

ICMseries Accessories: Quadrupoles & Isolation Transformer



When a quadrupole and a coupling capacitor are used together as the coupling device, high voltage is applied both to a test object and to the coupling capacitor in parallel with the test object. A quadrupole (sometimes called a measuring impedance) can then be placed in series with either the coupling capacitor or in series with the test object. Some quadrupoles also output a low-voltage copy of the applied high-voltage wave for synchronizing the PD detector. The three basic models of available Power Diagnostix quadrupoles are briefly described here.

CIL Quadrupole

The **CIL** quadrupoles consist of an inductor in parallel with a damping resistor. The inductor and resistor are calculated to form, together with a high-voltage coupling capacitor, a second order high pass filter. Therefore, matching the range of the CIL with the size of the coupling capacitor with which it will be used is important.



CIL/V Quadrupole

The **CIL/V** quadrupoles are similar to the CIL quadrupoles but also contain a capacitor acting as a voltage divider together with the high voltage coupling capacitor. This provides a low-voltage copy of the applied high-voltage wave that can be used through a HST to synchronize the PD detector and monitor the quality of the applied high-voltage wave.

CIT Quadrupole

The **CIT** coupling units are transformer type units, where a preamplifier's input resistance serves as the required damping resistor. CIT units offer a higher sensitivity than the CIL coupling units, so they are suitable for measurements at HV cables with high C_x values. Furthermore, CIT units are available for bridged configurations to connect to two similar test objects (CITxy2 models).



Optionally, the quadrupoles with built-in divider capacitor for voltage measurement can be supplied with a rotary switch to select the divider capacitor. Especially, when connected to the measurement tap of transformer bushings, the selectable capacitors expand the applicable voltage range.



Reference table of standard
Power Diagnostix quadrupoles

Type	Coupling Capacitor Range	Max. AC Current	Voltage Divider Capacitor (to be specified)
CIL1H	20 pF – 90 pF	50 mA	All CIL and CIT units are available with one, two, or multiple (switchable) built-in divider capacitors to provide a voltage output signal, marked by 'V'
CIL2H	60 pF – 250 pF	100 mA	
CIL3L	200 pF – 900 pF	50 mA	
CIL3M	200 pF – 900 pF	200 mA	
CIL3H	200 pF – 900 pF	500 mA	
CIL4L	600 pF – 2.5 nF	100 mA	
CIL4M	600 pF – 2.5 nF	400 mA	
CIL4H	600 pF – 2.5 nF	1100 mA	
CIL5L	2 nF – 9 nF	400 mA	
CIL5M	2 nF – 9 nF	1600 mA	
CIL5H	2 nF – 9 nF	3200 mA	
CIL6L	6 nF – 25 nF	1000 mA	
CIT4M	600 pF – 2.5 nF	400 mA	
CIT4H	600 pF – 2.5 nF	1100 mA	
CIT5M	2 nF – 9 nF	1600 mA	
CIT5H	2 nF – 9 nF	3200 mA	
CIT6M	6 nF – 25 nF	4000 mA	
CIT6H	6 nF – 25 nF	8000 mA	

IT Isolation Transformer

The IT series allows the permanent isolation of 250 Volts between input and output. Its high frequency behavior is optimized for 50Ω systems and the use with a multiplexer and RPA2 or RPA2B type of preamplifier. An extra voltage output 'V' with the 50/60 Hz fundamental frequency is available on request.



Type	Max. AC Current	Max. Voltage (< 1 minute)	-6dB LF Cut-Off	-3dB LF Cut-Off	-3dB HF Cut-Off	-6dB HF Cut-Off	Input Connector
IT2C	500mA	10 kV _{AC}	300 kHz	500 kHz	30 MHz	80 MHz	BNC
IT3B	1000mA	1 kV _{AC}	100 kHz	200 kHz	30 MHz	50 MHz	BNC
IT4B	1000mA	1 kV _{AC}	100 kHz	200 kHz	30 MHz	50 MHz	Banana



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.