

Service Manual

02

Rough Terrain Crane

GR-900XL-2

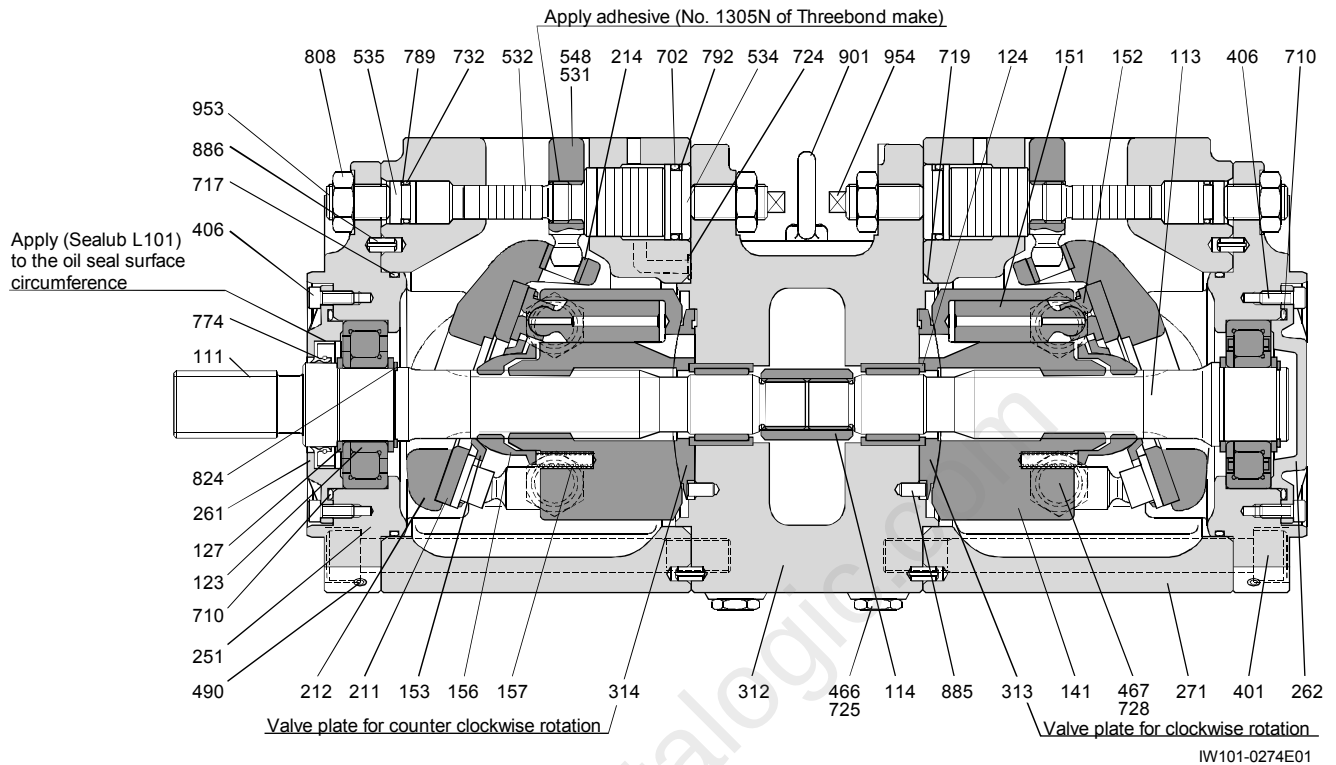
Model

GR-1000XL-2

Applicable Serial No. 547248 --

Hydraulic Pump (Double Variable Displacement Pump)

1.2 Pump main body



111. Drive shaft (F)	212. Swash plate	490. Plug	732. O-ring
113. Drive shaft (R)	214. Tilting bush	531. Tilting pin	774. Oil seal
114. Spline coupling	251. Support	532. Servo piston	789. Backup ring
123. Roller bearing	261. Seal cover (F)	534. Stopper (L)	792. Backup ring
124. Needle bearing	262. Seal cover (R)	535. Stopper (S)	808. Nut
127. Bearing spacer	271. Pump casing	548. Feed back pin	824. Snap ring
141. Cylinder block	312. Valve block	702. O-ring	885. Valve plate pin
151. Piston	313. Valve plate (R)	710. O-ring	886. Spring pin
152. Shoe	314. Valve plate (L)	717. O-ring	901. Eye bolt
153. Set plate	401. Hexagon socket head bolt	719. O-ring	953. Hexagon socket set screw
156. Spherical bush	406. Hexagon socket head bolt	724. O-ring	954. Set screw
157. Cylinder spring	466. Plug	725. O-ring	
211. Shoe plate	467. Plug	728. O-ring	

Thread size and tightening torque

Sign / Port	Thread size	Tightening torque		
		N-m	kgf-m	ft-lbf
401	M16	240	24.5	177
406	M6	12	1.2	8.8
466	G1/4	36	3.7	26.5
467	G1/2	110	11.2	81
490	NPTF 1/16	8.8	0.9	6.5

Sign / Port	Thread size	Tightening torque		
		N-m	kgf-m	ft-lbf
531, 532	M20x1.5	240	24.5	177
808	M16	130	13.3	96

Solenoid Control Valve (Outrigger, Suspension)

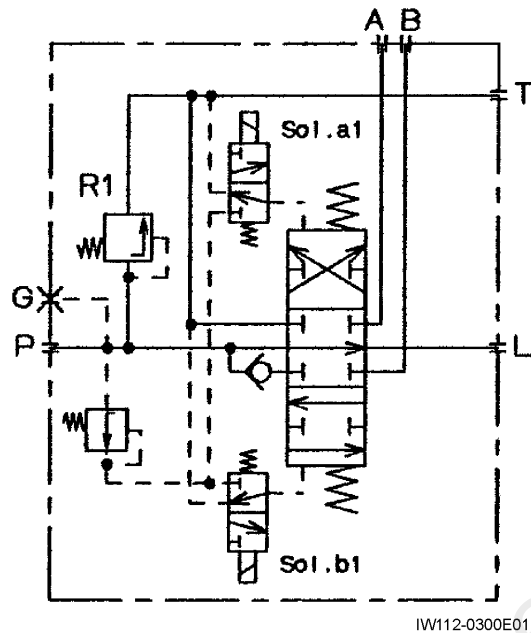
C-2 Solenoid Control Valve (Outrigger, Suspension)

[NOTICE]

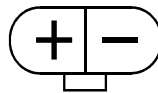
◆ There is a case that the appearance and so on differ from the parts for this machine. Although there is not so much difference in functions and disassembly procedures, make sure of the serial number of this machine and the part sales unit described in the parts catalog before starting disassembling operations.

1. Structure

1.1 General view

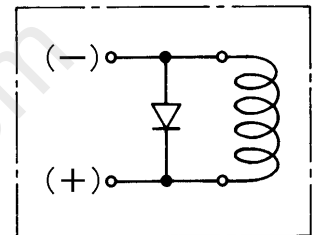


Connector



IW121-0542E01

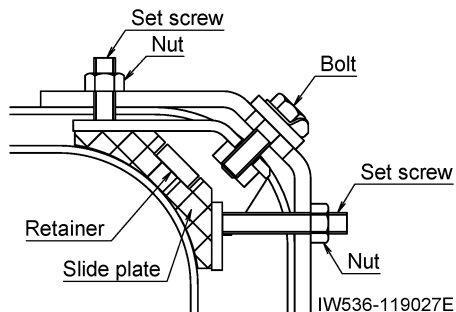
(+): Red
(-): Yellow



IW121-023002

Boom (Five-Section Boom)

3. Loosen the set screws, nuts (on the sides and top) and bolts on the top of the 4th boom section head for adjusting the slide plates in order to make the clearance to the top boom section.

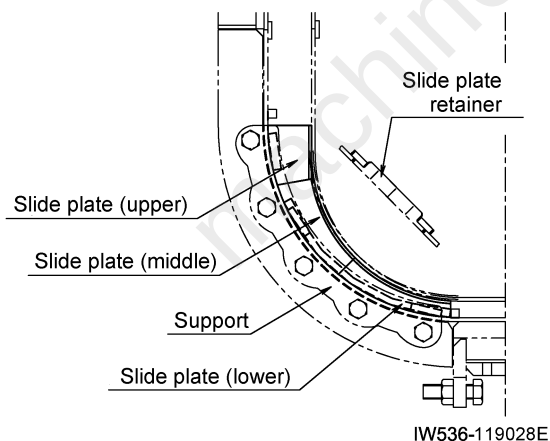


4. Pull out the top boom section by approx. 1 m (3.28 ft).

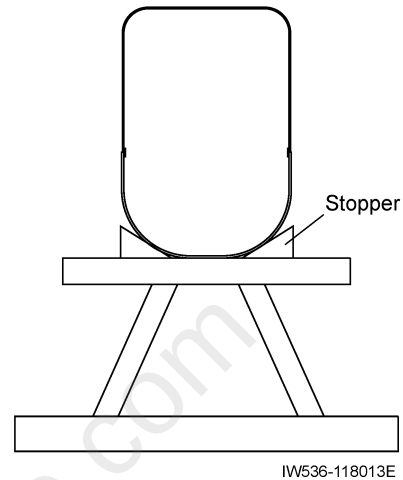
5. Remove the retainers and slide plates.

6. Remove the support (which holds the slide plates) on the bottom of the 4th boom section head by loosening the bolts.

While lifting up the top boom section slightly, remove the slide plates (upper, middle, and lower) for the rounded face and the slide plate retainer.



7. Lift up and pull out the top boom section using a crane, and place it on a platform. Put stoppers to keep balance of the boom assy.



Air Conditioner

11.4 Car air conditioner system diagnosis table IV (Electronic thermo system)

Operation trouble phenomenon of functional parts	Guessing of trouble functional parts	Check and confirmation of operational parts	Diagnosis result (Refer to temperature characteristic for thermistor.)	Possible cause	Measures (Thermistor amplifier replacement, and connector repair.)
Compressor clutch stayed ON.	Check thermistor.	Measure resistance of thermistor connector.	Resistance is small. (Abnormal if resistance is about 7kΩ or less.)	Thermistor failure.	Replace thermistor.
			Resistance is about 2kΩ (25°C).	Thermistor is normal.	-----
	Check thermo volume.	Turn OFF thermo volume.	Compressor clutch is turned OFF.	Thermo volume is short-circuited.	Replace thermo volume.
	Check relay contact and thermo amp.	Remove connector of thermistor.	Compressor clutch cannot be turned OFF. (Stayed ON)	Relay contact joining. Thermo amp. failure.	Replace relay or thermo amp.
Compressor clutch stayed OFF.	Check thermistor.	Measure resistance of thermistor connector.	Resistance is about 7kΩ or more.	Thermistor failure.	Replace thermistor.
	Check thermo volume.	Measure resistance of thermo volume terminal.	Resistance is ∞ (infinity).	Thermo volume is disconnected.	Replace thermo volume.
	Check relay contact and thermo amp.	Detach connector of thermistor, and short-circuit thermo amp. side connector.	Compressor clutch cannot be turned ON.	Relay contact joining. Thermo amp. failure.	Replace relay or thermo amp.
Compressor clutch does chattering.	Check thermo switch.	Check conduction in thermo volume terminal.	Tester indicator changes if applying shock to thermo volume.	Contact failure in thermo switch.	Replace thermo switch.
			Tester indicator does not change even if applying shock to thermo volume.	Thermo switch is normal.	-----
	Check thermo amp.	Remove thermistor, and short-circuit thermo amp. side connector.	When applying shock to thermo amp., compressor clutch does chattering.	Soldering failure (or, caulking failure) in thermo amp.	Replace thermo amp.
	Check contact condition in wiring connector.	Twist connectors.	Compressor clutch does chattering.	Connector failure.	Repair connector.
Insufficient cooling. (Clutch works ON and OFF.)	Replaces thermistor with new one.	Gets cold normally.	Thermistor failure.	Deterioration of thermistor.	Replace thermistor.

Display Control Unit (DCU)

5.6 Actual value conversion formula

(1) Formula for vehicle speed

Formula for main speed (V_s : Vehicle speed [km/h], f : Pi2 main speed signal input frequency [Hz])

Main speed sensor: 637 [min^{-1}] at 60 [km/h], 20 pulses per 1 revolution

$$f = \frac{637 \times 20}{60} \times \frac{V_s}{60} \text{ [Hz]}$$

$$V_s = \frac{3600 \times f}{637 \times 20} \text{ [km/h]}$$

Distance traveled: 7.85 cm/pulse

(1 km/h = 6.2137×10^{-1} mile/h)

(2) Formula for engine speed

E_{rev} : Engine speed [min^{-1}], f : Upper Pi1 engine speed input frequency [Hz])

Engine speed sensor: D pulses per engine revolution

$$f = \frac{E_{rev} \times D}{60} \text{ [Hz]}$$

$$E_{rev} = \frac{60 \times f}{D} \text{ [min}^{-1}\text{]}$$

The following values apply to D depending on the type of serial data received from MDT.

Type (0, 0, 0): D = 3, type (0, 0, 1): D = 6, type (0, 1, 0): D = 4, type (0, 1, 1): D = 12

(3) Formula for air pressure

P: Air pressure, V: Input voltage [V]

$$P \text{ [MPa]} = 0.735V - 0.37$$

$$\{P \text{ [kgf/cm}^2\text{]} = 7.5V - 3.75\}$$

(4) Formula for T/C hydraulic temperature

R: Sensor resistance value (W),

THTC: Torque controller hydraulic temperature ($^{\circ}\text{C}$)

$$TH_{TC} \text{ [}^{\circ}\text{C]} = 305.9 - 84.67 \times \ln(R) + 9.97 \times \ln^2(R) - 0.56 \times \ln^3(R)$$

(Conversion equation : $t^{\circ}\text{C} = 5(T^{\circ}\text{F} - 32) / 9$, $T^{\circ}\text{F} = (9 \times t^{\circ}\text{C} + 160) / 5$)

(5) Formula for remaining fuel

F: Remaining fuel (%: A value of 0 £ F £ 100 with decimal places rounded up),

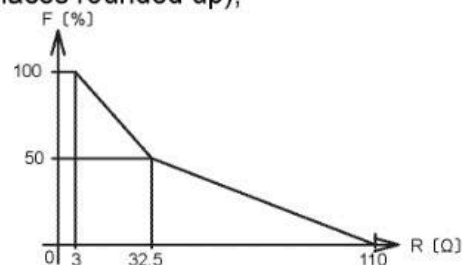
R: Sensor resistance value (W)

$$R < 3 : F \text{ [%]} = 100$$

$$3 \leq R < 32.5 : F \text{ [%]} = -1.7 \times R + 105.1$$

$$32.5 \leq R < 110 : F \text{ [%]} = -0.65 \times R + 71.2$$

$$110 \leq R : F \text{ [%]} = 0$$



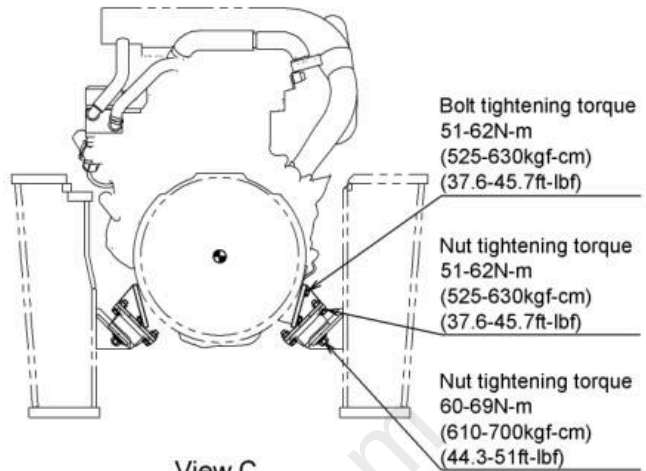
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Driving Power Transmission System

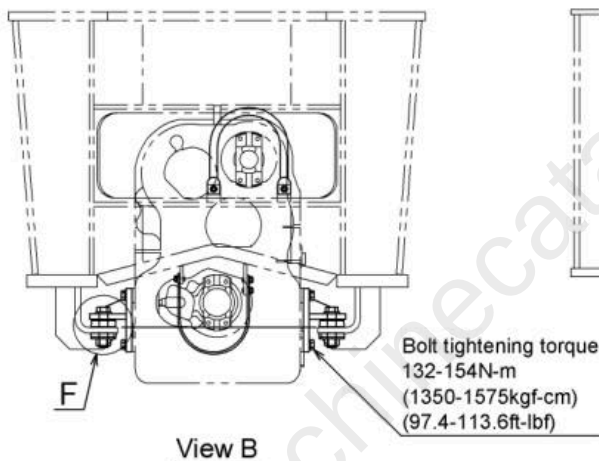
Nut tightening torque
35-40N-m
(360-405kgf-cm)
(26-29.5ft-lbf)
(12 places)

Bolt tightening torque
32-49N-m
(330-500kgf-cm)
(23.6-36ft-lbf)
(16 places)

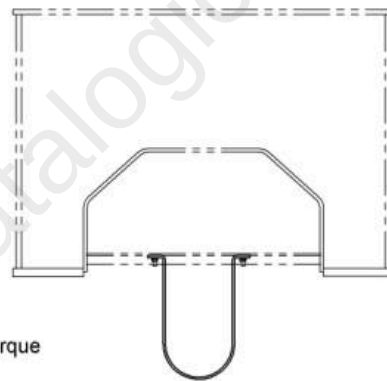
Detail E



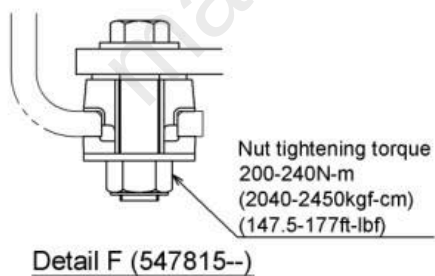
View C



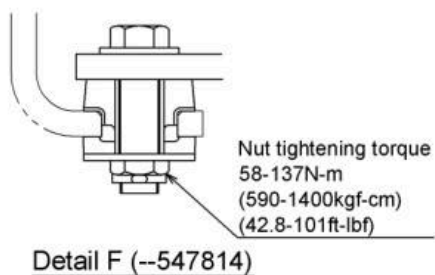
View B



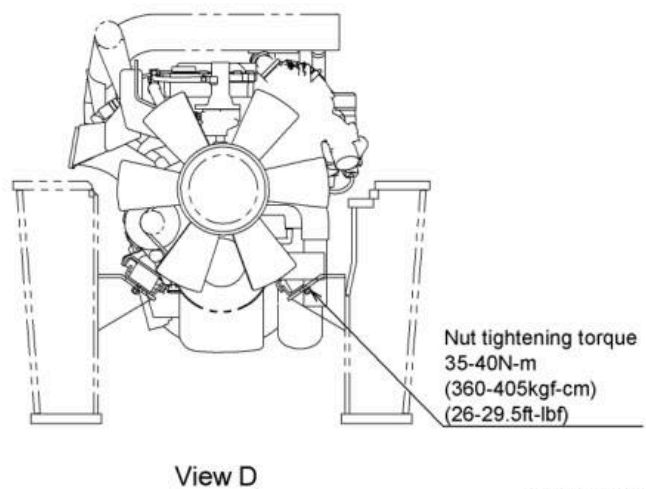
View A



Detail F (547815--)



Detail F (--547814)

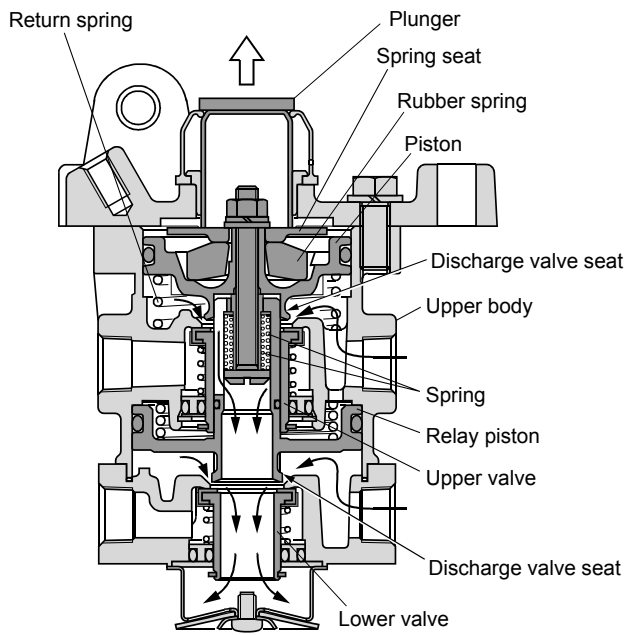


View D

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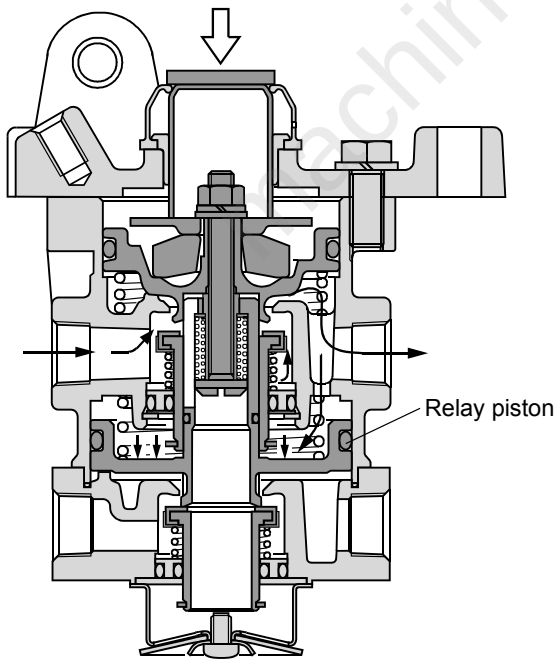
Brake Valve



2.4 Operation under piping rupture

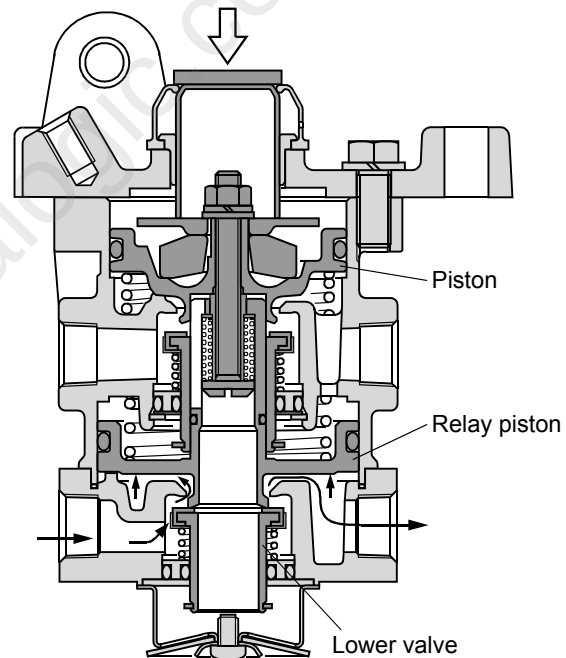
1. Operation with only primary system

When the secondary brake system is broken, the primary system remains operational, because relay piston separates it from the secondary system.



2. Operation with only secondary system

When the primary brake system is damaged, no air pressure is generated in the primary system, so that no primary air pressure is available to work on the relay piston for actuation of the secondary system. However, in this case, depressing the pedal further down brings the lower end of piston in contact with the top of relay piston, causing the discharge valve seat of relay piston to directly push lower valve to make the secondary system operate in the same way as the primary system in the normal state, generating air pressure, stabilizing, and releasing it.



3. Dismounting and remounting

1. Dismount the valve after immobilizing the vehicle and discharging the compressed air from the reservoir by opening the drain cock.
2. Tighten the pipe fitting: 29.4 - 39.2 N-m (3 - 4 kgf-m) (21.7 - 28.9 ft-lbf)

Full Version Available

Tadano GR-1000XL-2 Rough Terrain Crane Service Manual

Tadano GR-1000XL-2 rough terrain crane service manual with repair procedures, adjustments and troubleshooting for the main systems. Instant PDF download.

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