EZ-Cal Scan Tools

The EZ-Cal Scan Tools interface with the machine's control system to provide system information and to allow adjustment. The EZ-Cal receives its power from the GP500 or GP440. The system must be powered up by pulling out both Emergency Stop Switches. You must also select Base or Platform depending on the station from which you will operate.

> EZ-Cal Handheld

Onboard EZ-Cal Option -- Lower Controls Box

To use and operate the onboard EZ-Cal, set the Base/Platform Key switch to Base, then open the door to the Lower Controls Box. The onboard EZ-Cal scan tool provides the same functionality as the hand-held unit.

Handheld EZ-Cal -- Lower/Upper Controls Box

The handheld EZ-Cal is not provided with the machine and is available from the MEC parts department (part #90888).

To use and operate the handheld EZ-Cal at the upper controls station:

- Set the Base/Platform Key Switch to Platform
- Open the lid to the Upper Controls Box
- Plug the EZ-Cal into port P9 of the GP440 module. This plug is on the right side of the module, facing down.

Using The EZ-Cal Scan Tool

- Once, powered up, the EZ-Cal display will illuminate and read "HELP: PRESS ENTER". From this point, use the right and left arrows to scroll through the base menus.
- Once the desired base menu is obtained (i.e. ADJUSTMENTS) press Enter to access sub menus.
- Use the right and left arrows to scroll through sub menus, then press Enter again to choose a sub menu.
- The up/down arrows are used to change settings only.
- Press ESC to back up one level.



SYMBOL	KEY FUNCTIONS
ESC ENTER	ESC/ENTER BUTTONS To move back and forth between menu and sub-menu
	LEFT/RIGHT BUTTONS Select menus and setting to be adjusted
	UP/DOWN BUTTONS Adjust setting values



Using The EZ-Cal With The Flow Charts

Use the EZ-Cal Flow Charts as a guide to locate diagnostic information and make adjustments. Each box in the flow chart will have 3 bits of information.



The IDENTIFIER (5c2): Used to characterize the cell for reference.

The PERSONALITY (Up Max): Identifies the individual personalities.

The DEFAULT SETTING: The factory setting. If adjustments are made, they must be returned to default setting.



ACCESS LEVEL 1 PROVIDES ACCESS TO CHANGE PERSONALITIES NORMALLY PRESET AT THE FACTORY TO PROVIDE PROPER MACHINE MOVEMENT AT SAFE SPEEDS. PERSONALITIES MUST NOT BE CHANGED WITHOUT PRIOR AUTHORIZATION FROM MEC AND MAY ONLY BE RETURNED TO FACTORY SPECIFICATION AS LISTED IN THE FOLLOWING TABLES.

Error Messages

To obtain error messages from the EZ-Cal, access the EZ-Cal as mentioned above. The display will read, "HELP:PRESS ENTER". Press Enter to display the current error message. If an error message is present, use the following list of error messages to better understand the fault. If an error message is not present, the display will show the last operation performed.

Pressing Enter twice will provide a log of previous errors and operations that may have occurred within recent operation. The first message will be the most recent.

Flash Codes

Flash Codes, provided from the GP500 LED, will also assist in the event an EZ-Cal is not available. However, the EZ-Cal yields considerably more relevant information. Refer to "EZ-Cal Messages" on page 102 for flash coded error messages.



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"Help Messages" will appear on the EZ-Cal scan tool as a means of explaining operating and nonoperating function(s) and system errors or interruptions that are accompanied by flash codes. It can also be used for verifying system operation. Refer to the EZ-Cal Instruction page for additional help with EZ-Cal operation.

To access messages, power the system up, (it is not necessary to have the engine running) the EZ-Cal display will illuminate and read "HELP - PRESS ENTER". Press ENTER to view current message. Press ENTER a second time then use right and left arrow buttons to access up 30 logged messages from the memory. Many messages simply detail operations being performed by the GP500; other messages detail occurrences that also take place during operation either normal or may be symptomatic of a malfunction.

Operational Messages

The following messages appear as result of normal operation and usually do not represent a problem.

EVERYTHING OK Flash Code: None All circuits performing properly, no current operation performed.

GROUND MODE ACTIVE______ Flash Code: None

Base/Platform selector switch set to base control station.

STARTUP

Flash Code: None

GP500 performing start up procedure, normally a short sequence.

MOVING FRAME _____ Flash Code: None

• Chassis level in progress.

MOVING PLATFORM Flash Code: None

• Platform level in progress.

TELESCOPING_ Flash Code: None

Boom extend/retract (telescope) in progress.

Flash Code: None LIFTING

• Boom lift up in progress.

• Boom Lower down in progress.

DRIVING

• Drive forward or reverse in progress.

VEHICLE TILTED

Flash Code: None

Flash Code: None

• Chassis is tilted beyond pre-set maximum. Use auto-level feature to level chassis or re-position the machine.

Flash Code: None



Can Bus Related Messages

CAN bus communication system is the network by which the control modules and CAN Tilt modules communicate with the GP500.

NO DATA FROM CAN TILT #1 Flash Code: None

 CAN Tilt module mounted to front of main boom (located behind panel, Left Module) has malfunctioned or wiring is damaged.

NO DATA FROM CAN TILT #2_____

• CAN Tilt module mounted to Front axle has malfunctioned or wiring is damaged.

NO DATA FROM CAN TILT #3_____

• CAN Tilt module mounted to front of main boom (located behind panel, Right Module) has malfunctioned or wiring is damaged.

NO DATA FROM CAN TILT #4_____ Flash Code: None

• CAN Tilt module mounted to Rear axle has malfunctioned or wiring is damaged.

FAULT: CAN BUS!

LT: CAN BUS!_____ Flash Code: 6/6 The CAN bus cable may be damaged or disconnected from one or more of the modules. All • modules must be connected to the CAN bus for machine operation.



Flash Code: None

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Calibration Related Messages

The following messages appear when the GP500 microprocessor has not been calibrated or was improperly calibrated.

FACTORY OVERRIDE_

 GP500 is shipped in this condition to allow temporary operation of the machine without interruption from the safety system so that calibration procedures can be performed. The GP500 must be prepared for the machine to which it will be installed, including calibration and Customer/ model selection. See "GP500 Setup" for instructions. Once Calibrated, Factory Override is gone forever.

ALL SAFETY SETTINGS ARE INACTIVE WHEN THE GP500 IS IN FACTORY OVERRIDE, NEVER OPERATE MACHINE IN FACTORY OVERRIDE EXCEPT TO CALIBRATE THE GP500.

NOT CALIBRATED

• The GP 500 microprocessor has not been calibrated. Operation will be restricted until calibration is completed. Refer to "Set up procedures" in this section for calibration information and instructions.

HEIGHT NOT CALIBRATED_

• The Height portion of the calibration has not been completed. Operation will be restricted until calibration is completed. Refer to "Set up procedures" in this section for calibration information and instructions.

FUNCTIONS LOCKED - NOT CALIBRATED_____ Flash Code: 1/1

The GP 500 microprocessor has not been calibrated. Operation will be restricted until calibration is completed. Refer to "Set up procedures" in this section for calibration instructions.

FAULT: CUSTOMER_

 Customer vs. Model settings not correct. Using the EZ-Cal, go to SETUPS/CHANGE DEFAULTS/CUSTOMER to correct. Changing customer or model will require access level 1 code. NOTE: all adjustments and settings return to default value when Customer or Model is changed, ensure proper settings and adjustments after changing Customer or Model.



____ FAST FLASH

_ Flash Code: 1/1

___ Flash Code: 1/1

Flash Code: 1/1

Interlock Messages

The following messages appear as result of perceived improper operation, machine positioning, or other incorrect operation. Interlock messages may be the result of a part failure if the part in question provides incorrect information to the GP500.

FUNCTIONS LOCKED - LIMIT REACHED Flash Code: 2/2

Rotating platform not centered; Certain operations require centered platform Rotating platform at • extreme CW or CCW; no further rotation possible in that direction

FUNCTIONS LOCKED - TEST MODE SELECTED Flash Code: 2/2

• Calibration in progress or internal test mode active. Cycle EMS to clear.

FUNCTIONS LOCKED - OUTRIGGERS Flash Code: 2/2

• Stabilizers must be set before operation is allowed.

FUNCTIONS LOCKED - OVERLOADED_____ Flash Code: 2/2

• Platform overloaded - reduce weight in platform until alarms stop (Overload option only)

 FUNCTIONS LOCKED - UNDERLOADED _____ Flash Code: 2/2
 Overload system detects less then normal lift cylinder pressure. Platform resting atop a fixed object, possible pressure switch failure or not calibrated correctly.

FUNCTIONS LOCKED - TILTED

Platform sensors indicate platform out of level; level platform or chassis until alarm stops or reposition machine

FUNCTIONS LOCKED - AUTO PLATFORM LEVEL Flash Code: 2/2

• Auto Platform Level operation running, wait until completed to operate other functions.

FUNCTIONS LOCKED - TOO HIGH

• Elevation sensor indicating elevation beyond 98%. Height Calibration performed incorrectly; Angle Transducer loose or remounted incorrectly or extend proximity switch/s failure. Use EZ-Cal in conjunction with EZ-Cal Flow Charts to identify GP500 or GP440 for sensor's inputs to check sensor readings.

FUNCTIONS LOCKED - EXTERNAL SHUTDOWN Flash Code: 2/2

Boom not retracted or axle/s off level. Boom must be retracted to allow frame level, drive or outrigger operation. Axles must be centered before drive is allowed when the platform is elevated. Also, drive will be interrupted if Stabilizer pressure sensor output is below 0.2 volts (possible sensor failure or sensor wiring issue).

CHECK DRIVE/STEER SWITCHES

Drive joystick output without enable or during power up. Check drive joystick analog output and steer switch digital output using the EZ-Cal.

CHECK LIFT SWITCHES

Lift joystick or toggle switch movement without enable or during power up. Check joystick analog • output using the EZ-Cal.

Flash Code: 2/2

Flash Code: 2/2

Flash Code: 2/2

Flash Code: 2/2

CHECK PLATFORM SWITCHES_

• Platform Rotate/slide joystick or toggle switch movement without enable or during power up. Check joystick analog output and switch digital outputs using the EZ-Cal.

CHECK TELE SWITCHES_

• Telescope joystick or toggle switch movement without enable or during power up. Check joystick analog output and switch digital output using the EZ-Cal.

RELEASE ENABLE SWITCH_

• One or more enable switches activated for extended period of time without corresponding function or during start up. Check enable switches digital outputs using the EZ-Cal.



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Flash Code 2/2

Flash Code 2/2

Flash Code 2/2

Other Messages

The following messages are the result of various possible failures or occurrences which may result in machine interruption.

FUNCTIONS LOCKED - NO VALVE SUPPLY! Flash Code 2/3

• GP500 detects no power on P7-1 of the GP500. Check wiring to plug connection; possible GP500 internal failure.

FAULT: ENERGIZED VALVE _____ Flash Code: 3/2
Power on valve output wire at GP500 plugs P4, P5 or P6. Unplug these connectors and cycle Estop switch to clear code. Plug in one-at-a-time until code reappears then isolate the circuit (with voltage) within that plug. If code does not clear, possible GP500 failure. EZ-Cal not useful for this procedure.

FAULT: VALVE FEEDBACK HIGH! Flash Code: 3/2

• On start-up GP500 p-5 pin voltage incorrect, check P5-X wiring for voltage feed back. Possible GP500 internal fault

FAULT: BAD INTERNAL SAFETY SWITCH! Flash Code: 3/4

• At startup, internal feedback of output incorrect, possibly failed output driver; check wiring to P6-12/13/14/15: possible GP500 internal failure

FAULT: LOW OIL PRESSURE!

Oil pressure switch opened during operation or time out. Check oil pressure, pressure switch, wiring. Message will appear if engine stops running for reasons other then normal shut down.

FAULT: BAD INTERNAL SLAVE!_____ Flash Code: 4/2

• Malfunction within the GP500 possibly caused by a short circuit in the wiring or high voltage surge. Replace GP500

FAULT: BAD INTERNAL 5 VOLTS! Flash Code: 4/2

5 volt circuit that provides voltage to sensors had failed. Possible short in the wiring or high voltage surge on supply.

FAULT: BATTERY VOLTAGE TOO LOW!_____ Flash Code: 4/4

• Charge battery and battery connections, check charging system and voltage source connections.

FAULT: BATTERY VOLTAGE TOO HIGH! Flash Code: 4/4

GP500 input voltage should be 12 volts. Check battery and battery connections, alternator output.

FAULT: CHECK HEIGHT 2 SENSOR!_____ Flash Code 6/1

Height 2 sensor output over 4.5 volts or under .5 volts. Check height 2 sensor output using the EZ-Cal (height 2 sensor on CE option only). Possible sensor failure or wire connection failure.

FAULT: CHECK HEIGHT 1 SENSOR! _____ Flash Code 6/1
Height 1 sensor output over 4.5 volts or under .5 volts. Check height 1 sensor output using the EZ-Cal. Possible sensor failure or wire connection failure.

Flash Code: 4/1



FAULT: CHECK HEIGHT SENSORS!

• Voltage from Height sensors out of range, should be .5 volts to 4.5 volts

FAULT: CHECK PRESSURE SENSOR!_____ Flash Code 6/2

• Voltage from Pressure sensor out of range, should be .5 to 4.5 volts (Overload option only).

FAULT: CHECK ELEVATION SWITCH! Flash Code 6/3

Check for incorrect GP 500 part. ٠

FAULT: LOW OIL PRESSURE!

- _____ Flash Code 7/7 Engine Start was pushed but engine did not start or oil pressure switch did not close. •
- Engine Oil Pressure is low. Check oil level. •

FAULT: SOME BIG BAD PROBLEM!_____ Flash Code 9/9

• A failure happened that has no message associated with it. This should never occur.



Flash Code 6/1

Troubleshooting Chart

The following chart describes the possible causes for inoperation of the different functions of this machine. The Causes and Solutions columns list various points of references that can be found in the Hydraulic, Electrical, Schematics and Troubleshooting sections of this manual.

The majority of electrical troubleshooting on this model will require the use of the onboard EZ-Cal scan tool, located inside the lower control box door. Please refer to "EZ-Cal Scan Tools" on page 98 for further instructions on the use of the EZ-Cal scan tool.

Perform a full assessment of machine operations prior to troubleshooting this model and using this chart. This model is operated by a Microprocessor Control System equipped with a variety of builtin safety interlocks to prevent continued operation in the event of a failure or misoperation. Some interlocks may only be detected through the use of the EZ-Cal.

Problem	Possible Cause	Remedy/Solution
General Power Issue		
	Emergency stop switch pushed in or ignition switch turned off or faulty switches	Lower E-stop switch and ignition switch will cut all power. Upper E-stop will cut only upper power as will the ignition switch in platform control box.
No operation from upper	Battery discharged or faulty cables	Will receive 4-4 or 7-7 flash on GP500. Clean, service and charge battery. Repair cables.
or lower control station. No LEDs on modules.	Circuit breaker tripped	Located in lower control box. Look for short circuit and/or damage in wiring or high amperage draw at valve coils or engine actuators.
	Faulty Terminal Block Module (TBM)	Located inside the lower control box. Initiates all power when signaled by the key switch. Check for loose terminals. Terminal 4 is Common power from Circuit breaker. Terminals 1 and 2 are signals to close the relay.
No operation from upper or lower control station Module LEDs on or flashing	Flash codes are the GP500's indication of a fault in the system.	Refer to flash code designation in this section of the manual or plug in an EZ-Cal scan for more relevant information relating to the failure. See EZ-Cal Instructions for more information.
	Starter Relay or Starter failure	Test for signal and Common power to Starter Relay. Check fuse for Common power to relay. Test Starter.
	Base/Platform select switch not in Platform position or switch malfunction	Ensure that the switch is in the Platform position. Check switch function.
Operates from lower controls but not from upper controls. No LEDs when in Upper control position.	Damaged or loose harness connections to upper control box	Check for power inside the upper control box on E-stop switch and at Buss Module. Check for presence of ground on the Ground Buss Module. Repair connections.
	Malfunctioning GP440 Module (Module inside the upper control box)	Check help messages using the EZ-Cal tool. Also check for joystick inputs (see 2C2 and 2D2 Diagnostic Chart for inputs from GP440).
	System interlock	Check EZ-Cal HELP messages for interlock

Problem	Possible Cause	Remedy/Solution	
Engine Related Issues			
Starter will not crank from upper or lower stations	Battery discharged or faulty cables	Will receive 4-4 flash on GP500. Clean, service and charge battery. Repair cables.	
	Malfunctioning start relay or fuse	Test/replace relay located on left hand side of engine and fuse located near starter	
	Malfunctioning starter	Test/replace starter	
	Faulty start switch either location	Test/replace as necessary	
	Starter interrupt system initiated	Check for red "Start Disable" light on lower panel. Starter may be operated for 10 seconds before a 30 second "cool down" is initiated.	



Section 19 - Troubleshooting

Problem	Possible Cause	Remedy/Solution
Engine Related Issues		
7-7 Flash code on GP500	Indicates an attempt to start was sent by the GP500 but the oil pressure switch did not close.	Check all the above
	Low fuel reservoir	Check/fill fuel reservoir. Fuel system requires air purge after loss of fuel.
	Air trapped in the fuel system	Purge air from the fuel system (see Section 18 - Mechanical Components for instructions). Check fuel reservoir level or for leaks in the fuel hoses.
	Restriction in the fuel system	Replace Fuel Filter. Check fuel supply hoses
Starter cranks but engine	Malfunctioning fuel solenoid	Check/replace fuel solenoid located on the top of the injection pump.
will not start	Malfunctioning glow plugs (cold climates)	Test/ replace grid heater relay, fuse and grid heater
	Obstructed air filter	Clean/replace air filter.
	Contaminated fuel	Test/replace fuel
	Other engine issues	See engine manufacturers troubleshooting guide
No high throttle	Malfunctioning throttle controller, solenoid or blown fuse	Test/replace throttle controller and/or throttle solenoid and fuse
	Restriction in the fuel system	Replace Fuel Filter. Check fuel supply hoses
	Obstructed air filter	Clean/replace air filter.
	Other engine issues	See engine manufacturers troubleshooting guide

Problem	Possible Cause	Remedy/Solution		
Boom Lift/Lower				
	Excessive weight on platform	Reduce weight to within platform capacity		
	Machine out of level (platform elevated above 10')	Indicator light will be illuminated and alarm will sound off. Reposition machine to level ground.		
	Main relief valve (25) out of adjustment	Adjust Main relief valve (25) to rated platform capacity located on function manifold - see Hydraulic Section.		
	Lift valve (5) not energized	Check wiring to lift valve. Check for EZ-Cal message or flash code		
	Lift valve (5) not shifting	Clean debris. Check for damage/replace.		
Platform will not raise	Relief Valve (14) dump valve not energized	Check wiring to valve. Check EZ-Cal ref. P5-14 for output.		
	Relief Valve (14) load sense dump not shifting	Clean debris. Check for damage/replace.		
	Main system pressure inadequate	Check pump output flow and pressure		
		Check Joystick output using EZ-Cal ref. 2E2-2 & P7-1		
	Lin/Lower joystick moperative	P7-1 for analog joystick output signal		
	Battery discharged - no charge output	Check battery voltage, alternator output (14.5 volts) Check GP500 for 4-4 flash code.		
	System interlock	Check EZ-Cal HELP messages for interlock		
	Lowering valve (5) not energized	Check wiring to lowering valve located inside control module - see Hydraulic section for location.		
Platform will not lower or	Lowering valve (5) not shifting	Clean debris. Check for damage/replace.		
IOWEIS SIOWIY	System interlock	Check EZ-Cal HELP messages for interlock		
	Main system pressure inadequate	Check pump output flow and pressure		
Emergency lowering not	Battery discharged, not charging	Check/charge battery. Check charge Isolator relay and fuse. Check alternator output (14.5 volts)		
	Auxiliary power unit malfunction	Check APU located beside lower control box		
	Emergency Down switch failure	Check/replace switch.		
working	Lowering valve (5) not shifting	See "Platform will not lower or lowers slowly"		
	Counterbalance Valve (on lift cylinder) not adjusted correctly	Contact Factory Technical Support for instructions for counterbalance valve adjustment		
	System interlock	Check EZ-Cal HELP messages for interlock		



Problem	Possible Cause	Remedy/Solution
Boom Extend/Retract		
	Excessive weight on platform	Reduce weight to within platform capacity
	Level sensor out of level (platform elevated above 10')	Indicator light will be illuminated and alarm will sound off. Reposition machine to level ground
	Main relief valve (25) out of adjustment	Adjust Main relief valve (25) to rated platform capacity located on function manifold - see Hydraulic Section.
	Solenoid Valve (8) (dump valve) not energized	Check wiring to valve. Check EZ-Cal ref. P5-7 for output
No boom extension	Ext/Retract valve (10) not energized	Check wiring to valve. Check for EZ-Cal message or flash code.
	Extend/Retract valve (10) not shifting	Clean debris. Check for damage/replace.
	Ext/Retract switch inoperative	Check switch output using EZ-Cal ref. 2D-2, P14-1 & P14-2 for upper control digital output signal
	Battery discharged - no charge output	Check battery voltage, alternator output (14.5 volts). Check GP500 for 4-4 flash code.
	System interlock	Check EZ-Cal HELP messages for interlock
	Excessive weight on Platform	Reduce weight to within platform capacity
Boom ovtonds/rotracts	Main relief valve (25) out of adjustment	Adjust Extend relief valve (see Hydraulics Section) located on function manifold.
slow	Extend/Retract valve (10) not shifting completely	Clean debris. Check for damage/replace.
	Extend Speed adjustment reduced in GP500 Processor	Use the EZ-Cal and check/adjust setting. See ADJUSTMENTS/TELESCOPE OUT MAX
	Main relief valve (25) out of adjustment	Adjust Main relief valve (25) to rated platform capacity located on function manifold - see Hydraulic Section.
No boom retract	Foreign debris stuck in boom slide pads	Inspect/clean slide pads.
	Solenoid Valve (8) (dump valve) not energized	Check wiring to valve. Check EZ-Cal ref. P5-7 for output.
	Ext/Retract valve (10) not energized	Check wiring to lift valve. Check for EZ-Cal message or flash code.
	Extend/Retract valve (10) not shifting	Clean debris. Check for damage/replace.
	Ext/Retract joystick inoperative	Check joystick output using EZ-Cal ref. 2D-2, P14-1 & P14-2 for upper control analog output signal.
	Battery discharged - no charge output	Check battery voltage, alternator output (14.5 volts). Check GP500 for 4-4 flash code.
	System interlock	Check EZ-Cal HELP messages for interlock

Problem	Possible Cause	Remedy/Solution
Platform Auto-Level		
Platform will not remain level while elevating or lowering platform (level cylinder not moving at all)	Platform Level solenoid (4.1) valve not energized	Check wiring to valve. Check output from GP500 P5-10 (UP) and P5-11 (DOWN).
	Platform Level solenoid valve (4.1) sticking	Remove valve and inspect for debris or damage. Replace valve located up on the side of the boom.
	Counterbalance valve faulty	Valve must not be tampered with. Replace valve.
	Flow Compensator valve (2) not shifting	Clean debris. Check for damage/replace.
Platform will not remain	Excessive weight on Platform	Reduce weight to within platform capacity
level while elevating or lowering platform (level cylinder moving too slow or fast)	Main relief valve (25) out of adjustment	Adjust main relief valve (see Hydraulics Section) located on function manifold.
	Platform Level solenoid valve (4.1) not shifting completely	Clean debris. Check for damage/replace.



Problem	Possible Cause	Remedy/Solution
Platform Auto-Level		
Platform will not remain	Flow Compensator valve (2) not shifting completely	Clean debris. Check for damage/replace.
level while elevating or lowering platform (level cylinder moving too slow or fast)	Adjustments in GP500 incorrect	Refer to Adjustments Flow Chart column 4G for settings that will allow leveling to be close then make slight changes until operating correctly. Contact MEC Technical Support for assistance if needed.
	Pump faulty	Test/replace pump

Problem	Possible Cause	Remedy/Solution
Platform Manual Level		
Platform level operates automatically but not manually	Platform Level toggle switch inoperative	Check output from toggle using EZ-Cal. See I.D.# 2D-1, P15-3 (up) P15-6 (down) for lower control operation or 2D-2, P14-11 (up) or P14-12 (down) from upper controls.
	System Interlock	Check EZ-Cal HELP message for interlock

Problem	Possible Cause	Remedy/Solution
Turntable Rotate		
Turntable will not rotate either direction	Turntable Rotate joystick inoperative	Check joystick output using EZ-Cal. See 2E2 P7-2 for signal.
	Rotate Valve (12) not energizing.	Check wiring to valve Check GP500 output using EZ-Cal. See 2F1 P4-7 (left) and P4-8 (right).
	Rotate valve (12) not shifting.	Clean debris. Check for damage/replace.
	Internal damage or failure of rotator	Inspect/clean/repair
	System interlock	Check EZ-Cal HELP messages for interlock
	Rotate Valve (12) not energizing	Check wiring to valve
Turntable will rotate in one direction only	Rotate valve (12) not shifting	Clean debris. Check for damage/replace.
	Mechanical interference in rotator	Inspect, clean or repair
	System interlock	Check EZ-Cal HELP messages for interlock
	Output Settings Too Low	Increase swing CW Max and CCW Max to improve Rotate Speeds.

Problem	Possible Cause	Remedy/Solution
Platform Rotate		
	Platform Rotate joystick inoperative	Check joystick output using EZ-Cal. See 2D2 P6-2 for signal.
	Rotate Valve (4-3) not energizing	Check wiring to valve Check GP500 output using EZ-Cal. See 2F1 P5-1 (left) and P5-15 (right)
Platform will not rotate either direction	Rotate valve (4-3) not shifting	Clean debris. Check for damage/replace.
	Internal damage or failure of rotator	Inspect, clean or repair
	Flow Compensator valve (2) not shifting	Clean debris. Check for damage/replace.
	System interlock	Check EZ-Cal HELP messages for interlock
	Rotate Valve (4-3) not energizing	Check wiring to valve
Platform will rotate in one direction only	Rotate valve (4-3) not shifting	Clean debris. Check for damage/replace.
	Mechanical interference in rotator	Inspect, clean or repair
	System interlock	Check EZ-Cal HELP messages for interlock



Section 19 - Troubleshooting

Problem	Possible Cause	Remedy/Solution
Drive		
	Planetary hub bypass engaged	Check bypass plates located in the center of each planetary hub. Should be convex. Turn over if not.
No drive operation	System interlock	Check EZ-Cal HELP messages for interlock
	Hydraulic oil incorrect for severe low temperatures	Use hydraulic tank warmer if equipped. Operate drive continuously until drive begins to operate.

Problem	Possible Cause	Remedy/Solution
Drive		
No drive operation	Drive Valve (on drive pump) not energized	Check Drive output from GP500 2FI, P4-2 (FWD) and P4-3 (REV). Check for power at valve coils located on top of the drive pump.
	Drive Valve (on drive pump) not shifting	Check drive valve for contamination
	Brakes not releasing (system under pressure when drive attempted)	Check brake valve and brake pressure. See hydraulic diagram for location.
	Drive joystick output failure	Check drive joystick output from GP500 (see 2E2, P10-1) check joystick enable trigger operation, Check wire connections.
	Low pump charge pressure	Check at brake manifold port GCP (see hydraulic Diagram). Adjust stand-by pressure to 300 PSI (21 bar).
	Incorrectly adjusted or worn hydraulic drive pump	See Hydraulics Section for pump adjustment. Inspect or replace pump.
No drive with platform elevated	Unit out of level	Lower boom and operate on more level surfaces.
	FWD MIN, REV MIN setting incorrect	Reset drive speeds using EZ-Cal
	Hydraulic oil incorrect for severe low temperatures	Use hydraulic tank warmer if equipped. Operate drive continuously until drive begins to operate.
	Low pump charge pressure	Check at brake manifold port GCP (see hydraulic Diagram). Adjust stand-by pressure to 300 PSI (21 bar).
	System interlock	Check EZ-Cal HELP messages for interlock
**CE rated models	Axles not parallel	Reposition machine on flat ground
Slow drive with platform in stowed position and boom retracted	Slow engine RPM.	Check throttle solenoid.
	Hydraulic oil incorrect for severe low temperatures	Use hydraulic tank warmer if equipped. Operate drive continuously until drive begins to operate.
	Low pump charge pressure	Check at brake manifold port GCP (see hydraulic Diagram). Adjust stand-by pressure to 300 PSI (21 bar).
	FWD MAX, REV MAX setting incorrect	Reset drive speeds using EZ-Cal
	Wheel motor not functioning correctly	Inspect wheel motors for damage or wear.
Poor grade-ability or drive performance	Wheel motor not functioning correctly	Inspect wheel motors for excessive bypass or shift not working properly
	Hydraulic oil incorrect for severe low temperatures	Use hydraulic tank warmer if equipped. Operate drive continuously until drive begins to operate.
	Planetary hub bypass engaged	Check bypass plates located in the center of each planetary hub. Should be convex. Turn over if not.
	Low pump charge pressure	Check at Brake/Axle manifold, should be 300 PSI (21 bar). Adjust charge pressure to 300 PSI (21 bar).
	Incorrectly adjusted or worn hydraulic drive pump	See Hydraulics Section for pump adjustment. Inspect or replace pump.
Drive in one direction only	Drive valve not energizing in one direction	Check 12 volts to coil. Check coil. Check valve function (located on top of drive pump).
	No output from GP500 Module	Check output from GP500 2FI, P4-2 (FWD) and P4-3 (REV)
	Drive joystick output failure	Check drive joystick output from GP500 (see 2E2, P10-1)



Problem	Possible Cause	Remedy/Solution	
Steer			
No steer in either direction	Joystick rocker switch inoperative	Check continuity through micro-switch inside joystick handle using wires outside the handle. Check output (see EZ-Cal 2D2, P10-7 and P7-8).	
	Steering valve 11 inoperative	Check steering valve for power. Check for damage and contamination. Check output from GP500 (see EZ-Cal ID # 2F1 P5-2 and P5-3). Inspect/ replace steering valve.	
	Hoses connected incorrectly	See Hydraulic Section for correct connection.	
	System interlock	Check EZ-Cal HELP messages for interlock	
Steer in one direction only	Joystick rocker switch inoperative	Check continuity through micro-switch inside joystick handle using wires outside the handle. Check output (see EZ-Cal 2D2, P10-7 and P7-8).	
	Steering valve 11 inoperative	Check steering valve for power. Check for damage and contamination. Check output from GP500 (see EZ-Cal ID # 2F1 P5-2 and P5-3). Inspect/ replace steering valve.	
	System interlock	Check EZ-Cal HELP messages for interlock	
Will steer but not fully or slow steering	One or both steering cylinder internal seal failure	Check/replace steering cylinder seals.	
	King pin/s seizing in the bore	Disassemble and inspect. Replace bushings.	



Electrical Schematic - Lower Schematic



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Electrical Schematic - Turntable





Electrical Schematic - Upper Controls

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Hydraulic Schematic





Main Manifold Valves



