2-channel Monitor

type VMSH

Application

Monitor type VHSM is intended for measurements of rotating machinery shaft eccentricity and relative vibrations in slide bearings, absolute vibrations of bearing housings, shaft axial position in thrust bearing, rotor thermal relative expansion , casing thermal absolute expansion, valve position .

Module mates with TECHNICAD eddy current proximity MDS sensors and eddy current contact LDS sensors, providing measurement signal of measured quantity of -4 to -20V. During absolute vibration measurement, module mates via VA1-INT interface with piezoelectric vibration sensors conforming to ICP$^®$ standard, measuring both vibration acceleration and velocity, and with electro-dynamical vibration sensors.

Description

The VMSH monitor is built based on 32-bit DSP processor.   All measured quantities are determined numerically and sent as a response to superior system (master) queries. Module functions as a slave. Data are transmitted via RS485 link using MODBUS protocol (developed by Modicon, commonly used in PLC, SCADA and DCS type systems). Single module is equipped with two measurement channels and single input for phase marker impulses for synchronization and rate of rotating speed measurement.

Monitor provides outputs of values of specific measured parameters, proper for specific measured quantities (channel configuration). It also informs on common channel and monitor status, independent on channel configuration.
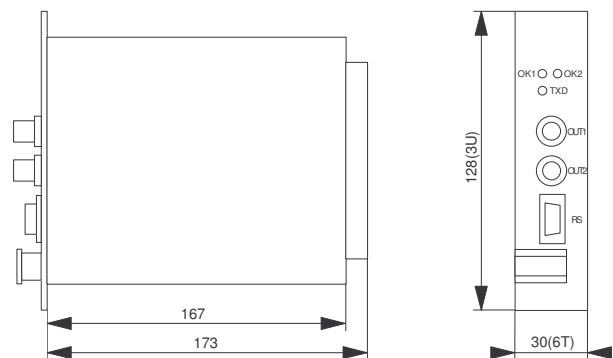

Monitor status:
OK: informs that the instrumentation amplifier works properly
Configuration type: informs on measurement quantity, for which the module was configured
Configuration error: Informs that the module configuration is wrong
Channel status:
OK: informs that the measurement channel works properly

Alert/alarm: informs on any of binary output activation connected with exceeding of channel threshold values (it is possible to define one, two or more threshold values of all measured parameters)
Alert/alarm identification: informs, which of the measured parameters caused the alert/alarm status activation
Bypass: informs, that some or all binary outputs connected with a channel are suppressed

Module software allows to determine under mentioned data and parameters from both measurement channels:
  ➢ sequence of samples in time (synchronous for both channels)
  ➢ dynamic signal root-mean-square value **RMS**
  ➢ dynamic signal mean value **Mean**
  ➢ sensor working gap **Gap**
  ➢ maximum and minimum dynamic signal actual value **Peak Plus**, **Peak Minus**
  ➢ peak to peak value **Peak to Peak**

- dynamic signal peak value **Peak**, as a higher absolute value out of Peak Plus and Peak Minus values
- signal amplitude spectrum
- amplitudes and phase angles of first **H1,F1** and second **H2,F2** signal harmonic (vectors)
- vector sums sequence of actual amplitude from both channels (shaft motion trajectory)
- maximum shaft relative displacement in bearing **Smax** (single value for both channels)
- rate of rotation calculated based on phase marker impulse **RPM**
- Proportional value of measured quantity for static channels **Direct**

Measured quantities, depending on the module purpose, are set by a program via user interface, allowing also loading of threshold values of measured parameters and other data, connected with channel and module configuration.

Protection (binary outputs for threshold value exceeding, usually two for each channel) may be realized from any of the above parameters, assigned to the measured quantity.

Module programming (configuration) may be realized via RS232 socket located at the cap plate or remotely by workstation via RS485 serial link.

Performances

METROLOGICAL
Signal input: 2 x -2 to -22 V
Phase marker input: TTL (0 to +5 V)
Input impedance: 10kΩ
Input sensitivity:
Loaded by the program during configuration
Analogue output:
   AC : 2 x (-10 to +10V)
   DC : 2 x (0 do +5 V) proportional to one of the measured parameters
   Front panel BNC connector: AC or DC buffered analogue signal
Digital output: RS 232/RS485 with MODBUS RTU protocol
Binary output: 6 x OC (two for threshold values and one for circuit inefficiency of both channels).
Alarm thresholds are set by software at the range of 0-100% of the parameter range. Binary output delay is set by the software at the range of 0,1 - 60s.
Supply voltage output to proximity transducer: -24VDC
Front plate diodes:
OK1 and OK2: Informs that the measurement channels (respectively 1 and 2) work properly
TXD: Informs if module communicates with superior system

MEASURED QUANTITIES AND PARAMETERS
Relative vibrations: Peak to peak, Gap, Amplitude 1H, Phase angle 1F, Amplitude 2H, Phase angle 2F, Amplitude Smax
Eccentricity: Peak to peak, Peak Plus, Peak Minus, Gap
Axial position: Direct, Gap
Relative expansion: Direct, Gap
Absolute expansion: Direct
Valve position: Direct
Absolute vibrations: RMS and peak values of acceleration and velocity at the vibration acceleration sensor input and RMS and peak values of velocity at the vibration velocity sensor input

ELECTRICAL
Power consumption: nominal <3W

ENVIRONMENTAL
Ambient temperature range: 0^0C to +65^0C
Relative humidity: 95% no condensation

MECHANICAL
Rack space: 3U/6T x 160
Dimensions (H x W x D) 128x30x167
Weight: 170g
Casing material: aluminum front panel
Leakproofness rate: IP00

Ordering information
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         A      B
VMSH- ❏ ❏ – ❏ ❏
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Options specification
A ❏ ❏ Measurement circuit name for channel 1
   0 1 Relative vibrations
   0 2 Eccentricity
   0 3 Absolute vibrations
   0 4 Axial position
   0 5 Relative expansion
   0 6 Absolute expansion
   0 7 Valve position
B ❏ ❏ Measurement circuit name for channel 2
   0 1 Relative vibrations
   0 2 Eccentricity
   0 3 Absolute vibrations
   0 4 Axial position
   0 5 Relative expansion
   0 6 Absolute expansion
   0 7 Valve position
In case of 01-03, both channels has to be configured in a same way.
In case of 04-07, channels 1 and 2 may be configured differently.