



Refrigerant Fill System

Model: *DataFill RRV-2490*

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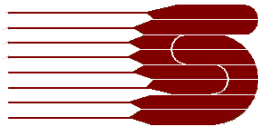


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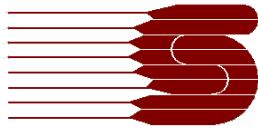
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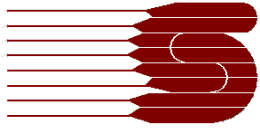
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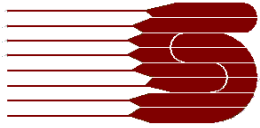


1.0 Introduction

This manual applies to the *DataFill-XXX290* models of fill systems. The primary purpose of this system is to provide the accurate dispensing of refrigerant into a production unit, within the required production time. These systems use Allen-Bradley Programmable Controllers for process control and Allen-Bradley Operator Interfaces for process configuration. All the components used in these systems are selected for reliability and ease of use. Substantial customization is possible with this model of fill equipment.

This manual applies to machines that are capable of single fill or multiple fills and, single or multiple fluids. The fill systems are also capable of operating with or without a vacuum sequence. If the system provides vacuum functions, a dedicated vacuum pump is required. A typical fill sequence performs either a single point unit evacuation, or a tool evacuation followed by a vacuum level rise test. This test provides an operator independent method of finding production units with gross-leaks, or with non-condensable contaminants and moisture. System flexibility provides the adjustment of process parameters (times and levels), allowing the system to function within the process requirements of any production environment.

This manual is organized by function. The following sections describe the components used in the system, installation guidelines, explanation of the system's operation and maintenance, and troubleshooting information.



2.0 The Serv-I-Quip Refrigerant Fill System

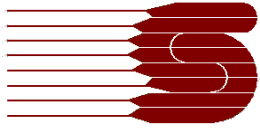
This portion of the Manual will cover the in-depth operation and design of the DataFill Refrigerant Fill System. The hardware devices in the system allow the machine to function at an operational level to meet the customer's manufacturing standards. These components are chosen for reliability, repeatability, and ease of service.

2.1 Electrical Enclosure and Electrical Panels

The Electrical Enclosure chosen for the 2019 Serv-I-Quip product line is a customized cabinet designed to meet NEMA standards as well as comply with NFPA 70 arc flash criteria. The right side of the enclosure is below the 50 Volt threshold to allow for entry with limited PPE. In actuality, the panel is 24 VDC or less. The left side of the cabinet is protected by a rotary disconnect switch and houses all voltages above 24 Volts. This may include but is not limited to 480 Volts 3 Phase, 240 Volts 3 Phase, 208 Volts Single Phase, and 120 Volts Single Phase. Depending on the voltage, respective ARC flash PPE must be worn when working inside this portion of the cabinet. All of SIQ's electrical panels are UL certified and have the sticker and appropriate fixed labels for the fuses etc. required to comply with UL standards.

2.2 CompactLogix L306ER

The [5069-L306ER] Allen-Bradley CompactLogix is another commonly used 5069 Series PLC and it does not include embedded I/O. Instead, it has several expansion cards to handle the various digital and analog inputs and outputs on SIQ machines. The maximum I/O modules that it can have is 8. It runs a Studio 5000 program in Ladder Logic language, which is programmed by a Serv-I-Quip Controls Engineer. The PLC program is then able to interpret input signals and fire outputs accordingly, controlling the operation of the testing equipment. The processor has the capability to communicate with remote devices, such as a PanelView HMI via Ethernet (or less commonly, serial) connection. It can also interact with Dataserv, SIQ's custom software for operator interaction.



2.2.1 High Speed Counters Module Cards

The 5069-HSC is a High Speed Counter inputs and outputs. In a standard charging application, the HSC input(s) processes the high speed raw pulse train output from the flow meter transmitter and is then used in the logic to determine how much refrigerant has been dispensed during the charge. The flow meter as well as the HSC inputs themselves must be configured properly with their respective software in order to count the refrigerant at a rate of 1000 counts per ounce. The PLC is responsible for the math portion and calculates a proper count value in live time based upon the expected counts per ounce, a calibration factor, and the speed at which the refrigerant is flowing.

2.2.2 Analog Module Cards

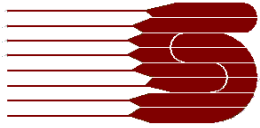
The 5069-IF8 is Analog Inputs and Outputs. These inputs are used to scale the analog devices in the system. These devices include pressure transducers and vacuum gauges in standard applications but can be custom based on the application at hand. The analog inputs must be configured based on the analog sensor type and then scaled accordingly to provide an accurate reading for process control and user safety.

2.2.3 Input Module Cards

The 5069-IB16 has 16 built-in discrete inputs. These inputs monitor the status of devices such as push buttons, pressure switches, level switches etc. that are crucial to process control.

2.2.4 Output Module Cards

The 5069-OB16 has 16 built-in discrete outputs. These outputs are used to control devices such as lights, valves, relays etc.



2.3 Flow Meter

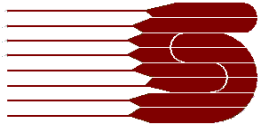
The Endress Hauser E-Series sensor used in the fill system is a mass flow meter. By sensing the velocity, density, and vibration of the fluid being charged, the sensor transmits a signal to the Endress Hauser 1000 and 2000 Transmitter. The 1000 and 2000 Transmitters convert a raw signal from the flow meter into a 24 VDC pulse that is transmitted to the high speed counter card at the PLC. A Serv-I-Quip, Inc. representative must configure flow meters. Flow meters can be setup to either measure mass or volume. Typical set-ups are based upon 16000 counts equaling one pound of refrigerant or 100000 counts per gallon.

2.4 Vacuum Pump

The vacuum pump is used to pull vacuum on the charging gun when the machine is in an idle state and to pull vacuum on the unit to be filled during the evacuation process. Depending on the process and desired line layout, the vacuum pump will be sized accordingly to handle the load needed at the charge station. When the charging equipment is idle the system vacuum level should be below 50 mTorr, if the level is above 50 microns the vacuum pump(s) or the tool should be serviced accordingly. See the provided manufacturer's literature for maintenance schedule, oil replacement type and vacuum troubleshooting.

2.5 Stinger Vacuum Gauge

The vacuum gauge monitors the vacuum level drawn by the vacuum pump. It feeds a 0-10 VDC signal to the analog input of the PLC. This signal is scaled in the RSLogix program to provide accurate vacuum measurements. The gauge is Pirani thermal conductivity gauges, which operates by heating a wire filament to a constant temperature and monitoring the current required to keep that wire at the same temperature as the air around it is removed. The gauge in use has an effective range of 1×10^{-4} Torr to 10 Torr. The Manual can be found attached at the back of this manual or online here: <http://www.instrutechinc.com/convection-vacuum-gauge-stinger/>



2.6 Refrigerant Pressure Transducer

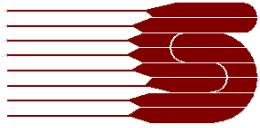
The pressure transducer monitors the liquid refrigerant inlet pressure as well as other crucial process pressures. For spare parts consistency as well as reliability, an IFM -14.5 to 735 psig gauge is used everywhere it is applicable. The sensor outputs a 4-20mA signal to the PLC to be scaled as such. The pressure transducers monitor critical system pressures throughout the closed circuit plumbing to determine if the process is in jeopardy at any point, or to aid in the cycle process.

2.7 Air Pressure Switch

The air pressure switch ensures that the inlet air pressure is sufficient to operate the machine. If the air pressure drops, the machine goes into reject mode and a fault message is displayed on the OIT. The switch setting should be at 65-75 psig. The switch is wired normally closed, so when air pressure is present, the corresponding input to the PLC should be lit. The plant air is used to control the tool stem that engages to the unit allowing the vacuum sequence and fill to operate properly. The air source does not have to be exceptionally dry; however, excessive water may damage the air solenoid over time. Air consumption amount is negligible.

2.8 Serv-I-Quip 3 Port Valve Body/Tool

A custom brass valve body and tool allows the machine to perform the various functions required in the manufacturing process for a Refrigerant Sealed System. Valves used to control the flow of vacuum and fluid(s), seal against the valve body to provide flow control. These valves are ASCO brand chosen for reliability and ease of maintenance. Rebuild Instructions are provided in Section 5 of this manual.



3.0 Installation

While in most cases a Serv-I-Quip employee will commission the charging system, plant personnel should complete the physical installation of the system before start-up. The refrigerant supply line(s), air, and oil supply lines where required, electrical power, and reclaim piping should all be completed and tested. The charging system inlet valve should not be opened until start-up.

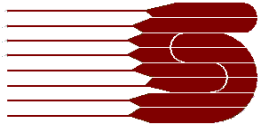
3.1 Location

Install the Charging System with **unrestricted access to both front and back** of the enclosure. Some maintenance work requires access to the back panel. Do not back the system up to a wall, unless there is a way to move the machine away from the wall without disconnecting the supply lines and electrical connections. Front door clearance is 20".

3.2 Power Requirements

Standard Charging Systems require 480 VAC 50/60 Hz 20 Amp service. Systems are available in custom configurations for other power supplies, and will be marked specifically as to power requirements. After connecting power to the disconnect terminals, the installing electrician should measure potential from the fused lead to ground. Full supply potential should be present. Then measure from the neutral (un-fused) terminal block to ground. No potential should be measured. If full potential is present between the un-fused leg and ground, the hot and neutral leads are reversed. If some potential is present between each terminal and ground, this indicates a faulty ground.

When a vacuum pump is supplied with a charging system, the installing electrician should be certain of the voltage, current and phase necessary for the motor. After wiring is complete, a 3-phase motor should be "bumped" (started briefly, then stopped immediately) to see that the rotation direction matches the arrow on the pump. If it is not, switching any two leads will correct the rotation.



3.3 Refrigerant Supply

The fill equipment is configured to measure liquid flow. The system will not measure vapor accurately. To ensure the refrigerant is liquid, it must be raised to a pressure above its vapor pressure at the ambient temperature. The following chart provides pressure requirements for the supply pump and the low-pressure cutout setting:

Table 3-1: Refrigerant supply pressure and pressure switch settings

Maximum Ambient Temperature	Minimum Refrigerant Supply Pressure (psig)				Refrigerant Low Pressure Cut-out			
°F	R-134A	R-404	R-22	R-410	R-134A	R-404	R-22	R-410
85	150	240	230	330	120	210	190	290
90	160	260	245	350	130	225	200	310
95	170	270	260	370	140	235	215	330
100	180	290	275	390	150	250	230	350
105	190	310	290	410	160	270	245	370

The pressure may be elevated by pumping or by heating the refrigerant container. Building an insulated enclosure for the tank and heating the enclosure to a maximum of 125°F can accomplish heating. The line from the cylinder to the charge board should be copper, and long enough for the refrigerant to cool before it reaches the charging equipment. Allowing space for two cylinders will allow for one cylinder to be in use, while another is already heated and on stand-by, ready to be placed in use when the current cylinder is empty. Turbine pumps are generally used in bulk storage applications. In ton cylinder applications, air-driven pumps are common. **In all cases, the refrigerant must be elevated above the pump.** A typical installation for pumping from ton cylinders is illustrated in Figure 3-2. To use 125 lb. cylinders, invert them, and open the valve marked “VAPOR”. Stands to hold a cylinder inverted are available from refrigerant suppliers.

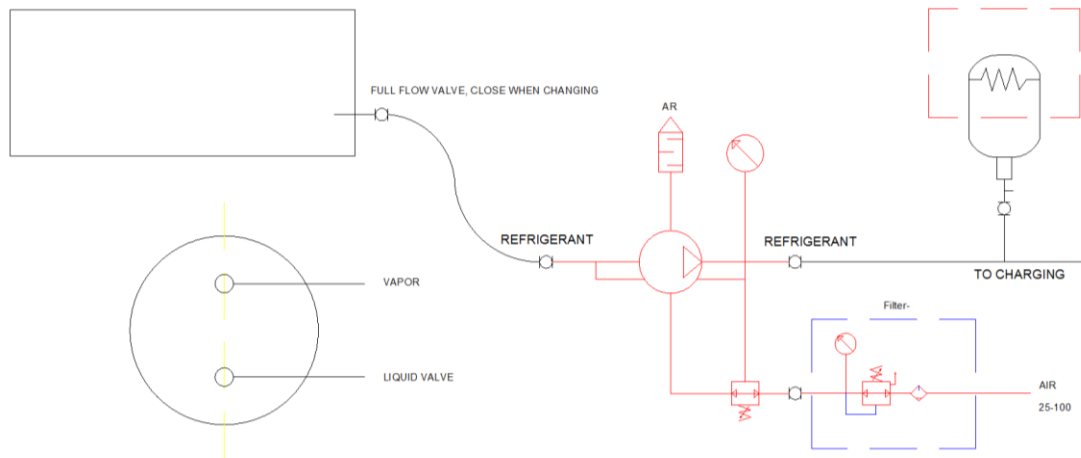
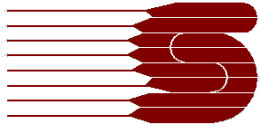
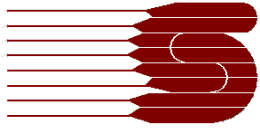


Figure 3-2: Typical Ton-Cylinder Installation

3.3.1 Supply Line Accumulator

A supply line accumulator is required when a reciprocal air-driven pump is used in order to smooth the pulses the pump produces. An accumulator is recommended in a system using a turbine pump, to absorb the line shock caused by the start-stop flow of liquid in the line. To install a Serv-I-Quip accumulator in an air or turbine pump system, proceed as follows:

1. Pipe the accumulator into the supply line between the pump and the charging system.
2. Evacuate the supply line and the accumulator.
3. Set the accumulator's temperature controller at 150° F (66° C)
4. Set the high temperature cutout at 200° F (93° C)
5. Set the high pressure cutout about 40 psig above normal operating pressure (see Table 3-1, above)
6. Turn the main pressure switch on and allow unit to come up to temperature.
7. Slowly open the valve and allow refrigerant to enter the accumulator.
8. When the pressure in the system equalizes, open the valve all the way.
9. Leave power on to the accumulator. If power is cut off, and the accumulator cools down, it may liquid fill. Then when power is re-applied, the pressure in the system will increase, and may blow relief valves.



3.3.2 Air Operated Refrigerant Supply Pump

When operating from ton cylinders of refrigerant, an air operated pump provides a convenient way to transfer refrigerant at suitable charging pressures. **The pump must be installed with its inlet physically below the refrigerant level in the cylinder.** The piping or hose between the cylinder and the pump inlet must be as short and non-restrictive as possible. The pump uses standard plant air, at 60 psig minimum.

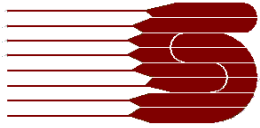
Install the pump and the air and refrigerant piping. Evacuate the refrigerant piping. Open the valve from the refrigerant supply and the inlet valve to the pump. Open the air-supply, and adjust the air regulator to 40-60 psig. The pump should pump several strokes, bringing the outlet side up to pressure. Adjust the regulating valve to the required system pressure (see Table 3-1).

3.4 Refrigerant Supply Piping

Copper tubing (type ACR, K, or L) may be used for supply piping. The charging system inlet is a 1/2" male flare. The supply line piping should be a larger size (3/4" to 1" nominal) and be reduced at the charger. A valve at the point where the line is reduced will permit future movement of the equipment for service or relocation without emptying the supply line. Joints in copper tubing should be silver-soldered with a brazing alloy recommended for use in refrigeration systems. Evacuate the piping and leak-check the piping. The supply piping should be filled with refrigerant vapor, leak-checked with a refrigerant leak detector, and any leaks repaired before it is filled with liquid refrigerant.

3.5 Oil Supply (If Applicable)

Oil must be prepared before it is charged into refrigeration systems, to remove moisture and non-condensable gasses. Piping can be similar to that for refrigerant supply.



3.6 Tool Installation

In most cases, hanging the tool(s) slightly above operating level on a tool balancer provides the best installation. In some cases, a swinging boom may be required. In any situation, the tool should be supported up off the floor. Hoses coming from the charging cabinet must also be supported if the full weight of the hoses will cause kinking and affect the operation of the system.

3.7 Liquid Filling the Charging System

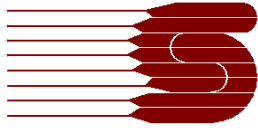
If you must empty or fill a system, please read this section carefully. If you have any questions, please call Serv-I-Quip. The following description assumes the supply line is connected to the Charging System, and the supply line is filled with liquid refrigerant. Make certain the outlet valves are open and inlet valves are closed.

1. The system must be evacuated before refrigerant can be introduced to it. To evacuate the system open the outlet valves to the tooling, and connect a vacuum pump to the 1/4" access needle valve. Start the pump, and open the needle valve. Evacuate the system to below 200 microns, close the needle valve and remove the vacuum pump from the system.

2. Open the inlet valve slowly to avoid "hammering" the refrigerant piping. Fill the filter, tooling hose and piping, then open the inlet valve all the way and backseat it.

3.8 Tool Connections and Hose Filling

All tools ports are labeled. Connect the tool hoses and plugs to appropriately labeled outlet ports on the Charging System. The refrigerant hose will be labeled with a blue section of heat-shrink, the reclaim hose will be labeled with a red section of heat shrink, and the vacuum hose will remain bare.



3.9 Setting the Low Pressure Cut-Out

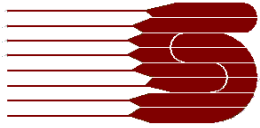
The pressure sensor output signal allows the system to operate only when the refrigerant pressure is high enough to be sure only liquid, not vapor, flows through the flow meter. If vapor were to flow through the meter, the conversion from volumetric to gravimetric measurement would be grossly inaccurate. The low refrigerant cutout pressure (specific to the refrigerant you are using) is set prior to shipment of the system. To adjust the setting in an AccuFill system access the maintenance screen in the operator interface. Select Low Pressure Cut-Out, and enter the cutout pressure specific to the refrigerant being used. This pressure can be obtained from the chart provided in table 3-1 of this manual. When using a DataFill system the set point must be adjusted in the environment table.

To check the low-pressure cutout, connect an empty sample cylinder to the tool. Close the refrigerant inlet valve. Select the appropriate pressure from table 3-1 above, push the charge button, and when the refrigerant solenoid valve energizes, slightly open the outlet valve, while watching the pressure gauge. By opening the inlet valve, you can raise the pressure, and then drop it slowly through the cutout pressure, to verify your setting.

3.10 System Calibration

Calibration is necessary to ensure that the charging equipment is operating properly. Proper calibration procedure must be followed to ensure that the adjustments made improve performance and not deteriorate the system accuracy. There are several pieces of equipment necessary to perform a proper calibration check. These include a calibrated scale that can read to the order of magnitude required for the production unit specifications, and a certified vessel in which to dispense the fluid.

Evacuate the certified vessel and get the tare weight. Dispense the fluid and weigh the filled vessel. If the charge board has been setting idle for an extended period of time the first charge will not be a good sample. The fluid will not be the same density as the fluid entering the flow meter and needs to be flushed out. Once the system has been flushed, take two to three charges and average the weights. Use this average for the actual amount. Make sure that the vessel is evacuated and re-weighed after each charge; the vessel will pick up weight from frosting if not cleaned between each test charge.



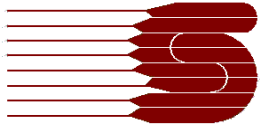
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www.siqinc.com

Installation

Section 3

If the message “System Out of Calibration” appears, it means that the two values entered cause the system Correction Factor to be outside the tolerances. First, try to re-enter the numbers and re-calibrate the system again. If the message still appears, call Serv-I-Quip Inc. for assistance.



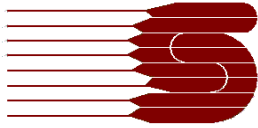
4.0 Operation

Various configurations of the charging system are available to meet specialized requirements. There are two typical configurations for a fill system: tool evacuation and single point unit evacuation.

In a tool evacuation automatic leak check system, the product arrives at the fill system pre-evacuated. The operator then connects the tooling to the product's fill port. Due to the design of the fill tool, connecting the tooling does not open the quick coupler on the product, keeping the product under deep vacuum. By pressing the start button on either the fill tool or the front panel, the operator starts the process. The system evacuates the air from the tool to ensure that the unit under process is not contaminated. When the vacuum level is below the set level, the charging tool automatically extends the stem forward, isolates the vacuum pump and opens the product quick coupler, starting the vacuum decay test. The system monitors the vacuum level of the unit. If vacuum level stays below the set level for the duration of the test the product passes vacuum check, the system fills the preset amount of refrigerant, and sounds the cycle complete alarm. The operator disconnects the tooling and proceeds to the next unit.

In a single point unit evacuation automatic leak check system, the product arrives at the fill system. The operator connects the tooling to the product's fill port. By pressing the start button on either the fill tool or the front panel, the operator begins the process. The charging tool automatically extends the stem forward and evacuates the air from the unit under process. A vacuum is pulled on the unit for a set time. If the vacuum level is below the set level at the end of that time, the system performs a vacuum check test. The system then isolates the vacuum pump and monitors the vacuum level of the unit. If the vacuum level stays below the set level for the duration of the test, the product passes vacuum check and the system fills the preset amount of refrigerant, which sounds the cycle complete alarm. The operator disconnects the tooling and proceeds to the next unit.

The vacuum cycle of the systems can be altered through the operator interface. The cycle configuration switches are used to choose which type of vacuum cycle the system will run, and whether or not the system will run all the vacuum steps.



4.1 Switching Tools Procedure

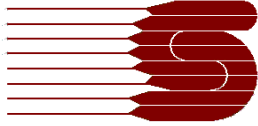
With a DataFill system, the tool selection can be made when creating/configuring a recipe in Dataserv. Upon scanning a unit, the appropriate recipe is selected. The correct tools must be used based on the type of refrigerant used for that particular tool and unit.

4.2 Starting a Cycle

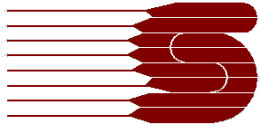
To start a cycle using a DataFill system, scan in the required fields. Once the fields have been populated, the Dataserv software will prompt the operator with the message “Press Start to Begin Cycle”. This tells the operator to press the start button to begin the automatic cycle. To start a cycle using an AccuFill system, select the desired configuration for both charge and vacuum. Then, navigate to the ‘Run’ screen and press the start button to begin the automatic cycle.

4.3 Final Data Completion Codes

1	Cycle Complete
40	Failure E-Stop Pressed
41	Failure Reset Pressed
42	Failure Low Air Pressure
43	Failure Door Interlock Open
45	Failure Gas Sensor High Alarm
47	Failure Low Refrigerant Pressure R-454B
48	Failure Low Refrigerant Pressure R-410A
150	Failed High Side Gross Evacuation
151	Failed High Side Final Evacuation
152	Failed High Side Vacuum Check
153	Failed High Side No Rise During Vacuum Check
154	Failed High Side Reject Evacuation
155	Failed Vacuum Pump 1 OL Tripped
156	Failed Vacuum Pump 1 Not Running
160	Failed Low Side Gross Evacuation
161	Failed Low Side Final Evacuation
162	Failed Low Side Vacuum Check



163	Failed Low Side No Rise During Vacuum Check
164	Failed Low Side Reject Evacuation
165	Failed Vacuum Pump Overload
166	Failed Vacuum Pump Off
167	Failed Low Fluid 1 Pressure
168	Failed Low Fluid 2 Pressure
169	Failed Low Fluid 3 Pressure
170	Failed Fill 1 High Side Counter HSC Never Reset
171	Failed Fill 1 High Side Counter HSC Count Fault
172	Failed Fill 2 High Side Counter HSC Never Reset
173	Failed Fill 2 High Side Counter HSC Count Fault
175	Failed No Vacuum Rise During Vacuum Check
176	Failed Pressure In Tool 1 Start Of Test
177	Failed Pressure In Tool 2 Start Of Test
178	Failed Tool 1 Disconnected During Cycle
179	Failed Tool 2 Disconnected During Cycle
180	Failed Tool 3 Disconnected During Cycle
181	Failed Tool 4 Disconnected During Cycle
184	Failed Pressure Present in Unit
185	Failed Reclaim Tool 2
186	Failed Reclaim Tool 3
187	Failed Reclaim Tool 4
188	Failed Reclaim Tool 5
189	Failed Reclaim Tool 6
190	Failure No Signal PT-001-01
191	Failure No Signal PT-001-02
192	Failed No Signal VT-001-01
193	Failed No Signal VT-001-02

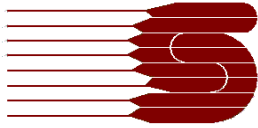


5.0 Maintenance and Troubleshooting

Charging systems require little regular maintenance, however, some scheduled maintenance is necessary for the charging tool itself. In most installations, rebuilding the charging tools annually is adequate. This should consist of disassembling the tool, cleaning the parts, replacing the seals, and reassembling. Exploded diagrams and parts lists are included in this manual for each type of charging tool. The air filters should be cleaned quarterly with soap and water.

Regular calibration checks are necessary to be certain that the machine is operating correctly. A quick visual inspection will determine if light bulbs in the pilot lights need to be replaced. The vacuum gauge can be checked with a zero-reference simulator. As long as the system cycles correctly and fills accurately, there is no further maintenance necessary.

If the charging system does not deliver the correct fill amount, but the weight delivered is consistent, the problem is most likely in calibration. Please refer to Section 3.10 to adjust the fill through recalibration.



5.1 Preventative Maintenance Schedule

The following is a preventative maintenance schedule for a refrigerant charge system.

Weekly

- Check /Replace O-rings in the PCU coupler connecting the tool to the unit being processed (if applicable)
- Check both the color and level of the vacuum pump oil. Add oil if level dictates and change oil if discolored.
- Check that all lights function as they should and replace bulbs accordingly.
- Check/Verify the function of the PC and bar code scanner and replace if necessary.
- Check E-stop push-button functionality. If not working repair before running the equipment.

Monthly

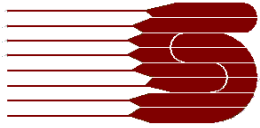
- Inspect the plumbing of the equipment to ensure that there are no leaks.
- Inspect the electrical connections to make sure nothing is worn in an unsafe manner. (Caution!! Only authorized personnel must perform the electrical inspection)
- Visually check all hose and plug connections on the charger to make sure that nothing is damaged.
- Check the tool for any physical damage (loose or worn parts etc.)

Every 3 Months

- Replace Vacuum Pump Oil

Every 1-2 Years

- Inspect and clean/replace air filter for the plant air to the charge board. If plant air is relatively clean this interval can be extended
- Inspect and replace vacuum pump mist eliminator if needed.
- Re-build the tools mounted on the charger. Rebuild instructions found in Section 5.5. Part numbers for the rebuild kit found in Section 5.2 as well as on the drawings

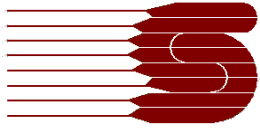


5.2 Recommended Spare Parts

This spare parts list is for a Refrigerant fill system. This list is not a strict dictation of spare parts to be ordered but rather a recommendation and can be taken as such.

SIQ Part #	Description	Recommended Maintenance	Qty.
CALL SIQ	REBUILD KIT ASSEMBLY FOR 1020291	Rebuild recommended once every 3-5 years or as needed. Buy at your discretion.	4
CALL SIQ	REBUILD KIT ASSEMBLY for 1020292	Rebuild recommended once every 3-5 years or as needed. Buy at your discretion.	4
1013995A	FILTER ELEMENT	3 Years or as Needed	2

The items listed as “Stock” are considered maintenance items and are replacements which are further outlined in Section 5.1. Quantity to order is at your discretion.



5.3 Troubleshooting Counting Malfunctions

The Charging System dispenses measured amounts of refrigerant by counting the pulses from a flow metering circuit and comparing them to the high-speed counter preset. The pulses start when the fluid passes through the flowmeter. The fluid solenoid valve remains open until the counter reaches the preset, then the system closes the solenoid valve. The current count displays on the front panel during the charge. Counting malfunctions generally fall into one of two categories: erratic count and complete loss of counts. This section refers to Serv-I-Quip Charging Systems in general; there may be minor discrepancies between the description below and the particular unit you are working on, but the general operation remains the same. These troubleshooting methods still apply. Other relevant documentation includes the cut sheets and manuals on Endress Hauser Flowmeter and Transmitter.

Common Symptoms

Symptom: System fills refrigerant but does not count.

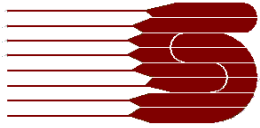
Possible Cause: Counting circuit power supply failure or poor connections.

Action: Open the bottom door of the system enclosure. A Sola 24 VDC power supply is in the center of the panel. Use a voltmeter to check this supply. It should be within 0.1 volts of 24. If voltage is present, but not 24 volts, the power supply may have failed. If no voltage is present, the power supply may have failed, or wiring may be at fault. The power supply is fuses on both the line and load sides. It may be possible a fuse has blown. Trace wiring back to the power supply and rectify the power problem.

Symptom: System does not fill and does not count.

Possible Cause: Refrigerant valve not opening on tooling.

Action: Check the electrical connections to the tooling.



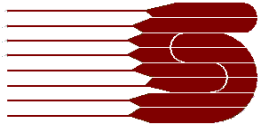
5.4 Vacuum Systems Troubleshooting

Systems that perform vacuum check may present problems that are initially difficult to trace. The system may fail to perform its sequence for reasons that are not immediately obvious. For this reason, a thorough understanding of vacuum and the vacuum test process will be a considerable aid in troubleshooting.

The pressure range referred to as vacuum is the region from complete absence of pressure (0 psia, or pounds per square inch absolute) to atmospheric pressure (approximately 14.7 psia, 1013 mbar or 760 Torr). Industry often uses the Torr range to measure vacuum, even though the SI units Pascals and bars are preferred by ISO/1000. The mbar (10^{-3} bar) = 1×10^2 Pa = 0.75 Torr. The entire range, from the deepest vacuum to atmospheric pressure, represents less than a 15 psi difference. In a system being evacuated, the flow rate is directly proportional to the pressure difference between the highest pressure and the lowest (typically the inlet of the vacuum pump). Once a system is below 1 Torr, the greatest pressure differential possible, if a pump could pull a perfect vacuum, would be about 0.0193 psi. The difference between 200 mTorr and 500 mTorr is about 0.0058 psi. So it is clear that the pressure differences we are working with are very small, and the flow rates they produce will be low.

The vacuum check system consists of a vacuum pump, a normally open solenoid valve, a gauge/controller, and a normally closed solenoid valve at the tool. The normally open solenoid valve, when energized, isolates the pump from the rest of the system.

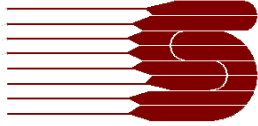
The sequence performed by most vacuum test systems operating on pre-evacuated product consists of tool evacuation, followed by a timed vacuum decay test during which a solenoid valve isolates the product from the vacuum pump. A vacuum pressure limit determines whether a product passes or fails; if the product pressure exceeds the set point before the test completes, it fails. Product that is not pre-evacuated will be evacuated by the charging system in a single point application. The tool evacuation makes certain the tool is at a low pressure before opening up the product. In manual vacuum check systems, the operator starts tool evacuation and watches the vacuum gauge, waiting for it to indicate a pressure below a predetermined point before attaching the tool to the product. In automatic systems, the operator connects the tool to the product before starting the cycle. The tool quick-coupler has an air driven plunger, in place of the spring-loaded plunger in a standard female coupler. During tool evacuation the plunger is retracted, so the tool is not open to the product. Only the



volume up to the product quick coupler is evacuated. This portion of the cycle typically has two limits: vacuum level and time. As soon as the vacuum level is below the limit, the system can proceed to vacuum check. If it doesn't get below this limit within the time limit (a timer in the PLC program - usually set to less than 20 seconds), the system fails tool evacuation.

After tool evacuation completes successfully, the vacuum supply solenoid closes, isolating the product, the tool and the vacuum hose from the pump. The air solenoid valve energizes, causing the stem in the tool quick coupler to extend. This opens the product quick coupler, and lets the vacuum gauge sense the vacuum level in the product. The vacuum level reported by the gauge will usually rise somewhat during this time. If it stays below the upper set point, the product passes vacuum check, and the sequence advances to charge.

Problems with vacuum check systems fall into one of three categories: poor overall system vacuum levels, tool evacuation rejects, or vacuum check failure. The following chart offers suggestions for isolating possible causes.



Common Symptoms

Symptom: Poor system vacuum levels.

Possible Cause: Vacuum pump oil contaminated.

Action: If there is a hand valve where the tool hoses connect to the vacuum system piping, close it and watch the vacuum level. If no valve is present, remove the hose and cap the connection. If the vacuum level goes down, there are most likely leaks in the piping system (see next possible cause). If the vacuum level does not improve when the valve is shut, the pump is not performing adequately, or there are leaks between the pump and the valve. Vacuum pump oil may become contaminated by evacuating product (or other vessels) containing refrigerant or other volatile substances, or humid air. If this happens sporadically, or in small amounts, adjusting the vacuum pump's gas ballast valve (see vacuum pump manual) to a small amount of flow can help keep the oil clean. In more severe cases, it may be necessary to change the oil.

Possible Cause: Leaks in vacuum system piping.

Action: A volatile solvent (automotive electrical cleaner works well) applied to piping joints will cause the vacuum level to jump if the joint leaks. Vacuum sealant (e.g. Kinseal, distributed by the Kinney Vacuum Co.) can be applied to all joints as a precautionary measure.

Possible Cause: Vacuum pump in need of repair.

Action: Repair or rebuild pump.

Symptom: Tool evacuation failure.

Possible Cause: Quick coupler O-ring worn or damaged.

Action: Replace, and oil lightly before use. If the process fittings are damaged, replace o-rings or the entire quick disconnect on the process fittings. Rough handling of the process fitting will reduce the life cycle and cause leakage problems.

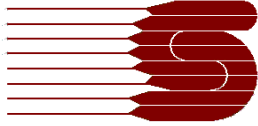
Possible Cause: Tooling port leaking or seals swelled and need replaced.

Action: Rebuild charge tool, particularly the solenoid seals between the air chamber and the charging passage in the tool block.

Symptom: Vacuum check failure.

Possible Cause: Product evacuation problems.

Action: If most products do not pass vacuum check, take an empty sample cylinder used to calibrate the fill equipment. Pull a vacuum on the cylinder. Run a cycle on the test cylinder. If the cylinder passes the vacuum sequence then the fill equipment is operating properly, and the production units or the production process is faulty. Check the process fittings; this is the main cause of failure. Other possibilities include a change in the upstream process, particularly a change that could introduce moisture, or humid air into the product.



Action: If most products pass vacuum check, but a larger than normal percentage is failing vacuum check, this may indicate problems with the vacuum pumps used to pre-evacuate the product. Each time a product fails vacuum check, identify the pump that pre-evacuated it, by tagging it, writing down its number, etc. If more units from a particular pump fail, that vacuum pump may be at fault.

Possible Cause: Leaks in vacuum piping.

Action: The vacuum pump may be able to maintain low vacuum levels in a system with very small leaks, by removing the air as fast as it leaks in. During vacuum check, the vacuum pump is isolated from the system, and even a very small leak will show up.

Possible Cause: Tooling port leaking or seals swelled and need replaced.

Action: Rebuild charge tool, particularly the piston seals or Rev-O-Caps in the end-effector of the tool (see illustration of tool).

Possible Cause: Quick coupler O-ring worn or damaged.

Action: Replace, and oil lightly before use. If the process fittings are damaged, replace o-rings or the entire quick disconnect on the process fittings. Rough handling of the process fitting will reduce the life cycle and cause leakage problems.

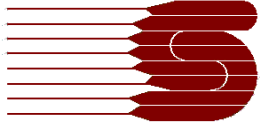
Symptom: Tooling Leaks Air.

Possible Cause: Tooling port leaking or seals swelled and need replaced.

Action: Rebuild charge tool, particularly the piston seals (see illustration of tool).

Possible Cause: Airline loose or cracked.

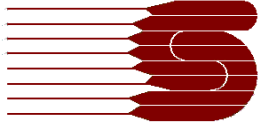
Action: Insure airline is properly into the quick release compression fitting or replace the airline.



5.5 Draining Tool After Lockout Procedure

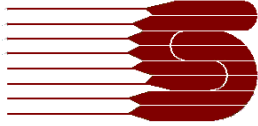
This procedure applies to both DataFill and AccuFill systems. In order to drain the tool after the lockout tagout procedure has been completed, the operator will need to enter service mode.

1. Plug the end of the tool with a coupler. The coupler can be open to the atmosphere on the end as it will not need to be sealed for this process.
2. Open the service mode screen.
3. For this example, Tool # is locked out and needs to be drained, enable the Tool # Reclaim Valve as well as the Tool # Refrigerant Valve. This will allow the remaining refrigerant in the system to flow through the valve body of the tool and out through the reclaim line, emptying the system. Make sure the refrigerant inlet valve to that line is **closed(!)** as otherwise this will result in a constant circulation of refrigerant, draining your supply.
4. Allow sufficient time for the remaining refrigerant to escape. If the reclaim system is working properly this should take no more than 1-2 minutes. Monitor the refrigerant pressure gauge on the back panel of the system throughout this process.
5. Once the line is relieved of pressure, close the Reclaim and Refrigerant Valves that were opened in step 3. Then exit service mode.
6. Double check the pressure gauge, then slowly loosen the refrigerant line for Tool # from the back panel to make sure there is no remaining refrigerant/pressure in the line.
7. Remove the remaining reclaim line, vacuum line, electrical connector, and air line in order to release the tool from the back panel and to be taken to service. Make sure to close all outlet valves from the back panel to the removed tool.

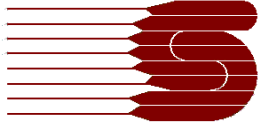


6.0 Bill of Materials

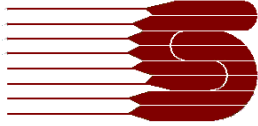
PART #	DESCRIPTION	QTY	BIN
1019977	DATAFILL RRV-2490, CARRIER MX, PLANT D, 12/22	1	
ENCLOSURES	COMMERCIAL CHARGER ENCLOSURES	1	
1020020	ENCLOSURE, HOFFMAN, CSD303012-CC439, CUSTOM PAINT: RAL5012 ROUGH TEXTURE BLUE (87786350)	2	STORAGE
1014053	ENCLOSURE PANEL, HOFFMAN, CP3030, PANEL FOR CONCEPT SERIES ENCLOSURES 30"X 30"	2	STORAGE
MECHANICAL	COMMERCIAL CHARGER MECHANICAL	1	
1017286	PARKER LOCKING BALL VALVE VP500P-8 1/2" FEMALE NPT X 1/2" FEMALE NPT YELLOW HANDLE	15	B1-18
1011140	SWITCH PRESSURE 0-145PSI ADJ #PK 6224	1	B1-17
1015609	SOLENOID AIR 1/8" 2 POSITION P2LAZ391ESNDBB49	18	B1-31
1015616	CABLE 5 METERS(STANDARD) MURR 7000-11021-2160500	18	B1-34
1015611	MANIFOLD 10 STATION 91213210SXZN	2	B1-26
1015610	BLANKING PLATE 912132BPSXZ FOR P2LA VALVE	2	B1-26
1015956	PNEUMATIC PB 31P HUMPHREY TAC SERIES AIR VALVE	8	Tool Cell
1016149	SWITCH HOLDER FOR HONDA HFO	4	CART
1015958	PNEUMATIC RELAY, SMC, VR3201-N01-Q, CE COMPLIANT	8	B1-99
1019505	PNEUMATIC VALVE, COAX, VMK102C140ETN1/2XX1VXXXP1F, 1/2 NPT, 2-WAY NC	2	B1-25
1012695	TRANSDUCER PRESS NO DISPLY 4-20MA 1/4 NPT -14.5 - 735.5 EPDM seal 4 PIN PX3422	2	B1-17
1013238	CONNECTOR, IFM EFFECTOR, EVC814, 5 PIN STRAIGHT MICRO DC FEMALE WIRABLE (was E11511)	3	B1-37
1013021	Gauge - 2" Dial, 1/4" NPT Center Back, 0 - 600 PSI 3846K8	2	PUMP CELL
1005646A	RELIEF VALVE, SUPERIOR 3012C 550 PSIG SET PRESSURE ASME	2	B1-28
1013995	FILTER 15CN110QEBPGN1221	2	B1-31
1020158	Needle Valve, Parker, 4M-V4LR-B, brass, 1/4MNPT x 1/4MNPT, PTFE seals	2	B1-109
1017273	Endress Hauser Flowmeter Promass E300 Model:8E3B08- 2QH0/0 E&H Part:8E3B08-CSINAEAAADSACVSHA1	2	B1-00
1008767	SOLENOID VALVE, ASCO, SC8210G034, NORMALLY OPEN 24/DC	2	B2-34



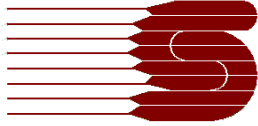
1015904	ALLEN BRADLEY 889V-LD2DBE-5 CORDSET DIN A *** MUST BE SERIES B (thin diameter), NOT SERIES A (thicker diameter)***	2	B2-06
1011341	VACUUM GAUGE STINGER CVM 211GAA	2	B1-28
1012901	CONNECTOR 94575T17 DB9 FEM alt is 92f6311	2	B1-28
1009446	TWO-STAGE ROTARY VANE PUMP, LEYBOLD, 11296, TRIVAC D65B Mot6506961 HTSUS:8414100000 (no power supply cable is needed since this pump gets hardwired by an electrician)	2	BAY 5
1007593	HOSE VARDEX 1" NEW AGE 1400280, 100FT CONTINUOUS LENGTH	6	NA
1009272	SMOKE ELIMINATOR SE30-60 99171127	2	B2-34
1009273	SAME AS 1008191B - C RING FOR VAC PUMP KF 40 88348	4	B1-29
1008191C	CLAMPING RING 18343	4	B1-30
1013003	FITTING FOR HOSE END OF VACUUM ASSEMBLY, ALUMINUM	2	B1-29
1019343	ADAPTER, KF40 TO 1" HOSE	2	
1007821B	REGULATOR W/ GAUGE PARKER 1/2"NPT 07R318AC	1	B2-22
ELECTRICAL	COMMERCIAL CHARGER ELECTRICAL	1	
1003670	DISCONNECT ,FUSED,A-B, 194RJ301753,600V,30 AMP 3PH	1	PS-58
1012148	SWITCH,DISCONNECT,A-B, 194R-PY (replaces 194R-HS1E)	1	B1-58
1017017	Ground Lug BLKADR21-21 2/0 2C 1H CU/AL LG	1	PS-59
1008903	POWER DISTRIBUTION BLOCK 1492-PDM3141, 3 POLE, 4 LOAD/POLE, 115 AMP, 600VAC, ALUMINUM	1	PS-59
1011942	COVER FOR POWER DISTRIBUTION BLOCK, ALLEN BRADLEY, 1492-PBC9, FINGER SAFE COVER FOR POWER DISTRIBUTION BLOCK	1	PS-59
1009464	FUSE ZZ HOLDER ALLEN BRADLEY 1492-FB2C30-L 2-POLE W/ INDIC	1	PS-56
1011055	FUSE FNQ-R-6	2	FUSE CART
1007181	TRANSFORMER ACME .75KVA T-2-53009-S	1	B1-125
1002779	FUSE BLOCK,A-B,1492-H4,AC NEON INDICATORS	10	PS-50
1015923A	CONTACTOR AB 100-K12ZJ10	2	PS-69
1015922	OVERLOAD KSERIES 4.5-6.3A 193-KB63	2	PS-71
1018009	POWER SUPPLY, ALLEN BRADLEY, 1606-XLB240E, 24VDC 10A POWER SUPPLY	1	PS-57
1017997	POWER SUPPLY, ALLEN BRADLEY, 1606-XLB120E, 24VDC 5A POWER SUPPLY	1	PS-57



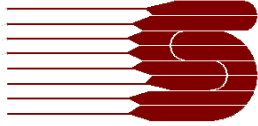
1017079	MARINCO 5279BL 15 Amp 125 Volt Flanged Outlet Receptacle, Zack Electronics Part No. 5279BL	1	B1-37
1015473	CIRCUIT BREAKER, MCB 1492-SPM1C100 1 POLE 10 A SUPPLEMENTAL	1	PS-77
1004830	FUSE BLOCK,A-B,1492-H5,DC LED INDICATORS	12	PS-50
1019029A	A2L/CAT1 DIV2 MONITOR, MSA, A-X5000 0-F-0-1-0- AB-00-0,	1	STORAGE
1011138	OUTLET DUPLEX AC 125VAC 15AMP DIN RAIL mcm 1671k13	1	PS-60
1015582	LOAD SWITCH ENCLOSED 25 AMP 194E-Y25-1753-6N	1	B1-57
1007468	RELAYA/B700HLT1Z24ORPHNX 24VDC 2966171 1 POLE	13	PS-95
1003672a	SHAFT 194R-S1 12" FOR NH100'S	1	B1-58
1015701	RELAY, ALLEN BRADLEY, 700-HF34Z24, 4 POLE 24 VDC COIL	1	PS-61
1015701A	RELAY BASE, ALLEN BRADLEY, 700-HN139 BASE FOR RELAY 1015701 700-HF32Z24	1	PS-61
1006298	FUSE LPJ-30SP BUSSMAN	3	FUSE CART
1015251	RESISTOR 1492JD3RB152 1.5 KOHM (20/PACK)	2	PS-93
HOSES, CABLES AND ACCESSORIES	COMMERCIAL CHARGER HOSES	1	
1011734	STAINLESS STEEL REINFORCED PTFE HOSE, MTO, SB-06, 5/16ID SAE100R14 300FT CONTINUOUS LENGTH IN A ROLL OR BUNDLE (was CHARGING HOSE 1/4" SS GOOD YEAR S-6TW-36000 or 2ND CHOICE AERS-6TW-36000 or PARKER W/TEFLON WALL 929-6)	240	Tool Cell
1011734A	FITTING CRIMP FOR 1011734 10891N-6-6 1/4" SAE FEM S	16	Tool Cell
1011733	STAINLESS STEEL REINFORCED PTFE HOSE, MTO, SB-08, 13/32ID SAE100R14 300FT CONTINUOUS LENGTH ON A ROLL OR IN A BUNDLE (was CHARGING HOSE 1/2" SS GOOD YEAR S-8TW-36000 or 2ND CHOICE AERS-8TW-36000 or PARKER W/TEFLON WALL 929-8)	120	Bay 2
1011733A	FITTING CRIMP FOR 1011733 10691N-8-8 1/2" JIC FEM SWIV	8	Bay 2
1020213A	CABLE GLAND, AMERICAN FITTINGS, CG75K, VARIABLE SIZE CABLE GLAND 0.125"-.875" CORD DIAMETER ALSO RATED CLASS1 DIV2	4	B2-00
1017786	CABLE, OMNI, A21603, 16/3 SHIELDED TRAY CABLE CLASS 1 DIV 2	120	B1-TEMP
1002767	CONNECTOR,AMP,RECEPTACLE 206043-1 46f318	4	B1-38
1002768	CONNECTOR,AMP,PLUG 206044-1 46f320	4	B1-83



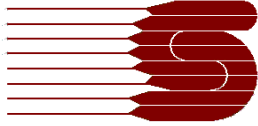
1002769	CIRCULAR CONNECTOR THERMOPLASTIC CLAMP, AMP 206070-8, new# is 84k8505 (old# was 44f8396)	4	B1-83
1012973	COUPLER, FASTEST COREMAX, SCP062H	8	DW5
1020325	REFRIGERANT HOSE, PARKER, 285-4, 3/16" ID WORKING PRESSURE 500 PSI	8	HOSE CELL
1018799	Crimp Fitting, Parker, 16826-4-4, 26 Series #4JIC X #4 Hose, straight fitting	16	B2
CONTROLS	COMMERCIAL CHARGER CONTROLS	1	
1016819	5069-L306ER AB PROCESSOR	1	PS-66
1016825	REMOVABLE TERMINAL BLOCK, ALLEN BRADLEY, 5069-RTB64-SPRING, RTB TERMINAL BLOCKS 5069 PROCESSORS	1	PS-66
1016822	5069-IB16 AB DIGITAL INPUT CARD	2	PS-65
1016823	5069-OB16 AB DIGITAL OUTPUT CARD	3	PS-66
1016821	5069-IF8 AB ANALOG INPUT CARD 8IN	1	B1-63
1016824	5069-HSC2XOB4 AB HIGH SPEED COUNTER	1	PS-77
1016826	REMOVABLE TERMINAL BLOCK, ALLEN BRADLEY, 5069-RTB18-SPRING, RTB TERMINAL BLOCKS 5069 I/O	7	PS-66
1016007	AB SAFETY RELAY 440C-CR30-22BBB	1	PS-79
COMPUTER/COMMS	COMMERCIAL CHARGER COMPUTER	1	
1015214A	HIRSCHMANN 942132002 SPIDER III 8TX UNMANAGED ETHERNET SWITCH 8 PORTS 10/100MB	1	PS-60
1005856	ETHERNET CABLE, AMAZON, ASIN: B00AJHBXLO, 7ft CAT6 ETHERNET PATCH CABLE 550MHz RJ45 BLUE (was B011A8M706)	4	B1-146
1017849	ETHERNET CABLE, AMAZON, ASIN# B00K2E4STI, 10 PACK CAT6 SNAGLESS ETHERNET PATCH CABLE 7FT BLACK SLIM FOR ENDRESS FLOWMETERS	2	B1-143
1005923A	APC Back-UPS 600VA UPS Battery Backup & Surge Protector with USB Charging Port (BE600M1) (limited shelf space)	1	O3
1016855	KEYBOARD, AMAZON, ASIN# B009349046, SolidTek Keyboard with Touchpad - Industrial IP68 Waterproof Rugged Silicone KBIKB107 (was B00LU62UA6)	1	B1-152
1017049	MONITOR 24", Asus, VA24EHE, 1080p VESA	1	B1-156
1013008	C2G / Cables To Go 54171 USB 3.0 A Male to A Male Cable, Black (2 Meter/6.5 Feet), (ASIN# B003VTZ07U)	3	B1-146
1019381	Monitor Mount It, Amazon MI2829	1	B1-145
1019009	*ETHERNET CABLE 3FT CAT6 HIGH SPEED, AMAZON, ASIN B08MB79YT4, 6 PACK	2	B1-142



OPERATOR INTERACTION	COMMERCIAL CHARGER OPERATOR INTERACTION	1	
1018152	* BARCODE SCANNER, HONEYWELL, 1911i-ER or 1991i-SR, CORDLESS USB KIT, INCLUDES: CHARGE AND COMMUNICATION BASE, TYPE A 3M STRAIGHT CABLE	1	B1-151
1018152A	POWER SUPPLY, HONEYWELL, PS-05-1000W-A-6, EXTERNAL POWER SUPPLY FOR GRANIT SERIES SCANNERS 1.0A 5.2VDC	1	B1-151
1016862a	AB 800F PUSH BUTTON 800FM-LE3, Extended, Illuminated, Momentary, Metal, GREEN	2	B1-39
1016863a	AB 800F PUSH BUTTON 800FM-LE4, Extended, Illuminated, Momentary, Metal, RED	2	B1-39
1016864	AB 800F MUSHROOM 800FP-LMT44 METAL 40mm RED TWIST TO RELEASE	1	B1-39
1016865	AB 800F PLASTIC LATCH 800F-ALP PKG. 10 - SAME AS # 1013684B	3	B1-38
1016866	SAME AS # 1013684F - AB 800F NC CONTACT 800F-X01	3	B1-38
1016867	SAME AS # 1013684C, 1015538D, & 1016514C - AB 800F NO CONTACT 800F-X10	3	B1-38
1016868	AB 800F LED MODULE GREEN 800F-N3G 24VAC/VDC PKG. OF 10	2	B1-38
1016869	AB 800F LED MODULE RED 800F-N3R 24VAC/VDC PKG. OF 10	3	B1-38
1016960	MALLORY Alarm, Constant, 16-28VDC, 40mA, 85-95dB, Terminal Block, 2.9kHz, 1.69X1.41in. Mfr. Part#: ZA028LDCT Allied Stock#: 70232572	2	B1-39
1018407	STACK LIGHT, BANNER, K30LGYPQ, 3 COLOR GREEN/AMBER/RED PANEL MOUNT 24VDC ALLIED #70167576	2	B1-77
1020291	ASSEMBLY, VALVE BODY, EXHX, 3 PORT EXPLOSION PROOF HALF HEX, NO END EFFECTOR	4	
1015921	VALVE BODY, AVR9 ARM MOUNT	1	DW9
1019450	SOLENOID, ASCO, HIGH PRESSURE EXPLOSION PROOF FOR VALVE BODIES, EEL8262R232 100-240 K , 120/60, 110/50, 72" LEADS	1	Tool Cell
1019351	SOLENOID, PNEU-MAGNETIC FOR EXPLOSION PROOF VALVE BODIES	2	
1001131B	KIT, VALVE, ASCO 304-354, BUNA POPPET	2	B1-94
1014361	CONDUIT BOX, ERC50, APPLETON, EXPLOSION PROOF	1	





1020292	ASSEMBLY, VALVE BODY, EX2HX, 2 PORT EXPLOSION PROOF HALF HEX, NO END EFFECTOR	4	
1015921	VALVE BODY, AVR9 ARM MOUNT	1	DW9
1019351	SOLENOID, PNEU-MAGNETIC FOR EXPLOSION PROOF VALVE BODIES	2	
1001131B	KIT, VALVE, ASCO 304-354, BUNA POPPET	2	B1-94




7.0 Lockout/Tagout Procedure

THIS IS A SAMPLE LOCKOUT TAGOUT PROCEDURE. THE CUSTOMER SHOULD DEVELOP A PROCEDURE TO MITIGATE RISK AT THEIR DISCRETION.

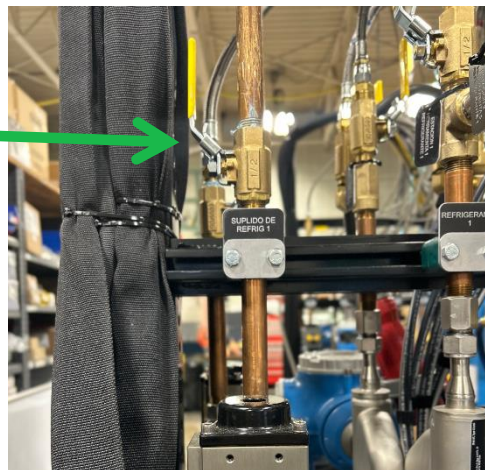
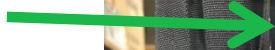
Lockout/Tagout Procedure DataFill RRV-2490

 	NOTICE <p>This machine may have more than one type of primary energy and/or multiple sources of the same primary energy, including: Electrical, Hydraulic, Pneumatic, Gas, Chemical, Etc. –LOCK IT OUT! TAG IT!</p> <p>This machine may have multiple stored energy sources including: High Pressure, Stored Electricity, Etc. – RELEASE IT! LOCK IT OUT! TAG IT!</p> <p>If this machine also has associated machinery you must also read the ECPL placards of these machines and follow their lockout procedure.</p>
---	---

Unless otherwise noted below, to restart this machine after lockout/tagout procedure, verify that the safeguards are in place, non-essential items are removed, controls are in a safe state, and personnel are clear. Once all the listed criteria are met, reverse the lockout procedure and notify any employees affected.


Check It!	Prep It!	Lock It!	Release it!	Verify It!
Energy Source/Type	Lockout Location	Procedure for Lockout/Tagout	Procedure for Releasing Energy Source	Verification Procedure
Refrigerant Supply	Main Plant Refrigerant Supply 	Rotate valve (F1) to off position (horizontal). Mark Valve with appropriate tagout label.	Release Steps: - Rotate the Refrigerant Supply Valve (F1) to the off position. - Plumb a line from the needle valve in the Refrig. Circuit to a reclaimer - Slowly open the needle valve and wait until pressure reaches 0	Verify that the System Refrigerant Pressure Gauge on the top of the DataFill reads zero if a pressure release was required. MUST BE EVACUATED BEFORE REINTRODUCING REFRIGERANT

Back Side of Cabinet

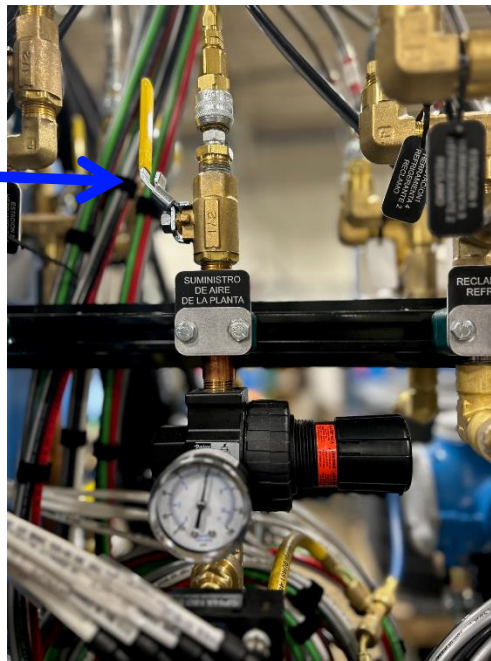


Refrigerant Supply Valve
On – Vertical (Pictured)
Off – Horizontal

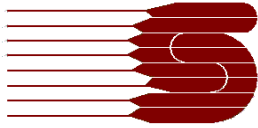



Check It!	Prep It!	Lock It!	Release it!
Energy Source/Type	Lockout Location	Procedure for Lockout/Tagout	Procedure for Releasing Energy Source
Air Supply	Main Plant Air Supply Valve 	Rotate the Air supply valve (P1) to the off position. Mark Valve with appropriate tag out label.	Release Steps: - Rotate Ball Valve (P1) to off position. - Disconnect Plant Air Supply Hose - Rotate ball valve back to on position slowly to release air from system. - Return Valve to Off Position and mark with appropriate tag out label.

Back Side of Cabinet

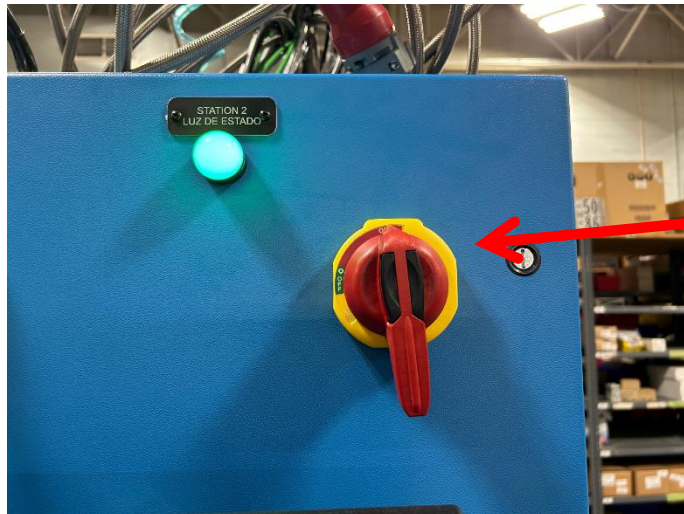


Air Supply Valve
On – Vertical (Pictured)
Off – Horizontal

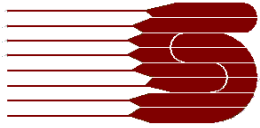


Check It!	Prep It!	Lock It!	Release it!	Verify It!
Energy Source/Type	Lockout Location	Procedure for Lockout/Tagout	Procedure for Releasing Energy Source	Verification Procedure
480V/Electrical Source	Main Electrical Disconnect 	Rotate handle (E1) counter-clockwise and insert safety lock.	Release Not Needed if Main Power is Shut down.	Verify that the Main Power Disconnect is in the off position and has been locked. Visually Examine Electrical Components for any signs of power (Power Lights, Voltage Indicator Lights, etc.)

Left Side of Cabinet



Main Power Disconnect
On – Vertical (Pictured)
Off – Horizontal

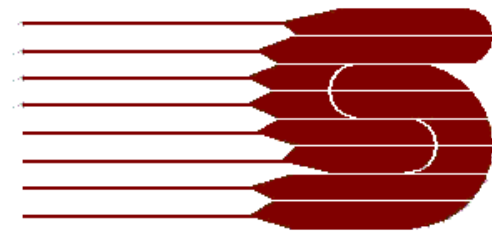


Serv-I-Quip, Inc

www.siqinc.com

DataServ 3.0

User Manual



erv-I-Quip

DataServ 3.0 User Manual

Serv-I-Quip, Inc.

127 Wallace Ave

Downingtown, PA 19335

Phone: (610) 873-7010

Fax: (610) 873-7151

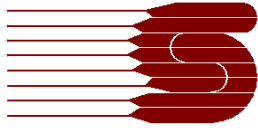
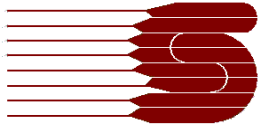
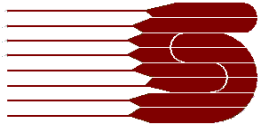


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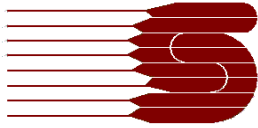
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Dataserv HMI

Purpose

The Dataserv HMI is the Human Machine Interface (HMI) component of the Dataserv Software Suite. This HMI is meant to be used by the line operators and maintenance personnel to run a unit, monitor the fill process, and help diagnose unit problems.

Main Run Screen

File DataServ Mode Form Editor Reprints

Screenshot

Exit HMI

DSE 3 Running

Serial Number

Model Number

Scan Barcode to Retrieve Charge Data

Waiting For Barcode Scan

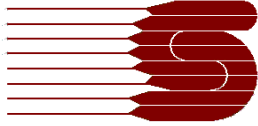
Refrigerant Fill	Cycles Passed: 2	Cycles Failed: 3	System Serial Number: 1016620	System Mode: Auto	R-134a Flowmeter Information	R-410a Flowmeter Information
Fill Type: N/A					R-134a Density: 9.10 Pounds/gallon	R-410a Density: 9.12 Pounds/gallon
Fill Quantity (oz.)					R-134a Temperature: 24 Celsius	R-410a Temperature: 24 Celsius
0					R134a Flow Rate: 0.00 Pounds/second	R410a Flow Rate: 0.00 Pounds/second
Preset Fill Quantity (oz.)					R-134a Cycle Mass Total: 0.00 Pounds	R-410a Cycle Mass Total: 0.00 Pounds
0					R-134a Inventory Total: 6.60 Pounds	R-410a Inventory Total: 3.01 Pounds
Flow Rate (oz./sec.)					R-134a K-Factor: 0	R-410a K-Factor: 0
0					R-134a Pressure: 360	R-410a Pressure: 360
Fill Time					R-134a Low Pressure Curout: 0	R-410a Low Pressure Curout: 0
0					PLC R-134a Totalizer: 32.00	PLC R-410a Totalizer: 0.00
Total Cycle Time						
3						

Friday, September 16, 2016 11:18:39 AM

Image 1 Main Run Screen on Dual Refrigerant Charger

Components

1. Menu Items
 2. Status Bar
 3. Scanning Panel
 4. Process Steps
 5. Statistics (Optional based on Screen Space Available)
 6. Other Utilities
- **Menu Items**
 - a.) File



Screenshot – Takes a picture of the current HMI view and prompts to save it to a local computer directory. This functionality is useful when trying to troubleshoot process errors with someone that does not have immediate access to the computer running the Dataserv Application

Exit HMI – Closes the current application window. The HMI tries to always be the top most window on the computer, if access is required to the desktop of the system it is possible to close it out using this, the HMI can be relaunched from inside the Dataserv Engine interface.

b.) DataServ

Start a Cycle – Brings up a Start Cycle utility allowing a cycle to be started without a barcode scan. Please see the [<TODO: link>](#) Main Run Screen\Other Utilities\Start a Cycle section for more details.

Recipes – Brings up the Recipe dialog that allows adding, viewing, and modifying model configurations for process cycles. Please see the [Recipe Form](#) section for more details.

Key Component – Brings up the Key Component dialog which allows for configuration of the Key Component validation of units. Please see the [Key Component](#) section for more details.

Run History – Brings up the Historical Records linked to this machine's process. Please see the [Output Data Viewer](#) section for more details.

Manual Operations – Contains a list of functions that can be run that preform some kind of interaction with the underlying process. These typically include a way to reset pass/fail statistics, totalizers for fluids dispensed, and/or calibrate flow meters. Please see the [<TODO: link>](#) Main Run Screen\Other Utilities\Manual Operations section for more details.

Environment Settings – Brings up the Environment dialog allowing for process wide variables to be changed. Some examples of a process wide variable would be final vent times for a pressure



check system, or the location of this machine for aggregated records. Please see the [Environment Settings](#) section for more details.

View Documentation – Brings up the Documentation dialog allowing for viewing, updating, or appending notes to important files related to this machine or process. Please see the [Documentation](#) section for more details.

Security – Allows the user to specifically login or if a user is logged in displays a prompt for them to be logged out.

Show Dataserv Engine – Closes the current instance of Dataserv HMI and brings up the local Dataserv Engine. If a process is running it continues to run but prompts will not be displayed to the user till the HMI is relaunched from inside the Dataserv Engine interface.

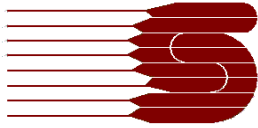
Tag Viewer – Brings up the Tag Viewer Utility, an independent form that displays PLC registers and other process tags as raw values. This is a useful troubleshooting utility. Please see the [Tag Viewer](#) section for more details.

Diagnostics – Brings up the Diagnostics Utility. This is a useful troubleshooting utility specifically for diagnosing network and communication issues. Please see the [Diagnostics](#) section for more details.

c.) Mode

Edit Mode – Switches the HMI into “Edit Mode” allowing the user to add, remove, or adjust the look of the current screen. See the [HMI\Edit Mode](#) section for more details.

Service Mode – Attempts to place the PLC in Service Mode. If the PLC is in a state that will allow it to enter Service Mode the screen will then change. For more details on Service Mode and troubleshooting access to Service Mode please see the [HMI\Service Mode](#) section.



Change Screens – If the system has multiple run screen they can be force changed using this dialog. A system with multiple run screen will typically change the screen itself based on PLC conditions as needed under normal operation.

d.) Form Editor

The Form Editor Options are only enabled during “Edit Mode” and should **only be used under direction from a Serv-I-Quip employee**. If you were instructed to use “Edit Mode” please see the <TODO: link> HMI\Edit Mode section for more details.

e.) Reprints

If printing is part of this system’s configuration, open previous printed items for viewing, copying, editing and reprinting. <TODO: Printing will probably need its own section at some point.>

f.) Other

If this system called for a customization to be implemented that should be launched from the HMI it will likely be a top level menu item along with these. Please see the <TODO: Link customization appendix >Customizations appendix for an explanation if this machine required any Customization.

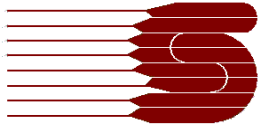
- **Status Bar**

This is the general status display for the Dataserv application, it mostly shows messages as they relate to HMI <-> Engine communication. The rectangle on the left side depicts our connection status. The text displayed here is the last message we received from the Engine. A status dialog can be brought up by double clicking on the status bar.

Connection Status



Image 2 Status Bar in a Disconnected from Dataserv Engine State



Red – The HMI does not have communication with the Dataserv Engine. This typically means that the Engine has either stopped responding to requests or is no longer running. Please see the [<TODO: add link> Troubleshooting\Dataserv Engine Has Stopped Responding](#) section for more details.



Image 3 Status Bar in a Dataserv Engine Disconnected from PLC State

Yellow – The HMI is communicating with the Engine but the Engine does not have a connection to one or more of its data sources (PLC, Inficon, etc.). Please see the [<TODO: add link> Troubleshooting\Dataserv Engine Is Not Communicating](#) section for more details.

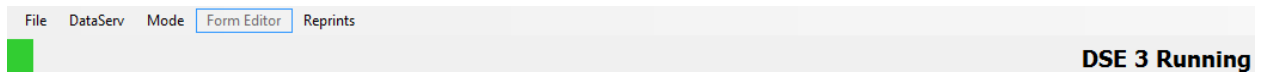
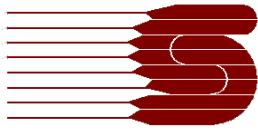


Image 4 Status Bar Showing a Successful Connection State

Green – Everything is working well, data is being passed and read as it should be.

Status Message

Whenever the HMI runs a specific command against the engine, the response is displayed here. Most of the time it should show “DSE 3 is Running” this is our default general response to a status request. While running a manual operation or a specific task like scanning in a new unit you may see it briefly display “Operation Completed Successfully”. If you begin to experience issues with communications or starting an operation you should check if the message displayed here is potentially related to your problem. See the [<TODO: Link troubleshooting> Troubleshooting](#) section to try and identify the issue.



Status Dialog

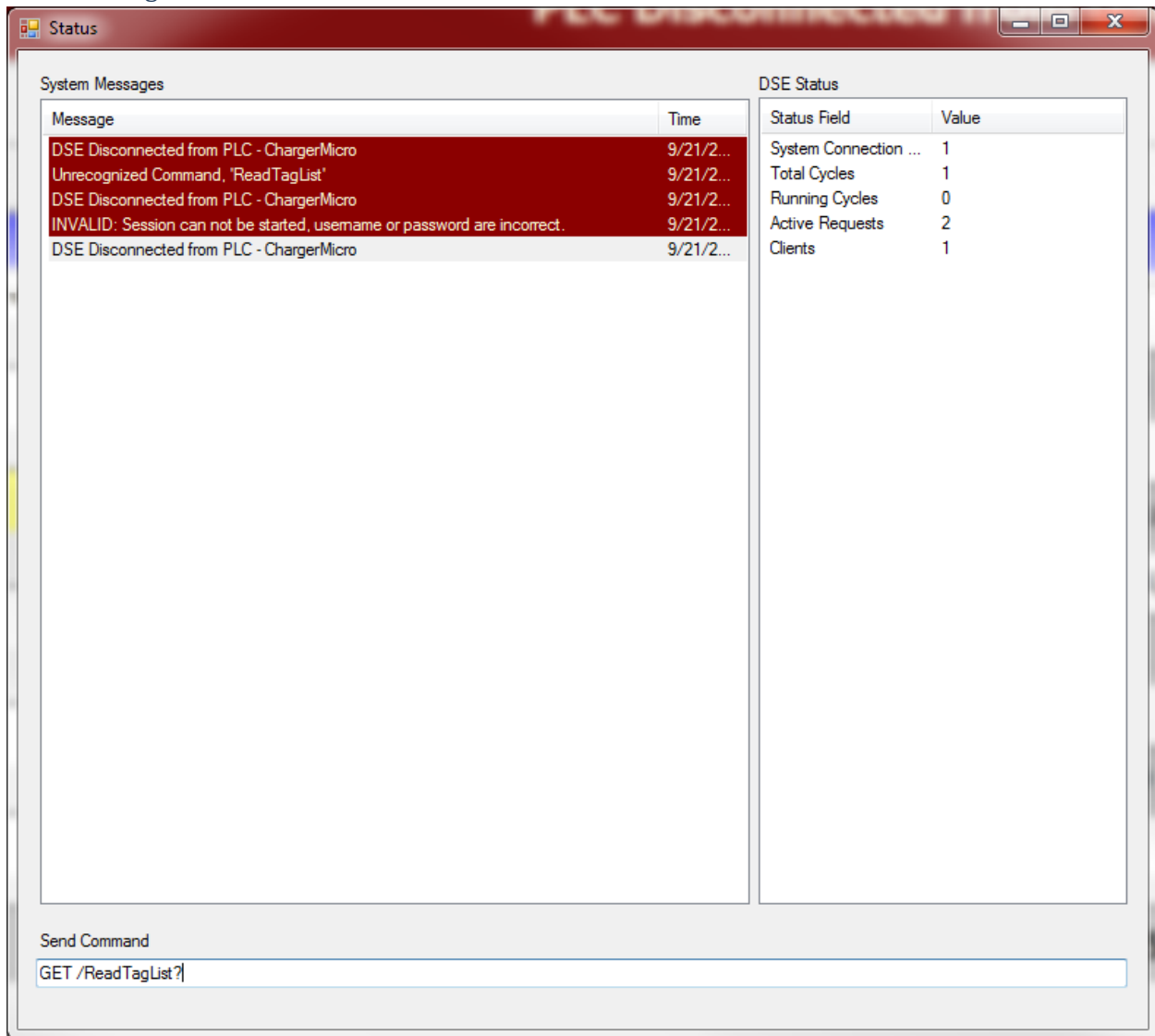
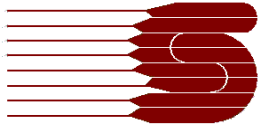


Image 5 Status Dialog

An expanded Status Dialog can be viewed by double clicking the Status Message on the Status Bar. System Messages is a history of all the Status Messages received and timestamped since this instance of the HMI was started. DSE Status is the expanded breakdown from the Status command sent to the DSE instance related to this HMI. Send Command is a troubleshooting that should **only be used under direction from a Serv-I-Quip employee.**



- **Scanning Panel**

The Scanning Panel is the primary way an operator would interact with the Dataserv application. It is the set of text boxes typically at top of the screen. Text is usually entered here by use of a hand scanner along with some barcodes, but keyboard entry is supported. Depending on the state of the machine these text boxes are likely to be either hidden with a message, or disabled.

Auto Mode

Auto Mode is the normal run state of the machine, this is the state in which Dataserv will automatically load unit information into the PLC, prompt the operator to begin the unit process, and record data. If the system is in Auto Mode the scanning text boxes will be shown, if the system is waiting for configuration these text boxes will accept the scans. If the system already has a unit loaded and is waiting to be processed these text boxes will be disabled and show relevant scan information, such as loaded serial and recipe model.

Serial Number	Model Number
<input type="text"/>	<input type="text"/>

Image 6 Scanning Panel Waiting for Operator Scan in Auto Mode

Serial Number	Model Number
<input type="text" value="EXAMPLESERIAL"/>	<input type="text"/>

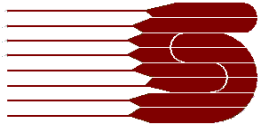
Image 7 Scanning Panel after Entering a Partial Scan

Serial Number	Model Number
<input type="text" value="EXAMPLESERIAL"/>	<input type="text" value="EXAMPLEMODEL"/>

Image 8 Scanning Panel after Submitting All Scan Elements and Waiting for the Scan to be accepted

Serial Number	Model Number
<input type="text"/>	<input type="text"/>

Image 9 Scanning Panel Disabled because of PLC State in Auto Mode



Process Steps

Statistics

Other Utilities

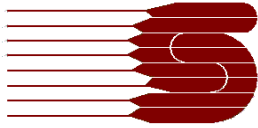
Tag Viewer

The screenshot shows a window titled 'frmTagViewer' with a table containing three columns: TAGGROUP, TAG, and Value. The table lists various system and HMI parameters and their current values.

TAGGROUP	TAG	Value
DataServHMI	System Message	DSE Discon...
	System Message St...	2
	System Connection ...	1
	Last Response Proc...	11.0011
	Dataserv Engine Ho...	localhost
	Dataserv Engine Port	19336
	HMI Reset	False
	Reset Step Number	1
	Scanner Config Cha...	False
	Inactive Background	Color [A=255...
	Inactive Foreground	Color [A=255...
	Active Background	Color [A=255...
	Active Foreground	Color [A=255...
	Done Background	Color [A=255...
	Done Foreground	Color [A=255...
	Error Background	Color [A=255...
	Error Foreground	Color [A=255...
	Manual Operation - ...	
	Manual Operation - ...	1
	Manual Operation - ...	
	Manual Operation - ...	1

Image 10 HMI Tag Viewer

The Tag Viewer is a basic utility used for troubleshooting communication and value issues between the Dataserv Engine and PLC. The Tag Viewer from the HMI shows all of the values being pushed from the Engine to the HMI. The left column indicates the TagGroup the value is coming from, this is the grouping designated at tag creation and should be help narrow down where the information is coming from. The middle column "Tag" is the specific piece of information being represented, the name should provide some kind of explanation of what it represents. The right column indicates the current value the HMI sees for this tag, anything that uses this tag should be consistent with the value represented here.



There are three right click context options after selecting a tag from the Tag Viewer. “Copy Tag” adds the selected tag’s fully quantified path to your clip board to allow pasting into a text edit/e-mail if you notice an issue with some specific value.

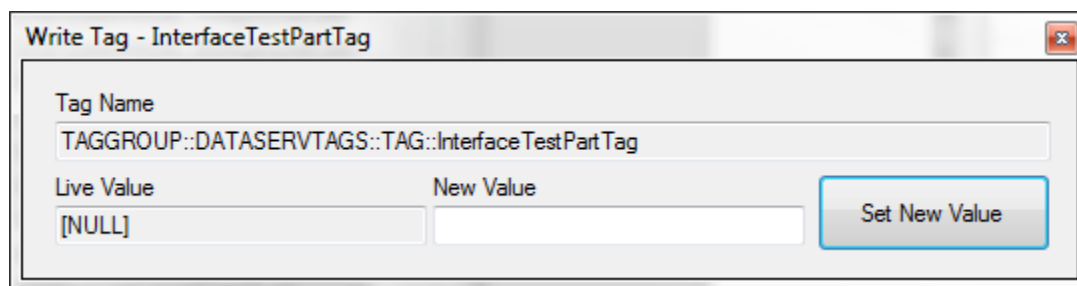


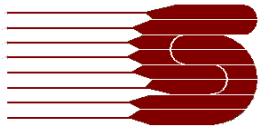
Image 11 Write Tag Dialog

“Write Tag” opens up the Write Tag Dialog, this is security protected, but allows direct editing of values if need be ***this should only be used under direction from a Serv-I-Quip employee***.

[illegible]

Image 12 Specific Tag Monitor Dialog

“Add to Monitor”, this spawns a separate Tag Viewer where any tag that “Add to Monitor” is selected on can be viewed easier. This allows you to group any relevant tags together for easier diagnostics.



Diagnostics

The diagnostics window provides network information relevant to this Dataserv System.

IP Addresses:

The screenshot shows the 'GlobalDiagnostics' application window with the 'IP Addresses' tab selected. The window displays network information for a machine named 'T-65XW'. It lists the machine's IP addresses (IPv6 and IPv4) and the addresses of configured PLCs, including 'MultiFill' at '192.168.0.1' which has a 'TimedOut' ping. There is also a section for 'Other Addresses' which is currently empty. At the bottom, there are buttons for 'Open Command Window', 'Open Elevated Window', and 'Open Set IP Utility', along with fields for 'Available Domains' (set to 'ServIQuipInc.local') and 'User Name'.

Machine Name		
T-65XW		

I.P. Addresses of This Computer		
Address	IP Version	
fe80::6569:225a:c71f:c255%11	IPV6	
fe80::b09c:7359:df53:4e2f%17	IPV6	
192.168.101.51	IPV4	
10.1.20.5	IPV4	

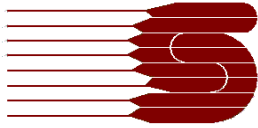
PLC Addresses		
Name	Address	Ping
MultiFill	192.168.0.1	TimedOut

Other Addresses		
Description	Address	Ping

Open Command Window Available Domains: ServIQuipInc.local
Open Elevated Window User Name:
Open Set IP Utility

Image 13 Diagnostics Window – IP Addresses

“Machine Name” is the name of the computer running this instance of the HMI. “I.P. Addresses of This Computer” are all the currently configured IPv4 and IPv6 addresses of this system, whether static or dynamic. “PLC Addresses” is a list of addresses for all configured PLCs utilized by the Dataserv Engine.



“Other Addresses” is automatically populated if there are any other relevant network addresses utilized by the Dataserv Engine.

IP Config:

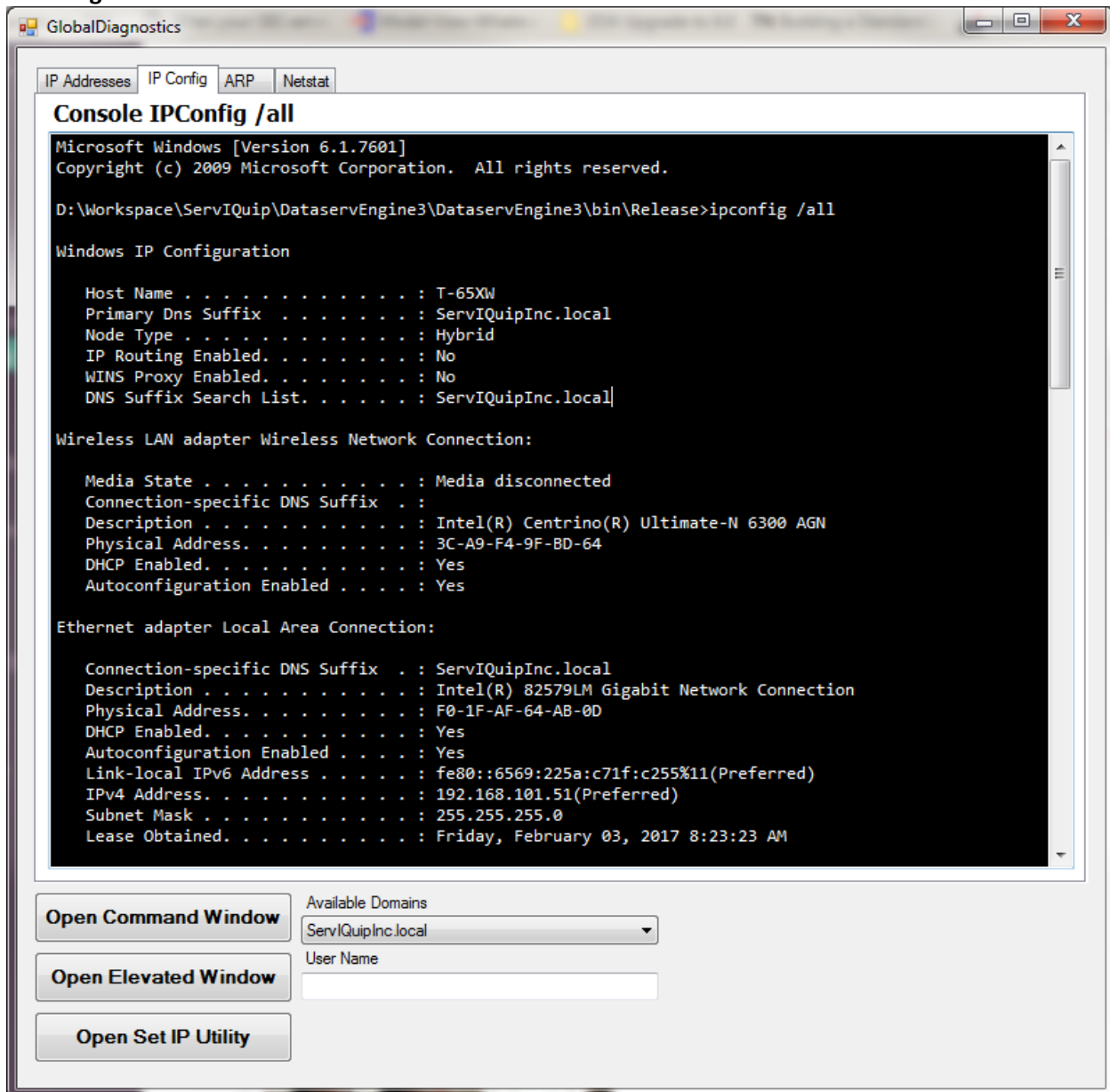


Image 14 Diagnostics Window – IP Config

The IP Config tab is a run of “ipconfig /all” on the current system. This provides an expanded view of the current network configuration information of this system.

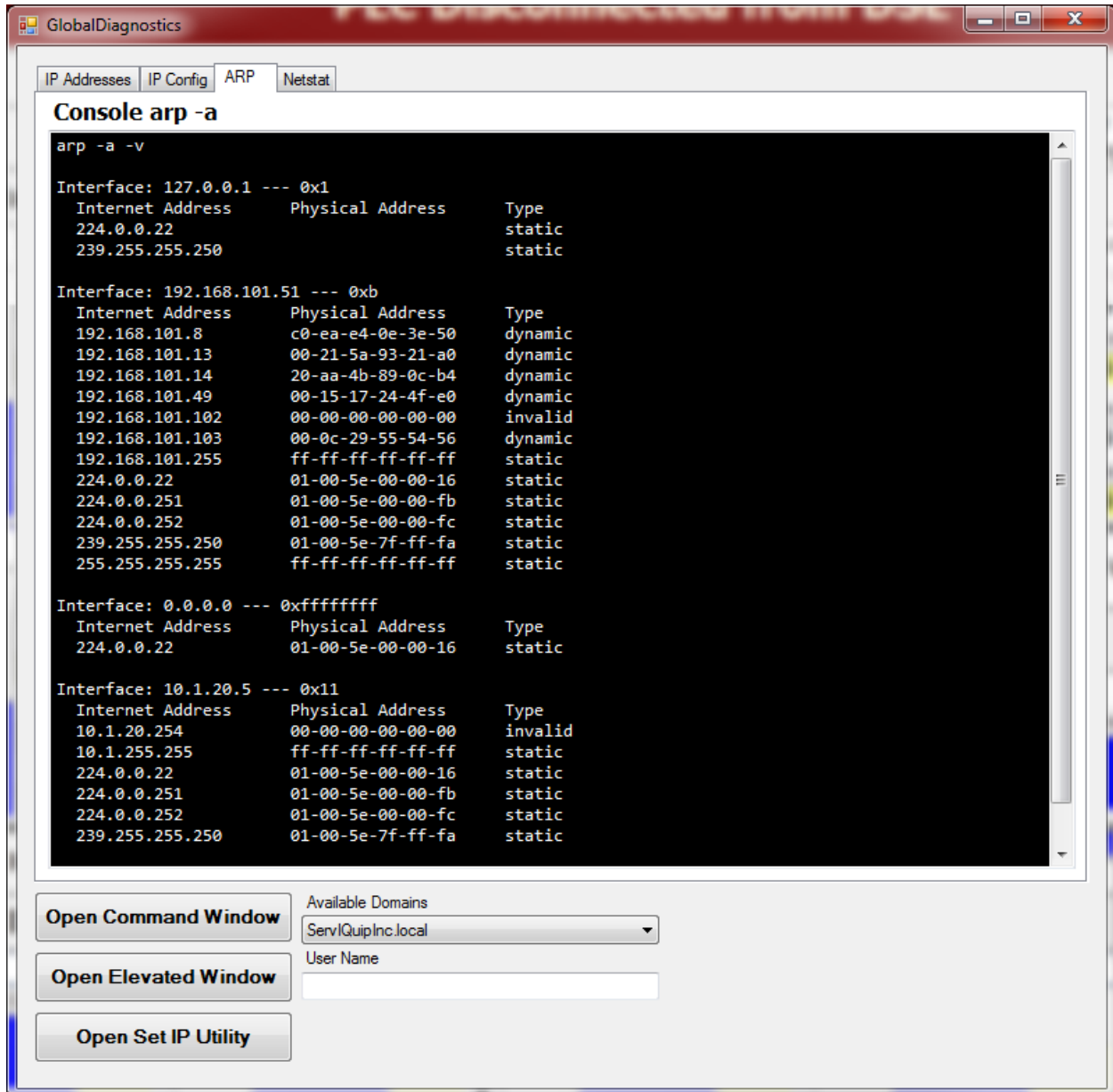
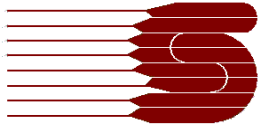


Image 15 Diagnostic Window – ARP

The ARP tab is a run of the 'arp -a' command on the local system. The ARP command provides a list of all other address this system has communicated with and knows which network path to reach them. This is mostly used to verify if the system has had a connection to another system in the recent past.

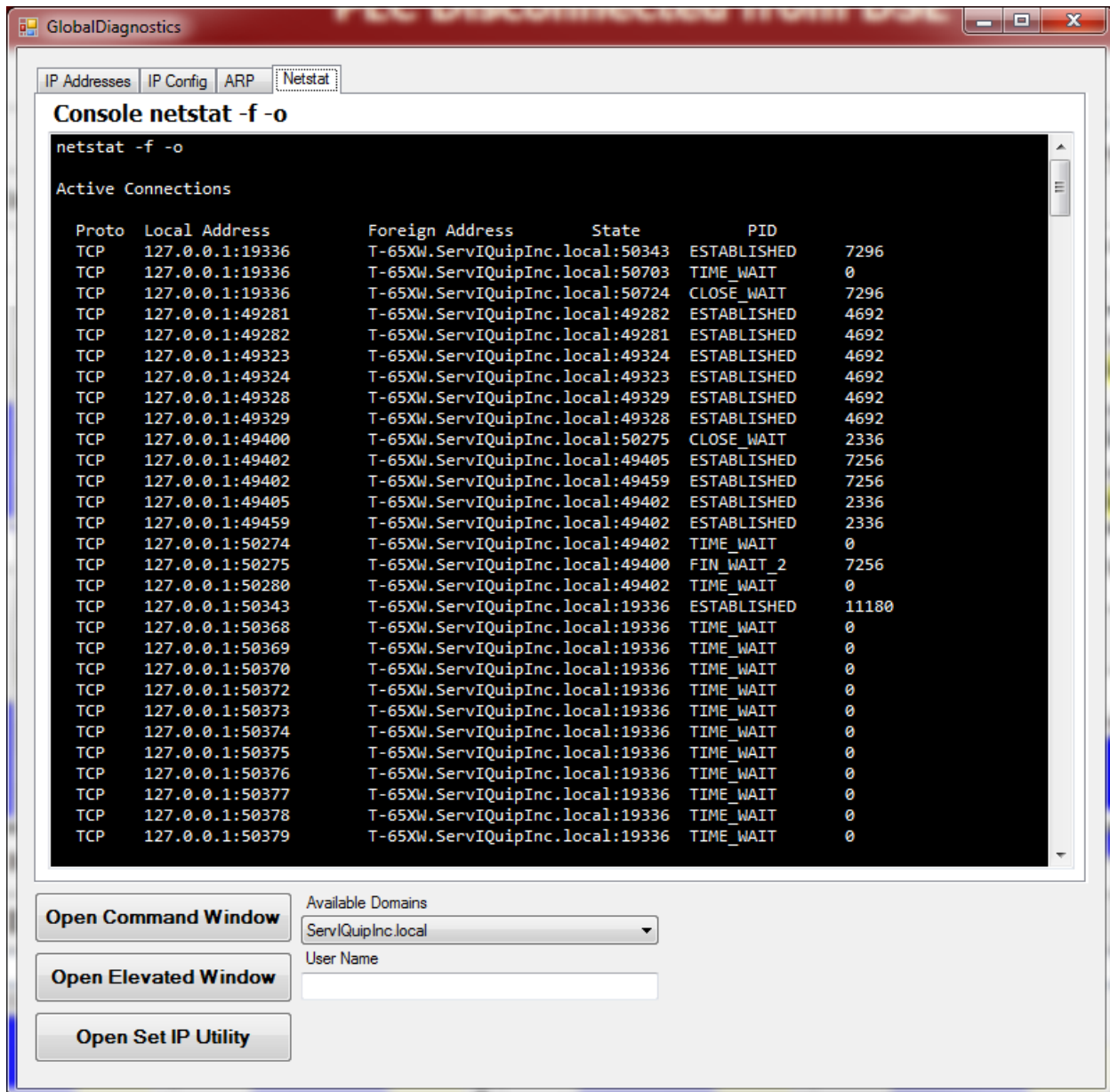
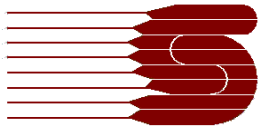
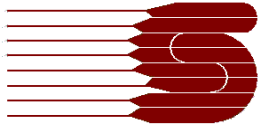


Image 16 Diagnostic Window – Netstat

The Netstat tab is a run of “netstat -f -o” on the local system. This provides a list of all active network connections, the port they are using, activity state, and the process they’re associated with. This can be used to verify active realtime connections between systems.



Command Helpers:

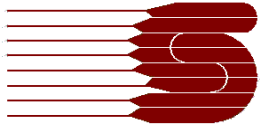
The “Open Command Window” spawns a standard window cmd.exe window (“command prompt” or “dos prompt”). The “Open Elevated Window” does the same while using the “Available Domain” and “User Name” to provide UAC credentials.

Set IP:

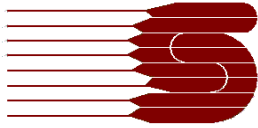
A screenshot of the 'Ip Address Update' utility window. The window has a title bar with the text 'Ip Address Update' and standard Windows window controls. The main area contains several fields: 'Computer Name' with the value 'T-65XW', 'Interface' with a dropdown menu showing 'Local Area Connection', 'Current IP' with the value '192.168.101.51', 'Update IP' with an empty text box, 'Current Subnet Mask' with the value '255.255.255.0', 'Update Subnet Mask' with an empty text box, 'Current Gateway IP' with the value '192.168.101.8', and 'Update Gateway IP' with an empty text box. At the bottom right, there is an 'Apply' button.

Image 17IP Address Update Utility

The “Open Set IP Utility” spawns the IP Address Update Utility, this is a helper utility to make setting an IP address of the local computer more straight forward ***This should only be used under direction of a Serv-I-Quip Employee or local IT support personnel***. By selecting an interface from the drop down the currently configured address information is populated. When the “Apply” button is pressed a basic sanity check is made against the supplied update information, then an attempt will be



made to apply the information to the selected interface. If this is successful the interface will be set to a static address and the current information will be updated.



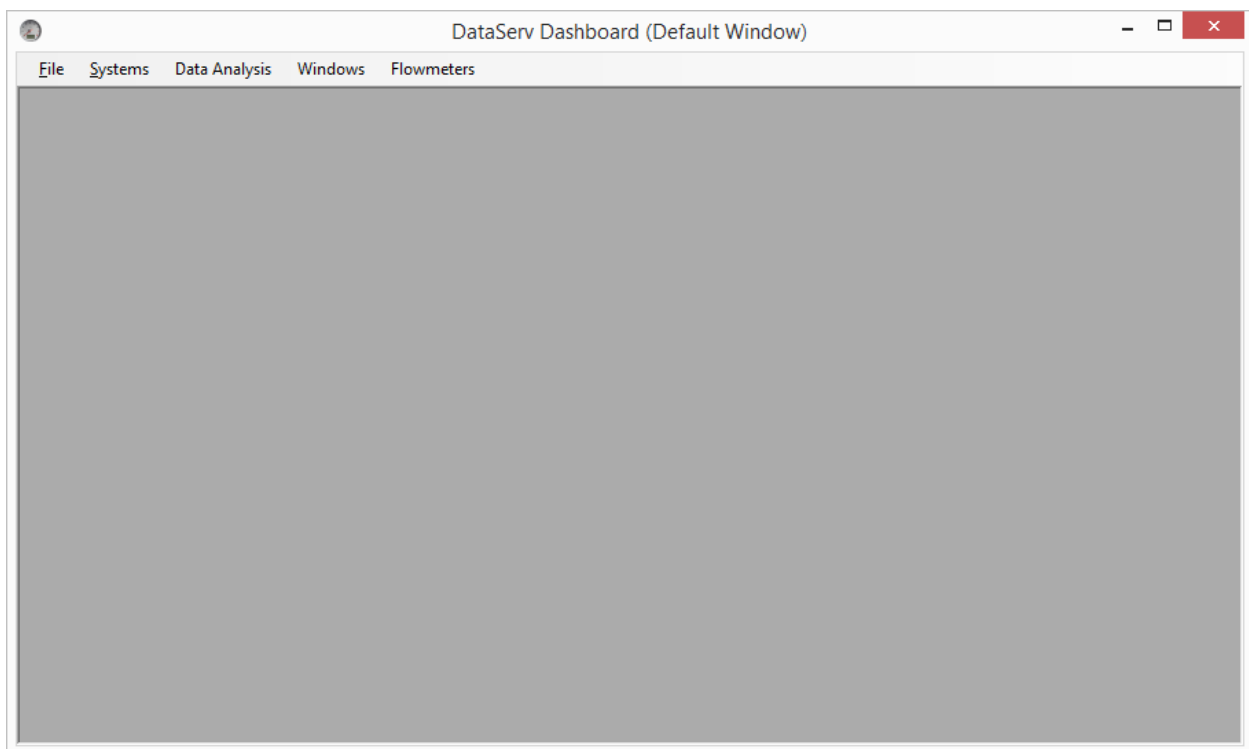
Dataserv Dashboard

Purpose

The Dataserv Dashboard provides remote management of any Serv-I-Quip system running the Dataserv Engine 3.0. Line Engineers and Process Owners can use the dashboard to edit Recipes, view Output Data, see a Live View of the Run Screen, perform Backups, and more.

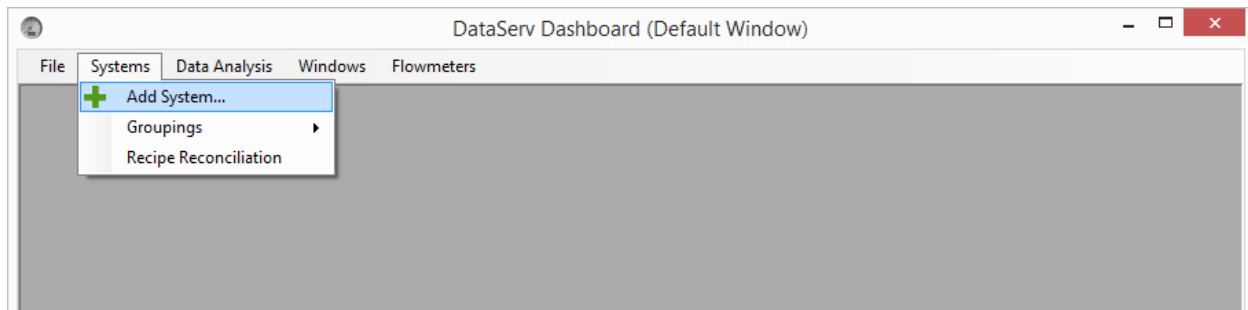
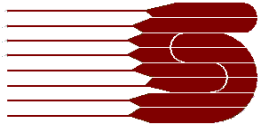
Getting Started

The Dashboard launches as an empty MDI (Multiple-Document Interface) form. Any number of additional MDI forms can be added to take advantage of multiple monitors and to organize workspaces broken out by Process or Assembly Line at the user's discretion. The default MDI form looks like this:



System Maintenance

The first step to using the Dashboard is to add the Systems you will be managing. In the "Systems" menu item (second from the left), choose the sub-item "[Add System...](#)" as shown here:



This will bring up the System Details Form with default values:

System Form

Display / Description
New System 8/30/2016 8:48:12 AM

Serv-I-Quip Serial Number: 636081436924713915
Host Name / PC Name: S636081436924713915

IP Address:
Listening Port: 19336

System Type: Refrigerant Charger
Line: [None]

Cancel Save

Details describing your new system are entered on this form. This allows the Dashboard to show options for the system, retrieve information from the system, and send commands to the system. The items that can be entered are:

- Display / Description
 - i. How you want the system to be shown when selecting from menus and lists
- Serv-I-Quip Serial Number
 - i. The unique Serial Number assigned to your system during manufacture. This is generally a 7-digit number starting with “101”.
- Host Name / PC Name
 - i. The name of the networked PC that is running the Dataserv 3.0 software. If your PC was supplied by Serv-I-Quip, this will be the letter “s” followed by the Serial Number.



- IP Address
 - i. If your PC has been given a static I.P. address or DHCP reservation, you can optionally include that I.P. in this field. Leave this field blank if you are unsure.
- Listening Port
 - i. The default port on which the Dataserv Engine accepts connections is 19336. It is rare that you will need to change this number.
- System Type
 - i. Pick the type of system from the drop-down list. This is used purely for display purposes.
- Line
 - i. During first setup, there are no lines pre-configured to choose from. Leave this set to “[None]”. If you choose to configure lines [<TODO: Link lines>](#) at a later time, this setting can be set at that point.

When the system details have been entered, click the “Save” button, and the system will be added to the Dashboard’s list of systems. Here is a sample of a completed System form:

System Form

Display / Description
Sample Charger 1

Serv-I-Quip Serial Number
1016XXX

Host Name / PC Name
COMPUTER1

IP Address
192.168.101.3

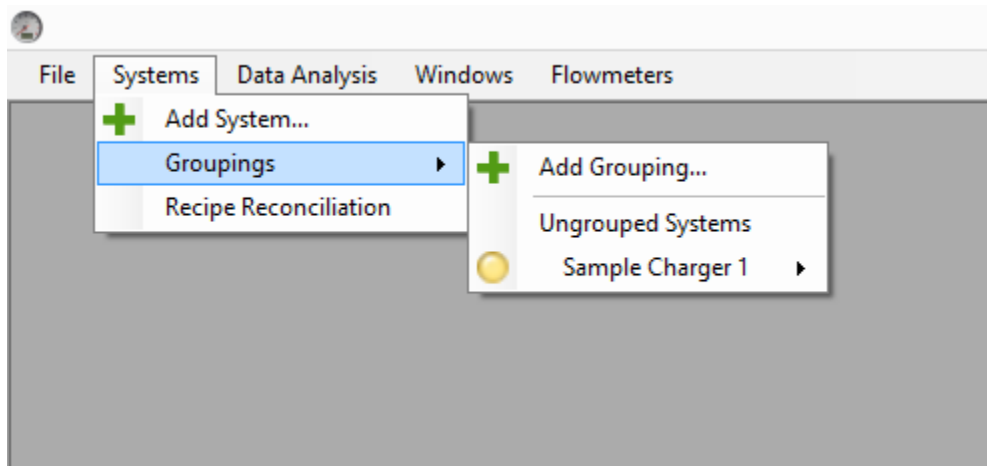
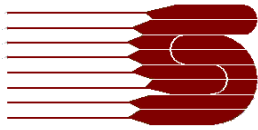
Listening Port
19336

System Type
Refrigerant Charger

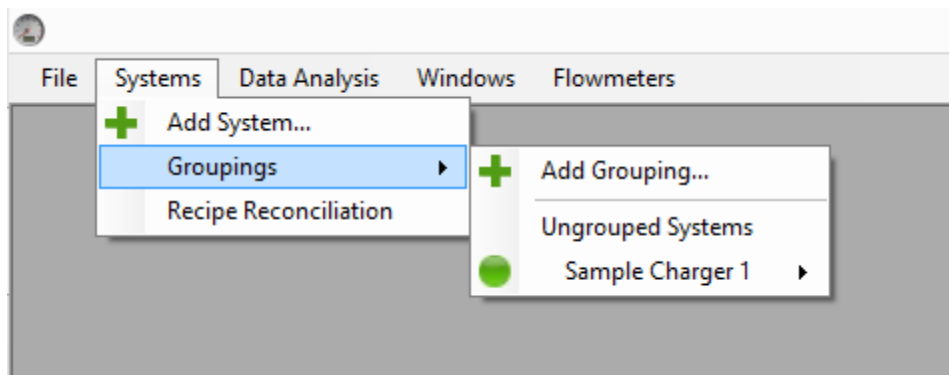
Line
[None]

Cancel Save

After the System is added, a new Menu Item will show up under the “Systems → Groupings” menu below the “Ungrouped Systems” heading. Initially, there will be a yellow “LED” indicator next to the system as shown here:

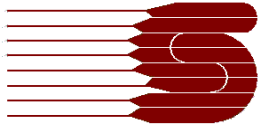


A yellow indicator means that connectivity to the System is being checked. Once communication is established, the indicator will change to green:



A red indicator means that the system is not responding to “Status” requests. See the Troubleshooting <TODO: [Link troubleshooting](#)> section for possible causes.

That is all that is required to set up basic connectivity from the Dataserv Dashboard to a system running Dataserv 3.0. The menu item created by adding a system has sub-items that will let the user Edit Recipes, View Output Data, View the Run Screen in real-time, Open Documentation, and more. Detailed information of Dashboard operation can be seen below. More details about System Maintenance can be found [here](#).



Dashboard Operation

Components

1. Menu Items
2. Notify Icon / Systray Icon

- *Menu Items*

- a) File

Hide This Window – Make the current MDI form invisible. Form can be shown again from Systray Icon [Context Menu](#).

Close This Window – Remove the current MDI window from the collection of Dashboard Windows.

Dashboard Environment Settings – Open up the Dashboard Environment configurator. <TODO: [Link Environment](#)>

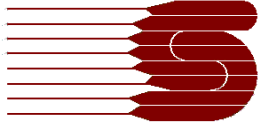
Open Image – Open an image file from disk for printing. This feature is intended for use as a design and troubleshooting tool for End-Of-Cycle printing from Dataserv. It can be used to determine the best printer settings for label printing.

Exit – Close the dashboard, including all other MDI forms.

- b) Systems

Add System – Open the System Details Form for New System Entry.

Groupings – Contains the [Add Grouping](#) menu item and a list of all Groups currently configured in the Dashboard. Systems not assigned to any Groups will be shown under the “Ungrouped Systems” heading. Each Group menu will also have links for [Editing](#) and [Deleting](#) groups.



Add Grouping – Open the Group Detail Form to [add a new System Group](#)

System Description – Under each named group and the “Ungrouped System” heading will be a menu item for each system in that group. Systems may be members of multiple groups. The menu item text is determined by the value shown in the “Display / Description” field in the System Details Form.

Edit Recipes – Open the [Recipe Configuration Form](#) for the selected System.

Output Data – Contains options for viewing and copying Output Data for the selected system.

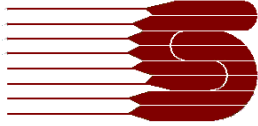
[View Output Data](#) – Open the Output Display Form for the selected system.

Copy Data – Export the Output Data from the selected system to .XML or .CSV format.

Reprint Labels – If printing is part of the selected system’s configuration, open previous printed items for viewing, copying, editing and reprinting.

Environment Settings – Open up the Environment Configurator of the selected system.

Open Live Screen – Brings up a real-time view of the Operator is currently seeing at the System. With sufficient privileges, a user can right-click and elect to “Take Control” of the screen.



Open Documentation – Bring up the Documentation Window for the selected System.

Tag Viewer – Open a streaming Tag Viewer form connected to the selected System.

Open Security – Open the Security Configurator for the selected System.

Admin Tools – Sub-items of the Admin Tools menu item allow for configuration and backup of several Dataserv Engine features.

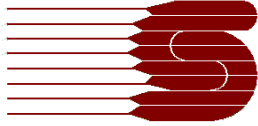
Open Command Prompt – Starts a console process on the selected Dataserv System and redirects input and output through a form in the Dashboard.

Open File Explorer – Opens a window in the Dashboard to browse the file structure of the selected System. Files can be downloaded, uploaded, viewed, and deleted through this interface.

Get Log Files – Downloads all Log Files from the selected System. Enables the user to send logs to Serv-I-Quip if troubleshooting or debugging is required.

Get Backup of Current Configuration – Opens the Get Backup window targeting the selected System.

Restart Station – Opens the Update and Restart form targeting the selected System.



Administration – Contains a series of sub-items linked to all the administrative modules of the Dataserv Engine. With the exception of Scan Item Administration and ID Lookup Administration, use of these features without advice from a Serv-I-Quip Technician is discouraged.

PLC Administration – Opens PLC Configurator of selected system.

Tag Administration – Opens Tag Configurator of selected system.

Table Administration – Opens Table Configurator of selected system.

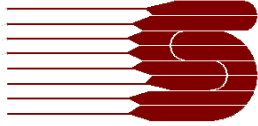
ID Lookup Administration – Opens ID Lookup Configurator of selected system.

Circuit Administration – Opens Circuit Configurator of selected system.

Cycle Administration – Opens Cycle Configurator of selected system.

Recipe Administration – Opens Recipe Configurator of selected system.

Output Mapping Administration – Opens Output Mapping Configurator of selected system.



Scan Item Administration – Opens Scan Item Configurator of selected system.

Manual Operation Administration – Opens Manual Operation Configurator of selected system.

Stream Sampling Administration – Opens Stream Sampling Configurator of selected system.

Printing – Contains sub-items linking to configurators related to Dataserv Printing functionality.

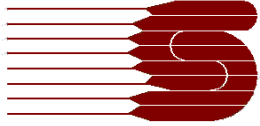
Print Layout Administration – Opens the Print Layout Designer of selected system.

Print Mapping – Opens the Print Mapping Configurator of selected system.

Print Link – Opens the Print Link Configurator of selected system.

Watchdog Administration – Opens the Watchdog Configurator of selected system.

Station Details – Opens the Station Details Form with the details of the selected System.



Remove from Group / Remove from Dashboard – If the system is “Ungrouped”, this menu item will remove all references of it from the Dashboard. If the System is grouped, it will be removed from the current group. If this is the only Group the System is a member of, it will be added to the list of “Ungrouped Systems.”

Recipe Reconciliation – Launch the Recipe Reconciliation interface for all Systems.

c) [Data Analysis](#)

Configuration – Contains sub-items related to System and Process configuration used when performing Data Analysis.

Shifts – Opens the Shift Configurator.

Recipe / Final Data Relationships – Opens the Recipe to Output Field Relationship Configurator.

Processes – Opens the Process Configurator.

Station Monitor – Opens the Station Monitor.

Capability Analysis / Production – Opens the Process Capability Evaluator and Production Report Generator.

Unit Trace – Opens the Unit Trace interface.



d) Windows

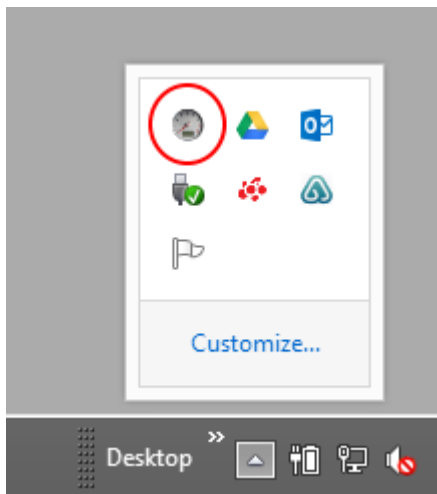
Window Text – Every Child Window of the current MDI Window will be a sub-item of this menu, allowing the user to quickly activate and bring each form to the front of all others.

e) Flowmeters

Launches the flowmeter display window.

- *Notify Icon / Systray Icon*

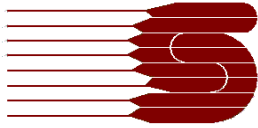
The Dashboard's Systray Icon provides Balloon Tooltip style notifications to the user and allows program control of otherwise invisible Dashboard objects. The Dashboard Systray Icon has the same Icon as the Dashboard application, a small dial gauge as seen here:



Right-Clicking on the Systray Icon will bring up the Systray Context Menu which contains the following items:

a) Add Window

Prompts the user for the title of a new Dashboard MDI Form.



b) Show/Hide

Contains an entry for each loaded Dashboard MDI Form. The user can choose to show or hide the MDI Form from these sub-items.

c) Exit

Close the Dataserv Dashboard and all open windows.

System and Group Options

As noted in the [Getting Started](#) heading of the Dashboard documentation, individual DataServ machines are referred to as “Systems” within the Dashboard, and Systems can be members of one or more Groups. The purpose of Groups is to give the user the ability to categorize Systems by Process, physical location, or any criteria desired to make it easier to navigate to that System’s specific menus as quickly and easily as possible. Making groups is not a required action within the Dashboard. If no group affiliations are created, all Systems will simply be listed in the **Systems → Groupings → Ungrouped Systems** menu area.

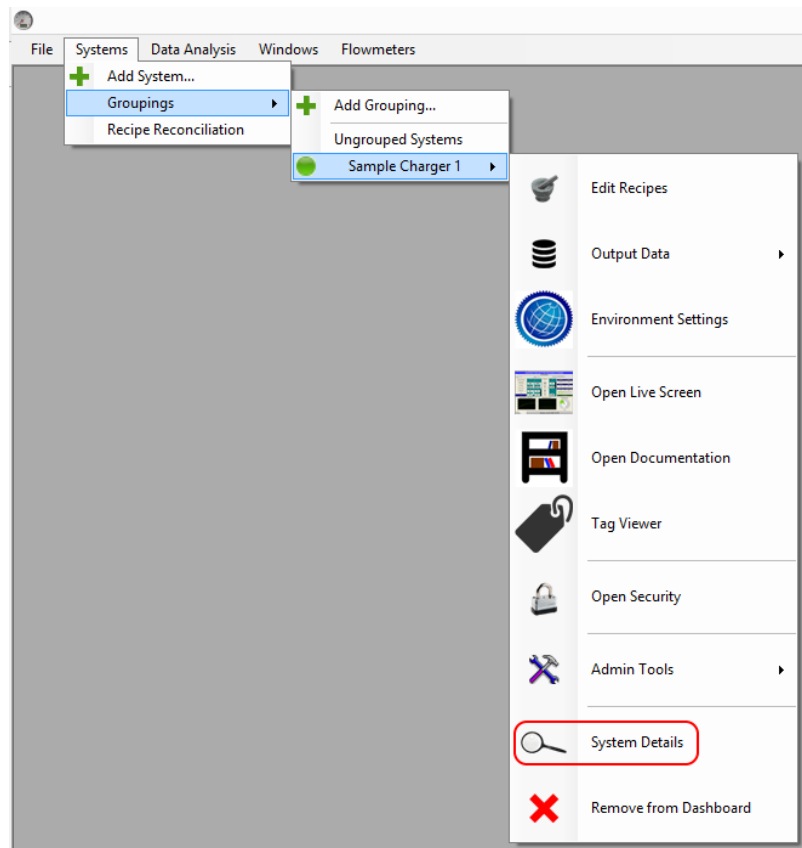
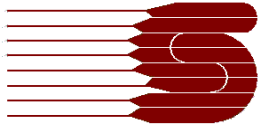
System Maintenance

Adding a System

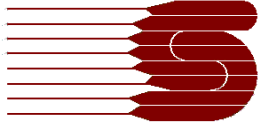
For instructions on adding a new system, please refer to the [System Maintenance](#) section in the Getting Started heading of this document. Adding a system is the minimum requirement for using the Dashboard. Having a System in the Dashboard gives the user access to all basic Dashboard functionality.

Editing a System

To edit a System’s properties (Serial Number, I.P. Address, etc.), access the System’s menu options from anywhere in the **Systems** menu tree, either as a grouped System or an Ungrouped System. Click the **Station Details** menu.



This will bring up the System Details Form. Make any desired changes and click the **Save** button.



System Form

Display / Description
Sample Charger 1

Serv-I-Quip Serial Number
1016XXX

Host Name / PC Name
COMPUTER1

IP Address
192.168.101.3

Listening Port
19336

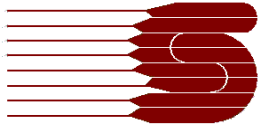
System Type
Refrigerant Charger

Line
[None]

Cancel Save

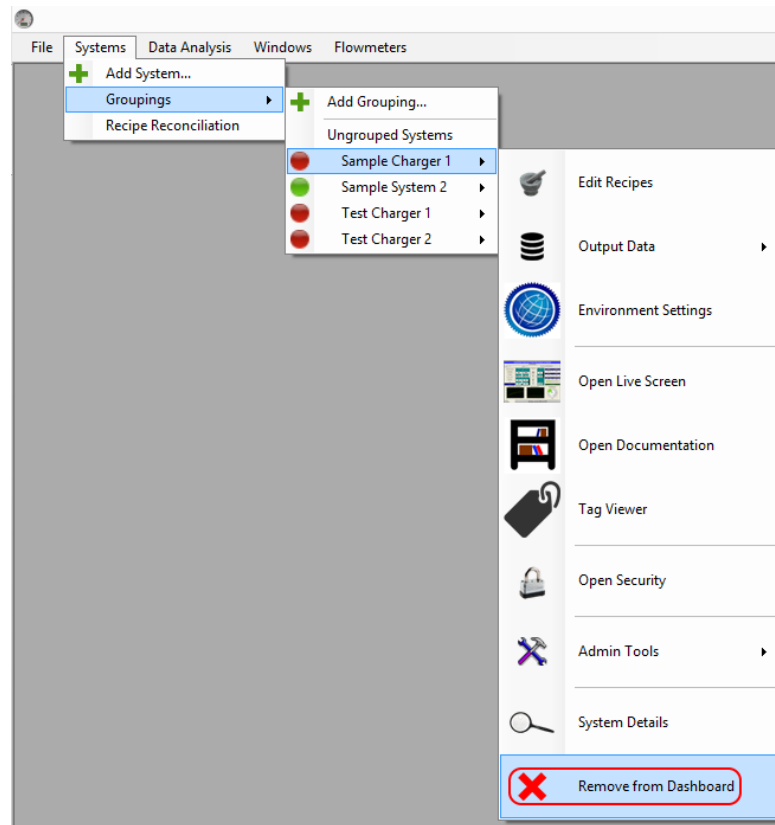
The items that can be entered are:

- Display / Description
 - i. How you want the system to be shown when selecting from menus and lists
- Serv-I-Quip Serial Number
 - i. The unique Serial Number assigned to your system during manufacture. This is generally a 7-digit number starting with “101”.
- Host Name / PC Name
 - i. The name of the networked PC that is running the Dataserv 3.0 software. If your PC was supplied by Serv-I-Quip, this will be the letter “s” followed by the Serial Number.
- IP Address
 - i. If your PC has been given a static I.P. address or DHCP reservation, you can optionally include that I.P. in this field. Leave this field blank if you are unsure.
- Listening Port
 - i. The default port on which the Dataserv Engine accepts connections is 19336. It is rare that you will need to change this number.
- System Type
 - i. Pick the type of system from the drop-down list. This is used purely for display purposes.
- Line
 - i. During first setup, there are no lines pre-configured to choose from. Leave this set to “[None]”. If you choose to configure lines [<TODO: Link lines>](#) at a later time, this setting can be set at that point.



Deleting a System

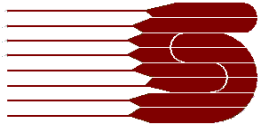
To delete a System, expand that System's menu and select **Remove from Dashboard** at the bottom of the menu as shown below:



Note that if the System belongs to a Group, the text of this menu item is **Remove from Group**. If a System is a member of one or more Groups, it must be removed from all Groups before it can be removed from the Dashboard entirely.

Group Maintenance

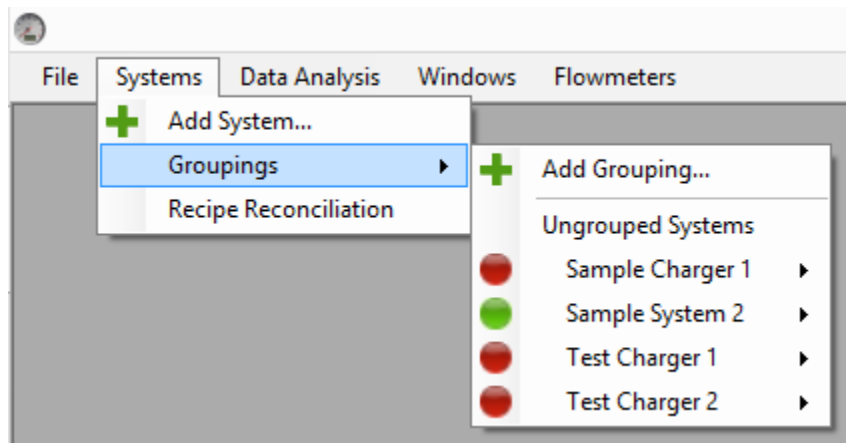
As stated earlier, Groups are an optional feature of the Dashboard intended to provide a means to logically group Systems by Process, Line or some other criterion. When only a few Systems



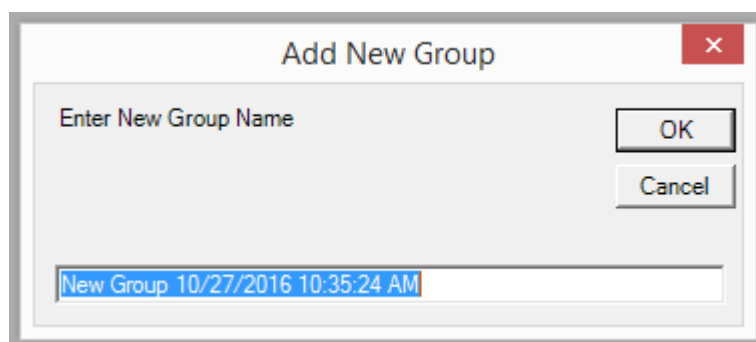
are in a given facility, Groups will probably not be necessary or useful. The only affect Group membership has on a System is where it will be located under the **Systems** menu.

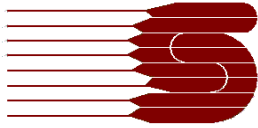
Adding a Group

When no groups exist, the **Systems** menu will look something like this:

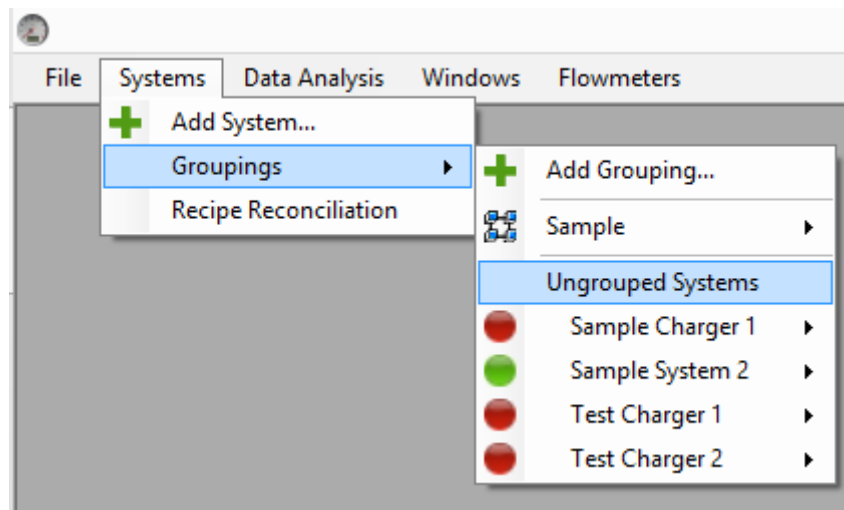


In this state, all Systems are listed under the **Ungrouped Systems** heading. To start creating a new Group, simply click **Add Grouping**. A text prompt will be shown asking for a new Group Name. The default text will be "New Group" and the date and time as seen here:

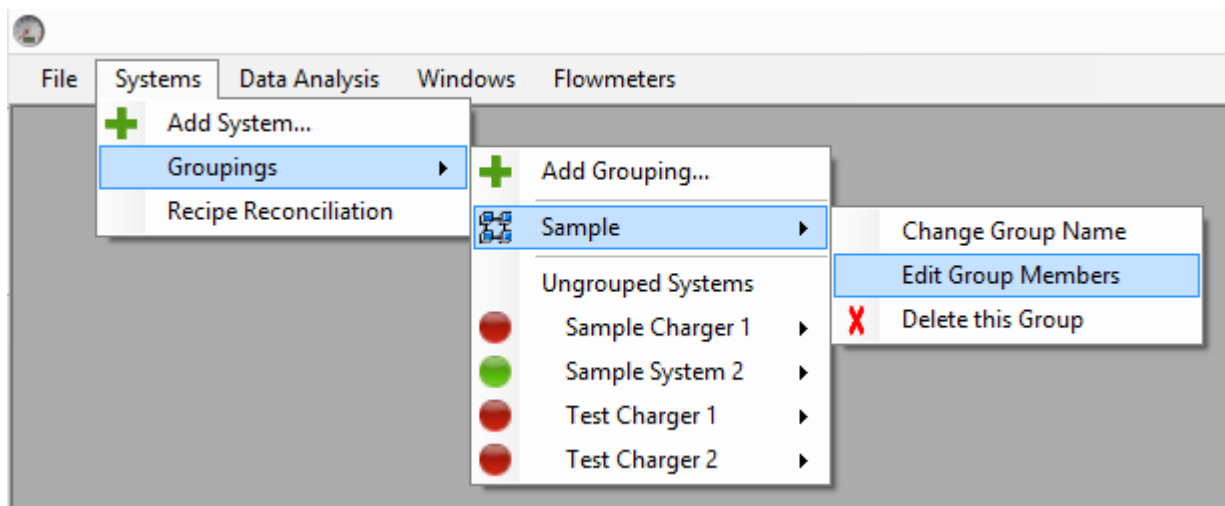


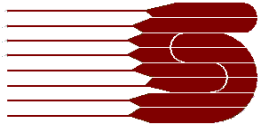


For this example, the Group will be named “Sample.” Once the desired Group Name is entered and the OK button is pressed, the group will be added to the **Groupings** menu as seen here:

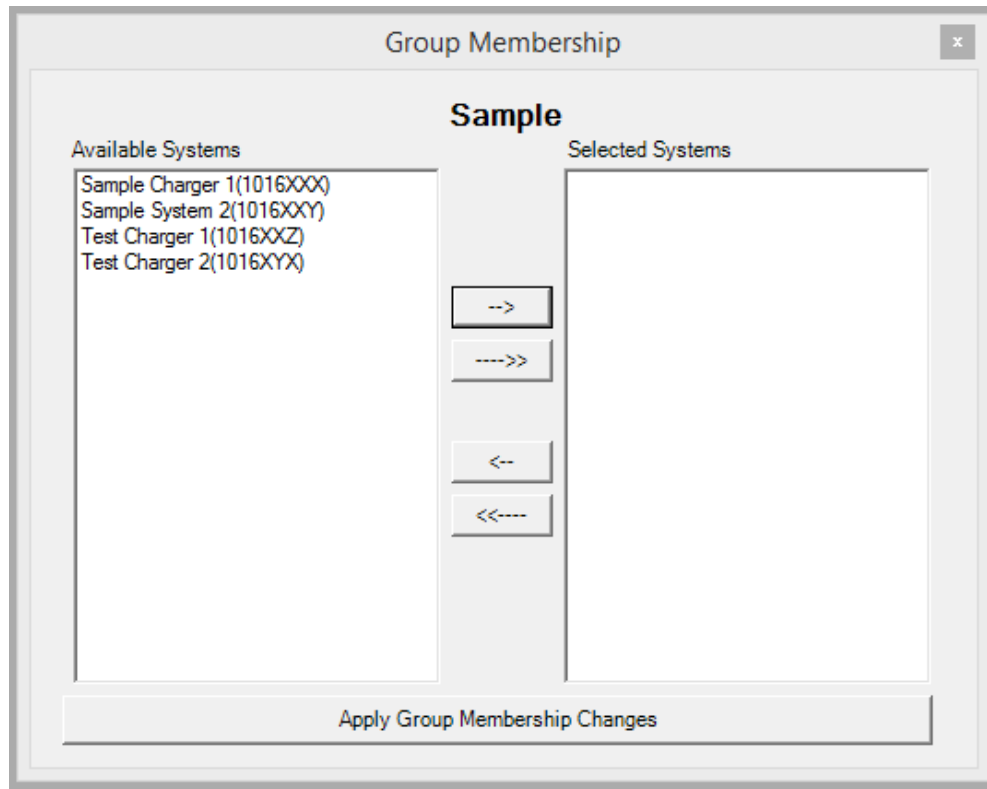


At this point, the Group exists, but has no members. To add or remove Systems, the Group menu can be expanded to expose the **Edit Group Members** menu.

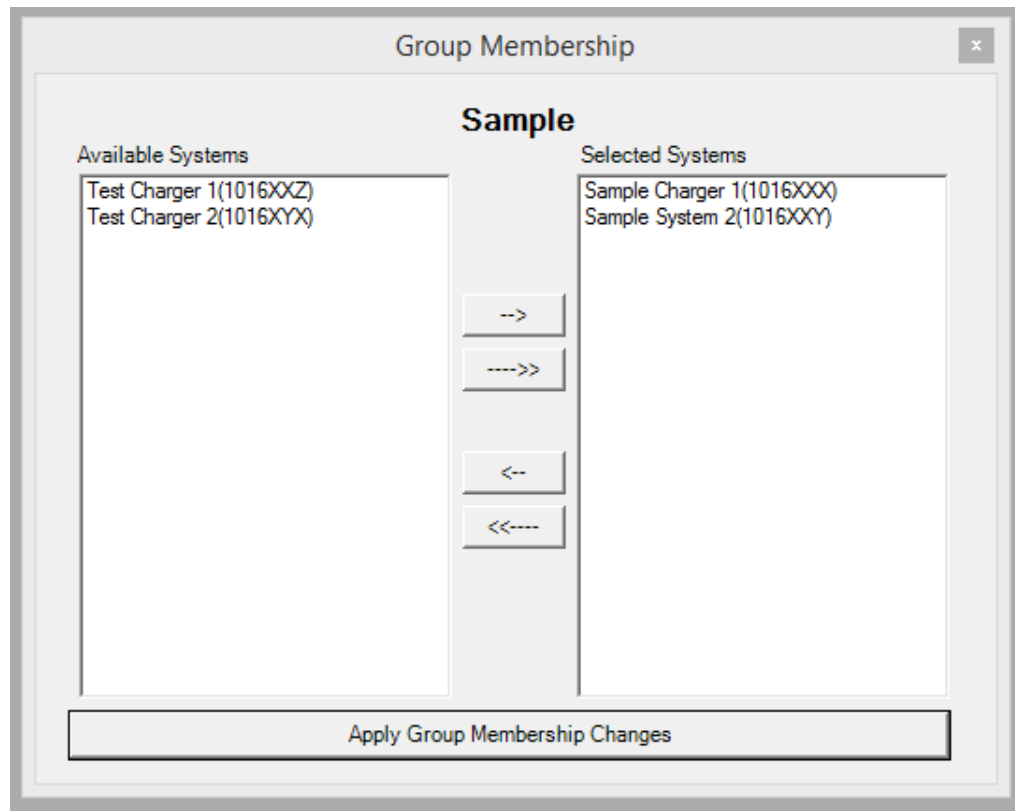




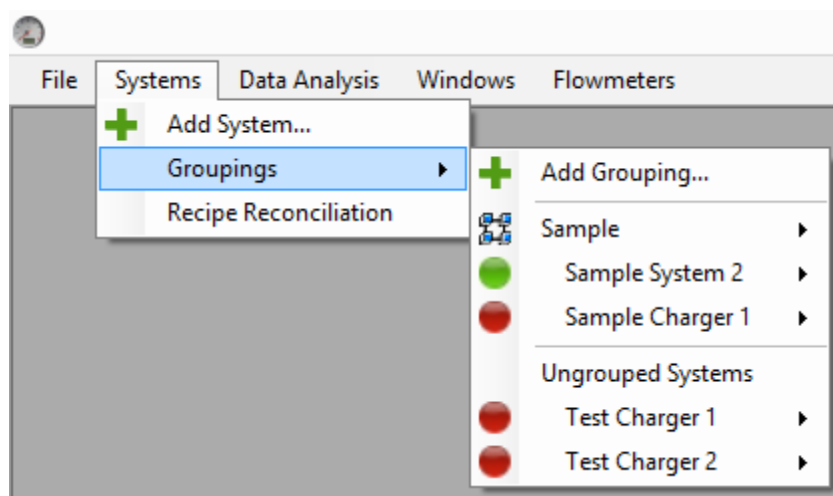
When this menu item is selected, the Group Membership Window is displayed. This is the Group Membership Window:

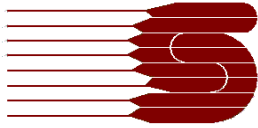


Systems can be added or removed from the current Group by highlighting them and clicking the → button (select) or ← button (deselect). In this example, both systems with “Sample” in the name will be added to the “Sample” group. This will have the Group Membership Window displaying like this:



When the **Apply Group Membership Changes** button is clicked, the form will close and the **Systems** menu tree will change to reflect the new Group memberships. Continuing with the example, the menu would look like this:

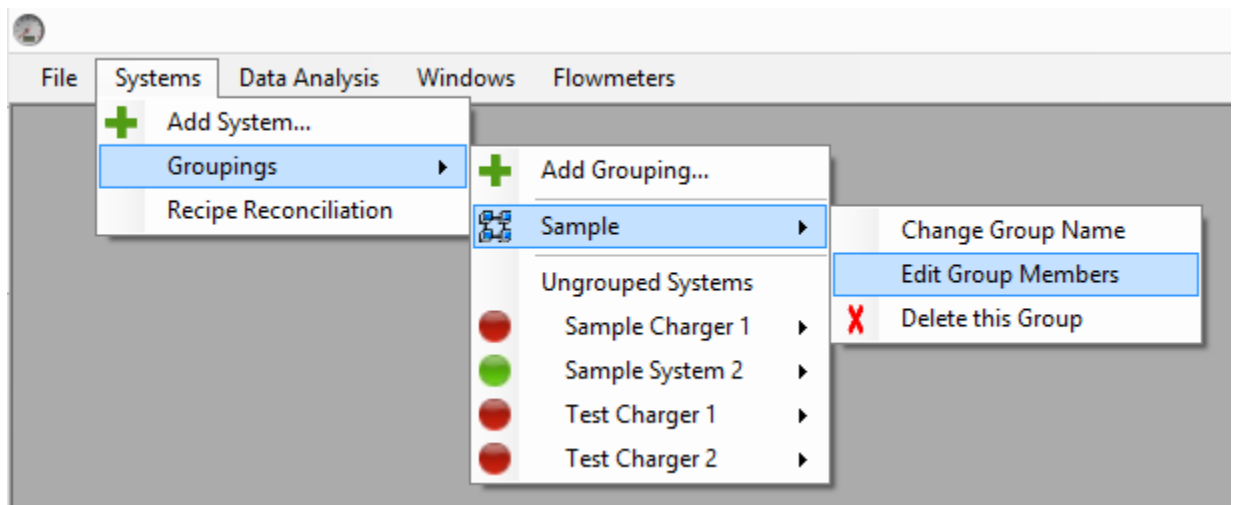




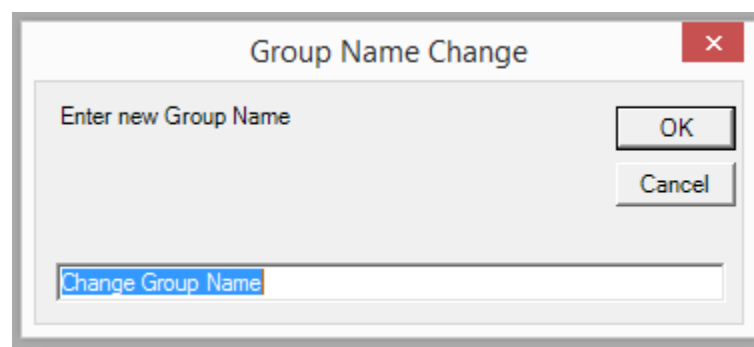
“Sample System 2” and “Sample Charger 1” are now listed under the “Sample” group, and only “Test Charger 1” and “Test Charger 2” are listed under “Ungrouped Systems.”

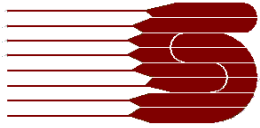
Renaming a Group

Group names can be changed without affecting membership. Expanding the Group menu of any group gives access to the Change Group Name menu.



Group name changes are displayed exactly the same as when [Adding a Group](#). An input box will be displayed with the default value “Change Group Name.”





Whatever value is placed in the box becomes the Group's new name once the **OK** button is clicked.

Deleting a Group

The last option in the **Group** menu is **Delete this Group**. Deleting a Group will automatically return any Systems in that group to the **Ungrouped Systems** area if they aren't members of another Group.

Data Analysis

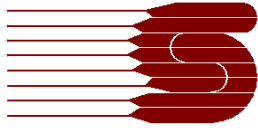
Configuring Systems and Groups gives immediate access to basic functionality: Recipe editing, Output viewing, Live View, Administration, etc. More functionality is available through the **Data Analysis** menu. This functionality requires input from the user to group Systems into Processes, associate Recipe and Output data points and some other important information.

Configuration

The **Data Analysis → Configuration** menu offers links to the configuration pages for extended Dashboard functionality. The first area listed is **Shift Management**. This is followed by Recipe / Final Data Relationships and Processes.

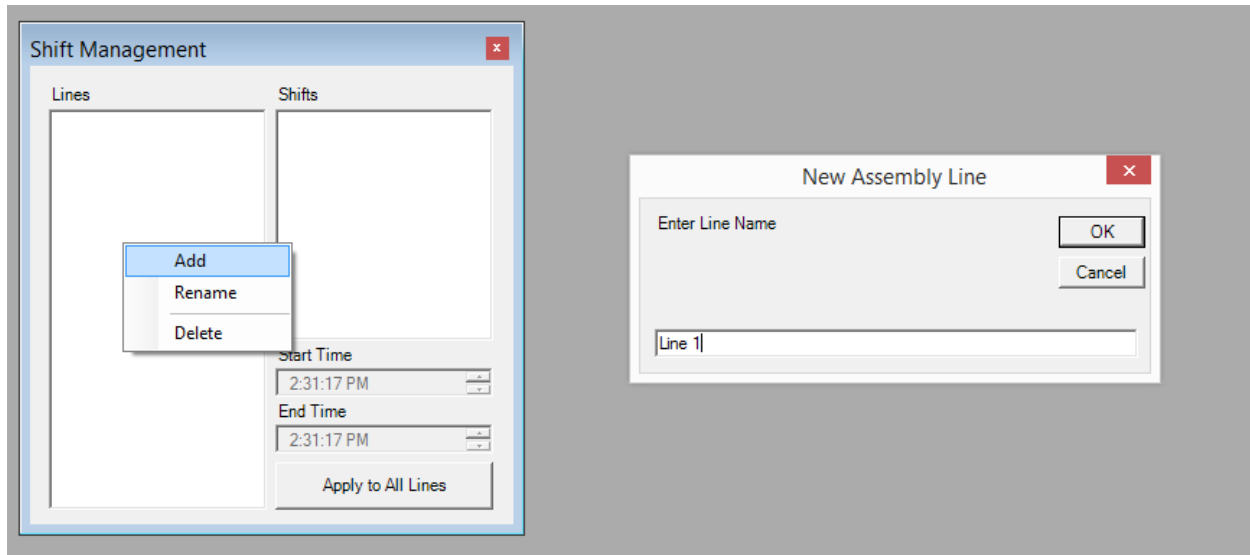
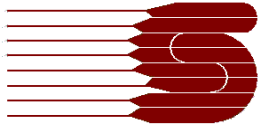
Shift and Line Management

Shifts and Lines are one way data can be sorted and filtered when doing Data Analysis and Visualization within the Dashboard. In order to do so, individual Lines and their Shifts must be configured here first. Like Groups, Lines and Shifts are optional configurable items. Clicking the **Data Analysis → Configuration → Shifts** menu will bring up the Lines and Shifts configurator:

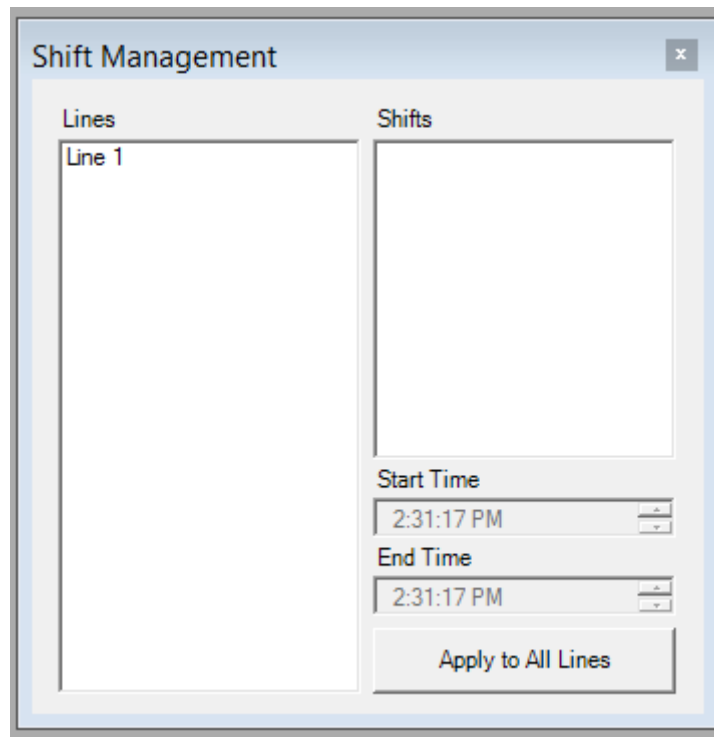
A screenshot of the 'Shift Management' application window. The window has a title bar with the text 'Shift Management' and a close button (red 'X'). Inside the window, there are two main sections: 'Lines' on the left and 'Shifts' on the right. The 'Lines' section is a large empty rectangular box. The 'Shifts' section contains two empty rectangular boxes, one above the other. Below these boxes, there are two time input fields. The first is labeled 'Start Time' and contains the text '2:31:17 PM'. The second is labeled 'End Time' and also contains the text '2:31:17 PM'. Both time fields have small up and down arrow buttons to the right of the text. At the bottom of the 'Shifts' section, there is a button labeled 'Apply to All Lines'.

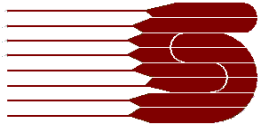
Line Management

Lines are added by right-clicking the Lines list and selecting Add from the context menu. This will bring up an input box to allow the user to give the Line a name.



When the **OK** button is pressed, the new Line is added to the list of Lines as seen below:

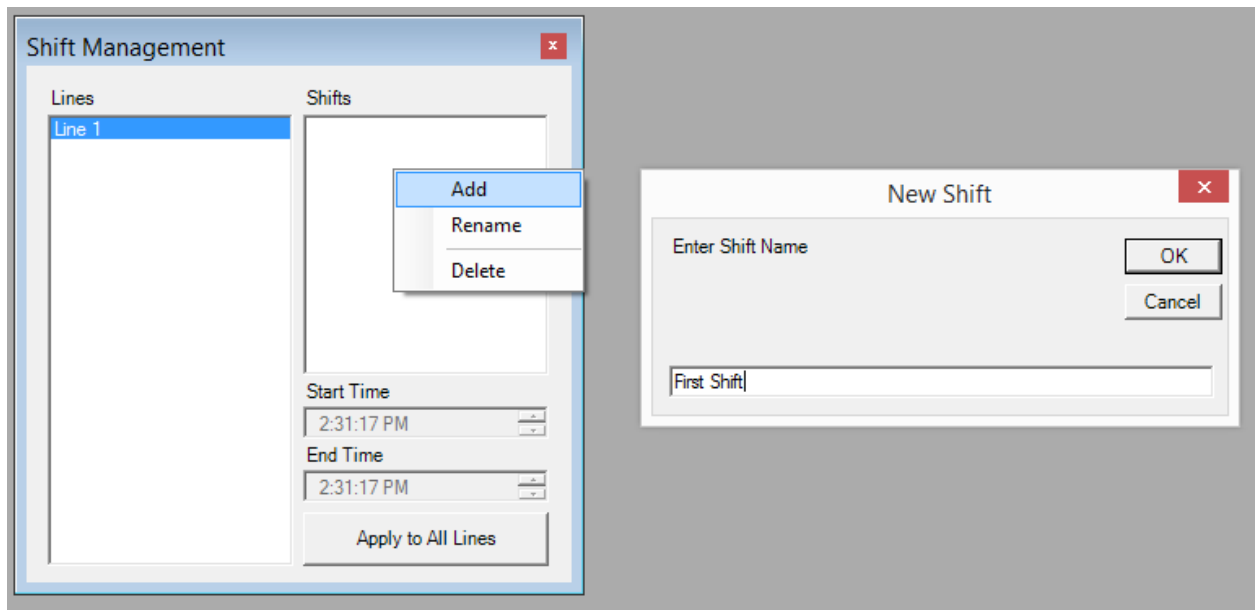




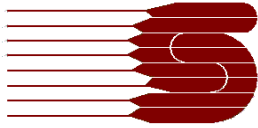
The same context menu also contains the menu items for **Renaming** an **Deleting** Lines. These options require that one and only one Line be highlighted.

Shift Management

Changing Shifts within a Line is similar to changing Lines. When a Line is highlighted in the Line list, it will be shown as what text on a blue background. Any existing Shifts will be shown in the Shifts List. Right-clicking on the Shift list will bring up a context menu with the same **Add**, **Rename**, and **Delete** options available for Lines. As shown for Lines, **Add** will bring up an input box to enter a Shift name.



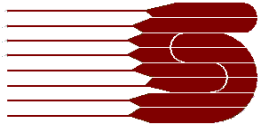
As before, once the OK button is clicked, the Shift is added to the Shift list with the name chosen. If the shift is highlighted, the start and end times of that shift will be enabled below the shift list. Newly created Shifts will default to 8:00 am to 4:00 pm. The end result of the above example looks like this:

A screenshot of the 'Shift Management' window. The window has a title bar with a close button. It is divided into two main sections: 'Lines' on the left and 'Shifts' on the right. The 'Lines' section contains a list with 'Line 1' selected. The 'Shifts' section contains a list with 'First Shift' selected. Below the 'Shifts' list, there are two time controls: 'Start Time' set to '8:00:00 AM' and 'End Time' set to '4:00:00 PM'. At the bottom right, there is a button labeled 'Apply to All Lines'.

Start and End times are editable through the time controls. If desired, a list of Shifts from one Line can be applied to all Lines configured. With one Line selected, clicking the **Apply to All Lines** button will erase all current Shifts on other Lines and replace them with the Shifts from the selected Line. Highlighting an individual Shift and right-clicking will bring up the context menu and allow **Renaming** or **Deleting** that shift.

Recipe to Output Field Relationships

With many systems, especially Runtest and Flowtest systems where Recipe values have upper and lower limits, it can be advantageous to compare Setpoint Limits to calculated Control Limits to evaluate Process Capability. To do so, the Dashboard must have a roadmap to match up Recipe values to Actual values. The Recipe to Putput Field Relationship Window is where this can be done. A blank Recipe/Output Field Relatoinship Window looks like this:



Station Name	Station Type	Assembly Line
Sample Charger 1	Refrigerant Charger	
Sample System 2	Brake Fill	
Test Charger 1	Refrigerant Charger	
Test Charger 2	Refrigerant Charger	

Target/Max Recipe Field	Min Recipe Field	Output Field
-------------------------	------------------	--------------

As long as a system is Online, highlighting that System in the System list will fill in the [Circuits](#) list.

Shared Components

Many Dataserv interfaces are available from more than one menu or application. These are called “Shared Components.”

- **Recipe Form**



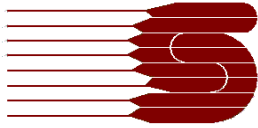
The Recipe Form provides the Process Owner a user-friendly interface for updating Recipe information either at the system through the HMI and through the Dashboard. Each system has a unique Recipe Form layout. A typical Recipe Form will look something like this:

Components

1. Available Recipes List
2. Search Controls
3. Record Navigator
4. Save Button
5. Recipe Value Controls
6. Key Component List
7. Main Menu
8. Context Menu
9. Exit Multi-Update Button

- **Available Recipes List**

All Recipes currently configured can be found in the List Box under the heading “Available Recipes.” Selecting any recipe in the list will fill the form with the values from that recipe.



- *Search Controls*

With the “Search” controls, the user can narrow down the contents of the “Available Recipes” list by entering a partial or complete Model Number and clicking the “Search” button. Clicking the red “X” button will clear the search and repopulate the “Available Recipes” list with all models.

The image shows a search interface with a button labeled "Search", a text input field, and a red "X" button to clear the search.

- *Record Navigator*

The Record Navigator is a set of three controls that allows the user to move forward or backwards, alphabetically, through the Recipe list one Recipe at a time.

The image shows a record navigator with left and right arrow buttons, a text field displaying "1 of 4", and a right arrow button.

- *Save Button*

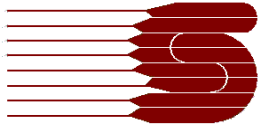
The Save Button initiates a save of the current Recipe, preceded by Data Validation

The image shows a single button labeled "Save".

- *Recipe Value Controls*

All controls on the Recipe Form related to Recipe values or their descriptions are in this group. They are typically grouped visually by Process Step on simpler systems such as Refrigerant Chargers or Leak Detection Systems. Multi-Fill Systems or Electrical Runtest Systems will usually separate Fluids or Runtest steps into separate tabs, respectively.

- *Key Component List*



If the system is performing Key Component checking, a list of key components associated with that model will be listed under the “Key Components” label. Each Key Component will be listed by name (“Important Component” in this example) with possible part numbers for that component listed underneath. Any and all valid part numbers should have the checkbox next to them ticked to mark them as “valid” for that model. Leaving all checkboxes unticked will skip Key Component validation for that model.

Clicking the “Show Parts” Button in the Key Component List will enable editing of Key Component Part Numbers. Existing components can be edited or deleted and new components added from this interface. Clicking “Hide Parts” will return the Key Component List to select-only mode.

Key Components

Important Component

☒ COMPONENT1

☐ COMPONENT2

☐ COMPONENT3

☐ COMPONENT4

☐ COMPONENT5

☐ COMPONENT6

☐ COMPONENT7

☐ COMPONENT8

Show Parts

Key Components

Important Component

☒ COMPONENT1

☐ COMPONENT2

☐ COMPONENT3

☐ COMPONENT4

☐ COMPONENT5

☐ COMPONENT6

☐ COMPONENT7

☐ COMPONENT8

636081720747163024

Hide Parts

Part Name

Description

ACOMPONENT

Important Compon

Possible Values for Important Component

COMPONENT1

COMPONENT2

COMPONENT3

COMPONENT4

COMPONENT5

COMPONENT6

COMPONENT7

COMPONENT8

NEWCOMPONENT1

<

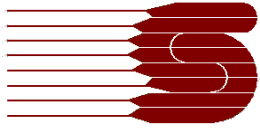
>

- **Main Menu / Context Menu**

The Main Menu and The Context Menu brought up by right-clicking the Available Recipes List contain the same options.

1. New

Adds a new row to the recipe list with all blank parameters.



2. Copy

Adds a new row to the recipe list by making an exact copy of the currently selected recipe and adding “_COPY” to the end of the model number.

3. Delete

Deletes the currently selected recipe.

4. Set Global Preset

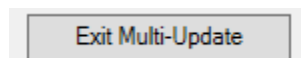
Opens the Global Preset [<TODO: Link Global Preset>](#) Window.

5. Update Several Models

Opens the Recipe Picker Window to begin a Multi-Update session. [<TODO: Link Multi Update>](#)

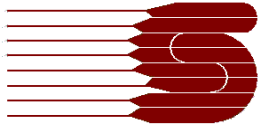
- ***Exit Multi-Update Button***

This button cancels or terminates a Multi-Update session.



Updating Recipe Fields

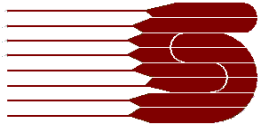
Once a Recipe has been selected, either by creating a new Recipe, copying an existing Recipe, or highlighting an existing Recipe, the Recipe Value Controls will be filled in with the appropriate values



from that Recipe. When a New Recipe is created, all fields will be blank and the Record Navigator will indicate “(New Row).”

To make changes to recipe fields, TAB to or click on the desired parameter and type the new value or select the desired option from the drop-down list. Once all desired changes are made, click the “Save” button. If any user entries are not valid for the data type of the recipe field, a message will be displayed to the user and the fields identified as shown here:

If no errors are present, the recipe will be saved and fields that were updated will be shown in **Orange** for reference.



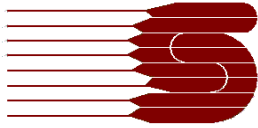
Similarly, if the user makes changes to recipe fields and navigates away from the current model by clicking another model or using the forward and back buttons, the Recipe Form will prompt the user and offer the choice of whether to preserve or discard the changes.

The screenshot shows the 'Recipe Configuration' form. It has several sections: 'Model Number' with a text field containing 'MODEL1', 'Model Description' with a text area containing 'MODEL DESCRIPTION 1', 'Vacuum Check' with 'Vacuum Check Time' (1113) and 'Vacuum Check Level' (18000), 'Reject Evac.' with 'Evacuation Time' (90) and 'Evacuation Level' (100), and 'Evacuation Time' (180). A dialog box titled 'Unsaved Changes Detected' is overlaid on the form, asking 'Changes have been made to the highlighted fields, would you like to save before you continue?' with 'Yes' and 'No' buttons.

Deleting Recipes

Though it's not recommended, recipes can be removed from the recipe database by using the "Delete" option from the Main Menu or the Context Menu. When a delete request is made by the user, the Recipe form will prompt for acknowledgment.

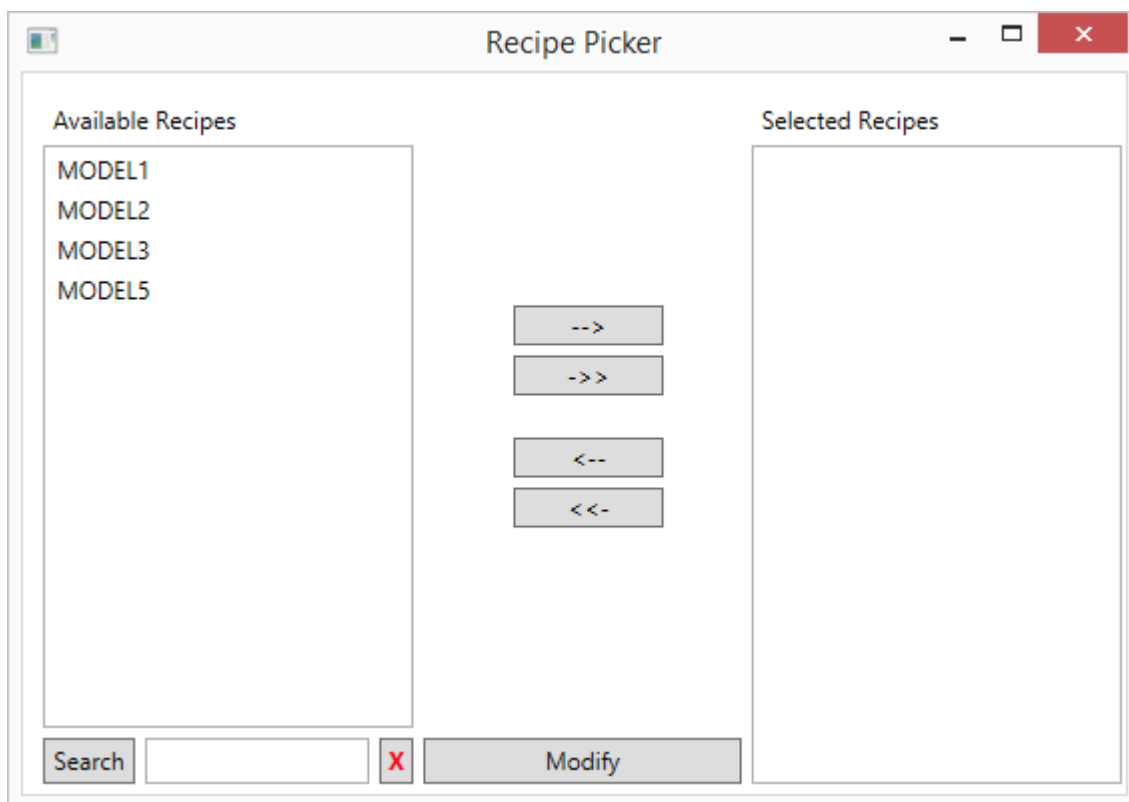
The screenshot shows the 'Recipe Configuration' form with a dialog box titled 'Confirm Deletion' overlaid. The dialog box asks 'Delete recipe for model 'SIQTEST'' with 'Yes' and 'No' buttons. The background form shows fields for 'Pressure Tolerance', 'Helium Fill Level', 'Vacuum Check Time', and 'Vacuum Check Level'.



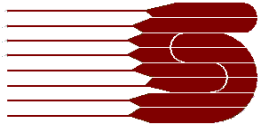
If a user selects “Yes”, a delete request will be sent to the Dataserv Engine. If deletion is successful, the recipe will be removed from the list of Available Recipes.

Multi-Update

It is often necessary or advantageous to be able to make the same updates to two or more recipes at once. The Recipe Form provides this ability through a “Multi-Update.” To begin a Multi-Update, chose “Update Several Models” from the Main Menu under “Recipe”, or through the Context Menu of the Available Recipes list. Doing so will bring up the Recipe Picker Window:

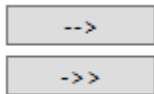


The Recipe Picker has similar Available Recipes and Search Controls to the main Recipe Form. There are four selector/deselector controls in the middle, a Selected Recipes list on the right, and a “Modify” button bottom center.



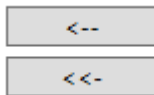
Selectors and deselection buttons with single arrows select or deselect the currently selected recipe. Selectors with double arrows select or deselect all recipes in a list.

These are the selector controls, the single arrow control on top will move the currently selected Recipe into the “Selected Recipes” list.



The select all button on the bottom will move all Recipes in Available Recipes to the “Selected Recipes” list. If the contents of “Available Recipes” is not the result of a search, all recipes in a system are selected for the Multi-Update.

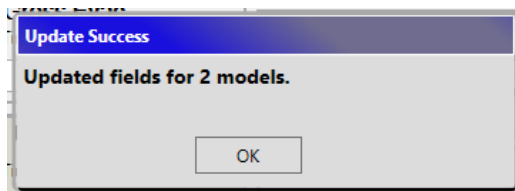
The deselection buttons have the same basic functionality as the selector buttons. They move the highlighted recipe or all Recipes out of the “Selected Recipes” list and into the “Available Recipes” list.



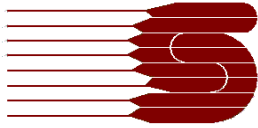
For this example, MODEL2 and MODEL3 recipes will be selected. Once the user clicks the “Modify” button, the Multi-Update process is started. Several small changes take place on the recipe screen during a Multi-Update. The Search Controls, Record Navigator, and Key Component Control (if present) will become disabled. Also, the “Exit Multi-Update” button will become visible. The Record Navigator text will change to “(Multi-Select)”, all text-box controls in the Recipe Value Controls group will be blanked, and all drop-down lists in the Recipe Value Controls group will gain an additional choice “Keep Model Value” and be automatically set to that value. A sample of what the recipe screen will look like is shown below.



Any Recipe Value Controls left blank or set to “Keep Model Value” will have no effect when the “Save” button is clicked. To update Recipe values for the selected recipes, place the values in the desired Recipe Value Controls and click “Save.” Value checking is performed just as with a regular save. An acknowledgement will be displayed when a response is received from the Dataserv Engine that the update is complete.



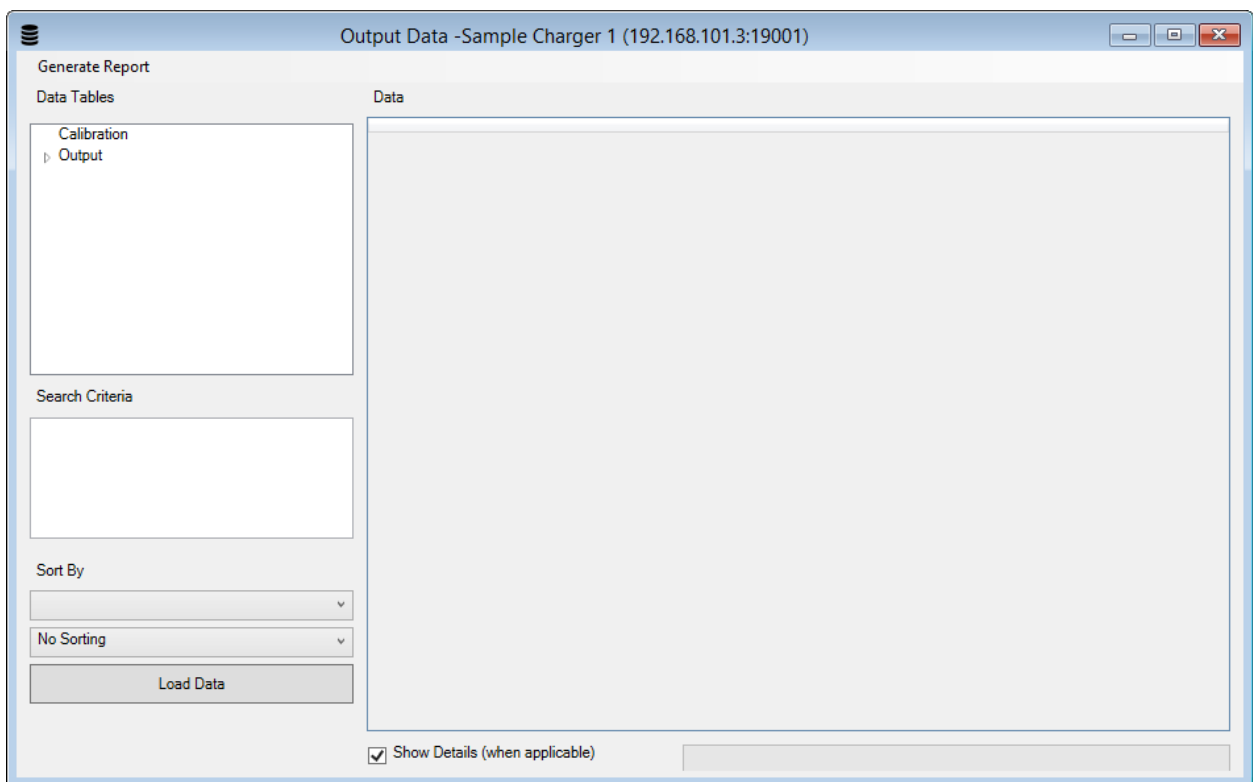
The altered Recipe Value Controls will maintain their new values, but will not be shown in orange as during a single Recipe update. The update and save process can be repeated until the user is satisfied with all the results. A Multi-Update session can be terminated at any time by clicking the “Exit Multi-Update” button. The Recipe Form will be returned to the default state with the first model in Alphabetical Order selected.



<TODO: Many Links above and MANDATORY REVISION NOTES>

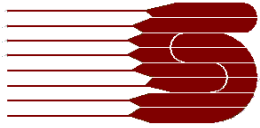
- **Output Data Viewer**

The Output Data Viewer is one way to look at the Run History of a System. It's available at the System via the HMI Menu <TODO: Link HMI Menu> and in the Dashboard as a sub-item of individual System menus. <TODO: Link Dashboard Menu> A typical Output Data Viewer looks something like this when opened:



Components

1. Data Tables List
2. Search Criteria List
3. Sort Controls
4. Load Data Button
5. Main Menu
6. Data Grid



7. Show Details Selector
8. Detail Progress Indicator

- *Data Tables List*

All Dataserv Systems will have a number of Tables configured. If the table is marked to be “Shown in Output View”, it will be listed in the “Data Tables” list on the top left of the Output Data Viewer. To load data for that table, the user must highlight the desired table and click the “Load Data” button.

- *Search Criteria List*

The Search Criteria List, located directly beneath the Data Tables List, shows all current search criteria, and provides a Context Menu to Add, Delete, and Change criteria.

- *Sort Controls*

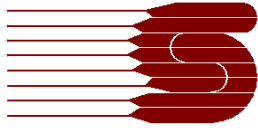
The Sort Controls provide the user the ability to pick a field to sort the data on, and which direction to sort the data. Clicking any column header will also sort the data by that column, clicking the header again will reverse the sort order.

- *Load Data Button*

Clicking the “Load Data” button will load data from the selected table based on the currently defined Search Criterial and Sort options.

- *Main Menu*

The Main Menu provides extended Run History options.



a.) Generate Report

Generates an Excel workbook with Pareto Chart, Production Report, and Raw Data for the selected output table, where applicable.

- *Data Grid*

All data that is loaded in the Output Data Viewer is displayed in the Data Grid.

- *Show Details Selector*

When checked, selecting a row in the Data Grid causes details about the row, and any Child Table information to be loaded into the Row Details portion of the Data Grid. These details can include Printed Items, Stream Samplings, and other data related to the selected Output record.

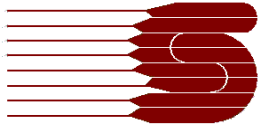
- *Detail Progress Indicator*

The Detail Progress Indicator displays a rough measurement of the progress of the load details process. Details are loaded one at a time from the Dataserv Engine.

Loading Data

As previously stated, just loading data is as simple as selecting a table and clicking the “Load Data” button. Usually, when loading data, the intent is to find something specific. This is what the Search Criteria list and the Sort Controls are for.

To sort, the user picks a field from the first Sort drop-down list. A typical selection would be the “Run Date” or “Cycle Data” field. Next, a sort direction must be picked, in the case of Date/Time fields, “Descending” is the obvious choice as it will put the newest records at the top of the list. In the sample application, a sort as described here would look like this:



Sort By

Run Date

In Descending Order

Load Data

The resulting “Load Data” operation results in the following display to the user:

Output Data -Sample Charger 1 (192.168.101.3:19001)

Generate Report

Data Tables

Calibration

Output

Search Criteria

Sort By

Run Date

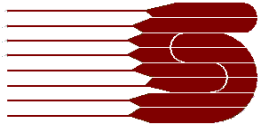
In Descending Order

Load Data

Model Number	Serial Number	Operator	Run Date	Final Completion Code
MODEL1	21131608106776001	Operator	8/29/2016 12:06:00 PM	Cycle Completed Successfully.
MODEL1	21131608106775001	Operator	8/29/2016 11:21:37 AM	Cycle Completed Successfully.
MODEL1	21131608106774001	Operator	8/29/2016 11:14:53 AM	Cycle Completed Successfully.
MODEL1	21131608106772001	Operator	8/29/2016 10:57:49 AM	Cycle Completed Successfully.
MODEL1	21131608106771001	Operator	8/29/2016 10:51:35 AM	Cycle Completed Successfully.
MODEL1	21131608106770001	Operator	8/29/2016 10:45:07 AM	Cycle Completed Successfully.
MODEL1	21131608106769001	Operator	8/29/2016 10:40:30 AM	Cycle Completed Successfully.
MODEL1	21131608106767001	Operator	8/29/2016 10:27:16 AM	Failed Final Evacuation
MODEL1	21131608106768001	Operator	8/29/2016 10:25:46 AM	Cycle Completed Successfully.
MODEL1	21131608106767001	Operator	8/29/2016 10:22:00 AM	Failed Final Evacuation
MODEL1	21131608106766001	Operator	8/29/2016 10:13:55 AM	Cycle Completed Successfully.
MODEL1	21131608106763001	Operator	8/29/2016 10:10:02 AM	Cycle Completed Successfully.
MODEL1	21131608106765001	Operator	8/29/2016 10:02:51 AM	Cycle Completed Successfully.
MODEL1	21131608106764001	Operator	8/29/2016 9:55:04 AM	Cycle Completed Successfully.
MODEL1	21131608106761001	Operator	8/29/2016 9:18:01 AM	Cycle Completed Successfully.
MODEL3	21131608106427001	Operator	8/29/2016 9:09:13 AM	Cycle Completed Successfully.
MODEL3	21131608106426001	Operator	8/29/2016 8:47:11 AM	Cycle Completed Successfully.
MODEL3	21131608106424001	Operator	8/29/2016 8:38:40 AM	Cycle Completed Successfully.
MODEL3	21131608106423001	Operator	8/29/2016 8:34:41 AM	Cycle Completed Successfully.
MODEL3	21131608106422001	Operator	8/29/2016 8:29:23 AM	Cycle Completed Successfully.
MODEL3	21131608106421001	Operator	8/29/2016 8:19:35 AM	Cycle Completed Successfully.
MODEL3	21131608106420001	Operator	8/29/2016 8:08:58 AM	Cycle Completed Successfully.
MODEL3	21131608106417001	Operator	8/29/2016 8:03:17 AM	Cycle Completed Successfully.
MODEL3	21131608106419001	Operator	8/29/2016 7:57:05 AM	Cycle Completed Successfully.
MODEL3	21131608106418001	Operator	8/29/2016 7:47:46 AM	Cycle Completed Successfully.
MODEL3	21131608106428001	Operator	8/29/2016 7:41:38 AM	Cycle Completed Successfully.
MODEL3	21131608106429001	Operator	8/29/2016 7:23:27 AM	Cycle Completed Successfully.
MODEL3	21131608106430001	Operator	8/29/2016 7:21:00 AM	Cycle Completed Successfully.

☒ Show Details (when applicable)

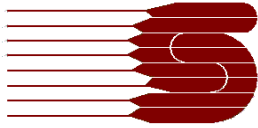
To further organize data, the user can restrict the results to a subset of the available records using the Search Criteria list. To add a new criteria, the user can right-click on the Search Criteria List and select “Add” from the context menu options.

A screenshot of the 'Search Criteria' window. It has a title bar 'Search Criteria'. Below the title bar is a large empty rectangular area. A context menu is open over this area, showing three options: 'Add' (highlighted in blue), 'Edit', and 'Delete'. Below the menu area, there is a 'Sort By' label, followed by two dropdown menus. The first dropdown is set to 'Run Date' and the second is set to 'In Descending Order'. At the bottom of the window is a 'Load Data' button.

This brings up the Criterion Detail Window in “New Criterion” mode, meaning no options are selected. The Window looks like this:

A screenshot of the 'Criterion Detail' window. It has a title bar 'Criterion Detail' with standard window controls (minimize, maximize, close). The window contains four labels: 'Field', 'Operator', 'Operand 1', and 'Operand 2'. Each label is followed by a dropdown menu. The 'Field' dropdown is currently selected. At the bottom center of the window is an 'OK' button.

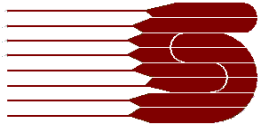
The user can now select the properties of the Criterion they wish to add to filter Output Data. The first item to set is “Field”, or the data column to apply the filter to. This example will use Model Number to get only records for a specific Model. Next, the user must select the “Operator”, or compare method, that the Criterion will use. These are comparisons such as “Equal”, “Not Equal”, “Greater Than”, etc. Depending on the data type (number, alphanumeric, date, etc.) the options for this item will be different. Continuing with the example, “Equal” will be selected.

A screenshot of the 'Criterion Detail' dialog box. The 'Field' dropdown is set to 'Model Number'. The 'Operator' dropdown menu is open, showing a list of comparison operators: 'Equal', 'NotEqual', 'Contains', 'Between', 'GreaterThan', 'LessThan', 'StartsWith', 'EndsWith', and 'In'. 'Equal' is currently selected and highlighted in blue.

The last item the user sets are the Operands, or the values that the Operator will use to compare to the value in the Run History database. Operand 1 is always used while Operand 2 is only used with a limited number of comparisons. To complete the example, Operator 1 will be set to "MODEL1."

A screenshot of the 'Criterion Detail' dialog box. The 'Field' dropdown is 'Model Number', the 'Operator' dropdown is 'Equal', 'Operand 1' is 'MODEL1', and 'Operand 2' is empty. An 'OK' button is located at the bottom center of the dialog.

When the "OK" button is clicked, the Search Criteria List on the Output Data Viewer will be updated to show the new Criterion:



Search Criteria

Model Number = MODEL1

Now, when “Load Data” is clicked, only records for “MODEL1” will be included in the Data Grid:



Output Data -Sample Charger 1 (192.168.101.3:19001)

Generate Report

Data Tables

Calibration

Output

Search Criteria

Model Number = MODEL1

Sort By

Run Date

In Descending Order

Load Data

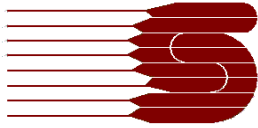
Model Number	Serial Number	Operator	Run Date	Final Completion Code
MODEL1	21131608106776001	Operator	8/29/2016 12:06:00 PM	Cycle Completed Successfully.
MODEL1	21131608106775001	Operator	8/29/2016 11:21:37 AM	Cycle Completed Successfully.
MODEL1	21131608106774001	Operator	8/29/2016 11:14:53 AM	Cycle Completed Successfully.
MODEL1	21131608106772001	Operator	8/29/2016 10:57:49 AM	Cycle Completed Successfully.
MODEL1	21131608106771001	Operator	8/29/2016 10:51:35 AM	Cycle Completed Successfully.
MODEL1	21131608106770001	Operator	8/29/2016 10:45:07 AM	Cycle Completed Successfully.
MODEL1	21131608106769001	Operator	8/29/2016 10:40:30 AM	Cycle Completed Successfully.
MODEL1	21131608106767001	Operator	8/29/2016 10:27:16 AM	Failed Final Evacuation
MODEL1	21131608106768001	Operator	8/29/2016 10:25:46 AM	Cycle Completed Successfully.
MODEL1	21131608106767001	Operator	8/29/2016 10:22:00 AM	Failed Final Evacuation
MODEL1	21131608106766001	Operator	8/29/2016 10:13:55 AM	Cycle Completed Successfully.
MODEL1	21131608106763001	Operator	8/29/2016 10:10:02 AM	Cycle Completed Successfully.
MODEL1	21131608106765001	Operator	8/29/2016 10:02:51 AM	Cycle Completed Successfully.
MODEL1	21131608106764001	Operator	8/29/2016 9:55:04 AM	Cycle Completed Successfully.
MODEL1	21131608106761001	Operator	8/29/2016 9:18:01 AM	Cycle Completed Successfully.
MODEL1	21131608105587001	Operator	8/26/2016 11:59:35 AM	Cycle Completed Successfully.
MODEL1	21131608104874001	Operator	8/26/2016 11:59:13 AM	Cycle Completed Successfully.
MODEL1	21131608104874001	Operator	8/25/2016 3:18:24 PM	Operator Pressed Cycle Reset Button During The Cyc
MODEL1	21131608105610001	Operator	8/25/2016 3:11:13 PM	Cycle Completed Successfully.
MODEL1	21131608104874001	Operator	8/25/2016 3:06:48 PM	Failed Unit Evacuation
MODEL1	21131608104874001	Operator	8/25/2016 2:58:26 PM	Operator Pressed Cycle Reset Button During The Cyc
MODEL1	21131608105626001	Operator	8/25/2016 2:57:29 PM	Cycle Completed Successfully.
MODEL1	21131608105625001	Operator	8/25/2016 2:41:30 PM	Cycle Completed Successfully.
MODEL1	21131608105624001	Operator	8/25/2016 2:38:53 PM	Cycle Completed Successfully.
MODEL1	21131608105623001	Operator	8/25/2016 2:28:24 PM	Cycle Completed Successfully.
MODEL1	21131608105621001	Operator	8/25/2016 2:07:57 PM	Cycle Completed Successfully.
MODEL1	21131608105622001	Operator	8/25/2016 1:58:27 PM	Cycle Completed Successfully.
MODEL1	21131608105620001	Operator	8/25/2016 1:54:58 PM	Cycle Completed Successfully.

☒ Show Details (when applicable)

<TODO: Show Details (get data imported correctly), and finalize the “Generate Report” functionality so it can be added to the documentation>

- **Environment Settings**

The Environment Settings Window is where all values that are global to a particular system are kept. Most Environment Settings are not changed once a System has been installed and tested, but a few may require changes from time to time. The Environment Settings Window looks like this:



Environment Item	Current Value
Serv-I-Quip Serial Number	S1015846
Engine Controls HMI Display	False
Failed To Write History Prompt Tag	TAGGROUP::SystemStreamBlock::TAG::Stream1FinalDataResetFailure
Failed To Write History Prompt Value	Literal:1
Failed To Write History Prompt Result F	TAGGROUP::SimpleFunctionBlock::TAG::SimpleFunction1OverrideReset
Low Pressure Cutoff for R-404a	15
Low Pressure Cutoff for R-410a	15

Value
S1015846

Update

Components

1. Environment Item List
2. Value Control
3. Update Button

Environment Item List

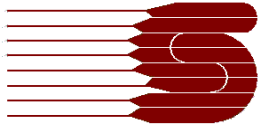
The largest feature of the Environment Settings Window is the list of Environment Items. It's a two-column list with the description of the item on the left, and the current value on the right.

Value Control

On the bottom-left of the Environment Settings Window is the Value Control. When an item is selected in the Environment Item List, the appropriate type of control will appear and have the current value in it.

Update Button

If a user desires a change to an Environment Item, the value in the Value Control must be changed, and the Update Button clicked.



Changing Environment Item Values

Changing the value of an Environment Item is an easy process. The user clicks on the desired item, enters the new value or picks the new drop-down option, and clicks the “Update” button. If the value is valid for the data type of the Environment item, the update is complete.

- **Security**

Security is a set of tools to allow only certain users to have access to specific information or make changes to the application view or configuration. The security suite included with Dataserv is all maintained on a per-system basis and challenged through the Dataserv Engine, this means that a user connecting through the dashboard to a system must challenge that specific systems security. If that system is un-reachable then that feature is locked out by default.

Logging In

When selecting a restricted feature, if there is no active user logged in, or the active user does not have permission to access that feature the user will be presented with a login screen.

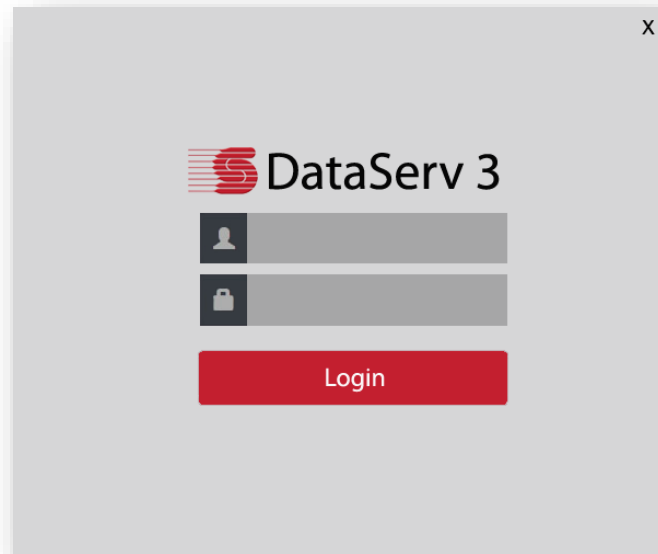
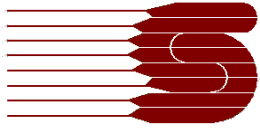


Image 18 Security Login Prompt

If there is a problem logging in a notice will pop up on the bottom of the window. For details on troubleshooting login issues please see [<TODO: add link> Troubleshooting\Security](#).

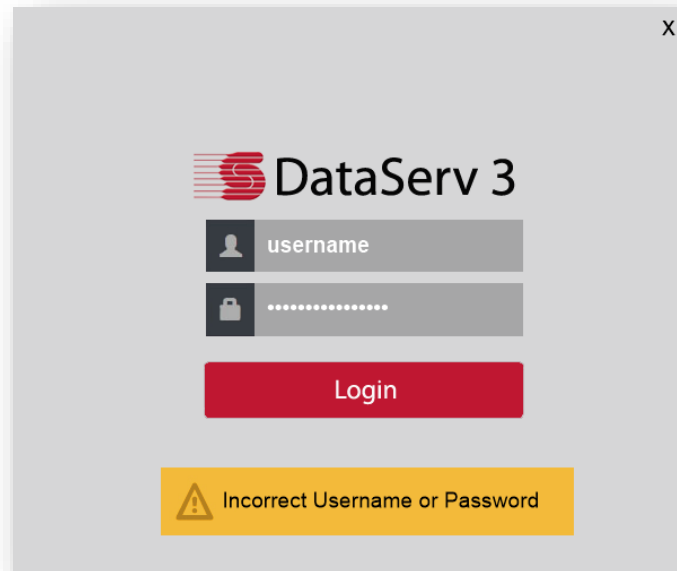
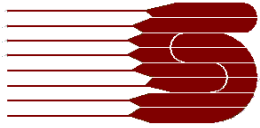
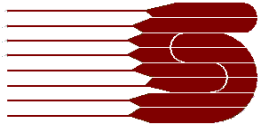


Image 19 Security Login with Failure Message



Managing Security

The Security management interface can be accessed from the Dataserv Engine Console or through the Dashboard for a specific station.

Username	Is Admin
serviquip	True
operator	False
JCrouch	True
JHanks	True
MGrubb	True
KCarter	True
TGorman	True
YJordan	False
PHall	True
BToussaint	False
Maintenance	False
1234	True

New User:

Username:

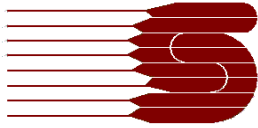
Password:

☐ Admin

Image 20 Security New User Form

The default page of security is the list of users. A new user can be added by clicking the “Add” button on the bottom. To update an existing user select them on from the list of current users. To remove a user select them from the list and click the “Remove” button.

The Admin toggle for a user means that they have access to all sections by default and do not require specific permissions granted to them for access. Admin should only be set on user accounts that need to be able to do everything always.

The image shows a screenshot of the 'Security Configuration' application window. It has three tabs: 'Users', 'Groups', and 'Permissions'. The 'Users' tab is active. On the left, there is a table listing users and their admin status. The 'operator' user is selected. On the right, there is a form titled 'Update operator:' with fields for 'Username', 'Password', and a checkbox for 'Admin'. Below the table are 'Add', 'Update', and 'Remove' buttons. Below the form are 'Update Username', 'Update Password', and 'Update Admin' buttons.

Username	Is Admin
serviquip	True
operator	False
JCrouch	True
JHanks	True
KCarter	True
YJordan	False
PHall	True
BToussaint	False
Maintenance	False
1234	True

Update operator:

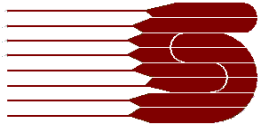
Username:

Password:

☐ Admin

Image 21 Security Update User Form

Updating a user changes their general account information. If there is an issue updating a field a message will be displayed near the issue in red, giving you information on how to solve the problem.



Security Groups

Security Configuration

Users Groups Permissions

Users:

Username	Is Admin
serviquip	True
operator	False
JCrouch	True
JHanks	True
KCarter	True
YJordan	False
PHall	True
BToussaint	False
Maintenance	False
1234	True

User's Groups:

administrators
root

Groups:

administrators
root
operators

<--

Delete Group

New Group:

Add Group

Remove

Image 22 Security Update Groups Form

Security Groups allow you to change and grant permissions for multiple people without having to edit the permissions for those people individually. For example, it is recommended that if you create separate users for each of your Maintenance personnel that you make a Maintenance group and administer their permission through that.

The all available Groups are listed on the right side. A new group can be added by entering a name under "New Group" and clicking Add Group. A Group can be deleted by selecting it from the "Groups" list and clicking "Delete Group".



Selecting a user from the “Users” list will populate the “User’s Groups” with all groups they currently belong to. To add a member ship to this user select a global group from the “Groups” list and click the “←” button. To remove membership highlight the group you wish to remove from the “User’s Groups” list and click the “Remove” button underneath.

Security Permissions

Security Configuration

Users | Groups | Permissions

Users:

Username	Is Admin
serviquip	True
operator	False
JCrouch	True
JHanks	True
KCarter	True
YJordan	False
PHall	True
BToussaint	False
Maintenance	False
1234	True

Groups:

Groupname
administrators
root
operators
test group

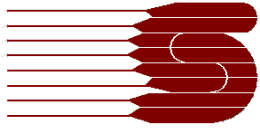
Permissions for User: operator

Permission	Allowed
AdministerTable	False
AdministerTags	False
AdministerWatchdog	False
CanOpenCommandPrompt	False
CanOpenRemoteFileBrowser	False
CanRunThisModel	False
CanStartRemoteSecuritySession	False
CanTakeControl	False
ChangePermissions	False
ChangeUserPassword	False
ChangeUserUsername	False
CreateNewGroup	False
CreateNewUser	False
Edit Environment	False <input type="checkbox"/>
EditKeyComponents	False
EditRecipe	False
EnterServiceMode	False
GoToEditMode	False
JustLogin	True
MakeUserAdmin	False
OpenSecurityForm	False
RemoveUserAdmin	False
RemoveUserFromGroup	False
RestartAndUpdate	False
UpdateDocumentation	False

☐ Allow All

Save

Image 23 Security Edit Permissions Form



Permissions are what we check to see if a user has access to a given feature or interface of the Dataserv Application. If a user is listed as “Is Admin” – True then they have access to everything regardless of the explicit permissions of their user or group membership.

When we challenge a given user’s permissions we check whether the “Allowed” is true for either their user itself, or any of the groups that user belongs to as described in the Security Groups section.

To change access for a user select them from the “Users” list, this will update the “Permissions for Users” with their current explicit permissions. If you want to enable or disable all current permissions without making the user an “Admin” you can toggle the “Allow All” check box. For specific permissions, selecting the permission from the “Permissions for User” list then toggling the checkbox that appears on the right side under “Allowed” will adjust that specific permission. The same can be done for Groups by selecting the Group under the “Groups” list.

When a user’s permissions get challenged we check the explicit permissions for the user, and the permissions for all of the groups that user belongs to. If any of those are set to allowed the user then passes that challenge and is allowed to continue on with the task. If the account that the user tried to access that feature with does not successfully pass the challenge they will be prompted to login with an account that does. If the user fails to login with an account that has that permission or is an “Admin” they will be prevented from accessing that feature.

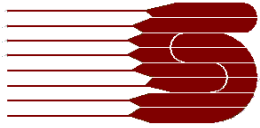
List of Permissions <TODO: Should we add better descriptions or links to where these are relevant? There are also probably more, or ones for Customizations that won’t showup everywhere>

AddUserToGroup – Ability to add a user to a group through security.

AdministerCircuit – Ability to access the Administration Circuit dialog.

AdministerCycle – Ability to access the Administration Cycle dialog.

AdministerEnvironment – Ability to access the Administration Environment dialog.



AdministerIDLookups – Ability to access the Administration IDLookups dialog.

AdministerKeyComponent – Ability to access the Administration Key Component dialog.

AdministerManualOperation – Ability to access the Administration Manual Operations dialog.

AdministerOutputMapping – Ability to access the Administration Output Mapping dialog.

AdministerPLC – Ability to access the Administration PLC dialog.

AdministerPrintLayout – Ability to access the Administration Print Layouts dialog.

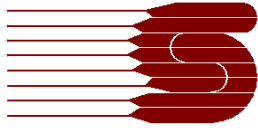
AdministerPrintLink – Ability to access the Administration Print Links dialog.

AdministerPrintLinks – Ability to access the Administration Print Links dialog. <TODO:Check this>

AdministerPrintMapping – Ability to access the Administration Print Mappings dialog.

AdministerPrintMappings – Ability to access the Administration Print Mappings dialog. <TODO:Check this>

AdministerRecipe – Ability to access the Administration Recipe dialog.



AdministerScanItem – Ability to access the Administration Scan Items dialog.

AdministerStreamSampling – Ability to access the Administration Stream Sampling dialog.

AdministerTable – Ability to access the Administration Table dialog.

AdministerTags – Ability to access the Administration Tag dialog.

AdministerWatchdog – Ability to access the Administration Watchdog dialog.

CanOpenCommandPrompt – Ability to open a remote command prompt to the given Station's system.

CanOpenRemoteFileBrowser – Ability to open a remote file browser to the given Station's system.

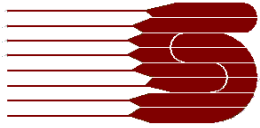
CanRunThisModel – Ability to start a cycle through the "Run This Model" dialog.

CanStartRemoteSecuritySession – Is the user allowed to access this system remotely, either through the Dashboard or HMI.

CanTakeControl – Ability to take control of the Station's system remotely through the Dashboard.

ChangePermissions – Ability to change any user's permissions through the Security Configuration Form.

ChangeUserPassword – Ability to change any user's password through the Security Configuration Form.



ChangeUserUsername – Ability to change any user’s username through the Security Configuration Form.

CreateNewGroup – Ability to create a group through the Security Configuration Form.

CreateNewUser – Ability to create a new user through the Security Configuration Form.

EditEnvironment – Ability to edit Environment settings through the HMI or Dashboard.

EditKeyComponents – Ability to edit KeyComponents through the HMI or Dashboard.

EditRecipe – Ability to edit Recipes through the HMI or Dashboard.

EnterServiceMode – Ability to enter Service Mode through the HMI.

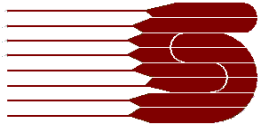
GoToEditMode – Ability to enter Edit Mode on the HMI.

JustLogin – Ability to login.

MakeUserAdmin– Ability to make any user an “Admin” through the Security Configuration Form.

OpenSecurityForm – Ability to open the Security Configuration Form.

RemoveUserAdmin – Ability to revoke a user’s “Admin” status thorough the Security Configuration Form.



RemoveUserFromGroup – Ability to remove a group from any user’s security settings through the Security Configuration Form.

RestartAndUpdate – Ability to issue a Restart and Update command remotely from the Dashboard.

UpdateDocumentation – Ability to access the update dialogs through Documentation.

- **Documentation**

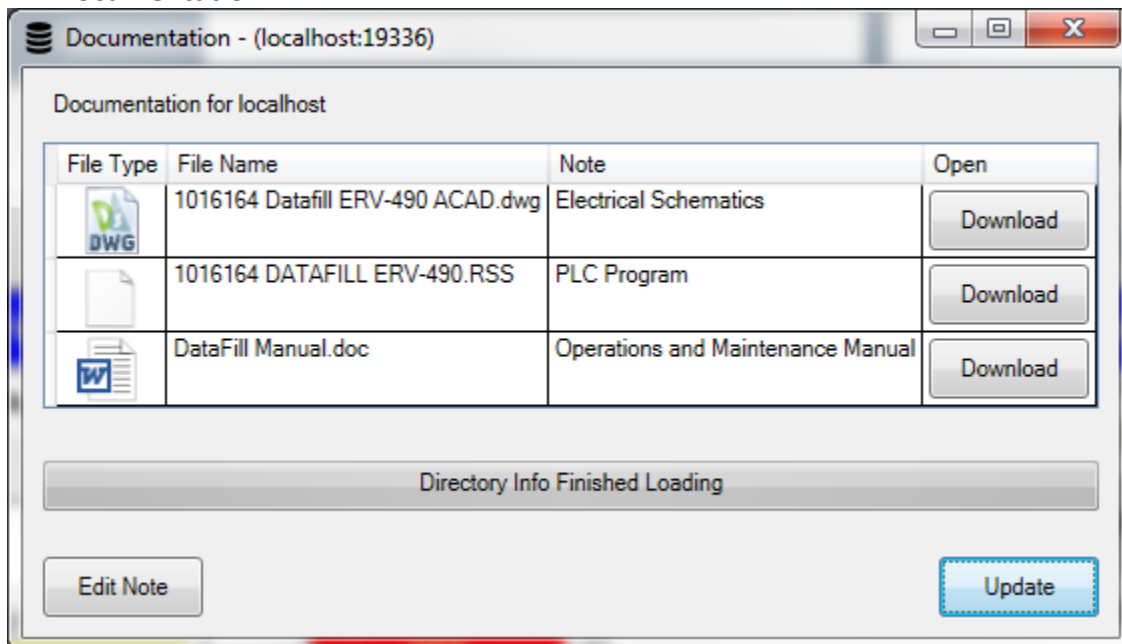
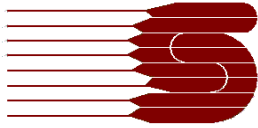


Image 24 Documentation Form

Documentation stores and allows access to any relevant digital files to a specific Dataserv system. Documentation allows for these files to be shared through the HMI or any number of Dashboard connections. Each file can have a note attached to them to detail what they are, and to whom they may be relevant. The files are only pulled from the Engine when the “Download” button is clicked, if the local



file is up to date it can instead open the file immediately. The files are opened on your local system using the built in Windows file association.

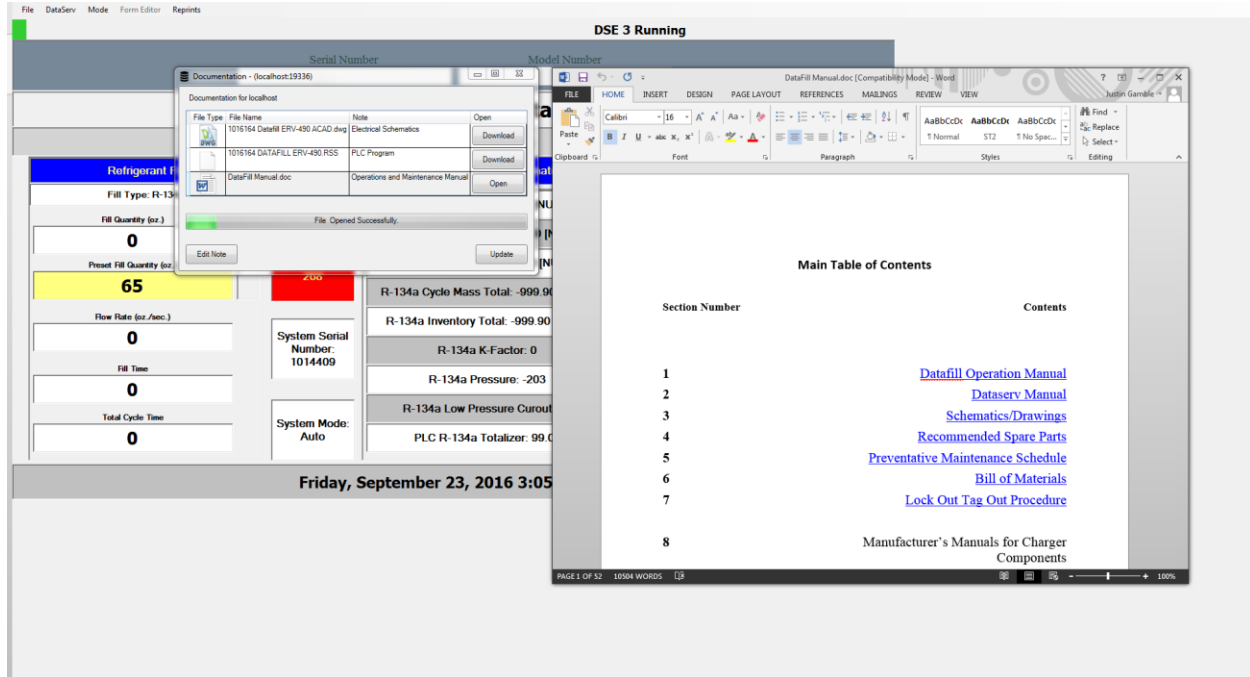


Image 25 Opening a document through the Documentation Form on the HMI.

Editing a Note

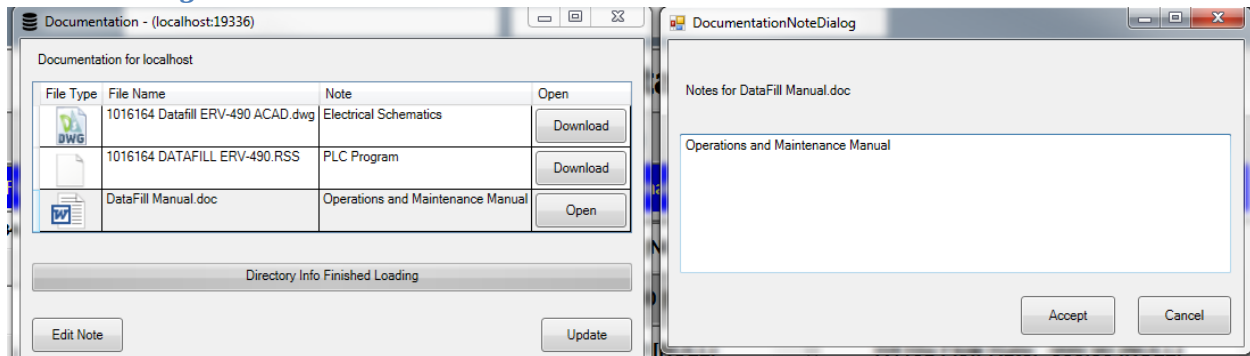
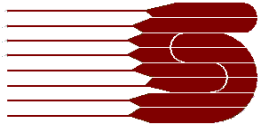


Image 26 Editing Documentation Note

After selecting a listed file and clicking the “Edit Note” button on the Documentation window, the Note dialog will come up. This allows you to put expanded relevant text that anyone accessing the Documentation for this system will be able to see. Some useful information to attach to Documentation files would be who should need to see this file (Electrical drawings of the system may be relevant to the Maintenance personnel) or when this file created (You can store production reports inside the documentation).



Updating Documentation

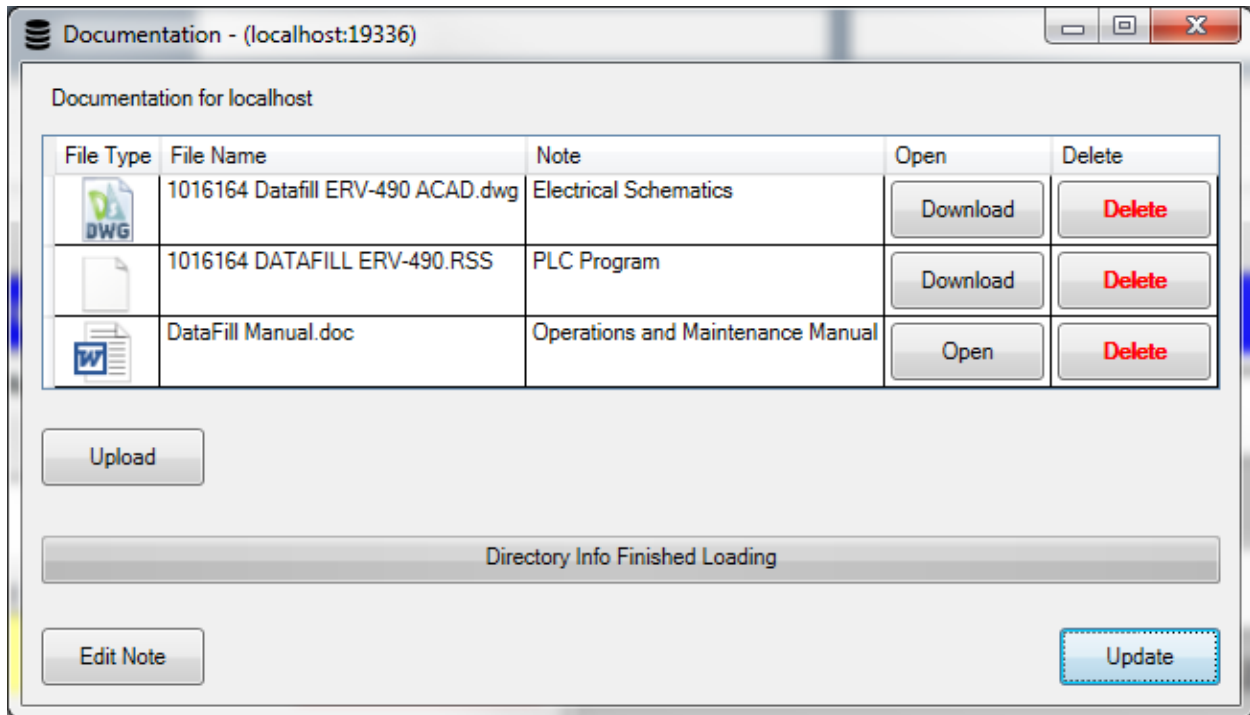


Image 27 Updating Documentation

Documents can be updated by clicking the “Update” button and passing a security challenge. Inside the update version of the form you have the ability to delete document files from the list and upload new documents. If you happen to delete a file you did not mean to, a backup is created in the Dataserv Configuration folder under Documentation\Backup. Uploading files through the Upload dialog will allow anyone with access to this station to retrieve these files.

Procedures

Taking and Restoring Backups

Purpose

Having regular backups of the Dataserv Application is important so that if there is ever an unexpected issue with the computer running the application, downtime can be significantly mitigated. The recommended procedure is detailed below, Serv-I-Quip suggests taking a backup before and after any major updates to the application take place (ie, major changes to recipes or actual configuration



changes to, but not limited of, Scanner, Database, and Messages). It is always better to have a backup and not need it than to need a backup and not have it, so it is recommended to also take a backup monthly if not weekly.

Standard Backup Routine

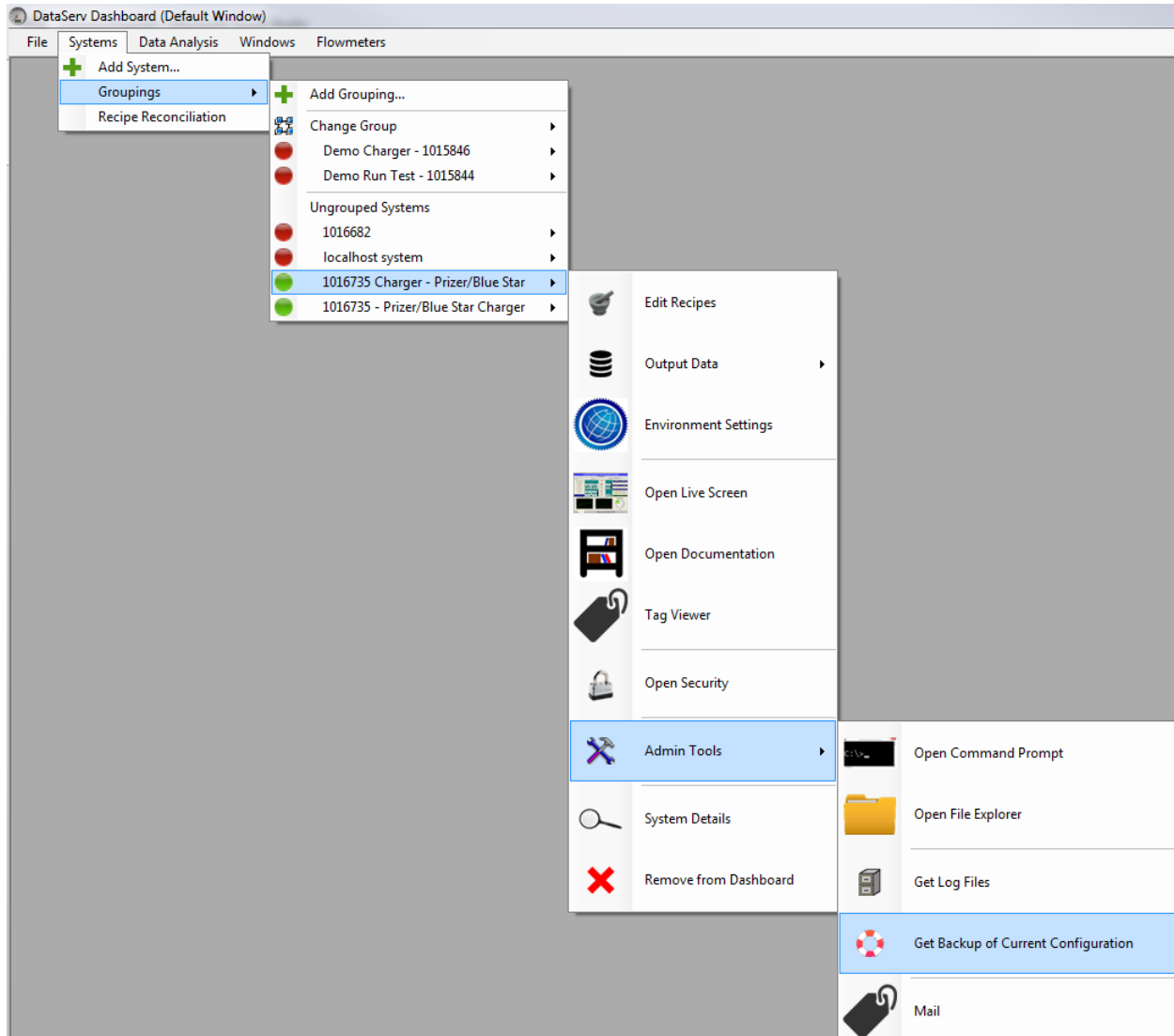


Image 28 Dashboard Backup Menu Item

The Dataserv Dashboard has a [Station](#) -> 'Get Backup of Current Configuration'.

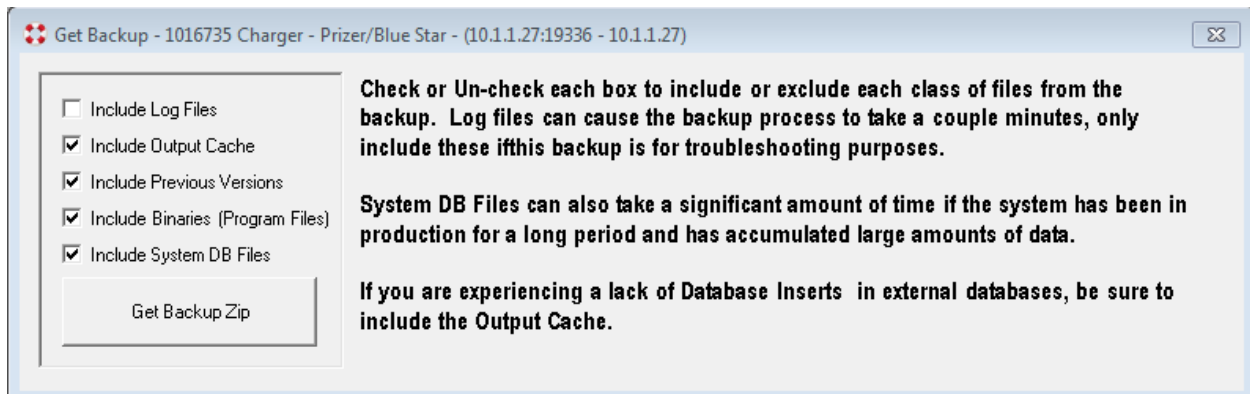
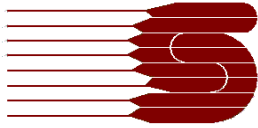


Image 29 Default Selection for Backup Utility

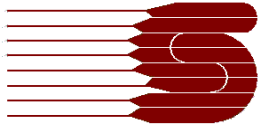
The default selection is recommended, this will provide all the information that is required to restore the Dataserv Application as it was running. After clicking the “Get Backup Zip” button there will a slight delay while the backup is created and sent from the remote station. Afterwards a file dialog will allow you to designate where the Backup is saved. If you have a dedicated network share for the station backup would be ideal, but store it some place you have access to and know where it will be (Default is the Dashboard install location -> files -> station connection info).

Advanced/Manual Backup

The Advanced Backup section will be for IT personnel that would like to roll the Dataserv Application backup into an existing backup mechanism. There are two major components that should need to be backed up, the application install directory and the historical records database.

The application install directory by default is “C:\siq”, this is where the application, configuration, and any required utilities will be installed on a Dataserv 3.0 system. If only periodic configuration backups are desired, that path is “C:\siq\DSE 3.0\CONFIG”. A single “c:\siq” backup will be required to restore, but after startup a config only backup will get the majority of changes that will be made.

The historical records are stored in a local Microsoft SQL Server instance on the system, all inside a “Dataserv” database. Default instance credentials are username: “sa”, password: “Dataserv1”. If a SQL server backup is not possible, a data backup to a flat file is possible, but not recommended for standard backup procedures.



Install Prerequisites on New Computer

If the Dataserv Application is being moved to a new system there are a few prerequisites that need to be setup before the backup can be fully restored.

First download the installer from <http://mail.siqinc.com> (if this site isn't accessible, please contact Serv-I-Quip for download mirrors), and login with the username "Customer" and password "Serv-I-Customer". The installer will be located in the "Customer Shared Folder" -> "Setup" -> "Installers", and download the "Dataserv 3.0 Installer.zip".

Move the Dataserv 3.0 Installer.zip to the desktop of the new computer, and extract the contents. Make sure that the computer has been restarted at least once before proceeding, there's an occasional issue with the windows install service and the SQL Server install routine.

Grab the Backup zip, or backup files that were made from the previous machine, and extract them in a place that is reachable from the new machine (Desktop is fine). Copy the contents of the "Binaries" directory into the extracted installer directory's "\\siq\DSE 3.0". Then copy the "Config" directory into that same directory (so the path looks like "\\siq\DSE 3.0\Config").

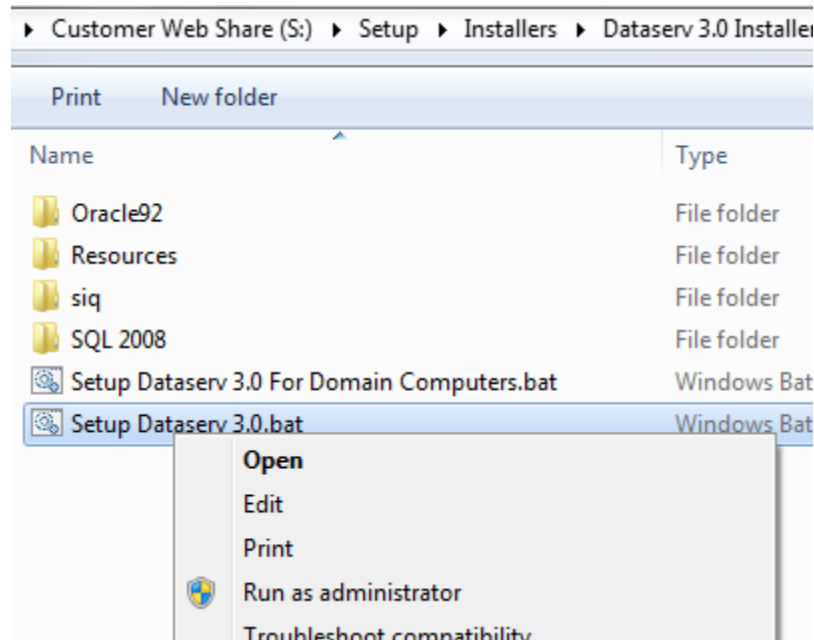
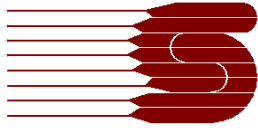


Image 30 'Run as Administrator' Dialog is required for the setup routine.

Right click and select “Run as Administrator” on the “Setup Dataserv 3.0.bat”, alternatively if you do not want the computer to automatically logon to a local user account (typically for Domain computers), run the “Setup Dataserv 3.0 for Domain Computers.bat” instead.

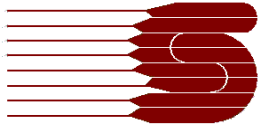
The process will run and install all of the prerequisites. There will be a shortcut placed on the desktop of all users pointing to the Dataserv Engine executable, run this to verify that the system is setup.

Roll Back Running Installation to Backup

To restore a configuration backup that was taken, simply exit the Dataserv engine and HMI completely, and overwrite the existing “C:\siq\DSE 3.0\CONFIG” with the one from the backup.

Restoring an SQL Backup

Restoring the SQL Backup should only be done on a fresh computer that has not had any units processed yet. If the records need to be restored from a backup for analysis but were not restored before running



it is recommended that a local IT personnel contacts Serv-I-Quip for directions (this requires setting up a dummy instances of SQL Server and doing a data export).

NOTE: Following the rest of this procedure will likely overwrite any existing data in the database, only proceed if you have already acquired a recent backup or exported the data for analysis.

With the backup extracted to an accessible location, open up Microsoft SQL Server Management Studio (MSSMS). If MSSMS is not currently installed on the system, and this is a new install then the SQL install likely failed, please contact Serv-I-Quip for troubleshooting tips (TODO: provide some in line tips here)

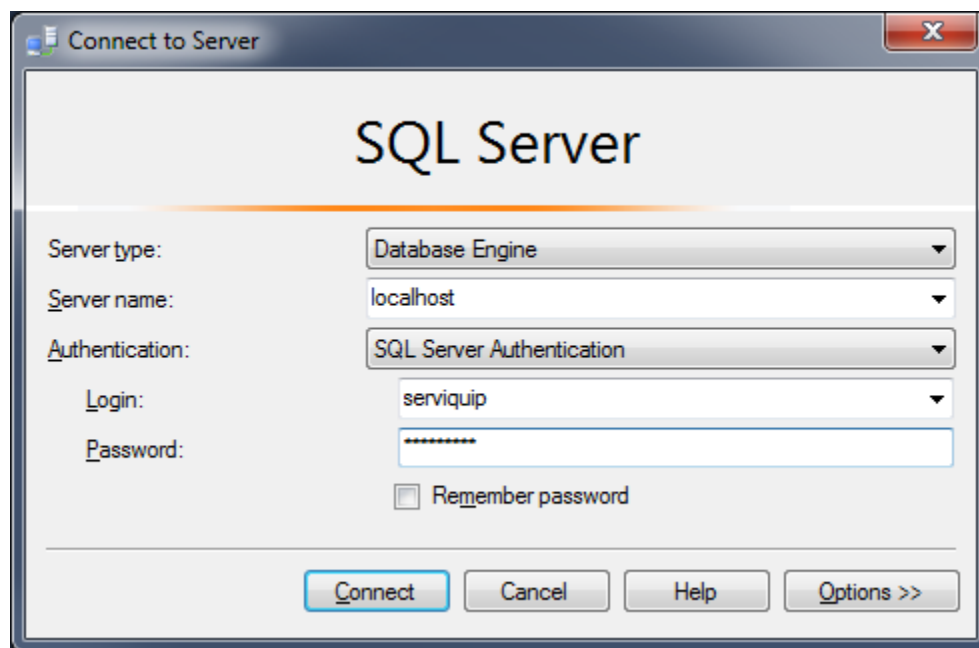


Image 31 MSSMS Connect Dialog

Logging into the local server instance should look like the above, recommended credentials are username: "sa", password: "Dataserv1". Under "Databases" there should be a "DataServ", if this is a restore into a different SQL Server Instance than a new database "DataServ" should be created.

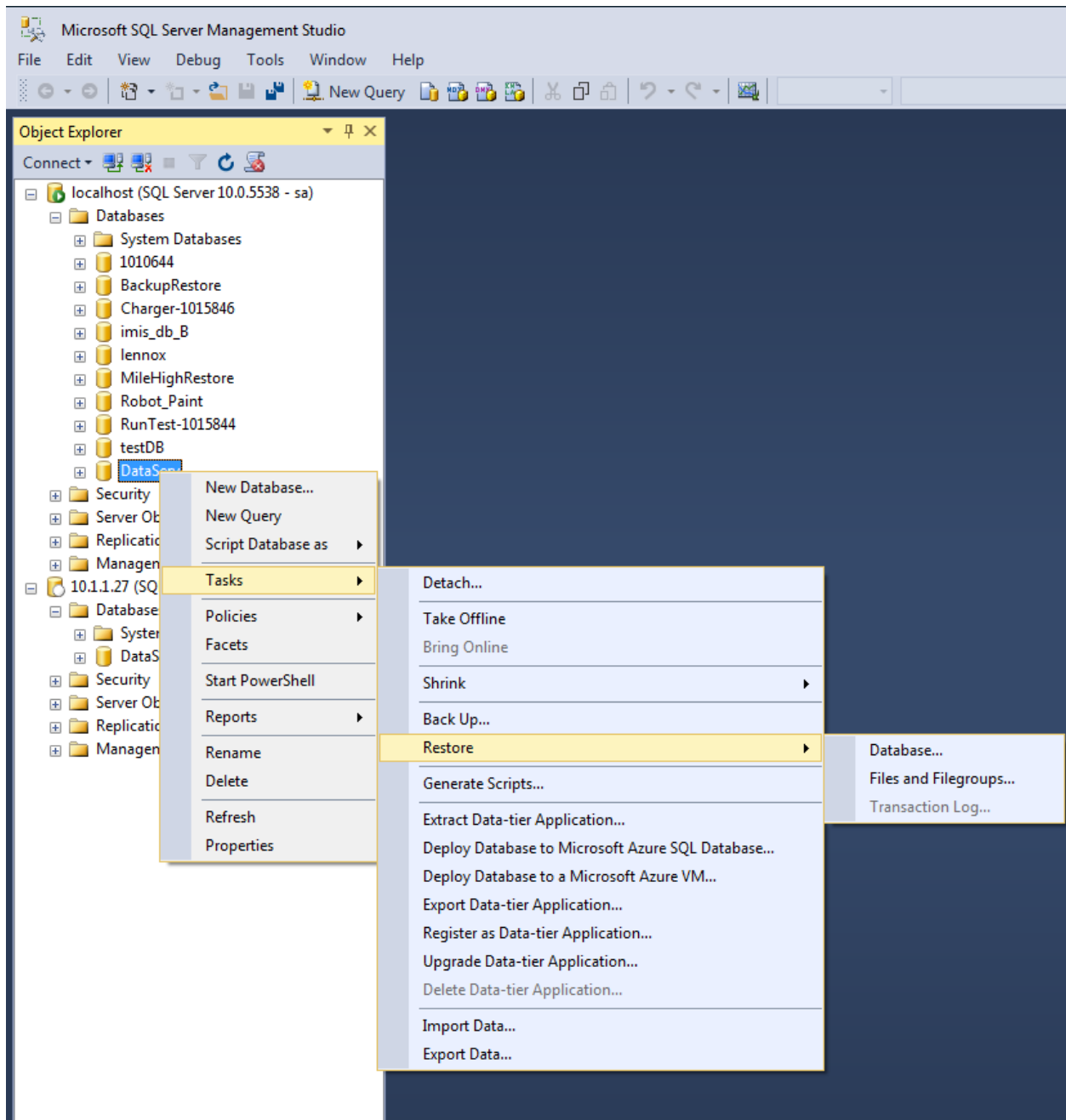
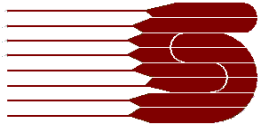


Image 32 Restore Database Task Dialog Selection

Right clicking on the “DataServ” database, selecting Tasks -> Restore -> Database will bring up the ‘Restore Database’ dialog, enter the information as the image below shows, selecting the Backup’s “dbBackup\DataservDatabase.bak” where applicable.

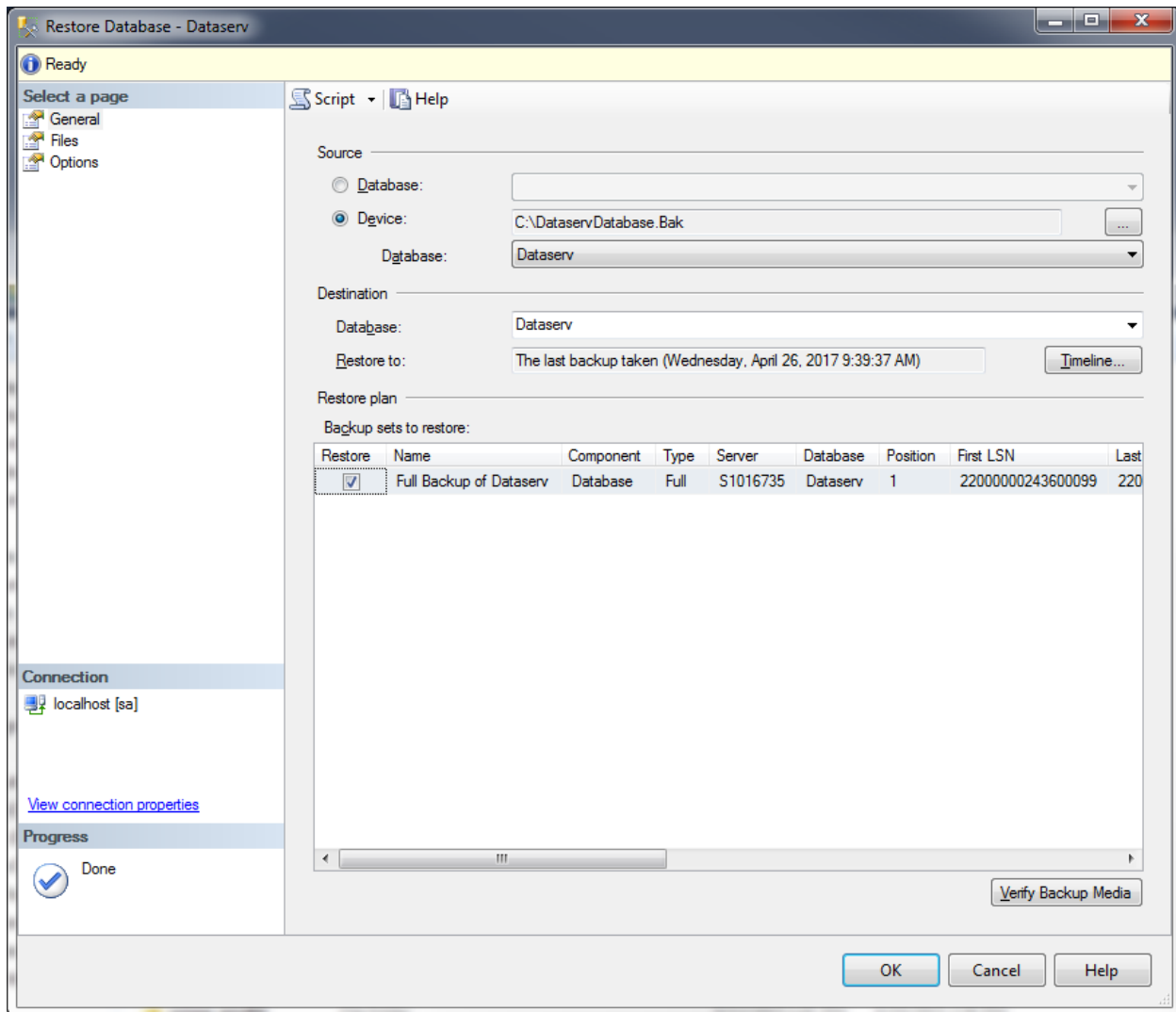
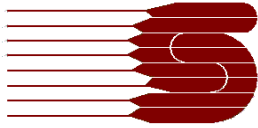


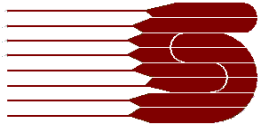
Image 33 Restore Database Dialog

Select the “Options” page and tick the “Overwrite the existing database (WITH REPLACE)” before hitting OK to begin the restore procedure. Once complete the Database is restored as it existed at the time of the backup.

Glossary

Circuit

A Circuit in Dataserv is defined as an individual process within a [Cycle](#). The term Circuit is taken from refrigeration systems where each sealed system is commonly referred to as a circuit. In a Vehicle system, each fluid or individual fill is usually defined as a Circuit. Fuel, Coolant, AC, and Transmission fluids, for example, would all be configured as individual circuits. When multiple Circuits are present,



Dataserv can be configured to run them in series, in parallel, or a combination of the two. When combined with multiple Cycles, Circuits can also become Stations at a System level. A three Station System where each Station is doing a single fill would have three Cycles, each with one Circuit. When dealing with [Run History](#), each instance of a Circuit being run generates one output row in the database.

Cycle

A Cycle in Dataserv is defined as any single [Circuit](#) or group of Circuits initiated by a single barcode scan. All Circuits within the Cycle derive Serial, Model, and Recipe information based on that scan.

System

A single Serv-I-Quip machine with a unique Serv-I-Quip Serial Number.

External Data Destinations

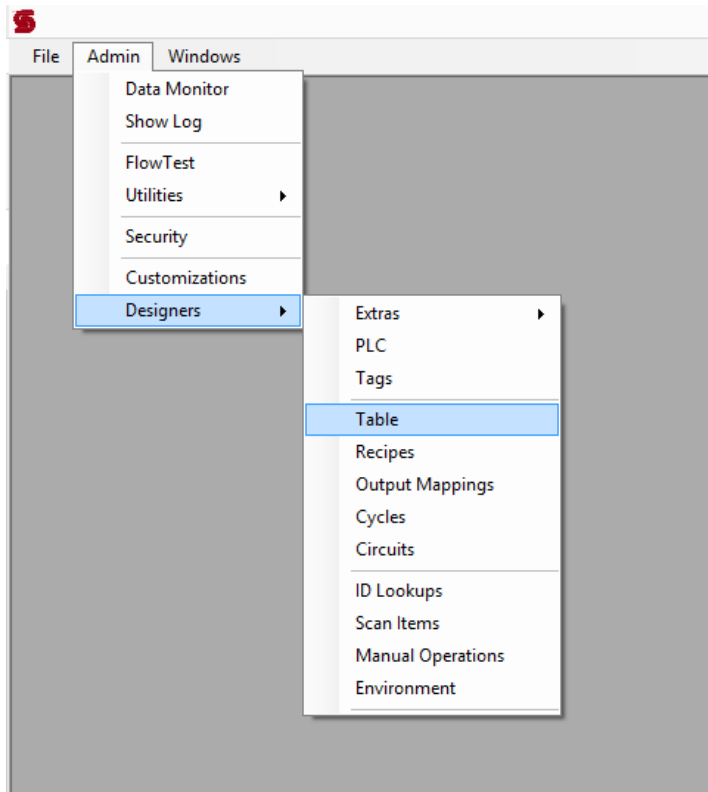
All Output Data for a Dataserv3 system is configured by default to store to a local instance of SQL Server Express 2008 or higher. It is recommended that a central repository on the network be added as an additional target for output data. The server that is targeted should be on a routine backup schedule to ensure no data is lost. The steps to adding an additional data destination are as follows:

- Adding a Table to the Dataserv3 configuration.
- Adding an Output Mapping to the new table.
- Linking the Circuit to the Output Mapping.

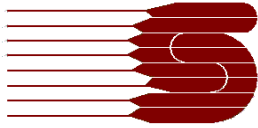
Adding a Table

Adding a table to Dataserv3 is done in one of two ways, using discovery, or by manually creating the table. Manual table entry is recommended to be done only by Serv-I-Quip personnel. If a custom table is desired, it is recommended that Serv-I-Quip be contacted for assistance.

The Table Designer is entered by bring up the Dataserv Engine interface, and choosing the Admin → Designers → Table menu item.

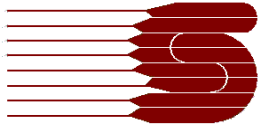


If the user has sufficient privileges, the designer will be shown. Table discovery is accomplished by clicking the blue “Discovery...” label on the top right of the table list:



The screenshot shows the 'AdministrationTable' window. On the left, a list of tables is displayed, including 'Required System Table Cycle', 'Required System Table Circuit', 'Required System Table Historical Printed Item', 'Required System Table Recipe Revision', 'Required System Table Recipe Revision Field Change', 'Required System Table Analog Calibration Records', and 'Evac and Charge Recipes'. A 'Discover' button is visible. In the center, a 'SQL Server' discovery window is open, showing fields for 'Name', 'Database Name', 'Display', 'Code Field', 'Serial Field', and 'Model Field'. It also includes a 'Connection String' field and a 'Test...' button. On the right, a 'Fields' table is shown with columns for 'Description', 'Data Type', 'Name', and 'In Key'. At the bottom, there are 'Save', 'Add', and 'Delete' buttons.

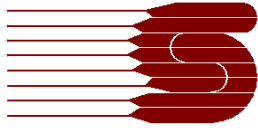
When a Storage Method is chose (SQL, Oracle, etc.), the associated discover form will be shown. This example will use the SQL discovery window. If the server name and port are known, they can be entered in the “Server Name” entry box.




The SQLDiscovery application window is titled "SQLDiscovery" and includes a standard Windows-style close button (red square with a white 'X') in the top right corner. The interface is divided into two main sections. On the left, there are input fields for "Server Name" (with a dropdown arrow), "User Name", and "Password". Below these is a "Databases" list box containing a single entry labeled "Database". A "Scan" button is positioned to the right of the "Databases" list. On the right side of the window is a "Tables" section, which contains a table with two columns: "Table" and "Identity Column". The table is currently empty. At the bottom of the window, there are two radio buttons: "Table" (which is selected) and "Stored Procedure". To the right of these radio buttons is a "Select" button.

Clicking the expander next to the “Server Name” label will poll the network for SQL servers. This may take some time and may or may not find all SQL Server instances on the network.

When a Server Name is entered, and valid credentials are entered into the “User Name” and “Password” fields, clicking the “Scan” button will display a list of Databases on that server. When a Database is highlighted in the “Databases” list, the Tables or Stored Procedures in that database will be displayed in the “Tables” list.




SQLDiscovery

Server Name  localhost

User Name sa

Password *****

Databases  Scan

Database

DataServ

DeereUpgrade

Duplicates

FirstData

FullCh...

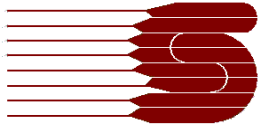
Tables

Table	Identity Column
PROCESS_CHECK	UNITID
Output_OLD_636300039211...	Output_Id
Calibration	[NONE]
Main	Main_Id
Charge	Charge_ID
Output	Output_Id
Model	[NONE]
PartNumberCount	[NONE]
part	[NONE]
LeakLocations	LeakLocations_ID
Results	[NONE]
RecipeRevisionFieldChange	RecipeRevisionFieldChan...
AnalogCalibrationRecord	AnalogCalibrationRecord...
xCHARGING	[NONE]
CHARGING	CHARGING_Id

☒ Table ☐ Stored Procedure

Select

Highlighting a table in the “Tables” list and clicking the “Select” button, will import the selected table into Dataserv. The Discovery window will not automatically close. If only one new table is desired, close the Discovery window and return to the Table Designer. The imported table will be the last table in the list. Highlighting it will show the default details.



The AdministrationTable dialog box is used for configuring a table in the database. It includes sections for Tables, Fields, and various configuration options.

Tables: A list of tables to choose from, including Charge History, Reclaim History, Required System Table for Meter Calibration Records, Vacuum Trace, Required System Table Leak Location Records, and Your Table is Charge. The selected table is 'Your Table is Charge'.

Fields: A list of fields to choose from, including Charge_ID, Circuit_ID, Serial, Model, Run Date, Operator, Completion Code, Precess Config, Cycle Time, Evac Time, Evac Level, Reject Evac Time, Reject Evac Level, Vacuum Check Time, Vacuum Check Level, Fill Type, Fill Time, Fill Quantity, Fill Pressure, Reclaim Time, Data Parameter1, Data Parameter2, and Circuit. The selected fields are Charge_ID, Circuit_ID, Serial, Model, Run Date, Operator, Completion Code, Precess Config, Cycle Time, Evac Time, Evac Level, Reject Evac Time, Reject Evac Level, Vacuum Check Time, Vacuum Check Level, Fill Type, Fill Time, Fill Quantity, Fill Pressure, Reclaim Time, Data Parameter1, Data Parameter2, and Circuit.

Configuration Options:

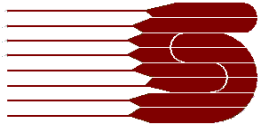
- Default Date Field: Text
- Command Type: Identity Column
- Connection String: server=localhost;database=DataServ;Pwd=DataServ1;User ID=sa
- Schema Type: NotApplicable
- Schema Location:
- Storage Type: SQL
- Append Method: InsertOnly
- Template File:

Buttons: Save, Add, Delete, Discover, Test, Add, Edit, Delete.

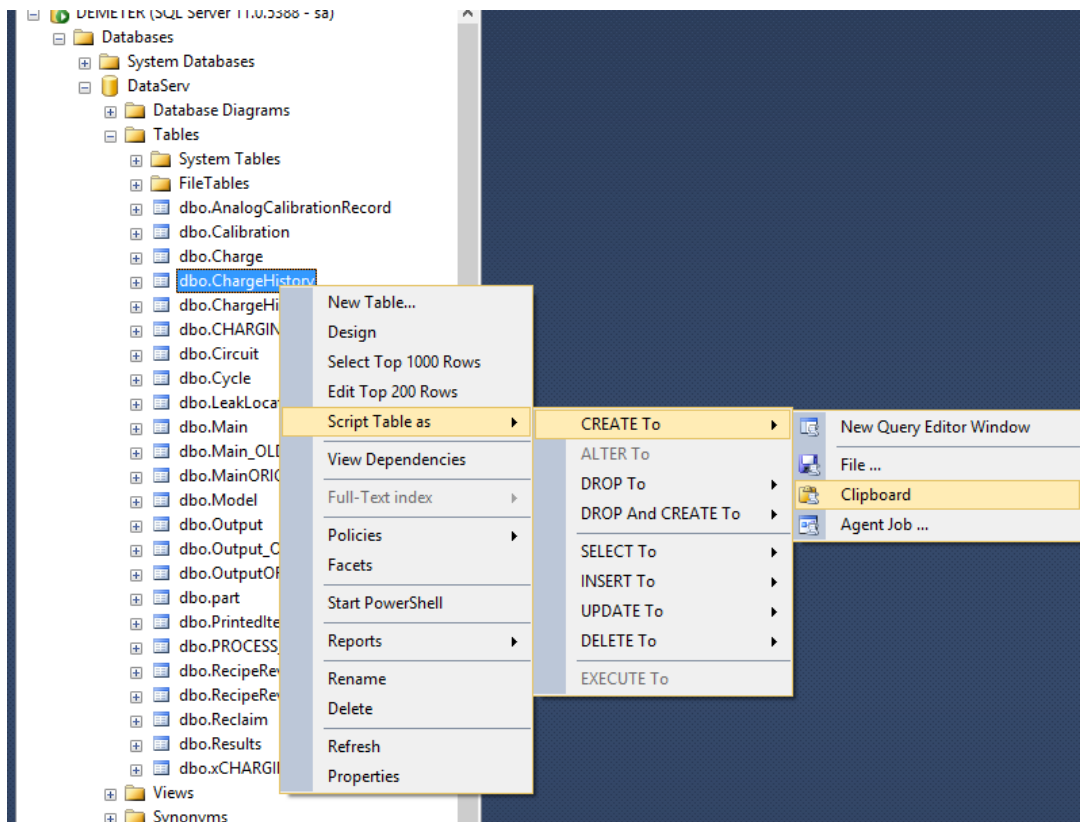
The “Name” property must be unique. It is recommended the name be short but descriptive. The “Database Name” property should not be changed as it is defined by the Database. The “Display” field is how the table will be shown in user interfaces locally and in the dashboard. This is where longer descriptions of the table’s location and purpose should be kept. Clicking the “Save” button will apply this change to the Dataserv Engine. If the window is closed without saving, the user will be prompted to save.

A dialog box titled "Save Changes?" with a red close button. The text inside says "Table information has changed, would you like to save now?". There are three buttons at the bottom: Yes, No, and Cancel.

Clicking “Cancel” will keep the Table Designer open, clicking “Yes” saves the changes, and clicking “No” will discard the changes.

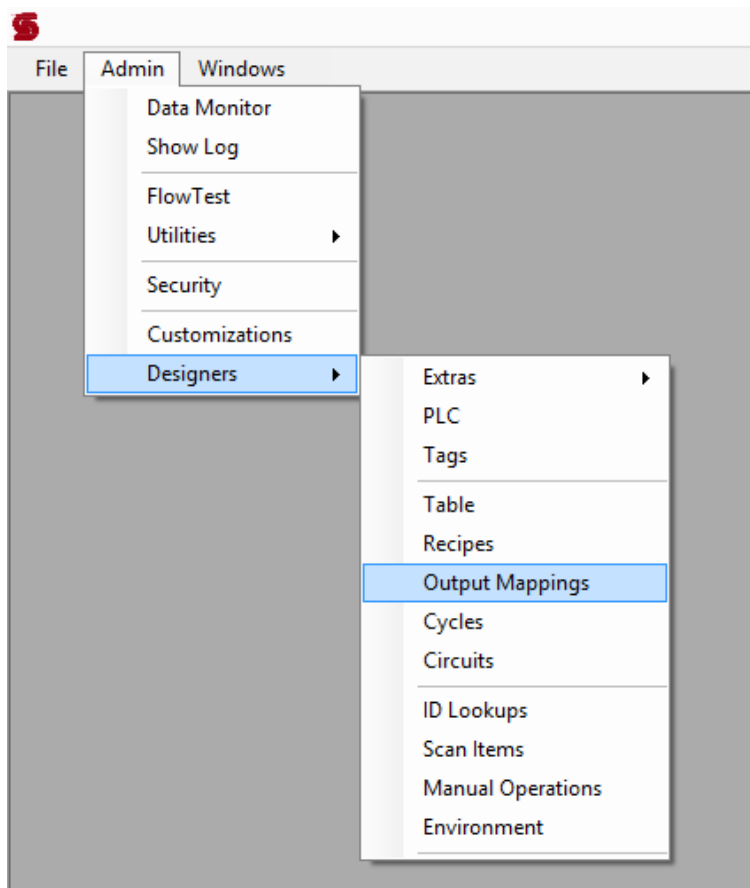
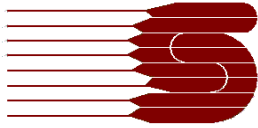


The most common, and recommended way to make a secondary data destination is to make a clone of Dataserv's internal table. This can be done by logging into the local instance of SQL, browsing to the desired table in the "DataServ" database, right-clicking the table and choosing "Script Table as → CREATE To → " and either "File" or "Clipboard" and then providing the generated script to IT to be modified and added to the production Database.

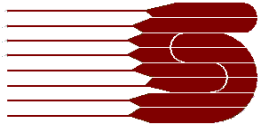


Adding an Output Mapping

Once a table is created to contain the Output Data, an Output Mapping must be created to tell Dataserv which process variables should be inserted into which fields in the Table. The Output Mapping Designer is entered by bring up the Dataserv Engine interface, and choosing the "Admin → Designers → Output Mappings" menu item from the Dataserv Engine.



The Output Mapping Designer shows a list of existing Output Mappings on the left. When any Output Mapping is highlighted, its details will be shown. “Name”, “Display”, and “Table” are, respectively, the unique name the mapping is known by within Dataserv, the legend displayed wherever the mapping is displayed in user interfaces, and the table who’s fields are being mapped to. On the right, the “Output Fields” list will show all of the mappings from Process Variables (known as “Tags”) to fields.



The screenshot shows the 'AdministrationOutputMapping' window. On the left, the 'Output Mappings' section has a list box containing 'Charge Output Mapping', 'Reclaim Output Mapping', and 'Vacuum Trace'. Below this are fields for 'Name', 'Display', and 'Table'. On the right, the 'Output Fields' section is empty. At the bottom, there are buttons for 'Add', 'Save Output Mapping File', 'From Scratch By Table', 'Add', 'Edit', and 'Delete'.

If the most recommended method of adding an external data write are being followed, the process of adding the mapping is quite simple. In this example, the table “Charge History” associated with the mapping “Charge Output Mapping” has been cloned. It has kept the default name assigned by the designer, “Your Table is ChargeHistory_Sample“. As this should be a direct copy of all mappings, a new Output Mapping can be created by right-clicking the output mapping, and selecting “Copy”.

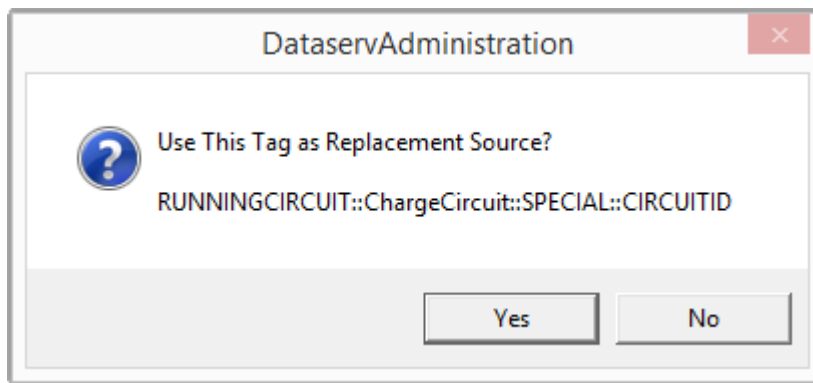
This screenshot shows the same 'AdministrationOutputMapping' window, but with a context menu open over the 'Charge Output Mapping' entry in the 'Output Mappings' list. The menu options are 'Add', 'Copy', and 'Delete'. The 'Table' field now displays 'Charge History'. The 'Output Fields' section on the right is populated with a list of source and destination fields, including 'RUNNINGCIRCUIT::ChargeCircuit::SPECIAL::CIRCUITID' mapping to 'Circuit_ID', and various 'TAGGROUP::Final::TAG::Final' fields mapping to their respective 'Final' counterparts.

The system may prompt for a “Replacement Source”. This step in the copy tool is only for multi-station or multi-circuit systems. When making copies for external data writes, this step should be “ignored” by

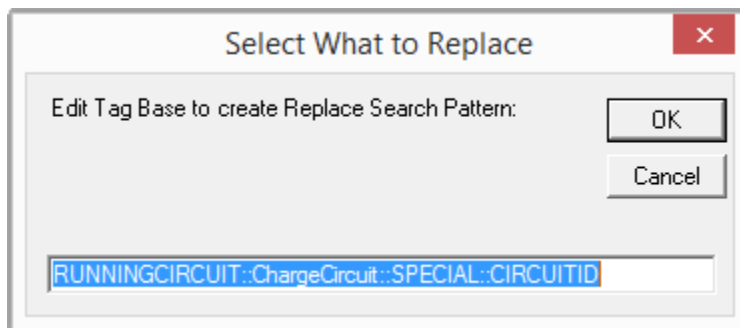


providing identical replacement sources and destinations by choosing “Yes” at the first prompt, “OK” at the second and third prompts without making changes, and “Yes” again at the last warning.

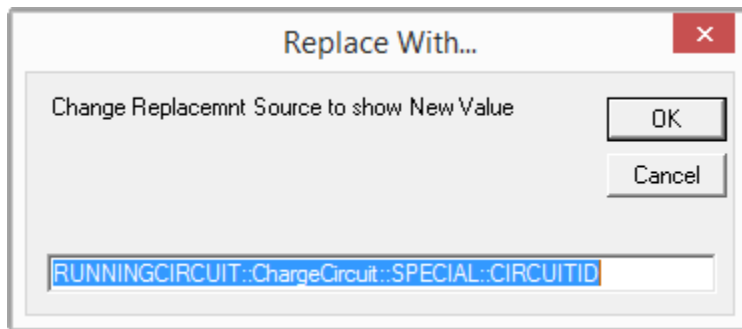
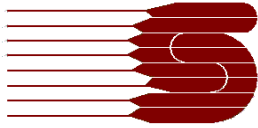
Prompt 1:



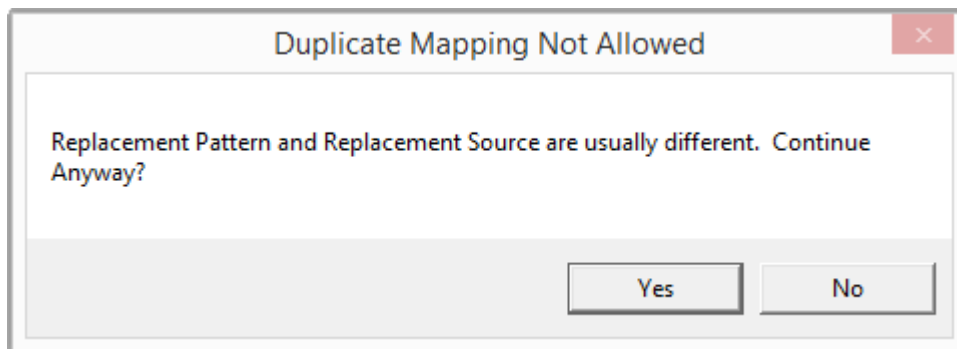
Prompt 2:



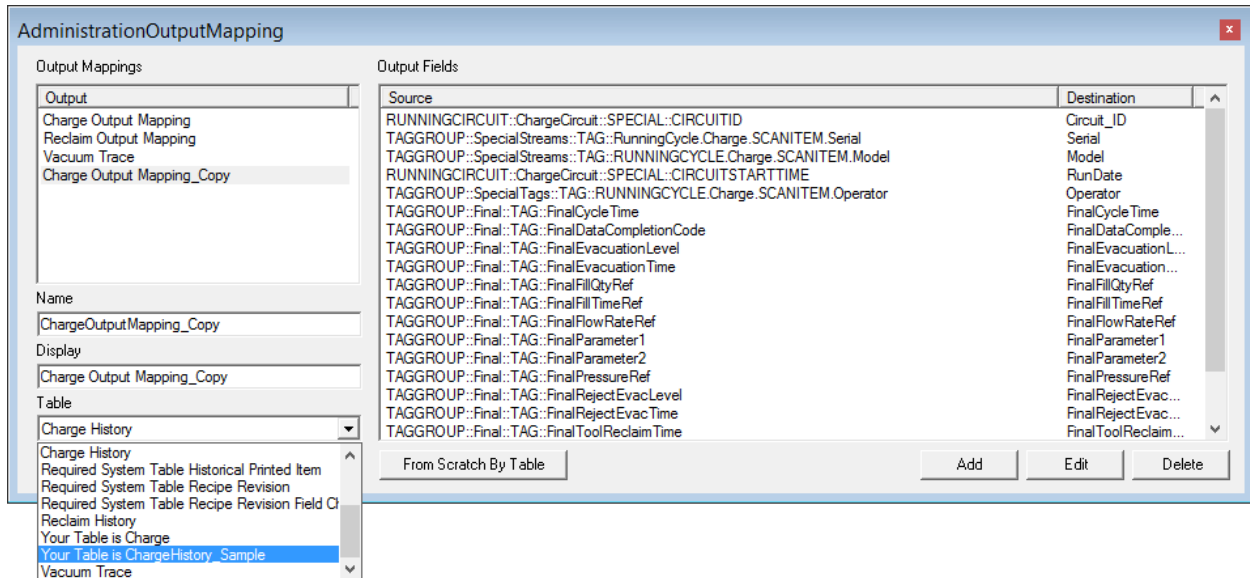
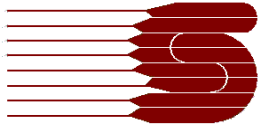
Prompt 3:



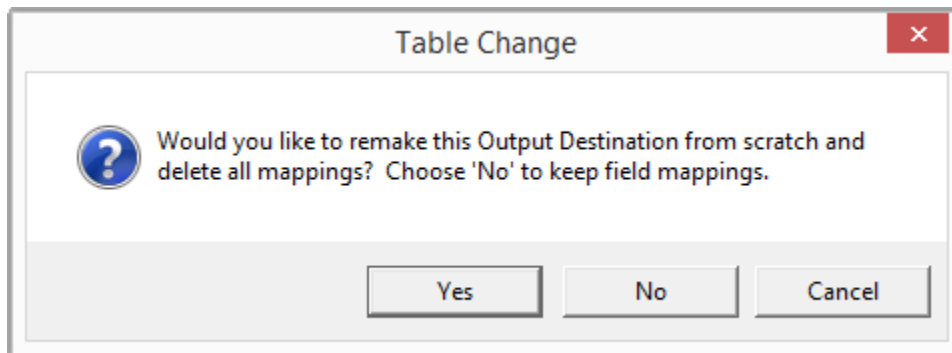
Prompt 4:



Once all the prompts have been answered, a new Output Mapping will be added to the list with “_Copy” appended to the name. To complete the new Output Mapping, it must now be directed at the external table. This is done by highlighting the new mapping and changing the combo box selection for “Table”.

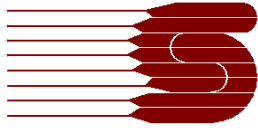


Dataserv will prompt for what should be done about the table change:



“Cancel” will revert to the previously selected table, “Yes” will erase all field mappings and try to match process variables to field names based on name, “No” (the option desired here), will leave the Output Mapping unchanged and direct it to the selected table.

Clicking the “Save Output Mapping File” button, or answering “Yes” to the prompt when closing the Designer will apply the changes to the Output Mapping configuration.



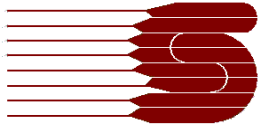
Translating Column Names and Data Types (non-cloned Tables)

Sometimes, data must be mapped to an existing table in a database where the field names and data types will not match those of the internal Dataserv Table. In this instance, each field must be mapped manually. For these cases, it's easiest to add the mapping blank by right-clicking the Output Mappings List and selecting "Add".

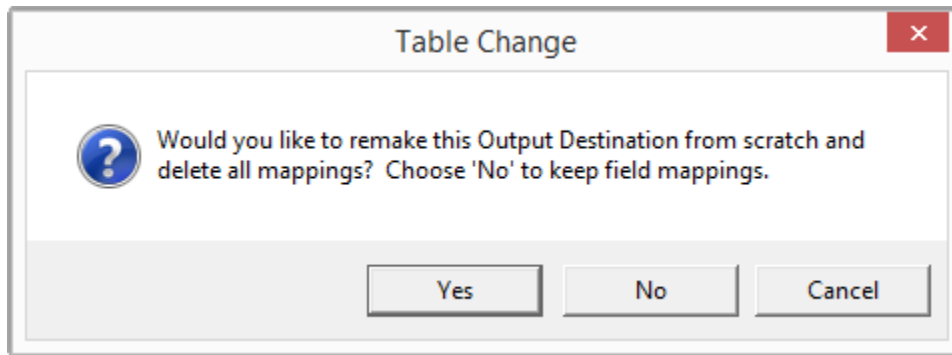
The screenshot shows the 'AdministrationOutputMapping' window. On the left, the 'Output Mappings' list contains: 'Output', 'Charge Output Mapping', 'Reclaim Output Mapping', 'Vacuum Trace', and 'Charge Output Mapping_Copy'. A right-click context menu is open over this list, showing 'Add', 'Copy', and 'Delete' options. Below the list are fields for 'Name', 'Display', and 'Table'. On the right, the 'Output Fields' table has columns 'Source' and 'Destination'. At the bottom are buttons: 'Add', 'Save Output Mapping File', 'From Scratch By Table', 'Add', 'Edit', and 'Delete'.

A new mapping will be created with default values. The "Name" and "Display" fields will be timestamped with a large number, and the "Table" will be set to the first Table in the list.

The screenshot shows the 'AdministrationOutputMapping' window after a new mapping has been added. The 'Output Mappings' list now includes 'New Output Mapping 636311359625092194'. The 'Name' field is 'NewOutputMapping_636311359625092194', the 'Display' field is 'New Output Mapping 636311359625092194', and the 'Table' dropdown is set to 'Required System Table 'Cycle''. The 'Output Fields' table remains empty. The bottom buttons are the same as in the previous screenshot.

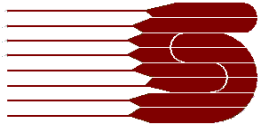


“Name” can be changed to anything unique, and “Display” can be anything. When “Table” is selected, the user is prompted whether all field mappings should be deleted.



When creating a new mapping from scratch, the appropriate answer is “Yes”.

To get started, clicking the “From Scratch By Table” button will create a field mapping for each column in the selected Table (except Identity Columns), and attempt to match it with a “Tag”, or process variable. This will bring up a window with recommended Source/Destination mappings.



Tools_OutputGenerator

Fields

Source	Destination
TAGGROUP::SpecialTags::TAG::RUNNINGCYCLE.Charge.SCANITEM.Operator	DSESerial
	DSEModel
	Operator
	RunDate
	Machine
	RevNum
TAGGROUP::DATASERVTags::TAG::DSEFinalDataCompletionCode	CompletionCode
TAGGROUP::Stream::TAG::StreamTotalCycleTime	TotalCycleTime
	NitrogenFillLevel
	NitrogenFillTime
	NitrogenStabilize...
	NitrogenStabilize...
	NitrogenPressure...
	PressureDecayL...
	NitrogenPressure...
	NitrogenVentPre...
	NitrogenVentTime
	NitrogenEvacuati...

Field mappings above are auto-generated by looking for matching or similar names of tags and fields. Click "Accept" to return the mappings above to the main Output Mappings form to start working with these mappings. To return to the previous screen and discard these auto-mappings click "Cancel" or close this window.

Cancel Accept

Choosing "Accept" will apply these Field Mappings to the new Output Mapping.

AdministrationOutputMapping

Output Mappings

Output
Charge Output Mapping
Reclaim Output Mapping
Vacuum Trace
Charge Output Mapping_Copy
New Output Mapping 636311359625092194

Name
NewOutputMapping_636311359625092194

Display
New Output Mapping 636311359625092194

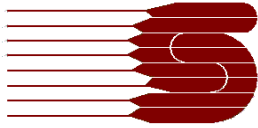
Table
Your Table is Main

Add Save Output Mapping File From Scratch By Table

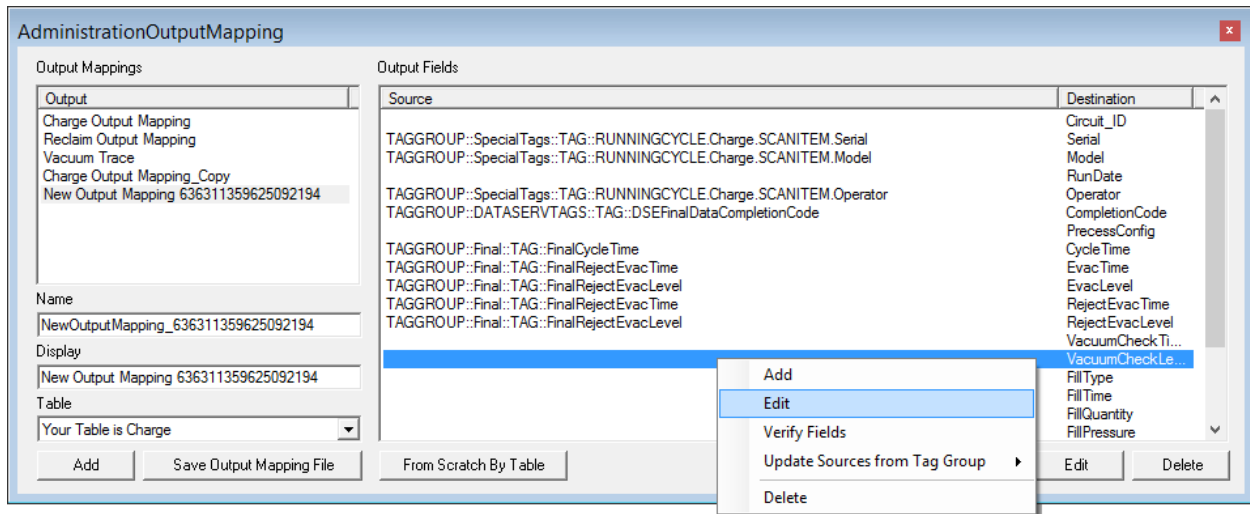
Output Fields

Source	Destination
TAGGROUP::SpecialTags::TAG::RUNNINGCYCLE.Charge.SCANITEM.Operator	DSESerial
	DSEModel
	Operator
	RunDate
	Machine
	RevNum
TAGGROUP::DATASERVTags::TAG::DSEFinalDataCompletionCode	CompletionCode
TAGGROUP::Stream::TAG::StreamTotalCycleTime	TotalCycleTime
	NitrogenFillLevel
	NitrogenFillTime
	NitrogenStabilize...
	NitrogenStabilize...
	NitrogenPressure...
	PressureDecayL...
	NitrogenPressure...
	NitrogenVentPre...
	NitrogenVentTime
	NitrogenEvacuati...

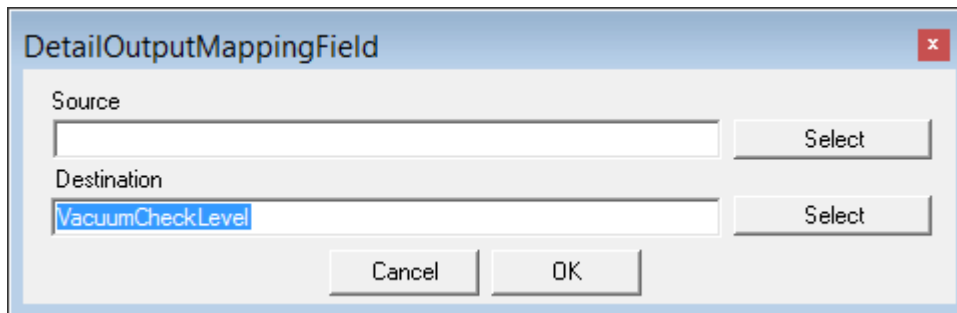
Add Edit Delete



How many fields are matched, and how many matches are correct, has much to do with how similarly the data points have been named. Individual fields can be set by right-clicking a field, and choosing “Edit”.

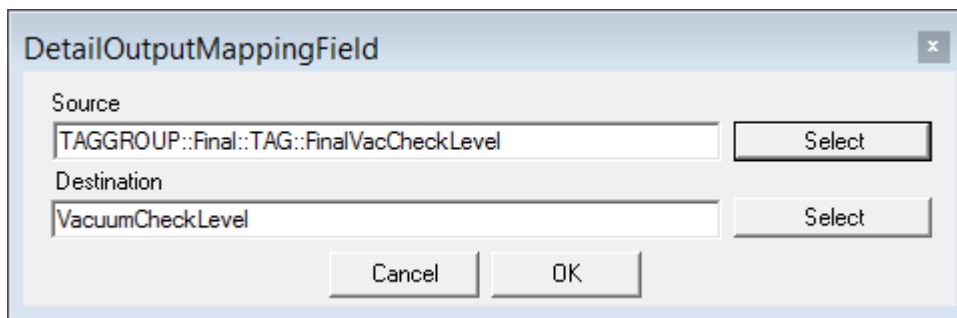
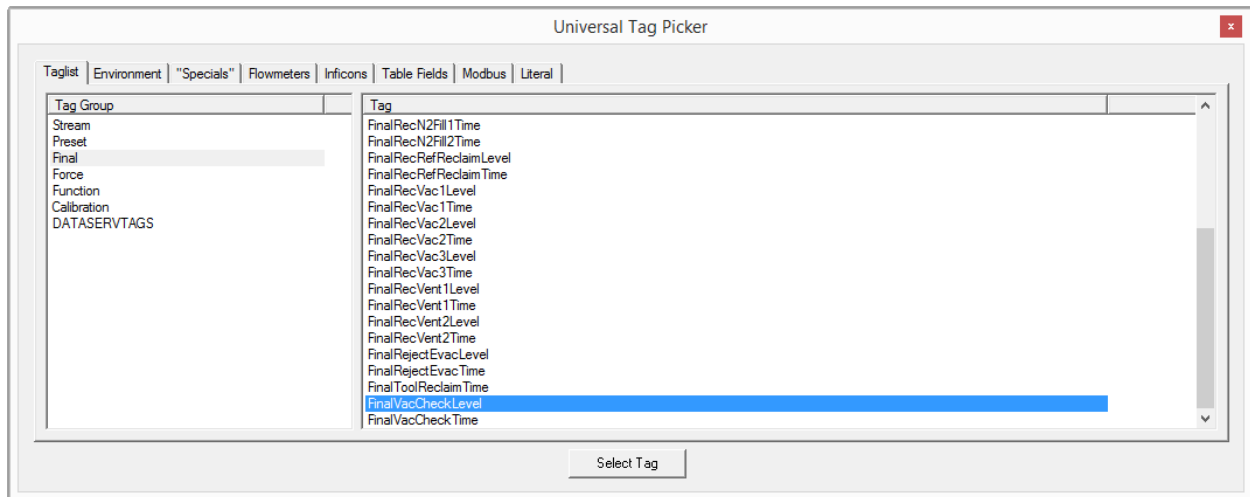
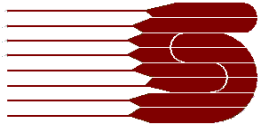


This brings up the Field Detail Toolbox.

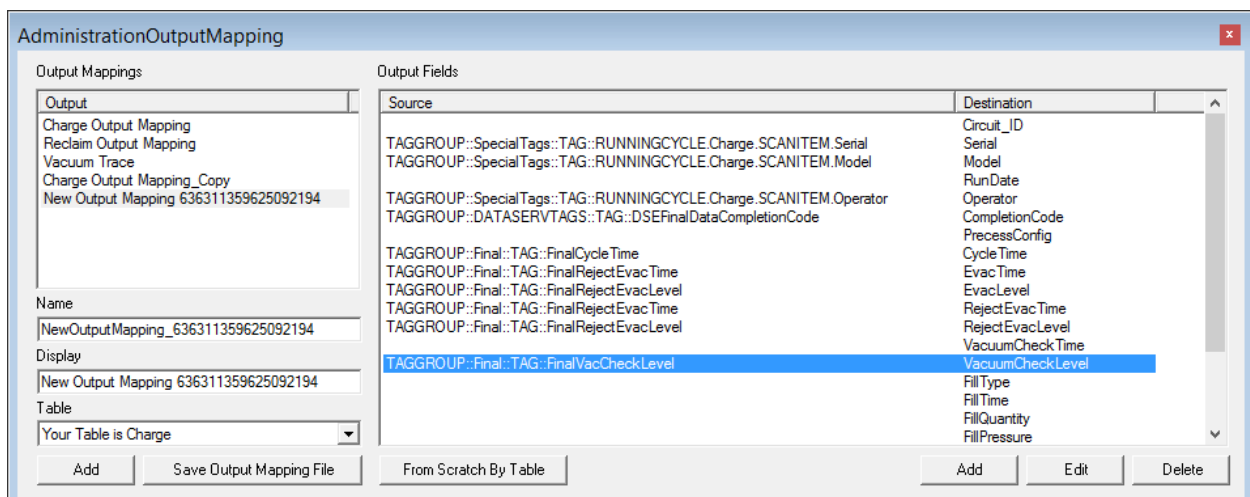


Clicking the “Select” button next to the “Source” input box will launch the Universal Tag Picker, which provides an interface for choosing every process variable available within the given application.

When the desired Tag is found, clicking the “Select Tag” button will auto-fill the “Source” box in the Field Detail Toolbox.



Clicking the “OK” button updates the Field Mapping in the Output Mapping.





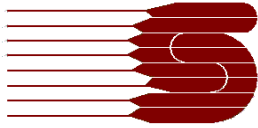
Linking the Circuit to the Output Mapping

The final step in adding the external data write is to link the output mapping with a “Circuit”. The Circuit Designer is accessed by the Dataserv Engine menu items “Admin → Designers → Circuits”. Many systems will have only one Circuit, a Serv-I-Quip Technician can offer guidance when the appropriate circuit is unknown. When a Circuit is selected in the “Circuits” List, the “Available Output Mappings” combo box to the right of the Circuits List will become enabled.

The AdministrationCircuit window is divided into several sections:

- Circuits List:** A table with columns 'Name' and 'Description'. It contains two entries: 'ChargeCircuit' (highlighted in blue) and 'ReclaimCircuit'.
- Form Fields:** Below the list, there are fields for 'Name' (set to 'ChargeCircuit'), 'Skip Conditional', 'Serial Scan Item' (set to 'Serial'), 'Cycle' (set to 'Charge'), 'Start On' (set to 'SCAN'), 'Final Data Trigger' (set to 'TAGGROUP::Stream::TAG::StreamFinalDataTrigger'), 'Final Data Writeback (Trigger Reset)' (set to 'TAGGROUP::Function::TAG::SimpleFunctionResetF'), 'Step Number Tag' (set to 'TAGGROUP::Stream::TAG::StreamStepNumber'), 'Recipe' (set to 'Charger Recipe'), and a 'Recipe' dropdown menu.
- Buttons:** At the bottom left are 'Save', 'Add Many', 'Add', and 'Delete' buttons.
- Available Output Mappings:** A dropdown menu showing 'Charge Output Mapping'.
- Available File Templates:** A dropdown menu showing 'Charge Template'.
- Output Mappings:** A table with columns 'Output' and 'Description'. It contains one entry: 'Charge Output Mapping'.
- File Templates:** A table with columns 'Name / Description' and 'Description'. It contains one entry: 'Charge Template'.
- Circuits Available to Spawn:** A dropdown menu.
- Spawned Circuits:** A table with columns 'Circuit' and 'Spawn Style'.
- Available Print Links:** A dropdown menu.
- Print Links:** A table with columns 'Name' and 'Layout'.

The mapping can be added by selecting it in the “Available Output Mappings” list and clicking the “Add This Mapping” button.



AdministrationCircuit

Circuits	Available Output Mappings	Available File Templates								
<table border="1"><thead><tr><th>Name</th></tr></thead><tbody><tr><td>ChargeCircuit</td></tr><tr><td>ReclaimCircuit</td></tr></tbody></table>	Name	ChargeCircuit	ReclaimCircuit	<table border="1"><thead><tr><th>Output Mappings</th></tr></thead><tbody><tr><td>Charge Output Mapping</td></tr><tr><td>Charge Output Mapping_Copy</td></tr></tbody></table>	Output Mappings	Charge Output Mapping	Charge Output Mapping_Copy	<table border="1"><thead><tr><th>File Templates</th></tr></thead><tbody><tr><td>Charge Template</td></tr></tbody></table>	File Templates	Charge Template
Name										
ChargeCircuit										
ReclaimCircuit										
Output Mappings										
Charge Output Mapping										
Charge Output Mapping_Copy										
File Templates										
Charge Template										

Name: ChargeCircuit

Skip Conditional: ☐

"Serial" Scan Item: ☐

Serial:

Cycle:

Charge:

Start On:

SCAN:

Final Data Trigger:

Final Data Writeback (Trigger Reset):

Step Number Tag:

Recipe:

Charge Recipe:

Save Add Many Add Delete

Circuits Available to Spawn:

Spawned Circuits:

Circuit	Spawn Style
---------	-------------

Available Print Links:

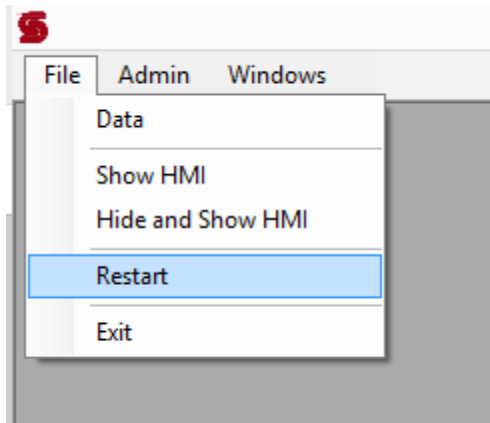
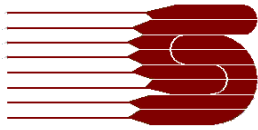
Print Links:

Name	Layout
------	--------

Delete This Mapping Delete This Template Delete This Circuit Delete Print Link(s)

As always, the "Save" button will save these changes. If the user does not save before closing the Designer, a prompt will be displayed to determine whether the changes will be saved or not.

Changes to the Output Mappings can now be tested. The Dataserv Engine must be restarted for the configuration changes to take effect. This can be done by exiting the Dataserv HMI and Engine, or by the "File → Restart" menu option from the Dataserv Engine.



If the Engine prompts about closing open HMI windows, the answer should be "OK".

