APPENDIX K—SOLENOID RESISTANCE CHARTS

The following graphs show the coil resistance characteristics of Allison 4th Generation Controls solenoids.

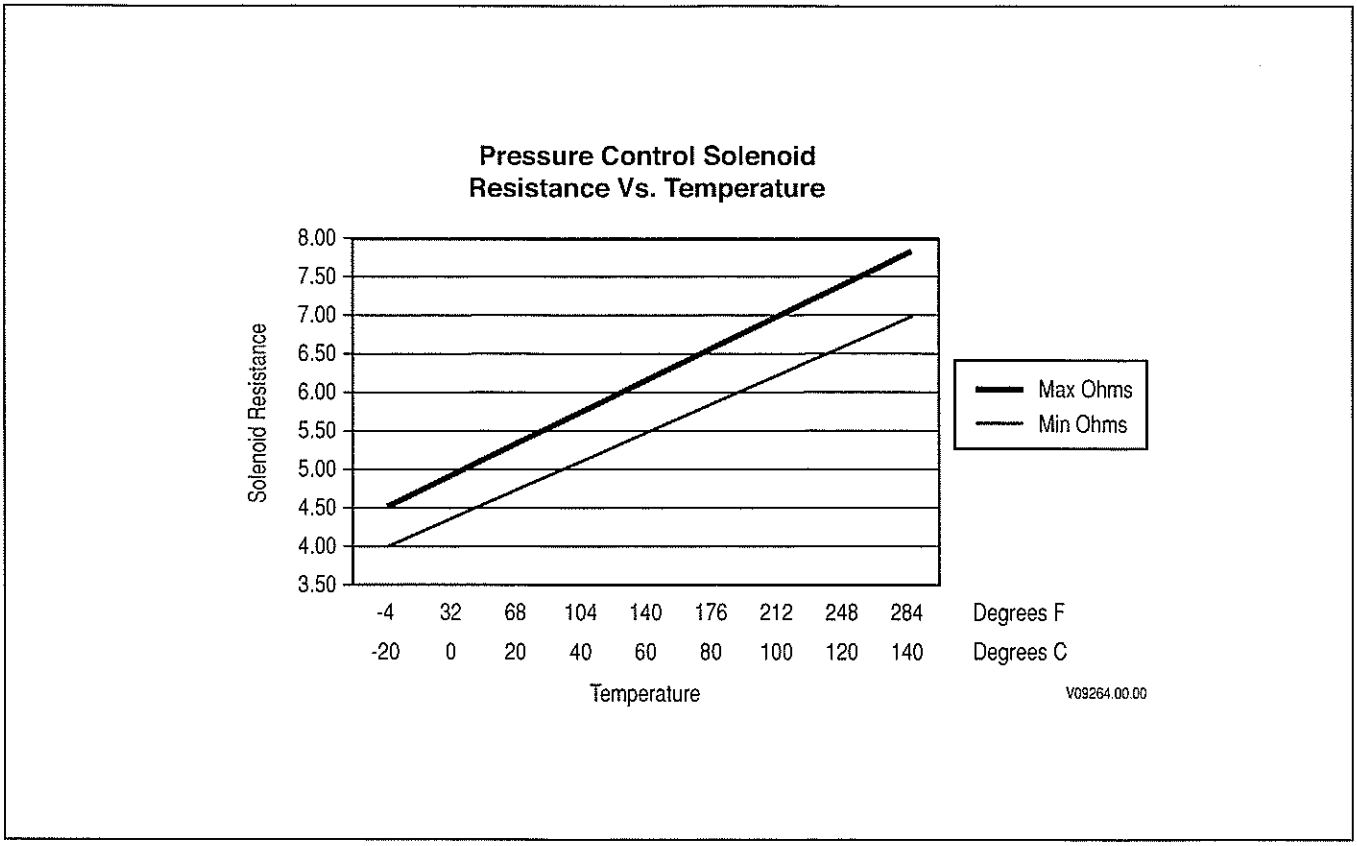

Figure K–1. 3000 and 4000 Product Families Variable Bleed Solenoids—Main Mod, TCC, And PCS1 through PCS6

APPENDIX K—SOLENOID RESISTANCE CHARTS

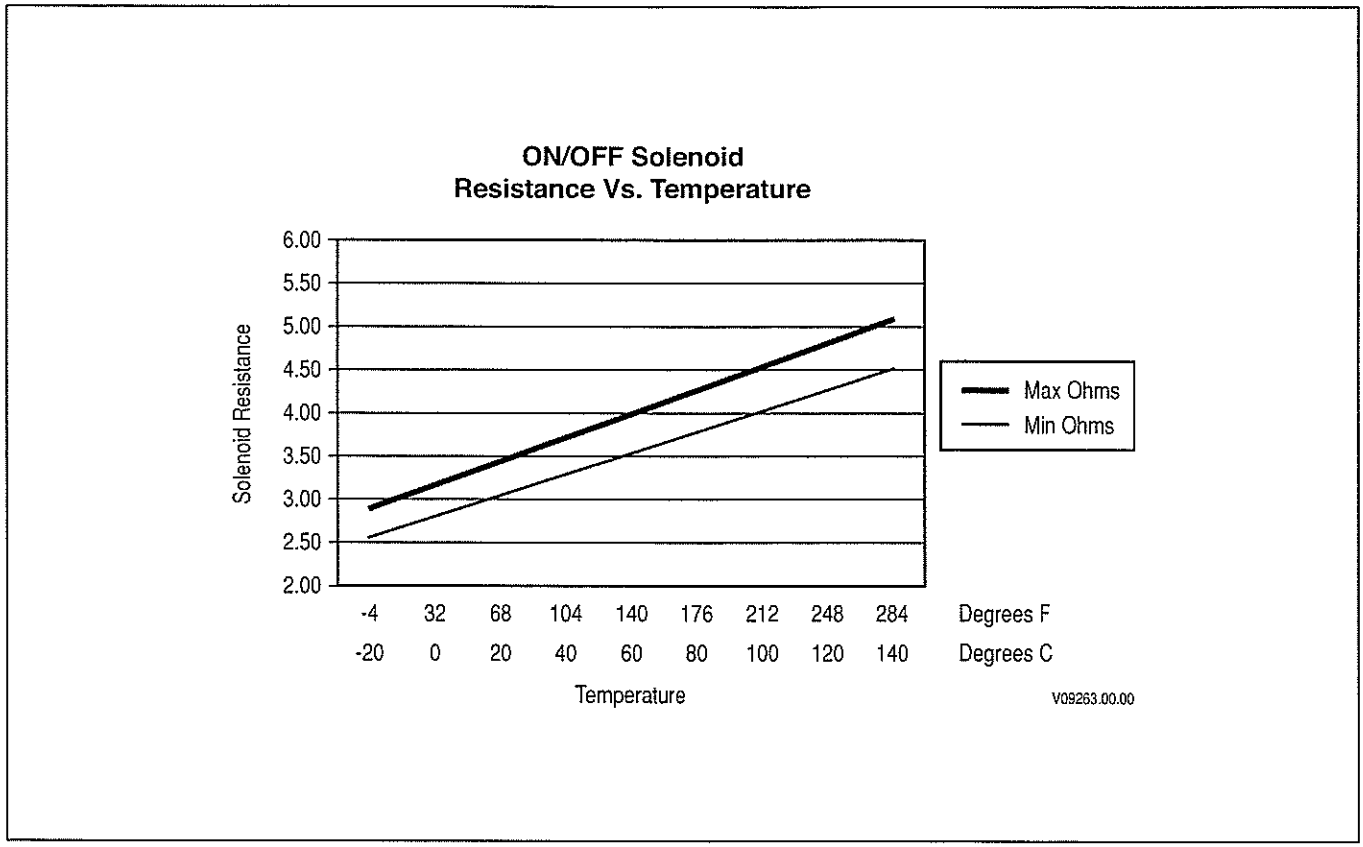

Figure K–2. 3000 and 4000 Product Families ON/OFF Solenoids—SS1 And SS2 (C6 Enable) in 7-Speed Models

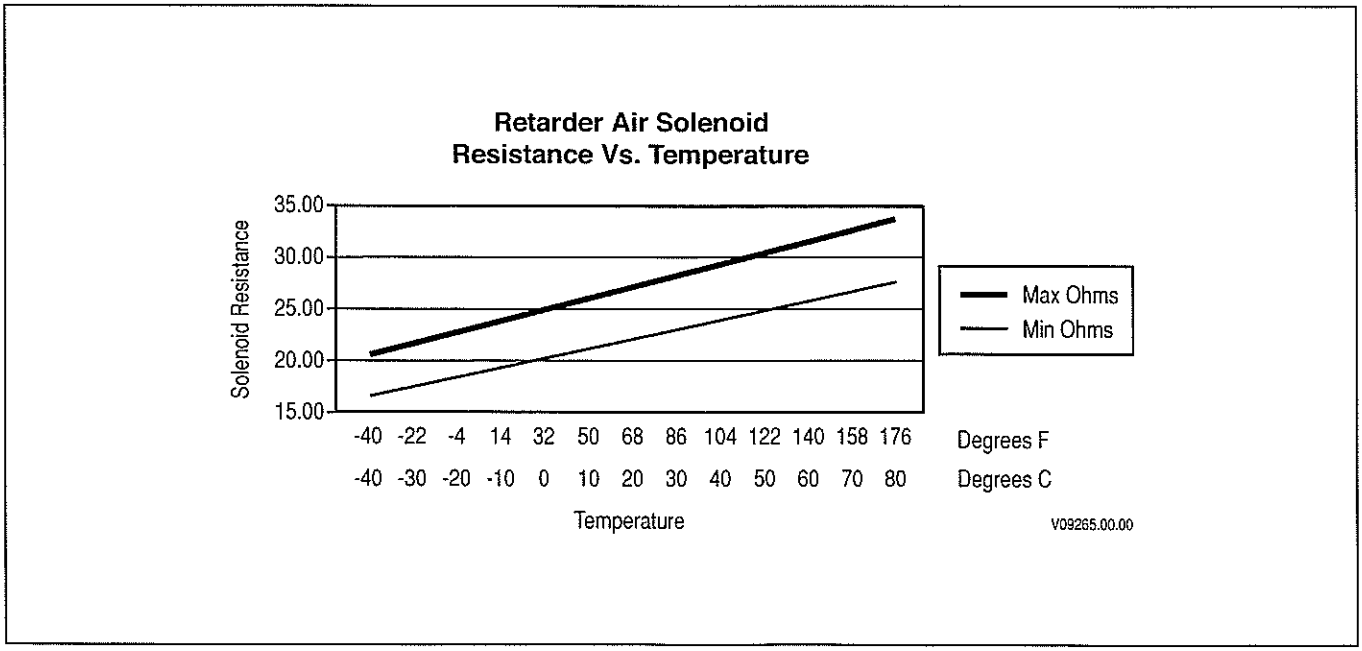

Figure K–3. 3000 and 4000 Product Families Retarder Accumulator Air Solenoid—SS2 in Retarder-Equipped Transmissions

APPENDIX L—EXTERNALLY-GENERATED ELECTRONIC INTERFERENCE

L–1. ELECTROMAGNETIC/RADIO FREQUENCY INTERFERENCE

Be sure that the TCM for the Allison Transmission Electronic Controls is properly grounded to prevent EMI interference problems. The chassis frame must be connected to the negative post of the vehicle battery. A proper connection to the chassis frame is required. The connection must be free from rust and paint. The electrical integrity of this connection must not deteriorate with the age of the vehicle. If the TCM is cab-mounted, there must be two 1½ to 2 inch braided grounding straps connecting the cab structure to the chassis frame.

All electrical and electronic systems generate electromagnetic fields that can interfere with other electronic systems. Allison Transmission electronic transmission controls comply with Federal Communications Commission (FCC) regulations and other guidelines concerning emitted radio frequency interference for transportation electronics. The position of Allison Transmission is that manufacturers and installers of EMI/RFI emitting equipment are responsible for adhering to FCC regulations and other guidelines concerning emitted radio frequency interference for transportation electronics.

Some radio-telephone or two-way communication radios (land-mobile radio), or the manner in which they are installed, can adversely affect vehicle operation or be affected by other vehicle components. Expenses incurred to protect vehicle-related systems from EMI/RFI emissions by radio-telephone or two-way communications radios (land-mobile radio) or to integrate such devices into vehicles are not the responsibility of Allison Transmission.

L–2. GENERAL GUIDELINES FOR RADIO EQUIPMENT INSTALLATION

The following general guidelines for installing radio-telephone or two-way communications radios (land-mobile radio) in a vehicle supplement, but DO NOT replace, detailed instructions provided by the radio equipment manufacturer. Detailed installation instructions are the sole responsibility of the radio equipment manufacturer.

Experience has shown that most EMI/RFI problems can be prevented or eliminated by following the guidelines. If EMI/RFI problems persist after following the guidelines and after ensuring the installation conforms to the guidelines, contact the vehicle and radio equipment manufacturers for additional installation or equipment operation instructions.

A. Transmitter Installation

1. Locate remote radio transmitters as far away from other electronic devices and as near to the side of the vehicle body as possible.
2. Mount transceivers (transmitter and receiver in one box) under the dash so as not to interfere with vehicle controls or passenger movement.

B. Antenna Installation

Each vehicle and body style react differently to radio frequency energy. When dealing with an unfamiliar vehicle, test various antenna locations by using a magnetic mount antenna and checking for adverse effects. Antenna location is a major factor in EMI/RFI problems.

C. Antenna Cable Routing

1. Use high quality, 95 percent shield coverage, coaxial (coax) cable. Route the coax well away from any electronic components.
2. Route antenna cables as far away from vehicle wiring as possible to reduce the likelihood of the vehicle wiring acting as an antenna for interference.

APPENDIX L—EXTERNALLY-GENERATED ELECTRONIC INTERFERENCE

D. Radio Wiring and Connector Location

1. Connect transmitter power leads directly to the battery.
2. For transceivers (transmitter and receiver in one box) with ignition control, place a 12V power contactor at the vehicle battery. Drive the contactor coil, through an appropriate in-line fuse, from an ignition circuit not powered during engine cranking.
3. Any negative lead from a handset or control unit must return to battery negative.
4. Connect the positive lead from a handset or control unit directly to battery.
5. Fuse handset or control unit positive and negative leads separately from the transceiver negative and positive leads. Use correctly rated fuses.

E. Power and Ground Wire Routing

Route radio power and ground wires as far away as possible from electronic control modules.

F. Troubleshooting

The following are common causes of EMI/RFI problems:

- Power leads connected to points other than the battery
- Improper antenna location
- Poor shielding or connections to antenna cable
- Transmitter or transceiver wiring too close to vehicle electronics

L–3. EXTERNALLY-GENERATED SPEED SENSOR SIGNALS

A. Testing for Externally-Generated Speed Sensor Signals

Use the following procedures to determine if speed sensor signals generated by a source external to the transmission or wiring harness are present:

1. Turn ignition ON.
2. Keep engine OFF.
3. If the TCM is ON (shift selector display remains illuminated), connect the Allison DOC™ For PC–Service Tool.

*NOTE: **If false speed signals were present at the previous shutdown, the TCM might still be "on" even though the ignition is "off." The Allison DOC™ For PC–Service Tool is powered by ignition power so the ignition must be "on" to use the Allison DOC™ For PC–Service Tool to read the speed signals.***

4. Read speed sensor signals.
5. If a speed sensor signal is other than one (1), then there is a short to another circuit that is carrying an AC or PWM signal.
6. Measure the resistance of the sensor.
7. Test for shorts to other circuits within the harness or transmission connector.
8. Inspect to be sure there is no conductive material inside the connector.

APPENDIX L—EXTERNALLY-GENERATED ELECTRONIC INTERFERENCE

9. Inspect to be sure speed sensor circuit wires are a twisted pair.
10. Test to be sure a properly grounded drain wire.
11. Test for the presence of a strong external AC signal.
12. Repair or replace parts as required.

APPENDIX L—EXTERNALLY-GENERATED ELECTRONIC INTERFERENCE

NOTES

APPENDIX M—DIAGNOSTIC TREE—3000 AND 4000 HYDRAULIC SYSTEM

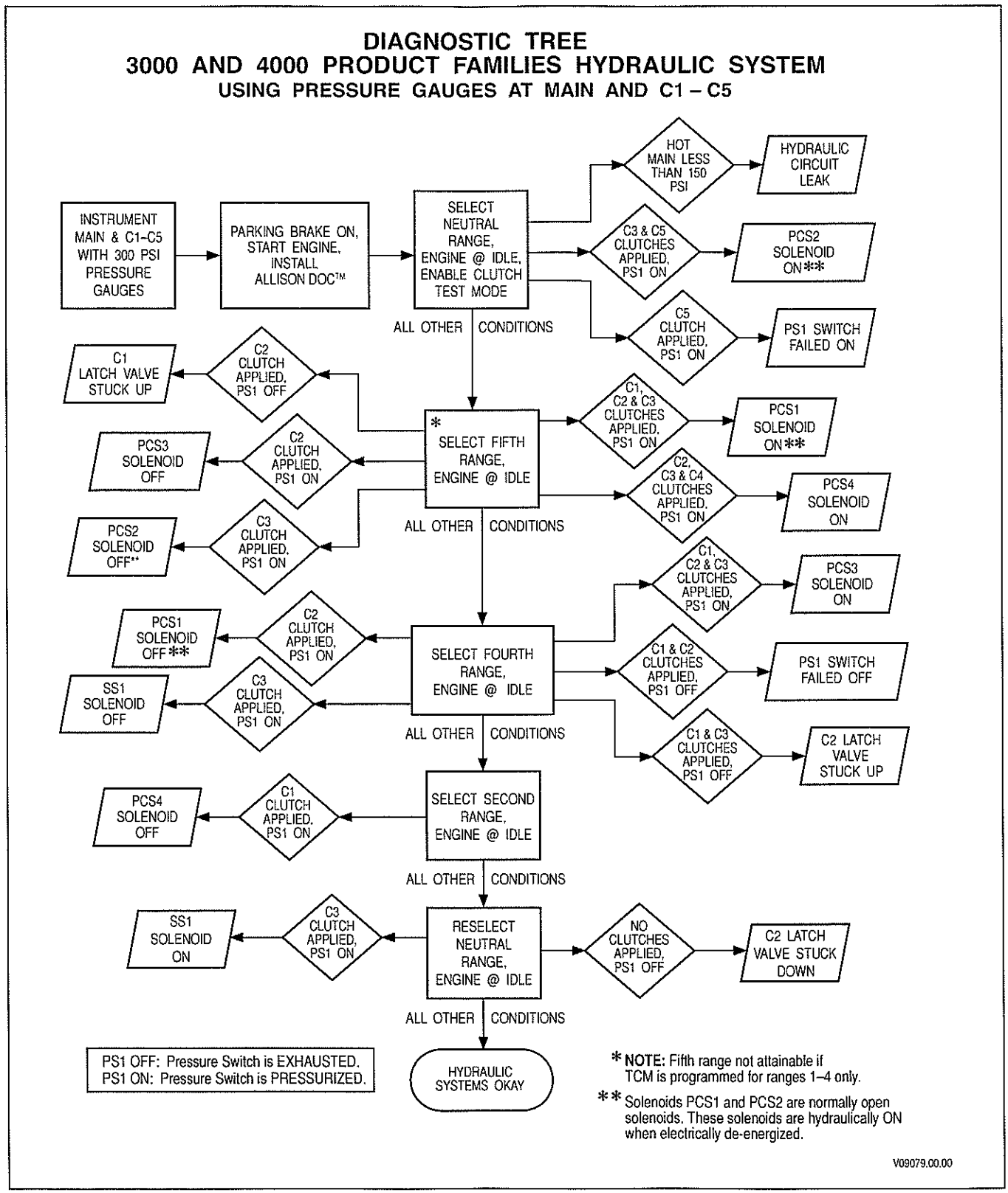

Figure M–1. Diagnostic Tree—3000 and 4000 Product Families Hydraulic System Using Pressure Gauges At Main and C1–C5

APPENDIX M—DIAGNOSTIC TREE—3000 AND 4000 HYDRAULIC SYSTEM

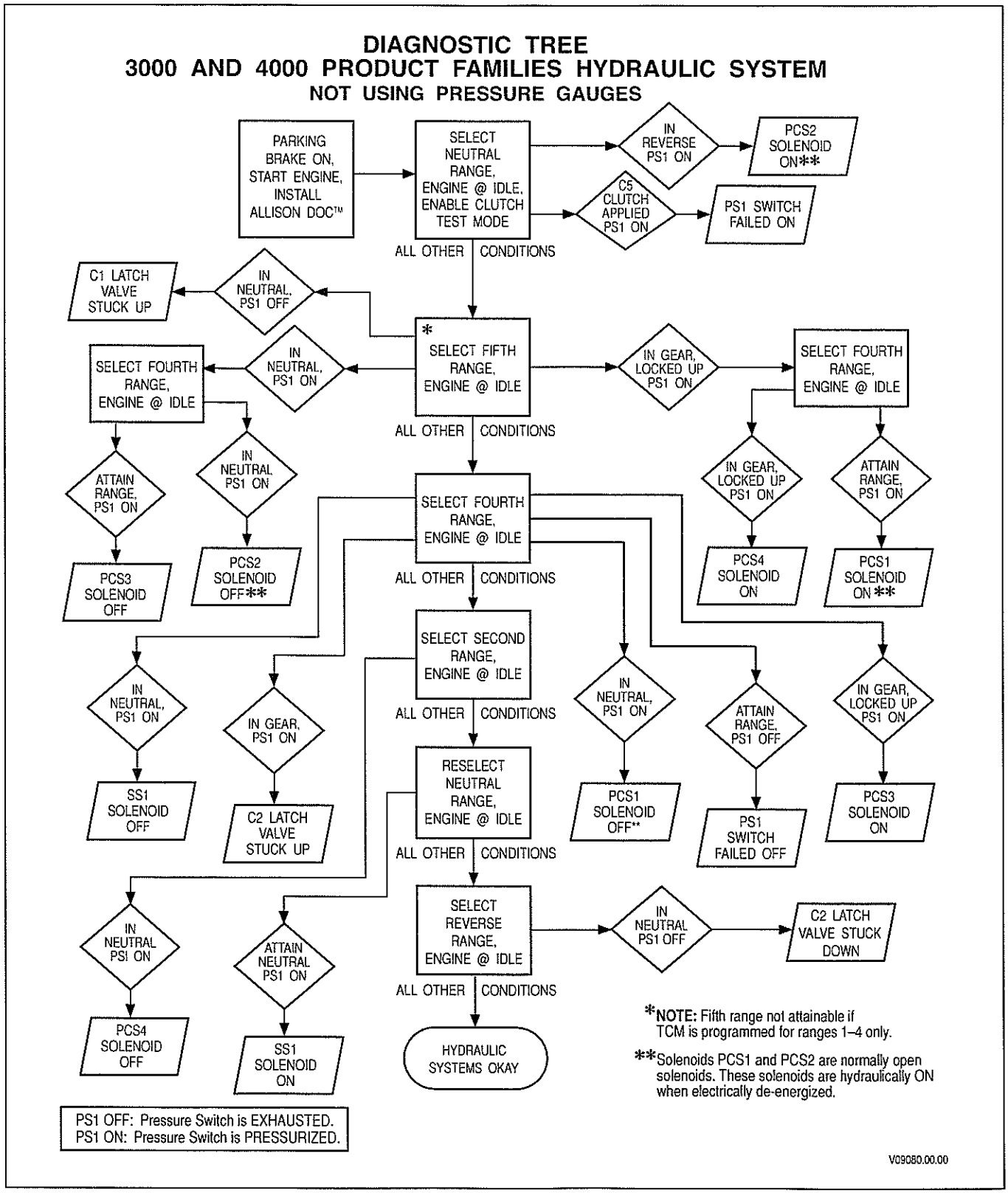

Figure M–2. Diagnostic Tree—3000 and 4000 Product Families Hydraulic System Without Pressure Gauges

APPENDIX N—ALLISON DOC™ FOR PC–SERVICE TOOL

NOTE: Refer to the Allison DOC™ For PC–Service Tool User Guide, GN3433EN, for complete information.

APPENDIX N—ALLISON DOC™ FOR PC–SERVICE TOOL

NOTES

APPENDIX P—INPUT/OUTPUT FUNCTIONS

WARNING!

These schematics show the intended use of the specified controls features which have been validated in the configuration shown. Any miswiring or use of these features which differs from that shown could result in damage to equipment or property, personal injury, or loss of life. ALLISON TRANSMISSION IS NOT LIABLE FOR THE CONSEQUENCES ASSOCIATED WITH MISWIRING OR UNINTENDED USE OF THESE FEATURES.

The schematics which follow were taken from the Sales Tech Data Book entitled Allison 4th Generation Controls. These schematics provide detail information needed to correctly perform input and output function connections. For an overview of Input/Output Functions, refer to Section 7 of this manual.

INPUT FUNCTION A. SECONDARY SHIFT SCHEDULE

USES: Provides operator selection of dual shift schedules. Can be used for performance/economy, loaded/empty, or other shift schedule combinations.

VARIABLES TO SPECIFY: None

VOCATIONS: Various

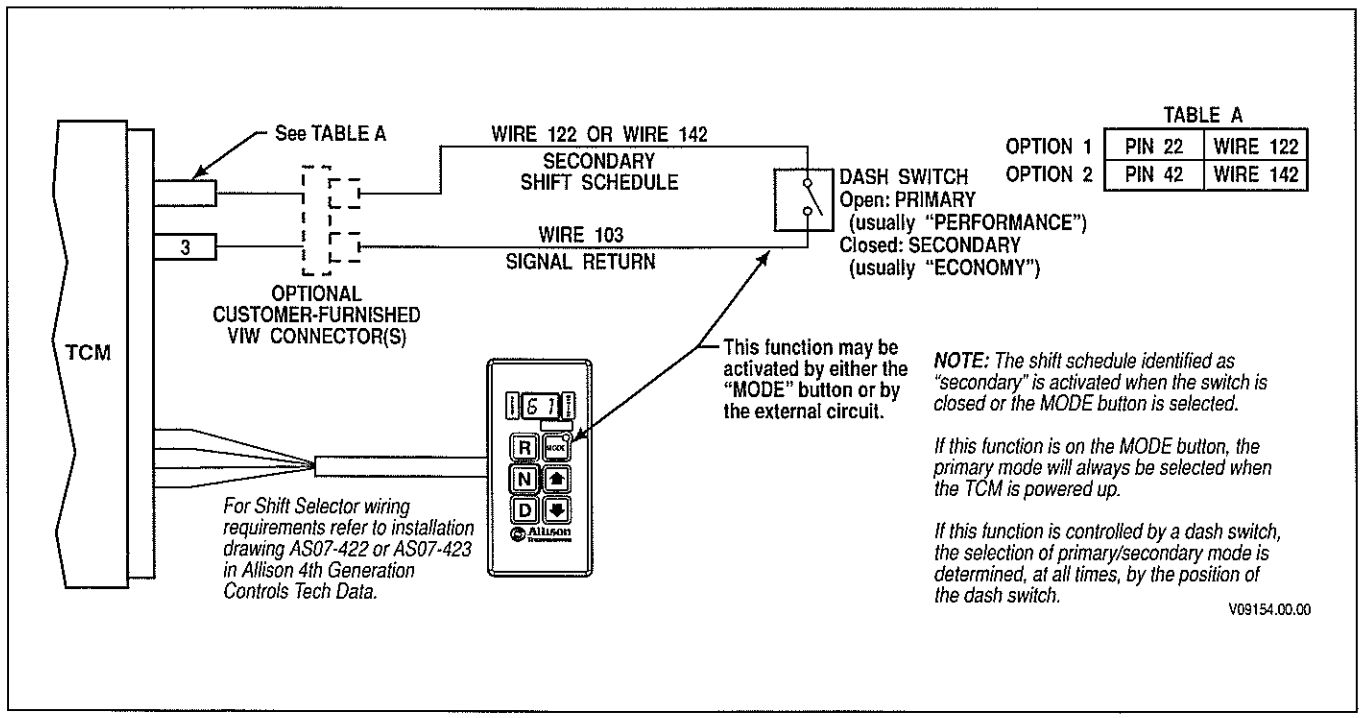

Figure P–1. Secondary Shift Schedule

This function can be provided by a J1939 message.

APPENDIX P—INPUT/OUTPUT FUNCTIONS

WARNING!

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INPUT FUNCTION B. D1 SELECTION

USES: Provides a convenient means of attaining 1st range hold for pushbutton shift selectors. Range to select is programmable for Primary and Secondary modes.

VARIABLES TO SPECIFY: Primary Mode selected range, Secondary Mode selected range (usually 1st range). Can be used only on the MODE button.

VOCATIONS: Various

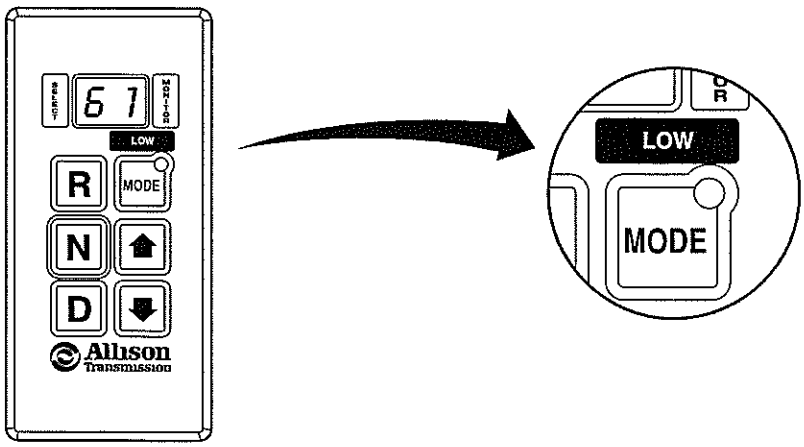


Figure P–2. D1 Selection

APPENDIX P—INPUT/OUTPUT FUNCTIONS

WARNING!

These schematics show the intended use of the specified controls features which have been validated in the configuration shown. Any miswiring or use of these features which differs from that shown could cause unscheduled operation of the PTO or other unpredictable operation resulting in damage to equipment or property, personal injury, or loss of life. ALLISON TRANSMISSION IS NOT LIABLE FOR THE CONSEQUENCES ASSOCIATED WITH MISWIRING OR UNINTENDED USE OF THESE FEATURES.

INPUT FUNCTION C. PTO ENABLE—SWITCHED TO POWER (WIRE 143)

USES: Permits PTO to be engaged only when engine speed and output speed are in allowable range and throttle is low. Also disengages PTO if speeds are exceeded.

VARIABLES TO SPECIFY: Minimum and maximum engine speed for engagement, maximum engine speed for allowable operation, minimum and maximum output speed for engagement, maximum output speed for allowable operation.

VOCATIONS: Various (with usage of PTO)

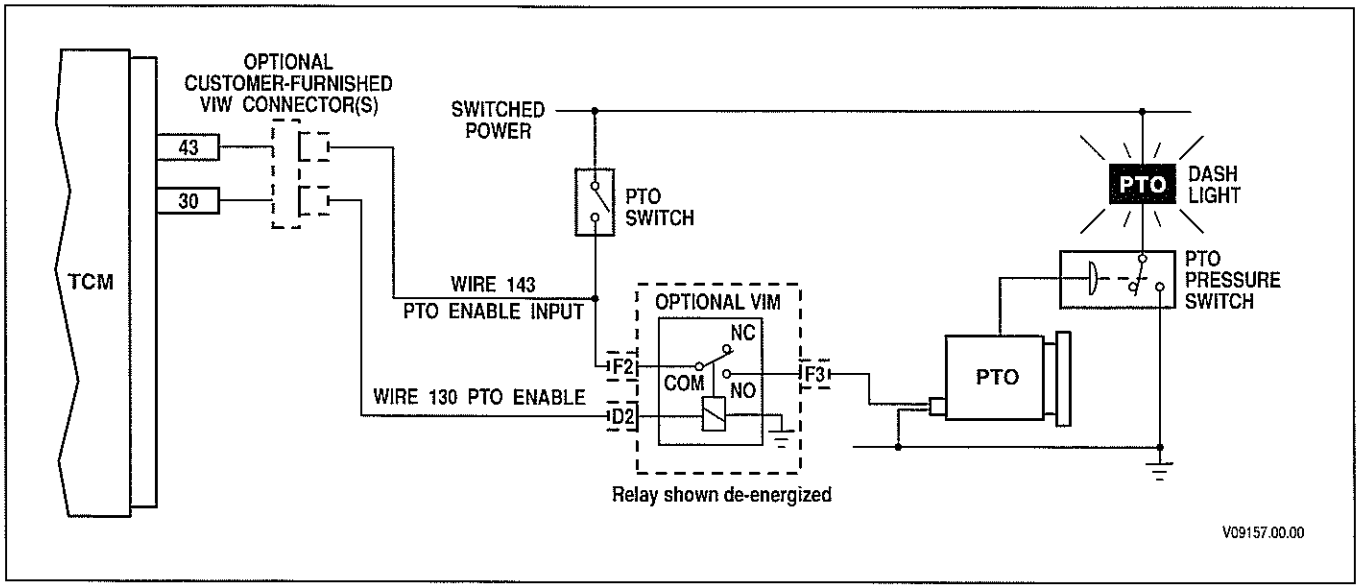


Figure P–3. PTO Enable—Switched to Power (Wire 143)

APPENDIX P—INPUT/OUTPUT FUNCTIONS

WARNING!

These schematics show the intended use of the specified controls features which have been validated in the configuration shown. Any miswiring or use of these features which differs from that shown could cause unscheduled operation of the PTO or other unpredictable operation resulting in damage to equipment or property, personal injury, or loss of life. ALLISON TRANSMISSION IS NOT LIABLE FOR THE CONSEQUENCES ASSOCIATED WITH MISWIRING OR UNINTENDED USE OF THESE FEATURES.

INPUT FUNCTION C. PTO ENABLE—SWITCHED TO GROUND (WIRE 142)

USES: Permits PTO to be engaged only when engine speed and output speed are in allowable range and throttle is low. Also disengages PTO if speeds are exceeded.

VARIABLES TO SPECIFY: Minimum and maximum engine speed for engagement, maximum engine speed for allowable operation, minimum and maximum output speed for engagement, maximum output speed for allowable operation.

VOCATIONS: Various (with usage of PTO)

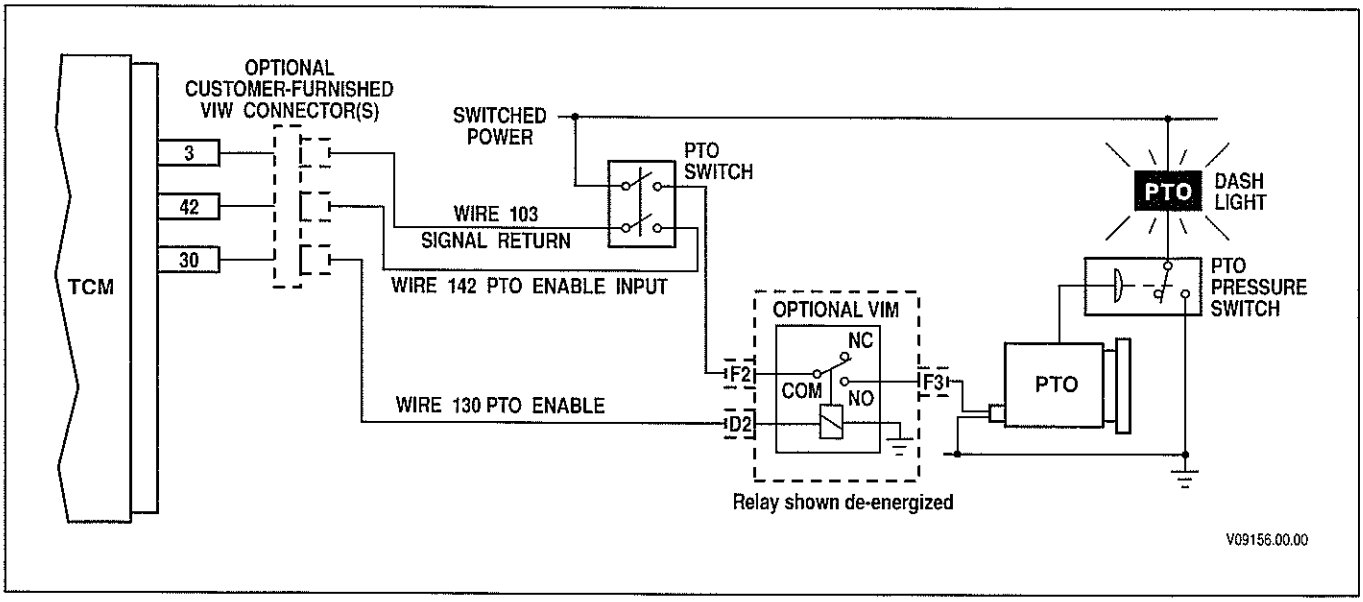


Figure P–4. PTO Enable—Switched to Ground (Wire 142)

APPENDIX P—INPUT/OUTPUT FUNCTIONS

WARNING!

These schematics show the intended use of the specified controls features which have been validated in the configuration shown. Any miswiring or use of these features which differs from that shown could cause unscheduled operation of the PTO or other unpredictable operation resulting in damage to equipment or property, personal injury, or loss of life. ALLISON TRANSMISSION IS NOT LIABLE FOR THE CONSEQUENCES ASSOCIATED WITH MISWIRING OR UNINTENDED USE OF THESE FEATURES.

INPUT FUNCTION C. PTO ENABLE—USING MODE BUTTON

USES: Permits PTO to be engaged only when engine speed and output speed are in allowable range and throttle is low. Also disengages PTO if speeds are exceeded.

VARIABLES TO SPECIFY: Minimum and maximum engine speed for engagement, maximum engine speed for allowable operation, minimum and maximum output speed for engagement, maximum output speed for allowable operation.

VOCATIONS: Various (with usage of PTO)

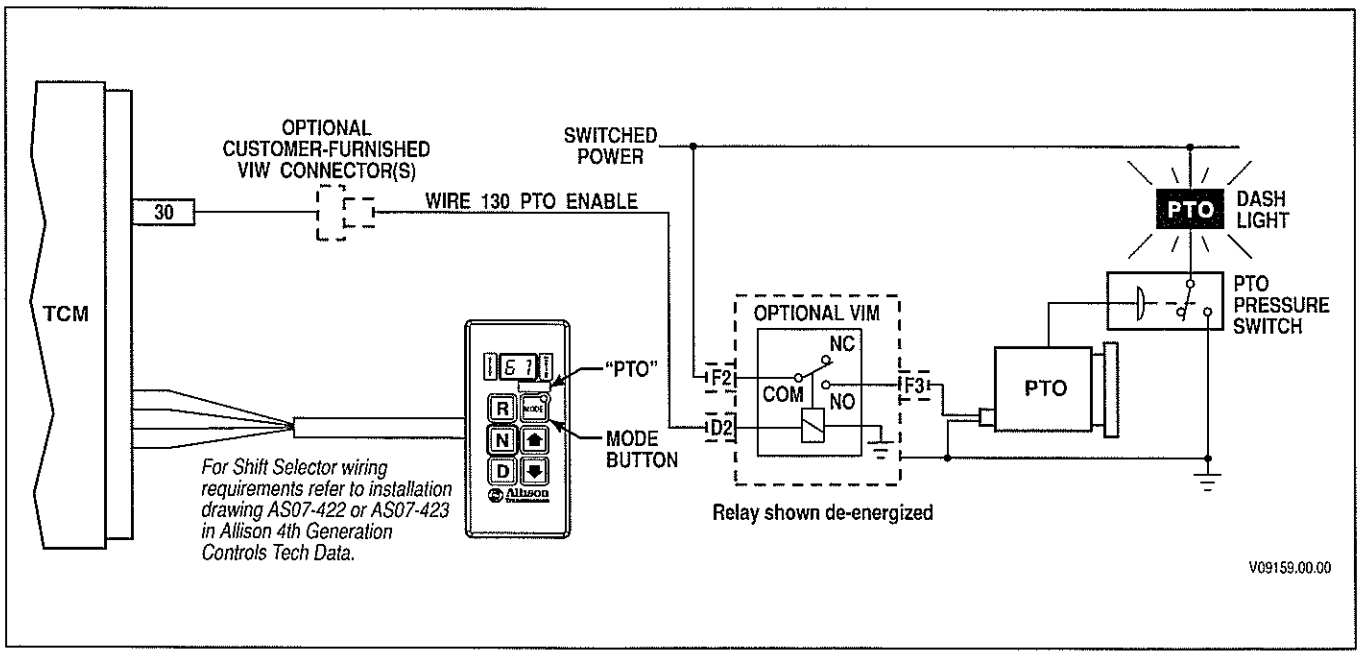


Figure P–5. PTO Enable—Using MODE Button

APPENDIX P—INPUT/OUTPUT FUNCTIONS

WARNING!

These schematics show the intended use of the specified controls features which have been validated in the configuration shown. Any miswiring or use of these features which differs from that shown could result in damage to equipment or property, personal injury, or loss of life. ALLISON TRANSMISSION IS NOT LIABLE FOR THE CONSEQUENCES ASSOCIATED WITH MISWIRING OR UNINTENDED USE OF THESE FEATURES.

INPUT FUNCTION D. SHIFT SELECTOR TRANSITION

USES: When two shift selectors are used, to select which one is active.

VARIABLES TO SPECIFY: None

VOCATIONS: Various

WARNING!

If this function is enabled in the shift calibration, the function MUST be integrated into the vehicle wiring. If the function is available in the shift calibration but will not be used in the vehicle, it MUST be disabled in the calibration.

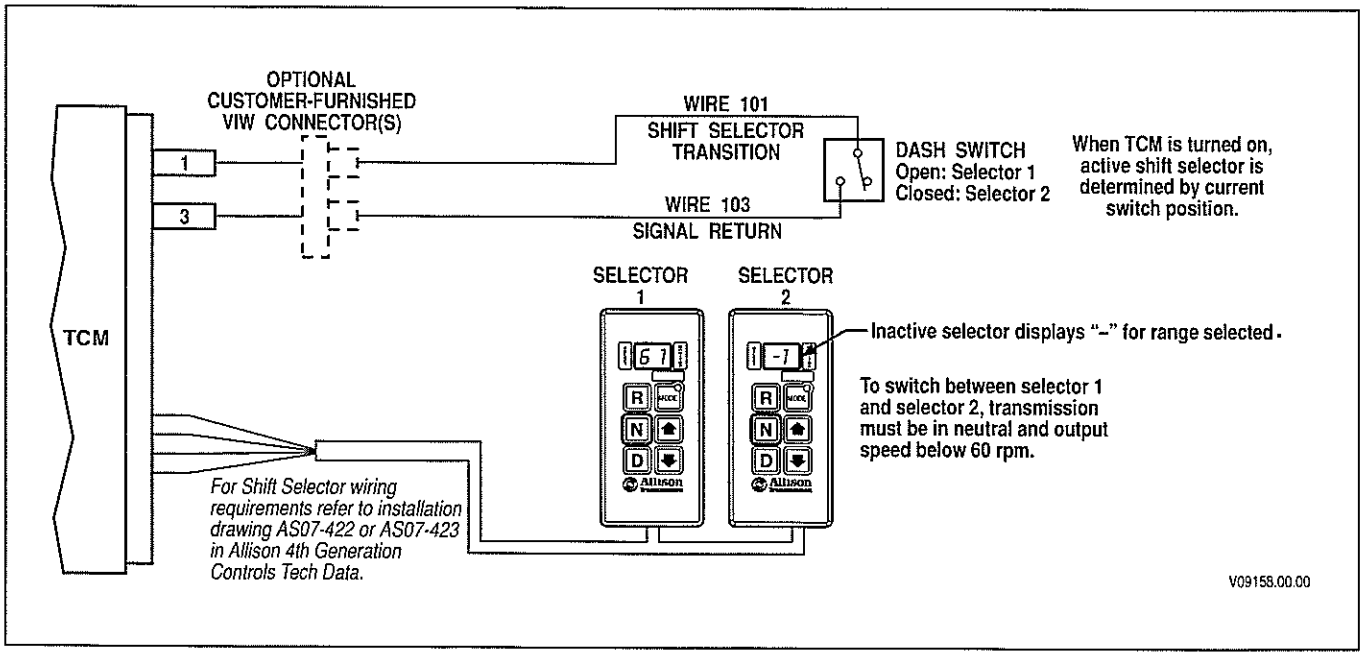


Figure P–6. Shift Selector Transition

APPENDIX P—INPUT/OUTPUT FUNCTIONS

WARNING!

These schematics show the intended use of the specified controls features which have been validated in the configuration shown. Any miswiring or use of these features which differs from that shown could cause unintended selection of range or other unpredictable operation resulting in damage to equipment or property, personal injury, or loss of life. ALLISON TRANSMISSION IS NOT LIABLE FOR THE CONSEQUENCES ASSOCIATED WITH MISWIRING OR UNINTENDED USE OF THESE FEATURES.

INPUT FUNCTION E. SINGLE INPUT AUXILIARY FUNCTION RANGE INHIBIT

USES: Prevents inadvertent range selection when auxiliary equipment is operating or prevents engagement of the transmission unless brake pedal is depressed.

VARIABLES TO SPECIFY: None

VOCATIONS: Transit bus, school bus—auxiliary equipment input; various (brake pedal input)

WARNING!

If this function is enabled in the shift calibration, the function MUST be integrated into the vehicle wiring. If the function is available in the shift calibration but will not be used in the vehicle, it MUST be disabled in the calibration.

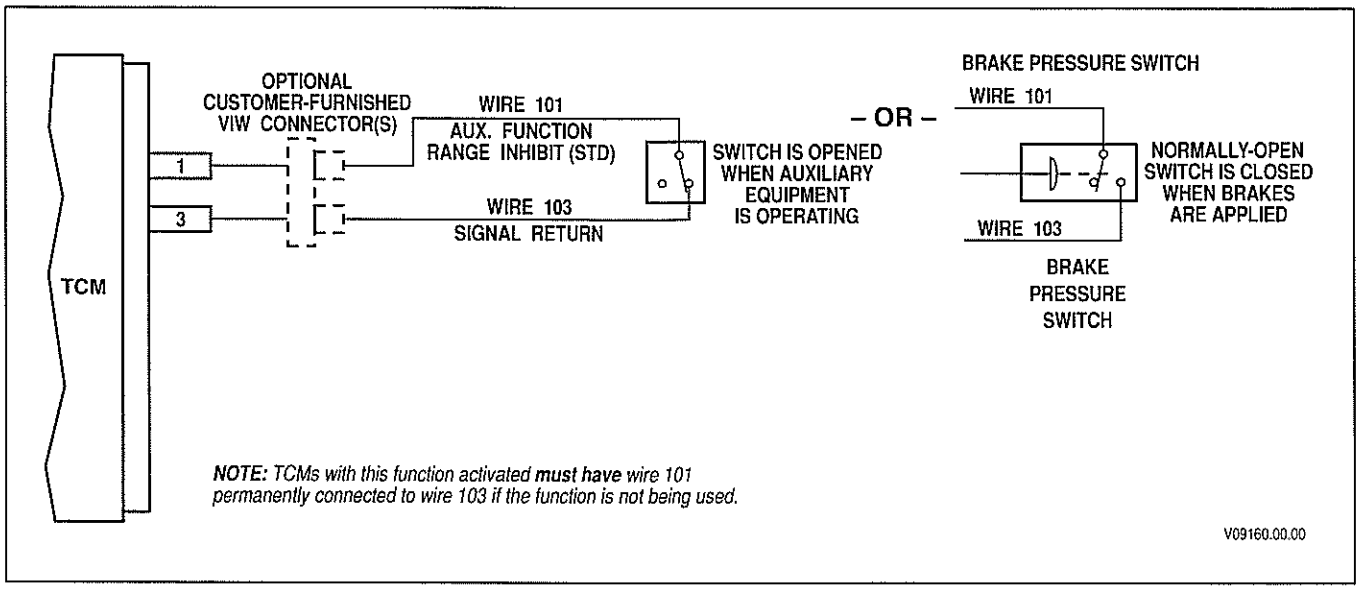


Figure P–7. Single Input Auxiliary Function Range Inhibit

This function can be provided by a J1939 message.

APPENDIX P—INPUT/OUTPUT FUNCTIONS

WARNING!

These schematics show the intended use of the specified controls features which have been validated in the configuration shown. Any miswiring or use of these features which differs from that shown could cause unintended selection of range or other unpredictable operation resulting in damage to equipment or property, personal injury, or loss of life. ALLISON TRANSMISSION IS NOT LIABLE FOR THE CONSEQUENCES ASSOCIATED WITH MISWIRING OR UNINTENDED USE OF THESE FEATURES.

INPUT FUNCTION F. DUAL INPUT AUXILIARY FUNCTION RANGE INHIBIT

USES: Prevents inadvertent range selection when auxiliary equipment is operating. Used in emergency equipment to prevent inadvertent range selection from NEUTRAL.

VARIABLES TO SPECIFY: None

VOCATIONS: Emergency equipment

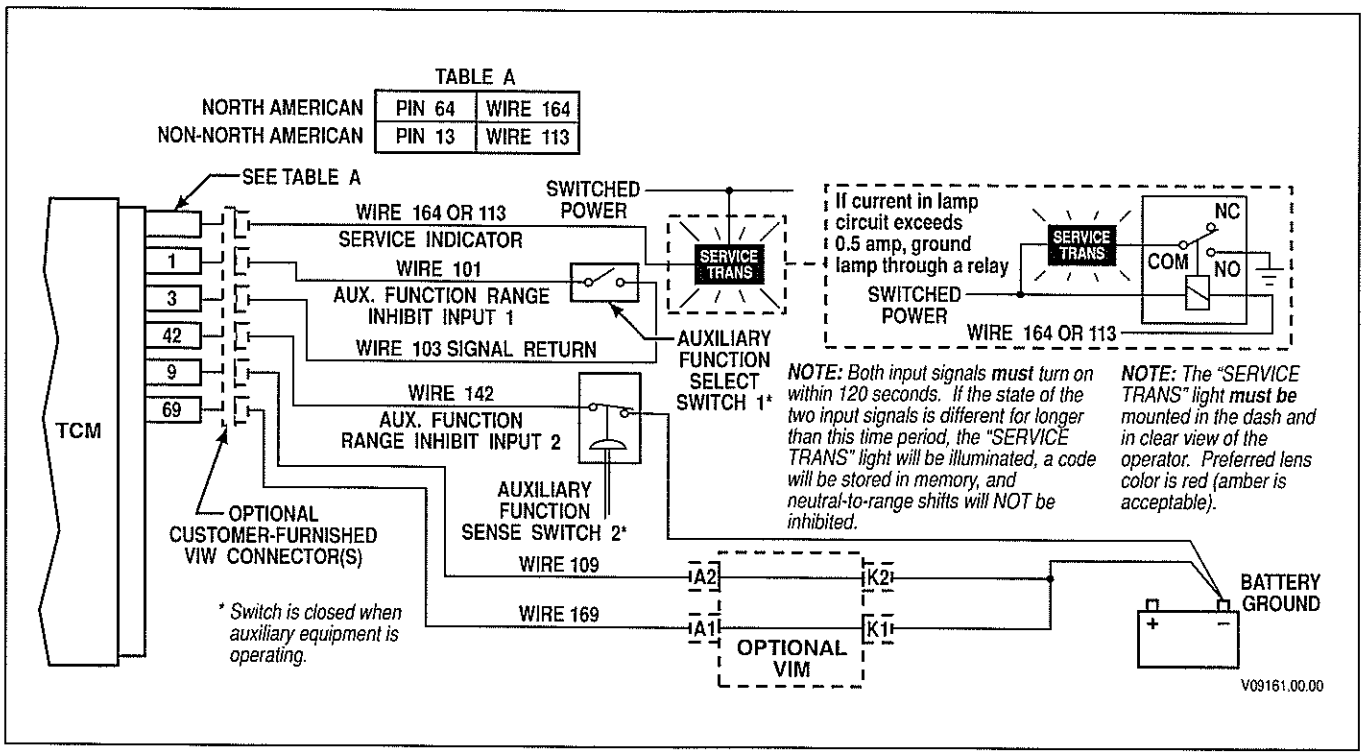


Figure P–8. Dual Input Auxiliary Function Range Inhibit

APPENDIX P—INPUT/OUTPUT FUNCTIONS

WARNING!

These schematics show the intended use of the specified controls features which have been validated in the configuration shown. Any miswiring or use of these features which differs from that shown could result in damage to equipment or property, personal injury, or loss of life. ALLISON TRANSMISSION IS NOT LIABLE FOR THE CONSEQUENCES ASSOCIATED WITH MISWIRING OR UNINTENDED USE OF THESE FEATURES.

INPUT FUNCTION G. AUXILIARY HOLD

USES: Provide a discrete input to hold the transmission in present range.

VARIABLES TO SPECIFY: None

VOCATIONS: Various

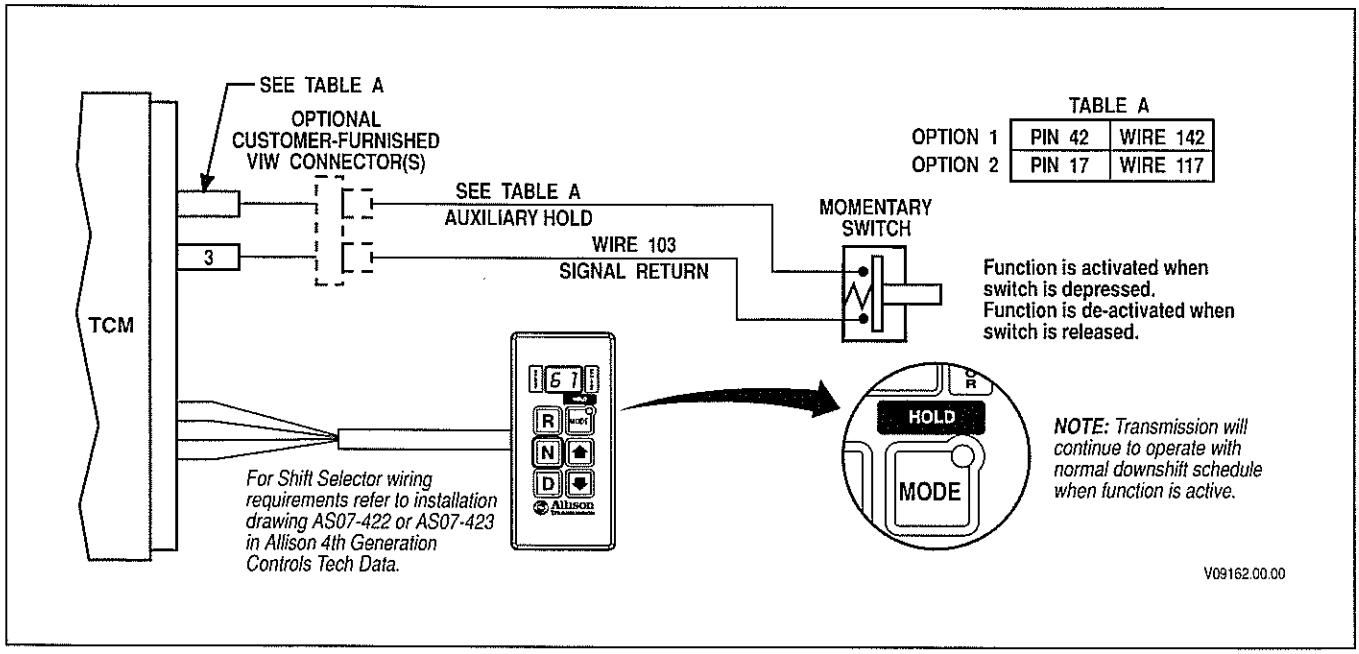


Figure P–9. Auxiliary Hold

APPENDIX P—INPUT/OUTPUT FUNCTIONS

WARNING!

These schematics show the intended use of the specified controls features which have been validated in the configuration shown. Any miswiring or use of these features which differs from that shown could result in damage to equipment or property, personal injury, or loss of life. ALLISON TRANSMISSION IS NOT LIABLE FOR THE CONSEQUENCES ASSOCIATED WITH MISWIRING OR UNINTENDED USE OF THESE FEATURES.

INPUT FUNCTION H. ENGINE BRAKE ENABLE AND PRESELECT REQUEST PLUS ENGINE BRAKE ENABLE OUTPUT USING EXHAUST BRAKES

USES: Used with engine brakes to signal the TCM that the brake is active and to provide increased braking by preselecting a lower range. Also prevents engagement of engine brake with throttle > 0 or lockup OFF.

VARIABLES TO SPECIFY: Preselect range. Standard value is second range.

VOCATIONS: Various

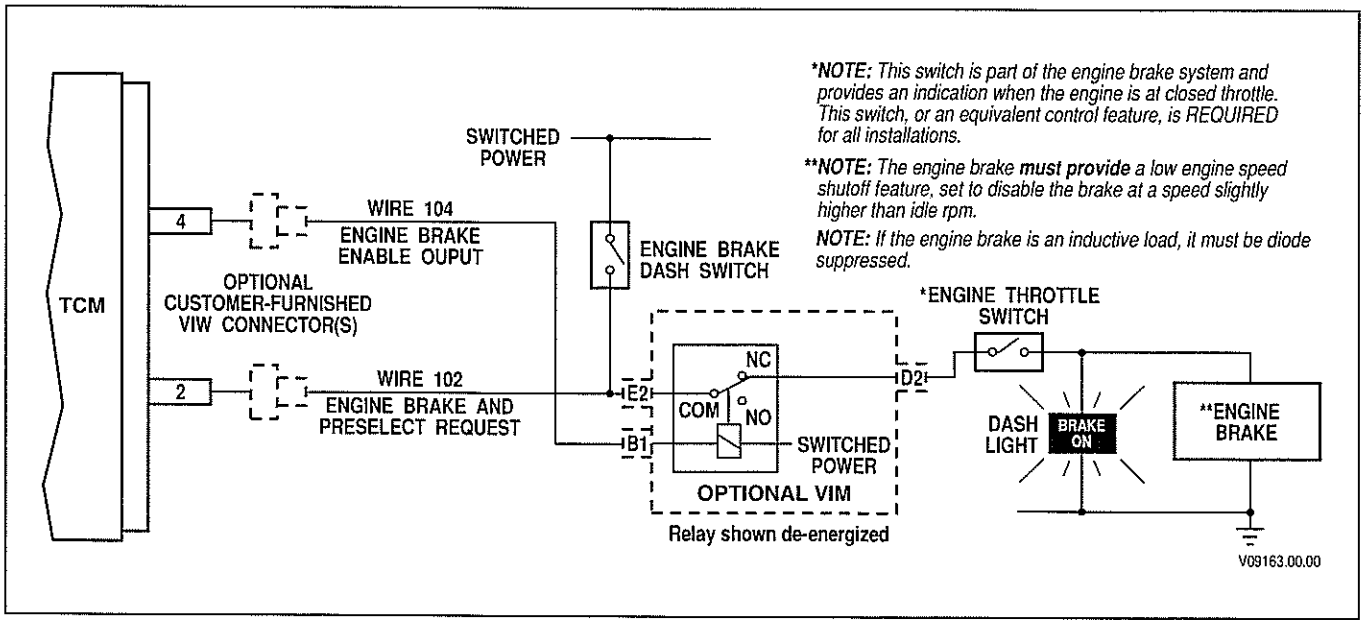


Figure P–10. Engine Brake Enable And Preselect Request Plus Engine Brake Enable Output Using Exhaust Brakes

This function can be provided by a J1939 message.

APPENDIX P—INPUT/OUTPUT FUNCTIONS

WARNING!

These schematics show the intended use of the specified controls features which have been validated in the configuration shown. Any miswiring or use of these features which differs from that shown could result in damage to equipment or property, personal injury, or loss of life. ALLISON TRANSMISSION IS NOT LIABLE FOR THE CONSEQUENCES ASSOCIATED WITH MISWIRING OR UNINTENDED USE OF THESE FEATURES.

INPUT FUNCTION H. ENGINE BRAKE ENABLE AND PRESELECT REQUEST PLUS ENGINE BRAKE ENABLE OUTPUT USING ECM CONTROLLED EXHAUST BRAKES

USES: Used with exhaust brakes controlled by electronic engines to signal the TCM that the brake is active and to provide increased braking by preselecting a lower range. Also prevents engagement of engine brake with throttle > 0 or lockup OFF.

VARIABLES TO SPECIFY: Preselect range. Standard value is second range.

VOCATIONS: Various

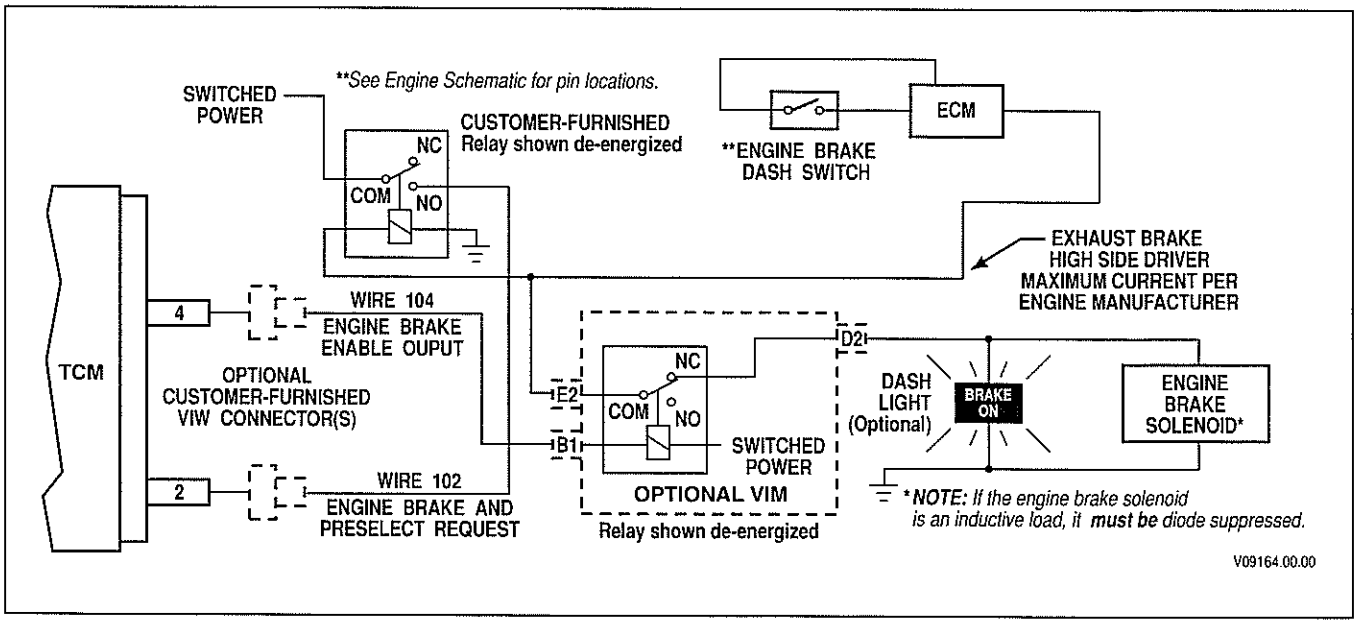


Figure P–11. Engine Brake Enable And Preselect Request Plus Engine Brake Enable Output Using ECM Controlled Exhaust Brakes

This function can be provided by a J1939 message.

APPENDIX P—INPUT/OUTPUT FUNCTIONS

WARNING!

These schematics show the intended use of the specified controls features which have been validated in the configuration shown. Any miswiring or use of these features which differs from that shown could result in damage to equipment or property, personal injury, or loss of life. ALLISON TRANSMISSION IS NOT LIABLE FOR THE CONSEQUENCES ASSOCIATED WITH MISWIRING OR UNINTENDED USE OF THESE FEATURES.

INPUT FUNCTION H. ENGINE BRAKE ENABLE AND PRESELECT REQUEST PLUS ENGINE BRAKE ENABLE OUTPUT WITH SINGLE LEVEL COMPRESSION BRAKES

USES: Used with engine brakes to signal the TCM that the brake is active and to provide increased braking by preselecting a lower range. Also prevents engagement of engine brake with throttle > 0 or lockup OFF.

VARIABLES TO SPECIFY: Preselect range. Standard value is fourth range.

VOCATIONS: Various

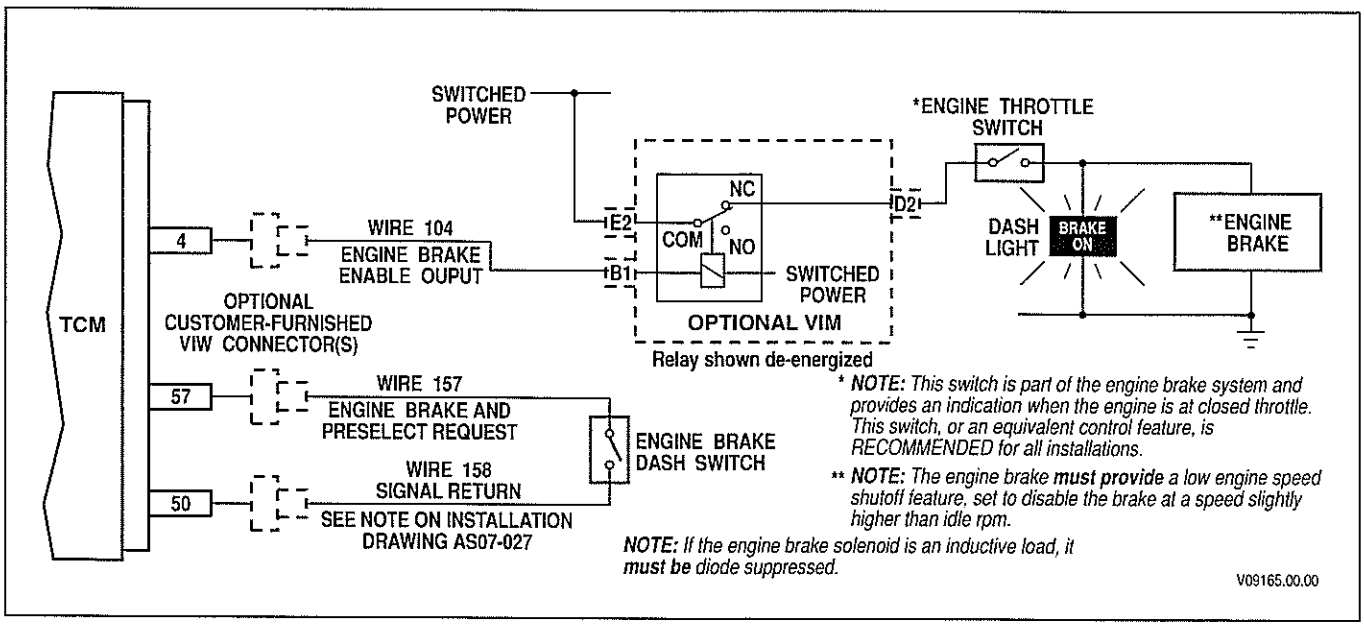


Figure P–12. Engine Brake Enable And Preselect Request Plus Engine Brake Enable Output With Single Level Compression Brakes

APPENDIX P—INPUT/OUTPUT FUNCTIONS

WARNING!

These schematics show the intended use of the specified controls features which have been validated in the configuration shown. Any miswiring or use of these features which differs from that shown could result in damage to equipment or property, personal injury, or loss of life. ALLISON TRANSMISSION IS NOT LIABLE FOR THE CONSEQUENCES ASSOCIATED WITH MISWIRING OR UNINTENDED USE OF THESE FEATURES.

INPUT FUNCTION H. ENGINE BRAKE ENABLE AND PRESELECT REQUEST PLUS ENGINE BRAKE ENABLE OUTPUT WITH MULTI-LEVEL COMPESSION BRAKES

USES: Used with multiple-level compression brakes to signal the TCM that the brake is active and to provide increased braking by preselecting a lower range. Also prevents engagement of engine brake with throttle > 0 or lockup OFF.

VARIABLES TO SPECIFY: Preselect range. Standard value is fourth range.

VOCATIONS: Various

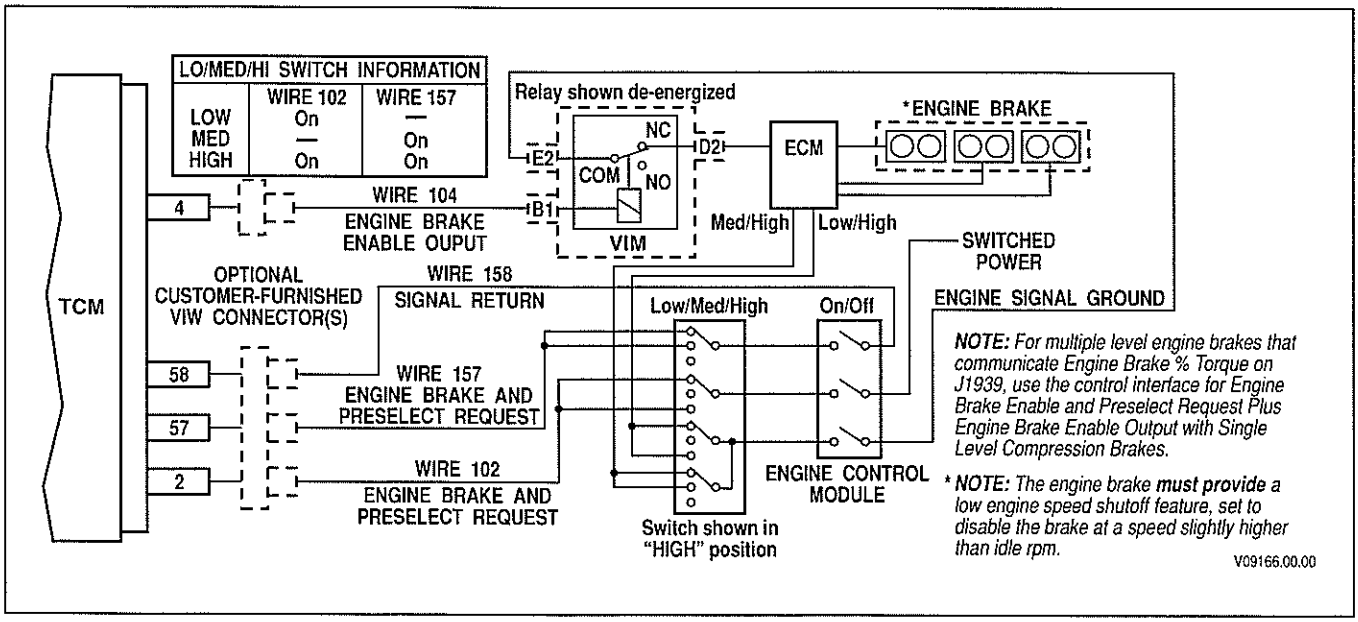


Figure P–13. Engine Brake Enable and Preselect Request Plus Engine Brake Enable Output With Multi-Level Compression Brakes

APPENDIX P—INPUT/OUTPUT FUNCTIONS

WARNING!

These schematics show the intended use of the specified controls features which have been validated in the configuration shown. Any miswiring or use of these features which differs from that shown could result in damage to equipment or property, personal injury, or loss of life. ALLISON TRANSMISSION IS NOT LIABLE FOR THE CONSEQUENCES ASSOCIATED WITH MISWIRING OR UNINTENDED USE OF THESE FEATURES.

INPUT FUNCTION I. EUROPEAN ENGINE BRAKE ENABLE AND PRESELECT REQUEST PLUS ENGINE BRAKE ENABLE OUTPUT USING EXHAUST BRAKES

Used with engine brakes to provide a signal to the TCM that the brake is active and to provide increased braking by preselecting a lower range. Also prevents engagement of engine brake with throttle > 0 or lockup OFF.

VARIABLES TO SPECIFY: Preselect range. Standard value is second range.

VOCATIONS: Various

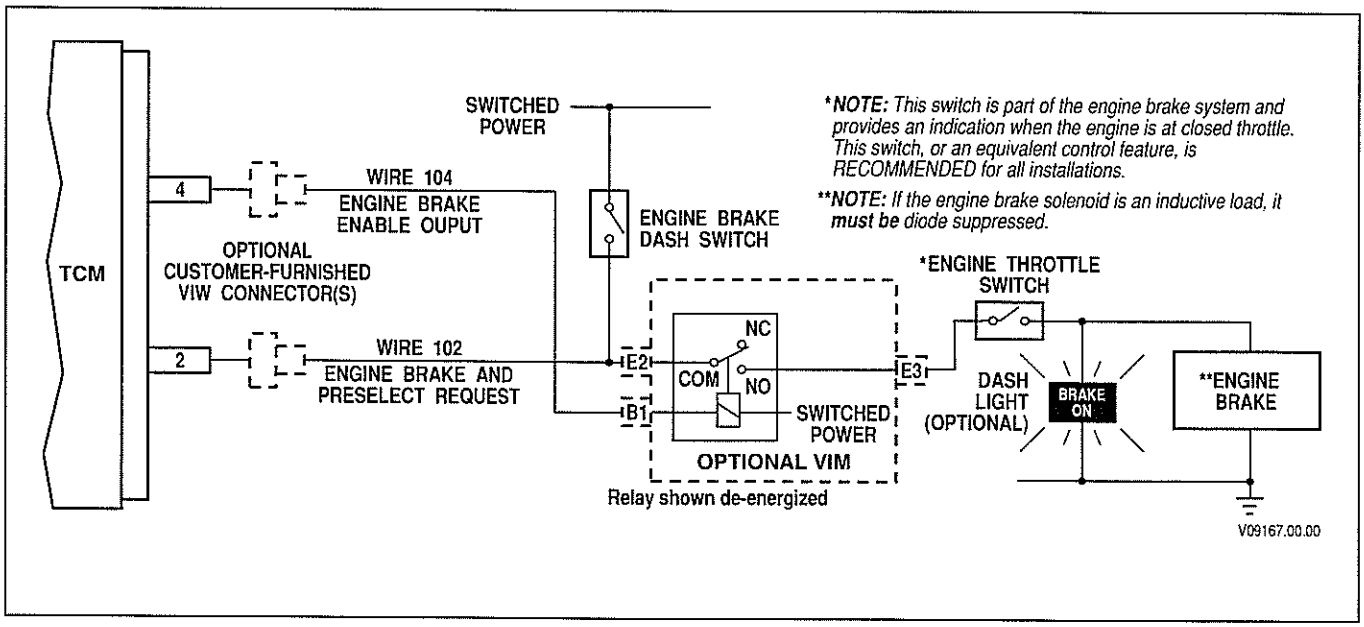


Figure P–14. European Engine Brake Enable and Preselect Request Plus Engine Brake Enable Output Using Exhaust Brakes

APPENDIX P—INPUT/OUTPUT FUNCTIONS

WARNING!

These schematics show the intended use of the specified controls features which have been validated in the configuration shown. Any miswiring or use of these features which differs from that shown could result in damage to equipment or property, personal injury, or loss of life. ALLISON TRANSMISSION IS NOT LIABLE FOR THE CONSEQUENCES ASSOCIATED WITH MISWIRING OR UNINTENDED USE OF THESE FEATURES.

INPUT FUNCTION I. EUROPEAN ENGINE BRAKE ENABLE AND PRESELECT REQUEST PLUS ENGINE BRAKE ENABLE OUTPUT WITH SINGLE LEVEL COMPRESSION BRAKES

USES: Used with engine brakes to provide a signal to the TCM that the brake is active and to provide increased braking by preselecting a lower range. Also prevents engagement of engine brake with throttle > 0 or lockup off.

VARIABLES TO SPECIFY: Preselect range. Standard value is fourth range.

VOCATIONS: Various

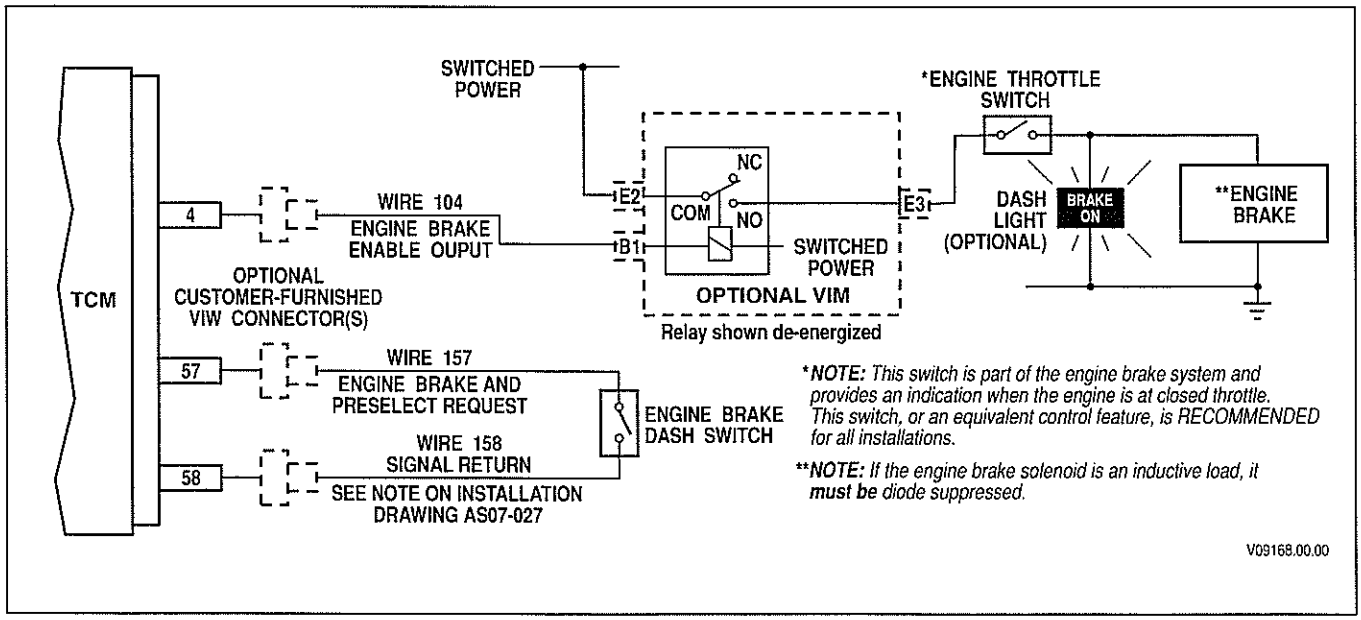


Figure P–15. European Engine Brake Enable and Preselect Request Plus Engine Brake Enable Output With Single Level Compression Brakes

APPENDIX P—INPUT/OUTPUT FUNCTIONS

WARNING!

These schematics show the intended use of the specified controls features which have been validated in the configuration shown. Any miswiring or use of these features which differs from that shown could result in damage to equipment or property, personal injury, or loss of life. ALLISON TRANSMISSION IS NOT LIABLE FOR THE CONSEQUENCES ASSOCIATED WITH MISWIRING OR UNINTENDED USE OF THESE FEATURES.

INPUT FUNCTION J. FIRE TRUCK PUMP MODE—OPERATOR AND PUMP ACTIVATED (NORTH AMERICA)

USES: Facilitates engagement of split shaft PTO and shifts transmission to fourth range lockup.

VARIABLES TO SPECIFY: None

VOCATIONS: Fire Truck Pumpers

WARNING!

If this function is enabled in the shift calibration, the function MUST be integrated into the vehicle wiring. If the function is available in the shift calibration but will not be used in the vehicle, it MUST be disabled in the calibration.

SYSTEM OPERATION

OPERATOR ACTION—System Response

TO ENGAGE:

1. *SELECT NEUTRAL*—Transmission shifts to Neutral.
2. *APPLY PARK BRAKE*—None
3. *SELECT PUMP*—Turns on "Pump Mode Requested" light. Turns on input signal to TCM (wire 123) which activates "fire truck" mode. When split-shaft shifts, wire 122 is activated and "Pump Engaged" light is turned on.
4. *SELECT DRIVE*—Transmission shifts to fourth lockup. "OK To Pump" light is turned on.

TO DISENGAGE:

1. *SELECT NEUTRAL*—Transmission shifts to Neutral if output shaft speed is less than 1000 rpm.
2. *SELECT ROAD MODE*—PTO disengages. If output shaft rotation continues, press the Momentary Trans. Brake Switch before selecting Road Mode. This will cause the transmission output shaft to stop if transmission is in Neutral and output shaft speed is less than 175 rpm.

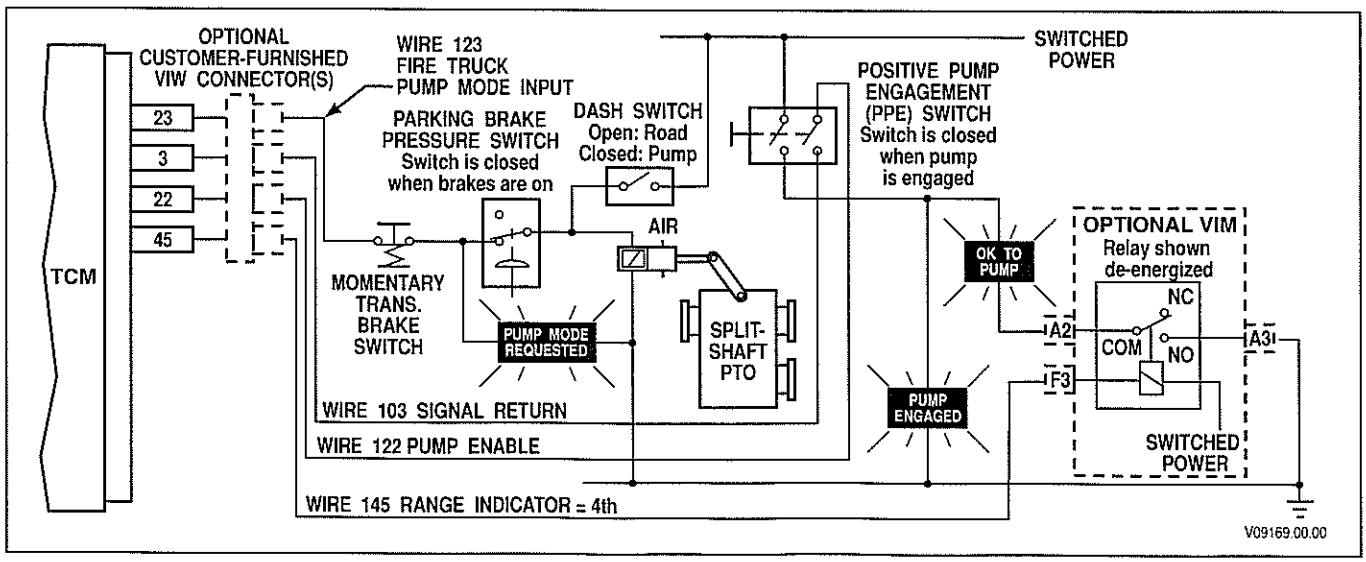


Figure P–16. Fire Truck Pump Mode—Operator and Pump Activated (North American)

APPENDIX P—INPUT/OUTPUT FUNCTIONS

WARNING!

These schematics show the intended use of the specified controls features which have been validated in the configuration shown. Any miswiring or use of these features which differs from that shown could result in damage to equipment or property, personal injury, or loss of life. ALLISON TRANSMISSION IS NOT LIABLE FOR THE CONSEQUENCES ASSOCIATED WITH MISWIRING OR UNINTENDED USE OF THESE FEATURES.

INPUT FUNCTION J. FIRE TRUCK PUMP MODE—OPERATOR ONLY ACTIVATED (NORTH AMERICA)

USES: Facilitates engagement of split shaft PTO and shifts transmission to fourth range lockup.

VARIABLES TO SPECIFY: None

VOCATIONS: Fire Truck Pumpers

WARNING!

If this function is enabled in the shift calibration, the function MUST be integrated into the vehicle wiring. If the function is available in the shift calibration but will not be used in the vehicle, it MUST be disabled in the calibration.

SYSTEM OPERATION

OPERATOR ACTION—System Response

TO ENGAGE:

1. SELECT NEUTRAL—Transmission shifts to Neutral.
2. APPLY PARK BRAKE—None
3. SELECT PUMP—Turns on "Pump Mode Requested" light. Turns on both input signals to TCM (wires 122 and 123) which activates "fire truck" mode. When split-shaft shifts, "Pump Engaged" light is turned on.
4. SELECT DRIVE—Transmission shifts to fourth lockup. "OK To Pump" light is turned on.

TO DISENGAGE:

1. SELECT NEUTRAL—Transmission shifts to Neutral if output shaft speed is less than 1000 rpm.
2. SELECT ROAD MODE—PTO disengages. If output shaft rotation continues, press the Momentary Trans. Brake Switch before selecting road mode. This will cause the transmission output shaft to stop if transmission is in Neutral and output shaft speed is less than 175 rpm.

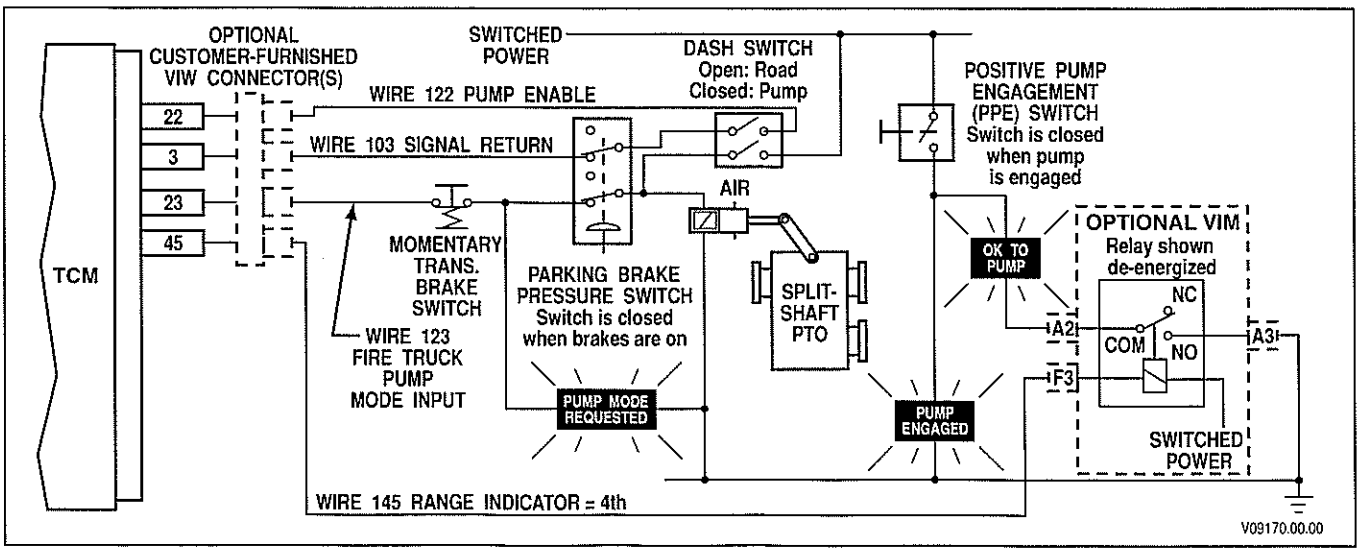


Figure P–17. Fire Truck Pump Mode—Operator Only Activated (North American)

APPENDIX P—INPUT/OUTPUT FUNCTIONS

WARNING!

These schematics show the intended use of the specified controls features which have been validated in the configuration shown. Any miswiring or use of these features which differs from that shown could result in damage to equipment or property, personal injury, or loss of life. ALLISON TRANSMISSION IS NOT LIABLE FOR THE CONSEQUENCES ASSOCIATED WITH MISWIRING OR UNINTENDED USE OF THESE FEATURES.

INPUT FUNCTION J. FIRE TRUCK PUMP MODE—OPERATOR AND PUMP ACTIVATED (NON-NORTH AMERICA)

USES: Facilitates engagement of split shaft PTO and shifts transmission to fourth range lockup.

VARIABLES TO SPECIFY: None

VOCATIONS: Fire Truck Pumpers

WARNING!

If this function is enabled in the shift calibration, the function MUST be integrated into the vehicle wiring. If the function is available in the shift calibration but will not be used in the vehicle, it MUST be disabled in the calibration.

SYSTEM OPERATION

OPERATOR ACTION—System Response

TO ENGAGE:

1. SELECT NEUTRAL—Transmission shifts to Neutral.
2. APPLY PARK BRAKE—None
3. SELECT PUMP—Turns on "Pump Mode Requested" light. Turns on both input signals to TCM (wire 143) which activates "fire truck" mode. When split-shaft shifts, WIRE 117 IS ACTIVE AND "Pump Engaged" light is turned on.
4. SELECT DRIVE—Transmission shifts to fourth lockup. "OK To Pump" light is turned on.

TO DISENGAGE:

1. SELECT NEUTRAL—Transmission shifts to Neutral if output shaft speed is less than 1000 rpm.
2. SELECT ROAD MODE—PTO disengages. If output shaft rotation continues, press the Momentary Trans. Brake Switch before selecting road mode. This will cause the transmission output shaft to stop if transmission is in Neutral and output shaft speed is less than 175 rpm.

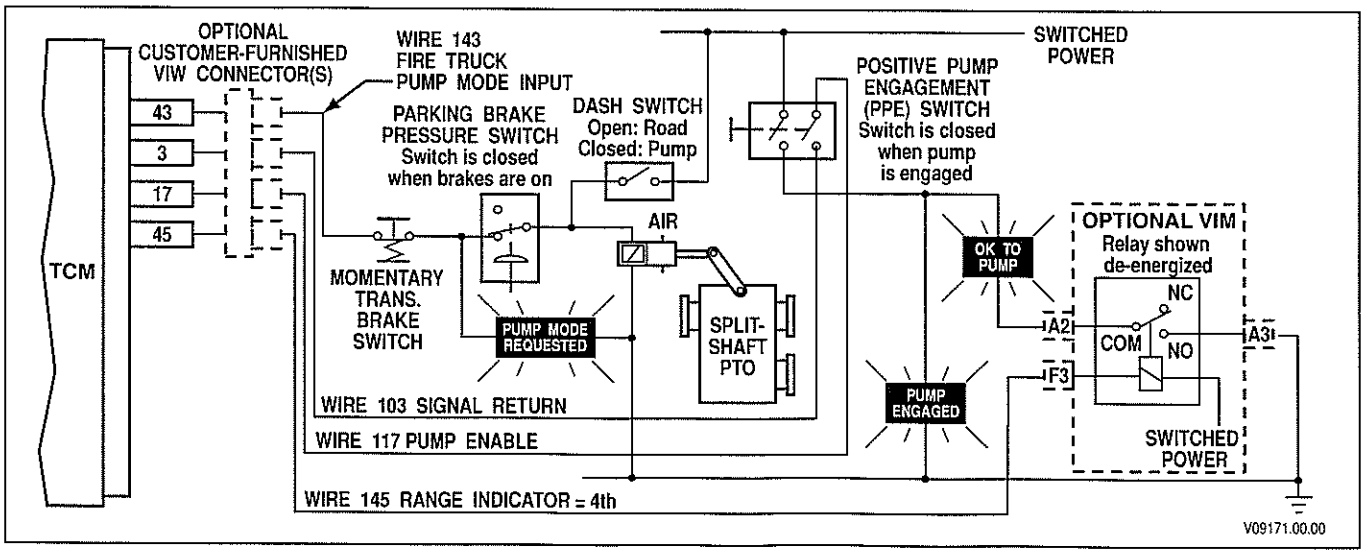


Figure P–18. Fire Truck Pump Mode—Operator and Pump Activated

APPENDIX P—INPUT/OUTPUT FUNCTIONS

WARNING!

These schematics show the intended use of the specified controls features which have been validated in the configuration shown. Any miswiring or use of these features which differs from that shown could result in damage to equipment or property, personal injury, or loss of life. ALLISON TRANSMISSION IS NOT LIABLE FOR THE CONSEQUENCES ASSOCIATED WITH MISWIRING OR UNINTENDED USE OF THESE FEATURES.

INPUT FUNCTION J. FIRE TRUCK PUMP MODE—OPERATOR ONLY ACTIVATED (NON-NORTH AMERICA)

USES: Facilitates engagement of split shaft PTO and shifts transmission to fourth range lockup.

VARIABLES TO SPECIFY: None

VOCATIONS: Fire Truck Pumpers

WARNING!

If this function is enabled in the shift calibration, the function MUST be integrated into the vehicle wiring. If the function is available in the shift calibration but will not be used in the vehicle, it MUST be disabled in the calibration.

SYSTEM OPERATION

OPERATOR ACTION—System Response

TO ENGAGE:

1. SELECT NEUTRAL—Transmission shifts to Neutral.
2. APPLY PARK BRAKE—None
3. SELECT PUMP—Turns on "Pump Mode Requested" light. Turns on both input signals to TCM (wires 117 and 143) which activates "fire truck" mode. When split-shaft shifts, "Pump Engaged" light is turned on.
4. SELECT DRIVE—Transmission shifts to fourth lockup. "OK To Pump" light is turned on.

TO DISENGAGE:

1. SELECT NEUTRAL—Transmission shifts to Neutral if output shaft speed is less than 1000 rpm.
2. SELECT ROAD MODE—PTO disengages. If output shaft rotation continues, press the Momentary Trans. Brake Switch before selecting road mode. This will cause the transmission output shaft to stop if transmission is in Neutral and output shaft speed is less than 175 rpm.

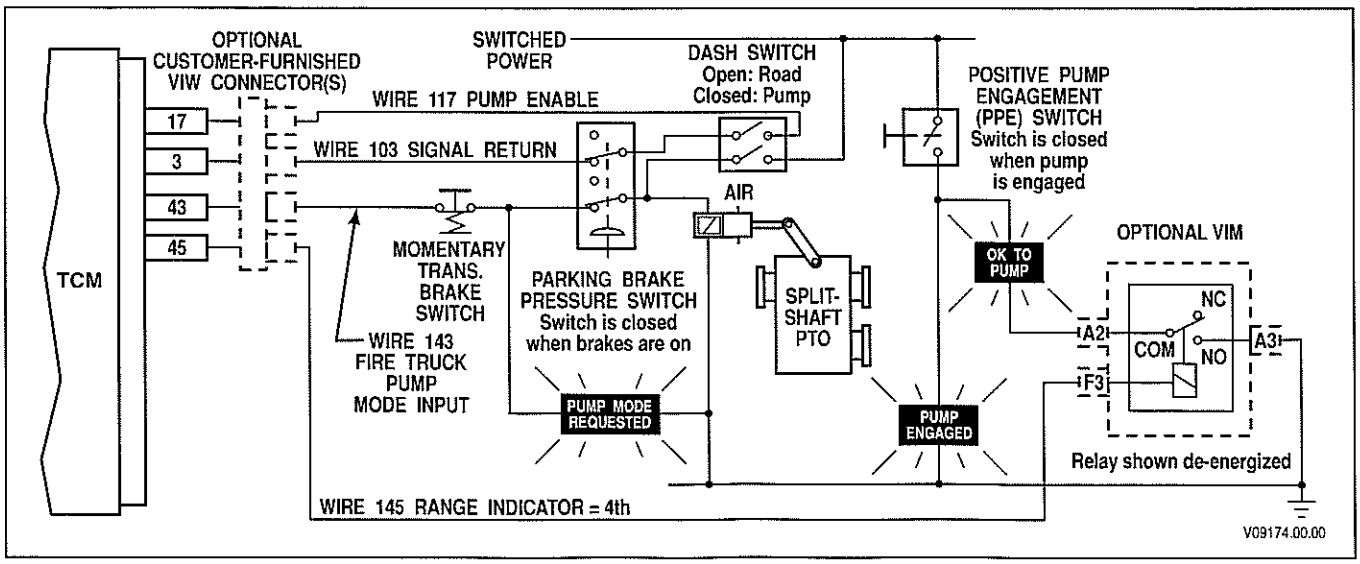


Figure P–19. Fire Truck Pump Mode—Operator Only Activated

APPENDIX P—INPUT/OUTPUT FUNCTIONS

WARNING!

These schematics show the intended use of the specified controls features which have been validated in the configuration shown. Any miswiring or use of these features which differs from that shown could result in damage to equipment or property, personal injury, or loss of life. ALLISON TRANSMISSION IS NOT LIABLE FOR THE CONSEQUENCES ASSOCIATED WITH MISWIRING OR UNINTENDED USE OF THESE FEATURES.

INPUT FUNCTION L. AUTOMATIC NEUTRAL—SINGLE INPUT SWITCHED TO GROUND (WIRE 117)

USES: Provides for automatic selection of NEUTRAL when PTO is operated regardless of range selected. Requires re-selecting range to shift out of NEUTRAL. Shown with range indicator output.

VARIABLES TO SPECIFY: Maximum output speed for activating this function. Range indicator = neutral.

VOCATIONS: Various (with usage of PTO)

WARNING!

If this function is enabled in the shift calibration, the function MUST be integrated into the vehicle wiring. If the function is available in the shift calibration but will not be used in the vehicle, it MUST be disabled in the calibration.

This function must not be used with Neutral Indicator For PTO (Output "S").

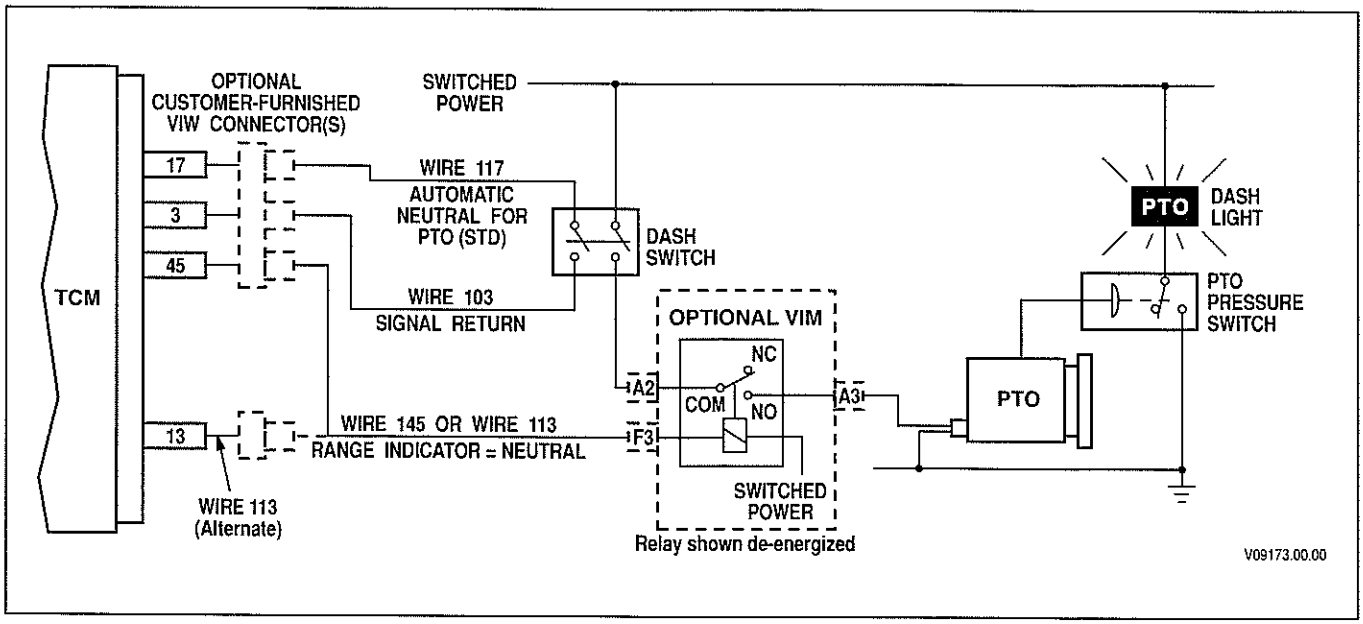


Figure P–20. Automatic Neutral—Single Input Switched to Ground (Wire 117)

APPENDIX P—INPUT/OUTPUT FUNCTIONS

WARNING!

These schematics show the intended use of the specified controls features which have been validated in the configuration shown. Any miswiring or use of these features which differs from that shown could result in damage to equipment or property, personal injury, or loss of life. ALLISON TRANSMISSION IS NOT LIABLE FOR THE CONSEQUENCES ASSOCIATED WITH MISWIRING OR UNINTENDED USE OF THESE FEATURES.

INPUT FUNCTION L. AUTOMATIC NEUTRAL—SINGLE INPUT SWITCHED TO POWER

USES: Provides for automatic selection of NEUTRAL when PTO is operated regardless of range selected. Requires re-selecting range to shift out of NEUTRAL. Shown with range indicator output.

VARIABLES TO SPECIFY: Maximum output speed for activating this function. Range indicator = neutral.

VOCATIONS: Various (with usage of PTO)

WARNING!

If this function is enabled in the shift calibration, the function MUST be integrated into the vehicle wiring. If the function is available in the shift calibration but will not be used in the vehicle, it MUST be disabled in the calibration.

This function must not be used with Neutral Indicator For PTO (Output "S").

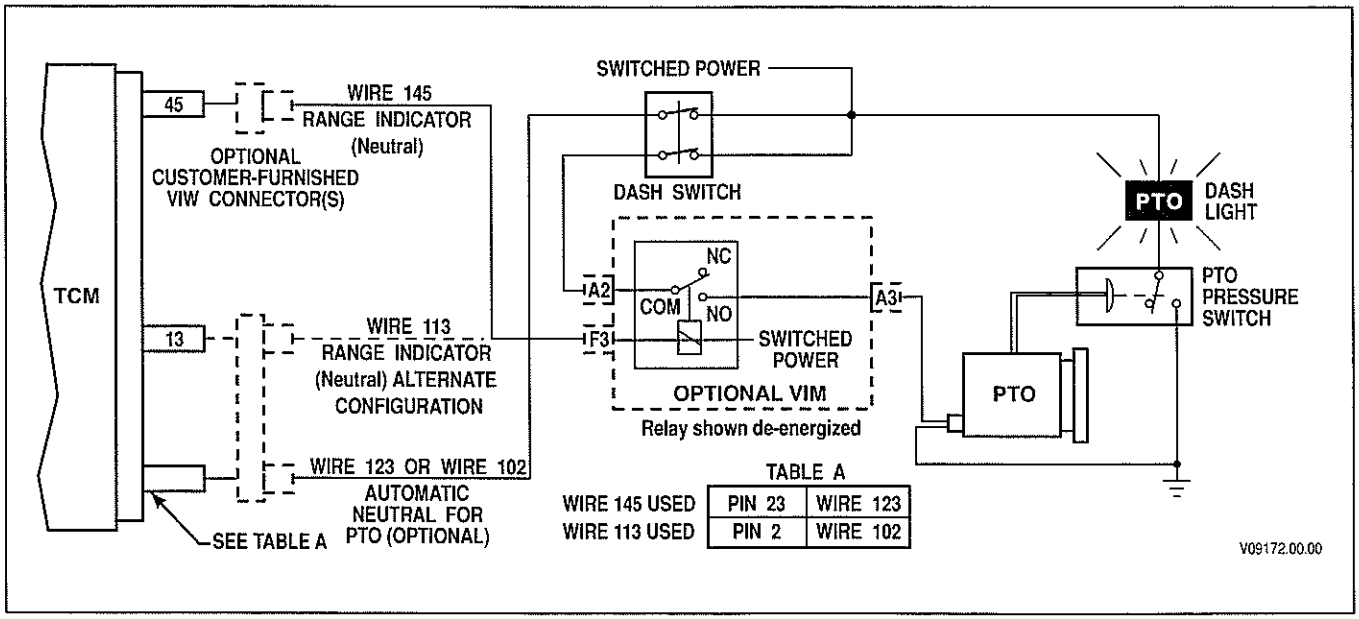


Figure P–21. Automatic Neutral—Single Input Switched to Power (Wire 123 or 102)

APPENDIX P—INPUT/OUTPUT FUNCTIONS

WARNING!

These schematics show the intended use of the specified controls features which have been validated in the configuration shown. Any miswiring or use of these features which differs from that shown could result in damage to equipment or property, personal injury, or loss of life. ALLISON TRANSMISSION IS NOT LIABLE FOR THE CONSEQUENCES ASSOCIATED WITH MISWIRING OR UNINTENDED USE OF THESE FEATURES.

INPUT FUNCTION Q. TWO-SPEED AXLE—INPUT AND OUTPUT

USES: Provides output speed interlock for axle engagement, input to ECU, and input to speedometer to adjust for axle ratio change.

VARIABLES TO SPECIFY: Output speed to activate, output speed to deactivate.

VOCATIONS: Dump truck, refuse packer, cement mixer, two-speed axle equipped vehicles.

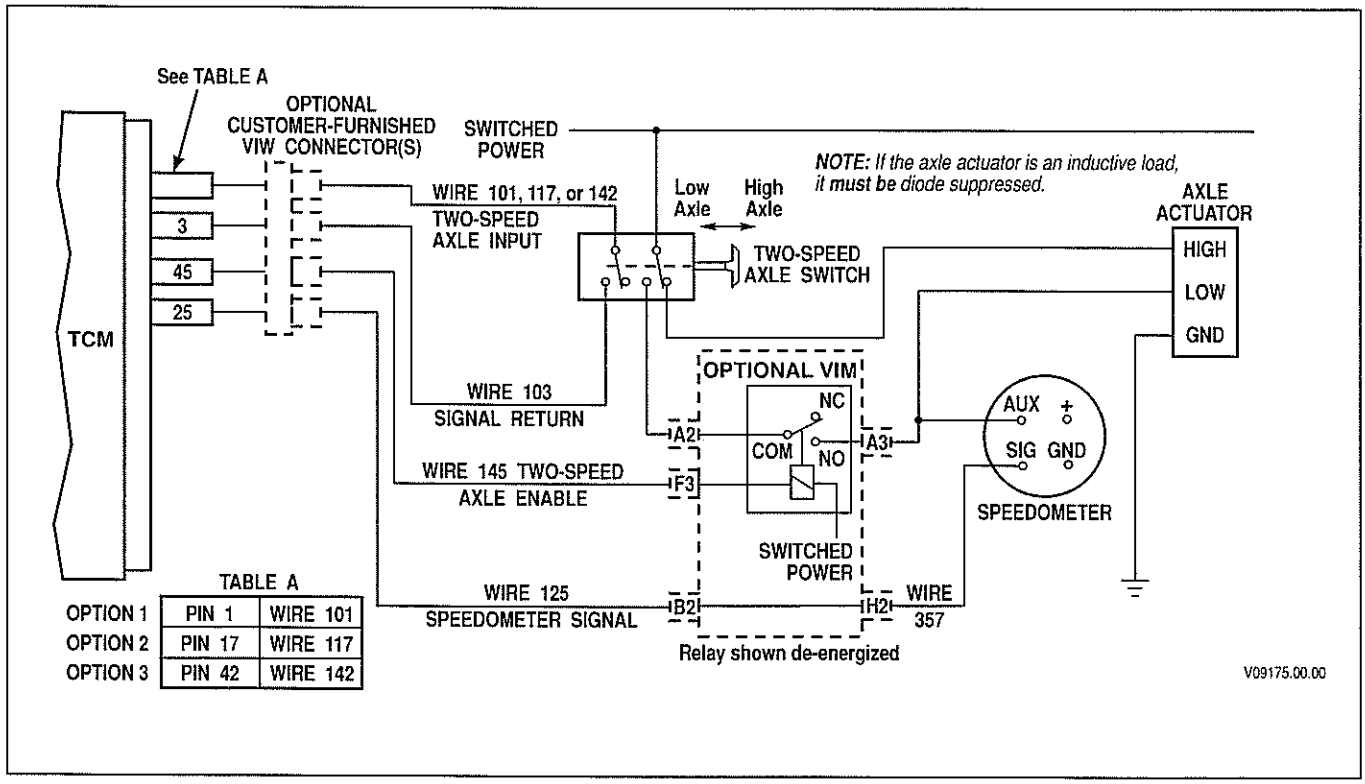


Figure P–22. Two-Speed Axle—Input and Output

APPENDIX P—INPUT/OUTPUT FUNCTIONS

WARNING!

These schematics show the intended use of the specified controls features which have been validated in the configuration shown. Any miswiring or use of these features which differs from that shown could result in damage to equipment or property, personal injury, or loss of life. ALLISON TRANSMISSION IS NOT LIABLE FOR THE CONSEQUENCES ASSOCIATED WITH MISWIRING OR UNINTENDED USE OF THESE FEATURES.

INPUT FUNCTION V. REVERSE ENABLE SWITCHED TO GROUND

USES: Provides for a separate instrument panel-mounted switch which must be pressed simultaneously with the REVERSE button to achieve Reverse.

VARIABLES TO SPECIFY: None

VOCATIONS: European transit buses and tour buses

WARNING!

If this function is enabled in the shift calibration, the function MUST be integrated into the vehicle wiring. If the function is available in the shift calibration but will not be used in the vehicle, it MUST be disabled in the calibration.

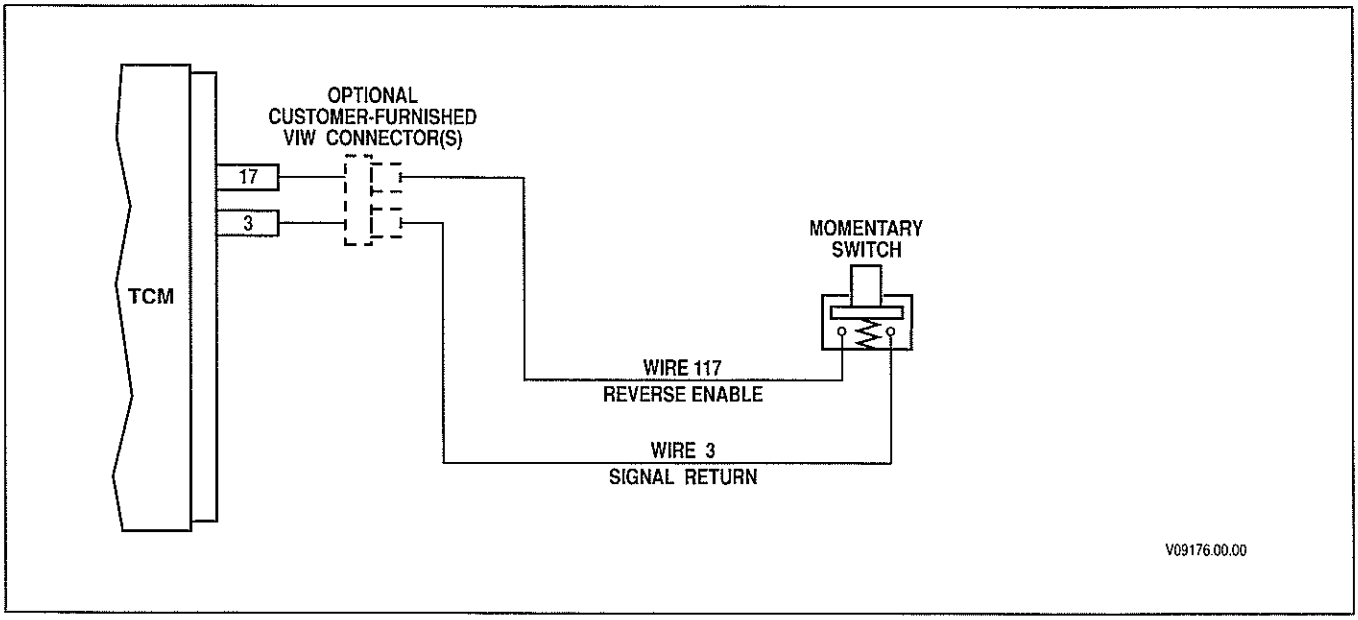


Figure P–23. Reverse Enable Switched to Ground

APPENDIX P—INPUT/OUTPUT FUNCTIONS

WARNING!

These schematics show the intended use of the specified controls features which have been validated in the configuration shown. Any miswiring or use of these features which differs from that shown could result in damage to equipment or property, personal injury, or loss of life. ALLISON TRANSMISSION IS NOT LIABLE FOR THE CONSEQUENCES ASSOCIATED WITH MISWIRING OR UNINTENDED USE OF THESE FEATURES.

INPUT FUNCTION V. REVERSE ENABLE SWITCHED TO POWER

USES: Provides for a separate instrument panel-mounted switch which must be pressed simultaneously with the REVERSE button to achieve Reverse.

VARIABLES TO SPECIFY: None

VOCATIONS: European transit buses and tour buses

WARNING!

If this function is enabled in the shift calibration, the function MUST be integrated into the vehicle wiring. If the function is available in the shift calibration but will not be used in the vehicle, it MUST be disabled in the calibration.

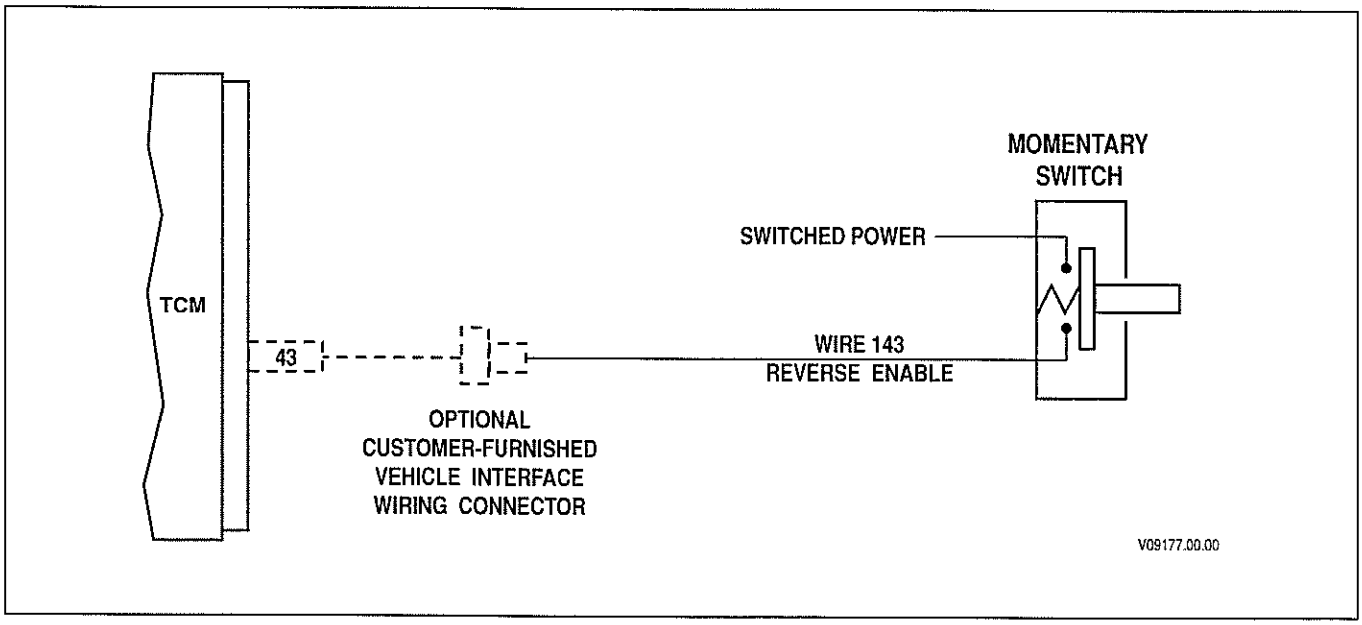


Figure P–24. Reverse Enable Switched to Power

APPENDIX P—INPUT/OUTPUT FUNCTIONS

WARNING! **These schematics show the intended use of the specified controls features which have been validated in the configuration shown. Any miswiring or use of these features which differs from that shown could result in damage to equipment or property, personal injury, or loss of life. ALLISON TRANSMISSION IS NOT LIABLE FOR THE CONSEQUENCES ASSOCIATED WITH MISWIRING OR UNINTENDED USE OF THESE FEATURES.**

INPUT FUNCTION W. DIRECTION CHANGE ENABLE SWITCHED TO GROUND

USES: An active input signals the TCM to permit a requested direction change shift (Neutral to Drive, Neutral to Reverse, Reverse to Drive, or Drive to Reverse). If the Direction Change Enable input is inactive and a direction change shift is requested, the TCM will inhibit the direction change shift by forcing the transmission to Neutral. The direction change inhibit remains in effect until the Direction Change Enable input becomes active AND a range (Reverse, Neutral, or Drive) is requested at the shift selector.

VARIABLES TO SPECIFY: None

VOCATIONS: Various

WARNING! **If this function is enabled in the shift calibration, the function MUST be integrated into the vehicle wiring. If the function is available in the shift calibration but will not be used in the vehicle, it MUST be disabled in the calibration.**

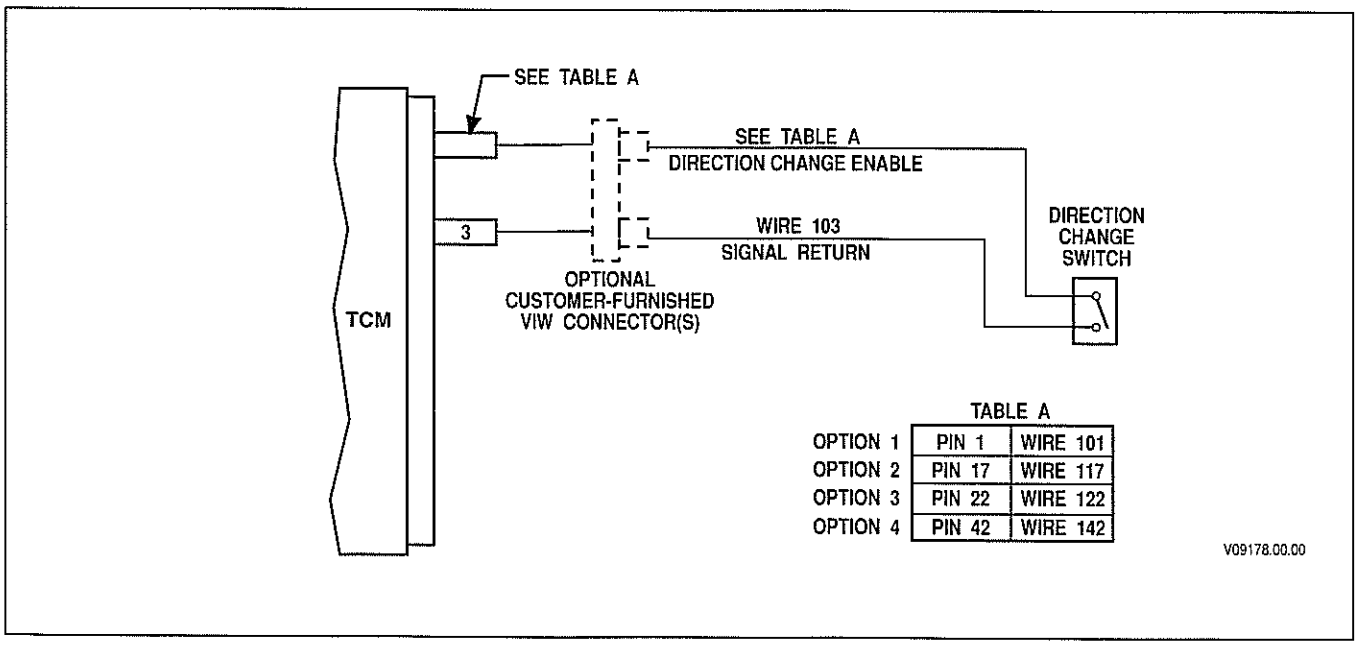


Figure P–25. Direction Change Enable Switched to Ground

This function can be provided by a J1939 message.

APPENDIX P—INPUT/OUTPUT FUNCTIONS

WARNING!

These schematics show the intended use of the specified controls features which have been validated in the configuration shown. Any miswiring or use of these features which differs from that shown could result in damage to equipment or property, personal injury, or loss of life. ALLISON TRANSMISSION IS NOT LIABLE FOR THE CONSEQUENCES ASSOCIATED WITH MISWIRING OR UNINTENDED USE OF THESE FEATURES.

INPUT FUNCTION W. DIRECTION CHANGE ENABLE SWITCHED TO POWER

USES: An active input signals the TCM to permit a requested direction change shift (Neutral to Drive, Neutral to Reverse, Reverse to Drive, or Drive to Reverse). If the Direction Change Enable input is inactive and a direction change shift is requested, the TCM will inhibit the direction change shift by forcing the transmission to Neutral. The direction change inhibit remains in effect until the Direction Change Enable input becomes active AND a range (Reverse, Neutral, or Drive) is requested at the shift selector.

VARIABLES TO SPECIFY: None

VOCATIONS: Various

WARNING!

If this function is enabled in the shift calibration, the function MUST be integrated into the vehicle wiring. If the function is available in the shift calibration but will not be used in the vehicle, it MUST be disabled in the calibration.

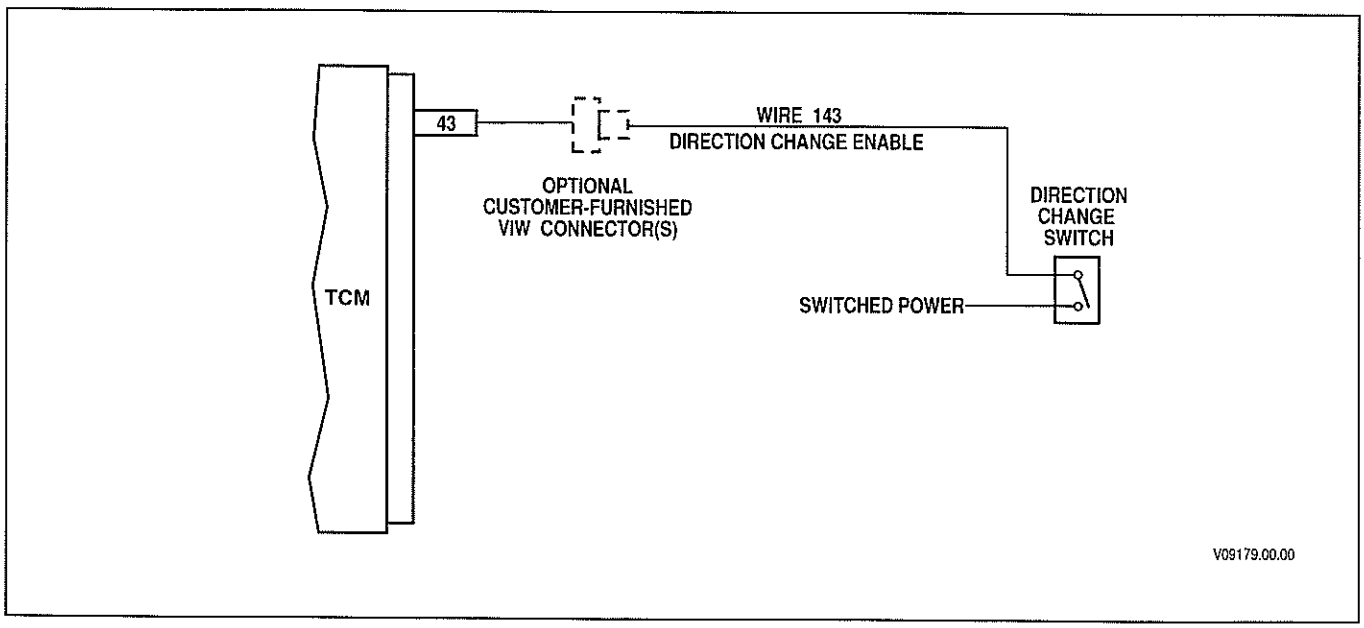


Figure P–26. Direction Change Enable Switched to Power

This function can be provided by a J1939 message.

APPENDIX P—INPUT/OUTPUT FUNCTIONS

WARNING!

These schematics show the intended use of the specified controls features which have been validated in the configuration shown. Any miswiring or use of these features which differs from that shown could result in damage to equipment or property, personal injury, or loss of life. ALLISON TRANSMISSION IS NOT LIABLE FOR THE CONSEQUENCES ASSOCIATED WITH MISWIRING OR UNINTENDED USE OF THESE FEATURES.

INPUT FUNCTION Y. ANTI-LOCK BRAKE RESPONSE WITH INPUT FROM ABS CONTROLLER

USES: Signals the TCM when ABS function is active, so that lockup clutch and retarder will be disabled.

VARIABLES TO SPECIFY: None

VOCATIONS: Various

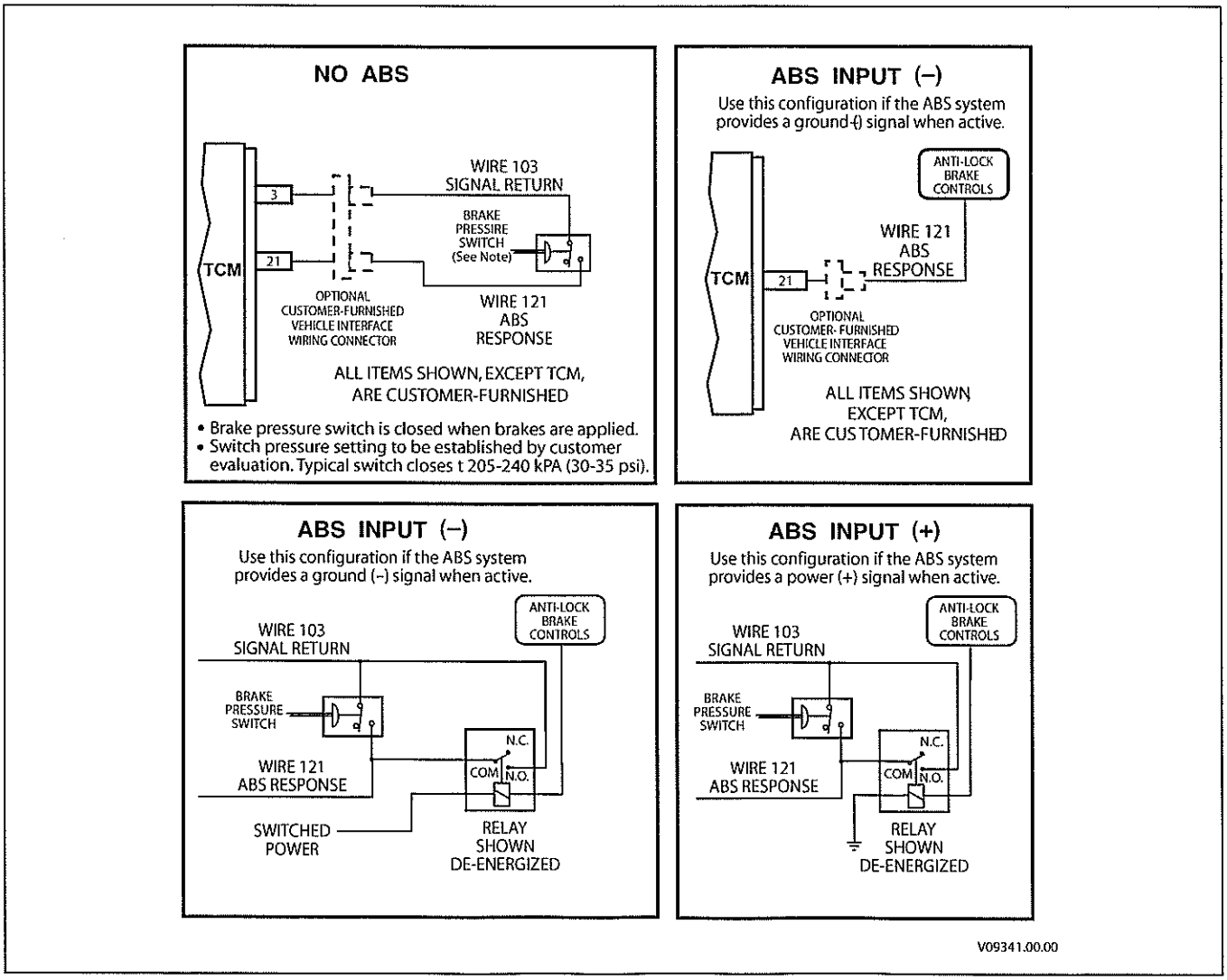


Figure P–27. Anti-Lock Brake Response With Input From ABS Controller

APPENDIX P—INPUT/OUTPUT FUNCTIONS

WARNING!

These schematics show the intended use of the specified controls features which have been validated in the configuration shown. Any miswiring or use of these features which differs from that shown could result in damage to equipment or property, personal injury, or loss of life. ALLISON TRANSMISSION IS NOT LIABLE FOR THE CONSEQUENCES ASSOCIATED WITH MISWIRING OR UNINTENDED USE OF THESE FEATURES.

INPUT FUNCTION Y. ANTI-LOCK BRAKE RESPONSE VIA J1939 COMMUNICATIONS LINK

USES: Signals the TCM when ABS function is active so that the lockup clutch and retarder will be disabled. Signals the TCM during hard braking even if ABS is not activated, so that the lockup clutch and retarder will be disabled.

VARIABLES TO SPECIFY: None

VOCATIONS: Various

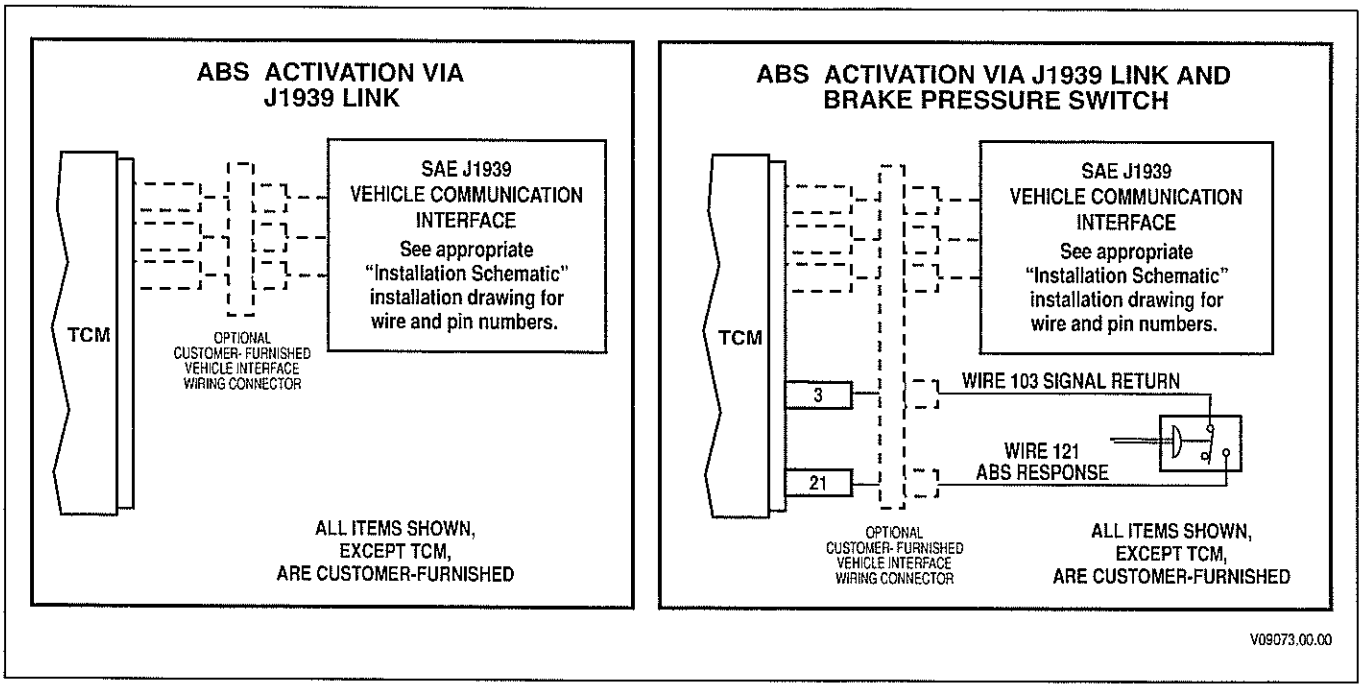


Figure P–28. Anti-Lock Brake Response Via J1939 Communications Link

APPENDIX P—INPUT/OUTPUT FUNCTIONS

WARNING!

These schematics show the intended use of the specified controls features which have been validated in the configuration shown. Any miswiring or use of these features which differs from that shown could result in damage to equipment or property, personal injury, or loss of life. ALLISON TRANSMISSION IS NOT LIABLE FOR THE CONSEQUENCES ASSOCIATED WITH MISWIRING OR UNINTENDED USE OF THESE FEATURES.

INPUT FUNCTION Z. RETARDER ENABLE

USES: Provides for operator ON/OFF control of the retarder, transmission temperature indication, and brake lights during retarder operation.

USES: None

VOCATIONS: Various. This function is required for retarder-equipped transmissions.

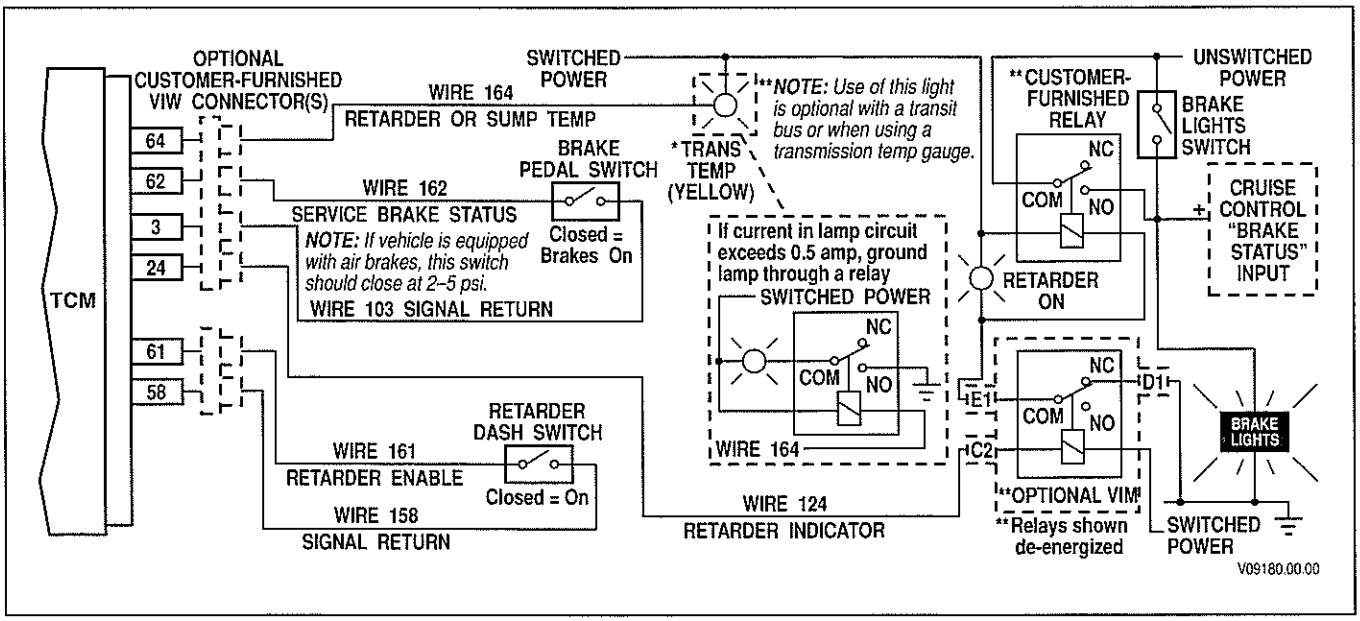


Figure P–29. Retarder Enable

APPENDIX P—INPUT/OUTPUT FUNCTIONS

WARNING!

These schematics show the intended use of the specified controls features which have been validated in the configuration shown. Any miswiring or use of these features which differs from that shown could result in damage to equipment or property, personal injury, or loss of life. ALLISON TRANSMISSION IS NOT LIABLE FOR THE CONSEQUENCES ASSOCIATED WITH MISWIRING OR UNINTENDED USE OF THESE FEATURES.

INPUT FUNCTION AA. SERVICE BRAKE STATUS

USES: Indicates to the TCM whether vehicle braking is being provided by the retarder or vehicle brakes, so that the transmission controls can be adapted accordingly.

VARIABLES TO SPECIFY: None

VOCATIONS: Various. This function is **required** for retarder-equipped transmissions.

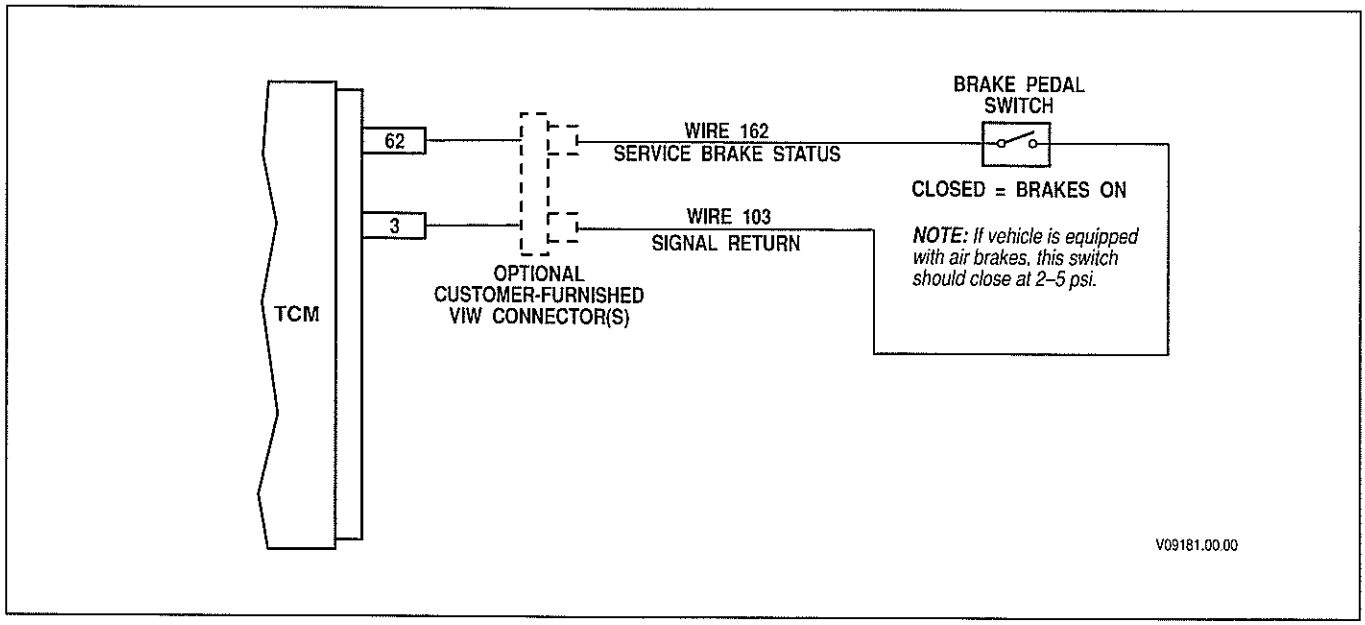


Figure P–30. Service Brake Status

APPENDIX P—INPUT/OUTPUT FUNCTIONS

WARNING!

These schematics show the intended use of the specified controls features which have been validated in the configuration shown. Any miswiring or use of these features which differs from that shown could result in damage to equipment or property, personal injury, or loss of life. ALLISON TRANSMISSION IS NOT LIABLE FOR THE CONSEQUENCES ASSOCIATED WITH MISWIRING OR UNINTENDED USE OF THESE FEATURES.

INPUT FUNCTION AF. DIFFERENTIAL CLUTCH REQUEST

USES: Provides for operator ON/OFF control of the differential locking clutch in the 3000 Product Family 7-speed transmission transfer case.

VARIABLES TO SPECIFY: None

VOCATIONS: Various. This function is **required** for all 3000 Product Family 7-speed transmissions and used only with this transmission.

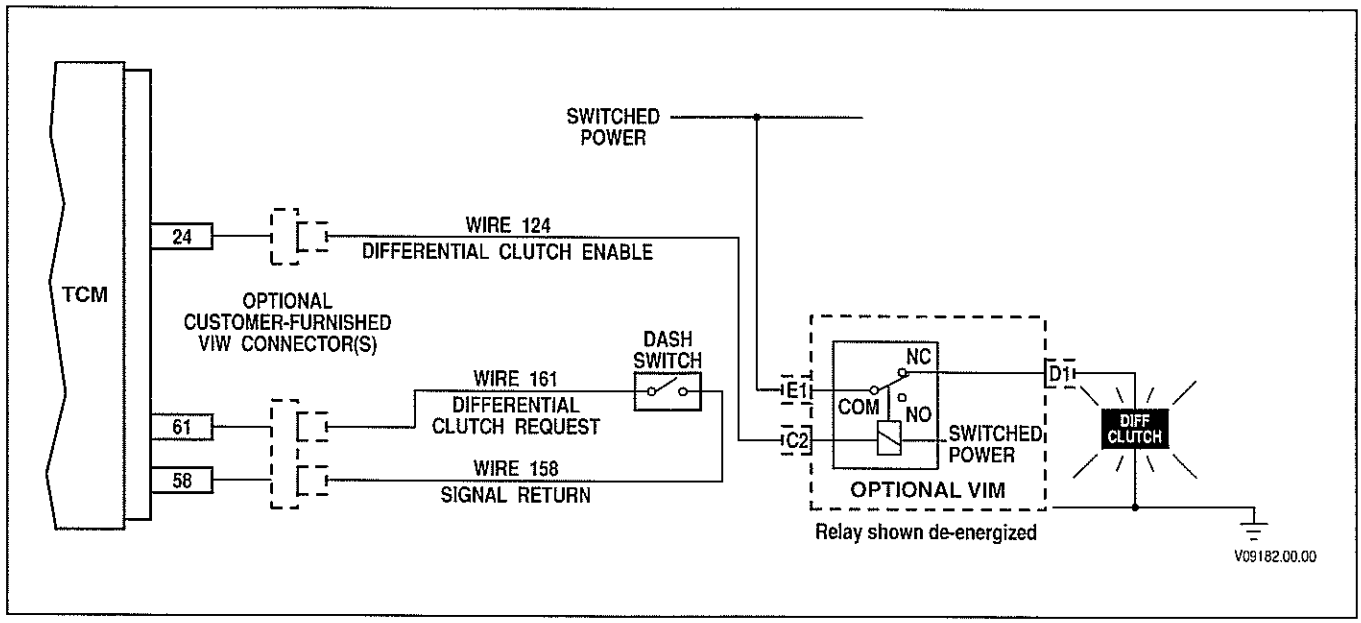


Figure P–31. Differential Clutch Request

APPENDIX P—INPUT/OUTPUT FUNCTIONS

WARNING!

These schematics show the intended use of the specified controls features which have been validated in the configuration shown. Any miswiring or use of these features which differs from that shown could result in damage to equipment or property, personal injury, or loss of life. ALLISON TRANSMISSION IS NOT LIABLE FOR THE CONSEQUENCES ASSOCIATED WITH MISWIRING OR UNINTENDED USE OF THESE FEATURES.

INPUT FUNCTION AG. AUTOMATIC NEUTRAL—DUAL INPUT—PARK BRAKE ACTIVATED

USES: Provides for automatic selection of NEUTRAL and activation of fast idle when park brake is applied. Automatically re-engages transmission when park brake is released. PTO can be enabled independent of transmission range.

VARIABLES TO SPECIFY: Max output rpm to enable Neutral, max engine rpm for PTO engagement, max engine rpm for PTO operation, max output rpm for PTO engagement, max output rpm for PTO operation.

VOCATIONS: Refuse packer, recycling truck

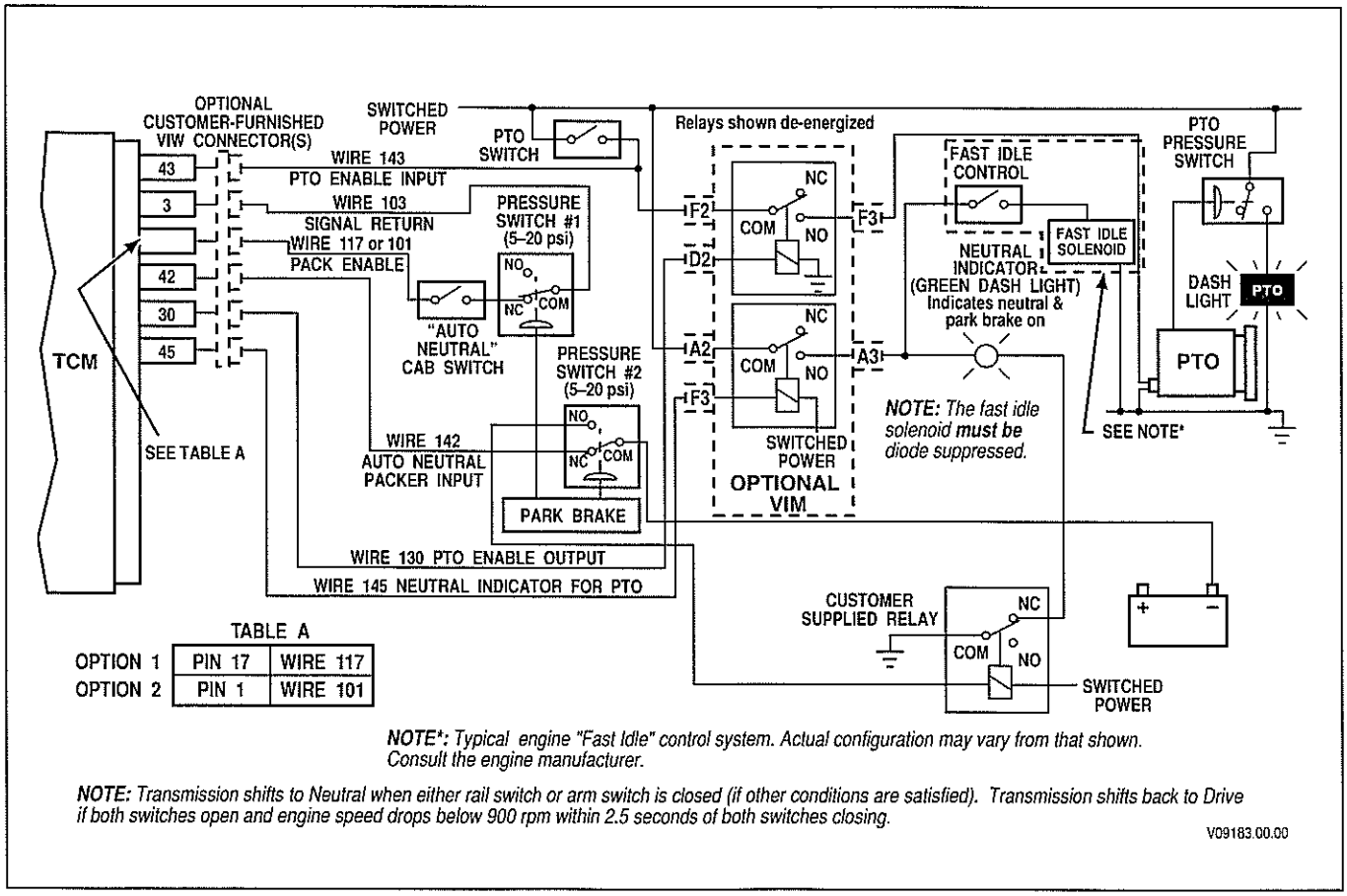


Figure P–32. Automatic Neutral—Dual Input—Park Brake Activated

APPENDIX P—INPUT/OUTPUT FUNCTIONS

WARNING!

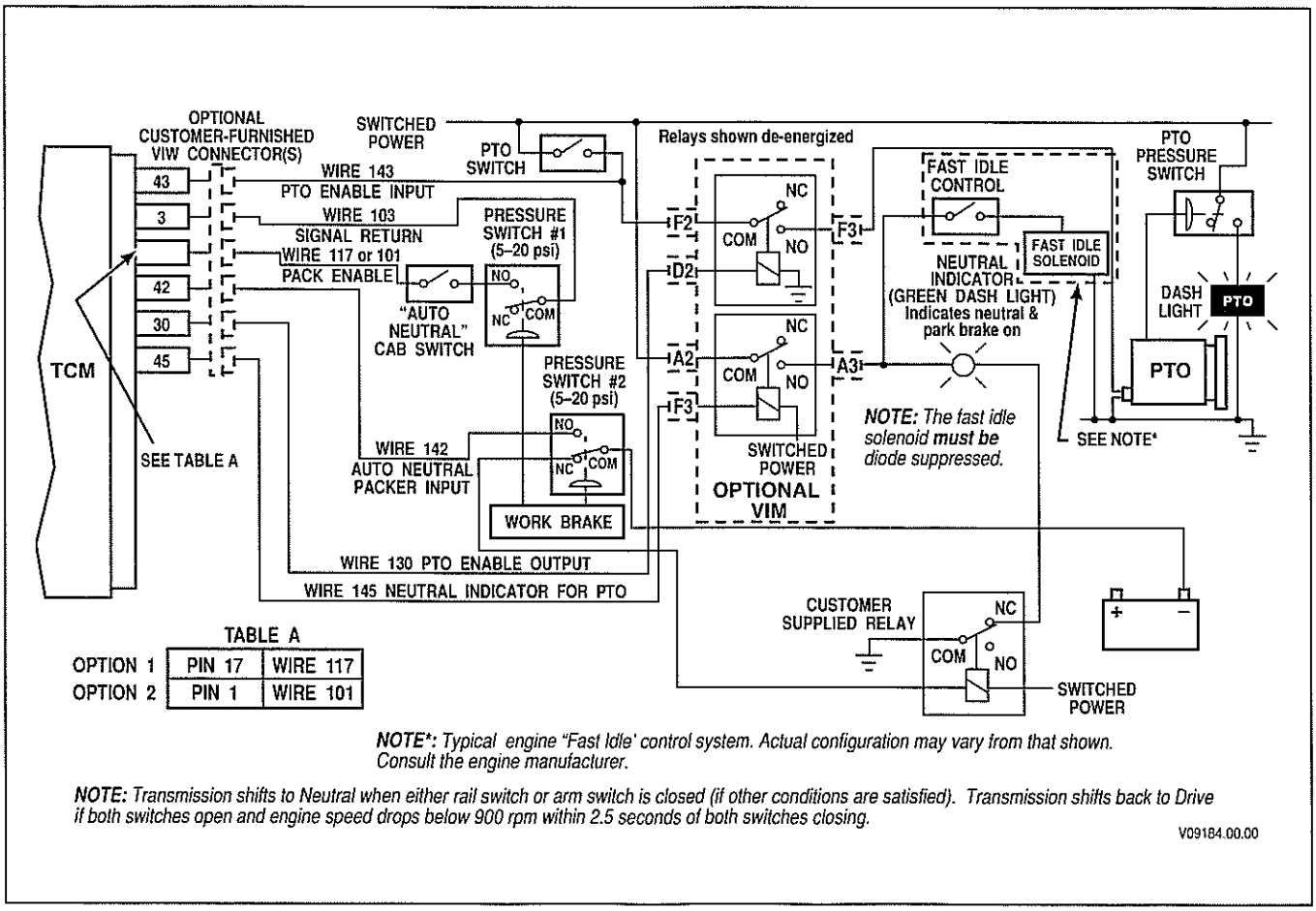
These schematics show the intended use of the specified controls features which have been validated in the configuration shown. Any miswiring or use of these features which differs from that shown could result in damage to equipment or property, personal injury, or loss of life. ALLISON TRANSMISSION IS NOT LIABLE FOR THE CONSEQUENCES ASSOCIATED WITH MISWIRING OR UNINTENDED USE OF THESE FEATURES.

INPUT FUNCTION AG. AUTOMATIC NEUTRAL—DUAL INPUT—WORK BRAKE ACTIVATED

USES: Provides for automatic selection of NEUTRAL and activation of fast idle when work brake is applied. Automatically re-engages transmission when park brake is released. PTO can be enabled independent of transmission range.

VARIABLES TO SPECIFY: Max output rpm to enable Neutral, max engine rpm for PTO engagement, max engine rpm for PTO operation, max output rpm for PTO engagement, max output rpm for PTO operation.

VOCATIONS: Refuse packer, recycling truck



NOTE: Typical engine "Fast Idle' control system. Actual configuration may vary from that shown. Consult the engine manufacturer.*

NOTE: Transmission shifts to Neutral when either rail switch or arm switch is closed (if other conditions are satisfied). Transmission shifts back to Drive if both switches open and engine speed drops below 900 rpm within 2.5 seconds of both switches closing.

V09184.00.00

Figure P–33. Automatic Neutral—Dual Input—Work Brake Activated

APPENDIX P—INPUT/OUTPUT FUNCTIONS

WARNING!

These schematics show the intended use of the specified controls features which have been validated in the configuration shown. Any miswiring or use of these features which differs from that shown could result in damage to equipment or property, personal injury, or loss of life. ALLISON TRANSMISSION IS NOT LIABLE FOR THE CONSEQUENCES ASSOCIATED WITH MISWIRING OR UNINTENDED USE OF THESE FEATURES.

INPUT FUNCTION AH. KICKDOWN

USES: Provides both economy and performance shift points at full throttle. Operator changes from economy to performance by stepping through a detent at the throttle pedal.

VARIABLES TO SPECIFY: None

VOCATIONS: Various

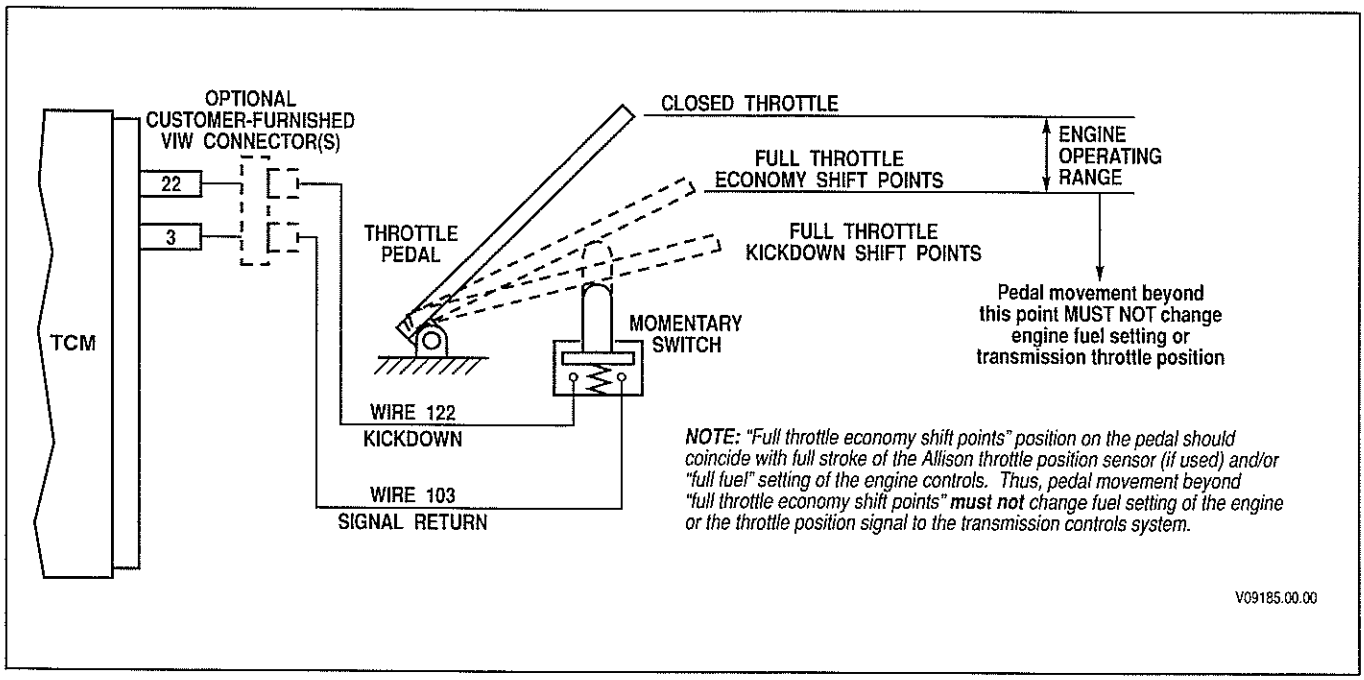


Figure P–34. Kickdown

This function can be provided by a J1939 message.

APPENDIX P—INPUT/OUTPUT FUNCTIONS

WARNING!

These schematics show the intended use of the specified controls features which have been validated in the configuration shown. Any miswiring or use of these features which differs from that shown could cause unintended selection of range or other unpredictable operation resulting in damage to equipment or property, personal injury, or loss of life. ALLISON TRANSMISSION IS NOT LIABLE FOR THE CONSEQUENCES ASSOCIATED WITH MISWIRING OR UNINTENDED USE OF THESE FEATURES.

INPUT FUNCTION AI. MILITARY AUXILIARY FUNCTION RANGE INHIBIT (STANDARD)

USES: Prevents inadvertent range selection when auxiliary equipment is operating.

VARIABLES TO SPECIFY: None

VOCATIONS: Military wheeled vehicles

WARNING!

If this function is turned "ON" in the shift calibration, the function MUST be integrated into the vehicle wiring. If the function is available in the shift calibration but will not be used in the vehicle, it MUST be turned "OFF" in the calibration.

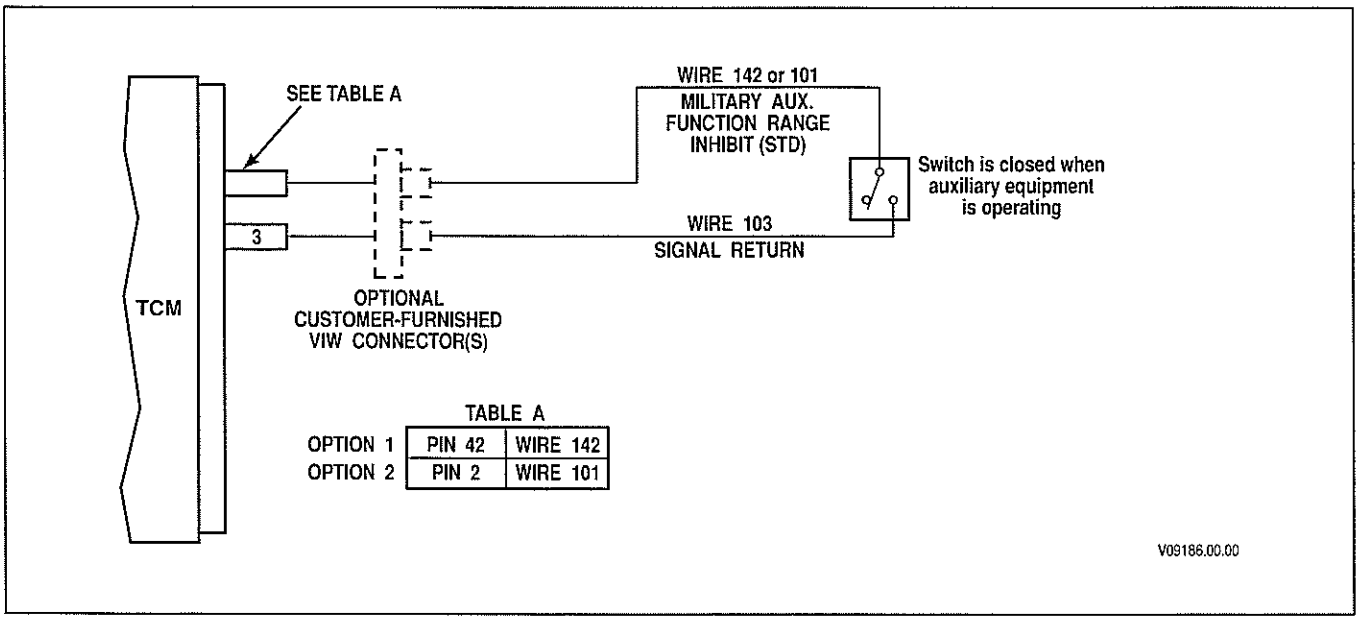


Figure P–35. Military Auxiliary Function Range Inhibit (Standard)

APPENDIX P—INPUT/OUTPUT FUNCTIONS

WARNING!

These schematics show the intended use of the specified controls features which have been validated in the configuration shown. Any miswiring or use of these features which differs from that shown could result in damage to equipment or property, personal injury, or loss of life. ALLISON TRANSMISSION IS NOT LIABLE FOR THE CONSEQUENCES ASSOCIATED WITH MISWIRING OR UNINTENDED USE OF THESE FEATURES.

INPUT FUNCTION AJ. FOURTH LOCKUP PUMP MODE—OPERATOR AND PUMP ACTIVATED (NORTH AMERICA)

USES: Facilitates engagement of split shaft PTO and shifts transmission to fourth range lockup for driving a vehicle-mounted pump.

VARIABLES TO SPECIFY: None

VOCATIONS: Street cleaners, sewer cleaners

WARNING!

If this function is turned "ON" in the shift calibration, the function MUST be integrated into the vehicle wiring. If the function is available in the shift calibration but will not be used in the vehicle, it MUST be turned "OFF" in the calibration.

SYSTEM OPERATION

OPERATOR ACTION—System Response

TO ENGAGE:

1. *SELECT NEUTRAL*—Transmission shifts to Neutral.
2. *APPLY PARKING BRAKE*—None
3. *SELECT PUMP*—Turns on "Pump Mode Requested" light. Turns on input signal to TCM (wire 123) which activates pump mode. When split-shaft shifts, wire 122 is activated and "Pump Engaged" light is turned on.
4. *SELECT DRIVE*—Transmission shifts to fourth lockup. "OK To Pump" light is turned on.

TO DISENGAGE:

1. *SELECT NEUTRAL*—Transmission shifts to Neutral if output rpm is less than 1000.
2. *SELECT ROAD MODE*—PTO disengages. If output shaft rotation continues, press the "Momentary Trans. Brake" switch before selecting Road Mode. This will cause the transmission output shaft to stop if transmission is in Neutral and output shaft speed is less than 175 rpm.

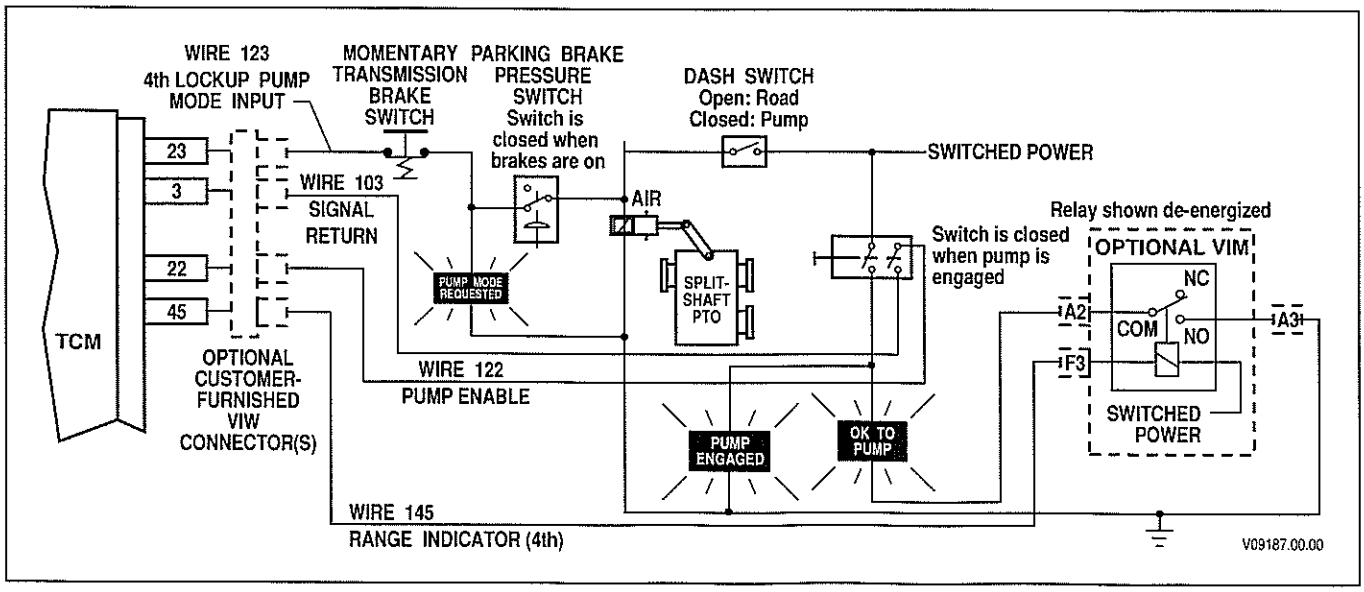


Figure P–36. Fourth Lockup Pump Mode—Operator and Pump Activated (North America)

APPENDIX P—INPUT/OUTPUT FUNCTIONS

WARNING!

These schematics show the intended use of the specified controls features which have been validated in the configuration shown. Any miswiring or use of these features which differs from that shown could result in damage to equipment or property, personal injury, or loss of life. ALLISON TRANSMISSION IS NOT LIABLE FOR THE CONSEQUENCES ASSOCIATED WITH MISWIRING OR UNINTENDED USE OF THESE FEATURES.

INPUT FUNCTION AJ. FOURTH LOCKUP PUMP MODE—OPERATOR ONLY ACTIVATED (NORTH AMERICA)

USES: Facilitates engagement of split shaft PTO and shifts transmission to fourth range lockup for driving a vehicle-mounted pump.

VARIABLES TO SPECIFY: None

VOCATIONS: Street cleaners, sewer cleaners

WARNING!

If this function is turned "ON" in the shift calibration, the function MUST be integrated into the vehicle wiring. If the function is available in the shift calibration but will not be used in the vehicle, it MUST be turned "OFF" in the calibration.

SYSTEM OPERATION

OPERATOR ACTION—System Response

TO ENGAGE:

1. *SELECT NEUTRAL*—Transmission shifts to Neutral.
2. *APPLY PARKING BRAKE*—None
3. *SELECT PUMP*—Turns on "Pump Mode Requested" light. Turns on both input signals to TCM (wires 122 and 123) which activates pump mode. When split-shaft shifts, "Pump Engaged" light is turned on.
4. *SELECT DRIVE*—Transmission shifts to fourth lockup. "OK To Pump" light is turned on.

TO DISENGAGE:

1. *SELECT NEUTRAL*—Transmission shifts to Neutral if output rpm is less than 1000.
2. *SELECT ROAD MODE*—PTO disengages. If output shaft rotation continues, press the "Momentary Trans. Brake" switch before selecting Road Mode. This will cause the transmission output shaft to stop if transmission is in Neutral and output shaft speed is less than 175 rpm.

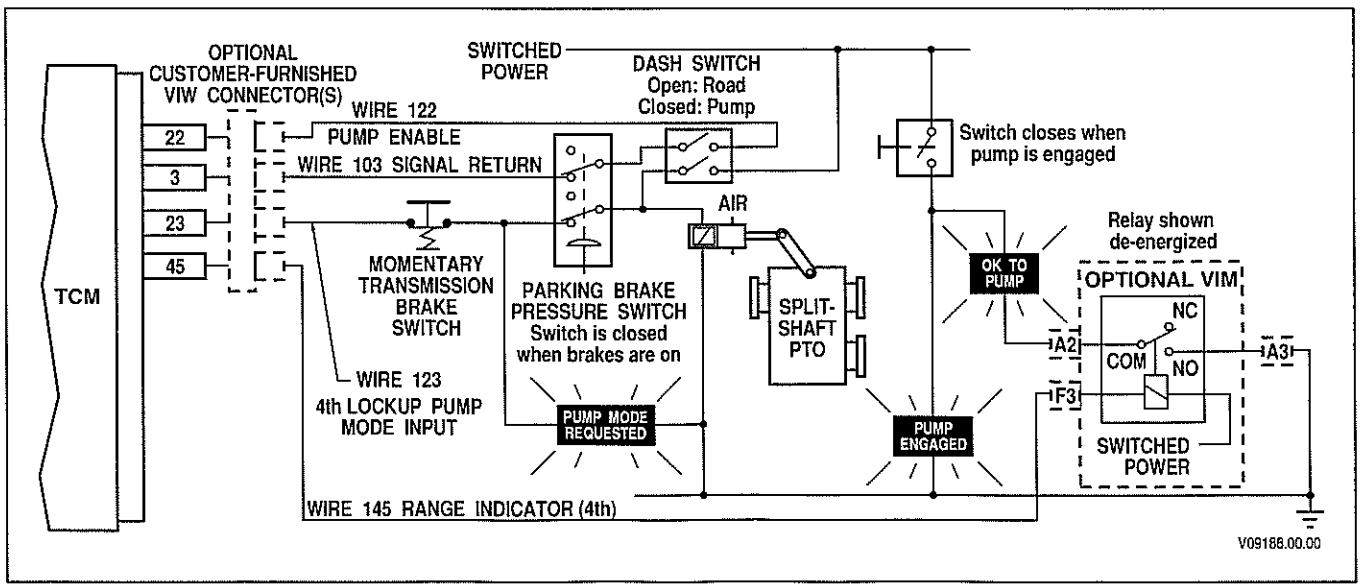


Figure P–37. Fourth Lockup Pump Mode—Operator Only Activated (North America)

APPENDIX P—INPUT/OUTPUT FUNCTIONS

WARNING!

These schematics show the intended use of the specified controls features which have been validated in the configuration shown. Any miswiring or use of these features which differs from that shown could result in damage to equipment or property, personal injury, or loss of life. ALLISON TRANSMISSION IS NOT LIABLE FOR THE CONSEQUENCES ASSOCIATED WITH MISWIRING OR UNINTENDED USE OF THESE FEATURES.

INPUT FUNCTION AJ. FOURTH LOCKUP PUMP MODE—OPERATOR AND PUMP ACTIVATED (NON-NORTH AMERICA)

USES: Facilitates engagement of split shaft PTO and shifts transmission to fourth range lockup for driving a vehicle-mounted pump.

VARIABLES TO SPECIFY: None

VOCATIONS: Street cleaners, sewer cleaners

WARNING!

If this function is turned "ON" in the shift calibration, the function MUST be integrated into the vehicle wiring. If the function is available in the shift calibration but will not be used in the vehicle, it MUST be turned "OFF" in the calibration.

SYSTEM OPERATION

OPERATOR ACTION—System Response

TO ENGAGE:

1. *SELECT NEUTRAL*—Transmission shifts to Neutral.
2. *APPLY PARKING BRAKE*—None
3. *SELECT PUMP*—Turns on "Pump Mode Requested" light. Turns on both input signals to TCM (wires 143 and 123) which activates pump mode. When split-shaft shifts, "Pump Engaged" light is turned on.
4. *SELECT DRIVE*—Transmission shifts to fourth lockup. "OK To Pump" light is turned on.

TO DISENGAGE:

1. *SELECT NEUTRAL*—Transmission shifts to Neutral if output rpm is less than 1000.
2. *SELECT ROAD MODE*—PTO disengages. If output shaft rotation continues, press the "Momentary Trans. Brake" switch before selecting Road Mode. This will cause the transmission output shaft to stop if transmission is in Neutral and output shaft speed is less than 175 rpm.

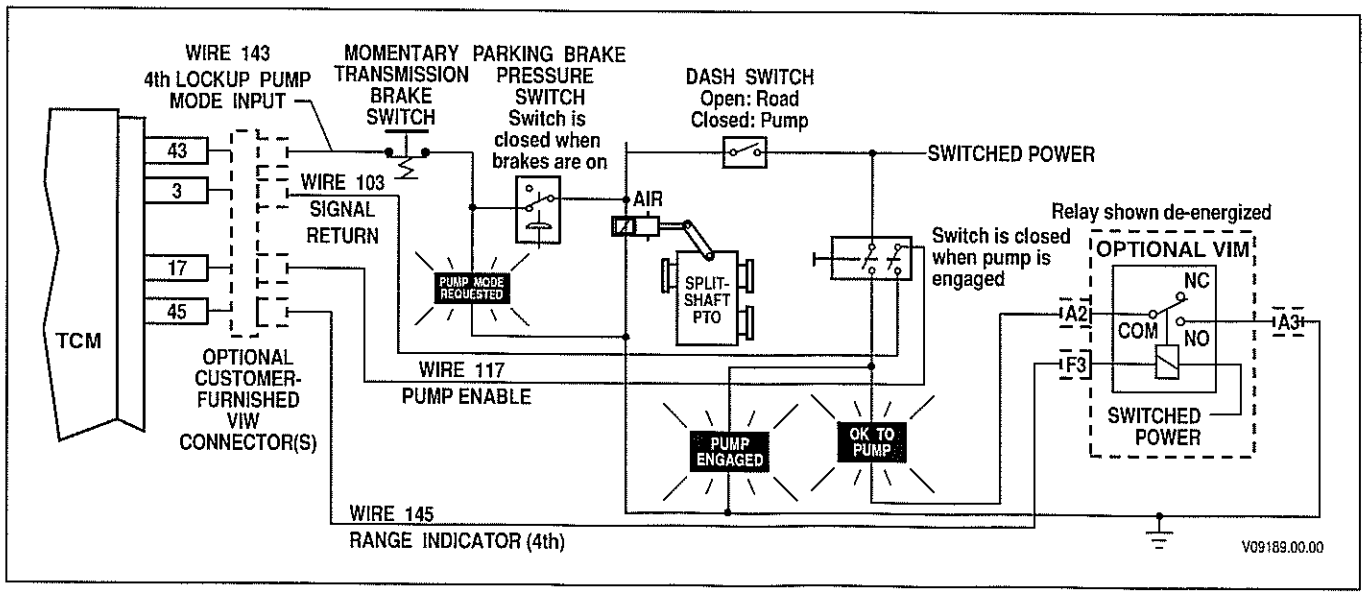


Figure P–38. Fourth Lockup Pump Mode—Operator and Pump Activated (Non-North America)

APPENDIX P—INPUT/OUTPUT FUNCTIONS

WARNING! **These schematics show the intended use of the specified controls features which have been validated in the configuration shown. Any miswiring or use of these features which differs from that shown could result in damage to equipment or property, personal injury, or loss of life. ALLISON TRANSMISSION IS NOT LIABLE FOR THE CONSEQUENCES ASSOCIATED WITH MISWIRING OR UNINTENDED USE OF THESE FEATURES.**

INPUT FUNCTION A.J. FOURTH LOCKUP PUMP MODE—OPERATOR ONLY ACTIVATED (NON-NORTH AMERICA)

USES: Facilitates engagement of split shaft PTO and shifts transmission to fourth range lockup for driving a vehicle-mounted pump.

VARIABLES TO SPECIFY: None

VOCATIONS: Street cleaners, sewer cleaners

WARNING! **If this function is turned "ON" in the shift calibration, the function MUST be integrated into the vehicle wiring. If the function is available in the shift calibration but will not be used in the vehicle, it MUST be turned "OFF" in the calibration.**

SYSTEM OPERATION

OPERATOR ACTION—System Response

TO ENGAGE:

1. *SELECT NEUTRAL*—Transmission shifts to Neutral.
2. *APPLY PARKING BRAKE*—None
3. *SELECT PUMP*—Turns on "Pump Mode Requested" light. Turns on both input signals to TCM (wires 117 and 143) which activates pump mode. When split-shaft shifts, "Pump Engaged" light is turned on.
4. *SELECT DRIVE*—Transmission shifts to fourth lockup. "OK To Pump" light is turned on.

TO DISENGAGE:

1. *SELECT NEUTRAL*—Transmission shifts to Neutral if output rpm is less than 1000.
2. *SELECT ROAD MODE*—PTO disengages. If output shaft rotation continues, press the "Momentary Trans. Brake" switch before selecting Road Mode. This will cause the transmission output shaft to stop if transmission is in Neutral and output shaft speed is less than 175 rpm.

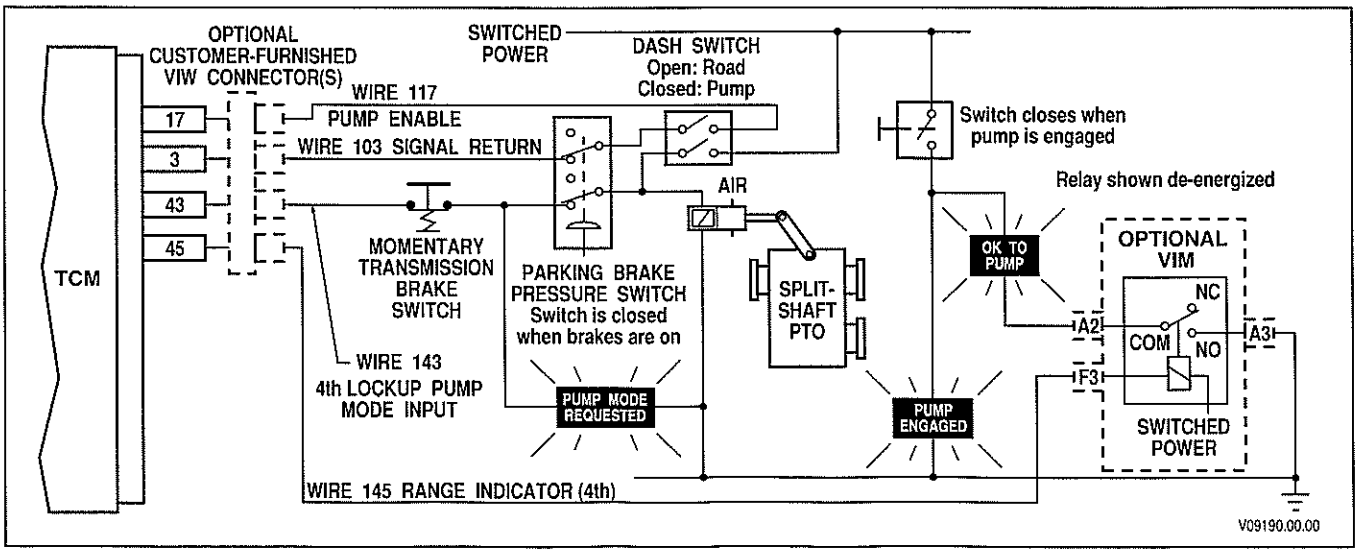


Figure P–39. Fourth Lockup Pump Mode—Operator Only Activated (Non-North America)

APPENDIX P—INPUT/OUTPUT FUNCTIONS

WARNING!

These schematics show the intended use of the specified controls features which have been validated in the configuration shown. Any miswiring or use of these features which differs from that shown could result in damage to equipment or property, personal injury, or loss of life. ALLISON TRANSMISSION IS NOT LIABLE FOR THE CONSEQUENCES ASSOCIATED WITH MISWIRING OR UNINTENDED USE OF THESE FEATURES.

INPUT FUNCTION AK. AUTOMATIC NEUTRAL—DUAL INPUT WITH SERVICE BRAKE STATUS—AUTOMATED SIDE LOADER ACTIVATED

USES: Provides for automatic selection of NEUTRAL and activation of fast idle when loading arm is activated. Automatically re-engages transmission when loading arm is retracted if service brake is depressed. Only re-engagement of forward is allowed. Reverse is not re-engaged.

VARIABLES TO SPECIFY: Max output rpm to enable Neutral, max engine rpm for PTO engagement, max engine rpm for PTO operation, max output rpm for PTO engagement, max output rpm for PTO operation.

VOCATIONS: Refuse packer, recycling truck

WARNING!

This feature is meant to be used in applications where the vehicle operator remains in the cab. If the operator leaves the vehicle, the park brake must be engaged and Neutral must be selected prior to the operator exiting the cab. In addition, vehicles using this feature must have the following Warning sticker visible in the vehicle cab: "WARNING: Set Park Brake and select Neutral before exiting cab!"

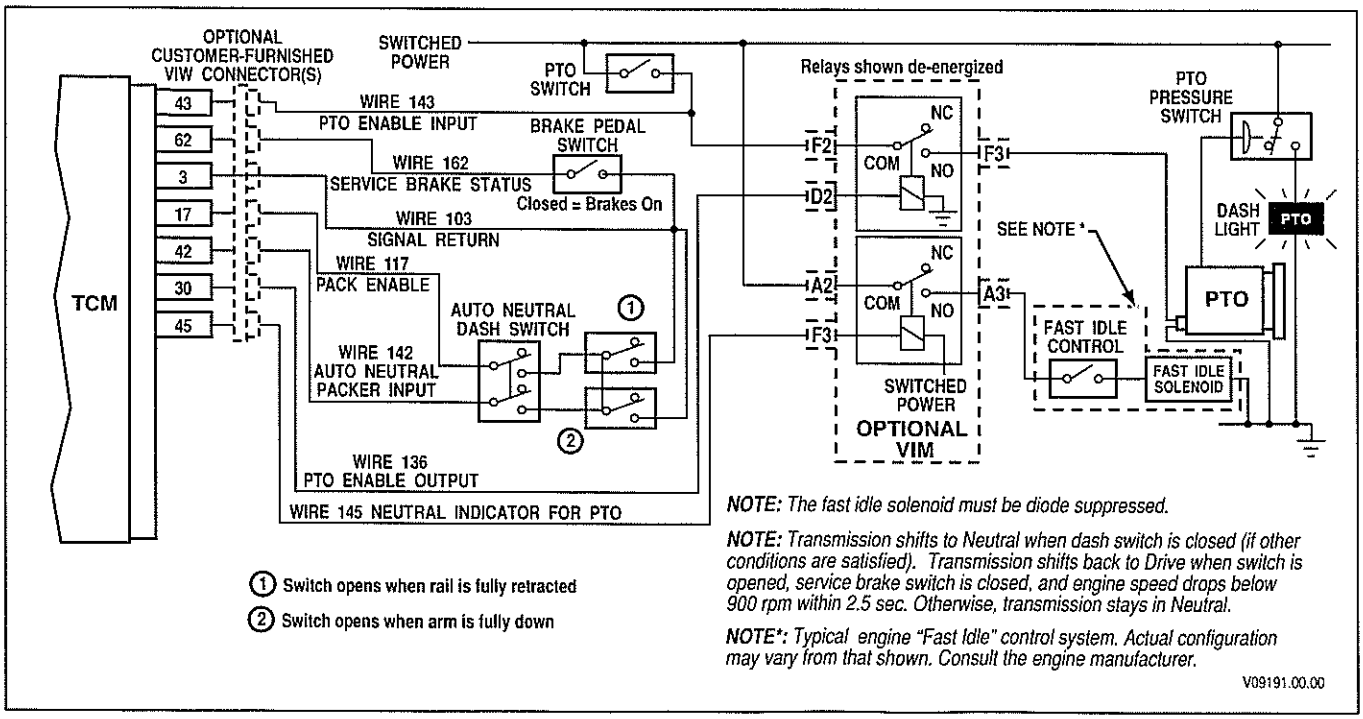


Figure P–40. Automatic Neutral—Dual Input With Service Brake Status—Automated Side Loader Activated

APPENDIX P—INPUT/OUTPUT FUNCTIONS

WARNING!

These schematics show the intended use of the specified controls features which have been validated in the configuration shown. Any miswiring or use of these features which differs from that shown could result in damage to equipment or property, personal injury, or loss of life. ALLISON TRANSMISSION IS NOT LIABLE FOR THE CONSEQUENCES ASSOCIATED WITH MISWIRING OR UNINTENDED USE OF THESE FEATURES.

INPUT FUNCTION AK. AUTOMATIC NEUTRAL—DUAL INPUT WITH SERVICE BRAKE STATUS—DASH SWITCH ACTIVATED

USES: Provides for selection of NEUTRAL and enabling fast idle through activation of a dash mounted switch. Automatically re-engages transmission when switch is opened if service brake is depressed Only re-engagement of forward is allowed. Reverse is not re-engaged.

VARIABLES TO SPECIFY: Max output rpm to enable Neutral, max engine rpm for PTO engagement, max engine rpm for PTO operation, max output rpm for PTO engagement, max output rpm for PTO operation.

VOCATIONS: Refuse packer, recycling truck

WARNING!

This feature is meant to be used in applications where the vehicle operator remains in the cab. If the operator leaves the vehicle, the park brake must be engaged and Neutral must be selected prior to the operator exiting the cab. In addition, vehicles using this feature must have the following Warning sticker visible in the vehicle cab: "WARNING: Set Park Brake and select Neutral before exiting cab!"

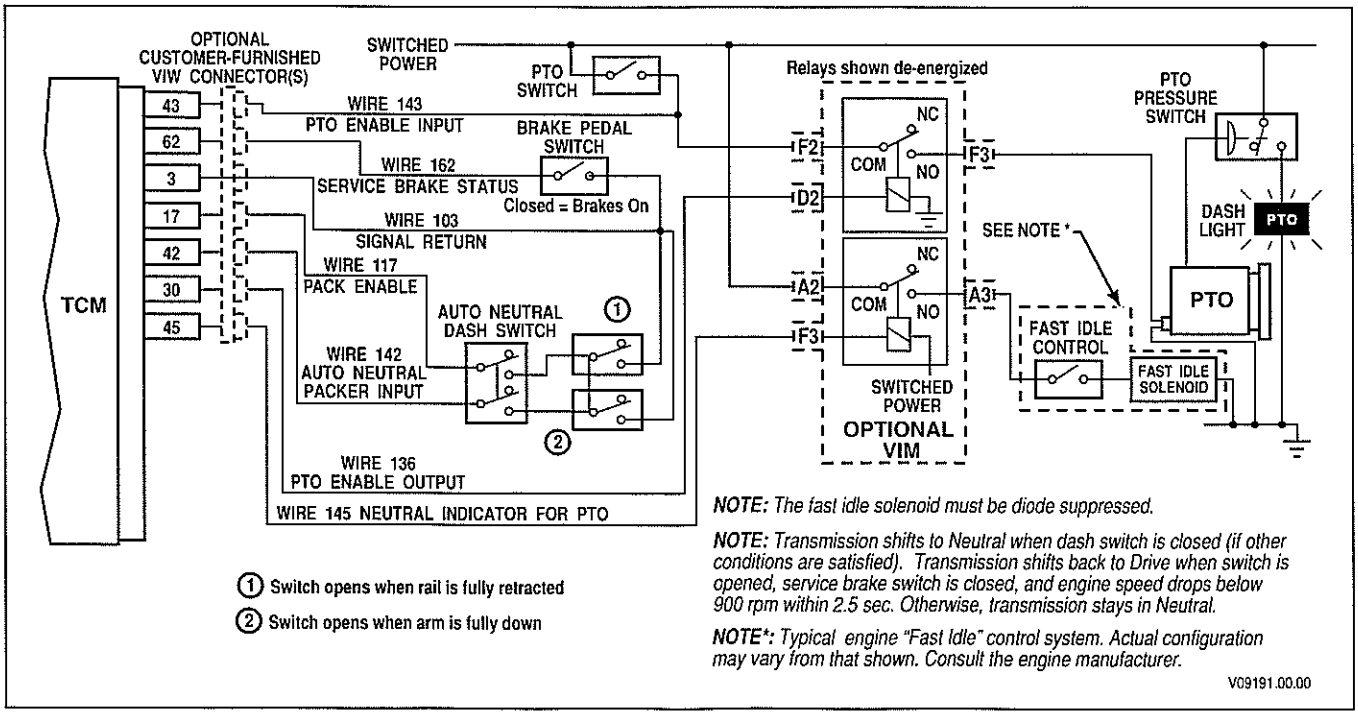


Figure P–41. Automatic Neutral—Dual Input With Service Brake Status—Dash Switch Activated

APPENDIX P—INPUT/OUTPUT FUNCTIONS

WARNING! **These schematics show the intended use of the specified controls features which have been validated in the configuration shown. Any miswiring or use of these features which differs from that shown could result in damage to equipment or property, personal injury, or loss of life. ALLISON TRANSMISSION IS NOT LIABLE FOR THE CONSEQUENCES ASSOCIATED WITH MISWIRING OR UNINTENDED USE OF THESE FEATURES.**

INPUT FUNCTION AK. AUTOMATIC NEUTRAL—DUAL INPUT WITH SERVICE BRAKE STATUS—PARK BRAKE ACTIVATED

USES: Provides for automatic selection of NEUTRAL and activation of PTO when park brake is applied. Automatically re-engages transmission when park brake is released (if service brake is depressed). Only re-engagement of forward is permitted. Reverse is not re-engaged.

VARIABLES TO SPECIFY: Max output rpm to enable Neutral, max engine rpm for PTO engagement, max engine rpm for PTO operation, max output rpm for PTO engagement, max output rpm for PTO operation.

VOCATIONS: Refuse packer, recycling truck, emergency equipment.

NOTE: ***This function is also available with emergency equipment calibration features.***

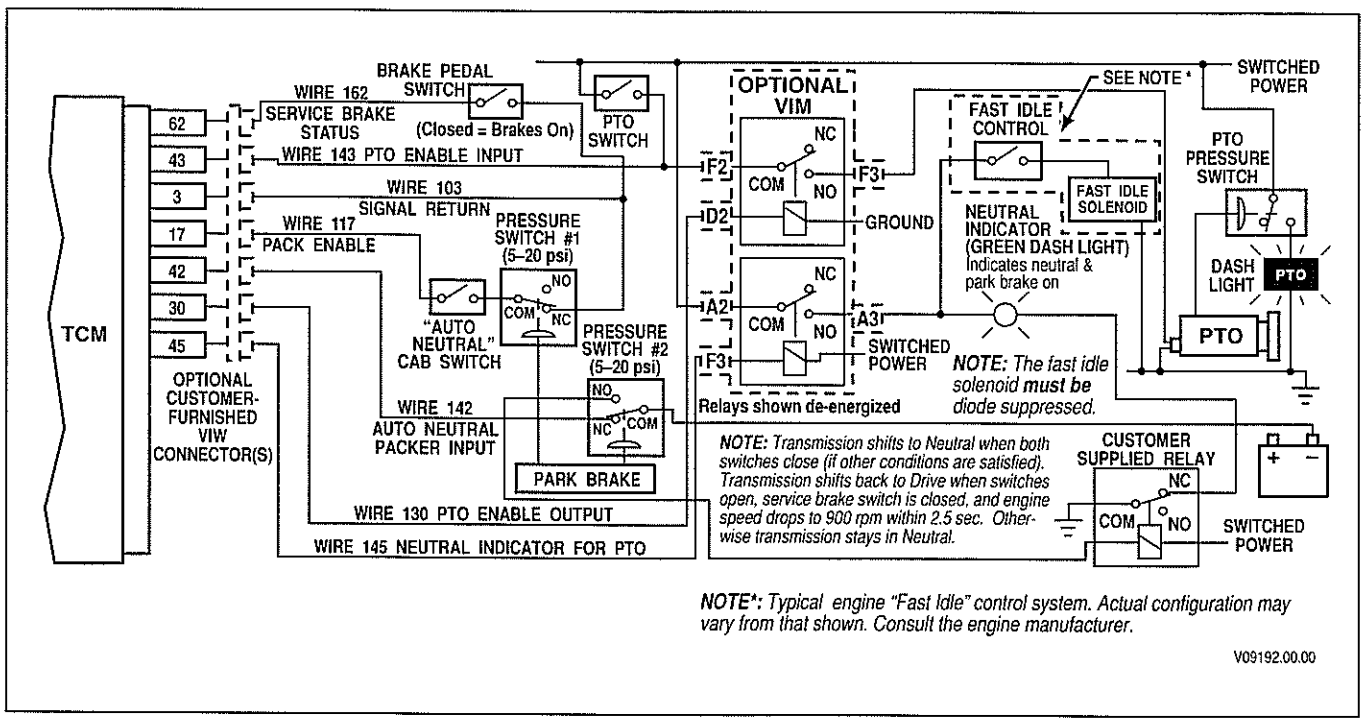


Figure P–42. Automatic Neutral—Dual Input With Service Brake Status—Park Brake Activated

APPENDIX P—INPUT/OUTPUT FUNCTIONS

WARNING!

These schematics show the intended use of the specified controls features which have been validated in the configuration shown. Any miswiring or use of these features which differs from that shown could result in damage to equipment or property, personal injury, or loss of life. ALLISON TRANSMISSION IS NOT LIABLE FOR THE CONSEQUENCES ASSOCIATED WITH MISWIRING OR UNINTENDED USE OF THESE FEATURES.

INPUT FUNCTION AK. AUTOMATIC NEUTRAL—DUAL INPUT WITH SERVICE BRAKE STATUS—WORK BRAKE ACTIVATED

USES: Provides for automatic selection of NEUTRAL and activation of PTO when work brake is applied. Automatically re-engages transmission when work brake is released (if service brake is depressed). Only re-engagement of forward is permitted. Reverse is not re-engaged.

VARIABLES TO SPECIFY: Max output rpm to enable Neutral, max engine rpm for PTO engagement, max engine rpm for PTO operation, max output rpm for PTO engagement, max output rpm for PTO operation.

VOCATIONS: Refuse packer, recycling truck

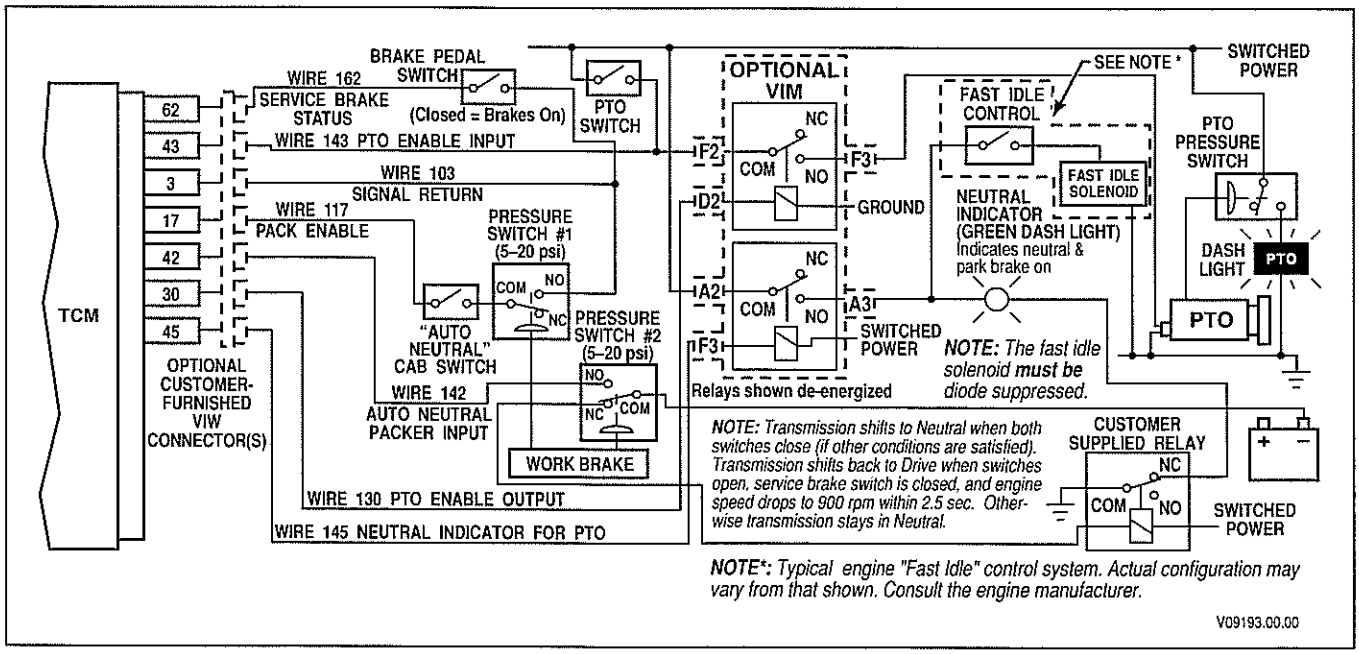


Figure P–43. Automatic Neutral—Dual Input With Service Brake Status—Work Brake Activated

APPENDIX P—INPUT/OUTPUT FUNCTIONS

WARNING!

These schematics show the intended use of the specified controls features which have been validated in the configuration shown. Any miswiring or use of these features which differs from that shown could result in damage to equipment or property, personal injury, or loss of life. ALLISON TRANSMISSION IS NOT LIABLE FOR THE CONSEQUENCES ASSOCIATED WITH MISWIRING OR UNINTENDED USE OF THESE FEATURES.

INPUT FUNCTION AK. INPUT FUNCTION AK.AUTOMATIC NEUTRAL—DUAL INPUT WITH SERVICE BRAKE STATUS—EMERGENCY VEHICLE OPTION

USES: Provides for automatic selection of NEUTRAL when park brake is applied. Reselection of DRIVE or REVERSE is required. The transmission does not shift out of Neutral when park brake is released, as with other variations of Function AK.

VARIABLES TO SPECIFY: Max output rpm to enable Neutral.

VOCATIONS: Emergency vehicles

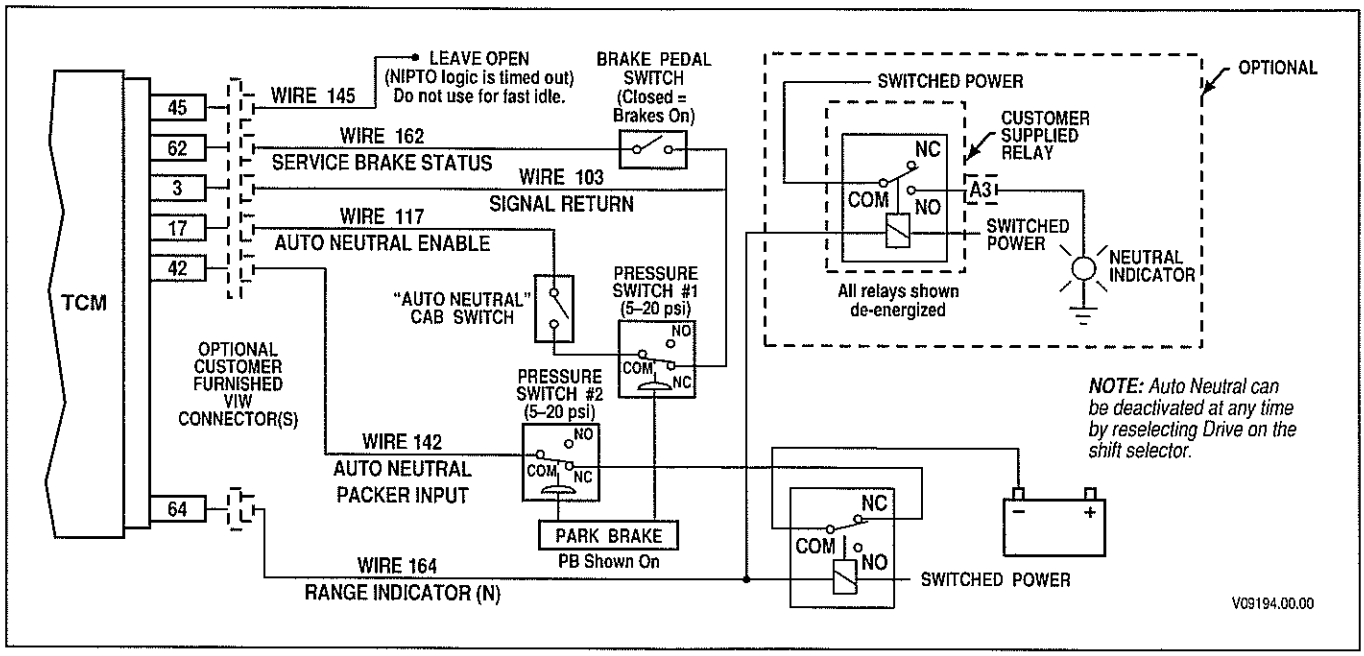


Figure P–44. Automatic Neutral—Dual Input With Service Brake Status—Emergency Vehicle Option

APPENDIX P—INPUT/OUTPUT FUNCTIONS

WARNING!

These schematics show the intended use of the specified controls features which have been validated in the configuration shown. Any miswiring or use of these features which differs from that shown could result in damage to equipment or property, personal injury, or loss of life. ALLISON TRANSMISSION IS NOT LIABLE FOR THE CONSEQUENCES ASSOCIATED WITH MISWIRING OR UNINTENDED USE OF THESE FEATURES.

INPUT FUNCTION AL. SHIFT SELECTOR TRANSITION AND SECONDARY SHIFT SCHEDULE WITHOUT AUTO NEUTRAL

USES: Provides for operator selection of dual shift selectors and shift schedules. Primary mode will always be active when shift selector 1 is selected, and secondary mode will always be active when shift selector 2 is selected.

VARIABLES TO SPECIFY: None

VOCATIONS: Dual-station refuse vehicles, crane carrier

WARNING!

If this function is enabled in the shift calibration, the function MUST be integrated into the vehicle wiring. If the function is available in the shift calibration but will not be used in the vehicle, it MUST be disabled in the calibration.

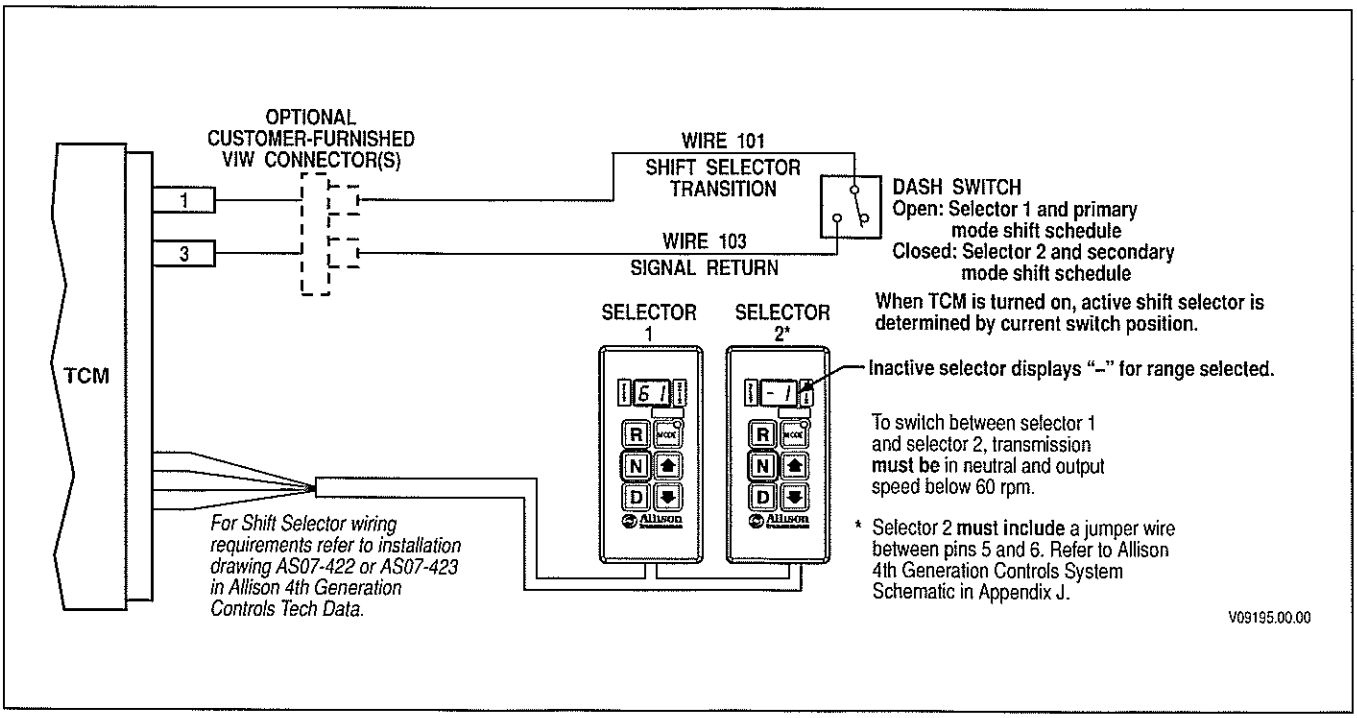


Figure P–45. Shift Selector Transition and Secondary Shift Schedule Without Auto Neutral

APPENDIX P—INPUT/OUTPUT FUNCTIONS

WARNING!

These schematics show the intended use of the specified controls features which have been validated in the configuration shown. Any miswiring or use of these features which differs from that shown could result in damage to equipment or property, personal injury, or loss of life. ALLISON TRANSMISSION IS NOT LIABLE FOR THE CONSEQUENCES ASSOCIATED WITH MISWIRING OR UNINTENDED USE OF THESE FEATURES.

INPUT FUNCTION AL. SHIFT SELECTOR TRANSITION AND SECONDARY SHIFT SCHEDULE WITH AUTO NEUTRAL

USES: Provides for operator selection of dual shift selectors and shift schedules. Primary mode will always be active when shift selector 1 is selected, and secondary mode will always be active when shift selector 2 is selected.

VARIABLES TO SPECIFY: None

VOCATIONS: Dual-station refuse vehicles

WARNING!

If this function is enabled in the shift calibration, the function MUST be integrated into the vehicle wiring. If the function is available in the shift calibration but will not be used in the vehicle, it MUST be disabled in the calibration.

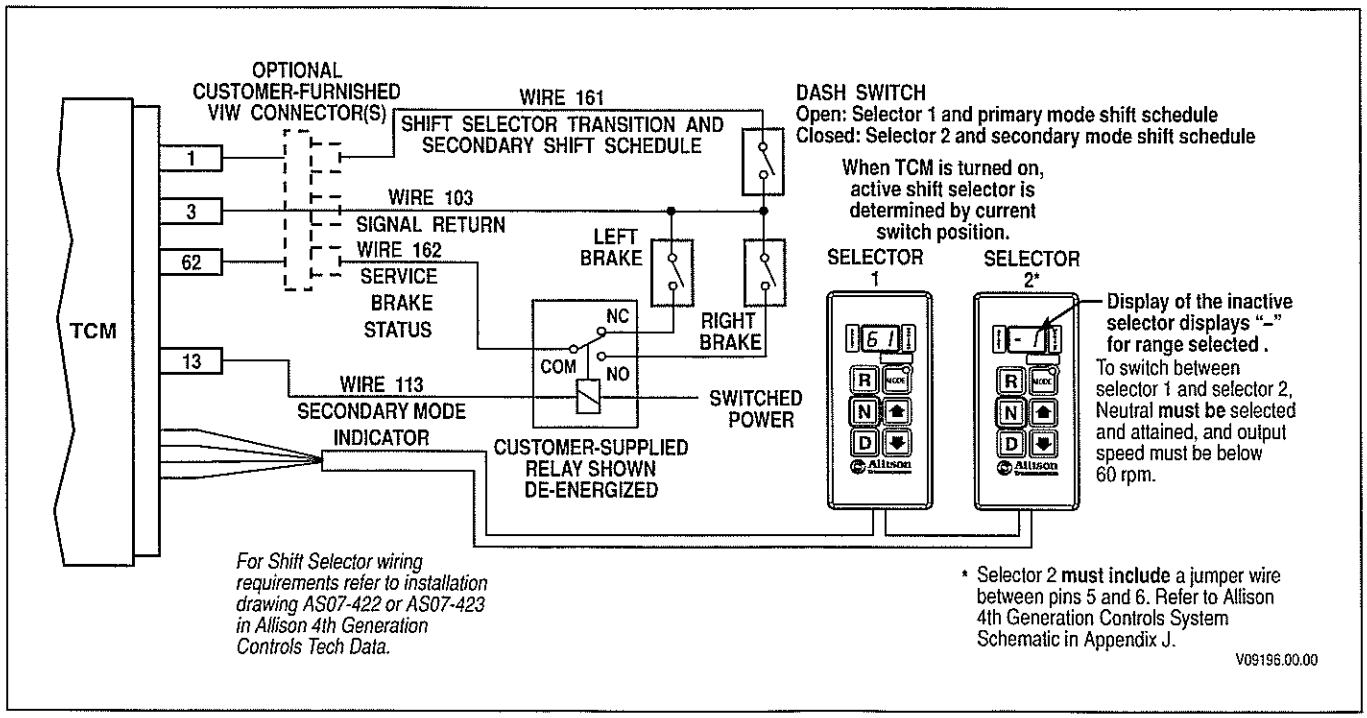


Figure P–46. Shift Selector Transition and Secondary Shift Schedule With Auto Neutral

APPENDIX P—INPUT/OUTPUT FUNCTIONS

WARNING!

These schematics show the intended use of the specified controls features which have been validated in the configuration shown. Any miswiring or use of these features which differs from that shown could result in damage to equipment or property, personal injury, or loss of life. ALLISON TRANSMISSION IS NOT LIABLE FOR THE CONSEQUENCES ASSOCIATED WITH MISWIRING OR UNINTENDED USE OF THESE FEATURES.

INPUT FUNCTION AM. REFUSE PACKER STEP SWITCH

USES: Limit operation of transmission to first range and inhibit reverse with presence of personnel on rear of vehicle.

VARIABLES TO SPECIFY: None

VOCATIONS: Refuse

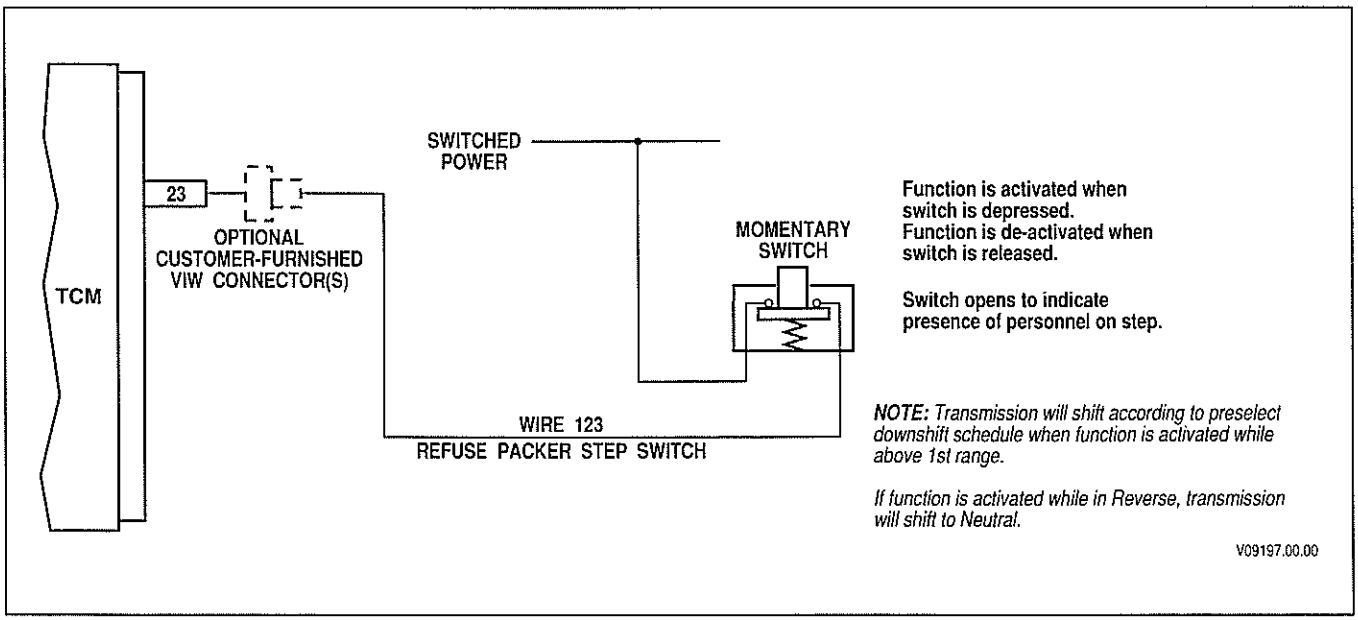


Figure P–47. Refuse Packer Step Switch

APPENDIX P—INPUT/OUTPUT FUNCTIONS

WARNING!

These schematics show the intended use of the specified controls features which have been validated in the configuration shown. Any miswiring or use of these features which differs from that shown could result in damage to equipment or property, personal injury, or loss of life. ALLISON TRANSMISSION IS NOT LIABLE FOR THE CONSEQUENCES ASSOCIATED WITH MISWIRING OR UNINTENDED USE OF THESE FEATURES.

INPUT FUNCTION AQ. SELECTOR DISPLAY BLANKING

USES: Blanks the digital display and mode on indicator on the lever or pushbutton shift selectors.

VARIABLES TO SPECIFY: None

VOCATIONS: Military wheeled vehicles

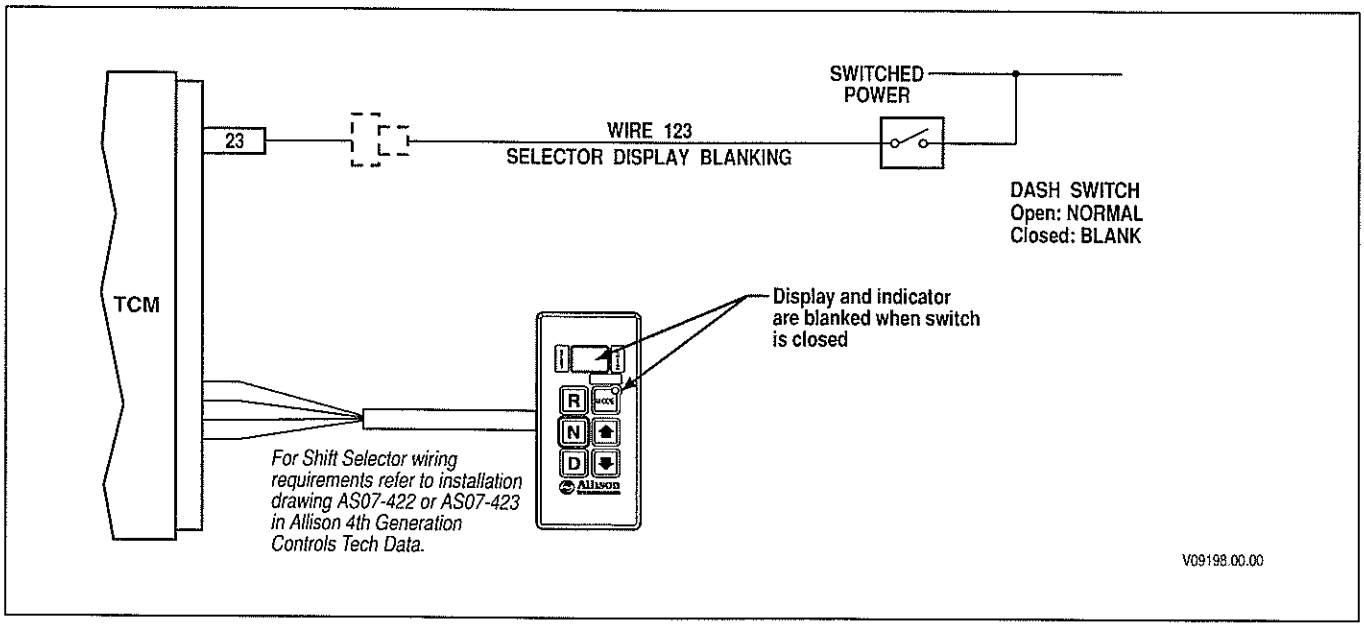


Figure P–48. Selector Display Blanking

APPENDIX P—INPUT/OUTPUT FUNCTIONS

WARNING! **These schematics show the intended use of the specified controls features which have been validated in the configuration shown. Any miswiring or use of these features which differs from that shown could result in damage to equipment or property, personal injury, or loss of life. ALLISON TRANSMISSION IS NOT LIABLE FOR THE CONSEQUENCES ASSOCIATED WITH MISWIRING OR UNINTENDED USE OF THESE FEATURES.**

INPUT FUNCTION AS. REDUCED ENGINE LOAD AT STOP (RELS)

USES: Automatically activates Reduced Engine Load at Stop (RELS) when vehicle service brakes are applied, vehicle is stopped, and throttle is closed. RELS deactivates when the service brakes are released, or the throttle is advanced, or Drive is selected at the shift selector. If an "Automatic Neutral" input is activated, RELS will be deactivated.

VARIABLES TO SPECIFY: None

VOCATIONS: Buses, coach, and on-highway trucks. Use of this function is not permitted in refuse vehicles, concrete mixers, or emergency vehicles. This feature is also not available in applications that utilize second-range start shift calibrations.

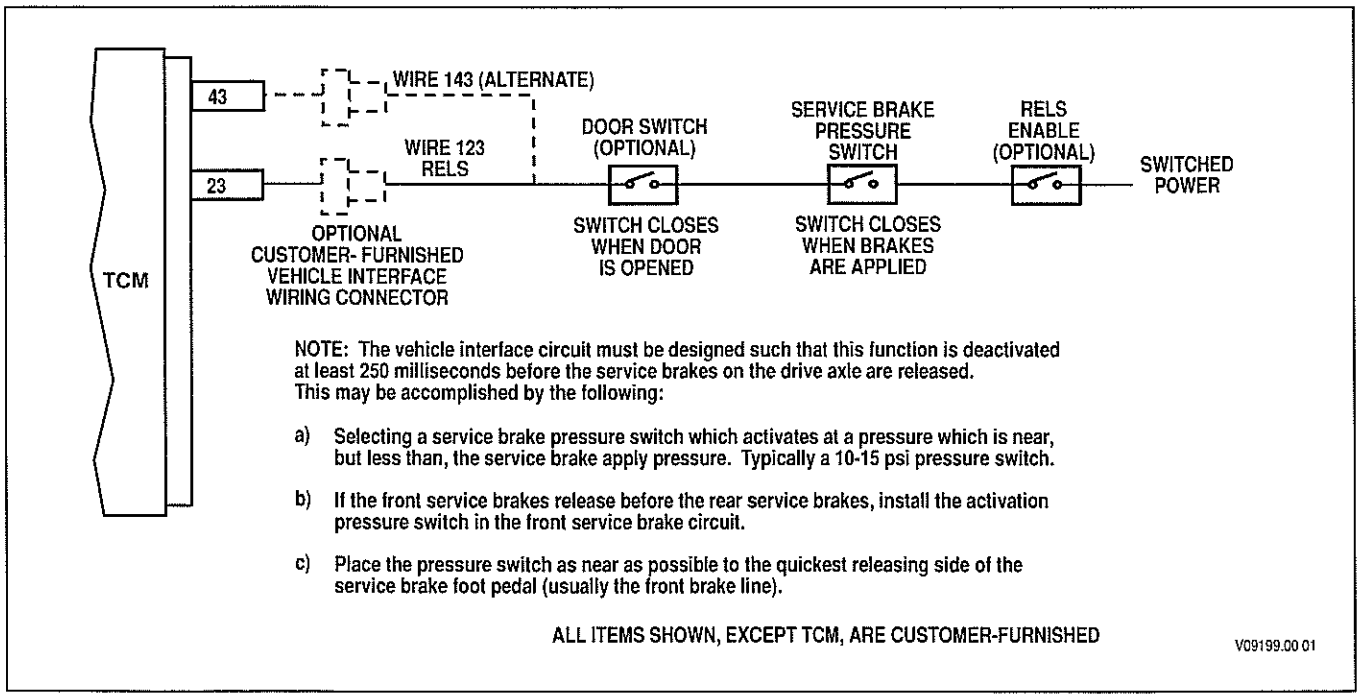


Figure P–49. Reduced Engine Load at Stops (RELS)

APPENDIX P—INPUT/OUTPUT FUNCTIONS

WARNING!

These schematics show the intended use of the specified controls features which have been validated in the configuration shown. Any miswiring or use of these features which differs from that shown could result in damage to equipment or property, personal injury, or loss of life. ALLISON TRANSMISSION IS NOT LIABLE FOR THE CONSEQUENCES ASSOCIATED WITH MISWIRING OR UNINTENDED USE OF THESE FEATURES.

INPUT FUNCTION BB. RELS WITH SERVICE BRAKE STATUS

USES: Combines functions AA and As on a single wire.

VARIABLES TO SPECIFY: None

VOCATIONS: Transit bus and tour coach

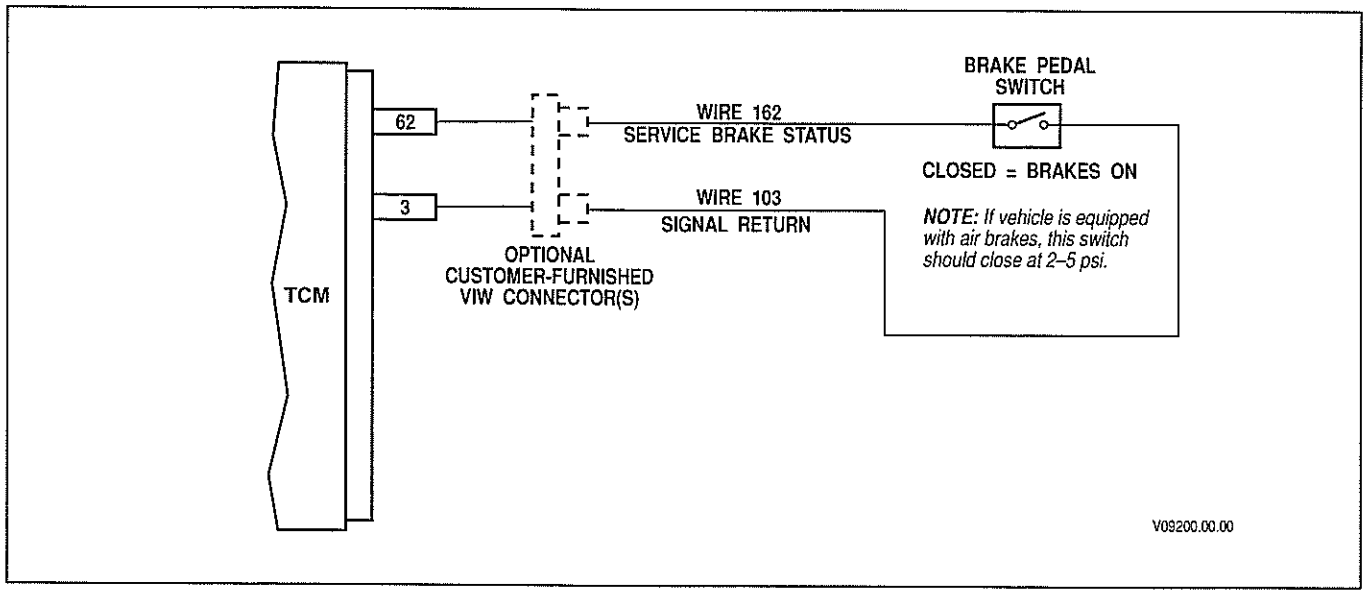


Figure P–50. RELS With Service Brake Status

APPENDIX P—INPUT/OUTPUT FUNCTIONS

WARNING!

These schematics show the intended use of the specified controls features which have been validated in the configuration shown. Any miswiring or use of these features which differs from that shown could result in damage to equipment or property, personal injury, or loss of life. ALLISON TRANSMISSION IS NOT LIABLE FOR THE CONSEQUENCES ASSOCIATED WITH MISWIRING OR UNINTENDED USE OF THESE FEATURES.

INPUT FUNCTION BD. AUTO 2–1 PRESELECT FOR 7-SPEED

USES: Military vehicles and commercial heavy equipment transporters (HET) to help prevent transmission overheating. Allows an automatic 2–1 shift in a 7-speed if conditions are conducive to successfully completing the shift.

VARIABLES TO SPECIFY: None

VOCATIONS: Various

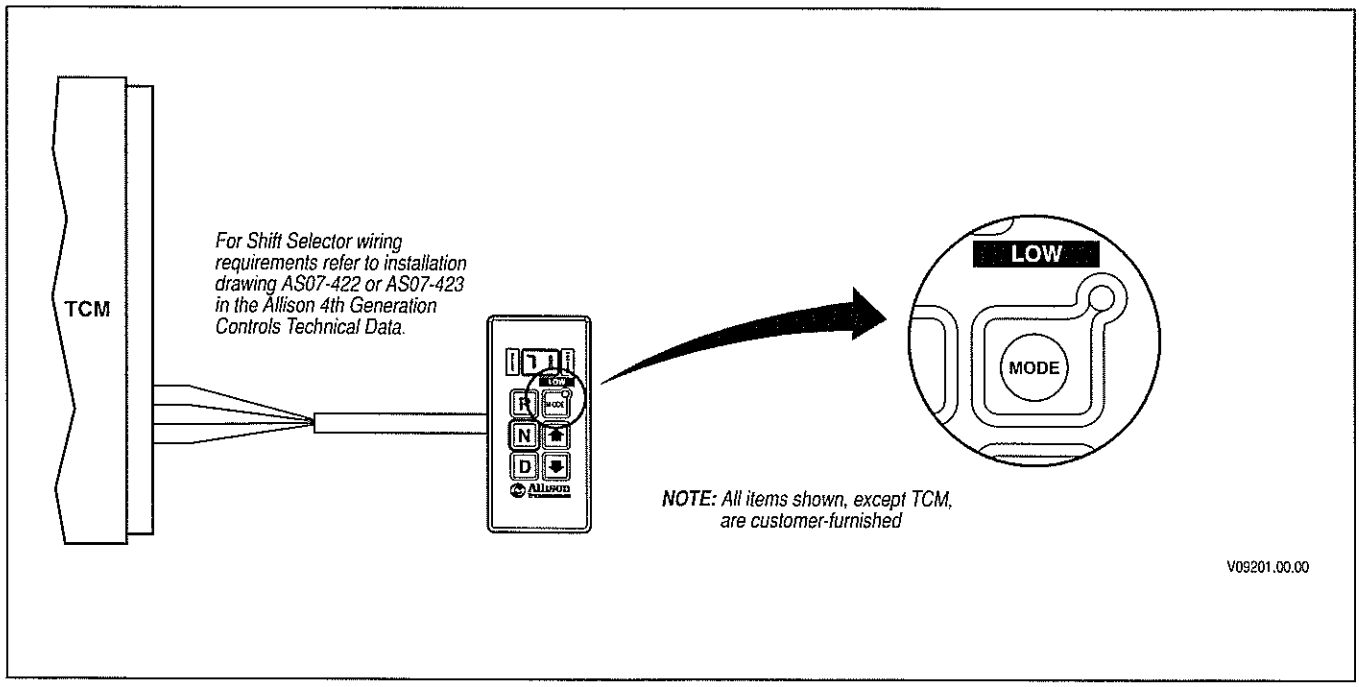


Figure P–51. Auto 2–1 Preselect For 7-speed

APPENDIX P—INPUT/OUTPUT FUNCTIONS

WARNING!

These schematics show the intended use of the specified controls features which have been validated in the configuration shown. Any miswiring or use of these features which differs from that shown could result in damage to equipment or property, personal injury, or loss of life. ALLISON TRANSMISSION IS NOT LIABLE FOR THE CONSEQUENCES ASSOCIATED WITH MISWIRING OR UNINTENDED USE OF THESE FEATURES.

OUTPUT FUNCTION A. ENGINE BRAKE ENABLE

USES: Used with engine brakes to signal the ECU that the brake is active and to provide increased braking by preselecting a lower range. Also prevents engagement of engine brake with throttle > 0 or lockup OFF.

VARIABLES TO SPECIFY: Preselect range. Standard value is second range.

VOCATIONS: Various

Refer to "*Inputs H and I: Engine Brake Enable and Preselect Request.*" This output is inverted when used with Input H.

APPENDIX P—INPUT/OUTPUT FUNCTIONS

WARNING!

These schematics show the intended use of the specified controls features which have been validated in the configuration shown. Any miswiring or use of these features which differs from that shown could result in damage to equipment or property, personal injury, or loss of life. ALLISON TRANSMISSION IS NOT LIABLE FOR THE CONSEQUENCES ASSOCIATED WITH MISWIRING OR UNINTENDED USE OF THESE FEATURES.

OUTPUT FUNCTION B. SUMP/RETARDER TEMPERATURE INDICATOR

USES: Turn on dash indicator when transmission sump or retarder-out temperature has exceeded specified limits.

VARIABLES TO SPECIFY: None

VOCATIONS: Various

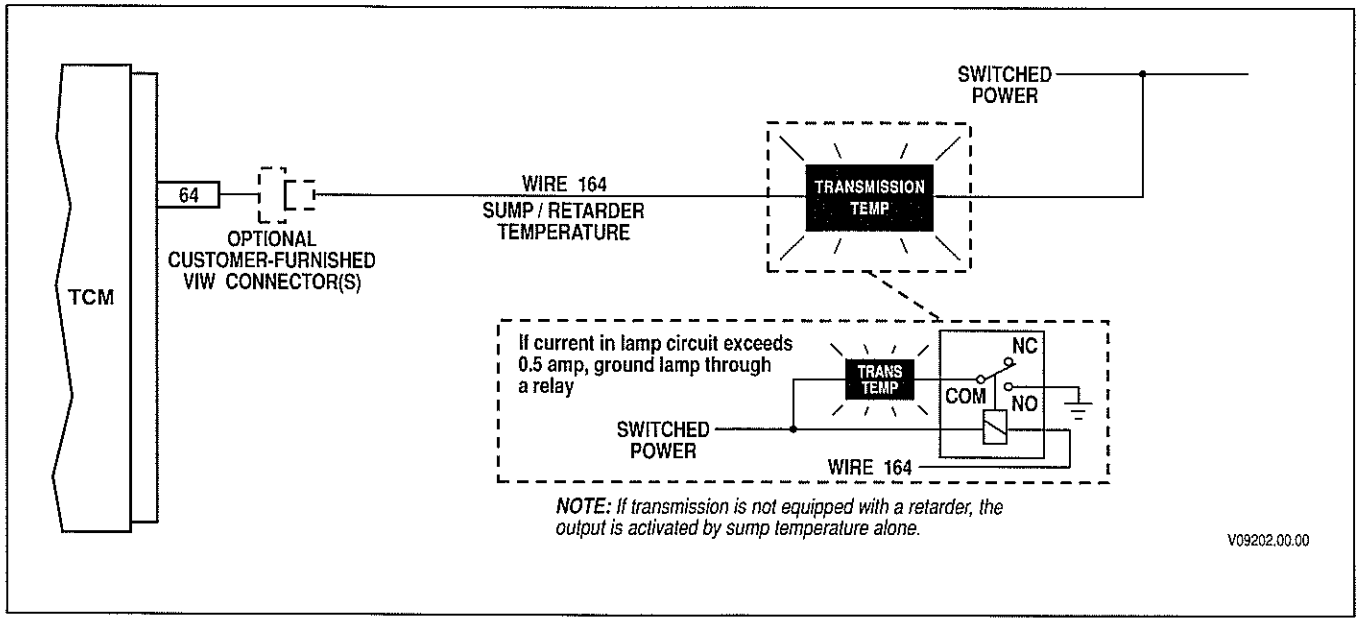


Figure P–52. Sump/Retarder Temperature Indicator

This function can be provided by a J-1939 message.

APPENDIX P—INPUT/OUTPUT FUNCTIONS

WARNING!

These schematics show the intended use of the specified controls features which have been validated in the configuration shown. Any miswiring or use of these features which differs from that shown could result in damage to equipment or property, personal injury, or loss of life. ALLISON TRANSMISSION IS NOT LIABLE FOR THE CONSEQUENCES ASSOCIATED WITH MISWIRING OR UNINTENDED USE OF THESE FEATURES.

OUTPUT FUNCTION C. RANGE INDICATOR

USES: Used with auxiliary vehicle systems to permit operation only in specified transmission range(s).

VARIABLES TO SPECIFY: Range or ranges to be indicated

VOCATIONS: Various

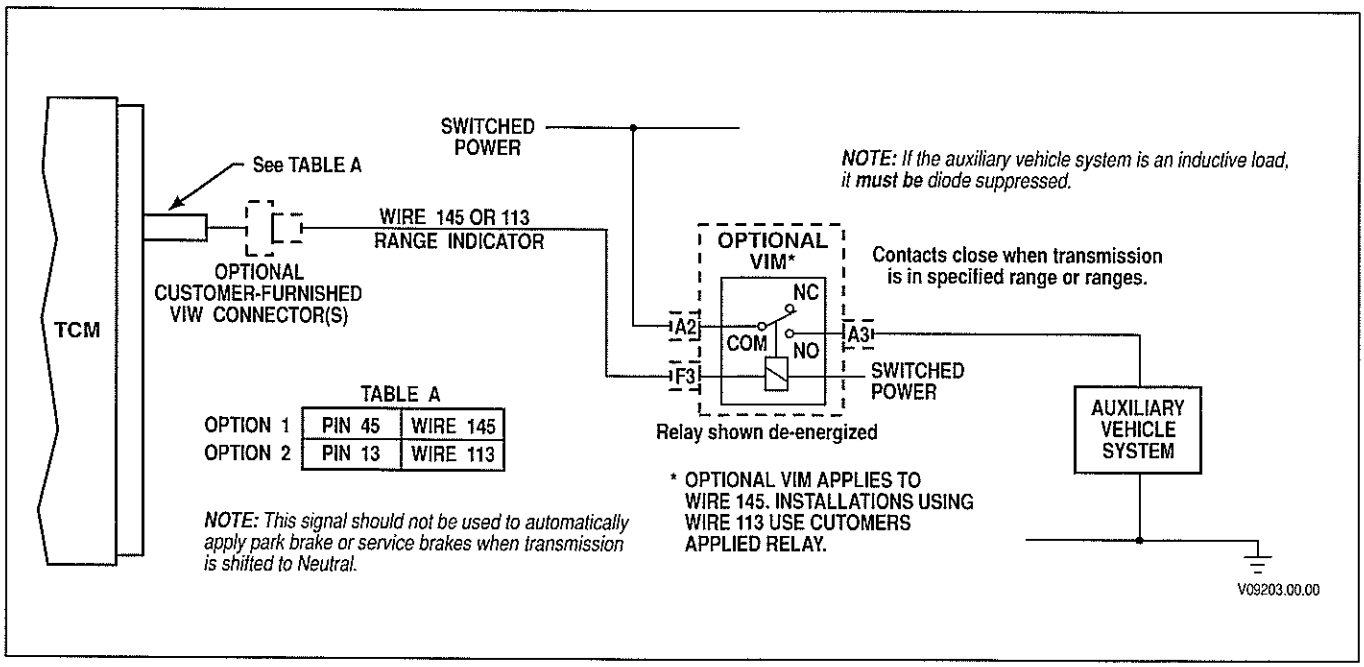


Figure P–53. Range Indicator

This function can be provided by a J1939 message.

APPENDIX P—INPUT/OUTPUT FUNCTIONS

WARNING!

These schematics show the intended use of the specified controls features which have been validated in the configuration shown. Any miswiring or use of these features which differs from that shown could result in damage to equipment or property, personal injury, or loss of life. ALLISON TRANSMISSION IS NOT LIABLE FOR THE CONSEQUENCES ASSOCIATED WITH MISWIRING OR UNINTENDED USE OF THESE FEATURES.

OUTPUT FUNCTION D. OUTPUT SPEED INDICATOR—A (SWITCHED TO GROUND)

USES: To signal that the transmission output shaft has exceeded a specified value.

VARIABLES TO SPECIFY: Rpm to turn output ON and to turn output OFF. The ON value must be higher than the OFF value.

VOCATIONS: Various

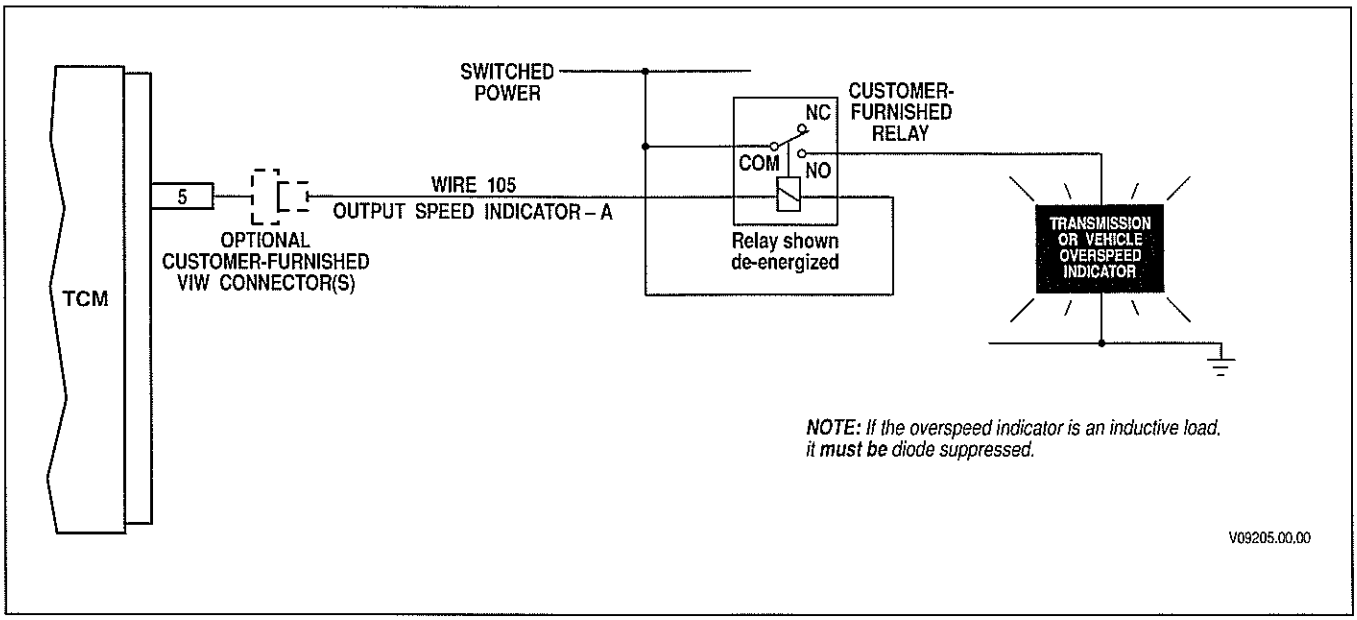


Figure P–54. Output Speed Indicator—A (Switched to Ground)

APPENDIX P—INPUT/OUTPUT FUNCTIONS

WARNING!

These schematics show the intended use of the specified controls features which have been validated in the configuration shown. Any miswiring or use of these features which differs from that shown could result in damage to equipment or property, personal injury, or loss of life. ALLISON TRANSMISSION IS NOT LIABLE FOR THE CONSEQUENCES ASSOCIATED WITH MISWIRING OR UNINTENDED USE OF THESE FEATURES.

OUTPUT FUNCTION D. OUTPUT SPEED INDICATOR—A (SWITCHED TO POWER)

USES: To signal that the transmission output shaft has exceeded a specified value.

VARIABLES TO SPECIFY: Rpm to turn ON output and to turn OFF output. The ON value must be higher than the OFF value.

VOCATIONS: Various

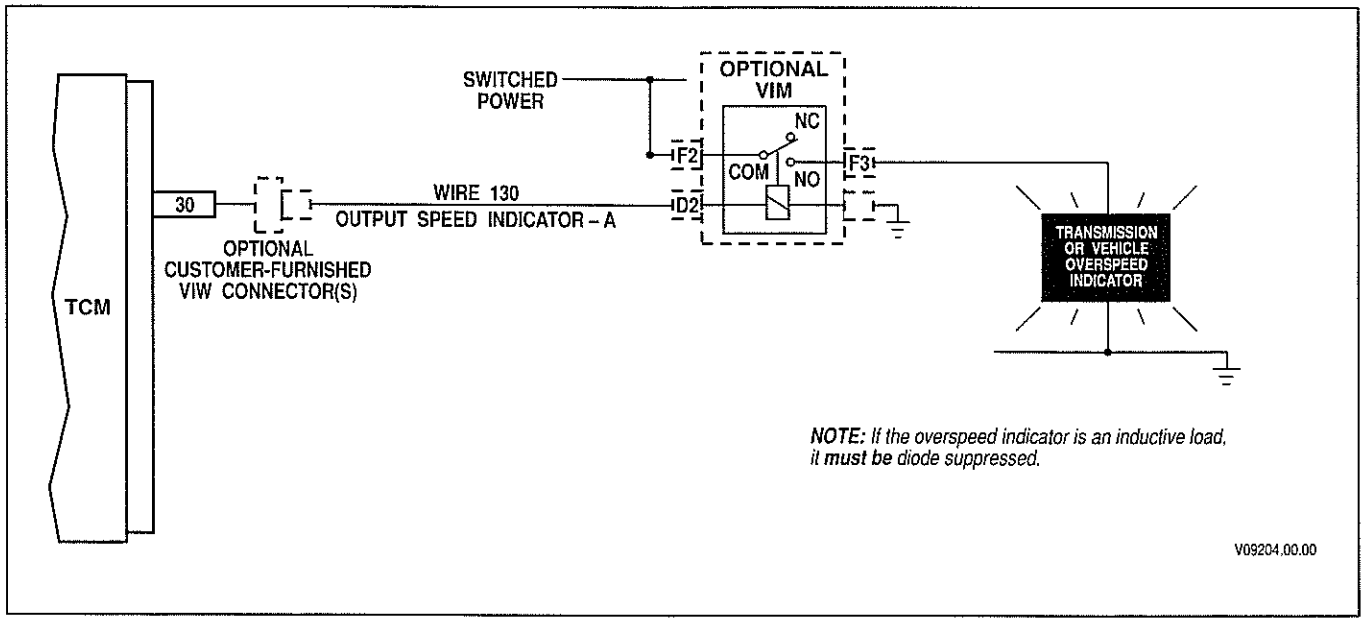


Figure P–55. Output Speed Indicator—A (Switched to Power)

APPENDIX P—INPUT/OUTPUT FUNCTIONS

WARNING!

These schematics show the intended use of the specified controls features which have been validated in the configuration shown. Any miswiring or use of these features which differs from that shown could result in damage to equipment or property, personal injury, or loss of life. ALLISON TRANSMISSION IS NOT LIABLE FOR THE CONSEQUENCES ASSOCIATED WITH MISWIRING OR UNINTENDED USE OF THESE FEATURES.

OUTPUT FUNCTION E. OUTPUT SPEED INDICATOR—B

USES: To signal that the transmission output shaft has exceeded a specified value.

VARIABLES TO SPECIFY: Rpm to turn ON output and to turn OFF output. The ON value must be higher than the OFF value.

VOCATIONS: Various

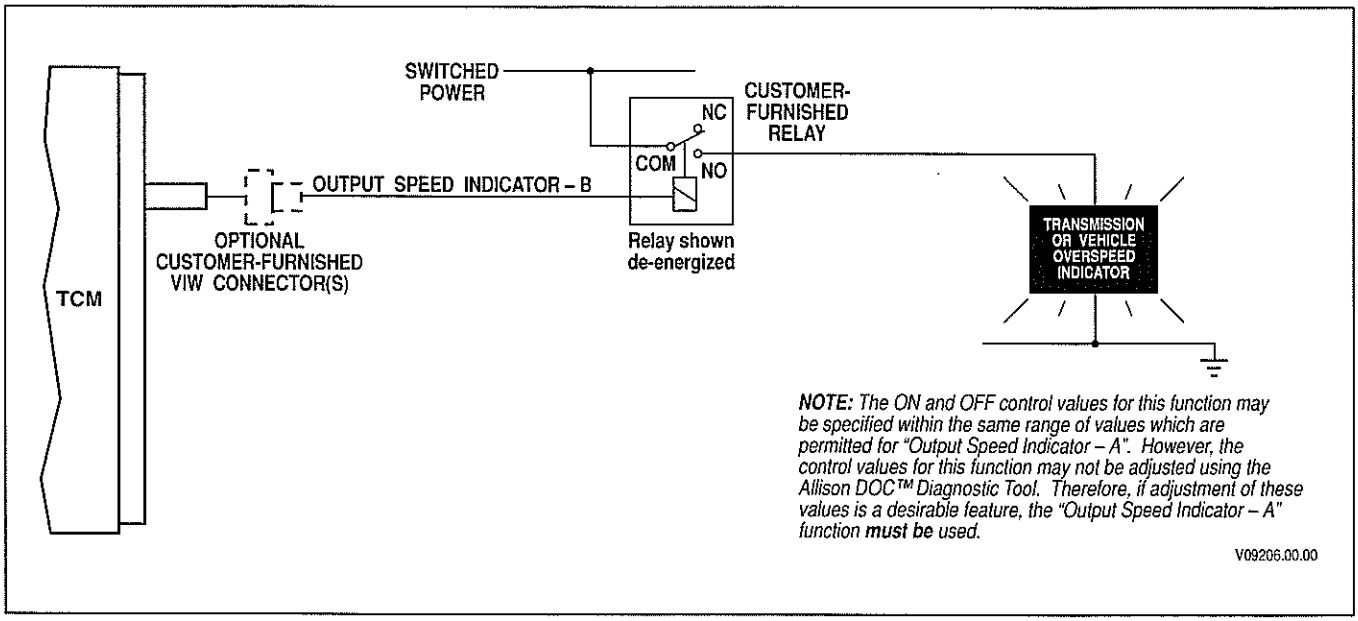


Figure P–56. Output Speed Indicator—B

This function can be provided by a J1939 message.

APPENDIX P—INPUT/OUTPUT FUNCTIONS

WARNING!

These schematics show the intended use of the specified controls features which have been validated in the configuration shown. Any miswiring or use of these features which differs from that shown could cause unscheduled operation of the PTO or other unpredictable operation resulting in damage to equipment or property, personal injury, or loss of life. ALLISON TRANSMISSION IS NOT LIABLE FOR THE CONSEQUENCES ASSOCIATED WITH MISWIRING OR UNINTENDED USE OF THESE FEATURES.

INPUT FUNCTION G. PTO ENABLE

USES: Used with PTO Enable Input C. Permits PTO to be engaged only when engine speed and output speed are in allowable range and throttle is low. Also disengages PTO if speeds are exceeded.

VARIABLES TO SPECIFY: Minimum and maximum engine speed for engagement, maximum engine speed for allowable operation, minimum and maximum output speed for engagement, maximum output speed for allowable operation.

VOCATIONS: Various (with usage of PTO)

Refer to *"Input C: PTO Enable"* and *"Input AG: Automatic Neutral—Dual Input."*

APPENDIX P—INPUT/OUTPUT FUNCTIONS

WARNING!

These schematics show the intended use of the specified controls features which have been validated in the configuration shown. Any miswiring or use of these features which differs from that shown could result in damage to equipment or property, personal injury, or loss of life. ALLISON TRANSMISSION IS NOT LIABLE FOR THE CONSEQUENCES ASSOCIATED WITH MISWIRING OR UNINTENDED USE OF THESE FEATURES.

OUTPUT FUNCTION I. ENGINE OVERSPEED INDICATOR SWITCHED TO POWER

USES: To turn on dash light when engine reaches an overspeed condition.

VARIABLES TO SPECIFY: Rpm to turn ON; rpm to turn OFF.

VOCATIONS: Various

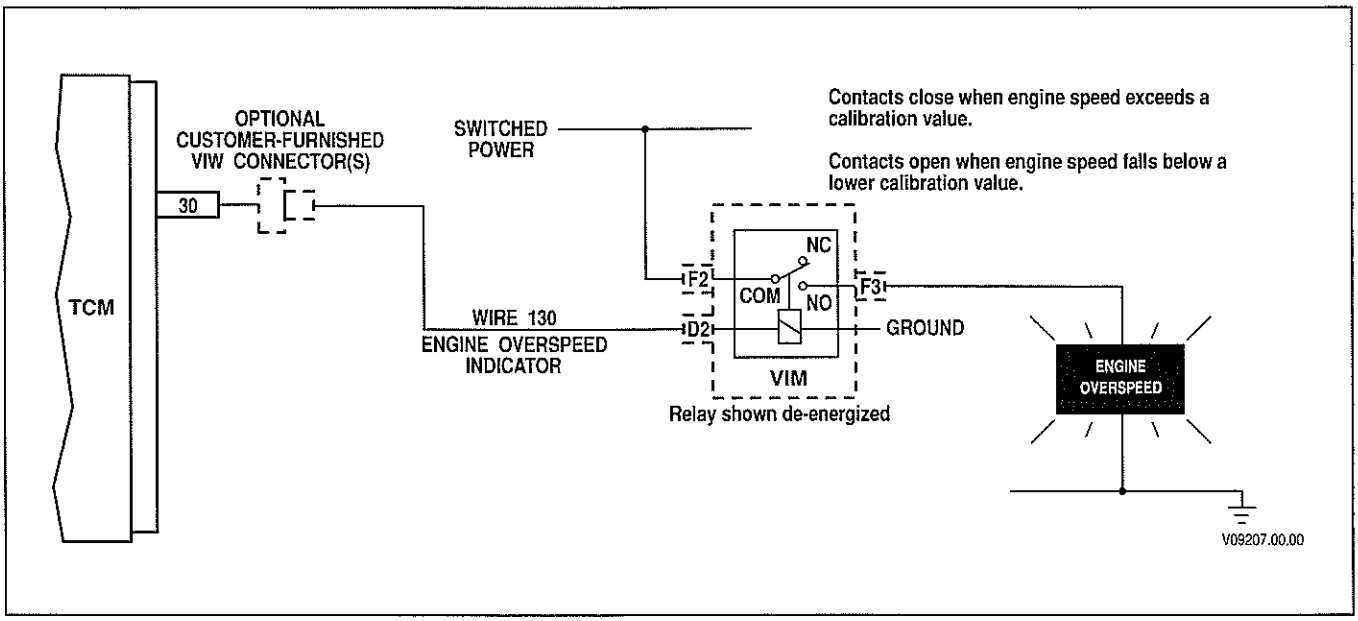


Figure P–57. Engine Overspeed Indicator Switched to Power

APPENDIX P—INPUT/OUTPUT FUNCTIONS

WARNING!

These schematics show the intended use of the specified controls features which have been validated in the configuration shown. Any miswiring or use of these features which differs from that shown could result in damage to equipment or property, personal injury, or loss of life. ALLISON TRANSMISSION IS NOT LIABLE FOR THE CONSEQUENCES ASSOCIATED WITH MISWIRING OR UNINTENDED USE OF THESE FEATURES.

OUTPUT FUNCTION I. ENGINE OVERSPEED INDICATOR WITHOUT VIM—SWITCHED TO GROUND

USES: To turn on dash light when engine reaches an overspeed condition.

VARIABLES TO SPECIFY: Rpm to turn ON; rpm to turn OFF.

VOCATIONS: Various

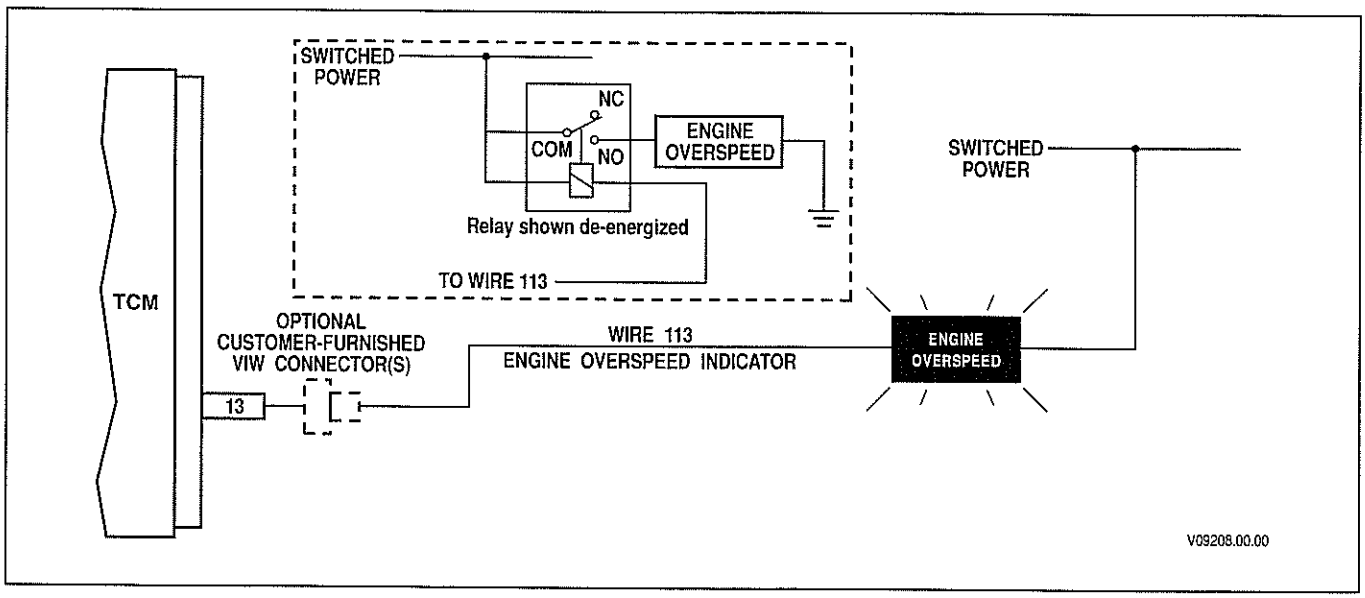


Figure P–58. Engine Overspeed Indicator Without VIM—Switched to Ground

APPENDIX P—INPUT/OUTPUT FUNCTIONS

WARNING!

These schematics show the intended use of the specified controls features which have been validated in the configuration shown. Any miswiring or use of these features which differs from that shown could result in damage to equipment or property, personal injury, or loss of life. ALLISON TRANSMISSION IS NOT LIABLE FOR THE CONSEQUENCES ASSOCIATED WITH MISWIRING OR UNINTENDED USE OF THESE FEATURES.

OUTPUT FUNCTION J. TWO SPEED AXLE ENABLE

USES: Used with Two Speed Axle Enable input to provide a speed protected engagement of low axle.

VARIABLES TO SPECIFY: None

VOCATIONS: Various

Refer to *"Input Q: Two Speed Axle Enable"*.

APPENDIX P—INPUT/OUTPUT FUNCTIONS

WARNING!

These schematics show the intended use of the specified controls features which have been validated in the configuration shown. Any miswiring or use of these features which differs from that shown could result in damage to equipment or property, personal injury, or loss of life. ALLISON TRANSMISSION IS NOT LIABLE FOR THE CONSEQUENCES ASSOCIATED WITH MISWIRING OR UNINTENDED USE OF THESE FEATURES.

OUTPUT FUNCTION K. LOCKUP INDICATOR

USES: Turn on dash indicator when transmission lockup clutch is engaged. Used to indicate when maximum engine braking is available.

VARIABLES TO SPECIFY: None

VOCATIONS: Various

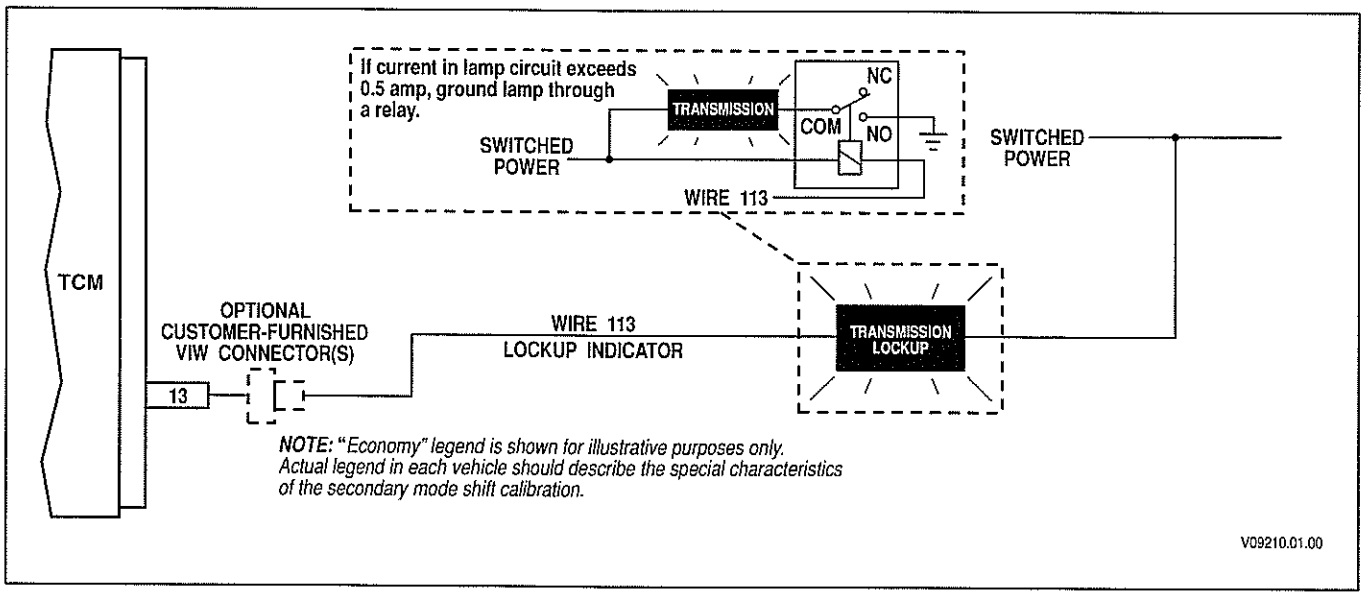


Figure P–59. Lockup Indicator

APPENDIX P—INPUT/OUTPUT FUNCTIONS

WARNING!

These schematics show the intended use of the specified controls features which have been validated in the configuration shown. Any miswiring or use of these features which differs from that shown could result in damage to equipment or property, personal injury, or loss of life. ALLISON TRANSMISSION IS NOT LIABLE FOR THE CONSEQUENCES ASSOCIATED WITH MISWIRING OR UNINTENDED USE OF THESE FEATURES.

OUTPUT FUNCTION N. SECONDARY MODE INDICATOR

USES: To indicate that Secondary Mode is active.

VARIABLES TO SPECIFY: None

VOCATIONS: Various

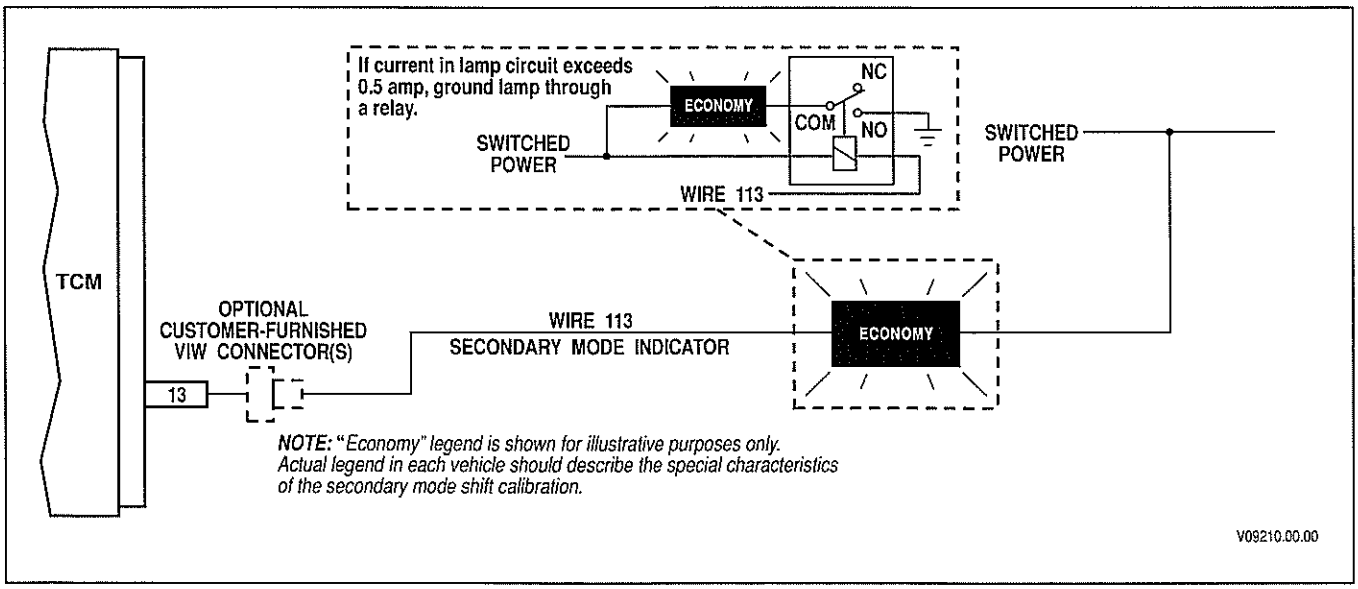


Figure P–60. Secondary Mode Indicator

This function can be provided by a J1939 message.

APPENDIX P—INPUT/OUTPUT FUNCTIONS

WARNING!

These schematics show the intended use of the specified controls features which have been validated in the configuration shown. Any miswiring or use of these features which differs from that shown could result in damage to equipment or property, personal injury, or loss of life. ALLISON TRANSMISSION IS NOT LIABLE FOR THE CONSEQUENCES ASSOCIATED WITH MISWIRING OR UNINTENDED USE OF THESE FEATURES.

OUTPUT FUNCTION N. SECONDARY MODE INDICATOR—SWITCHED TO POWER

USES: To indicate that Secondary Mode is active.

VARIABLES TO SPECIFY: None

VOCATIONS: Various

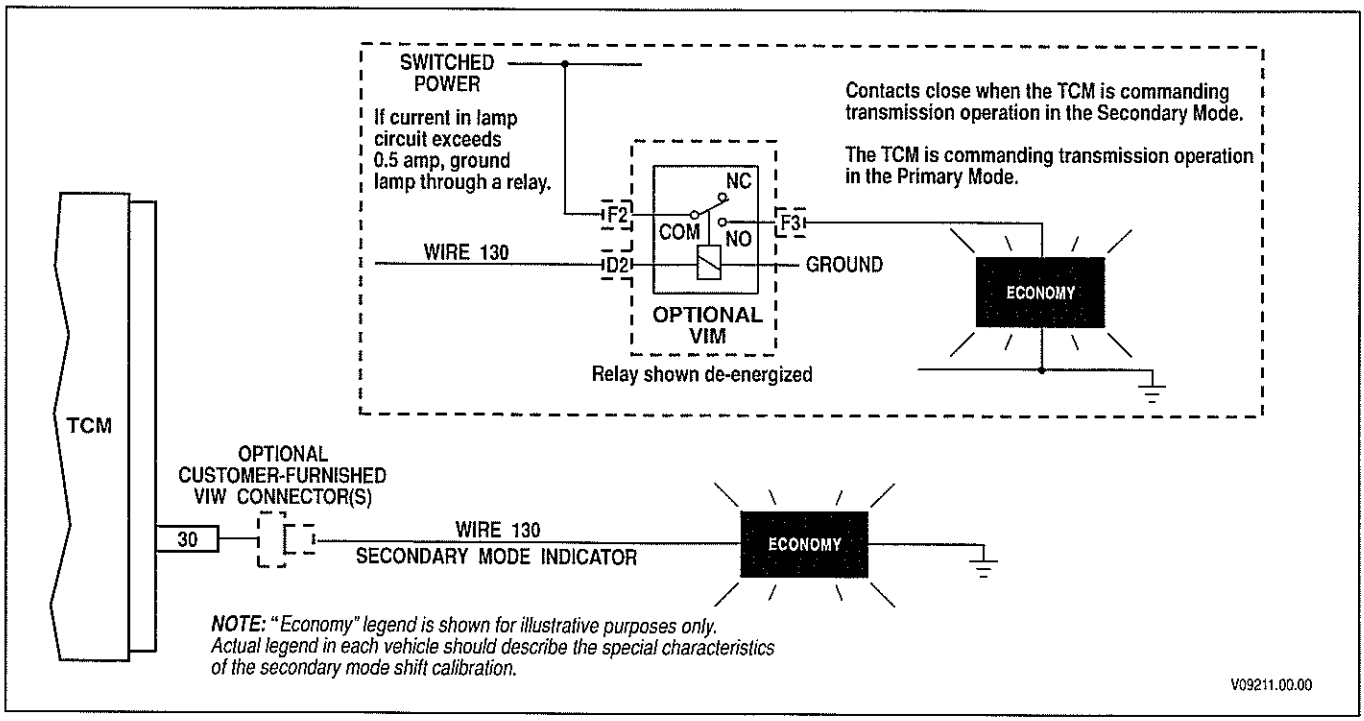


Figure P–61. Secondary Mode Indicator—Switched to Power

APPENDIX P—INPUT/OUTPUT FUNCTIONS

WARNING!

These schematics show the intended use of the specified controls features which have been validated in the configuration shown. Any miswiring or use of these features which differs from that shown could result in damage to equipment or property, personal injury, or loss of life. ALLISON TRANSMISSION IS NOT LIABLE FOR THE CONSEQUENCES ASSOCIATED WITH MISWIRING OR UNINTENDED USE OF THESE FEATURES.

OUTPUT FUNCTION O. SERVICE INDICATOR

USES: This function is required with *"Input Function F: Dual Input Auxiliary Function Range Inhibit"* to indicate that there is a problem with the vehicle wiring for the input signal. This output signal is typically used to turn on a dash-mounted light to indicate to the operator or service personnel to check for diagnostic codes stored in the ECU.

VARIABLES TO SPECIFY: None

VOCATIONS: Various

Refer to *"Input F: Dual Input Auxiliary Function Range Inhibit."*

APPENDIX P—INPUT/OUTPUT FUNCTIONS

WARNING!

These schematics show the intended use of the specified controls features which have been validated in the configuration shown. Any miswiring or use of these features which differs from that shown could result in damage to equipment or property, personal injury, or loss of life. ALLISON TRANSMISSION IS NOT LIABLE FOR THE CONSEQUENCES ASSOCIATED WITH MISWIRING OR UNINTENDED USE OF THESE FEATURES.

OUTPUT FUNCTION Q. RETARDER INDICATOR

USES: Signals that the retarder is active. Typically used to turn on the vehicle brake lights when the retarder is in use.

VARIABLES TO SPECIFY: None

VOCATIONS: Various

This function is used in conjunction with Input Function "Z", Retarder Enable. Refer to schematic for Input Function "Z", noting the use of wire 125.

APPENDIX P—INPUT/OUTPUT FUNCTIONS

WARNING!

These schematics show the intended use of the specified controls features which have been validated in the configuration shown. Any miswiring or use of these features which differs from that shown could result in damage to equipment or property, personal injury, or loss of life. ALLISON TRANSMISSION IS NOT LIABLE FOR THE CONSEQUENCES ASSOCIATED WITH MISWIRING OR UNINTENDED USE OF THESE FEATURES.

OUTPUT FUNCTION R. DIFFERENTIAL CLUTCH INDICATOR

USES: Signals the status of the differential clutch in the 3000 Product Family 7-Speed transfer case.

VARIABLES TO SPECIFY: None

VOCATIONS: Various. This function is required for all 3000 Product Family 7-Speed transmissions and used only with that model.

Refer to *"Input AF: Differential Clutch Request."*

APPENDIX P—INPUT/OUTPUT FUNCTIONS

WARNING!

These schematics show the intended use of the specified controls features which have been validated in the configuration shown. Any miswiring or use of these features which differs from that shown could cause unscheduled operation of the PTO or other unpredictable operation resulting in damage to equipment or property, personal injury, or loss of life. ALLISON TRANSMISSION IS NOT LIABLE FOR THE CONSEQUENCES ASSOCIATED WITH MISWIRING OR UNINTENDED USE OF THESE FEATURES.

OUTPUT FUNCTION S. NEUTRAL INDICATOR FOR PTO AND PTO ENABLE—PACK-ON-THE-FLY OPTION

USES: Provides for fast idle operation in neutral, "pack-on-the-fly", and PTO engagement with overspeed protection.

VARIABLES TO SPECIFY: Max engine rpm for PTO engagement, max engine rpm for PTO operation, max output rpm for PTO engagement, max output rpm for PTO operation.

VOCATIONS: Refuse packer, recycling truck.

SYSTEM OPERATION

Operator selects NEUTRAL to enable fast idle.

Transmission shifts to neutral if throttle and output speed are low.

When DRIVE is re-selected, fast idle is interrupted and transmission shifts to drive if engine speed drops below 900 rpm within approximately two seconds.

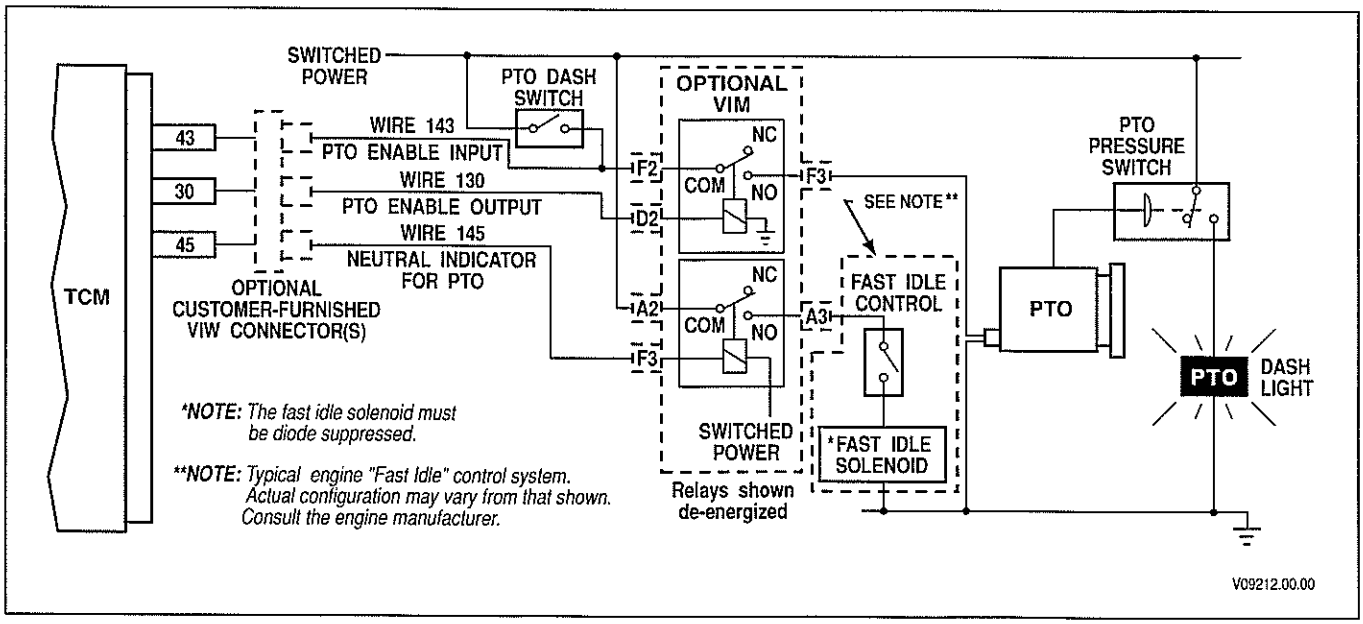


Figure P–62. Neutral Indicator for PTO and PTO Enable—Pack-On-The-Fly Option

APPENDIX P—INPUT/OUTPUT FUNCTIONS

WARNING!

These schematics show the intended use of the specified controls features which have been validated in the configuration shown. Any miswiring or use of these features which differs from that shown could cause unscheduled operation of the PTO or other unpredictable operation resulting in damage to equipment or property, personal injury, or loss of life. ALLISON TRANSMISSION IS NOT LIABLE FOR THE CONSEQUENCES ASSOCIATED WITH MISWIRING OR UNINTENDED USE OF THESE FEATURES.

OUTPUT FUNCTION S. NEUTRAL INDICATOR FOR PTO AND PTO ENABLE—NEUTRAL OPERATION ONLY

USES: Provides for fast idle operation in neutral, and PTO engagement with overspeed protection.

VARIABLES TO SPECIFY: Max engine rpm for PTO engagement, max engine rpm for PTO operation, max output rpm for PTO engagement, max output rpm for PTO operation.

VOCATIONS: Refuse packer, recycling truck.

SYSTEM OPERATION

Operator selects NEUTRAL to enable fast idle.

Transmission shifts to neutral if throttle and output speed are low.

When DRIVE is re-selected, fast idle is interrupted and transmission shifts to drive if engine speed drops below 900 rpm within approximately two seconds.

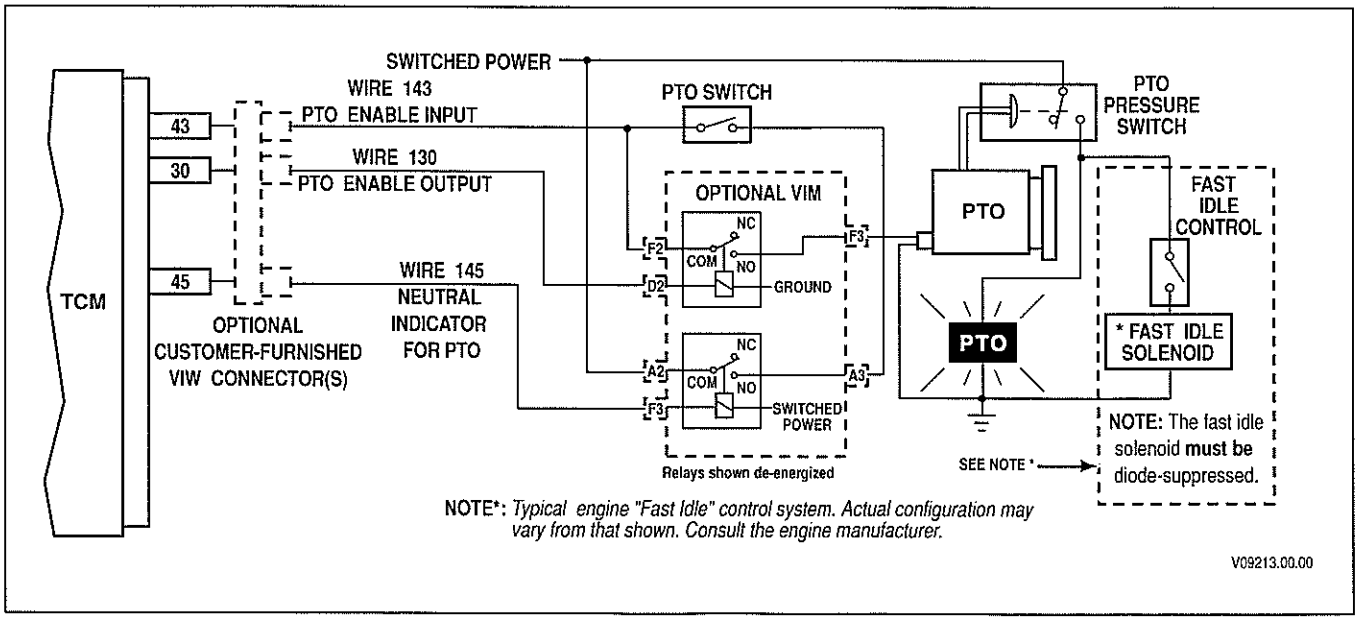


Figure P–63. Neutral Indicator for PTO and PTO Enable—Neutral Operation Only

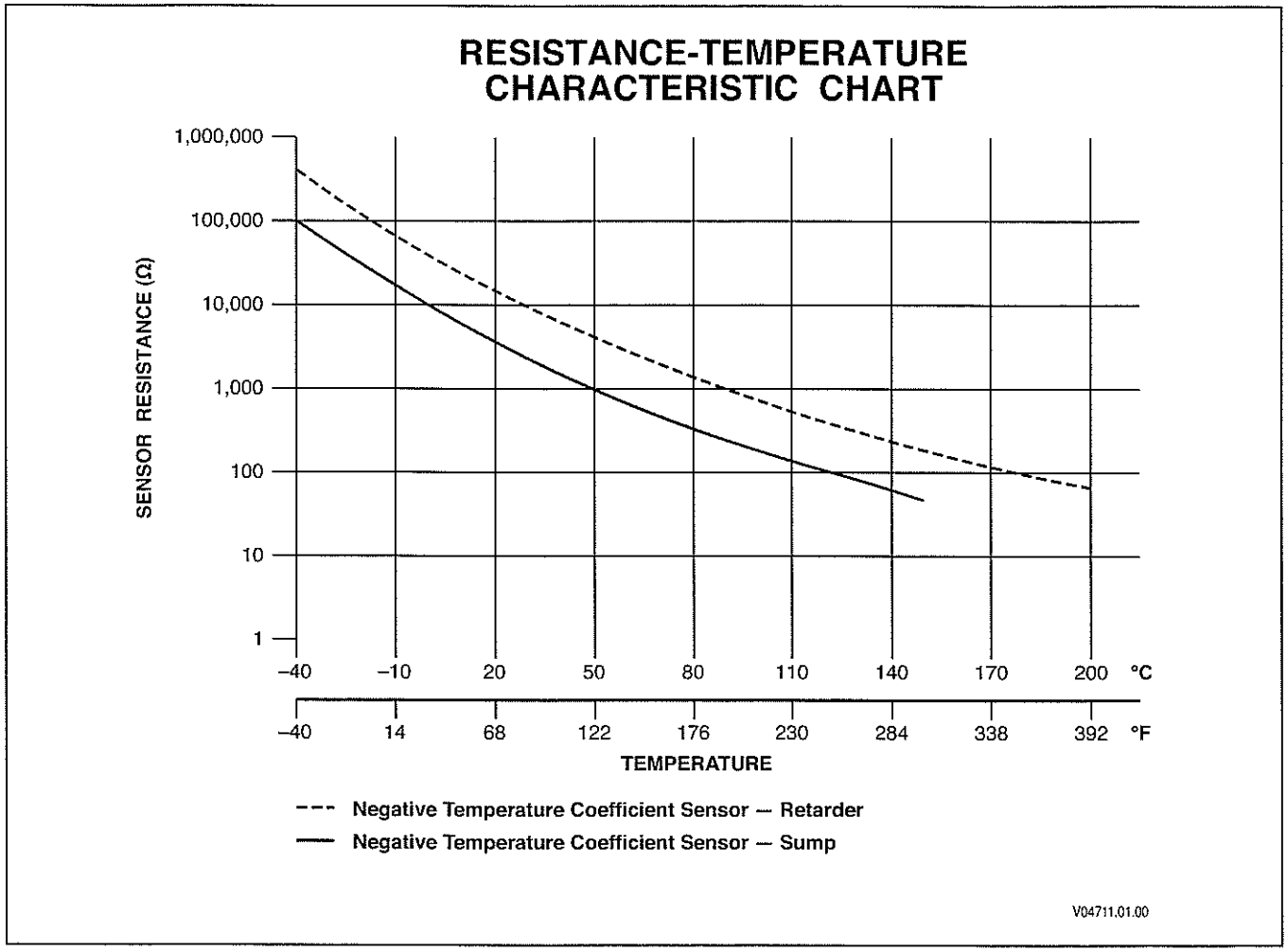
APPENDIX P—INPUT/OUTPUT FUNCTIONS

NOTES

APPENDIX Q—THERMISTOR TROUBLESHOOTING INFORMATION

Resistance Vs. Temperature Characteristics

Graph Q–1 is a graph of the temperature indicated by the resistance measured by the 3000 and 4000 Product Families product line sump and retarder temperature sensors. Both sensors have a have a negative temperature coefficient which means the indicated temperature increases as the measured resistance decreases within a range of about 200,000 Ohms down to about 50 Ohms for the sump thermistor and about 400,000 Ohms down to about 60 Ohms for the retarder thermistor.



Graph Q–1. TransID Thermistor Characteristics

NOTE: ***Look carefully at the graph. The scale for the resistance (on the left side) is not constant (linear). It is logarithmic which means it can display a great range of values within a small space. Each section of the graph is ten units, but the units vary from 1 to 100,000 Ohms. The range of resistance for the old thermistor is very small when compared with that of the new thermistors.***

The following table shows the range of resistance values that correspond to either retarder or sump fluid temperature shown in one degree increments over the operating range of the thermistors.

APPENDIX Q—THERMISTOR TROUBLESHOOTING INFORMATION

THERMISTORS—RESISTANCE (OHMS) VS. TEMPERATURE

Retarder Thermistor					Sump Thermistor				
Degree C	Degree F	Lo Ohms	Nom Ohms	Hi Ohms	Degree C	Degree F	Lo Ohms	Nom Ohms	Hi Ohms
					–50	–58	182288	202642	226183
					–49	–56.2	169859	188561	210206
					–48	–54.4	158357	175549	195459
					–47	–52.6	147708	163519	181840
					–46	–50.8	137844	152390	169255
					–45	–49	128702	142089	157621
					–44	–47.2	120224	132550	146860
					–43	–45.4	112359	123711	136900
					–42	–43.6	105057	115517	127678
					–41	–41.8	98276	107917	119134
–40	–40	352399	402392	452385	–40	–40	95956	100865	107181
–39	–38.2	329878	376270	422662	–39	–38.2	89769	94317	100181
–38	–36.4	308936	352005	395074	–38	–36.4	84019	88235	93681
–37	–34.6	289453	329454	369456	–37	–34.6	78674	82582	87642
–36	–32.8	271318	308486	345655	–36	–32.8	73701	77326	82030
–35	–31	254431	288981	323531	–35	–31	69073	72437	76811
–34	–29.2	238698	270827	302956	–34	–29.2	64764	67886	71956
–33	–27.4	224033	253923	283814	–33	–27.4	60749	63649	67497
–32	–25.6	210358	238177	265995	–32	–25.6	57008	59702	63228
–31	–23.8	197600	223501	249402	–31	–23.8	53520	56024	59308
–30	–22	185693	209817	233941	–30	–22	50266	52594	55654
–29	–20.2	174574	197053	219531	–29	–20.2	47229	49394	52247
–28	–18.4	164188	185140	206093	–28	–18.4	44394	46408	49069
–27	–16.6	154480	174018	193556	–27	–16.6	41746	43620	46102
–26	–14.8	145404	163630	181856	–26	–14.8	39271	41016	43332
–25	–13	136915	153923	170930	–25	–13	36958	38583	40745
–24	–11.2	128971	144848	160724	–24	–11.2	34794	36308	38328
–23	–9.4	121534.6	136360.5	151188	–23	–9.4	32770	34181	36088
–22	–7.6	114569.9	128419.6	142269.4	–22	–7.6	30875	32190	33954
–21	–5.8	108044.7	120987	133929.3	–21	–5.8	29101	30327	31976
–20	–4	101928.7	114027.2	126125.7	–20	–4	27439	28582	30125
–19	–2.2	96194	107507.5	118821	–19	–2.2	25881	26948	28391
–18	–0.4	90814.8	101397.8	111980.7	–18	–0.4	24420	25417	26767
–17	1.4	85767	95669.8	105572.7	–17	1.4	23051	23981	25245
–16	3.2	81028.5	90297.8	99567.2	–16	3.2	21766	22634	23818
–15	5	76578.5	85257.7	93937	–15	5	20660	21371	22480
–14	6.8	72397.9	80527.1	88656.4	–14	6.8	19427	20185	21225

APPENDIX Q—THERMISTOR TROUBLESHOOTING INFORMATION

THERMISTORS—RESISTANCE (OHMS) VS. TEMPERATURE *(cont'd)*

Retarder Thermistor					Sump Thermistor				
Degree C	Degree F	Lo Ohms	Nom Ohms	Hi Ohms	Degree C	Degree F	Lo Ohms	Nom Ohms	Hi Ohms
–13	8.6	68469	76085.4	83701.9	–13	8.6	18363	19072	20046
–12	10.4	64775.3	71913.4	79051.6	–12	10.4	17363	18026	18940
–11	12.2	61301.3	67993.3	74685.3	–11	12.2	16424	17043	17900
–10	14	58033	64308.5	70584	–10	14	15540	16120	16924
–9	15.8	54956.9	60843.6	66730.3	–9	15.8	14709	15251	16006
–8	17.6	52060.8	57584.4	63108	–8	17.6	13927	14434	15143
–7	19.4	49333.13	54517.51	59701.9	–7	19.4	13190	13666	14331
–6	21.2	46763.28	51630.64	56498	–6	21.2	12497	12942	13567
–5	23	44341.27	48912.25	53483.24	–5	23	11844	12261	12848
–4	24.8	42057.81	46351.65	50645.49	–4	24.8	11228	11619	12171
–3	26.6	39904.26	43938.84	47973.42	–3	26.6	10648	11014	11533
–2	28.4	37872.55	41664.54	45456.53	–2	28.4	10101	10444	10932
–1	30.2	35955	39520	43085	–1	30.2	9585	9906	10365
0	32	34145.1	37497.4	40850	0	32	9098	9399	9831
1	33.8	32430	35590	38750	1	33.8	8638	8921	9329
2	35.6	30810	33790	36770	2	35.6	8203	8470	8854
3	37.4	29282	32092	34903	3	37.4	7793	8044	8407
4	39.2	27838	30490	33142	4	39.2	7406	7643	7985
5	41	26474	28976	31479	5	41	7041	7263	7587
6	42.8	25184	27547	29910	6	42.8	6696	6905	7211
7	44.6	23965	26197	28428	7	44.6	6369	6567	6855
8	46.4	22813	24920	27028	8	46.4	6061	6247	6519
9	48.2	21722	23713	25704	9	48.2	5769	5944	6202
10	50	20690	22572	24454	10	50	5493	5658	5902
11	51.8	19712	21492	23271	11	51.8	5231	5387	5618
12	53.6	18787	20469	22152	12	53.6	4984	5131	5349
13	55.4	17910	19502	21093	13	55.4	4750	4888	5095
14	57.2	17079	18585	20091	14	57.2	4528	4659	4854
15	59	16292	17717	19141	15	59	4318	4441	4626
16	60.8	15545	16894	18242	16	60.8	4118	4235	4410
17	62.6	14836.8	16113.8	17391	17	62.6	3929	4039	4205
18	64.4	14164.8	15374.1	16583.5	18	64.4	3750	3854	4011
19	66.2	13527	14672.6	15818.2	19	66.2	3580	3678	3827
20	68	12921.4	14006.9	15092.4	20	68	3418	3511	3653
21	69.8	12346.4	13375.1	14403.8	21	69.8	3265	3353	3487
22	71.6	11800.1	12775.3	13750.5	22	71.6	3120	3202	3330
23	73.4	11281	12205.7	13130.3	23	73.4	2981	3060	3180
24	75.2	10787.6	11664.6	12541	24	75.2	2850	2924	3039

APPENDIX Q—THERMISTOR TROUBLESHOOTING INFORMATION

THERMISTORS—RESISTANCE (OHMS) VS. TEMPERATURE *(cont'd)*

Retarder Thermistor					Sump Thermistor				
Degree C	Degree F	Lo Ohms	Nom Ohms	Hi Ohms	Degree C	Degree F	Lo Ohms	Nom Ohms	Hi Ohms
25	77	10318.5	11150.4	11982.3	25	77	2725	2795	2904
26	78.8	9872.4	10661.7	11451	26	78.8	2606	2673	2776
27	80.6	9448	10197.1	10946.1	27	80.6	2493	2556	2655
28	82.4	9755.2	9755.2	10466.2	28	82.4	2385	2445	2540
29	84.2	8659.8	9334.9	10009.9	29	84.2	2282	2340	2430
30	86	8293.8	8934.9	9575.9	30	86	2185	2240	2326
31	87.8	7945.3	8554.2	9163.1	31	87.8	2092	2144	2227
32	89.6	7613.3	8191.7	8770.2	32	89.6	2003	2053	2132
33	91.4	7296.91	7846.57	8396.2	33	91.4	1919	1967	2043
34	93.2	6995.38	7517.77	8040.17	34	93.2	1839	1884	1957
35	95	6707.92	7204.5	7701.07	35	95	1763	1806	1875
36	96.8	6433.8	6905.92	7378.04	36	96.8	1690	1731	1797
37	98.6	6172.32	6621.29	7070.25	37	98.6	1620	1660	1723
38	100.4	5922.86	6349.87	6776.89	38	100.4	1554	1592	1653
39	102.2	5685	6091	6497	39	102.2	1491	1527	1585
40	104	5457.5	5844	6231	40	104	1430	1465	1521
41	105.8	5241	5608	5976	41	105.8	1373	1406	1459
42	107.6	5033	5383	5733	42	107.6	1318	1349	1401
43	109.4	4835	5169	5502	43	109.4	1265	1296	1345
44	111.2	4646	4963	5281	44	111.2	1215	1244	1291
45	113	4465	4768	5070	45	113	1167	1195	1240
46	114.8	4293	4580	4868	46	114.8	1122	1148	1192
47	116.6	4127	4402	4676	47	116.6	1078	1103	1145
48	118.4	3969	4231	4492	48	118.4	1036	1060	1100
49	120.2	3818	4067	4316	49	120.2	996.3	1019	1058
50	122	3673	3911	4148	50	122	958.1	980.3	1017
51	123.8	3535	3761	3988	51	123.8	921.6	942.9	978.4
52	125.6	3403	3619	3835	52	125.6	886.7	907.1	941.4
53	127.4	3276	3482	3688	53	127.4	853.3	872.9	905.9
54	129.2	3155	3352	3548	54	129.2	821.4	840.1	871.9
55	131	3039	3227	3414	55	131	790.8	808.8	839.4
56	132.8	2928	3107	3286	56	132.8	761.5	778.8	808.3
57	134.6	2821	2992	3163	57	134.6	733.5	750	778.5
58	136.4	2718.9	2882.4	3046	58	136.4	706.6	722.5	750
59	138.2	2621.1	2777.3	2933.5	59	138.2	680.9	696.2	722.7
60	140	2527.2	2676.5	2825.7	60	140	656.2	670.9	696.5
61	141.8	2437.3	2579.9	2722.5	61	141.8	632.6	646.7	671.4
62	143.6	2351	2487.3	2623.6	62	143.6	609.9	623.5	647.3

APPENDIX Q—THERMISTOR TROUBLESHOOTING INFORMATION

THERMISTORS—RESISTANCE (OHMS) VS. TEMPERATURE *(cont'd)*

Retarder Thermistor					Sump Thermistor				
Degree C	Degree F	Lo Ohms	Nom Ohms	Hi Ohms	Degree C	Degree F	Lo Ohms	Nom Ohms	Hi Ohms
63	145.4	2268.2	2398.5	2528.8	63	145.4	588.2	601.2	624.2
64	147.2	2188.8	2313.4	2438	64	147.2	567.4	579.9	602.1
65	149	2112.5	2231.7	2350.8	65	149	547.4	559.4	580.8
66	150.8	2039.3	2153.3	2267.3	66	150.8	528.2	539.8	560.5
67	152.6	1969.1	2078.1	2187.1	67	152.6	509.8	520.9	540.9
68	154.4	1901.6	2005.9	2110.2	68	154.4	492.1	502.8	522.2
69	156.2	1836.8	1936.6	2036.4	69	156.2	475.2	485.4	504.1
70	158	1774.5	1870	1965.5	70	158	458.9	468.7	486.8
71	159.8	1714.6	1806.1	1897.5	71	159.8	443.2	452.7	470.2
72	161.6	1657.1	1744.6	1832.2	72	161.6	428.2	437.3	454.2
73	163.4	1601.8	1685.6	1769.4	73	163.4	413.7	422.5	438.9
74	165.2	1548.65	1628.89	1709.1	74	165.2	399.8	408.3	424.1
75	167	1497.52	1574.36	1651.21	75	167	386.5	394.6	410
76	168.8	1448.33	1521.94	1595.54	76	168.8	373.6	381.5	396.3
77	170.6	1401.01	1471.52	1542.03	77	170.6	361.3	368.9	383.2
78	172.4	1355.47	1423.03	1490.58	78	172.4	349.4	356.7	370.6
79	174.2	1311.65	1376.38	1441.11	79	174.2	338	345	358.5
80	176	1269	1331	1394	80	176	327	333.8	346.8
81	177.8	1228.3	1288.3	1348	81	177.8	316.4	322.9	335.6
82	179.6	1190	1247	1304	82	179.6	306.2	312.5	324.7
83	181.4	1152	1207	1261	83	181.4	296.4	302.5	314.3
84	183.2	1116	1168	1220	84	183.2	288.9	292.8	304.3
85	185	1081	1131	1181	85	185	277.8	283.5	294.6
86	186.8	1047	1095	1143	86	186.8	269	274.5	285.4
87	188.6	1015	1061	1107	87	188.6	260.5	265.9	276.5
88	190.4	983	1028	1072	88	190.4	253.3	257.6	268
89	192.2	953	996	1038	89	192.2	244.3	249.5	259.7
90	194	924	965	1005	90	194	236.7	241.8	251.7
91	195.8	896	935	974	91	195.8	229.4	234.4	244
92	197.6	869	906	944	92	197.6	222.3	227.2	236.6
93	199.4	843	879	915	93	199.4	215.5	220.2	229.5
94	201.2	817	852	886	94	201.2	208.9	213.5	222.6
95	203	793	826	859	95	203	202.5	207.1	215.9
96	204.8	769	801	833	96	204.8	196.4	200.9	209.5
97	206.6	747	777	808	97	206.6	190.5	194.8	203.3
98	208.4	725	754	784	98	208.4	184.8	189	197.3
99	210.2	703.6	731.8	760	99	210.2	179.2	183.4	191.5
100	212	683.2	710.2	737.3	100	212	173.9	178	185.9

APPENDIX Q—THERMISTOR TROUBLESHOOTING INFORMATION

THERMISTORS—RESISTANCE (OHMS) VS. TEMPERATURE *(cont'd)*

Retarder Thermistor					Sump Thermistor				
Degree C	Degree F	Lo Ohms	Nom Ohms	Hi Ohms	Degree C	Degree F	Lo Ohms	Nom Ohms	Hi Ohms
101	213.8	663.4	689.4	715.3	101	213.8	168.8	172.8	180.5
102	215.6	644.4	669.3	694.1	102	215.6	163.8	167.8	175.3
103	217.4	626	649.8	673.7	103	217.4	159	162.9	170.3
104	219.2	608.2	631.1	653.9	104	219.2	154.4	158.2	165.4
105	221	591	612.9	634.9	105	221	149.9	159.6	160.7
106	222.8	574.3	595.4	616.5	106	222.8	145.6	149.2	156.2
107	224.6	558.2	578.4	598.7	107	224.6	141.4	145	151.8
108	226.4	542.6	562.1	581.5	108	226.4	137.4	140.9	147.5
109	228.2	527.6	546.2	564.9	109	228.2	133.5	136.9	143.4
110	230	513	530.9	548.8	110	230	129.7	133.1	139.4
111	231.8	498.8	516.1	533.3	111	231.8	126.1	129.4	135.6
112	233.6	485.2	501.8	518.3	112	233.6	122.6	125.8	131.9
113	235.4	471.9	487.9	503.9	113	235.4	119.2	122.3	128.2
114	237.2	459.1	474.5	489.8	114	237.2	115.9	118.9	124.8
115	239	446.73	461.51	476.3	115	239	112.7	115.7	121.4
116	240.8	434.72	448.95	463.18	116	240.8	109.6	112.5	118.1
117	242.6	423.08	436.79	450.5	117	242.6	106.6	109.5	114.9
118	244.4	411.8	425.02	438.23	118	244.4	103.7	106.5	111.9
119	246.2	400.88	413.61	426.35	119	246.2	100.91	103.7	108.9
120	248	390.29	402.57	414.86	120	248	98.2	100.9	106
121	249.8	380	392	404	121	249.8	95.58	98.23	103.2
122	251.6	370.1	381.5	393	122	251.6	93.04	95.63	100.5
123	253.4	360	371	383	123	253.4	90.58	93.12	97.9
124	255.2	351	362	372	124	255.2	88.2	90.68	95.36
125	257	342	352	363	125	257	85.89	88.32	92.9
126	258.8	333	343	353	126	258.8	83.65	86.03	90.51
127	260.6	325	334	344	127	260.6	81.49	83.8	88.19
128	262.4	316	326	335	128	262.4	79.38	81.65	85.95
129	264.2	308	317	326	129	264.2	77.35	79.56	83.77
130	266	301	309	318	130	266	75.37	77.54	81.65
131	267.8	293	302	310	131	267.8	73.46	75.58	79.6
132	269.6	286	294	302	132	269.6	71.6	73.67	77.61
133	271.4	279	287	294	133	271.4	69.8	71.82	75.68
134	273.2	272	279	287	134	273.2	68.05	70.03	73.8
135	275	265	272	280	135	275	66.35	68.29	71.98
136	276.8	258	266	273	136	276.8	64.7	66.6	70.21
137	278.6	252	259	266	137	278.6	63.11	64.96	68.5
138	280.4	246	253	260	138	280.4	61.56	63.37	66.83

APPENDIX Q—THERMISTOR TROUBLESHOOTING INFORMATION

THERMISTORS—RESISTANCE (OHMS) VS. TEMPERATURE *(cont'd)*

Retarder Thermistor					Sump Thermistor				
Degree C	Degree F	Lo Ohms	Nom Ohms	Hi Ohms	Degree C	Degree F	Lo Ohms	Nom Ohms	Hi Ohms
139	282.2	240	247	253	139	282.2	60.05	61.82	65.21
140	284	234.2	240.6	247	140	284	58.59	60.32	63.64
141	285.8	228.6	234.8	241.1	141	285.8	57.17	58.86	62.11
142	287.6	223.1	229.2	235.2	142	287.6	55.79	57.45	60.63
143	289.4	217.8	223.7	229.6	143	289.4	54.45	56.07	59.18
144	291.2	212.6	218.4	224.1	144	291.2	53.15	54.73	57.78
145	293	207.6	213.2	218.8	145	293	51.89	53.43	56.42
146	294.8	202.7	208.1	213.6	146	294.8	50.66	52.17	55.09
147	296.6	197.9	203.2	208.5	147	296.6	49.47	50.94	53.81
148	298.4	193.3	198.5	203.7	148	298.4	48.31	49.75	52.55
149	300.2	188.8	193.9	198.9	149	300.2	47.18	48.59	51.34
150	302	184.4	189.4	194.3	150	302	46.09	47.46	50.15
151	303.8	180.2	185	189.8	—	—	—	—	—
152	305.6	176	180.7	185.4	—	—	—	—	—
153	307.4	172	176.6	181.2	—	—	—	—	—
154	309.2	168.1	172.6	177.1	—	—	—	—	—
155	311	164.3	168.6	173	—	—	—	—	—
156	312.8	160.54	164.84	169.1	—	—	—	—	—
157	314.6	156.93	161.13	165.33	—	—	—	—	—
158	316.4	153.42	157.53	161.63	—	—	—	—	—
159	318.2	150.01	154.01	158.02	—	—	—	—	—
160	320	146.68	150.6	154.51	—	—	—	—	—
161	321.8	143.43	147.27	151.1	—	—	—	—	—
162	323.6	140	144	148	—	—	—	—	—
163	325.4	137.2	140.9	145	—	—	—	—	—
164	327.2	134	138	141	—	—	—	—	—
165	329	131	135	138	—	—	—	—	—
166	330.8	128	132	135	—	—	—	—	—
167	332.6	126	129	132	—	—	—	—	—
168	334.4	123	126	130	—	—	—	—	—
169	336.2	120	124	127	—	—	—	—	—
170	338	118	121	124	—	—	—	—	—
171	339.8	115	118	122	—	—	—	—	—
172	341.6	113	116	119	—	—	—	—	—
173	343.4	10	113	117	—	—	—	—	—
174	345.2	108	111	114	—	—	—	—	—
175	347	106	109	112	—	—	—	—	—
176	348.8	104	107	109	—	—	—	—	—

APPENDIX Q—THERMISTOR TROUBLESHOOTING INFORMATION

THERMISTORS—RESISTANCE (OHMS) VS. TEMPERATURE *(cont'd)*

Retarder Thermistor					Sump Thermistor				
Degree C	Degree F	Lo Ohms	Nom Ohms	Hi Ohms	Degree C	Degree F	Lo Ohms	Nom Ohms	Hi Ohms
177	350.6	101	104	107	—	—	—	—	—
178	352.4	99	102	105	—	—	—	—	—
179	354.2	97	100	103	—	—	—	—	—
180	356	95	98	101	—	—	—	—	—
181	357.8	93.4	96.1	99	—	—	—	—	—
182	359.6	91.5	94.1	96.8	—	—	—	—	—
183	361.4	89.6	92.3	94.9	—	—	—	—	—
184	363.2	87.8	90.4	93	—	—	—	—	—
185	365	86.1	88.6	91.1	—	—	—	—	—
186	366.8	84.3	86.8	89.4	—	—	—	—	—
187	368.6	82.7	85.1	87.6	—	—	—	—	—
188	370.4	81	83.4	85.9	—	—	—	—	—
189	372.2	79.4	81.8	84.2	—	—	—	—	—
190	374	77.8	80.2	82.6	—	—	—	—	—
191	375.8	76.3	78.7	81	—	—	—	—	—
192	377.6	74.8	77.1	79.4	—	—	—	—	—
193	379.4	73.4	75.6	77.9	—	—	—	—	—
194	381.2	71.9	74.2	76.4	—	—	—	—	—
195	383	70.5	72.8	75	—	—	—	—	—
196	384.8	69.2	71.4	73.6	—	—	—	—	—
197	386.6	67.84	70.02	72.20	—	—	—	—	—
198	388.4	66.54	68.70	70.86	—	—	—	—	—
199	390.2	65.27	67.41	69.54	—	—	—	—	—
200	392	64.03	66.14	68.25	—	—	—	—	—
201	393.8	62.82	64.91	65.99	—	—	—	—	—
202	395.6	61.64	63.70	65.76	—	—	—	—	—
203	397.4	60.00	63.00	65.00	—	—	—	—	—
204	399.2	59.30	61.40	63.00	—	—	—	—	—

APPENDIX R—SAE J1939 COMMUNICATION LINK

This Appendix is an overview of how Allison Transmission implements the J1939-based functions.

The Controller Area Network (CAN) defined by SAE J1939 enables the integration of various vehicle components into an overall vehicle system by providing a standard way of exchanging information between these modules in the vehicle. Use of a J1939 network, or datalink, for on-vehicle communication can greatly reduce the amount of wiring in a vehicle, and give many different components and subsystems access to a wider range of information.

Allison uses the J1939 communication link for vehicle operation controls, powertrain interaction, and conveying vehicle management information (Figure R–1).*

Details are found in the Vehicle Function Requirements section of the Datalink Communications Tech Data.

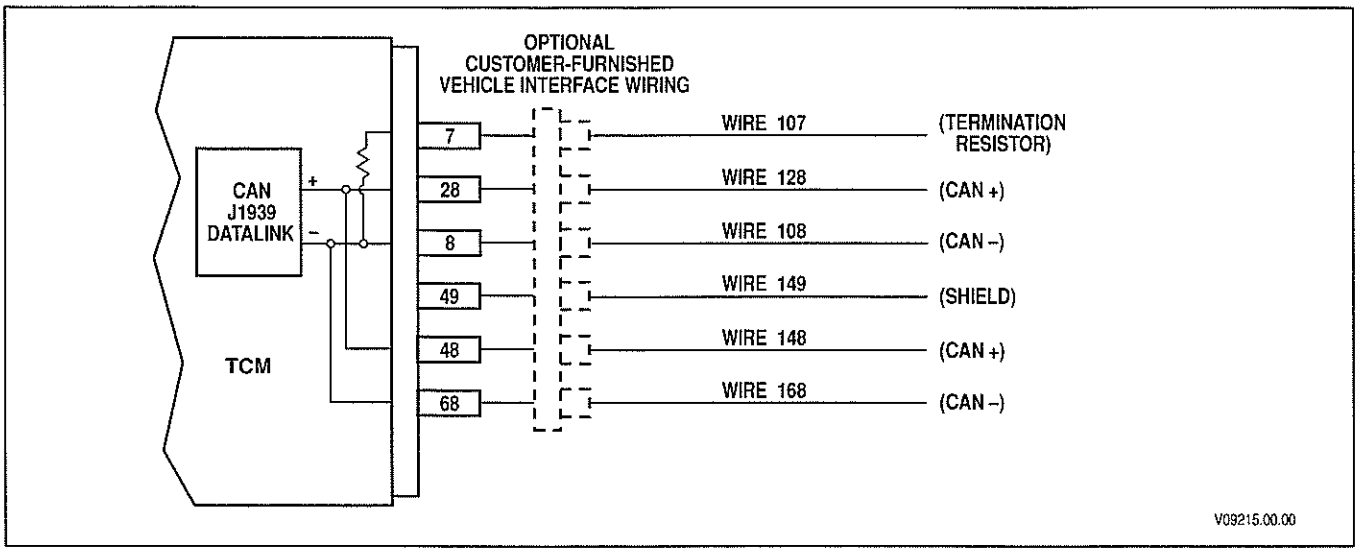


Figure R–1. J1939 Interface Wiring (TCM Pin-Out)

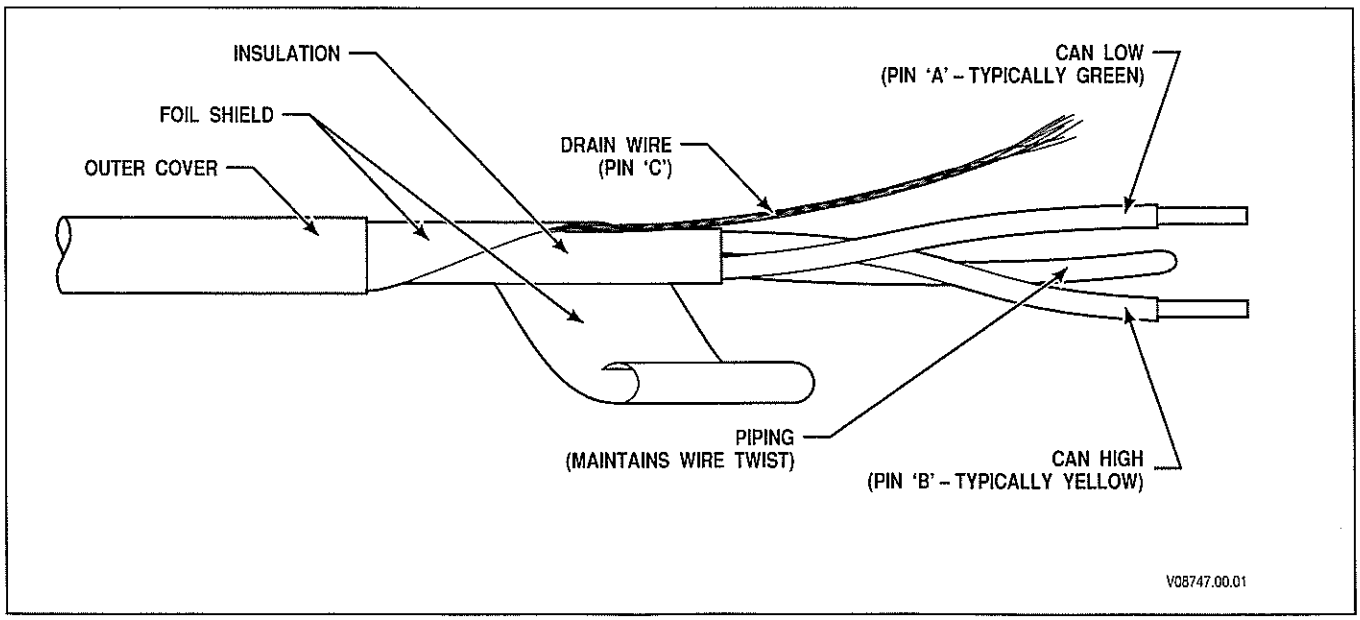


Figure R–2. J1939-11 Twisted, Shielded Pair Cable

** NOTE: On Allison 4th Generation Controls Systems, off-board communications are only enabled via J1939.*

APPENDIX R—SAE J1939 COMMUNICATION LINK

Wiring

Allison recommends implementing J1939 network wiring per SAE J1939-11, which specifies 120 Ohm impedance twisted pair cable with shielding (Figure R–2). The shielding greatly reduces the communication link's susceptibility to induced electromagnetic interference.

The drain wire connects to a "shield" pin on each controller on the network. These "shield pins" are not the same as ground connections; there is circuitry between the shield pin and the controller's ground connection.

In addition to the above connections, the shield drain wire should break out of the backbone in one location, preferably as close to the center as possible, and connect directly to the battery ground terminal or grounding bus bar.

Allison Transmission does not recommend the use of unshielded cabling specified in J1939-15 (often referred to as "J1939 Lite"). The lack of shielding makes the J1939 network more susceptible to electromagnetic interference, which can be extremely difficult to diagnose and correct. Many vehicle OEMs, however, opt to use J1939-15 cable due to its lower cost and greater flexibility. J1939-11 (shielded) and J1939-15 (unshielded) cable should never be mixed in a vehicle installation.

Cable suppliers include:

- Belden Wire and Cable Co.
- BICC Brand-Rex Co.
- Champlain Cable Co.
- Raychem.

J1939 networks are laid out in a linear fashion, consisting of a central "backbone" with "stubs" branching off to individual controllers or "nodes" (refer to Figure R–3).

Regardless of the cable used, two 120 Ohm termination resistors are required, one at each end of the backbone cable (refer to Figure R–4). These resistors may be built into a receptacle connector or plug connector that contains a blue wedge lock.

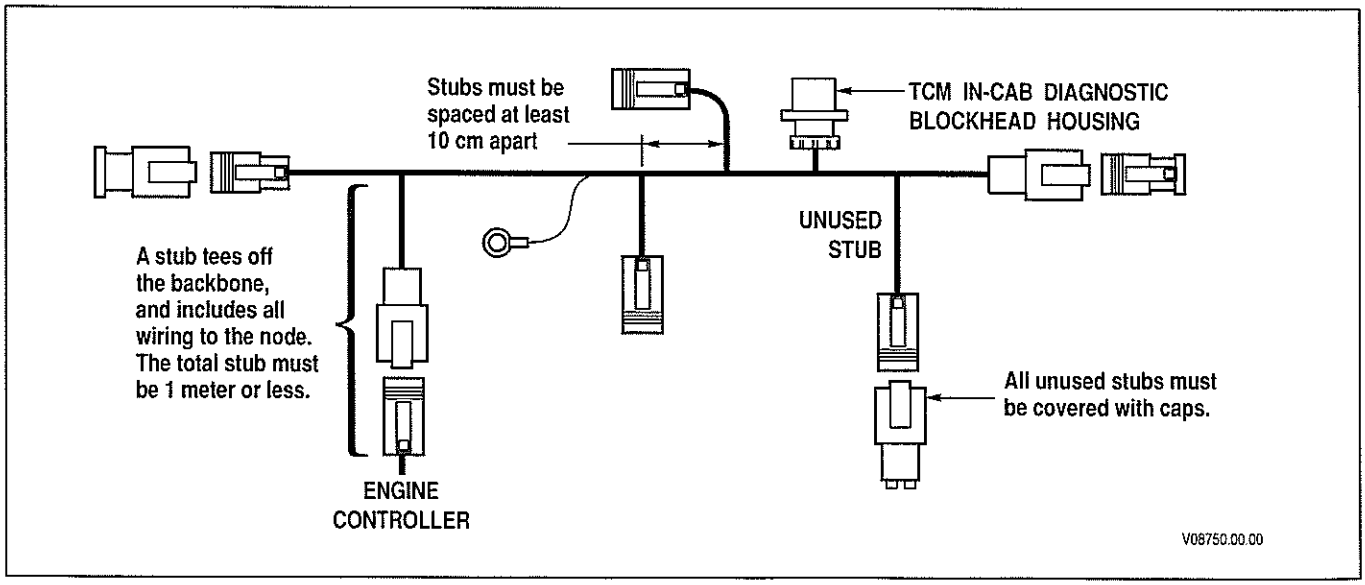


Figure R–3. J1939-11 Network Configuration

APPENDIX R—SAE J1939 COMMUNICATION LINK

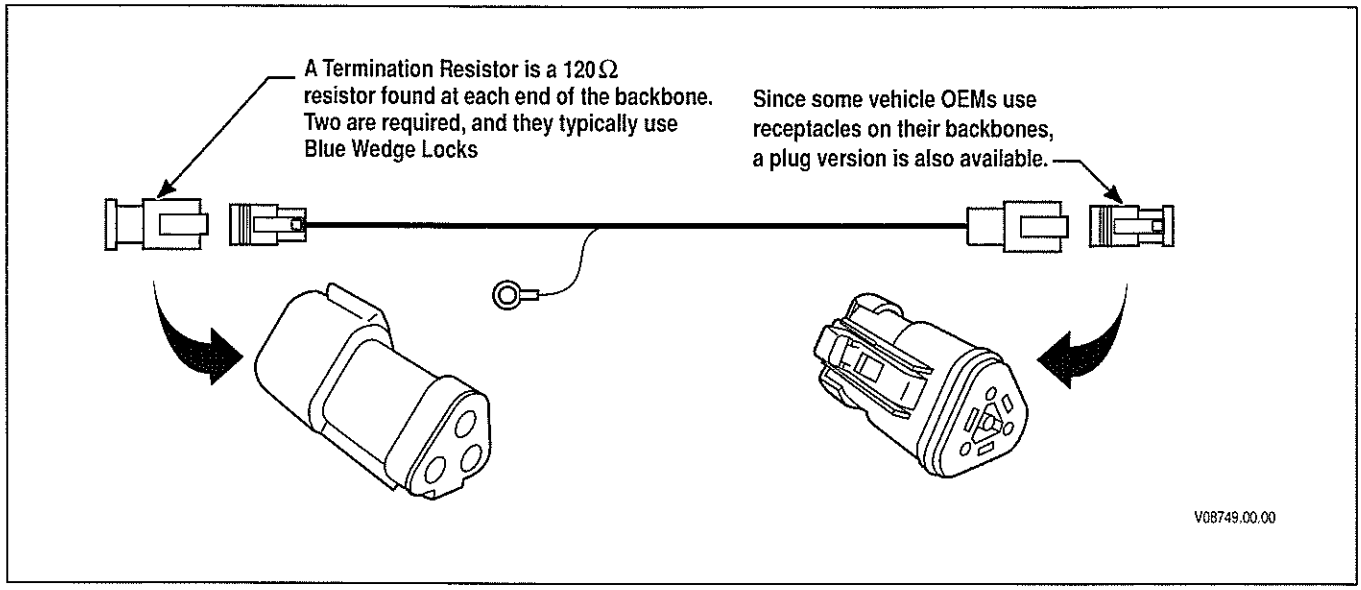


Figure R–4. Termination Resistors Requirement on J1939-11 Backbone

Typically, all connectors on the backbone and stubs are of the "plug" type. However, "receptacle" connectors may be used in some installations. Stubs and nodes use orange or green wedge locks.

The backbone may be no longer than 40 meters in length. A stub includes the length of wiring on the node, and the length from the backbone to the node must be one meter or less.

Figure R–3 shows a typical J1939-11 network cable configuration including controllers, or "nodes". The connector for the Allison controller is a 3-way connector configured as follows (refer to Figure R–5):

- Terminal A = CAN High
- Terminal B = CAN Low
- Terminal C = CAN Shield.

Typically CAN High is a yellow wire and CAN Low is a green wire.

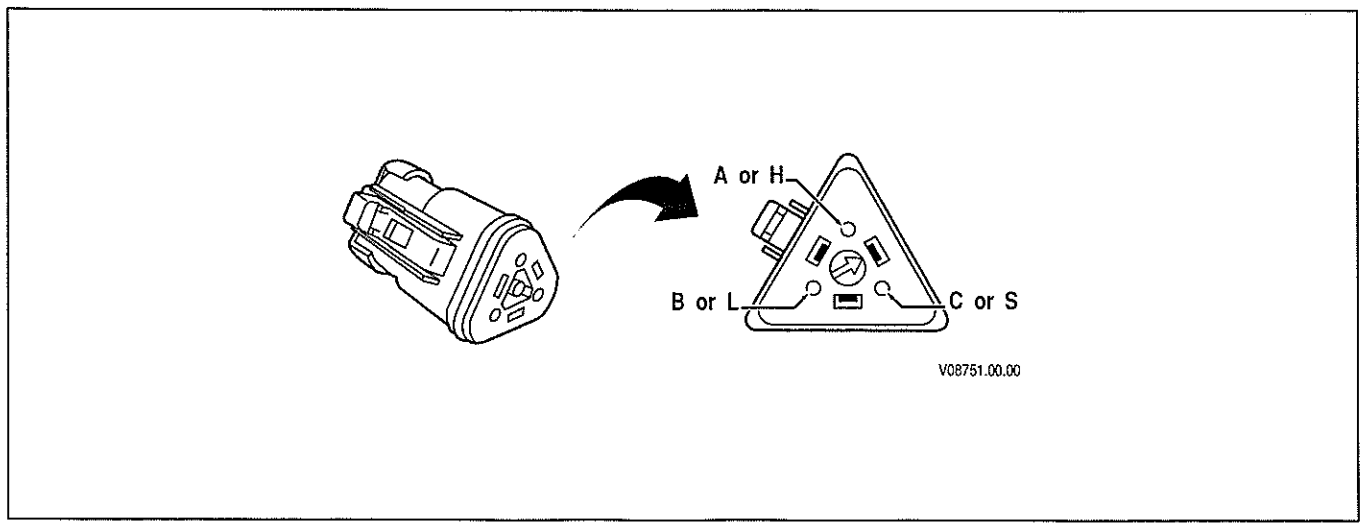


Figure R–5. 3-Way Allison Controller Connector

APPENDIX R—SAE J1939 COMMUNICATION LINK

A 9-way, in-cab, diagnostic bulkhead housing, if used, will be configured as follows (refer to Figure R–6):

- A = Ground
- B = +12 volts (unswitched)
- C = High (Yellow)
- D = Low (Green)
- E = Shield
- F = J1587 + (typically blue)
- G = J1587 – (typically white)
- H and J = For OEM use.

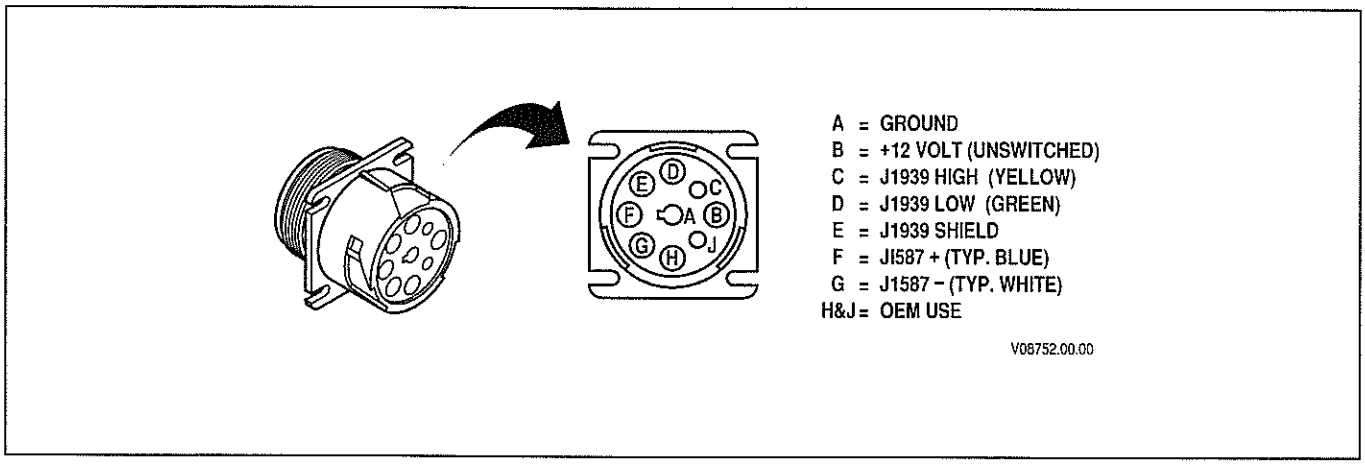


Figure R–6. 9-Way, In-Cab, Diagnostic Connector

Troubleshooting

In terms of J1939 communication, Allison Transmission is only responsible for the Allison TCM hardware, software, and calibration. Wiring issues belong solely to the vehicle manufacturer. The responsibility for putting valid data on the datalink, and properly using the data obtained from the datalink, belongs to each component supplier with a device connected to the datalink.

CAN vs. Traditional Wiring

A key difference between traditional analog wires and CAN datalinks is the detection of signal corruption between the communicating devices.

An analog electrical signal generated properly by a sender may be *corrupted* on the way to the receiver by such problems as electrical noise or shorts-to-ground or power. This corruption may or may not affect the value received.

CAN communication links are much more robust, as *wiring integrity cannot change the values being sent.* Wiring faults can only prevent messages from arriving at their destination. The CAN hardware makes sure that a message is accepted only and exactly as the sending node generated the message. CAN chips reject messages affected by electrical noise or wire faults.

When communication is possible and there are no wiring issues present, CAN makes certain that information is received exactly as it is sent. However, CAN cannot detect when a device is putting out bad information or when a device misuses information pulled off of the network. For example, if the ABS system sends information stating that it is active, whether it actually is or not, the TCM will still react as if the ABS is active.

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The CAN Community

A unique aspect of the J1939 datalink is that the TCM can be one of many controllers on the network. As such, intended communication with certain devices (such as the engine) may be impacted by other devices on the datalink, such as an instrument cluster or body controller.

The manufacturer of each individual controller on the network is responsible to make sure that correct information is placed on the network at all times. This work should be covered during the development of any device that will connect to the J1939 network. As such, troubleshooting here will deal only in the context of wiring and calibration issues, which are most often encountered in the field.

Datalink Diagnostic Tools

Digital Multi-Meters

A digital volt/ohmmeter (DVOM) can be used to detect datalink activity. However, datalink voltages change extremely fast, causing meter float. DVOMs are best suited to testing for proper termination resistance, or the presence of open- or short-circuits in the network wiring.

Temporary Backbone

The first step in any datalink-related problem is to determine who 'owns' the problem. Connecting a temporary backbone between the engine and transmission can be used to identify the source of the problem, eliminating many of the unknowns such as vehicle wiring, interference from another controller, etc. If the problem goes away while using the temporary backbone and returns when the OEM backbone is reconnected, it is not an Allison Transmission issue; there is a problem with the vehicle's OEM wiring.

Wiring and Connector Failures

Wiring and connectors are the number one cause of problems in the field. Opens, shorts, and CAN high being connected to CAN low are among the most frequently encountered issues.

Termination Resistors

A J1939 network requires a 120 Ohm termination resistor at each end of the backbone (Figure R–3). With all controllers powered off and both termination resistors in place, an ohmmeter should read 60 Ohms across terminals A and B of the 3-way connector (Figure R–5), or Terminals C and D of the 9-way connector (Figure R–6). The test can be performed with controllers connected to the backbone because the impedance at the controllers is much higher than 60 Ohms and therefore does not affect the reading.

A measurement of 120 Ohms typically indicates that either one of the two termination resistors is not in place, or there is an open somewhere in the backbone of the network.

A measurement of 0 (zero) Ohms indicates that there is a short between the CAN high and CAN low wires of the network. The short may be in the backbone itself, or in one of the stubs connecting it to a controller.

Open Circuits

Open circuits in the CAN High (A) or CAN Low (B) sides of the backbone or in any of the stubs can affect one or more controllers on the network. While an open circuit in a stub will have the most impact on the controller attached to that stub, other devices on the network who normally receive information or expect a response from that controller will be impacted as well.

When there are multiple nodes attached to the network, and their connectors are accessible, an open circuit can be tracked by moving down the backbone from stub to stub looking at the datalink information present at each connector. When there is a difference in the amount of datalink traffic between two connection points, there is

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likely an open circuit somewhere on the stubs or the backbone between the two connection points. A DVOM may be used to detect activity.

Short Circuits

A short circuit can occur in the J1939 backbone or stubs between:

- CAN high and CAN low
- CAN high or CAN low and battery voltage
- CAN high or CAN low and ground

When a short circuit is present, typically multiple controllers on the network indicate an error of some sort, due to the loss of all communication between any of the nodes. For example, datalink-based instrument clusters will not function properly. Short circuits typically fall into one of the following categories:

- Mechanical failure—Insulation cut or scraped through, wires pinched, etc.
- Incorrectly wired pins on one or more of the controllers
- Missing connector seal(s), allowing water intrusion.

Inducted Noise

Inducted noise tends to be a much greater issue when J1939-15 (unshielded) cable is used. While the following routing tips are a good idea for shielded networks, they are critical when unshielded cable is used. J1939-15 cable routing must avoid the following by a minimum of 3 to 4 inches of physical separation:

- Solenoids
- Alternator
- Flasher modules
- High output CB radio
- Starter motor
- Relays
- Any high-current switching device.

Inducted noise is typically "event driven", or associated with an activity that involves operation of a high-current load near the network wiring. For example, "everytime I use my left turn signal, the ABS lamp acts up..."

To find noise sources, monitor datalink traffic under the following conditions:

- With the key switch on: Operate every input the driver has access to, such as the CB, blower motors, fans, air conditioning, flashers, turn signals, lights, horn, brakes, etc.
- With the engine running: Exercise every function on the vehicle as is possible, such as engaging the engine fan, turning on the air conditioning compressor, operating the dump bed, etc.

If errors or pauses in datalink traffic are noted during any specific activity, investigate the network wiring near the associated component(s).

Calibrations

After wiring, calibrations are the number two cause of problems in the field. Inappropriate calibration changes in the field can affect the operation of the Allison transmission, or the entire vehicle.

If a particular transmission or vehicle function worked prior to a calibration update of one of the controllers on the J1939 datalink, but does not function properly *afterwards*, it is likely that a customer-programmable value was changed on one or more controllers during the update. The same situation can exist for software upgrades, as well.

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In either event, the cause can be narrowed down by reloading the previous software and/or calibration and determining if the issue goes away.

From an Allison perspective, there are two common causes of miscalibration:

- An internal "auto-detect" process was completed by the TCM before all of the appropriate controllers on the vehicle were connected to the J1939 datalink. In this case, Allison DOC™ For PC–Service Tool can be used to reset the auto-detection process.
- A calibration was constructed with an incorrect datalink package as specified in the Production Calibration Configuration System (PCCS). In this case, a new calibration with the correct package will have to be made. Table R–1 illustrates Allison J1939 broadcast and receive parameters versus PCCS datalink package.

Outside of the Allison TCM programming, engine TCM programming can have the greatest affect on transmission operation. Electronic engines typically have many "customer programmable" items that can affect transmission operation, such as:

- Transmission type set incorrectly
- Incompatible engine governor selected
- Engine brake (compression or exhaust) options set incorrectly
- J1939 communication not activated.

Tables R–1 through R–4, on the following pages, provide an overview of J1939 messages and parameters sent and received by Allison 4th Generation Controller System. Support varies versus the datalink package in PCCS. Refer to Datalink Tech Data for details.

Table R–1. J1939 Broadcasts—TCM

PGN	SA	Rate	Byte	Bits	Parameters Sent	Remarks
00000 TSC1	03	12.5 MS[1]	(See Datalink Tech Data for Details)			⑥
59904 PGN Request	03	As Req'd	1–3	—	PGN of Requested Message	ON
61184 Proprietary A	03	100 ms	1–8	—	Proprietary Shift Selector Information	ON
61440 ERC1	16	100 ms	1	4–1	Retarder Torque Mode	ON ③
			2	—	Actual Retarder—Percent Torque	ON ③
			3	—	Intended Retarder—Percent Torque	ON ③
			4	2, 1	Engine Coolant Load Increase	ON ③
			5	—	SA of Controlling Device for Retarder Control	ON ③
			7	—	Retarder Selection, Non-Engine	ON ③
			8	—	Actual Max. Available Retarder—Percent Torque	ON ③
61442 ETC1	03	12.5 ms[1]	1	6,5	Shift in Progress	ON
				4,3	Torque Converter Lockup Engaged	ON
				2,1	Driveline Engaged	ON
			2,3	—	Transmission Output Shaft Speed	ON
			5	4,3	Progressive Shift Disable	ON
			6,7	—	Transmission Input Shaft Speed	ON
			8	—	SA of Controlling Device For Transmission Control	ON

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Table R–1. J1939 Broadcasts—TCM *(cont'd)*

PGN	SA	Rate	Byte	Bits	Parameters Sent	Remarks
61445 ETC2	03	100 ms	1	—	Transmission Selected Gear (range commanded)	ON
			2,3	—	Transmission Actual Gear Ratio	ON
			4	—	Current range (AT range attained)	ON
			5,6	—	Transmission Request Range (range selected)	ON
			7,8	—	Transmission Current Range (range attained)	ON
61452 ETC8	03	Varies[2]	1,2	—	Transmission Torque Converter Ratio	⑥
65098 ETC7	03	100 ms	1	8,7	Trans. Requests Range Display Flash State	ON
				6,5	Trans. Requests Range Display Blank State	ON
			2	8,7	Shift Inhibit Indicator	ON
				6,5	Transmission Engine Crank Enable	ON
				4,3	Active Shift Console Indicator	ON
			3	8,7	Transmission Mode 1 Indicator	ON
				6,5	Transmission Mode 2 Indicator	ON
				2,1	Transmission Mode 4 Indicator	ON
			4	8,7	Transmission Request Gear Feedback	ON
65099 TCFG2	03	Varies	1,2	—	Transmission Torque Limit	ON
65226 DM1	03 or 16	1000 ms when active	1	4,3	Amber Warning Light Status	ON
			⑧	—	Suspect Parameter Number	ON
			⑧	—	Failure Mode Identifier	ON
65242 SOFT	03	Request	1	—	Number of Software Identification Fields	ON
			2–N	—	Software Identification	ON
65249 RCFG	16	At power up, on request, and on 10% map change	1	8–5	Retarder Location	ON③
				4–1	Retarder Type	ON③
			2	—	Retarder Control Method	ON③
			⑧	—	Torque and Speed Map (See text for details)	ON③
			17,18	—	Reference Retarder Torque	ON③
65250 TCFG	03	Request	1	—	Number of Reverse Ratios	ON
			2	—	Number of Forward Ratios	ON
			⑧	—	Transmission Gear Ratio	ON
65259 CI	03	Request	1–5	—	Make	ON
			⑧	—	Model	ON
65272 TF	03	Request	5,6	—	Transmission Oil Temperature	ON
			7	—	Transmission Oil Level High/Low	ON④
			8	8–5	Transmission Oil Level Measurement Status	ON④
			8	4–1	Transmission Oil Level Countdown Timer	ON④
65275 RF	16	1000 ms	2	—	Hydraulic Retarder Oil Temperature	ON③

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Table R–2. J1939 Reception—TCM

PGN	Rate	Byte	Bits	Parameters Sent	Remarks
00000 TSC1(to DA16)	50 ms	(See Datalink Tech Data text for details)			33, 17, 00, 11, 39⑦
00256 TC1	50 ms	3	—	Transmission Requested Gear	05, 06
		6	8,7	Transmission Mode 4	05, 06
			4,3	Transmission Mode 2	33
		7	8,7	Selector Display Mode Switch	05, 06
61440 ERC1	100 ms	2	—	Actual Retarder—Percent Torque	15, 41, 00⑤⑧
		1	6,5	Retarder Enable—Brake Assist Switch	15, 41, 33
		7	—	Retarder Selection, Non-Engine	33
61441 EBC1	100 ms	1	6,5	Anti-lock (ABS) Active	11
			2,1	ASR Engine Control Active	11
		5	—	Engine Retarder Selection	33, 00⑤
61444 EEC1	Varies With Engine Speed	1	4-1	Engine/Retarder Torque Mode	00
		2	—	Driver's Demand Engine—Percent Torque	00
		3	—	Actual Engine—Percent Torque	00
		6	—	SA of Controlling Device For Engine Control	00
		8	—	Engine Demand—Percent Torque	00
61443 EEC2	50 ms	1	6,5	Road Speed Limit Status	00
			4,3	AL Kickdown Switch	00, 33, 17⑤⑥
		2	—	Accelerator Pedal (AP) Position	00, 33, 17⑤
		3	—	Percent Load at Current Speed	00
		6	1,2	Vehicle Acceleration Rate Limit Status	00
65214 EEC4	Request	1,2	—	Rated Power	00
65247 EEC3	250 ms	1	—	Nominal Friction—Percent Torque	00
		5	—	Est. Engine Parasitic Losses—Percent Torque	00
65249 RCFG	Request	17,18	—	Reference Retarder Torque	15, 41, 33⑤⑧
65251 ECFG	5000 ms and on request	20,21	—	Reference Engine Torque	00
		31,32	—	Engine Inertia	00
		33,34	—	Engine Default Torque Limit	00
65259 C1	Request	1–5	—	Make	00
		⑧	—	Model	00
65262 ET	1 S	1	—	Engine Coolant Temperature	00
65265 CCVS	100 ms	2, 3	—	Wheel-Based Vehicle Speed	00
		4	6, 5	Brake Switch	00, 33, 17⑤
		6	—	Cruise Control Set Speed	00, 33, 17⑤
		7	8–6	Cruise Control State	00, 33, 17⑤
			5–1	PTO State	00

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Table R–3. J1939 Broadcasts—Allison Shift Selector

PGN	SA	Rate	Byte	Bits	Parameters Sent	Remarks
00256 TC1	05 06	50 ms	3	—	Transmission Requested Gear	ON
				8,7	Transmission Mode 4	ON
			7	8,7	Selector Display Mode Switch	ON
60928 Address Claimed	05 06	As Req'd	See Allison 4th Generation Control Datalink Tech Data for details			ON
652421 Soft	05 06	Request	1	—	Number of Software Identification Fields	ON
			2–N		Software Identification	ON

Table R–4. J1939 Reception—Allison Shift Selector

PGN	Rate	Byte	Bits	Parameters Sent	Remarks
59504 PGN Request	Varies	1–3	—	PGN of Requested Message	03
61184 Proprietary A	100 ms	1–8	—	Proprietary Shift Selector Information	03
65098 ETC7	100 ms	2	4,3	Active Shift Console Indicator	03
			2,1	Transmission Mode 4 Indicator	03

Footnotes:

① The TCM does not support SAE-specified broadcast rate of 10 ms.

② 25 ms when torque converter active, 100 ms when torque converter is in lockup. TCM does not support SAE-specified broadcast rate of 20 ms.

③ Only broadcast in applications where the presence of an Allison driveline retarder has been auto-detected or forced 'ON' via calibration.

④ Only broadcast in applications where the presence of an Allison oil level sensor has been auto-detected or forced 'ON' via calibration.

⑤ Of the listed acceptable source addresses, the TCM locks onto the 'most preferred' source, as determined by auto-detect logic.

⑥ This parameter is calibration dependent and may not be present on the Datalink.

⑦ TCM supports reception from all acceptable source addresses, not just one.

⑧ TCM can support reception from more than one acceptable source address in a given installation.

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