

Service Manual

02

Rough Terrain Crane

GR-900XL-2

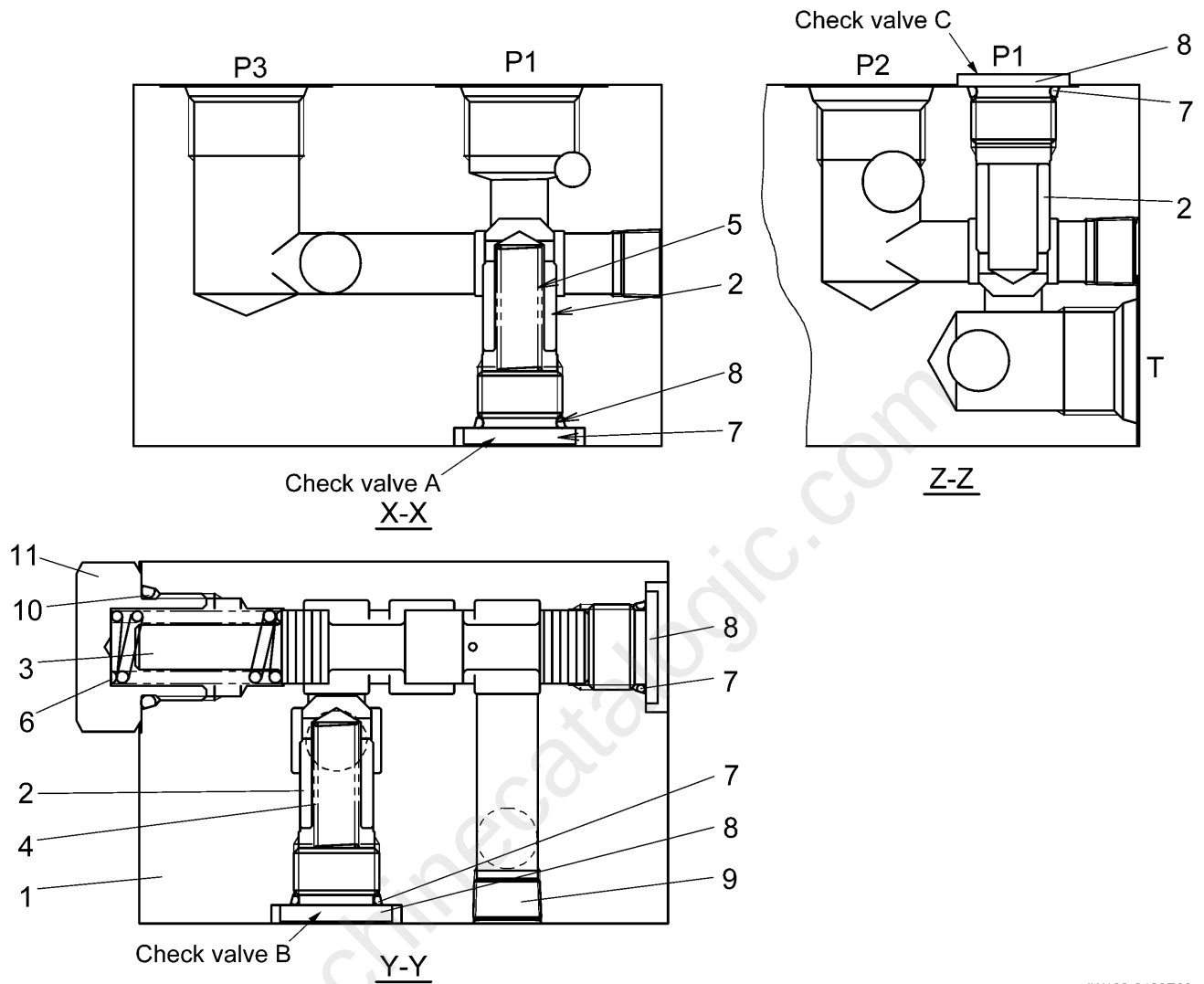
Model

GR-1000XL-2

Applicable Serial No. 547248 --

Hydraulic Valve (Emergency Steering)

Cross section along the line X-X, Y-Y, Z-Z



IW123-0420E03

- | | | |
|-----------|-----------|------------|
| 1. Body | 5. Spring | 9. Plug |
| 2. Poppet | 6. Spring | 10. O-ring |
| 3. Spool | 7. Spring | 11. Plug |
| 4. Spring | 8. Plug | |

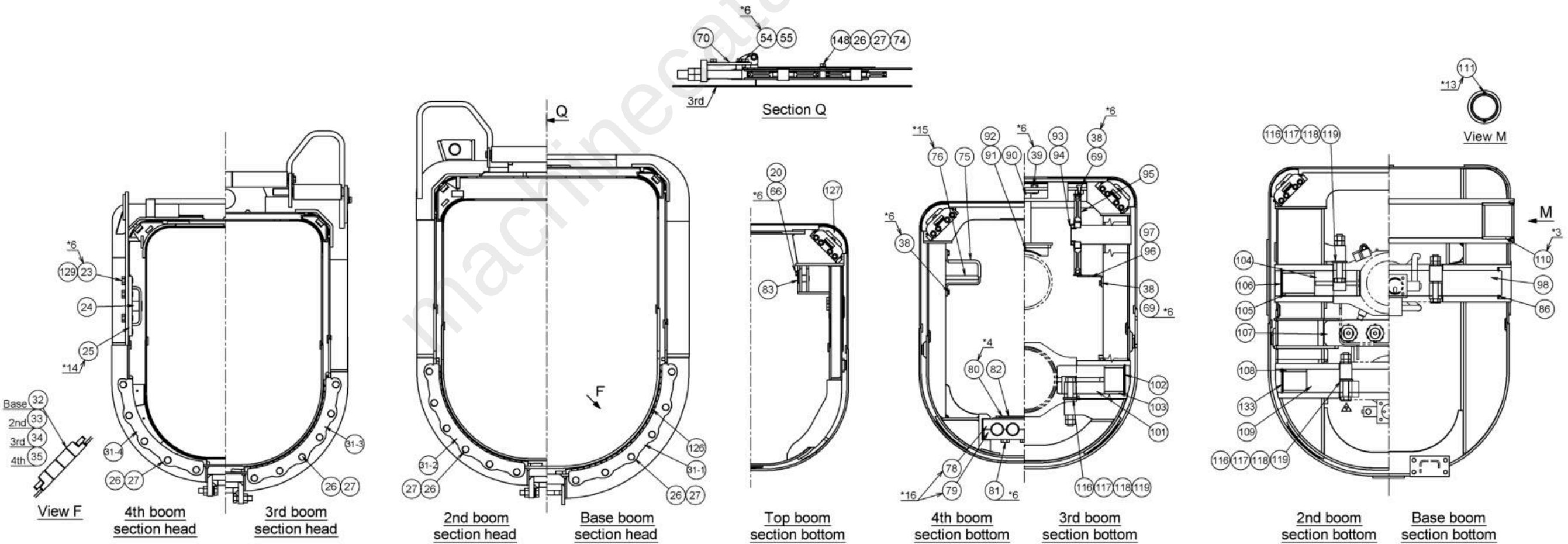
Boom (Five-Section Boom)

Boom assy (2/2)

- *1. Apply thread locking agent (ThreeBond 1305 or equivalent) to the bolts [36], tighten the bolts and lock them with nuts [37]. Use the plain washers [144, 145] as necessary to make the clearance between the bolts and the surface X 1.5 mm (0.06 in) or less.
- *2. Insert the plates [42] into the both ends, and adjust the horizontal play of the roller to 1 mm (0.04 in) or less.
(If the plates cannot be inserted to the both ends, insert the plate to the one end.)
- *3. Press fit the plain bearings [110], and then tap them.
- *4. Tighten the machine screws [80], then turn them back for a quarter turn. Apply thread locking agent to the screws and tighten them again.
- *5. Apply thread locking agent (ThreeBond 1305 or equivalent) to the bolts [36], tighten them. Let the bolts touch the surface Y slightly, and then lock the bolts with nuts [37].
- *6. Apply thread locking agent.
- *7. Bend its one end to stop the bolt rotation.
- *8. When assembling sheaves, put them close to the center line of the boom as far as possible.
- *9. Decide the number of the plates so that the maximum clearance is 1.5 mm (0.06 in).
(Standard clearance is 1.2 mm (0.048 in).)
- *10. When installing this pin, apply TNR grease to the head boss.
- *11. Tighten the bolt [146], loosen it for a half turn and lock it using the nut [147].
(Apply ThreeBond 1305 or equivalent to the threaded section.)
- *12. Adjust the clearance to 0.6mm (0.024in) or less.
- *13. Do not let the set screws protrude beyond the boss.
- *14. When installing the supports, push them against the stopper.
- *15. Make sure that the pins turn smoothly.
- *16. Install the support so that its chamfered side (C6) faces toward the boom head.
- *17. Apply thread locking agent (ThreeBond 1401 or equivalent).

Thread size and tightening torque

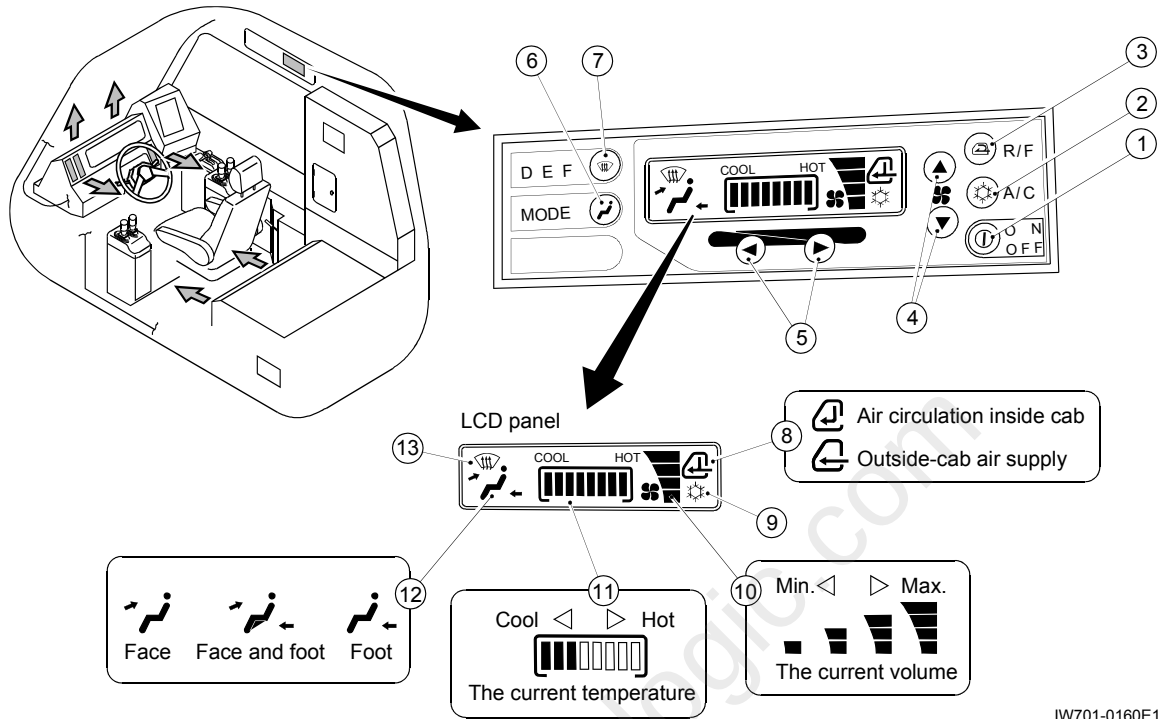
Thread	Thread size	N-m	kgf·m	ft-lbf
(39)	M12	49-59	5-6	36.1-43.5
(124)	M10	43-49	4.4-5	31.7-36.1



IW536-1320E02

Air Conditioner

3.8 Components



IW701-0160E14

Switches

1. Power switch
2. Air conditioner switch
3. Inside/outside air selector switch
4. Air flow switches
5. Temperature control switches
6. Air outlet changeover switch
7. Defroster switch

Sign on the LCD panel

8. Sign of air supply selection
9. Sign of air conditioner operation (Snow-shaped sign)
10. Sign of air flow volume
11. Sign of air temperature
12. Sign of air blowing direction
13. Sign of the defroster switch

Engine Control Unit (ECU) (GR-900-2-00101, GR-1000-2-00101, 00103)

2.7 Diagnosis code chart

No.	faulty part	Failure determination			Error code		Diag lamp		Backup control	Backup value
		Condition	Value	Period	P-code	Diag code	Orange	Red		
1	Atmospheric pressure sensor	Atmospheric pressure sensor voltage < Specified voltage	1900 mV	2944 ms	0107	19	ON	OFF	Atmospheric pressure is fixed to backup value. EGR control stops.	1013 hPa
		Atmospheric pressure sensor voltage > Specified voltage	4700 mV	2944 ms	0108					
2	Intake air temperature sensor	Intake air temperature sensor voltage < Specified voltage	100 mV	2944 ms	0112	44	ON	OFF	Intake air temperature is fixed to backup value.	At start: -20°C Normal: 25°C
		Intake air temperature sensor voltage > Specified voltage	4800 mV	2944 ms	0113					
3	Coolant temperature sensor	Coolant temperature sensor voltage < Specified voltage	100 mV	2944 ms	0117	21	ON	OFF	Coolant temperature is fixed to backup value. EGR control stops.	At start: -20°C Normal: 80°C
		Coolant temperature sensor voltage > Specified voltage	4800 mV	2944 ms	0118					
4	Throttle position mutual diagnosis	Throttle position sensor 1 position > Throttle position sensor 2 position ≥ Specified position	70%	992ms	0121	58	ON	OFF	-	-
5	Throttle position sensor 1	Throttle position sensor 1 voltage < Specified voltage	600 mV	992ms	0122	24	ON	OFF	Control is continued by means of throttle position sensor 2.	-
		Throttle position sensor 1 voltage > Specified voltage	4400 mV	992ms	0123					
6	Both throttle position sensors	Simultaneous failure in throttle position sensors 1 and 2	-	-	0122 or 0123 & 0222 or 0223	24 & 16	ON	OFF	Throttle position is fixed to backup value by accelerator switch. Accelerator switch error judgment stops. EGR control stops. Cruise control stops.	At ON: 0% At OFF: 30%
7	Fuel temperature sensor(injection pump side)	Fuel temperature sensor voltage < Specified voltage	100 mV	2944 ms	0182	41	ON	OFF	Fuel temperature(injection pump value) is fixed to backup value.	At start: 40°C Normal: 80°C
		Fuel temperature sensor voltage > Specified voltage	4800 mV	992 ms	0183					
8	Fuel temperature sensor(leak side)	Fuel temperature sensor voltage < Specified voltage	100 mV	2944 ms	0187	56	ON	OFF	Fuel temperature is fixed to backup value.	At start: 40°C Normal: 80°C
		Fuel temperature sensor voltage > Specified voltage	4800 mV	2944 ms	0188					
9	Common rail pressure sensor	Pressure is held at middle value.	-	20000 ms	0191	11	ON	OFF	Rail pressure control enters open loop control. Limp home mode (injection quantity limited) starts. EGR control stops. Cruise control stops.	-
		Common rail pressure sensor voltage < Specified voltage	700 mV	960 ms	0192					
		Common rail pressure sensor voltage > Specified voltage	4950 mV	96 ms	0193					
10	Injectors, Bank 1	Open-circuit is detected by hardware.	-	-	0200	82	ON	OFF	Bank 1 injection stops. EGR control stops. Cruise control stops. Bank 1 injection stops. Limp home mode (injection quantity limited, rail pressure limited) starts. EGR control stops. Cruise control stops.	-
		Short to GND is detected by hardware.	-	-	0200					
		Short to battery is detected by hardware.	-	-	0200					
11	Injector #1	Open-circuit is detected by hardware.	-	-	0201	37	ON	OFF	Injector #1 stops injection. EGR control stops. Cruise control stops.	-
12	Injector #5	Open-circuit is detected by hardware.	-	-	0202	38	ON	OFF	Injector #5 stops injection. EGR control stops. Cruise control stops.	-
13	Injector #3	Open-circuit is detected by hardware.	-	-	0203	39	ON	OFF	Injector #3 stops injection. EGR control stops. Cruise control stops.	-
14	Injector #6	Open-circuit is detected by hardware.	-	-	0204	08	ON	OFF	Injector #6 stops injection. EGR control stops. Cruise control stops.	-
15	Injector #2	Open-circuit is detected by hardware.	-	-	0205	46	ON	OFF	Injector #2 stops injection. EGR control stops. Cruise control stops.	-
16	Injector #4	Open-circuit is detected by hardware.	-	-	0206	47	ON	OFF	Injector #4 stops injection. EGR control stops. Cruise control stops.	-
17	Engine overrun	Engine speed > Specified overrun speed	3400 rpm	64 ms	0219	07	OFF	ON	Engine stop (Recovers at overrun recovery speed)	-
18	Throttle position sensor 2	Throttle position sensor 2 voltage < Specified voltage	600 mV	992 ms	0222	16	ON	OFF	Control is continued by means of throttle position sensor 1.	-
		Throttle position sensor 2 voltage > Specified voltage	4400 mV	992 ms	0223					
19	Boost pressure sensor	Boost pressure sensor voltage < Specified voltage	300 mV	2996 ms	0237	32	ON	OFF	Boost pressure is fixed to backup value.	1013 hPa
		Boost pressure sensor voltage > Specified voltage	4700 mV	2996 ms	0238					

Air Dryer

Symptom	Probable cause	Remedy
Condensate flows out from the air tank.	The desiccant regeneration capability is reduced due to short purge time.	Inspect the check valve and O-ring. (Purge time should be approximately 35 seconds at the pressure of 890 kPa (9 kgf/cm ²) (129psi) through 0 kPa (0kgf/cm ²) (0psi).)
	The desiccant regeneration capability is reduced due to low pressure in the purge chamber.	Check the governor discharge pressure. If it is different from the specified value, adjust or replace the governor.
No condensate is discharged from the exhaust port.	The drain valve is frozen and fails to open.	If there is an open circuit in the heater, replace the heater. (Check the conduction with a tester.) • If the thermostat is faulty, replace it. (Leave it at 0°C (32°F) or lower, then check the conduction with a tester.) • Check that no wires have been disconnected. • If the machine is left for a long time in a cold environment, time will be required for the temperature to rise after the heater is turned ON. (Approximately 15 - 20 minutes to rise from -20°C - 0°C (-4°F - 32°F))
	The governor discharge pressure is 490 kPa (71psi) or less, and the drain valve does not open.	Check the governor discharge pressure. If it differs from the specified value, adjust or replace the governor.
	A foreign substance (carbonized oil) has entered during the valve operation, preventing valve operation.	Disassemble and inspect the valve operation parts. Remove any foreign substances that are found.
Air leaks from the exhaust port.	The drain valve is frozen and does not close.	If there is an open circuit in the heater, replace the heater. • If the thermostat is faulty, replace it. • Check that no wires have been disconnected. • If the machine is left for a long time in a cold environment, time will be required for the temperature to rise after the heater is turned ON.
	A foreign substance has been caught in the valve, preventing it from sealing.	Disassemble and inspect the valve, and remove any foreign substances. If the valve seal surface is scratched, replace the valve component or valve body.

Full Version Available

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