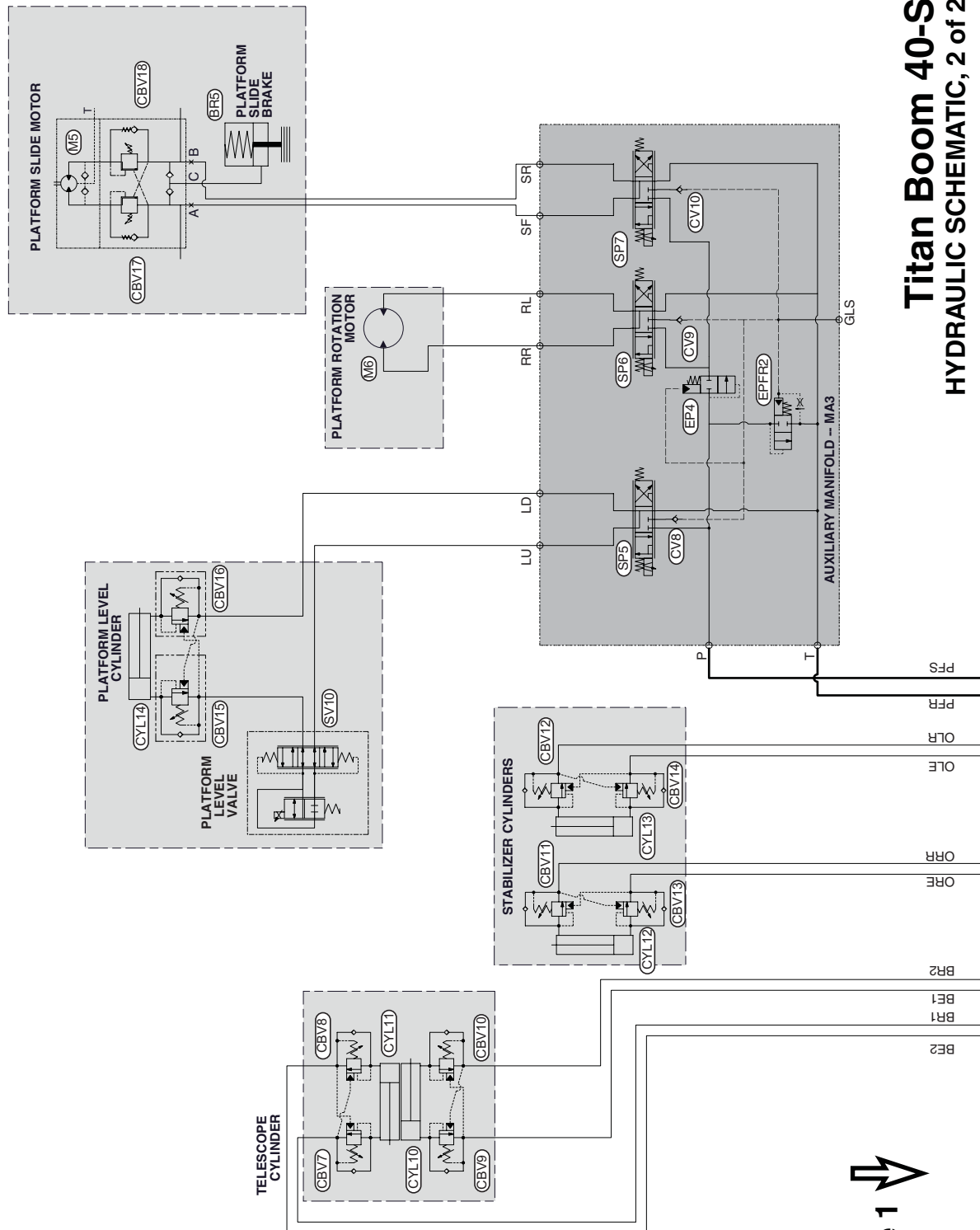


HYDRAULIC SCHEMATICS

The following table applies to Figure 5-1 through Figure 5-5.

Callout	Description	Callout	Description
BR1-BR4	Wheel Brakes (located in gear hubs)	ORF1	Orifice -- Brake Apply .040
R5	Platform Slide Brake	ORF2	Orifice -- Traction Manifold .052
CV1	Check Valve, P1	ORF3	Orifice -- Traction Manifold .052
CV2	Check Valve -- Load Sense	ORF4	Orifice -- Traction Manifold .040
CV3	Check Valve -- Load Sense	ORF5	Orifice -- Traction Manifold .090
CV4	Check Valve -- Load Sense	PD1	Pilot-Operated Valve
CV5	Check Valve -- Load Sense	PD2	Pilot-Operated Valve
CV6	Check Valve -- Low to High Flow	PR1	Pressure Reducing Valve
CV7	Check Valve -- Auxiliary Manifold Supply	RV1	Relief Valve -- High Flow
CV8	Check Valve -- Platform Level	RV2	Relief Valve -- Telescope
CV9	Check Valve -- Platform Rotate	RV3	Relief Valve -- Low Flow
CV10	Check Valve -- Platform Slide	RV4	Relief Valve -- Traction Manifold 300 psi
CYL1	Boom Lift Cylinder	SP1	Proportional Valve -- Boom
CYL2-5	Steer Cylinders	SP2	Proportional Valve -- Telescope
CYL6-9	Axle Cylinders	SP3	Proportional Valve -- Stabilizer
CYL10-CYL11	Boom Extend Cylinders	SP4	Proportional Valve -- Stabilizer
CYL12-CYL13	Stabilizer Cylinders	SP5	Proportional Valve -- Platform Level
CYL 14	Platform Level Cylinder	SP6	Proportional Valve -- Platform Rotate
EP1	Flow Compensator -- Boom	SP7	Proportional Valve -- Platform Slide
EP2	Flow Compensator -- Telescope	SVD1	Directional Valve -- Boom
EP3	Flow Control -- Auxiliary Pump	SVD2	Directional Valve -- Telescope
EP4	Flow Control -- Auxiliary Manifold	SV1	Solenoid Valve -- L/S Dump
EPFR1	Flow Regulator	SV2	Solenoid Valve -- Re-Gen, Tele
EPFR2	Flow Regulator	SV3	Solenoid Valve -- Re-Gen, Tele
FD1	Flow Divider -- Telescope	SV4	Solenoid Valve -- Axle Float
FD2	Flow Divider -- Traction Manifold	SV5	Solenoid Valve -- Steer Direction
FD3	Flow Divider -- Traction Manifold	SV6	Solenoid Valve -- Frame Level
FD4	Flow Divider -- Traction Manifold	SV7	Solenoid Valve -- Low Flow Dump
FR1	Flow Regulator -- Steer	SV8	Solenoid Valve -- Brake
FR2	Flow Regulator -- Auxiliary Manifold	SV9	Solenoid Valve -- 2-Speed Drive
HS1		SV10	Solenoid Valve -- Platform Level
LS2	Load Sense Shuttle		
LS3	Load Sense Shuttle		
M1-M4	Motor -- Wheels	Gauge Ports	
M5	Motor -- Platform Slide	GP1	Gauge Port -- High Flow
M6	Motor -- Platform Rotate	GP2	Gauge Port -- Low Flow
MA1	Functions Manifold	GCP	Gauge Port -- Charge Pressure
MA2	Traction Manifold	GD	Gauge Port -- Drive Pressure
MA3	Auxiliary Manifold		





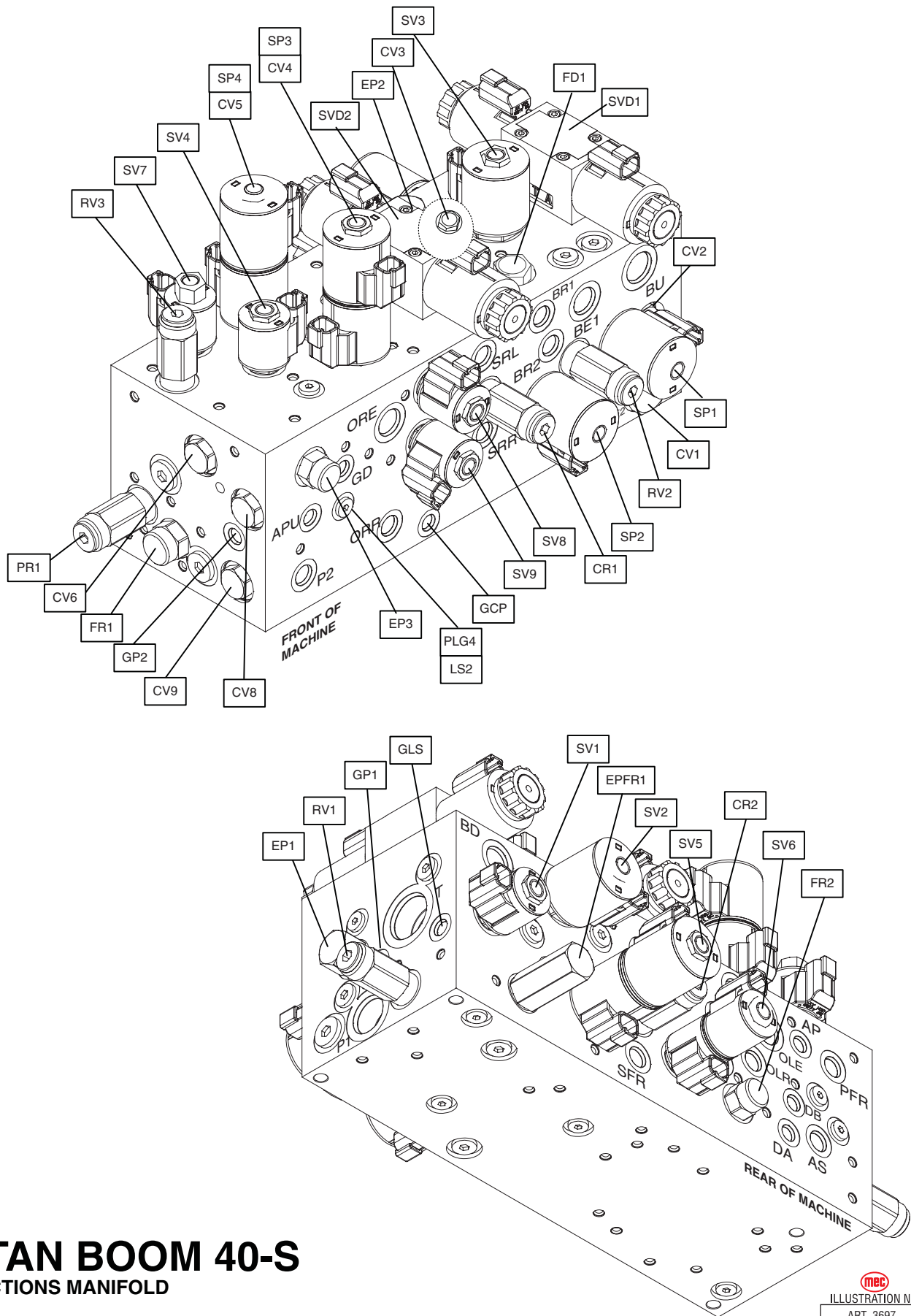
Titan Boom 40-S

HYDRAULIC SCHEMATIC, 2 of 2

To Page 1



ILLUSTRATION No.
ART_3696

Figure 5-3: Function Manifold, MA1

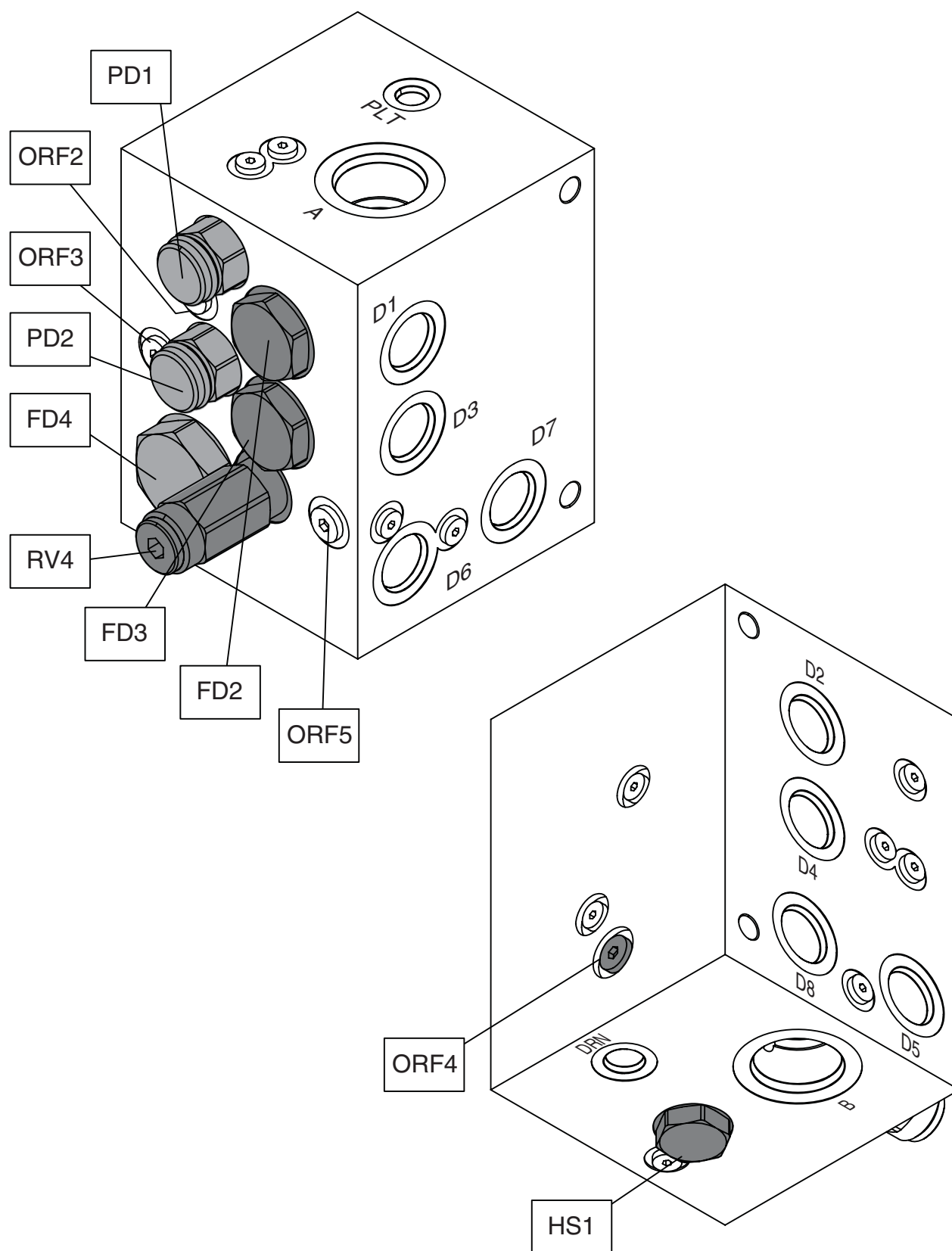
TITAN BOOM 40-S

FUNCTIONS MANIFOLD

MA1

ILLUSTRATION No.
ART_3697

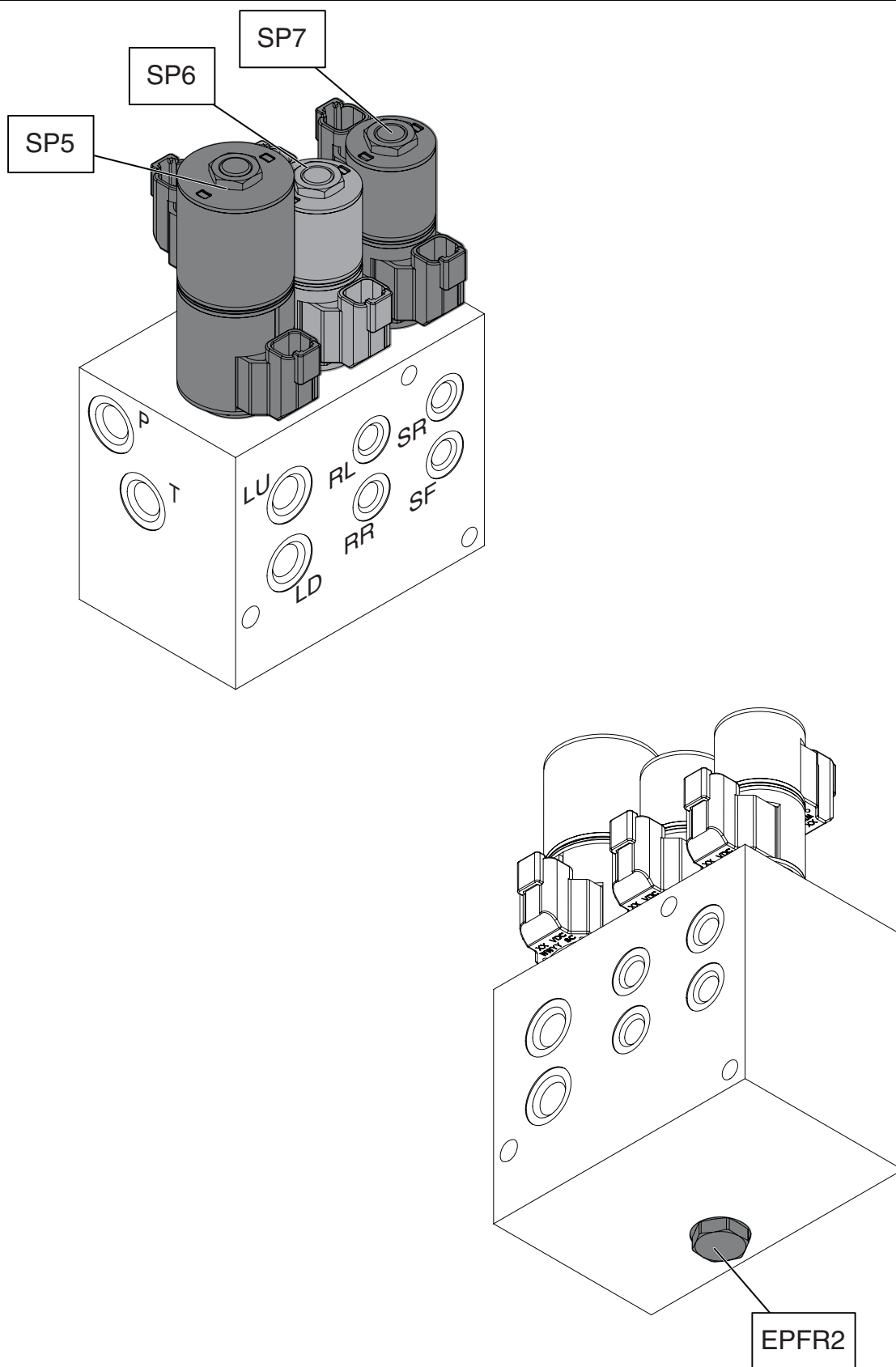


Figure 5-4: Traction Manifold, MA2

Titan Bom 40-S

TRACTION MANIFOLD
MA2

mec
ILLUSTRATION No.
ART_3698

Figure 5-5: Auxiliary Manifold, MA3

Titan Boom 40-S

AUXILLARY MANIFOLD
MA3


ILLUSTRATION No.
ART_3699



ELECTRICAL SCHEMATICS

Figure 5-6: Electric Schematic, Lower Control Box

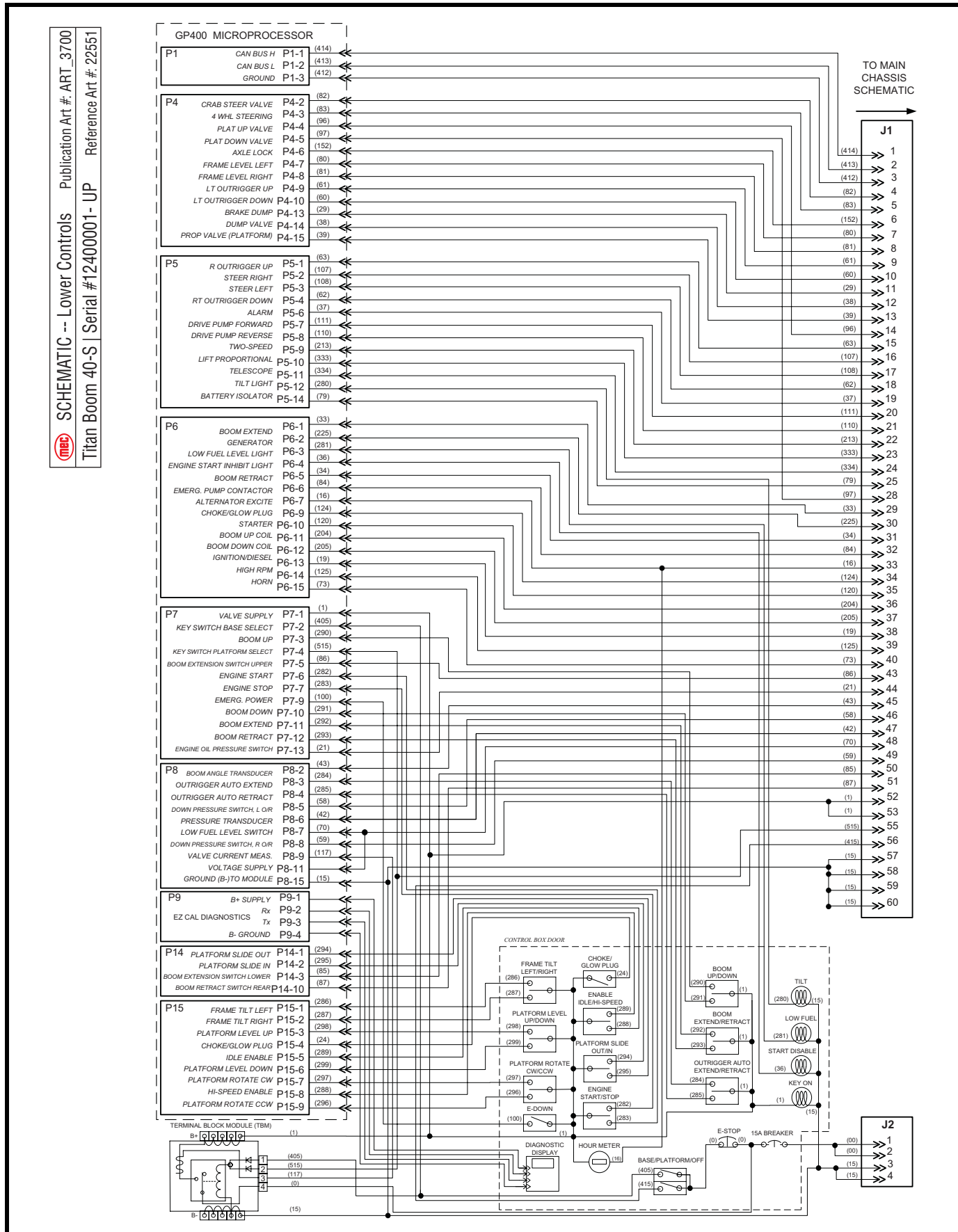
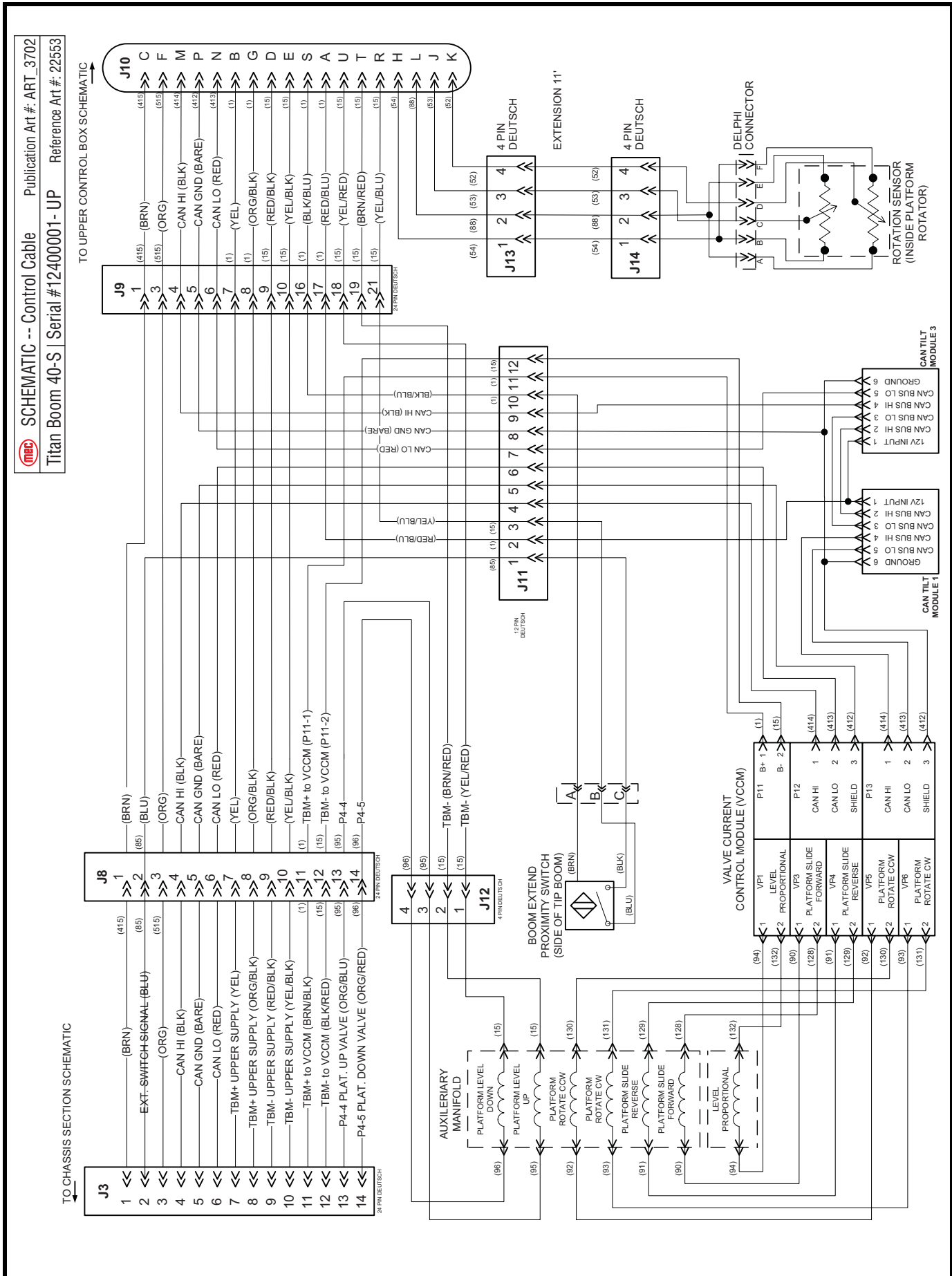
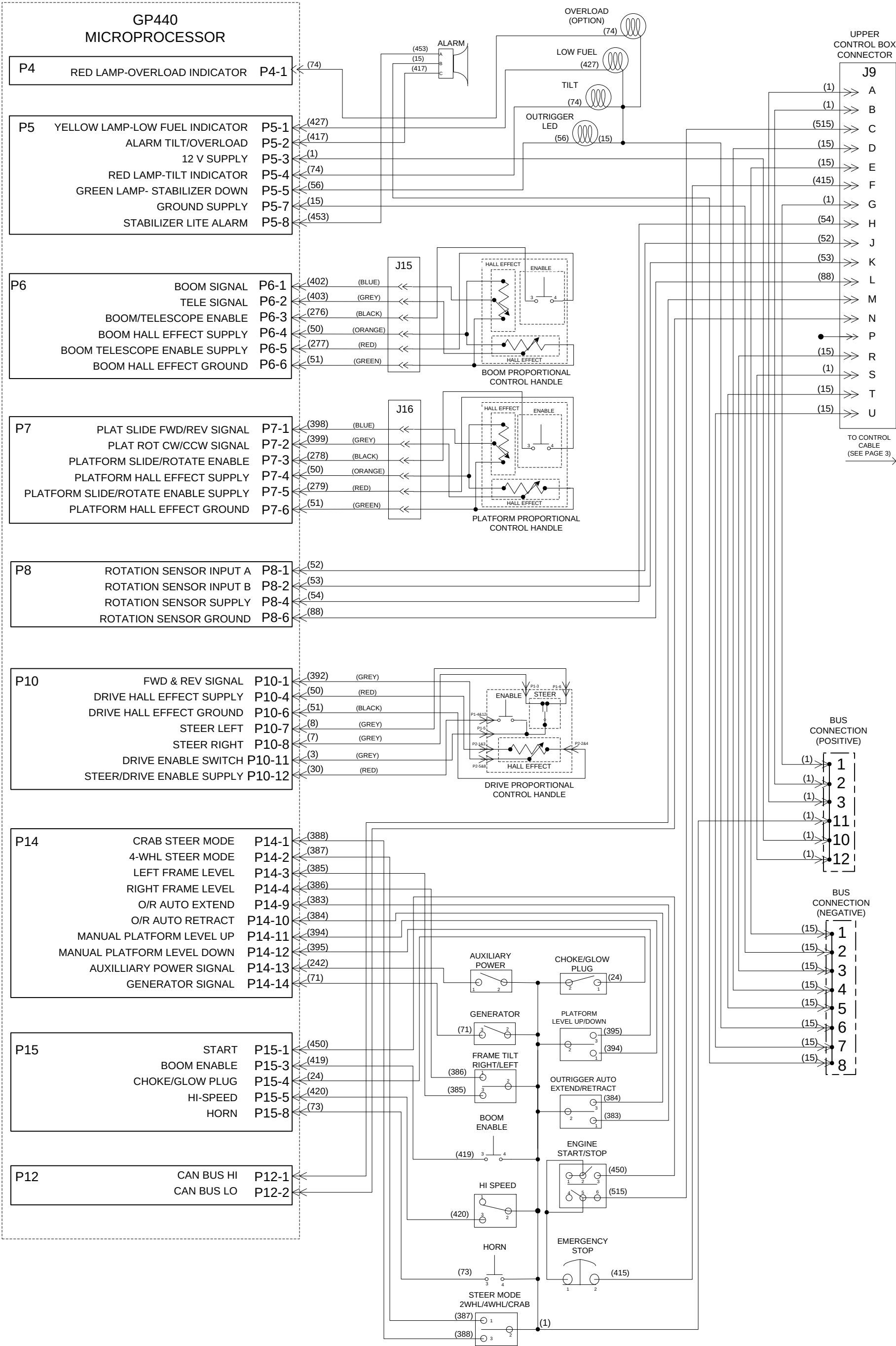


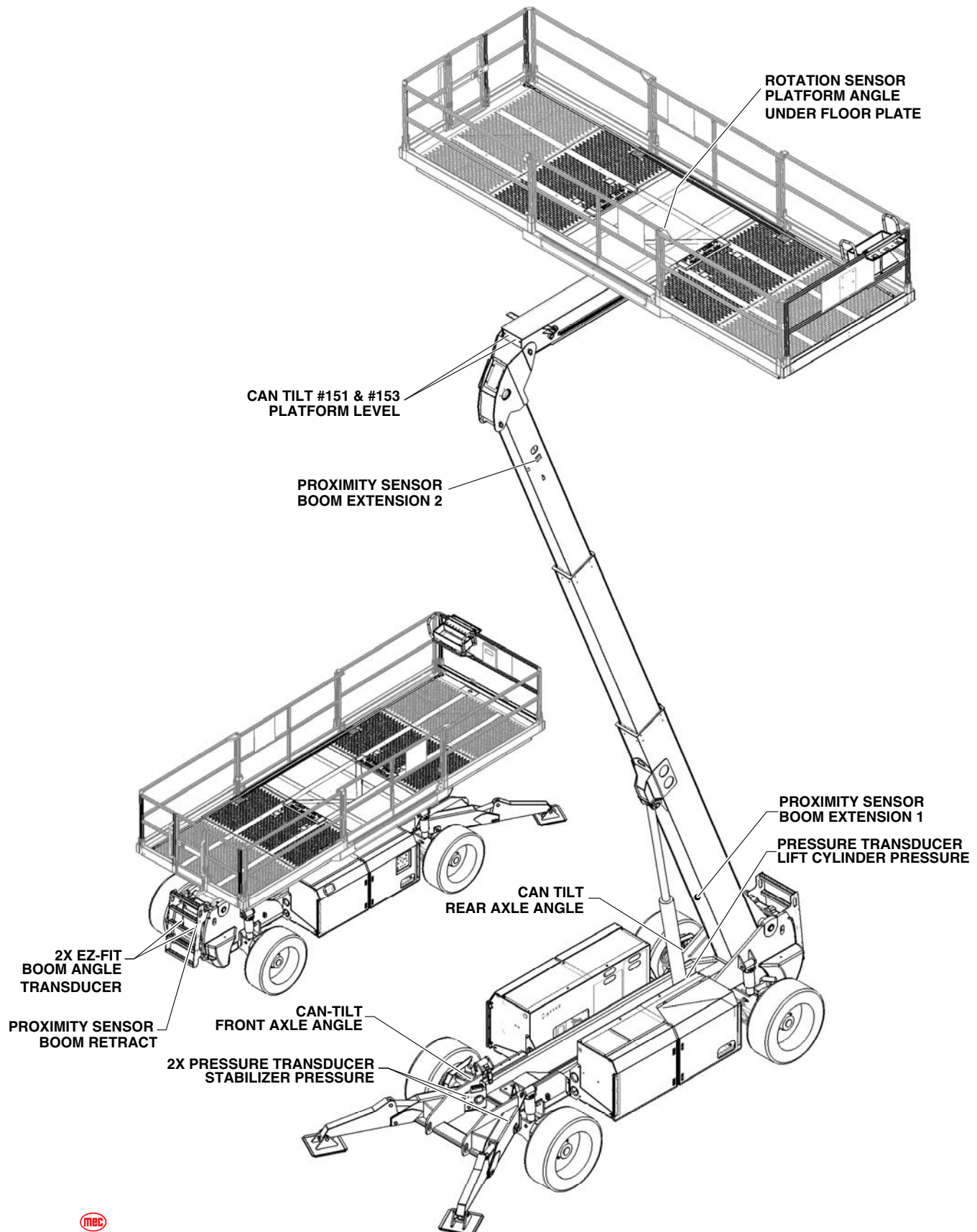


Figure 5-8: Electric Schematic, Control Cable



TITAN BOOM 40-S ELECTRICAL SCHEMATIC PAGE 4 (UPPER CONTROL BOX) 22552 REV-0





EZcal MESSAGES

"Help Messages" will appear on the EZcal scan tool as a means of explaining non-operating function/s that are accompanied by flash codes. It can also be used for verifying system operation. On Titan models, the EZcal is conveniently located inside the lower control box. Refer to the EZcal Instruction page for additional help with EZcal operation.

To access messages, power the system up, (it is not necessary to have the engine running) the EZcal display will illuminate and read "HELP – PRESS ENTER". Press ENTER to view current error message. Press ENTER a second time then use right and left arrow buttons to access up to 30 logged messages from the memory. Many messages simply detail operations being performed by the GP400; 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
GP400 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	
LIFTING	Flash Code: None
Boom lift up in progress	
LOWERING	Flash Code: None
Boom Lower down in progress	
DRIVING	Flash Code: None
Drive forward or reverse in progress	
VEHICLE TILTED	Flash Code: None
Chassis is tilted beyond pre-set maximum. Use auto-level feature to level chassis or re-position the machine.	

CAN BUS RELATED MESSAGES

CAN bus communication system is the network by which the control modules and Cantilt modules communicate with the GP400.

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 ***Flash Code: None***

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

NO DATA FROM CAN TILT #3 ***Flash Code: None***

- 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! ***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.

CALIBRATION RELATED MESSAGES

The following messages appear when the GP400 microprocessor has not been calibrated or was improperly calibrated.

FACTORY OVERRIDE ***FAST FLASH***

- GP400 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 GP400 must be prepared for the machine to which it will be installed, including calibration and Customer/model selection. See “GP400 Setup” for instructions. Once Calibrated, Factory Override is gone forever.
- **WARNING: All safety settings are inactive when the GP400 is in Factory Override, never operate machine in Factory Override except to calibrate the GP400.**

NOT CALIBRATED ***Flash Code: 1/1***

- The GP 400 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 ***Flash Code: 1/1***

- 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 400 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 _____ **Flash Code: 1/1**

- Customer vs. Model settings not correct. Using the EZcal, 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.

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 GP400.

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 (CE option only)

FUNCTIONS LOCKED – UNDERLOADED _____ **Flash Code: 2/2**

- Overload system detects less than normal lift cylinder pressure. Platform resting atop a fixed object, possible pressure switch failure or not calibrated correctly.

FUNCTIONS LOCKED – TILTED _____ **Flash Code: 2/2**

- Platform sensors indicate platform out of level; level platform or chassis until alarm stops or re-position 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 _____ Flash Code: 2/2

- Elevation sensor indicating elevation beyond 98%. Height Calibration performed incorrectly; Angle Transducer loose or remounted incorrectly or extend proximity switch/s failure. Use EZcal in conjunction with EZcal Flow Charts to identify GP400 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 _____ Flash Code: 2/2

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

CHECK LIFT SWITCHES _____ Flash Code: 2/2

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

CHECK PLATFORM SWITCHES _____ Flash Code 2/2

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

CHECK TELE SWITCHES _____ Flash Code 2/2

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

RELEASE ENABLE SWITCH _____ Flash Code 2/2

- 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 EZcal.

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

- GP400 detects no power on P7-1 of the GP400. Check wiring to plug connection; possible GP400 internal failure.

FAULT: ENERGISED VALVE _____ Flash Code: 3/2

- Power on valve output wire at GP400 plugs P4, P5 or P6. Unplug these connectors and cycle e-stop 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 GP400 failure. EZcal not useful for this procedure.

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

- On start-up GP400 p-5 pin voltage incorrect, check P5-X wiring for voltage feed back. Possible GP400 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 GP400 internal failure

FAULT: LOW OIL PRESSURE!_____ Flash Code: 4/1

- 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 than normal shut down.

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

- Malfunction within the GP400 possibly caused by a short circuit in the wiring or high voltage surge. replace GP400

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

- GP400 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 EZcal (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 EZcal. Possible sensor failure or wire connection failure.

FAULT: CHECK HEIGHT SENSORS!_____ Flash Code 6/1

- 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 (CE only)

FAULT: CHECK ELEVATION SWITCH!_____ Flash Code 6/3

- This message should not occur on Titan models; check for incorrect GP 400 part.

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

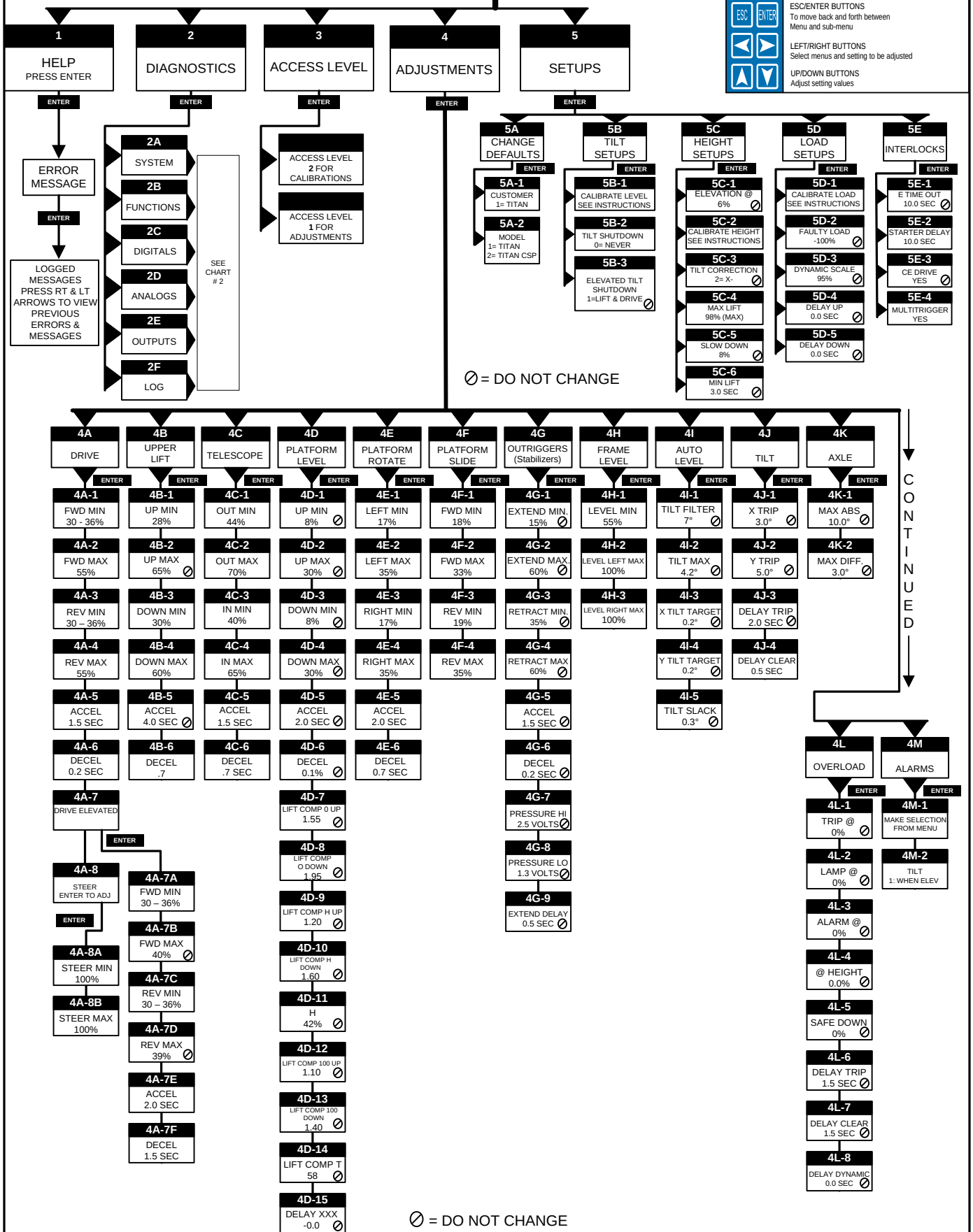
- A failure happened that has no message associated with it. This should never occur

Adjustments & Setups

TITAN BOOM EZ-CAL MENU

EZ-Cal Flow Chart Chart 1 of 2

SYMBOL	KEY FUNCTIONS
	ESCCENTER 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



4 - ADJUSTMENTS TABLES EXPLANATION OF PERSONALITIES

Changing personalities is possible in Access Level 1 only. Personalities may be viewed in any access level

To reach ADJUSTMENTS menu for inspection and troubleshooting, press ⇨ for ADJUSTMENTS - press enter - press ⇨ to scroll through the sub menus. Once the sub menu is found, for example "DRIVE", press Enter again. Then press ⇨ to scroll through the personalities and compare the settings with this table. Only authorized personnel have access to, and may make changes to personalities

NOTE: ID numbers are provided as a means to match personalities between the EZ-cal Flow Chart and the following information tables. They will **not** appear on the EZ-cal display.

OPERATION	ID	PERSONALITY	Factory Setting	Explanation
4A DRIVE (platform Stowed)	4A1	Fwd Min	30 - 36%	Slowest speed threshold
	4A2	Fwd Max	50%	Maximum speed setting
	4A3	Rev Min	30%	Slowest speed possible
	4A4	Rev Max	50%	Maximum speed potential
	4A5	Accel	30 sec.	Ramp up time to maximum
	4A6	Decel	.2 sec.	Ramp down to time stop
	4A7	DRIVE ELEVATED	Sub Menu	<i>Press ENTER to access elev. drive settings</i>
	4A7a	Fwd Min	30 - 36%	Slowest speed threshold
	4A7b	Fwd Max	40%	DO NOT CHANGE
	4A7c	Rev Min	30 - 36%	Slowest speed possible
	4A7d	Rev Max	40%	DO NOT CHANGE
	4A7e	Accel	2.0 sec.	Ramp up time to maximum
	4A7f	Decel	1.5 sec.	Ramp down to time stop
	4A8	STEER	Sub Menu	<i>Press ENTER to access steer settings</i>
	4A8a	Steer Min	100%	Steering speed adjustment
	4A8b	Steer Max	100%	Steering speed adjustment
4B UPPER LIFT	4B1	Up Min	28%	Slowest speed threshold
	4B2	Up Max	65%	DO NOT CHANGE
	4B3	Down Min	30%	Slowest speed threshold
	4B4	Down Max	60%	Maximum speed setting
	4B5	Accel	4.0 sec.	DO NOT CHANGE
	4B6	Decel	0.7 sec.	Ramp down time to stop
4C TELESCOPE	4C1	Out Min	44%	Slowest speed threshold
	4C2	Out Max	70%	Maximum speed setting
	4C3	In Min	40%	Slowest speed threshold
	4C4	In Max	70%	Maximum speed setting
	4C5	Accel	1.5 sec.	Ramp up time to maximum
	4C6	Decel	0.7 sec.	Ramp down time to stop
4D PLATFORM LEVEL	4D1	Up Min	8%	DO NOT CHANGE
	4D2	Up Max	30%	DO NOT CHANGE
	4D3	Down Min	8%	DO NOT CHANGE
	4D4	Down Max	30%	DO NOT CHANGE
	4D5	Accel	2.0 sec.	DO NOT CHANGE
	4D6	Decel	0.1 sec.	DO NOT CHANGE
	4D7	Lift Comp 0 up	1.55	DO NOT CHANGE
	4D8	Lift Comp 0 Down	1.95	DO NOT CHANGE
	4D9	Lift Comp H Up	1.2	DO NOT CHANGE
	4D10	Lift Comp H Down	1	DO NOT CHANGE
	4D11	H	42%	DO NOT CHANGE
	4D12	Lift Comp 100 Up	1%	DO NOT CHANGE
	4D13	Lift Comp 100 Down	1%	DO NOT CHANGE
	4D14	Lift Comp T	58%	DO NOT CHANGE
	4D15	Delay XXX	0	DO NOT CHANGE
4E PLATFORM ROTATE	4E1	Left Min	17	Slowest speed threshold
	4E2	Left Max	35	Maximum speed setting
	4E3	Right Min	17	Slowest speed threshold
	4E4	Right Max	35	Maximum speed setting
	4E5	Accel	2.0 sec.	Ramp up time to maximum
	4E6	Decel	0.7 sec.	Ramp down time to stop

OPERATION	ID	PERSONALITY	FACTORY SETTING	Explanation
4F PLATFORM SLIDE	4F1	Fwd Min	18%	Slowest speed threshold
	4F2	Fwd Max	33%	Maximum speed setting
	4F3	Rev Min	19%	Slowest speed threshold
	4F4	Rev Max	35%	Maximum speed setting
4G OUTRIGGERS (STABILIZERS)	4G1	Extend Min	35%	DO NOT CHANGE
	4G2	Extend Max	60%	DO NOT CHANGE
	4G3	Retract Min	35%	DO NOT CHANGE
	4G4	Retract Max	60%	DO NOT CHANGE
	4G5	Accel	2%	DO NOT CHANGE
	4G6	Decel	20%	DO NOT CHANGE
	4G7	Pressure Hi	2.5 volts	DO NOT CHANGE
	4G8	Pressure lo	1.3 Volts	DO NOT CHANGE
	4G9	Extend Delay	0.5 sec	DO NOT CHANGE
4H FRAME LEVEL	4H1	Level Min	55%	Slowest speed threshold
	4H2	Level Left Max	100%	Maximum speed setting
	4H3	Level Right Max	100%	Maximum speed setting
4I AUTO-LEVEL	4I1	Tilt Filter	3 deg	DO NOT CHANGE
	4I2	Tilt Max	5 deg	DO NOT CHANGE
	4I3	X Tilt Target	.2 deg	DO NOT CHANGE
	4I4	Y Tilt Target	.2 deg	DO NOT CHANGE
	4I5	Tilt Slack	.3 deg	DO NOT CHANGE
4J TILT	4J1	X Trip	3.0 deg	DO NOT CHANGE
	4J2	Y Trip	5.0 deg	DO NOT CHANGE
	4J3	Delay Trip	2.0 sec.	DO NOT CHANGE
	4J4	Delay Clear	0.5 sec	Time before clear out-of-level shutdown
4K AXLE	4K1	MAX ABS	10.0 deg	DO NOT CHANGE
	4K2	Max Differential	3.0 deg	DO NOT CHANGE
4L OVERLOAD <i>ANSI/ CE option</i>	4L1	Trip @	0% ansi/ 110%CE	DO NOT CHANGE
	4L2	Lamp @	0% ansi/ 110%CE	DO NOT CHANGE
	4L3	Alarm@	0% ansi/ 110%CE	DO NOT CHANGE
	4L4	@ Height	0% ansi/ 8% CE	DO NOT CHANGE
	4L5	Safe Down	0% ansi/ 12% CE	DO NOT CHANGE
	4L6	Delay Trip	1.5 sec	DO NOT CHANGE
	4L7	Delay Clear	1.5 sec.	DO NOT CHANGE
	4L8	Delay Dynamic	0.0 sec.	DO NOT CHANGE
4M ALARMS	4M1	Motion	Variable	Select alarm setting to indiv. requirement
	4M2	Tilt Alarm	1: When Elevated	selects when tilt alarm sounds

DIAGNOSTIC

Use in conjunction with
Diagnostic tables for
Thorough explanation
Of readout and values

TITAN BOOM EZ-CAL MENU

2

DIAGNOSTICS

ENTER

EZ-Cal Flow Chart Chart 2 of 2

SYMBOL	KEY FUNCTIONS
	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

2A SYSTEM

ENTER

2A-1
DRIVE ENABLE
NO

2A-2
BOOM ENABLE
NO

2A-3
B+ SUPPLY
ACTUAL INPUT
VOLTAGE

2A-4
TILT
STATE OF LEVEL
IN DEGREES

2A-5
AXLE
AXLE LEVEL
INFORMATION

2A-6
TILTED
YES or NO

2A-7
HEIGHT
ACTUAL IN %

2A-8
LOAD
ACTUAL IN %

2A-9
OVERLOADED
YES or NO

2A-10
ELEVATED
YES or NO

2A-11
EXTENDED
YES or NO

2A-12
RETRACTED
YES or NO

2A-13
STABLE
YES or NO

2A-14
ENGINE RPM
NOT USED

2A-4A
PLATFORM
ACTUAL IN
DEGREES LEVEL

2A-4B
GP400
ACTUAL IN
DEGREES LEVEL

2A-4C
CAN TILT 151
ACTUAL IN
DEGREES LEVEL

2A-4D
CAN TILT 152
ACTUAL IN
DEGREES LEVEL

2A-4E
CAN TILT 153
ACTUAL IN
DEGREES LEVEL

2A-4F
CAN TILT 154
ACTUAL IN
DEGREES LEVEL

2A-5A
ANGLES
ACTUAL IN DEG.

2A-5B
AXLE
LEVEL/OFF LEVEL

2A-7A
HEIGHT 1
ACTUAL IN %

2A-7B
HEIGHT 2 (CE)
ACTUAL IN %

2A-7C
HEIGHT no com
ACTUAL IN %

2A-7D
LIFT COMP T
NO USER INFO

2A-7E
LIFT COMP T
NO USER INFO

2A-7F
PLATFORM UD
NO USER VALUE

2A-7G
Fabandon
YES or NO

2B FUNCTIONS

ENTER

2B-1
DRIVE
ACTUAL

2B-2
STEER
ACTUAL

2B-3
UL(upper lift)
ACTUAL

2B-4
PLTud
(Platform up/down)
ACTUAL

2B-5
PLTr
(Platform L/R)
ACTUAL

2B-6
PLTr
(platform F/R)
ACTUAL

2B-7
TELE
ACTUAL

2B-8
FRAME
ACTUAL

2B-9
O/R (stablzrs)
ON or OFF

2B-9a
O/R (stablzrs)
O/R left
Direction and %

2B-9b
O/R (stablzrs)
O/R right
Direction and %

2B-9c
O/R (stablzrs)
Tilt
Time before stable

2B-9d
O/R (stablzrs)
Tight
Time before stable

2B-10
AUTO PLTud
ACTUAL

2B-11
AUTO FRAME
ACTUAL

2B-12
INTERLOCK
INFORMATION

2C DIGITALS

ENTER

2C-1
GP400 DIGITALS
Lower control box
INPUTS

ENTER

P7-1 POWER INPUT

P7-2 KEY SWITCH BASE SELECTED

P7-3 BOOM UP

P7-4 KEY SWITCH PLATFORM SEL

P7-5 BOOM EXT PROX SWITCH UPPER

P7-6 ENGINE START

P7-7 ENGINE STOP

P7-9 EMERGENCY BATTERY POWER

P7-10 BOOM DOWN

P7-11 BOOM EXTEND

P7-12 BOOM RETRACT

P7-13 ENG OIL PRESS SWITCH

P14-1 PLATFORM SLIDE OUT

P14-2 PLATFORM SLIDE IN

P14-3 BOOM EXT PROX SWITCH LOWER

P14-4 BOOM RET PROX SWITCH REAR

P15-1 FRAME TILT LEFT

P15-2 FRAME TILT RIGHT

P15-3 PLATFORM LEVEL UP

P15-4 CHOKE OR GLOW PLUG

P15-5 IDLE ENABLE

P15-6 PLATFORM LEVEL DOWN

P15-7 PLATFORM ROTATE CW

P15-8 HIGH SPEED ENABLE

P15-9 PLATFORM ROTATE CCW

2C-2
GP440
Upper control box
INPUTS

ENTER

P10-7 STEER LEFT

P10-8 STEER RIGHT

P10-11 DRIVE ENABLE SWITCH

P14-1 CRAB STEER MODE

P14-2 4-WHEEL STEER MODE

P14-3 LEFT FRAME LEVEL

P14-4 RIGHT FRAME LEVEL

P14-9 STABILIZER AUTO EXTEND

P14-10 STABILIZER AUTO RETRACT

P14-11 MANUAL PLAT LEVEL UP

P14-12 MANUAL PLAT LEVEL DOWN

P14-13 EMERG POWER SWITCH

P14-14 A/C GENERATOR SWITCH

P15-1 ENGINE START

P15-3 BOOM ENABLE

P15-4 CHOKE OR GLOW PLUG

P15-5 DRIVE HIGH SPEED

P15-8 HORN

2D ANALOGS

ENTER

2D-1
GP400 ANALOGS
Lower control box
INPUTS

ENTER

P8-2 BOOM ANGLE TRNSDCR

P8-3 STBLZER AUTO EXT SW

P8-4 STBLZER AUTO RET SW

P8-5 LT STBLZER PRESS SW

P8-7 LOW FUEL LEVEL SW

P8-8 RT STBLZER PRESS SW

P8-9 VALVE CURRENT MEAS

2D-2
GP440
Upper control box
analog inputs

ENTER

P6-1 BOOM UP/DWN JSTK

P6-2 TELE IN/OUT JSTK

P6-3 BOOM/TELE ENABLE

P7-1 PLAT SLIDE IN/OUT JSTK

P7-2 PLAT ROTATE JSTK

P7-3 PLAT SLIDE/ROT ENABLE

P8-1 ROTATE SENSOR SIG A

P8-2 ROTATE SENSOR SIG B

P10-1 DRIVE FWD/REV JSTK

NOTE:
When viewing
Proportional
valve outputs:
P5-7 thru P5-11
press ENTER
for actual %

2E OUTPUTS

ENTER

2E-1
GP400 OUTPUTS
Lower control box
OUTPUTS

ENTER

P4-2 CRAB STEER VALVE

P4-3 4-WHEEL STEER VALVE

P4-4 PLATFORM UP VALVE

P4-5 PLATFORM DOWN VALVE

P4-6 AXLE LOCK VALVES

P4-7 FRAME LEVEL LEFT VALVE

P4-8 FRAME LEVEL RIGHT VALVE

P4-9 STABILIZER LEFT UP VALVE

P4-10 STABILIZER LEFT DOWN VALVE

P4-13 BRAKE DUMP VALVE

P4-14 DUMP VALVE (NOT PLATFORM)

P4-15 DUMP VALVE PLATFORM

P5-1 STABILIZER RIGHT UP VALVE

P5-2 STEER RIGHT VALVE

P5-3 STEER LEFT VALVE

P5-4 STABILIZER RIGHT DOWN VALVE

P5-5 OVERLOAD LIGHT

P5-6 ALARM

P5-7 DRIVE PUMP FWD VALVE

P5-8 DRIVE PUMP REV VALVE

P5-9 2-SPEED VALVE

P5-10 LIFT PROPORTIONAL VALVE

P5-11 TELE PROPORTIONAL VALVE

P5-12 TILT LIGHT

P5-14 BATTERY ISOLATER RELAY

P6-1 BOOM EXTEND VALVE

P6-2 A/C GENERATOR (OPTIONAL)

P6-3 LOW FUEL LEVEL LIGHT

P6-4 ENGINE STRT INHIBET LIGHT

P6-5 BOOM RETRACT VALVE

P6-6 EMERGENCY PUMP MOTOR

P6-7 ALTERNATOR EXCITE

P6-8 GAS/PROPANE

P6-9 CHOKE/GLOW PLUG

P6-10 START - ENGINE

P6-11 BOOM UP VALVE

P6-12 BOOM DOWN VALVE

P6-13 FUEL SOLENOID (DIESEL) IGN

P6-14 THROTTLE

P6-15 HORN

2E-2
GP440 OUTPUTS
Upper control box
OUTPUTS

ENTER

P5-1 LOW FUEL INDICATOR LAMP

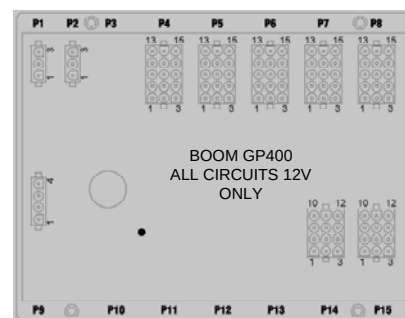
P5-2 TILT (OVERLOAD CE MODELS)

P5-3 12 VOLT SUPPLY

P5-4 TILT INDICATOR LAMP

P5-5 STABILIZER DOWN LAMP

P5-8 STABILIZER LOW PRESS ALARM



2 - DIAGNOSTICS TABLES

EXPLANATION OF PERSONALITIES

The Diagnostic menu provides the ability to view and test individual circuits for irregularities. When diagnosing a failure or testing functions during a PM, this menu provides a quick view at the inputs and outputs as registered by the GP400 control module and P440 Matrix module **in real time**. To use this table, reference the EZ-cal Flow Chart I.D number for the personality in question then locate the I.D. number on this table to gain additional information about individual personalities. To reach Diagnostics menu from HELP, press ⇨ to DIAGNOSTICS - press Enter. Find the sub menu and press ENTER. Press ⇨ to scroll through the following test points. The ID number will not read out on EZ-cal, it is for reference only. Press **ESC** to go back one level, necessary to change selection

SELECTION	ID #	EZ-cal Readout	Explanation
2A SYSTEM Sub Menu Press ENTER Sub Menu Press ENTER Sub Menu Press ENTER	2A1	Drive Enable Y or N	Drive enable switch open or closed
	2A2	Boom Enable Y or N	Boom enable switch open or closed
	2A3	B+ Supply (actual)	Supply voltage at GP200
	2A4	Tilt (actual in degrees)	Platform tilt angle as read by 4-way can tilt
	2A4a	Platform (actual in degrees)	Platform tilt angle as read by 4-way can tilt
	2A4b	GP400 (actual in degrees)	Chassis tilt angle as read by GP400
	2A4c	CAN TILT 151	Reading from Can Tilt in front of boom (Left)
	2A4d	CAN TILT 152	Reading from Can Tilt on Front axle
	2A4e	CAN TILT 153	Reading from Can Tilt in front of boom (Right)
	2A4f	CAN TILT 154	Reading from Can Tilt on Rear axle
	2A5	AXLE	Axle level information
	2A5A	Angle - in degrees	Axle angle compared to GP400 angle
	2A5b	Axle level/off level	State of axle angles
	2A6	Tilted Y or N	Tilted beyond trip angles
	2A7	Height (actual in deg)	As measured by rear angle transducer
	2A7a	Height 1	As measured by rear angle transducer #1
	2A7b	Height 2 (CE cert only)	As measured by rear angle transducer #2
	2A8	Load (actual in %	State of load on platform (CE cert. only)
	2A9	Overloaded Y or N	Y when excessive weight in platform CE only
	2A10	Elevated Y or N	Y when elevated above elevation @ setting
	2A11	Extended Y or N	Y when extended beyond 8 feet (2.6m)
	2A12	Retracted Y or N	Y when boom fully retracted
	2A13	Stable Y or N	Y when Stabilizers down and set
	2A14	Engine RPM	NOT USED
2B FUNCTIONS Sub Menu Press ENTER	2B1	DRIVE	Actual state, direction and %
	2B2	STEER	Actual state, direction and %
	2B3	UL (upper Lift)	Actual state, direction and % main lift
	2B4	PLT ud (platform level)	Actual state, direction and %
	2B5	PLT lr	Actual state, direction and % platform rotate
	2B6	PLT fr	Actual state, direction and % platform slide
	2B7	TELE	Actual state, direction and % telescope
	2B8	FRAME	Actual state, direction and % frame level
	2B9	O/R (Stabilizers)	Actual state, direction and % stabilizers
	2B9a	O/R O/R left	Actual state, direction and % left stabilizer
	2B9b	O/R O/R right	Actual state, direction and % right stabilizer
	2B9c	O/R T left	Time before stable
	2B9d	O/R T right	Time before stable
	2B10	AUTO PLT ud	NOT USED
	2B11	AUTO FRAME	Actual state, direction and % frame level when Auto-leveling
	2B12	INTERLOCK	Information on interlocks (shut downs)
2C DIGITALS	2C1	GP400 DIGITAL INPUTS	Enter to view switch Inputs from <u>lower</u> controls
		Individual input not displayed separately	Display chang from OFF to On when operations are selected
	2C2	GP440 DIGITAL INPUTS	Enter to view switch Inputs from <u>upper</u> controls
		Individual input not displayed separately	Display chang from OFF to On when operations are selected

2D ANALOGS Sub Menu Press ENTER Sub Menu Press ENTER	2D1	GP400 ANALOG INPUTS	<i>Enter to view inputs from chassis sensors and switches</i>
	2D1a	P8-2 Boom Angle Transducer	Actual position of boom elevation in %
	2D1b	P8-3 Stabilizer Auto-Extend Switch	Battery voltage when switch selected
	2D1c	P8-4 Stabilizer Auto-Retract Switch	Battery voltage when switch selected
	2D1d	P8-5 Left Stabilizer Down Press Sensor	Actual pressure indicated between 1.5 and 4.5 volts
	2D1e	P8-7 Low Fuel Level Sensor	On - off output from fuel tank sensor
	2D1f	P8-8 Right Stabilizer Down Press Sensor	Actual pressure indicated between 1.5 and 4.5 volts
	2D1g	P8-9 Valve Current Measurement	NOT USED
	2D2	GP440 ANALOG INPUTS	<i>Enter to view analog inputs from <u>upper</u> controls</i>
	2D2a	P6-1 Boom Up/Down variable input	Actual position of Boom joystick between 1 and 5 volts
	2D2b	P6-2 Tele in/out variable input	Actual position of Telescope joystick between 1 and 5 volts
	2D2c	P6-3 Boom/Tele enable input	On - off output from Boom/Telescope joystick button
	2D2d	P7-1 Platform Slide in/out variable input	Actual position of Plat Slide joystick between 1 and 5 volts
	2D2e	P7-2 Platform Rotate variable input	Actual position of Rotate joystick between 1 and 5 volts
	2D2f	P7-3 Platform Slide/Rot enable input	On - off output from Slide/Rotate joystick button
	2D2g	P8-1 Rotation Sensor A input	States position of platform rotation in voltage ~2.5v = centered
	2D2h	P8-2 Rotation Sensor B Input	States position of platform rotation in voltage ~2.5v = centered
	2D2i	P10-1 Drive fwd/Rev variable input	Actual position of Drive joystick between 1 and 5 volts
2E OUTPUTS	2E1	GP400 Outputs	<i>Enter to view outputs from <u>Lower</u> control module</i>
		Individual input not displayed separately	Display changes from OFF to On when power signal is sent
	2E2	GP440 Outputs	<i>Enter to view outputs from <u>Upper</u> control module</i>
	Individual input not displayed separately	Display changes from OFF to On when power signal is sent	
2F LOG	2F1	Cal Date	Date entered after last calibration completed
	2F2	Software	Software revision number
	2F3	Max Battery	Maximum battery voltage recorded.