

Leonova Diamond Basic Package

Technical Data Sheets

Package Features include:

- The instrument has been engineered to meet the demands industrial facilities by meeting IP65/NEMA 4X standards, thus offering an extremely rugged and reliable instrument for plant route readings.
- The Diamond offers Easy-to-Understand condition information – the data is displayed as green, yellow, red results that can easily be interpreted by the maintenance personnel.
- Data logging with Condmaster® software
- ISO 2372 and ISO 10816 vibration monitoring - Overall vibration measurements for determining machine health.
- Speed/RPM and Temperature Measurements
- Stethoscope function
- Replaceable battery packs ensure no issues with battery needing to be charged while readings are being taken
- Notes and Comments are easy and quick to add by using the optional headset and boom microphone for voice recording of them during round readings.
- Package includes all of the transducers, cables, magnetic bases, probes, battery charger and accessories needed to utilize the features and functions listed.
- Recommended annual calibration at a cost of \$759.99 USD. Includes a certificate of calibration good for 12 months.
- The instrument and software can easily have new functions added/ installed at any time without having to return the instrument. This allows you to expand the functionality of the instrument and software without having to buy new.



Leonova®

DIAMOND

Technical data sheets
2019-03



Leonova Diamond Basic Package includes:

- 1 x DIA300, Diamond HDm/HDc Platform
- 1 x DIA133, ISO 10816 + Spectrum, Diamond Function
- 1 x CHA03, Battery Charger DIA/EME
- 1 x CAB94, Communication Cable USB/USB-mini
- 1 x CAB83, Vib Measuring Cable 1.5m Straight
- 1 x SLD144S-UNF, Vib Transducer 2-10,000 Hz Side-Entry
- 1 x TRX40, Magnetic Base
- 1 x TTP10, Tach/Temp Probe with TTP11
- 1 x TAD16, Reflecting Tape, sheets
- 1 x CAS28, Soft-Sided Carrying Case
- 1 x CM-E101, Condmaster LITE edition Software
- See Condmaster 2026 Editions Overview PDF

Trademarks

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Patents

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Leonova Diamond® – Platform



Leonova Diamond is a three-channel handheld machine condition analyser designed for use in harsh environments. The following functions are always included for unlimited use:

- Data logging with Condmaster® Ruby.
- ISO 2372 vibration monitoring.
- Speed and temperature measurements.
- Analog signals, current, and voltage.
- Automatic recording, up to 50 hours.
- Stethoscope function.
- Reading from and writing to CondID® memory tags.
- Recording of vocal comments.

The main Leonova functions are user-selected, see TD-359. With synchronous measurement, enveloping, true zoom, and up to a 25 600 line spectrum over DC up to 40 kHz, Leonova Diamond has full vibration analysis capacity. The evaluation tables of the ISO 10816 standards for broadband measurement of vibration velocity, acceleration, and displacement are also incorporated. For single and dual plane rotor balancing, a graphical guide calculates balancing weights and their position. For shaft alignment, Leonova Diamond uses advanced laser technique with easy targeting, modulated line laser beam, and automatic precision calculation of shaft positions.

Part numbers

- DIA300** Leonova Diamond, SPM HDm/HDc
DIA302 Leonova Diamond, Balancing, single and dual plane
DIA303 Leonova Diamond, SPM LR/HR
DIA305 Leonova Diamond, SPM HDm/HDc and LR/HR
DIA162 Extra memory, 4 GB
DIA163 Extra memory, 8 GB
BATT02-Std Optional battery pack
16644 Battery adapter unit
CHA01 Battery charger incl. AC adapter, Euro plug
CHA02 Battery charger incl. AC adapter, UK plug
CHA03 Battery charger incl. AC adapter, US plug
CHA04 Battery charger incl. AC adapter, AU plug
93484 Car charger cable 12V
CAB94 Communication cable, USB-miniUSB
16675 Belt clip, complete
16646 Shoulder strap with safety buckle
CAS28 Carrying case, soft with modular insert, 370x200x270 mm
CAS35 Carrying case/trolley case with two wheels, plastic with foam insert, 560x350x230 mm
81468 Code lock, TSA approved, for CAS35

Parts of the Leonova system are specified on the technical data sheets (TD) listed below:

Instrument specifications	TD-357
User-selected functions	TD-359
Shock pulse method SPM HD	
frequency and time domain analysis	TD-361
SPM Shock pulse method dBm/dBc	TD-406
SPM Shock pulse method LR/HR	TD-362
SPM Spectrum®	TD-407
Vibration monitoring ISO 2372	TD-408
Vibration monitoring ISO 10816 with spectrum	TD-363
Vibration monitoring ISO 20283-5	TD-484
3-channel simultaneous vibration monitoring	TD-364
Vibration Advanced	TD-459
FFT spectrum with symptoms	TD-460
HD ENV	TD-511
Vibration Expert	TD-365
EVAM evaluated vibration analysis	TD-401
HD ENV	TD-511
Run up/Coast down and Bump test	TD-402
HD Order tracking	TD-403
Frequency Response Function, FRF	TD-402
HD Analysis	TD-514
Vibration Expert	TD-365
SPM HD Expert	TD-361
Orbit analysis/Shaft centerline plot	TD-368
Balancing, single and dual plane	TD-369
Shaft alignment	TD-370
Recording function	TD-409
Alignment Sensors	TD-524
Transducers and measuring cables	TD-377
Leonova Service Program	TD-379
Tachometer/Temperature probe	TD-380

Spare parts

- 16645** Protection foil for display
14661 Wrist strap
81469 Silica gel (moisture absorbent) spare for CAS35
90362 AC adapter, Euro plug, 100-240 V AC
90380 AC adapter, UK plug, 100-240 V AC
90379 AC adapter, US plug, 100-240 V AC
90528 AC adapter, AU plug, 100-240 V AC
16574 Battery charger
PRO52 Leonova Service Program
71950 Leonova Diamond User guide

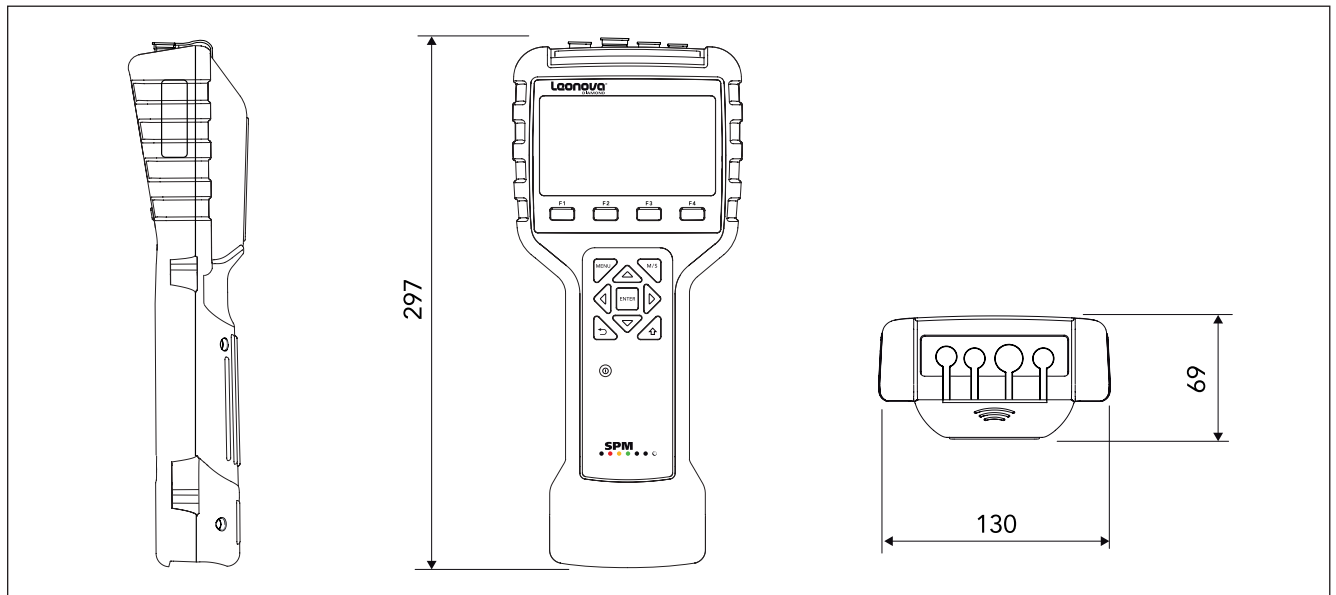
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Leonova Diamond® – Instrument specifications



Technical specifications

Housing:	ABS/PC/TPE, IP65
Dimensions:	297 x 130 x 69 mm
Weight:	890 g
Keypad:	Sealed, snap action
Display:	TFT colour, 480 x 272 pixels, 4.3 inch widescreen, adjustable backlight
Main processor:	400 MHz ARM
Memory:	256 MB RAM, 512 MB Flash, SD card 1GB expandable up to 8GB
Operating system:	Microsoft Windows® CE
DSP processor:	375 MHz floating point
Communication:	USB 2.0
Power supply:	Rechargeable Lithium-Ion battery pack, 5200 mAh or power adapter
Battery power:	For min. 16 hours normal use (20°C)
Operating temperature:	-20 to 55 °C , non condensing
Charging temperature:	0 to 45 °C
General features:	Language selection, battery status indication, transducer line test, metric or imperial units
Meas. point identification:	NFC transponder for communication with CondID™ tags, read/write distance max. 50 mm (2 inch)

Vibration monitoring

Vibration channels:	3 simultaneous
Dynamic range:	up to 120 dB, 24 bit A/D converter
Frequency range:	0 (DC) to 40 kHz
Resolution:	Max. 25 600 lines
Vibration transducer input:	< 24 Vpp. Transducer supply of 2,5 mA for IEPE (ICP) type can be set On/Off
Transducer types:	Any transducers (disp., vel. or acc.) with voltage output
Measuring techniques:	ISO 2372, ISO 10816, HD ENV, EVAM Evaluated Vibration Analysis, FFT Spectrum with Symptoms, Orbit analysis, 3 channels simultaneously, balancing

Bearing monitoring

Measuring range:	SPM HD: -30 to 110 dBsv (44000 transducer) dBm/dBc: -9 to 99 dBsv LR/HR: -19 to 99 dBsv
Resolution:	0,2 dB/HD, 1 dB dBm/dBc and LR/HR
Transducer types:	SPM 40000, 42000, 44000, probe and quick connector transducers, DuoTech

Tacho input

Measuring range:	1 to 150 000 PPM
Resolution:	1 pulse
Accuracy:	± (1 pulse + 0.01% of reading)
Transducer types:	TTP10, TTL pulses, keyphasor and proximity switch NPN/PNP.
Output:	TTL output for stroboscope and 12 VDC

Analog signals

Measurement range:	0 to 10 V DC, 0 to 20 mA
Resolution:	18 bit A/D converter
Accuracy:	± 1% of reading + 0,1 V/mA

Output/input

Headphones/microphone:	3.5 mm stereo plug
Communication:	Mini USB

Temperature measurement

Inputs:	TTP10 or via analog input
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Stethoscope

Transducer types:	Shock pulse and vibration transducer
Settings:	Filter, volume and gain



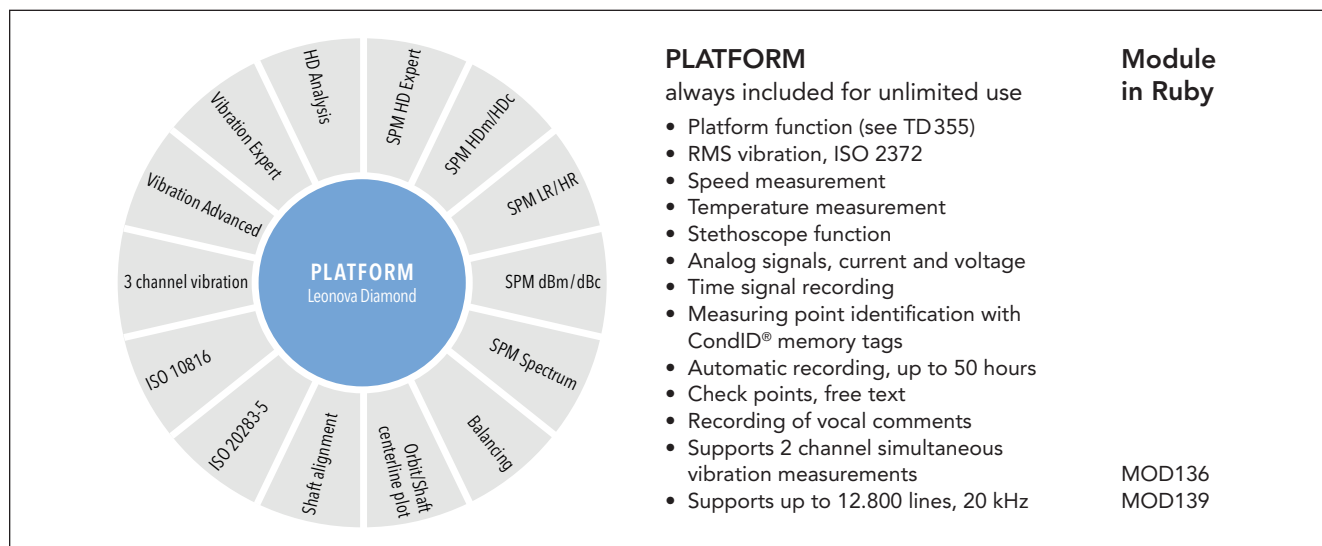
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Patents: DE#60304328.3 - US#7,054,761 - US#7,167,814 - US#7,200,519 - US#7,301,616 - US#7,313,484
US#7,324,919 - US#7,711,519 - US#7,774,166 - DE#60336383.0 - US#7,949,496 - DE#60337804.8
GB#1474662 - GB#1474663 - DE#60338365.3 - ZA#2011/04946 - SE#0951017.3 - DE#60341502.4
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Leonova Diamond® – User-selected functions



To obtain the optimal performance range and instrument price, Leonova users can select any or all of the condition diagnosis and maintenance functions below, under two alternative conditions of sale. The choice is between unlimited and limited use (Function & Use).

When use is limited, the price for the function itself is much lower. Instead, the user prepays a tankful of 'credits'.

Leonova automatically deducts credits from the tank when its 'Measure' key is pressed. Thus, the user's operating costs depend on the number of measurements taken. Credit tanks are refilled, and/or new functions added, by loading a coded file ordered via the local distributor.

Unlimited and limited functions can be combined at will. Platform functions are always included and their use is unlimited.

Functions for Unlimited Use

Module in Ruby

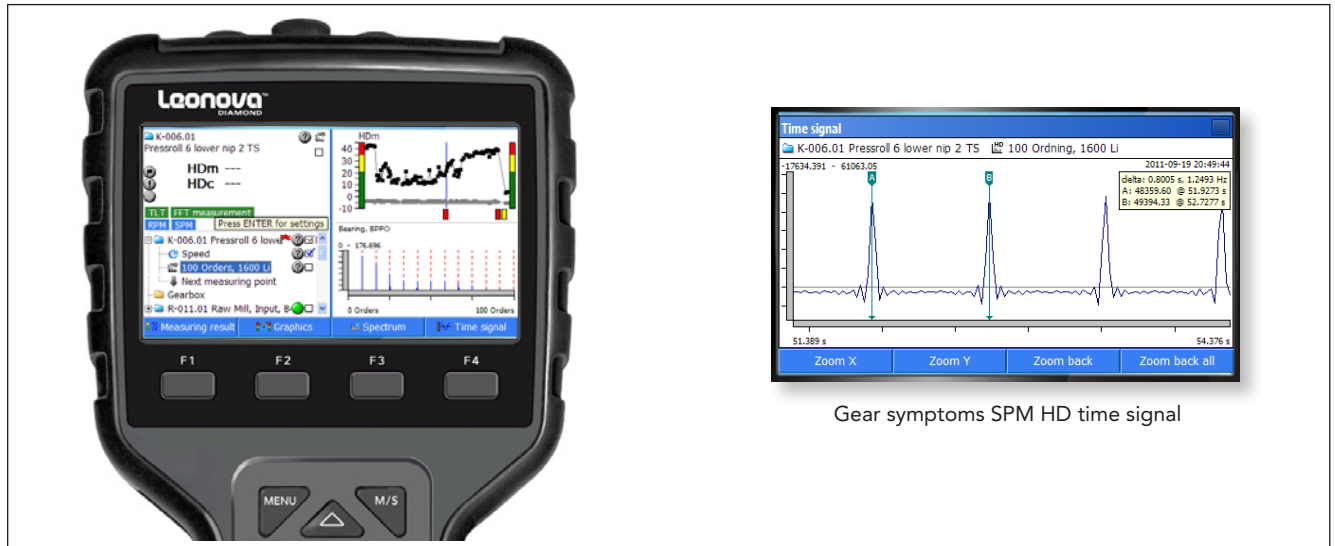
DIA195	SPM HD Expert, time and frequency domain analysis	MOD195
DIA197	Shock pulse method HDm/HDc	(Platform)
DIA130	Shock pulse method dBm/dBc	MOD130
DIA131	Shock pulse method LR/HR	MOD131
DIA132	SPM Spectrum, 12.800 lines/20 kHz	MOD132 MOD139
DIA133	Vibration ISO 10816 with spectrum	MOD133
DIA198	Vibration ISO 20283-5	MOD198
DIA138	Orbit analysis/Shaft centerline plot	MOD138
DIA192	3 channel simultaneous vibration	MOD192
DIA193	Vibration Expert HD ENV EVAM evaluated vibration analysis 25.600 lines/40 KHz HD Order Tracking Time signal, Post trigger Run up/coast down, Bump test and FRF	MOD193
DIA194	Vibration Advanced HD ENV FFT spectrum with symptoms 12.800 lines/20 kHz, Time signal, HD Order Tracking, Post trigger	MOD135+MOD139
DIA140	HD Analysis Vibration Expert SPM HD Expert	MOD140
DIA109	Balancing, single and dual plane	
DIA155	Shaft alignment	

Functions for Limited Use (Function & Use)

DIA295	SPM HD Expert, time and freq. domain analysis (3)
DIA297	Shock pulse method HDm/HDc (2)
DIA230	Shock pulse method dBm/dBc (1)
DIA231	Shock pulse method LR/HR (2)
DIA232	SPM Spectrum (2)
DIA233	Vibration ISO 10816 with spectrum (1)
DIA298	Vibration ISO 20283-5 (1)
DIA238	Orbit analysis (5), Shaft centerline plot (5)
DIA292	3 channel simultaneous vibration (6)
DIA293	Vibration Expert incl. HD Order Tracking, Time signal and 25.600 lines/40 KHz (no credit consumption) HD ENV (3) EVAM evaluated vibration analysis (2) Post trigger (25) Run up / coast down (50) Bump test (25) Frequency Response Function, FRF (25)
DIA294	Vibration Advanced incl. HD Order Tracking, Time signal and 12.800 lines/20 kHz (no credit consumption) HD ENV (3) FFT spectrum with symptoms (2) Post trigger (25)
DIA240	HD Analysis Vibration Expert (3–50) SPM HD Expert (3)
DIA209	Balancing, single and dual plane Single plane (4 runs: 16 / 2 runs: 42) Dual plane (80)
DIA255	Shaft alignment (30)
Credit consumption is stated within brackets.	
DIA290	Credits for limited functions
DIA291	Credits for limited functions, refill



Leonova Diamond® – Shock pulse measurement, SPM HD®



Gear symptoms SPM HD time signal

The signal

Throughout their lifetime, bearings generate shocks in the interface between the loaded rolling element and the raceway. These shocks 'ring' the SPM transducer which outputs electric pulses proportional to the shock magnitude.

Unlike vibration transducers, the shock pulse transducer responds at its carefully tuned resonance frequency of about 32 kHz, enabling a calibrated measurement of the shock pulse amplitudes.

Shock pulse amplitude is due to three basic factors:

- Rolling velocity (bearing size and rpm)
- Oil film thickness (separation between the metal surfaces in the rolling interface). The oil film depends on lubricant supply and viscosity as well as alignment and pre-load.
- The mechanical state of the bearing surfaces (roughness, stress, damage, loose metal particle).

Input data

The effect of rolling velocity on the signal is neutralized by entering rpm and shaft diameter as input data, with 'reasonable accuracy'. This sets an initial value (HDI), the start of the 'normalized' condition scale.

Technical specifications

Measuring range:	–30 to 110 dBsv (44000 transducer)
Resolution:	0.2 dBsv
Accuracy:	± 1 dB
Transducer type:	SPM 40000/42000/44000 probe transducer and quick connector transducer for adapters
Input data:	rpm, plus bearing type and mean diameter (or ISO bearing number)
Output quantity:	HDm, HDc, Time Signal HD SPM Spectrum HD
Spectrum lines:	400, 800, 1600, 3200, 6400, 12800, 25600
Measuring time:	1 to 10000 rev (default same as FFT)
Symptom enhancement factor:	Off, 1-10 (Default = off)

Output data

HDm/HDc (part of platform)

HDm is a scalar value expressed in decibels. It is the primary value to use to determine the severity of a bearing damage. It represents the highest shock pulses found during the measuring cycle. This value is also used for triggering alarms. HDc is a scalar value expressed in decibels. This value represents the level where 200 shocks/second are present. It is useful to determine lubrication condition.

Time Signal HD

Time signal HD is extremely useful to locate where in the bearing a possible damage is located. In many cases it is also possible to determine the nature of the damage (cracked inner race with spalling all around or a single crack etc.). The Time signal HD is a result of highly advanced digital algorithms where repetitive shocks are enhanced and random signals are suppressed.

SPM Spectrum HD

SPM Spectrum HD is the result of applying FFT algorithms on the Time Signal HD. The SPM HD spectrum is useful to determine where a possible bearing damage is located. It is also useful for trending purposes (applying symptom and band values).

High Definition Order Tracking

This function is primarily used for analysis on variable speed machines and adjusts extremely well to quick changes and variations in the RPM during measurement, see TD 403.

Evaluation

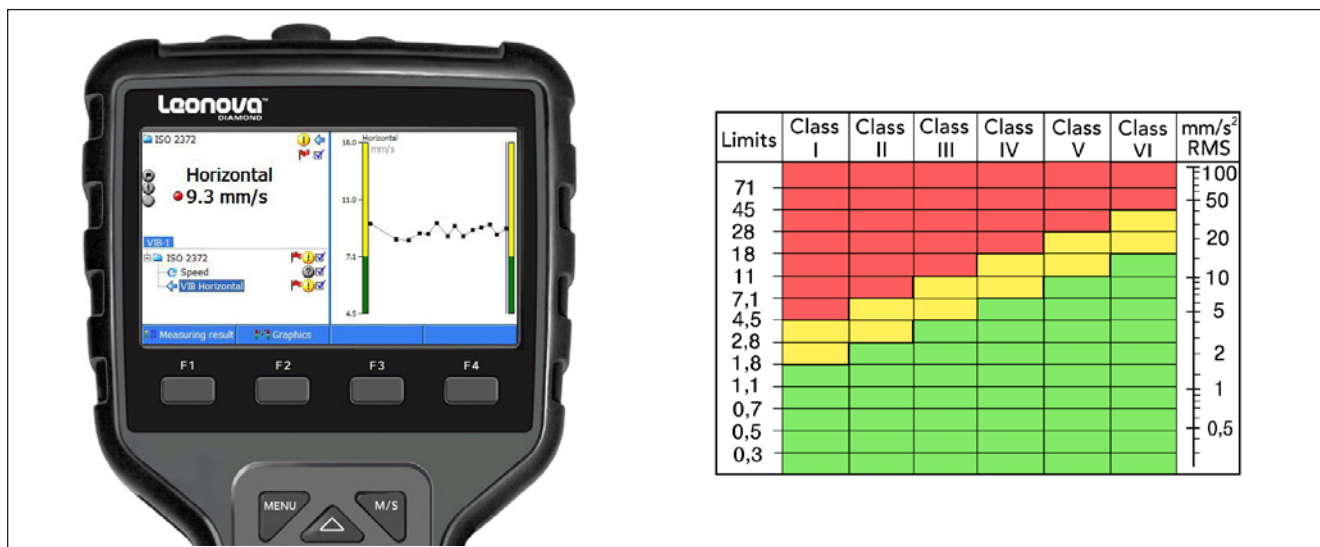
The initial value and the range of the three condition zones (green-yellow-red) was established empirically by testing bearings under variable operating conditions. The maximum value places the bearing into the condition zone. The height of the carpet value and delta (HDm – HDc) indicated lubrication quality or problems with bearing installation and alignment.

Part numbers

DIA195 Shock pulse method SPM HD Expert, unlimited use
DIA295 Shock pulse method SPM HD Expert, limited use
DIA197 Shock pulse method HDm/HDc, unlimited use
DIA297 Shock pulse method HDm/HDc, limited use



Leonova Diamond® – Vibration ISO 2372



Broadband vibration measurement is the most widely used and cost-efficient method for the diagnosis of general machine condition. There are two ISO recommendations concerning this type of machine condition monitoring; the much used ISO 2372 and the more recent ISO 10816, which is a ongoing replacement of the older standard.

In Leonova, vibration measurement according to ISO 2372 is a platform function, always included for unlimited use.

The features are:

- Machine condition is diagnosed on the basis of broadband measurements returning an RMS value of vibration velocity in the frequency range of 10 to 1000 Hz. This is called vibration severity.
- Machines are grouped into six vibration classes.
- A table of limit values is presented for each vibration class, differentiating between acceptable vibration (green range), unsatisfactory vibration (yellow range), and vibration that will cause damage unless reduced (red range).

and vibration that will cause damage unless reduced (red range).

- Measurements are made in three direction (horizontal, vertical, axial). The highest value returned determines machine condition.
- Default limit values for the change from green to yellow and from yellow to red are set automatically when one of the six machine classes is input under the measuring point data.

ISO 10816 is offered as a choice, see TD-363.

Technical specifications

Measurement quantities: Velocity, RMS value in mm/s over 10 to 1000 Hz

Transducer type: Vibration transducer SLD144 or IEPE* (ICP®) type transducers with voltage output

* Integral Electronic PiezoElectric



Leonova Diamond® – Vibration ISO 10816 with spectrum



Broadband vibration measurement is the most widely used and cost-efficient method for the diagnosis of general machine condition.

There are two ISO recommendations concerning machine condition monitoring by this type of measurement; the much used ISO 2372 and the more recent ISO 10816, which is an ongoing replacement of the older standard.

With Leonova, ISO 2372 measurement is a platform function, always included for unlimited use.

ISO 10816 is an option with ordering numbers DIA 133 (unlimited use) and DIA 233 (limited use).

Features of ISO 10816 are:

- Measurements are made in three directions (horizontal, vertical, axial).
- Machine condition is generally diagnosed on the basis of broadband vibration measurements returning an RMS value. ISO 10816 keeps the lower frequency range flexible between 2 and 10 Hz, depending on the machine type. The upper frequency is 1000 Hz.
- ISO 10816 operates with the term vibration magnitude, which, depending on the machine type, can be an RMS value of vibration velocity, acceleration or displacement. If two or more of these parameters are measured, vibration severity is the one returning the relative highest RMS value. For certain machines, ISO 10816 also recognizes peak-to-peak values as condition criteria.
- The standard consists of several parts, each treating a certain type of machines, with tables of limit values differentiating between acceptable vibration (green range), unsatisfactory vibration (yellow range), and vibration that will cause damage unless reduced (red range).

In Leonova, ISO part, machine group and foundation type are input using a multiple choice guide which displays the various ISO definitions and leads to the limit values.

Exceeding the requirements of the ISO standard, Leonova Diamond also provides a 1600 line spectrum up to 10 kHz.

Technical specifications

Measurement quantities:	Velocity, acceleration and displacement
Spectrum unit:	Velocity, mm/s or inch/s
Transducer type:	Vibration transducer SLD144 or IEPE* (ICP®) type transducers with voltage output
Quick mode:	Yes

* Integral Electronic PiezoElectric

Settings

Direction:	Horizontal, vertical, axial
Part:	2, 3, 4, 5, 6
Group:	2, 3, 4, 5, 6
Support:	Rigid, Flexible

Part numbers

DIA133	Vibration ISO 10816 with spectrum, unlimited use
DIA233	Vibration ISO 10816 with spectrum, limited use



Leonova Diamond® – Recording function



The Recording function is part of the platform, always included for unlimited use. It allows the user to measure and record measuring results over longer periods of time. The recording function is an analysis tool which can show the interaction of various condition parameters over time.

Leonova has six channels on four separate connectors, for

- shock pulse measurement
- speed and temperature measurement
- vibration (three channels)
- analog measurement

Simultaneous measurement can be done on up to four channels.

The recording function for a single quantity, e. g. temperature, is accessed and set up from the default file saved under the respective technique window. To record different quantities at the same time, a measuring point file with all the different techniques activated is required.

Under 'Total' in the recording window, the desired number of measurements is input, alternatively the total recording time in minutes.

Under 'Time between measurements' the interval is input in minutes. 0 minutes means 'as fast as possible'.

The measuring sequence is set by opening the list of available measuring techniques with NEW and selecting techniques in any order. A technique can be used more than once in the sequence.

Recording is started with the M/S key and can be terminated with the 'Cancel' key (F4).

Leonova displays the number of measurements taken and powers down when all are recorded. The batch is then saved by the user and can be transferred to Condmaster.

Leonova Diamond® – Services



The service program Leonova.exe is part of the basic function package for Leonova Diamond. It is used to:

- Print and save balancing and alignment reports
- Load credits and/or functions from the file 'Leonova.txt'
- Upgrade a Leonova software package
- Display and print a credit log containing all events in connection with measurement credits, up to 10000
- Make and reload safety copies of the Leonova files (file extension .lsc)

The operation of the service program is very simple: connect Leonova to the PC, put it in communication mode, then click on the desired service function. Follow the guidance on the screen.

For example, a safety copy of the Leonova file can be sent to SPM for technical advice. Upon reload, you choose which part of your safety copy should be reloaded.

The file 'Leonova.txt' can contain measuring credits and/or Leonova functions that are new for the instrument or changed from limited to unlimited use. It is coded to fit the individual instrument and ordered via the local SPM distributor.

Part numbers

PRO52	Leonova Diamond Service Program
DIA290	Credits
DIA291	Credits refill

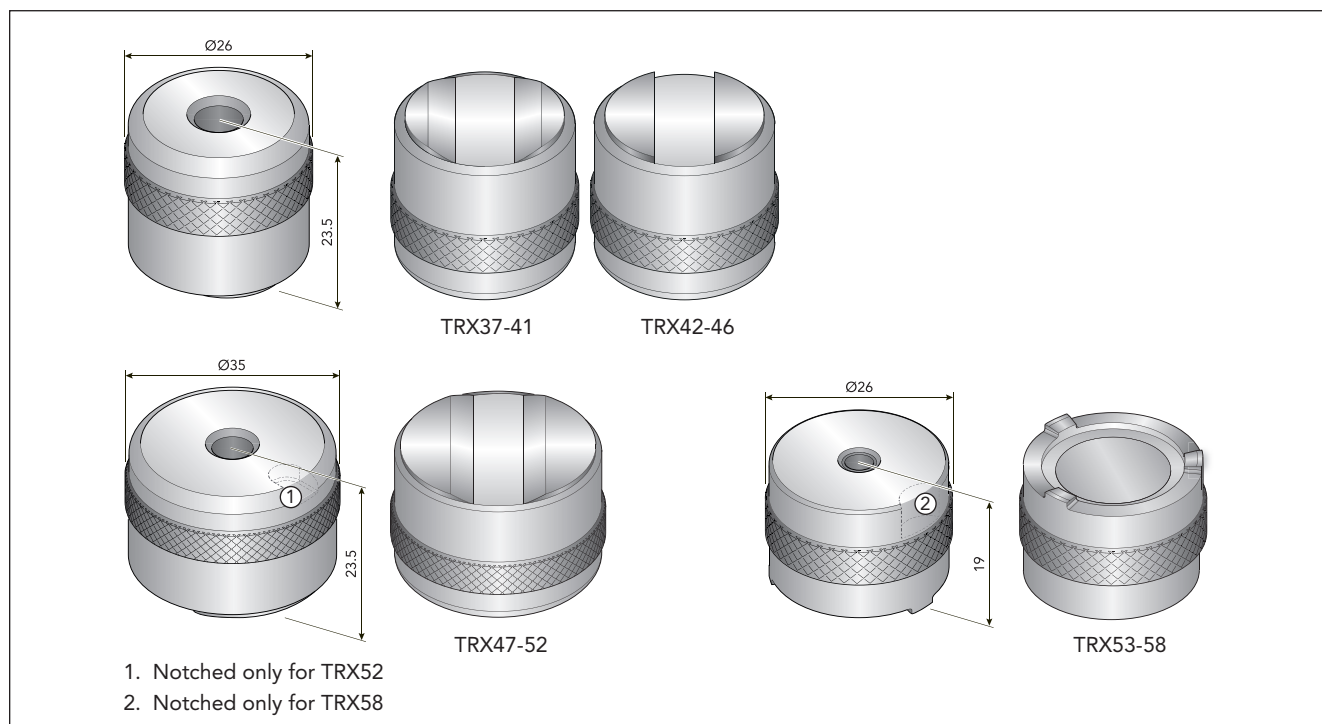
The credits required for a measuring round and the tank status are displayed in Leonova under 'Function and use'. There one can also set the values and time intervals for the 'tank low' warnings.

The amount of credits deducted when the 'Measure' command is given depends on the method used, see table. For balancing, credits are deducted for each vibration reading. The table shows the min. requirement.

Functions with limited use	Credit consumption
SPM HD Expert	2
SPM HDm/HDc	2
Shock pulse method dBm/dBc	1
Shock pulse method LR/HR	2
SPM Spectrum	2
Vibration ISO 10816 with spectrum	1
HD Enveloping	3
EVAM evaluated vibration analysis	2
FFT spectrum with symptoms	2
3-channel vibration measurement	6
Post trigger	25
Orbit analysis / Shaft Centerline Plot	5
Run up / coast down	50
Bump test and Frequency Response Function	25
Balancing, single plain 4 runs	16
Balancing, single plain 2 runs	42
Balancing, dual plane	80
Shaft alignment	30



Magnetic mounting bases



Two-rail, 25 mm diameter, 13 kg (29 lbs) pull strength

The two rail type magnetic mounting bases are usually utilized on curved surfaces, such as motor and compressor housings, although they are also suitable for flat surfaces.

TRX37	Magnetic mounting base, M6
TRX38	Magnetic mounting base, M8
TRX39	Magnetic mounting base, M10
TRX40	Magnetic mounting base, UNF 1/4
TRX41	Magnetic mounting base, UNC 5/16

Flat, 25 mm diameter, 13 kg (29 lbs) pull strength

The flat magnetic mounting bases are optimal for smooth, flat surfaces.

TRX42	Magnetic mounting base, M6
TRX43	Magnetic mounting base, M8
TRX44	Magnetic mounting base, M10
TRX45	Magnetic mounting base, UNF 1/4
TRX46	Magnetic mounting base, UNC 5/16

Two-rail, 35 mm diameter, 25 kg (55 lbs) pull strength

The two rail type magnetic mounting bases are usually utilized on curved surfaces, such as motor and compressor housings, although they are also suitable for flat surfaces. A large diameter enables magnetic mounting on two heat sinks for an electric motor, for example.

TRX47	Magnetic mounting base, M6
TRX48	Magnetic mounting base, M8
TRX49	Magnetic mounting base, M10
TRX50	Magnetic mounting base, UNF 1/4
TRX51	Magnetic mounting base, UNC 5/16
TRX52	Magnetic mounting base for triaxial transducers, UNF 10-32

Three-rail, 25 mm diameter, 10 kg (22 lbs) pull strength

The three rail type magnetic mounting base are usually utilized on curved or uneven surfaces.

TRX53	Magnetic mounting base, M6
TRX54	Magnetic mounting base, M8
TRX55	Magnetic mounting base, M10
TRX56	Magnetic mounting base, UNF 1/4
TRX57	Magnetic mounting base, UNC 5/16
TRX58	Magnetic mounting base for triaxial transducers, UNF 10-32

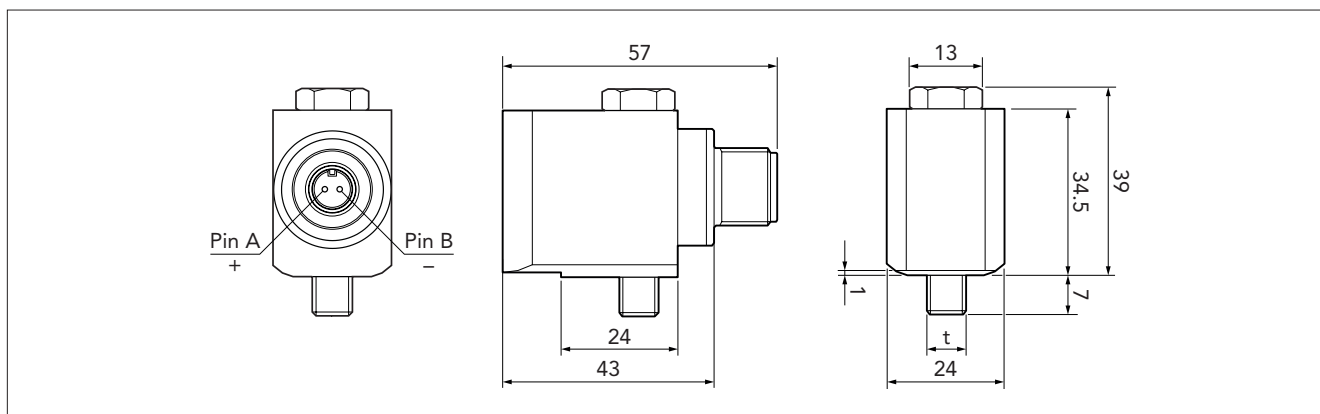
Technical specifications

Material:	stainless steel
Temperature:	up to 100 °C
Grip:	knurled edge

Options

16065	Mounting disc for 26 mm diameter magnetic mounting base (TRX37-46 and TRX53-58)
18033	Mounting disc for 35 mm diameter magnetic mounting base (TRX47-52)

Vibration transducer, SLD144S



The vibration transducer SLD144S is a piezo-electric accelerometer of compression type with side entry and built-in electronics, designed for vibration monitoring of industrial machinery. The electrical signal is isolated from the transducer housing.

The transducer is installed on a flat machine surface and connected via a twisted pair cable with a 2-pin connector. The flat machine surface must be min. 30 mm in diameter (min. 16 mm in diameter when using mounting base 15757, 15802, or 17769). The transducer has a captured bolt for installation. For vibration transducers with top entry, see TD-635.

Technical specifications

Nominal sensitivity,	
main axis:	10 mV/m/s ² * =100 mV/g
Transverse sensitivity:	max. 10%
Base strain sensitivity:	0.01 m/s ² /μ strain typical
Linear frequency range:	2 Hz to 10 kHz (± 1 dB)
Max. peak acceleration:	600 m/s ² = 60 g
Settling time:	3 sec
Bias point:	10 to 13 V (typical 12V)
Temperature range:	-40° to +125 °C (-40° to 257 °F)
Power requirements:	24 V, 2 to 5 mA
Isolation:	case isolated, > 10 Mohm
Casing:	stainless acid-proof steel Sandvik 1802, EN:1.4523
Sealing:	IP66/67
Thread (t):	M6x1.0, M8x1.25 or UNF 1/4"-28
Torque limit:	10 Nm (7.4 lbf·ft)
Weight:	200 grams (7 oz)
Connection:	2-pin connector, MIL-C-5015 style
Cable length:	max. 100 m (328 ft)
Cable capacitance:	210 pF/m

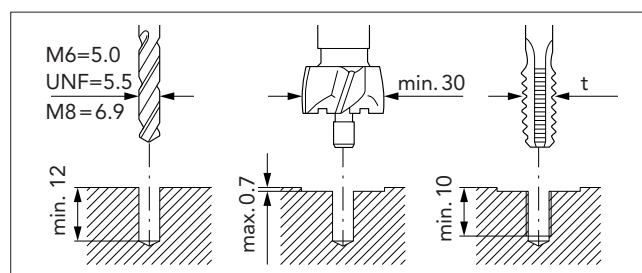
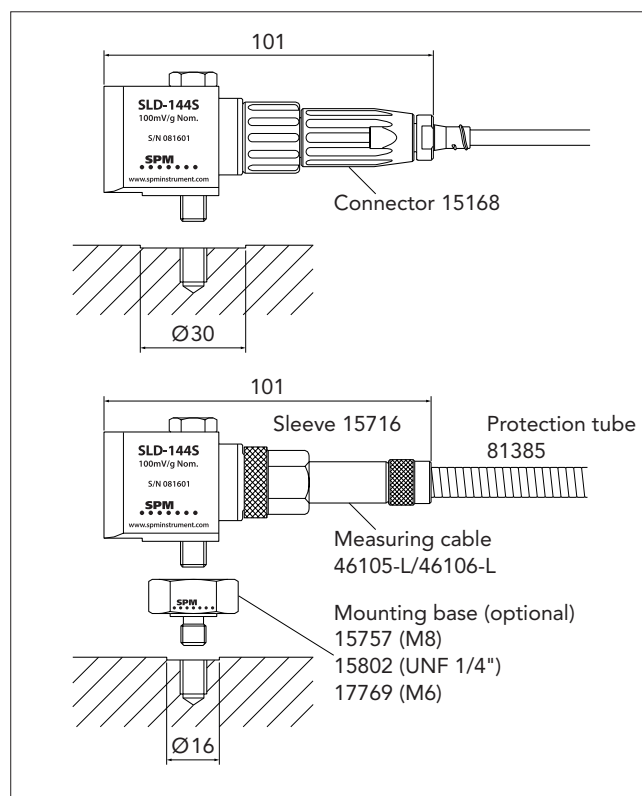
* Individual value given on the calibration chart.

ARTICLE NO: SLD144S - XXX
A B

A. Part number SLD144S
B. Thread (t) M6, M8, or UNF

SERIAL NO: XXXXX
Year Week Number

Installation examples



Installation tools

- 81393 Holder for counterbore
- 81394 Pilot for M6 and UNF 1/4"-28
- 81395 Pilot for M8
- 81396 Counterbore, diameter 30 mm

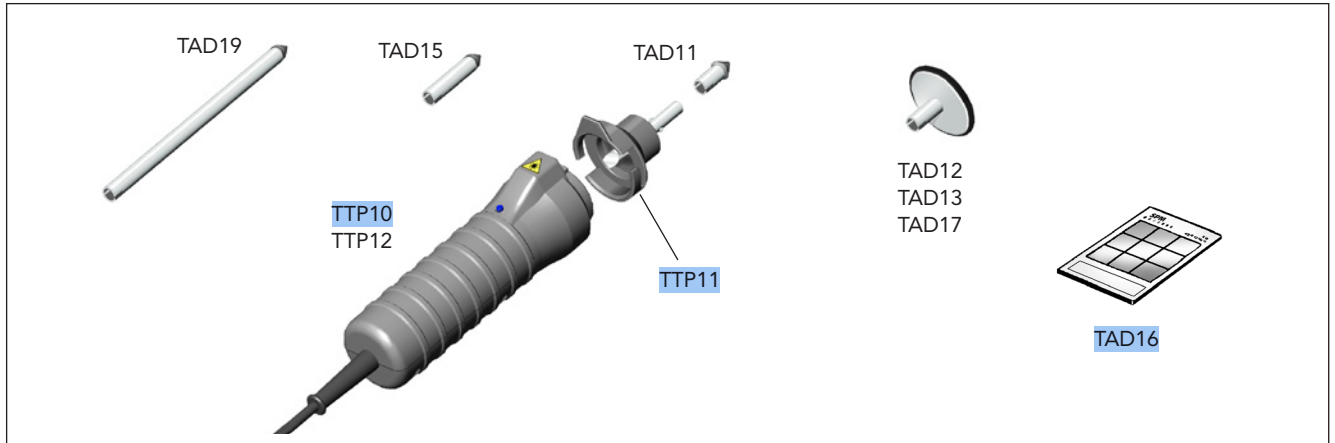


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Tachometer and Temperature Probe TTP10 / TTP12



The Tachometer and Temperature Probe TTP10/12 is used together with Leonova Diamond® and Emerald® instruments for optical or contact measurement of the rate of rotation and for contact measurement of peripheral speed. It also has a built-in temperature sensor.

Optical measurement of the rate of rotation

A laser light beam is directed against a reflecting tape on the rotating object, from a distance of 30-2000 mm and from an angle of 5-75°.

Contact measurement of rpm

The contact adapter TTP11 with a rubber tipped contact center, TAD-11/15/19, is attached onto the probe and then held against the center of a shaft end or a wheel.

Contact measurement of peripheral speed

The contact adapter TTP11 with contact wheel is held against the circumference of a shaft, a belt, etc. The speed is read out in units, depending on which contact wheel is used: TAD-12/13/17.

Temperature measurement

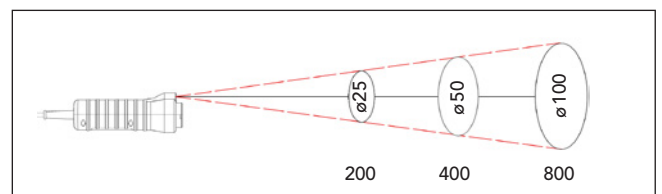
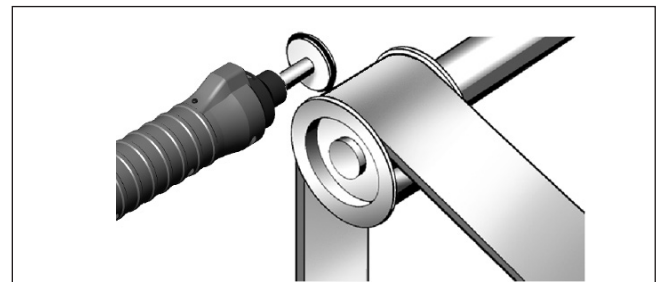
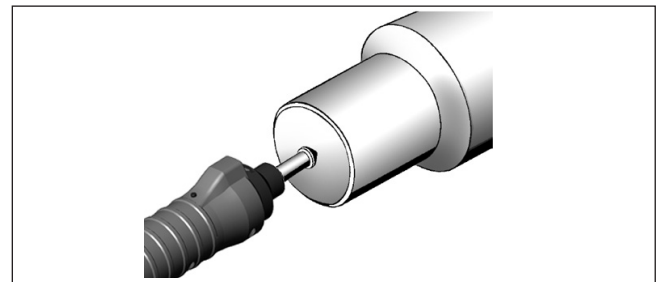
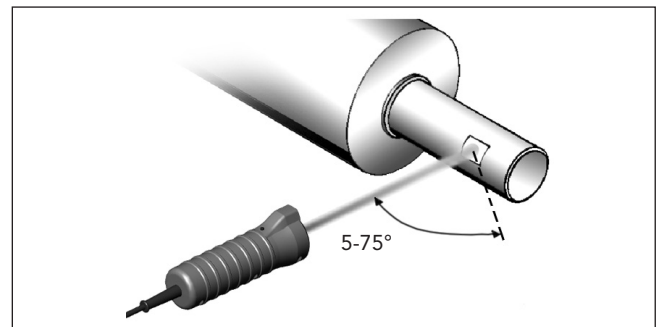
The Tachometer and Temperature Probe TTP10/12 is also used together with Leonova Diamond/Emerald for temperature measurements with a thermopile element in the range -20 to +300 °C.

Part numbers

TTP10	Tachometer and Temperature Probe, incl. TTP11 and cable, spiral 1-2 m
TTP12	Tachometer and Temperature Probe, incl. TTP11 and cable, straight 5 m
TAD11	Contact center, rpm, short, 30 mm
TAD15	Contact center, rpm, long, 60 mm
TAD19	Contact center, rpm, extra long, 170 mm
TAD12	Contact wheel m/min.
TAD13	Contact wheel yd./min
TAD17	Contact wheel ft./min
TAD16	Reflecting tape for thin shafts, 5 sheets
TTP11	Contact adapter (spare part)
CAB100	Cable, spiral (spare part for TTP10)

Technical specifications

Measuring range, rpm	max. 100 000 (pulses) optical
Measuring distance, rpm	30 to 2000 mm
Indicator, rpm	blue LED
Measuring range, temp.	-20 to +300 °C



Measuring accuracy, temp.	± 2,5° C*
Dimensions	137 x 50 mm, 179 x 50 mm incl. TTP11
Operating temperature	0 to + 40 °C
Weight	160 g (TTP10), 300 g (TTP12)
D:S	8:1

* If RF emission is present at 625MHz to 655MHz, the accuracy is possibly reduced to ±2.5°C – 10% of full scale

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Headset with microphone



EAR16/17/18 are specially selected headsets for Leonova Diamond/Emerald, providing excellent sound reproduction even in noisy environments. The headphones are equipped with microphone for voice recording of comments to the measuring points.

- Individually sprung headband wires of stainless sprung steel provide an even distribution of pressure around the ears. Steel headband wires retain their resilience better than plastic through a wide temperature range.
- Low, two-point fasteners and easy height adjustment with no protruding parts.
- Soft, wide foam and fluid-filled sealing rings with built-in pressure-equalizing channels provide low pressure, effective sealing and ideal comfort.
- Connection cord, 0.75 to 1.4 m, of soft spiral polyurethane with a 3.5 mm stereo plug.

The headsets are tested and approved in accordance with PPE directive 89/686/EEC and EMC directive 89/336/EEC to meet the demands for CE labelling.

Headset with headband, EAR16

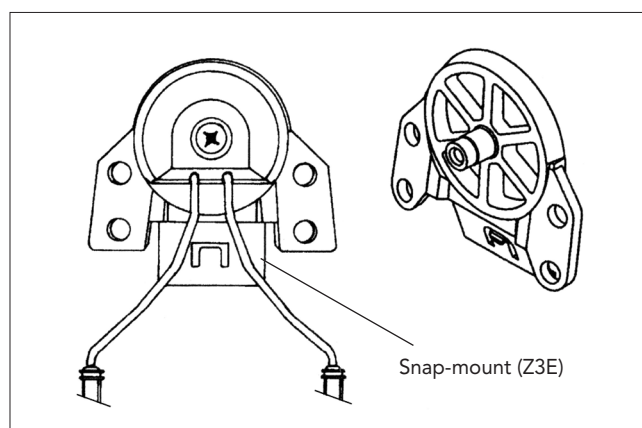
EAR16 is a headset with two parallel connected earphones and a microphone. It has a collapsible headband for convenient storage when you are not using the headset.

Headset, EAR18

EAR18 is a headset with two parallel connected earphones and a microphone. It has a neckband for use with or without helmet. A soft headband with velcro is optional.

Headset for helmet, EAR17

The headset with microphone EAR17 is a headset with two parallel connected earphones and a microphone. The headset fits most safety helmets available in the market today. The headphones have standard snap-mounts (Z3E) and are adapted to a specific helmet by simple manipulation.



To mount the headphone, snap the helmet attachment into the slot on the helmet. Note! The cups can be set in three positions: working position, ventilation position and parking position. When in use, the cups must be placed in working position. Press the wires inward until you hear a click on both sides. Make sure that the cup and the headband wire in working position are not pressing on the helmet lining or the edge of your hard hat so that leakage can occur. Parking position should not be used if the cups are damp inside after an intense period of use.

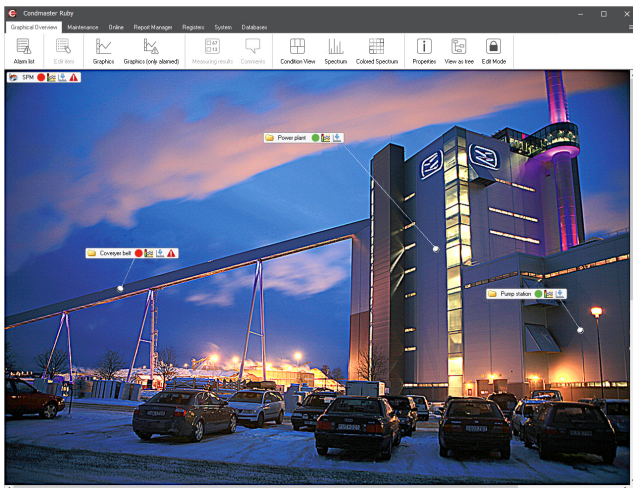
Part numbers

EAR16	Headset with headband
EAR17	Headset with helmet brackets
EAR18	Headset with neckband
EAS11	Hygiene set (consists of two sets of attenuating cushions and snap-in sealing rings.)
91015	Headband with velcro for EAR18

***Available to add to your package. Ask your SPM representative for pricing.**



Condmaster[®] RUBY



Technical Data sheets 2026



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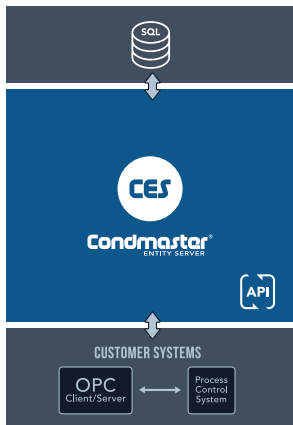
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Condmaster Entity Server (CES)



Condmaster Entity Server handles centralized license, database, and user administration, and also supports external user directories such as Microsoft Azure AD and Active Directory Federation Services. This backend centralization means simplified identity management for admins and a streamlined user login experience.

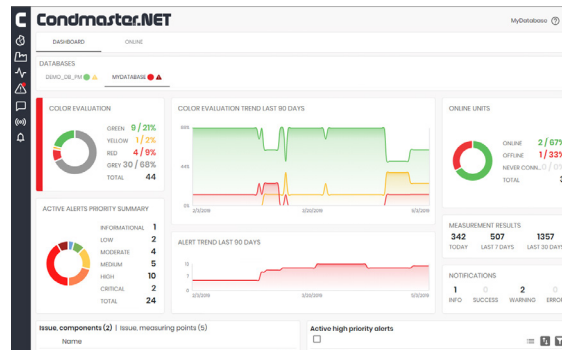
CES Admin Portal is where you perform many of your initial configurations when setting up your condition monitoring system. It is here you activate and manage your license, manage database connections, users, user groups, and perform some of the general system settings, etc.

Condmaster® Ruby

A comprehensive analysis, diagnostics, and troubleshooting software communicating with our portable instruments and online systems for condition monitoring.

Addressing the growing need for interoperability and real-time data integration in the Industry 4.0 age, Condmaster adds options that further simplify the exchange of data with automation assets, IIoT devices, and control systems in smart manufacturing. Condmaster Ruby has an easy-to-implement, Industry 4.0-friendly REST API enabling other resources to access Condmaster data for further processing or analysis.

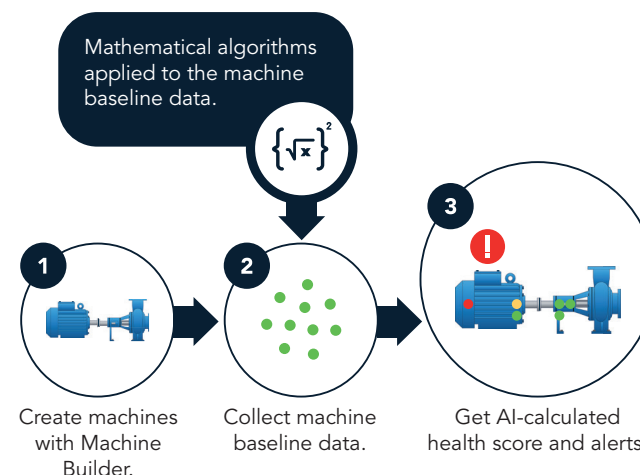
Condmaster.NET



Condmaster.NET is a web application and app for iOS and Android that allows users to access measuring data via web browsers. It presents an intuitive overview of color evaluation and alerts and offers basic analysis functionality. Application-specific, customized dashboards can be created to visualize and monitor process data.

Quickly assess the condition of critical assets, view status, alerts, and issues across all measuring points, components, and machines, and perform fundamental analysis using spectrums, time signals, trends, and alerts.

The Decision Support System (DSS)



DSS provides users with predictions about machine damage and general machine health. The overall purpose of the DSS is to relieve maintenance personnel from having to deal with vast amounts of measurement data to analyze and find insights into root causes and problem-solving. Instead, the DSS uses artificial intelligence, statistical analysis, and other algorithms to mine this data for information, automatically detecting the patterns that most warrant maintenance efforts.

In Condmaster Ruby, these standalone features form DSS:

- Machine Builder
- Signal Quality Test
- Machine baseline
- Health score
- Alerts
- Entity rules

Machine Builder

Complete machines can be created from a component library. The feature generates suitable measuring points, measurement assignments, and machine fault symptoms. Assembled machines are added to the Graphical Overview as illustrations with associated color zones.

Signal Quality Test

Signal Quality Test is a background process that continuously checks for ski slopes and bias problems. The function can also identify issues with faulty or incorrectly connected transducers. The main purpose is to determine if the signal is of good quality.

Machine baseline

Machine baseline is where normal machine behavior can be determined. The machine baseline data, collected during a learning phase, can be used to automatically calculate deviations and potentially raise alerts for the machine fault symptoms and condition parameters.

Health score

Health score is calculated by applying mathematical algorithms to the collected baseline data. The health score is presented in blue-green-yellow-orange-red-dark red colors for a detailed evaluation. The health score corresponds to a normalized floating-point value from 0 to 1, where 0.2 – visualized in green – represents the normal condition of the machine baseline.

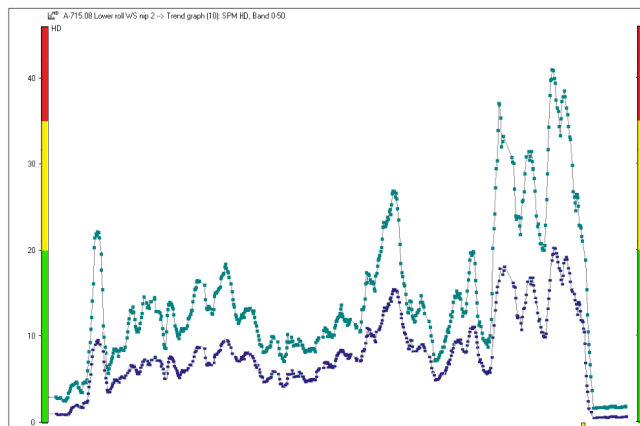
Alert management

Alert management inform users about deviating machine conditions, highlighted DSS predictions, and other device events. Alerts offer flexible handling of actions based on the condition and criticality of the machine, which includes setting priority levels and status indications on individual alerts.

Entity rules

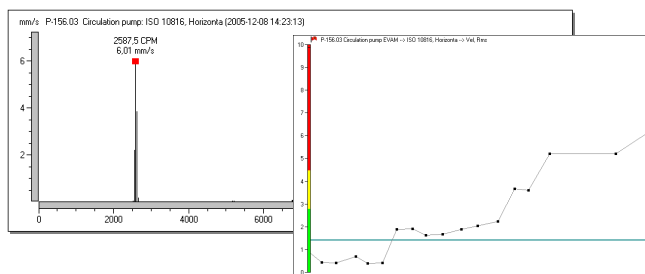
Entity rules is a feature that is used as a hub for expanding and customizing Condmaster with event-driven functions, as well as creating custom integrations with other IIoT systems. With Entity rules, it is possible to monitor a variety of events and automatically invoke actions based on these events.

HDm/HDc



The SPM HD[®] method is a patented further development of the Shock Pulse Method (SPM) in being less sensitive to interference from other signals and therefore unique in its ability to measure from very low rpm (0.1 - 20.000 RPM range). The scalar decibel value HDm represents the highest shock pulses found during the measuring cycle, and is the primary value for determining the severity of bearing damage, and also to trigger alerts. HDc, also a scalar dB value, is useful to determine lubrication conditions.

ISO2372, ISO10816



Broadband vibration measurement is the most widely used and cost-efficient method for the diagnosis of general machine condition. There are two ISO recommendations concerning this type of machine condition monitoring; the much used ISO 2372 and the more recent ISO 10816, which is an ongoing replacement of the older standard.

Features of ISO 10816 are:

- Measurements are made in three direction (horizontal, vertical, axial).
- Machine condition is generally diagnosed on the basis of broadband vibration measurements returning an RMS value. ISO 10816 keeps the lower frequency range flexible between 2 and 10 Hz, depending on the machine type. The upper frequency is 1000 Hz.
- ISO 10816 operates with the term vibration magnitude, which, depending on the machine type, can be an RMS value of vibration velocity, acceleration or displacement. If two or more of these parameters are measured, vibration severity is the one returning the relative highest RMS value. For certain machines, ISO 10816 also recognises peak-to-peak values as condition criteria.

RPM measurement

RPM measurement stands for Revolutions Per Minute measurement, and it refers to the process of determining how many full rotations a rotating component (such as a shaft, motor, or gear) completes in one minute. SPM Instrument offers several methods for measuring rotational speed (RPM) as an integral part of its condition monitoring systems. RPM measurement is essential for correctly evaluating bearing and vibration data, especially when using technologies such as SPM HD and HD Order Tracking.

Temperature measurement

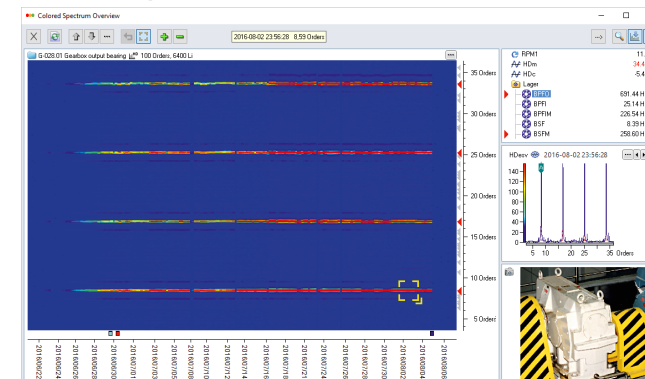
Temperature measurement is a critical component of SPM Instru-

ment's condition monitoring solutions, providing essential data to assess machine health and prevent failures. SPM integrates temperature monitoring across both portable and online systems to enhance predictive maintenance strategies. By incorporating temperature data alongside vibration and shock pulse measurements, SPM Instrument enables comprehensive condition assessments. This integration allows for early detection of issues such as overheating, lubrication failures, or misalignments, thereby supporting proactive maintenance and reducing downtime.

User-defined measurement

User-defined measurement is a flexible feature that allows users to integrate and monitor custom process parameters beyond standard measurements such as vibration, shock pulse, temperature, and RPM. These measurements can include variables like pressure, flow, load, or other analog signals relevant to specific applications. It offer a high level of flexibility, enabling broader and more tailored condition monitoring with SPM Instrument systems, and can be integrated with existing systems using OPC or analog inputs to collect data from installed sensors.

Colored Spectrum Overview (CSO)

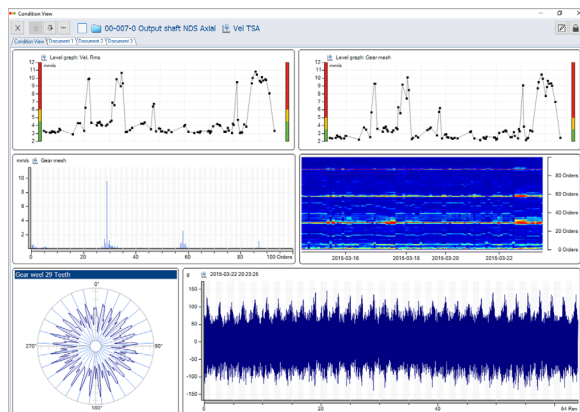


The purpose of Colored Spectrum Overview is to simplify the process of identifying in spectrums the patterns and trends which indicate damages. It clearly distinguishes between signals that are always present in the machine and signals caused by developing damages. The module function provides a good overall picture of the machine condition development. Among many features in

Colored Spectrum Overview are:

- Zooming possibilities in x, y and z axes.
- Logarithmic or power spectrum.
- Symptoms activation to simplify damage identification.

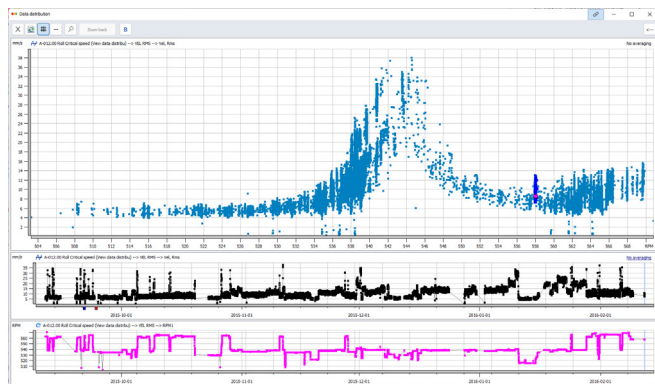
Condition View



Condition View is a powerful tool that combines multiple graph types and measuring assignments in a single window to show current machine condition, recent condition development, or maintenance actions, for example, to clarify or justify planned maintenance activities. It provides a valuable overview of the most interesting condition data and any complementary information for a particular measuring point.

For one or more measuring points, you can freely combine trend graphs, spectrums, time signals, Colored Spectrum Overview graphs, circular plots, and more as desired.

Data distribution



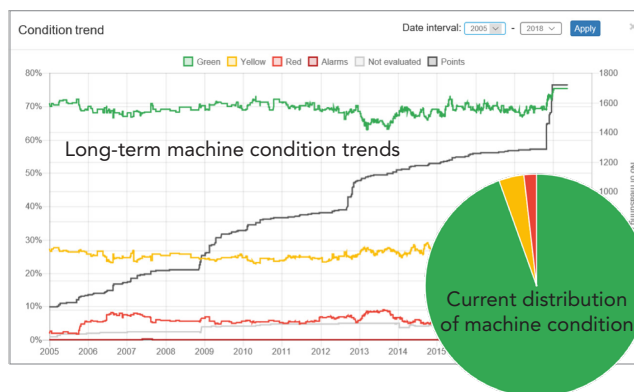
Data distribution is a powerful tool for discovering and analyzing relationships between different variables. This, in turn, is valuable for streamlining work with process optimization and alert limits.

For example, analyzing how the resonance frequencies of a pump or a roll in a paper machine vary with differences in the RPM or other parameters related to the process, such as flow (for a pump), can provide valuable insights to get the most out of your assets.

Online

The online module in Condmaster Ruby connects with Ethernet-compatible systems, including Airius sensors and the CMS online system, to monitor bearings, vibrations, and analog/digital signals. It supports advanced measurement, filtering, and alert functions, ensuring relevant and accurate monitoring. Results are evaluated in Condmaster Ruby and presented using color-coded diagnostics. Module MOD187 also enables Seamless and Time Signal Recording, offering precise, automated condition analysis based on standards and machine data.

Plant performer



Plant performer visualizes technical and economic KPIs (Key Performance Indicators) within the OEE/TEEP area. It demonstrates the benefits of condition monitoring and communicates its technical and economic impact to all levels of the organization. Data entered in Condmaster Ruby is used to monitor machine performance, condition, and maintenance costs. Statistics are shown in lists, charts, or timelines with filtering options. Data can be exported between databases and integrated via API. API examples include MTBF, vibration levels, operating condition, and total loss of contribution.

SAP and AMOS links

The SAP and AMOS links in Condmaster Ruby enable direct communication with SAP/AMOS systems. When an alert is triggered, the user clicks a button to send it to SAP/AMOS, which returns a work order number. Once the task is completed, a comment is sent back to Condmaster, the alert is cleared, and the comment is logged. No extra data input is needed, and standard messages like "Bearing replaced" can be used. Specific functions must be set up in SAP/AMOS, but Condmaster only provides protocol descriptions, not the actual implementations.

LinX

When running the Intellinova Standard/Compact online system, Condmaster offers LinX to handle filtering of the measurement results received from the Commander Unit. The purpose is to dispense with insignificant information. It serves as a middleware platform that enables communication between different software systems, both internal and external. By using Linx, we can streamline workflows, reduce manual data handling, and ensure that critical data is transferred reliably between systems.

For example, Linx is used to:

- Connect Condmaster Ruby with other business systems such as ERP, maintenance management systems (CMMS), or cloud platforms.
- Automate tasks, such as transferring machine condition data, generating reports, or sending alerts based on predefined conditions.
- Facilitate custom integrations for customers who require specific data flows or formats.

Voice recording

For each measurement, the user can input a comment as text or voice recording. When implemented, the function 'Recording' can be used to automatically record a stated number of measuring results or measure over a stated time.