BATTERY DISCONNECT

SERVICE MANUAL

Intellitec Battery Disconnect Panel, BD0, 01-00066-004

Warning: The Battery Disconnect system connects directly to the vehicle's positive battery terminal. Inadvertent shorts across the battery or to ground, may cause severe damage and injury. Use extreme caution when working with these wires. Always wear safety glasses when working with the battery connections.

Battery Disconnect provides a simple and safe means of remotely disconnecting batteries of an RV or boat. With a touch of a remote switch, the batteries will be completely disconnected, preventing unwanted drain when the RV / boat are put into storage.

The heart of the system is a unique latching relay developed specifically for this purpose. While this relay is capable of carrying heavy currents, it requires **NO** power to stay open or closed. It only draws power during activation. The relay is sealed against the environments and is designed to withstand the shock and vibration experienced in the most severe RV or boat applications.

THE RELAY - How It Works

The Battery Disconnect Relay is a mechanically latching switch that operates by the momentary application of battery voltage to the coil terminals in one direction for latching (closed) or the other direction for unlatching (open).

To close the relay, +12 volts is applied to the “I” terminal and ground to the “S” terminal of the relay. When this is done, the plunger is pulled into the coil and the contacts are connected. While this happens, the rod magnet suspended above the plunger is attracted (opposite poles attract) to the top of the plunger by the magnetic field. See FIGURE 1

When the voltage is removed from the coil, the plunger gets pushed upward by the return spring, but cannot move because the rod magnet is in the way. See FIGURE 2

Intellitec Battery Disconnect Relay with No Fuses, 01-00055-002
http://www.pdxrv.com/catalog/i1362.html

Relay Closing

Positive polarity applied to coil. Current flowing in coil. Plunger pulled in to coil. Rod magnet attracted to plunger by opposite polarity.

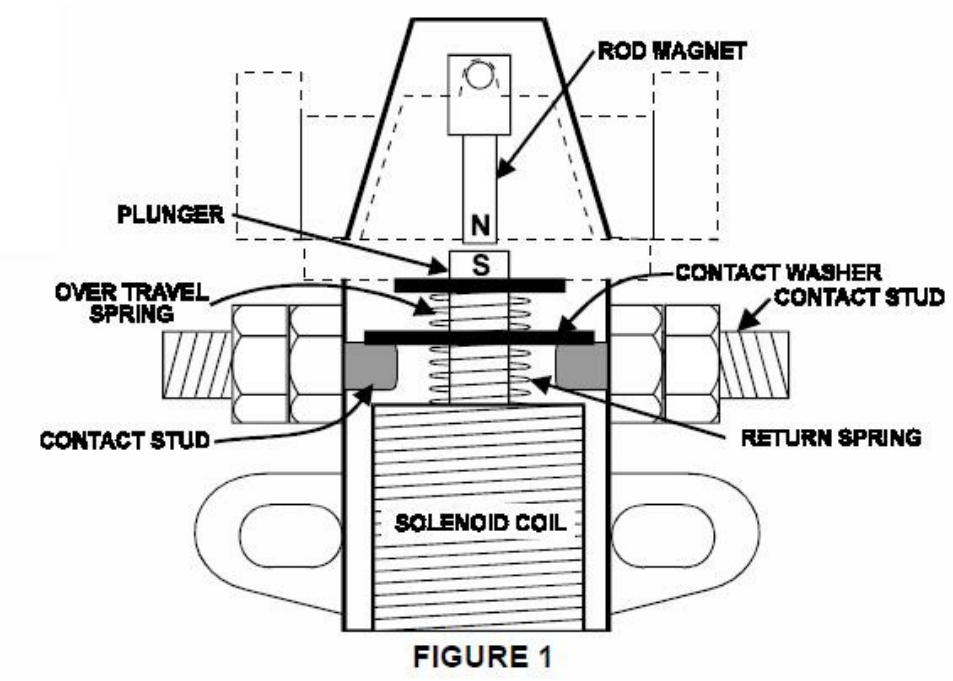

FIGURE 1

Relay Closed

Power removed from coil. Magnet blocks plunger from coming up, maintaining contact.

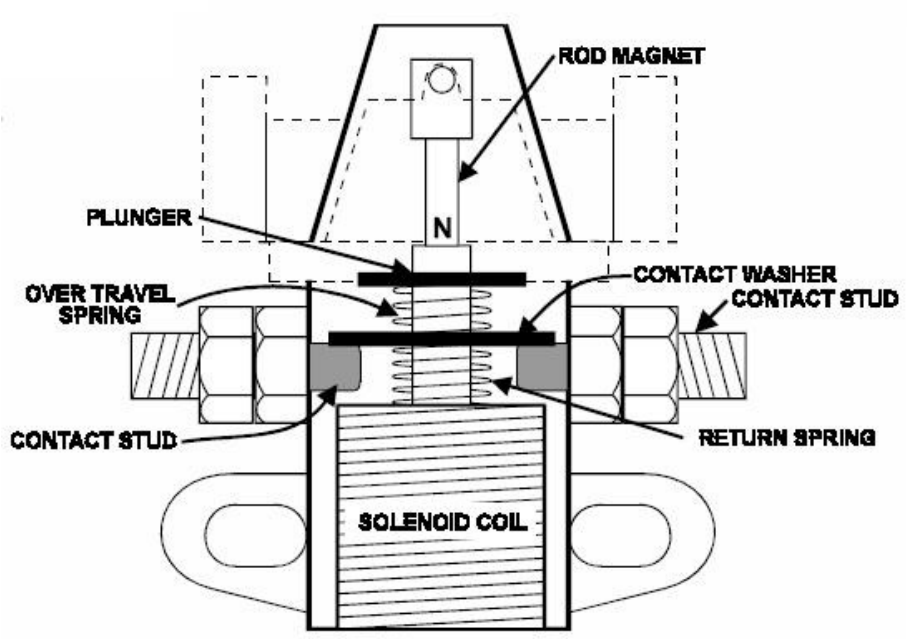

FIGURE 2

To open the relay, +12 volts is applied to the “S” terminal and ground on the “I” terminal. When this is done, the plunger is again pulled into the coil. However, since the magnetic polarity of the coil is reversed, the rod magnet is repelled (like poles oppose), and swings out of the way. See FIGURE 3

When the voltage is removed from the coil, the plunger gets pushed upwards by the return spring, breaking the connection between the two large terminals. See FIGURE 4.

Intellitec Battery Disconnect Relay with Fuses, 01-00055-000
http://www.pdxrv.com/catalog/i1361.html

Relay Opening

Negative polarity applied to coil. Current flowing in coil. Plunger pulled in. Rod magnet opposed by plunger same polarity magnetic field, swings out to side of housing.

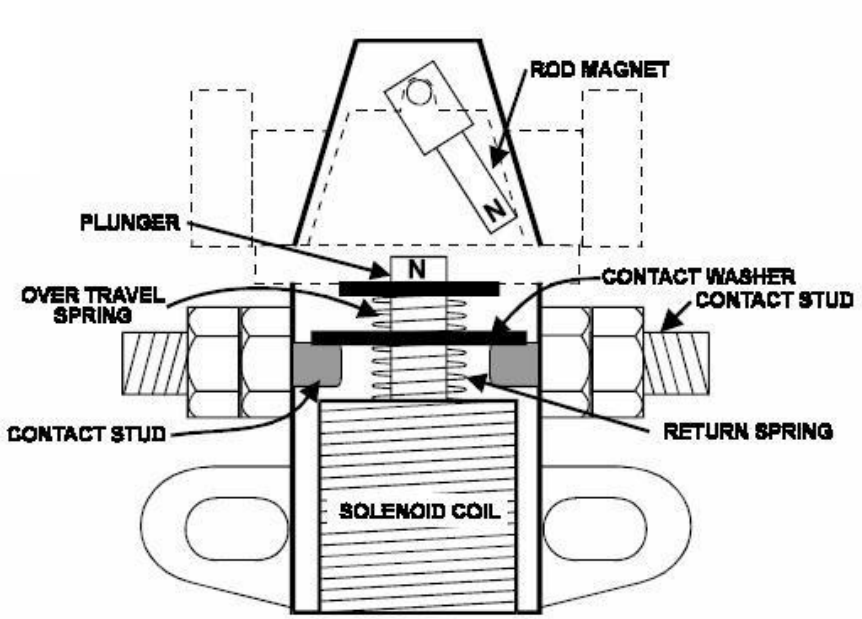

FIGURE 3

Relay Open

Power removed. No current flowing in coil. Plunger pushed up by return spring while magnet is off to the side. Contacts open. Magnet comes to rest at side of plunger.

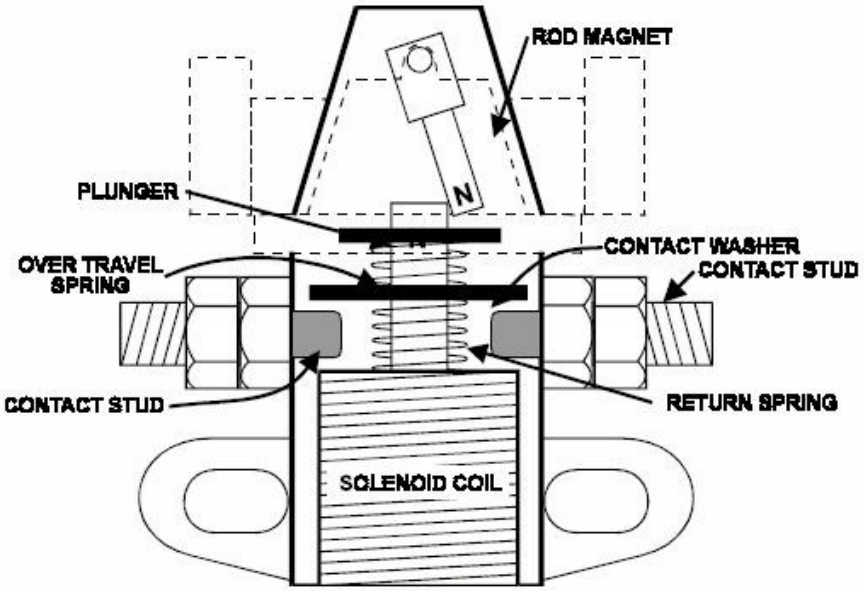

FIGURE 4

THE SYSTEM

A typical motor home may use one or two relays to disconnect the batteries. These relays are usually independent and operate from a switch panel located inside the coach. A harness is used to connect from the panel to the relays. The Intellitec panels are offered in four models. They are:

BD0 - Single battery system, with a cable and monitor panel with an on/off indicator

BD0 (BLACK/SILVER) 01-00066-004 http://www.pdxrv.com/catalog/i2755.html
BD0 (BROWN/GOLD) 01-00066-000 http://www.pdxrv.com/catalog/i1399.html

BD1 - Single battery system, with a cable and monitor panel with an on/off indicator and digital voltmeter

BD1 (BLACK/SILVER) 01-00066-005 http://www.pdxrv.com/catalog/i2757.html
BD1 (BROWN/GOLD) 01-00066-001 http://www.pdxrv.com/catalog/i1364.html

BD2 - Dual battery system, with cable and monitor panel with two on/off indicators and ignition interlock relay.

BD2 (BLACK/SILVER) 01-00066-006 http://www.pdxrv.com/catalog/i2758.html
BD2 (BROWN/GOLD) 01-00066-002 http://www.pdxrv.com/catalog/i1363.html

BD3 - Dual battery system, with cable and monitor panel with two on/off indicators, digital voltmeter, and ignition interlock relay.

BD3 (BLACK/SILVER) 01-00066-007 http://www.pdxrv.com/catalog/i2759.html
BD3 (BROWN/GOLD) 01-00066-003 http://www.pdxrv.com/catalog/i1400.html

Note: BD0 panel can be interchanged with BD, and BD2 can be interchanged with BD3

The dual relay panels include an ignition interlock relay that opens the power circuit to the chassis battery relay when the ignition is turned on, to prevent the battery from being accidently opened when the engine is running.

A typical circuit is shown in FIGURE 5 and FIGURE 6. The switches are each double pole, double throw, momentary, center off. Operating the switch in either direction will cause the relays to open or close, depending on the polarity of the voltage applied.

FUSES

There are two 5 Amp fuses for the system, mounted on each relay. Looking at the relay with cap at the top, the fuse on the right feeds the LED indicator and, if so equipped, the digital voltmeter. The fuse on the left feeds the power to the switch that operates the solenoid.

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Trouble Shooting

Problem		Possible Cause/Solution
House Relay won't engage, **BD0 & BD1 MODELS ONLY**	STEP 1	Check fuses on relay. If not blown go to step 3, if blown replace with same size fuse and retest. If fuse / fuses re-blow go to step 2.
	STEP 2	Disconnect harness from battery disconnect panel inside of RV, replace fuse, if fuse re-blows either attempt to find damage in the harness and repair or replace harness, (see PARTS LINK# 1 below). If fuse doesn't blow then go to step 3
	PARTS LINK #1	BDO / BD1 HARNESS, 11-00063-000 Parts link: http://www.pdxrv.com/catalog/i2756.html BD2 / BD2 HARNESS, 11-00139-000 Parts link: http://www.pdxrv.com/catalog/i2761.html
	STEP 3	Check battery voltage, the voltage must be greater than 10.5 Volts DC for the latching relay to close or open. If batteries are below 10.5 Volts DC, charge batteries and retest. If the batteries are charged and are above 10.5 Volts DC go to step 4.
	STEP 4	With an assistant, press and hold momentary switch, at the same time check for voltage across the coil terminals (+ on the "I" terminal and ground on the "S" terminal), **If 0 volts go to step 5. If voltage is 10.5 VDC or larger between the "I" & "S" terminals, replace relay.**
	STEP 5	Remove battery disconnect panel from cabinet / console and with a multi-meter set on DC voltage, measure between the red wire at pin # 3 and the black wire on pin # 6**.** The voltage should read the same approximate value as the batteries. If not replace harness, refer to PARTS LINK#1. If the voltage reading is the same go to step 6.
	STEP 6	With a multi-meter set on DC voltage, measure between the red wire at pin # 3 and the brown wire on pin # 1 while the switch is depressed**.** The voltage should read the same approximate value as the batteries. If not replace disconnect panel, refer to PARTS LINK # 2 (page 8). If the reading is the same go to step 7.

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Trouble Shooting Problem		Possible Cause/Solution
House Relay won't engage, **BD0 & BD1 MODELS ONLY**	PARTS LINK #2	BD0 (BROWN/GOLD) 01-00066-000 Parts link: http://www.pdxrv.com/catalog/i1399.html BD0 (BLACK/SILVER) 01-00066-004 Parts link: http://www.pdxrv.com/catalog/i2755.html BD1 (BROWN/GOLD) 01-00066-001 Parts link: http://www.pdxrv.com/catalog/i1364.html BD1 (BLACK/SILVER) 01-00066-005 Parts link: http://www.pdxrv.com/catalog/i2757.html BD2 (BROWN/GOLD) 01-00066-002 Parts link: http://www.pdxrv.com/catalog/i1363.html BD2 (BLACK/SILVER) 01-00066-006 Parts link: http://www.pdxrv.com/catalog/i2758.html BD3 (BROWN/GOLD) 01-00066-003 Parts link: http://www.pdxrv.com/catalog/i1400.html BD3 (BLACK/SILVER) 01-00066-007 Parts link: http://www.pdxrv.com/catalog/i2759.html
	STEP 7	With a multi-meter set on DC voltage, measure between the black wire at pin # 6 and the white wire on pin # 4 while the switch is pressed**.** The voltage should read the same approximate value as the batteries. If not replace disconnect panel, refer to PARTS LINK # 2 (this page).

Trouble Shooting Problem		Possible Cause/Solution
House Relay won't disengage, **BD0 & BD1 MODELS ONLY**	STEP 8	Check fuses on relay. If not blown go to step 10, if blown replace with size fuse and retest. If fuse / fuses re-blow go to step 9.
	STEP 9	Disconnect harness from battery disconnect panel inside of RV, replace fuse, if fuse re-blows either attempt to find damage in the harness and repair or replace harness, (see P# 1 link page 7). If fuse doesn't blow then go to step 10.
	STEP 10	Check battery voltage, the voltage must be greater than 10.5 Volts DC for the latching relay to close or open. If batteries are below 10.5 Volts DC, charge batteries and retest. If the batteries are charged and are above 10.5 Volts DC go to step11.

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Trouble Shooting

Problem		Possible Cause/Solution
House Relay won't disengage, **BD0 & BD1 MODELS ONLY**	STEP 11	With an assistant, press and hold momentary switch, at the same time check for voltage across the coil terminals (+ on the "S" terminal and ground on the "I" terminal), **If 0 volts go to step 12. If voltage is 10.5 VDC or larger between the "S" & "I" terminals, replace relay.**
	STEP 12	Remove battery disconnect panel from cabinet / console and with a multi-meter set on DC voltage, measure between the red wire at pin # 3 and the black wire on pin # 6**.** The voltage should read the same approximate value as the batteries. If not replace harness, refer to PARTS LINK#1 (page 7). If the voltage reading is the same go to step 13.
	STEP 13	With a multi-meter set on DC voltage, measure between the red wire at pin # 3 and the white wire on pin #4 while the switch is depressed**.** The voltage should read the same approximate value as the batteries. If not replace disconnect panel, refer to PARTS LINK # 2 (page 7). If the reading is the same go to step 14.
	STEP 14	With a multi-meter set on DC voltage, measure between the black wire at pin # 6 and the brown wire on pin # 1 while the switch is pressed**.** The voltage should read the same approximate value as the batteries. If not replace disconnect panel, refer to PARTS LINK # 2 (page 7).

Trouble Shooting

Problem		Possible Cause/Solution
House indicator light on panel remains on although relay is off. **BD0 & BD1 MODELS ONLY**	STEP 15	Is coach plugged in, unplug coach and retest Is engine running, turn engine off and retest If the panel fails one or both retests then go to step 16.

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Trouble Shooting Problem		Possible Cause/Solution
House indicator light on panel remains on although relay is off. **BD0 & BD1 MODELS ONLY**	STEP 16	Verify that the relay is actually in the disengaged (unlatched) state. With a test light, probe the larger 5/16" stud terminals on each side of the relay. Only one terminal should be powered up in the disengaged state. If both studs are powering up the test light go to step 8. If only one 5/16" terminal is powered up go to step 17
	STEP 17	Remove the battery disconnect panel from cabinet / console and with a multi-meter set on DC voltage, measure between the green wire at pin # 5 and the black wire on pin # 6**.** The voltage should read 0 Volts DC. If it reads 0 VDC then replace switch panel, refer to PARTS LINK #2 (page 8). If the voltage reading is the same as the nominal battery reading then go to step 18.
	STEP 18	Disconnect the plug from the battery disconnect panel, with a multi-meter set on DC voltage, measure between the green wire at pin # 5 and the black wire on pin # 6**.** The voltage continues to read 12 Volts DC go to step 19. If it now reads 0 VDC then replace switch panel, refer to PARTS LINK #2 (page 8).
	STEP 19	Leave the battery disconnect switch unplugged. At the relay location, disconnect the green wire from the relay. With a test light, probe the fuse for voltage. If the test light powers up, replace the relay and retest. If it does not, then probe the green wire. If there is voltage present replace the harness, refer to PARTS LINK #1 (page 7)

Trouble Shooting Problem		Possible Cause/Solution
House indicator light is off although relay is on (latched). **BD0 & BD1 MODELS ONLY**	STEP 20	Verify that the relay is actually in the engaged (latched) state. With a test light, probe the larger 5/16" stud terminals on each side of the relay. Both terminals should be powered up in the engaged (latched) state. If only one is powering up the test light go to step 1. If both 5/16" terminals are powered up go to step 21.

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Trouble Shooting

Problem		Possible Cause/Solution
House indicator light is off although relay is on (latched). **BD0 & BD1 MODELS ONLY**	STEP 21	Check fuses on relay. If not blown go to step 22, if blown replace with size fuse and retest. If fuse / fuses re-blow go to step 9.
	STEP 22	Remove the battery disconnect panel from cabinet / console and with a multi-meter set on DC voltage, measure between the green wire at pin # 5 and the black wire on pin # 6**.** The voltage should read whatever DC voltage as the batteries read (typically around 12 volts). If it reads 0 VDC then inspect the harness for damage, or replace harness, refer to PARTS LINK #1 (page 7). If the voltage reading is the same as the nominal battery reading then replace battery disconnect panel, refer to PARTS LINK #2 (page 8)

Trouble Shooting

Problem		Possible Cause/Solution
House Relay won't engage, **BD2 & BD3 MODELS ONLY**	STEP 23	Check fuses on house relay. If not blown go to step 25, if blown replace with size fuse and retest. If fuse / fuses re-blow go to step 24.
	STEP 24	Disconnect harness from battery disconnect panel inside of RV, replace fuse, if fuse re-blows either attempt to find damage in the harness and repair or replace harness, (see PARTS LINK# 1 page 7). If fuse doesn't blow then go to step 25.
	STEP 25	Check battery voltage, the voltage must be greater than 10.5 Volts DC for the latching relay to close or open. If batteries are below 10.5 Volts DC, charge batteries and retest. If the batteries are charged and are above 10.5 Volts DC go to step 26.
	STEP 26	With an assistant, press and hold momentary switch, at the same time check for voltage across the coil terminals (+ on the "I" terminal and ground on the "S" terminal), **If 0 volts go to step 27. If voltage is 10.5 VDC or larger between the "I" & "S" terminals, replace house relay.**

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Trouble Shooting

Problem		Possible Cause/Solution
House Relay won't engage, **BD2 & BD3 MODELS ONLY**	STEP 27	Remove battery disconnect panel from cabinet / console and with a multi-meter set on DC voltage, measure between the red wire at pin # 2 and the black wire on pin # 12**.** The voltage should read the same approximate value as the batteries. If not replace harness, refer to PARTS LINK#1 (page 7). If the voltage reading is the same go to step 28.
	STEP 28	With a multi-meter set on DC voltage, measure between the red wire at pin # 2 and the brown wire on pin # 1 while the switch is depressed**.** The voltage should read the same approximate value as the batteries. If not replace disconnect panel, refer to PARTS LINK # 2 (next page8). If the reading is the same go to step 29.
	STEP 29	With a multi-meter set on DC voltage, measure between the black wire at pin # 12 and the white wire on pin # 4 while the switch is pressed**.** The voltage should read the same approximate value as the batteries. If not replace disconnect panel, refer to PARTS LINK # 2 (page 8).

Trouble Shooting

Problem		Possible Cause/Solution
House Relay won't disengage, **BD2 & BD3 MODELS ONLY**	STEP 30	Check fuses on relay. If not blown go to step 32, if blown replace with size fuse and retest. If fuse / fuses re-blow go to step 31.
	STEP 31	Disconnect harness from battery disconnect panel inside of RV, replace fuse, if fuse re-blows either attempt to find damage in the harness and repair or replace harness, (see P# 1 link page 7). If fuse doesn't blow then go to step 32.
	STEP 32	Check battery voltage, the voltage must be greater than 10.5 Volts DC for the latching relay to close or open. If batteries are below 10.5 Volts DC, charge batteries and retest. If the batteries are charged and are above 10.5 Volts DC go to step33.

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Trouble Shooting Problem		Possible Cause/Solution
House Relay won't disengage, **BD2 & BD3 MODELS ONLY**	STEP 33	With an assistant, press and hold momentary switch, at the same time check for voltage across the coil terminals (+ on the "S" terminal and ground on the "I" terminal), **If 0 volts go to step 34. If voltage is 10.5 VDC or larger between the "S" & "I" terminals, replace house relay.**
	STEP 34	Remove battery disconnect panel from cabinet / console and with a multi-meter set on DC voltage, measure between the red wire at pin # 2 and the black wire on pin # 12**.** The voltage should read the same approximate value as the batteries. If not replace harness, refer to PARTS LINK#1 (page 7). If the voltage reading is the same go to step 35.
	STEP 35	With a multi-meter set on DC voltage, measure between the red wire at pin # 2 and the white wire on pin #4 while the switch is depressed**.** The voltage should read the same approximate value as the batteries. If not replace disconnect panel, refer to PARTS LINK # 2 (page 7). If the reading is the same go to step 36.
	STEP 36	With a multi-meter set on DC voltage, measure between the black wire at pin # 12 and the brown wire on pin # 1 while the switch is pressed**.** The voltage should read the same approximate value as the batteries. If not replace disconnect panel, refer to PARTS LINK # 2 (page 7).

Trouble Shooting Problem		Possible Cause/Solution
House indicator light on panel remains on although relay is off. **BD2 & BD3 MODELS ONLY**	STEP 37	Is coach plugged in, unplug coach and retest Is engine running, turn engine off and retest If the panel fails one or both retests then go to step 38.

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Trouble Shooting

Problem		Possible Cause / Solution
House indicator light on panel remains on although relay is off. **BD2 & BD3 MODELS ONLY**	STEP 38	Verify that the relay is actually in the disengaged (unlatched) state. With a test light, probe the larger 5/16" stud terminals on each side of the relay. Only one terminal should be powered up in the disengaged state. If both studs are powering up the test light go to step 8. If only one 5/16" terminal is powered up go to step 39.
	STEP 39	Remove the battery disconnect panel from cabinet / console and with a multi-meter set on DC voltage, measure between the green wire at pin # 10 and the black wire on pin # 12**.** The voltage should read 0 Volts DC. If it reads 0 VDC then replace switch panel, refer to PARTS LINK #2 (page 8). If the voltage reading is the same as the nominal battery reading then go to step 40.
	STEP 40	Disconnect the plug from the battery disconnect panel, with a multi-meter set on DC voltage, measure between the green wire at pin # 10 and the black wire on pin # 12**.** The voltage continues to read 12 Volts DC go to step 41. If it now reads 0 VDC then replace switch panel, refer to PARTS LINK #2 (page 8).
	STEP 41	Leave the battery disconnect switch unplugged. At the relay location, disconnect the green wire from the relay. With a test light, probe the fuse for voltage. If the test light powers up, replace the relay and retest. If it does not, then probe the green wire. If there is voltage present replace the harness, refer to PARTS LINK #1 (page 7)

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Trouble Shooting

Problem		Possible Cause / Solution
House indicator light is off although relay is on (latched). **BD2 & BD3 MODELS ONLY**	STEP 42	Verify that the relay is actually in the engaged (latched) state. With a test light, probe the larger 5/16" stud terminals on each side of the relay. Both terminals should be powered up in the engaged (latched) state. If only one is powering up the test light go to step 1. If both 5/16" terminals are powered up go to step 43.
	STEP 43	Check fuses on relay. If not blown go to step 44, if blown replace with size fuse and retest. If fuse / fuses re-blow go to step 9.
	STEP 44	Remove the battery disconnect panel from cabinet / console and with a multi-meter set on DC voltage, measure between the green wire at pin # 5 and the black wire on pin # 6**.** The voltage should read whatever DC voltage as the batteries read (typically around 12 volts). If it reads 0 VDC then inspect the harness for damage, or replace harness, refer to PARTS LINK #1 (page 7). If the voltage reading is the same as the nominal battery reading then replace battery disconnect panel, refer to PARTS LINK #2 (page 8)

Trouble Shooting

Problem		Possible Cause / Solution
Chassis Relay won't engage (latch), **BD2 & BD3 MODELS ONLY**	STEP 45	Check fuses on chassis relay. If not blown go to step 47, if blown replace with same size fuse and retest. If fuse / fuses re-blow go to step 46.
	STEP 46	Disconnect harness from battery disconnect panel inside of RV, replace fuse, if fuse re-blows either attempt to find damage in the harness and repair or replace harness, (see PARTS LINK# 1 page 7). If fuse doesn't blow then go to step 47.

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Trouble Shooting

Problem		Possible Cause / Solution
Chassis Relay won't engage (latch), **BD2 & BD3 MODELS ONLY**	STEP 47	Check battery voltage, the voltage must be greater than 10.5 Volts DC for the latching relay to close or open. If batteries are below 10.5 Volts DC, charge batteries and retest. If the batteries are charged and are above 10.5 Volts DC go to step 48.
	STEP 48	With an assistant, press and hold momentary switch, at the same time check for voltage across the coil terminals of the chassis battery relay(+ on the "I" terminal and ground on the "S" terminal), **If 0 volts go to step 49. If voltage is 10.5 VDC or larger between the "I" & "S" terminals, replace chassis relay.**
	STEP 49	Remove battery disconnect panel from cabinet / console and with a multi-meter set on DC voltage, measure between the orange wire at pin # 7 and the black wire on pin # 12**.** The voltage should read the same approximate value as the batteries. If not replace harness, refer to PARTS LINK#1 (page 7). If the voltage reading is the same go to step 50.
	STEP 50	With a multi-meter set on DC voltage, measure between the orange wire at pin # 7 and the gray wire on pin # 8 while the switch is depressed**.** The voltage should read the same approximate value as the batteries. If not replace disconnect panel, refer to PARTS LINK # 2 (page8). If the reading is the same go to step 51.
	STEP 51	With a multi-meter set on DC voltage, measure between the black wire at pin # 12 and the violet wire on pin # 6 while the switch is pressed**.** The voltage should read the same approximate value as the batteries. If not replace disconnect panel, refer to PARTS LINK # 2 (page 8).

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Trouble Shooting

Problem		Possible Cause / Solution
Chassis Relay won't disengage (unlatch), **BD2 & BD3 MODELS ONLY**	STEP 52	**NOTE**: The BD2 & BD3 panels have an interlock that will not allow chassis battery bank to be "unlatched" while ignition is on. This feature should not be defeated as high voltages from the alternator can damage sensitive electronics Is engine running / ignition is on, turn engine off / switch off ignition and retest. If the panel fails retests then go to step 53.
	STEP 53	Check fuses on relay. If not blown go to step 54, if blown replace with same size fuse and retest. If fuse / fuses re-blow go to step 54.
	STEP 54	Disconnect harness from battery disconnect panel inside of RV, replace fuse, if fuse re-blows either attempt to find damage in the harness and repair or replace harness, (see P# 1 link page 7). If fuse doesn't blow then go to step 55.
	STEP 55	Check battery voltage, the voltage must be greater than 10.5 Volts DC for the latching relay to close or open. If batteries are below 10.5 Volts DC, charge batteries and retest. If the batteries are charged and are above 10.5 Volts DC go to step 56.
	STEP 56	Remove battery disconnect panel from cabinet / console and with a multi-meter set on DC voltage, measure between the blue wire at pin # 5 and the black wire on pin # 12**.** The voltage should read 0 VDC, if your reading a voltage of 10.5 VDC or greater go to step 57. If the voltage reading is 0 VDC then go to step 58.
	STEP 57	**NOTE**: The BD2 & BD3 panels have an interlock that will not allow the chassis battery bank to be "unlatched" while ignition is on. Disconnect the plug from the battery disconnect panel, re-measure between the blue wire and the black wire. If there is no voltage, replace the battery disconnect panel, refer to PARTS LINK # 2 (page 8). If there is voltage on the blue wire, TBSH the ignition circuit as the ignition circuit is still on and is not being controlled by the ignition switch.

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Problem		Possible Cause / Solution
Chassis Relay won't disengage (unlatch), **BD2 & BD3 MODELS ONLY**	STEP 58	With an assistant, press and hold momentary switch, at the same time check for voltage across the coil terminals (+ on the "S" terminal and ground on the "I" terminal), **If 0 volts go to step 59. If voltage is 10.5 VDC or larger between the "S" & "I" terminals, replace chassis relay.**
	STEP 59	Remove battery disconnect panel from cabinet / console and with a multi-meter set on DC voltage, measure between the orange wire at pin # 7 and the black wire on pin # 12**.** The voltage should read the same approximate value as the batteries. If not replace harness, refer to PARTS LINK#1 (page 7). If the voltage reading is the same go to step 60.
	STEP 60	With a multi-meter set on DC voltage, measure between the orange wire at pin # 7 and the violet wire on pin #6 while the switch is depressed**.** The voltage should read the same approximate value as the batteries. If not replace disconnect panel, refer to PARTS LINK # 2 (page 7). If the reading is the same go to step 61.
	STEP 61	With a multi-meter set on DC voltage, measure between the black wire at pin # 12 and the gray wire on pin # 8 while the switch is pressed**.** The voltage should read the same approximate value as the batteries. If not replace disconnect panel, refer to PARTS LINK # 2 (page 7).

Trouble Shooting

Problem		Possible Cause / Solution
Chassis indicator light on panel remains on, although relay is off. **BD2 & BD3 MODELS ONLY**	STEP 62	Is engine running / ignition switch on, turn engine off and retest If the panel fails retests then go to step 63.

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Trouble Shooting

Problem		Possible Cause / Solution
Chassis indicator light on panel remains on, although relay is off. **BD2 & BD3 MODELS ONLY**	STEP 63	Verify that the relay is actually in the disengaged (unlatched) state. With a test light, probe the larger 5/16" stud terminals on each side of the relay. Only one terminal should be powered up in the disengaged state. If both studs are powering up the test light go to step 52. If only one 5/16" terminal is powered up go to step 64.
	STEP 64	Remove the battery disconnect panel from cabinet / console and with a multi-meter set on DC voltage, measure between the yellow wire at pin # 11 and the black wire on pin # 12**.** The voltage should read 0 Volts DC. If it reads 0 VDC then replace switch panel, refer to PARTS LINK #2 (page 8). If the voltage reading is the same as the nominal battery reading then go to step 65.
	STEP 65	Disconnect the plug from the battery disconnect panel, with a multi-meter set on DC voltage, measure between the yellow wire at pin # 11 and the black wire on pin # 12**.** If the voltage continues to read 12 Volts DC go to step 41. If it now reads 0 VDC then replace switch panel, refer to PARTS LINK #2 (page 8).
	STEP 66	Leave the battery disconnect switch unplugged. At the relay location, disconnect the yellow wire from the relay. With a test light, probe the fuse for voltage. If the test light powers up, replace the relay and retest. If it does not, then probe the green wire. If there is voltage present replace the harness, refer to PARTS LINK #1 (page 7)

Trouble Shooting

Problem		Possible Cause / Solution
Chassis indicator light is off although relay is on (latched). **BD2 & BD3 MODELS ONLY**	STEP 67	Verify that the relay is actually in the engaged (latched) state. With a test light, probe the larger 5/16" stud terminals on each side of the relay. Both terminals should be powered up in the engaged (latched) state. If only one is powering up the test light go to step 45. If both 5/16" terminals are powered up go to step 68.

BATTERY DISCONNECT

Trouble Shooting

Problem		Possible Cause / Solution
Chassis indicator light is off although relay is on (latched). **BD2 & BD3 MODELS ONLY**	STEP 67	Check fuses on chassis relay. If not blown go to step 68, if blown replace with size fuse and retest. If fuse / fuses re-blow go to step 9.
	STEP 68	Remove the battery disconnect panel from cabinet / console and with a multi-meter set on DC voltage, measure between the yellow wire at pin # 11 and the black wire on pin # 6**.** The voltage should read whatever DC voltage as the batteries read (typically around 12 volts). If it reads 0 VDC then inspect the harness for damage, or replace harness, refer to PARTS LINK #1 (page 7). If the voltage reading is the same as the nominal battery reading then replace battery disconnect panel, refer to PARTS LINK #2 (page 8)

Trouble Shooting

Problem		Possible Cause / Solution
No voltmeter reading on battery disconnect panel display panel. **BD3 MODEL ONLY**	STEP 68	Check fuse on house relay that attaches to the green wire. If not blown go to step 69, if blown replace with size fuse and retest. If fuse / fuses re-blow go to step 9.
	STEP 69	Remove the battery disconnect panel from cabinet / console and with a multi-meter set on DC voltage, measure between the green wire at pin # 5 and the black wire on pin # 6**.** The voltage should read whatever DC voltage as the batteries read (typically around 12 volts). If it reads 0 VDC then inspect the harness for damage, or replace harness, refer to PARTS LINK #1 (page 7). If the voltage reading is the same as the nominal battery reading then replace battery disconnect panel, refer to PARTS LINK #2 (page 8)

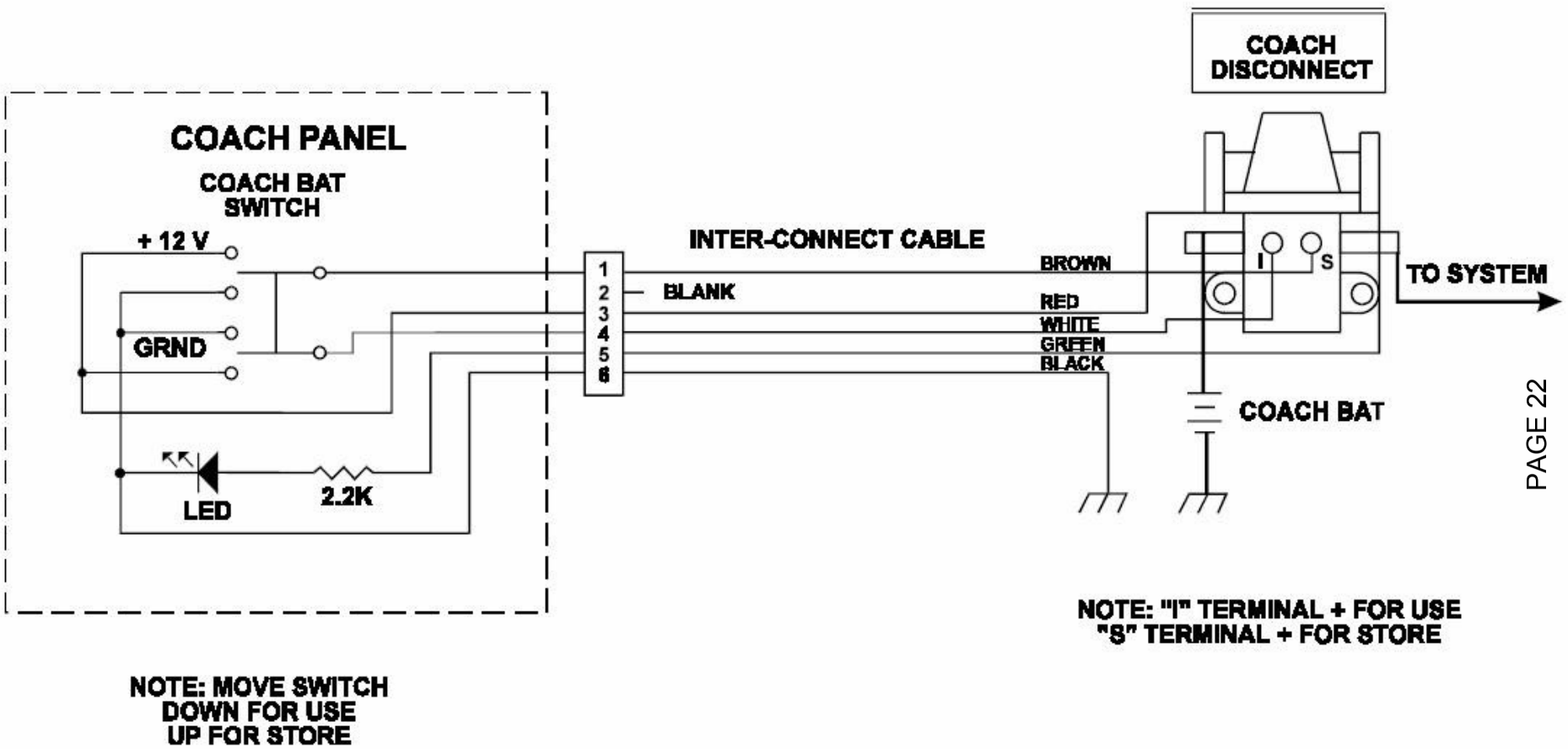
BATTERY DISCONNECT

Trouble Shooting

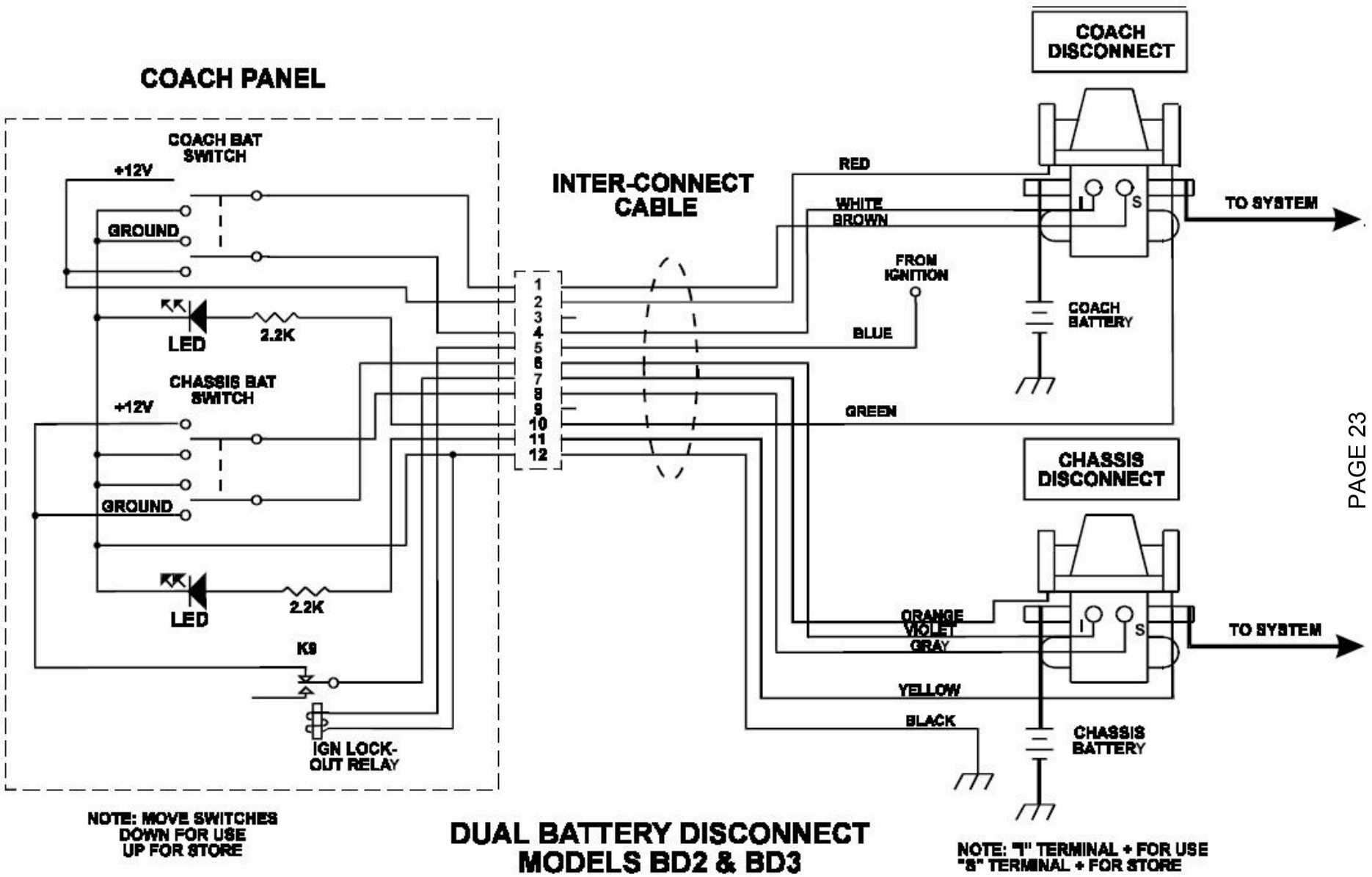
Problem		Possible Cause / Solution
No voltmeter reading on battery disconnect panel display panel (Read Volts Coach). **BD3 MODEL ONLY**	STEP 69	Check fuse on house relay that attaches to the green wire. If not blown go to step 70, if blown replace with size fuse and retest. If fuse / fuses re-blow go to step 9.
	STEP 70	Remove the battery disconnect panel from cabinet / console and with a multi-meter set on DC voltage, measure between the green wire at pin # 10 and the black wire on pin # 12**.** The voltage should read whatever DC voltage as the batteries read (typically around 12 volts). If it reads 0 VDC then inspect the harness for damage, or replace harness, refer to PARTS LINK #1 (page 7). If the voltage reading is the same as the nominal battery reading then replace battery disconnect panel, refer to PARTS LINK #2 (page 8)

Trouble Shooting

Problem		Possible Cause / Solution
No voltmeter reading on battery disconnect panel display panel (Read Volts Chassis). **BD3 MODEL ONLY**	STEP 71	Check fuse on chassis relay that attaches to the yellow wire. If not blown go to step 70, if blown replace with size fuse and retest. If fuse / fuses re-blow go to step 9.
	STEP 72	Remove the battery disconnect panel from cabinet / console and with a multi-meter set on DC voltage, measure between the yellow wire at pin # 11 and the black wire on pin # 12**.** The voltage should read whatever DC voltage as the batteries read (typically around 12 volts). If it reads 0 VDC then inspect the harness for damage, or replace harness, refer to PARTS LINK #1 (page 7). If the voltage reading is the same as the nominal battery reading then replace battery disconnect panel, refer to PARTS LINK #2 (page 8)



SINGLE BATTERY DISCONNECT
MODELS BD0 & BD1



DUAL BATTERY DISCONNECT
MODELS BD2 & BD3