

## Centrifugal Chiller

**R134a** 350–1800RT Standard  
2000–4000RT Nonstandard

**50Hz/60Hz**



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45 YEARS EXPERIENCE IN CHILLER INDUSTRY



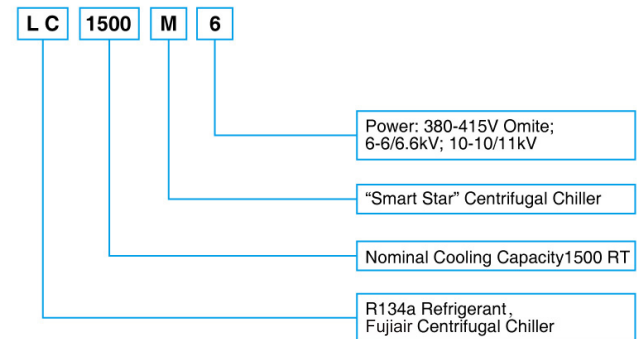
## Workshop



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## Chiller Nomenclature



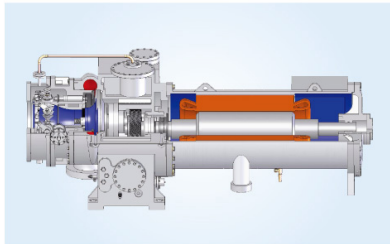
## Customized Capability in Centrifugal Chiller

- Multi medium are available: Water/Brine/Sea water/Glycol;
- Power supply: 380/400/415V/460V, 6kV/10kV, 50Hz/60Hz;
- Cooling capacity: 300RT to 4000RT;
- Industry usage centrifugal chiller especially low temperature unit.

## Product Feature

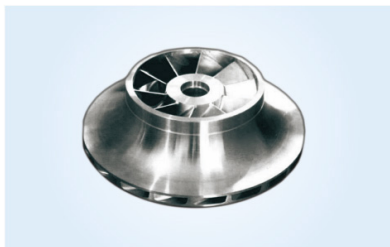
- R134a Refrigerant.
- Positive pressure, no ingestion of moisture and contaminants.
- Semi-hermetic refrigerant-cooled motor eliminates shaft seal maintenance, alignment and vibration problems.
- Modern Gear Drive compressor, low inertia components for low bearing loads, fast acceleration and coast down.
- New impeller designs, designed for maximum part-load efficiency.
- Micro-tech controller with PLC, optimize chiller operation for site conditions.
- Inlet guide vane work with moveable diffuser modulate the capacity from 10% to 100% without stall and surge.

## Compressor



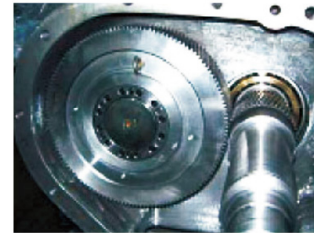
The rotor assembly consists of a heat-treated alloy steel drive shaft with a high strength, and The high speed shaft is forged with high strength and reliability. The enclosed type impeller is designed for balanced thrust and is dynamically balanced and overspeed tested for smooth, vibration free operation.

## Impeller And Inlet Guide Vane



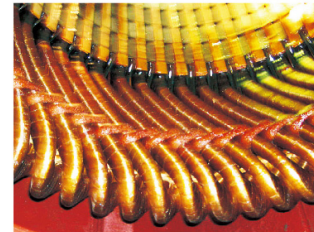
High strength aluminum-alloy compressor impellers feature backward-curved vanes for high efficiency Airfoil shaped inlet guide vane minimize flow disruption for the most efficient part load performance. Precisely positioned and tightly fitted, it allows the compressor to unload smoothly from 10% to 100% load output for excellent operation in real air conditioning application. The movement is controlled by a mounted electrical operator in response to refrigeration load on the evaporator. Impeller is made of high strength aluminum alloy which is tested at 125% design operating speed.

## Gear



The specially engineered, single helical gears with crowned teeth keep more than one tooth is in contact at all times to provide even distribution of compressor load and quiet operation. Gear tooth surfaces are case hardened and precision ground which can reach the class of 5. Gears are integrally assembled in the compressor rotor support and are film lubricated. Each gear is individually mounted in its own journal and thrust bearings to isolate it from impeller and motor forces. The double layer compressor case design prevent the gear contacting noise. The impeller connect with the main shaft without a key, which is Fujiar patent technology designed to avoid fault and enhance reliability.

## Motor



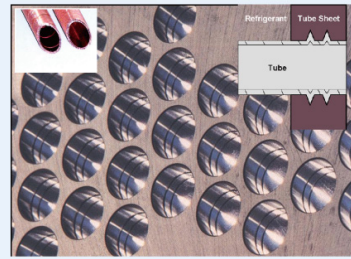
Fujiar centrifugal chiller use semi-hermetic two-pole motor which cooled by the circular refrigeration, Winding embedded sensors provide positive thermal protection to the motor. Asynchronism squirrel cage type with higher operation performance and long life span. Refrigerant cooled motor keeps motor heat out of the mechanical room and minimizes the vibration, shaft seal maintenance, vibration and shaft seal maintenance of open motors. Refrigerant cooled motor have lower inrush currents and low noise than open motor. No expensive mechanical seal is required.

Semi-hermetic motors, there is no need to provide additional ventilation or tempering (air conditioning) of the mechanical room than open motor design. The motor is bolt connected to the compressor gear housing and shaft labyrinth seas prevents refrigerant leakage from the motor to the gear box. Low voltage motor provide 6 terminal for reduced voltage starting (wye-delta or auto transformer start). High voltage motor provide three terminal posts for full voltage (across the line). Motor terminal pads are supplied. The moveable steel sheet terminal box encloses the terminal board area.



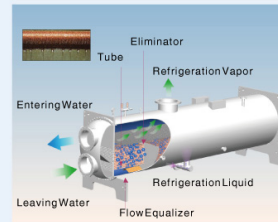
## Heat Exchanger Tube

Heat exchanger tubes are high-efficiency, externally and internally enhanced type to provide optimum performance. Tubes in both the evaporator and condenser are 3/4" O.D. copper alloy providing a internal and external surface. This provides extra wall thick ness (up to twice as thick) and non-work hardened copper at the support location, extending the life of the heat exchanger. Each tube is roller expanded into the tube sheets providing a leakproof seal, and is individually replaceable. Copper alloy material as a standard choice and 90/10 copper-nickel, 304 stainless steel or titanium material are also available.

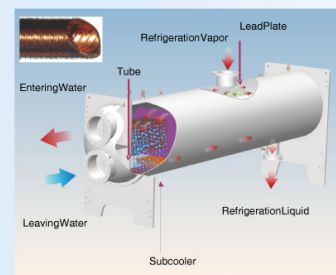


## Evaporator

The evaporator is a shell and tube, flooded type heat exchanger. A distributor trough provides uniform distribution of refrigerant over the entire shell length to yield optimum heat transfer. The evaporator shell contains a dual refrigerant relief valve arrangement set at 180 PSIG (1241 kPa) or single-relief valve arrangement, Intermediate tube support sheets positioned along the shell axis prevent relative tube motion. The waterside is hydrostatically tested at 1.5 times maximum working pressure.



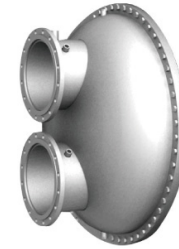
## Condenser



The condenser is a shell and tube type, with discharge gas baffle to prevent direct high velocity impingement on the tubes. The baffle is also used to distribute the refrigerant gas flow properly for most efficient heat transfer. An integral sub-cooler is located at the bottom of the condenser shell providing highly effective liquid refrigerant subcooling to provide the highest cycle efficiency. Regarding the dule stage compressing, using the economizer can improve the efficiency by 5-8%. The condenser contains a refrigerant relief valve sets at 1.6 MPa. Maximum waterside working pressure of 1.05 MPa is standard. The waterside is hydrostatically tested at 1.5 times maximum working pressure.

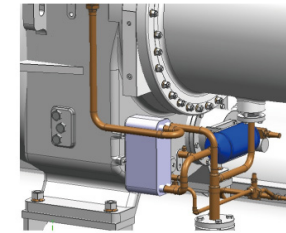
## Water Box

The removable water boxes are fabricated of steel. The design working pressure is 150 PSIG (1034 kPa) and the boxes are tested at 225 PSIG (1551 kPa). Integral steel water baffles are located and welded with in the water box to provide the required pass arrangements. These nozzle connetions are suit able for Victaulic couplings, welding or langes, and are capped when shipment. Plugged 3/4" drain and vent connections are provided in each water box.



## Outside Oil Filter And Oil Cooler

Outside oil filter and oil cooler is easy to do the maintain and replacement. You just need to stop the isolation valve and you can change the filter and oil cooler.

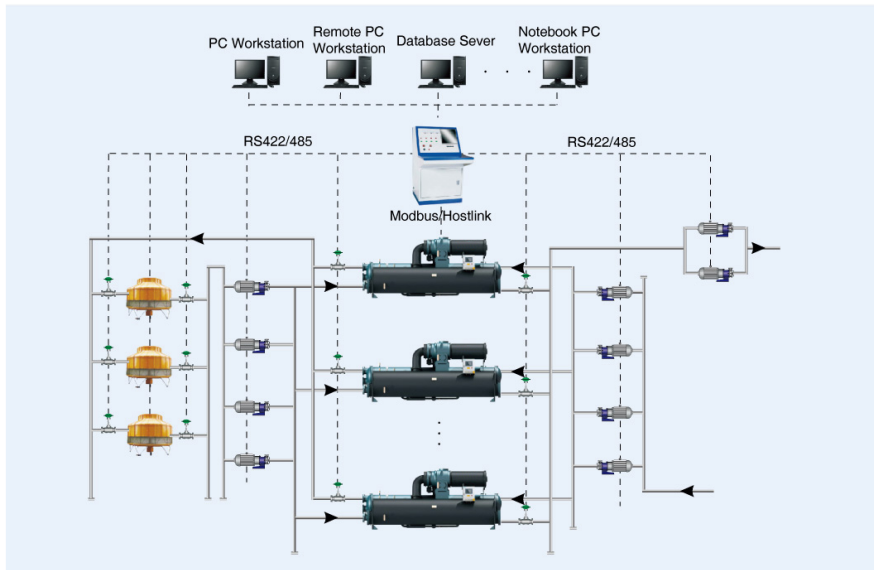


## Micro-computer Control System

Fujair adopts the state of art microcomputer control system with large 10.4 inch touchable screen LCD display with high disturbance resistance. The LCD touchable screen with picture view of chiller parameter for fast and easy access make the operation relatively simple. It can also contact with the user's PC and carry out the remote control for start, operation and stop for the cooling system. More than 30 items protection and malfunction used to make the chiller operation secure. The latest 10 items of failure parameter can be recorded for query.



## Centralized Control System



The centralized control system integrates the chiller, chilling water pump, chilled water pump and cooling tower. It includes the reading and writing of data to allow system monitoring, control and alarm Notification as specified in the unit sequence of operation and the system points list to optimized the system running condition.

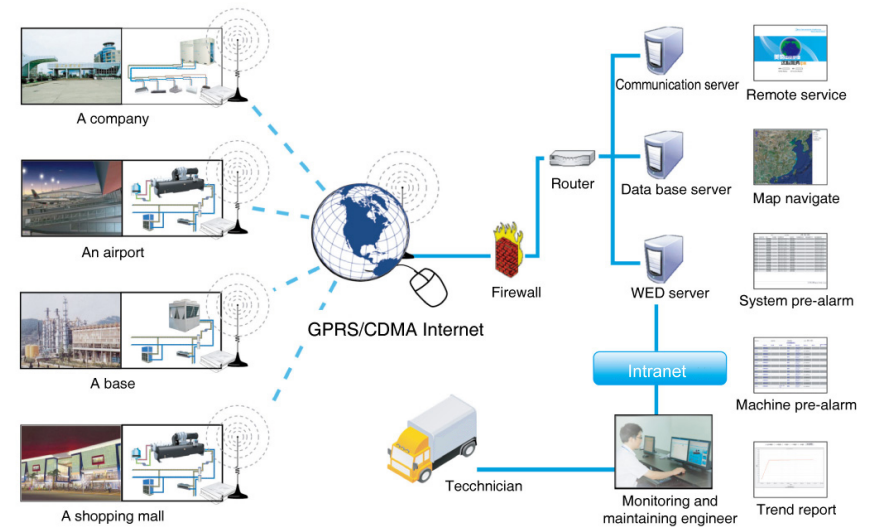
- Adjustment of chiller operation setpoint.
- Real time inspection and supervising of chiller operation state.
- Real time failure inspection.
- Historical operation data storage.

## Remote Service System

Fujair Central Air-conditioning Remote Service System consists of many Air-conditioning network devices around the world and two data centers. Profiting from various innovation technologies, the system can provide many kinds of incremental services for clients.

### Consummated air-conditioning trend & diagnostic service.

- **Real time data display service.**  
System can acquire real time data, and display them from the terminal interfaces.
- **Remote data diagnostic service.**  
System can analyze the operation information, acquire failure and protection data of the units, and providing full and accurate data for maintenance to ensure normal operation. Powerful air-conditioning data store & process service.
- **Data process expanding service.**  
System can provide uniform data interface for future expanded subsystem, and use for expert system, energy consuming analytic system, etc.



## Specification

LC Series (R134a, Single-stage Compression)

Model		LC350M	LC400M	LC450M	LC500M	LC550M	LC600M	
Cooling capacity	RT	350	400	450	500	550	600	
	kW	1230	1406	1582	1758	1934	2110	
	104kcal/h	105	120	136	151	166	181	
Evaporator	Chilled water flow volume	m <sup>3</sup> /h	210	242	272	302	332	362
	Chilled water pressure drop	kPa	62	68	66	64	68	70
	Pass	/	2					
	Chilled water inlet/outlet temperature	°C	12/7					
	Water pipe inlet/outlet diameter	/	DN200	DN200	DN200	DN200	DN250	DN250
Condenser	Cooling water flow volume	m <sup>3</sup> /h	256	292	327	362	397	433
	Cooling water pressure drop	kPa	83	88	82	80	85	88
	Pass	/	2					
	Cooling water inlet/outlet temperature	°C	32/37					
	Water pipe inlet/outlet diameter	/	DN200	DN200	DN200	DN200	DN250	DN250
Compressor	Power input	kW	230	262	293	316	345	373
	Power supply	380V/3P/50Hz (400V/415V/3P/50Hz, 380V/460V/3P/60Hz as option )						
	Motor cooled by	Refrigerant						
Efficiency	kW/RT	0.657	0.655	0.651	0.632	0.627	0.622	
Weight	Shipping weight	kg	7116	7254	7438	7610	8117	8265
	Running weight	kg	8261	8456	8752	9095	9726	9934
Dimension	Length	mm	4673	4673	4673	4673	4730	4730
	Width	mm	1850	1850	1850	1850	1990	1990
	Height	mm	2019	2019	2019	2019	2127	2127

### Notes:

- Nominal Cooling capacities are based on following conditions:  
Chilled water inlet/outlet temperature 12°C/7°C (53.6°F/44.6°F); Cooling water inlet/outlet temperature 32°C/37°C (89.6°F/98.6°F).
- The rated current datas listed in the above table are based on 380V/3P/50Hz power supply.
- The design fouling factor for both evaporator and condenser are 0.086m<sup>2</sup>·°C/kW (0.0005ft<sup>2</sup>·°F·hr/Btu), otherwise can be customized.
- The design working pressure for both evaporator and condenser are 1.05MPa, higher pressure demand can be customized.
- Due to possible product improvement, we reserve the right to make changes in design and construction at any time without notice.

## Specification

LC Series (R134a, Single-stage Compression)

Model		LC650M	LC700M	LC750M	LC800M	LC850M	
Cooling capacity	RT	650	700	750	800	850	
	kW	2285	2461	2637	2813	2988	
	104kcal/h	196	211	226	242	257	
Evaporator	Chilled water flow volume	m <sup>3</sup> /h	392	422	452	484	514
	Chilled water pressure drop	kPa	82	86	82	83	78
	Pass	/	2				
	Chilled water inlet/outlet temperature	°C	12/7				
	Water pipe inlet/outlet diameter	/	DN250	DN250	DN250	DN300	DN300
Condenser	Cooling water flow volume	m <sup>3</sup> /h	466	501	537	575	611
	Cooling water pressure drop	kPa	81	93	92	78	87
	Pass	/	2				
	Cooling water inlet/outlet temperature	°C	32/37				
	Water pipe inlet/outlet diameter	/	DN250	DN250	DN250	DN300	DN300
Compressor	Power input	kW	400	424	455	495	525
	Power supply	380V/3P/50Hz (400V/415V/3P/50Hz, 380V/460V/3P/60Hz as option )					
	Motor cooled by	Refrigerant					
Efficiency	kW/RT	0.615	0.606	0.607	0.619	0.618	
Weight	Shipping weight	kg	11343	11398	11668	11923	12333
	Running weight	kg	13112	13227	13456	13859	14575
Dimension	Length	mm	5077	5077	5077	5077	5077
	Width	mm	2200	2200	2200	2300	2300
	Height	mm	2540	2540	2540	2540	2540

### Notes:

- Nominal Cooling capacities are based on following conditions:  
Chilled water inlet/outlet temperature 12°C/7°C (53.6°F/44.6°F); Cooling water inlet/outlet temperature 32°C/37°C (89.6°F/98.6°F).
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## Specification

LC Series (R134a, Single-stage Compression)

Model		LC900M	LC950M	LC1000M	LC1100M	LC1200M	
Cooling capacity	RT	900	950	1000	1100	1200	
	kW	3165	3340	3516	3867	4220	
	104kcal/h	272	287	302	332	363	
Evaporator	Chilled water flow volume	m <sup>3</sup> /h	544	574	604	664	726
	Chilled water pressure drop	kPa	82	81	88	80	90
	Pass	/	2				
	Chilled water inlet/outlet temperature	°C	12/7				
	Water pipe inlet/outlet diameter	/	DN300	DN300	DN300	DN300	DN300
Condenser	Cooling water flow volume	m <sup>3</sup> /h	645	680	719	789	862
	Cooling water pressure drop	kPa	84	79	86	91	96
	Pass	/	2				
	Cooling water inlet/outlet temperature	°C	32/37				
Compressor	Power input	kW	547	577	623	679	737
	Power supply		380V/3P/50Hz (400V/415V/3P/50Hz, 380V/460V/3P/60Hz as option)				
	Motor cooled by		Refrigerant				
Efficiency	kW/RT	0.608	0.607	0.623	0.617	0.614	
Weight	Shipping weight	kg	12483	14931	14931	15198	15320
	Running weight	kg	14769	17575	17743	17827	18395
Dimension	Length	mm	5077	5160	5160	5160	5160
	Width	mm	2300	2500	2500	2500	2500
	Height	mm	2540	2625	2625	2625	2625

### Notes:

- Nominal Cooling capacities are based on following conditions:  
Chilled water inlet/outlet temperature 12°C/7°C (53.6°F/44.6°F); Cooling water inlet/outlet temperature 32°C/37°C (89.6°F/98.6°F).
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## Specification

LC Series (R134a, Single-stage Compression)

Model		LC1300M10	LC1400M10	LC1500M10	LC1600M10	LC1700M10	LC1800M10	
Cooling capacity	RT	1300	1400	1500	1600	1700	1800	
	kW	4572	4924	5276	5627	5979	6331	
	104kcal/h	393	423	454	484	514	544	
Evaporator	Chilled water flow volume	m <sup>3</sup> /h	786	847	907	968	1028	1089
	Chilled water pressure drop	kPa	102	115	120	105	106	115
	Pass	/	2					
	Chilled water inlet/outlet temperature	°C	12/7					
	Water pipe inlet/outlet diameter	/	DN350	DN350	DN350	DN400	DN400	DN400
Condenser	Cooling water flow volume	m <sup>3</sup> /h	926	992	1063	1134	1205	1276
	Cooling water pressure drop	kPa	94	98	108	103	104	106
	Pass	/	2					
	Cooling water inlet/outlet temperature	°C	32/37					
Compressor	Power input	kW	815	850	920	980	1030	1070
	Power supply		10kV/3P/50Hz (6kV/3P/50Hz, 6.6kV/3P/60Hz as option)					
	Motor cooled by		Refrigerant					
Efficiency	kW/RT	0.627	0.607	0.613	0.613	0.606	0.594	
Weight	Shipping weight	kg	18801	18949	19355	20899	21134	21484
	Running weight	kg	20658	21415	21590	24044	25166	25276
Dimension	Length	mm	5789	5789	5789	5866	5866	5866
	Width	mm	2700	2700	2700	2880	2880	2880
	Height	mm	2810	2810	2810	2945	2945	2945

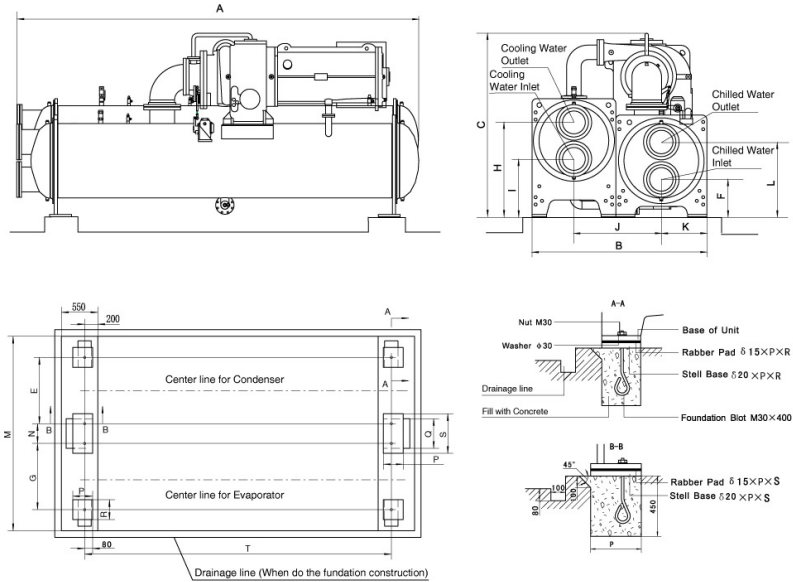
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- The rated current datas listed in the above table are based on 10kV/3P/50Hz power supply.
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## Dimension

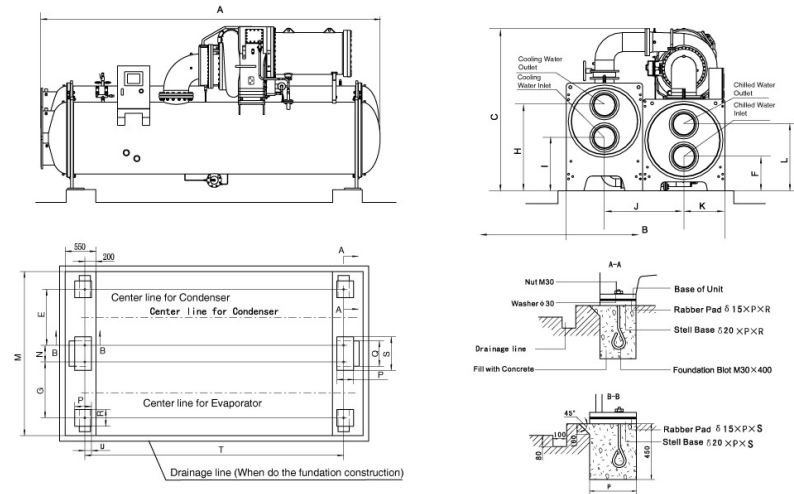
**A** LC350M-LC600M



Model	Dimension			Unit Base								Pipe Locate Position									
	A	B	C	M	G	E	N	P	R	Q	S	T	F	L	K	I	H	J	Evaporator	Condenser	
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	Diameter	Diameter	
LC350M																					
LC400M	4673	1850	2019	2150	780	670	200	240	200	350	400	3780	410	820	490	650	1020	925	DN200	DN200	
LC450M																					
LC500M	4673	1850	2019	2150	780	670	200	240	200	350	400	3780	410	820	490	650	1020	925	DN200	DN200	
LC550M																					
LC600M	4730	1990	2127	2290	870	720	200	240	200	350	400	3780	460	890	535	635	1035	995	DN250	DN250	

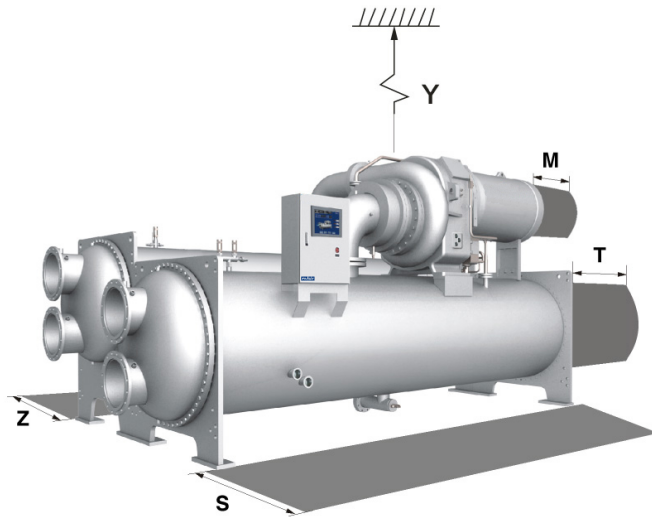
## Dimension

**B** LC650M-LC1800M10



Model	Dimension			Unit Base								Pipe Locate Position										
	A	B	C	M	G	E	N	P	R	Q	S	U	T	F	L	K	I	H	J	Evaporator	Condenser	
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	Diameter	Diameter	
LC650M																						
LC700M	5077	2200	2540	2500	1000	800	200	240	200	350	400	80	4080	550	1050	600	735	1205	1100	DN250	DN250	
LC750M																						
LC800M																						
LC850M	5077	2300	2540	2600	1000	900	200	240	200	350	400	80	4080	550	1050	600	785	1255	1150	DN300	DN300	
LC900M																						
LC950M																						
LC1000M	5160	2500	2625	2800	1100	1000	200	240	200	350	400	80	4080	560	1110	650	885	1425	1250	DN300	DN300	
LC1100M																						
LC1200M	5160	2500	2625	2800	1100	1000	200	240	200	350	400	80	4080	560	1110	650	885	1425	1250	DN300	DN350	
LC1300M10																						
LC1400M10	5789	2700	2810	3040	1100	1000	300	280	300	450	600	100	4640	605	1155	700	930	1480	1350	DN350	DN350	
LC1500M10																						
LC1600M10																						
LC1700M10	5866	2880	2945	3220	1180	1100	300	280	300	450	600	100	4640	655	1275	740	945	1565	1440	DN400	DN400	
LC1800M10																						

## Service Space

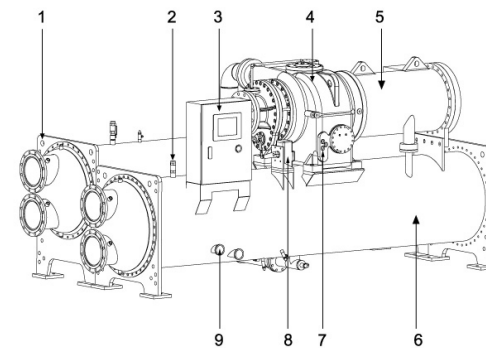


Model	Service Space(mm)				
	M	T	Y	S	Z
LC350M-LC600M	1100	4200	1200	1200	1000
LC650M-LC1200M	1500	4500	1300	1300	1000
LC1300M10-LC1800M10	1500	5300	1300	1300	1000

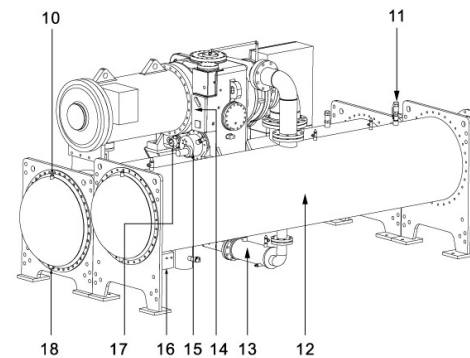
## Construction

A LC350M-LC600M

### Front View



### Rear View

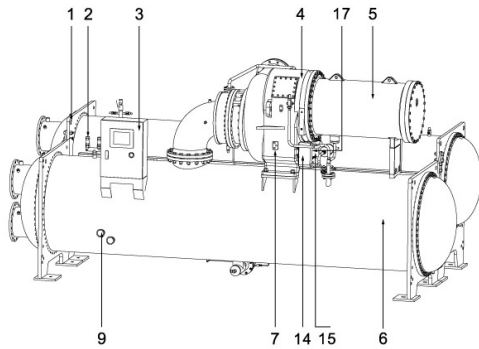


1. Lifting Points(4)
2. Evaporator Relief Valve
3. PLC Controller
4. Compressor
5. Main Motor
6. Evaporator
7. Oil Level Indicator
8. Guide Vane Actuator
9. Refrigerant Level Indicator
10. Air Release Valve
11. Condenser Security Valve
12. Condenser
13. Refrigerant Purity Device
14. Oil Cooler
15. Oil Pump
16. Oil Pump Electrical Panel
17. Electrical Heater
18. Water Drainage Valve

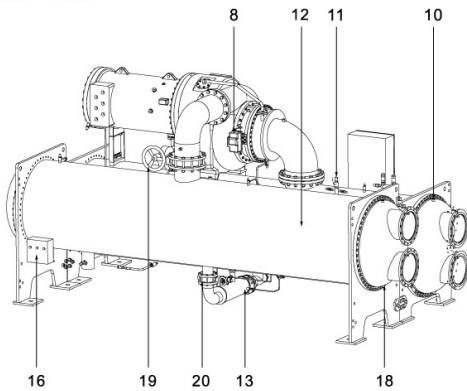
## Construction

**B** LC650M-LC1800M10

### Front View



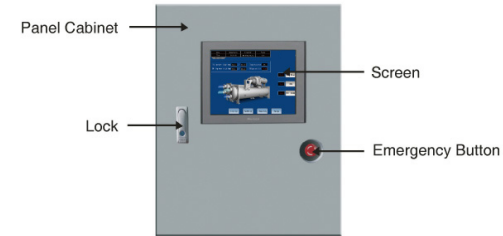
### Rear View



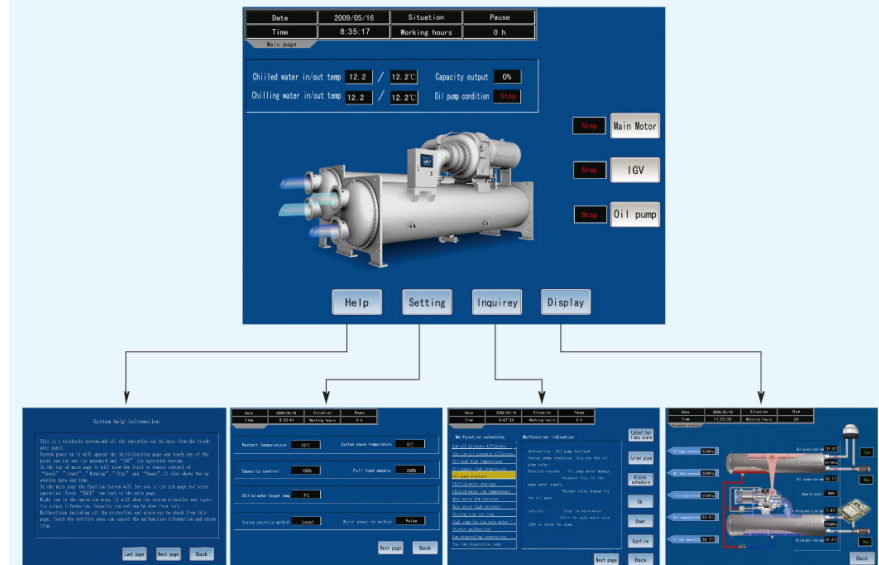
1. Lifting Points(4)
2. Evaporator Relief Valve
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5. Main Motor
6. Evaporator
7. Oil Level Indicator
8. Guide Vane Actuator
9. Refrigerant Level Indicator
10. Air Release Valve
11. Condenser Security Valve
12. Condenser
13. Refrigerant Purity Device
14. Oil Cooler
15. Oil Pump
16. Oil Pump Electrical Panel
17. Electrical Heater
18. Water Drainage Valve
19. Discharge Isolation Valve (Optional)
20. Liquid Line Isolation Valve (Optional)

## PLC Control

**A** PLC Controller



**B** Touchable Screen



## PLC Control

### Display On/Off Status

Emergency button on/off	Interlock on/off
Remote control on/off	Remote start on/off
Oil pump overload on/off	Chilled water supply on/off
Winding overheat protect on/off	Compressor operation on/off
Manual start/stop	Oil heater on/off
Oil pump on/off	Chilled water pump on/off
Cooling water pump on/off	Cooling tower on/off

### Display Simulate Date

Inlet Guide Vane openness	Running current
Chilled water inlet temperature	Chilled water outlet temperature
Cooling water inlet temperature	Cooling water outlet temperature
Oil sump temperature	Oil temperature
Condensing pressure	Evaporating pressure
Oil supply pressure	Oil sump pressure
Oil supply pressure difference	Total power on time
Total running time	Total start up times

### Operation Setting

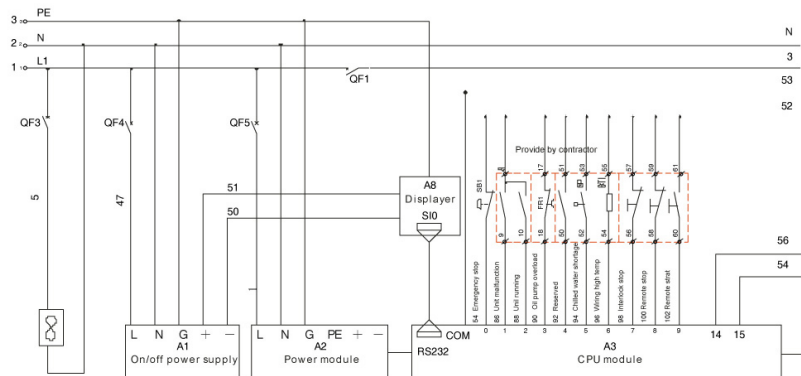
Restart temperature	Pause temperature
Rated motor currency	Full load currency
Chilled water outlet temperature	PID setting
Inlet Guide Vane openness to prevent surge	Max Inlet Guide Vane openness
Gather period	Atmosphere
Low oil supply pressure difference	Lowest oil supply pressure difference
Lowest oil sump temperature	High oil temperature
Highest oil temperature	Low chilled water temperature
Low evaporating pressure	Lowest evaporating pressure
High condensing temperature	Highest condensing temperature

## Recommended Cable Size

Model	380V			High Voltage	
	JSB2A Cable size (in)	JSB2A Cable size (out)	Auto transformer in/out	6 (kV)	10 (kV)
LC350M	BVR240	BVR185	BVR240	—	—
LC400M	BVR240	BVR185	BVR240	—	—
LC450M	BVR300	BVR240	BVR300	—	—
LC500M	2*BVR185	BVR240	2*BVR185	—	—
LC550M	2*BVR240	BVR300	2*BVR240	—	—
LC600M	2*BVR240	BVR300	2*BVR240	—	—
LC650M	2*BVR240	BVR300	2*BVR240	—	—
LC700M	2*BVR240	BVR300	2*BVR240	—	—
LC750M	2*BVR240	2*BVR185	2*BVR240	—	—
LC800M	2*BVR300	2*BVR185	2*BVR300	—	—
LC850M	2*BVR300	2*BVR185	2*BVR300	—	—
LC900M	2*BVR300	2*BVR240	2*BVR300	—	—
LC950M	3*BVR240	2*BVR240	3*BVR240	—	—
LC1000M	3*BVR240	2*BVR240	3*BVR240	YJV50	YJV35
LC1100M	3*BVR300	2*BVR300	3*BVR300	YJV50	YJV35
LC1200M	3*BVR300	2*BVR300	3*BVR300	YJV50	YJV35
LC1300M10				YJV50	YJV35
LC1400M10				YJV50	YJV35
LC1500M10				YJV50	YJV35
LC1600M10				YJV50	YJV50
LC1700M10				YJV50	YJV50
LC1800M10				YJV50	YJV50

## Control System

### Microcomputer System Principle

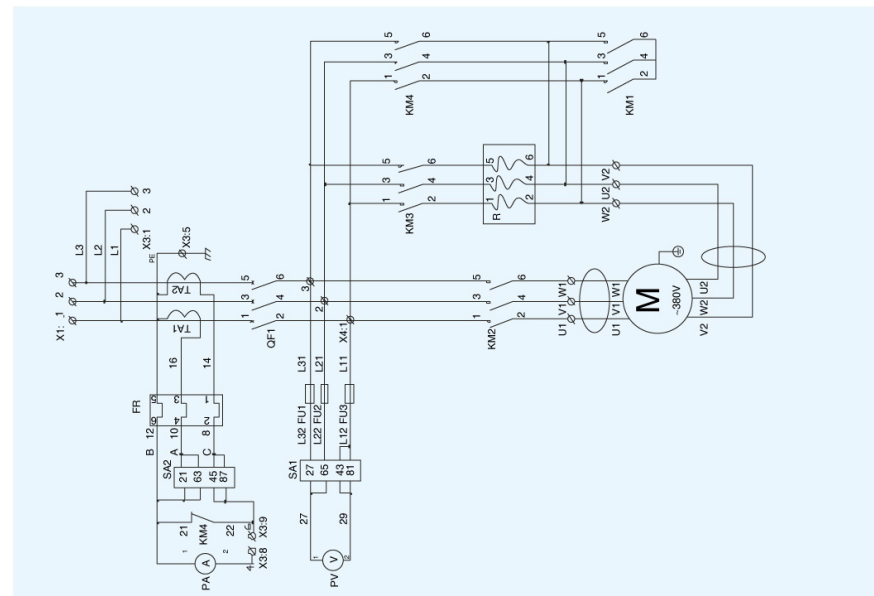
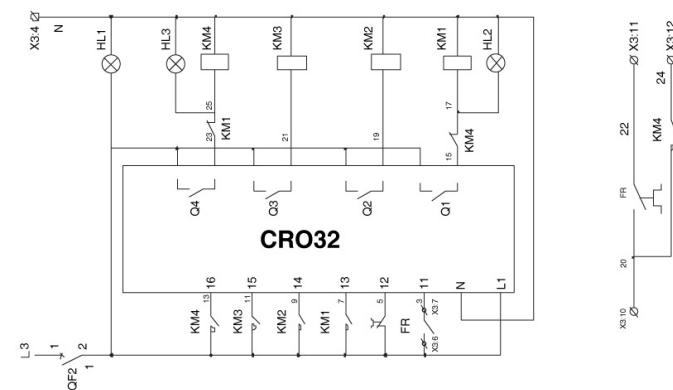


Microcomputer Components

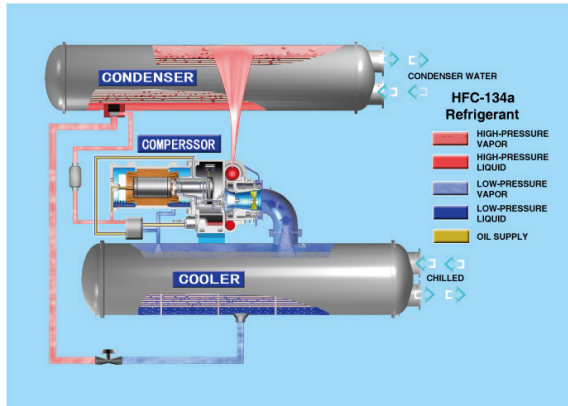
Code	A1	A2	A3	A9	QF1—4
Name Model	On/off power supply	Power module	CPU module	Displayer	Air switch
Code	SB1	KA1—4	EV	BP	BT
Name Model	Button	Middle relay	Exhaust fan	Water flow switch	wiring temp sensor

## Control System

### Wye-delta Starter Principle



## Refrigeration And Lubricant System

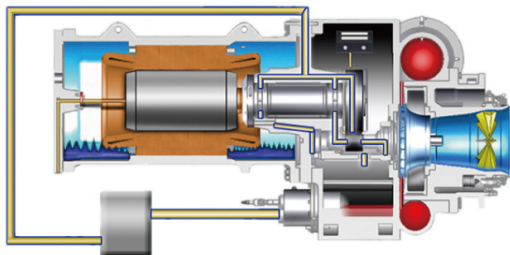


Refrigeration cycle Fujair LC centrifugal chiller is the steam-compressing type. The refrigerant will be imposed vertical energy by the high speed impeller to increase its temperature and pressure. The high pressure and temperature refrigerant will spread its thermal energy in condenser by the chilling water to decrease the temperature. After orifice throttling the pressure will decrease dramatically. In evaporator the low temperature and low pressure refrigerant will absorb the thermal energy from the chilled water to evaporating.

The low temperature chilled water produced in this refrigeration circulation. One refrigeration circulation includes four indispensable processes: compressing, condensing, throttling and evaporating.

## Lubricant System

The oil system provides the necessary lubricant to compressor bearings and gears. The oil is being pressurized by oil pump which driven by the enclosed motor which built inside the oil tank. After being cooled down by the oil cooler to certain temperature (35°C~55°C) the lube is transmitted to the oil filter for filtration. And then it will be adjusted the pressure before transmitted to bearings. To minimize the lube leaked into the main motor and then enter the R134a in evaporator, combs are installed at inner side of motor bearings at both ends for sealing. High pressure gas transmitted from the compressor chamber is used for preventing oil leakage. Besides, electric heater is used inside the oil tank. In this way, when the compressor shuts down,

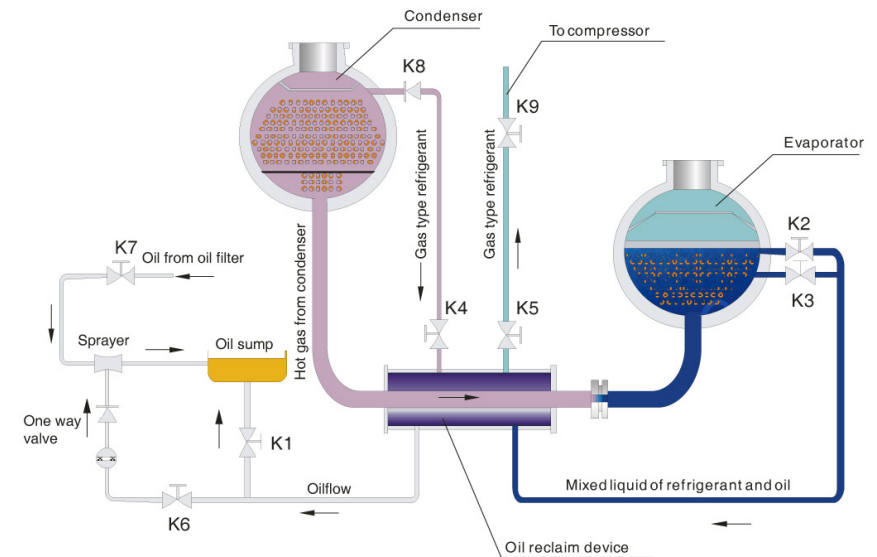


certain oil temperature (45°C~55°C) can be kept, thus to prevent the gas R134a from entering the oil to decrease the viscosity of the lubricant. Therefore, if the compressor should be shut down, it is necessary to keep oil heater on to make the oil temperature in certain temperature. If the compressor will out of service for a long time, it is required to power on and run the oil heater to increase the oil temperature to 45°C~55°C.

## Oil Reclaim System

### Patented Design for Oil Reclaim System

During the running of refrigerating unit, a small amount of lube interuses into the refrigerant. The mixed oil-refrigerant goes through compressor bearings and gearbox, and then interuses into the condenser. After the refrigerant be evaporated it will float on the liquid refrigerant. Fujair patented reclaim system used to reclaim the oil from the heat exchanger back to the oil tank. It will improve the refrigerant purity to increase the efficiency and provide sufficient oil supply to compressor. Reclaim system is installed below the condenser.



No.	Process	Valve	K1	K2 or K3	K4	K5	K6	K7
1	Manual	Separation of refrigerant and lubricant oil	×	○	△	○	×	×
		Lubricant oil reclamation	○	×	×	×	×	×
2	Automatic		×	○	×	○	○	○
3	When refrigerating medium purification device is not used		×	×	×	○	×	×

Note: ○: On    ×: Off    △: Less open    K8, K9 Valves keep open

## Starter Type

Model	Dimension	Outside View
Wye-delta starter	LxWxH: 800x750x2100mm	
VSD starter	LxWxH: 615x610x2010mm	
Auto transformer starter	LxWxH: 1100x2000x2400mm	
Across the line starter	LxWxH: 1000x1500x2300mm	

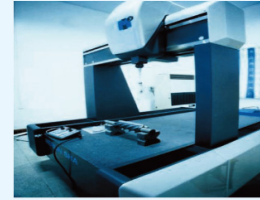
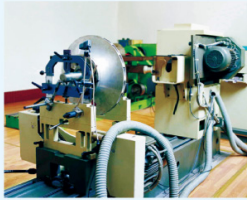
## Options For Unit

- VSD (Variable Speed Drive)
- Solid State Starter
- Auto Transformer Starter
- Across The Line Starter
- Dual Compressors
- Refrigerant Isolation Valves
- Customerized Pass on Evaporator/Condenser
- Customerized Marine Water Box on Evaporator/Condenser
- High Pressure Water Side Construction (2.0MPa)
- Remote Monitor/Control System
- Sectinal Shipment
- Spring Vibration Isolation
- Evaporator Shell 1 1/2 Inch (40mm) Insulation
- Evaporator/Condenser Water Pipe Victualic Connection

## Advanced And Integrated Machining Device



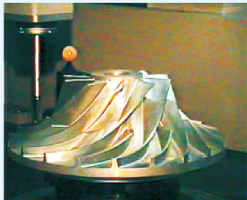
Germany GMD 5-axis Machining Center



IMS 3-axis Coordinate Measuring Machine



Germany Zeiss 4-axis Coordinate Measuring



Germany Schenck Dynamic Balancing Machine



Italy 5-axis Machining Center



Germany Schenck Dynamic Balancing Machine