Carrier

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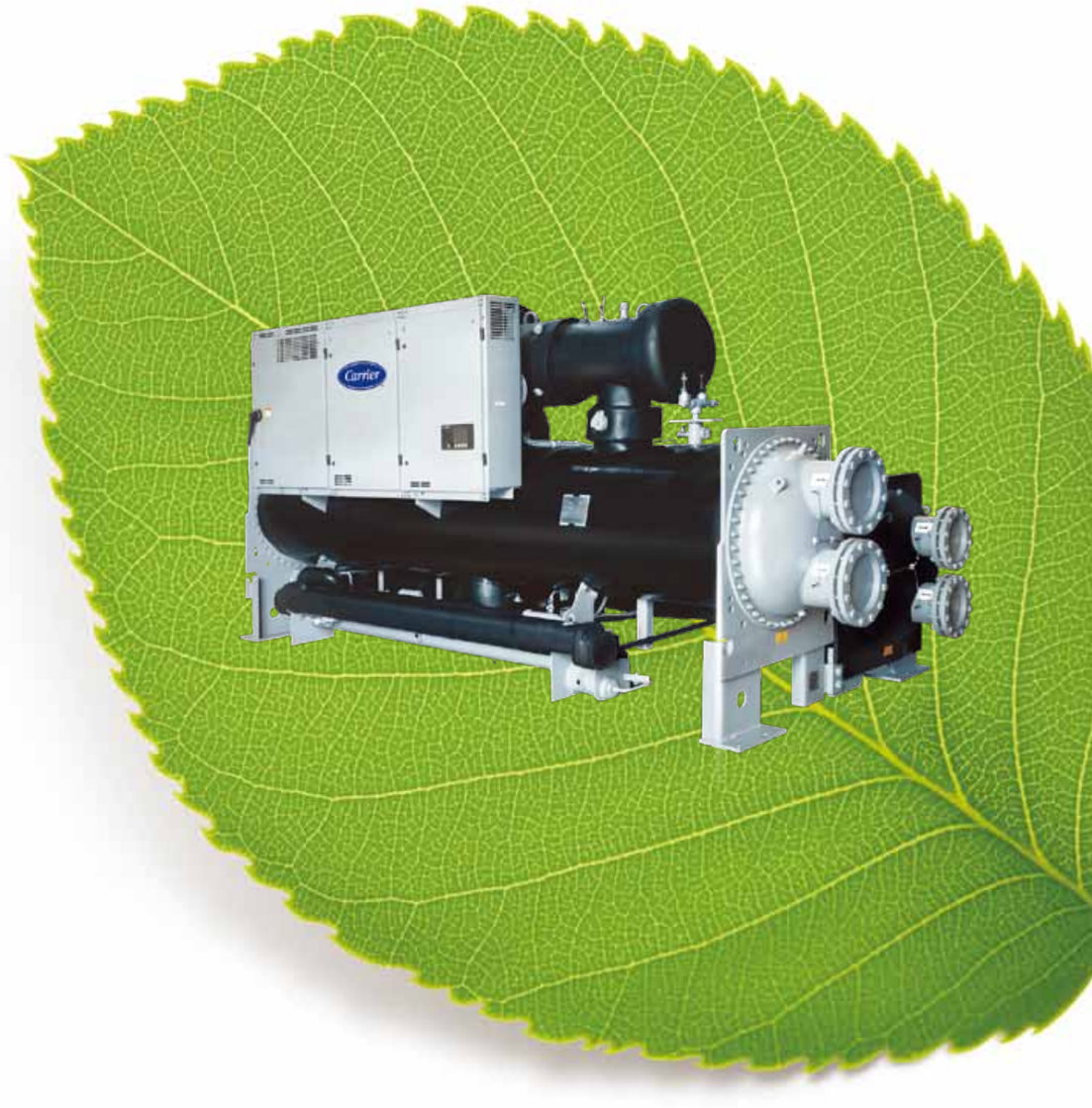


improve buildings™

Carrier improves the world around us; Carrier improves people's lives; our products and services improve building performance; our culture of improvement will not allow us to rest when it comes to the environment.

23XRV

High-Efficiency Variable Speed Screw Chiller

Cooling Capacity: 879~2110kW

Carrier

United Technologies
Climate | Controls | Security

Version:	CAT_23XRV_E-1301_01
Supersede:	-
EFfective Date:	Jan, 2013

Model number nomenclature

S	S - Specia	
0	Compressor Option 0 –Full Load Optimized 1 –Part Load Optimized	
9	Voltage Code 3 – 380-3-60 4 – 416-3-60 5 – 460-3-60 9 – 380/415-3-50	
CC	Drive Code	Max Input Current* / Max Output Current*
	AA –LF2	440 amps / 442 amps
	BA –LF2	520 amps / 442 amps
	BB –LF2	520 amps / 520 amps
	CC–LF2	608 amps / 608 amps
V	Motor Code V X	
R	Compressor Code Q*** R	
N	Economizer Option E –With Economizer N –No Economizer	
42	Condenser Size** 30-32 35-37 40-42 45-47 50-52 55-57	
40	Cooler Size** 30-32 35-37 40-42	
↑ 23XRV	23XRV： High-Efficiency Variable Speed Screw Chiller	

*Maximum limits only. Additional application limits will reduce these ampacities.
**First number denotes frame size.
***Only type V motors are used with Q compressors.

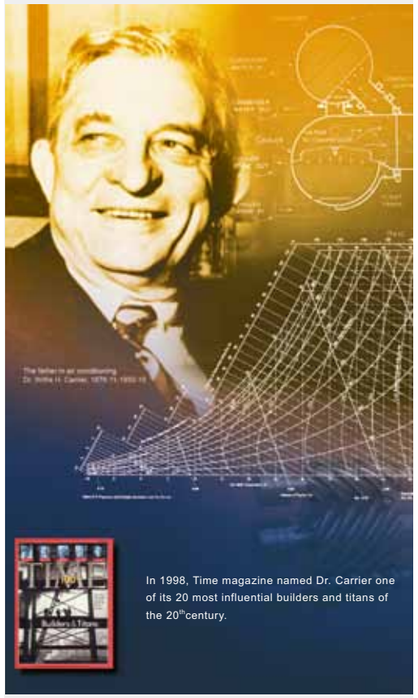
Cooling Capacity

879~2110kW

Carrier China

Carrier Corporation is a subsidiary of the United Technologies Corp. (UTC), which ranks the 150th in Fortune Top 500 in 2011 and has its operations in aerospace and building systems industries all over the world. From the time the founder Dr. Carrier invented the first system of modern air conditioning in 1902, Carrier has been the world leader in the air conditioning industry with its products and system solutions supplied to numerous famous buildings, and up to now, the network of distribution cover more than 170 countries all over the world. In 2011, Carrier ranked top in the HVAC industry field with its sales revenue of US $12 billion.

In China, there are 6 Carrier factories which have more than 2500 employees. As the world-class factory, Carrier has a number of technically advanced production lines, manufacturing commercial and residential chillers, compressors and air-side products. A wide range of products are able to meet diversified requirements of different customers. The global R&D center located in Shanghai has the capability of developing several major projects in the same time, with many advanced technical patents awarded to support Carrier stay most competitive in terms of technology advantage in the HVAC industry.



In 1998, Time magazine named Dr. Carrier one of its 20 most influential builders and titans of the 20th century.

Features

Carrier's Evergreen® 23XRV chiller is the world's first integrated variable speed, water-cooled, screw chiller. It incorporates significant breakthroughs in water-cooled chiller technology to provide excellent reliability and achieve superior efficiencies at true operating conditions all without compromising the environment.

The 23XRV chiller provides:

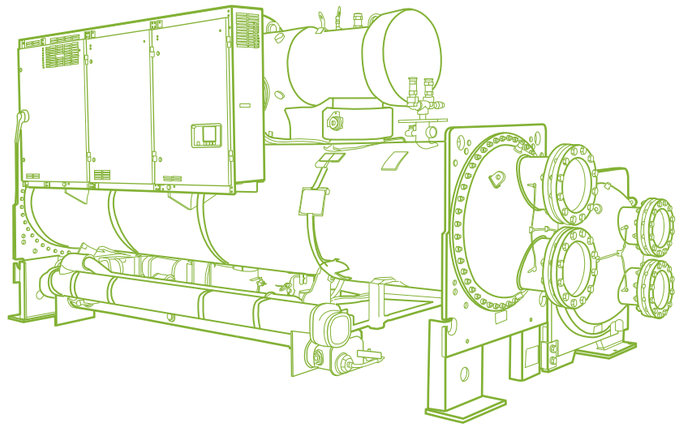
- High efficiency: variable speed, positive displacement screw compressor.
- High-performance: certified to 0.299 kW/ton AHRI IPLV.
- Environment-friendly: chlorine-free HFC-134a refrigerant.
- Low harmonic distortion: IEEE-519-compliant .
- Versatile: ideal solution for constant and variable flow pumping systems .

High Efficiency

- Next-generation technology: The 23XRV incorporates high-efficiency screw compressor technology with an innovative tri-rotor design.
- Energy efficiency: This refrigerant-cooled, variable frequency drive (VFD) chiller has the ability to reduce speed and optimize operation independent of ambient conditions. This unique capability permits the chiller to precisely match building load and conserve energy.
- High part-load performance: IPLV to 0.299 kW/ton(Air Conditioning, Heating, and Refrigerant Institute (AHRI) integrated part load value)
- High-performance tubing: Carrier's Evergreen chillers utilize advances in heat transfer technology, providing compact, high-efficiency heat exchangers. Tubing with advanced internally and externally enhanced geometry improves chiller performance by reducing overall resistance to heat transfer while reducing fouling.
- FLASC subcooler: Located in the bottom of the condenser, the Flash subcooler (FLASC) increases the refrigeration effect by cooling the condensed liquid refrigerant to a lower temperature, thereby reducing compressor power consumption.
- AccuMeter™ flow regulation: Regulating refrigerant flow according to load conditions, the AccuMeter system provides a liquid seal at all operating conditions and eliminates unintentional hot gas bypass.

Environmental Leader

- Sustainable long-term solution: The Evergreen 23XRV screw chiller epitomizes Carrier's long-held commitment to the environment and its dedication to innovation. The 23XRV offers customers a long-term, high-efficiency, chlorine-free chiller solution that will not be affected by refrigerant phase outs.
- Chlorine-free refrigerant: Carrier's decision to utilize non-ozone-depleting HFC-134a refrigerant lets customers select a safe and environmentally sound product without having to compromise on efficiency.



Reliability

- Advanced tri-rotor compressor: The tri-rotor compressor used in the 23XRV has been designed for extremely high reliability. It features balanced rotor geometry and shorter screw lengths, resulting in vastly reduced compressor bearing loads and a minimum L10 compressor bearing life in excess of 500,000 hours when operated at Air-Conditioning and Refrigeration Institute (ARI) standard conditions.
- Superior oil management: All Evergreen 23XRV chillers regulate oil temperature, viscosity and pressure. Rather than relying on differential system pressure to lubricate the compressor, the 23XRV uses a patented process to ensure that high-quality oil is delivered to the compressor bearings via a positive displacement pump. This allows continuous operation with cold condenser water at all loads. Should the input power to the chiller be lost, the system is designed to assure proper lubrication of the bearings during coast down.
- Refrigerant-cooled VFD: Refrigerant cooling of the variable frequency drive (VFD) minimizes VFD size and ensures proper cooling of the transistors for extended life. Using R-134a refrigerant instead of water also eliminates costly maintenance of the water cooling pump, heat exchanger, and rubber tubing used with water-cooled VFDs.
- Cooler tube expansion: The cooler tube is fitted with expansion values at center support sheets to prevent unwanted tube movement and vibration, thereby reducing the possibility of premature tube failure. The tube wall is thicker at the expansion location, and at support and end-tube sheets, in order to provide maximum strength and long tube life.
- Double-grooved end-tube sheet holes: The double-groove design provides a more robust seal than single rolled joints, reducing the possibility of leaks between the water and refrigerant sides of the chiller.

Advanced design

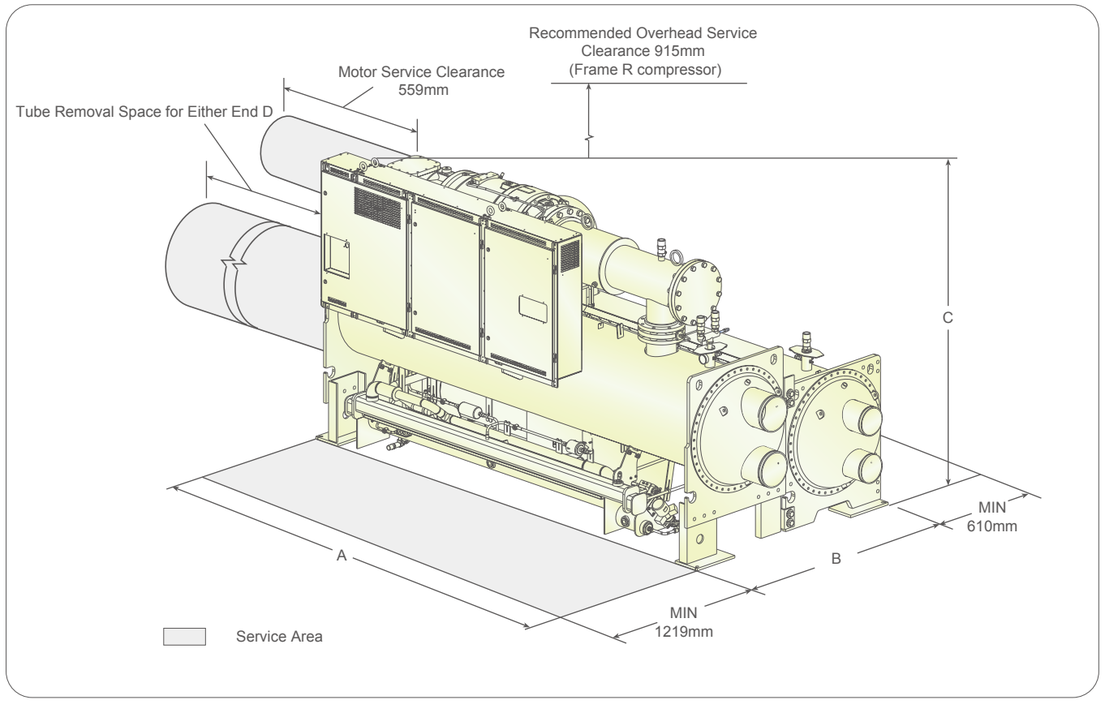
- Low harmonic distortion: The Evergreen 23XRV chiller generates less than 5% total harmonic distortion at the input to the variable frequency drive (VFD) without the use of any external filters or line reactors. This ensures that the VFD cannot exceed IEEE-519 standard for distortion at the point of common coupling. The integrated VFD provides a soft start, further reducing stress on the compressor and inrush current at start-up.
- Fully charged at shipment: 23XRV chillers can be shipped fully charged with refrigerant from the factory, minimizing the time required for start-up. Furthermore, an option for in-chiller refrigerant storage reduces maintenance time.
- Positive pressure design: The positive pressure design used in the 23XRV ensures that air, moisture and other performance-degrading contaminants are not sucked inside the chiller. This eliminates purge units and their associated maintenance.
- Product Integrated Control (PIC III): Carrier's direct digital electronic controls (PIC III) provide unmatched flexibility and functionality. Each unit integrates directly with the Carrier Comfort Network® (CCN) system, providing a solution to controls applications.

Selection Table

Model			23XRV3030 NQVAA90	23XRV3232 NQVAA90	23XRV4041 EQVAA90	23XRV4041 NRVAA90	23XRV4142 NRVAA90	23XRV4747 ERVBA90	23XRV5657 ERXCC90
Chiller	Cooling Capacity	kW	1055	1231	1407	1583	1758	1913	2110
		Tons	300	350	400	450	500	544	600
	Full Load COP	ikW/kW	0.168	0.161	0.158	0.162	0.167	0.163	0.163
	NPLV	ikW/kW	0.097	0.093	0.093	0.095	0.095	0.094	0.092
Motor	Input Power	kW	177	198	223	256	293	313	343
	RLA	A	269	299	337	387	443	472	520
	Inrush Amps	A	269	299	337	387	443	472	520
Condenser	Flow Rate	l/s	50.4	58.8	67.2	75.6	84	91.4	100.8
	Pressure Drop	kPa	86.4	64.8	63	77.9	78.1	87.3	77.4
	Water Connection	mm	DN200						
Cooler	Flow Rate	l/s	59.1	68.6	78.2	88.2	98.3	106.5	117.7
	Pressure Drop	kPa	88.8	64.3	49.9	62.3	64.2	82.1	58.1
	Water Connection	mm	DN200						DN250
Dimensionsr	Length	mm	4172	4172	4347	4347	4347	4867	4902
	Width	mm	1930	1930	2045	2045	2045	2127	2127
	Height	mm	2200	2200	2299	2299	2299	2305	2305
Weight	Rigging (W/Refrigerant)	kg	6953	7310	8404	8594	8759	9705	10791
	Operating	kg	7374	7864	9247	9437	9668	10731	12070
	Refrigerant	kg	295	295	408	340	340	460	649

Notes: 1. The above selection is based on entering/leaving chilled water temperature:12˚C/ 7˚C; entering/leaving cooled water temperature:30˚C/ 35˚C; cooler fouling factor: 0.0176m².K/kW; and condenser fouling factor: 0.044 m².K/kW.
2. Carrier will select specific models to match customer tonnage, and efficiency requirements. For details, please contact local agencies.
3. The above selection is based on voltage of 400V. For details, please contact local agencies.
4. Standard Water Pressure is 1.0MPa. Options for 1.6MPa and 2.0MPa are available.

Chiller Dimensions

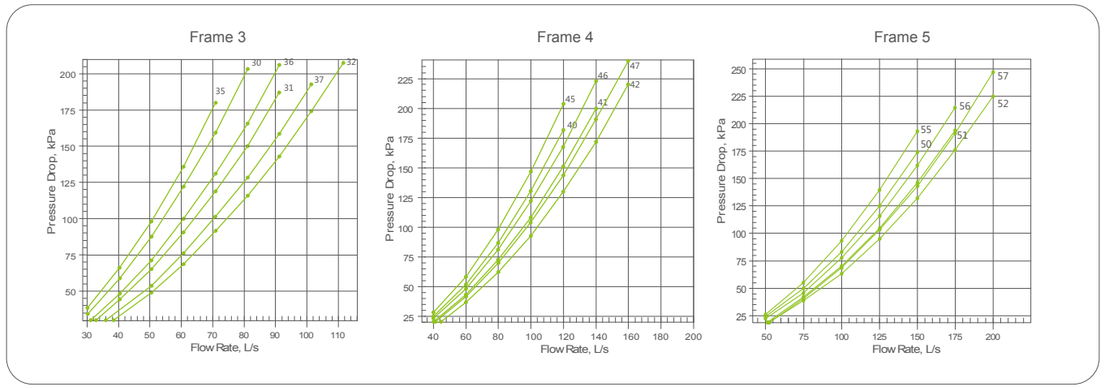


23XRV DIMENSIONS (NOZZLE-IN-HEAD WATERBOX)

Heat Exchanger	With Nozzle-in-Head Waterbox A(Length for 2 Pass)	B(Width)	C(Height)	D (Removal space for either side)
Size	mm	mm	mm	mm
30-32	4172	1930	2200	3848
35-37	4693	1930	2200	4369
40-42	4347	2045	2299	3848
45-47	4867	2045	2299	4369
50-52	4382	2127	2305	3848
55-57	4902	2127	2305	4369

Notes: 1. The above dimensions assume that both cooler and condenser nozzles are located on the same end of chiller.
2. Dimensions are approximate.
3. 'A' length and 'B' width dimensions shown are for standard 150 psig (1034 kPa) design and flange connections. The 300 psig (2068 kPa) design will add length. See certified drawings for details.
4. Standard connection is NIH. Marine waterbox is optional. See certified drawings for details.

Cooler Pressure Drop

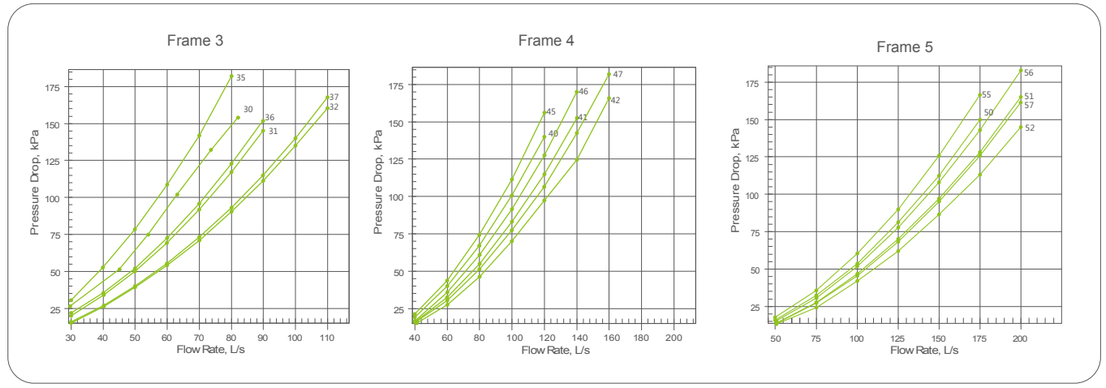


Cooler Min/Max Flow Rates

Cooler		1 Pass (L/S)		2 Pass (L/S)		3 Pass (L/S)	
		Min	Max	Min	Max	Min	Max
Frame 3	30	38	154	19	77	13	51
	31	46	185	23	92	15	62
	32	54	215	27	108	18	72
	35	38	154	19	77	13	51
	36	46	185	23	92	15	62
	37	54	215	27	108	18	72
Frame 4	40	62	249	31	125	21	83
	41	70	281	35	140	23	93
	42	77	307	38	154	26	112
	45	62	249	31	125	21	83
	46	70	281	35	140	23	93
	47	77	307	38	154	26	112
Frame 5	50	83	332	42	166	28	111
	51	93	374	47	187	31	125
	52	100	400	50	200	33	133
	55	83	332	42	166	28	111
	56	93	374	47	187	31	125
	57	100	400	50	200	33	133

Note: Flow rates based on standard tubes in the cooler and condenser. Minimum flow based on tube velocity of 3 ft/sec (0.91 m/sec);maximum flow based on tube velocity of 12 ft/sec (3.66 m/sec). Consult the factory if variable primary flow.

Condenser Pressure Drop



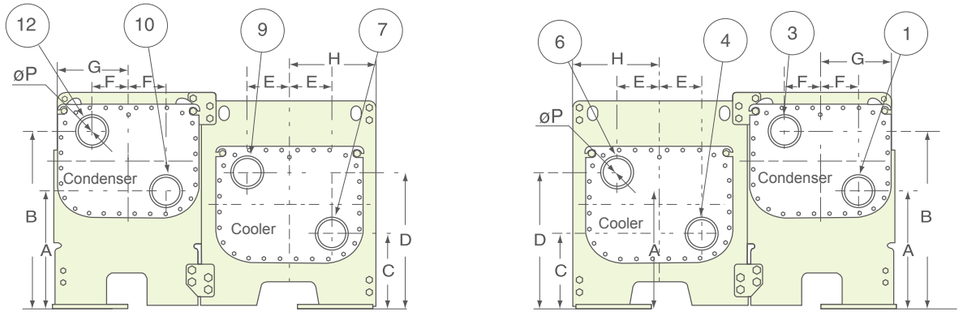
Condenser Min/Max Flow Rates

Condenser		1 Pass (L/S)		2 Pass (L/S)		3 Pass (L/S)	
		Min	Max	Min	Max	Min	Max
Frame 3	30	41	163	20	81	14	54
	31	50	199	25	100	17	67
	32	59	235	29	118	20	79
	35	41	163	20	81	14	54
	36	50	199	25	100	17	67
	37	59	235	29	118	20	79
Frame 4	40	69	277	35	138	23	92
	41	78	312	39	156	26	104
	42	86	346	43	173	29	115
	45	69	277	35	138	23	92
	46	78	312	39	156	26	104
	47	86	346	43	173	29	115
Frame 5	50	95	380	48	190	32	127
	51	104	416	52	208	35	138
	52	112	450	56	225	37	150
	55	95	380	48	190	32	127
	56	104	416	52	208	35	138
	57	112	450	56	225	37	150

Note: Flow rates based on standard tubes in the cooler and condenser. Minimum flow based on tube velocity of 3 ft/sec (0.91 m/sec);maximum flow based on tube velocity of 12 ft/sec (3.66 m/sec). Consult the factory if variable primary flow.

Nozzle Dimensions

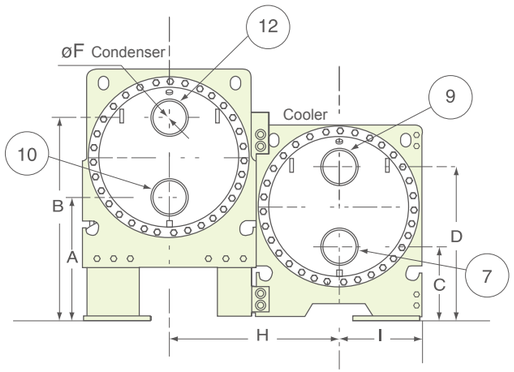
NOZZLE-IN-HEAD WATERBOXES



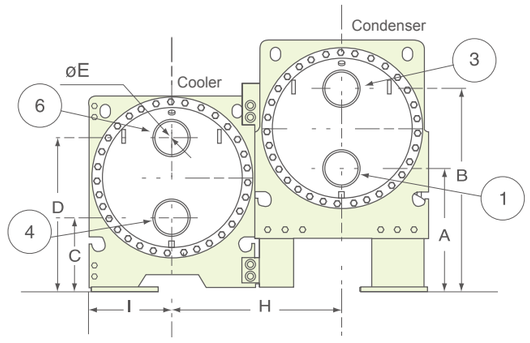
Discharge End

Frame 3

Suction End



Discharge End



Frame 4 and 5

Suction End

Discharge End (Type A)
Arrangement Code C: 7 in and 9 out
Arrangement Code R: 10 in and 12 out

Suction End (Type B)
Arrangement Code D: 4 in and 6 out
Arrangement Code S: 1 in and 3 out

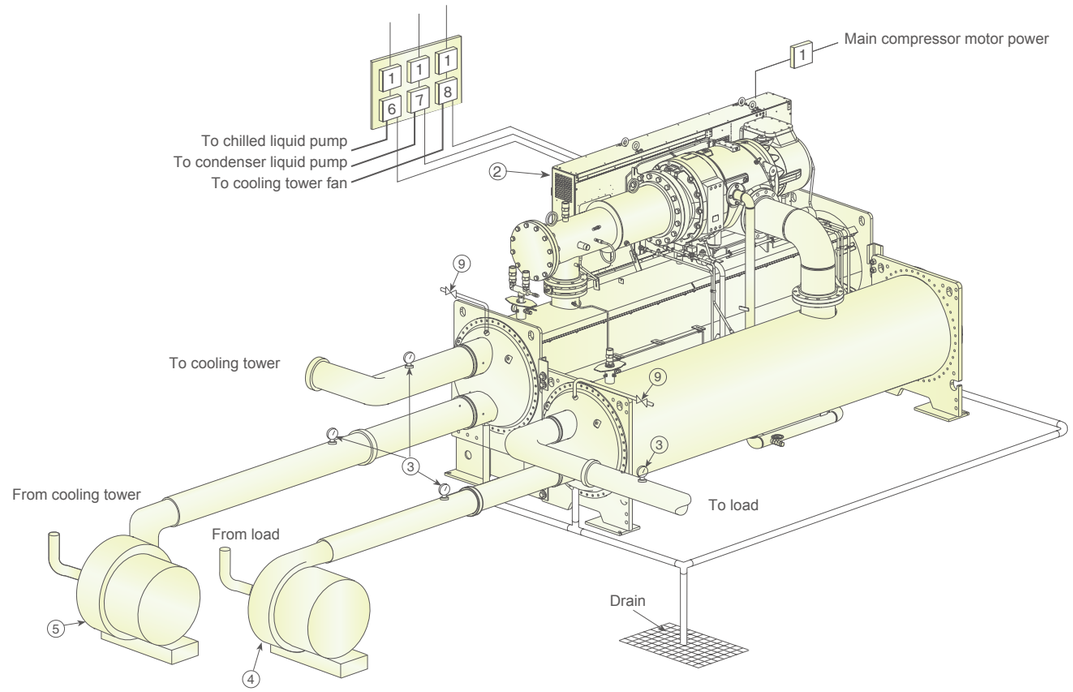
(mm)

Heat Exchanger Size		A	B	C	D	E	F	G	H	ØP
Frame 3	30~32 35~37	787	1048	562	832	213	152	381	454	DN200

Heat Exchanger Size		A	B	C	D	ØE	ØF	H	I
Frame 4	40~42 45~47	778	1146	651	1019	DN200	DN200	940	464
Frame 5	50~52 55~57	737	1168	483	851	DN200	DN250	997	489

Notes: 1. The above dimensions are based on standard 150 psig (1034 kPa) design. Dimensions will vary when the waterside pressure increases.
2. The suction end is on the left side of the chiller, facing the VFD, and the discharge end is on the right.
3. The above type A and type B are based on 2 Pass design. For 1 or 3 pass design, please contact local agencies.

Typical Piping and Wiring



Legend:
1 - Disconnect 2 - Unit-Mounted VFD/Control Center 3 - Pressure Gages
4 - Chilled Liquid Pump 5 - Condenser Liquid Pump 6 - Chilled Liquid Pump Starter
7 - Condenser Liquid Pump Starter 8 - Cooling Tower Fan Starter 9 - Vents

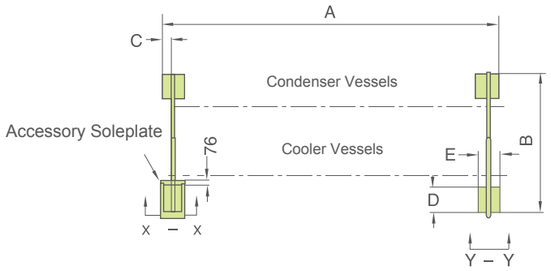
Notes:1. Wiring and piping shown are for general point-of-connection only and are not intended to show details for a specific installation. Certified field wiring and dimensional diagrams are available on request.
2. All wiring must comply with applicable codes.
3. Wiring not shown for optional devices such as:
· Remote start/stop · Remote alarms · 4 to 20 mA resets · Optional safety device
· Optional remote sensors · kW output · Head pressure reference
4. Flow switches are NOT required.

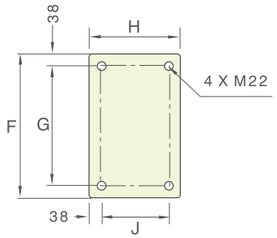
Piping
Control Wiring
Power Wiring

1. Electrical contractor shall supply and install main electrical power line, disconnect switches, circuit breakers, and electrical protection devices per local code requirements and as indicated necessary by the chiller manufacturer.
2. Electrical contractor shall wire the chilled water pump and flow, condenser water pump and flow, and tower fan control circuit to the chiller control circuit.
3. Electrical contractor shall supply and install electrical wiring and devices required to interface the chiller controls with the building control system if applicable.
4. Electrical power shall be supplied to the unit at the voltage, phase, and frequency listed in the equipment schedule.
5. Mechanical contractor shall supply and install pressure gages and thermometers in the entering and leaving water lines of the cooler and condenser. Scale range shall be such that design values shall be indicated at approximately midscale.
6. Mechanical contractor shall supply and install the filters in the chilled and cooling water piping system

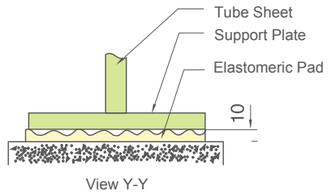
Isolation

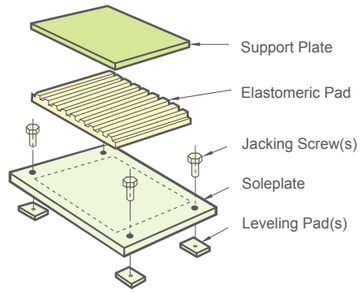
23XRV Machine Footprint



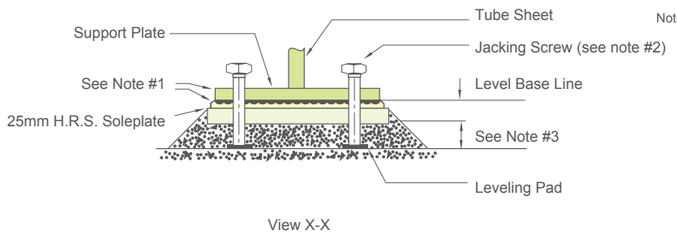


Standard Isolation(Isolation with isolation package only)





Typical Isolation



Notes:
1. Accessory soleplate package includes 4 soleplates, 16 jacking screws and leveling pads. Requires isolation package.
2. Jacking screws to be removed after grout has set.
3. Thickness of grout will vary, depending on the amount necessary to level chiller.
4. Service clearance under the chiller is enhanced if leveling pads are not extended along the entire length of the heat exchangers.

(mm)

Heat Exchanger Size		A	B	C	D	E	F	G	H	J
Frame 3	30~32	3931	1632	92	387	229	540	464	254	178
	35~37	4451	1632	92	387	229	540	464	254	178
Frame 4	40~42	3931	1829	92	387	229	540	464	254	178
	45~47	4451	1829	92	387	229	540	464	254	178
Frame 5	50~52	3931	1969	92	387	229	540	464	254	178
	55~57	4451	1969	92	387	229	540	464	254	178

Microprocessor Controls

Microprocessor controls provide the safety, interlock, capacity control, indications, and accessibility necessary to operate the chiller in a safe and efficient manner.
Carrier controls also ensure proper starting, stopping, and recycling of the chiller and provide a communication link to the Carrier Comfort Network® (CCN) system.
The microprocessor control on each Carrier chiller is factory-mounted, factory-wired, and factory-tested to ensure machine protection and efficient capacity control.

Control system

- Component test and diagnostic check
- Programmable recycle allows chiller to recycle at optimum loads for decreased operating costs
- Menu-driven keypad interface for status display, set point control, and system configuration
- CCN system compatible
- Primary and secondary status messages
- Individual start/stop schedules for local and CCN operation modes
- Recall of up to 25 alarm messages and 25 alert messages with diagnostic help
- Two chiller lead/lag with third chiller standby is standard in the PIC III software
- Optional soft stop unloading decreases compressor speed to unload the motor to the configured amperage level prior to stopping
- Languages pre-programmed at factory for English, Chinese, Japanese, Korean
- ILT (International Language Translator) available for conversion of extended ASCII characters

Capacity control

- Leaving chilled liquid control
- Entering chilled liquid control
- Soft loading control by temperature or load ramping
- Hot gas bypass valve (optional)
- Power (demand) limiter
- Automatic chilled liquid reset (3 methods)
- Manual speed control

Interlocks

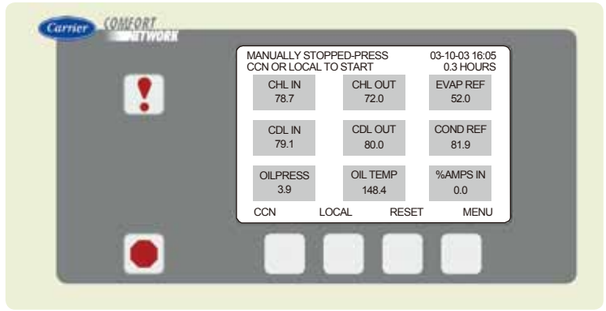
- Manual/automatic remote start
- Starting/stopping sequence
  Pre-lube/post-lube
  Pre-flow/post-flow
- Compressor run interlock
- Pre-start check of safeties and alerts
- Low chilled liquid (load) recycle
- Monitor/number compressor starts and run hours
- Manual reset of safeties

Safety cutouts

- Motor high temperature*†
- Refrigerant (condenser) high pressure*†
- Refrigerant (cooler) low temperature*†
- Lube oil low pressure*
- Compressor (refrigerant) high discharge temperature*
- Under voltage**
- Over voltage**
- Cooler and condenser liquid flow
- Motor overload†
- Motor acceleration time
- Intermittent power loss**
- Motor stall protection
- Low level ground fault
- Cooler and condenser freeze prevention*
- Low oil temperature
- Line voltage imbalance**
- Line current imbalance**
- Line frequency
- Motor current imbalance
- Motor rotation reversal
- Excessive motor amps
- Motor starts limit
- VFD speed out of range
- High VFD rectifier temperature*†
- High VFD inverter temperature*†
- DC bus voltage (Low/High)

Indications

- Chiller operating status message
- Power-on
- Pre-start diagnostic check
- Compressor motor amps
- Alert (pre-alarm)††
- Alarm
- Contact for remote alarm
- Safety shutdown messages
- Elapsed time (hours of operation)
- Chiller input kW
- Demand kW



✻ Can be configured by the user to provide alert indication at user-defined limit.

† Override protection: Causes compressor to first unload and then, if necessary, shut down.

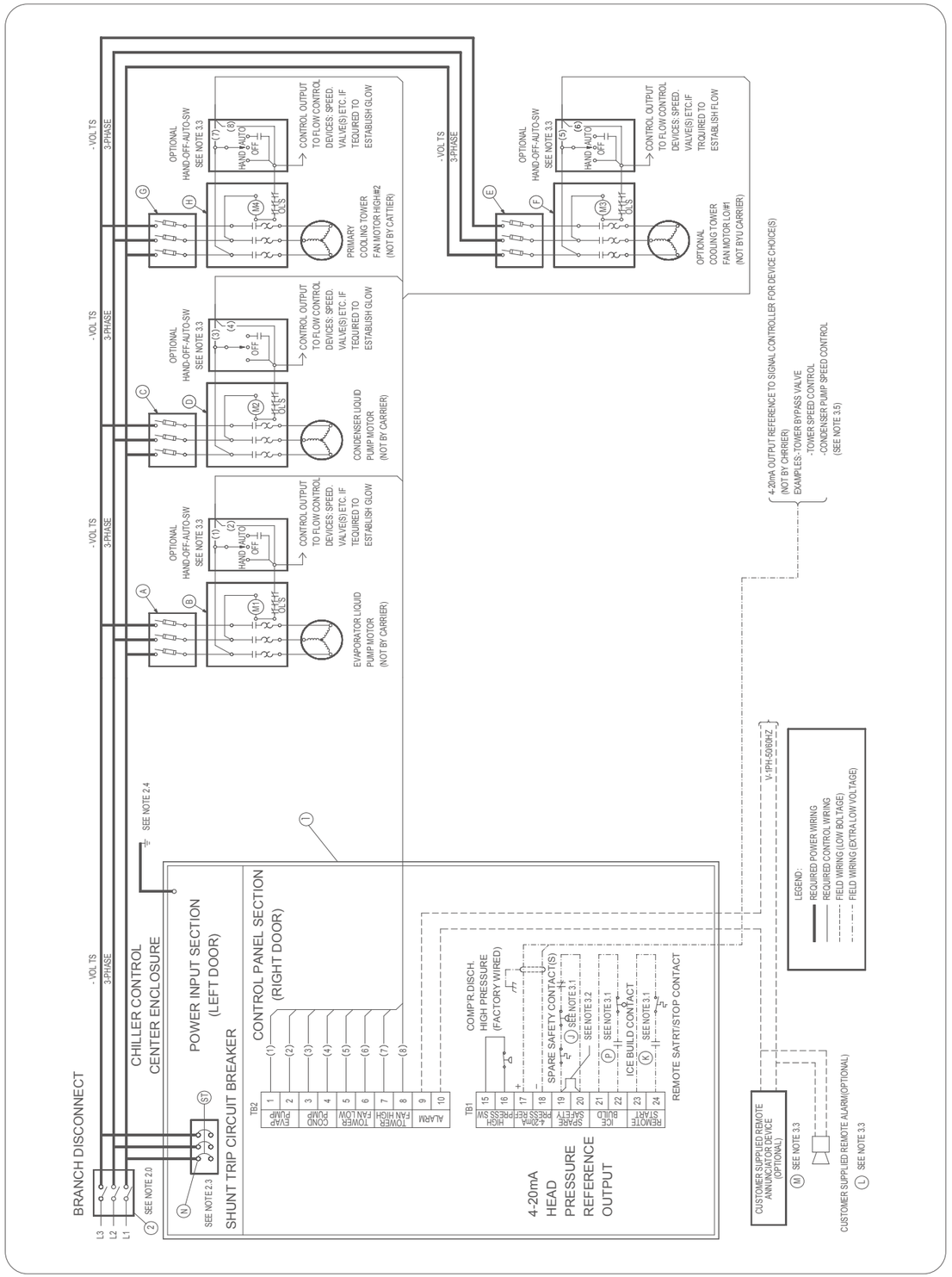
✻ ✻ Will not require manual reset or cause an alarm if autorestart after power failure is enabled.

† † By display code only.

Typical Field Wiring Schematic

Item		Description
1		Unit Mounted VFD with shunt trip circuit breaker (65K Amps interrupt/short circuit)
		Unit Mounted VFD with shunt trip circuit breaker (100K Amps interrupt/short circuit)
		Includes:
		(1) N.O. Chiller water pump contant output
		(1) N.O. Condenser water pump contant output
		(1) N.O. Tower fan low / #1 contact output
		(1) N.O. Tower fan high / #2 contact output
		(1) N.O. Alarm contact output
		(1) 4-20mA head pressure reference output
		(1) N.C. Spare safety (dry) contact input
		(1) N.O. Remote start (dry) contact input
		(1) N.O. Ice build (dry) contact input
	Protection	3 Phase under/over voltage protection (line side)
		Phase loss/imbalance/reversal protection (line side)
		Frequency shift protection (line side)
		Over current protection (line and load side)
		Phase to ground fault protection (line and load side)
	Metering	3 Phase Amps (chiller display line and load side)
		3 Phase Volts (chiller display line side)
		4 -20mA KW transducer output (line side) from chiller control module (CCM)
		KW hours/demand kW (chiller display line side)
		KW Metering (chiller display line and load side)
	Ancillary	Control power transformer (3kVA)
		Control and oil heater disconnect
		3 Phase analog Volts/Amps meter package (option)
		CE-Marking (option)
2		System feeder (short circuit, ground fault&protection)
A		Evaporator liquid pump starter disconnect
B		Evaporator liquid pump motor starter
C		Condenser liquid pump starter disconnect
D		Condenser liquid pump motor starter
E		Cooling tower fan starter disconnect (low fan/ #1)
F		Cooling tower fan starter (low fan/ #1)
G		Cooling tower fan starter disconnect (high fan/ #1)
H		Cooling tower fan starter (high fan/ #1)
J		Spare safety devices [N.C] See Note 3.1
K		Remote start/stop device [N.C] See Note 3.1
L		Remote alarm See Note 3.3
M		Remote annunciator See Note 3.3
N		Line side lug adapters See Note 2.3
P		Ice build start/terminate device See Note 3.1

Typical Field Wiring Schematic



Notes for Typical Field Wiring Schematic

1 GENERAL

1.0 Variable frequency drive (VFD) shall be designed and manufactured in accordance with Carrier engineering requirements.

1.1 All field-supplied conductors and devices and the field installation wiring and termination of conductors and devices must be in compliance with all applicable codes and job specifications.

1.2 The routing of field-installed conduit and conductors, and the location of field-installed devices, must not interfere with equipment access or the reading, adjusting, or servicing of any component.

1.3 Equipment installation, and all starting and control devices, must comply with details in equipment submittal drawings and literature.

1.4 Contacts and switches are shown in the position they would assume with the circuit de-energized and the chiller shutdown.

> ⚠ WARNING
>
> Do not use aluminum conductors. Contractor/installer assumes all liability resulting from the use of aluminum conductors within the VFD enclosure.

2 Power wiring to VFD

2.0 Provide a means of disconnecting branch feeder power to VFD. Provide short circuit protection and interrupt capacity for branch feeder in compliance with all applicable codes.

2.1 If metal conduit is used for the power wires, the last 1.2 meter or greater should be flexible to avoid transmitting unit vibration into the power lines and to aid in serviceability.

2.2 Line side power conductor rating must meet VFD nameplate voltage and chiller minimum circuit ampacity.

2.3 Lug adapters may be required if installation conditions dictate that conductors be sized beyond the minimum ampacity required. Circuit breaker lugs will accommodate the quantity and size cables (per phase) as shown in table of Lug Capacity.

2.4 Compressor motor and controls must be grounded by using equipment grounding lug provided inside unit mounted VFD enclosure.

3 Control wiring

3.0 Field-supplied control conductors to be at least 18 AWG or larger.

3.1 Ice build start/terminate device contacts, remote start/stop device contacts, and spare safety device contacts, (devices not supplied by Carrier), must have 24 VAC rating. Max current is 60 mA; nominal current is 10 mA. Switches with gold-plated bifurcated contacts are recommended.

3.2 Remove jumper wire between TB1-19 and TB1-20 before connecting auxiliary safeties between these terminals.

3.3 Each integrated contact output can control loads (VA) for evaporator pump, condenser pump, tower fan low, tower fan high, and alarm annunciator devices rated 5 amps at 115 VAC and up to 3 amps at 277 VAC.

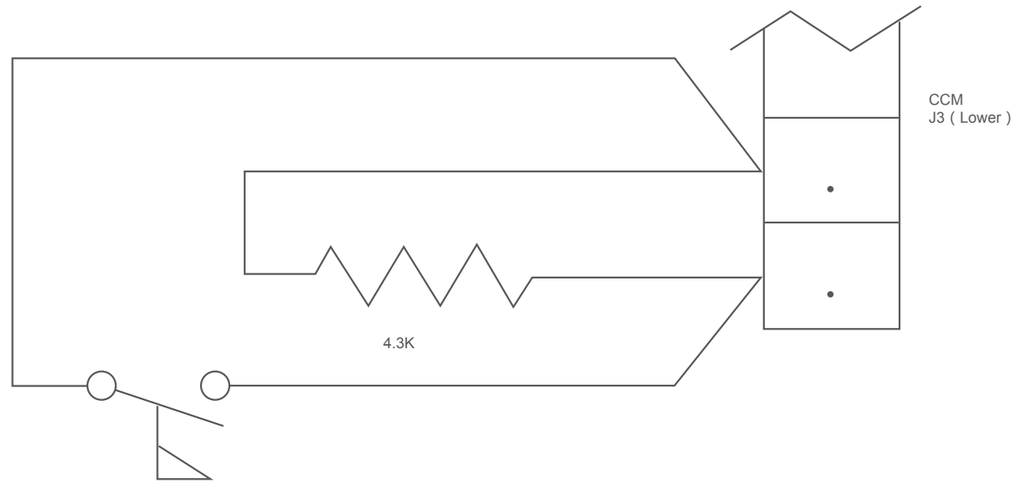
> ⚠ WARNING
>
> Control wiring required for Carrier to start pumps and tower fan motors and establish flows must be provided to assure machine protection. If primary pump, tower fan and flow control is by other means, also provide a parallel means for control by Carrier. Failure to do so could result in machine freeze-up or over-pressure.

Do not use control transformers in the control center as the power source for external or field-supplied contactor coils, actuator motors, or any other loads.

3.4 Do not route control wiring carrying 30 V or less within a conduit or tray which has wires carrying 50 V or higher or alongside wires carrying 50 V or higher.

3.5 Spare 4-20 mA output signal is designed for controllers with a non-grounded 4-20 mA input signal and a maximum input impedance of 500 ohms.

3.6 Flow devices to confirm evaporator or condenser pump flow are not required. However; if flow devices are used, wire as shown on drawing 23XRC1-1 (J3 lower). Remove jumper installed at these terminals and wire in a 4.3 K resistor in its place.



The flow device and resistor must be installed in parallel at these terminals such that the resistor provides a signal when the flow device is open.

Lug Capacity

VFD Max. Input Amps	Standard 65K AIC lug capacity (per phase)		OPTIONAL 100K AIC lug capacity (per phase)	
	No. Conductors	Conductor Range	No. Conductors	Conductor Range
225A	3	3/0－500MCM	2	3/0－50MCM
338A	3	3/0－500MCM	2	400－500MCM
440A	3	3/0－500MCM	2	400－500MCM
520A	3	3/0－500MCM	3	3/0－400MCM
608A	3	3/0－500MCM	3	3/0－400MCM

Note: If larger lugs are required, they can be purchased from the manufacturer of the circuit breaker (Cutler-Hammer or Square D).