

BENDIX C

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This proced by removing the CC-5 sta solenoid to k

8. If the solenoi actuator cabl and nut from cable nut is c checked, the from the RV-
9. If one hit on t mode is errat connector/pir check the foll
 - Resistance
 - Resistance
 - Resistance

As the CC-5 decrease, ch indicate inter Potentiomet 102315.

10. If the steps a the test unit. problem. Se

Improper

This secti system is functio

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*** Surging**

There are a couple types of problems, which often are described as surging. Two common examples are described below.

Rapid, erratic surging/drop out

This type of surging is erratic and seems more like the system is momentarily dropping out rather than hunting for the set speed. It can be caused by an intermittent speed, clutch or potentiometer signal. Since it does not disengage permanently, it is not caused by the brake or power signals. Verify that the wiring is intact to the speed sender. Also check for a faulty or misadjusted clutch switch, (often it is out of adjustment). Since an intermittent potentiometer signal from the CC-5 can cause this problem. Verify that the resistance between sockets 1 and 2 of the potentiometer connector varies in a smooth, continuous manner as the CC-5 is compressed.

Occasionally this symptom can be caused by a speed signal, which is modulated. Modulation can be caused if the plates such as those used with a driveshaft speed sensor are warped, or the holes are not symmetric. Using a cable between the transmission port and the MINI-GEN, or a fault MINI-GEN or drive tang can also cause this.

Slower, heavy surging/hunting

This type of surge may be associated with coming off of a grade or bobtail operation. Often the throttle pedal will move up and down as it surges. The Controller responding too quickly and overshooting when it adjusts the throttle position causes this type of surging. By increasing the damping to the system, this problem can be solved. Engines with All Speed governors, (CAT and MACK) are especially prone to this type of surge, especially if they have high horsepower. Refer to the governor description in the programming section of this manual for reasons behind this.

Having the CA-1 programmed for Min/Max when it is used on an All Speed governor engine can cause this type of surge. Having insufficient air line length between the Solenoids and the CC-5 can also cause it. With an All Speed governor, a minimum of 8 feet of 1/4" diameter air line is recommended. A 2 feet minimum is suggested for Min/Max governors.

The larger the volume (length and diameter) of the airline between the Solenoids and the CC-5, the greater the damping.

Increasing the throttle return spring force can also help dampen the system and may help this problem. Be certain that the correct CC-5 is being used, (truck vs. bus).

A slight surge of this type can occur if the CA-1 hertz rate is programmed lower than the vehicle's actual hertz rate. Programming at the next higher hertz rate setting will sometimes help this problem, although this will change the upper and lower set limits.

Excessive air pressure to the solenoid supply can contribute to surging. Reducing the air pressure by adjusting the RV-1 valve may improve the situation.

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*** Slow response/sloppy regulation**

A slow, sloppy response, which allows the vehicle speed to change more than +/- 1 MPH from the set speed, is usually caused by the system having too much damping. Opposite from the surging problem above, this can be caused if the CA-1 is programmed for an All Speed governor and a Min/Max is used. Too long of a line length can also cause this problem, although this can generally only occur in buses. Excessive throttle return spring, or wrong CC-5 spring force can contribute to this.

If the CA-1 is programmed for a hertz rate, which is higher than the actual vehicle hertz rate, this problem can result. Changing the programming to the next lower Hertz rate may help.

If the Throttle cable is damaged, or bent in a tight radius, the increased resistance to movement can cause the response to be sluggish.

This response can also be caused if the system supply pressure is too low or if there is a restriction in the air system.

*** Speed increase over time**

This problem rarely occurs, but it is usually associated with the use of a device which causes noise on the power supply, such as air conditioning or a CB radio. This problem will not occur if the Cruise Control system ground has a good connection to the vehicle power ground.

*** Lower than programmed top set limit**

This can result if the Top Set Limit is programmed wrong or if the Hertz rate is programmed lower than it should be. The most common cause of this problem is slack in the Actuator (throttle) cable. If there is too much slack, the 1.5" stroke of the CC-5 cannot pull the linkage to full throttle, and therefore cannot achieve high speeds.

VI. KITS/PART NUMBERS

This section lists all the component part numbers that will normally be needed. ~~If a line has been drawn through the part it is no longer available.~~

The kit concept was created to simplify the ordering of the parts. Bendix Parts Catalog 10-A-1 is an excellent source for ordering the common kits. It clearly explains which kits to order for a particular vehicle.

There are some special kits created for the OE. These exist since OEMs do not always require all the hardware or some of the components that we include in the Universal kits. Some of the parts used in these kits are only for special applications and have low usage. Even if an OE has special requirements, the parts contained in the Universal kits should be used (they can be ordered separately) whenever possible.

There are many different part numbers for pre-programmed CA-1s. The field programmable versions should always be used when possible to simplify ordering and to reduce the variety of part numbers that a customer must stock. They come with an instruction sheet, which explains the programming procedure. Also, the field programmable versions tend to have better availability due to their

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increased usage. Only field programmable versions are available in the After-market.

* CA-1s

The list on the next page has all currently available CA-1 module that are in the system.

In the table below, column "V" is the operating voltage of the CA-1. "LABEL" indicates that the CA-1 has an OE label applied to it; the particular OE is shown in the column. The type of connector used is indicated in the column "CONN"; letter "A" is the molded rubber type, letter "B" is the plastic Packard 56 series connector. The column labeled "STUD" refers to whether the enclosure has a stud provided for mounting solenoids.

The "TSL" column is the programmed Top Set Limit in MPH if the vehicle Hertz rate is exactly as programmed, (refer to the programming section for TSL if actual Hertz rate differs). Units labeled as "FIELD PROGRAMMABLE" have screws to hold the enclosures together, others have rivets. Part number 550179 has screws for field programming but instead of having all programming. Switches "on" before shipment, it has the ENGINE GOVERNOR switch preset to "off" for an All Speed Governor.

<u>P/N</u>	<u>V</u>	<u>LABEL</u>	<u>CONN.</u>	<u>STUD</u>	<u>TSL</u>	<u>GOVERNOR</u>	<u>HZ/MPH</u>	<u>THROT</u>
102718	24	-	A	Yes	No	M/M	8.4	No
102721	12	-	A	Yes	No	M/M	4.2	No
102722	12	-	A	Yes	No	M/M	8.4	Yes
102723	12	-	A	Yes	No	Allspd	8.4	Yes
103233	24	-	A	Yes	No	Allspd	8.4	Yes
103234	24	-	A	Yes	No	M/M	4.2	No
103235	12	-	B	Yes	No	M/M	8.4	No
103236	12	-	B	Yes	No	M/M	8.4	Yes
103237	12	-	B	Yes	No	Allspd	8.4	Yes
103238	12	-	A	Yes	58.6	M/M	8.4	No
103242	12	-	A	Yes	64.6	M/M	4.2	No
550021	24	-	A	Yes	51.2	M/M	8.4	No
550028	12	-	A	Yes	No	Allspd	8.4	No
550032	24	-	A	Yes	No	M/M	16.8	No
550034	12	-	A	Yes	No	M/M	8.4	No
550037	12	-	A	Yes	55.3	M/M	8.4	Yes
550040	12	-	A	Yes	62.5	Allspd	8.4	Yes
550043	12	-	A	Yes	No	M/M	16.8	Yes
550048	12	-	A	Yes	No	M/M	4.2	Yes
550050	12	-	A	Yes	62.5	M/M	8.4	Yes
550068	24	-	A	Yes	No	Allspd	4.2	Yes
550072	12	-	A	Yes	-----FIELD PROGRAMMABLE-----Service 065072-----			
550073	24	-	A	Yes	-----FIELD PROGRAMMABLE- Service 065073-----			
550106	12	FL	A	Yes	No	M/M	8.4	Yes
550107	12	FL	A	Yes	No	Allspd	8.4	Yes
550129	12	FL	A	No	No	M/M	8.4	Yes
550130	12	FL	A	No	No	Allspd	8.4	Yes

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102421	12	-	A	No	No	M/M	8.4	Yes
102422	12	-	A	No	No	Allspd	8.4	Yes
101657	12	H	B	No	No	M/M	8.4	Yes
101830	12	H	B	No	No	M/M	16.8	Yes
101941	12	H	B	No	No	Allspd	16.8	Yes
102866	12	-	B	No	No	M/M	8.4	Yes
102867	12	-	B	No	No	Allspd	8.4	Yes
550092	12	H	B	No	No	Allspd	8.4	Yes
550179	12	-	A	Yes	FIELD PROG, SET TO ALL SPD			

* CA-1s with Solenoids

This section lists the CA-1/Solenoid assemblies if there is a part number established. The part number of the CA-1 and the solenoid is given for each CA-1/Solenoid assembly.

CA-1/SOLN ASSY P/N	CA-1 P/N	SOLENOID P/N
102156	102722	102221
102076	102718	102074
102220	102723	102221
102523	103233	102074
102684	102721	101927
102700	103234	102074
102703	102722	102027
102704	102723	101927
104336	102723	101927
104359	550068	102074
550015	103238	101927
550017	103242	101927
550019	550021	102074
550029	550028	101927
550030	550034	101927
550033	550032	102074
550036	550037	102221
550039	550040	101927
550042	550043	101927
550045	550048	101927
550047	550050	101927
550070	550072	101927 (Field Prog)
550071	550073	102074 (Field Prog)
550178	550179	101927 (Field Prog)
102307	103235	101832
102521	103236	101832
102522	103237	101832

* Solenoids

101927- Service 065030 12 volt molded rubber connector

~~102074- 24 volt molded rubber connector~~

102625- Service 065029 12 volt Packard 56 connector

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~~101832- 12 volt Packard 56 connector (IHC label)~~

~~550105- 12 volt molded rubber connector (Freightliner Label)~~

~~102221- same as 102027 with elbows (294622) on parts~~

* CC-5s

101950- Molded rubber connector for trucks

~~101833- Packard 56 connector for trucks, (has IH label)~~

~~106389- Packard 56 connector for trucks~~

~~102261- Molded rubber connector for buses~~

Note: Cab Kit part number 209930 is the same as 209917 except it contains a bus CC-5 instead of a truck type.

CC-5 rebuild kit is 102315.

* Switches

101955- Set/Resume switch

101954- Control (power) switch, 12V

102101- Control (power) switch, 24V

294639- Switch cover plat

* Valves

282811- RV-1 Pressure Reducing Valve

101781- TR-3 Inversion Valve

* Brackets

The bracketry included in the engine kits listed in catalog SD-10-1 should be used.

* Speed Senders

102622- Non-feed-through MINI-GEN

~~102053- Feed through MINI-GEN~~

~~550112- Feed through MINI-GEN (Metric couplings)~~

~~296680- Magnetic sensor, (Wabash "G" Type)~~

102832- T-Adapter for Non-feed through MINI-GEN if feed through version does not fit due to space limitations.

* MINI-GEN Drive Tangs

Dual ear drive tangs must be used with the MINI-GEN. These are floating tangs and do not side load the MINI-GEN. Premature failure will occur if standard drive tangs are used. Available part numbers are:

~~294451- .192 square male~~

~~294452- .152 round male~~

294453- .185 round male

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294454- .203 round male

~~294455- .203 round male 2.3" (special application)~~

~~294488- .185 round male 2.3" (special application)~~

~~294459- .197 square female~~

294460- .161 round female

~~294461- .191 round female~~

294462- .213 round female

* 'T' Adapter to Transmission Drive Tangs

Refer to catalog page 10-A-10 for individual drive tang part numbers. Tangs are generally supplied by outside sources such as Stewart-Warner or S.S. White.

* Clutch Switch

~~260704- This kit contains a switch (spring shaft), bracket, hardware and installation instructions.~~

* Actuator Cables

102735- 4-foot length, swivel end, rubber boot, clamp bracket interface – (used in Cummins Kit)

102298- 4-foot length, beaded end, threaded nut bracket interface (used in DDAD and CAT engine kits)

~~550110- 4 foot length, swivel, clamp bracket interface clamp (used in MACK engine kit)~~

* Interconnect Cables

The list and diagrams below are the wire harnesses for the Cab Kit 209917. These common cables should be used whenever possible.

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Wiring Harness Pc. No.	Figure No	Connection		A Length (Approx.) In.	Wire Color
		To	From		
102238	1	Control Switch	Vehicle Power & Ground	60	Red & Black
102240	2	Control Switch	Set/Resume Switch	6	White
102244	3	CA-1 Controller	CC-5 Cylinder	182	Red, White, Black
102736	4	Control Switches & 102545 Harness	CA-1 Controller	155	White/Green, White/Yellow
102252	5	Vehicle Ground	CA-1 Controller	12	Green
102252	5	Vehicle Ground	102256 Harness	12	Green
102256	6	Speed Sensor & Cl. Switch	CA-1 Controller	A120/B180	Blue, Gray, Green & Violet
102545	7	Stop Light Switch	102736	120	Orange

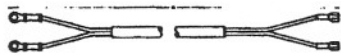


Fig. 1



Fig. 2

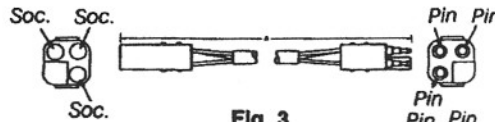


Fig. 3

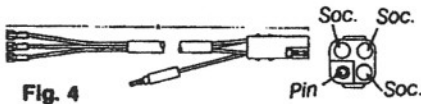


Fig. 4



Fig. 5

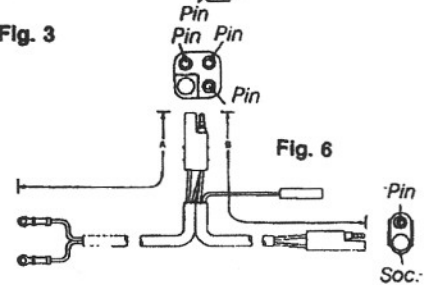


Fig. 6

Wiring Harnesses

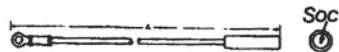
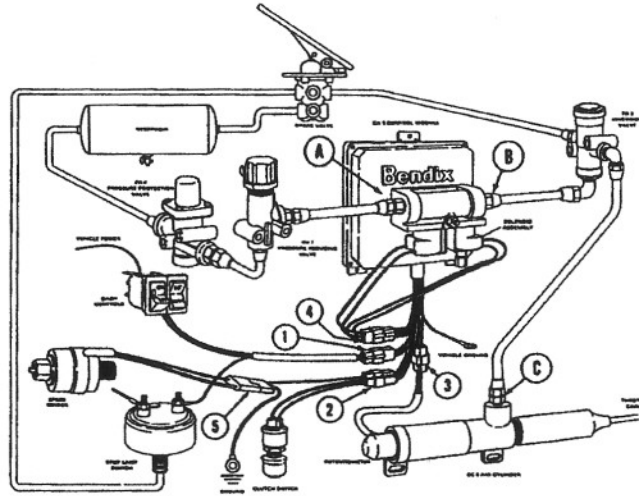


Fig. 7

The ground jumper wire 102252 will be obsolete soon. A ring terminal will replace the molded connector on all speed sender/clutch switch harnesses. This ring terminal can connect directly to ground, making the use of the 102252 jumper unnecessary.

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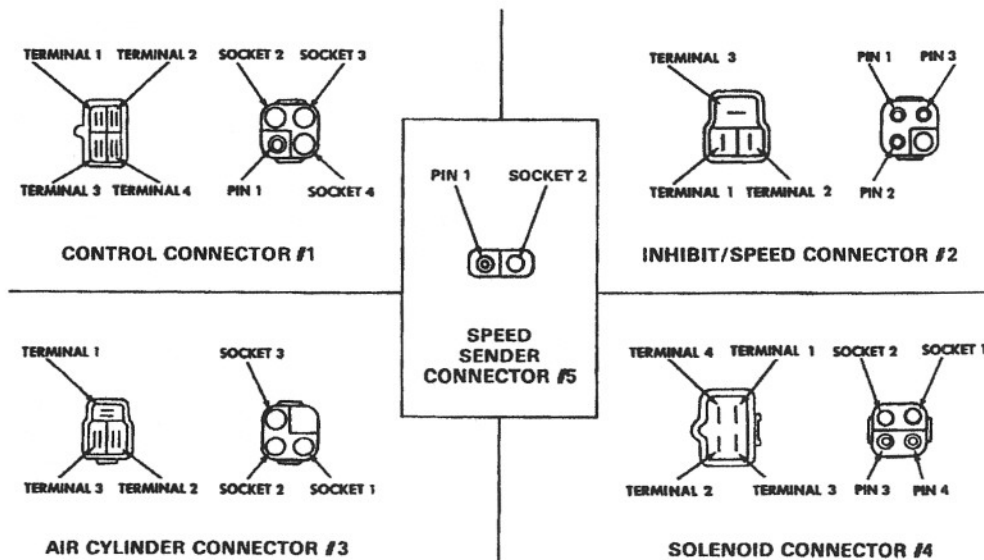


VII. CONNECTOR/WIRING DIAGRAMS

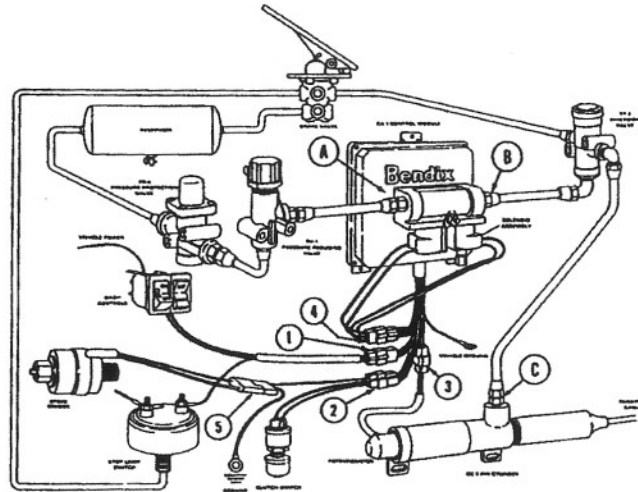
The following diagrams identify each of the system wiring connectors. The tables give the connector number and name, as well as the wire color, connection number and purpose of each circuit in the connector.

CONNECTOR NUMBER/NAME	TERMINAL SOCKET, OR PIN #	WIRE COLOR	SOCKET CIRCUIT
#1 Control	1	WHITE/RED	SET SWITCH
	2	WHITE/YELLOW	RESUME SWITCH
	3	WHITE/GREEN	ELECT. POWER
	4	ORANGE	STOP LAMP
#2 INHIBIT/SPEED	1	BLUE	CLUTCH SWITCH
	2	VIOLET	PWR TO CLUTCH SW.
	3	GRAY	SPEED INPUT
#3 AIR CYLINDER	1	RED	POTENT. SUPPLY
	2	WHITE	POTENT. WIPER
	3	BLACK	POTENT. GROUND
#4 SOLENOID	1	YELLOW/GREEN	SUPPLY SOLENOID
	2	BROWN/YELLOW	EXHAUST SOLENOID
	3	BROWN	EXHAUST SOL. POWER
	4	YELLOW	SUPPLY SOL. POWER

THIS SHOWS THE CONNECTORS ON THE VEHICLE WIRE HARNESS SIDE, (NOT THE CA-1 SIDE).



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CONNECTOR NUMBER/NAME	TERMINAL SOCKET, OR PIN #	WIRE COLOR	SOCKET CIRCUIT
#1 Control	1	WHITE/RED	SET SWITCH
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	3	WHITE/GREEN	ELECT. POWER
	4	ORANGE	STOP LAMP
#2 INHIBIT/SPEED	1	BLUE	CLUTCH SWITCH
	2	VIOLET	PWR TO CLUTCH SW.
	3	GRAY	SPEED INPUT
#3 AIR CYLINDER	1	RED	POTENT. SUPPLY
	2	WHITE	POTENT. WIPER
	3	BLACK	POTENT. GROUND
#4 SOLENOID	1	YELLOW/GREEN	SUPPLY SOLENOID
	2	BROWN/YELLOW	EXHAUST SOLENOID
	3	BROWN	EXHAUST SOL. POWER
	4	YELLOW	SUPPLY SOL. POWER

THIS SHOWS THE CONNECTORS ON THE CA-1 CONTROLLER (NOT THE VEHICLE WIRE HARNESS SIDE)

