BASIC TROUBLE SHOOTING SMART-LEVEL CONTROL CIRCUIT

NOTE:

This was developed to cover many applications there may be variances depending on the application. Such as when on a trailer there will be no ignition on, or park brake disable. Specific operational and connection items are available in the specific installation/owner's manual for the application.

CONTROL PANEL:

- Often the Control Panel is condemned as defective when it is not.
- Often a complaint on the Control Panel is an issue with another item such as wiring.
- See the complaint list below for help in determining the true issue.
- Also note that some applications will not allow operation of the jacks if the key is in the wrong position.
- Most systems will not allow the extension of the jacks if the key is in the on (engine run) position however there are some that will only allow extension if the key is on and the engine is running, and the voltage is at or above 13 VDC.
- Also, there is a park brake disable that may deny extension if the park brake is not applied.
- This park brake disable is not connected/operational in all applications.

CONTROL PANEL WILL NOT POWER UP:

1. The control panel should power up with the key in the on or off position.
2. There is a power indicator light next to the power switch that should come on when the power button is pressed.
3. If it does not, then there is a power supply issue, or the control panel is defective.
4. The power and ground connector for the control panel is the 3-pin connector labeled J 1 at the back of the panel.
5. One of the wires is black (ground/negative) the other two are red (Positive).
6. Measure for voltage between the black and both red wires.
7. There should be at least 12 VDC measured between the black (ground) and each of the two red wires.
8. If the voltage is present and the panel will not power up, then the control panel is defective.
9. If voltage is not present, then there is an issue with the wiring or fuse at the pump or with the power supply to the pump.
10. The voltage positive and ground comes from the two-pin connector with the black and yellow fused wires at the pump assembly.
11. The ground or negative (black wire) comes from the pump ground stud.
12. The positive 12 VDC positive (on both red wires) comes from the yellow fused wire at the pump motor solenoid/contactor.
13. The power (12VDC positive) and ground at the pump comes from the vehicle battery.
14. There may be a circuit breaker at the battery supply.
15. Check for voltage 12 VDC positive and ground (negative) by measuring between the pump ground stud and the positive connection at the motor solenoid.
16. If voltage (12 VDC) is not present, then there is a power or ground issue from the battery or breaker.
17. If voltage is low, then there is a week battery or poor connections between the battery and the pump.
18. Do not ignore the ground, the pump ground stud should be connected via a large gauge wire/cable to the frame or negative battery terminal (Preferred).

CONTROL PANEL POWERS UP THEN SHUTS DOWN WHEN OTHER BUTTONS ARE PRESSED:

1. This is known as a power reset.
2. This is caused by the voltage to the control panel dropping very rapidly down to below where the processor can operate.
3. When the control panel is powered back up the jacks down status LED's will be on, press all retract to clear after the voltage issue is resolved.
4. Check the battery and the connections from the battery to the pump assembly.
5. Both the positive and or the ground connections could be at fault.
6. Check the power and ground wires and their connectors feeding the control panel from the pump assembly as was described under Control Panel will not power up.

CONTROL PANEL LOCK UP:

1. When this occurs all or most the lights on the control panel will be on and you will not get any operation from the control panel.
2. Also, you will not be able to turn it off.
3. Generally, this is caused by "iritic" voltage or voltage spikes to the control panel.
4. Disconnect power to the panel by unplugging the connectors at the back of the panel wait several seconds then reconnect.
5. If this does not resolve the issue then the control panel needs to be replaced.

KEYPAD POWERS UP SEEMS TO OPERATE BUT PUMP DOES NOT COME ON TO EXTEND JACKS:

1. First verify that no disables are on (Key switch or park brake in wrong position, check status lights).
2. Locate the blue wire at the motor solenoid/contactor.
3. Using a digital voltmeter measure for voltage at the blue wire when manual extend of front or rear jacks or Auto Level (operating light flashing) is attempted.
4. There should be at least 10.5 VDC +.
5. If there is no voltage check the blue wire back thru the harness to the back of the control panel.
6. If there is no voltage (12VDC positive) at the blue wire at the back of the control panel when extend is attempted, then the control panel is defective.
7. If there is voltage on the blue wire, then the solenoid or the motor may be defective.
8. Note that if the jacks down status lights are on Auto Level will be denied.

CONTROL PANEL POWERS UP SEEMS TO OPERATE BUT PUMP DOES NOT COME ON TO RETRACT JACKS:

1. On Bi Rotational units locate the green wire at the motor solenoid or contactor.
2. Measure for voltage at the green wire when retract is attempted by all retract or manual switch(s).
3. There should be at least 10.5 VDC+.
4. If there is no voltage check the green wire back thru the harness and connectors to the control panel.
5. If there is no issue with the green wire and there is no voltage at the green wire at the back of the control panel then the control panel is defective.
6. If there is voltage at the green wire at the solenoid/contactor then the solenoid/contactor or motor may be defective.
7. On uni directional units the blue wire (at the motor solenoid) is connected to the green inside of the pump harness thru a diode.
8. Check for voltage at the green and blue wires.
9. There should be at least 10.5 VDC +.
10. If there is no voltage, check the green wire for voltage back at the back of the control panel.
11. If there is no voltage on the green wire at the back of the control panel during an attempt to retract then the control panel is defective.

CONTROL PANEL POWERS UP SEEMS TO OPERATE AND PUMP MOTOR RUNS, BUT ONE OR MORE JACK LEGS DO NOT EXTEND OR RETRACT:

1. Locate the manifold valve(s) and coil(s).
2. There is one for each function (jack leg).
3. Locate the proper valve/coil(s) for the leg(s) that do not operate.
4. Each coil will have different colored wires feeding them.
5. Measure voltage across the coil terminals when trying to operate the jack(s) that do not operate.
6. There should be at least 10.5 VDC+.
7. If there is no voltage check the wire(s) back thru the harness to the back of the control panel and the coil ground wire(s).
8. If the wire(s) is good, then the control panel is defective.
9. If there is voltage across the two terminals at the coil and the jack(s) do not operate then there is an issue with the coil or valve or other hydraulic control issue.

- All electrical testing of the AutoLevel control circuit must be done using a digital multi meter.
- The use of “test lights” is not recommended as they can not provide a true voltage reading and could cause damage to the control panel.

NOTE:

- The smart-level control panels contain what are known as “smart switches controlling the outputs.
- These are much more “robust” than older typical relays.
- Also, they have a “built” in characteristic of acting as like a circuit breaker would when encountering a short in wiring or excessive current draw of a component such as a valve coil or motor solenoid/contactor output.
- Most failures of a voltage/trigger output to a valve coil or motor solenoid or contactor are found to be a wiring connection issue perhaps through a plug connector.
- So check all wires going through connectors at the back of the control panel and at the pump assembly.

CONTROL PANEL STATUS LIGHTS

Jack down Status LED’s will not go out or Jack down LED’s go out and pump quits prior to jacks being fully retracted:

1. There is a “Jack down status light” near each set of manual up and down arrows that indicate (when illuminated) that the jack(s) are not fully stowed.
2. This issue is created by a problem with the pressure switch circuit.
3. This could be a defective pressure switch or an issue with the control panel or the yellow/black wire from the control panel to the pressure switch could be shorted to ground.
4. To test for this, remove the Yellow/Black wire from the pressure switch and using a digital voltmeter measure for voltage at the Yellow/black wire with the control panel turned on, there should be close to battery voltage (12VDC +).
5. If there is no voltage either the control panel is defective, or the yellow/black wire is shorted to ground, or it is open.
6. To further verify this, press all retract button (with the yellow/black wire disconnected from the pressure switch and protected from contact with a ground source) the jack status lights should go out within a few seconds after the pump comes on.
7. If the Jack down LEDs do not go out, then you have confirmed that the issue is with the control panel or the yellow/black wire is shorted to ground.
8. To check the pressure switch, check for continuity across the pressure switch terminals with the yellow/black wire disconnected.
9. If the jacks are extended, you should have continuity (Switch is closed).
10. Push all retract switch on the control panel and the pressure switch should go open (no continuity) shortly after all the jacks have reached full retraction.
11. If the switch stays closed, then the pressure switch is defective, or the pump can not develop enough retract pressure to trip the switch (This is a rare possibility).

JACK DOWN STATUS LIGHTS COME ON DURING TRAVEL:

- Generally, this is caused by a loss of fluid pressure in the retract side of the hydraulic circuit.
- Its most likely cause is an external fluid leak at a hose or fitting connection at a jack leg or slide cylinder.
- Other than this its cause may be air pockets in the system or a defective jack leg or slide cylinder.
- The retract pressure hold check or valve at the pump may also be a cause.
- Generally, this is not an issue with the control panel or the pressure switch as they are reporting a possible fault in the retract side of the hydraulic circuit as they were designed to do.

OPERATING LIGHT:

- When AutoLevel or All Retract is pressed the operating light should come on with a steady pulse (blink) and accompanying beep with be heard from the control panel.
- It will stop when the process is complete, or a fault has occoured.
- If there is a fault other lights will most likely come on as an aid in defining what the issue was.

LOW VOLTAGE:

- This light will come on if the voltage to the control panel falls below approximately 10.5 VDC.
- It will stay on until cleared by a press of any button on the control panel.
- When this light comes on the pump will shut off as the voltage to the unit has fallen below proper operational limits.
- The main cause of this is generally weak batteries or poor connections from the battery to the pump on the positive connection or the battery ground to frame or the pump ground side.

NOTE:

- There were some early Smart-Level control panels that this voltage was set at 13 VDC.
- These will be key/engine on operation units.

ENGAGE PARK BRAKE:

1. There is an optional connection to a park brake switch that will turn this light on if the park brake is released.
2. If this is connected the light will be on if the control panel is powered up and the park brake is released, the light should go out if the park brake is applied.
3. Not all manufactures of all vehicles connect this to operate.
4. If the Park Brake is applied and the light is on locate the black wire with the yellow trace.
5. On most units it will exit the harness near to the Control panel connection.
6. On some units this wire can be found in a 2-pin connector with a pink wire.

ENGAGE PARK BRAKE CONTINUED

7. To test locate the black wire with the yellow trace.
8. This wire is looking for ground to turn the light off.
9. If this wire is disconnected from ground the light will be on.
10. If the wire is grounded the light should go off.
11. If the black /yellow wire is connected to ground and the light is on check the wire back to the connector at the control panel.
12. If the wire is good and the light will not go out, then the control panel is defective.
13. Also note that if this light is on jacks may not extend from the manual down arrows and Auto Level may be denied (depending on control panel part # and software version).
14. If the wire is not being connected to ground when the Park Brake is applied, then there is an issue with the chassis side of the park brake circuit.

is an issue with the chassis side of the park brake circuit.

IGNITION ON:

1. This light will be on if the ignition key is turned to the on (engine run) position and the Keypad is powered up.
2. The light should go off when the ignition key is in the off position.
3. To test locate the pink wire, generally it will break out of the harness near the control panel.
4. It should have 12 VDC + applied to it when the ignition key is on (engine run) position.
5. There should be no voltage to it when the ignition key is in the off position.
6. If this is not correct the issue is with the connection to the chassis harness or chassis circuit.

EXCESSIVE SLOPE:

- This light will come on after an unsuccessful attempt of AutoLevel.
- Basically, it means that the system was unable to level the coach to within the specification of .5 degrees front to rear and left to right.
- Generally other lights will be on indicating a failure issue.
- Or one or more of the jacks have run out of travel (maximum extension) prior to the coach being level within the specification.
- Note: If after an auto level process is completed the excessive slope lite is not on then the system finished within the specification.

OTHER ITEMS

- **Jacks operate correctly from the manual control switches, but Auto Level does not properly level the coach, or it faults out.**
  - Generally, this is caused by the panel programing not being properly performed during the installation process.
  - The panel orientation and then the null setting must be properly performed for auto level operation.
  - This process is covered in the installation/operation manual for Smart-Level.
- **Improper manual operation of jacks.**
  - It is imperative that the jacks work correctly using the manual switches.
  - If when operating the front jacks, the rears operate or visa versa or the side to side is wrong then auto level will not operate correctly.
  - There is a separate document titled Hose Routing that covers this.
- **Motor or solenoid/contactor issues.**
  - There is a separate document covering testing of motors and solenoids/documents.
- **Manual switch operation.**
  - On Smart-Level control panels designed for motorized coaches the switches (arrows) are the direction of the jacks, the down arrows (buttons) extend the jacks and the up arrows (buttons) retract the jacks.
  - On trailer Smart-Level control panels, the manual operation is reversed.
- **Manual operation trailer only units.**
  - Side to side operation will be denied until after the control ‘knows” that the front and the rear jacks are firmly planted on the ground and supporting the trailer.
  - It is not uncommon for side operation to not be allowed until after auto level.
- **Wiring and connection issues.**
  - The system uses plug in connectors at the pump assembly and the back of the control panel.
  - Failure of one or more operations or items or intermittent operation could be connection issues.
  - Check wiring terminals for full insertion in housings buy performing simple pull/tug test on wires and connectors to verify that terminals are fully seated into housings.
- **Lock ups or failure to operate, control panel powered up will not turn off.**
  - Believed to be caused by voltage surges.
  - Disconnect power to the panel at either the fuse at the pump or the power and ground connector at the back of the panel.
  - After several seconds reconnect.
  - Then check to see if issue is resolved.

AIR SUSPENSION INFLATE AND DEFLATE:

1. On coaches with air suspension, it is sometimes desirable to deflate the suspension prior to/during the leveling process.
2. Many coaches with air suspension have an electric solenoid type dump system.
3. For these units there is an output available to trigger the deflation and an output to trigger inflation.
4. For this to work the coach/chassis must be equipped with an electric /solenoid type suspension dump system installed, Equalizer does not supply this.
5. If equipped equalizer provides a gray wire to trigger deflation and a purple wire to trigger inflation.
6. These wires/outputs (12VDC positive) come from the two end terminals of the J 2 connector at the back of the control panel.
7. The timing of these signals and their duration vary somewhat depending on the requirements of the coach manufacture.
8. However basically a 12 VDC positive signal is sent on the gray wire during auto level to trigger deflation and a 12 VDC signal is sent on the purple wire during all retract to trigger inflation.
9. If these signals are present the control panel is doing its part and the coach will not deflate or inflate then there is a coach/chassis wiring/valve issue, contact coach and or chassis manufacture on this.
10. On coaches that do not have the electric solenoid dump system they may have a manual/mechanical dump valve system.
11. On these units the suspension should be deflated full prior to performing auto level.

OTHER NOTES ON AIR SUSPENSIONS

- **Failure to re inflate most all these dump system control valves require that air pressure be available to the suspension control valving at the time that the inflate trigger signal is sent.**
  - Do to this it is advised/recommended that prior to all retract being pressed that the engine is started and that the coach air system be allowed to come up to full pressure prior to pressing all retract.
- **Crow hop/jack scoot: Some chassis and coaches experience the jacks scooting or dragging on the ground during operation.**
  - Mostly this occurs during retraction however it can occur during extension.
  - This is created by the geometry of the rear axle as it pivots on its attachment point when the coach body/frame is lifted and lowered, this pivot causes the coach to move and if the jacks are still on the ground during this then you have crow hop/jack scoot.
  - The further the rear of the coach is lifted/lowered the more prevent this will be.
  - The amount/severity of this scoot varies chassis to chassis (mfg./models).

BLUE TOOTH OR CAN BUS CONNECTION:

- Most all Smart-Level control panels are either Blue Tooth or Can Bus capable.
- There are exceptions to this.
- If it is a Can Bus unit then Blue Tooth may be present through the vehicle multiplex system.
- To positively identify this, look at the part number on the sticker on the back of the control panel.
- There is a 4-digit number followed by letters.
- If letters are SBT that indicates Smart-Level Blue tooth.
- If the letters are SC then it is a Can Bus unit.
- The SBT units can be controlled by a smart device (phone or other) after downloading the Equalizer Systems Smart-Level APP from your APP store.
- See System owner's manual for more info on this.
- The SC units may be controlled through the vehicle's system.
- Contact the vehicle manufacture for info on this

Can Connection issues:

1. If a function fails to operate from a Can Buss connection (vehicle multiplex).
2. Locate the Equalizer Systems Smart-Level panel.
3. Attempt operation from Smart-Level panel.
4. If there is no operation remove the panel and unplug the Can Buss connector(s).
5. This is the two-pin connection(s) at the far end of the panel.
6. Then attempt operation.
7. If operation works from the Smart-Level panel, then contact vehicle manufacture on possible issue with vehicle Can Bus connection.

Bluetooth Connection issues:

1. On control panels with Bluetooth (check control panel part #) to verify this as stated before these units will have a suffix of SBT after the 4 digits.
2. If having an issue operating with a smart device first check for proper operation from control panel.
3. If the system works correctly from the control panel, then the issue is with the Bluetooth connection.
4. Check the separate document on this.