Secondary CO2 Start-Up Guide

- Prior to startup of the equipment, please review the Walmart Support page for all relevant installation documentation and verify that the equipment was properly installed.
- The bullet points below reference supplementary documents required for Starting the Secondary CO2 Skids. The exact documents will vary depending on voltage (outlined in the specific document name) to be started but the base nomenclature will be as follows:
    - Installation, Operation and Maintenance Manual
    - Lifting and Rigging Document
    - Parameter List
    - Flow Setting Guideline
    - Sequence of Operation
- Make sure that each document matches the name plate voltage required for each Secondary CO2 Skid before attempting a startup. More than one equipment voltage may exist on a single site.
- Pre-Startup Checklist:
    - Check over equipment for damage that may have occurred during installation.
        - Immediately report any damage to the project manager and provide photo documentation.
        - Record any damage in the Startup Report.
    - Verify Unit has been mounted and installed according to the documents listed above.
    - Ensure that the Generac Battery Back-up system has been installed by following the Generac Install/Commissioning Guideline.
    - Generac Battery back-up system must be brought online before charging CO2. The back-up system supplies power to the Carel and Emerson Controllers in the case of a power loss.
    - Ensure that the Generac Battery Back-Up system has had time to fully charge.
        - This must be complete **before** filling the system's Co2 Tank. If Power Loss Occurs while filling Co2, there is a high probability of Co2 Loss without a functioning Auxiliary Cooling Unit.
    - System should be evacuated to 200 microns prior to charging. Evacuation may take as long as 2.5 days to complete.
    - After Evacuation, the system should not be charged with more than 250psig of CO2 **vapor only.**
    - Do not charge liquid CO2 before confirming the auxiliary cooling system can run. This will create a high probability of over pressurization.
        - Record any issues with these procedures in the Startup Report.

BEFORE ENERGIZING THE DISCONNECT

- Confirm incoming power and verify voltage and balance between L1, L2 & L3
- Voltage imbalance MUST NOT BE GREATER than +/- 10% of name plate rating and balance MUST be Less Than 2% of differential, Line to Line.
- Ensure that the unit nameplate voltage matches the measured incoming voltage before powering up the equipment. Record Voltage Readings in the Startup Report.

STOP! IF NAMEPLATE VOLTAGE AND MEASURED VOLTAGE DO NOT MATCH OR ARE NOT IN RANGE, DO NOT SUPPLY POWER TO THE UNIT! DO NOT TURN ON THE DISCONNECT!

- Confirm transformer secondary voltage.
  - Record Secondary Transformer Voltage in the Startup Report.
- Check all electrical terminals for secure wiring.
  - Record any loose connections on the Startup Report.
- Review the User Guide reference.
  - Go through Unit Configuration in Carel Controller to set up refrigerant type and store information.
- Verify all I/O reads correctly in the Carel Controller – **Technician should verify all digital readings with their gauges and meters to ensure that the sensor data is being reports accurately.**
  - Pump Differential Pressure (dp) at the controller should agree with field measured dp within reason.
  - Supply and Return Temperatures should reflect field measured temperatures within reason.
  - Pump Suction and Discharge Pressures should reflect field measured pressures within reason.
  - Record all readings and any discrepancies on the Startup Report.
- After confirming voltages and I/O the system may be charged with liquid CO2 following the System Charging section of the IOM.
- Verify valve drivers are communicating with Carel Controller
  - Superheat and Suction Pressure both come from the Valve Driver. Record all readings and any discrepancies on the Startup Report

The above supplementary documentation should be thoroughly reviewed to verify startup readiness. Failure to properly verify each of these steps could result in system damage.
Once all the above items have been verified, turn on the system to verify pump rotation.

To verify pump rotation:

Set the pump in hand to 20Hz, differential pressure should be approximately **11** psig. If the differential pressure does not read a positive value, shut the pump down, swap 2 leads, and retry. **If pump rotation is incorrect, immediately shut the pump off** and swap phases at the VFD or Pump and notate it in the Startup Report. If swapping leads does not solve the issue, Do not operate the equipment, immediately notate the issue in the Startup report and contact a RAE National Accounts Service representative.

RAE CORP. SECONDARY CO2 SKID STARTUP REPORT

WARNING !	
Unit Startup should be performed only by a qualified heating installer/service technician. Refer to the Installation and Operation Manual for your reference.	Have this unit serviced/inspected by a qualified service technician, at least annually. Failure to comply could result in severe personal injury, death, or substantial property damage.

Start-Up Performed By:		Start-Up Date:	
Company:	Name:		
Phone:	Job Name:		
Address:	City:	State:	Zip:
Contact Name:	Contact Phone:	Email:	

EQUIPMENT READINESS CHECKLIST AND START-UP DOCUMENTATION

Send completed form to: Email: napcommission@rae-corp.com Mail: RAE Corp./Service Dept. 4492 Hunt St. Pryor, OK 74361

Unit Damage Report (additional space in notes):			
Record any loose wiring connections (additional space in notes):			
Nameplate Voltage:	Supply Voltage – L1 to L2:	L1 to L3:	L2 to L3:
Generac Unit Online: Y/N	Co2 Manufacturer Name:		Co2 Grade:
Co2 Vapor Fill Pressure (psig):			
If all of the above are within specification, the unit can be powered for the next checks.			
Secondary Transformer Voltage:		Pump dp Value(psig):	
Pump Amp Draw – L1:	L2:	L3:	
Verify Unit Configuration in Controller: Y / N		Check I/O for Discrepancies: Y / N	
Co2 Total Weight Filled (Pounds of Vapor and Liquid):			
Enable Unit and Run for a minimum of 15 minutes to stabilize the system before moving on. Ensure an acceptable refrigeration pressure/temperature range is maintained during the stabilization period. Additionally, ensure that liquid Co2 flow is consistent and not full of air.			
Inlet Temp:	Outlet Temp:	Delta T:	
Refrigerant Type:	Superheat:	Suction Pressure:	
Number of Units at the jobsite:		Retrofit / New Construction:	
Each Piece of Equipment Must Have Its Own Startup Sheet Completed Separately			
Unit _____of _____ Model No: Serial Number:			
Internal Use Only – Date Startup Report Received:		**Received By:**	

ADDITIONAL NOTES

NOTES: