



OR34/35

2 to 8 Channel
Multi-analyzers

Instrument Specifications



► GENERAL DESCRIPTION

The following specifications concern OR34 & OR35 multi-analyzers. These instruments consist in a OR3x hardware containing optional inputs and processing modules, a PC with an Ethernet interface, and NVGate® software with optional plug-in analyzers.

• Modules

The following tables detail the complete capacity of OR34 & OR35 hardware. Optional or standard modules may fill the described slots.

OR34

Font end	Dynamic analog inputs:	2 slots of 2 inputs (BNC)
	Dynamic analog outputs:	1 output (BNC)
	Externals sync:	2 trigger/tachometer inputs (BNC)
Processors	Trigger / tachometer / monitoring	1 DSP
	PC communication / recording:	1 DSP
	Computation power:	1 DSP
Miscellaneous	Remote control:	1 with RS232 cable connection (RJ11)

OR35

Font end slots	Dynamic analog inputs:	4 slots of 2 inputs (BNC or BNC+LEMO)
	Dynamic analog outputs:	2 outputs (BNC)
	Externals sync:	2 trigger/tachometer inputs (BNC)
	Auxiliary ¹ :	1 slot of 4 parametric (DC) inputs (DB15)
Auxiliary slots	1 slot for: TEDSi, LEMO power supply, CAN bus interface ¹ , digital I/O ¹)	
Processors	Trigger / tachometer / monitoring	1 DSP
	PC communication / recording:	1 DSP
	Computation power:	2 slots of 1 DSP
Miscellaneous	Remote control:	1 with RS232 cable connection (RJ11)

• PC requirement

Minimum	Pentium III / 700MHz / 64 Mbytes of RAM / 8 Mbytes video card with 3D video processor / 50 Mbytes free on HD, CD ROM drive, 1024 x 768 display (XGA), directX 3.0
Recommended (For laptop)	Pentium IV / 1.7 GHz / 256 Mbytes of RAM / 32 Mbytes video card with 3D video processor / 100 Mbytes free on HD, CD ROM drive, 1280 x 1024 display (SXGA), directX 8.0
Recommended (For desktop)	Pentium IV / 2.2 GHz / 512 Mbytes of RAM / 64 Mbytes video card with 3D video processor / 100 Mbytes free on HD, CD ROM drive, 1600 x 1200 display (UXGA), directX 8.0
Connection	Type: Ethernet 100base TX , 100Mbits/s Connector: RJ45
Operating system	Windows 2000 Service pack 4 (recommended), Windows XP Pro

► **CASE**

• **Mechanicals**

OR34

Weight	1.4 kg (3 lbs)	
Dimensions	Case (w.h.d):	45 mm x 205 mm x 154 mm (1.8 in x 8.1 in x 8.8 in)
	Overall: (w.h.d)	54 mm x 215 mm x 163 mm (2.1 in x 8.4 in. x 6.4 in)

OR35

Weight	2.8 kg (6.2 lbs)	
Dimensions	Case (w.h.d):	56 mm x 246 mm x 222 mm (2.2 in x 9.7 in x 8.8 in)
	Overall: (w.h.d)	67 mm x 254 mm x 232 mm (2.6 in x 10 in. x 9.15 in)

• **Power supply**

OR34

Power	< 15 VA	
External AC Power supply	Voltage:	100 to 240 VAC
	Frequency:	47 to 63 Hz
DC	Range:	10 V to 28 V
	Overload protection:	31V (over this voltage DC poles are short-circuited)

OR35

Power	< 20 VA	
External AC Power supply	Voltage:	100 to 240 VAC
	Frequency:	47 to 63 Hz
DC	Range:	10 V to 28 V
	Overload protection:	31 V (over this voltage DC poles are short-circuited)
Battery	Type:	NiMh (no memory effect)
	Autonomy:	2 h (typical)
	Charge time:	3 h (typical)

- Environmental / Compliance with standard**

CE	Indicates compliance with EMC Directive 89/336/EEC and Low Voltage Directive 73/23/EEC	
Safety	EN 61010-1 June 2001:	Safety requirements for electrical equipment for measurement, control and laboratory use.
	Over-voltage Category:	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-A: 2002	Electrical equipment for measurement control and laboratory use EMC requirements. Industrial locations
	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.
Temperature	OR34 Operating:	0°C to 50°C (32 °F to 122°F)
	OR35 Operating:	0°C to 50°C (32 °F to 122°F)
	Storage:	-20°C to 65°C (-4 °F to 149°F)
	Absolute maximum rating ⁱⁱ :	-35°C to 70°C (-31°F to 158°F)
Humidity	93 % RH at 40°C non condensing	
Shock	Complies with IEC 68-2-7	
	Operating:	10 g (11 ms, ½ sine) and 70 g (3 ms, ½ sine)
	Storage:	20 g (11 ms, ½ sine) and 100 g (3 ms, ½ sine)
	Absolute maximum rating ⁱⁱ :	100 g (3 ms, ½ sine)
Vibration	Complies with IEC 68-2-6	
	Storage:	5 mm, 2 g, 5-500 Hz
	Storage:	5 mm, 2.5 g, 5-500 Hz
	Absolute maximum rating ⁱⁱ :	3 g, 5-500 Hz
Bump	Complies with IEC 68-2-29	
	Storage:	1000 bumps in each direction (6) at 40 g, 6 ms
Enclosure	IP 40	

- 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

► FRONT END

• Dynamic inputs

Sampling	Frequencies: (Additional decimators allow analysis bandwidth down to 0.8 Hz)	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
	Converters:	One 24 bit sigma-delta ADC for each input
	Frequency relative precision	0.5 10 ⁻⁴ (typical 1 10 ⁻⁵)
	Synchronization:	All inputs synchronized on the same sampling clock
Anti-aliasing filter	Type:	Over-sampled digital filters
	Slope:	> 400dB/octave
	Pass band ripple:	< 0.003 dB
	Rejection of parasites bands:	> 110dB (@ frequency > 0.57 x FS)
	Effective bandwidth:	0.43 x FS (ex: 23.2 kHz @ 51.2kS/s)
Range (peak)	With amplifier (included):	±17.5 mV, ±31.6 mV, ±60 mV, ±100 mV, ±175 mV, ±316 mV, ±600 mV, ±1V, ±1.75V, ±3.16V, ±6V
	Direct:	±10V
Absolute accuracy	Resolution:	24 bits (144 dB)
	All input ranges at 1 kHz:	± 0.05 dB (typical 0.015 dB)
	Temperature variability:	< 0.1 dB / 10°C
Frequency flatness and phase response	Includes channel to channel match with different gains	
	10 V range, 0 to 20 kHz:	± 0.02 dB / ± 0.02 °
	10 V range, 20 to 40 kHz:	± 0.05 dB / ± 0.05 °
	175 mV to 6 V ranges, 0 to 20 kHz:	± 0.02 dB / ± 0.1 °
	175 mV to 6 V ranges, 20 to 40 kHz:	± 0.10 dB / ± 0.5 °
	17.5 mV to 100mV ranges, 0 to 10 kHz:	± 0.05 dB / ±0.3 °
	17.5 mV to 100mV ranges, 10 to 20 kHz:	± 0.1 dB / ±1 °
Cross-talk	Between N (N is odd) and N+1 inputs @ 1 kHz: < -112 dB , @ 20 kHz: < -86 dB , @ 40 kHz: < -80 dB	
	between any inputs excluding: N (N is odd) and N+1 inputs @ 1 kHz: < -122 dB , @ 20 kHz: < -96 dB , @ 40 kHz: < -90 dB	
Signal to noise ratio	With 50 Ω terminators:	
	10 V range, 40 kHz bandwidth: > 100 dB , spurious lines < -115 dB of full scale	
	10 V range, 20 kHz bandwidth: > 104 dB , spurious lines < -125 dB of full scale	
Input noise	With 50 Ω terminators	
	Thermal input noise:	20nV/√Hz
	17.5 mV range:	20 kHz BW < 3 μVrms , 40 kHz BW: < 4.2 μVrms
	100 mV range:	20 kHz BW < 3 μVrms , 40 kHz BW: < 4.2 μVrms
	1 V range:	20 kHz BW < 5.4 μVrms , 40 kHz BW: < 8.5 μVrms
10V range:	20 kHz BW < 44 μVrms , 40 kHz BW: < 70 μVrms	
Impedance		1 MΩ ±1%, < 100 pF
Coupling	AC	Cut-off frequency 0.35 Hz ±10% (analog filter)
	DC	
	ICP	4 mA power supply with AC or DC coupling
	AC and DC float	Independent ground references for each input within the current input range
	GND	Shortcuts input poles to the ground
Protection	On any inputs ⁱⁱ :	± 60 V peak without damage
Dynamic	Spectral domain:	> 120 dB (typical >130 dB)

- **Dynamic outputs**

Sampling	Converters:	One 24 bit DAC for each output
	Synchronization:	Same sampling clock as the dynamic inputs
Range	Direct:	±10 V peak
	With attenuator (included):	±1 V peak
	Clipping:	User selectable in the output range
	Digital gain:	10⁻⁵ to 10³
Absolute accuracy	Resolution:	24 bit (144 dB)
	All output ranges at 1 kHz:	± 0.05 dB
	Temperature drift:	< 0.1 dB / 10°C
Frequency response	Variation relative to 0 dB at 1 kHz	
	All ranges, at 10 kHz:	±0.05 dB
	All ranges, at 20 kHz:	±0.15 dB
	All ranges, at 40 kHz:	±0.8 dB
Noise floor level	10 V range, 20 kHz bandwidth:	-110 dB of full scale, spurious lines < -125 dB of full scale
	10 V range, 40 kHz bandwidth:	-105 dB of full scale, spurious lines < -125 dB of full scale
	1 V range, 20 kHz bandwidth:	-99 dB of full scale, spurious lines < -110 dB of full scale
	1 V range, 40 kHz bandwidth:	-94 dB of full scale, spurious lines < -110 dB of full scale
Impedance	Impedance	50 Ω
Current	Max	± 10mA
Protection	Sum of injected + generated voltages	±15 V peak , On any outputs ⁱⁱ Permanent short circuit supported
Total harmonic distortion	THD @ 1 kHz:	< 0.002% or -94dB
	THD @ 5 kHz:	< 0.005% or -86dB
Cross-talk	Output 0 dBV to 50 Ω terminated input:	Lower than measurable noise

- **External sync**

Sampling	Frequencies:	64 time over-sampling of the current input sampling (up to 6.4 MHz)
	Converters:	High speed voltage comparator and time counter
Range (peak)	Direct:	±300 mV, ±1 V, ±3 V, ±10 V
Resolution	Amplitude accuracy	±1 % of range
Setting	Hysteresis:	1% (of input range) to input range
	Hold off:	0 sec to 500 sec
	Slope:	Rise or fall
	Pre-divider:	1 to 64
Time resolution		> 160 ns (0.06° at 1kHz and 1.2° at 20kHz)
Coupling	AC	Cut-off frequency 0.35 Hz ±10% (analog filter)
	DC	
Impedance		1 MΩ, < 100 pF
Protection	on any external sync ⁱⁱ	±60 V peak without damage

► DIGITAL COMPUTATION

The following table details the optional DSP modules that you can add to OR35 hardware to fit your analysis mode calculation needs.

• SPUs

SPU (Signal Processing Units): the following table gives the characteristics of each analysis mode and the associated SPU consumption.

Real-time means that the analysis follows the input rate and does not miss any sample.

FFT	Real-time FFT analysis with;
	401 lines (for 801, 1601,3201, 6401 lines multiply requested SPU respectively by 1.25,1.5, 2, 3)
	20 kHz bandwidth (Requested SPU are proportional to bandwidth)
	0% overlap 1 channel processing = 1 SPU
1/n Octave	Real-time filter based 1/n octave analysis with:
	1/3rd octave resolution (for 1/12 th and 1/24 th octave multiply SPU respectively by 2 and 4)
	20 kHz bandwidth (Requested SPU are proportional to bandwidth)
	1 channel processing = 3 SPU
Order analysis	Real-time order spectrum analysis (re-sampled time signal) with:
	Max order / order resolution = 800
	Max RPM x Max order = 1 200 000 (requested SPU is proportional to max RPM)
	1 channel processing = 3 SPU
Recorder	Gap free recording with:
	51.2 kHz sampling rate
	1 channel processing = 0.75 SPU

• Computation DSPs modules

Type	Sample size:	32 bit floating
	Computation words:	32/ 40 bit
	Memory:	4 MSample
Power	12 SPU / DSP module	

• Computation DSP module / OR34 & OR35 unit

Minimum	1 Computation DSP module:	12 SPU
OR34 Max.	1 Computation DSP modules:	12 SPU
OR35 Max.	2 Computation DSP modules:	24 SPU

► NOTES

The previous specifications describe all the guaranteed capacities and performances of the instrument and are applicable to an OR34-4 or OR35-8 hardware, powered for more than 15 minutes, at a stabilized room temperature of 25°C ± 5°C and calibrated since less than one year.

The adapted control software NVGate® is described separately.

ⁱ Prepared for future use: the related specifications or options are in development.

ⁱⁱ Exceeding absolute maximum ratings damages the system and voids guarantee.