



CONTROL SYSTEM DATA

ALLISON 6TH GENERATION CONTROLS

APPLICABLE MODELS: 1000 Product Family
2000 Product Family
2900 Product Family
3000 Product Family
4000 Product Family
eGen Power™

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List of Referenced Documents

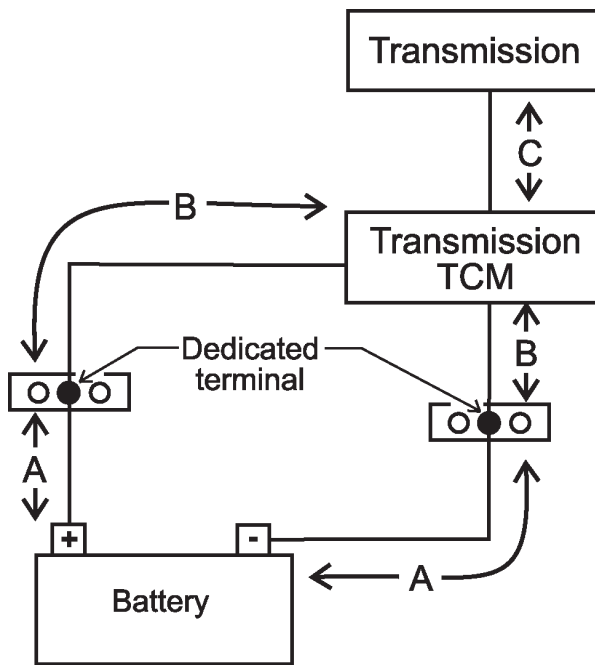
Revision History

ALLISON 6TH GENERATION CONTROLS – SYSTEM DATA

1.0 MAXIMUM POWER AND GROUND WIRE LENGTHS — BASED ON TOTAL CIRCUIT RESISTANCE REQUIREMENTS —

1.1 MAXIMUM POWER AND GROUND WIRE LENGTHS — 1000/2000, 2900, 3000, 4000 PRODUCT FAMILIES —

Input and output voltages for this control system are defined at the TCM pins. Voltage potentials develop along all cables and circuit traces depending on material, length, and thickness. The input and output voltages listed do not account for parasitic voltage drops in the vehicle wiring system. Vehicle design must accommodate parasitic voltages associated with vehicle wiring. Proper choices in wire lengths and thicknesses can reduce the effects of parasitic voltages. The following table provides a guide to the selection of conductors for the TCM power and ground circuits.



G4-108A

- Resistance for length A must be less than 1.0 m Ω .
- Total resistance for Lengths (A + B) must be 100 m Ω or less.

GA	m Ω per meter (ft) at 20° C	Maximum A + B Wire Length for:	
		Single Wire System* meter (ft.)	Double Wire System* meter (ft.)
6	1.2966 (0.3952)	77.1 (253)	154.2 (506)
8	2.0607 (0.6281)	48.5 (159)	96.9 (318)
10	3.2769 (0.9988)	30.5 (100)	61.0 (200)
12	5.22 (1.59)	18.9 (62)	37.8 (124)
14	8.27 (2.52)	11.9 (39)	23.8 (78)
16	13.19 (4.02)	7.3 (24)	14.6 (48)
18	20.96 (6.39)	N/A	9.1 (30)
Maximum C Wire Length: 12.2 meters (40 feet) Wire size must meet requirements in TD-173			
* Lengths based on standard annealed copper wire.			

NOTE: All data is applicable to both 12-volt and 24-volt installations.

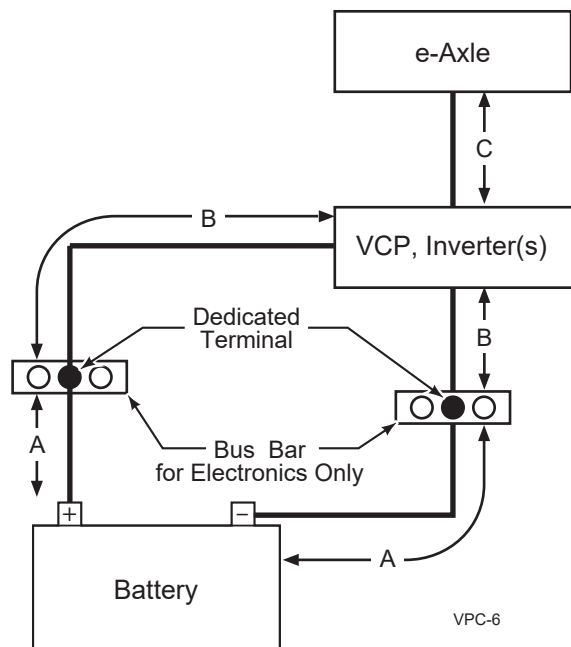
Conversions between Metric and U.S. units are not necessarily equivalent.

ALLISON 6TH GENERATION CONTROLS – SYSTEM DATA

1.0 MAXIMUM POWER AND GROUND WIRE LENGTHS — BASED ON TOTAL CIRCUIT RESISTANCE REQUIREMENTS —

1.2 MAXIMUM POWER AND GROUND WIRE LENGTHS — eGen Power™ e-Axle —

Input and output voltages for this control system are defined at the component pins. Voltage potentials develop along all cables and circuit traces depending on material, length, and thickness. The input and output voltages listed do not account for parasitic voltage drops in the vehicle wiring system. Vehicle design must accommodate parasitic voltages associated with vehicle wiring. Proper choices in wire lengths and thicknesses can reduce the effects of parasitic voltages. The following table provides a guide to the selection of conductors for the power and ground circuits for the various Allison eGen Power controls components.



- Total resistance for Lengths A + B must be 100 mΩ or less.
- Resistance for length A must be less than 1.0 mΩ.

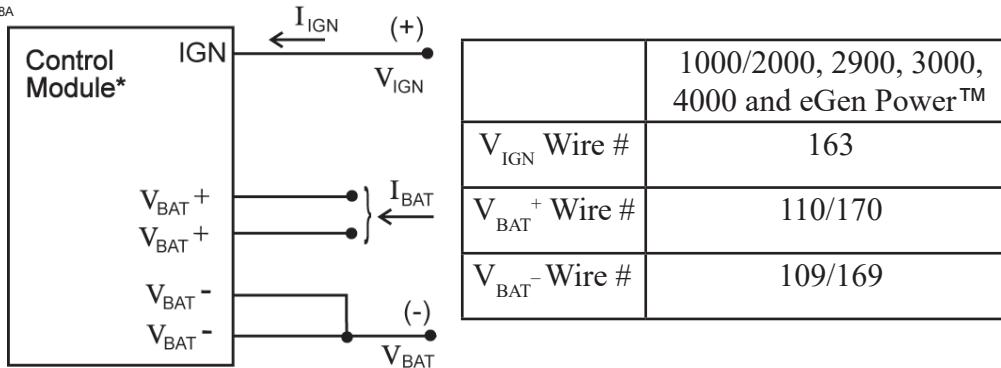
Allison recommends that the wire from the battery to the bus bars (Length A) be at least 1/0 gauge.

GA	mΩ per meter (ft.) at	Maximum A + B Wire Length for:	
		Single Wire System* meter (ft.)	Double Wire System* meter (ft.)
6	1.2966 (0.3952)	77.1 (253)	154.2 (506)
8	2.0607 (0.6281)	48.5 (159)	96.9 (318)
10	3.2769 (0.9988)	30.5 (100)	61.0 (200)
12	5.22 (1.59)	18.9 (62)	37.8 (124)
14	8.27 (2.52)	11.9 (39)	23.8 (78)
16	13.19 (4.02)	7.3 (24)	14.6 (48)
18	20.96 (6.39)	N/A	9.1 (30)
Maximum C Wire Length: 12.2 meters (40 feet)			
* Lengths based on standard annealed copper wire.			

NOTE: All data is applicable to both 12-volt and 24-volt installations.

2.0 CONTROL MODULE DATA

G4-118A



NOTES:

- All voltages and currents are as measured at the Control Module* pin.
- Wire lengths, connection points, terminal corrosion, and system current draw should be considered when choosing wire sizes and lengths for Control Module* battery power and battery return connections.
- Conversions between metric and U.S. units are not necessarily equivalent.

Control Module Configuration		12 - Volt	24 - Volt			
Control Module Model Designation *		C71x, C72x, C73x	C73x			
PARAMETER		VALUE	VALUE	UNITS		
Voltage Input at Control Module						
V _{BAT}	Min. Temporary Control Module Operation	9.0	9.0	Volts		
	Minimum Temporary CAN Communication	7.0	7.0	Volts		
	Minimum Continuous Operation	10.5	10.5	Volts		
	Maximum Continuous Operation	16.0	32.0	Volts		
	Minimum While Engine Cranking	4.5	4.5	Volts		
	Jump Start	26.5	36.0	Volts		
Reverse Voltage Protection from 0.1 ohm source		16.0	32.0	Volts		
Ignition Sense (V _{IGN}) Minimum On		9.0	9.0	Volts		
Ignition Sense (V _{IGN}) Maximum Off		1.9	1.9	Volts		
Current Input at Control Module		1000/2000 eGen Power™	2900, 3000/4000	1000/2000 eGen Power™	2900, 3000/4000	
I _{BAT}	Maximum During Normal Operation	4.0	6.0	4.0	6.0	Amperes
	Maximum After Ignition Shutdown	0.5		0.6		mA
I _{IGN}	Maximum Ignition Input Current	15.0		15.0		mA
I _{IGN}	Maximum Off State Current Leakage	0.38		0.38		mA
VIM Relay Contacts **						
	Maximum Continuous	10.0		10.0		Amperes
	Maximum Intermittent	14.0		14.0		Amperes
	Maximum Continuous All Relays	30.0		30.0		Amperes
	Minimum	5.0		5.0		Amperes

* C71x, C72x, C73x (Chassis-Mount for 1000/2000/3000/4000) (x=V for VR speed inputs, x=H for Hall Effect speed inputs, x=M for mixed speed inputs)

** VIM = Vehicle Interface Module; Values are for inductive loads

2.0 CONTROL MODULE DATA (CONTINUED)

Control Module Model Designation *	C71x, C72x, C73x	
PARAMETER	VALUE	UNITS
Temperature Limits**		
Operating – Maximum Continuous	105 (220)	°C (°F)
Operating – Minimum Exposure (Startup)	- 40 (- 40)	°C (°F)
Non-Operating – Maximum Continuous	140 (284)	°C (°F)
Non-Operating – Minimum Continuous	- 54 (- 65)	°C (°F)
Component Weight		
Control Module Assembly	0.63 (1.39)	kg (lb)

* C71x, C72x, C73x (Chassis-Mount for 1000/2000/3000/4000) (x=V for VR speed inputs, x=H for Hall Effect speed inputs, x=M for mixed speed inputs)

** Temperature Limits are for still air surrounding the component (measured 20mm from component)

Conversions between Metric and U.S. units are not necessarily equivalent.

3.0 ALLISON SHIFT SELECTOR DATA

NOTES:

- All voltages and currents are as measured at the shift selector pin.
- Wire lengths, connection points, terminal corrosion, and system current draw should be considered when choosing wire sizes and lengths for power and ground requirements.
- Conversions between metric and U.S. units are not necessarily equivalent.

PARAMETER	VALUE	UNITS
Voltage Input		
Minimum Temporary Operation	6.0	Volts
Minimum Continuous Operation	9.0	Volts
Maximum Continuous Operation	32.0	Volts
Minimum While Engine Cranking	6.0	Volts
Maximum Reverse Battery Continuous (with no damage)	32.0	Volts
Maximum Ignition Off	1.0	Volts
Current Input		
Typical at Nominal Input Voltage	120	mA
Maximum Current Draw (I_{DRAW}) at Any Continuous V_{DC}	400	mA
Maximum at standby	0.6	mA
Maximum Dimmer	100	mA
Maximum Ignition Off Current Leakage	0.38	mA
Temperature Limits *		
Operating: Maximum Continuous	85 (185)	°C (°F)
Operating: Minimum Exposure (Startup)	- 40 (- 40)	°C (°F)
Non-Operating: Maximum Continuous	105 (220)	°C (°F)
Non-Operating: Minimum Continuous	- 54 (- 65)	°C (°F)
Component Weight		
Lever Selector	1.15 (2.54) **	kg (lb)
Standard Keypad Pushbutton Selector	0.22 (0.49)	kg (lb)
Common Keypad Pushbutton Selector	0.24 (0.53)	kg (lb)
Compact Keypad Pushbutton Selector	0.25 (0.56) **	kg (lb)
Compact Alternate Keypad Pushbutton Selector	0.26 (0.57) **	kg (lb)
Strip Pushbutton Selector (all versions)	0.21 (0.45) **	kg (lb)
Digital Display		
Minimum brightness at maximum intensity	350 Foot-Lamberts at 150 cm **	
Color	Blue-green (490-500 nanometers)	

* Values are for still air surrounding the component (measured 20mm from component)

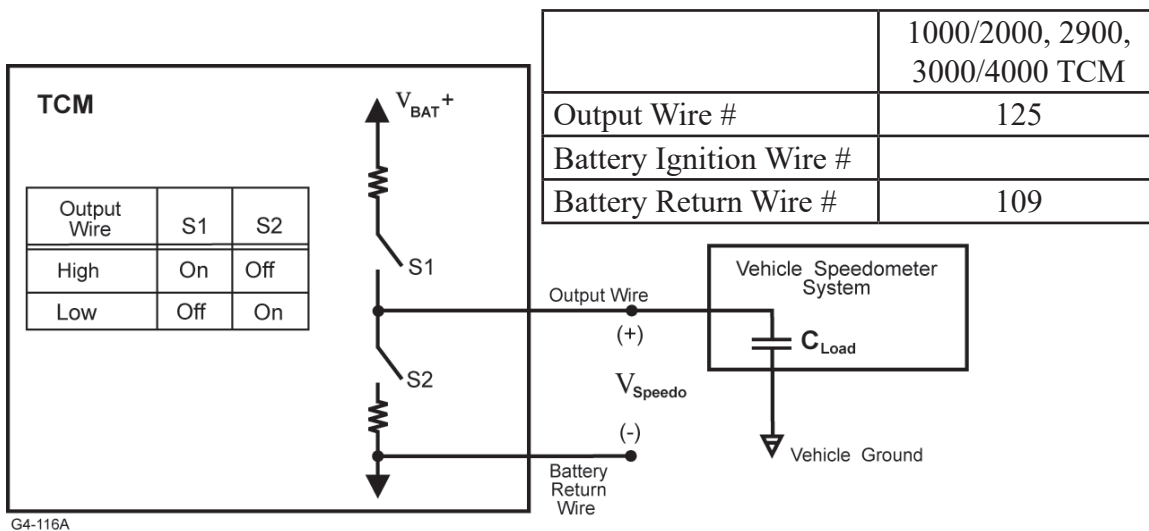
** Estimated data

4.0 OTHER CONTROLS COMPONENTS*

PARAMETER	VALUE	UNITS
HARNESS CONNECTORS:		
Temperatures: Maximum Exposure	120 (250) **	°C (°F)
Intermittent Heat Soak	150 (300) ***	°C (°F)
For harness information, refer to: Technical Document 173 (TD-173) for Allison 4th & 5th & 6th Generation Controls.		
THROTTLE POSITION SENSOR (TPS)		
Temperatures: Maximum Continuous	120 (250) ***	°C (°F)
Intermittent Heat Soak	150 (300) ***	°C (°F)
VEHICLE INTERFACE MODULE (VIM):		
Component Weight:	1.05 (2.32)	kg (lb)
Operating Temperatures:		
Maximum Continuous	85 (185) ***	°C (°F)
Minimum Exposure (Start-Up)	– 40 (– 40) ***	°C (°F)
Non-Operating Temperatures:		
Maximum Continuous	105 (220) ***	°C (°F)
Minimum Continuous	– 54 (– 65) ***	°C (°F)
<p>* For Control Module data, refer to Table 2. For Shift Selector data, see Table 3</p> <p>** Values are for surface of the component</p> <p>*** Values are for still air surrounding the component (measured 20mm from component)</p>		

Conversions between Metric and U.S. units are not necessarily equivalent.

5.0 SPEEDOMETER OUTPUT



WAVEFORM CHARACTERISTICS

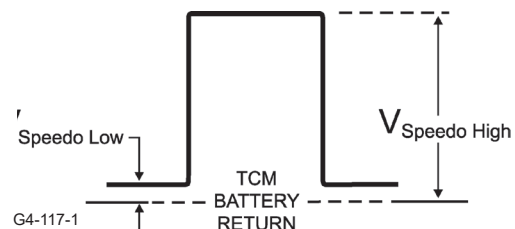
NOTE: All data is applicable to both 12-volt and 24-volt installations.

PARAMETER	MINIMUM	TYPICAL	MAXIMUM	UNIT	NOTES
Duty Cycle	45	50	55	%	
$V_{\text{Speedo Low}}$	0	—	0.5	Volts	
$V_{\text{Speedo High}}$	$V_{\text{BAT}} - 2.5$	—	V_{BAT}	Volts	
Source Current *	—	—	8	mA	@ $V_{\text{SPEEDO}} = V_{\text{BAT}} - 2.0$ @ $V_{\text{SPEEDO}} = 0.5 \text{ v}$
Sink Current **	—	—	8	mA	
Frequency All Models	—	8, 16, or 40	—	Pulses per Output Rev.	See NOTE below.
Load Capacitance (C_{Load})	—	—	0.006	μF	Depends on vehicle's speedometer system.

* When V_{Speedo} is High

** When V_{Speedo} is Low

NOTE: This signal will not accurately represent speed below a low-end threshold. Before using this signal to represent very low vehicle speed, the validity of the signal must be verified by the vehicle system designer or installer. Such analysis must confirm both the low-speed signal strength and waveform, preferably using an oscilloscope.

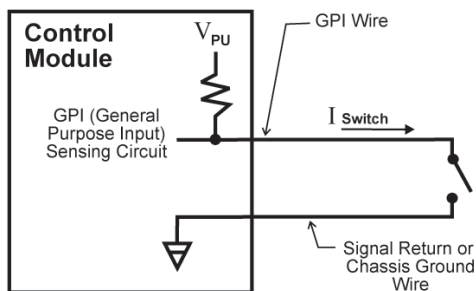


- Under no load condition, rise and fall time is measured at 10% and 90% of peak voltage and is no longer than 10% of period.
- Waveform rise and fall times will vary as a function of the load impedance.

6.0 INPUT AND OUTPUT REQUIREMENTS

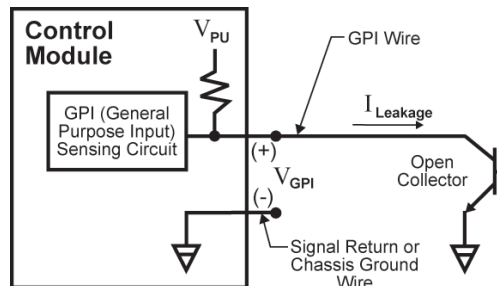
6.1 SWITCH-TO-GROUND INPUTS

Resistance Based Circuit



G5-005

Voltage / Current Based Circuit



G5-006

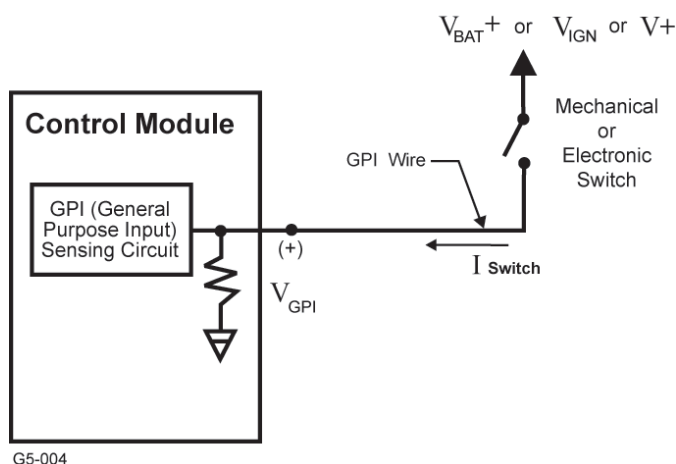
	1000/2000, 2900, 3000/4000 TCM, eGen Power™ VPC	Allison Selector Keypad or Lever
GPI Wire #	101, 117, 121, 122, 142, 157, 161, 162, 179	Not Yet Available
Signal Return Wire #	103	N/A

Parameter	Min.	Nom.	Max.	Units	Notes
Input Activated:					
• R _{Switch}	0	—	200	Ohms	R _{Switch} less than or equal to 10 ohms V _{GPI} is defined for an open collector transistor output as referenced to the signal return pin at the control module.
• I _{Switch}	—	5	—	mA	
• V _{GPI}	0	—	3.0	Volts	
Input Deactivated:					
• R _{Switch}	10	—	—	kOhms	I _{Leakage} is the leakage current of an open collector transistor. V _{GPI} is defined for an open collector transistor output as referenced to the signal return pin at the control module. V _{PU} is present whenever the Control Module is on
• I _{Leakage}	0	—	500	µA Volts	
• V _{GPI}	4.0	—	—	Volts	
• V _{PU}	—	5.0	—	Volts	
NOTE: All data is applicable to both 12-volt and 24-volt installations.					

- Do NOT connect or switch wire 103 to battery return, to vehicle chassis, or to any wire other than an Allison Switch-to-Ground Input wire.

6.0 INPUT AND OUTPUT REQUIREMENTS (CONTINUED)

6.2 SWITCH-TO-BATTERY INPUTS



G5-004

	1000/2000, 2900, 3000/4000 TCM, eGen Power™ VPC	Allison Selector Keypad or Lever
GPI Wire #	102, 123, 143	Not Yet Available
Battery Ignition Wire #	163	N/A

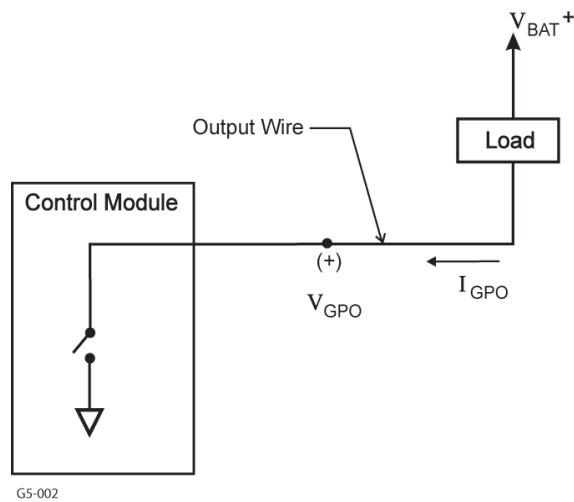
Parameter	Min.	Max.	Units	Notes
Input Activated:				
• R_{Switch}	—	2	kOhms	R_{Switch} less than or equal to 10
• I_{Switch}	—	15	mA	
• V_{GPI}	4.0	—	Volts	
Input Deactivated:				
• R_{Switch}	200	—	kOhms	$I_{Leakage}$ is the leakage current
• $I_{Leakage}$	0	500	μA	
• V_{GPI}	—	3.0	Volts	

NOTE: All data is applicable to both 12-volt and 24-volt installations.

- All voltages are as measured at the Control Module or Selector pins.
- Problems can be averted by minimizing the voltage differentials between the Allison Control Module ground and the ground of voltage source based GPI inputs.

6.0 INPUT AND OUTPUT REQUIREMENTS (CONTINUED)

6.3 SWITCH-TO-GROUND OUTPUTS



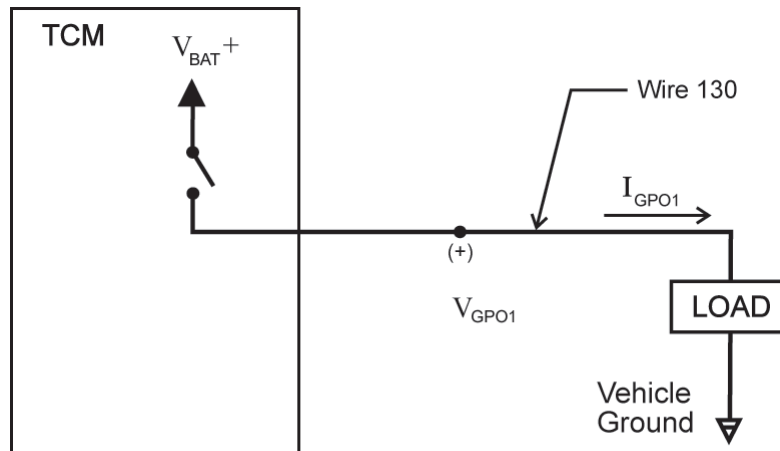
	1000/2000, 2900, 3000/4000 TCM, eGen Power™ VPC	Allison Selector Keypad or Lever
GPI Wire #	104, 105, 113, 124, 145, 150, 164, 165 (Reverse Warning), 129 (Check Trans Light)	Not Yet Available

Parameter	Min.	Max.	Units	Notes
Signal Active:				
• V_{GPO}	—	1.25	Volts	at $I_{GPO} = 500$ mA
• I_{GPO}	—	500	mA	at $V_{GPO} = 1.25$ volt
Signal Inactive:				
• TCM On: I_{GPO}	—	150	μA	
• TCM Off: I_{GPO}	—	20	μA	
NOTE: All data is applicable to both 12-volt and 24-volt installations.				

- All voltages are as measured at the Control Module or Selector pin.

6.0 INPUT AND OUTPUT REQUIREMENTS (CONTINUED)

6.4 SWITCH-TO-BATTERY OUTPUT



G5-003

– 3000/4000 Product Families Only –

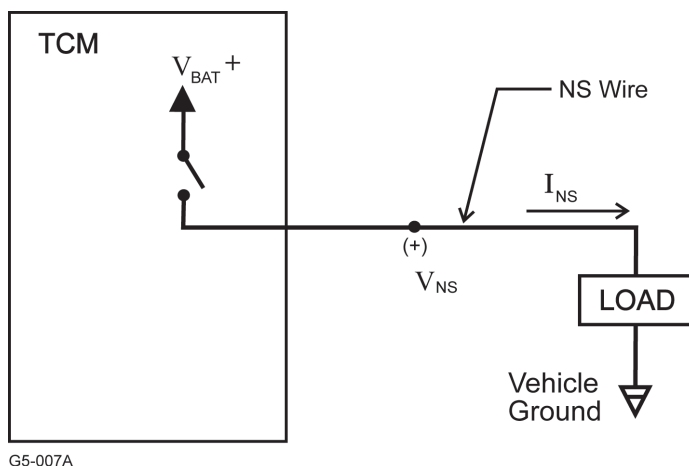
Parameter	Min.	Max.	Units	Notes
Signal Active:				
• V_{GPO1}	$(V_{BAT} - 1.26 \text{ v})$	V_{BAT}	Volts	Min. V_{GPO1} when $I_{GPO1} = 500 \text{ mA}$
• I_{GPO1} (Max. Source Current)	—	500	mA	Max. I_{GPO1} when, $V_{GPO1} = (V_{BAT} - 1.2) \text{ volts}$
Signal Inactive:				
• I_{GPO1}				
– TCM On:	—	100	μA	(Leakage Current when inactive)
– TCM Off:	—	20	μA	(Leakage Current when inactive)

NOTE: All data is applicable to both 12-volt and 24-volt installations.

- All voltages are as measured at the TCM pin.

6.0 INPUT AND OUTPUT REQUIREMENTS (CONTINUED)

6.5 NEUTRAL START OUTPUT



	1000/2000, 2900, 3000/40000 TCM	Allison Selector Keypad or Lever
Neutral Start Wire	141	N/A

Parameter	Min.	Max.	Units	Notes
Signal Active: • V_{NS} • I_{NS} (Max. Source Current)	$(V_{\text{Battery Power}} - 1.58 \text{ v})$ —	$V_{\text{Battery Power}}$ 800	Volts mA	Min. V_{NS} when $I_{NS} = 800 \text{ mA}$
Signal Inactive: • I_{NS} – TCM On: – TCM Off:	— —	100 20	μA μA	(Leakage Current when inactive) (Leakage Current when inactive)

NOTE: All data is applicable to both 12-volt and 24-volt installations.

- All voltages are as measured at the TCM pin.
- Once activated, the Neutral Start output will remain On down to V_{BAT} of 4.5 volts.
- Neutral Start is defined only for passive loads such as a relay. The Neutral Start signal is not intended to be used as a direct input to other controllers.

LIST OF REFERENCED DOCUMENTS

Technical Documents (TD's)

- [TD-173. Wiring Harnesses for Transmissions with Allison 4th, 5th & 6th Generation Controls](#)

REVISION HISTORY

June 2, 2022

- Added the 2900 Product Family

January 27, 2022

- In 2.0, changed the component weight to 0.63 kg (1.39 lb).

September 18, 2021

- In 5.0, changed the maximum load capacitance of the speedometer output from 0.1 to 0.006 μ F.

April 8, 2021

- Updated with eGen Flex and eGen Power controller information.

July 27, 2020

- Created, Allison 6th Generation Controls - Control System Data.