



7600 Isolated Digitizer and Receiver

GEN series

Features and Benefits

- Complete single-channel isolated analog input subsystem
- Rugged enclosure for use in EMI hostile environments
- Shock and vibration resistant
- Wide operating temperature range, up to 70 °C (158 °F)
- Digital fiber-optic data transmission for excellent DC stability
- Wide dynamic range and unsurpassed dynamic accuracy
- Up to 100 MegaSample/s sample rate at 14-bit resolution
- Combines with dedicated GEN series 4-channel receiver board with 900 MegaSample on-board memory

GEN series 7600 Isolated Digitizer and Receiver

The 7600 Isolated Digitizer is based on the fourth generation of fiber-optic isolated digitizers designed by HBM.

It is smaller, lighter and has improved performance when compared to its predecessors which make these Isolated Digitizers the leading product for use in the most demanding test lab applications.

The digitizer is a single component for integration into existing systems only⁽¹⁾.

Designed for applications that require high voltage isolation and safe and accurate measurements in harsh electrical environments.

The 7600 is exclusively DC powered⁽²⁾, the 7600 Isolated Digitizer offers remote operation, excellent signal fidelity and elimination of ground problems.

In addition the 7600 Isolated Digitizer offers an improved temperature range and an increased mechanical robustness with a stainless-steel housing.

Note

(1) This unit is not compatible with the 6600 digitizer and therefore cannot be used with it.

(2) HBM does not supply power sources for this digitizer.

Front-end specifications (Transmitter)

Analog input section

Component	Unit Description	Value
Channels	Per front-end	1
Input type	Single-ended to isolated common (unbalanced differential) (1)	1
Coupling	AC / DC / GND / Reference	
Connector	BNC	1
Ranges	Full Scale in 1, 2, 5 steps	± 20 mV to ± 100 V
Zero suppression	Automatic, equal to range	
Impedance		1 M Ω (± 2 %) // 38 pF (± 5 %)
Bandwidth	@ -3 dB (wideband)	25 MHz
	@ -3 dB (filtered)	10 MHz
Passband flatness	Ranges: ± 0.1 dB over full temperature range	< 4 V, DC to 2.5 MHz
	Ranges: ± 0.2 dB over full temperature range	≥ 4 V, DC to 2.5 MHz
CMRR	@ 80 Hz (1)	100 dB
MSE		0.1 % FS ± 50 μ V RTI(2)
Offset error		0.1 % FS ± 50 μ V RTI(2)
Noise (RMS)		0.05 % FS ± 0.1 mV RTI
Bias current		< 2 nA
Rise time		14 ns
Recovery time(3)	To 10 % following a 200 % Full Scale input	≤ 10 ns
	To 0.1 % following a 200 % Full Scale input	≤ 50 ns
Overload	Protected for ranges $\geq \pm 2$ V 125 Vpeak protected for ranges $< \pm 2$ V	250 Vpeak
	Transient (impulse spark-over voltage at 1 kV/ μ s)	800 Vpeak
Anti-alias filter	Low-pass at 10 MHz	6 th order Bessel

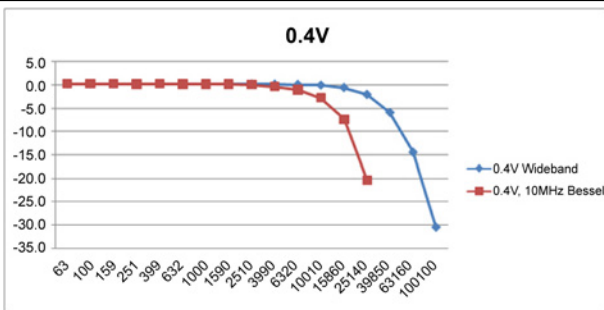


Figure 1.1: Bandwidth plot in 0.4 V range

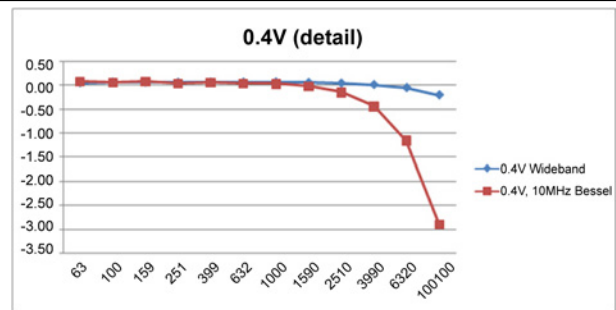


Figure 1.2: Bandwidth plot in 0.4 V range (detail)

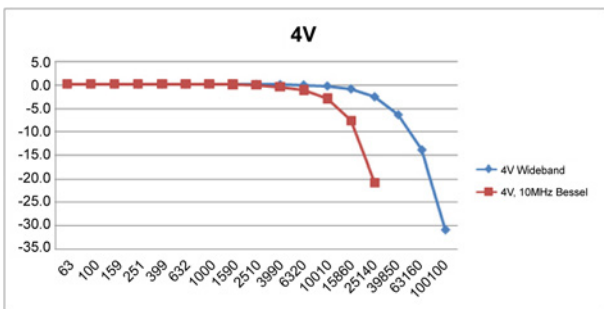


Figure 1.3: Bandwidth plot in 4 V range

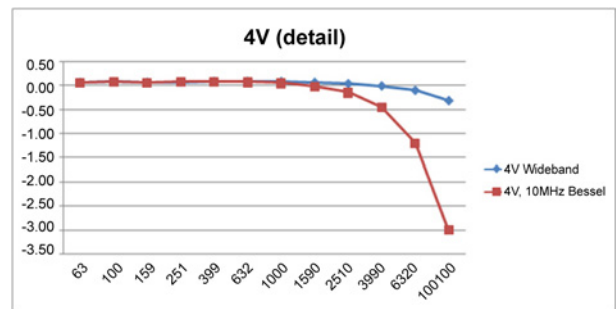


Figure 1.4: Bandwidth plot in 4 V range (detail)

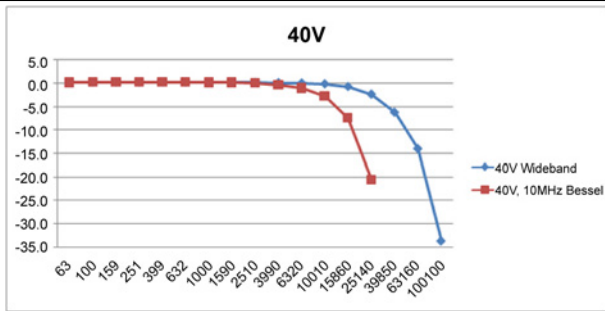


Figure 1.5: Bandwidth plot in 40 V

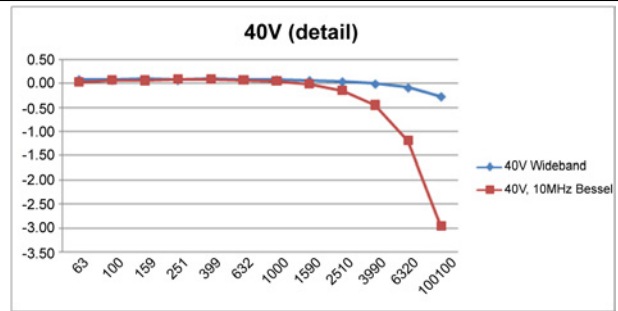


Figure 1.6: Bandwidth plot in 40 V range (detail)

Testing and control section

Component	Unit Description	Value
Power On/Off (transmitter)	Controlled by Perception	
Reference signal accuracy	Switched on via "Coupling" in Perception	
	Square wave	504 Hz +/- 1.8 V and +/- 0.09 V
	Amplitude	+/- 0.5 %
	Frequency	+/- 2 %
Control Out	Switched on via "Control-Out" in Perception	
	Open collector output, sink-current	< 50 mA
	Maximum open voltage; remotely controlled (open/closed) from Perception software to control e.g. external power supply	12 V

Digitizer section

Component	Unit Description	Value
Conversion	A-to-D Converter per channel Synchronous sampling between channels	Single
Conversion rate		100 MS/s
Resolution		14 bit (0.006 %)
	In enhanced mode (4)	16 bit
Aperture jitter		200 fs

Fiber-optic link

Component	Unit Description	Value
Light source	Class 1 laser product	1
Connector	LC Duplex	1
Transfer rate		2 Gbit/s
Wavelength		1310 nm
Cable type	Single mode	9/125 μ m
Dynamic range		+ 9 dB
Isolation		10^{15} Ω /meter
Cable length	See Accessories	
Maximum length ⁽⁵⁾	Typical with standard off-the-shelf cable	4 km
	Maximum with low-loss fiber optic cable	12 km

DC Power

Component	Unit Description	Value
Supply <i>Note: Power sources not available form HBM</i>	Normal	12 V DC
	Minimum	11 V DC
	Maximum	15 V DC

DC Power		
Component	Unit Description	Value
	Maximum operating current	0.6 A
	Maximum in sleep mode	80 mA
	Isolation	SELV (6)
Warnings	Low voltage warning	10.4 V
	Automatic shut down	9.2 V
Overheat	Red LED at receiver front panel indicates a transmitter internal temperature (Externally)	90 °C (approx. 70 °C)
Overheat protection	Transmitter shutdown Automatic restart trial every 5 minutes after shutdown (Externally)	95 °C (approx. 75 °C)
Connector	Lemo	FGG.1B.303

Physical and environmental specifications		
Component	Unit Description	Value
Dimensions	Width	122.4 mm (4.82")
	Depth	237.0 mm (9.33")
	Height	45.6 mm (1.79")

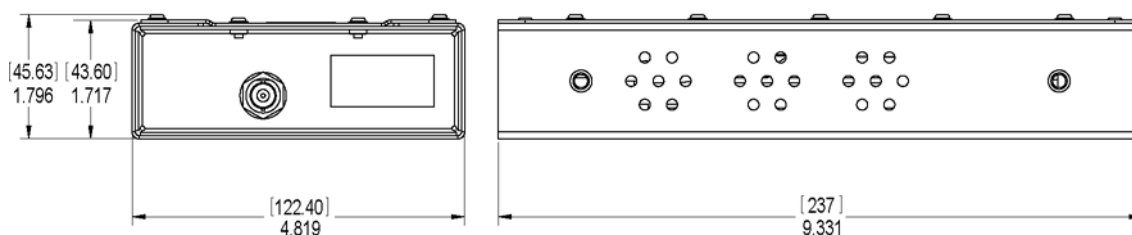


Figure 1.7: Isolated Digitizer 7600 Dimensions

Physical and environmental specifications		
Component	Unit Description	Value
Weight	Maximum	1.3 kg
Shielding	Stainless Steel housing	(304)
Operating temp.	Normal operating temperatures	-10 °C to +70 °C (14 °F to 158 °F)
Humidity	Relative humidity (non-condensing)	0 % - 80 %
Altitude	Maximum operational altitude	2000 m (6100 ft)
Shock	acc. MIL-PRF-28800F Class 1, Non-operational Shock test	30 g halvesine, 11 ms
	Transit drop test: height	460 mm
Vibration	Non-operational acceleration test	23 grms, 10 – 1500 Hz
	All three axes for	30 seconds per axis
Protection	IP Rating	IP20

Notes

- (1) Using an 'ideal' isolated power supply.
- (2) MSE and Offset error over the full temperature range will be 1 % of Full Scale.
- (3) Measured with a 1 kHz square wave signal at an input range of 1 V and no filter (wideband).

- (4) For sample rates ≤ 10 MHz and with digital filter ON.
- (5) Without additional connectors or patch boards.
- (6) SELV; safety extra-low voltage. In appliance standards (EN 60335)

All specifications are typical @ 25 °C (77 °F) unless otherwise stated and subject to change without notice in order to improve design- and/or performance characteristics.

Consult www.hbm.com/highspeed for more information.

Receiver specifications		
Fiber-optic link		
Component	Unit Description	Value
Light source	Class 1 laser product	1
Connector	LC Duplex	1
Transfer rate		2 Gbit/s
Wavelength		1310 nm

Filtering		
Component	Unit Description	Value
Digital filters	Sample rate $f_s = 100$ MS/s	No filter
	Sample rate $f_s < 100$ MS/s, User selectable in range (see value)	5 MHz to 50 kHz (in 12 steps)

Monitor output		
Component	Unit Description	Value
Outputs	one BNC per channel on receiver front panel	
Output level	Full Scale (± 0.5 %)	± 5 V
Output current		± 20 mA
Output load		$> 250 \Omega$
Conversion	D-to-A Converter per channel	Single
Conversion rate		100 MS/s
Resolution		14 bit (0.006 %)
Output filter	6-pole Bessel	10 MHz @ -3 dB
Delay ⁽⁷⁾	Delay from input to output: Minimum: (filter = wideband) Maximum: (filter = 50 kHz)	$< 1 \mu s$ $12 \mu s$

Transient memory		
Component	Unit Description	Value
Capacity	On-board, to be used by enabled channels	900 MS (1.8 GigaByte)

Triggering		
Component	Unit Description	Value
Type	Dual-level trigger digital trigger detector per channel	
Pre/post trigger	Pre- and post trigger segment can be zero samples up to full memory length	
Rate	Maximum	1 trigger/10 ms up to 100 triggers/s
	Zero re-arm time	

Triggering		
Component	Unit Description	Value
Resolution	On each level	16 bit (0.0015 %)

Acquisition modes	
Component	Unit Description
Recorder	For continuous acquisition
Scope	For repetitive phenomena
Transient	For intermittent events; single, dual or A-B-A timebase

Data Storage		
Component	Unit Description	Value
Recorder	Spoiled directly to hard disk of control PC. Unlimited file size or duration.	
	Maximum transfer rate:	10 MS/s per channel
Scope	Store in transient memory	
Transient	Store in transient memory; single or A-B-A timebase	

Notes

(7) With 1 meter of fiber optic cable.

All specifications are typical @ 25 °C (77 °F) unless otherwise stated and subject to change without notice in order to improve design- and/or performance characteristics.

Consult www.hbm.com/highspeed for more information.

Ordering information		
Component	Unit Description	Order Number
Four channel receiver	7600 Enhanced receiver card for Genesis system. Single Mode FO transmission. Accepts only 7600 Isolated digitizers. Includes 900 MS transient memory	1-GN402-2

Ordering information		
Component	Unit Description	Order Number
Single channel transmitters	7600 Enhanced isolated digitizer, 100 MS/s, Single Mode FO link, requires 7600 receiver	1-GN114-2

Accessories (to be ordered separately)				
Component	Unit Description	Length	Order Number	
Fiber Optic Cables KAB288	Standard Isobe7600 Cable Pair (Patch panel/Indoor use only) 7600 Standard Zipcord fiber optic Single Mode cable, 0,5 dB/km loss, LC-LC connectors, Yellow	2 m	1-KAB288-2	
	Diameter	2.4 x 4.8 mm (0.09" x 0.19")	10 m	1-KAB288-10
	Weight	14 kg/km (9 lbs/1000 ft)	20 m	1-KAB288-20
	Tension long term	529 N (119 LBS)	50 m	1-KAB288-50
	Bend radius	30 mm (1.2")	100 m	1-KAB288-100
	Operating temp	0 °C to +70 °C		

Accessories (to be ordered separately)				
Component	Unit Description		Length	Order Number
	Color	Yellow		

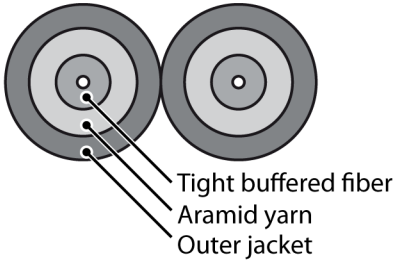


Figure 1.8: Standard Isobe7600 Cable Pair

Accessories (to be ordered separately)				
Component	Unit Description		Length	Order Number
Fiber Optic Cables Heavy duty KAB289	7600 Indoor/Outdoor, heavy duty, fiber optic, Single Mode cable, 0,5 db/km loss, LC-LC connectors, Black		10 m	1-KAB289-10
	Diameter	5.8 mm (0.23")	20 m	1-KAB289-20
	Weight	32 kg/km (21.5 lbs/1000 ft)	50 m	1-KAB289-50
	Crush resistance	2000 N/cm	100 m	1-KAB289-100
	Tension long term	290 N (66 LBS)	150 m	1-KAB289-150
	Bend radius	5.8 cm (2.3")	300 m	1-KAB289-300
	Operating temp.	-46 °C to +85 °C		
	Color	Black		

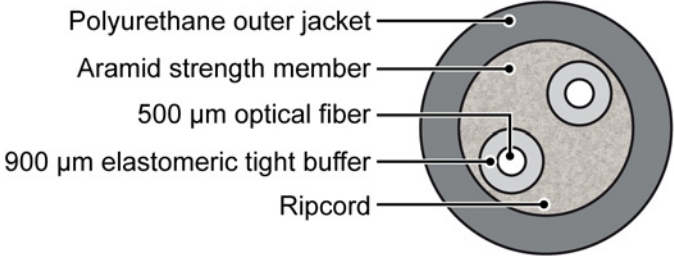


Figure 1.9: Heavy Duty Isobe7600 Cable

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Hottinger Baldwin Messtechnik GmbH
 Im Tiefen See 45 • 64293 Darmstadt • Germany
 Tel. +49 6151 803-0 • Fax: +49 6151 803-9100
 E-mail: info@hbm.com • www.hbm.com

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