

# SUPERHEAT OPTIMIZER SYSTEM

## (SUPERHEAT SENSOR SYSTEM)

### Low & Medium Temperature Refrigerated Display Cases

#### A) TXV Sizing

- 1) Multiply the manufacturer's evaporator BTU rating at the design SST, for the specified refrigerant, by a factor of 1.8. Select the closest available valve size from the manufacturer's engineering tables for the design SST and appropriate Freon (do not use nominal expansion valve values)

#### B) Distributor Orifice Sizing

- 1) Select the distributor orifice with the closest rating to the BTU value calculated in section A

#### C) Distributor Line Sizing

- 1) Distributor lines can be 3/16" or 1/4"
- 2) 5 deck low temp cases must use 5/16" lines

#### D) Superheat Sensor Sizing

- 1) Door cases - one, two and three door cases use 5/8" sensors
- 2) Door cases - four and five door cases use 7/8" sensors. The contractor must disconnect the soldered liquid line, run a new liquid line & install a new heat exchanger to feed the TXV
- 3) Tiered and bunker cases less than 6000 BTUs (per the manufacturer's rating at the design SST) use 5/8" sensors
- 4) Sensors for cases with capacities exceeding 6000 BTUs (per the manufacturer's rating at the design SST) are sized to match the evaporator suction line size of the coil

#### E) Required Components

- 1) Properly sized superheat sensor, distributor lines, distributor orifices and expansion valve
- 2) A manufactured heat exchanger
- 3) Two 1.5' type K thermocouples. Attach one (1) thermocouple on the TXV bulb on the superheat sensor & attach the other thermocouple to the suction line on the compressor side of the heat exchanger

**Walk-In Boxes** - the superheat sensor, which is bi-directional, may be positioned in either the vertical or horizontal position before the heat exchanger or any suction line trap. The superheat sensor DOES NOT have to be installed at a 45° angle for this application

#### A) TXV Sizing (same as above)

#### B) Distributor Orifice Sizing (same as above)

#### C) Distributor Line Sizing

- 1) Distributor lines can be 3/16", 1/4" or 5/16" as found on the evaporator

### Installation and Insulation

- 1) The superheat sensor must be as close as possible to the evaporator outlet before the suction line goes to any hot gas looping underneath the evaporator coil. Superheat sensors are bi-directional and must be installed on a 45° angle to the horizontal plane with the outlet of the sensor at the top
- 2) The superheat sensor must be mounted so the TXV bulb groove is turned to either 5 o'clock or 8 o'clock positions
- 3) The entire TXV bulb must be strapped in the superheat sensor groove provided, as close to the exit of the sensor as the groove allows
- 4) The TXV bulb strap bolts must be on the opposite side of the sensor to the TXV bulb
- 5) The TXV bulb must be mounted so that the capillary line is on the top with the bulb pointing downward as per diagram (page 2)
- 6) One 1.5' type K thermocouple is attached to the superheat sensor under the top TXV bulb strap. The other is attached to the suction line on the compressor side of the manufactured heat exchanger, not on the heat exchanger itself as per diagram (page 2)
- 7) All liquid lines components, such as: existing liquid line headers, filters, strainers, hand shutoff valves, etc., must not be in contact with cold air when the case is operating. They must be insulated completely with 1/2" insulation
- 8) The superheat sensor and manufactured heat exchanger must be insulated with 1/2" insulation
- 9) In hot gas defrost systems, the return line must be re-piped so that the return line is teed back to the liquid line on the receiver side of the heat exchanger
- 10) If the OEM has the liquid line soldered to the suction line, the contractor must disconnect the soldered liquid line, run a new liquid line and install a new heat exchanger
- 11) The TXV cannot be mounted with the power element on the bottom

If any questions should arise with the above instructions / specifications, contact:

Super S.E.E.R Systems Inc.  
1228 Advance Road,  
Burlington, Ontario, L7M 1G6

T(905)335-3831  
F(905)335-4929

## RETROFIT INSTALLATION INSTRUCTIONS

# SUPERHEAT OPTIMIZER SYSTEM (SUPERHEAT SENSOR SYSTEM)

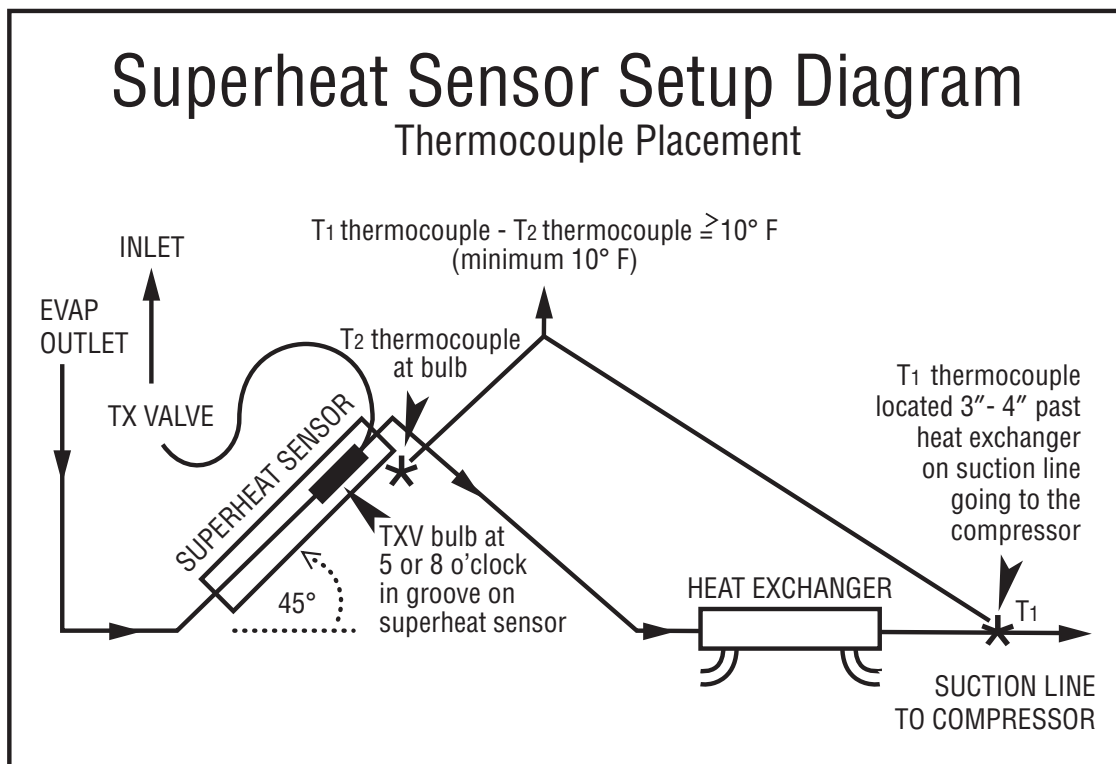
### FIELD - CONTRACTOR INSTRUCTION Low & Medium Temperature Refrigerated Display Cases and Walk-In Boxes

#### TXV Set-Up Procedure

(Same for display cases and walk-in boxes)

- 1) Expansion valve setup procedure must not begin until the system has been running for a minimum of 2 hours
- 2) System must be full of refrigerant before beginning the setup procedure

- 3) Any EPR valves on the subject cases must be completely open prior to the set-up procedure and put back into normal operation once the set-up procedure is complete
- 4) Use your low-side gauge attached to the suction access fitting at each evaporator and an electronic thermometer (capable of accepting Type K Thermocouples). Set the TXV superheat between 3° F - 5° F. This is to be done while maintaining a minimum 10° F higher temperature reading at the thermocouple that is attached to the suction line (on the compressor side of the heat exchanger) than the temperature found at the thermocouple fastened to the TXV bulb (on the superheat sensor)



### SYSTEM SET UP

**A) Stores with floating suction pressure require the float to be set at a suction pressure to maintain the required critical temperature cases. For both manual set point and floating suction pressure control, increase the rack set point by 3 psi and verify critical case temperatures**

If any questions should arise with the above instructions / specifications, contact:

Super S.E.E.R Systems Inc.  
1228 Advance Road,  
Burlington, Ontario, L7M 1G6

T(905)335-3831  
F(905)335-4929

# SUPERHEAT OPTIMIZER SYSTEM

## (SUPERHEAT SENSOR SYSTEM)

### Retrofit to include:

As per the **superheat optimizer system** installation instruction, price the installation of the system on the critical low temperature cases (ice cream - may be reach-in doors, multi-deck type and/or bunkers) and low temperature walk-in boxes as required for the store. Contractor to include all labor and parts (new TXV's, heat exchanger, orifices, distributors) as specified in the **superheat optimizer system** instruction sheet. The only item not included in the price are the actual superheat sensors and the type K thermocouples to be supplied by the manufacturer.

NB: Check to ensure the system is fully charged with freon prior to expansion valve setup

NB: If the liquid lines are soldered to the suction lines, a new liquid line must be run and insulated as per the retrofit instruction

### Example: TXV and distributor orifice sizing for 5 deck cases

**Low Temp R404 - 20°F SST**  
**12 ft Hussmann G6 5D frozen food 1760 BTU/FT**

- 1) Total BTU = 1760 x 12' = 21120 BTU
- 2) Use 1.8 Factor = 21,120 x 1.8 = 38016 BTU
- 3) Tonnage 38016 ÷ 12000 = 3.168 tons
- 4) **Expansion Valve**  
 Sporlan TX Valve at -20°F SST. Closest to this value is P.T. The closest valve to this value is found on page 7 of Sporlan bulletin 10-10: EBSSE 6Z (ZP) rated at 3.28 tons

### 5) Distributor Orifice

Use calculated tonnage (3.168 tons) and using Sporlan distributor bulletin 20-10 on page 12 R404. The distributor orifice to be used is a **#10 orifice providing 3.12 tons**

### RESULT :

For this case you use a Sporlan TXV EBSSE 6Z (ZP) Sporlan distributor orifice #10 and 5/16" distributor lines as required.

### Example: TXV and distributor orifice sizing for 5 door freezer rated at 1650 BTU per door at -20°F SST manufacturers rating using R-404

#### TX valve selection

- 1) BTU/door 1650
- 2) 5 door = 1650 x 5 = 8250 BTU
- 3) Using 1.8 factor from instructions:  
 1.8 x 8250 BTU = 14850 BTU
- 4) Tonnage = 14850 ÷ 12000 = 1.237 tons
- 5) From Sporlan bulletin 10/10 PT on page 7 the closest TX valve to the value is **SBFSE-BZ** which gives **1.37** at -20°F SST  
 TX value would be **SBFSE-BZ (ZP)**

#### Distributor Orifice Selection

- 1) Tonnage as figure above = 1.237 tons
- 2) Using Sporlan bulletin 20/20 P.12 at -20°F SST. R404
- 3) The closest orifice giving the required tonnage is  
 the **#3 orifice = 1.17 tons**

### Example of door cases

Based on 1650 BTU/door at -20°F SST R404

DOOR FREEZERS	R404A SPORLAN EG TXV	R404A SPORLAN TXV	R404A DANFOSS TXV	ORIFICE # SPORLAN DISTRIB.	DISTRIB. LINES	SUPERHEAT SENSOR SIZE
1. DOOR	EGSE 1/4 Z (ZP)	SBFSE - AZA (ZP)	TUAE4 = 0.27T	# 3/4 = 0.29T	1/4"	5/8"
2. DOOR	EGSE 1/2 Z (ZP)	SBFSE - AZ (ZP)	TUAE6 = 0.55T	# 1-1/2 = 0.57T	1/4"	5/8"
3. DOOR	EGSE 1 Z (ZP)	SBFSE - AZ (ZP)	TUAE7 = 0.73T	# 2 = 0.78T	1/4"	5/8"
4. DOOR	EGSE 1-1/2 Z (ZP)	SBFSE - BZ (ZP)	TUAE8 = 1.10T	# 2-1/2 = 0.97T	1/4"	7/8"
5. DOOR	EGSE 2 Z (ZP)	SBFSE - BZ (ZP)	TUAE9 = 1.62T	# 3 = 1.17T	1/4"	7/8"

# SUPERHEAT OPTIMIZER SYSTEM (SUPERHEAT SENSOR SYSTEM)

## 5-Deck Case Examples

Using R404 at -20°F SST based on 1760 BTU/FT

CASE 1760 BTU/FT	REQUIRED TONS	SPORLAN DIST. ORIFICE	SPORLAN TX VALVE	DISTRIBUTOR LINE SIZE
12FT. G6 5DK F.F.	3.17T	#10	EBSSE-6Z (ZP)	5/16"
8FT. G6 5DK F.F.	2.11T	#6	SBFSE-CZ (ZP)	5/16"
6FT. G6 5DK F.F.	1.58T	#4	SBFSE-BZ (ZP)	5/16"

### NB:

- 1) If using Danfoss valves, choose the valve and cartridge that gives you the required capacity for each case at the required saturated suction temperature for the application

## Suggested TXV's using R404 & keeprite coils

COILS	SENSORS	-25°F SST		-18°F SST	
KUC 62	5/8"	SBFSE AZ (ZP)		SBFSE AZ (ZP)	
KUC 82	5/8"	SBFSE BZ (ZP)		SBFSE BZ (ZP)	
KUC 102	7/8"	SBFSE BZ (ZP)		SBFSE BZ (ZP)	
KUC 123	7/8"	SBFSE CZ (ZP)		SBFSE CZ (ZP)	
KUC 153	7/8"	SBFSE CZ (ZP)		SBFSE CZ (ZP)	
KUC 204	1-1/8"	EBSSE 6Z (ZP)		EBSSE 6Z (ZP)	
KUC 255	1-1/8"	EBSSE 6Z (ZP)		EBSSE 6Z (ZP)	
KUC 306	1-3/8"	EBSSE 7 1/2 (ZP)		EBSSE 7 1/2 (ZP)	

## Walk-in Box Evaporator

Walk-in box evaporator distributor orifices have been found to be satisfactory as factory installed and do not need to be replaced. If you have to correct the orifice for better operation, use the sizing procedure from the display case section.

- 1) For other manufacturers coils, the superheat sensor is sized to match the suction line size coming off the evaporator
- 2) For other manufacturers evaporators, use the same procedure as outlined for the door and multi-deck cases to size the expansion valve

If any questions should arise with the above instructions / specifications, contact:

Super S.E.E.R Systems Inc.  
1228 Advance Road,  
Burlington, Ontario, L7M 1G6

T(905)335-3831  
F(905)335-4929