Scope of Work
Version 6 Prototypical Layout
Refrigeration, HVAC and EMS

Revised: May 1, 2015

You will find attached a revised document explaining the scope of work required to install the refrigeration, HVAC and EMS equipment supplied to Aldi, Inc for new store construction. This document contains all revisions from the January 1, 2012 document for Version 3 stores and includes specific references for the Version 6.0 floorplan. Summarizing some of the major changes:

- Additional multi-deck cases (medium temp) to be installed.
- Smaller grocery freezer complex.
- 6-fan micro channel condenser (roof top)
- R407a has been approved for usage.
- Electronic EPR's to be factory supplied for field installation.
- Vertical Protocol cabinet and remote receiver and frame.
- Roof penetrations and line clamping requirements.
- Siemen's control system for Lighting and HVAC
- Verisae equipment form to be completed and returned to ALDI.
- **(NEW) Walk-in LED requirement by refrigeration contractor.**
- **(NEW) Use of I-Controller inside CES unit.**

In addition to these equipment changes, your refrigeration contractor should be aware of the following control strategy changes:

- Split condenser control for the 6-fan micro channel. Includes two stages of coil surface reduction. An addendum has been added to the back of this document that provides detail on the operation and programming for this new strategy.
- Analog temperature sensors have been mounted on the electric defrost evaporator coils to terminate defrost.
- Special piping requirements for stores using hot air heat reclaim with CES units.
- Protocols delivering after November 1, 2014 will contain SRT leak detector sensors from Emerson.
- Additional specifications on proper foam and caulking of swing doors to insulated boxes.
- **(NEW) Addendum on requirements for Occupancy Sensors inside walk-in boxes.**

If you have any questions about the content of this package please call one of the following individuals:

Hussmann – Mason Laster @ 630-343-1035.
Emerson – Dennis Brown @ 574-261-2133
CES – Marty Robbins @ 866-706-2647
Siemens – Jason Knackstedt @ 614-0478-8053

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Scope of Work – Refrigeration Equipment

This document is not intended to serve as an architectural guide nor construction drawings for pulling permits. It is intended to provide guidelines on the equipment provided for an Aldi prototypical store. The refrigeration equipment supplied for this project is based on the Hussmann Protocol Refrigeration System. Installing contractor should refer to the PROTOCOL PLANNING DATA MANUAL (posted to APD Sharenology Projects website) for guidelines on how to implement the "loop piping" system required by Protocol. Additional documents that are also posted to the APD Sharenology Projects website:

- Technical data sheets for the multi-deck cases
- Technical data sheets for the walk-in coils
- Technical data sheets for the roof top Micro Channel condenser
- Piping diagrams for a Version 6 prototypical store
- Refrigeration legends for the Protocol system based on a V6 layout

The refrigeration contractor is also asked to pay particular attention to the piping requirements as outlined in this document. These requirements are provided to insure that you as the contractor apply industry accepted "best practices" during the installation of the equipment. Contractor should take note that this list IS NOT EXHAUSTIVE and you are encouraged to provide Aldi a leak-tight system and one that is mindful of future serviceability.

REFRIGERATION CONTRACTOR

The following is an itemized list of those items that should be completed by the refrigeration contractor:

Compressors and multi-deck cases:

- Receive, unload and install (1) Protocol parallel compressor system. Protocol to be located in back-store room area. See store drawing for exact location.
- Receive, unload and install (1) remote vertical receiver frame assembly. This will be located on the left hand side of the Protocol while standing in front of the unit.
- Receive, unload and install rooftop condenser. Micro-channel model MXA-06K. Roof curbs will typically be the responsibility of the general contractor or roofing contractor, unless otherwise noted. See store drawings for exact location.
- Receive, unload and install the Hussmann multi-deck display cases (model C6XLEP for meat and D6XULEP for deli). Typical length of lineup is 56'; 36 allocated to deli and 20' allocated for meat. The applicable length of each case will either be 8' or 12'.
- Receive, unload and install Variable Frequency Drive (VFD) from Control Techniques to be mounted on the roof top condenser. A mounting plate for the VFD is provided on the micro channel.

Walk-in cooler and freezers:

- Receive, unload and install insulated wall panels for the freezer complex and dairy cooler. See table below for approximate sizes. Note that grocery and ice cream freezer share a common wall.
    - All ceiling and wall penetrations must be fully caulked and filled with urethane foam. This includes any sprinkler head penetrations. Please note that in the instance of the freezer penetrations, sprinkler line should have insulation extending 12" above top of ceiling roof panel.
    - All panels must be fully caulked and sealed to the floor.
    - Panels to be caulked at all seam and/or joints using BUTYL RUBBER. See Crown supplied installation instructions for further details.
    - Install ceiling supports along front side of boxes to top of bar joists. The number of supports will vary based on the box lengths are based on utilization of the steel support systems supplied for the front side of the freezer/cooler complexes.
    - Header support brackets must be installed before Anthony glass door can be installed. Header must be straight and plumb to accept Anthony glass doors. Do not over tighten glass doorframes.
- **Install LED fixtures as called out in table below.**
- Receive, unload and install evaporator coils for the insulated rooms previously mentioned. See table below for coil models.
- Receive, unload and install swing doors for the freezer complex and dairy cooler. See table below for approximate number of doors.
    - Frames to be caulked inside and outside. Aldi specification requires foam between the swing doors and the box panels. Foam to also be applied where frame meets frame for both the grocery and the ice cream freezer.
    - All excess foam to be removed for a clean look.
    - Door swings vary per store. Confirm with owner's representative.
    - Doorframe alignment per owner.
    - Note that the milk doors to be installed in the dairy cooler have an "L" shaped bracket that must be installed from 2"x 6" to floor. These are supplied by the cooler manufacturer.
    - Do not leave door lights "on" until refrigeration is running.
- For the dairy cooler, four milk rails 2"x 10-1/2"x 60" should be installed to cooler floor per milk cart size. These are to be installed 28" apart, 14" right and left of the center of the milk door. Two 2"x 6" x60" milk rails to be installed on each end of the milk door.
- Milk rails must be caulked with clear silicone to floor on all sides.
- Install strip curtains on the blocking of the entry doors to the grocery freezer, ice cream freezer and the dairy cooler. Strip curtains to be installed on inside of entrance doors below vent. A fourth strip curtain to be installed on the blocking of the entry into the meat holding box, which is typically located inside the dairy cooler.
- Receive, unload and install the pallet doors for the grocery freezer and dairy cooler. Please note that in some instances, the freezer and dairy cooler doors may be a slider model rather than a swing door. In the instance of the slider door, the refrigeration contractor will be responsible for installing the header assembly and slider door.

Description	Grocery Freezer	Ice Cream Freezer	Meat Holding Box	Dairy Cooler
Size	25x19x10	16x19x10	11x12x 10	24x 65-7"x10
Coils (Heatcraft)	2) BML-250	1) BML-330	WKE-100	2) BMA365
Doors (Anthony)	9) Model ELM2 LT	6) Model ELM2 LT	None	11) Model ELM2 NT 4) Model EL23
Overhead Light Fixtures (refer to Note #1)	**3) Cree 8' fixtures (LS8-80L-35K-10V**	**1) Cree 8' fixture (LS8-80L-35K-10V)**	**2) Cree 4' fixtures (LS8-40L-35K-10V)**	**3) Cree 8' fixtures (LS8-80L-35K-10V)**
Strip Curtains	1	1	1	1

- **NOTE #1. Cree fixtures are to be provided by the GC electrical contractor. Actual mounting and wiring of fixtures will also be the responsibility of the Refrigeration Contractor and their electrical scope. Power will be provided to a junction box by the GC's electrician. Technical details along with purchasing information are posted in the Vendor Section of the APD Sharenology website.**

INSTALLATION NOTE

Contractor should ALWAYS follow the Crown/Tonka Installation Manual for instructions and details on construction of the walk-in boxes.

Refrigeration Piping:

- Two suction filters will be shipped loose for installation at the back of the Protocol.
- Contractor will need to follow the piping guidelines to connect the Remote Receiver Package to the Protocol (see attached).
- In addition to the aforementioned items contractor will also receive the following valves shipped loose with the Protocol system. Contractor to refer to refrigeration legend for proper circuit allocation
    - System A1 Ice Cream: (1) CDS-x
    - System A2 Grocery Freezer: (1) CDS-x
    - System A4 Dairy Cooler: (2) CDS-x
    - System A5 Dairy/Deli Case: (1) CDS-x
    - System A6 Fresh Meat: (1) CDS-x
    - System A7 Meat Holding Box: (1) 3/8" Liquid Solenoid Valve
- The Micro Channel condenser is equipped with solenoid valves to reduce coil surface during cold months. The control wiring for the fan motors (variable speed) and the winter control valve is identified in the drawings posted to the "APD Sharenology Projects" site.
- Furnish and install interconnecting refrigeration piping. NOTE: The Protocol refrigeration systems is based on a loop piping system with all low temperature systems sharing a common liquid line to feed the freezer evaporator coils and then returning to the Protocol sharing the same suction line. Likewise, the medium

temperature systems share a common liquid line feeding each case and cooler evaporator coil before returning to the Protocol on a common suction line.
    - No refrigeration lines to be installed on store partition walls.
    - Lines running through bar joists should be protected using a refrigeration saddle.
- For stores utilizing hot air heat reclaim coils inside the CES AON unit; contractor to provide the following valves: (3) check valves, (1) check valve with a 10 or 20 lb. spring), (2) ball valves and (1) heat reclaim valve (type 12D). Contractor to pipe these components as called out in the Refrigeration Drawings dated 10/01/14. Contractor may feel free to locate and pipe these valves on the Remote Receiver Assembly.
- Evaporator coils for walk-in coolers and freezer will be shipped from manufacturer with factory mounted expansion valves.
- Furnish and install all necessary hangers for overhead piping runs. Attached to this document is an appendix with piping details for best practices that contractor should follow.
- Furnish refrigerant (R407a) for proper system charge. Contractor is requested to supply 275 pounds of refrigerant for a Micro Channel application. In Northern Climates where heat reclaim is needed, additional refrigerant will be needed. Should contractor feel that additional refrigerant is needed; contractor to consult local Aldi Real Estate director.
- Furnish and install isolation ball valves for each refrigeration circuit. This will require two ball valves per circuit: one for the liquid line and one for the suction line. In the instance of the grocery freezer, contractor to supply (4) ball valves. Two for each of the two evaporator coils.
- Contractor to supply and install armaflex type insulation for all field installed refrigeration piping. All liquid lines (low and medium temperature) to have a minimum of ½" insulation due to the sub cooling that takes place in the Protocol. Suction line insulation should follow these guidelines: 1" wall thickness to be used on freezer (low temp circuits); ¾" wall thickness on the medium temp circuits. NOTE: Contractor will need to pipe some connections between the Protocol and the receiver frame assembly. Contractor may use ½" insulation on these field connections, providing that they follow mitering comment.
- All field installation insulation applied to piping corners should be mitered and glued together. When installing insulation contractor should terminate at any valve fitting.
- Roof penetrations to follow Aldi specifications. Refrigeration lines will clamp to a Pate roof cap PCC-5 installed by the GC. All lines should slope down (away) when leaving, or existing sleeve. Seal lines existing sleeve with spray urethane foam. Be sure to secure cap when work is complete.
- Furnish and install display case and unit cooler condensate drain piping. Note that ice cream freezer, grocery freezer and meat holding boxes will require that condensate lines be installed with heated tape to prevent freezing.
    - Condensate lines for evaporator coils in walk-in coolers and freezers to be run in copper, each compartment to be trapped independently, preferably outside the box. Once the condensate line is outside the walk-in cooler/freezer box, contractor can transition copper to PVC.

    - Condensate lines should have a union at each evaporator coil.
    - Medium temp drain lines to be not less than 5' from floor.
    - All condensate lines with heat tape should have 1" wall insulation.
- Hard hats are required to be worn at all times during construction of project.
- Clean boxes – dust, fingerprints, caulking on cooler and freezer when installed. Commercial gloves to be worn for box installation.
- System must be pressurized to 250 PSI (recommended) with dry nitrogen gas and held for 24 hours before final evacuation. Make sure all transducers access valves are close prior to pressurizing and pulling vacuum on the system,
- Refrigeration Contractor to pull a vacuum on system prior to system charge to insure a leak-free system. Vacuum should be pulled to 500 microns or lower and held for 24 hours.
- Contractor to furnish oil for compressors and system lubrication. Factory recommends Mobil Arctic 32 or equivalent.
- Start-up and adjust equipment. This Includes superheat adjustment for all expansion valves (cases and coils) and proper settings for winter control valves at condenser and the A8/ORD4 valves at the Protocol. Typical valve settings:
    - **Condenser Hold Back = 130 PSI**
    - **Low Temp Sub cooler EPR = 59 – 62 PSI**
    - **Medium Temp Sub cooler EPR = 88 – 91 PSI**
- All licenses, permits and inspection will be the responsibility of the refrigeration contractor.
- Refrigeration contractor to furnish 90-day service labor.

Electrical Considerations:

- Power to the Protocol system to be based on the MCA and MOPD values contained within the Buss bar Layout sheet that is attached to this document. A disconnect switch will be provided by the GC. It will be mounted next to the Protocol and wired (by the house electrician) back to the main electrical panel. Refrigeration contractor to provide electrical connection between disconnect and Protocol. NOTE: electrical connection to the Protocol should be a parallel (or dual) conductor feed so that minimum bending requirements inside the Protocol disconnect box are not exceeded.
- Power for the roof top condenser will be fed out of the Protocol system. Contractor is to furnish and install the interconnecting wires and conduit between the Protocol and roof-top condenser. Interconnecting wires to be defined as:
    - Main power feed to condenser as provided for by circuit breaker amounted on Protocol power distribution sheet: 40 Amps at 208-230/3/60.
    - Three phase power will be required from the L4, L5 and L6 terminals of the micro channel control panel to the corresponding lugs in the VFD. Returning power from the VFD (U1, V1 and W1) should be brought back to the micro channel and landed on lugs L7, L8 and L9.
    - Furnish and install control wiring between Protocol control panel (CPC multiflex boards) and appropriate terminals in the micro channel control panel (see Wiring Diagram for details).

- Furnish and install control wiring between Protocol control panel (CPC multiflex board) and VFD control panel (see Wiring diagram for details).
- Install and wire (1) shipped loose sensor (supplied with Protocol) at the roof top condenser (micro channel) and terminated on I/O board inside Protocol control panel. This will serve as the ambient temperature sensor for both refrigeration and EMS needs.
- Furnish and install communication cable from E2E controller (Protocol control panel) to Network Interface Card/Ethernet port in VFD control panel (see Control Techniques I/O manual for details).

ELECTRICAL NOTE: VARIABLE FREQUENCY DRIVE

Installing contractor should refer to Control Techniques installation manual for proper grounding requirements needed for the variable speed application. Failure to follow proper grounding techniques will result in electrical magnetic interference to affect the overall system performance and possible system failure.

- Furnish and install the necessary control wires for the defrost termination analog temperature sensors located inside the evaporator coils; connected back to the Protocol control panel. The equipment manufacturer will supply temperature sensors.
- Furnish and install the necessary control wires for the EEPR's.
- Furnish and install the necessary interconnecting wires between the Protocol system and temperature sensors mounted in the display cases. Shipped loose sensors will accompany the Protocol system and contractor should mount these at each of the evaporator coils inside the walkins. You will need to refer to the attached diagram labeled as "CPC Board Assignments" to identify where the sensors are to be landed. The CPC input boards are located inside the Protocol control panel.
- Furnish and install the necessary interconnecting wires and conduit between the Protocol system and the attached requirement loads. These items will be identified as the following and labeled on the attached Protocol Distribution Panel Schedule along with voltage and amperages of the connected loads:

Refrigeration Load	Lights	Fans	Defrost Htrs	PMAC Frame Htrs	Heat Tape Condensate	Pallet Door Heater
Ice Cream Frz		Yes	Yes	Yes	Yes	
Grocery Frz		Yes	Yes	Yes	Yes	Yes
Dairy Cooler		Yes		Yes		
Meat Holding Box		Yes	Yes		Yes	
Multi-Deck (Deli)	Yes	Yes				

Multi-Deck (Meat)	Yes	Yes				

NOTE: The Anthony Eliminator doors have a factory-applied, anti-fog coating. Door heaters on the Eliminator doors are to remain disconnected at the door unless contractor has specific direction from the Aldi Real Estate Director to make these connections.

- **The refrigeration contractor (and their electrician) to complete all wiring of interior lighting, including occupancy sensors and 3-way switches, for the walk-in boxes. Power will be brought to the respective walk-ins by house electrician and terminated in a junction box (consult drawings for box location).**
  - **The dairy cooler will require that the RC provide two 3-way light switches; one by pallet door and one by the service man door.**
  - **The freezer will have a single light switch located by the pallet door. The switch will be provided by the insulated panel manufacturer.**
  - **Provide Occupancy Sensors for both Dairy Cooler and Grocery Freezer complex. Contractor to follow guidelines as set out in Addendum #2, dated January 21, 2015, which is located in this document.**
- Furnish and install all necessary interconnecting wires and conduit for the luminaries located inside the walk-in boxes (ice cream, grocery freezer, dairy cooler and meat holding box). GC's electrician will provide power to a junction box located at each walk-in. Refrigeration contractor should verify location of this junction box with GC electrician.

ELECTRICAL NOTE: HEAT TAPE

Certain municipalities require that a GFI outlet be installed for the condensate line heat tape. Contractor should consult local code agency to determine if the GFI outlet can be installed outside the walk-in box.

The installation method will safeguard against moisture inadvertently tripping the GFI, which can lead to condensate lines freezing and ultimately breaking.

Scope of Work – Energy Management System

All sensor and panels will be provided as part of the Integrated Powerwall/EMS package by CD Controls. The following scope of work implies that contractor will mount sensors and wire them back to the CPC I/O boards located in the Powerwall system. Contractor should refer to the corresponding CPC EMS drawing set for exact location of sensors and cable requirements (reference APD Architects website).

The scope of work presented below is based on EMS package EME6.0.

List of items to be supplied by equipment supplier:

EM6.0 material

Department	***Qty***	**Part #**	**Description**
Facility Status Display	1	850-5100	E2E Alarm Panel.
Alarm Device	1	851-0352	Alarm enunciator, indicator, horn & override switch.
Temperature Sensor	1	809-6590	Temperature Sensor in Wall Mount enclosure
Humidity Sensors	1	203-5751	Relative Humidity sensor
General Sensors	3	118-4102	General purpose door switch
Anti-Cond Controller	3	851-1021	20 amp Single Channel PMAC

Scope of work:

- Contractor to supply shielded cable to connect all CPC sensor and I/O panels together as outlined below in the detailed scope of work. Contractor should refer to CPC EMS drawing for exact specifications on cable to be used.
- Install I/O Net communication wire between CD Control panel and CX-400 controller located in Protocol system.
- Refrigeration contractor to install control wiring between CD Control panel and CES RTU and alarm enunciator panel.
- Install (1) alarm panels, which include enunciator, alarm light indicator and horn with override switch, to be located in the receiving dock area.
- Install and wire (1) space sensor on sales floor. Wire to MF88 board in CD Control Panel.
- Install and wire (1) wall mount indoor relative humidity sensor. Wire to MF88 board in CD Control Panel.
- Install and wire (3) door switches for the walk-in cooler and freezer boxes (grocery freezer main pallet door; dairy cooler pallet door and meat holding box pallet door). Contractor to use ½" thin wall conduit to protect the control wiring.
- Install and wire (1) 20-amp PMAC devices for grocery freezer doors.

- Install and wire (1) 20-amp PMAC device for ice cream doors.
- Install and wire (1) 20-amp PMAC device for dairy cooler doors.
- Install Facility Status Display (FSD) in manager's office (power to be provided by G.C. electrical contractor).
- Install Cat-5 wire from FSD to Ethernet Hub (located in CD Control panel).
- Confirm E2E on Protocol is set at default settings of IP: 2.2.2.2; subnet 255.255.255.0.
- Configure FSD addresses on-site as follows: FSD IP: 2.2.2.3 (refer to supplemental document ALDI V6.0 EMR E2E and FSD IP Address Programming Instructions).
- Refrigeration contractor to coordinate with Security Company for wiring to CPC board (CD Control panel) for refrigeration alarm per board, 5.6.
    - Security Company responsible providing, installation and termination of cabling from security panel to CPC RO8 board (CD Control panel)
    - Test & commission for local alarming and remote contact closure with Security Company.
    - Test supervisory alarm by removing power to board and confirm alarm with security provider.
- Provide and install standard flat phone cable between the modem (located inside the CX-400 controller) and telephone line #3. Contact CPC Technical Support Group at 800-829-2724 to commission modem, insure proper operation of modem and to backup all settings and finished program.
- Refer to supplemental documents for additional information, included as separate attachments in bid set. Supplemental documents include:
    1. ALDI V6.0 EMR VFD start-up procedure
    2. ALDI V6.0 EMR E2E and FSD IP Address Programming Instructions

Scope of Work – HVAC

CES units will be provided from the factory with a preprogrammed and tested I-Controller. The I-Controller is an Emerson product that is branded as CES. All programming and support for the I-Controller will come from CES. The controller will be pre-programmed and the unit will be factory started and tested before delivery. It is the responsibility of the installing contractor to ensure that the unit is seated correctly on the roof curb, that all electrical connections are made according to local code and gas connections (if applicable) are made. The unit should be inspected for damage that might have occurred during shipping.

Sensors and Networking

The field installed sensors (space temp, space humidity and supply temp) that are used by the CES unit should be installed and connected before the CES unit can be commissioned. These sensors must be wired to the inputs in the CES unit. The supply temperature sensor should be installed beneath the condenser side of the CES unit in the supply duct and 10 feet (or as far as possible) away from the unit not the compressor side. This will avoid short cycling the heat stages and allow full heating capacity to be used.

With the new I-Controller, it is no longer necessary to place this on the network with the Hussman Protocol controller. The I-Controller will be connected via 3 conductor modbus cable to the Siemens building controller. The installer of the Siemens equipment is responsible for installing the modbus cable and connecting it to the I-Controller.

Heat Reclaim

The CES Type 1 unit comes equipped with a 125 MBH refrigerant heat reclaim coil. This is a 2 row coil with 1 3/8" connections. The heat reclaim coil is to be piped in series with the refrigeration system condenser. If the line size for the refrigeration condenser is smaller than 1 3/8", a reducer should be used at the header connections of the reclaim coil to match the line size. This will only result in a little less capacity of the heat reclaim coil.
It is the responsibility of the refrigeration contractor to provide the valves and piping for the heat reclaim system.
The three way valve will be controlled from an output point located on the I-Controller in the CES unit and must be wired to that point. A Sporlan 12D13B is commonly used. Two ball valves should be installed (one inlet and one outlet) to allow isolation of the heat reclaim coil.
Piping should be such that the reclaim coil is in series with the refrigeration condenser.

The supply piping to the heat reclaim coil should be insulated.

CES does not recommend the use of heat reclaim for projects where the CES unit is more than 90 feet away from the refrigeration system and condenser.

Commissioning

Site commissioning of the CES unit will be coordinated by CES with a contractor. The check sheets and documentation for commissioning will be sent to the contractor by CES.

Aldi Design Types:

Type 1 : 20 Ton Multi-Path with 2 row Heat Reclaim coil & 405 MBH of natural gas heating
Type 2 : 20 Ton Multi-Path with 2 row Reheat coil & 405 MBH of natural gas heating
Type 3 : 20 Ton Multi-Path with 2 row Reheat coil & 270 MBH of natural gas heating
Type 4 : 25 Ton Multi-Path with 2 row Reheat coil & 270 MBH of natural gas heating
Type 5 : 25 Ton Multi-Path with 2 row Reheat coil & 45.1 KW of electric heating
Type 6 : 25 Ton Multi-Path with 2 row Reheat coil & 405 MBH of natural gas heating

City of Chicago

Inside the city of Chicago, Ill. the building code requires that the CES unit be equipped with an ERV for energy recovery. The control wiring for the ERV components and the ERV apparatus are installed at the factory. In most cases, an additional exhaust fan is installed in the ceiling. This exhaust fan control wiring must be routed to the CES unit. The points for controlling the fan will be located on the boards in the CES unit and the CES program will accommodate the fan.

VAV STORES

Some projects use a VAV box for the office and break room. The ductwork is run from the CES unit to the VAV box. The VAV control wiring and the temperature sensor wiring is to be routed to the CES unit. The control points and the CES program located in the CES unit will accommodate the VAV box.

SIEMENS

1. Refrigeration Contractor will be responsible to receive the following list of loose items provided by Siemens:

(1) Current transducer per snowmelt circuit (northern climates only)
(1) Duct mounted temperature sensor per RTU, VAV box and duct heater
(1) Digital Zone Controller (DZC) for each backroom unit heater or non-CES rooftop unit
(1) Rooftop-mounted DZC (RT-DZC) for main CES unit and VAV zone, if applicable
(1) Outside sensing device with light level and ambient temp sensors
(1) Zone temperature sensor for each CES unit and each VAV zone if applicable
(There will be 2 zone temp sensors for Siemens and 3 for CES)

2. RC will be responsible for field mounting the current transducers. These are to be mounted in the breaker panel that provides power for the snow melt system. The CT's will be terminated by the RC at a remote i/o connected to the Siemens SLP controller within the CDC powerwall. This is detailed on Siemens EMS drawing EMS-2, details RIO/1 and CT/1.

3. RC will be responsible for field mounting the outside sensing device. This can be field mounted to the CES unit to avoid additional roof penetration, but must be installed facing North for proper operation. Device should be mounted approximately 3' above the unit in order to avoid radiant, and should be installed in such a way that shadow is not cast on the sensor by other structures. This is to be wired back to the SLP panel inside the CDC wall with 18/4 shielded, stranded, plenum-rated cable. This is detailed on Siemens drawing EMS-2, detail OSD-2, and also on EMS-3 detail SL-1

4. RC will be responsible for field mounting the duct temp sensors in the supply duct for the CES unit, any additional RTU's, and downstream of the VAV box, where applicable. These sensors are to be wired back to the respective DZC's with 18/2 shielded, stranded, plenum-rated cable, as detailed on Siemens drawing EMS-3, detail SL-1

5. RC will be responsible for running the CAT-6 EMS cable from the CDC powerwall to Aldi-provided IP port as noted on Siemens EMS-3, detail SL-1.

6. RC will be responsible for mounting the DZC's, one in the CES unit, one per additional RTU or backroom heater, and one per VAV where applicable. These DZC's need to be wired together for communication and then back to the SLP within the CDC powerwall with 24/1P shielded, stranded, twisted pair, plenum-rated cable.

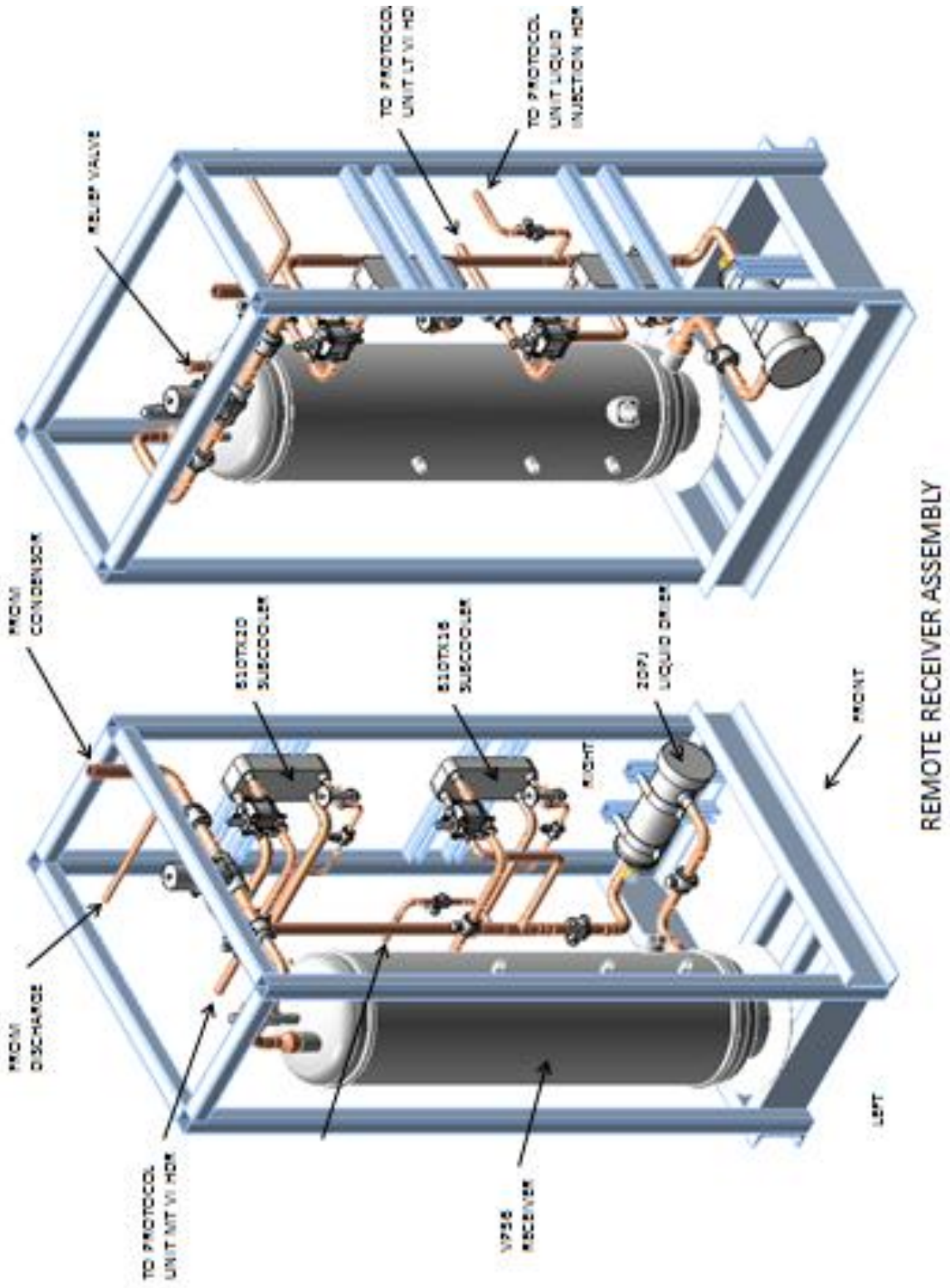
7. RC will be responsible for mounting the Siemens Zone temperature sensors, one on the main sales floor, one in the zone served by any non-CES RTU, and one in the office area being served by the CES unit using a VAV box. These need to be wired back to the respective DZC's with 18/2 shielded, stranded, plenum-rated cable as referenced on drawing EMS-3, detail SL-1.

Siemens zone temperature sensors should be co-located (same wall, same column face, etc.) with sensors in the same zone(s) being served by the CES unit.

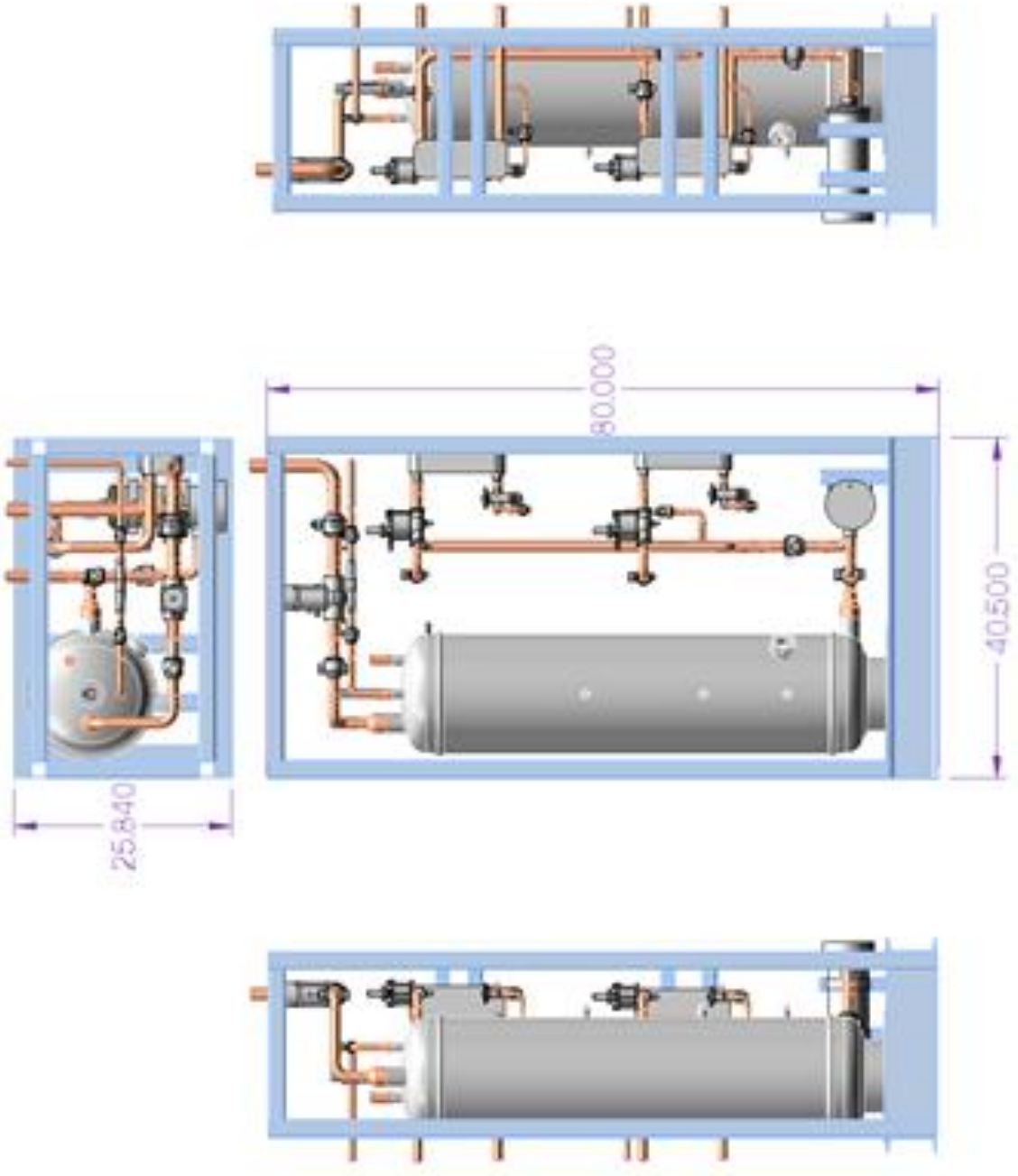
Additional notes:

- Siemens will not provide any occupancy sensors for NC or remodels
- Siemens is fine with direct connect to security integration, so long as the connections are available before we get there for commissioning. Use 18AWG wire for security connections. We are hoping for the security company to provide the final connections

ADDENDUM: ALDI Remote Receiver Assembly



ADDENDUM: ALDI Remote Receiver Assembly



ADDENDUM: August 1, 2012 / Micro Channel Condenser Control Strategy

A new method of controlling the 6-fan Micro Channel condenser has been added to the E2 controller. This control method uses two separate Condenser applications to control the condenser during different ambient conditions. During warm weather, the CONDENSER SUMR application will be enabled and will control all 6 of the condenser fans. During cold weather, the CONDENSER WNTR application will be enabled and will control the 2 fans in the lead section of the condenser while the other 4 fans and 2 condenser sections are shut off.

Although two Condenser applications are used to control the condenser, only one of them will be enabled at any given time. The switchover between the two Condenser applications is controlled by an Analog Sensor Control application named COND SUMR STPT. This application works much like the control for a traditional split condenser in that it uses the ambient temperature to switch between the two Condenser applications.

The Analog Sensor Control application COND SUMR STPT has a cut-in and cut-out setpoint that can be adjusted to determine when the condenser control switches between the SUMR and WNTR applications. When the ambient temperature falls below the cut-out setting, the CONDENSER WNTR application will be activated to control the 2 fans in section 1 of the condenser. When the ambient temperature rises above the cut-in setting, the CONDENSER SUMR application will be enabled to control all 6 of the condenser fans.

In an attempt to maximize energy savings from the condenser VFD, the Condenser applications will be using a differential control strategy to control the condenser fans in lieu of the more traditional fixed pressure setpoint. Instead of using a single fixed pressure setpoint to control the condenser fans, a temperature differential control strategy will be used which will use a condensing temperature value that is calculated from the dropleg pressure transducer to maintain a condensing temperature setpoint that will vary with the ambient temperature. The condensing temperature setpoint will be calculated by adding the ambient temperate to the design temperature differential of the condenser (typically 10° for R404a and 9° for R407a). For example, on a system with R404a refrigerant and an ambient temperature of 80°, the target condensing temperature will be 90° (80° ambient plus the 10° differential). The calculated condensing temperature setpoint will vary between a range of 70° and 105°, meaning that for a system with R404a, the minimum setpoint will be used for ambient temperatures below 60° and the maximum setpoint will be used for ambient temperatures above 95°.

When the ambient temperature rises above the cut-in setting in the COND SUMR STPT Analog Sensor Control application, the CONDENSER SUMR application will be enabled and the CONDENSER WNTR application will be disabled. The CONDENSER SUMR application will control the condenser as follows.

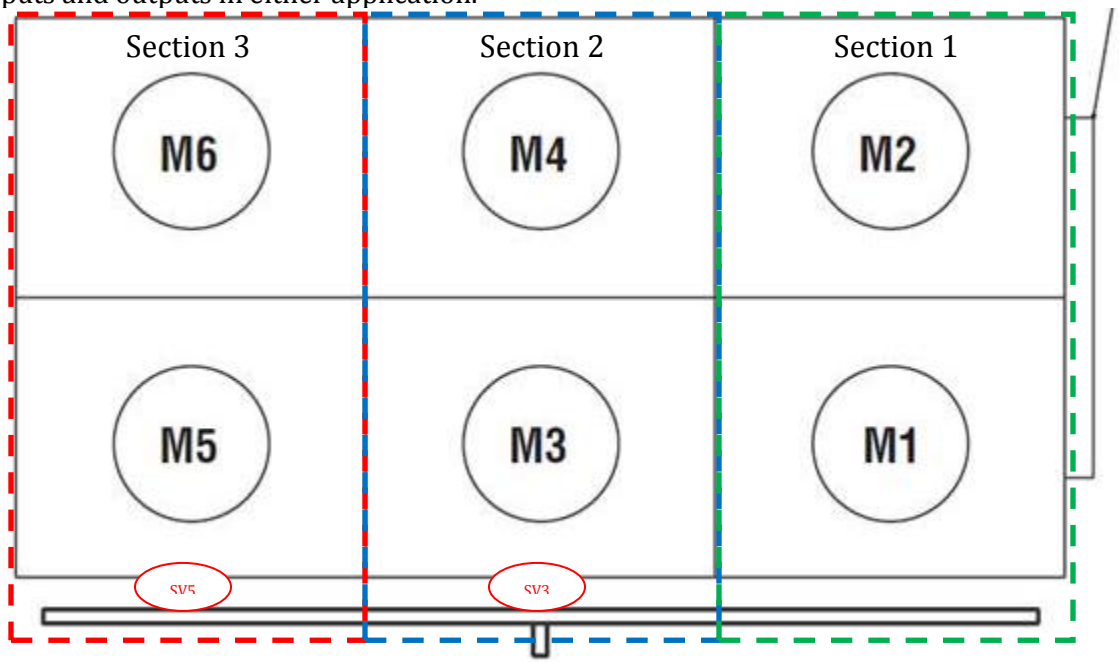
- At higher ambient temperatures and higher condenser load, all 6 condenser fans will run while the VFD ramps up and down to vary the condenser fan speed as needed to maintain the condenser pressure setpoint.
- As the ambient temperature drops or the condenser load decreases, the VFD will reduce the condenser fan speed as required to maintain the condenser pressure setpoint.
- Once the calculated condenser capacity, which is basically the PID output percentage, falls below the SPL BELOW % setting in the Condenser application (typically 20% and is user adjustable), the condenser will enter “split mode” operation which will shut off condenser fan motors M2, M4, and M6. All 3 condenser sections will remain open with just their header fans running.
- If the condenser is operating in “split mode” and the ambient temperature or condenser load increases, the condenser will exit “split mode” when the calculated condenser capacity, which is basically the PID output

percentage, rises above the USPL ABOVE % setting in the Condenser application (typically 85% and is user adjustable).

When the ambient temperature falls below the cut-out setting in the COND SUMR STPT Analog Sensor Control application, the CONDENSER WNTR application will be enabled and the CONDENSER SUMR application will be disabled. The CONDENSER WNTR application will control the condenser as follows.

- As the CONDENSER WNTR application is enabled, condenser fans M3, M4, M5, and M6 will be shut off and the condenser capacity control valves SV3 and SV5 will be energized shutting off section 2 and 3 of the condenser.
- Condenser fans M1 and M2 will run while the VFD ramps up and down to vary the condenser fan speed as needed to maintain the condenser pressure setpoint.
- As the ambient temperature drops or the condenser load decreases, the VFD will reduce the condenser fan speed as required to maintain the condenser pressure setpoint.
- Once the calculated condenser capacity, which is basically the PID output percentage, falls below the SPL BELOW % setting in the Condenser application (typically 20% and is user adjustable), the condenser will enter “split mode” operation which will shut off condenser fan motor M2. Condenser section 1 will remain open with just the header fan running.
- If the condenser is operating in “split mode” and the ambient temperature or condenser load increases, the condenser will exit “split mode” when the calculated condenser capacity, which is basically the PID output percentage, rises above the USPL ABOVE % setting in the Condenser application (typically 90% and is user adjustable).
- As a safety, if while operating in the CONDENSER WNTR mode the discharge pressure rises abruptly and the Fast Recovery setpoint is reached, the CONDENSER SUMR application will be enabled allowing all 6 condenser fans and all 3 condenser sections to run and reduce the discharge pressure.

In addition to the two Condenser applications, there are also 2 Flexible Combiner applications and a Digital Sensor Control application that are used to control some of the features of the Condenser applications. The two Flexible Combiners are named COND CONTROL and COND S/W XOVER and the Digital Sensor Control is named VSD STATE. There are no user adjustable settings in these applications and they should be left as is. The settings in the Condenser applications can be adjusted as on any normal condenser, however, there should be no changes to the assignment of the inputs and outputs in either application.



Header End

ADDENDUM: January 21, 2015 / Motion Sensor Requirements

- Furnish and install two Kason 1901A Occupancy Sensors to be installed in the dairy cooler and grocery freezer complex, 1 each.
- Sensors to be mounted on the ceiling pointing down, closer to the door to detect staff entering the space.
    - If an angle bracket comes with the sensor, it should not be used, mounting the sensor flat in order to take advantage of the 20' diameter coverage.
    - If there is a door between a cooler space and its backend freezer install near cooler door. 10' from the man door and centered on the door opening (accommodating for any light fixtures and sprinkler heads accordingly).
    - If there are two entry doors to the walk-in (one from stock and one from sales floor), install sensor in a central location in order to pick up motion from either door.
- Set the On time of cooler/freezer motion sensors at 20 minutes.
- Set the sensitivity of the motion sensors at 70%.

- Testing procedure: flip dipswitch to enable walk-through mode. Walk through the zone without stopping and this will turn lights on for three minutes. Flip dipswitch back to appropriate settings after verifying functionality.

Approved Motion Sensor:

Kason 1901A sensor. Manufacturer's part number for low bay installations: 11901A00005

ALDI Refrigeration Installer Checklist

Fill out the form in for any equipment change or addition. Email completed to the Division's Real Estate team.

Store #:	Division:	City, State:	Date of Install:	Work Order #:	Service Provider & Tech Name:

New Refrigeration Equipment Installation Details

New System Model # (i.e. Protocol):		Serial #:
Full Charge:	Refrig Type:	Comments if charge exceeded 300 pounds).
Date of Scope of Work used as guideline for installation.		

Installation Requirement	Completed (Yes/No)	Comments
System pressurized to 250 PSI with dry nitrogen for 24 hours (0 drop in pressure required).		
Vacuum pulled to 500 microns or lower and held for 24 hours (0 vacuum loss is required).		
Energy management system installed per scope of work and in accordance with Aldi User Guide.		
Piping installed per Prototypical Refrigeration Drawings (includes proper support of lines and all 90 degree angles mitered and 9insulated).		
System Leak Checked.		

I certify that the previously listed items have been completed according to the specifications set forth in the scope of work. Any deficiencies found during commissioning will be corrected at the sole expense of the installation contractor within 30 days of notification.

		Date
Refrigeration Contractor		
Signature of Refrigeration Contractor Representative		
ALDI Director of Real Estate		

ALDI Refrigeration/HVAC System New Store Form

Fill out the form in for any equipment change or addition. Email completed to the Division's Real Estate team.

Store #:	Division:	City, State:	Date of Install:	Work Order #:	Service Provider & Tech Name:

New Refrigeration Equipment Details

New System Name (i.e. Protocol):		Description:	
Active Date:		Asset Category (circle one): HVAC REFRIGERATION	
EPA Category (select one): Commercial Refrigeration HVAC			
Certification Type (select one): Universal Low Pressure High Pressure			
Full Charge:	Refrig Type:	Hermetically Sealed: Yes No	Automatic Leak Detection: Yes No
Charge Determination Method (select one): Measurement Manufacturer Tag (Established range) Onsite Documentation Calculation Estimate			
Manufacturer: Manufacturer Date:	Warranty Name: Warranty Period:	Warranty Description:	
System Status (select one): Normal Operation Provisional Operation Inactive			

New HVAC Equipment Details

New System Name (i.e. Office Unit):		Description:	
Active Date:		Asset Category (circle one): HVAC REFRIGERATION	
EPA Category (select one): Commercial Refrigeration HVAC			
Certification Type (select one): Universal Low Pressure High Pressure			
Full Charge:	Refrig Type:	Hermetically Sealed: Yes No	Automatic Leak Detection: Yes No
Charge Determination Method (select one): Measurement Manufacturer Tag (Established range) Onsite Documentation Calculation Estimate			
Manufacturer: Manufacturer Date:	Warranty Name: Warranty Period:	Warranty Description:	
System Status (select one): Normal Operation Provisional Operation Inactive			

New HVAC Equipment Details

New System Name (i.e. Sales #1 Unit):		Description:	
Active Date:		Asset Category (circle one): HVAC REFRIGERATION	
EPA Category (select one): Commercial Refrigeration HVAC			
Certification Type (select one): Universal Low Pressure High Pressure			
Full Charge:	Refrig Type:	Hermetically Sealed: Yes No	Automatic Leak Detection: Yes No
Charge Determination Method (select one): Measurement Manufacturer Tag (Established range) Onsite Documentation Calculation Estimate			
Manufacturer: Manufacturer Date:	Warranty Name: Warranty Period:	Warranty Description:	
System Status (select one): Normal Operation Provisional Operation Inactive			

ALDI Refrigeration/HVAC System New Store Form

New HVAC Equipment Details			
New System Name (i.e. Sales #2 Unit):		Description:	
Active Date:		Asset Category (circle one): HVAC REFRIGERATION	
EPA Category (select one): Commercial Refrigeration HVAC			
Certification Type (select one): Universal Low Pressure High Pressure			
Full Charge:	Refrig Type:	Hermetically Sealed: Yes No	Automatic Leak Detection: Yes No
Charge Determination Method (select one): Measurement Manufacturer Tag (Established range) Onsite Documentation Calculation Estimate			
Manufacturer: Manufacturer Date:	Warranty Name: Warranty Period:	Warranty Description:	
System Status (select one): Normal Operation Provisional Operation Inactive			

New HVAC Equipment Details			
New System Name (i.e. Backroom Unit):		Description:	
Active Date:		Asset Category (circle one): HVAC REFRIGERATION	
EPA Category (select one): Commercial Refrigeration HVAC			
Certification Type (select one): Universal Low Pressure High Pressure			
Full Charge:	Refrig Type:	Hermetically Sealed: Yes No	Automatic Leak Detection: Yes No
Charge Determination Method (select one): Measurement Manufacturer Tag (Established range) Onsite Documentation Calculation Estimate			
Manufacturer: Manufacturer Date:	Warranty Name: Warranty Period:	Warranty Description:	
System Status (select one): Normal Operation Provisional Operation Inactive			

ALDI USE Only: Updated in Verisae System on _____ by_____