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INTRODUCTION

Thank you for purchasing a *FSI HEAT 201/202* water-driven, proportional injector.

For the best possible performance from your new DI 16 PX, please read this manual carefully and keep it in a safe place for further reference. Your injector is made with high quality materials and includes the following important features:

- Non-electric
- Volumetric
- Proportional
- Built-in mixing chamber
- ¾” NPT connections

SPECIFICATIONS

Flow Range: 2.64 to 660 gallons per hour
Injection Range: 1:500 (0.2%) to 1:64 (1.6%)
Operating Pressure: 4.3 to 85 p.s.i.
Maximum Operating Temperature: 104°F

**NOTE:** Units are **NOT** preset

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**Important!**

The serial number of your unit is stamped into the bell housing. Please record this number in the space below and refer to it when you call FSI North America for information, parts, and service.

**CUSTOMER SERVICE** (440) 949-2400

<table>
<thead>
<tr>
<th>Model #</th>
<th>Serial #</th>
<th>Purchase Date</th>
</tr>
</thead>
</table>
ACCESSORIES

**Dosa-Cart**
Offers portability to 7, 11, 20 (with adapter) and 40 GPM units
Steel cart with 12 gallon solution tank, pneumatic tires
Includes: brass quick disconnects
Part # DC300

**Filter**
Protects unit from sand damage
200 Mesh water filter
¾” NPT connections
Part # AKF5AP11KIT

Also available in 1”, 1½”, and 2”

**Check Valve**
Protects unit from water hammer damage
¾” connections
Part # CV34

Also available in 1”, 1½”, and 2”

**Manual Bypass**
Allows untreated water
Part # MPDI045

**Maintenance Kits**
DI16 Part # MKDI16

Also available:
DI150 Part # MKDI150
DI210 Part # MKDI210
D200RE Part # MKD200
D400RE Part # MKD400

**Additional Options:**
PVDF and side injection units are also available
PRECISE, SIMPLE and RELIABLE

HERE'S HOW IT WORKS:
Installed directly in the water supply line, the injector operates without electricity, using water pressure as the power source.

The water activates the injector, which takes up the required percentage of concentrate directly from the stock solution container. Inside the injector, the concentrate is mixed with the water, and the water pressure forces the solution downstream.

The dose of concentrate will be directly proportional to the volume of water entering the injector, regardless of variations in flow or pressure which may occur in the main line.
BOX CONTENTS

A : Unit
B : Suction tube, weight, and strainer
C : Bracket + strap
PRECAUTION

INSTALLATION

• Check with local authorities for requirements of backflow devices.
• Do not install the unit on the suction side of the supply pump as the risk of siphoning may exist.
• Protect the unit from freezing and excessive heat.
• A **200 mesh/80 microns filter** must be installed prior to the unit (see accessories).
• A water hammer arrestor should be used in applications subject to water hammer.

MAINTENANCE

• Do not use tools when servicing or disassembling unit.
• Rinse injection areas after using the unit. To do this, insert suction tube into container of clean water and inject for 5 minutes.
• Soak entire disassembled unit in soapy water prior to installing after non-use period.
• Replace injection seals annually to ensure precise injection.

SERVICE

• Complete maintenance and seal kits are available.
• This unit was tested prior to packaging.
• Call FSI North America at 440-949-2400 for parts and service.
EXAMPLE INSTALLATIONS

Fig. 1 - Bypass. Recommended for all fixed installations. Allows untreated water if required.

Fig. 2 - Series. Allows injection of multiple chemicals into the same line.

Fig. 3 - Parallel. Allows flow rates up to 22 GPM.

Notes:
- If the unit clicks more than 40 times in 15 seconds, the maximum flow of 11 gallons per minute is being exceeded. A second or a larger unit should be installed.
- Periodically test the finished solution to ensure the unit is accurately injecting.
ASSEMBLY

- Attach bracket to desired surface.
- Snap the unit into bracket by fitting the two lugs on one side of the body into the corresponding holes in the bracket, and springing the arms apart until the other two lugs click into place. Thread strap through slots in bracket.
- Remove the plastic caps from the inlet, outlet, and dosing stem before connecting unit to the water supply.
- Make certain the water flows in the same direction as the arrows on the body.
SUCTION TUBE

- Unscrew suction tube nut at the bottom of the injection assembly and thread it onto the suction tube.
- Push the tube onto the barb as far as it will go and handtighten the nut.
- Place the suction tube into solution container and position strainer at least 4” above the bottom to avoid particles from being drawn into the unit.
- The level of the solution container must be below the inlet of the unit.

CONNECTION TO WATER SUPPLY

- Attach to water line and slowly open valve to allow flow and pressure to build gradually.

SETTING THE INJECTION RATE

To set the desired injection rate, follow the steps below:

- Turn the water supply off and allow pressure to drop.
- Unscrew the medium retaining nut 2 full turns.
- Screw in or unscrew the injection stem until the desired mark on the graduated scale is aligned with the line inside the clear indicator ring.
- Handtighten medium retaining nut.
OPERATION

• **Slowly** open the water supply valve.
• Press the air-bleed button on the top of the unit. When a constant flow of water comes out from around the button, release it.
• **Slowly** open the water inlet valve to the permitted maximum flow.

![Air-bleed button]

When unit is operating, liquid will be drawn from the solution container and a clicking sound will be heard.

**NOTE**: Rinse the unit after injecting soluble products.

**HOW TO CHANGE SEALS ?**
See pages 10 - 11

**UNIT NOT INJECTING ?**
See page 10 - PLUNGER SEAL

**WATER GOING INTO SOLUTION CONTAINER ?**
See page 11 - CHECK VALVE

**NO CLICKING ?**
See pages 12 - 14
INJECTION STEM

O-RING, PLUNGER SEAL, TOP SEAL AND O-RING

In order to examine or replace the injection stem o-ring, plunger seal, top seal, and O-ring, turn water supply off and allow pressure to drop.

A Unscrew and remove the medium retaining nut. Remove injection stem by twisting and pulling it straight out. Inspect o-ring for cleanliness and wear. Clean or replace as needed.
B Unscrew the piston plunger. Inspect plunger seal for cleanliness and wear. Clean or replace as needed.
C Unscrew injection sleeve. Remove top seal and o-ring and inspect for cleanliness and wear. Clean or replace as needed.

NOTE : Raised center of top seal must face up.

D When installing injection stem, the lug on the bottom of the injection sleeve must be in a notch on the indicator ring.
CHECK VALVE

The check valve is located at the bottom of the injection stem. This valve prevents water from going into the solution container. To remove the check valve, follow the steps below:

A Unscrew the suction tube nut.
B Unscrew the check valve nut. Remove check valve assembly.
C Disassemble the check valve assembly and inspect components to ensure good condition and position. Replace if necessary. If water is going into the solution container, inspect the seal, cone and spring for residue and wear. Replace if necessary.

NOTE: Raised center of check valve seal must face up.
PISTON

The piston or motor must click for the unit to inject. The piston moving up and down in the housing creates clicking. If a unit is not clicking, turn water off and follow the steps below:

A Unscrew bell housing.
B Remove injection stem and piston plunger as discussed on page 10. Lift piston out of body.
C Inspect piston.
PISTON FIT TEST

The piston must fit snugly into the body and bell housing to operate. Follow the steps below to test the fit of the upper and lower piston shells.

Upper Piston Shell
Insert the piston into the bell housing as far as it will go. Slowly, pull piston out. There should be uniform resistance. If not, replace upper piston shell.

Lower Piston Shell
Insert the piston into the body as far as it will go. Slowly, pull piston out. There should be uniform resistance. If not, replace lower piston shell.
BODY AND BELL HOUSING INSPECTION

Inspect body and bell housing for deep scoring or scratches. If present, replace component. A 200 mesh water filter installed in line prior to injector will virtually eliminate sand damage.

High Flow
Flow is the amount of finished solution (water and chemical) that is demanded. The injector is designed to operate up to 11 gallons per minute. Mechanical damage will occur if it operates with flows greater than 11 gallons per minute.

Water Hammer
Water hammer is a surge of water or shock wave caused by opening or closing a valve quickly. The wave rebounds and is diffused by, in most cases, the injector. In order to prevent water hammer, an arrestor will absorb the shock that causes damage to the unit.

For technical support call
FSI North America customer service
at 440-949-2400
# TROUBLESHOOTING

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Cause</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Piston Motor</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Injector does not start or stops</td>
<td>Piston stalled</td>
<td>Reset piston</td>
</tr>
<tr>
<td></td>
<td>Air has not been bled from unit</td>
<td>Bleed air from unit</td>
</tr>
<tr>
<td></td>
<td>Water filter is clogged</td>
<td>Clean the water filter</td>
</tr>
<tr>
<td></td>
<td>Maximum flow exceeded</td>
<td>1. Reduce flow, restart unit 2. Check piston valve seals to ensure correct position</td>
</tr>
<tr>
<td></td>
<td>Piston motor is damaged</td>
<td>Return unit to FSI for repair</td>
</tr>
<tr>
<td><strong>Injection</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water flowing back into solution container</td>
<td>Contaminated, worn, or missing check valve parts</td>
<td>Clean or replace check valve parts</td>
</tr>
<tr>
<td>No suction of solution</td>
<td>The piston has stopped</td>
<td>See piston section of operating manual</td>
</tr>
<tr>
<td></td>
<td>Air leak (inlet) in the suction tube</td>
<td>Check the tightness of the nuts in the injection area</td>
</tr>
<tr>
<td></td>
<td>Blocked suction tube or clogged strainer</td>
<td>Clean suction tube and strainer</td>
</tr>
<tr>
<td></td>
<td>Missing or worn check valve seal</td>
<td>Clean or replace check valve seal</td>
</tr>
<tr>
<td></td>
<td>Missing or worn plunger seal</td>
<td>Clean or replace plunger seal</td>
</tr>
<tr>
<td><strong>Under injection</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suction of air</td>
<td>1. Check the tightness of the nuts in the injection area 2. Check suction tube</td>
<td></td>
</tr>
<tr>
<td>Dirty or worn check valve seal</td>
<td>Clean or replace check valve seal</td>
<td></td>
</tr>
<tr>
<td>Maximum flow exceeded</td>
<td>Reduce flow</td>
<td></td>
</tr>
<tr>
<td>Worn plunger seal</td>
<td>Replace plunger seal</td>
<td></td>
</tr>
<tr>
<td>Worn injection stem</td>
<td>Replace injection stem</td>
<td></td>
</tr>
<tr>
<td><strong>Leaks</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leaks in the vicinity of the black nut under the body</td>
<td>Diffuser seal is damaged or positioned incorrectly</td>
<td>Position correctly or replace diffuser seal</td>
</tr>
<tr>
<td>Leaks between the body and bell housing</td>
<td>Bell housing seal is damaged, positioned incorrectly, or missing</td>
<td>Position correctly, clean the seal seat, or replace bell housing seal</td>
</tr>
</tbody>
</table>
FSI Products

LIMITED 1-YEAR WARRANTY

FSI North America®, a Division of Fire Safety International, Inc.® ("Warrantor") warrants to the original purchaser of all new FSI equipment supplied by Warrantor and to any person to whom such equipment is transferred, that such equipment shall be free from defects in materials and workmanship during the one (1) year period commencing upon the receipt of such equipment.

FSI will repair or replace product at FSI's discretion, which fails to satisfy this warranty at no charge.

We will not be responsible for wear and tear; any improper installation; improper use or maintenance; negligence of the owner or user; damage; or anything else beyond our control. Further, we will not be responsible for any consequential, incidental or indirect damages including any damages and loss of profits from any cause whatsoever. No person has authority to change this warranty.

FSI North America® warrants all new FSI products for a period of one (1) year after the date of purchase against defects in materials or workmanship. We will repair or replace a product that fails to satisfy this warranty. Repair/replacement shall be at the discretion of FSI. Products must be returned promptly to FSI for warranty service AT CLIENT’S COST IN PACKAGING SUITABLE AND CORRECT TO PROPERLY PROTECT THE PRODUCTS DURING THE RETURN SHIPMENT. DAMAGE CAUSED DURING THE RETURN PROCESS, IF ANY, WILL BE AT CLIENT’S EXPENSE AND RESPONSIBILITY. IF THE CLAIM IS INDEED A VALID WARRANTY CLAIM AS DEFINED SOLELY BY FSI - ALL FREIGHT COSTS WILL BE CREDITED BACK TO CLIENT. We will not be responsible for: wear and tear, improper installation, use, maintenance or storage, negligence of the owner/user, repair or modifications after delivery, failure to follow instructions or recommendations, or other misuse or activity beyond our control. FSI reserves the right to change the design or parts of/ in its’ products from time to time without notice and with no obligation to maintain a spare parts inventory or to make matching changes in products previously manufactured.

FSI DAT® series showers and shelters are offered with carry bags/SHELTER SLEEVES designed to offer a basic method to move and transport the product from point A to B. The bags/SLEEVES may also provide basic product protection. In such a capacity FSI carry bags/SLEEVES are subject to scuffs, rips, tears, stitch pulls, et al. These are not considered warranty items. Further FSI carry bags/SHELTER SLEEVES are not considered a product in and of themselves and so no limited 1 year warranty is offered on carry bags/ SHELTER SLEEVES.

NO OTHER WARRANTIES, EXPRESS OR IMPLIED, OTHER THAT THOSE INCLUDED IN THE AFOREMENTIONED STATEMENT ARE OFFERED. FURTHER, WE DISCLAIM ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE.
EMDI 003 - Motor Seal Kit
Includes:
1 - JDI001 Bell housing seal
1 - JDI067 Rack seal
4 - 8J002 Valve seal

EDDI 002 - Dosing Seal Kit
Includes:
1 - JDI009 Injector body seal
1 - JDI010 Plunger seal
2 - JDI011 Check valve seal
2 - JDI012 Check valve O-ring
PARTS LIST

8J002 Seal
20J002 Seal
20P035 Nut
CDDI002 Injection stem assy
EDDI002 Dosing seal kit
EMDI003 Motor seal kit
JDI001 Bell housing seal
JDI067 Rack seal
JDI007 Diffuser seal
JDI009 Injection stem O-ring
JDI010 Plunger seal
JDI011 Seal
JDI012 O-ring
JDI030 Seal
JDI031 Air-bleed seal
MDI001 Water filter
MDI016 Washer
MDI018 Screw
MDI028 Check valve spring
MDI030 Weight nut
MDI092 Screw
MDI215 Cage spring PX
MDI216 Valve spring PX
MDI247 Release spring PX
MMDI015 Plunger rod
MPDI005 Suction hose assembly
MPDI039 Bell housing assembly
MPDI041 Air bleed assembly
MPDI097 Mounted guide assy PX
MPDI098 Piston assembly PX
MPDI099 Mounted cage assy
MPDI100 Cage/guide assembly
MPDI101 Cage/cross head assy
P041 Bracket
PCDI008 Complete piston
PCDI009 Motor piston assy PX
PDI001 Bell housing
PDI002 Body
PDI005-U Actuator rack
PDI007 Upper valve stem
PDI008 Lower valve stem
PDI020 Diffuser
PDI026 Percent scale
PDI027 Ratio scale
PDI029 Medium retaining nut
PDI030 Stem retaining ring
PDI031 Dosage indicator
PDI032 Check valve cone
PDI034 Valve guide
PDI035 Valve seal retainer
PDI036 Nut
PDI037 Check valve barb
PDI038 Suction hose nut
PDI039 Upper seal retainer
PDI042 Suction hose
PDI043 Strainer
PDI108 Air-bleed ring
PDI230 Strap
PDI294 Upper axle PX
PDI296 Piston thrust PX
PDI303 Piston nut PX
PDI304 Piston rod retainer PX
PDI305 Lower piston shell
PDI306 Upper piston shell
PJDII001 Check valve assembly
PJDII002 Plunger assembly
PJDII003 Injection sleeve assembly
PJDII004 Diffuser assembly
PJDII019 Injection stem assembly
PPDI004 Injection sleeve