

# Instrument Specifications

## OR36<sub>2</sub>/38<sub>2</sub> Mobi-Pack<sub>2</sub>

4 to 32 Channels  
Multi-analyzers / Recorders



## Table of Content

---

<b>General description</b> .....	<b>3</b>
Modules .....	3
Basic hardware configuration .....	3
PC requirement .....	4
<b>Case</b> .....	<b>4</b>
Mechanicals.....	4
Power supply .....	4
<b>Environmental / Compliance with standard</b> .....	<b>5</b>
Radio frequencies sensibility .....	5
Removable Disk .....	5
<b>Front-end</b> .....	<b>6</b>
Expander modules (Xpod).....	8
<b>Digital computation</b> .....	<b>9</b>
Signal Processing Units.....	9
Special DSPs modules .....	10
Computation DSPs modules .....	10
Computation DSP module / OR36, Mobi-Pack & OR38 unit.....	10
<b>Notes</b> .....	<b>10</b>

## General description

The following specifications concern OR36<sub>2</sub>, Mobi-Pack<sub>2</sub> & OR38<sub>2</sub> multi-analyzers/recorders. These systems consist of an OR3x hardware containing optional inputs and processing modules, a PC with an Ethernet interface, and NVGate<sup>®</sup> software with optional plug-in analyzers.

### Modules

The following tables detail the complete capacity of OR36<sub>2</sub>, Mobi-Pack<sub>2</sub> & OR38<sub>2</sub> hardware system. Optional or standard modules may fill the described slots.

#### OR36/Mobi-Pack

<b>Front-end slots</b>	Dynamic and/or parametric analog inputs	4 slots of 4 inputs (BNC)
	Dynamic analog outputs	1 slot of 2 outputs (BNC)
	Externals sync	1 slot of 2 trigger/tachometer inputs (BNC)
	Auxiliary	2 slots of 2 inputs/outputs for optional outputs, Ext. sync or DC (parametric) inputs (BNC)
<b>Auxiliary slots</b>	1 slot for: TEDS	
<b>Processor slots</b>	PC interface	1 slot of 1 DSP (Ethernet)
	Disk management	1 slot of 1 DSP
	Trigger / tachometer / monitoring	1 slot of 1 DSP
	Processing power	4 slots of 1 DSP
<b>Miscellaneous</b>	Internal Hard drive	1 60 GB removable disk with USB 2.0 port
	Remote control (on/off, NVTerm™)	1 RS232 cable connection (RJ11)

#### OR38

<b>Front-end slots</b>	Dynamic and/or parametric analog inputs	4 slots of 8 inputs (BNC)
	Dynamic analog outputs	1 slot of 2 outputs (BNC)
	Externals sync	1 slot of 2 trigger/tachometer inputs (BNC)
	Auxiliary	2 slots of 2 inputs/outputs for optional outputs or Ext. sync or DC (parametric) inputs (BNC)
<b>Auxiliary slots</b>	1 slot for: TEDS	
<b>Processor slots</b>	PC interface	1 slot of 1 DSP (Ethernet)
	Disk management	1 slot of 1 DSP
	Trigger / tachometer / monitoring	1 slot of 1 DSP
	Processing power	8 slots of 1 DSP
<b>Miscellaneous</b>	Internal Hard drive	1 60 GB removable disk with USB 2.0 port
	Remote control (on/off)	1 RS232 cable connection (RJ11)

## Basic hardware configuration

Hardware unit contains at least the following modules. All the other modules are optional.

#### OR36/Mobi-Pack

<b>Font end</b>	4 analog inputs, 2 analog outputs, 2 trigger/tachometer inputs
<b>Processors</b>	1 Ethernet DSP module for PC interfacing.
	1 disk DSP module for disk management.
	1 master DSP module for Trigger / tachometer / monitoring.
	1 computation DSP module
<b>Disk</b>	1 removable disk with USB 2.0 port

#### OR38

<b>Front-end</b>	8 analog inputs, 2 analog outputs, 2 trigger/tachometer inputs
<b>Processors</b>	1 Ethernet DSP module for PC interfacing.
	1 disk DSP module for disk management.
	1 master DSP module for Trigger / tachometer / monitoring.
	1 computation DSP module
<b>Disk</b>	1 removable disk with USB 2.0 port

## PC requirement

<b>Minimum</b>	Pentium 4/ 2 GHz / 256 <sup>1</sup> MB RAM with Windows XP or 512 <sup>1</sup> MB with Windows Vista/ Graphics video with at least 32 MB dedicated (not shared) memory / 100 MB free on HD + storage for measurements and signals, CD ROM drive, 1024 x 768 display (XGA), DirectX 8.0
<b>Recommended (for laptop)</b>	Intel <b>Core 2 Duo</b> / 2 GHz / 1 GB of RAM with XP/7, <b>2 GB of RAM with Vista</b> / Graphics video with <b>256 MB dedicated</b> (not shared) memory / 100 MB free on HD + storage for measurements and signals, CD or DVD ROM drive, 1400 x 1024 display (SXGA+), DirectX 10
<b>Recommended (for desktop)</b>	Intel <b>Core 2 Duo / 2.6 GHz</b> or <b>AMD Athlon 64 X2 Dual-Core 6000+ / 3 GB of RAM</b> / Graphics video with <b>512 MB dedicated</b> (not shared) memory / 100 MB free on HD + storage for measurements and signals, CD or DVD ROM drive, 1600 x 1200 display (UXGA), DirectX 10
<b>Connection</b>	Type: <b>Ethernet 100base TX</b> , 100 Mbit/s - Connector: <b>RJ45</b> For removable disk: <b>USB 2.0</b> - At least one <b>USB port</b> for dongle key.
<b>Operating systems</b>	Windows <b>XP Pro</b> Service Pack 3 (recommended), Windows <b>Vista Business</b> Service Pack 2, Windows <b>7</b>

- 1) Waterfall depth depends on available memory. Minimum configuration does not allow waterfall storage.

## Case

### Mechanicals

#### OR36

<b>Weight</b>	<b>5.2 kg</b> (11.5 lb)	
<b>Dimensions</b>	Case (w.h.d)	<b>102 mm x 260 mm x 311 mm</b> (4.16 in x 10.27 in x 12.24 in)
	Overall (w.h.d)	<b>114 mm x 280 mm x 350 mm</b> (4.48 in x 11.03 in x 13.78 in)

#### Mobi-Pack

<b>Weight</b>	<b>10.7 kg</b> (23.5 lb) power supply and accessories included	
<b>Dimensions</b>	Overall (w.h.d)	<b>470 mm x 180 mm x 360 mm</b> (18.5 in x 7.08 in x 11.81 in)

#### OR38

<b>Weight</b>	<b>8.2 kg</b> (18 lb)	
<b>Dimensions</b>	Case (w.h.d)	<b>102 mm x 380 mm x 311 mm</b> (4.16 in x 14.96 in x 12.24 in)
	Overall (w.h.d)	<b>114 mm x 410 mm x 350 mm</b> (4.48 in x 16.14 in x 13.78 in)

## Power supply

#### OR36/Mobi-Pack

<b>Power</b>	<b>&lt; 60 VA</b>	
<b>External AC Power supply</b>	Voltage	<b>100 to 240 VAC</b>
	Frequency	<b>47 to 63 Hz</b>
<b>DC</b>	Range	<b>10 V to 28 V</b>
	Overload protection	<b>31 V</b> (over this voltage DC poles are short-circuited)
<b>Battery</b>	Type	<b>NiMh</b> (no memory effect)
	Autonomy	<b>30 min</b> (1 h for systems with 4 ch. & 1 computation DSP)
	Charge time	<b>2 h</b> (typical)
	Charge conditions	DC power supply > 18 V

#### OR38

<b>Power</b>	<b>&lt; 100 VA</b>	
<b>Internal AC Power supply</b>	Voltage	<b>85-132 VAC</b> and <b>170-265 VAC</b> (auto selectable)
	Frequency	<b>47 to 63 Hz</b>
	Complies with <b>EN61000-3-2 class D</b>	
<b>DC</b>	Range	<b>10 V to 28 V</b>
	Overload protection	<b>31 V</b> (over this voltage DC poles are short-circuited)
<b>Battery</b>	Type	<b>NiMh</b> (no memory effect)
	Autonomy	<b>20 min</b> (40 min for systems with 8 ch. & 2 computation DSPs)
	Charge time	<b>2 h</b> (typical)
	Charge conditions	DC power supply > 18 V or powered by mains

## Environmental / Compliance with standards

CE	Indicates compliance with EMC Directive <b>89/336/EEC</b> and Low Voltage Directive <b>73/23/EEC</b>	
Safety	EN 61010-1 June 2001	Safety requirements for electrical equipment for measurement, control and laboratory use.
	Over-voltage Cat.	II (Local level mains, appliance, and portable equipment)
	Pollution Degree	2: Do not operate in environments where pollutants may be present.
EMC Emission	EN 50081-1	Generic emission standard: Residential, commercial and light industry.
	EN 50081-2	Generic emission standard: Industrial environment.
	IEC 61326-1	Electrical equipment for measurement control and laboratory use EMC requirements.
	CISPR 22	Radio disturbance characteristics of information technology equipment. Class B limits.
	FCC Rules	Complies with the limits for a Class B digital device.
EMC Immunity	EN 50082-1	Generic immunity standard: Residential, commercial and light industry.
	IEC 61326-1	Electrical equipment for measurement control and laboratory use EMC requirements.
	EN 50082-2	Generic immunity standard: Industrial environment.
	Linear input response range on interference	max slew rate on input: <b>5 V/μs</b>
Materials	ROHS	2011/65/EU
	WEEE	2002/96/CE – 2003/108/CE End user support recycling and concern fees
Temperature	OR36 Operating	0°C to 50°C (32°F to 122°F)
	Mobi-Pack Operating	0°C to 50°C (32°F to 122°F)
	OR38 Operating	0°C to 45°C (32°F to 113°F)
	Storage	-20°C to 65°C (-4°F to 149°F)
	Absolute maximum rating <sup>ii</sup>	-35°C to 70°C (-31°F to 158°F)
Humidity	Max <b>80 % RH</b> at 40°C non condensing	
Shocks	Complies with IEC 68-2-27	
	Operating	100 m/s <sup>2</sup> (11 ms, ½ sine) and 700 m/s <sup>2</sup> (3 ms, ½ sine)
	Storage	200 m/s <sup>2</sup> (11 ms, ½ sine) and 1 000 m/s <sup>2</sup> (3 ms, ½ sine)
	Absolute maximum rating <sup>ii</sup>	1 000 m/s <sup>2</sup> (3 ms, ½ sine)
Vibrations	Complies with IEC 68-2-6	
	Operating	10 m/s <sup>2</sup> , 5-500 Hz, 5mm
	Storage	25 m/s <sup>2</sup> , 5-500 Hz, 5mm
	Absolute maximum rating <sup>ii</sup>	30 m/s <sup>2</sup> , 5-500 Hz, 5mm
Enclosure	Type	IP 40 / IP 31 for Mobi-Pack

### Radio frequencies sensibility

	Input measured with 50 Ω terminator
Radiated RF: 80-1000 MHz, 80% AM 1 kHz, 10 V/m	< 20 μV
Conducted RF: 0.15-80 MHz, 80% AM 1 kHz, 10 V	< 100 μV
Magnetic field: 30 A/m, 50 Hz	< 2 μV

### Removable Disk

HDD	type	1.8" - 60 GB - 4 200 RPM
	Shock	Operating: 50 m/s <sup>2</sup> , 1 ms / Non operating: 120 m/s <sup>2</sup> , 1 ms
	Vibrations	Operating: 20 m/s <sup>2</sup> - 15 to 500 Hz / non operating 50 m/s <sup>2</sup>
	Throughput	Max: 32 ch. @20 kHz BW (40 kHz in 16 bits) - 5h 20min
SSD	type	1.8" - 32 GB - SLC NAND Flash Memory
	Shock	10 000 m/s <sup>2</sup> -, 0.5 ms
	Vibrations	200 m/s <sup>2</sup> - 40 to 2 000 Hz
	Throughput	Max: 24 ch. @20 kHz BW – 2 h gap free
Case	Case (w.h.d)	83 mm x 20 mm x 97 mm (3.24 in x 0.78 in x 3.79 in)
	weight	0.250 kg (0.55 lb)
Connection	Into the analyzer	High speed parallel IDE bus 16.7 MB/s
	To the PC	USB 2.0 480 Mbit/s
Power supply	On PC	USB powered
	On analyzer	Internal power supply

## Front-end

Each front end slot of the OR36/Mobi-Pack (4 BNC) and the OR38 (8 BNC) can be occupied by one of the following inputs type:

- Dynamic inputs
- Parametric inputs
- Universal inputs

### Universal inputs

The universal inputs gather both dynamics and parametric input in the same board and connector. The universal inputs are necessary to support the Xpod signal conditioner. The type of use of the universal inputs is selectable by software (NVGate®) during the analyzer operations.

The universal inputs fulfill all the performances, precision and operability of each specific input type.

### Dynamic inputs

<b>Sampling</b>	Sampling frequencies (Additional decimators allow analysis bandwidth down to 0.8 Hz)	<b>102.4 kHz, 65.536 kHz, 51.2 kHz, 37.768 kHz, 25.6 kHz, 16.384 kHz, 12.8 kHz, 8.192 kHz, 6.4 kHz, 5.12 kHz, 4.096 kHz, 3.2 kHz, 2.048 kHz</b>
	Converters	One <b>24 bit sigma-delta ADC</b> for each input
	Frequency relative precision	<b><math>0.5 \cdot 10^{-4}</math></b> (typical $1 \cdot 10^{-5}$ )
	Synchronization	All inputs synchronized on the same sampling clock
<b>Anti-aliasing filter</b>	Type	Over-sampled digital filters
	Slope	<b>&gt; 400 dB/octave</b>
	Pass band ripple	<b>&lt; <math>\pm 0.005</math> dB</b>
	Rejection of parasites bands	<b>&gt; 100 dB</b> (@ frequency > 0.57 x FS)
	Effective bandwidth	<b>0.45 x FS</b> (ex: 23.4 kHz @ 51.2 kS/s)
<b>Range (peak)</b>	With amplifier (included)	<b><math>\pm 100</math> mV, <math>\pm 300</math> mV, <math>\pm 1</math> V</b>
	Direct	<b><math>\pm 10</math> V</b>
	With attenuator (included)	<b><math>\pm 40</math> V</b>
<b>Absolute accuracy</b>	Resolution	<b>24 bits</b> (144 dB)
	All input ranges at 1 kHz	<b><math>\pm 0.05</math> dB</b> (typical $\pm 0.015$ dB)
	Temperature variability	<b>&lt; 0.002 dB / 10 °C</b>
<b>DC offset</b>	$\pm 100$ mV, $\pm 300$ mV and $\pm 1$ V ranges	<b>&lt; <math>\pm 100</math> <math>\mu</math>V</b>
	$\pm 10$ V range	<b>&lt; <math>\pm 1</math> mV</b>
	$\pm 40$ V range	<b>&lt; <math>\pm 2</math> mV</b>
<b>Frequency flatness and phase response</b>	<i>Includes channel to channel match with different ranges</i>	
	$\pm 10$ V range, DC to 20 kHz	<b>&lt; <math>\pm 0.02</math> dB / &lt; <math>\pm 0.02</math> °</b>
	$\pm 10$ V range, 20 kHz to 40 kHz	<b>&lt; <math>\pm 0.05</math> dB / &lt; <math>\pm 0.05</math> °</b>
	$\pm 0.1$ V, $\pm 0.3$ V and $\pm 1$ V ranges, DC to 20 kHz	<b>&lt; <math>\pm 0.02</math> dB / &lt; <math>\pm 0.1</math> °</b>
	$\pm 0.1$ V, $\pm 0.3$ V, $\pm 1$ V ranges, 20 kHz to 40 kHz	<b>&lt; <math>\pm 0.1</math> dB / &lt; <math>\pm 0.5</math> °</b>
	$\pm 40$ V range, DC to 20 kHz	<b>&lt; <math>\pm 0.1</math> dB / &lt; <math>\pm 0.4</math> °</b>
<b>Cross-talk</b>	<i>Between N (N is odd) and N+1 inputs:</i>	
	@ 1 kHz: <b>&lt; -120 dB</b> , @ 20 kHz: <b>&lt; -96 dB</b> , @ 40 kHz: <b>&lt; -90 dB</b>	
	<i>Between any inputs excluding: N (N is odd) and N+1 inputs:</i>	
<b>Signal to noise ratio</b>	<i>With 50 <math>\Omega</math> terminators:</i>	
	$\pm 10$ V range, 40 kHz bandwidth: <b>&gt; 100 dB</b> , spurious lines <b>&lt; -115 dB</b> of full scale	
	$\pm 10$ V range, 20 kHz bandwidth: <b>&gt; 104 dB</b> , spurious lines <b>&lt; -125 dB</b> of full scale	
<b>Input noise</b>	<i>With 50 <math>\Omega</math> terminators:</i>	
	Thermal input noise	<b>20nV/<math>\sqrt</math>Hz</b>
	$\pm 100$ mV and $\pm 300$ mV ranges	20 kHz BW <b>&lt; 3.5 <math>\mu</math>V rms</b> , 40 kHz BW: <b>&lt; 5 <math>\mu</math>V rms</b>
	$\pm 1$ V range	20 kHz BW <b>&lt; 5.4 <math>\mu</math>V rms</b> , 40 kHz BW: <b>&lt; 8.5 <math>\mu</math>V rms</b>
<b>Impedance</b>	$\pm 10$ V range	
	20 kHz BW <b>&lt; 44 <math>\mu</math>V rms</b> , 40 kHz BW: <b>&lt; 70 <math>\mu</math>V rms</b>	
<b>Protection</b>	Overvoltage	<b><math>\pm 60</math> V peak without damage - On any inputs<sup>ii</sup></b>
<b>Dynamic</b>	Spectral domain	<b>&gt; 140 dB</b>

### Dynamic inputs (continued)

<b>Coupling</b>	<b>AC</b>	Cut-off frequency 0.35 Hz $\pm$ 10% (analog filter)
	<b>DC</b>	
	<b>ICP</b>	<b>2 mA</b> or <b>4 mA</b> power supply with AC coupling ( $\pm$ 10%)
	<b>ICP + TEDS</b>	ICP + reverse current on TEDS reading operations
	<b>GND</b>	Shortcut to ground- Automatic current limitation to 50 mA
<b>Floating</b>	<b>Coupling</b>	AC or DC - Signal ground is floating
	<b>Common mode voltage</b> (all ranges)	Max: <b><math>\pm</math>12 V</b>
<b>TEDS</b>	Standards	<b>IEEE 1451.4 2001</b> revision 1
	Supported templates	Accelerometer/Force meter ( <b>25</b> ) Microphones ( <b>27, 28</b> and <b>29</b> )

### Parametric (DC) inputs

The following parametric inputs can be added to the standard OR36<sub>2</sub> or OR38<sub>2</sub> hardware configuration as follows:

- On the **auxiliary slots** by set of 2 inputs (max 4)<sup>1</sup>
- On the **OR36/Mobi-Pack** as replacement of 4 dynamics inputs (max 12)
- On the **OR38** as replacement of 8 dynamics inputs (max 24)

The following specifications apply to the universal inputs.

<b>Sampling</b>	Bandwidth / Sampling	<b>-3 dB @ 3.5 Hz</b> Independent from dynamic sampling clock
	Converters	One <b>24 bit sigma-delta ADC</b> for each input
<b>Range (peak)</b>	Direct	<b><math>\pm</math>10 V</b>
	With attenuator (included)	<b><math>\pm</math>40 V</b>
<b>Frequencies rejection</b>	Notch filters frequencies	<b>50 Hz &amp; 60 Hz @ <math>\pm</math>1%</b>
	Rejection	<b>&gt; 120 dB</b>
<b>Amplitude</b>	Effective resolution	<b>22 bits</b> (out of noise)
	Linearity	Typ. <b>0.0003 %</b> of input range peak
	Gain drift	<b>20 ppm</b> of input range peak/ $^{\circ}$ C typ.
<b>Offset</b>	Offset	$\pm$ 10 V range: <b>&lt; <math>\pm</math>1 mV</b> / $\pm$ 40 V range: <b>&lt; <math>\pm</math>2 mV</b>
	Offset drift	$\pm$ 10 V range: <b>&lt; 40 <math>\mu</math>V/<math>^{\circ}</math>C</b> / $\pm$ 40 V range: <b>&lt; 160 <math>\mu</math>V/<math>^{\circ}</math>C</b>
<b>Impedance</b>		<b>1 M<math>\Omega</math>, 5 nF</b> typ.
<b>Protection</b>	On any input <sup>ii</sup>	<b><math>\pm</math>60 V</b> peak
<b>Input Noise</b>	<i>With 50 <math>\Omega</math> terminators, excepted <math>\pm</math>40 V range:</i>	
	Input noise	<b>&lt; 4 <math>\mu</math>V</b> rms in 0.1 to 2 Hz BW – Typ <b>2 <math>\mu</math>V</b> rms
	Max. Deviation	<b>&lt; 6 <math>\mu</math>V</b> peak

### Dynamic outputs

<b>Sampling</b>	Converters	One <b>24 bit DAC</b> for each output
	Synchronization	Same sampling clock as the dynamic inputs
<b>Range</b>	Direct	<b><math>\pm</math>10 V peak</b>
	With attenuator (included)	<b><math>\pm</math>1 V peak</b>
	Clipping	<b>User selectable</b> in the output range
	Digital gain	From <b>10<sup>-5</sup></b> to <b>10<sup>3</sup></b>
<b>Absolute accuracy</b>	Resolution	<b>24 bits</b> (144 dB)
	All output ranges at 1 kHz	<b><math>\pm</math>0.05 dB</b>
	Temperature variability	<b>&lt; 0.1 dB / 10 <math>^{\circ}</math>C</b>
<b>Frequency response</b>	<i>Variation relative to 0 dB @ 1kHz</i>	
	All ranges, at 10 kHz	<b>&lt; <math>\pm</math>0.05 dB</b>
	All ranges, at 20 kHz	<b>&lt; <math>\pm</math>0.15 dB</b>
	All ranges, at 40 kHz	<b>&lt; <math>\pm</math>0.8 dB</b>
<b>Noise floor level</b>	10 V range, 20 kHz bandwidth	<b>-110 dB</b> of full scale, spurious lines <b>&lt; -125 dB</b> of full scale
	10 V range, 40 kHz bandwidth	<b>-105 dB</b> of full scale, spurious lines <b>&lt; -125 dB</b> of full scale
	1 V range, 20 kHz bandwidth	<b>-99 dB</b> of full scale, spurious lines <b>&lt; -110 dB</b> of full scale
	1 V range, 40 kHz bandwidth	<b>-94 dB</b> of full scale, spurious lines <b>&lt; -110 dB</b> of full scale

<sup>1</sup> DC inputs on auxiliary slots features 16 bit dedicated converters, see previous instrument specifications(M002-19-4) for details

### Dynamic outputs (continued)

<b>Impedance</b>	User selectable	<b>50 Ω, 600 Ω or Grounded</b>
<b>Current</b>	Max	<b>±10 mA</b>
<b>Protection</b>	Sum of injected + generated voltages	<b>±15 V peak</b> , On any output <sup>ii</sup> Permanent short circuit supported
<b>Total harmonic distortion</b>	THD @ 1 kHz	<b>&lt; 0.002%</b> or <b>-94dB</b> at 20 kHz BW
	THD @ 5 kHz	<b>&lt; 0.005%</b> or <b>-86dB</b> at 20 kHz BW
<b>Cross-talk</b>	Output 0 dBV to 50 Ω terminated input	<b>Lower than measurable noise</b>

### External sync

<b>Sampling</b>	Frequencies	<b>64 times over-sampling</b> of the current input sampling (up to <b>6.4 MHz</b> )
	Converters	High speed voltage comparator and time counter
<b>Ranges (peak)</b>		<b>±300 mV, ±1 V, ±3 V, ±10 V, ±40 V</b>
<b>Resolution</b>	Amplitude accuracy	<b>±1% of range</b>
<b>Setting</b>	Hysteresis	<b>1%</b> (of input range) to input range
	Hold off	<b>0 s to 500 s</b>
	Slope	<b>Rise or fall</b>
	Hardwired pre-divider	<b>1 to 255</b>
<b>Accuracy</b>	<b>Time resolution</b>	<b>&gt; 160 ns</b> (0.06° at 1 kHz and 1.2° at 20 kHz)
<b>Pulse rate</b>	Max	<b>375 kpulse/s</b>
<b>Coupling</b>	<b>AC</b>	Cut-off frequency 0.35 Hz ±10% (analog filter)
	<b>DC</b>	
<b>Impedance</b>		<b>1 MΩ, &lt; 100 pF</b>
<b>Protection</b>	on any external sync <sup>ii</sup>	<b>±60 V peak</b> without damage

### Expander modules (Xpod)

With the universal inputs the OR36<sub>2</sub> and OR38<sub>2</sub> can receive signal conditioning modules called Xpod<sup>2</sup>. Different Xpod types are available.

#### Wheatstone bridge Xpod

<b>Connectors</b>	Type	<b>Sub-D9 – Female</b>
<b>Bridges</b>	Mounting	<b>Full, Half and quarter</b>
	½ bridge completion resistors	<b>2 * 10 kΩ - 0.1% - 10 ppm</b>
	¼ bridge completion resistors	<b>120 Ω or 350 Ω - 0.1% - 25 ppm</b>
	Excitation voltages	<b>0 to 10 V</b>
	Excitation currents	<b>0 to 4 V: &lt; 30 mA - 4 V to 10 V: &lt; 12 mA</b>
	Sensing	<b>Negative and positive probes</b>
<b>Amplifiers</b>	Type	Differential – DC capable
	Gains	<b>10 or 100</b>
	Error	<b>&lt; 0.01 dB</b>
<b>Inputs</b>	Ranges	<b>±100 mV - ±1 V</b>
	Common mode voltage	<b>±7 V</b> without limiting differential input
	Impedance	<b>1 MΩ</b>
	Noise floor levels (100 Hz to 20 kHz)	Gain 100: <b>2 μVrms</b> - Gain 10: <b>4 μVrms</b>
<b>DC offset</b>	Temperature drift	<b>1 μV/°C</b>
	Compensation resolution	<b>3 %</b> of present offset
<b>Protection</b>	Overvoltage	Device on: max <b>±30 V</b> - device off: max <b>±15 V</b>

<sup>2</sup> Not available on Mobi-Pack



## Temperature Xpod

The temperature Xpod operates on the universal or parametric inputs. The XPod support thermocouple and RTDS conditioning, cold point compensation and linearization. Amplified signal are re-inject in the analyzer on the  $\pm 10$  V range.

Connectors	Type	Mini Thermocouple/RTD type
	Pins	<b>3 polarized pin</b> - spring-loaded - compatible with 2 point plugs
	Material	Glass filled thermoplastic - White body
Thermocouples	<b>Type J</b>	<b>-210 °C to +1 100 °C</b> - Yellow LED
	<b>Type K</b>	<b>-200 °C to +1 300 °C</b> - Green LED
	<b>Type T</b>	<b>-200 °C to +390 °C</b> - Brown LED
	<b>Type N</b>	<b>-200 °C to +1 200 °C</b> - Pink LED
	<b>Type E</b>	<b>-200 °C to +800 °C</b> - Purple LED
	Cold compensation	Integrated - 2 sensors - user on/off
	Absolute temperature error	< $\pm 0.1\%$ full range - < $\pm 0.4$ °C @ 0°C
RTDS	PT 100	<b>-190 °C to +880 °C*</b> - Blue LED
	PT 1000	<b>-190 °C to +880 °C*</b> - Grey LED
	Absolute temperature error	< $\pm 0.5\%$ full range - < $\pm 0.25$ °C @ 0°C
	Wires	3 wires connections
	Current	PT100: <b>500 <math>\mu</math>A to 4 mA</b> - PT1000: <b>500 <math>\mu</math>A to 1 mA</b>

Calibrated up to +800 °C

## Digital computation

The following table details the optional DSP modules that can be added to OR36 & OR38 hardware to fit analysis mode calculation needs.

### Signal Processing Units

SPU (Signal Processing Units): the following table gives the characteristics of each analysis mode and the associated SPU consumption. For multi-analysis purpose, add the corresponding SPUs of each mode used simultaneously and increase the sum by 10%. "Real-time" means that the analysis speed is faster than the input rate and does not miss any sample.

<b>FFT</b>	Real-time FFT analysis with;
	<b>401 lines</b> (for 801, 1601,3201, 6401 lines, multiply requested SPU respectively by 1.25, 1.5, 2, 3)
	<b>20 kHz</b> bandwidth (Requested SPU are proportional to bandwidth)
	<b>0% overlap</b> 1 channel processing requires <b>1 SPU</b>
<b>Order analysis</b>	Real-time order spectrum analysis (re-sampled time signal) with:
	Any duration of visualization, any averaging
	<b>20 kHz</b> bandwidth (Requested SPU are proportional to bandwidth) 1 channel processing requires <b>3 SPUs</b>
<b>Time Domain</b>	Real-time time domain monitor and statistical analysis with:
	Simultaneous time view and statistical extraction. Any duration of visualization, any averaging
	<b>20 kHz</b> bandwidth (Requested SPU are proportional to bandwidth) 1 channel processing requires <b>1 SPU</b>
<b>1/n Octave</b>	Real-time filter based 1/n octave analysis with:
	<b>1/3rd</b> octave (for 1/12 <sup>th</sup> and 1/24 <sup>th</sup> octave multiply requested SPU respectively by 2 and 4)
	<b>20 kHz</b> bandwidth (Requested SPU are proportional to bandwidth) 1 channel processing requires <b>3 SPUs</b>
<b>Recorder</b>	Gap free recording with:
	<b>51.2 kHz</b> sampling rate gap free recording
	1 channel processing requires:
	-Standard DSP: <b>1 SPU @ SF <math>\geq</math> 32 768 S/s – 1 SPU x SF/32 768 SF @ SF &lt; 32 768 S/s</b> -Force DSP: <b>0.66 SPU</b>

## Special DSPs modules

The following DSPs are always integrated in OR36 & OR38 hardware.

<b>Master DSP module</b>	Monitor computations	<b>FFT 401 lines</b> (max 4 Channels)
	Time domain detectors	<b>DC, Max, Min, RMS, Kurtosis</b> (on the monitor Channels)
	Events	Threshold detections, combinations
<b>Disk DSP module</b>	<b>File management and recovery</b>	
	<b>On-line computation</b> (compression) of recorded <b>raw data overview</b>	
	Samples compression	<b>32 or 16 bits</b> (user selectable)
<b>Ethernet DSP module</b>	<b>Connection to PC</b>	
	<b>D-rec management</b>	

## Computation DSPs modules

The following computation DSP modules are optional. DSP mix is not allowed; All DSPs must be of the same type in one instrument.

### Standard DSP

<b>Type</b>	Sample size	<b>32 bit floating</b>
	Computation words	<b>32/40 bits</b>
	Internal memory	<b>4 MSamples</b>
<b>Power</b>	Computation capability	<b>12 SPU / DSP module</b>
<b>Input sharing</b>	Inputs per DSP	<b>8 max</b>

### ForceDSP

<b>Type</b>	Sample size	<b>32 bit floating</b>
	Computation words	<b>32/40 bits</b>
	Internal memory	<b>16 MSamples</b>
<b>Power</b>	Computation capability	<b>Up to 48 SPU / DSP module</b>
<b>Input sharing</b>	Inputs per DSP	<b>8 max</b>

## Computation DSP module / OR36, Mobi-Pack & OR38 unit

<b>Minimum</b>	<b>1</b> Computation DSP module	<b>12 SPU / 48 SPU</b>
<b>OR36/MP Max.</b>	<b>4</b> Computation DSP modules	<b>48 SPU / 192 SPU</b>
<b>OR38 Max.</b>	<b>8</b> Computation DSP modules	<b>96 SPU / 384 SPU</b>

## Notes

The previous specifications describe all the guaranteed capacities and performances of the instrument and are applicable to an OR36/MP<sub>2</sub>-16 or OR38<sub>2</sub>-32 hardware powered for more than 15 minutes at a stabilized room temperature of 23°C ±5°C and calibrated since less than one year.

The adapted control software NVGate<sup>®</sup> is described separately.

<sup>i</sup> Prepared for future use: the related specifications or options are in development.

<sup>ii</sup> Exceeding absolute maximum ratings damages the system and voids guarantee.

# OROS, Leadership through Innovation

## About Us

Now approaching 30-years in business, OROS' designs and manufacturing have been renowned for providing the best in noise and vibration analyzers as well as in specific application solutions.

## Our Philosophy

Reliability and efficiency are our ambition everyday. We know you require the same for your measurement instruments: comprehensive solutions providing performance and assurance, designed to fit the challenges of your demanding world.

## Our Emphasis

Continuously paying attention to your needs, OROS collaborates with a network of proven scientific affiliates to offer the latest of the technology, always based on innovation.

## Worldwide Presence

OROS products are marketed in more than 35 countries, through our authorized network of representatives, offices and accredited maintenance centers.

## Want to know more?

<b>OROS headquarters</b>	<b>OROS Inc</b>	<b>OROS French Sales Office</b>	<b>OROS GmbH</b>	<b>OROS China</b>
Tel: +33.811.70.62.36	Tel: +1.888.200.0ROS +1.703.478.3204	Tel: +33.169.91.43.00	Tel: +49.261.133.96.50	Tel: +86.10.59892134
Mail: info@oros.com	Mail: info@orosinc.com	Mail: info@orosfrance.fr	Mail: info@oros-deutschland.com	Mail: info@oroschina.com
Web: www.oros.com	Web: www.oros.com	Web: www.oros.fr	Web: www.oros-deutschland.com	Web: www.oros.com

