

# ICMseries Accessories: Calibrators



Power Diagnostix makes a range of calibration charge injectors suitable for use in calibrating partial discharge measurements. The appropriate choice of a calibration instrument depends on the range of typical charge values of the PDs being measured. Calibrators can also be used for time domain reflectometry in cables to determine cable length and location of joints.

### Conformity to International Standards



By end of 2003, Power Diagnostix received the accreditation as calibration laboratory within the German Calibration Service (Deutscher Kalibrierdienst, DKD). The audit was held by 'Physikalisch Technische Bundesanstalt' PTB, the German authority of standards. Power Diagnostix accreditation is filed under DKD-K-31101.

New charge calibrators are shipped with the DKD calibration certificate to ensure the traceability to international standards. However, Power Diagnostix still offers the cost-effective factory calibration, if the formal traceability is not required.

### Simple to Use

The calibrator is switched on with the pushbutton On/Off. Both amplitude (Range) and polarity (Pos/Neg) of the *single* charge pulse per cycle are displayed and can be adjusted by pressing of the two buttons. Each calibrator is also available supplying two pulses per cycle, as well as with double impulse output with adjustable interval.

The instrument 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 (50Hz- and 60Hz-versions available).

Accessories - Calibrators



CALIA



## Available Calibrators

The standard calibration impulse generator CAL1A offers the charge range of 1/2/5/10/20/50/100 pC, while the CAL1B, mainly suitable for rotating machine testing, covers the range of 100/200/500pC/1/2/5/10nC.

Special signal sources are available for GIS measurements, such as the CAL2A: 0.5/1/2/5/10/20/50 pC,  $t_R \leq 300ps$ ,  $f_{3dB} \leq 1$  GHz, or with voltage output, the CAL2B: 0.5/1/2/5/10/20/50 V,  $Z_L = 50 \Omega$ ,  $t_R \leq 200ps$ ,  $t_f = 100$  ns.

The Power Diagnostix line of calibration impulse generators is unique in that the charge pulse is generated by injecting a *variable* voltage step (correlated to an internal reference) via a *fixed* capacitor. This injection capacitor is relatively small, as the step voltage amounts up to 120 V for full range output. Therefore, the Power Diagnostix calibrators offer excellent impulse properties. Further, calculation of the correction factor is usually not necessary ( $C_i \ll C_s$ ).

The standard line of Power Diagnostix calibration instruments is listed in the table below, along with their ranges and key features.



CAL1B

Calibration Impulse Generator	Range	Injection Capacitor (C <sub>i</sub> )	IEC60270 compliant	2 pulses / cycle option	BNC connection	Usage
CAL1A	1, 2, 5, 10, 20, 50, 100pC	<1pF	✓	✓	✓	standard, lab use
CAL1B	100, 200, 500pC, 1, 2, 5, 10nC	<100pF	✓	✓	✓	see CAL1E & F
CAL1C	1, 2, 5, 10, 20, 50, 100pC* at 100pF	V (50Ω)	✓	✓	✓	c/w ext. capacitor
CAL1D	10, 20, 50, 100, 200, 500, 1000pC	<10pF	✓	✓	✓	standard, lab use
CAL1E	0.5, 1, 2, 5, 10, 20, 50nC	<500pF	✓	✓	✓	high level application, e.g. rotating machines, cable field tests
CAL1F	0.2, 0.5, 1, 2, 5, 10, 20nC	<200pF	✓	✓	✓	
CAL1G	0.02, 0.05, 0.1, 0.2, 0.5, 1, 2nC	<20pF	✓	✓	✓	transformer test
CAL1H	0.5, 1, 2, 5, 10, 20, 50pC* at 2pF	V (50Ω)	✓	✓	✓	GIS, live injection via stray cap.
CAL2A	0.5, 1, 2, 5, 10, 20, 50pC	<1pF	✓	✓	N	GIS & UHF
CAL2B	2, 5, 10, 20, 30, 40, 50V (into 50Ω)	V (50Ω)	✓	-	N	GIS & UHF
CAL2C	0.2, 0.5, 1, 2, 5, 10, 20V (into 50Ω)	V (50Ω)	✓	-	N	GIS & UHF
CAL3A	700kHz to 1.35MHz, 10μV to 10mV	V (50Ω)	✓		✓	RIV calibration
CAL3B	400kHz to 1.9MHz, 10μV to 10mV	V (50Ω)	✓		✓	RIV calibration

\*with external high voltage capacitor

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The versatility of the Power Diagnostix line of PD detection equipment is due in large part to the range of accessories available for the ICMseries instruments. Each ICMseries data acquisition unit can be combined with different accessories to suit specific applications.

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