



REFRIGERATION EQUIPMENT SCOPE - QUESTIONNAIRE

Please provide the following information to receive a no-cost estimate of how much money our control system could save your facility and to assist us in preparing our proposal for you.

This questionnaire is designed for only one interconnected refrigeration plant. If your facility has more than one refrigeration system or more equipment then our questionnaire has space for, please make multiple copies of the appropriate pages and include in submission.

Date: _____

Company/Plant: _____

Name: _____

Position: _____

Address: _____

Phone: _____ Fax: _____ E-mail: _____

Please Include:

1. **12 months of electric bills** - To enable us to calculate energy cost savings projections, we'll need to be able to review your current rate structure and charges. Please include at least 2 recent electrical utility bills representing a high and low usage months (last 12 months is strongly preferred). If not readily evident on that bill, please contact your electrical utility for a copy of the electrical charge rate structure.
2. **Site Layout** - To aide in project design, controller selection, placement and cost factors.
3. **P&ID** – This is highly desirable for us to better understand your refrigeration system.

Note: Our energy savings analysis and controller selection is determined based on the information provided. Analysis may not be sent back for further clarification if information is missing or erroneous. Inadequate or inaccurate information on this Questionnaire may result in inaccuracies in savings projections. In addition, omissions or inaccuracies may cause redesign or installation delays. If equipment or installation additions are beyond the scope of the quote provided, additional project charges may occur.



General Information:

- 1. What is the nature of the business? _____

- 2. Plant's refrigerant:
 Ammonia (R717) Freon (R22) Other _____
- 3. Approximate time your refrigeration system was built:
 Prior to 1950 1950s 1960s 1970s
 1970s 1900s 2000s New Installation
- 4. Do you currently have a Central Refrigeration Control System(s)? Yes or No
a. If yes, please describe _____

- 5. Do you currently have a Refrigeration Energy Management System? Yes or No
a. If yes, please describe _____

b. Pros/Cons _____

- 6. What is your primary Energy or CO₂ reduction concerns or goals? _____

- 7. What time frame are you looking to install a Refrigeration Energy Management System?
 Next 3 months 3- 6 months 6-12 months 1-2 years Unsure
- 8. Are you planning any additions to your refrigeration's system in the next 2 years? Yes or No
a. If yes, please describe _____

- 9. Do you have any compatibility concerns or questions regarding the addition of a Hench Energy Management System?
a. If yes, please describe _____



Compressor:		
Compressor ID	Type (screw, recip, rotary)	Runtime (Hours per Year)
Compressor Horsepower	Operating Stage	
1. _____ _____ hp	<input type="checkbox"/> Screw <input type="checkbox"/> Rotary <input type="checkbox"/> Recip - _____ <small># of Unloaders</small> <input type="checkbox"/> High <input type="checkbox"/> Low <input type="checkbox"/> Low-Low	<input type="checkbox"/> Actual <input type="checkbox"/> Estimate Runtime _____ hr/yr
2. _____ _____ hp	<input type="checkbox"/> Screw <input type="checkbox"/> Rotary <input type="checkbox"/> Recip - _____ <small># of Unloaders</small> <input type="checkbox"/> High <input type="checkbox"/> Low <input type="checkbox"/> Low-Low	<input type="checkbox"/> Actual <input type="checkbox"/> Estimate Runtime _____ hr/yr
3. _____ _____ hp	<input type="checkbox"/> Screw <input type="checkbox"/> Rotary <input type="checkbox"/> Recip - _____ <small># of Unloaders</small> <input type="checkbox"/> High <input type="checkbox"/> Low <input type="checkbox"/> Low-Low	<input type="checkbox"/> Actual <input type="checkbox"/> Estimate Runtime _____ hr/yr
4. _____ _____ hp	<input type="checkbox"/> Screw <input type="checkbox"/> Rotary <input type="checkbox"/> Recip - _____ <small># of Unloaders</small> <input type="checkbox"/> High <input type="checkbox"/> Low <input type="checkbox"/> Low-Low	<input type="checkbox"/> Actual <input type="checkbox"/> Estimate Runtime _____ hr/yr
5. _____ _____ hp	<input type="checkbox"/> Screw <input type="checkbox"/> Rotary <input type="checkbox"/> Recip - _____ <small># of Unloaders</small> <input type="checkbox"/> High <input type="checkbox"/> Low <input type="checkbox"/> Low-Low	<input type="checkbox"/> Actual <input type="checkbox"/> Estimate Runtime _____ hr/yr
6. _____ _____ hp	<input type="checkbox"/> Screw <input type="checkbox"/> Rotary <input type="checkbox"/> Recip - _____ <small># of Unloaders</small> <input type="checkbox"/> High <input type="checkbox"/> Low <input type="checkbox"/> Low-Low	<input type="checkbox"/> Actual <input type="checkbox"/> Estimate Runtime _____ hr/yr
7. _____ _____ hp	<input type="checkbox"/> Screw <input type="checkbox"/> Rotary <input type="checkbox"/> Recip - _____ <small># of Unloaders</small> <input type="checkbox"/> High <input type="checkbox"/> Low <input type="checkbox"/> Low-Low	<input type="checkbox"/> Actual <input type="checkbox"/> Estimate Runtime _____ hr/yr
8. _____ _____ hp	<input type="checkbox"/> Screw <input type="checkbox"/> Rotary <input type="checkbox"/> Recip - _____ <small># of Unloaders</small> <input type="checkbox"/> High <input type="checkbox"/> Low <input type="checkbox"/> Low-Low	<input type="checkbox"/> Actual <input type="checkbox"/> Estimate Runtime _____ hr/yr
9. _____ _____ hp	<input type="checkbox"/> Screw <input type="checkbox"/> Rotary <input type="checkbox"/> Recip - _____ <small># of Unloaders</small> <input type="checkbox"/> High <input type="checkbox"/> Low <input type="checkbox"/> Low-Low	<input type="checkbox"/> Actual <input type="checkbox"/> Estimate Runtime _____ hr/yr
10. _____ _____ hp	<input type="checkbox"/> Screw <input type="checkbox"/> Rotary <input type="checkbox"/> Recip - _____ <small># of Unloaders</small> <input type="checkbox"/> High <input type="checkbox"/> Low <input type="checkbox"/> Low-Low	<input type="checkbox"/> Actual <input type="checkbox"/> Estimate Runtime _____ hr/yr
11. _____ _____ hp	<input type="checkbox"/> Screw <input type="checkbox"/> Rotary <input type="checkbox"/> Recip - _____ <small># of Unloaders</small> <input type="checkbox"/> High <input type="checkbox"/> Low <input type="checkbox"/> Low-Low	<input type="checkbox"/> Actual <input type="checkbox"/> Estimate Runtime _____ hr/yr



Compressor (con't):

1. Are any of the screw compressors without micros or slide valves? Yes or No
 Details: _____
 Plan to purchase/install: Hench Micro (Please add to quote) Other Micro
2. Do any of the screw compressors have VFD or variable Vi? Yes or No
 Details: _____
3. Do any compressors swing between stages? Yes or No
 Details: _____
4. Please list compressors that are decommissioned and will never used: _____

Operating Pressures	High Stage	Low Stage	Low-Low Stage	Other _____
Suction – Winter range	____ to ____ psig	____ to ____ psig	____ to ____ psig	____ to ____ psig
Suction – Summer range	____ to ____ psig	____ to ____ psig	____ to ____ psig	____ to ____ psig
Discharge – Winter range	____ to ____ psig	____ to ____ psig	____ to ____ psig	____ to ____ psig
Discharge – Summer range	____ to ____ psig	____ to ____ psig	____ to ____ psig	____ to ____ psig

5. Discharge pressure needed for hot gas defrost: _____ psig
6. When not defrosting, how low can the discharge pressure go? _____
7. How is your discharge pressure controlled? _____
 Set Point Floating on ambient temp Floating on wet bulb temp
8. Are there special processes that require the suction pressure to be lowered part of the time? (Examples: Glycol loop, Blast Freezers, Pre-cooler, Spiral Freezers, Plate freezers, tank cooling, ice rink, etc)
 What can the suction pressure be raised to when the process is not needed? _____
 Process: _____
 Pressure required for this process _____ Est. hr/wk _____ Est. wk/yr _____
 Process: _____
 Pressure required for this process _____ Est. hr/wk _____ Est. wk/yr _____
9. How is your suction pressure controlled? _____
 Fixed Suction Pressure Control Floating Suction Pressure Control



Condensers:

Condenser Number	#1	#2	#3
Condenser ID	_____	_____	_____
Hp of pump	_____@_____hp	_____@_____hp	_____@_____hp
	_____@_____hp	_____@_____hp	_____@_____hp
Fan speed	<input type="checkbox"/> 1-speed <input type="checkbox"/> 2-speed <input type="checkbox"/> Variable speed (VFD)	<input type="checkbox"/> 1-speed <input type="checkbox"/> 2-speed <input type="checkbox"/> Variable speed (VFD)	<input type="checkbox"/> 1-speed <input type="checkbox"/> 2-speed <input type="checkbox"/> Variable speed (VFD)
Number of fans and hp per fan. Circle fans that are bundled on to the same motor starter.	_____fans @_____hp each	_____fans @_____hp each	_____fans @_____hp each
	_____fans @_____hp each	_____fans @_____hp each	_____fans @_____hp each
	_____fans @_____hp each	_____fans @_____hp each	_____fans @_____hp each

1. Do you plan to modify any of the condenser fans to VFDs in the next 2 years? Yes or No
 a. If yes, please describe _____

Process Monitoring and Control:

Our system was designed to easily handle customer additions for monitoring and ladder logic control. We can monitor, control and alarm on your existing gas leak detectors, tank levels and vessel pressures.

2. Would you like to be able to monitor, receive alarms or control other items? Yes or No
 a. If yes, please describe _____

3. Would you like us to supply gas detectors? Yes or No
 a. If yes, please list _____



Evaporators:

Room ID _____	Room ID _____	Room ID _____
Zone: # of Zones _____ Zone Temp _____ °F	Zone: # of Zones _____ Zone Temp _____ °F	Zone: # of Zones _____ Zone Temp _____ °F
Evaporator: # of Evaps _____ Fans/Evaps _____ Motor hp/fan _____ hp Speed: <input type="checkbox"/> 1-speed <input type="checkbox"/> 2-speed <input type="checkbox"/> VFD	Evaporator: # of Evaps _____ Fans/Evaps _____ Motor hp/fan _____ hp Speed: <input type="checkbox"/> 1-speed <input type="checkbox"/> 2-speed <input type="checkbox"/> VFD	Evaporator: # of Evaps _____ Fans/Evaps _____ Motor hp/fan _____ hp Speed: <input type="checkbox"/> 1-speed <input type="checkbox"/> 2-speed <input type="checkbox"/> VFD
Defrost: <input type="checkbox"/> Hot Gas <input type="checkbox"/> Air <input type="checkbox"/> None Minutes/cycle _____ Defrost Freq./day _____ Defrost Solenoid Valves: <input type="checkbox"/> Liquid Supply <input type="checkbox"/> Suction <input type="checkbox"/> Hot Gas <input type="checkbox"/> Suction Bleed <input type="checkbox"/> Hot Gas Bleed <input type="checkbox"/> Other _____	Defrost: <input type="checkbox"/> Hot Gas <input type="checkbox"/> Air <input type="checkbox"/> None Minutes/cycle _____ Defrost Freq./day _____ Defrost Solenoid Valves: <input type="checkbox"/> Liquid Supply <input type="checkbox"/> Suction <input type="checkbox"/> Hot Gas <input type="checkbox"/> Suction Bleed <input type="checkbox"/> Hot Gas Bleed <input type="checkbox"/> Other _____	Defrost: <input type="checkbox"/> Hot Gas <input type="checkbox"/> Air <input type="checkbox"/> None Minutes/cycle _____ Defrost Freq./day _____ Defrost Solenoid Valves: <input type="checkbox"/> Liquid Supply <input type="checkbox"/> Suction <input type="checkbox"/> Hot Gas <input type="checkbox"/> Suction Bleed <input type="checkbox"/> Hot Gas Bleed <input type="checkbox"/> Other _____
Room ID _____	Room ID _____	Room ID _____
Zone: # of Zones _____ Zone Temp _____ °F	Zone: # of Zones _____ Zone Temp _____ °F	Zone: # of Zones _____ Zone Temp _____ °F
Evaporator: # of Evaps _____ Fans/Evaps _____ Motor hp/fan _____ hp Speed: <input type="checkbox"/> 1-speed <input type="checkbox"/> 2-speed <input type="checkbox"/> VFD	Evaporator: # of Evaps _____ Fans/Evaps _____ Motor hp/fan _____ hp Speed: <input type="checkbox"/> 1-speed <input type="checkbox"/> 2-speed <input type="checkbox"/> VFD	Evaporator: # of Evaps _____ Fans/Evaps _____ Motor hp/fan _____ hp Speed: <input type="checkbox"/> 1-speed <input type="checkbox"/> 2-speed <input type="checkbox"/> VFD
Defrost: <input type="checkbox"/> Hot Gas <input type="checkbox"/> Air <input type="checkbox"/> None Minutes/cycle _____ Defrost Freq./day _____ Defrost Solenoid Valves: <input type="checkbox"/> Liquid Supply <input type="checkbox"/> Suction <input type="checkbox"/> Hot Gas <input type="checkbox"/> Suction Bleed <input type="checkbox"/> Hot Gas Bleed <input type="checkbox"/> Other _____	Defrost: <input type="checkbox"/> Hot Gas <input type="checkbox"/> Air <input type="checkbox"/> None Minutes/cycle _____ Defrost Freq./day _____ Defrost Solenoid Valves: <input type="checkbox"/> Liquid Supply <input type="checkbox"/> Suction <input type="checkbox"/> Hot Gas <input type="checkbox"/> Suction Bleed <input type="checkbox"/> Hot Gas Bleed <input type="checkbox"/> Other _____	Defrost: <input type="checkbox"/> Hot Gas <input type="checkbox"/> Air <input type="checkbox"/> None Minutes/cycle _____ Defrost Freq./day _____ Defrost Solenoid Valves: <input type="checkbox"/> Liquid Supply <input type="checkbox"/> Suction <input type="checkbox"/> Hot Gas <input type="checkbox"/> Suction Bleed <input type="checkbox"/> Hot Gas Bleed <input type="checkbox"/> Other _____



Evaporator (con't):

1. Do you plan to modify any evaporator fans to VFDs in the next 2 years? Yes or No
 - a. If yes, please describe _____

2. Are any of the rooms or docks not operated 24 hr/day, 7days/week? Yes or No
 - a. If yes, please describe _____

3. Are any of the rooms or docks hot gas defrost capable, but not currently used? Yes or No
 - a. If yes, please describe _____

Electrical Usages:

1. Annual electric energy consumption? _____ kWh/yr
2. What is your average cost of power? _____ cents/ kWh?
3. How many power mains or meters supply electrical power to this facility? _____
4. Highest and lowest month kWh use: (H) _____ (L) _____
5. Busy season months _____
6. Do you have Current Meter(s)? Yes or No
 - a. If yes, how many? _____
 - b. What areas of your facility or equipment do they measure (Compressor, engine room, whole plant, etc) ? _____
7. Do you have Pulse Power Meter(s)? Yes or No
 - a. If yes, how many? _____
 - b. What areas of your facility or equipment do they measure (Compressor, engine room, whole plant, etc) ? _____

