THERMAL MANAGEMENT

Centricor™

60-350 Ton Models, featuring Magnetic Centrifugal Compressor Technology

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by Schneider Electric

Magnetic Centrifugal Compressor Technology

The Motivair MLT chiller range features the world-renowned Turbocor centrifugal compressor. Designed with aerospace technology, the Turbocor compressor offers unparalleled performance in efficiency, sound level and reliability.

With energy usage between 30%-50% less than traditional compressors, the Turbocor option creates new opportunities for ultra high efficiency chiller designs from Motivair.

Variable Frequency Drive Speed Control

An integrated variable frequency drive allows each compressor to reduce speed and maximize energy savings as the heat load of the system or chiller condensing temperatures decrease.

The compressors' Insulated Gate Bipolar Transistor (IGBT) converts DC voltage to an adjustable three-phase AC voltage. An internal electronics system determines speed control based on feedback from the compressor motor and magnetic bearings.

Oil-Free Magnetic Bearings

Oil-Free compressor operation eliminates inefficiencies that exist in standard oil lubricated screw and centrifugal compressor systems. Oil related service expenses are also eliminated. Friction-free magnetic bearings levitate the compressor's motor/shaft/impeller assembly which eliminates any metal to metal contact and associated component wear.

An internal electronic control system dictates magnetic bearing and speed control. Compressor shaft location is monitored 100,000 times per second ensuring accurate positioning.

Integrated Electronic Package

Built in digital electronics provide independent logic, control and monitoring for each compressor in real time allowing for precise speed control and motor/shaft/impeller position.

Soft Start Module

Inrush current is dramatically reduced during startup, reducing thermal stress on motor stator.

Low Noise

Sound levels of a Turbocor compressor can be measured at 72 dBA (TT300) in a typical mechanical room which is significantly less than a comparable screw compressor of similar tonnage. This feature offers new applications for low noise chiller operation and eliminates costly compressor wraps and enclosures needed for traditional compressor systems.

FLEXIBILITY IN SYSTEM DESIGN

1 REFRIGERANT

All MLT chillers feature environmentally friendly R-134A refrigerant. Ideally suited for use with Turbocor compressors, R-134A offers maximum overall chiller performance, EER and IPLV data. Low GWP refrigerants including R1234ze, R513A, & R515B are also available.

Refrigerant Components: Each circuit includes an electronic expansion valve, liquid receiver, filter dryer with replaceable core, sight glass with color change indicator, high and low side service access valves, HP and LP pressure safety switches, and glycerin filled HP and LP gauges.

2 CONDENSER FAN & MOTORS

Fans feature high strength composite fan blades which improve overall efficiency and generate less sound when compared to traditional commercial HVAC equipment. Motors are TEAO and suitable for permanent outdoor use. Each fan features Electronically Commutated (EC) variable speed motor technology. More efficient than VFD speed control, EC motors offer the highest efficiencies and added chiller redundancy.

These exceptionally reliable motors feature a reversed stator and rotor, which eliminates the traditional fan motor shaft. The outer shell of the motor is the rotating body, to which the composite blades are bolted. This unique arrangement reduces torque stress on the blades, eliminates fan blade stress fractures, maximizes airflow, and maintains efficiency over the entire performance curve.

3 CONDENSER & FREE COOLING OPTION

Standard air-cooled MLT chillers feature high efficiency aluminum Microchannel condenser coils built in a "V" configuration. These state of the art, vacuum brazed condensers are light weight, versatile and offer unparalleled condensing efficiency.

The MLT-FC integrated air-cooled condenser/ Free Cooling coils are constructed from seamless copper tubes expanded into aluminum fins. This unique design, available only from Motivair features a combined condenser/free-Cooing coil constructed as a single coil with two independent circuits, one for refrigerant and one for glycol free Cooling.

Both condensing and free-cooling performance are optimized for maximum efficiency. Copper tube and aluminum fin condenser coils are also available.

4 EVAPORATOR OPTIONS

Flooded shell and tube evaporators are a preferred standard for the MLT chiller range. By using a flooded refrigerant shell with process water/glycol in the tubes, design evaporating approach temperatures create optimal chiller efficiencies. Custom selections are available to handle high glycol concentrations. Standard Certifications: ASME, CRN

Shell and Tube evaporators offer high efficiency performance and allow for alternate design criteria with refrigerant in the tubes and process water/glycol in the shell when required.

Stainless steel brazed plate evaporators are used only for custom water-cooled chiller applications where size constraints require a reduced overall chiller footprint. Standard certifications: UL

The Ultimate Solution For Industry-Leading Energy Savings

The Motivair MLT-FC chillers with integrated "Free-Cooling" are designed to provide the owner with optimal performance, year round, in varying ambient temperatures.

This "Free-Cooling" option, available on models MLT-FC 200 – MLT-FC 1200 is complete with the "Free-Cooling" system and the Centricor advanced PLC control package – a unique single package for year-round energy savings.

The high efficiency centrifugal refrigeration plant is designed to cool the designated heat load during summer months. When ambient temperatures fall overnight or during cooler seasonal weather, the integrated "Free-Cooling" system is automatically activated. The system operates by directing the return chilled glycol through the "Free-Cooling" coil, before it enters the evaporator.

This is achieved via an automatic motorized valve, controlled by the PLC, whenever the ambient falls below the return chilled glycol temperature set point. The glycol is either partially or completely cooled in the "Free-Cooling" coil for maximum energy savings.

As a result, less mechanical refrigeration is required to achieve the chilled glycol set point, and the Turbocor centrifugal compressors are unloaded and eventually cycled off by the PLC, which continuously monitors the system.

Energy savings in areas with cooler winter months are substantial. The ability to allow the Turbocor compressors to unload in cooler weather further drives overall chiller efficiencies. Wear and tear on chiller components is dramatically reduced, due to fewer start-ups and running hours during winter months. Automatic switching between mechanical cooling and "Free-Cooling" is seamless, which allows optimal performance year round. As a general rule of thumb, "Free-Cooling" savings more than pay for the initial investment in the first year of operation.

The Pioneer of Free Cooling Technology

The MLT-FC chillers were designed, built and tested specifically as factory-packaged Free Cooling Chillers. There are no aftermarket or 3rd party add-on free cooling coils, components or controls. Motivair free cooling chillers are ETL tested and listed to current UL & CSA standards.

Motivair is the only USA supplier with a cataloged and tested Free Cooling chiller range. Trust your mission critical process to the Free-Cooling Chiller experts by specifying Motivair Free-Cooling chillers.

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Adiabatic "Efficiency Boosting" System

AIR-COOLED CHILLER SYSTEMS

The Motivair Adiabatic "Efficiency Boosting" System uses a proprietary evaporative "Pre-Cooling" media designed to pre-cool warm ambient air before it reaches the air-cooled chiller condenser coils.

During warmer seasonal weather, the Adiabatic System automatically activates and allows a small flow of city water to wet the evaporative media.

Warm, dry air first passes through the evaporative media where it is pre-cooled before it enters the condenser coils. Water that is not evaporated is collected and recycled.

Depending on geographic location, inlet air temperatures can be reduced by up to 20°F yielding significant chiller efficiency gains, increased reliability during extreme summer weather, and reduced building energy demand loads.

The evaporative media is specifically designed for ultra-low pressure drop with virtually no added static to condenser fans.

As a factory supplied option, media thickness and air flow velocities are designed to allow zero water carry over onto the chiller coils.

The evaporative media is easily removed for field service, cleaning or inexpensive replacement.

Virtually maintenance-free and requiring little or no water treatment, the Adiabatic System is ideal for clients seeking simple and reliable efficiency gains for their air-cooled chiller system.

FREE-COOLING CHILLER SYSTEMS

Motivair Free-Cooling chillers can be ordered with the adiabatic option fitted.

By automatically turning on the system when Free Cooling is active and the ambient temperature is above freezing, partial and 100% Free-Cooling operating hours can be significantly increased.

This allows the refrigeration compressors to be turned off for longer periods of time, in addition to the improved summer air cooled efficiency described above.

The Adiabatic System is controlled and protected by the proprietary Motivair chiller PLC software and is completely automatic including auto fill, winter drain down, low water level and anti-freeze alarms.

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Gain Speed to Insight with Centurion Monitoring System

Available on select Motivair chillers as an optional feature, the Centurion ™ Monitoring System provides owners access to critical data and a range of safeties measures.

FEATURES

1 **DATA TRENDING**

2 **ADJUSTABLE WARNING THRESHOLDS**

3 **PASSWORD-PROTECTED MULTI-LEVEL ACCESS**

Leverage predictive analytics and gain insights to critical data from a remote location via cellular service, outside of the customer's firewall.

The new monitoring system empowers the owner by offering a fully transparent exchange of encrypted data between the owner and chiller from a remote location via cellular service, outside of the firewall. If the chiller is operating in an unsafe condition or in the unlikely event of an alarm, designated contacts are immediately notified by the chiller of its condition. The pending alarm can then be avoided or quickly corrected.

PLC CONTROL FEATURES:

The MLC range features the PCO5 control system, which is an advanced Programmable Logic Controller, with a base-operating platform that can be easily modified to adapt to various applications. A multi-character LCD display, and easy to follow directional prompts, gives the operator complete control over all chiller functions. Multiple digital and analog inputs as well as digital and PWM outputs offer unparalleled control possibilities.

INTELLIGENT CHILLER RESPONSE

Motivair® software allows the chiller to respond to system changes in real time, adjust performance accordingly, providing:

- Automatic restart after a power outage
- Rapid restart of refrigeration compressors after a power outage, while affording maximum compressor protection
- Selective decision on which compressor(s) to start first based on run-time and fastest possible response to system load
- Liquid injection to the compressors under high ambient operation
- Seamless change from refrigeration & optional Free Cooling mode based on system load, chilled water temp, ambient temp and installation profile.

CONTROL FEATURES:

- Highly visible LCD display
- Tactile push-buttons
- Adjustable alarm set points
- °F/°C selectable
- Compressor Lead/Lag control
- Anti-Compressor short cycle
- Compressor failure alarm
- Adjustable water set point
- Supply water temp. display
- Return water temp. display
- Low water temperature alarm
- Freeze alarm
- Low water/glycol flow alarm
- High water temperature alarm
- Low refrigeration pressure alarm
- High refrigeration pressure alarm
- Irregular voltage alarm
- General Alarm Relay
- Remote Start/Stop Relay
- Manual alarm reset
- RS 232/RS 485 communication
- Ethernet Communication
- LON, BACNET, MODBUS communication (optional)

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Technical Specifications

Centricor™	MLT	270	330	350	425	440	525	625	700	870	1100	1200
Nominal Cooling Capacity *	Tons	75	94	101	120	125	150	175	199	250	300	350
Nominal Cooling Capacity *	BTU/H	901,607	1,133,839	1,212,389	1,441,206	1,499,264	1,799,799	2,103,750	2,390,625	3,000,000	3,600,000	4,200,000
Min Load @ Nom. Design Conditions	Tons	21	23	25	37	50	50	52	67	75	65	80
Compressor	Qty	1	1	1	1	2	2	2	2	2	3	3
Refrigerant	Type	R-134A										
Refrigerant Circuits	Qty	1	1	1	1	2	2	2	2	2	3	3
Compressor Running Current	Amps	93.3	116.9	124.8	162.7	76.1	93.1	105.4	125.1	171.5	135.5	158.0
Evaporator												
Type		Shell & Tube										
Fluid Flow Rate	GPM	180	226	242	286	299	359	420	477	600	715	837
Pressure Drop	Psid	10.73	12.76	11.43	10.43	11.18	7.99	10.54	10.21	6.50	8.5	8.5
Evaporator Volume	Gallons	9	11	13	15	15	21	21	25	32	42	42
Inlet/Outlet Connections	in	5	5	5	6	6	6	6	6	8	8	8
Condenser												
Type		Microchannel or Copper Tube & Aluminum Fin										
Sound Pressure **	dB(A)	59	59	61	62	61	62	62	64	66	67	67
Fans	Type	EC										
Fan quantity	Qty	6	6	6	8	8	10	12	12	14	18	18
Total Airflow	CFM	62,228	76,916	77,551	97,045	100,647	125,650	150,864	150,864	171,000	220,000	220,000
Absorbed Current	Amps	19.3	19.3	19.3	25.8	25.8	32.2	38.6	38.6	55.0	70.2	70.2
Electrical												
Electrical Power ***	V/PH/HZ	460/3/60										
Control Power	V/PH/HZ	230/1/60										
Total Absorbed Power	kW	78.6	95.1	97.5	128.8	126.0	153.3	174.2	195.2	280.0	333.7	384.4
Full Load	Amps	112.6	136.2	144.1	188.5	178.0	218.4	249.4	288.8	398.0	477.0	546.0
MCA	Amps	135.9	165.4	175.3	229.2	197.0	241.7	275.8	320.1	441.0	511.0	585.0
MOP	Amps	229.2	282.3	300.1	391.9	273.1	334.8	381.2	445.2	600.0	600.0	700.0
Dimensions / Weights												
Length	in	136.2	177.6	177.6	177.6	177.6	218.9	260.2	260.2	386.0	504.0	504.0
Width	in	87.0	87.0	87.0		87.0		87.0	87.0	87.0	87.0	87.0
Height	in	98.5	98.5	98.5		98.5		98.5	98.5	98.5	98.5	98.5
Shipping Weight	Lbs	4,806	5,666	5,732	6,239	6,548	8,245	9,215	9,392	14,750	19,600	19,800
Operating Weight	Lbs	4,877	5,752	5,836	6,363	6,671	8,417	9,387	9,599	15,200	20,200	20,400

ADDITIONAL CHILLER OPTIONS AVAILABLE - Consult Factory for Performance Data

- Integrated Free Cooling System (Page 4)
- Adiabatic System (Page 5)
- Low & Super Low Noise
- Simplex & Duplex Pump System

*Listed Capacity Rated @ 44°F LWT / 54°F EWT / 95°F AMB **Sound Pressure Rated @ 32.8' Feet. *** FL AMCA MOP are based on 460/3/60

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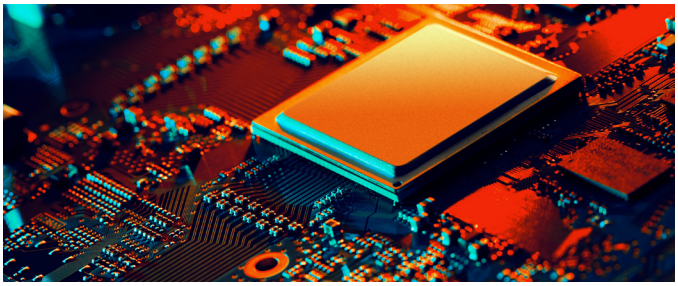
We cool the most advanced technology on the planet

We discover, design, and develop resilient thermal technologies and strategies, and convert that into actionable insights and unparalleled value for our clients.

From climate research to finance, cloud to artificial intelligence, customers trust Motivair's cooling technologies so they can break new boundaries and help deliver tomorrow's innovations faster.

We're helping our clients discover cures for diseases, combat climate change, and make tomorrow's data-driven services more reliable and accessible.

We are touching millions of lives each day by providing the critical cooling technology to support productivity and innovation that is changing our world.



DIRECT-TO-CHIP COOLING

Supercomputing isn't just in the lab anymore. The power of high-performance computing is scaling out as more enterprises and corporations look to utilize artificial intelligence for advanced decision-making and accelerate digital transformation.

DATA CENTER & IT COOLING

Designed for and used by the enterprise data center and supercomputer owners and operators, our cooling technology is engineered to help you leap forward in scale, quality, and speed.

THERMAL MANAGEMENT

When it comes to cooling your critical infrastructure, we work to customize specialty chiller technology for you, rather than selecting from a catalog

CLIENT SERVICES GROUP

Manage every aspect of your cooling infrastructure, from planning and design to start up, commissioning and post-sale performance. Your business depends not only on our products but also our ability to respond when you need us.

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