Target Corporation Stores Operational Standards

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Operational Guidelines

Lighting Guidelines

Lighting Strategy

Pre-2009 Store Lighting Panel

Post-2009 Store Lighting Panel

SALES FLOOR LIGHTING CONTROLS	sales floor lighting controls			
THE SALES FLOOR LIGHTING IS MADE UP OF A MANUFACTURED WIRING SYSTEM AND CONTROLLED BY AN ENERGY MANAGEMENT SYSTEM, SALES FLOOR LIGHTING IS DIVIDED INTO FOUR(4) EQUALLY SPACED PROGRAMS TO ENSURE EVEN LAMP BURN AND AN EVEN ILLUMINATED SALES FLOOR THAT CAN BE CONTROLLED IN 25% INCREMENTS.	THE SALES FLOOR LIGHTING IS CONTROLLED BY AN ENERGY MANAGEMENT SYSTEM, SALES FLOOR LIGHTING IS DIVIDED INTO EIGHT(8) EQUALLY SPACED PROGRAMS TO ENSURE EVEN LAMP BURN AND AN EVEN ILLUMINATED SALES FLOOR THAT CAN BE CONTROLLED IN 1/8 INCREMENTS.			
TEST THE SALES FLOOR EMS CONTROLLED LIGHTING SYSTEM TO VERIFY THE ALTERNATING ZONES AND ENSURE THAT THE FOUR(4) ALTERNATING ZONE PATTERN IS MAINTAINED AS SHOWN ON THIS SHEET.	TEST THE SALES FLOOR EMS CONTROLLED LIGHTING SYSTEM TO VERIFY THE ALTERNATING ZONES AND ENSURE THAT THE EIGHT(8) ALTERNATING ZONE PATTERN IS MAINTAINED AS SHOWN ON THIS SHEFT			
ON POWER LOSS, EMS TURNS ON EMERGENCY LIGHTS.	ON POWER LOSS.EMS TURNS ON EMERGENCY LIGHTS.			
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	HITTH "C" HITTH "G" HITTH "C" HITTH "G"			
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₩₩₽°C• ₩₩₽°D• ₩₩₽°C• ₩₩₽°D•	│			
⊞∰ 'B' ∰∰ 'A' ∰∰ 'B' ∰∰ 'A'	"C"			
	"B" "F" B" "F"			
PROGRAM "A": TYPE "AI" PROGRAM "B": TYPE "A2"	□ D" □ IIII "H" □ IIII "D" □ IIIII "H"			
PROGRAM "C": TYPE "AI" PROGRAM "D": TYPE "A2" IF ON EMERGENCY CIRCUIT (SHADED SYMBOL) TYPE "A3"	PROGRAM "A-H": TYPE "A1" IF ON EMERGENCY CIRCUIT (SHADED SYMBOL) TYPE "A2"			

All lighting systems at Target are on a set schedule. These schedules differ based on a store's stocking/flow schedule. Overrides allow stores to manually turn on a system for a given amount of time. Once the time has elapsed, overrides can be repeated. If an override is set to off, the system cannot be manually turned on at the store level.

Included in the 2009 Prototype lighting strategy are 8 different lighting programs that are referred to as A, B, C, D, E, F, G and H. This differs from the Pre-2009 A, B, C, D lighting programs. Each lighting program represents 1/8th of the store lighting on the sales floor. As shown in the picture above, the programs of lights alternate down the store aisles to ensure that all parts of the store are equally lit by each program. Only two sets of lights (A, B, C, D, E, F, G, or H) will be on when a store is operating on 25% lighting; four sets will be on for 50% lighting. The actual lights that stay lit on 25%, 50%, and 75% settings rotate among programs (A, B, C, D, E, F, G, H) to keep bulb exposure consistent.

Target prototypes from 2009 and newer are designed with a Powerlink electrical panel, which utilizes breakers within this panel to control the lights. The signal is sent from the EMS system to the breakers. However, a manual override can also be done at this breaker by someone at the store if necessary. This differs from the pre-2009 prototype which utilizes contactors instead of breakers to control the lighting. Most MR/RS stores do <u>not</u> get Powerlink panels if they did not previously have them. However, if **both** electrical closets are getting updated during the remodel they will be upgraded with Powerlink at that time.

RSM Lighting Schedules

All lighting systems at Target operate on a set time schedule based on a when the store flow team arrives to stock the store. Refer to tables below for information regarding when these units turn on and off. System schedules are based on the store's hours of operation and then adjusted for time overlaps (e.g. + 00:01 for plus one minute or -00:01 for minus one minute). Some stores have adjusted schedules due to state laws.

Different lighting settings (e.g. 100% and 25%) can overlap even though they involve the same light fixtures. The system was designed this way to prevent a complete blackout when switching from one light setting to the next. For example, at closing time, the 25% light setting is set to turn on at -1 minute or one minute before closing. The 100% lights are consequently set to turn off right at closing. This same concept is used at opening time.

Overrides allow stores to manually turn on a system for a given amount of time. Once the time has elapsed, overrides can be repeated. If an override is set to off, the system cannot be manually turned on at the store level. Case lighting is controlled through the Einstein panel, independently in the REMS system, or in conjunction with display lighting in the EMS system. *Any permanent changes to these schedules must be approved and will be noted on store graphics*.

RSM Lighting Schedules - Consistent for All Stores								
	From	hh:mm	То	hh:mm	Override			
100% Sales	Open-	0:01	Close+	0:00	Off			
75% Sales	Open-	0:01	Close+	0:00	Off			
50% Sales	Open-	0:01	Close+	0:00	1 hr.			
Display	Open-	0:01	Close+	0:00	0 hr.			
Case Lighting	Open-	0:00	Close+	0:00	0 hr.			
Guest AM Parking	Open-	0:30	Dawn+	0:10	1 hr.			
Guest PM Parking	Dusk-	0:10	Close+	0:30	1 hr.			
Exterior Signs (PM)	Dusk-	0:10	Close+	0:00	1 hr.			
Exterior Signs (AM)	Open-	0:30	Dawn+	0:10	1 hr.			
Security	Dusk-	0:10	Dawn+	0:10	1 hr.			
Garden Center	Dusk-	0:10	Close+	0:30	1 hr.			
Guest Toilet Lights	Open-	1:00	Close+	1:00	1 hr.			
Misc. Lights	Open+	0:00	Close+	0:00	1 hr.			

	RSM Lighting Schedules for Schedules Specific to Flow Schedule							
		From	hh:mm	То	hh:mm	Override		
	25% Sales	Time	0:00	Time	24:00:00	1 hr.		
Overnight	Team AM Parking	Open-	4:30	Dawn+	0:10	1 hr.		
Overnight	Team PM Parking	Dusk-	0:10	Dawn+	0:10	1 hr.		
	Stock/Rec Lighting	Open-	4:00	Close+	8:00	1 hr.		
	25% Sales no burg/interlock	Open-	4:30	Close+	1:15	1 hr.		
	25% Sales w/ burg/interlock	Time	0:00	Time	24:00:00	1 hr.		
4:00 AM	Team AM Parking	Open-	4:45	Dawn+	0:10	1 hr.		
	Team PM Parking	Dusk-	0:10	Close+	1:30	1 hr.		
	Stock/Rec Lighting	Open-	4:00	Close+	0:10	1 hr.		
	25% Sales no burg/interlock	Open-	2:30	Close+	1:15	1 hr.		
	25% Sales <u>w/ burg/interlock</u>	Time	0:00	Time	24:00:00	1 hr.		
6:00 AM	Team AM Parking	Open-	2:45	Dawn+	0:10	1 hr.		
	Team PM Parking	Dusk-	0:10	Close+	1:30	1 hr.		
	Stock/Rec Lighting	Open-	2:00	Close+	0:10	1 hr.		
					-			

7:30 AM	25% Sales no burg/interlock	Open-	1:00	Close+	1:15	1 hr.
	25% Sales <u>w/ burg/interlock</u>	Time	0:00	Time	24:00:00	1 hr.
	Team AM Parking	Open-	1:15	Dawn+	0:10	1 hr.
	Team PM Parking	Dusk-	0:10	Close+	1:30	1 hr.
	Stock/Rec Lighting	Open-	1:00	Close+	0:10	1 hr.

Lighting and HVAC Overrides Schedule Link

Sometimes there are special events going on at the stores. Types of override and duration for each type of special event can be found here: <u>http://wiki.target.com/tgtwiki/index.php/Overrides_(HVAC_and_Lighting)</u>

Store Hours, Flow Schedules, and Stores without economizer mode

In an effort to compress the amount of pages within the OG document, all information related to permanent and temporary flow schedules, store hours, and stores not utilizing economizer mode are now located in the following locations:

Store Attributes List

Please email OG@target.com with any questions related to this.

HVAC Guidelines

All HVAC systems operate on a set time **schedule** based on a when the store flow team arrives to stock. During this time frame, HVAC units at the store will reflect occupied set points (see HVAC set points table). Outside of this time frame, HVAC units will reflect unoccupied set points.

RSM HVAC Schedules: Consistent for All Stores								
Schedule	From	hh:mm	hh:mm	Override				
Office	Open-	2:00	Close+	0:00	1 hr.			
Office C.C.I.	Open-	3:30	Close+	0:00	1 hr.			
Checklanes	Open-	0:10	Close+	0:00	0 hr.			
Softlines	Open-	0:00	Close -	1:00	0 hr.			
Softlines C.C.I.	Open-	1:30	Close -	1:00	0 hr.			
Hardlines	Hardlines Flow time Close+ 0:00 1 hr.							
*Note: If Smart Start Strategy is implemented at store, HVAC will go occupied 30 minutes earlier than times above, but the HVAC RSM screen in Web Control will still reflect the open or close times listed above.								

RSM HVAC Schedules Specific to Flow Schedule								
Flow	Schedule	From	hh:mm	То	hh:mm	Override		
	Hardlines	Open -	4:00	Close +	8:00	1 hr.		
Overnight	Stock	Open -	4:00	Close +	8:00	1 hr.		
	Receiving	Open -	4:00	Close +	8:00	1 hr.		

2:00 AM (Flow Only Used During Holiday <u>or</u> Special Events	Hardlines	Flow time		Close+	0:00	1 hr.
	Hardlines C.C.I.	Flow time -	1:30			
	Stock	Flow time		Class	0.00	1 hr
	Stock C.C.I.	Flow time -	1:30	Close+	0.00	1 111.
	Receiving	Flow time				
	Receiving C.C.I.	Flow time -	1:30	Close+	0:00	1 hr.

4:00 AM	Hardlines	Flow time		Close	0.00	1 hr
	Hardlines C.C.I.	Flow time -	1:30	CIOSE+	0.00	1 111.
	Stock	Flow time		Class	0.00	1 hr
	Stock C.C.I.	Flow time -	1:30	CIOSE+	0.00	1 111.
	Receiving	Flow time				
	Receiving C.C.I.	Flow time -	1:30	Close+	0:00	1 hr.

6:00 AM	Hardlines	Flow time		Class	0.00	1 hr
	Hardlines C.C.I.	Flow time -	1:30	Close+	0.00	I M.
	Stock	Flow time		Class	0.00	1 hr
	Stock C.C.I.	Flow time -	1:30	CIUSE+	0.00	1111.
	Receiving	Flow time				
	Receiving C.C.I.	Flow time -	1:30	Close+	0:00	1 hr.

7:30 AM	Hardlines / Hardlines C.C.I.	Open-	2:00	Close+	0:00	1 hr.
or stores without a	Stock / Stock C.C.I	Open-	2:00	Close+	0:00	1 hr.
team (i.e. Express)	Receiving / Receiving C.C.I.	Open-	2:00	Close+	0:00	1 hr.

Overrides allow stores to manually turn on a system for a given amount of time. Once the time has elapsed, overrides can be repeated. If an override is set to off, the system cannot be manually turned on at the store level. Any permanent changes to these schedules must be approved and will be noted on store graphics.

Optimal Start: Optimal Start is still enabled at some locations but limited to a 1 hour maximum pre-cool and 4 hour maximum pre-heat.

Smart Start: As of January of 2015, 700\+ stores had Smart Start programming enabled. Unlike Optimal Start, Smart Start has an occupied heating/cooling start time 30 minutes prior to the flow team arriving. This programming also brings on a second stage of heating or cooling at that time. This takes the guesswork out of trying to determine when heating/cooling will come on at the store. At a later date, most stores will have Smart Start enabled and Optimal Start will be phased out.

Temperature set points vary according to stocking schedule. Checklanes and office units, large AHUs, and units with VFDs will have supply fans programmed to run constantly during occupied hours. Super Target stores have an actively controlled dew point set point of 53°F.

P-stores have a high RH adjustment that reduces the set point by 2 degrees when the following conditions are all true:

- Outdoor air temperature is greater than 70 degrees with a hysteresis of 2
- Store dew point is greater than 58 with a hysteresis of 2
- HVAC Hardlines schedule is in occupied mode

If there is a FAF in the entry/vestibule of a Super Target, the FAF should have 65 degree heating set point and the RTU should have 65. In a P-store, the settings should be 68 and 65, respectively.

Most stores are set up so that every other unit follows the Hardlines or Softlines schedule and set points (please note that this will apply to most but not all stores within this category).

				Н	VAC Set po	oints				
			Cooling			Heating		Dehu	midification	
Zone	Schedule	Occupied (°F)	Unoccupied (°F)	Hysteresis (°F)	Occupied (°F)	Unoccupied (°F)	Hysteresis (°F)	Occupied / Unoccupied (°F)	Hysteresis (°F)	Low Temp Lock- Out
*Sales Floor (Non- Ventilating Units)	16 - HVAC Softlines	75	81	1	68	59	1			
Sales Floor (Ventilating Units, Non-DHU)	15 - HVAC Hardlines	74	81	1	68	59	1			
Sales Floor (DHU, Non-Market	15 - HVAC Hardlines	74	81	1	68	59	1	**53/57	2	
***** Sales Floor (w/Reheat)	15 - HVAC Hardlines	74	74	1	68	59	1	53	2	68
Market (DHU)	15 - HVAC Hardlines	74	75	1	68	59	1	**53/57	2	62
Market (non-DHU)	15 - HVAC Hardlines	74	81	1	68	59	1			
***** Grocery	15 - HVAC Hardlines	74	74	1	68	59	1	51	2	62
***** Deli/Bakery	15 - HVAC Hardlines	74	81	1	68	59	1			
***** Deli/Bakery (w/Reheat)	15 - HVAC Hardlines	74	81	1	68	59	1	53	2	68
Checklanes (DHU)	15 - HVAC Hardlines	74	81	1	68	59	1	**53/57	2	
Checklanes (Non- DHU)	15 - HVAC Hardlines	74	81	1	68	59	1			
*****Checklanes (w/Reheat)	15 - HVAC Hardlines	74	81	1	68	59	1	53	2	68
Entry / Vestibule	17 - HVAC Checklanes	78	81	1	65	59	1			
***Offices	18 - HVAC Offices	74	81	1	68	59	1			
District Office	18 - HVAC Offices	74	81	1	68	59	1			
***Lounge	15 - HVAC Hardlines	74	81	1	68	59	1			

			Cooling			Heating		Dehu	midificatior	h
Zone	Schedule	Occupied (°F)	Unoccupied (°F)	Hysteresis (°F)	Occupied (°F)	Unoccupied (°F)	Hysteresis (°F)	Occupied / Unoccupied (°F)	Hysteresis (°F)	Low Temp Lock- Out
Guest Services	17 - HVAC Checklanes	74	81	1	68	59	1			
Food Avenue	17 - HVAC Checklanes	74	81	1	68	59	1			
Starbucks Starbucks Prep	18 - HVAC Offices	74	81	1	68	59	1			
Pharmacy / Clinic	18 - HVAC Offices	74	75	1	70	65	1			
Optical / Bank / Photo / Portrait	17 - HVAC Checklanes	74	81	1	68	59	1			
Toilet/Restroom	17 - HVAC Checklanes	74	81	1	68	59	1			
Control Room (RTU)	15 - HVAC Hardlines	72	72	1	0	0	1			
Control Room (VAV)	15 - HVAC Hardlines	74	74	1	0	0	1			
Stock / Receiving / Marking	19 - HVAC Stock	74	81	1	66	59	1			
****Stock (Unit Heater)	19 - HVAC Stock	155	155	1	66	59	1			
******Elevator Machine/Equipment Room (split system)	Stand-alone control with EMS monitoring sensor	85	85		50	50				
Fitting Room (VAV)	17 - HVAC Checklanes	74	81	1	68	59	1			

*The Softlines Occupied Cooling set point for some non-ventilation units may reflect a 74 degree set point instead of 75 degrees. This typically occurred at stores with unique layouts (i.e. multi-level) or those with a limited number of sales floor units (i.e. only 4 sales floor units exist.

** Stores with open refrigerated cases: A) if store has MUNTERS DHU dehumidification set point varies from 53 to 57. B) If store does not have MUNTERS DHU dehumidification set point = 53

***Certain locations which were part of the Comfort Control Initiative (CCI) may reflect lower Occupied Cooling set points in the Office and Lounge Zones than those listed above.

****The settings for unit heaters above include only those under EMS Control. All other unit heaters that are not part of this system are manually set by team members at the store. ***** These settings are specific to Super Target locations and differ from those found at P Fresh and General Merchandise Stores.

******* Elevator equipment rooms should be part of a split system which has stand-alone control and an EMS monitoring sensor. If the temperature is 4 degrees above cooling set point at least 20 minutes, a critical email alert is sent to FMOC.

******Most elevator equipment rooms will not have heat. However, if the room is on an outside wall, the specification instructs that these rooms should have heat added to the unit. The heating set point is 50 degrees.

Comfort Initiatives

Comfort Improvement Initiative 2010

The Comfort Improvement Initiative August 2010 was rolled out to specific overnight and non-overnight stores as a way to provide relief for team members throughout the chain. Criteria utilized as part of this initiative included work order history, sales volume, and region of the country. As part of this initiative, the following changes were implemented:

- Set points were changed for VAV's and units that were part of the lounge and offices.
- High Humidity Dew point Broadcast parameters were disabled on units and VAV's associated with the Offices and Lounge.
- RSM changes were made to Hardlines, Softlines, and Stock/ Receiving schedules.

As of January of 2011, variations of these changes were customized per store and remain effective.

Flow Team Relief Initiative 2011

The Flow Team Relief Initiative was rolled out in April of 2011. This initiative provides comfort cooling for sales team staff in specific non-overnight stores across the chain. Criteria utilized as part of this initiative included store age, prototype, and ASHRAE. As part of this initiative, RSM changes were made to Hardlines, Softlines, and Stock/ Receiving schedules. Stores included in this initiative were not involved in the Comfort Improvement Initiative of 2010.

As of June of 2011, Pharmacies received changes to their set points and schedules to ensure team member comfort and product integrity. Please refer to the HVAC Set points section in the Table of Contents for additional information.

HVAC Humidity (Dew Point) Control Strategy

Target addresses store indoor humidity levels through dew point control because it is easier to understand than relative humidity control. The fact that relative humidity is "relative" to the indoor temperature makes it more difficult to understand. Dew point control automatically compensates for the air's temperature making it a fixed value that quantifies comfort and moisture content.

P-Stores

P-Stores without open refrigerated cases do not have true humidity control. The strategy used to address humid conditions in these stores is called the High Store Relative Humidity Broadcast Mode (HSRHBM). This mode adjusts the cooling set points throughout the store (exception is RTUs with Softlines schedules) down 2°F whenever the store dew point is greater than 58 deg F (with a 2 deg F dew point hysteresis, which means the store dew point must drop below 56 deg F before HSRHBM will terminate). The store dew point is calculated from the Store Temp/RH combo sensor located near the check lanes. This is referred to as passive humidity control strategy since moisture removal is a byproduct of zone temperature set point control instead of an actual direct control of indoor humidity.

HSRHBM has been set up to not activate when the store is unoccupied (based on Hardlines Schedule). HSRHBM will not activate unless the outdoor air temperature is greater than 70 deg F.

There are some stores that use relative humidity for control of HSRHBM instead of dew point. These stores have a 57% RH set point (with a 2% RH hysteresis, which means the store relative humidity must drop below 55% RH before HSRHBM will terminate). This RH set point combined with the 74 dry bulb set point results in a 58 deg dew point.

All Target stores have HSRHBM in their EMS programming, but P-Fresh Stores and Super Target Stores have additional humidity control strategies on their sales floor which actively maintain Market/Grocery area dew points lower than HSRHBM set point of 58 deg F dew point. Since these additional active control strategies maintain sales floor dew

point below 58 deg F, HSRHBM will typically not activate on P-Fresh or Super Targets unless there is a problem. Click on the following link to access the PNODS-P Store (No Open Cases) High Store Relative Humidity Broadcast Mode (HSRHBM) Dehumidification Strategy Visio for P Stores:

http://itgtcollab.target.com/sites/PD2GO/Shared%20Documents/PMAssets/SmartBuildings/All%20Dehumidification%20Visios.pdf

P-Fresh Stores

P-Stores with open refrigerated cases (P-Fresh) will have active humidity control in the Market Area. This area will be dehumidified by one of the following methods;

- 1) A dedicated De-Humidification Unit (DHU) with full dehumidification capacity through the use of a desiccant wheel (Munters).
- 2) Sales floor units using ERV wheels to pre-treat the outdoor air (Aaon/Lennox/Carrier/other air conditioning units) and possibly hot gas reheat (free reheat from the air conditioning refrigeration circuit). RTUs which receive an ERV wheel for the purpose of dehumidification are also designated as DHU.
- 3) Supermarket natural gas reheat in dry climates.

The DHU is a dehumidifier that actively maintains the Market Area dew point set point of 53°F 24/7. If a P-Fresh Market Area has high humidity, this DHU is the first place to look for problems.

In addition to a P-Fresh store's DHU(s), all other sales floor RTUs which are providing ventilation to the sales floor will assist the DHU(s) in maintaining the Market RTU dew point set point. This is accomplished through Sales Floor Dehumidification Mode (SFDHM) which broadcasts the Market dew point to all ventilating RTUs, which are then forced into cooling mode to pre-dehumidify the moist ventilation air to a dew point below 53° F before it is delivered to the sales floor. This is achieved by cooling the ventilation air to a RTU discharge air temperature (DAT) of less than 53° F dry bulb (if dry bulb temp is less than 53° F, it guarantees that the airs dew point is less than 53° F). The dominant source of indoor moisture in a Target store is outside ventilation air, and the fundamental concept of SFDHM is that removing the moisture from the raw outside air (OA) is much more economical than removing the moisture after OA is allowed to mix with indoor air.

On stores with 24 hour ventilation, the sales floor units which are providing ventilation at night will perform SFDHM all night if the market area dew point exceeds set point. The only time a ventilating sales floor unit will drop out of SFDHM is if the unit's zone temperature drops to within 1 °F of its heating set point.

It is important to identify which P-Stores have open refrigerated cases and are then considered P-Fresh stores. A visual representation of the following list of different potential dehumidification strategies and the functions of the sales floor units on a P-Fresh store can be accessed via the following links: <u>http://itgtcollab.target.com/sites/PD2GO/Shared%20Documents/PMAssets/SmartBuildings/All%20Dehumidification%20Visios.pdf</u>

Super Target Stores

The Grocery RTU's (Seasons 4 or Munters Super Aire) on Super Targets have full dehumidification capacity through the use of hot gas reheat (Seasons 4) or a desiccant dehumidification wheel (Munters Super Aire). Hot gas reheat dehumidification is an air conditioning process which cools the air and wrings out moisture, then partially reheats that same air before sending it back to the conditioned space to keep the zone warm enough for dehumidification to continue. A Desiccant dehumidification wheel uses desiccant to adsorb moisture from the room air and discharge that moisture to the outside air. The Grocery RTU is a giant dehumidifier that remains occupied 24/7 to maintain the indoor dew point set point. If a Super Target has high humidity, this RTU is the first place to look for problems.

In addition to the Grocery RTU, slightly more than half of the sales floor RTUs on Super Targets will also have hot gas reheat which provides active dehumidification. These RTUs have local combination Temperature/Relative Humidity sensors in their zone which will activate dehumidification (i.e. turn on the compressor) when the zone dew point is greater than 53 deg F, even if the zone temperature is below the RTUs cooling set point. Super Target sales floor RTUs with hot gas reheat do not set back to unoccupied cooling set points (i.e. they will maintain 74°F overnight), so essentially the sales floor should maintain at occupied set points 24/7. Super Target RTUs without hot gas reheat will setback their temperature set points.

The Super Target Dehumidification Strategy described above is shown visually on the next page (Code: SupTDS).

When a Super Target Store receives a Merchandise Remodel, some of the sales floor RTUs will receive ERVs to more efficiently dehumidify the ventilation air brought into the sales floor. The ERVs may be bolted onto the end of an existing sales floor RTU or stand- alone ERVs may be added to the roof and ducted (under the roof) into the return air ductwork of associated RTUs. When this occurs, the 24 hour ventilation strategy will also be added to the store to further improve energy efficiency and dehumidification performance. The Super Target with ERV and 24 Hour Ventilation Dehumidification Strategy which results a Super Target receives these additions is shown visually on the second page after this one (Code: SupTDS with ERV).

A visual representation of the following list of different potential dehumidification strategies and the functions of the sales floor units in Super Target stores can be accessed via the following links:

http://itgtcollab.target.com/sites/PD2GO/Shared%20Documents/PMAssets/SmartBuildings/All%20Dehumidification%20Visios.pdf

Condensate Vacuum Systems

Target currently utilizes Vacuum Pumps at certain Target stores to remove condensate drainage from the refrigerated market cases. Engineering makes that determination based on the location of existing under floor piping or the existing structural slab conditions.

The Acorn Vacuum System is a drainage system that uses vacuum pressure to collect and remove condensation from the refrigeration cases and deposit it in the mop basin in an enclosed room. The condensate vacuum system includes pumps, tanks, valves, and electrical control panel. These systems are used in some new stores as well as remodels.

The control panel will set off alarms that need to be attended to. There is an interactive user read out on the front of the panel and phone numbers to call to walk through the process of clearing an alarm. The alarm panel is also tied into the REMS panel which will notify the store and Facilities Management Operations Center (FMOC) of any alarms that needs to be addressed.

Some of the condensate vacuum skids may be connected to the emergency generator, but not all of them. Currently there is no tracking of which of these are tied into the generator and which are not. If the pump is tied into the generator, it will still work when there is a power outage.

There are phone numbers on the control panel for the support line of Acorn Vac.

Figure 1 – Acorn Vac skid with control panel.



Figure 2 - EVAC condensate vacuum skid with control panel



There are only 8 stores that utilize the EVAC condensate vacuum systems (this is different from the Acorn system). T-0819, T-1385, T-1542, T-0012, T-1436, T-1443, T-1256, T-1804

Things to be aware of if there is an Acorn Vacuum system at the store:

- 1. If there is a scheduled power outage, the store will want to take necessary precautions with the product in the cases. The ice merchandiser should not be left full of ice, this will melt and run all over the floor.
- 2. When walking thru the market area, listen for a hissing sound. This sound is caused by something sticking in the extraction valve. To activate the valve, simply push the button on the valve (on top of the case) and that usually takes care of it. Pouring a little water in the case that is making the noise will also trigger the valve without having to climb on top of the case.
- 3. Price tags and other debris should be kept out of the bottom of the cases.
- 4. The mop basin in the vacuum room is used only for the discharge from the vacuum tanks. There should be no buckets, mops or cleaning supplies kept at this mop basin. This should be kept free of debris. Everything that is in the bottom of the cases will end up in the mop basin, so it will need to be cleaned out on a regular basis.
- 5. Water should be reported on the floor around the refrigerated cases.
- 6. Alarms on the control panel should be responded to.

Please utilize the following link http://wiki.target.com/tgtwiki/index.php/Condensate_Vacuum to locate the following information:

- Condensate Vacuum Equipment Use
- Maintenance
- Troubleshooting
- Service requests

The control panel will set off alarms that need to be attended to. There is an interactive user read out on the front of the panel and phone numbers to call to walk through the process of clearing an alarm. The alarm panel is also tied into the REMS panel which will notify the store and Facilities Management Operations Center (FMOC) of any alarms that needs to be addressed.

Some of the condensate vacuum skids may be connected to the emergency generator, but not all of them. Currently there is no tracking of which of these are tied into the generator and which are not. If the pump is tied into the generator, it will still work when there is a power outage.

There are phone numbers on the control panel for the support line of Acorn Vac. Figure 1 – Acorn Vac skid with control panel

EMS Controllers

Target uses specific energy management system (EMS) software to control and/or monitor our **<u>Refrigeration</u>**, <u>**HVAC**</u>, and <u>**Lighting**</u> equipment:

Einstein 2 (E2) Controller:

- 1. The (E2) controller is a microprocessor-based control system used primarily to control and/or monitor refrigerated cases, compressor groups, condensers, and other mechanisms of **refrigeration** building control. These controllers are found at the majority of Target locations.
 - a. Note: Not_all refrigerated cases are connected to the E2 controllers (i.e. Checklanes coolers, Food Avenue under counter equipment, etc.).
 - b. Note: Some Target locations utilize the E2 controllers to control and/or monitor the **<u>HVAC</u>** and **<u>Lighting</u>** equipment (City Targets: T3200, T3201, T3202, Super Target: T1767).
- 2. Target can interface with the E2 controllers via the following systems:
 - a. Ultrasite: Allows team members to communicate with the E2 controller via a specified network computer IP address and view system point values. Alarms sent to SBN can be investigated with Ultrasite to help diagnose and troubleshoot the root cause(s)
 - b. Terminal Mode: This feature allows team members to see the screen of the E2 exactly as it is on site. This can be used to remotely assist technicians with what they are seeing on the store's E2 controller.
 - i. Note: Due to an identified security risk, terminal mode has been disabled via the built in webpage on the E2. Locally, technicians will need to log into the controller itself. Terminal mode within Ultrasite is the only available terminal access at Target.

Web Control Controller:

1. Web Control is a web-based automated building control system used primarily to control and/or monitor HVAC and Lighting system values, schedules, zones, and equipment trends.

Refrigeration EMS Circuit Naming Convention

The Target Standard for naming <u>refrigeration</u> circuits in the EMS Einstein Controller software (E2) is listed below. Stores opened or remodeled after December 2015 will follow the format listed below. Existing stores may still reflect a non-standardized naming convention.

		Short I	Description Key		
Circuit		Physical		Product	
Number	Description	Description	Description	Туре	Description
XX00X		XXXX		XXX	
AB01A	Sales Floor Dual Temp Case	02DR	Number Doors	DLT	Dual Temp
A_01_	Sales Floor Frozen Temp Case	30FT	Open Case Length Feet	FRZ	Frozen
B_01_	Sales Floor Medium Temp Case	ISLD	Island	MEA	Meat
BA01_	Sales Floor Med Temp (on Low Temp Rack)	BNKR	Bunker	MTP	Meat Prep
C_01_	Condensing Unit - System Varies	FLEX	Flexible Merchandiser	SEA	Seafood
D_01_	Condensing Unit - System Varies	FLOR	Floral Case	PRD	Produce
E_01_	Condensing Unit - System Varies	COFF	Coffin	DAI	Dairy
F_01_	Condensing Unit - System Varies	WIFZ	Walk In Freezer	FLO	Floral
FS01_	Food Service	WICL	Walk In Cooler	DEL	Deli
RK-BS	Rack Point	SPAR	Spare Circuit	FDS	Food Service
SC01_	Guest-Facing Self Contained	SUBC	Subcooler	BER	Beer
ST01_	Back-of-House/Stock Room Self Contained			BAK	Bakery
				PRO	Promotion (multiple products)
				DSL	Dry Storage/Labeling
				GnG	Grab and Go
				EXP	Experience Center (multiple products)
				BAB	Baby Food
				PET	Pet Food/Fresh Pet
				SBX	Starbucks
		Exceptio	ns/Old Convention		
SB01	Starbucks Case	ISLA	(HUSSMANN)	ICE	Ice Cream
PF01	Pet Fresh Case			PRT	Produce Table (i.e. T1356)
EC01	Experience Center (i.e. T1356 Mtka, T1095				
	Stinson)				
PT01	Produce Table (i.e. T1356 Mtka)				
FC01	Floral Case				
		Long D	escription Key		
		Case Type - I	Manufacturer - Model		
Notes					
14 charact	er short description limit - A space will exist be	tween each cha	aracter string (i.e XXOOX X	(XXX XXX)	

Refrigeration Lighting

Lighting Control:

- Refrigeration lighting is currently controlled by the following:
 - REMS System (Einstein Controllers)
 - Typically controls case lighting in the following locations:
 - Stores opened or remodeled after 2011
 - You may find new or remodeled stores with REMS control prior to 2011
 - EMS System (Web Control)
 - Typically controls case lighting in the following locations:
 - Stores opened or remodeled prior to 2011
 - You may find new or remodeled stores with REMS control prior to 2011
 - ➤ Case control (this is controlled by the case itself).
 - Includes older equipment or self-contained units that have the lights controlled within the case itself (i.e. TRUE cases).

Lighting Schedules:

- These stores typically utilize the following lighting schedule:
 - > Sales floor cases: Time of store open to time of store close.
 - ➢ Walk in Freezers and Coolers: No schedule exists at this time.

LED Lighting:

- LED Lighting has been implemented in many P Fresh, City, and Express stores and <u>some</u> Super Target stores.
 - Sales Floor Freezer and Cooler Cases with doors:
 - All <u>aisle</u> cases and a portion of the back wall LED lights are motion activated and will turn off at any time during the day if no movement is detected.
 - These lights are controlled by a Watt Stopper Motion Detector. After 30 seconds, the LED Lights will turn off if no additional movement is detected. They will turn on again once movement is again detected by the sensor
 - Dual Temperature cases and a portion of the back wall with LED lights are <u>not</u> motion activated and are always on during store hours.
 - Sales Floor <u>Open</u> Cases:
 - These lights are <u>not</u> motion activated and are always on during normal schedule hours.
 - ➤ Walk in Coolers:
 - LED lights in Walk in Coolers are controlled by a switch and are <u>not</u> motion activated
 - After 2012, LED Lighting was implemented in the Walk-in Coolers
 - ➤ Walk in Freezers:
 - LED lights in Walk in Freezers are controlled by a switch and are <u>not</u> motion activated
 - After 2012, LED Lighting was implemented in the Walk-in Freezers

Suction Pressure/Temperature settings by Refrigerant Type: (P Fresh, City, Super, and P&G Stores)

Suction	Suc	ction Pressure	e by Refriger	ant Type		
(F)	R-404A	R-134A	R-22	R-407A	R-744	R-448/R-449
-26*	12-13		6.5-7.5	5-6		8-9
-25*	12-13		7-8	5.5-6.5		
-24	13-14		7.5-8.5	6-7		
-22**	15-16		8.5-9.5	7-8	185-192	
-18***	17-18		11-12	9-10	188-196	11-12
-15****	19.5-20.5		13-14	11-12	196-204	
-14	20-21		13.5-14.5	12-13		
+15	49-50	15-16	37-38	36.5-37.5		38-39
+16	50-51	15-16	38.5-39.5	37.5-38.5		
+18**	52-53	16.5-17.5	40.5-41.5	39.5-40.5		48-50
+20	55-56	18-19	42.5-43.5	42-43		
+22***	57.5-58.5	19.5-20.5	45-46	44-45		
+24	60.5-61.5	21-22	47-48	46.5-47.5		
+26*	63-64	22-23	49.5-50.5	49-50		

*This used to be the suction temp setting for stores with Walk in Freezers on the Rack, but since the -15 to -10 adjustment on the Walk in Freezers, should no longer be the case and should be set at -22 for the suction temp.

**Rack contains re-used Tyler cases

*** Rack does not contain re-used Tyler cases

**** Suction Settings may differ with Zero Zone Cases

Note: Stores which utilize floating suction may float within a wider range of its specified pressure above.

Defrost Types and Descriptions: All Prototypes (P Fresh, City, Super, and P&G Stores

Electric Defrost

This style of defrost removes frost from the evaporator. Instead of utilizing hot gas, electric defrosts utilize cowl rod heaters similar to those used in an electric oven. The heating elements are turned "on" for defrost and "terminated" (turned off) based on an adequate temperature within the unit.

Advantages of Electric Defrost:

- Systems are easy to service and maintain by refrigeration technicians.
- Reduced ice formation, which can sometimes be found in other hot gas systems. This is due to the heating element residing within the drain pan to melt any ice formation.

Disadvantages of Electric Defrost:

- Increased length of time required to defrost the case
- Increased energy needed during defrost versus a hot gas system.

Note: Canada stores only utilize electric defrosts and not hot gas or pulsed defrost.

Loop systems:

A loop system refers to the refrigerant piping arrangement. In this type of system, there is one large liquid line and one large suction line that goes from the rack to the sales floor. This differs from a hot gas system which selectively diverts gas to **individual** refrigeration circuits. For this reason, a loop system will <u>not</u> function with a hot gas defrost and instead utilizes electric defrost.

Hot Gas (Straight-Time) Defrost

As part of the refrigeration process, normally directed gas / vapor to the condenser is diverted to the evaporator for defrost. Depending on the refrigerant, gas temperatures range from 140 to 230 degrees. Heat removed from 75% of the refrigerated equipment is used to defrost 25% of it, and this ratio should not be exceeded. The rack will not have enough load to keep the compressors running if too many circuits are placed into defrost at the same time. This is the reason why defrost times are scattered throughout the day and not scheduled all at once in Ultrasite.

This type of defrost is normally limited or terminated based on temperature to prevent the case from getting too warm during a defrost cycle.

Advantages of Hot Gas Defrost:

- You get 2 ¹/₂ to 3 times the amount of energy out for the energy put in (i.e. free heat due to rerouting gas).
- The defrost cycle is very quick compared to an electric defrost cycle

Disadvantages of Hot Gas Defrost:

- Knowledge required; maintenance of this type of system requires a more detailed understanding of the process, which not all refrigeration technicians are trained on.
- More maintenance is required to sustain this type of system. This is due to the constant expansion and contraction of the copper piping during defrost, which can cause separation along areas where the pipe soldering has occurred. This can eventually lead to leaks

Hot Gas Pulsed Defrost

Pulsed defrost works in much the same way as noted above, except that the hot gas is turned on and off intermittently during the defrost cycle time period. Pulsed defrost turns on for 4 minutes initially, and is set to maintain 70 degrees with a 5 degree dead band. Therefore, when the temperature sensor mounted on the evaporator coil gets up to 72.5 degrees, the defrost turns off. If the temperature falls to 67.5 degrees, the defrost turns on. This may turn on and off in intervals of one minute or longer.

Advantages of Pulsed Defrost:

- The prevention of case overheating, which is typical of a "straight time" gas defrost.
- Maximization of the thermal energy (BTUH) available in the hot gas / vapor. This is because gas is allowed to regenerate from time defrost is pulsed off to time that it is pulsed back on.
- Energy efficiency: this type of gas defrost is in most instances more energy efficient than "straight time" gas defrost. This is because cases are not as warm following defrost, and not as much energy is necessary to lower the temperature.
- Decreased ice formation and adequate heating of the drain pan for condensation drainage.
- Prevention of a de-merchandising/deicing event at that store.

Disadvantages of Pulsed Defrost (similar to those noted in "straight time" hot gas defrosts):

- Knowledge required: maintenance of this type of system requires a more detailed understanding of the process, which not all refrigeration technicians are trained on.
- More maintenance is required to sustain this type of system. This is due to the constant expansion and contraction of the copper piping during defrost, which can cause separation to occur along areas where the pipe has been soldered. This can eventually lead to leaks.

All P Fresh stores with hot gas availability will receive a pulsed defrost strategy going forward. However, not all cases with a hot gas defrost utilize a pulsed defrost. Refer to the Defrost/Alarm schedule for listings of which cases utilize this type of defrost.

Defrost termination and Minimum Defrost Duration

Freezers (and sometimes coolers) operate with defrost terminations and minimum defrost durations. This means that the defrost cycle will run for the intended duration unless it reaches a temperature higher than what is specified for that time period. If this occurs, the defrost cycle will then terminate. Cases which have defrost terminations and minimum defrost durations are called out in the Defrost/Alarms section of the document.

Defrost/Alarm Settings: P Fresh, Flex Format, Super, P&G Stores

			DUAL TEMP	HIGH	DUAL TEMP	LOW	DUAL TEMP LOW		TYDICAL	# OF	DEEDOCT		
		POINT	POINT		ALARM			DELAY	DEFROST	# OF DEFROSTS	DURATIO	DEFROST	MIN DEFROST
BRAND /MODEL	FIXTURE TYPE	(°F)	(°F)	(°F)	LIMIT (°F)	(°F)	(°F)	*(MIN)	TYPE	PER DAY	N (MIN)	TERM (°F)	(MIN)
	*WHEN IN DEFROS	5T, 30 MIN AD	DED TO A	LARM DELA	AY (SEE ABOVE)	BEFORE HI	GH TEMP A	LARM TRIGG	ERED (I.E. IF AL	ARM DELAY IS	5 60 MIN, WIL	L NOT ALARM UN	TIL 90 MIN)
	**P&G AND SELEC	T SUPER TARC	GET PROT	OTYPES WIT	H NO EEPR CO	NTROL MAY	STILL REFL	ECT A -12 SE					
TYLER	***NON-PFAB STO	ORES PRODUC	E CASES R	EFLECT 36 L	SET PT & HIGH	IGH ALARM H ALARM SE	SEL PLOF	46, PFAB STC .40 DEAB STC		34 DEG SET PT	& HIGH ALAR	M SET PT OF 41	
LRPHP	ISLAND PRODUCE	36		46		26		60	OFF TIME	6	12		
N2MHP	MULTI-DECK MEAT	28		40		20		60	OFF TIME	6	16-26	48 (WHERE APPLICABLE)	15-20 (WHERE APPLICABLE)
N3HMGHP	MULTI-DECK MEAT	29		40		20		60	OFF TIME	6	32		
									PULSED HOT GAS	1	25	70	4
	IC GLASS DOORS	**-8		5				60	ELECTRIC	1	60	55 (WHERE APPLICABLE)	30
									HOT GAS	1	18-25	65	8
NSFG(N)(A)									PULSED HOT GAS	1	25	70	4
	DUAL TEMPERATURE	**-8	34	5	41		26	60	HOT GAS	1	18-25	65	8
		Ū	51	5	11		20		ELECTRIC	1	60	55 (WHERE APPLICABLE)	30
									OFF TIME	1	60		
N5 N GN(A)/P5N GN(A)	MED TEMP GLASS DOORS	34		41		26		60	OFF TIME	1	60		
	MULTI-DECK PRODUCE	***34/36		***41/ 46		26		60	OFF TIME	6	16-26	48 (WHERE APPLICABLE)	15-20 (WHERE APPLICABLE)
N6DHPL / N6DHPACL /	MULTI-DECK BEVERAGE / BEER	34		41		24		60	OFF TIME	6	16-26	48 (WHERE APPLICABLE)	15-20 (WHERE APPLICABLE)
Νουμρινί	MULTI-DECK DAIRY	34		41		26		60	OFF TIME	6	16-26	48 (WHERE APPLICABLE)	15-20 (WHERE APPLICABLE)
	MULTI-DECK MEAT	****28 /30		****38 /40		20		60	OFF TIME	6	16-26	48 (WHERE APPLICABLE)	15-20 (WHERE APPLICABLE)
	MULTI-DECK MEAT	****28 /30		****38 /40		20		60	OFF TIME	6	16-26	48 (WHERE APPLICABLE)	15-20 (WHERE APPLICABLE)
N6MHPM	MULTI-DECK DAIRY	34		41		26		60	OFF TIME	6	16-26	48 (WHERE APPLICABLE)	15-20 (WHERE APPLICABLE)
	MULTI-DECK PRODUCE	***34/36		***41/ 46		26		60	OFF TIME	6	16-26	48 (WHERE APPLICABLE)	15-20 (WHERE APPLICABLE)
N6PHP(M)	MULTI-DECK PRODUCE	***34/36		***41/ 46		26		60	OFF TIME	6	12		
NPW	ISLAND PRODUCE	36		46		26		60	OFF TIME	1	60		

			DUAL TEMP	HIGH	DUAL TEMP	LOW	DUAL TEMP						
BRAND /MODEL	FIXTURE TYPE	TEMP SET POINT (°F)	SET POINT (°F)	ALARM LIMIT (°F)	HIGH ALARM LIMIT (°F)	ALARM LIMIT (°F)	ALARM LIMIT	ALARM DELAY *(MIN)	TYPICAL DEFROST TYPE	# OF DEFROSTS PER DAY	DEFROST DURATIO N (MIN)	DEFROST TERM (°F)	MIN DEFROST (MIN)
	COFFIN DUAL	**-8	24/27	5	38		18	60	HOT GAS	1 TO 3	16-30	65-Defrost Term Sensor,	12
	TEMP	_	,	_			_		ELECTRIC	1	60	50	30
NTJ (E) (CX) /NFJE (CX)									PULSED HOT GAS	1	25	70	4
, - (-)	IC GLASS DOORS	**-8		5				60	ELECTRIC	1	45	55 (WHERE APPLICABLE)	30
									HOT GAS	1	18-25	65	8
									PULSED HOT GAS	1	25	70	4
	DUAL	** 0	24	F	41		20	60	HOT GAS	1	18-25	65	8
P5FG (N)	TEMPERATURE	**-8	34	5	41		26	60	ELECTRIC	1	60	55 (WHERE APPLICABLE)	30
									OFF TIME	1	60		
HUSSM	ANN	*WHEN IN **P&G ANE ***NON-PF ****NON-F	DEFROST, D SELECT S AB STORE PFAB STOR	30 MIN AD SUPER TARG S PRODUCE RES MEAT C	DED TO ALARM GET PROTOTYPE E CASES REFLEC [®] ASES REFLECT 2	DELAY BEF S WITH NO T 36 DEG SE 8 DEG SET F	ORE HIGH T EEPR CONT T PT & HIGI PT & HIGH A	EMP ALARM ROL MAY ST H ALARM SET ALARM SET P	I TRIGGERED (I. ILL REFLECT A - T PT OF 46, PFA T OF 38-40, PFA	E. IF ALARM D •12 SET POINT .B STORES REF AB STORES RE	ELAY IS 60 MI LECT 34 DEG S FLECT 30 DEG	N, WILL NOT ALAR SET PT & HIGH ALA SET PT & HIGH AL	M UNTIL 90 MIN) ARM SET PT OF 41 ARM SET PT 40
C2XXEP	OPEN LOW PROFILE MEAT	30		40		20		60	OFF TIME	2	30		
C4LE	MULTI-DECK PRODUCE	36		*41/46		26		60	OFF TIME	4	30	48 (WHERE APPLICABLE)	15 (WHERE APPLICABLE)
	MULTI-DECK PRODUCE CASE	***34/36		***41/ 46		26		60	OFF TIME	4	30	48 (WHERE APPLICABLE)	15 (WHERE APPLICABLE)
C5E / C5LE	MULTI-DECK MEAT	29/30		40		20		60	OFF TIME	4	30	48 (WHERE APPLICABLE)	15 (WHERE APPLICABLE)
	MULTI-DECK DAIRY	31		41		26		60	OFF TIME	4	30	48 (WHERE APPLICABLE)	15 (WHERE APPLICABLE)
	MULTI-DECK MEAT	30		40		20		60	OFF TIME	2	30	48 (WHERE APPLICABLE)	15 (WHERE APPLICABLE)
C5X-LEP	MULTI-DECK PRODUCE	***34/36		***41/ 46		26		60	OFF TIME	2	30	48 (WHERE APPLICABLE)	15 (WHERE APPLICABLE)
	MULTI-DECK DAIRY	34		41		26		60	OFF TIME	2	30	48 (WHERE APPLICABLE)	15 (WHERE APPLICABLE)
	MULTI-DECK BEER /	34		41		26		60	OFF TIME	4	35	48 (WHERE APPLICABLE)	15 (WHERE APPLICABLE)
D5(E) / D5(LE)	MULTI-DECK DAIRY	34		41		26		60	OFF TIME	4	35	48 (WHERE APPLICABLE)	15 (WHERE APPLICABLE)
	MULTI-DECK DELI	32		41		26		60	OFF TIME	4	35	45 (WHERE APPLICABLE)	15 (WHERE APPLICABLE)

		TEMP SET POINT	DUAL TEMP SET	HIGH ALARM LIMIT	DUAL TEMP HIGH ALARM	LOW ALARM LIMIT	DUAL TEMP LOW	ALARM DELAY	TYPICAL DEFROST	# OF DEFROSTS	DEFROST DURATIO	DEFROST	MIN DEFROST
BRAND /MODEL	FIXTURE TYPE	(°F)	POINT	(°F)	LIMIT (°F)	(°F)	ALARM	*(MIN)	ТҮРЕ	PER DAY	N (MIN)	TERM (°F)	(MIN)
DK	MULTI-DECK DAIRY	34		41		26		60	OFF TIME	6	40		
ESBDHV	MULTI-DECK DELI	29		41		20		60	OFF TIME	2	60-90	45-60 (WHERE APPLICABLE)	15 (WHERE APPLICABLE)
E2SP	BAKERY SERVICE	30		41		20		60	OFF TIME	2	60	48 (WHERE APPLICABLE)	15 (WHERE APPLICABLE)
F3	MULTI-DECK DELI /BAKERY	29		<i>A</i> 1		24		60	OFE TIME	Д	40	45 (WHERE APPLICABLE)	15 (WHERE APPLICABLE)
ID5SM	MULTI-DECK	32		41		26		60	OFF TIME	6	20		
104-04	ISLAND MEAT	34		41		26		60	OFE TIME	6	20		
	ISLAND MULTI- DECK MEAT	27		40		20		60	OFF TIME	6	20	45 (WHERE APPLICABLE)	10 \(WHERE APPLICABLE)
ISLA	ISLAND MULTI- DECK DAIRY	32		41		26		60	OFF TIME	6	20	45 (WHERE APPLICABLE)	10 \(WHERE APPLICABLE)
114/	SINGLE DECK	** 0						60	HOT GAS	1	15-18	48 (where applicable)	8
LVV	FROZEN FOOD	-8	5					60	ELECTRIC	1	60	48 (where applicable)	20
P2	MULTI-DECK PRODUCE	36		46		26		60	OFF TIME	4	30	48 (WHERE APPLICABLE)	15 (WHERE APPLICABLE)
Q3.5	MULTI-DECK DELI/BAKERY	31		41		26		60	OFF TIME	6	25	45	15 (WHERE APPLICABLE
Q4-DC	BAKERY/DELI SERVICE	28		41		20		60	OFF TIME	3	40	45	15 (WHERE APPLICABLE
R3	MULTI-DECK DELI	30		40		20		60	OFF TIME	4	40	45 (WHERE APPLICABLE)	15 (WHERE APPLICABLE)
	MULTI-DECK DELI	30		41		24		60		C	20	48 (WHERE	15 (WHERE
KI-SIN	MULTI-DECK PRODUCE	***34/36		***41/ 46		26		60		D	20	APPLICABLE)	APPLICABLE)
									PULSED HOT GAS	1	25	70	4
	IC GLASS DOORS	**-8		5				60	HOT GAS	1	20	65/70	8
									ELECTRIC	1	45	50/55	20
RL/ RLN		** 0	24	F	41		26	60	PULSED HOT GAS	1	25	70	4
	TEIVIPERATURE	-8	54	5	41		20	60	ELECTRIC	1	60	50/55	20
									OFF TIME	1	60		
RMN	MED TEMP GLASS DOORS	34			41		26	60	OFF TIME	1	60		
SFNG	ENDCAP BUNKER OF ISLA	-6	27	5	38		18	60	ELECTRIC	2	30	48 (WHERE APPLICABLE)	15 (WHERE APPLICABLE)
Q2	Experience Center	36	-	46	-	26	-	60	OFF TIME	4	30	-	-

		TEMP SET	DUAL TEMP SET	HIGH ALARM	DUAL TEMP HIGH	LOW ALARM	DUAL TEMP LOW ALARM	ALARM	TYPICAL	# OF	DEFROST		
		POINT	POINT	LIMIT	ALARM	LIMIT	LIMIT	DELAY	DEFROST	DEFROSTS	DURATIO	DEFROST	MIN DEFROST
BRAND /MODEL	FIXTURE TYPE	(°F)	(°F)	(°F)	LIMIT (°F)	(°F)	(°F)	*(MIN)	ТҮРЕ	PER DAY	N (MIN)	TERM (°F)	(MIN)
HILL PH	OENIX	*WHEN IN **P&G ANI ***NON-PF	DEFROST, D SELECT S AB STORE	30 MIN AD SUPER TARG S PRODUCE	DED TO ALARM SET PROTOTYPE E CASES REFLEC	DELAY BEF S WITH NO T 36 DEG SE	ORE HIGH 1 EEPR CONT ET PT & HIG	'EMP ALARM 'ROL MAY ST H ALARM SE'	I TRIGGERED (I. ILL REFLECT A - T PT OF 46, PFA	E. IF ALARM D • 12 SET POINT .B STORES REF	ELAY IS 60 MI	N, WILL NOT ALAR SET PT & HIGH ALA	ARM SET PT OF 41
JNRBHA	MED TEMP GLASS DOORS	34			41		26	60	OFF TIME	1	50-60	40-48 (WHERE APPLICABLE)	20 (WHERE APPLICABLE)
JNRBHXL	MED TEMP GLASS DOORS	34			41		26	60	OFF TIME	2	30	40-48 (WHERE APPLICABLE)	20 (WHERE APPLICABLE)
JNRZHA	IC GLASS DOORS	**-8		5				60	ELECTRIC	1	40-45	48 (WHERE APPLICABLE)	20 (WHERE APPLICABLE
	IC GLASS DOORS	**-8		5				60	PULSED HOT GAS	1	25	70	4
									ELECTRIC	1	46	60	20
JNRZHXL									PULSED HOT GAS	1	25	70	4
	DUAL TEMPERATURE	**-8	34	5	41		26	60		1	60	60	20
									OFF TIME				
ОВ	ORCHARD BIN	36		46		26		60					
ОНРН	MULTI-DECK PRODUCE CASE	36		46		26		60	OFF TIME	3	45		
ONNS	MULTI-DECK BEVERAGE CASE	36		48		26		60	OFF TIME	6	40	47 (WHERE APPLICABLE)	15 (WHERE APPLICABLE
ONRB	MULTI-DECK DELI GLASS DOORS	36		41		26		60	OFF TIME	4	30	47 (WHERE APPLICABLE)	15 (WHERE APPLICABLE)
OIP	ISLAND PRODUCE	34		48		26		60	OFF TI ME	3	44	38 (WHERE APPLICABLE)	15 (WHERE APPLICABLE)
	IC GLASS DOORS	**-8		5				60	HOT GAS	1	24	73	10
									ELECTRIC	1	46	60	20
ONRZH /ORZH	DUAL	**_Q	2/	5	A1		26	60	ELECTRIC	1	60	60	20
	TEMPERATURE	-0	54	C I	41		20	00	OFF TIME	1	00	00	20
	MED TEMP GLASS DOORS		34		41		26	60	OFF TIME	1	60		

BRAND /MODEL	FIXTURE TYPE	TEMP SET POINT (°F)	DUAL TEMP SET POINT (°F)	HIGH ALARM LIMIT (°F)	DUAL TEMP HIGH ALARM LIMIT (°F)	LOW ALARM LIMIT (°F)	DUAL TEMP LOW ALARM LIMIT (°F)	ALARM DELAY *(MIN)	TYPICAL DEFROST TYPE	# OF DEFROSTS PER DAY	DEFROST DURATIO N (MIN)	DEFROST TERM (°F)	MIN DEFROST (MIN)
	COFFIN DUAL	6	27	F	20		10	60	HOT GAS	1	20	60	10
OWIZ /OWEZ	TEMP	-0	27	Э	38		18	60	ELECTRIC	1	60	50	20
O3UM	MULTI-DECK	30		40		20		60	HOT GAS	3	15	45	5
030101	MEAT	30		40		20		00	OFF TIME	3	40	45	15
	MULTI-DECK	26		46		26		60			22	47 (WHERE	15 (WHERE
	MULTI-DECK	30		46		26		60	OFF TIME	4	32	47 (WHERE	15 (WHERE
	DAIRY	34		41		26		60	OFF TIME	4	32	APPLICABLE)	APPLICABLE)
OEDM	MULTI-DECK BEER/BEVERAGE	34		41		26		60	OFF TIME	4	32	47 (WHERE APPLICABLE)	15 (WHERE APPLICABLE)
05DW	MULTI-DECK	20		40		20		60			22	47 (WHERE	15 (WHERE
		30		40		20		60	OFF TIME	4	32	APPLICABLE)	15 (WHERE
	MEAT CASE	30		40		20		60	HOT GAS	4	32	APPLICABLE)	APPLICABLE)
O5DM-NRG	MULTI-DECK	***24/20		***41		26		60		C	20	47 (WHERE	15 (WHERE
	MULTI-DECK	24		/40		20		60		6	30	APPLICABLE)	15 (WHERE
0501-1110	DAIRY	54		41		20		00		0	40	42	APPLICABLE)
	MULTI-DECK MEAT	30		40		20		60	OFF TIME	6	40-45	42-45	15 (WHERE APPLICABLE)
	MULTI-DECK MEAT ON CU	28		40		20		60	OFF TIME	6	40-45	42-45	15 (WHERE APPLICABLE)
O5M-NRG	MULTI-DECK PRODUCE	***34/36		***41 /46		26		60	OFF TIME	6	40-45	48	15 (WHERE APPLICABLE)
	MULTI-DECK DAIRY	34		41		26		60	OFF TIME	6	40-45	48	15 (WHERE APPLICABLE)
	MULTI-DECK PROMOTION	32		40		26		60	OFF TIME	6	40-45	48	15 (WHERE APPLICABLE)
	MULTI-DECK MEAT/ GRAB &	30		40		20		60	OFF TIME	6	40-45	42-45	15 (WHERE APPLICABLE)
	MULTI-DECK PRODUCE	***34/36		***41 /46		26		60	OFF TIME	6	40-45	48	15 (WHERE APPLICABLE)
05M	MULTI-DECK DAIRY	34		41		26		60	OFF TIME	6	40-45	48	15 (WHERE APPLICABLE)
	MULTI-DECK BEER/BEVERAGE	34		41		26		60	OFF TIME	6	40-45	48	15 (WHERE APPLICABLE)
	MULTI-DECK PROMOTION	32		40		26		60	OFF TIME	6	40-45	48	15 (WHERE APPLICABLE)
OB	Tiered Orchard Bin	36	-	46	-	26		60	OFF TIME	4	15-20	-	-

BRAND /MODEL	FIXTURE TYPE	TEMP SET POINT (°F)	DUAL TEMP SET POINT (°F)	HIGH ALARM LIMIT (°F)	DUAL TEMP HIGH ALARM LIMIT (°F)	LOW ALARM LIMIT (°F)	DUAL TEMP LOW ALARM LIMIT (°F)	ALARM DELAY *(MIN)	TYPICAL DEFROST TYPE	# OF DEFROSTS PER DAY	DEFROST DURATIO N (MIN)	DEFROST TERM (°F)	MIN DEFROST (MIN)
SMD	Service Deli Bakery	28		38		18		60	OFF-TIME	4	65		36
PFI	Produce Island	27		41		26		60	OFF-TIME	6	45		15 (WHERE APPLICABLE)
HSC	Produce table	36	-	46	-	26		60	OFF TIME	3	15-20	-	-

			DUAL		DUAL		DUAL TEMP						
		TEMP SET	DUAL TEMP SET	HIGH ALAR M	DUAL TEMP HIGH	LOW ALARM	LOW ALAR M	ALARM	TYPICAL	# OF DEFROST	DEFROST		
BRAND /MODEL	FIXTURE TYPE	POINT (°F)	POIN T (°F)	LIMIT (°F)	ALARM LIMIT (°F)	LIMIT (°F)	LIMIT (°F)	DELAY *(MIN)	DEFROST TYPE	S PER DAY	DURATIO N (MIN)	DEFROST TERM (°F)	MIN DEFROST (MIN)
ZERO ZO	ONE	*WHEN II 90 MIN)	N DEFROS	5T, 30 MIN	ADDED TO ALA	RM DELAY	BEFORE H	IGH TEMP AI	LARM TRIGGEF	RED (I.E. IF AL	ARM DELAY IS	5 60 MIN, WILL NO	OT ALARM UNTIL
									HOT GAS	1	30	65	10
	IC GLASS DOORS	**-8		5				60	PULSED HOT GAS	1	25	70	4
									ELECTRIC	1	45	50	20
RVZC30									HOT GAS	1	30	65	10
	DUAL TEMPERATURE	**-8	34	5	41		26	60	PULSED HOT GAS	1	25	70	4
									ELECTRIC	1	60	50	20
									OFF TIME	1	60	65	10
RVCC30	MEDIUM TEMP GLASS DOORS		34		41		26	60	OFF TIME	2	30		
VRBH	REACH IN BEER GLASS DOOR	34		41		26		60	OFF TIME	2	30	40	15 (WHERE APPLICABLE)
BARKE	र												
BDPF	MULTI-DECK DELI	28		41		20		60	OFF TIME	4-6	20-30	48	15 (WHERE APPLICABLE)
BDPTD	MULTI-DECK DELI / SUSHI / CHEESE	28		41		20		60	OFF TIME	6	20-30	48	15 (WHERE APPLICABLE)
BLF	BAKERY SERVICE	28		41		20		60	OFF TIME	4-6	20-30	48	15 (WHERE APPLICABLE)
BMD	MULTI-DECK DELI/MEAT	28		40/41		20		60	OFF TIME	6	20-30	48	15 (WHERE APPLICABLE)
QC72 / QC96	MULTI-DECK DELI	28		41		20		60	OFF TIME	6	20-30		
Carter		*All cases	have a 6	F deadbar	nd Tasa tamparatu	ro, caco wi	ll float dou	into 11 E o	nd float un to	E E			
ID	MULTI-DECK DAIRY	31	-	41	-	26	-	60	OFF TIME	6	45	52	20
ID	MULTI-DECK MEAT	27	-	41	-	26	-	60	ELECTRIC	6	45	52	20
ID	MUTLI-DECK PRODUCE	33	-	41	-	26	-	60	OFF TIME	6	45	52	20
ND	ISLAND CASE DAIRY	29	-	41	-	26	-	60	ELECTRIC	6	40	52	20
FC	GLASS DOOR MED TEMP	32	-	41	-	26	-	60	ELECTRIC	6	45	46	15

FD	DUAL TEMP GLASS DOOR CASE	-11	31	5	41	-	26	60	ELECTRIC	2	45	39	10
Floraline													
SP-60	OPEN FLORAL	34		55		20		60	OFF TIME	2	60		
Traullsen													
G31310	Self contained Upright Door case-Freezer	-10	-	10	-	-	-	60					
G20010	Self contained Upright Door case-Cooler	35	-	41	-	26	-	60					

**Note: existing Super Targets with Manual EPR control will retain their previous settings within the sales floor freezers and will not necessarily reflect the -8 degree set point listed in the table above. Click here for a listing of these stores: <u>No EEPR Control</u>.

DUAL TEMP HIC	6H DUAL TEMI	P LOW	DUAL TEMP LOW						
TEMP SET SET ALA	ARM HIGH	ALARM	ALARM	ALARM	TYPICAL	# OF	DEFROST		
POINT POINT LIM	IIT ALARM	LIMIT	LIMIT	DELAY	DEFROST	DEFROSTS	DURATIO	DEFROST	MIN DEFROST
BRAND / MODEL FIXTURE TYPE (°F) (°F) (°F)	LIMIT (°F)	(°F)	(°F)	*(MIN)	ТҮРЕ	PER DAY	N (MIN)	TERM (°F)	(MIN)
*WHEN IN DEFROST, 30 M	IN ADDED TO ALAR	M DELAY BEF	ORE HIGH T	EMP ALARM	TRIGGERED (I.	E. IF ALARM D	ELAY IS 60 MI	N, WILL NOT ALAR	M UNTIL 90 MIN)
** SOME SELECT OLDER S	JPER TARGETS MAY	HAVE A 45 N	AIN AND NO	DT 60 MIN DE	FROST DURAT	ION (MOST H	AVE 60)		
***NOT ALL WALK IN FOO	D AVENUE COOLER	/ FREEZER DE	FROSTS CO	NTROLLED B	Y E2 CONTROLI	LER			
****SOME SELECT OLDER	SUPER TARGETS M	, AY HAVE A 40		NOT 60 MIN	DEFROST DURA	ATION (MOST	HAVE 60)		
	R SLIPER TARGETS N	ΛΔΥ STILL ΗΔ	VE -15 DEG	REE TEMP SE		IN ERFEZERS I	E SPECIAL EOL	I IIPMENT EXISTS V	
WALK IN UNITS ALLOW A -10 DEGREE SET	PT								
	· ·		1	r	T	T		T	r
WALK IN DAIRY 34 4	11	26		60	OFF TIME	3	**60		
COOLER									
WALK IN DRY									
STORAGE AREA 58	58	40		90	OFF TIME	2	50		
***\\\\ Δ K N									
	11	26		60		2	60		
	+1	20		00		2	00		
COOLER									
					FLECTRIC	3	30	55	10
28 28	38	18		60	LLECTRIC	5	50	55	10
COOLER					HOT GAS	_			
					(ON RTCR)	3	16	65	10
λιαικ in MEAT					(0				
	50	28		90		2	60		
		20		50		2	00		
	58	40		90	OFF TIME	2	50		
WALK IN									
PRODUCE 36 4	46	26		60	OFF TIME	3	****60		
COOLER									
WALK IN BAKERY	11	26		60		2	****60		
/ DELI COOLER 34 4	+1	20		60	OFF TIME	3			
WALK IN BEER									
	41	26		60	OFF TIME	3	60		
*** WALK IN									
FOOD AVENUE -5				60	ELECTRIC	3	30	55	10
FREEZER									
WALKIN					FLECTRIC	з	30	55	10
(VALK IN *****-10)	LO			60		Ĵ	50	55	10
FREEZER						2	16	65	10
					HUI GAS	5	10	05	10
WALK IN BAKERY			1						10 (WHERE
/ DELLEREEZER -5 1	LO			60	HOT GAS	3	16	65	
				<u> </u>	+	-		-	
			1	1	1				
				60	HOTGAS	2	16	65	10 (WHERE

 FREEZER
 APPLICABLED

 *****A few select Super Targets may still have -15 degree set point in Walk in Freezers if special equipment exists which does not allow a -10 degree set point. For a list of these stores, refer to this link.

							DUAL						
			DUAL	HIGH			TEMP						
			TEMP	ALAR	DUAL TEMP	LOW	LOW						
		TEMP SET	SET	М	HIGH	ALARM	ALARM	ALARM	TYPICAL	# OF	DEFROST		
		POINT	POINT	LIMIT	ALARM	LIMIT	LIMIT	DELAY	DEFROST	DEFROSTS	DURATIO	DEFROST	MIN DEFROST
BRAND /MODEL	FIXTURE TYPE	(°F)	(°F)	(°F)	LIMIT (°F)	(°F)	(°F)	*(MIN)	ТҮРЕ	PER DAY	N (MIN)	TERM (°F)	(MIN)

STAND ALONE / SELF CONTAINED UNITS

*WHEN IN DEFROST, 30 MIN ADDED TO **ALARM DELAY** BEFORE HIGH TEMP ALARM TRIGGERED (I.E. IF ALARM DELAY IS 60 MIN, WILL NOT ALARM UNTIL 90 MIN) **TEMPERATURE & DEFROST SETTINGS ON STAND ALONE CASES **NOT** UNDER CONTROL OF E2. HIGH & LOW ALARM LIMITS CURRENTLY ONLY MONITORED SETTINGS ON THESE CASES.

ZERO ZONE								
2RVCP30	**FOOD AVENUE/ SERVICE COOLER	34	 41	 26	 60	 	 	
HILL PHOEN	IX							
ONNRSA	**GRAB & GO COOLER	34	 41	 26	 60	 	 	
O3UMA	**GRAB & GO COOLER	34	 41	 26	 60	 	 	
HSC	**SINGLE DECK PRODUCE TABLE	36	 46	 26	 60	 	 	
ОВ	**SINGLE DECK PRODUCE TABLE	36	46	26	60			
HUSSMANN								
Q2-SS-SC	**EXPERIENCE CENTER CASE	28	 41	 20	 60	 	 	
TRUE	·							
TVM-48SL- HC~SW01	**BABY COOLER	34	 41	 26	 30	 	 	
MISCELLAN	EOUS							
STRUCTURAL CONCEPTS OASIS	**SBUX WOC (Starbuck's Wall of Chill)	34	 41	 26	 60	 	 	
AHT GD XL SLIM	**FRESH PET COOLER	30	 41	 20	 60	 	 	
	**FOOD AVENUE/ SERVICE FREEZER	-8	 10	 	 60	 	 	

MS Settings: (P Fresh, City, Super and P&G Stores)

Condensers	Name	Input	Set Point	High Limit (trips)	Low Limit	Delay (High Alarm)	Seasonal Split	Floating Condenser	Notes
	Fan (Pressure) Control Set Point	Discharge pressure	86F (Hot Gas Defrost) 70 F (Electric Defrost)	129F	-	5 sec	Yes	-	Discharge pressure is maintained through cycling of fans. In Ultrasite condenser fan set point: 190 psig R404A, 95 psig R134a, 177 psig R407A. For FMOC alarming purposes: High alarm: 350 psig R404A, 195 psig R134a, 330 psig R407A.
	Condenser Hold Back Valve	Drop leg pressure	72F (Hot Gas Defrost) 60 F (Electric Defrost)	-	-	-	-	-	Mechanical A8 or A9 valves field set and verified. Electronic hold back valve controlled via REMs program.
Air Cooled, Pressure Controlled	Receiver Pressurization Valve	Receiver pressure	67F (Hot Gas Defrost) 50 F (Electric Defrost)	-	-	-	-	-	Mechanical A8 or A9 valves field set and verified. Electronic receiver pressurization valve controlled via REMs program.
	Split	OAT	60 F	-	-	-	-	-	Split: Once the OAT temp falls below 57.5 F, split valve is energized "closed" the "summer only" half of the condenser fans are disabled, and the refrigerant is diverted to the "full time" side of the condenser only. When OAT rises above 62.5 F, split valve de-energizes "opening" the "summer only" half of the condenser and enabling the "summer only fans.
	Un-Split	Discharge pressure	102 F					-	Super Targets: When discharge pressure rises above 101 F, condenser is taken out of "Split Mode
	Fast Recovery	Discharge pressure	117 F	-	-	-	-	-	
	Surge Ambient Cooling	Drop Leg pressure/temp	CI 12 F, CO 10 F	-	-	-	-	Yes	Condenser sub-cooling is calculated by converting the drop leg pressure to temperature then subtract the actual drop leg temperature from the conversion.

Condensers	Name	Input	Set Point	High Limit (trips)	Low Limit	Delay (High Alarm)	Seasonal Split	Floating Condenser	Notes
	Fan (Temperature) Differential Control Set Point	Ambient Temp, Drop Leg Pressure converted to temp	10 F difference(low temp)* 15 F difference (medium temp)*	90 F (ambient temp input)	70 F	-	Yes	Yes	*Measured between ambient temp and drop leg pressure converted to temp
	Condenser Hold Back Valve	Drop leg pressure	60 F	-	-	-	-	-	Mechanical A8 or A9 valves field set and verified. Electronic hold back valve controlled via REMs program.
	Receiver Pressurization Valve	Receiver pressure	50 F	-	-	-	-	-	Mechanical A8 or A9 valves field set and verified. Electronic receiver pressurization valve controlled via REMs program.
Air Cooled, Variable Condensing Pressure (Temperature	Split	OAT	50 F	-	-	-	-	-	Split: Once the OAT temp falls below 47.5 F, split valve is energized "closed" the "summer only" half of the condenser fans are disabled, and the refrigerant is diverted to the "full time" side of the condenser only. When OAT rises above 52.5 F, split valve de-energizes "opening" the "summer only" half of the condenser and enabling the "summer only fans.
Differential)	Un-Split	Discharge pressure	102 F					-	Super Targets: When discharge pressure rises above 101 F, condenser is taken out of "Split Mode
	Fast Recovery	Discharge pressure	117 F	-	-	-	-	-	
	Surge Ambient Cooling	Drop Leg pressure/temp	CI 12 F, CO 10 F	-	-	-	-	Yes	Condenser sub-cooling is calculated by converting the drop leg pressure to temperature then subtract the actual drop leg temperature from the conversion.
	Fast Recovery	Discharge pressure	117 F	-	-	-	-	-	
	Surge Ambient Cooling	Drop Leg pressure/temp	CI 12 F, CO 10 F	-	-	-	-	Yes	Condenser sub-cooling is calculated by converting the drop leg pressure to temperature then subtract the actual drop leg temperature from the conversion.

Condensers	Name	Input	Set Point	High Limit (trips)	Low Limit	Delay (High Alarm)	Seasonal Split	Floating Condenser	Notes
	Drop Leg Temp	Drop Leg Temp – Temperature Differential Strategy	25° above outdoor Wet Bulb Temp (min. 78°, max. 110°)	129F	-	5 sec	N/A	-	See subheadings for evaporative condenser below. Super Targets: Fast Recovery enabled at 300psi Discharge Pressure. Each fan has a proof input for proof failure alarming
	Discrete Spray	Condenser Pump	-	-	-	-	-	-	Turns on anytime pump is OFF
	Condenser Water Temp	Water Sump Temp Sensor	CI: 34 F, CO 32 F	-	32 F	-	-	-	-
Evaporative Condenser	Condenser Flow Switch	Flow Switch Dry Contacts Relay	Flow Switch Dry Contacts Relay	Alarms when OFF (no relay closure)	-	1 min	-	-	Flow switch will be ON (relay closed) as long as pump is working and water flow to condenser is good. No flow, or impeded flow, will cause flow switch contacts to open (OFF in E2), which will generate an alarm, call for the pump to turn off, and discrete spray will turn on.
	Condenser Pump Proof	Current sensing relay	-	No relay closure	-	5 sec	-	-	When E2 calls for pump, contactor energizes. Current Sensing Relay closes. After 5 seconds, if CSR does not match E2, alarm is generated.
	Condenser Fan Proof	Current sensing relay	-	No relay closure	-	-	-	-	When E2 calls for a fan, contactor energizes. Current Sensing Relay closes. After 30 seconds, if CSR does not match E2, alarm is generated.
	Evap Condenser Pump	Always On	-	-	-	-	-	-	Condenser water temp must be above 34°, flow switch must be "ON" signaling good flow; pump will shut off if either of these are not ok.

Condensers	Name	Input	Set Point	High Limit (trips)	Low Limit	Delay (High Alarm)	Seasonal Split	Floating Condenser	Notes
	Drop Leg Temp	Drop Leg Temp – Temperature Differential Strategy	25° above outdoor Wet Bulb Temp (min. 78°, max. 110°)	129F	-	5 sec	N/A	-	INFORMATION included in all of the sections to the left are a copy and paste from the evaporative condenser above. All points need to be reviewed and confirmed.
	Discrete Spray	Condenser Pump	-	-	-	-	-	-	
Adiabatic Condenser	Condenser Water Temp	Water Sump Temp Sensor	CI: 34 F, CO 32 F	-	32 F	-	-	-	
	Condenser Flow Switch	Flow Switch Dry Contacts Relay	Flow Switch Dry Contacts Relay	Alarms when OFF (no relay closure)	-	1 min	-	-	
	Condenser Pump Proof	Current sensing relay	-	No relay closure	-	5 sec	-	-	
-	Condenser Fan Proof	Current sensing relay	-	No relay closure	-	-	-	-	
	Evap Condenser Pump	Always On	-	-	-	-	-	-	

Compressor Racks	Name	Input	Set point (Control point)	High Limit (trips)	High Alarm Delay (secon ds or minut es)	Low Limit	Low Limit Delay (minutes)	Notes
	Compressors	Suction Transducer	Store Specific	8-12 psig above set point	60 min	8-12 psig below set point	60 min	When Floating Suction is programmed, set-point adjusts from design set-point to design +5-6 psig based on the temp of the designated lead circuit. As long as the lead circuit is "satisfied" set-point will adjust up in 1 pound increments. If the lead circuit is no longer satisfied, set-point is adjusted down in 1lb increments. The Float interval is 5 minutes. Floating suction is enabled after the store opens and only enabled on medium temperature RTCR's.
	Compressor Proof	Current sensing relay	_	No relay	35 min	_	_	When E2 calls for a compressor, contactor energizes Current Sensing Relay closes. After 35 minutes, if CSR does not match E2 alarm is generated
	Compressor Oil	current sensing reidy		No relay	33 1111			doses. Arter of minutes, in ear does not match 22, darm is Senerated.
	fail	Dry contact	-	closure	30 min	-	-	Alarm, compressor shut-down.
	Discharge Trip	Discharge Transducer	129 F	129 F	5 sec	-	-	All compressors shutdown off, and all condenser fans on.
Compressor	Mechanical	Sub-cooler in-let	CL 45 E CO 35 E	_	_	_	_	Control of liquid feeding electronic expansion value
Racks (All	Mechanical	temp	0 451,00 551	-		-	-	
except R744)	Subcooling	Sub-cooler out-let						Carteral of the Cub and Carterallan beaud "avera devus"
<u>except</u> ((744)	LOCKOUT Mechanical	temp	CI 34 F, CO 35 F	-	-	-	-	Control of the Sub-cool Controller board "pump-down".
	Sub-cooling CDS/TXV (existing PUC design	Sub-cooler liquid out temp	40 F	-	-	-	-	
	Receiver Liquid	Pacaivar flaat	•	100%	60 min	50/	60 min	Alarm only
	High Low Bypass	0-500 lb. Transducer		48 F	5 min	-	-	Alarm only. Note: for FMOC Ultrasite alarm purposes- In Ultrasite, high alarm value is 100 for R404a, 43 for R134a, and 85 for R407a.
				15 psig : R134a, 50 psig: R404A, 71				
	Rupture Disk	0-500 lb. Transducer	-	psig: R407A	10 min	-	-	Alarm only
	Exterior Water Service Room (Canadian Stores Only)	Temperature sensor	-	-	60 min	40 F	-	When the water service room is located on the exterior wall of the building and only utilizes an electric heater, an alarm will be sent to the REMS panel when the temperature in the room goes below 40 ° F for 1 hour. These are only present in certain Canadian stores.

					High Alarm Delay			
Compressor			Set point	High Limit	(secon ds or minut	low	Low Limit	
Racks	Name	Input	point)	(trips)	es)	Limit	(minutes)	Notes
	Compressors	Suction Transducer	-	315 psi	-	160 psi Pump- down	-	Pressure and Temperature ranges will be entered for all set-point data
	Compressor Proof CO2 LT Compressors	Current sensing relay	-	No relay closure	-	-	-	Summation of all compressor proof fails Immediate CO2 Main Liquid Line Shut-down
Compressor	Compressor Proof MT Compressors	Current sensing relay	-	No relay closure	-	-	-	Summation of all compressor proof fails Immediate CO2 Main Liquid Line Shut-down
Racks	Evaporator							INFORMATION NEEDED-SuperHeat Settings!!!!
(R744a)	Discharge Trip	Discharge psi 0-650 lb. Transducer	520 psig Alarm	-	5 sec	-	-	All compressors shutdown off, Immediate Main Liquid Line Shut-down
	High CO2 Suction Pressure Trip Set- point	Suction psi 0-500 lb. Transducer	Cl 315 psig CO 295 psig	-	-	-	-	Immediate Main Liquid Line Shut-down
	MT High Suction Pressure CO2 Shut-down	MT Suction psi 0-200 lb. transducer	CI 20 psig, CO 17 psig	-	3 min	-	-	CO2 Main Liquid Line Shut-down
	Receiver Liquid Level	Receiver Electronic Eye	-	-	15 min notice	5%	-	CO2 Receiver Liquid Level 15% Warning 5% Alarm
	Door Switch	Door switch control panel	-	Open door	35 min	-	-	When door open, suction valve and liquid line solenoid close (freezer only). Strobe light flashes when door open. If door open more than 15 minutes, horn sounds. After 35 minutes, alarm is generated to FMOC.
	Door never opens alarm	Door switch control panel	-	Door unopened	48 hours or more	-	-	If door is showing unopened over 48 hours, alarm comes into FMOC. This is a sign there may be something wrong with door switch. Typically door should be open more often with deliveries, stocking, etc. This was implemented in new and MR/RS stores starting in 2014, but will not be done retroactively at existing locations.
	*Industry standard i	s 100 ppms for Leak Transdu	cers, but high alarm lir	nits may reflect d	ifferent value	es in Ultrasite de	epending on Refrig	gerant type.
Walk In Unit	R-404A	Leak Transducer	-	*65	No Delay	-	-	If Refrigerant Leak Transducer reaches high alarm limit: Alarm generated to FMOC, W/I
Values	R-134A	Leak Transducer	-	*250	No Delay	-	-	energizes. All will return to normal once falls below alarm limit. Alarm needs to be
	R-407A	Leak Transducer	-	*100	No Delay	-	-	acknowledged in the Einstein.
R C	R-448A / R-449A	Leak Transducer	CI 500, CO 450	100	10 min.	-	-	If the Refrigerant Leak sensor reaches 100 ppm, an alarm will be generated to FMOC, Refrigerant Leak Indicators energize, (alarm silences and resets when level drops to 50 ppm, alarm must be acknowledged). At 500 ppm the box LLS will be shut down, resets when ppm level drops to 450. Horn will remain on until the front office alarm panel is silenced.
	R-744 EMC Leak Detection	Leak Transducer	-	*2000	No Delay	-	-	If Refrigerant Leak Transducer reaches high alarm limit: Alarm generated to FMOC, W/I box will shut down, Refrigerant Leak Indicators energize, and the front office enunciator energizes. All will return to normal once falls below alarm limit. Alarm needs to be acknowledged in the Einstein.
	IRLDS Leak Detection	Infrared Leak Detection System		*750	10 min.	-	-	If the Refrigerant Leak sensor reaches 750 ppm, an alarm will be generated to FMOC, the box will shut down, and the Refrigerant Leak Indicators energize. All will return to normal once ppm falls below 745 ppm. Horn will remain on until the front alarm panel is silenced.

P Fresh Refrigeration Guidelines

Checklists:

Compressor Rack R404A Settings

Yes or No		Description							
RTCR A	RTCR B								
		Condenser fan (THIS IS THE CURRENT REMS SETTING)							
		190 psi (Hot Gas Defrost)							
		Minimum condensing pressure 160 DSIC (75E)							
		Hold back 150 DSIG (70E) (10 DSIG LESS THAN MINIMUM							
		CONDENSING)							
		Receiver pressure 140 PSIG (65F) 10 PSIG LESS THAN HOLD BACK VALVE)							
		Split 60F (THIS IS CURRENT REMS SETTING for Pressure Control)							
		Split 50F (THIS IS CURRENT REMS SETTING for Floating Condensing Control)							
		Un-split 240 PSIG (THIS IS CURRENT REMS SETTING)							
		Fast recovery 300 PSIG (THIS IS CURRENT REMS SETTING)							
		Mechanical HPS 350 PSIG							
		Mechanical LPS -20 degree (16 PSIG REMS SETPOINT) / on @ 10 PSIG / off @ 3 PSIG / stage up time Stage 1 0-1 seconds, all remaining stages 30 seconds							
		Mechanical LPS +18 degree (54 PSIG REMS SETPOINT) / on @ 45 PSIG / off @ 38 PSIG / stage up time delay Stage 1 0-1 seconds, all remaining stages 30 seconds							
		Mechanical condenser fan switches (if equipped) to operate in the range: CUT IN 190-200-210 PSIG / CUT OUT 170-180-190 PSIG (MECHANICAL PRESSURE CONTROLS HAVE TO MAKE FOR REMS RELAYS TO WORK).							
		Defrost differential valve 20-25 PSIG (nothing in defrost) (10 PSIG compensation for liquid lift).							
		Receiver heater set-points 0n @ 45 F 0ff @ 50 F (use receiver outlet temp).							
		Sub-cooling mechanical EPR – Set to 65 psig (30 F evaporator temperature – adjust as required to maintain 40 F exiting liquid temperature from sub-cooler).							
		Sporlan Sub-cool Controller							

Sub-cooler Return Gas High Limit: 120 F
Sub-cooler OFF Temperature Differential : 10 F
Superheat Set point : 10 F
Refrigerant – System dependent
Liquid Proportional Gain set-point :1.0
Liquid Integral Gain set-point : 60
Liquid Derivative Gain set-point : 0
Superheat Proportional Gain set-point :1.0
Superheat Integral Gain set-point :120
Superheat Derivative Gain set-point : 0
Low Superheat Integral Gain :10
Valve Steps – 1596 (valve type/size: SE5, SEI-1,
SER-1.5, SEI-2, SEI-3.5, SEI-6, SER-6, SEI-11, SER-11,
 SER-20).
Valve Steps – 2500 (valve type/size: SER-B, C, D, G,
 J, K, L).
 Valve Steps – 3193 (valve type/size: SEI-30).
Valve Steps – 6386 (valve type/size: SEI-50, SHE-
 100, SHE-175).
Evaporative Condenser Fan set-points 25 F above wet bulb, minimum 78 F,
 and maximum 110 F. (THIS IS THE CURRENT REMS SETTING)
CURRENT REMS SETTING)
 Evaporative Condenser Pump set-points, sump temp above 34 F pump on.
(THIS IS THE CURRENT REMS SETTING)
Evaporative Condenser Discrete Spray set-point, pump proof fail, discrete
 spray on. (THIS IS THE CURRENT REMS SETTING)
Evaporative Condenser Loss of Flow set-point, loss of flow, pump off.
(1HIS IS THE CUKKENT KEMS SETTING)

Sub-cooler Note: Rack is supplied with a liquid sub cooler. Refrigerant from the main liquid line feeds sub cooling circuit with Sporlan Sub-cooler Controller controlling a Sporlan electronic expansion valve (EEV). On suction side of sub cooling circuit a mechanical evaporator pressure regulating valve is provided to maintain a set evaporator pressure for sub-cooler operation. Suction gas is used then for vapor injection of Copeland Scroll compressors. Reciprocating compressor racks: Medium temp RTCR is designed to sub-cool low temp RTCR liquid.

Condensing Unit R404A Settings

Yes or No	Description
	Condenser fan (s) turn on 235 PSIG / turn off 190 PSIG (multiple fans stage every 10
	PSI)
	Head pressure control set 180 PSIG)
	Liquid De-superheating TEV set at 40 degrees F at center of valve swing.
	High Pressure Switch setting 350 PSIG
	Low temperature Low Pressure Switch - set to maintain -10 degree F box temperature
	Food Avenue Freezer -5F
	Medium temperature Low Pressure Switch - set to maintain the following box
	temperatures – Meat +28F Dairy +34F Produce +34F Dry Storage +58F Food Ave
	Cooler +34F
	(COPELAND ZB SCROLL MINIMUM SUCTION PRESSURE IS 17 PSIG)

Condensing Unit R404A Settings with Hot Gas Bypass

Yes or No	Description
	Hot Gas Bypass Dual Temp. Set valve to open when suction PSI falls below 15 PSIG.
	Hot Gas Bypass Med Temp. Set valve to open when suction PSI falls below 50 PSIG.
	Crankcase Pressure Regulator valve Low Temp. Set to throttle compressor suction pressure @ 30-35 PSIG. Set valve immediately after start-up when evaporator is close to room temp
	Crankcase Pressure Regulating valve Med Temp. Set to throttle compressor suction pressure @ 80-85 PSIG. Set valve immediately after start-up when evaporator is close to room temp.
	Dual Temp Low Pressure Switch set to maintain case low temperature set-point

Condensing Unit R448A/R449A Settings

Yes or No	Description
	Condenser fan (s) turn on 225 PSIG / turn off 177 PSIG (multiple fans stage every 10
	PSI)
	Head pressure control set 167 PSIG)
	Liquid De-superheating TEV set at 40 degrees F at center of valve swing.
	High Pressure Switch setting 350 PSIG
	Low temperature Low Pressure Switch - set to maintain -10 degree F box temperature
	Food Avenue Freezer -5F
	Medium temperature Low Pressure Switch - set to maintain the following box
	temperatures – Meat +28F Dairy +34F Produce +34F Dry Storage +58F Food Ave
	Cooler +34F
	(COPELAND ZB SCROLL MINIMUM SUCTION PRESSURE IS 17 PSIG)

Condensing Unit R448A/R449A Settings with Hot Gas Bypass

Yes or No	Description
	Hot Gas Bypass Dual Temp. Set valve to open when suction PSI falls below 15 PSIG.
	Hot Gas Bypass Med Temp. Set valve to open when suction PSI falls below 50 PSIG.
	Crankcase Pressure Regulator valve Low Temp. Set to throttle compressor suction pressure @ 30-35 PSIG. Set valve immediately after start-up when evaporator is close to room temp.
	Crankcase Pressure Regulating valve Med Temp. Set to throttle compressor suction pressure @ 80-85 PSIG. Set valve immediately after start-up when evaporator is close to room temp.
	Dual Temp Low Pressure Switch set to maintain case low temperature set-point

Rooftop Compressor Rack R134A Settings (if applicable)

Yes or No	Description
	Condenser fan 95 PSIG
	Minimum condensing pressure 78 PSIG (75F)
	Hold back 71 PSIG (70F)
	Receiver pressure 65 PSIG (65F)
	Split 60F (THIS IS CURRENT REMS SETTING)
	Un-split 125 PSIG
	Fast recovery 165 PSIG
	Mechanical HPS 195 PSIG
	Mechanical LPS +22 degree (20 PSIG REMS SETPOINT) / on @ 22 PSIG / off @ 18
	PSIG / stage up time delay Stage 1 0-1 seconds, all remaining stages 30 seconds
	Mechanical condenser fan switches (if equipped) to operate in the range: CUT IN 115,
	125, and 135 PSIG / CUT OUT 100, 110, 120 PSIG (MECHANICAL PRESSURE
	CONTROLS HAVE TO MAKE FOR REMS RELAYS TO WORK).

Rooftop Compressor Rack R513A Settings (if applicable)

Yes or No	Description
	Condenser fan 95 PSIG
	Minimum condensing pressure 78 PSIG (75F)
	Hold back 71 PSIG (70F)
	Receiver pressure 65 PSIG (65F)
	Split 60F (THIS IS CURRENT REMS SETTING)
	Un-split 125 PSIG

Fast recovery 165 PSIG
Mechanical HPS 195 PSIG
Mechanical LPS +22 degree (20 PSIG REMS SETPOINT) / on @ 22 PSIG / off @ 18
PSIG / stage up time delay Stage 1 0-1 seconds, all remaining stages 30 seconds
Mechanical condenser fan switches (if equipped) to operate in the range: CUT IN 115,
125, and 135 PSIG / CUT OUT 100, 110, 120 PSIG (MECHANICAL PRESSURE
CONTROLS HAVE TO MAKE FOR REMS RELAYS TO WORK).

RTCR Compressor Rack CO2 Lower Cascade (R-744) Settings

Yes or No	Description		
	Low Side Operating Range 200 – 275 psig @ -20 evaporator design		
	Low Suction Alarm Set-point <160 psig		
	High Suction Alarm Set-point >315 psig		
	High Side Operating Range 400 – 500 psig		
	Low Discharge Alarm Set-point < 400 psig		
	High Discharge Alarm Set-point > 500 psig		
	Discharge Safety Trip 510 psig CI, Reset 475 psig		
	Pressure Regulating Relief Valve 560 psig		
	Main Pressure Relief 625 psig		
	Master Defrost Shutdown 500 Separator psig		
	Compressor Max Low Side Relief 350 psig		
	Compressor Mechanical LPS CO 150 psig, Minimum Differential 58 psi		
	Compressor Mechanical HPS CO 530 psig, Minimum Differential 58 psi		
	Compressor Mechanical stage up time delays 30 seconds for first compressor, then 60s		
	spread (30s, 90s, 150s)		
	Main Liquid Solenoid Valve CO2: Valve shall close under any of the following		
	conditions;		
	• ACU (auxiliary condensing unit is turned on (if applicable).		
	Main Liquid Line Solenoid Valve switch is turned off.		
	Rack experiences a Master Defrost Shutdown.		
	• Rack Phase Loss.		
	• Controller out-put opens (out-put shall open when all CO2 compressors are in oil or proof fault		
	condition.		
	Main Liquid Line Solenoid Valve HFC: Valve shall close under any of the following		
	conditions;		
	• Controller out-put opens (out-put shall open when all HFC compressors are in oil or proof fault		
	condition.		
	• Rack Phase Loss.		
	HFC Main Liquid Line Solenoid Valve switch is turned off.		
	CO2 discharge pressure falls below 290 psig.		

	Air Cooled De-superheater CI 35 CO 30 deg F Ambient Temperature
	CO2 Receiver Liquid Level 15% Warning 5% Alarm

*Note: The CO2 system currently utilizes the Smart Valve for subcooling and is not controlled by the E2 Controller.

CO2 Note: Refer to manufacturers Installation/Start-up/Operational manuals SNLTX2 and Second Nature Secondary Refrigerant documents for set-up, evacuation, charging, sequence of operations, and troubleshooting guides.

Compressor Rack R448A/R449A Settings (if applicable)

Yes or No		Description
Rack A	Rack B	
		Condenser fan 177 PSIG (85 F Midpoint)
		Minimum condensing pressure 154 PSIG (75 F Midpoint)
		Hold back 140 PSIG (70 F Midpoint)
		Receiver pressure 128 PSIG (65 F Midpoint)
		Split 60F (THIS IS CURRENT REMS SETTING for Pressure Control)
		Split 50F (THIS IS CURRENT REMS SETTING for Floating Condensing
		Control)
		Un-split 210 PSIG (94 F)
		Fast recovery 265 PSIG (115 F)
		Mechanical HPS 330 PSIG (130 F)
		Mechanical LPS -20 degree on @ 2 PSIG below REMS / off @ 3 PSIG / stage
		up time stage up time delay, Stage 1 0-1 seconds, all remaining stages 30
		seconds
		Mechanical LPS +18 degree (48 PSIG REMS SETPOINT) / on @ 38 PSIG / off
		@ 28 PSIG / stage up time delay, Stage 1 0-1 seconds, all remaining stages 30
		seconds
		Mechanical condenser fan switches (if equipped) to operate in the range: CUT
		IN 165-180-195 PSIG / CUT OUT 150-165-180 PSIG (MECHANICAL
		PRESSURE CONTROLS HAVE TO MAKE FOR REMS RELAYS TO
		WORK).

Super Target Refrigeration Guidelines

Checklists:

Compressor Rack R404A Settings

Yes or No		Description
Rack A	Rack B	
		Condenser fan 190 PSIG (THIS IS THE CURRENT REMS SETTING)
		Minimum condensing pressure 160 PSIG (75F)
		Hold back 150 PSIG (70F) (10 PSIG LESS THAN MINIMUM
		CONDENSING)
		Receiver pressure 140 PSIG (65F) (10 PSIG LESS THAN HOLD BACK
		VALVE)
		Split 60F (THIS IS CURRENT REMS SETTING for Pressure Control)
		Split 50F (THIS IS CURRENT REMS SETTING for Floating Condensing
		Control)
		Un-split 240 PSIG (THIS IS CURRENT REMS SETTING)
		Fast recovery 300 PSIG (THIS IS CURRENT REMS SETTING)
		Mechanical HPS 350 PSIG
		Mechanical LPS -28 degree on @ 2 PSIG below REMS / off @ 3 PSIG /
		stage up time delays stage up time delay, Stage 1 0-1 seconds, all remaining
		stages 30 seconds
		Mechanical LPS +18 degree on @ 9 PSIG below REMS/ off @ 38 PSIG /
		stage up time delay stage up time delay, Stage 1 0-1 seconds, all remaining
		stages 30 seconds
		Mechanical condenser fan switches (if equipped) to operate in the range:
		CUT IN 190-200-210 PSIG / CUT OUT 1/0-180-190 PSIG
		(MECHANICAL PRESSURE CONTROLS HAVE TO MAKE FOR DEMS DELAYS TO WODK)
		REMS RELATS TO WORK).
		compensation for liquid lift)
		Sub cooling mechanical EPP Set to 65 psig (30 E evaporator temperature
		- adjust as required to maintain 40 F existing liquid temperature from sub-
		cooler).
		Subcoolomatic Controller:
		Subconomatic Controller.
		Sub Cooled Liquid Temperature (LQSP): 40 F liquid
		temperature exiting
		Superheat set point :10 F
		Refrigerant : System dependent
		Valve size : "SMAL"
		Derivative set-point : 0

Proportional gain set-point :10
Integral set-point : 10
Sporlan Sub-cool Controller:
Sub Cooled Liquid Outlet Temperature Set-point (LoSP) :
40 F liquid temperature exiting
Sub-cooler Return Gas High Limit: 120 F
Sub-cooler OFF Temperature Differential : 10 F
Superheat Set point : 10 F
Refrigerant : System Dependent
Liquid Proportional Gain set-point: 1
Liquid Integral Gain set-point: 60
Liquid Derivative Gain set-point: 0
Superheat Proportional Gain set-point : 10
Superheat Integral Gain set-point : 120
Superheat Derivative Gain set-point: 0
Low Superheat Integral Gain : 10
Valve Steps – 1596 (valve type/size: SE5, SEI-1, SER-
1.5, SEI-2, SEI-3.5, SEI-6, SER-6, SEI-11, SER-11,
SER-20).
Valve Steps – 2500 (valve type/size: SER-B, C, D, G, J, K, L).
Valve Steps – 3193 (valve type/size: SEI-30).
Valve Steps – 6386 (valve type/size: SEI-50, SHE-100,
SHE-175).
Evaporative Condenser Fan set-points 25 F above wet bulb, minimum 78 F,
and maximum 110 F. (THIS IS THE CURRENT REMS SETTING)
Evaporative Condenser Fan Fast Recovery 300 PSI. (THIS IS THE
CURRENT REMS SETTING)
Evaporative Condenser Pump set-points, sump temp above 34 F pump on.
(THIS IS THE CURRENT REMS SETTING)
Evaporative Condenser Discrete Spray set-point, pump proof fail, discrete
spray on. (THIS IS THE CURRENT REMS SETTING)
Evaporative Condenser Loss of Flow set-point, loss of flow, pump off.
(THIS IS THE CURRENT REMS SETTING)

Sub-cooler Note: Rack is supplied with a liquid sub cooler. Refrigerant from the main liquid line feeds sub cooling circuit with Sporlan Sub-cooler Controller controlling a Sporlan electronic expansion valve (EEV). On suction side of sub cooling circuit a mechanical evaporator pressure regulating valve is provided to maintain a set evaporator pressure for sub-cooler operation. Suction gas is used then for vapor injection of Copeland Scroll compressors. **Reciprocating compressor racks:** Medium temp RTCR is designed to sub-cool low temp RTCR liquid.

Condensing Unit R404A Settings

Yes or No	Description			
	Condenser fan (s) turn on 235 PSIG / turn off 190 PSIG (multiple fans stage every 10			
	PSI)			
	Head pressure control set 180 PSIG)			
Liquid De-superheating TEV set at 40 degrees F at center of valve swing.				
	High Pressure Switch setting 350 PSIG			
	Low temperature Low Pressure Switch - set to maintain -10 degree F box temperature			
Medium temperature Low Pressure Switch - set to maintain the following				
	temperatures – Meat +28F Dairy +34F Produce +34F Dry Storage +58F Food Ave			
	Cooler +34F Food Avenue Freezer -5F			
	(COPELAND ZB SCROLL MINIMUM SUCTION PRESSURE IS 17 PSIG)			

Condensing Unit R404A Settings with Hot Gas Bypass

Yes or No	Description		
	Hot Gas Bypass Dual Temp. Set valve to open when suction PSI falls below 15 PSIG.		
	Hot Gas Bypass Med Temp. Set valve to open when suction PSI falls below 50 PSIG.		
	Crankcase Pressure Regulator valve Low Temp. Set to throttle compressor suction pressure @ 30-35 PSIG. Set valve immediately after start-up when evaporator is close to room temp.		
	Crankcase Pressure Regulating valve Med Temp. Set to throttle compressor suction pressure @ 80-85 PSIG. Set valve immediately after start-up when evaporator is close to room temp.		
	Dual Temp Low Pressure Switch set to maintain case low temperature set-point		

Condensing Unit R448A/R449A Settings

Yes or No	Description				
	Condenser fan (s) turn on 225 PSIG / turn off 177 PSIG (multiple fans stage every 10				
	PSI)				
	Head pressure control set 167 PSIG)				
	Liquid De-superheating TEV set at 40 degrees F at center of valve swing.				
	High Pressure Switch setting 350 PSIG				
	Low temperature Low Pressure Switch - set to maintain -10 degree F box temperature				
	Food Avenue Freezer -5F				

Medium temperature Low Pressure Switch - set to maintain the following box
temperatures – Meat +28F Dairy +34F Produce +34F Dry Storage +58F Food Ave
Cooler +34F
(COPELAND ZB SCROLL MINIMUM SUCTION PRESSURE IS 17 PSIG)

Condensing Unit R448A/R449A Settings with Hot Gas Bypass

Yes or No	Description		
	Hot Gas Bypass Dual Temp. Set valve to open when suction PSI falls below 15 PSIG.		
	Hot Gas Bypass Med Temp. Set valve to open when suction PSI falls below 50 PSIG.		
Crankcase Pressure Regulator valve Low Temp. Set to throttle compressor pressure @ 30-35 PSIG. Set valve immediately after start-up when evapor to room temp			
	Crankcase Pressure Regulating valve Med Temp. Set to throttle compressor suction pressure @ 80-85 PSIG. Set valve immediately after start-up when evaporator is close to room temp.		
	Dual Temp Low Pressure Switch set to maintain case low temperature set-point		

Compressor Rack R407A Settings (if applicable)

Yes or No		Description
Rack A	Rack B	
		Condenser fan 177 PSIG (85 F Midpoint)
		Minimum condensing pressure 150 PSIG (75 F Midpoint)
		Hold back 138 PSIG (70 F Midpoint)
		Receiver pressure 127 PSIG (65 F Midpoint)
		Split 60F (THIS IS CURRENT REMS SETTING for Pressure Control)
		Split 50F (THIS IS CURRENT REMS SETTING for Floating Condensing
		Control)
		Un-split 224 PSIG 100 F Midpoint
		Fast recovery 278 PSIG 115 F Midpoint
		Mechanical HPS 342 PSIG 130 F Midpoint
		Mechanical LPS -20 degree on @ 2 PSIG below REMS / off @ 3 PSIG / stage
		up time stage up time delay, Stage 1 0-1 seconds, all remaining stages 30
		seconds
Mechanical LPS +22 degree (43 PSIG REMS SETPOINT) / on @ 3		
		@ 28 PSIG / stage up time delay stage up time delay, Stage 1 0-1 seconds, all
		remaining stages 30 seconds
		Mechanical condenser fan switches (if equipped) to operate in the range: CUT
		IN 165-180-195 PSIG / CUT OUT 150-165-180 PSIG (MECHANICAL
		PRESSURE CONTROLS HAVE TO MAKE FOR REMS RELAYS TO
		WORK).

Compressor Rack R448A/R449A Settings (if applicable)

Yes or No		Description
Rack A	Rack B	
		Condenser fan 177 PSIG (85 F Midpoint)
		Minimum condensing pressure 154 PSIG (75 F Midpoint)
		Hold back 140 PSIG (70 F Midpoint)
		Receiver pressure 128 PSIG (65 F Midpoint)
		Split 60F (THIS IS CURRENT REMS SETTING for Pressure Control)
		Split 50F (THIS IS CURRENT REMS SETTING for Floating Condensing
		Control)
		Un-split 210 PSIG (94 F)
		Fast recovery 265 PSIG (115 F)
		Mechanical HPS 330 PSIG (130 F)
Mechanical LPS -20 degree on @ 2 PSIG below		Mechanical LPS -20 degree on @ 2 PSIG below REMS / off @ 3 PSIG / stage
		up time stage up time delay, Stage 1 0-1 seconds, all remaining stages 30
		seconds
Mechanical LPS +18 degree (48 PSIG REMS SE		Mechanical LPS +18 degree (48 PSIG REMS SETPOINT) / on @ 38 PSIG / off
@ 28 PSIG / stage up time delay, Stage 1 0-1 seconds, all re		@ 28 PSIG / stage up time delay, Stage 1 0-1 seconds, all remaining stages 30
		seconds
	Mechanical condenser fan switches (if equipped) to operate in the range: C	
	IN 165-180-195 PSIG / CUT OUT 150-165-180 PSIG (MECHANICA	
		PRESSURE CONTROLS HAVE TO MAKE FOR REMS RELAYS TO
		WORK).

Super Target's with Remote Headers: Due to pressure drop with R448 & R449, the condensing set-point at 85F will not provide adequate liquid pressure to maintain case temperature. Because of this pressure drop the condensing set-point will vary depending on system characteristics. The condensing set-point shall be determined by Target Refrigeration Authority (TRA) or Target Refrigeration Operations Technical Lead (TL)

Superheat and Thermostatic Expansion Valve Adjustment Process

- Setting expansion values is critical to the performance of a refrigeration system. Refrigeration Technician shall be prepared to execute the following steps in a slow, thorough and measured manner.
- Superheat shall only be measured with all evaporator covers, case bottom pans and cooler/freezer doors closed as applicable to case or evaporator coil under adjustment and evaluation.
- □ Top off receiver refrigerant level to 40% as required. Monitor receiver refrigerant level as the TXV adjustment progresses (additional refrigerant may be required to maintain the 40% level).
- Elevate the suction manifold so it is 5° F above the design saturated suction temperature (SST) of the warmest evaporator temperature line-up on the rack by manually toggling a combination of compressor horsepower off. THIS PROCEDURE PREVENTS COMPRESSOR CYCLING during the thermostatic expansion valve adjustment.
- \Box Set all expansion valves of the warmest line-up first.
- □ Set all expansion valves on the next coldest line-up, using same method as with the warmest circuit.
- \Box Set each low temperature evaporator superheat at 6° F, at the center of valve swing.
- \Box Set each medium temperature evaporator superheat at 8° F, at the center of the valve swing.

NOTE: While setting superheats, the refrigerant charge MUST be monitored continuously. If the refrigerant levels at the receiver drop below 20% while setting superheats, expansion valve settings must be rechecked.

Anti-sweat Heaters: P Fresh, City, Super, and P&G Stores

The glass door frozen food cases that Target uses in the market area of P-stores, P Fresh, and within the grocery area of a Super Targets are equipped with anti-sweat heaters on the doors and door frames. These heaters are factory installed and are designed to warm the glass and metal surfaces of the door and door frame to prevent the formation of condensation.

Target uses a strategy through one of the energy management systems to control the anti-sweat heaters based on store dew point temperature. During periods of low dew point, less energy is required to prevent condensation from forming. This is why Target's control system periodically cycles the anti-sweat heaters on or off to maintain a door, glass and frame temperature that is above the store dew point.

Target's control set points for the anti-sweat heaters are shown below.

	All On	All On	All Off	All Off
DOE Climate Zone	(Dew point setting)	(%)	(Dew point setting)	(%)
Zone 1A	58° F	100%	35° F	15%
Zone 2A	58° F	100%	35° F	15%
Zone 2B	60° F	100%	35° F	15%
Zone 3A	58° F	100%	35° F	15%
Zone 3B	60° F	100%	35° F	15%
Zone 3C	60° F	100%	35° F	15%
Zone 4A	60° F	100%	35° F	15%
Zone 4B	60° F	100%	35° F	15%
Zone 4C	60° F	100%	35° F	15%
Zone 5A	60° F	100%	35° F	15%
Zone 5B	60° F	100%	35° F	15%
Zone 6A	60° F	100%	35° F	15%
Zone 6B	60° F	100%	35° F	15%
Zone 7A	60° F	100%	35° F	15%
Zone 7B	60° F	100%	35° F	15%
Zone 7C	60° F	100%	35° F	15%
Row 8D	60° F	100%	35° F	15%





March 24, 2003