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KiNOVA XL (Plus)

Type 5809A30A, 5809A31A

Data acquisition for high channel count NVH

KiNOVA XL and XL Plus are expandable and customizable data acquisition hardware's for high channel count NVH testing.

Key technical features:
- Up to 96 channels per system and up to 1024 channels in total
- Customizable with a variety of input and output cards
- Portable or rack-mounted
- Rugged device, suitable for engine bed or vehicle applications
- Standalone operation

KiNOVA XL and XL Plus – Data Acquisition Hardware
KiNOVA XL and XL Plus are data acquisition hardware's for high channel count NVH testing applications. The systems can be customized based on the measurement needs with a variety of cards.
KiNOVA XL and XL Plus can host up to 12 input/output cards per unit, and up to 96 channels per unit. Depending on the configuration, multiple units can be stacked to reach the required flexibility. Every system includes two built-in tacho inputs to acquire data or to trigger the system externally.
KiNOVA XL and XL Plus systems ensure compatibility with Kistler's IEPE accelerometers besides other common sensors for NVH applications. All acquisition and programmable capabilities are under software control and are managed by KiNOVA Acquisition software, which also supports remote channel statistics for monitoring applications.

KiNOVA XL
KiNOVA XL is designed for laboratory or test bench applications, which require accurate live visualization of the measured data. The chassis can host up to 12 input/output cards and reach a maximum of 96 channels. USB connection to the PC ensures operation efficiency. Moreover, multiple KiNOVA XL and Pro can be connected together.

KiNOVA XL Plus
KiNOVA XL Plus allows targeting high channel count measurements in laboratory and at test benches but also mobile NVH applications. The chassis includes an internal processor and storage capacity (customizable). Therefore, besides live visualization of data for monitoring purposes, it is also possible to operate the system in standalone mode, without the need for a direct connection to a PC. KiNOVA XL Plus connects to a PC via Ethernet, and its channel count can be expanded up to 1024 by connecting multiple systems. Connectivity to KiNOVA XL and Pro is also possible.

KiNOVA XL/XL Plus
- KiNOVA XL/XL Plus – data acquisition system
- Connecting cable – USB or Ethernet crossover
- Ground cable
- DC power cable and power supply with IEC cable (country specific)

Technical data

Hardware chassis

Inputs		12 configurable card slots per unit (max. 96 ch per unit) 2 built-in tacho input per unit
Max. sampling rate		Depending on the card: 300k samples/sec/channel @24-bit 800k samples/sec/channel @16-bit (different sampling rates can run on separate modules)
Tacho inputs		2 channels (built-in) (see note in the options)
Tacho mode		IEPE, Direct
Tacho sampling rate		– 16x the sampling rate, when sampling rate is <50 k Sps – Same as the sampling rate, when sampling rate is >50 k Sps
Tacho Input range	V	28
Communication to PC		USB for KiNOVA XL, Ethernet and wireless (via Nano USB adapter, optional) for KiNOVA XL Plus
Supply voltage		external +/- 10V to +/- 36V DC, AC mains (adapter supplied)
Dimensions (H x W x D)	mm	185 x 450 x 400
Weight	kg	9kg (depending on configuration)
Processor		Intel Atom E3825, 1.33 GHz (KiNOVA XL Plus)
Storage capability		256 GB solid-state (customizable) (KiNOVA XL Plus)

5809A30A_003-549e-03.22

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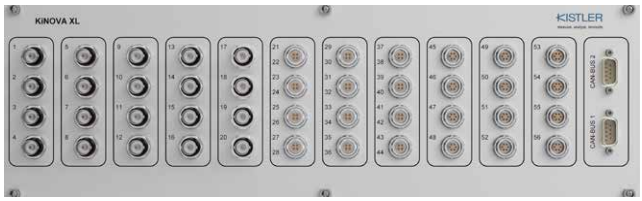
Environment and general data

Operating temperature	°C	0…+40
Humidity		95% RH, non-condensing
IP rating		IP21 (customizable)

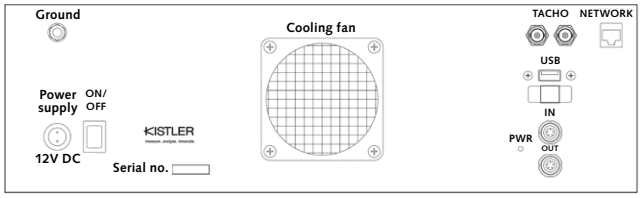
Optional Input and Output cards:
One KiNOVA XL or XL Plus unit can feature up to 12 cards chosen from the following selection.

The chassis has two tacho inputs Tacho 1 and Tacho 2 to have a tacho input available on Tacho 1 either an 1, 1H, 2, 2H, 3 or 4 card needs to be fitted in slot 1. Similarly, to have a tacho input available on Tacho 2 either an 1, 1H, 2, 2H, 3 or 4 card needs to be fitted in slot 2.

Example of front panel



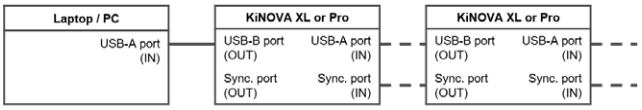
Example of back panel



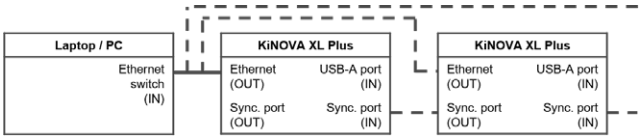
Description back panel:
Power supply 12 Volt DC, on/off button, ground connector, cooling fan, two Tacho inputs with BNC connectors, USB Type-A, USB Type-B (only for KiNOVA XL), synchronization input and output with a 5-pin lemo connector, Ethernet connector (only for KiNOVA XL Plus), power led.

Connecting multiple systems
Multiple KiNOVA systems can be combined and connected.

KiNOVA XL is connected to a PC via USB cable. Additional KiNOVA XL or Pro systems can be daisy chained via USB and synchronization cables, as shown in the scheme below. Because of the limitations of USB connection, a maximum of 12 cards can be supported.



KiNOVA XL Plus can be connected to a laptop via Ethernet. To extend the channel count further it is possible to connect multiple KiNOVA XL Plus systems via an Ethernet switch. To ensure a synchronous capture, the systems must be connected via a synchronization cable, as shown in the scheme below. Because KiNOVA XL Plus embeds an internal processor and storage capacity, it is also possible to capture the data in standalone mode. This means without a connection to a PC.



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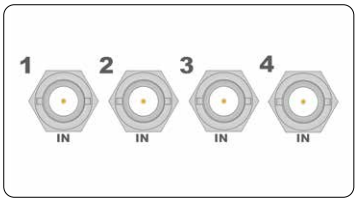
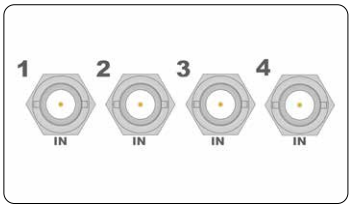
Technical data

Card No. 1: **4 channel ADC + Tacho, IEPE, Direct**	
Description	4 channel analogue input card with 1 tacho Designed for universal use, this card has built-in signal conditioning for almost all types of transducer. It has the capability of high sample rates – up to 400 kSps at 16-bit – and synchronous parallel sampling with an additional tachometer input. It also offers a choice of AC or DC coupling to direct voltage inputs and support for IEPE transducers, including those with TEDS.
Input channels	4
Connector	BNC
Input range	±10 mV to ±10 V (common range ±10 V)
16-bit sample rate	400 k samples/sec/channel
24-bit sample rate	100 k samples/sec/channel
Effective bandwidth	0.4 x sample rate
Anti-aliasing attenuation	>100 dB
AC coupling high pass filter	20 db/dec –3dB at 0.3 Hz or 1Hz
DC/AC Input	Yes/Yes
IEPE/Charge Input	Yes/No
Programmable excitation/ bridge completion	No/No
24-bit Dynamic range	105 dB at 10 Ks/s
24-bit Noise floor	–120 dB at 10 Ks/s
16-bit Dynamic range	92 dB at 10 Ks/s
16-bit Noise floor	–110 dB at 10 Ks/s
Non-linearity	<1 bit
Accuracy	±0.1% FSD
DC Offset control	±50% FS in 32,768 steps
Tacho channels	1
Tacho input range	±28 V
Supports TEDS	Yes
Auto-zero	Yes
Gain Steps	13
Absolute max. input range	±24 V
Power usage (worst case)	6 W

Technical data

Card No. 1H: **4 high speed channel ADC + Tacho, IEPE, Direct**	
Description	4 channel high speed analogue input card with 1 tacho This card is a high speed version of card number 1. The main distinguishing feature is the sampling rate – the capabilities reach up to 300 kSps at 24-bit and 800 kSps at 16-bit. This increases the measurement accuracy to an ultra-exact performance.
Input channels	4
Connector	BNC
Input range	±10 mV to ±10 V (common range ±10 V)
16-bit sample rate	800 k samples/sec/channel
24-bit sample rate	300 k samples/sec/channel
Effective bandwidth	Up to 160 kHz
Anti-aliasing attenuation	>100 dB
AC coupling high pass filter	20 db/dec –3dB at 0.3 Hz or 1Hz
DC/AC Input	Yes/Yes
IEPE/Charge Input	Yes/No
Programmable excitation/ bridge completion	No/No
24-bit Dynamic range	105 dB at 10 Ks/s
24-bit Noise floor	–120 dB at 10 Ks/s
16-bit Dynamic range	92 dB at 10 Ks/s
16-bit Noise floor	–110 dB at 10 Ks/s
Non-linearity	<1 bit
Accuracy	±0.1% FSD
DC Offset control	±50% FS in 32,768 steps
Tacho channels	1
Tacho input range	±28.5 V
Supports TEDS	Yes
Auto-zero	Yes
Gain Steps	13
Absolute max. input range	±24 V
Power usage (worst case)	5 W

5809A30A_003-549e-03.22

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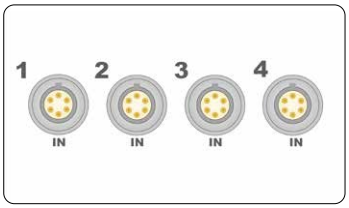
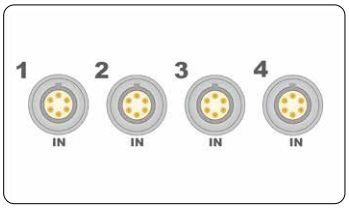
Technical data

Card No. 2: **4 channel ADC + Tacho, IEPE, Direct, Bridge**	
Description	4 channel analogue input card with 1 tacho, plus bridge This card shows the main features of the previous one and includes bridge completion and transducer excitation. Each of the 4 channels provides bridge completion configurations of quarter, half and full bridge, internal calibration shunt resistors and selectable bridge resistance of 120, 350 or 1,000 Ω. Each channel also provides program selectable supply voltage of 5 and 10V for transducer excitation.
Input channels	4
Connector	Lemo 6-pin
Input range	±10 mV to ±10 V (common range ±10 V)
16-bit sample rate	400 k samples/sec/channel
24-bit sample rate	100 k samples/sec/channel
Effective bandwidth	0.4 x sample rate
Anti-aliasing attenuation	>100 dB
AC Coupling high pass filter	20 db/dec –3dB at 0.3 Hz or 1 Hz
DC/AC Input	Yes/Yes
IEPE/Charge Input	Yes/No
Programmable excitation/ bridge completion	Yes/Yes
24-bit Dynamic range	105 dB at 10 Ks/s
24-bit Noise floor	–120 dB at 10 Ks/s
16-bit Dynamic range	92 dB at 10 Ks/s
16-bit Noise floor	–110 dB at 10 Ks/s
Non-linearity	<1 bit
Accuracy	±0.1% FSD
DC Offset control	±50% FS in 32,768 steps
Tacho channels	1
Tacho input range	±28 V
Supports TEDS	Yes
Auto-zero	Yes
Gain Steps	13
Absolute max. input range	±24 V
Power usage (worst case)	8 W

Technical data

Card No. 2H: **4 high speed channel ADC + Tacho, IEPE, Direct, Bridge**	
Description	4 channel high speed analogue input card with 1 tacho, plus bridge This card is a high speed version of card number 2. The main distinguishing feature is the sampling rate – the capabilities reach up to 300 kSps at 24-bit and 800 kSps at 16-bit. This increases the measurement accuracy to an ultra-exact performance. Each of the 4 channels provides bridge completion configurations of quarter, half and full bridge, internal calibration shunt resistors and selectable bridge resistance of 120, 350 or 1,000 Ω. Each channel also provides program selectable supply voltage of 5 and 10 V for transducer excitation.
Input channels	4
Connector	Lemo 6-pin
Input range	±10 mV to ±10 V (common range ±10 V)
16-bit sample rate	800 k samples/sec/channel
24-bit sample rate	300 k samples/sec/channel
Effective bandwidth	Up to 160 kHz
Anti-aliasing attenuation	>100 dB
AC Coupling high pass filter	20 db/dec –3dB at 0.3 Hz or 1 Hz
DC/AC Input	Yes/Yes
IEPE/Charge Input	Yes/No
Programmable excitation/ bridge completion	Yes/Yes
24-bit Dynamic range	105 dB at 10 Ks/s
24-bit Noise floor	–120 dB at 10 Ks/s
16-bit Dynamic range	92 dB at 10 Ks/s
16-bit Noise floor	–110 dB at 10 Ks/s
Non-linearity	<1 bit
Accuracy	±0.1% FSD
DC Offset control	±50% FS in 32,768 steps
Tacho channels	1
Tacho input range	±28.5 V
Supports TEDS	Yes
Auto-zero	Yes
Gain Steps	13
Absolute max. input range	±24 V
Power usage (worst case)	8 W

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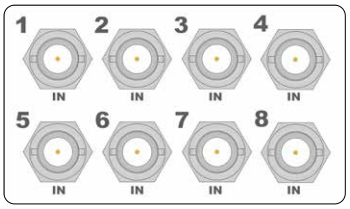
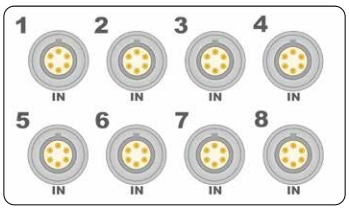
Technical data

Card No. 3: **8 channel ADC + Tacho, IEPE, Direct, TEDS**	
Description	8 channel analogue input card with 1 tacho This card reaches industry standard for NVH applications, ensuring high quality, repeatability and high resolution. It is the standard card advised for KiNOVA Pro and given the high channel density it allows reaching the maximum channel count per hardware unit (32 per unit). To maximize the channel count of a unit, card nr 3 can be implemented to have 4x 4-pin lemo instead of 8 BNCs and that a connector can be used to split the lemo to 2 BNCs.
Input channels	8
Connector	8 channel BNC or 4 channel 4-pin Lemo (depending on the overall card configuration of KiNOVA XL system the 4x 4-pin Lemo connector can be used to optimize space on the front panel)
Input range	±10m V to ±10 V (common range ±10 V)
24-bit sample rate	100 k samples/sec/channel
Effective bandwidth	0.4 x sample rate
Anti-aliasing attenuation	>100 dB
AC Coupling high pass filter	20 db/dec –3 dB at 0.3 Hz or 1 Hz
DC/AC Input	Yes/Yes
IEPE/Charge Input	Yes/No
Programmable excitation/ bridge completion	No/No
24-bit Dynamic range	102 dB at 10 Ks/s
24-bit Noise floor	–120 dB at 10 Ks/s
Non-linearity	<1 bit
Accuracy	±0.1% FSD
DC Offset control	±100% FS in 32,768 steps
Tacho channels	1
Tacho input range	±28 V
Supports TEDS	Yes
Auto-zero	Yes
Gain Steps	4
Absolute max. input range	±24 V
Power usage (worst case)	6 W

Technical data

Card No. 4: **8 channel ADC + Tacho, Direct, Bridge**	
Description	8 channel analogue input card with 1 tacho This card shows the main features of the previous one and includes bridge completion and transducer excitation. Each of the 8 channels provides bridge completion configurations of quarter, half and full bridge, internal calibration shunt resistors and selectable bridge resistance of 120, 350 or 1,000 Ω. Each channel also provides program selectable supply voltage of 5 and 10 V for transducer excitation.
Input channels	8
Connector	Lemo 6-pin or 48 multiway connector (depending on the overall card configuration of KiNOVA XL system a multiway connector can be used to optimize space on the front panel)
Input range	±10 mV to ±10 V (common range ±10 V)
24-bit sample rate	100 k samples/sec/channel
Effective bandwidth	0.4 x sample rate
Anti-aliasing attenuation	>100 dB
AC Coupling high pass filter	20 db/dec –3 dB at 0.3 Hz or 1 Hz
DC/AC Input	Yes/Yes
IEPE/Charge Input	Yes/No
Programmable excitation/ bridge completion	Yes/Yes
24-bit Dynamic range	102 dB at 10 Ks/s
24-bit Noise floor	–120 dB at 10 Ks/s
Non-linearity	<1 bit
Accuracy	±0.1% FSD
DC Offset control	±100% FS in 32,768 steps
Tacho channels	1
Tacho input range	±28 V
Supports TEDS	Yes
Auto-zero	Yes
Gain Steps	4
Absolute max. input range	±24 V
Power usage (worst case)	12 W

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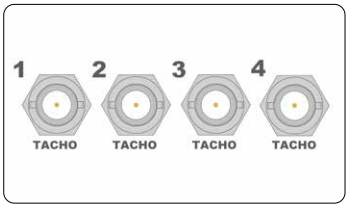
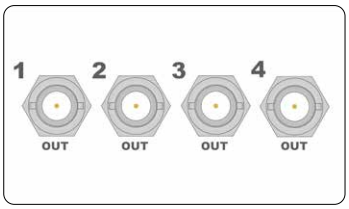
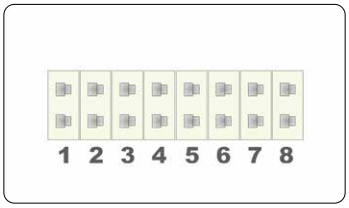
Technical data

Card No. 5: **4 channel Advanced Tacho card**	
Description	4 channel advanced tacho input card This card is ideal for acquiring positional information and time relative positional information of rotating machineries. Torsional and angular vibration can be measured precisely, thanks to this high-speed and high-resolution card. It can measure the pulses with a resolution of 4ns!
Tacho input channels	4
Connector	BNC
Resolution	4 ns
Tacho input range	±30.1 V
Absolute max. input range	±50 V
Slope selection	-ve
Dynamic noise rejection	Yes
Power usage (worst case)	1.3 W

Technical data

Card No. 6: **4 channel DAC output card**	
Description	4 channel DAC output card This output card is ideal to replay analogue signals. Used for applications such as modal analysis or general noise and vibration analysis, where source or shaker control is required. Generated or captured signals can be replayed as analogue voltage signals.
Analogue output channels	4
Connector	BNC
24-bit sample rate	48 k samples/sec/channel
Analogue output range	±4 V
Power usage (worst case)	1.8 W

Technical data

Card No. 7: **8 channel thermocouple card**	
Description	8 channel Thermocouple input card This card gives the option for temperature data to be integrated and synchronised with noise and vibration data. The industry standard connectors of this card allow measuring eight thermocouple inputs simultaneously.
Input channels	8
Connector	IsoThermal Block
Input range	Thermocouple
24-bit sample rate	500 samples/sec/channel
DC/AC Input	Yes/Yes
IEPE/Charge Input	No/No
Programmable excitation/ bridge completion	No/No
Non-linearity	<1 bit
Accuracy	±0.1% FSD
Supports TEDS	No
Auto-zero	No
Gain Steps	2
Power usage (worst case)	6.2 W

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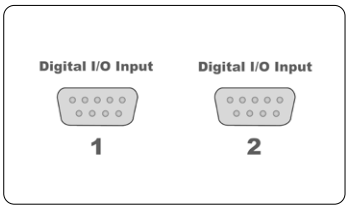
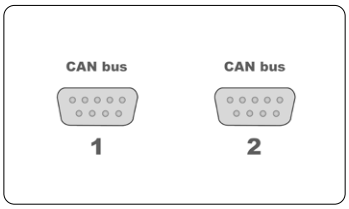
Technical data

Card No. 8: **8 channel digital I/O card with multi-way**	
Description	8 channel digital input and output card with multi-way This card is analogue to card no. 6 and offers a multi-way input or output to integrate different systems with a higher flexibility.
Digital input channels	8
Digital output channels	8
Digital output range	TTL compatible
Connector	2 x 9-way D-type
Power usage (worst case)	1.8 W

Technical data

Card No. 9: **2 channel CAN Bus input card**	
Description	2 channel CAN Bus input card This card offers two separate operating CAN Bus inputs to monitor and capture two independent systems. Supporting monitoring tasks where messages are read and logged from the BUS and operating in PID mode allows to request automatic PIDs under user control.
Link interface	ISO 11898
Bus rates	125 k, 250 k, 500 k, 1M bit/s
Operating modes	Passive - log all traffic Active - request PID
Active – request PID	2 x 9-way D-type
Power usage (worst case)	1.3 W
CAN Bus inputs	2

5809A30A_003-549e-03.22

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USB CAN-BUS logging system

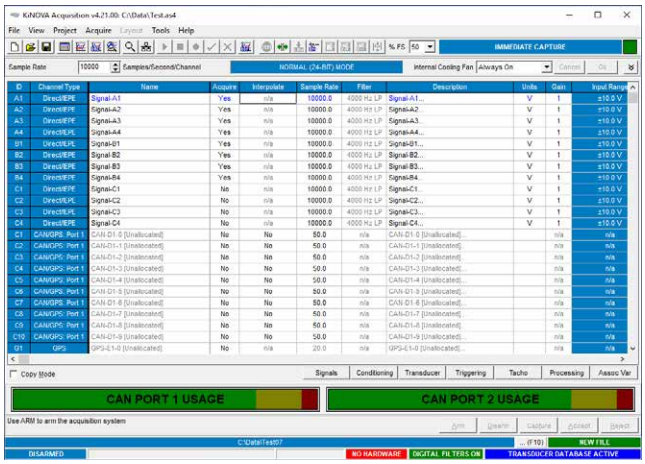
The system can be made compatible with a specific Kvaser USB CAN device, upon license activation. The external CAN-BUS acquisition device can be connected to the KiNOVA system and powered via USB port. The CAN-BUS device supports CAN2.0A (1 Mbps), CAN2.0B (1 Mbps) and CAN-FD (8 Mbps). It is also ISO 11898-2 compliant and J1979 OBD-II compatible. The KiNOVA Acquisition software (see below) allows users to import DBC files and select the necessary signals. Moreover, users can view the CAN data together with other data measured by the KiNOVA system.

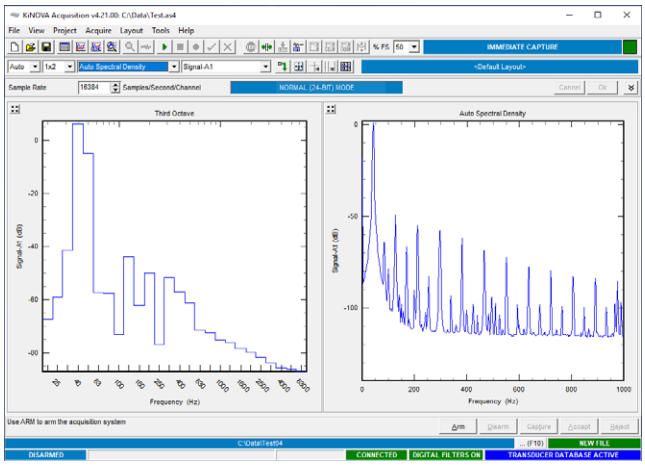
KiNOVA Acquisition/Advanced Acquisition Software

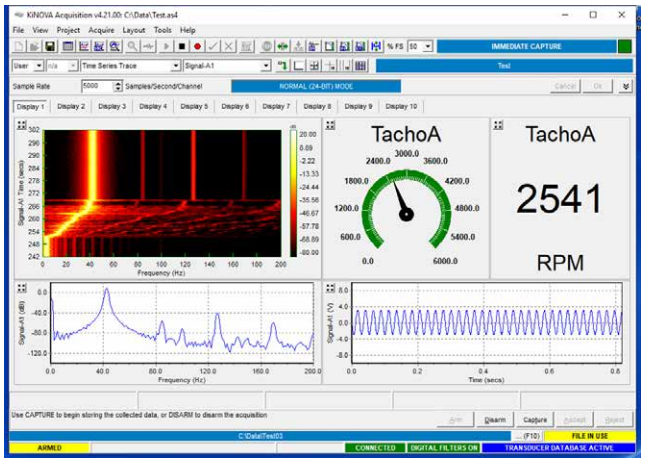
KiNOVA Acquisition is an advanced acquisition software, which provides full flexibility of data capture and live visualization. KiNOVA Acquisition allows setting up the channels of a KiNOVA XL and XL Plus, making sure that all relevant details, like calibration and trigger information, are included.
KiNOVA Acquisition allows visualizing live data in complete freedom. Multi-window functionalities allow customizing the display with desired quantities: waterfalls, order analysis, speed curves, meters, time-domain, frequency-domain, octave bands, digital panels and much more. KiNOVA Acquisition comes with an export utility to allow to save the measured data as *.sdf, *.bunv, *.mat, .tdm and *.csv format.

KiNOVA Acquisition is designed to:

- Setup the channels and triggers
- Fully customize data visualization
- Support you with sensor calibration
- Export data







Technical data

KiNOVA Acquisition features

Channel setup	Signal setup assistant, acquisition control deck, Pre- and Post-triggers, Start/Stop trigger on tacho signal, Auto-range
Graphical display (displays can be fully customized)	Time series trace, time series snapshot, time series trend, trend and speed, frequency spectra, Nth octave, RMS meter, sound intensity, cross spectra, signal vs signal, modulus/phase snapshot, transfer function, waterfall, order track, order-based snapshot, speed curve, digital panel, data grid, overrange grid, multi-signal histogram, triggered data capture, review results (optional), record event information
Calibration	Audio, tone, DC, shunt, multi-channel

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Continuation Technical data

Additional features/ functions	TEDS reader, Expression editor and virtual channels, CAN-bus parameter definition and setup, Transducer database, Acquisition scheduler for standalone mode, Replay mode, DAC replay output suite (optional) for signal generation, Remote statistics for monitoring function, Alarm profiles (optional)

KiNOVA Acquisition include:
- KiNOVA Acquisition – advanced acquisition software
- Export utility - exporting measured data to common formats
- Installation USB stick
- License dongle

Optional packages	**Type/Mat. No.**
• KiSUITE – software platform for NVH	2840A…
• KiNOVA hardware warranty	
• KiNOVA hardware calibration	
• KiSUITE software support	
• KiNOVA and KiSUITE training	
• Synchronization cable (connecting two KiNOVA XL or XL Plus)	5809AZ100
• External CAN-BUS logger	
USB CAN-BUS logger device	5809AZ320
KiNOVA Acquisition extension	2840AZ320
• Wireless connection	
Nano USB adapter	5809AZ220
KiNOVA Acquisition extension	2840AZ220

Ordering key

KiNOVA XL	**Type 5809A30A**
KiNOVA XL Plus	**Type 5809A31A**

Input/output cards (slots A to D)

Input/output cards	Card no.	Type no.
4ch ADC+Tacho IEPE Direct	**1**	5307A12
4ch high speed ADC + Tacho IEPE Direct	**1H**	5307A13
4ch ADC+Tacho IEPE Direct Bridge	**2**	5307A22
4ch high speed ADC + Tacho IEPE Direct Bridge	**2H**	5307A23
8ch ADC+Tacho IEPE Direct	**3**	5307A31
8ch ADC+Tacho IEPE Direct Bridge	**4**	5307A41
4ch Advanced Tacho	**5**	5307A51
4ch DAC output card BNC	**6**	5620A11
8ch thermocouple card	**7**	5307A71
8ch Digital I/O card multi-way	**8**	5620A21
2ch CAN bus input card	**9**	5620A31

KiNOVA Acquisition **Type 2840A50**

For further information and questions on the KiNOVA product line and Kistler sensors, please visit our website or contact us at kinova@kistler.com.

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