APPENDIX A: CODES

The codelisted may not be used in all applications. A default value in the normal operating range is used by the ECM to provide for engine operation if a sensor failure is present.

DDC Code # (Flashed)	PID	SID	FMI	Description
--	240	--	2	Fram Checksum Incorrect
--	251	--	10	Clock Module Abnormal Rate
--	251	--	13	Clock Module Fault/Failure
--	--	253	13	Incompatible Calibration Version
--	--	254	0	External Failed RAM
--	--	254	1	Internal Failed RAM
--	--	254	6	Entered Boot Via Switches
11	187	--	4	Variable Speed Governor Sensor Voltage Low
11	187	--	7	Variable Speed Governor Switch System Not Responding
12	187	--	3	Variable Speed Governor Sensor Voltage High
13	111	--	4	Coolant Level Sensor Input Voltage Low
13	111	--	6	Add Coolant Level Sensor Input Voltage Low
14	52	--	3	Intercooler Coolant Temperature Sensor Input Voltage High
14	110	--	3	Coolant Temperature Sensor Input Voltage High
14	175	--	3	Oil Temperature Sensor Input Voltage High
15	52	--	4	Intercooler Coolant Temperature Sensor Input Voltage Low
15	110	--	4	Coolant Temperature Sensor Input Voltage Low
15	175	--	4	Oil Temperature Sensor Input Voltage Low
16	111	--	3	Coolant Level Sensor Input Voltage High
16	111	--	5	Add Coolant Level Sensor Input Voltage High
17	72	--	3	Throttle Plate Position Sensor Input Voltage High
17	51	--	3	Throttle Position Sensor Input Voltage High
18	72	--	4	Bypass Position Sensor Input Voltage Low
18	51	--	4	Throttle Plate Position Sensor Input Voltage Low
21	91	--	3	Throttle Position Sensor Input Voltage High
22	91	--	4	Throttle Position Sensor Input Voltage Low
23	174	--	3	Fuel Temperature Sensor Input Voltage High
23	--	65	3	Oxygen Content Circuit Input Voltage High
24	174	--	4	Fuel Temperature Sensor Input Voltage Low
24	--	65	4	Oxygen Content Circuit Input Voltage Low
25	--	--	--	Reserved for ‘‘No Codes"
26	--	25	11	Aux. Shutdown #1 Active
26	--	61	11	Aux. Shutdown #2 Active
27	171	--	3	Ambient Air Temperature Sensor Input Voltage High (Release 2.00 or later only)

DDC Code # (Flashed)	PID	SID	FMI	Description
27	172	--	3	Air Temperature Sensor Input Voltage High
27	105	--	3	Intake Manifold Temperature Sensor Input Voltage High
28	171	--	4	Ambient Air Temperature Circuit Failed Low (Release 2.00 or later only)
28	172	--	4	Air Temperature Sensor Input Voltage Low
28	105	--	4	Intake Manifold Temperature Sensor Input Voltage Low
31	--	51	3	Aux. Output #3 Open Circuit (High Side) - S3
31	--	51	4	Aux. Output #3 Short To Ground (High Side) - S3
31	--	51	7	Aux. Output #3 Mechanical System Fail - S3
31	--	52	3	Aux. Output #4 Open Circuit (High Side) - T3
31	--	52	4	Aux. Output #4 Short To Ground (High Side) - T3
31	--	52	7	Aux. Output #4 Mechanical System Fail - T3
32	--	238	4	SEL Open Circuit
32	--	238	3	SEL Short to Battery (+)
32	--	239	3	CEL Short to Battery (+)
32	--	239	4	CEL Open Circuit
33	102	--	3	Turbo Boost Pressure Sensor Input Voltage High
34	102	--	4	Turbo Boost Pressure Sensor Input Voltage Low
35	100	--	3	Oil Pressure Sensor Input Voltage High
35	19	--	3	High Range Oil Pressure Sensor Input Voltage High
36	100	--	4	Oil Pressure Sensor Input Voltage Low
36	19	--	4	High Range Oil Pressure Sensor Input Voltage Low
37	94	--	3	Fuel Pressure Sensor Input Voltage High
37	18	--	3	High Range Fuel Pressure Sensor Input Voltage High
37	95	--	3	Fuel Restriction Sensor Input Voltage High
38	94	--	4	Fuel Pressure Sensor Input Voltage Low
38	18	--	4	High Range Fuel Pressure Sensor Input Voltage Low
38	95		4	Fuel Restriction Sensor Input Voltage Low
39	--	152	7	EGR Valve Not Responding (Release 29.0 or later)
39	--	153	7	VNT Vanes Not Responding (Release 29.0 or later)
41	--	21	0	Too Many SRS (missing TRS)
42	--	21	1	Too few SRS (missing SRS)
43	111	--	1	Coolant Level Low
44	52	--	0	Intercooler Coolant Temperature High
44	110	--	0	Coolant Temperature High
44	172	--	0	Air Inlet Temperature High
44	175	--	0	Oil Temperature High
44	105	--	0	Intake Manifold Temperature High
45	100	--	1	Oil Pressure Low

DDC Code # (Flashed)	PID	SID	FMI	Description
45	19	--	1	High Range Oil Pressure Low
46	168	--	1	ECM Battery Voltage Low
46	--	214	1	RTC Backup Battery Voltage Low (Release 29.0 or later)
46	--	232	1	Sensor supply Voltage Low
47	94	--	0	Fuel Pressure High
47	102	--	0	Turbo Boost Pressure High
47	106	--	0	Air Inlet Pressure High
47	164	--	0	Injection Control Pressure High
47	18	--	0	High Range Fuel Pressure High
48	18	--	1	High Range Fuel Pressure Low
48	94	--	1	Fuel Pressure Low
48	106	--	1	Air Inlet Pressure Low
48		154	1	EGR Temperature Low (Release 29.0 or later)
48		155	1	EGR Delta Pressure Low (Release 29.0 or later)
48	164	--	1	Injection Control Pressure Low
52	--	254	12	A/D Conversion Fail
53	--	253	2	Nonvolatile Checksum Incorrect
53	--	253	12	EEPROM Write Error
53	--	253	13	Out of Calibration
54	84	--	12	Vehicle Speed Sensor Fault
55	--	216	14	Other ECU Fault (Release 27.0 or later) (This fault is logged in conjunction with another fault to indicate missing information from another ECU.)
55	--	231	12	J1939 Data Link Fault
55	--	248	8	Proprietary Data Link Fault (Master)
55	--	248	9	Proprietary Data Link Fault (Receiver)
56	--	250	12	J1587 Data Link Fault
57	--	249	12	J1922 Data Link Fault
58	92	--	0	Torque Overload
61	--	xxx	0	Injector xxx Response Time Long
62	--	26	3	Aux. Output #1 Short to Battery (+) - F3
62	--	26	4	Aux. Output #1 Open Circuit - F3
62	--	40	3	Aux. Output #2 Short to Battery (+) - A2
62	--	40	4	Aux. Output #2 Open Circuit - A2
62	--	53	3	Aux. Output #5 Short to Battery (+) - W3
62	--	53	4	Aux. Output #5 Open Circuit - W3
62	--	54	3	Aux. Output #6 Short to Battery (+) - X3
62	--	54	4	Aux. Output #6 Open Circuit - X3
62	--	55	3	Aux. Output #7 Short to Battery (+) - Y3
62	--	55	4	Aux. Output #7 Open Circuit - Y3
62	--	56	3	Aux. Output #8 Short to Battery (+) - A1
62	--	56	4	Aux. Output #8 Open Circuit - A1

DDC Code # (Flashed)	PID	SID	FMI	Description
62	--	26	7	Aux. Output #1 Mechanical System Not Responding Properly -F3
62	--	40	7	Aux. Output #2 Mechanical System Not Responding Properly -A2
62	--	53	7	Aux. Output #5 Mechanical System Not Responding Properly - W3
62	--	54	7	Aux. Output #6 Mechanical System Not Responding Properly - X3
62	--	55	7	Aux. Output #7 Mechanical System Not Responding Properly - Y3
62	--	56	7	Aux. Output #8 Mechanical System Not Responding Properly - A1
63	--	57	3	PWM #1 Short to Battery (+)
63	--	57	4	PWM #1 Open Circuit
63	--	58	3	PWM #2 Short to Battery (+)
63	--	58	4	PWM #2 Open Circuit
63	--	59	3	PWM #3 Short to Battery (+)
63	--	59	4	PWM #3 Open Circuit
63	--	60	3	PWM #4 Short to Battery (+)
63	--	60	4	PWM #4 Open Circuit
63	--	57	0	PWM #1 Above Normal Range
63	--	57	1	PWM #1 Below Normal Range
63	--	58	0	PWM #2 Above Normal Range
63	--	58	1	PWM #2 Below Normal Range
63	--	59	0	PWM #3 Above Normal Range
63	--	59	1	PWM #3 Below Normal Range
63	--	60	0	PWM #4 Above Normal Range
63	--	60	1	PWM #4 Below Normal Range
64	103	--	8	Turbo Speed Sensor Input Failure
64	103	--	0	Turbo Overspeed
65	51	--	0	Throttle Plate Position Above Normal Range
65	51	--	1	Throttle Plate Position Below Normal Range
65	51	--	2	Throttle Plate Position Erratic
65	51	--	7	Throttle Plate Not Responding
65	107	--	3	Air Filter Restriction Sensor Voltage High
65	107	--	4	Air Filter Restriction Sensor Voltage Low
66	--	76	0	Engine Knock Level Above Normal Range
66	--	76	3	Engine Knock Level Sensor Input Voltage High
66	--	76	4	Engine Knock Level Sensor Input Voltage Low
66	--	76	7	Engine Knock Level Sensor Not Responding
66	99	--	3	Oil Filter Restriction Sensor Voltage High
66	99	--	4	Oil Filter Restriction Sensor Voltage Low
67	109	--	3	Coolant Pressure Sensor Input Voltage High
67	109	--	4	Coolant Pressure Sensor Input Voltage Low

DDC Code # (Flashed)	PID	SID	FMI	Description
67	106	--	3	Air Inlet Pressure Sensor Input Voltage High
67	106	--	4	Air Inlet Pressure Sensor Input Voltage Low
67	20	--	3	High Range Coolant Pressure Sensor Input Voltage High
67	20	--	4	High Range Coolant Pressure Sensor Input Voltage Low
68	--	230	6	TPS Idle Validation Circuit Fault (short to ground)
68	--	230	5	TPS Idle Validation Circuit Fault (open circuit)
71	--	xxx	1	Injector xxx Response Time Short
72	84	--	0	Vehicle Overspeed
72	84	--	11	Vehicle Overspeed (Absolute)
72	--	65	0	Oxygen Content Too High
72	--	65	1	Oxygen Content Too Low
73	--	151	14	ESS Transmission Stuck in Gear
73	--	226	11	Transmission Neutral Switch Failure (ESS Transmission)
73	--	227	2	Aux Analog Input Data Erratic, Intermittent, or Incorrect (ESS Transmission)
73	--	227	3	Aux Analog Input #1 Voltage High (ESS Transmission)
73	--	227	4	Aux Analog Input #1 Voltage Low (ESS Transmission)
73	--	77	0	Gas Valve Position Above Normal Range
73	--	77	1	Gas Valve Position Below Normal Range
73	--	77	3	Gas Valve Position Input Voltage High
73	--	77	4	Gas Valve Position Input Voltage Low
73	--	77	7	Gas Metering Valve Not Responding
73	107	--	0	Air Filter Restriction High
74	99	--	0	Oil Filter Restriction High
74	70	--	4	Optimized Idle Safety Loop Short to Ground
75	168	--	0	ECM Battery Voltage High
75	--	214	0	RTC Backup Battery Voltage High (Release 29.0 or later)
75	--	232	0	Sensor Supply Voltage High
76	121	--	0	Engine Overspeed With Engine Brake
77	3	–	0	Cylinder Head Temperature Above Range (Release 31.0 or later)
77	19	–	0	Extended Range Oil Pressure Above Range (Release 31.0 or later)
77	20	–	0	Extended Range Coolant Pressure Above Range (Release 31.0 or later)
77	72	–	0	Bypass Blower Door Position Above Range (Release 31.0 or later)
77	72	–	1	Bypass Blower Door Position Below Range (Release 31.0 or later)
77	73	–	1	Pump Pressure Below Range (Release 31.0 or later)

DDC Code # (Flashed)	PID	SID	FMI	Description
77	81	–	0	Exhaust Back Pressure Above Range (Release 31.0 or later)
77	81	–	1	Exhaust Back Pressure Below Range (Release 31.0 or later)
77	81	–	3	Exhaust Back Pressure Failed High (Release 31.0 or later)
77	81	–	4	Exhaust Back Pressure Failed Low (Release 31.0 or later)
77	81	–	12	Exhaust Back Pressure at Rampdown Threshold (Release 31.0 or later)
77	95	–	1	Fuel Filter Differential Pressure Below Range (Release 31.0 or later)
77	99	–	1	Oil Filter Differential Pressure Below Range (Release 31.0 or later)
77	100	–	0	Engine Oil Pressure Above Range (Release 31.0 or later)
77	102	–	1	Turbo Boost Pressure Below Range (Release 31.0 or later)
77	105	–	1	Inlet Manifold Temperature Below Range (Release 31.0 or later)
77	107	–	1	Air Filter Differential Pressure Below Range (Release 31.0 or later)
77	108	–	0	Barometric Pressure Above Range (Release 31.0 or later)
77	108	—	1	Barometric Pressure Below Range (Release 31.0 or later)
77	109	—	0	Coolant Pressure Above Range (Release 31.0 or later)
77	110	—	1	Coolant Temperature Below Range (Release 31.0 or later)
77	110	—	0	Coolant Level Above Range (Release 31.0 or later)
77	171	—	0	Ambient Air Temperature Above Range (Release 31.0 or later)
77	171	—	1	Ambient Air Temperature Below Range (Release 31.0 or later)
77	172	—	1	Air Inlet Temperature Below Range (Release 31.0 or later)
77	174	—	0	Fuel Temperature Above Range
77	174	—	0	Fuel Temperature Below Range
77	175	—	1	Engine Oil Temperature Below Range (Release 31.0 or later)
77	177	—	0	Transmission Oil Temperature Above Range (Release 31.0 or later)
77	177	—	1	Transmission Oil Temperature Below Range (Release 31.0 or later)
77	177	—	3	Transmission Oil Temperature Failed High (Release 31.0 or later)
77	177	—	4	Transmission Oil Temperature Failed Low (Release 31.0 or later)
77	222	—	14	Anti-Theft Fault Present (Release 31.0 or later)
77	251	—	10	Clock Module Abnormal Rate of Change (Release 31.0 or later)

DDC Code # (Flashed)	PID	SID	FMI	Description
77	251	—	13	Clock Module Failure (Release 31.0 or later)
77	252	—	10	Clock Module Abnormal Rate of Change (Release 31.0 or later)
77	252	—	13	Clock Module Failure (Release 31.0 or later)
78	86	--	14	Cruise Control/Adaptive Cruise Control Fault (Release 27.0 or later)
81	--	20	3	Timing Actuator (Dual Fuel) Input Voltage High
81	98	--	3	Oil Level Sensor Input Voltage High
81	101	--	3	Crankcase Pressure Sensor Input Voltage High
81	153	--	3	Extended Crankcase Pressure Input Voltage High (Release 27.0 or later)
81	154	--	3	EGR Temperature Input Voltage High (Release 29.0 or later)
81	155	--	3	EGR Delta Pressure Input Voltage High (Release 29.0 or later)
81	164	--	3	Injection Control Pressure Circuit Voltage High
81	173	--	3	Exhaust Temperature Sensor Input Voltage High
82	--	20	4	Timing Actuator (Dual Fuel) Input Voltage Low
82	98	--	4	Oil Level Sensor Input Voltage Low
82	101	--	4	Crankcase Pressure Sensor Input Voltage Low
82	153	--	4	Extended Crankcase Pressure Input Voltage Low (Release 27.0 or later)
82	154	--	4	EGR Temperature Input Voltage Low (Release 29.0 or later)
82	155	--	4	EGR Delta Pressure Input Voltage Low (Release 29.0 or later)
82	164	--	4	Injection Control Pressure Sensor Input Voltage Low
82	173	--	4	Exhaust Temperature Sensor Input Voltage Low
83	98	--	0	Oil Level High
83	101	--	0	Crankcase Pressure High
83	153	--	0	Extended Crankcase Pressure High (Release 27.0 or later)
83	154	--	0	EGR Gas Temperature High
83	155	--	0	EGR Delta Pressure High
83	173	--	0	Exhaust Temperature High
83	73	--	0	Pump Pressure High
84	98	--	1	Oil Level Low
84	101	--	1	Crankcase Pressure Low
84	153	--	1	Extended Crankcase Pressure Low (Release 27.0 or later)
85	190	--	0	Engine Overspeed
85	190	--	14	Engine Overspeed Signal (Release 28.0 or later)
86	73	--	3	Pump Pressure Sensor Input Voltage High
86	108	--	3	Barometric Pressure Sensor Input Voltage High
87	73	--	4	Pump Pressure Sensor Input Voltage Low

DDC Code # (Flashed)	PID	SID	FMI	Description
87	108	--	4	Barometric Pressure Sensor Input Voltage Low
88	109	--	1	Coolant Pressure Low
88	20	--	1	High Range Coolant Pressure Low
89	95	--	0	Fuel Restriction High
89	111	--	12	Maintenance Alert Coolant Level Fault

A.1 PIDS

The codes listed are sorted by PID.

PID	FMI	DDC Code # (Flashed)	Description
3	0	77	Cylinder Head Temperature Above Range (Release 32.0 or later)
18	0	47	High Range Fuel Pressure High
18	1	48	High Range Fuel Pressure Low
18	3	37	High Range Fuel Pressure Sensor Input Voltage High
18	4	38	High Range Fuel Pressure Sensor Input Voltage Low
19	0		Extended Range Oil Pressure Above Range (Release 31.0 or later)
19	1	45	High Range Oil Pressure Low
19	3	35	High Range Oil Pressure Sensor Input Voltage High
19	4	36	High Range Oil Pressure Sensor Input Voltage Low
20	0		Extended Range Coolant Pressure Above Range (Release 31.0 or later)
20	1	88	High Range Coolant Pressure Low
20	3	67	High Range Coolant Pressure Sensor Input Voltage High
20	4	67	High Range Coolant Pressure Sensor Input Voltage Low
51	0	65	Throttle Plate Position Above Normal Range
51	1	65	Throttle Plate Position Below Normal Range
51	2	65	Throttle Plate Position Erratic
51	3	17	Throttle Plate Position Sensor Input Voltage High
51	4	18	Throttle Plate Position Sensor Input Voltage Low
51	7	65	Throttle Plate Not Responding
52	0	44	Intercooler Coolant Temperature High
52	3	14	Intercooler Coolant Temperature Sensor Input Voltage High
52	4	15	Intercooler Coolant Temperature Sensor Input Voltage Low
70	4	74	Optimized Idle Safety Loop Short to Ground
72	0	77	Bypass Blower Door Position Above Range (Release 31.0 or later)
72	1	77	Bypass Blower Door Position Below Range (Release 31.0 or later)
72	3	17	Bypass Position Sensor Input Voltage High
72	4	18	Bypass Position Sensor Input Voltage Low
73	0	83	Pump Pressure High
73	1	77	Pump Pressure Below Range (Release 31.0 or later)
73	3	86	Pump Pressure Sensor Input Voltage High
73	4	87	Pump Pressure Sensor Input Voltage Low
81	0	77	Exhaust Back Pressure Above Range (Release 31.0 or later)
81	1	77	Exhaust Back Pressure Below Range (Release 31.0 or later)
81	3	77	Exhaust Back Pressure Failed High (Release 31.0 or later)
81	4	77	Exhaust Back Pressure Failed Low (Release 31.0 or later)
81	12	77	Exhaust Back Pressure at Rampdown Threshold (Release 31.0 or later)
84	0	72	Vehicle Overspeed

PID	FMI	DDC Code # (Flashed)	Description
84	11	72	Vehicle Overspeed (Absolute)
84	12	54	Vehicle Speed Sensor Fault
86	14	78	Cruise Control/Adaptive Cruise Control Fault (Release 27.0 or later)
91	3	21	Throttle Position Sensor Input Voltage High
91	4	22	Throttle Position Sensor Input Voltage Low
92	0	58	Torque Overload
94	0	47	Fuel Pressure High
94	1	48	Fuel Pressure Low
94	3	37	Fuel Pressure Sensor Input Voltage High
94	4	38	Fuel Pressure Sensor Input Voltage Low
95	0	89	Fuel Restriction High
95	1	77	Fuel Filter Differential Pressure Below Range (Release 31.0 or later)
95	3	37	Fuel Restriction Sensor Input Voltage High
95	4	38	Fuel Restriction Sensor Input Voltage Low
98	0	83	Oil Level High
98	1	84	Oil Level Low
98	3	81	Oil Level Sensor Input Voltage High
98	4	82	Oil Level Sensor Input Voltage Low
99	0	74	Oil Filter Restriction High
99	1	77	Oil Filter Differential Pressure Below Range (Release 31.0 or later)
99	3	66	Oil Filter Restriction Sensor Voltage High
99	4	66	Oil Filter Restriction Sensor Voltage Low
100	0	77	Engine Oil Pressure Above Range (Release 31.0 or later)
100	1	45	Oil Pressure Low
100	3	35	Oil Pressure Sensor Input Voltage High
100	4	36	Oil Pressure Sensor Input Voltage Low
101	0	83	Crankcase Pressure High
101	1	84	Crankcase Pressure Low
101	3	81	Crankcase Pressure Sensor Input Voltage High
101	4	82	Crankcase Pressure Sensor Input Voltage Low
102	0	47	Turbo Boost Pressure High
102	1	77	Turbo Boost Pressure Below Range (Release 31.0 or later)
102	3	33	Turbo Boost Pressure Sensor Input Voltage High
102	4	34	Turbo Boost Pressure Sensor Input Voltage Low
103	0	64	Turbo Overspeed
103	8	64	Turbo Speed Sensor Input Failure
105	0	44	Intake Manifold Temperature High
105	1	77	Inlet Manifold Temperature Below Range (Release 31.0 or later)
105	3	27	Intake Manifold Temperature Sensor Input Voltage High
105	4	28	Intake Manifold Temperature Sensor Input Voltage Low
106	0	47	Air Inlet Pressure High

PID	FMI	DDC Code # (Flashed)	Description
106	1	48	Air Inlet Pressure Low
106	3	67	Air Inlet Pressure Sensor Input Voltage High
106	4	67	Air Inlet Pressure Sensor Input Voltage Low
107	0	73	Air Filter Restriction High
107	1	77	Air Filter Differential Pressure Below Range (Release 31.0 or later)
107	3	65	Air Filter Restriction Sensor Voltage High
107	4	65	Air Filter Restriction Sensor Voltage Low
108	0	77	Barometric Pressure Above Range (Release 31.0 or later)
108	1	77	Barometric Pressure Below Range (Release 31.0 or later)
108	3	86	Barometric Pressure Sensor Input Voltage High
108	4	87	Barometric Pressure Sensor Input Voltage Low
109	0	77	Coolant Pressure Above Range (Release 31.0 or later)
109	1	88	Coolant Pressure Low
109	3	67	Coolant Pressure Sensor Input Voltage High
109	4	67	Coolant Pressure Sensor Input Voltage Low
110	0	44	Coolant Temperature High
110	0	77	Coolant Temperature Below Range (Release 31.0 or later)
110	1	77	Coolant Temperature Above Range (Release 31.0 or later)
110	3	14	Coolant Temperature Sensor Input Voltage High
110	4	15	Coolant Temperature Sensor Input Voltage Low
111	1	43	Coolant Level Low
111	3	16	Coolant Level Sensor Input Voltage High
111	4	13	Coolant Level Sensor Input Voltage Low
111	5	16	Add Coolant Level Sensor Input Voltage High
111	6	13	Add Coolant Level Sensor Input Voltage Low
111	12	89	Maintenance Alert Coolant Level Fault
121	0	76	Engine Overspeed With Engine Brake
153	3	81	Extended Crankcase Pressure Sensor Input Voltage High (Release 27.0 or later)
153	4	82	Extended Crankcase Pressure Sensor Input Voltage Low (Release 27.0 or later)
153	0	83	Extended Crankcase Pressure High (Release 27.0 or later)
153	1	84	Extended Crankcase Pressure Low (Release 27.0 or later)
164	0	47	Injection Control Pressure High
164	1	48	Injection Control Pressure Low
164	3	81	Injection Control Pressure Circuit Voltage High
164	4	82	Injection Control Pressure Sensor Input Voltage Low
168	0	75	ECM Battery Voltage High
168	1	46	ECM Battery Voltage Low
171	0	77	Ambient Air Temperature Above Range (release 31.0 or later)
171	1	77	Ambient Air Temperature Below Range (release 31.0 or later)
171	3	27	Ambient Air Temperature Sensor Input Voltage High (Release 2.00 or later only)

PID	FMI	DDC Code # (Flashed)	Description
171	4	28	Ambient Air Temperature Circuit Failed Low (Release 2.0 or later only)
172	0	44	Air Inlet Temperature High
172	1	77	Air Inlet Temperature Below Range (Release 31.0 or later)
172	3	27	Air Temperature Sensor Input Voltage High
172	4	28	Air Temperature Sensor Input Voltage Low
173	0	83	Exhaust Temperature High
173	3	81	Exhaust Temperature Sensor Input Voltage High
173	4	82	Exhaust Temperature Sensor Input Voltage Low
174	0	77	Fuel Temperature Above Range
174	1	77	Fuel Temperature Below Range
174	3	23	Fuel Temperature Sensor Input Voltage High
174	4	24	Fuel Temperature Sensor Input Voltage Low
175	0	44	Oil Temperature High
175	1	77	Engine Oil Temperature Below Range (Release 31.0 or later)
175	3	14	Oil Temperature Sensor Input Voltage High
175	4	15	Oil Temperature Sensor Input Voltage Low
177	0	77	Transmission Oil Temperature Above Range (Release 31.0 or later)
177	1	77	Transmission Oil Temperature Below Range (Release 31.0 or later)
177	3	77	Transmission Oil Temperature Failed High (Release 31.0 or later)
177	4	77	Transmission Oil Temperature Failed Low (Release 31.0 or later)
187	3	12	Variable Speed Governor Sensor Voltage High
187	4	11	Variable Speed Governor Sensor Voltage Low
187	7	11	Variable Speed Governor Switch System Not Responding
190	0	85	Engine Overspeed
190	14	85	Engine Overspeed Signal (Release 28.0 or later)
222	14	77	Anti-Theft Fault Present (Release 31.0 or later)
240	2	--	Fram Checksum Incorrect
251	10	77	Clock Module Abnormal Rate of Change (Release 31.0)
251	13	77	Clock Module Failure (Release 31.0)
252	10	77	Clock Module Abnormal Rate of Change (Release 31.0)
252	13	77	Clock Module Failure (Release 31.0)

A.2 SIDS

The codes listed are sorted by SID.

SID	FMI	DDC Code # (Flashed)	Description
xxx	0	61	Injector xxx Response Time Long
xxx	1	71	Injector xxx Response Time Short
20	3	81	Timing Actuator (Dual Fuel) Input Voltage High
20	4	82	Timing Actuator (Dual Fuel) Input Voltage Low
21	0	41	Too many SRS (missing TRS)
21	1	42	Too few SRS (missing SRS)
25	11	26	Aux. Shutdown #1 Active
26	3	62	Aux. Output #1 Short to Battery (+) - F3
26	4	62	Aux. Output #1 Open Circuit - F3
26	7	62	Aux. Output #1 Mechanical System Not Responding Properly - F3
40	3	62	Aux. Output #2 Short to Battery (+) - A2
40	4	62	Aux. Output #2 Open Circuit - A2
40	7	62	Aux. Output #2 Mechanical System Not Responding Properly - A2
51	3	31	Aux. Output #3 Open Circuit (High Side) - S3
51	4	31	Aux. Output #3 Short To Ground (High Side) - S3
51	7	31	Aux. Output #3 Mechanical System Fail - S3
52	3	31	Aux. Output #4 Open Circuit (High Side) - T3
52	4	31	Aux. Output #4 Short To Ground (High Side) - T3
52	7	31	Aux. Output #4 Mechanical System Fail - T3
53	3	62	Aux. Output #5 Short to Battery (+) - W3
53	4	62	Aux. Output #5 Open Circuit - W3
53	7	62	Aux. Output #5 Mechanical System Not Responding Properly - W3
54	3	62	Aux. Output #6 Short to Battery (+) - X3
54	4	62	Aux. Output #6 Open Circuit - X3
54	7	62	Aux. Output #6 Mechanical System Not Responding Properly - X3
55	3	62	Aux. Output #7 Short to Battery (+) - Y3
55	4	62	Aux. Output #7 Open Circuit - Y3
55	7	62	Aux. Output #7 Mechanical System Not Responding Properly - Y3
56	3	62	Aux. Output #8 Short to Battery (+) - A1
56	4	62	Aux. Output #8 Open Circuit - A1
56	7	62	Aux. Output #8 Mechanical System Not Responding Properly - A1
57	0	63	PWM #1 Above Normal Range
57	1	63	PWM #1 Below Normal Range
57	3	63	PWM #1 Short to Battery (+)
57	4	63	PWM #1 Open Circuit
58	0	63	PWM #2 Above Normal Range
58	1	63	PWM #2 Below Normal Range
58	3	63	PWM #2 Short to Battery (+)

SID	FMI	DDC Code # (Flashed)	Description
58	4	63	PWM #2 Open Circuit
59	0	63	PWM #3 Above Normal Range
59	1	63	PWM #3 Below Normal Range
59	3	63	PWM #3 Short to Battery (+)
59	4	63	PWM #3 Open Circuit
60	0	63	PWM #4 Above Normal Range
60	1	63	PWM #4 Below Normal Range
60	3	63	PWM #4 Short to Battery (+)
60	4	63	PWM #4 Open Circuit
61	11	26	Aux. Shutdown #2 Active
65	0	72	Oxygen Content Too High
65	1	72	Oxygen Content Too Low
65	3	23	Oxygen Content Circuit Input Voltage High
65	4	24	Oxygen Content Circuit Input Voltage Low
76	0	66	Engine Knock Level Above Normal Range
76	3	66	Engine Knock Level Sensor Input Voltage High
76	4	66	Engine Knock Level Sensor Input Voltage Low
76	7	66	Engine Knock Level Sensor Not Responding
77	0	73	Gas Valve Position Above Normal Range
77	1	73	Gas Valve Position Below Normal Range
77	3	73	Gas Valve Position Input Voltage High
77	4	73	Gas Valve Position Input Voltage Low
77	7	73	Gas Metering Valve Not Responding
151	14	73	ESS Transmission Stuck in Gear
152	7	39	EGR Valve Not Responding (Release 29.0 or later)
153	7	39	VNT Vanes Not Responding (Release 29.0 or later)
154	1	48	EGR Temperature Low (Release 29.0 or later)
154	3	81	EGR Temperature Low (Release 29.0 or later)
154	4	82	EGR Temperature Input Voltage Low (Release 29.0 or later)
154	0	83	EGR Gas Temperature High
155	1	48	EGR Delta Pressure Low (Release 29.0 or later)
155	3	81	EGR Delta Pressure Input Voltage High (Release 29.0 or later)
155	4	82	EGR Delta Pressure Input Voltage Low (Release 29.0 or later)
155	0	83	EGR Delta Pressure High
214	1	46	RTC Backup Battery Voltage Low (Release 29.0 or later)
214	0	75	RTC Backup Battery Voltage High (Release 29.0 or later)
216	14	55	Other ECU Fault (Release 27.0 or later) (This fault is logged in conjunction with another fault to indicate missing information from another ECU.)
226	11	73	Transmission Neutral Switch Failure (ESS Transmission)
227	2	73	Aux Analog Input Data Erratic, Intermittent, or Incorrect (ESS Transmission)
227	3	73	Aux Analog Input #1 Voltage High (ESS Transmission)

SID	FMI	DDC Code # (Flashed)	Description
227	4	73	Aux Analog Input #1 Voltage Low (ESS Transmission)
230	5	68	TPS Idle Validation Circuit Fault (open circuit)
230	6	68	TPS Idle Validation Circuit Fault (short to ground)
231	12	55	J1939 Data Link Fault
232	0	75	Sensor Supply Voltage High
232	1	46	Sensor supply Voltage Low
238	3	32	SEL Short to Battery (+)
238	4	32	SEL Open Circuit
239	3	32	CEL Short to Battery (+)
239	4	32	CEL Open Circuit
248	8	55	Proprietary Data Link Fault (Master)
248	9	55	Proprietary Data Link Fault (Receiver)
249	12	57	J1922 Data Link Fault
250	12	56	J1587 Data Link Fault
253	2	53	Nonvolatile Checksum Incorrect
253	12	53	EEPROM Write Error
253	13	--	Incompatible Calibration Version
253	13	53	Out of Calibration
254	0	--	External Failed RAM
254	1	--	Internal Failed RAM
254	6	--	Entered Boot Via Switches
254	12	52	A/D Conversion Fail

APPENDIX B: HARNESS WIRING DIAGRAMS

The following harness schematics may be found on the DDC extranet:

- ☐ Vehicle Interface Harness
- ☐ Vehicle Interface Harness - Series 4000
- ☐ Vehicle Interface Harness - Series 2000 Single-ECM
- ☐ Vehicle Interface Harness - Series 2000 Multi-ECM (1 of 2)
- ☐ Vehicle Interface Harness - Series 2000 Multi-ECM (2 of 2)
- ☐ Engine Sensor Harness - Series 60/50
- ☐ Engine Sensor Harness - Series 4000-12V & 16V
- ☐ Engine Sensor Harness - Series 149
- ☐ Engine Sensor Harness - Series 2000-8V
- ☐ Engine Sensor Harness - Series 2000-12V & 16V
- ☐ Engine Interface Harness,-Series 2000, Multi-ECM
- ☐ Injector Harness Schematic - Series 71-12V and Series 149-12V
- ☐ Injector Harness Schematic - Series 92-12V
- ☐ Injector Harness Schematic - Series 92-16V
- ☐ Injector Harness Schematic - Series 149-16V
- ☐ Injector Harness Schematic - Series 149-20V
- ☐ Injector Harness Schematic - Series 4000-12V
- ☐ Injector Harness Schematic - Series 4000-16V
- ☐ Injector Harness Schematic - Series 2000-12V
- ☐ Injector Harness Schematic - Series 2000-16V
- ☐ 12V Series 4000 Marine Exhaust Temperature Sensors
- ☐ 8V Series 4000 Marine Exhaust Temperature Sensors
- ☐ 16V Series 4000 Marine Exhaust Temperature Sensors
- ☐ 12V and 16V Series 4000 Marine Engine Harness

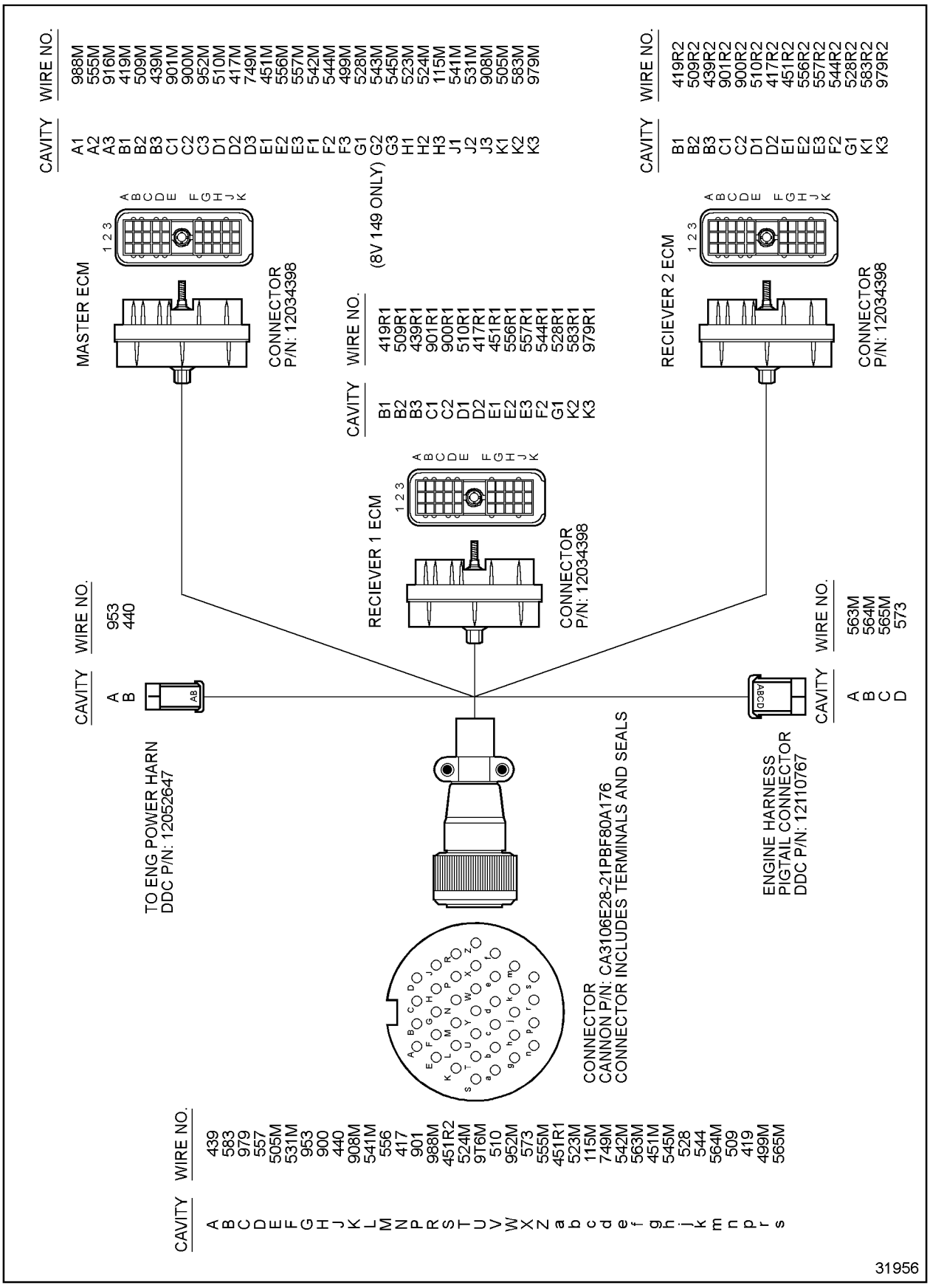


Figure B-1 Engine Interface Harness - Series 149 Multi-ECMs

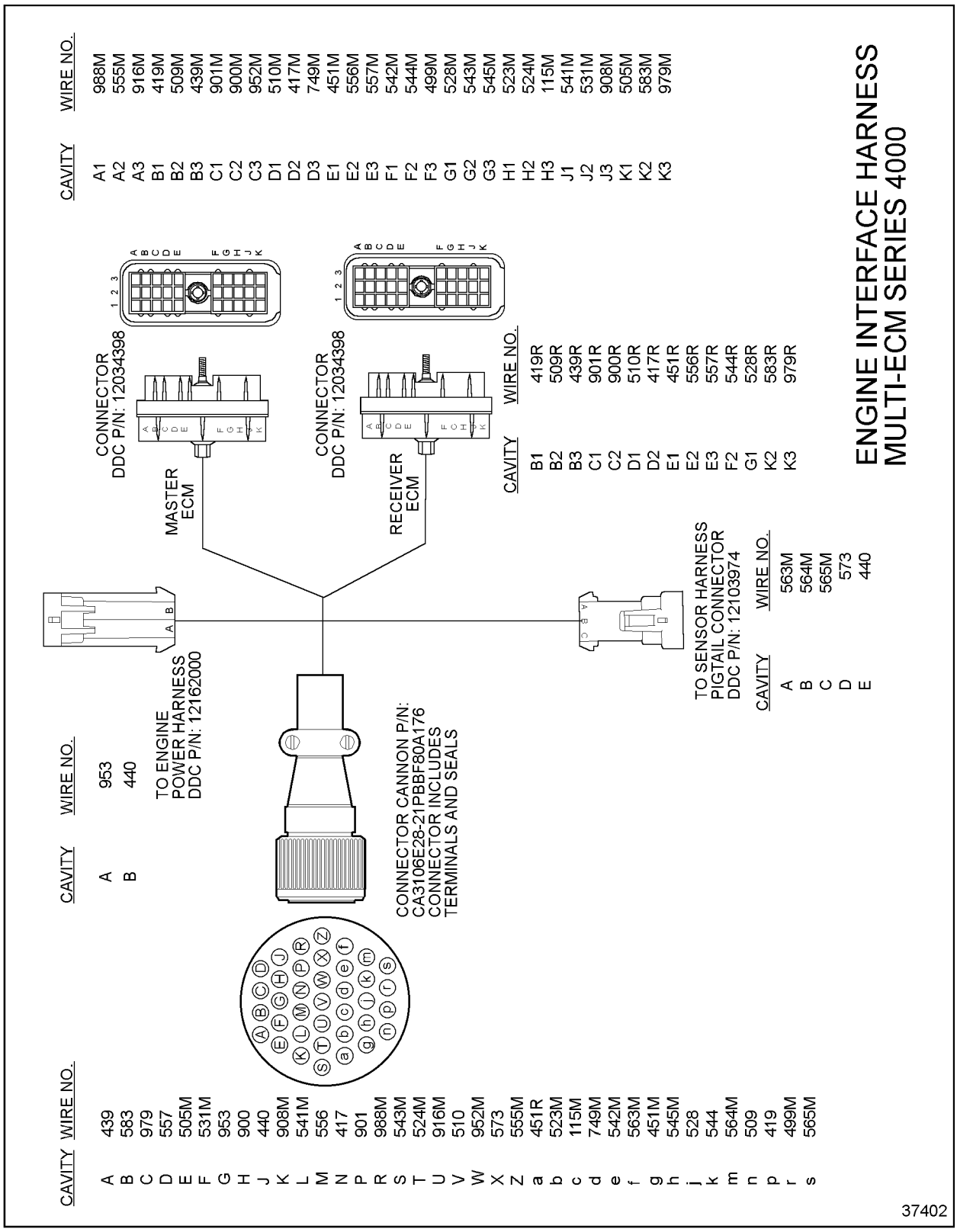


Figure B-2 Engine Interface Harness, Series 4000, Multi-ECM

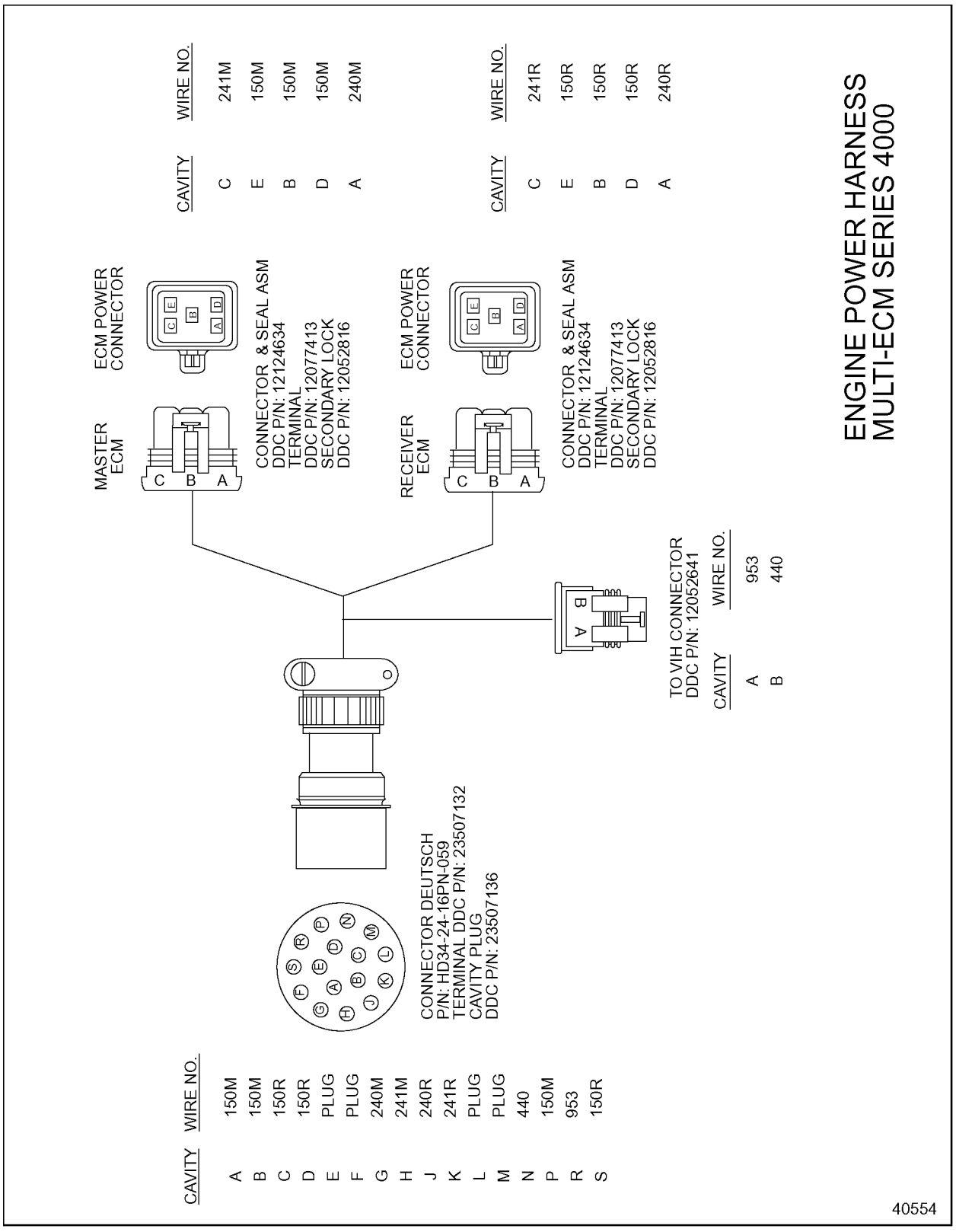


Figure B-3 Engine Power Harness- Series 4000, Multi-ECM

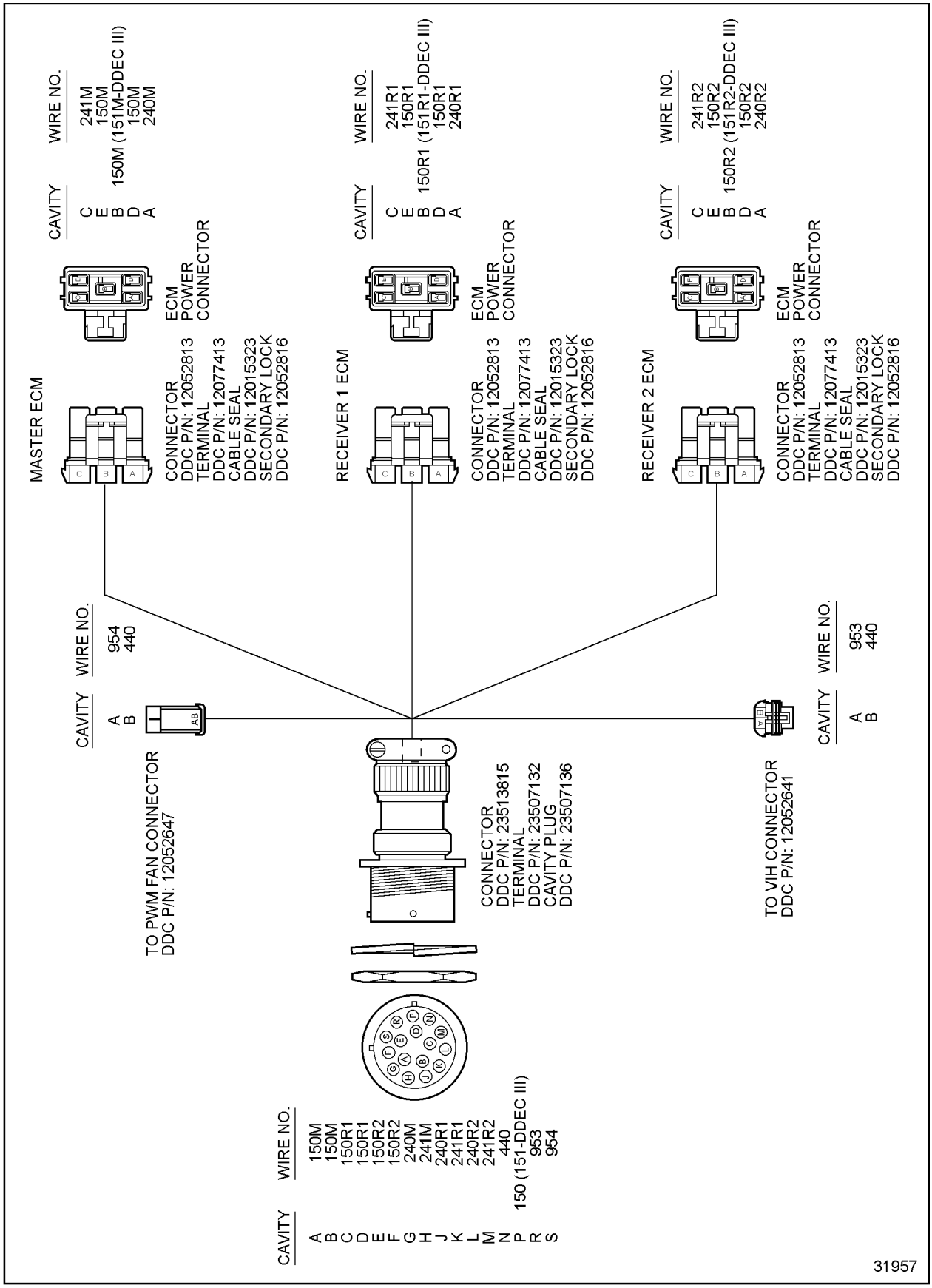


Figure B-4 Engine Power Harness — Series 149 Multi-ECM

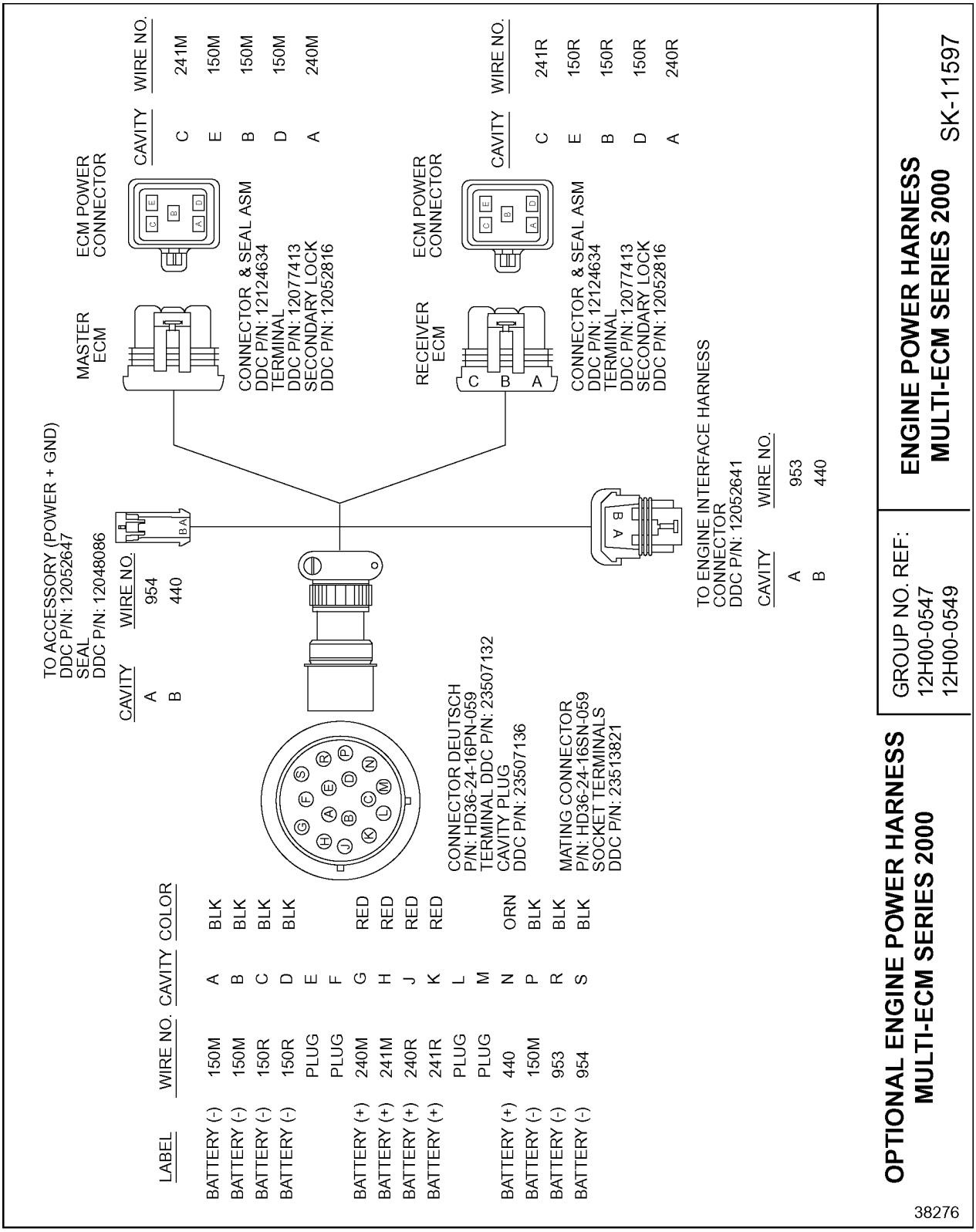


Figure B-5 Optional Engine Power Harness - Series 2000 Multi-ECM

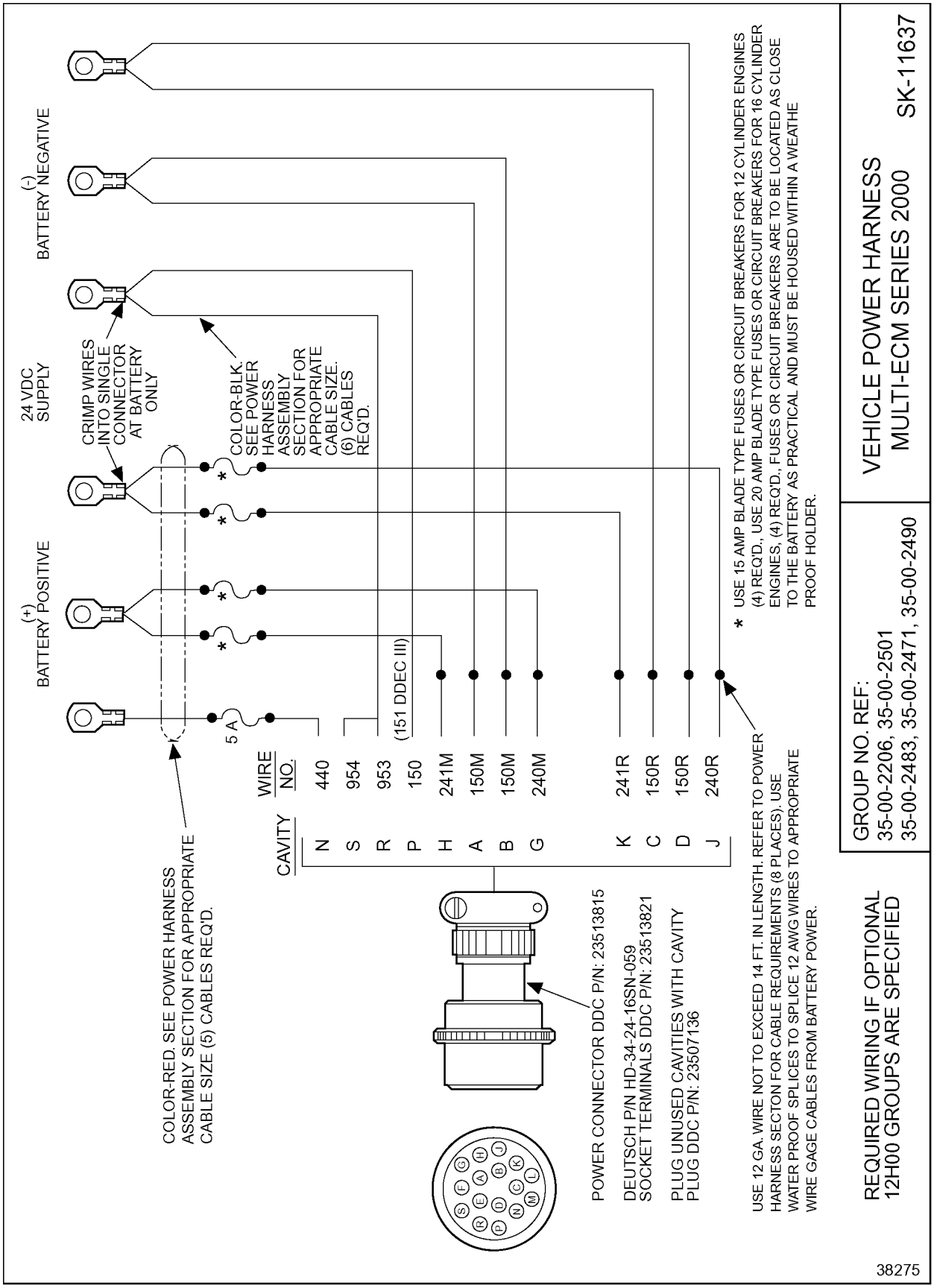


Figure B-6 Vehicle Power Harness - Series 2000, Multi-ECM

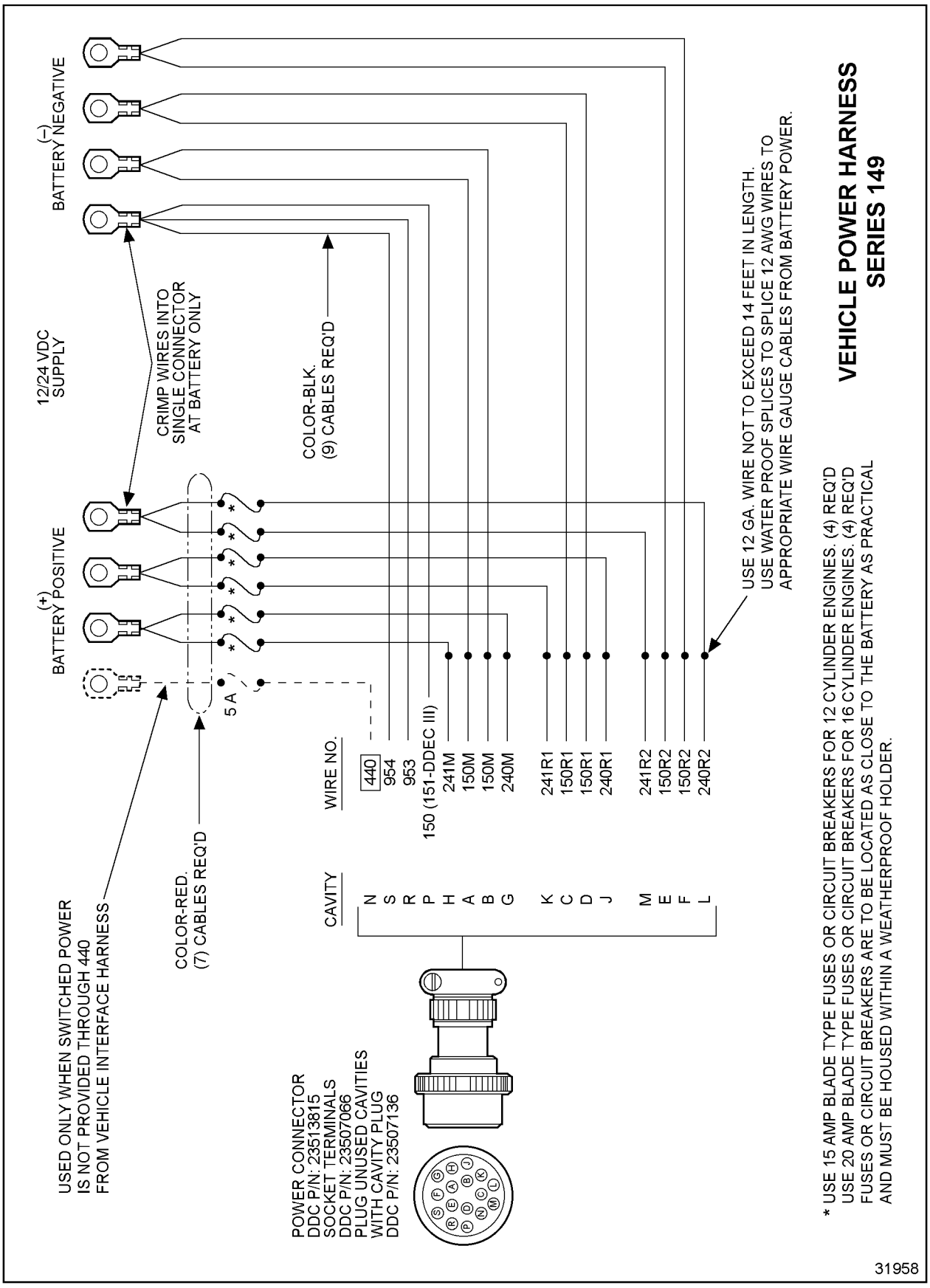


Figure B-7 Vehicle Power Harness - Series 149

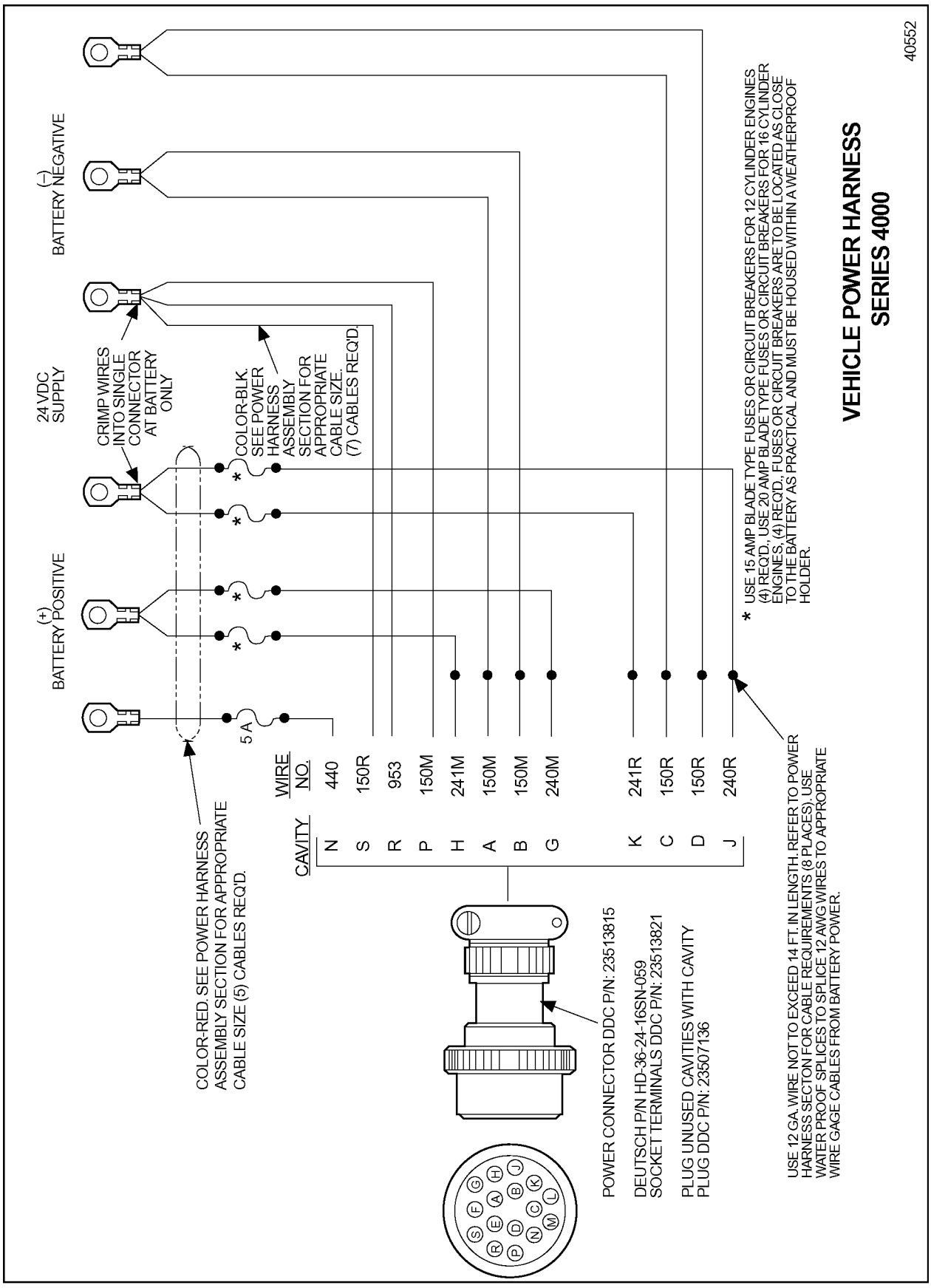


Figure B-8 Vehicle Power Harness - Series 4000

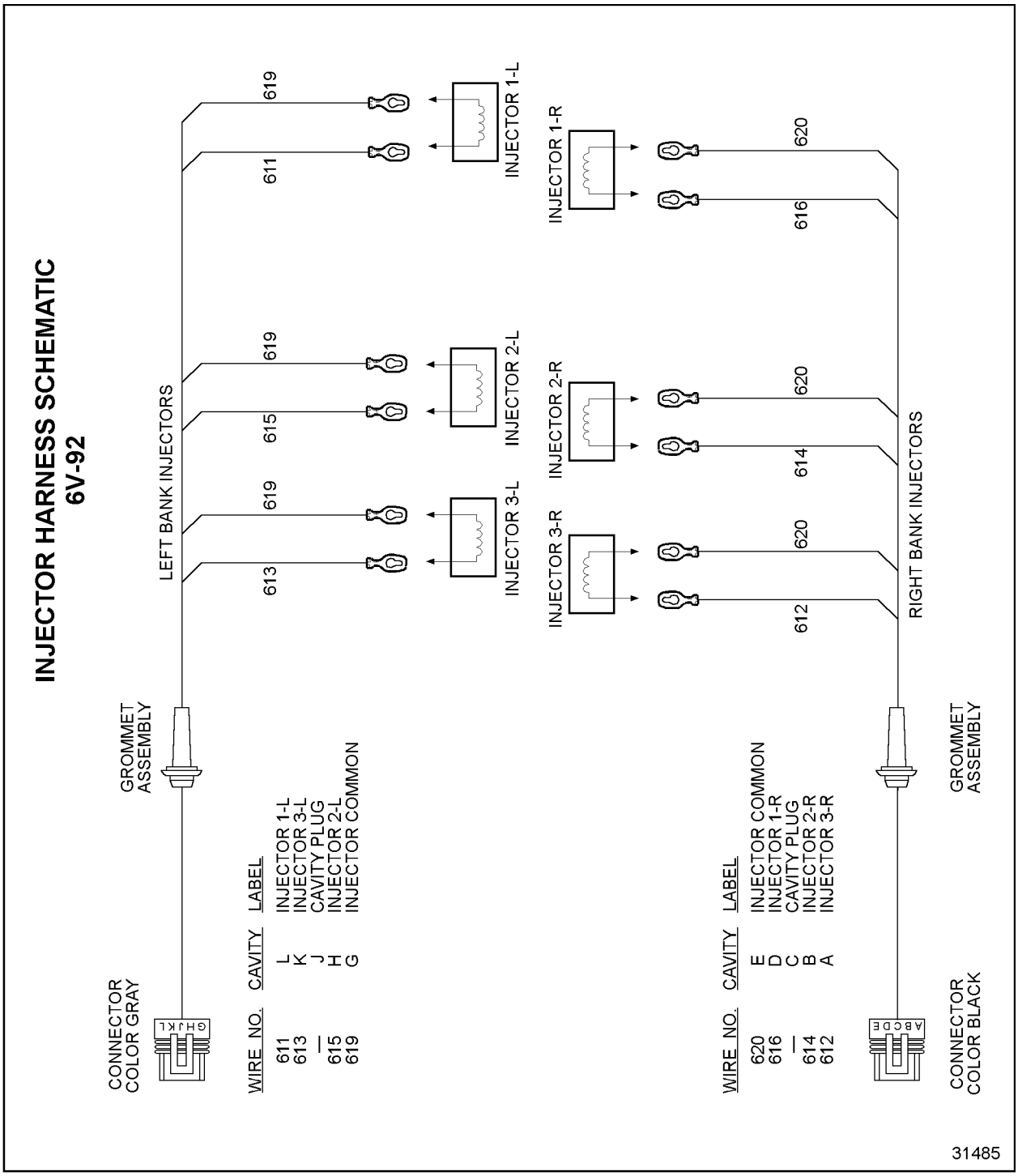


Figure B-9 Injector Harness Schematic - Series 92-6V

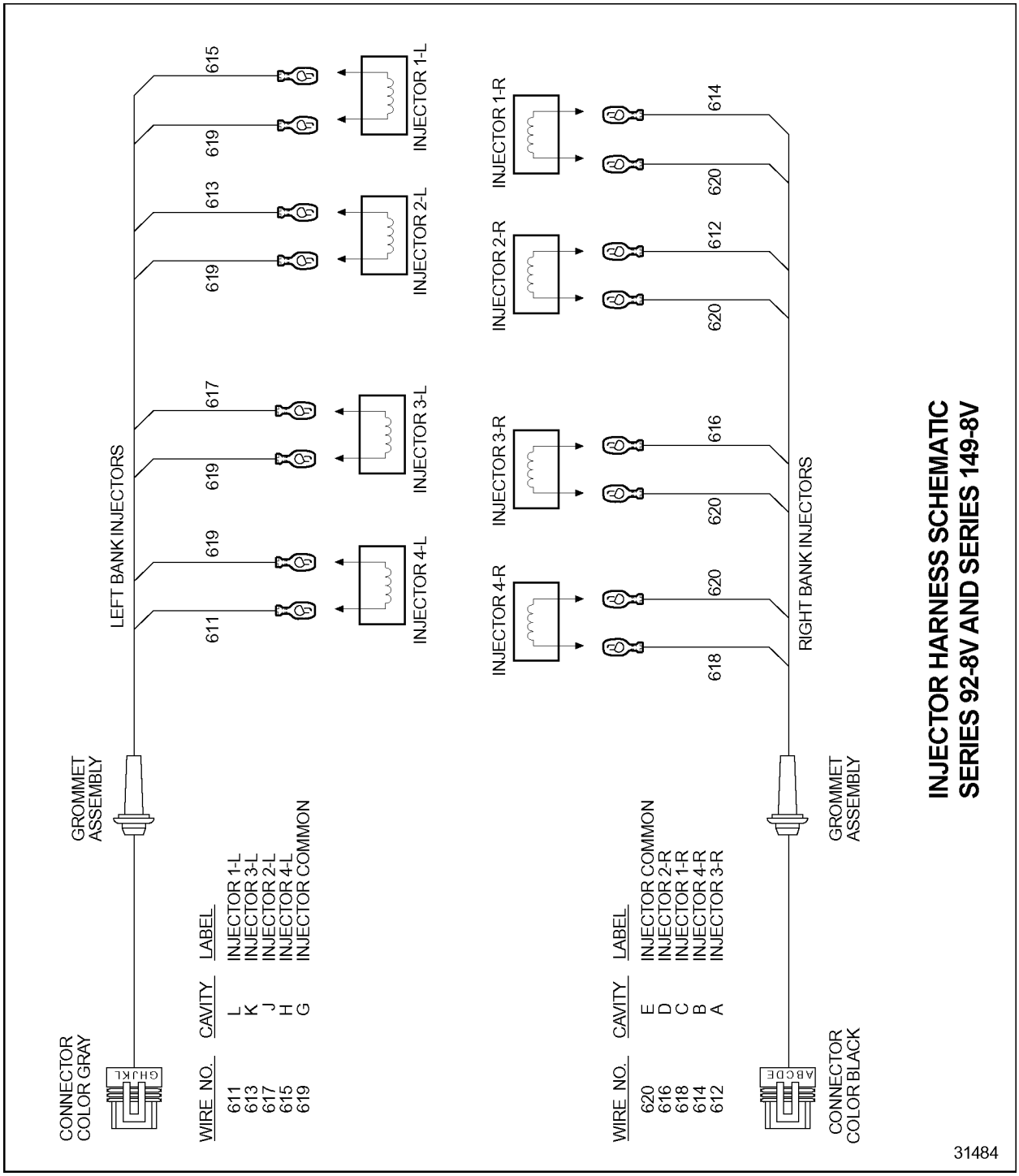


Figure B-10 Injector Harness Schematic -Series 92-8V and Series 149- 8V

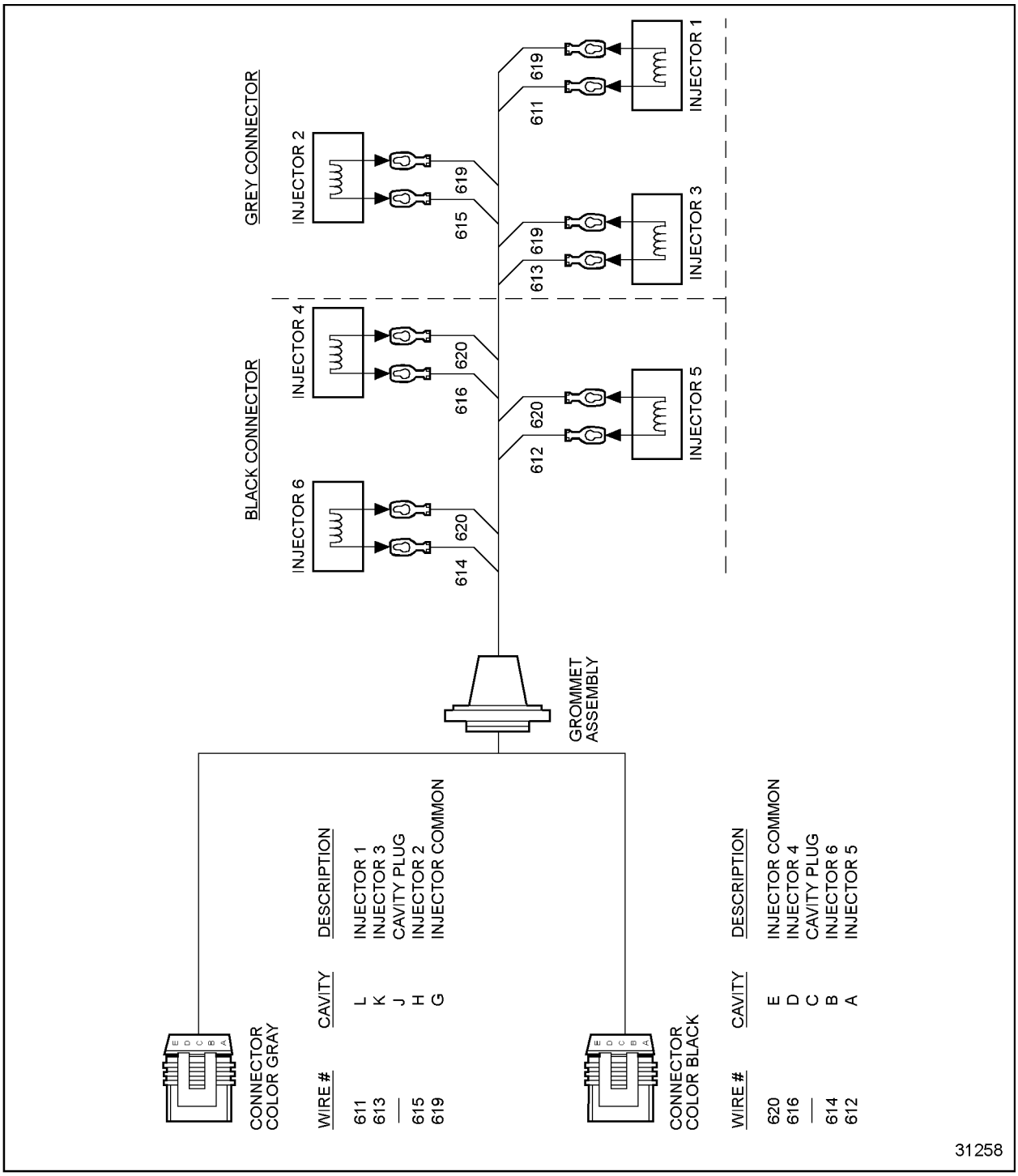


Figure B-11 Injector Harness Schematic - Series 60

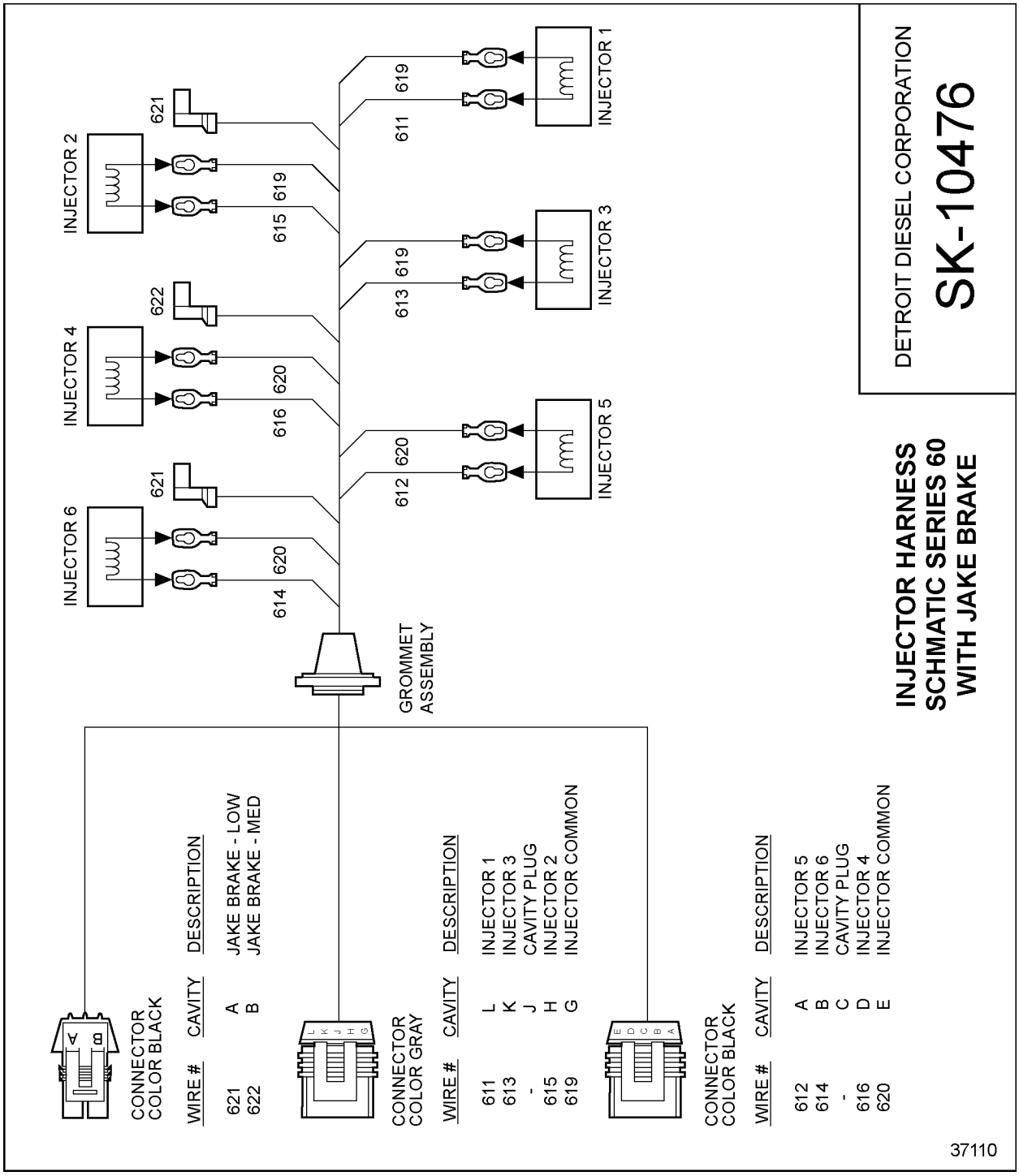


Figure B-12 Injector Harness Schematic - Series 60 with Jake Brake

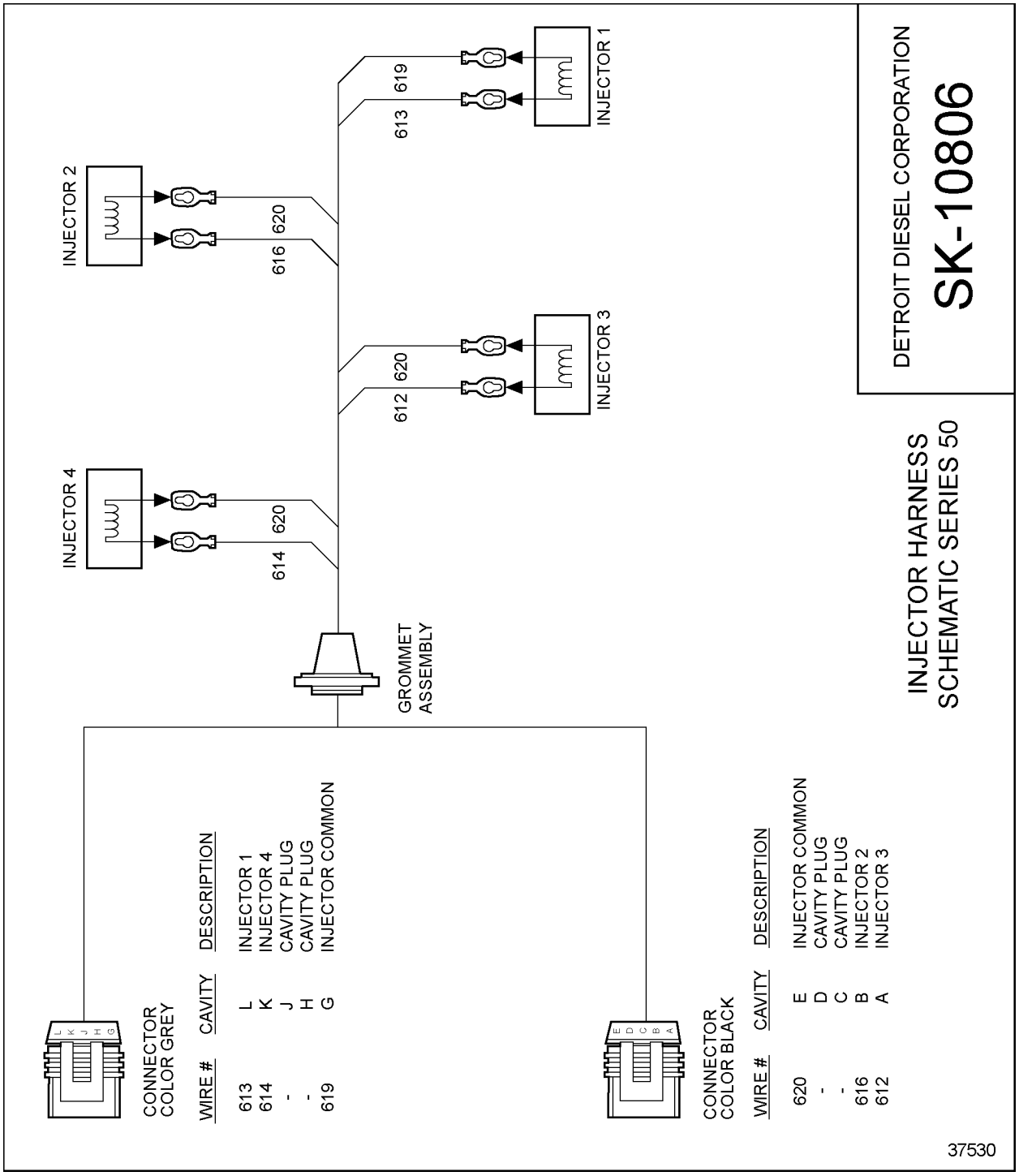


Figure B-13 Injector Harness Schematic - Series 50

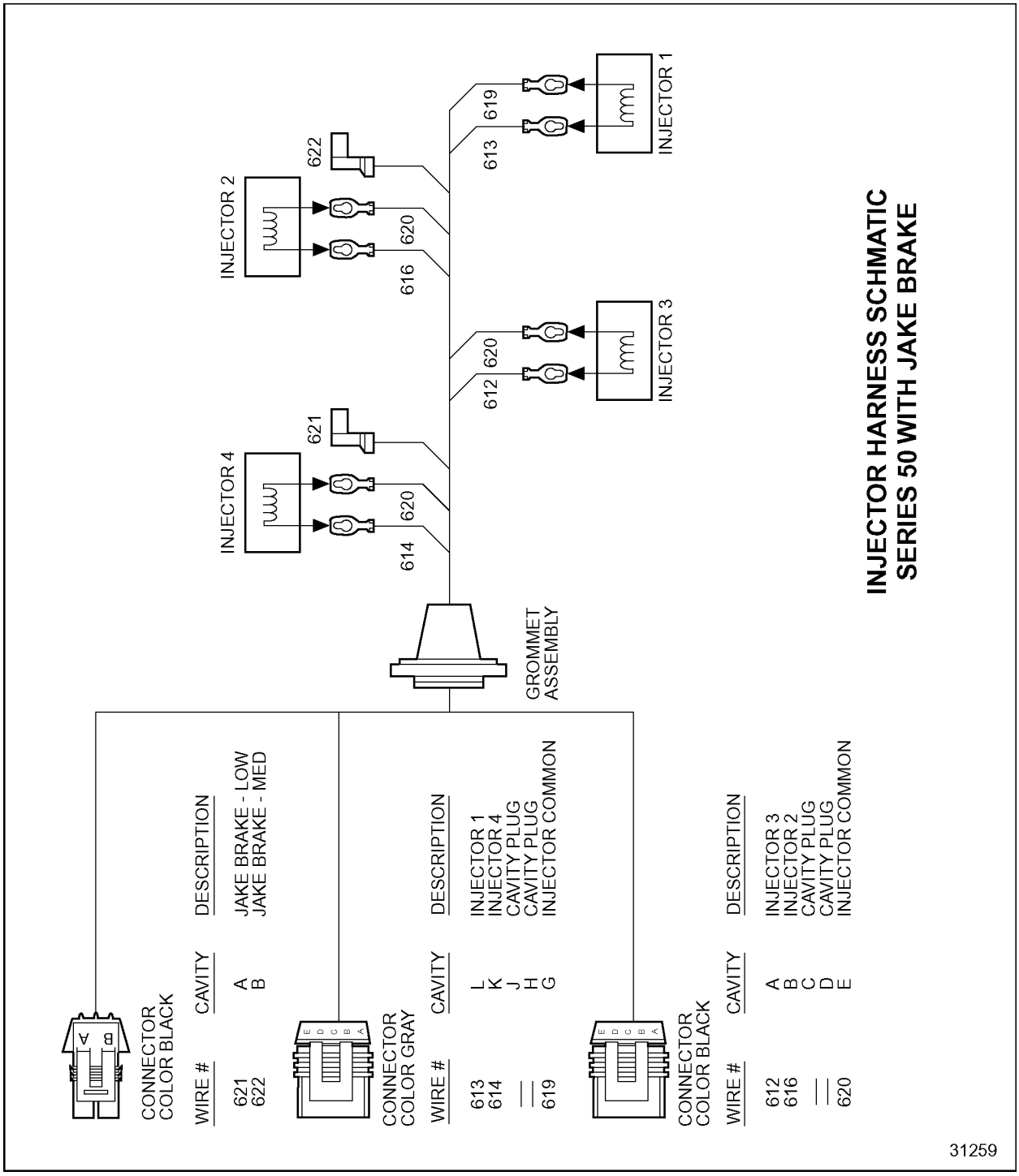


Figure B-14 Injector Harness Schematic - Series 50 with Jake Brake

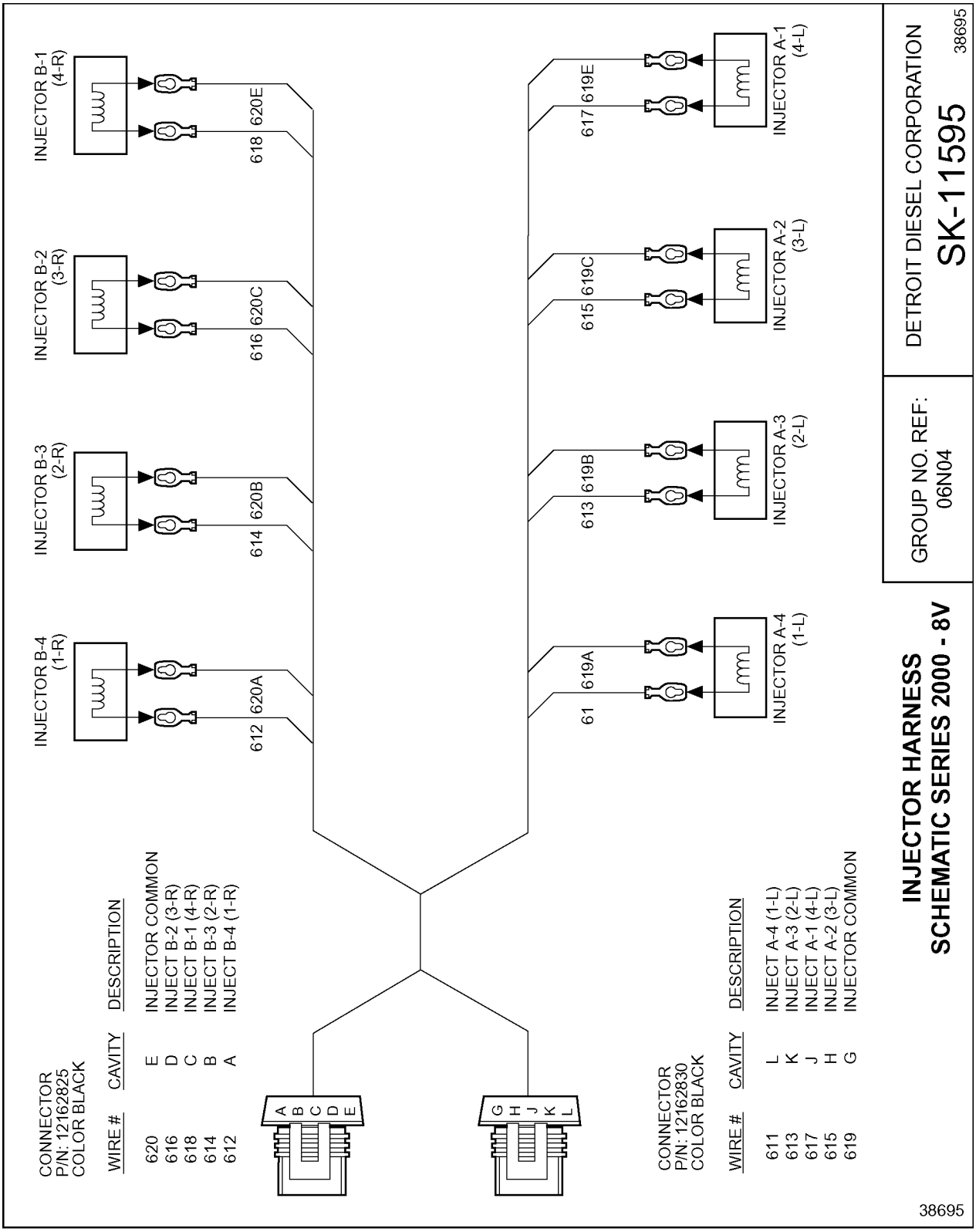


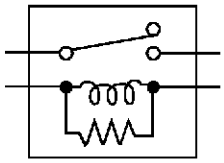
Figure B-15 Injector Harness Schematic - Series 2000-8V

APPENDIX C: SYMBOLS

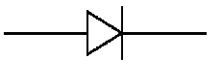
ALARM

COIL

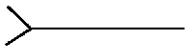
COIL, RELAY
Normally open single pole double throw relay



DIODE

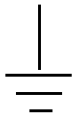


FEMALE TERMINAL

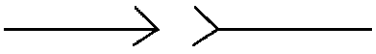


FUSE

GROUND, BATTERY

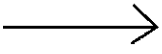


INLINE CONNECTION



LIGHT

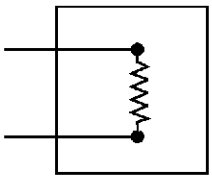
MALE TERMINAL



40396

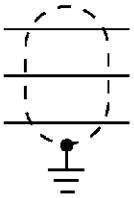
PICKUP, MAGNETIC

POTENTIOMETER



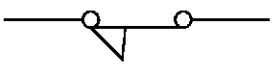
RESISTOR

SHIELDED CABLE



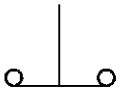
SPLICE

SWITCH, LIGHT
(Normally Closed)



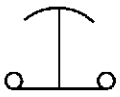
SWITCH, LIGHT
(Normally Open)

SWITCH, MOMENTARY
(Closed)



SWITCH, MOMENTARY
(Open)

SWITCH, MUSHROOM-HEAD SAFETY
(Normally Closed)



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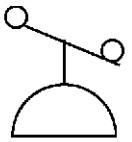
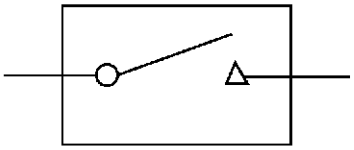
SWITCH, PRESSURE
(Closes on Rising Pressure)

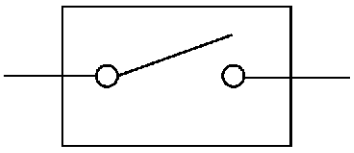


SWITCH, SAFETY INTERLOCKS
(Circuit Closing)

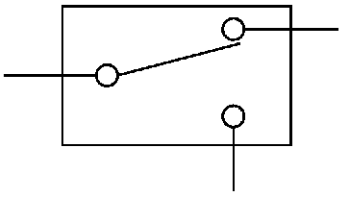
SWITCH, SINGLE POLE, SINGLE THROW
(With Spring Return)



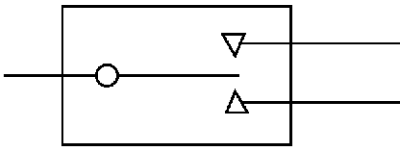
SWITCH, SINGLE POLE, SINGLE THROW
(Without Spring Return)



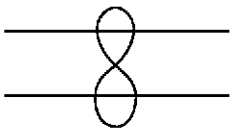
SWITCH, SINGLE POLE, DOUBLE THROW
(Without Spring Return)



SWITCH, SINGLE POLE, DOUBLE THROW
(With Double Spring Action)



TWISTED PAIR



40398

APPENDIX D: ACRONYMS

ABS	Anti-lock Braking System
ACLS	Add Coolant Level Sensor
ACS	Application Code System
ACPS	Air Compressor Pressure Sensor
AFRS	Air Filter Restriction Sensor
AIM	Auxiliary Interface Module
ATI	Aux Timed Input
ATS	Air Temperature Sensor
CEL	Check Engine Light
CFPS	Common Rail Fuel Pressure Sensor
CLS	Coolant Level Sensor
CPS	Coolant Pressure Sensor
CTS	Coolant Temperature Sensor
DDC	Detroit Diesel Corporation
DDDL	Detroit Diesel Diagnostic Link
DDEC	Detroit Diesel Electronic Controls
DDR	Diagnostic Data Reader
DRS	DDEC Reprogramming System
ECM	Electronic Control Module
EDM	Electronic Display Module

EFC	Electronic Fire Commander
EFPA	Electronic Foot Pedal Assembly
EEPROM	Electronically Erasable Programmable Read Only Memory
EOP	Engine Over Temperature Protection
ESH	Engine Sensor Harness
ESS	Engine Synchro Shift
ETS	Exhaust Temperature Sensor
EUI	Electronic Unit Injectors
EUP	Electronic Unit Pump
FEI	Fuel Economy Incentive
FMI	Failure Mode Identifier
FPS	Fuel Pressure Sensor
FRS	Fuel Restriction Sensor
FTS	Fuel Temperature Sensor
HEI	Half Engine Idle
ICPS	Intercooler Coolant Pressure Sensor
ICTS	Intercooler Coolant Temperature Sensor
IRIS	InfraRed Information System
ISD	Idle Shutdown
LSG	Limiting Speed Governor
OEM	Original Equipment Manufacturer
OI	Optimized Idle

OLS	Oil Level Sensor
OPS	Oil Pressure Sensor
OTS	Oil Temperature Sensor
MAS	Maintenance Alert System
MPG	Miles Per Gallon
MPH	Miles Per Hour
MID	Message IDentification Character
MUI	Mechanical Unit Injector
PGN	Parameter Group Number
PID	Parameter IDentification Character
PTO	Power Take-off
PSG	Pressure Sensor Governor
PVM	Pulse to Voltage Module
PW	Pulse Width
PWM	Pulse Width Modulated
SEL	Stop Engine Light
SEO	Stop Engine Override
SRS	Synchronous Reference Sensor
SID	Subsystem IDentification Character
TBS	Turbo Boost Sensor
TDC	Top Dead Center

TPS	Throttle Position Sensor
TRS	Timing Reference Sensor
VEPS	Vehicle Electronic Programming System
VIH	Vehicle Interface Harness
VIN	Vehicle Identification Number
VSG	Variable Speed Governor
VSL	Vehicle Speed Limiting
VSS	Vehicle Speed Sensor

APPENDIX E: VENDORS

Compatible engine accessories may be obtained from several vendors. This section provides vendors name, address.

FANS

Single-speed fans are available from:

Linnig Corp.
P.O. Box 2002
Tucker, GA 30084
Phone: (770) 414-9499

Index Sensors & Controls, Inc.
13205 Southeast 30th Street
Bellevue, WA 98005-4433
Phone: (206) 746-4049

Bendix (A division of Allied Signal)
901 Cleveland St.
P.O. Box 4016
Elyria, OH 44036
Phone: 1-800-AIR-BRAKE

Kysor
1100 Wright Street
Cadillac, MI 49601
Phone: (616) 779-7528

Horton, Inc.
2565 Walnut Street
Roseville, MN 55113
Phone: 1-800-621-1320

Two-speed fans are available from:

Linnig Corp
P.O. Box 2002
Tucker, GA 30084
Phone: (770) 414-9499

A variable speed fan is available from:

Rockford Powertrain, Inc.
1200 Windsor Road
Rockford, IL 61132-2908
Phone: (815) 633-7460

VEHICLE SPEED SENSORS

Wabash Technologies
1375 Swan Streets
Huntington, Indiana 46750-0829
Phone: 219-356-8300
Fax: 219-356-3846

Airpax Instruments
Phillips Technologies
150 Knotter Drive
Chesire, Connecticut 06410
Phone: 1- 800-643-0643

Electro Corporation
1845 57th Street
Sarasota, Florida 34243
Tel: 941-355-8411
Fax: 941-355-3120

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GLOSSARY

Add Coolant Level Sensor — Provides another coolant level sensor, higher in the top tank of the vehicle cooling system. Typically, this is used to recognize the coolant is low, but not low enough to activate the DDEC engine protection.

Air Temperature Sensor — An intake mounted sensor which provides air temperature information to the ECM. Located in the bottom middle of the air intake manifold on the Series 50 and Series 60 Engines.

Check Engine Light — A panel mounted yellow indicator light, provided by the vehicle OEM as standard.

Coolant Level Sensor — Activates the engine protection if the coolant level is low.

Coolant Temperature Sensor — Provides coolant level information to the ECM. Used for engine protection.

Communication Harness — This OEM supplied harness connects the ECM's J1922 and J1939 ports to other vehicle systems.

Cruise Control — Operates in either Engine or Vehicle Speed Mode and maintain a targeted speed (MPH or RPM) by increasing or decreasing fueling to maximize fuel economy and driveability.

Check Engine Light — A panel mounted yellow indicator light. Provided by the vehicle OEM as standard.

Customer Option Password — A 4 digit alphanumeric password to protect and change customer parameters in the DDR. This password is set with the DDR. This password does not protect the horsepower rating.

DDEC IV — Fourth generation of Detroit Diesel Electronic Controls.

Deceleration Light — Illuminates on the rear of the vehicle when you take your foot off the accelerator pedal to indicate that the vehicle is slowing down. Typically, this is used on the rear of a bus that operates in the city.

Diagnostic Request Switch — A switch that allows the yellow and red lights to flash two digit diagnostic codes when the engine is idling or off. The yellow light flashes inactive (or historic) codes. The

	red light flashes active codes. These two digit codes are defined on the DDEC diagnostic data reader pocket card. This can be the same switch as the stop engine override.
Electronic Control Module	The ECM includes control logic to provide overall engine management. The ECM continuously performs self diagnostic checks and monitors other system components
Electronic Fire Commander	A complete pressure governor control unit for DDEC IV engines. The EFC displays engine RPM, battery voltage, engine oil pressure, and either engine oil temperature or engine coolant temperature (programmable).
Electronic Unit Injector	Provides fuel delivery to the engine cylinders. The EUI controls injection timing and metering using a solenoid operated valve. The duration of valve closure determines the quantity of fuel injected.
Electronic Fire Commander	Designed for the fire fighting and emergency services market, EFC combines the DDEC Pressure Sensor Governor (PSG), a system monitor, and a pump panel display for vital engine operating parameters into one compact, durable package.
Engine Brakes Cruise Control	Provides cruise control compatibility with engine brakes. While in cruise control, the engine brakes will turn on and go off automatically in order to maintain the same cruise set speed.
Engine Brake LOW ON (Above Cruise Control)	The additional engine speed above the driver selected cruise speed that the low engine brakes (Jake Brakes) turn on.
Engine Brake Medium/High On (Increment)	Sets the engine brake medium and high limits to a vehicle speed above engine brake low.
Engine Fan Braking	Automatically engages the cooling fan clutch when all the engine brakes are on, (HIGH).
Engine Interface Harness	Used in multi-ECM applications is usually installed at the factory and delivered connected to all ECMs. Ends with a quick disconnect connector. The OEM VIH connects to the quick disconnect connector.
Engine Protection	Provides three levels of protection to the engine if it is operating out of the limits. These three levels are warning, rampdown, and shutdown. Coolant level,

	coolant temperature, oil temperature, oil pressure, and two additional sensors provide protection to the engine. Typically, the additional sensors are used for high oil temperature in the automatic transmission, low oil level in the engine, and other vehicle systems that require the engine to shutdown.
Engine Over Temperature Protection	The reduction in operating power from between the time the CEL and the SEL illuminates. For high coolant and/or oil temperature only.
Engine Overspeed	Logs diagnostic code at 2500 RPM, DDC standard.
Engine Sensor Harness	Connects the ECM to all engine sensors, facilitates the receipt of inputs and outputs signals, controlling the fuel injection process and engine speed.
Failure Mode Identifier	The FMI describes the type of failure detected in the subsystem and identified by the PID or SID.
Fan Clutch Override	Used to engage the cooling fan when desired. Fan Controls use the DDEC oil temperature, coolant temperature, or air temperature sensors to engage the cooling fan.
Fuel Pressure Sensor	Provides fuel pressure information to the ECM. Used for diagnostics.
Fuel Temperature Sensor	Provides fuel temperature information to the ECM. Used for determining hot fuel, and adjusting the calibration based on this temperature.
Half Engine Idle	The engine idles on three of the cylinders to reduce the amount of white smoke on cold engine start-up.
High Range Max MPH	Defines the minimum vehicle speed required to activate the high range max RPM function. This is used to encourage the driver to use high gear, while in cruise control.
High Range Max RPM	Limits the maximum engine speed in the top range of gears, encouraging the driver to upshift to the next higher gear to increase vehicle speed. This function will determine the vehicle speed limit, unless a slower speed limit is selected for the vehicle speed limit parameter. During the shift sequence, the high range max MPH must be reached before the high range max RPM is achieved.

Horsepower Rating Password — A 4 digit alphanumeric password to protect and activate the horsepower rating in the ECM. This password is set with the DDR.

Horsepower Rating Security — Protects the multiple horsepower ratings in the ECM. Only one rating will be available with this feature turned on. This lock is set at the time of engine order from DDC or the OEM.

Idle Shutdown Override With Throttle — Allows the engine shutdown to be canceled by depressing the accelerator pedal while the yellow check engine light is flashing 90 seconds before engine shutdown.

Idle Time — The amount of time spent idling before the engine will automatically shutdown; set with the DDR.

Idle Timer Shutdown — Allows the engine to shutdown after a customer set time expires on idling (low idle or high idle or PTO).

Injector Harness — Installed at the factory and are delivered connected to the injection units and the ECMs.

InfraRed Information System — Provides infrared two-way communication between a vehicle and a PC.

Limiting Speed Governor — Maintains vehicle speed based on driver throttle input. The engine changes RPM to maintain a vehicle speed with the accelerator pedal.

Maintenance Alert System — Monitors engine fluid levels and filter restrictions and notifies the driver and/or technician when maintenance is required.

Maximum Security — Protects and locks out all of the programmed parameters in the ECM. This lock is set at the time of engine order from DDC or at the OEM. Feature settings cannot be changed with maximum security turned on.

Oil Pressure Sensor — Provides engine oil pressure to the ECM. Used for engine protection.

Oil Temperature Sensor — Provides the engine oil temperature to the ECM. Used for engine protection and fan controls.

Parameter Identification Character — A PID is a single byte character used in J1587 messages to identify the data byte(s) that follow.

PasSmart	Allows a fleet manager to enable a second Vehicle Limit Speed (VLS) above the normal VLS to assist while passing other vehicles on the highway. This second VLS is programmed for a limited duration during a given time period (interval).
Power Harness	Connects battery power (12 or 24 volts) and ground to the ECM and includes fuse(s) or circuit breaker(s). OEM supplied.
Power Take Off	A mechanical gear device used to divert engine horsepower to other machinery.
Progressive Shifting	Encourages the driver to shift in to a higher gear before the engine reaches governed speed. The Spec Manager program should be utilized to determine maximum vehicle speed. Typically, this is used on 2100 RPM rated engines.
Pressure Sensor Governor For Fire Trucks	Maintains a set water pressure on a fire truck water pump. The engine speed will vary to maintain a constant water pressure. This feature is in fire trucks.
Pressure Sensor Governor Light For Fire Trucks	Indicates that the Pressure Sensor Governor is active.
Pulse Width	The duration of time the injectors are fueling the engine, measured in degrees of rotation of the engine.
Pulse Width Modulated	A type of electrical signal output.
SAE J1587	Communication link used for DDR, Data Hub, ABS, etc.
SAE J1922	Communication link used for traction control systems and CEEMAT Fuller transmissions.
SAE J1939	Communication link used for multiple block engines and other vehicle systems.
Starter Lockout	Prevents the starter from activating after the engine is already running. Typically, this is used in buses.
Stop Engine Light	A panel mounted red indicator light provided by the OEM as standard.
Stop Engine Override	This switch allows an override of the engine protection system when toggled in the rampdown or shutdown mode

	every 30 seconds. This can be the same switch as the diagnostic request.
Subsystem Identification Character	A SID is a single byte character used to identify field-repairable or replaceable subsystems for which failures can be detected or isolated.
Synchronous Reference Sensor	Indicates a specific cylinder in the firing order; tells the ECM when the #1 cylinder is at top dead center of its stroke. DDC standard.
Timing Reference Sensor	Indicates crank position of every cylinder; tells the ECM where the rotation of the engine is or when to fuel each cylinder. DDC standard.
Throttle Inhibit	Disables the accelerator pedal by making it unresponsive when a switch is toggled. Typically, this is used in buses for when the doors are open, or when the pressure governor system is active in a fire truck.
Throttle Position Sensor	Converts the operator's hand throttle and/or foot pedal input into a signal for the ECM, better known as the accelerator pedal. This pedal, located on the floor of the vehicle cab, tells the ECM how much fuel is needed based on the driver input. Provided by the OEM, standard.
Top Dead Center	When the piston is at the top of the stroke nearest the head of the engine. The point at which the piston stops going up and starts going down.
Turbocharger Boost Sensor	Provides air pressure (atmospheric and boost) information from turbocharger to the ECM. This sensor is located in the air intake manifold. Used for white smoke and emissions. DDC standard.
Variable Speed Governor	Maintains a constant engine speed with varying loads. A variable speed governor is referred to as: high idle, fast idle, hand throttle, Vernier, voltage divider, power take off (PTO), cruise control, or cruise switch PTO.
Vehicle Electronic Programming System	A PC software package used to change the parameters to be programmed into the DDEC IV ECM. OEM supplied.
Vehicle Interface Harness	Connects the ECM to other vehicle systems.
Vehicle Power Shutdown	Allows the chassis power and DDEC power to shutdown after idling on low idle, high idle, or PTO for the set

	idle time. The idle shutdown override with throttle will override the vehicle power shutdown. In addition, the vehicle power will shutdown after an engine protection shutdown. This can be overridden by the stop engine override switch.
Vehicle Speed Limiting	The vehicle's fastest speed. limits the vehicle from going faster than a preset limit.
Vehicle Speed Maximum	The fastest vehicle speed (MPH/KPH) the driver is allowed to travel on flat ground.
Vehicle Speed Sensor	Tells the ECM how fast the vehicle is going. This magnetic pickup is located on the tail shaft of the transmission or on the rear drive wheel of the vehicle. Provided by the OEM. Required for cruise control, vehicle speed limiting, vehicle overspeed with/without throttle, progressive shift, and engine brakes. Optional.
Wire Comb	A strain relief for the back of the VIH connector to prevent water from entering the connector from the back. Used in all Series 50, Series 149, and Industrial applications.

INDEX

A

B

C

D

E

F

G

H

I

J

K

L

M

O

P

R

S

T

V

W