

Data Sheet no. 6.33/2

PD Calibrators, Type CAL

The appropriate choice of a calibrator depends on the range of typical charge values of the PDs being measured. The requirements for calibrators as well as the calibration procedures are given in IEC 60270:2000. Calibrators of type CAL (Fig.1) are used for the calibration of a PD measuring system **in the complete test circuit**. The repetitive calibration charges q_0 are generated by a step voltage pulse U_0 injected into a capacitor C_0 :

$$q_0 = U_0 C_0.$$

Type CAL calibrators use a variable voltage step U_0 up to 120 V (IEC 60270: rise time < 60 ns) and a fixed capacitor C_0 . This injection capacitor is relatively small, as the step voltage amounts up to 120 V for full range output. Therefore, the calibrators offer excellent impulse properties. The injection capacitor can also be a HV capacitor in the measuring circuit. This enables the calibration of completely metal enclosed HV test circuits (e.g. for GIS testing in factory or on site) or permanent calibration during PD measurement by using the type CAL1C.

For special application in GIS testing including UHF PD measurement (see Data Sheet 6.23) the calibrators supply a very steep voltage step of < 0.3 ns rise time.

Type CAL calibrators are calibrated according to IEC 60270:2000 traceable to the German National Institute of Standards, PTB Braunschweig.

Simple to use

The calibrator is switched on with the push button On/Off. Both, amplitude (Range) and polarity (Pos/Neg) of the *single* charge pulse per cycle are displayed and can be adjusted by pressing the two buttons.

The calibrator automatically synchronizes to line frequency by a photo diode. In case of insufficient pick-up of power frequency light, the calibrator automatically selects the internal quartz oscillator (50 Hz- and 60 Hz-versions available).



Fig. 1: Calibrators type CAL

Calibrators can be selected by using the following table

Type	Range	Injection Capacitor (C_0)	50 Hz or 60 Hz light sync.	IEC 60270 compliant	2 pulses / cycle option	Connection	Usage
CAL1A	1, 2, 5, 10, 20, 50, 100 pC	< 1 pF	✓	✓	✓	BNC	standard, lab use
CAL1B	100, 200, 500 pC, 1, 2, 5, 10 nC	< 100 pF	✓	✓	✓	BNC	see CAL1E & F
CAL1C	1, 2, 5, 10, 20, 50, 100 pC*	V (50 Ω)	✓	✓	✓	BNC	c/w ext. capacitor
CAL1D	10, 20, 50, 100, 200, 500, 1000 pC	< 10 pF	✓	✓	✓	BNC	standard, lab use
CAL1E	0.5, 1, 2, 5, 10, 20, 50 nC	< 500 pF	✓	✓	✓	BNC	high level application, e.g. rotating machines, cable field tests
CAL1F	0.2, 0.5, 1, 2, 5, 10, 20 nC	< 200 pF	✓	✓	✓	BNC	
CAL1G	0.02, 0.05, 0.1, 0.2, 0.5, 1, 2 nC	< 20 pF	✓	✓	✓	BNC	transformer test
CAL1H	0.5, 1, 2, 5, 10, 20, 50 pC* at 2 pF	V (50 Ω)	✓	✓	✓	BNC	GIS, live injection via stray capacitance
CAL2A	0.5, 1, 2, 5, 10, 20, 50 pC	< 1 pF	✓	✓		N	GIS & UHF
CAL2B	0.5, 1, 2, 5, 10, 20, 50 V (into $R_L=50\Omega$)	external	✓	--		N	GIS & UHF
CAL2C	0.2, 0.5, 1, 2, 5, 10, 20 V (into $R_L=50\Omega$)	V (50 Ω)	✓	--	--	N	GIS & UHF

* with external high-voltage 100 pF capacitor

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