

Introduction

FuelCom® flowmeters are reliable, easy to install, and simple to disassemble and reassemble. This manual has been prepared specifically to assist with the installation and maintenance of your flowmeter and sensor. **Each flowmeter and sensor is calibrated as a set and must be installed and operated as a set. Please read this manual carefully.** Call your sales representative or Flowdata if assistance is needed.

Flowmeter Description: Each FuelCom flowmeter has a model number stamped on its nameplate. The Flowmeter Ordering chart, on page 10, explains what each digit of that number represents.

Sensor Description: Each FuelCom sensor has a model number printed on its nameplate. The Sensor Ordering chart, on page 10, explains what each digit of that number represents.

Replacement Parts: The Assembly Diagram on page 9 shows the individual parts that make up each flowmeter. Refer to the Replacement Parts chart on page 9 if replacement or spare parts are needed. When ordering parts, include the flowmeter model number and serial number and any application changes.

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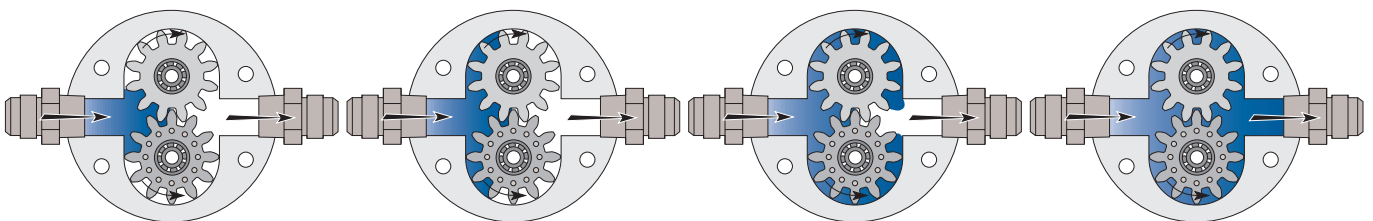
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FuelCom® System



Protected by one or more U.S. Patents:
4641522, 4798092, 4815318, 5027653

Principle of Operation



FuelCom flowmeters use two rotating impellers driven by the flowing fuel. Magnets imbedded in the impellers activate a non-intrusive sensor which generates a pulsed output signal. Each pulse represents a known volume of fuel that is captured between the lobes of the impellers. The current fuel temperature is also measured by the non-intrusive sensor. Both the pulse and temperature data are sent to a microprocessor in the FuelCom FC900 transmitter. The pulse data is then compensated for the temperature effects on the fuel viscosity, thereby providing a highly linearized output signal. The unique design of the FuelCom flowmeters makes them impervious to pressure pulsations caused by engine fuel injectors.

FuelCom® System

Flowmeter Specs.

Standard Operating Fuel Temperature:

3°F to 185°F [-16°C to 85°C]

Operating Pressure:

250psig [1724kPa], standard

Turndown Ratio:

> 7:1 standard (Based on maximum rated flow)

Calibration:

40°F to 160°F [4°C to 70°C] #2 Diesel Fuel

Reference Accuracy:

Burn Rate Accuracy=

$$\frac{(\text{Supply Rate} \times .0025) + (\text{Return Rate} \times .0025)}{\text{Burn Rate}}$$

Burn Rate

Typically ±1% to ±2% of Burn Rate

[4°C to 70°C] for two meter system (Supply/Return),
Temperature Compensated to 60°F, API

Construction Materials:

Flowmeter Body:	Anodized Aluminum
Shafts:	316 Stainless Steel
Impellers:	Teflon® Anodized Aluminum
Ball Bearings:	440C
Case Bolts:	Gr. 8 Zinc Plated Alloy Steel
Flow Conditioners:	Zinc Plated Alloy Steel
O-ring:	Viton®
Shims:	300 Series Stainless Steel

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Flowmeter Installation

Environment

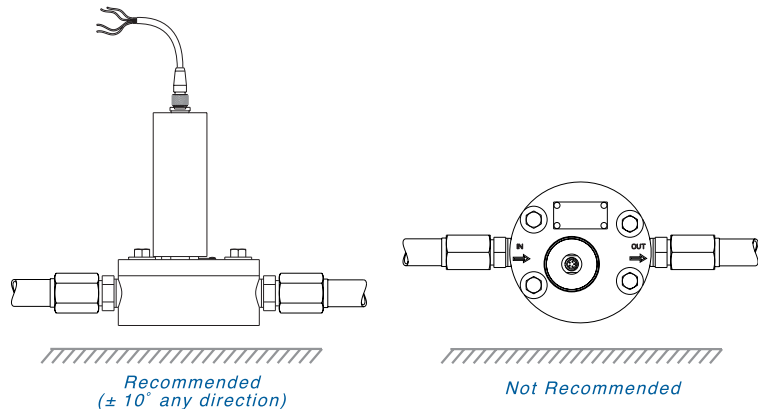
FuelCom flowmeters will operate in normal environmental conditions. The temperature must be kept within the specified operating range for the sensor (See Page 7) and electronics (Refer to the technical manuals that came with the electronics). Vibrations do not affect the meter performance.

Orientation

The **only acceptable** mounting configuration is in the horizontal position with the inlet and outlet parallel with the ground and the sensor up. The sensor must be positioned within 10° of perpendicular to the inlet and outlet.

Inlet and Outlet

FC02, FC03, FC05, FC10: All meters **MUST** be installed correctly with regards to the inlet and outlet. They are **NOT** interchangeable. The words "IN" and "OUT" are stamped on the meters to identify the inlet and outlet. The inlet and outlet include factory installed SAE tube fittings. The inlet fitting also serves as a precision engineered flow conditioner. **REMOVAL OF THE INLET FITTING WILL ADVERSELY AFFECT THE ACCURACY OF THE FLOWMETER.**



Mounting

Pipe hangers attached around the fittings of the flowmeter or on the adjacent piping will usually be adequate at holding the flowmeter in place (Refer to the Weight specifications on Page 8). Mounting holes are also provided on the base of the flowmeter. See Page 8 for details.

Instrumentation Installation

Sensor

A FuelCom sensor/transmitter must be used with its matched FuelCom flowmeter. The two components are calibrated as a set. The sensor must be screwed **COMPLETELY** into the mounting hole of the flowmeter in order to operate properly. **FINGER TIGHTEN ONLY; the sensor and flowmeter can be damaged by overtightening.** Specifications and wiring information is provided on pages 3 and 7.

Flow Computers and Accessories

Flow Computers, displays, junction boxes, analog converters and other accessories are available from Flowdata. Refer to the manuals that came with these devices for proper wiring and installation.

Assembly and Operation Notes

• **IMPORTANT - Read Carefully** •

K-Factor - The K-Factor, expressed in units of pulses per gallon (PPG), is stamped on the flowmeter nameplate. This represents the number of pulses per gallon of #2 diesel fuel and is temperature compensated to 60°F, API.

Fuel Condition - For the meter to function properly and produce the best possible accuracy, the incoming fuel must be free of air or gas. Solids in the liquid should be filtered (See Filters).

Pressure - DO NOT exceed the rated working pressure as stamped on the flowmeter nameplate.

Temperature - DO NOT exceed the temperature rating as stamped on the flowmeter nameplate.

Flow Rate - DO NOT exceed the maximum flow rate of the flowmeter. The Model Specs. Section on Page 8 lists the maximum flow rate for each meter size.

Pressure Drop - See page 8 for approximate maximum pressure drops vs. flow and fuel temperature.

Back Pressure - Enough back pressure (5psi min.) must be maintained on the outlet side of the flowmeter, so that the meter remains completely filled during operation. Back pressure can be maintained with check valves or by locating the flowmeter away from unpressurized openings in the piping. If the flowmeter is located close to a pump, place it on the discharge side, since it is difficult to maintain back pressure on the suction side.

Impeller Set - The impellers are manufactured as a matched set. These mating impellers are marked with matching serial numbers. Keep the set of impellers with the flowmeter that they were shipped with from the factory. **Handle the impellers carefully.** They can be damaged if dropped.

Impeller with Magnets - One of the impellers has magnets imbedded in its side. **The magnet impeller has an X stamped on the magnet side and its serial number is stamped on the opposite side. The “magnet side” must be facing the side of the flowmeter on which the sensor is installed.**

Impeller Centering Shims - The impellers are centered in the flowmeter body by four precision shims. **The shims are required for proper operation.**

Sensor/Transmitter - The FuelCom sensor is actually a combination flow sensor / temperature sensor / digital computer / and signal transmitter. It provides both linearized pulse and digital RS-485 output. **The sensor and flowmeter are calibrated as a set and must be installed and operated as a set. Note the address number on the sensor label.** It represents the RS-485 network address of the transmitter.

Sensor/Transmitter Installation - When installing the sensor, **FINGER TIGHTEN ONLY.** The sensor and the flowmeter can be damaged from overtightening. The sensor must be installed anytime the flowmeter is pressurized to help prevent damage to the sensor hole from any sudden bursts of pressure. Do not remove the sensor from the flowmeter until the pressure has been reduced to 50% of the pressure rating stamped on the nameplate.

Filters - Flowdata highly recommends that filters be installed up stream from the flowmeter. The recommended mesh size for these filters is listed with the Model Specs. in the Disassembly/ Reassembly instructions on the following pages. An upstream filter will prevent large particles in the liquid from jamming or damaging the flowmeter. Additionally, Flowdata highly recommends the use of air-eliminators upstream of the flowmeters to remove micro-bubbles that could skew the flow readings.

Operating Conditions - Your Flowdata flowmeter and sensor are specified for your particular application. **Operating your flowmeter with liquids or conditions other than those specified can reduce its accuracy, can damage the flowmeter, and may void your Flowdata warranty.** Consult your sales representative or Flowdata **BEFORE** changing the operating conditions.

Cable Color Codes - There are two types of cables that may be supplied on a FuelCom system. Older systems use a 4 conductor cable with solid colored wire insulation. Newer systems use a 5 conductor cable with striped (dual-colored) wire insulation.

OLD CABLE (Phoenix)		NEW CABLE (Woodhead)	
1	WHITE (+)RS485/PULSE	RED/WHITE	(+)RS485
2	RED +VDC	RED	+VDC
3	BLACK DC COMMON	GREEN	DC COMMON
4	BARE SHIELD	RED/YELLOW	PULSE
5	GREEN (-)RS485	RED/BLACK	(-)RS485
--		BARE	SHIELD

Trouble-Shooting

Most flowmeter operation problems can be solved by carefully reviewing this manual. Some specific problems are listed below. Review all of the possible causes and solutions since some difficulties are caused by a combination of problems and may require multiple solutions. **Operating your flowmeter with liquids or conditions other than those specified can reduce its accuracy, can damage the flowmeter, and may void your Flowdata warranty.** Consult your sales representative **BEFORE** changing operating conditions.

If your problem is beyond the scope of this manual, or if you need assistance of any kind, contact your sales representative or Flowdata at **1-888-383-5356**. When calling for technical assistance, please have the following information available so we may better assist you:

- Flowmeter model number and serial number (See nameplate)
- Date of flowmeter purchase and installation
- Current fluid application
- Flow controls used

WARNING: Before disassembling the flowmeter, depressurize any of the lines connected to the meter. A small amount of fuel will remain in the flowmeter and will leak out when it is opened. Take any precautions necessary to deal with this fuel. Failure to heed this warning may result in serious bodily injury.

Symptom	Possible Cause	Solution
Flow is restricted.	Flow conditioner is clogged.	Debris may be caught in the flow conditioner. If so, disconnect inlet and remove debris. Also, make sure that an appropriately sized filter is located upstream.
	Pressure drop across flowmeter is too high.	Call sales representative or Flowdata for assistance. Flowmeter size may need to be increased. Pump pressure may be increased as long as the pressure rating of the meter is not exceeded and the pressure drop is less than 100 psi.
	Bent impeller shafts.	Consult Flowdata for replacement meter.
Fluid flowing, but there is no output signal.	Instrumentation is improperly setup.	First, confirm that all wiring is properly connected. Then, review the technical manual(s) supplied with the instrumentation for trouble shooting procedures. If the sensor is on a RS-485 network, ensure that the proper transmitter address is being used. The transmitter address is printed on the sensor body tube.
	Sensor is not screwed into the flowmeter properly.	Unscrew the sensor and make sure that the sensor hole is clear of any dirt and debris. Screw the sensor back in. FINGER TIGHTEN ONLY ; over tightening can damage the sensor and/or the flowmeter.
	Sensor is malfunctioning.	Improper wiring, jolts, or extreme temperatures can damage the sensor. Sensor and flowmeter are calibrated as a set and must be recalibrated as a set if either fails. Call your sales representative or Flowdata.
	Impellers installed backwards.	Confirm that the impellers are oriented properly. The magnets imbedded in the impellers must be facing the sensor side of the flowmeter. The X and O marks are on the SAME side of the impeller as the magnets. See Page 6.
	Impellers are jammed.	Debris may be caught in the impellers. If so, open the flowmeter and remove it. Also, make sure that an appropriately sized filter is located upstream from the flowmeter. Make sure that the ball-bearings spin freely. Jammed bearings may also cause the impellers to jam. If you suspect this, call Flowdata.
Flowmeter is giving inaccurate readings.	Flow rate is too low.	Increase flow rate or check to see if the fluid application has changed. If the application has changed, consult your sales representative or Flowdata.
	Instrumentation is not setup correctly.	Review the technical manual(s) supplied with the instrumentation, to verify setup. If using the pulse output, confirm that instrumentation is using K-Factor stamped on nameplate of flowmeter.
	Sensor wire is receiving interference.	Interference can be caused by other electrical devices placed too close to the sensor wire or by not properly grounding the sensor.
	Impellers are dragging.	Impeller centering shims are not installed or incorrect type. Jammed or worn ball-bearings may also cause the impellers to drag. Call your sales representative or Flowdata.
Flow rate is not steady through the flowmeter.	Flowmeter outlet is not pressurized.	Pressurize the downstream side of the flowmeter or lengthen the amount of piping between the flowmeter and the pipe outlet.
	Flow rate is too low.	See above or call your sales representative or Flowdata.
	Air in the fuel line.	Check piping system for possible sources of air and remove. If needed, install air-eliminator. Even micro-bubbles can affect the flowmeter readings. Call your sales representative or Flowdata.

FC900 COMMUNICATIONS PROTOCOL

This section describes the communication protocol required by a customer to write communication drivers from their own remote display units or computers for direct interface with FuelCom FC900 series transmitters.

The standard serial communications between a remote display unit or computer and the FC900 transmitter units are conducted under the control of the remote display unit or computer. The remote display or computer "polls" or "interrogates" each FC900 transmitter unit once per second. Communication between the remote display unit or computer and the ADAM4021 units are also conducted once per second.

Interrogation is conducted in the following manner: The remote display or computer transmits the FC900's address. The FC900 "hears" its address and responds immediately with its flow rate, temperature and address. This can occur for each configured flow meter, once per second.

All communications are conducted under the following serial conditions:

- Duplex:** **Half**
- Baud Rate:** **19200 baud**
- Start bits:** **1**
- Stop bits:** **1**
- Data bits:** **8**
- Parity:** **none**

The FC201 interrogations sequence is defined as follows:

Byte	Value	Description
0	0x7E	1st byte of attention/sync sequence
1	0x7E	2nd byte of attention/sync sequence
2	0x7E	3rd byte of attention/sync sequence
3	0x00	4th byte of attention/sync sequence
4	(??)	the least significant 8 bits of the 16 bit FC900 address
5	(??)	the most significant 8 bits of the 16 bit FC900 address

Note: Numeric quantities specified in the form "0xNN" are hexadecimal (base 16) numbers. The number 0x7E hex (base 16) is equivalent to 126 decimal (base 10).

The FC900 reply sequence is defined as follows:

Byte	Description
0	the least significant byte of the FC900 address
1	the most significant byte of the FC900 address
2	the least significant byte of the flowrate in hundredths of a gallon per hour
3	the next more significant byte of the flowrate
4	the next more significant byte of the flowrate
5	the most significant byte of the 32-bit flowrate in gallons per hour/100
6	the least significant byte of the temperature in tenths of a degree Centigrade

- 7 the most significant byte of the temperature in °C x 10
- 8 (reserved)
- 9 checksum (the modulo 256 sum of bytes 0 through 8)

The flowrate is defined as a 32-bit unsigned integer. Since there are no fractional quantities in integers, in order to supply two decimal points of precision, the flowrate is multiplied by 100. In other words, a flowrate of 123.45gph is multiplied by 100 to get the integer quantity 12345, which is then transmitted. The remote display unit or computer, upon receiving the flowrate, must divide the 12345 by 100 to get 123.45gph.

The temperature is scaled similarly, except that it is a 16-bit unsigned integer, and it is scaled up by a factor of 10, as opposed to the flowrate which is scaled up by a factor of 100.

For example, to interrogate a FC900 having the address 32767, you would transmit the following 6 byte hexadecimal sequence:

0x7E, 0x7E, 0x7E, 0x00, 0xFF, 0x7F

If the FC900 had a flowrate of 123.45 gallons per hour, a temperature of 34.5°C, and the "reserved" byte was 0x00, then the FC900 "reply" would be:

0xFF, 0x7F, 0x39, 0x30, 0x00, 0x00, 0x59, 0x01, 0x00, 0x11

- The number 0x7FFF hex translates to 32767 decimal.
- The number 0x00003039 hex translates to 12345 decimal, which is divided by 100 to get 123.45 gallons per hour.
- The number 0x0159 hex translates to 345 decimal, which is divided by 10 to get 34.5°C.
- The number 0x11 hex translates to 17 decimal. The sum of the first 9 bytes is 0x0211 hex (529 decimal). Throw away everything except the least significant 8 bits, and you get 0x11 hex. Thinking in decimal, 529 divided by 256 equals 2, with a remainder of 17 decimal. Throw away the 2, and the remainder, 17, is the checksum. The interrogation sequence takes approximately 3.8ms. The delay before the FC900 reply is approximately 2.7ms. The FC900 reply takes approximately 5.5ms.

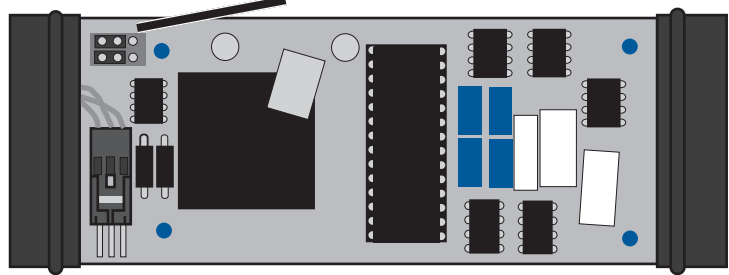
FC900 Output configuration:

The FC900-4 and FC900-5 transmitters have the ability to output flowrate information as either a 4-20mA signal or as RS-485 serial data. The two models are identical except for this configuration: the "-4" model has the jumpers on the printed circuit board set at the factory to output an RS-485 signal, and the "-5" model has the jumpers set to output a 4-20mA signal, as shown below.

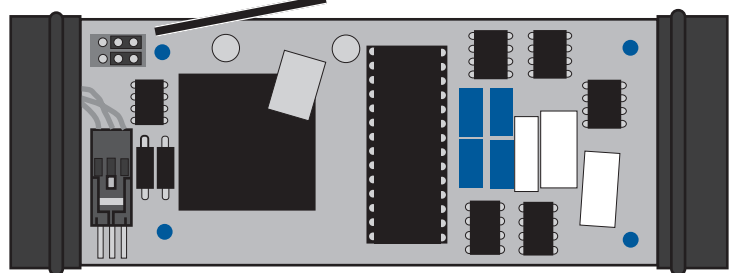
The flowrate-spanning range of the 4-20mA output is not user-adjustable. It is set by the factory at the time the calibration parameters are programmed. Factory standard ranges are shown in the table at left. Values differing from these are available upon request. Please discuss the desired setting with your sales representative when ordering.

Meter Size	4mA	20mA
1" (10)	0 gph	1250 gph
1/2" (05)	0 gph	500 gph
3/8" (03)	0 gph	360 gph
1/4" (02)	0 gph	180 gph

FC900-4: Jumper block set for RS-485 output



FC900-5: Jumper block set for 4-20mA output



Optionally, the scaling may be spanned over the range of 3.5mA to 21.5mA. If this option is desired, please specify when ordering.

NOTES:

FuelCom® System

FC900 Sensor/Transmitter Specs.

Design: Microprocessor-based sensor/transmitter with 3D surface fit in PROM

Supply Voltage: 12-36VDC (see cable length graph)

Supply Current: 125mA @ 15VDC

Operating Frequency: 10-720 Hz

FC02 thru FC05: 1.0 Hz equals 1 gph

FC10: 0.1 Hz equals 1 gph

Output:

- 1 NPN Open Collector (no pull-up provided)
Sinks up to 100mA (Obsolete)
- 2 RS-485 (2-Wire) Serial Communication (Obsolete)
- 4 RS-485 2-wire Serial Communication and NPN open collector with pull-up resistor, sink up to 100mA

5 4-20mA current loop and NPN open collector with pull-up resistor, sink up to 100mA

Output Connector:

Male 5-pin Micro-Change® Connector

Operating Temperature:

3°F to 185°F [-16°C to 85°C]

Storage Temp: -40°F to 212°F [-40°C to 100°C]

Cable:

5-Pin Micro-Change® Connectors, 22AWG

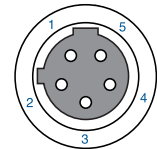
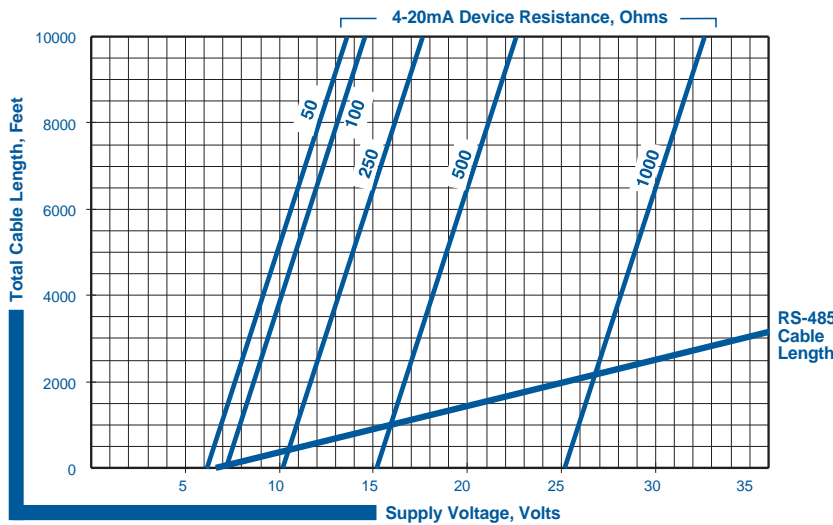
Construction Materials:

- Body: Anodized Aluminum
- Sensor Adapter: 316 Stainless Steel
- Remote Sensor: 303 Stainless Steel
- Cable: PVC Jacket
- O-rings: Viton®

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MicroChange® is a registered trademark of Woodhead industries, Inc.

FC900 Flow Sensor/Transmitter

Cable Lengths for Digital RS-485 and 4-20mA Current Loop Options

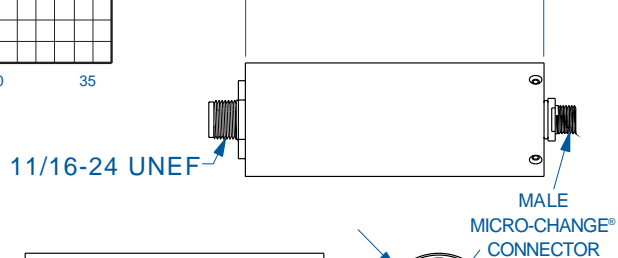


MALE MICRO-CHANGE® CONNECTOR

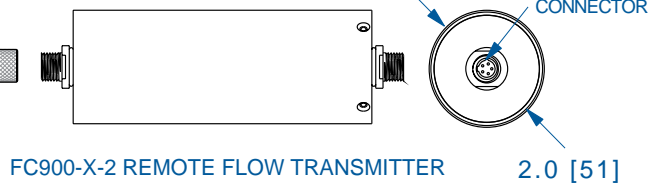
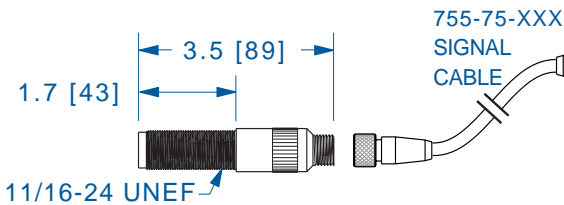
Connection/Cable Wiring	
1) Red/White	-- (+)RS485 or (+) 4-20mA
2) Red	-- (+)VDC in
3) Green	-- DC Common
4) Red/Yellow	-- Pulse Output
5) Red/Black	-- (-)RS485 or (-) 4-20mA

FC900-X-1 INTEGRAL FLOW TRANSMITTER

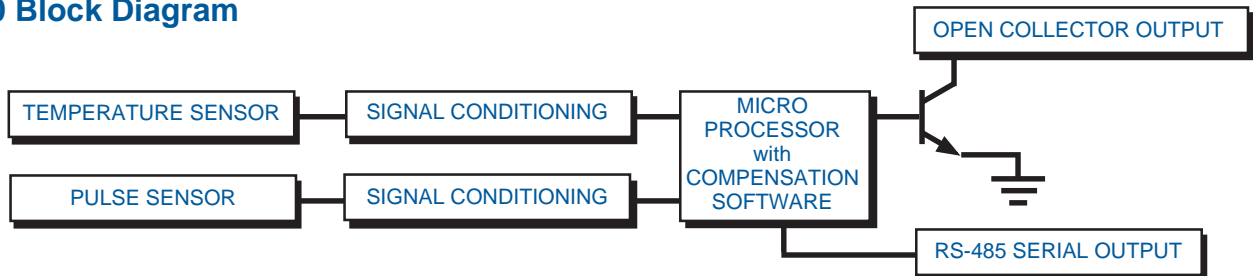
5.35 [136]



RS-90-QD REMOTE SENSOR



FC900 Block Diagram



Flowmeter Disassembly/Reassembly

Models: FC02, FC03, FC05, FC10

WARNING

Before disassembling the flowmeter, depressurize any of the lines connected to the meter. A small amount of fluid will remain in the flowmeter and will leak out when it is opened. Take any precautions necessary to deal with this fluid. Failure to heed this warning may result in serious bodily injury.

Disassembly

- 1. Disconnect Sensor Cable** - Unscrew and unplug the sensor cable from the sensor.
- 2. Remove Sensor** - Unscrew the sensor from the flowmeter. **DO NOT DROP THE SENSOR**; it can be damaged by a sudden jolt. **IMPORTANT: Each flowmeter has a "matched" sensor and the two are calibrated as a set. They are NOT interchangeable. The sensor label includes the serial number of its matched flowmeter.**
- 3. Remove Front Cover** - While holding the front cover in place, loosen and remove the cover bolts. Fuel may leak out; take any precautions necessary. Remove the front cover and catch the case o-ring and shims if they fall out. **Caution:** The front cover can be damaged if dropped.
- 4. Remove Case O-ring** - If the case o-ring is still set in the body, remove it by hand.
- 5. Remove Outer Impeller Shims** - If the outer shims are still on the impeller shafts, remove them by hand.
- 6. Remove Impellers** - Carefully remove the impellers by hand. Do not use any type of object to pry them out. Handle the impellers carefully. They can be damaged if dropped. Catch the inner shims if they fall out.
- 7. Remove Inner Impeller Shims** - The inner set of impeller shims may still be on the shafts. Remove them by hand if necessary.

Reassembly

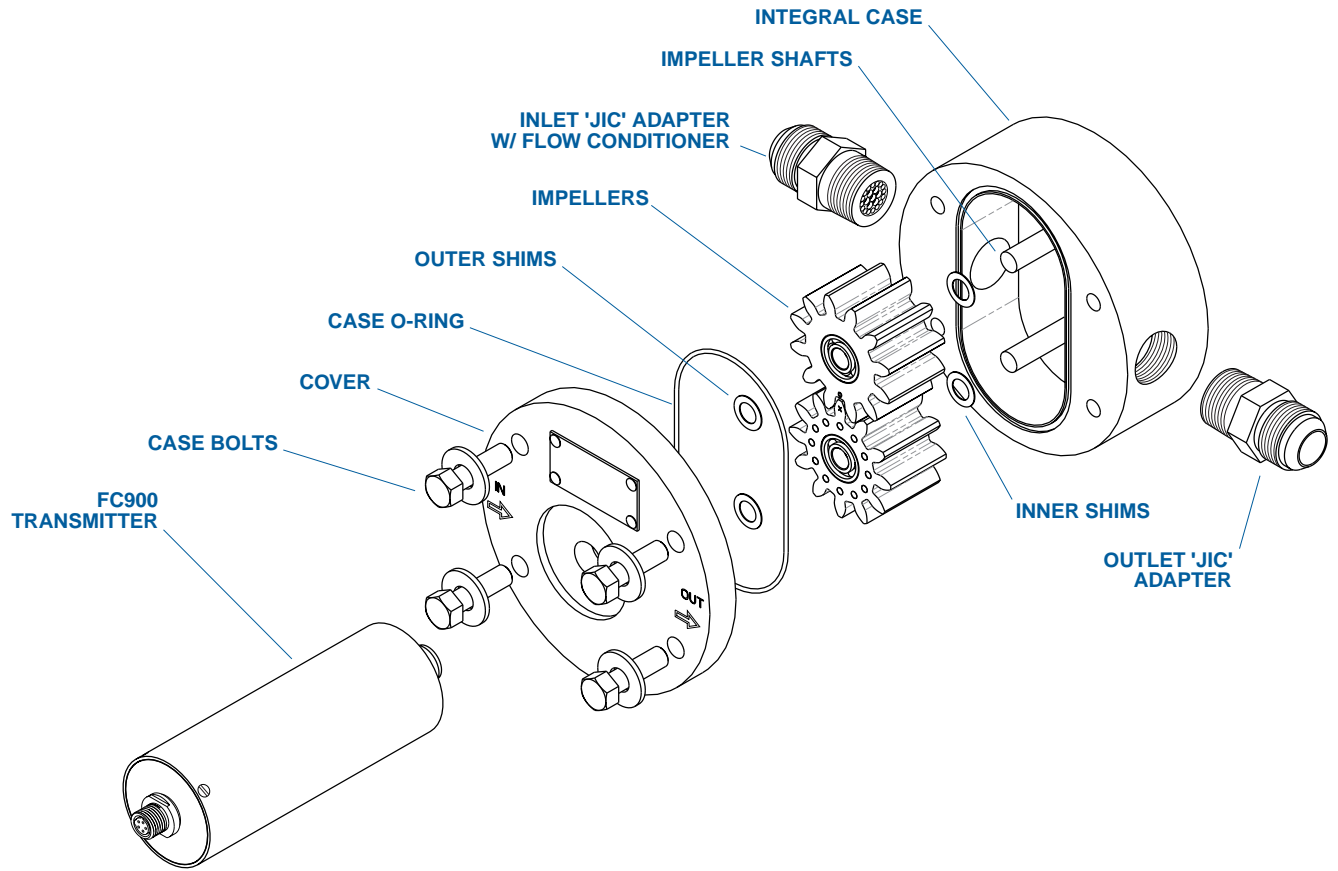
- 1. Install Inner Impeller Shims** - Carefully slide the inner set of impeller shims onto the shafts.
- 2. Install Impellers** - Carefully slide the impellers onto the impeller shafts. The impellers are marked with an X and an O. Place the impellers on the corresponding shafts - the X Impeller on the shaft marked with an X and the O impeller on the shaft marked O. **Both marks must be visible with the impellers in the body.** The X and O marks on the impellers are placed on a tooth and root respectively, so that the two impellers can be indexed to each other. **Ensure that the X mark on one impeller meshes with the O mark on the other.**
- 3. Install Outer Impeller Shims** - Carefully put the outer set of impeller shims onto the shafts.
- 4. Install Case O-ring** - Insert the case o-ring into the o-ring groove in the body. Make sure the case o-ring is completely set in the groove. A lubricant, which is compatible with both the case o-ring material and fuel (such as petroleum jelly), may be used to help the case o-ring stay in the groove during assembly.
- 5. Mount Front Cover** - Carefully mount the front cover onto the integral body. Hold the case o-ring in the groove. Do not install the cover bolts until the case o-ring is set properly; damage will occur to the case o-ring if it is not. **Install the cover bolts and tighten to these torques.** To help ensure equal tension, move around the face of the meter tightening every other bolt; then tighten the remaining bolts. **Failure to set the correct torque on the cover bolts can adversely affect the flowmeter accuracy.**
- 6. Install Sensor** - Screw the sensor into the sensor opening on the cover plate of the flowmeter. **FINGER-TIGHTEN ONLY** or damage to the sensor or flowmeter may occur.
- 7. Attach Sensor Cable** - Plug the cable into sensor.

Cover Bolt Torque

Meter	in-lbs	[Nm]
FC02	64-68	[7.2-7.7]
FC03	62-66	[7.0-7.5]
FC05	150-160	[17-18]
FC10	280-300	[32-34]

Model Specs.	Fitting Size SAE 37° Flare	Flow Rate GPH [L/hr]		Pressure Drop, PSI [kPa]				Recommended Mesh Size		Weight
				@ 50°F [10°C]		@ 160°F [70°C]				
	Minimum	Maximum	@ Max Flow	@ 70% Flow	@ Max Flow	@ 70% Flow	Sieve #	Micron	lbs [Kg]	
FC02	8	25 [95]	180 [681]	5.6 [39]	2.5 [18]	4.2 [29]	1.6 [11]	100	150	1.8 [0.8]
FC03	10	50 [189]	360 [1363]	5.2 [36]	2.4 [17]	4.1 [28]	1.6 [11]	80	177	2.3 [1.0]
FC05	12	50 [189]	500 [1892]	4.9 [34]	2.4 [17]	3.8 [26]	1.8 [13]	70	210	5.3 [2.4]
FC10	20	200 [757]	1300 [4921]	4.9 [34]	2.8 [20]	3.9 [27]	1.8 [13]	60	250	9.0 [4.1]

Flowmeter Assembly Diagram Models: FC02, FC03, FC05, FC10

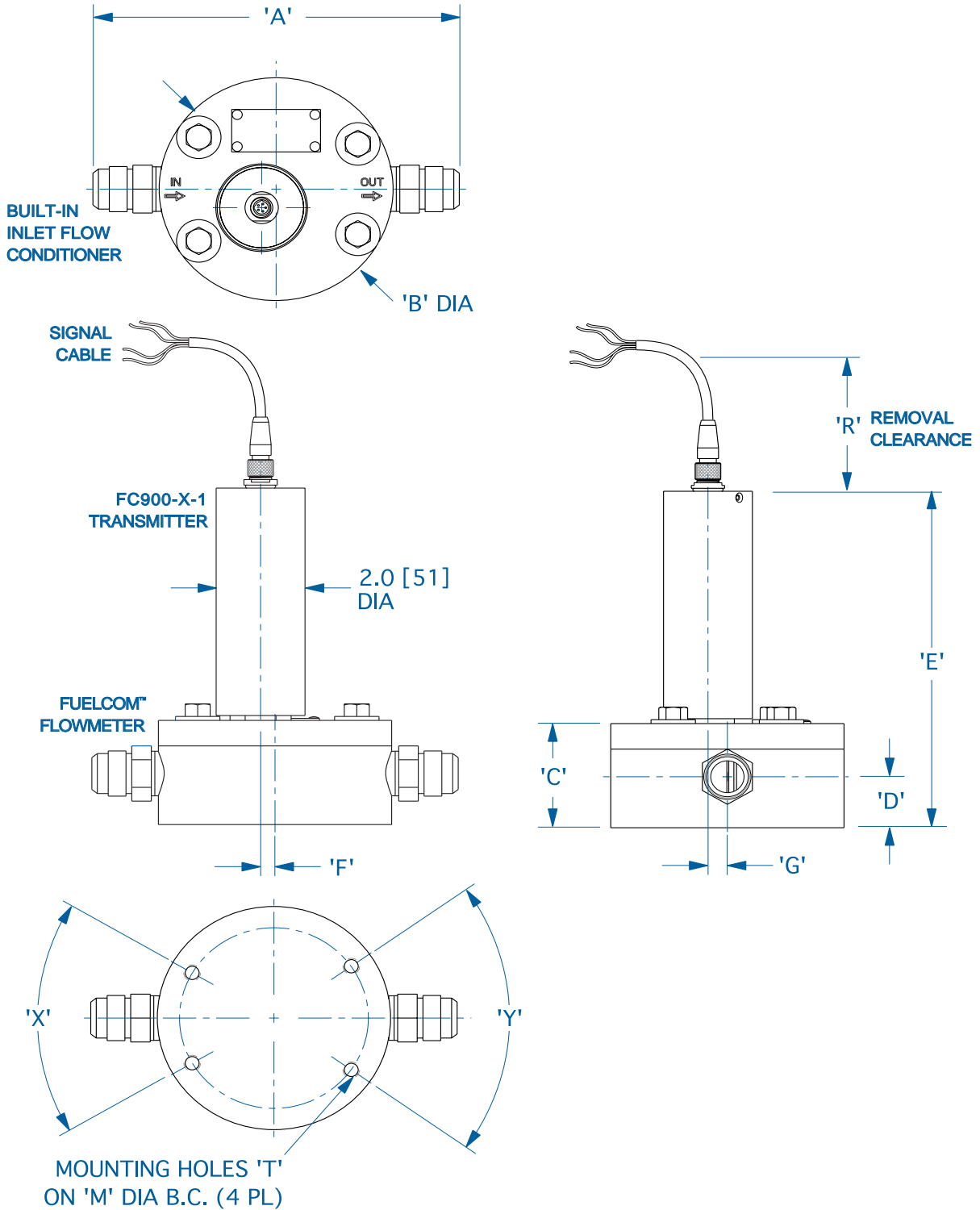


Replacement Part Ordering Models: FC02, FC03, FC05, FC10

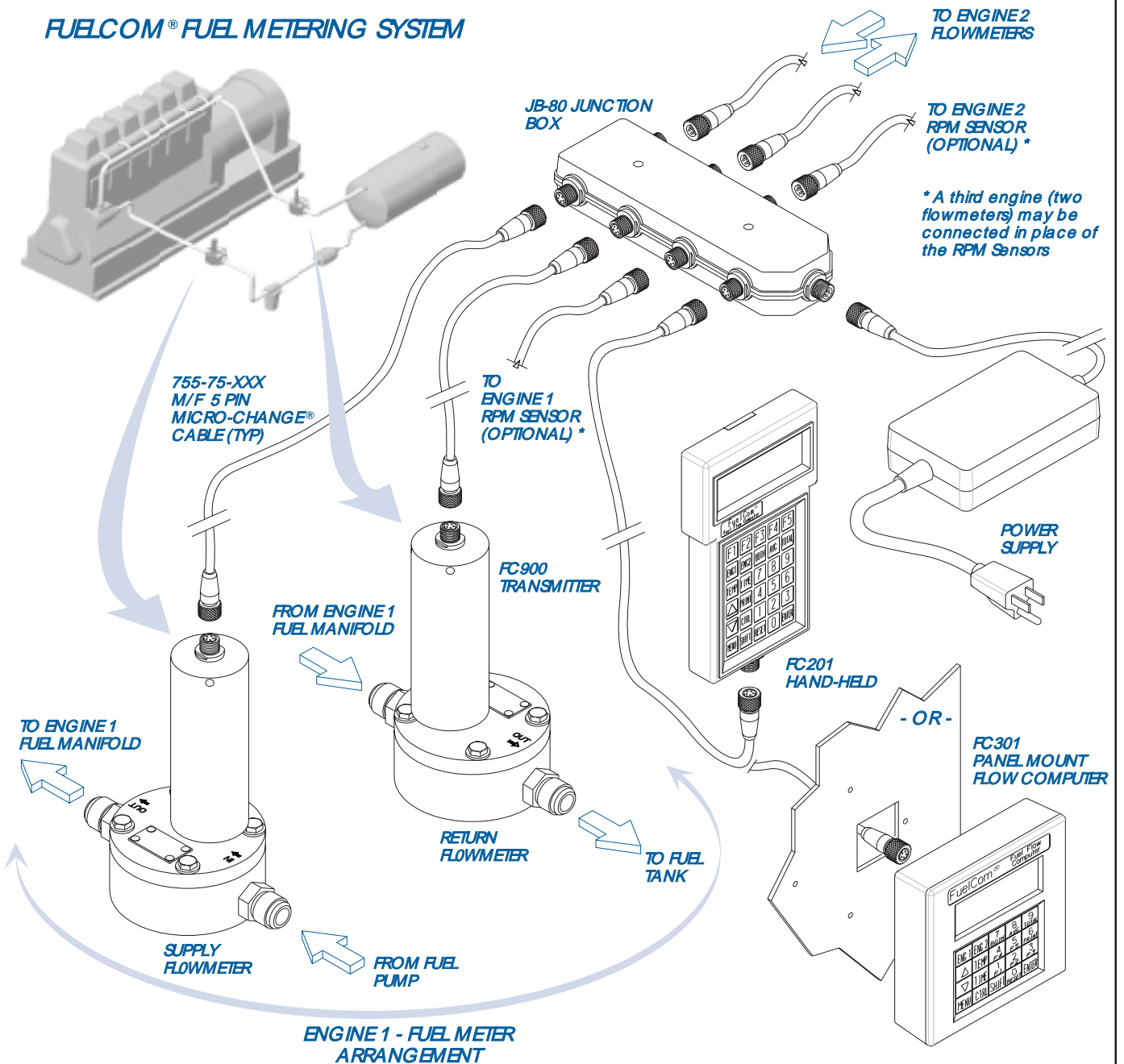
ITEM	FLOWMETER			
	FC02	FC03	FC05	FC10
O-RING	55-040-21	55-041-21	55-044-21	55-048-21
SHIMS	FC02-605-03-00	FC03-605-03-00	FC05-605-03-00	FC10-605-03-00
FLOW CONDITIONER	FS-02A	FS-03A	FS-05A	FS-10B
OUTLET ADAPTER	60-03NAT8J-80	60-05NAT10J-80	60-07NAT12J-80	60-12NAT20J-80

Dimensions, inches [mm]

Model	'A'	'B'	'C'	'D'	'E'	'F'	'G'	'M'	'T'	'R'	'X'	'Y'
FC02	6.4 [163]	4.00 [102]	1.47[38]	0.66 [17]	6.3 [160]	0.29 [7]	0.36 [9]	3.38 [86]	1/4-20UNC x .5 DP	2.5 [64]	80°	90°
FC03	6.90 [175]	4.00 [102]	1.95 [50]	0.90 [23]	6.8 [173]	0.37[9]	0.43 [11]	3.38 [86]	1/4-20UNC x .5 DP	2.5 [64]	80°	90°
FC05	8.50 [216]	5.25 [133]	2.45 [62]	1.20 [30]	7.1 [180]	0.33 [8]	0.44 [11]	4.25 [108]	3/8-16UNC x .5 DP	2.5 [64]	60°	70°
FC10	9.90 [251]	6.25 [159]	3.59 [91]	1.48 [38]	7.6 [193]	0.40 [10]	0.51 [13]	4.90 [125]	1/2-13UNC x .5 DP	2.5 [64]	60°	70°



FUELCOM® FUEL METERING SYSTEM



MicroChange® is a registered trademark of Woodhead Industries, Inc.

This diagram represents a typical FuelCom® Fuel Metering System on a large diesel engine in a "net burn" configuration (SUPPLY FLOW minus RETURN FLOW)

FuelCom® System Ordering

Meter Part Number FC - - -

Nominal Size _____

02 1/4"

03 3/8"

05 1/2"

10 1"

O-ring Material _____

1 Viton®

Fitting Type _____

1 SAE 37° Flare w/ integral Flow Conditioner

Flow Transmitter FC900 - -

Output Type _____

4 RS-485 C2 wire Serial Communication and NPN open collector with pull-up provided, sink up to 100mA

5 4-20mA current loop and NPN open collector with pull-up provided, sink up to 100mA

Configuration _____

1 Sensor / Transmitter Combined

2 Sensor Separated from Transmitter, Requires:

Remote Flow Sensor RS-90-QD

RPM Transmitter FC901 - -

Output Type _____

1 Open Collector

2 RS-485

Configuration _____

2 Sensor Separated from Transmitter, Requires:

Remote RPM Sensor RS-9S-QD

Signal Cable 755 - 75 -

Length _____

010	10 ft	020	20 ft	050	50 ft
100	100 ft	150	150 ft	200	200 ft

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Limited Warranty

For a period of not less than one (1) year nor more than two (2) years from the original date of shipment. Seller warrants that the products described in this Warranty are free from defects in workmanship and materials only. For specific Warranty periods please refer to Seller's Warranty schedule. Seller shall not be liable for any special, incidental or consequential damages. This Warranty extends to the original purchaser of the product warranted hereunder and to each transferee owner of the product during the term of the Warranty. In the event of a defect, malfunction, or failure of the product not caused by any misuse or damage to the product while in possession of the owner, the warrantor will remedy the failure or defect, within a reasonable amount of time after written notification from the owner of same. The remedy will consist of repair or replacement of the product only, at the warrantor's option. The owner must return the defective or malfunctioning component part(s) to the factory for such repair or replacement. If this product or one of its component parts is modified in any way by the owner, transferee owner, his agent or employee, this Warranty shall become null and void.

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