



The Standard of Measurement

DMP100 / RMP100 Pulse Transmitter



Installation, Operation & Maintenance Manual

NOTES:

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Warning Symbols



WARNING

Follow the warning instructions within the following information to avoid equipment failure, personal injury or death.



TURN POWER OFF

Before performing any maintenance, be sure to turn system power off to avoid any potential electric spark



FLAMMABLE

Flammable liquids and their vapors may cause a fire or explosion if ignited.



EYE PROTECTION

Pressurized systems may cause hazardous leaks and spray that may be dangerous for your eyes. Always wear eye protection around pressurized systems and its hazardous liquids.



INJURY

Wear gloves for protection from hazardous liquids that may cause irritation or burns.



READ

Read and understand all related manuals thoroughly. The Engineering and OIM manuals will provide the knowledge for all systems, maintenance and operation procedures. If you have any questions, please consult the factory.

Notice

Total Control Systems (TCS) shall not be liable for technical or editorial errors in this manual or omissions from this manual. TCS makes no warranties, express or implied, including the implied warranties of merchantability and fitness for a particular purpose with respect to this manual and, in no event, shall TCS be liable for special or consequential damages including, but not limited to, loss of production, loss of profits, etc.

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Notice (Continued)

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Design

The Direct Mount Pulser (DMP) and Register Mount Pulser (RMP) were designed to convert the mechanical rotation of the flow meter into an electronic pulse. An optical shaft encoder transmits the single or dual channel (quadrature) square wave frequency. An overlapping (quadrature) output permits the detection of direction of rotation and errors on either channel but not both concurrently. The single channel devices are used when greater pulse density is desired and error detection is not required. The pulse transmitters provide accurate signals for remote indication, totalizers and data monitoring systems.

The DMP is driven directly off of the 700 series flow meter output shaft, in place of the packing gland. This is a magnetically coupled device that utilizes a stainless steel retaining wall with wetted drive, mated with the polar opposite coupling on the shaft encoder. This removes the packing gland dynamic seal from any potential leak and isolates the electronics from fluid or vapor.

The RMP is driven directly off of the 682 series flow meter output shaft or for any meter, directly off of the main Veeder-Root mechanical register output shaft.

The optical shaft encoder and circuit board are located in an enclosure that is either located directly on the meter output shaft or on the mechanical register counter. These enclosures have an O-ring sealed, threaded cover. The DMP UL/cUL version features a 1/2-14 NPT female hub for conduit or a cable gland. The DMP ATEX/IECEX version features an M20 x 1.5 6H female hub for conduit or cable gland. A removable terminal block on the circuit board provides ease of wiring. Each DMP enclosure housing has been designed for explosion proof and weather proof ratings, when completely sealed.

The DMP complies with the requirements of UL, cUL and ATEX & IECEX for use in hazardous locations. ***The RMP carries no UL, cUL, ATEX or IECEX approvals.***

ATEX Certification No: DEMKO 10 ATEX 1005021X

IECEX Certification No: IECEX UL 10.0007X

Product Marking: II 2 G Ex db IIB T5 Gb

Features

- Converts mechanical rotation into electronic pulses
- Low torque requirement equals greater measurement accuracy
- Aluminum housing with stainless steel hardware
- DMP — Stainless steel glandless drive with Nickel plated magnets
- RMP — Mounts on any Veeder-Root register counter housing
- Removable terminal strip for easy wiring
- Cross wire protected
- Encoder board can switch power requirements via shunt on circuit board
- Low torque and low speed requirements
- Maintenance free
- Long distance operation



Direct Mount Pulser (DMP100-3)
700-35SPA2DX

Pulse Transmitters

Model #	Agency Listing & Approvals	Description	Model #	Agency Listing & Approvals	Description
DMP100-1	UL/cUL	700-15 Drive Direct Mount 100 ppr Quadrature Pulse Output Device;	DMP100-1-5	UL/cUL	700-15 Drive Direct Mount 100 ppr Quadrature Pulse Output Device;
DMP100-1A	ATEX/IECEEx	FKM O-ring; 6 to 30 VDC	DMP100-1A5	ATEX/IECEEx	FKM O-ring; 5 VDC
DMP100-2	UL/cUL	700-15 Drive Direct Mount 100 ppr Quadrature Pulse Output Device;	DMP100-2-5	UL/cUL	700-15 Drive Direct Mount 100 ppr Quadrature Pulse Output Device;
DMP100-2A	ATEX/IECEEx	Simriz® O-ring; 6 to 30 VDC	DMP100-2A5	ATEX/IECEEx	Simriz® O-ring; 5 VDC
DMP100-3	UL/cUL	700 Drive Direct Mount 100 ppr Quadrature Pulse Output Device;	DMP100-3-5	UL/cUL	700 Drive Direct Mount 100 ppr Quadrature Pulse Output Device;
DMP100-3A	ATEX/IECEEx	FKM O-ring; 6 to 30 VDC	DMP100-3A5	ATEX/IECEEx	FKM O-ring; 5 VDC
DMP100-4	UL/cUL	700 Drive Direct Mount 100 ppr Quadrature Pulse Output Device;	DMP100-4-5	UL/cUL	700 Drive Direct Mount 100 ppr Quadrature Pulse Output Device;
DMP100-4A	ATEX/IECEEx	Simriz® O-ring; 6 to 30 VDC	DMP100-4A5	ATEX/IECEEx	Simriz® O-ring; 5 VDC
DMP100-5	UL/cUL	Fork Drive Direct Mount 100 ppr Quadrature Pulse Output Device;	DMP100-5-5	UL/cUL	Fork Drive Direct Mount 100 ppr Quadrature Pulse Output Device;
DMP100-5A	ATEX/IECEEx	FKM O-ring; 6 to 30 VDC	DMP100-5A5	ATEX/IECEEx	FKM O-ring; 5 VDC
DMP100-6	UL/cUL	Fork Drive Direct Mount 100 ppr Quadrature Pulse Output Device;	DMP100-6-5	UL/cUL	Fork Drive Direct Mount 100 ppr Quadrature Pulse Output Device;
DMP100-6A	ATEX/IECEEx	Simriz® O-ring; 6 to 30 VDC	DMP100-6A5	ATEX/IECEEx	Simriz® O-ring; 5 VDC
DMP100-7	UL/cUL	700 Drive Direct Mount 100 ppr Quadrature Pulse Output Device;	DMP100-7-5	UL/cUL	700 Drive Direct Mount 100 ppr Quadrature Pulse Output Device;
		Buna O-ring; 6 to 30 VDC			Buna O-ring; 5 VDC
DMP100-8	UL/cUL	682 Drive Direct Mount 100 ppr Quadrature Pulse Output Device;	DMP100-8-5	UL/cUL	682 Drive Direct Mount 100 ppr Quadrature Pulse Output Device;
DMP100-8A	ATEX/IECEEx	FKM O-ring; 6 to 30 VDC	DMP100-8A5	ATEX/IECEEx	FKM O-ring; 5 VDC
DMP100-9	UL/cUL	700 Drive Direct Mount 100 ppr Quadrature Pulse Output Device;	DMP100-9-5	UL/cUL	700 Drive Direct Mount 100 ppr Quadrature Pulse Output Device;
DMP100-9A	ATEX/IECEEx	EPDM O-ring; 6 to 30 VDC	DMP100-9A5	ATEX/IECEEx	EPDM O-ring; 5 VDC
DMP100-10	UL/cUL	Brodie Drive Direct Mount 100 ppr Quadrature Pulse Output Device;	DMP100-10-5	UL/cUL	Brodie Drive Direct Mount 100 ppr Quadrature Pulse Output Device;
DMP100-10A	ATEX/IECEEx	FKM O-ring; 6 to 30 VDC	DMP100-10A5	ATEX/IECEEx	FKM O-ring; 5 VDC
DMP100-11	UL/cUL	Smith Drive Direct Mount 100 ppr Quadrature Pulse Output Device;	DMP100-11-5	UL/cUL	Smith Drive Direct Mount 100 ppr Quadrature Pulse Output Device;
DMP100-11A	ATEX/IECEEx	FKM O-ring; 6 to 30 VDC	DMP100-11A5	ATEX/IECEEx	FKM O-ring; 5 VDC
RMP100-1	Not Approved	Register Mount 100 ppr Quadrature Pulse Output Device; 6 to 30 VDC	RMP100-1-5	Not Approved	Register Mount 100 ppr Quadrature Pulse Output Device; 5 VDC

Simriz® is a registered trademark of Freudenberg-NOK.

Encoder Specifications

POWER REQUIREMENTS (Input power MUST be supplied by a Class 2 Power Supply)

Input Supply Voltage: 6 to 30 VDC
5 VDC

Current Supply: 30 mA maximum at 6 to 30 VDC, per channel
20 mA maximum at 5 VDC, per channel

SIGNAL

Type: Square Wave

Signal: Single or Dual Channel

Output Resolution: 100 pulses per revolution unscaled

Amplitude: 6 to 30 VDC (1.0 K Ω Internal Pull-up, No Load)
5 VDC (1.0 K Ω Internal Pull-up, No Load)

Rotation: Standard is bi-directional

Input Shaft Speed: 2500 rpm maximum

Pulse Timing: Nominal 50% on and 50% off

Output: Current sinking 100 mA maximum in "ON" state;
V+ supply @ 1.0 K Ω in "OFF" state.

Rise/Fall Time of Pulse: <5 μ s

Pulse Transmission Distance: Up to 5,000 feet (1,524 meters)

DMP ENVIRONMENTAL RATINGS

Enclosure: Type 4X, Class I, Division 1, Groups C & D, II 2 G Ex db IIB T5 Gb

IP Code: IPX6

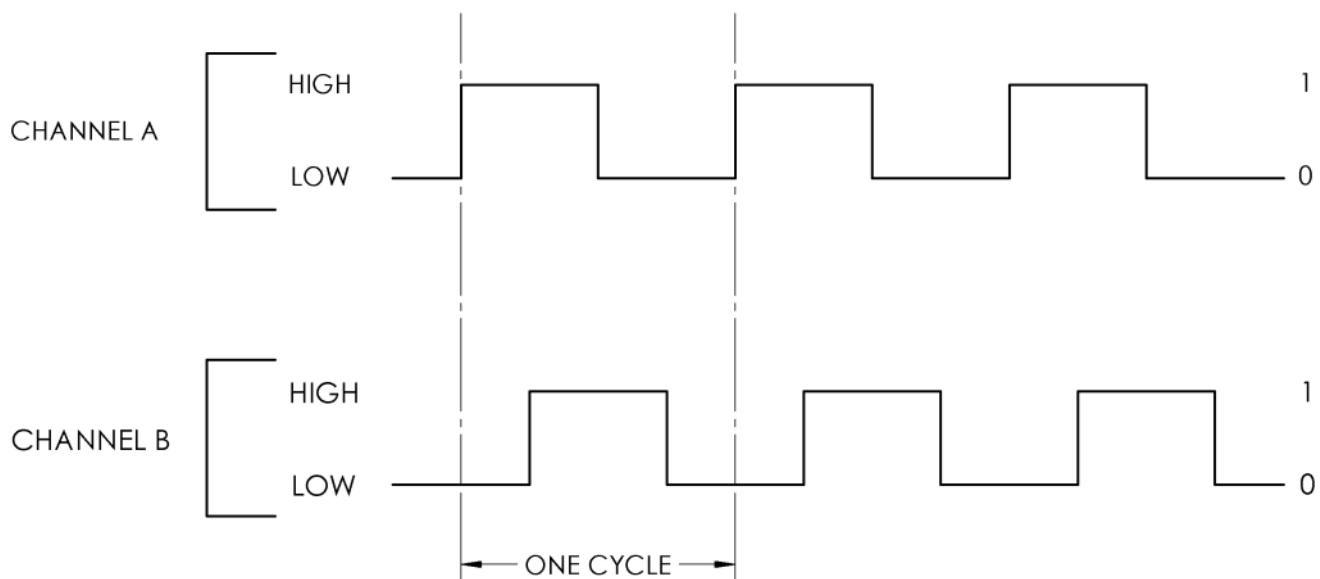
Connections: 1/2" NPT Conduit Hub or M20 x 1.5 6H

Operating Temperature Range: - 40° to 185°F (- 40° to 85°C)

Relative Humidity: 0-98% at 104°F (40°C), non-condensing

Vibration Resistance: Harmonic motion with amplitude of 15g, within a varied
10 - 2000 Hz frequency per MIL-STD-202:M204

Shock Resistance: 50g for 11 μ s per MIL-STD-202:M213



Direct Mount Pulser (DMP) Output Resolution

METER		682-15	700-15	700-20	700-25	700-30
Pulses Per Gallon		400.0	1223.7	555.5	555.5	205.8
Pulses Per Litre		105.7	323.4	146.8	146.8	54.4
With TCS 3000 Register	Single Channel Pulses Per Gallon	400.0	1223.7	555.5	555.5	205.8
	Single Channel Pulses Per Liter	105.7	323.4	146.8	146.8	54.4
	Dual Channel Pulses Per Gallon	800.0	2447.4	1111.0	1111.0	411.6
	Dual Channel Pulses Per Liter	211.4	646.8	293.6	293.6	108.8
	Quadrature Channel Pulses Per Gallon	1600.0	4894.8	2222.0	2222.0	823.2
	Quadrature Channel Pulses Per Liter	422.8	1293.6	587.2	587.2	217.6
Maximum Output — Hz		333.3	1223.7	925.8	1388.8	686.0
METER		700-35	700-40	700-45	700-60	700-65
Pulses Per Gallon		205.8	74.2	74.2	37.1	37.1
Pulses Per Litre		54.4	19.6	19.6	9.8	9.8
With TCS 3000 Register	Single Channel Pulses Per Gallon	205.8	74.2	74.2	37.1	37.1
	Single Channel Pulses Per Liter	54.4	19.6	19.6	9.8	9.8
	Dual Channel Pulses Per Gallon	411.6	148.4	148.4	74.2	74.2
	Dual Channel Pulses Per Liter	108.8	39.2	39.2	19.6	19.6
	Quadrature Channel Pulses Per Gallon	823.2	296.8	296.8	148.4	148.4
	Quadrature Channel Pulses Per Liter	217.6	78.4	78.4	39.2	39.2
Maximum Output — Hz		1029.0	618.3	742.0	618.3	742.0

Register Mount Pulser (RMP) Output Resolution

	1/10th Units Mechanical Register	1/1 Units Mechanical Register
100:1	100 Pulses Per Unit of Measure	10 Pulses Per Unit of Measure

Direct Mount Pulser (DMP) Installation



!WARNING!

All internal pressure must be relieved to ZERO (0) pressure before beginning disassembly of meter or components.

To install the Direct Mount Pulser onto a 700 Series Flow Meter, use the following procedure:

- 1) Relieve system pressure to zero (0) PSI and remove the 3/8" plugs from the front and rear covers to drain fluid from the flow meter
- 2) Remove the mechanical register counter, calibration adjuster and drive assembly from the counter support.
- 3) Remove the counter support from the front cover.
- 4) Remove the packing gland screws and retaining plate, then pull the packing gland from the front cover.
- 5) Assemble the DMP assembly to the front cover. During assembly, note that the joint between the stainless steel hub and the DMP housing has Loctite on the threads. This joint is NOT intended to be disassembled because the joint may become damaged. Please contact the factory for details on joints if there are any questions.
 - a) Assemble packing O-ring around stainless steel drive hub.
 - b) Align the blade drive of the DMP to the drive coupling from the rotor, through the front cover assembly.
 - c) Rotate pulser assembly to a position from Illustration 2, making sure that moisture drains away from the conduit hub.
 - d) Tighten mounting screws on DMP retaining plate.
- 6) Reassemble the 3/8" NPT plugs in front and rear covers.
- 7) Whether using a cable gland, rigid or flexible conduit for wiring connection, review and understand all local electrical codes for hazardous location installation (National Electrical Code, Canadian Electrical Code, ATEX Electrical Code, etc.).
- 8) Use seal wire on each drilled head screw for weights and measures seal.
- 9) See pages 14-15 for wiring instructions.

ILLUSTRATION 1

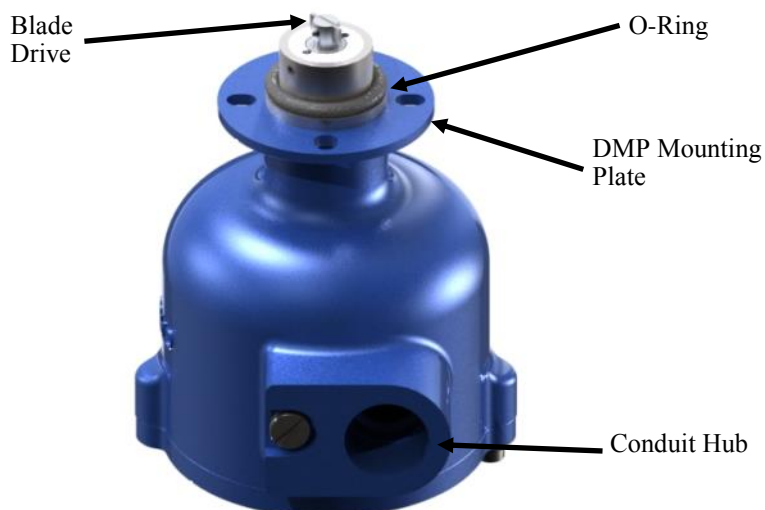
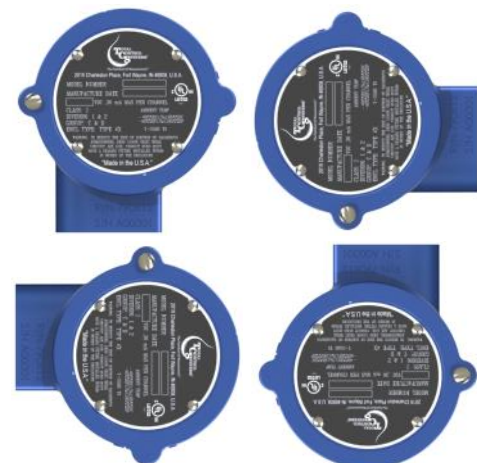


ILLUSTRATION 2



Register Mount Pulser (RMP) Installation



!WARNING!

All internal pressure must be relieved to ZERO (0) pressure before beginning disassembly of meter or components.

A primary application for the RMP is as a replacement for existing Veeder-Root pulse transmitters.

To install the RMP onto a mechanical register counter, you must first disconnect power from the pulse transmitter.

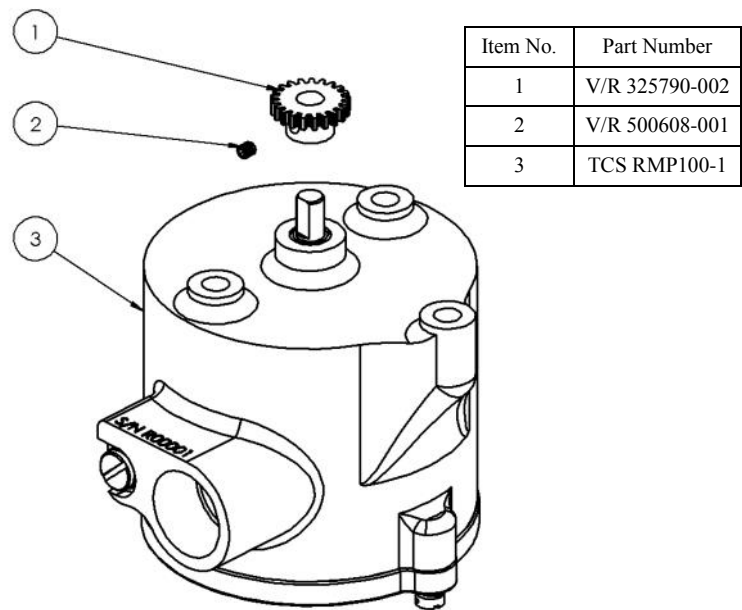
Remove the Veeder-Root pulse transmitter. Remove items 1 and 2 as shown in the image (at right). Reinstall these to the RMP. The RMP is then mounted to the Veeder-Root register as a direct replacement.

Directly mounted to a 682 Series Piston Flow Meter is another application for the RMP.

The RMP may be outfitted on the 682 Series Piston Flow Meter at the factory or retrofitted in the field. For this purpose, the RMP is pre-installed to a mounting plate at the factory. The entire assembly is then simply installed to the register support of the 682 Series Piston Flow Meter in place of the register.

See pages 14-15 for wiring instructions.

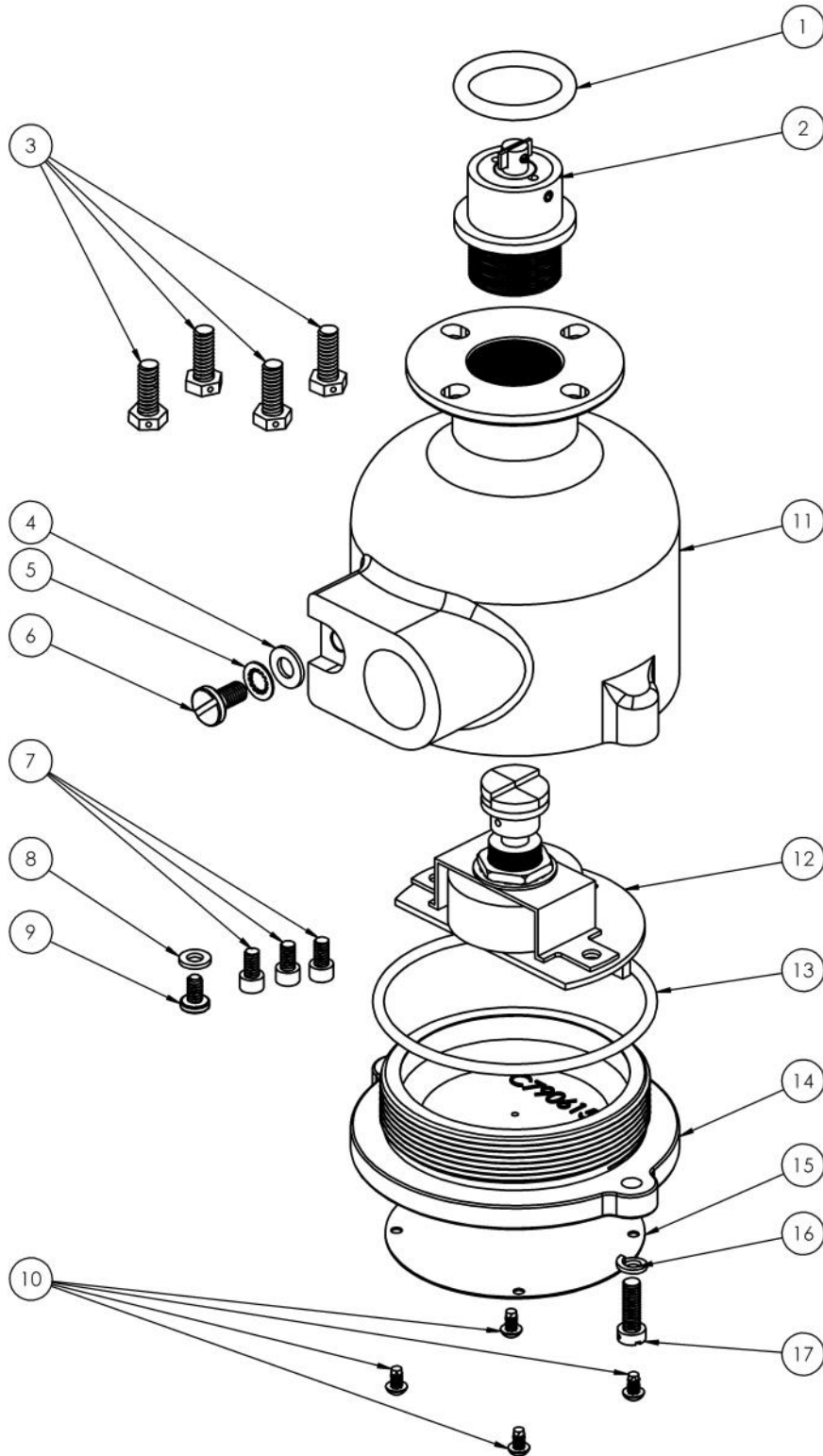
RMP100-1 with Gear



RMP 100 pulse transmitter mounted on a Veeder-Root 7887 Register Counter.



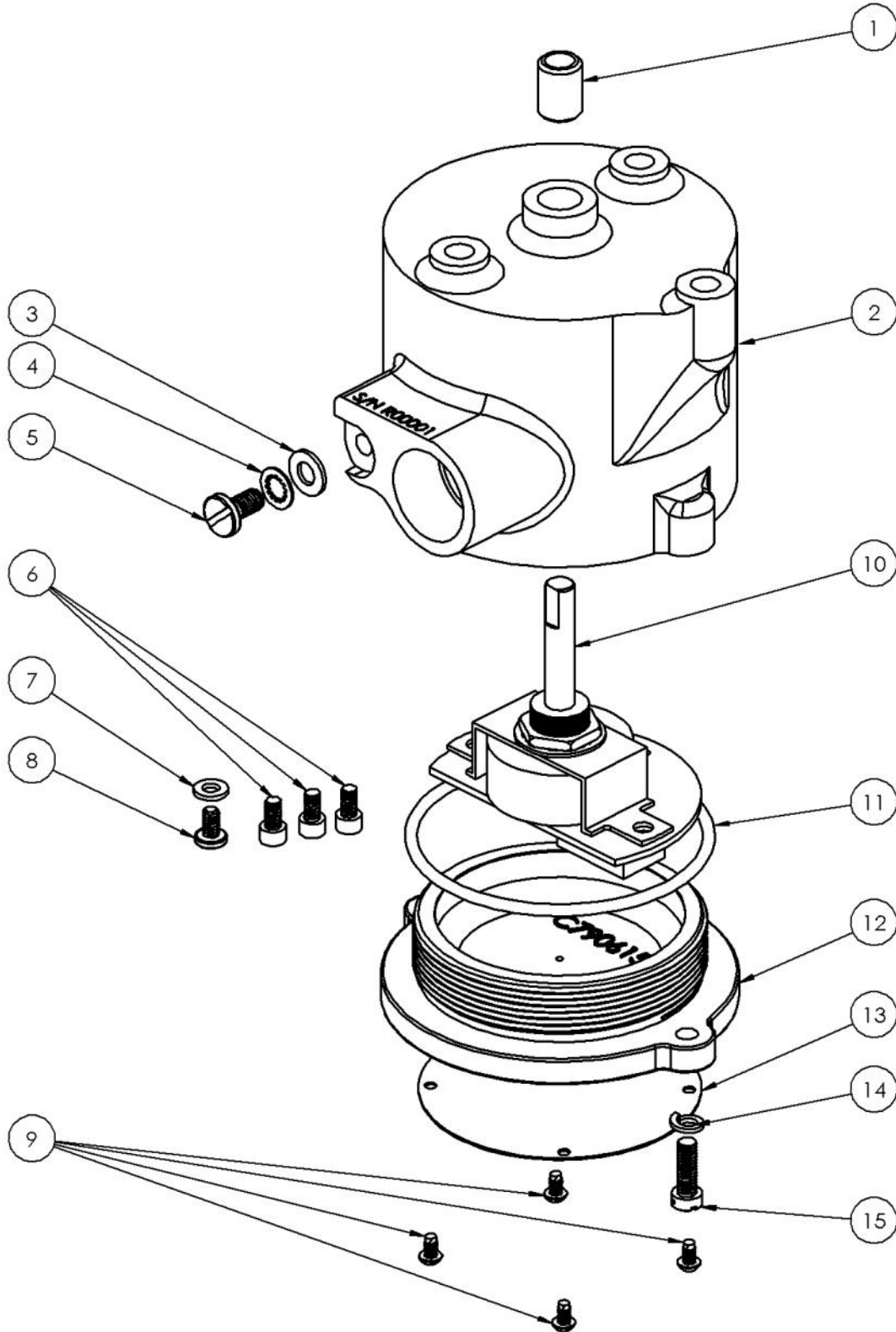
Direct Mount Pulser (DMP) Assembly



Direct Mount Pulser (DMP) Assembly Continued

Item No.	Part Number	Description
1A	TCS 700009	FKM PACKING O-RING
1B	TCS 700010	SIMRIZ® PACKING O-RING
1C	TCS 700049	BUNA PACKING O-RING
1D	TCS 700809	EPDM PACKING O-RING
2A	TCS 790691	700-15 DMP DRIVE ASSEMBLY
2B	TCS 690690	700-20/25/30/35/40/45/60/65 DMP DRIVE ASSEMBLY
2C	TCS 790695	FORK DRIVE DMP DRIVE ASSEMBLY
2D	TCS 690682	682 DMP DRIVE ASSEMBLY
2E	TCS 790698	BRODIE DMP DRIVE ASSEMBLY
2F	TCS 790699	SMITH DMP DRIVE ASSEMBLY
2G	TCS 690692	700-20/25/30/35/40/45/60/65 DMP DRIVE HT ASSEMBLY
2H	TCS 690687	682 DMP DRIVE HIGH TORQUE ASSEMBLY
3	TCS 790102D	DRILLED 10-24 X 1/2 BOLT
4	TCS 790663	#10 FLAT WASHER
5	TCS 790676	INTERNAL TOOTH LOCKWASHER
6	TCS 790660	10-32 X 1/4 SLOTTED PAN SCREW
7	TCS 790665	6-32 X 1/4 SOCKET HEAD SCREW
8	TCS 790662	6-32 GROUNDING INSERT
9	TCS 790661	6-32 GROUNDING SCREW
10	TCS 790095	#4 X 3/16 DRIVE SCREW
11A	TCS 790610	UL HOUSING
11B	TCS 790612	ATEX HOUSING
12A	TCS 790685	CIRCUIT BOARD ASSEMBLY; 5 VDC
12B	TCS 790686	CIRCUIT BOARD ASSEMBLY; 6-30 VDC
13	TCS 790625	CAP O-RING
14	TCS 790615	CAP
15A	TCS 790617-1	UL NAME PLATE
15B	TCS 790617-2	ATEX NAME PLATE
16	TCS 790675	8-32 LOCKWASHER
17	TCS 790670D	DRILLED 8-32 x 1/2 SCREW

Register Mount Pulser (RMP) Assembly



Register Mount Pulser (RMP) Assembly Continued

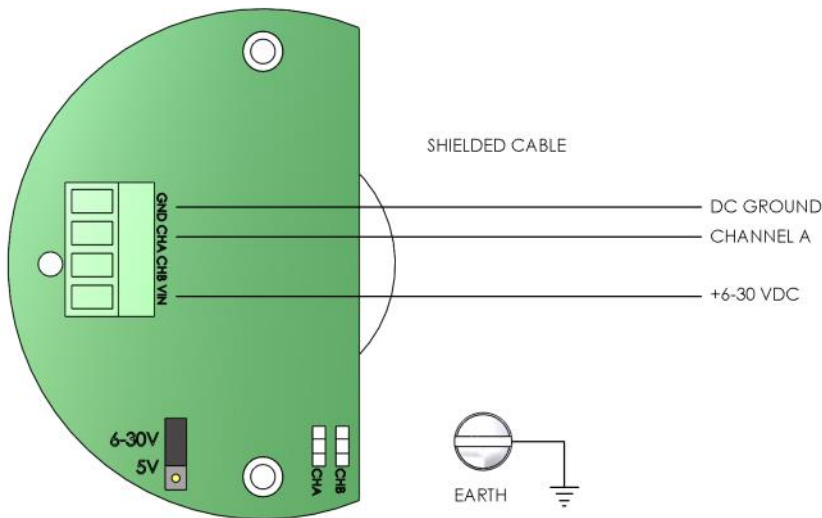
Item No.	Part Number	Description
1	TCS 790410	PULSER SHAFT BUSHING
2	TCS 790400	PULSER HOUSING
3	TCS 790663	#10 FLAT WASHER
4	TCS 790676	10-32 INTERNAL TOOTH LOCKWASHER
5	TCS 790660	10-32 X 3/8 PAN HEAD SCREW
6	TCS 790665	6-32 X 1/4 SOCKET HEAD SCREW
7	TCS 790662	GROUNDING INSERT
8	TCS 790661	6-32 X 1/4 GROUND SCREW
9	TCS 790095	#4 X 3/16 DRIVE SCREW
10	TCS 790687 (5V) TCS 790688 (6-30V)	RMP LONG SHAFT CIRCUIT BOARD
11	TCS 790625	CAP O-RING
12	TCS 790615	PULSER HOUSING CAP
13	TCS 790617	NAME PLATE
14	TCS 790675	#8 SPLIT LOCKWASHER
15	TCS 790670D	8-32 X 1/2 FILLISTER HEAD SCREW

Single Channel Wiring Instructions

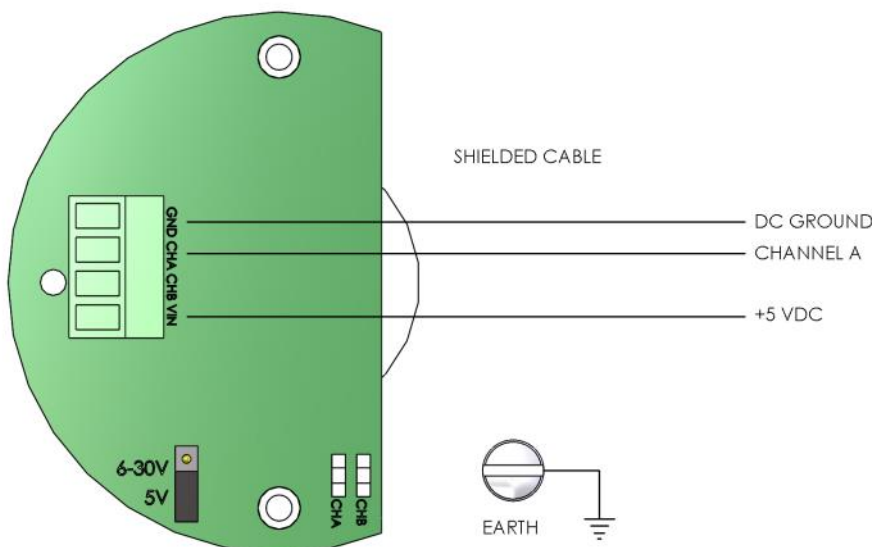


- 1) TURN SYSTEM POWER OFF
- 2) Keep all stripped wire leads short as possible.
- 3) Use shielded cable for signal wiring suitable for at least 92°C (recommended 18 AWG).
- 4) Connect shielded drain to earth or chassis ground.
- 5) Use only 1/8th straight blade for tightening terminal blocks screws.
- 6) The internal grounding terminal shall be used as the equipment grounding means and the external terminal is only a supplemental bonding connection where local authorities require/permit such a connection.

SINGLE CHANNEL - 6 TO 30 VDC



SINGLE CHANNEL - 5 VDC

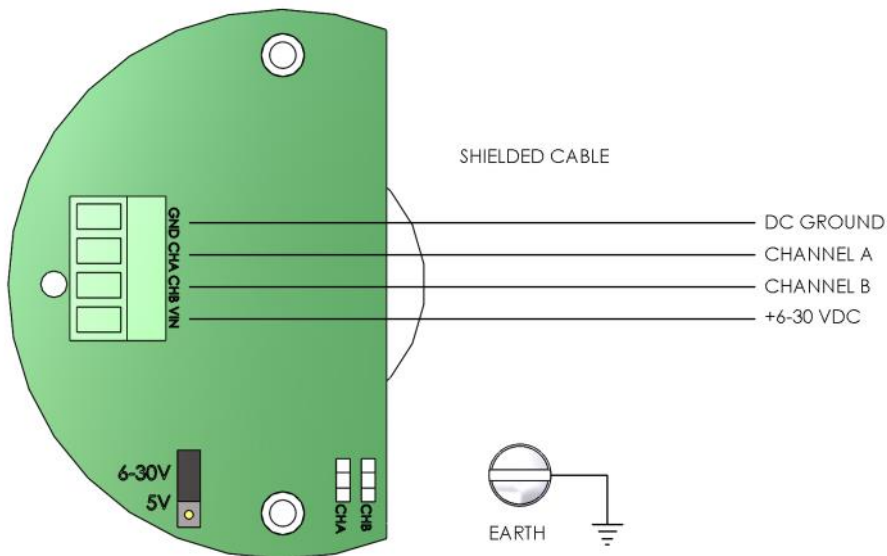


Dual Channel Wiring Instructions

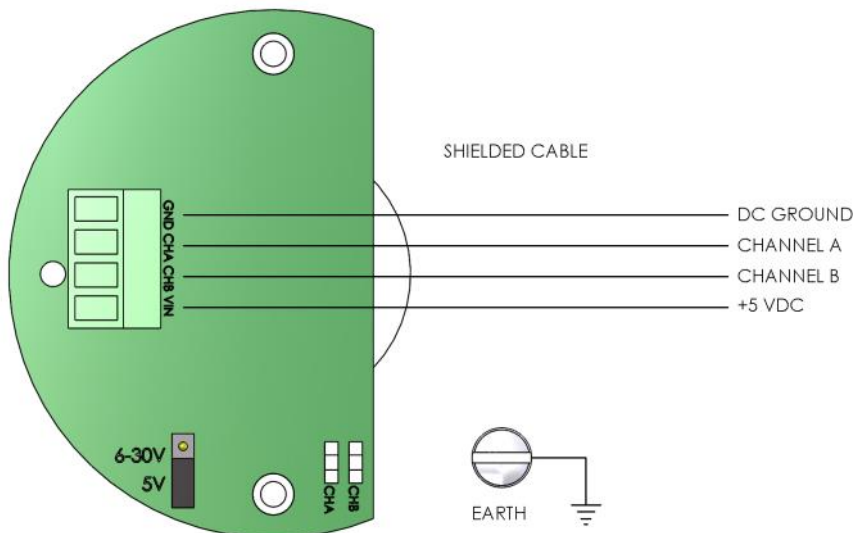


- 1) TURN SYSTEM POWER OFF
- 2) Keep all stripped wire leads short as possible.
- 3) Use shielded cable for signal wiring suitable for at least 92°C (recommended 18 AWG).
- 4) Connect shielded drain to earth or chassis ground.
- 5) Use only 1/8th straight blade for tightening terminal blocks screws.
- 6) The internal grounding terminal shall be used as the equipment grounding means and the external terminal is only a supplemental bonding connection where local authorities require/permit such a connection.

DUAL CHANNEL - 6 TO 30 VDC



DUAL CHANNEL - 5 VDC





DECLARATION OF CONFORMITY

The undersigned, on behalf of:

Total Control Systems, a division of Murray Equipment, Inc
2515 Charleston Place
Fort Wayne, IN 46808 USA
Ph.: 1-260-484-0382
www.tcsimeters.com

Declares that the product:

Make: TCS DMP Direct Mount Pulser
Type: Pulse Encoders Flameproof "d"
Model: TCS DMP100-XAY (See Annex 1)
Serial Number: UNIQUE PER UNIT

Is in conformity with the provisions of the Directive 2014/34/EU for use in potentially explosive atmospheres.

Product Marking:  II 2 G Ex db IIB T5 Gb

EC Type Examination Certificate: DEMKO 10 ATEX 1005021X

Harmonized Standards: EN 60079-0:2012+A11:2013
EN 60079-1:2014

Product Quality Assurance Notification: 10 ATEX Q150186
UL International Demko A/S, Notified Body 0539
Borupvang 5A, 2750 Ballerup
Denmark
+45 44 85 65 65
Info.dk@dk.ul.com

Date of Issue: 2015-06-25

EC Directives: 2014/34/EU ATEX Directive

Signature:

A handwritten signature in black ink, appearing to read "Dan Murray", is written over a horizontal line.

Dan Murray, Vice President

DECLARATION OF CONFORMITY

Annex 1

Direct Mount Pulser Units

TCS	DMP	100	-	X	A	Y
------------	------------	------------	----------	----------	----------	----------

X: Numeric Value from 1 through 11, denoting meter drive and sealing gasket options

Y: Optional Numeric Value of 5 denoting 5 Volt DC unit. Model designations without the Y=5 value are 6 to 30 Volt DC.

EXAMPLES: TCS DMP 100-1A5

TCS DMP 100-5A

Warranty

New DMP and RMP pulse transmitters, equipment or components manufactured by Total Control Systems, a division of Murray Equipment, Inc. (TCS) with which this warranty is enclosed, are warranted by TCS to the original purchaser only for a period of TWELVE (12) months from installation or eighteen (18) months from the date of shipment, to be free, under normal use and service, from defects in material and workmanship.

Defects occurring within the stated warranty period, TCS will repair or replace, 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.

EXCLUSIONS: Warranty does not cover any parts and equipment not manufactured by TCS, but these items may be covered by separate warranties of their respective manufacturers. This warranty does not extend to any equipment that has been subjected to misuse, negligence or accident or if operated in any manner other than in accordance with TCS's operating instructions and specifications.

CLAIM PROCEDURES: In order to obtain performance by TCS of its obligations under this warranty, the original purchaser must obtain a Return Goods Authorization (RGA) number from TCS's customer service department within 30 days of discovery of a purported breach of warranty, but not later than the expiration of the warranty period. Once authorization is received, return the RGA and defective meter, piece of equipment, or component covered by this warranty, with transportation charges prepaid, to TCS together with a written RGA form, MSDS sheet and packaging clearly marked with the RGA number. All RGA procedures must strictly be followed for safety and quick resolve. TCS reserves the right of refusal for shipments sent back freight collect and/or without proper paperwork.

LIMITATIONS: There are no other warranties of any kind, expressed or implied. TCS specifically disclaims any warranty of merchantability or of fitness for any particular purpose. TCS will determine if all parts or meter defect falls within the warranty guidelines and will repair or replace within a reasonable time span. TCS is not responsible for any in or out bound freight. TCS's sole obligation shall represent the buyer's sole and exclusive remedy shall be to repair or at TCS's option to replace any product or part determined to be defective. In no event shall TCS be liable for any special, direct, indirect, incident, consequential or other damages of similar nature, including without limitation, loss of profits, products, production time, or loss of expenses of any nature incurred by the buyer or any third party. TCS has not authorized on its behalf any representation or warranties to be made, nor any liability to be assumed except as expressly provided herein; there is no other express or implied warranty.

REPAIR WARRANTY: All repair work is warranted for ninety (90) days from the date of shipment to customer. Some parts may be warranted for longer periods by the Original Equipment Manufacturer.

DESIGN AND EQUIPMENT CHANGES: Any changes in design or improvements added shall not create any obligation to install same on equipment previously sold or ordered.

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Check us out at www.TCSmeters.com!



The Standard of Measurement

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Check us out at www.TCSimeters.com!