Century

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Century

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Oil-Free Inverter Centrifugal Chiller

We strive in building a
better environment for the future.

Century Products

CHILLER UNIT / AIR HANDLING UNIT
MARINE & INDUSTRIAL EQUIPMENT
NUCLEAR HVAC SYSTEM
AIR CONDITIONER / Other Products

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About Us...

Century is a company that specializes in refrigeration and air conditioning. Century has been developing through independent domestic technology during the last forty years and is still strengthening its position as a leading manufacturer of refrigeration and air conditioning equipment through continuous research, development and the application of cutting-edge technology.

Thanks to the strong commitment in its field, Century has become a great partner to its clients in various sectors, such as refrigeration, air conditioning, industrial machineries, cooling/heating systems and nuclear power plants. Century is also developing as an eco-friendly company with expertise that has developed throughout the years. Century accomplishes this on its specialized technology and environmental factors.

Century Corporation has been supplying various nuclear power related HVAC systems, radioactive waste systems and other types of plants for about twenty nuclear power plants (nuclear fuel manufacturing plant, research institutes and others). These facilities, built and operating in Korea, as well as internationally, for the past 25 years, also expanding to equipment supply related engineering, inspections, testing, commissioning and construction areas.

Century
Oil-Free Inverter
Centrifugal WaterChiller

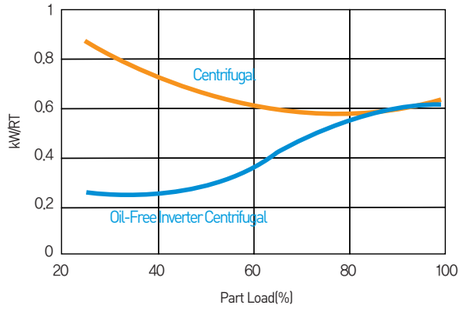
〈Product Line-Up〉 1. Oil-free Inverter Centrifugal Chiller (Water-cooled Type) : TR-W100HA1~ W2000HF1
2. Oil-free Inverter Centrifugal Chiller (Air-cooled Type) : TR-A060HA1 ~ A200HB1

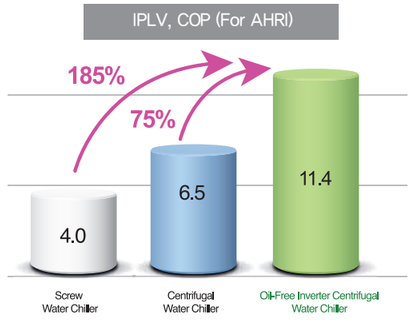
Oil-free Inverter Centrifugal Chiller (Water-Cooled Type)

Features

- Volume Control : INVERTER+IGV
- VFD & SOFT STARTER (Optimal part load and low starting current)
- OIL-FREE TYPE
- MAGNETIC DIRECT DRIVE SYSTEM
- ENERGY-SAVING (Lower operation cost with high efficiency)
- Low-noise, compact, and lightweight
- Optimal high-performance heat transfer tube
- Optimum cycle control technology
- High-efficiency and eco-friendly refrigerant R-134a

Optimal Part Load (IPLV 11.4)





- Improved IPLV than centrifugal and screw chillers
- Oil-free centrifugal chiller (0.31 kW/RT) (IPLV)
- Improved economic feasibility (Saves a minimum of 46% in annual operation cost with 50% load operation) and lower operation cost with low and part load operation
- For 100~2,000 USRT models

Certifications

- AHRI certificate (AIR-CONDITIONING, HEATING & REFRIGERATION INSTITUTE)
- Certification for high-efficiency energy equipment, etc.

Oil-free Inverter Centrifugal Chiller (Water-cooled Type)

Compressor

TT Serise

- Turbocor Compressor (OIL-FREE SYSTEM)
- Inverter embedded in the compressor
- Oil-free magnetic bearing with a compact high-speed rotation system (Solution for oil-related problems and lower maintenance cost)
- Initial startup can be made under the rated current

VTT Serise

- IntraFlowTM to control the capacity
- Diversified driving with stable load
- Better flow for refrigerant (IGV removed)
- External type inverter

Heat Exchanger

- Shell structure with evaporator and condenser separated (Shell and tube structure)
- High-efficiency heat transfer tube (Improved heat exchange rate, reduced compressor load, and reduced power consumption)
- SUBCOOLING SYSTEM

Micom Control

- Improved refrigerating efficiency with DDC-type PID precision control
- Modbus protocol and Ethernet communication
- Color TFT touch screen

Low-noise, Compact, and Lightweight Product

- 75~78dB or lower (12% lower than constant-speed centrifugal chiller)
- Lower volume (33% lower than our same-size model)
- Lightweight (48% lower than our same-size model)

Economic Conditions

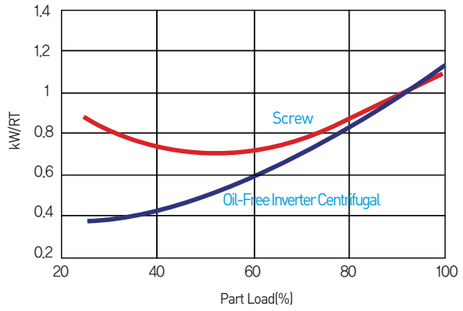
	100~50% Part Load (in June~August)		75~25% Part Load (in March~May & September~October)		50~25% Part Load (in November~February)	
	Operation cost	Savings	Operation cost	Savings	Operation cost	Savings
Oil-free Inverter Centrifugal	10,685	**Approx. 8.3% savings than centrifugal chiller** **Approx. 37.8% savings than screw chiller**	9,288	**Approx. 38.2% savings than the centrifugal chiller** **Approx. 56.0% savings than the screw chiller**	3,982	**Approx. 62.2% savings than the centrifugal chiller** **Approx. 73.0% savings than the screw chiller**
Centrifugal Chiller	11,647		15,035		10,546	
Screw Chiller	17,189		21,081		14,768	
Remarks	- Unit : KRW 1,000 - 150-USRT cooling capacity with standard temperature condition - 24 hr operation/day - Industrial electricity, low-voltage electricity, under 300-kW contract electricity (as of Nov. 21, 2013)					

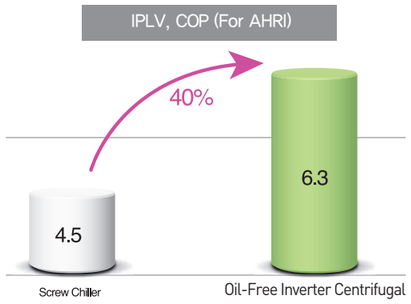
Oil-free Inverter Centrifugal Chiller (Air-Cooled Type)

Features

- Volume Control : INVERTER+IGV
- VFD & SOFT STARTER (Optimal part load and low starting current)
- OIL-FREE TYPE
- MAGNETIC DIRECT-DRIVE SYSTEM
- Optimal high-performance air-cooling condensation heat transfer tube
- High-performance propeller fan (stable airflow)
- Fan speed control based on condensation temperature
- High-efficiency and eco-friendly refrigerant R-134a

Optimal Part Load (IPLV 6.3)





Turbocor Compressor

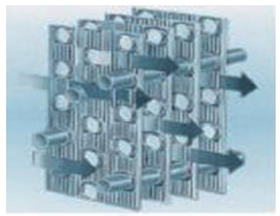
- Turbocor Compressor (Oil-free system)
- Oil-free magnetic bearing with compact high-speed rotation system (Solution for oil-related problems & lower maintenance cost)
- Initial startup can be made under the rated current

Micom Control

- Improved refrigerating efficiency with DDC-type PID precision control
- Modbus protocol and Ethernet communication
- Color TFT touch screen

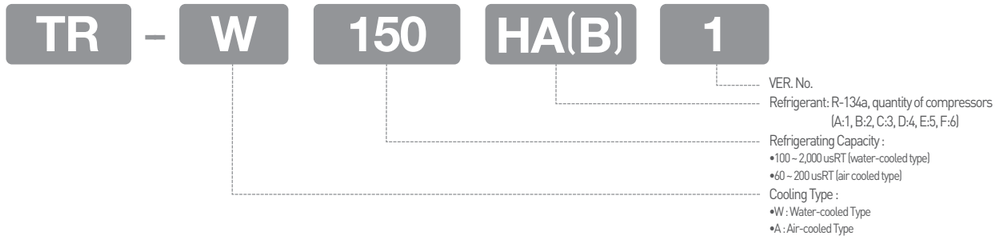
High-performance Condensation Heat Transfer Tube

- Thermo-fin Tube and Super Slit Fin (1.7-times higher heat transmission rate than plain tubes & plate fins)
- Compact size with a high-efficiency and high-performance heat transfer tube



Oil-Free Product Feature

Model Nomenclature



Features of Oil-free Centrifugal Chiller

- Optimal heat transfer system with oil-free design
- Addressing peak current with soft start
- Eco-friendly design with HFC-134a
- Minimized noise
- Maximized part load efficiency and energy saving with improved efficiency
- High reliability and longer life cycle
- 50,000 hr or longer life cycle of magnetic bearing

Soft-Start Efficiency
- Optimization of electrical parts with reduced Max. Power Loads

Eco-friendly Refrigerant
- Eco-friendly refrigerant of ODP index "0"

Lower Noise
- Reduced noise with non-touch rotation
- 75~78dB(A)

Compact & Lightweight
- Compact and lightweight with reduced compressor volume and weight

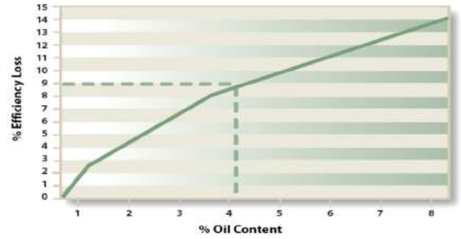
Optimum Heat Transfer Efficiency with Oil-free Design
- 15~25% more effective heat transfer efficiency
- (In general) 9% lower efficiency with 4% oil content

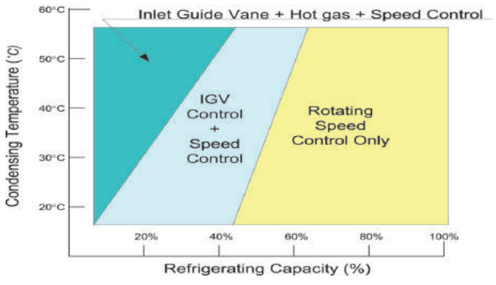
Excellent Energy Saving

- Optimized efficiency design with high-efficiency Danfoss Turbocor oil-free turbo compressors
- Improved IPLV efficiency with magnetic bearing technology and optimum rpm control than existing turbo, screw, and reciprocating motion types using refrigeration oil
- 36% more effective energy saving than the existing centrifugal chiller (annual operation cost)
- 55% more effective energy saving than the existing screw chiller (annual operation cost)
- High reliability
  Turbocor compressor consists of 1 drive that is rotated by a digital-control magnetic bearing and it controls with a feedback of 100,000 times/second with the positional information of magnetic bearing.

Extensive Capacity Control system

The capacity control system of the Century oil-free inverter centrifugal chiller offers 10~100% continuous and automatic operation with rpm control, an inlet guide vane, a hot gas bypass, and a number of compressors by capacity and conditions.



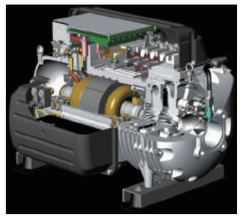


Capacity control system of the Century oil-free centrifugal chiller

Oil-Free Product Feature

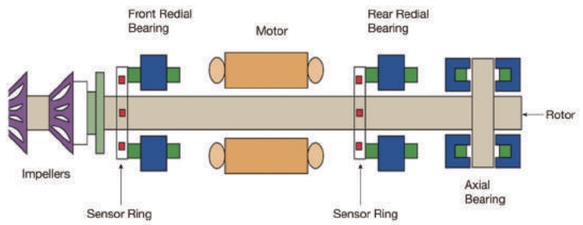
Features of compressor

The Century centrifugal chiller is optimally designed with Turbocor's oil-free system. The magnetic bearing technology is automatically controlled with a 2-stage centrifugal compression and a feedback of 100,000 times/second positional information for high reliability.



Cross section of the Danfoss Turbocor compressor equipped with oil-free magnetic bearing technology for the Century centrifugal chiller

2-step turbo compressor shaft and magnetic bearing of Turbocor rotating above the rotor assembly magnetic bearing for the Century centrifugal chiller

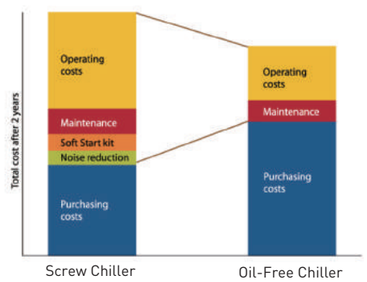


magnetic bearing

Excellent Energy-saving Capacity

The Century oil-free inverter centrifugal chiller features a compact size, low noise, and high efficiency.

This oil-free inverter centrifugal chiller consists of shell and tube evaporator and condenser, a 2-stage compressor, an optimally programmed controller, a refrigerant level sensor for optimum control, an electronic expansion valve, and several safety devices. The oil-free inverter centrifugal chiller possesses a high-efficiency optimal system achieved through the adoption of Danfoss Turbocor's oil-free system.
In addition, the automatic and optimally programmed high-performance controller supports a perfect remote control system with Modbus and RS-232 communications. The Century Turbocor chiller provides outstanding performance under part load and minimized operation cost with high reliability.



The graph above compares the total cost of the screw chiller and the oil-free chiller for 2 years.

Energy-saving and High-performance Heat Transfer Tube

High-performance heat transfer tube, "THERMOEXCEL," is used for a more effective heat exchange rate between an evaporator and a condenser.
Using this product, evaporation temperature is increased and condensation temperature is decreased, making the compression rate small and the load of the compressor much less, thus lessening power consumption.

1. Heat transfer tube" THERMOEXCEL - EKW" for evaporator

For the heat transfer tube of the evaporator, a tunnel is made in a circumferential direction under the surface to promote boiling and increase the air bubble production point. In the tunnel, the refrigerant evaporates quickly and the boiling is continuously and completely made.
In addition, grooves and projects are processed double to improve heat transfer performance. This structure offers better heat transfer performance than existing single-grooved and project-processed heat transfer tubes.

2. Heat transfer tube" THERMOEXCEL - CKW" for condenser

For the heat transfer tube of the condenser, it is processed in a micro-fin shape with a sharp point for easy condensation and dripping of refrigerant. In addition, grooves and projects are processed double to improve the heat transfer performance. This structure offers better heat transfer performance than existing single-grooved and project-processed heat transfer tubes.

Boiling state

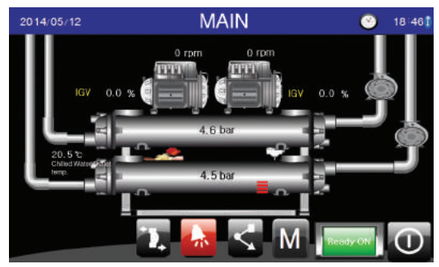
Condensation & dripping state

Control

- DDC-type PID precision control
- Precision control : Better efficiency and energy saving for chillers
- Data processing and saving during operation

- Support for communication protocol
- Communications : RS485 and Ethernet

- Touch Screen
- Easy control and operation with English language interface and visualization
- One screen shows full operation state
- Convenient alarm history management



Specification(Water-cooled Type)

TR-W100HA1~ W300HB1

ITEM \ MODEL			Inverter Centrifugal Chiller (Water-cooled Type) (TR-W Type)													
			100HA1		120HA1		150HA1		180HA1		200HB1		250HB1		300HB1	
Chilled Water Outlet Temp.			5	7	5	7	5	7	5	7	5	7	5	7	5	7
Cooling Capacity		usRT	100	100	110	120	125	150	160	180	180	200	220	250	260	300
		kW	351.6	351.6	386.8	422.0	439.5	527.4	562.6	632.9	632.9	703.3	773.6	879.1	914.2	1054.9
Input		kW	66	59	70	71	79	89	101	107	113	118	139	146	164	176
Efficiency(IPLV)		kW/RT	0.307		0.307		0.307		0.306		0.306		0.307		0.307	
		COP	11.448		11.453		11.472		11.480		11.480		11.438		11.439	
Chilled Water	Flow Rate	m³/h	61	61	67	73	76	91	97	109	109	121	134	152	158	182
	Pressure Drop	mAq	4.4	4.4	4.0	4.8	4.0	5.7	4.0	5.0	4.9	6.0	3.4	4.4	3.5	4.6
	Connection Size	A	100		100		125		125		125		150		150	
	No. of Passes	-	3		3		3		3		3		2		2	
Cooling Water	Temperature		Inlet 32 / Outlet 37													
	Flow Rate	m³/h	73	72	81	88	92	108	117	130	132	145	163	183	190	216
	Pressure Drop	mAq	5.8	5.5	5.1	5.9	4.5	6.3	4.5	5.6	5.6	6.9	4.2	5.2	4.1	5.3
	Connection Size	A	100		125		125		125		125		150		150	
	No. of Passes	-	3		3		3		3		3		2		2	
Dimension	Length(L)	mm	3,200		3,200		3,200		3,750		3,750		4,090		4,090	
	Width(W)	mm	1,160		1,160		1,160		1,360		1,495		1,485		1,485	
	Height(H)	mm	2.140		2.140		2.140		2,480		2,480		2,560		2,560	
Shipping Weight		Ton	2.8		2.9		3.2		4.0		4.3		4.5		4.6	
Operating Weight		Ton	3.3		3.5		3.8		4.8		5.1		5.4		5.6	
Main Power		-	3Ph, 380/400/440/460V, 50/60Hz													

Note) 1. Temperature difference of inlet and outlet of chilled water is 5℃.
2. Fouling factor of chilled water and cooling water is 0.0001 $m^2h℃/kcal$.
3. Max use pressure of chilled water and cooling water is 10kg/cm^2G, however, higher pressure can be supported.
If it requires higher than 10kg/cm^2G, please contact us.
4. The standard voltage of the main power is 3ø 380/440V, 50/60Hz
5. Specifications may be subject to change without prior notice for product improvement.

TR-W360HB1 ~ W900HE1

ITEM \ MODEL			Inverter Centrifugal Chiller (Water-cooled Type) (TR-W Type)													
			360HB1		380HC1		450HC1		540HC1		600HD1		720HD1		900HE1	
Chilled Water Outlet Temp.			5	7	5	7	5	7	5	7	5	7	5	7	5	7
Cooling Capacity		usRT	320	360	340	380	380	450	480	540	500	600	640	720	800	900
		kW	1125.2	1265.9	1195.5	1336.2	1336.2	1582.3	1687.8	1898.8	1758.1	2109.8	2250.4	2531.7	2813.0	3164.7
Input		kW	202	213	215	225	239	266	302	319	315	354	403	426	504	533
Efficiency(IPLV)		kW/RT	0.306		0.307		0.307		0.307		0.307		0.307		0.307	
		COP	11.480		11.438		11.454		11.460		11.448		11.460		11.459	
Chilled Water	Flow Rate	m³/h	194	218	206	230	230	273	291	327	303	363	388	436	484	545
	Pressure Drop	mAq	4.0	5.1	4.1	5.1	4.0	5.6	4.4	5.6	4.0	5.7	4.9	6.2	5.3	6.7
	Connection Size	A	150		200		200		200		250		250		300	
	No. of Passes	-	2		2		2		2		2		2		2	
Cooling Water	Temperature		Inlet 32 / Outlet 37													
	Flow Rate	m³/h	233	260	253	278	279	324	350	390	367	432	467	520	582	649
	Pressure Drop	mAq	4.5	5.6	4.0	5.6	4.8	6.5	4.8	6.0	4.8	6.7	5.6	7.0	5.8	7.1
	Connection Size	A	200		200		200		250		250		300		300	
	No. of Passes	-	2		2		2		2		2		2		2	
Dimension	Length(L)	mm	4,200		4,714		4,714		5,036		5,036		4,930		5,430	
	Width(W)	mm	2,100		2,030		2,030		2,280		2,355		2,450		2,865	
	Height(H)	mm	2,000		2,186		2,186		2,140		2,050		2,250		2,360	
Shipping Weight		Ton	5.4		5.8		6.2		8.3		8.5		9.7		10.9	
Operating Weight		Ton	6.7		7.3		7.7		9.9		10.3		11.9		14.1	
Main Power		-	3Ph, 380/400/440/460V, 50/60Hz													

Note) 1. Temperature difference of inlet and outlet of chilled water is 5℃.
2. Fouling factor of chilled water and cooling water is 0.0001 $m^2h℃/kcal$.
3. Max use pressure of chilled water and cooling water is 10kg/cm^2G, however, higher pressure can be supported.
If it requires higher than 10kg/cm^2G, please contact us.
4. The standard voltage of the main power is 3ø 380/440V, 50/60Hz
5. Specifications may be subject to change without prior notice for product improvement.

Specification (Water-cooled Type)

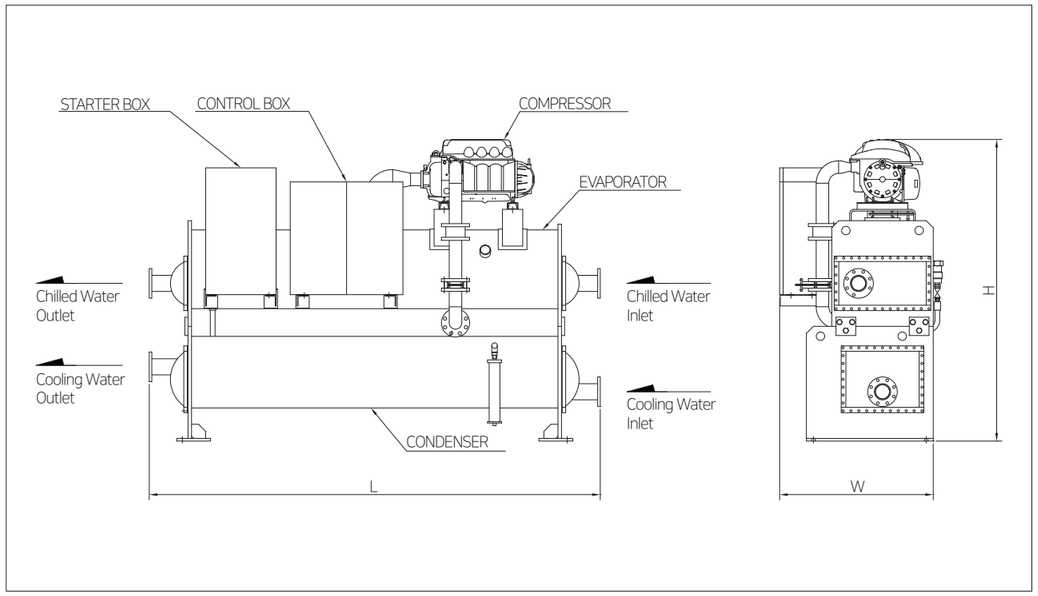
TR-W1050HC1~ W2000HF1

ITEM \ MODEL			Inverter Centrifugal Chiller (Water-cooled Type) (TR-W Type)							
			1050HC1		1400HD1		1700HE1		2000HF1	
Chilled Water Outlet Temp.			5	7	5	7	5	7	5	7
Cooling Capacity		usRT	900	1050	1200	1400	1500	1700	1800	2000
		kW	3164.7	3692.1	4219.5	4922.8	5274.4	5977.7	6329.3	7032.6
Input		kW	567	621	756	828	945	1005	1134	1183
Efficiency(IPLV)		kW/RT	0.307		0.307		0.307		0.307	
		COP	11.461		11.461		11.459		11.461	
Chilled Water	Flow Rate	m^3/h	545	635	726	847	908	1,029	1,089	1,210
	Pressure Drop	mAq	5.3	6.8	7.2	9.8	8.0	10.3	8.5	10.5
	Connection Size	A	300		350		400		400	
	No. of Passes	-	2		2		2		2	
Cooling Water	Temperature		Inlet 32 / Outlet 37							
	Flow Rate	m^3/h	654	756	872	1,008	1,090	1,221	1,308	1,435
	Pressure Drop	mAq	6.2	7.7	7.6	10.2	8.6	10.8	9.0	10.9
	Connection Size	A	350		400		400		450	
	No. of Passes	-	2		2		2		2	
Dimension	Length(L)	mm	5,228		6,440		7,350		7,350	
	Width(W)	mm	2,965		3,350		3,895		3,895	
	Height(H)	mm	2,650		3,065		3,153		3,153	
Shipping Weight		Ton	12.5		17.4		22.5		24.3	
Operating Weight		Ton	15.7		21.2		26.9		29.2	
Main Power		-	3Ph, 380/400/440/460V, 50/60Hz							

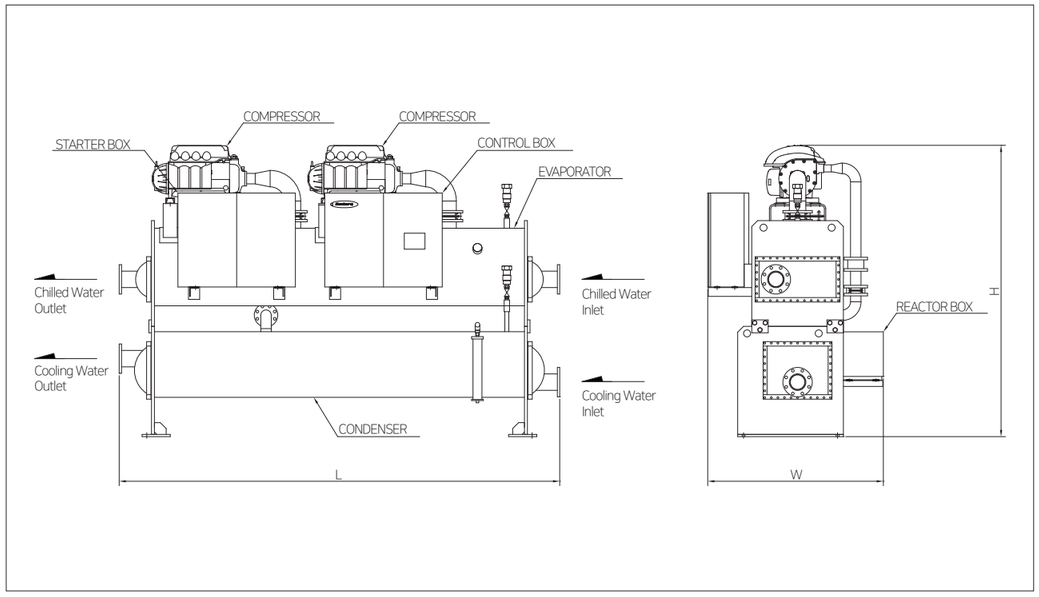
Note) 1. Temperature difference of inlet and outlet of chilled water is 5°C.
2. Fouling factor of chilled water and cooling water is 0.0001 $m^2h°C/kcal$.
3. Max use pressure of chilled water and cooling water is 10kg/cm^2G, however, higher pressure can be supported.
If it requires higher than 10kg/cm^2G, please contact us.
4. The standard voltage of the main power is 3ø 380/440V, 50/60Hz
5. Specifications may be subject to change without prior notice for product improvement.

Drawing (Water-cooled Type)

TR-W100 ~ W180HA1

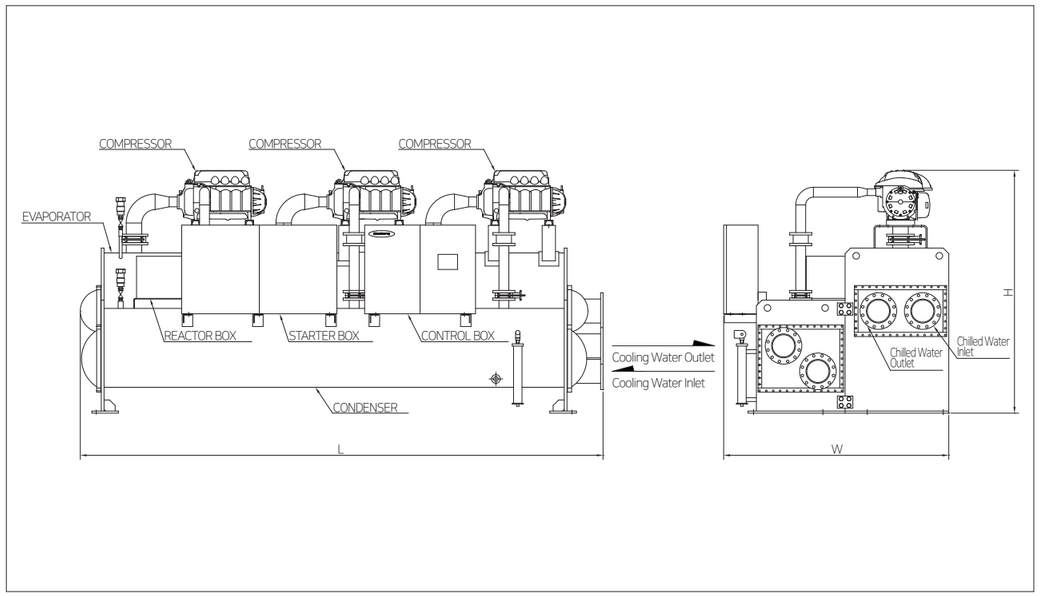


TR-W200 ~ W360HB1

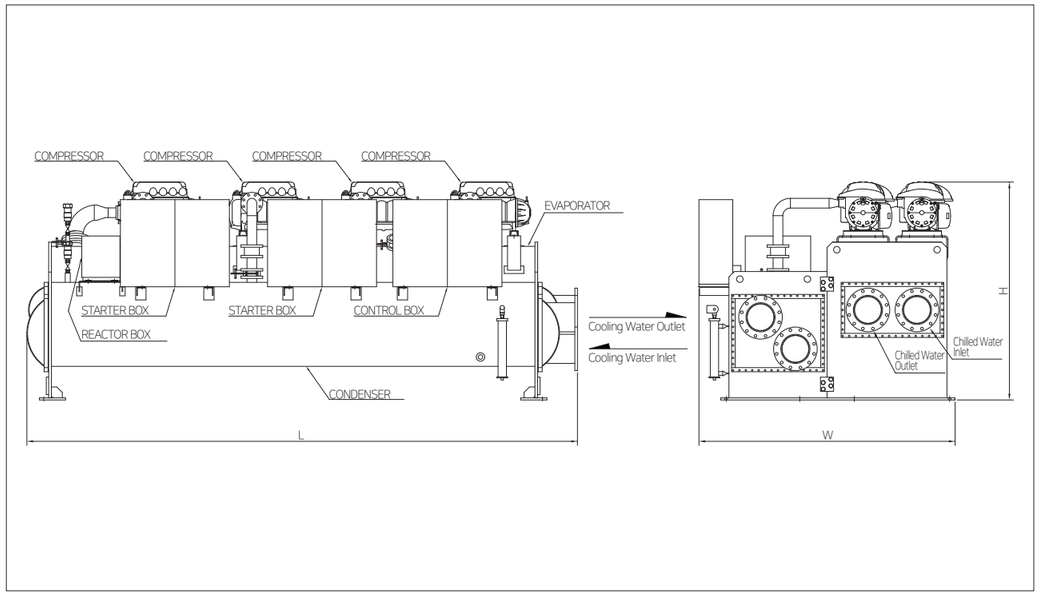


Drawing (Water-cooled Type)

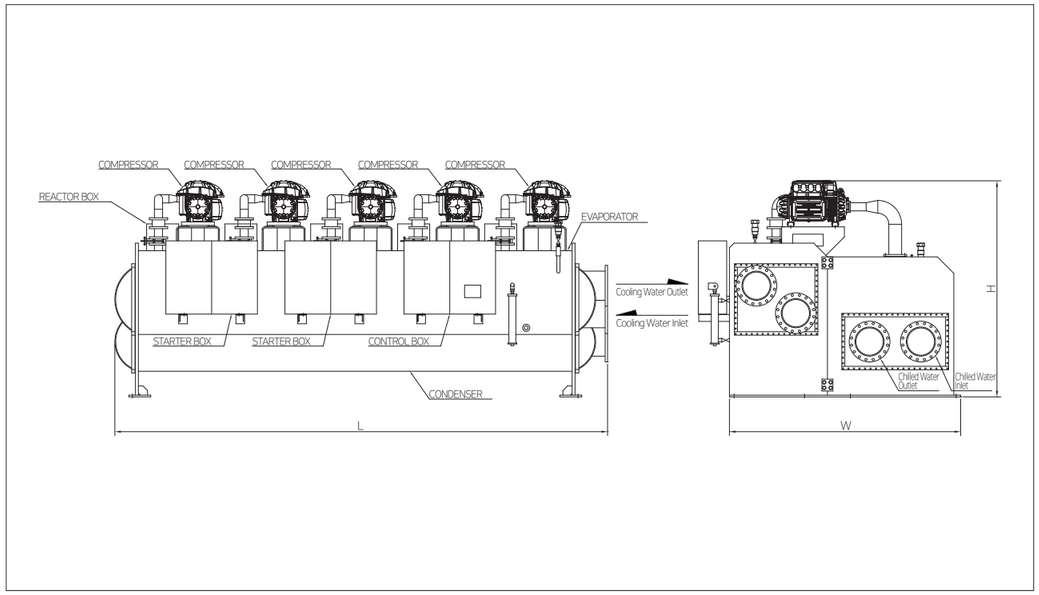
TR-W380 ~ W540HC1



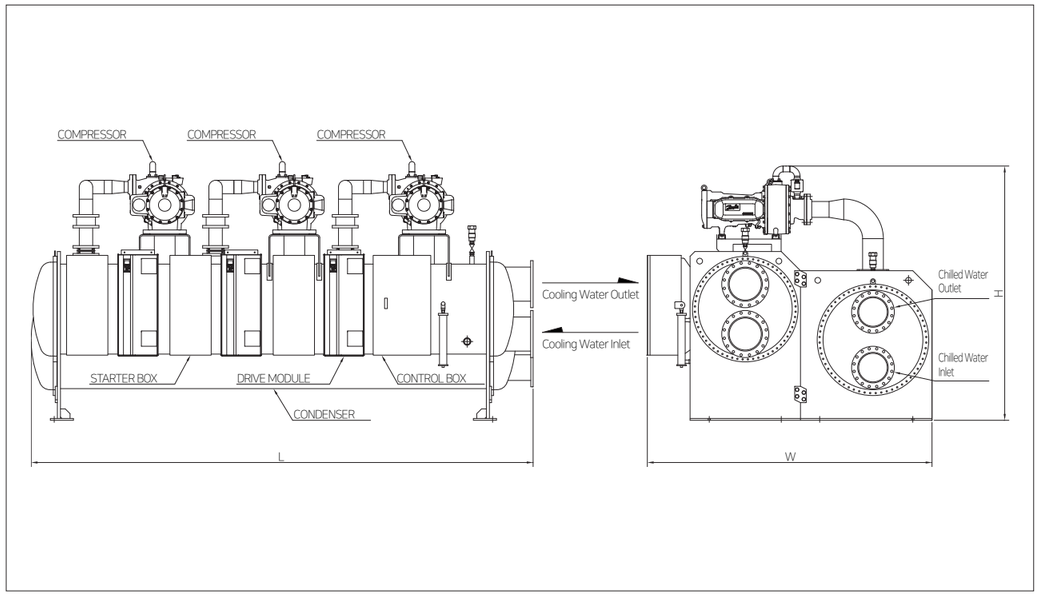
TR-W600 ~ W720HD1



TR-W900HE1

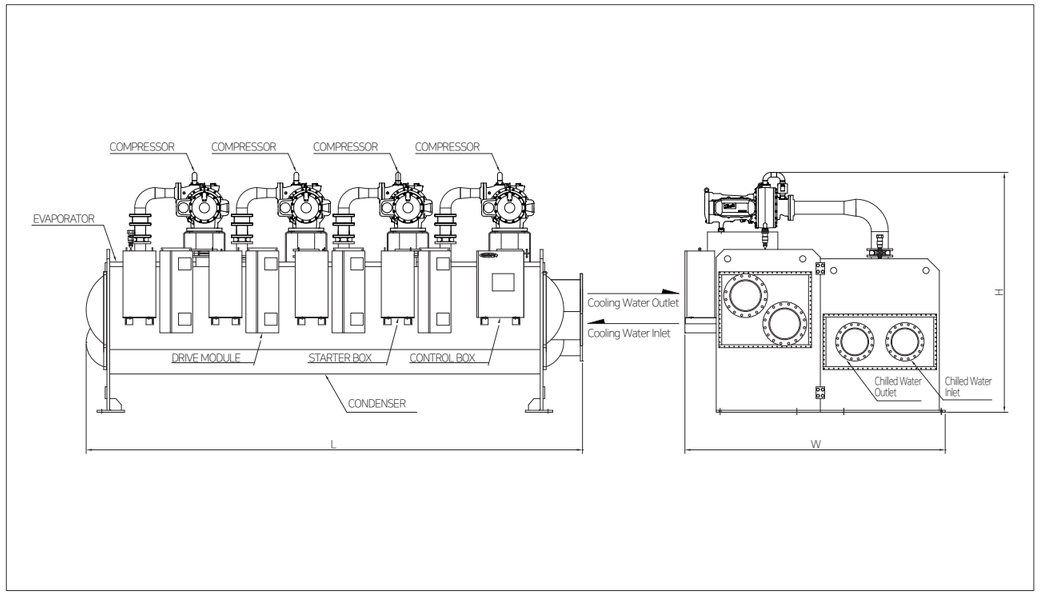


TR-W1050HC1

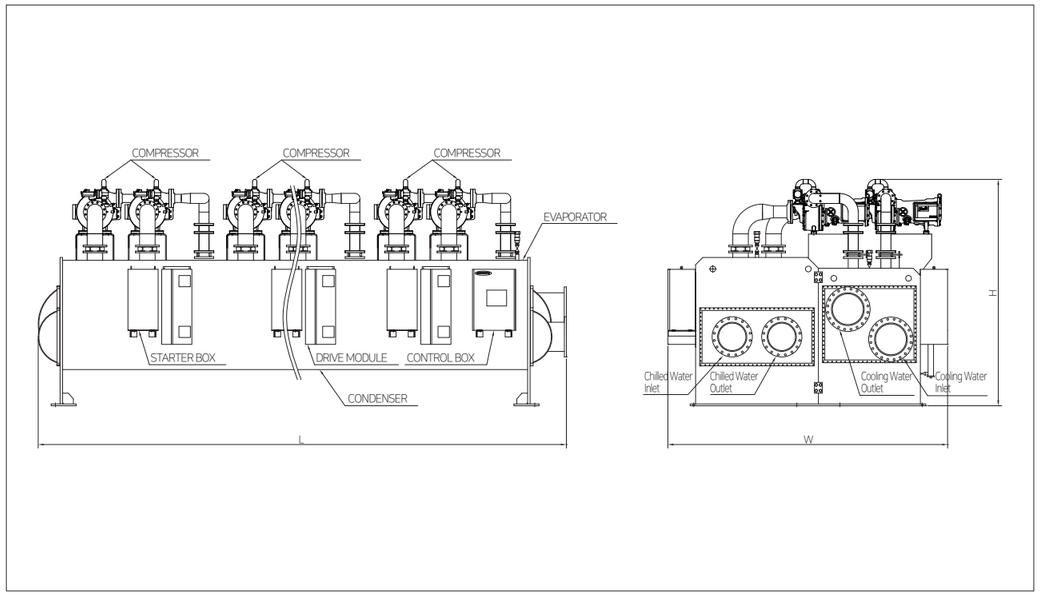


Drawing (Water-cooled Type)

TR-W1400HD1



TR-W1700HE1~ TR-W2000HF1



Specification (Air-cooled Type)

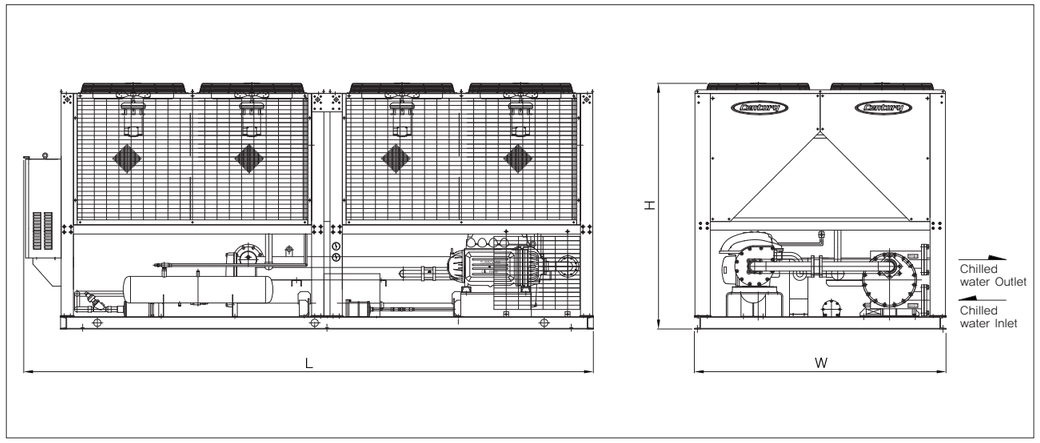
TR-A060HA1 ~ A200HB1

ITEM \ MODEL			Inverter Centrifugal Chiller (Air-cooled Type) (TR Type)							
			60HA1		100HA1		120HB1		200HB1	
Chilled Water Outlet Temp.			5	7	5	7	5	7	5	7
Cooling Capacity		usRT	50	60	85	100	100	120	170	200
		kW	175.8	211	298.9	351.6	351.6	422	597.8	703.3
Input		kW	60	65	101	113	120	130	202	226
Efficiency(IPLV)		kW/RT	0.538		0.526		0.538		0.526	
		COP	6.536		6.683		6.536		6.683	
Evaporator	Flow Rate	m^3/h	30	36	51	60	60	73	103	121
	Pressure Drop	mAq	3.1	4.4	3.5	4.8	3.3	4.8	4.3	6.0
	Connection Size	A	100		100		125		125	
	No. of Passes	-	3		3		3		3	
Condenser	Ambient		35							
	Airflow	CMM	1,400		2,100		2,800		4,200	
	Fan Q'ty	-	4		6		8		12	
	Rated Output of Motor	kW	1.57×4		1.57×6		1.57×8		1.57×12	
Dimension	Length(L)	mm	2,610		3,750		4,960		7,220	
	Width(W)	mm	2,150		2,250		2,150		2,250	
	Height(H)	mm	2,200		2,400		2,200		2,400	
Shipping Weight		Ton	2.5		3.4		4.9		6.9	
Operating Weight		Ton	2.7		3.6		5.1		7.3	
Main Power		-	3Ph, 380/400/440/460V, 50/60Hz							

Note] 1. Temperature difference of inlet and outlet of chilled water is 5°C.
2. Fouling factor of chilled water is 0.0001 $m^2h°C/kcal$.
3. Max use pressure of chilled water is 10kg/cm^2G, however, higher pressure can be supported.
If it requires higher than 10kg/cm^2G, please contact us.
4. The standard voltage of the main power is 3ø 380/440V, 50/60Hz
5. Specifications may be subject to change without prior notice for product improvement.

Drawing (Air-cooled Type)

TR-A060HA1 ~ A200HB1



MEMO