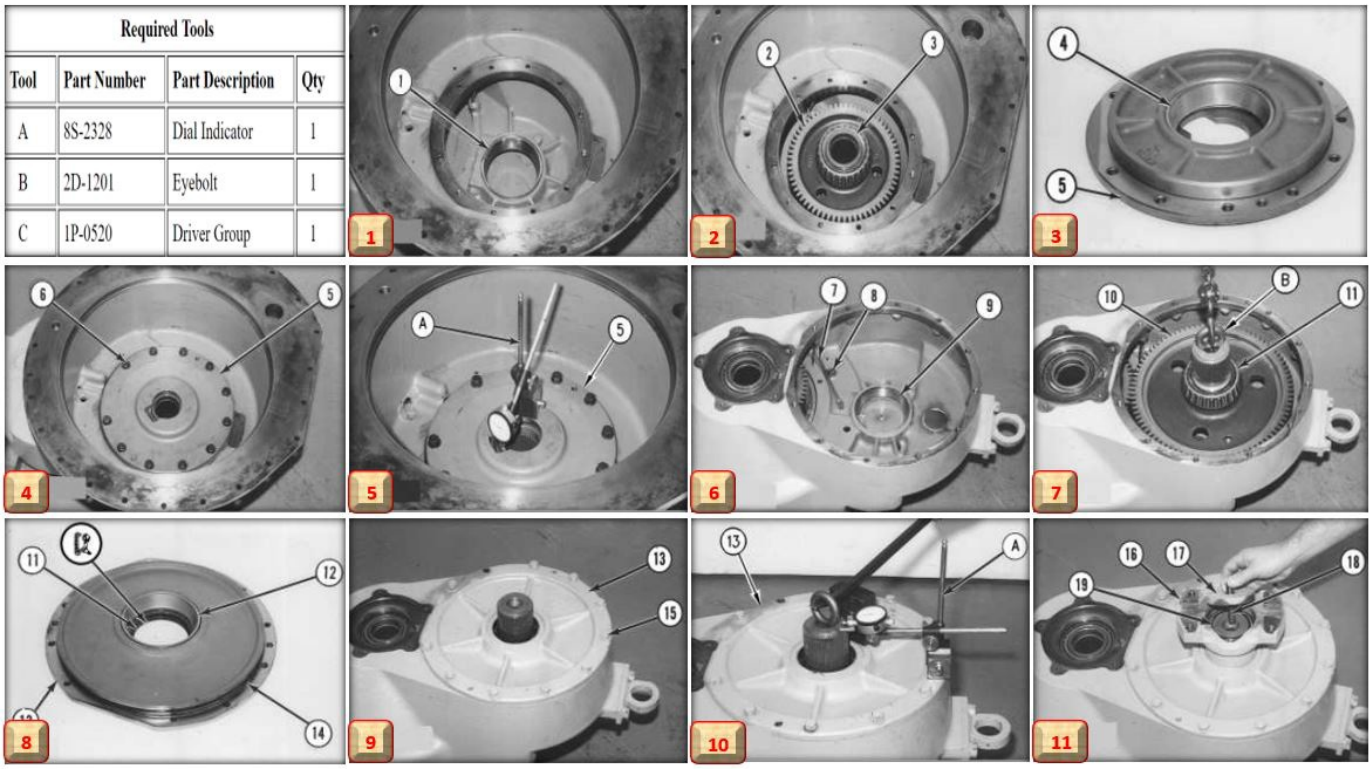
Digital Assembly Checksheet

Work Order Number	Unit Number	
6733785	RD7859	
Work Order Description	**Unit Description**	**Component**
TCRC-RD7859-CAT 777D-REBUILD TRANSMISSION	Cat 777D	Transmission

Section: 1.Transfer Gears

Transfer Gears - Assemble

Required Tools			
Tool	Part Number	Part Description	Qty
A	8S-2328	Dial Indicator	1
B	2D-1201	Eyebolt	1
C	1P-0520	Driver Group	1

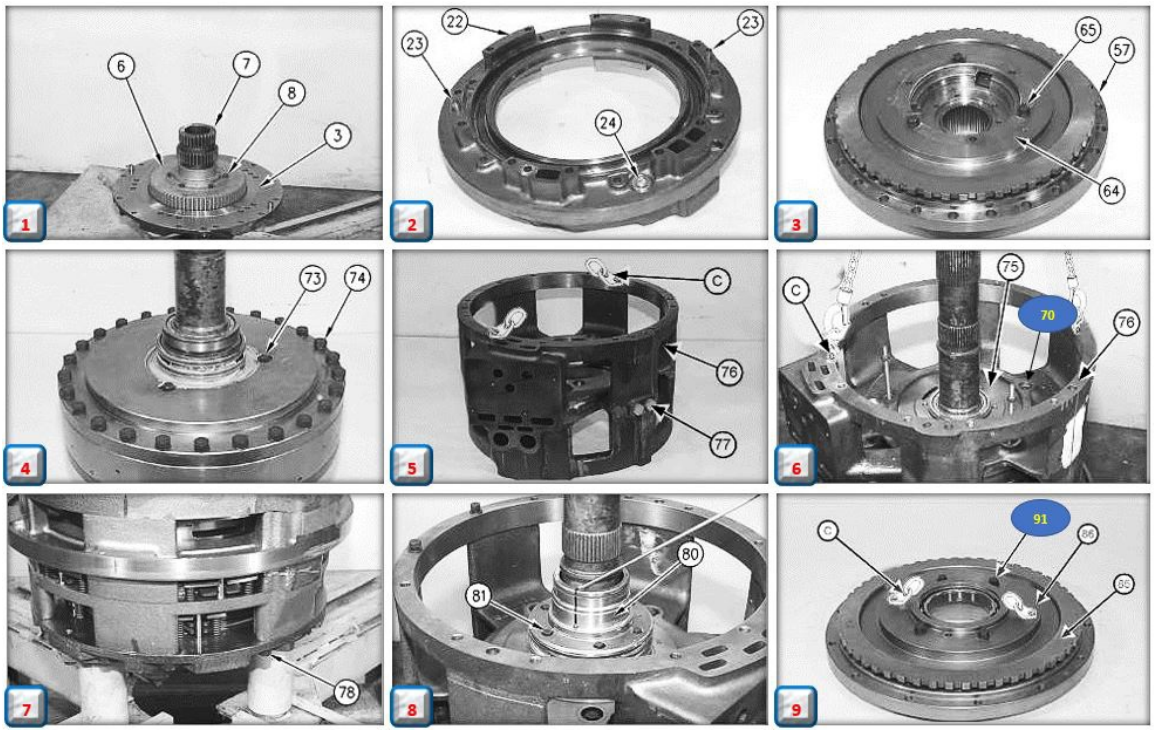


No	Activity	Measurement Type	Technical Spesification	Actual Measurement	Mech	LH
a	In the beginning, always calibrate torque wrench before use. (Di awal, selalu calibrasi torque wrench sebelum digunakan).		OK		Apurnomo	-
b	Note : Mark the bolts after giving torque.(Catatan : Tandai baut setelah diberi toque).		OK		Apurnomo	-
c	Note:Cleanliness is an important factor. Before assembly, thoroughly clean all parts in cleaning fluid. Allow the parts to air dry. Do not use wiping cloths or rags to dry parts. Lint may be deposited on the parts which may cause trouble. Inspect all parts. Dirt and other contaminants can damage the precision component. Perform assembly procedures on a clean work surface. Keep components covered and protected at all times.(Catatan: kebersihan adalah factor yang penting. Sebelum perakitan, semua part harus secara menyeluruh dibersihkan dalam cairan pembersih. Biarkan part tersebut kering dengan sendirinya. Tissue atau kain lap tidak boleh digunakan untuk mengeringkan part. Serat dari tissue atau kain lap dapat menempel pada part yang dapat menyebabkan masalah dikemudian. Kotoran dan kontaminan dapat merusak komponen dengan keakuratan. Lakukan pemasangan komponen pada permukaan yang berih. Pastikan komponen selalu tertutup dan terlindungi setiap saat).		OK		Apurnomo	-
1	Lower temperature of roller bearing cone (1) . Install roller bearing cone (1) into the transfer gear case assembly.		OK		Apurnomo	-
2a	Heat roller bearing cone (3) and the roller bearing cone on the other side of input transfer gear (2) to a maximum temperature of 135 °C (275 °F). Install roller bearing cone (3) and the other roller bearing cone onto input transfer gear (2) .		OK		Apurnomo	-
2b	Install input transfer gear (2) into the transfer gear case assembly.		OK		Apurnomo	-
3	Cool roller bearing cup (4) to a temperature of -40 °C (-40 °F). Install roller bearing cup (4) into bearing cage (5) .		OK		Apurnomo	-
4	Install the shims between bearing cage (5) and the transfer gear case assembly. Install the same amount of shims that were removed. Use two people to install bearing cage (5) . The weight of bearing cage (5) is 30 kg (65 lb). Install 11 bolts (6) and the washers.		OK		Apurnomo	-

5a	Rotate the input transfer gear several times in both directions. Position Tooling (A) on bearing cage (5) , as shown. The tip of the dial indicator should touch the input transfer gear. Measure the end play of the input transfer gear. Add or subtract shims so that the end play is 0.15 ± 0.5 mm **(0.006 ± 0.002 inch).**	US	0.006 ± 0.002 Inch	0.006 Inch	Apurnomo	-
5b	Remove bolts (6) and apply loctite. Reinstall the bolts (6) and torque to 120 ± 20 Nm**(89 ± 15 lb ft).**	US	89 ± 15 lb ft.	95 lb ft.	Apurnomo	-
6a	Install tube assembly (7) into the transfer gear case assembly. Install bolt (8) and the washer.	OK			Apurnomo	-
6b	Cool roller bearing cone (9) to a temperature of -40 °C (-40 °F). Install roller bearing cone (9) into the transfer gear case assembly.	OK			Apurnomo	-
7a	Install Tool (B) into input transfer gear (10) .Heat roller bearing cone (11) and the roller bearing cone on the other side of input transfer gear (10) to a maximum temperature of 135 °C (275 °F). Install roller bearing cone (11) and the other roller bearing cone onto input transfer gear (10)	OK			Apurnomo	-
7b	Position a suitable lifting device on Tool (B) . Secure the suitable lifting device to a hoist. Install input transfer gear (10) into the transfer gear case assembly.	OK			Apurnomo	-
8a	Apply 7M-7260 Liquid Gasket to the bore of bearing cage (13) . Apply the Liquid Gasket at the point of contact between the lip seal (11) and the bearing cage (13) . Allow the Liquid Gasket to dry.	OK			Apurnomo	-
8b	Position bearing cage (13) into a suitable press. Use Tooling (C) (not shown) to install lip seal (11) into bearing cage (13) , as shown. The lip seal (11) and the top of bearing cage (13) should be even. Lubricate lip seal (11) with the lubricant that is being sealed.	OK			Apurnomo	-
8c	Cool roller bearing cup (12) to a temperature of -40 °C (-40 °F). Install roller bearing cup (12) into bearing cage (13) .	OK			Apurnomo	-
8d	Install O-ring seal (14) onto bearing cage (13) .	OK			Apurnomo	-
9	Install the shims between bearing cage (13) and the transfer gear case assembly. Install the same amount of shims that were removed. Position bearing cage (13) on the transfer gear case assembly. Install 11 bolts (4) and the washers.	OK			Apurnomo	-
10a	Rotate the input transfer gear several times in both directions. Position Tooling (A) on bearing cage (13) , as shown. The tip of the dial indicator should touch the input transfer gear. Measure the end play of the input transfer gear. Add or subtract shims so that the end play is 0.15 ± 0.5 mm **(0.006 ± 0.002 inch).**	US	0.006 ± 0.002 Inch	0.006 Inch	Apurnomo	-
10b	Remove bolts (4) and apply loctite. Reinstall the bolts (4) and torque to 120 ± 20 Nm **(89 ± 15 lb ft).**	US	89 ± 15 lb ft.	95 lb ft.	Apurnomo	-
11	Install yoke (16).Install O-ring seal (19) on yoke (16).Position retainer (17) on O-ring seal (19) . Install bolt (18) and torque to 215 ± 40 N·m **(160 ± 30 lb ft).**	US	160 ± 30 lb ft.	-	-	-

	Approved By	Approved Date
Mechanic	Apurnomo	05/05/2023
Supervisor	#	#

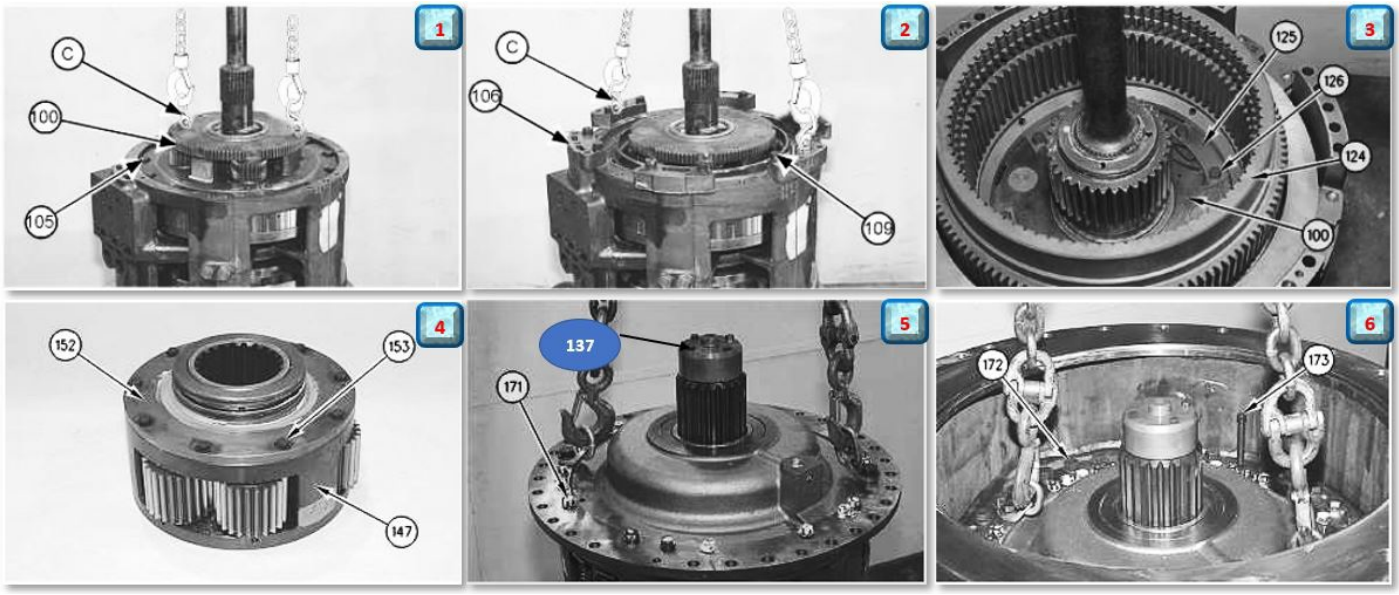
Section: 2.Assembly T/M Picture 1



No	Activity	Measurement Type	Technical Spesification	Actual Measurement	Mech	LH
1	Install bolts (8) and torque to 47 ± 9 N·m (35 ± 7 lb ft)	US	35 ± 7 lb ft.	-	-	-
2	Install plug (24) and torque to 220 ± 33 N·m (162 ± 24 lb ft)	US	162 ± 24 lb ft.	-	-	-
3	Install bolts (65) on PISTON-BALANCE and torque to 47 ± 9 N·m (35 ± 7 lb ft)	US	35 ± 7 lb ft.	-	-	-
4a	Install bolts (74) and torque to 105 ± 20 N·m (75 ± 15 lb ft)	US	75 ± 15 lb ft.	-	-	-
4b	Install bolts (73) and torque to 47 ± 9 N·m (35 ± 7 lb ft)	US	35 ± 7 lb ft.	-	-	-
5	Install plug (77) and torque to 100 ± 15 N·m (74 ± 11 lb ft)	US	74 ± 11 lb ft.	-	-	-
6	Install bolt (70) on MANIFOLD-CENTER and torque to 47 ± 9 N·m (35 ± 7 lb ft)	US	35 ± 7 lb ft.	-	-	-
7	Install bolts (78) and torque to 105 ± 20 N·m (75 ± 15 lb ft)	US	75 ± 15 lb ft.	-	-	-
8	Install bolts (81) and torque to 47 ± 9 N·m (35 ± 7 lb ft)	US	35 ± 7 lb ft.	-	-	-
9	Install bolts (91) on PISTON-BALANCE and torque to 47 ± 9 N·m (35 ± 7 lb ft)	US	35 ± 7 lb ft.	-	-	-

	Approved By	Approved Date
Mechanic	-	-
Supervisor	#	#

Section: 3.Assembly T/M Picture 2



No	Activity	Measurement Type	Technical Spesification	Actual Measurement	Mech	LH
1	Install bolts (105) and torque to 105 ± 20 N·m (75 ± 15 lb ft)	US	75 ± 15 lb ft.	90 lb ft.	Esantoso	-
2	Install bolts (109) and torque to 105 ± 20 N·m (75 ± 15 lb ft)	US	75 ± 15 lb ft.	90 lb ft.	Esantoso	-
3	Install bolts (126) and torque to 47 ± 9 N·m (35 ± 7 lb ft)	US	35 ± 7 lb ft.	38 lb ft.	Esantoso	-
4	Install bolts (153) and torque to 47 ± 9 N·m (35 ± 7 lb ft)	US	35 ± 7 lb ft.	38 lb ft.	Esantoso	-
5a	Install bolts (171) and torque to 105 ± 20 N·m (75 ± 15 lb ft)	US	75 ± 15 lb ft.	85 lb ft.	Aputra	-
5b	Install bolts (137) and torque to 25 ± 6 N·m (220 ± 53 lb in)	US	220 ± 53 lb in.	220 lb in.	Aputra	-
6	Install Transmission case to transmission planetary. Install bolts (172) and torque to 215 ± 40 N·m (160 ± 30 lb ft).	US	160 ± 30 lb ft.	170 lb ft.	Aputra	-

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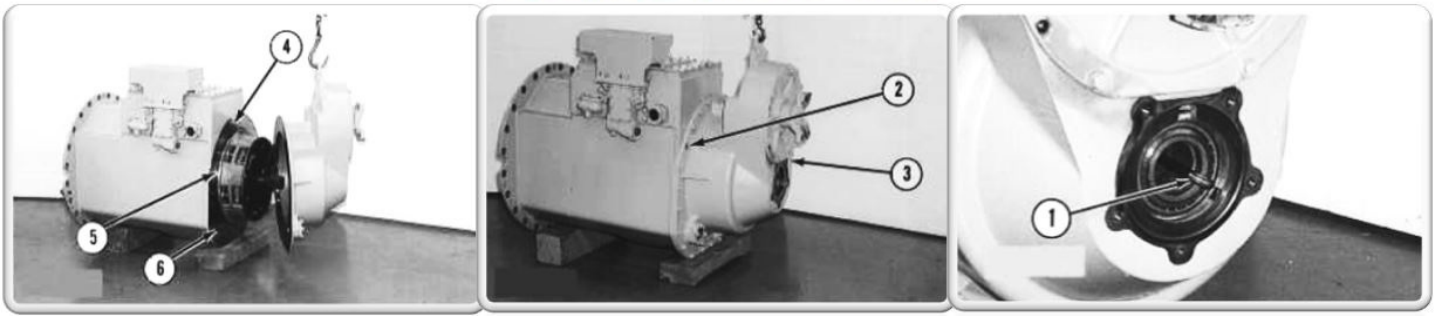
Mechanic	Aputra	10/05/2023
Supervisor	-	-

Section: 4.Transmission and Transfer Gears - Connect

Transmission and Transfer Gears – Connect



No	Activity	Measurement Type	Technical Spesification	Actual Measurement	Mech	LH
1	Install O-ring seals (4), (5), and (6) onto the case assembly.	OK			Aputra	-
2	Position a suitable lifting device on transfer gear (3). Secure the lifting device to a hoist. The weight of transfer gear (3) is 147 kg (325 lb).	OK			Aputra	-
3	Position transfer gear (3) to the transmission, as shown. Install 24 bolts (2) and the washers. Torque bolts (2) to 120 ± 20 Nm (89 ± 15 lb ft).	US	89 ± 15 lb ft	90 lb ft	Aputra	-
4	Install governor drive shaft (1) into the input shaft assembly	OK			Aputra	-

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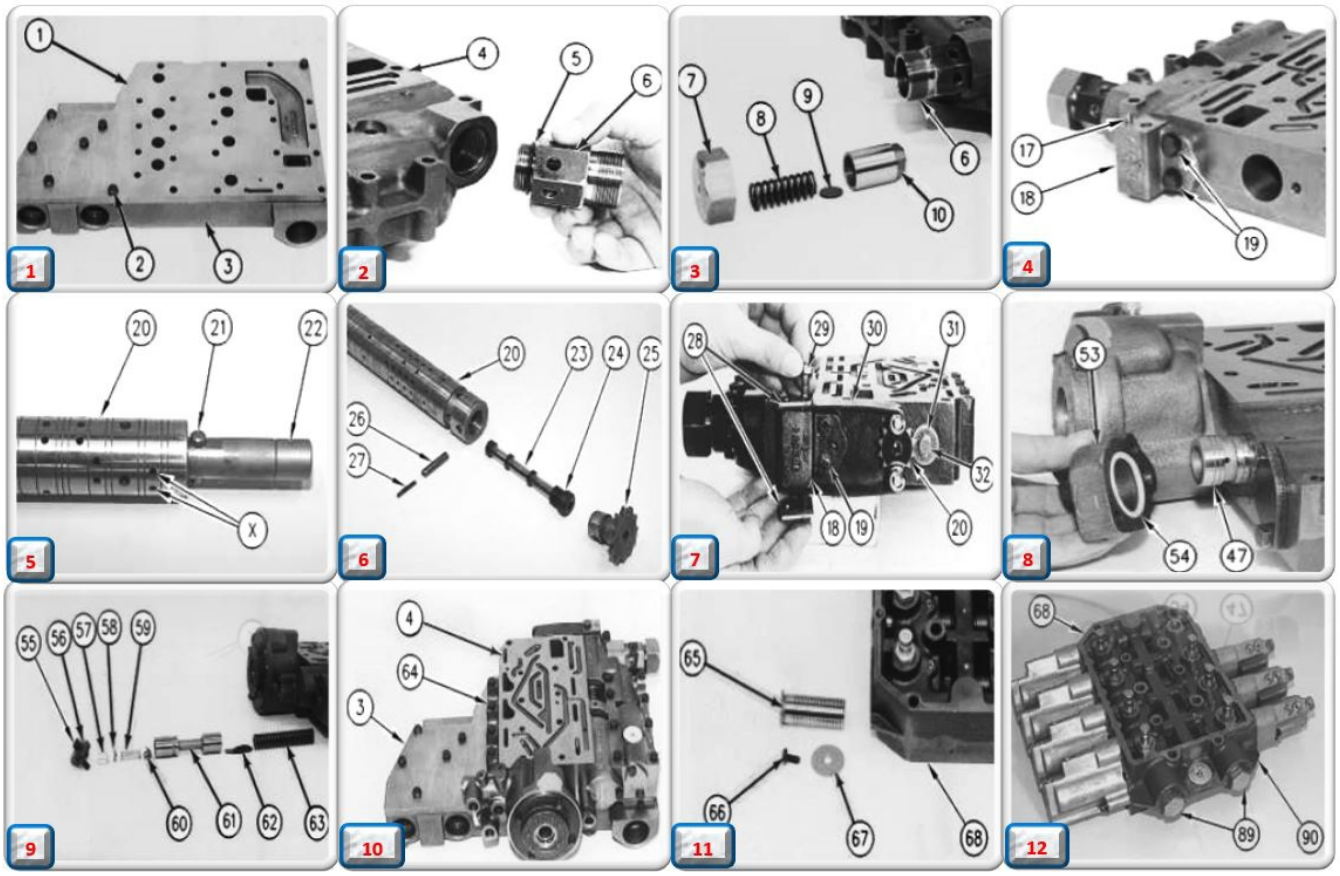
Mechanic	Aputra	10/05/2023
Supervisor	-	-

Section: 5.Transmission Hydraulic Control - Assemble



No	Activity	Measurement Type	Technical Spesification	Actual Measurement	Mech	LH
1	Position plate (1) on manifold (3). Install seven bolts (2). Tighten bolts (2) to a torque of 30 ± 4 N·m (22 ± 3 lb ft).	US	22 ± 3 lb ft.	22 lb ft.	Ekoarysw	ssyahrizal
2	Install O-ring seal (5) on body (6). Install body (6) in selector and pressure control valve (4). Tighten body (6) to a torque of 41 ± 7 N·m (30 ± 5 lb ft).	US	30 ± 5 lb ft.	35 lb ft.	Ekoarysw	ssyahrizal
3	Install valve (10), spacer (9), spring (8), and cap (7) into body (6). Tighten cap (7) to a torque of 41 ± 7 N·m (30 ± 5 lb ft).	US	30 ± 5 lb ft.	35 lb ft.	Ekoarysw	ssyahrizal
4	Install the hard washers and bolts (19). Torque bolts (19) 30 ± 4 N·m (22 ± 3 lb ft).	US	22 ± 3 lb ft.	22 lb ft.	Ekoarysw	ssyahrizal
5	Install pin (21) in spool assembly (20). Use Holes (X) as a reference in order to position the pin.	OK			Ekoarysw	ssyahrizal
6	Install O-ring seal (24) on screen filter (23). Install the screen filter in spool assembly (20). Tighten the screen filter to a torque of 6 ± 1 N·m (53 ± 9 lb in).**Pn spool as rotary 174-9161**	US	53 ± 9 lb in.	60 lb in.	Ekoarysw	ssyahrizal
7a	Install spool assembly (20) in the selector and pressure control valve. Install washer (31) and install bolt (32) that holds spool assembly (20) in position. Tighten bolt (32) to a torque of 30 ± 7 N·m (22 ± 5 lb ft).	US	22 ± 5 lb ft.	22 lb ft.	Ekoarysw	ssyahrizal
7b	Install retainers (28) and install two locating bolts (29). Tighten the locating bolts to a torque of 30 ± 7 N·m (22 ± 5 lb ft).	US	22 ± 5 lb ft.	22 lb ft.	Ekoarysw	ssyahrizal
8	Install O-ring seal (54) and the pin (not shown) in cover (53). Install the cover on spool assembly (47). Install the two bolts that hold the cover in position. Tighten the bolts to a torque of 30 ± 7 N·m (22 ± 5 lb ft).	US	22 ± 5 lb ft.	22 lb ft.	Ekoarysw	ssyahrizal
9	Install cover (56) that holds reducing spool assembly (61) in position. Install two bolts (55). Tighten the bolts to a torque of 30 ± 7 N·m (22 ± 5 lb ft).	US	22 ± 5 lb ft.	22 lb ft.	Ekoarysw	ssyahrizal
10	Install thirteen bolts (64) that secure selector and pressure control valve (4) to manifold (3). Tighten the bolts to a torque of 30 ± 4 N·m (22 ± 3 lb ft).	US	22 ± 3 lb ft.	22 lb ft.	Ekoarysw	ssyahrizal
11	Tighten bolt 66 to a torque of 12 ± 3 N·m **Note :**Pastikan 3 pengecekan dan penadaan pada bolt no 66 Mekanik,**leader** dan **Qc**	US	9 ± 2 lb ft.	11 lb ft.	Ekoarysw	ssyahrizal
12	Tighten plug 89 to a torque of 100 ± 15 N·m (74 ± 11 lb ft)	US	74 ± 11 lb ft.	70 lb ft.	Ekoarysw	ssyahrizal

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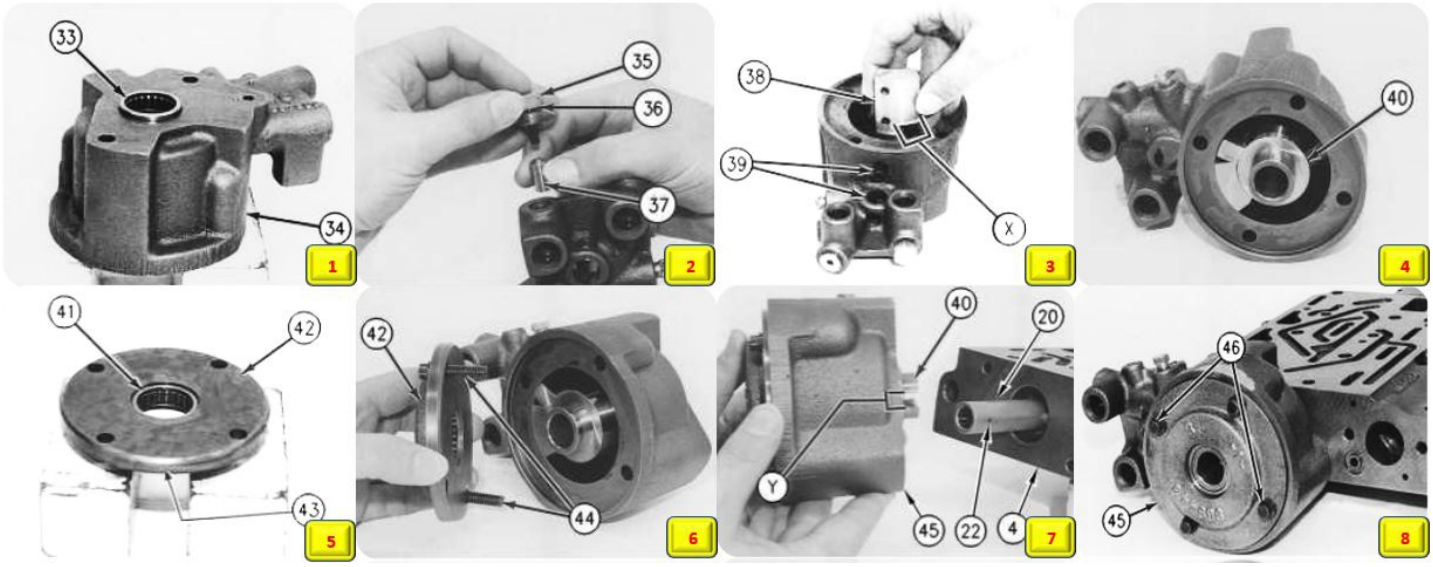
Mechanic	Ekoarysw	04/05/2023
Supervisor	-	-

Section: 6.Rotary actuator - assembly

Rotary actuator - assembly



No	Activity	Measurement Type	Technical Spesification	Actual Measurement	Mech	LH
1	Position actuator body (34) in a suitable press. Use Tooling (B) (not shown) in order to install roller bearing (33). The roller bearing should protrude 4.0 ± 0.5 mm (0.16 ± 0.02 inch) above the surface of the actuator body.	Metric	4 ± 0.5 mm	4 mm	Ekoarysw	ssyahrizal
2	Put an O-ring seal (36) on each of the two O-ring plugs (35). Lubricate two exhaust valves (37) with the oil that is used in the system	OK			Ekoarysw	ssyahrizal
3	Install two exhaust valves (37) in the actuator body. Make sure that the flat end is installed first. Install two O-ring plugs (35).	OK			Ekoarysw	ssyahrizal
4	Install actuator vane (38) in the actuator body. Make sure that Notch (X) is in the correct position. Install two bolts (39). Do not tighten the bolts at this time.	OK			Ekoarysw	ssyahrizal
6	Position cover (42) in a suitable press. Use Tooling (B) (not shown) in order to install roller bearing (41) in cover (42). The roller bearing should protrude 7.20 ± 0.25 mm (0.280 ± 0.001 inch) from surface (43).	Metric	7.2 ± 0.25 mm	7.2 mm	Ekoarysw	ssyahrizal
7	Install cover (42) on the actuator body. Install bolts (44) and install the washers. Tighten bolts (44) to a torque of 30 ± 4 N·m (22 ± 3 lb ft).	US	22 ± 3 lb ft.	22 lb ft.	Ekoarysw	ssyahrizal
8	Tighten two bolts (39) (not shown) to a torque of 15 ± 3 N·m (11 ± 2 lb ft). The rotary actuator must turn freely through 300 degrees of rotation.	US	11 ± 2 lb ft.	11 lb ft.	Ekoarysw	ssyahrizal
9	Install rotary actuator (45) on selector and pressure control valve (4). Make sure that large Groove (Y) in actuator rotor (40) is in alignment with dowel (22) on spool assembly (20).	OK			Ekoarysw	ssyahrizal
10	Install bolts (46) and the washers in rotary actuator (45). Tighten the bolts to a torque of 30 ± 4 N·m (22 ± 3 lb ft).	US	22 ± 3 lb ft.	22 lb ft.	Ekoarysw	ssyahrizal
11	Make sure that the rotary actuator turn freely for 270 degrees of rotation.	OK			Ekoarysw	ssyahrizal

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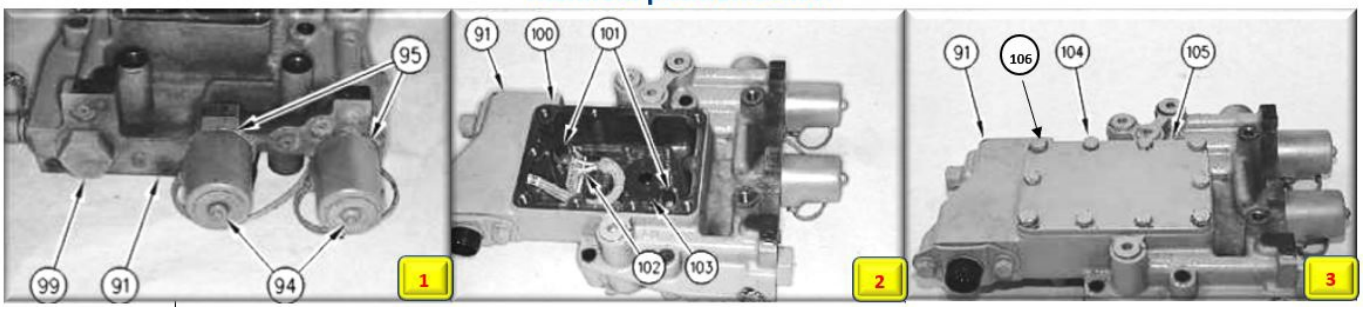
Mechanic	Ekoarysw	04/05/2023
Supervisor	-	-

Section: 7.Manifold position sensor

Manifold position sensor

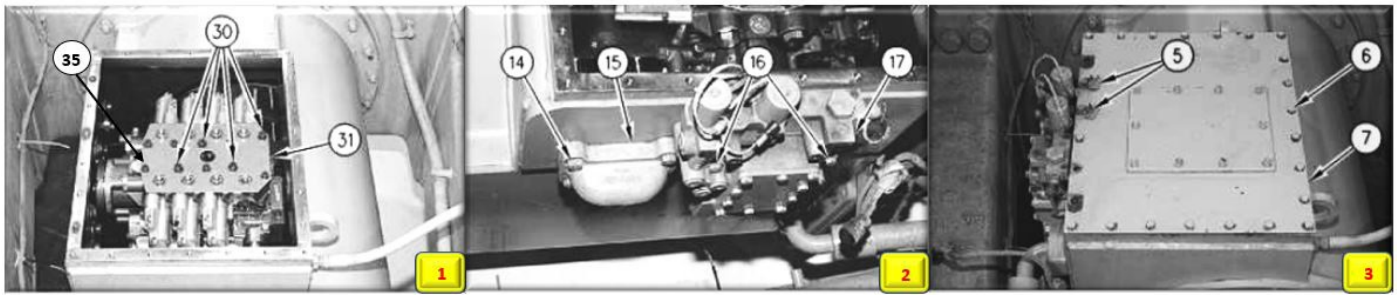


No	Activity	Measurement Type	Technical Spesification	Actual Measurement	Mech	LH
1	Install cartridge assemblies (96) in manifold (91). Tighten the cartridge assemblies to a torque of 80 ± 5 N·m (59 ± 4 lb ft).	US	59 ± 4 lb ft.	60 lb ft.	Ekoarysw	ssyahrizal
2	Install position sensor (103) in manifold (91). Install two bolts (101) and torque to 12 ± 3 N·m (105 ± 27 lb in)	US	105 ± 27 lb in	105 lb in	Ekoarysw	ssyahrizal
3a	Position cover (105) on manifold (91). Install bolts (104) and torque to 25 ± 6 N·m (220 ± 53 lb in)	US	220 ± 53 lb in	220 lb in	Ekoarysw	ssyahrizal
3b	Install bolts (106) and torque to 47 ± 9 N·m (35 ± 7 lb ft).	US	35 ± 7 lb ft.	35 lb ft.	Ekoarysw	ssyahrizal

	Approved By	Approved Date
Mechanic	Ekoarysw	04/05/2023
Supervisor	-	-

Section: 8.Control Valve and Selector Manifold - Connect

Control Valve and Selector Manifold - Connect



No	Activity	Measurement Type	Technical Spesification	Actual Measurement	Mech	LH
1a	Install four bolts (30) and the washers. Tighten the bolts to a torque of 48 ± 4 N·m (35 ± 3 lb ft).	US	35 ± 3 lb ft.	35 lb ft.	Aputra	-
1b	Install five bolts (35) and the washers. Tighten the bolts to a torque of 30 ± 4 N·m (22 ± 3 lb ft).	US	22 ± 3 lb ft.	22 lb ft.	Aputra	-
2	Position manifold (17) on the transmission case. Make sure that the coupling and the three sleeves are properly aligned in the transmission shift control valve. Install four bolts (16). Tighten the bolts to a torque of 48 ± 4 N·m (35 ± 3 lb ft).	US	35 ± 3 lb ft	35 lb ft	Aputra	-
3	Position the gasket (not shown) and position cover (7) on the transmission case. Install 21 bolts (6).	OK			Aputra	-

	Approved By	Approved Date
Mechanic	Aputra	10/05/2023
Supervisor	-	-