ELECTRONIC CONTROL SYSTEM DIAGNOSTICS

International® MAXXFORCE™ DT, 9 and 10
Beginning with 2007 Model Year

MAXXFORCE INTERNATIONAL DIESEL POWER

WARNING

To prevent personal injury or death, read all safety instructions in the "Safety Information" section of *Engine Diagnostics Manual* EGES-370 before doing any diagnostic procedures.

Information on this form was current at the time of publication. Updates may have been made to introduce product improvements and technical advancements. See correct truck service manual for chassis wiring.

For detailed circuit information, refer to the following Truck documents:
- *Chassis Electrical Circuit Diagram Manual*
- *Electrical System Troubleshooting Guide*

Color code for schematic lines

Red	B+ (VBAT)
Red	High side driver control
Purple	Injectors (48 Volts)
Blue	VREF (5 Volts)
Green	Signal circuit
Brown	Data Communication Link
Brown	PWM - H-Bridge Control
Black	Ground circuit
Black	Low side driver control

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SIGNAL VALUES (All values with the breakout box installed on the ECM and harness)

WARNING: Read Safety Instructions in EGES-370 *Diagnostic Manual*, before starting diagnostic procedures.

Pin	Item	Circuit	Key ON		Low Idle			High Idle			Operating Range	Comments
			Signal	Actual value	Signal	Data List	Actual value	Signal	Data List	Actual value		
(E) ENGINE CONNECTOR												
7	WIF	Water In Fuel sensor	0 - 5V		0 - 5V	No / Yes		0 - 5V	No / Yes		0 V - 5V	4.6 V = No water , below 4 V = water in fuel
10	CANL	CAN (private) Low	1 V – 4 V		1 V – 4 V			1 V – 4 V			1 V - 4 V	Digital signal communications (VGT and EGR control)
11	CANH	CAN (private) High	1 V – 4 V		1 V – 4 V			1 V – 4 V			1 V - 4 V	Digital signal communications (VGT and EGR control)
13	EOP	Engine Oil Pressure	0.62 V at 0 PSIG		Performance Specs			Performance Specs			0 psi – 100 psi	0.62 V = 0 psi 3.61 V = 60 psi
15	MAT	Manifold Air Temperature	Temp depend		Temp depend			Temp depend			0 V - 5V	See Performance Specifications – Sensor specs
20	EBP	Exhaust Back Pressure	0.73 V		Performance Specs			Performance Specs			0 V - 5V	See Performance Specifications
24	CMPL	Camshaft Position										CMP Ground
25	CKPL	Crankshaft Position										CKP Ground
26	CMP/CKP SHD	CMP/CKP Shield GND	0 V		0 V			0 V			0 V	Ground shield for CMP/CKP sensors
28	SIG GND	Signal Ground	0 V		0 V			0 V			0 V	Signal ground for engine sensors
32	EFP	Engine Fuel Pressure	0.62 V at 0 PSIG		Performance Specs			Performance Specs			0 psi – 100 psi	0.62 V = 0 psi 3.61 V = 60 psi
33	ECT	Engine Coolant Temperature	Temp depend		Temp depend			Temp depend			0 V – 5 V	DMM set to V , EST – Continuous Monitor Session
35	VREF	Voltage Reference	5 V ± 0.5 V		5 V ± 0.5 V			5 V ± 0.5 V			5 V ± 0.5 V	VREF for engine sensors
41	CKPH	Crankshaft Position	Min 130 Hz at crank		650 Hz – 700 Hz	700 rpm		2600 – 2750 Hz			0 – Governed speed	DMM set to ACV – Hz, EST - PID Engine Speed
42	CMPH	Camshaft Position	Min 130 RPM② at crank		700 RPM②	700 rpm		2700 RPM②	2700 rpm		0 – Governed speed	DMM set to ACV – RPM ②, EST – PID Engine Speed
43	IPR	Injection Pressure Regulator									0 – 100% Duty Cycle	Duty Cycle controlled, High side driver
48	MAP	Manifold Absolute Pressure	0.73 V		Performance Specs			Performance Specs			0 V – 5 V	See Performance Specifications
57 & 75	ITVL	Intake Throttle Valve Low	Performance Specs		Performance Specs			Performance Specs			0 V / B+	Monitor ITVP and run Output State test high and low
58 & 76	ITVH	Intake Throttle Valve High	Performance Specs		Performance Specs			Performance Specs			0 V / B+	Monitor ITVP and run Output State test high and low
59	IAH	Intake Air Heater	0 V Off / B+ On		0 V Off / B+ On			0 V Off / B+ On			0 V / B+	0V = IAHC off, B+ = IAHC on, EST - Output State test
66	EOT	Engine Oil Temperature	Temp depend		Temp depend			Temp depend			0 V – 5 V	See Performance Specifications – Sensor specs
68	ITVP	Intake Throttle Valve Position	1.30 V		DPF Regen device			DPF Regen device			0 – 100%	See Performance Specifications
(C) CHASSIS CONNECTOR												
1, 3, 5	ECM PWR	ECM Power from Relay	B+		B+			B+			0 V / B+	B+ from ECM power relay
2, 4, 6	ECM GND	ECM Ground from Battery	0 V		0 V			0 V			0 V	ECM ground from Battery Negative
7	ECI	Engine Crank Inhibit	GND		Open circuit			Open circuit			GND to Open	GND allows cranking, OPEN inhibits cranking
8	EGT1	Exhaust Gas Temperature 1	Temp depend		Temp depend			Temp depend			0 V – 5 V	See Performance Specifications – Sensor specs
10	ATAL	ATA Communication Link (Low)	1 V – 4 V		1 V – 4 V			1 V – 4 V			0 V – 5 V	Digital signal communications
11	XCS	Transfer case										Chassis body builder option only
16	RPRE	Remote Preset PTO										Chassis body builder option only
17	EGT2	Exhaust Gas Temperature 2	Temp depend		Temp depend			Temp depend			0 V – 5 V	See Performance Specifications – Sensor specs
19	EGDP	Exhaust Gas Differential Pressure	0.70 V		DPF soot level depend			DPF soot level depend			0 V – 5 V	DMM set to V , EST – Continuous Monitor Session
21	OWL	Oil Warn Lamp										Chassis body builder option only
22	WEL	Warn Engine Lamp										Chassis body builder option only
25	ATAH	ATA Communication Link (High)	1 V – 4 V		1 V – 4 V			1 V – 4 V			0 V – 5 V	Digital signal communications
27	VREF	Voltage Reference										Chassis body builder option only
30	BPS	Brake Pressure Switch	B+ Off / 0V On		B+ Off / 0V On			B+ Off / 0 V On			0 V / B+	B+ = Off / 0V On. Applications without ESC module
31	VIGN	Ignition Voltage	B+		B+			B+			0 V / B+	Switched Ignition power B+ = Key On , 0 V = Key Off
33	APS	Accelerator Position Sensor	0.66 V		0.66 V	0%		3.83 V	100%		0 % – 100 %	0.66V = 0%, 3.83V = 100%
34	SIG GND	Signal Ground	0 V		0 V			0 V			0 V	Signal ground for APS sensor
35	SIG GND	Signal Ground										Chassis body builder option only
37	SIG GND	Signal Ground	0 V		0 V			0 V			0 V	Signal ground for chassis sensors
39	RSE	Radiator Shutter Enable	0 V / B+		0 V / B+			0 V / B+			0 V / B+	0 V = Shtr Closed, B+ = Shtr Open, Low side driver.
42	ECL	Engine Coolant Level	0 V Low – 5 V Full		0 V Low – 5 V Full			0 V Low – 5 V Full			0 V / B+	0 V = Low coolant 5 V = Full coolant
45	IPR PWR	IPR Power	B+		B+			B+			0 V / B+	Switched ignition power , B+ = Key On, 0 V = Key Off
47	IVS	Idle Validation Switch	0 V Release / B+ Depress		0 V			B+			0 V / B+	0 V at normal state, B+ Accelerator pedal depressed
49	RAS	Resume Accel Switch										Chassis body builder option only
50	RPS	Remote Pedal Position Sensor										Chassis body builder option only
51	VREF	Voltage Reference	5 V ± 0.5 V		5 V ± 0.5 V			5 V ± 0.5 V			5 V ± 0.5 V	VREF for chassis sensors
53	VSSL	Vehicle Speed Signal (Low)	0 V		2 – 14 VAC			2 – 14 VAC			2 – 14 VAC	VSSL is used on applications without an Allison Trans
54	VSSH	Vehicle Speed Signal (High)	0 V		2 – 14 VAC			2 – 14 VAC			2 – 14 VAC	VSSH is an input signal from the TCM or VSS sensor
58	EFAN	Engine Fan	0 V On / B+ Off		0V On / B+ Off			0V On / B+ Off			0 V / B+	B+ at normal state, 0 V enables relay, Low side driver
60	RVAR	Remote Variable PTO										Chassis body builder option only
61	CANH	CAN (public) High	1 V – 4 V		1 V – 4 V			1 V – 4 V			1 V – 4 V	Digital signal communications
62	CANL	CAN (public) Low	1 V – 4 V		1 V – 4 V			1 V – 4 V			1 V – 4 V	Digital signal communications
63	VREF	Voltage Reference	5 V ± 0.5 V		5 V ± 0.5 V			5 V ± 0.5 V			5 V ± 0.5 V	VREF for APS sensor
65	DDS	Drive Line Disengagement Switch	0 V – B+		B+			B+			0 V / B+	0 V = In gear , B+ = Park , Neutral or clutch pedal down
66	IAT	Intake Air Temperature	Temp depend		Temp depend			Temp depend			0 V – 5 V	See Performance Specifications – Sensor specs
67	EGT3	Exhaust Gas Temperature 3	Temp depend		Temp depend			Temp depend			0 V – 5 V	See Performance Specifications – Sensor specs
68	SCS	Speed Control Switch										Chassis body builder option only
69	BOO	Brake On / Off switch	0 V Off / B+ On		0 V Off / B+ On			0 V Off / B+ On			0 V / B+	0 V = Off / B+ On. Applications without ESC module
70	MPR	Main Power Relay enable	0 V		0 V			0 V			0 V / B+	0 V = enable, B+ = disable, Low side driver
71	TACH	Tachometer Output signal										0 Hz = 0 rpm, 140 Hz = 700 rpm, 540 Hz = 2700 rpm
72	VSO	Vehicle Speed Output signal										0 Hz = 0 mph, 124 Hz = 15 mph
EST only	ICP	Injection Control Pressure	0.2 V		Performance Specs			Performance Specs			0 psi – 4061 psi	See Performance Specifications
EST only	BCP	Engine Brake Control Pressure	0.2 V		0 V			0 V			0 psi – 4061 psi	See Performance Specifications
EST only	BSV	Brake Shutoff Valve	0 %		0 V			0 V			0 V / B+	0 V = BSV Off, B+ = BSV On, EST Output State Test.

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