DM-100 Creep Detection System
Installation Manual

(P/N: 9428-25I4A-500)

This manual divides into the following sections:

Section 1: Overview of the DM-100 Creep Detection System

Section 2: VM3.12 Air Gap Sensor Installation

Section 3: Triaxial Extension Cable Installation

Section 4: DCC-631 Module Installation

Section 5: Power Supply and Auxiliary Relay Installation

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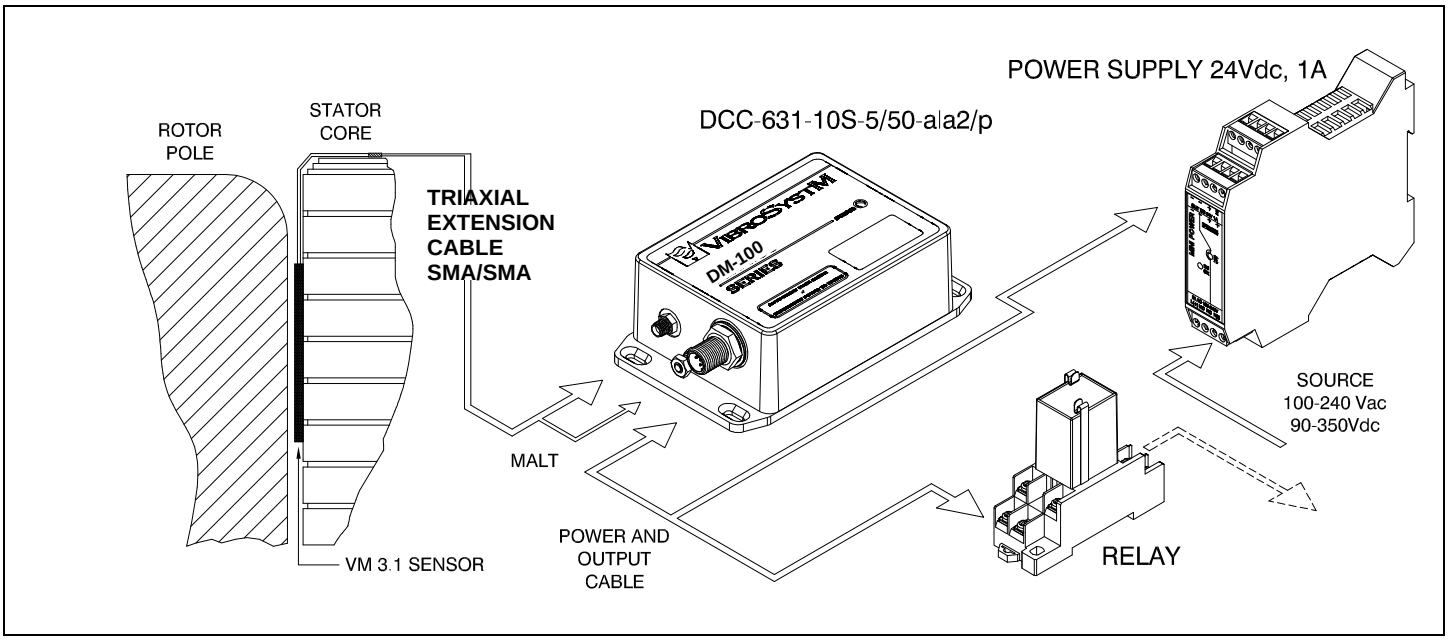
1. DM-100 CREEP DETECTION SYSTEM OVERVIEW



The purpose of the DM-100 Creep Detection System is to detect rotor motion (creep), and provide a mean of triggering a remote alarm warning of unexpected rotor movement during maintenance, or a signal confirming standstill status.

The DM-100 System is comprised of:

Qty	Description
1	VM3.1 Capacitive Air Gap Sensor
1	10 m *[33 ft.]* Triaxial Extension Cable - Model 10S
1	DCC-631-10S-5/50-ala2/p Signal Conditioner Module
1	Standard M12 terminated cable for power input and signal output to the Auxiliary Power Relay
1	$+24V_{DC}$ Power Supply
1	Auxiliary Power Relay on a mounting socket to trigger a remote creep detection alarm

Note: The $+24V_{DC}$ power supply, DCC-631 module, and auxiliary power relay must be placed inside a protection enclosure. A $100\text{-}240V_{AC}$ or $90\text{-}350V_{DC}$ source must be available for the $+24V_{DC}$ power supply inside this enclosure.

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1.1 Safety information

This manual contains information and warnings that must be observed to keep instruments in a safe condition and ensure safe operation.

Warning - Danger messages identify conditions or practices that could cause bodily harm, and result in damage to the measuring chain and other equipment to which it is connected.

Caution messages identify conditions or practices that could result in permanent loss of data.

Warning - Danger
• To use the described measuring chains correctly and safely, read and follow all the safety instructions or warnings given throughout this manual. • To avoid electric shock, personal injury, or death, carefully read the information under “Safety Information” before attempting to install, use, or service the measuring chains. • In addition, follow all generally accepted safety practices and procedures required when working with and around electricity. • For safe operation and to ensure that your system functions at its optimum capability, the installation and adjustment process should be handled only by VibroSystM trained service specialists.

- Although most instruments and accessories are normally used at non-hazardous level voltages, hazardous conditions may be present in some situations.
- This product in intended for use by qualified operators and maintenance personnel who recognize shock hazards and are familiar with the safety precautions required to avoid possible injury. Read and follow all installation, operation, and maintenance information carefully before using the product.
- Install and use the measuring chains only as specified in this manual, or the protection provided by the measuring chain might be impaired.
- Do not use the measuring chain in wet environments.
- Whenever it is likely that safety protection has been impaired, make the measuring chain inoperative and secure it against any unintended operation.
- Have the DCC-631 modules serviced only by qualified service personnel.
- AC-input connection to power supply:

  When AC-input to the power supply is present, easily accessible external disconnecting device must also be present. For safety purposes, a 15A circuit breaker should be included in the AC-input wiring. The disconnect and circuit protection functions may be provided by two separate devices (such as a toggle switch, and a circuit breaker), or by a combined circuit breaker interrupter. Several instruments may be connected to a circuit protected by a circuit breaker, but each instrument must have its own disconnect device.

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- Safety and electrical symbols that appear in this manual and on the material:

	emphasizes important information.
	Caution - identify conditions or practices that could result in permanent loss of data.
	Warning - Danger - identify conditions or practices that could cause bodily harm, and result in damage to the measuring chain and other equipment to which it is connected. Conditions include a risk of electric shock (voltage > 30 V_{DC} or V_{AC} peak might be present).
	Do not apply paint or other coating.
	Earth (ground) terminal.
	Category 1 protective conductor terminal, including grounding and equipotential protection.

1.2 Planning and installation requirements

Respect the following guidelines when planning your equipment configuration:

- The signal linearization module and power supply module must be kept away from sources of electrically conductive dust, as well as oil, water or moisture.
- Allow sufficient clearance around the protection cabinet for verification and maintenance of enclosed components.
- Each component generates heat. When placing components in an enclosed rack, enough ventilation and air circulation must be provided, with the addition of fans and exhaust at adequate locations to keep enclosed rack pressure if needed.
- Cabling must be kept away from sources of electrical noise, power lines and fluorescent lighting fixtures.

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1.3 DM-100 System - General specifications

Operation

• Sensor	VM 3.12
• Matching linearization modules	DCC-631-10S-5/50-ala2/p
• Power requirement	100-240V_{AC} 50-60Hz, 90-350V_{DC} (for 24V_{DC} Power Supply)
• Output	contacts (through auxiliary DPDT relay)
• Trigger/release of auxiliary relay:	
- Standstill to rotation (air gap variations > 5 mm *[197 mils]):*	instantaneous
- Rotation to standstill (Stop) (air gap variation < 5 mm *[197 mils]*):	after 25 seconds

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2. INSTALLATION OF THE VM 3.12 AIR GAP SENSOR

2.1 Preliminary considerations

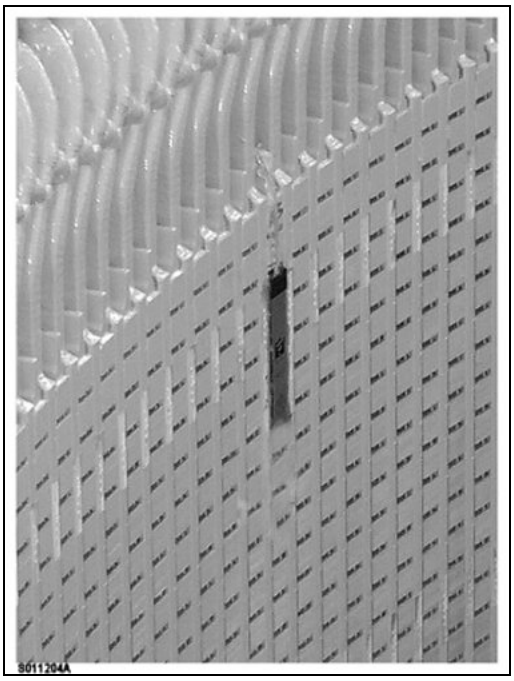

Figure 1 : VM 3.12 Air Gap Sensor on a stator wall

- The VM 3.12 sensor is a flat, non-contact sensor using capacitive technology to measure the distance from its face to a target (ex.: rotor poles). The target may be any conductive or semi-conductive surface. The raw signal is transmitted via a triaxial extension cable to an electronic module for processing. The resulting signal is sent to an acquisition unit, control unit, or any other instrument compatible with this signal.
- When a system requires several VM 3.12 sensors, the sensors must be installed as symmetrically as possible around the stator wall.
- The target surface must be parallel to the sensor detecting surface. The sensors must therefore be glued against the stator wall at a position where they will face the plane area of the rotor poles, usually beneath the second ventilation hole.

- The length of the integral cable, 50 cm (19.7 in) limits the depth at which the sensor can be glued, since the connector must remain on top of the stator at all times.
- The integral cable must also be glued tight against the wall of the stator, and covered with a bead of silicone to protect the cable.

Warning - Danger

- **Integral cables must be installed on the stator core or a grounded surface to avoid disrupting the equipotential.**
- **Never install triaxial cables on high voltage components.**
- **Never install the sensor over a wedge, always install on stator core laminations.**
- **Avoid using silicone or PVC based products and components when installing the sensors in an hydrogen-cooled machine.**

- Handle the sensor with great care.
- Never pull on the triaxial cable or on the connector.
- Do not apply paint or silicone on the sensor sensing surface.

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2.1.1 Needed Supplies

Figure 2 : Sensor installation kit, sandpaper and cleaning rags

- clean dry cloth
- fine sandpaper (with non metallic particles)
- a sensor installation kit including:
  - glue (Loctite 330) and its activator (Loctite 7387) or equivalent
  - silicone (3145RTV) or equivalent

2.2 Step by step installation of the VM3.12 Sensor

2.2.1 Preparation of Stator Surface

After choosing the location where the sensor should be installed, clean the stator surface to remove oil and carbon deposits. This step must not be neglected as sensor adherence depends on the preparation of the surface.

1. Clean the stator surface with a clean dry cloth.
2. Run fine sandpaper on the stator surface, straight along the laminations. Make sure only non-metallic paper is used.
3. After sanding, clean the stator surface again with a dry cloth.

2.2.2 Glueing the VM3.12 Sensor

⚠ Caution
• **Sensors must be glued on stator core laminations, and NEVER ON THE WEDGES.** • The glue bonds and sets quickly. All preparation must be completed before applying the glue.

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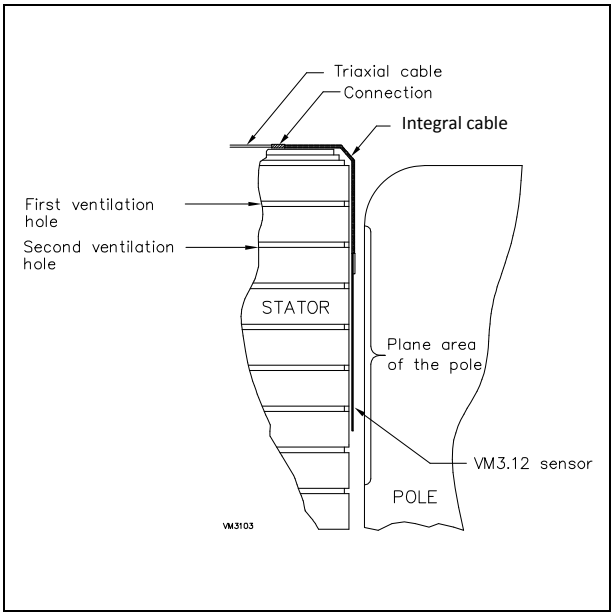

1. If needed, clean the back of the sensor with a clean dry cloth.
2. Apply glue on the back surface of the sensor. Spread glue to a thin and even coat, which will not run down when the sensor is pressed against the stator.
3. Apply the catalyst over the glue on the sensor.
4. Position sensor on the clean surface of the stator. The top of the sensor must face the plane area of the rotor poles, usually beneath the second ventilation hole.
5. Pivot sensor slightly in order to spread the glue evenly and then reposition vertically. Hold in straight position for 60 seconds.
6. Temporarily fasten the integral cable with adhesive tape so that it does not hang into the air gap or gets pulled inadvertently.

Figure 3 : Lateral view of VM 3.12 sensor installed below second ventilation hole

You will need to glue the integral cable to the stator wall, but only after having completed the installation of the extension triaxial cable. Finally, you must also apply a fine bead of silicone around the sensor edges and over the integral cable to prevent damage from dirt and particles, and protect the sensor edges from deterioration.

2.3 VM 3.12 Sensor - General specifications

Operation

• Linear measuring range	varies depending on linearization module used
• Frequency response	limited by linearization module
• Interchangeability	± 5 %

Environmental

• Temperature range	0° to 120°C *[32° to 248°F]*
• Magnetic field	up to 2 Tesla (50 Hz or 60 Hz)
• Dust and oil contamination	small deposits have no effect on performance

Connection

• Integral Cable	
- Type	coaxial
- Length	50.0 cm *[19.68 in.]*
• Connector	SMA plug (male contact)

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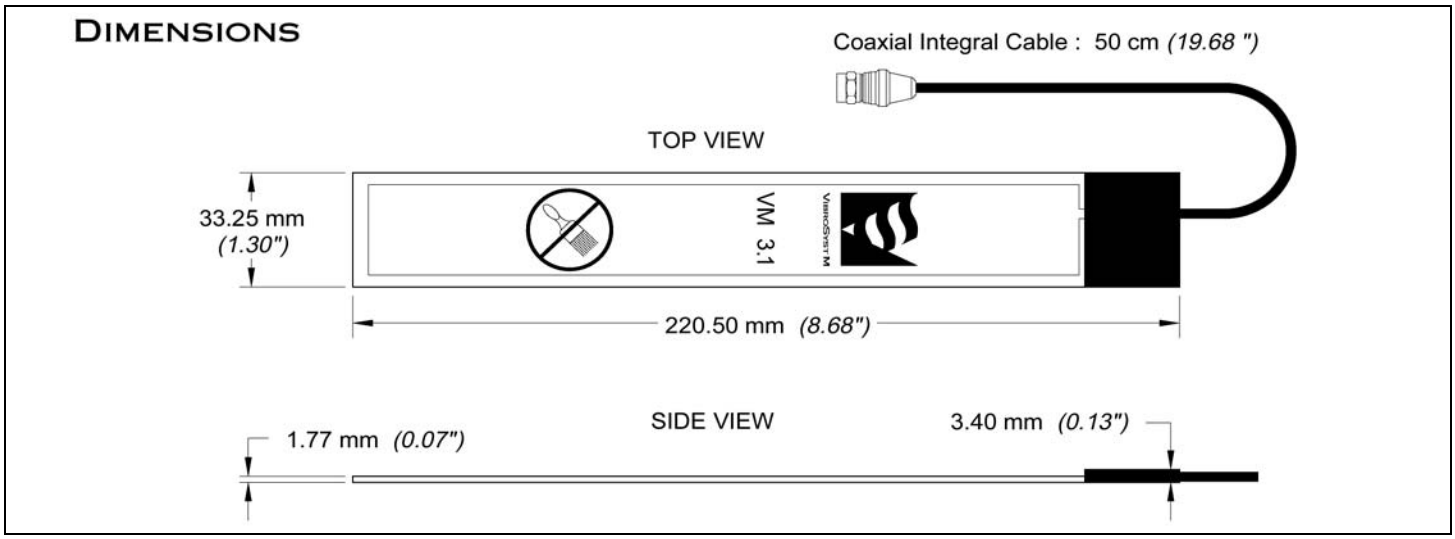
Dimensions

- Probe overall dimensions

- Height	220.5 mm	*[8.68 in.]*
- Width	33.25 mm	*[1.30 in.]*
- Thickness	1.77 mm	*[0.07 in.]*
- Clearance	3.40 mm	*[0.13 in.]*



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3. INSTALLATION OF THE TRIAXIAL CABLE FOR THE DM-100 SYSTEM

3.1 Preliminary considerations

WARNING - DANGER

Never install triaxial cable on high voltage components.

CAUTION

Triaxial cables are calibrated and must never be cut or altered.

- Installation of the triaxial cable usually follows that of the sensor.
- Before installing the triaxial cable, it is important to determine where the protection box containing the signal conditioner module will be installed, keeping in mind the maximum length of the triaxial cable. The cable must be protected by a combination of conduit, protective tubing, and heat-shrinkable tubing

The ground lugs must be electrically connected on BOTH ends of the triaxial cable. On the sensor end, the ground lug must be connected to the stator frame. On the signal conditioner end, the ground lug must be connected to the signal conditioner grounding screw.

Table 1: Characteristics of the triaxial cable for the DM-100 System

Cable Type	Description	Length	Connector Type	
			On sensor end	On module end
10S	Triax “S” SMA-SMA	10 m *[33.5 ft.]*	SMA (female)	SMA (male)
Note: Due to the calibration process, the triaxial cable may be shorter than its typical length. The minimal length for a Type 10S cable is 9.5 m *[31.2 ft.]*.				

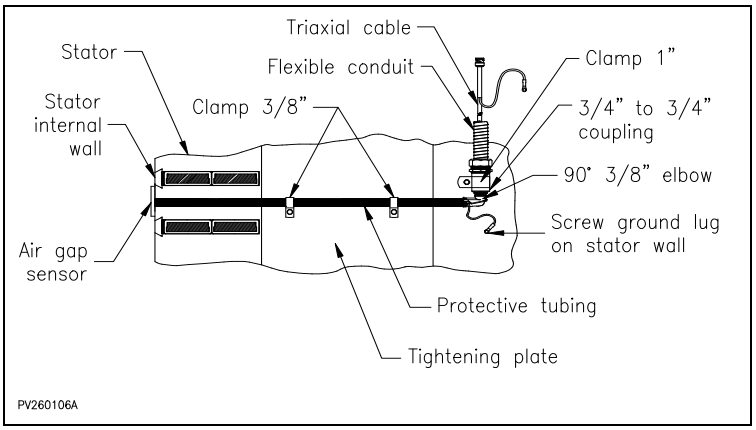

Figure 4 : Holding down protective tubing and elbow assembly with clamps

Clamps must be used to hold down all components subjected to vibrations. This step is essential to prevent damage by abrasion.

Two sizes of clamps are used to secure the protective tubing and elbow assembly to the stator.

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3.1.1 Supplies needed

Figure 5 : Hardware included in the installation kit for one triaxial cable

- triaxial cable installation kit comprised of:
  - two (2) 24” lengths of 1/2” protective tubing
  - one (1) 3/4” watertight connector
  - one (1) 90° 3/8” elbow
  - one (1) 3/4” to 3/4” coupling
  - one (1) 3/4” to 1/2” reducer
  - one (1) piece of 3/8” heat-shrinkable tubing
  - three (3) 1/4-20 x 5/8” hexagon cap screws
  - three (3) M6-1,00 x 16mm metric hex screws
  - three (3) 1/4” flat washers
  - three (3) 1/4” spring lock washers
  - two (2) 3/8” clamps for the protective tubing
  - one (1) 1” clamp for the elbow assembly
- 3/4” flexible conduit (not included)
- glue (Loctite 404 or equivalent)
- liquid thread locker (Loctite 242 or equivalent)

3.1.2 Tools needed

- assorted drill bits and taps
- heat gun for heat-shrinkable tubing
- cutters or saw for protective tubing
- fish-tape
- two 8mm (or *[5/16”]*) flat wrenches
- screwdriver (flat or Phillips # 2)

3.2 Step by step installation of the triaxial cable

3.2.1 Preparation

Trace a path for the flexible conduit from the elbow assembly (on top of the stator) to the location of the protection box or cabinet housing the signal conditioner module. Keep in mind that the triaxial cable has a maximum length which cannot be extended.

WARNING - DANGER
Triaxial cables must be installed on the stator frame or a grounded surface to avoid disrupting the equipotential.

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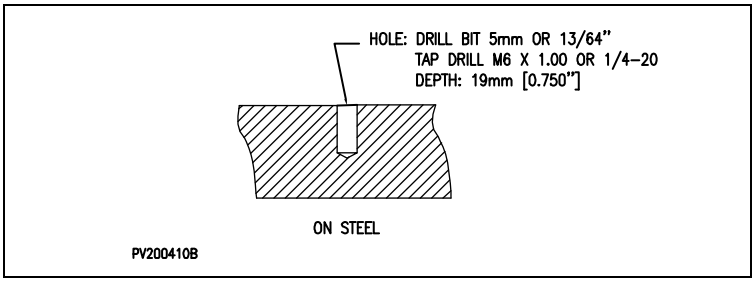

Figure 6 : Preparing the holes for the clamps

1. Prepare the holes for the clamps.

3.2.2 Installation of triaxial cable - sensor end

WARNING - DANGER

The protective tubing supplied with the installation kit must be installed on top of the stator core and frame assembly (connected to earth ground).

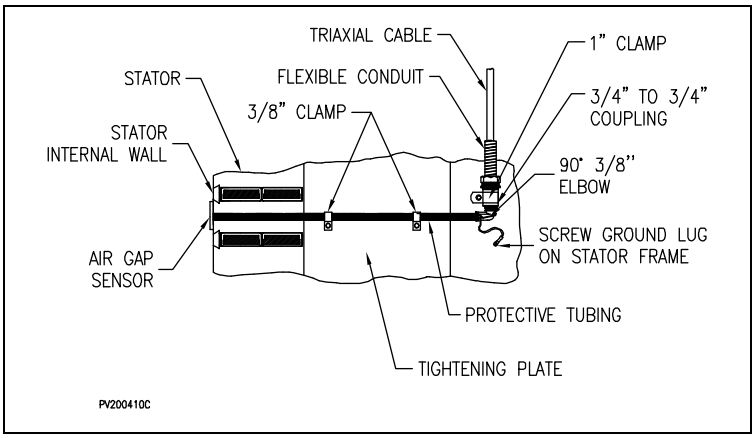

Figure 7 : Installation on top of the stator

1. On top of the stator, protective tubing must be installed to protect the triaxial cable and its connection to the sensor.

   Cut the tubing to the right length so that it will not extend beyond the stator edge. The tubing can be heated and bent. Install the tubing in close contact, as much as possible, with the top of the stator frame.

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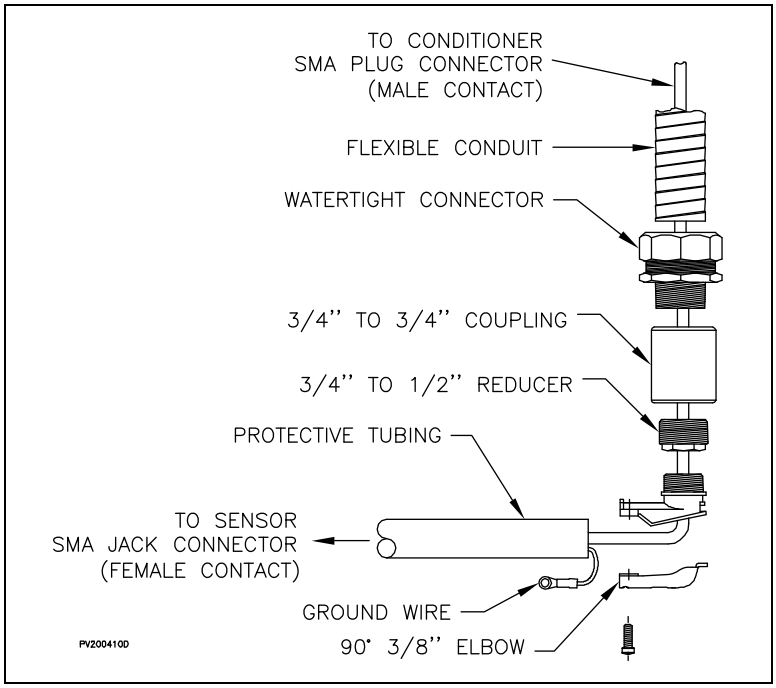

Figure 8 : Detailed view of the elbow assembly

2. Attach the 3/4 to 3/4 coupling and the 3/4 to 1/2 reducer to the 90° 3/8" elbow. Temporarily leave the cover of the elbow open, to allow pulling the triaxial cable.
3. Carefully pull the end of the triaxial cable terminated with a SMA jack (female contact) connector into the elbow assembly and protective tubing. Use a fishtape if needed.

   Pull out just enough extra length to work on the connection, without pulling the ground wire completely into the protective tubing.

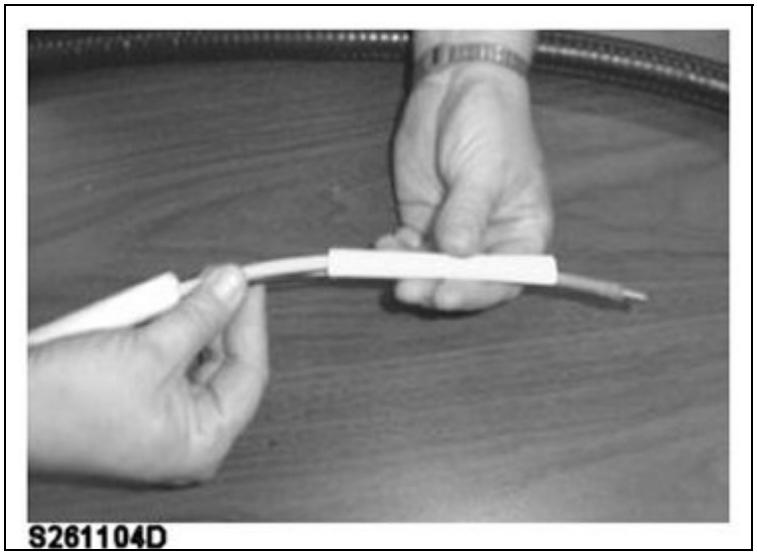

Figure 9 : Heat-shrinkable tubing on the cable

4. Slip a piece of heat-shrinkable tubing on the portion of triaxial cable sticking out of the protective tubing.

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Figure 10 : Attaching the SMA connector to the SMA jack

5. Attach the SMA plug from the sensor cable to the SMA jack at the end of the triaxial cable. Use two 8mm (or *[5/16”]*) flat wrenches to tighten the connection firmly.

Recommended connection torque: 1.7 Nm *[15 lb-in]*

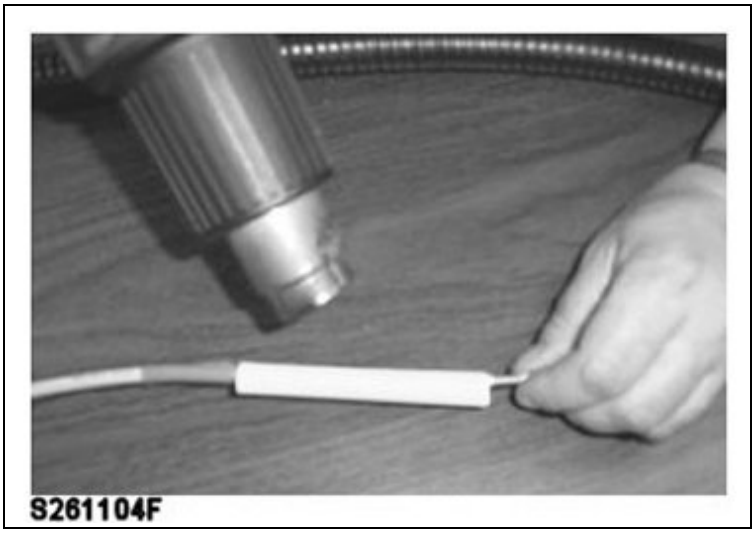

Figure 11 : Heating the heat-shrinkable tubing over the connection

6. Slide the heat-shrinkable tubing over the connection and shrink the tubing with a heat gun.

   The heat-shrinkable tubing must be placed over the SMA connection to prevent accidental short-circuits between SMA connector and metallic parts such as flexible conduit, stator frame, etc.

The heat-shrinkable tubing must cover the whole SMA connection to ensure insulation and secure the connection.

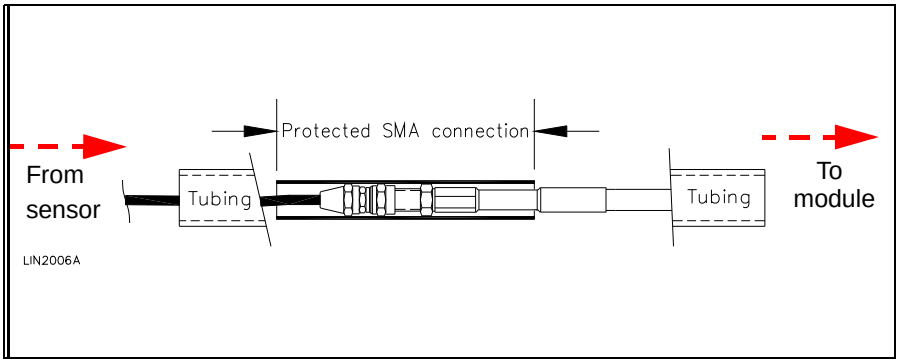

Figure 12 : Pulling the SMA connection into the protective tubing

7. Pull the connection inside the tubing, just enough to straighten the cable and eliminate slack.

   Using instant adhesive (Loctite 404 or equivalent), glue the sensor’s integral cable against the stator from the sensor to the protective tubing opening.

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Figure 13 : Grounding wire out of the elbow assembly

8. Carefully remove the slack between the protective tubing and the elbow assembly. Leave just enough slack to allow for thermal expansion and contraction.

   Install the cover on the 90° 3/8” elbow, and attach the assembly to the protective tubing.

   Let the grounding wire exit the assembly through the open space that remains between the body and cover, near one of the screws.

   The elbow must be firmly clamped to the protective tubing.

Figure 14 : Attaching the grounding wire to the structure through a cable clamp

9. The grounding wire must be attached to the grounded structure.

   Adequate installation of the ground wire to the grounded structure is essential for reliability of results.

   It is common practice to attach the ground lug to the structure through a cable clamp. When doing this, however, make sure that the connection point is at the same potential level as the stator frame.

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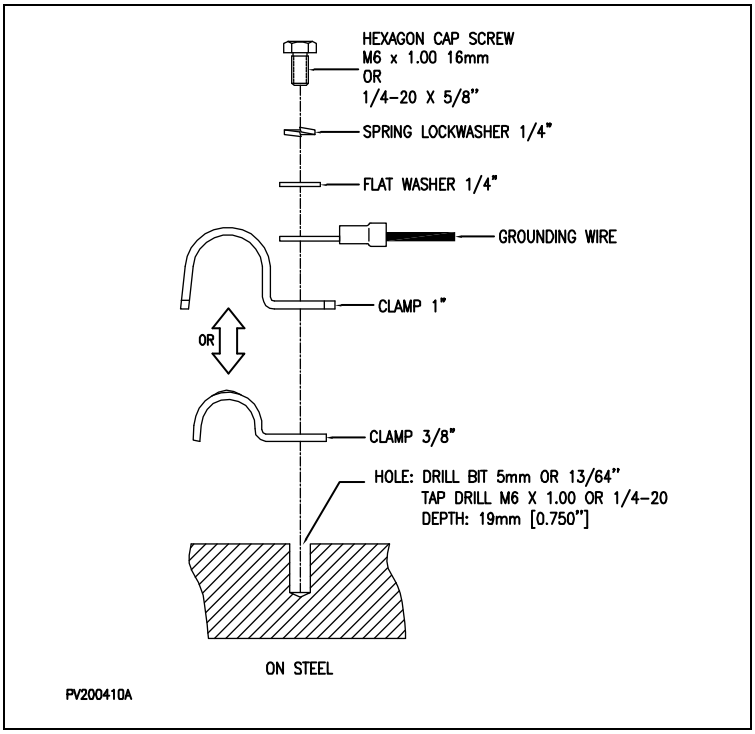

Figure 15 : Preparation of hole to install cable clamp

10. Install the cable clamps and grounding wire. Use threadlocker (Loctite 242 or equivalent) to secure the hexagon cap screws.

3.2.3 Applying silicone

CAUTION

- **DO NOT APPLY SILICONE IN HYDROGEN-COOLED LOCATIONS.**
- When applying silicone, keep the sensor face clean and free of silicone.

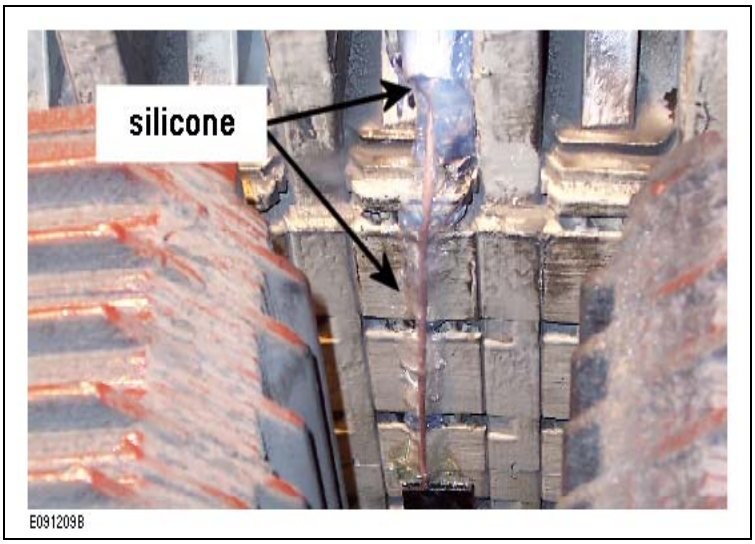

Figure 16 : Applying silicone

11. Cover the sensor's integral cable with silicone, from the top of the sensor to the edge of the protective tubing.

    To prevent cable deterioration, and dust and debris from entering, apply silicone inside the tubing to form a plug.

3.2.4 Triaxial cable installation - module end of the cable

Figure 17 : Attaching flexible conduit to a protection box

1. Install flexible tubing along the path selected for the triaxial cable, and cut the conduit to the proper length.

   Install a 19mm *[3/4”]* liquid-tight connector at the end of the flexible cable which will be attached to the cabinet or protection box housing the DCC-631 module.

> **Avoid installing two triaxial cables or more in parallel close to one another. Keep cables at least 30 cm *[1 ft.]* apart.**

> **Caution**
>
> To prevent damage to the cable when pulling it into the conduit:
>
> - protect the connector by wrapping electrical tape over it
> - proceed slowly
> - avoid placing too much tension
> - do not force beyond the minimum bending radius (5 cm *[2”]*).

2. From the module end of the flexible conduit, use a fish tape to pull (the conditioner end of) the triaxial cable into the flexible conduit.

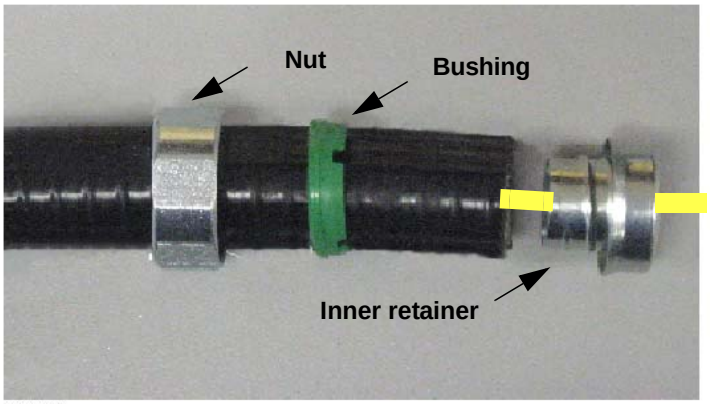

Figure 18 : Flexible conduit connector assembly

3. Remove the nut, bushing, and inner retainer from the elbow assembly, and install these components on the sensor end of the flexible conduit.

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Figure 19 : Flexible conduit attached to the elbow assembly

4. Connect the flexible conduit to the elbow assembly and tighten firmly

Figure 20 : Surplus cable stored inside a protection cabinet

5. Excess cable can be coiled and stored in the protection box.

Coil the cables individually, and keep the coils apart inside the protection box.

3.3 Triaxial cable - General specifications

Cable type	triaxial
Connectors	
- sensor end	SMA jack (female contact) and lug-terminated grounding wire
- signal conditioner module end	SMA plug (male contact) and lug-terminated grounding wire

Cable Type	Description	Length	Connector Type	
			On sensor end	On module end
10S	Triax “S” SMA-SMA	10 m *[33.5 ft.]*	SMA (female)	SMA (male)
Note: Due to the calibration process, the triaxial cable may be shorter than its typical length. The minimal length for a Type 10S cable is 9.5 m *[31.2 ft.]*.				

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4. DCC-631 MODULE FOR THE DM-100 SYSTEM

4.1 Preliminary considerations

Figure 21 : DCC-631 module from the DM-100 Series

The DCC-631 module is a specialized command instrument which controls an auxiliary power relay to announce rotor movement. An absence of air gap variation over a period of at least 25 seconds indicates the rotor has stopped moving, and the DCC-631 module then outputs +24V_{DC} to the auxiliary relay. The power to the auxiliary relay is instantly cut upon detection of signal variations from the VM 3.12 air gap sensor.

- The VM3.12 sensor connects to the DCC-631 module through a 10S Type triaxial extension cable. The nominal length of the 10S triaxial cable is 10m (*[32.8 ft.]*). The effective length of this cable may however vary by + or - 0.5m (*[1.6 ft.]*). The length of the cable is set during factory calibration and must not be altered.
- The DCC-631 must be installed close to the stator of the monitored machine.
- **The DCC-631 casing must be grounded.**
- The cast aluminium casing is not water-proof. An additional protection against dust, oil, and water is needed, particularly in harsh conditions. The DCC-631 module should therefore be installed in a water-tight enclosure or cabinet.
- A standard 2m *[6 ft.]* M12 connectorized cable is included in the DM-100 system installation kit. A longer cable (45 m *[145 ft.]*) is also available in option.
- The M12 connectorized cable serves double duty:
  - carry in the +24V_{DC} supply needed to power the DCC-631 module
  - carry out the voltage output signal which drives the auxiliary relay for creep alarm annunciation.

- The location where the DCC-631 module will be installed must meet certain requirements. Before proceeding with the installation, make sure the selected location allows:
  - drilling 4 mounting holes for mechanical installation of the DCC-631 module;
  - connection of the triaxial extension cable (from the VM 3.12 sensor);
  - connection of the power input and signal output M12 connectorized cable to/from the +24V_{DC} power supply and auxiliary relay.

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4.2 DCC-631 module installation

4.2.1 Supplies needed

Mounting screws are not included. The following must be provided:

- 4 mounting screws
- 4 lock washers
- 4 nuts (if mounting holes are not tapped)

4.2.2 Tools needed

- drill and assorted bits (and tapping kit if mounted without nuts)
- screwdriver assorted to the mounting screws used
- pliers or flat wrench for nuts, if used

4.2.3 Mechanical installation of the casing

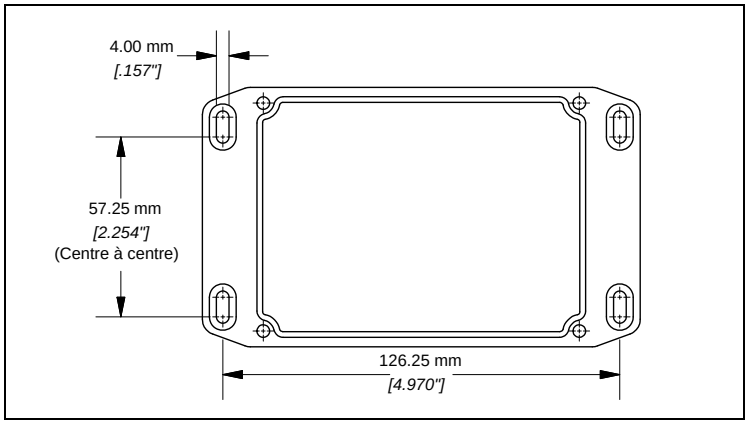

Figure 22 : Holes location for DCC-631 module

1. Drill four holes on the mounting surface as shown in the adjoining drawing.
2. Use screws and lock washers to firmly set the casing in place.

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4.3 Connection of the cables to the DCC-631 module

The triaxial extension cable connects to the SMA socket and grounding bolt. The standard M12 cable for power input and signal output connects to the M12 socket.

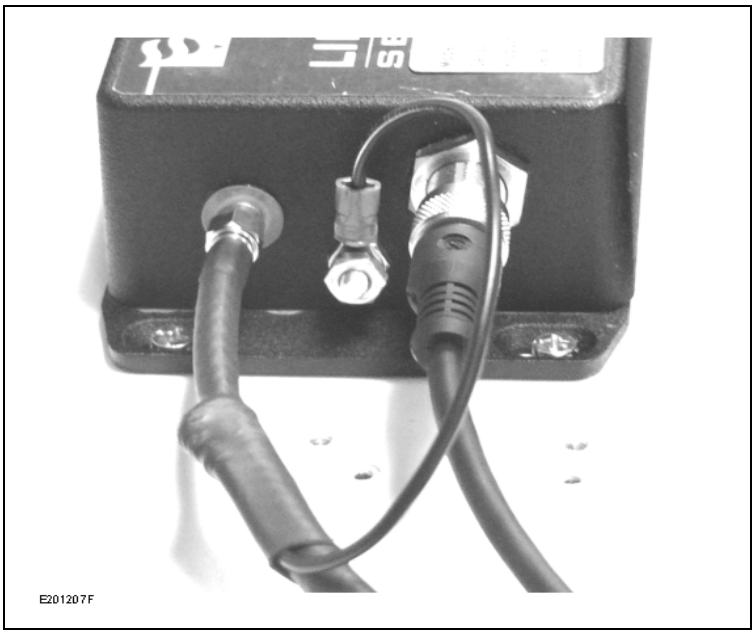

Figure 23 : Cables connected to the DCC-631 module

1. Insert the SMA male connector and engage by turning clockwise.

> **Recommended SMA connection torque: 1.7 Nm *[15 lb-in]***

2. Insert the tooth lock washer, the round lug, the spring lock washer and the nut onto the grounding bolt. Screw the nut firmly to ensure the grounding connection.

> - **Recommended grounding connection torque: 2.8 Nm *[25 lb-in]***
> - **The ground lug must not come in contact with neither SMA connector nor M12 connector.**

Table 2: DCC-631 module M12 connector configuration

M12 connect. pin	M12 cable - conductor color	Description
1	Brown	$24V_{DC}$ supply
2	White	(not used)
3	Blue	Common - grounding
4	Black	Creep detection

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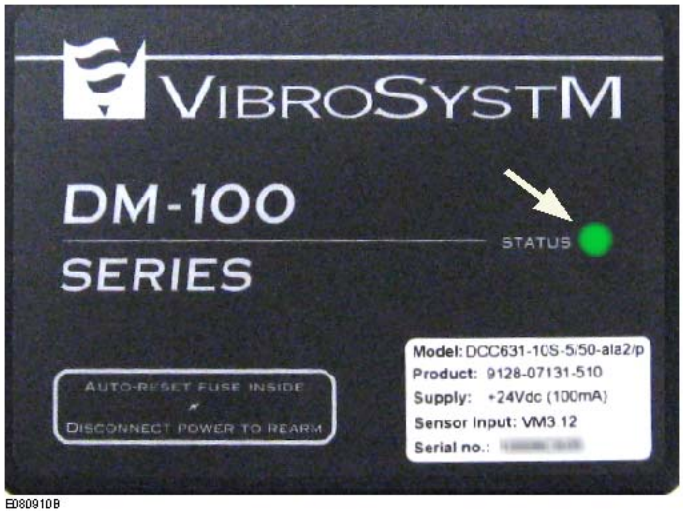
4.4 LED functionality



A colored LED provides a visual clue to the status of the DCC-631 module.

The sequence at startup is as follows:

1. an orange flash, followed by
2. a green flash, followed by
3. a green or red pulsation.

- A green pulsation (one brief flash per second) indicates normal operation (Status OK).
- The LED turns red and repeats a sequence of pulses to indicate an error condition:

  Error condition # 1: the LED turns on for one second, followed by one brief flash, to indicate that the sensor is either not connected, or the distance to the target is beyond the maximal detection range

  Error condition # 2: the LED turns on for one second, followed by two brief flashes, to indicate that the distance to the target is below the minimal detection range.

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4.5 DCC-631 Linearization Module - General specifications

• Matching sensor	VM 3.12
• Measuring range	5 to 50mm *[200 to 2000 mils]*
• Accuracy	< 5% of reading
• Repeatability	± 0.6% of reading
• Interchangeability	± 5% of reading
• Frequency response	DC to 1 kHz (-3dB)
• Temperature drift	< 500 ppm/°C
• Matching extension cable	
Type:	triaxial SMA/SMA
Length (minimum):	9.5m *[32.8 ft.]*
• Output signal on creep detection	
Type:	voltage
System OFF	$0V_{DC}$
Group in rotation	$0V_{DC}$
Group stopped	$24V_{DC}$, 60 mA max
• Power requirement	
Voltage	$+24V_{DC}$ +/- 15%
Consumption	90 mA ($+24V_{DC}$)
Protection	auto-reset fuse
• Connections	
Triaxial extension cable	SMA socket and grounding pin
Power & output cable	M12 socket
• Environmental	
Temperature:	
- Operation	0° to 55°C *[32° to 130°F]*
- Storage	0° to 85°C *[32° to 185°F]*
Humidity	Up to 95%, non condensing
• Die cast aluminium compact casing body	
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.]*

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5. POWER SUPPLY AND AUXILIARY RELAY INSTALLATION

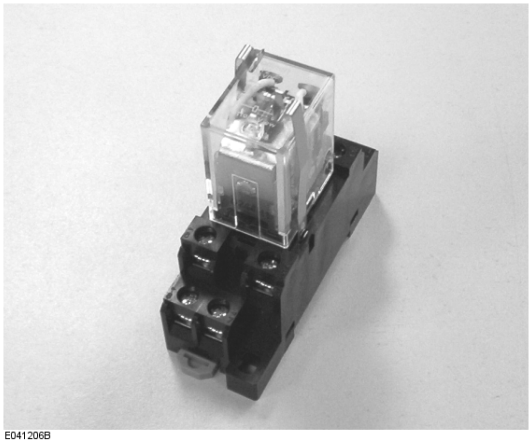
5.1 Preliminary Considerations

- The standard M12 VSM cable links the power supply and auxiliary relay to the DCC-631 Conditioner. This 4-conductor shielded cable has a length of 2 m (*[6 ft.]*). A longer cable measuring 45 m (*[148 ft.]*) is available in option.

E150110A

- The power supply module needs a 100-240V_{AC} or 90-350V_{DC} source to provide the +24V_{DC} needed by the DCC-631 Signal Conditioner module and auxiliary relay.

- The power supply module must be clipped on a flat 35mm DIN rail, and preferably close to the auxiliary relay.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- The auxiliary relay is supplied with a socket which can be clipped on a flat 35mm DIN rail, or mounted on a surface with two screws.

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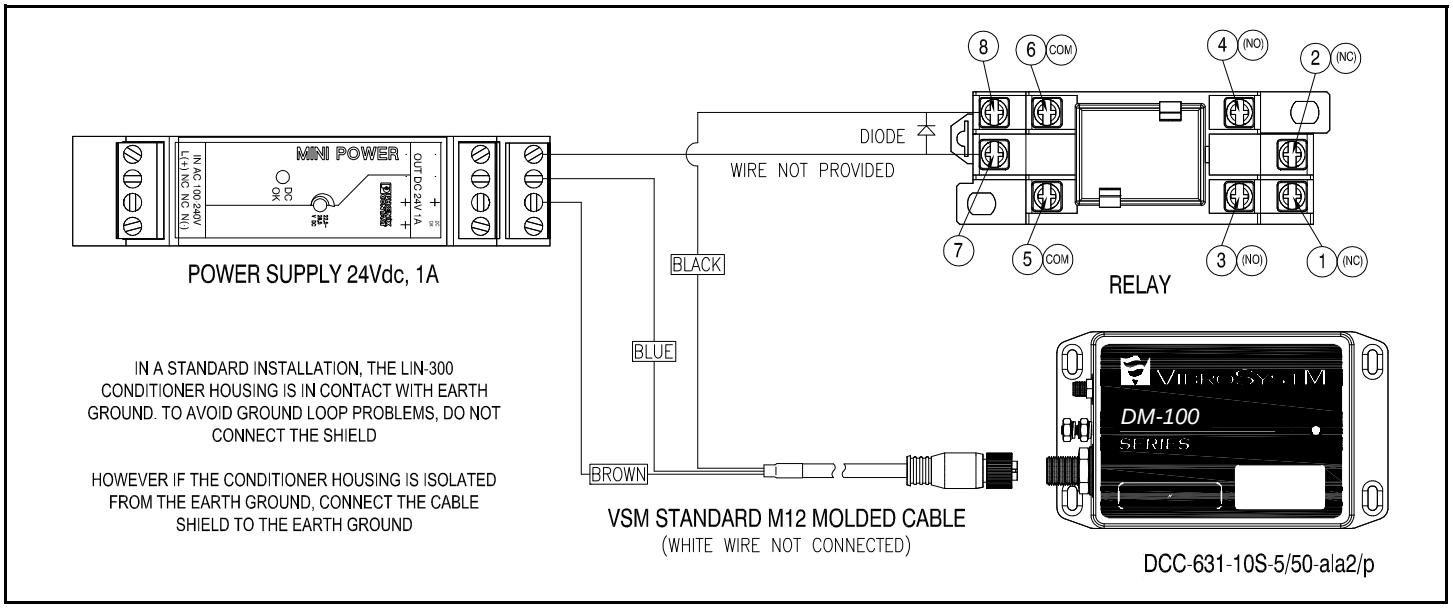
5.2 Power supply installation

5.2.1 Power supply and auxiliary relay connection

ATTENTION - DANGER
Warning!: Make sure power has been cut off at the source before starting cabling.



1. Connect the standard M12 cable as shown in the following table, and add a wire between the (-) terminal from the power supply to the #7 terminal (coil) of the auxiliary relay. The relay base is supplied with a diode installed between #7 and #8 terminals. Make sure the cathode is on terminal 8.

Table 3: Standard M12 cable configuration

M12 cable pin #	Color	Description
1	Brown	**+** terminal on $24V_{DC}$ power supply
2	White	(not used)
3	Blue	**-** terminal on $24V_{DC}$ power supply
4	Black	#8 terminal (coil) of auxiliary relay

2. Connect the power source to the power supply as follows:

N (-)	Neutral / Common
L (+)	Line voltage ($100\text{-}240V_{AC}$ or $90\text{-}350V_{DC}$)

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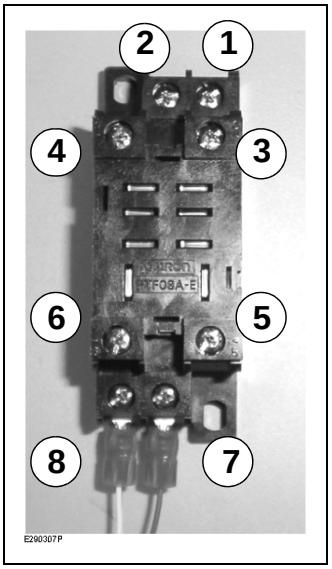
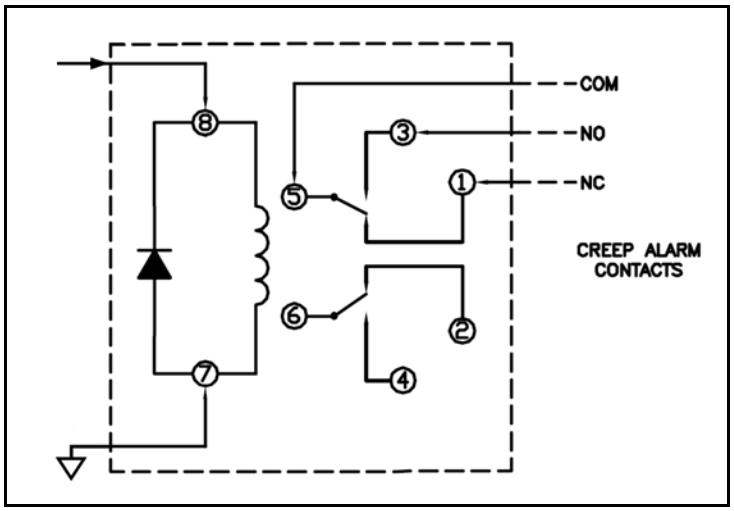
5.3 Auxiliary relay for DM-100 system



5.3.1 Relay connection

Terminal	Description	
1	NC-1	Normally closed contact no. 1
2	NC-2	Normally closed contact no. 2
3	NO-1	Normally opened contact no. 1
4	NO-2	Normally opened contact no. 2
5	Com-1	Common point for NO-1 and NC-1
6	Com-2	Common point for NO-2 and NC-2
7	Coil	(–) terminal power supply (AWG 20 min. conductor)
8	Coil	Standard M12 cable black conductor (controlled by DCC-631)



5.3.2 Summary of DM-100 system operation

Black wire from DCC-631 module controlling the auxiliary relay coil:

when group status changes from “Stopped” to “In rotation” (air gap variation > 5 mm)	relay de-energized immediately
when group status changes from “In rotation” to “Stopped” (air gap variation < 5 mm)	relay energized after 25 seconds without movement

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5.4 Power supply and auxiliary relay - General specifications

Power supply

• Power source	universal (100-240V_{AC}, 50-60Hz, 90-350V_{DC})
• Output	24V_{DC}, 1A
• Connection	pluggable screw terminals
• Conductor gauge	0.52 to 1.31 mm^2 *[20 to 16 AWG]*
• Mounting	flat 35 mm DIN rail

Auxiliary relay

• Coil rated voltage	24V_{DC}
- rated current:	36.9 mA
- resistance;	650 Ω
• Contact Form	DPDT (2 NO and 2 NC)
• Rated load	10A, resistive load (24V_{DC} or 100V_{AC})
• Temperature (operation)	–25°C to +55°C
• Max. switching capability	1000 VA, 240W
• Mounting	flat 35 mm DIN rail, or surface mount through two screw holes

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