

The equipment shown depends on the respective VMSet 22 to 24

VMSet-22..24

The VMSet-22, -23 and -24 come in a handy case and provide you with everything you need for the measurement of vibrations on buildings acc. to DIN 4150.

Vibrations in all three axes can be measured simultaneously. The complete solution offers more than small handheld units:

- The program guides you through the measurement reliably, with clear indications and graphics.
- Measured values as well as an assessment (red / yellow / green) are already indicated during the measurement.

- Each measurement is automatically transferred to the data storage with time stamp and can be completed with your own remarks.
- Alarm by e-mail, lamps or horns can be added.
- The Pro version additionally offers displaying the signal course and a frequency analysis of each event. Thus, each exceedance can be followed in detail if required.

Equipment	VMSet-22-1 DIN 4150-2	VMSet-23-1 DIN 4150-3	VMSet-23-2 2 x DIN 4150-3	VMSet-24-1 DIN 4150-2/3
Hardware				
Sensor for vibration measurement	Piezoelektrischer Beschleunigungsaufnehmer mit Scherkeramik - Empfindlichkeit: 500 mV/g, - Linearer Frequenzbereich: 0,07 .. 6000 Hz - Arbeitstemperatur: -30 .. 90 °C - Zubehör: Kabel i221-10, i205-0,5, i592 Dreifuß-Bodenplatte, i596 Montagescheibe, i535 Haftmagnet			
number of	1 x	1 x	2 x	1 x
USB Box for Digitization	InnoBeamer LX2 - Inputs: 2x analog for vibration sensor(s), 1x digital for photoelectric reflex switch - Signal frequency: 0.1 .. 3200 Hz - Supply current: < 500 mA with supply of all sensors - no mains adapter required - Operating temperature: -20 .. 50 °C, weight: 350 gr. - Accessories: Synchronisation cable and 1m USB cable			
Anzahl	2 x	2 x	3 x	2 x
Software licenses				
Global Option Free Replay	✓	✓	✓	✓
InnoMeter 4150-2 Pro	3 x ✓	-	-	3 x ✓
InnoMeter 4150-3 Pro	-	3 x ✓	6 x ✓	3 x ✓

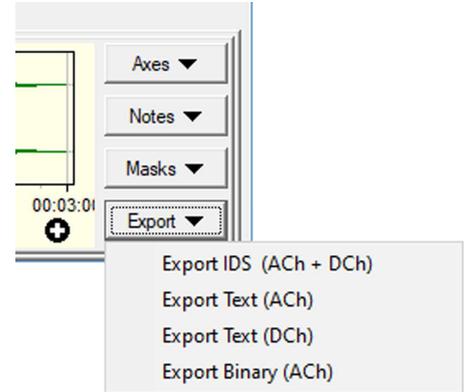
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Global Options - InnoMaster Replay

IDS2ASC and IDS2BIN - Export functions

If you want to analyze the raw data with your own software, we recommend to use the option IDS2ASC or IDS2BIN. The original InnomicDataStream (IDS) format for the InnoMaster Replay not only contains the raw data, but also many other pieces of information, for instance the wall clock time valid during the measurement, your notes etc. By means of the option IDS2ASC, the InnoMaster Replay extracts the pure measurement data and saves it in ASCII text format. Now the data can be indicated with an arbitrary text editor or it can be further processed with your own software. In contrast, the option IDS2BIN exports the measurement data in binary format, which allows more compact files than in text format.



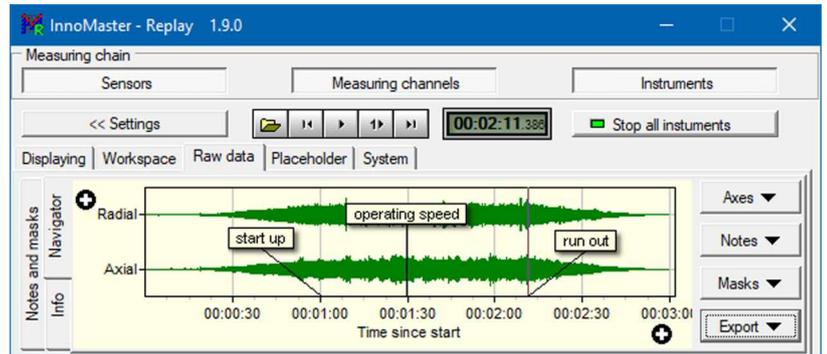
FRep - Free Replay

The complete off-line analysis of the InnoMaster Replay is available for you without extra charge if the same InnoBeamers are connected to the PC at both times, during measurement and off-line analysis. By means of Free Replay, that is not necessary. You can send the files with the raw data, the recipient downloads the free VibroMatrix software and can analyse the raw data. That is how you achieve an excellent team work between the field measurement staff and analysis team in your home company.

Free Replay means: Arbitrarily many persons at arbitrary locations at arbitrary times can replay and analyse the recorded raw data with the InnoMaster Replay.

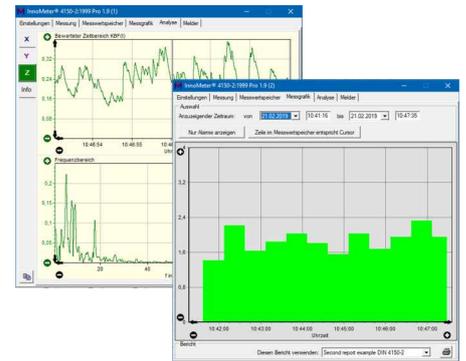
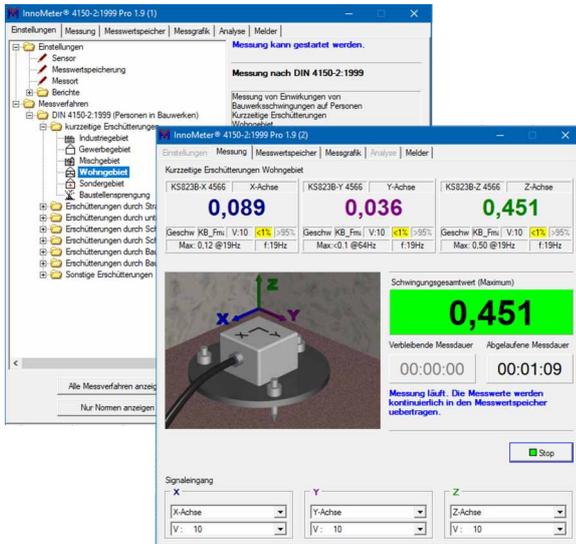
Without the need to invest a single cent for measurement equipment. Thus, you multiply the advantages of VibroMatrix.

For analysis, the instruments which were licensed during data recording are available.



Software Module - InnoMeter 4150-2 Pro® 1.9

Vibration effects on persons in buildings



Graphical event overview and event analysis

Clearly arranged selection and execution of the measurement

Messverfahren	Datum	Zeit	Max	Bewertung
Sonstige Erschütterungen Sondergebiet: Baustelle: Werkgele!	22.02.2019	08:26:57	0,187	gut
1. Anhaltswerte eingehalten	22.02.2019	08:26:57	0,187	gut
2. Anhaltswerte eingehalten	22.02.2019	08:27:27	0,178	gut
3. Anhaltswerte eingehalten	22.02.2019	08:28:00	0,168	gut
4. Anhaltswerte eingehalten	22.02.2019	08:28:32	0,173	gut
5. Anhaltswerte eingehalten	22.02.2019	08:29:04	0,077	gut

Automatic event storage

Application

The InnoMeter 4150-2 is designed for the measurement of vibrations in buildings assesses the effect on persons acc. to DIN 4150-2.

Persons in buildings are exposed to vibrations from heavy building activities, traffic, machine operation or also detonations. The InnoMeter 4150-2 measures these vibrations, immediately evaluates them acc. to the standard and informs about the occurred vibrations and their permissibility at any time.

Suitable kits incl. sensors and signal converters for connection to your own computer are available: VMSet-22(P) and VMSet-24(P).

Properties

Das InnoMeter 4150-2 vereinigt Erschütterungsmessung, automatische Auswertung und Ergebnisdarstellung in einem Instrument. Das wichtigste Merkmal: Zu jedem Zeitpunkt kann auf Knopfdruck ein Bericht erzeugt werden, denn die Auswertung wird zeitgleich mit der Messung vorgenommen. Umständliche Datenübertragung ist hier nicht notwendig, der Anwender ist jederzeit aussagefähig.

The InnoMeter 4150-2 combines vibration measurement, automatic evaluation and presentation of results in one instrument. The most important characteristic: A report can be printed at any time since the evaluation is carried out simultaneously with the measurement. Circuitous data transfer is not required here. You are ready for giving a statement at any time.

The German standard DIN 4150-2 describes a multi-level system for deciding whether vibrations have a troubling effect on humans in buildings or not. The InnoMeter 4150-2 runs through this decision tree with the currently measured values. Based on these facts, it provides immediate assessment for the harassments.

You simply select the measurement mode and the type of area. Click the start button and and off you go!

The measured data is available in differently detailed levels: You can see the overall status at once, but you are able to display more details concerning interesting events progressively. Detail depth reaches up to the recorded high-resolution vibration signal.

When it comes to printing a record, the detail depth can be selected as well. The most important data incl. the measurement graph fits on one A4 page. If required, the single events are printed as well. The period for the report to be printed can also be selected.

Automatic transmission of measurement results via email or notification of outsiders about alarms for instance via signal lamps is possible as well.

Technical Data Software Module - InnoMeter 4150-2 Pro®

	InnoMeter 4150-2 Pro®	InnoMeter 4150-2®
Signal Processing		
Filter	Butterworth filter acc. to the standard with 40dB/decade, 1..80 Hz; frequency weighting filter acc. to DIN 4150-2	
Measurand	Weighted vibration severity acc. to DIN 4150-2	
Characteristics	Maximum weighted vibration severity $KB_{F_{max}}$ and $KB_{F_{TI}}$ value	
Measurement Duration	Adjustable 30 s .. infinitely	
Graphical Presentation		
Numeric Display	5 digits: 0.001 .. 99999	
Refresh	1..4 times per second *	
Status Indicators	Sensor, measuring channel, measurand, characteristic, gain, underload, overload	
Data Acquisition, Storage and Presentation		
Measurement Modes	<ul style="list-style-type: none"> - Short-time vibrations / vibrations caused by rail traffic / vibrations caused by civil works / other vibrations in: - Industrial / commercial / mixed / residential / special areas 	
Measurement	<ul style="list-style-type: none"> - User guide - Selection of the measurement mode - Selection of the location - Indication of elapsed and remaining measurement duration - Indication of the maximum weighted vibration severity $KB_{F_{max}}$ for all axes - Indication of the current main frequency for all axes - Indication of the vibration total value (maximum of the 3 axes) 	
Automated Evaluation	Calculation of $KB_{F_{max}}$ and $KB_{F_{TI}}$ value already during measurement and comparison with guide values A_u , A_o , A_r acc. to the standard. Indication in traffic light colors.	
Data Storage	<ul style="list-style-type: none"> - Data storage of up to 100000 events with detailed data for each time interval - For marked measurement: Indication of $KB_{F_{TI}}$ and further measurement values, evaluation - You can note own remarks for each event - Saving and reload measured values in CSV format - Printing a report about overall assessment, individual report templates can be configured 	
Integrierte grafische Auswertungen		
Vibration History	<ul style="list-style-type: none"> - Expanding and compressing both Y- and time-axis - Y-axis optionally as absolute values or relative to the limit value in % - Time period to be selected by input boxes - Warnings can be displayed/omitted - Cursor available, movable by mouse, runs synchronously with the time interval in the data storage - Printing a report about the selected time period, individual report templates can be configured 	
Analysis Single Event	<ul style="list-style-type: none"> - Signal progression of weighted vibration velocity - Automatic marking of the maximum in the signal progression - Frequency analysis of the time interval 	-
Event Annunciators		
Display	Display of total vibration value as well as evaluation of single measurement in traffic light colors	
Radio Switch	Binary signaling of single measurement's evaluation (good/bad)	
Digital Output	Binary signaling of single measurement's evaluation (good/bad)	
E-Mail	<ul style="list-style-type: none"> - Transfer of total vibration value as well as evaluation of single measurement - Cyclic transfer of the data storage 	
Miscellaneous		
Available in a Kit	VMSet-22, VMSet-24	
General Functions	module is cloneable	

* Centrally managed in the InnoMaster

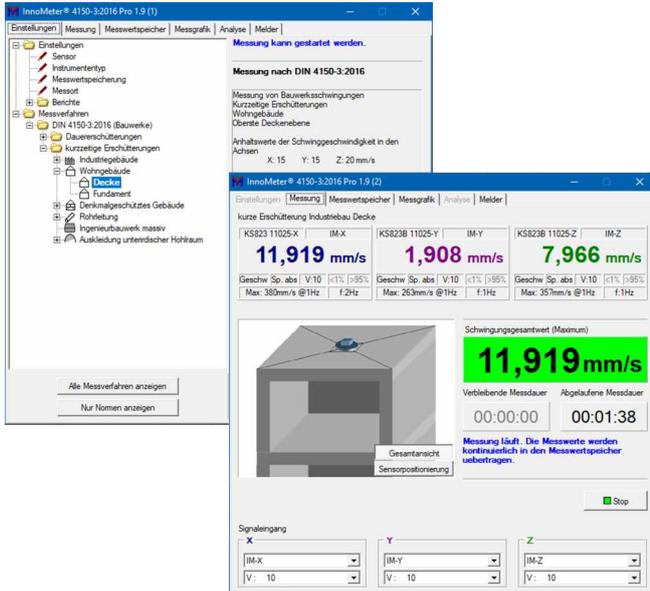
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Software Module - InnoMeter 4150-3 Pro® 1.9

Vibration Measurement on Buildings



Clearly arranged selection and execution of the measurement

Messverfahren	Datum	Zeit	Max (mm/s)	Bewertung
kurze Erschütterung Wohngebäude Fundament (alternative)	10.10.2017	09:31:24	384,71	schlecht
1. Kein Ereignis	10.10.2017	09:31:24	0,216	gut
2. Grenzwert überschritten	10.10.2017	09:37:22	384,71	schlecht
3. Kein Ereignis	10.10.2017	09:37:37	1,904	gut
4. Warnschwelle überschritten	10.10.2017	09:37:41	3,237	akzeptabel
5. Grenzwert überschritten	10.10.2017	09:37:44	291,98	schlecht
6. Kein Ereignis	10.10.2017	09:37:53	1,574	gut

Gesamtbeurteilung		Messwertordner	
kurze Erschütterung Wohngebäude Fundament (alternative Bewertung)		Aktueller Ordner	
Messung durchgeführt am	10.10.2017 um 09:31:24	C:\Users\Public\Documents\VibroMatrix\Data\I	
Messdauer	00:06:42	Einfügen	
Zeitkonstante (s)	3,000	Speichern unter...	
Bewertung	7594%	Speichern	
bei Frequenz (Hz)	X: 1,465 Y: 1,343 Z: 1,221	Zuletzt benutzte Ordner einlesen:	
Messwert (mm/s)	X: 384,71 Y: 275,81 Z: 361,58	Bau-Messung 30-06-2022 15-44-36 134587c	
Grenzwert (mm/s)	X: 5,000 Y: 5,000 Z: 5,000	Berichtsdruck für Gesamtbeurteilung	
Maximalwert (mm/s)	X: 384,71 Y: 275,81 Z: 361,58	Beispielbericht 1 DIN 4150-3	
bei Frequenz (Hz)	X: 1,465 Y: 1,343 Z: 1,221		
Ihre Bemerkungen			

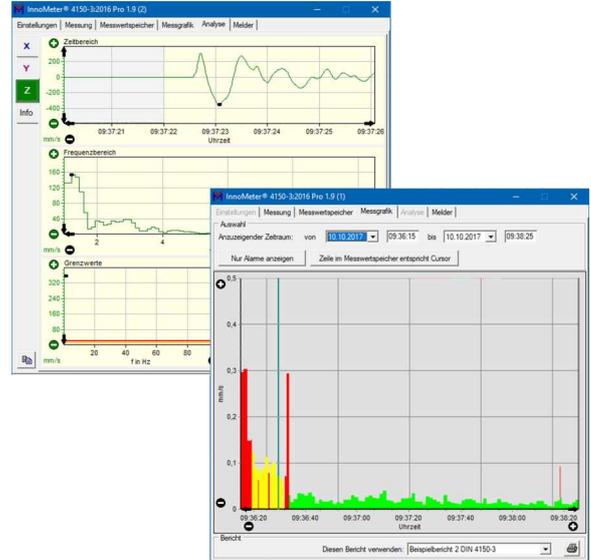
Automatic event storage

Application

The InnoMeter 4150-3 is designed for the measurement of vibrations on buildings acc. to DIN 4150-3 and SBR.

Vibrations from heavy building activities, traffic, machine operation or also detonations affect existing building stock. The InnoMeter 4150-3 measures these vibrations, evaluates them acc. to the standard immediately and can inform about the occurred vibrations at any time.

Therefore, a triaxial vibration sensor is positioned at the building. By means of a signal converter type InnoBeamer, its signals are transmitted to the computer on which the InnoMeter 4150-3 is running.



Graphical event overview and event analysis

Properties

The InnoMeter 4150-3 combines vibration measurement, evaluation and presentation of results in one instrument. The most important characteristic: A report can be printed at any time since the evaluation is carried out simultaneously with the measurement. Circuitous data transfer is not required here. You are ready for giving a statement immediately and at any time.

In the German standard DIN 4150-3 the main frequency is an important parameter as it determines the maximum allowable vibration level. The main frequency recognition is a problem for many instruments but not for InnoMeter 4150-3: It features a permanently active, automatic frequency recognition and achieves exact results with 4 million analyses/day.

The measured data is available in differently detailed levels: You can see the overall status at once, but you are able to display more details concerning interesting events progressively. Detail depth reaches up to the recorded high-resolution vibration signal. This way, analysis with additional software can be carried out easily.

When it comes to printing a record, the detail depth can be selected as well. The most important data incl. the measurement graph fits on one A4 page. If required, the single events are printed as well. The period for the report to be printed can also be selected.

Automatic transmission of measurement results via email or notification of outsiders about alarms for instance via signal lamps is possible as well.

Technical Data Software Module - InnoMeter 4150-3 Pro®

	InnoMeter 4150-3 Pro®	InnoMeter 4150-3®
Signal Processing		
Filter	Butterworth filter acc. to the standard with 40dB/decade, selectable 1..80 Hz and 1..315 Hz	
Measurand	Vibration velocity (vibration severity) in mm/s	
Characteristics	Peak value of vibration velocity, instantaneous main frequency	
Measurement Duration	Adjustable 10 s .. infinitely	
Graphical Presentation		
Numeric Display	5 digits: 0.001 .. 99999	
Refresh	1 .. 4 times per second *	
Status Indicators	Sensor, measuring channel, measurand, parameter, gain, underload, overload	
Data Acquisition. Storage and Presentation		
Measurement Modes	<ul style="list-style-type: none"> - Sustained vibrational excitation / Short-time vibrational excitation: - Industrial / residential / listed buildings - Pipelines: Steel / concrete / plastics 	
Measurement	<ul style="list-style-type: none"> -- User guide - Choice of the measurement mode - Indication of elapsed and remaining measurement duration - Indication of the peak value for all axes incl. main frequency for all axes - Indication of the maximum vibration value so far incl. respective main frequency - Indication of the vibration total value (maximum of the 3 axes) 	
Data Storage	<ul style="list-style-type: none"> - Data storage of up to 100000 events with detailed data for each event - You can note own remarks for each event - Saving and reload measured values in CSV format - Printing a report about single event, individual report examples can be configured 	
Integrated Graphical Evaluations		
Vibration history	<ul style="list-style-type: none"> - Expanding and compressing both Y- and time-axis - Y-axis optionally as absolute values in mm/s or relativeto the limit value in % - Time period to be selected by input boxes - Warnings can be displayed/omitted - Cursor available, movable by mouse, runs synchronously with the event in the data storage - Printing a report about the selected time period, individual report examples can be configured 	
Analysis Single Event	<ul style="list-style-type: none"> - Signal progression of vibration velocity - Automic marking of the maximum in the signal progression - Frequency analysis of the event - Automic marking of the maximum in the frequency analysis - Evaluation of the event in the InnoMeter 4150-3 limit-value-graphic 	-
Event Annunciators		
Display	Display of total vibration value as well as evaluation of single measurement in traffic light colors	
Radio Switch	Binary signaling of single measurement's evaluation (good/bad)	
Digital Output	Binary signaling of single measurement's evaluation (good/bad)	
E-Mail	<ul style="list-style-type: none"> - Transfer of total vibration value as well as evaluation of single measurement - Cyclic transfer of the data storage 	
Miscellaneous		
Available as a Kit	VMSet-23, VMSet-24	
General Functions	module is cloneable	

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