- Operating Pressure — 150 psi
- Maximum Operating Temperature
  Cold Water 105°F (40°)
- 3 Layers Epoxy Coating

SIZE	2"	3"	4"	6"	8"
Max. Flow Rate — GPM	400	850	1100	2600	4400
Transition Flow — GPM	4.4	8.8	8.8	17.6	26.4
Min. Flow Rate — GPM	1.5	2.2	2.6	8.8	17.6
Laying Length — Inches	7 7/8"	8 7/8"	9 7/8"	11 3/4"	13 3/4"
Weight — Pounds	28	34	43	83	105

"WP" Series Turbine Meters
Sizes — 2", 3", 4", 6", & 8"

- **WPT** — Turbine Meter/Totalizing
- **WPR** — Turbine Meter/Reed Switch Sensor.
  Provides a dry contact closure to pumps and controls. No external power source is required.
- **WPO** — Turbine Meter with Opto-Electric Sensor
  Three wire device providing transistor output and requiring external power.
- **WPI** — Turbine Meter with Inductive Sensor
  Two wire device and requiring a smart signal conditioner.
- **C** — All Hays WP Series Meters are available in C-Cold Water 105°F (40°C)

SPECIAL FEATURES

Accuracy to 1½% of Reading
The Hays WP Series Turbine Meters are accurate to ± **1½%** of reading of normal flow range.

High Continuous Load is Handled with Ease and Accuracy
WP Series Turbine Meters gives high continuous load in combination with high measuring accuracy.

Especially Low Pressure Loss
Whatever your flow requirements, the HAYS WP Series Turbine Meter has very low pressure loss.

Low Maintenance
The Hays WP Series are designed for long, maintenance free life.

Installs in any Position
Installation in any position gives flexibility to those difficult placement conditions.

High Quality Polymer Inserts and Bearings
Insures long lasting accuracy with lowest wear and corrosion resistance even under severe installation conditions.

TYPICAL APPLICATIONS

- **Totalizing**
- **Water Treatment Control**
- **Proportional Feed of Chemicals**
- **Commercial/Industrial Water Softening**
- **Water Conservation**

TO ORDER TURBINE METERS

Models

- WP — Turbine Meter — Totalizing
- WPR — Turbine Meter — Reed Switch Sensor

Temperatures

- C-Cold Water to 125°F (50°C)

Pulse Rates

WPR Turbine Meter Pulse Rate Chart

Size	2"	3"	4"	6"	8"
Gallons / Pulse	100 / 1000	100 / 1000	100 / 1000	1000 / 10000	1000 / 10000

WPO & WPI Turbine Meter Pulse Rate Chart

Size	2"	3"	4"	6"	8"
Gallons / Pulse	1	1	1	10	10

WPR Turbine Meter Pulse Rate Chart

Size	2"	3"	4"	6"	8"
Pulses / Gallon	.01 / .001	.01 / .001	.01 / .001	.001 / .0001	.001 / .0001

WPO & WPI Turbine Meter Pulse Rate Chart

Size	2"	3"	4"	6"	8"
Pulses / Gallon	1	1	1	.1	.1

Example: 3" Turbine Meter with Reed Switch Sensor in a cold water application with a pulse rate of 100 gallons/pulse.

Order: WPR — C — 3"— 100 G/P.

SPECIFICATIONS

High Flow - Turbine Meters

Materials

Body: Cast Iron Epoxy Coating

Insert Cap: Cast Iron

Register Plate: Die-Cast Bronze

Shafts: Stainless Steel

Turbine and Insert: Engineered Thermoplastic

Drive Magnet: Ceramic Permanent

Pressure Range: Up to 150 PSI Working Pressure

Temperature: 105°F (40° C) Cold Water

Accuracy: ±1 1/2% of Reading

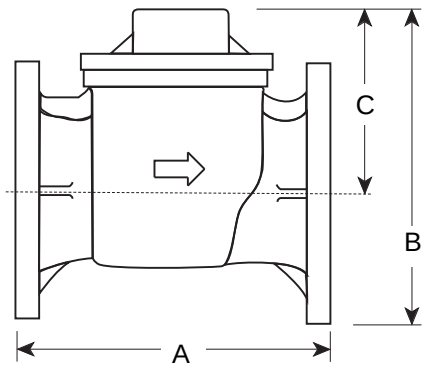
Reed Switch: 100mA at 24V Max.

Shipping Weight:

2" = 28 lbs.
3" = 34 lbs.
4" = 43 lbs.
6" = 83 lbs.
8" = 105 lbs.

TYPICAL APPLICATIONS

Dimensions



	2"	3"	4"	6"	8"
A	7 7/8"	8 7/8"	9 7/8"	11 3/4"	13 3/4"
B	8 1/8"	9 1/4"	9 7/8"	12 5/8"	14 3/8"
C	5"	5 3/8"	5 5/8"	7 1/2"	8 1/4"
Wt. lbs.	33	42	51	89	111

- Choice of PVC or Stainless Steel
- Rate, Total and Pulse Output
- High - Accuracy
- Jewel Bearings
- Register can be Meter-Mounted or Remote
- Temperature

SS	- Standard	140ºF
	- High Temp.	250ºF
PVC	-	140ºF

"WT" Series Turbine Meters
Sizes 2",3",4" & 6"

SPECIAL FEATURES

Accuracy ± 1 1/2% of Reading
The Hays WT Series Turbine Meters are accurate to ± 1 1/2% of reading normal flow range.

High Continuous Load is Handled with Ease and Accuracy
WT Series Turbine Meters gives high continuous load in combination with measuring accuracy.

Especially Low Pressure Loss
Whatever your flow requirements, the HAYS WT Series Turbine Meter has very low pressure loss.

Low Maintenance
The Hays WT Series are designed for long, maintenance free life.

Installs in Any Position
Installation in any position gives flexibility to those difficult placement conditions.

High Quality Polymer Inserts and Jewel Bearings
Insures long lasting accuracy with lowest wear and corrosion resistance even under severe installation conditions.

GENERAL INFORMATION

The Hays WT Series Turbine Meters are manufactured to the highest standards. There is only one moving part, a precision machined helical rotor. Rotation of the rotor is electronically detected and processed. Jewel bearings and a polished tungsten-carbide shaft minimize friction while providing long wear life. Should service be required, the entire rotor assembly can easily be removed without removing the meter from the pipe.

The electronic register (Hays FT 400) can be mounted directly to the meter, wall mounted or panel mounted up to 2000 feet away to display flow rate, total (resettable or non-resettable), provide a programmable pulse output and optional 4-20 mA signal.

TYPICAL APPLICATIONS

- **Totalizing**
- **Commercial/Industrial Water Softening**
- **Water Treatment Control**
- **Water Conservation**
- **Proportional Feed of Chemicals**
- **SCADA**

HOW TO ORDER

Specify: model, PVC/SS option, size ***Example:*** WT101P 3" (3" WT Meter w/electronic register)

WT(P) Series (PVC)
WT 100P w/sensor only
WT 100S w/sensor only

WT(S) Series (Stainless Steel)
WT 101P w/electronic register
WT 101S w/eletronic register

SPECIFICATIONS

Materials:

Meter Body	PVC P model or 316 SS S model
Turbine Rotor	Acetal Plastic, PVDF Optional
Rotor Shafts	Tungsten Carbide
Bearings	Ruby Ring, Sapphire Endstone
Rotor Strut	PVC

Maximum Working Pressure: 200 PSI Stainless, see Temp/Pressure Chart for PVC
Maximum Temperature: 175°F Stainless, see Temp/Pressure Chart for PVC
Accuracy: ± 1% FS, ± 1.5% of Reading Across Designated Range

Flow Range (GPM):	2"	3"	4"	6"
Minimum	2	3	6	12
Maximum	150	400	600	1200

Temperature/Pressure for PVC Body:

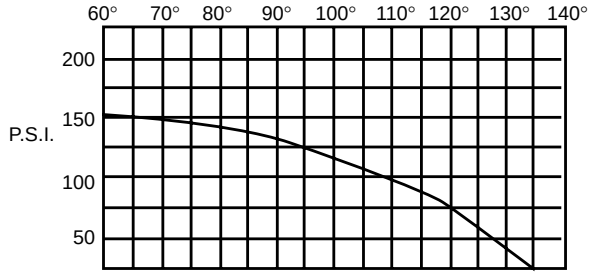
Operating Temp. °F.	Maximum Operating Pressure
75	150
100	150
120	110
140	50

Temperature/Pressure for Stainless Steel Body: Standard 140°F
High Temp. 250°F

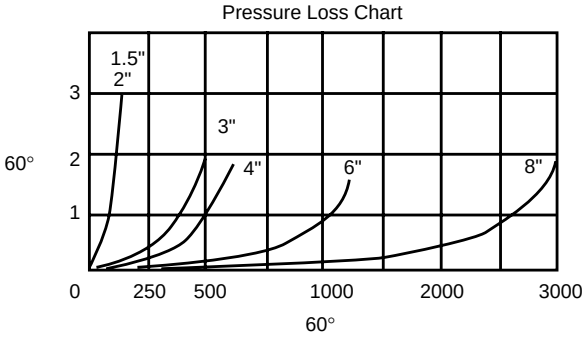
SPECIFICATIONS (cont'd)

WT101 (FT400 Rate/Total)

Power	11-18 VDC, 20 mA max. 24 VDC optional
Rate	8-digit autorange
Total	8-digit, selectable decimal reset standard, non-reset option
Memory	Non-volatile (no battery needed)
K-factor Range	.050 - 1,999.999
Pulse Output	0.1 second, open collector
Pulse Range	0.1 - 99,999 gallons per pulse
Analog Option	4-20 mA, user-programmed

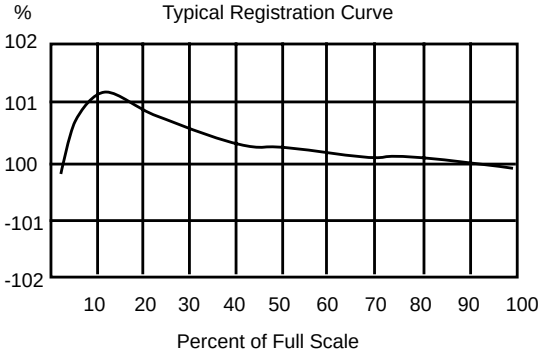


PVC WORKING PRESSURE VS TEMPERATURE



WT100 (Pulse Only)

Power	2-24 VDC
Pulse Type	Current sinking
Pulse Rate	(P/G Nominal)
1 1/2"	20
2"	20
3"	8.5
4"	4
6"	1.75



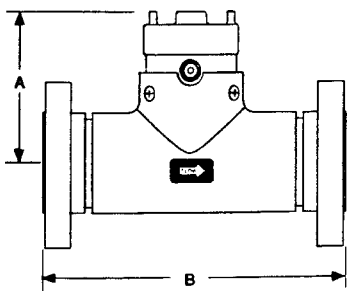
WT102 (A045 Blind Transmitter)

Output	4-20 mA
Loop Power	12 - 36 VDC (isolated)
Accuracy	± 1%
Response Time	3 sec., 95% FS

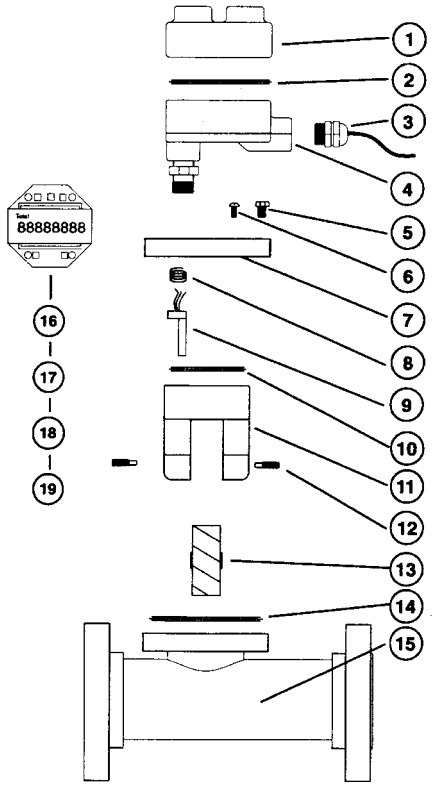
WT103 (Battery-powered Totalizer)

Total	6-digit, non-reset electro-mechanical
Battery Life	3 years
Battery Type	Lithium, replaceable
Pulse Output	Open collector 100 ms, units factory programmed to order.

Dimensions



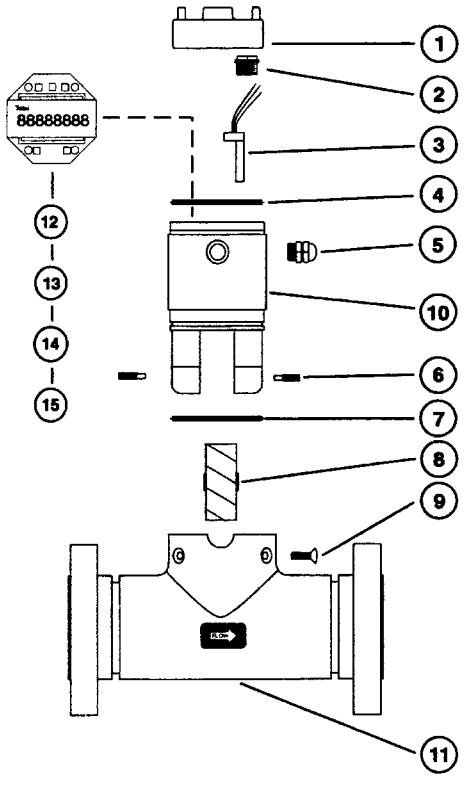
Meter Size	A	B
2"	7.5"	10"
3"	6.5"	12"
4"	7"	14"
6"	8.5"	18"
8"	10"	20"



WT(S) Parts		
1	Insert cover	
	window (WT101, WT103)	9085
	solid (all other)	9089
2	Cover o-ring	16433
3	Strain relief	7620
4	Electronics Housing	9090
5	Flange Screw (4)	7707
6	Insert Screw (4)	7689
7	Top Flange	15604
8	Sensor Spring	16491
9	Sensor (WT103)	
	1-½" - 4"	11018
	6" - 8"	11019
9	Sensor (all others)	
	1-½" - 4"	11013
	6" - 8"	11014
10	Insert O-ring	16443
11	Insert	
	2"	16800
	3" & 4"	16820
	6" & 8"	16860
12	Turbine shaft (2)	16710
13	Turbine rotor (Acetal)	
	1-½" & 2"	16745
	3" & 4"	16750
	6" & 8"	16755
13	Turbine rotor (PVDF)	
	1-½" & 2"	15301
	3" & 4"	15306
	6" & 8"	15316
14	Top Flange O-ring	16442
15	Meter Body	
16	PD10 divider board	11090
17	FT400 rate/total display	11150
18	AO45 blind 4-20 mA	11250
19	BT25 battery totalizer	11260

STAINLESS STEEL

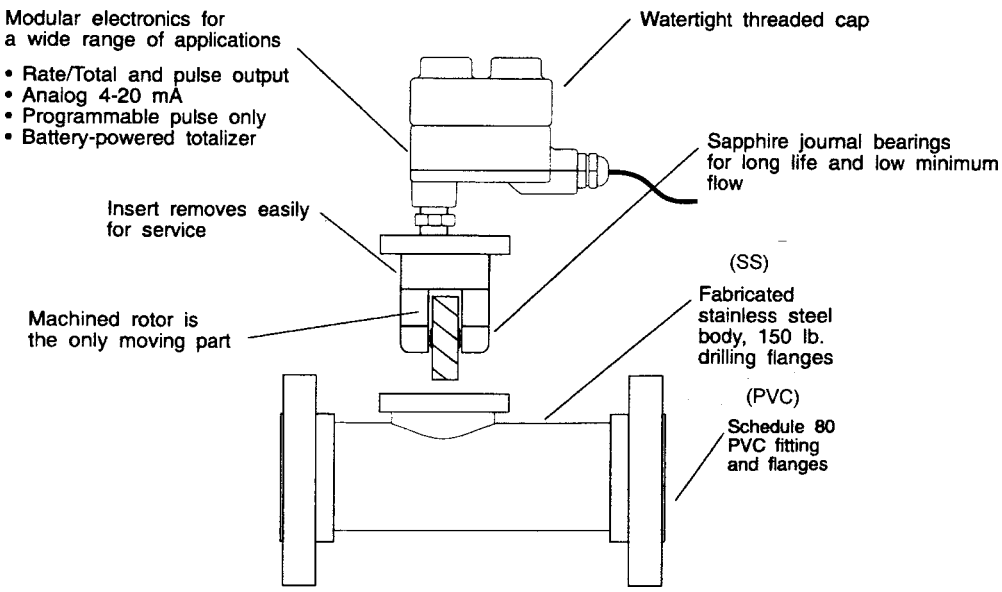
PVC



WT(P) Parts		
1	Insert cover	
	window (WT101, WT103)	9085
	solid (all other)	9089
2	Sensor retainer	16940
3	Sensor (WT103)	
	1-½" - 4"	11018
	6" - 8"	11019
3	Sensor (all others)	
	1-½" - 4"	11013
	6" - 8"	11014
4	Cover o-ring	16433
5	Strain relief	7620
6	Turbine shaft (2)	16710
7	Insert o-ring	
	1-½" & 2"	16427
	3" - 8"	16428
8	Turbine rotor (Acetal)	
	1-½" & 2"	16745
	3" & 4"	16750
	6" & 8"	16755
8	Turbine rotor (PVDF)	
	1-½" & 2"	15301
	3" & 4"	15306
	6" & 8"	15316
9	Insert screw (4)	7689
10	Insert	
	1-½" & 2"	16810
	3" & 4"	16830
	6" & 8"	16870
11	Meter body	
12	PD10 divider board	11090
13	FT400 rate/total display	11150
14	AO45 blind 4-20 mA	11250
15	BT25 battery totalizer	11260

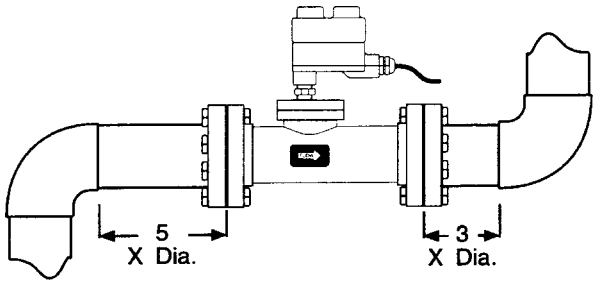
INSTRUCTION MANUAL

FEATURES



INSTALLATION

Piping Conditions. In general, the standard practice of installing the meter with five diameters of straight pipe upstream and three downstream is recommended.



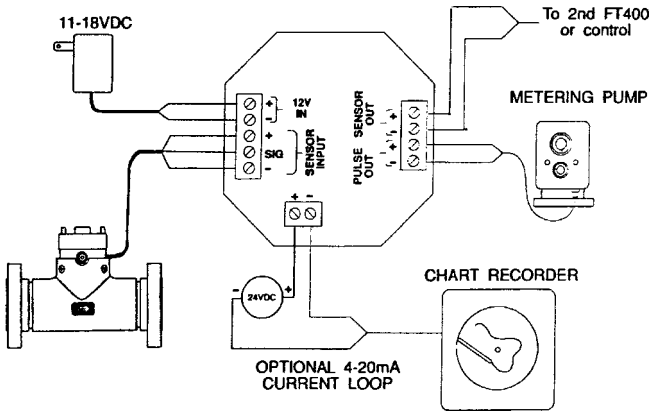
Flanges (SS): Standard flanges are 150 lb. ANSI drilling. Either partial or full-face gaskets can be used. When installing, tighten the bolts evenly, and use care to prevent a misaligned gasket from entering the flow stream.

Flanges (PVC). Flanged PVC meters should be installed according to the pipe manufacturer's recommendations. A bolt torque of 10-20 ft. lbs. for flanges 1 1/2" and 2", 20-30 ft. lbs. for flanges 3" and 4", and 35-50 ft. lbs. for flanges 6" and 8" is recommended. Tighten the bolts evenly. Either partial or full-face gaskets can be used. Use care to prevent a misaligned gasket from entering the flow stream.

INSTALLATION (cont'd)

Position. The WT Series are all-position meters, and can be operated in a vertical or horizontal position, and with the meter insert in any radial position. A horizontal insert position is preferred if there is a risk of air becoming trapped due to constant low flows. Operating the meter in partially-filled pipe will result in inaccuracies.

Connections. Most WT meters require electrical connections. Refer to the connections diagram below for the one relevant to your meter.



MAINTENANCE AND REPAIR

Recalibration. Should recalibration ever become necessary please contact HAYS.

Turbine Insert Removal and Installation. In order to repair any mechanical parts (rotor or shafts) it is necessary to remove the turbine insert. To do this, first remove all pressure from the line. Then remove the screws which hold the insert in place. On the 1 1/2" and 2" meters there are two; all others have four. Tug gently on the insert until it comes free. A twisting motion can help to loosen the O-ring seal. Reverse the procedure to reinstall, after coating the O-ring with a lubricant which is plastics-compatible. Do not over-tighten the screws. Snug tightening with a hand screwdriver is sufficient.

Rotor and Shaft Replacement. Examine the rotor to determine if bearings or shaft are damaged or excessively worn. The rotor should spin smoothly and freely, with no visible wobble. Back and forth play should be very minor, less than 1/64". If it is necessary to replace the rotor or shafts, first back out both shafts, first back out both shafts with a 3/32" Allen wrench.The rotor will come free as soon as the shaft ends come free of the rotor bearings.

Sensor Replacement. This procedure is rarely necessary. However, certain electrical conditions can damage the sensor. To replace it, first remove any electronic module which is in the turbine insert. Remove the three sensor leads from the electronic module terminals (red, black, and white), and remove the threaded plug over the sensor. Finally, remove the sensor by pulling on the sensor leads. A gentle tug should be sufficient. Reverse the process to replace the sensor.

Electronic Module Repair. Printed circuit boards must be replaced as complete units. In order to replace an electronic module, loosen the four screws which fasten each unit to standoffs. Once the screws are loose, the unit will lift free from the insert housing.

The FT400 has a fuse holder and fuse on the back side of the board. To replace a fuse, remove the board stack and turn it over.Locate the fuse holder then remove and replace the fuse.