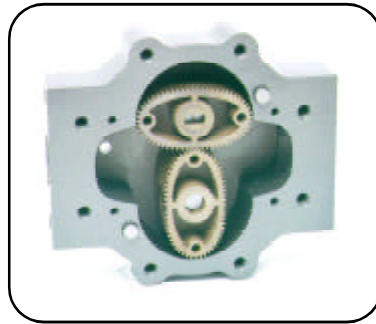


**Stealth Electronic Manual ZTM1010  
Installation & Maintenance**

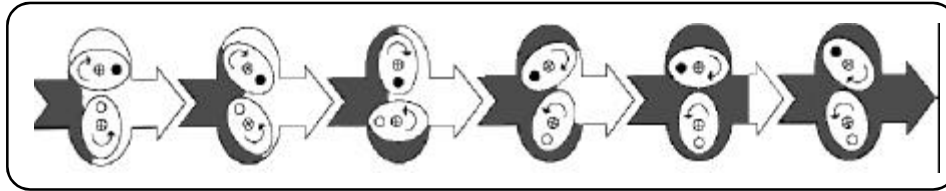
**For Oval Gear Meter Models:** TS10   
TS15   
TS20   
TS30

**including :**

CC56	<input type="checkbox"/>	PIA	<input type="checkbox"/>	EDB 180	<input type="checkbox"/>
PC58	<input type="checkbox"/>	PCDT58	<input type="checkbox"/>	PDB 180	<input type="checkbox"/>
DU53	<input type="checkbox"/>	PRT	<input type="checkbox"/>	PDMB 180	<input type="checkbox"/>
ELNC	<input type="checkbox"/>	PAC	<input type="checkbox"/>	PMFC	<input type="checkbox"/>

**Meter Model No.:** TS \_\_\_\_\_

## FPP Meters and Our Principle of Operation



### FPP Meters' Superior Meter Accuracy and Reliability Results from Two Close-Fitting Oval Gears within A Precision Measuring Chamber

#### About FPP Meters

FPP Meters, formerly Fluid Power Products, is now a tradename of Tuthill Transfer Systems. FPP was established in 1980. Since its inception, the company has been dedicated to manufacturing cost-effective high performance flow metering devices for petroleum, industrial, commercial, and municipal service.

Our facilities include computerized order entry and inventory control so that you are assured accurate and prompt deliveries. Furthermore, our production personnel ensure that each order, regardless of size, receives individual attention.

Constant attention to new product development and production design, our high standards of manufacture and final testing are the reasons why FPP Meters meet your most demanding requirements.

Our meters are used in batching, blending, process control and dispensing of liquid products in all liquid handling industries.

#### Principle of Operation

Elliptical-shaped rotors are used to accurately measure liquid flow by precisely sweeping a known volume of liquid through a close tolerance measuring chamber. The meshed rotors seal the inlet from the outlet flow, developing a small pressure differential. As the rotors rotate, they trap a precise quantity of liquid in the area between the rotor and the measuring chamber wall. The total quantity of flow for one rotation of the rotor pair is four times the volume trapped between the rotor and the measuring chamber wall. Close tolerance machining of the rotors and the measuring chamber means minimum slippage and high accuracy which is essentially unaffected by changes in viscosity. The rate of flow through the meter is proportional to the rotational speed of the rotors. Therefore, the meter output is directly proportional to the rate of flow. The output for Stealth meters can be either mechanical or

electronic. The output for mini oval gear meters is electronic.

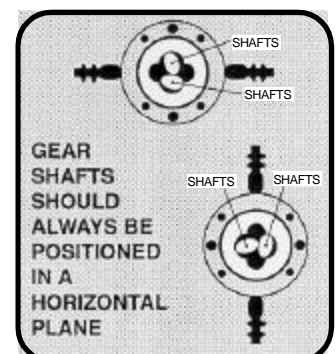
In the mechanical meter, the output shaft drives a gear train that provides a registration in engineering units.

In the electronic version of the meter, magnets mounted in the rotors actuate a switch. Each switch closure represents a precise increment of volume. The switch output can then be used as an input to a variety of electronics including scaling counters, batch controllers, computers, analog converters, etc. The combination of accuracy, low cost and few moving parts makes the FPP Meters' mini oval gear meters a natural for your metering applications.

#### Fluid Compatibility

If in doubt about compatibility of a specified fluid, contact our manufacturing plant or see Chemical Compatibility Chart to check compatibility of chemicals to the wetted materials.

**If You Have Any Questions About Installation or Operation, Please Consult the Factory Prior to Installation (888) 578-3258.**



## Installation & Operation



### SAFETY INSTRUCTIONS

**Make sure that all necessary safety precautions have been taken including proper clothing, personal safety equipment and fire safety equipment if required.**

#### **Before Start-up of Meter Make Certain:**

- 1. The meter is properly mounted, secured and piped.**
- 2. All connections are tight.**
- 3. All bleed and drain valves are closed.**
- 4. Do NOT smoke near meter or use meter near an open flame when metering flammable fluids. Fire could result.**
- 5. This meter is not intended for use with fluids for human consumption.**

**Install the Meter and Accessories in Compliance with All Applicable Local, State and Federal Construction, Electrical and Safety Codes.**

### Installation

Positive displacement meters are designed to operate full of liquid. The meter should be installed in a manner such that it remains full of liquid at all times.

Protective caps installed in each meter at the time of shipment should remain in the openings until you are ready to install in the piping system.

Prior to meter installation, the piping system should be flushed to remove all debris. Apply pipe compound to the male threads, to install the companion flanges.

**The meter must be installed in the system free of pipe stress. Pipe stress can deform the meter chamber, resulting in loss of accuracy. The meter should always be supported by bolting to a platform. Never use the connecting pipe as the means of support.**

When installing the meter consider future maintenance, and install in the best location available to facilitate future meter maintenance. The meter can be disassembled and serviced in place, and provisions for service should be considered during installation.

For the best accuracy, install the meter so that the gear shafts are positioned in a horizontal plane, rotating without the weight of the gear resting on the body or cover of the meter as shown on page 1. In critical installations block valves and by-pass lines are recommended. This allows the meter to be serviced without interruption of flow in critical process application.

**Thermal relief valves are recommended and should be installed whenever it is possible to block the meter between two valves. Thermal pressures many times the operating pressure are possible with only a small rise in temperature.**

**It is recommended that a strainer be installed upstream of each meter to prevent damage from foreign matter, such as weld slag, pipe scale, etc.**

Calibration means should be provided during installation. An easy means for diverting flow into a calibration vessel should be considered.

**Hydraulic shock like thermal expansion can be harmful to meter components. Consideration should be given to designing pumping piping systems to eliminate hydraulic shock.**

### Operation

Fill the system slowly to avoid operation on air or vapor. This can be accomplished in the following manner:

1. Throttle the meter inlet valve, and allow to fill slowly by gravity.
2. Crack open the outlet valve, start the pump, then slowly crack open the inlet valve and fill the meter slowly before fully opening the inlet and outlet valves.

The meter is not designed to operate on air, but the design and materials of construction allow for operation on vapor for short periods of time without damage to the elliptical gears or meter internals.

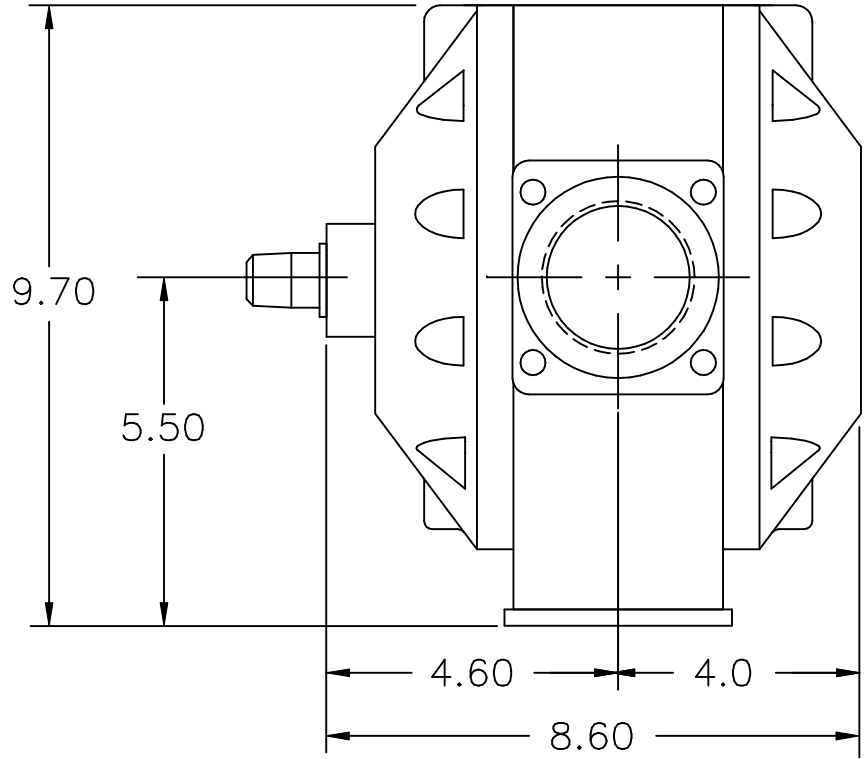
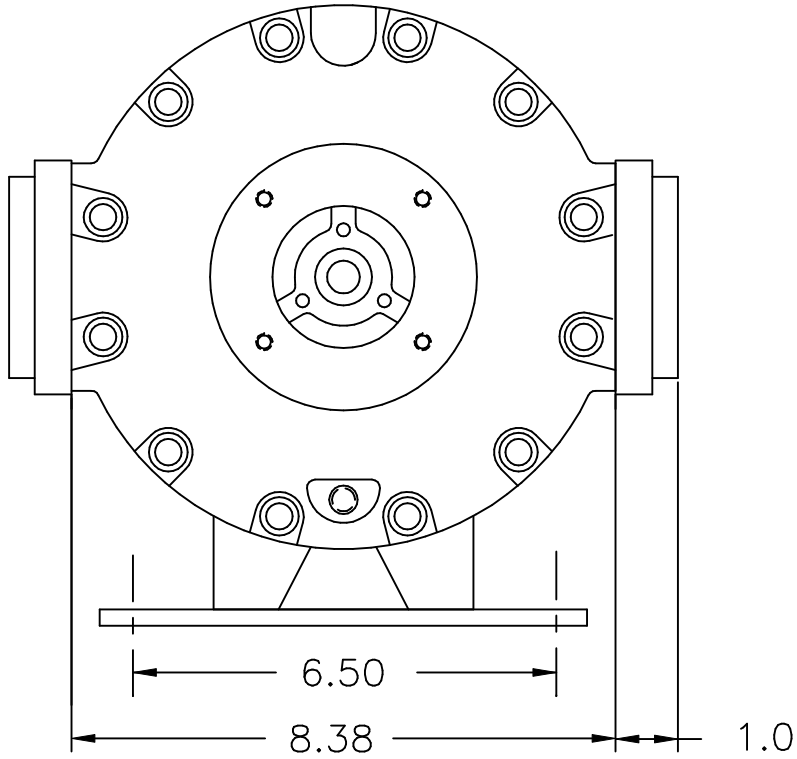
**Note: Over-speed and hammer caused by the presence of vapor in the system can cause internal damage to the meter.**



### SAFETY INSTRUCTIONS

**The meter's non-shock Maximum Operating Pressure is indicated on the meter name plate. The meter should never be operated in excess of this pressure. Care should be taken to eliminate thermal and hydraulic shock pressures so that they do not exceed the meter's Maximum Working Pressure design.**

Operating the meter in excess of its maximum design flow can cause excessive wear or premature failure. However, the meter can be calibrated to operate below the minimum design flow rate as indicated on the meter name plate if the flow remains constant, or the product is viscous.



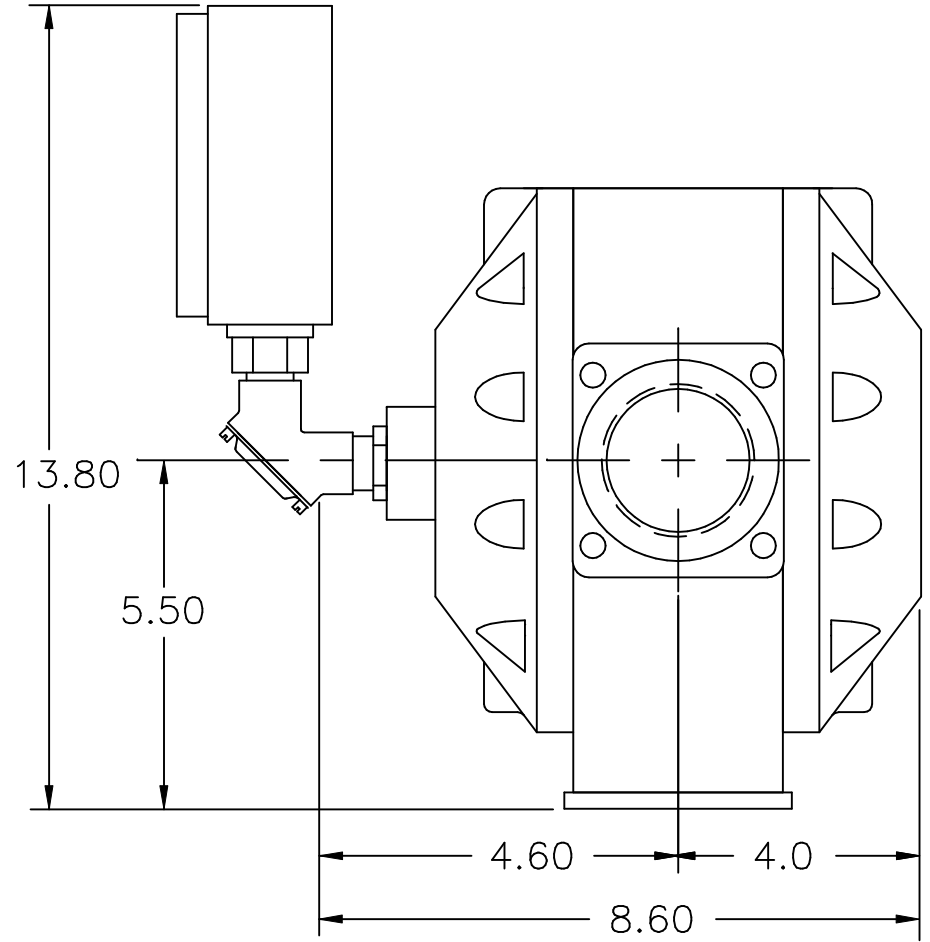
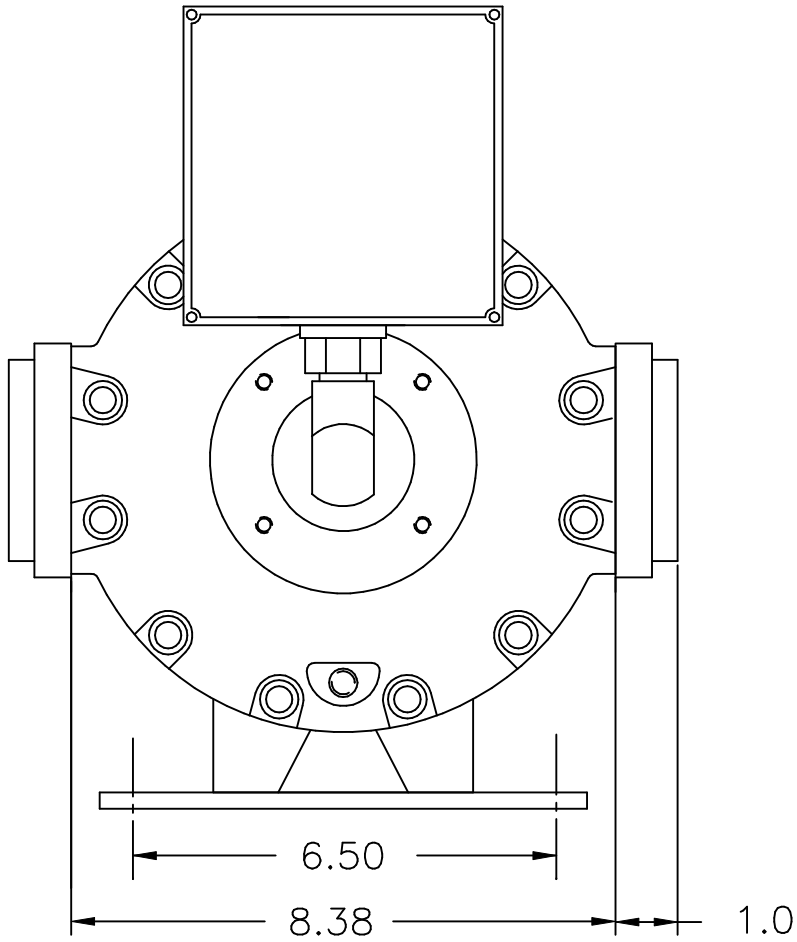
2" SS METER W/REED SWITCH  
/HALL EFFECT FLOW SENSOR

DWN.	RCD	DRAWING NO.
APPD.	KOL	598HE/RSFS
PART NO.	TS20CS	



REVISION	ECN	DATE
A	N/A	10/31/00





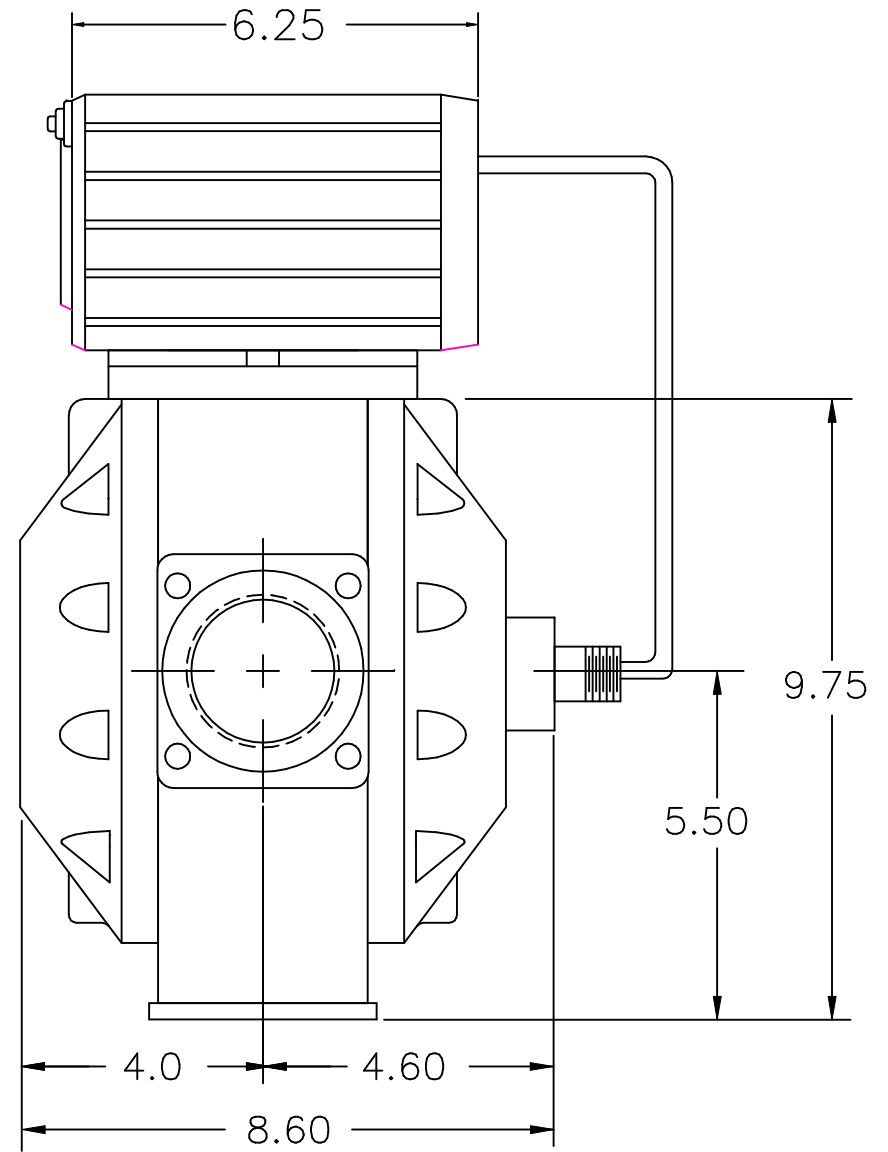
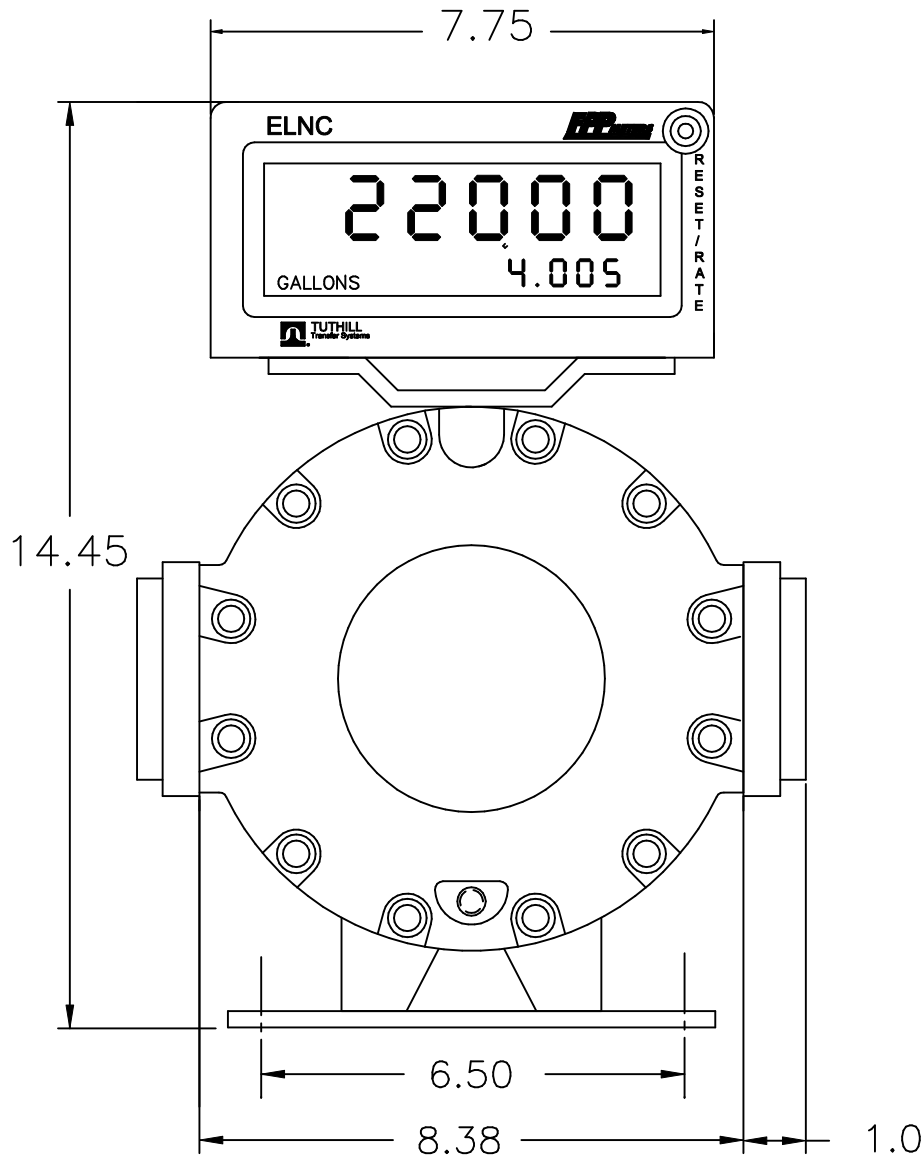
2" SS METER W/LOCAL  
NEMA 4X ENCLOSURE

DWN.	RCD	DRAWING NO.
APPD.	KOL	598LN4
PART NO.	TS20CD	



REVISION	ECN	DATE
A	N/A	10/31/00





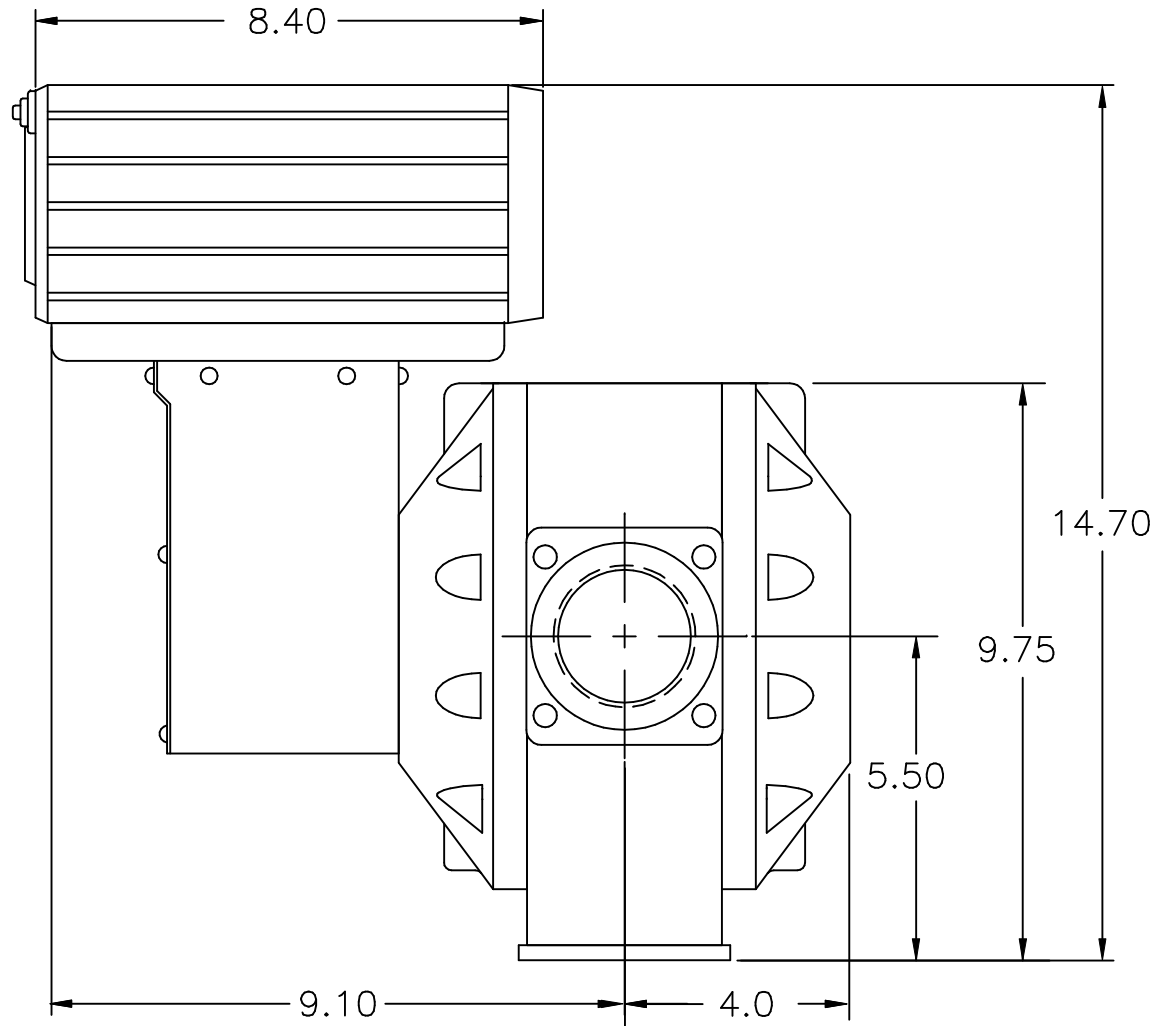
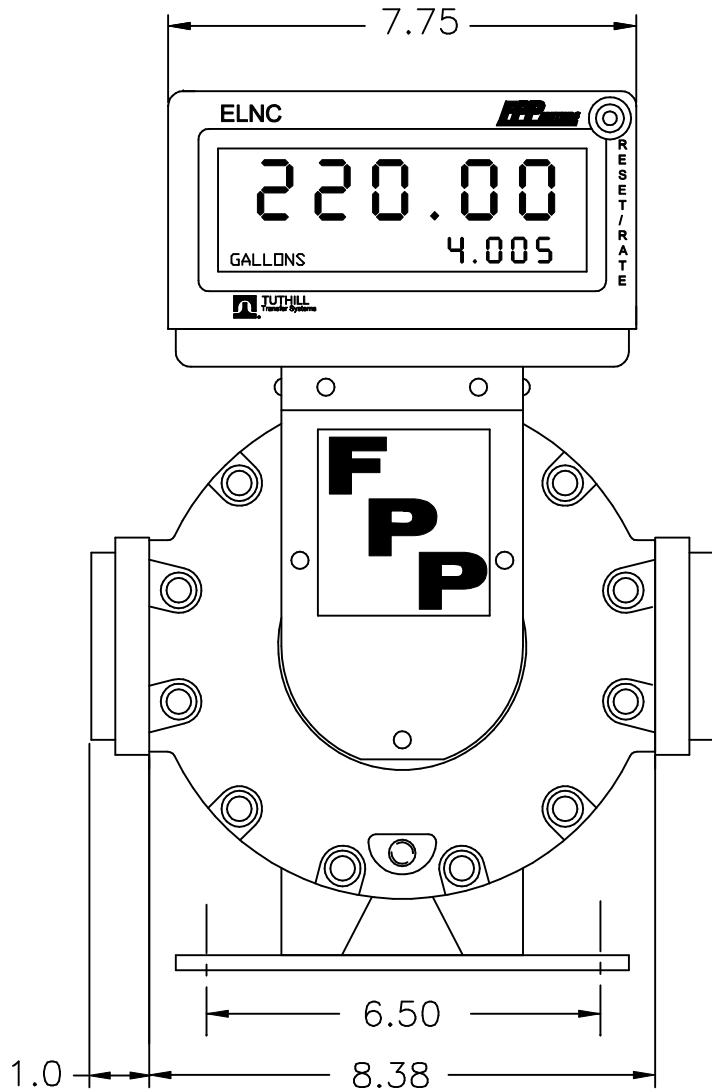
2" SS METER W/ELECT.  
LARGE NUMERAL COUNTER

DWN. RCD	DRAWING NO.
APPD. KOL	598ELNC
PART NO. TS20CE10	



REVISION	ECN	DATE
A	N/A	12/15/99





2" SS METER W/ELNC  
MOUNTED ON V/R ADAPTER

DWN.	RCD	DRAWING NO.
APPD.	KOL	598AELNC
PART NO.	TS20C	



REVISION	ECN	DATE
A	N/A	10/31/00



# Parts List for Electronic Meter Model TS20C

Serial no.s > 598A1000



Item	Qty.	Description	Part #	Item	Qty.	Description	Part #
1	1	TS20C Meter Body	MB9310	8	8	10-32 X 3/8" SS SHCS	FS9651
2*	1	Gear Set, Ryton™	GS598R	9*	2	"O" Ring, Teflon™, Covers	SL2167
		Gear Set, Ryton™, 34 PPG	GS590R34	10	24	3/8-16 X 7/8" SS SHCS	FS2928
		Gear Set, Ryton™, 34 PPG, med. visc.	GS590R34MV	11	1	Retaining plate	MP9061
		Gear Set, Ryton™, Carbon, 34 PPG	GS590RC34	12	1	"O" Ring, Teflon™, sensor	SL2212
		Gear Set, Ryton™, 34 PPG, high visc.	GS590RHV34	13	3	8-32 X 3/8" SS SHCS	FS9515
3	1	Post plate assembly	CP93151	14	2	2" Companion flange, NPT	MP9506
3a**	1	Post plate	CP9315			2" Companion flange, BSPP	MP9508
3b**	2	Gear posts	MP90692	15	2	"O" Ring, Teflon™, companion flanges	SL2233
3c**	2	5/16-18 X 3/4" SS SHCS	FS9900	16	8	3/8-16 X 7/8" SS SHCS	FS2928
3d**	2	Lock washers	FS5008	17	1	Meter pedestal	MP9112
4	1	Gear plate	CP9316	18	4	3/8-16 X 3/4" FLHD SHCS	FS8914
5	4	Dowel pin	MS9021	19	2	1/4" SS drain plug	MS4019
6	1	Front cover	CP9399	20*	1	Reed switch assembly	EL5598RS
7	1	Rear cover	CP9398	21*	1	Hall effect assembly	EL5598HE

## Torque Specifications

Part #	Description	Torque	Tool	Part #	Description	Torque	Tool
FS9900	5/16-18 X 3/4" SS SHCS	Snug tite	1/4 Allen	FS2928	3/8-16 X 7/8" AL SHCS	34 ft.lbs.	5/32 Allen
FS9651	10-32 X 3/8" SS SHCS	24 in.lbs.	5/32 Allen	FS8914	3/8-16 X 3/4" FLHD SHCS		
FS2928	3/8-16 X 7/8" AL SHCS	34 ft.lbs.	5/32 Allen	MS4019	1/4" SS Drain plug	Snug tite	1/4 Allen
FS9515	8-32 X 3/8" SS SHCS	Snug tite	9/64 Allen				

\* Recommended Spare Parts

\*\* Part of Post plate assembly, Part No.: CP93151

ZLT234 10/00

Printed in the USA



**Please have the following information available when you make inquiries, order replacement parts, or schedule service:**

Your meter's serial number: \_\_\_\_\_

Your meter's model number: \_\_\_\_\_

Your full service Distributor: \_\_\_\_\_

Your full service Distributor's phone number: \_\_\_\_\_

**Warranty**

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Tuthill Transfer Systems ("Manufacturer") warrants to each buyer of its FPP Meters products (the "Buyer") for a period of 12 months from date of invoice or sales receipt, but in no event more than 18 months from date of manufacture, that goods of its manufacture ("Goods") will be free from defects of material and workmanship. Manufacturer's sole obligation under the foregoing warranties will be limited to either, at Manufacturers' option, replacing or repairing defective Goods (subject to limitations hereinafter provided) or refunding the purchase price for such Goods theretofore paid by the Buyer, and Buyer's exclusive remedy for breach of any such warranties will be enforcement of such obligations of Manufacturer. If Manufacturer so requests the return of the Goods, the Goods will be redelivered to Manufacturer in accordance with Manufacturer's instructions F.O.B. Factory. The remedies contained herein shall constitute the sole recourse of the Buyer against Manufacturer for breach of warranty. IN NO EVENT SHALL MANUFACTURER'S

LIABILITY ON ANY CLAIM FOR DAMAGES ARISING OUT OF THE MANUFACTURE SALE, DELIVERY OR USE OF THE GOODS EXCEED THE PURCHASE PRICE OF THE GOODS. The foregoing warranties will not extend to Goods subjected to misuse, neglect, accident or improper installation or maintenance, or which have been altered or repaired by anyone other than Manufacturer or its authorized representative. THE FOREGOING WARRANTIES ARE EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES OF MERCHANTABILITY, FITNESS FOR PURPOSE OF ANY OTHER TYPE, WHETHER EXPRESS OR IMPLIED. No person may vary the foregoing warranties and remedies except in writing signed by a duly authorized officer of Manufacturer. Warranties or remedies that differ from the foregoing shall not otherwise be binding on Manufacturer. The Buyer's acceptance of delivery of the Goods constitutes acceptance of the foregoing warranties and remedies, and all conditions and limitations thereof.



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