VIBROSYSTM MD / ®

ISO 9001

DMV™-100

ROTOR CREEP AND SPEED DETECTOR

DESCRIPTION

The DMV™-100 Rotor Creep and Speed Detector has two purposes: to detect and annunciate slow rotor motion (creep) and to measure rotational speed (RPM). It notifies when machine is at standstill, safeguards against unexpected rotor motion, and provides RPM to external devices.

It consists of a VM 3.1 ˈCapacitive Sensor, a 10 m *(32.8 ft)* extension cable, a DCC-631 Signal Conditioner, a 30 m *(98.4 ft)* power and output cable, and a DMV™-100 Monitor (rack-mount unit).

The noncontact sensor detects rotor motion by sensing air gap variations as poles pass by. While machine operates, the conditioner produces a 1/pole pulse. Its primary relay activates when gap variation stops for over 25 seconds. **A 1/2 pole motion instantly de-energizes relay (Δ 5 mm *(196.8 mils)***. The monitor displays rotor status (LEDs) and activates the main power relay for connection to automation system or annunciation devices. The pulse signal is processed by a programmable tachometer which displays real-time RPM and provides a proportional 4-20 mA output to external device.

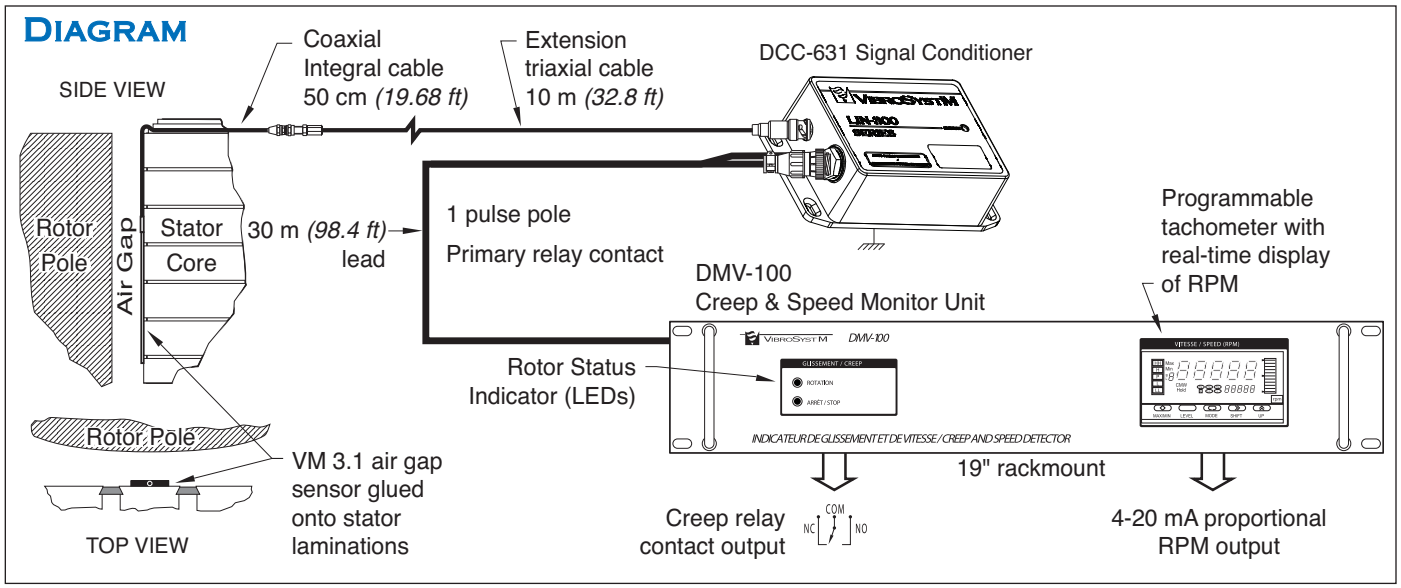
APPLICATIONS

- Detection of rotor motion and RPM on generators and large electric motors with salient poles
- Notify automation system when the machine reaches standstill, safeguard against unexpected rotor motion
- Provide RPM output to external instrumentation

FEATURES

- Comprizes:
  - VM 3.1 Air Gap ˈCapacitive Sensor (noncontact, extended range: 5–50 mm / *196.8–1968.5 mils*)
  - Fixed-length extension cable (10 m / *32.8 ft*)
  - DCC-631 Signal Conditioner (built-in primary relay and 1/pole pulse outputs)
  - 30 m (*98.4 ft)* cable link
  - DMV™-100 Monitor (2U rack-mount unit, built-in main power relay for creep detection and, digital tachometer)
- Triggering incident:
  - non-changing air gap for a period of 25 seconds (i.e. rotor not in motion) energizes relay,
  - 1/2 pole motion **instantly** de-energizes relay (Δ 5 mm *(196.8 mils)*
- Front-panel display of rotor status (LEDs – Rotation vs. Stop) and real-time rotational speed (5-digit meter)
- Outputs of creep detection (main power relay – NO and NC contacts available) to SCADA or annunciation device and proportional 4-20 mA signal of RPM to external metering or monitoring devices

DIAGRAM



DMV™-100 Rotor Creep and Speed Detector
DCC-631 Main Specifications

Operation

• Matching Sensor	VM 3.1
• Detection Range	Extended to 5 to 50 mm *(196.8 to 1968.5 mils)*
• Output Signal	
- System Stopped	0VDC
- Machine in Rotation	0VDC
- Machine Stopped	+24VDC, 60 mA max
• Accuracy	<5% of reading
• Repeatability	±0.6% of reading
• Interchangeability	±5% of reading
• Frequency Response	
Min.	DC to 1 kHz (-3 dB)
Typical	DC to 1.2 kHz (-3 dB)
• Temperature Drift	<500 ppm/°C

Power Requirement

• Voltage	+24VDC ±15%
• Consumption	90 mA typical (+24VDC)
• Protection	auto-reset fuse

Connection

• Cable from Sensor	SMA connector (female) and grounding screw
• Power & Output Cable	M12 male connector

Environmental

• Temperature:		
- Operation	0°C to 55°C	*(32°F to 131°F)*
- Storage	0°C to 85°C	*(32°F to 185°F)*
• Humidity	Up to 95% non condensing	

Physical Characteristics

• Module Body	Die-cast aluminium
• Dimensions	
- A- Height	44.5 mm *(1.75 in.)*
- B- Width	82.5 mm *(3.25 in.)*
- C- Length	139.5 mm *(5.5 in.)*

Matching Triaxial Cable

• Type	Triaxial 100% shielded
• Length	
- Nominal	10 m *(32.8 ft)*
- Minimum	9.5 m *(31.2 ft)*
• Connectors	
- On Sensor End	SMA connector (female) and lug-terminated grounding wire
- On Conditioner End	SMA connector (male) and lug-terminated ground lug bolt
- Minimum Bending Radius	5 cm *(2 in.)*

Contact Output (Built-in Primary Relay)

• Type	Dry contact SPST, normally opened
- Unit rotating	Opened
- Unit stopped	Closed, $t_{stop\ delay}$ >25 sec.
• Sensitivity	
- Stopped to rotation	Δ air gap >5 mm *(197 mils)*,
Time to react	Instantaneous
- Rotation to stopped	Δ air gap <5 mm *(197 mils)*,
Time to react	25 sec. after stop

Pulse Output

• Type	NPN, open collector 1 pulse per pole

Connection

• Sensor side (VM 3.12)	
- Connector	Female bayonet
• DMV™-100 Monitor side	
- Connector	9-pin male CPC socket
- Cable	4-pair shielded
- Length	30 m *(98 ft)* lead with female CPC socket at one end and flying leads at other end

Power Supply

• Input Voltage	+24 VDC ± 15% [300 mA]
• Power Consumption	7 W
• Fuse	0.5 A slow-blow

DMV™-100 Rotor Creep and Speed Detector
DMV™-100 Monitor Unit
Main Specifications

- 2U, 19" rack-mount
- Creep detection relay output
- Rotor status LED display (rotation/stop)
- Rotational speed 5-digit display and 4-20 mA output

Overall

Connection

• DCC-631 Power and Output	Removable 8-screw terminal
• Relay Contact Output	Removable 3-screw terminal
• RPM Output	Removable 3-screw terminal
• Power from Main	Removable 3-screw terminal

Supply

• Input Voltage	85-264 VAC, 105-370 VDC
• Input Frequency	47-440 Hz
• System-wide Consumption	15.9 W max
• Fuse	Two 0.50 A, slow-blow

Environmental

• Temperature Range	
- Operation	0°C to 50°C *(32°F to 122°F)*
- Storage	-20°C to 65°C *(-5°F to 150°F)*
• Humidity	Up to 90% noncondensing

Dimensions

• Height	89 mm	*(3.5 in.)*
• Width	483 mm	*(19.0 in.)*
• Depth	305 mm	*(12.0 in.)*
• Weight	7.25 kg	*(16 lb)*

Creep Detection Section

• Input from DCC-631	Dry contact from primary SPST relay
• Front-panel LED Indicators	
- GREEN	Rotor stopped, Relay energized
- RED	Rotor moving, Relay de-energized
• Output to user equipment	Dry contact, DPDT relay Normally Opened (NO) and Normally Closed (NC) available, from main power relay
• State	As per DCC-631 output
- System OFF	Opened / De-energized
- Unit Rotating	Opened / De-energized
- Unit Stopped	Closed / Energized
	$t_{\text{stop delay}}$ >25 sec.
• Relay Power Requirement	+24 VDC
• Relay Contact Ratings	Resistive load
- Limitations	10 A @ 24 VDC, 0.5 A @ 110 VDC, 5 A @ 250 VAC,
- Maximum Voltage	250 VAC/125 VDC
- Maximum Current	10 A
- Switching Capacity	1100 VA, 240 W

Rotational Speed Detection Section

• Meter	Digital tachometer, front-panel display / keypad, programmable RPM range
• Input Signal	1/pole pulse, NPN-type
• Input Range	0.0005 to 50,000 pulses/sec.
• Accuracy @ 23°C (±5°C)	0.006% of reading ±1 digit
• Internal Transfer Formula	RPM = nbr pulses/sec. x 60 x α (α = 1/nbr poles)
• Front-panel Display	5-digit LCD, real-time RPM
• Output Signal	4-20 mA, proportional to programmed RPM range
• Output Resistive Load	500 Ω max.

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