



## HM860 FLOWMETER

### OPERATOR'S MANUAL

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

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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

8200 OPERATORS MANUAL  
393-000-010

8605 OPERATORS MANUAL  
39300018

HINIKER ANHYDROUS AMMONIA MONITORING AND CONTROL SYSTEM  
360-000-246

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

**\* PRELIMINARY SPECIFICATIONS ONLY. 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	
P R E S S U R E	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

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## 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 APPLICATIONS

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.

**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 (inline 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.

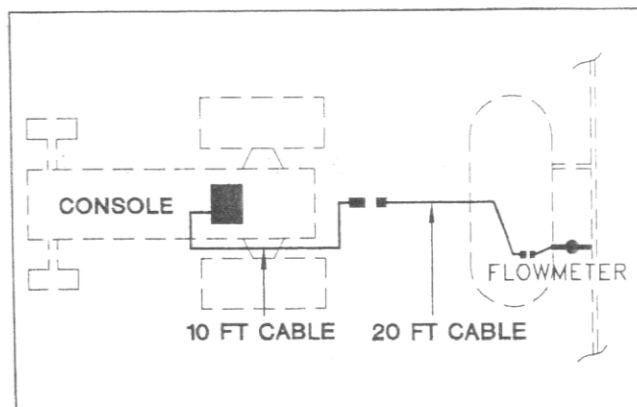
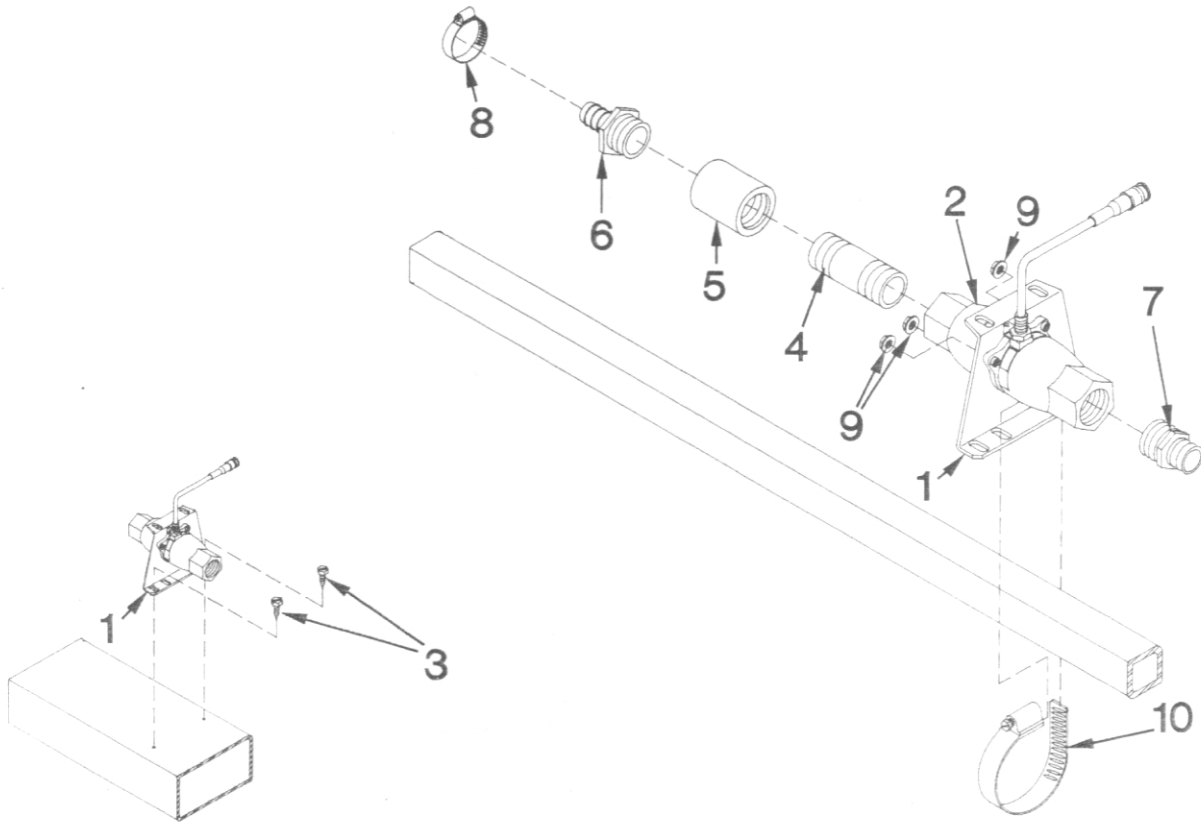


Figure 1

DWG. NO. 111



## OPTIONAL INSTALLATION

FIGURE 2

DWG. NO. 2465

ITEM NUMBER	PART NUMBER	DESCRIPTION	QTY. REQ'D.
	8086	Flowmeter Base Kit (Includes 1-3, 9-14)	
	8087	Sprayer Installation Kit (Includes 4-8)	
1	360-004-016	Flowmeter Mounting Plate	1
2	363-004-020	HM860 Flowmeter Assembly (Serial No. Less Than 1000)	1
	363-004-025	HM860 Flowmeter Assembly (Serial No. 1000 And Higher)	1
3	950-005-024	Self Tapping Screw 5/16 - 12 x 1 SL H HD	2
4	612768	Nipple 1 1/4 NPT x 4 PL	1
5	614392	Coupling 1 1/4 x 1 1/4 NPT	1
6	612447	Adapter 1 1/4 NPT x 1 Hose Barb	1
7	394-002-010	Reducing Nipple 1 1/4 NPT x 1 NPT	1
8	614582	Hose Clamp 1 1/16 - 2	1
9	060954	Locknut 1/4 Nylon Insert	3
10	958-025-004	4 Inch Hose Clamp	1
11	367-001-011	14 Inch Cable Tie (Not Shown)	15
12	388-003-004	10 Foot Flowmeter Cable (Not Shown)	1
13	388-003-008	20 Foot Flowmeter Cable (Not Shown)	1
14	393-080-020	HM860 Flowmeter Operators Manual (Not Shown)	1

## INSTALLATION ANHYDROUS AMMONIA APPLICATION

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**CAUTION: FOR YOUR SAFETY DO NOT INSTALL THE HM860 FLOWMETER BEFORE READING THE "HINIKER ANHYDROUS AMMONIA MONITORING AND CONTROL SYSTEM MANUAL", PART NUMBER 360-000-246**

**IMPORTANT:** The pipe adapter (item 1) 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 1** Refer to figure 3 and install the HM860 FLOWMETER (item 2), pipe adapters (items 1,3,4,5), the pressure relief valve (item 6, 7, 8), and the servo valve (item 9), to the output of the heat exchanger.

**NOTE: USE TEFLON PIPE SEALANT TAPE ON ALL PIPE CONNECTIONS.**

**STEP 2** Locate the mounting bracket (item 10) under the end of the servo valve as shown in figure 3. Mark the holes on the tool bar through the bracket bottom (wide end) and drill two 1/4 inch holes.

Now install the mounting bracket to the tool bar using the two 5/16 inch self tapping screws (item 13). Mount the servo valve to the bracket using the U-bolt (item 11) and two 1/4 inch nuts (item 12).

**STEP 3** 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.



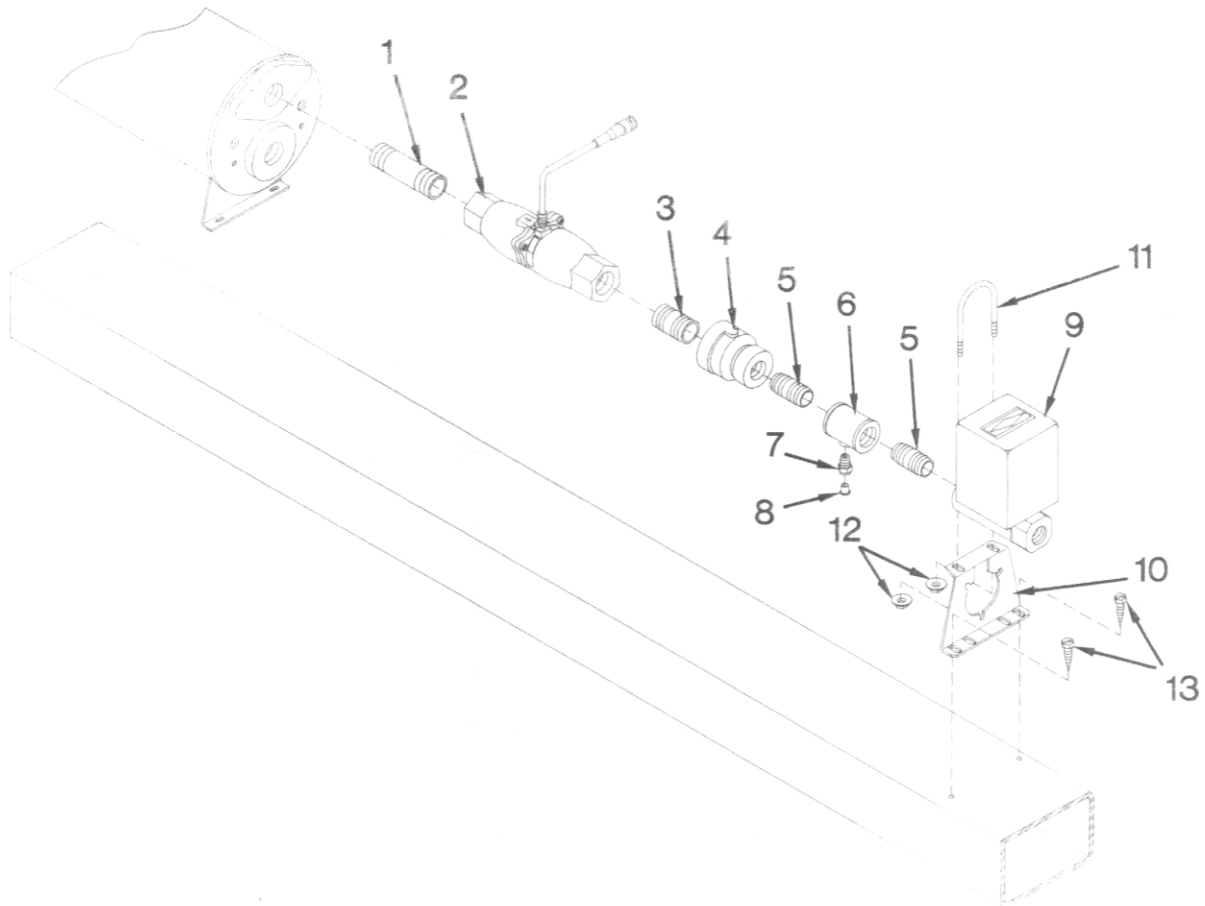


FIGURE 3

DWG. NO. 2464

ITEM NUMBER	PART NUMBER	DESCRIPTION	QTY. REQ'D.
	8086	Flowmeter Base Kit (Includes Items 2, 10-17)	
	8088	Anhydrous Ammonia Installation Kit (Includes 1, 3-5)	
1	394-002-120	Nipple 1 1/4 x 4 SCH. 80	1
2	363-004-020	HM860 Flowmeter Assembly (Serial No. Less Than 1000)	1
	363-004-025	HM860 Flowmeter Assembly (Serial No. 1000 And Higher)	1
3	394-002-121	Nipple 1 1/4 x 2 SCH. 80	1
4	394-002-122	Reducing Coupling 1 1/4 x 1 Black	1
5	360-000-251	Pipe Stub 1 Inch	2
6	360-000-250	Reducing Tee	1
7	360-000-249	Hydrostatic Relief Valve	1
8	360-000-235	Plastic Plug	1
9	363-003-094	1 Inch General Purpose Servo Valve	1
10	360-004-016	Flowmeter Mounting Plate	1
11	394-002-013	U-Bolt 1/4 - 20 UNC x 2	1
12	060954	Locknut 1/4 - 20 UNC Nylon Insert	2
13	950-005-024	Self Tapping Screw 5/16 - 12 x 1 SL H HD	2
14	367-001-011	14 Inch Cable Tie (Not Shown)	15
15	388-003-004	10 Foot Flowmeter Cable (Not Shown)	1
16	388-003-008	20 Foot Flowmeter Cable (Not Shown)	1
17	393-008-020	HM860 Flowmeter Operators Manual (Not Shown)	1

## MAINTENANCE

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### 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 MANUFACTURERS 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 a part 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 to 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.

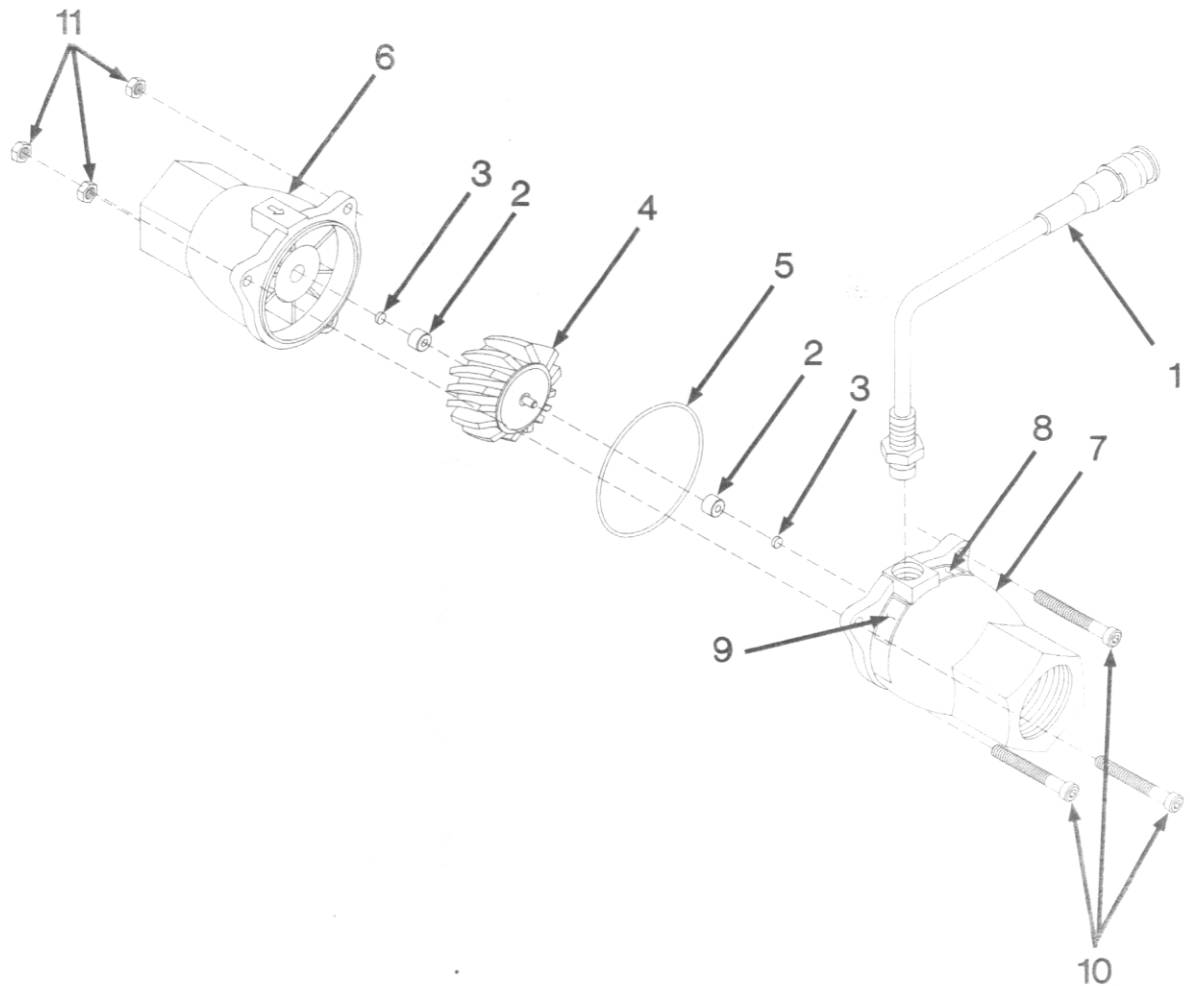


FIGURE 4

DWG. NO.2462

ITEM NUMBER	PART NUMBER	DESCRIPTION	QTY. REQ'D.
	363-004-020	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, 10, 11.	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	393-002-068	Decal, Pulses/LB-N	1
9	393-002-069	Decal, Pulses/Gal.	1
10	950-004-064	SCKT HD SCR 1/4-20 UNC x 1 1/2 SS	3
11	060954	Locknut 1/4 - 20 UNC NY INS	3

## TROUBLESHOOTING

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### 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 the company gives and the only warranty the dealer is authorized to give is as follows:

We warranty products sold by us 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, 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 installation or any liability for direct, indirect or consequential damage or delay. If requested by us, 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 us, 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.

Warranty does not apply to any machine or part which has been repaired or altered in any way so as in the company's judgement to affect its reliability, or which has been subject to misuse, negligence or accident.

When Warranty is **LIMITED or NOT APPLICABLE:** Warranty on hoses, cylinder, engines, hubs, spindles, bolts or other trade accessories are limited to the warranties made by the respective manufacture only and not by **HINIKER COMPANY.**

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

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