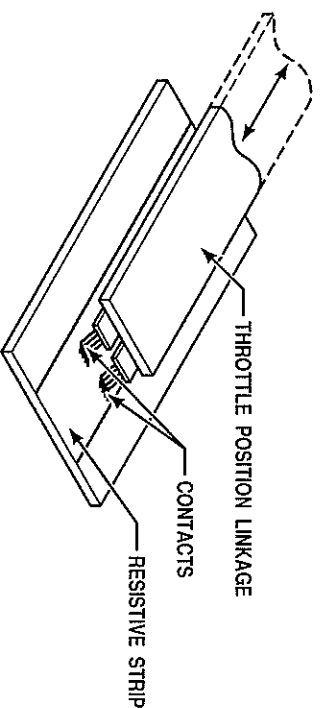


APPENDIX F—THROTTLE POSITION SENSOR ADJUSTMENT

A. Description of Operation (Figure F-1)

- To properly communicate throttle position to the Transmission Control Module (TCM), the throttle position sensor must convert its mechanical movement to an electrical form the TCM can understand. To accomplish this, contacts move across a resistive strip inside the sensor which translates position into voltage (Figure F-1).



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Figure F-1. Throttle Position to Voltage Conversion

- Each position gives a different voltage. The TCM then converts this voltage into percent. Each millimeter of travel converts to approximately 0.110 volts. Figure F-2 diagrams the voltage and throttle movement relationship.

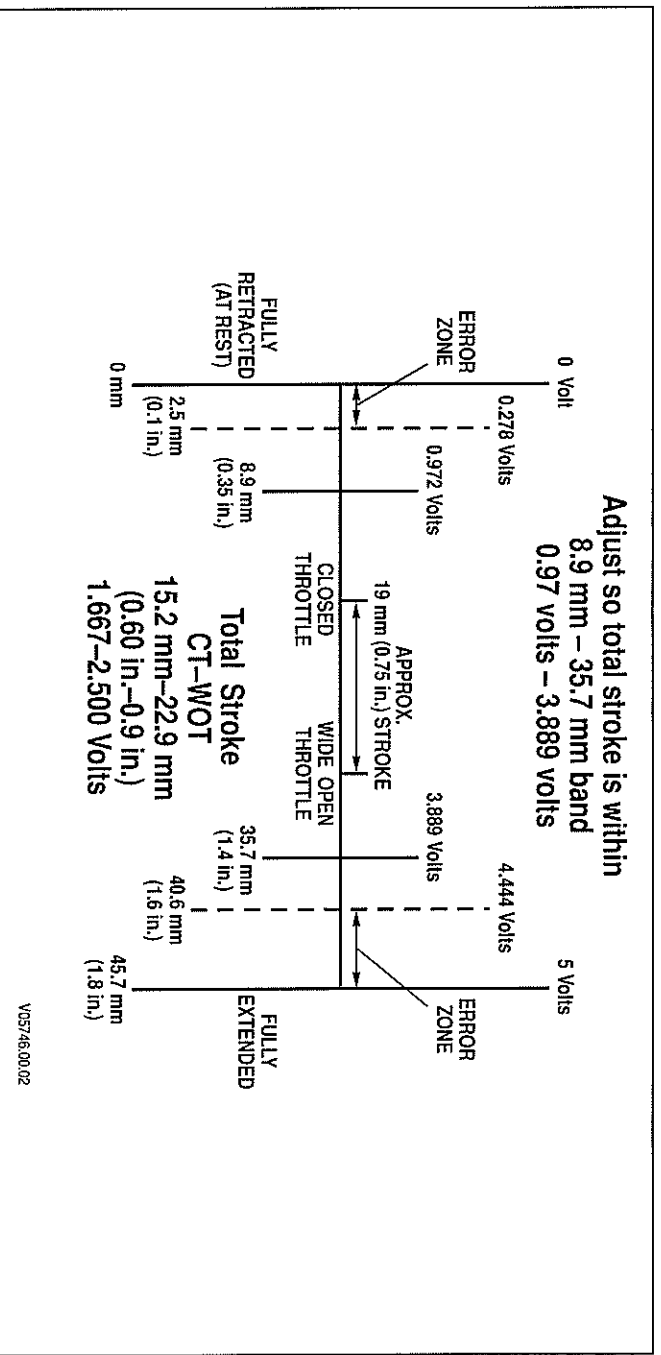


Figure F-2. Throttle Position Determination Diagram

- Throttle percent is proportional to the amount of travel of the throttle position sensor (Table F-1). Therefore a small amount of travel corresponds to a low throttle percentage and a large amount of travel corresponds to a high throttle percentage (Table F-1).
- The throttle position sensor (TPS) is self-calibrating within its normal range of operation. Each time the vehicle is started and the TCM is initialized, the idle position that is stored for closed throttle is increased from its previous lowest reading. Also, the wide open throttle position is reduced from its previous highest reading. Once the new position is read from the TPS, the idle and wide open

APPENDIX F—THROTTLE POSITION SENSOR ADJUSTMENT

throttle set points are continuously readjusted to the lowest and highest points, respectively. This compensates for fuel control system wear or previous mechanical adjustment. One area of particular concern is when the throttle sensor extends into the error zone. This indicates a TPS misadjustment to the TCM, and 100 percent throttle is assumed until readjustment is performed. Simply clearing the DTC will not resolve the situation; use the Allison DOC[™] For PC-Service Tool to reset the TPS calibrations after a TPS adjustment.

B. Throttle Position Sensor (TPS) Adjustment

When properly installed by the equipment manufacturer (Figure F-3), the TPS should not require adjustment. Confirm that the throttle sensor is installed to manufacturer specifications before adjusting the throttle position sensor. The idle position should be approximately 8.9 mm or 0.97 volts or higher, and full throttle position should be approximately 35.7 mm or 3.889 volts or lower. The TPS is self-calibrating, meaning there is no optimum closed position or wide open position. As long as the travel is within the 8.5–35.7 mm range the TPS is set properly. A total stroke of 15.2–22.9 mm **must be maintained**. Watch the movement of the throttle sensor as the controls move it through its full stroke. Be sure there is no misalignment or obstruction to smooth movement through the full stroke. Make certain the idle and full throttle positions are not in the error zones (Figure F-2). The error zones occur when the idle position is less than 2.5 mm, or when the full throttle position is more than 40.6 mm. When idle or wide open throttle positions are in the error zones, the TCM will log a code. When a TPS code is logged, the TCM assumes a default throttle setting which will negatively affect shift quality.

NOTE: Use Test Harness J 41339 for measuring voltages.

Table F-1.

mm	Volts	mm	Volts
0	0	24	2.634
1	0.110	25	2.744
2	0.220	26	2.854
3	0.329	27	2.964
4	0.439	28	3.073
5	0.549	29	3.183
6	0.659	30	3.293
7	0.768	31	3.403
8	0.878	32	3.512
9	0.988	33	3.622
10	1.098	34	3.732
11	1.207	35	3.842
12	1.317	36	3.951
13	1.427	37	4.061
14	1.537	38	4.171
15	1.646	39	4.281
16	1.756	40	4.390
17	1.866	41	4.500
18	1.976	42	4.610
19	2.085	43	4.720
20	2.195	44	4.829
21	2.305	45	4.939
22	2.415	46	5.049
23	2.524		

APPENDIX F—THROTTLE POSITION SENSOR ADJUSTMENT

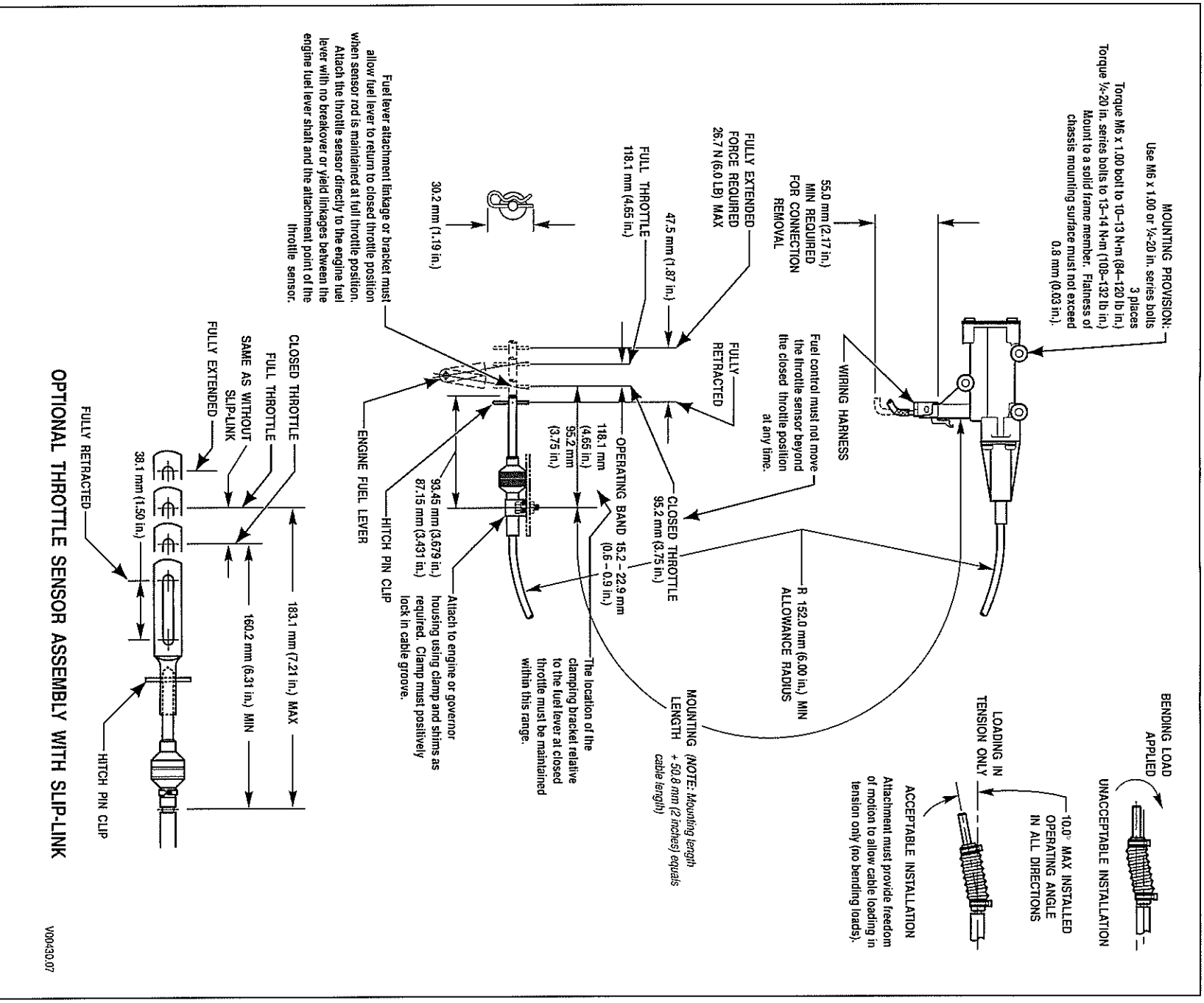


Figure F-3. Throttle Position Sensor Adjustment

APPENDIX F—THROTTLE POSITION SENSOR ADJUSTMENT

Allison Transmission only supplies the detail parts of these assemblies for both service requirements and support equipment requirements to OEMs and DOEMs. Here is the list of detail parts that are attached to the detail throttle position sensor to achieve the different configurations.

Configuration	Description	Part Number	Quantity
Chassis-mounted with Slip-Link	Throttle Position Sensor x length	Various	1
	Slip-Link	29503631	1
Engine-mounted with Slip-Link	Throttle Position Sensor x length	Various	1
	Slip-Link	29503631	1
	Engine Bracket	29500824	1
	Grommet	29509441	3
	Ferrule	29509442	3
	0.250-20 x 2.250 long; bolt with nylon patch	25944294	3
	Throttle Position Sensor x length	Various	1
Transmission-mounted (right or left) with Slip-Link	Slip-Link	29503631	1
	Engine Bracket	29508371	1
	Grommet	29509441	3
	Ferrule	29509442	3
	0.250-20 x 2.250 long; bolt with nylon patch	2954494	3

The bolt for attaching the throttle sensor to the ferrules in engine and transmission brackets is torqued to 8–11 N·m (72–98 inch lbs).

APPENDIX G—WELDING ON VEHICLE/VEHICLE INTERFACE MODULE

G-1. WELDING ON VEHICLE

When frame or other welding is required on the vehicle, take the following precautions to protect the electronic control components:

1. Disconnect the wiring harness connectors at the transmission electronic control unit.
2. Disconnect the positive and negative battery connections, and any electronic control ground wires connected to the frame or chassis.
3. Cover electronic control components and wiring to protect them from hot sparks, etc.
4. Do not connect welding cables to electronic control components.

WARNING!

Do not jump start a vehicle with arc welding equipment. Arc welding equipment's dangerously high currents and voltages cannot be reduced to safe levels.

G-2. VEHICLE INTERFACE MODULE

The Allison Vehicle Interface Module (VIM) containing all Allison system relays and fuses must be used as the interface to all vehicle wiring. Refer to Figure G-2 for VIM component location and pin-out. To close an open VIM, tighten the bolts in the numerical order shown in Figure G-1 to provide a sealed, water-tight box. Torque the bolts to 5–8 N·m (4–6 lb ft).

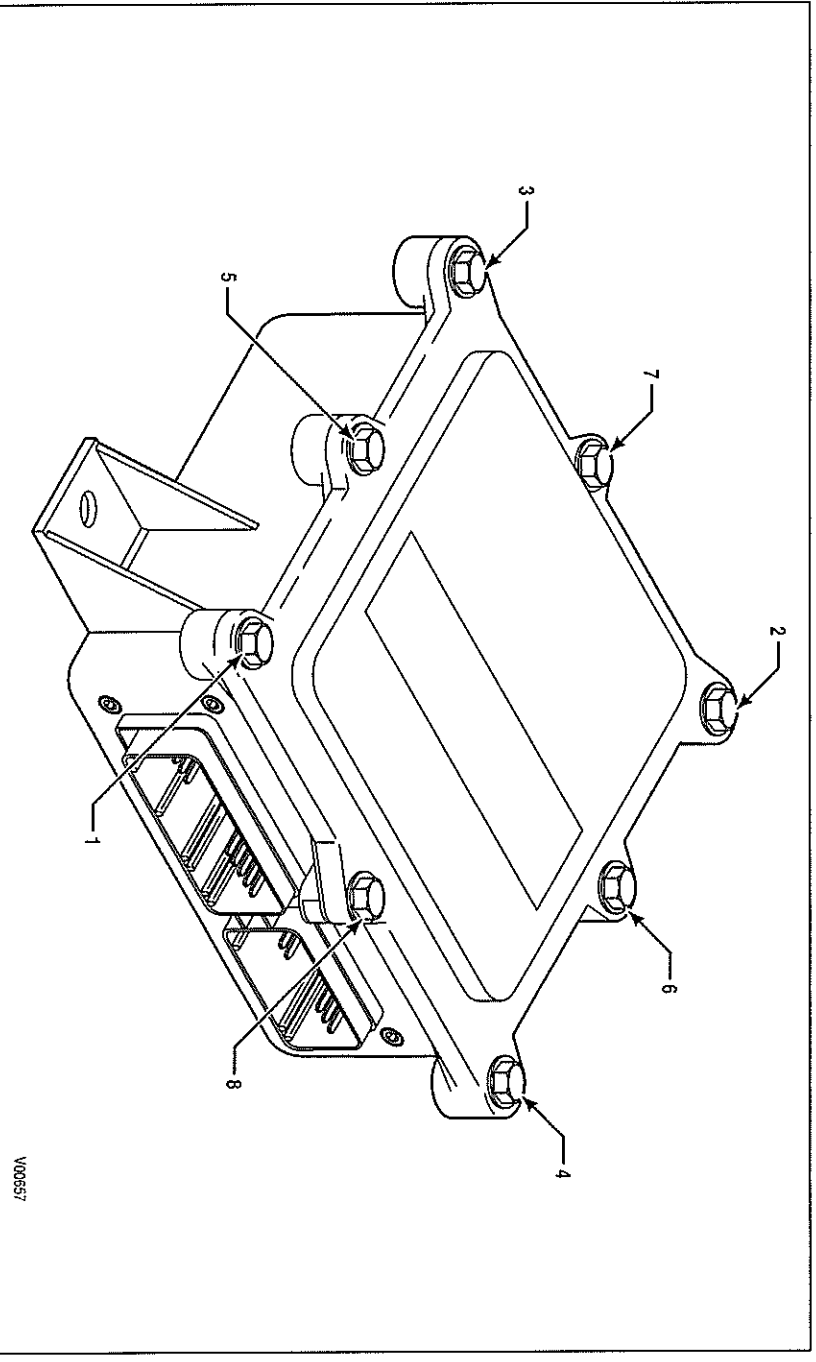


Figure G-1. Vehicle Interface Module (VIM)

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APPENDIX G—WELDING ON VEHICLE/VEHICLE INTERFACE MODULE

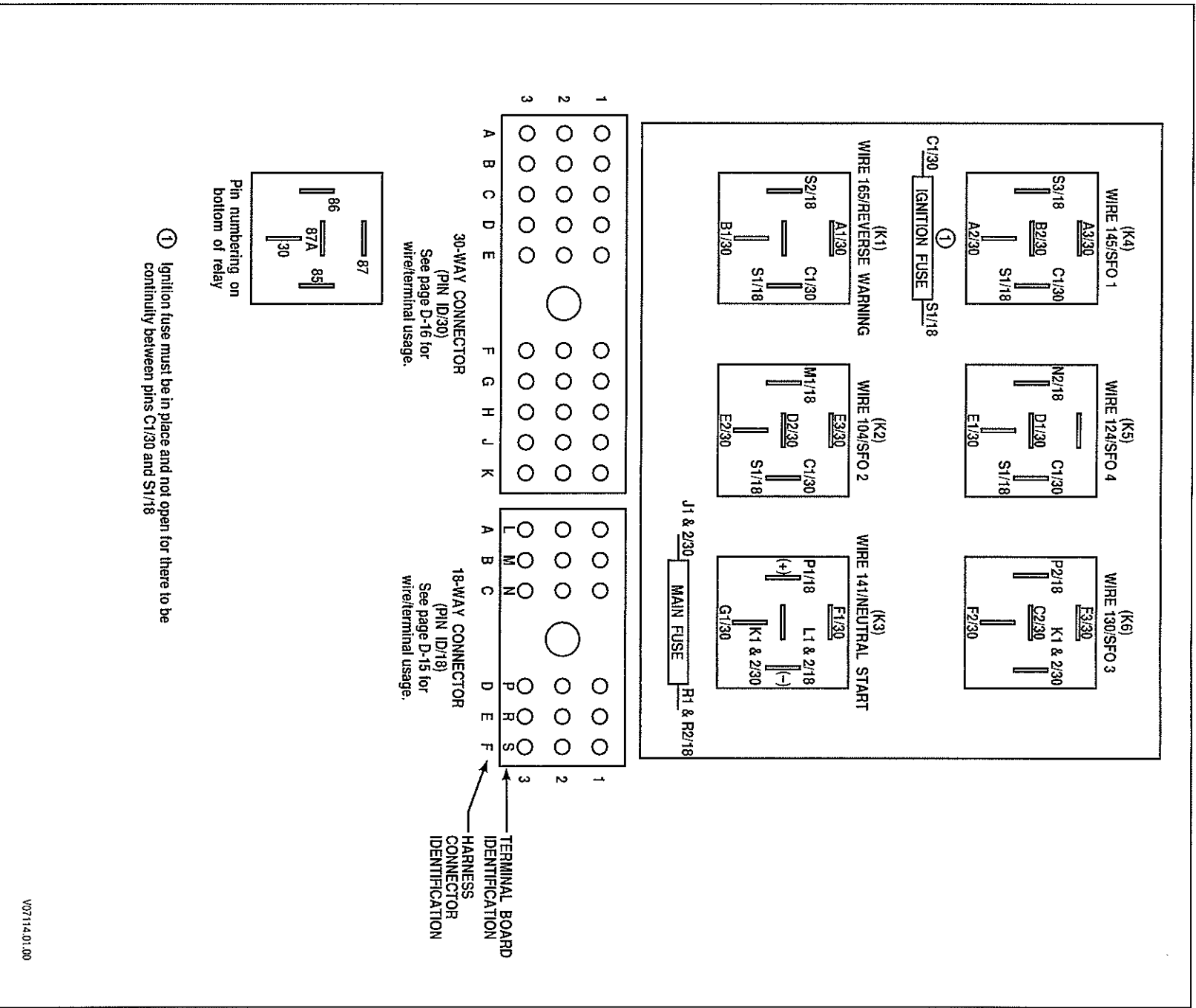


Figure G-2. VIM Components Location and Pin-Out Diagram

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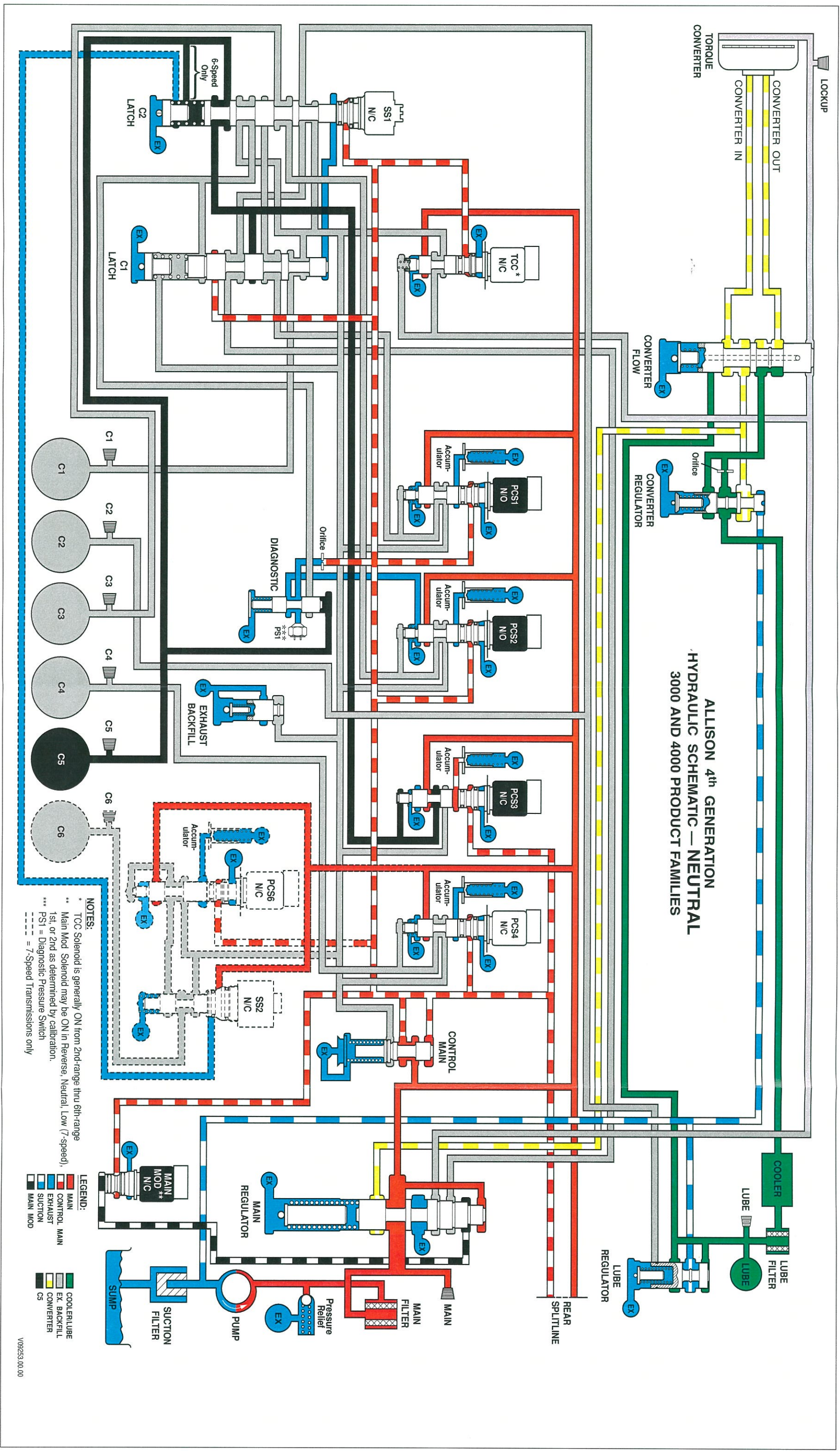
APPENDIX H—HYDRAULIC SCHEMATICS

Figure	Description	Page No.
H-1	3000 and 4000 Product Families—Neutral	H-3/H-4
H-2	3000 and 4000 Product Families—Reverse	H-5/H-6
H-3	3000 Product Family—7-Speed, Low Range	H-7/H-8
H-4	4000 Product Family—7-Speed, Low Range	H-9/H-10
H-5	3000 and 4000 Product Families—First Range	H-11/H-12
H-6	3000 and 4000 Product Families—Second Range	H-13/H-14
H-7	3000 and 4000 Product Families—Third Range	H-15/H-16
H-8	3000 and 4000 Product Families—Fourth Range	H-17/H-18
H-9	3000 and 4000 Product Families—Fifth Range	H-19/H-20
H-10	3000 and 4000 Product Families—Sixth Range	H-21/H-22
H-11	3000 Product Family—Retarder OFF	H-23/H-24
H-12	3000 Product Family—Retarder ON	H-25/H-26
H-13	4000 Product Family—Retarder OFF	H-27/H-28
H-14	4000 Product Family—Retarder ON	H-29/H-30

APPENDIX H—HYDRAULIC SCHEMATICS

NOTES

APPENDIX H—HYDRAULIC SCHEMATICS



APPENDIX H — HYDRAULIC SCHEMATICS

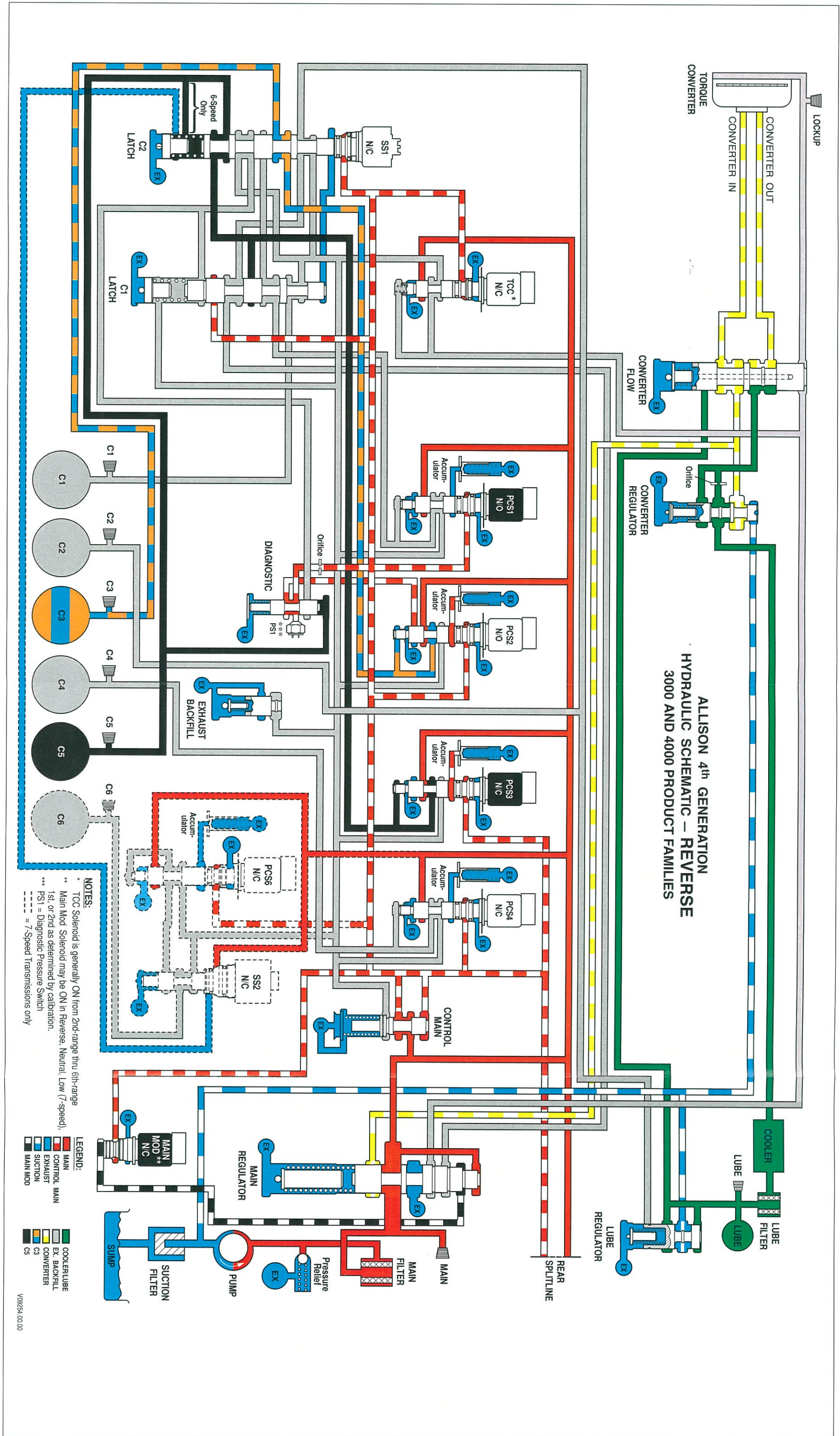


Figure H-2. 3000 and 4000 Product Families Hydraulic Schematic — Reverse

APPENDIX H—HYDRAULIC SCHEMATICS

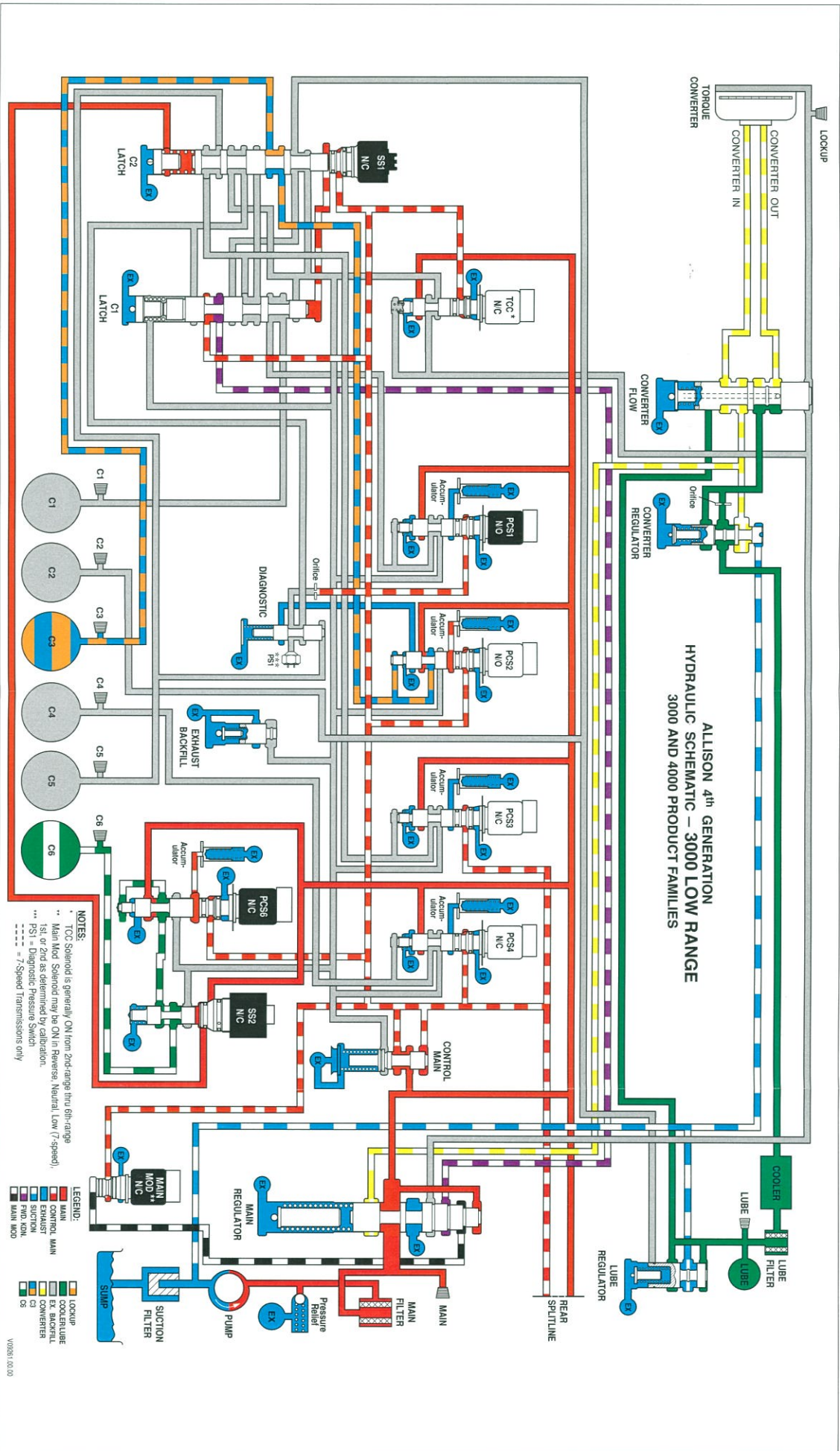


Figure H-3. 3000 Product Family Hydraulic Schematic—7-Speed, Low Range