

- **Complies fully with SAE J211 regulations**
- **16 bit resolution**
- **modular design with 8-channel plug-in boards**
- **100 kHz maximum analog sampling rate**
- **500 G/3 ms shock-proof**
- **10 Mbit/s Ethernet 10 Base-T interface**
- **suitable for all strain-gauge and piezoresistive sensors**
- **various trigger options**
- **Less than 100 gr/channel**
- **Software controlled with CrashSoft®3**
- **Renting available**
- **with cross-check of bridge supply voltage and gain**
- **calibration board**
- **51 s recording time at 20 kHz**
- **32-channel digital input board**
- **airbag fire board with current and voltage measurement**

## Technical Specifications

### 1. Analog board

#### Digitization, Storage

Channels; Resolution	8 channels; 16 bit resolution
Sampling rate	max. 100 kSamp/s per channel on all channels simultaneously, separately programmable for each single channel sampling rates: 5...100 kSamp/s [100/n kSamp/s, n=1...20] 100 kSamp/s are mandatory e.g. for fire tests of airbags (< 2 ms)
Memory per board	standard: 4 Mbyte; 16 Mbyte optional special capacities are available upon request
Recording time	depending on memory capacity and allocation; for example: 13.1 s at 20 kHz sampling rate for each channel with 4 MByte over 50 s at 20 kHz sampling rate for each channel with 16 MByte
Recording mode	cyclic, linear (programmable)
Pre/Post-Trigger	Freely assignable between 0-100 %
Storage of data	on each board for more than 2 days without power

#### Sensor supply voltage

Voltage	5 V/10 V programmable
Load regulation	± 2.5 mV
Response to temperature changes	10 ppm/°C (0...50 °C)
Current	nominal: 29 mA (for 350 Ω at 10 V); short-circuit: approx. 50 mA
Test function	shortcut and low voltage of excitation

#### Signal conditioning

Input voltage	up to ± 5 V (overvoltage protection up to ± 40 V)
Gain range	1...10,000 programmable for each single channel in 14744 steps
Non-linearity max.	0.02 % FS
Offset adjustment range	input: ± 9.5 mV (256 steps); amplified signal: ± 3.0 V (256 steps)
Response to temperature changes Offset; Gain	0.5 μV/°C max.; 20 ppm/°C typ.
Antialiasing filter	10 kHz fixed
Cut-off frequency	sampling rate/10

#### Test Functions

Shunting	Internal and external shunting
Bridge Supply	Measurement of voltage
Procedure	Automatic check run prior to and after test

### 2. Digital board

#### Inputs with auxiliary voltages

Number/Type	8 optocoupled channels per board, every 2 of them with an auxiliary voltage (common potential) implemented together on one socket
Switching threshold	2.5 V (overvoltage protection up to ± 40 V)
Hysteresis	0.2 V
Operating delay	10 μs
Insulation voltage	500 V (optocoupler)
Auxiliary voltage	4 × 12 V, 100mA insulated by means of DC/DC converter
Sampling rate	max. 800 kSamp/s per channel on all channels simultaneously, separately programmable for each single channel sampling rates: 800/n kSamp/s, n = 1...1023 (782 Hz...800 kHz)
Storage of data	on each board for more than 2 days without power

**Digital board (continued)****Airbag Firing Outputs**

Number/Type/Voltage	4 per board on 4 sockets, 12 V insulated by means of DC/DC converter
Short-circuit current	25 mA (for approx. 2 ms 8 A from 1,500 $\mu$ F as pyro igniting current)
Delay	0...100 s programmable in steps of 0.1 ms
Special features	protective circuit to avoid mis-ignition: <ul style="list-style-type: none"> <li>– squib recognition by means of a 2 mA test current</li> <li>– resistance measuring <math>1 \Omega &lt; R &lt; 10 \Omega</math> with LED display</li> <li>– logical and electrical interlock</li> </ul>
Standard Version	8 digital inputs and 4 airbag firing outputs
Optional Versions	with 32 digital inputs with 4 ignition outputs with current and voltage measurement

**3. Controller**

<b>Processor</b>	i386EX, 4 MB RAM, 1 MB Flash ROM
<b>Interfaces</b>	
Data transfer	by cable: Ethernet 10 Mbit/s 10 Base-T twisted pair TCP/IP protocol
Trigger bus	for cascaded arrangement and synchronization of max. 16 NA33
<b>Tasks</b>	
Data exchange with PC	measured values, commands; partial download of data possible
Control of analog and digital slide-in modules	zero balancing, gain, memory organization, sampling rates, cut-off frequency, ignition delays etc.
Triggering	scanning and evaluation of trigger channels
Power Management	monitoring the discharge degree of the rechargeable battery, switching off the cards in case of undervoltage, sleep modes
ID module	programming and read-out of MESSRING, Endevco, MSC, Dallas
Real time clock	logging documentation etc.

**4. Hub**

Type/ports	10 Base-T: 8 ports (10 Base-2: 1 port optional)
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**5. Calibration Board**

Analog Channel	8 channels simultaneously with different input signals, offset test, crosstalk between channels, anti-alias filter
Bridge Supply	Simulation of static or dynamic loads and short circuit, readout of supply voltage
Curve generation	Arbitrary, software programmable
Frequency	0..10 kHz
Voltage	0.. $\pm 5$ V or 0.. $\pm 0.05$ V
Resolution	16 bit
Digital Channel	16 channels simultaneously with independent signals
Airbag firing channels	Output voltage, crosstalk
Calibration Procedure	Fully automatic, software programmable
Calibration Results	Comparison between DAS input and readout of DAS, fully automatic
Software	CrashSoft 3 under Win2000 and XP
Hardware	Plug-in-board in NA33-Data Acquisition System

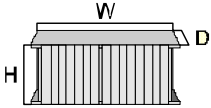
## 6. General

### Power Supply

Voltage	charging: 18...22 V DC; operation: 12...22 V
Current	approx. 10 A (12 slide-in modules)
Battery backup	at least 5 min at full load (96 analog channels with 350 $\Omega$ bridge connected)
Capacity	2.4 Ah
Protective functions	overvoltage, short circuit, discharge degree, overcharge

### Dimensions

Board size	137 × 133 mm; front plate: 137 × 20 mm
Frame dimensions/weight:	370 × 150 × 145 mm (W×H×D)/approx. 8.6 kg (weight of fully equipped case) dead weight of case: 5.2 kg



### Connectors

Digital input/auxiliary voltage	2 inputs and 1 auxiliary voltage Lemo 1 B compatible*, 7-pole
Digital output	1 output Lemo 1 B compatible*, 2-pole
Analog input	1 input Lemo 1 B compatible*, 7-pole

\* other connectors on request

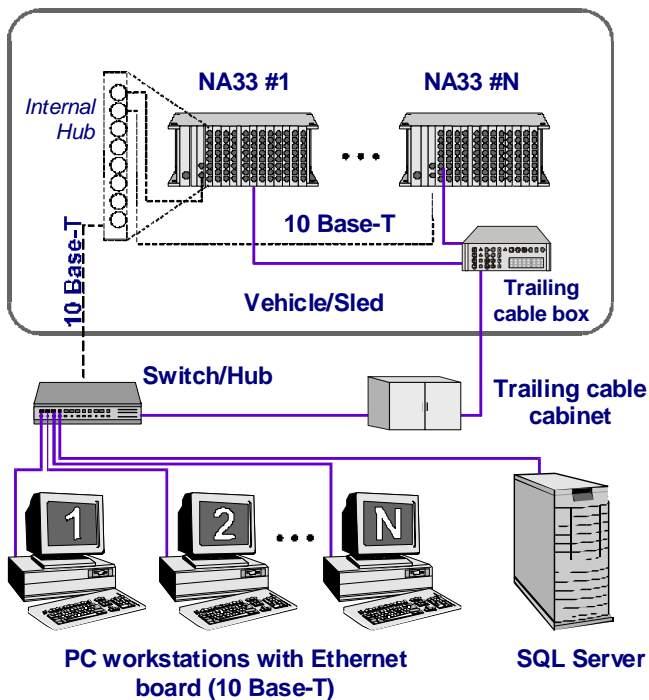
### Shock resistance

arbitrary number of 500 G / 3 ms shocks in +X direction  
arbitrary number of 100 G / 15 ms shocks in directions  $\pm Z$  and  $\pm Y$

### Trigger

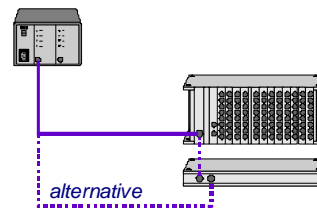
Trigger modes	1 analog, 1 digital, 1 external; options: 4 analog, 4 digital analog: threshold value, digital: characteristic signal change
Trigger bus	RS 485 for up to 500 m cable length and 16 systems

## Connections for Data Transfer



## Connections for Power Supply

Ext. power supply  
unit/battery charger  
(stationary)



crash-proof, ext. rechargeable  
battery to be mounted under NA33

Do you know our low-cost  
data acquisition type NA34?



Please contact us for further information.