

Service Manual

(Circuit Diagrams and Data)

01

Rough Terrain Crane

Model **GR-550XL-2**

Applicable Serial No. 540642 --

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Service Data



3. Hydraulic device

3.1 Hydraulic pump

Item		Standard value	Remarks
Crane pump	Speed reducing ratio	0.918	
	Idling (min ⁻¹)	730 ± 27	Eng. 670 ± 25
	Max. (min ⁻¹)	2342 ⁺⁵⁴ ₀	Eng. 2150 ⁺⁵⁰ ₀ (PTO - ON)
	Displacement (cm ³ /rev)	82 + 82	
Steering pump	Speed reducing ratio	1.066	
	Idling (min ⁻¹)	629 ± 23	Eng. 670 ± 25
	Max. (min ⁻¹)	2683 ± 38	Eng. 2860 ± 40
	Displacement (cm ³ /rev)	34 + 16 + 16	
Charging pump (Torque converter)	Speed reducing ratio	1.066	
	Idling (min ⁻¹)	629 ± 23	Eng. 670 ± 25
	Max. (min ⁻¹)	2683 ± 38	Eng. 2860 ± 40
	Displacement (cm ³ /rev)	33.2	
Emergency steering pump	Displacement (cm ³ /rev)	14.56	

3.2 Hydraulic motor

(1 L/min = 2.64172 × 10⁻¹ gal/min)

Item		Standard value	Remarks
Winch (main, auxiliary) 366-638-00010 	Displacement (cm ³ /rev)	195	
	Drain (when running)	6.5 L/min at maximum	For reference
Swing 366-631-70010 	Displacement (cm ³ /rev)	45.3	
	Drain (when running)	7 L/min at maximum	For reference

3.3 Hydraulic cylinder

(1 mm = 3.93701 × 10⁻² in)

Item		Standard value	Limit value	Remarks
Amount of spontaneous retraction when lever is neutral, and the engine stopped.	Elevating	3 mm or less/30 minutes	6 mm or less/30 minutes	With boom raised to horizontal, fully retracted
	Telescoping	6 mm or less/30 minutes	9 mm or less/30 minutes	Boom extended by approx. 100 mm with elevating angle at Max.
	Jack	3 mm or less/15 hours	6 mm or less/15 hours	Jack extended close to the cylinder's stroke end

Adjusting Pressure (Hydraulic Pressure)

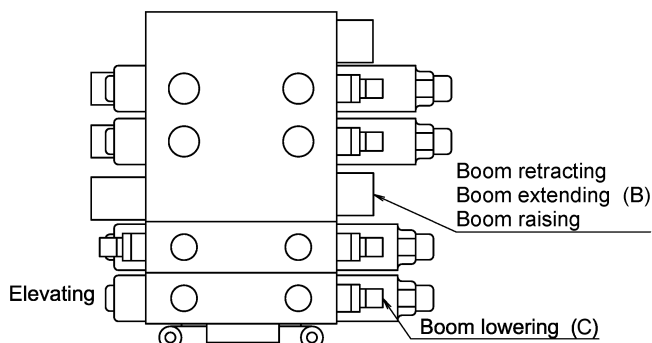
3. Elevating

[NOTICE]

- ◆ Oil temperature: $50 \pm 5^\circ\text{C}$ (113 - 131°F) (Hydraulic oil: TADANO Hydraulic Oil LL)
- ◆ Confirm set pressure on the crane information screen in the maintenance mode of AML.
- ◆ Shift the control lever or switch while the engine is idling, then increase engine speed.

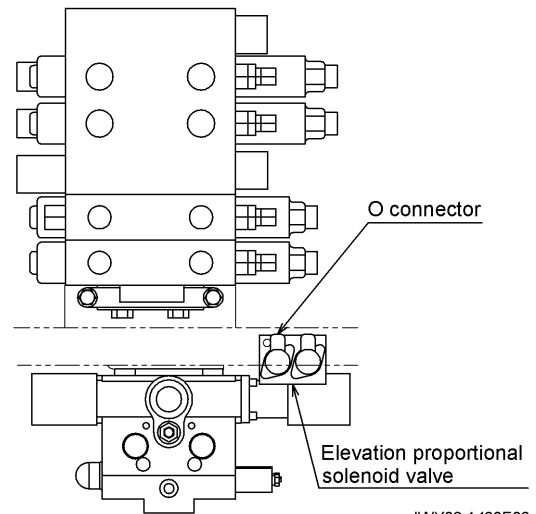
Item (Mark)	Set pressure			Engine speed (min ⁻¹)	Check procedure
	MPa	kgf/cm ²	psi		
Boom raising (B)	22.1 ± 0.5	225 ± 5	3200 ± 70	2150 (MAX.)	Refer to "2. Telescoping".
Boom lowering (C)	$2.9^{+0.5}_0$	30^{+5}_0	420^{+70}_0	670 (IDL.)	<ol style="list-style-type: none"> 1. Deactivate the slow stop circuit. (*1) 2. Turn the PTO switch ON 3. Fully retract the elevating cylinder. 4. Move the elevating lever at its full stroke on the lowering side. 5. In this state, check the pressure.

*1: To deactivate the slow stop circuit, disconnect the connector (O) of the elevation proportional solenoid valve.
(After adjusting, connect the connector (O).)



Hydraulic pilot control valve (elevating, telescoping, winch)

IWY02-1430E02



IWY02-1430E03

Air Bleeding Procedure

2. Winch brake

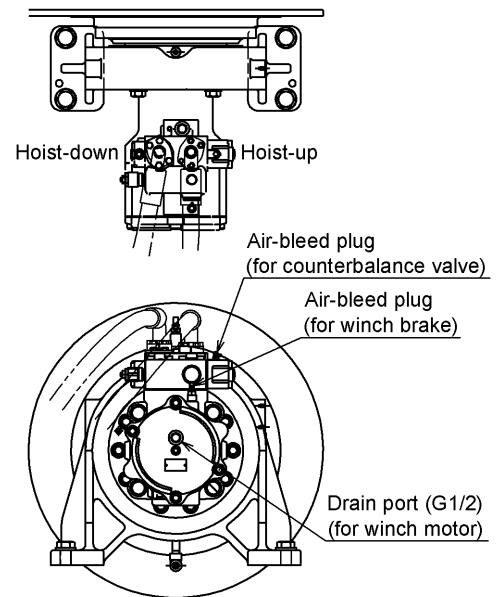
[NOTICE]

◆ To avoid damage to the friction plates of the winch brakes, bleed the winch brakes following the procedures below.

1. When assembling piping, plug the piping between the hoist-down port of each main and auxiliary winch motor and the corresponding hydraulic pilot control valve (main). (For plugging, attach plugs to the pipe end closer to the hoist-down port of each motor and the one closer to the corresponding hydraulic pilot control valve port.)

[NOTICE]

- ◆ After assembly, do not perform hoisting operation.
 - ◆ Hereafter, hoist-up operation by the main and auxiliary winches is prohibited until bleeding of the winch brakes is completed.
2. Perform hoist-down operation of each main and auxiliary winch using the corresponding air-bleed plug of the winch brake.
 - Engine: idling
 - Corresponding control lever moved fully to the hoist-down side
(You need not move the winch lever to and fro.)
 - When no more bubbles come out of the plug, bleeding is completed.
 3. After bleeding of the winch brakes is completed, remove the plugs from the piping and connection sections, and reassemble the piping.



Port position (common to main and aux. winch)

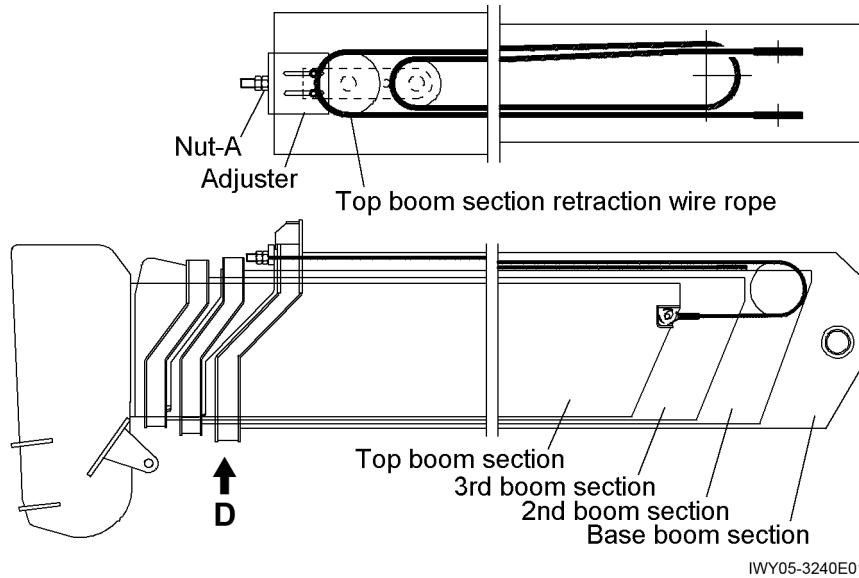
IWY05-3030E03

Assembly Adjustment (Crane Operation)



8. When the wire rope is tense:

8.1 Tighten nut-A by approx. a third turn.



NG 8.2 Extend the boom by 200 to 300 mm (8 to 12 in) by operating the boom telescoping control lever and then retract it fully. Check the boom is fully retracted.

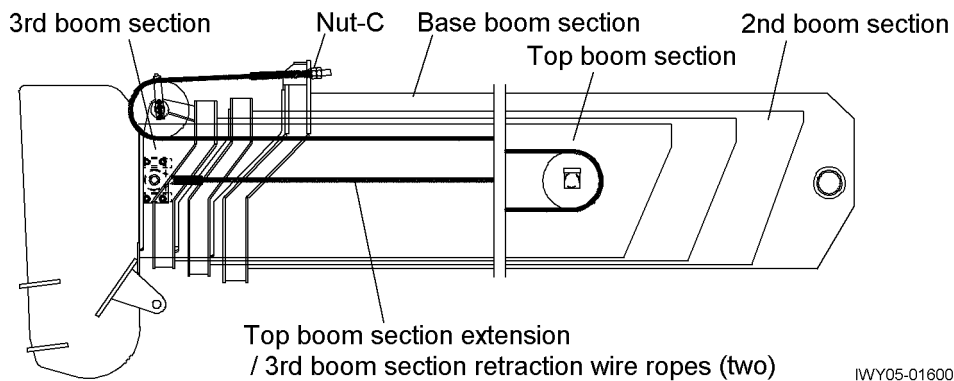
NG

OK

9. When only the 3rd boom section is not fully retracted:

END

9.1 Tighten two nut-C's by approx. a third turn equally.



NG 9.2 Extend the boom by 200 to 300 mm (8 to 12 in) by operating the boom telescoping control lever and then retract it fully. Check the boom is fully retracted.

OK

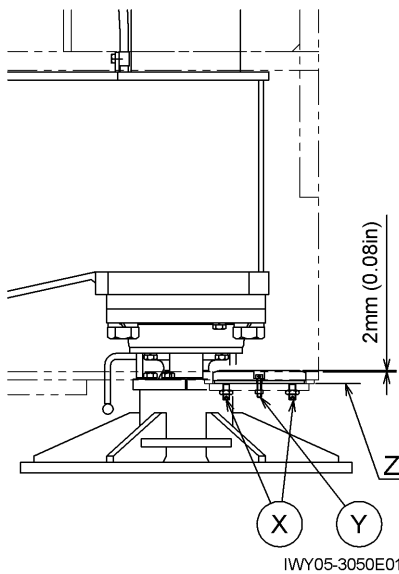
END

Operation Check (Crane Operation)

7. Warning

Item	Type of alarm	Sound	Checking procedure
AML limit	Electronic buzzer	<ul style="list-style-type: none"> • 280Hz • Continuous low tone 	Occurs at 100% when main switch is ON and PTO switch is ON. (Intermittent low tone sound occurs at 90% and above.)
Overwind warning	Electronic buzzer	<ul style="list-style-type: none"> • 2300Hz • Continuous high-low tones 	Occurs when the overwind switch contact of either the main or auxiliary winch is turned OFF by winch hoist-up operation.
Outrigger operation switch detection	Electronic buzzer	<ul style="list-style-type: none"> • 2300Hz • Intermittent beeping 	Sounds when either the outrigger extension/retraction or jack slide selector switch has been left in any position other than neutral 10 seconds after operation is completed.
E/G cover interference automatic stop	Electronic buzzer	<ul style="list-style-type: none"> • AML buzzer: sounds 3 seconds 	When main switch is ON and PTO switch is ON, make sure that the operation stops while boom angle is 5° or less and swing angle is between 155° and 205°.

8. Outrigger slide plate adjustment



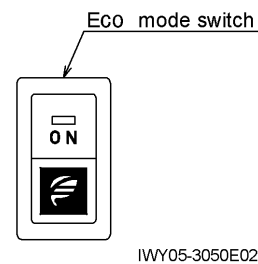
1. With the outriggers fully retracted, install the slide plate and the plate into the outrigger box.
2. Adjust the slide plate with the bolt X so that the slide plate is 2mm (0.08 in) away from the upper surface of outrigger box bottom plate.
3. If the slide plate is 2 mm (0.08 in) or more away, make sure that the bolt X does not protrude beyond the plane Z.
4. Tighten the bolts of Y slightly to fix the slide plate. Then tighten the nuts of Y hard.
5. Tighten the nut of X.

9. Eco mode operation check

While the PTO is engaged, select the Eco mode 1 and Eco mode 2, and depress the accelerator pedal fully. Then check that the maximum engine speed lowers while the respective mode is selected.

Eco mode	Max. engine speed (min ⁻¹)
OFF	Approx. 2150
1	Approx. 1750
2	Approx. 1500

- ◆ Use the AML to select the Eco mode 1 or Eco mode 2. The maximum engine speeds above listed are for reference.



"Location" shows each applicable paragraph No. of this manual's contents.
Refer to the contents.

Z-1 Hydraulic Circuit

1. Comparison table of hydraulic parts (Part No., Part name and Location)

Part No.	Part name	Location	Part No.	Part name	Location	Part No.	Part name	Location	Part No.	Part name	Location
1	Variable piston pump		24-1	Steering cylinder (FL)	Z-8 2.	48-4	Pressure switch (aux. winch hoist-up)		73	-	
2	Gear pump	Z-8 1.	24-2	Steering cylinder (RR)	Z-8 2.	48-5	Pressure switch (main winch hoist-up)		74	Jib lock pin cylinder	
3	Pump (for emergency steering) (option)		25	Hydraulic oil temperature switch (50°C) (122°F)	Z-8 5.	48-6	Pressure switch (boom raising)		75	Jib offset cylinder	
4	Oil filter	Z-8 5.	26	Hydraulic oil temperature switch (85°C) (185°F)	Z-8 5.	48-7	Pressure switch (boom lowering)	Z-7 12.	76-1	Pilot check valve (for jib lock)	Z-7 13.
5	Oil tank		27	Priority valve	Z-7 9.	48-8	Pressure switch (aux. winch hoist-down)		76-2	Pilot check valve (for jib offset)	
6	Oil filter		28	Orbitrol	Z-7 9.	48-9	Pressure switch (main winch hoist-down)		77-1	Orifice (for jib lock)	
8	Solenoid control valve		30-1	Filter (for swing proportional valve circuit (right swing))	Z-7 11.	48-10	Pressure switch (boom retracting)		77-2	Orifice (for jib offset)	
-	Solenoid (for O/R extending/retracting) (SL20, SL21)	Z-8 4.	30-2	Filter (for swing proportional valve circuit (left swing))	Z-7 11.	50	Shuttle valve (lever/pedal)		78	Solenoid control valve (jib set)	
-	Solenoid (for suspension lock) (SL04)		30-3	Filter (for priority valve)	Z-7 9.	51	Proportional control valve (for elevation slow stop)	Z-7 8.	80	Oil cooler	Z-8 5.
9	Check valve		30-4	Filter (for solenoid valve (pilot pressure))	Z-7 5.	-	Boom raising proportional control valve (SL124)		82	Solenoid valve (for positive control) (SL96)	Z-8 4.
10-1	Solenoid valve (for O/R, J/S selection) (FR) (SL22) (SL23)	Z-8 3.	30-5	Filter (for remote control valve (left side) (aux. winch/telescoping, swing))	Z-7 11.	-	Boom lowering proportional control valve (SL125)		83	-	
10-2	Solenoid valve (for O/R, J/S selection) (FL) (SL24) (SL25)		30-6	Filter (for remote control valve (right side) (main winch, elevation))	Z-7 8.	52	Solenoid valve (boom telescoping/aux. winch)	Z-7 1.	84	-	
10-3	Solenoid valve (for O/R, J/S selection) (RR) (SL26) (SL27)		30-7	Filter (for elevation proportional valve circuit (boom lowering))	Z-7 8.	-	Solenoid (for boom extending/hoist-down) (SL143)		85	-	
10-4	Solenoid valve (for O/R, J/S selection) (RL) (SL28) (SL29)		30-8	Filter (for elevation proportional valve circuit (boom raising))	Z-7 11.	-	Solenoid (for boom retracting/hoist-up) (SL144)	Z-7 5.	86	Filter assy (swing, steering circuit)	Z-7 9.
11-1	Slide cylinder (FL)	Z-8 6.	30-9	Filter (for remote control valve (pedal))	Z-8 4.	53	Hydraulic pilot control valve	Z-7 3.			
11-2	Slide cylinder (FR)		30-10	Filter (for solenoid valve (positive control))	Z-7 5.	54	Counterbalance valve (for elevation)				
11-3	Slide cylinder (RL)		30-11	-	Z-8 2.	55	Elevation cylinder	Z-7 2.			
11-4	Slide cylinder (RR)		30-13	Filter (for solenoid control valve (jib set))	Z-7 10.	56	Counterbalance valve (for telescoping cylinder (No.1))				
12-1	Jack cylinder (FL)		30-14	Filter (for solenoid valve (suspension lock selection))	Z-7 5.	57	Telescoping cylinder (No.1)	Z-7 1.			
12-2	Jack cylinder (FR)		31	Sequence valve (pilot pressure)	Z-8 4.	58-1	Main winch				
12-3	Jack cylinder (RL)		32	Check valve (for air conditioner)	Z-7 9.	58-2	Aux. winch				
12-4	Jack cylinder (RR)		33	Solenoid valve (for air conditioner) (SL280)	Z-7 4.	59-1	Main winch speed reducer				
13-1	Pilot check valve (FL)		34	Hydraulic motor (for air conditioner)	Z-7 5.	59-2	Aux. winch speed reducer				
13-2	Pilot check valve (FR)		35	Center joint	Z-7 7.	60	Hydraulic valve (winch brake) (main, aux.)				
13-3	Pilot check valve (RL)		36	Check valve (for orbitrol)	Z-7 6.	61	Filter (for hydraulic valve (winch brake))	Z-7 5.			
13-4	Pilot check valve (RR)		38	Hydraulic pilot control valve (for swing)	Z-7 6.	62-1	Check valve				
14	Solenoid valve (for suspension lock selection)		-	Swing right proportional reducing solenoid valve (SL120)	Z-7 4.	62-2	Check valve	Z-7 6.			
-	Solenoid (for suspension lock) (SL02)		-	Swing left proportional reducing solenoid valve (SL121)	Z-7 5.	62-3	Check valve	Z-8 5.			
-	Solenoid (for suspension free) (SL03)		39	Hydraulic motor (for swing)	Z-7 7.	63	Accumulator	Z-7 5.			
15-1	Pilot check valve (for suspension lock) (FL)	Z-8 2.	40	Swing speed reducer	Z-7 6.	64	Orifice (for elevation cylinder)	Z-7 3.			
15-2	Pilot check valve (for suspension lock) (RR)		41	Solenoid valve (pilot pressure)	Z-7 7.	65	Pressure sensor (for elevation cylinder extending)				
16-1	Suspension lock cylinder (FL)		-	Solenoid (for remote control pressure vent) (SL102)	Z-7 8.	66	Pressure sensor (for elevating cylinder retracting)				
16-2	Suspension lock cylinder (RR)		-	Solenoid (for swing brake release) (SL160)	Z-7 9.	67	-				
17-1	Pilot check valve (for suspension lock) (FR)		42	Check valve (for main pressure)	Z-7 11.	68	-				
17-2	Pilot check valve (for suspension lock) (RL)		43	Pressure sensor (for main pressure)	Z-7 12.	70-1	Orifice (for main winch hoist-down pilot circuit)	Z-7 1.			
18-1	Suspension lock cylinder (FR)		44	Solenoid valve (for AML vent) (SL100)	Z-7 11.	70-2	Orifice (for aux. winch hoist-down pilot circuit)				
18-2	Suspension lock cylinder (RL)		45-1	Remote control valve (right side)	Z-7 6.	70-3	Orifice (for boom retracting pilot circuit)	Z-7 8.			
20	Hydraulic valve (for emergency steering selection) (option)	Z-8 1.	45-2	Remote control valve (left side)	Z-7 6.	70-4	Orifice (for swing brake release circuit)	Z-7 5.			
21	Pilot check valve (rear steering hydraulic lock)	Z-8 2.	46	Remote control valve (pedal)	Z-7 7.	70-5	Orifice (for boom lowering pilot circuit)	Z-7 8.			
22	Solenoid valve (for steering mode selection)		47	Check valve	Z-7 8.	71	Check valve	Z-8 5.			
-	Solenoid (crab: SL30), (4 wheel: SL31)		48-1	Pressure switch (right swing)	Z-7 9.	72	-				
23-1	Steering cylinder (FR)		48-2	Pressure switch (left swing)	Z-7 10.						
23-2	Steering cylinder (RL)		48-3	Pressure switch (boom extending)	Z-7 11.						

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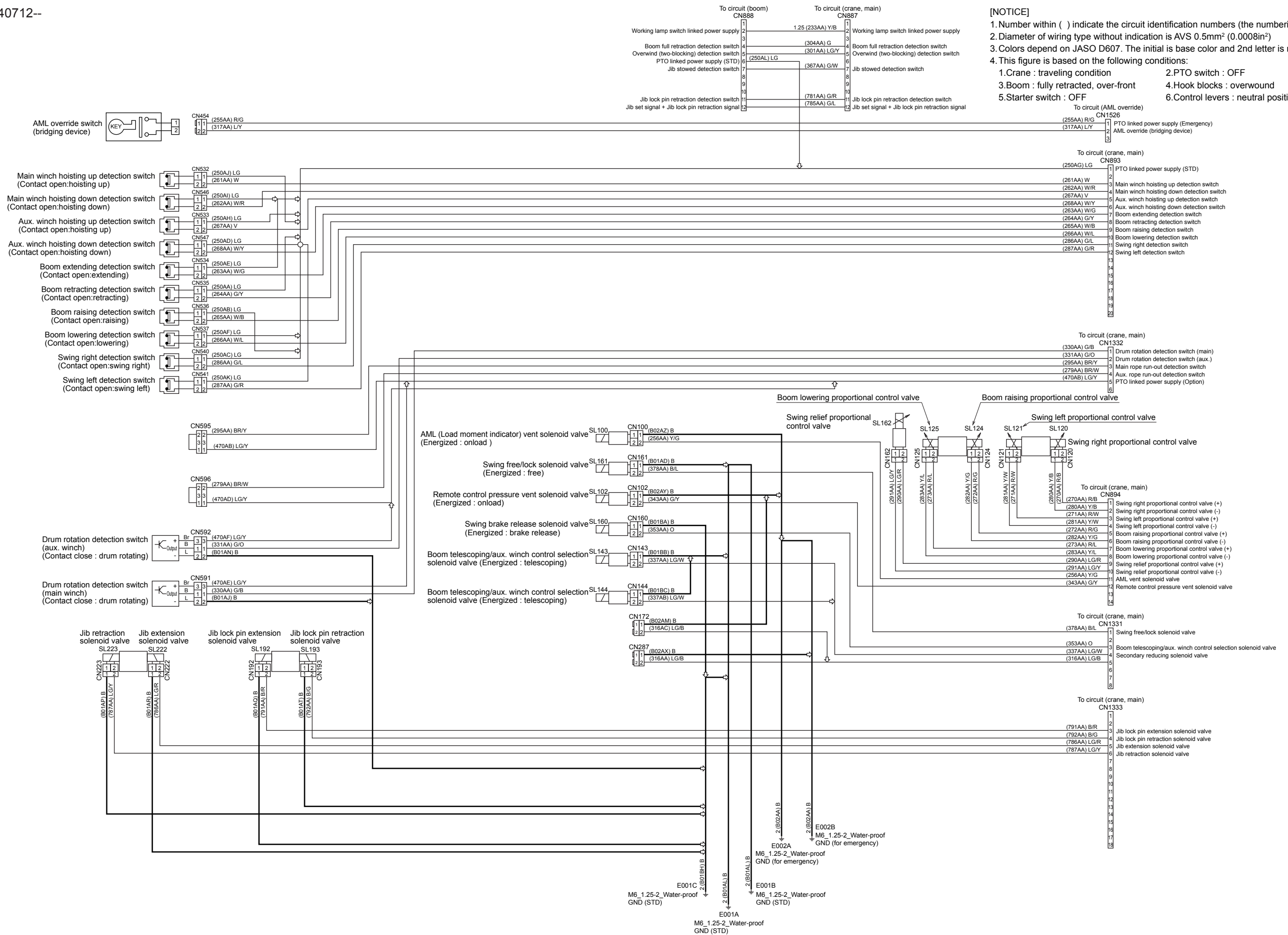
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4.3.2 540712--

[NOTICE]

1. Number within () indicate the circuit identification numbers (the numbering of wiring end).
2. Diameter of wiring type without indication is AVS 0.5mm² (0.0008in²).
3. Colors depend on JASO D607. The initial is base color and 2nd letter is marking color.
4. This figure is based on the following conditions:
 1. Crane : traveling condition
 2. PTO switch : OFF
 3. Boom : fully retracted, over-front
 4. Hook blocks : overwound
 5. Starter switch : OFF
 6. Control levers : neutral positions

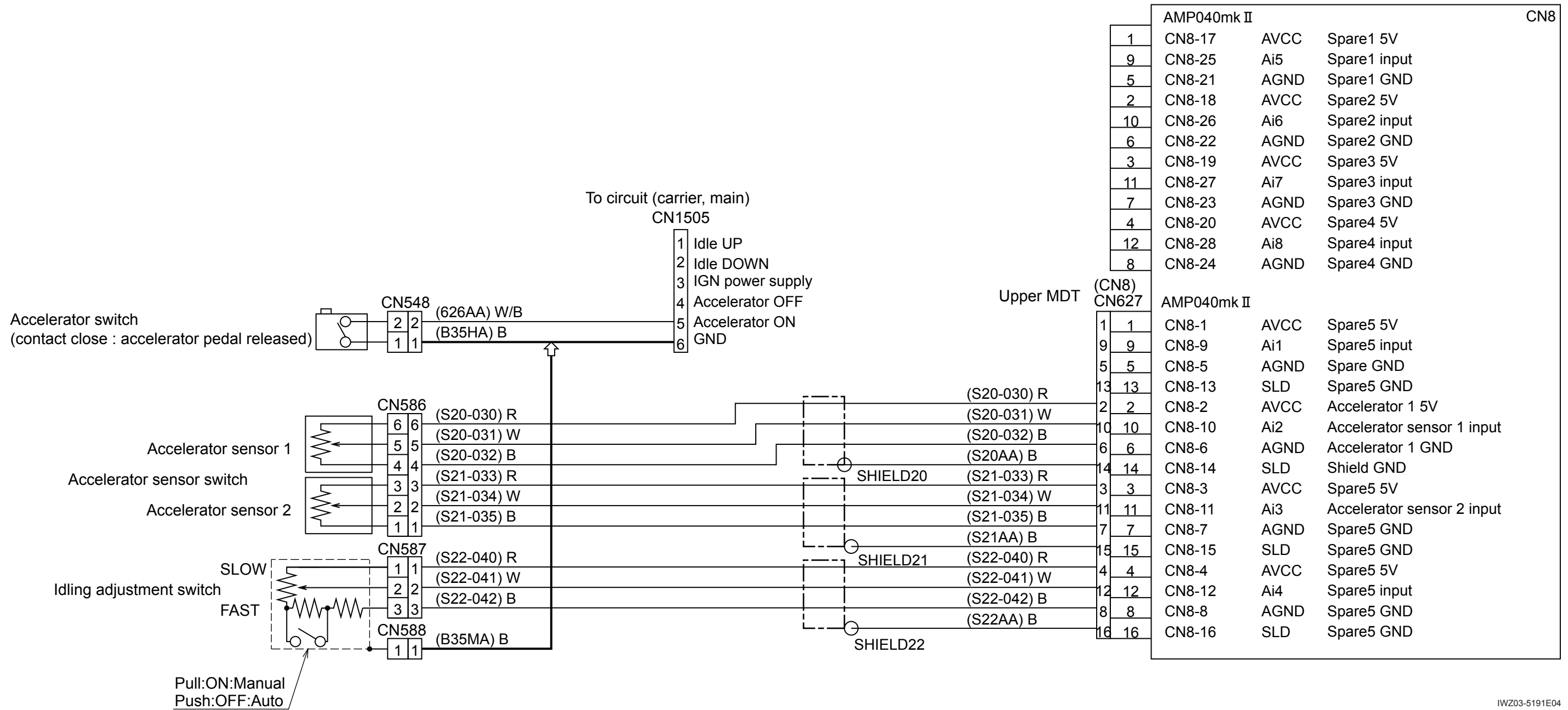


3.3 Electric circuit (accelerator)

[NOTICE]

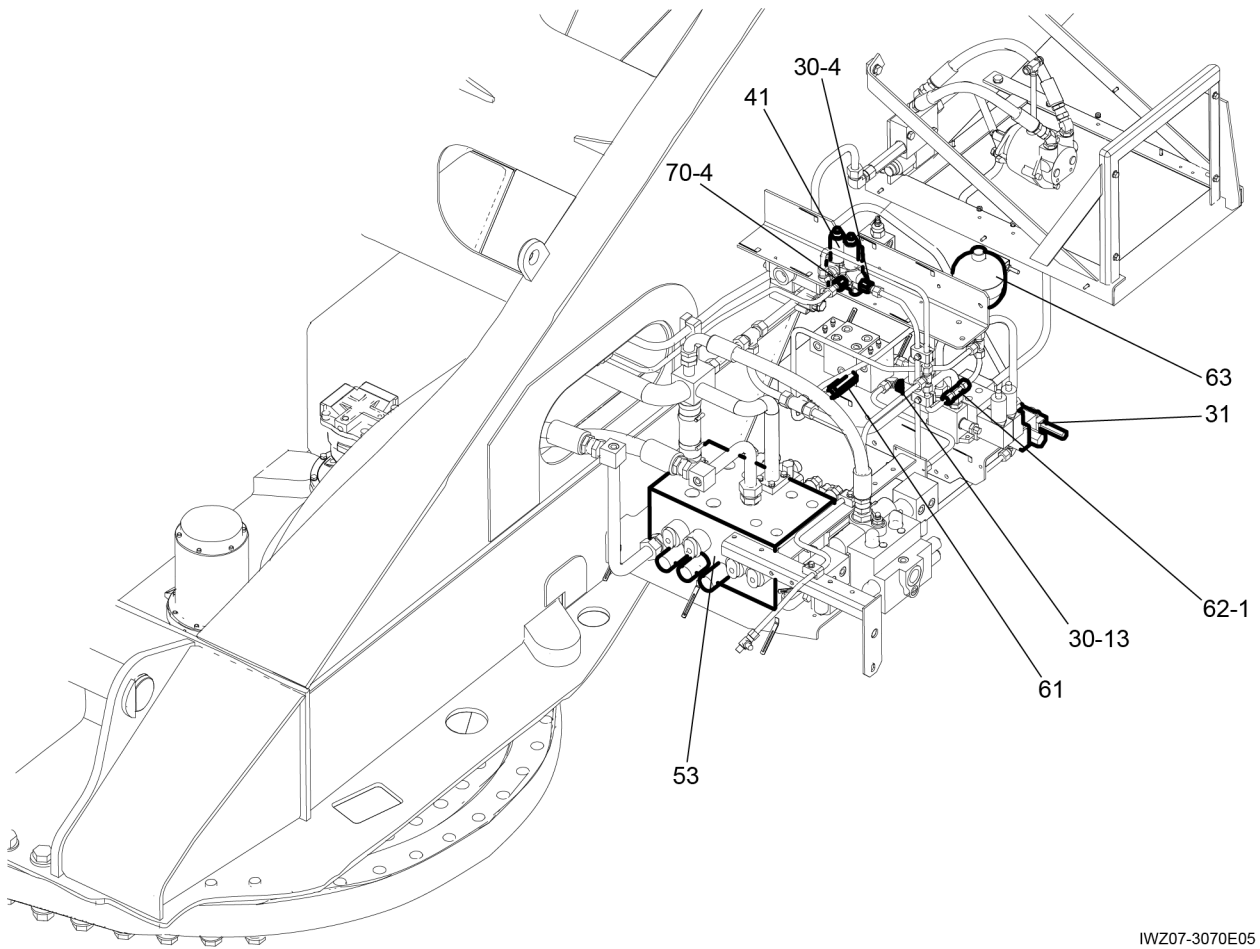
- 1.Number within () indicate the circuit identification numbers (the numbering of wiring end).
- 2.Diameter of wiring type without indication is AVS 0.5mm² (0.0008in²)
- 3.Colors depend on JASO D607. The initial is base color and 2nd letter is marking color.
- 4.This figure is based on the following conditions:

1.Crane : traveling condition	2.PTO switch : OFF
3.Boom : fully retracted, over-front	4.Hook blocks : overwound
5.Starter switch : OFF	6.Control levers : neutral positions



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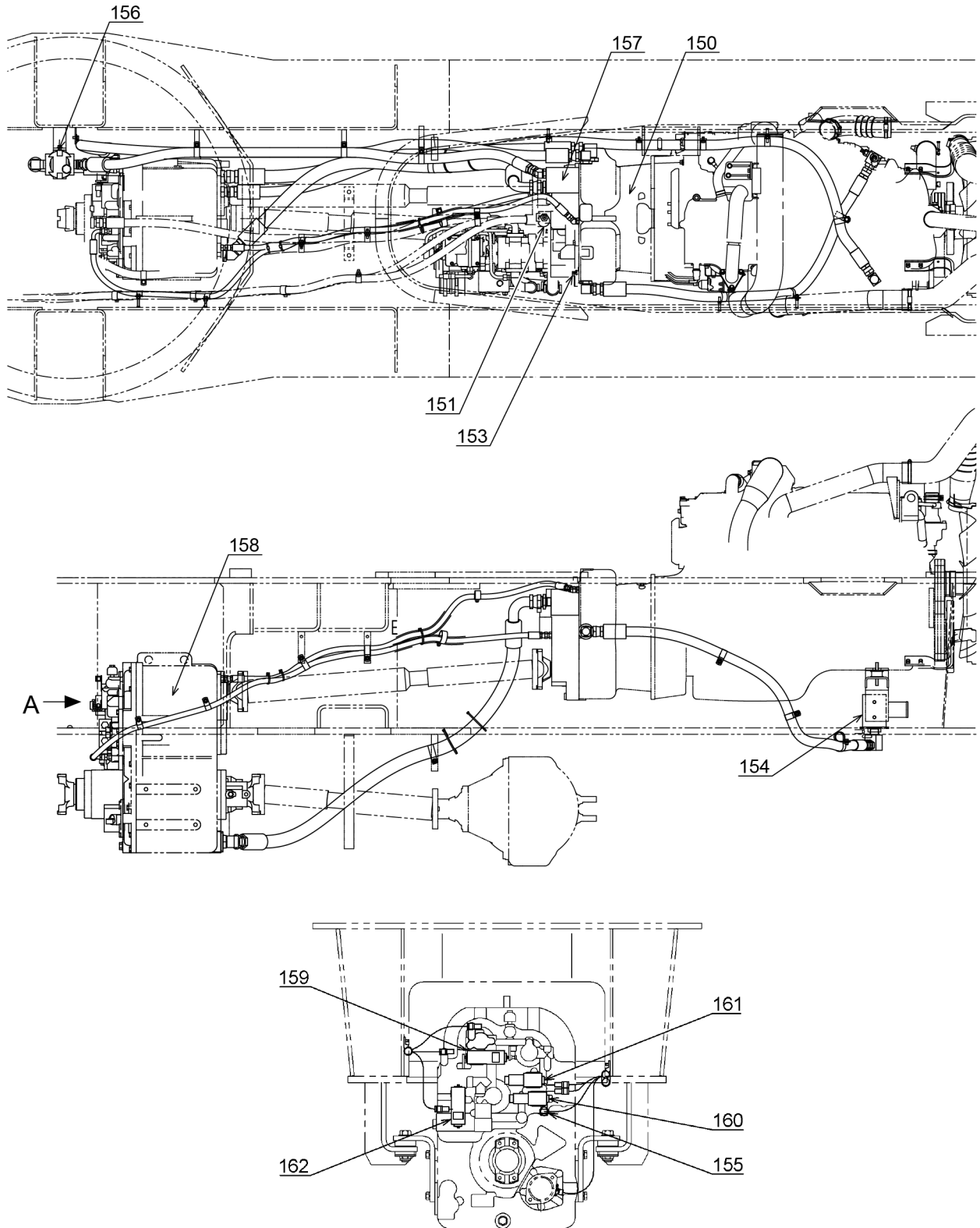
5. Return



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Z-9 Hydraulic Parts Location Diagram (Torque Converter)

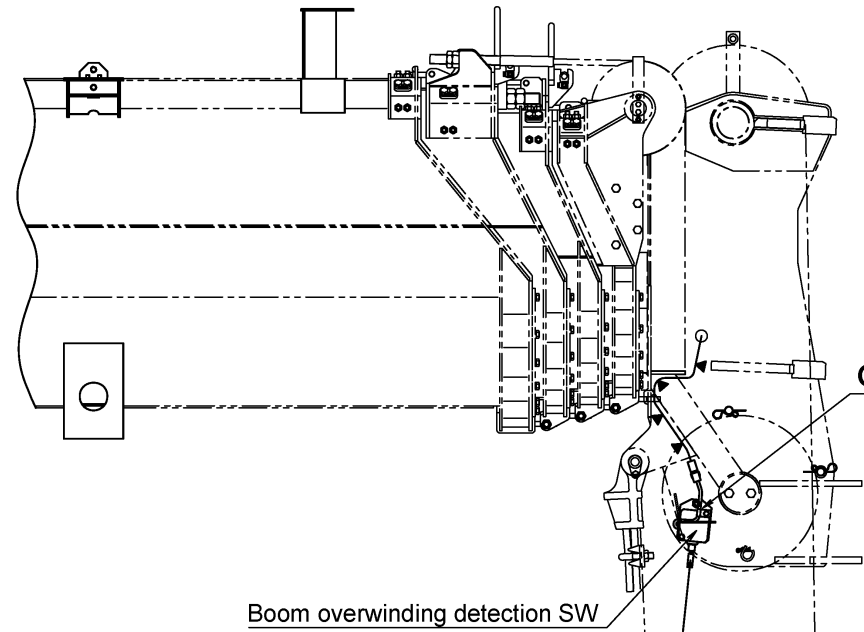
1. Torque converter related



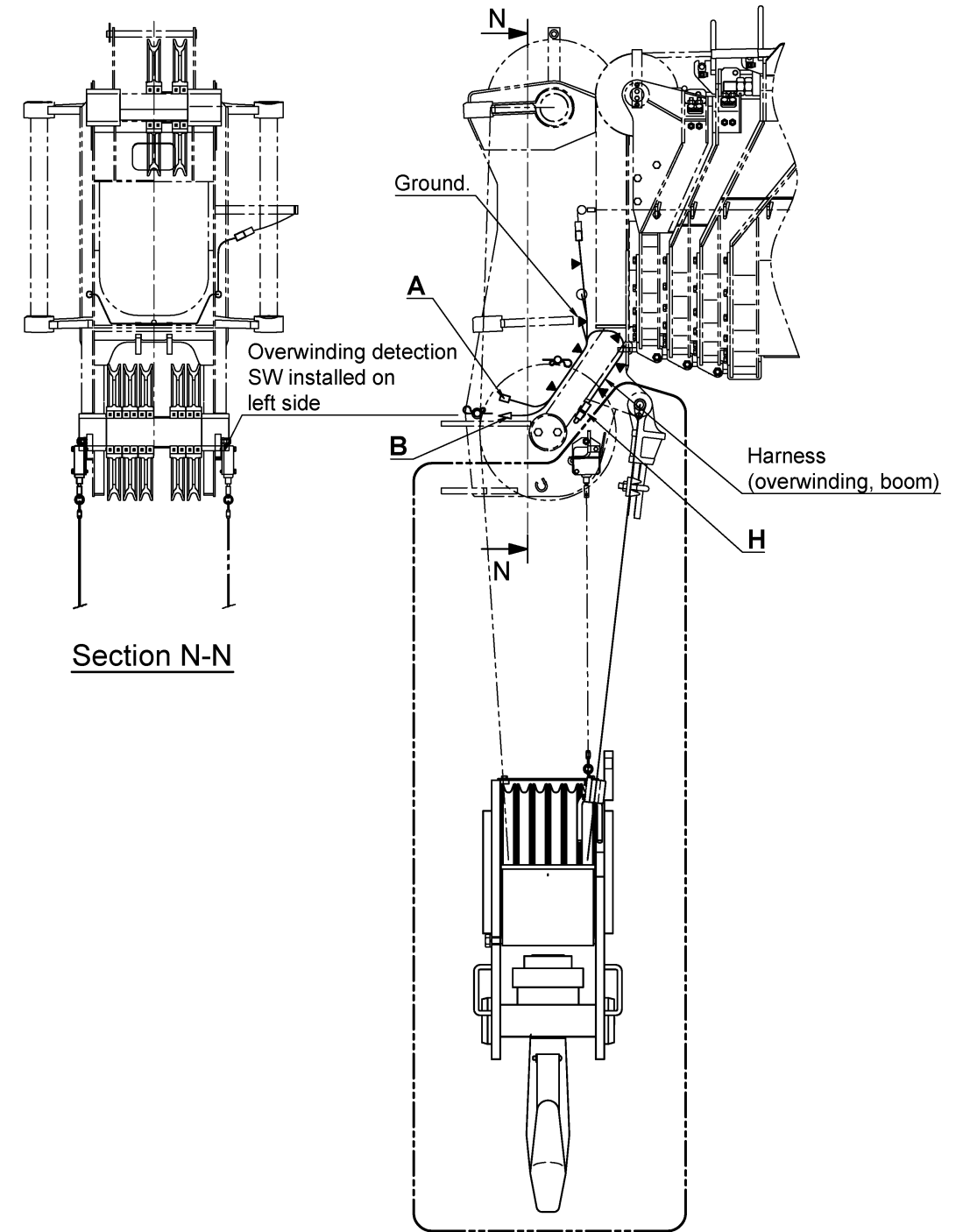
View A

IWZ07-3090E01

2. Overwinding indicator assy (boom)

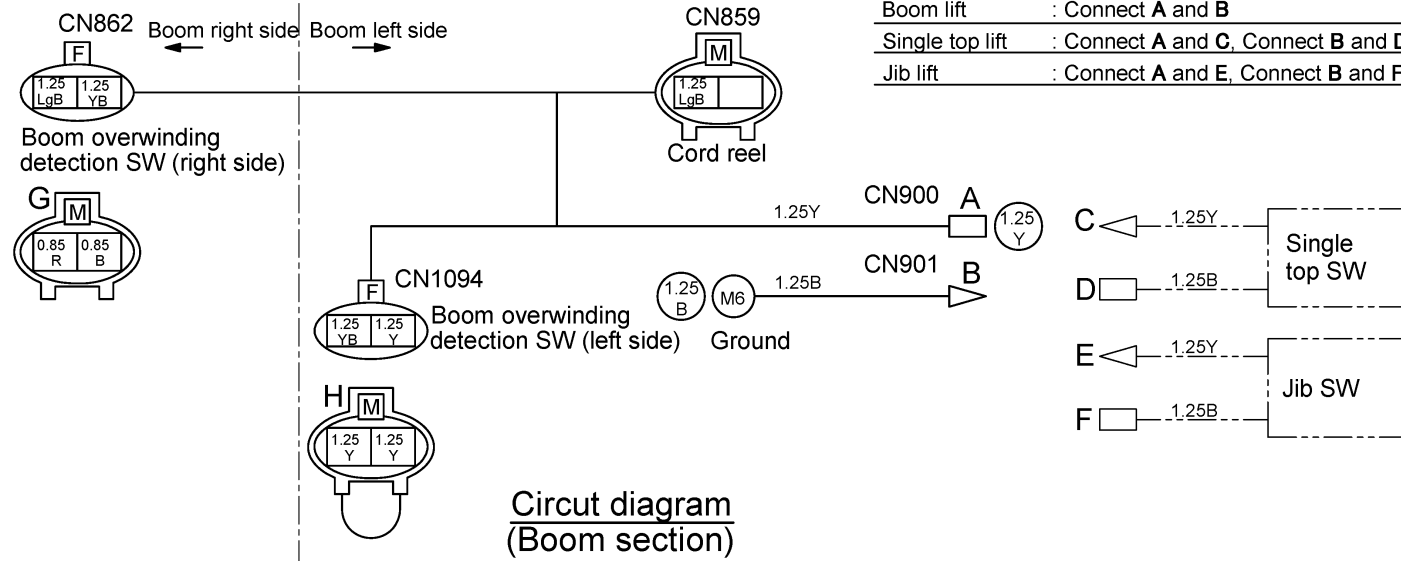


Boom overwinding detection SW

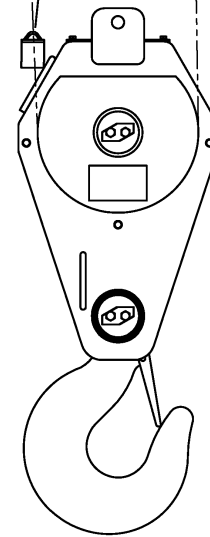


Section N-N

- Boom lift : Connect A and B
- Single top lift : Connect A and C, Connect B and D
- Jib lift : Connect A and E, Connect B and F



Circuit diagram (Boom section)

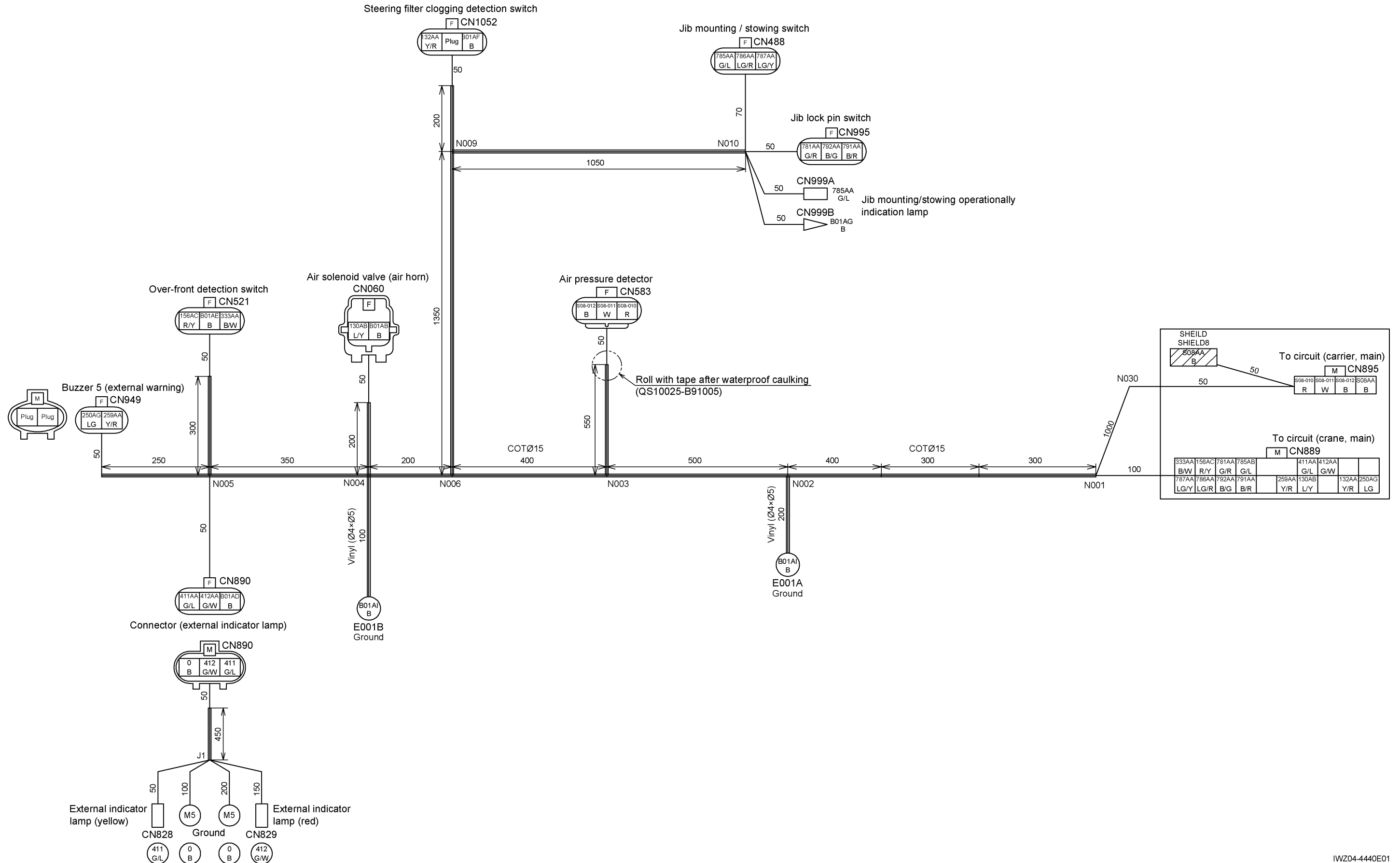


Overwinding detection SW installed on right side (Standard installation)

Overwinding detection SW installed on left side (Connect SW to H instead of G)

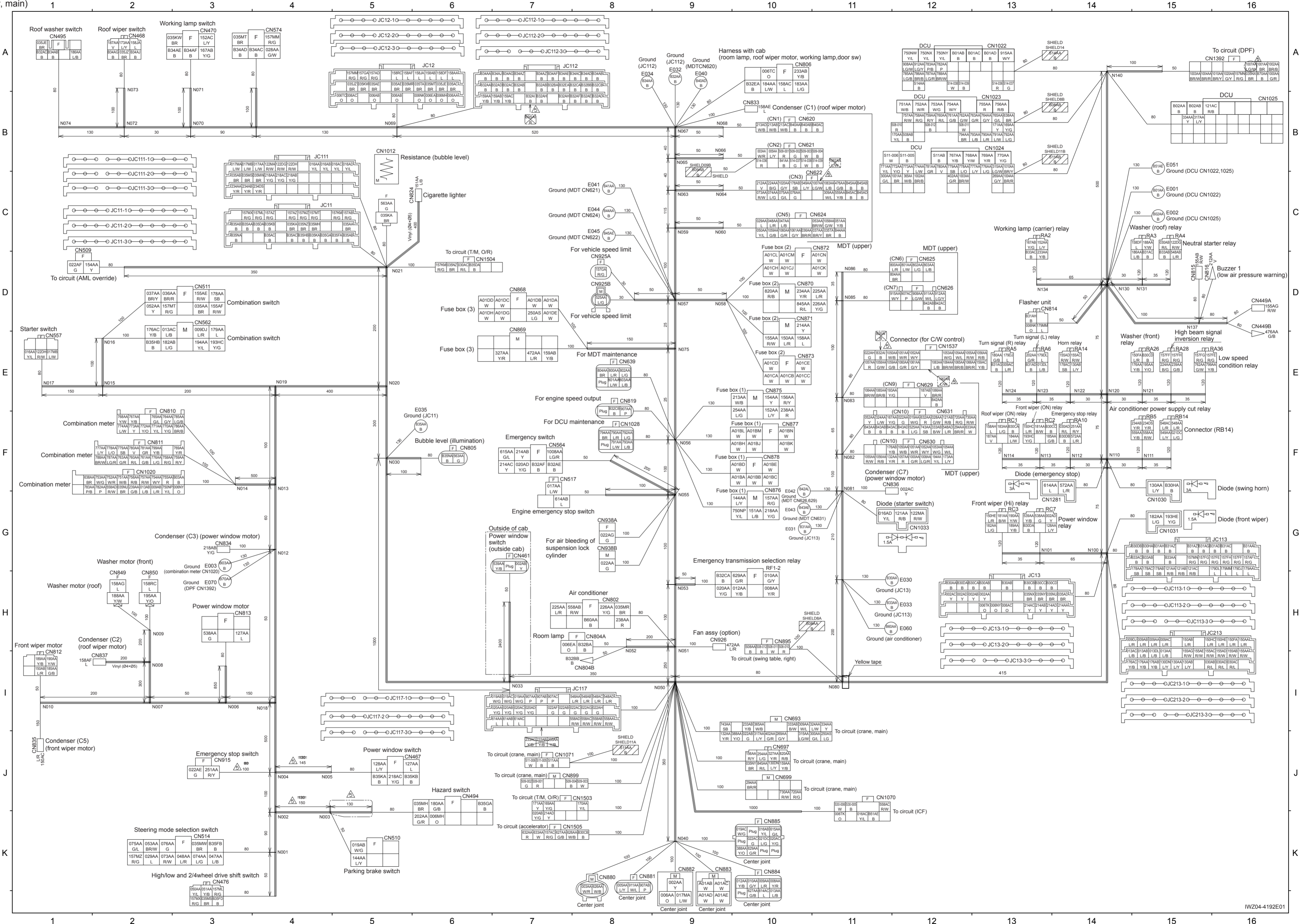
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2. Harness (swing table, right)



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1.2 Harness (carrier, main)



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