

# Multi-Channel Test Sequencer

BE3200



## Special features

- Fiber optic isolated
- Fully programmable sequence
- Up to 64 channels
- Up to 128 channels in Master/Slave
- 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
- Built-in UPS

## 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 BE3200s 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.

<b>Fiber Optic I/O</b>	
Sockets	
Input	Broadcom HFBR-2523
Output	Broadcom HFBR-1523; 660 nm LED
Connectors	
Simplex latching connector	Broadcom HFBR-4503
Duplex latching connector	Broadcom HFBR-4516
Drive	
Control lines	10 to 60 meter
Status and channel outputs	60 to 100 meter
Optical Communication Link USB	1; Optical to Electronic USB converter. See Manufacturers web-site for details and drivers if Perception not installed: <a href="http://www.ratioplast.com">www.ratioplast.com</a>

<b>Cable (POF : Plastic Optical Fiber)</b>	
Type	Plastic, single step index, Broadcom HFBR-RXXYYY series
Diameter	1.00 mm; Core and cladding
Attenuation	0.22 dB/m
Delay	5.0 ns/m; Propagation delay constant
Force	
Short term tensile force	50 N max. (< 30 minutes)
Long term tensile load	1 N
Bend radius	
Short term	25 mm
Long term	35 mm
Flexing	1000 cycles; 90 degree bend on 25 mm radius mandrel

<b>Synchronization</b>	
Sources	
Generator 1, Clock and Zero	Using a generator with two signal to the BE3200. Clock signal with multiple pulses per rotation/sine wave and a Zero indication to determine the correct angle Synchronization adjustments performed on every clock signal leading to the best possible synchronization.
Generator 1, Zero	Using a generator with one signal to the BE3200. Zero signal indicating the zero crossing of the sine wave. Synchronization adjustments performed on every zero pulse.
Generator 2, Clock and Zero	Using a generator with two signal to the BE3200. Clock signal with multiple pulses per rotation/sine wave and a Zero indication to determine the correct angle Synchronization adjustments performed on every clock signal leading to the best possible synchronization.
Generator 2, Zero	Using a generator with one signal to the BE3200. Zero signal indicating the zero crossing of the sine wave. Synchronization adjustments performed on every zero pulse.
Mains	Zero crossing detection on Mains signal. Synchronization adjustments performed on every zero pulse.
Modes	
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	During the complete sequence the selected synchronization source is used

## Generators

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 Hz to 70 Hz
Zero	Zero-index pulse once per cycle @ cycles ranging from 16 Hz to 400 Hz

## Mains

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

## Internal

When synchronization is set to "none", the internal clock is used	
Frequency	16 to 400 Hz

## Resolution and accuracy

Resolution (one cycle being 360 degrees)			
Synchronization frequencies of 16 Hz - 200 Hz	One (1) electrical degrees		
Synchronization frequencies of 200 Hz - 400 Hz	Two (2) electrical degrees		
Tracking			
Deviations of the input signals frequency	Up to 15% per second		
Minimum start frequency	16 Hz		
Minimum frequency during sequence	~ 11 Hz Below 11 Hz the sequence switches to <b>measured mode</b> and the sequence is completed with the last measured value		
Maximum Synchronization In-accuracy Accuracy is a function of frequency and synchronization mode			
Synchronization mode	Synchronization on...	50 HZ	400 HZ
None	-	$\pm 0.025 \text{ }^\circ/\text{cycle}^{(1)}$	$\pm 0.14 \text{ }^\circ/\text{cycle}^{(1)}$
Measured	Mains	$\pm 0.5 \text{ }^\circ/\text{cycle}^{(1)}$	$\pm 0.5 \text{ }^\circ/\text{cycle}^{(1)}$
	Zero	$\pm 0.5 \text{ }^\circ/\text{cycle}^{(1)}$	$\pm 0.5 \text{ }^\circ/\text{cycle}^{(1)}$
	Clock + Zero	$\pm 0.5 \text{ }^\circ/\text{cycle}^{(1)}$	-
Timed	Mains	$\pm 0.5 \text{ }^\circ/\text{cycle}^{(1)}$	$\pm 0.5 \text{ }^\circ/\text{cycle}^{(1)}$
	Zero	$\pm 0.5 \text{ }^\circ/\text{cycle}^{(1)}$	$\pm 0.5 \text{ }^\circ/\text{cycle}^{(1)}$
	Clock + Zero	$\pm 0.5 \text{ }^\circ/\text{cycle}^{(1)}$	-
Full	Mains	$\pm 0.12 \text{ }^\circ^{(2)}$	$\pm 0.4 \text{ }^\circ^{(2)}$
	Zero	$\pm 0.12 \text{ }^\circ^{(2)}$	$\pm 0.4 \text{ }^\circ^{(2)}$
	Clock + Zero	$\pm 0.4 \text{ }^\circ/\text{cycle}^{(1)}$	-

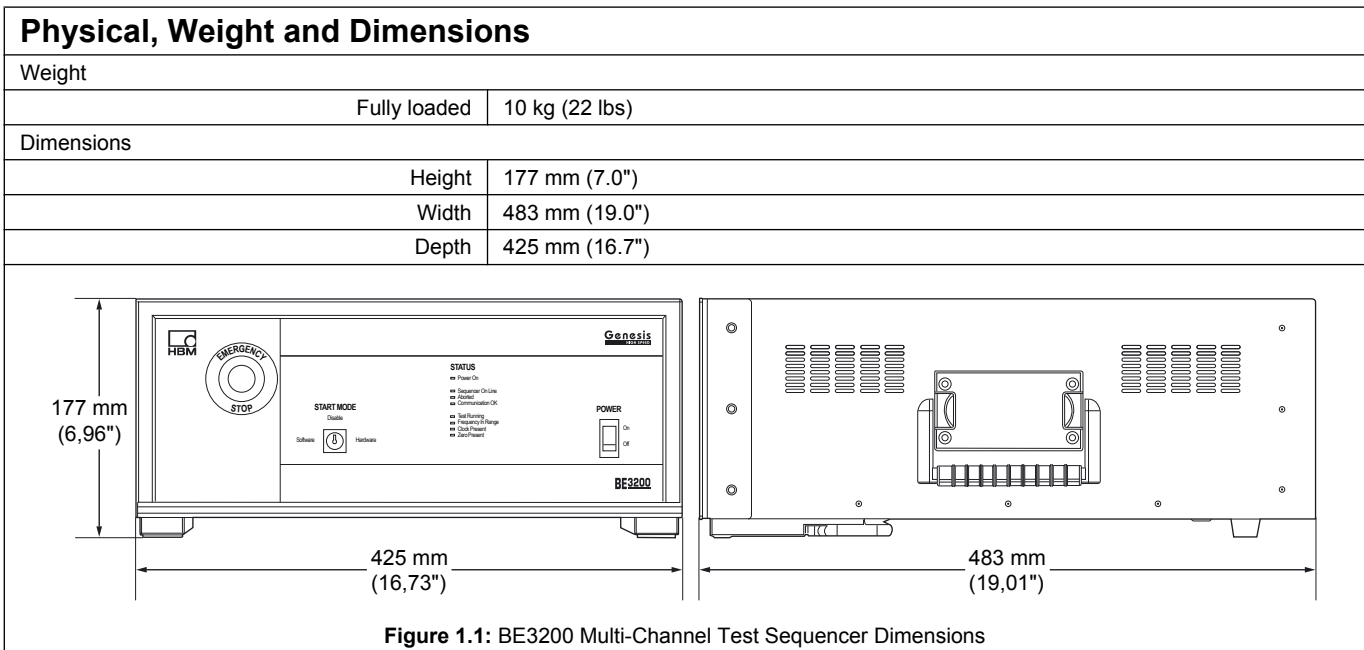
(1) The maximum deviation which will occur in one cycle after the synchronization period. This error will accumulate in all consecutive cycles. E.g. an error of  $0.5 \text{ }^\circ/\text{cycle}$  will produce in worst case an error of 25 degrees after one second at 50 Hz.

(2) The maximum deviation at any time which will occur in the complete sequence.

<b>Fast Repeat</b>	
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.

<b>Response time</b>	
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. When more than 128 events (programmed ON-states) occur within one sequence the response time will increase, depending on the number of events. This has no impact on the fast repeat.

<b>Power</b>	
Power Inlet	86 – 264 VAC 47 – 440 Hz
Total power of unit	75 VA
Uninterpretable power supply	Rechargeable NiCad battery, 12 VDC @ 6.5 Ahr; Built-in automatic recharge system. Typical 30 minutes back-up time.




<b>Environmental Specifications</b>		
Altitude	Maximum 2000 m (6100 ft); operational	
Protection class	IP20	
Relative humidity	0% to 80%; non-condensing	
Temperature Range		
	Operational	0 to 40 °C (+32 °F to 104 °F)
	Non-operational (Storage)	-25 °C to +70 °C (-13 °F to 158 °F)

## Rack Mount Kit (Option, to be ordered separately)

Rack Mount Kit



Rack mountable; Optional 19-inch rack mount required  
19" height

## Ordering Information<sup>(1)</sup>

Article	Description	Order No.
32-Channel Test Sequencer		1-GENTS32-2
64-Channel Test Sequencer		1-GENTS64-2

(1) All GEN series systems are intended for exclusive professional and industrial use.

## Option, to be ordered separately

Article	Description	Order No.
Plastic Optic Fiber 10m		1-KAB283-10
Light to TTL PCB		1-G602-2
TTL to Light PCB		1-G603-2
Rack Mount	19" rack mount assembly	1-G604-2

## Software Options, to be ordered separately<sup>(1)</sup>

Article	Description	Order No.
SEQUENCE	To control BE3200 Test Sequencer from Perception via USB port. Requires Perception Standard or higher (1-PERC-ST-01-2).	1-PERC-OP-SEQ-01-2

(1) Software options are also sold in a package with multiple single seat licenses and multiple seat network license.

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