MULTIPLE DISC BRAKE

(modular design - SAE C size)

Service Instructions

NOTE

The 545 Series "C" Mount Brakes have been replaced by the 547 Series "C" Mount Brakes. Use these instructions to service both the 545 and 547 Series. If you do not find your specific model number in TABLE 1, contact ZF Off-Highway Solutions Minnesota Inc. for further information.

TABLE 1

Model Number	Oil Cooled	Lining Kit Number	Bearing Kit Number	O-ring Kit Number	Spring Kit Number	Red Springs Quantity	Blue Springs Quantity	Total Rotor Quantity	Rotor Stacking Arrangement
13-547-002	No	12-501-004	12-501-006	12-501-002	12-501-008	0	6	5	Figure 1
13-547-006	Yes	12-501-004	12-501-006	12-501-002	12-501-008	4	4	5	Figure 1
13-547-014	No	12-501-004	12-501-238	12-501-239	12-501-008	4	4	5	Figure 1
13-547-016	No	12-501-222	12-501-220	12-501-219	12-501-221	8	4	5	Figure 1
13-547-022	Yes	12-501-014	12-501-006	12-501-002	12-501-008	8	6	*6	Figure 3
13-547-024	Yes	12-501-004	12-501-006	12-501-002	12-501-008	8	2	*6	Figure 3
13-547-026	No	12-501-014	12-501-006	12-501-002	12-501-008	8	2	*6	Figure 3
13-547-028	No	12-501-222	12-501-360	12-501-219	12-501-221	4	2	5	Figure 1
13-547-030	No	12-501-014	12-501-006	12-501-002	12-501-008	8	6	*6	Figure 3
13-547-034	Yes	12-501-014	12-501-006	12-501-002	12-501-008	8	6	*6	Figure 3
13-547-036	Yes	12-501-014	12-501-006	12-501-002	12-501-008	8	6	*6	Figure 3
13-547-038	No	12-501-014	12-501-006	12-501-002	12-501-008	8	6	*6	Figure 3
13-547-044	No	12-501-014	12-501-006	12-501-002	12-501-092	14	0	*6	Figure 3
13-547-046	No	12-501-014	12-501-006	12-501-002	12-501-008	0	4	*6	Figure 3
13-547-048	Yes	12-501-004	12-501-006	12-501-002	12-501-008	8	4	5	Figure 1
13-547-052	No	12-501-004	12-501-006	12-501-002	12-501-008	0	8	3	Figure 6
13-547-054	No	12-501-004	12-501-006	12-501-002	12-501-008	4	0	5	Figure 4
13-547-058	No	12-501-004	12-501-006	12-501-002	12-501-008	0	6	5	Figure 1
13-547-060	No	12-501-004	12-501-006	12-501-002	12-501-008	0	6	5	Figure 1
13-547-064	No	12-501-014	12-501-006	12-501-002	12-501-008	0	6	*6	Figure 3
13-547-066	No	12-501-004	12-501-006	12-501-002	12-501-008	8	2	2	Figure 7
13-547-068	No	12-501-004	12-501-357	12-501-356	12-501-008	4	2	5	Figure 1
13-547-072	No	12-501-004	12-501-006	12-501-002	12-501-008	4	2	5	Figure 1
13-547-074	No	12-501-014	12-501-006	12-501-002	12-501-008	4	2	*6	Figure 3
13-547-076	No	12-501-004	12-501-006	12-501-002	12-501-008	4	4	5	Figure 1
13-547-078	Yes	12-501-004	12-501-006	12-501-002	12-501-008	4	4	5	Figure 1
13-547-082	No	12-501-014	12-501-006	12-501-002	12-501-008	6	0	*6	Figure 3
13-547-084	No	12-501-004	12-501-006	12-501-002	12-501-008	6	2	5	Figure 1
13-547-086	Yes	12-501-004	12-501-006	12-501-002	12-501-008	6	2	5	Figure 1
13-547-090	No	12-501-004	12-501-006	12-501-002	12-501-008	8	0	5	Figure 1
13-547-092	No	12-501-004	12-501-006	12-501-002	12-501-008	8	0	5	Figure 1
13-547-094	No	12-501-004	12-501-006	12-501-002	12-501-008	8	0	5	Figure 1
13-547-096	No	12-501-004	12-501-006	12-501-002	12-501-008	8	0	5	Figure 1
13-547-098	No	12-501-014	12-501-006	12-501-002	12-501-008	6	4	*6	Figure 3
13-547-102	No	12-501-004	12-501-006	12-501-002	12-501-008	8	4	5	Figure 1
13-547-104	No	12-501-004	12-501-006	12-501-002	12-501-008	8	4	5	Figure 1
** 13-547-106	No	12-501-146	12-501-006	12-501-002	12-501-008	8	4	5	Figure 1
13-547-108	Yes	12-501-004	12-501-006	12-501-002	12-501-008	8	4	5	Figure 1
13-547-110	No	12-501-004	12-501-006	12-501-002	12-501-008	8	4	5	Figure 1
13-547-116	No	12-501-004	12-501-006	12-501-002	12-501-008	8	4	5	Figure 1
13-547-118	No	12-501-014	12-501-006	12-501-002	12-501-008	8	6	*6	Figure 3
13-547-120	No	12-501-004	12-501-006	12-501-002	12-501-008	4	4	5	Figure 1
13-547-122	No	12-501-014	12-501-006	12-501-002	12-501-008	6	4	*6	Figure 3
13-547-124	No	12-501-004	12-501-006	12-501-002	12-501-008	8	0	5	Figure 1
13-547-126	Yes	12-501-014	12-501-006	12-501-002	12-501-008	6	4	*6	Figure 3

* Uses two different thicknesses of rotors.

continued...

** One of the rotors is a speed sensor rotor.

NOTE: If your product number is not listed, please contact ZF Off-Highway Solutions Minnesota Inc. for information.

Continued from page 1

Model Number	Oil Cooled	Lining Kit Number	Bearing Kit Number	O-ring Kit Number	Spring Kit Number	Red Springs Quantity	Blue Springs Quantity	Total Rotor Quantity	Rotor Stacking Arrangement
13-547-130	No	12-501-014	12-501-006	12-501-002	12-501-008	6	0	*6	Figure 3
13-547-132	No	12-501-004	12-501-006	12-501-002	12-501-008	8	0	5	Figure 1
13-547-134	No	12-501-004	12-501-006	12-501-002	12-501-008	8	4	5	Figure 1
13-547-164	No	12-501-014	12-501-006	12-501-002	12-501-008	8	2	*6	Figure 3
13-547-166	No	12-501-014	12-501-006	12-501-002	12-501-008	0	4	*6	Figure 3
13-547-182	No	12-501-014	12-501-006	12-501-002	12-501-008	6	4	*6	Figure 3
13-547-190	No	12-501-004	12-501-006	12-501-002	12-501-008	8	4	5	Figure 1
13-547-204	No	12-501-014	12-501-006	12-501-002	12-501-008	6	0	*6	Figure 3
13-547-208	No	12-501-004	12-501-006	12-501-002	12-501-008	4	2	5	Figure 1
13-547-210	No	12-501-004	12-501-182	12-501-002	12-501-008	8	0	5	Figure 1
13-547-212	No	12-501-004	12-501-006	12-501-002	12-501-008	8	4	5	Figure 1
13-547-214	No	12-501-014	12-501-006	12-501-002	12-501-008	4	2	*6	Figure 3
13-547-220	No	12-501-014	12-501-006	12-501-002	12-501-008	6	4	*6	Figure 3
13-547-226	Yes	12-501-014	12-501-006	12-501-002	12-501-008	6	0	*6	Figure 3
13-547-228	No	12-501-014	12-501-006	12-501-002	12-501-008	0	4	*6	Figure 3
13-547-232	No	12-501-004	12-501-006	12-501-002	12-501-008	4	4	5	Figure 1
13-547-238	Yes	12-501-014	12-501-006	12-501-002	12-501-092	14	0	*6	Figure 3
13-547-244	Yes	12-501-154	12-501-006	12-501-002	12-501-008	6	2	*6	Figure 3
13-547-246	No	12-501-014	12-501-006	12-501-002	12-501-008	6	4	*6	Figure 3
13-547-252	No	12-501-004	12-501-006	12-501-002	12-501-008	0	8	3	Figure 6
13-547-254	Yes	12-501-014	12-501-006	12-501-002	12-501-008	8	0	5	Figure 1
13-547-262	No	12-501-004	12-501-006	12-501-002	12-501-092	16	0	5	Figure 1
13-547-264	No	12-501-004	12-501-006	12-501-002	12-501-008	4	2	5	Figure 1
13-547-266	No	12-501-004	12-501-006	12-501-002	12-501-008	8	0	5	Figure 1
13-547-268	No	12-501-004	12-501-182	12-501-002	12-501-008	8	4	5	Figure 1
13-547-272	No	12-501-014	12-501-182	12-501-002	12-501-008	8	6	*6	Figure 3
** 13-547-276	No	12-501-227	12-501-006	12-501-002	12-501-008	6	2	5	Figure 1
13-547-278	No	12-501-014	12-501-006	12-501-002	12-501-008	6	4	*6	Figure 3
13-547-280	No	12-501-004	12-501-006	12-501-002	12-501-008	8	4	5	Figure 1
13-547-282	No	12-501-014	12-501-006	12-501-002	12-501-008	8	6	*6	Figure 3
** 13-547-286	No	12-501-146	12-501-006	12-501-002	12-501-008	8	0	5	Figure 1
13-547-288	No	12-501-014	12-501-182	12-501-002	12-501-008	8	6	*6	Figure 3
13-547-290	No	12-501-004	12-501-006	12-501-002	12-501-008	4	4	5	Figure 1
13-547-294	No	12-501-004	12-501-006	12-501-002	12-501-008	8	4	5	Figure 1
13-547-296	No	12-501-014	12-501-006	12-501-002	12-501-008	8	6	*6	Figure 3
13-547-298	Yes	12-501-004	12-501-006	12-501-002	12-501-008	4	4	5	Figure 1
13-547-300	No	12-501-014	12-501-224	12-501-223	12-501-008	8	6	*6	Figure 3
** 13-547-304	Yes	12-501-237	12-501-006	12-501-002	12-501-008	6	2	*6	Figure 3
13-547-306	No	12-501-004	12-501-006	12-501-002	12-501-008	0	6	5	Figure 1
13-547-316	No	12-501-014	12-501-182	12-501-002	12-501-008	8	6	*6	Figure 3
13-547-324	No	12-501-004	12-501-006	12-501-002	12-501-008	8	4	5	Figure 1
13-547-332	No	12-501-004	12-501-006	12-501-002	12-501-008	4	2	5	Figure 1
13-547-334	No	12-501-004	12-501-006	12-501-002	12-501-008	8	4	5	Figure 1
13-547-336	No	12-501-014	12-501-182	12-501-002	12-501-008	6	4	*6	Figure 3
13-547-342	No	12-501-004	12-501-006	12-501-002	12-501-008	8	0	5	Figure 1
13-547-344	No	12-501-004	12-501-182	12-501-002	12-501-008	4	4	5	Figure 1
13-547-352	No	12-501-004	12-501-006	12-501-002	12-501-008	4	2	5	Figure 1
13-547-354	No	12-501-004	12-501-006	12-501-002	12-501-008	4	4	5	Figure 1
13-547-358	No	12-501-014	12-501-006	12-501-002	12-501-008	6	0	*6	Figure 3
13-547-362	Yes	12-501-004	12-501-006	12-501-002	12-501-008	4	2	5	Figure 1
13-547-364	No	12-501-004	12-501-006	12-501-002	12-501-008	4	4	5	Figure 1
13-547-370	Yes	12-501-014	12-501-006	12-501-002	12-501-008	8	6	*6	Figure 3
13-547-376	No	12-501-014	12-501-006	12-501-002	12-501-008	8	2	*6	Figure 3
13-547-378	No	12-501-004	12-501-182	12-501-002	12-501-008	8	4	5	Figure 1
13-547-384	No	12-501-004	12-501-006	12-501-002	12-501-008	4	2	5	Figure 1
13-547-390	Yes	12-501-213	12-501-284	12-501-285	12-501-008	6	0	7	Figure 2
** 13-547-392	No	12-501-286	12-501-006	12-501-002	12-501-008	6	2	5	Figure 1
13-547-396	No	12-501-004	12-501-006	12-501-002	12-501-008	8	4	5	Figure 1
13-547-398	No	12-501-004	12-501-006	12-501-002	12-501-008	0	8	3	Figure 6
13-547-402	No	12-501-004	12-501-182	12-501-002	12-501-008	4	2	5	Figure 1
13-547-404	No	12-501-004	12-501-182	12-501-002	12-501-008	4	2	5	Figure 1
13-547-410	No	12-501-222	12-501-220	12-501-219	12-501-221	8	0	5	Figure 1
13-547-414	Yes	12-501-349	12-501-350	12-501-347	12-501-348	8	2	7	Figure 2
13-547-416	No	12-501-004	12-501-006	12-501-002	12-501-008	4	2	5	Figure 1
13-547-418	No	12-501-004	12-501-182	12-501-002	12-501-008	4	4	5	Figure 1

* Uses two different thicknesses of rotors.

continued...

** One of the rotors is a speed sensor rotor.

NOTE: If your product number is not listed, please contact ZF Off-Highway Solutions Minnesota Inc. for information.

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Model Number	Oil Cooled	Lining Kit Number	Bearing Kit Number	O-ring Kit Number	Spring Kit Number	Red Springs Quantity	Blue Springs Quantity	Total Rotor Quantity	Rotor Stacking Arrangement
13-547-420	Yes	12-501-014	12-501-182	12-501-002	12-501-008	8	6	*6	Figure 3
13-547-422	No	12-501-222	12-501-220	12-501-219	12-501-221	4	2	5	Figure 1
13-547-424	No	12-501-004	12-501-006	12-501-002	12-501-008	4	2	5	Figure 1
13-547-426	No	12-501-004	12-501-238	12-501-239	12-501-008	8	4	5	Figure 1
13-547-428	No	12-501-004	12-501-351	12-501-002	12-501-008	4	2	5	Figure 1
13-547-430	Yes	12-501-349	12-501-350	12-501-347	12-501-348	8	2	7	Figure 2
13-547-432	No	12-501-014	12-501-006	12-501-002	12-501-008	8	2	*6	Figure 3
13-547-434	Yes	12-501-222	12-501-357	12-501-356	12-501-221	8	4	5	Figure 1
13-547-438	Yes	12-501-222	12-501-357	12-501-356	12-501-221	8	4	5	Figure 1
13-547-440	Yes	12-501-014	12-501-357	12-501-356	12-501-221	8	6	*6	Figure 3
13-547-442	No	12-501-222	12-501-220	12-501-219	12-501-221	6	2	5	Figure 1
13-547-444	No	12-501-004	12-501-367	12-501-002	12-501-008	4	4	5	Figure 1
13-547-446	No	12-501-004	12-501-006	12-501-002	12-501-008	6	0	5	Figure 1
13-547-448	Yes	12-501-222	12-501-220	12-501-219	12-501-221	8	0	5	Figure 1
13-547-450	No	12-501-004	12-501-006	12-501-300	12-501-008	8	4	5	Figure 1
** 13-547-452	No	12-501-286	12-501-006	12-501-002	12-501-008	6	2	5	Figure 1
13-547-454	No	12-501-004	12-501-006	12-501-002	12-501-008	4	2	5	Figure 1
13-547-456	No	12-501-004	12-501-182	12-501-002	12-501-008	4	2	5	Figure 1
13-547-458	No	12-501-222	12-501-220	12-501-219	12-501-221	4	4	5	Figure 1
13-547-460	No	12-501-004	12-501-006	12-501-002	12-501-008	5	5	2	Figure 7
13-547-462	No	12-501-334	12-501-006	12-501-002	12-501-008	8	6	*6	Figure 3
13-547-464	Yes	12-501-004	12-501-006	12-501-002	12-501-008	0	6	3	Figure 6
13-547-466	Yes	12-501-349	12-501-006	12-501-002	12-501-008	8	2	7	Figure 2
13-547-468	No	12-501-004	12-501-367	12-501-002	12-501-008	6	2	5	Figure 1
13-547-470	No	12-501-004	12-501-006	12-501-002	12-501-008	8	4	5	Figure 1
13-547-472	Yes	12-501-004	12-501-006	12-501-002	12-501-008	8	0	5	Figure 1
13-547-474	Yes	12-501-014	12-501-006	12-501-002	12-501-008	6	0	*6	Figure 3
13-547-476	No	12-501-004	12-501-182	12-501-002	12-501-008	4	2	3	Figure 6
13-547-478	No	12-501-004	12-501-006	12-501-002	12-501-008	4	4	1	None
13-547-480	No	12-501-004	12-501-006	12-501-002	12-501-008	8	4	5	Figure 1
13-547-482	No	12-501-014	12-501-006	12-501-002	12-501-008	8	2	*6	Figure 3
13-547-484	No	12-501-004	12-501-006	12-501-002	12-501-008	8	0	5	Figure 1
13-547-486	Yes	12-501-004	12-501-006	12-501-002	12-501-008	0	8	3	Figure 6
13-547-490	No	12-501-004	12-501-351	12-501-002	12-501-008	4	2	5	Figure 1
13-547-492	No	12-501-004	12-501-006	12-501-002	12-501-008	4	4	5	Figure 1
13-547-496	No	12-501-014	12-501-006	12-501-002	12-501-008	8	4	*6	Figure 3
***13-547-498	No	n/a	n/a	12-501-523	n/a	8	0	5	Figure 1
13-547-500	No	12-501-014	12-501-006	12-501-002	12-501-008	6	4	*6	Figure 3
13-547-502	No	12-501-004	12-501-438	12-501-002	12-501-008	4	2	5	Figure 1
13-547-504	No	12-501-014	12-501-220	12-501-219	12-501-221	6	0	*6	Figure 3
13-547-506	No	12-501-004	12-501-006	12-501-002	12-501-008	0	4	3	Figure 7
13-547-508	Yes	12-501-004	12-501-006	12-501-002	12-501-008	6	2	5	Figure 1
13-547-510	Yes	12-501-014	12-501-182	12-501-002	12-501-441	14	0	*6	Figure 3
13-547-516	Yes	12-501-004	12-501-006	12-501-002	12-501-008	8	8	5	Figure 1
13-547-518	No	12-501-004	12-501-006	12-501-002	12-501-008	4	2	5	Figure 1
13-547-522	Yes	12-501-004	12-501-006	12-501-002	12-501-008	4	2	5	Figure 1
13-547-526	Yes	12-501-004	12-501-006	12-501-002	12-501-008	4	2	5	Figure 1
13-547-528	No	12-501-004	12-501-006	12-501-002	12-501-008	10	5	5	Figure 1
† 13-547-530	Yes	n/a	n/a	n/a	n/a	16	0	5	Figure 1
**13-547-532	Yes	12-501-004	12-501-006	12-501-002	12-501-008	8	0	5	Figure 1
13-547-534	No	12-501-014	12-501-480	12-501-481	12-501-482	4	3	*6	Figure 3
13-547-540	No	12-501-014	12-501-006	12-501-002	12-501-092	14	0	*6	Figure 3
13-547-542	Yes	12-501-493	12-501-494	12-501-495	12-501-496	4	2	5	Figure 1
13-547-544	Yes	12-501-014	12-501-006	12-501-002	12-501-008	0	6	*6	Figure 3
13-547-548	Yes	12-501-004	12-501-006	12-501-002	12-501-441	14	0	5	Figure 1
13-547-550	No	12-501-448	12-501-449	12-501-442	12-501-443	4	0	5	Figure 1
13-547-558	Yes	12-501-004	12-501-006	12-501-002	12-501-008	6	2	5	Figure 1
13-547-560	Yes	12-501-004	12-501-006	12-501-002	12-501-008	8	6	*6	Figure 3
13-547-566	No	12-501-004	12-501-006	12-501-002	12-501-008	8	0	5	Figure 1
13-547-570	No	12-501-004	12-501-006	12-501-002	12-501-008	8	4	5	Figure 1
13-547-574	No	12-501-334	12-501-220	12-501-219	12-501-221	0	4	*6	Figure 3

* Uses two different thicknesses of rotors.

** One of the rotors is a speed sensor rotor.

*** All Repair Kit items are included in kit number 12-501-429.

† All Repair Kit items are included in kit number 12-501-473.

NOTE: If your product number is not listed, please contact ZF Off-Highway Solutions Minnesota Inc. for information.

TABLE 2 (Items included in kits)

Lining Kit	Bearing Kit	O-ring Kit	Spring Kit
Case Gaskets (8) Primary Disc (11) Rotor Discs (12) Stator Discs (13) *O-rings (6)	Case Gaskets (8) Oil Seal (4) Bearing (3) *O-rings (6) *Bearing (22) *Oil Seal (24) *Bearing (25)	Case Gaskets (8) Oil Seal (4) O-rings (19 & 21) Back-up Rings (18 & 20) *O-rings (6) *Oil Seal (24)	Case Gaskets (8) Springs - red (16) Springs - blue (16) *O-rings (6)

* Not used in all models.

NOTE: Model number 13-547-542 uses o-rings in place of case gaskets (8).

NOTE

This literature services various models in this brake series. The components shown in Figures 1 and 9 may appear different than what is found in your brake.

DISASSEMBLY

(Refer to Figures 1 through 8)

1. Remove six socket head cap screws (29) and bearing cover (28). **NOTE: Not all models use socket head cap screws (29) or bearing cover (28).**
2. Remove two socket head bolts (5). A suitable holding fixture is useful to hold the brake in position. Some 545 Series Brakes use two 3/8-16UNC flat head bolts and o-rings (6). Remove o-rings (6) from bolts.
3. Remove retaining ring (26) from shaft assembly (9). **NOTE: Not all models use retaining ring (26).**
4. If possible, tap female end of spline shaft (9) and spring plate (15) with a soft mallet to separate cover (7). If sections cannot be separated this way, use a screwdriver and carefully pry sections apart. For models that use bearing (22), the bearing may or may not separate from pressure plate (23) during this procedure. **NOTE: Not all models use bearing (22).**
5. Remove retaining ring (2) from shaft assembly (9). **NOTE: Shaft assembly (9) need not be disassembled unless it is damaged.**
6. Remove shaft assembly (9) from cover (7) by tapping on the male end of shaft assembly (9) with a soft mallet.
7. Remove retaining ring (1) from cover (7) and press out oil seal (4) and bearing (3).
8. Remove four socket head shoulder bolts (10). A suitable holding fixture is useful to hold the brake in position.

⚠ CAUTION

Do not remove shoulder bolts without pressurization of the brake, approximately 20.7 bar (300 PSI), or damage may occur.

9. Before removing primary disc (11), rotor discs (12), and stator discs (13), record the stacking arrangement for reassembly purposes. Remove primary disc (11), rotor discs (12), and stator discs (13).
10. Release the pressure to the brake before removing the four socket head cap screws (14). Remove four socket head cap screws. Some 545 Series Brakes use only two 7/16-14UNC socket head cap screws.
11. Remove spring plate (15). Remove case gasket (8) from spring plate (15).
12. Before removing springs (16), record the spring pattern and color for reassembly purposes. Remove springs (16).
13. Remove piston (17) by carefully applying hydraulic pressure through brake release port on pressure plate (23).
14. Remove o-rings (19 & 21) and back-up rings (18 & 20) from piston (17). **NOTE: Be careful not to scratch or damage piston.**
15. Remove case gasket (8) from pressure plate (23).
16. Remove retaining ring (27) from pressure plate (23) and press out oil seal (24) and bearing (25). **NOTE: Not all models use retaining ring (27), oil seal (24), and bearing (25).**

ASSEMBLY

(Refer to Figures 1 through 8)

LUBRICATE ALL RUBBER COMPONENTS FROM KITS WITH CLEAN TYPE FLUID USED IN THE SYSTEM.

1. Clean all parts thoroughly before assembling.
2. Press oil seal (4) into cover (7) bore until it is flush with the bearing shoulder. Note direction of oil seal (4).
   Dry Design Brake: oil seal (4) must be installed with open side facing pilot end of cover.
   Wet Design Brake: oil seal (4) must be installed with closed side facing pilot end of cover.
   Model Number 13-547-542: uses two oil seals (4) installed with the closed sides adjacent to one another.
3. Press bearing (3) into position until it bottoms out on oil seal borestep.
4. Install retaining ring (1) into cover (7).
5. Press shaft assembly (9) into bearing (3) until it bottoms out on shaft shoulder. **NOTE: Bearing (3) inner race must be supported during this operation.**
6. Install retaining ring (2) on shaft assembly (9).
7. For models that use bearing (22), press new bearing (22) in pressure plate (23) until it bottoms on the borestep. **NOTE: Not all models use bearing (22).**
8. Install back-up rings (18 & 20) and o-rings (19 & 21) on piston (17). Back-up rings are on the spring pocket side of piston (17). Be sure o-rings are flat and all twists are removed. **NOTE: Be careful not to scratch or mar piston.**
9. Lubricate piston (17) with clean type fluid used in the system. Carefully press piston into pressure plate (23). Be sure piston (17) is positioned so that the threaded holes in the piston are aligned with the through holes in spring plate (15) when installed.
10. Install springs (16) in the spring pockets on piston (17). Be sure to install the springs according to spring pattern and color recorded during disassembly. Contact ZF Off-Highway Solutions Minnesota Inc. if you have questions regarding spring pattern.
11. Affix case gasket (8) to pressure plate (23) and spring plate (15). The kits include replacement case gaskets (8) for both 545 and 547 Series Brakes. Refer to the illustrations in Figure 1 for the case gasket styles.
12. Place unit on a press. A suitable fixture is useful to hold the brake in position. Depress and install four socket head cap screws (14). Apply two drops of Loctite #242 to the threads and torque 47.5-54.2 N·m (35-40 lb·ft). **NOTE: Some 545 Series Brakes use only two 7/16-14UNC socket head cap screws. For these, apply two drops of Loctite 242 to the threads and torque 74.6-81.4 N·m (55-60 lb·ft).**
13. Install rotor discs (12) and stator discs (13) in the same arrangement as recorded during disassembly. Install primary disc (11). Refer to TABLE 1 for rotor disc quantity and Figures 1 through 7 for stacking arrangement illustrations. **NOTE: Do not contaminate disc friction surfaces with oil if used for dry design brake models.**

14. Align discs and partially screw in four socket head shoulder bolts (10). A suitable holding fixture is useful to hold the brake in position. Apply two drops of Loctite #242 to threads of bolts. Inspect for free movement of stack. Pressurize the brake release port approximately 20.7 bar (300 PSI) to release the discs. Torque shoulder bolts 20.3-24.4 N·m (15-18 lb·ft).
15. Affix case gasket (8) to cover (7) and install cover (7) using socket head bolts (5). For models that use bearing (25), bearing inner race must be supported during this operation. Apply two drops of Loctite #242 to threads and torque 12.2-14.9 N·m (9-11 lb·ft). **NOTE: Some 545 Series Brakes use two 3/8-16UNC flat head bolts and o-rings (6). Install o-rings (6) on flat head bolts (5). Apply two drops of Loctite #242 to threads of flat head bolts and torque 33.9-40.7 N·m (25-30 lb·ft).**
16. Install six socket head cap screws (29) and bearing cover (28). Torque socket head cap screws (29) 14.9-16.3 N·m (11-12 lb·ft). **NOTE: Not all models use socket head cap screws (29) or bearing cover (28).**

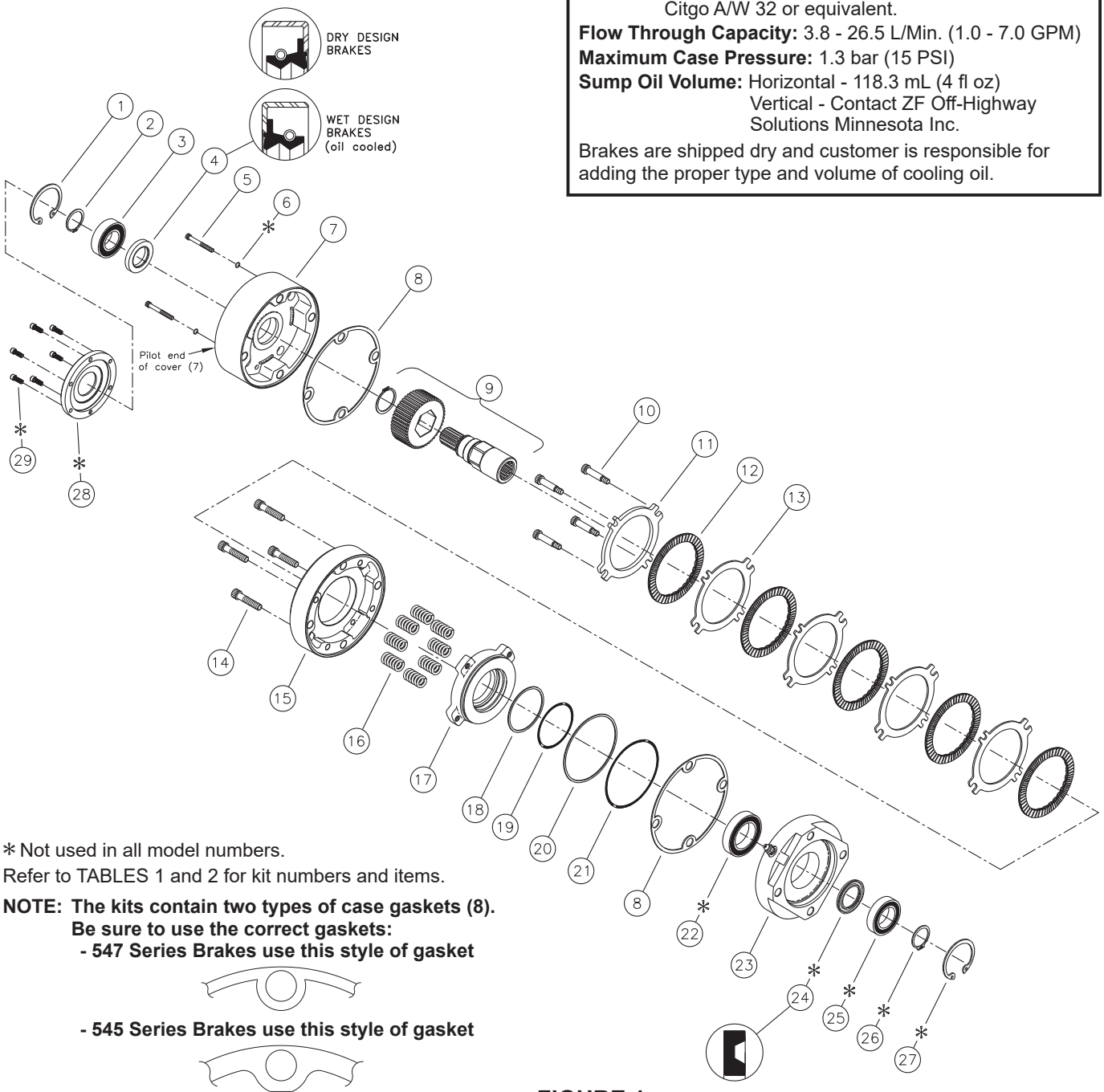
⚠ CAUTION

If hydrostatic bench testing is performed on the brake assembly, release pressure should not exceed 69.0 bar (1000 PSI) unless four additional bolts are used to supplemental clamping.

Special Notes for Oil Cooled ("Z" Option) Brakes

NOTE

Oil Type: Mineral base hydraulic oil such as Mobil DTE 24, Citgo A/W 32 or equivalent.
Flow Through Capacity: 3.8 - 26.5 L/Min. (1.0 - 7.0 GPM)
Maximum Case Pressure: 1.3 bar (15 PSI)
Sump Oil Volume: Horizontal - 118.3 mL (4 fl oz)
Vertical - Contact ZF Off-Highway Solutions Minnesota Inc.
Brakes are shipped dry and customer is responsible for adding the proper type and volume of cooling oil.



* Not used in all model numbers.

Refer to TABLES 1 and 2 for kit numbers and items.

NOTE: The kits contain two types of case gaskets (8). Be sure to use the correct gaskets:

- 547 Series Brakes use this style of gasket

- 545 Series Brakes use this style of gasket

FIGURE 1

Additional Stacking Arrangements

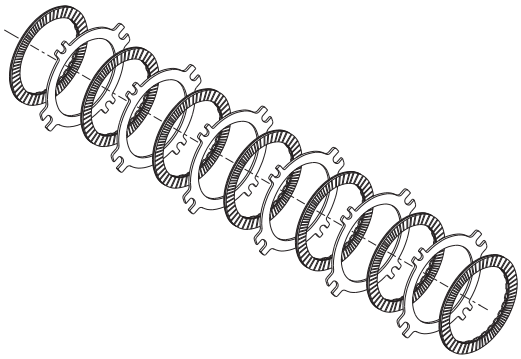


FIGURE 2

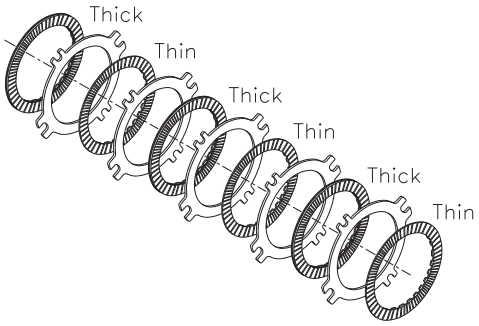


FIGURE 3

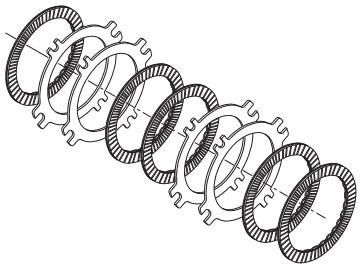


FIGURE 4

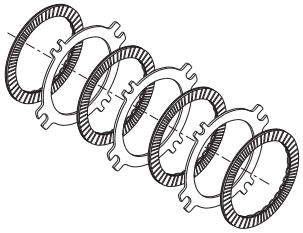


FIGURE 5

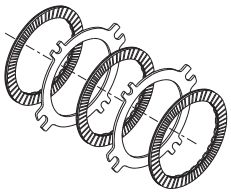


FIGURE 6

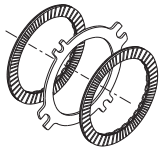
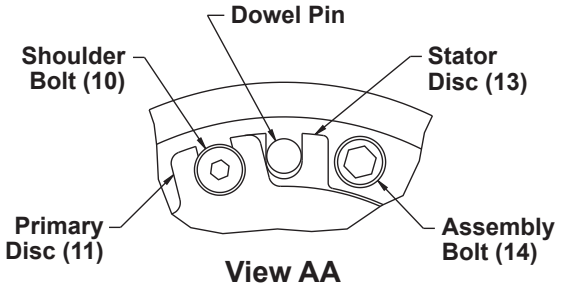


FIGURE 7



View AA

Stack assembly detail for revised design brakes with dry torque rating at 1170 N·m (9800 lb·in) or higher only.

Slots in stator discs (13) engage with dowel pins in spring plate (15). See Figure 1.

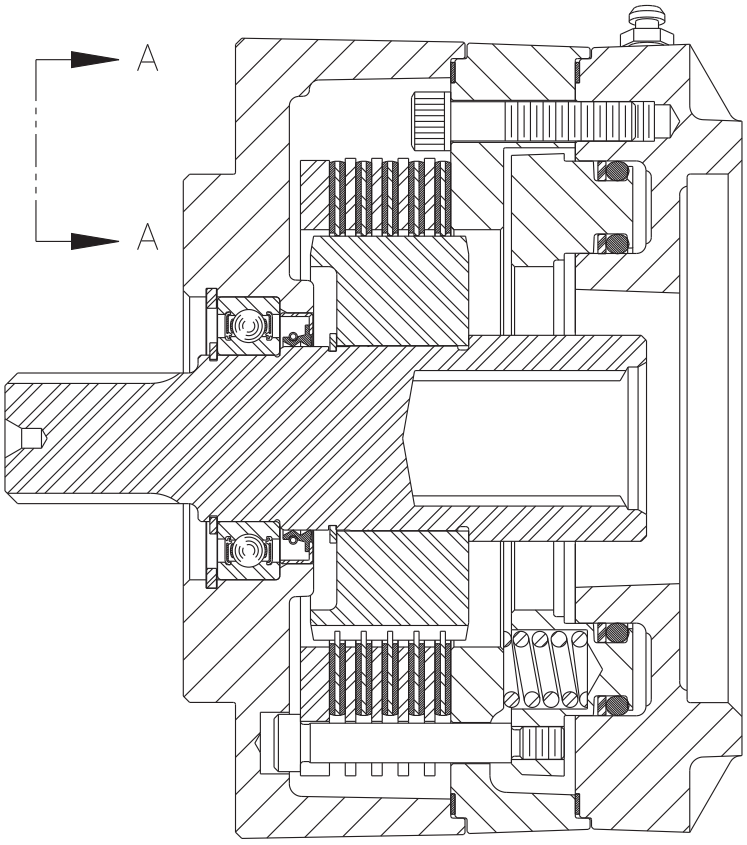


FIGURE 8
(typical design)

BLEEDING

1. Install brake in system and connect pressure lines.
2. Bleed pressure release section of brake by pressurizing side inlet port and allowing air to escape from top port. Pressure should not exceed 6.89 bar (100 PSI) during bleeding.
3. Apply sufficient pressure to release brake and check for proper operation in system.

SERVICE DIAGNOSIS

PROBLEM	CAUSE	EXPLANATION	ACTION
Brake slips	A. Excessive pressure in hydraulic system	If there is back pressure in the actuation line of the brake, holding torque will be reduced.	Check filters, hose size, restrictions in other hydraulic components.
	B. Oil in brake if designed for dry use	Dry linings generate 50% more torque than linings saturated with oil. If the brake has oil in it, check the type of oil. 1. Gearbox oil 2. Hydraulic oil	Replace oil seal in brake. Check motor seal. Check piston seals. **NOTE: Internal components will need to be inspected, cleaned, and replace as required**
	C. Disc plates worn	The thickness of the disc stack sets the torque level. A thin stack reduces torque.	Check disc thickness and contact ZF Off-Highway Solutions Minnesota Inc.
	D. Springs broken or haven taken a permanent set	Broken or set springs can cause reduced torque, a rare occurrence.	Check release pressure and contact ZF Off-Highway Solutions Minnesota Inc. (May need servicing with new spring kit).
Brake drags or runs hot	A. Low actuation pressure	The brake should be pressurized to a minimum of 1.38 bar (20 PSI) over the full release pressure under normal operating conditions. Lower pressures will cause the brake to drag thus generating heat.	Attach pressure gauge to bleed port and check pressure with system on.
	B. Bearing failure	If bearing should fail, a large amount of drag can be generated.	Replace the bearing. Refer to kits in TABLE 1.
	C. Oil in brake	Excess fill of oil in sump condition through wet brakes can cause the unit to run hot. Also, excessive RPM in sump condition.	Drain oil and refill as specified for brake. Switch to flow through cooling oil.
Brake will not release	A. Stuck or clogged valve	Brakes are designed to come on when system pressure drops below stated release pressure. If pressure cannot get to the brake, the brake will not release.	Attach pressure gauge to bleed port. Check for adequate pressure. Replace defective line or component.
	B. Bad o-rings	If release piston will not hold pressure, the brake will not release.	Replace o-rings. Refer to kits in TABLE 1.
	C. Discs frozen	These brakes are designed for only limited dynamic braking. A severe emergency stop or prolonged reduced release pressure operation may result in this type of damage.	Replace disc stack. Refer to kits in TABLE 1.

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