

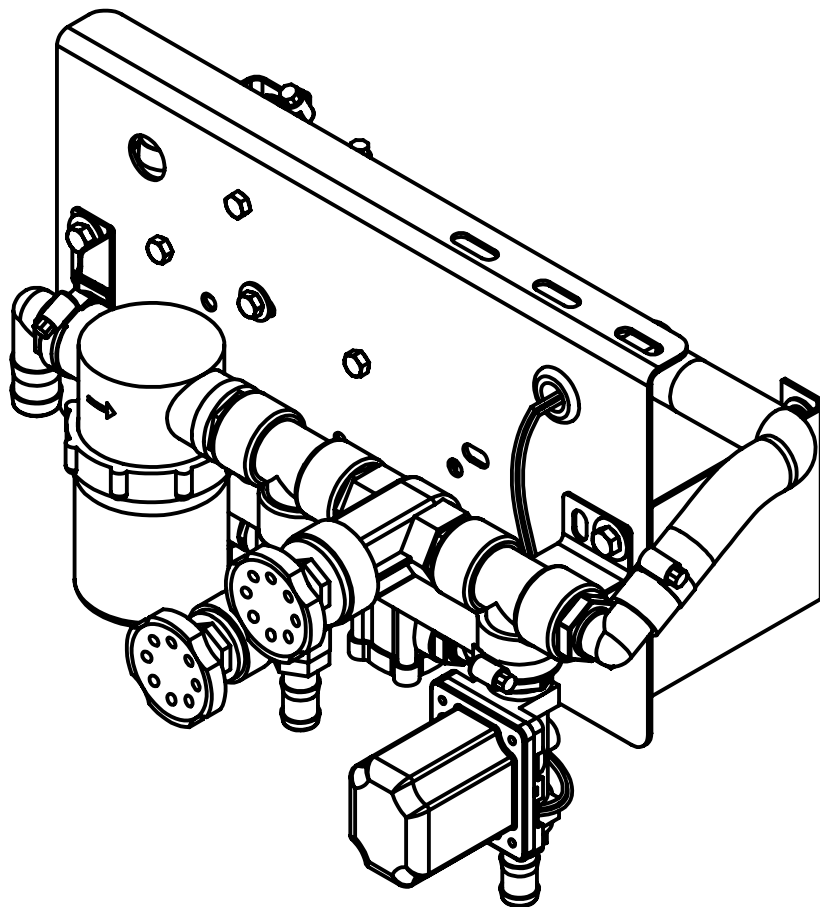
OPERATORS MANUAL

# Demco

12/16  
AB20037, Rev 9



## ELECTRIC CONTROL PANEL CP414HVR



**READ** *complete manual CAREFULLY  
BEFORE attempting operation.*

Doing Our Best to Provide You the Best

Thank you for purchasing a Demco Sprayer Control System. We feel you have made a wise choice and hope you are completely satisfied with your new Sprayer Control System. If you have any questions regarding the application of certain solutions or chemicals, contact your chemical supplier and follow chemical manufacturer recommendations as well as all licensing and use restrictions or regulations.

## WARRANTY POLICY, OPERATOR MANUALS & REGISTRATION

Go online to [www.demco-products.com](http://www.demco-products.com) to review Demco warranty policies, operator manuals and register your Demco product.



**WARNING:** TO AVOID PERSONAL INJURY OR PROPERTY DAMAGE, OBSERVE FOLLOWING INSTRUCTIONS:

**Chemicals are dangerous. Know exactly what you're going to do and what is going to happen before attempting to work with these products. Improper selection or use can injure people, animals, plants and soil.**

**Always wear protective clothing such as coveralls, goggles and gloves when working with chemicals or sprayer.**

**Be sure to dispose of all unused chemicals or solutions in a proper and ecologically sound manner.**

## GENERAL INFORMATION

1. Unless otherwise specified, high-strength (grade5) (3 radial-line head markings) hex head bolts are used throughout assembly of this sprayer.
2. Whenever terms “**LEFT**” and “**RIGHT**” are used in this manual it means from a position behind sprayer and facing forward.
3. When placing a parts order, refer to this manual for proper part numbers and place order by **PART NO., DESCRIPTION, and COLOR.**

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## **EQUIPMENT SAFETY GUIDELINES**

Every year many accidents occur which could be avoided by a few seconds of thought and more careful approach to handling equipment. You, the operator, can avoid accidents by observing precautions in this section. To avoid personal injury, study precautions and insist those working with you, or you yourself, follow them.

In order to provide a better view, certain illustrations in this manual may show an assembly with a safety shield removed. However, sprayer should never be operated in this condition. Keep all shields in place. If shield removal becomes necessary for repairs, replace shield prior to use.

Replace any caution, warning, danger or instruction safety decal that is not readable or is missing. Location of such decals is indicated in this booklet.

Do not attempt to operate this sprayer under the influence of alcohol or drugs.

Review safety instructions with all users.

Operator should be a responsible adult. **DO NOT ALLOW PERSONS TO OPERATE OR ASSEMBLE THIS SPRAYER UNTIL THEY HAVE DEVELOPED A THOROUGH UNDERSTANDING OF SAFETY PRECAUTIONS AND HOW IT WORKS.**

To prevent injury or death, use a tractor equipped with a roll over protective system (ROPS). Do not paint over, remove, or deface any safety signs or warning decals on your sprayer. Observe all safety signs and practice instructions on them.

Never exceed limits of sprayer. If its ability to do a job, or to do so safely is in question **DON'T TRY IT.**



### **REMEMBER**

Your best assurance against accidents is a careful and responsible operator. If there is any portion of this manual or function you do not understand, contact your local authorized dealer or manufacturer.



### **BEFORE OPERATION:**

- Carefully study and understand this manual.
- Do not wear loose-fitting clothing which may catch in moving parts.
- Always wear protective clothing and substantial shoes.
- It is recommended that suitable hearing and eye protection be worn.
- Operator may come in contact with certain materials which may require specific safety equipment relative to handling of such materials. (Examples: extremely dusty, molds, fungus, bulk fertilizers, etc.)

- Give sprayer a visual inspection for any loose bolts, worn parts, or cracked welds, and make necessary repairs. Follow maintenance safety instructions included in this manual.
- Be sure there are no tools lying on or in equipment
- Do not use the sprayer until you are sure that area is clear, especially around children and animals.
- Don't hurry learning process or take sprayer for granted. Ease into it and become familiar with your new equipment.
- Practice operation of your sprayer and its attachments. Completely familiarize yourself and other operators with its operation before using.
- Manufacturer does not recommend usage of tractor with ROPS removed.
- Move tractor wheels to widest recommended settings to increase stability.
- Do not allow anyone to stand between tongue or hitch and towing unit when backing up to equipment.



### **DURING OPERATION**

- Do not walk or work under raised components or attachments unless securely positioned and blocked.
- Keep all bystanders, pets, and livestock clear of work area.
- Never stand alongside of unit with engine running or attempt to start engine and/or operate machine while standing alongside of unit.
- Never leave running equipment attachments unattended.
- As a precaution, always recheck hardware on equipment following every 100 hours of operation. Correct all problems. Follow maintenance safety procedures.





## **FOLLOWING OPERATION**

- Following operation, or when unhitching, stop tractor or towing unit, set brakes, disengage PTO and all power drives, shut off engine and **remove ignition key**.
- Store sprayer in an area away from human activity.
- Do not permit children to play on or around sprayer at any time.
- Make sure all parked machines are on a hard, level surface and engage all safety devices.
- Wheel chocks may be needed to prevent unit from rolling.



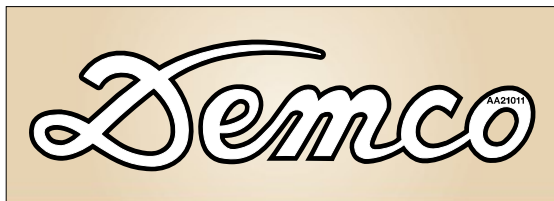
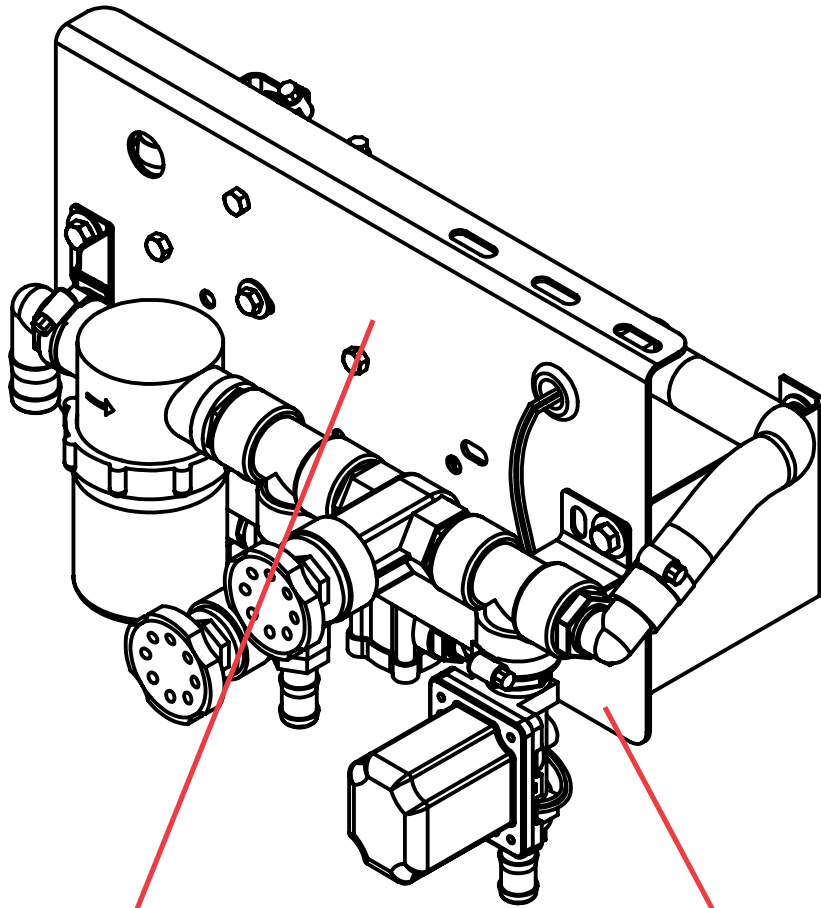
## **PERFORMING MAINTENANCE**

- Good Maintenance is your responsibility. Poor maintenance is an invitation to trouble.
- Make sure there is plenty of ventilation. Never operate engine of towing vehicle in a closed building. Exhaust fumes may cause asphyxiation.
- Before working on this machine, stop towing vehicle, set brakes, disengage PTO and all power drives, shut off engine and **remove ignition key**.
- Be certain all moving parts and attachments have come to a complete stop before attempting to perform maintenance.
- Always use proper tools or equipment for job at hand.
- Use extreme caution when making adjustments.
- Follow torque chart in this manual when tightening bolts and nuts.
- Never use your hands to locate a hydraulic leak on attachments. Use a small piece of cardboard or wood. Hydraulic fluid escaping under pressure can penetrate skin.
- After servicing, be sure all tools, parts and service equipment are removed.
- Do not allow grease or oil to build up on any steps or platform.
- When replacing bolts refer to owners manual.
- Refer to bolt torque chart for head identification marking.
- Where replacement parts are necessary for periodic maintenance and servicing, genuine factory replacement parts must be used to restore your equipment to original specifications. Manufacturer will not claim responsibility for use of unapproved parts or accessories and other damages as a result of their use.
- If equipment has been altered in any way from original design, manufacturer does not accept any liability for injury or warranty.
- A fire extinguisher and first aid kit should be kept readily accessible while performing maintenance on this equipment



## SAFETY SIGN LOCATIONS

Types of safety sign and locations on equipment are shown in illustration below. Good safety requires that you familiarize yourself with various safety signs, type of warning, and area or particular function related to that area, that requires your SAFETY AWARENESS.



AA21011



AB21001

## GENERAL INFORMATION

The CP414HVR Sprayer Control has been designed to give the operator complete boom control from the convenience of the tractor cab. The spraying pressure and boom selection control can be constantly monitored and adjusted to help insure the accurate application of today's expensive agricultural chemicals. Many unique features add to the value of this sprayer control.

- Control housing constructed with durable, non-corrosive Noryl material.
- Wiring protected with an easily replaceable fuse.
- Units furnished with quick connect terminals and easily mounted components.
- High quality sealed switches.
- Black gauge face to reduce glare.
- Lighted pressure gauge and boom section indicators.

The 144A 1 electric valve has been designed for remote on/off control of the spray boom. The encapsulated solenoid coil can be changed without disconnecting the valve from the spray line. Metal parts in contact with the liquid are stainless steel to provide added corrosion resistance. The large internal flow chambers with no pilot hole reduces the chance of plugging.

- Operating pressure ranges of 0-100 PSI.
- Flow capacities of 10 GPM for the electric valve.
- Nylon encapsulated 12 VDC coil with 1/4" quick connect terminals.
- Glass filled polypropylene valve body.
- 2.5 amp power requirement.
- Internal metal parts are stainless steel, other metal parts are epoxy coated or electroless nickel plated.
- Chemical resistant EPDM rubber seat washer and diaphragms.

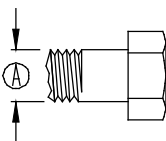
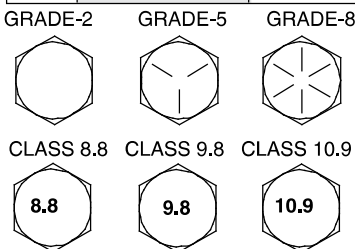
### BOLT TORQUE - TORQUE DATA FOR STANDARD NUTS, BOLTS, AND CAPSCREWS.

Tighten all bolts to torques specified in chart unless otherwise noted. Check tightness of bolts periodically, using bolt chart as guide. Replace hardware with same grade bolt.

NOTE: Unless otherwise specified, high-strength Grade 5 hex bolts are used throughout assembly of equipment.

#### Bolt Torque for Metric bolts \*

lb-ft	CLASS 8.8		CLASS 9.8		CLASS 10.9	
	lb-ft	(N.m)	lb-ft	(N.m)	lb-ft	(N.m)
6	9	(13)	10	(14)	13	(17)
7	15	(21)	18	(24)	21	(29)
8	23	(31)	25	(34)	31	(42)
10	45	(61)	50	(68)	61	(83)
12	78	(106)	88	(118)	106	(144)
14	125	(169)	140	(189)	170	(230)
16	194	(263)	216	(293)	263	(357)
18	268	(363)	--	--	364	(493)
20	378	(513)	--	--	515	(689)
22	516	(699)	--	--	702	(952)
24	654	(886)	--	--	890	(1206)



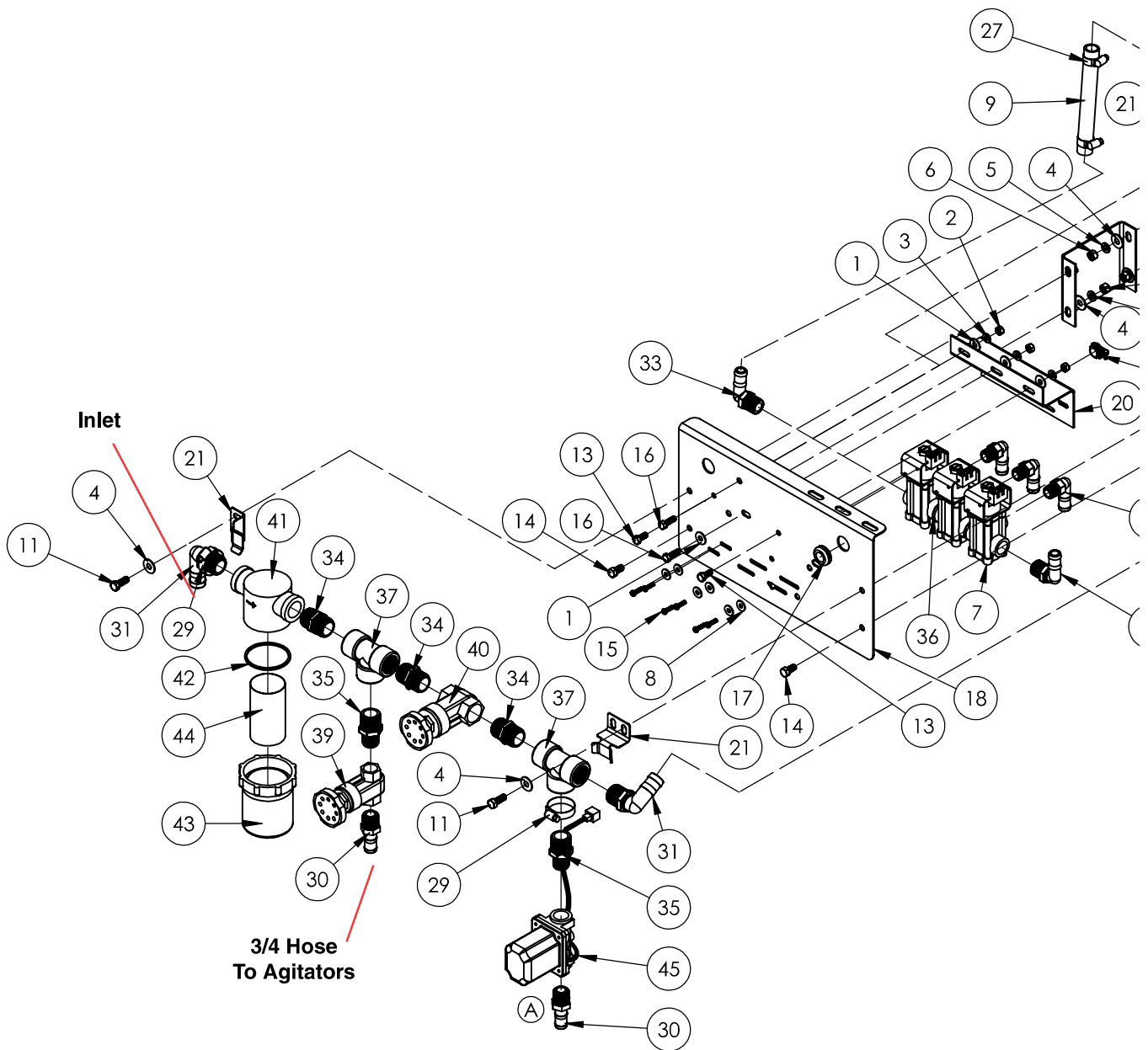
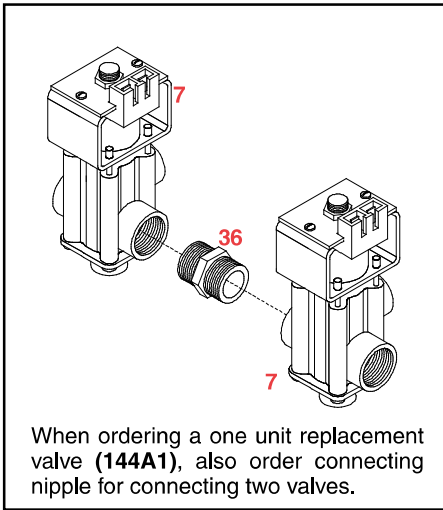
### Torque Specifications

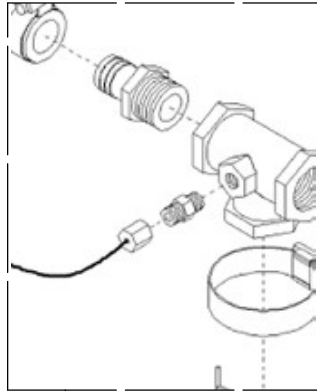
Torque figures indicated are valid for non-greased or non-oiled threads and heads unless otherwise specified. Therefore, do not grease or oil bolts or capscrews unless otherwise specified in this manual. When using locking elements, increase torque values by 5%.

\* GRADE or CLASS value for bolts and capscrews are identified by their head markings.

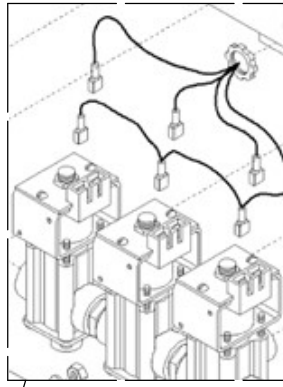
#### Bolt Torque for Standard bolts \*

"A"	GRADE 2		GRADE 5		GRADE 8	
	lb-ft	(N.m)	lb-ft	(N.m)	lb-ft	(N.m)
1/4"	6	(8)	9	(12)	12	(16)
5/16"	10	(13)	18	(25)	25	(35)
3/8"	20	(27)	30	(40)	45	(60)
7/16"	30	(40)	50	(70)	80	(110)
1/2"	45	(60)	75	(100)	115	(155)
9/16"	70	(95)	115	(155)	165	(220)
5/8"	95	(130)	150	(200)	225	(300)
3/4"	165	(225)	290	(390)	400	(540)
7/8"	170	(230)	420	(570)	650	(880)
1"	225	(300)	630	(850)	970	(1310)

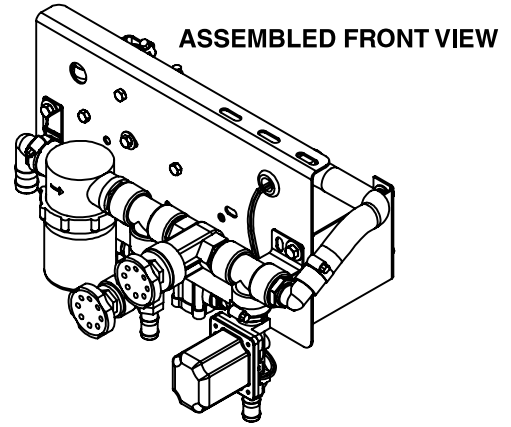




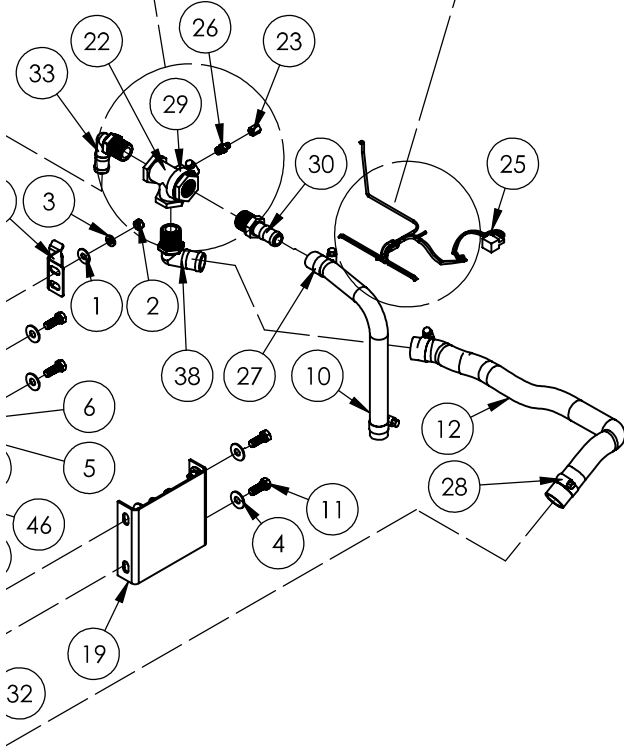
Pressure Gauge Connection



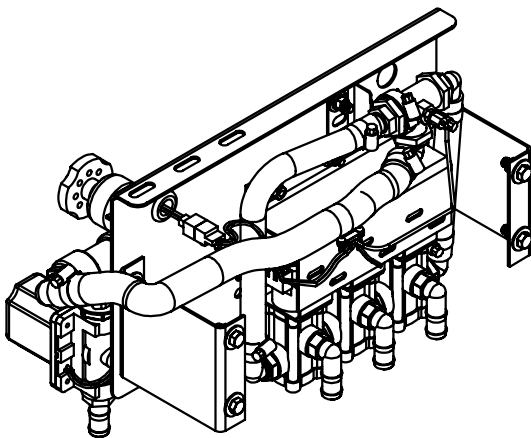
Electric Solenoid Valve Connection



ASSEMBLED FRONT VIEW



ASSEMBLED REAR VIEW



**Return Line  
To Front Of Tank  
Or Suction Hose**

**CP414HVR CONTROL PANEL PARTS LIST**

REF. NO.	PART NO.	QTY.	DESCRIPTION
1.	00004	5	5/16" Flatwasher
2.	00007	4	5/16"-18 UNC Hex Nut
3.	00036	4	5/16" Lockwasher
4.	00059	14	3/8" Flatwasher
5.	00060	8	3/8" Lockwasher
6.	00061	8	3/8" -16 UNC Hex Nut
7.	144A1	3	Replacement one unit Electric Solenoid Valve
8.	00214	6	1/4" Flatwasher
9.	340RB	-	3/4" Rubber Hose
10.	340RB	-	3/4" Rubber Hose
11.	00907	6	3/8" -16 UNC x 1" Hex Head bolt (Gr.5)
12.	1010RB	-	1" Rubber Hose
13.	01263	2	5/16" -18 UNC x 3/4" Hex Head Bolt (Gr.5)
14.	01899	2	3/8" -16 UNC x 3/4" Hex Head Bolt (Gr.5)
15.	01906	6	1/4" -20 UNC x 3/4" Slotted Trus Hd. Bolt
16.	02990	2	5/16" -18 UNC x 1" Hex Head Bolt (Gr.5)
17.	04396	1	Rubber Grommet (11/26" ID)
18.	04925-30	1	Panel Mounting Plate
19.	04926-30	2	Panel Mounting Bracket
20.	04928-30	1	Solenoid Valve Cover
21.	05286-95	3	Plumbing Bracket
22.	21476NY	1	3/4" FPT Tee with gauge fitting
23.	21545NY	1	Tube Nut
24.	*21634	-	15' Pressure Gauge Tubing (25' optional)
25.	*21720 6	1	6' Wire Harness (15' optional)
26.	21736NY	1	Male Coupling
27.	B12H	6	3/4" Hose Clamp
28.	B16H	2	1" Hose Clamp
29.	B24H	3	1-1/4" Hose Clamp
30.	BA3434	3	3/4" MPT x 3/4" Hose Barb (GFP)
31.	BEL1010	2	1" MPT x 1" Hose Barb Elbow (GFP)
32.	BEL1234	3	1/2" MPT x 3/4" Hose Barb (GFP)
33.	BEL3434	3	3/4" MPT x 3/4" Hose Barb Elbow (GFP)
34.	BM1000	3	1" MPT SHort Nipple (GFP)
35.	BM1034	2	1" MPT x 3/4" FPT Reducer Fitting (GFP)
36.	BM3400	2	3/4" MPT Short Nipple (GFP)
37.	BTT100	2	1" FPT Tee (GFP)
38.	EL3410	1	3/4" MPT x 1" Hose Barb Elbow (GFP)
39.	G2002	1	3/4" FPT Gate Valve
40.	G2003	1	1" FPT Gate Valve
-	RVF100 40	1	1" Line Strainer with 40 mesh screen
41.	RVF100C	-	1" Strainer Cap
42.	RVF114GV	-	Viton Gasket
43.	RVF114B	-	Strainer Bowl
44.	RVF140	-	40 Mesh Screen for 1" Strainer
45.	244 3/4	1	Electric Regulation Valve
46.	06119	1	Romex Connector
-	AA21011	1	Demco Decal, White with Black Border
-	AB21001	1	Spray Warning Decal

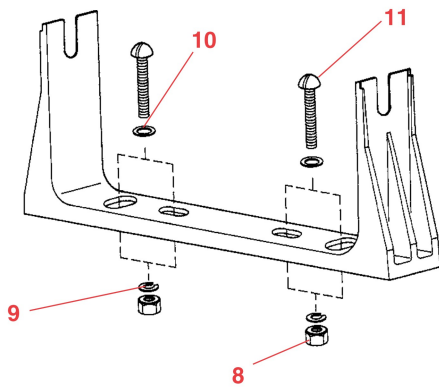
Please order replacement parts by PART NO. and DESCRIPTION.

\* Specify quantity (Footage) to be ordered.

## INSTALLATION PROCEDURES

1. Turn Off all Switches on the 3318 sprayer control console.
2. Determine the best location for the control console in the tractor cab according to the following guidelines:
  - Pressure gauge should be readily visible.
  - Switches should be within easy reach.
  - Controller bracket should rest on a flat surface.
  - 12 volt-DC power source accessible (maximum draw of 10 amps).
3. Determine the best routing for cables & pressure tube:
  - Away from operators movement area.
  - Away from moving parts.
  - Away from sharp objects.
4. Install mounting bracket using 1/4" drill, machine screws, nuts, washers, and lockwashers as shown. Attach the control housing assembly to the mounting bracket using the console adjusting knobs and washers.

### BRACKET MOUNTING



5. Installation of output control cable: Cut approx. 1" dia. opening which will be used to feed this cable from the interior of the tractor cab out to the control panel on the sprayer. Make sure that this hole has no burrs or sharp edges that could damage the wire.

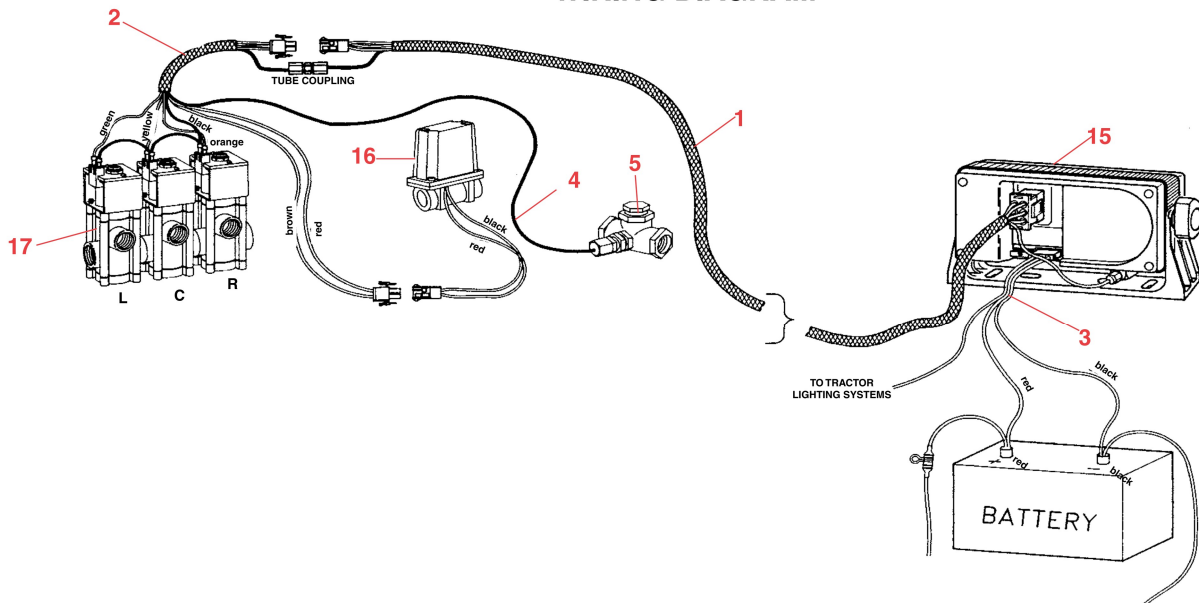
3318 Control Console: 6 wires from the control cable are used to control a three section boom. Orange/ Yellow/Green wires - 144A1 valve, Black wire - common ground 144A1 valve, Red/Brown wires - 244 3/4 valve.

**NOTE: Do not plug the control cable into the control console until it has been fully connected to the control valves. Doing so may allow the unconnected leads to short out.**

6. Installation of input power cable: the power cable should also use the same 1" dia. hole as did the control cable and pressure tube. This cable consists of three (3) wires. The red wire should be connected to a 12 volt power supply in the tractor cab (i.g. ignition switch). The yellow wire should be connected to the headlight system of the tractor either by directly connecting this wire to the auxiliary terminal of the headlight switch or splicing into the wire going to the headlight. The black wire is the negative and should be connected to a good chassis ground.

To test the installation of the power input cable, plug it into the power input receptacle on the back of the control console. Turn the tractor ignition switch to the ON position. The boom section indicator lights should illuminate when the boom section switches are turned on. The gauge light should illuminate when the tractor headlights are switched on.

## WIRING DIAGRAM

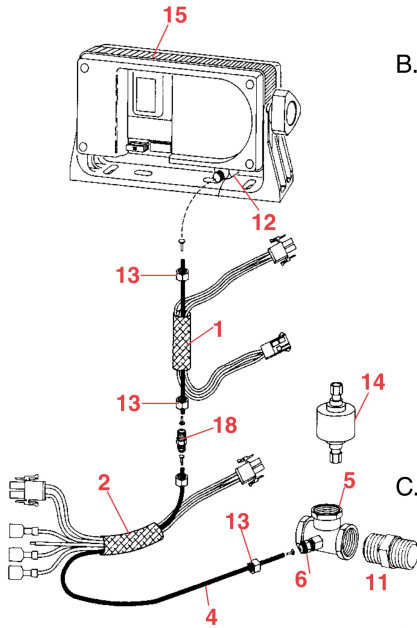




**PREVENTIVE MAINTENANCE  
3318 CONTROL CONSOLE**

- The tubing for the pressure gauge is supplied as one continuous 15 ft. piece (25 ft. optional). The tube coupling can be installed by the operator at any location. The tube coupling is normally installed outside the tractor cab in case of leakage. If a gauge isolator is used with the system, it should be installed in place of the tube coupling, outside the tractor cab, to satisfy regional or safety regulations.

**PRESSURE GAUGE  
TUBE ASSEMBLY**



A. Determine the location at which the coupler is to be installed and cut the tubing at that point.

B. Remove all tube nuts from the 3 couplers and slide the tubing through the nuts as shown.

Note: that the threaded portion of the nut should face their respective couplings. The tube itself should protrude approx. 1/2" beyond the nut.

C. One brass tube insert is provided. This piece must be used with the gauge coupling.

D. Fluid leakage around the gauge indicates a poor connection or a defective gauge.

**NOTE: All cables and the tube should be out of the way of the operators feet and path so that they cannot be snagged or pulled. These lines should be routed away from sharp metal edges and moving parts. DO NOT PINCH THE TUBE.**

**REMOVAL OF THE CONTROL CONSOLE**

- Depressurize the system.
- Uncouple the nylon pressure tube from outside the cab and allow the liquid to drain. Then uncouple the tube from the back of the console.
- Disconnect the input power cable from the back of the control console.
- Disconnect the output control cable from the back of the control console.
- Remove the triangular knobs and washers from the bracket and remove the control console box. Replace these items on the control console after it has been removed from the bracket for safe keeping.

Several routine procedures should be followed to help maintain the control console and the control panel.

- Check all wires and connections for wear, damage and frayed ends to prevent shorting out the system.
- Make sure that the mounting bracket for the control console is secure.
- All connectors and terminals should be free of corrosion.
- The control unit is designed so that it may be removed, cleaned and stored during periods of non-use, to protect it from exposure to extreme heat or cold.
- Please note that the control console is not waterproof. Do not immerse the unit when cleaning.
- Periodic flushing of the sprayer will help prevent clogging due to residue build-up.

**CONTROL PANEL & 144A1 VALVES**

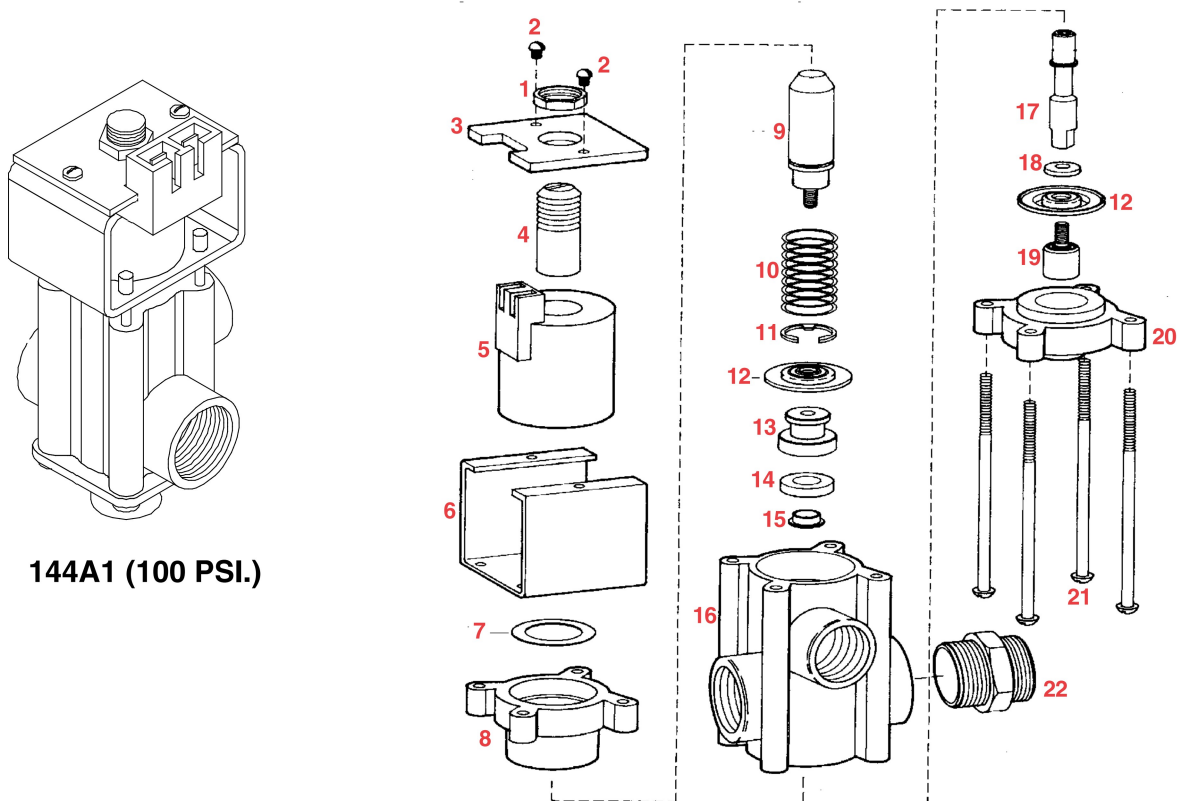
- Keep all electrical connections, coil, and metal strap clean at all times.
- A protective coating may be applied to the completed electrical connections, if desired.
- Flush system with clean water after each days use especially when using wettable powders.
- For winter storage, flush and drain the system.
- Do not apply lubricating oils or petroleum products to the valves, as this may cause swelling of the rubber parts. Also, check with the chemical manufacturer to be sure that chemicals used are compatible with the valve parts.
- If nozzle cannot be seen by operator during spray application, the on-off operation of valves should be checked periodically.

**\*Tubing Sold By The Foot**

REF. NO.	PART NO.	QTY.	DESCRIPTION
1.	21720-15	1	15 ft. Output Extension
-	21720-8	-	8 ft. Output Extension
2.	21725-15	1	15 ft. Extension for Solenoid End
-	21725-6	-	6 ft. Extension for Solenoid End
3.	21478-1	1	8 ft. Power Cord
4.	*21634-15	1	Pressure Gauge Tubing (15 ft.)
5.	21476NY	1	Tee, 3/4" FPT with Gauge Port
6.	21736NY	1	Male Coupling For Gauge Fitting w/1 nut
7.	09783	2	#8-32 x 1 Slotted Rnd Head Machine Screw
8.	01901	2	#8 Hex Nut
9.	00057	2	Spring Lockwasher
10.	00214	2	Flatwasher
11.	BM3400	-	3/4" Nipple Fitting
12.	37211NYB	1	Gauge Fitting
13.	21545	4	Tube Nut
14.	23800	1	Isolator Kit (Optional)
15.	3400-3	1	Electric Control Console(Incl. #17& #18)
16.	244 3/4	1	Electric Regulator
17.	144A1	3	Direct-o-Valve
18.	21486NY	1	Tube Coupling w/2 nuts

**Please order replacement parts by  
PART NO. and DESCRIPTION.**

## ELECTRIC SOLENOID VALVE PARTS BREAKDOWN



**144A1 (100 PSI.)**

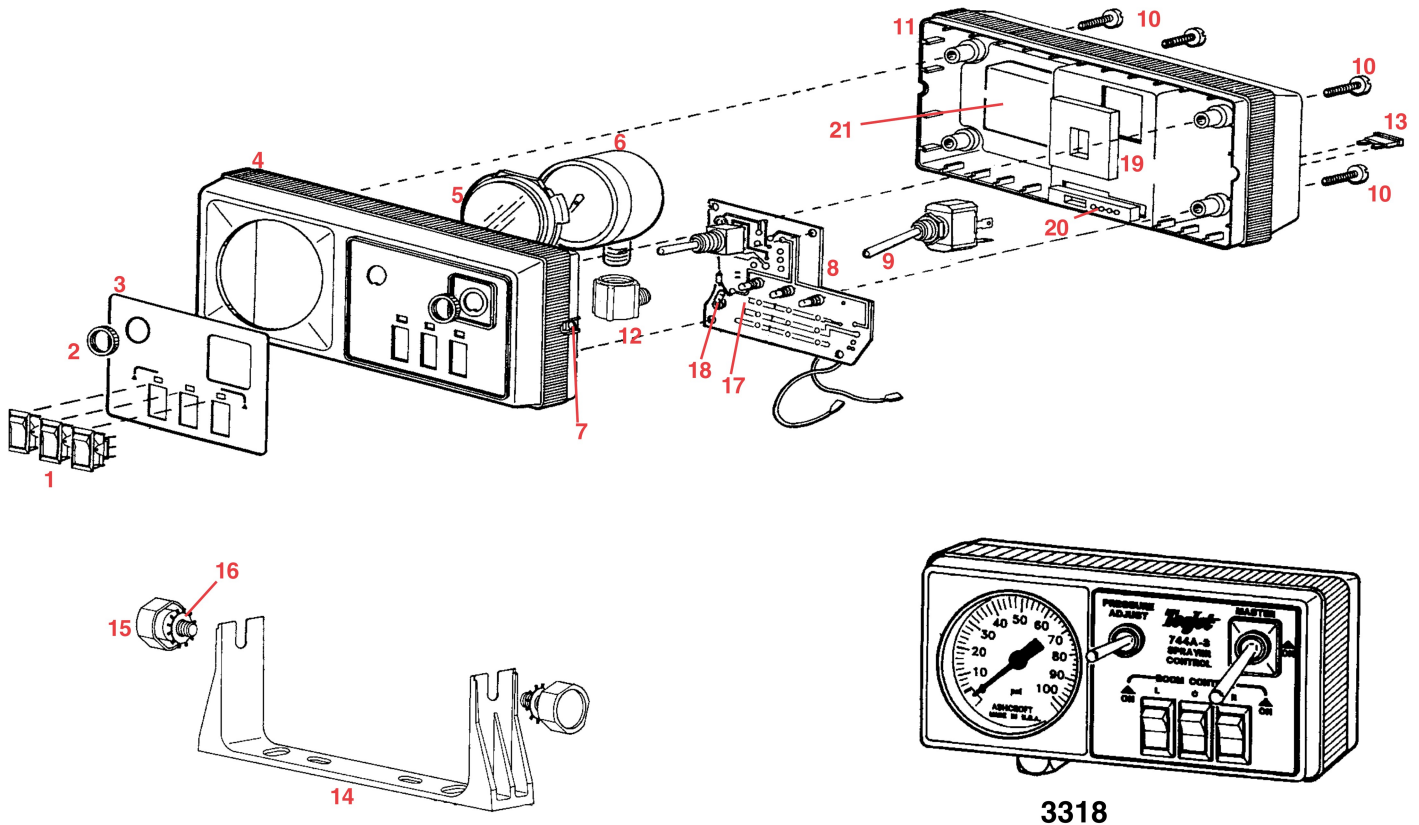
### ELECTRIC SOLENOID VALVE PARTS LIST

REF. NO.	PART NO.	QTY.	DESCRIPTION
1.	14814IECP	1	Jam Nut Steel-Electroless Nickle Plated
2.	14933 SS	2	Stainless Steel Screw
3.	14926 1	1	Coil Cover
4.	14809IENP	1	Armature Stop
5.	15163I	1	12 VDC Coil
6.	14927 1	1	Steel Epoxy Strap
7.	14806SS	1	Washer, Type 302 Stainless Steel
8.	14818IENP	1	Upper Diaphragm Housing
9.	15170IENP	1	Armature
**10.	14803-302SS	1	Type 302 Spring-65 PSI.
11.	14813 IENP	1	Retainer Ring
*12.	36101 EPR	2	EPDM Rubber Diaphragm (Optional)
**12.	36101 VI	2	EPDM Diaphragm (viton standard)
13.	14807SS	2	Seat Washer Retainer
*14.	14802R	2	EPDM Rubber Seat Washer (Optional)
**14.	14802VI	2	EPDM Seat Washer (Viton Standard)
15.	14811SS	2	Stainless Steel Spacer
16.	14801PP	1	Black Polypropylene Body
17.	14812SS	1	Stainless Steel Stem
18.	14806SS	1	Stainless Steel Washer
19.	14808SS	1	Lower Diaphragm Piston
20.	14817SS	1	Lower Diaphragm Housing
21.	14819SS	4	Stainless Steel Screw
22.	BM3400	1	Connecting Nipple
<b>AB144A1</b>			- Valve Repair Kit (EPDM) includes ref. no. marked with an (*)
<b>AB144A1VI</b>			- Valve Repair Kit (VITON) includes ref. no. marked with an (**)

Please order replacement parts by **PART NO.** and **DESCRIPTION.**



## (3300) CONTROL CONSOLE PARTS BREAKDOWN



3318

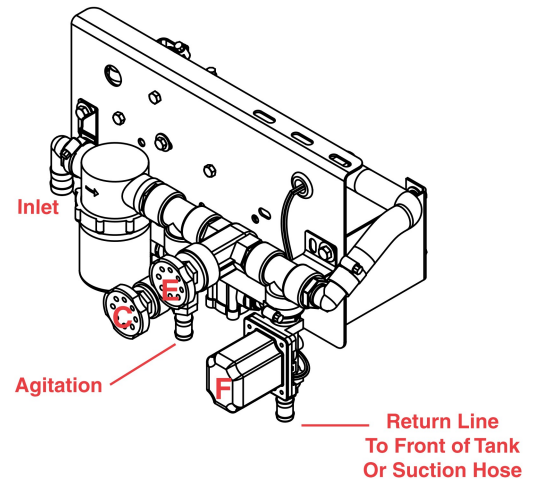
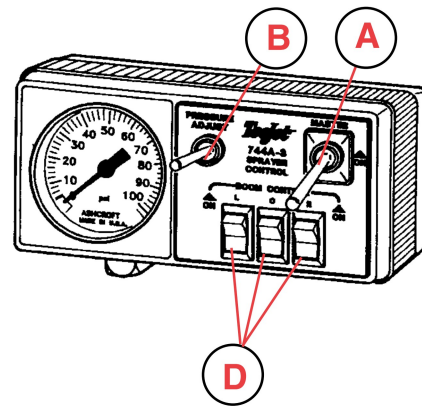
### (3318) CONTROL CONSOLE PARTS LIST

REF. NO.	PART NO.	QTY.	DESCRIPTION
1.	26211	3	Boom Switch
2.	---	1	Knurled Nut
3.	---	1	Graphic Panel
4.	21969	1	Front Housing
5.	21972	1	Lens Gauge
6.	12118	1	Liquid Only 160 GBF
7.	21469IZP	2	Square Nut (Incl. with Front Housing)
8.	21541	1	Circuit Board Module (Incl. #17 & #18)
9.	22573	1	Toggle Switch w/Knurled Nut
10.	214951	4	#6 Plastic Screw, Type 410 SS
11.	21462	1	Back Housing
12.	37211NYB	1	Elbow, Nylon (Black)
13.	05480	1	Fuse, 15 Amp
14.	21465IZP	1	Mounting Bracket
15.	---	2	Lock Knob
16.	04499	2	1/4" External Tooth Lockwasher Type A
17.	---	3	Boom L.E.D.
18.	---	2	Gauge Lamp
19.	---	1	Output Cable Shield
20.	---	1	Receptacle-Fuse Shield
21.	---	1	Foam Spacer For Gauge

Please order replacement parts by PART NO. and DESCRIPTION.

## PANEL OPERATION

1. Mount the CP414HVR Panel to the front of the sprayer main frame and the Control Console in the tractor cab.
2. Flip master switch **A** on the control console in the tractor cab up to the **ON** position. Toggle the pressure adjust switch **B** up until the pressure on the gauge is as high as it will go. This means the pressure regulating valve **F** is closed all the way. Close the agitation wedge valve **C** on the control panel.
3. Run the sprayer at desired RPM with the boom spraying (boom control switches **D** on the console should be **ON**). Begin by closing valve **E** until the pressure reads approx. 7-10 PSI over desired spraying pressure then open or close the regulating valve with switch **B** until the gauge reads approx. 3 PSI over your desired spraying pressure with all three booms spraying. (The spraying pressure may vary depending on the tip size and type of chemical solution being sprayed.)
4. Open the agitation wedge valve **C** until the gauge drops to your desired spraying pressure.  
**Example:** If desired spraying pressure is 30 PSI adjust valve **E** until gauge reads 37-40 PSI. After this, open or close the regulating valve with switch **B** until the gauge reads approx. 3 PSI over your desired spraying pressure with all three booms spraying. After this, open the wedge agitation valve **C** until the gauge drops down to 30 PSI. This is to insure the recommended pressure to the tank jet agitators.
5. Sprayer is now ready to use. **Check pressure and tip wear periodically.**  
**NOTE:** The master switch **A** activates all solenoid valves at once. Individual booms are on/off controlled with separate switches.



## TROUBLE SHOOTING THE ELECTRIC VALVE (144A 1)

CONDITION	POSSIBLE CAUSES	HOW TO CHECK
1. Valve won't open.	A. No electrical power to valve.	Manually activate valve. If stem movement is free, check and clean electrical connections. Inspect electrical system.
	B. Stroke too long.	Energize coil. Check length of stroke - should be 1/8" (.125"). If not, reset stroke. To do this turn armature stop (#4) on page 16 clockwise until it just makes slight contact with the armature (#9) on page 16. From this point back the armature stop (#4) out two full turns and lock with jam nut (#1).
	C. Stem movement restricted.	Manually activate stem by pushing on lower diaphragm piston. If more than 5 lbs. of force is required to move stem, disassemble valve, inspect and clean all parts. Replace any damaged or worn parts with new ones.
2. Valve won't shut off.	A. Spring malfunction.	Manually activate stem. Stem should offer about 2 - 6 lbs. resistance, but movement should be quick and smooth. If there is very little resistance, disassemble and check spring.
	B. Stem movement restricted.	Manually activate stem by pushing on lower diaphragm piston. If more than 5 lbs. force is required to move stem, disassemble valve, inspect and clean all parts. Replace any damaged or worn parts with new ones.
	C. Seat washer blown out of retainer due to excessive pressure.	Remove stem from valve body and inspect condition of seat washer.
	D. Seat washer worn or damaged.	Pull down on lower diaphragm piston. If this tends to induce shut-off, disassemble and replace seat washer.
3. Leakage around coil or around lower diaphragm piston.	A. Ruptured diaphragms.	Disassemble valve and replace diaphragms with new ones.
4. Blowing fuses.	A. Short circuit in power line leading to coil.	Inspect wires for worn insulation and check connections.
	B. Short within the coil.	Remove connections from coil and activate switch, making sure connections don't touch. If fuse doesn't blow, replace coil with new one.
5. Valve operating properly but pressure drop too high.	A. Not getting full stroke.	Energize coil. Check length of stroke should be 1/8" (.125"). If not, remove coil and check for obstructions between armature and armature stop. If clean, reset stroke. To do this turn armature stop (#4) on page 16 clockwise until it just makes slight contact with the armature (#9) on page 16. From this point back the armature stop (#4) out two full turns and lock with jam nut (#1).
	B. Obstruction in valve body.	Remove inlet and outlet connections and inspect body.

# MAINTENANCE AND OPERATION OF THE ELECTRIC VALVES



**CAUTION: To prevent personal injury, before performing any maintenance, make sure electrical power to the coil is shut off and line pressure is relieved.**

## I. TO REPLACE COIL ONLY:

1. Shut off power to coil.
2. Disconnect wires from terminals.
3. Remove two screws (no.2 on page 16) from top of coil cover (no.3).
4. Lift off coil (no.5) and replace with new coil.
5. Replace coil cover (no.3) and attach securely with the two screws (no.2).

## II. TO REPLACE DIAPHRAGMS AND SEAT WASHER:

1. Remove four screws (no.21 page 16) that secure the body (no.16) and separate coil sub-assembly. Remove upper and lower diaphragm housings ( no. 8 and no.20)
2. Remove spring (no.10) from armature (no.9).
3. Secure flats of armature (no.9) with 7/16" open end wrench. Unscrew entire assembly with screwdriver secured in slot of lower diaphragm piston (no.19).

**NOTE: Stem/Seat/Diaphragm assembly may unscrew at lower diaphragm piston (no. 19) (see step 4) or armature (no.9) (see step 5).**

4. If lower diaphragm piston (no.19) unscrews, remove diaphragm (no.12 ) and washer (no.18) and inspect or replace as necessary. Remaining seat/upper diaphragm assembly may be removed from top of valve body (no.16) and disassembled by securing flats on stem (no.17) and unscrewing armature (no.9). Flats on stem (no.17) and seat washer retainer (no.13) can be secured with wrenches to disassemble remaining parts.
5. If armature (no.9) unscrews, remove along with diaphragm (no.12 ) and washer (no.18) . Secure flats of seat washer retainer (no.13) and slot of lower diaphragm piston (no.19). Lower diaphragm piston (no.19) should now unscrew; however seat washer retainer (no.13) may unscrew also. Removal of stem (no.17) from seat washer retainers (no.13) is necessary to free spacer (no.15) for removal of seat washer (no.14).

## III. TO REASSEMBLE:

6. Reassemble seat washer retainer (no.13), seat washer (no.14) and spacer (no.15) onto stem (no.17) and tighten securely.
7. Reassemble upper diaphragm (no.12 ) with "Fluid Side" marked facing valve body, washer (no.18) and armature (no.9) onto stem (no.17) end and tighten securely.
8. Insert entire stem/armature/seat sub-assembly into polypropylene body (no.16) from top. Screw lower diaphragm piston (no.19), with diaphragm (no.12) and washer (no.18) in proper sequence into bottom end of stem assembly. Snug tight with screwdriver.
9. Reinstall spring (no.10) over armature (no.9). Place upper diaphragm housing (no.8) over armature and spring. Place coil assembly (no.5) on top of upper diaphragm housing (no.8).
10. Position polypropylene body sub-assembly and coil sub-assembly together. Mounting position is not important; the relationship of the inlets and outlets may be placed at any position relative to the electrical connections on the coil assembly.
11. Replace lower diaphragm housing (no.20) . Secure coil sub-assembly, body subassembly and bottom housing using four screws (no.21). Care must be exercised to uniformly tighten the retaining screws (no.21).

## IV. IF STROKE ADJUSTMENT IS NEEDED:

1. Unscrew the jam nut.
2. Push up on the lower diaphragm piston until the seat washer contacts the body seating surface.
3. While holding the diaphragm piston up, turn the screw in until it just makes contact with the armature.
4. Turn the armature stop out 1/4 turn and lock it with the jam nut.

4010 320th St., BOYDEN, IA. 51234

PH: (712) 725-2311

FAX: (712) 725-2380

TOLL FREE: 1-800-54DEMCO (1-800-543-3626)

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