

# III<sup>®</sup> MULTISTACK<sup>®</sup>

Originators. Innovators. Never the Imitators.



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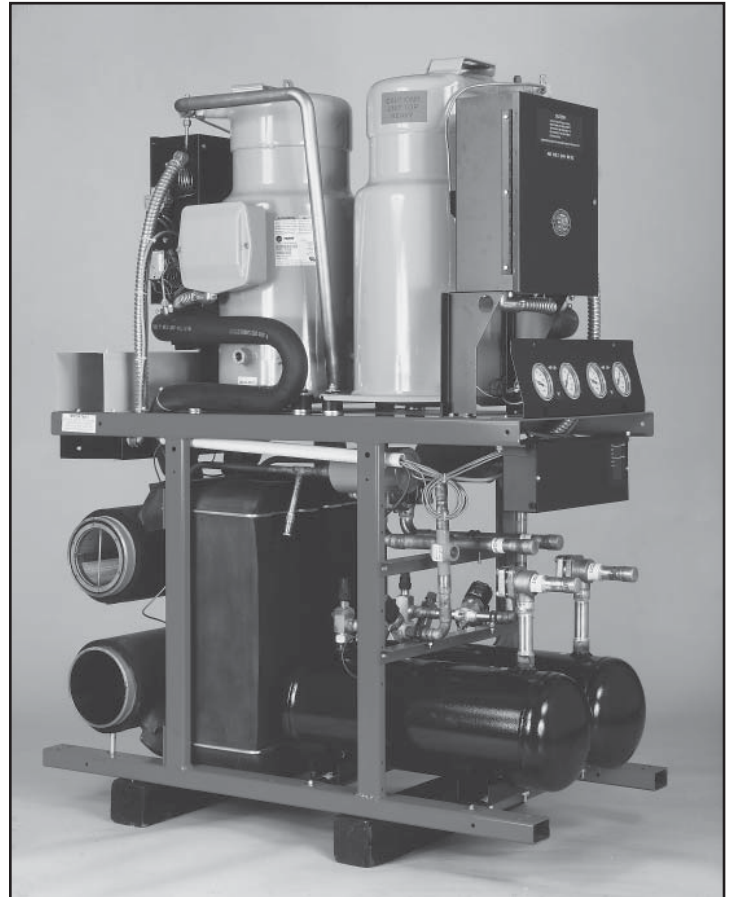
**Air Cooled Installation**  
Installation Manual Supplement for  
use with a Remote Condenser

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**NOTE:**

**This document is to be used as a supplement to the MULTISTACK Installation Manual.**

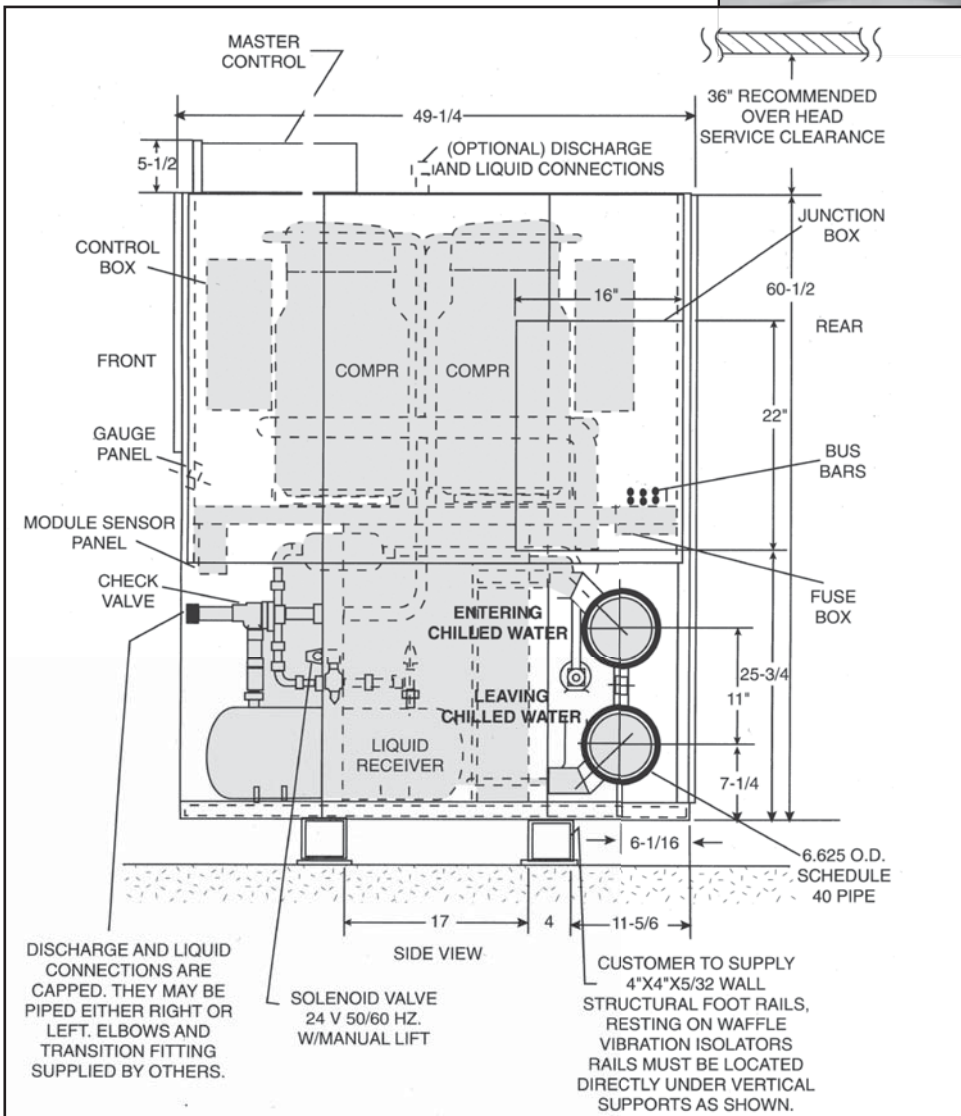
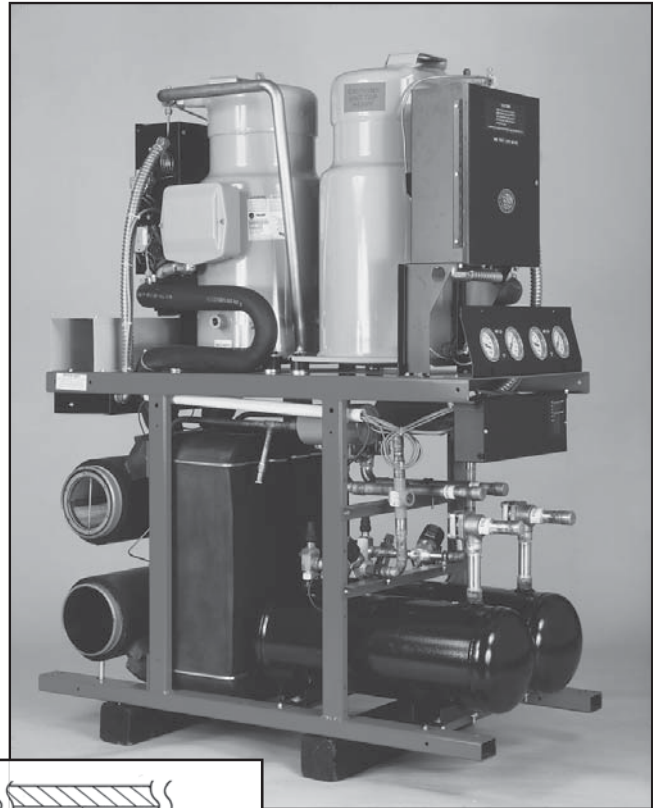
- This MULTISTACK Inc. INSTALLATION MANUAL has been prepared to serve as a guide to assist in the proper installation of the MULTISTACK Modular Chiller. This is an Installation Guide ONLY. Separate documents and instructions are available for Operation and Maintenance.
- Review this manual carefully before beginning the installation.
- The information and illustrations contained in this manual are generalized. Your installation may be customized to an extent that consultation with a MULTISTACK representative may be necessary in order to provide specific details not covered in this manual.
- Good piping practices must be followed and the MULTISTACK Inc. INSTALLATION MANUAL must be strictly adhered to as it pertains to this installation.
- Manufacture and use of this equipment meets all existing legislated rules which pertain.
- This equipment should not be installed near an open flame per local codes and ASHRAE specifications.
- Personnel servicing MULTISTACK equipment must have a minimum Class II EPA certification.
- Any questions regarding the content of this Installation Manual, the handling or installation of the MULTISTACK Chiller components should be directed immediately to your authorized MULTISTACK Representative or to the MULTISTACK Service Department at (608) 366-2400 or FAX (608) 366-2450.



# Air Cooled Chiller

The following components, normally required in an air cooled split system, are factory installed and shipped as part of the standard MULTISTACK module:

- Refrigerant receiver tanks with pressure relief valves and rear manual shut-off valves.
- Liquid line solenoid valves.
- Check valves in liquid and discharge lines.
- Liquid line filter drier.
- Liquid line sight glass.



Note: MS30 dimensions shown

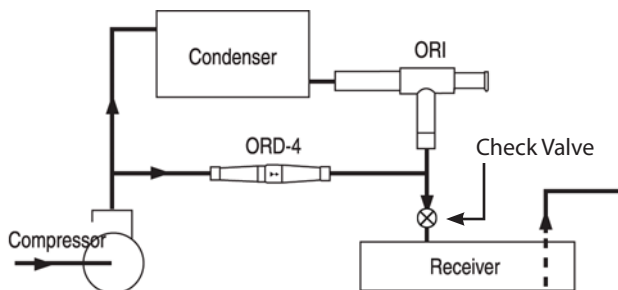
Note: The Multistack module has an isolation valve on the receiver outlet only. An isolation valve should be installed external to the liquid inlet of the receiver and discharge outlet.

# Air Cooled Chiller, Cont'd

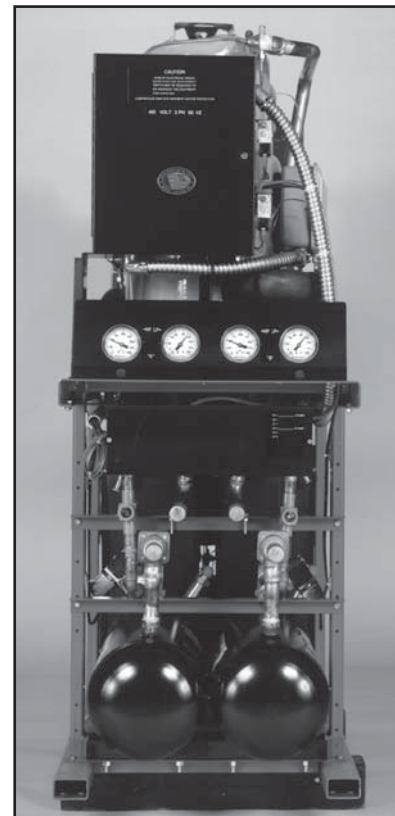
MULTISTACK requires air cooled condensers to include:

- Separate condenser circuit for each compressor (2 per module).
- Pressure cycle fans.
- Flooded condenser head pressure control on each circuit for operation at ambient temperature below 45°F.
- 24 vac control voltage to be compatible with chiller.
- Additional oil may have to be added to the system at time of start-up to accommodate the air cooled condenser and interconnecting lines.

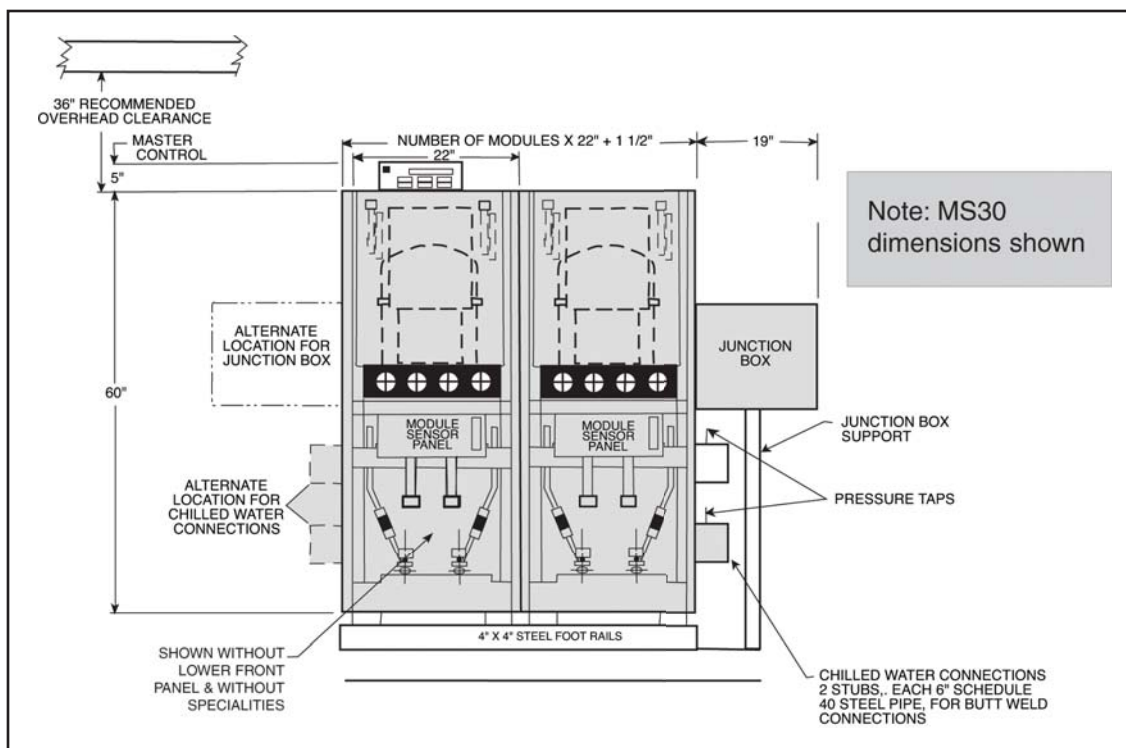
## Condenser Schematic with Head Pressure Control



LOCATE ORI OUTSIDE AT CONDENSER OUTLET  
LOCATE ORD INSIDE AT COMPRESSOR OUTLET AND RECEIVER INLET.



Discharge and liquid lines are capped. They may be piped either right or left.



# Site Preparation

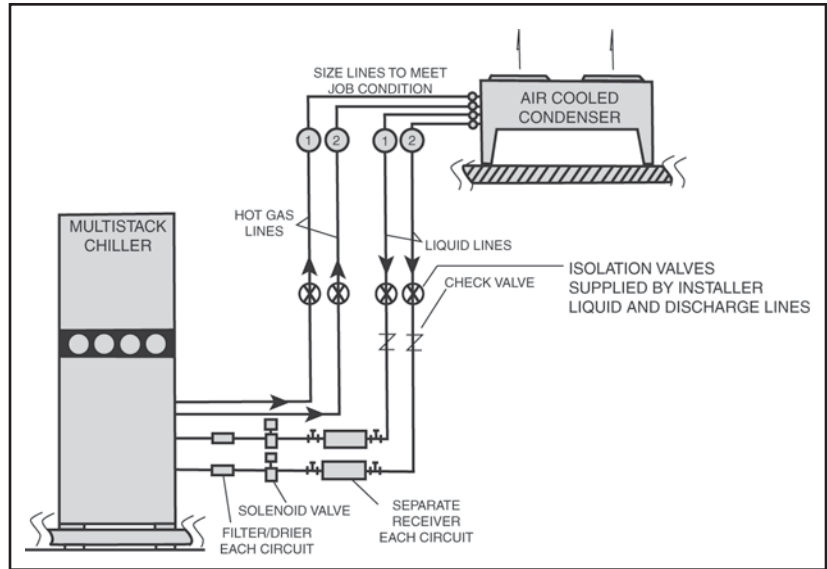
## Piping

### Interconnecting Refrigerant Piping Between Chiller and Condenser

The interconnecting piping is supplied by others and good engineering practice should be used in sloping and trapping lines. The maximum recommended distance to the condenser is 150'. Recommended line sizes for use with specific MULTISTACK modules are:

Discharge Lines:	ASR20C	ASR30C	ASR50Z
50 foot equivalent length	1 $\frac{1}{8}$ "	1 $\frac{1}{8}$ "	1 $\frac{3}{8}$ "
75 foot equivalent length	1 $\frac{1}{8}$ "	1 $\frac{3}{8}$ "	1 $\frac{5}{8}$ "
100 foot equivalent length	1 $\frac{1}{8}$ "	1 $\frac{3}{8}$ "	1 $\frac{5}{8}$ "
150 foot equivalent length	1 $\frac{3}{8}$ "	1 $\frac{3}{8}$ "	1 $\frac{5}{8}$ "

Liquid Lines:	ASR20C	ASR30C	ASR50Z
50 foot equivalent length	$\frac{3}{4}$ "	$\frac{7}{8}$ "	1 $\frac{1}{8}$ "
75 foot equivalent length	$\frac{3}{4}$ "	$\frac{7}{8}$ "	1 $\frac{1}{8}$ "
100 foot equivalent length	$\frac{3}{4}$ "	$\frac{7}{8}$ "	1 $\frac{1}{8}$ "
150 foot equivalent length	$\frac{3}{4}$ "	$\frac{7}{8}$ "	1 $\frac{1}{8}$ "



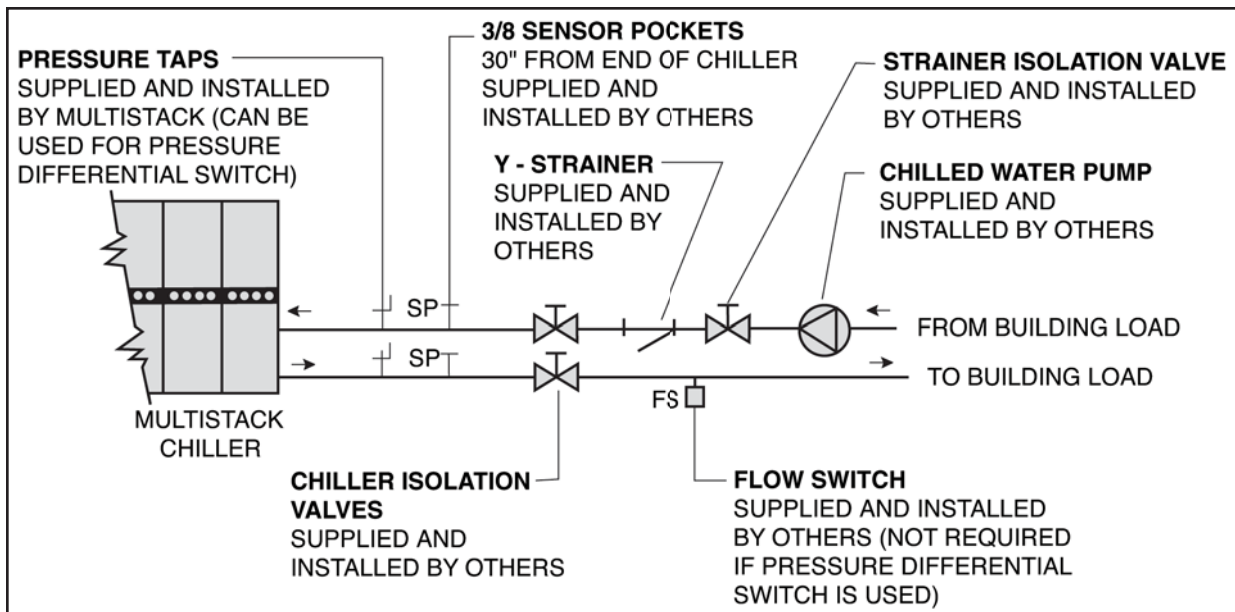
\*When in doubt, go to the next largest size

All piping must be properly and adequately supported at coupling connections and other suitable intervals along the piping runs. Hanger design must provide for the weight of fluids in the piping system when the chiller is in operation.

MULTISTACK modules are equipped with brazed plate heat exchangers made of 316 stainless steel. The brazed plate heat exchangers have narrower fluid passages which make it more susceptible to plugging with water entrained debris. MULTISTACK recommends a "Y" type or other similar system strainer. MULTISTACK supplies a serviceable 30 mesh filter in the evaporator inlet header.

It is the responsibility of the contractor to make sure the water systems have been flushed, strainers are clean and clear of debris before any startup of the chiller will take place.

### Required Chilled Water Piping



# Start-Up Data Log

## Air Cooled Supplement

Temperatures		
	ECHW	LCHW
Start Time:		
Stop Time:		

Module Circuit		CURRENT			TEMPERATURE		HIGH PRESSURE	LOW PRESSURE
		PHASE A	PHASE B	PHASE C	SUCTION	LOCHW		
1.	A.							
	B.							
2.	A.							
	B.							
3.	A.							
	B.							
4.	A.							
	B.							
5.	A.							
	B.							
6.	A.							
	B.							

OBSERVATIONS

# Start-Up Data Log

START-UP DATE: \_\_\_\_\_ SHIP DATE: \_\_\_\_\_  
 JOB NAME: \_\_\_\_\_ JOB NUMBER: \_\_\_\_\_  
 ADDRESS: \_\_\_\_\_  
 MULTISTACK REPRESENTATIVE: \_\_\_\_\_  
 MODEL NUMBER: \_\_\_\_\_  
 MODULE SERIAL NUMBERS (Indicate Master Controller with an X)  
 1. \_\_\_\_\_  
 2. \_\_\_\_\_  
 3. \_\_\_\_\_  
 4. \_\_\_\_\_  
 Master Controller Serial # \_\_\_\_\_

## WATER SIDE AND INSTALLATION CHECKLIST

### CIRCLE CORRECT RESPONSE

- |  |     |    |
|--|-----|----|
| 1. Chiller mounted on rails and isolators?   | YES | NO |
| 2. Any visible damage?   | YES | NO |
| If yes, detail: _____  |     |    |
| 3. Any obvious oil and/or refrigerant leaks?   | YES | NO |
| If yes, detail: _____  |     |    |
| 4. All pipe work independently supported from chiller?   | YES | NO |
| 5. Sensor pockets installed: <b>CHILLED: IN</b> ___ <b>OUT</b> ___ <b>CONDENSER: IN</b> ___ <b>OUT</b> ___ |     |    |
| 6. FLOW or differential switches installed: <b>CHILLED:</b> ___ <b>CONDENSER:</b> ___                      |     |    |
| 7. Operation of flow or differential switches with reduction of 50% P ___                                  |     |    |
| 8. CHW System strainer installed? Type _____ Y-Basket _____ Other _____                                    |     |    |
| 9. CHW or CW solenoids on modules?   | YES | NO |
| <b>If yes is minimum flow bypass installed?</b> _____  |     |    |
| 9a. If solenoid valves: system psi= _____ Differential psi _____   |     |    |

## AIR-COOLED CHECKLIST

- |   |     |    |
|---|-----|----|
| 1. Condenser head pressure control installed? YES ___ NO ___ ORI/ORD ___ OTHER ___        |     |    |
| 2. Lead fan controlled on? <b>Pressure</b> Ambient Secondary fan? <b>Pressure</b> Ambient |     |    |
| 3. Receivers and check valves factory installed on unit?                                  | YES | NO |
| 4. Ambient cut out installed if no head pressure control? <b>N/A</b> Yes ___ °F <b>NO</b> |     |    |
| 5. Notes: _____   |     |    |
| 6. Interconnecting piping between chiller and condenser installed and acceptable sizing?  | YES | NO |
| 7. Discharge line equivalent length of run _____ ft. diameter _____ in.                   |     |    |
| Liquid line equivalent length _____ ft. diameter _____ in.                                |     |    |

## ELECTRICAL AND CONTROLS CHECKLIST

### CIRCLE CORRECT RESPONSE

- |  |     |    |
|--|-----|----|
| 1. All electrical connections tight and correct?               | YES | NO |
| 2. Power wiring sufficient to carry F.L.A.?                    | YES | NO |
| 3. Voltage levels: <b>PHASES 1 + 2 2 + 3 1 + G 2 + G 3 + G</b> |     |    |
| 4. Total AMP draw at 100% capacity: ___ AMPS                   | YES | NO |
| 5. Program system variable to site connections?                | YES | NO |
| 6. Verify demand for cooling?                                  | YES | NO |
| 7. Check sensors through microprocessor display?               | YES | NO |
| 8. Check interlock operation: <b>Stop chilled water pump?</b>  | YES | NO |
| <b>Stop condenser water pump?</b>                              | YES | NO |
| 9. Program date & time in microprocessor                       | YES | NO |
| 10. Leave system in full operation?                            | YES | NO |
| 11. Notify contractor of any problems?                         | YES | NO |

\_\_\_\_\_  
 Start-up Service Technician

\_\_\_\_\_  
 Owner or Contractor Acceptance

# Install Checklist & Request for Authorized Engineer

CUSTOMER: \_\_\_\_\_  
 JOB NAME: \_\_\_\_\_  
 JOB LOCATION: \_\_\_\_\_  
 CUSTOMER ORDER NUMBER: \_\_\_\_\_

The work checked below is in process and will be completed by: (Date) \_\_\_\_\_. The service of a Multistack Authorized Start-up Engineer is requested on this date and it is understood that if the work checked below is not completed, the engineer's time and expenses will be billed to us by Multistack. Terms Net 30 days. Multistack to be notified at least ten (10) working days in advance of the start-up date.

<b>Chilled Water</b>	<b>Yes</b>	<b>No</b>	<b>N/A</b>
Piping complete and connected to Multistack units.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Water system filled and vented.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pumps installed (Rotation checked).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Recommended strainers installed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Controls (3-way valves & by-pass valves, etc.) operable.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Water system operated and flow balanced to meet unit design recommended.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Strainers checked for unusual debris.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Flow or differential pressure switch installed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<b>Remote Air Cooled Condenser</b>	<b>Yes</b>	<b>No</b>	<b>N/A</b>
Piping complete and connected to Multistack module.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
All piping in accordance with good engineering practice.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hot gas and liquid lines installed correctly.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Low ambient (refrigerant head pressure controls) installed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Condenser fans controlled on head pressure.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Condenser wired and operational. (correct rotation)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Control wires ran from Multistack module to remote condenser.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<b>Electrical</b>	<b>Yes</b>	<b>No</b>	<b>N/A</b>
Power wiring complete and in accordance with nameplate rating on Multistack unit and prepared for connection in accordance with installation manual.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Note: No power is to be applied to unit prior to inspection by Multistack engineer.**

All interlock wiring complete between control panel and complies with Multistack specifications and with applicable codes.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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<b>Miscellaneous</b>	<b>Yes</b>	<b>No</b>	<b>N/A</b>
Thermometer wells, thermometer gauges, control, etc. installed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A minimum system load of 50% of total building load is available for testing and adjusting controls.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

We understand that authorized representatives of the installing electrical and piping contractor must be available during the start-up period and that coordination is our responsibility.

We further understand that the services of Multistack Authorized Start-Up Engineer will be furnished for a period of not more than sixteen (16) consecutive normal working hours and we agree that a charge for time and expenses will be made by Multistack if services are required for longer than sixteen (16) consecutive normal working hours or if repeat calls are required through no fault of Multistack.

**Signed** \_\_\_\_\_  
 Title \_\_\_\_\_  
 \_\_\_\_\_  
 Company Name \_\_\_\_\_  
 \_\_\_\_\_  
 Company Location \_\_\_\_\_

\_\_\_\_\_  
 Company Telephone \_\_\_\_\_  
 \_\_\_\_\_  
 Job Location Telephone \_\_\_\_\_

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**|||<sup>®</sup> MULTISTACK<sup>®</sup>**

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