

682 Series

Piston Positive Displacement Flow Meter



The Standard of Measurement

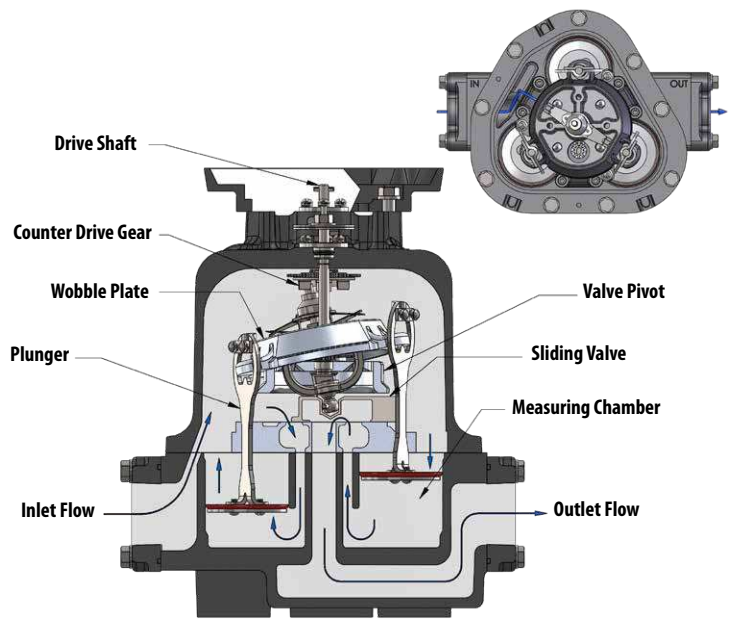


www.TCSmeters.com

Design Principle

The TCS 682 reciprocating piston 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. 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.

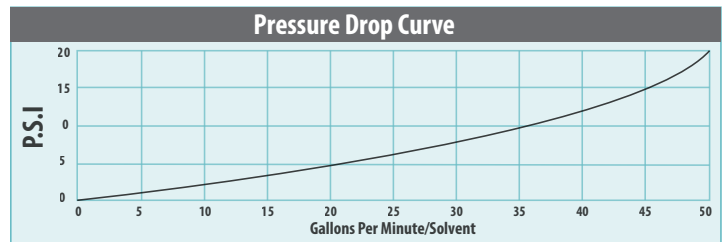
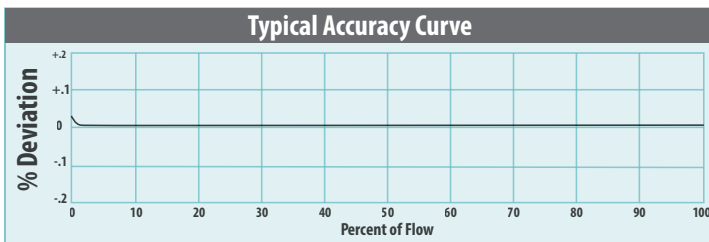
The valve pivot drives a sliding valve from piston to piston as a known amount of product flows through each cylindrical bore, controlling the sequence of events in a smooth mechanical motion. This smooth mechanical motion is then transferred through the drive shaft to the register.



Performance Features

The TCS 682 reciprocating piston flow meter combines outstanding accuracy (0.1% of flow rate) with one of the widest turndown ratios in the industry (250:1). The TCS 682 reciprocating piston flow meter has a rugged industrial design that is tolerant to changing viscosities, temperatures and liquids with suspensions and solids. This proven design has over 80 years of unmatched performance and continues to provide the very best in flow measurement, backed by our industry leading **10 year warranty (5 year warranty LPG)**!

FLOW RANGE:	0.2 to 50 GPM (0.76 to 189 LPM); 250:1 Turndown Ratio LP Flow Rates: 2 to 50 GPM (7.5 to 189 LPM); 25:1 Turndown Ratio
LINEAR ACCURACY:	Capable of $\pm 0.1\%$ over the full flow range
REPEATABILITY:	Capable of 0.01%
OPERATING PRESSURE:	Up to 150 PSI (10.5 BAR); 350 PSI (26 BAR) on LP meter type
TEMPERATURE RANGE:	-40°F to 160°F (-40°C to 71°C)
VISCOSITY RANGE:	Will accurately measure liquids up to 50,000 SSU (11,000 CPS)
CONNECTIONS:	1-1/2" NPT Companion flanges are standard, 1" & 2" NPT optional. BSPT, slip weld, and ANSI flanges are available upon request.
REGULATORY:	NIST, OIML, NMI, SABCS, S. WA and other global regulatory approvals. (Contact factory for information on specific approvals.)



Meter Types

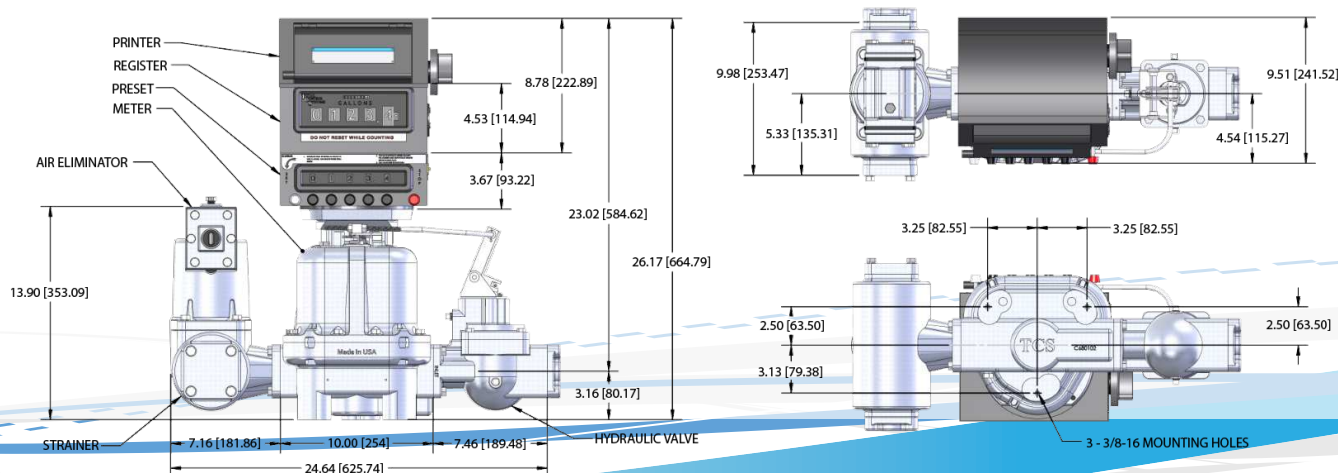
SP	Standard Petroleum	For metering refined petroleum products such as Gasoline, Fuel Oils, Diesel, Bio-Diesel, Kerosene, Vegetable Oils, Motor Oils, Naptha, Ethylene Glycol, etc.
SPA	Standard Petroleum (Aviation)	For metering refined petroleum products such as Aviation Gasoline, Jet Fuels, Ethanol, Gasoline, Fuel Oils, Diesel, Bio-Diesel, Kerosene, Vegetable Oils, Motor Oils, Naptha, Ethylene Glycol, etc.
SPD	Standard Petroleum (Ductile Iron)	For metering refined petroleum products such as Ethanol, Methanol, Gasoline, Fuel Oils, Diesel, Bio-Diesel, Kerosene, Aviation Gasoline, Vegetable Oils, Motor Oils, Naptha, Ethylene Glycol, etc.
AF	All-Ferrous	For metering Pesticides, Fertilizers, Food Processing Liquids, Industrial Chemicals, Solvents, Paints, Inks, Alcohols and many other liquids; such as Liquid Sugars, Liquid Feeds, MEK, Ethanol, Corn Syrup, Soy Bean Oil, Shortenings, Latex Products, Adhesives, Naptha, etc.
SS	Stainless Steel	For metering the same products as the SP, SPA, SPD and AF meter types, but includes special handling liquids; such as Acids, Anti-Icing Fluids, Vinegar, Fruit Juices, Corn Syrup, Micro-Nutrients, etc.
SSD	Stainless Steel (DEF)	For metering Diesel Exhaust Fluid (DEF), AdBlue, ARLA and AUS32
LP	Liquefied Petroleum	For metering Liquefied Petroleum Gas (LPG), NH3

Meter Materials of Construction

Description	SP	SPA	SPD	AF	SS	SSD	LP
Housing	Anodized Aluminum	Anodized Aluminum	Ductile Iron	Ductile Iron	Stainless Steel	Stainless Steel	Ductile Iron
Internal Mechanism	Iron, Steel & Stainless Steel	Ni-Resist II	Iron, Steel & Stainless Steel	Iron, Steel & Stainless Steel	Stainless Steel	Stainless Steel	Iron, Ni-Resist II & Stainless Steel
Ball Bearings	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Ceramic	Ceramic	Ceramic
Internal Hardware	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
Packing Seal	FKM	FKM	Simriz®	Simriz®	Simriz®	EPDM Peroxide Cured	Buna
Body O-ring	FKM	FKM	PTFE	PTFE	PTFE	EPDM Peroxide Cured	Buna

*Simriz is a registered trademark of Freudenberg-NOK

Dimensions in Inches (mm)



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www.TCSmeters.com!

Meter Accessories



Electronic Registration

TCS 3000 electronic register is a fully integrated flow computer that will control all delivery operations. The modular design and open software architecture provide you with a tailored system that is expandable for future needs.



TCS HUB Delivery Software

TCS HUB is a SQL-based software designed to capture truck delivery information wirelessly to be electronically collected at locations and/or the home office. The TCS HUB software supports both line of sight wireless modems and/or cellular modems for real-time delivery tracking.



Pulse Transmission

The DMP pulse transmitters provide accurate signals for remote indication, totalizers and data monitoring systems by transferring the mechanical rotation of the flow meter into an electronic pulse. This pulse can be used by the TCS 3000 or a flow computer of your choice.



Air/Vapor Elimination

Mechanical and electronic air eliminators are devices designed to extract free or accumulated volumes of air or vapor from a liquid dispensing system to achieve accurate measurement results.



Control Valves

Mechanical, pneumatic and electronic actuated piston and diaphragm control valves designed to meet the variety of needs in the fluid process industry. Such valves include preset flow control valves, air differential control valves, pressure relief and safety valves.



Mechanical Registration

Mechanical 5 wheel register V/R 7887 or 6 wheel register V/R 7886 with optional preset, ticket printer, swivel, micro switch and register mounted pulser.



Miscellaneous

Miscellaneous product accessories were developed to increase functionality of your metering solution. Such items as flow indication, RTD temperature probes, clutch assemblies, insulation jackets, protective covers and various flange connections.

Authorized Distributor



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Fort Wayne, Indiana 46808
United States of America

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700 Series

Rotary Positive Displacement Flow Meter



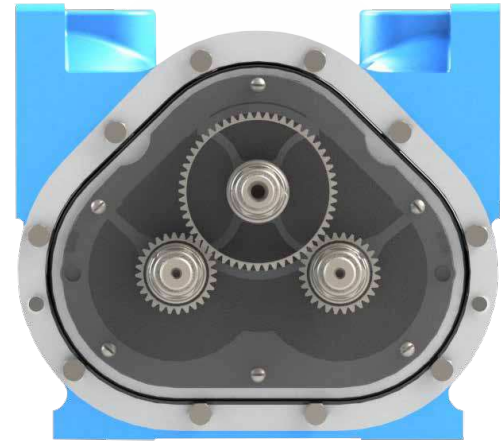
The Standard of Measurement



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Design Principle

The TCS 700 series rotary flow meter has a simple and efficient meter design consisting of a housing and three rotors that rotate in unison within the measuring chamber. The absence of wear, from no metal-to-metal contact within the chamber, eliminates any deterioration in accuracy and provides a long service life. The rotors are supported by bearings inserted into two bearing plates, where at the end of each rotor shaft is a timing gear. The timed rotation between each rotor is then transferred through the calibration adjuster to the register, giving a consistent and superior measurement of accuracy.



Performance Features

The TCS 700 rotary flow meter combines excellent accuracy with low pressure drop. The TCS 700 rotary flow meter has a compact size and lightweight design that offers minimal maintenance and long service life. This meter is built with advanced materials of construction for a broad range of measurement applications and is accompanied by a full selection of accessories and electronic registration.

FLOW:	Capable of up to 1,000 GPM (3,785 LPM); Bi-directional flow
LINEAR ACCURACY:	Capable of $\pm 0.15\%$ over the full flow range
REPEATABILITY:	Capable of 0.02% (constant operation conditions with 700SP meters & mechanical registration, using 1 CPS test fluid)
VISCOSITY:	Will accurately measure liquids up to 1,500,000 SSU (325,000 CPS)
REGULATORY:	Meets a wide range of global weights and measures requirements. (Contact factory for information on specific approvals.)

Meter Operating Specifications

Meter	Type(s) Available	Flange Connection(s)*	Max. Capacity	Working Pressure**	Working Temperature***
700-15	SP, SPA, IP & IC	1 1/2" NPT Flange; 1" & 2" Options	60 GPM (227 LPM)	150 PSI (10.5 BAR)	-40°F to 160°F (-40°C to 71°C)
700-20	SP, SPA, SPD, IP, IC, AF, SS, SSD & LP	2" NPT Flange; 1 1/2" Option	100 GPM (380 LPM)	150 PSI (10.5 BAR)	-40°F to 160°F (-40°C to 71°C)
700-25	SPA & SPD	2" NPT Flange	150 GPM (567 LPM)	150 PSI (10.5 BAR)	-40°F to 160°F (-40°C to 71°C)
700-30	SP, SPA, SPD, IP, IC & AF	3" NPT Flange; 2" Option	200 GPM (760 LPM)	150 PSI (10.5 BAR)	-40°F to 160°F (-40°C to 71°C)
700-35	SPA & SPD	3" NPT Flange	300 GPM (1,135 LPM)	150 PSI (10.5 BAR)	-40°F to 160°F (-40°C to 71°C)
700-40	SP, SPA, SPD, IP, IC & AF	4" NPT Flange; 3" Option	500 GPM (1,893 LPM)	150 PSI (10.5 BAR)	-40°F to 160°F (-40°C to 71°C)
700-45	SPA & SPD	4" NPT Flange	600 GPM (2,271 LPM)	150 PSI (10.5 BAR)	-40°F to 160°F (-40°C to 71°C)
700-60	SPA	6" ANSI Flange	800 GPM (3,040 LPM)	150 PSI (10.5 BAR)	-40°F to 160°F (-40°C to 71°C)
700-65	SPA	6" ANSI Flange	1000 GPM (3,800 LPM)	150 PSI (10.5 BAR)	-40°F to 160°F (-40°C to 71°C)

* Flanged NPT is standard; BSPT, Slip Weld, ANSI & others are available upon request

** Higher working pressures are available. (Consult factory for more information.)

*** Higher working temperatures can be achieved at reduced pressures. (Consult factory for more information.)

Meter Types

SP	Standard Petroleum	For metering refined petroleum products such as Gasoline, Fuel Oils, Diesel, Bio-Diesel, Kerosene, Vegetable Oils, Motor Oils, Naptha, Ethylene Glycol, etc.
SPA	Standard Petroleum (Aviation)	For metering refined petroleum products such as Aviation Gasoline, Jet Fuels, Ethanol, Gasoline, Fuel Oils, Diesel, Bio-Diesel, Kerosene, Vegetable Oils, Motor Oils, Naptha, Ethylene Glycol, etc.
SPD	Standard Petroleum (Ductile Iron)	For metering refined petroleum products such as Ethanol, Methanol, Gasoline, Fuel Oils, Diesel, Bio-Diesel, Kerosene, Aviation Gasoline, Vegetable Oils, Motor Oils, Naptha, Ethylene Glycol, etc.
AF	All-Ferrous	For metering Pesticides, Fertilizers, Food Processing Liquids, Industrial Chemicals, Solvents, Paints, Inks, Alcohols and many other liquids; such as Liquid Sugars, Liquid Feeds, MEK, Ethanol, Corn Syrup, Soy Bean Oil, Shortenings, Latex Products, Adhesives, Naptha, etc.
IP	Industrial Products	For Food Processing, Chemicals, General Solvents and many other liquids such as Corn Syrup, Soy Bean Oil, Liquid Sugars, Shortenings, Latex Products, Adhesives, etc.
IC	Industrial Chemicals	For metering Alcohols, Chemicals, Solvents, Water and many other Non-Lubricating Liquids such as Acetones, Ethanol, Naphta, Xylene, MEK, Toluene, Resins, etc.
SS	Stainless Steel	For metering the same products as the SP, SPA, SPD, IP, IC and AF meter types, but includes special handling liquids; such as Acids, Anti-Icing Fluids, Vinegar, Fruit Juices, Corn Syrup, Micro-Nutrients, etc.
SSD	Stainless Steel (DEF)	For metering Diesel Exhaust Fluid (DEF), AdBlue, ARLA and AUS32
LP	Liquefied Petroleum	For metering Liquefied Petroleum Gas (LPG), NH3

Meter Materials of Construction

Description	SP	SPA	SPD	AF	IP	IC	SS	SSD	LP
Housing	Hardcoat Anodized Aluminum	Hardcoat Anodized Aluminum	Ductile Iron	Ductile Iron	Hardcoat Anodized Aluminum	Hardcoat Anodized Aluminum	Stainless Steel	Stainless Steel	Hardcoat Anodized Aluminum
Rotors	Hardcoat Anodized Aluminum	Hardcoat Anodized Aluminum	Ni-Resist	Ni-Resist	Hardcoat Anodized Aluminum	Hardcoat Anodized Aluminum	Stainless Steel	Stainless Steel	Hardcoat Anodized Aluminum
Rotor Journals	Plated Stainless Steel	Plated Stainless Steel	Plated Stainless Steel	Plated Stainless Steel	Plated Stainless Steel	Plated Stainless Steel	Plated Stainless Steel	Plated Stainless Steel	Plated Stainless Steel
Bearing Plates	Ni-Resist	Ni-Resist	Ni-Resist	Ni-Resist	Ni-Resist	Ni-Resist	Stainless Steel	Ryton	Ni-Resist
Bearing Sleeves	Ni-Resist	Carbon Graphite	Carbon Graphite	Carbon Graphite	Ni-Resist	Carbon Graphite	Carbon Graphite	Ryton	Ni-Resist
Timing Gears	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
Packing Seal	FKM	FKM	Simriz®	Simriz®	Simriz®	Simriz®	Simriz®	EPDM	Buna
Body O-ring	FKM	FKM	FKM	PTFE	PTFE	PTFE	PTFE	EPDM	Buna

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TCS HUB Delivery Software

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TCS 910000.003

TCS 3000

Electronic Register



The Standard of Measurement



www.TCSmeters.com



One Register to Connect It All

The TCS 3000 is a powerful, electronic register designed to transform the way you deliver fuel. It has been engineered to control most vehicle delivery operations. The TCS 3000 can improve your cash flow by allowing the driver to make more deliveries in less time with increased accuracy and security.



Do More with the TCS 3000

The TCS 3000 electronic register was designed for a marketplace that is developing rapidly. With the ease of setup, you have the option of a simple "Pump & Print" delivery or a custom measurement solution.

- » Simple Pump & Print
- » Single or Multiple Products
- » Auto-Calibration
- » Preset Price or Gallons
- » In-field Setup & Configuration
- » Temperature Volume Compensation
- » Additive Injection
- » Tank Gauging
- » Corrected Differential Pressure
- » Electronic Pump Control/PTO
- » Electronic Preset
- » Wireless Data Capture
- » Multiple Reports
- » Electronic Vapor or Air Elimination
- » And More!

Specifications

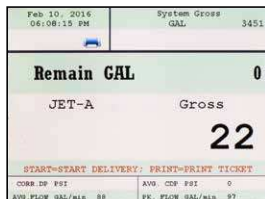
MEMORY:	4 GB of Non-Volatile Memory
SERIAL PORTS:	RS-232 and RS-485
PRINTER INTERFACES:	Open Interface for Slip, Roll, and Wireless Printing
WIRELESS COMMUNICATION:	WiFi, Radio, Cell and Bluetooth Add-Ons Available (Consult Factory for Pricing)
GPS TRACKING:	Available Upon Request
MOUNTING OPTIONS:	75 Degree, 90 Degree, & Remote (Must be Specified at Time of Order)
SOFTWARE:	Integrated Database, Interface Software Available
TEMPERATURE RATING:	-40 to 158° F (-40 to 70° C)
INPUT VOLTAGE:	12-30 Vdc
UL/cUL RATING:	Class 1, Division 2, Groups C & D

Customizable Screen Views

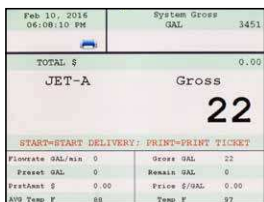
Quickly switch between 4 configurable delivery screens that display the information you need - even while fueling. Additional inventory, reporting, setup, and other helpful screens take the TCS 3000 functionality to the next level. Delivery screen with 1 configurable field is shown right.



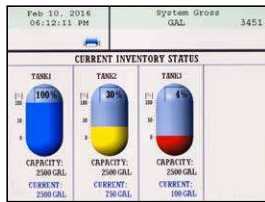
2 Configurable Fields



7 Configurable Fields



11 Configurable Fields



Inventory

Easy-to-Read Display

The large, color VGA display is visible day or night. Additionally, it is heated to allow it to work even in extreme temperatures. Combined with easy operation, this register is a favorite among users.

Backlit Keypad

The TCS 3000 is equipped with a backlit alpha-numeric keyboard that makes operation a breeze! Whether controlling simple metering functions or capturing detailed fueling information, this keyboard provides simplicity and ease of operation.

Powerful Software

Equipped with state-of-the-art software, the TCS 3000 goes beyond standard meter register capabilities. This flow computer controls and interfaces with a wide variety of equipment. Now you can have more insight into your operational data than ever before!

Mounting Flexibility

The TCS 3000 is available in 3 (fixed) orientations to fit seamlessly in any number of applications. 75 degree and 90 degree direct meter mountings or remotely mounted, the TCS 3000 can be constructed for the optimal viewing position.



75 Degrees

8.78" w x 10.91" h x 8.45" d



90 Degrees

8.78" w x 10.08" h x 7.87" d



Remote

8.78" w x 10.12" h x 4.43" d

Easy Setup & Maintenance

Setup of the TCS 3000 is not only easy, it can be done without other auxiliary devices. This not only streamlines installation, it significantly lowers costs. After installation, the TCS 3000 is equally easy to maintain. On-screen status icons and messages are displayed for quick troubleshooting. Open software architecture allows the TCS 3000 to stay current with new features. Updates can be made via USB flash drive.



Shown: 1 configurable field

OnBoard Computer & Back Office Integration

Thanks to an integrated database, the TCS 3000 is a stand-alone solution. However, when you're ready to take your automation to the next level, the TCS 3000 can be integrated with Cell, WiFi, or Radio communication to close the gap between your meter and your back office software. This includes connecting to many on-board computing devices or using the TCS HUB software to collect and transmit data.

Check out our other solutions online at
www.TCSmeters.com!

TCS Register Integration



Flow Meters

The TCS 682 and 700 Series flow meters, and the majority of 3rd party meters can connect to the TCS 3000 remotely, and in some cases, directly. Consult factory for compatibility and any special considerations for 3rd party meters.



TCS HUB Delivery Software

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Electronic Air/Vapor Elimination

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Electronic Control Valves

Electronic actuated piston and diaphragm control valves are designed to meet the variety of needs in the fluid process industry. Such valves include preset flow control valves, air differential control valves, pressure relief and safety valves.



Printers

Receipt printers interface to the TCS 3000 to print delivery ticket information. Roll, slip, and wireless printers can be connected via serial port (native), WiFi (add-on), and Bluetooth (add-on), using the TCS open printing interface. Popular printers include Epson (TM-U295 & TM-U220), Citizen (CMP30), Printek, Blaster, and others.



Temperature Correction

The RTD probe compensates for the effect of product temperature change on the metered liquid volume. It takes and transmits multiple temperature readings to the register per second. The probe is accurate to 0.45° F (0.25° C) over the entire TCS 3000 operating temperature range.

Authorized Distributor



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