ORTEC®

265A
Photomultiplier Base

- **For use with 12-stage PMTs that fit standard 21-pin sockets**
- **Designed for fast-timing applications**
- **Excellent pulse fidelity for a wide range of signal currents**
- **High-impedance linear signal from dynode, and dc-coupled anode signal at 50-Ω impedance for timing**
- **Excellent for single-photon counting**
- **Magnetic shield available**

The ORTEC Model 265A Photomultiplier Base is a mechanical assembly and a resistive voltage divider network, with appropriate capacitive decoupling, for operation of 12-stage photomultiplier tubes (PMTs). It is particularly suited to applications requiring fast timing or single photon counting. The Model 265A accommodates the following types of PMTs.

12-stage PMTs that fit standard 21-pin sockets, including:

Hamamatsu R329, R1332, R1333

Burle (formerly RCA) 8575, 8850, C31000M.

These PMTs offer excellent characteristics for both timing and energy resolution. The Model 265A PMT Base structure complements the tube characteristics by maintaining good pulse fidelity through a wide range of signal currents (Fig. 1).

Negative high voltage is applied to the cathode, and the anode is operated essentially at ground potential. This facilitates the incorporation of several features that augment the fast-timing performance. The anode output is dc-coupled, with the anode connected to ground through a 50-Ω load resistor. This eliminates the base-line shift caused by varying counting rates in ac-coupled systems. It also suppresses reflections by providing back-termination for the anode output connection. Each of the last four dynodes is also available externally through the contacts of the auxiliary connector. These connections allow external voltage stabilization for the last four dynodes of the PMT by using external voltage supplies. Internal trimmer controls permit optimum adjustment of the voltage distributed to the focus electrode, and to the second and twelfth dynodes.

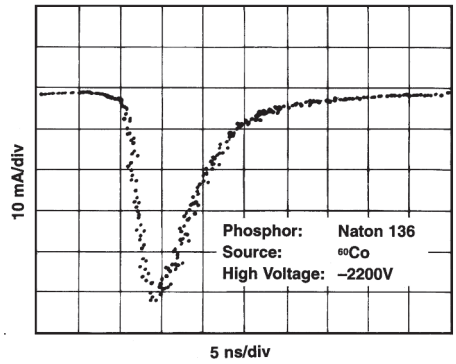

Fig. 1. Typical Anode Output with a Burle 8575 Photomultiplier Tube.

Two outputs are furnished from the Model 265A. The negative signal from the anode is optimized for timing applications, while the positive, linear signal from the ninth dynode is intended for energy measurements. For fast scintillator applications, the anode signal is connected directly to the input of a constant-fraction timing discriminator via a 50-Ω coaxial cable. For single-photon counting a fast amplifier is typically inserted between the anode output and the discriminator. In scintillator applications the ninth dynode output is normally connected to the input of a preamplifier, such as the ORTEC Models 113 or 142IH. The output pulses from the preamplifier are amplified and shaped for energy spectroscopy through an amplifier such as the ORTEC Models 460 or 575A.

Excellent results for both timing and energy measurements can be obtained with fast plastic scintillators, fast liquid scintillators, and NaI(Tl). The Model 265A PMT Base is also ideal for single-photon applications.

Specifications

PERFORMANCE

All photomultiplier tube specifications are furnished by the PMT manufacturer. The Model 265A Base includes an appropriate voltage divider network for the tube elements.

CONTROLS

Internal adjustments are included for the focus electrode and for the second and twelfth dynodes.

INPUTS

HIGH VOLTAGE –3 kV maximum at 2 mA maximum for bleeder network. SHV connector.

AUXILIARY Last four dynodes are available at pins in the Auxiliary connector for optional external voltage stabilization; MS3112E12-10-S or Bendix PT02E-12-10S connector.

OUTPUTS

ANODE Negative timing signal, 50 Ω, dc-coupled, back-terminated; very good pulse quality for signal currents to 0.5 A with the Burle 8575; BNC connector.

DYNODE Positive linear signal from the ninth dynode, capacitively-coupled, high impedance (Z_o ~1 MΩ); BNC connector.

AMETEK®

265A
Photomultiplier Base

ELECTRICAL AND MECHANICAL

WEIGHT (Net)
265A PM Base 0.63 kg (1.4 lb).
218 Shield 0.45 kg (1 lb).

WEIGHT (Shipping)
265A PM Base 1.3 kg (3 lb).
218 Shield 0.9 kg (2 lb).

DIMENSIONS
265A PM Base 7.62 cm (3 in.) diam X 20.32 cm (8 in.) long.
218 Shield 7.62 cm (3 in.) diam; assembled Models 265A and 218, 33.0 cm (13 in.) long.

Related Equipment

The anode timing signal should be furnished to a fast discriminator such as the ORTEC Models 583B, 584, or 935, when using either NaI(Tl), liquid, or plastic scintillators. A Model C-25-12 50-Ω cable assembly is available as an accessory for this purpose.

For single-photon counting insert a fast amplifier, such as the Model VT120, between the anode output and the discriminator input.

The linear output from the ninth dynode is normally processed through an ORTEC Model 113 Scintillation Preamplifier and a shaping amplifier such as the ORTEC Models 460, 570, 572A, or 575A.

An ORTEC Model 218 Magnetic Shield is recommended to reduce the interference from either the earth's magnetic field or from stray-magnetic fields from other equipment.

High voltage, at the level recommended by the manufacturer of the PMT, can be furnished from a high-voltage power supply such as the ORTEC Model 556. The mating cable, C-36-12, is also available for connecting the Model 265A to the Model 556; C-36-12 consists of 3.66 m (12 ft) of RG-59A/U 75-Ω cable with two SHV connectors assembled and ready to use.

Ordering Information

Model	Description
265A	Photomultiplier Base
218	Magnetic Shield
C-25-12	RG-58A/U 50-Ω Cable with two BNC male plugs, 12-ft length
C-36-12	RG-59A/U 75-Ω Cable with two SHV female plugs, 12-ft length

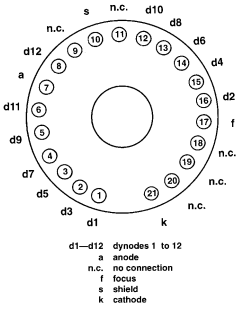

Fig. 2. Pin Assignments.

d1 – d12	dynodes 1 to 12
a	anode
n.c.	no connection
f	focus
s	shield
k	cathode

218
Magnetic Shield

An accessory magnetic shield (Model 218) is available for the Model 265A Photomultiplier Tube Base. The magnetic shield isolates the photomultiplier tube from ambient magnetic fields that would introduce error into the output signal; it also isolates the sides of the PMT from ambient light. The magnetic shield complies with standard photomultiplier tube dimensions.

Specifications subject to change
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