

# High Voltage 50 $\Omega$ Pulse Generator CMTI-3010C

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
- CMTI slew rate:
  - a) up to 15 000 V ns<sup>-1</sup> at 1.5 kV at open load output voltage and 100 ps rise time
  - b) up to 7500 V ns<sup>-1</sup> at 750 V at 50  $\Omega$  load output voltage and 100 ps rise time
- 11 kW output power into 50  $\Omega$  load
- 6 (optional 8) programmable pulse rise times out of: 50 ns, 20 ns, 10 ns, 7 ns, 5 ns, 3.5 ns, 2 ns, 1 ns, 0.6 ns, 300 ps, 200 ps, 100 ps (other values on request)
- Optional automatic software programmable pulse width extensions 125 ns to 1600 ns (up to 2  $\mu$ s on request) in 25 ns step size using the external pulse width extender [TLP-3011C](#)
- High speed 50  $\Omega$  trigger output for oscilloscopes (synchronous to high voltage pulse output)
- Built-in pulse reflection suppression
- Fast pulse repetition rate, typically 100 ms per pulse
- Application programming interface (API): software macros to control pulse generator in standalone operation
- Integrated interlock safety shut-down (optional)
- Industrial isolated and EMI/ESD protected USB control interface
- Two years warranty on the total system

## 2 Description

The CMTI-3010C 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-3010C. The output of the digital isolator is evaluated regarding digital transmission errors.

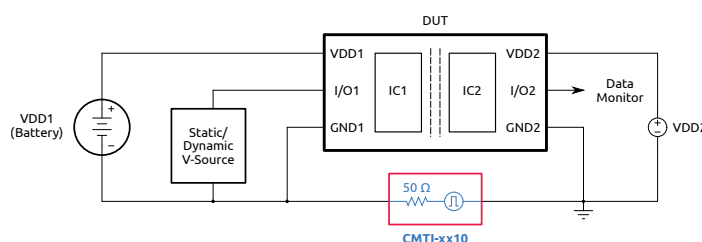


Figure 1: Typical CMTI measurement setup

The CMTI-3010C provides a maximum open load output voltage of 2 kV at minimum 100 ps pulse rise time. 6 (optional 8) software programmable pulse rise times out of: 50 ns, 20 ns, 10 ns, 7 ns, 5 ns, 3.5 ns, 2 ns, 1 ns, 0.6 ns, 300 ps, 200 ps, 100 ps (other values on request). 8 programmable built-in pulse width of 1, 2.5, 5, 10, 25, 50, 75, 100 ns. Further software programmable pulse width of 125 ns to 1600 ns (up to 2  $\mu$ s on request) in 25 ns step size using the optional external automatic pulse width extender [TLP-3011C](#).

The CMTI-3010C 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

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

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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.

## 2.1 Front and Rear Panel View

Fig. 2 and Fig. 3 show the schematic front and rear view of the CMTI-3010C pulse generator.

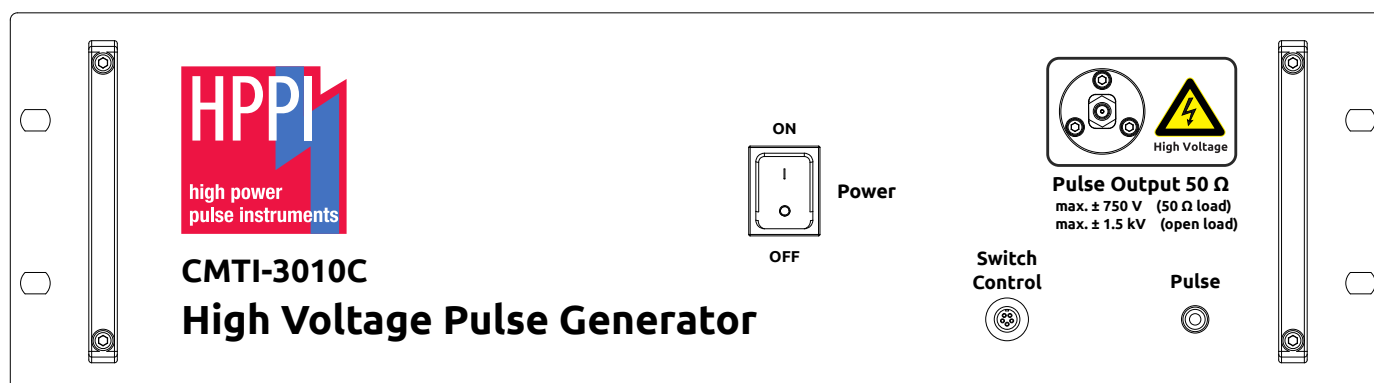


Figure 2: CMTI-3010C front view (482.6 mm x 132.55 mm)

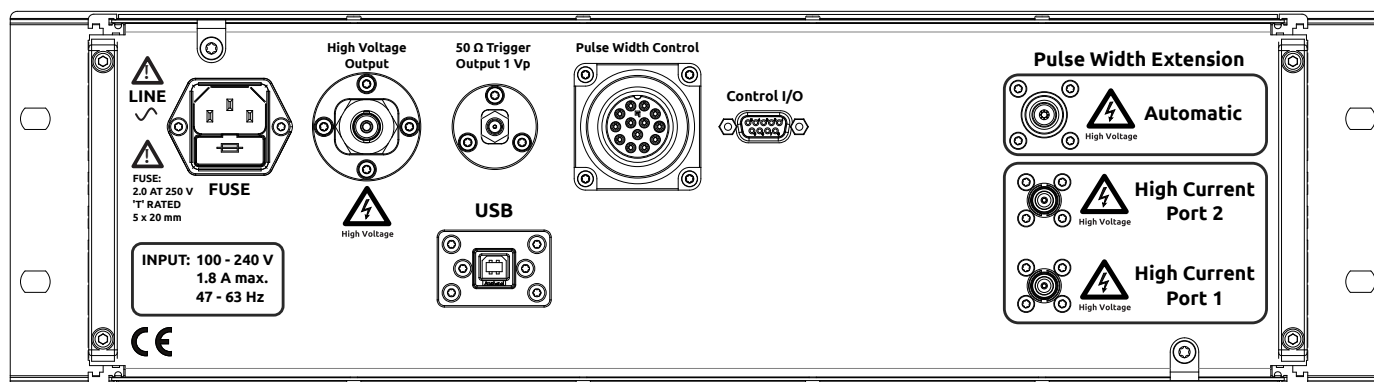


Figure 3: CMTI-3010C rear view

## 3 CMTI-3010C Specifications

Parameter	Symbol	Limit Values			Unit	Remarks
		Min.	Typ.	Max.		
Output voltage (open load)	$V_{out,\infty}$	-1.5		+1.5	kV	into open load
Output voltage (50 $\Omega$ load)	$V_{out,50\Omega}$	-750		+750	V	into 50 $\Omega$ load
Peak pulse output power (50 $\Omega$ load)	$P_{out,50\Omega}$			11	kW	into 50 $\Omega$ load
Minimum output voltage step size	$V_{\Delta}$		0.1		V	software programmable
Maximum output current (short circuit)	$I_{max,0\Omega}$	-30		+30	A	short circuit
Maximum output current (50 $\Omega$ )	$I_{max,50\Omega}$	-15		+15	A	50 $\Omega$ load
Pulse repetition frequency	$f_p$		5	10	Hz	state dependent

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Parameter	Symbol	Limit Values			Unit	Remarks
		Min.	Typ.	Max.		
Pulse width	$t_{p,int}$	1		100	ns	programmable in 8 steps: 1, 2.5, 5, 10, 25, 50, 75, 100 ns
Pulse width using the external automatic pulse width extender TLP-3011C (optional)	$t_{pB,ext}$	125		1600	ns	digital programmable in 68 steps: 125 ns to 1600 ns at 25 ns step size, optional up to 2 $\mu$ s
Output pulse rise time	$t_r$	0.1		50	ns	software programmable 6 (optional 8) steps, out of: 0.1, 0.2, 0.3, 0.6, 1, 2, 3.5, 5, 7, 10, 20, 50 ns (other custom values on request)
Digital control interface	-	USB			-	Industrial isolated and EMI/ESD protected USB 2.0 interface
AC line voltage range	$V_{AC}$	100		240	V	47-63 Hz, max. 1.8 A
Dimensions CMTI-3010C (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 outer dimension
Weight CMTI-3010C	W		14		kg	excluding accessories

## 4 Accessories Suitcase Included With CMTI-3010C (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 evaluation of digital isolators according IEC-60747-5-5 and IEC-60747-17	CMTI-3010C
	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-3010C	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-3010C including accessories, software and manuals	CMTI-3010C
02	Automatic pulse width extender 125 ns to 1600 ns (optional up to 2 $\mu$ s on request)	TLP-3011C

### 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:

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