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52 MM (2″) DIAMETER FAST PHOTON COUNTING AND LS

Electrical Characteristics and Ratings

	PHYSICAL CHARACTERISTICS			CATHODE SENSITIVITY									ANODE SENSITIVITY					DARK EMISSION AT NOMINAL A/lm		
Type	Spectral response	Dynodes	Effective cathode size mm	µA/lm		Corning blue		Corning red		Infra red		QE% peak	A/lm	V_{k-a}	V_{k-a}	Gain x10^6		I_a(dark) nA		Count s^{-1}
			nom	min	typ	min	typ	min	typ	min	typ	typ	nom	typ	max	nom		typ	max	typ
9893B/100	Bialk	14LF BeCu	2.5		60	7	8.5		1			22	5000	2250	2700	83		0.1	1	20
9893B/350	Bialk	14LF BeCu	9		60	7	8.5		1			22	5000	2250	2700	83		0.2	1	40
9863B/100	S20	14LF BeCu	2.5	125	185		9.5		70		2.5	20	5000	1950	2500	27		0.4	4	40
9863B/350	S20	14LF BeCu	9	125	185		9.5		70		2.5	20	5000	1950	2500	27		1.0	5	300
9869B	Bialk	8LF CsSb	45		90	10	13		2			30	10	970	1300	0.1		0.02	1	200
9899B	Bialk	12LF CsSb	45		85	9.5	13		2			30	500	1050	1800	6		1.0	5	200
9829B	Bialk	12LF BeCu	45		75	9.5	13		1.9			30	500	1660	1800	6.7		1.6	10	200

Series characteristics

The fast photon counting series consists of types 9863 and 9893. They utilize internal focusing to reduce the effective cathode diameter to 2.5 mm (/100 types) and 9 mm (/350 types). This results in a very low dark count at room temperature. These types have exceptionally low afterpulse rates, making them particularly suitable for photon correlation applications. Every tube is supplied with a photon counting test report showing signal, background and afterpulse data. Custom designed Electron Tubes housings and electronic modules are recommended to obtain the best performance.

The liquid scintillation series consists of types 9899, 9829 and 9869. These are high performance tubes with thin, convex, low radioactivity glass windows for reduced background count. They are normally graded in a LSC test instrument and supplied as pairs, to the customer's specification.

Quartz (fused silica) windows are available, for all these types, for extended UV response. They are all normally supplied black plastic sleeved with a graphite coating connected to the cathode potential, to minimise dark current (add 0.8 mm to published diameter). An integral mu-metal shield is also available.

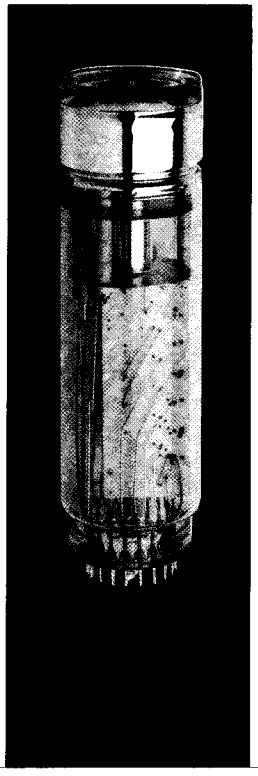
- **9863/100 and 9863/350 (photon counting parent type)**
  These types have S20 photocathodes giving a wide spectral range. Typical background counts of 40 s^{-1} and 300 s^{-1} for /100 and /350 types respectively, can be further reduced by cooling with Electron Tubes cooled housings. They are used primarily where the light can be focused to a small spot in applications such as particle sizing through laser scattering.

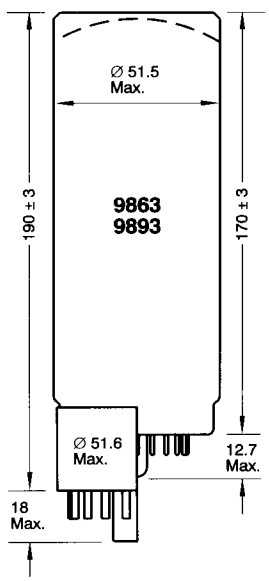
- **9893/100 and 9893/350**
  These types have bialkali photocathodes for applications involving blue light. Typical background counts of 20 s^{-1} and 40 s^{-1} respectively can be reduced by a factor of 2 by cooling.

- **9899 (LSC parent type)**
  New to the range, this photomultiplier supersedes type 9849. The new electron optical design ensures high LSC counting efficiency (typical ^3H=65%), together with low background (typical coincident count 20 cpm). This results in excellent E^2/B values.

- **9829**
  An earlier 12 stage fast linear focused type, long established in the previous generation of LSC instruments.

- **9869**
  This short 8 stage variant of 9899 is for use in compact bench top LSC instruments.





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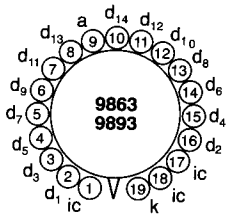
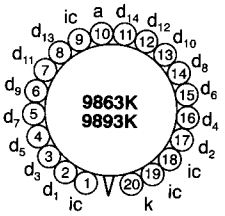
	SER	TIME RESPONSE ns				RATINGS – subject to not exceeding maximum rated A/lm						VOLTAGE DIVIDER
Type	p/v	Rise time	Pulse width (fwhm)	Transit time	Jitter (fwhm)	A/lm	V_{k-d1}	V_{d-d}	V_{k-a}	$\bar{I}_k$ nA	$\bar{I}_a$ µA	Distribution used
												See Page 62
	typ	typ	typ	typ	typ	max	max	max	max	max	max	
9893B/100		2.5	4	45	1.8	10^4	450	450	3000	0.1	200	H
9893B/350		2.5	4	45	1.8	10^4	450	450	3000	1.5	200	H
9863B/100		2.5	4	45	1.8	10^4	450	450	3000	2.5	200	H
9863B/350		2.5	4	45	1.8	10^4	450	450	3000	30	200	H
9869B		3.3	5	30	2.0	50	300	300	1800	100	200	H
9899B	2.0	4	5.5	45	3.5	2000	500	450	2800	50	200	H
9829B	2.0	2	3	41	2.2	2000	500	450	2800	50	200	H

Pin connections

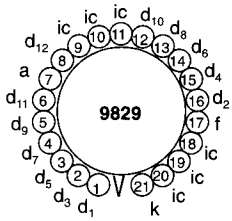
(Viewed from below. V indicates position of short pin or key; ic=internal connection). The corresponding socket type number is shown below each diagram. Focus electrode, f, where fitted, should normally be connected by the user to d_1.



B19A



B20



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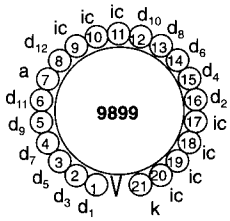

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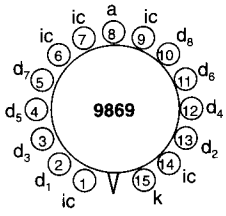
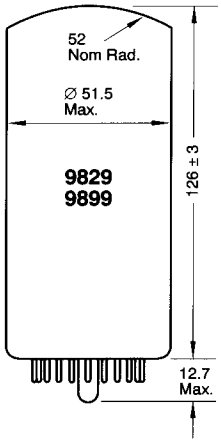
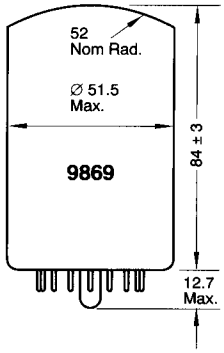
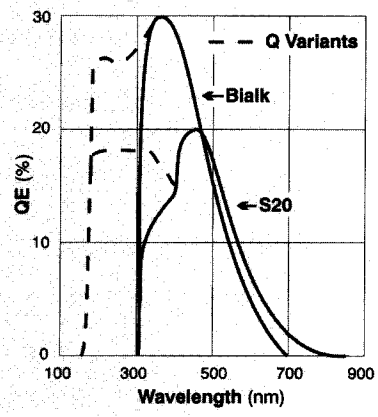


B15B





Spectral Response



Gain Curves