

# CAL1, CAL2, CAL3 SERIES Calibration impulse generators



- Unique operating principle ensures excellent impulse properties
- Calibrated in our DAkkS-accredited laboratory which is certified according to ISO 17025:2018
- Optional features to suit a broad range of applications
- Enable reliable partial discharge measurements compliant to international standards, such as IEC 60270, CISPR 18-2, and NEMA 107
- Suitable for time domain reflectometry (TDR) in cables to determine the cable length and the location of joints
- Devices of the CAL2 series can be used for sensitivity verification on GIS according to CIGRÉ's technical brochure 654

## DESCRIPTION

Power Diagnostix offers a broad range of calibration charge injectors suitable for the calibration of partial discharge (PD) measurements. The appropriate choice of a calibration instrument depends on the range of typical charge values of the PDs being measured.

PDIX calibrators can be used for high frequency, ultra-high frequency, and RIV measurement setups. Hence, they are suitable for calibrating test setups for the following assets:

- Cables
- Transformers
- Rotating machines
- Gas-insulated switchgear

Additionally, the calibrators of the CAL1 series can also be used for time domain reflectometry in cables to determine the cable length and the location of joints.

## EASY TO USE

- Clear arrangement of the controls
- Large LC display for good readability
- Automatic synchronisation to line frequency by a photo diode
- Convenient connection of the calibrator with ready-to-use connection sets
- Up to 200 hours of operation due to long-life battery

## OPTIONS

- Suitable for 50 and 60 Hz, switchable
- Double pulse with adjustable time delay (for CAL1 series)
- Remote power input for supply by an external 12 to 24 V DC voltage
- Selection switch for single pulse or continuous pulses (allows the output of manually triggered single pulses)



## CAL1, CAL2, CAL3 SERIES Calibration impulse generators

### RANGES AND KEY FEATURES

TYPE	RANGE	INJECTION CAPACITOR (C <sub>i</sub> )	IEC 60270 COMPLIANT	CONNECTOR	REMARKS/ APPLICATION	INCLUDED CONNECTION SET
CAL1A	1, 2, 5, 10, 20, 50, 100 pC	<1 pF	●	BNC	Cable and transformer tests	CAL1-CS1
CAL1B	100, 200, 500 pC, 1, 2, 5, 10 nC	<100 pF	●	BNC	High level application, e.g., rotating machines	CAL1-CS1
CAL1C/100	1, 2, 5, 10, 20, 50, 100 pC* at 100 pF	V (50 Ω)	●	BNC	Incl. ext. capacitor 100 pF; cable tests	CAL1-CS4
CAL1C/1000	1, 2, 5, 10, 20, 50, 100 pC* at 100 pF 10, 20, 50, 100, 200, 500, 1000 pC* at 1000 pF	V (50 Ω)	●	BNC	Incl. switchable ext. capacitor 100/1000 pF; cable tests	CAL1-CS4
CAL1D	10, 20, 50, 100, 200, 500, 1000 pC	<10 pF	●	BNC	Laboratory use, transformer tests	CAL1-CS1
CAL1E	0.5, 1, 2, 5, 10, 20, 50 nC	<500 pF	●	BNC	See CAL1B	CAL1-CS1
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 tests	CAL1-CS1
CAL1H/V(+/S)	0.5, 1, 2, 5, 10, 20, 50 pC* at **pF	V (50 Ω)	●	BNC	GIS, live injection via stray capacitance	CAL1-CS5
CAL1J	10, 20, 50, 100, 200, 500, 1000 pC* at 100 pF, 100, 200, 500, 1000, 2000, 5000, 10000 pC* at 1 nF	V (50 Ω)	●	BNC	Incl. switchable ext. capacitor 100pF/1nF; transformer tests	CAL1-CS4
CAL2B(/500)	2, 5, 10, 20, 30, 40, 50 V (into 50 Ω)	V (50 Ω)		N	GIS & UHF	CAL2-CS1
CAL2C(/500)	1, 2, 5, 7, 10, 12, 15, 17, 20 V (into 50 Ω)	V (50 Ω)		N		
CAL3A	600 kHz to 1.35 MHz, 10 μV to 10 mV	V (50 Ω)		BNC	RIV calibration; NEMA 107 compliant	CAL3-CS1
CAL3B	400 kHz to 1.9 MHz, 10 μV to 10 mV	V (50 Ω)		BNC	RIV calibration; NEMA 107 compliant	
CAL3D	400 kHz to 1.9 MHz, 10 μV to 10 mV (into 300 Ω)	V (>20 KΩ)		BNC	RIV calibration; CISPR 18-2 compliant	

\* with external high voltage capacitor, \*\* value to be specified by customer

### CONNECTION SETS

Every PDIX calibrator comes with a set of clamps, plugs, adapters, and pre-assembled cables for the comfortable connection of the calibration impulse generator to the measurement setup. The ready-to-use sets include

everything for a quick and convenient connection of the device to the specific test setup. The basic cable set consists of two banana cables (1 m), two crocodile clips, and a BNC banana adapter.

CONNECTION SET	CAL1-CS1	CAL1-CS2	CAL1-CS3	CAL1-CS4	CAL1-CS5	CAL2-CS1	CAL2-CS3	CAL3-CS1	CAL3-CS2
Basic cable set	●	●	●	●	●		●	●	●
Banana cable, 4 m black		●						●	
Banana cable, 2.5 m black			●						
RG108 twinaxial cable, 10 m					●				
T-joint (BNC)				●				●	●
T-joint (N)						●			
50 Ω termination				●		●		●	
N-N adapter						●			
N-BNC adapter							●		

# CAL1, CAL2, CAL3 SERIES

## Calibration impulse generators

### TECHNICAL DATA

Supply:	9 V lithium metal battery (or equivalent)
Current consumption:	1 to 5 mA in operation
Operation time:	Lithium metal battery: Approx. 200 h Alkaline battery: Approx. 90 h
Quiescent current:	Negligible
Display:	LCD, 3½ digits
Operation:	Two buttons
Output impedance:	CAL1x/CAL2x/CAL3A/CAL3B: 50 Ω CAL3D: 30 kΩ
Output connector:	CAL1x/CAL3x: BNC connector CAL2x: N connector
Synchronisation:	By photo diode to the power frequency light or internal quartz oscillator
Operation frequency:	50 Hz or 60 Hz
Operation temperature:	10–40 °C (non-condensing)
Width:	65 mm (excl. wing nut of CAL1C)
Depth:	40 mm
Height:	164 mm (CAL1x and CAL3x, incl. BNC connector) 170 mm (CAL2x, incl. N connector)
Weight:	Approx. 450 g
Rise time:	CAL1x: ≤ 35 ns CAL2x: < 200 ps CAL2x/500: Typ. 550 ps CAL3x: Depending on selected frequency

### ORDERING INFORMATION

Product	Order no.
Calibration impulse generator CAL1A	PX15000
Calibration impulse generator CAL1B	PX15001
Calibration impulse generator CAL1C	PX15002
Calibration impulse generator CAL1D	PX15003
Calibration impulse generator CAL1E	PX15004
Calibration impulse generator CAL1F	PX15005
Calibration impulse generator CAL1G	PX15006
Calibration impulse generator CAL1H/V	PX15039
Switching Unit for CAL1H/V	PX15040
Calibration impulse generator CAL1J	PX15016
UHF impulse generator CAL2B	PX15009
UHF impulse generator CAL2B/500	PX15037
UHF impulse generator CAL2C	PX15010
UHF impulse generator CAL2C/500	PX15038
RIV calibration unit CAL3A	PX15012
RIV calibration unit CAL3B	PX15013
RIV calibration unit CAL3D	PX15020

Accessories	Order no.
Connection set CAL1-CS1 for CAL1	PX15024
Connection set CAL1-CS2 for CAL1	PX15025
Connection set CAL1-CS3 for CAL1	PX15026
Connection set CAL1-CS4 for CAL1	PX15027
Connection set CAL2-CS1 for CAL2	PX15011
Connection set CAL2-CS3 for CAL2	PX15022
Connection set CAL3-CS1 for CAL3	PX15028
Connection set CAL3-CS2 for CAL3	PX15029

**One standard connection set included with every calibrator!**

Options	Order no.
50/60 Hz switchable	PX15104
Double pulse with adjustable time delay (for CAL1x)	PX15102
Remote power input	PX15107
Selection switch for single pulse/continuous	PX15101

### SALES OFFICE

**Power Diagnostix Systems GmbH**  
**Vaalsler Strasse 250**  
**52074 Aachen, Germany**  
**T +49 241 74927**  
**E support@pdix.com**

### CAL\_DS\_E1.01

**www.pdix.com**

**Technical changes reserved**  
**ISO 9001, ISO 14001**  
**ISO 17025, ISO 45001**

**PD**   
**by Megger®**  
 Power Diagnostix Systems