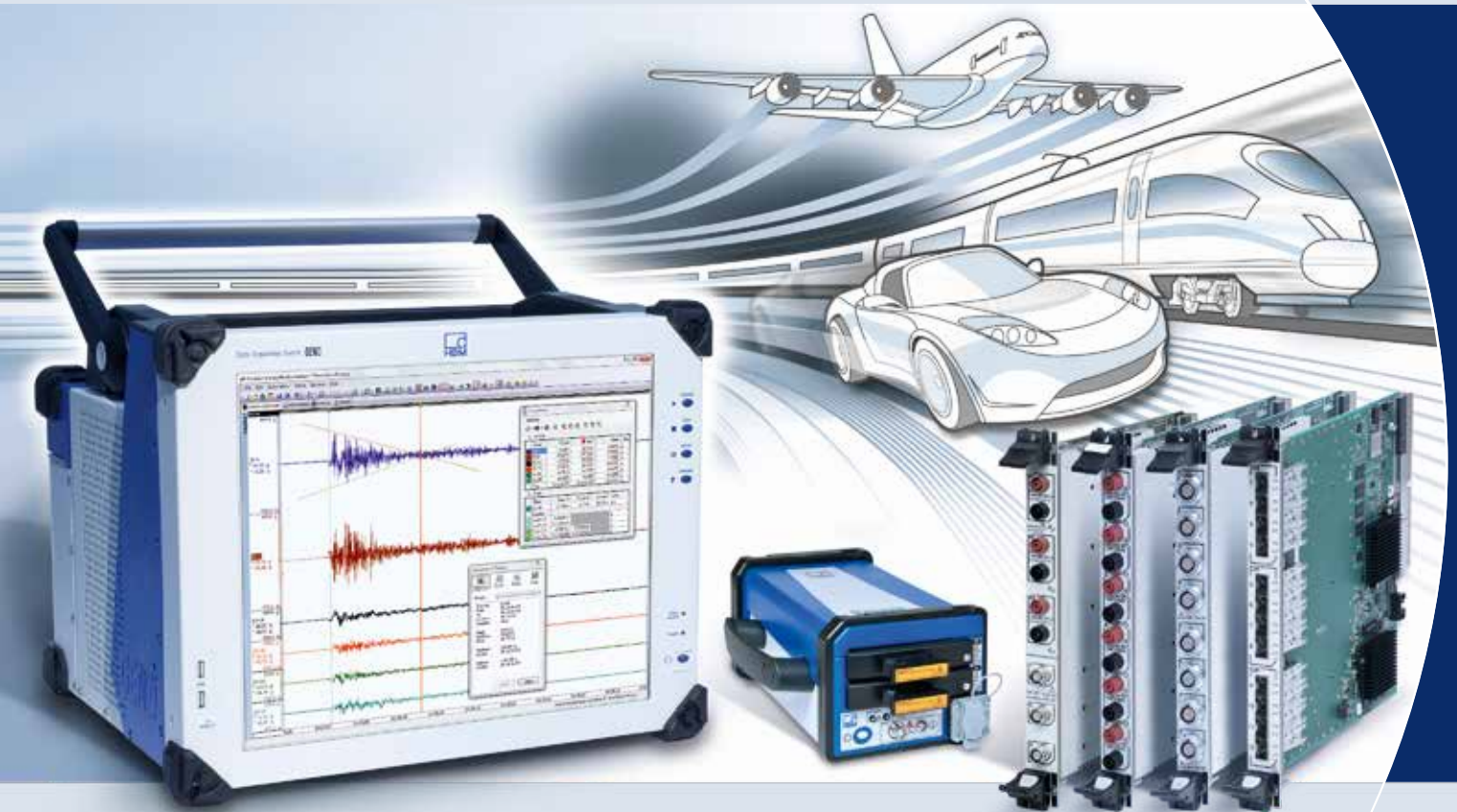


# Genesis

HIGH SPEED

High speed data acquisition in one solution



# Versatile applications: the gateway to high speed

The data acquisition instruments and transient recorders of the Genesis HighSpeed family open the gateway to high speed measurements. Owing to the combination of continuous and transient acquisition function, these devices allow you to acquire and store highly dynamic one-time events or recordings that last for hours.

## Aerospace

Testing on-board electronics

Rocket motor burn testing

Satellite shock & vibration tests

Lightning strike monitoring

“Chicken gun” testing

## Automotive

Injection and ignition test

“Battery to road” efficiency measurements

Electric and hybrid motor test rigs

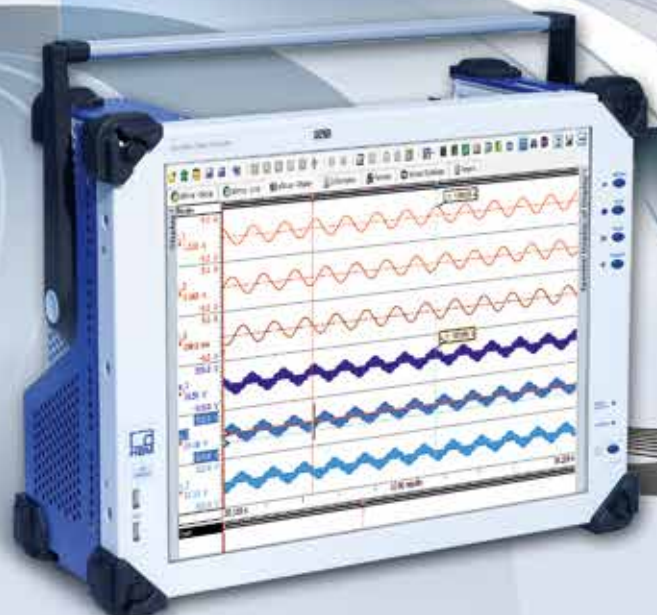
EV battery short circuit tests

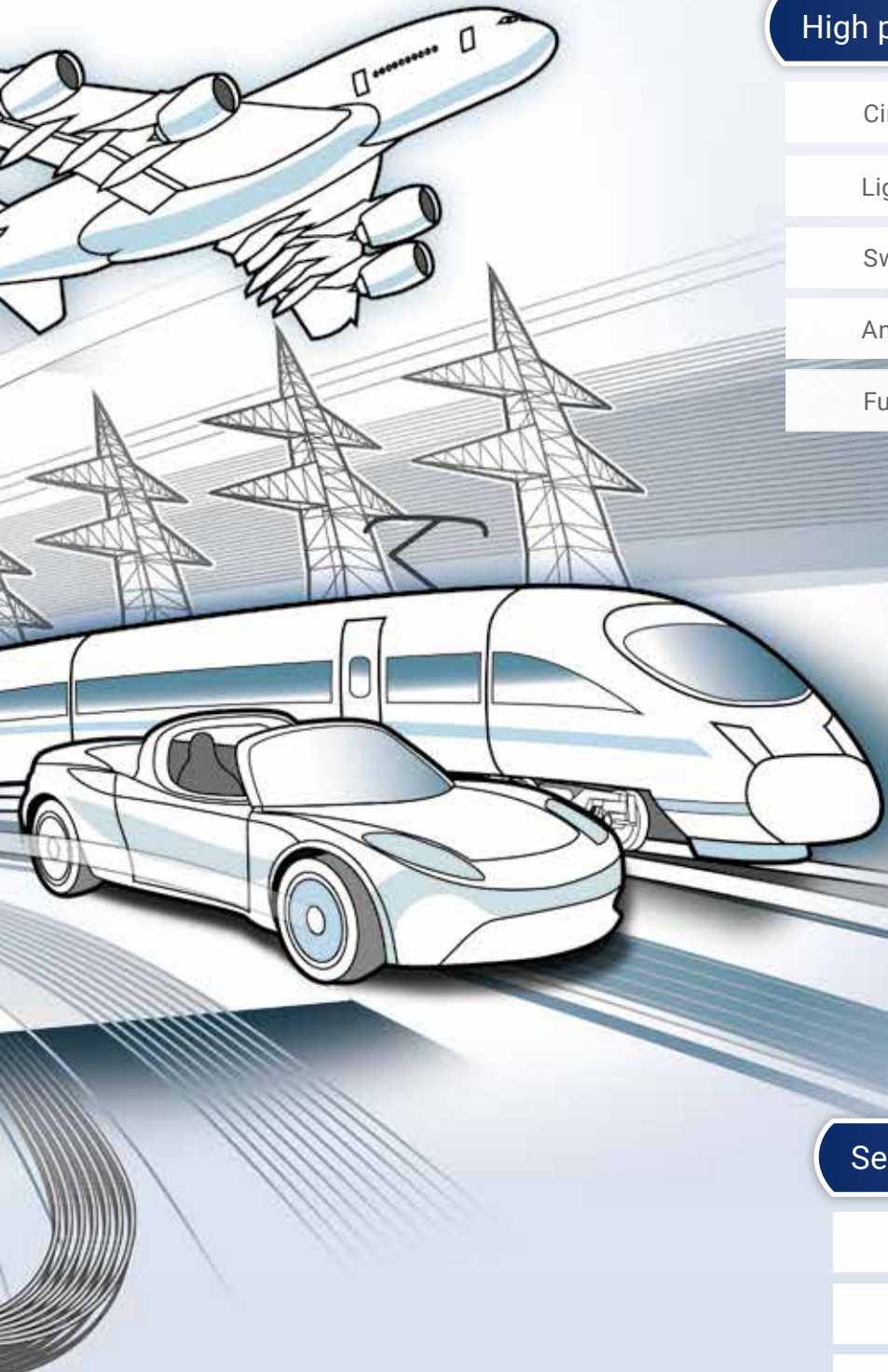
## Power grid and electrical machines

Testing inverter driven e-machines

Power measurement and grid analysis

Efficiency mapping of e-drives





### High power and high voltage labs

Circuit breaker and switchgear testing

Lightning impulse analysis

Switching impulse analysis

Analysis of Transient Recovery Voltage (TRV)

Fuse tests

### Highly dynamic material testing

Drop tests

Impact tests

Split-Hopkinson bar tests

Notched-bar impact-bending tests

Crash tests

Explosion and ballistic tests

Vibration tests

### Service and maintenance

Preventive maintenance and inspection

Revisions according to maintenance plan

Troubleshooting

# Measuring at high speed

Genesis HighSpeed is the modular platform for fast measurements of electrical and mechanical parameters. It's a transient recorder, data recorder and data acquisition system – all in one. Devices with signal conditioning for all commonly used sensors and optically isolated digitizers for signal acquisition, even in the high-voltage range, are available.

Mainframes

Data acquisition cards



## Modular

Thanks to its modular architecture, Genesis HighSpeed is equipped for any high speed measurement task. Build your own configuration consisting of a mainframe with or without an integrated PC, data acquisition cards and Perception software.

Using the synchronization function, you can operate several mainframes simultaneously – with thousands of channels in parallel.

## Fast

Genesis HighSpeed offers a wide selection of data acquisition cards with sampling rates of 20 kS/s to 250 MS/s.

Store your data on-board with up to 8 GB memory per card without any speed limit or stream to hard disk with up to 400 MB/s.

## Perception software



Dual acquisition mode makes it possible to switch sampling rates – up to 400 times per second if necessary.

Our patented display technology enables the display and review of gigabytes of data in just a few seconds.

### Safe

Even in challenging application environments, you can be sure that your measurement results are secure with Genesis HighSpeed – especially for non-repeatable tests.

For highest data security, choose one of the “t” mainframes that acquire and store data while exclusively running LINUX, no Windows OS involved.



# Perception

Analysis with high speed software

## Instrument setup

Ready for use without any programming

Multiple devices can be configured with just one PC

Sensor database ensures easy setup

## Displays

Unlimited number of y-t / x-y / FFT displays, and meters

Displays gigabytes in seconds - patented display technology

Review while recording – analysis while the measurement is running

Powerful tools like seven cursors, trace markers, waveform calculator

## Real-time capabilities

Real time calculations like RMS, Max, Mean per channel

User programmed formulas executed in real time

Live display and storage of computed results

Real time transfer of computed results to control system

## Reporting

Create reports with a high-performance report generator

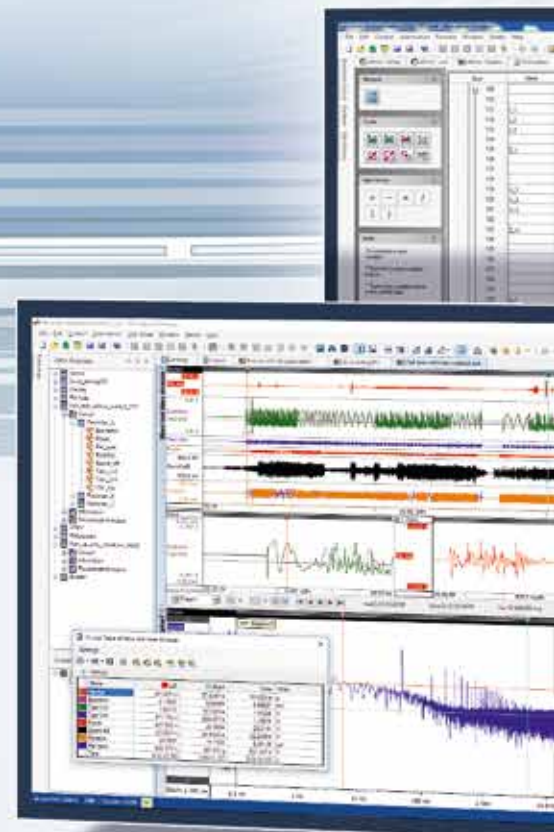
Quick Report to Word – simply click to transfer data

## Analysis

Formula database with over 150 analysis functions

Logfile to store results across recordings

Automate analysis with user-defined macros





Free Perception Standard software available for setup, acquisition and review

Full 64-bit software support: Perception is designed to work quickly and reliably with large datasets, which makes it ideal for the high speed acquisition of measurement data.

Designed for international use: Perception is available in eight languages (English, German, French, Chinese, Japanese, Korean, Russian, Portuguese).

# Hardware and software interfacing

## Genesis HighSpeed DAQ system

You can control Genesis HighSpeed hardware "out of the box" using Perception software or from your own application software. After setup, Genesis High-Speed can even run stand alone, acquiring data and

storing it on embedded SSD just on triggers - without any PC involved.



EtherCAT

GEN DAQ API  
or CAN<sup>FD</sup>

PNRF

TTL basic  
remote  
control

## Genesis HighSpeed integration in your software

You can use Genesis HighSpeed hardware as an acquisition system and "number cruncher" with your own software. The **GEN DAQ API** enables full hardware setup and acquisition control, while basic control can also be achieved using TTL signals or **CAN** bus.

Results are streamed over **EtherCAT, CAN FD** or the **API** to your application software and raw data is stored on local SSD.



## Perception set up and a

Would you like to unpack your new instrument and start using it right away? With an user interface that can be adapted to your requirements? Perception offers instrument setup, acquisition, review, analysis

## Data analysis with your

Would you like to have access to the acquired data in your usual software environment, but none of our 25 export formats do the job? You can avoid exporting and read the acquired data directly in your program.

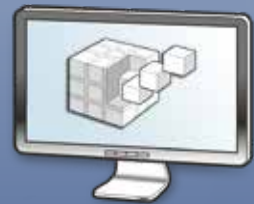
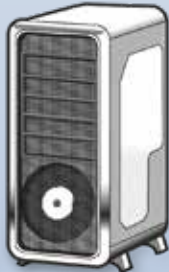


### Analysis software

and documentation in a single, integrated package - without any programming.

### Customization of Perception

Would you want to expand Perception by designing a special user interface or adding your own calculation to the formula database? The Custom Software Interface (CSI) feature enables you to do this.



PNRF

RPC



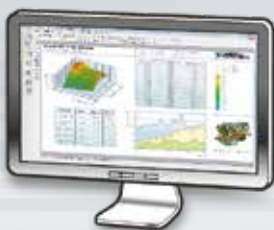
### software

Use the **PNRF reader API** and get direct access to the data. Most popular analysis packages like LabView and MATLAB do this already.

### Interfacing Perception with your software

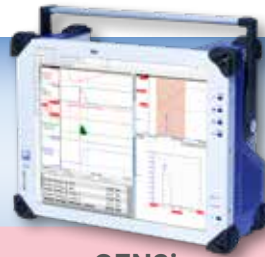
Would you like to control Perception (and all attached hardware) remotely or to retrieve data? Then you can use cross-platform **Remote Procedure Calls (RPC)**. Is your software installed on the Perception PC?

Then you can use the **COM interface** (Component Object Model) for easy integration under Windows.



# Mainframes – with integrated PC ...

The “i = integrated” mainframes feature a built-in high end Windows PC. They are perfect for portable or bench top use in an “instrument-like” fashion. No external PC, no cables, no power supplies to worry about - just switch on and use the pre-installed Perception software to work like you would with a scope or a tape recorder. Third party softwares for control or analysis can be installed on the built in PC.



Product	GEN3i	GEN7i
Description	Portable, PC integrated system; for low to medium channel count	Portable, PC integrated system; for medium to high channel count
Integrated PC	Intel i3, 8 GB RAM	Intel i5, 16 GB RAM
Touchscreen	17" TFT, 1280x1024	17" TFT, 1280x1024
Installed / included software	Perception Advanced 64bit	Perception Enterprise 64bit
Slots for data acquisition cards	3	7
Number of channels	up to 96	up to 224
Data transfer rate		
... to PC, 1 GBit Ethernet	100 MB/s	100 MB/s
... to PC, 10 GBit Ethernet	--	--
... to internal SSD, not removable	200 MB/s	350 MB/s
... to internal SSD, removable	--	200 MB/s or 350 MB/s
Digital events / timers / counters	32 / 4	96 / 12
Data bus	Standard / High Speed	Standard / High Speed
EtherCAT data transfer	--	--
CAN FD data transfer and control	--	--
Synchronization	PTPv2, master/slave, IRIG, GPS	

## ... or stand alone

The “t = tethered” mainframes are supposed to be used stand alone or with a PC connected via Ethernet. They are the first choice for fixed installations in a test bench/rack, mobile in a car or distributed in a larger installation. They feature the LINUX OS, local hard disk storage and can be controlled either using the Perception software or via low level API from other DAQ softwares like LabView.



**GEN2tB**



**GEN4tB**



**GEN7tA**



**GEN17tA**

To be used with external PC;  
portable use or rack mount;  
for small channel counts

To be used with external PC;  
portable use or rack mount;  
for small channel counts

To be used with external PC;  
for rack mount  
and for medium channel counts

To be used with external PC;  
for rack mount  
and for high channel counts

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Perception Standard 64bit

Perception Standard 64bit

Perception Standard 64bit

Perception Standard 64bit

2

4

7

17

up to 16

up to 32

up to 224

up to 544

100 MB/s

100 MB/s

100 MB/s

100 MB/s

--

400 MB/s

400 MB/s

400 MB/s

200 MB/s

200 MB/s or 350 MB/s

--

--

--

--

350 MB/s

350 MB/s

32 / 4

64 / 8

96 / 12

96 / 12

High Speed

High Speed

Standard / High Speed

Standard / High Speed

--

✓

✓

✓

✓

✓







✓

✓

PTPv2, master/slave, IRIG, GPS




































# High speed data acquisition cards

Data acquisition cards of the Genesis HighSpeed family combined with the mainframes offer maximum flexibility. That means you can find the right solution for all your measurement tasks.

			
Product	<b>GN3211</b>	<b>GN3210</b>	<b>GN815 / GN816</b>
Features	Voltage signals	Voltage signals; IEPE sensors (with TEDS); Charge sensors	Voltage signals; IEPE sensors (with TEDS)
Input circuit	Differential	Differential / IEPE / Charge	Asymmetrically differential / IEPE
Isolation	--	--	✓
Analog inputs	 Voltage	 Voltage  Current-fed piezoelectric transducer (IEPE)  Passive piezoelectric transducer (charge)	 Voltage  Current-fed piezoelectric transducer (IEPE)
Digital inputs	 Digital In/Out	 Incremental encoder  Pulse counter, frequency  Digital In/Out	 Incremental encoder  Pulse counter, frequency  Digital In/Out
Input range	± 10 mV ... ± 20 V	± 10 mV ... ± 20 V	± 10 mV ... ± 50 V
Sampling rate	20 kS/s	250 kS/s	2 MS/s / 200 kS/s
Resolution	16 bits	24 bits	18 bits
Memory	200 MB	1800 MB	2000 MB / 200 MB
Channels	32	32	8
Digital inputs / timers / counters	16 / --	16 / 2	16 / 2



Note: GN3211 and GN3210 support standard data bus only.

Newest B-type boards offer on-board DSPs to execute real time calculations, e.g. predefined formulas such as for power or efficiency measurements, or user defined formulas to do any specific analysis in real time.

							
GN610B / GN611B		GN310B / GN311B		GN840B / GN1640B		GN8101B / ..02B / ..03B	
Voltage signals; 600 V RMS CATII		Power analyser module; Voltage and current signals; 1000 V RMS CAT III		1/4, 1/2 and 1/1 bridge circuits; Voltage excited sensors; IEPE, PTx, TC, charge, 4-20 mA		Voltage signals	
Differential		Differential		Bridge / Differential / IEPE / Charge		Single ended (differential via probes)	
✓		✓		✓		--	
 Voltage  High Voltage  Current (via burden resistor)		 Voltage  High Voltage  Current (via built-in burden resistors)  Current (as voltages from current probes)		 Voltage  Current-fed piezoelectric transducer (IEPE)  SG (resistance) quarter bridge circuit  SG (resistance) half bridge circuit  SG (resistance) full bridge circuit  Potentiometer  Piezoresistive transducer  Current 4-20 mA  Thermo-resistors  Passive piezoelectric transducer (charge)  Thermocouple		 Voltage	
 Incremental encoder  Digital In/Out  Pulse counter, frequency		 Incremental encoder  Digital In/Out  Pulse counter, frequency		 Incremental encoder  Digital In/Out  Pulse counter, frequency		 Incremental encoder  Digital In/Out  Pulse counter, frequency	
± 20 mV ... ± 1 kV		Voltages: ± 50 V to ± 1500 V Currents: ± 75 mA to ± 2 A		± 1 mV ... ± 10 V		± 500 mV ... ± 100 V	
2 MS/s / 200 kS/s		2 MS/s / 200 kS/s		500 kS/s		250 MS/s / 100 MS/s / 25 MS/s	
18 bits		18 bits		24 bits		14-16 bits	
2000 MB / 200 MB		2000 MB		2000 MB		8000 MB	
6		3 power channels (3 voltage and 3 current inputs)		8 / 16		8	
16 / 2		16 / 2		16 / 2		16 / 2	

# High speed isolated digitizers

Optically-isolated digitizers are the first choice for performing potential-free measurements and reliable tests in high-voltage environments using Genesis HighSpeed DAQ systems. Typical applications include circuit breaker testing, switch gear testing in short-circuit and high-voltage laboratories, and analyzing high-voltage lightning strikes. The isolated digitizers can also be used for electrical machine testing where extremely high input voltages are needed.

			
Product	GN110 / GN111	GN112 / GN113	GN1202B
Description	Optically-isolated digitizer for the high-voltage range (digitizer only), battery-powered; for connecting to receiver card GN1202B	Optically-isolated digitizer for the medium-voltage range (digitizer only) with integrated, isolated power supply (1.8 kV RMS); for connecting to receiver card GN1202B	Receiver card with 12 channels for connecting optically isolated digitizers; optional real time math
Channels	1	1	12 (1 channel per digitizer)
Input circuit	Asymmetrically differential	Asymmetrically differential	--
Isolation	Floating and isolated through fibre-optic link	Floating and isolated through fibre-optic link	--
Input range	$\pm 20$ mV ... $\pm 100$ V	$\pm 20$ mV ... $\pm 100$ V	--
Sampling rate	100 MS/s / 25 MS/s	100 MS/s / 25 MS/s	--
Resolution	14 bits / 15 bits	14 bits / 15 bits	--
Memory	--	--	8000 MB
Automatic cable length compensation	✓	✓	✓
Data bus	--	--	High Speed



## Test sequencer for short-circuit and high-voltage laboratories



The BE3200 is a high speed, optically isolated sequencer offering precise timing control for testing in low-voltage, high-voltage and high-power laboratories. Fully controlled by the Perception software, it offers 32 or 64 optical outputs for control and 16 qualifier inputs to allow safe start of sequencing. It is equipped with extensive safety functions to protect the equipment, instruments and users against power failures and synchronization errors, while an internal watchdog timer monitors proper function.



# Isolated probe system ISOBE5600

The ISOBE5600 is the perfect probe to isolate any digitizing instrument from high voltages. It is used for safe measurement using high voltage dividers or for current measurements using shunts. It offers safe and digital optical signal transmission and convenient analog output to connect to a DAQ or Scope. The "4M" receiver adds transient memory to the system to be used as stand alone, 4 channel transient recorder in high voltage environments like impulse labs. Then, the system acts under Perception control (Perception Standard 64bit included).

		
4-channel receiver	GENIS-4R	GENIS-4M
Description	Isolation system for existing DAQ or scope; consisting of 1 to 4 digitizers and one receiver; digital data transfer via fiber optic cable	Isolated, stand alone 1-4 channel transient recorder; consisting of 1 to 4 digitizers and one receiver; digital data transfer via fiber optic cable; remote controlled using Perception
Model	Receiver with analog output	Receiver with analog output and integrated memory for data acquisition
Memory	--	256 MB
Digital / analog conversion rate	100 MS/s	
Resolution (DAC)	14 bits	

		
Single-channel digitizer	GENIS-1T	GENIS-1TM
Model types	Battery-operated, with an operating duration of 12 hours (one battery) or 24 hours (two batteries)	Continuous operation with isolated power supply (1.8 kV RMS)
Input circuit	Asymmetrically differential	
Input range	$\pm 100 \text{ mV} \dots \pm 50 \text{ V}$	
Isolation	Floating and isolated through fibre-optic link	
Sampling rate	100 MS/s	
Sampling rate (analog-in to analog-out)	20 MHz	
Resolution (ADC)	14 bits	
Automatic cable length compensation	--	



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