Brüel & Kjær Vibro


# VIBROCONTROL 1100

## The 2 x 2 solution for bearing vibration and rolling-element bearing condition

# VIBROCONTROL 1100

reliably helps prevent machine damage and production downtime. These objectives are reached when

- the actual condition of the machine and its components are continuously measured,
- irregularities in the operating condition are signalled at an early stage and
- reaching a dangerous operating condition results in an immediate shutdown of the machine.

### Bearing vibrations

Through measurement of the mechanical vibrations in the frequency range up to 1000 Hz and comparison of the measured values with

- Standards and guidelines,
- Default values from the machine manufacturer or
- Values determined by experience

decisions can be made about the overall machine condition. Faults such as rotor unbalance, alignment errors, foundation movements, blade and gear damage can be identified in this way at an early stage.

### Rolling-element bearing condition

Impulses caused by rolling-elements are a measure of the rolling-element bearing condition. Reliable monitoring of the rolling-element bearing condition is possible through

- Measurement of the intensity and regularity of the impulses,
- Formation of a special charac teristic value, namely and Bearing Condition Unit (BCU) and
- Normalized BCU values

Damage and production downtime as a result of “defective” bearings can be prevented with a high degree of accuracy.

VIBROCONTROL 1100 consists of the component vibration sensors and electronic monitoring instrument.

### Vibration sensor

Mechanical vibrations and impulses which occur at the machine are converted by the vibration sensors into electrical signals. According to the monitoring task, acceleration or vibration velocity sensors can be used.

### Monitoring electronics

The monitoring electronics has 2 sensor inputs and carries out the vibration and bearing condition measurements at two separate signal paths.

According to the operating mode and measurement type, cycle times of 0.25 secs for single-channel and 6…20 secs for 2-channel operation can be achieved. For each channel, 2 limit values for vibration and 1 limit value for bearing condition can be set up. The alarm relay delay time is individually selectable for each limit value signal.

VIBROCONTROL 1100
2 analogue outputs. The assignment of the measurements to the analogue outputs and their operating mode can be freely programmed.

3 limit value relays with potential-free contacts for signalling limit value violations. The OK-relay signals the condition of the sensors, cable and power supply.

The operator can be directly informed at the instrument about the current measurements, limit value violations, relay conditions and Logbook entries.

The Logbook represents a ring memory with max. 99 entries for the storage of events, e.g. limit value violations, OK-faults, power failures.

### Reliability

An internal, system-testing software, automatic self-calibration and protective circuits such as

- Self-monitoring
- Limit value blocking
- Power-up error protection

provide a guarantee of trouble-free operation of the instrument.

- Plug-in connection terminals
- Rugged industrial housing in IP-65 protection class
- Selectively 1 or 2 acceleration or vibration velocity sensors in industrial design.

## Setting up the monitoring electronics

### Directly at VIBROCONTROL 1100

All settings can be carried out directly at the instrument and edited at any time through the user-friendly dialogue. The instrument has a built-in LCD display and 5 operating pushbuttons.

# VIBROCONTROL 1100 Technical Data

| | |
|---|---|
|  | **2-channel bearing vibration and 2-channel bearing condition** |
| **Order code**<br><br>VC-1100-Cxx | **Type**<br>C01 Bearing vibration and bearing condition 230/115 V AC, 50/60 Hz, approx. 15 VA<br>C02 Bearing vibration and bearing condition 24 V DC (16…36 V), appr. 15 W<br>C11 Bearing vibration 230/115 V AC, 50/60 Hz, appr. 15 VA<br>C12 Bearing vibration 24 V DC (16…36 V), appr. 15 W |
| **Inputs**<br>No. of vibration channels<br>Sensor connections<br><br>Sensor power<br><br>Sensor OK monitoring | <br>2<br>Acceleration sensor, e.g. AS-022, AS-062, (CCS), ASA-022 etc.<br>Vibration velocity sensor, e.g. VS-068, VS-069, VS-0168, VC-0169<br>-24 V DC (max. 30 mA) or 4 mA constant-current power (CCS)^)<br>Velocity sensor : no power required<br>Yes |
| **Measurement types†)**<br>Measurement channels (operating modes)<br><br>Frequency range<br><br>Vibration displacement‡)<br>Bearing vibration measurement<br><br><br>Bearing condition measurement<br><br><br><br>Measurement accuracy | <br>1-channel operation with continuous monitoring<br>2-channel operation with cyclic monitoring<br>Cycle time appr. 6…20 sec.<br>Standard setting 10 Hz to 1 kHz<br>Highpass: 1, 3, 10 Hz; Lowpass: 1 kHz, 10 kHz<br>Integrated vibration velocity signal (10 Hz – 1 kHz) in µm<br>RMS value of vibration velocity in mm/s<br>Signal detection selectable:<br>RMS, peak value, peak-peak value<br>RMS value of acceleration in $mm/s^2$<br>Signal detection selectable:<br>RMS, peak value (p), peak-peak value (p-p)<br>BCU (Bearing Condition Unit)<br>Bearing vibration 2% of measured value<br>Bearing condition +/- 6% of measured value and +/- 3.5% of measuring range full scale value |
| **Monitoring†)**<br><br>Alarm signalling<br><br>Alarm relay delay time<br>Alarm relays | <br><br>Alert and Danger alarms for bearing vibrations and one alarm for bearing condition<br><br>1...99 sec.<br>3 relays with free assignment to measurement type, with AND/OR coupling, normally-energized or normally de-energized operation, latching or non-latching |
| **Outputs†)**<br>Analogue signal outputs<br><br>Measured signal outputs | <br>The function can be assigned to one of the measurement types:<br>0/4…20 mA (Load <= 500 Ω) or 0…10 V (Load >= 1 kΩ)<br>Phase-correct data (Buffered output) of the sensor signal |
| **Power supply**<br>Mains power | <br>230/115 V AC +15% / - 25%, 50/60 Hz, appr. 15 VA<br>24 V DC (16…36 V), appr. 15 W |
| **Environmental conditions**<br>Operating temperature range<br>Storage temperature range<br>Humidity | <br>0°C…+ 50°C<br>- 20°C…+ 70°C<br>Max. 95% non-condensing |
| **Mechanical data**<br>Housing<br>Dimensions<br>Cable feed | <br>Rugged aluminium housing in IP-65 protection class. Total weight appr. 5 kg<br>400 x 160 x 91 mm (L x B x H)<br>3 x M 20 x 1.5 and 9 x M 16 x 1.5 feed-through fittings |

†) Each channel and connected sensor
^) only with acceleration sensors with constant-current power (CCS)
‡) only with vibration velocity sensors

**Order data for VIBROCONTROL 1100 and accessories**

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|---|---|---|
| VC-1100 Monitoring electronics | Type C01 | For vibration and bearing condition, Power supply 230/115 V AC, 50/60 Hz |
| | Type C01 CCS | For vibration and bearing condition, Power supply 230/115 V AC, 50/60 Hz [1] |
| | Type C02 | For vibration and bearing condition, Power supply 24 V DC |
| | Type C02 CCS | For vibration and bearing condition, Power supply 24 V DC [1] |
| | Type C11 | For vibration only, Power supply 230/115 V AC, 50/60 Hz |
| | Type C11 CCS | For vibration only, Power supply 230/115 V AC, 50/60 Hz [1] |
| | Type C12 | For vibration only Power supply 24 V DC |
| | Type C12 CCS | For vibration only Power supply 24 V DC [1] |
| Installation accessories like: | AC-2104 | Terminal protective housing for max. 2 vibration sensors, standard |
| | AC-2105 | Terminal protective housing for max. 2 acceleration sensors, Ex-protection (Exi) |
| | AC-2103 | Terminal protective housing for max. 2 velocity sensors, Ex-protection (Exe) |
| | AC-112 | Signal cable, shielded, 4 x 0.5 $mm^2$, for acceleration sensor |
| | AC-114 | Signal cable, shielded, 4 x 0.5 $mm^2$, for acceleration sensor, Ex protection (Exi) |
| | AC-186 | Signal cable, shielded, 2 x 0.75 $mm^2$, for velocity sensor, Ex protection (Exe) |
| | AC-2201 | PU-sheathed steel protective conduit, minimum order length 5 m |
| | AC-2202 | Protective conduit fittings M 12 x 1.5, delivery extent: 2 pieces |
| | AC-2304/16/12 | Reducers for protective conduit fittings from M 16 x 1.5 to M 12 x 1.5; 10 pieces |
| | AC-352 | Mounting bolt for acceleration sensors |
| | AC-354 | Stepped drill for mounting bolts |
| Acceleration sensors | AS-022 | Any measurement direction, 5 m cable with central threaded mounting hole |
| | ASA-022 | Any measurement direction, 5 m cable, Ex-protection II 2G Ex ia IIC T6/ II 2D Ex iaD 21 T=145°C [2] |
| | AS-030 | Any measurement direction, without cable, with Fast-On lugs, with protective cap |
| | AS-062 (CCS) | Any measurement direction, 5 m cable with central threaded mounting hole |
| | ASA-062 (CCS) | Any measurement direction, 5 m cable with central threaded mounting hole [2] |
| Velocity sensors | VS-068 | For horizontal measurement, 5 m cable |
| | VS-069 | For vertical measurement, 5 m cable |
| | VS-0168 | For horizontal measurement, 10 m cable, Ex protection II 2G Ex d IIC T6/ II 2D Ex tD A21 IP66 T=85°C [2] |
| | VS-0169 | For vertical measurement, 10 m cable, Ex protection II 2G Ex d IIC T6/ II 2D Ex tD A21 IP66 T=85°C [2] |
| Accessories for Ex protection | AC-293 | Safety barriers, complete for one acceleration sensor ASA-02x with Ex protection |

Accessories for computer connection and network operation, e.g. interface converters, special cables, over-voltage protection equipment and further installation accessories on enquiry.

[1] only with acceleration sensor with constant-current power (CCS)

[2] ATEX certificates and datasheets are available on our homepage for download

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