METERING PUMP
4, 6, AND 8 ROW
OPERATORS MANUAL

READ complete manual CAREFULLY
BEFORE attempting operation.

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www.demco-products.com
Thank you for purchasing a Demco Metering Pump. We feel you have made a wise choice and hope you are completely satisfied with your new Metering Pump. If you have any questions regarding the applications of certain solutions or chemicals, contact your chemical supplier and follow chemical manufacturer recommendations as well as all licensing and use restrictions or regulations.

**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 (grade 5) (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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**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.
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.

**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.

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### Bolt Torque for Standard bolts *

<table>
<thead>
<tr>
<th>i A i</th>
<th>GRADE 2</th>
<th>GRADE 5</th>
<th>GRADE 8</th>
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<td>lb-ft (N.m)</td>
<td>lb-ft (N.m)</td>
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<td>1/4î</td>
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<td>9 (12)</td>
<td>12 (16)</td>
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<td>10 (13)</td>
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<td>25 (35)</td>
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<td>20 (27)</td>
<td>30 (40)</td>
<td>45 (60)</td>
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<tr>
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<td>30 (40)</td>
<td>50 (70)</td>
<td>80 (110)</td>
</tr>
<tr>
<td>1/2î</td>
<td>45 (60)</td>
<td>75 (100)</td>
<td>115 (155)</td>
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<td>9/16î</td>
<td>70 (95)</td>
<td>115 (155)</td>
<td>165 (220)</td>
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<td>5/8î</td>
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<td>3/4î</td>
<td>165 (225)</td>
<td>290 (390)</td>
<td>400 (540)</td>
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<td>7/8î</td>
<td>170 (230)</td>
<td>420 (570)</td>
<td>650 (880)</td>
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<tr>
<td>1î</td>
<td>225 (300)</td>
<td>630 (850)</td>
<td>970 (1310)</td>
</tr>
</tbody>
</table>

* 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.

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### Bolt Torque for Metric bolts *

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

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* Bolt Torque for Metric bolts *
CHANGING THE PUMP ROTATION

In some instances, it may become necessary to change the direction of material flow in the metering pump. For example: The MPGDW drive unit is set up to be pulled thru the field with an M series pump. If the unit must be pushed thru the field the direction of material flow in the metering pump must be reversed.

1. Remove the pump hoses from the hose barbs on the manifold. (Leave the hoses connected to the hose barbs on the front plate.

2. Remove the front plate from the pump.

3. Remove the tightener holder bracket from the front plate and fasten it to the opposite side of the front plate.

4. Turn the front plate upside down and replace the tightener holder bracket.

5. Replace the front plate in the pump.

6. Replace the hoses on the manifold hose barbs.

7. Rotate the pump to see if the hoses climb on each other. If they do, twist the pump hose on the barb slightly to eliminate climbing.

8. Rotate the manifold in the front plate so the hoses won't be kinked.

METERING PUMP DRIVE METHODS

Counter Shaft Drive: The metering pump can be mounted and driven several different ways. Metering pumps are mounted on either pull type planters or tool bar planters with tailor made mounting brackets available for most planters in use today. Most planters have a "counter shaft" which is normally used to drive various other mechanisms on the planter and is also used to drive the metering pump by using a "drive sprocket".

Gauge Wheel Drive: Some planters don't have counter shaft and therefore require a different means of drive. Two methods can be used to drive the metering pump on a planter without a counter shaft. One of these would be to use the GDW 14, 15 or 16 drive which consists of a hub, shaft and sprocket which bolts on an existing gauge drive wheel on the planter. The pump is driven from this wheel. This type of drive is used most frequently on unit type planters.

Ground Wheel Drive: The other means of driving the metering pump on a planter without a counter shaft would be to use the MPGDW drive which consists of a ground drive wheel that mounts on the planter frame. The metering pump sets on top of the MPGDW and is driven from the ground drive wheel. This type is used most frequently on planters with press wheel drives.
QUICK COUPLERS FOR SIDE MOUNTED TRACTOR TANKS

NOTE: Metering orifices are not recommended to be used with Demco metering pumps. Flow dividers are not recommended to split the flow from one pump hose to two individual outlets.

PLUMBING PARTS LIST

<table>
<thead>
<tr>
<th>REF. NO.</th>
<th>PART NO.</th>
<th>QTY.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>EL3410</td>
<td>2</td>
<td>3/4&quot; MPT x 1&quot; HB Elbow</td>
</tr>
<tr>
<td>2.</td>
<td>R20</td>
<td>8</td>
<td>1&quot; Hose Clamp</td>
</tr>
<tr>
<td>3.</td>
<td>1000</td>
<td>-</td>
<td>1&quot; Vinyl Hose</td>
</tr>
<tr>
<td>4.</td>
<td>UV075FP</td>
<td>2</td>
<td>3/4&quot; Poly Ball Valve</td>
</tr>
<tr>
<td>5.</td>
<td>A3410</td>
<td>4</td>
<td>3/4&quot; MPT x 1&quot; HB Fitting</td>
</tr>
<tr>
<td>6.</td>
<td>R11SS</td>
<td>-</td>
<td>1/2&quot; Hose Clamp</td>
</tr>
<tr>
<td>7.</td>
<td>120</td>
<td>-</td>
<td>1/2&quot; Vinyl Hose</td>
</tr>
</tbody>
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Additional Parts Needed for Side Mount Tanks

<table>
<thead>
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<th>PART NO.</th>
<th>QTY.</th>
<th>DESCRIPTION</th>
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<tbody>
<tr>
<td>8.</td>
<td>633C1</td>
<td>2</td>
<td>1&quot; Quick Coupler</td>
</tr>
<tr>
<td>9.</td>
<td>633E1</td>
<td>2</td>
<td>1&quot; Adaptor</td>
</tr>
<tr>
<td>10.</td>
<td>R20</td>
<td>4</td>
<td>1&quot; Hose Clamp</td>
</tr>
</tbody>
</table>

NOTE: All pump inlets must be fed to assure even application to each row.

1. Begin the plumbing installation by turning the one fitting (#1) into the tank outlet fitting in the bottom of each tank.
2. Run the 1" vinyl hose (#3) from the tanks to the pump. Make sure the hose doesn't rub against a sharp edge or turning shaft, etc.
3. Turn the fittings (#5) into the 3/4" ball valves.
4. Run the 1" vinyl hose going from the tank to the pump and insert the ball valve. Cut and insert the valves in a location where they are easily accessible.
5. Run the 1/2" vinyl hose (#7) from the outlet fittings on the pump to the flow divider assemblies on the application devices.

NOTE: The pump will act as a valve in the system when there is tension on the pump hoses. However, it is recommended that the ball valves be shut-off if the planter is going to set still more than 10 minutes.

NOTE: If a loop is put in the hose directly above the shoe or disc opener fertilizer should not drain from the hoses after the planter is raised.

NOTE: Pipe thread sealant should be used on all threaded fittings.

INSTALLATION

Please order replacement parts by PART NO. and DESCRIPTION.
### FOUR ROW METERING PUMP PARTS LIST

<table>
<thead>
<tr>
<th>REF. NO.</th>
<th>PART NO.</th>
<th>QTY.</th>
<th>DESCRIPTION</th>
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<tbody>
<tr>
<td>1.</td>
<td>00007</td>
<td>6</td>
<td>5/16”-18 UNC Hex Nut</td>
</tr>
<tr>
<td>2.</td>
<td>00062</td>
<td>8</td>
<td>1/4”-20 UNC Hex Nut</td>
</tr>
<tr>
<td>3.</td>
<td>00085</td>
<td>4</td>
<td>1/2” Flatwasher</td>
</tr>
<tr>
<td>4.</td>
<td>00090</td>
<td>4</td>
<td>9/16”-12 UNC Jam Nut</td>
</tr>
<tr>
<td>5.</td>
<td>01076</td>
<td>2</td>
<td>1/4”-20 UNC x 3/4” Hex Head Bolt</td>
</tr>
<tr>
<td>6.</td>
<td>01263</td>
<td>6</td>
<td>5/16”-18 UNC x 3/4” Hex Head Bolt</td>
</tr>
<tr>
<td>7.</td>
<td>01380</td>
<td>4</td>
<td>Bearing Plate</td>
</tr>
<tr>
<td>8.</td>
<td>01663</td>
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<td>Sealed Bearing</td>
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<tr>
<td>9.</td>
<td>01669-30</td>
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<td>Pump Frame - 4 row</td>
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<tr>
<td>10.</td>
<td>01670</td>
<td>1</td>
<td>Four Outlet Manifold</td>
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<td>1/4”-20 UNC x 1” Hex Bolt</td>
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<tr>
<td>13.</td>
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<td>1/2” Pump Hose (standard)</td>
</tr>
<tr>
<td></td>
<td>25CS</td>
<td>4</td>
<td>3/8” Pump Hose (optional)</td>
</tr>
<tr>
<td></td>
<td>26CS</td>
<td>4</td>
<td>5/8” Pump Hose (optional)</td>
</tr>
<tr>
<td>14.</td>
<td>28TH-30</td>
<td>1</td>
<td>28 Tooth Hub Sprocket</td>
</tr>
<tr>
<td>15.</td>
<td>2CS4-30</td>
<td>1</td>
<td>Front Plate - 4 row</td>
</tr>
<tr>
<td>16.</td>
<td>38CS-95</td>
<td>1</td>
<td>Tightening Holder Bracket</td>
</tr>
<tr>
<td>17.</td>
<td>3CS-95</td>
<td>2</td>
<td>Outer Manifold Clamp</td>
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<tr>
<td>18.</td>
<td>4CS</td>
<td>1</td>
<td>Clevis Pin - 1/4” x 3/4”</td>
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<td>19.</td>
<td>5CS-95</td>
<td>1</td>
<td>Special Washer</td>
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<td>20.</td>
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<td>Spring</td>
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<td>21.</td>
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<td>Cylinder Wheel (set screw included)</td>
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<td>01377</td>
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<td>7/16”-14 UNC x 11 Sq. Hd. Set Screw</td>
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<td>01378</td>
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<td>7/16”-14 UNC Jam Nut</td>
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### FOUR ROW METERING PUMP PARTS BREAKDOWN

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<td>Roller Assy. - 4 row</td>
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<td>A1212</td>
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<td>1/2” MPT x 1/2” HB (standard)</td>
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<tr>
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<td>A1238</td>
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<td>1/2” MPT x 3/8” HB (optional)</td>
</tr>
<tr>
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<td>A1258</td>
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<td>1/2” MPT x 5/8” HB (optional)</td>
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<td>1/2” Hose Clamp (standard)</td>
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### Torsion Arm Assembly

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<td>23CS-95</td>
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Please order replacement by PART NO. and DESCRIPTION.
SIX & EIGHT ROW METERING PUMP PARTS BREAKDOWN

EIGHT ROW METERING PUMP PARTS LIST

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<td>8</td>
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<tr>
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<td>00085</td>
<td>4</td>
<td>1/2&quot; Flatwasher</td>
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<td>02858</td>
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<td>9/16&quot;-12 UNC Jam Nut</td>
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<tr>
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<td>01263</td>
<td>6</td>
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<td>7.</td>
<td>01368-30</td>
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<td>01370-30</td>
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<td>Front Plate - 8 Row</td>
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<td>01372</td>
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<td>Long Roller w/male threads - 8 Row</td>
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<td>Short Roller - 8 Row</td>
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<td>Cylinder Wheel w/set screw</td>
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<td>2</td>
<td>7/16-14 UNC x 11 Sq. Hd. Set Screw</td>
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<td>7/16-14 UNC Jam Nut</td>
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<td>01380</td>
<td>4</td>
<td>Bearing Plate</td>
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<td>01660</td>
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<td>Eight Outlet Manifold</td>
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<td>Pump Shaft</td>
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<td>17.</td>
<td>01663</td>
<td>2</td>
<td>Sealed Bearing</td>
</tr>
<tr>
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<td>04055</td>
<td>4</td>
<td>1/4&quot;-20 UNC x 1&quot; 1/4&quot; Hex Bolt</td>
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<tr>
<td>19.</td>
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<td>4</td>
<td>1/2&quot; Pump Hose (standard)</td>
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<td>25CS</td>
<td>4</td>
<td>3/8&quot; Pump Hose (optional)</td>
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<td>26CS</td>
<td>4</td>
<td>5/8&quot; Pump Hose (optional)</td>
</tr>
<tr>
<td>22.</td>
<td>28TH-30</td>
<td>1</td>
<td>28 Tooth Hub Sprocket</td>
</tr>
<tr>
<td>23.</td>
<td>38CS-95</td>
<td>1</td>
<td>Tightening Holder Bracket</td>
</tr>
<tr>
<td>24.</td>
<td>3CS-95</td>
<td>2</td>
<td>Outer Manifold Clamp</td>
</tr>
<tr>
<td>25.</td>
<td>4CS</td>
<td>1</td>
<td>Clevis Pin - 1/4&quot; x 3/4&quot;</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>REF. NO.</th>
<th>PART NO.</th>
<th>QTY.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>26.</td>
<td>EL3410</td>
<td>2</td>
<td>3/4&quot; MPT x 1&quot; HB Elbow</td>
</tr>
<tr>
<td>27.</td>
<td>R11SS</td>
<td>16</td>
<td>1/2&quot; Hose Clamp (standard)</td>
</tr>
<tr>
<td>28.</td>
<td>R9SS</td>
<td>32</td>
<td>3/8&quot; Hose Clamp (optional)</td>
</tr>
<tr>
<td>29.</td>
<td>R12SS</td>
<td>32</td>
<td>5/8&quot; Hose Clamp (optional)</td>
</tr>
<tr>
<td>30.</td>
<td>00992</td>
<td>2</td>
<td>1/4&quot;-20 UNC x 1/2&quot; Ig. Hex Head Bolt</td>
</tr>
<tr>
<td>31.</td>
<td>28CS</td>
<td>1</td>
<td>Small Hairpin</td>
</tr>
<tr>
<td>32.</td>
<td>F1200</td>
<td>2</td>
<td>Plug (Turn 8 row to 6 row)</td>
</tr>
</tbody>
</table>

Please order replacement by PART NO. and DESCRIPTION.

---

Torsion Arm Assembly

<table>
<thead>
<tr>
<th>REF. NO.</th>
<th>PART NO.</th>
<th>QTY.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>00007</td>
<td>2</td>
<td>5/16&quot;-18 UNC Hex Nut</td>
</tr>
<tr>
<td>2.</td>
<td>01921</td>
<td>2</td>
<td>5/16&quot;-18 UNC x 3/4&quot; Ig. Truss Hd. Bolt</td>
</tr>
<tr>
<td>3.</td>
<td>21CS-95</td>
<td>1</td>
<td>Lever Bracket</td>
</tr>
<tr>
<td>4.</td>
<td>22CS-95</td>
<td>1</td>
<td>Tightening Lever</td>
</tr>
<tr>
<td>5.</td>
<td>23CS-95</td>
<td>1</td>
<td>Notched Tension Arm</td>
</tr>
</tbody>
</table>

Page 7
Begin by determining the gallon per acre you wish to apply (contact your local fertilizer dealer for recommended amounts on particular soil types) and set the pump rollers to obtain your desired gallons per acre. After the rollers are set, adjust the pressure or tension the pump rollers exert on the pump hoses. The tension on the hose plays an important part in determining the rate per acre. If the tension isn’t enough the material from the tank will gravity flow by the pump and the rate per acre will be much higher than indicated on the rate chart. If the tension is too tight the hoses will collapse between the pump rollers and the rate per acre will be much lower than indicated on the rate chart.

Proper hose tension can be obtained by setting the front plate in the correct holes in the base plate and by setting the notched tension lever on top of the pump at the corresponding setting. When choosing the desired setting, the front plate should be kept as close to perpendicular to the base plate as possible. Each time the pump roller setting or hose size is changed, the settings for the front plate and notched tension lever must also be changed.

NOTE: Always shut tank valves and release hose tension when the pump is not being used to extend pump life.

**ROTATING THE MANIFOLD**

After setting the pump roller and hose tension the manifold must be rotated in the front plate so the hose won’t become kinked coming off of the manifold fittings. If the pump hoses are kinked the rate per acre will be reduced. To eliminate this problem simply loosen the four bolts on the front plate holding the manifold in place, rotate the manifold accordingly, and retighten the bolts. After these adjustments are completed the pump should be ready for operation.

NOTE: Hoses are running straight from manifold fittings.
There are many factors which may affect the rate per acre chart, therefore the chart should only be used as a guide. When the rate per acre chart was calibrated, the following factors were found to affect the rate per acre.

1. **The position of the tank outlet fitting in relation to the manifold on the pump.**
   During testing the tank outlet fitting and the pump manifold were on the same level. If the tank is located above the pump the rate per acre may be increased slightly over what the chart indicates. If the tank is located below the pump the rate per acre is decreased.

2. **The distance from the tank to the pump.**
   When using TBP plumbing kits, the length of hose from the tank to the pump is much longer. This will cause a reduction in the rate per acre.

3. **The material being used.**
   The rate chart was calibrated using water. Fertilizer solutions are normally heavier and therefore would reduce the rate per acre.

4. **The tire size.**
   The rate chart was calibrated using a 7.75 x 14" tire with an 85" circumference. A tire larger than this would slow the pump down, thereby decreasing the rate shown in the chart. A smaller tire would speed the pump up, increasing the rate per acre.

5. **The hose tension.**
   If the hose tension isn't set tight enough the material will "gravity flow" through the pump and the rate per acre will be higher than indicated in the chart. If the hose tension is too tight the hose will collapse between the rollers and the rate per acre will be reduced.

6. **The planter.**
   The rate per acre chart is calibrated by using a 1 to 1.25 ground drive wheel to planter counter shaft ratio. Some planter's counter shafts turn slower than this and some turn faster.

7. **Others**
   Tire pressure, tire tread, soil condition and other factors can play a part in determining rate per acre. Although the difference in rates caused by these factors may be almost negligible, they should not be ignored.

### HOSE OUTPUT IN GALLONS PER ACRE

<table>
<thead>
<tr>
<th>PUMP SETTINGS</th>
<th>3/8&quot; HOSE</th>
<th>1/2&quot; HOSE</th>
<th>5/8&quot; HOSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>20&quot; Rows</td>
<td>8 10 14 16 18</td>
<td>14 18 26 34 38</td>
<td>18 28 38 48 60</td>
</tr>
<tr>
<td>30&quot; Rows</td>
<td>5 7 9 11 12</td>
<td>9 12 17 23 25</td>
<td>12 19 25 32 40</td>
</tr>
<tr>
<td>36&quot; Rows</td>
<td>4 6 8 9 10</td>
<td>8 10 14 19 21</td>
<td>10 16 21 27 33</td>
</tr>
<tr>
<td>38&quot; Rows</td>
<td>4 5 7 8 9</td>
<td>7 9 14 18 20</td>
<td>9 15 20 25 32</td>
</tr>
<tr>
<td>40&quot; Rows</td>
<td>4 5 7 8 9</td>
<td>7 9 13 17 19</td>
<td>9 14 19 24 30</td>
</tr>
</tbody>
</table>

The above chart does not apply to low volume pumps.

The above chart was calibrated using a ground drive wheel tire with an 85" circumference and a 1 to 1.25 revolution ratio between the ground drive wheel and metering pump. Use this chart as a guide and check the actual output of the pump after installation is complete.

### HOW MUCH FERTILIZER TO THE ACRE

The metering Pump can be made to apply from less than 4 gallons per acre to 60 gallons per acre. In most cases 100 lbs. or 10 gallons per acre is considered to be a normal application amount, therefore the metering pump is fitted with 1/2" hoses and preset at the factory to apply approximately 100 lbs. per acre when installed on most planters. Application rates below or above the 100 lbs. setting can be obtained: 1. By Changing the pump roller setting on the cylinder wheel 2. By using different size sprockets, or 3. By using different size pump hoses.

**NOTE:** DETHMERS MANUFACTURING COMPANY does not and will not make any recommendations concerning the application of various chemicals or solutions. These recommendations relate to either amount or procedure of materials applied. If you have any questions regarding the application of certain chemicals or solutions, contact your chemical supplier and follow chemical manufacturer recommendations.

1. **Pump Roller Settings**
   The rate per acre can be changed by moving the rollers on the pump wheel in or out. The five settings marked on the pump cylinder wheel are numbered 4, 5, 6, 7 and 8. The number 4 setting will produce the lowest volume and the number 8 setting will produce the largest volume. The rollers can also be set in between numbers to vary the rate a few gallons up or down.

2. **Sprockets**
   There are a number of different size sprockets available from DETHMERS to vary the rate per acre of the metering pump. The sprockets included with the pump are considered standard and are used to obtain a predetermined ratio between the ground drive wheel and the pump. The rate per acre chart is also based on those standard sprocket combinations. If other sprockets are used the following must be done:
**Increasing the rate per acre using sprockets (cont’d)**

When the pump roller is set on the number 8 setting and a larger rate per acre is desired, the sprocket combination must be changed. This can be done by:

**A:** Use a larger drive sprocket (on the counter shaft or ground drive wheel depending on which method is being used to drive the pump). To find the percentage of increase, divide the number of teeth of the replacement sprocket by the number of teeth on the standard sprocket:

\[
\% \text{Increase} = \frac{\text{TR (no. of teeth on replacement sprocket)}}{\text{TS (no. of teeth on standard sprocket)}}
\]

For example: If the standard drive sprocket has 28 teeth and the replacement drive sprocket has 34 teeth, the percentage of increase would be approximately 21 percent.

\[
\frac{34 \text{ (no. of teeth on replacement sprocket)}}{28 \text{ (no. of teeth on standard sprocket)}} = 21\%
\]

**B.** Use a smaller drive sprocket on the pump.

The above formula would be reversed as follows:

\[
\% \text{Decrease} = \frac{\text{TS (no. of teeth on standard sprocket)}}{\text{TR (no. of teeth on replacement sprocket)}}
\]

For example: If the standard pump sprocket has 28 teeth and the replacement sprocket has 24 teeth, the percentage of decrease would be approximately 16.5 percent.

\[
\frac{24 \text{ (no. of teeth on replacement sprocket)}}{28 \text{ (no. of teeth on standard sprocket)}} = 16.5\%
\]

**Decreasing the rate per acre using sprockets**

When the pump rollers are set on the number 4 setting and a smaller rate per acre is desired, the sprocket combination must be changed. This can be done by:

**A.** Use a smaller drive sprocket (on the counter shaft or ground drive wheel, depending on which method is being used to drive the pump). To find the percentage of decrease, divide the number of teeth of the replacement sprocket by the number of teeth on the standard sprocket:

\[
\% \text{Decrease} = \frac{\text{TR (no. of teeth on replacement sprocket)}}{\text{TS (no. of teeth on standard sprocket)}}
\]

For example: If the standard drive sprocket has 28 teeth and the replacement drive sprocket has 24 teeth, the percentage of decrease would be approximately 14.3 percent.

\[
\frac{24 \text{ (no. of teeth on replacement sprocket)}}{28 \text{ (no. of teeth on standard sprocket)}} = 14.3\%
\]

**B.** Use a larger drive sprocket on the pump shaft. The above formula would be reversed as follows:

\[
\% \text{Decrease} = \frac{\text{TS (no. of teeth on standard sprocket)}}{\text{TR (no. of teeth on replacement sprocket)}}
\]

For example: If the standard pump sprocket has 28 teeth and the replacement pump sprocket has 34 teeth, the percentage of decrease would be approximately 17.6 percent.

\[
\frac{34 \text{ (no. of teeth on replacement sprocket)}}{28 \text{ (no. of teeth on standard sprocket)}} = 17.6\%
\]

### 3. Pump Hoses

There are three different size pump hoses that can be used on the metering pump: 3/8" I.D., 1/2" I.D. and 5/8" I.D.

3/8" Pump hoses are normally used for low volume applications. This can range anywhere from 4 gallons per acre to a maximum of 9 gallons per acre using standard sprockets.

1/2" Pump hoses are normally used for average applications. Rates from slightly over 7 gallons per acre to a maximum of 18 gallons per acre can be applied using standard sprockets.

5/8" Pump hoses are normally used for high volume applications. Rate from approximately 8 gallons per acre to a maximum of 30 gallons per acre can be applied using standard sprockets.

The lowest and highest volume for each size pump hose is with the pump rollers in the number 4 setting for the lowest volumes and the number 8 setting for the highest volumes.

If it becomes necessary to change the pump hoses, make sure they are running straight on the rollers after installing the new hoses. Check this by rotating the pump approximately 30 revolutions. If the hoses "climb up" on each other, twist the hose on the hose barb fittings until the problem is corrected. Pump hose change-over kits are available from complete with hoses, fittings and clamps.

### CALIBRATION PROCEDURE

Mark off a distance of 660 feet in the field where the spraying is to be done and run the tractor over this distance, making sure that your rig is at desired speed before traveling the distance, and being careful to mark the throttle setting or speedometer reading. With the tank full of water, pull the hose off the disc opener or pop up and collect the water while driving over the 660 ft. distance.

Measure the output of one (or several) rows in gallons.

\[
\begin{align*}
1 \text{ cup} & = 1/16 \text{ gallon} = .0625 \\
1 \text{ pint} & = 1/8 \text{ gallon} = .125 \\
1 \text{ quart} & = 1/4 \text{ gallon} = .25
\end{align*}
\]

Calculate the amount applied.

\[\text{# of gallons used x 66} = \text{rate} \times \text{(row width (in inches) / 12)}\]

Example: We collect 1 quart + 1 pint + 1 cup

\[
\begin{align*}
1 \text{ quart} & = .25 \\
1 \text{ pint} & = .125 \\
1 \text{ cup} & = .0625 \\
\end{align*}
\]

\[
.4375 \times 66 = 28.875 \text{ gallons}
\]

\[
\frac{28.875 \text{ gallons}}{2.5} = 11.55 \text{ GPA}
\]
TROUBLE SHOOTING

The information given below has been provided to assist operators in locating common problems encountered with the operation of this pump.

**Problem** Pump is putting on too much material.

**Cause** The hose tension is set too loose and material is gravity flowing through the pump.

**Solution** Check under “Preparing the Pump for Operation” and reset the front plate and notched tension lever setting accordingly.

**Problem** No material is being pumped at all or only to some lines.

**Cause** Obstacle in the manifold or inlet lines.

**Solution** Take the manifold off and check for obstacle and check inlet lines to pump.

**Problem** Clutch fork pins show excessive wear.

**Cause** Improper clutch rod adjustment on either the clutch arm on the pump or the axle bar bracket on the planter.

**Solution** Set the clutch rod in a different hole in the clutch arm on the pump or the axle bar bracket on the planter.

**Problem** Hoses climb or roll up on each other.

**Cause** One or more hoses may be twisted slightly on the barb fittings coming from either the manifold or the front plate.

**Solution** Turn the hose on the barb fitting a little bit to straighten it out.

**Cause** Twisted pump hose.

**Solution** Remove hose from barb on manifold end. Using a plier, turn entire hose and barb assembly on distribution end 180 degrees. Replace hose on manifold end. (If this fails, remove hose, turn end-for-end, and reinstall.)

**Problem** Pump isn’t putting on enough material.

**Cause** The hose tension is set too tight and the hoses aren’t opening properly between the pump rollers.

**Solution** Check under “Preparing the Pump for Operation” and reset the front plate and notched tension lever setting accordingly.

**Cause** Wrong sprocket combination.

**Solution** Check under “Decreasing Rates Per Acre By Using Sprockets” and substitute the sprockets accordingly.

**Cause** Wrong hose size or wrong pump roller setting.

**Solution** Substitute existing pump hose with smaller hoses or reposition the pump rollers.

**Cause** The manifold wasn’t rotated properly.

**Solution** Check under “Rotating The Manifold”.

**Problem** No material is being pumped at all or only to some lines.

**Cause** Obstacle in the manifold or inlet lines.

**Solution** Take the manifold off and check for obstacle and check inlet lines to pump.

**Problem** Clutch fork pins show excessive wear.

**Cause** Improper clutch rod adjustment on either the clutch arm on the pump or the axle bar bracket on the planter.

**Solution** Set the clutch rod in a different hole in the clutch arm on the pump or the axle bar bracket on the planter.

**Problem** Hoses climb or roll up on each other.

**Cause** One or more hoses may be twisted slightly on the barb fittings coming from either the manifold or the front plate.

**Solution** Turn the hose on the barb fitting a little bit to straighten it out.

**Cause** Twisted pump hose.

**Solution** Remove hose from barb on manifold end. Using a plier, turn entire hose and barb assembly on distribution end 180 degrees. Replace hose on manifold end. (If this fails, remove hose, turn end-for-end, and reinstall.)

**Problem** Pump isn’t putting on enough material.

**Cause** The hose tension is set too tight and the hoses aren’t opening properly between the pump rollers.

**Solution** Check under “Preparing the Pump for Operation” and reset the front plate and notched tension lever setting accordingly.

**Cause** Wrong sprocket combination.

**Solution** Check under “Decreasing Rates Per Acre By Using Sprockets” and substitute the sprockets accordingly.

**Cause** Wrong hose size or wrong pump roller setting.

**Solution** Substitute existing pump hose with smaller hoses or reposition the pump rollers.

**Cause** The manifold wasn’t rotated properly.

**Solution** Check under “Rotating The Manifold”.

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**Cause** Obstacle in the manifold or inlet lines.

**Solution** Take the manifold off and check for obstacle and check inlet lines to pump.

**Problem** Clutch fork pins show excessive wear.

**Cause** Improper clutch rod adjustment on either the clutch arm on the pump or the axle bar bracket on the planter.

**Solution** Set the clutch rod in a different hole in the clutch arm on the pump or the axle bar bracket on the planter.

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**Problem** Pump isn’t putting on enough material.

**Cause** The hose tension is set too tight and the hoses aren’t opening properly between the pump rollers.

**Solution** Check under “Preparing the Pump for Operation” and reset the front plate and notched tension lever setting accordingly.

**Cause** Wrong sprocket combination.

**Solution** Check under “Decreasing Rates Per Acre By Using Sprockets” and substitute the sprockets accordingly.

**Cause** Wrong hose size or wrong pump roller setting.

**Solution** Substitute existing pump hose with smaller hoses or reposition the pump rollers.

**Cause** The manifold wasn’t rotated properly.

**Solution** Check under “Rotating The Manifold”.

**Problem** No material is being pumped at all or only to some lines.

**Cause** Obstacle in the manifold or inlet lines.

**Solution** Take the manifold off and check for obstacle and check inlet lines to pump.

**Problem** Clutch fork pins show excessive wear.

**Cause** Improper clutch rod adjustment on either the clutch arm on the pump or the axle bar bracket on the planter.

**Solution** Set the clutch rod in a different hole in the clutch arm on the pump or the axle bar bracket on the planter.

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**Solution** Remove hose from barb on manifold end. Using a plier, turn entire hose and barb assembly on distribution end 180 degrees. Replace hose on manifold end. (If this fails, remove hose, turn end-for-end, and reinstall.)

**Problem** Pump isn’t putting on enough material.

**Cause** The hose tension is set too tight and the hoses aren’t opening properly between the pump rollers.

**Solution** Check under “Preparing the Pump for Operation” and reset the front plate and notched tension lever setting accordingly.

**Cause** Wrong sprocket combination.

**Solution** Check under “Decreasing Rates Per Acre By Using Sprockets” and substitute the sprockets accordingly.

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**Solution** Remove hose from barb on manifold end. Using a plier, turn entire hose and barb assembly on distribution end 180 degrees. Replace hose on manifold end. (If this fails, remove hose, turn end-for-end, and reinstall.)

**MAINTENANCE**

One of the features of the metering pump is that it is almost maintenance free. There are a few things that should be done, however, to prolong the life of the pump.

1. Always flush the metering pump (and the rest of the system) out with water after operation.

2. If fertilizer comes in contact with pump, especially the pump rollers, wash everything thoroughly with water.

3. If the planter is stored outside, make sure the pump is covered with black plastic to shield the pump hoses from direct sunlight.

4. Always completely release the tension on the pump hoses when the planter is not in use.

5. Make sure the chain receives enough oil to run smoothly.
METERING PUMP CHECKLIST:

Downtime caused by field breakdowns is costly and time consuming. Many breakdowns can be eliminated by periodic equipment maintenance. By spending time reviewing this checklist before seasonal spraying application time and following proper after-season care, you can save time and money later.

⚠️ WARNING: To Prevent Serious Injury Or Death

- Keep hands, feet, and loose clothing away from rotating parts.
- Wear protective clothing recommended by your chemical and fertilizer manufacturer when working with chemicals.

Check Before Going To The Field:

1. **HOSES**
   - Check all hoses for worn or soft spots. Be sure all hose clamps are tightened and hoses are not kinked or pinched. Check for leakage in any lines.

2. **TANK**
   - Inspect fitting and grommets to insure they are in good condition.

3. **CONTROLS**
   - Check for leakage, plugging, or wear on all valves, fittings, etc. Clean off any build up of foreign material.

4. **PUMP**
   - Check to be sure metering pump turns freely.

5. **FRAME**
   - Be sure all bolts are tightened.

6. **REPLACEMENT PARTS**
   - Replace all worn or damaged parts.

After Season Care:

**NOTE:** It is important to wear proper safety equipment when cleaning the metering pump. See your chemical or fertilizer package for this information.

1. After spraying chemicals, run water mixed with cleaners through tank, pump and all hose hookups. If wettable powder dries out in the system, it is very difficult to put back into suspension and can cause malfunction, damage or injury.

2. When cleaned, tank should have all openings closed or covered to keep dirt from entering.

3. Dispose of all unused chemicals or solutions in a proper and ecologically sound manner.

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