

# High Voltage 50 $\Omega$ Pulse Generator CMTI-8010A

Advanced TLP/HMM/HBM Solutions

## 1 Features

- High voltage 50  $\Omega$  pulse generator for static and dynamic common mode transfer interference (CMTI) evaluations of digital isolators according IEC-60747-5-5 and IEC-60747-17
- 10 000 V ns<sup>-1</sup> CMTI slew rate at 3 kV open load output voltage and 0.3 ns rise time
- 80 kW output power into 50  $\Omega$  load
- 8 programmable pulse rise times out of: 20 ns, 10 ns, 7 ns, 5 ns, 3.5 ns, 2 ns, 1 ns, 0.6 ns, 0.3 ns. Other values on request.
- 100 ns pulse width
- Optional external pulse width extensions from 5 ns to 500 ns (up to 2  $\mu$ s on request) using the external pulse width extender TLP-8012A5
- High speed 50  $\Omega$  trigger output for oscilloscopes (synchronous to high voltage pulse output)
- Built-in pulse reflection suppression
- 200 ms pulse repetition rate
- Application programming interface (API): software macros to control pulse generator in standalone operation
- Integrated interlock safety shut-down needed for pulse widths beyond 500 ns
- Industrial isolated and EMI/ESD protected USB control interface
- Two years warranty on the total system

## 2 Description

The CMTI-8010A is a high voltage 50  $\Omega$  pulse generator for static and dynamic common mode transfer interference (CMTI) evaluations of digital isolators according IEC-60747-5-5 and IEC-60747-17.

Fig. 1 shows a typical measurement setup for CMTI evaluation. The output supply voltage domain GND2 and VDD2 of the digital isolator (DUT) acts as reference voltage. The input supply domain is pulsed in common mode by the CMTI-8010A. The output of the digital isolator is evaluated regarding digital transmission errors.

The CMTI-8010A can be controlled by the unified standard HPPI tester GUI<sup>1</sup> including automation, or by an independent application programming interface (API) written by the user. The API allows for communication between network software and network services, such as Transmission Control Protocol/Internet Protocol (TCP/IP). This allows also the remote execution of the CMTI measurements.

If 8 software programmable rise-times are not sufficient we would propose our rise-time extender RTE-24A: [https://www.hppei.de/?page\\_id=2337](https://www.hppei.de/?page_id=2337). In this document one can also find several measurement set-up possibilities and further information on CMTI measurements. The RTE-24 adds up to 24 programmable rise-times to the standard pulse generator, which enables in total up to 32 programmable rise-times.

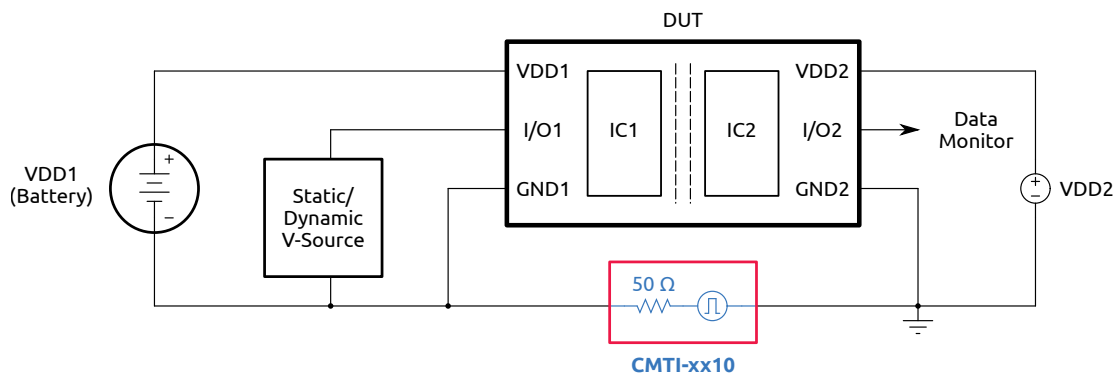


Figure 1: Typical CMTI measurement setup

<sup>1</sup>same for all HPPI pulse generators.

# High Voltage 50 $\Omega$ Pulse Generator CMTI-8010A

Advanced TLP/HMM/HBM Solutions

## 2.1 Front and Rear Panel View

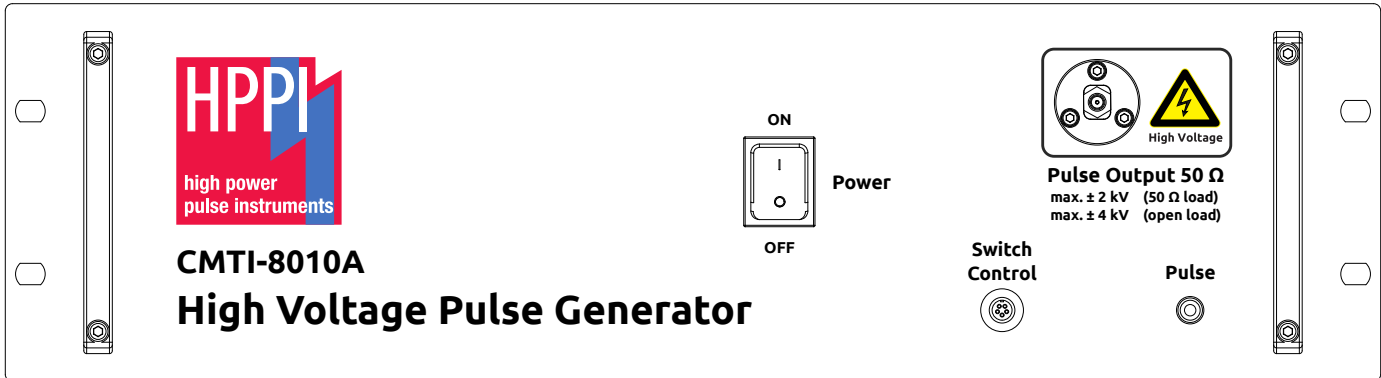


Figure 2: CMTI-8010A schematic front view (482.6 mm x 132.55 mm)

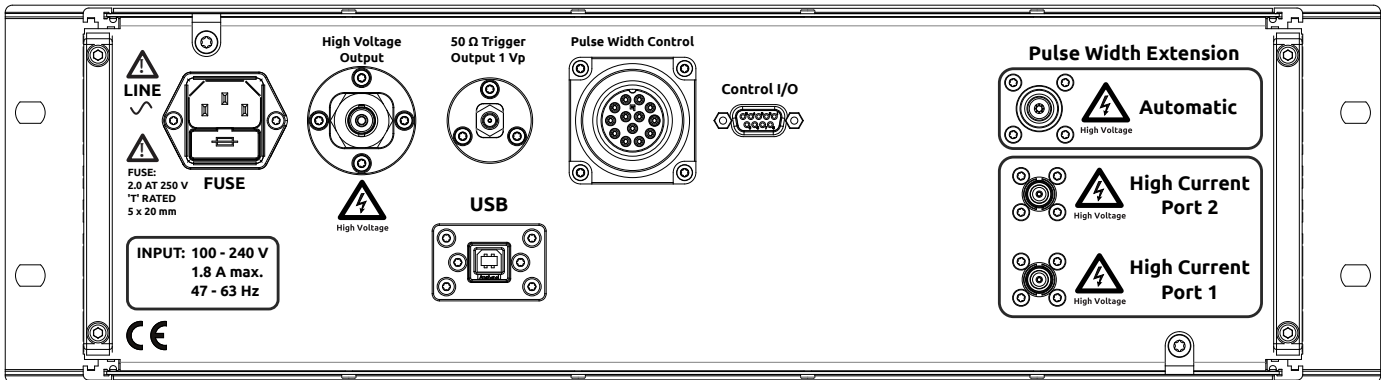


Figure 3: CMTI-8010A schematic rear view

## 3 Specifications

Parameter	Symbol	Limit Values			Unit	Remarks
		Min.	Typ.	Max.		
Output voltage (open load)	$V_{out,\infty}$	-4.0		+4.0	kV	into open load <sup>1)</sup>
Output voltage (50 $\Omega$ load)	$V_{out,50\Omega}$	-2.0		+2.0	kV	into 50 $\Omega$ load
Peak pulse output power (50 $\Omega$ load)	$P_{out,50\Omega}$		80		kW	into 50 $\Omega$ load
Minimum output voltage step size	$V_{\Delta}$		0.1		V	into open load, programmable
Maximum output current	$I_{max,0\Omega}$	-80		+80	A	short circuit
Maximum output current	$I_{max,50\Omega}$	-40		+40	A	50 $\Omega$ load
Pulse repetition frequency	$f_p$		5	10	Hz	state dependent
Pulse width	$t_{p,int}$		100		ns	
Pulse width using pulse width extender TLP-8012A5 (optional)	$t_{p,ext}$	5		500	ns	optional up to 2 $\mu$ s
Output pulse rise time	$t_r$	0.3		50	ns	programmable 8 steps, out of: 0.3, 0.6, 1, 2, 3.5, 5, 7, 10, 20, 50 ns (other custom values on request)

Table continued on next page ...

<sup>1)</sup>The maximum open load output voltage can reach 4 kV. But it is depending on pulse width and it is limited by the breakdown voltage of the DUT connectors and the interconnection. Therefore, at open load condition the DUT voltage should not exceed 2.5 kV to 3 kV.

# High Voltage 50 $\Omega$ Pulse Generator CMTI-8010A

Advanced TLP/HMM/HBM Solutions

... Table continued from previous page

Parameter	Symbol	Limit Values			Unit	Remarks
		Min.	Typ.	Max.		
Digital control interface	-	USB			-	Industrial isolated and EMI/ESD protected USB 2.0 interface
AC line voltage range	V <sub>AC</sub>	100		240	V	47-63 Hz, max. 1.8 A
Dimensions CMTI-8010A (W x H x D)	D	428 (482.6) x 132.5 x 485			mm <sup>3</sup>	428 mm body, 482.6 mm rack flange
Weight CMTI-8010A	W		18		kg	excluding accessories

## 4 Accessories Suitcase Included With CMTI-8010A (Typical Set)

Item	Sub-Item	Qty.	Descriptions	Model Number
1	1.0	1	High voltage 50 $\Omega$ pulse generator for static and dynamic common mode transfer interference evaluations of digital isolators according IEC-60747-5-5 and IEC-60747-17. A interlock safety switch is implemented inside the CMTI-8010A in order to guarantee safe usage of the high voltage capabilities. The customer has to provide adequate measurement set-up housing to guarantee the safety of the operators.	CMTI-8010A
	1.1	2	SMA(m)/SMA(m) adaptor	SMA(m)/SMA(m)
	1.2	2	SMA(f)/SMA(f) adaptor	SMA(f)/SMA(f)
	1.3	1	SMA jack T-shape	DELOCK 88711
	1.4	2	50 $\Omega$ high performance SMA cable 2 m, Sucoflex 104	SF104-2m
	1.5	1	Transient voltage suppressor protection for scope input	TVS-70MF-10
	1.6	1	50 $\Omega$ SMA Wideband Pick-Off Tee PT-95A	PT-95A
	1.7	1	High voltage attenuator 50 $\Omega$ , 34 dB	HVA-34A
	1.8	1	High voltage attenuator 50 $\Omega$ , 10 dB	HVA-10A
	1.9	1	High voltage attenuator 50 $\Omega$ , 6 dB	HVA-06B
	1.10	1	SMA torque wrench	74Z-0-0-21
	1.11	1	USB 2.0 cable A male to B male 3 m shielded	102-1030-BL-F030
	1.12	1	Power line cable according supply voltage, 1.5 m	PLC-150A
	1.13	1	Hardware manual CMTI-8010A	CMTI-HM
	1.14	1	Safety switch to allow 2 $\mu$ s pulse width	CMTI-IN-LO (optional)

## 5 Ordering Information

Pos.	Description	Part No.
01	High voltage 50 $\Omega$ pulse generator CMTI-8010A including cables, software and manuals	CMTI-8010A
02	Optional pulse width extender 5 ns to 500 ns (up to 2 $\mu$ s on request )	TLP-8012A5

### General

The product data contained in this data-sheet is exclusively intended for technically trained staff. You and your technical departments will have to evaluate the suitability of the product for the intended application and the completeness of the product data with respect to such application. Our products are solely intended to be commercially used internally and should not be sold to consumers. This data-sheet is describing the specifications of our products for which a warranty is being granted by HPPI GmbH. Any such warranty is granted exclusively pursuant to the terms and conditions of the respective supply agreement. There will be no guarantee of any kind for the product and its specifications. For further information on technology, specific applications of our product, delivery terms, conditions and prices please contact HPPI:

High Power Pulse Instruments GmbH  
Stadlerstrasse 6A  
D-85540 Haar, Germany  
Phone : +49 (0)89 8780698 - 440  
Fax : +49 (0)89 8780698 - 444  
E-Mail : [info@hppi.de](mailto:info@hppi.de)

Due to technical requirements our products and/or their application may be harmful. For information please read carefully the manual or contact HPPI. Safety notes in the manual will inform you about possible risks that result from any foreseeable application of our products. Changes of this data-sheet are reserved.