PRM2105

Outdoor Microphone Preamplifier

Reference Manual

LARSON DAVIS
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Larson Davis

PRM2105

Preamplifier

Reference Manual

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Table of Contents

Module 1 PRM2105 Instrument Overview

In this module:

1.1 Features

The Larson Davis PRM2105 is a remote-activated, outdoor microphone preamplifier. It features multi-frequency calibration check functionality, and a desiccant-free, heater to control internal humidity. It's adaptable, and requires only one microphone to obtain random, 90 degree, or free-field response. (821 microphone correction settings are required for PRM2105-FF.)

The PRM2105 is compatible with the Larson Davis SoundExpert821 (821ENV) and SoudExpert 721 (721ENV). It is not compatible with the SoundAdvisor 831C or the Spartan 821/721 (821IH/721IH).

The Larson Davis PRM2105 Outdoor Microphone Preamplifier provides the following features:

- Permanent outdoor noise monitoring compliant with IEC 61672 Class 1 measurements (when configured with SoundExpert 821 and 377B02 microphone)
- For use with Larson Davis EPS2116 environmental protection shroud and SoundExpert® Model 821 sound level meter
- Automatic calibration check at five frequencies, including 31.5, 250, 1000, 4000, and 8000 Hz
- Protection from rain, wind, and birds when used with EPS2116 environmental protection shroud
- Single-cable connectivity
- Integrated heater for condensation protection
- Stainless steel construction

1.2 Applications

The PRM2105 does not include the 377B02 microphone. When ordering the PRM2105-FF, the optional 377B02 microphone is included, and it provides frequency response characteristics consistent with precision sound level meter requirements for free-field measurements.

FIGURE 1-1 PRM2105-FF With Model 377B02 Mic

FIGURE 1-2 EPS2116 Outdoor Protection System for PRM2105

1.3 Optional Accessories

Microphone

- Prepolarized 377B02 1/2” free-field microphone

Environment Protection

- EPS2116 Outdoor Microphone and Preamplifier Protection, including rain, wind, and bird protection

Cables

- EXC Cables

Calibrators

- CAL1200 Class 1 Sound Level Calibrator, 94/114 dB @ 1 kHz
- CAL1250 Class 1 Sound Level Calibrator, 114 dB @ 250 Hz

1.4 Related Content

All associated product references and manuals can be found at https://www.larsondavis.com/product-literature

Module 2 Getting Started

This module describes mounting, preparation, and basic operation for the PRM2105 (and PRM2105-FF) preamplifier.

TAKE NOTE Refer to the SoundExpert821 Manual for calibrating a SLM configured with the PRM2105.

2.1 Connecting the PRM2105

The PRM2105 uses a single 5-pin cable (EXC series of cables) for both signal and control functions when connected to a compatible sound level meter.

The following connection diagrams show this connection within each of the noise monitoring application systems. Locate your system/application diagram for applicable details.

Connecting Directly to a Sound Level Meter

The PRM2105 connects to Larson Davis sound level meter SoundExpert 821 and 721, as shown in *Figure 2-1*.

FIGURE 2-1 Connection to 821 Only

To Connect the Pre-amplifier:

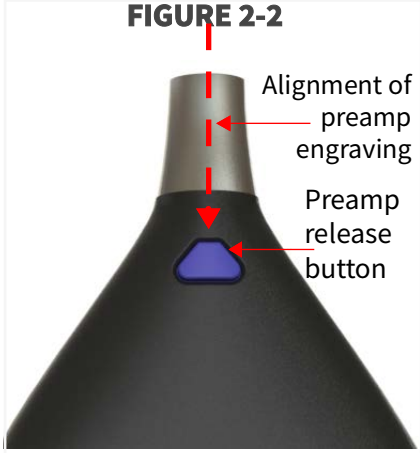
The pre-amplifier is marked to enable correct alignment when connecting to the meter. Observe each step of the following process to prevent unnecessary damage.

> **CAUTION** Do not attempt to screw the pre-amplifier into the meter's pre-amplifier housing.

Step 1. Look for an engraved line along the length of the pre-amplifier. When correctly assembled, the engraved line aligns with the top of the **preamp release** button (*Figure 2-2*).

Step 2. With the marks on both pieces aligned, insert the 5-pin connector of the pre-amplifier into the preamp housing and beyond the preamp seal *until it latches with a small audible click*.

FIGURE 2-2



To Disconnect the Pre-amplifier:

Press and hold the **preamp release** button, then pull the pre-amplifier assembly from the meter.

Connecting via EXC Series of Cables

The PRM2105 connects to Larson Davis sound level meter SoundExpert 821 and 721 via the EXC series of cables.

2.2 Setting Microphone Corrections for the PRM2105-FF

Larson Davis SoundExpert 821 sound level meter provides corrections for the PRM2105-FF when used with EPS2116 to produce a response that complies with the requirements of IEC 61672-1. These correction filters make the 377B02 microphone response and protection system useful for a variety of applications. The current Mic Correction setting displays on the meter screen whenever the preamplifier is first connected or disconnected.

These are the Microphone Correction filter settings available in the SoundExpert 821 to be applied to the PRM2105, and to the PRM2105-FF:

- "FF:RI 2116" provides random incidence response
- "FF:FF 2116" provides corrected free-field response. This is usually selected when aiming the microphone for 0° measurements
- "FF:90 2116" provides 90° response. This is usually selected when microphone placement is on a vertical pole, but 90° measurements are needed

2.2.1 Choosing Mic Correction Settings On the SoundExpert 821

Refer to the SoundExpert821 Manual for setting PRM2105-FF microphone corrections filter settings when utilizing the Model 821 SLM.

Module 3 Operating the PRM2105

This module provides information for specifying PRM2105 heater controls, viewing data, and performing calibration checks using the SoundExpert 821 and G4 LD Utility.

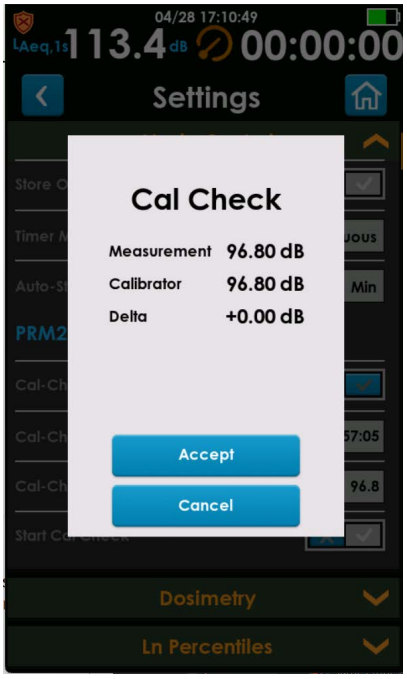
In this module:

3.1 Performing the Acoustic Calibration

After installing the PRM2105, the SLM meter should be calibrated using the procedure found in the SoundExpert 821 Manual.

After performing this acoustical calibration, perform a calibration check.

3.1.1 Performing Calibration Checks



TAKE NOTE The calibration check level reported by the SoundExpert is the broadband level.

To perform a calibration check, please see the SoundExpert 821 Manual.

The PRM2105 calibration check function produces five discrete tones simultaneously. Calibration checks can be performed automatically at specified times, or at any time manually, either on the SoundExpert 821 or via G4 LD Utility.

3.2 PRM2105 Heater Controls

Heater controls are selectable on the meter and in G4 LD Utility with the meter connected as directed. Instructions for how to control the PRM2105 heater can be found in the SoundExpert 821 Manual.

The PRM2105 includes a heater to provide protection from condensation to the microphone. The heater state can be specified for On or Off.

We recommend setting the heater to On in order to provide protection from condensation.

The Off setting is available for situations where minimizing power consumption is critical and protection form condensation will be provided using another method.

Appendix A Technical 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. Unless otherwise noted, specifications are applicable to the following conditions: 20°C, 50% RH, 12 V, when using 377B02 microphone, and SoundExpert 821.

Values specified are typical, unless tolerances are provided.

A.1 PRM2105 Compliances

Safety Requirements

- Electrical Equipment for Measurement, Control, and Laboratory Use: IEC 61010-1 (2010)

CE and RoHS Compliant

A.2 Electrical Specifications

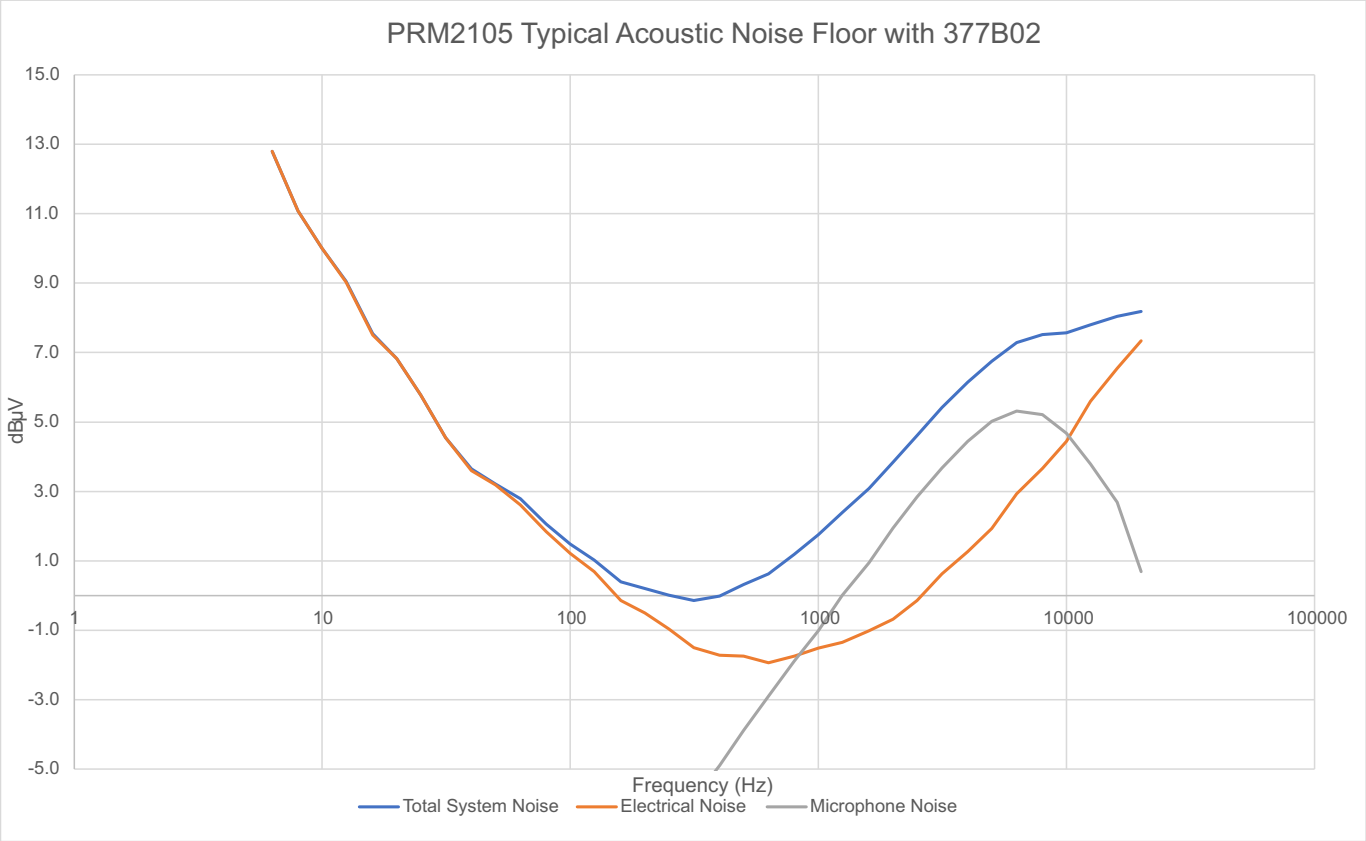
Tested with ADP090 adapter (12 pF), equivalent to capacitance of 377B02 microphone.

Table A-1

Microphone Bias	0 V
Input Impedance	9.7 GΩ // 0.07 pF (typical)
Gain (unweighted)	-0.3 dB at 1 kHz (typical)
Max Input Level (for THD < -30 dB)	± 18 V peak (142 dB re. 20 µPa)
Max Output Level (typical)	± 14 V peak (143 dB peak using 50 mV/Pa mic)
Max Output Current	10 mA
Output Impedance	50 Ω (typical)
Total Harmonic Distortion +N	< -60 dBc at 8V rms and 1 kHz
Analog Power Supply	+34 to 38V DC (36V nominal)
Digital Power Supply	+3.0 to 6.1 V (5 V Nominal)

Phase Linearity	10 Hz to 32 Hz: -3° to 10° 32 Hz to 100 kHz: < ± 3° The output is in phase with the input electrical signal. A positive change in acoustic pressure results in a positive output.
Calibration Check Level at 1 kHz	92 dB ± 2 dB
Calibration Check Level - Other Frequencies	+/- 1.0 dB relative to 1 kHz
Calibration Check Frequencies	31.25, 250, 1000, 4000, & 8000 Hz
Calibration Check Sensitivity	± 0.005 dB/°C (typical)
Dynamic Range	124 dB; 13 dB (A-weighted) noise floor to 140 dB re. 20 µPa with input electrically tested through an ADP090 adapter (12 pF)

FIGURE A-1 Acoustic Noise Floor with 377B02 Microphone



A.2.1 Self-Generated Noise (with 377B02 Microphone)

Table A-2

Self-generated noise levels are time-averaged sound levels (re. 20 µPa).	A-Weighted	C-Weighted	Z-Weighted
	16.1 dB	17.3 dB	28.3 dB

Electrical Noise

Tested with ADP090 adapter (12 pF), equivalent to capacitance of 377B02 microphone.

Table A-3 Heater OFF

EXC Cable Length	A-Weighted dBµV	C-Weighted dBµV	Z-Weighted dBµV
6 ft	12	15	24
20 ft	12	15	25
100 ft	13	16	25
330 ft	16	20	28

Table A-4 Heater ON

EXC Cable Length	A-Weighted dBµV	C-Weighted dBµV	Z-Weighted dBµV
6 ft	12	15	24
20 ft	12	15	25
100 ft	13	16	25
330 ft	16	20	28

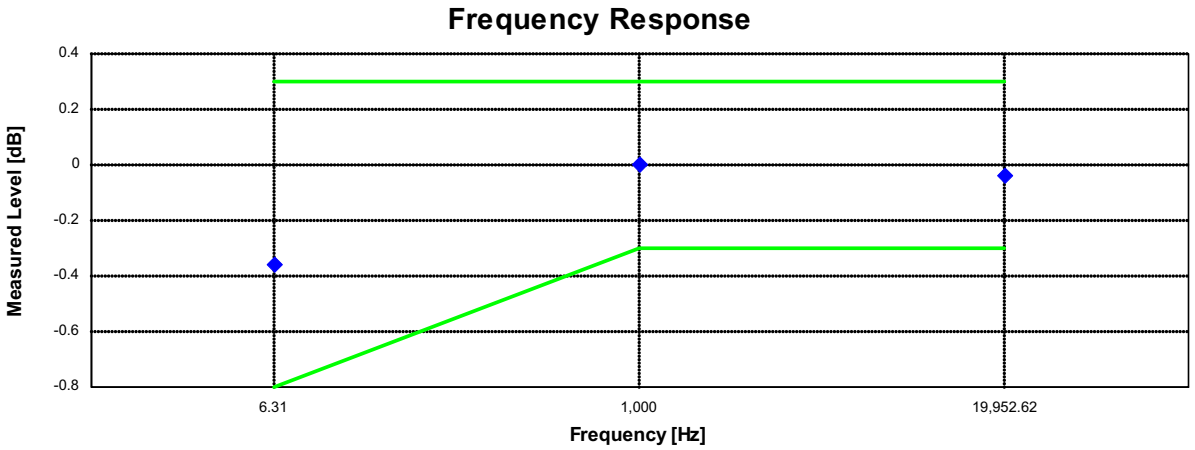
Power Consumption

Table A-5 Power Consumption

	Total Power Draw
Heater OFF	139 mW
Heater ON	433 mW

FIGURE A-2 Frequency Response Test Report

Certificate Number 2026003087



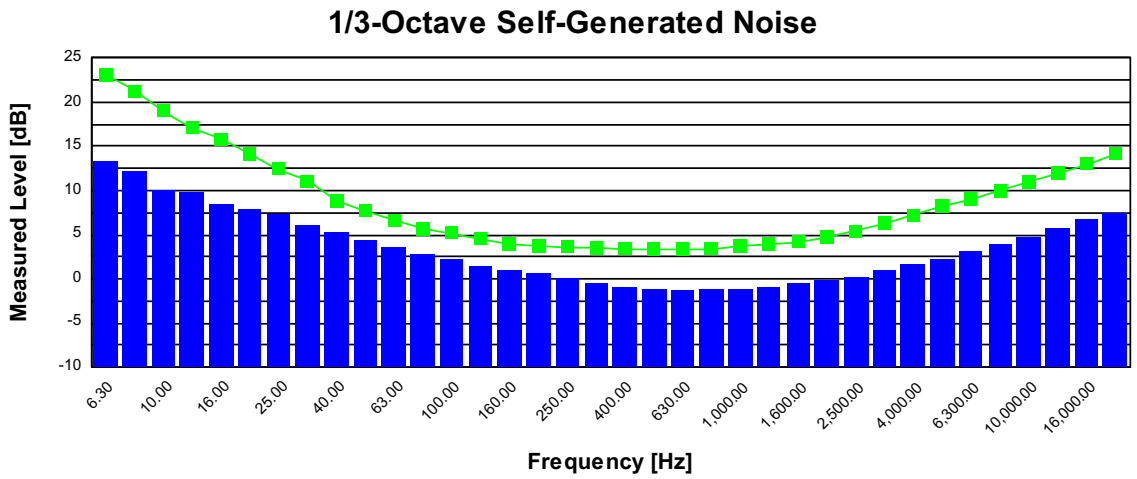
Frequency response electrically tested at 114.0 dB µV

Frequency [Hz]	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
6.31	-0.36	-0.80	0.30	0.12	Pass
1,000.00	0.00	-0.30	0.30	0.10	Pass
19,952.62	-0.04	-0.30	0.30	0.10	Pass

Measurement	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
1000 Hz Reference	113.63	113.40	114.00	0.10	Pass
DC Voltage	18.04	16.00	19.00	0.25	Pass

FIGURE A-3 1/3 Octave Self-Generated Noise

Certificate Number 2026002890



The values shown above are the combined contributions of the Model 821 SLM and PRM2105 self-generated noise

Frequency [Hz]	Test Result [dB]	Upper limit [dB]	Result
6.30	13.37	23.10	Pass
8.00	12.11	21.30	Pass
10.00	10.01	19.10	Pass
12.50	9.73	17.10	Pass
16.00	8.36	15.80	Pass
20.00	7.81	14.10	Pass
25.00	7.21	12.40	Pass
31.50	6.14	11.10	Pass
40.00	5.28	8.80	Pass
50.00	4.30	7.70	Pass
63.00	3.55	6.60	Pass
80.00	2.83	5.70	Pass
100.00	2.21	5.20	Pass
125.00	1.45	4.60	Pass
160.00	0.93	3.90	Pass
200.00	0.54	3.70	Pass
250.00	0.01	3.60	Pass
315.00	-0.57	3.50	Pass
400.00	-0.88	3.40	Pass
500.00	-1.08	3.30	Pass
630.00	-1.28	3.30	Pass
800.00	-1.15	3.40	Pass
1,000.00	-1.07	3.70	Pass
1,250.00	-0.95	3.90	Pass
1,600.00	-0.59	4.20	Pass
2,000.00	-0.27	4.70	Pass
2,500.00	0.15	5.40	Pass
3,150.00	0.90	6.30	Pass
4,000.00	1.52	7.20	Pass
5,000.00	2.17	8.20	Pass
6,300.00	3.11	9.00	Pass
8,000.00	3.87	10.00	Pass

A.3 Physical Specifications

Microphone Thread	11.7 mm - 60 UNS (.4606 - 60 UNS)
Diameter	12.7 mm (0.5 in)
Height	113.1 mm (4.45 in)
Weight	57 g (2.01 oz.)

Output Connector	5-pin male (Switchcraft TA5MLAUX)
Venting	The PRM2105 is vented through the 5-pin connector for pressure equalization. 377B02 microphone is rear-vented and sealed to the PRM2105 using an O-ring.
Environmental	
Operating Temperature Range	- 40 °C to 70 °C (- 40 °F to 158 °F)
Operating Humidity Range	0 to 100% relative humidity, excluding internal condensing
Temperature Sensitivity	<±1.0 dB at 1 kHz from -40 °C to -10 °C (-40 °F to 14 °F) <±0.5 dB at 1 kHz from -10 °C to 50 °C (14 °F to 122 °F) <±0.9 dB at 1 kHz from 50 °C to 70 °C (122 °F to 158 °F)
Humidity Sensitivity	< ± 0.2 dB @ 1 kHz from 0 to 100% relative humidity, at 40 °C (104 °F)

A.3.1 Examining the Effect of Temperature Variation

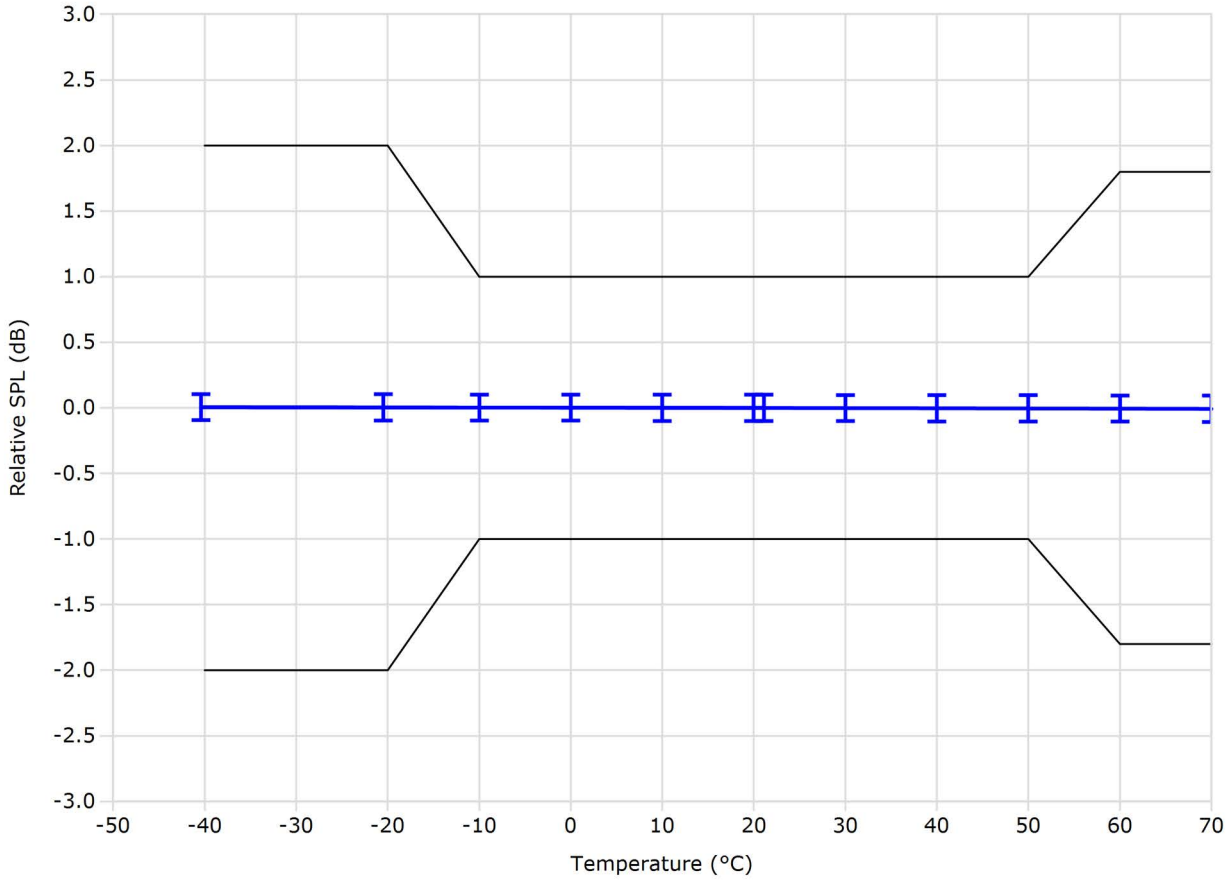
The effects of temperature variation and associated testing parameters for the PRM2105 are shown in *Figure A-4*.

FIGURE A-4 Relative SPL versus temperature

PRM2105 Relative SPL vs. Temperature
Outdoor Preamplifier PRM2105 Serial Number: 001013

Test conditions: 59% RH

Test Date: 15 May 2026 13:56:48



Reference check at end of test: 20°C 51% RH, relative SPL -0.00 dB

0.1dB expanded uncertainty at ~95% confidence level (k=2)

Test Location: Larson Davis – A PCB Division
1681 West 820 North, Provo, Utah 84601
Tel: 716 684-0001 www.LarsonDavis.com

A.3.2 Examining the Effect of Humidity

The effects of humidity on the PRM2105 and associated testing parameters are shown in *Figure A-5*.

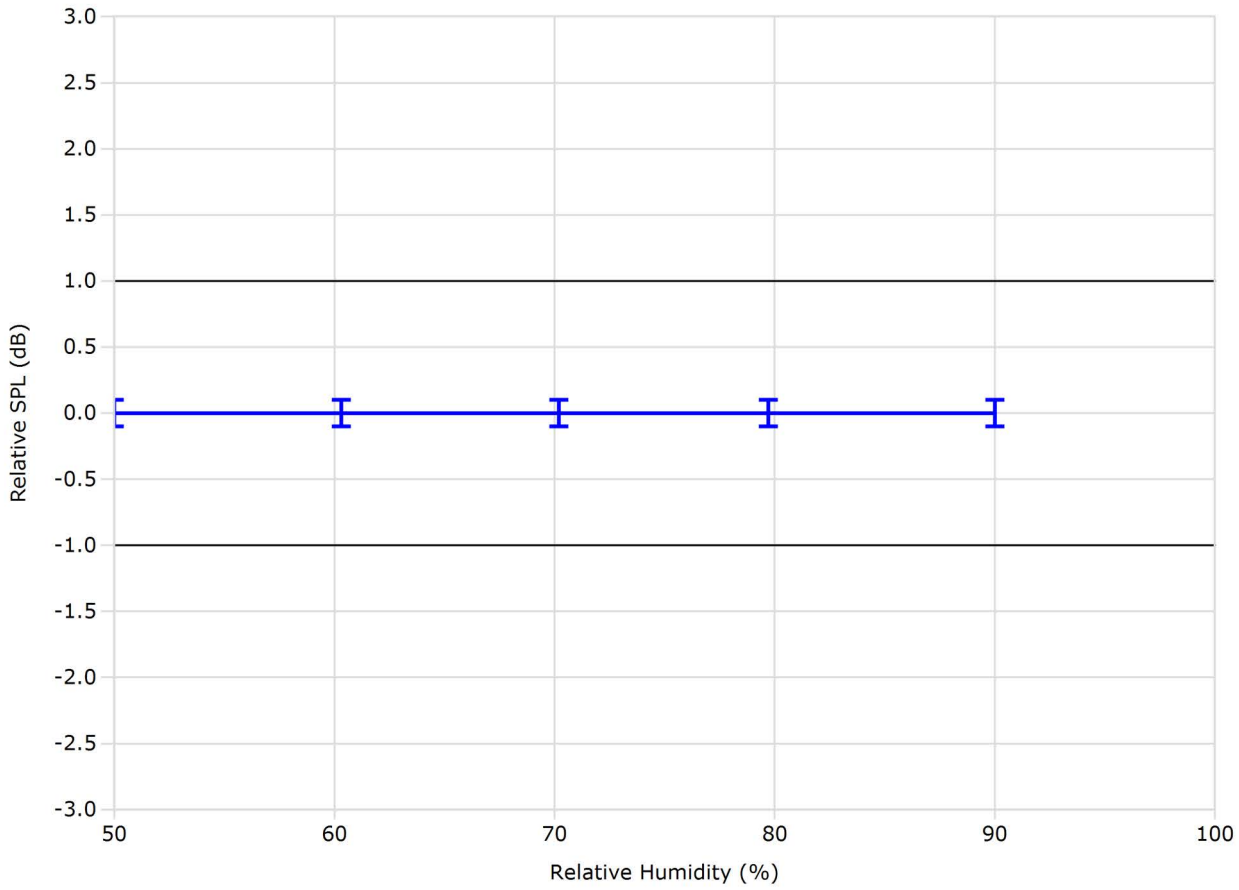
FIGURE A-5 Relative SPL versus Humidity

PRM2105 Relative SPL vs. Humidity

Outdoor Preamplifier PRM2105 Serial Number: 001013

Test conditions: 40°C

Test Date: 15 May 2026 13:56:48



Humidity Reference: 40°C 50% RH, relative SPL -0.00 dB

0.1dB expanded uncertainty at ~95% confidence level (k=2)

Test Location: Larson Davis – A PCB Division
1681 West 820 North, Provo, Utah 84601
Tel: 716 684-0001 www.LarsonDavis.com

The Relative SPL exposed to humidity and associate testing parameters for the PRM2105 are shown in *Figure A-6*.

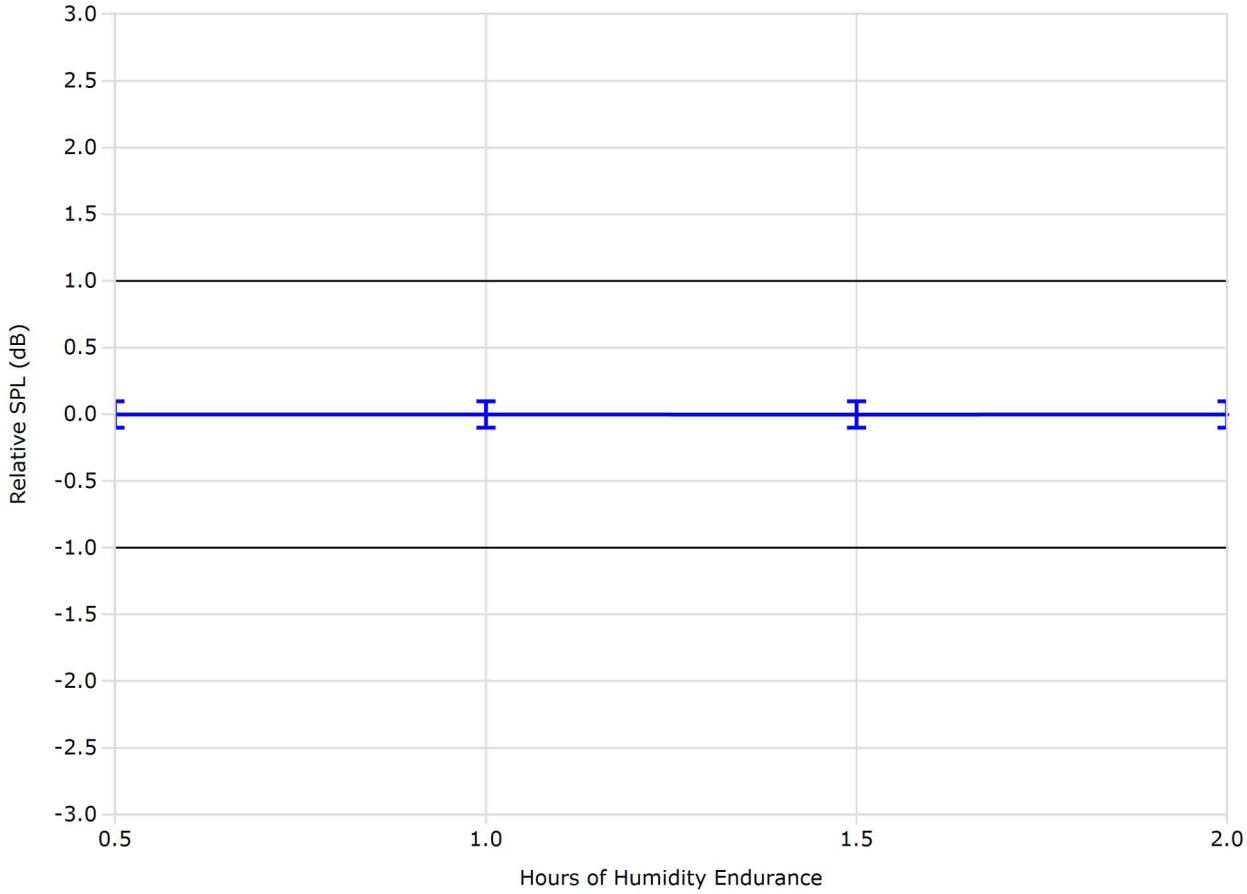
FIGURE A-6 Relative SPL versus Humidity Endurance

PRM2105 Relative SPL vs. Humidity Endurance

Outdoor Preamplifier PRM2105 Serial Number: 001013

Test conditions: 90% RH and 41°C

Test Date: 15 May 2026 13:56:48



Humidity Reference: 40°C 50% RH, relative SPL -0.00 dB

0.1dB expanded uncertainty at ~95% confidence level (k=2)

Test Location: Larson Davis – A PCB Division
1681 West 820 North, Provo, Utah 84601
Tel: 716 684-0001 www.LarsonDavis.com

A.4 Acoustical Response

Acoustical response data and corresponding corrections for PRM2105 contained within the EPS2116 Environmental Protection System can be found in the SoundExpert 721/821 Manual.

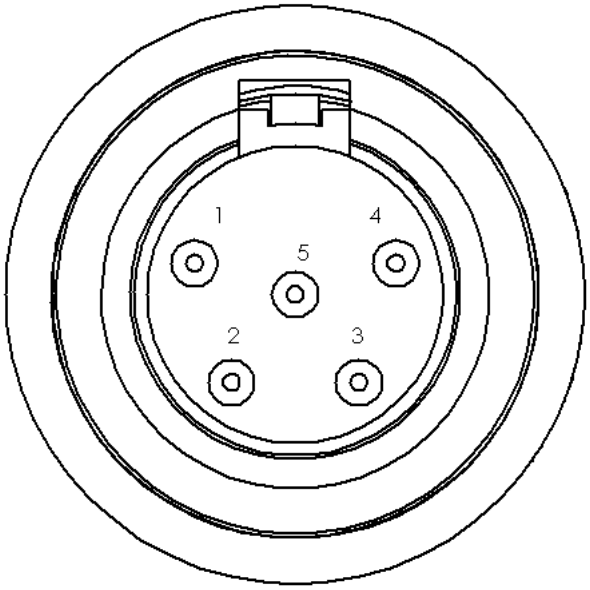
Directional Response information for the EPS2116 environmental shroud is available in the EPS2116 Microphone/ Preamplifier Protection System Manual.

A.5 Cables Specifications

The PRM2105 connects with the EXC series of cables.

The standard lengths for the EXC are 20', but are available up to 100'.

FIGURE A-7 View Looking Directly Into the Cable's 5-pin Connector (mating-side view).



This connector is the Switchcraft TA5MLAUX.

End of Technical Specifications for PRM2105

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