ORTEC®

AMETEK®

276L
Low-Power Photomultiplier Base

- **For use with 10-stage PMTs that fit standard 14-pin sockets**
- **Built-in low-noise preamplifier and focus control**
- **Both preamplifier output and anode output**
- **Test input for system testing**
- **Protection circuit for internal transistors**





The ORTEC Model 276L Low-Power Photomultiplier Tube Base and Preamplifier incorporates an integral low-noise preamplifier, a PMT base with a low-power voltage divider network, and a focus control for optimum performance in scintillation detector applications. The unit is ideally suited for use with NaI(Tl) detectors.

The Model 276L provides two outputs: the preamplifier output for energy analysis and the anode output for either timing or auxiliary energy analysis. The preamplifier is dc-coupled to simplify pole-zero cancellation in the main amplifier. A Test input accepts the output of a pulse generator to calibrate and test the preamplifier and the system. The Model 276L has a diode protection network to prevent damage to the internal transistors due to sudden application or removal of high voltage to the unit. The Model 276L is powered from any ORTEC main amplifier or preamplifier power supply.

The Model 276L is directly compatible with many commercially available integrated NaI-PMT assemblies including:

ORTEC Model 905-2, -3, -4 NaI(Tl) Scintillation Detector Assemblies;

Bicron Model 2M2 and 3M3 Monoline Spectrometers;

Harshaw Model S288 and S332 Integral Line Assemblies;

Teledyne S-88-I and S-1212-I Integral Assemblies.

Also, the Model 276L is directly compatible with 10-stage PMTs that fit standard 14-pin sockets including those listed in Table 1.

The Model 276L is also compatible with other 10-stage tubes not listed in Table 1 (see Fig. 1).

Compatibility may be determined by comparison with those listed.

Specifications

PERFORMANCE

PREAMPLIFIER

Integral Nonlinearity <±0.02%, 0 to +10 V.

Temperature Instability <±0.005%/°C, 0 to 50°C.

Output Rise Time <100 ns for test input or fast scintillator.

Output Fall Time Time constant of 50 µs.

Output Noise <50 µV rms with ORTEC main amplifier such as Model 672 and time constant of 1 µs.

Conversion Gain Nominally 5 µV/eV with 2- by 2-inch NaI(Tl) crystal and PMT gain of 10^6; the typical output for a 511-keV gamma ray will be 250 mV at a PMT gain of 10^5.

Saturation Level +10 V into an open circuit; +5 V into 93-Ω load.

VOLTAGE DIVIDER Resistor-divider connected to 10-stage PMT base. Total resistance 5.6 MΩ resulting in bleeder current of 200 µA with typical high voltage of 1 kV. The distribution is linear to all stages with the focus adjustment on the grid.

CONTROL

FOCUS Single-turn locking potentiometer on panel for external adjustment of PMT grid potential.

INPUTS

POS HV SHV connector, AMP 51494-2, for distribution of positive high voltage to PMT base; +2000 V maximum.

TEST BNC connector, accepts pulses from an ORTEC pulse generator for testing and calibration.

SIGNAL Preamplifier input is connected internally to dynode 10.

Table 1. Compatible Photomultiplier Tubes.

ADIT		Burle (formerly RCA)		Hamamatsu		Philips
B51B01	B89B01	4900	S83021E	PM55	R1513	XP2202
L51B01	B89C01	5819	S83022F	R208	R1612	XP2203B
V51B01	B89D01	6342A	S83025F	R550	R1791	XP2412B
B51D01	B133D01	6655A		R594	R1836	
B51C01	B133C01	S83006E		R877	R1847-07	
B76B01	V133B01	S83013F		R878	R1848-07	
V76B01		S83019F		R1507	7696	
B76C01		S83020F		R1512		

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POWER Captive 4-m (12-ft) power cable terminated in Amphenol 17-20090 connector accepts preamplifier operating power; compatible with all ORTEC main amplifiers and the Model 4002P Portable Power Supply.

PMT SOCKET TRW 3B14. Fits JEDEC B14-38 PMT pin base (see Fig. 1).

OUTPUTS

PREAMP BNC connector furnishes preamplifier positive output pulse to any ORTEC main shaping amplifier for linear energy analysis, Z_o = 93 Ω, dc-coupled.

ANODE BNC connector furnishes negative anode output pulse for use for either timing or auxiliary energy analysis; Z_o = 1 kΩ ac-coupled.

ELECTRICAL AND MECHANICAL

POWER REQUIRED For preamplifier, +24 V, 16 mA; –24 V, 16 mA; for PMT base, +2000 V maximum (use rated voltage for the tube that is installed).

WEIGHT
Net 0.65 kg (1.5 lb).
Shipping 1.3 kg (3.0 lb).

DIMENSIONS 5.6 cm (2.2 in.) diameter x 10.2 cm (4 in.) long; equipped with 4-m (12-ft) captive power cable.

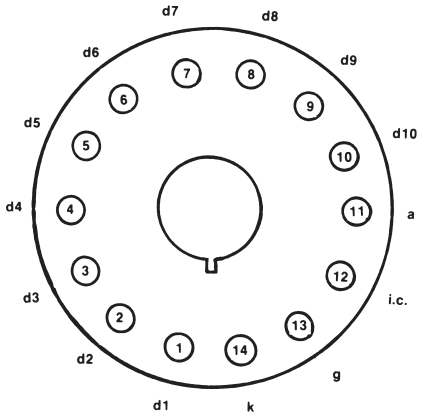


Fig. 1. JEDEC B14-38 PMT Pin Base, with Pin Assignments:

d1 – d10	dynodes 1 to 10
a	anode
i.c.	internal connection
g	grid
k	cathode

Ordering Information

To order, specify:

Model	Description
276L	Low-Power Photomultiplier Base with Preamplifier
C-36-12	RG-59A/U 75-Ω Cable with two SHV female plugs, 12-ft length
C-24-12	RG-62A/U 93-Ω Cable with two BNC male plugs, 12-ft length
T50	50-Ω Terminator, BNC

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Specifications subject to change
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