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Certification Exhibit

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Manual

GPR with Mini Switch Installation Guide

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Table of Contents

Pre-Installation	7
Before You Begin	7
Safety Overview	7
Preliminary Checks	8
Site Requirements	8
Required Materials	9
Dial Wheels	9
FCC & Industry Canada Information to the User	12
FCC Class B	13
RF Exposure	13
Industry Canada	13
Compliance	14
American Index Cover & Gas Module Removal	15
Meter Preparation	15
Index Cover and Commercial Gas Module Removal	19
Meter Preparation	19
Index Cover and Commercial Gas Module Removal	23
Meter Preparation	23
Index Mounting Bracket Types	24
Unsupported Mounting Bracket Assembly	24
Supported Mounting Bracket Assembly	25
Index Cover and Commercial Gas Module Removal	27
Meter Preparation	27
Mini Switch Kit Installation	31
Meter Preparation	31
Installing 2-Piece Magnetic Pulse Wheels on Metal Pointer Indexes	32
Installing Dual Set Screw Magnetic Pulse Wheels on Plastic Pointer Indexes	34
Installing Index Into Index Cover	36
Magnetic Pulse Wheel and Index Installation	39
Meter Preparation	39
Installing 2-Piece Magnetic Pulse Wheels	39
Installing The Index	41
Magnetic Pulse Wheel and Index Installation	43
Meter Preparation	43
Installing 2-Piece Magnetic Pulse Wheels	44
Magnetic Pulse Wheel and Index Installation	47
Installing 2-Piece Magnetic Pulse Wheels on Metal Pointer Indexes	47
Installing Dual Set Screw Magnetic Pulse Wheels on Plastic Pointer Indexes	51
GPR Configuration and Waterproofing	53
Configuring the GPR	53
GPR Configuration and Waterproofing	55
Before You Begin	55
GPR Configuration	55

GPR Configuration Using GPrep	56
Applying Water Sealant to Circuit Board Connections	58
GPR Configuration and Waterproofing	63
Configuring the GPR	63
GPR Configuration Using GPREP	64
Applying Water Sealant to Circuit Board Connections	65
GPR Configuration and Waterproofing	69
Before You Begin	69
Configuring the GPR	69
GPR Configuration Using GPREP	70
Applying Water Sealant to Circuit Board Connections	71
GPR-P Index Cover and GPR Assembly Installation	75
GPR Direction	75
GPR Mounting	75
Solid State Pulser Index Cover and GPR Installation	79
GPR Direction	79
GPR Mounting	79
Solid State Pulser Index Cover & GPR Installation	83
GPR Direction	83
GPR Mounting	83
Solid State Pulser Index Cover and GPR Installation	87
Changing GPR Direction	93
Procedure	93
Changing GPR Direction	97
Procedure	97
Changing GPR Direction	99
Procedure	99
Changing GPR Direction	101
GPR Connection Water Proofing Materials	107
Ordering Information	107
Chapter 1: Pre-Installation	7
Before You Begin	7
Safety Overview	7
Preliminary Checks	8
Site Requirements	8
American Required Materials	9
Dial Wheels	9
Rockwell Required Materials	12
Schlumberger Required Materials	15
Sprague Required Materials	17
FCC & Industry Canada Information to the User	20
FCC Class B	20
RF Exposure	20
Industry Canada	20
Compliance	21
Chapter 2: American Index Cover & Gas Module Removal	23

Meter Preparation	23
Chapter 3: Rockwell Index Cover & Gas Module Removal	27
Meter Preparation	27
Chapter 4: Schlumberger Index Cover & Gas Module Removal	31
Meter Preparation	31
Index Mounting Bracket Types	32
Unsupported Mounting Bracket Assembly	32
Supported Mounting Bracket Assembly	33
Chapter 5: Sprague Index Cover & Gas Module Removal	35
Meter Preparation	35
Chapter 6: American Mini Switch Kit Installation	39
Meter Preparation	39
Installing 2-Piece Magnetic Pulse Wheels on Metal Pointer Indexes	40
Installing Dual Set Screw Magnetic Pulse Wheels on Plastic Pointer Indexes	42
Installing Index Into Index Cover	44
Chapter 7: Rockwell Mini Switch Kit Installation	47
Meter Preparation	47
Installing 2-Piece Magnetic Pulse Wheels	47
Installing The Index	49
Chapter 8: Schlumberger Mini Switch Kit Installation	51
Meter Preparation	51
Installing 2-Piece Magnetic Pulse Wheels	52
Chapter 9: Sprague Mini Switch Kit Installation	55
Installing 2-Piece Magnetic Pulse Wheels on Metal Pointer Indexes	55
Installing Dual Set Screw Magnetic Pulse Wheels on Plastic Pointer Indexes	59
Chapter 10: American GPR Configuration and Waterproofing	61
Configuring the GPR	61
Applying Water Sealant to Circuit Board Connections	61
Chapter 11: Rockwell GPR Configuration and Waterproofing	67
Before You Begin	67
GPR Configuration	67
Applying Water Sealant to Circuit Board Connections	67
Chapter 12: Schlumberger GPR Config & Waterproofing	73
Configuring the GPR	73
Applying Water Sealant to Circuit Board Connections	73

Chapter 13: Sprague GPR Configuration and Waterproofing	77
Before You Begin	77
Configuring the GPR	77
Applying Water Sealant to Circuit Board Connections	77
Chapter 14: American GPR-P Index Cover & GPR Install	81
GPR Direction	81
GPR Mounting	81
Chapter 15: Rockwell GPR-P Index Cover & GPR Install	85
GPR Direction	85
GPR Mounting	85
Chapter 16: Schlumberger GPR-P Index Cover & GPR Install	89
GPR Direction	89
GPR Mounting	89
Chapter 17: Sprague GPR-P Index Cover & GPR Install	93
Appendix A: American Changing GPR Orientation	99
Procedure	99
Appendix B: Rockwell Changing GPR Orientation	103
Procedure	103
Appendix C: Schlumberger Changing GPR Orientation	105
Procedure	105
Appendix D: Sprague Changing GPR Direction	107
Appendix E: GPR Connection Water Proofing Materials	111
Ordering Information	111

Pre-Installation

Before You Begin

This text contains the symbols which are explained below.



NOTE: Notes provide important information about products and installation.



CAUTION: Cautions provide information that you must read to avoid making relatively moderate errors.



WARNING: Warnings provide special, must-read information. If you ignore a warning you may create a safety hazard, omit essential data, or make a critical error.

Safety Overview



NOTE: Proper planning and thorough preparation are critical for successful installation. This chapter outlines basic requirements for the pre-installation phase.

Prior to starting the installation process, you must develop and launch an installer safety training plan for initial, refresher, and ongoing safety training. Ensure that installers receive appropriate initial and refresher training to meet their specific safety-related responsibilities. Installers should be instructed in the following safety elements as well as any site-specific safety issues.

- New duties for which the installer has not previously received training.
- New processes and methodologies representing new risks that are introduced into the installation environment.
- Situations where previously unidentified risks are reported.
- Hazard Communication (Employee Right to Know)
- Lifting
- Safe driving
- Use of hand tools
- Confined space

The installation supervisory team assumes responsibility for ensuring that installers are properly trained, authorized, and continually qualified to perform their work. The team must also take responsibility for the safety of their installers and to assure safe work methodologies. Installers must

understand that their supervisor's responsibility does not relieve them from their individual responsibility to perform the work safely and to follow all safety rules and procedures applicable to their work.

Preliminary Checks

1. The installer will verify correct site, as specified on work order.
2. The installer will verify that the site is safe for installer activity and equipment.
3. The installer will notify the customer of installer presence and activity, telling the customer that meter access is required. If necessary, the installer will have the customer sign the work order.
4. When installing meters, the installer will follow guidelines issued by the utility in addition to those given in this guide.
5. The installer will never perform an installation during a lightning storm or under excessively wet conditions.

Site Requirements

The site must comply with the following criteria:

1. There is no chance that another object will be set over the antenna.
2. Some instances may require additional cable.

Table 1-1. Typical Gas Meter Module Installation Tool List

Torx Pin Head Driver, T10	Phillips Screwdriver, #2
Flat-tip Screwdriver, 3/16 inch x 4 inch	Flat-tip Screwdriver, 1/4 inch x 5 inch
Phillips Screwdriver, #0, precision	Torque Driver / Wrench, 0.5 inch-pounds to 20 foot-pounds
Torx Pin Head Driver, T15	5/16 Combination Wrench
Wire Brush	Awl, Heavy duty
Scraper, Brass, 1.25 inch wide	



Figure 1 - 1. Examples of some required tools



NOTE:

Recommended Torque Driver Source:
 Mountz
 1080 N. 11th St. San Jose, CA 95112
 Phone: 877-833-1704 or 408-292-2214
 Fax: 408-292-2733
 e-mail: sales@mountztorque.com

American Required Materials

Table 1-2. American Large Diaphragm Meter Mini Switch Kits

Description	Part Number
Mini Switch Kit for American AL800-1000 Large Diaphragm Meter	40-1679
Mini Switch Kit for American AL800-1000 Large Diaphragm Meter with 100' Drive Index	40-1688
Mini Switch Kit for American AL425 Diaphragm Meter	40-1678

Dial Wheels

Table 1-3. American Large Diaphragm Meter Dial Wheels

Description	Part Number
Dial Wheel, Balanced, C+I, Epoxy	40-1538
Dial Wheel, Index Face Mount, Epoxy	40-1742
0.030" Shim, Dial Wheel, Orange, Polyester	29-1300



CAUTION: Part numbers are subject to change. Contact the Landis+Gyr Supply Chain for the latest part numbers.



Figure 1 - 2. Mini Switch Kit for Plastic Index



NOTE: GPR switch cable color may vary from that shown in photos.



Figure 1 - 3. Mini Switch Kit for Metal Index

As part of the Required Materials, part number 45-1189 or 45-1190, American Large Diaphragm GPR Kit, includes the following components: 45-1185, GPR Kit with Universal Mounting Bracket and Hardware; 45-1205 Hardware Kit, American Large Diaphragm.

Table 1-4. Kit, GPR Installation, American Large Diaphragm, Right Bracket #45-1189

Description	Part Number
Bracket, GPR, C&I Gas, American	28-1440
Hardware Kit, American Large Diaphragm, 2-Way	45-1203
GPR, Kit, All Large Diaphragm, Module & Bracket Assembly	45-1185

Table 1-5. Kit, GPR Installation, American Large Diaphragm, Behind Index #45-1190

Description	Part Number
Bracket, GPR, C&I Gas, American, Behind Index	28-1441
Hardware Kit, American Large Diaphragm, 2-Way	45-1203
GPR, Kit, All Large Diaphragm, Module & Bracket Assembly	45-1185

Table 1-6. Kit, American Large Diaphragm Left Bracket GPR, #45-1193

Description	Part Number
Bracket, GPR, C & I Gas American, Front-Right	28-1443
Kit, GPR, All Large Diaphragm, Module & Bracket Assembly	45-1185
Hardware Kit, American Large Diaphragm, 2-Way	45-1203

Table 1-7. Hardware Kit, American Large Diaphragm #45-1203

Description	Part Number
Cup, Tamper Seal, C&I, 2-Way Gas	22-1384
Cup, Tamper Seal, C&I Gas	22-0277
Index Screw, Self-threading, 8-18x3/4 inch, Type 25, SS	22-1174

Table 1-7. Hardware Kit, American Large Diaphragm #45-1203

Description	Part Number
Screw, 12-24x1 inch, Fillister Head, Slotted, SS	22-1383
Tie Wrap, 3.9 inch, UV, Nylon, Black	30-0502
Screw, 8-32x5/8 inch, Fillister Head, SS	22-0310
Seal, Residential Gas, Security	29-1557
Seal, Tamper, C&I Gas	22-0278

Table 1-8. GPR With Universal Mounting Bracket and Hardware #45-1185

Description	Part Number
Assy, 2-Way C&I Gas Module	40-1672
GPR, Bracket, Universal, C&I	28-1308
Screw, #6x1/2in, Flat Head, Pin-In-Torx, Self-tap, SS	22-1057
Screw, 10-32x3/8 inch, Pan Head, SS	22-1468
Washer, #10, EXT LK, SS	22-0119
Kit, Hardware, Wall Mount Cover	45-1042

Table 1-9. GPR Cover Mounting Kit #45-1042

Description	Part Number
Seal, Tamper, C&I Gas	22-0278
Screw, #6x1in, Button Head, Pin-In-Torx, T-10, Self-tapping, SS	22-1057

**Figure 1 - 4. GPR with American Large Diaphragm brackets and hardware**



Figure 1 - 5. Hardware Kit #45-1203 for Index Cover and Bracket



Figure 1 - 6. 0.030 Shim #29-1300 for Dial Wheel Installation



NOTE: Individual components and kits may be ordered for installing the GPR with American large diaphragm meters.

Rockwell Required Materials

Table 1-10. Rockwell Large Diaphragm Meter Solid State Pulser Kit

Description	Part Number
Solid State Pulser Index Cover Assembly for Rockwell R750 Large Diaphragm Meter Index Cover, switch and cable assembly	40-1675

Table 1-11. Rockwell Large Diaphragm Meter Solid State Pulser Two-Piece Dial Wheel

Description	Part Number
Two-Piece Dial Wheel, Shaft Mount	40-1743



CAUTION: Part numbers are subject to change. Contact the Landis+Gyr Supply Chain for the latest part numbers.



Figure 1 - 7. Solid State Pulser Index Cover and Magnet Wheel



NOTE: Solid State Pulser switch cable color may vary from that shown in photos.

As part of the Required Materials, part number 45-1136, Rockwell 750 Large Diaphragm GPR Kit, includes the following components:

- 45-1178, GPR Kit with Universal Mounting Bracket
- 45-1169, Rockwell Large Diaphragm Index Cover Hardware Kit

Table 1-12. Complete GPR Installation Kit for Rockwell 750 Large Diaphragm Meter #45-1186

Description	Part Number
Bracket, MM MTG, C&I Gas, Rockwell	28-1161
Kit, Rockwell Large Diaphragm Index Cover Hardware	45-1169
GPR Kit with Universal Mounting Bracket and Hardware	45-1185

Table 1-13. Kit, Rockwell Large Diaphragm Index Cover Hardware #45-1169

Description	Part Number
Cup, Security, Wedge LOC	22-0281
Screw, 5/16 - 18x1.25 LG, SS, FH	22-1358
Seal, Tamper, MM, RKWL, Cover	22-0275
Tie Wrap, 3.9 inch, UV, Nylon, Black	30-0502

Table 1-14. GPR Kit with Universal Mounting Bracket and Hardware #45-1178

Description	Part Number
Assy, GPR, Parylene Coat PCBA, w/Enclosure, Hi Cap Battery, TRP (OTP)	40-1514
GPR, Bracket, Universal, C&I	28-1308
Screw, #6x1/2 inch, Flat Head, Pin-In-Torx, Self-Tap, SS	22-1057
Screw, 10-32x3/8 inch, PNH, SS	22-1468
Washer, #10, Ext LK, SS	22-0119



Figure 1 - 8. Rockwell Large Diaphragm Hardware Kit # 45-1169



Figure 1 - 9. Part No. 29-1300 0.030" thick Shim for 2-piece Pulse Wheel Installation



Figure 1 - 10. GPR with Rockwell Large Diaphragm Universal Hardware



NOTE: Individual components and kits may be ordered for installing the GPR with Rockwell large diaphragm meters.

Schlumberger Required Materials

Table 1-15. Schlumberger Large Diaphragm Meter Solid State Pulser Kit

Description	Part Number
Solid State Pulser Assembly for Actaris/Schlumberger 675A Large Diaphragm Meter Index Cover, switch and cable assembly	40-1676

Table 1-16. Schlumberger Large Diaphragm Meter Solid State Pulser Two-Piece Dial Wheel

Description	Part Number
Two-Piece Dial Wheel, Shaft Mount	40-1743



CAUTION: Part Numbers Are Subject to Change. Contact the Landis+Gyr Supply Chain for the Latest Part Numbers.



Figure 1 - 11. Solid State Pulser Index Cover With Magnet Wheel



NOTE: Solid State Pulser switch cable color may vary from that shown in photos.

As part of the Required Materials, part number 45-1137, the Schlumberger Large Diaphragm GPR Kit, includes the following components:

- 45-1178, GPR Kit with Universal Mounting Bracket
- 45-1171 Schlumberger Large Diaphragm Index Cover Hardware Kit.

Table 1-17. Schlumberger Large Diaphragm GPR Kit #45-1187

Description	Part Number
Bracket, MM MTG, C&I Gas, Schlumberger	28-1162
Kit, GPR, All Large Diaphragm, Module & Bracket Assembly, Parylene Coated	45-1185
Kit, Schlumberger Large Diaphragm Index Cover Hardware	45-1171

Table 1-18. Kit, Schlumberger Large Diaphragm Index Cover Hardware # 45-1171

Description	Part Number
SEAL,TAMPER,C&I GAS	22-1289
SCREW,1/4x20x5/8-inch, FILH, SS	22-0312
TIE WRAP, 3.9inch, UV, NYLON, BLACK	30-0502

Table 1-19. GPR Kit with Universal Mounting Bracket and Hardware #45-1178

Description	Part Number
Assy, GPR, Parylene Coat PCBA, w/Enclosure, Hi Cap Battery, TRP (OTP)	40-1514
GPR, Bracket, Universal, C&I	28-1308
SCREW, #6x1/2in, FLAT HEAD,PIN-IN-TORX,SELF-TAP,SS	22-1057
SCREW,10-32x3/8-inch, PNH, SS	22-1468
WASHER,#10,EXT LK,SS	22-0119



NOTE: Individual components and kits may be ordered for installing the GPR with Schlumberger large diaphragm meters.



Figure 1 - 12. Schlumberger Large Diaphragm Index Cover Hardware (Part# 45-1171)



Figure 1 - 13. GPR with Brackets and Hardware.

Sprague Required Materials



CAUTION: Part numbers are subject to change. Contact the Landis+Gyr Supply Chain for the latest part numbers.

Table 1-20. Sprague Large Diaphragm Meter Solid State Pulser Kit

Description	Part Number
Solid State Pulser Index Cover Assembly for Sprague 675-1000 Large Diaphragm Meter Index Cover, switch and cable assembly	40-1677

Table 1-21. GPR-P Dial Wheels

Description	Part Number
Dual Set Screw Balanced Aluminum Wheel for Plastic Pointer	40-1538
Two-Piece Dial Wheel for Metal Index Pointer	40-1742



Figure 1 - 14. Sprague 675-1000 Solid State Pulser Index Cover Assembly

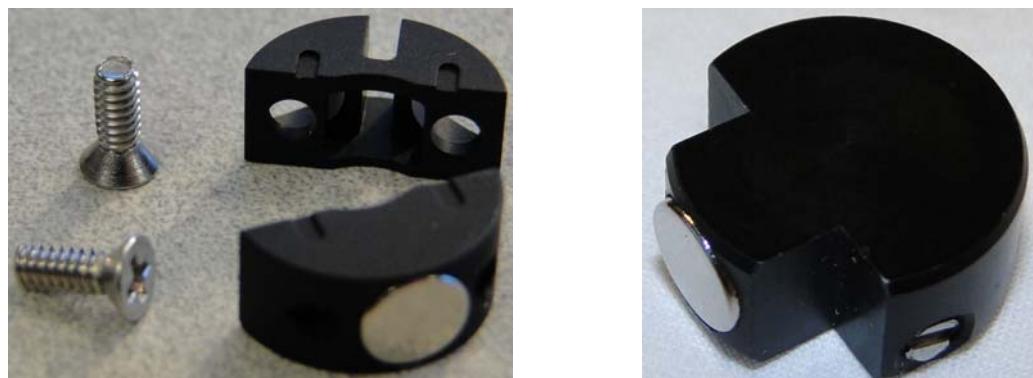


Figure 1 - 15. 2-Piece and Dual Set Screw Pulse Wheels



NOTE: Solid State Pulser switch cable color may vary from that shown in photos.

As part of the Required Materials, part number 45-1188, Sprague Large Diaphragm GPR Kit, includes the following components:

- 45-1185, GPR Kit with Universal Mounting Bracket
- 45-1114, Sprague Large Diaphragm Index Cover Hardware Kit



Figure 1 - 16. 0.030 Shim for Magnetic Dial Wheel Installation, Part # 29-1300

Table 1-22. Complete GPR Installation Kit for Sprague 675 - 1000 Meters #45-1188

Description	Part Number
Sprague Large Diaphragm Index Cover Hardware Kit	45-1114
GPR Kit with Universal Mounting Bracket and Hardware	45-1185
Bracket, MM MTG, C&I Gas, Sprague	28-1163

Table 1-23. Sprague Large Diaphragm Index Cover Hardware Kit #45-1114

Description	Part Number
Washer, Flat, M5, SS	22-0178
Cup, Tamper Seal, C&I Gas, Sprague	22-0277
Seal, Tamper C&I Gas, Sprague	22-0278
Screw, 10-24 x 3/4 inch, FILH, SS	22-1376
Screw, 10-24 x 7/8 inch, FILH, Slotted, SS	22-1355
Tie Wrap, 3.9 inch, UV, Nylon, Black	30-0502



Figure 1 - 17. Sprague Large Diaphragm Hardware Kit #45-1114 for Index Cover

Table 1-24. GPR Kit with Universal Mounting Bracket and Hardware #45-1178

Description	Part Number
Assy, GPR, Parylene Coated PCBA, w/Enclosure, Hi Cap Battery, TRP (OTP)	40-1514
Washer, #10, EXT LK, SS	22-0119
Screw, #6 X 1/2in, Flat Head, Pin-IN-Torx, Self-tap, SS	22-1057
Screw, 10-32 X 3/8-inch, PNH, SS	22-1468
GPR, Bracket, Universal, C&I	28-1308



Figure 1 - 18. GPR with Sprague Large Diaphragm Brackets and Hardware



NOTE: Individual components and kits may be ordered for installing the GPR with Sprague large diaphragm meters.

FCC & Industry Canada Information to the User

Manufacturer: Landis+Gyr

Model Name: American Large Diaphragm GPR

FCC ID: R7PEC6R1S1

IC: 5294A- EC6R1S1

Module Model: GPR

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.

FCC Class B

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the Instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

1. Reorient or relocate the receiving antenna.
2. Increase the separation between the equipment and receiver.
3. Consult Landis+Gyr or an experienced radio technician for help.



WARNING: Changes or modifications to this device not expressly approved by Landis+Gyr could void the user's authority to operate the equipment and the product warranty.

RF Exposure

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20 cm between the radiator and your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Industry Canada

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radiov exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante.

Compliance

This apparatus is suitable for Class I, Division 2, Group D Hazardous Locations.



WARNING: Substitution of components may impair the suitability for Class I, Division 2 applications. Replace battery only with Landis+Gyr part number 40-1590H.

American Index Cover & Gas Module Removal

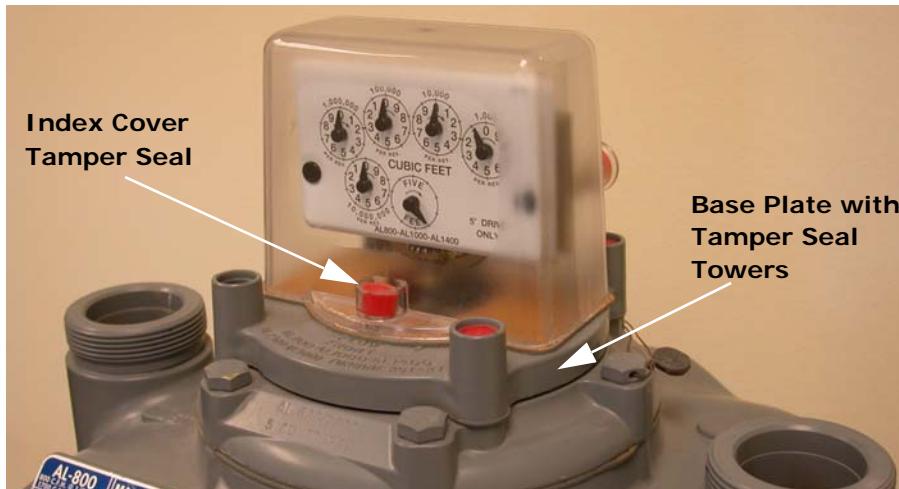


Figure 2 - 1. American Large Diaphragm Meter

Meter Preparation

1. Remove the tamper seals, screws, and index cover assembly from the meter.
2. If the meter index cover base plate contains tamper seal towers, remove the base plate. Do not discard the base plate screws.



Figure 2 - 2. Base Plate with Tamper Seal Towers

3. Replace the base plate with American Meter part number 48828P038. Install a new base plate gasket if the original gasket cannot be reused. The base plate must be installed with the American Meter model numbers facing toward the front of the meter.



Figure 2 - 3. Base Plate Gasket



NOTE: Replace the base plate with American Meter part number 48828P038. Install a new base plate gasket if the original gasket cannot be reused. The base plate must be installed with the American Meter model numbers facing toward the front of the meter.

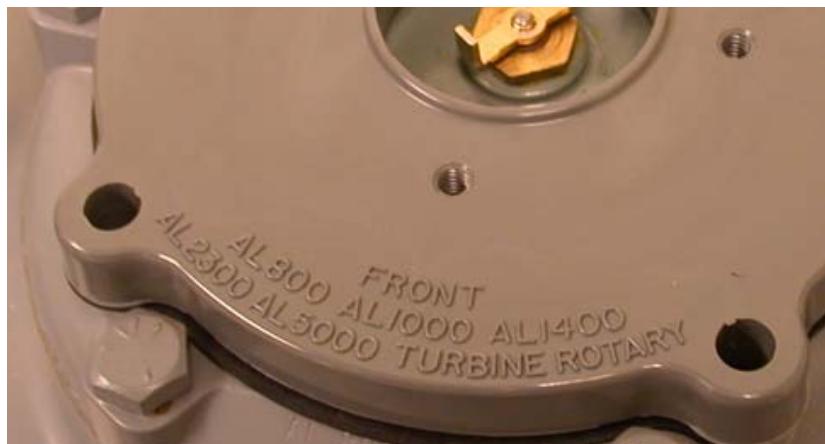


Figure 2 - 4. Base Plate with American Model Numbers Toward Front of Meter

4. If the meter has an existing Commercial Gas Module, perform the following steps.
 - A. Remove the index cover tamper seals.
 - B. Remove the module bracket tamper seals.

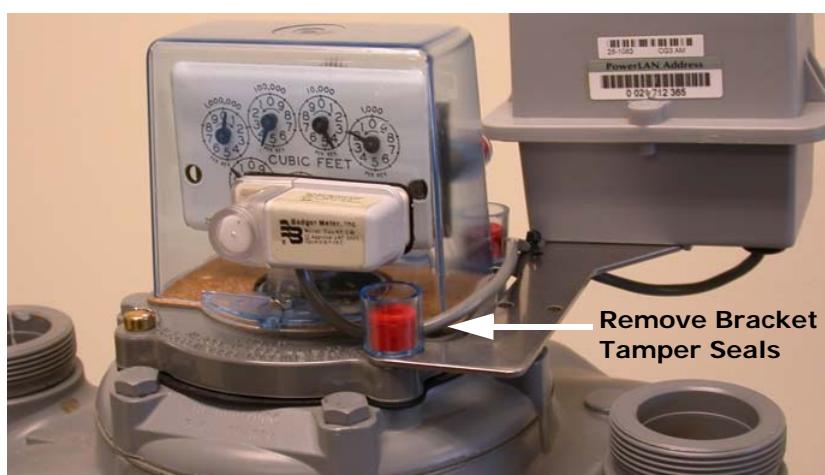


Figure 2 - 5. American Large Diaphragm Meter with Commercial Gas Module



Figure 2 - 6. Remove Index Cover and Module Bracket Tamper Seals

- C. Remove the index cover fasteners. If needed, use a 5/16 inch combination wrench to loosen the index cover front bolt.

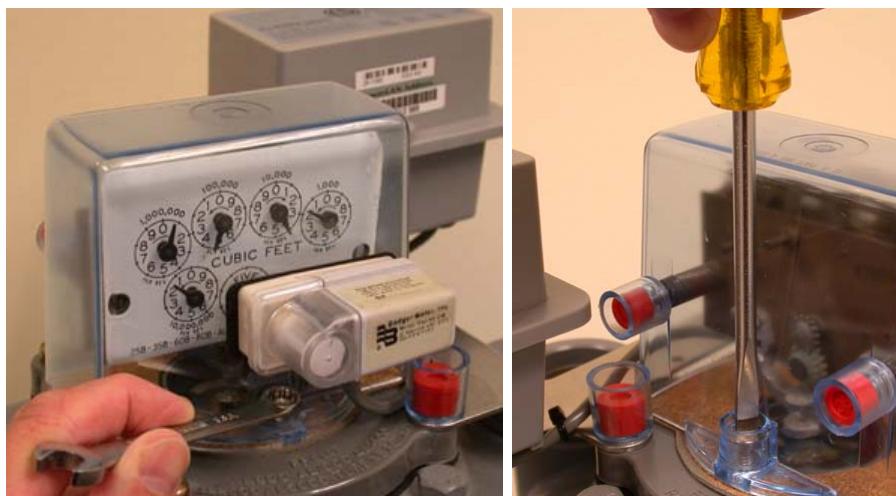


Figure 2 - 7. Remove Index Cover Fasteners

- D. Remove the module bracket fasteners and carefully disconnect the module and index cover assembly from the meter.
- E. If the original gasket is damaged or cannot be reused, replace the index cover gasket. A scraper and wire brush may be required to remove leftover gasket material.



Figure 2 - 8. Cover Gasket and Base Plate with Optional Tamper Cup & Seal

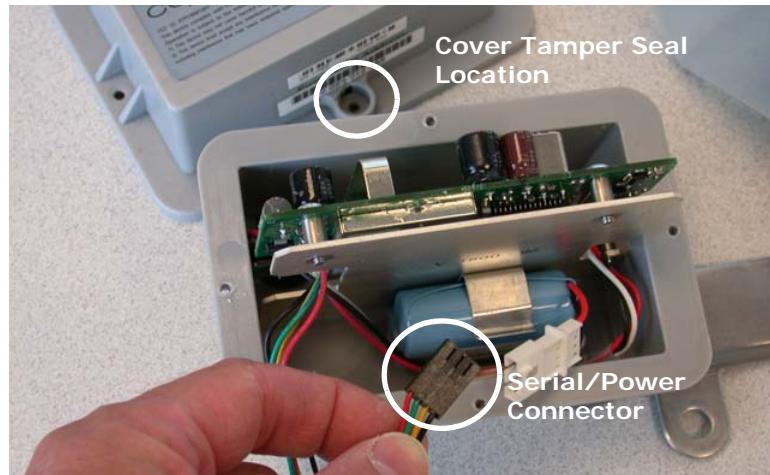


Figure 2 - 9. Commercial Module Cover Removed

5. Swipe each end of the module with an RF Buster or magnet to force the module to save meter data to non-volatile memory. Remove the Commercial Gas Module tamper seals, screws, and cover. Disconnect the battery.
6. The Commercial Gas Module must be disassociated from the meter.
7. Disconnect the module from the programming device. Leave the battery disconnected, replace the module cover, and return the module to the Landis+Gyr cross-dock.

Rockwell Index Cover & Gas Module Removal

Meter Preparation

1. Remove the tamper seals, screws, and index cover assembly from the meter.

If there is no Commercial Gas Module connected to the meter, it will appear as below.



Figure 3 - 1. Rockwell Large Diaphragm Meter Index Cover Front And Rear Views



Figure 3 - 2. Remove Index Cover Tamper Seals, Screws, and Index Cover

2. If the meter has a Commercial Gas Module, perform the following steps.
 - A. Remove the index cover tamper seals.
 - B. Remove the module bracket fasteners and carefully disconnect the module and index cover assembly from the meter.



Figure 3 - 3. Center Dial and Offset Dial Mount Rockwell Commercial Index Covers



NOTE: There are two types of Rockwell Commercial index covers. Shown at left in Figure 3 - 3 is the Center Dial Mount and at right is the Offset Dial Mount. Both types may be removed from the meter in the same manner as shown in the next illustration.



Figure 3 - 4. Remove Module Bracket Tamper Seals, Screws, and Gas Module Assembly

3. Remove the 5/16-18 x 3/8" index frame screws and index mounting frame assembly from the meter. Set the screws aside for later use.



CAUTION: DO NOT remove the index from the mounting frame unless the frame or index is damaged.

For proper meter operation, the frame screw tabs should be approximately 90 degrees (perpendicular) to the upper portion of the frame containing the index.



Figure 3 - 5. Index Frame Screws and Frame Tabs

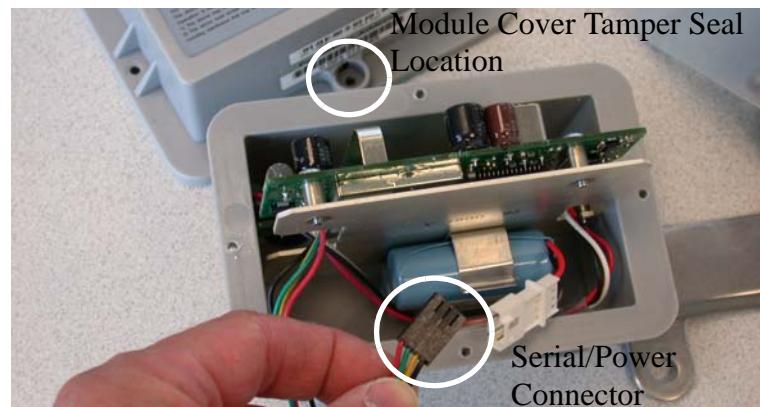


Figure 3 - 6. Commercial Module Cover Removed

4. Swipe each end of the module with an RF Buster or magnet to force the module to save meter data to non-volatile memory. Remove the Commercial Gas Module tamper seals, screws, and cover. Disconnect the battery.
5. The Commercial Gas Module must be disassociated from the meter.
 - A. If RIMS is used to manage gas module installations, leave the battery disconnected, replace the module cover, and return the module to the Landis+Gyr cross-dock.
 - B. If GPrep is used to install the gas modules, connect the laptop PC and Shooter Box or USB Shooter programming cable to the module Serial/Power connector. Follow the procedures on using GPrep “MRB Mode” outlined in the “GPrep User Guide,” Landis+Gyr publication 98-1119.
6. Disconnect the module from the programming device. Leave the battery disconnected, replace the module cover, and return the module to the Landis+Gyr cross-dock.

Schlumberger Index Cover & Gas Module Removal



WARNING: The Schlumberger/Actaris 675-1000 meter is designed so that the index may face the front or rear of the meter. Landis+Gyr only supports Solid State Pulser cover use when installed:
with the index facing the front of the meter
where the meter inlet pipe is located at the left side of the meter.

Meter Preparation

1. Remove the tamper seals, screws, and index cover assembly from the meter.
2. If the meter has a Landis+Gyr Commercial Gas Module, perform the following steps.
 - A. Remove the index cover tamper seals.
 - B. Remove the module bracket tamper seals.
 - C. Remove the module bracket fasteners and index cover screws.
 - D. Carefully disconnect the module and index cover assembly from the meter.

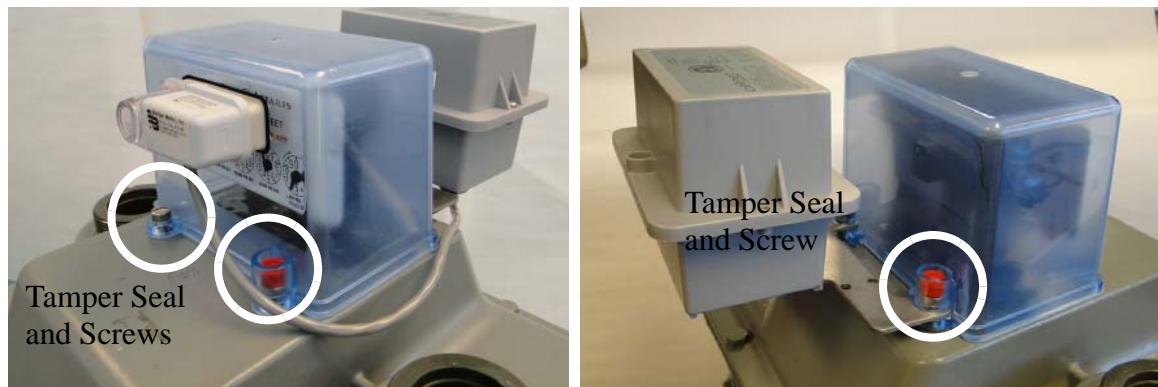


Figure 4 - 1. Front and Rear Views: Index Cover with Commercial Gas Module and Bracket

3. Two types of Schlumberger/Actaris 675 index mounting brackets may be encountered during Solid State Pulser Index Cover installations.

Index Mounting Bracket Types

Unsupported Mounting Bracket Assembly

The next three figures illustrate an example of an index mounting bracket assembly NOT supported by the Schlumberger/Actaris Solid State Pulser Index cover. This bracket assembly must be replaced with Itron (Schlumberger/Actaris) part number 55045404.

- A. Remove the index mounting bracket assembly screws as shown in the following Figure (red circles). Save the screws. They will be used again later.



Figure 4 - 2. Unsupported Index Mounting Bracket Assembly

- B. Remove the index screws and index from the mounting bracket as shown in the next two figures. Save the screws. They will be used again later.



Figure 4 - 3. Remove Index and Screws; Discard the Unsupported Bracket Assembly

- C. Indexes with part numbers 050556 and 050557, in good condition, should be set aside. They may be used again later.
- D. Discard the index mounting bracket assembly shown in Figure 4 - 4 and replace it with Itron (Schlumberger/Actaris) part number 55045404 shown in Figure 4 - 5.



Figure 4 - 4. Index Removed from Unsupported Bracket Assembly

Supported Mounting Bracket Assembly

The index mounting bracket assembly shown in the next two figures, Itron (Schlumberger/Actaris) part# 55045404, is supported with the Solid State Pulser index cover.

- A. Remove the index mounting bracket assembly screws as shown in the following figure (red circles). Save the index screws. They will be used during reassembly.

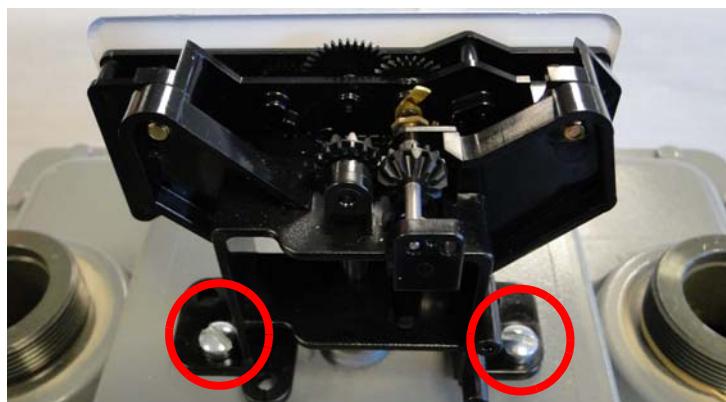


Figure 4 - 5. Rear View of Supported Index Mounting Bracket Assembly

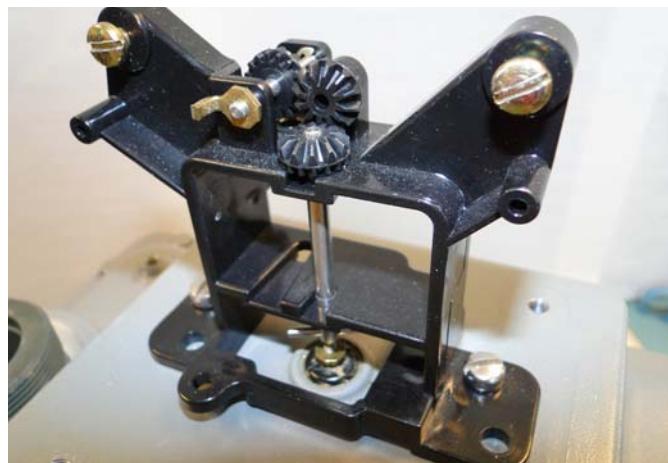


Figure 4 - 6. Front View of Supported Index Bracket with Index Removed



CAUTION: For illustrative purposes, the index has been removed from the mounting bracket assembly in Figure 4 - 6. During on-site installations, DO NOT remove the index from this type

of mounting bracket unless the index is defective or damaged. See “Meter Preparation” on page 31 for index approval criteria.

1. Remove the original gasket material from the meter. A scraper and wire brush may be required to remove gasket material still adhering to meter mounting surfaces.
2. Swipe each end of the module with an RF Buster or magnet to force the module to save meter data to non-volatile memory. Disconnect the battery.
3. Remove the Commercial Gas Module tamper seals, screws, and cover. Disconnect the battery

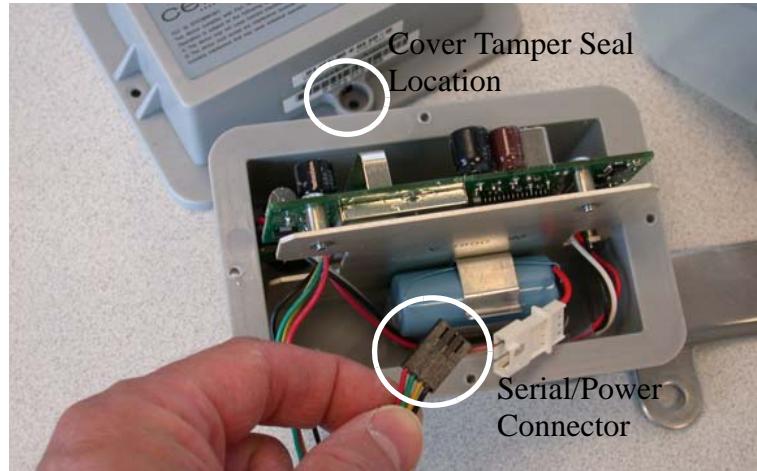


Figure 4 - 7. Disconnect Commercial Module Battery

4. The Commercial Gas Module must be disassociated from the meter.
 - A. If RIMS is used to manage gas module installations, leave the battery disconnected, replace the module cover, and return the module to the Landis+Gyr cross-dock.
 - B. If GPREP is used to install the gas modules, connect the laptop PC and Shooter Box or USB Shooter programming cable to the module Serial/Power connector. Follow the procedures on using GPREP “MRB Mode” outlined in L+G document, “GPREP User Guide 98-1119.”
5. Disconnect the module from the programming device. Leave the battery disconnected, replace the module cover, and return the module to the Landis+Gyr cross-dock.

Sprague Index Cover & Gas Module Removal



Figure 5 - 1. Typical Sprague Large Diaphragm Gas Meters

Meter Preparation

1. Remove the tamper seals, screws, and index cover assembly from the meter.
2. If a Commercial Gas Module is present, remove the tamper seals and screws.

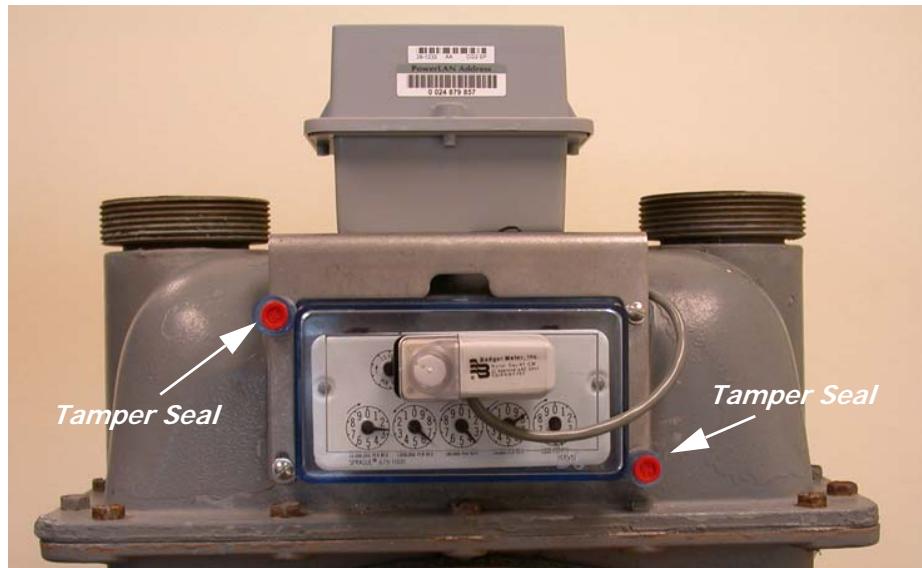


Figure 5 - 2. Sprague Large Diaphragm Meter with Commercial Gas Module

3. Remove the bracket and Index Cover assembly. Take care not to damage the meter index.



Figure 5 - 3. Remove Tamper Seals and Screws – Carefully Remove Module & Bracket Assembly



Figure 5 - 4. Commercial Module Cover Removed

4. Swipe each end of the module with an RF Buster or magnet to force the module to save meter data to non-volatile memory. Remove the Commercial Gas Module tamper seals, screws, and cover. Disconnect the battery.
5. The Commercial Gas Module must be disassociated from the meter.
 - A. If RIMS is used to manage gas module installations, leave the battery disconnected, replace the module cover, and return module to the Landis+Gyr cross-dock.
 - B. If GPrep is used to install gas modules, connect the laptop PC and Shooter Box or USB Shooter programming cable to the module Serial/Power connector.
Follow the procedures on using GPrep “MRB Mode” outlined in Landis+Gyr document “GPrep User Guide 98-1119.”
6. Disconnect the module from the programming device. Leave the battery disconnected, replace the module cover, and return the module to the Landis+Gyr cross-dock.
7. Remove all of the original gasket material from the meter. Clean the gasket surface of the meter with a wire brush and a gasket scraper. The index may need to be removed during gasket removal to prevent damage and avoid gasket material entering the index gears.



Figure 5 - 5. Removing Old Gasket Material with a Scraper and a Wire Brush

8. Inspect the index. Replace it if:
 - index pointers are loose on their shafts
 - the index face contains cracked or peeling enamel
 - Index drive mechanism does not rotate easily

American Mini Switch Kit Installation

Meter Preparation

1. Remove the tamper seals and screws from the index cover as shown in the following photos.

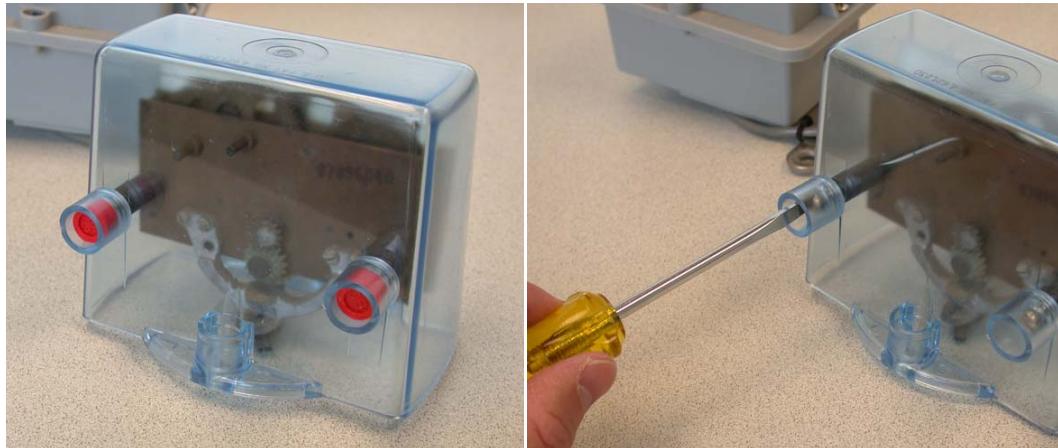


Figure 6 - 1. Remove Index Cover Tamper Seals and Screws

2. Gently push the Badger pulse wheel toward the front of the index cover and away from the index dial pointer. Lift the index out of the cover.

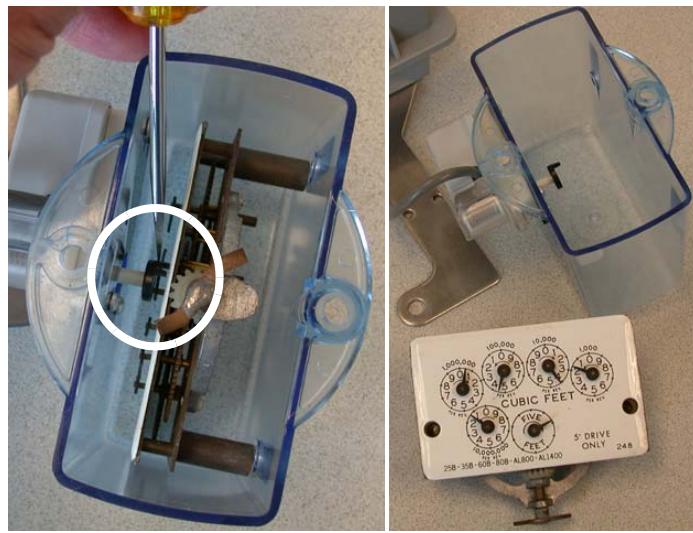


Figure 6 - 2. Disengage Badger Pulse Wheel from Index; Remove Index from Cover

3. Inspect the index and replace it if any of the following conditions exists:
 - Pointers are loose on their shafts.
 - Index face contains cracked or peeling enamel.

- Index drive mechanism does not rotate easily.

**WARNING:**

The 2-Piece magnetic pulse wheel (29-1312) must be used with metal pointer indexes.

The 2/3 magnetic pulse wheel (40-1531) must be used on plastic pointer indexes.

Installing 2-Piece Magnetic Pulse Wheels on Metal Pointer Indexes



WARNING: For 2-piece magnetic pulse wheels with alignment slots, the wheels must be installed so that the alignment slots on each wheel half are on top as shown in the next figure.



Figure 6 - 3. Where Alignment Slots Are Present On 2-Piece Magnetic Pulse Wheels, The Slots Must Be Installed On Top



NOTE: For wheels WITHOUT alignment slots, there is no top or bottom, and there is no special consideration regards dial wheel assembly.

1. Insert screws into the notched pulse wheel half.



Figure 6 - 4. Magnetic Pulse Wheel Half with Screws Inserted

2. Rotate the index drive mechanism so that the metal proving/test pointer is in an upward direction.



NOTE: For wheels WITHOUT alignment slots, there is no top or bottom, and there is no special consideration regards dial wheel assembly.

3. Position the screw-bearing notched wheel half for installation by sliding it downward over the index proving/test pointer tip as shown in Figure 6 - 5. The two alignment slots and pointer notch must be visible on top of the wheel half.

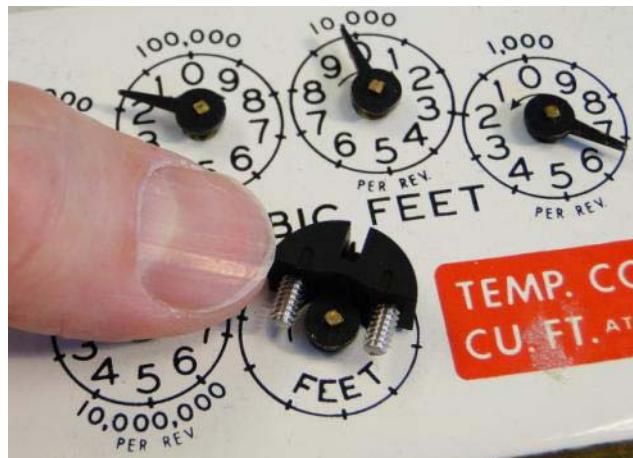


Figure 6 - 5. Slide Screw-bearing Wheel Half Over Index Proving/Test Pointer Tip

4. Position the bottom wheel half against the back of the index pointer. Use a small Phillips-type screwdriver and turn each screw a few turns until they begin to thread into the bottom wheel half. Do not tighten the screws.

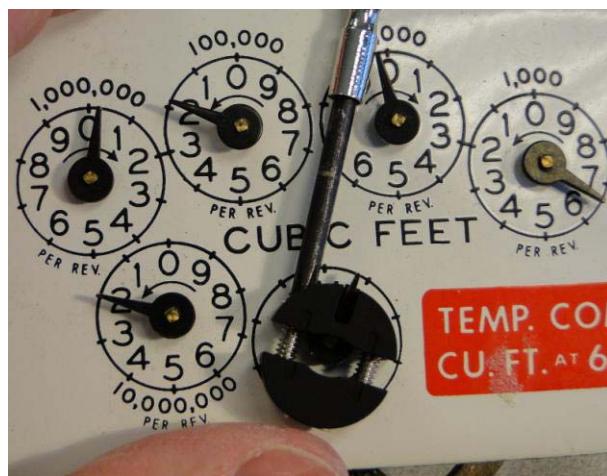


Figure 6 - 6. Thread Screws into Bottom Wheel Half

5. Insert the 0.030 inch thick clear spacer shim beneath the 2-Piece pulse wheel as shown in Figure 6 - 7. Hold the pulse wheel as shown. Tighten each screw a few turns at a time so that the two wheel halves remain parallel with each other. Tighten the screws to 3.5 inch-pounds (± 0.50 inch-pounds). Remove the spacer shim.



WARNING: The main index drive shaft must remain free to rotate while the wheel screws are tightened to prevent damage to the index pointer and pointer shaft.

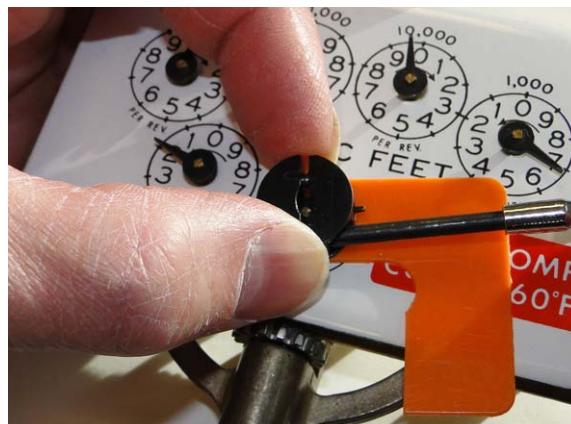


Figure 6 - 7. Insert 0.030 inch thick clear Shim and alternately tighten the Dial Wheel Screws to 3.5 inch-pounds (± 0.50 inch-pounds).



NOTE: Orange colored shim is shown for illustrative purposes only.



WARNING: To avoid damaging the index pointer and pulse wheel, take care not to over-tighten the set screws.

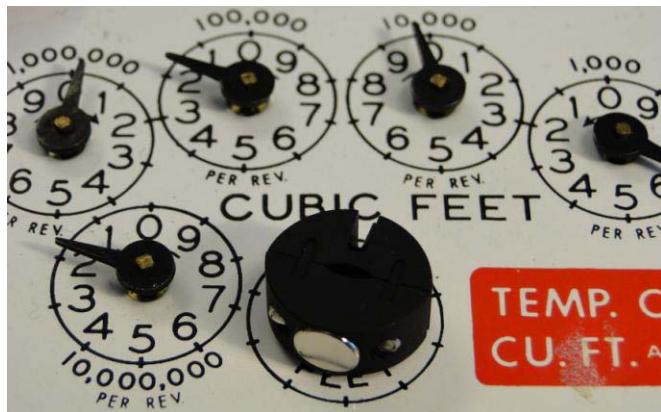


Figure 6 - 8. 2-Piece Magnetic Pulse Wheel Installed

6. Verify that the pulse wheel rotates freely without rubbing the index surface.



CAUTION: The installed pulse wheel shall not move from the installed position, and cannot physically contact the index face or other pointers on the index. If contact occurs, the index should be replaced with an approved index. If the replacement index has plastic pointers, make sure you follow the applicable Pulse Wheel installation instructions for plastic pointers instead (use the Dual Set-Screw Balanced Wheel).

Installing Dual Set Screw Magnetic Pulse Wheels on Plastic Pointer Indexes

1. Using a small flat blade screw driver, turn each screw counter-clockwise until the tip of each screw is flush with the inner surface of the wheel.



Figure 6 - 9. Top View - Dual Set Screw Pulse Wheel With Screws Backed Out



Figure 6 - 10. Bottom View - Dual Set Screw Pulse Wheel

2. Position the Dual Set Screw pulse wheel over the plastic index proving/test pointer as shown in the following figures. The bottom of the pulse wheel is slotted so that it may only be installed with the slot in the same direction as the index pointer.
3. Insert the 0.030" thick clear shim beneath the pulse wheel. (An orange colored shim is shown for illustrative purposes to stand out clearly against the index surface)
4. Position the index facing upward on a work surface or in the palm of your hand so that the main drive shaft points away from contact with all surfaces as shown in the following figures.
5. Gently press the wheel against the shim with your index finger or thumb. The pulse wheel must be level with the surface of the index.
6. Evenly tighten each screw to 1.20 ± 0.10 in-lb.



WARNING: The main index drive shaft must remain free to rotate as the wheel screws are tightened to prevent damage to the index pointer and pointer shaft



Figure 6 - 11. Tighten Pulse Wheel Screws to 1.20 inch-pounds (± 0.10 inch-pound)



WARNING: Take care not to over-tighten the set screws to avoid damaging the index pointer and pulse wheel. The installed pulse wheel shall not move from the installed position, and

cannot physically contact the index face or other pointers on the index. If contact occurs, the index should be replaced with an approved index.

7. Remove the shim and verify that the wheel rotates freely while remaining level with the index surface.



Figure 6 - 12. Dual Set Screw Magnetic Pulse Wheel Installed

Installing Index Into Index Cover

1. Gently press the cable toward the front of the cover to provide clearance for installation of the index and to prevent stress or damage to the wires.

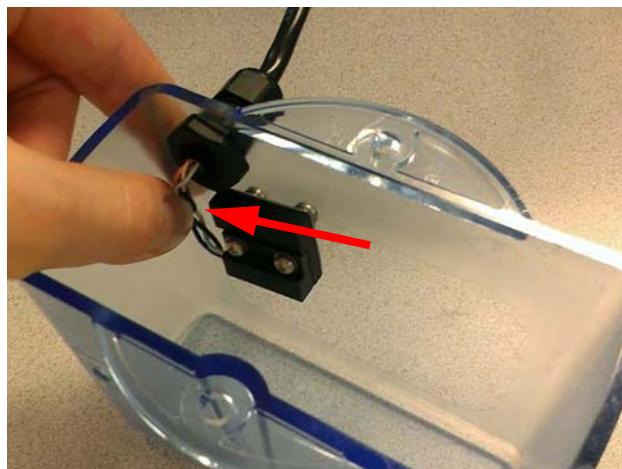


Figure 6 - 13. Gently Move Cable To Provide Clearance For Index

2. Hold the index at an angle to initially clear the wires and gently slide it into the cover while holding the wires out of the way as shown.

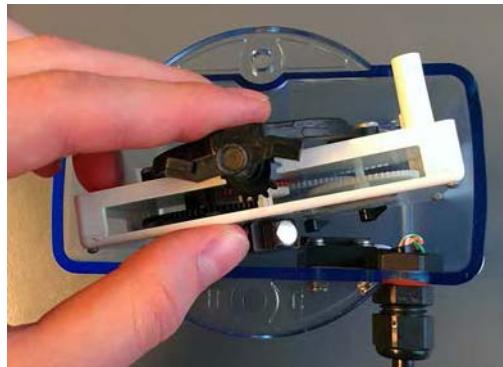


Figure 6 - 14. Insert the Index At an Angle To Clear Wires and Switch During Installation

3. As the index passes by the wires toward the switch, gently rotate the index into its normal mounting position.

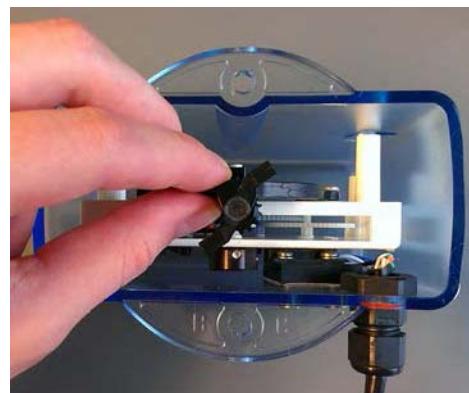


Figure 6 - 15. Position Index In Normal Mounting Location

4. From the hardware kit, install the two smaller tamper cups, washers, and screws as shown in the following photos. Use the Type 25 8-18 x 3/4 inch, self-threading screws (part# 22-1174) with plastic indexes. Use the 8-32 x 5/8 inch machine screws (part# 22-0310) with metal indexes. Torque the screws to 9 inch-pounds (+/- one inch-pound).



CAUTION: New plastic indexes may require the mounting holes to be pre-threaded prior to installation into the cover. Pre-threading the plastic index's mounting holes will help prevent damage to the index during installation.



Figure 6 - 16. Left: Self-Threading Screws / Right: Machine Screws

5. Install the tamper seals.



NOTE: Cable color may vary from that shown in photos.

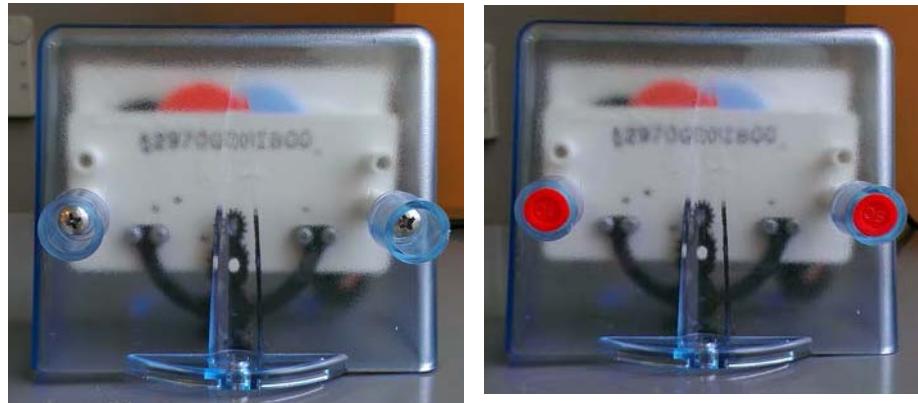


Figure 6 - 17. Install Index Screws and Tamper Seals



Figure 6 - 18. Dual Set-Screw Wheel on Plastic Pointer Index

Rockwell Mini Switch Kit Installation

Meter Preparation

1. Inspect the index and replace it if any of the following conditions exists:
 - Pointers are loose on their shafts.
 - Index face contains cracked or peeling enamel.
 - Index drive mechanism does not rotate easily.



NOTE: The GPR module gets readings from a pulse wheel mounted on the vertical drive shaft behind the index. The cover is installed on the meter with the sensor in the cover positioned on the BACK side of the index.

Installing 2-Piece Magnetic Pulse Wheels



Figure 7 - 1. Alignment Slots Top of Each Wheel Half

1. Insert one screw into the notched pulse wheel half.
2. If the dial wheel halves have alignment slots, position them so that the slots on each half are aligned. Turn the screw until it begins to thread into the threaded bottom wheel half as shown in the following figures.



Figure 7 - 2. Notched Wheel Half with Screw Inserted



NOTE: For wheels WITHOUT alignment slots, there is no top or bottom, and there is no special

consideration regarding dial wheel assembly.

3. Slide threaded wheel half behind the rear vertical index drive shaft.

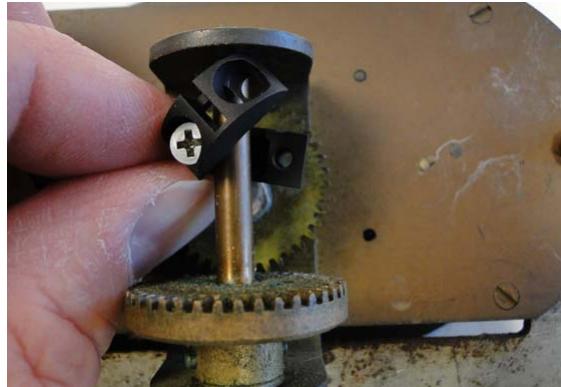


Figure 7 - 3. Place the Screw-bearing Notched Wheel Around the Index Drive Shaft

4. Rotate the notched wheel half in front of the shaft and insert the second screw.
5. Use a small Phillips-type screwdriver and turn each screw a few turns until they begin to thread into the threaded wheel half.
6. Insert the 0.030 inch thick spacer shim between the pulse wheel and the index top shaft support as shown in the next figure.

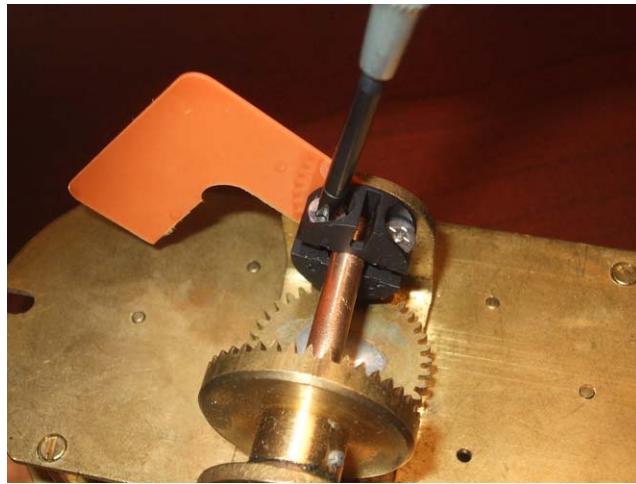


Figure 7 - 4. Shim insertion

7. Press the pulse wheel upward against the shim. The wheel must be held flush with the shim while tightening the screws.
8. Tighten each screw a few turns at a time so that the two wheel halves remain parallel with each other, keeping the pulse wheel hole centered on the shaft. Tighten the screws to 3.5 inch-pounds ± 0.5 inch-pound).



WARNING: To avoid damaging the pulse wheel, take care not to overtighten the set screws.

9. Remove the shim. Verify that:
 - the index shaft rotates freely
 - the wheel does not wobble on the shaft or rub against the frame

Installing The Index

1. Install the index and frame assembly onto the meter.
2. Align the index drive shaft arm with the meter as shown in the next figure.
3. Using the 5/16-18 x 3/8" index frame screws that were set aside at the beginning of this procedure, tighten the screws to 18 foot-pounds. \pm 2 foot-pounds.



NOTE: For proper meter operation, the index frame screw tabs should be about 90 degrees (perpendicular) to the upper portion of the frame containing the index.



Figure 7 - 5. Index Drive Shaft Arm Alignment

If the index must be replaced or if the index has been removed from the frame, install the index to the frame and tighten the 8-32 x 3/16 inch screws to 10.5 inch-pounds (\pm 1.5 inch-pound).



CAUTION: The index **MUST** be installed with the mounting bracket inside the index back plate, as shown in the following photograph.

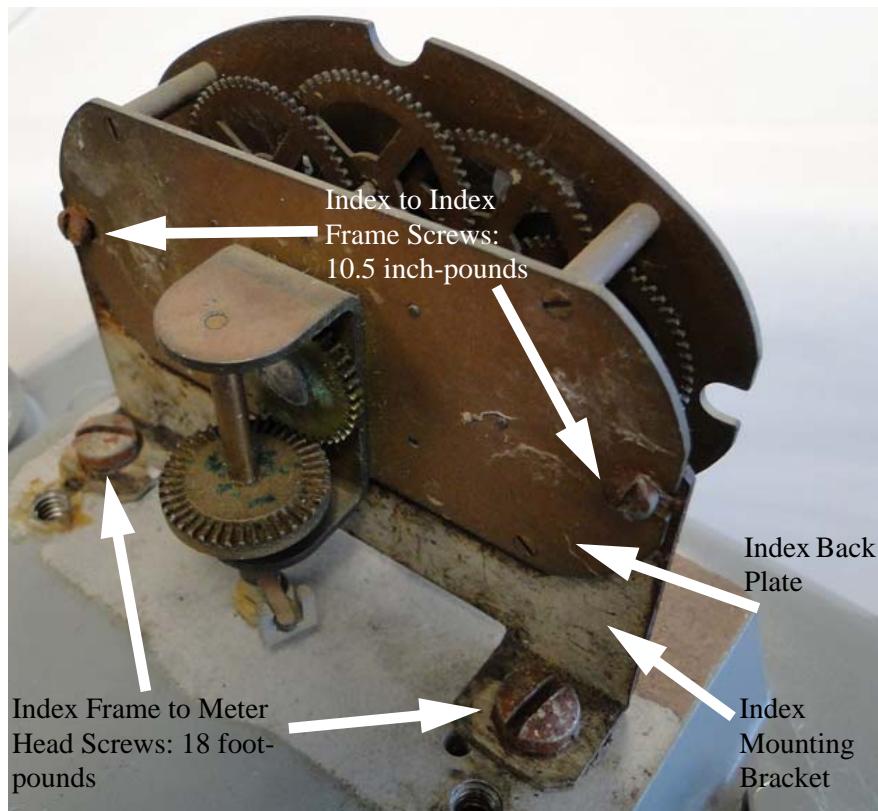


Figure 7 - 6. Index Frame to Meter Head; Index to Index Frame Screws

4. Tighten the index frame to meter head screws to 18 foot-pounds ($+\text{-} 2$ ft-lbs). Tighten the index to index frame screws to 10.5 inch-pounds (± 1.5 inch-pounds).

Schlumberger Mini Switch Kit Installation

Meter Preparation



NOTE: The Solid State Pulser assembly gets readings from a pulse wheel mounted on the horizontal shaft behind the index. The cover is installed on the meter with the sensor in the cover positioned on the back side of the index.

Inspect the index and replace it if any of the following conditions exists:

- Pointers are loose on their shafts.
- Index face contains cracked or peeling enamel.
- Index drive mechanism does not rotate easily.

Perform the following steps if the index must be replaced:



Figure 8 - 1. Index Screw and Drive Details

1. Turn index screws (shown by red circles) counter clockwise enough to loosen and gently slide the old index screw tabs from beneath the screws using a right-to-left motion.
2. Slide the replacement index screw tabs beneath the screws using a left-to-right motion as shown in the photo at right in Figure 8 - 1.
3. Verify that the index drive mechanisms of both the bracket and index (red arrows) are aligned and free to rotate without binding.
4. Itron recommends tightening the screws “hand-tight” or 6 to 12 inch-pounds. The Itron specification is listed as “3 to 6 inch-pounds (after relaxation)” in their published documents.

Installing 2-Piece Magnetic Pulse Wheels



Figure 8 - 2. Alignment Slots On Top of Each Wheel Half

1. Insert one screw into the notched pulse wheel half.
2. If the dial wheel halves have alignment slots, position them so that the slots on each half are aligned. Turn the screw until it begins to thread into the threaded bottom wheel half as shown in the following figures.

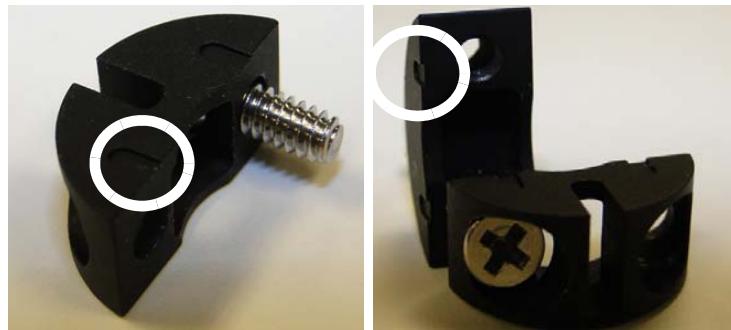


Figure 8 - 3. Alignment Slots Top of Each Wheel Half



NOTE: For wheels WITHOUT alignment slots, there is no top or bottom, and there is no special consideration regarding dial wheel assembly.

3. Slide threaded wheel half beneath the rear horizontal index drive shaft.

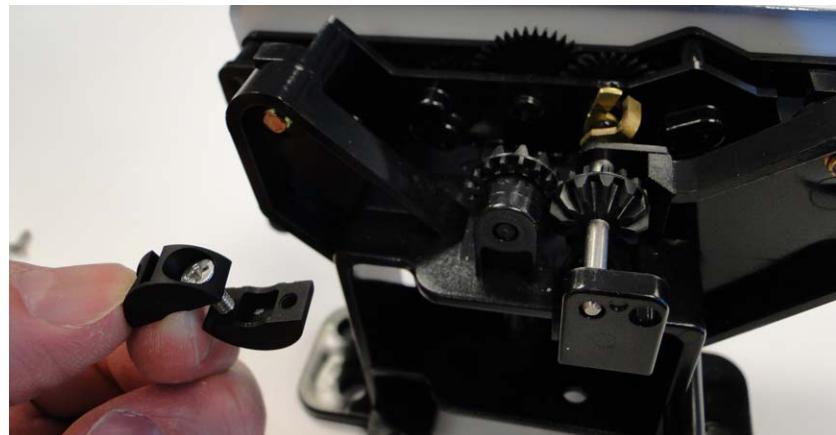


Figure 8 - 4. Slide Threaded Wheel Half Beneath the Index Drive Shaft



Figure 8 - 5. Slide Threaded Wheel Half Beneath Shaft

4. Rotate the notched wheel half over the top of the shaft and insert the second screw.

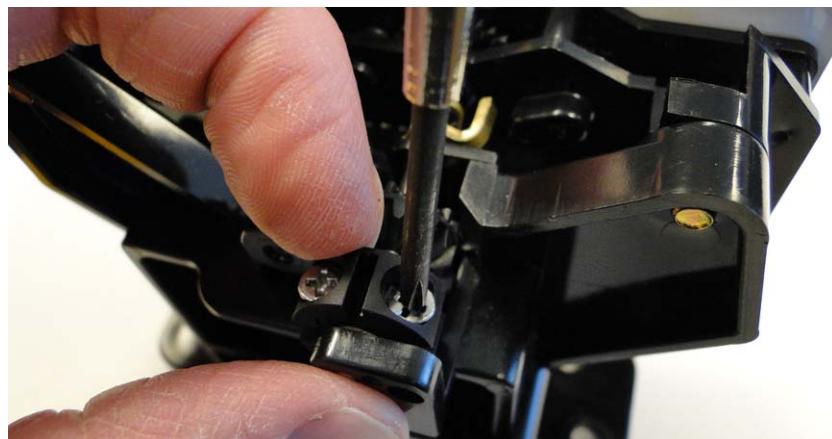


Figure 8 - 6. Turn Each Screw a Few Turns

5. Use a small Phillips-type screwdriver and turn each screw a few turns until they begin to thread into the lower wheel half.
6. Press wheel lightly but evenly against the shaft snap ring located at the rear of the shaft. The pulse wheel must not touch the gears on the shaft.
7. Tighten each screw a few turns at a time so that the two wheel halves remain parallel with each other, and the pulse wheel hole is centered on the shaft. Tighten the screws to 3.5 inch-pounds ± 0.50 inch-pounds.



WARNING: Avoid damaging the pulse wheel. Take care not to overtighten the set screws.

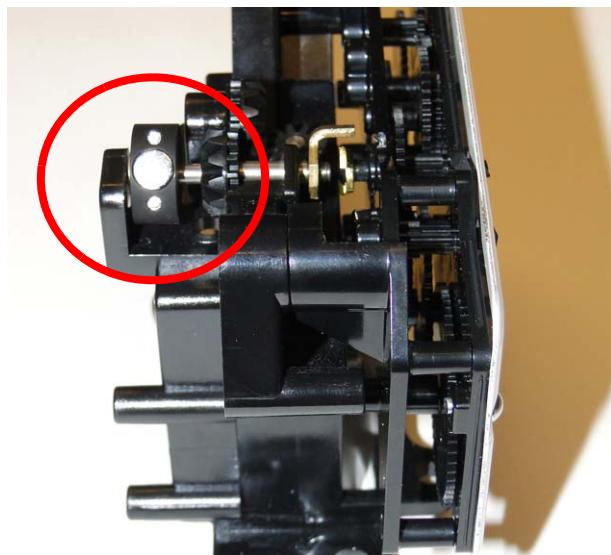


Figure 8 - 7. Pulse Wheel on Shaft

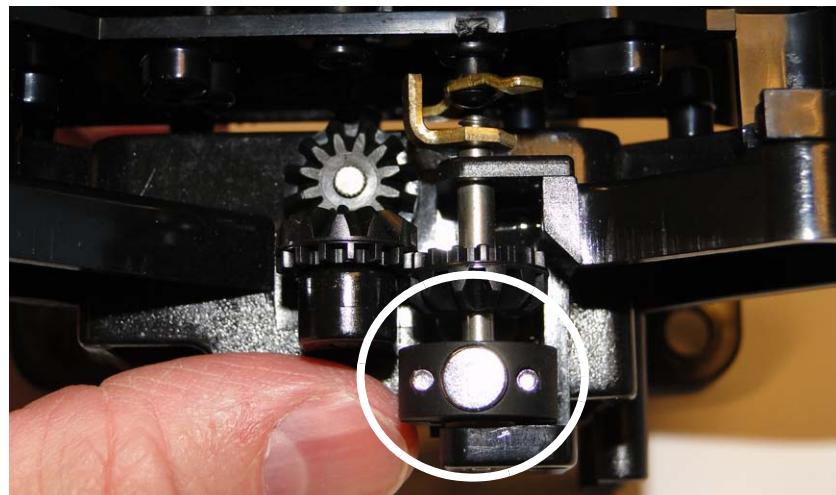


Figure 8 - 8. Top View of Installed Pulse Wheel

8. Install the index mounting bracket assembly onto the meter using the original screws. Tighten the screws to 6 - 12 in-lb.



NOTE: The Schlumberger/Actaris 675-1000 meter is designed so that the index may face the front or rear of the meter. Landis+Gyr only supports use of the Solid State Pulser cover when installed with the index facing the front of the meter where the meter inlet pipe is located at the left side of the meter.

Sprague Mini Switch Kit Installation



WARNING: The 2-Piece magnetic pulse wheel must be used with metal pointer indexes. The Dual Set Screw magnetic pulse wheel must be used on plastic pointer indexes.



CAUTION: Take care not to over-tighten the set screws to avoid damaging the index pointer and pulse wheel.

Installing 2-Piece Magnetic Pulse Wheels on Metal Pointer Indexes

1. Remove the index from the meter. Place the screws aside for re-use at the end of this process.



WARNING: To maintain proper clearance, the 2-Piece magnetic pulse wheel must be installed so that, if alignment slots are present, the alignment slots on each wheel half are on top as shown in Figure 9 - 1.



Figure 9 - 1. Alignment Slots Top of Each Wheel Half



NOTE: For wheels WITHOUT alignment slots, the dial wheel has no top or bottom, and there is no special consideration regarding dial wheel assembly.

2. Insert screws into the notched pulse wheel half.

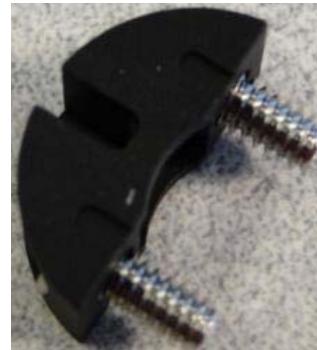


Figure 9 - 2. Notched Wheel Half with Screws Inserted

3. Rotate the index drive mechanism so that the metal proving/test pointer is in an upward direction.
4. Position the screw-bearing notched wheel half for installation by sliding it downward over the index proving/test pointer tip as shown in Figure 9 - 3. If present, the two alignment slots and pointer notch must be visible on top of the wheel half.

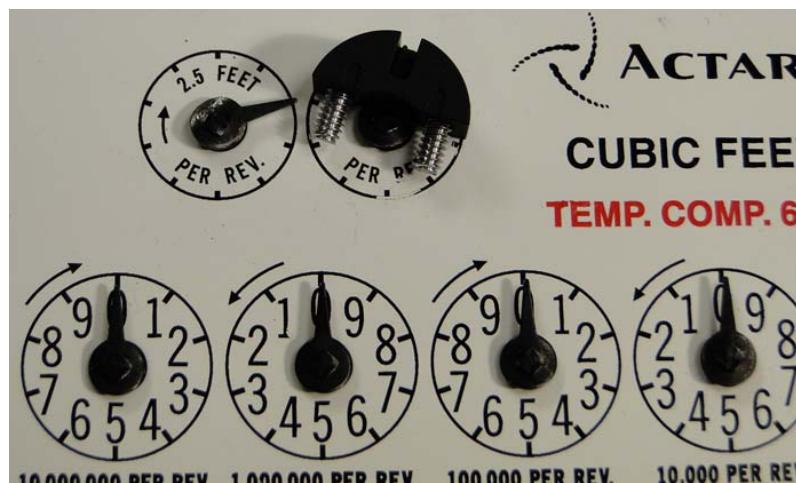


Figure 9 - 3. Slide Screw-bearing Notched Wheel Half over Index Proving/Test Pointer Tip

5. Position the threaded wheel half against the rounded end of the index pointer. Use a small Phillips-type screwdriver and turn each screw a few turns until they begin to thread into the threaded wheel half. Do not tighten the screws.

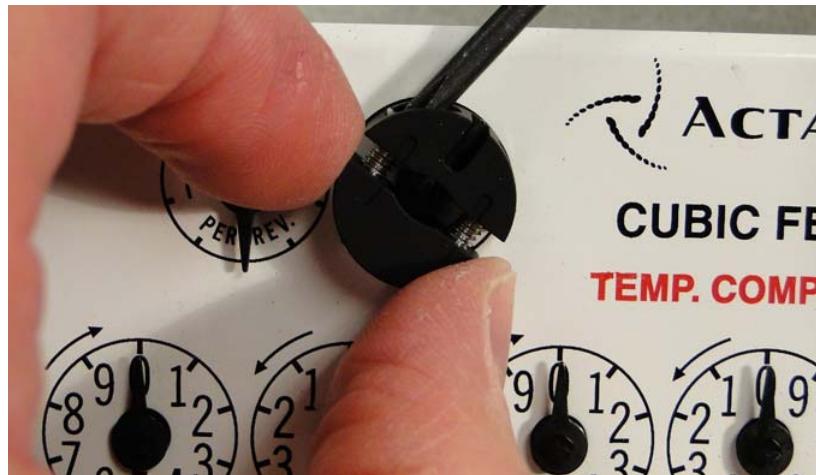


Figure 9 - 4. Thread Screws Into threaded Wheel Half

6. Insert the 0.030 inch thick spacer shim beneath the 2-Piece pulse wheel as shown in Figure 9 - 5. Hold the pulse wheel as shown. Tighten each screw a few turns at a time so that the two wheel halves remain parallel with each other. Tighten the screws to 1.2 ± 0.1 inch-lbs. Remove the spacer shim.



WARNING: The main index drive shaft must remain free to rotate while the wheel screws are tightened to prevent damage to the index pointer and pointer shaft.

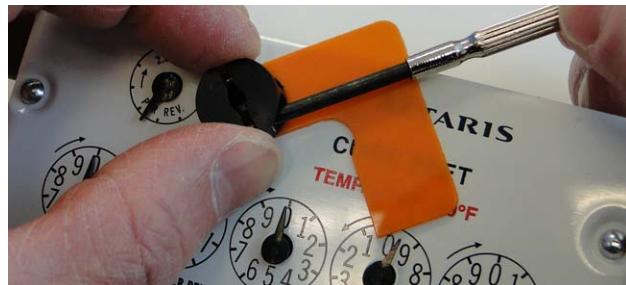


Figure 9 - 5. Insert Shim and Alternately Tighten Screws To 1.2 inch-lbs. (± 0.10 inch-lbs.)



WARNING: To avoid damaging the index pointer and pulse wheels, take care not to over-tighten the set screws.

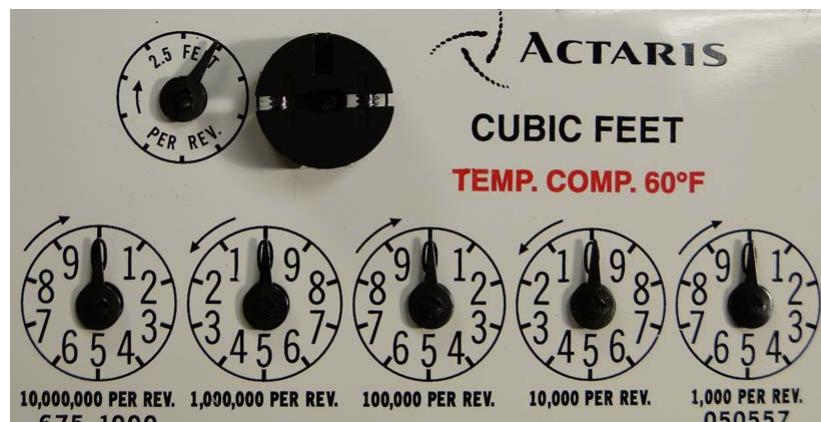


Figure 9 - 6. 2-Piece Magnetic Pulse Wheel Installed

7. Verify that the pulse wheel rotates freely without rubbing the index surface. Rotate the wheel several times as shown in the next figure to verify that the wheel does NOT contact adjacent index pointers.

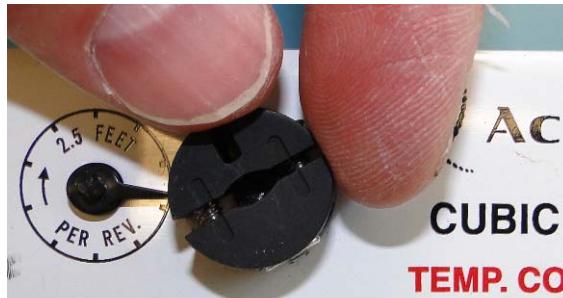


Figure 9 - 7. Pulse Wheel Must Not Contact Adjacent Pointers As It Rotates



CAUTION: The installed pulse wheel shall not move from the installed position, and cannot physically contact the index face or other pointers on the index.

If contact occurs, Landis+Gyr recommends replacing the metal pointer index with an index using plastic pointers so that the Dual Set-Screw Balanced Pulse Wheel can be used.

If pulse wheel contact with the adjacent proving pointer tip is unavoidable, 1/4 of the adjacent proving pointer tip may be removed with diagonal cutters, but only with permission from the utility customer.

8. Install the index onto the meter using the original screws that were placed aside in the first step of this process. If the index has a brass mounting bracket, tighten the index screws to a torque value of 6 - 12 inch-pounds. If the index uses a plastic mounting bracket, tighten the index screws to a torque value of 15 - 20 inch-pounds.



CAUTION: Use caution when tightening the index screws to prevent damage to the index.

9. Confirm that the index's center of rotation is aligned with the meter dog's center of rotation. Adjust the index alignment as needed. The magnet wheel center of rotation **must be aligned** with the meter index drive mechanism center of rotation, shown by **RED ARROWS** in the following photos.

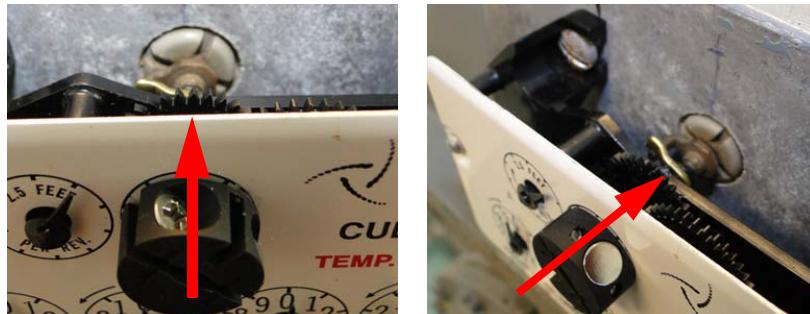


Figure 9 - 8. Wheel Center Of Rotation Must Align With Meter Drive Center Of Rotation

Installing Dual Set Screw Magnetic Pulse Wheels on Plastic Pointer Indexes

1. Using a small flat blade screw driver, turn each screw counter-clockwise until the tip of each screw is flush with the inner surface of the wheel.



Figure 9 - 9. Top View - Dual Set Screw Pulse Wheel



Figure 9 - 10. Bottom View - Dual Set Screw Pulse Wheel

2. Position the Dual Set Screw pulse wheel over the plastic index proving/test pointer as shown in the following figures. The bottom of the pulse wheel is slotted so that it may only be installed with the slot in the same direction as the index pointer.
3. Insert the 0.030 inch thick shim beneath the pulse wheel.
4. Gently press the wheel against the shim with your index finger or thumb. The pulse wheel must be level with the surface of the index.
5. Evenly tighten each screw to 1.2 ± 0.10 inch-pounds.



WARNING: The main index drive shaft must remain free to rotate as the wheel screws are tightened to prevent damage to the index pointer and pointer shaft

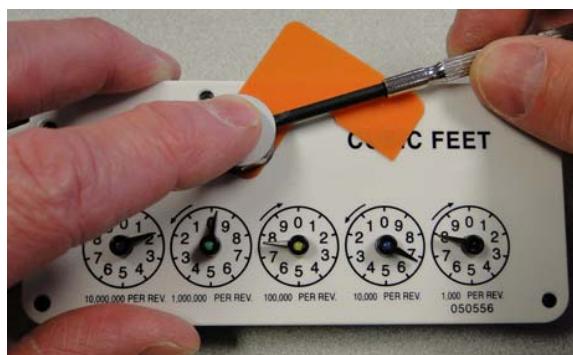


Figure 9 - 11. Tighten Pulse Wheel Screws to 1.2 ± 0.10 Inch-Pounds



WARNING: Take care not to over-tighten the set screws to avoid damaging the index pointer and pulse wheel.

The installed pulse wheel shall not move from the installed position, and cannot physically contact the index face or other pointers on the index. If contact occurs, the index should be replaced with an approved index.

6. Remove the shim and verify that the wheel rotates freely while remaining level with the index surface.



Figure 9 - 12. Dual Set-Screw Balanced Pulse Wheel Installed

7. Install the index onto the meter using the original screws. The meter's drive dog must be inserted into a groove on the index drive mechanism as shown in Figure 9 - 13.
8. Confirm that the index's center of rotation is aligned with the meter dog's center of rotation. Adjust the index alignment as needed. The magnet wheel center of rotation **must be aligned** with the meter index drive mechanism center of rotation, shown by **RED ARROWS** in the following photos. Tighten the index screws to a torque of 15 - 20 inch-pounds.

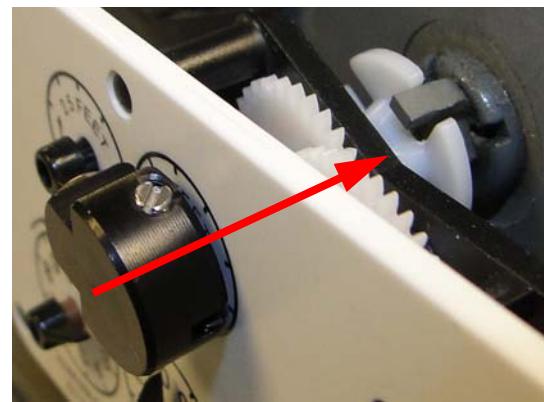
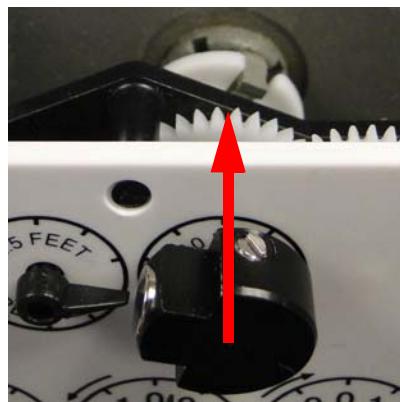


Figure 9 - 13. Wheel Center Of Rotation Must Align With Meter Drive Center Of Rotation

American GPR Configuration and Waterproofing



WARNING: Before performing the following steps, determine the direction that the GPR will face. The GPR must face away from nearby walls and toward the nearest Router. Refer to [Appendix A, American Changing GPR Orientation](#) for instructions on how to set the direction that the GPR will face.



WARNING: The GPR and bracket must not interfere with access to the meter pressure tap. There must be adequate room for connections to the pressure tap (refer to the following photos).



Figure 10 - 1. Installed GPR MUST NOT Interfere with or Block the Pressure Tap

Configuring the GPR

The GPR must be programmed with customer-specific requirements. The GPR, when installed for the first time, will start operation in Install Mode. During Install Mode, the GPR will auto register to the Network and then go through an auto-configuration process.

Applying Water Sealant to Circuit Board Connections

Dow Corning 4 Electrical Insulating Compound is recommended as a sealant to prevent water intrusion into the GPR Pulse Input and Battery circuit board connections.



Figure 10 - 2. Dow Corning 4 Electrical Insulating Compound



NOTE: Novagard® G661 is also approved as an electrical sealant and is available in 5.3 ounce tubes. It has a shelf-life of eighteen (18) months from the date of manufacture, as indicated by the lot number, when stored in the original, unopened container at, or below, 100°F.

Novagard® G661 may be ordered from:

Novagard Solutions®
5109 Hamilton Avenue
Cleveland, OH 44114
Phone: (216) 881-3890 Facsimile: (216) 881-6977
www.Novagard.com

1. Liberally apply Dow Corning 4 Compound (“the compound”) to the Battery and GPR Pulse Input circuit board connectors as shown in Figure 10 - 3 and Figure 10 - 4. A tapered nozzle is not provided with the compound. It may be applied directly from the tube opening if a nozzle is not available. Refer to [Appendix E, GPR Connection Water Proofing Materials](#), for information on ordering nozzles.

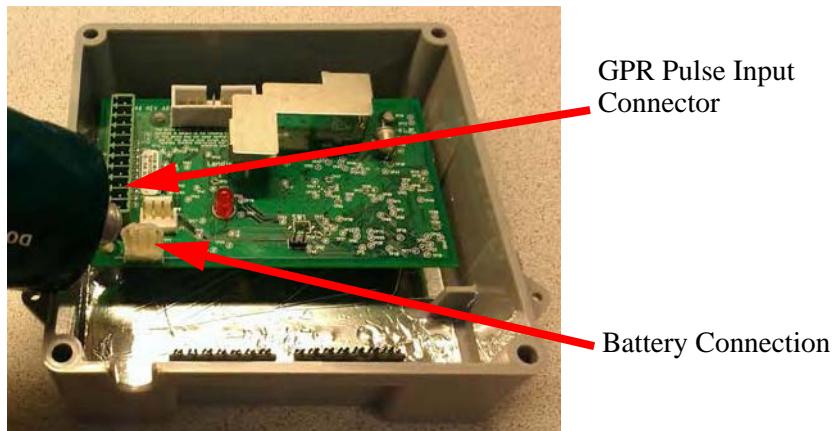


Figure 10 - 3. Apply the Compound to the Battery Connector



Figure 10 - 4. Apply the Compound to the GPR Pulse Input Connector

2. Force the compound between the connector pins with a cotton tipped swab or other suitable applicator as shown in Figure 10 - 5.



Figure 10 - 5. Force the Compound between Connector Pins

3. Liberally apply the compound to the connectors of the GPR Pulse Input and Battery Interface cables. Force the compound into ALL holes and cover ALL electrical contacts, as shown in the following photos.



NOTE: The following photos show representative cables to illustrate compound application.



Figure 10 - 6. Apply the Compound to GPR Cable Connectors: Cover All Contacts

4. First, install the GPR Pulse Input cable, and then the Battery Interface cable, onto the GPR circuit board connectors as shown in Figure 10 - 7.



WARNING: The GPR Pulse Input cable MUST be installed prior to installing the Battery cable. Do NOT disconnect the Battery cable after it has been installed. Disconnecting the battery may cause unwanted pulses to be counted by the GPR. If the battery is disconnected, reprogram the GPR to clear any unwanted pulse counts, then reconnect the battery.



WARNING: Substitution of components may impair the suitability for Class I, Division 2 applications. Replace battery only with Landis+Gyr part number 40-1590H.

5. Liberally apply the compound to the back of each cable connector, forcing the compound into each hole where the wires exit the connectors. The GPR circuit board and cable connectors must be completely covered as shown in Figure 10 - 7. A cotton tipped swab may be used to force the compound between each wire and into each connector hole.

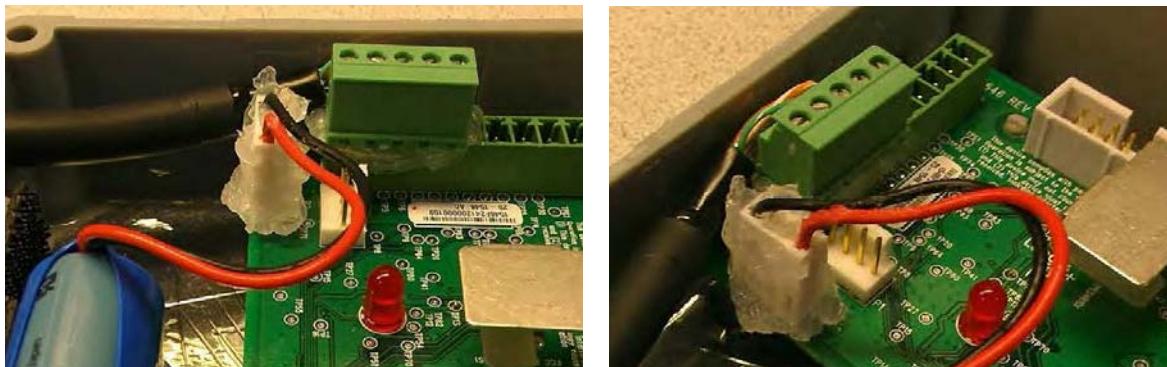


Figure 10 - 7. The Compound Must Cover Wires and Connectors for Watertight Seal

6. Arrange the GPR Pulse Input and Battery Interface cables as shown in Figure 10 - 8. The cables must not interfere with or block the GPR antenna.



CAUTION: The GPR Pulse Input cable must be inserted into the GPR enclosure strain relief slot as shown. The shrink tubing on the cable must be inserted into the strain relief slot.

7. Gently press the cable downward into the strain relief slot at midpoint of the heat shrink tubing as shown in the following figures.

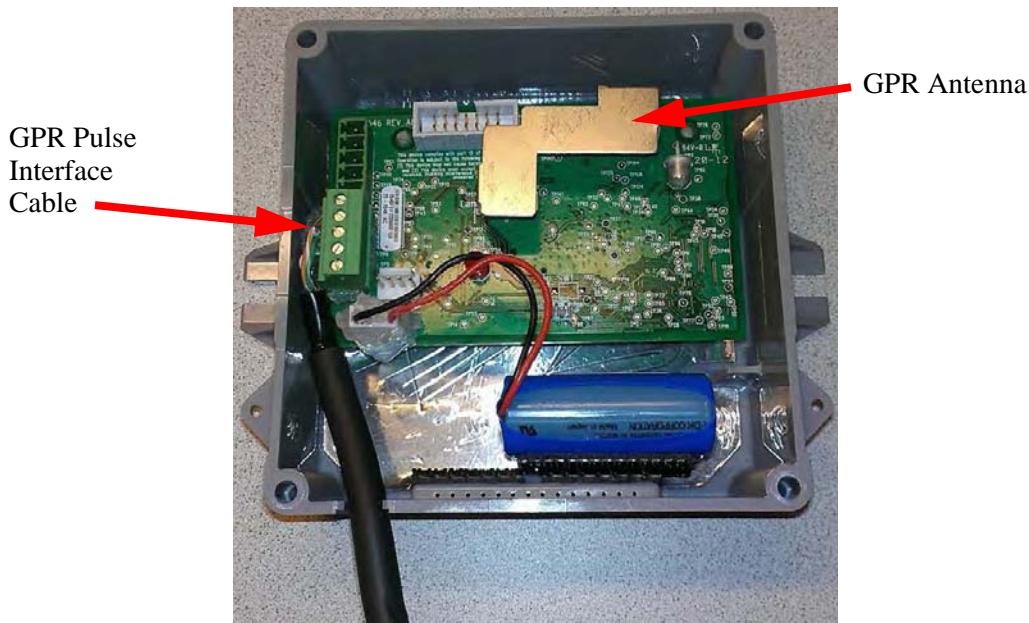


Figure 10 - 8. Arrange Cables As Shown Before Installing the GPR Cover

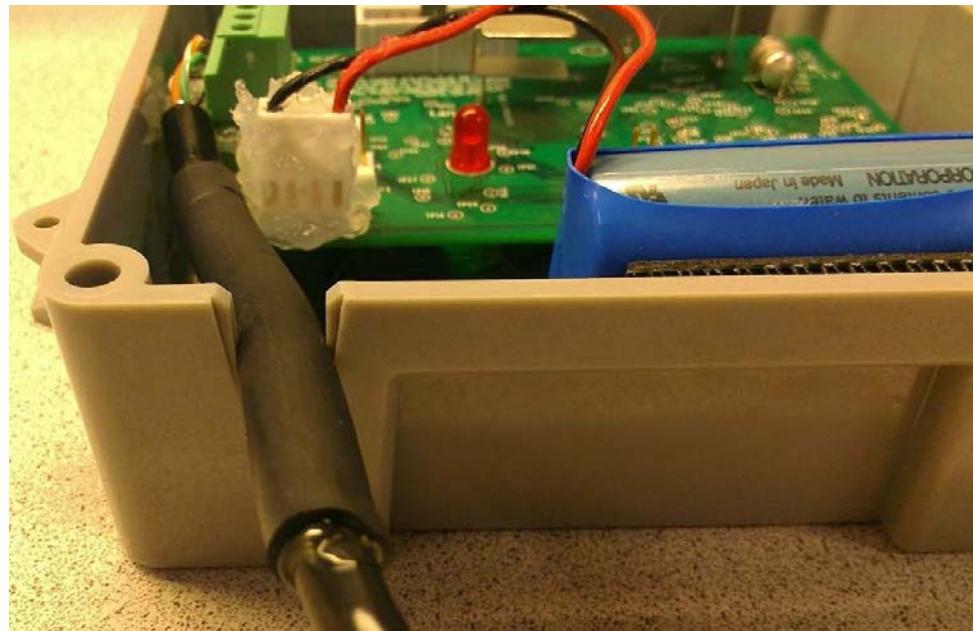


Figure 10 - 9. Heat Shrink Tubing Midpoint Pressed Into Strain Relief Slot

Rockwell GPR Configuration and Waterproofing

Before You Begin



WARNING: Before performing the following steps, determine the direction that the GPR will face. The GPR must face away from nearby walls and toward the nearest MCC or Concentrator. See [Appendix B, Rockwell Changing GPR Orientation](#) for additional details.



Figure 11 - 1. Meter Pressure Tap



WARNING: The GPR and bracket **MUST NOT** interfere with access to the meter pressure tap. There must be adequate room for connections to the pressure tap.

GPR Configuration

The GPR must be programmed with customer-specific requirements. The GPR, when installed for the first time, will start operation in Install Mode. During Install Mode, the GPR will auto register to the Network and then go through an auto-configuration process.

Applying Water Sealant to Circuit Board Connections

Dow Corning 4 Electrical Insulating Compound is recommended as a sealant to prevent water intrusion into the GPR Pulse Input and Battery circuit board connections.



Figure 11 - 2. Dow Corning 4 Electrical Insulating Compound



NOTE: Novagard® G661 is also approved as an electrical sealant and is available in 5.3 ounce tubes. It has a shelf-life of eighteen (18) months from the date of manufacture, as indicated by the lot number, when stored in the original, unopened container at, or below, 100°F.

Novagard® G661 may be ordered from:

Novagard Solutions®
5109 Hamilton Avenue
Cleveland, OH 44114
Phone: (216) 881-3890 Facsimile: (216) 881-6977
www.Novagard.com

1. Liberally apply Dow Corning 4 Compound ("the compound") to the GPR Pulse Input and Battery circuit board connectors as shown in Figure 11 - 6 and Figure 11 - 7. A tapered nozzle is not provided with the compound. It may be applied directly from the tube opening if a nozzle is not available. Refer to [Appendix E, GPR Connection Water Proofing Materials](#), for information on ordering nozzles.

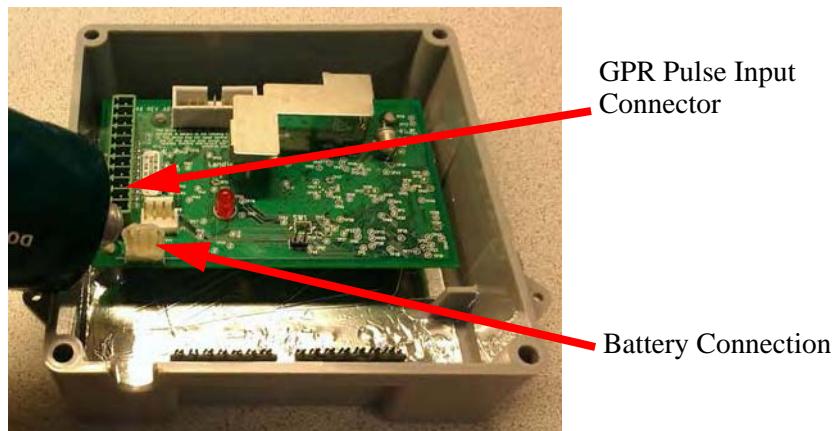


Figure 11 - 3. Apply the Compound to the Battery Connector



Figure 11 - 4. Apply the Compound to the GPR Pulse Input Connector

2. Force the compound between the connector pins with a cotton tipped swab or other suitable applicator as shown in Figure 11 - 8.



Figure 11 - 5. Force the Compound between Connector Pins

3. Liberally apply the compound to the connectors of the GPR Pulse Input and Battery Interface cables. Force the compound into ALL holes and cover ALL electrical contacts, as shown in the following photos.



NOTE: The following photos show representative cables to illustrate compound application.



Figure 11 - 6. Apply the Compound to GPR Cable Connectors: Cover All Contacts

4. First, install the GPR Pulse Input cable, and then the Battery Interface cable, onto the GPR circuit board connectors as shown in Figure 11 - 10.



WARNING: The GPR Pulse Input cable MUST be installed prior to installing the Battery cable.

Do NOT disconnect the Battery cable after it has been installed. Disconnecting the battery may cause unwanted pulses to be counted by the GPR. If the battery is disconnected, reprogram the GPR to clear any unwanted pulse counts, then reconnect the battery.



WARNING: Substitution of components may impair the suitability for Class I, Division 2 applications. Replace battery only with Landis+Gyr part number 40-1590H.

5. Liberally apply the compound to the back of each cable connector, forcing the compound into each hole where the wires exit the connectors. The GPR circuit board and cable connectors must be completely covered as shown in Figure 11 - 10. A cotton tipped swab may be used to force the compound between each wire and into each connector hole.



Figure 11 - 7. The Compound Must Cover Wires and Connectors for Watertight Seal

6. Arrange the GPR Pulse Input and Battery Interface cables as shown in Figure 11 - 11. The cables must not interfere with or block the GPR antenna.



CAUTION: The GPR Pulse Input cable must be inserted into the GPR enclosure strain relief slot as shown. The shrink tubing on the cable must be inserted into the strain relief slot.

7. Gently press the cable downward into the strain relief slot at midpoint of the heat shrink tubing as shown in the following figures.

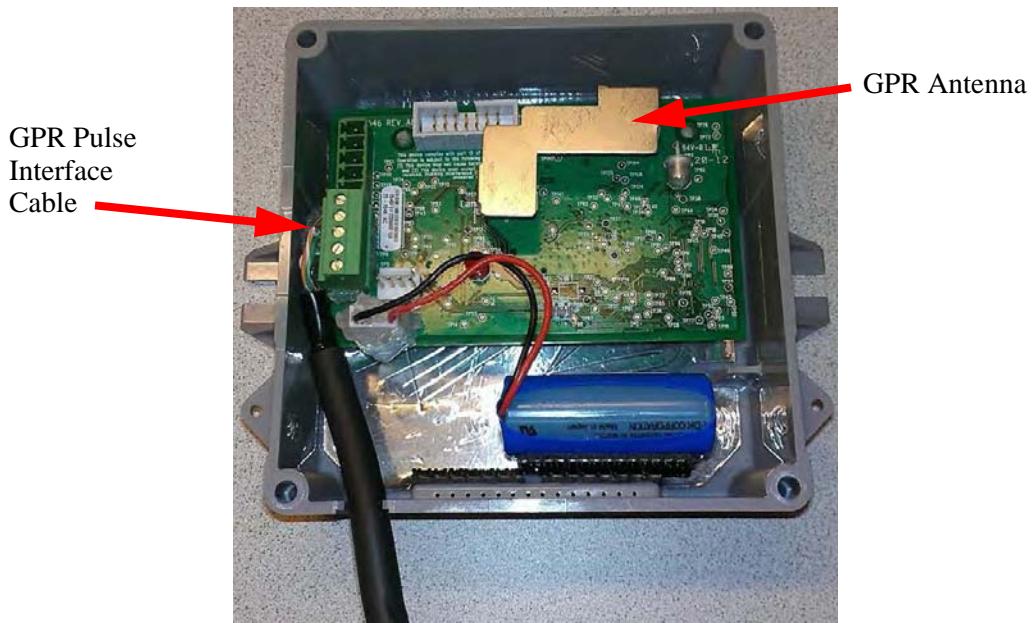


Figure 11 - 8. Arrange Cables As Shown Before Installing the GPR Cover

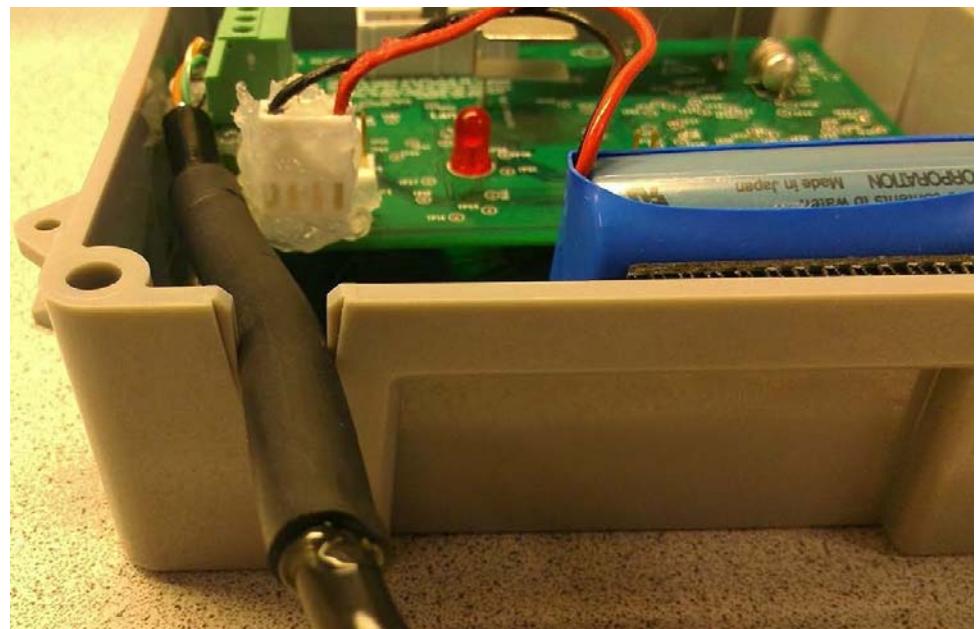


Figure 11 - 9. Heat Shrink Tubing Midpoint Pressed Into Strain Relief Slot

Schlumberger GPR Config & Waterproofing

Configuring the GPR



WARNING: Before performing the following steps, determine the direction that the GPR will face. The GPR must face away from nearby walls and toward the nearest MCC or Concentrator. Consult Appendix C, *Schlumberger Changing GPR Orientation*, for instructions on setting GPR direction.

The GPR must be programmed with customer-specific requirements. The GPR, when installed for the first time, will start operation in Install Mode. During Install Mode, the GPR will auto register to the Network and then go through an auto-configuration process.

Applying Water Sealant to Circuit Board Connections

Dow Corning 4 Electrical Insulating Compound is recommended as a sealant to prevent water intrusion into the GPR Pulse Input and Battery circuit board connections.



Figure 12 - 1. Dow Corning 4 Electrical Insulating Compound



NOTE: Novagard® G661 is also approved as an electrical sealant and is available in 5.3 ounce tubes. It has a shelf-life of eighteen (18) months from the date of manufacture, as indicated by the lot number, when stored in the original, unopened container at, or below, 100°F.

Novagard® G661 may be ordered from:

Novagard Solutions®
5109 Hamilton Avenue
Cleveland, OH 44114
Phone: (216) 881-3890 Facsimile: (216) 881-6977
www.Novagard.com

1. Liberally apply Dow Corning 4 Compound (“the compound”) to the GPR Pulse Input and Battery circuit board connectors as shown in Figure 11 - 6 and Figure 11 - 7. A tapered nozzle is

not provided with the compound. It may be applied directly from the tube opening if a nozzle is not available. Refer to [Appendix E, GPR Connection Water Proofing Materials](#), for information on ordering nozzles.

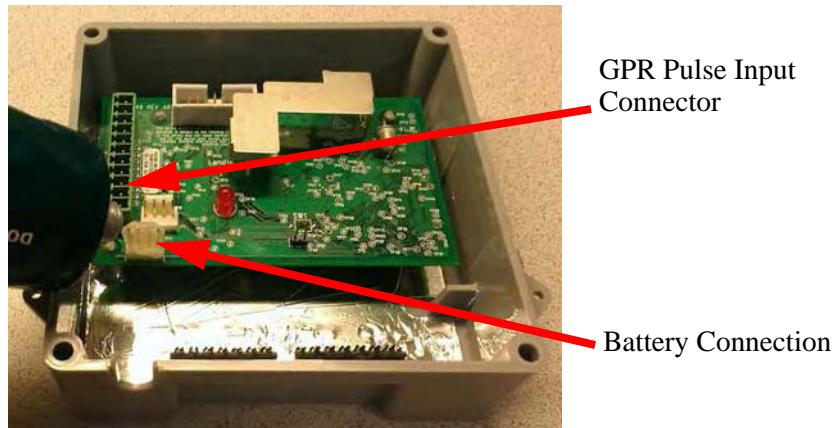


Figure 12 - 2. Apply the Compound to the Battery Connector



Figure 12 - 3. Apply the Compound to the GPR Pulse Input Connector

2. Force the compound between the connector pins with a cotton tipped swab or other suitable applicator as shown in Figure 11 - 8.



Figure 12 - 4. Force the Compound between Connector Pins

3. Liberally apply the compound to the connectors of the GPR Pulse Input and Battery Interface cables. Force the compound into ALL holes and cover ALL electrical contacts, as shown in the following photos.



NOTE: The following photos show representative cables to illustrate compound application.



Figure 12 - 5. Apply the Compound to GPR Cable Connectors: Cover All Contacts

4. First, install the GPR Pulse Input cable, and then the Battery Interface cable, onto the GPR circuit board connectors as shown in Figure 11 - 10.



WARNING: The GPR Pulse Input cable MUST be installed prior to installing the Battery cable.

Do NOT disconnect the Battery cable after it has been installed. Disconnecting the battery may cause unwanted pulses to be counted by the GPR. If the battery is disconnected, reprogram the GPR to clear any unwanted pulse counts, then reconnect the battery.



WARNING: Substitution of components may impair the suitability for Class I, Division 2 applications. Replace battery only with Landis+Gyr part number 40-1590H.

5. Liberally apply the compound to the back of each cable connector, forcing the compound into each hole where the wires exit the connectors. The GPR circuit board and cable connectors must be completely covered as shown in Figure 11 - 10. A cotton tipped swab may be used to force the compound between each wire and into each connector hole.

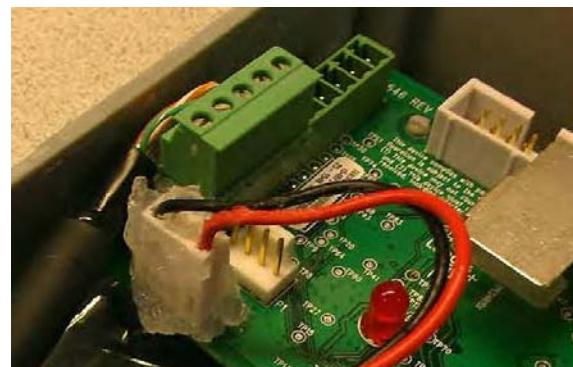


Figure 12 - 6. The Compound Must Cover Wires and Connectors for Watertight Seal

6. Arrange the GPR Pulse Input and Battery Interface cables as shown in Figure 11 - 11. The cables must not interfere with or block the GPR antenna.



CAUTION: The GPR Pulse Input cable must be inserted into the GPR enclosure strain relief slot as shown. The shrink tubing on the cable must be inserted into the strain relief slot.

7. Gently press the cable downward into the strain relief slot at midpoint of the heat shrink tubing as shown in the following figures.

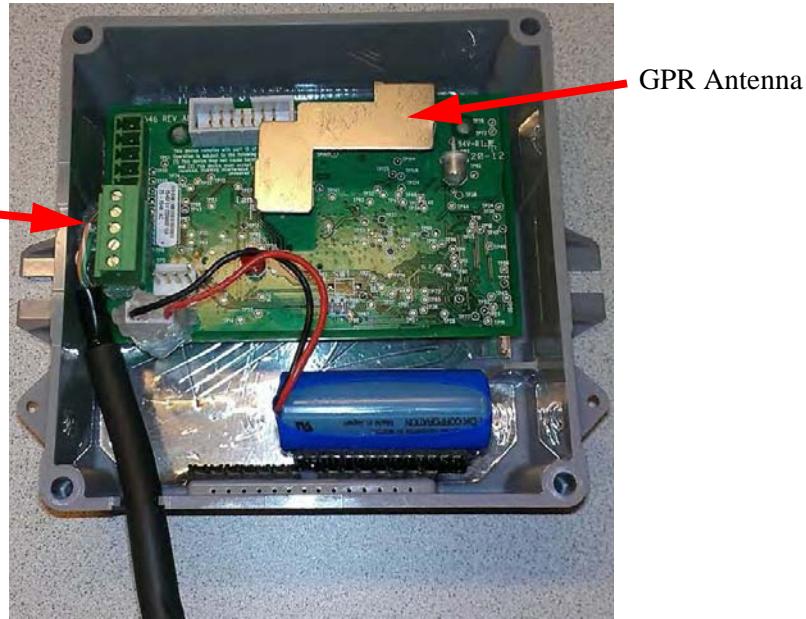


Figure 12 - 7. Arrange Cables As Shown Before Installing the GPR Cover

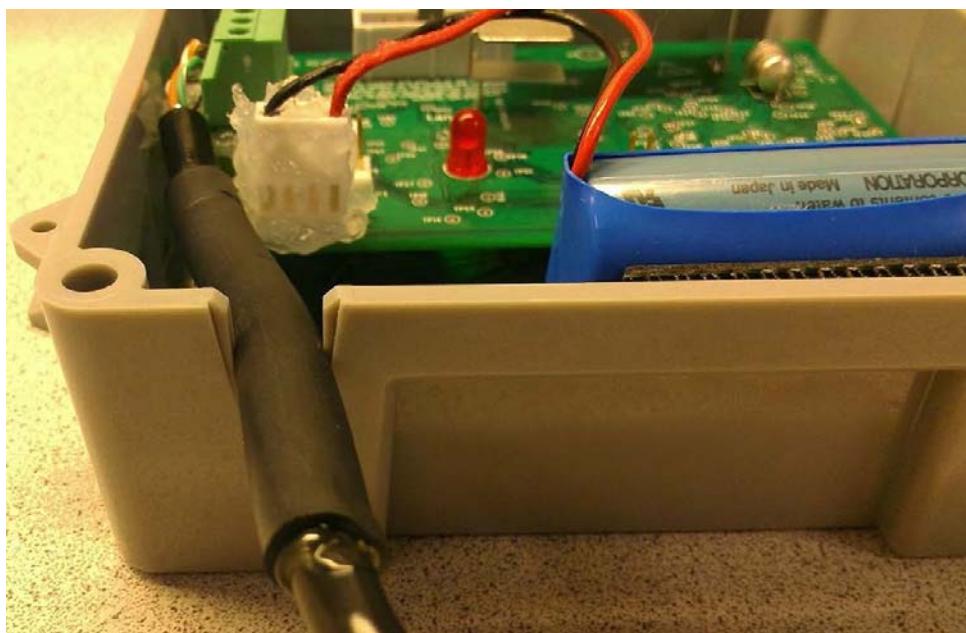


Figure 12 - 8. Heat Shrink Tubing Midpoint Pressed Into Strain Relief Slot

Sprague GPR Configuration and Waterproofing

Before You Begin



WARNING: Before performing the following steps, determine the direction that the GPR will face. The GPR must face away from nearby walls and toward the nearest MCC or Concentrator. Refer to [Appendix D, Sprague Changing GPR Direction](#) for additional details.

Configuring the GPR

The GPR must be programmed with customer-specific requirements. The GPR, when installed for the first time, will start operation in Install Mode. During Install Mode, the GPR will auto register to the Network and then go through an auto-configuration process.

Applying Water Sealant to Circuit Board Connections

Dow Corning 4 Electrical Insulating Compound is recommended as a sealant to prevent water intrusion into the GPR Pulse Input and Battery circuit board connections.



Figure 13 - 1. Dow Corning 4 Electrical Insulating Compound



NOTE: Novagard® G661 is also approved as an electrical sealant and is available in 5.3 ounce tubes. It has a shelf-life of eighteen (18) months from the date of manufacture, as indicated by the lot number, when stored in the original, unopened container at, or below, 100°F.

Novagard® G661 may be ordered from:

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5109 Hamilton Avenue
Cleveland, OH 44114
Phone: (216) 881-3890 Facsimile: (216) 881-6977
www.Novagard.com

1. Liberally apply Dow Corning 4 Compound (“the compound”) to the GPR Pulse Input and Battery circuit board connectors as shown in Figure 11 - 6 and Figure 11 - 7. A tapered nozzle is not provided with the compound. It may be applied directly from the tube opening if a nozzle is not available. Refer to [Appendix E, GPR Connection Water Proofing Materials](#), for information on ordering nozzles.

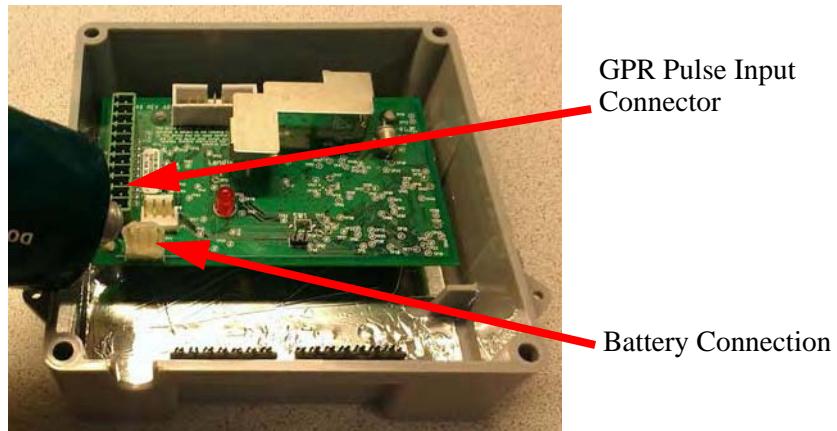


Figure 13 - 2. Apply the Compound to the Battery Connector



Figure 13 - 3. Apply the Compound to the GPR Pulse Input Connector

2. Force the compound between the connector pins with a cotton tipped swab or other suitable applicator as shown in Figure 11 - 8.



Figure 13 - 4. Force the Compound between Connector Pins

3. Liberally apply the compound to the connectors of the GPR Pulse Input and Battery Interface cables. Force the compound into ALL holes and cover ALL electrical contacts, as shown in the following photos.



NOTE: The following photos show representative cables to illustrate compound application.



Figure 13 - 5. Apply the Compound to GPR Cable Connectors: Cover All Contacts

4. First, install the GPR Pulse Input cable, and then the Battery Interface cable, onto the GPR circuit board connectors as shown in Figure 11 - 10.



WARNING: The GPR Pulse Input cable MUST be installed prior to installing the Battery cable.

Do NOT disconnect the Battery cable after it has been installed. Disconnecting the battery may cause unwanted pulses to be counted by the GPR. If the battery is disconnected, reprogram the GPR to clear any unwanted pulse counts, then reconnect the battery.



WARNING: Substitution of components may impair the suitability for Class I, Division 2 applications. Replace battery only with Landis+Gyr part number 40-1590H.

5. Liberally apply the compound to the back of each cable connector, forcing the compound into each hole where the wires exit the connectors. The GPR circuit board and cable connectors must be completely covered as shown in Figure 11 - 10. A cotton tipped swab may be used to force the compound between each wire and into each connector hole.

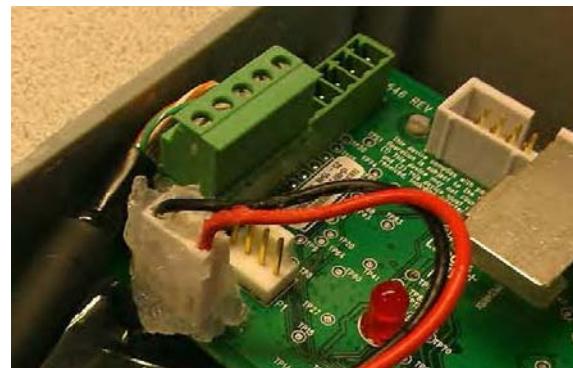


Figure 13 - 6. The Compound Must Cover Wires and Connectors for Watertight Seal

6. Arrange the GPR Pulse Input and Battery Interface cables as shown in Figure 11 - 11. The cables must not interfere with or block the GPR antenna.



CAUTION: The GPR Pulse Input cable must be inserted into the GPR enclosure strain relief slot as shown. The shrink tubing on the cable must be inserted into the strain relief slot.

7. Gently press the cable downward into the strain relief slot at midpoint of the heat shrink tubing as shown in the following figures.

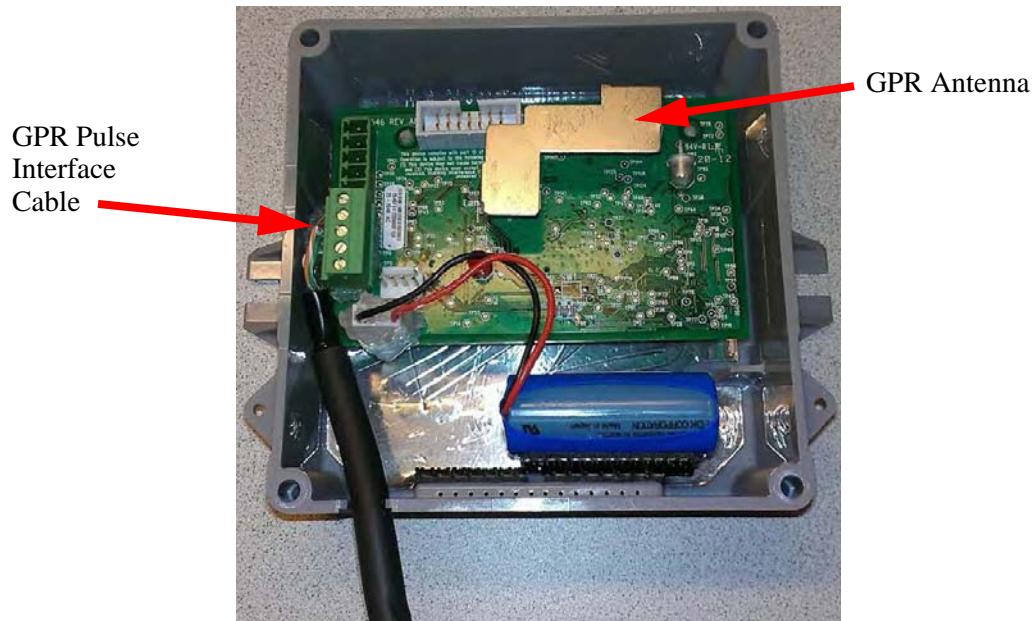


Figure 13 - 7. Arrange Cables As Shown Before Installing the GPR Cover

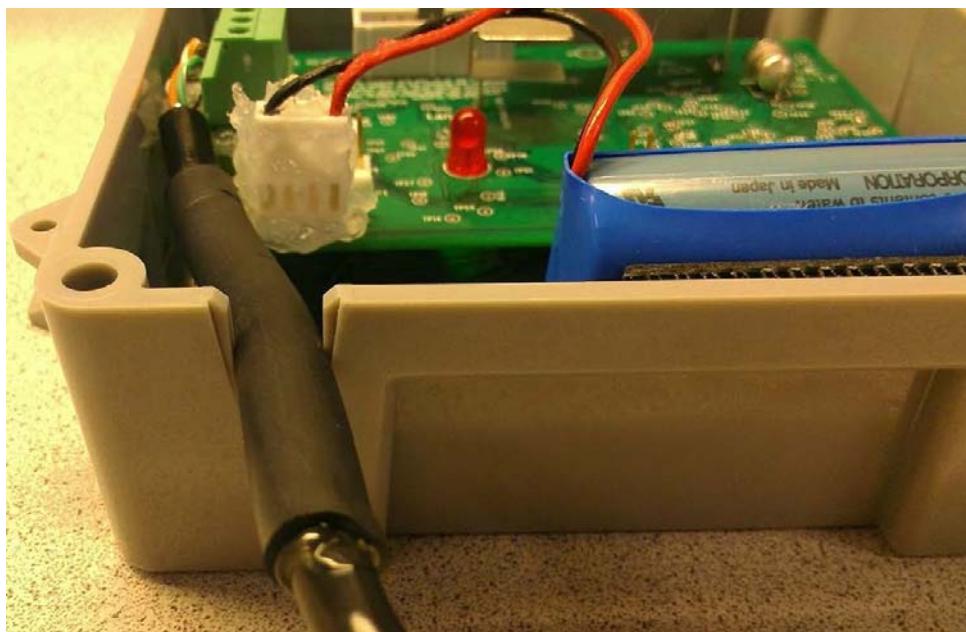


Figure 13 - 8. Heat Shrink Tubing Midpoint Pressed Into Strain Relief Slot

American GPR-P Index Cover & GPR Install

GPR Direction

The GPR must face away from nearby walls and toward the nearest MCC or Concentrator, and should be installed in a location unobstructed by gas pipes. Mounting options are shown and described in [Appendix A, American Changing GPR Orientation](#).

GPR Mounting

1. Arrange the GPR Pulse Input and Battery Interface cables as shown in Figure 14 - 1. The cables must not interfere with or block the GPR antenna.



CAUTION: The GPR Pulse Interface cable must be inserted into the GPR enclosure strain relief slot as shown. The shrink tubing on the cable must be inserted into the strain relief slot.



Figure 14 - 1. Pulse Interface Cable's Shrink Tubing Must Route Through GPR Strain Relief Slot

2. Install the GPR cover using the four security Torx screws included with the GPR. The cover must be installed with the gasket tab inserted into the strain relief slot located at the bottom left corner of the GPR enclosure as shown in the following photos.

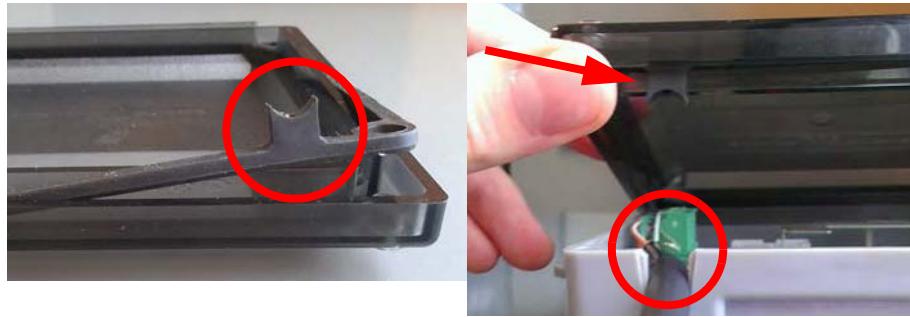


Figure 14 - 2. GPR Cover Gasket Tab and Cover Strain Relief Slot

3. Tighten the screws to 13 inch-pounds (± 1 inch-pound).



Figure 14 - 3. GPR Cover Screws

4. Using two #12-24 x 1/2 inch screws (part# 22-0185), install the GPR-P Mini Switch cover assembly as shown in the following photographs.



CAUTION: Check the index cover switch cable assembly for nicks, abrasions, or any damage prior to installing the assembly onto the meter.

5. Install a new index cover gasket as required. Tighten the screws to 20 inch-pounds (± 5 inch-pounds).



Figure 14 - 4. Tighten Front and Rear Cover Screws to 20 in-lbs (± 5 in-lbs)



NOTE: Photos are for illustrative purposes only. Torque driver not shown in photos.



WARNING: Take care not to pinch the index cover switch cable assembly in any way, especially during the following installation steps:

During index cover and cable assembly installation onto the meter.

**During GPR enclosure cover installation.
Between the GPR and meter brackets and meter.**

6. Install front and rear index cover tamper seals.
7. Coil the excess cable. Route it behind the index cover and dress it beneath the GPR bracket.



Figure 14 - 5. Left: 28-1441 Bracket. Right: 28-1440 Bracket

8. Secure the cable to the bracket immediately below the GPR housing with a black nylon zip tie as shown in [Figure 14 - 6.](#).



Figure 14 - 6. Left: Coiled Cable Attached to 28-1441 Bracket with Zip Tie. Right: Coiled Cable Attached to 28-1440 Bracket.



Figure 14 - 7. Left: Final Installation with 28-1441 Bracket. Right: Final Installation with 28-1440 Bracket

Rockwell GPR-P Index Cover & GPR Install

GPR Direction

The GPR must face away from nearby walls and toward the nearest MCC or Concentrator, and should be installed in a location unobstructed by gas pipes. Mounting options are shown and described in [Appendix B, Rockwell Changing GPR Orientation](#).

GPR Mounting

1. Arrange the GPR Pulse Input and Battery Interface cables as shown in Figure 15 - 1. The cables must not interfere with or block the GPR antenna.



CAUTION: The GPR Pulse Input cable must be inserted into the GPR enclosure strain relief slot as shown. The shrink tubing on the cable must be inserted into the strain relief slot.



Figure 15 - 1. Pulse Interface Cable's Shrink Tubing Must Route Through GPR Strain Relief Slot

2. Install the GPR cover using the four security Torx screws included with the GPR. The cover must be installed with the gasket tab inserted into the strain relief slot located at the bottom left corner of the GPR enclosure as shown in the following photos.



WARNING: Take care not to pinch the Index Cover Cable assembly during GPR cover installation.



Figure 15 - 2. GPR Cover Gasket Tab and Cover Strain Relief Slot



Figure 15 - 3. GPR cover screws

3. Tighten the GPR cover screws to 13 inch-pounds (± 1 inch-pound).



CAUTION: Check the index cover switch cable assembly for nicks, abrasions, or any damage prior to installing the assembly onto the meter.

4. Install the GPR bracket onto the index cover so that the bracket slot straddles the cable strain relief as shown in Figure 15 - 4.
5. Use the two 5/16-18 x 1.25" screws and tamper cups provided in the parts kit to attach the GPR bracket onto the index cover as shown in Figure 15 - 4. Tighten the screws to between 15 and 20 inch-pounds, as shown in Figure 15 - 5.



Figure 15 - 4. Install GPR Bracket, Screws and Tamper Cups

6. Install tamper seals into the tamper cups as shown in Figure 15 - 7 and Figure 15 - 6.



Figure 15 - 5. Tighten Bracket Screws 15 to 20 inch-pounds



NOTE: Sensus (Rockwell/Equimeter) does not specify nor recommend a gasket between the index cover and meter head. The meter parts list and assembly diagram do not include an index cover gasket.



WARNING: Take care not to pinch the index cover switch cable assembly in any way, especially during the following installation steps:

**during index cover and cable assembly installation onto the meter.
during GPR enclosure cover installation.
between the GPR and meter brackets and meter.**



Figure 15 - 6. Coil Excess Cable

7. Coil the excess cable as shown in the photographs above.
8. Route the cable behind the index cover and dress it beneath the GPR bracket as shown in the previous photo. Take care not to crimp the cable or pull the cable tight.
9. Secure the coiled cable to the GPR bracket with a black nylon zip tie.



Figure 15 - 7. *Install a Seal In Each Tamper Cup*

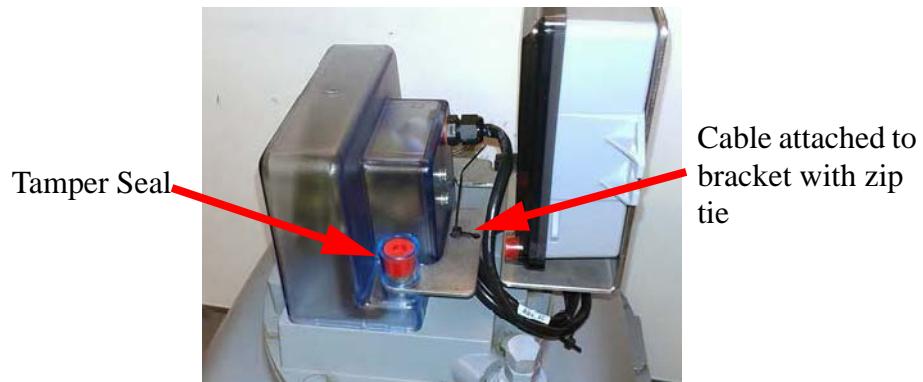


Figure 15 - 8. *Attach Cable to Bracket with Black Zip Tie*



Figure 15 - 9. *GPR and Index Cover Installed in Both Orientations*

Schlumberger GPR-P Index Cover & GPR Install

GPR Direction

If at all possible, the GPR must face away from nearby walls and toward the nearest MCC or Concentrator, and should be installed in a location unobstructed by gas pipes. Mounting options are shown and described in [Appendix C, Schlumberger Changing GPR Orientation](#).

GPR Mounting

1. Arrange the GPR Pulse Input and Battery Interface cables as shown in Figure 16 - 1. The cables must not interfere with or block the GPR antenna.



Figure 16 - 1. Pulse Interface Cable's Shrink Tubing Must Route Through GPR Strain Relief Slot

2. Install the GPR cover using the four security Torx screws included with the GPR. The cover must be installed with the gasket tab inserted into the strain relief slot located at the bottom left corner of the GPR enclosure as shown in the following photos.



Figure 16 - 2. GPR Cover Gasket Tab and Cover Strain Relief Slot

3. Tighten the screws to 13 inch-pounds (± 1 inch-pound).



Figure 16 - 3. GPR Cover Screws



NOTE: The Schlumberger/Actaris Solid State Pulser index cover comes with a silicone gasket. The installer is not required to install a separate gasket.



CAUTION: Check the index cover switch cable assembly for nicks, abrasions, or any damage prior to installing the assembly onto the meter.

4. Install the Solid State Pulser cover assembly as shown in the following photographs. The Solid State Switch must be located at the rear of the index.
5. Insert two 1/4x20x5/8 inch screws provided in the parts kit into the index cover front screw holes. Turn the screws clockwise until they begin to thread into the index cover mounting holes. Do not tighten the screws.
6. Insert the GPR Bracket into the index cover rear tamper cup slot as shown below.



WARNING: Take care not to pinch the index cover switch cable assembly in any way, especially during the following installation steps:

During index cover and cable assembly installation onto the meter.

During GPR enclosure cover installation.

Between the GPR and meter brackets and meter.



Figure 16 - 4. Slide Bracket into Index Cover Tamper Cup Slot

7. Insert two 1/4x20x5/8 inch screws into the index cover rear screw holes. Tighten all index cover screws to between 15 to 20 inch-pounds.
8. The cable may be routed above or below the mounting bracket as shown in the following photos. Use the routing method that provides the best security and protection to the cable.



Figure 16 - 5. Coil the Excess Cable



Figure 16 - 6. Route and Attach the Excess Cable

9. Attach the excess coiled cable to the GPR bracket with a black nylon zip tie as shown in the previous figures.



CAUTION: The cable should slope downward and away from the index cover to aid the water tight strain relief in preventing water from entering the cover. Do NOT crimp or pull the cable tight.

10. Insert tamper seals into the tamper cups.



Figure 16 - 7. GPR and Index Cover Assembly Installed On a Schlumberger Large Diaphragm Meter



WARNING: The index cover switch cable assembly must not be pinched in any way, especially under the following circumstances:

During index cover and cable assembly installation onto the meter.

During GPR enclosure cover installation.

Between the GPR and meter brackets and meter.

Sprague GPR-P Index Cover & GPR Install



WARNING: Before performing the following steps, determine the direction that the GPR will face. The GPR must face away from nearby walls and toward the nearest MCC or Concentrator. Refer to Appendix D for instructions on how to set the direction that the GPR will face.

1. Arrange the GPR Pulse Input and Battery Interface cables as shown in Figure 17 - 1. The cables must not interfere with or block the GPR antenna.



CAUTION: The GPR Pulse Interface cable must be inserted into the GPR enclosure strain relief slot as shown. The shrink tubing on the cable must be inserted into the strain relief slot.



Figure 17 - 1. Pulse Interface Cable's Shrink Tubing Must Route Through GPR Strain Relief Slot

2. Install the GPR cover using the four security Torx screws included with the GPR. The cover must be installed with the gasket tab inserted into the strain relief slot located at the bottom left corner of the GPR enclosure as shown in the following figures.



Figure 17 - 2. GPR Cover Gasket Tab and Cover Strain Relief Slot

3. Tighten the screws to 13.0 inch-pounds (± 1.0 inch-pound).



WARNING: The Index Cover Cable assembly must not be pinched during GPR cover installation.



Figure 17 - 3. GPR Cover Security Torx Screws

4. Bend about three inches of cable into a loop and attach the cable to the bracket with a nylon zip tie as shown in the following figure. Do not bend the cable so much as to crimp it. This provides additional security for the cable and serves as a drip loop.



Figure 17 - 4. Switch Cover and GPR Assembly, with drip loop



NOTE: The cable strain relief is water tight and does not require a drip loop

5. Position the GPR bracket assembly over the cover edges as shown in Figure 17 - 4.



CAUTION: Check the index cover switch cable assembly for nicks, abrasions, or any damage prior to installing the assembly onto the meter.

6. Coil the excess cable and route it behind the bracket as shown in [Figure 17 - 5](#). Position the cable behind the bracket and secure the cable to the bracket immediately below the GPR housing with a black nylon zip tie. Do not completely tighten the zip tie. The cable must remain free to move until the GPR has been installed on the meter.

Loosely secure the excess cable to the bracket with a black zip tie



Figure 17 - 5. Excess Coiled Cable Attached Beneath GPR Bracket



Figure 17 - 6. Excess Coiled Cable Attached Beneath GPR Bracket



WARNING: Take care not to pinch the index cover switch cable assembly in any way, especially during the following installation steps:

**During index cover and cable assembly installation onto the meter.
During GPR enclosure cover installation.
Between the GPR and meter brackets and meter.**

7. Install the Solid State Pulser index cover and GPR assembly over the meter dial index as shown in the next figure. The cover must be installed with the 1/8 inch thick cork gasket provided with the Solid State Pulser index kit.



Figure 17 - 7. Switch Wires Must Not Interfere With Index Pointers

8. Route the cable between the GPR bracket and top of the meter so that the cable has minimal slack protruding from behind the bracket. Verify that the cable is not pinched between the bracket and meter.

If the cable will not fit beneath the GPR bracket, or if the cable is subject to pinching or abrasion between bracket and meter, attach the excess coiled cable to the top of the index cover bracket, immediately below the GPR as shown in the next figure.



Figure 17 - 8. Cable Optionally Routed Above Index Cover Bracket

9. Tighten the nylon zip tie so that the cable is snug against the bracket. Cut away excess tie length.
10. Install the two 10-24 x 3/4 inch index cover screws with flat washers. Install one at lower left and the other at upper right. Do not tighten these screws.
11. Install two tamper cups, plastic washers, and 10-24 x 7/8 inch screws in the remaining cover holes. Tighten all four cover screws to a torque value of 20 inch-pounds.



Figure 17 - 9. Tamper Cups and Screws

12. Verify that the magnet wheel does not contact the switch. A visible gap must exist between the wheel and switch as shown in the following photograph.



Figure 17 - 10. Gap Must Be Visible Between Wheel and Switch

13. Install tamper seals into the tamper cups as shown in [Figure 17 - 11](#).



Figure 17 - 11. GPR Assembly installed on a Sprague Large Diaphragm Meter



WARNING: Take care not to pinch the index cover switch cable assembly in any way, especially during the following installation steps:

**During index cover and cable assembly installation onto the meter.
During GPR enclosure cover installation.
Between the GPR and meter brackets and meter.**

A

American Changing GPR Orientation

Procedure

The GPR must face away from nearby walls and toward the nearest MCC or Concentrator. The GPR should be installed in a location unobstructed by gas pipes. Different mounting options are shown in the following photographs.



Figure A - 1. GPR at Left Rear - Using 28-1443 Bracket



Figure A - 2. GPR at Right Rear - Using 28-1440 Bracket

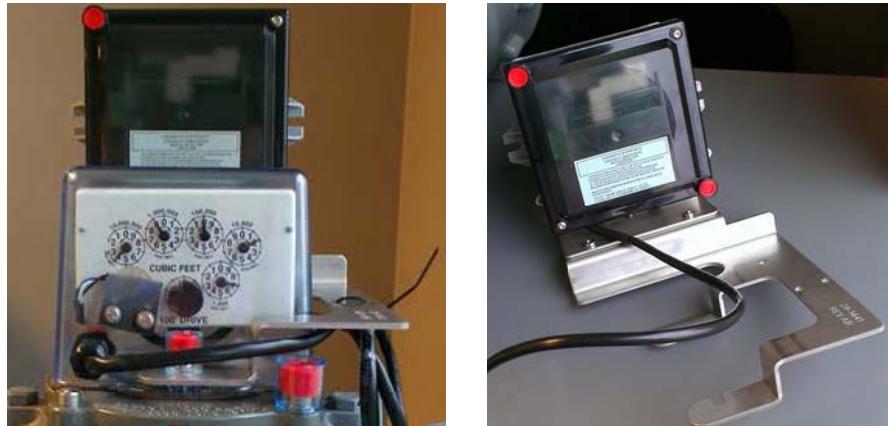


Figure A - 3. GPR at Center Rear - Using 28-1441 Bracket



Figure A - 4. GPR at Center Rear - Using 28-1423 Bracket

1. Lay the GPR face down. Remove the two screws and washers holding the two brackets together as shown in [Figure A - 5](#).

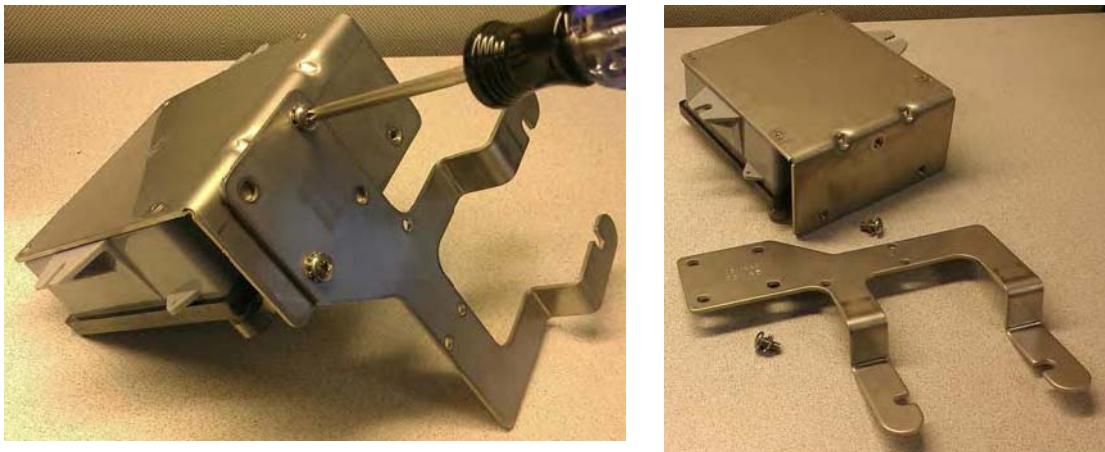


Figure A - 5. GPR Bracket Disassembly

2. Determine the appropriate GPR direction.
3. Install the two screws and lock washers. Tighten the screws to 30 inch-pounds (+/- 2 inch-pounds).



CAUTION: If the meter's pipe route prevents installing the GPR as described in this manual, the GPR may be mounted in a remote location away from the meter, such as on a wall or a gas pipe. The maximum cable length between the Mini Switch and GPR must not exceed 200 feet.



CAUTION: In a remote GPR Mounting environment, Pipe Bracket Kit 45-0080 may be used to install the GPR on suitable plumbing pipes. Remote GPR mounting is beyond the scope of this manual.

Rockwell Changing GPR Orientation

Procedure

The GPR must face away from nearby walls and toward the nearest MCC or Concentrator. The GPR should be installed in a location unobstructed by gas pipes. Different mounting options are shown in the following photographs.

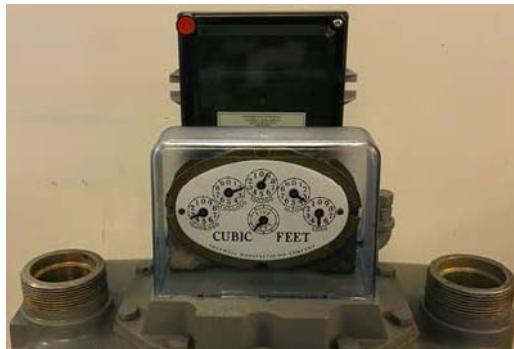


Figure B - 1. GPR Facing Forward-Center



Figure B - 2. GPR Facing Forward-Left

1. Remove the two screws and washers holding the two brackets together as shown in [Figure B - 3.](#)



Figure B - 3. GPR Bracket Disassembly

2. Determine the appropriate GPR direction.
3. Install the two screws and lock washers. Tighten the screws to 30 inch-pounds (+0 / -2 inch-pound).



CAUTION: If the meter's pipe route prevents installing the GPR as described in this manual, the GPR may be mounted in a remote location away from the meter, such as on a wall or a gas pipe. The maximum cable length between the Index Cover Assembly and GPR must not exceed 200 feet.

In a remote GPR Mounting environment, Pipe Bracket Kit 45-0080 may be used to install the GPR on suitable plumbing pipes. Remote GPR mounting is beyond the scope of this manual.

C

Schlumberger Changing GPR Orientation

Procedure

The GPR must face away from nearby walls and toward the nearest MCC or Concentrator. The GPR should be installed in a location unobstructed by gas pipes. Different mounting options are shown in the following photographs.



Figure C - 1. GPR Facing Left



Figure C - 2. GPR Facing Right

1. Lay the GPR on its back. Remove the two screws and washers holding the two brackets together as shown in the next figure.

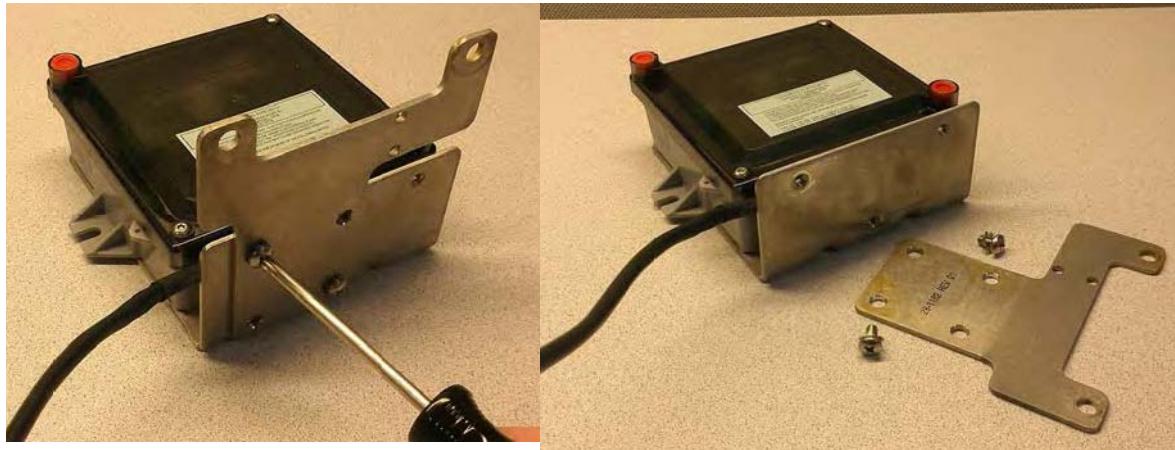


Figure C - 3. GPR Bracket Disassembly

2. Determine the appropriate GPR direction.
3. Install the two screws and lock washers. Tighten the screws to 30 inch-pounds (+ / - 2 inch-pounds).



CAUTION: If the meter's pipe route prevents installing the GPR as described in this manual, the GPR may be mounted in a remote location away from the meter, such as on a wall or a gas pipe. The maximum cable length between the Index Cover Assembly and GPR must not exceed 200 feet.

In a remote GPR Mounting environment, Pipe Bracket Kit 45-0080 may be used to install the GPR on suitable plumbing pipes. Remote GPR mounting is beyond the scope of this manual.

Sprague Changing GPR Direction

The GPR must face away from nearby walls and toward the nearest MCC or Concentrator. The GPR may be oriented in three different directions:

- Forward toward the front of the meter
- 90 degrees toward the left side of the meter
- 90 degrees toward the right side of the meter

The previous instructions show the GPR facing towards the front of the meter.

The following figures show the other two possible orientations.



Figure D - 1. GPR Facing Right Side of Meter



Figure D - 2. GPR Facing Left Side of Meter

1. Lay the GPR face down. Remove the two screws and washers holding the two brackets together as shown in [Figure D - 3.](#)



Figure D - 3. GPR bracket disassembly

2. Determine the appropriate GPR direction.



WARNING: The GPR must be mounted in the forward-most position on the lower bracket so that the gas pipes do not interfere with data transmissions. Refer to the following figures for additional detail.



Figure D - 4. Left-Facing GPR Shown Extended Forward to Avoid Gas Pipe Interference



WARNING: A right-facing GPR must have the cable routed as shown in [Figure D - 5.](#) The cable must not be routed around the edge of the GPR bracket ([Figure D - 6.](#)), where it may be exposed to unknown hazards.



Figure D - 5. For Right-facing GPR Installs, Route Cable As Shown



Figure D - 6. Do Not Route the Cable In Front of the GPR Bracket - Route the Cable As Shown in Figure D - 5



Figure D - 7. GPR Facing Left Side of Meter



Figure D - 8. GPR Facing Right Side of Meter

3. Install the two screws and lock washers. Tighten the screws to 30 inch-pounds (+0 / -2 inch-pounds).



CAUTION: If the gas meter's pipe route prevents installing the GPR as described in this manual, the GPR may be mounted in a remote location away from the meter such as on a wall or a gas pipe. The maximum cable length between the Index Cover Assembly and GPR must not exceed 200 feet.

Remote GPR mounting is beyond the scope of this manual.



CAUTION: In a Remote GPR Mounting environment, Pipe Bracket Kit 45-0080 may be used to install the GPR on suitable plumbing pipes.

GPR Connection Water Proofing Materials

Ordering Information

Dow Corning 4 Electrical Insulating Compound may be ordered from:

Ellsworth Adhesives

W129 N10825 Washington Dr.
Germantown, WI 53022
Phone: 1-877-454-9224
Part #: 4 CMPD 150G TUBE
<http://www.ellsworth.com/Home.html>

Cone-Shaped Adhesive Nozzles for Dow 4 Compound may be ordered from:



NOTE: Nozzles listed here have not been tested to verify compatibility with Dow 4 Compound tube threads. Contact each supplier's customer support for additional information

3M Collision Repair Solutions

3M™ Threaded Cartridge Nozzle
Part Number: 08187
UPC: 00051135081877
Stock Number: 60455034698
<http://3mcollision.com/products/tools/applicators-and-accessories/3m-threaded-cartridge-nozzle-08187.html>

3M Distributors

<http://3mcollision.com/dealers/search?zip=30022&lat=34.029613&lng=-84.23841700000003>

DKHardware.com

Phone: 877-509-8040
CRL Screw-On Uncut Standard Urethane Nozzle
Item # UN0Z
<http://www.dkhardware.com/product-11007-un0z-screw-on-uncut-standard-urethane-nozzle.html>

Ellsworth Adhesives

W129 N10825 Washington Dr.
Germantown, WI 53022
Phone: 1-877-454-9224
<http://www.ellsworth.com/Home.html>

- Sika Nozzle - Uncut
- Part #: A4006P - 189429
- Description: Uncut nozzle for adhesive dispensing.

Sold as pack (6/pack)

<http://www.ellsworth.com/display/productdetail.html?productid=1453&Tab=Vendors>

- Sika Nozzle - Threaded Cone
- Part #: 883970 - 169853
- Description: Threaded cone nozzle for adhesive dispensing.

Sold as pack (6/pack)

<http://www.ellsworth.com/display/productdetail.html?productid=1443&Tab=Vendors>