TOPAIRE

R134a

TCCWCψ9± Series

TOPAIRE WATER COOLED INVERTER DIRECT DRIVE CENTRIFUGAL CHILLER

Cooling Capacity: 250 to 1300 TR (879 to 4572 kW)

50Hz

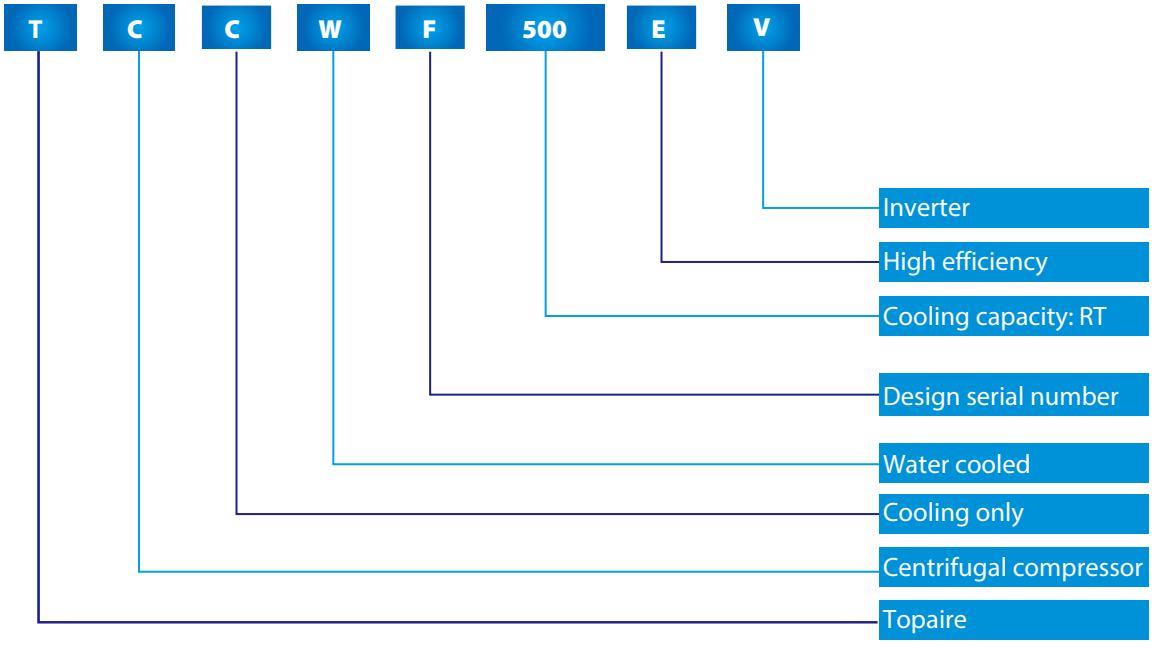
ARI CERTIFIED

Innovation Beyond Comfort

Contents

Overview

Nomenclature



Certified in accordance with the AHRI Water-Cooled Water-Chilling and Heat Pump Water-Heating Packages Using Vapor Compression Cycle Certification Program, which is based on AHRI Standard 550/590 (I-P) and AHRI Standard 551/591 (SI). Certified units may be found in the AHRI Directory at www.ahridirectory.org

Benefits and Features:

Energy saving: COP up to 6.58, IPLV up to 10.69

Technology leading: more than 20 patents

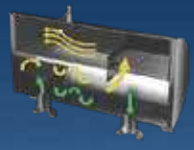
Environmentally friendly: less refrigerant charge and lower noise

Flexibility: wider operation range but compact size

Unit Member

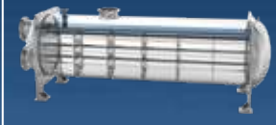
VFD panel

Back-to-back two-stage compressor



Condenser with integral economizer (patented)

250-550RT: built-in economizer;
600-1300RT: external economizer



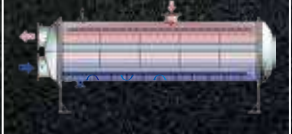
Full falling film evaporator (patented)

R134a

Eco-friendly refrigerant

Inverter motor

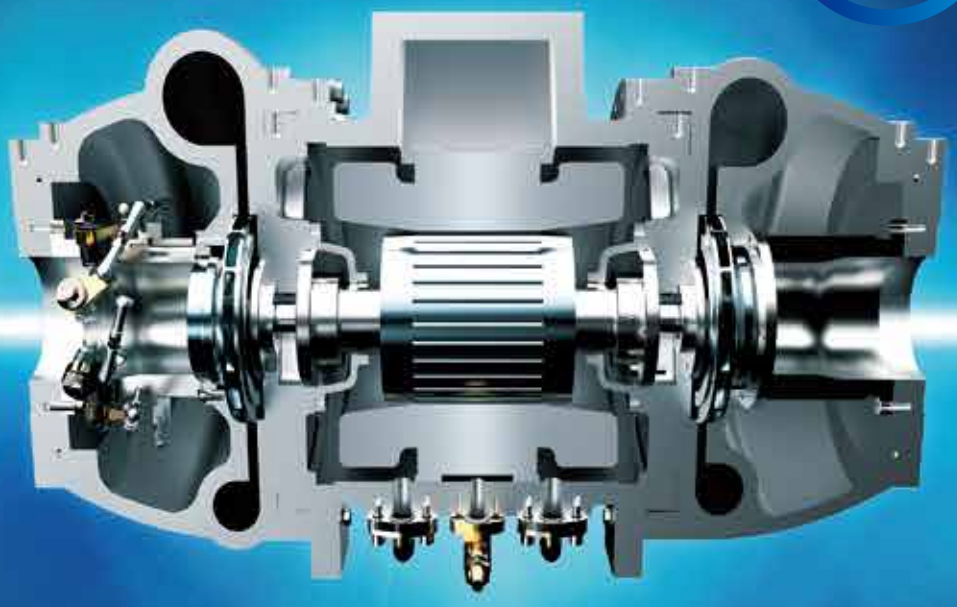
Colorful touch screen



Condenser with integral sub-cooler

Features

Horizontally back-to-back centrifugal compressor



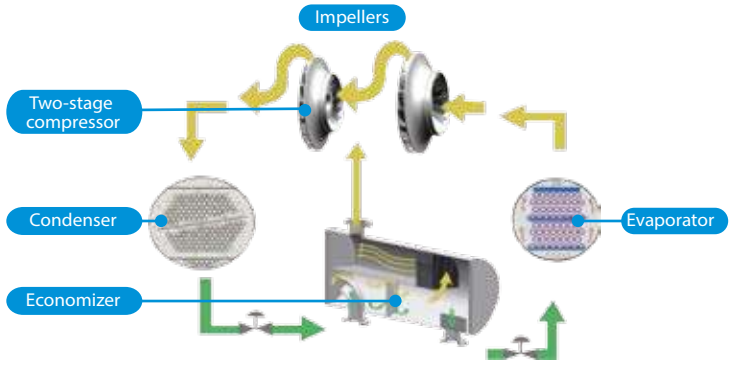
Inverter direct-drive centrifugal compressor adopts the patented technologies as follow:

1) Horizontally back-to-back self-balanced impeller
2) Impeller profile joint and fastening technology
3) Inlet guide vane regulating mechanism with rolling element
4) Integration design of thrust plate and rotation axis
5)Wire leading device and motor equipped with wire leading
6) A centrifugal chiller inlet guide vane correcting algorithm
7) Gas-inlet regulation mechanism and centrifugal compressor with this mechanism

Energy Saving

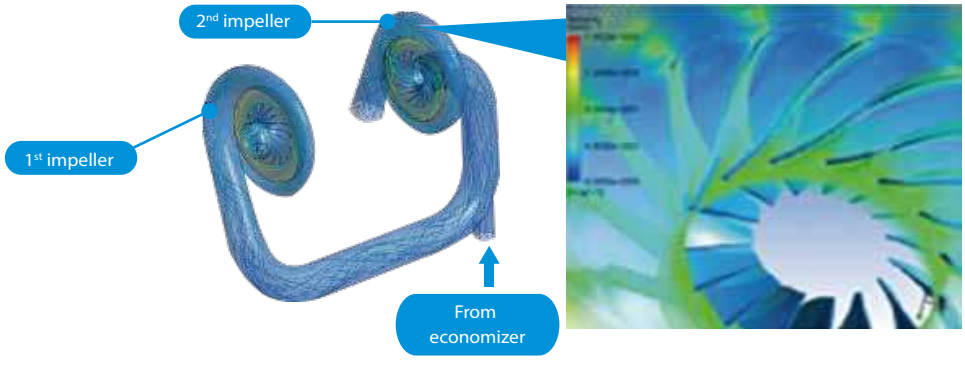
Two-stage compressing »

- 6% higher efficiency than single-stage compression.
- Lower speed and higher reliability.
- Unique three-stage separation economizer, reliable and effective.



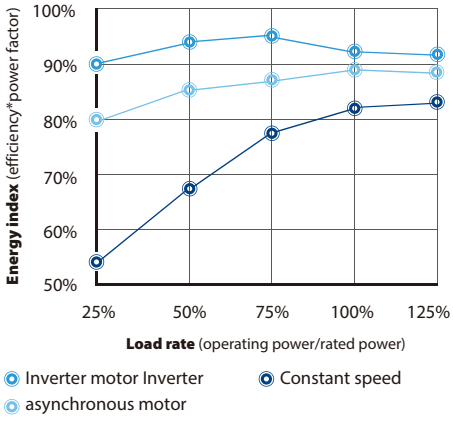
Aerodynamic compressor design »

- With 3D-flow closed and strongly backward-bladed impeller design, impeller efficiency higher than 97%.
- Unique pipeline crossover, with large backflow radius to reduce flow losses and noise.
- The technology of two-stage compression with economizer fully demonstrates the advantage of aerodynamic design and brings higher efficiency to the system.



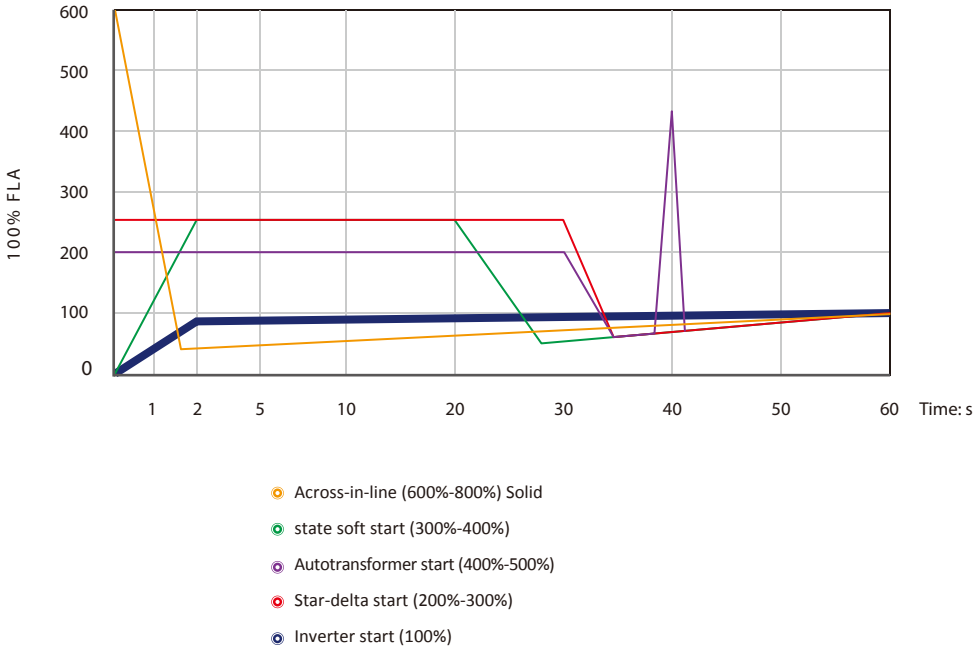
High efficiency inverter motor »

- Motor efficiency as high as 95.5%, energy index (efficiency power factor) over 2% higher than inverter asynchronous motor.
- High power density and small size, with size only 20% of AC inverter motor.
- Designed based on speed and high-frequency operation, with variable frequency range of 120~300Hz.



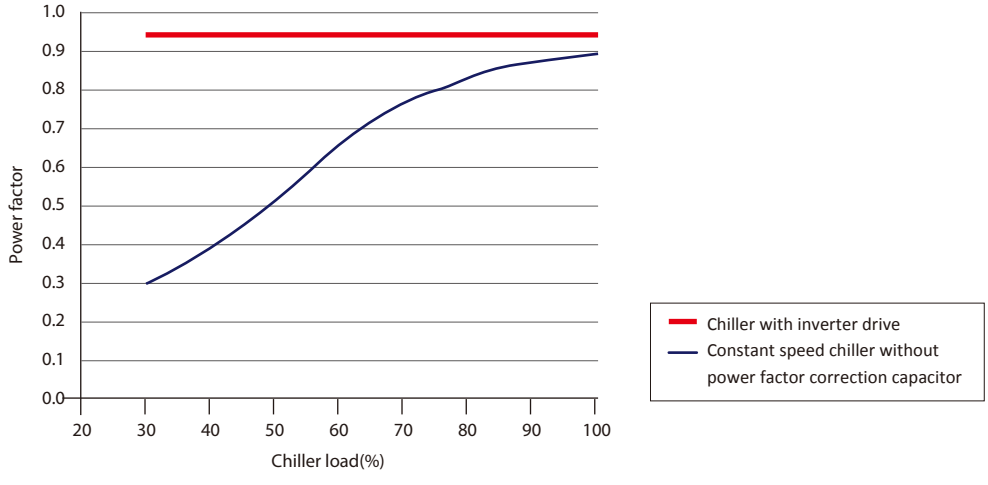
Zero in-rush current »

- The unit adopts inverter starting mode, which produces zero in-rush current during the starting process and enables a stable operation from 0A to FLA.



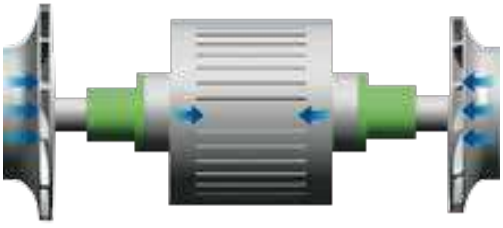
0.95 power factor »

- The high power factor eliminates the need for a power factor connection capacitor.

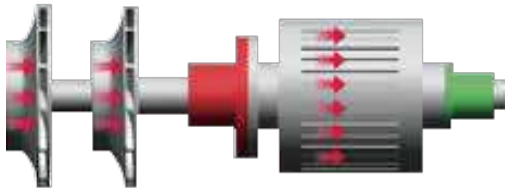


Leading Technology

Back-to-back compression technology »



VS



Horizontally back-to-back impeller

- First developed the patented horizontally back-to-back compression technology with crossover pipe structure.
- Balance the thrust forces for longer life span and improved efficiency by less seal leakage and no gear loss.

Traditional serial impeller

- The traditional two-stage centrifugal impellers are arranged in serial to the same direction, and the axial forces on the two impellers are from the same direction and overlapped.
- More stress on thrust bearing, cause mechanical damage, and require higher reliability of bearing.

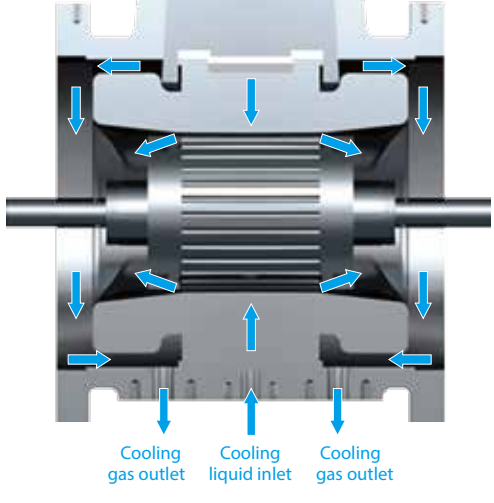
Patented IGV correcting algorithm

- Realized stable load regulating, energy saving and more comfort.
- High precision and high compatibility.
- Invented a centrifugal chiller load regulate method.

Guide vane opening correction model: B=a*sd1(t)2+b*sd1(t)+c
B: the 2nd guide vane opening
sd1(t): the 1st guide vane opening
a: quadratic coefficient
b: monomial coefficient
c: constant

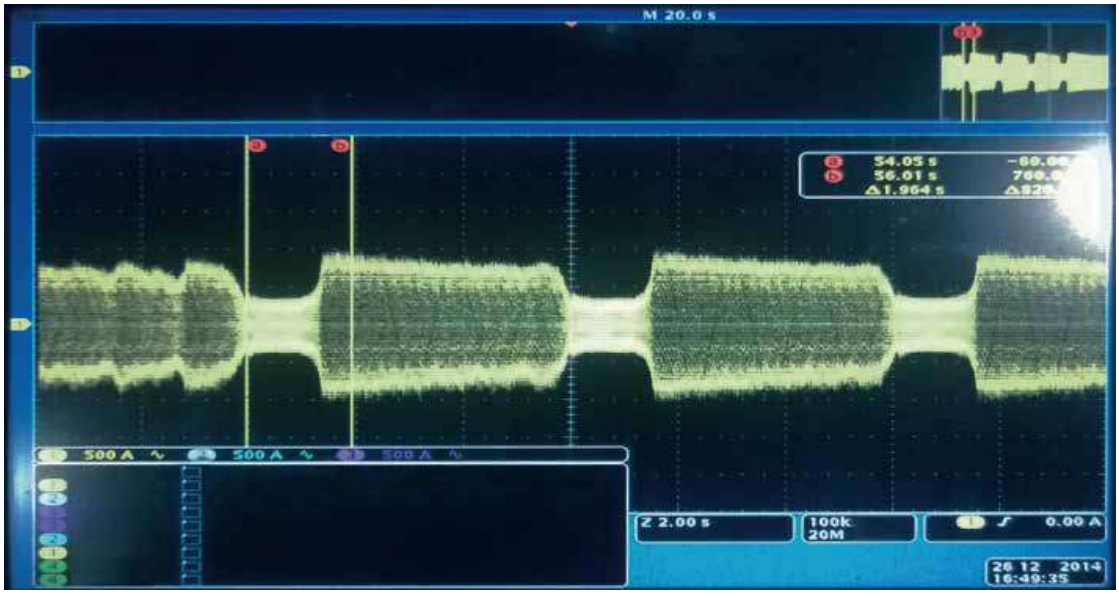
360° motor cooling technology »

- The motor is cooled by the refrigerant, with liquid supply and gas return at the bottom, thus high efficiency.
- Cooling method eliminates the potential for shaft seal leaks and refrigerant/ oil loss.
- The motor adopts F-level insulation design, with three PTC temperature switches preset in the winding to ensure constant safety.



Anti-surge technology »

- Extend the surge curve: real-time to adjust the motor speed in different operation condition.
- Precise monitor and comparing: real-time to monitor running current and comparing running current curve to current data base in the controller.

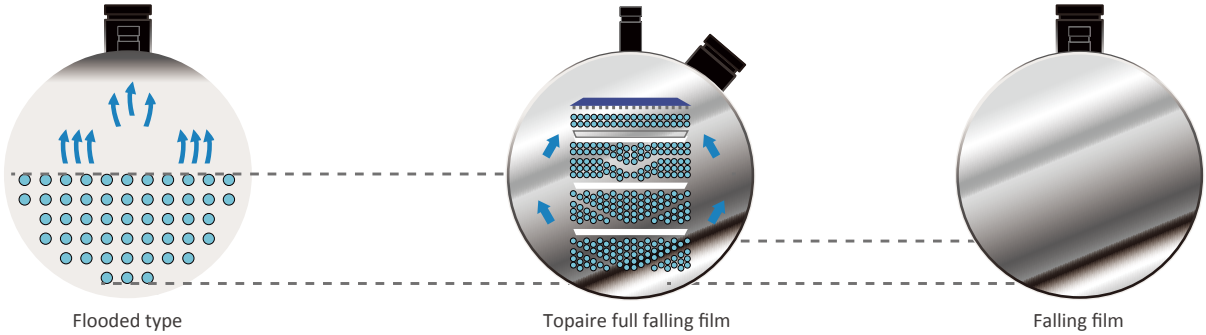


Typical current waveform in surging condition

Full Falling Film Evaporating Technology »

- First created the full falling film evaporator and adopted spray technology to achieve film evaporation on the surface of the heat exchange tube, greatly increasing overall heat transfer efficiency and reducing refrigerant charge by up to 40%. The
- patented refrigerant distributor can improve the homogeneity of the liquid to avoid local drying, fully showcasing the performance of the heat exchange tube and increasing unit efficiency.

Patent No: 201210414053.9; 201220552298.

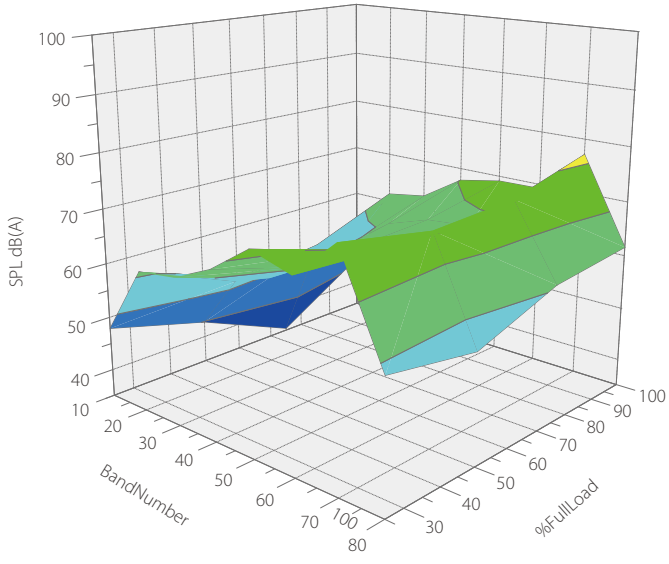


Flooded type	Topaire full falling film	Falling film
Full falling film reduced refrigerant charge by up to 40% compared with the flooded type	Almost zero liquid level	Full falling film reduced refrigerant charge by up to 25% compared with the falling film type

Environmentally friendly

Quieter operation »

Inverter direct-drive centrifugal chiller is the quietest chiller in its size range with sound pressure ratings as low as 78 dBA per AHRI Standard 575. That makes it ideal for sound sensitive environments such as schools, performance halls, museums, condominiums and libraries.



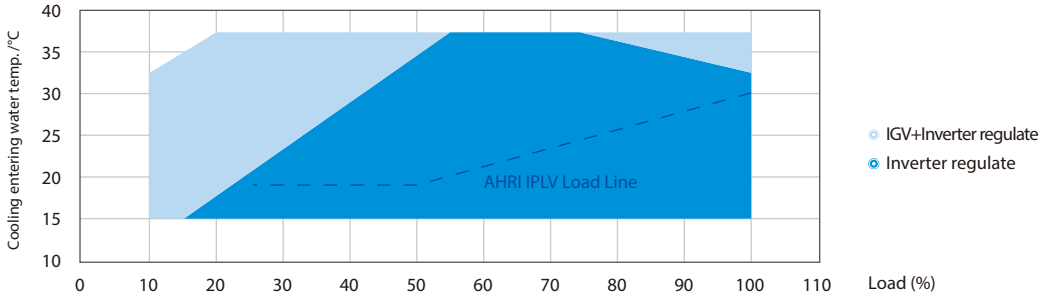
LEED »

Zero-ozone depletion R134a refrigerant, green, and has no elimination cycle. Full falling-film technology reduces refrigerant charge by up to 40%, which enables you to qualify for maximum Leadership in Energy and Environmental Design (LEED®) points for Enhanced Refrigerant Management. And with the chiller's high efficiency, you can also earn additional points for credits from Optimized Energy Performance (EAc1).

Flexibility

Wider operation map »

- Only inverter regulation on AHRI condition to save energy.
- Capacity load from 10%~100% and cooling EWT up to 37 °C are able to satisfy the application requirement of multiple operating conditions (load from 10%-20% need hot gas bypass).



More choices »

Unit-mounted and free standing starter panel are available.

Option 1

Option 2

Compact size »

Compact size is ideal for retrofit as well as small installation space project. The space savings can add up as quickly as the energy savings.

Specifications

Model		TCCWF	250EV	300EV	350EV	400EV	450EV	500EV	550EV
Cooling capacity		RT	250.0	300.0	350.0	400.0	450.0	500.0	550.0
		kW	879.0	1055	1231	1406	1582	1758	1934
		10^4kcal/h	75.59	90.71	105.8	121.0	136.1	151.2	166.3
Power input		kW	141.2	165.2	193.0	223.9	247.3	276.6	310.1
COP		W/W	6.224	6.385	6.376	6.282	6.399	6.356	6.237
IPLV		W/W	9.341	9.591	9.737	10.46	10.61	10.59	10.69
Motor configuration power		kW	200.0	200.0	240.0	280.0	280.0	315.0	350.0
Rated current		A	230.7	269.9	315.3	365.7	403.9	451.9	506.6
Max. operating current		A	262.4	305.4	358.9	416.1	457.5	507.9	565.8
Locked-rotor current		A	1523	1523	1883	2603	2603	2985	3338
Evaporator	Water flow	m^3/h	135.8	163.0	190.1	217.3	244.4	271.6	298.8
	Pressure drop	kPa	43.3	43.2	43.6	42.9	43.2	42.4	44.1
	Water pipe connection	mm	DN200	DN200	DN200	DN250	DN250	DN250	DN250
Condenser	Water flow	m^3/h	169.7	202.9	236.8	271.1	304.2	338.3	373.1
	Pressure drop	kPa	44.7	45.7	45.9	44.8	44.6	46.5	46.8
	Water pipe connection	mm	DN200	DN200	DN200	DN250	DN250	DN250	DN250
Unit dimensions	Length	mm	3650	3650	3650	3650	3650	3650	3650
	Width	mm	1940	1940	1940	2000	2000	2000	2000
	Height	mm	2150	2150	2150	2150	2150	2150	2150
Shipping weight		kg	4650	4800	4950	5650	5800	5950	6100
Running weight		kg	5580	5780	5980	6730	6930	7130	7330

Note:
(1) Performance and efficiency are based on AHRI 550/590-2018. Evaporator conditions: water inlet=54°F, water outlet=44°F , fouling factor=0.0176m^2. °C/kW;
Condenser conditions: water inlet=85°F, water outlet=94.3°F, fouling factor=0.0440m^2. °C/kW.
(2) The design's max working pressure for both the evaporator and condenser are 1.0MPa, but higher pressure can be customized if required.
(3) As a result of the continuous improvement of the product, the above parameters may be changed, please refer to the product nameplate and in-kind.

Model		TCCWF	600EV	650EV	700EV	750EV	800EV	850EV
Cooling capacity		RT	600.0	650.0	700.0	750.0	800.0	850.0
		kW	2110	2285	2461	2637	2813	2989
		10^4kcal/h	181.4	196.6	211.7	226.8	241.9	257.0
Power input		kW	331.3	357.2	378.0	407.5	442.1	460.7
COP		W/W	6.367	6.397	6.511	6.471	6.362	6.488
IPLV		W/W	9.315	9.628	9.991	10.16	10.19	10.15
Motor configuration power		kW	400	400	450	450	500	560
Rated current		A	541.3	583.6	617.6	665.7	722.3	752.6
Max. operating current		A	613.1	658.9	696.0	745.8	801.6	850.4
Locked-rotor current		A	3281	3281	3905	3905	4864	6495
Evaporator	Water flow	m^3/h	325.9	353.1	380.3	407.4	434.6	461.7
	Pressure drop	kPa	53.8	52.2	58.6	56.1	60.1	56.2
	Water pipe connection	mm	DN300	DN300	DN300	DN300	DN300	DN300
Condenser	Water flow	m^3/h	404.3	437.9	470.6	504.7	539.7	572.2
	Pressure drop	kPa	51.4	54.5	51.0	55.1	54.7	55.2
	Water pipe connection	mm	DN300	DN300	DN300	DN300	DN300	DN300
Unit dimensions	Length	mm	4700	4700	4700	4700	4700	4750
	Width	mm	1950	1950	1950	1950	1950	2150
	Height	mm	2750	2750	2750	2750	2750	2900
Shipping weight		kg	9060	9120	9330	9410	9490	10665
Running weight		kg	10700	10790	11080	11210	11330	12885

Model		TCCWF	900EV	950EV	1000EV	1100EV	1200EV	1300EV
Cooling capacity		RT	900.0	950.0	1000	1100	1200	1300
		kW	3164	3340	3516	3868	4219	4571
		10^4kcal/h	272.2	287.3	302.4	332.6	362.9	393.1
Power input		kW	482.2	513.3	538.8	591.8	641.7	698.0
COP		W/W	6.563	6.507	6.525	6.535	6.575	6.549
IPLV		W/W	10.37	10.39	10.55	10.35	10.57	10.69
Motor configuration power		kW	560	560	630	700	700	800
Rated current		A	787.7	838.6	880.3	966.9	1048	1140
Max. operating current		A	888.6	945.5	991.7	1089	1181	1282
Locked-rotor current		A	6495	6495	6246	6638	6638	6955
Evaporator	Water flow	m^3/h	488.9	516.1	543.2	597.5	651.9	706.2
	Pressure drop	kPa	62.4	54.5	58.4	57.0	57.0	56.0
	Water pipe connection	mm	DN300	DN300	DN300	DN300	DN300	DN300
Condenser	Water flow	m^3/h	605.2	639.8	673.3	740.7	807.5	875.1
	Pressure drop	kPa	58.9	53.4	55.6	52.6	53.4	58.0
	Water pipe connection	mm	DN300	DN300	DN300	DN300	DN300	DN300
Unit dimensions	Length	mm	4750	4750	4750	4800	4800	4800
	Width	mm	2150	2150	2150	2260	2260	2260
	Height	mm	2900	2900	2900	3050	3050	3050
Shipping weight		kg	10690	11050	11050	13320	13520	13650
Running weight		kg	12915	13450	13450	16180	16495	16710

Note:
(1) Performance and efficiency are based on AHRI 550/590-2018. Evaporator conditions: water inlet=54°F, water outlet=44°F , fouling factor=0.0176m^2. °C/kW;
Condenser conditions: water inlet=85°F, water outlet=94.3°F, fouling factor=0.0440m^2. °C/kW.
(2) The design's max working pressure for both the evaporator and condenser are 1.0MPa, but higher pressure can be customized if required.
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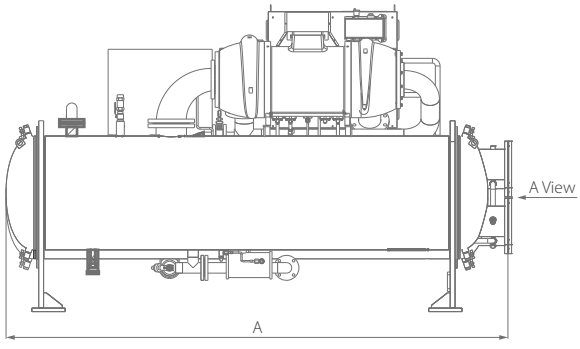
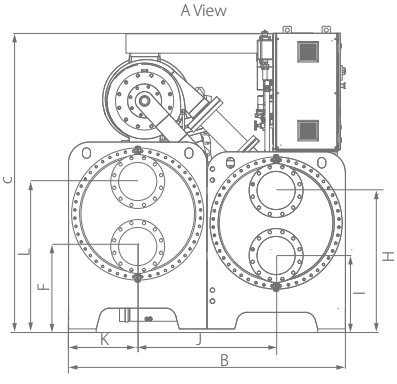
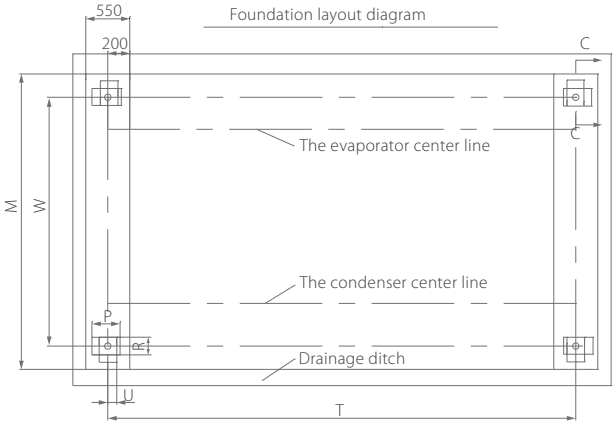
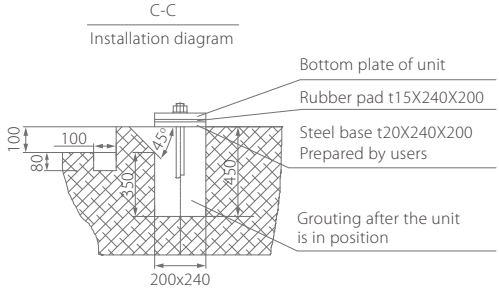
Dimensions



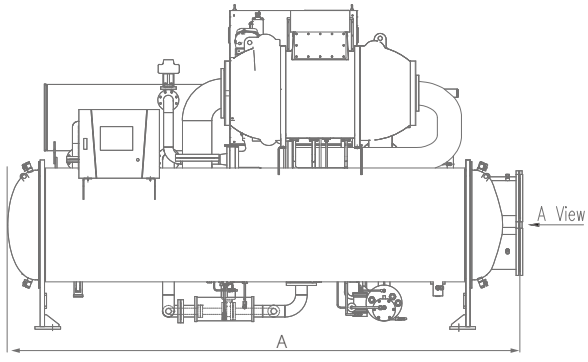


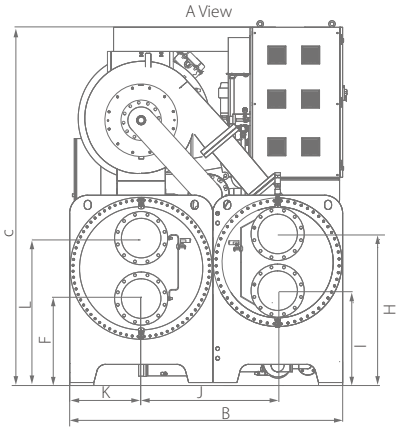


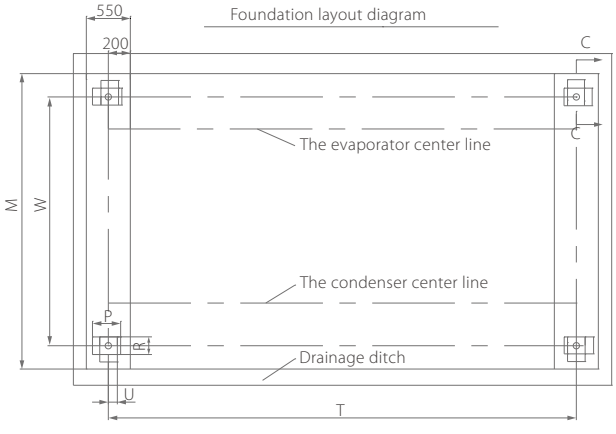


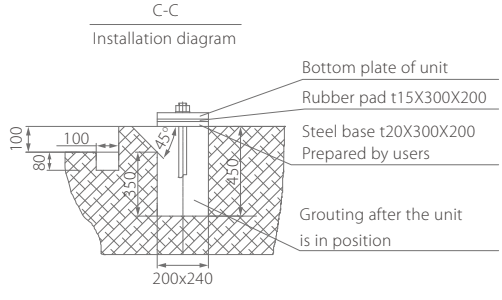
Model	Dimensions			Support						Pipe locate position					
	Length (A)	Width (B)	Height (C)	M	W	P	R	U	T	F	L	K	I	H	J
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
TCCWF250EV	3650	1940	2150	2240	1740	240	200	100	2780	670	1040	485	605	975	970
TCCWF300EV															
TCCWF350EV															
TCCWF400EV	3650	2000	2150	2300	1800	240	200	100	2780	620	1090	500	555	1025	1000
TCCWF450EV															
TCCWF500EV															
TCCWF550EV															

Dimensions









Model	Dimensions			Support						Pipe locate position					
	Length (A)	Width (B)	Height (C)	M	W	P	R	U	T	F	L	K	I	H	J
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
TCCWF600EV	4700	1950	2750	2550	1750	240	200	200	3780	635	1095	500	683	1143	975
TCCWF650EV															
TCCWF700EV															
TCCWF750EV															
TCCWF800EV															
TCCWF850EV	4750	2150	2900	2750	1950	240	200	200	3780	710	1180	550	765	1225	1075
TCCWF900EV															
TCCWF950EV															
TCCWF1000EV															
TCCWF1100EV	4800	2260	3050	2860	2060	240	200	200	3780	720	1220	593	785	1255	1130
TCCWF1200EV															
TCCWF1300EV															

Space layout

Model	Maintenance space (mm)			
	T	Y	S	Z
TCCWF250EV	1000	1200	1200	3200
TCCWF300EV				
TCCWF350EV				
TCCWF400EV				
TCCWF450EV				
TCCWF500EV				
TCCWF550EV				
TCCWF600EV	1000	1200	1200	4500
TCCWF650EV				
TCCWF700EV				
TCCWF750EV				
TCCWF800EV				
TCCWF850EV				
TCCWF900EV				
TCCWF950EV				
TCCWF1000EV				
TCCWF1100EV				
TCCWF1200EV				
TCCWF1300EV				

Note: Z is the tube removal space and both ends can be selected.

Options/ Accessories

Items	Standard	Optional
Power supply	380V-3Ph-50Hz	380~460V, 50/60Hz
Water inlet/outlet connection type	Flange	×
High pressure water box	1.0MPa	1.6MPa, 2.0MPa
Marine water box	×	√
Anti-vibration	Rubber pad	Spring isolator
Vessel code	GB	ASME, PED
Heat recovery	×	√
Chilled water Delta T	5°C	6°C~11°C
Centrifugal heat pump	×	Hot water temperature up to 45°C
Water storage	×	√
Communication protocol	Modbus-RTU (RS485)	BACnet IP, BACnet MS/TP (RJ-45 port)
Hot gas bypass	×	√
Flow switch	Differential pressure	×
Knockdown shipment	×	√
Witness performance testing	×	√
Chiller Plant Control	×	√
Smart Cloud platform	×	√
QuickView	×	√
Tube automatic cleaning system	×	√
Low total harmonic current distortion rate (THDI)	≤35% (full load)	≤5% (full load)

Note: For other options, please contact our engineers.

Operating and Control System

Intelligent color touch screen

The perfect operating and control system of centrifugal chiller integrates a series of control and monitoring functions including intelligent operations, safety protection and interlocking control to achieve reliable start, high efficiency operations and internal control of chiller.

Interface display

- 10-inch true color graphic display interface
- Full screen touch operation experience
- Visual display of unit operating status
- Multi-level password protection
- Unit operation data display
- Pre-alarm/alarm display and recording
- Operation log display

Operation control

- Freely select the inlet/outlet water control mode
- Target temperature settings
- Auto loading/unloading and soft loading
- Automatic optimization control function
- Quick start and startup after power restoration (optional)
- Independent start/stop function
- Remote and timed power-on/off functions
- Detailed unit status query

Interlocking control

- Frequency and guide vane control
- Water system bypass control
- Chilled water and cooling water pump interlocking control
- Cooling tower fan interlocking control
- Reserved upper computer interface control
- Reserved alarm interlocking control
- Pre-startup safety interlocking control

Safety protection

- Compressor current protection
- Anti-surge protection
- Condensing pressure high/too high protection
- Evaporation pressure low/too low protection
- Water outage protection
- Operating anti-freeze protection
- VFD panel fault protection

Note: The control interface and display content vary with each model. Please refer to the actual product.

TOPAIRE

AHRI CERTIFIED

Head Office

TOPAIRE SALES & SERVICES SDN BHD

(274725-W)

No.A7-2-2, Block A, Megan Salak Park, Jalan
2/125E, Taman Desa Petaling, 57100 Kuala Lumpur.

Tel : 603-90563228 (Hunting line)
603-90562818 / 603-90562868.
Fax : 603-90562800.
Email : sales@topaire.com.my

CVC EMS

Manufacturer
Is certified under the ISO 14001 International standard
for environmental management.
Certificate No.15912E10020R0L

CVC OHSMS

Manufacturer
Certificate of Occupational Health and Safety Management System
Certificate No. 15912S20006R0L-1.

TÜVRheinland® CERT ISO 9001

Manufacturer
Is certified under the ISO 9001 International standard
for quality assurance.
NO.01 100 019209

Branches

Penang
No 4, Lengkok Kikik 2, Taman Inderawasih, 13600, Prai, Pulau Pinang.
Tel: 04-399 2050/1 Fax: 04-398 2050

Johor Bahru
No. 62, Jalan Permas Jaya 9/13, Bandar Baru Permas Jaya, 81750 Johor Bahru, Johor Darul Takzim.
Tel: 07-388 4600/1 Fax: 07-388 4602

Kota Bahru
Lot 1848, Jalan Hospital, Kg. Cherang, Taman Kenangan, 15200 Kota Bahru, Kelantan.
Tel: 09-748 9295 Fax: 09-748 9297

Sabah
Lot 2, (DBKK No.69) Lorong Inanam 5 3/4 Miles, Tuaran Road, 88450 Kota Kinabalu, Sabah.
P.O. Box 526, 88857, Inanam, Kota Kinabalu, Sabah
Tel: 088-388 339 Fax: 088-389 339

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