# Transmitter Certification

# Test Report

**FCC ID: SDBGFL**

**FCC Rule Part: CFR 47 Part 24 Subpart D, Part 90 Subpart I, Part 101 Subpart C**

**ACS Report Number: 06-0194-LD**

Applicant: Advanced Metering Data Systems, LLC
Equipment Type: Water Meter Data Transmitter
Trade Name: Sensus AMDS GFL Gas Meter Transmitter
Model(s): GFL

# Users Manual

# Product Description

The FlexNet® wireless transmitter for gas AMR applications permits offsite meter reading by way of a fixed base radio network. In addition to solving meter reading problems such as lockouts, entering unsafe meter locations, "curbside" reading estimates, estimated billing, and errors associated with manual meter reading methods, a fixed network provides benefits such as daily reads and status alerts.

A significant advantage of the module is its powerful one- Watt transmitter. The long range enabled by the strong signal and high receiver sensitivity, minimizes the number of base station receivers and provides optimal coverage at minimal deployment and ongoing costs. FlexNet transmitters are powered by a replaceable Lithium battery pack, with an expected service life of over 20 years.

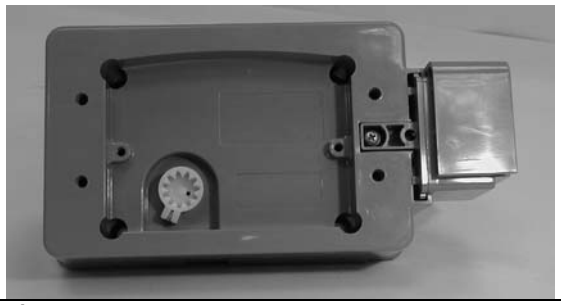
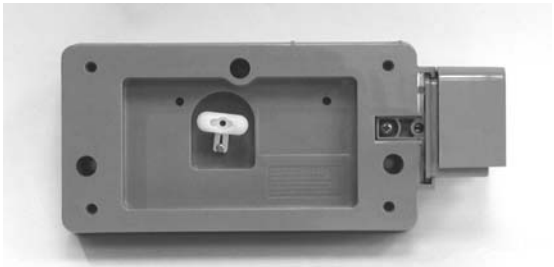
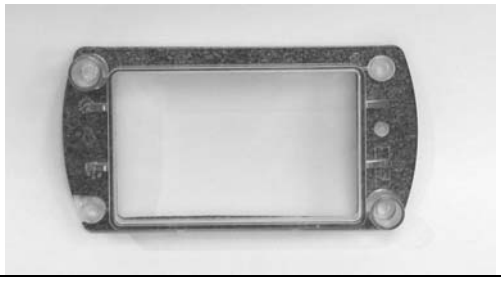
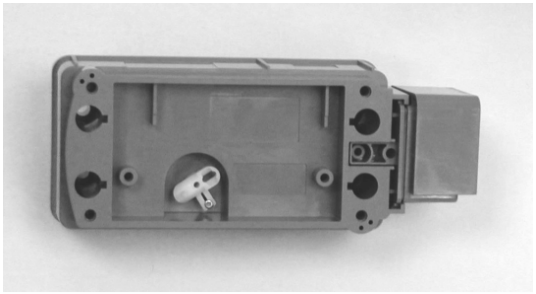
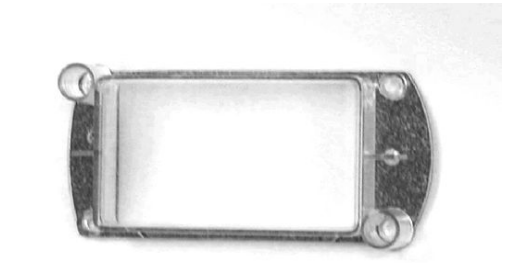
The transmitter is enclosed in a durable polycarbonate casing with a clear cover that enables reusing the original meter index. The module consists of a narrow band transmitter, magnetic sensors, and mechanical meter interface that includes a shaft with a magnet. A handheld terminal is used to initialize operation. The module monitors the meter and sends data to the base station receiver network at predefined and programmable intervals. Transmitter messages contain meter reading data, status and relevant parameters such as index pressure and the number of dials. Messages are routed to a database, where the data gets formatted for export to billing, marketing and customer service systems.

| Compatible Meters | |
|---|---|
| Sensus (Rockwell, Equimeter, Invensys) | R175, R200, RT200, RT230, R275, RT275, R315, R250, R310, S110, S200, 175S, S120, T120, T110 (11-tooth gear) |
| | R415, RT100, RT360 (18-tooth gear) |
| | MR-8, MR-12 (16-tooth gear) |
| American/Canadian Meter | W75AL, AL175, AC175, AT175, ALC175, AT210, AL225, 5B, AL250, AR250, AC250, AT250, AM250, AL310, AL350, AT350, AL425, AC630 |
| Actaris (Sprague, Schlumberger) | 175, 175WC, 210, 240, 250, 250WC, METRIS 250, 400, 400A (All slant interface, 3 hole index cover) |

| Specifications | | | |
|---|---|---|---|
| **RF Output** | 30dBm (1 Watt) | **Power Supply** | Lithium Thionyl Chloride batteries with HLC |
| **Range** | Urban area (typical) – over 5 miles (8 km) | **Battery Life (Typical)** | Over 20 years for daily reads<br>Over 10 years for hourly reads |
| **Modulation** | Proprietary narrow band | **Regulatory Compliance** | FCC CFR 47 Part 15, Part 24, Part 90, and Part 101 Rules<br>Certified Intrinsic Safety Certification Measurement Canada Certification |
| **Data Rate** | Up to 8 Kbps | **Environmental** | -40C to +80C, up to 95% relative humidity |
| **Frequencies** | 896-960 MHz, 10,240 channels x 6.25 kHz steps | **Alerts** | Magnetic tamper Non-reads, High/Low alerts – via MDM software |
| **Memory** | Non-volatile | **Warranty** | 20 years for battery (with daily reads) and electronics |

# *Automated Meter Reading (AMR)*

## *Meter Components*

| Transmitter | Cover | Supported Meters |
|---|---|---|
| **FlexNet 100G-FL**<br>  | | AC250, AL175, AL250, AL5B (=AL225), AL425 and any other American Meter model with a standard residential index. |
| **FlexNet 200G-FL**<br>  |  | S175, S240, S250, Schlumberger Metris MET250 and S400, with slant index interface. |
| **FlexNet 300G-FL**<br>  |  | AC250, AL175, AL250, AL5B (=AL225), AL425 and any other American Meter model with a standard residential index. |
| **FlexNet 700G-FL**<br> | Transmitter (on the left) is shown with cover and mounting plate | Sensus Sonix 12, 16, 25, volume correcting instruments and any other device with Form-A or 'dry contact' pulse output. |

# *Transmitter Mounting Instructions*

## *FlexNet 100G-FL, 200G-FL and 300G-FL*

See the appendix for descriptions of the screw kits and tools required for mounting the AMR transmitters.

### *Remove Index Cover*

1. Use a small, flat screwdriver to punch out the snap seals covering the index cover screws.

| **NOTE:** |
| --- |
| If two (2) or more screws shear off during the cover removal (or were previously sheared off), the meter will need to be replaced by a qualified utility representative. Reinstall any index cover screws that were removed and cap with seals if possible. Enter the appropriate information in the *Mint* HHT |

2. Remove the index cover screws.
3. Remove the index cover.

### *Remove Index*

1. Remove the screws securing the index to the meter.
2. Carefully, remove the index from the meter.
3. Remove any debris from the index.
4. Inspect the index for proper operation by turning the input shaft and verifying that the gears turn freely.
5. Inspect the index for any missing or broken hands.
6. Use a putty knife to scrape away any remaining gasket material.

### *Mount Transmitter*

1. Align the transmitter's shaft with the gas meter's male/female wriggler.
2. Place the AMR Transmitter on the gas meter.
3. Adjust the transmitter shaft's position
4. Ensure the shafts are aligned by holding the transmitter in place and gently rotating the transmitter's shaft with your other hand.
5. Loosely attach the transmitter to the meter using the transmitter mounting screws
6. Check shaft alignment.

| **NOTE:** |
| --- |
| If two (2) or more screws shear off during the cover installation, the meter will need to be replaced by a qualified utility representative. Reinstall any index cover screws that were removed and cap with seals if possible. Notify the utility of the condition of the meter in accordance with your company policy. |

7. Tighten the transmitter mounting screws.

### *Replace Index and Install New Index Cover*

1. Loosely attach the index to the transmitter using the index screws.
2. Align the index's male/female wriggler with the transmitter's shaft, and adjust as needed.
3. Center the index in the transmitter, and ensure there is no binding between the shaft and the wriggler.
4. Secure the index screws.
5. Install the new index cover.
6. Align the gasket with the transmitter.

**CAUTION**

Use care when working with a power screwdriver to insert screws in the plastic Transmitter box. Over tightening will damage the box and/or weaken the contact. Failure to comply with this caution can result in damage to the equipment.

7. Secure the cover to the transmitter with the index cover screws.
8. Align and insert the two snap seals into the index cover using a ¼" nut driver until the snap seals are fully seated.

# *FlexNet 700G-FL*

## *Pulse Output Identification*

1. If the output is a 'dry contact' pulse (i.e., magnetic relay, reed switch), use both wires.
2. If the output is an electronic pulse:
   a. Connect the 'plus' wire, to the red wire from the transmitter.
   b. Connect the 'minus' or ground wire to the black wire from the transmitter.

## *Mount Back Plate*

**NOTE:**

When locating a place for the transmitter, consider:

- The wire lengths
- The convenience of wiring and ability to properly secure the wires
- That a high spot is preferable for optimal radio coverage
- The proximity (<6") of the transmitter to metallic objects (not including the pipe on which the transmitter is mounted)

1. Locate an appropriate spot for mounting the transmitter.
2. Secure the back plate to the wall with the mounting screws, or to the pipe using the pipe clamp. The pipe clamp can be horizontal or vertical as long as the back plate is horizontal.

## *Mount Transmitter*

1. Before mounting the transmitter, use the HHT to ensure that the transmitter is functioning properly. Refer to the *Gas AMR Installation HHT (Mint) User's Guide*.
2. Secure the transmitter to the back plate using the mounting screws.
3. Ensure that the transmitter is completely secure and horizontal.

## *Splice Wires*

1. Strip the wires so that approximately 2" of the wires are exposed.
2. Insert two matching wire ends, as identified in Step 2 of "Pulse Output Identification," into a UY-2 gel-cap.
3. Crimp the gel-cap using the 3M Scotchlok® E-9Y steppe-jaw crimping tool until the cap releases the waterproof gel,
4. Ensure the splice is secure by gently pulling on the gel-cap while holding the wires.
5. Repeat Step 1 through Step 4 for the remaining connection.
6. Secure any unused connections with UY-2 gel-caps.

If any of the wire connections are not being used they should be capped at the end with a UY-2 gel-cap. This is to prevent water from getting into unused wires.

7. Secure excess or loose wiring.
8. Mount index cover on transmitter and secure with the index cover screws.
9. Align and insert the two snap seals into the index cover using a ¼" nut driver until the snap seals are fully seated.

# *Initialize Transmitter*

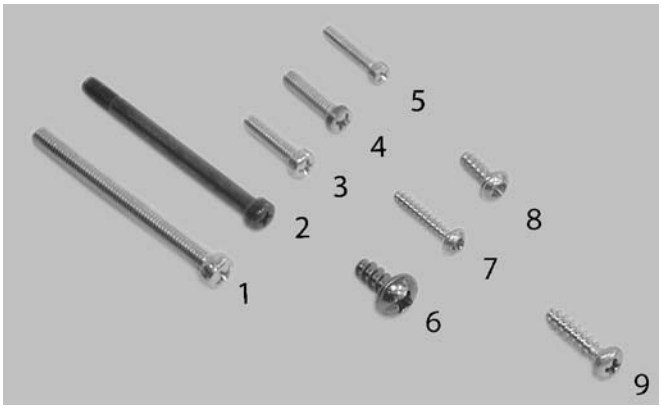
Use a Sensus handheld terminal (HHT) to initialize the transmitter.

# *Appendix: Screw Kits and Tools*

## *Screw Kits*

Screw kits accompany the AMR transmitters. Each kit contains any of the following (depending on transmitter model):

- Mounting screws
- Index screws
- Index cover screws
- Snap seals
- 3M Scotchlok® UY-2 butt connector “gel-caps”
- Pipe clamp




### *Mounting Screws*

1. Equimeter/Rockwell commercial meter (e.g. R750) – 5/16” x 3½” combo fillister
2. American commercial meter (e.g. AL800) – #18-18 x 84 Phillips pan head
3. American residential meter (e.g. AC250) – ¼” x 1” Phillips fillister
4. Schlumberger/Sprague residential meter (e.g. S175) – 10-24 x 1” Phillips fillister
5. Equimeter/Rockwell residential meter (e.g. R275) – 10-24 x 1” Phillips fillister

### *Index Screws*

6. Equimeter/Rockwell commercial meter (e.g. R750) – WN1411 KA 60x14 Phillips
7. Equimeter/Rockwell residential meter (e.g. R275) – WN1412 KA 35x22 Phillips
8. American & Schlumberger/Sprague residential meter– WN1411 KA 40x12 Phillips

### *Index Cover Screws*

9. All residential meters – WN1412 KA 50x20 Phillips

## *Tools*

Mounting the transmitters require the use of standard and specialized tools. Depending on the model of the transmitter, the following tools are needed.

- Phillips screwdriver (#1, #2)
- Standard screwdriver (¼” blade, $^{5}/_{32}$” blade)
- Stiff-blade putty knife
- Pointed tweezers
- ¼” Nut driver
- 3M Scotchlok® E-9Y steppe-jaw crimping tool with wire cutter
- Sensus handheld terminal (HHT)

# APPENDIX A: REGULATORY INFORMATION:

**COMPLIANCE INFORMATION:**

**FCC:**

NOTE: 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:

- Reorient of relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet or circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

WARNING: Changes or modifications to this device not expressly approved by Sensus or AMDS LLC could void the user's authority to operate this equipment.

**Industry Canada:**

This Class B digital apparatus meets all requirements of the Canadian Interference Causing Equipment Regulations. 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.
Cet appareillage numérique de la classe B répond à toutes les exigences de l'interférence canadienne causant des règlements d'équipement. L'opération est sujette aux deux conditions suivantes: (1) ce dispositif peut ne pas causer l'interférence nocive, et (2) ce dispositif doit accepter n'importe quelle interférence reçue, y compris l'interférence qui peut causer l'opération peu désirée.

**RF Exposure:**

In accordance with FCC requirements of human exposure to radiofrequency fields, the radiating element shall be installed such that a minimum separation distance of 20cm is maintained.

# APPENDIX B: REGULATORY LABELING

**FCC LABELING:**

This device when used in an end product where the FCC label of the device is not visible must have an exterior label as shown below.

Contains FCC ID: SDBGFL
Contains IC: 2220A-GFL
This device complies with Part 15 of the FCC Rules and Industry Canada requirements. Operation is subject to the following two condition: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation."
This Class B digital apparatus complies with Canadian ICES-003.
Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.