HINIKER

HM860 FLOWMETER

OPERATOR'S MANUAL

DO NOT USE OR OPERATE THIS EQUIPMENT UNTIL THIS MANUAL
HAS BEEN READ AND THOROUGHLY UNDERSTOOD

PART NUMBER 393-008-020 Rev. C

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393-008-020 Rev. C **12/10** **Manual/393008020RevC**

THIS SAFETY SYMBOL IDENTIFIES IMPORTANT SAFETY INFORMATION IN THIS MANUAL. WHEN YOU SEE THIS SYMBOL, BE ALERT TO THE POSSIBILITY OF PERSONAL INJURY AND READ CAREFULLY THE INFORMATION THAT FOLLOWS.

INTRODUCTION

CAUTION: DO NOT INSTALL OR OPERATE THIS EQUIPMENT UNTIL THIS MANUAL HAS BEEN READ AND THOROUGHLY UNDERSTOOD.

HM860 FLOWMETER

The purpose of this manual is to provide information on the basic installation, operation, and maintenance of the HM860 FLOWMETER.

For system setup, operation, and precautions, consult the manual(s) for the system being used.

For HINIKER systems refer to one or more of the manuals listed here.

8100 OPERATORS MANUAL 393-000-009

8150 OPERATORS MANUAL 393-000-015

8160 OPERATORS MANUAL 39300030

8200 OPERATORS MANUAL 393-000-010

8605 OPERATORS MANUAL 39300018

HINIKER ANHYDROUS AMMONIA MONITORING AND CONTROL SYSTEM

Refer to manual part number 360-000-246 Revision E or later for heat exchanger manufactured prior to 2007. These are painted gray. Or, refer to manual part number 39300035 for heat exchanger manufactured in 2007 or after. These are painted white.

Copies of these manuals are available through your local HINIKER dealer.

HINIKER COMPANY RESERVES THE RIGHT TO CHANGE ANY SPECIFICATION WITHOUT NOTICE.

SPECIFICATIONS *	
Flow Range:	3.0 Gpm - 70 Gpm
Pressure:	400 Psi Max.
Output:	Open Collector 20 Ma. Max. 20 VDC. Max.
Power:	8 VDC. - 18 VDC @ 13 Ma. Max.
Connector:	Pin #1 - Ground
	Pin #2 - Signal
	Pin #3 - Power

MATERIALS OF CONSTRUCTION	
Housing:	Stainless Steel
Turbine:	Polypropylene
Magnet:	Ceramic 1, 2 Pole
Shaft:	Stainless Steel
Bushings:	Graphite
Bearings:	Sapphire
Sensor:	Polypropylene

TYPICAL PERFORMANCE	
Pressure Drop:	2 PSI @ 70 GPM
Flow Range:	3.0 GPM - 70 GPM
Linearity:	3.0 GPM - 70 GPM: +/- 1.5%
	7 GPM - 70 GPM: +/- .5%

INSTALLATION OPERATION

INSTALLATION PRECAUTIONS

Although the HM860 FLOWMETER was designed to be operated while mounted in any direction, when used in applications with flow of 5 gallons per minute or less, it is recommended to install the HM860 FLOWMETER in the vertical position with the flow direction up (arrow on meter pointing up).

Do not install the HM860 FLOWMETER near strong magnetic fields such as those created by solenoids or motors. Keep all electrical wiring at least 1 foot away from meter.

INSTALLATION

For proper flowmeter location for your application consult the operating manual supplied with your system.

OPERATION

The HM860 FLOWMETER has an output signal proportional to the flow through it. There are decals on the meter with the calibration numbers needed to calibrate the controller. These calibration numbers are in “PULSES PER GALLON” and “PULSES PER POUND OF ACTUAL NITROGEN”.

For system operation refer to the operating manual for the system being used.

INSTALLATION
SPRAYER APPLICATION

Refer to figure 2 for the proper installation of the HM860 FLOWMETER.

STEP 1 Find a convenient location (vertical for low flow rates) on your sprayer to mount the flowmeter.

NOTE: Use Teflon pipe sealant tape on all pipe connections. Check all hoses and fittings for slag or contamination prior to assembly. Slag and pipe sealant (tape) are a major cause of flowmeter problems.

IMPORTANT: The pipe adapter (item 4) must be installed on the inlet side of the flowmeter. It's purpose is to reduce turbulence caused by hoses, elbows, and reducers. Failure to use at least 4 inches of straight 1 1/4 inch pipe may cause the flowmeter to be inaccurate.

STEP 2 Install pipe adapters (items 4, 5, 6, 7) on the flowmeter.

STEP 3 Install mounting bracket (item 1) to flowmeter assembly using the three 1/4 inch nuts supplied (item 9).

NOTE: For ease of maintenance the nut opposite the sensor may be left off. This allows removal of flowmeter from bracket without removing bracket from sprayer.

NOTE: Make sure arrow on the flowmeter is pointing in the direction of the flow.

STEP 4 Connect the input hose to the flowmeter by pressing hose firmly on to the hose barb and securing with hose clamp (item 8).

STEP 5 Connect the output to the servo valve (in-line system) or use a 1 1/4 inch by 1 inch hose barb and attach to the output hose. Secure with a 1 1/16 inch hose clamp.

STEP 6 Install the mounting bracket assembly to the sprayer using the 4 inch hose clamp, (item 10) or drill two 1/4 inch diameter holes, and use the 5/16 self tapping screws (item 3).

STEP 7 Connect your flowmeter to the console using the 10 foot and 20 foot cables as shown in figure 1. Route them away from moving or hot parts, using the cable ties provided. Both cables are labeled for easy identification. Connect the 10 foot cable into the console receptacle labeled "Flowmeter".

Extension cables are available from your nearest HINIKER dealer if required.

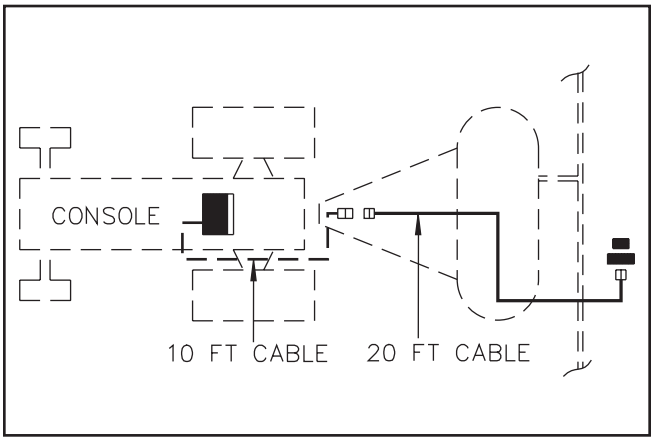
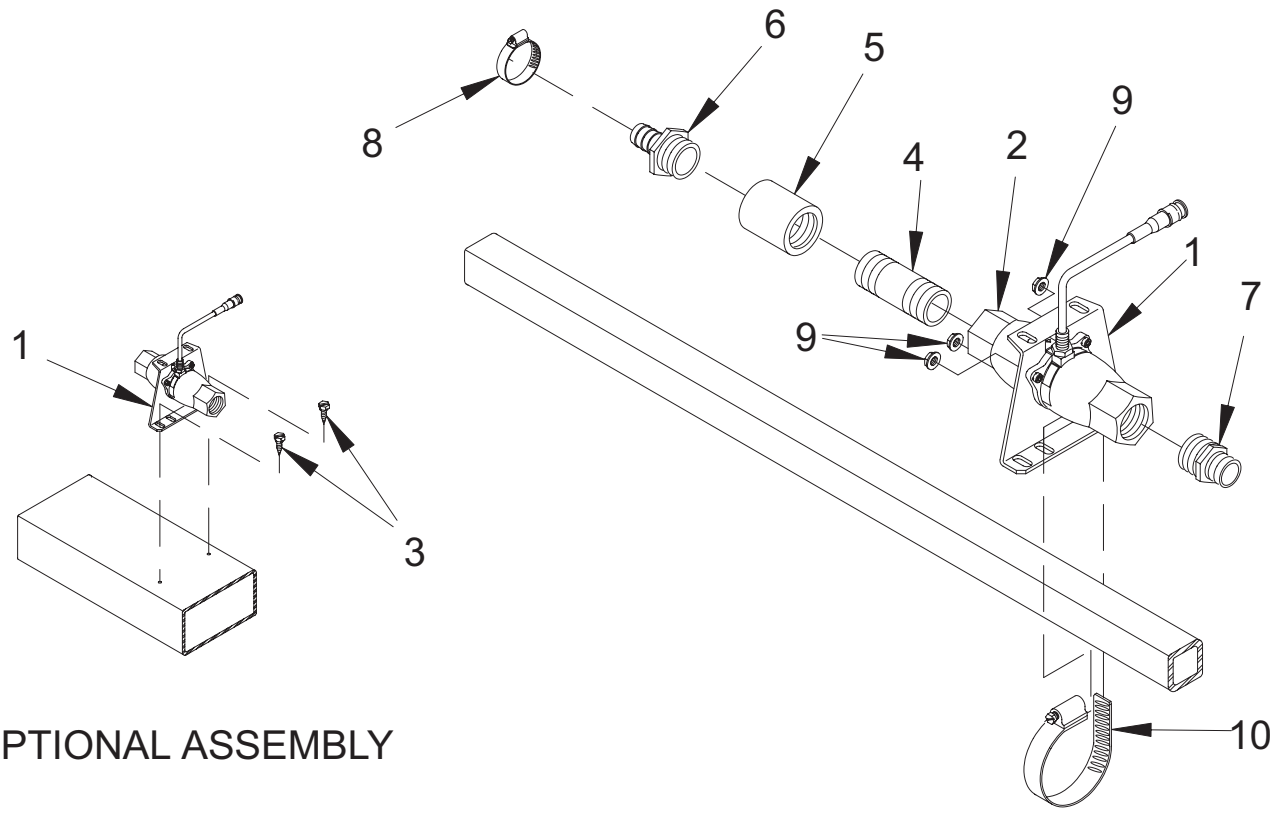


Figure 1 DWG. NO. 111



OPTIONAL ASSEMBLY

Figure 2

DWG. NO. 2465

REF. NO.	PART NUMBER	DESCRIPTION	QTY.	REF. NO.	PART NUMBER	DESCRIPTION	QTY.
	8086	Flowmeter Base Kit (Includes 1-3, 9-10)		7	394-002-010	Reducing Nipple 1 1/4 NPT x 1 NPT (Used When Using 1" Servo)	1
	8087	Sprayer Installation Kit (Includes 4-8)					
1	360-004-016	Flowmeter Mounting Plate	1	8	614582	Hose Clamp 1 1/16-2	1
2	363-004-020	HM860 Flowmeter Assy (Serial No. Less Than 1000)	1	9	060954	Lock Nut 1/4 Nylon Insert	3
	363-004-025	HM860 Flowmeter Assy (Serial No. 1000 & Higher)	1	10	958-025-004	4 Inch Hose Clamp	1
3	950-005-024	Self Tapping Screw 5/16 - 12 x 1 SL H HD	2	11	367-001-011	14 Inch Cable Tie (Not Shown)	15
4	612768	Nipple 1 1/4 NPT x 4 PL	1	12	388-003-004	10 Foot Flowmeter Cable (Not Shown)	1
5	614392	Coupling 1 1/4 x 1 1/4 NPT	1	13	388-003-008	20 Foot Flowmeter Cable (Not Shown)	1
6	612447	Adapter 1 1/4 NPT x 1 Hose Barb	1		393-008-020	HM860 Flowmeter Operators Manual (Not Shown)	1

INSTALLATION
ANHYDROUS AMMONIA APPLICATION

CAUTION: FOR YOUR SAFETY DO NOT INSTALL THE HM860 FLOWMETER BEFORE READING THE "HINIKER ANHYDROUS AMMONIA MONITORING AND CONTROL SYSTEM MANUAL", Refer to manual part number 360-000-246 Revision E or later for heat exchanger manufactured prior to 2007. These are painted gray. Or, refer to manual part number 39300035 for heat exchanger manufactured in 2007 or after. These are painted white.

NOTE: USE TEFLON PIPE SEALANT TAPE ON ALL PIPE CONNECTIONS. CHECK ALL HOSES AND FITTINGS FOR SLAG OR CONTAMINATION PRIOR TO ASSEMBLY. SLAG AND PIPE SEALANT (TAPE) ARE A MAJOR CAUSE OF FLOWMETER PROBLEMS.

The bracket that comes with the flowmeter is used in sprayer applications and NH3 applications using the older Hiniker Heat Exchanger (Part # 360-000-242). The new Hiniker Heat Exchanger (Part # 36013004) requires a new bracket due to changes to the Heat Exchanger outlet location. This is included in the convenience plumbing package (Part # 8172).

IMPORTANT: The 6" pipe adapter must be installed on the inlet side of the flowmeter. Its purpose is to reduce turbulence caused by hoses, elbows and reducers. Failure to use at least 4 inches of straight 1 1/4 inch pipe may cause the flowmeter to be inaccurate.

A convenience plumbing package (Part # 8172) is available for the Hiniker Heat Exchanger (Part # 36013004). This package is shown in drawing 6289. It does not include the shut-off valve.

IMPORTANT: the following installation instructions are for heat exchangers manufactured in 2007 or after that are painted white (part #36013004). Refer to the current NH3 manual part #39300035 for complete information. For heat exchangers (part #360-000-242) manufactured prior to 2007 refer to NH3 manual 360-000-246 revision E or later for installation information.

Failure to follow the proper guidelines may cause improper application of NH3.

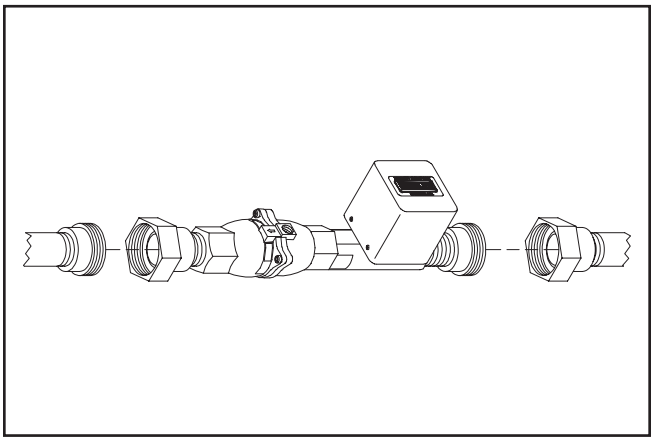
If the 1 1/4 inch x 6 inch pipe nipple included with the Heat Exchanger base kit was previously installed, it will need to be temporarily removed to allow installation of The 1 1/4 inch close nipple and 1 1/4 inch 45 degree elbow in the top (inlet) port of the heat exchanger After installing the 45 degree elbow reinstall the 1 1/4 inch x 6 inch pipe nipple into the lower (Output) port.

NOTE: It is usually easiest to assemble the flowmeter, servo valve, and shutoff valve in a vise before installing onto the toolbar.

Refer to drawing 6656. Install the male threaded half of the union fitting to the 1 1/4 inch x 6 inch pipe nipple.

The female threaded half of the union fitting with the clamping nut, is installed onto the flowmeter using a 1 1/4 close nipple.

The male half of the other union fitting should be installed on the outlet side of the servo valve as shown in DWG NO. 6656. This prevents the possibility of reinstalling the assembly backward after being removed for maintenance. It also eliminates the need to purchase two union fittings when the flowmeter and servo valve assembly is used on multiple machines. Only one will be required.



DWG. NO. 6656

Install the 1 1/4 inch Tee to the outlet of the Shutoff valve. Normally the tee is pointing down.

Install the 1 1/4 NPT x 3/8 NPT hex bushing reducer, 3/8 elbow and 3/8 hose barb into the Tee connected to the Shutoff valve. Connect the 3/8 tubing from the hose barb to the hose barb on the refrigerant input of the Heat Exchanger.

Locate an appropriate location on your applicator to mount the Heat Exchanger/Plumbing assembly.

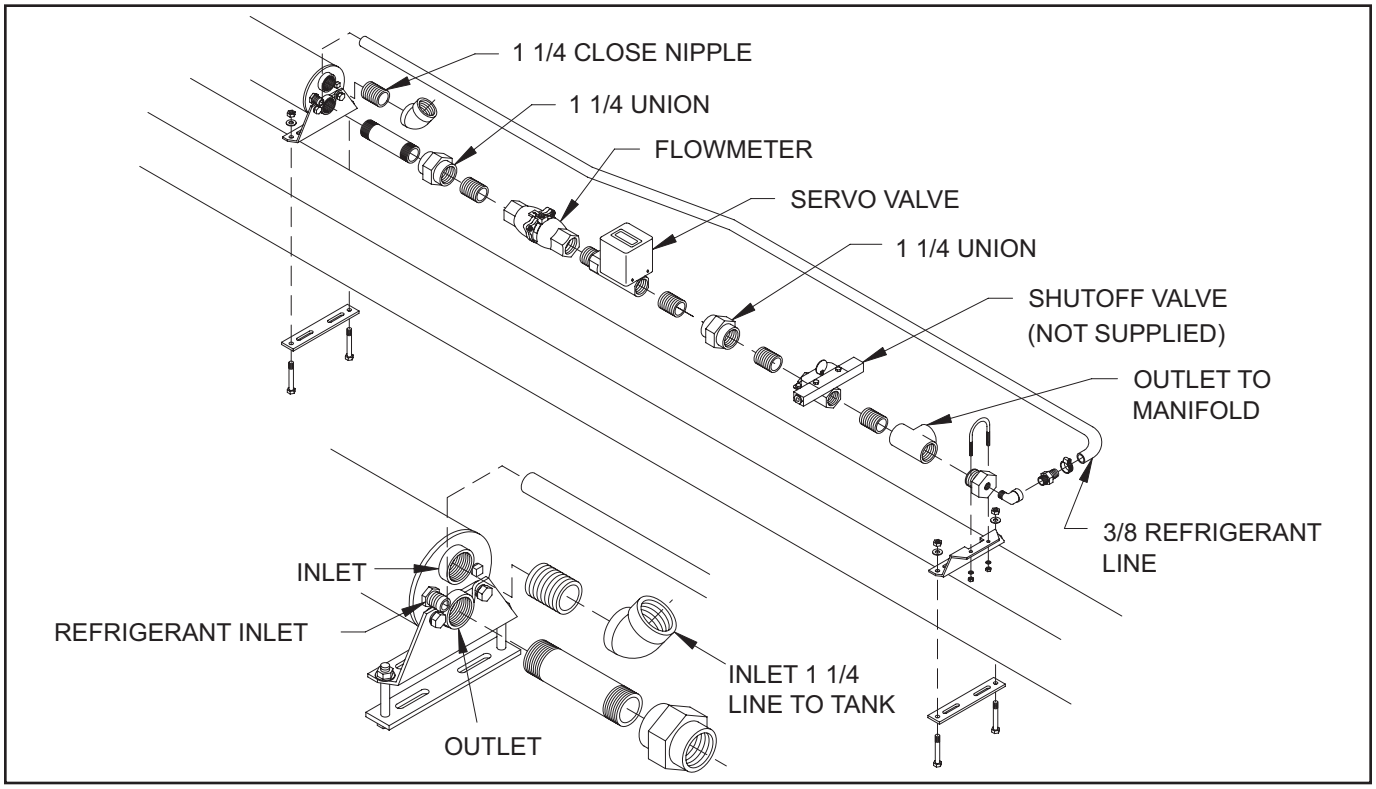
Locate the mounting bracket under the plumbing as shown in drawing 6289. Mount the plumbing to the bracket using the U-bolt and two 1/4 inch nuts and washers.

Secure the unit to the tool bar using the mount straps, mount studs, flat washers and 3/8-16 nuts.

Connect your flowmeter to the console using the 10 foot and 20 foot cables. Route them away from moving or hot parts, using the cable ties provided. Both cables are labeled for easy identification. Connect the 10 foot cable into the console receptacle labeled “Flowmeter.”

Extension cables are available from your nearest HINIKER dealer if required.

Installation Of Convenience Plumbing Package To The 36013004 Heat Exchanger



DWG. NO. 6289

MAINTENANCE

MAINTENANCE

For all applications, except anhydrous ammonia, the HM860 FLOWMETER should be thoroughly flushed with clean water immediately after each use.

Periodic disassembly and cleaning of the HM860 FLOWMETER is recommended for maximum lifetime and accuracy. Some chemicals may tend to curdle or become gummy, and may require frequent flushing, especially at low flow rates. Do not allow the flowmeter to dry out before it has been thoroughly flushed.

CAUTION: ALWAYS FOLLOW MANUFACTURES RECOMMENDATIONS WHEN WORKING WITH CHEMICALS.

DISASSEMBLY

Refer to figure 4 for proper parts placement.

Remove the three nuts holding the two flowmeter halves together.

Carefully pull the two halves straight apart, If flowmeter is not pulled apart straight, damage to bushings and shaft may result.

Remove any chemical or rust residue. Flush thoroughly with water. NOT WITH DIESEL FUEL.

TURBINE- Inspect the turbine and shaft for damage or excessive wear.

BUSHINGS- Inspect the two graphite bushings. The inside diameter should not be oval.

BEARINGS- Inspect the two sapphire end bearings. Cracked bearings should be replaced. These “glass” bearings are held in place by the “pressed in” graphite bushings.

To replace a bushing or bearing, gently insert by hand a #6 sheet metal screw into the graphite bushing and pull.

NOTE: Damage may result to the sapphire bearing if the screw is inserted too far.

Do not reuse graphite bushings after removal. Use new bushings.

O-Ring- Some chemicals may slightly deform the O-ring. Replace it if necessary.

ASSEMBLY

Place the turbine and o-ring into the housing half without the sensor, with the magnet end of the turbine showing.

Carefully mate the flowmeter halves together. Install the three 1/4 inch stainless steel screws and tighten evenly the three 1/4 inch Nylock nuts. Torque nuts to 10 foot pounds.

The turbine should spin freely when a very small amount of air is directed into the flowmeter.

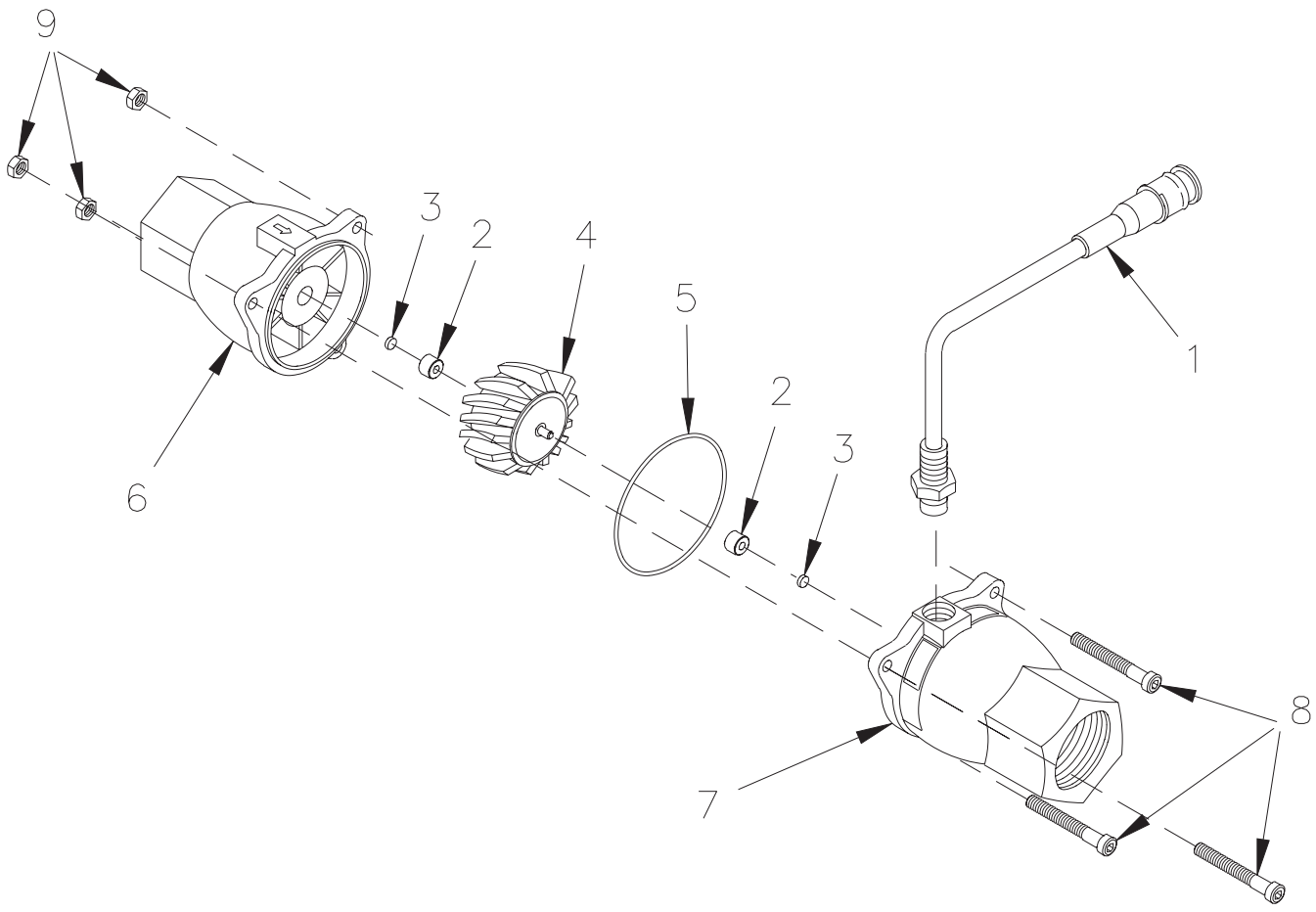


Figure 4

DWG. NO. 2462

REF. NO.	PART NUMBER	DESCRIPTION	QTY.
	Not Serviced	Flowmeter Assy (Includes All Below) (For Flowmeter With Serial No. Less Than 1000)	
	363-004-025	Flowmeter Assy (Includes All Below) (For Flowmeter With Serial No. 1000 And Higher)	
1	363-004-010	Sensor Assy, Solid State	1
2	394-002-009	Bushing Graphite	2
3	394-002-038	Bearing, Sapphire	2
4	394-002-103	Flowmeter Rotor	1
5	394-002-104	O-Ring (For Flowmeter With Serial No. Less Than 1000)	1
	394-002-115	O-Ring (For Flowmeter With Serial No. 1000 And Higher)	1
6	394-002-111	Discontinued Flowmeter Housing Inlet (For Flowmeter With Serial No. Less Than 1000). To Update Order Items 5, 6, (Serial No. 1000 And Higher) Items 2, 3, 8, 9.	1
	394-002-116	Flowmeter Housing Inlet (For Flowmeter With Serial No. 1000 And Higher)	1
7	394-002-112	Flowmeter Housing Outlet	1
8	950-004-064	Socket Head Cap Screw 1/4-20 x 1 1/2 SS	3
9	060954	Lock Nut 1/4 - 20 Nylon Insert	3

TROUBLE SHOOTING

TROUBLESHOOTING

For system troubleshooting consult the operator manual for the system being used.

Listed below are some possible problems that could be encountered with the HM860 FLOWMETER.

1. The HM860 FLOWMETER SENSOR will output a pulse each time a pole of a magnet is passed over the sensor's end.

   To check the sensor, first set the pulses per gallon calibration number to "1", then make sure the console is not in hold.

   The console should count up by one each time a magnet is passed under the bottom of the sensor (sensor is removed from flowmeter).

2. Make sure direction of flow (arrow on flowmeter) is correct.

3. Check flowmeter for debris slowing or stopping the turbine. For the flowmeter to measure accurately it must be kept very clean.

4. For application rates under 5 gallons per minute, the flowmeter should be mounted vertically with the flow going up.

5. Make sure magnet on turbine is positioned under sensor.

6. Make sure sensor is inserted fully into meter.

7. Flowmeter operation may be effected by strong magnetic fields such as those created by motors and solenoid valves.

HINIKER WARRANTY

The only warranty Hiniker Company (Hiniker) gives and the only warranty the dealer is authorized to give is as follows:

We warranty new products sold by Hiniker or authorized Hiniker dealers to be in accordance with our published specifications or those specifications agreed to by us in writing at time of sale. Our obligation and liability under this warranty is expressly limited to repairing or replacing, at our option, within one year after date of retail delivery, to the original purchaser, any product not meeting the specification. **WE MAKE NO OTHER WARRANTY, EXPRESS OR IMPLIED AND MAKE NO WARRANTY OF MERCHANTABILITY OR OF FITNESS FOR ANY PARTICULAR PURPOSE.** Our obligation under this warranty shall not include any transportation charges or costs or any liability for direct, indirect or consequential damage or delay. If requested by Hiniker Company, products or parts for which a warranty claim is made are to be returned freight prepaid to our factory. Any improper use, operation beyond rated capacity, substitution of parts not approved by Hiniker Company, or any alteration or repair by others in such manner as in our judgement affects the product materially and adversely shall void this warranty. **NO EMPLOYEE OR REPRESENTATIVE IS AUTHORIZED TO CHANGE THIS WARRANTY IN ANY WAY OR GRANT ANY OTHER WARRANTY.**

HINIKER reserves the right to make improvement changes on any of our products without notice.

HINIKER does not warrant the following:

1. Used products

2. Any product that has been repaired modified or altered in a way not approved by Hiniker Company.

3. Depreciation or damage caused by normal wear, lack of reasonable and proper maintenance, failure to follow Operator Manual Instructions, misuse, lack of proper protection during storage, or accident.

4. Parts replacement and service necessitated by normal wear or maintenance including, but not limited to, belts, cutting parts, and ground engaging parts.

A DELIVERY REPORT FORM must be filled out and received by HINIKER COMPANY to initiate the warranty coverage.

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