

**IMPORTANT INFORMATION:** Product must be installed and used in strict conformance with NFPA Pamphlet 58 and/or NFPA Pamphlet 54 and all other codes, regulations and manufacturer recommendations.

Failure to follow these codes, regulations and recommendations could result in hazardous installation, bodily injury and/or death.

**PRODUCT TRAINING SCHOOLS AVAILABLE.** Contact a GEC customer service representative for more information.

**WARNING:** LP Gas is extremely flammable and explosive. Devices used for handling LP Gas and Anhydrous Ammonia must be installed and used in strict conformance with NFPA Pamphlet 58 and 54 and all other codes, regulations and manufacturer recommendations.

**WARNING:** Before disassembly of any meter or accessory component, **ALL INTERNAL PRESSURES** must be relieved. Pressure must be at 00 (zero) PSI. Close all liquid and vapor lines between the meter and vapor lines between the meter and liquid or gas pressure source, such as supply tank, supply lines and discharge lines.

## Liquid Controls MA Series Meters

*Precise, volumetric, positive displacement liquid measuring principle with minimum intrusion to the liquid flow:*

- No metal-to-metal contact within measuring chamber assures sustained accuracy over service life.
- Carbon insert bearings reduce friction and wear for extended service life.
- Low Pressure Loss increases maximum flow rate system.
- No planned obsolescence means you can rebuild rather than replace.
- Synchronized rotary measurement principle offers the longest service life in the industry.
- Precision machined parts produce unequaled accuracy and are totally interchangeable.
- Ratio gear train is located in the base of the counter where the lack of product lubricity doesn't affect gear train wear.

Whatever your LP Gas requirement, Liquid Controls has a meter for the job - fleet fueling, bulk truck, terminal, pipeline, and refinery applications.

All meters meet the accuracy requirements of the National Institute of Standards Technology (NIST) and numerous international weights and measures specifications, and comply with the safety standards established by the NFPA

### MA Series Meters

For operation at any non-shock working pressure up to 350 PSI (25 bar) and at ambient temperatures up to 160°F (71°C).

- Size for size, LC MA Series Meters are lighter and provide greater mounting flexibility.
- Accessories may be rotated 180 degrees or covers swapped to reverse direction of flow from L to R or R to L. No additional parts or special tools required.

### MA 4 Meters

#### For LPG Motor Fuel Applications

Rate of flow 5 to 30 GPM (20-115 L/min.) capacity range. Choice of ¾", 1 ½", and 2" companion flanges. UL listed.

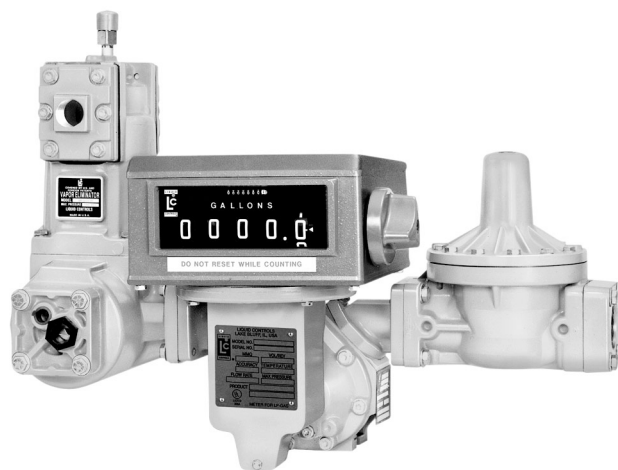
| Model #    | Description  |
|------------|--|
| MA-4-CX-10 | Standard meter w/air eliminator, strainer differential valve & counter |
| MA-4-CY-10 | Same as MA-4-CX-10 except: w/temperature volume compensator            |
| MA-4-GX-10 | Same as MA-4-CX-10 except: w/printer                                   |
| MA-4-GY-10 | Same as MA-4-CX-10 except: w/printer & temperature volume compensator  |

### MA 5 Meters

#### For Truck & High Speed Motor Fuel Applications

Rate of flow 12 to 60 GPM (45-225 L/min.) capacity range. Choice of 1 ½" standard, and 2" optional companion flanges.

| Model #    | Description   |
|------------|---|
| MA-5-CX-10 | Standard meter w/air eliminator, strainer, differential valve, and counter. |
| MA-5-CY-10 | Same as MA-5-CX-10 except: w/temperature volume compensator                 |
| MA-5-GX-10 | Same as MA-5-CX-10 except: w/printer  |
| MA-5-GY-10 | Same as MA-5-CX-10 except: w/printer & temperature volume compensator       |



MA-4-CX-10, MA-5-CX-10  
Shipping wt. 95 lbs.

# Liquid Controls MA Series Meters

## MA 7 Meters

### For Truck & Bulk Loading Applications

Rate of flow 20 to 100 GPM (75-380 L/min.) capacity range.  
Choice of 2" NPT standard, 1 1/2" optional companion flanges.  
UL listed.

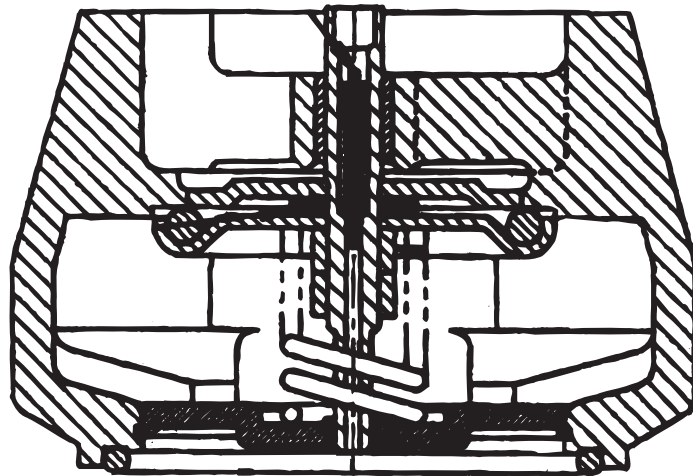
| Model #    | Description  |
|------------|--|
| MA-7-CX-10 | Standard meter w/air eliminator, strainer differential valve & counter |
| MA-7-CY-10 | Same as MA-7-CX-10 except: w/temperature volume compensator            |
| MA-7-GX-10 | Same as MA-7-CX-10 except: w/printer                                   |
| MA-7-GY-10 | Same as MA-7-CX-10 except: w/printer & temperature volume compensator  |



MA-7-GY-10  
Shipping wt. 110 lbs.

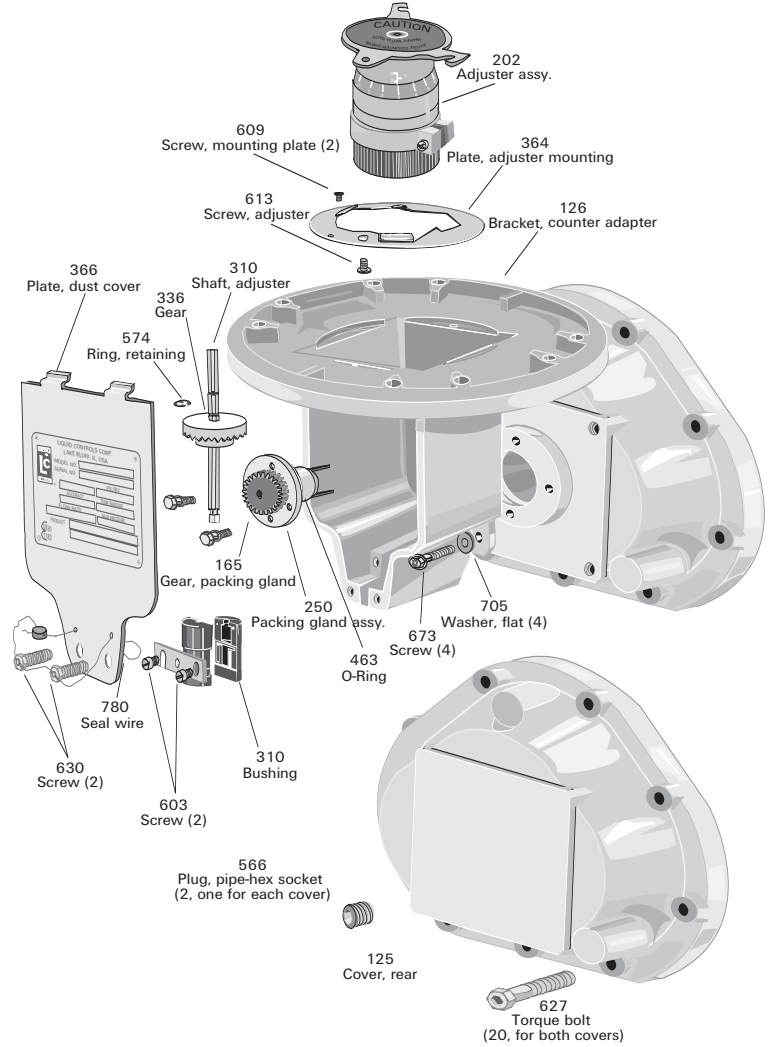
## A2883 Inlet Back Check

Used on MA-4/MA-5/MA-7

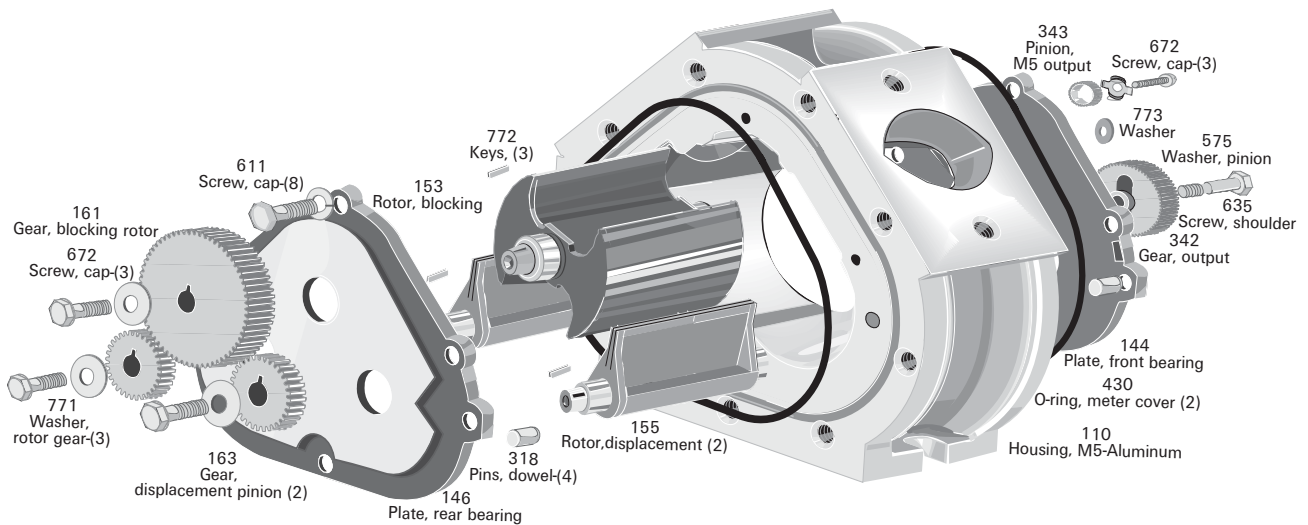


## Parts — LC M-5, MA-5 & MA-4 Meter Covers & Element

| Item # | Old Part # | New Part # | Qty | Description                    |
|--------|------------|------------|-----|--------------------------------|
| 110    | 48271      | 482711     | 1   | Housing, Aluminum              |
| 123    | 49446      | 48272      | 1   | Cover, Front                   |
| 124    | 49447      | 48273      | 1   | Cover, Rear                    |
| 126    | 49434      | 49582      | 1   | Bracket, Counter Adapter       |
| 144    | 47671      |            | 1   | Bearing Plate, Front           |
| 146    | 47670      |            | 1   | Bearing Plate, Rear            |
| 153    | 48079      | 48919      | 1   | Blocking Rotor Assy            |
| 155    | 48078      | 48920      | 2   | Displacement Rotor Assy        |
| 161    | 48090      |            | 1   | Gear Blocking                  |
| 163    | 48089      |            | 2   | Gear, Displacement Pinion      |
| 202    | 49403      |            | 1   | Adjuster - Standard            |
| 250    | 49561      |            | 1   | Pack Gland Assy, Kit           |
| 310    | 41786      | 47862      | 1   | Bushing W/Adjuster Drive Shaft |
| 318    | 40665      |            | 4   | Pin, Dowel                     |
| 336    | 40122      |            | 1   | 1:1 Delrin, Gear               |
| 342    | 48276      |            | 1   | Gear, Output                   |
| 343    | 48257      |            | 1   | Pinion, Output                 |
| 366    | 49390      |            | 1   | Plate, Cover Adjuster          |
| 375    | 48208      |            | 1   | Retainer, Adjuster Shaft Bush. |
| 430    | 09123      |            | 2   | O-Ring, Buna-N                 |
| 463    | 06856      |            | 1   | O-Ring, .875 Buna-N            |
| 566    | 06790      |            | 2   | Pipe Plug                      |
| 574    | 02188      |            | 1   | Retainer Ring                  |
| 575    | 48277      |            | 1   | Washer lock, Output Pinion     |
| 603    | 06845      |            | 2   | Screw, #10-24 X .375           |
| 611    | 09079      |            | 8   | Screw, #10-24 X .625           |
| 627    | 09080      |            | 18  | Screw, .312-18 X 1.375         |
| 630    | 09093      |            | 2   | Screw, #10-32 X .50            |
| 635    | 48275      |            | 1   | Screw, Shoulder                |
| 672    | 09110      |            | 4   | Screw, #8-32 X .640            |
| 673    | 09084      |            | 4   | Screw, .250-20 X 1"            |
| 705    | 06743      |            | 4   | Washer, Flat                   |
| 771    | 48319      |            | 3   | Washer Lock, Rotor Gear        |
| 772    | 48345      |            | 3   | Key, Stainless Steel           |
| 780    | 48864      |            | 1   | Seal Wirer Kit                 |

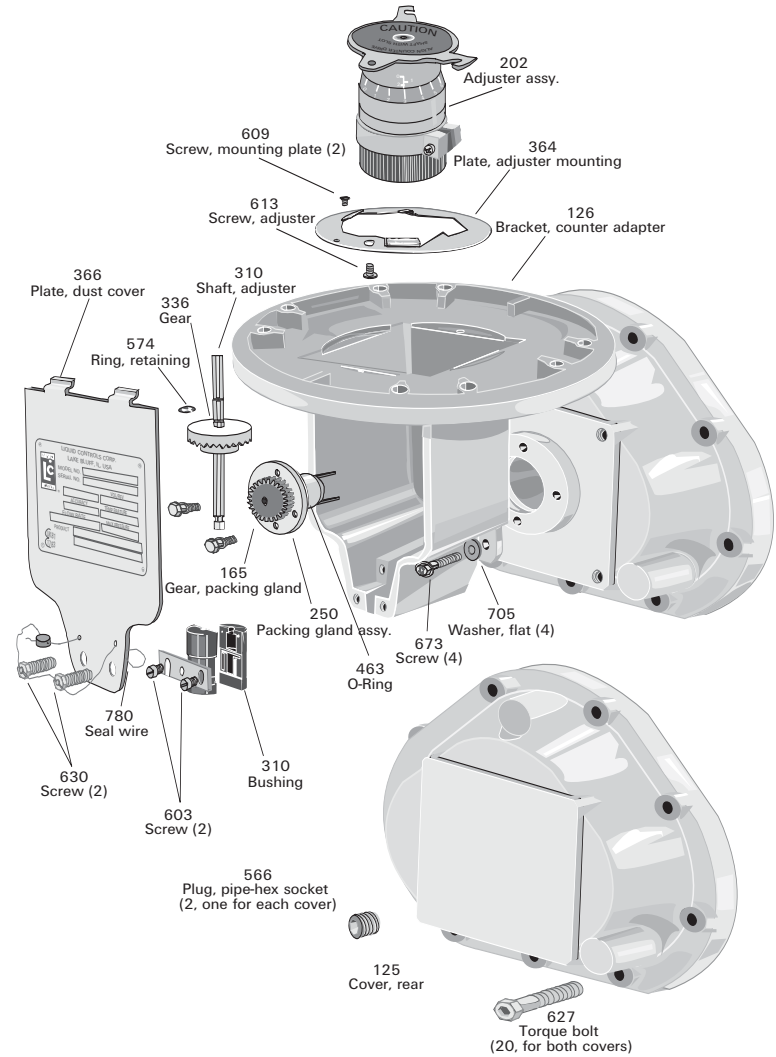


Rear cover ← → Front cover



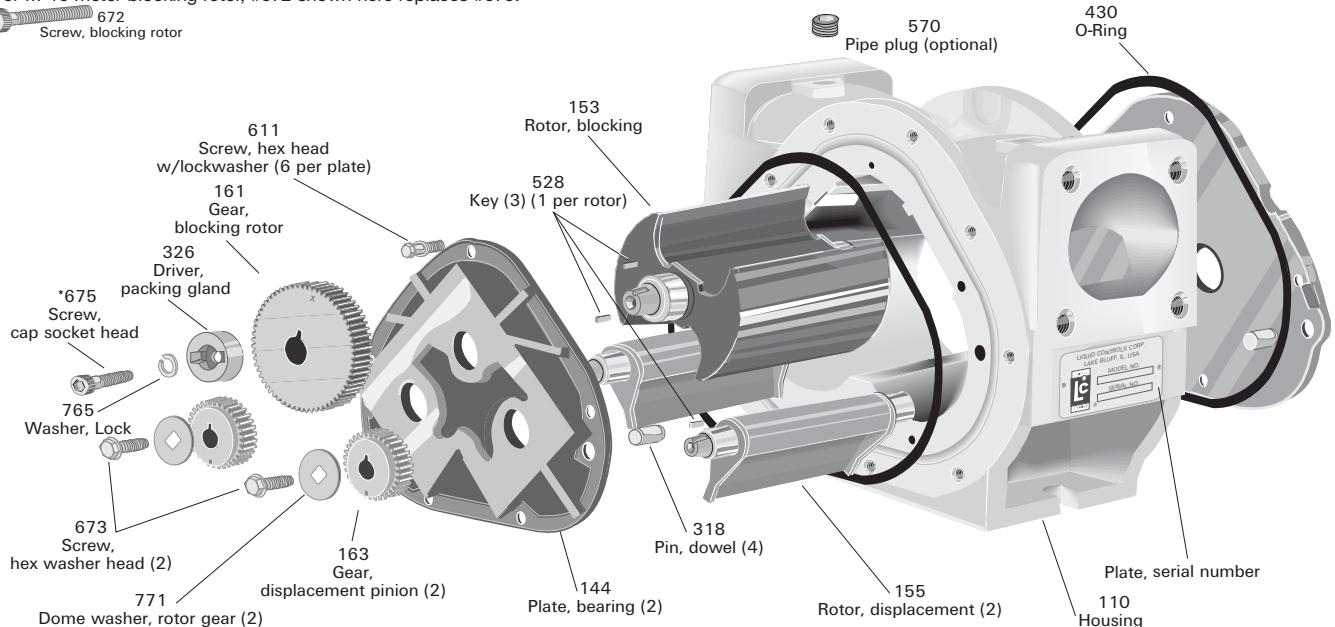
## Parts — LC M-7, MA-7 & M-10 Meter Covers & Housing

| Item # | Old Part # | New Part # | Qty | Description                  |
|--------|------------|------------|-----|------------------------------|
| 110    | 49445      | 494451     | 1   | Housing Aluminum             |
| 123    | 49449      | 48301      | 1   | Cover, Front                 |
| 125    | 49450      | 48302      | 2   | Cover, Rear                  |
| 126    | 49434      | 49582      | 1   | Bracket, Counter Adapter     |
| 144    | 47668      |            | 2   | Bearing Plate, Assy          |
| 153    | 48306      | 48927      | 1   | Blocking Rotor Assy          |
| 155    | 48366      | 48928      | 2   | Displacement Rotor Assy      |
| 161    | 47646      |            | 1   | Blocking Gear                |
| 163    | 47647      |            | 2   | Gear, Pinion                 |
| 202    | 49403      |            | 1   | Adjuster - Standard          |
| 250    | 49561      |            | 1   | Packing Gland Assy Kit       |
| 310    | 41786      |            | 1   | Bushing, With Adjuster Shaft |
| 318    | 40665      |            | 4   | Pin, Dowel                   |
| 326    | 48756      |            | 1   | Packing Gland                |
| 336    | 40122      |            | 1   | 1:1 Delrin Gear              |
| 366    | 49390      |            | 1   | Plate, Cover Adjuster        |
| 375    | 48208      |            | 1   | Bushing Retainer             |
| 430    | 06850      | 09258      | 1   | O-Ring 6.25 ID Buna-N        |
| 463    | 06856      | 417862     | 2   | O-Ring .88 ID Buna-N         |
| 528    | 48332      |            | 3   | Key, Stainless Steel         |
| 566    | 06790      |            | 20  | Pipe Plug                    |
| 574    | 02188      |            | 1   | Retainer Ring                |
| 603    | 06845      |            | 2   | Screw, #10-24 X .375         |
| 611    | 09079      |            | 10  | Screw, #10-24 X .625         |
| 627    | 09080      |            | 2   | Screw .312-18 X 1.375        |
| 630    | 09093      |            | 2   | Screw, #10-32 X .50          |
| 673    | 09106      | 09027      | 2   | Screw, .25-20 X 75 lg        |
| 673    | 09084      |            | 4   | Screw, .250-20 X 1"          |
| 675    | 07483      |            | 1   | Screw                        |
| 705    | 06743      |            | 4   | Washer, Flat                 |
| 765    | 06174      |            | 1   | Washer Lock                  |
| 771    | 48348      |            | 2   | Washer, Rotor Gear           |
| 780    | 48864      |            | 1   | Seal Wire Kit                |



Front cover ← → Rear cover

\* For M-10 meter blocking rotor, #672 shown here replaces #675.



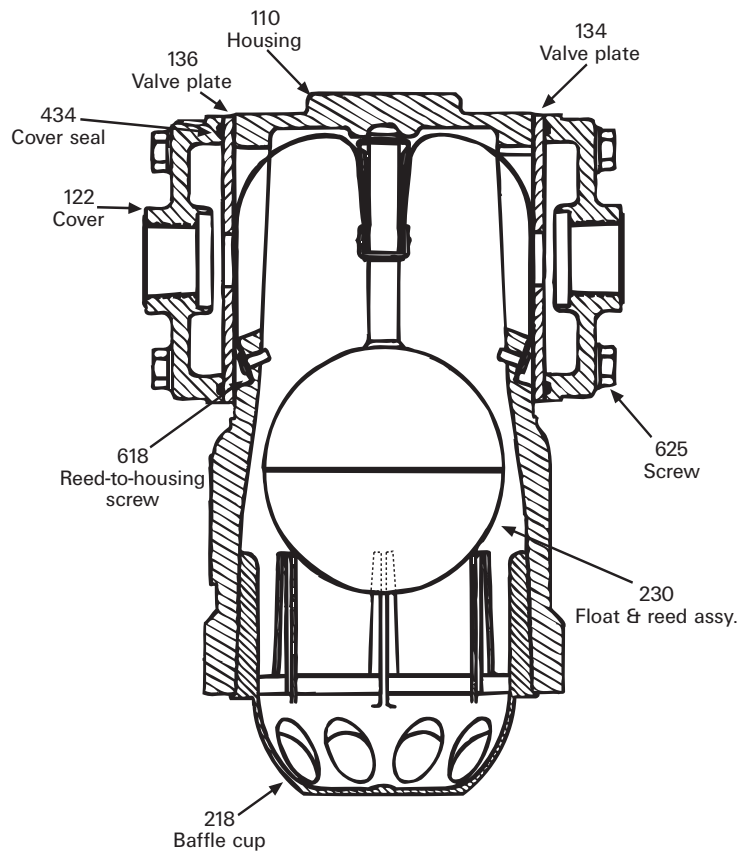
## Parts — LC High Pressure Air Eliminator

For Use With MA-4, MA-5, MA-7 & MA-15 Meters.

Can be installed with FA-7 strainer.

Complete Assembly - part # A8340A

| Ref. # | Part # | Qty | Description                             |
|--------|--------|-----|---|
| 110    | 49672  | 1   | Housing, air eliminator                 |
| 122    | 48329  | 2   | Cover, air eliminator outlet - aluminum |
| 134    | 42822  | 1   | Plate, valve; UL Buna Standard          |
| 136    | 42824  | 1   | Plate, valve; UL Buna Limited Bleed     |
| 218    | 48421  | 1   | Cup, baffle - plastic                   |
| 230    | 501040 | 1   | Float & reed assembly                   |
| 434    | 42823  | 2   | Seal ring outlet cover                  |
| 618    | 06797  | 2   | Screw                                   |
| 625    | 09080  | 12  | Screw                                   |

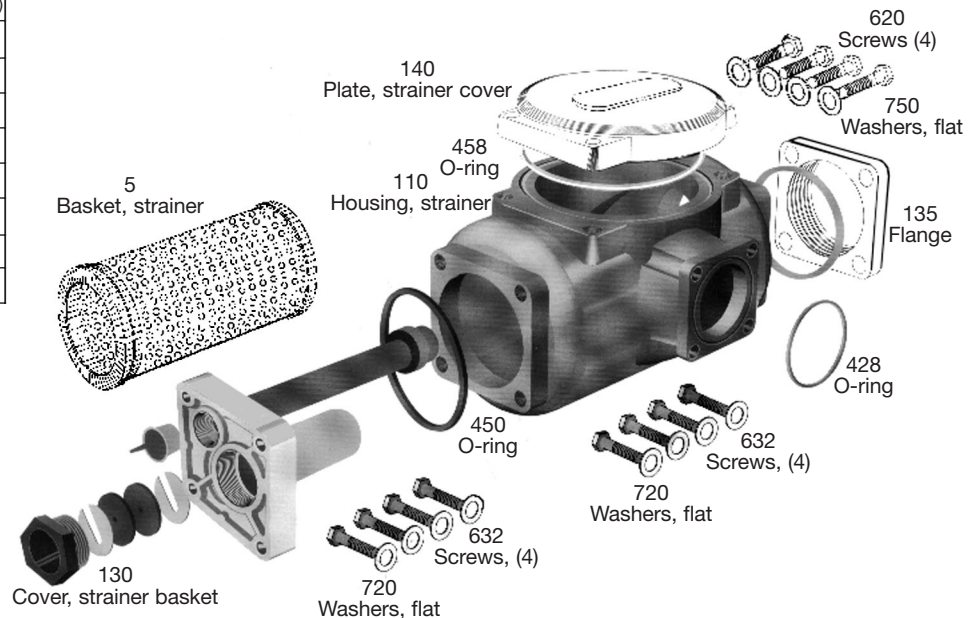


## Parts — LC FA-7 Aluminum LPG Strainer

For Use With MA-4, MA-5, & MA-7 Meters

Complete Assembly - part # A2343A

| Ref. # | Part # | Qty. | Description                    |
|--------|--------|------|--------------------------------|
| 5      | A2439  | 4    | Basket, strainer F7 (200 Mesh) |
| 110    | A48297 |      | Housing, F7 strainer           |
| 130    | A45420 |      | Thermowell assy.               |
| 428    | 06854* | 1    | O-ring, 2.88 ID Buna-N         |
| 450    | 06844  |      | O-ring, 2.62 ID Buna-N         |
| 458    | 06847* |      | O-ring, 4.75 ID Buna-N         |
| 620    | 04444  | 4    | Screw, .375-16 x 1.25          |
| 622    | 06851  | 4    | Screw, .375-16 x 1.50          |
| 720    | 04498  | 8    | Flat washer, .406 ID           |



**CAUTION**

**Diaphragm Replacement**

Before removing any bolts from the cover, the threaded rod (3/8-16 UNC all-thread bolts 6" long), washer (1 1/2" diameter) and 3/8" nut must be in place to keep spring compressed. The threaded rod is inserted through the cover center hole and screwed securely into threaded hole in diaphragm nut. The washer is then placed onto the rod and the nut is screwed down until spring pressure is felt. The cover bolts can now be removed and cover taken off.

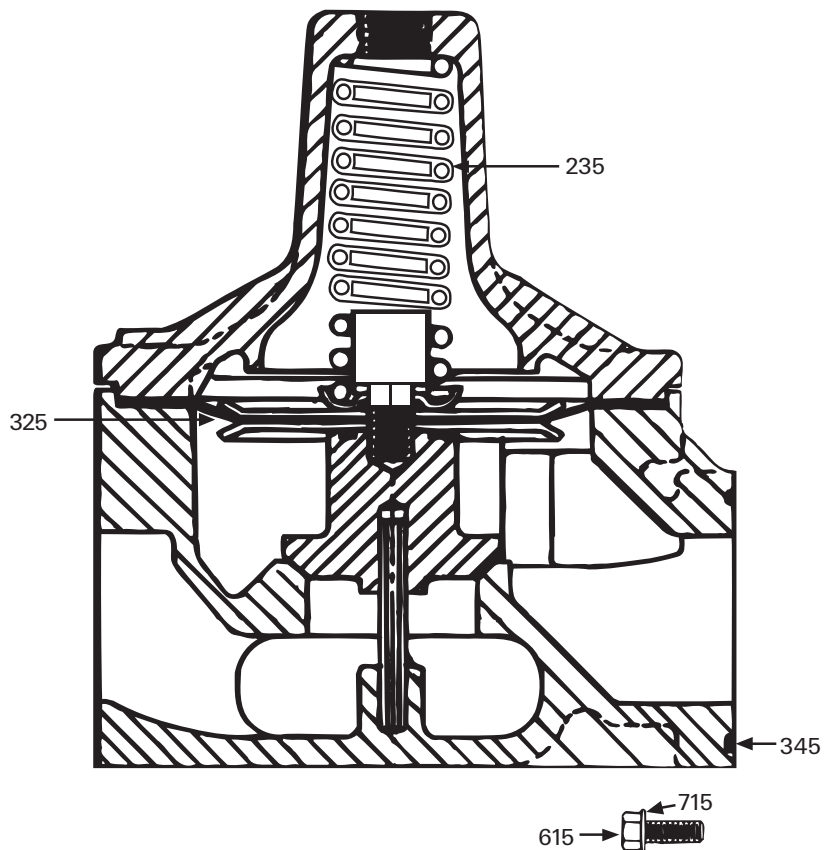
The Diaphragm assembly can be removed from cover by slowly loosening the nut on the threaded rod until spring returns to its free length and exerts no pressure on the assembly. **CAUTION MUST BE TAKEN TO MAKE SURE THE THREADED ROD DOES NOT UNSCREW FROM THE DAIPHGRAM NUT BEFORE SPING PRESSURE IS TAKEN OFF THE ASSEMBLY.** The nut and washer are then removed to take apart diaphragm assembly, spring and cover.

**FOLLOW ABOVE STEPS IN REVERSE TO REASSEMBLE VALVE.**

**A2843 Differential Valve**

Used on MA-4/MA-5/MA-7/MA-15

| Ref. # | Part # | Qty | Description |
|--------|--------|-----|-------------|
| 235    | 47305  | 1   | Spring      |
| 325    | 47306  |     | Diaphragm   |
| 345    | 07838  |     | O-ring      |
| 615    | 06851  | 4   | Screw       |
| 715    | 04498  |     | Flat washer |

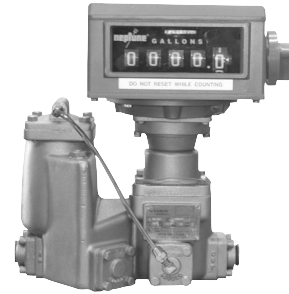


## Fill Station Meters

### 1" Aluminum LPG Meter - Type 4D MD

Includes vapor eliminator register, and differential valve. New aluminum design is 40% lighter than previous ductile iron.

| New Model #  | Old Model # | Description                    | Capacity |
|--------------|-------------|--------------------------------|----------|
| RL100-108A1a | 400051-VR   | With Veeder-Root register only | 3-18 gpm |
| RL100-118A2b | 400051-002  | With register & ATC            |          |



400051  
Shipping wt. 24 lbs.

## Bulk Truck/Bulk Plant Meters

### 1 1/4" LPG Meter - Type 4D

Ideal for larger motor filling stations and small bulk trucks. Available with printer/register and temperature compensation. Rate Of Flow: 5-30 GPM.

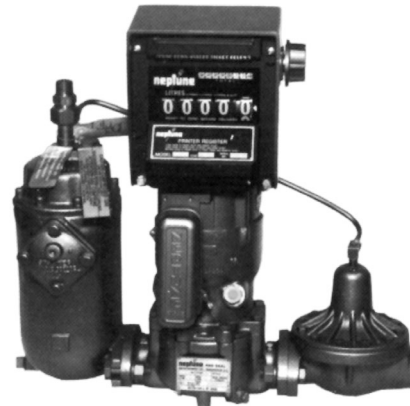
| New Model #  | Old Model # | Description                                      | Capacity |
|--------------|-------------|--|----------|
| RL125-11RGD1 | 90040-001   | With printer register                            | 5-30 gpm |
| RL125-21RGD1 | 90040-101   | With printer register & temperature compensation |          |
| RL125-11RGA1 | 90040-002   | With register only (non-print)                   |          |
| RL125-21RGA1 | 90040-102   | With register & temperature compensation         |          |



## Bulk Truck/Bulk Plant Meters

### 1 1/2" LPG Meter - Type 4D

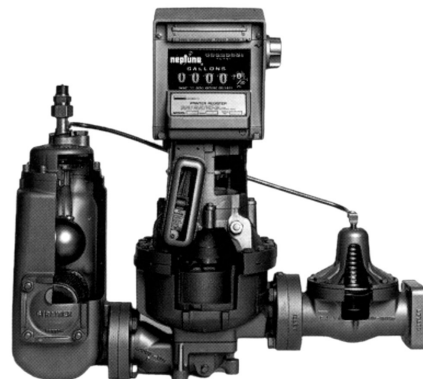
| New Model #  | Old Model # | Description                                      | Capacity  |
|--------------|-------------|--|-----------|
| RL150-11RGD1 | 90041-001   | With printer register                            | 12-60 gpm |
| RL150-21RGD1 | 90041-101   | With printer register & temperature compensation |           |
| RL150-11RGA1 | 90041-201   | With register only (non-print)                   |           |
| RL150-21RGA1 | 90041-302   | With register & temperature compensation         |           |



## Bulk Truck/Bulk Plant Meters

### 2" Aluminum LPG Meter - Type 4D MT

| New Model #    | Old Model # | Description                                    | Capacity   |
|----------------|-------------|--|------------|
| RL200-118SRGD2 | 400069-001  | With print register                            | 20-100 gpm |
| RL200-218BRGD2 | 400069-101  | With print register & temperature compensation |            |

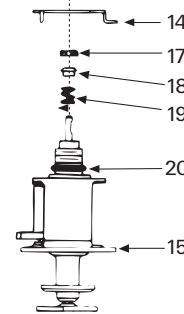
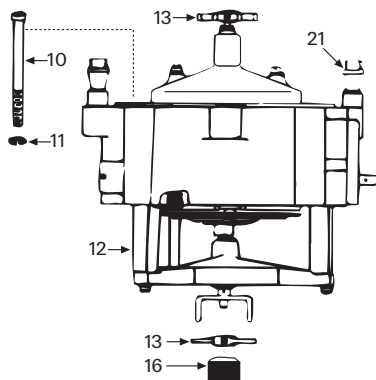
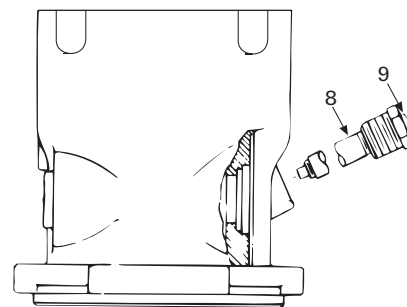
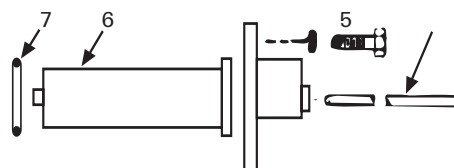
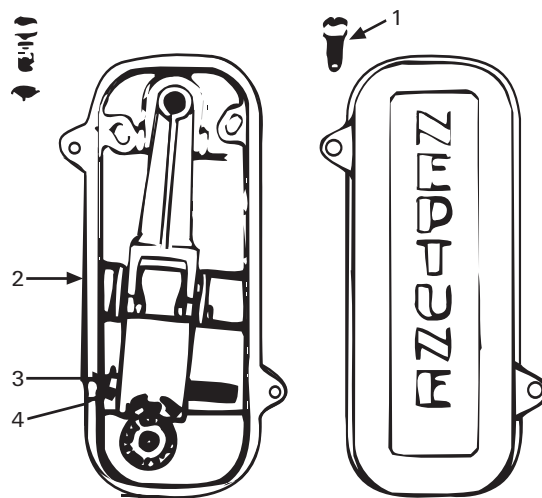


RL200-21RGD2  
Shipping wt. 144 lbs.

### Temperature Compensator

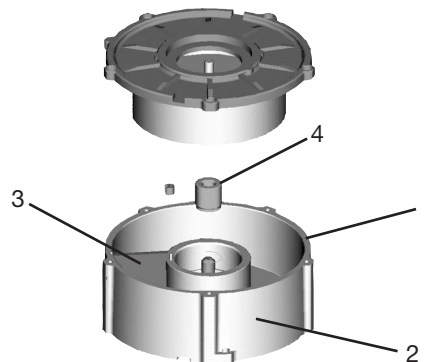
1 1/4", 1 1/2" & 2" Type 4D & 4D-MT

| Index | Description                          | Part #     |           |           |
|-------|--------------------------------------|------------|-----------|-----------|
|       |                                      | 1 1/4"     | 1 1/2"    | 2"        |
| 1     | Screw, cover                         | 9287-003   |           |           |
| 2     | Mounting plate & lever arm assy.     | 86649-003  |           |           |
| 3     | Pin, lever arm lock                  | 86661-001  |           |           |
| 4     | Cotter pin, 1/16" dia. x 3/8", brass | 86973-000  | 86973-00  | 86973-000 |
| 5     | Pin, thermostat                      | 86648-000  |           |           |
| 6     | Thermostat Bellows                   | 86646-000  |           |           |
| 7     | O-ring                               | 100139-005 |           |           |
| 8     | Thermometer well complete            | 1001906    |           |           |
| 9     | Cover                                | 600443-001 |           |           |
| 10    | Screw, 1/4-20 x 2 1/2, fil hd steel  | 8302-107   |           |           |
| 11    | Lockwasher, 1/4" steel, small        | 88721-000  |           |           |
| 12    | Adapter unit complete                | 86602-005  |           |           |
| 13    | Star assembly                        | 82976-001  |           |           |
| 14    | Adapter                              | 85006-000  | -         |           |
| 15    | Gear train complete                  | 83501-000  | 84981-000 | 83502-000 |
| 16    | Nut stuffing box                     | 83536-000  |           |           |
| 17    | U-cup, shaft seal                    | 100025-002 |           |           |
| 18    | Expander                             | 83539-000  |           |           |
| 19    | Stuffing box spring                  | 83540-000  |           |           |
| 20    | O-ring                               | 100138-003 |           |           |
| 21    | Mounting stud                        | 84435-000  |           |           |
| -     | Compensator complete                 | 86600-201  | 86600-204 | 86702-301 |



### Measuring Chamber

| Index | Description                | Part #     |            |            |
|-------|----------------------------|------------|------------|------------|
|       |                            | 1 1/4"     | 1 1/2"     | 2"         |
| 1     | Gasket                     | 4862-008   |            | 84806-000  |
| 2     | Measuring chamber complete | 43260-101  | 83271-101  | 45806-101  |
| 3     | Diaphragm                  | C43260-101 | C83271-101 | C45806-101 |
| 4     | Roller, control            | 43275-000  |            | 42316-001  |
| 5     | Diaphragm Roller Kit       | 43260-702  | 83271-702  | 45806-701  |
| 6     | Complete Seal Kit          | 101757-001 |            | 101758-001 |



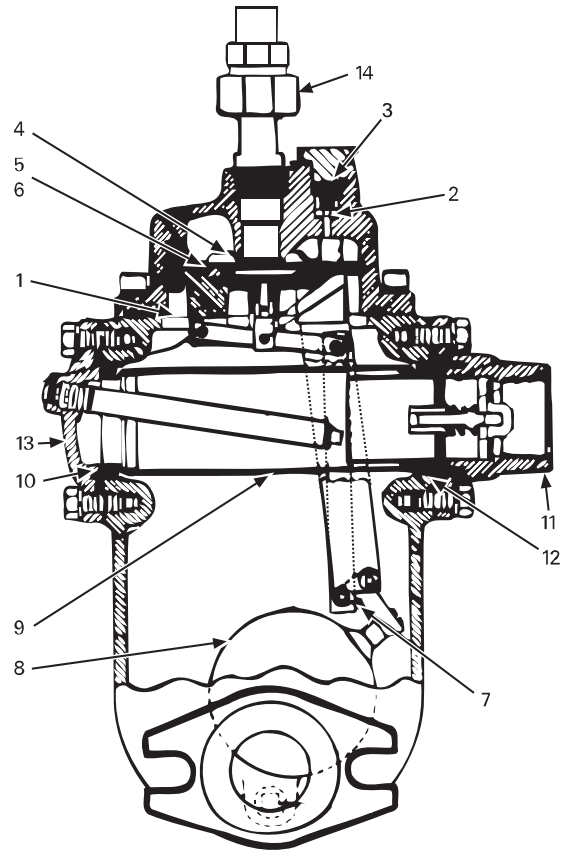
## Vapor Release & Strainer

1 1/4", 1 1/2" & 2" Type 4D & 4D-MT\*

| Index | Description                               | Part #     |            |    |
|-------|---|------------|------------|----|
|       |   | 1 1/4"     | 1 1/2"     | 2" |
| 2     | Gasket, o-ring                            | 100139-022 |            |    |
| 2     | Valve assy. bypass                        | 100237-001 |            |    |
| 3     | O-ring, 1/16" sect x 11/16" ID            | 100138-006 |            |    |
| 4     | Main valve complete                       | 89274-006  |            |    |
| 5     | Sleeve, valve                             | 82446-005  |            |    |
| 6     | Piston, seal                              | 83179-000  |            |    |
| 7     | Cotter pin, 1/16" dia x 1/2", brass       | 41402-000  |            |    |
| 8     | Float, complete                           | 82476-001  |            |    |
| 9     | Strainer & gasket assy. (80-mesh)         | 101433-704 | 101405-004 |    |
| 10    | Gasket, strainer, o-ring                  | 100139-032 | 100139-038 |    |
| 11    | Inlet check valve, complete (soft seal)   | 84983-704  | 84813-702  |    |
| 12    | Gasket, o-ring                            | 100139-010 | 200139-018 |    |
| 13    | Strainer cover (with thermometer well)    | 83485-702  | 400074-001 |    |
|       | Strainer cover (without thermometer well) | 83486-705  | 600103-000 |    |
| 14    | Valve, vapor return check (straight type) | 84828-000  |            |    |

\*4D= Steel Case

4D-MT= Aluminum Case



### CAUTION - Diaphragm Replacement

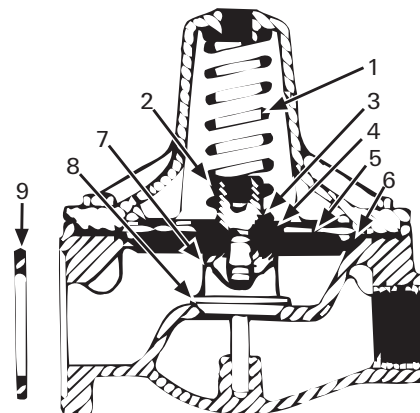
Before removing any bolts from the cover, the threaded rod (3/8-16 UNC all-thread bolts 6" long), washer (1 1/2" diameter) and 3/8" nut must be in place to keep spring compressed. The threaded rod is inserted through the cover center hole and screwed securely into threaded hole in diaphragm nut. The washer is then placed onto the rod and the nut is screwed down until spring pressure is felt. The cover bolts can now be removed and cover taken off.

The Diaphragm assembly can be removed from cover by slowly loosening the nut on the threaded rod until spring returns to its free length and exerts no pressure on the assembly. **CAUTION MUST BE TAKEN TO MAKE SURE THE THREADED ROD DOES NOT UNSCREW FROM THE DAIPHGRAM NUT BEFORE SPING PRESSURE IS TAKEN OFF THE ASSEMBLY.** The nut and washer are then removed to take apart diaphragm assembly, spring and cover.

**FOLLOW ABOVE STEPS IN REVERSE TO REASSEMBLE VALVE.**

## Differential Valve

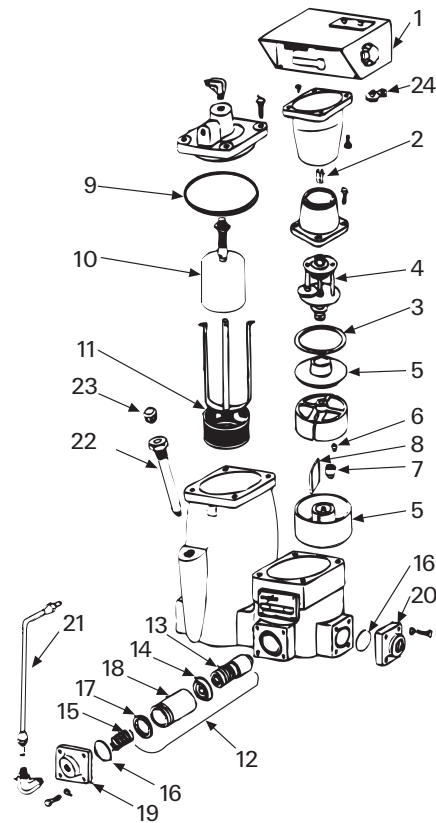
| Index | Description             | Part #     |            |    |
|-------|-------------------------|------------|------------|----|
|       |                         | 1 1/4"     | 1 1/2"     | 2" |
| 1     | Spring, valve           | 83775-000  |            |    |
|       | Diaphragm, complete     | 1001571    | 1001569    |    |
| 2     | Screw, diaphragm        | 83774-002  |            |    |
| 3     | Lockwasher, 7/16" steel | 41012-002  |            |    |
| 4     | Retainer, spring        | 83773-000  |            |    |
| 5     | Retainer, diaphragm     | 83772-002  |            |    |
| 6     | Diaphragm               | 1000624    |            |    |
| 7     | Gasket, o-ring          | 100139-001 |            |    |
| 8     | Valve stem assembled    | 83768-002  | 83927-002  |    |
| 9     | Gasket, flang           | 82060-000  | 100139-018 |    |



## 3/4" & 1" Fill Station Type 4D & 4D-MD

### 3/4" Type 4D

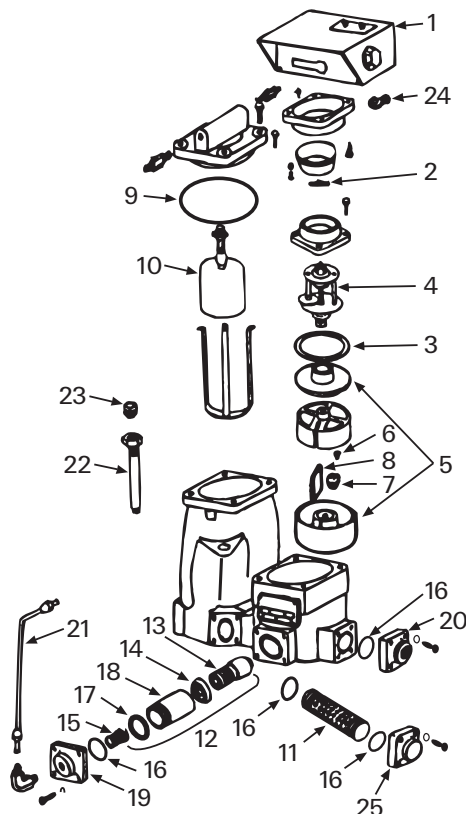
| Index | Description                       | Part #     |            |
|-------|-----------------------------------|------------|------------|
|       |                                   | 3/4"       | 1"         |
| 1     | Register complete 600 series/gal. | 100498-009 | 100498-016 |
| 2     | Coupling & key assy.              | 100711-004 | 82976-001  |
| 3     | Main case gasket                  | 4861-016   |            |
| 4     | Gear train complete               | 80905-012  | 80905-017  |
| 5     | Measuring chamber complete        | C42075-101 | C01748-001 |
| 6     | Seal pin                          | 42792-000  |            |
| 7     | Control roller                    | 42086-000  |            |
| 8     | Diaphragm                         | 42791-000  |            |
| 8A    | Diaphragm Kit, Includes # 7 & 8   | 42075-702  |            |
| 9     | O-ring                            | 100139-012 |            |
| 10    | Float assy.                       | —          | 400026-001 |
| 11    | Strainer                          | 87185-000  | 101738-001 |
| 12    | Differential valve kit complete   | 100028-001 |            |
| 13    | Piston                            | 100160-002 |            |



## 1" With 3/4" FPT Connections

### Type 4D & Type 4D-MD

| Index | Description             | Part #     |            |
|-------|-------------------------|------------|------------|
|       |                         | 3/4"       | 1"         |
| 14    | U cup, seal             | 100025-002 |            |
| 15    | Spring                  | 100024-001 |            |
| 16    | Cover o-ring            | 100139-007 |            |
| 17    | Sleeve sealing o-ring   | 100139-006 |            |
| 18    | Valve sleeve            | 100027-003 |            |
| 19    | Cover flange            | 400020-002 |            |
| 20    | Flange, inlet or outlet | 600057-000 | 600057-001 |
| 21    | Tube assembly           | 87196-001  |            |
| 22    | Thermometer well assy.  | 1001906    |            |
| 23    | Cover, thermometer well | 600443-001 |            |
| 24*   | Change gear             | 81230-XXX  |            |
| 25    | Strainer cover          | —          | 400025-701 |
| —     | Complete gasket set     | 101756-00  |            |



## Veeder-Root Registers

### Large Numeral Counter (Register)

A large numeral Counter registers the amount of each delivery or batch and provides a five-figure reset totalizer.

| Part #      | Description                               |
|-------------|---|
| 789002-002  | Register/printer for Neptune style ticket |
| 788700-002  | Register only                             |
| E788700-002 | Exchange register                         |
| E789002-002 | Exchange print register                   |
| E788702-004 | Exchange register with pulsar             |



789002-002



788700-002  
Register only

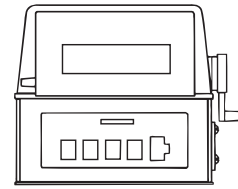
**Exchange Service Available**

### Adapters & Gear Plates To Convert 1 1/4" Through 2" Neptune Meters To Veeder-Root Register Heads

Make the switch to Veeder-Root registers

- Greater reliability
- Lower torque
- Much lower cost

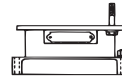
| Part #     | Description  |
|------------|--|
| 117900-232 | Adapter for 1 1/4" through 2" Neptune meter  |
| 117900-233 | Adapter for 1 1/4" through 2" Neptune meter with temperature compensation                                      |
| 310450-421 | Gear plate for 1 1/4" through 2" Neptune meter   |
| 310450-422 | Gear plate for 1 1/4" through 2" Neptune meter with temperature compensation                                   |
| 370020-017 | Adapter and gear plate to convert 1" Neptune w/600 Series register to Veeder Root                              |
| 370020-018 | Adapter and gear plate to convert 1" Neptune w/600 Series register to Veeder Root with temperature compensator |
| 312020-747 | Adapter and gear plate to convert 3/4" Neptune to Veeder Root.   |



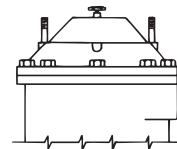
Print Register



Gear Plate



Veeder-Root Adapter



Neptune Style Mounting

### Change Gears

When ordering change gears, the last two numbers of the part number need to be the number of teeth on the gear.  
(ex. Veeder-Root change gear 32996-024)

| Description             | Part #    |
|-------------------------|-----------|
| Veeder-Root change gear | 32996-0__ |
| Neptune change gear     | 81230-0__ |

### Neptune Registers

Neptune registers provide high reliability and readability.

| Model # | Part #     | Register Type                  | Description                         |
|---------|------------|--------------------------------|-------------------------------------|
| 631     | 100498-009 | Direct read                    | Non-print register for 3/4"         |
|         | 100498-016 |                                | Non-print register for 1"           |
| 833     | 880030-000 | Direct read w/ ticket printing | Print register for 1 1/4" and above |
| 833     | 100447-101 | -                              | Weather Shield                      |



631 Series



833 Series

To guarantee that your Neptune meter performs at its best, always use Genuine Neptune Parts.

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## Register Does Not Run When Meter Is In Operation

**A.** Loosen the two square-head clamp screws at the front base of the register. Remove the register & look into the bottom at the change gears. Each change gear has a shear strip in the center hub. If broken, replace complete gear with another that has the same number of teeth (part #81230 - Teeth No.)

**B.** While the register is off the meter, check the star drive gear on the meter to make sure it is not slipping on the gear train shaft. If loose, tighten the alien set screw. Also, check the gear train by rotating the star gear with your fingers. You should be unable to turn the star gear a full revolution unless the gear train is broken and must be replaced.

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## Meter Flow Rate Decreasing Or Completely Stopped

The Differential Valve on the discharge side of the meter is designed to require **AT LEAST 18 POUNDS MORE PRESSURE** on the inlet side of the meter than the discharge side. This "Differential Pressure" must be present for the meter to operate properly. Check by installing pressure gauges on both sides of the meter and comparing the readings. Insufficient differential pressure can be caused in the following ways:

- A.** 1) A worn pump, indicated by fluctuating needle on pressure gauge.  
2) Wrong size pump.  
3) Pump bypass not set properly.  
4) Restrictions in suction or supply lines.

**CAUTION:** Before opening any part of the meter, close valve between supply tank and meter. Disconnect coupling in vent line in vapor release cover. Perform the following outdoors, away from building or sources of ignition: Open valve slowly at end of delivery hose or other outlet piping. After pressure is dissipated, unscrew vent valve (hex. nut) slowly (maximum 3 turns) on top of vapor release to depressurize product in meter.

**B. A defective float or main valve in the vapor release, or ruptured diaphragm (U-cups on 3/4") in the differential valve.** To check for either of these possibilities, engage pump as if a delivery is to be made and shut off vapor line to storage by disconnecting backcheck coupling on top of the vapor release or by manual shutoff valve (if one is installed in the line). Then disconnect the tubing that connects the top of the differential valve to the top of the vapor release.

After the trapped LPG in this line has been expelled, there should be no evidence of LPG. If LPG continues to escape from the differential side of this line, the diaphragm, U-cups on 3/4", in the differential is ruptured and needs replacement. If LPG continues to escape from the vapor release side, the rubber seat of the main valve is worn or has trash on it and needs replacing. Or, the float ball could be collapsed from shock pressure or is filling up with liquid, & it needs to be replaced.

**C. Clogged strainer in the vapor release.** This can cause excessive vaporization of the LPG which would prevent the vapor release from closing. Cleaning or replacement of the strainer will correct this problem;

**D. Improper vapor return line routing.** The vapor line should be connected only to the vapor space of the supply tank. Connection with other vapor lines should be done as close to supply tank as possible. Never connect the vapor return line to the pump bypass as this can cause erratic meter performance.

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## Measuring Chamber Repair

If none of these checks correct flow rate decrease or stoppage, check the measuring chamber in the meter for foreign matter that caused sticking or jamming of the piston. Clean out all foreign matter and smooth down any score marks on the piston and chamber housing with a 3-sided machinist scraper, and then lightly polish both assemblies with very fine emory cloth. Check the center control roller, the diaphragm, and the seal pin (Ref. Meter Parts List) for wear, and replace those parts as needed. Then reassemble chamber and rotate piston to assure there are no sticking points remaining.

**WHEN PLACING CHAMBER BACK IN THE METER HOUSING, BE SURE TO GET THE LOCATING PIN IN THE HOUSING ALIGNED PROPERLY WITH LOCATING SLOT ON THE BOTTOM OF THE CHAMBER TO PREVENT CHAMBER DAMAGE.**

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## Register Creeping

If the meter creeps a few tenths when the pump is engaged, it is probably caused by a worn out or metal-seat inlet check valve. This assembly is found where the supply piping enters the vapor release unit. Replace old assembly with a new rubber seat assembly, which gives a positive seal that prevents bleed back of LPG from the meter.

If the problem exists after replacing the inlet, check valve assembly, check the delivery hose and nozzle for leaks. If the meter creeps continuously with the pump engaged and delivery nozzle closed, the diaphragm (U-cups on 3/4") in the differential valve most likely has a hole in it and needs replacing. This hole would allow LPG to circulate through the meter & back to storage through the connector and vapor return line (see above).

**NOTE: IT IS NOT RECOMMENDED TO REUSE OLD GASKETS**

## Actaris Vapor Meter

The Will-Call delivery is a top-of-the-list concern of propane dealers. Installing vapor meters will enable you to set your own delivery time. A vapor meter not only gives you the ability to deliver gas when you want, but extends your bulk storage muscle to the capacity of each tank in your inventory

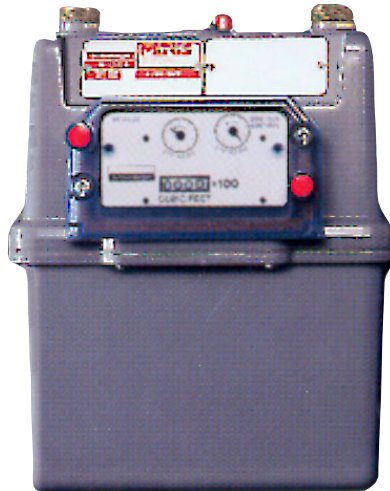
### Vapor Meters -

**INCREASE CASH FLOW** – customers will enjoy invoicing on a monthly basis of only the gas used.

**ALLOW FOR MORE EFFECTIVE GAS PURCHASING** – with the increased use of your tank inventory for storage, you will be able to buy gas when the time is right.

**ALLOW FOR GREATER CUSTOMER RETENTION** – leasing both the tank and the meter helps ensure customer loyalty.

All of this is accomplished without the customer being aware you ever filled their tank.



The METRIS250 temperature compensated vapor meter provides enhancements and unmatched performance not found in traditional meters. The compact size, reduced weight, long-term proof retention, and a rating of a full 250 CFH (natural gas at .60 sp. gr., 202 CFH propane at 1.53 sp. gr.), make this the meter of choice.

The seamless single convolution diaphragm, lubrication-free bearing surfaces, and direct diaphragm support found in the module all contribute to the METRIS's long-term proof retention. Further, since the measurement module is completely removable, meters can be remanufactured in record time by simply replacing the module. No more three-week lead times when repair is needed.

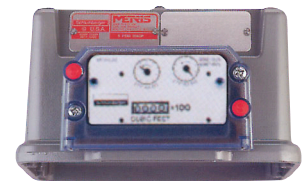
The METRIS meter has a Lifetime Case Warranty and a 20-year Accuracy Assurance.

## Meter

| Part #      | Description  | Connection                  | Weight |
|-------------|--|-----------------------------|--------|
| METRIS250TC | Temperature Compensated Vapor Meter<br>Maximum Working Pressure 5# | 20LT<br>(Industry Standard) | 8#     |

## Accessories

| Part #         | Description                          |
|----------------|--------------------------------------|
| METRIS-CONNECT | 3/4" Nipple (2 Required) X 20LT      |
| METER-BAR-R    | 3/8" x 1" Polyester coated meter bar |



## Meter Capacity at Various Inlet Pressures for Propane 1.53 sp. gr.

| Inlet Pressure | Capacity CFH | Approx. BTU | Replacement Index Face |
|----------------|--------------|-------------|------------------------|
| 11" w.c.       | 202          | 508,000     | Metris Index 11        |
| 2 psi          | 534          | 1,343,000   | Metris Index 2         |
| 5 psi          | 607          | 1,528,000   | Metris Index 5         |

| *           | Specific Gravity | Cubic Feet | BTU     |
|-------------|------------------|------------|---------|
| Natural Gas | 0.6              | 250        | 250,000 |
| Propane     | 1.53             | 156        | 392,496 |

To convert cubic feet of propane to gallons, divide cubic feet by 36.39 (assuming 1.53 sp.gr.)



METER-BAR-R

