



Multi-Channel Test Sequencer

BE3200

Features and Benefits

- Completely optically-isolated with fiber-optic
- Fully programmable sequence
- Up to 64 channels in one housing
- Various synchronization sources
- Synchronizes with frequencies from 16 Hz to 400 Hz
- Timing resolution of one electrical degree for synchronization frequencies up to 200 Hz
- Extensive protection measures to prevent damage to the equipment under test

The BE3200 Test Sequencer

A high speed controller that provides precise timing for the operation of devices used for testing in low voltage, high voltage and high power laboratories.

Sequences are created on a PC using Perception software and are then uploaded to the test sequencer.

Timing of the test sequencer can be synchronized to cycles present in the mains generator, the external mains or derived from an internal timer.

Outputs are switched on and off by the programmed sequence in the BE3200, fully synchronized with the chosen synchronization method. Fiber-optics provide optically isolated inputs and outputs.

Two BE3200's can be connected together to synchronize more channels.

Protection measures within the test sequencer prevent damage to the equipment under test, guaranteeing proper completion of the sequence even in the event of interrupted mains supply or synchronization inputs.

Perception software runs on a PC and controls the required sequence, either in milliseconds or with degrees-of-a-cycle to 1 degree of resolution where one cycle is 360 degrees.

The sequence can be run in a repetitive (random) mode for endurance testing along with other various modes. A complete sequence set-up can be saved and recalled from disk.

Physical/Environmental specifications		
Physical/Environmental		
Component	Unit Description	Value
Dimensions	Width	483 mm (19.0")
	Depth	425 mm (16.7")
	Height	177 mm (7.0")
Rack	Rack mountable ⁽¹⁾	19"
Weight	Fully loaded	10 kg (22 lbs)
Power		86 – 264 VAC @ 47 – 440 Hz
	Maximum	75 VA
Battery	Built-in automatic recharge system. Backup with rechargeable NiCad battery:	12 VDC @ 6.5 Ahr
Altitude	Maximum operational altitude	2000 m (6100 ft)
Protection	IP Rating	IP20
Temperature	Operating	0 to 40 °C; 32 to 104 °F
	Storage	-25 to + 70 °C; -13 to 158 °F
Humidity	Non-condensing	0 to 80 %

Notes

(1) Optional 19 inch rack mount required.

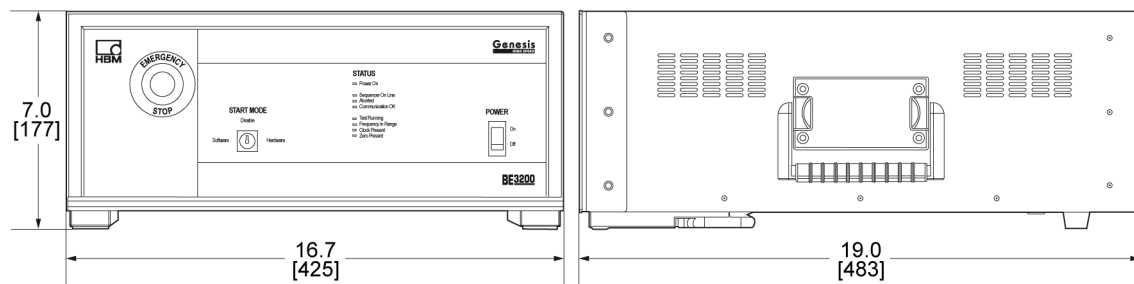


Figure 1.1: BE3200 Multi-Channel Test Sequencer Dimensions

Fiber-optic I/O specifications		
Fiber-optic I/O		
Component	Unit Description	Value
Sockets	Input: Hewlett-Packard HFBR-2523	
	Output: Hewlett-Packard HFBR-1523	660 nm LED
Connectors	Hewlett-Packard HFBR-4503 Simplex latching connector	
	Hewlett-Packard HFBR-4516 Duplex latching connector	
Drive	Control lines	10 to 60 meter
	Status and channel outputs	60 to 100 meter
Optical Communication Link USB	Optical to Electronic USB converter. See Manufacturers web-site for details and drivers if Perception not installed: www.ratioplast.com	1

Cable		
Component	Unit Description	Value
Type	Plastic, single step index, Hewlett-Packard HFBR-RXXYYY series	
Diameter	Core and cladding	1.00 mm

Cable		
Component	Unit Description	Value
Attenuation		0.22 dB/m
Delay	Propagation delay constant	5.0 ns/m
Force	Short term tensile force	50 N max. (< 30 minutes)
	Long term tensile load	1 N max.
Bend radius	Short term	25 mm
	Long term	35 mm
Flexing	90° bend on 25 mm radius mandrel	1000 cycles

Synchronization specifications

Sources

Component	Unit Description	Value
Sources	<p>One of three sources can be selected:</p> <ul style="list-style-type: none"> • Generator 1 (Clock and Zero) • Generator 1 (Zero) • Generator 2 (Clock and Zero) • Generator 2 (Zero) • Mains 	

Generators

Component	Unit Description	Value
Inputs	Four fiber-optic inputs are provided for two generators. For each generator two synchronization inputs are available: clock and zero.	
Clock	120 to 360 times per cycle @ cycles ranging from	16 to 70 Hz
Zero	Zero-index pulse once per cycle @ cycles ranging from	16 to 400 Hz

Mains

Component	Unit Description	Value
Input	Completely insulated and galvanically isolated banana sockets	
Input voltage		10 to 1000 VACrms
Protection		1500 VACrms
Frequency		16 to 400 Hz

Internal

Component	Unit Description	Value
	When synchronization is set to "none", the internal clock is used.	
Frequency		16 to 400 Hz

Modes

Component	Unit Description	Value
The BE3200 provides four synchronization modes:	<ul style="list-style-type: none"> • None: no synchronization mode is used. The internal clock operates on the set frequency. • Measured: Measures a synchronization value before the start of a sequence which is then set and used for the rest of the sequence. • Timed: Measures a synchronization value during a set time period at the start of a sequence which is then used for the rest of the sequence. • Full synchronization: during the complete sequence the selected synchronization source is used. 	

Resolution and accuracy					
Component	Unit Description		Value		
Resolution	For synchronization frequencies of 16 Hz - 200 Hz and with one cycle being 360 degrees, Parameters are set with a resolution of		One (1) electrical degree		
	For synchronization frequencies of 200 Hz - 400 Hz and with one cycle being 360 degrees, Parameters are set with a resolution of		Two (2) electrical degrees		
Tracking	The BE3200 follows deviations of the input signals frequency		Up to 15% per second		
	Minimum start frequency		16 Hz		
	During the execution of the sequence the frequency may drop to 11 Hz. Below this frequency the sequence switches to measured mode and the sequence is completed with the last measured value		~ 11 Hz		
Accuracy	Accuracy is a function of frequency and synchronization mode				
	The following Synchronization Accuracy part of the table gives a list of measured MAXIMUM deviation with various synchronization modes at two frequencies (cycles per second).				
	SYNCHRONIZATION ACCURACY				
	Mode	Synchronization on...	50 HZ	400 HZ	
	None	-	± 0.025 °/cycle	± 0.14 °/cycle	
	Measured	Mains		± 0.5 °/cycle	± 0.5 °/cycle
		Zero		± 0.5 °/cycle	± 0.5 °/cycle
		Clock + Zero		± 0.5 °/cycle	-
	Timed	Mains		± 0.5 °/cycle	± 0.5 °/cycle
		Zero		± 0.5 °/cycle	± 0.5 °/cycle
		Clock + Zero		± 0.5 °/cycle	-
Full	Mains		± 0.12 °	± 0.4 °	
	Zero		± 0.12 °	± 0.4 °	
	Clock + Zero		± 0.4 °/cycle	-	
Interpretation	<p><i>Accuracy in degrees:</i> this is the maximum deviation at any time which will occur in the complete sequence.</p> <p><i>Accuracy in degrees/cycle:</i> this is the maximum deviation which will occur in one cycle after the synchronization period. This error will accumulate in all consecutive cycles. E.g. an error of 0.5 °/cycle will produce in worst case an error of 25 degrees after one second at 50 Hz.</p>				

Fast Repeat				
Component	Unit Description		Value	
	The sequencer can execute a defined sequence multiple times without computer control.			
Count			1 to 50000	
Dead time	Between each consecutive repetition a minimum dead time occurs of at least one cycle. Depending on the output correction this may increase to two cycles.			
Synchronization	When timed or measured synchronization is selected this synchronization is only used for the first sequence in a burst. Consecutive sequences are in free run mode. When computer controlled repeat is also on, each first sequence of a burst will be synchronized again with the selected mode.			
	When full synchronization is used all sequences are fully synchronized.			

Response time		
Component	Unit Description	Value
	<p>The BE3200 Test Sequencer firmware responds on a start command (software and external hardware) within one second when the total number of events (programmed ON-states) within one sequence does not exceed 128, i.e. Chan1_Events + Chan2_Events + ... + ChanN_Events ≤ 128.</p> <p>When more than 128 events (programmed ON-states) occur within one sequence the response time will increase, depending on the number of events.</p> <p>This has no impact on the fast repeat.</p>	

Ordering information		
Component	Unit Description	Order Number
32-Channel Test Sequencer	Test Sequencer with 32 fiber-optic outputs. Fully programmable via fiber-optic isolated bi-directional RS-232 interface. Needs Perception Sequencer Control option	1-GENTS32-2
64-Channel Test Sequencer	Test Sequencer with 64 fiber-optic outputs. Fully programmable via fiber-optic isolated bi-directional RS-232 interface. Needs Perception Sequencer Control option	1-GENTS64-2
8-Ch Start Qualifier Input	Eight channel start qualifier input card using fiber-optic inputs	1-G601-2
Boards	Light to TTL	Converts information from Optical to electronic signals
	TTL to Light	Converts information from Electrical to Optical signals
Rack Mount	19" Rack mount assembly	1-G604-2
Perception Sequencer Control option	Sequencer control: to control the BE3200 Test Sequencer from Perception via a USB light converter; requires Perception software	1-PERC-OP-SEQ-01-2

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