



## PROCESS COOLING LINE

The FMCS-P: FriconUSA Modular Chiller System, Premium series, air cooled condenser, satisfies a wide range of capacities. The flexible modular design allows it to work independently in capacities between 15 to 50 TR or grouped in different combinations of sizes to form one or various sets and meet the requirements of capacities up to 750 TR per set. The quality, high efficiency up to 11.3 EER and excellent IPLV, according to AHRI Standard 550/590, assure our customers reliability, low operating costs and long equipment life.

The most common applications are for oil cooling systems in plastic processes such as injection molding, extrusion and blow molding, laser cutting, medical equipment, chemical processing, beverage industry, glycol cooling systems, industrial laundry, ice rinks, thermal ice energy storage and petroleum. Additionally it is ideal for demanding air conditioning in industrial plants or data centers.

By using Bitzer Ecoline semi-hermetic compressors with infinite variable capacity control "CRII" between 10% and 100% or the implementation of an external Variable Frequency Drive (VFD) or "Varispeed Compressor" on the Master unit, we convert this unit into an incredible Variable Refrigerant Flow (VRF) system resulting in a greater adaptability to the thermal load of the set, stabilizing the fluid temperature and maximizes energy savings at partial load.

Standard ambient operating temperature range: +110°F (+43.3°C) to +40°F (4.4°C)  
Extended ambient operating temperature range: +125°F (+51.7°C) to -35°F (-37.2°C)\*

\*See optional packages.

Application / leaving fluid temperature range:

"H" High: +55°F (+12.8°C) to +15°F (-9.4°C)  
"M" Medium: +41°F (+4.9°C) to -17°F (-27.0°C)

### STANDARD FEATURES & BENEFITS:

- Bitzer semi-hermetic compressor with unloader and with spring mounted vibration insulation, crankcase heater and internal thermal protection.
- Step unloader on the compressor (4 cylinders: 50-100%, 6 cylinders: 33-66-100%).
- Aluminum structure with galvanized steel reinforcement, high efficiency condenser with reinforced structure and aluminum micro-channel coils. Its low weight and size reduces the costs of transportation, installation and construction.
- Galvanized, powder coated, acoustically semi-insulated and weatherproof semi-enclosed compressor cabin.
- EcoFriendly; Air cooled micro-channel condenser coil with internal volume reduced requires between 40% and 60% less refrigerant charge and results in a significant reduction of the refrigerant charge necessary for normal or flooded operations.
- Wide range of application temperatures for ambient working conditions.
- Quiet, high efficiency, external rotor motor, two speed, AC type axial fan(s) for a better operation.
- Built-in, Direct Expansion (DX) brazed plate evaporator, one circuit with reduced internal volume requires less refrigerant charge.

# FMCS-P SERIES, A.1

## MODULAR CHILLER SYSTEM

PREMIUM SERIES, AIR COOLED CONDENSER  
SEMI-HERMETIC COMPRESSOR

15-50 TR PER UNIT / 750 TR PER SET

PREMIUM  
SERIES



DESIGNED • ENGINEERED • ASSEMBLED  
IN THE USA

UL  
US LISTED  
508A

ECOFriendly  
BY FRICONUSA

POWERED BY:

Ref. FMCS-P SS EN 1809

**STANDARD FEATURES & BENEFITS (CONT.):**

- Electronic expansion valve, liquid sight glass and solenoid valve.
- Mechanical flow switch.
- Liquid drier with replaceable core.
- Flexible joint on suction and discharge lines on the compressor.
- Refrigerant: R-407c for high temperature application or R-407a for medium temperature application.
- Factory pre-charged and individually tested.
- UL 508A listed built-in electrical control panel.
- Compressor and fan circuit breakers.
- Voltage and phase-loss monitor with protection module for the compressor.
- Control: 208-230V / 1PH / 60HZ
- Power supply voltage 460V / 3PH / 60HZ with single point power connection.
- Electronic Control System; compressor and condenser fans operational management: alarms, measurement of pressure and temperature variables, 132x64 LCD backlit built-in display with 6-button keypad. Alarm management: 3 alarms for compressor (overload, pressure and oil) and 1 overload alarm for condenser fans.
- Fixed high pressure compressor control.
- BMS (Building Management System): ModBus protocol for supervisor or HMI (Human Machine Interface).
- 2-year warranty.

**STANDARD OPTIONS:**

- Different compressor brand.
- Condenser coil with E-coating for greater resistance to corrosion.
- Protective mesh for the condenser.
- EC type fans with variable speed (for 575V a VFD is used).
- Evaporator option:
  - Remote evaporator
- External Hydronic Package includes TEFC type motors and NEMA 3R control panel:
  - 1 recirculation pump
  - 1 recirculation pump with VFD
  - 1 recirculation pump & polyethylene buffer tank
  - 1 recirculation pump with VFD & polyethylene buffer tank
  - 2 recirculation pumps
  - 2 recirculation pumps with VFD
  - 2 recirculation pumps & polyethylene buffer tank
  - 2 recirculation pumps with VFD & polyethylene buffer tank
- Refrigerants: R-404a, R-407a, R-407c, R-448a, R-449a, R-507a
- Different power supply voltage.

**ADDITIONAL OPTIONS:**

- VRF (Variable Refrigerant Flow) package to maximize the efficiency and capacity adaptability to the demand (only available for the Master unit):
  - VRF-I: CRII Unloader. Infinite capacity control on the compressor (4 cylinders: 10≈100%, 6 cylinders: 33≈100%).
  - VRF-II\*: Variable Frequency Drive (VFD). Infinite capacity control on the lead compressor in each circuit (42≈116%).
  - VRF-III: Bitzer Varispeed Compressor. Infinite capacity control on the compressor (25≈145%). Only available for certain models.

*\*Certain limitations apply.*
- FECC (Fully Enclosed Compressor Cabin) package for better soundproofing:
  - FECC-I: Fully enclosed metal compressor cabin.
  - FECC-II: Same as FECC-I with internal convoluted acoustic foam panel lining.
- Refrigerant and oil evacuated for non-hazardous shipping.
- LAOP (Low Ambient Operation Package) required for operation below +40°F:
  - LAOP-I: +110°F (+43.3°C) to +10°F (-12.2°C), Includes: split condenser with variable speed fan on the first fan section and electrical antifreeze heater on the evaporator.
  - LAOP-II: +110°F (+43.3°C) to -20°F (-28.9°C), Includes: same as LAOP-I plus liquid receiver and flooded condenser with head pressure control valve.
  - LAOP-III\*: +110°F (+43.3°C) to -35°F (-37.2°C), Includes: same as LAOP-II plus insulated liquid receiver with electric heater, thermally insulated compressor cabin and control panel with ventilated heating.

*\*Requires FECC-II (Fully Enclosed Compressor Cabin) package.*
- HAOP (High Ambient Operation Package) required for operation above +110°F:
  - HAOP-I: +125°F (+51.7°C) to +40°F (4.4°C), Includes: air exhaust duct to the condenser plenum for cooling of the control panel and filter for the air inlet.
- Suction pressure regulator valve "EPR" required for applications with a water temperature range below +40°F (+4.4°C) or when a greater precision in the fluid temperature is necessary.
- Suction accumulator.
- Helical oil separator with discharge check valve and replaceable 5 micron oil filter.
- MDS (Main Disconnect Switch).
- Electronic control system:
  - BACnet Communication board.
  - Remote LCD display.
  - Local or remote touch screen display.
  - Energy Management Module.
  - CHSM (Chiller System Manager) controls the sequence between multiple sets.
- Extended 5-year compressor warranty (U.S. only).

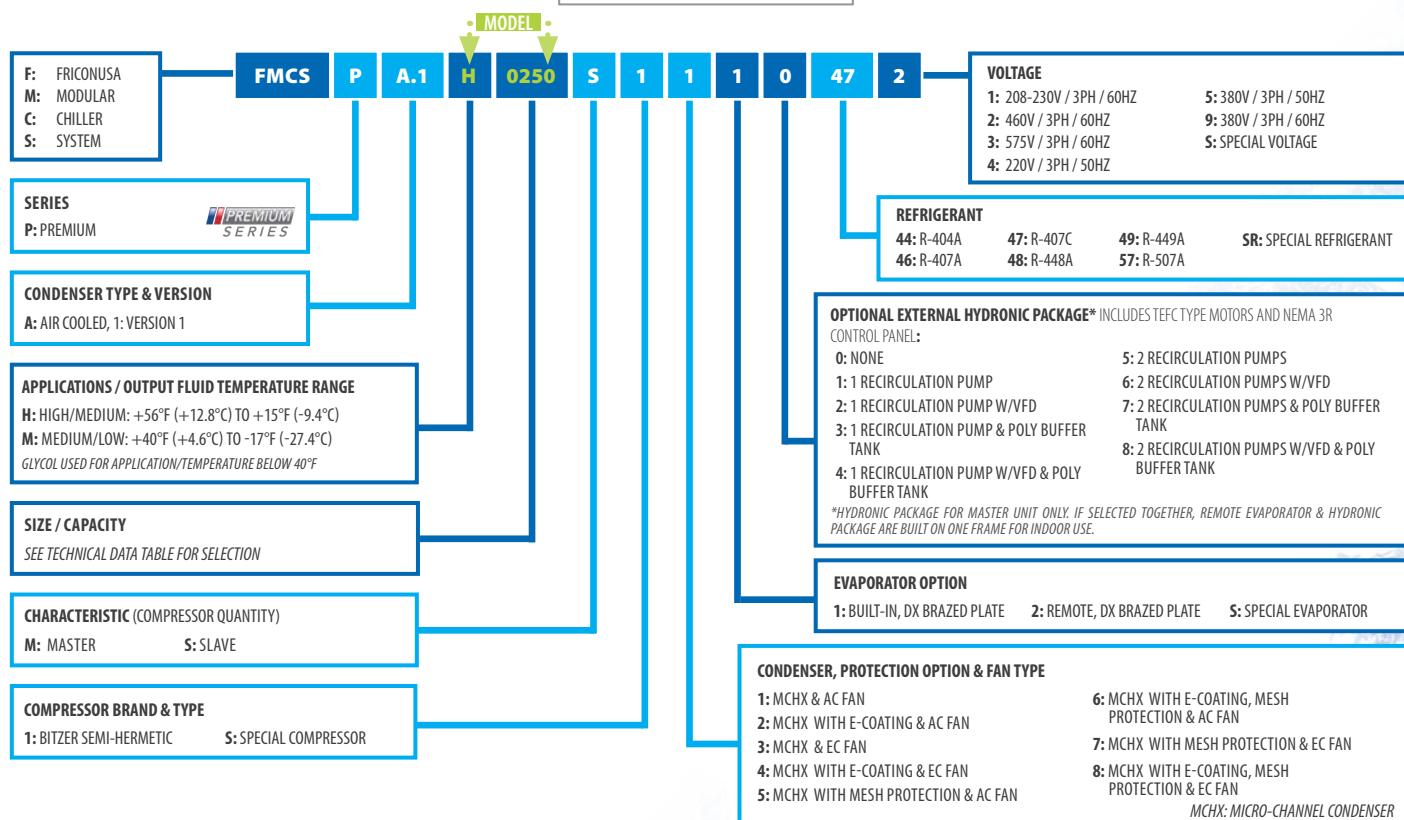


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|----------------------------|-------------------------------|------------------------------|------------------------------------|
| 1. Compressor              | 4. Brazed plate evaporator    | 7. Fluid inlet/outlet        | 10. Access doors                   |
| 2. Micro-channel condenser | 5. Liquid drier               | 8. Electrical control panel  | 11. Suction accumulator (optional) |
| 3. Fans                    | 6. Electronic expansion valve | 9. Electronic Control System | 12. Protective mesh (optional)     |



SUBJECT TO CHANGE ACCORDING TO  
ACCESSORIES/OPTIONS. PLEASE CONSULT  
THE FACTORY FOR SPECIFIC INFORMATION.

### NOMENCLATURE





## TECHNICAL DATA - APPLICATION / LEAVING FLUID TEMPERATURE RANGE

## SEMI-HERMETIC COMPRESSOR

Performance based on Bitzer Ecoline compressor

CAPACITY IN ACCORDANCE TO AHRI STANDARD 550/590.

## R-407c

## H: HIGH/MEDIUM TEMPERATURE: +56°F (+13.4°C) TO +15°F (-9.4°C)

MODEL		COMPRESSOR		FAN AC TYPE QTY	CAPACITIES IN TR @ 95°F AMBIENT R-407C** LEAVING FLUID TEMPERATURE							ELECTRICAL DATA 60HZ						MECHANICAL DATA						FRAME TYPE		
					WATER			GLYCOL				230 VOLT			460 VOLT			575 VOLT <sup>†</sup>			CENTRIFUGAL PUMP		REFRIGERANT CHARGE		APROX WEIGHT.	
SIZE		BITZER MODEL	QTY		56°F	50°F	44°F	38°F	32°F	27°F	21°F	15°F	RLA COMP.	SYSTEM MCA	RLA COMP.	SYSTEM MCA	RLA COMP.	SYSTEM MCA	GPM	M3H	In/Out in.	LB	(KG)	LB	(KG)	
UNIT	HP				13.4°C	10.0°C	6.7°C	3.4°C	0.1°C	-3.1°C	-6.2°C	-9.4°C														
H-0200	20	1	4NE-20Y	2 19000	CAP. EER	19.4 12.9	17.5 12.0	15.8 11.3	14.1 10.5	12.6 9.7	11.3 9.1	10.0 8.5	8.8 7.9	57.7	82.7	28.8	41.4	23.6	33.3	37.6	8.5	2	29.8 (14)	1763	(802)	A
H-0220	22	1	4JE-22Y		CAP. EER	21.1 12.4	19.2 11.7	17.1 10.9	15.5 10.3	13.8 9.6	12.3 8.9	10.9 8.4	9.6 7.8	61.5	87.5	30.8	43.9	24.4	34.3	40.8	9.3	2	32.3 (15)	1894	(861)	
H-0250	25	1	4HE-25Y	2 19000	CAP. EER	23.8 12.1	21.5 11.4	19.5 10.8	17.6 10.2	15.6 9.5	14.0 8.9	12.4 8.3	11.0 7.8	75.6	105.1	37.8	52.7	30.1	41.4	46.4	10.5	2	36.7 (17)	1987	(903)	
H-0300	30	1	4GE-30Y	2 22750	CAP. EER	27.8 11.9	25.2 11.2	22.7 10.4	20.5 9.9	18.3 9.2	16.4 8.6	14.7 8.2	13.1 7.7	89.7	126.5	44.9	63.5	35.9	50.5	54	12.3	2	42.8 (19)	2015	(916)	
H-0330	33	1	6JE-33Y		CAP. EER	30.8 11.5	28.0 10.9	25.3 10.3	22.6 9.5	20.1 8.8	18.2 8.4	16.1 7.8	14.3 7.3	100	143.2	50	71.9	39.7	57.1	60.2	13.7	2	47.7 (22)	2059	(936)	
H-0340	35	1	4FE-35Y	2 26500	CAP. EER	32.5 11.1	29.5 10.5	26.7 9.9	24.2 9.4	21.8 8.9	19.3 8.3	17.3 7.8	15.3 7.2	95	137	47.5	68.8	38	55	63.6	13.7	2 1/2	50.4 (23)	1721	(782)	B
H-0350*	35	1	6HE-35Y		CAP. EER	36.9 11.7	33.5 11.1	30.1 10.3	27.1 9.7	24.3 9.0	21.8 8.5	19.5 8.0	17.0 7.3	105.1	153	52.6	76.8	41.7	60.9	71.6	13.7	2 1/2	56.7 (26)	1832	(833)	
H-0400*	40	1	6GE-40Y	2 37000	CAP. EER	41.3 11.5	37.5 10.9	34.0 10.2	30.7 9.7	27.4 9.0	24.6 8.5	21.8 7.9	19.4 7.4	141	197.9	70.5	99.1	56.4	79.3	81	13.7	2 1/2	64.1 (29)	1850	(841)	
H-0500*	50	1	6FE-50Y		CAP. EER	47.5 10.9	43.1 10.2	39.0 9.7	35.5 9.3	31.8 8.6	28.5 8.1	25.5 7.7	22.4 7.1	143.6	201.1	71.8	100.8	57.1	80.2	92.8	13.7	2 1/2	73.5 (33)	1875	(852)	

## R-407a

## M: MEDIUM/LOW TEMPERATURE: +40°F (+4.6°C) TO +17°F (-27.4°C)

MODEL		COMPRESSOR		FAN AC TYPE QTY	CAPACITIES IN TR @ 95°F AMBIENT R-407A** LEAVING FLUID TEMPERATURE							ELECTRICAL DATA 60HZ						MECHANICAL DATA						FRAME TYPE		
					WATER			GLYCOL				230 VOLT			460 VOLT			575 VOLT <sup>†</sup>			CENTRIFUGAL PUMP		REFRIGERANT CHARGE		APROX WEIGHT.	
SIZE		BITZER MODEL	QTY		40°F	28°F	22°F	11°F	5°F	-6°F	-12°F	-17°F	RLA COMP.	SYSTEM MCA	RLA COMP.	SYSTEM MCA	RLA COMP.	SYSTEM MCA	GPM	M3H	In/Out in.	LB	(KG)	LB	(KG)	
UNIT	HP				4.6°C	-2.1°C	-5.4°C	-11.8°C	-15.0°C	-21.2°C	-24.3°C	-27.4°C														
M-0150	15	1	4JE-15Y	2 19000	15.9	12.8	11.3	8.8	7.7	5.7	4.8	4.0	50.0	73.1	25.0	36.7	20.0	28.8	29.8	6.8	2	20.9 (9)	1877	(853)	A	
M-0180	18	1	4HE-18Y		18.4	14.8	13.1	10.3	9.0	6.8	5.7	4.8	54.1	78.2	27.1	39.3	21.7	30.9	34.5	7.8	2	24.2 (11)	1902	(865)		
M-0230	23	1	4GE-23Y	2 22750	21.5	17.3	15.4	12.1	10.6	8.0	6.9	5.9	57.7	86.5	28.8	43.4	23.1	34.6	40.4	9.2	2	28.4 (13)	1949	(886)		
M-0250	25	1	6JE-25Y	2 22750	23	18.6	16.4	12.8	11.3	8.4	7.1	6.0	71.0	103.2	35.5	51.8	28.4	43.1	43.4	9.9	2	30.4 (14)	2009	(913)		
M-0270	28	1	4FE-28Y	2 26500	25.1	20.2	18.1	14.1	12.5	9.4	8	6.8	76.9	114.3	38.5	57.5	30.8	46.1	47.2	10.7	2 1/2	33.4 (15)	1982	(901)		
M-0280	28	1	6HE-28Y	2 26500	26.8	21.8	19.3	15.1	13.3	9.9	8.5	7.2	77.6	115.2	38.8	57.9	31.0	46.4	50.8	10.7	2 1/2	35.6 (16)	2011	(914)		
M-0340*	34	1	6GE-34Y	2 37000	31.5	25.5	22.6	17.8	15.5	11.6	9.9	8.4	84.6	127.4	42.3	63.9	33.3	50.4	59.4	10.7	2 1/2	41.8 (19)	2073	(942)	B	
M-0440*	44	1	6FE-44Y	2 37000	36.7	29.8	26.4	20.9	18.3	13.7	11.9	10.1	97.4	143.4	48.7	71.9	39.1	57.7	69.4	10.7	2 1/2	48.8 (22)	2127	(967)		

\* Models with 900mm EC Fan as standard (for 575V a VFD is used).

\*\* See Capacity Correction Factors on PG 5

Compressor RLA: Rated Load Amperage (RLA) estimated to the full load of the compressor RLA = Maximum Continuous Current (MCC) / 1.56  
Compressor MCC: Maximum Continuous Current (MCC) of the compressor(s)MCA: Minimum Circuit Amperage (MCA) = RLA of the largest compressor X 1.25 + SUM RLA other compressor(s) + Total FLA Fans + Control panel load  
FLA Fan: Full Load Amperage (FLA) of the fans

Performance based on Bitzer Ecoline compressor

CAPACITY IN ACCORDANCE TO AHRI STANDARD 550/590.

## TECHNICAL DATA - APPLICATION / LEAVING FLUID TEMPERATURE RANGE

## SEMI-HERMETIC COMPRESSOR

R-404a

M: MEDIUM/LOW TEMPERATURE: +41°F (+4.9°C) TO +17°F (-27.4°C)

MODEL		COMPRESSOR		FAN	CAPACITIES IN TR @ 95°F AMBIENT R-404A**							ELECTRICAL DATA 60HZ						MECHANICAL DATA						FRAME TYPE			
					WATER		LEAVING FLUID TEMPERATURE GLYCOL					230 VOLT			460 VOLT			575 VOLT <sup>†</sup>			CENTRIFUGAL PUMP		REFRIGERANT CHARGE		APROX WEIGHT.		
SIZE		BITZER		QTY	41°F	29°F	23°F	11°F	6°F	-5°F	-11°F	-17°F	RLA COMP.	SYSTEM MCA	RLA COMP.	SYSTEM MCA	RLA COMP.	SYSTEM MCA	FLOW	GPM	M3H	In/Out in.	LB	(KG)	LB	(KG)	
UNIT	HP	QTY	MODEL	CFM	4.9°C	-1.6°C	-5.0°C	-11.5°C	-14.6°C	-20.8°C	-23.9°C	-27.4°C															
M-0150	15	1	4JE-15Y	2	19000	17.6	14.4	12.8	10.1	9.0	7.1	6.3	5.2	50.0	73.1	25.0	36.7	20.0	28.8	32.4	7.4	2	23.0	(10)	1,877	(853)	A
M-0180	18	1	4HE-18Y	2	19000	20.1	16.8	14.7	11.7	10.5	8.3	7.3	6.4	54.1	78.2	27.1	39.3	21.7	30.9	37.9	8.6	2	26.3	(12)	1,902	(865)	
M-0230	23	1	4GE-23Y	2	22750	23.2	19.0	17.0	13.4	12.1	9.6	8.5	7.5	57.7	86.5	28.8	43.4	23.1	34.6	43.0	9.8	2	30.5	(14)	1,949	(886)	
M-0250	25	1	6JE-25Y	2	22750	25.1	20.7	18.5	14.6	15.5	10.3	9.1	8.0	71.0	103.2	35.5	51.8	28.4	43.1	46.8	10.6	2	33.1	(15)	2,009	(913)	
M-0270	28	1	4FE-28Y	2	26500	26.9	22.2	19.9	15.9	14.3	11.5	10.2	9.0	76.9	114.3	38.5	57.5	30.8	46.1	50.2	11.4	2	35.6	(16)	1,982	(901)	
M-0280	28	1	6HE-28Y	2	26500	28.8	23.6	21.3	16.8	15.0	11.9	10.5	9.3	77.6	115.2	38.8	57.9	31.0	46.4	53.4	11.4	2	38.2	(17)	2,011	(914)	
M-0340*	34	1	6GE-34Y	2	37000	32.2	26.5	24.1	19.3	17.8	14.1	12.5	11.1	84.6	127.4	42.3	63.9	33.3	50.4	59.8	11.4	2	43.1	(20)	2,073	(942)	
M-0440*	44	1	6FE-44Y	2	37000	39.0	32.5	29.2	23.4	21.1	16.8	14.9	13.1	97.4	143.4	48.7	71.9	39.1	57.7	73.4	11.4	2½	52.3	(24)	2,127	(967)	B

\* Models with 900mm EC Fan as Standard (for 575V a VFD is used).

\*\* See Capacity Correction Factors on PG.5

Compressor RLA: Rated Load Amperage (RLA) estimated to the full load of the compressor RLA = Maximum Continuous Current (MCC) / 1.56  
Compressor MCC: Maximum Continuous Current (MCC) of the compressor(s)MCA: Minimum Circuit Amperage (MCA) = RLA of the largest compressor X 1.25 + SUM RLA other compressor(s) + Total FLA Fans + Control panel load  
FLA Fan: Full Load Amperage (FLA) of the fans

## CAPACITY CORRECTION FACTORS

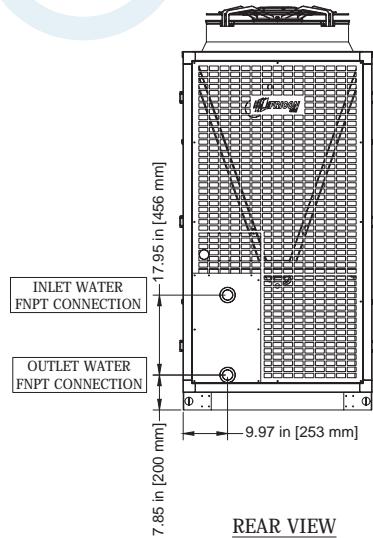
Ambient Temperature in °F	60	65	70	75	80	85	90	95	100	105	110	115	120	125
Capacity Factor R-404A & R-507A	1.32	1.28	1.23	1.19	1.15	1.10	1.05	1.00	0.95	0.90	0.85	0.81	0.76	0.72
Capacity Factor R-407A & R-407C	1.29	1.25	1.21	1.17	1.12	1.08	1.04	1.00	0.97	0.92	0.87	0.83	0.79	0.75

HAOP (High Ambient Operation Package) required for operation above +110°

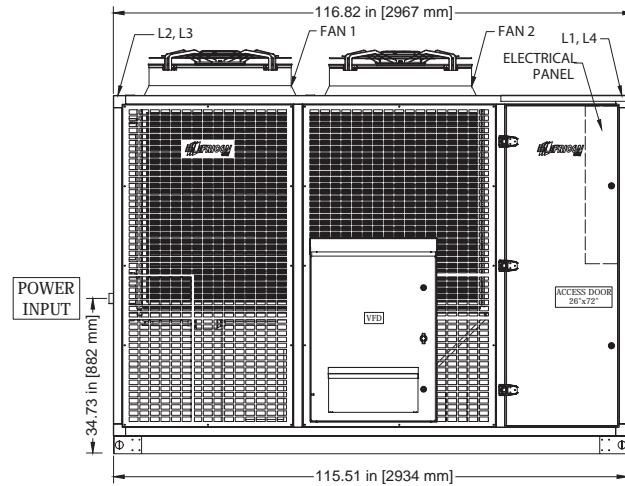
† Multiply capacity by .83 when used with 50 Hz power.

All capacities are calculated at 20°F return gas temperature and dew point values

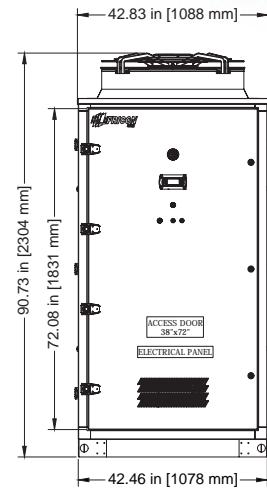
## FRAME TYPE / DRAWINGS REFERENCE

A) Single semi-hermetic compressor, 800mm AC type fans

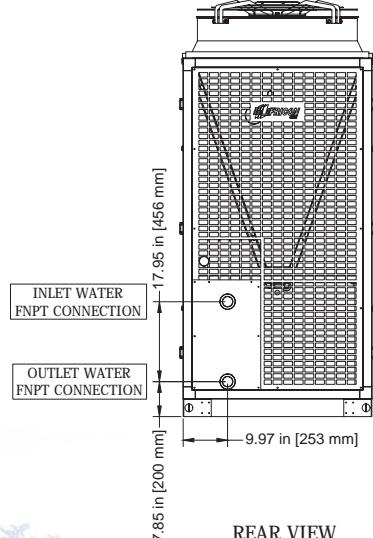
REAR VIEW



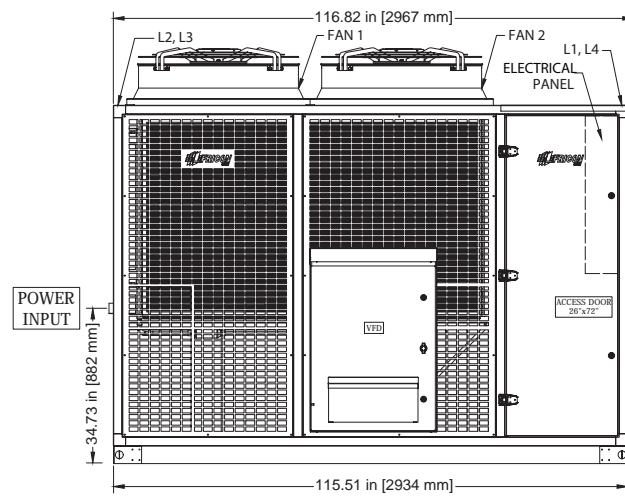
RIGHT SIDE VIEW



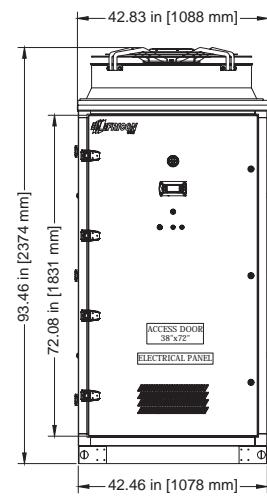
FRONT VIEW

B) Single semi-hermetic compressor, 900mm EC type fans

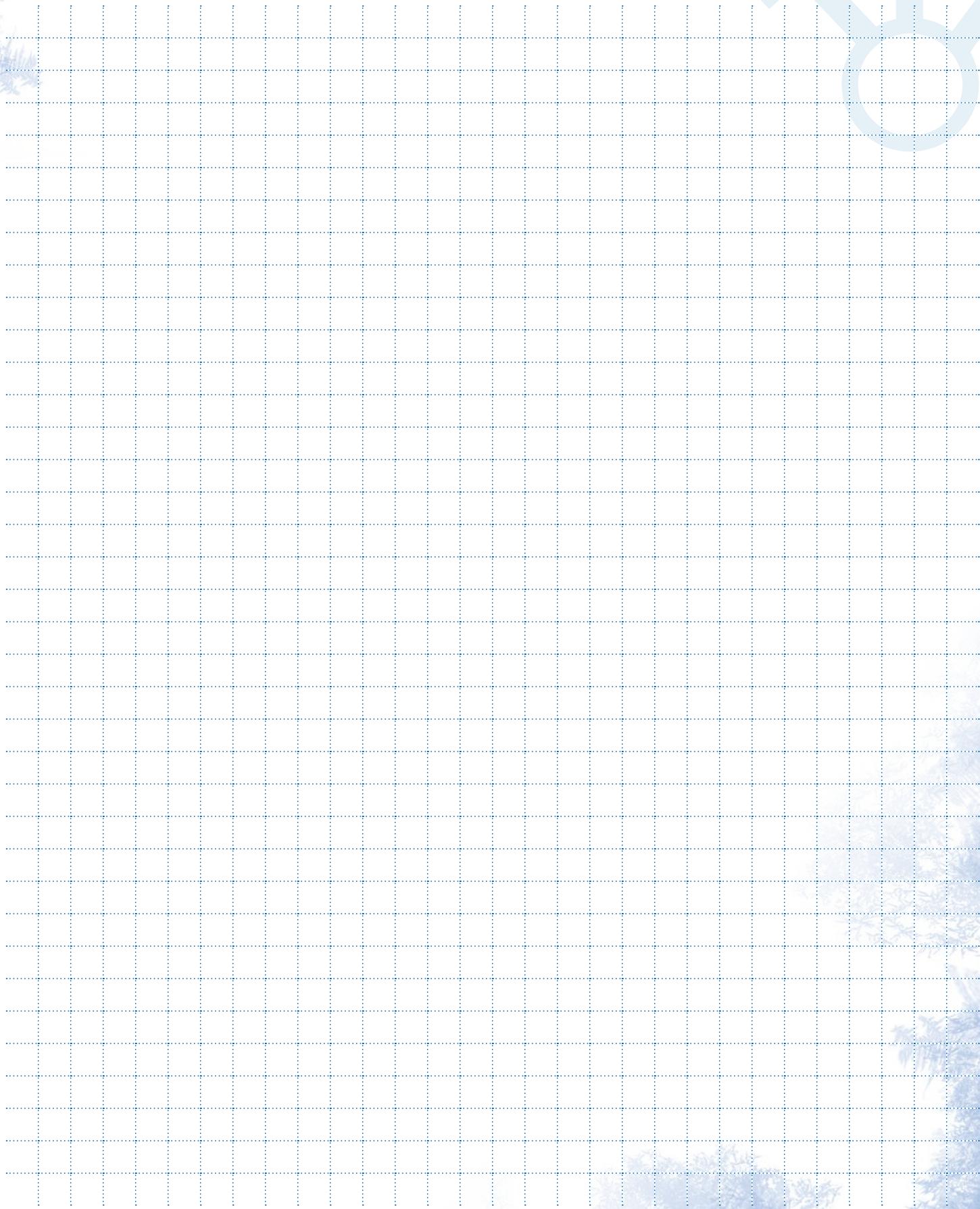
REAR VIEW



RIGHT SIDE VIEW



FRONT VIEW



## FRICONUSA AIR COOLED CHILLERS FOR PROCESSES

PROCESS COOLING LINE

