WATER CHILLERS HEAT PUMP

- Energy excellence
- Compact and reliable
- Twin-turbine centrifugal compressors
- Oil-Free compressors
- Flooded shell and tubes evaporator
- Self-adjusting electronic control
- Touch screen control interface

19PV

AQUAEDGE

Cooling capacity 550-1600 kW
Heating capacity 650-1875 kW

The latest generation of **19PV** water chillers and water-to-water heat pumps are the perfect solution for all heating and cooling applications in the Office, Healthcare, Industry, Administration, Shopping centers, data centers and Collective Housing markets.

19PV is optimised to use ozone-friendly HFC R134a refrigerant.

This range guarantees compliance with the most demanding requirements for high energy efficiency and CO_2 reduction to comply with the various applicable European directives and regulations.

When producing chilled water, these units can be connected to a drycooler or a water cooling tower.

With the heat pump option, the units can produce hot water for heating applications. They can also be used in cooling mode by reversing the cycle on the hydronic circuits using a set of valves (hydraulic valves not supplied).

EUROVENT CERTIFIED PERFORMANCE
www.eurovent-certification.com

CARRIER participates in the ECP programme for LCP/HP
Check ongoing validity of certificate:
www.eurovent-certification.com

DESCRIPTION

■ ***19PV, series***

Very High Efficiency cooling or heating version

The product is optimised to meet the most demanding technical and economic requirements.

The product is optimised for very high energy efficiency applications for which optimum seasonnal performance SEER values are required, ensuring operating costs are kept to a minimum.

19PV units are packaged machines supplied as standard with the following components:

- Maglev centrifugal semi-hermetic compressors
- No oil
- Shell and tube type chilled-water evaporator
- Shell and tube type hot water condenser
- Electrical power and remote control cabinet:
  - 400 V-3ph-50 Hz general power supply (+/-10%) + Earth
  - transformer fitted as standard on the machine for supplying the remote control circuit with 24 V
- Touch'Pilot electronic control module
- Casing for indoor installation

The entire 19PV range complies with the following EC directives and standards:

- Machinery Directive 2006/42/EC
- Electromagnetic Compatibility Directive 2014/30/EU
- EMC immunity and emissions EN 61800-3 'C2'
- Low Voltage Directive 2014/35/EU
- RoHS 2011/65/EU
- Pressure Equipment Directive (PED) 2014/68/EU
- Machinery Directive EN 60-204 -1
- Refrigeration systems and heat pumps EN 378-2.
- Regulation (EU) 2016/2281 implementing Directive 2009/125/EC with regard to ecodesign requirements

DESIGNATION

-

DESCRIPTION OF THE COMPONENTS

Twin-turbine centrifugal compressors,

- 2 Stages centrifugal compressors
- Optimized for R134a refrigerant
- Oil-free type
- Noiseless, vibration less via Magnetic levitation
- Compression ratio: from 1.5 to 5.0
- High efficiency permanent-magnet synchronous inverter motor.
- Linear step less capacity control via integrated inverter motor (up to 36000 rpm)
- Compressor equipped with Inlet Guide Valve at the turbine suction
- Compressor capacity control by successive use of speed variation swept volume variation at the turbine
- Integrated Soft- Start system (starting current limited to 5A)
- High Power Factor motor (cosφ > 0.9 for main operating conditions)
- Motor and electronic power section cooled by refrigerant
- Full electronic protection of motor against thermal and electrical overload via Internal sensors
- Rotation direction, no phase, under voltage, over voltage and power failure control
- Sensor on refrigerant suction and discharge for temperature monitoring
- Degree of protection: IP54

Shell and tube evaporator

- High performance glandless technology
- Copper tube bundle with internal and external grooves
- 19 mm thermal insulation
- Victaulic type coupling
- Maximum pressure, water side, of 10 bar.

Shell and tube condenser

- Copper tube bundle with internal and external grooves
- 19 mm thermal insulation (option)
- Built-in oil separator
- Victaulic type coupling
- Maximum pressure, water side, of 10 bar.

Refrigerant accessories

- Dehumidifier filters with rechargeable cartridges
- Hygroscopic sight glasses
- Electronic expansion valves
- Check-valve to prevent fluid recirculation in the compressor during transition phase

Regulation and safety instruments

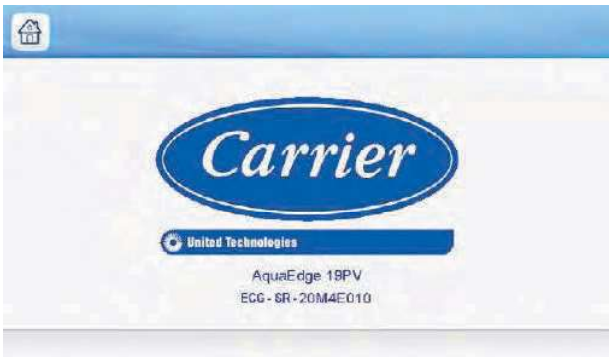
- High and low pressure sensors
- Safety relief valves on refrigerating circuit
- High pressure switch on each compressor
- Evaporator antifreeze protection sensor
- Chilled water and hot water control sensors
- Electronic evaporator water circulation controller

Electrical cabinet

- Electrical cabinet index of protection IP23
- Safety disconnect switch
- 24 V control circuit
- Remote control transformer circuit
- Protection of the power and control circuits
- Touch'Pilot microprocessor-controlled electronic control module
- Electrical cabinet wire numbers
- Location of main components
- EMC filters and line reactors
- Door contact protection

Touch'Pilot control module

- User interface with 7 inch touchscreen
- Intuitive, user-friendly navigation using icons
- Clear information display in 10 languages (English, Spanish, French, German, Dutch, Turkish, Italian, Portuguese, Russian +1 Free)



The electronic control module performs the following main functions:

- regulation of the chilled water temperature (at the return or at the outlet)
- regulation of the water temperature based on the outdoor temperature (water law)
- regulation for low temperature energy storage
- second setpoint management
- complete management of compressors with start-up sequence, timer and operating time balancing
- self-regulating and proactive functions with adjustment of settings on drift control
- continuous power control slide system on the compressors according to the thermal requirements
- management of compressor short cycle protection
- phase reversal protection
- management of occupied/unoccupied modes (according to the time schedule)
- equalisation of compressor operating hours
- condensing temperature limitation (Option 152)
- diagnosis of fault and operating statuses
- management of a fault memory allowing a log of the last 50 incidents to be accessed, with operating readings taken when the fault occurs
- blackbox memory
- master/slave management of two machines with equalisation of operating hours and automatic switching in case of a machine fault
- weekly and hourly time schedule for the machine, including 16 periods of absence
- display of all machine parameters (3 access levels, User/ Maintenance/Factory, password-protected): temperature, setpoints, pressures, flow rate, operation time.
- display of trend curves for the main values
- storage of maintenance manual, wiring diagram and spare parts list.

Unit construction

- Electrical cabinet in light grey (RAL 7035)

DESCRIPTION OF THE COMPONENTS

Remote management

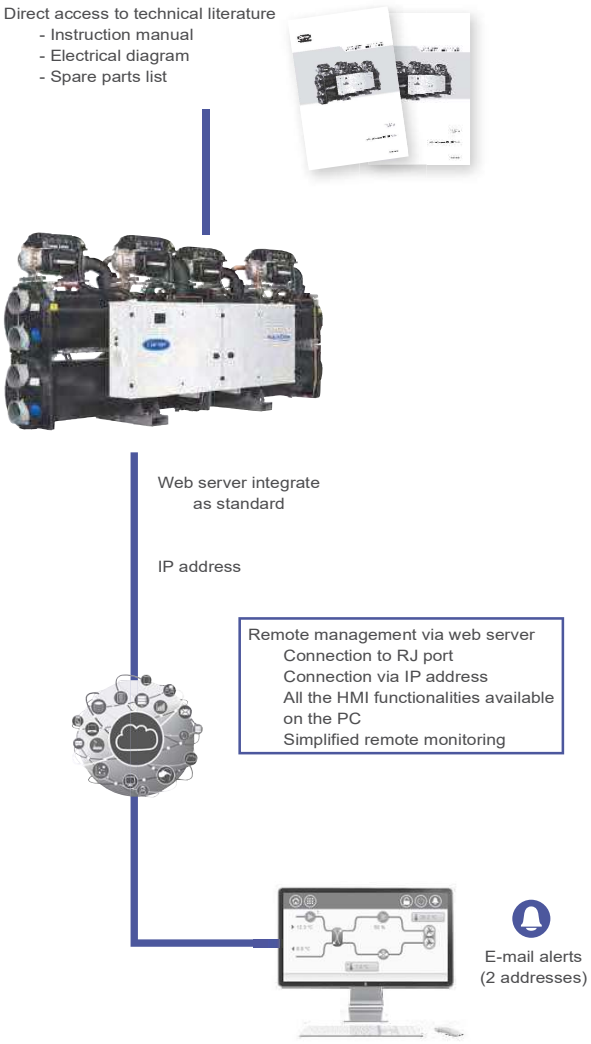
Touch'Pilot is equipped as standard with an ETHERNET (IP) connection, offering a range of options for remote management, monitoring and diagnostics.

Using the integrated Webserver, a simple internet connection uses the unit's IP address to access the Touch'Pilot interface on the PC, facilitating everyday management tasks and maintenance operations.

Numerous communication protocols are available: MODBUS/ JBUS TC/IP as standard, BACNET IP optional, enabling integration with most CMS/BMS

Several contacts are available as standard, enabling the machine to be controlled remotely by wired link:

- automatic operation control: when this contact is open, the machine stops
- setpoint 1/setpoint 2 selector: when this contact is closed, a second cooling setpoint is activated (energy storage or unoccupied mode, for example)
- heating/cooling operating mode selection
- fault reporting: this contact indicates the presence of a major fault which has caused one or both refrigerating circuits to stop
- operational status reporting indicates that the unit is in production mode
- Condenser flow switch
- setpoint adjustable via 4-20 mA signal: this input is used to adjust the active setpoint.
- power limitation adjustable by 4-20 mA signal
- power indication: analogue output (0-10 V) providing an indication of the unit's load rate.
- user fault reporting enables integration of a fault in the water loop
- general fault reporting: this contact indicates that the unit has stopped completely
- User interlock (open=unit shuts down / closed = enable to operate)
- alert reporting: this contact indicates the presence of a minor fault which has not caused the circuit affected to stop.
- end of storage signal: enables return to the second setpoint at the end of the storage cycle
- schedule override: closing this contact cancels the time schedule.
- Evaporator pump control (control by 0-10V command)



Maintenance alert as standard

Touch'Pilot has two maintenance reminder functions as standard, making users aware of the need to regularly perform maintenance operations and to guarantee the service life and performance of the unit. These two functions can be activated independently.

A reminder message appears on the unit's HMI screen, and stays there until it is acknowledged by the maintenance operator. The information and alert relating to these functions are available on the communication bus to be used on the CMS/BMS.

- the scheduled maintenance reminder: when activated, this function enables the period between two maintenance inspections to be set. This period may be set by the operator in either days, months or operating hours, depending on the application.
- the compulsory F-GAS sealing test maintenance reminder: when activated, this function, which is the default factory setting, enables the period between two sealing tests to be selected, according to the refrigerant charge, in compliance with the F-GAS regulations.

OPTIONS

Option	No.	Description	Advantage	Use 19PV
Low noise level	15	Discharge piping acoustic insulation	Up to 3 dB(A) quieter than standard unit	0550-1600
Master/slave operation	58A	Unit equipped with supplementary water outlet temperature sensor kit (to be field installed) allowing master/slave operation of two units connected in parallel over Ethernet network (IP)	Optimised operation of two units connected in parrallel operation with operating time equalisation	0550-1600
Single power connection point	81	Unit power connection via one main supply connection	Quick and easy installation	0900-1600
Evap. single pump power/ control circuit	84	Unit equipped with an electrical power and control circuit for one pump evaporator side	Quick and easy installation: the control of fixed speed pumps is embedded in the unit control	0550-1180
Cond. single pump power/ control circuit	84R	Unit equipped with an electrical power and control circuit for one pump condenser side	Quick and easy installation: the control of fixed speed pumps is embedded in the unit control	0550-1180
Condenser insulation	86	Thermal condenser insulation	Minimizes thermal dispersions condenser side (key option for heat pump or heat recovery applications)	0550-1600
Service valve set	92	Liquid line valve (evaporator inlet) and compressor suction line valve	Allow isolation of various refrigerant circuit components for simplified service and maintenance	0550-1600
Evaporator with one pass less	100C	Evaporator with one pass on the water side. Evaporator inlet and outlet on opposite sides.	Easy to install, depending on site. Reduced pressure drops	0550-1600
Condenser with one pass less	102C	Condenser with one pass on the water side. Condenser inlet and outlet on opposite sides.	Easy to install, depending on site. Reduced pressure drops	0550-1600
Reversed evaporator water connections	107	Evaporator with reversed water inlet/outlet	Easy installation on sites with specific requirements	0550-1600
Reversed condenser water connections	107A	Condenser with reversed water inlet/outlet	Easy installation on sites with specific requirements	0550-1600
Bacnet over IP	149	Bi-directional high-speed communication using BACnet protocol over Ethernet network (IP)	Easy and high-speed connection by ethernet line to a building management system. Allows access to multiple unit parameters	0550-1600
Control for low cond. temperature	152	Output signal (0-10 V) to control the condenser water inlet valve	Simple installation: for applications with cold water at condenser inlet (ex. ground-source, groundwater-source, superficial water-source applications) the signal permits to control a 2 or 3-way valve to maintain condenser water temperature (and so conden	0550-1600
Dry-cooler control	154	Remote control of 09PE or 09VE dry-cooler based on a 0-10V signal. The 09PE or 09VE dry-cooler shall be selected with control cabinet option	Easy system management, extended control capabilities of a remote dry-cooler	0550-1600
Input contact for Refrigerant leak detection	159	0-10 V signal to report any refrigerant leakage in the unit directly on the controlller (the leak detector itself must be supplied by the customer)	Immediate customer notification of refrigerant losses to the atmosphere, allowing timely corrective actions	0550-1600
Compliance with Swiss regulations	197	Additional tests on the water heat exchangers: supply (additional of PED documents) supplementary certificates and test certifications	Conformance with Swiss regulations	0550-1600
Compliance with Russian regulations	199	EAC certification	Conformance with Russian regulations	0550-1600
Welded evaporator connection kit	266	Victaulic piping connections with welded joints	Easy installation	0550-1600
Welded condenser water connection kit	267	Victaulic piping connections with welded joints	Easy installation	0550-1600
Flanged evaporator water connection kit	268	Victaulic piping connections with flanged joints	Easy installation	0550-1600
Flanged condenser water connection kit	269	Victaulic piping connections with flanged joints	Easy installation	0550-1600
230V electrical plug	284	230V AC power supply source provided with plug socket and transformer (180 VA, 0,8 Amps)	Permits connection of a laptop or an electrical device during unit commissioning or servicing	0550-1600
Free-cooling dry-cooler control	313	Remote control of 09PE or 09VE dry-cooler based on a 0-10V signal. The 09PE or 09VE dry-cooler shall be selected with control cabinet option	Easy system management, extended control capabilities of a remote dry-cooler used in free-cooling mode	0550-1600
Heat Pump application	322	Unit configurated for Heat Pump application, includes thermal condenser insulation	Optimisation on heating mode & minimize thermal dispersions condenser side	0550-1600

STANDARD UNIT TECHNICAL CHARACTERISTICS

19PV				550	720	800	900	1010	1180	1300	1450	1600
Heating												
Standard unit Full load performances*	HW1	Nominal capacity	kW	649	844	939	1050	1198	1389	1538	1700	1875
		COP	kW/kW	6,13	6,26	5,93	5,79	5,89	5,76	5,97	5,89	5,67
	HW2	Nominal capacity	kW	629	817	915	1039	1186	1351	1491	1648	1820
		COP	kW/kW	4,89	4,81	4,63	4,68	4,68	4,53	4,72	4,62	4,50
Standard unit Seasonal energy efficiency**		$SCOP_{30/35°C}$	kW/kW	7,43	7,42	7,35	7,30	7,23	6,82	6,90	6,47	6,54
		$\eta s\ heat_{30/35°C}$	%	289	289	286	284	281	265	268	251	254
		P_{rated}	kW	763	993	1103	1235	1409	1634	1809	2001	2203
Cooling												
Standard unit Full load performances*	CW1	Nominal capacity	kW	550	717	791	880	1007	1167	1302	1442	1578
		EER net	kW/kW	5,39	5,53	5,18	5,02	5,15	5,13	5,38	5,42	5,13
		Eurovent class		A	A	A	B	A	A	A	A	A
		EER gross***		5,55	5,70	5,32	5,14	5,30	5,33	5,63	5,69	5,39
	CW2	Nominal capacity	kW	631	823	917	1014	1134	1348	1441	1638	1794
		EER net	kW/kW	8,00	8,43	7,79	7,61	7,86	7,80	8,04	8,11	7,49
		Eurovent class		A	A	A	A	A	A	A	A	A
		EER gross***		8,41	8,88	8,19	7,94	8,25	8,37	8,68	8,78	8,17
Standard unit Seasonal energy efficiency**		**$SEER_{12/7°C}$ Comfort low temp.**	**kW/kW**	**9,70**	**9,55**	**9,54**	**9,79**	**9,59**	**9,49**	**9,50**	**9,48**	**9,14**
		$\eta s\ cool_{12/7°C}$	**%**	**385**	**379**	**379**	**389**	**381**	**377**	**377**	**376**	**363**
		$SEPR_{12/7°C}$ Process high temp.	**kWh/kWh**	**9,48**	**10,31**	**9,78**	**9,05**	**9,26**	**9,44**	**9,49**	**9,75**	**9,32**
		ESEER	kW/kW	8,55	8,47	8,40	8,70	8,21	8,15	8,00	8,04	7,93
		ESEER gross***	kW/kW	9,74	9,62	9,48	9,79	8,96	9,66	9,51	9,74	9,77
Sound levels												
standard unit												
Sound power(1)			dB(A)	89	92	94	92	94	95	94	95	97
Sound pressure at 10 m(2)			dB(A)	57	60	62	60	62	63	62	63	65
Dimensions												
Standard unit												
Length			mm	3140	3160	3360	4345	4345	4345	4800	4800	4800
Width			mm	1270	1310	1335	1385	1385	1385	1385	1390	1410
Height			mm	1780	1880	1965	2036	2036	2036	2000	2050	2100
Operating weight(3)												
Standard unit			kg	2402	2930	3376	4831	4855	4904	5504	6164	6730
Compressors				MagLev compressor TT300 / TT350								
Circuit A				2	2	2	1	1	1	2	2	2
Circuit B				-	-	-	2	2	2	2	2	2

* In accordance with standard EN14511-3:2013.

** In accordance with standard EN14825:2013, average climate

*** Values not Eurovent certified. Calculation without the impact of the exchanger pressure drop.

HW1 Heating mode conditions: Evaporator entering/leaving water temperature 10°C/7°C, condenser entering/leaving water temperature 30°C/35°C, evaporator and condenser fouling factor 0 m^2. k/W

HW2 Heating mode conditions: Evaporator entering/leaving water temperature 10°C/7°C, condenser entering/leaving water temperature 40°C/45°C, evaporator and condenser fouling factor 0 m^2. k/W

CW1 Cooling mode conditions: Evaporator water entering/leaving temperature 12°C/7°C, condenser entering/leaving water temperature 30°C/35°C, evaporator and condenser fouling factor 0 m^2.K/W

CW2 Cooling mode conditions: Evaporator water entering/leaving temperature 23°C/18°C, condenser entering/leaving water temperature 30°C/35°C, evaporator and condenser fouling factor 0 m^2.K/W

$\eta s\ cool_{12/7°C}$ & $SEER_{12/7°C}$ **Bold values compliant to Ecodesign regulation: (EU) No 2016/2281 for Comfort application**

$SEPR_{12/7°C}$ **Bold values compliant to Ecodesign regulation: (EU) No 2016/2281 for Process application**

(1) in dB ref=10^{-12} W, 'A' weighted. Declared dual-number noise emission values in accordance with ISO 4871 with an associated uncertainty of +/-3dB(A). Measured in accordance with ISO 9614-1 and certified by Eurovent.

(2) In dB ref 20µPa, 'A' weighted. Declared dual-number noise emission values in accordance with ISO 4871 with an associated uncertainty of +/-3dB(A). For information, calculated from the sound power Lw(A).

(3) Values are guidelines only. Refer to the unit name plate.

EUROVENT CERTIFIED PERFORMANCE www.eurovent-certification.com

Eurovent certified values

STANDARD UNIT TECHNICAL CHARACTERISTICS

19PV		550	720	800	900	1010	1180	1300	1450	1600
Refrigerant(3)		R-134a								
Circuit A	kg	95,0	120,0	140,0	100,0	100,0	100,0	125,0	135,0	150,0
	teqCO_2	135,9	171,6	200,2	143,0	143,0	143,0	178,8	193,1	214,5
Circuit B	kg	-	-	-	125,0	125,0	125,0	125,0	135,0	150,0
	teqCO_2	-	-	-	178,8	178,8	178,8	178,8	193,1	214,5
Capacity control		Touch'Pilot, electronic expansion valves (EXV)								
Minimum capacity	%	15	10	10	10	10	10	10	10	10
Evaporator		Flooded multi-pipe type								
Water volume	l	115	165	180	285	285	285	330	330	365
Water connections (Victaulic)	in	6	6	8	8	8	8	8	8	8
Drain and vent connections (NPT)	in	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8
Max. water-side operating pressure	kPa	1000	1000	1000	1000	1000	1000	1000	1000	1000
Condenser		Flooded multi-pipe type								
Water volume	l	145	157	187	308	308	308	339	487	487
Water connections (Victaulic)	in	6	6	8	8	8	8	8	8	8
Drain and vent connections (NPT)	in	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8
Max. water-side operating pressure	kPa	1000	1000	1000	1000	1000	1000	1000	1000	1000

(3) Values are guidelines only. Refer to the unit name plate.

ELECTRICAL DATA NOTES FOR STANDARD UNITS

19PV		550	720	800	900	1010	1180	1300	1450	1600
Power circuit supply										
Nominal voltage	V-ph-Hz	400-3-50								
Voltage range	V	360-440								
Control circuit supply		24 V via the built-in transformer								
Maximum operating input power(1)- Standard unit										
Circuit 1(a)	kW	140	201	230	76	116	111	133	187	222
Circuit 2(a)	kW	-	-	-	152	152	222	204	187	222
Unit with option 81	kW	-	-	-	229	269	333	337	375	445
Power factor at maximum power(1)		0,92	0,92	0,92	0,92	0,92	0,92	0,92	0,92	0,92
Total Harmonic Distortion Intensity	%	<45	<45	<45	<45	<45	<45	<45	<45	<45
Nominal operating current draw(2)- Standard unit										
Circuit 1(a)	A	162	208	244	93	129	119	151	210	243
Circuit 2(a)	A	-	-	-	185	187	237	229	210	243
Unit with option 81	A	-	-	-	278	315	356	380	420	486
Maximum operating current draw (Un)(1)- Standard unit										
Circuit 1(a)	A	220	315	361	119	183	174	209	294	349
Circuit 2(a)	A	-	-	-	239	239	349	319	294	349
Unit with option 81	A	-	-	-	358	422	523	528	588	697
Maximum current (Un-10%)(1)- Standard unit										
Circuit 1(a)	A	237	340	390	129	197	188	225	318	377
Circuit 2(a)	A	-	-	-	258	258	377	345	318	377
Unit with option 81	A	-	-	-	387	456	565	570	635	753
Maximum start-up current(Un) - Standard unit(3)		Lower than max current								
Dissipated power of electrical equipment(1)	W	782	1249	1249	1144	1347	1814	1884	2351	2351

(1) Values obtained at unit continuous maximum operating conditions (data given on the unit nameplate)
(2) Standardised EUROVENT conditions, water-cooled exchanger water inlet/outlet = 12°C/7°C, condenser entering/leaving water temperature = 30°C/35°C
(3) Start-up current is limited by the soft-start controller included in the compressor.
(a) When the machines are equipped with two power supplies, circuit 1 supplies the refrigerant circuit A and circuit 2 supplies the refrigerant circuit B

Note: Options 84 and 84R are not included in these values.

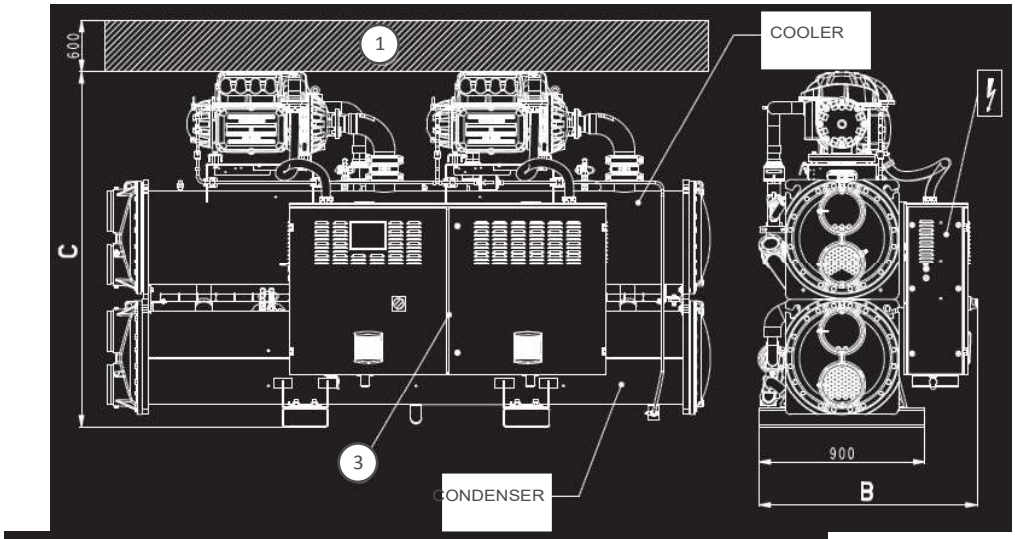
19PV		550	720	800	900	1010	1180	1300	1450	1600
Short-circuit whistand current (TN system)										
Circuit A+B	KA	50	50	50	50	50	50	50	50	50

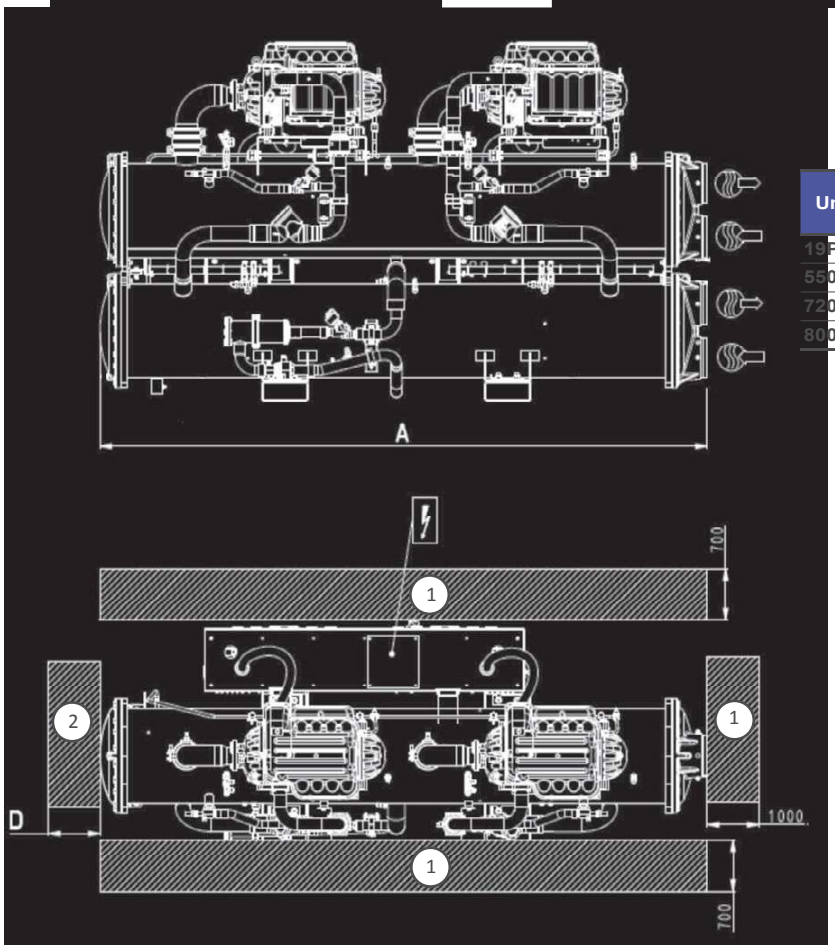
(1) If another current limitation protection device is used, its time-current and thermal constraint (I^2t) trip characteristics must be at least equivalent to those of the recommended protection.

Note: The short-circuit stability current values above are suitable with the TN system.

DIMENSIONS

19PV 550 to 800





Units sizes	Dimensions in mm			
	A	B	C	D
19PV				
550	3045	1120	1745	2800
720	3070	1155	1846	2800
800	3270	1190	1925	3000

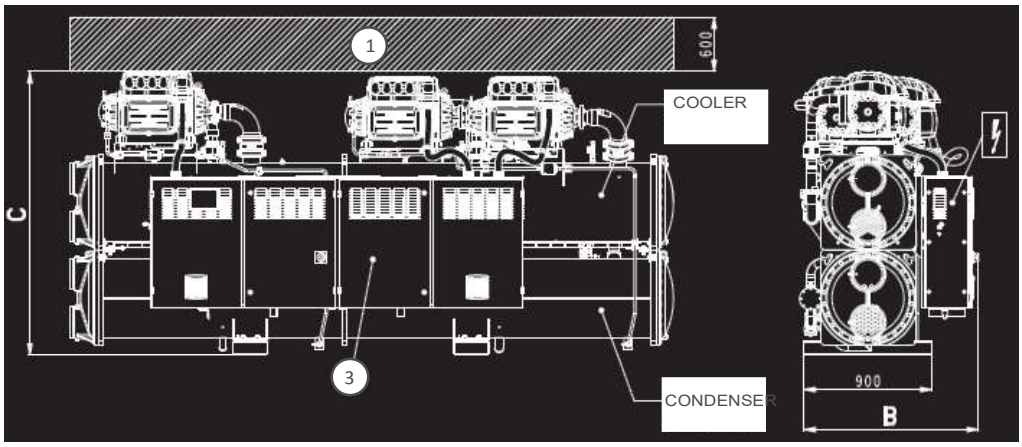
Legend:
All dimensions are given in mm.

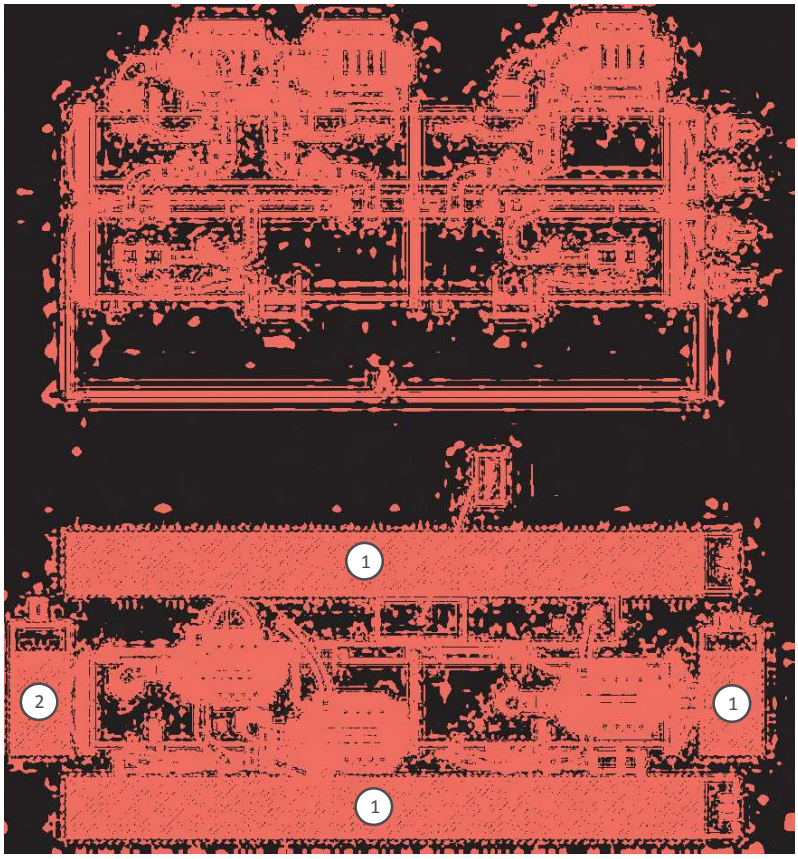
(1) Required clearance for maintenance
(2) Recommended clearance for tube removal
Water inlet
Water outlet
Electrical cabinet

NOTE: Drawings are not contractually binding. Before designing an installation, consult the certified dimensional drawings, available on request.

DIMENSIONS

19PV 900 to 1180





Units sizes	Dimensions in mm			
	A	B	C	D
19PV				
900	4257	1290	1955	3950
1010	4257	1290	1955	3950
1180	4257	1290	1955	3950

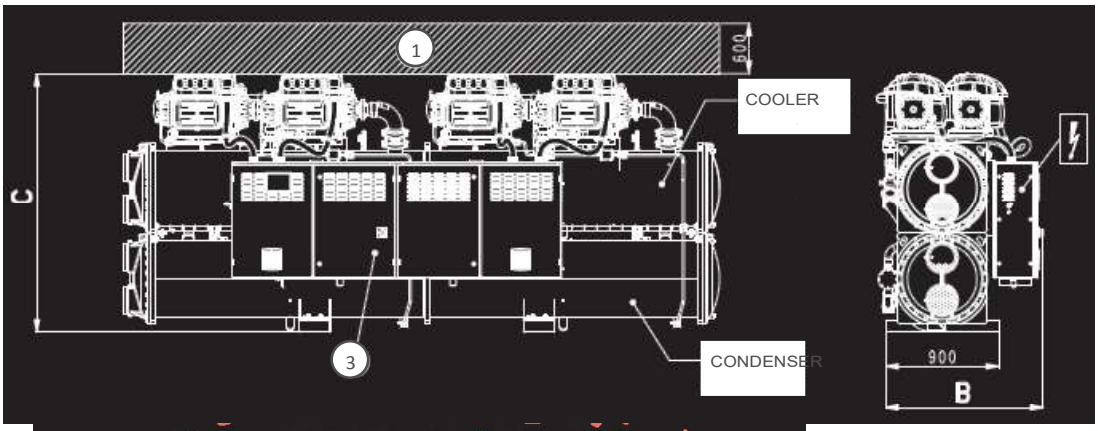
Legend:
All dimensions are given in mm.

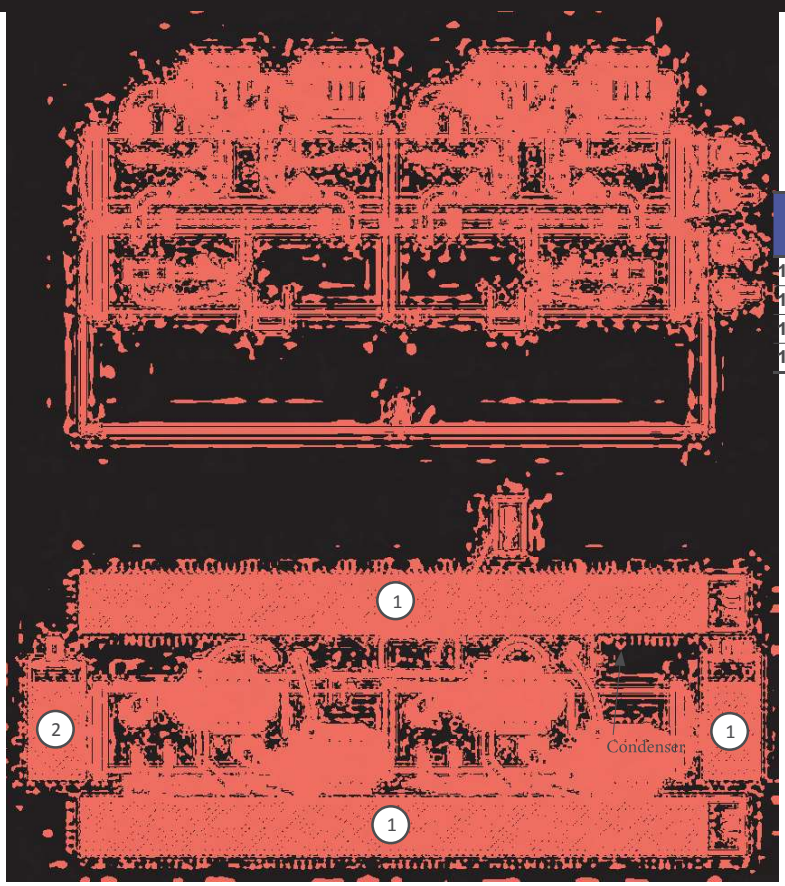
(1) Required clearance for maintenance
(2) Recommended clearance for tube removal
Water inlet
Water outlet
Electrical cabinet

NOTE: Drawings are not contractually binding. Before designing an installation, consult the certified dimensional drawings, available on request.

DIMENSIONS

19PV 1300 to 1600





Units sizes	Dimensions in mm			
	A	B	C	D
19PV				
1300	4705	1290	1955	4400
1450	4740	1290	2011	4400
1600	4740	1325	2065	4400

Legend:
All dimensions are given in mm.

(1) Required clearance for maintenance
(2) Recommended clearance for tube removal
Water inlet
Water outlet
Electrical cabinet

NOTE: Drawings are not contractually binding. Before designing an installation, consult the certified dimensional drawings, available on request.