Chapter 1 DRAFT 1

FIREFLY Installation

Installation Preparation

Installation Overview - Sensor End

1. Set Auto Advance to "Off" from the Main Menu, Option 'C'.
2. Install the optical sensor. *(See instructions "Installing the Optical Sensor" on page 2).*
3. Program the FIREFLY MIU using the PPU (*See instructions "Programming the FIREFLY MIU" on page* ***Error! Bookmark not defined.***).
4. Choose a method and mount the FIREFLY MIU.
5. Set the FIREFLY interegation mode to Install Read to verify the FIREFLY MIU is transmitting properly by using the ROADRUNNER to receive an RF message.

Installation Considerations

1. Signal distance varies depending on the location of the MIU. FIREFLYs installed above-ground generally transmit the greatest distance.
2. The material of a pit or vault lid affects the transmission range. For example, a transmitter has a greater range sending from a pit with a plastic lid than a cast iron lid.
3. Lids with holes of a diameter of one inch make it possible to mount of the FIREFLY MIU through the lid. This can increase transmission range significantly.
4. Complete field installation of an MIU takes 5-10 minutes, depending on the meter location and mounting application.

5. If the lid has a hole for the unit, use the cap and wing nut assembly ("lid lock" pictured at right). Ensure that enough space exists between the box lid and the ground for the unit to sit. If not, remove some of the dirt from the bottom of the box. **Do not over-tighten lid locks.**

Water FIREFLY Installation

Installing the Optical Sensor-End FIREFLY

Meter Preparation

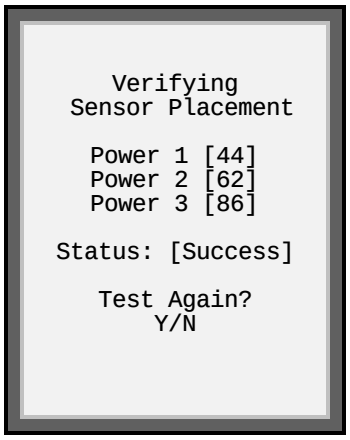
1. Remove meter box lid.
2. Survey the meter, checking lid, hole depth, and overall cleanliness.
3. Check for meter disqualification's and enter the corresponding skip code.
4. Clean excess dirt from meter lid, exposing meter number and verify it with the account on the ROADRUNNER.
5. Flip lid back and pre-clean meter face/lens using Fast Orange™ non-pumice cleaner and a cloth or cotton swab to remove residue.
6. Clean meter face/lens with an isopropyl alcohol and a **NEW** lint-free cotton swab.

Note: Use Isopropyl rubbing alcohol, 99% by volume, for best results. Lower concentrations do not clean as well and adversely affect the sensor-to-meter bond.

7. Re-wipe the surface of the meter lens with a clean, new cotton swab each time until the swab comes up clean, and the clean lens squeaks when wiped.
8. After cleaning, ensure that the lens is *completely dry*; allow time for the alcohol to evaporate

Background Check

1. Connect the ROADRUNNER to the FIREFLY via the PPU.
2. On the 860 ES ROADRUNNER Press **SHIFT** **I** to display the FIREFLY main menu and on the ROADRUNNER X7 press **F5** .
3. Press **A** to begin testing the FIREFLY optics.



The values shown are in decimal and the test keys on Power Level 2 (P2). A successful test and sensor target placement is achieved when the P2 value is 60 or greater.

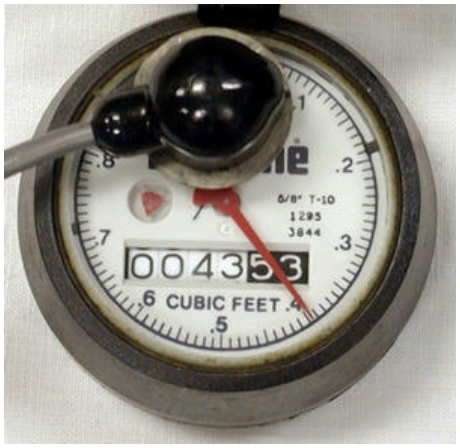
**After completing the sensor background test, determine if another alcohol cleaning is needed on the register face prior to installation of the sensor.*

Sensor Flap

Within each case of FIREFLYs, 24 rubber Sensor Flaps are included for every installation. Utilizing these Sensor Flaps insures a stable environment during the calibration process.

Sensor Placement

1. Insert sensor cable through sensor flap.
2. Remove the adhesive backing from the high-bond tape on the Optic Sensor face.
3. Install sensor to the location of the best background according to the background check.
4. Orient the sensor so the water meter needle approaches the sensor from the cable side and perpendicular to the cable. There are indents on each side of the sensor base that are to be in line with the needle when it passes.
5. Attach the sensor to the water meter lens surface.
6. **Since the 3M tape provides a *pressure sensitive seal,* the installer must apply 15 lbs. of pressure to the MIU sensor immediately after attaching to the lens surface. The next step is to maintain constant pressure for a minimum of 60 seconds.**



Tip: Palm the sensor and lean onto it to apply the appropriate pressure.

7. A full cure on the seal is achieved in 24 - 96 hours. Do not touch, pull, move, or handle the sensor in any way during this period.
8. Apply approved adhesive around the sensor to seal it completely in case the pit fills with water prior to the 24 - 96 hour cure time, or if the meter face is curved and not flat.

Note: If the sensor is initially misplaced, do not attempt to remove the sensor by twisting the sensor body. A fully cured sensor requires breaking the seal at the adhesive tape joint with a flat tool such as a screwdriver. Insert the screwdriver between the aluminum base and meter lens and twist.

9. Mount the FIREFLY MIU to an appropriate wall, stake or through hole in meter box/vault lid with the threaded neck pointing up.
   If using a stake, bury the stake in the ground adjacent to the meter register at least 6 inches. The platform area of the pole needs to face inward.
   Position the MIU on the pole platform.
   Attach the MIU to the pole with the binding material, such as a zip tie (14”).

   If utilizing a lidlock, make certain Not to overtighten the FIREFLY within the lock. Also be sure to never rest the weight of the lid on the FIREFLY.
10. Place sensor flap over sensor, insuring a snug fit.
11. Program the MIU and set to "AutoCAL".
12. Prior to leaving, take an RF read (using the Install Read Mode).

Installing the Wire-end FIREFLY

1. *Refer to Appendix C “Meter Qualification” on page **Error! Bookmark not defined.** to determine wire connection for the brand and model of meter.*
2. Connect FIREFLY wire-end to meter contacts using Posi-lock connector or Gel caps.
3. Use burial pod/epoxy combination to cover the wire connections.
4. Mount the FIREFLY to an appropriate wall, stake, or through hole in the meter box / vault lid.
5. If using a stake, bury the stake in the ground adjacent to the meter register at least 6 inches. The platform area of the pole needs to face inward.
6. Position the MIU on the pole platform.
7. Position the FIREFLY MIU with the threaded neck pointing up.
8. Attach the MIU to the pole with the binding material.

Note: Do not connect a multi-meter, probe or other interrogating device to the FIREFLY wires. Doing so may cause the unit to globally reset, erasing all programmed data!

Installing the Wire End FIREFLY with a Logical Switch

The FIREFLY Logical Switch MUST be handled with care at all times. A drop or shock of any kind could effect the performance of the Logical Switch. The Logical Switch is compatible with FIREFLY Firmware 0108 and above.

Use the following instructions to install FIREFLYS:

1. Set Reading Mode to **Install Mode.**

Connect Wires with the FIREFLY and Logical Switch

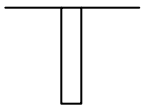
2. Connect the wires with the MIU and Logical Switch using the schematics below:

Schematics:

FIREFLY	**Brown**	**White**	**Blue**
Logical Switch	**Black**	**White**	**Red**

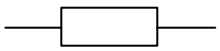
3. Connect wires using gel cap connectors. If wires are stripped, cut off the stripped ends. Wires must have unstripped ends for use in gel cap connectors.
4. Splice Methods:
   A. Water Pit Splice Method

      Fill the burial pod about halfway with epoxy. Insert the UY connections into the burial pod so that cables come out of either side. Completely fill the empty space left in the pod with approved 2-ton epoxy and snap shut. Allow 10 minutes to dry before water comes in contact with pod. Example of how to secure wires in pod:



   B. Basement Splice Method

      The mastic pad should be cut into thirds, no smaller. All wires must be covered with the pad. Example of how to secure wires:



Clean the Register

5. Clean the register with a rag to make sure there is no mud or dirt that would get caught between the collar and glass.

Attach the Logical Switch to the Register

6. Place the Logical Switch on the register and secure with the two screws attached on the switch.

Programming the Template

7. Couple the PPU with the MIU.
8. Press Shift I, 2 to program the MIU.

9. Verify the meter #.
10. Enter the visual reading.
11. View Current Settings screen--Check normal values entered on template and battery voltage--Enter.
12. View FF Options screen--Select **Save and Exit** and press Enter.
13. Select Meter brand and size.
14. When ROADRUNNER has returned to the route, turn off the PPU.
15. Interrogate (press I) MIU using manual mode—you should now get a reading.

Mount the FIREFLY

16. Mount the MIU to a stake, wall or as predetermined.
17. Zip tie cable to meter.

Electric FIREFLY Installation

Installation Preparation

Following is a list of hardware needed to install one Electric FIREFLY on one meter:

Landis &Gyr	**ABB**
Two 32 x ½ inch long screws	Two 0.25 in. spacers
Two .25-inch spacers	Two fuse clips – part #3510
Two meter spacer posts	Original screws are used
Two fuse clips - part #3510	
Sangamo	**GE**
Two 1/8" x ½" long screws	Two 4-48x3/8 long screws
Two 0.25 inch spacers	Two 0.25 spacers
Two fuse clips – part #3510	Two fuse clips – part #3510
	Two Lock Washers
Westinghouse	
Two 6-40 x ½" long screws	
Two 0.25 inch spacers	
Two fuse clips – part #3510	

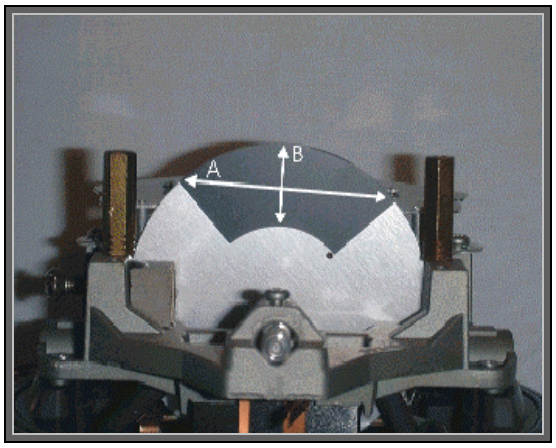
Installing Disk Decals

1. Remove nameplate on meter.
2. Clean rotating disk target area with 99% isopropyl alcohol.
3. Place approved decal* on target area. Be sure the edge of the decal is not overhanging on the disk and it is centered of the FIREFLY optical sensors.
4. The user needs to smooth the decal on the plate by applying pressure with his/her thumb.

Note: Be sure not to touch the adhesive side of the decal as the oil from the skin can cause it not to adhere.

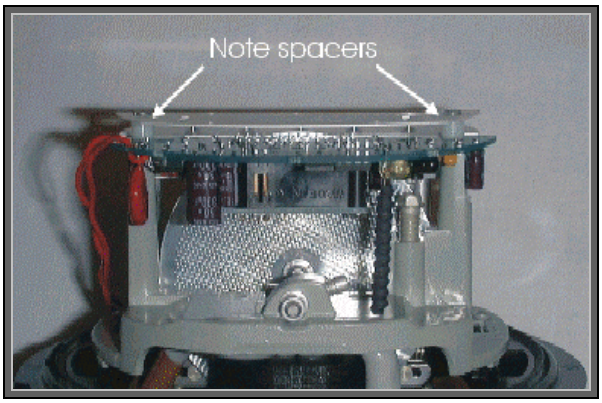
5. Clean surface of decal after installation with same cotton/alcohol swab to remove skin oil.

**Contact Datamatic for specifications on approved decals*



(A=58mm, B=24mm)

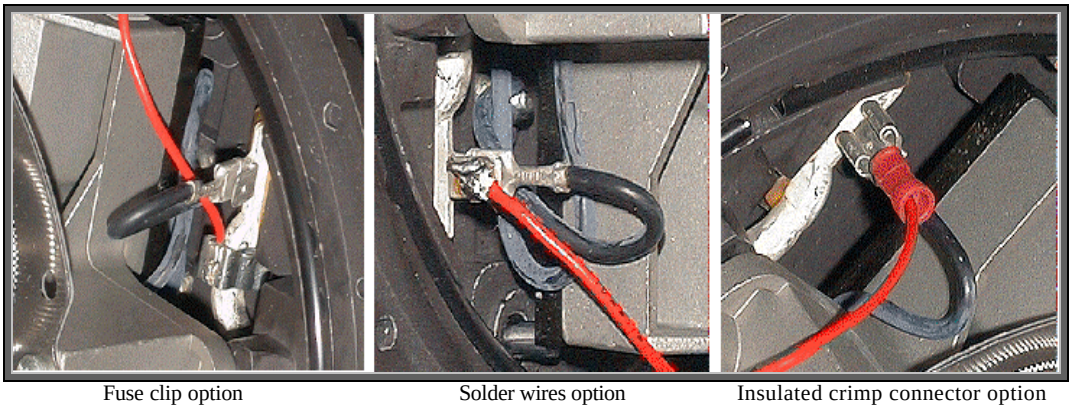
Installing the Electric FIREFLY



1. Remove nameplate.
2. Position the unit on top of the nameplate posts.
3. Mount the unit flush on top of the nameplate posts with the spacer and nameplate above it.
4. Thread the mounting screw through the nameplate, the 0.25-inch spacer, (*see following illustration*), and FIREFLY into the nameplate post holes.
5. Adjust play in mounting holes so that FIREFLY is parallel with disk and the distance between sensor face and disk is between 0.070 and 0.110 inches.

6. Choose one of the following three options to connect the wires to the 240VAC terminals on the meter.
   - Option A. Use fuse clip to attach wires to the 240VAC terminals on the meter.
   - Option B. Use soldering to attach two wires to the 240VAC terminals on the meter.
   - Option C. Use female insulated crimp connector to connect the wires to the 240VAC terminals on the meter.

Note: If connectors are used in place of soldering, use UL-certified crimper.



Fuse clip option | Solder wires option | Insulated crimp connector option

Note: The FIREFLY requires 240VAC during programming for the settings to be written to its memory.

7. Power the meter with 240VAC or power the FIREFLY using between 5 and 12 volts applied to the external battery jack.
8. Zero out the register.

Gas FIREFLY Installation

Installing the Gas FIREFLY

1. Remove meter index cover.
2. Ensure that no gasket material remains on the meter.
3. Remove the meter index.
4. Install the meter index onto the front of the Gas FIREFLY, ensuring that the rotating shaft seats into the index crank.
5. Install the gas FIREFLY onto the meter, ensuring that the rotating shaft engages the index drive.
6. Place the index cover gasket onto the inner surface of the index cover.
7. Install the index cover onto the gas FIREFLY.

WARNING: These devices operate under Part 15 of the FCC rules. Modifications to these devices not expressly authorized by Datamatic, Ltd. May affect your ability to legally operate these devices.