snorkel

600S
660SJ



SERVICE & MAINTENANCE MANUAL

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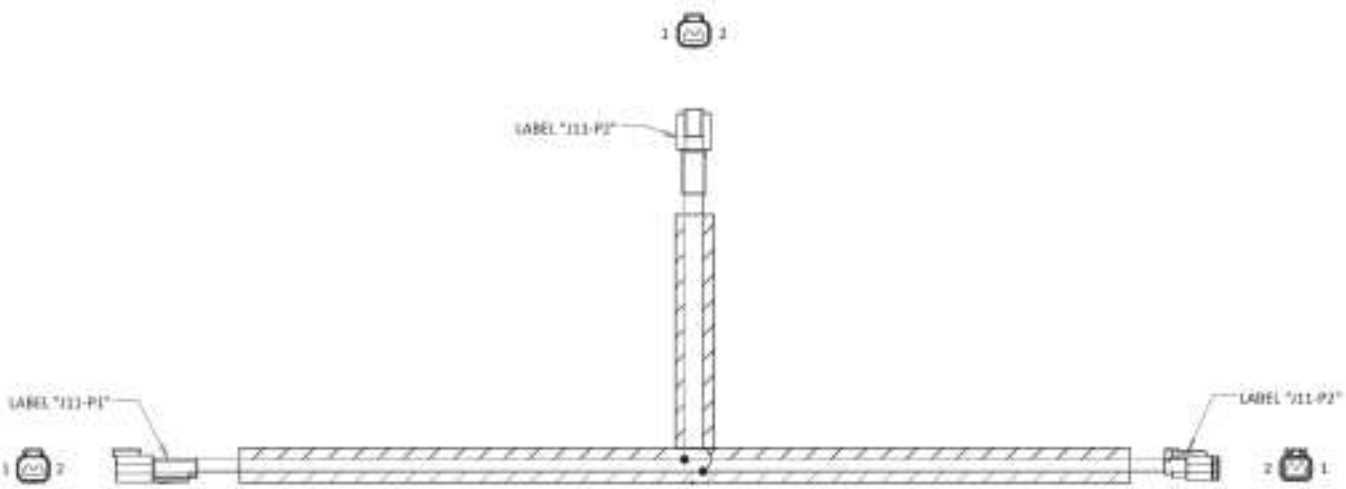
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HARNESSES

All Engines

Lower Control Box to Amber Light Harness



Wiring Schematic		
From	**To**	**Wire Color**
P1-1	S1-1	Red
P1-2	S1-2	Blk
P2-1	S1-1 (Splice)	Red
P2-2	S1-2 (Splice)	Blk

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10KW GENERATOR

Troubleshooting

If generator voltage is consistent but low, proceed with the following sequence of troubleshooting.

1. Check Engine rpm: Engine rpm while generator is operating should be set at 2,100 rpm. This is essential for correct flow output from the main hydraulic pump to the generator motor.

CAUTION: DO NOT EXCEED MID THROTTLE SPECIFICATION OF 2,100 RPM. OVERSPEEDING THE ENGINE COULD OVERSPEED THE GENERATOR RESULTING IN DAMAGE TO THE INTERNAL VOLTAGE REGULATOR AND/OR ARMATURE.

2. Check Maximum Flow Adjustment on Pump:

   a. Threaded rod protruding from back of pump should be 11/16" in length from the pump housing. Include the jam nut in the measurement.

3. Check Pump Pressure:

   a. Standby pressure should be approximately 350-400 psi.

   b. Maximum system pressure should be approximately 2,800-3,000 psi.

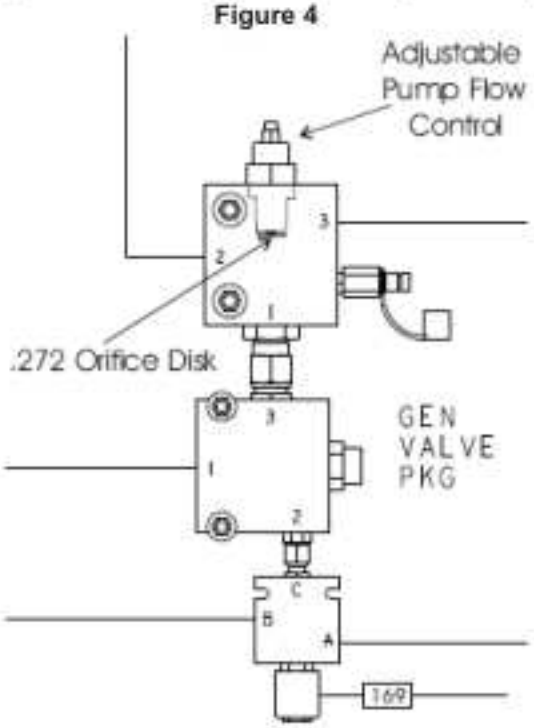
4. Check Generator rpm:

   a. Using a strobe tachometer, measure the AC generator rpm at the shaft end of the generator. The generator should measure 3,600 rpm but shall not exceed 3,600 rpm.

NOTE: EXCEEDING 3600 RPM ON THE AC GENERATOR MAY RESULT IN DAMAGE TO THE INTERNAL VOLTAGE REGULATOR AND/OR ARMATURE.

   b. If the generator does not measure 3,600 rpm but the pump pressure, pump flow, and engine rpm are correct; the generator flow control valve may need adjustment (figure 4).

Figure 4



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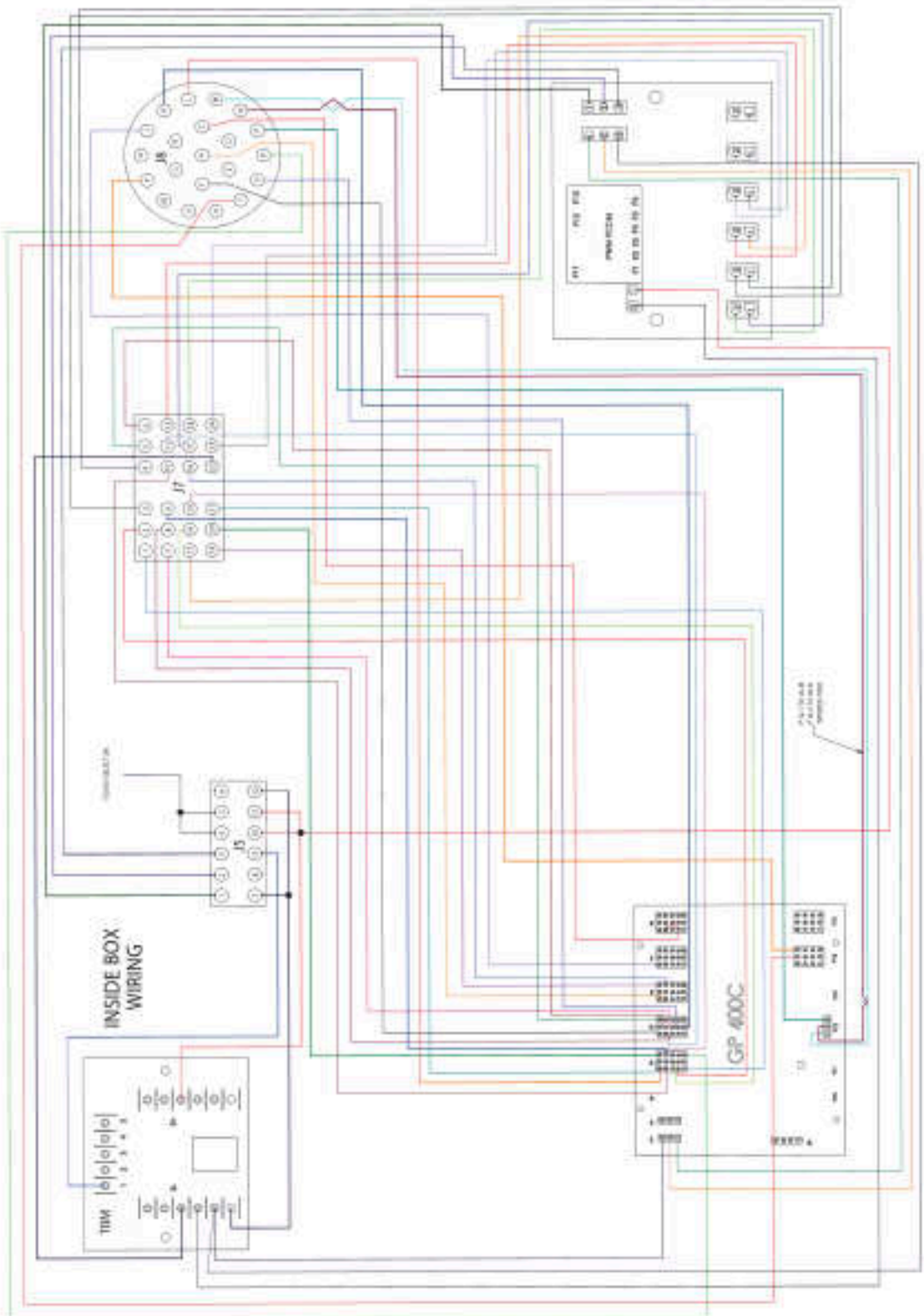
Frequent Inspection and Maintenance – Every 90 Days or 150 Hours

Item	Procedure	Information	P/F/R
Lower Controls			
Control switch in the lower controls position	Check for proper operation	With selector in the lower controls position, upper controls do not work	
Station selector switch in the upper controls position	Check for proper operation	With selector in the upper controls position, lower controls do not work	
Engine Start – Stop	Check for proper operation		
Throttle High – Low	Check for proper operation		
Turntable CW – CCW	Check for proper operation		
Boom elevation Up – Down	Check for proper operation		
Boom Extend – Retract	Check for proper operation		
Jib Up – Down (660SJ Only)	Check for proper operation		
Jib rotation CW – CCW (660SJ Only)	Check for proper operation		
Platform level Up – Down	Check for proper operation		
Platform rotation CW – CCW	Check for proper operation		
Emergency power, all functions	Check for proper operation		
Emergency stop	Check for proper operation		
Booms			
Structural	Check for damage and cracked welds		
Lift cylinder pin caps and tie wire	Verify that all fasteners are in place and are tight		
Hydraulic tubes and hoses	Check for leaks, wear, and damage		
Extension cylinder pin caps and bolt retainer	Verify that all fasteners are in place and are tight		
Extension cylinder and holding valve	Check for leaks, wear, damage, and for proper operation		
Jib boom pin caps and snap rings	Verify that all fasteners are in place and properly installed		
Jib cylinder pin caps and snap rings	Verify that all fasteners are in place and properly installed		
Jib cylinder and holding valve	Check for leaks, wear, damage, and for proper operation		
Slave level cylinder pin caps and tie wire	Verify that all fasteners are in place and are tight		
Slave level cylinder and holding valves	Check for leaks, wear, damage, and for proper operation		
Hose carrier tube and support	Check for residue buildup/proper operation		
Plastic hose track	Check for wear and damage		
Electrical wires	Check for wear and damage		
Decals and placards	Check for damage and readability Order replacements as necessary		
Extension System			
Sheaves and wire rope anchors	Check for wear and damage		
Wire ropes	Check for wear and damage		
Cables	Check for proper installation		
Cables	Properly tensioned		
Whiffle bracket	Check for proper installation	Bracket should be straight	

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LOWER CONTROL BOX

660SJ
Single Capacity T4F
Internal Wiring

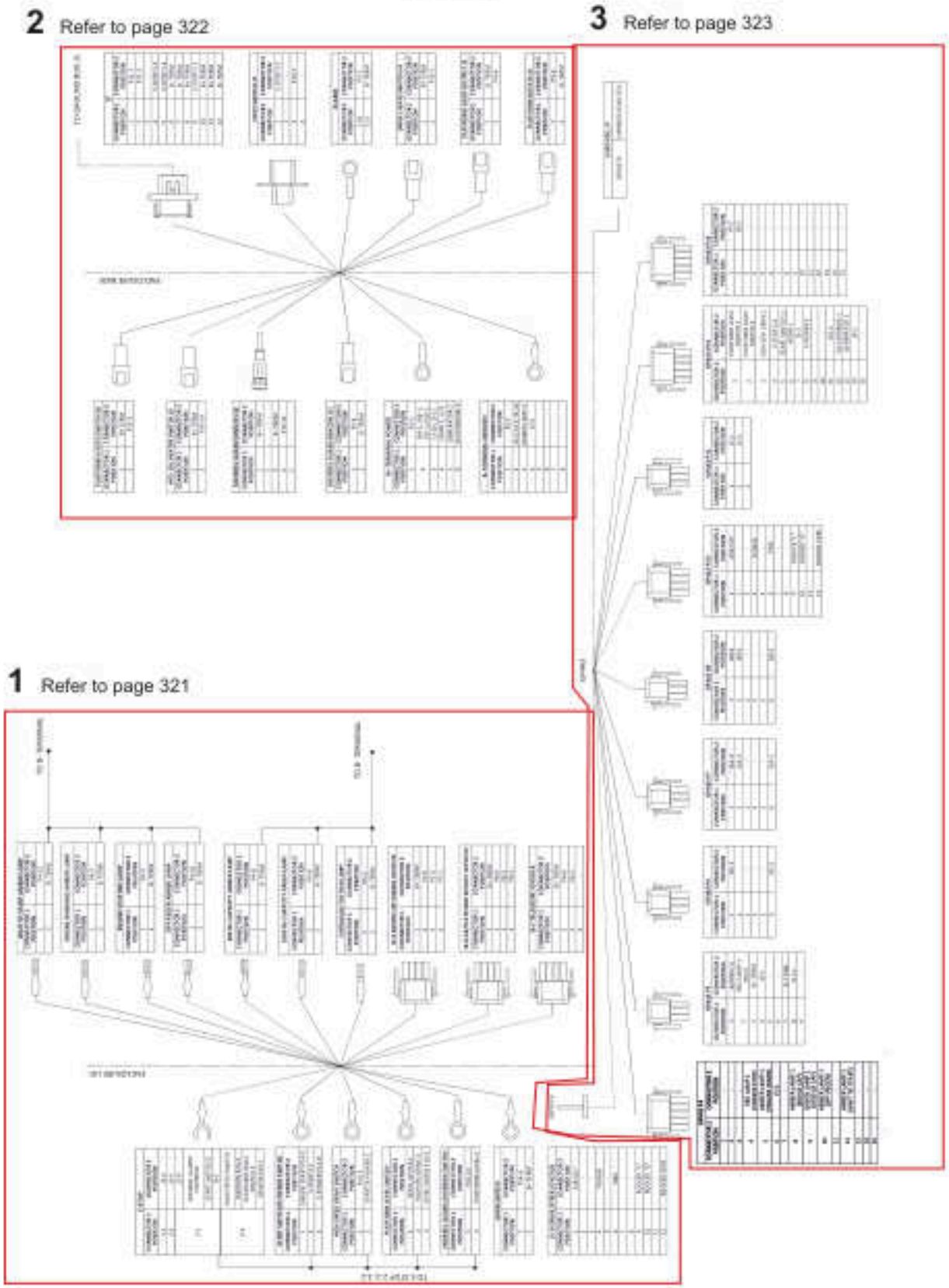


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UPPER CONTROL BOX

660SJ
Dual Capacity
Harness



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I/O CONTROL SHEETS: 21 510 520 21 510 523		GP400C I/O Allocations			
		400/460/600/660 Cummins T4F, DZ T4F/ST5 Vehicle Number 13	600/660 Kubota T4i Gen2 Vehicle Number 14	400/460 Kubota Gen2 Vehicle Number 15	600/660 Kubota DF (CAN) Vehicle Number 16
P1-1	CAN1H	VCCM-P12-1	VCCM-P12-1	VCCM-P12-1	VCCM-P12-1
P1-2	CAN1L	VCCM-P12-2	VCCM-P12-2	VCCM-P12-2	VCCM-P12-2
P1-3	GND	VCCM-P12-3	VCCM-P12-3	VCCM-P12-3	VCCM-P12-3
P12-1	CAN2 H	Engine ECU CAN H	J1939 THROTTLE ACTUATOR, NOT USED	J1939 THROTTLE ACTUATOR, NOT USED	Engine ECU CAN H
P12-2	CAN2 L	Engine ECU CAN L	J1939 THROTTLE ACTUATOR, NOT USED	J1939 THROTTLE ACTUATOR, NOT USED	Engine ECU CAN L
P12-3	CAN2 gnd				
P4-1	High side PWM output	Platform level up	Platform level up	Platform level up	Platform level up
P4-2	High side 2A output	600lb region light	600lb region light	600lb region light	600lb region light
P4-3	High side 2A output	do not use if PP12-x (CAN 2) is used	Throttle Relay (P4-3, Lower Control Box J8-T):	Throttle Relay (P4-3, Lower Control Box J8-T):	
P4-4	High side PWM output	Platform level down	Platform level down	Platform level down	Platform level down
P4-5	High side PWM output	Steer right	Steer right	Steer right	Steer right
P4-6	High side 2A output	1000lb region light	1000lb region light	1000lb region light	1000lb region light
P4-7	High side PWM output	Snorkel Guard Blue Flashing Light	Snorkel Guard Blue Flashing Light	Snorkel Guard Blue Flashing Light	Snorkel Guard Blue Flashing Light
P4-8	High side PWM output	Boom lift down	Boom lift down	Boom lift down	Boom lift down
P4-9	High side PWM output	Steer left	Steer left	Steer left	Steer left
P4-10	High side PWM output	Boom lift up	Boom lift up	Boom lift up	Boom lift up
P4-11	High side PWM output	do not use if P4-12 used	do not use if P4-12 used		
P4-12	Safe High PWM output	Axle oscillate valve (energized=no lock)	Axle oscillate valve (energized=no lock)	Axle oscillate valve (energized=no lock)	Axle oscillate valve (energized=no lock)
P4-13	Safe High side output	Starter relay	Starter relay (If P7-8 HIGH, then P4-13 HIGH)	Starter relay (If P7-8 HIGH, then P4-13 HIGH)	Starter relay
P4-14	Safe High side output	Load sense dump valve	Load sense dump valve	Load sense dump valve	Load sense dump valve
P4-15	Safe High side output	Brake release valve	Brake release valve	Brake release valve	Brake release valve
P5-1	High side PWM output	Generator (PWM output to HAWE)	Generator (PWM output to HAWE)		Generator (PWM output to HAWE)
P5-2	High side 2A output	Emergency power relay	Emergency power relay	Emergency power relay	Emergency power relay
P5-3	High side 2A output	Hour Meter	Hour Meter	Hour Meter	Hour Meter
P5-4	High side PWM output				Fuel Select Relay (ON=propane or gas?) -DF only
P5-5	High side 2A output	Ignition (Key Sw input to engine ECU)	Ignition (Key Sw input to throttle actuator supply)	Ignition (Key Sw input to throttle actuator supply)	Ignition (Key Sw input to engine ECU)
P5-6	High side 2A output	Generator (output to relay)	Generator (output to relay)	Generator (output to relay)	Generator (output to relay)
P5-7	High side PWM output	Boom retract	Boom retract	Boom retract	Boom retract
P5-8	High side PWM output	Boom extend	Boom extend	Boom extend	Boom extend
P5-9	High side 2A output	Tilt/Overload Lamp	Tilt/Overload Lamp	Tilt/Overload Lamp	Tilt/Overload Lamp
P5-10	High side PWM output	SPARE	SPARE	SPARE	SPARE
P5-11	High side PWM output	Jib down/ Platform rotate CW	Jib down/ Platform rotate CW	Jib down/ Platform rotate CW	Jib down/ Platform rotate CW
P5-12	High side 2A output	Power Washer output	Power Washer output	Power Washer output	Power Washer output
P5-13	Programmable Output				
P5-14	High side 2A output	NOT AVAILABLE	Fuel shut-off solenoid	Fuel shut-off solenoid	NOT AVAILABLE
P5-15	High side PWM output	Jib up/ Platform rotate CCW	Jib up/ Platform rotate CCW	Jib up/ Platform rotate CCW	Jib up/ Platform rotate CCW
P6-1	High side 2A output	Drive Lights	Drive Lights	Drive Lights	Drive Lights
P6-2	High side 2A output	DPF regeneration Standstill Lamp	DPF regeneration Standstill Lamp	DPF regeneration Standstill Lamp	Engine Speed Control 2 (1 of 2 combination for 4x speeds)-DF only
P6-3	High side 2A output				
P6-4	High side 2A output	Engine Red Stop Lamp	Engine Red Stop Lamp	Engine Red Stop Lamp	Engine Red Stop Lamp
P6-5	High side 2A output	Engine Amber Warning Lamp	Engine Amber Warning Lamp	Engine Amber Warning Lamp	Engine Amber Warning Lamp
P6-6	High side 2A output				
P6-7	High side 2A output	Hydraulic warm-up valve	Hydraulic warm-up valve	Hydraulic warm-up valve	Hydraulic warm-up valve
P6-8	High side 2A output	Hydraulic Cooler valve	Hydraulic Cooler valve	Hydraulic Cooler valve	Hydraulic Cooler valve
P6-9	High side 2A output				
P6-10	High side 2A output	redundant neutral sw for engine ECU (K15) (this needs to occasionally change state)	Glow Plugs	Glow Plugs	Engine Speed Control 1 (1 of 2 combination for 4x speeds)-DF only
P6-11	High side 2A output	Wait-to-start lamp	Wait-to-start lamp	Wait-to-start lamp	SPARE
P6-12	High side 2A output	Horn	Horn	Horn	Horn
P6-13	High side 2A output	lower Alarm	lower Alarm	lower Alarm	lower Alarm
P6-14	High side 2A output	Beacon	Beacon	Beacon	Beacon
P6-15	High side 2A output	High speed valve	High speed valve	High speed valve	High speed valve
P7-1	B+ Digital Input	TBM B+ (also used for switch common)	TBM B+ (also used for switch common)	TBM B+ (also used for switch common)	TBM B+ (also used for switch common)
P7-2	B+ Digital Input	ground select & TBM # 2	ground select & TBM # 2	ground select & TBM # 2	ground select & TBM # 2
P7-3	B+ Digital Input	Track unit keypad signal, ignition P5-5=ON	Track unit keypad signal, ignition P5-5=ON	Track unit keypad signal, ignition P5-5=ON	Track unit keypad signal, ignition P5-5=ON
P7-4	B+ Digital Input	platform select & TBM #1	platform select & TBM #1	platform select & TBM #1	platform select & TBM #1
P7-5	B+ Digital Input	Enable / Enable+E.Power	Enable / Enable+E.Power	Enable / Enable+E.Power	Enable / Enable+E.Power
P7-6	B+ Digital Input				Fuel Select Switch (ON=propane or gas?) -DF only
P7-7	B+ Digital Input	Hydraulic warm-Up switch	Hydraulic warm-Up switch	Hydraulic warm-Up switch	Hydraulic warm-Up switch
P7-8	B+ Digital Input	Engine start (crank) sw	Engine start (crank) sw	Engine start (crank) sw	Engine start (crank) sw
P7-9	B+ Digital Input	platform level up	platform level up	platform level up	platform level up
P7-10	B+ Digital Input	platform level down	platform level down	platform level down	platform level down
P7-11	B+ Digital Input	DPF regeneration Standstill Switch	DPF regeneration Standstill Switch	DPF regeneration Standstill Switch	
P7-12	B+ Digital Input				
P7-13	Negative (B-) Digital Input		Oil Pressure switch	Oil Pressure switch	
P7-14	Negative (B-) Digital Input	axle lock pressure sw (NC)	axle lock pressure sw (NC)	axle lock pressure sw (NC)	axle lock pressure sw (NC)
P7-15	Negative (B-) Digital Input	axle lock pressure sw (NO)	axle lock pressure sw (NO)	axle lock pressure sw (NO)	axle lock pressure sw (NO)
P8-1	Analog Input	Hyd Oil Temp (also connected to P8-12)	Hyd Oil Temp (also connected to P8-12)	Hyd Oil Temp (also connected to P8-12)	Hyd Oil Temp (also connected to P8-12)
P8-2	Safe Analog Input	Boom Angle Sensor #1	Boom Angle Sensor #1	Boom Angle Sensor #1	Boom Angle Sensor #1
P8-3	Analog Input	Boom Angle Sensor #2	Boom Angle Sensor #2	Boom Angle Sensor #2	Boom Angle Sensor #2
P8-4	Analog Input		Engine coolant temp sensor (connected to P8-11)	Engine coolant temp sensor (connected to P8-11)	
P8-5	Analog Input				
P8-6	Safe Analog Input				
P8-7	Analog Input				
P8-8	Analog Input				
P8-9	Analog Input	TBM #3	TBM #3	TBM #3	TBM #3
P8-10	Analog Input				
P8-11	+5V via 1K		Engine coolant temp sensor (connected to P8-4)	Engine coolant temp sensor (connected to P8-4)	
P8-12	+5V via 1K	Connected to Hyd Oil Temp input (P8-1)	Connected to Hyd Oil Temp input (P8-1)	Connected to Hyd Oil Temp input (P8-1)	Connected to Hyd Oil Temp input (P8-1)
P8-13	GND				
P8-14	GND	TBM B-	TBM B-	TBM B-	TBM B-
P8-15	GND				
P15-1	B+ Digital Input	boom extend	boom extend	boom extend	boom extend
P15-2	B+ Digital Input	boom retract	boom retract	boom retract	boom retract
P15-3	B+ Digital Input	swing CW	swing CW	swing CW	swing CW
P15-4	B+ Digital Input	swing CCW	swing CCW	swing CCW	swing CCW
P15-5	B+ Digital Input	boom up	boom up	boom up	boom up
P15-6	B+ Digital Input	boom down	boom down	boom down	boom down
P15-7	B+ Digital Input	jib up	jib up	jib up	jib up
P15-8	B+ Digital Input	jib down	jib down	jib down	jib down
P15-9	B+ Digital Input	Elevation/retracted sw. (NO)	Elevation/retracted sw. (NO)	Retracted Limit Switch (NO). ON means Retracted=NO. When Retracted=NO, then do not allow high drive speed	Elevation/retracted sw. (NO)
P15-10	B+ protected Supply	TBM #5 (boost supply)	TBM #5 (boost supply)	TBM #5 (boost supply)	TBM #5 (boost supply)
P15-11	B+ protected Supply				
P15-12	B+ protected Supply				
P14-1	B+ Digital Input	platform rotate CCW	platform rotate CCW	platform rotate CCW	platform rotate CCW
P14-2	B+ Digital Input	platform rotate CW	platform rotate CW	platform rotate CW	platform rotate CW
P14-3	B+ Digital Input	Slew centered sw. (NO)	Slew centered sw. (NO)	Slew centered sw. (NO)	Slew centered sw. (NO)
P14-4	B+ Digital Input				
P14-5	B+ Digital Input				
P14-6	B+ Digital Input	Slew centered sw. (NC)	Slew centered sw. (NC)	Slew centered sw. (NC)	Slew centered sw. (NC)
P14-7	B+ Digital Input				
P14-8	B+ Digital Input	Elevation/retracted sw. (NC)	Elevation/retracted sw. (NC)	Retracted Limit Switch (NC). OFF means Retracted=NO. When Retracted=NO, then do not allow high drive speed.	Elevation/retracted sw. (NC)
P14-9	B+ Digital Input	Dual Capacity Limit SW (NO, ON when retracted)	Dual Capacity Limit SW (NO, ON when retracted)	Dual Capacity Limit SW (NO, ON when retracted)	Dual Capacity Limit SW (NO, ON when retracted)
P14-10	B+ Digital Input	Dual Capacity Limit SW (NC, OFF when retracted)	Dual Capacity Limit SW (NC, OFF when retracted)	Dual Capacity Limit SW (NC, OFF when retracted)	Dual Capacity Limit SW (NC, OFF when retracted)
P14-11	B+ Countable Input		Alternator Tach/Pulse		
P14-12	Neg (B-) Countable Input			Engine speed sensor/mag switch (same as current A46, 21510508)	

I/O CONTROL SHEETS: 21 510 520 21 510 523		GP440 I/O Allocations			
		"600/660" Cummins T4 engine (CAN) Vehicle Number 13	"600/660" Kubota Gen2 Vehicle Number 14	"400/460" Kubota Gen2 Vehicle Number 15	"600/660" KUBOTA DF (CAN) Vehicle Number 15
P1-1	+5Volts	Load cell 1, BRN	Load cell 1, BRN	Load cell 1, BRN	Load cell 1, BRN
P1-2	Diff. +	Load cell 1, YLW	Load cell 1, YLW	Load cell 1, YLW	Load cell 1, YLW
P1-3	Diff -	Load cell 1, PNK	Load cell 1, PNK	Load cell 1, PNK	Load cell 1, PNK
P1-4	GND	Load cell, GRY	Load cell, GRY	Load cell, GRY	Load cell, GRY
P3A-1	+5Volts				
P3A-2	Diff. +				
P3A-3	Diff -				
P3A-4	GND				
P11-1	CANH VCCM-P13-1				
P11-2	CANL VCCM-P13-2				
P11-3	Gnd				
P9-1	RS232				
P9-2	RS232				
P9-3	RS232				
P9-4	RS232				
P6-1	Analog Input	Boom Extend/Retract	Boom Extend/Retract	Boom Extend/Retract	Boom Extend/Retract
P6-2	Analog Input				
P6-3	Analog Input				
P6-4	+5Volts				
P6-5	+5V via 1K				
P6-6	Gnd	Ground, Boom Extend/Retract	Ground, Boom Extend/Retract	Ground, Boom Extend/Retract	Ground, Boom Extend/Retract
P7-1	Analog Input	Lift	Lift	Lift	Lift
P7-2	Analog Input	Swing	Swing	Swing	Swing
P7-3	Analog Input				
P7-4	+5Volts				
P7-5	+5V via 1K				
P7-6	Gnd				
P8-1	Analog Input	Jib	Jib	Jib	Jib
P8-2	Analog Input	Platform Rotate	Platform Rotate	Platform Rotate	Platform Rotate
P8-3	Analog Input				
P8-4	+5Volts				
P8-5	+5V via 1K				
P8-6	Gnd				
P5-1	High side 2A output	upper Alarm	upper Alarm	upper Alarm	upper Alarm
P5-2	High side 2A output	Overload (on) / Tilt (flashing) lamp	Overload (on) / Tilt (flashing) lamp	Overload (on) / Tilt (flashing) lamp	Overload (on) / Tilt (flashing) lamp
P5-3	Board supply	12V supply from TBM B+	12V supply from TBM B+	12V supply from TBM B+	12V supply from TBM B+
P5-4	High side 2A output	Platform rotate enable valve (jib function when disable)	Platform rotate enable valve (jib function when disable)	Platform rotate enable valve (jib function when disable)	Platform rotate enable valve (jib function when disable)
P5-5	High side 2A output	Aircraft Bump Guard Lamp	Aircraft Bump Guard Lamp	Aircraft Bump Guard Lamp	Aircraft Bump Guard Lamp
P5-6	Analog Input				
P5-7	Gnd	Battery Ground supply	Battery Ground supply	Battery Ground supply	Battery Ground supply
P5-8	High side 2A output	Snorkel Guard Blue Flashing Light	Snorkel Guard Blue Flashing Light	Snorkel Guard Blue Flashing Light	Snorkel Guard Blue Flashing Light
P5-9	Analog Input				
P10-1	Analog Input	Drive	Drive	Drive	Drive
P10-2	Analog Input	NOT AVAILABLE-A46 JOYSTICK POPULATED	NOT AVAILABLE-A46 JOYSTICK POPULATED	NOT AVAILABLE-A46 JOYSTICK POPULATED	NOT AVAILABLE-A46 JOYSTICK POPULATED
P10-3	Analog Input	NOT AVAILABLE-A46 JOYSTICK POPULATED	NOT AVAILABLE-A46 JOYSTICK POPULATED	NOT AVAILABLE-A46 JOYSTICK POPULATED	NOT AVAILABLE-A46 JOYSTICK POPULATED
P10-4	+5Volts	NOT AVAILABLE-A46 JOYSTICK POPULATED	NOT AVAILABLE-A46 JOYSTICK POPULATED	NOT AVAILABLE-A46 JOYSTICK POPULATED	NOT AVAILABLE-A46 JOYSTICK POPULATED
P10-5	+5V via 1K	NOT AVAILABLE-A46 JOYSTICK POPULATED	NOT AVAILABLE-A46 JOYSTICK POPULATED	NOT AVAILABLE-A46 JOYSTICK POPULATED	NOT AVAILABLE-A46 JOYSTICK POPULATED
P10-6	Gnd	NOT AVAILABLE-A46 JOYSTICK POPULATED	NOT AVAILABLE-A46 JOYSTICK POPULATED	NOT AVAILABLE-A46 JOYSTICK POPULATED	NOT AVAILABLE-A46 JOYSTICK POPULATED
P10-7	Digital Input	NOT AVAILABLE-A46 JOYSTICK POPULATED	NOT AVAILABLE-A46 JOYSTICK POPULATED	NOT AVAILABLE-A46 JOYSTICK POPULATED	NOT AVAILABLE-A46 JOYSTICK POPULATED
P10-8	Digital Input	NOT AVAILABLE-A46 JOYSTICK POPULATED	NOT AVAILABLE-A46 JOYSTICK POPULATED	NOT AVAILABLE-A46 JOYSTICK POPULATED	NOT AVAILABLE-A46 JOYSTICK POPULATED
P10-9	Digital Input	Steer Left Rocker	Steer Left Rocker	Steer Left Rocker	Steer Left Rocker
P10-10	Digital Input	Steer Right Rocker	Steer Right Rocker	Steer Right Rocker	Steer Right Rocker
P10-11	Digital Input	NOT AVAILABLE-A46 JOYSTICK POPULATED	NOT AVAILABLE-A46 JOYSTICK POPULATED	NOT AVAILABLE-A46 JOYSTICK POPULATED	NOT AVAILABLE-A46 JOYSTICK POPULATED
P10-12	B+ protected supply	NOT AVAILABLE-A46 JOYSTICK POPULATED	NOT AVAILABLE-A46 JOYSTICK POPULATED	NOT AVAILABLE-A46 JOYSTICK POPULATED	NOT AVAILABLE-A46 JOYSTICK POPULATED
P14-1	Digital Input	Platform level up	Platform level up	Platform level up	Platform level up
P14-2	Digital Input	Platform level down	Platform level down	Platform level down	Platform level down
P14-3	Digital Input	Drive high speed turn P6-15 only if elev.sw P15-9 is at 12V	Drive high speed turn P6-15 only if elev.sw P15-9 is at 12V	Drive high speed turn P6-15 only if elev.sw P15-9 is at 12V	Drive high speed turn P6-15 only if elev.sw P15-9 is at 12V
P14-4	Digital Input	Ignition	Ignition	Ignition	Ignition
P14-5	Digital Input	Start SW	Start SW	Start SW	Start SW
P14-6	Digital Input	Horn SW	Horn SW	Horn SW	Horn SW
P14-7	Digital Input	Enable Footswitch	Enable Footswitch		Enable Footswitch
P14-8	Digital Input	Emergency Power	Emergency Power	Emergency Power	Emergency Power
P14-9	Digital Input	Left turn signal sw	Left turn signal sw	Left turn signal sw	Left turn signal sw
P14-10	Digital Input	Right turn signal sw	Right turn signal sw	Right turn signal sw	Right turn signal sw
P14-11	Digital Input	Snorkel Guard proxi sw.	Snorkel Guard proxi sw.	Snorkel Guard proxi sw.	Snorkel Guard proxi sw.
P14-12	Digital Input	Snorkel Guard override sw.	Snorkel Guard override sw.	Snorkel Guard override sw.	Snorkel Guard override sw.
P14-13	Digital Input	Generator sw (No funtions allowed if on pending generator setting)	Generator sw (No funtions allowed if on pending generator setting)	Generator sw (No funtions allowed if on pending generator setting)	Generator sw (No funtions allowed if on pending generator setting)
P14-14	Digital Input	Hydraulic Warm-Up switch	Hydraulic Warm-Up switch	Hydraulic Warm-Up switch	Hydraulic Warm-Up switch
P14-15	Digital Input	Pressure Washer sw (reduced speeds while active)	Pressure Washer sw (reduced speeds while active)	Pressure Washer sw (reduced speeds while active)	Pressure Washer sw (reduced speeds while active)
P15-1	Digital Input	Drive lights sw.	Drive lights sw.	Drive lights sw.	Drive lights sw.
P15-2	Digital Input	Platform Work lights sw.	Platform Work lights sw.	Platform Work lights sw.	Platform Work lights sw.
P15-3	Digital Input	Engine low speed switch	Engine low speed switch	Engine low speed switch	Engine low speed switch
P15-4	Digital Input	Hydraulic Generator (PLASMA/GOUGE)	Hydraulic Generator (PLASMA/GOUGE)	Hydraulic Generator (WELD)	Hydraulic Generator (PLASMA/GOUGE)
P15-5	Digital Input	Hydraulic Generator (WELD)	Hydraulic Generator (WELD)	Hydraulic Generator (PLASMA/GOUGE)	Hydraulic Generator (WELD)
P15-6	Digital Input	Aircraft Bump Guard 1 (NC sw)	Aircraft Bump Guard 1 (NC sw)	Aircraft Bump Guard 1 (NC sw)	Aircraft Bump Guard 1 (NC sw)
P15-7	Digital Input	Aircraft Bump Guard 2 (NC sw)	Aircraft Bump Guard 2 (NC sw)	Aircraft Bump Guard 2 (NC sw)	Aircraft Bump Guard 2 (NC sw)
P15-8	Digital Input	Hydraulic Generator (7.5kW VAR)	Hydraulic Generator (7.5kW VAR)	Hydraulic Generator (7.5kW VAR)	Hydraulic Generator (7.5kW VAR)
P15-9	Digital Input				Fuel Select Switch (ON=propane or gas?) -DF only
P15-10	Digital Input				
P15-11	Digital Input				
P15-12	Digital Input				
P15-13	Digital Input				
P15-14	Digital Input				
P15-15	Digital Input				
P4-1	High side 2A output	Left turn signal light	Left turn signal light	Left turn signal light	Left turn signal light
P4-2	High side 2A output	Right turn signal light	Right turn signal light	Right turn signal light	Right turn signal light
P4-3	High side 2A output	Tail light	Tail light	Tail light	Tail light
P4-4	High side 2A output	Engine Red Stop Lamp	Engine Red Stop Lamp	Engine Red Stop Lamp	Engine Red Stop Lamp
P4-5	High side 2A output	Engine Amber Warning Lamp	Engine Amber Warning Lamp	Engine Amber Warning Lamp	Engine Amber Warning Lamp
P4-6	High side 2A output	Platform Work Lights	Platform Work Lights	Platform Work Lights	Platform Work Lights
P4-7	High side PWM output				
P4-8	High side 2A output	600lb region light	600lb region light	600lb region light	600lb region light
P4-9	High side 2A output	1000lb region light	1000lb region light	1000lb region light	1000lb region light
P4-10	High side 2A output	DPF regeneration Standstill Lamp	DPF regeneration Standstill Lamp	DPF regeneration Standstill Lamp	DPF regeneration Standstill Lamp
P4-11	High side PWM output				
P4-12	High side 2A output	wait-to-start lamp	wait-to-start lamp	wait-to-start lamp	wait-to-start lamp
P4-13	High side 2A output				
P4-14	High side 2A output				
P4-15	High side PWM output				

VCCM

Pin #	Description	
VP1-1	Valve 1 positive supply	
VP1-2	Current control PWM output	Drive fwd prop. Valve
	Valve 1 minimum current	0.3A
	Valve 1 maximum current	1.3A
VP2-1	Valve 2 positive supply	
VP2-2	Current control PWM output	Drive reverse prop. Valve
	Valve 2 minimum current	0.3A
	Valve 2 maximum current	1.3A
VP3-1	Valve 3 positive supply	
VP3-2	Current control PWM output	Swing CW prop. Valve
	Valve 3 minimum current	0.3A
	Valve 3 maximum current	1.3A
VP4-1	Valve 4 positive supply	
VP4-2	Current control PWM output	Swing CCW prop. Valve
	Valve 4 minimum current	0.3A
	Valve 4 maximum current	1.3A
VP5-1	Valve 5 positive supply	Hydrostatic pump valves common
VP5-2	Current control PWM output	Hydrostatic pump drive forwards
	Valve 5 minimum current	0.0A
	Valve 5 maximum current	1.6A
VP6-1	Valve 6 positive supply	
VP6-2	Current control PWM output	Hydrostatic pump drive reverse
	Valve 6 minimum current	0.0A
	Valve 6 maximum current	1.6A
VP11-1	12/24V module supply	
VP11-2	GND module supply	
VP12-1	CANH	
VP12-2	CANL	
VP12-3	GND	
VP13-1	CANH	
VP13-2	CANL	
VP13-3	GND	

12 V TBM

Terminal:	FROM:	TO:
B+		P7-1 GP400
B-	B- Battery	B+ supply to all I/O B- supply to all I/O tp P8-14 of GP400
1	Platform select switch	P7-4 of GP400
2	Ground Select Switch	P7-2 of GP400
3		P8-9 of GP400
4	After EMS GND	
5		P15-10

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