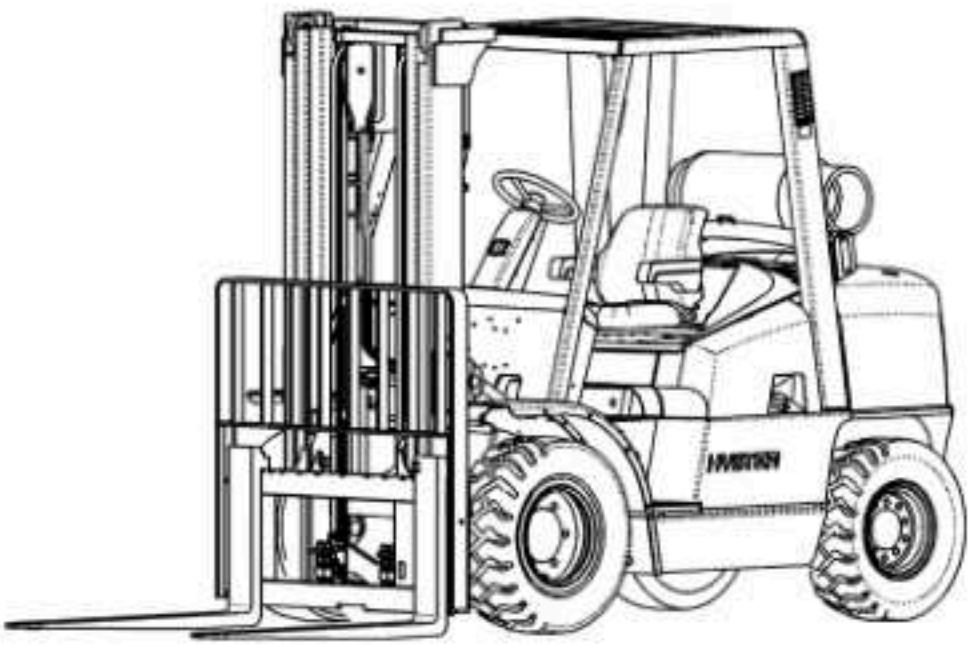
SERVICE MANUAL

H70-120XM (L005)



FORM 1560150 Rev. 03/04

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H70-120XM (L005)
SERVICE MANUAL CONTENTS

Section	SRM Number	Rev Date
FRAME	0100 SRM 0726	11/03
OPERATOR'S CAB	0100 SRM 0778	02/04
GM V-6 4.3L ENGINE	0600 SRM 0590	11/03
PERKINS DIESEL ENGINE 1104 (RE)	0600 SRM 1070	12/03
COOLING SYSTEM	0700 SRM 0740	02/04
ELECTRONIC CONTROLLED LPG/GASOLINE FUEL SYSTEM GM 3.0L	0900 SRM 1088	03/04
& 4.3 EPA COMPLIANT ENGINES	0900 SRM 1088	03/04
2-SPD POWERSHIFT TRANSMISSION - DESCR / OPER	1300 SRM 0727	09/03
2-SPD POWERSHIFT TRANSMISSION - REPAIR	1300 SRM 0728	09/03
SINGLE-SPD POWERSHIFT TRANS - DESCR / OPER	1300 SRM 0751	09/03
SINGLE-SPD POWERSHIFT TRANSMISSION - REPAIR	1300 SRM 0752	09/03
DRIVE AXLE	1400 SRM 0731	09/03
STEERING CONTROL UNIT	1600 SRM 0732	10/03
STEERING AXLE	1600 SRM 0733	09/03
BRAKE SYSTEM	1800 SRM 0734	09/03
HYDRAULIC SYSTEM	1900 SRM 0743	10/03
HYDRAULIC GEAR PUMP	1900 SRM 0753	09/03
MAIN CONTROL VALVE	2000 SRM 0754	12/03
TILT CYLINDERS	2100 SRM 0735	09/03
ALTERNATOR	2200 SRM 0002	10/03
STARTER	2200 SRM 0755	10/03
INSTRUMENT PANEL INDICATORS and SENDERS	2200 SRM 0756	11/03
ELECTRONIC ENGINE CONTROL-DESCR/OPER (GM 4.3L)	2200 SRM 0766	08/02
ELECTRONIC ENGINE CONTROL-REPAIR (GM 4.3L)	2200 SRM 0767	08/02
ELECTRONIC CONTROL MODULE (ECM) DIAGNOSTIC	2200 SRM 1090	01/04
TROUBLESHOOTING GM 3.0L & 4.3L EPA COMPLIANT ENGINES	2200 SRM 1090	01/04
HIGH VOLTAGE SWITCH (HVS) IGNITION GM 4.3L EPA COMPLIANT	2200 SRM 1097	12/03
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CAPACITIES and SPECIFICATIONS	8000 SRM 0738	09/03
DIAGRAMS	8000 SRM 0757	12/03

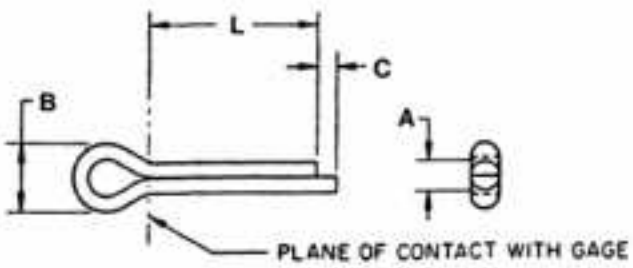
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Table 8. Cotter Pin Dimensional Data

Nominal Size	Shank Diameter A		Head Dia. B	Length of Extended Prong C		Recommended Hole Size	
	max	min	min	max	min	min	max
1.00 mm (0.031 in.)	0.90 mm (0.035 in.)	0.70 mm (0.028 in.)	1.50 mm (0.060 in.)	1.52 mm (0.060 in.)	0.25 mm (0.01 in.)	0.91 mm (0.036 in.)	1.37 mm (0.054 in.)
1.60 mm (0.047 in.)	1.20 mm (0.048 in.)	0.90 mm (0.035 in.)	1.50 mm (0.060 in.)	2.54 mm (0.10 in.)	0.51 mm (0.02 in.)	1.50 mm (0.059 in.)	1.78 mm (0.070 in.)
2.00 mm (0.062 in.)	1.50 mm (0.060 in.)	1.30 mm (0.051 in.)	2.40 mm (0.094 in.)	2.54 mm (0.10 in.)	0.76 mm (0.03 in.)	1.90 mm (0.075 in.)	2.18 mm (0.086 in.)
2.50 mm (0.094 in.)	2.30 mm (0.091 in.)	2.10 mm (0.083 in.)	4.00 mm (0.158 in.)	2.54 mm (0.10 in.)	1.00 mm (0.04 in.)	2.41 mm (0.095 in.)	2.95 mm (0.116 in.)
3.20 mm (0.125 in.)	3.00 mm (0.120 in.)	2.70 mm (0.106 in.)	5.10 mm (0.201 in.)	3.30 mm (0.13 in.)	1.52 mm (0.06 in.)	3.12 mm (0.123 in.)	3.76 mm (0.148 in.)
4.00 mm (0.156 in.)	3.80 mm (0.150 in.)	3.50 mm (0.138 in.)	6.50 mm (0.256 in.)	4.06 mm (0.16 in.)	1.78 mm (0.07 in.)	3.94 mm (0.155 in.)	4.55 mm (0.179 in.)
5.00 mm (0.188 in.)	4.60 mm (0.181 in.)	4.40 mm (0.172 in.)	8.00 mm (0.315 in.)	4.06 mm (0.16 in.)	2.03 mm (0.08 in.)	4.93 mm (0.194 in.)	5.33 mm (0.210 in.)
6.30 mm (0.250 in.)	5.90 mm (0.232 in.)	5.60 mm (0.220 in.)	10.3 mm (0.406 in.)	4.06 mm (0.16 in.)	2.03 mm (0.08 in.)	6.22 mm (0.245 in.)	6.96 mm (0.274 in.)
8.00 mm (0.312 in.)	7.50 mm (0.295 in.)	7.00 mm (0.275 in.)	13.1 mm (0.516 in.)	4.06 mm (0.16 in.)	2.03 mm (0.08 in.)	7.85 mm (0.309 in.)	8.28 mm (0.326 in.)
9.50 mm (0.375 in.)	9.50 mm (0.374 in.)	8.40 mm (0.329 in.)	16.6 mm (0.654 in.)	6.35 mm (0.25 in.)	4.06 mm (0.16 in.)	9.45 mm (0.372 in.)	9.73 mm (0.383 in.)
13.0 mm (0.500 in.)	12.4 mm (0.488 in.)	11.9 mm (0.467 in.)	21.7 mm (0.854 in.)	6.35 mm (0.25 in.)	3.05 mm (0.12 in.)	12.62 mm (0.497 in.)	13.21 mm (0.520 in.)
16.0 mm (0.625 in.)	15.4 mm (0.606 in.)	15.0 mm (0.590 in.)	27.0 mm (1.063 in.)	8.89 mm (0.35 in.)	3.05 mm (0.12 in.)	15.80 mm (0.622 in.)	16.28 mm (0.641 in.)



EXTENDED PRONG

HM211587

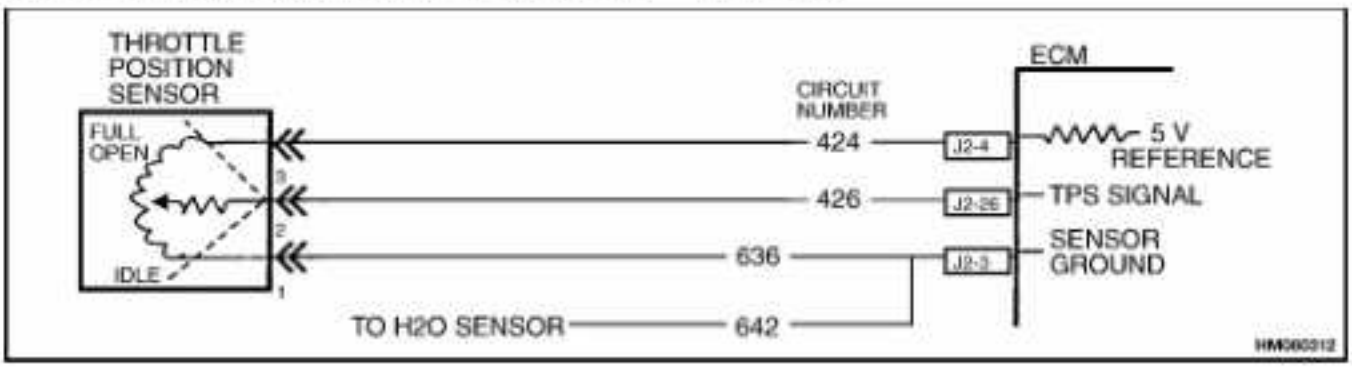
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Fault Code 22 - Throttle Position Sensor Circuit (Signal Voltage Low)

CIRCUIT DESCRIPTION

The throttle position sensor sends a voltage signal to the ECM that changes as the throttle opens and closes. The variation in signal voltages from 0.5 volt at idle to approximately 4.5 volts at full open throttle. The throttle position sensor is one of the most important signals to the ECM because the ECM uses this signal for fuel control and most of the other output signals. See Figure 30.

NOTE: The throttle position sensor indicates approximately 4.5 volts when the throttle plates are fully open.



1. ECM
2. 5V REFERENCE
3. TPS SIGNAL
4. SENSOR GROUND
5. CIRCUIT NUMBER
6. TO H_2O SENSOR
7. IDLE
8. FULL OPEN
9. THROTTLE POSITION SENSOR

Figure 30. Fault Code 22 - Circuit Description

TEST DESCRIPTION

The numbers below are a reference to the bold numbers in Figure 31.

1. A Code 22 is indicated if the engine is running and the voltage signal from the throttle position sensor is less than approximately 0.2 volt.

2. If the ECM senses a Code 21 (signal voltage high), the ECM and the wires are correct.

3. This test (signal voltage high) is used to check for an open circuit in CKT 426.

NOTE: A SCAN Tool indicates the throttle position in volts. The correct indication is 0.45 to 1.25 volts when the throttle is closed (idle position). When the throttle is opened at a steady rate toward full open throttle, the voltage will correctly increase at a steady rate toward 3.5 volts.

Some SCAN Tools indicate the throttle angle. 0% = closed throttle and 100% = full open throttle.

An open circuit or a short circuit to ground in CKT 424 and CKT 426 causes a Code 22.

The throttle position sensor can cause poor engine performance. See Troubleshooting, Poor Operation if this troubleshooting chart for Code 22 does not repair the problem.

Turn the ignition switch to **ON** and do not start the engine. The correct variation in voltage is less than 2.5 volts when the throttle is closed to 3.5 volts when the throttle is in the full open position.

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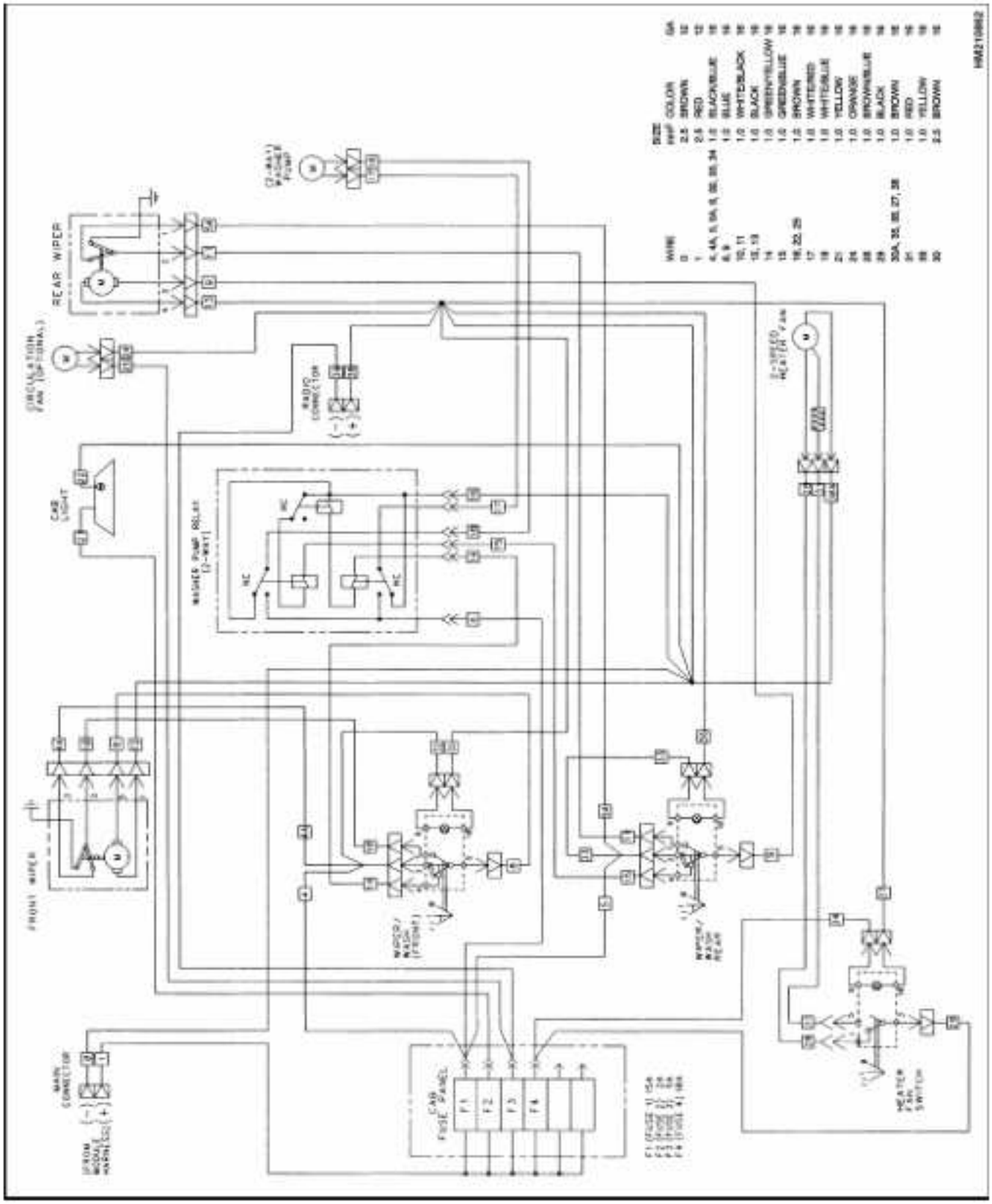


Figure 13. Operator Cab Wiring Schematic

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