



## CONFIGURED PRODUCT SUBMITTAL

Model #: ACA220BT3512F-FC

Serial #: AC1512472

Year: 2015

Size: 230



Chiller Base Model: ACA220BT3512F-FC-460V Air Cooled Chiller, 230 ton

L: 26' 7"

W: 8'

H: 10'

Shipping Weight: 23,000 lbs.  
Operating Weight: 25,000 lbs.

# **CHILLER CONFIGURATION DETAILS**

## **Base Chiller Description - Model ACA220BT3512F-FC -460V Air Cooled Chiller, 230 ton**

### **DOCUMENTS SPECIFIC TO THIS SUBMITTAL**

#### **CHILLER STANDARD FEATURES**

- High quality oversized industrial components are employed for longer lasting trouble free operation of chiller.
- Chiller is provided with a circuit disconnect switch so that compressor can be isolated for maintenance purpose.
- Chiller is equipped with the following power connection - Single point Power Connection - (2) AWG #350 MCM
- User friendly expandable Programmable Logic Controller is employed. Systems data can be configured to customer requirements while chiller is operating.
- Operator interface Touch-Screen displays all text and graphical messages. Displays condenser & chilled water inlet/outlet temperature in a graphical manner. Any system fault is displayed on the touch screen for diagnostics.
- Chiller is equipped with all safety and operational controls.
- Master panel makes this assembly suitable for single point electric supply.

#### **AIR COOLED CHILLER FEATURES**

• Arctic Cool air-cooled chillers have dedicated refrigerant circuits for each Turbocor centrifugal compressor. This approach resolves traditional issues of operating centrifugal compressors with the higher head pressure and pressure ratio of air cooled environments and assures each compressor is directly controllable irrespective of any adjacent compressor circuits activity, and eliminates system-wide refrigerant management issues in multi-compressor single circuit approaches. A standard brazed-plate sub-cooler/interstage injection system and oversized liquid receiver allows the Arctic Cool chiller to be deployed across a wider range of duties and safely control the Turbocor environment(s). Optional adiabatic pre-coolers extend this range and energy efficiencies significantly. Refrigerant migration, inverted-start conditions, subcooling, compressor staging and optimization methods are improved by dedicating compressors, evaporator and condenser circuits, receivers, sub-coolers and EXVs.

#### **TWO-STAGE OIL-FREE, VARIABLE-SPEED CENTRIFUGAL MAGNETIC BEARING COMPRESSOR**

- Exclusive design of Oil Free Centrifugal compressor ratio of 5:1.
- Low Maintenance.
- Soft Start with 2 amp start up current.
- Low Noise TT350 @ 72dB.
- Refrigerant cooled design.
- Magnetic bearing for extraordinary friction-free service life with very low noise levels during operation.
- Infinite capacity control using internal Variable-Speed-Drive.
- Lightweight for service and rigging. Isolation valves enable compressor removal without losing refrigerant.

- Equipped with electronic protection device to monitor and control winding temperature through built-in thermistor, control of high discharge temperature, and phase loss protection.

### **AIR-COOLED REFRIGERATION COMPONENTS**

- High quality components are employed
- NEMA 3R electrical panels are rated for outdoor use.
- ASME Shell and Tube type evaporator and high-efficiency aluminum and copper condenser coils.
- 910mm direct-DC-drive variable-speed high static pressure condenser fans.
- Relief valve with dual manifold on evaporator and liquid receiver or return line for air cooled models. Cut sheet is attached.
- Electronic Expansion valve with sensor and transducer for condenser level
- High and low pressure switches
- Liquid line moisture sight glass
- Suction and discharge service valves
- ACR refrigeration pipes.
- Liquid line service valve
- Closed-cell insulation on the Evaporator - 3/4 inch
- Air Cooled Chiller IOM: [ArcticCool AirCooled IOM D5](#)

### **CHILLER CONTROL PANEL**

- NEMA 3R rated wired and tested electrical enclosures for power and controls.
  - Circuit fused disconnect for each compressor. Fuses are Fast acting J type as indicated in the drawing.
  - Line-reactor is installed and wired for each compressor.
  - Control transformer with primary and secondary fusing- Fuses are CC type , Time Delay
- 
- Genuine Danfoss MCX20 controller to provide direct digital control all Compressors
  - ARCTICVIEW interface Touch Screen interface for display and control
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- Specification includes the following BMS option: Modbus RTU

### **CONTROLS**

- Entering and leaving chilled water sensors
- Freeze protection control through controller

### **DISPLAYS**

- Low and High pressure display
- Chilled water inlet and outlet temperature display
- Condenser water in/out temperatures
- Operating compressor condition
- Operating envelope - Surge and Choke speeds
- Motor fault display

### STEEL STRUCTURE AND CABINET

- Steel frame is coated with high quality corrosion resistance paint.
- Cabinet and external posts are manufactured with powder coated steel.

### Base Chiller Dimensions: AS DRAWING

#### 1. Base Construction Configurations

<b>Chiller Base Model</b>	ACA220BT3512F-460Volt, Air Cooled, Nom 220	<b>Compressor Type</b>	TT350 , 2
<b>Voltage</b>	460/3/60	<b>Chiller Circuits</b>	2
<b>Power Connections</b>	Single Point Power Connection (2) AWG #350 MCM	<b>Harmonics Filter Option</b>	No Harmonic Filter
<b>Staging Valves</b>	Compressor Staging Valves	<b>EMI Filter Option</b>	No Filters Selected

#### 2. Evaporator Configurations

<b>Evaporator Passes</b>	Standard evaporator pass per design	<b>Connection Side</b>	Standard Back - Evaporator Connections
<b>Evap. Flow Proof</b>	Evaporator Flow Switch	<b>Connection Type</b>	Flanged Evaporator Pipe Connections
<b>Evap. Pressure</b>	Standard 150 PSI Evaporator Design Pressure	<b>Water Circuits</b>	Standard Single Water Circuit

### 3. Air Cooled Condenser Configurations

<b>Condenser Fans</b>	VSD Fans with Noise Diffuser Tops - 12 Fans
<b>Field Wiring Option</b>	Right Hand Field Wiring
<b>Coil Coating</b>	No Coating

### 4. Controls Configurations

<b>Controller Type</b>	Danfoss Standard MCX20 Chiller Controller	<b>BMS Connectivity</b>	Modbus RTU
<b>Remote Web Access</b>	No Remote Control		



Software Revision - AirCooled: 13A.5.2



**Chiller Report**

ACA220BT3512F-910-460Volt

Chiller Data		Compressor Data	
ChillerType	AirCooled	Software Version	Version: 1895 Date: 2013-07-25
Refrigerant	R134A	Name	TT350-G12-1-HL-E-O-NC
Number of Compressors	2	Manufacturer	Turbocor
Type	Centrifugal	Type	Centrifugal
Input Power (kW)	247.1	Power (kW)	113.9
Current (amps)	342.0	Current (amp)	160.1
Capacity (tons)	230	Capacity (tons)	230
Efficiency (kW/ton)	1.074	Efficiency (kW/ton)	0.990
Nominal Capacity (tons)	250	Power Requirements	460/3/60

Evaporator Data		Condenser Data (per Fan)		Notes Certified in accordance with the AHRI Air-Cooled Water Chilling Packages Using Vapor Compression Cycle Certification Program, which is based on AHRI Standard 550/590 (I-P). Certified units may be found in the AHRI Directory at <a href="http://www.ahridirectory.org">www.ahridirectory.org</a>
Name	ACW220EVP-CT	Name	ACC080	
Type	Flooded	Type	Air Cooled	
Inlet Temperature (°F)	52.0	Ambient Temp (°F)	95.0	
Outlet Temperature (°F)	42.0	Condensing Temp (°F)	116.6	
Length (in)	144.0	Length (in)	88.0	
Pass Count	2	Pass Count	4	
Flow (gpm)	600.2	Air Flow (scfm)	16002	
Fluid	Biogreen	Fluid	Air	
Fluid Concentration (%)	30	Refrigerant Flow (lb/hr)	3144.2	
Capacity(tons)	230	Heat of Rejection (tons)	24	
Fouling Factor (h·ft <sup>2</sup> ·°F/Btu)	0.000102	Tube Count (Per row)	60	
Super Heat (°F)	1.8	Sub Cooling (°F)	12.8	
Pressure Drop (psi)	9.18	Pressure Drop (inH2O)	0.3	
Velocity (ft/s)	6.5	Number of Fans	12	
Reynolds Number	9970	Fan Power (kW)	1.6	

NPLV (kW/ton)				
25% Load	50% Load	75% Load	100% Load	NPLV
0.347	0.391	0.713	1.074	<b>0.477</b>

Chiller Performance											
Load	Tons	kW	RLA	Eff.	Evap Inlet (°F)	Evap Out (°F)	Evap Temp (°F)	Evap Flow (gpm)	Cond Temp (°F)	Air Flow Per Fan (scfm)	Ambient (°F)
100 %	230.0	247.09	342.0	1.074	52.0	42.0	40.7	600.2	116.6	16,000	95.0
90 %	207.0	182.29	255.5	0.881	50.3	42.0	40.6	600.2	108.6	15,000	89.0
80 %	184.0	139.48	199.5	0.758	49.4	42.0	40.8	600.2	100.8	14,000	83.0
75 %	172.5	122.92	177.6	0.713	48.9	42.0	40.8	600.2	96.1	14,500	80.0
70 %	161.0	103.11	151.3	0.640	48.4	42.0	40.9	600.2	92.5	14,000	77.0
60 %	138.0	69.34	106.7	0.502	47.5	42.0	41.0	600.2	85.9	11,500	71.0
50 %	115.0	44.97	73.3	0.391	46.6	42.0	41.1	600.2	79.0	9,500	65.0
40 %	92.0	38.06	57.1	0.414	45.7	42.0	41.2	600.2	78.0	13,000	61.0
30 %	69.0	23.36	38.0	0.339	44.8	42.0	41.3	600.2	71.7	10,500	57.0
25 %	57.5	19.96	32.1	0.347	44.3	42.0	41.3	600.2	65.4	13,000	55.0
20 %	46.0	13.67	24.2	0.297	43.8	42.0	41.3	600.2	66.5	8,500	55.0

Chiller Configuration					
Compressor	FLA (amp)	RLA (amp)	Chiller FLA (amp)	Chiller MCA (amp)	Chiller MOCP (amp)
TT350	168	160	359	400	600



Chiller Model  
**ACA220BT3512F-FC**

**Free cooling information** with 30 % Biogreen

Ambient	Fluid In	Fluid out	GPM	CFM per coil	BTU per coil	Ton per coil	total ton	kw / ton
35	52	44.1	567	23250	257955	21.5	172	0.15
30	52	41.8	567	23250	332390	27.7	222	0.12
25	52	41.8	567	15000	331811	27.7	221	0.11
20	52	42.2	567	10500	318807	26.6	213	0.09
10	52	41.7	567	8500	333720	27.8	222	0.06
0	52	42.1	567	5400	322950	26.9	215	0.04

note below 20 degree F the fan slow down to keep the leaving fluid temp to 44

**Delta P** 12 psi

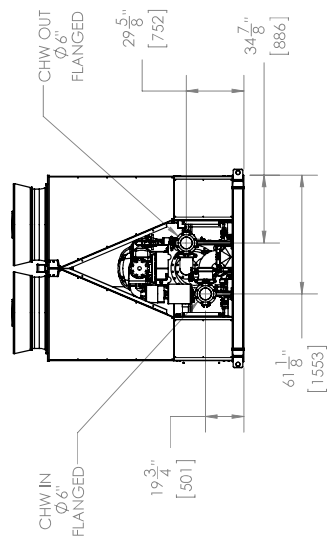
**Operation Notes:**

If the total tonnage of the system required is higher than the free cooling available then the mechanical cooling will run on one circuit and the other will be in free cooling

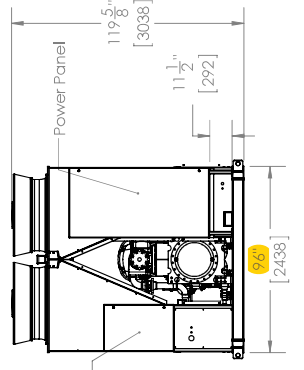
When in pre cooling mode, the fan is control by the required min STD required to achieve the required tonnage

during the Free cooling mode the fan pull 2,2Kw at full speed

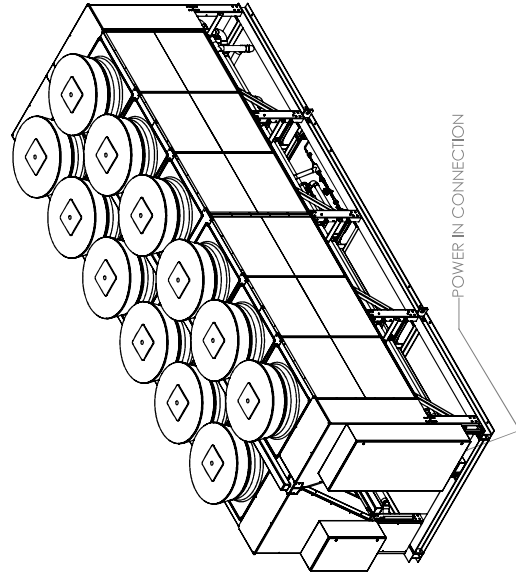
for 12 fan unti the total 26.4



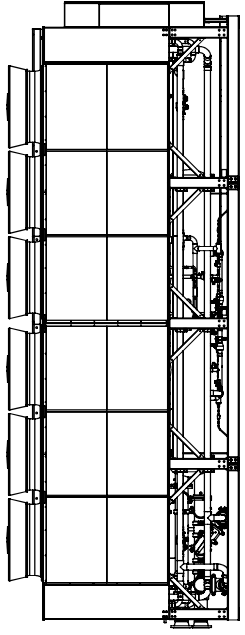
FRONT VIEW



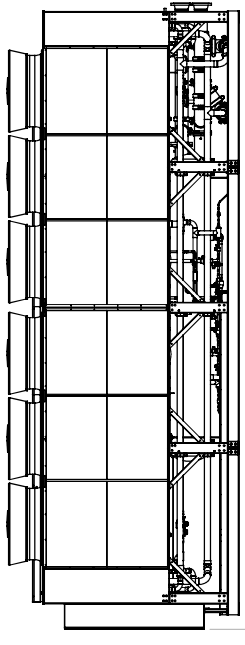
BACK VIEW



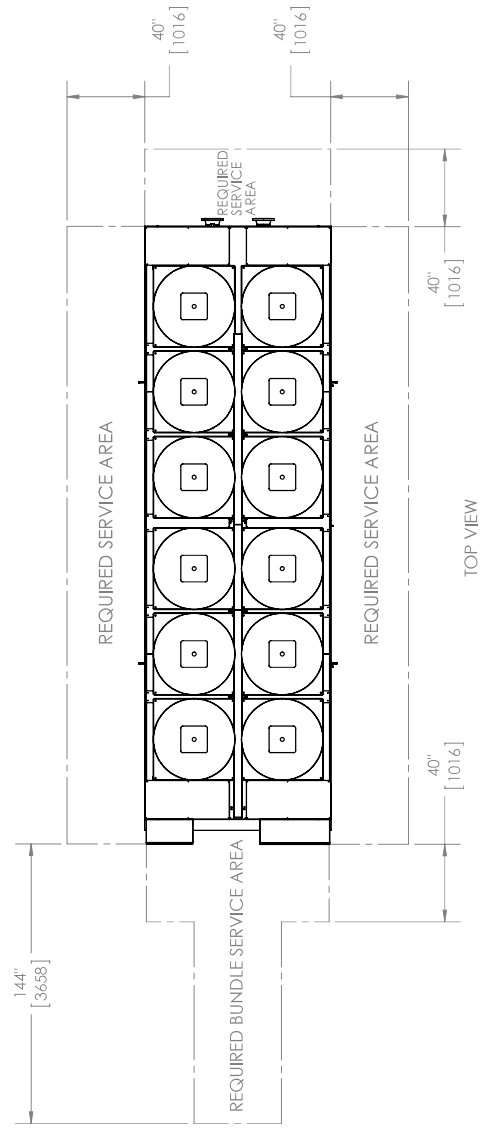
ISOMETRIC VIEW



LEFT VIEW



RIGHT VIEW



TOP VIEW

- NOTES:
- FLUID CONNECTIONS ARE TENTATIVE LOCATIONS.
  - ALL DIMENSIONS  $\pm 1/2"$  [13mm], UNLESS OTHERWISE INDICATED.
  - DUE TO CONTINUOUS PRODUCT IMPROVEMENTS, THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE.

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Shipping Wt. **23,300 lbs**  
 Operating Wt. **25,100 lbs**  
 Scale: NTS Sheet No. 1 of 1 Rev.