PRM 2101K

Outdoor Microphone Preamplifier System

User Manual

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IPRM2101K Rev C

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CHAPTER

1 PRM2101K Outdoor Microphone Preamplifier System Installation and Operation

Introduction

The PRM2101K outdoor preamplifier has been designed for permanent outdoor use in severe weather conditions. It is constructed of stainless steel to resist corrosion, and its thin profile minimizes both wind resistance and acoustic reflections. It is mounted to resist shock and will screw onto any 1.5" standard pipe thread.

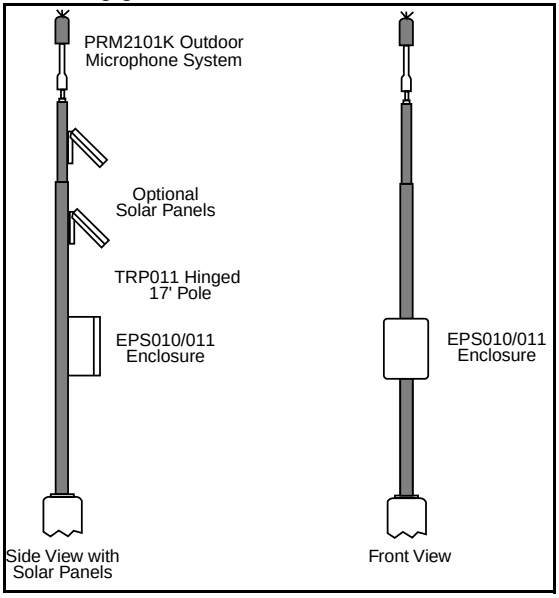

FIGURE 1-1 Remote Noise Monitoring Site

The PRM2101K is designed to be a major component of a remote noise monitoring site as shown in FIGURE 1-1 "Remote Noise Monitoring Site" . A typical remote noise monitoring site includes the following components:

- PRM2101K with preamplifier, electrostatic actuator and driver, heater, and silica gel desiccant chamber
- EPS2110 rainhat with electrostatic actuator
- WS005 windscreen with birdspikes

In addition, the following Larson Davis accessories are recommended:

- Random incidence microphones (Model 2560 or 377A60) or free-field microphone (Model 2541 or 377B41)
- Model 820 sound level meter with 820-OPT 01 Control output
- PSA007B NMS switching power supply (90 - 264 VAC) with battery BAT001 (12 V, 26 Ah) or PSA012B Solar Battery Power Supply with 47 W solar panel.
- Preamplifier cables EXC020 and CBL009-020
- Tilt-down TRP011 (17', aluminum) , portable tripod tower TRP007-10 (10') or portable tripod tower TRP007-20 (20')
- TRP008 accessory mount for fixing weather sensors into the TRP007 portable tripod tower.
- TRP012 accessory mount for fixing weather sensors into the TRP011 17' tilt-down tower.

Initial Installation

The PRM2101K comes from the factory fully assembled, with its microphone installed (if purchased at the same time). The microphone grid cap is replaced with the rainhat and electrostatic actuator. The grid cap is stored in the microphone box for use when the system is acoustically calibrated. (If the PRM2101K is purchased without a microphone, see Figure 1-4 "PRM2101K Assembly".)

The PRM2101K is installed on a 1.5" diameter threaded pipe, such as at the top of the TRP011 or other pole.

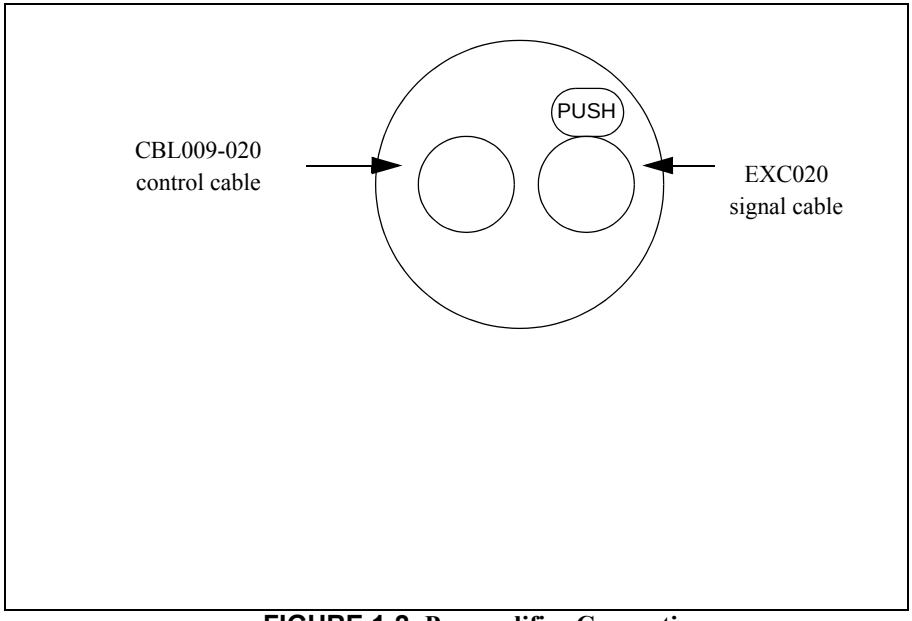

FIGURE 1-2 Preamplifier Connections

PRM2101K Mounting Instructions

To mount the PRM2101K on an outdoor pole, follow the instructions in the order listed and refer to Figure 1-3 "Mounting the PRM2101K". Larson Davis tilt-down towers must be installed according to contractor specifications.

Mounting the PRM2101K.

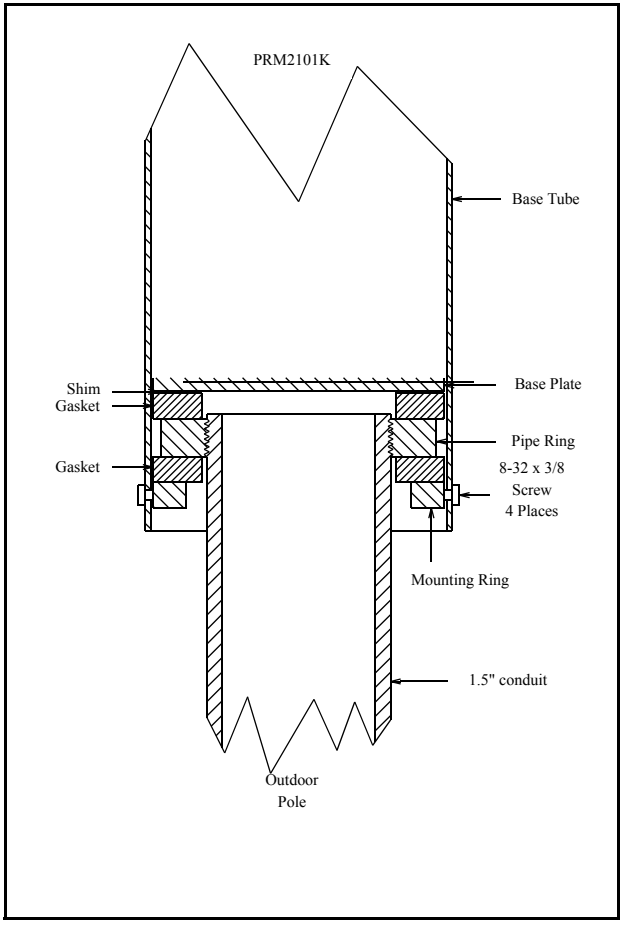

FIGURE 1-3 Mounting the PRM2101K

1. First slide the mounting ring, then one rubber gasket, over the 1.5" conduit or pipe on the top of the outdoor pole.
2. Fasten the pipe ring firmly on the 1.5" pipe. For proper shock mounting, threads must not extend beyond the top surface of the ring
3. Place one or two clear plastic shims in the bottom of the base tube if needed for tightness.
4. Place the second rubber gasket in the bottom of the base tube.
5. Connect the EXC020 and the CBL-009 to the base of the PRM2101K and mount the PRM2101K onto the TRP011 such that the desiccant chamber window will be facing towards the ground if the pole can be lowered. This will make it easier to change the desiccant in the future.
6. Align the four holes of the base tube with the corresponding holes in the mounting ring. Use the socket head screws to secure the PRM 2101K. Turning the PRM2101K is not required.

The other ends of the preamp cables connect to an accessory as follows:

- The EXC020 female end connects to the 820 preamplifier input.

- The CBL009-020 enclosure end has three connectors: the stereo plug connects to the 820 control I/O port, the others to the PSA007B power supply (push-on to fuse box and spade to grounding block). The 820 control I/O port is the one closest to the instrument battery compartment.

Sound Measurement

The PRM2101K is normally shipped with a precision air condenser microphone installed under the EPS 2110 rainhat.

With the PRM2101K connected to the 820, turn on the polarization voltage (normally the 200 V setting is used) and observe if the instrument is responding to sounds. The PRM 2101K will perform similarly to a standard preamplifier. If there are any difficulties at this point, substitute a Model 828 preamplifier onto the 820 to ascertain if the PRM2101K is working properly.

Acoustic Calibration

Caution: Be careful not to touch the microphone diaphragm when removing and replacing the actuator and microphone grid (see FIGURE 1-4 "PRM2101K Assembly"

To calibrate the measurement system with an acoustic calibrator, follow steps 1 through 12 when the microphone, rainhat and electrostatic actuator (hereafter referred to as rainhat), and birdspikes are in place.

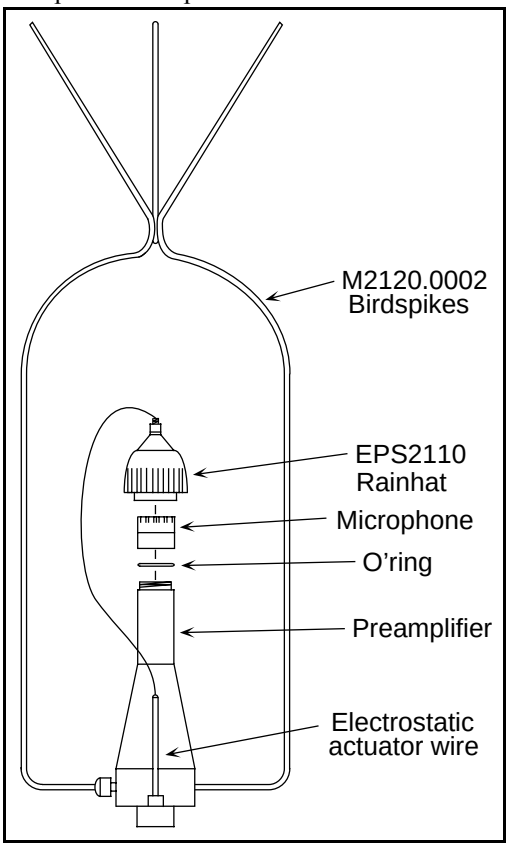

FIGURE 1-4 PRM2101K Assembly

The birdspikes enclose the windscreen. The rainhat is screwed on the top of the microphone, replacing its grid cap. The rainhat and microphone are covered by the windscreen.

Note: The birdspikes slides ~ 2" to provide room for the calibrator. Removal and replacement of the microphone is not recommended in the outdoor environment.

1. Pull the windscreen cover off and loosen the screw at the base of the birdspikes to make room for the calibrator. Tighten the birdspikes screw after raising the assembly 2".
2. Unscrew the wire attached to the top of the rainhat by turning the nut, not the wire. Do not allow the actuator wire to come in contact with metal or flesh. It carries electrical currents during calibration check.
3. Unscrew the rainhat and place it on a clean, dry surface.

Caution: Be sure that you do not unscrew the microphone. Do not put any pressure on the ribs of the rainhat. Do not let the actuator get contaminated

4. Screw on the microphone grid cap. It is usually kept in the microphone box.
5. Place the calibrator over the microphone and press its ON switch.
6. Check the calibration level. Refer to your measurement instrument's operations manual.
7. If necessary change the calibration level.
8. Remove the calibrator.
9. Remove the microphone grid cap. Place the grid cap back into the microphone box.
10. Replace the rainhat and attach the actuator wire
11. Replace the windscreen, move the birdspikes all the way down, and tighten the screw.

Caution: When moving the birdspikes down, be sure the actuator wire is placed in the slot provided; otherwise it could be damaged.

12. Perform a calibration check with the 820. The electrostatic actuator will automatically give a dB level depending on the microphone used. Write the level down, and compare with readings taken in "Auto-CAL Mode" (setting # 37). Use it as the reference for all measurements using the same microphone.

Note: When the 820 is in the "Auto-CAL Mode", the actuator will initiate a daily calibration check which will be recorded (refer to the 820 manual, setup items #37 and #38). To determine if there is any significant calibration drift, compare the reference level with the daily levels.

The PRM2101K is now ready to take acoustic measurements.

Desiccant Replacement

The desiccant is contained in eleven plastic cylinders. The end cylinder can be seen through the window. The change of color from blue to pink determines when the desiccant should be replaced.

1. Unscrew the six screws holding the window in place. Unscrew only far enough to release the window. Screws are self retaining and should not be removed from the acrylic window.
2. Remove the window and gasket.
3. Raise the pole to the one o'clock position. This will allow the eleven desiccant tubes to fall out of the PRM2101K to the ground.
4. Lower the pole and replace the desiccant.
5. Replace the window and gasket.
6. Gently tighten the six screws evenly, but not overly tight or the window may be damaged.

Tilting the Hinged Tower

The PRM2101K may be mounted on the TRP011 tiltdown tower. This hinged tower is in two parts; one stationary and the other movable. The movable part overlaps the stationary part. The bottom back of the pole has:

- a latch with a hole for a lock that secures the tower to prevent unauthorized persons from tilting the tower down.

- a 3/4" bolt that keeps the two parts from separating.

Caution: Do not loosen or remove the bolt unless both ends of the restraining rope are properly attached. Be sure the area in front of the tower is clear. Do not maintain the tower in an electrical storm or when the wind speed exceeds 32 km/hr (19.2 mph). Use more than one technician when the wind speed exceeds 15 km/hr (9 mph).

- two flanges with holes, two bolt nuts, one welded to the stationary part and one welded to the movable part. These are for clamping each end of a retaining rope.

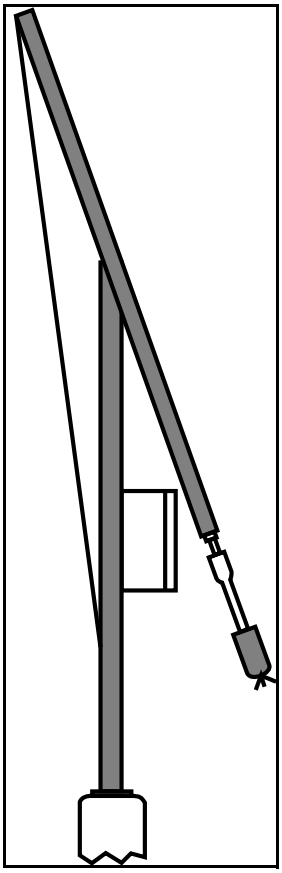

FIGURE 1-5 TRP011 Tilt-down Tower

Tilting the tower down

1. Clamp one end of the rope to the bottom flange attached to the stationary part.
2. Clamp the other end of the rope to the top flange attached to the movable part.
3. Remove the lock and the bolt. Put pressure on the movable part to keep it from suddenly tilting.
4. Hold the rope and allow the movable part to tilt slowly down.

Tilting the tower up

1. Pull the rope, and allow the movable part to tilt slowly up.
2. Replace the bolt. Put pressure on the movable part to keep it from suddenly tilting.
3. Replace the lock and remove the rope, storing it in the tower housing.

CHAPTER

2 PRM2101K System Specifications

The technical specifications in this chapter are subject to change without notice. Please refer to calibration and test results for data on a specific unit.

Included Components

PRM2101K

Frequency:

± 0.1 dB: 20 Hz to 20 kHz

- 3 dB @ 1 Hz

Gain:

- 0.15 dB

Input Impedance:

10 GΩ // 0.3 pF

Output Impedance:

< 50 Ω

Maximum rms out:

1.0 Volt with Model 820

Noise Floor: (2541, 377B41, 2560 or 377A60 microphone, EXC020 cable)

A-weight: 19 dB typical, 22 dB max

C-weight: 18 typical, 21 dB max

Power Supply

Voltage Range:

Dual: ± 7 Volt to ± 18 Volt

Single: 14 Volt to 36 Volts

Quiescent Current:

1.7 mA typical

Resistive Heater

Operating Power:

8 to 14 Vdc (75 mA @ 12 Vdc), 160 Ω, 0.9 Ω

Turn-on:

< 2 Vdc, 45 µA from open collector

Electrostatic Actuator:

Output:

Nominal 96 dB SPL @ 1 kHz

Operating Power:

5 to 18 Vdc (60 mA @ 12 Vdc)

70 µA when off

Turn-on:

4 to 15 Vdc (20 mA @ 5 Vdc)

Desiccant (dehumidifier)

17 gram blue silica gel (eleven capsules @ 1.5 gram) with expected life of 6 - 12 months (replacement required when gel turns pink).

Rainhat/electrostatic actuator (EPS2110)

Windscreen/birdspikes (WS005)

Windscreen Insert (WS005-F)

Recommended Components

Model 820 Noise and Vibration Monitor

Dynamic Range:

110 dB

Data Storage:

256Kbyte

Interface:

RS-232

Microphones:

- Free-Field, high sensitivity Model 2541 or 377B41
- Random, high sensitivity Model 2560 or 377A60

Both are 1/2” condenser microphones, 18 pF, with diaphragm impervious to nitric acid, sulfuric acid, hydrochloric acid and salt.

Cables:

- 20 foot preamplifier cable (EXC020)
- 20 foot control cable (CBL009-020)

Calibration

Internal electrostatic actuator verifies complete system accuracy (including microphone) to Type 1 performance. Actuator provides approximately 96 dB sound pressure level output at a frequency of 1 kHz.

Environmental

Temperature Range:

- 40° to 65° C (- 40° to 149° F)

Humidity Range:

0 to 100% relative humidity

Physical

Mounting Screw Threads

1 1/2” NPT (shock mounting built-in)

Dimensions (not including windscreen)

Preamplifier diameters:

Top: 13.3 mm (1/2 in)

Middle: 26.7 mm (1 in)

Bottom: 76.2 mm (3 in)

Lengths:

Overall (top of birdspikes): 1092 mm (43.0 in)

Preamplifier: 918 mm (35.8 in)

Weight:

3 kg (6.6 lb.)

Connectors

Signal (female; mates with Switchcraft TA5ML)

Pin	Purpose
1	Ground
2	Signal Output

Table 3-1 Signal Pins

Pin	Purpose
3	Power supply negative voltage
4	Microphone bias (0 to 200 Vdc)
5	Power supply positive voltage

Table 3-1 Signal Pins

Control (male; mates with Switchcraft TA5FL)

Pin	Purpose
1	Ground
2	+ 12 V
3	Electrostatic Actuator Control
4	Heater Control
5	Not Used

Table 3-2 Control Pins

Switches (internal to 820, connected to CBL009-020)

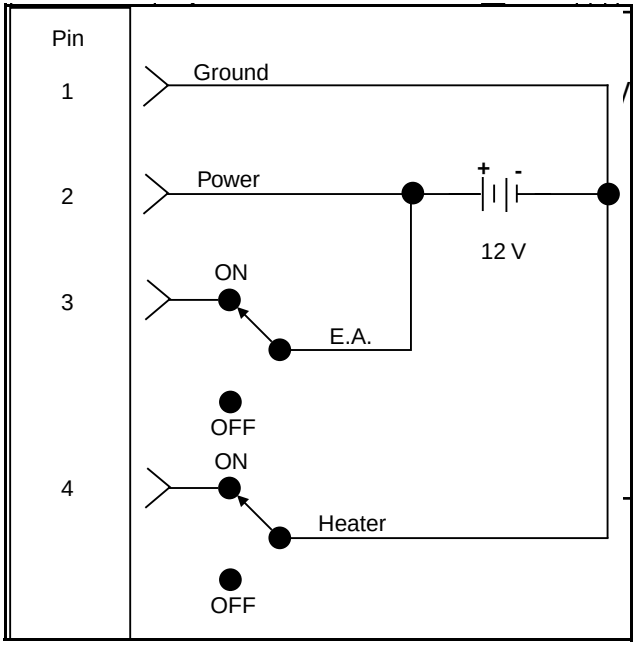

FIGURE 2-1 Control Switches

APPENDIX

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C. Shipping Charges. The buyer will return the product freight prepaid by the Buyer to an authorized service center. The product will be returned to the buyer freight prepaid by LD.

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5.COSTS OF MODIFYING THE PRODUCT IN ANY WAY ONCE DELIVERED TO THE BUYER, EVEN IF SUCH MODIFICATIONS WERE ADDED AS A PRODUCTION CHANGE ON OTHER PRODUCTS MADE AFTER THE BUYER'S PRODUCT WAS BUILT.

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