



Refrigerant Accumulator Manual

Model: *RA-7EX*



Serv-I-Quip, Inc.

127 Wallace Ave

Downingtown, PA 19335

Phone: (610) 873-7010

Fax: (610) 873-7151

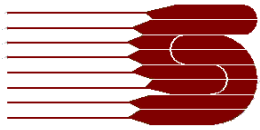


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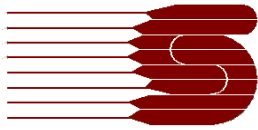
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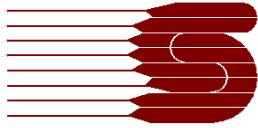


1.0 Introduction

The purpose of this manual is to provide instruction and further understanding of the Serv-I-Quip Refrigerant Accumulator, Model: RA-7EX. Throughout the manual the topics discussed will cover the functionality of the accumulator, the different screens and how to operate the PanelView, and troubleshooting.

The purpose of utilizing an accumulator in conjunction with a refrigerant charger is mainly to regulate the incoming pressure at a usable level. Without it, the charger would see very large dips in pressure and would not be able to recover nearly as quickly before the next charge.

This is achieved by a vapor cushion on the top of the piston accumulator. Vapor from the refrigerant supply tank is pre-charged in the top of the piston accumulator creating a vapor cushion. When a unit is charged down the line, this cushion acts as a buffer and prevents loss of pressure by pumping more liquid refrigerant into the accumulator tank.



2.0 General Operation

The main components that will be covered in this section are: the piston accumulator, the refrigerant inlet solenoid, and air inlet solenoid valves.

Piston accumulator: refers to the black cylinder under the RA-7EX cabinet.

Refrigerant solenoid valve: refers to the valve that allows liquid refrigerant from the supply tank to enter the accumulator tank.

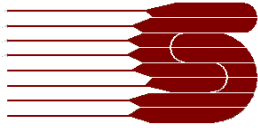
Air solenoid valve: refers to the valve that allows air to the pump.

Upon power-up, the following sequence of events will occur:

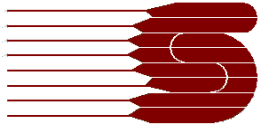
1. The pre-charge of the piston accumulator must reach the minimum set point before introducing pressure.
 - a. Components involved: Accumulator Pressure Transducer
2. Once accumulator pressure is reached, the pump will begin pumping
 - a. Components involved: Refrigerant inlet and air inlet solenoid valves are **OPENED**
3. Once the refrigerant pressure reaches the high set point, the solenoid valves are closed
 - a. Components involved: Refrigerant inlet and air inlet solenoid valves are **CLOSED**
4. Once pressures are within the set points provided by the operator, (refer to PT chart for your refrigerant) the refrigerant and air valves will operate accordingly to regulate output refrigerant pressure. In normal operation, the pump can be heard hissing or stroking, and the solenoid valves click on or off, depending on the pressure demands.

Indicator Lights:

1. (Green) System Ready Light – This light will turn on after power-up and will remain on unless there is a fault. It indicates that the system is in an OK state to run but can be accompanied by the following messages:
 - a. Pressure within Range – this means that both refrigerant pressure and accumulator pressure are within the specified high and low set points.
 - b. Standby – The standby message indicates that the accumulator is either building pressure or is otherwise outside of the specified ranges, but is in an OK state.



2. (Red) System Fault – Whenever a fault occurs, the red light will turn on and will be accompanied by a red message indicating what the fault is. See the Troubleshooting guide for more information on faults.

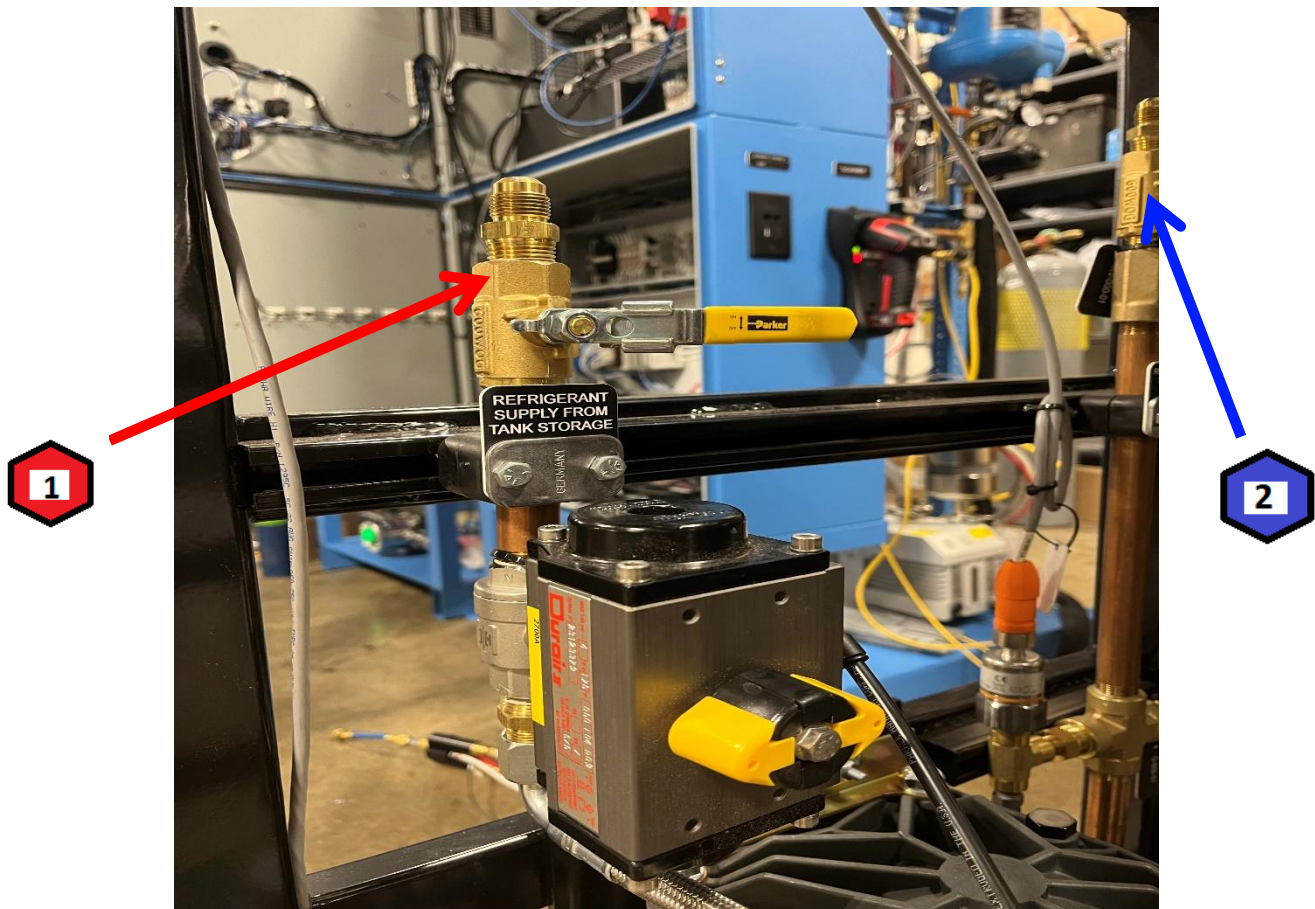


3.0 Power-Up Procedure

Do not power on the machine until steps 1-2 have been completed.

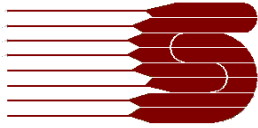
1. **DO NOT TURN ON REFRIGERANT** tank or supply, and ensure that all ball valves are in the **CLOSED** position, (where yellow handle is perpendicular to the line). Connect lines like on

Picture 1



Picture 1

1 – From Supply Tank
2 – To Charger
Description 3.1



2. Additionally, set both air regulators to 0 psi: pull air regulator REG-000-01 dial out and rotate it all the way counterclockwise (See picture 2) so that pressure can be introduced safely. Use a wrench to rotate the Metrex valve spring all the way out (clockwise, looking down on the square knob, (see Picture 3). Then, connect your air supply and open the ball valve, (see Picture 4).



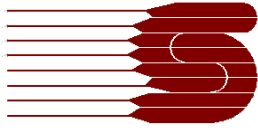
Picture 2



Picture 3



Picture 4

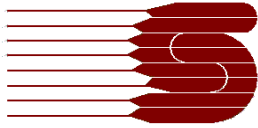


3. Power up the machine
4. Check the pressure on the gas side of the cylinder, (see picture 5). It should be 70% of the working pressure. For example, the working refrigerant pressure is **350psi**, then the gas side pressure will be $350 \times 0.7 = \mathbf{245psi}$. If it's less than 70%, fill it with nitrogen by using the gas side needle valve **NV-000-02**.



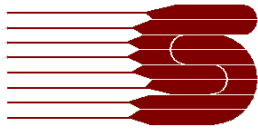
Picture 5

5. Vacuum down the RA-7. For this step you can use your charger if it's connected to the RA-7 and doesn't have refrigerant inside. Alternatively, you can use any service grade vacuum pump. If you are using a charger, you can contact SIQ for help with this. If you are using a service vacuum pump, connect the pump to the refrigerant side service valve **NV-000-01** (See picture 6).



Picture 6

6. After vacuuming down all plumbing lines, close all ball valves, **disconnect pump** and introduce refrigerant **slowly**. Ensure the supply refrigerant line is connected to the **liquid** port on the tank, and open the valve at the tank. Next, open the ball valve on the RA-7 to the refrigerant inlet valve.
7. Use section 4.0 of this manual to set your set points for refrigerant pressure.
8. Set **40 psi** on an air regulator **REG-000-01** (See picture 2), shouldn't be any strokes on a pump yet.
9. Use a wrench to rotate the Metrex valve in direction according to arrow on the Metrex valve that says "Raise" (See picture 3). Keep doing it until you reach your pressure set point and air operated shut-off valve get closed (See picture 1).



4.0 PanelView Operation

1. Run Screen

- a. The Run Screen shown below is the main screen that is visible during normal operation. It provides the current refrigerant inlet pressure and accumulator pressure, the current high and low set points, as well as indicating whether or not the inlet valves are on (open), or off (closed). From this screen one can navigate to the Main Menu, where there are several options.

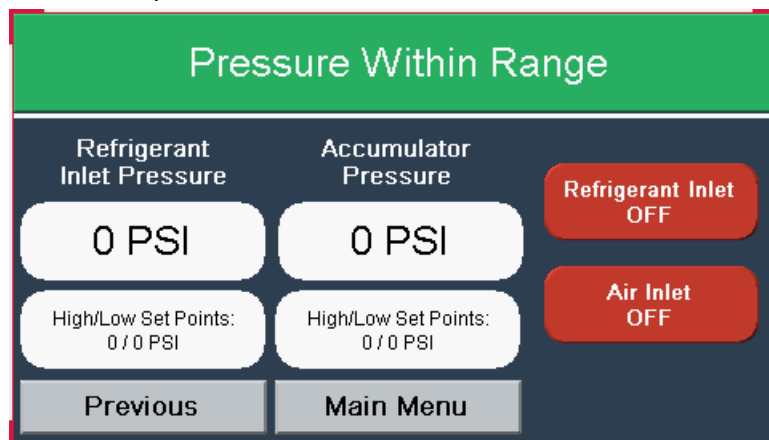


Figure 1

- b. System Failure will display whenever system fails. Message banner will be displayed with a failure message and there is an option to click on "What do I do". After the error is being resolved, "Reset Failure" can be clicked.

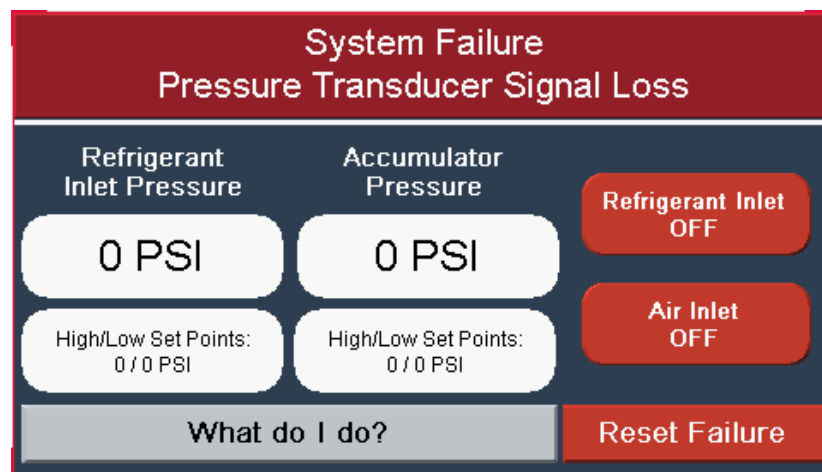
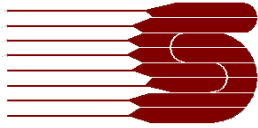


Figure 2



2. Main Menu Screen

- a. Being on the Main Menu screen does not affect how the machine runs. From there, the user may go to: Title Screen, Set Points, Service Mode, and Security. These screens will require a certain level of security in order to gain access.

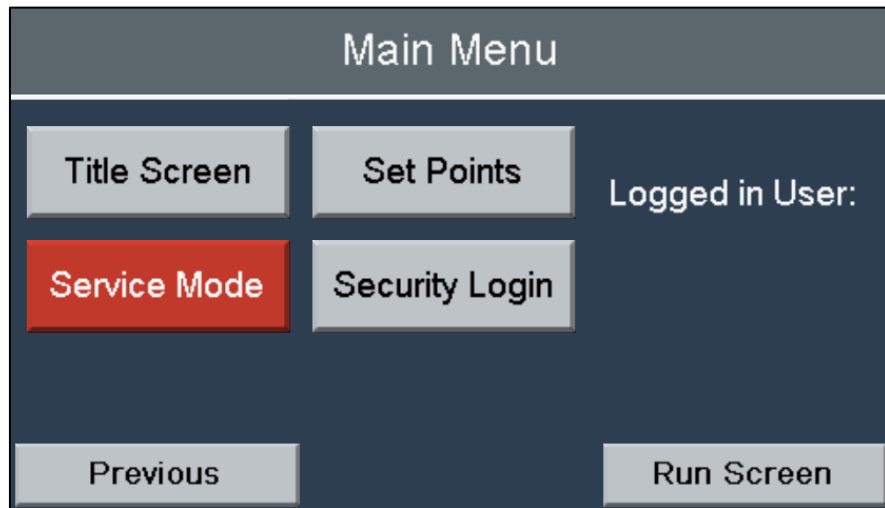
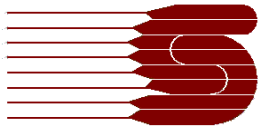


Figure 3



3. Set Points Screen

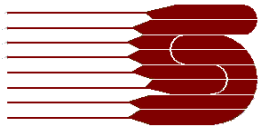
- a. This screen is where the high set points for refrigerant pressure and accumulator pressure may be set. **Only the High Set Points may be set, and are limited in terms of the highest/lowest values that may be entered, while the low set points are determined by the high set points. See Figure 4 below as an example, (Low Pressure Set Point is always 20 below the High Set Point).** In addition, the High Pressure Cut-Off value is set prior to shipping, and cannot be changed.

The image shows a screenshot of the 'Set Points' screen on a PanelView device. The screen has a dark blue background with white text. At the top, the title 'Set Points' is centered in a large white font. Below the title, there are two columns of input fields. The first column is labeled 'Pressure (PSI)' and the second is labeled 'Accumulator (PSI)'. Under 'Pressure (PSI)', there are three rows: 'High Set Point:' with an empty input box, 'Low Set Point:' with an input box containing the number '0', and 'High Pressure Cut-Off:' with an input box containing the number '0'. Under 'Accumulator (PSI)', there are two rows: 'High Set Point:' with an empty input box and 'High Pressure Cut-Off:' with an input box containing the number '0'. At the bottom of the screen, there are three buttons: 'Previous', 'Main Menu', and 'Run Screen', all in white text on a dark blue background.

	Pressure (PSI)	Accumulator (PSI)
High Set Point:		
Low Set Point:	0	
High Pressure Cut-Off:	0	0

Previous Main Menu Run Screen

Figure 4



4. Service Mode

- a. The Service Mode screens should only be used if absolutely necessary to troubleshoot or fix a problem, or during initial start-up. From the Main Menu, you will be asked for a Username and Password for access to Service Mode. Please contact SIQ's Engineering department for that information.
- b. There are two separate screens for Embedded Inputs and Embedded Outputs. Inputs can only be observed, while outputs may be toggled. If only testing for functionality, **close all ball valves**. This will prevent any accidental filling of the accumulator tank. As can be seen in **Figures 5 and 6** below, the red inputs/outputs are OFF, while the green are ON. To navigate from Inputs to the Outputs screen, hit "Next" or "Previous".

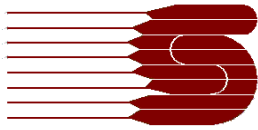
Service Mode - Embedded Inputs		
Input 04 - Air Pressure Switch	Input 08 - Spare	
Input 05 - Spare	Input 09 - Spare	
Input 06 - Spare	Input 10 - Permissive Charger	
Input 07 - Spare	Input 11 - Spare	
Previous	Main Menu	Next

Figure 5

Service Mode - Embedded Outputs		
Output 00 - Refrigerant Inlet SV	Output 04 - System Ready Light	
Output 01 - Air Inlet SV	Output 05 - Spare	
Output 02 - Spare CR	Output 06 - Fault Light	
Output 03 - Spare		
Previous	Main Menu	Run Screen

Figure 6

- c. While in Service Mode, all outputs will be automatically turned OFF, and "Normal Operation" is paused. Once Service Mode is exited, by going to any other screen, Normal Operation will resume.



5. Security Login

- a. When entering certain screens from the Main Menu, the user will be asked to login. Or, at any time, the user can navigate to the Security Login screen and enter their credentials. Once logged in, the option to “Shutdown” appears. This button simply closes the PanelView application that is currently loaded. Below is an example of potential users with various security access.

The Security Login screen has a red header bar with the text "Security Login". Below the header, on the left, is a "User List:" with four options: SIQ, ENG, MAINT, and OPER. To the right of the user list is a "Logged in User:" field. Below the user list and logged in user field are three buttons: "Login", "Logout", and "Shutdown". The "Shutdown" button is highlighted in red. Below these buttons is a "Reset Password" button. At the bottom of the screen are three buttons: "Previous", "Main Menu", and "Run Screen".

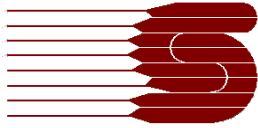
Security Login		
User List:	Logged in User:	
SIQ	Login	Logout
ENG		
MAINT	Shutdown	Reset Password
OPER		
Previous	Main Menu	Run Screen

Figure 5

Credentials for siq user:

siq

19335



6. System Failure Screens

- a. This screen displays the failure message, reason for failure and what the solution is to fix it.

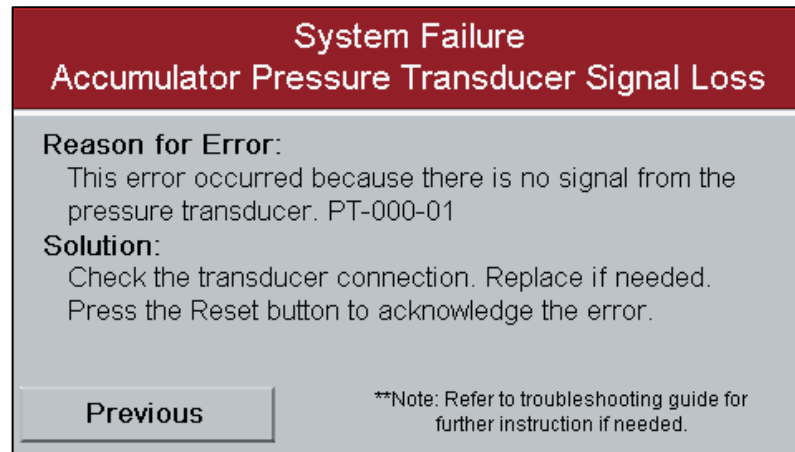


Figure 6

- b. This screen displays all the possible failures. Failures in red will be the active failures.

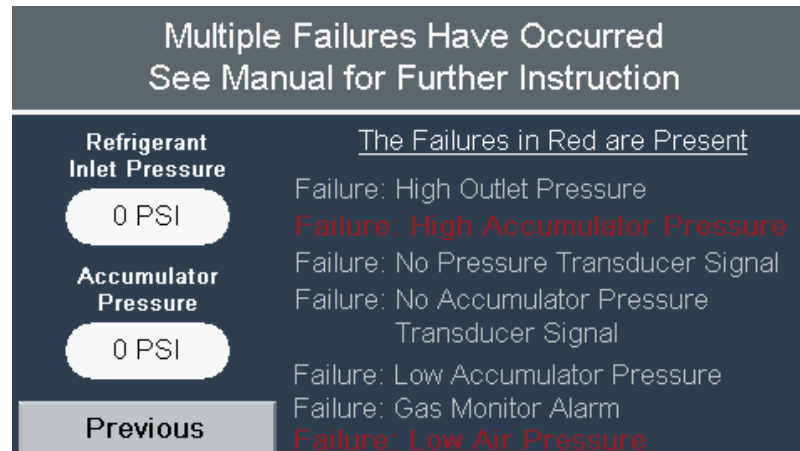
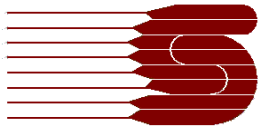
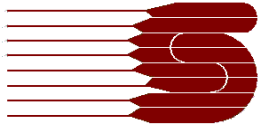


Figure 9

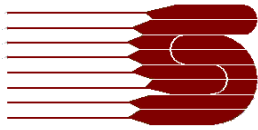


5.0 Bill of Materials

Part#	Description	Q-TY	Bin#
Mechanical	HLB RA7 P&A, AIRXCEL, KS, 0123		
1014701	SOLENOID VALVE 1/4" SV8262H212 24VDC DIN TERMINAL	1	B2-31
1005646A	RELIEF VALVE, SUPERIOR 3012C 550 PSIG SET PRESSURE ASME	1	B1-28
1011733A	FITTING CRIMP FOR 1011733 10691N-8-8 1/2" JIC FEM SWIV	8	Bay 2
1018311	1/2" FPT X 1/2" MFL X 1/2" MFL FEMALE BRANC TEE, PARKER, 8-8-8 OTX-S, FOR ACCUMULATORS	1	PUMP CELL
1018257	1/2" MALE RUN TEE, PARKER, 1/2 MRO-S, FOR ACCUMULATORS	3	PUMP CELL
1018259	1/4" STREET/RUN TEE, PARKER, 1/4 MRO-S, FOR ACCUMULATORS	2	PUMP CELL
1016909	1/2" x 3" PLATED BRASS NIPPLE 9151K65	3	B1-18
1003191A	* VALVE 1/4 " PARKER MV608-4	1	PUMP CELL
1018261	1/4" MALE PIPE TO 1/4" FLARE, PARKER, 4-4 FTX-S, FOR ACCUMULATORS	2	PUMP CELL
1018279	Adapter Fitting, Colliflower, Parker 8-8FTX-S 1/2" Male JIC X 1/2" Male NPT	1	B2
1011140	SWITCH PRESSURE 0-145PSI ADJ #PK 6224	1	B1-17
1012695	TRANSDUCER PRESS NO DISPLY 4-20MA 1/4 NPT -14.5 - 735.5 EPDM seal 4 PIN PX3422	2	B1-17
1020146	* AIR OPERATED BALL VALVE, DURAVALVE, AS7212, AOBV STAINLESS BODY PTFE SEALS MAX INLET PRESSURE1000 PSI 1/2" FPT CV=15 PRESSURE DROP ASSISTED	1	1
1013733	VALVE SC8320G182 24VDC DIN CONNECTOR ASCO	1	B2-31
1002449A	PUMP FOR HLB AAD-5 MODIFIED HASKEL 57933 NEOPRENE SEALS & BALL (weight ~25lbs.)	1	PUMP CELL
1006616	METREX VALVE 840PRL50SE NOW WITHOUT N - REPLACES 1000708	1	PUMP CELL
1006407	Air Regulator, Parker, 14R113FC, 1/4" NPT, 1/8" NPT gauge port, 0-125 PSI pressure range, Self Relieving Manufacturer: Parker (was 1/4" NPT JUPITER PNEUMATICS REGULATOR 62383591)	1	B1-17
1017286	* PARKER LOCKING BALL VALVE VP500P-8 1/2" FEMALE NPT X 1/2" FEMALE NPT YELLOW HANDLE 600PSI MAX	3	B1-18
1006965	GAUGE WIKA 0-160 PSI 1/8"CBM 1.5" GC620	1	PUMP CELL
1005577	CONNECTOR,BRASS, U18D 1/2~MPT X 1/2~FLARE (was McMaster 50635K387)	3	B1-21



1000163	VALVE NEEDLE, 1/4~MPT X 1/4~MPT, B-1RM4	1	B1-09
1013021	Gauge - 2" Dial, 1/4" NPT Center Back, 0 - 600 PSI 3846K8	2	PUMP CELL
1019673	1/4" FEMALE TEE- STEEL,PARKER, 1/4 MMO-S	3	
1019674	1/4" MALE TEE-STAINLESS STEEL, PARKER,4-4-4 MT-B	1	
1000449	CROSS, NPT, CAJON B-4-CS, 1/4 FPT	1	
1011733	STAINLESS STEEL REINFORCED PTFE HOSE, MTO, SB-08, 13/32ID SAE100R14 XXXFT 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)	30	Bay 2
1019675	3/8" MALE TO 3/8" FEMALE JIC ELBOW-STEEL, PARKER,8 DTX-S	1	
1019676	1/2 FEMALE ELBOW-BRASS, GRAINGER, 8-8 FE-B	1	
1001131	KIT, VALVE, ASCO 304354-J, NEOPRENE POPPET	1	B1-94
1019855	ACCUMULATOR, FOX, HP150-10, PISTON ACCUMULATOR 10 LITER NBR SEALS FLUID PORT - 1" BSPF HOLDING CHARGE PORT - 3/8" BSPF	1	EXTON PUMP CELL
1020148	ACCUMULATOR MOUNTING CLAMPS McMaster 3042T166	3	
Electrical	HLB RA7 P&A, AIRXCEL, KS, 0123		
1018143	MICRO 820 PLC, ALLEN BRADLEY, 2080-LC20-20QWB(R)	1	PS-77
1014326	* InstallerParts# 25915-SFP (100 Pack) CAT 6 RJ45 Shielded Industrial Panel Mount Bulkhead, Amazon ASIN# B07FK7NMP2, COUPLER ETHERNET BULKEHEAD, NEWARK 20M4010 TYCO 1738601-2	1	
1017997	POWER SUPPLY, ALLEN BRADLEY, 1606-XLB120E, 24VDC 5A POWER SUPPLY	1	PS-57
1017751	PILOT LIGHT, ALLEN BRADLEY, 800FD-P3N3, 24 VAC/VDC GREEN	1	PUMP CELL
1017752	PILOT LIGHT, ALLEN BRADLEY, 800FD-P4N3, 24 VAC/VDC RED	1	PUMP CELL
1002779	FUSE BLOCK,A-B,1492-H4,AC NEON INDICATORS	3	PS-50
1004830	FUSE BLOCK,A-B,1492-H5,DC LED INDICATORS	8	PS-50
1003056	END BARRIER,A-B,1492-N37, FOR FUSE BLOCK	4	PS-50
1017580	TERMINAL BLOCK, ALLEN BRADLEY 1492-PG3Q, SINGLE-LEVEL FEED-THROUGH 4 POINT GROUND TERMINAL BLOCK 26-12 AWG, PK. OF 50	2	PS-52
1017577	END BARRIER, ALLEN BRADLEY 1492-EBP3Q, END BARRIER FOR SINGLE-LEVEL FEED-THROUGH 4 POINT TERMINAL BLOCK 1492- P3Q, PK. OF 50	11	PS-53
1017578	TERMINAL BLOCK, ALLEN BRADLEY 1492-P3Q, SINGLE-LEVEL FEED- THROUGH 4 POINT TERMINAL BLOCK 28-12 AWG, 100/pk	20	PS-52
1002808	END ANCHOR 1492-EAJ35	10	PS-54



1017196A	RELAY SOCKET FOR 1017196 AB 700-HN221 MINI SOCKET 5-BLADE	1	PS-61
1017196	RELAY AB 700-HK36Z24 10 AMP CONTACT 24 VDC SPDT	1	PS-61
1013238	CONNECTOR, IFM EFFECTOR, EVC814, 5 PIN STRAIGHT MICRO DC FEMALE WIRABLE (was E11511)	2	B1-37
1015904	ALLEN BRADLEY 889V-LD2DBE-5 CORDSET DIN A *** MUST BE SERIES B (thin diameter), NOT SERIES A (thicker diameter)***	1	B2-06
1004554	GROMMET, 2~, 9600K63	1	B1-15
1003463	FITTING, STRAIN RELIEF, THOMAS & BETTS, 2520 (100/pack)	2	
1002842	FITTING, STRAIN RELIEF, THOMAS & BETTS, 2521 (25/box)	2	
1016290	CONDUIT BODY, KILLARK, EAC1CGN, 1/2" C WITH COVER & GASKET 10/BOX	1	B2
1018288	LOAD SWITCH, ALLEN BRADLEY, 194E-A16-1753-4N, IEC LOAD SWITCH 16A ENCLOSURE	1	PUMP CELL
1008616	SHAFT EXTENSION, ALLEN BRADLEY, 194L-G3394	1	PUMP CELL
1017453	PANELVIEW, ALLEN BRADLEY, 2711R-T4T, PROGRAMMED 800 (4")	1	B1-154
1015040A	(limited shelf space) HIRSCHMANN 942132001 SPIDER III 5TX UNMANAGED ETHERNET SWITCH 5 PORTS 10/100MB	1	PS-60
1005856	ETHERNET CABLE, AMAZON, ASIN: B00AJHBXLO, 7ft CAT6 ETHERNET PATCH CABLE 550MHz RJ45 BLUE (was B011A8M706)	4	
1019158	CONNECTOR, L-COM, DGB9FT, DB9 FEMALE CONNECTOR FOR FIELD TERMINATION	1	B1-27
1010799	CONNECTOR, IFM EFFECTOR, EVC816, 5 PIN STRAIGHTMICRO DC MALE WIREABLE (was E11506)	1	B1-37
1020700	WALLPLATE, PANDUIT, NK4FNBL, PAN NK 4-PORT SINGLE GANG FLUSH MOUNT VERT	1	B1-143
1017069	ETHERNET KEYSTONE INSERT, DIGIKEY, TL413-ND, TRIPP LITE ETHERNET KEYSTONE INSERT BLACK RJ45	2	B1-144
1017070	BLANK KEYSTONE INSERT, ALLIED, 70163524, BLANK INSERT FOR KEYSTONE PLATE BLACK 10PCS/BAG, 10BAGS/BOX	2	B1-144
1018025	M12 CORDSET, ALLEN BRADLEY, 889D-F5AC-5, M12 889 CABLE 5 PIN FEMALE TO FIELD WIRABLE 5 METER	3	B1-35
Enclosure	HLB RA7 P&A, AIRXCEL, KS, 0123		
1011684	ENCLOSURE CSD24248	1	STORAG E
1016710A	PANEL CP2424 FOR 1016710	1	B2