

FIELD TROUBLESHOOTING ERROR CODE REFERENCES




EXPLANATION OF ERROR CODE DISPLAY

NOTE

There are three kinds of information in the Electronic Control System (ECS) display.

1. Icons in the lower left corner of the display describe what the driver should do. Table 1 defines each of the three driver actions.






Table 1. Driver Action Icons.

ICON	DESCRIPTION
	STOP MACHINE IMMEDIATELY in a safe way. Can be a safety issue. Machine performance may be restricted. Read operator's manual (TM 10-3930-675-10) for instructions. Contact maintenance personnel. Any active "Stop" type error code will de-rate the engine to 1,000 RPMs. The ignition must be shut off to clear the engine de-rate. Any engine temperature or oil pressure codes will de-rate the engine to 1,000 RPMs for 30 seconds and then shut the engine down.
	WARNING - DEGRADED OPERATION, stop machine in a safe way. Read operator's manual (TM 10-3930-675-10) for instructions. Contact maintenance personnel. Confirm that error message is acknowledged by pressing RESET button. Error will appear every 3 minutes as long as error is active. It can be reset every time it shows.
	INFORMATION/MAINTENANCE action is needed. Error code shows once when machine starts up. Acknowledge error message by pressing RESET. These error codes may be deactivated for driver, so that they only show when maintenance personnel activate them. The information/maintenance icon will appear in the ECS display operational screen (weight/load center) to alert the maintenance personnel of potential service.

EXPLANATION OF ERROR CODE DISPLAY - Continued

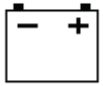



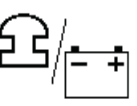

2. Icons in the center of the display identify the type of fault. Table 2 describes the five fault types used in the display.

Table 2. Type of Fault Icons.

ICON	DESCRIPTION	ICON	DESCRIPTION
	Sensor		Lever
	Valve		Temperature
	Pressure		





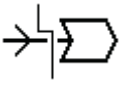

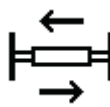

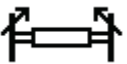

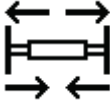


3. Icons in the right of the display identify what function or machine system the fault is related to. Table 3 lists the various functions or machine systems used in the display.

Table 3. Function Icons.

ICON	DESCRIPTION	ICON	DESCRIPTION
	Battery		Twistlock
	Forklift Kit		Up/Down
	Emergency Stop or Battery		In/Out

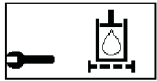



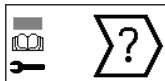
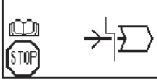
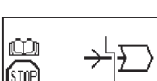
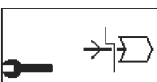
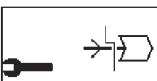
EXPLANATION OF ERROR CODE DISPLAY - Continued

Table 3. Function Icons - Continued.

ICON	DESCRIPTION		ICON	DESCRIPTION
	Rotation ECS display; lockout indication (V1R, V2, V3 only)			Transmission ECS display; lockout indication (V1R, V2, V3 only)
	Hydraulic Filter			Fan
	Communication			Engine
	Sideshifting			No Overload Protection
	Oscillation (leveling)			Brake
	Spreading			Tilt ECS display; lockout indication (V1R, V2, V3 only)
	Steering			

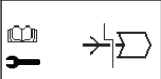
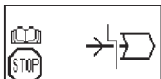
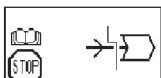
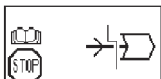




EXPLANATION OF ERROR CODE DISPLAY - Continued

Table 4. Error Code Reference Index.

ERROR CODE	DISPLAY LAYOUT	TROUBLESHOOTING PROCEDURE WORK PACKAGE	ERROR CODE CATEGORY/ EXPLANATION	MACHINE LIMITATIONS
1		(Volume 2, WP 0238)	Information/Maintenance Lifting/lowering boom. Hydraulic filter clogged.	None.
2		(Volume 2, WP 0238)	Information/Maintenance Steering. Hydraulic filter clogged.	None.
3		(Volume 2, WP 0238)	Information/Maintenance Tophandler attachment. Hydraulic filter clogged.	None.
4		(Volume 2, WP 0238)	Information/Maintenance Return filter. Hydraulic filter clogged.	None.
103		(WP 0102)	Information/Maintenance Appears during replacement of ECU. Software not compatible with other software in system.	Undesired functions and not relevant error codes may appear.
105		(WP 0102)	Stop Machine Immediately ECU 790 not responding. Circuit breaker tripped. Cable defective. ECU 790 defective.	Operating system not responding. Boom and tophandler may not work.
106		(WP 0102)	Stop Machine Immediately ECU 791 not responding. Circuit breaker tripped. Cable defective. ECU 791 defective.	Operating system not responding. Boom and tophandler may not work.
107		(WP 0102)	Information/Maintenance Communication, cable segment 1 between ECU 795 and 791. Cable between ECU 795 - 791 interrupted or short circuited.	No redundancy in ECS system of boom, display, and tophandler function
108		(WP 0102)	Information/Maintenance Communication, cable segment 2 between ECU 791 and 790. Cable	No redundancy in ECS system of boom, display,

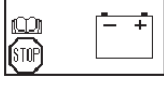
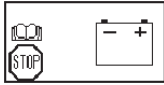
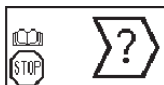
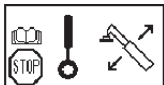

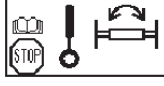


EXPLANATION OF ERROR CODE DISPLAY - Continued

Table 4. Error Code Reference Index - Continued.

ERROR CODE	DISPLAY LAYOUT	TROUBLESHOOTING PROCEDURE WORK PACKAGE	ERROR CODE CATEGORY/ EXPLANATION	MACHINE LIMITATIONS
			between ECU 791 - 790 interrupted or short circuited.	and tophandler function.
109		(WP 0102)	Information/Maintenance Communication, cable segment 3 between ECU 790 and 795. Cable between ECU 790 - 795 interrupted or short circuited.	No redundancy in ECS system of boom, display, and tophandler function.
110		(WP 0102)	Stop Machine Immediately Communication, ECU 792 - steering computer not responding. Circuit breaker tripped. Cable defective. ECU 792 defective.	Steering may not function properly.
111		(WP 0102)	Stop Machine Immediately Communication, ECU 793 - transmission computer not responding. Circuit breaker tripped. Cable defective. ECU 793 defective.	Transmission may not function properly
112		(WP 0102)	Stop Machine Immediately ECU 794 - engine computer not responding. Circuit breaker tripped. Cable defective. ECU 794 defective.	Engine may not function properly.
118		(Volume 2, WP 0205)	Stop Machine Immediately No pressure/signal - both brake systems. Circuit breaker tripped. Hydraulic failure.	Brakes may not function properly.
119		(Volume 2, WP 0205)	Warning - Degraded Operation No pressure - brake circuit 1. Hydraulic failure.	Only half brake capability available.
120		(Volume 2, WP 0205)	Warning - Degraded Operation No pressure - brake circuit 2. Hydraulic failure.	Only half brake capability available.
121		(WP 0096)	Stop Machine Immediately Supply voltage - ECU 790. Emergency stop engaged. Circuit breaker tripped. Cable defective.	Operating system and boom function not working.

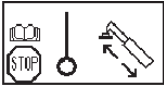
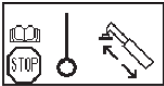
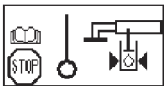
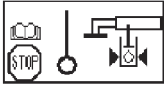
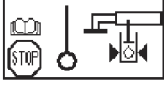
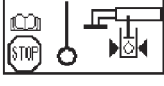
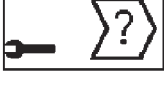
EXPLANATION OF ERROR CODE DISPLAY - Continued

Table 4. Error Code Reference Index - Continued.

ERROR CODE	DISPLAY LAYOUT	TROUBLESHOOTING PROCEDURE WORK PACKAGE	ERROR CODE CATEGORY/ EXPLANATION	MACHINE LIMITATIONS
122		(WP 0096)	Stop Machine Immediately Supply voltage - CAN 790. Circuit breaker tripped. Cable defective.	Operating system and boom function not working.
123		(WP 0096)	Stop Machine Immediately Ref. voltages 10 VDC - ECU 790. Circuit breaker tripped. Cable defective.	Operating system and boom function not working.
125		(Volume 2, WP 0233)	Stop Machine Immediately Memory fault, check ECU 790. Circuit breaker tripped. Cable defective.	None if code clears. Operating system and boom function not working.
126		(Volume 2, WP 0244)	Stop Machine Immediately Signal for lifting/lowering, out of range. Cable defective. Short circuit. Potentiometer in joystick not functioning.	Lift/lower does not function properly (hydraulic stops).
127		(Volume 2, WP 0248)	Stop Machine Immediately Signal for boom in/out, out of range. Cable defective. Short circuit. Potentiometer in joystick not functioning.	Boom in/out does not function properly (hydraulic stops).
128		(Volume 2, WP 0251)	Stop Machine Immediately Signal for slewing, out of range. Cable defective. Short circuit. Potentiometer in joystick not functioning.	Slewing does not function properly (hydraulic stops).
129		(Volume 2, WP 0254)	Stop Machine Immediately Signal for tilt in/out, out of range. Cable defective. Short circuit. Potentiometer in joystick not functioning.	Tilt does not function properly (hydraulic stops).
130		(Volume 2, WP 0254)	Stop Machine Immediately Overload protection error. Error codes 131 - 136 or 210 have been active.	No overload protection system. Reduced hydraulic speed.


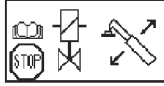
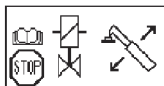
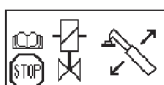
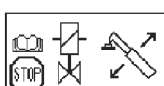
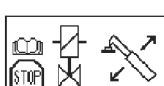
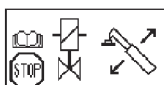
EXPLANATION OF ERROR CODE DISPLAY - Continued

Table 4. Error Code Reference Index - Continued.

ERROR CODE	DISPLAY LAYOUT	TROUBLESHOOTING PROCEDURE WORK PACKAGE	ERROR CODE CATEGORY/ EXPLANATION	MACHINE LIMITATIONS
131		(WP 0085)	Stop Machine Immediately Boom sensor - boom length out of range or no signal change when boom is moving. Cable defective. Short circuit. Potentiometer damaged. Hydraulic failure.	No overload protection system. Reduced hydraulic speed.
132		(WP 0085)	Stop Machine Immediately Boom sensor - boom angle out of range or no signal change when lowering/lifting boom. Sensor bracket or lever damaged. Cable defective. Short circuit. Potentiometer damaged. Hydraulic failure.	No overload protection system. Reduced hydraulic speed.
133		(WP 0085)	Stop Machine Immediately Left lift cylinder pressure sensor, signal out of range. Cable defective. Short circuit. Pressure sensor defective.	No overload protection system. Reduced hydraulic speed.
134		(WP 0085)	Stop Machine Immediately Right lift cylinder pressure sensor, signal out of range. Cable defective. Short circuit. Pressure sensor defective.	No overload protection system. Reduced hydraulic speed.
135		(WP 0085)	Stop Machine Immediately Left lift cylinder return pressure sensor, signal out of range. Cable defective. Short circuit. Pressure sensor defective.	No overload protection system. Reduced hydraulic speed.
136		(WP 0085)	Stop Machine Immediately Right lift cylinder return pressure sensor, signal out of range. Cable defective. Short circuit. Pressure sensor defective.	No overload protection system. Reduced hydraulic speed.
141		(Volume 2, WP 0233)	Information/Maintenance Communication fault - ECU 790. Computer hardware fault.	Possible ECU malfunction. Other codes will also show.

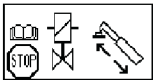
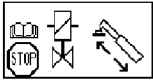
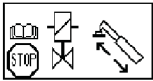
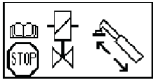
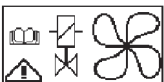
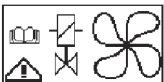
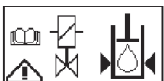
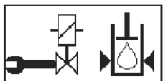

EXPLANATION OF ERROR CODE DISPLAY - Continued

Table 4. Error Code Reference Index - Continued.

ERROR CODE	DISPLAY LAYOUT	TROUBLESHOOTING PROCEDURE WORK PACKAGE	ERROR CODE CATEGORY/ EXPLANATION	MACHINE LIMITATIONS
142		(Volume 2, WP 0233)	Information/Maintenance Communication fault - ECU 790. Computer hardware fault.	Possible ECU malfunction. Other codes will also show.
151		(Volume 2, WP 0244)	Stop Machine Immediately Locking valve, broken circuit. Cable to valve defective.	Boom cannot be lowered with joystick. Emergency lowering is necessary.
152		(Volume 2, WP 0244)	Stop Machine Immediately Locking valve, short circuit. Cable to valve defective.	Boom cannot be lowered with joystick. Emergency lowering is necessary.
154		(Volume 2, WP 0244)	Stop Machine Immediately Lifting valve, broken circuit. Cable to valve defective.	Lifting is impossible.
155		(Volume 2, WP 0244)	Stop Machine Immediately Lifting valve, short circuit. Cable to valve defective.	Uncontrolled self-lifting may occur.
157		(Volume 2, WP 0244)	Stop Machine Immediately Lowering valve, broken circuit. Cable to valve defective.	Boom cannot be lowered with joystick. Emergency lowering is necessary.
158		(Volume 2, WP 0244)	Stop Machine Immediately Lowering valve, short circuit. Cable to valve defective.	Boom cannot be lowered with joystick. Emergency lowering is necessary. Uncontrolled self-lifting may occur.



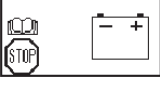
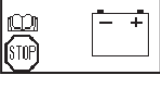
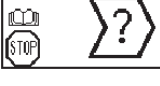
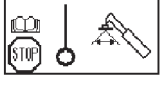
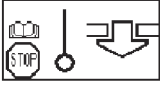
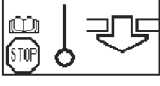
EXPLANATION OF ERROR CODE DISPLAY - Continued

Table 4. Error Code Reference Index - Continued.

ERROR CODE	DISPLAY LAYOUT	TROUBLESHOOTING PROCEDURE WORK PACKAGE	ERROR CODE CATEGORY/ EXPLANATION	MACHINE LIMITATIONS
160		(Volume 2, WP 0248)	Stop Machine Immediately Boom in valve, broken circuit. Cable to valve defective.	Boom cannot be retracted.
161		(Volume 2, WP 0248)	Stop Machine Immediately Boom in valve, short circuit. Cable to valve defective.	Boom cannot be retracted. Uncontrolled self-retraction may occur.
163		(Volume 2, WP 0248)	Stop Machine Immediately Boom out valve, broken circuit. Cable to valve defective.	Boom cannot be extended.
164		(Volume 2, WP 0248)	Stop Machine Immediately Boom out valve, short circuit. Cable to valve defective.	Boom cannot be extended. Uncontrolled self-extension may occur.
166		(WP 0083)	Warning - Degraded Operation Cooling fan valve, broken circuit. Cable to valve defective.	Cooling fan will run at full speed. No fording activities possible.
167		(WP 0083)	Warning - Degraded Operation Cooling fan valve, short circuit. Cable to valve defective.	Cooling fan may run at any speed. No fording activities possible. Overheating may occur.
169		(Volume 2, WP 0234)	Warning - Degraded Operation Emergency hydraulic valve, broken circuit. Cable to valve defective.	No hydraulic emergency operation is possible.
172		(Volume 2, WP 0237)	Information/Maintenance Pump turn off valve, broken circuit. Cable defective.	May be difficult to start because of engaged pumps.
191		(Volume 2, WP 0206)	Stop Machine Immediately	Brakes may overheat at front axle.

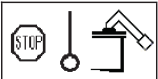
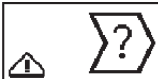

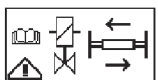
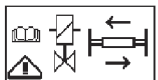
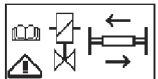
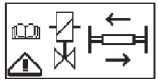
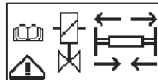
EXPLANATION OF ERROR CODE DISPLAY - Continued

Table 4. Error Code Reference Index - Continued.

ERROR CODE	DISPLAY LAYOUT	TROUBLESHOOTING PROCEDURE WORK PACKAGE	ERROR CODE CATEGORY/ EXPLANATION	MACHINE LIMITATIONS
			Temperature in front wheel end above 203°F (95°C). Cable defective. No cooling.	
192		(Volume 2, WP 0206)	Stop Machine Immediately Temperature in rear wheel end above 203°F (95°C) Cable defective. No cooling.	Brakes may overheat at rear axle.
201		(WP 0096)	Stop Machine Immediately Supply voltage, ECU 791. Emergency stop engaged. Circuit breaker tripped. Cable defective.	Tophandler not working.
202		(WP 0096)	Stop Machine Immediately Supply voltage, CAN 791. Circuit breaker tripped. Cable defective.	Operating system and tophandler not working.
203		(WP 0096)	Stop Machine Immediately 10 VDC Reference voltage, check ECU 791. Circuit breaker tripped. Cable defective.	Operating system not working.
205		(WP 0093)	Stop Machine Immediately Memory fault - check ECU 791. Circuit breaker tripped. Cable defective.	None if code clears. Operating system and tophandler not working.
210		(WP 0085)	Stop Machine Immediately Tilt angle sensor, signal out of range. Potentiometer damaged. Cable defective. Short circuit. Generate error code 130.	Operating system and boom function not working.
212		(Volume 2, WP 0265)	Stop Machine Immediately Logical error - left twistlock. Short circuit. Signal from both 7204L and 7205L.	Both locked and unlocked twistlock at the same time. Safe operation is not possible.
213		(Volume 2, WP 0265)	Stop Machine Immediately Logical error - right twistlock. Short circuit. Signal from both 7204R and 7205R.	Both locked and unlocked twistlock at the same time. Safe

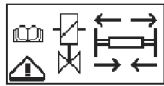
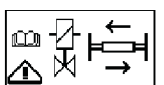
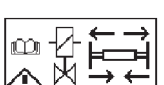
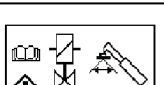
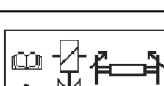
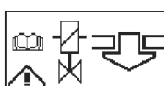
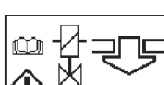

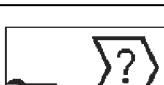
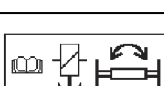
EXPLANATION OF ERROR CODE DISPLAY - Continued

Table 4. Error Code Reference Index - Continued.

ERROR CODE	DISPLAY LAYOUT	TROUBLESHOOTING PROCEDURE WORK PACKAGE	ERROR CODE CATEGORY/ EXPLANATION	MACHINE LIMITATIONS
				operation is not possible.
214		(Volume 2, WP 0265)	Stop Machine Immediately Logical error - forklift sensors. Cable defective. Signal from 7206-1 or 7206-2.	Operation of forklift is not possible.
220		(WP 0093)	Warning - Degraded Operation One pulse signal to the steering wheel interrupted. Clock 1. Clock 2.	Stop machine by switching to neutral. Steering system will operate but is not redundant. The steering computer uses non interrupted signal to steer the machine.
221		(WP 0093)	Information/Maintenance Communication fault - ECU 791, connector 2. Computer hardware fault.	Possible ECU malfunction. Other codes will also show.
225		(Volume 2, WP 0261)	Warning - Degraded Operation Left sideshift, open circuit. Cable to valve defective.	Left sideshift is not possible.
226		(Volume 2, WP 0261)	Warning - Degraded Operation Left sideshift, short circuit. Cable to valve defective.	Uncontrolled left sideshift may occur.
228		(Volume 2, WP 0261)	Warning - Degraded Operation Right sideshift, open circuit. Cable to valve defective.	Right sideshift is not possible.
229		(Volume 2, WP 0261)	Warning - Degraded Operation Right sideshift, short circuit. Cable to valve defective.	Uncontrolled right sideshift may occur.
231		(Volume 2, WP 0263)	Warning - Degraded Operation 20 to 40 valve, open circuit. Cable to valve defective.	Spreading from 20 to 40 ft (6 to 12 m) is not possible.

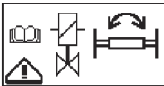
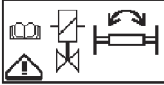
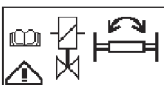
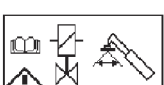

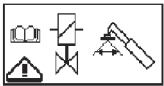
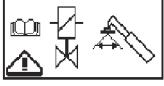
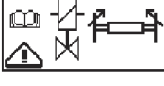
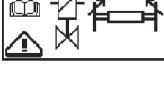
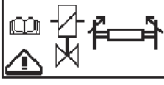
EXPLANATION OF ERROR CODE DISPLAY - Continued

Table 4. Error Code Reference Index - Continued.

ERROR CODE	DISPLAY LAYOUT	TROUBLESHOOTING PROCEDURE WORK PACKAGE	ERROR CODE CATEGORY/ EXPLANATION	MACHINE LIMITATIONS
232		(Volume 2, WP 0263)	Warning - Degraded Operation 20 to 40 valve, short circuit. Cable to valve defective.	Spreading from 20 to 40 ft (6 to 12 m) is not possible.
234		(Volume 2, WP 0263)	Warning - Degraded Operation 40 to 20 valve, open circuit. Cable to valve defective.	Spreading from 40 to 20 ft (6 to 12 m) is not possible.
235		(Volume 2, WP 0263)	Warning - Degraded Operation 40 to 20 valve, short circuit. Cable to valve defective.	Spreading from 20 to 40 ft (6 to 12 m) is not possible.
237		(Volume 2, WP 0254)	Warning - Degraded Operation Active tilt valve, open circuit. Cable to valve defective.	Tophandler locked, not automatically leveled.
240		(Volume 2, WP 0258)	Warning - Degraded Operation Active pile slope, open circuit. Cable to valve defective.	Tophandler locked, not free oscillated.
243		(Volume 2, WP 0265)	Warning - Degraded Operation Twistlock valve lock, open circuit. Cable to valve defective.	Impossible to lock twistlock.
246		(Volume 2, WP 0265)	Warning - Degraded Operation Twistlock valve unlock, open circuit. Cable to valve defective.	Impossible to unlock twistlock.
250		(WP 0093)	Information/Maintenance Communication fault - ECU 791, connector 3. Computer hardware fault.	Possible ECU malfunction. Other codes will also show.
251		(WP 0093)	Information/Maintenance Communication fault - ECU 791, connector 3. Computer hardware fault.	Possible ECU malfunction. Other codes will also show.
255		(Volume 2, WP 0251)	Warning - Degraded Operation Slewing clockwise valve, open circuit. Cable to valve defective.	Slewing clockwise is not possible.

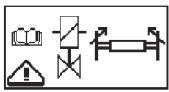
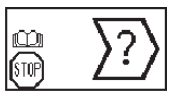



EXPLANATION OF ERROR CODE DISPLAY - Continued

Table 4. Error Code Reference Index - Continued.

ERROR CODE	DISPLAY LAYOUT	TROUBLESHOOTING PROCEDURE WORK PACKAGE	ERROR CODE CATEGORY/ EXPLANATION	MACHINE LIMITATIONS
256		(Volume 2, WP 0251)	Warning - Degraded Operation Slewing clockwise valve, short circuit. Cable to valve defective.	Uncontrolled slewing may occur.
258		(Volume 2, WP 0251)	Warning - Degraded Operation Slewing counterclockwise valve, open circuit. Cable to valve defective.	Slewing clockwise is not possible.
259		(Volume 2, WP 0251)	Warning - Degraded Operation Slewing counterclockwise valve, short circuit. Cable to valve defective.	Uncontrolled slewing may occur.
261		(Volume 2, WP 0254)	Warning - Degraded Operation Tilt out valve, open circuit. Cable to valve defective.	Tilt out is not possible.
262		(Volume 2, WP 0254)	Warning - Degraded Operation Tilt out valve, short circuit. Cable to valve defective.	Uncontrolled tilt may occur.
264		(Volume 2, WP 0254)	Warning - Degraded Operation Tilt in valve, open circuit. Cable to valve defective.	Tilt in is not possible.
265		(Volume 2, WP 0254)	Warning - Degraded Operation Tilt in valve, short circuit. Cable to valve defective.	Uncontrolled tilt may occur.
267		(Volume 2, WP 0259)	Warning - Degraded Operation Right oscillation valve, open circuit. Cable to valve defective.	Right oscillation (leveling) is not possible.
268		(Volume 2, WP 0259)	Warning - Degraded Operation Right oscillation valve, short circuit. Cable to valve defective.	Uncontrolled oscillation (leveling) may occur.
270		(Volume 2, WP 0260)	Warning - Degraded Operation Left oscillation valve, open circuit. Cable to valve defective.	Left oscillation (leveling) is not possible.



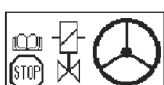
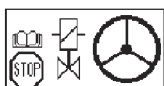
EXPLANATION OF ERROR CODE DISPLAY - Continued

Table 4. Error Code Reference Index - Continued.

ERROR CODE	DISPLAY LAYOUT	TROUBLESHOOTING PROCEDURE WORK PACKAGE	ERROR CODE CATEGORY/ EXPLANATION	MACHINE LIMITATIONS
271		(Volume 2, WP 0260)	Warning - Degraded Operation Left oscillation valve - short circuit. Cable to valve defective	Uncontrolled oscillation (leveling) may occur.
300		(Volume 2, WP 0116)	Stop Machine Immediately Steering system malfunction. Steering computer - hardware error (EEPROM, watchdog, reference voltages, etc.)	No steering or driving functions are available. Reduced power and engine speed.
301 302 303 304 305 306 307 308		(Volume 2, WP 0221)	Warning - Degraded Operation One track of actual value potentiometer out of range (e.g., cable interrupted). Wheel 1, track 1. Wheel 2, track 1. Wheel 3, track 1. Wheel 4, track 1. Wheel 1, track 2. Wheel 2, track 2. Wheel 3, track 2. Wheel 4, track 2.	Stop machine by switching to NEUTRAL. Steering system will operate but is not redundant.
309 310 311 312		(Volume 2, WP 0221)	Stop Machine Immediately Both tracks of actual value potentiometer out of range. Wheel 1. Wheel 2. Wheel 3. Wheel 4.	Stop machine by switching to NEUTRAL. Faulty wheel is locked immediately. Other wheels remain operational. Reduced power and engine speed.
313 314 315 316		(Volume 2, WP 0221)	Stop Machine Immediately Deviation between two potentiometer tracks, but both inside tolerance range. Wheel 1. Wheel 2. Wheel 3. Wheel 4.	Stop machine by switching to NEUTRAL. Steering system will operate but is not redundant. Reduced power and engine speed.





EXPLANATION OF ERROR CODE DISPLAY - Continued

Table 4. Error Code Reference Index - Continued.

ERROR CODE	DISPLAY LAYOUT	TROUBLESHOOTING PROCEDURE WORK PACKAGE	ERROR CODE CATEGORY/ EXPLANATION	MACHINE LIMITATIONS
317 318 319 320		(Volume 2, WP 0216)	Stop Machine Immediately Steering deviation between set point and actual value (tracking error). Wheel 1. Wheel 2. Wheel 3. Wheel 4.	Stop machine by switching to NEUTRAL. Steering remains active and tries to close up to set point. System will be active as soon as deviating wheel has closed up. Reduced power and engine speed.
321 322 323 324		(Volume 2, WP 0216)	Stop Machine Immediately Wheel alignment values out of range. Wheel 1. Wheel 2. Wheel 3. Wheel 4.	This error prohibits driving after steering calibration if calibration was not successful or calibration values are out of range. Reduced power and engine speed.
325 326 327 328		(Volume 2, WP 0209)	Stop Machine Immediately Break in cable to proportional valve. Wheel 1. Wheel 2. Wheel 3. Wheel 4.	Stop machine by switching to NEUTRAL. Steering computer cannot control wheel with broken cable. Faulty wheel has to be aligned by manual operation of valve. Reduced power and engine speed.
329 330 331 332		(Volume 2, WP 0209)	Stop Machine Immediately Cable to proportional valve - short circuit. Wheel 1. Wheel 2.	Stop machine by switching to NEUTRAL. Steering computer cannot


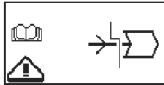
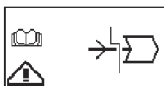
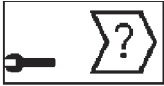
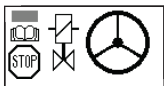
EXPLANATION OF ERROR CODE DISPLAY - Continued

Table 4. Error Code Reference Index - Continued.

ERROR CODE	DISPLAY LAYOUT	TROUBLESHOOTING PROCEDURE WORK PACKAGE	ERROR CODE CATEGORY/ EXPLANATION	MACHINE LIMITATIONS
			Wheel 3. Wheel 4.	control wheel with broken cable. Faulty wheel has to be aligned by manual operation of valve. Reduced power and engine speed.
339		(Volume 2, WP 0209)	Stop Machine Immediately Steering wheel sensor malfunction. Possible loss of ground.	Steering system out of order. No steering or driving functions are available.
340		(Volume 2, WP 0209)	Warning - Degraded Operation Supply pressure below 1450 psi (100 bar). Leaking hydraulics.	Stop machine by switching to NEUTRAL. Steering system will operate in a degraded mode.
341		(Volume 2, WP 0209)	Stop Machine Immediately Steering wheel signals inconsistent (e.g., two incremental counters deviating). Cables defective. Steering column sensor defective.	Stop machine by switching to NEUTRAL. Steering system will operate but is not redundant. Steering computer uses one of two counters to steer machine. Reduced power and engine speed.
342 343		(Volume 2, WP 0209)	Warning - Degraded Operation One pulse signal to steering wheel interrupted. Cables defective. Steering column sensor defective.	Stop machine by switching to NEUTRAL. Steering system will operate but is not redundant. Steering computer uses uninterrupted


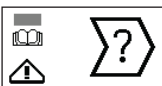
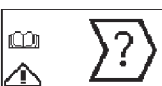
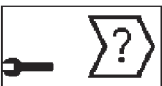
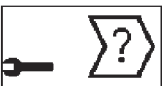

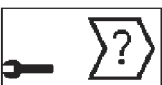
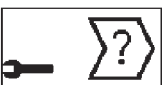
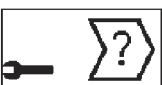
EXPLANATION OF ERROR CODE DISPLAY - Continued

Table 4. Error Code Reference Index - Continued.

ERROR CODE	DISPLAY LAYOUT	TROUBLESHOOTING PROCEDURE WORK PACKAGE	ERROR CODE CATEGORY/ EXPLANATION	MACHINE LIMITATIONS
				signal to steer machine.
344		(Volume 2, WP 0209)	Stop Machine Immediately Both pulse signals to steering wheel interrupted. Cables defective. Steering column sensor defective.	Stop machine by switching to NEUTRAL. Steering system will not operate. Reduced power and engine speed.
345		(WP 0102)	Warning - Degraded Operation No CAN communication to display. Cable defective.	Error codes from steering ECU will not show on display. Steering function is operational.
346		(WP 0102)	Warning - Degraded Operation No CAN communication to transmission. Cables defective.	It is not possible to change from 2WD to 4WD or vice versa. Steering system remains operational, but steering features dependent on driving speed are not available. To keep machine in full operation, steering program selection is allowed at this time.
347		(Volume 2, WP 0209)	Information/Maintenance No valid steering program selected.	None.
350 351 352 353		(Volume 2, WP 0127)	Stop Machine Immediately Steering valve solenoid. This error code occurs if the solenoid or circuit resistance differs from the preset value.	Stop machine by switching to NEUTRAL. Steering system will not operate properly.

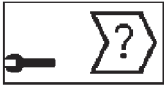
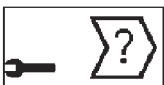
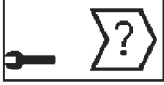

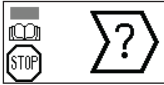

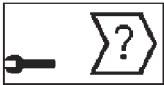

EXPLANATION OF ERROR CODE DISPLAY - Continued

Table 4. Error Code Reference Index - Continued.

ERROR CODE	DISPLAY LAYOUT	TROUBLESHOOTING PROCEDURE WORK PACKAGE	ERROR CODE CATEGORY/ EXPLANATION	MACHINE LIMITATIONS
354 355 356 357		(Volume 2, WP 0127)	Stop Machine Immediately Start-up failure in steering system. This error code is caused by incorrect parameter settings in steering computer.	Stop machine by switching to NEUTRAL. Steering system will not operate properly.
399		(Volume 2, WP 0127)	Warning - Degraded Operation EEPROM parameter error in steering computer. One or more parameter values inside EEPROM are out of range.	Fully operational. History storage of error codes may not be possible.
401		(Volume 2, WP 0127)	Warning - Degraded Operation Digital output short circuit - "Enable driving" (no neutral gear from steering ECU). Cables defective.	Transmission will not go into neutral automatically.
404		(Volume 2, WP 0127)	Information/Maintenance Digital output short circuit - "Control lamp, front wheel steering." Cables defective.	Control lamp on steering selection switch is not working.
405		(Volume 2, WP 0127)	Information/Maintenance Digital output short circuit - "Control lamp, four wheel steering." Cables defective.	Control lamp on steering selection switch is not working.
406		(Volume 2, WP 0127)	Information/Maintenance Digital output short circuit - "Control lamp, crab steering" Cables defective.	Control lamp on steering selection switch is not working.
408		(Volume 2, WP 0127)	Information/Maintenance Digital output short circuit - "Control lamp, unlocked twistlock." Cables defective.	Control lamp on steering column is not working.
409		(Volume 2, WP 0127)	Information/Maintenance Digital output short circuit - "Control lamp, locked twistlock." Cables defective.	Control lamp on steering column is not working.
410		(Volume 2, WP 0127)	Information/Maintenance	Control lamp on steering column is not working.



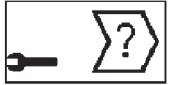

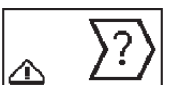

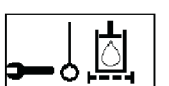
EXPLANATION OF ERROR CODE DISPLAY - Continued

Table 4. Error Code Reference Index - Continued.

ERROR CODE	DISPLAY LAYOUT	TROUBLESHOOTING PROCEDURE WORK PACKAGE	ERROR CODE CATEGORY/ EXPLANATION	MACHINE LIMITATIONS
			Digital output short circuit - "Control lamp, alignment." Cables defective.	
411		(Volume 2, WP 0234)	Information/Maintenance Digital output short circuit - "Auxiliary hydraulic pump." Cables defective.	Cab cannot be moved. No emergency operation of boom or tophandler available.
412		(Volume 2, WP 0127)	Information/Maintenance Digital output short circuit - "Ether start kit." Cables defective.	Ether start not working.
413		(Volume 2, WP 0127)	Information/Maintenance Digital output short circuit - "Oil supply valve, boom folding." Cables defective.	Boom cannot be folded.
414		(Volume 2, WP 0206)	Warning - Degraded Operation Digital output short circuit - "Drive axle cooling, bypass valves." Cables defective.	Brakes may be overheated. Error codes 191 and 192 will show if brakes have overheated.
415		(Volume 2, WP 0127)	Stop Machine Immediately Digital output short circuit.	Reduced power and engine speed.
416		(Volume 2, WP 0127)	Stop Machine Immediately Digital input not read correctly - "Steering pressure." Cables defective.	Steering pressure failure cannot be detected, error code 340.
417		(Volume 2, WP 0234)	Information/Maintenance Digital input not read correctly - "Auxiliary hydraulic pump switch." Cables defective.	Auxiliary hydraulic pump cannot be started.
418		(Volume 2, WP 0127)	Warning - Degraded Operation	2WD cannot be selected.






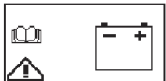
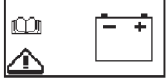
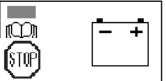
EXPLANATION OF ERROR CODE DISPLAY - Continued

Table 4. Error Code Reference Index - Continued.

ERROR CODE	DISPLAY LAYOUT	TROUBLESHOOTING PROCEDURE WORK PACKAGE	ERROR CODE CATEGORY/ EXPLANATION	MACHINE LIMITATIONS
			Digital input not read correctly - "Front wheel steering switch." Cables defective.	
419		(Volume 2, WP 0127)	Warning - Degraded Operation Digital input not read correctly - "Four wheel steering switch" Cables defective.	4WD cannot be selected.
420		(Volume 2, WP 0127)	Warning - Degraded Operation Digital input not read correctly - "Crab steering switch." Cables defective.	Crab steering cannot be selected.
422		(Volume 2, WP 0127)	Information/Maintenance Digital input not read correctly - "Sensor, cab in transport position." Cables defective. Steering computer damaged.	Boom folding is not possible.
423		(Volume 2, WP 0127)	Information/Maintenance Digital input not read correctly - "Ether start switch." Cables defective. Steering computer damaged.	Ether injection is not possible.
426		(WP 0083)	Warning - Degraded Operation Digital input not read correctly - "Fording level switch." Cables defective. Steering computer damaged.	Fording operations are not possible.
427		(Volume 2, WP 0127)	Information/Maintenance Digital input not read correctly - "Tophandler work light switch." Cables defective. Steering computer damaged.	Work lights on tophandler do not function.
432		(Volume 2, WP 0238)	Information/Maintenance Digital input not read correctly - "Hydraulic filter indication (lift/lower; boom in/out)." Cables defective. Steering computer damaged.	None.

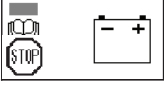




EXPLANATION OF ERROR CODE DISPLAY - Continued

Table 4. Error Code Reference Index - Continued.

ERROR CODE	DISPLAY LAYOUT	TROUBLESHOOTING PROCEDURE WORK PACKAGE	ERROR CODE CATEGORY/ EXPLANATION	MACHINE LIMITATIONS
433		(Volume 2, WP 0238)	Information/Maintenance Digital input not read correctly - "Hydraulic filter indication, steering." Cables defective. Steering computer damaged.	None.
434		(Volume 2, WP 0238)	Information/Maintenance Digital input not read correctly - "Hydraulic filter indication, tophandler." Cables defective. Steering computer damaged.	None.
435		(Volume 2, WP 0238)	Information/Maintenance Digital input not read correctly - "Hydraulic filter indication, return oil." Cables defective. Steering computer damaged.	None.
440		(Volume 2, WP 0127)	Information/Maintenance Error on power supply for steering wheel sensor error code can be caused by: Short circuit of analog output terminal 38 to +24 VDC. Short circuit of analog output terminal 38 to ground. Fault in steering computer output.	Steering wheel has no end positions or steering resistance.
450		(Volume 2, WP 0127)	Warning - Degraded Operation Ambient temperature too high. Temperature sensor defective. ECU 792 defective.	Stop machine by switching to neutral
451		(Volume 2, WP 0120)	Warning - Degraded Operation Supply voltage too high. Alternator defective.	Stop machine by switching to neutral.
452		(Volume 2, WP 0120)	Warning - Degraded Operation Supply voltage too low. Power supply off. Alternator defective	Stop machine by switching to neutral
453		(Volume 2, WP 0120)	Stop Machine Immediately Supply voltage for wheel sensors out of range. The +5 supply voltage for angle transducer track 2 is too low. Error code can be caused by short	The machine is stopped by switching to neutral gear. If error code 454 is also active, all






EXPLANATION OF ERROR CODE DISPLAY - Continued

Table 4. Error Code Reference Index - Continued.

ERROR CODE	DISPLAY LAYOUT	TROUBLESHOOTING PROCEDURE WORK PACKAGE	ERROR CODE CATEGORY/ EXPLANATION	MACHINE LIMITATIONS
			circuit in one or more angle transducer tracks or low impedance to ground.	wheels are locked.
454		(Volume 2, WP 0120)	Stop Machine Immediately Supply voltage for wheel sensors out of range. The +5 supply voltage for angle transducer track 1 is too low. Error code can be caused by short circuit in one or more angle transducer tracks or low impedance to ground.	The machine is stopped by switching to neutral gear. If error code 454 is also active, all wheels are locked.
618		(Volume 2, WP 0197)	Warning - Degraded Operation Logical error at direction select signal - transmission ECU detected incorrect signal combination for the direction. Cables defective. Shift lever defective.	Stop machine by switching to neutral.
622		(Volume 2, WP 0197)	Information/Maintenance Logical error at axle connection - axle connection feedback measured by transmission ECU and output signal do not match. Cables defective. Switch defective. Mechanical error.	When shifting from 2WD to 4WD or vice versa, engage forward drive and immediately return to neutral. Turn the ignition switch off for at least 30 seconds, then turn switch back on.
637		(Volume 2, WP 0172)	Information/Maintenance Short circuit to battery voltage or open circuit at transmission sump temperature sensor input - voltage too high. Cables defective. Sensor defective. Connector pin broken.	None.
638		(Volume 2, WP 0172)	Information/Maintenance Short circuit to ground at transmission sump temperature sensor input - voltage too low.	None.





EXPLANATION OF ERROR CODE DISPLAY - Continued

Table 4. Error Code Reference Index - Continued.

ERROR CODE	DISPLAY LAYOUT	TROUBLESHOOTING PROCEDURE WORK PACKAGE	ERROR CODE CATEGORY/ EXPLANATION	MACHINE LIMITATIONS
			Cables defective. Sensor defective. Connector pin broken.	
639		(Volume 2, WP 0172)	Information/Maintenance Short circuit to battery voltage or open circuit at converter output temperature sensor input - voltage too low. Cables defective. Sensor defective. Connector pin broken.	None.
640		(Volume 2, WP 0172)	Information/Maintenance Short circuit to battery voltage or open circuit at converter output temperature sensor input - voltage too low. Cables defective. Sensor defective. Connector pin broken.	None.
649		(Volume 2, WP 0178)	Information/Maintenance Short circuit to battery voltage or open circuit at engine speed input - transmission ECU measures a voltage higher than 7.0 VDC at speed input pin. Cables defective. Sensor defective. Connector pin broken.	Gearshift quality is reduced, due to another control mode (operating mode: substitute clutch control).
650		(Volume 2, WP 0178)	Information/Maintenance Short circuit to ground at engine speed input - transmission ECU measures a voltage less than 0.45 VDC at speed input pin. Cables defective. Sensor defective.	Gearshift quality is reduced, due to another control mode (operating mode: substitute clutch control).
651		(Volume 2, WP 0178)	Information/Maintenance Logical error at engine speed input - transmission ECU measures engine speed over a threshold and the next moment the measured speed is zero. Cables defective. Sensor defective. Incorrect sensor gap size.	Gearshift quality is reduced, due to another control mode (operating mode: substitute clutch control).





EXPLANATION OF ERROR CODE DISPLAY - Continued

Table 4. Error Code Reference Index - Continued.

ERROR CODE	DISPLAY LAYOUT	TROUBLESHOOTING PROCEDURE WORK PACKAGE	ERROR CODE CATEGORY/ EXPLANATION	MACHINE LIMITATIONS
652		(Volume 2, WP 0178)	Warning - Degraded Operation Short circuit to battery voltage or open circuit at turbine speed input - transmission ECU measures a voltage higher than 7.0 VDC at speed input pin. Cables defective. Sensor defective. Incorrect sensor gap size.	Gearshift quality is reduced, due to another control mode (operating mode: substitute clutch control). If there is also a failure at output speed, transmission ECU shifts to neutral. Limp home.
653		(Volume 2, WP 0178)	Warning - Degraded Operation Short circuit to ground at turbine speed input - transmission ECU measures a voltage less than 0.45 VDC at speed input pin. Cables defective. Sensor defective.	Gearshift quality is reduced, due to another control mode (operating mode: substitute clutch control). If there is also a failure at output speed, transmission ECU shifts to neutral. Limp home.
654		(Volume 2, WP 0178)	Warning - Degraded Operation Logical error at turbine speed input - transmission ECU measures turbine speed over a threshold and at the next moment the measured speed is zero. Cables defective. Sensor defective. Incorrect sensor gap size.	Gearshift quality is reduced, due to another control mode (operating mode: substitute clutch control). If there is also a failure at output speed, transmission ECU shifts to neutral. Limp home.
655		(Volume 2, WP 0178)	Information/Maintenance Short circuit to battery voltage or open circuit at internal speed input - transmission ECU measures a voltage higher than 7.0 VDC at speed input pin.	Gearshift quality is reduced, due to another control mode (operating mode: substitute clutch control).

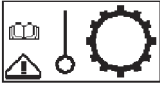

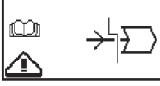
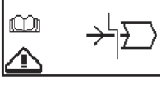
EXPLANATION OF ERROR CODE DISPLAY - Continued

Table 4. Error Code Reference Index - Continued.

ERROR CODE	DISPLAY LAYOUT	TROUBLESHOOTING PROCEDURE WORK PACKAGE	ERROR CODE CATEGORY/ EXPLANATION	MACHINE LIMITATIONS
			Cables defective. Sensor defective.	substitute clutch control).
656		(Volume 2, WP 0178)	Information/Maintenance Short circuit to ground at internal speed input - transmission ECU measures a voltage less than 0.45 VDC at speed input pin. Cables defective. Sensor defective.	Gearshift quality is reduced, due to another control mode (operating mode: substitute clutch control).
657		(Volume 2, WP 0178)	Information/Maintenance Logical error at internal speed input - transmission ECU measures internal speed over a threshold and at the next moment the measured speed is zero. Cables defective. Sensor defective. Incorrect sensor gap size.	Gearshift quality is reduced, due to another control mode (operating mode: substitute clutch control). If there is also a failure at output speed, transmission ECU shifts to neutral. Limp home.
658		(Volume 2, WP 0178)	Warning - Degraded Operation Short circuit to battery voltage or open circuit at output speed input - transmission ECU measures a voltage higher than 12.5 VDC at speed input pin. Cables defective. Sensor defective.	Gearshift quality is reduced, due to another control mode (operating mode: substitute clutch control). If there is also a failure at turbine speed, transmission ECU shifts to neutral. Limp home.
659		(Volume 2, WP 0178)	Warning - Degraded Operation Short circuit to battery voltage at output speed input - transmission ECU measures a voltage less than 1.0 VDC at speed input pin. Cables defective. Sensor defective.	Gearshift quality is reduced, due to another control mode (operating mode: substitute clutch control). If there is also a failure at turbine speed,


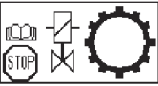


EXPLANATION OF ERROR CODE DISPLAY - Continued

Table 4. Error Code Reference Index - Continued.

ERROR CODE	DISPLAY LAYOUT	TROUBLESHOOTING PROCEDURE WORK PACKAGE	ERROR CODE CATEGORY/ EXPLANATION	MACHINE LIMITATIONS
				transmission ECU shifts to neutral. Limp home.
660		(Volume 2, WP 0178)	Warning - Degraded Operation Logical error at output speed input - transmission ECU measures internal speed over a threshold and at the next moment the measured speed is zero. Cables defective. Sensor defective.	Gearshift quality is reduced, due to another control mode (operating mode: substitute clutch control). If there is also a failure at turbine speed, transmission ECU shifts to neutral. Limp home.
662		(Volume 2, WP 0178)	Warning - Degraded Operation Output speed does not fit other speed signals. If transmission is not in neutral and shifting has finished, transmission ECU measures output speed as zero and turbine or internal speed as not equal to zero. Cables defective. Sensor defective. Incorrect sensor gap size.	Gearshift quality is reduced, due to another control mode (operating mode: substitute clutch control). If there is also a failure at turbine speed, transmission ECU shifts to neutral. Limp home.
684		(WP 0102)	Warning - Degraded Operation CAN message time-out from display computer. Cable defective. Defective display computer.	Error codes from transmission ECU will not show.
685		(WP 0102)	Warning - Degraded Operation CAN message time-out from display computer. Cable defective. Defective steering computer.	Error codes from transmission ECU will not show.

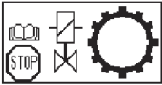
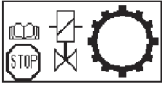


EXPLANATION OF ERROR CODE DISPLAY - Continued

Table 4. Error Code Reference Index - Continued.

ERROR CODE	DISPLAY LAYOUT	TROUBLESHOOTING PROCEDURE WORK PACKAGE	ERROR CODE CATEGORY/ EXPLANATION	MACHINE LIMITATIONS
713		(Volume 2, WP 0191)	Stop Machine Immediately Short circuit to battery voltage at clutch K1 - measured valve resistance is beyond limit, voltage at K1 valve is too high. Cables defective. Regulator defective.	Transmission ECU shifts to neutral. Limp home. If there is also a failure at another clutch, ECU shifts to neutral. ECU will shut down. Reduced power and engine speed.
714		(Volume 2, WP 0191)	Stop Machine Immediately Short circuit to ground at clutch K1 - measured valve resistance is beyond limit, voltage at K1 valve is too low. Cables defective. Regulator defective.	Transmission ECU shifts to neutral. Limp home. If there is also a failure at another clutch, ECU shifts to neutral. ECU will shut down. Reduced power and engine speed.
715		(Volume 2, WP 0191)	Stop Machine Immediately Open circuit at clutch K1 - measured valve resistance is beyond limit. Cables defective. Regulator defective.	Transmission ECU shifts to neutral. Limp home. If there is also a failure at another clutch, ECU shifts to neutral. ECU will shut down. Reduced power and engine speed.
716		(Volume 2, WP 0191)	Stop Machine Immediately Short circuit to battery voltage at clutch K2 - measured valve resistance is beyond limit, voltage at K2 valve is too high. Cables defective. Regulator defective.	Transmission ECU shifts to neutral. Limp home. If there is also a failure at another clutch, ECU shifts to neutral. ECU will shut down.




EXPLANATION OF ERROR CODE DISPLAY - Continued

Table 4. Error Code Reference Index - Continued.

ERROR CODE	DISPLAY LAYOUT	TROUBLESHOOTING PROCEDURE WORK PACKAGE	ERROR CODE CATEGORY/ EXPLANATION	MACHINE LIMITATIONS
				Reduced power and engine speed.
717		(Volume 2, WP 0191)	Stop Machine Immediately Short circuit to ground at clutch K2 - measured valve resistance is beyond limit, voltage at K2 valve is too low. Cables defective. Regulator defective.	Transmission ECU shifts to neutral. Limp home. If there is also a failure at another clutch, ECU shifts to neutral. ECU will shut down. Reduced power and engine speed.
718		(Volume 2, WP 0191)	Stop Machine Immediately Open circuit at clutch K2 - measured valve resistance is beyond limit. Cables defective. Regulator defective.	Transmission ECU shifts to neutral. Limp home. If there is also a failure at another clutch, ECU shifts to neutral. ECU will shut down. Reduced power and engine speed.
719		(Volume 2, WP 0191)	Stop Machine Immediately Short circuit to battery voltage at clutch K3 - measured valve resistance is beyond limit, voltage at K3 valve is too high. Cables defective. Regulator defective.	Transmission ECU shifts to neutral. Limp home. If there is also a failure at another clutch, ECU shifts to neutral. ECU will shut down. Reduced power and engine speed.
720		(Volume 2, WP 0191)	Stop Machine Immediately Short circuit to ground at clutch K3 - measured valve resistance is beyond limit, voltage at K3 valve	Transmission ECU shifts to neutral. Limp home. If there is also a failure at

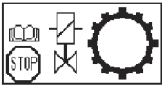

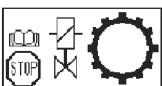
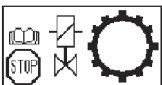
EXPLANATION OF ERROR CODE DISPLAY - Continued

Table 4. Error Code Reference Index - Continued.

ERROR CODE	DISPLAY LAYOUT	TROUBLESHOOTING PROCEDURE WORK PACKAGE	ERROR CODE CATEGORY/ EXPLANATION	MACHINE LIMITATIONS
			is too low. Cables defective. Regulator defective.	another clutch, ECU shifts to neutral. ECU will shut down. Reduced power and engine speed.
721		(Volume 2, WP 0191)	Stop Machine Immediately Open circuit at clutch K3 - measured valve resistance is beyond limit. Cables defective. Regulator defective.	Transmission ECU shifts to neutral. Limp home. If there is also a failure at another clutch, ECU shifts to neutral. ECU will shut down. Reduced power and engine speed.
729		(Volume 2, WP 0191)	Stop Machine Immediately Short circuit to battery voltage at clutch K4 - measured valve resistance is beyond limit, voltage at K4 valve is too high. Cables defective. Regulator defective.	Transmission ECU shifts to neutral. Limp home. If there is also a failure at another clutch, ECU shifts to neutral. ECU will shut down. Reduced power and engine speed.
730		(Volume 2, WP 0191)	Stop Machine Immediately Short circuit to ground at clutch K4 - measured valve resistance is beyond limit, voltage at K4 valve is too low. Cables defective. Regulator defective.	Transmission ECU shifts to neutral. Limp home. If there is also a failure at another clutch, ECU shifts to neutral. ECU will shut down. Reduced power and engine speed.

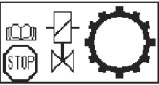
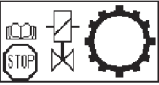


EXPLANATION OF ERROR CODE DISPLAY - Continued

Table 4. Error Code Reference Index - Continued.

ERROR CODE	DISPLAY LAYOUT	TROUBLESHOOTING PROCEDURE WORK PACKAGE	ERROR CODE CATEGORY/ EXPLANATION	MACHINE LIMITATIONS
731		(Volume 2, WP 0191)	Stop Machine Immediately Open circuit at clutch K4 - measured valve resistance is beyond limit. Cables defective. Regulator defective.	Transmission ECU shifts to neutral. Limp home. If there is also a failure at another clutch, ECU shifts to neutral. ECU will shut down. Reduced power and engine speed.
732		(Volume 2, WP 0191)	Stop Machine Immediately Short circuit to battery voltage at clutch KV - measured valve resistance is beyond limit, voltage at KV valve is too high. Cables defective. Regulator defective.	Transmission ECU shifts to neutral. Limp home. If there is also a failure at another clutch, ECU shifts to neutral. ECU will shut down. Reduced power and engine speed.
733		(Volume 2, WP 0191)	Stop Machine Immediately Short circuit to ground at clutch KV - measured valve resistance is beyond limit, voltage at KV valve is too low. Cables defective. Regulator defective.	Transmission ECU shifts to neutral. Limp home. If there is also a failure at another clutch, ECU shifts to neutral. ECU will shut down. Reduced power and engine speed.
734		(Volume 2, WP 0191)	Stop Machine Immediately Open circuit at clutch KV - measured valve resistance is beyond limit. Cables defective. Regulator defective.	Transmission ECU shifts to neutral. Limp home. If there is also a failure at another clutch, ECU shifts to neutral. ECU will shut down.




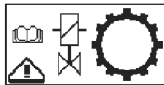
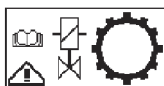
EXPLANATION OF ERROR CODE DISPLAY - Continued

Table 4. Error Code Reference Index - Continued.

ERROR CODE	DISPLAY LAYOUT	TROUBLESHOOTING PROCEDURE WORK PACKAGE	ERROR CODE CATEGORY/ EXPLANATION	MACHINE LIMITATIONS
				Reduced power and engine speed.
735		(Volume 2, WP 0191)	Stop Machine Immediately Short circuit to battery voltage at clutch KR - measured valve resistance is beyond limit, voltage at KR valve is too high. Cables defective. Regulator defective.	Transmission ECU shifts to neutral. Limp home. If there is also a failure at another clutch, ECU shifts to neutral. ECU will shut down. Reduced power and engine speed.
736		(Volume 2, WP 0191)	Stop Machine Immediately Short circuit to ground at clutch KR - measured valve resistance is beyond limit, voltage at KR valve is too low. Cables defective. Regulator defective.	Transmission ECU shifts to neutral. Limp home. If there is also a failure at another clutch, ECU shifts to neutral. ECU will shut down. Reduced power and engine speed.
737		(Volume 2, WP 0191)	Stop Machine Immediately Open circuit at clutch KR - measured valve resistance is beyond limit. Cables defective. Regulator defective.	Transmission ECU shifts to neutral. Limp home. If there is also a failure at another clutch, ECU shifts to neutral. ECU will shut down. Reduced power and engine speed.
745		(Volume 2, WP 0197)	Information/Maintenance Short circuit to ground at reverse warning alarm relay - transmission ECU detected incorrect voltage at output pin that	None.





EXPLANATION OF ERROR CODE DISPLAY - Continued

Table 4. Error Code Reference Index - Continued.

ERROR CODE	DISPLAY LAYOUT	TROUBLESHOOTING PROCEDURE WORK PACKAGE	ERROR CODE CATEGORY/ EXPLANATION	MACHINE LIMITATIONS
			looks like a short circuit to battery voltage. Cables defective. Backup alarm device defective.	
746		(Volume 2, WP 0197)	Information/Maintenance Short circuit to battery voltage at reverse warning alarm relay - transmission ECU detected incorrect voltage at output pin that looks like a short circuit to battery voltage. Cables defective. Backup alarm device defective.	None.
747		(Volume 2, WP 0197)	Information/Maintenance Open circuit at reverse warning alarm relay - transmission ECU detected incorrect voltage at output pin that looks like an open circuit for this output pin. Cables defective. Backup alarm device defective.	None.
761		(Volume 2, WP 0197)	Warning - Degraded Operation Short circuit to ground at axle connection solenoid - transmission ECU detected incorrect voltage at output pin that looks like a short circuit to machine ground. Cables defective. Axle connection solenoid defective.	Switching from 2WD to 4WD is not possible.
762		(Volume 2, WP 0197)	Warning - Degraded Operation Short circuit to battery voltage axle connection solenoid - transmission ECU detected incorrect voltage at output pin that looks like a short circuit to battery voltage. Cables defective. Axle connection solenoid defective.	Switching from 2WD to 4WD is not possible.
763		(Volume 2, WP 0197)	Warning - Degraded Operation Open circuit at axle connection solenoid - transmission ECU detected incorrect voltage at output pin that looks like an open circuit for this output pin. Cables	Switching from 2WD to 4WD is not possible.





EXPLANATION OF ERROR CODE DISPLAY - Continued

Table 4. Error Code Reference Index - Continued.

ERROR CODE	DISPLAY LAYOUT	TROUBLESHOOTING PROCEDURE WORK PACKAGE	ERROR CODE CATEGORY/ EXPLANATION	MACHINE LIMITATIONS
			defective. Axle connection solenoid defective.	
777		(Volume 2, WP 0201)	Stop Machine Immediately Slippage at clutch K1 - transmission ECU calculates a differential speed at closed clutch K1. If this calculated value is outside range, ECU interprets this as a slipping clutch. Low pressure. Sensor defective. Incorrect sensor gap size. Clutch defective.	Transmission ECU shifts to neutral. Limp home. If there is also a failure at another clutch, ECU shifts to neutral. ECU will shut down. Reduced power and engine speed.
778		(Volume 2, WP 0201)	Stop Machine Immediately Slippage at clutch K2 - transmission ECU calculates a differential speed at closed clutch K2. If this calculated value is outside range, ECU interprets this as a slipping clutch. Low pressure. Sensor defective. Incorrect sensor gap size. Clutch defective.	Transmission ECU shifts to neutral. Limp home. If there is also a failure at another clutch, ECU shifts to neutral. ECU will shut down. Reduced power and engine speed.
779		(Volume 2, WP 0201)	Stop Machine Immediately Slippage at clutch K3 - transmission ECU calculates a differential speed at closed clutch K3. If this calculated value is outside range, ECU interprets this as a slipping clutch. Low pressure. Sensor defective. Incorrect sensor gap size. Clutch defective.	ECU shifts to neutral. Limp home. If there is also a failure at another clutch, ECU shifts to neutral. ECU will shut down. Reduced power and engine speed.
780		(Volume 2, WP 0201)	Stop Machine Immediately Slippage at clutch K4 - transmission ECU calculates a differential speed at closed clutch K4. If this calculated value is outside range, ECU interprets this as a slipping clutch. Low	Transmission ECU shifts to neutral. Limp home. If there is also a failure at another clutch, ECU shifts to


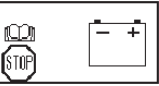
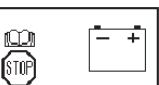
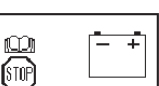
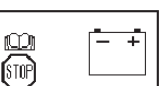
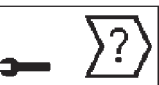
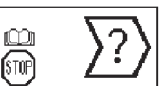
EXPLANATION OF ERROR CODE DISPLAY - Continued

Table 4. Error Code Reference Index - Continued.

ERROR CODE	DISPLAY LAYOUT	TROUBLESHOOTING PROCEDURE WORK PACKAGE	ERROR CODE CATEGORY/ EXPLANATION	MACHINE LIMITATIONS
			pressure. Sensor defective. Incorrect sensor gap size. Clutch defective.	neutral. ECU will shut down. Reduced power and engine speed.
781		(Volume 2, WP 0201)	Stop Machine Immediately Slippage at clutch KV - transmission ECU calculates a differential speed at closed clutch KV. If this calculated value is outside range, ECU interprets this as a slipping clutch. Low pressure. Sensor defective. Incorrect sensor gap size. Clutch defective.	Transmission ECU shifts to neutral. Limp home. If there is also a failure at another clutch, ECU shifts to neutral. ECU will shut down. Reduced power and engine speed.
782		(Volume 2, WP 0201)	Stop Machine Immediately Slippage at clutch KR - transmission ECU calculates a differential speed at closed clutch KR. If this calculated value is outside of range, ECU interprets this as a slipping clutch. Low pressure. Sensor defective. Incorrect sensor gap size. Clutch defective.	Transmission ECU shifts to neutral. Limp home. If there is also a failure at another clutch, ECU shifts to neutral. ECU will shut down. Reduced power and engine speed.
783		(Volume 2, WP 0172)	Warning - Degraded Operation Overheated sump - transmission ECU measured temperature in oil sump that is over 212°F (100°C). Low oil level. Temperature sensor defective.	Stop machine by switching to neutral.
786		(Volume 2, WP 0238)	Information/Maintenance Oil filter differential pressure - transmission ECU measured a voltage at differential pressure switch outside allowable range. Oil filter polluted. Cable/connector defective. Differential switch defective.	None.



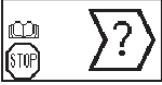
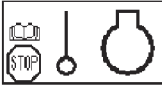




EXPLANATION OF ERROR CODE DISPLAY - Continued

Table 4. Error Code Reference Index - Continued.

ERROR CODE	DISPLAY LAYOUT	TROUBLESHOOTING PROCEDURE WORK PACKAGE	ERROR CODE CATEGORY/ EXPLANATION	MACHINE LIMITATIONS
795		(Volume 2, WP 0172)	Warning - Degraded Operation Overheated converter output - ECU measured oil temperature at converter output that is over 248°F (120°C). Low oil level. Temperature sensor defective.	Stop machine by switching to neutral.
811		(Volume 2, WP 0120)	Stop Machine Immediately Low power at battery - measured voltage at power supply is lower than 18 VDC. Cable defective. Battery defective. Connector defective.	Transmission ECU shifts to neutral. ECU will shut down. Reduced power and engine speed.
812		(Volume 2, WP 0120)	Stop Machine Immediately High power at battery - measured voltage at power supply is higher than 32.5 VDC. Cable defective. Battery defective. Connector defective.	Transmission ECU shifts to neutral. ECU will shut down. Reduced power and engine speed.
813		(Volume 2, WP 0120)	Stop Machine Immediately Error at shift valve power supply (VPS1). Cable defective. Connector defective. ECU defective.	ECU shifts to neutral. ECU will shut down. Reduced power and engine speed.
814		(Volume 2, WP 0120)	Stop Machine Immediately Error at shift valve power supply (VPS2). Cable defective. Connector defective. ECU defective.	ECU shifts to neutral. ECU will shut down. Reduced power and engine speed.
841		(Volume 2, WP 0116)	Information/Maintenance General EEPROM fault - ECU cannot read memory. ECU defective.	None.
843		(Volume 2, WP 0116)	Stop Machine Immediately Application error. ECU defective.	Transmission stays in neutral. ECU will shut down. Reduced









EXPLANATION OF ERROR CODE DISPLAY - Continued

Table 4. Error Code Reference Index - Continued.

ERROR CODE	DISPLAY LAYOUT	TROUBLESHOOTING PROCEDURE WORK PACKAGE	ERROR CODE CATEGORY/ EXPLANATION	MACHINE LIMITATIONS
				power and engine speed.
845		(Volume 2, WP 0201)	Stop Machine Immediately Clutch failure - AEB was not able to adjust clutch filling parameters. Clutch defective.	Transmission stays in neutral. ECU will shut down. Reduced power and engine speed.
846		(Volume 2, WP 0201)	Information/Maintenance Clutch adjustment data lost - ECU was not able to read correct adjustment parameters. Interference during data saving process.	None.
1111		(Volume 2, WP 0116)	Stop Machine Immediately ECM internal memory error. Hardware defective. Internal microprocessor communication failure.	Engine will not start. Reduced power and engine speed.
1115		(Volume 2, WP 0154)	Stop Machine Immediately No engine speed signal detected in either engine position sensor circuits.	Engine will shut down and will not start. Reduced power and engine speed.
1121		(Volume 2, WP 0154)	Warning - Degraded Operation No engine speed signal detected in one engine position sensor circuit.	Stop machine by switching to neutral.
1122		(Volume 2, WP 0166)	Warning - Degraded Operation High voltage detected in intake manifold pressure sensor circuit.	Reduced engine power output.
1123		(Volume 2, WP 0166)	Warning - Degraded Operation Low voltage detected in intake manifold pressure sensor circuit.	Reduced engine power output.
1131		(WP 0080)	Stop Machine Immediately High voltage detected in throttle position sensor circuit.	Severe power and speed loss. Limp home power only. Reduced power




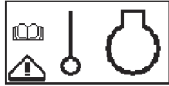





EXPLANATION OF ERROR CODE DISPLAY - Continued

Table 4. Error Code Reference Index - Continued.

ERROR CODE	DISPLAY LAYOUT	TROUBLESHOOTING PROCEDURE WORK PACKAGE	ERROR CODE CATEGORY/ EXPLANATION	MACHINE LIMITATIONS
				and engine speed.
1132		(WP 0080)	Stop Machine Immediately Low voltage detected in throttle position sensor circuit.	Severe power and speed loss. Limp home power only. Reduced power and engine speed.
1135		(Volume 2, WP 0156)	Warning - Degraded Operation High voltage detected in oil pressure sensor circuit.	Oil pressure warning not working.
1141		(Volume 2, WP 0156)	Warning - Degraded Operation Low voltage detected in oil pressure sensor circuit.	Oil pressure warning not working.
1143		(Volume 2, WP 0156)	Stop Machine Immediately Oil pressure signal indicates low oil pressure.	Reduced power and speed. Engine will shut down in 30 to 45 seconds.
1144		(Volume 2, WP 0158)	Warning - Degraded Operation High voltage detected in coolant temperature circuit.	Temperature warning not functioning.
1145		(Volume 2, WP 0158)	Warning - Degraded Operation Low voltage detected in coolant temperature circuit.	Temperature warning not functioning.
1151		(Volume 2, WP 0158)	Stop Machine Immediately Coolant temperature signal indicated coolant temperature above critical threshold.	Reduced power and speed. Engine will shut down in 30 to 45 seconds.
1153		(Volume 2, WP 0158)	Warning - Degraded Operation High voltage detected in intake manifold temperature sensor circuit.	Possible white smoke. No engine protection for intake manifold temperature.








EXPLANATION OF ERROR CODE DISPLAY - Continued

Table 4. Error Code Reference Index - Continued.

ERROR CODE	DISPLAY LAYOUT	TROUBLESHOOTING PROCEDURE WORK PACKAGE	ERROR CODE CATEGORY/ EXPLANATION	MACHINE LIMITATIONS
1154		(Volume 2, WP 0158)	Warning - Degraded Operation Low voltage detected in intake manifold temperature sensor circuit.	Possible white smoke. No engine protection for intake manifold temperature.
1155		(Volume 2, WP 0158)	Stop Machine Immediately Intake manifold temperature signal indicated coolant temperature above critical threshold.	Reduced power and speed. Engine will shut down in 30 to 45 seconds.
1187		(Volume 2, WP 0152)	Warning - Degraded Operation Low voltage detected on ECM voltage supply line to some sensors.	Engine will run degraded. No protection for oil pressure.
1212		(Volume 2, WP 0158)	Warning - Degraded Operation High voltage detected in oil temperature sensor circuit.	No engine protection for oil temperature.
1213		(Volume 2, WP 0158)	Warning - Degraded Operation Low voltage detected in oil temperature sensor circuit.	No engine protection for oil temperature.
1214		(Volume 2, WP 0158)	Stop Machine Immediately Oil pressure signal indicates temperature above critical threshold.	Reduced power and speed.
1221		(Volume 2, WP 0164)	Information/Maintenance High voltage detected in ambient air pressure sensor circuit.	Reduced power and speed.
1222		(Volume 2, WP 0164)	Information/Maintenance Low voltage detected in ambient air pressure sensor circuit.	Reduced power and speed.
1227		(Volume 2, WP 0152)	Warning - Degraded Operation High voltage detected on ECM voltage supply line to some sensors.	Engine will run degraded. No protection for oil pressure.










EXPLANATION OF ERROR CODE DISPLAY - Continued

Table 4. Error Code Reference Index - Continued.

ERROR CODE	DISPLAY LAYOUT	TROUBLESHOOTING PROCEDURE WORK PACKAGE	ERROR CODE CATEGORY/ EXPLANATION	MACHINE LIMITATIONS
1234		(Volume 2, WP 0154)	Stop Machine Immediately Engine speed signal indicates engine speed greater than 2,730 RPM.	Fuel shutoff valve is closed until engine speed drops. Fuel shutoff valve will open when engine speed falls below 2,184 RPM. Reduced power and engine speed.
1254		(Volume 2, WP 0167)	Stop Machine Immediately Less than 6 VDC detected at fuel shutoff driver. Excessive current draw. Power supply faulty.	ECM turns off FSO supply voltage. Engine will shut down. Reduced power and engine speed.
1255		(Volume 2, WP 0167)	Warning - Degraded Operation Externally supplied voltage detected going to fuel shutoff supply circuit.	No performance limitations. Fuel shutoff valve stays open.
1285		(WP 0102)	Warning - Degraded Operation Information from multiplexed device not received by ECM or received too late.	At least one multiplexed device will not operate properly.
1286		(WP 0102)	Warning - Degraded Operation Only a portion of information from multiplexed device received by ECM.	At least one multiplexed device will not operate properly.
1287		(Volume 2, WP 0152)	Stop Machine Immediately Data error received while multiplexing accelerator pedal and IVS.	The engine will only idle. Reduced power and engine speed.
1295		(Volume 2, WP 0164)	Information/Maintenance Ambient air pressure sensor circuit error detected by ECM.	Engine is degraded to no air setting.





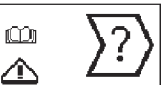
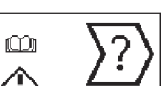
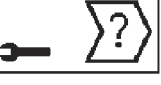

EXPLANATION OF ERROR CODE DISPLAY - Continued

Table 4. Error Code Reference Index - Continued.

ERROR CODE	DISPLAY LAYOUT	TROUBLESHOOTING PROCEDURE WORK PACKAGE	ERROR CODE CATEGORY/ EXPLANATION	MACHINE LIMITATIONS
1298		(Volume 2, WP 0165)	Stop Machine Immediately Intake system indicates air cleaner is clogged.	Reduced power and speed.
1311		(WP 0073)	Information/Maintenance Current detected at injector for cylinder #1 when voltage is turned OFF.	Injector for cylinder #1 turned OFF.
1312		(WP 0073)	Information/Maintenance Current detected at injector for cylinder #5 when voltage is turned OFF.	Injector for cylinder #5 turned OFF.
1313		(WP 0073)	Information/Maintenance Current detected at injector for cylinder #3 when voltage is turned OFF.	Injector for cylinder #3 turned OFF.
1314		(WP 0073)	Information/Maintenance Current detected at injector for cylinder #6 when voltage is turned OFF.	Injector for cylinder #6 turned OFF.
1315		(WP 0073)	Information/Maintenance Current detected at injector for cylinder #2 when voltage is turned OFF.	Injector for cylinder #2 turned OFF.
1321		(WP 0073)	Information/Maintenance Current detected at injector for cylinder #4 when voltage is turned OFF.	Injector for cylinder #4 turned OFF.
1322		(WP 0073)	Information/Maintenance No current detected at injector for cylinder #1 when voltage is turned OFF.	Injector for cylinder #1 turned OFF.
1323		(WP 0073)	Information/Maintenance No current detected at injector for cylinder #5 when voltage is turned ON.	Injector for cylinder #5 turned ON.







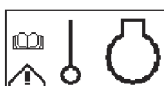
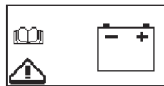
EXPLANATION OF ERROR CODE DISPLAY - Continued

Table 4. Error Code Reference Index - Continued.

ERROR CODE	DISPLAY LAYOUT	TROUBLESHOOTING PROCEDURE WORK PACKAGE	ERROR CODE CATEGORY/ EXPLANATION	MACHINE LIMITATIONS
1324		(WP 0073)	Information/Maintenance Current detected at injector for cylinder #3 when voltage is turned ON.	Injector for cylinder #3 turned ON.
1325		(WP 0073)	Information/Maintenance Current detected at injector for cylinder #6 when voltage is turned ON.	Injector for cylinder #6 turned ON.
1331		(WP 0073)	Information/Maintenance No current detected at injector for cylinder #2 when voltage is turned ON.	Injector for cylinder #2 turned ON.
1332		(WP 0073)	Information/Maintenance No current detected at injector for cylinder #4 when voltage is turned ON.	Injector for cylinder #4 turned OFF.
1341		(Volume 2, WP 0116)	Warning - Degraded Operation Severe loss of data from ECM.	No noticeable performance effects possible. Possibility of engine stopping or difficulty in starting engine.
1343		(Volume 2, WP 0116)	Warning - Degraded Operation Microprocessor communication error inside ECM.	No noticeable performance effects possible. May encounter severe loss of power.
1346		(Volume 2, WP 0116)	Information/Maintenance Software error in ECM.	Possibly too short of time for ECM to power down, less than 30 seconds.
1352		(Volume 2, WP 0152)	Warning - Degraded Operation Low voltage detected at sensor. Faulty power supply.	Engine is degraded to no air setting.

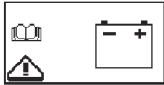




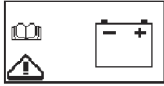
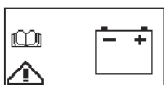
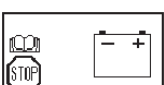


EXPLANATION OF ERROR CODE DISPLAY - Continued

Table 4. Error Code Reference Index - Continued.

ERROR CODE	DISPLAY LAYOUT	TROUBLESHOOTING PROCEDURE WORK PACKAGE	ERROR CODE CATEGORY/ EXPLANATION	MACHINE LIMITATIONS
1415		(Volume 2, WP 0156)	Stop Machine Immediately Oil pressure signal indicates below critical threshold.	Reduced power and speed. Engine will shut down in 30 to 45 seconds.
1419		(Volume 2, WP 0166)	Information/Maintenance Error in intake manifold pressure sensor signal detected by ECM.	Engine is degraded to no air setting.
1431		(WP 0080)	Information/Maintenance Both idle validation off-idle and on-idle signals indicate the same voltage reading.	None.
1432		(WP 0080)	Warning - Degraded Operation Idle validation switch voltages are opposite (complementary) but disagree with a valid throttle position sensor.	Engine will only idle.
1433		(Volume 2, WP 0166)	Information/Maintenance Intake manifold pressure sensor voltage indicates a high pressure reading.	Engine is degraded to no air setting.
1434		(Volume 2, WP 0168)	Warning - Degraded Operation Battery voltage too low or insufficient amount of time for battery power to ECM for powering down after key off.	No noticeable performance effects possible. Possibility of engine stopping or difficulty in starting engine.
1435		(Volume 2, WP 0156)	Warning - Degraded Operation ECM detects error in oil pressure sensor signal.	None. No engine protection for oil pressure.
1441		(Volume 2, WP 0168)	Warning - Degraded Operation Battery voltage below normal operating level.	No noticeable performance effects possible. Possibility of rough idle.


EXPLANATION OF ERROR CODE DISPLAY - Continued

Table 4. Error Code Reference Index - Continued.

ERROR CODE	DISPLAY LAYOUT	TROUBLESHOOTING PROCEDURE WORK PACKAGE	ERROR CODE CATEGORY/ EXPLANATION	MACHINE LIMITATIONS
1442		(Volume 2, WP 0168)	Warning - Degraded Operation Battery voltage above normal operating level.	None.
1443		(Volume 2, WP 0152)	Warning - Degraded Operation Low voltage detected on ECM voltage supply line to throttle.	Engine will only idle.
1474		(Volume 2, WP 0168)	Warning - Degraded Operation Low voltage detected in starter lockout relay circuit when energized or voltage detected when circuit de-energized.	None.
1551		(WP 0080)	Warning - Degraded Operation No voltage detected simultaneously in both idle validation off-idle and on-idle circuits.	Engine will only idle.
1581		(Volume 2, WP 0167)	Warning - Degraded Operation High voltage detected in fuel inlet pressure sensor circuit.	None.
1596		(Volume 2, WP 0168)	Warning - Degraded Operation Battery voltage above normal operating range.	None.
1597		(Volume 2, WP 0168)	Warning - Degraded Operation Battery voltage below normal operating range.	None.
1598		(Volume 2, WP 0168)	Stop Machine Immediately Very low battery voltage - critical level.	Engine is degraded to no air setting.
1697		(Volume 2, WP 0158)	Information/Maintenance High voltage detected in ECM internal temperature sensor circuit.	None.
1698		(Volume 2, WP 0158)	Information/Maintenance Low voltage detected in ECM internal temperature sensor circuit.	None.

EXPLANATION OF ERROR CODE DISPLAY - Continued

Table 4. Error Code Reference Index - Continued.

ERROR CODE	DISPLAY LAYOUT	TROUBLESHOOTING PROCEDURE WORK PACKAGE	ERROR CODE CATEGORY/ EXPLANATION	MACHINE LIMITATIONS
1951		(WP 0073)	Information/Maintenance Power imbalance between cylinders detected by ECM.	Engine may rough idle or misfire.

END OF WORK PACKAGE