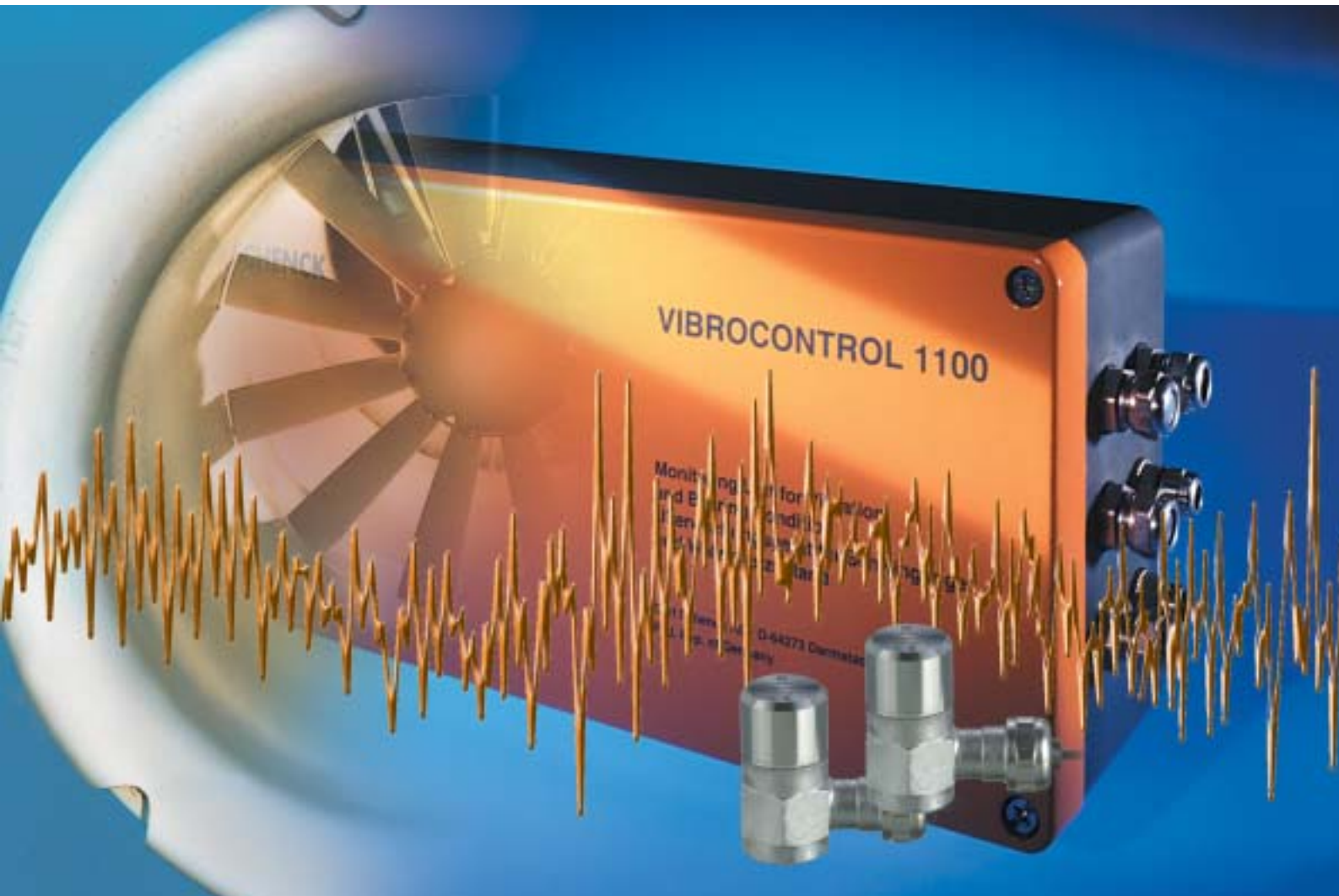




Brüel & Kjær Vibro



VIBROCONTROL 1100

Cost-Effective Monitoring of
Machine Vibration and Bearing Condition

Prevent machine damage and production loss with consistent precision

Maintenance of machines and equipment is of considerable economic importance for the industry. Continuity of production, preservation of invested capital, environmental safety and economic operation can, in the long term, only be assured by an efficient and conscientious maintenance process to predict damage and permit scheduling of repairs.

These goals are achievable if:

- The condition of machinery and components is continually monitored,
- Irregularities in operational condition are detected early,
- And when reaching a dangerous condition, the machine is immediately shut down.

Machine condition

By measuring vibration frequencies up to 1,000 Hz, and comparing the values with

- Limits recommend by the applicable standards
- Levels recommended by the machine manufacturer
- Vibration levels determined by experience

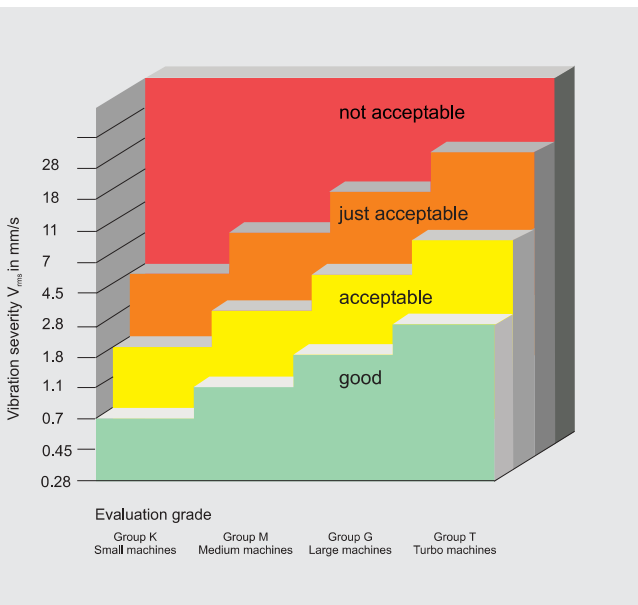
A decision can be made regarding the condition of the machine. Problems arising from unbalance, misalignment, sinking of foundations, blade -, or gear damage, can be recognized at an early stage.

Bearing condition

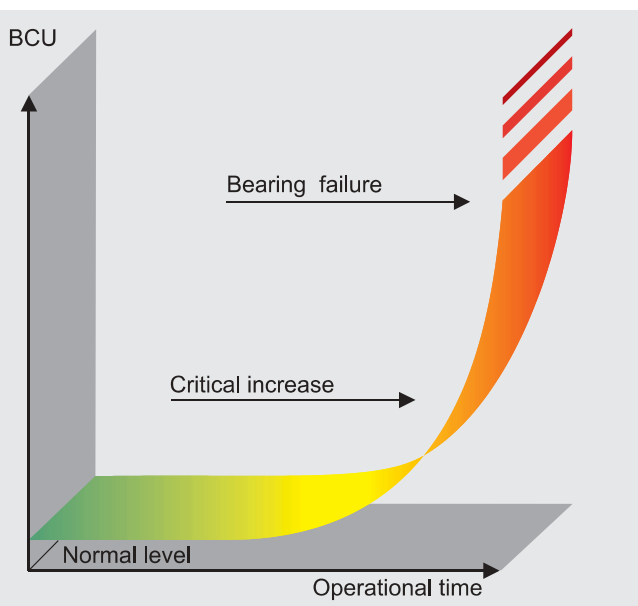
Impulses caused by damage to the outer or inner race, rolling element, or cage are a good indicators of the bearing condition. Reliable monitoring of the bearing condition is possible by:

- Measuring the intensity and frequency of the impulses
- Representing these by a special parameter called "Bearing Condition Unit", BCU
- Observing the trend of these values over a period of time.

Machine damage and production losses as a result of damaged bearings can be successfully avoided by monitoring this parameter.



Evaluation limits for the vibrational behaviour of machines.



The trend curves shows typical BCU values when bearing failure occurs

VIBROCONTROL 1100 – A cost – effective solution for machine protection

VIBROCONTROL 1100 consists of two main functional parts – vibration sensor and monitoring unit.

Vibration sensor

This is mounted on the machine surface and converts mechanical vibrations into an electrical signal. VIBROCONTROL 1100 accepts inputs from either accelerometers or vibration velocity sensors.

Monitoring unit

This unit has two separate inputs for sensors, and the signals for vibrations and bearing condition are monitored in completely independent electronic circuits.

Depending on the mode of operation and measured variable, cycle times are 0,25 sec. in 1-channel operation, and 6...20 sec. in 2-channel operation. For each channel, two limits for vibration and one for bearing condition can be set and monitored. The relay response delays are individually adjustable.

Information-output

VIBROCONTROL 1100 has two recorder and two diagnostic outputs.

3 limit relays with potential free contacts are supplied. And an OK relay which indicates the condition of the sensor, signal cable and mains-supply.

Additionally the unit is equipped with 2 RS-232 C interfaces, these allow the communication with a personal computer and network operation of various units.

On the units display the user can directly view the measured- and limit values, relay status and logbook entries.

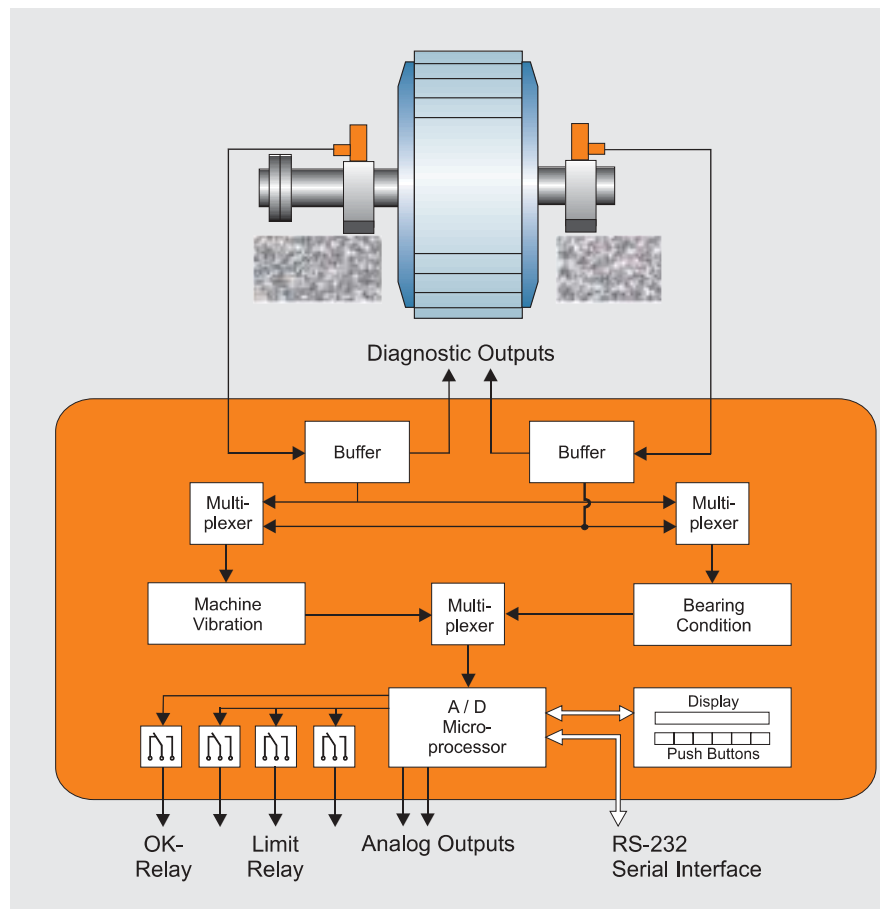
The logbook has a ring buffer capable of storing a max of 99 events, such as limit exceeding, OK faults and power outs.

Reliability

An internal test software, automatic self-calibration and safety circuits such as

- Self monitoring
- Limit relay disable
- Switch on error protection

ensure trouble free operation of the monitor.



VIBROCONTROL 1100

Rugged – Modern – User-friendly

Installation

- The sensors are mounted at, or as close as possible to the machine bearing housings with a threaded stud.
- The monitor is mounted near the machine or in a conveniently located control cabinet.
- Sensors, monitor, and monitor outputs to the machine controls are then connected.

- 1 Snap-in terminal strips for fast installation
- 2 Printed circuit boards are enclosed and shielded on all sides
- 3 16 digit display of measured values and operator information
- 4 RS-232 serial interfaces for connection to a PC or for network operation
- 5 All set-up functions can be accessed with only 5 push buttons.
- 6 PG type fitting for all cable connections
- 7 Connections diagram on the cover
- 8 Rugged, industrial housing meeting IP 65
- 9 A choice of 1 or 2 Acceleration- or vibration velocity sensors in industrial versions



Setup of monitoring unit

Direct on VIBROCONTROL 1100

Using the latest microprocessor technology, the setup can be verified and altered using the push buttons.

The setup is displayed and automatically checked for any configuration conflicts.

The unit is equipped with a 16 digit LCD display and 5 push buttons for this purpose. Potentiometers, switches and jumper wires belong to the past.

Using the setup software

The CM-401 software enables all settings to be made from the PC. Settings or changes in configuration can thus be made remotely. In order to additionally display the actual measured values and status indication, the CM-402 software can be used instead.

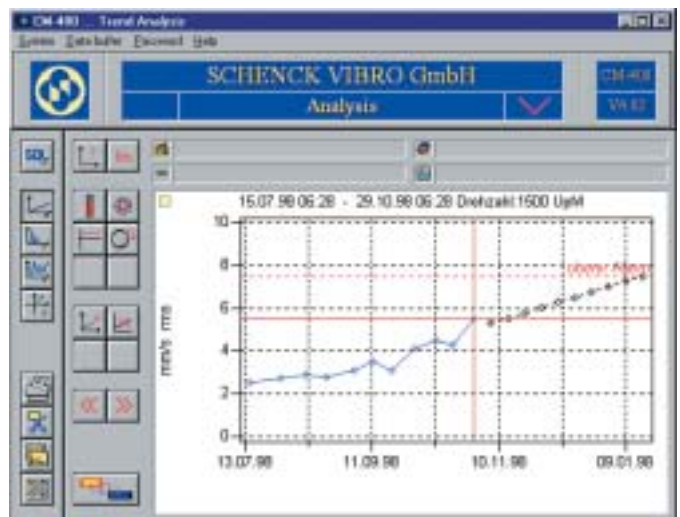
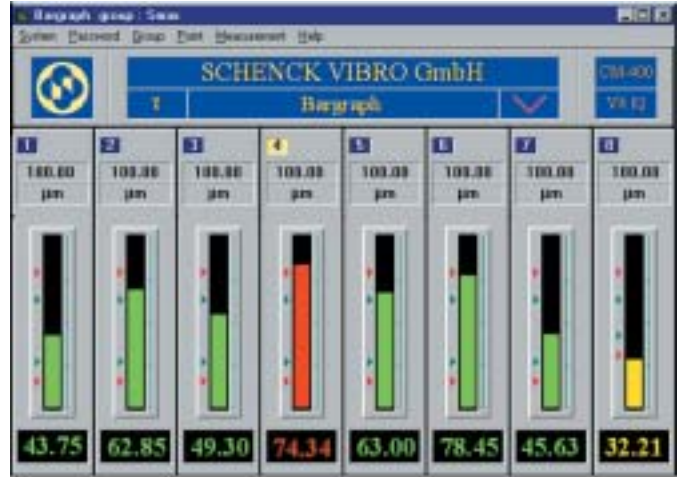
Visualisation of the measurements and data storage with VIBROEXPERT

VIBROCONTROL 1100 can be easily integrated into the condition oriented machine maintenance concept VIBROEXPERT.

The Software package VIBROEXPERT (runs under Windows 95/98/2000/NT4.0) stores the measured data from the individual units, which can then be viewed as bar charts, archived or analysed as required.

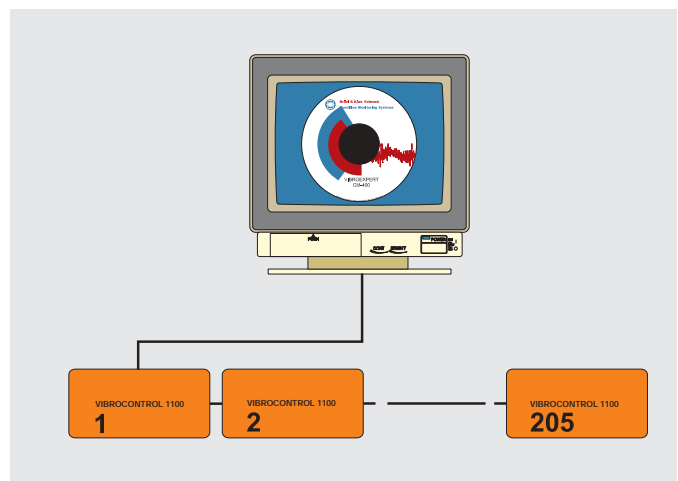
The following modules can be used with the VIBROCONTROL 1100:

- On-line data acquisition
- Bar charts for display of current measured values
- Analysis of stored data, e.g vibration characteristics and BCU, simple or multiple trend analysis, with the forecast possibility.



Networking

If several VIBROCONTROL 1100 units are used in a plant, the individual units can be integrated into a network (up to 205 units).



Technical data of the monitoring unit

Sensor inputs

2, for either accelerometers or velocity sensors

Measured parameters

	Values in	rms peak peak-to-peak
● Acceleration ¹⁾		
● Velocity		
● Displacement ²⁾		
● Bearing condition ¹⁾		

Measuring channels

- 1- channel operation with continuous monitoring
- 2- channel operation with multiplexed signal processing, cycle times from 6 to 20 sec.

Measuring (Full scale) and frequency ranges

Acceleration ¹⁾	4.00 m/s ² (0.5 g)...750 m/s ² (80 g) 3/10...1,000/10,000 Hz
Velocity ¹⁾	5.00 mm/s (0.2 in/s)...999 mm/s (37.5 in/s) 3/10...1,000/10,000 Hz
Velocity ²⁾	5.00 mm/s (0.2 in/s)...150 mm/s (5.75 in/s) 1/3/10...1,000 Hz
Displacement ²⁾	50 μm (2.0 mils)...325 μm (13.0 mils) 10...1,000 Hz
Bearing Condition ¹⁾	1.00 BCU...140 BCU 13 kHz...64 kHz

Tolerance

For vibration ¹⁾	2% of measured value
For bearing condition	6% of measured value (± 3.5% of full scale)

Monitoring

Limit values per Channel	2 for vibration 1 for bearing condition
Relay response delay	1...99 s
Limit relays	3, for use with a choice of measured parameters, and a choice of AND/OR logic, latching/non-latching, energized/deenergized switching, max. 5 A, 220v/2000 VA
Self monitoring	1 OK relay normally-energized, non-latching; max 5 A, 220 V/2000 VA

Outputs

Analog outputs	2, each 0/4...20 mA (load = 500 Ω) or 0..10 V (resistance ≥1k Ω)
Diagnostic outputs	2, buffered output signals (resistance ≥10k Ω)
Serial interfaces	2, RS-232 C, asynchronous, fully duplexed, data-only, max 9.600 Baud
Supply Voltage	230/115 VAC (+/-20%) ca. 15 VA 24 VDC (+50/-33%)
Operating Conditions	Working temperature 0...+55 °C (+32...+131°F), after 1 hour -10 ...+55 °C (+14...+131°F, storage temperature -20...+70°C (-4...+158°F), max. relative humidit: 95% non-condensing
Mechanical Construction	Heavy aluminum case, IP 65/NEMA 4x with PG 9 cable grips, cover painted RAL 2011, housing painted RAL 7032, weight: approx. 5 kg (11 lb)

Remarks: ¹⁾ only with accelerometers
²⁾ only with velocity sensors

Ordering information

VIBROCONTROL 1100 and accessories

VC 1100 ◀ Monitoring unit

Type C 0 1 ◀ For vibration and bearing condition
Power supply: 230/115 V, 50/60 Hz

Standard ◀ Sensor supply 24 V DC

Type C C S ◀ Constand current sensor 3... 6 mA

Type C 0 2 ◀ For vibration and bearing condition
Power supply: 24 V DC

Type C 1 1 ◀ For vibration only
Power supply: 230/115 V, 50/60 Hz

Standard ◀ Sensor supply 24 V DC

Type C C S ◀ Constand current sensor 3... 6 mA

Type C 1 2 ◀ For vibration only
Power supply: 24 V DC

Installation accessories

AC - 2 2 1 ◀ Junction box for up to 2 vibration sensors

AC - 1 7 8 ◀ Junction box for up to 2 accelerometers,
explosion proof (E Exi)

AC - 1 9 6 ◀ Junction box for up to 2 velocity sensors,
explosion proof (E Exe)

AC - 1 1 2 ◀ Signal cable, shielded for vibration sensors
4 x 0.5 mm² (4 x 7.75 x 10⁻⁴inch²)

AC - 1 1 4 ◀ Signal cable, shielded, for accelerometers,
explosion proof (E Exi) 4 x 0.5 mm²
(4 x 7.75 x 10⁻⁴inch²)

AC - 1 8 6 ◀ Signal cable, shielded, for velocity sensors,
explosion proof (E Exe) 2 x 0.75 mm²
(2x 11.6 x 10⁻⁴inch²)

AC - 3 3 1 ◀ PU covered steel conduit, min. order 5 m
(16.4 ft)

AC - 3 4 1 ◀ Conduit fittings (2 pieces)

AC - 3 2 1 ◀ Reducers from PG 9 to PG 7 for conduit fittings

AC - 3 9 3 ◀ Safety barriers set, for one explosion
proof accelerometer

AC - 5 0 6 ◀ Safety module for velocity sensors
E Ex d II C T 6

AC - 3 5 2 ◀ Mounting bolt for accelerometer

AC - 3 5 4 ◀ Step drill for mounting bolt

Configuration software

CM - 4 0 1 ◀ Software for configuration of the VC 1100

CM - 4 0 2 ◀ Software for configuration and display of the
measured values and status of the VC 1100

Accelerometers

AS - 0 2 2 ◀ Omnidirectional, 5 m (16.4 ft) cable,
with central mounting

ASA- 0 2 2 ◀ Omnidirectional, 5 m (16.4 ft) cable,
explosion proof. E Ex ib II C T 6/5/4

AS - 0 3 0 ◀ Omnidirectional, without cable, with
FAST-ON connectors, incl. AC-305

AS - 0 6 2 ◀ Constand current sensor 5 m (16.4 ft) cable

ASA- 0 6 2 ◀ Constand current sensor 5 m (16.4 ft) cable
E Ex ia II C T 6 (Zone 0,1 and 2)
EN 50014: 1992 and EN 50020: 1994

AS - 0 7 0 ◀ Constand current sensor 10 m (32.8 ft) cable

Velocity sensors

VS - 0 6 8 ◀ For horizontal measuring direction
5 m (16.4 ft) cable

VS - 0 6 9 ◀ For vertical measuring direction
5 m (16.4 ft) cable

VS - 1 6 8 ◀ For horizontal measuring direction
10 m (32.8 ft) cable, explosion proof,
E EX d II C T 6

VS - 1 6 9 ◀ For vertical measuring direction
10 m (32.8 ft) cable, explosion proof,
E EX d II C T 6

Special accessories

AC - 1 2 9 ◀ Analog meter, panel type; 96 x 24 mm, class
1.5; measuring range 4...20 mA; Scale
division 0...100% horizontal scale

CM - 400 ◀ Software for condition oriented machine maintenance

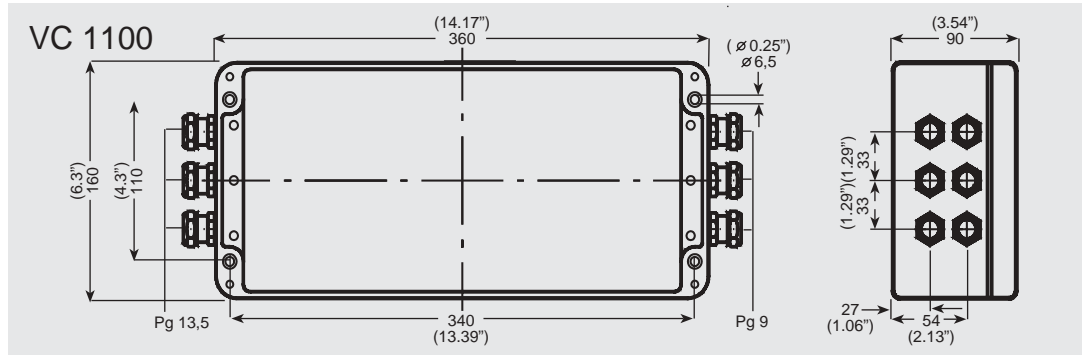
Modul 2 0 ◀ VIBROEXPERT basic module Online with
Database, setup and bargraph-display
(runs under Windows 95/98/2000/NT4.0).

Modul 2 2 ◀ Communication module for interfacing the
VC 1100 to the database

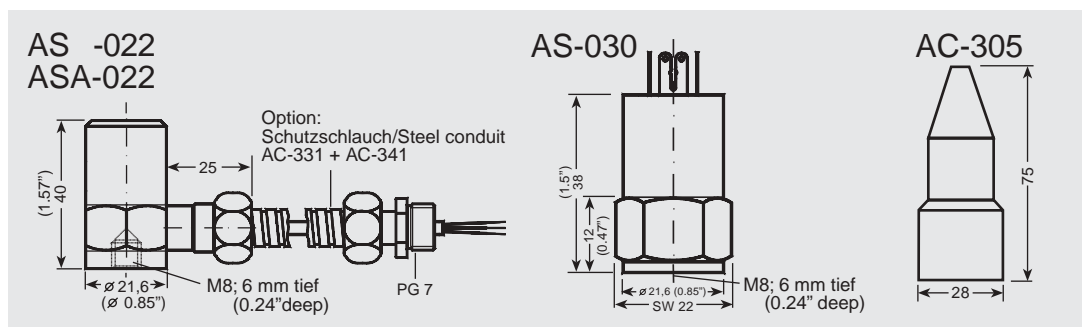
Modul 6 5 ◀ Analysis module for displaying the measured
values, trend diagnosis and predictive function

Accessories for computer applications and network operation, such as interfaces converters, special cables, overvoltage protection, etc. available upon inquiry. Sensors for special applications, and further installation accessories please refer to brochure BV-P1001/e

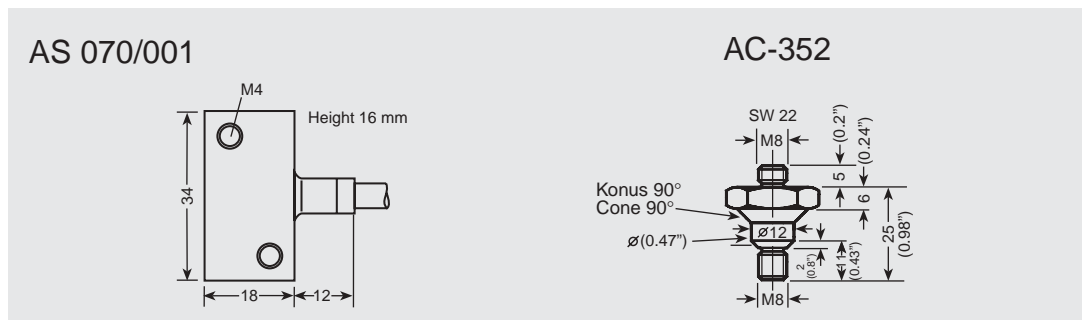
Dimensions



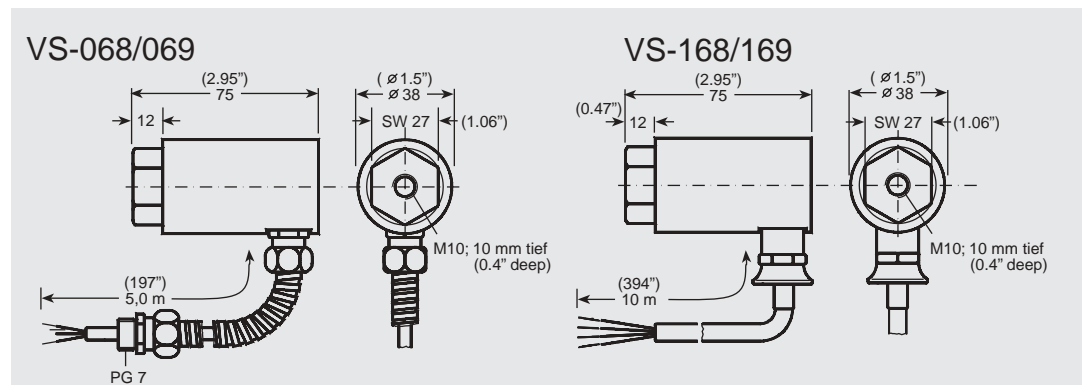
Monitoring unit



Accelerometer with fixed, radial cable outlet



Accelerometer with plug-in axial cable connection and mounting bolt, protective cap



Velocity sensors

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