SYSTEM STARTUP CHECKLIST

JOB NAME: _____
SALES ORDER #: _____
LOCATION: _____
SOLD BY: _____
INSTALLING CONTRACTOR: _____
START-UP TECHNICIAN/ COMPANY: _____
START-UP DATE : _____

CHILLER MODEL #: _____
SERIAL #: _____

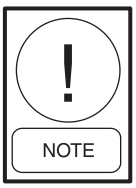
COMPRESSOR #1
MODEL#: _____
SERIAL #: _____
COMPRESSOR #2
MODEL#: _____
SERIAL #: _____

Unit Checks (No Power)

Check the system 24 hours prior to initial start

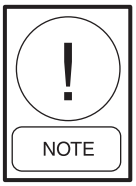
- ❑ 1. Inspect the unit for shipping or installation damage.
- ❑ 2. Ensure that all piping has been completed.
- ❑ 3. Check that the unit is properly charged and that there are no piping leaks.
- ❑ 4. Open each compressor suction service valve, discharge service valve, economizer service valve, liquid line stop valve, and oil line ball valves.
- ❑ 5. The compressor oil level should be maintained so that an oil level is visible in either of the twooil separator sight glasses. In other words, oil level should always be maintained, running or n o t , above the bottom of the lower sight glass and below the top of the upper sight glass.

  If it is necessary to add oil, connect a YORK oil pump to the charging valve on the oil separator, but do not tighten the flare nut on the delivery tubing. With the bottom (suction end) of the pump submerged in oil to avoid entrance of air, operate the pump until oil drips from the flare nut joint, allowing the air to be expelled, and tighten the flare nut. Open the compressor oil charging valve and pump in oil until it reaches the proper level as described above.



In actual operation, due to splashing, an oil level may be seen in both sight glasses. Run the compressor for a few minutes, shut the system down, and ensure there is an oil level showing in the bottom or top sight glass with the compressor off.

- ❑ 6. Ensure water pumps are on. Check and adjust water pump flow rate and pressure drop across the cooler.



Excessive flow may cause catastrophic damage to the evaporator.

- ❑ 7. Check the control panel to ensure it is free of foreign material (wires, metal chips, etc.).
- ❑ 8. Visually inspect wiring (power and control). Wiring MUST meet N.E.C. and local codes. See Fig. 8 and 9, pages 31 and 32.
- ❑ 9. Check tightness of power wiring inside the power panel on both sides of the motor contactors and inside the motor terminal boxes.
- ❑ 10. Check for proper size fuses in main and control circuits.
- ❑ 11. Verify that field wiring matches the 3-phase power requirements of the compressor. See chiller nameplate (Page 22).
- ❑ 12. Ensure 115VAC Control Power has 30A minimum capacity. See Fig. 13, page 36.
- ❑ 13. Be certain all water temp. sensors are inserted completely in their respective wells and are coated with heat conductive compound.
- ❑ 14. Ensure that evaporator TXV bulbs are strapped onto the suction lines at 4 or 8 o'clock positions.
- ❑ 15. Ensure that the 15 ton economizer TXV bulbs are strapped onto the compressor economizer supply lines at 4 or 8 o'clock positions.

Panel Checks
(Power ON – Both System Switches "OFF")

- ❑ 1. Apply 3-phase power and verify its value (See Fig. 8 and 9 pages 31 and 32).
- ❑ 2. Apply 115VAC and verify its value on the terminal block in the lower left of the Power Panel. Make the measurement between terminals 5 and 2 (See Fig. 13, page 36). The voltage should be 115VAC +/- 10%.
- ❑ 3. Ensure the heaters on each compressor are on. Allow the compressor heaters to remain on a minimum of 24 hours before start-up. This is important to ensure that no refrigerant is in the compressor oil at start-up!
- ❑ 4. Program the dip switches on the microprocessor board for the desired operating requirements. See Fig. 54, page 126. OPEN = Left side of switch pushed down. CLOSED = Right side of switch pushed down.

SWITCH	SWITCH "OPEN" SETTING	SWITCH "CLOSED" SETTING
1	Water Cooling	Brine Cooling
2	Standard Ambient Control	Low Ambient Control
3	Refrigerant R-407C	Refrigerant R-22

Verify the selections by pressing the OPTIONS Key on the control panel. Check them off.

Damage to the chiller could result if switches are improperly programmed.

Dip switches 4 through 8 are spares and have no function.

- ❑ 5. Program the required operating values into the micro for cutouts, safeties, etc. and record them in the chart below. See Page 143 for details.

  If Default Values are desired for programming convenience, press the PROGRAM key, 6140, and ENTER. This loads default values. Record these values in the chart below.

PROGRAMMED VALUES

Refrigerant Type = _____

Disch Press Cutout = _____ PSIG (kPa)

Disch Press Unld = _____ PSIG (kPa)

Suction Press Cutout = _____ PSIG (kPa)

High Amb Cutout = _____ °F (°C)

Low Amb Cutout = _____ °F (°C)

Leaving Chilled Liquid Temp Cutout = _____ °F (°C)

High Motor Current Unload = _____ % FLA

Anti-Recycle Time = _____ Secs

- ❑ 6. Program the Chilled Liquid Setpoint/Range and record:

  Setpoint = _____ °F (°C)

  Range = _____ to _____ °F (°C)

  Keep in mind that the target temperature displayed by the micro should equal the desired leaving water temperature.
- ❑ 7. Ensure that the CLK jumper J18 on the Microprocessor Board is in the ON position (Top 2 pins).
- ❑ 8. Set the Time and Date.
- ❑ 9. Program the Daily Schedule start and stop times.

INITIAL START-UP

After the control panel has been programmed and the compressor heater has been on for 24 hours prior to start-up, the chiller may be placed into operation.

- ❑ 1. Place the System Switches on the Microprocessor Board to the ON position.
- ❑ 2. The compressor will start and a flow of refrigerant will be noted in the sight glass. After several minutes of operation, the bubbles in the sight glass will disappear and there will be a solid column of liquid when the TXV stabilizes. After the water temperature stabilizes at desired operating conditions, the oil should be clear.
- ❑ 3. Allow the compressor to run a short time, being ready to stop it immediately if any unusual noise or adverse conditions develop. Immediately at start-up, the compressor will make sounds different from its normal high-pitched sound. This is due to the compressor coming up to speed and lubrication changing from liquid refrigerant to oil. This should be of no concern and lasts for only a short time.
- ❑ 4. Check the system operating parameters. Do this by selecting various displays such as pressures and temperatures. Compare these to test gauge readings.

CHECKING SUBCOOLING AND SUPERHEAT

The subcooling should always be checked when charging the system with refrigerant and/or before setting the superheat.

When the refrigerant charge is correct, there will be no bubbles in the liquid sight glass with the system operating under full load conditions, and there will be 10 - 15°F (6 - 8°C) subcooled liquid leaving the condenser. An overcharged system should be guarded against. Evidences of overcharge are as follows:

a. If a system is overcharged, the discharge pressure will be higher than normal. (Normal discharge/condensing pressure can be found in the refrigerant temperature/pressure chart; use entering air temperature +30°F (17°C) for normal condensing temperature.

b. The temperature of the liquid refrigerant out of the condenser should be not be more than 15°F (8°C) less than the condensing temperature (The temperature corresponding to the condensing pressure from the refrigerant temperature/pressure chart).

The subcooling temperature of each system should be calculated by recording the temperature of the liquid line at the outlet of the condenser and subtracting it from the recorded liquid line pressure at the liquid stop valve, converted to temperature from the temperature/pressure chart.

Example:

Liquid line pressure =		
202 PSIG converted to	102°F	(39°C)
minus liquid line temp.	- 87°F	(31°C)
SUBCOOLING =	15°F	(8°C)

The subcooling should be adjusted to 12 - 15°F (7 - 8°C).

- ❑ 1. Record the liquid line pressure and its corresponding temperature, liquid line temperature and subcooling below:

	SYS 1	SYS 2		
Liq Line Press =	_____	_____	PSIG	(kPa)
Temp =	_____	_____	°F	(°C)
Liq Line Temp =	_____	_____	°F	(°C)
Subcooling =	_____	_____	°F	(°C)

After the subcooling is set, the suction superheat should be checked. The superheat should be checked only after steady state operation of the chiller has been established, the leaving water temperature has been pulled down to the required leaving water temperature, and the unit is running in a fully loaded condition. Correct superheat setting for a system is 10 - 12°F (6 - 7°C).

The superheat is calculated as the difference between the actual temperature of the returned refrigerant gas in the suction line entering the compressor and the temperature corresponding to the suction pressure as shown in a standard pressure/temperature chart.

Example:

Suction Temp =	46°F	(8°C)
minus Suction Press		
60 PSIG converted		
to Temp	- 34°F	(1°C)
	12°F	(7°C)

The suction temperature should be taken 6" (13 mm) before the compressor suction service valve, and the suction pressure is taken at the compressor suction service valve.

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Normally, the thermal expansion valve need not be adjusted in the field. If, however, adjustment needs to be made, the expansion valve adjusting screw should be turned not more than one turn at a time, allowing sufficient time (approximately 15 minutes) between adjustments for the system and the thermal expansion valve to respond and settle out. Ensure that superheat is set at 10 - 15°F (6 - 8°C).

❑ 2. Record the suction temperature, suction pressure, suction pressure converted to temperature, and superheat of each system below:

	SYS 1	SYS 2		
Suction Temp =	_____	_____	PSIG	(kPa)
Suction Temp =	_____	_____	°F	(°C)
Temp =	_____	_____	°F	(°C)
Superheat =	_____	_____	°F	(°C)

CHECKING ECONOMIZER SUPERHEAT (IF APPLICABLE) (15 TON TXV)

The economizer superheat should be checked to ensure proper economizer operation and motor cooling. Correct superheat setting is approx. 10 - 12°F (6 - 7°C).

The superheat is calculated as the difference between the pressure at the Economizer Service Valve on the compressor converted to the corresponding temperature in a standard pressure/temperature chart and temperature of the gas at the bulb on the entering piping to the motor housing.

Example:

Motor Gas Temp =	90°F	(32°C)
minus Economizer Press 139 PSIG converted to Temp	- 78°F	(26°C)
	12°F	(6°C)

Normally, the thermal expansion valve need not be adjusted in the field. If however, adjustment needs to be made, the expansion valve adjusting screw should be turned not more than one turn at a time, allowing sufficient time (approximately 15 minutes) between adjustments for the system and the thermal expansion valve to respond and settle out. Ensure that superheat is set between 10 - 12°F (6 - 7°C).

❑ 1. Record the motor gas temperature, economizer pressure, economizer pressure converted to temperature, and economizer superheat below:

	SYS 1	SYS 2		
Motor Gas Temp =	_____	_____	PSIG	(kPa)
Economizer Press =	_____	_____	°F	(°C)
Temp =	_____	_____	°F	(°C)
Superheat =	_____	_____	°F	(°C)

This superheat should only be checked in an ambient above 90°F (32°C). Otherwise, mid-range adjustment (factory setting) is acceptable.

LEAK CHECKING

❑ 1. Leak check compressors, fittings, and piping to ensure no leaks.

If the unit is functioning satisfactorily during the initial operating period, no safeties trip and the compressors load and unload to control water temperature, the chiller is ready to be placed into operation.