

## VibroFlex Range

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 comprises 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. VibroFlex Range is the outdoor-proof long-range laser sensor head designed for remote

analysis of vibrating structures, model validation and health monitoring on large and distant structures from more than 300 m. The laser sensor conveniently monitors structural dynamics and stability of buildings, operating machinery and critical production facilities, providing a fast and efficient on-site testing solution. The determined Eigen frequencies and deflections can be used e. g. for health monitoring or model validation of simulations. The patented multi-path inter-ferometer technology QTec® grants highest signal quality even at long distances and on uncooperative surfaces.

VibroFlex – the superior flexibility in laser vibration measurement.



### Highlights

- Remote vibration analysis  
> 300 m with laser precision
- SWIR laser and QTec® for best SNR
- Measures on all surfaces, even corroded and dirty structures
- Remote access to distant and hazardous areas
- True zero Hz performance for precise determination of natural frequencies
- Patented coaxial HD camera for precise targeting
- Robust and outdoor-proof sensor (IP63)

## VibroFlex Range

Remote detection of vibrations  
from distant structures

Preliminary datasheet



# Technical data



## General specifications

<b>Model</b>	<b>VibroFlex Range VFX-I-150</b>
Weight	ca. 8.7 kg (11.07 kg including VIB-A-P08 and A-VIS-SCOP1)
Protection class	IP63 (protected against dust and spraying water)
Dimensions [W x H x L]	165 x 118 x 418 mm (without handle); 171 x 174 x 418 mm with handle
Operating temperature	+5 °C ... +40 °C (41 °F ... 104 °F)
Storage temperature	-10 °C ... +65 °C (14 °F ... 149 °F)
Relative humidity	max. 80%, non-condensing
Controller compatibility	VibroFlex Connect
Maximum velocity	± 30 m/s
Targeting	<ul style="list-style-type: none"> <li>▪ Visual targeting with visible green laser spot and additional reticle overlay in image of integrated Full HD camera</li> <li>▪ Fine adjustment (±1° tilt, ±1.5° pan), repeatability approx. 5 mm @ 100 m</li> <li>▪ Coarse adjustment with coarse positioning groove via 3-way geared head</li> </ul>
Control elements	<ul style="list-style-type: none"> <li>▪ Signal level (RSSI) indicator</li> <li>▪ Laser emission</li> </ul>
Mechanical interfaces	<ul style="list-style-type: none"> <li>▪ 3/8" - 16 UNC thread for tripod in base plate</li> <li>▪ 3x M5 threads for quick release plate in base plate</li> <li>▪ 2x M6 threaded holes and fitting holes for mounting in base plate</li> <li>▪ 10-32 UNF-2B standard thread for accelerometer A-VIB-ACC1 at back side</li> </ul>
Sensor cable connector	Robust push-pull connector on sensor head for connection to VibroFlex Connect front-end with the sensor cable VFX-C-110-Sxx

## Optical specifications

Optical setup	QTec® heterodyne multi-path interferometer utilizing reception diversity. Protected by international patents
Laser type	Measurement laser: invisible (IR), wavelength 1550 nm, output power <10 mW Targeting laser: visible (green), wavelength 520 ± 10 nm, effective output power < 1 mW, can be dimmed. (VIB-A-170 IR-Converter Card included in scope of supply)
Laser class	Class 2, with both lasers in operation
Focus	Manual focus
Maximum stand-off distance	More than 300 m <sup>1</sup>
Min. stand-off distance	5 m (0.75 m) <sup>1</sup>
Exit beam diameter (1/e <sup>2</sup> )	27 mm
Optical Signal Robustness OSR <sup>2</sup>	> 10,000 mm/dropout

## Integrated Full HD camera in VFX-I-150 sensor head

Alignment	Patented coaxial integration; parallax-free and aligned with laser focal plane
Resolution (H x V)	1920 x 1080 pixel
Video outputs	HD-SDI for external TFT monitor, Ethernet for connecting to computer

## Compliance with standards

Laser safety	IEC/EN 60825-1		
Electrical safety	IEC/EN 61010-1		
EMC	IEC/EN 61326-1	Emission:	Limit class B, IEC/EN 61000-3-2 and 61000-3-3
		Immunity:	IEC/EN 61000-4-2 to 61000-4-6 and IEC/EN 61000-4-11
RoHS	IEC/EN 6300		



Working distance and laser spot size			
Stand-off distance [m] <sup>1</sup> :	Typical spot size [mm]	Depth-of-field [m]	Camera field of view [m x m]
5	0.35	±0.062	0.18 x 0.10
10	0.71	±0.26	0.37 x 0.21
20	1.44	±1.05	0.74 x 0.42
50	3.64	±6.7	1.85 x 1.06
100	7.52	±28.7	3.70 x 2.12
150	12.1	±74	5.56 x 3.18
each additional m add	+ 0,09 mm		



<sup>1</sup> Measured from the front edge of the front lens. Shorter stand-off distances between 0.75 m and 5 m are possible, when using the additional Close-Up lenses (see accessories).

<sup>2</sup> The Optical Signal Robustness OSR quantifies the statistical lateral movement in mm between two dropouts. It is a measure for the noise performance of the instrument on typical engineered surfaces. A high value indicates a high signal-to-noise ratio in all operating conditions. For test conditions refer to application note VIB-G-030.

## Options and accessories

1	A-VIS-SCOP1 Telescopic Sight	Telescopic sight with variable magnification allows a wider field of view and easier selection of target on repeating structures like stay-cables
2	A-MON-TFT4 Monitor	7" TFT monitor with tripod mount displays image of integrated, coaxial Full HD camera with reticle overlay for comfortable and easy targeting. Can be connected directly to the sensor head via HD-SDI.
3	VIB-A-T07 Tripod with Geared Head	Rigid tripod with 3-way geared head Adjustment: Tilt +90° to -30°. Pan 360° for easy and precise coarse adjustment
4	VIB-A-P08 Fine Adjustment	Fine adjustment for precise positioning of the laser spot even at large stand-off distances (±1° tilt, ±1.5° pan, repeatability approx. 5 mm @ 100 m)
5	VFX-C-110-Sxx Sensor Cable	Sensor cable with robust and easy to use push-pull connector for the sensor head for connecting to a VibroFlex Connect front-end. Length: 5 m, 10 m or 20 m
	C-001-00xx-INDU Data cable, Industrial version	Ethernet cable for connecting the integrated camera in the sensor head with a computer. Industrial grade connector M12 for sensor head and RJ45 for computer (Ethernet, X-coded). Length: 5m, 10 m or 20 m.
	A-MPS-001 Mobile Power Supply	Mobile power supply for A-MON-TFT4 monitor, includes high-performance rechargeable battery (lithium-polymer, A-MPS-PB1). Also includes battery charger with adapter plates for EU, UK, US and AU sockets, a Power supply cable and a convenient waterproof bag (A-MPS-BAG), that allows to attach the battery directly to the tripod
	A-VIB-ACC1 Compensation Sensor	Accelerometer with isolation stud, can be used to measure and compensate for ambient vibration. Can be mounted on backplate of sensor head.
	VIB-A-CAS19 Transp. Case (VibroFlex Range VFX-I-150)	Robust transportation case for the sensor head



### Close-up lenses for smaller working distances

The high-aperture optics of VibroFlex Range are designed for best optical sensitivity at long range. A choice of close-up lenses is available to accommodate to distances between 0.75 m and 5 m for occasional use in the lab.



#### Optical specifications with close-up lenses

Stand-off distance [m]	Typical spot size [mm]	Depth-of-field [mm]	Camera field of view [mm x mm]
0.75	0.05	±13	28 x 16
0.87	0.06	±18	32 x 19
1.05	0.075	±26	39 x 22
1.25	0.09	±38	46 x 26
1.7	0.12	±71	62 x 35
2.5	0.172	±150	91 x 52

#### Ranges of stand-up distances with different combinations of close-up lenses

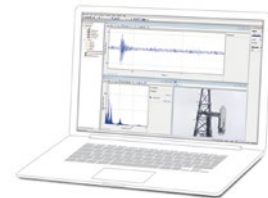
Min. stand-off distance [m]	Max. stand-off distance [m]	Number of required close-up lenses of type VIB-A-...			Possible with set of close-up lenses VIB-A-....			
		-161	-261	-500	CLS01	CLS02	CLS03	CLS04
0.75	0.87	2	-	-	-	•	-	-
0.87	1.05	1	1	-	•	-	-	•
1.05	1.35	-	2	-	-	-	•	-
1.25	1.7	1	-	-	•	•	-	•
1.7	2.5	-	1	-	•	-	•	•
2.5	5.0	-	-	1	-	-	-	•

### VibSoft: Data acquisition and analysis

VibSoft is a comprehensive and easy-to-use software package for digital or analog vibration data acquisition and analysis and remote control of VibroFlex Range and other Polytec laser vibrometers. It closes the gap between raw signal acquisition and profound analysis of vibration measurement data even with special filters and signal enhancement dedicated to laser vibrometers. Further options like the powerful SignalProcessor (a Polytec math library for post-processing) and a scripting engine for individual post-processing and control make VibSoft an extremely powerful tool.

The VibroLink interface allows for direct and fully digital data acquisition via Ethernet. Thus, **VibSoft-VL** is the ideal lightweight solution for mobile use – set up quickly and easily, with reduced cabling and no need for additional data acquisition hardware.

The USB based compact data acquisition system **VibSoft-20** can be used for measuring frequencies up to 20 kHz enabling the connection of one additional analog sensor. Suitable for laptop computers. Comprises VIB-E-220 Junction box.



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