PROTEUS

Water Cooled Scroll Chillers

WCS 50/60Hz

Cooling Capacity: 12 to 62 TR (42 to 218 kW)

R407C

ASHRAE 90.1 COMPLIANT

DUNHAM-BUSH®

Products that perform...By people who care

INTRODUCTION

For more than 100 years, Dunham-Bush has focused on innovative product development. Today, we provide a full portfolio of HVAC/R products from Fan Coil Units to large centrifugal chillers as well as many other innovative green solutions. Our commitment to innovation, matched with an aggressive attitude toward growth, makes Dunham-Bush a leader in global markets. Our product development is tailored to meet the specific needs of customers. No other HVAC/R manufacturer takes this approach to meeting your performance expectations.

PROTEUS series, WCS Water Cooled Scroll Chillers, have a cooling capacity range from 12 to 62 TR [42 to 218 kW] version using environmentally sound HFC-407C refrigerant. The entire product line features energy efficiency, installation ease, control flexibility, high reliability, compact footprint and advanced controls.

Scroll Compressors are designed for Commercial/Industrial Applications and provide the same high quality and efficiency as Reciprocating or Screw Compressors. They have been developed specifically for use in Packaged Chillers and Condensing Unit products.

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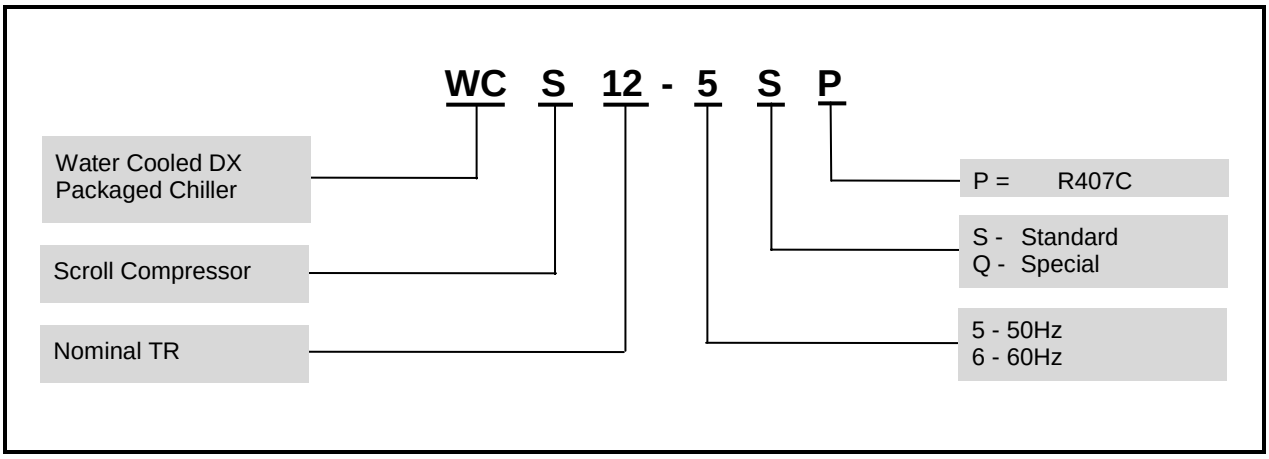
NOMENCLATURE



STANDARD FEATURES

Size Range

- Standard version available.
- Rated with R407C. Consult factory for use of other HFC refrigerants.

Compressor

- Scroll hermetic type operating at 2950 RPM (50Hz); 3550 RPM (60Hz)
- High EER, low sound power level and high reliability.
- Controlled orbit with floating seals and advanced scroll geometry.
- No-contact scroll design and 100% motor cooled by suction gas.
- Thermostat fitted to prevent thermal overload.
- Capability of 50% tandem unloading.

Evaporator

- Vessels constructed in accordance to ASME CODES Sections Vlll Division I for unfired pressure vessels.
- Dunham-Bush high efficiency inner-fin tubes design for compactness and weight reduction.
- 250psig [17bar] on refrigerant side design pressure.
- 150psig [10bar] on water side design pressure.
- Approval Stamp available from JKKP (Malaysia), UDT (Poland), BPA, China State Bureau of Quality and Technical Supervision of the People's Republic of China and ASME.
- 1"[25mm] thick PE foam closed cell insulation.

Condenser

- Vessels constructed in accordance to ASME CODES Sections Vlll Division I for unfired pressure vessels.
- Removable heads and interchangeable end-for-end for job flexibility.
- 3/4"[19mm] OD seamless, extended surface copper tubes.
- 300psig [21bar] on refrigerant side design pressure.
- 150psig [10bar] on water side design pressure.
- Approval Stamp available from JKKP (Malaysia), UDT (Poland), BPA, China State Bureau of Quality and Technical Supervision of the People's Republic of China and ASME.

Electrical/Control

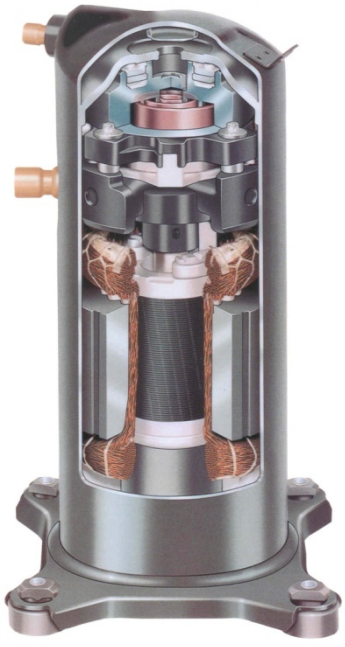
- Reliable microprocessor based controller with electromechanical system is standard for all models.
- Chilled water pump control.

OPERATING BENEFITS

FIGURE 1 : SCROLL COMPRESSOR

1. **DELIVERING THE HIGHEST EFFICIENCY**
   Scroll compressor gives efficiencies 10% higher than any competitive compressor on the market today – at the right conditions.

2. **DELIVERING THE QUIETEST OPERATION**
   Scroll technology gives you compressor operation that is many times quieter than other technologies.



3. **DELIVERING THE INDUSTRY'S BEST VALUE**
   Scroll compressor clearly delivers more system value because of its high efficiency, fewer required components, increased reliability and quieter operation.

4. **DELIVERING FOR THE FUTURE**
   Scroll compressor is by far the most advanced products in the industry today for air conditioning, refrigeration and heat pump applications.

OPERATING BENEFITS

FIGURE 2 : PRINCIPLE OF SCROLL COMPRESSION

The scroll is a simple compression concept first patented in 1905. A scroll is an involute spiral which, when matched with a mating scroll form as shown above, generates a series of crescent-shaped gas pockets between the two members. During compression, one scroll remains stationary (fixed-scroll) while the other form (orbiting scroll) is allowed to orbit (but not rotate) around the first form. As this motion occurs, the pockets between the two forms are slowly pushed to the center of the two scrolls while simultaneously being reduced in volume. When the pocket reaches the center of the scroll form, the gas, which is now at a high pressure, is discharged out of a port located at the center. During compression, several pockets are being compressed simultaneously, resulting in a very smooth process. Both the suction process (outer portion of the scroll members) and the discharge process (inner portion) are continuous.

Compression in the scroll is created by the interaction of an orbiting spiral and a stationary spiral. Gas enters the outer openings as one of the spirals orbits.

The open passages are sealed off as gas is drawn into the spiral.

As the spiral continues to orbit, the gas is compressed into two increasingly smaller pockets.

By the time the gas arrives at the center port, discharge pressure has been reached.

Actually, during operation, all six gas passages are in various stages of compression at all times, resulting in nearly continuous suction and discharge.

SYSTEM CONTROL

CAPACITY CONTROL

The standard system capacity control operates as follows:

- As the chiller load initially drops, the suction of the compressor(s) starts dropping proportionately, thus balancing minor load variations.
- Variation of unit capacity in response to system load requirements is controlled by an operating thermostat, which monitors the return water temperature.
- On multiple compressor units, capacity is controlled by compressor staging.

ELECTRICAL CONTROLS

MCCB/ MCB - Main Circuit Breaker

This is an automatic, calibrated, ambient compensated, magnetic trip circuit breaker, which provides both direct line-break compressor branch circuits. Short circuit locked rotor and overload protection. It has a manually operable handle for compressor circuit disconnect.

M - Contactor

The Contactor, operated by the control circuit, provides power individually to the compressors. Contactors are used in single across-the-line start. This device is amp rated to handle both rated load amp and locked rotor amps.

CR - Relays (Miscellaneous Control)

These relays provide the necessary circuit logic for lock-in, lock -out and control functions.

HTR - Crankcase Heater

Energized continuously as long as control circuit power disconnect switch (not supplied with the unit) is closed and compressor is off. This heater maintains crankcase temperature above the system temperature during the compressor off cycle, preventing refrigerant migration into the crankcase and consequent cause compressor damage.

SOL - Liquid Line Solenoid Valve

Closes when the compressor(s) is off to prevent any liquid refrigerant from accumulating in the chiller during the off cycle.

OL - Motor Overload (Manual Reset)

The compressors are protected by thermal overload relays. The overload relays are manually reset.

PCR or UVR -Phase Control Relay (Optional)

Protects the unit from the following electric supply malfunctions: Under voltage, phase reversal, phase loss and phase imbalance. If the PCR or UVR trips, a control relay will de-energize and open the control circuit. A red LED trip light, located on the PCR or UVR, will indicate a supply malfunction. Tile PCR or UVR is a Auto reset control device.

PHYSICAL SPECIFICATIONS

50 Hz

Unit Model WCS		12-5SP	17-5SP	20-5SP	25-5SP	30-5SP	35-5SP	40-5SP	50-5SP
Nominal Capacity	**TR**	12	18	22	26	31	36	43	53
Compressors Type (Qty)		Single (2)	Single (2)	Single (2)	Single (2)	Single (1) Tandem (1)	Tandem (2)	Tandem (2)	Tandem (2)
% Step Capacity Reduction		0, 50, 100	0, 50, 100	0, 50, 100	0, 50, 100	0, 30, 60, 100	0, 25, 50, 75, 100	0, 25, 50, 75, 100	0, 25, 50, 75, 100
EVAPORATOR									
Flowrate	**USgpm**	29.3	43.0	51.7	63.4	74.7	86.0	103.3	126.9
Pressure Drop	**Psig**	10.1	14.1	14.0	13.0	20.4	14.4	7.6	11.7
Water Conn. Size	**inch**	3 MPT	3 MPT	4 MPT	4 MPT	4 MPT	4 MPT	4 MPT	4 MPT
CONDENSER									
Flowrate	**USgpm**	35.3	53.1	63.8	78.3	92.2	106.2	127.4	156.5
Pressure Drop	**Psig**	1.8	4.0	5.7	5.1	6.3	7.4	3.0	3.3
Water Conn. Size	**inch**	2 MPT	2 MPT	2 MPT	2 MPT	2 MPT	2 MPT	4 MPT	4 MPT
ELECTRICAL									
Power Supply		415V/3Ph/50Hz							
Compressor (Each)	**RLA**	14.4 (2)	16 (2)	20.3 (2)	30.1 (2)	14.8 (2) 30.1 (1)	16 (4)	20.3 (4)	30.1 (4)
	LRA	95 (2)	118 (2)	140 (2)	174 (2)	111 (2) 174 (1)	118 (4)	140 (4)	174 (4)
Unit Data	**RLA**	29	32	41	60	60	64	81	120
	MCA	32	36	46	68	67	68	86	128
	MFS	45	50	60	90	90	80	100	150
GENERAL									
Unit Length	**inch**	100 1/2	100 1/2	94 1/2	94 1/2	100 1/2	100 1/2	96 1/4	98 5/8
Unit Width	**inch**	24	24	24	24	34	34	35	35
Unit Height	**inch**	65	65	68	70	63	61	68	68
Refrigerant Charge, R407C	**lbs**	26	37	45	55	63	75	94	110
Unit Shipping Weight	**lbs**	1627	1658	1852	2015	2482	2661	3360	3596
Unit Operating Weight	**lbs**	1773	1805	2016	2219	2731	2929	3683	4003

60Hz

Unit Model WCS		15-6SP	20-6SP	25-6SP	30-6SP	35-6SP	40-6SP	50-6SP	60-6SP
Nominal Capacity	**TR**	15	20	25	31	35	41	51	62
Compressors Type (Qty)		Single (2)	Single (2)	Single (2)	Single (2)	Tandem (2)	Tandem (2)	Tandem (2)	Tandem (2)
% Step Capacity Reduction		0, 50, 100	0, 50, 100	0, 50, 100	0, 50, 100	0, 25, 50, 75, 100	0, 25, 50, 75, 100	0, 25, 50, 75, 100	0, 25, 50, 75, 100
EVAPORATOR									
Flowrate	**USgpm**	36.0	49.3	61.0	75.0	86.7	98.5	122.1	149.7
Pressure Drop	**Psig**	7.5	12.8	12.1	15.6	14.6	7.0	10.5	10.5
Water Conn. Size	**inch**	4 MPT	4 MPT	4 MPT	4 MPT	4 MPT	4 MPT	4 MPT	4 MPT
CONDENSER									
Flowrate	**USgpm**	44.6	60.9	75.5	92.8	107.3	121.8	151.0	185.3
Pressure Drop	**Psig**	2.9	5.2	4.8	6.3	7.6	2.8	3.1	3.7
Water Conn. Size	**inch**	2 MPT	2 MPT	2 MPT	2 MPT	2 MPT	4 MPT	4 MPT	4 MPT
ELECTRICAL									
Power Supply		460V/3Ph/60Hz							
Compressor (Each)	**RLA**	10.8 (2)	13.6 (2)	17.3 (2)	22.7 (2)	11.8 (4)	13.6 (4)	17.3 (4)	22.7 (4)
	LRA	95 (2)	125 (2)	150 (2)	179 (2)	114 (4)	125 (4)	150 (4)	179 (4)
Unit Data	**RLA**	22	27	35	45	47	54	69	91
	MCA	24	31	39	51	50	58	74	96
	MFS	30	40	50	70	60	70	80	110
GENERAL									
Unit Length	**inch**	94 1/2	94 1/2	94 1/2	100 1/2	100 1/2	96 1/4	98 5/8	96 1/4
Unit Width	**inch**	24	24	24	24	34	35	35	35
Unit Height	**inch**	68	68	70	70	61	68	68	70
Refrigerant Charge, R407C	**lbs**	31	43	54	65	75	86	108	129
Unit Shipping Weight	**lbs**	1737	1839	2006	2139	2661	3331	3576	3785
Unit Operating Weight	**lbs**	1887	2002	2210	2386	2929	3654	3983	4222

Legend: RLA - Rated Load Amps LRA - Locked Rotor Amps MCA - Minimum Circuit Ampacity MFS - Maximum Fuse Size Note: Nominal capacity is based on evaporator LWT 44°F and condenser EWT 85°F, actual capacity depends on the specified operating conditions.

PERFORMANCE DATA

50 Hz

Model WCS	Leaving Chilled Water Temperature °F	Condenser Water Entering Temp. °F					
		75		85		95	
		TR	kW[I]	TR	kW[I]	TR	kW[I]
12-5SP	42	12.5	8.8	11.7	10.0	10.8	11.3
	44	13.0	8.8	12.2	10.0	11.3	11.2
	46	13.6	8.8	12.7	9.9	11.8	11.2
	48	14.2	8.8	13.3	9.9	12.3	11.2
	50	14.8	8.8	13.8	9.9	12.9	11.2
17-5SP	42	17.8	12.4	16.6	14.5	15.5	15.9
	44	18.6	12.4	17.9	14.5	16.2	15.9
	46	19.4	12.3	18.3	14.5	16.9	15.9
	48	20.2	12.3	18.9	14.5	17.6	15.8
	50	21.1	12.3	19.8	14.4	18.4	15.8
20-5SP	42	22.0	15.5	20.6	17.3	19.1	19.5
	44	23.0	15.5	21.5	17.4	20.0	19.6
	46	24.0	15.6	22.5	17.4	20.9	19.6
	48	25.1	15.7	23.4	17.5	21.8	19.6
	50	26.1	15.7	24.5	17.5	22.7	19.7
25-5SP	42	27.0	19.0	25.3	21.4	23.6	24.2
	44	28.1	19.0	26.4	21.4	24.6	24.1
	46	29.3	19.0	27.6	21.3	25.7	24.1
	48	30.6	18.9	28.7	21.3	26.9	24.0
	50	31.9	18.9	30.0	21.2	28.0	24.0
30-5SP	42	31.3	21.9	29.3	25.2	27.3	28.0
	44	32.7	21.8	31.1	25.2	28.5	27.9
	46	34.1	21.8	32.1	25.1	29.7	27.9
	48	35.5	21.8	33.3	25.1	31.1	27.8
	50	37.0	21.7	34.7	25.0	32.4	27.8
35-5SP	42	35.6	24.7	33.3	29.0	30.9	31.8
	44	37.2	24.7	35.8	29.0	32.3	31.7
	46	38.8	24.7	36.6	29.0	33.8	31.7
	48	40.5	24.6	37.9	28.9	35.2	31.6
	50	42.2	24.6	39.5	28.8	36.8	31.6
40-5SP	42	44.1	30.9	41.2	34.7	38.3	39.0
	44	46.0	31.0	43.0	34.7	40.0	39.1
	46	48.0	31.2	44.9	34.8	41.7	39.2
	48	50.1	31.3	46.9	34.9	43.6	39.2
	50	52.3	31.4	48.9	35.0	45.5	39.3
50-5SP	42	53.9	38.0	50.6	42.8	47.2	48.3
	44	56.3	38.0	52.8	42.7	49.3	48.2
	46	58.7	37.9	55.1	42.6	51.5	48.1
	48	61.2	37.9	57.5	42.6	53.7	48.0
	50	63.8	37.8	59.9	42.5	56.0	47.9

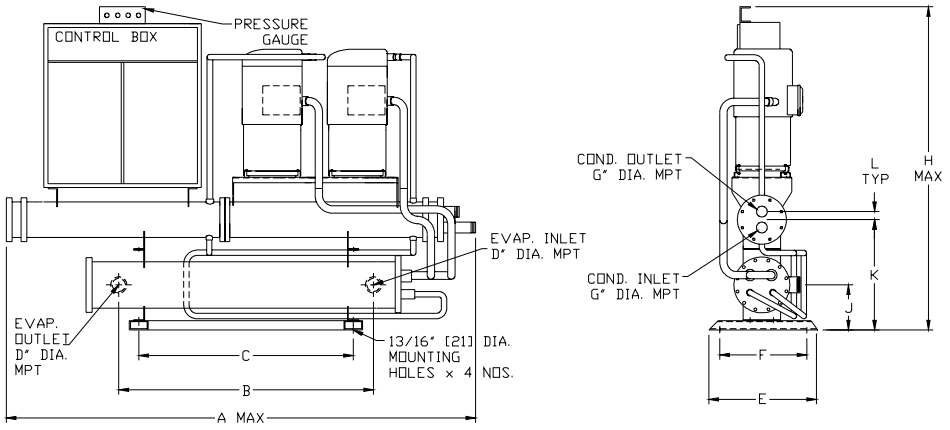
PERFORMANCE DATA

60 Hz

Model WCS	Leaving Chilled Water Temperature °F	Condenser Water Entering Temp. °F					
		75		85		95	
		Tons	kWI	Tons	kWI	Tons	kWI
15-6SP	42	14.7	10.6	14.2	12.3	12.8	13.5
	44	15.3	10.6	15.0	12.3	13.3	13.5
	46	16.0	10.6	15.6	12.3	13.9	13.5
	48	16.7	10.6	16.1	12.3	14.5	13.5
	50	17.4	10.6	16.7	12.3	15.2	13.5
20-6SP	42	21.0	14.8	19.6	16.8	18.2	19.1
	44	21.9	14.8	20.5	16.8	19.1	19.0
	46	22.9	14.8	21.4	16.8	19.9	19.0
	48	23.9	14.8	22.3	16.7	20.8	19.0
	50	24.9	14.8	23.3	16.7	21.7	19.0
25-6SP	42	26.0	18.5	24.3	20.8	22.6	23.4
	44	27.1	18.6	25.4	20.8	23.6	23.5
	46	28.3	18.7	26.5	20.9	24.6	23.5
	48	29.6	18.8	27.7	20.9	25.7	23.5
	50	30.8	18.9	28.9	21.0	26.8	23.6
30-6SP	42	31.8	22.8	29.8	25.7	27.8	29.0
	44	33.2	22.8	31.2	25.6	29.1	28.9
	46	34.6	22.7	32.5	25.6	30.4	28.9
	48	36.1	22.7	33.9	25.5	31.7	28.8
	50	37.6	22.7	35.4	25.5	33.1	28.8
35-6SP	42	36.9	26.3	34.6	29.7	32.2	33.6
	44	38.5	26.2	36.1	29.6	33.6	33.5
	46	40.2	26.2	37.7	29.6	35.1	33.5
	48	41.9	26.1	39.3	29.5	36.6	33.4
	50	43.7	26.1	41.0	29.5	38.2	33.3
40-6SP	42	42.0	29.7	39.3	33.7	36.5	38.1
	44	43.9	29.6	41.0	33.6	38.1	38.1
	46	45.8	29.6	42.8	33.5	39.8	38.0
	48	47.7	29.5	44.7	33.5	41.6	38.0
	50	49.8	29.5	46.6	33.4	43.4	37.9
50-6SP	42	52.0	37.1	48.6	41.6	45.2	46.8
	44	54.3	37.2	50.8	41.7	47.2	46.9
	46	56.7	37.4	53.0	41.8	49.3	47.0
	48	59.1	37.5	55.3	41.9	51.4	47.1
	50	61.7	37.7	57.7	42.0	53.7	47.2
60-6SP	42	63.6	45.7	59.7	51.4	55.7	58.0
	44	66.4	45.6	62.3	51.3	58.2	57.8
	46	69.2	45.5	65.0	51.2	60.7	57.7
	48	72.2	45.4	67.8	51.1	63.4	57.6
	50	75.2	45.4	70.7	51.0	66.1	57.5

DIMENSIONAL DATA

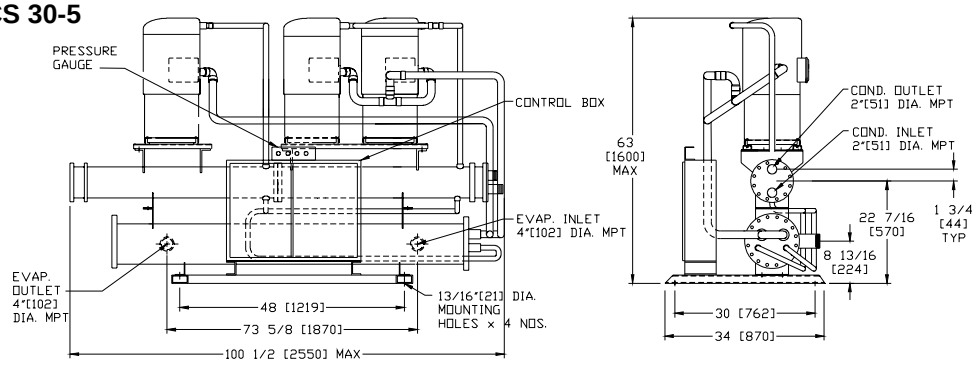
50Hz: WCS 12-5, 17-5, 20-5, 25-5
60Hz: WCS 15-6, 20-6, 25-6, 30-6



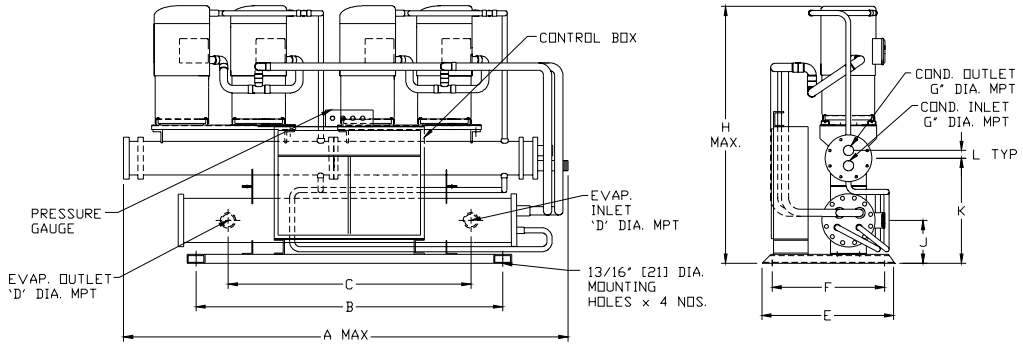
50 HZ											
MODEL	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**J**	**K**	**L**
WCS 12-5	100 1/2	74 3/4	60	3	24	20	2	65	7 13/16	19 7/16	1 1/2
WCS 17-5	100 1/2	74 3/4	60	3	24	20	2	65	7 13/16	19 7/16	1 1/2
WCS 20-5	94 1/2	53 5/8	60	4	24	20	2	68	9 13/16	22 7/16	1 1/2
WCS 25-5	94 1/2	53 5/8	60	4	24	20	2	70	9 13/16	23 7/16	1 3/4

60 HZ											
MODEL	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**J**	**K**	**L**
WCS 15-6	94 1/2	43 5/8	60	4	24	20	2	68	9 13/16	22 7/16	1 1/2
WCS 20-6	94 1/2	53 5/8	60	4	24	20	2	68	9 13/16	22 7/16	1 1/2
WCS 25-6	94 1/2	53 5/8	60	4	24	20	2	70	9 13/16	23 7/16	1 3/4
WCS 30-6	100 1/2	73 5/8	60	4	24	20	2	70	8 13/16	22 7/16	1 3/4

50Hz: WCS 30-5



50Hz: WCS 35-5, 40-5, 50-5
60Hz: WCS 35-6, 40-6, 50-6, 60-6



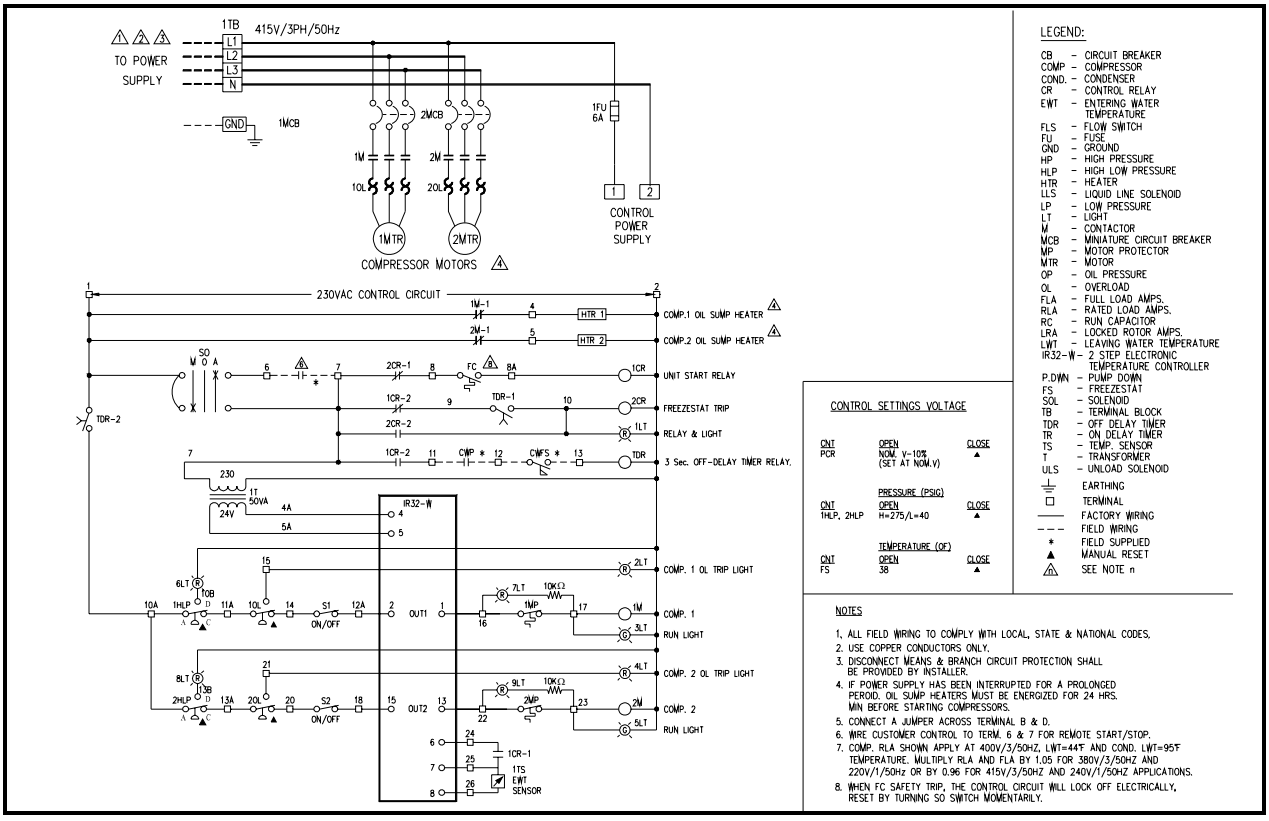
50 HZ											
MODEL	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**J**	**K**	**L**
WCS 35-5	100 1/2	60	73 5/8	4	34	30	2	61	8 13/16	22 7/16	1 3/4
WCS 40-5	96 1/4	60	53 3/4	4	35	31	4	68	11 7/8	27 5/8	3
WCS 50-5	98 5/8	60	73 3/4	4	35	31	4	68	11 7/8	27 5/8	3

60 HZ											
MODEL	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**J**	**K**	**L**
WCS 35-6	100 1/2	60	73 5/8	4	34	30	2	61	8 13/16	22 7/16	1 3/4
WCS 40-6	96 1/4	60	53 3/4	4	35	31	4	68	11 7/8	27 5/8	3
WCS 50-6	98 5/8	60	73 3/4	4	35	31	4	68	11 7/8	27 5/8	3
WCS 60-6	96 1/4	60	53 1/2	4	35	31	4	70	12 7/8	29 5/8	3

Notes:
1.) Water piping to be supported to minimize load on unit.
2.) Sufficient room must be allowed for evaporator and condenser water connection.
3.) 36" of flexible conduit shall be used.
4.) Spring and rubber isolators are optional. If spring isolator are installed, flexible connection shall be used to provide isolation in condenser water and chilled water pipes.
5.) Dimension do not include cooler insulation.
6.) All dimensions are in inches.

TYPICAL WIRING DIAGRAM

2 SINGLE COMPRESSOR 50Hz



CONTROL SETTINGS VOLTAGE

CNT	OPEN	CLOSE
PCR	NOM. V-10% (SET AT NOM.V)	▲

PRESSURE (PSIG)

CNT	OPEN	CLOSE
1HLP, 2HLP	H=275/L=40	▲

TEMPERATURE (OF)

CNT	OPEN	CLOSE
FS	38	▲

LEGEND:

CB – CIRCUIT BREAKER
COMP – COMPRESSOR
COND. – CONDENSER
CR – CONTROL RELAY
EWT – ENTERING WATER TEMPERATURE
FLS – FLOW SWITCH
FU – FUSE
GND – GROUND
HP – HIGH PRESSURE
HLP – HIGH LOW PRESSURE
HTR – HEATER
LLS – LIQUID LINE SOLENOID
LP – LOW PRESSURE
LT – LIGHT
M – CONTACTOR
MCB – MINIATURE CIRCUIT BREAKER
MP – MOTOR PROTECTOR
MTR – MOTOR
OP – OIL PRESSURE
OL – OVERLOAD
FLA – FULL LOAD AMPS.
RLA – RATED LOAD AMPS.
RC – RUN CAPACITOR
LRA – LOCKED ROTOR AMPS.
LWT – LEAVING WATER TEMPERATURE
IR32-W – 2 STEP ELECTRONIC TEMPERATURE CONTROLLER
P.DWN – PUMP DOWN
FS – FREEZESTAT
SOL – SOLENOID
TB – TERMINAL BLOCK
TDR – OFF DELAY TIMER
TR – ON DELAY TIMER
TS – TEMP. SENSOR
T – TRANSFORMER
ULS – UNLOAD SOLENOID
⏚ EARTHING
□ TERMINAL
——— FACTORY WIRING
– – – FIELD WIRING
* FIELD SUPPLIED
▲ MANUAL RESET
⚠ SEE NOTE n

NOTES

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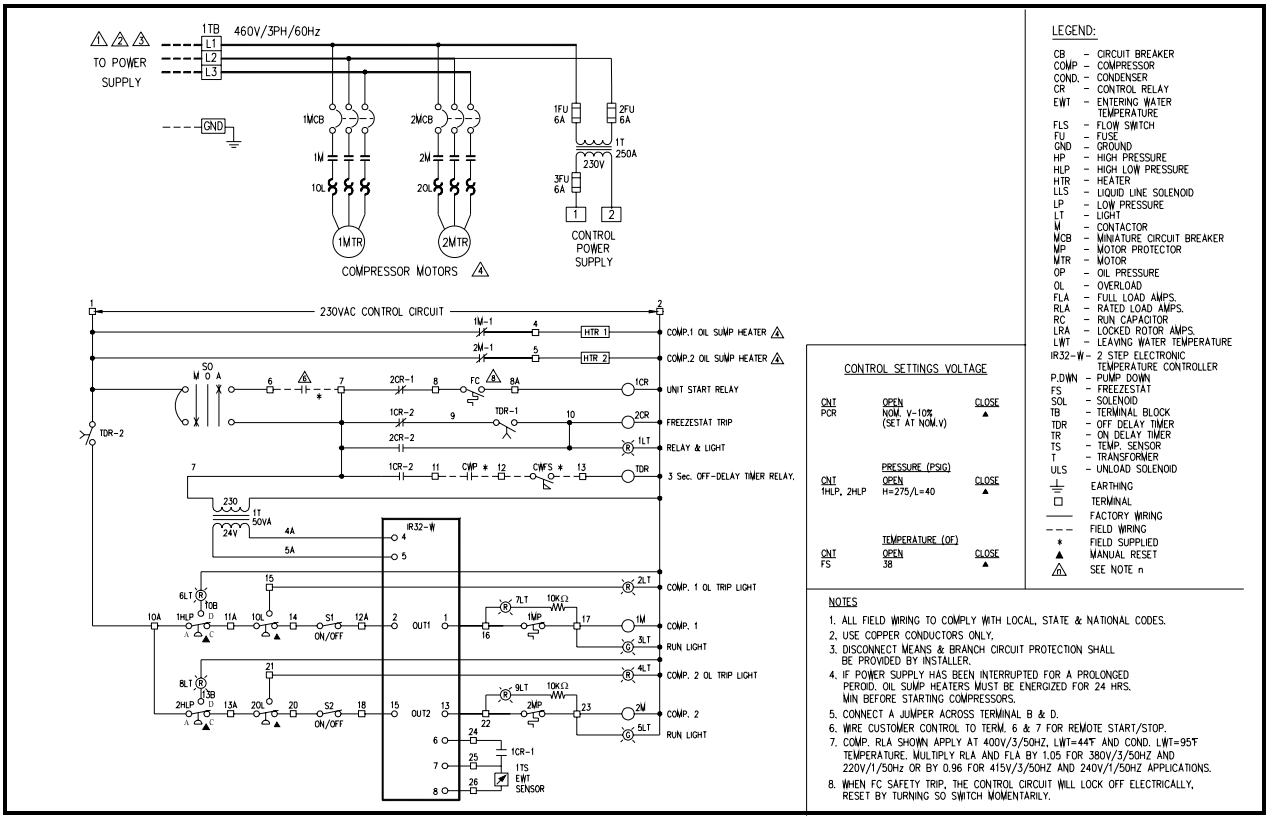
2. USE COPPER CONDUCTORS ONLY.
3. DISCONNECT MEANS & BRANCH CIRCUIT PROTECTION SHALL BE PROVIDED BY INSTALLER.
4. IF POWER SUPPLY HAS BEEN INTERRUPTED FOR A PROLONGED PEROID. OIL SUMP HEATERS MUST BE ENERGIZED FOR 24 HRS. MIN BEFORE STARTING COMPRESSORS.
5. CONNECT A JUMPER ACROSS TERMINAL B & D.
6. WIRE CUSTOMER CONTROL TO TERM. 6 & 7 FOR REMOTE START/STOP.
7. COMP. RLA SHOWN APPLY AT 400V/3/50HZ, LWT=44°F AND COND. LWT=95°F TEMPERATURE. MULTIPLY RLA AND FLA BY 1.05 FOR 380V/3/50HZ AND 220V/1/50Hz OR BY 0.96 FOR 415V/3/50HZ AND 240V/1/50HZ APPLICATIONS.
8. WHEN FC SAFETY TRIP, THE CONTROL CIRCUIT WILL LOCK OFF ELECTRICALLY, RESET BY TURNING SO SWITCH MOMENTARILY.

2 SINGLE COMPRESSOR 60Hz



CONTROL SETTINGS VOLTAGE

CNT	OPEN	CLOSE
PCR	NOM. V-10% (SET AT NOM.V)	▲

PRESSURE (PSIG)

CNT	OPEN	CLOSE
1HLP, 2HLP	H=275/L=40	▲

TEMPERATURE (OF)

CNT	OPEN	CLOSE
FS	38	▲

LEGEND:

CB – CIRCUIT BREAKER
COMP – COMPRESSOR
COND. – CONDENSER
CR – CONTROL RELAY
EWT – ENTERING WATER TEMPERATURE
FLS – FLOW SWITCH
FU – FUSE
GND – GROUND
HP – HIGH PRESSURE
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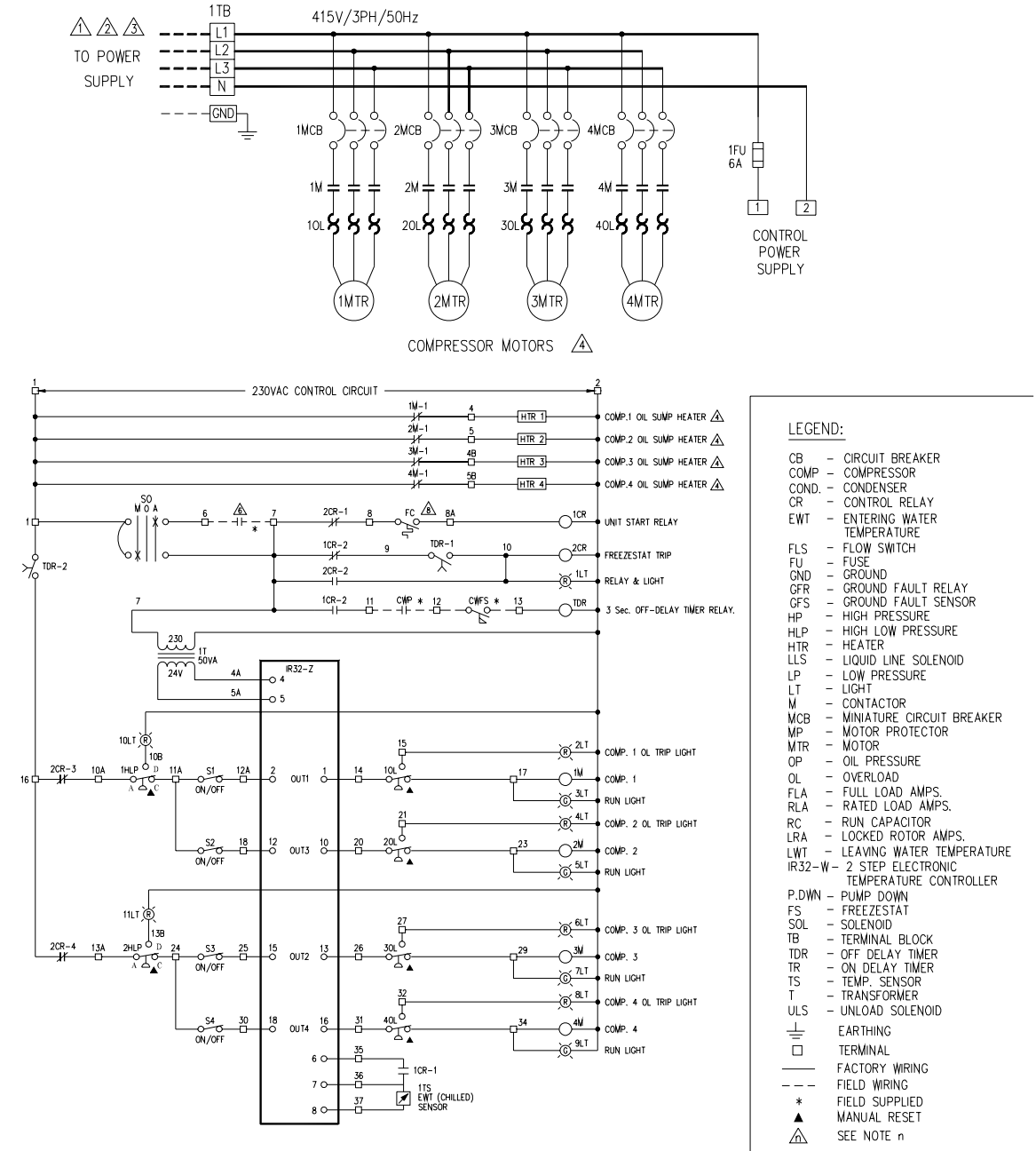
8. WHEN FC SAFETY TRIP, THE CONTROL CIRCUIT WILL LOCK OFF ELECTRICALLY, RESET BY TURNING SO SWITCH MOMENTARILY.

TYPICAL WIRING DIAGRAM

2 TANDEM COMPRESSOR 50Hz



LEGEND:

CB	–	CIRCUIT BREAKER
COMP	–	COMPRESSOR
COND.	–	CONDENSER
CR	–	CONTROL RELAY
EWT	–	ENTERING WATER TEMPERATURE
FLS	–	FLOW SWITCH
FU	–	FUSE
GND	–	GROUND
GFR	–	GROUND FAULT RELAY
GFS	–	GROUND FAULT SENSOR
HP	–	HIGH PRESSURE
HLP	–	HIGH LOW PRESSURE
HTR	–	HEATER
LLS	–	LIQUID LINE SOLENOID
LP	–	LOW PRESSURE
LT	–	LIGHT
M	–	CONTACTOR
MCB	–	MINIATURE CIRCUIT BREAKER
MP	–	MOTOR PROTECTOR
MTR	–	MOTOR
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FLA	–	FULL LOAD AMPS.
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SOL	–	SOLENOID
TB	–	TERMINAL BLOCK
TDR	–	OFF DELAY TIMER
TR	–	ON DELAY TIMER
TS	–	TEMP. SENSOR
T	–	TRANSFORMER
ULS	–	UNLOAD SOLENOID
⏚		EARTHING
□		TERMINAL
———		FACTORY WIRING
– – –		FIELD WIRING
*		FIELD SUPPLIED
▲		MANUAL RESET
△n		SEE NOTE n

CONTROL SETTINGS VOLTAGE

CNT	OPEN	CLOSE
PCR	NOM. V-10% (SET AT NOM.V)	▲

PRESSURE (PSIG)

CNT	OPEN	CLOSE
1HLP, 2HLP	H=164/L=28	▲

TEMPERATURE (OF)

CNT	OPEN	CLOSE
FS	38	▲

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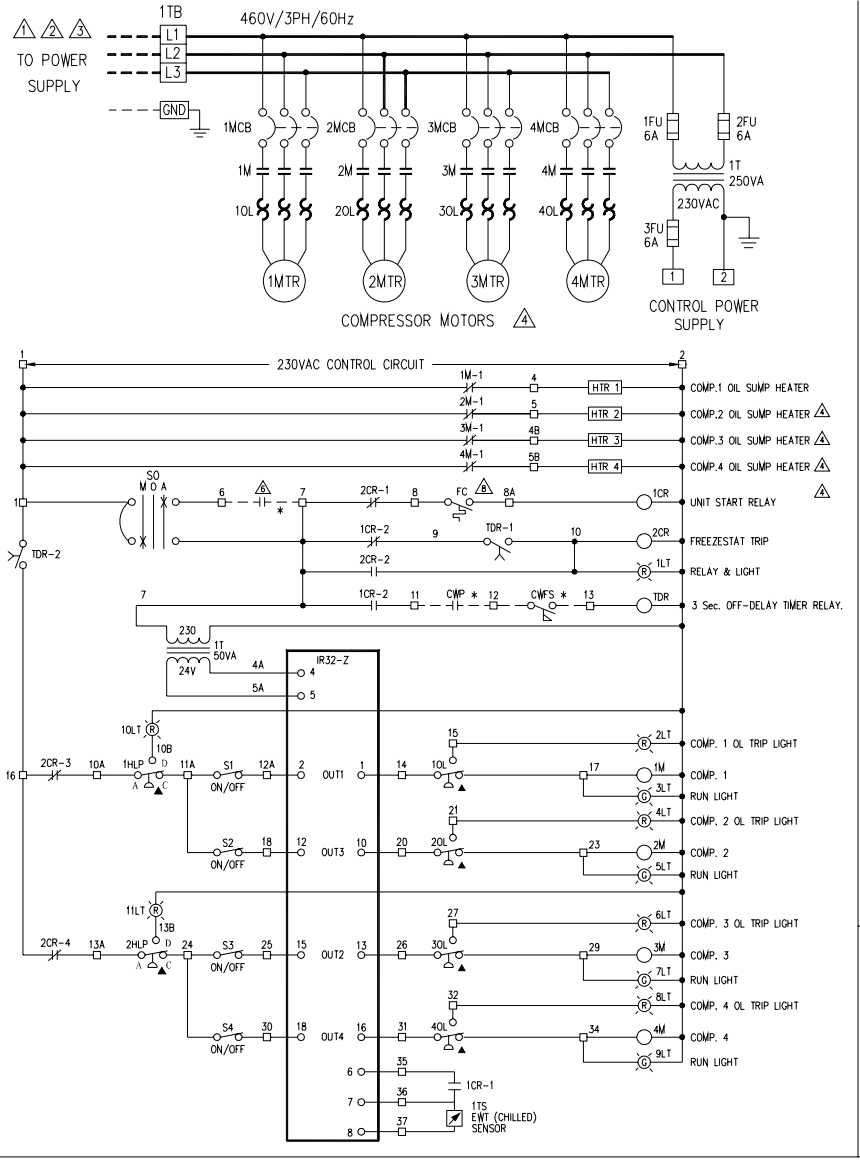
8. WHEN FC SAFETY TRIP, THE CONTROL CIRCUIT WILL LOCK OFF ELECTRICALLY, RESET BY TURNING SO SWITCH MOMENTARILY.
9. UTILISE SHIELDED TWISTED PAIR AWG20 OR AWG22, THE SUPERVISORY INSTRUMENT MUST HAVE A TERMINATION RESISTOR OF 120Ω BETWEEN D+ AND D–.

TYPICAL WIRING DIAGRAM

2 TANDEM COMPRESSOR 60Hz



LEGEND:

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□ TERMINAL
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PCR	NOM. V-10% (SET AT NOM.V)	▲

PRESSURE (PSIG)

CNT	OPEN	CLOSE
1HLP, 2HLP	H=164/L=28	▲

TEMPERATURE (OF)

CNT	OPEN	CLOSE
FS	38	▲

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