



Installation Instructions

KIT
PC. No. 209845

BENDIX CRUISE CONTROL (MCI BUS MODELS MC-5, MC-7, MC-8, MC-9)

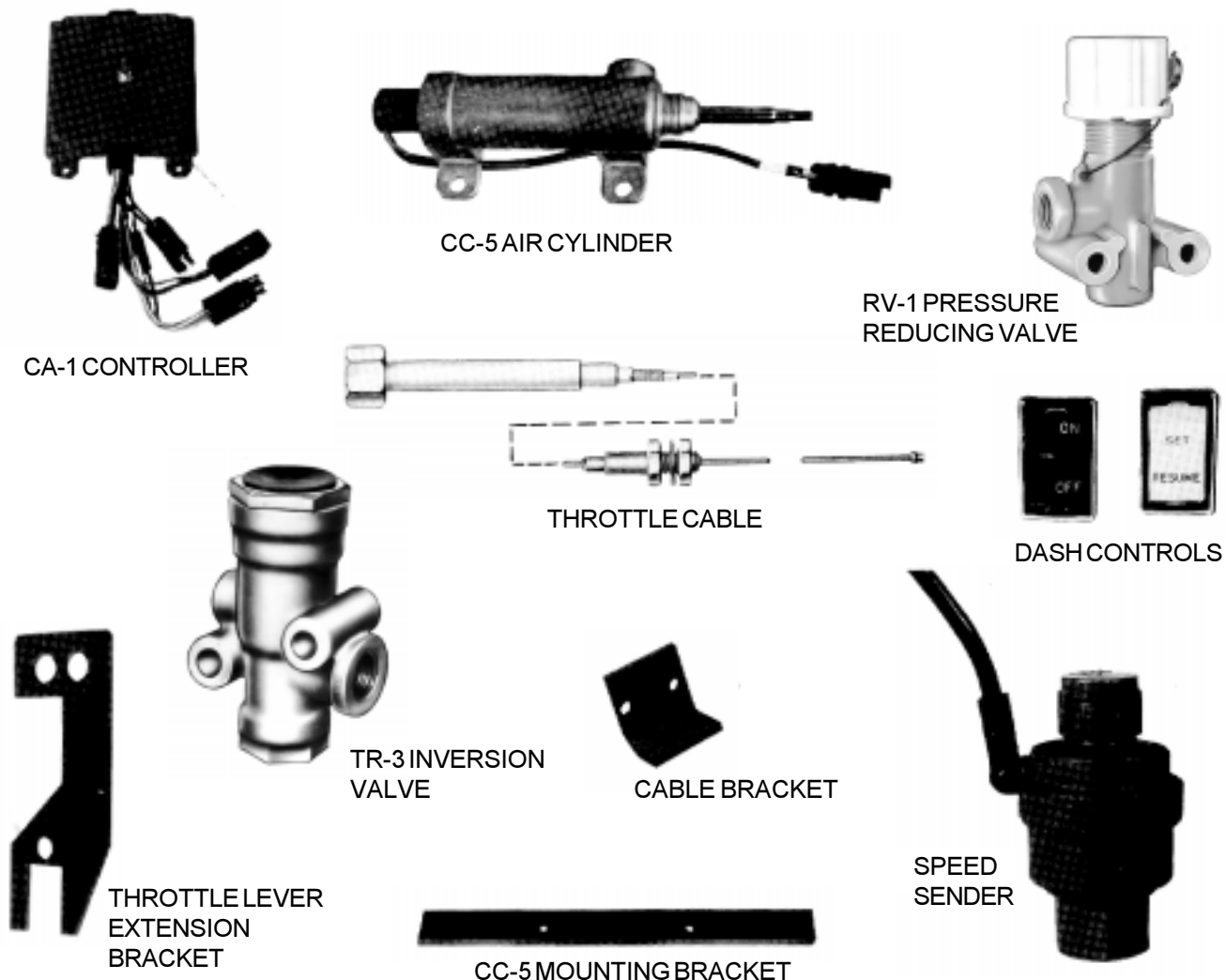


IMPORTANT! PLEASE READ:

When working on or around a vehicle, the following general precautions should be observed.

1. Park the vehicle on a level surface, apply the parking brakes, and always block the wheels.
2. Stop the engine when working around the vehicle.
3. If the vehicle is equipped with air brakes, make certain to drain the air pressure from all reservoirs before beginning ANY work on the vehicle.
4. Following the vehicle manufacturer's recommended procedures, deactivate the electrical system in manner that removes all electrical power from the vehicle.
5. When working in the engine compartment the engine should be shut off. Where circumstances require that the engine be in operation, **EXTREME CAUTION** should be used to prevent personal injury resulting from contact with moving, rotating, leaking, heated, or electrically charged components.
6. Never connect or disconnect a hose or line containing pressure; it may whip. Never remove a component or plug unless you are certain all system pressure has been depleted.
7. Never exceed recommended pressures and always wear safety glasses.
8. Do not attempt to install, remove, disassemble or assemble a component until you have read and thoroughly understand the recommended procedures. Use only the proper tools and observe all precautions pertaining to use of those tools.
9. Use only genuine Bendix replacement parts, components, and kits. Replacement hardware, tubing, hose, fittings, etc. should be of equivalent size, type, and strength as original equipment and be designed specifically for such applications and systems.
10. Components with stripped threads or damaged parts should be replaced rather than repaired. Repairs requiring machining or welding should not be attempted unless specifically approved and stated by the vehicle or component manufacturer.
11. Prior to returning the vehicle to service, make certain all components and systems are restored to their proper operating condition.

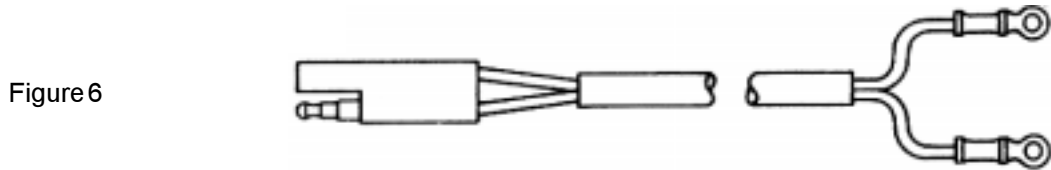
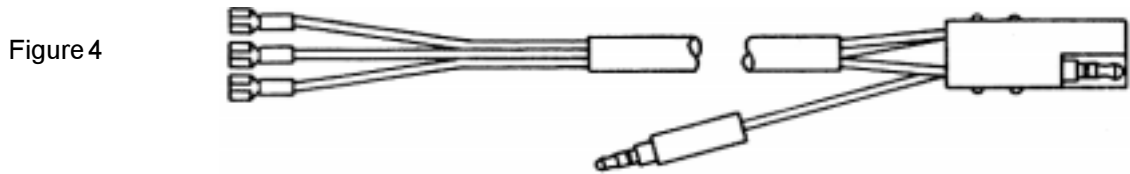
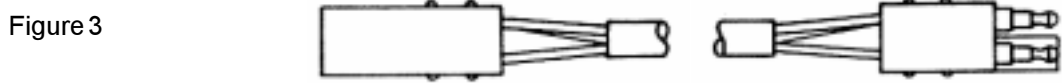
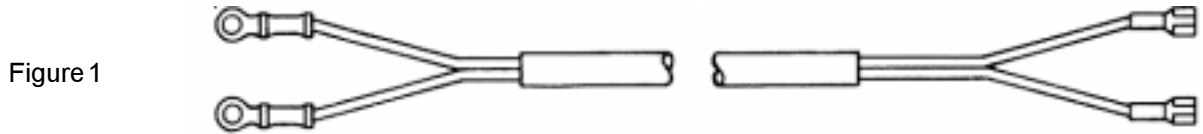
CRUISE CONTROL COMPONENTS CONTAINED IN THIS KIT



MISCELLANEOUS PARTS

QUANTITY	DESCRIPTION	WHERE USED
1	3/8" - 1/4" Reducer Bushing	Reservoir or Brake Valve
2	5/16" Hex Nut	Mount Cable "L" Bracket
3	Tubing Conn (straight 1/4 tube x 1/4 MPT)	CC-5 Inlet Port, Reservoir, Brake Valve
3	Tubing Elbow (1/4 tube x 1/8 MPT)	Control Port of TR-3, Supply & Delivery Ports of Solenoid
4	Tubing Elbow (1/4 tube x 1/4 MPT)	TR-3 Supply & Delivery Ports, RV-1 Supply & Delivery Ports
2	5/16" x 3/4" Cap Screw	Mount CC-5 Cylinder
1	Nylon Tubing	Air Piping
2	5/16" Lockwasher	Mount Cable "L" Bracket
2	5/16" Machine Screw	Mount Cable "L" Bracket
3	Hex Head SEMS Screw (1/4" - 20 3/4")	Mount CA-1 Controller
1	Nylon Retainer	Cable Assembly
1	Switch Mounting Plate	Dash Switches
1	Throttle Lever	Attaches to existing Throttle Lever
4	Hex Head SEMS Screws	Mount RV-1 and TR-3 Valves
12	Tubing Sleeves	Air Piping
4	#6 Black Metal Screws	Switch Plate
1	Operational Hand Book (BW-1331)	
1	Installation Instruction (BWS-759)	
1	Service Data (SD-10-1)	

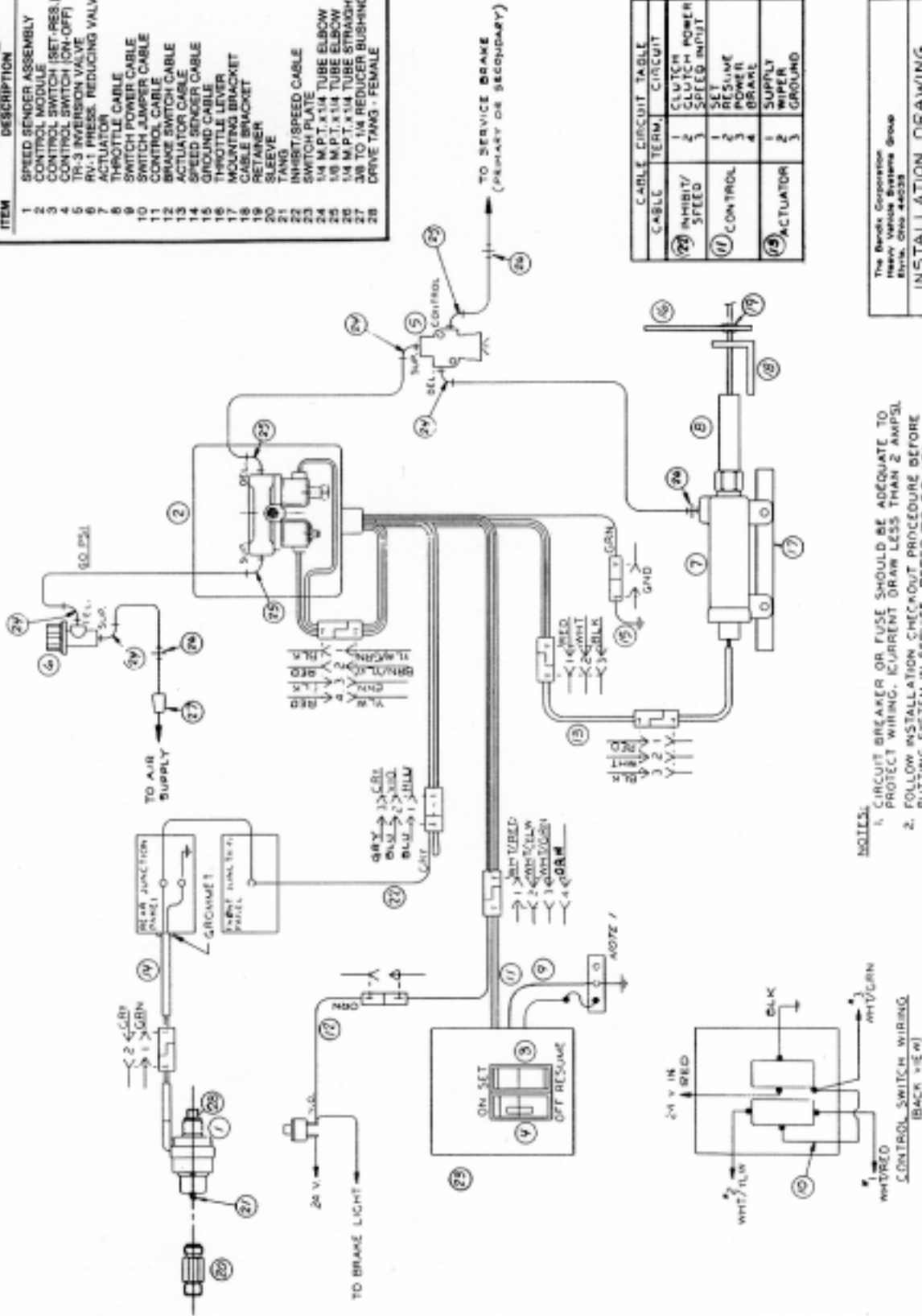
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WIRING HARNESSES

FIGURE	TO	CONNECTION FROM	APPROX. LENGTH (")	WIRE COLOR
1	On-Off Switch	Electrical Junction Box	60	Red and Black
2	On-Off Switch	Set-Resume Switch	4	White
3	CA-1 Cont.	CC-5 Cylinder	60	Red, White, Black
4	Dash Switch	CA-1 Cont.	120	Green, Yellow, Red, Orange
5	Vehicle Ground	CA-1 Cont.	12	Green
6	Electrical Junction Box	Speed Sender	98	Gray and Green
7	Stop Lamp Switch	To Figure 4 Harness	60	Orange

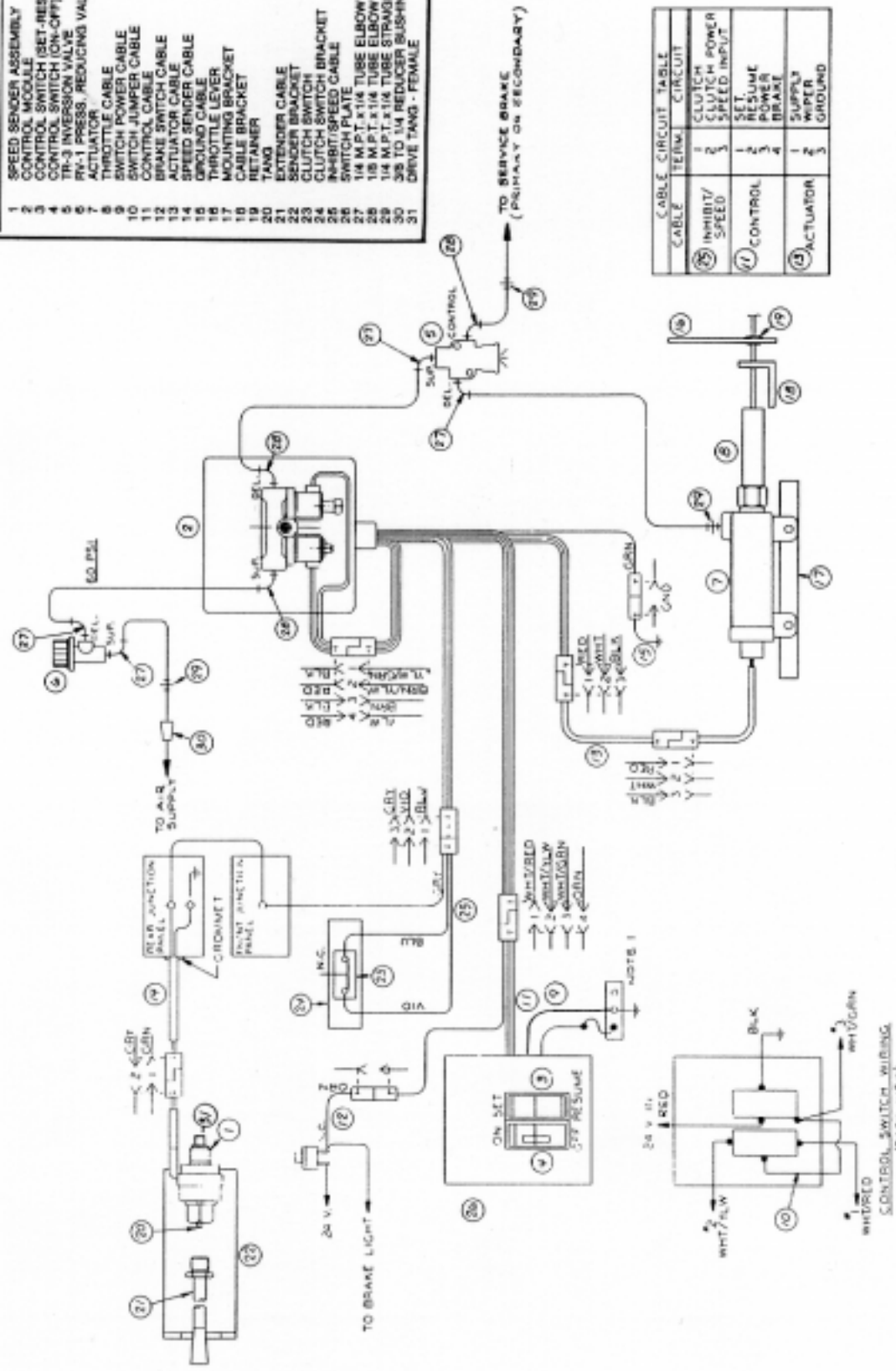
ITEM	LIST OF MATERIAL DESCRIPTION
1	SPEED SENDER ASSEMBLY
2	CONTROL MODULE
3	CONTROL SWITCH (SET-RES.)
4	CONTROL SWITCH (ON-OFF)
5	TR-3 INVERSION VALVE
6	RV-1 PRESS. REDUCING VALVE
7	ACTUATOR
8	THROTTLE CABLE
9	SWITCH POWER CABLE
10	SWITCH JAMPER CABLE
11	CONTROL CABLE
12	BRAKE SWITCH CABLE
13	ACTUATOR CABLE
14	SPEED SENDER CABLE
15	GROUND CABLE
16	THROTTLE LEVER
17	MOUNTING BRACKET
18	CABLE BRACKET
19	RETAINER
20	SLEEVE
21	TANG
22	INHIBIT/SPEED CABLE
23	SWITCH PLATE
24	1/4 M.P.T. x 1/4 TUBE ELBOW
25	1/8 M.P.T. x 1/4 TUBE ELBOW
26	1/4 M.P.T. x 1/4 TUBE STRAIGHT
27	3/8 TO 1/4 REDUCER BUSHING
28	DRIVE TANG - FEMALE



The Beck Corporation
The Vehicle Systems Group
Beck, Ohio 44328

INSTALLATION DRAWING
HCT AUTOMATIC TRANSMISSION
CRUISE CONTROL

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1	SPEED SENDER ASSEMBLY
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8	THROTTLE CABLE
9	SWITCH POWER CABLE
10	SWITCH JUMPER CABLE
11	CONTROL CABLE
12	BRAKE SWITCH CABLE
13	ACTUATOR CABLE
14	SPEED SENDER CABLE
15	GROUND CABLE
16	THROTTLE LEVER
17	MOUNTING BRACKET
18	CABLE BRACKET
19	RETAINER
20	TANK
21	EXTENDER CABLE
22	SENDER BRACKET
23	CLUTCH SWITCH
24	CLUTCH SWITCH BRACKET
25	INHIBIT/SPEED CABLE
26	SWITCH PLATE
27	1/4 M.P.T. x 1/4 TUBE ELBOW
28	1/8 M.P.T. x 1/4 TUBE ELBOW
29	1/4 M.P.T. x 1/4 TUBE STRAIGHT
30	3/8 TO 1/4 REDUCER BUSHING
31	DRIVE TANG - FEMALE



NOTES:

1. CIRCUIT BREAKER OR FUSE SHOULD BE ADEQUATE TO PROTECT WIRING. CURRENT DRAW LESS THAN 2 AMPS.
2. FOLLOW INSTALLATION CHECKOUT PROCEDURE BEFORE PUTTING SYSTEM IN SERVICE. REFER TO 8D-104.
3. INSTALLATION INSTRUCTIONS 8W8-759 AND INSTRUCTION SHEET 8W8-761 APPLY.

The Bendix Corporation
Heavy Vehicle Systems Group
Elyria, Ohio 44038

INSTALLATION DRAWING
MCI STANDARD TRANSMISSION
CRUISE CONTROL

NOTE:

To minimize installation time and the possibility of errors, please read and make sure you understand all instructions for the part of the system being worked on. A check-off box is provided to check off each step as it is completed.

PART A. VEHICLE PREPARATION

1. Unlatch front bumper, remove spare tire.
2. Remove spare tire shield (if so equipped).
3. Open driver side front steering gear access door.
4. Open front and rear electrical junction box.
5. Access to transmission will be necessary. Vehicle must be raised or driven over pit. CAUTION! Take necessary measures to prevent lowering of vehicle due to loss of air from suspension system.
6. Locate vehicle identification plate and record vehicle serial numbers for use later in installation procedures.

PART B. INSTALLATION OF AIR COMPONENTS

The CA-1 Controller, RV-1 Reducing Valve and TR-3 Inversion Valve are mounted on the front bulkhead supports within the spare tire compartment. The method of mounting is at the option of the installer. The use of a mounting plate, which is not furnished in the kit, affords convenience in installation. If more than one installation is to be made, the fabrication of plates prior to installation may be desirable. For mounting plate specifications, refer to Figure 3. An alternate is to fasten mounting straps (horizontally) to the front bulkhead supports and fasten the components to the straps. Regardless of the method elected, the components must be mounted within the center front bulkhead area so that the length of electrical harnesses and tubing furnished is of proper length to permit connection.

1. Install tubing fittings into components as shown on Figure 4. Use small amount of thread sealant.
1/4" N.P.T. x 1/2" tubing elbows are installed in the supply and delivery ports of TR-3 Inversion Valve and RV-1 Pressure Reducing Valve. Install 1/8" N.P.T. x 1/4" tubing elbows in control port of TR-3 Inversion Valve and the supply and delivery ports of the solenoid assembly. (Do not exceed 50 inch pounds torque on solenoid assembly.)
2. Mount the CA-1 Controller/Solenoid Assembly to plate or straps with three 1/4" - 20 x 3/4" cap screws. Mount the TR-3 and RV-1 Valves with 1/4"-20x2" cap screws. (See Figure 4. (Optional mounting hardware will be required for a non-metallic mounting plate.) Torque car screws to 125 inch pounds.
3. As illustrated in Figure 4, install 1/4" nylon tubing as follows; (Use tubing inserts furnished in kit.)
 - A. RV-1 delivery port to solenoid supply port
 - B. Solenoid delivery port to TR-3 Inversion Valve supply port.
4. Mount plate assembly in the spare tire compartment's open space (approximately 7" x 15"), the approximate center of vehicle. Plate or mounting straps must be rigidly mounted to the front bulkhead supports. Plate or strap material and method of mounting is at the discretion of

installer, however, care should be taken to securely mount all components in a manner which facilitates removal in the event replacement is necessary. (See Figure 3 for plate specifications and Figure 5 for mounting location.)

PART C. INSTALLATION OF CC-5 AIR CYLINDER AND THROTTLE CABLE

1. Remove cap screw from throttle lever. Mount throttle lever extension bracket to the existing throttle lever. Be sure the support legs of the extension bracket are around the existing throttle lever and are in straight alignment with the existing throttle lever. Re-install cap screw. (See Figure 6)
2. Install throttle cable on air cylinder:
 - A. Install cable nut to pull rod of air cylinder and tighten firmly (use wrench flats on pull rod when tightening nut). Do not exceed 100 inch pounds torque.
 - B. Install large sheath nut to air cylinder body and tighten. Do not exceed 125 inch pounds torque.
3. Install a 1/4" N.P.T. x 1/4" straight tubing fitting in air cylinder inlet port. (Use small amount of thread sealant.)
4. The CC-5 Air Cylinder is mounted to the rear step support. Using the (10" x 1") mounting bracket as a template, mark location of holes and drill two 5/16" holes through the step support. Insert the bracket into the step support, align holes, install 5/16"x3/4" cap screws and tighten. (See Figure 7) Torque cap screws to 125 inch pounds.

WHILE REFERRING TO FIGURE 6A, REVIEW STEPS 5 THROUGH 9 BEFORE PROCEEDING.

5. Remove one of the cable sheath adjusting nuts. Slide the cable sheath "L" bracket on cable assembly and reinstall nut. ("L" bracket will be mounted later.)
6. Reference Figure 6, the hole used in the throttle lever extension will depend on bus model and serial number. To identify proper hole to be used, bus model and serial number must be known.

MODEL MC-5

Serial No. 6897 to 7150 - use hole "A"

Serial No. 7151 to 7350 - use hole "B"

MC-5 models prior to serial No. 6897 require replacement of the shaft, housing and lever (See Page 3 for complete information). After installation of the new parts, hole "B" is used.

MODEL MC-7

Serial No. 10461 and later - use hole "A"

MC-7 models prior to serial No. 10461 require replacement of the shaft housing and lever (See Page 3 for complete information). After installation of the new parts, hole "A" is used.

MODEL MC-8

Serial No. 30651 to 33051 - use hole "B"

Serial No. prior to serial No. 30651 - use hole "A"

MODEL MC-9

All serial numbers - use hole "B"

Insert cable end through proper hole in throttle lever extension bracket.

7. Install nylon retainer on cable between cable end and throttle lever extension.

NOTE: the four slots of the retainer are inserted into bracket toward rear of vehicle. (See Figure 6A). Firmly press retainer into bracket hole.

8. Install cable sheath "L" bracket on the fore/aft frame support. Position so that the cable can be adjusted taut using cable sheath adjusting nuts. (See Figure 6A) On most models, bolts are present and may be used to install bracket. If not present, using "L" bracket as template, drill two 5/16" holes and mount bracket with 5/16"-18 x 1 " cap screws, lockwashers and nuts. Care should be taken to align bracket for minimum tilt angle between cable end and throttle lever extension bracket.

9. Using adjusting nuts, adjust cable so it is taut when accelerator cable is released. CAUTION! Cable must be taut, however, engine throttle should remain in idle position. Do not exceed 175 inch pounds torque on adjusting nuts.

PART D. AIR LINE INSTALLATION

(Ref. Figures 2 & 2A)

1. Drain air pressure from all reservoirs.

2. Locate accessory reservoir (usually located inside driver's side front access door.) Locate an unused port and install a 1/4" tubing x 1/4" N.P.T. connector. Use reducer bushing, if necessary.

3. Install 1/4" tubing as follows: (Use tubing supports provided in kit.)

A. Between accessory reservoir and supply port of RV-1 Reducing Valve.

B. Between delivery port of TR-3 Inversion Valve and supply port of CC-5 Air Cylinder.

C. Between delivery port of foot brake valve and control port of TR-3 Inversion Valve. (If an unused port of the brake valve is used, install a 1/4" N.P.T. x 1/4" tubing connector and reducing bushing. If desirable, a tee may be installed in an existing delivery line.) It is recommended a small amount of thread sealant be used.

4. All air lines should be securely supported.

PART E. CONTROL SWITCH INSTALLATION

1. Locate an appropriate location for mounting of mounting plate and switches. Using switch plate as template, cut hole. Hole in dash should be 1/8" larger than hole in mounting plate. Be certain adequate rear clearance is provided for switches and wiring. Location left of steering column is preferred. If adequate space is not available, it may be necessary to discard switch plate and mount switches individually. (See Figure 8, & 8A.)

NOTE: On some later MCI models an inspection plate on left side of dash can be removed and opening enlarged to accept switches. Holes for screws from inspection plate can be used for switch mounting plate. (See Figure 8 & 8A)

2. Mount switches in mounting plate; however, do not mount switch plate to dash.

PART F. WIRING PROCEDURE

NOTE:

All molded wiring connectors are foolproof, in that only the

correct mating connectors can be installed into each other. Secure all wiring harnesses after connections have been made to prevent fraying.

1. Locate an unused 6-8 amp accessory circuit breaker and a good vehicle ground in the front electrical junction box. (An accessory circuit breaker is powered only when the engine is running.)

2. Locate the stoplight switch (usually located in one of the brake valve delivery ports). Using a test light identify the terminal that is powered only when the brakes are applied. (The other terminal is powered at all times.)

3. Turn off all electrical power to bus (switch located in battery compartment).

4. Locate and open the electrical junction box inside the bus, usually located adjacent to the driver's seat.

5. Install power wire harness between junction box and on/off switch as follows:

A. Red wire spade terminal to #1 of on/off switch. (See Figure 9)

B. Black wire eyelet to junction box ground and black wire spade terminal to #2 on/off switch.

6. Install white jumper wire between on/off switch terminal #3 and set/resume switch terminal #1 .

NOTE: The dual spade connector is installed on terminal #3 of on/off switch. (See Figure 9 and Figure 2 & 2A)

7. Connect wiring harness between the CC-5 air cylinder wiring connector and CA-1 controller wiring connector.

Firmly seat all connectors. (See Figure 2 & 2A)

8. Connect solenoid wiring harness to CA-1 controller connector. Firmly seat all connectors. (See Figure 2 & 2A)

9. Connect green wire (provided) to bullet connector of CA-1 controller. Connect other end to vehicle ground. (See Figure 2 & 2A)

10. Connect orange wire eyelet to stop light switch terminal identified in Step 2. Connect other end to single bullet

connector of control switch wiring harness. Firmly seat connector. (See Figure 2&2A)

11. Route three remaining wires of control switch harness to switches and connect as follows: (Ref.-Figure 9)

A. White/green wire to terminal #3 of on/off switch.

B. White/red wire to terminal #3 of set/ resume switch.

C. White/yellow wire to terminal #2 of set/ resume switch.

12. Install mounting plate/switch assembly to dash, using sheet metal screws provided.

13. Restore vehicle power.

PART G. SPEED SENDER INSTALLATION

The speed sender is installed in the transmission speedometer output located in the transmission housing. All parts necessary to complete the cruise control speed sender installation are available in an installation kit. However, additional parts may be required. Please read No. 1, paragraphs A and B to determine if additional parts are required.

1. Before proceeding with speed sender installation, carefully study Figure 10 and inspect vehicle to determine:

A. AUTOMATIC TRANSMISSION

If a driven gear is present in transmission and has a .187" round socket drive, it can be used. If no gear is present or if socket drive in gear is other than .187" round, a new gear

with a .187" round socket drive must be procured. For installations that use the transmission speedometer output to drive an accessory (speedometer, tachograph, etc.) and utilize other than .187" round socket drive, it will be necessary to purchase Kit 209851 which contains an assortment of male and female drive tangs.

B. STANDARD TRANSMISSION

If a driven gear is present in transmission and has a .193" square socket drive, it can be used. If no gear is present or if socket drive in gear is other than .193" square, a new gear with a .193" square socket drive must be procured. For installations that use the transmission speedometer output to drive an accessory (speedometer, tachograph, etc.) and utilize other than .193" square socket drive, it will be necessary to purchase Kit 209851 which contains an assortment of male and female drive tangs.

2. Refer to Figure 10 and install cruise control speed sender as per illustrations.

3. Locate and identify an unused wire running from the front to rear electrical junction boxes. In most cases these terminals and/or wires are numbered for ease of identification. (CONSULT VEHICLE SERVICE MANUAL AND CONFIRM WITH CONTINUITY CHECK.) Route speed sender wiring harness from speed sender to junction box.

4. Connect green wire terminal eyelet of the speed sender wiring harness to terminal identified in Step 3. Connect gray wire eyelet terminal to vehicle ground in junction box.

5. Connect wiring harness to speed sender connector. Wiring harness should be supported as necessary. This completes the speed sender installation at rear of vehicle. If automatic transmission vehicle, proceed to Step 7; if standard transmission, proceed to Step 10.

6. If driven option is not used, install cap on sender. (Figure 10)

AUTOMATIC TRANSMISSION ONLY (Use Kit No.209846)

7. Locate the inhibit/speed wiring harness, one gray wire, one blue wire, single eye terminal on one end, three (3) pin connector on other end. Install single eye terminal on front junction box terminal identified in Step #3.

8. If driven option is not used, install cap on on sender. (Figure 10)

9. Connect the other end of the inhibit/speed wiring harness to the CA-1 controller, firmly seating connector. This completes installation of cruise control system. Proceed to Part H System Check-Out.

STANDARD TRANSMISSION ONLY (Use Kit No. 209847)

10.Remove two (2) cap screws as illustrated in Figure 11 and install clutch switch bracket as shown using two (2) 3/8" x 1-1/4" cap screws, nuts, lockwashers and flat washers furnished.

NOTE: Flat washers should be located between the bracket and lockwasher.

11.Install clutch switch in bracket and adjust switch so that

when clutch pedal is depressed approximately one inch (1"), the switch will be open. (Proper adjustment can be confirmed with a volt-ohm-meter. With clutch pedal released, less than 50 ohms resistance should be present across clutch switch terminals. With clutch pedal depressed approximately one inch (1"), reading should be in excess of 10,000 ohms.)

12.Locate inhibit/speed wiring harness. (Three pin connector on one end, three wires with eyelet terminals; gray, blue, violet wire on other end.)

13.Install gray wire to front electrical junction box terminal identified in Step 3.

14.Install blue and violet wires to terminals of clutch switch. (Either terminal for either wire may be used.)

15. Connect other end of inhibit/speed wiring harness to CA-1 controller. This completes cruise control installation.

Proceed to Part H - System Check-Out.

PART H. SYSTEM CHECK-OUT

Before performing road test, please refer to Cruise Control Operational Handbook (BW-1331) and Service Data SD-10-1 (road test section) included with this kit. If a malfunction is detected during the road test, refer to the Troubleshooting Section of Service Data SD-10-1 .

