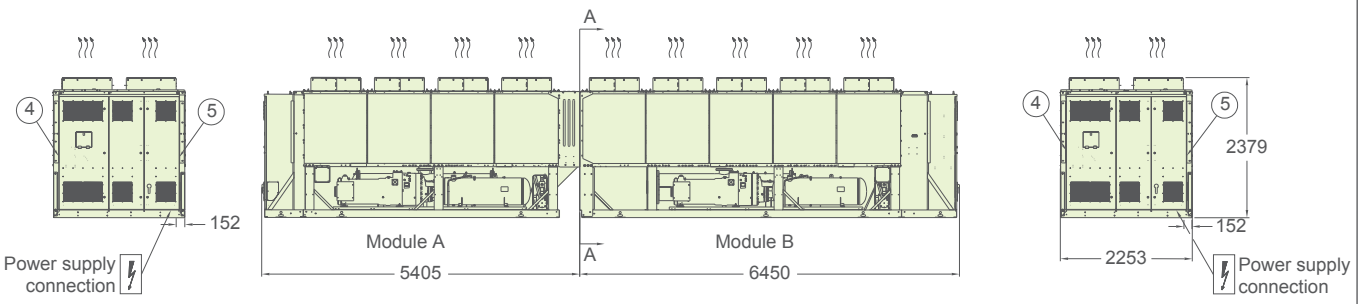
① Required clearances for maintenance
② Recommended space for evaparator tube removal
③ Safety valve
④ Fan drive cabinet
⑤ Comp drive cabinet

Water inlet
Water outlet
Air outlet
Power supply connection
Center gravity

Dimension Drawing

30KAV1350A



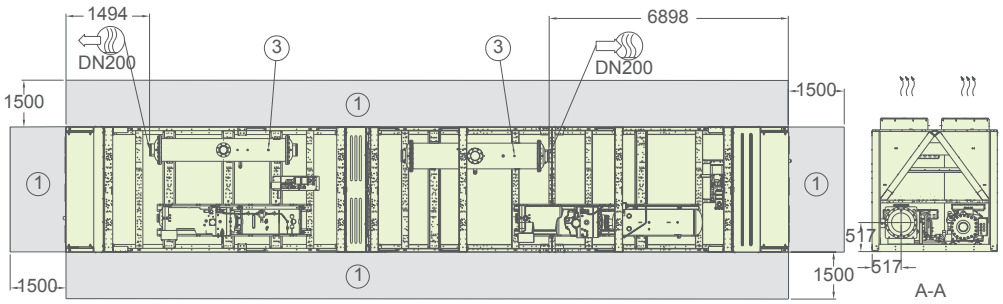


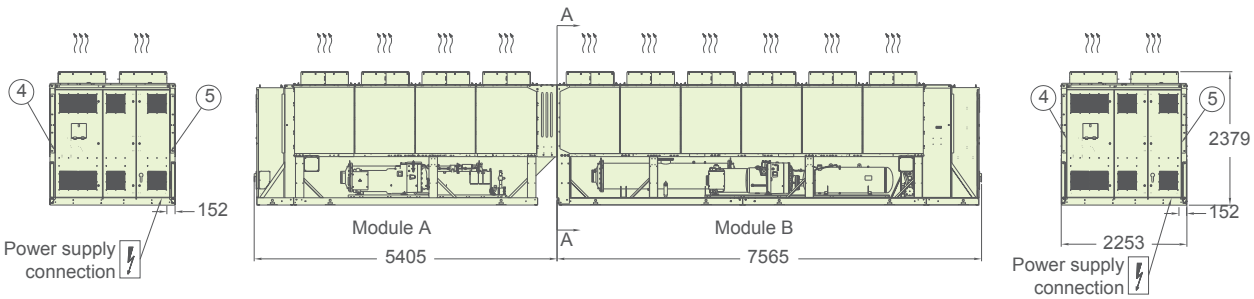
① Required clearances for maintenance
② Recommended space for evaparator tube removal
③ Safety valve
④ Fan drive cabinet
⑤ Comp drive cabinet

Water inlet
Water outlet
Air outlet
Power supply connection
Center gravity

Dimension Drawing

30KAV1400A



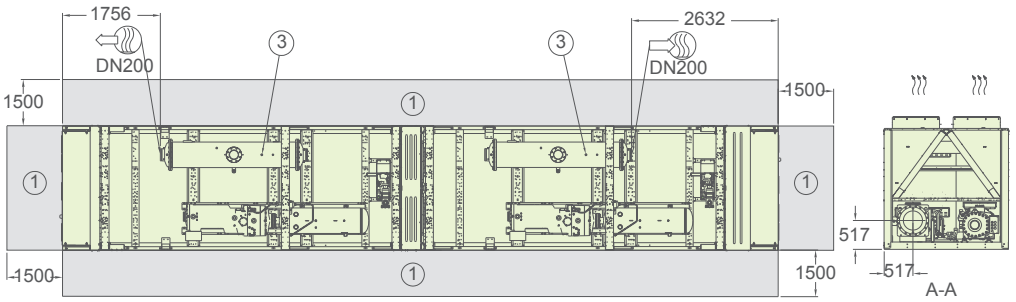


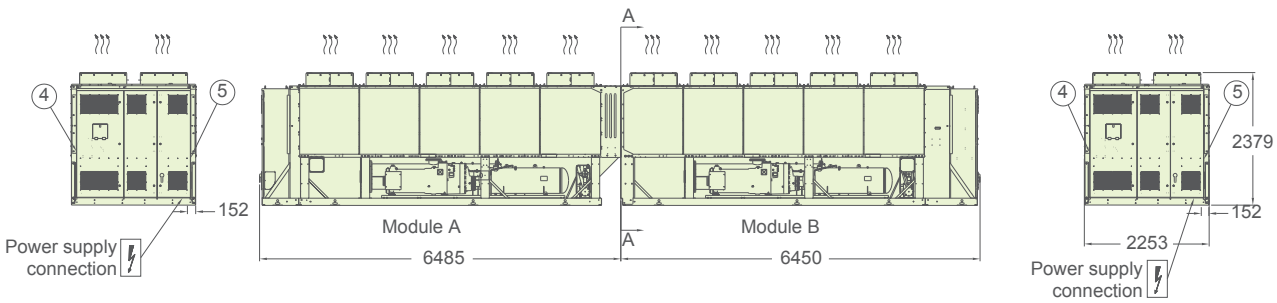
① Required clearances for maintenance
② Recommended space for evaparator tube removal
③ Safety valve
④ Fan drive cabinet
⑤ Comp drive cabinet

Water inlet
Water outlet
Air outlet
Power supply connection
Center gravity

Dimension Drawing

30KAV1500A





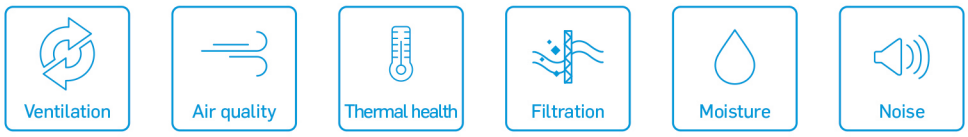
① Required clearances for maintenance
② Recommended space for evaporator tube removal
③ Safety valve
④ Fan drive cabinet
⑤ Comp drive cabinet

Water inlet
Water outlet
Air outlet
Power supply connection
Center gravity

HEALTHY**BUILDINGS**

As the inventors of modern air conditioning and a world leader in HVAC, refrigeration, and fire and security, solutions, Carrier has a legacy of creating safe and comfortable buildings. Our Healthy Buildings Program builds on that legacy through in-depth expertise and a holistic suite of healthy building technologies and services .to address the immediate pandemic concerns and long into the future.

6 of 9 foundations of healthy building are related closely to air conditioning system.



Primary support for the study came from Carrier.
MacNaughton P, Allen J, Satish U, Laurent J, Flanigan S, Vallarino J, Coull B, Spengler. 2016. The Impact of Working in a Green Certified Building on Cognitive Function and Health. Building and Environment DOI: 10.1016/j.buildenv.2016.11.041

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PRINTED DATE: MARCH 2024