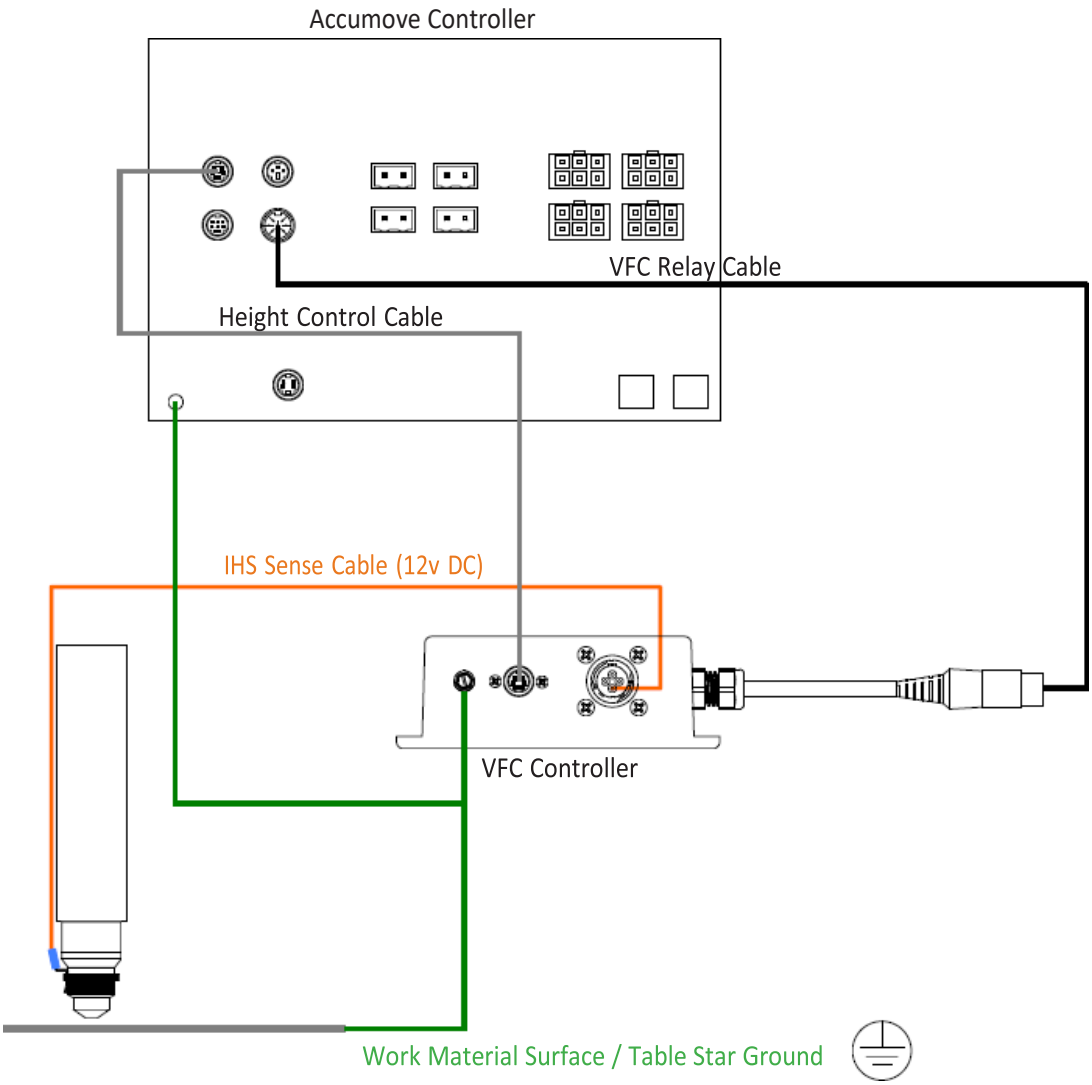
TECHNICAL BULLETIN — OHMIC SENSING / IHS GUIDE:

What is IHS and How Does it Work?

What is IHS?: IHS (initial height sensing) is the action, when running a job, to determine the top of the material before piercing the plate. This function is also referred to as Ohmic Sensing in previous software builds of VMD (Visual Machine Designer). The IHS function is a normally open 12v DC circuit that closes when the signal from the orange wire, attached to the torch lead retaining cap, reaches the ground stud of the VFC box. This happens because the VFC and work surface are grounded to the table.



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IHS can only be detected, or closed, under two conditions:

- Running a Job
- Manually toggling the Relay Output On in the Configuration.wap menu and then jogging the torch to the material

Jogging the torch to the top of the material does not change the IHS status. This is because there is a relay in line with the IHS circuit, inside of the VFC box, that remains open unless one of the previously mentioned conditions is toggled.

There are two modes of the IHS function:

- Always: this mode will always determine the top of material by touching the top of the surface to close the IHS circuit
- Optimal: this mode will touch the top of the metal surface during the first cut sequence and record the Z-axis location as the top of material for all other cuts.

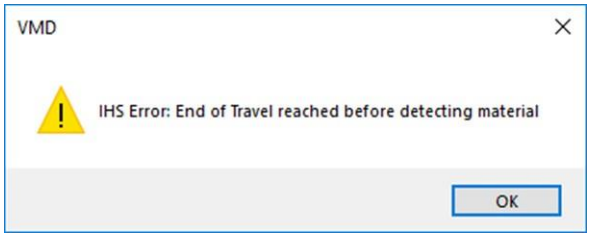
It is suggested that the IHS mode be set to Always when cutting thin gauge material, 0.1875" and thinner. Though the Optimal mode does sound more efficient, when cutting thin material the work surface may bow or bend because of the heat produced when plasma cutting. This changes the top of material significantly and therefore never in the same place all of the time. Using the Optimal IHS mode with thin gauge material can cause the torch to breakaway because of the difference between the recorded top of material position and the material bowing while cutting. The Optimal IHS mode works best with material that is 0.25" and thicker.

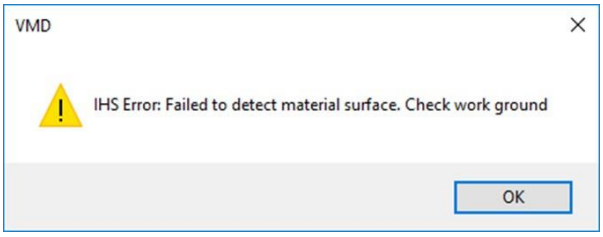
Troubleshooting: There are (2) primary scenarios that will occur as a result of IHS failing to correctly detect the top of the material. **IHS did not detect** and **IHS detecting before moving from Z-axis 0 position**.

1. IHS did not Detect:
   a. IHS Error: End of Travel reached before detecting material
   b. IHS Error: Failed to detect material surface. Check work ground
   c. Torch breakaway detected

2. IHS Detecting Before Moving from Z-Axis 0 Position
   a. IHS Error: Detecting material before starting IHS. Check consumables
   b. Execution Error Overtravel Detected Z= (positive or negative value)

Scenario 1
IHS Did not Detect





Step 1:

Verify that the torch position is adjusted to factory specifications using the links below:

Flexcut 80

Flexcut 125

After adjusting the torch position, run another job to determine if the issue is resolved. If not, proceed to step 2.

Step 2:

Check the work material surfaces for rust, debris, or any type of film that can cause resistance between the work material surface and the Torchmate CNC machine star ground. Clear the material of any and all surface obstructions that apply. Run another job to determine if the issue is resolved. If not, proceed to step 3.

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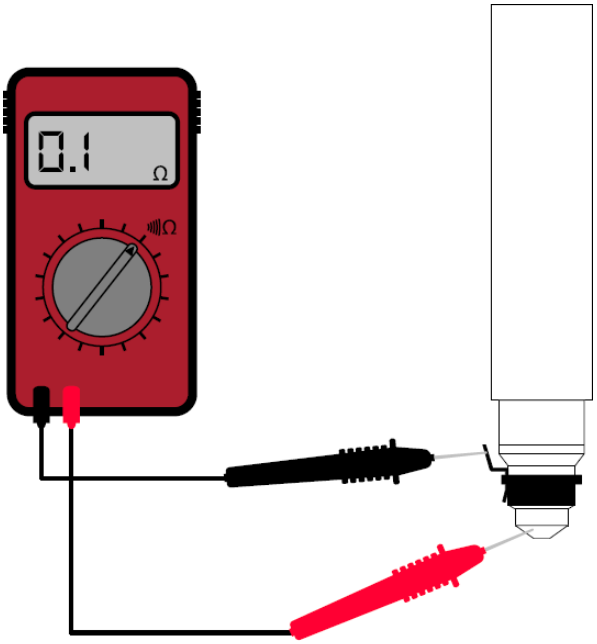
Step 3:

Remove the shield from the retaining cap and inspect the tip for any film or debris. Depending on the condition of the shield, either clean the shield so that fresh copper is exposed or replace with a new shield. Run another job to determine if the issue is resolved. If not, proceed to step 4.

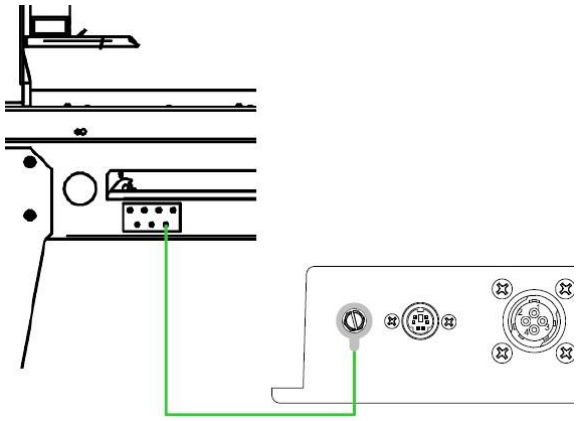
Step 4:

Using a digital multi-meter, measure the continuity between the tip of the shield and the spade connector for the orange signal wire on the retaining cap. If the multi-meter reads an open line, adjust the metal tab shown in the image below so that it is making contact with the shield. Run another job to determine if the issue is resolved. If not, proceed to step 5.



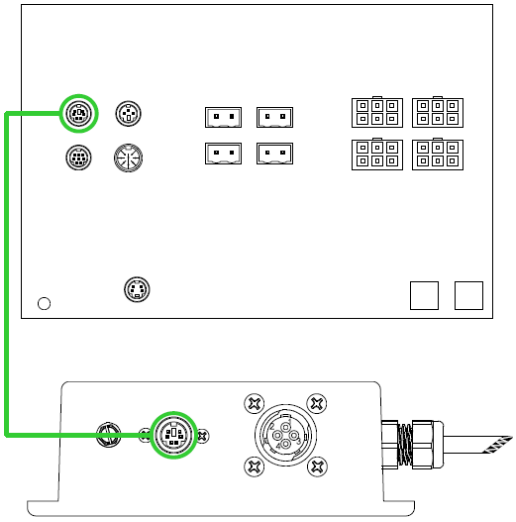
Step 5:

Validate that the wire on the ground point of the Accumove VFC box is still attached. The wire should be attached to the Accumove VFC box using a green flat head screw. Follow the wire from the Accumove VFC box to the star ground of the Torchmate CNC machine. If the wire is loose or detached at either end, reinstall the wire and run another job to determine if the issue is resolved. If not, proceed to step 6.



Step 6:

Reseat the height control cable at both ends, the Accumove control box and the Accumove VFC box. While disconnecting each end of the cable, inspect the pins inside each plug to verify that there are no damaged or missing pins. Run another job to determine if the issue is resolved. If not, proceed to step 7.



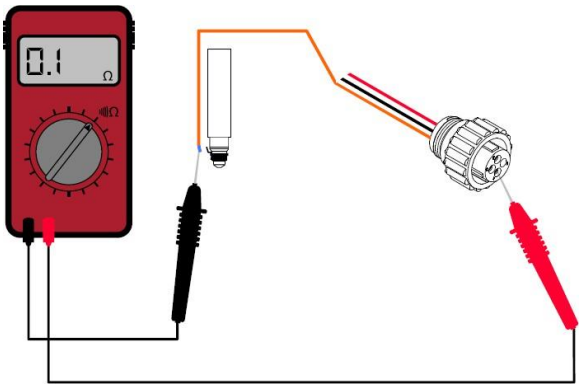
Step 7:

Using a digital multi-meter, verify that there are no breaks in the orange signal wire. Jog the X and Y axis of the Torchmate CNC machine so that the torch is closest to the location of the Accumove VFC box. Disconnect the orange signal wire from the retaining cap and unthread the CAN connector on the Accumove VFC box for the ohmic/arc voltage connection. Measure continuity between the spade connector and pin #4 of the CAN connector.

If the digital multi-meter is reading an open line inspect the orange wire for breaks.

If no breaks are found in the wire, replace the spade connector at the end of the orange signal wire.

If the digital multi-meter is still reading an open line contact technical support.



Scenario 2
IHS Detecting Before Moving From Z Axis 0

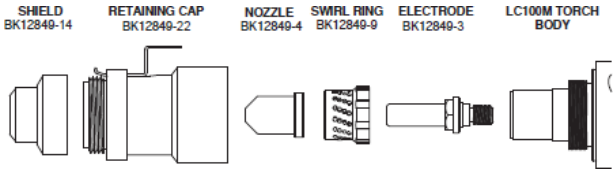
This scenario occurs when signal from the orange wire, that is attached to the retaining cap, completes through the electrode inside of the torch body. The electrode is the negative terminal for the raw arc voltage circuit connected to the Accumove VFC box.

Step 1:

Remove the shield from the retaining cap and verify that there is no metallic debris built up. Clear out any debris that may be causing the shield and nozzle to touch. Run another job to determine if the issue is resolved. If not, proceed to step 2.

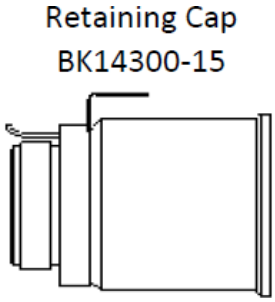
Step 2:

This step will only apply to the Flexcut 80. Remove the consumables and validate the amperage rating of the nozzle and shield. The 60/80 amp consumables share a conical shape for the shield and nozzle that differ from the 40 amp consumables. If a 60 or 80 amp nozzle are matched with a 40 amp shield, the nozzle will always touch the shield allowing for the Ohmic/IHS circuit to complete. Change consumables so that the assembly matches the Flexcut 80 user's guide. Run another job to determine if the issue is resolved. If not, proceed to step 3.

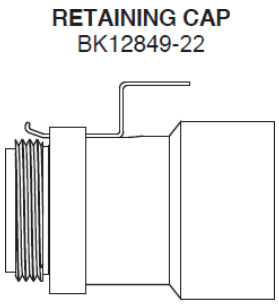


Step 3:

Replace the retaining cap. Run another job to determine if the issue is resolved. If not, please contact technical support.



Flexcut 125



Flexcut 80

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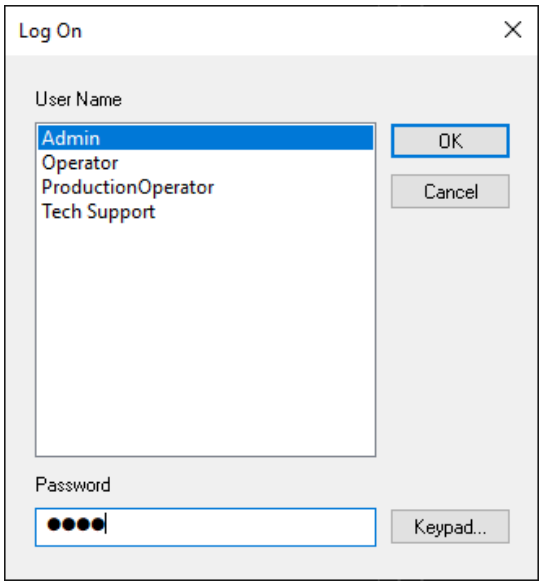
Troubleshooting
IHS Circuit

If Ohmic/IHS is still not detecting after validating all of the possible environment issues, the circuit needs to be diagnosed using the instructions below.

Step 1:

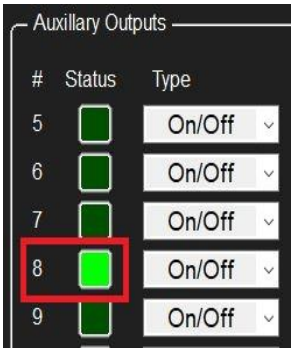
Tap on the Log On button at the top right corner of the VMD screen. Select the Admin profile and enter the password 1234. The Configuration.wap window will appear on the screen immediately after logging into the Admin profile.



Step 2:

Tap on the Advanced tab. Find the Relay Output button and turn it On. By default it should be Off. Move the Configuration.wap window so that Ohmic/IHS status is visible.

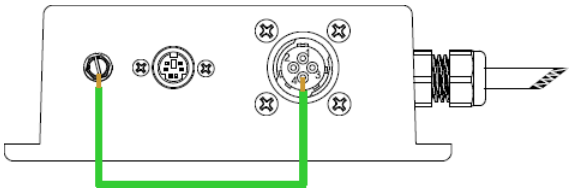
Note: Newer Versions of VMD no longer Have Advanced Tab. Instead they have a Diagnostic Tab. If you have a Diagnostic Tab, go to Input/Output Tab. Here you will want to toggle Auxiliary Outputs 8 by clicking the Status Box (enabling Aux 8 is the same as Relay Output On/Off).



Step 3:

Disconnect the Ohmic/Arc Voltage harness from the VFC box. Using a jumper wire, touch one end to the ground screw and the other end to pin # 4. Look at the VMD software screen to see if Ohmic/IHS is detecting.

If Ohmic/IHS is detecting, look back through this guide regarding Scenario 1. The circuit is working, but the signal from the orange wire is not getting back to the VFC ground. If Ohmic/IHS is not detecting, continue to step 4.

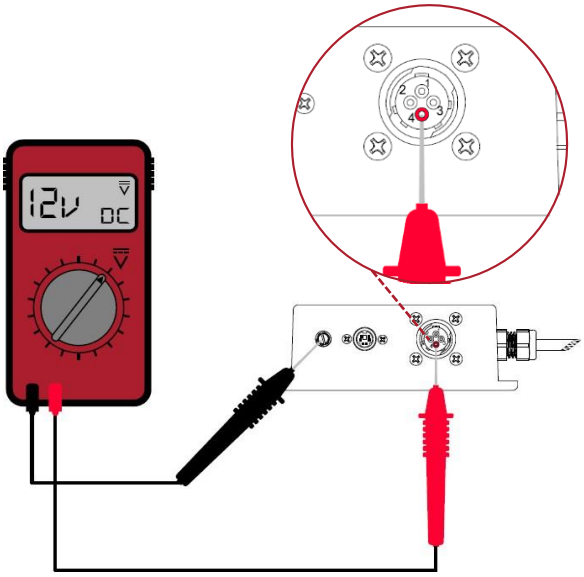


Step 4:

Set the digital multi-meter to read DC voltage. Touch one probe to the VFC ground and the other probe to Pin 4 of the CPC connection on the VFC.

- The multi meter should read 12v DC between these points. If it does then check the condition of the jumper wire.
- If this does not show the IHS as Detected, and the jumper wire is good, the Accumove controller may need to be repaired.

If the meter is not reading 11-13v then continue to step 5.



Step 5:

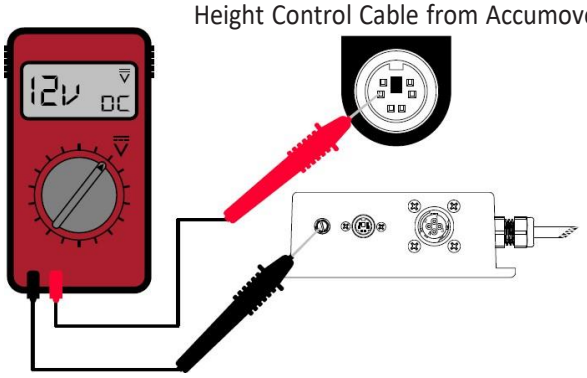
Remove the Height control cable from the VFC box and locate pins 2 and 3.

Measure the DC voltage with a mutli meter from pin #2 to ground. The multi meter should read 12v+/-.

- If this test reads 0v, measure the continuity of the height control cable and verify whether there are breaks in the wire. If there is an open line between two of the pins, contact parts@torchmate.com for a new Height Control Cable.
- If the multi meter reads less than 11v DC, after the height control cable has been validated, the Accumove controller may need to be repaired.

If the meter reads 12v DC (+/- 1v DC), proceed to step 6.

Height Control Cable from Accumove



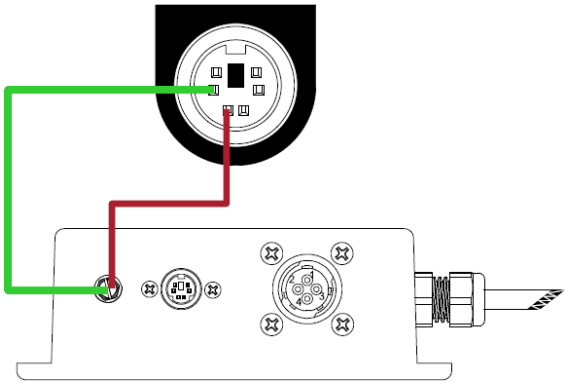
Step 6:

Measure DC voltage with a digital multi meter on pin #3 to ground on the VFC. The meter should read 24v DC (+/- 1v DC).

- If this test reads 0v DC then the Accumove controller may need to be repaird.
- If this test reads 24v (+/- 1v DC), proceed to next test

Jump pin #2 to ground and be careful to not accidentally jump pin #3 to ground.

- If Ohmic/IHS detects, then your VFC needs to be replaced.
- If Ohmic/IHS does not detect, then the Accumove controller may need to be repaired.



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