VibroFlex Connect

Polytec

The Polytec VibroFlex laser Doppler vibrometer is a modular high-performance solution for non-contact vibration measurement. It offers unrivalled measurement performance and versatility for solving pressing vibration issues in both R&D and industrial quality control.

The VibroFlex family includes the front-end VibroFlex Connect and a selection of non-contact laser sensor heads. Integrated with the VibSoft data acquisition and analysis software, the vibration measurement system is ready to go. Study acoustics, dynamics and vibrations on nano to macro structures without contact and with laser precision.

Core of VibroFlex as flexible laser vibrometer solution is the Front-End Connect. Choose from decoding option for velocity, displacement and acceleration.

The Front-End Connect enables custom setups and makes sure to have the application-specific settings with upgrade options at any time. The high-performance signal processing of the Connect assures reliable measurement data even under challenging conditions. Keep track of all relevant parameters and control via PC or the 7" large touch screen, avoiding any influences on the measurement by this no-touch concept.

VibroFlex – the new flexibility of laser vibration measurement.

Highlights

- Configure your options freely, upgrade later and stay future-proof
- Synchronous output of displacement, velocity and acceleration
- Large bandwidth from DC to 24 MHz, also upgradeable
- High velocity measuring range up to 30 m/s
- VibroLink digital interface for comfortable measurement data transfer (Ethernet TCP/IP)

VibroFlex Connect

Configurable core of the modular vibration sensing system

Preliminary datasheet

Technical data

General specifications	
Model	**VibroFlex Connect VFX-F-110**
Interface/display	7" color touchscreen with interactive menu guidance for setup of front-end and sensor heads
Dimensions	W x H x D: 285 x 140 x 383 mm
Weight	ca. 7.5 kg
Protection class	IP20
Operating temperature	+ 5...+ 40 °C (41...104 °F)
Storage temperature	– 10...+ 65 °C (14...149 °F)
Relative humidity	max. 80 %, non-condensing
Power supply	100...240 VAC ± 10 %, 50/60 Hz
Power consumption	max. 100 VA

Metrological specifications	
Analog signal outputs	3 BNC connectors (± 1 V @ 50 Ω; ± 2 V @ 1MΩ) for simultaneous and phase synchronized output of: • Velocity • Displacement[1] • Acceleration[1]
Digital signal outputs	VibroLink digital interface for measurement data (velocity) and signal level requires VibSoft 5.5 software
Frequency bandwidth	DC to 24 MHz[1] (15 selectable frequency bandwidths)
Max. velocity	± 30 m/s[1]
High pass filters	Can be choosen individually for velocity, displacement and acceleration signal: 1 Hz, 2 Hz, 4 Hz, 8 Hz, 15 Hz, 30 Hz, 60 Hz, 120 Hz, 250 Hz, 500 Hz, 1 kHz, 2 kHz, 4 kHz, 8 kHz, 15 kHz, 30 kHz, 60 kHz (depending on selected frequency bandwidth)
Low pass filters	Can be choosen individually for displacement and acceleration signals: 1 kHz, 2 kHz, 5 kHz, 10 kHz, 20 kHz, 50 kHz, 100 kHz, 200 kHz, 500 kHz, 1 MHz, 1.5 MHz, 3 MHz, 6 MHz, 12 MHz, 24 MHz (depending on selected frequency bandwidth for the velocity signal)
Tracking filter	Slow, medium, fast
ASE filter	Adaptive signal enhancement[1] – improves signal quality when measuring on surfaces with low reflectivity
Signal level	• Bargraph on touchscreen and on sensor head • Output as DC voltage signal (BNC, 0 ... 2 V)
Analog input signals	CLEAR IN: resets displacement signal to zero (BNC); Analog mode and digital mode (TTL)
PC interface	Via integrated VibroLink connector and Data cable (Ethernet): remote control of the instrument settings with web browser
Compatible sensor heads	• VibroFlex Neo • VibroFlex Xtra[2] • VibroFlex Compact • VibroFlex Fiber
Supported sensor head wavelengths	• Visible red (633 nm) • IR (1550 nm)

[1] depending on configuration
[2] Also supports MLV-I-120 Sensor Head Xtra (requires Firmware upgrade of the sensor head)

Configurable options

The VibroFlex Connect front-end offers a lot of flexibility: thanks to its various options for frequency bandwidth, output signals for measurands, signal enhancement capabilities and accessories, which can be combined freely with each other, it fits perfectly to your application.

Frequency bandwidth
Choose between 7 different maximum frequency bandwidths from 50 kHz to 24 MHz covering the acoustic and the ultrasonic range.

Option	Description	
VFX-BW-50kHz	50 kHz maximum frequency bandwidth (For usage of VibroFlex Xtra, this option must be combined with option VFX-VelHighSpeed)	S
VFX-BW-100kHz	100 kHz maximum frequency bandwidth (For usage of VibroFlex Xtra, this option must be combined with option VFX-VelHighSpeed)	O
VFX-BW-500kHz	500 kHz maximum frequency bandwidth	O
VFX-BW-1MHz	1 MHz maximum frequency bandwidth	O
VFX-BW-3MHz	3 MHz maximum frequency bandwidth	O
VFX-BW-12MHz	12 MHz maximum frequency bandwidth	O
VFX-BW-24MHz	24 MHz maximum frequency bandwidth	O

S = Standard / O = Option

Velocity output
The velocity limit of minimum ± 6 m/s can be extended by adding performance options. For extending the velocity resolution, the Super fine resolution option offers measurement ranges down to ± 1 mm/s (full scale).

Maximum velocity options		
Option	**Description**	
VFX-VelBase	Base (± 6 m/s)	S
VFX-VelPerformance	Performance (± 12 m/s)	O
VFX-VelHighSpeed	Xtra High Speed (± 30 m/s)	O

S = Standard / O = Option

Velocity resolution options		
Option	**Description**	
VFX-VelResH	High resolution Smallest measurement range ± 0.01 m/s (peak)	S
VFX-VelResS	Super fine resolution Smallest measurement range ± 0.001 m/s (peak)	O

S = Standard / O = Option

Configurable options

Displacement output
In addition to the velocity output, the displacement output option VFX-DispOut can be added. The maximum displacement can be scaled with various options up to ±2.5 m. For resolving smallest movements, super fine measurement ranges can be chosen.

Maximum displacement options		
VFX-DispL	Standard Displacement Range Allows displacement measurements up to ± 200 mm (peak)	S
VFX-DispXL	Extended Displacement Range Additional displacement range ± 500 mm (peak) (requires a sensor head and front lens with corresponding depth of field)	O
VFX-DispXXL	Extended Displacement Range XXL Additional displacement ranges ± 1 m and ± 2.50 m (peak) (requires a sensor head and front lens with corresponding depth of field)	O

S = Standard / O = Option

Displacement resolution options		
Option	**Description**	
VFX-DispResH	High resolution Smallest measurement range ± 0.5 µm (peak) with a resolution of 16 pm.	S
VFX-DispResS	Super fine resolution Smallest measurement range ± 10 nm (peak) with a resolution of 0.3 pm.	O

S = Standard / O = Option

Acceleration output
Adding the acceleration output option VFX-AccOut enables measuring accelerations up to $100x10^6$ m/s^2 at frequencies up to 3 MHz.

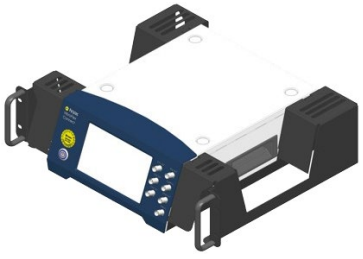
Signal enhancement
For reliable measurement results with best signal-to-noise ratio even under difficult conditions, the included Tracking filter with three ranges and an additional adaptive filter are available.

Option		**Description**	
Tracking Filter	VFX-TRACK	Tracking Filter 3 steps: slow, medium, fast	S
ASE Filter	VFX-ASE	Adaptive Signal Enhancement Filter: ASE improves signal quality when measuring on surfaces with low reflectivity	O

S = Standard / O = Option

Accessories		
Option	**Description**	
VFX-C-100-S05	Sensor cable with quick lock connectors for connecting a VibroFlex sensor head to the VibroFlex Connect front-end (length 5 m).	S
VFX-C-100-S10	Sensor cable with quick lock connectors for connecting a VibroFlex sensor head to the VibroFlex Connect front-end (length 10 m).	O
VFX-C-100-S20	Sensor cable with quick lock connectors for connecting a VibroFlex sensor head to the VibroFlex Connect front-end (length 20 m).	O
VFX-C-100-D02	Data cable (length 2 m) for connecting VibroFlex Connect to a computer. Industrial grade connector and RJ45 (Ethernet). Allows configuration via web browser and data transfer via VibroLink.	S
A-RMK-0001	Rack Mounting Kit with handles for mounting the VibroFlex Connect front-end in a 19" rack.	O
VIB-A-CAS12	Transportation Case for VibroFlex Connect.	O

S = Standard / O = Option



A-RMK-0001 Rack Mounting Kit

VIB-A-CAS12 Transportation Case

Velocity performance specifications

Measurement range (peak)	Maximum frequency range[1]	Typical resolution[2] for sensor heads VibroFlex Neo, Compact and Fiber	Typical resolution[2] for VibroFlex Xtra sensor head	Maximum acceleration	
m/s	kHz	$\frac{nm/s}{\sqrt{Hz}}$	$\frac{nm/s}{\sqrt{Hz}}$	m/s²	
0.001	100	1 @ 1 kHz	5 @ 1 kHz	628	O[5]
0.002	100	1 @ 2 kHz	5 @ 2 kHz	1,250	O[5]
0.005	100	3 @ 5 kHz	10 @ 5 kHz	3,140	O[5]
0.01	3,000	3 @ 10 kHz	10 @ 10 kHz	188,000	S[6]
0.02	3,000	5 @ 20 kHz	15 @ 20 kHz	376,000	S[6]
0.05	3,000	10 @ 50 kHz	30 @ 50 kHz	942,000	S[6]
0.1	24,000	10 @ 100 kHz	50 @ 100 kHz	15,000,000	S[6]
0.2	24,000	20 @ 200 kHz	100 @ 200 kHz	30,100,000	S[6]
0.5	24,000	50 @ 500 kHz	200 @ 500 kHz	75,300,000	S[6]
1	24,000	100 @ 1,000 kHz	400 @ 1,000 kHz	150,000,000	S[6]
2	24,000	250 @ 3,000 kHz	1,200 @ 3,000 kHz	301,000,000	S[6]
5	24,000	500 @ 6,000 kHz	2,000 @ 6,000 kHz	753,000,000	S[6]
6	24,000	500 @ 6,000 kHz	2,000 @ 6,000 kHz	904,000,000	S[6]
10	24,000	1,000 @ 12,000 kHz	5,000 @ 12,000 kHz	1,500,000,000	O[7]
12	100[3]/24,000[4]	400 @ 50 kHz	5,000 @ 12,000 kHz	7,530,000[3] /1,800,000,000[4]	O[7]
20	24,000		5,000 @ 12,000 kHz	3,010,000,000	O[8]
25	24,000		5,000 @ 12,000 kHz	3,760,000,000	O[8]
30	100		1,000 @ 50 kHz	18,800,000	O[8]

S = Standard / O = Option

Maximum linearity error: 0.5% for all measurement ranges.

[1] Frequency range from 0 Hz up to given value. Maximum frequency bandwidth depending on system configuration.
[2] The noise-limited resolution is defined as the signal amplitude (rms) at which the signal-to-noise ratio is 0 dB and with 1 Hz spectral resolution, measured on a mirror.
[3] For sensor heads VibroFlex Neo, Compact or Fiber
[4] For sensor head VibroFlex Xtra
[5] Requires option Super fine resolution (VFX-VelResS)
[6] Standard: included with base configuration VFX-VelBase and VFX-VelResH
[7] Requires option VFX-VelPerformance (± 12 m/s) or option VFX-VelHighSpeed (± 30 m/s)
[8] Requires option VFX-VelHighSpeed (± 30 m/s)

Displacement performance specifications[1]

Measurement range (peak)	Maximum frequency range[1]	Resolution[3]	available with the following options			
µm	kHz	pm	VFX-DispResS	VFX-DispResH / VFX-DispL	VFX-DispXL	VFX-DispXXL
0.01	24,000	0.31	O			
0.02	24,000	0.63	O			
0.05	24,000	1.56	O			
0.1	24,000	3.13	O			
0.2	24,000	6.25	O			
0.5	24,000	15.63		S		
1	24,000	31.25		S		
2	24,000	62.5		S		
5	24,000	156.3		S		
10	24,000	312.5		S		
20	24,000	625		S		
50	24,000	1,563		S		
100	24,000	3,125		S		
200	24,000	6,250		S		
500	24,000	15,625		S		
1,000	24,000	31,250		S		
2,000	24,000	62,500		S		
5,000	24,000	156,250		S		
10,000	24,000	312,500		S		
20,000	24,000	625,000		S		
50,000	24,000	1,562,500		S		
100,000	24,000	3,125,000		S		
200,000	24,000	6,250,000		S		
500,000	24,000	15,625,000			O	O
1,000,000	24,000	31,250,000				O
2,500,000	24,000	78,125,000				O

S = Standard / O = Option

[1] Displacement output only available with option VFX-DispOut

[2] Frequency range from 0 Hz up to given value. Maximum frequency bandwidth depending on system configuration.

[3] The resolution corresponds to the quantization step at the analog output. Noise limited resolution: 0.1 pm/sqrt(Hz) in the smallest measurement range. The noise-limited resoultion is defined as the signal amplitude (rms) at which the signal-to-noise ratio is 0 dB with 1 Hz spectral resolution, for frequencies above 1 kHz measured on a mirror.

Acceleration performance specifications[1]

Measurement range (peak)	Maximum frequency range[1]
m/s²	kHz
10	3,000
20	3,000
50	3,000
100	3,000
200	3,000
500	3,000
1,000	3,000
2,000	3,000
5,000	3,000
10,000	3,000
20,000	3,000
50,000	3,000
100,000	3,000
200,000	3,000
500,000	3,000
1,000,000	3,000
2,000,000	3,000
5,000,000	3,000
10,000,000	3,000
20,000,000	3,000
50,000,000	3,000
100,000,000	3,000

[1] Acceleration output only available with option VFX-AccOut
[2] Frequency range from 0 Hz up to given value.
Maximum frequency bandwidth depending on system configuration.

OM_DS_VibroFlex-Connect_E_5.2024
2019/04 · Technical specifications are subject to change without notice