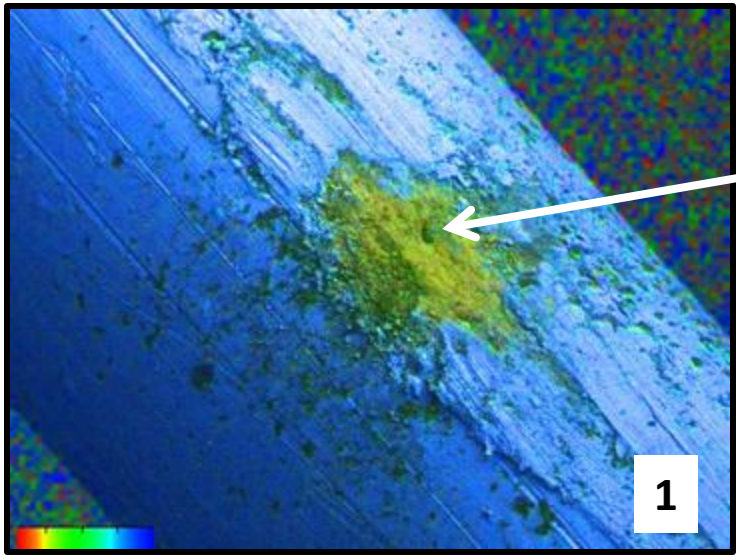
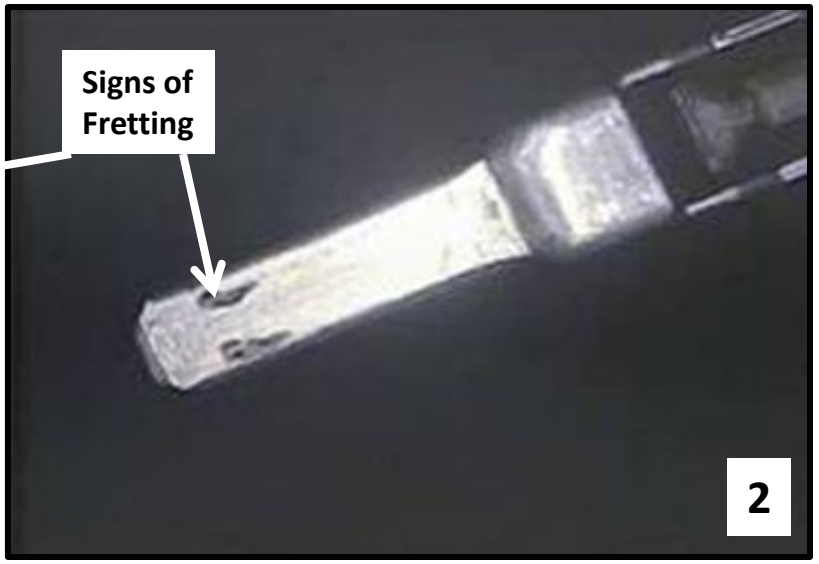
About Terminal Connection “Fretting”

Fretting corrosion is a buildup of insulating oxidized debris (nonconductive material) caused by micro motion between two contact surfaces. (Fig 1)





Fretting is commonly found on tin plated terminals, such as Micro pack 100 and Micro pack 64 connections.
Replacement of sensors, modules and other components will result in only a temporary relief of a fretting issue. Actually, just the unplugging and re-plugging of a connector will clear the fretting corrosion from the terminal, correcting the condition for a short time until fretting corrosion builds back up again.
Symptoms caused by fretting corrosion include:
Intermittent electrical component operations
DTCs being set, or No Trouble Found (NTF)
Low current signal circuits -- fretting corrosion (high resistance) can cause intermittent connections.
High current power circuits -- permanent increases in the connection resistance can lead to overheating.
Fretting usually appears as: small, dark smudges on electrical terminals, or smudges at the locations of electrical contact (Fig. 2). In less severe cases, it may require a magnifying glass to identify a fretting condition.

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About Terminal Connection “Fretting”, cont.

Fretting is caused by the motion between the connector and the terminal, which can be due to vibration - micro motion between two contact surfaces causing build up of insulating oxidized debris (nonconductive material), Thermal cycling, packaging of the connector, wiring harness and/or device, poor connection/terminal retention.

How fretting corrosion progresses:

A. Tin - clean (free of any corrosion) (Fig. 3, A)

B. A connection is made through the cracks in the tin-oxide layer, making a stable connection. (Fig. 3, B)

C. When the terminal vibrates or moves a section of the clean tin is exposed to the air and it quickly forms an insulating tin-oxide film. (Fig. 4)

Every time there is motion at the contact spot the cycle repeats and more tin oxide is worn away and debris builds up. (Fig. 5)

With continued microscopic fretting, enough insulating tin-oxide wear debris can build up high resistance creating intermittent connections. (Fig. 6)

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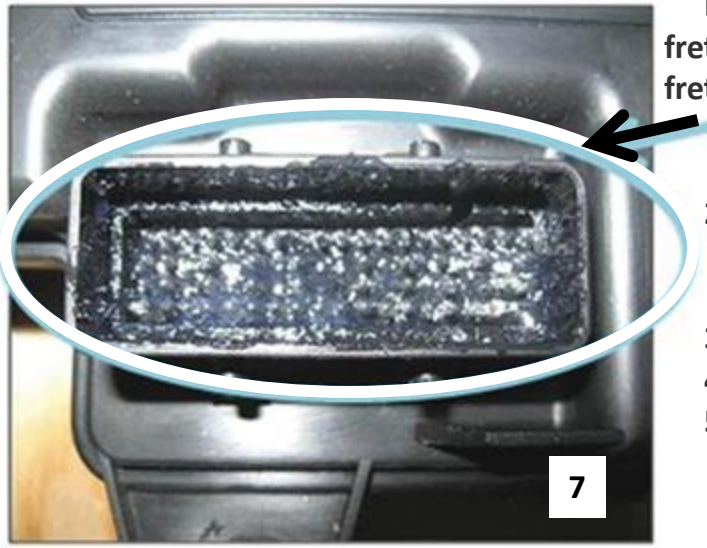

How to solve a fretting problem:

Disconnecting and reconnecting a connector will temporarily "fix" a fretting condition, but it will eventually come back if the conditions for fretting still exist. The best preventative measure is to perform the following:

1. **Disconnect the appropriate module(s)/connector(s)**
2. **Lube both sides of the connector (module side and harness side) with NyoGel® 760G lubricant, GM part number 12377900 (in Canada, P/N 10953529) (Fig. 7)**
3. **Reconnect the connector.**
4. **Wipe away any excess lubricant.**
5. **Duplicate the condition per the SI Diagnostic Procedure Instruction section.**
   Circuit/System Description
   Conditions for Running/Setting the DTC
   Circuit/System Verification

IMPORTANT: **If the condition CANNOT be duplicated, the repair is complete. DO NOT replace the module/component/part.**

IMPORTANT: **If the condition can be duplicated, the repair is incomplete. Follow the appropriate SI Circuit/System Testing procedure.**

For all intermittent service lamps or electrical module/component/system operation, in addition to those exhibiting a fretting condition, it's recommended to disconnect the appropriate module(s)/connector(s) and lube both sides of the connector (module side and harness side) with NyoGel 760G lubricant.

For more information on the terminal repair procedure, refer to service bulletin #09-06-03-004.

Thanks to Rob Prough, Keith Borowy and Pamma Chana