SPECIFICATIONS
682-15 Flow Meter

TOTAL CONTROL SYSTEMS



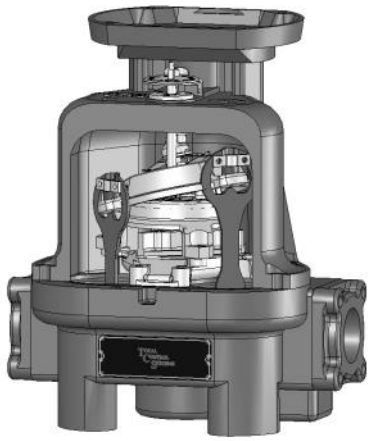
Total Control Systems piston positive displacement flow meter offers precise measurement solutions for preset delivery, flow rate control, blending and custody transfer of vehicle or wholesale measurement applications.

INDUSTRIES SERVED

- Alternative Fuels
- Aviation Fuels
- Agricultural Chemicals
- Diesel Exhaust Fluid (DEF)
- Petroleum Products
- Petrochemicals
- Textiles
- Food and Beverage
- Paints and Coatings
- Pharmaceuticals
- Printing Inks
- Solvents

DESIGN

The 682 series flow meter is a true positive displacement meter that has a unique inline design consisting of three reciprocating pistons operating within their respective measuring chambers, where each piston works in a manner similar to an automobile engine. The pistons are fitted to a wobble plate, which has a shaft extending from its upper surface and a valve pivot attached beneath it. The valve pivot drives a sliding valve from piston to piston as a known amount of product flows through each cylindrical bore, controlling the sequence of events in a smooth mechanical motion. The meter's calibration is adjusted separate from the drive shaft output for minimal accuracy drift.



PERFORMANCE FEATURES

ACCURACY: perfect solution for low flow measurement applications, where 0.1% accuracy is required at low and high delivery volumes.

SUSTAINED ACCURACY: the unique reciprocating piston design with a positive displacement seal coupled with a self-lapping valve design provides no measurement deterioration, regardless of pressure fluctuations. Minimal measurement drift over a 12 million gallon service life test!

LINEAR ACCURACY:

50:1 Turndown - capable of ± 0.050% of maximum nominal flow rate
125:1 Turndown - capable of ± 0.075% of maximum nominal flow rate
250:1 Turndown - capable of ± 0.100% of maximum nominal flow rate

REPEATABILITY: capable of 0.010% over the entire range of flow

Data provided from test conditions where all system variables were constant. The results are based on the custody transfer 682 series flow meters (SP, SPA & SPD) and Veeder Root mechanical registration, using 32 SSU testing fluid..

REGULATORY: NIST, OIML, Canada, SABS, NMI, USA military and other international weights and measures approved.

OPERATING SPECIFICATIONS

DESIGN TYPE:	Reciprocating Three (3) Piston Positive Displacement
FLOW CAPACITY:	0.2 GPM to 50 GPM 0.76 LPM to 189 LPM
VISCOSITY:	Up to 250,000 SSU (55,000 CPS)
PRESSURE RATING:	150 PSI (10.5 BAR)
TEMPERATURE RATING:	-40°F to 160°F (-40°C to 71°C)
CONNECTIONS:	1-1/2" NPT Standard, Optional 1" or 2"available. BSPT, Slip Weld, Metric & ANSI flanges are available upon request.

METER TYPES

SP **STANDARD PETROLEUM -** For metering refined petroleum products such as Gasoline, Fuel Oils, Diesel, Bio-Diesel, Kerosene, Motor Oils, Naptha, Anti-Freeze, Vegetable Oils, etc.

SPA **STANDARD PETROLEUM (AVIATION) -** For metering refined petroleum products such as Aviation Gasoline, Jet Fuels, Gasoline, Fuel Oils, Diesel, Bio-Diesel, Kerosene, Motor Oils, etc.

SPD **STANDARD PETROLEUM (DUCTILE IRON) -** For metering alternative fuels such as Natural Gasoline, Ethanol, Methanol, Bio-Diesel, Aviation Gasoline, Fuel Oils, Diesel, Motor Oils, etc.

AF **ALL FERROUS -** For metering Pesticides, Nitrogen Solutions, Fertilizer, Chlorinated Solvents, Paints, Inks, Alcohols, Adhesives, Motor Oils, Molasses, Corn Syrup, Liquid Sugars, etc.

SS **STAINLESS STEEL -** For metering the same liquids as the SP, SPA, SPD and AF flow meters, but includes food processing and special handling fluids such as Phosphorus and Glacial Acetic Acids, Anti-Icing Fluids, Vinegar, Fruit Juices, etc.

SSD **STAINLESS STEEL (DIESEL EXHAUST FLUID) -** For metering Diesel Exhaust Fluid, AdBlue, ARLA and AUS32

MATERIALS OF CONSTRUCTION

Meter Type	Housing	Internal Castings	Ball Bearings	Internal Hardware	Plunger Cups	Seals
SP	Anodized Aluminum	Cast Iron & Ni-Rsist II	Stainless Steel	Steel & Stainless Steel	Glass-filled PTFE	FKM
SPA	Anodized Aluminum	Ni-Resist II	Ceramic	Stainless Steel	Glass-filled PTFE	FKM
SPD	Ductile Iron	Cast Iron & Ni-Resist II	Stainless Steel	Steel & Stainless Steel	Glass-filled PTFE	PTFE & Simriz ®
AF	Ductile Iron	Cast Iron & Ni-Resist II	Stainless Steel	Stainless Steel	Glass-filled PTFE	PTFE & Simriz ®
SS	Stainless Steel	Stainless Steel	Ceramic	Stainless Steel	Glass-filled PTFE	PTFE & Simriz ®
SSD	Stainless Steel	Stainless Steel	Ceramic	Stainless Steel	Glass-filled PTFE	EPDM

Simriz is a registered trademark of Freudenberg-NOK

METER COMPONENTS

AIR ELIMINATOR
A mechanical float assembly is designed to sense and remove free or entrained air before it can enter the flow meter. Required for custody transfer applications to ensure the most precise measurement.



ELECTRONIC AIR ELIMINATOR
A contact float sensor and solenoid valve exhaust vent are designed to electronically sense and remove free or entrained air before it can enter the flow meter. The solenoid valves are available with 12 or 24 VDC coils. Required for custody transfer applications to ensure the most precise measurement.



STRAINER
A 90° strainer provides protection from debris entering into the flow meter. Stainless steel screens are available in 40 mesh and 0.050 perforation.



MECHANICAL PRESET VALVE
A normally closed, hydraulically balanced piston control valve allows for auto-batch preset deliveries. The inline, two–stage control valve is mechanically linked to Veeder Root Preset Counter.



ELECTRONIC PRESET VALVE
A normally closed two-stage diaphragm preset valve for use with an electronic relay control. The solenoid valves are available in 12 or 24 VDC, or 110 VAC coils. Dimensionally interchangeable with the mechanical valve.



REGISTRATION OPTIONS

COUNTER REGISTER
Liquid measurement volume indication, using a 5 digit large numeral reset display and an 8 digit non-reset totalizer. Electronic or mechanical meter counter register is available. U.S. or Imperial Gallons, Liters, Dekaliter, Barrels, pounds, etc.

COUNTER PRESET
Select predetermined volume for precise batch control, utilizing preset control valve. Mechanical or electronic preset counters or batch controllers are available.

TICKET PRINTER
Provides an imprinted ticket record of each delivery transaction. Accumulative or Zero-Start, Face down or Face Up mechanical ticket printers available. Electronic slip or roll printers available for use with various electronic registration.

ELECTRONIC METER REGISTER
Digital liquid measurement volume indication that offers multiple functions to enhance the flow meter's accuracy and accountability. Most electronic registration are available with rate of flow indication, pulse output, valve control, RS232 and RS485 communication, currency and temperature compensation.

PULSE TRANSMITTER
The electronic pulse signal output converts the register counter volume per unit value into a electrical pulse stream. The electronic pulse stream can be transmitted to other electronic controllers for rate of flow, volume indication, additive injection or data acquisition.

TEMPERATURE COMPENSATION
Automatically corrects changes in volume caused by liquid temperature variations, during metered delivery. Normally corrects net volume or mass to 60°F (15°C) based on the product's coefficient of expansion, API or specific gravity.

MICROSWITCH
Mechanical signal from the Veeder Root preset counter converted into an electrical or pneumatic signal to provide control of remotely located valve, pump, and other system related equipment.

COUNTER EXTENSION
Raises the elevation of the counter registration for easy visibility or to protect from high temperatures. Counter Extension is required for temperatures more than 180°F (82°C).

RATE OF FLOW INDICATOR
Mechanical or digital indicator displays the volume at which the liquid is flowing through the flow meter.

SWIVEL
Allows mechanical registration to be rotated 360°. Designed for the Veeder Root counter register and ticket printer only.

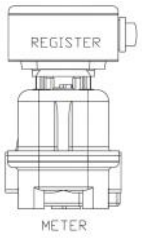
ASSEMBLY COMBINATIONS

GROUP COMBINATIONS

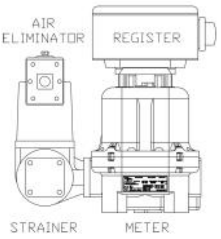
2 Meter & Register
3 Meter, Register & Ticket Printer
4 Meter, Register, Air Eliminator & Strainer
4S Meter, Register, Electronic Eliminator & Strainer
5 Meter, Register & Strainer
6 Meter, Register, Ticket Printer, Air Eliminator & Strainer
7 Meter, Register, Printer, & Strainer
8 Meter, Register, Preset & Valve
9 Meter, Register, Ticket Printer, Preset & Valve
10 Meter, Register, Preset, Valve, Air Eliminator & Strainer
10S Meter, Register, Preset, Valve, Electronic Air Eliminator & Strainer
11 Meter, Register, Ticket Printer, Preset, Valve, Air Eliminator & Strainer
12 Meter, Register, Preset, Valve & Strainer
13 Meter, Register, Ticket Printer, Preset, Valve & Strainer

METER ORIENTATION

A Meter Assembly with Veeder Root Registration
B Meter Assembly less Veeder Root Registration
C Meter Assembly with electronic register drive adapter
D Meter Assembly with direct drive pulse transmitter
E Meter Assembly with TCS3000 Register (75 Degree)
F Meter Assembly with TCS3000 Register (90 Degree)
G Meter Assembly with TCS3000 Register (Remote)



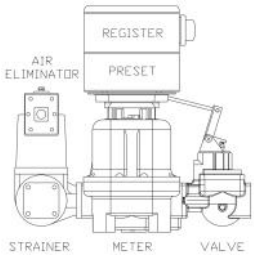
GROUP 2



GROUP 4



GROUP 8



GROUP 10


Meter A
(682-15SP11AT)


Meter B
(682-15SP2BX)


Meter C
(682-15SP2CX)


Meter D
(682-15SP2DX)



Meter E
(682-15SP2E)

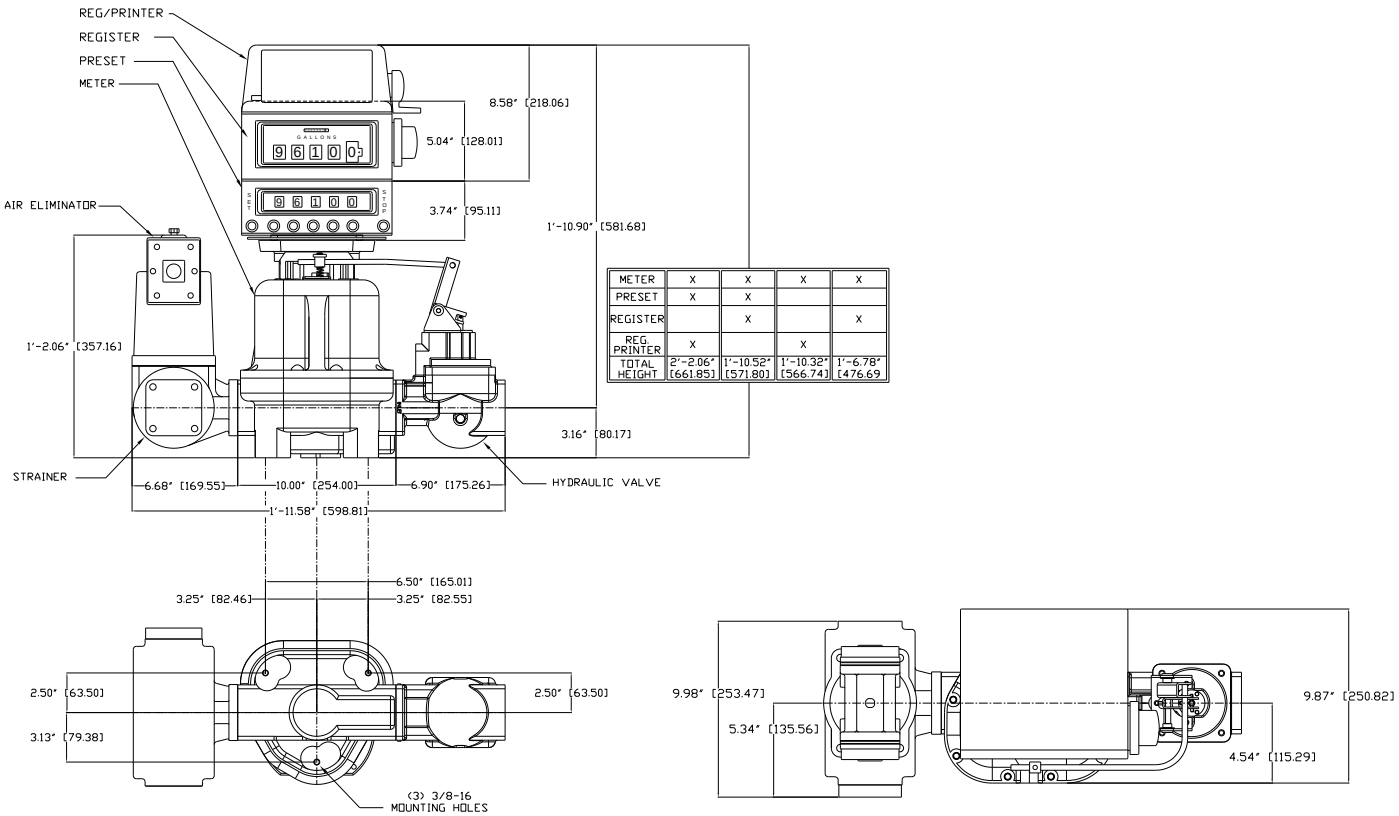


Meter F
(682-15SP2F)



Meter G
(682-15SP2G)

682-15 DIMENSIONS IN INCHES (MILLIMETERS)



METER	X	X	X	X
PRESET	X	X		
REGISTER		X		X
REG. PRINTER	X		X	
TOTAL HEIGHT	2'-2.06" [661.85]	1'-10.52" [571.80]	1'-10.32" [566.74]	1'-6.78" [476.69

682-15 NET WEIGHTS IN POUNDS (KILOGRAMS)

Meter Type	Flow Meter	Register Counter	Preset Counter	Ticket Printer	Air Eliminator	Electronic Air Eliminator	Mechanical Valve	Electronic Valve
SP	34 (15.4)	12 (5.4)	10 (4.5)	12 (5.4)	17 (7.7)	17 (7.7)	7 (3.2)	15 (6.8)
SPA	34 (15.4)	12 (5.4)	10 (4.5)	12 (5.4)	17 (7.7)	17 (7.7)	7 (3.2)	15 (6.8)
SPD	71 (32.2)	12 (5.4)	10 (4.5)	12 (5.4)	39 (17.8)	39 (17.8)	22 (10.0)	-
AF	71 (32.2)	12 (5.4)	10 (4.5)	12 (5.4)	39 (17.8)	-	22 (10.0)	-
SS	74 (33.6)	12 (5.4)	10 (4.5)	12 (5.4)	45 (20.4)	-	24 (10.9)	-
SSD	74 (33.6)	12 (5.4)	10 (4.5)	12 (5.4)	45 (20.4)	45 (20.4)	24 (10.9)	-

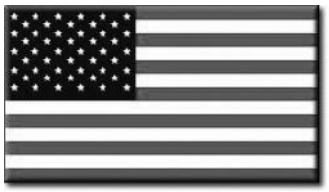
WARRANTY

Total Control Systems 682 piston flow meter warranty to the original purchaser only, for a period of TEN (10) years from the date of installation or the date of shipment, to be free, under normal use and service, from defects in material and workmanship. If a warranty dispute occurs the DISTIBUTOR may be required to provide proof of date of sale. Defects occurring within the stated warranty period, will be repaired or replaced, at TCS's option; provided that part or parts are returned to TCS transportation charges prepaid, and TCS's examination discloses the parts or workmanship to have been defective upon delivery to the purchaser. All repaired or warranted meters will be shipped Ex-works Fort Wayne, Indiana. Total Control Systems shall not be liable for consequential damages, whether or not arising out of warranty, negligence or otherwise.

NOTE: The above warranty applies only to Total Control Systems, Fort Wayne, Indiana manufactured products. Private label and OEM engineered products are specifically excluded from the above warranty. Consult factory for non-TCS manufacturer's warranty.

TOTAL CONTROL SYSTEMS

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