

REFERENCE:	Nova Bus Manuals
SECTION:	08: Pneumatic system
RS N°:	–
EFFECTIVE IN PROD.:	–

APPLICATION DEADLINE:NA

SUBJECT:	Air disk brake checklist issued by the manufacturer Bendix.
JUSTIFICATION:	Diagnose a potentiel Bendix disk brake thermal overload.

LEVEL	DESCRIPTION	DIRECT CHARGES		TIME
		LABOUR	MATERIAL	
1	Perform, at your own convenience, the Bendix's procedure.	Client	Client	–
2	–	–	–	–

MATERIAL

QTY	PART N°	REV.	DESCRIPTION	REPLACES PART N°
LEVEL 1				
–	–	–	–	–
LEVEL 2				
–	–	–	–	–

DISPOSAL OF PARTS

REMOVED PARTS ARE:	DISCARDED	RETAINED	–
	–	–	

REVISION HISTORY

REV.	DATE	CHANGE DESCRIPTION	WRITTEN BY
NR	2014JA14	Initial release	Bertrand Plouffe

CLIENT	ORDER	ROAD NUMBER		VIN (2NVY/4RKY...)		QTY
		FROM	TO	FROM	TO	
Academy Bus - New Jersey	L231	—	—	L82U563000166	L82U163000178	13
Academy Bus - New Jersey	L333	—	—	L82U273000207	L82U473000211	5
Academy Bus - New Jersey	L339	—	—	L82U483000047	L82U883000052	5
Academy Bus - New Jersey	L340	—	—	L82U493000003	L82U193000007	5
Airdrie Transit - Alberta	L664	—	—	L82U2B3000507	L82U2B3000507	1
Airdrie Transit - Alberta	L759	—	—	L82U0D3000928	L82U0D3000928	1
Ames Transportation Agency - Iowa	L707	660	661	S92U5C4500159	S92U1C4500160	2
Arrow Coach Line - Arkansas	L252	—	—	L82U963000235	L82U963000235	1
Arrow Coach Line - Arkansas	L494	—	—	L82U793000397	L82U793000397	1
Austin - CMTA - Texas	L635	5001	5001	S92U7C4500163	S92U7C4500163	1
Austin - CMTA - Texas	L636	5002	5022	S92U1D4500306	S92U0D4500328	21
Barrie - Ontario	L022	1001	1001	L82P3W3000001	L82P3W3000001	1
BC Transit - BCT - British Columbia	L215	9201	9210	L82U663000001	L82U763000010	10
BC Transit - BCT - British Columbia	L236	9211	9231	L82U063000141	L82U663000161	21
BC Transit - BCT - British Columbia	L342	9232	9251	L82U173000294	L82U173000313	20
BC Transit - BCT - British Columbia	L343	9252	9267	L82U973000463	L82U073000478	16
BC Transit - BCT - British Columbia	L414	9268	9289	L82U983000299	L82U783000320	22
BC Transit - BCT - British Columbia	L417	9290	9297	L82U983000321	L82U183000328	8
BC Transit - BCT - British Columbia	L430	9301	9318	L82U483000503	L82U483000520	18
BC Transit - BCT - British Columbia	L458	9298	9300	L82U683000521	L82UX83000523	3
BC Transit - BCT - British Columbia	L463	9319	9333	L82U093000273	L82U093000287	15
BC Transit - BCT - British Columbia	L481	9334	9353	L82U794000004	L82U094000023	20
BC Transit - BCT - British Columbia	L484	9370	9403	L82U494000090	L82U494000123	34
BC Transit - BCT - British Columbia	L486	9354	9369	L82U294000024	L82U494000039	16
BC Transit - BCT - British Columbia	L487	9404	9433	L82U094000149	L82U794000178	30
BC Transit - BCT - British Columbia	L604	9434	9434	L82U5C3000597	L82U5C3000597	1
BC Transit - BCT - British Columbia	L735	9435	9440	L82U4C3000848	L82U8C3000853	6
BC Transit - BCT - British Columbia	L736	9441	9446	L82U8D3000854	L82U7D3000859	6
Belleville Transit - Ontario	L176	—	—	L82U563000233	L82U563000233	1
Belleville Transit - Ontario	L179	179-1	179-1	L82UX53000033	L82UX53000033	1
Belleville Transit - Ontario	L180	180-1	180-1	L82U753000118	L82U753000118	1
Belleville Transit - Ontario	L354	354-1	354-1	L82U983000089	L82U983000089	1
Belleville Transit - Ontario	L357	357-1	357-1	L82U783000091	L82U783000091	1
Belleville Transit - Ontario	L542	—	—	L82UXA3000088	L82U8A3000090	3
Belleville Transit - Ontario	L598	—	—	L82U5A3000581	L82U7A3000582	2
Belleville Transit - Ontario	L655	—	—	L82U3B3000385	L82U3B3000385	1
Belleville Transit - Ontario	L702	—	—	L82U4D3000706	L82U4D3000706	1
Belleville Transit - Ontario (ref. L809)	L754	—	—	L82U2D4500404	L82U2D4500404	1
Belleville Transit - Ontario (L168)	L129	—	—	L82S633000199	L82S933000200	2
Bow Valley Transit - Alberta	L347	1	4	L82W083000175	L82W683000178	4
Bow Valley Transit - Alberta	L712	5	6	L82U6C3000804	L82U8C3000805	2
Brampton - Ontario	L209	0601	0621	L82U253000222	L82U853000242	20

CLIENT	ORDER	ROAD NUMBER		VIN (2NVY/4RKY...)		QTY
		FROM	TO	FROM	TO	
Brampton - Ontario	L238	0609	0609	L82U663000094	L82U663000094	1
Brampton - Ontario	L253	0622	0632	L82U463000269	L82U763000279	11
Brampton - Ontario	L284	0633	0638	L82U363000280	L82U263000285	6
Brampton - Ontario	L348	0701	0715	L82U273000479	L82U773000493	15
Brampton - Ontario	L349	0801	0810	L82U283000094	L82UX83000103	10
Brampton - Ontario	L424	0811	0827	L82U783000463	L82U083000479	17
Brampton - Ontario	L425	0901	0916	L82U993000045	L82U593000060	16
Brampton - Ontario	L501	0917	0926	L82U893000506	L82U893000523	10
Brandon - Manitoba	L008	8001	8001	L82K5V3000083	L82K5V3000083	1
Brantford - Ontario	L150	—	—	L82U643000173	L82U843000174	2
Brantford - Ontario	L175	—	—	L82U363000232	L82U363000232	1
Brantford - Ontario	L256	—	—	L82U363000229	L82U363000229	1
Brantford - Ontario	L257	—	—	L82UX63000230	L82UX63000230	1
Brantford - Ontario	L258	—	—	L82U163000231	L82U163000231	1
Brantford - Ontario	L351	9071	9075	L82U883000018	L82UX83000022	5
Brantford - Ontario	L422	9081	9084	L82U183000524	L82U783000527	4
Brantford - Ontario	L547	10101	10105	L82X6A3000082	L82X3A3000086	5
Brantford - Ontario	L663	10121	10121	L82U1B3000532	L82U1B3000532	1
Brantford - Ontario	L718	10123	10125	L82U5C3000826	L82U9C3000828	3
Brantford - Ontario	L775	10131	10132	L82U1D3000999	L82U2D3001000	2
Calgary Transit - Alberta	L601	8101	8114	L82U5A4000099	L82U4A4000112	14
Calgary Transit - Alberta	L607	8115	8130	L82UXA3000477	L82U6A3000492	16
Calgary Transit - Alberta	L615	8131	8158	L82U1B4000019	L82U4B4000046	28
Calgary Transit - Alberta	L624	—	—	L82U4B4000077	L82U6B4000078	2
Calgary Transit - Alberta	L637	8161	8180	L82U7B3000356	L82U2B3000376	20
Calgary Transit - Alberta	L709	8181	8200	L82UXC3000806	L82U3C3000825	20
Calgary Transit - Alberta	L733	8201	8202	L82AXD3000926	L82A1D3000927	2
CATS - Charlotte, North Carolina	L029	29001	29044	L82P3W3000032	L82P5W3000078	44
CATS - Charlotte, North Carolina	L048	48001	48007	L82P6X3000057	L82P1X3000063	7
CATS - Charlotte, North Carolina	L068	852	897	L82PXY3000001	L82PXY3000046	46
CATS - Charlotte, North Carolina	L085	898	914	L82P3Y3000177	L82P1Y3000193	17
CDTA - Albany, New York	L041	9901	9944	L82P4X3000056	L82P6X3000124	44
CDTA - Albany, New York	L053	9951	9959	L82PXX3000157	L82P9X3000165	9
CDTA - Albany, New York	L063	0001	0011	L82P2X3000296	L82P1X3000306	11
CDTA - Albany, New York	L076	3021	3030	L82P1Y3000162	L82P2Y3000171	10
Central Florida Regional Transportation Authority	L725	—	—	S92Y9D4500329	S92Y5D4500330	2
Central Florida Regional Transportation Authority	L764	—	—	S92Y7D4500331	S92Y9D4500332	2
Chemung Transit New York	L046	421	423	L82P8X3000125	L82P1X3000127	3
Chicago Transit Authority - CTA - Illinois	L043	6400	6549	L82S2Y3000157	L82S1Y3000361	150
Chicago Transit Authority - CTA - Illinois	L083	6550	6708	L82S713000001	L82S913000159	159
Chicago Transit Authority - CTA - Illinois	L093	6709	6883	L82S523000001	L82S523000225	175
Chicago Transit Authority - CTA - Illinois	L773	—	—	L82JXD4500429	L82J6D4500430	2

CLIENT	ORDER	ROAD NUMBER		VIN (2NVY/4RKY...)		QTY
		FROM	TO	FROM	TO	
Clemson Area Transit - South Carolina	L617	—	—	S92U5C4500002	S92U5C4500002	1
Clemson Area Transit - South Carolina (ref. L722)	L641	—	—	L82U1C4500005	L82U5C4500010	5
CMBC (TransLink) - British Columbia	L301	9602	9649	L82U373000216	L82U173000263	48
CMBC (TransLink) - British Columbia	L302	9650	9706	L82U673000386	L82U973000351	56
CMBC (TransLink) - British Columbia	L317	9601	9601	L82U973000155	L82U973000155	1
CMBC (TransLink) - British Columbia	L341	V9707	V9725	L82U373000412	L82U573000430	19
CMBC (TransLink) - British Columbia	L380	9726	9747	L82U483000209	L82U683000230	22
CMBC (TransLink) - British Columbia	L381	9748	9781	L82U383000329	L82U483000369	34
CMBC (TransLink) - British Columbia	L382	9782	9791	L82U083000370	L82U783000379	10
CMBC (TransLink) - British Columbia	L412	9401	9401	L82X993000136	L82X993000136	1
CMBC (TransLink) - British Columbia	L454	9402	9470	L82X793000359	L82XX93000453	69
CMBC (TransLink) - British Columbia	L455	9471	9491	L82X093000459	L82X993000489	21
CMBC (TransLink) - British Columbia	L482	9492	9517	L82X894000040	L82X094000064	25
CMBC (TransLink) - British Columbia	L483	9518	9542	L82X294000065	L82X594000089	25
CMBC (TransLink) - British Columbia	L532	9543	9551	L82U093000497	L82U693000505	9
CMBC (TransLink) - British Columbia	L533	9552	9573	L82U193000511	L82U093000537	22
CMBC (TransLink) - British Columbia	L534	9574	9589	L82U694000124	L82U894000139	16
CMBC (West Vancouver) - British Columbia	L033	33001	33001	L82S2W3000172	L82S2W3000172	1
CMBC (West Vancouver) - British Columbia	L345	701	702	L82U373000264	L82U573000265	2
CMBC (West Vancouver) - British Columbia	L401	801	803	L82U983000206	L82U283000208	3
CMBC (West Vancouver) - British Columbia	L539	901	909	L82U494000140	L82U994000148	9
Coach USA - Arrow	L059	1300	1309	L82PXX3000210	L82P6X3000219	5
Coach USA - Newark	L058	—	—	L82P4X3000204	L82P1X3000208	3
Coach USA - Puerto Rico	L057	99-100	99-123	L82S5X3000166	L82S6X3000189	24
COTA - Columbus, Ohio	L052	9901	9928	L82P6X3000088	L82P2X3000153	28
CT Transit - Connecticut	L554	1041	1065	S92U1A4000139	S92U0A4000164	25
CT Transit - Connecticut	L571	1101	1110	S92YXB4000144	S92Y4B4000169	10
Demo - Articulated Bus	L433	—	—	S92UX93000029	S92UX93000029	1
Demo - Articulated Bus APTA US	L359	—	—	S92U583000289	S92U583000289	1
Demo - Engineering Platform 2010 (Altoona)	L373	373-1	373-1	L82UX83000151	L82UX83000151	1
Demo - Nova PF2010 (TARC)	L356	356-2	356-2	L82U883000231	L82U883000231	1
Demo - Plateforme 2010 (ATQ)	L456	—	—	L82U893000019	L82U893000019	1
Demo - Proto Platform 2010	L271	—	—	L82U283000001	L82U283000002	2
Demo - Volvo	L031	31001	31001	L82S0W3000171	L82S0W3000171	1
Demo CNG	L716	—	—	L82A5D3000896	L82A5D3000896	1
Demo US NIS	L754	—	—	L82U1D4500278	L82UXD4500408	16
Duke University - North Carolina	L651	—	—	S92Y1B4000145	S92Y3B4000146	2
Duke University - North Carolina (ref. L703)	L641	—	—	L82U9C4500012	L82U1C4500022	8
Durham Region Transit - Ontario	L058	—	—	L82P0X3000202	L82P3X3000209	4
Durham Region Transit - Ontario	L059	1302	1308	L82P3X3000212	L82P4X3000218	3
Durham Region Transit - Ontario	L101	151	152	L82P613000275	L82P813000276	2
Durham Region Transit - Ontario	L114	153	160	L82P923000367	L82P623000374	8

CLIENT	ORDER	ROAD NUMBER		VIN (2NVY/4RKY...)		QTY
		FROM	TO	FROM	TO	
Durham Region Transit - Ontario	L142	424	429	L82U643000108	L82UX43000113	6
Durham Region Transit - Ontario	L143	—	—	L82S243000010	L82S843000013	4
Durham Region Transit - Ontario	L149	161	168	L82U443000155	L82UX43000161	7
Durham Region Transit - Ontario	L182	182-1	182-1	L82U653000157	L82U653000157	1
Durham Region Transit - Ontario	L199	169	169	L82U453000125	L82U453000125	1
Durham Region Transit - Ontario	L212	—	—	L82UX53000128	L82UX53000128	1
Durham Region Transit - Ontario	L213	—	—	L82U153000129	L82U153000129	1
Durham Region Transit - Ontario	L224	170	170	L82U963000011	L82U963000011	1
Elliot Lake - Ontario	L148	04-01	04-02	L82U143000162	L82U343000163	2
First Transit Inc. (ref. L173)	L144	—	—	L82U543000049	L82U543000049	1
Fredericton - New Brunswick	L146	8031	8032	L82U543000164	L82U743000165	2
Fredericton - New Brunswick	L178	8053	8053	L82U653000109	L82U653000109	1
Fredericton - New Brunswick	L225	8061	8061	L82U663000032	L82U663000032	1
Fredericton - New Brunswick	L240	8062	8062	L82U163000181	L82U163000181	1
Fredericton - New Brunswick	L276	8064	8065	L82U463000286	L82U663000287	2
Fredericton - New Brunswick	L281	8063	8063	L82U363000263	L82U363000263	1
Fredericton - New Brunswick	L282	8071	8072	L82UX73000097	L82U173000098	2
Fredericton - New Brunswick	L289	—	—	L82U573000072	L82U573000072	1
Fredericton - New Brunswick	L369	1	1	L82U693000018	L82U693000018	1
Fredericton - New Brunswick	L375	8081	8081	L82U983000142	L82U983000142	1
Fredericton - New Brunswick	L672	8111	8112	L82U0B3000540	L82U2B3000541	2
Fredericton - New Brunswick	L688	8113	8113	L82U8C3000643	L82U8C3000643	1
Fredericton - New Brunswick	L774	8131	8131	L82U7D3000960	L82U7D3000960	1
Gaylord Opryland - Nashville, Tennessee	L223	—	—	L82VX53000221	L82VX53000221	1
Gaylord Opryland - Nashville, Tennessee	L283	—	—	L82V773000034	L82V773000034	1
Gaylord Opryland - Nashville, Tennessee	L353	—	—	L82U583000008	L82U383000010	3
GCRTA - Cleveland, Ohio	L050	9901	9915	L82SXX3000065	L82SXX3000079	15
GCRTA - Cleveland, Ohio	L066	9951	9965	L82S5X3000281	L82S5X3000295	15
GCRTA - Cleveland, Ohio	L111	2101	2150	L82S713000287	L82S513000336	50
Grand River Transit - GRT - Ontario	L017	530	531	L82K5V3000150	L82K7V3000151	2
Grand River Transit - GRT - Ontario	L056	536	537	L82S7X3000198	L82S9X3000199	2
Grand River Transit - GRT - Ontario	L145	2400	2417	L82U143000114	L82U143000131	18
Grand River Transit - GRT - Ontario	L161	2418	2433	L82U643000254	L82U843000269	16
Grand River Transit - GRT - Ontario	L243	2601	2614	L82U463000188	L82U363000201	14
Grand River Transit - GRT - Ontario	L337	2701	2712	L82U373000281	L82UX73000293	12
Grand River Transit - GRT - Ontario	L338	2713	2724	L82U773000431	L82U173000442	12
Grand River Transit - GRT - Ontario	L404	8007	8021	L82U683000244	L82U683000258	15
Grand River Transit - GRT - Ontario	L405	8022	8027	L82W683000259	L82WX83000264	6
Grand River Transit - GRT - Ontario	L464	20901	20913	L82U193000296	L82U493000308	13
Grand River Transit - GRT - Ontario	L560	21001	21009	L82U2A3000246	L82U1A3000254	9
Grand River Transit - GRT - Ontario	L599	21116	21118	L82X9B3000465	L82X2B3000467	3
Grand River Transit - GRT - Ontario	L631	21119	21121	L82X4B3000468	L82X2B3000470	3

CLIENT	ORDER	ROAD NUMBER		VIN (2NVY/4RKY...)		QTY
		FROM	TO	FROM	TO	
Grand River Transit - GRT - Ontario	L633	21101	21115	L82U7B3000289	L82U8B3000303	15
Grand River Transit - GRT - Ontario	L668	21201	21220	L82U6C3000737	L82UXC3000756	20
Greater Toronto Airports Authority - GTAA - Ontario	L432	432-1	432-1	L82U793000061	L82U793000061	1
Greater Toronto Airports Authority - GTAA - Ontario	L477	L477-1	L477-1	L82U194000001	L82U194000001	1
Guelph - Ontario	L115	169	176	L82P933000080	L82P133000087	8
Guelph - Ontario	L132	177	179	L82P443000019	L82P243000021	3
Guelph - Ontario	L167	180	182	L82U943000250	L82U243000252	3
Guelph - Ontario	L187	185	188	L82U353000214	L82U953000217	4
Guelph - Ontario	L211	183	184	L82U653000126	L82U853000127	2
Guelph - Ontario	L241	189	194	L82U363000182	L82U263000187	6
Guelph - Ontario	L397	195	198	L82U183000152	L82U783000155	4
Guelph - Ontario	L418	199	205	L82U883000410	L82U983000416	7
Guelph - Ontario	L431	206	220	L82U793000030	L82U793000044	15
Guelph - Ontario	L579	221	224	L82UXA3000401	L82U5A3000404	4
Guelph - Ontario	L669	225	228	L82U9B3000536	L82U4B3000539	4
Guelph - Ontario	L715	234	235	L82U3C3000792	L82U5C3000793	2
Guelph - Ontario	L767	237	239	L82UXD3000967	L82U3D3000969	3
H.R. Ross Industries - Massachussets	L107	7001	7002	L82T713000234	L82T913000235	2
Halifax - Nova Scotia	L034	987	997	L82S6X3000001	L82S9X3000011	11
Halifax - Nova Scotia	L069	997	1000	L82S4Y3000158	L82S4Y3000161	4
Halifax - Nova Scotia	L558	717	731	S92UXA3000293	S92U6A3000307	15
Halifax - Nova Scotia	L613	732	741	S92UXB3000019	S92UXB3000028	10
Halifax - Nova Scotia	L693	526	534	L82U8C3000657	L82U7C3000665	9
Halifax - Nova Scotia	L708	742	761	L92UXC3000782	S92U3C3000803	20
Halifax - Nova Scotia	L710	1160	1161	L82U7C3000780	L82U9C3000781	2
Hamilton - Ontario	L019	9701	9720	L82K1V3000162	L82K5V3000181	20
Honolulu - Hawaii	L559	201	224	L82U6A4000113	L82U7A4000136	24
Houston - Texas	L737	1510	1510	S92U4D4500297	S92U4D4500297	1
Houston - Texas	L755	1511	1579	S92U4D4500333	S92U8D4500402	69
Kenosha - Wisconsin	L047	412	414	L82P4X3000154	L82P8X3000156	3
Kings Transit - Nova Scotia	L581	—	—	L82U2B3000054	L82U2B3000054	1
Knoxville - Tennessee	L039	652	657	L82P1X3000192	L82P0X3000197	6
Leduc Bus Line - Ontario	L181	—	—	L82V853000119	L82V853000119	1
Leduc Bus Line - Ontario	L228	228-1	228-1	L82V663000041	L82V663000041	1
Leduc Bus Line - Ontario	L346	—	—	L82UX83000053	L82UX83000053	1
Lethbridge - Alberta	L489	165	169	L82U493000454	L82U193000458	5
Marketing Sales Demo	L705	—	—	L82U1D3000906	L82U1D3000906	1
Marketing Sales Demo - MSD 1 ISB Hybrid	L548	—	—	L82X5A3000087	L82X5A3000087	1
Marketing Sales Demo - MSD 2	L616	—	—	L82U4C4500001	L82U4C4500001	1
Marketing Sales Demo - MSD 4	L618	—	—	S92U1C3000377	S92U1C3000377	1
Marketing Sales Demo - MSD 5	L619	—	—	L82X7C3000367	L82X7C3000367	1
Marketing Sales Demo - MSD 6 Houston	L628	—	—	L82U8C4500003	L82UXC4500004	2

CLIENT	ORDER	ROAD NUMBER		VIN (2NVY/4RKY...)		QTY
		FROM	TO	FROM	TO	
MATA - Memphis, Tennessee	L014	800	838	L82K4V3000026	L82K9V3000121	39
MATA - Memphis, Tennessee	L070	839	863	L82S9Y3000088	L82S2Y3000112	25
MATA - Memphis, Tennessee	L077	869	888	L82S3Y3000118	L82S7Y3000137	20
MATA - Memphis, Tennessee	L078	864	868	L82S4Y3000113	L82S1Y3000117	5
MATA - Memphis, Tennessee	L108	889	903	L82S713000337	L82S113000351	15
MATA - Memphis, Tennessee	L112	904	908	L82S313000352	L82S013000356	5
MATA - Memphis, Tennessee	L116	909	923	L82S723000226	L82S123000240	15
MATA - Memphis, Tennessee	L117	924	928	L82S323000241	L82S023000245	5
Minnesota Valley Transit Authority - MVTA	L706	4252	4258	L82U4C4500127	L82UXC4500133	7
Moncton (Codiac) - New Brunswick	L082	—	—	L82S313000237	L82S213000245	4
Moncton (Codiac) - New Brunswick	L147	504	505	L82U943000166	L82U043000167	2
Moncton (Codiac) - New Brunswick	L226	506	507	L82U863000033	L82UX63000034	2
Moncton (Codiac) - New Brunswick	L334	600	603	L82U673000212	L82U173000215	4
Moncton (Codiac) - New Brunswick	L358	358-1	358-1	L82U093000001	L82U093000001	1
Moncton (Codiac) - New Brunswick	L361	361-1	361-1	L82U293000002	L82U293000002	1
Moncton (Codiac) - New Brunswick	L569	—	—	L82U4B4000001	L82U4B4000001	1
Moncton (Codiac) - New Brunswick	L570	—	—	L82U6B4000002	L82U6B4000002	1
Moose Jaw - Saskatchewan	L344	17	25	L82U083000143	L82U883000147	5
MTD - Santa Barbara, California	L016	16001	16028	L82P7W3000003	L82PXW3000030	28
MTD - Santa Barbara, California	L080	80001	80005	L82P4Y3000172	L82P1Y3000176	5
NFTA - Buffalo, New York	L065	65001	65021	L82S8X3000260	L82S3X3000280	21
Niagara Falls - Ontario	L499	2986	2989	L82U093000564	L82U693000567	4
Niagara Falls - Ontario	L652	—	—	S92U3C3000607	S92U6C3000617	11
Niagara Falls - Ontario	L653	—	—	L82U9C3000618	L82U9C3000621	5
Niagara Falls - Ontario	L771	1396	1397	L82U9D3000958	L82U0D3000959	2
Niagara Parks Commission - Ontario	L656	—	—	L82U0C3000653	L82U2C3000654	2
Niagara Parks Commission - Ontario	L685	—	—	S92U9C3000644	S92U8C3000652	9
Ohio State University - Ohio	L032	32001	32001	L82P1W3000031	L82P1W3000031	1
Ohio State University - Ohio	L040	40001	40001	L82S8X3000064	L82S8X3000064	1
Ortect Stainless Steel	L038	38001	38001	—	—	1
Ottawa - Ontario	L020	9721	9740	L82K7V3000182	L82K7V3000201	20
Ottawa - Ontario	L162	162-1	162-1	L82V343000270	L82V343000270	1
Peterborough - Ontario	L130	60017	60021	L82S143000001	L82S943000005	5
Peterborough - Ontario	L159	60022	60024	L82S443000168	L82S243000170	3
Peterborough - Ontario	L202	—	—	L82U253000110	L82U653000112	3
Peterborough - Ontario	L411	36	50	L82U283000354	L82U083000532	15
Peterborough - Ontario	L490	—	—	L82UX93000345	L82U593000348	4
Peterborough - Ontario	L770	55	60	L82U0D3000993	L82UXD3000998	6
Puerto Rico (ref. L788)	L754	—	—	L82UXD4500277	L82U0D4500305	16
Red Deer - Alberta	L726	—	—	L82UXC3000840	L82U1C3000841	2
Red Deer - Alberta	L766	1104	1105	L82U7D3001025	L82U9D3001026	2
Red Deer - Alberta	L772	1106	1108	L82J2E3001120	L82J6E3001122	3

CLIENT	ORDER	ROAD NUMBER		VIN (2NVY/4RKY...)		QTY
		FROM	TO	FROM	TO	
Regina - Saskatchewan	L166	598	603	L82U453000027	L82U853000032	6
Regina - Saskatchewan	L183	604	608	L82U853000046	L82UX53000050	5
Regina - Saskatchewan	L239	609	610	L82U363000179	L82UX63000180	2
Regina - Saskatchewan	L304	611	616	L82U373000457	L82U773000462	6
Regina - Saskatchewan	L356	356-1	356-1	L82U883000150	L82U883000150	1
Regina - Saskatchewan	L360	—	—	L82U283000290	L82U283000290	1
Regina - Saskatchewan	L459	617	624	L82UX83000537	L82U783000544	8
Regina - Saskatchewan	L476	625	628	L82U893000313	L82U393000316	4
Regina - Saskatchewan	L561	631	644	L82U8B4000003	L82UXB4000018	14
Regina - Saskatchewan	L639	645	654	L82U1B3000336	L82U2B3000345	10
Regina - Saskatchewan	L748	655	662	L82U3D3000874	L82U0D3000881	8
Regina - Saskatchewan	L776	663	669	L82U4D3001001	L82U5D3001007	7
San Joaquin County - California	L768	—	—	S92L4D4500422	S92L3D4500427	6
Saskatoon - Saskatchewan	L551	1005	1007	S92UXA3000178	S92U8A3000180	3
Saskatoon - Saskatchewan	L568	—	—	S92U9B3000013	S92U9B3000013	1
Saskatoon - Saskatchewan	L690	1201	1204	L82U6C3000690	L82U1C3000693	4
Sault Ste-Marie Transit Services - Ontario (ref. 751)	L754	—	—	L82U7D4500284	L82U7D4500284	1
Sault Ste-Marie Transit Services - Ontario (ref. L686)	L641	135	139	L82U7C4500008	L82U6C4500016	5
SEPTA - Pennsylvania	L724	7300	7301	S92Y1D4500275	S92Y3D4500276	2
SEPTA - Pennsylvania	L728	—	—	L82W7D4500335	L82W7D4500335	1
SEPTA - Pennsylvania	L749	—	—	S92Y7D4500409	S92LXE4500457	40
St. John - New Brunswick	L272	—	—	S92U483000011	S92U483000011	1
St. John - New Brunswick	L273	—	—	S92U383000050	S92U383000050	1
St. John's - Newfoundland	L028	9844	9846	L82P6W3000039	L82P4W3000041	3
St. John's - Newfoundland	L082	0147	0152	L82S113000236	L82S013000244	6
St. John's - Newfoundland	L242	0753	0756	L82U273000028	L82U273000031	4
St. John's - Newfoundland	L352	0857	0861	L82U683000003	L82U383000007	5
St. John's - Newfoundland	L403	0962	0965	L82U299300014	L82U493000017	4
St. John's - Newfoundland	L503	1066	1066	L82U4A3000071	L82U4A3000071	1
St. John's - Newfoundland	L687	1201	1209	L82U7C3000598	L82U2C3000606	9
St. John's - Newfoundland	L731	1310	1314	L82U3C3000842	L82U2C3000847	5
Stratford - Ontario	L371	—	—	L82U183000104	L82U183000104	1
Stratford - Ontario	L493	—	—	L82U2A3000019	L82U2A3000019	1
Stratford - Ontario	L634	—	—	L82UXB3000352	L82UXB3000352	1
Stratford - Ontario	L752	—	—	L82U9D3000863	L82U9D3000863	1
Strathcona County Transit - Alberta	L177	921	923	L82U953000024	L82U253000026	3
Strathcona County Transit - Alberta	L233	924	929	L82V963000101	L82V863000106	6
Strathcona County Transit - Alberta	L303	930	936	L82U073000156	L82U673000162	7
Strathcona County Transit - Alberta	L383	—	—	L82U083000269	L82U083000269	1
Strathcona County Transit - Alberta	L406	937	939	L82U783000270	L82U083000272	3
Strathcona County Transit - Alberta	L407	940	943	L82W083000273	L82W683000276	4
Strathcona County Transit - Alberta	L457	944	949	L82U683000597	L82U683000602	6

CLIENT	ORDER	ROAD NUMBER		VIN (2NVY/4RKY...)		QTY
		FROM	TO	FROM	TO	
Strathcona County Transit - Alberta	L523	2010	2010	L82U693000603	L82U693000603	1
Strathcona County Transit - Alberta	L524	3005	3010	L82X593000604	L82X493000609	6
Strathcona County Transit - Alberta	L580	2011	2023	L82U1A3000464	L82U8A3000476	13
Strathcona County Transit - Alberta	L659	2024	2028	L82U7B3000440	L82U4B3000444	5
Sudbury - Ontario	L018	18001	18005	L82K8V3000157	L82KXV3000161	5
Sudbury - Ontario	L208	—	—	L82U653000191	L82UX53000193	3
Sudbury - Ontario	L250	—	—	L82U063000236	L82U263000240	5
Sudbury - Ontario	L251	—	—	L82U063000241	L82U263000242	2
Sudbury - Ontario	L293	—	—	L82U673000128	L82U673000131	4
Sudbury - Ontario	L294	—	—	L82U873000132	L82UX73000133	2
Sudbury - Ontario	L385	781	782	L82U583000137	L82U783000138	2
Sudbury - Ontario	L386	785	785	L82U783000141	L82U783000141	1
Sudbury - Ontario	L399	783	784	L82U983000139	L82U583000140	2
Sudbury - Ontario	L465	791	795	L82U593000317	L82U793000321	5
Sudbury - Ontario	L552	801	808	L82U3A3000238	L82U0A3000245	8
Sudbury - Ontario	L632	811	817	L82U9B3000326	L82U4B3000332	7
Sudbury - Ontario	L740	831	833	L82U1D3000887	L82U5D3000889	3
TCAT - Ithaca, New York	L087	0101	0108	L82PX13000277	L82P713000284	8
Thunder Bay - Ontario	L021	126	129	L82K3V3000146	L82K9V3000149	4
Thunder Bay - Ontario	L054	130	131	L82S1X3000200	L82S3X3000201	2
Thunder Bay - Ontario	L064	132	134	L82S8X3000257	L82S1X3000259	3
Thunder Bay - Ontario	L105	135	136	L82S213000357	L82S413000358	2
Thunder Bay - Ontario	L131	137	141	L82SX43000014	L82S743000018	5
Thunder Bay - Ontario	L221	142	144	L82U863000033	L82UX63000034	3
Thunder Bay - Ontario	L285	—	—	L82U473000046	L82U873000048	3
Thunder Bay - Ontario	L408	—	—	L82U283000239	L82U483000243	5
Thunder Bay - Ontario	L453	—	—	L82U283000533	L82U683000535	3
Thunder Bay - Ontario	L488	—	—	L82U193000332	L82U593000334	3
Thunder Bay - Ontario	L614	—	—	L82UXB3000061	L82U3B3000063	3
Thunder Bay - Ontario	L662	20168	20168	L82U3B3000533	L82U7B3000535	3
Thunder Bay - Ontario	L739	—	—	L82U3D3000860	L82U7D3000862	3
Timmins - Ontario	L184	184-1	184-1	L82UX53000081	L82UX53000081	1
Timmins - Ontario	L254	254-1	254-1	L82UX73000035	L82UX73000035	1
Timmins - Ontario	L426	—	—	L82U783000480	L82U883000536	2
Timmins - Ontario	L475	—	—	L82U493000311	L82U693000312	2
Timmins - Ontario	L550	—	—	L82U8A3000171	L82UXA3000172	2
Timmins - Ontario	L661	—	—	L82U9B3000486	L82U9B3000486	1
Timmins - Ontario	L720	12-98	12-98	L82U0C3000829	L82U0C3000829	1
Timmins - Ontario	L783	—	—	L82U8D3001017	L82UXD3001018	2
Timmins - Ontario (ref. L189)	L144	—	—	L82U343000048	L82U343000048	1
Toronto Transit Commission - TTC - Ontario	L729	9000	9000	S92U9D3000905	S92U9D3000905	1
Toronto Transit Commission - TTC - Ontario	L738	9001	9026	S92J6D3001094	S92J7D3001119	26

CLIENT	ORDER	ROAD NUMBER		VIN (2NVY/4RKY...)		QTY
		FROM	TO	FROM	TO	
Triborough - New York	L103	3001	3002	L82P913000285	L82P013000286	2
University of Alabama - Alabama	L295	7001	7001	L82U173000134	L82U173000134	1
University of Alabama - Alabama	L296	7002	7003	L82U373000135	L82U573000136	2
University of Alabama - Alabama	L310	7004	7013	L82U973000267	L82UX73000276	10
University of Alabama - Alabama	L311	7014	7017	L82U173000277	L82U173000280	4
University of Alabama - Alabama	L479	479-1	479-1	L82U394000002	L82U394000002	1
University of Alabama - Alabama	L480	480-1	480-1	L82U594000003	L82U594000003	1
University of Alabama - Alabama	L573	—	—	L82U9A4000137	L82U0A4000138	2
University of Alabama - Alabama	L640	—	—	L82U9B4000141	L82UOB4000142	2
University of Alabama - Alabama	L671	7024	7025	L82U5C4500119	L82U1C4500120	2
University of Alabama - Alabama	L727	7026	7027	L82U4D4500310	L82U6D4500311	2
University of Colorado - Colorado	L237	—	—	L82U163000164	L82U363000165	2
University of Colorado - Colorado	L336	—	—	L82U773000266	L82U773000266	1
University of Colorado - Colorado	L427	—	—	S92U693000027	S92U693000027	1
University of Colorado - Colorado	L428	—	—	S92U893000028	S92U893000028	1
University of Colorado - Colorado	L627	—	—	S92UXB4000139	S92U6B4000140	2
Walt Disney World - Florida	L074	4815	4829	L82P0Y3000282	L82P0Y3000296	15
Walt Disney World - Florida	L084	4830	4832	L82P2Y3000297	L82P6Y3000299	3
Walt Disney World - Florida	L104	4833	4861	L82PX13000246	L82P413000274	29
Walt Disney World - Florida	L113	4862	4884	L82P623000343	L82P523000365	23
Walt Disney World - Florida	L118	4885	4885	L82P723000366	L82P723000366	1
Walt Disney World - Florida	L174	174-1	174-1	L82U553000005	L82U553000005	1
Walt Disney World - Florida	L535	1204	1213	L82UXA4000003	L82U0A4000012	10
Walt Disney World - Florida	L763	—	—	S92U0D3001019	S92U4D3001024	6
Whitehorse - Yukon	L278	—	—	L82U563000264	L82U263000268	4
Whitehorse - Yukon	L423	—	—	L82U983000481	L82U083000482	2
Whitehorse - Yukon	L563	38	41	L82U3A3000255	L82U9A3000258	4
Windsor - Ontario	L015	549	553	L82K9V3000152	L82K6V3000156	5
Windsor - Ontario	L186	555	564	L82U053000181	L82U453000190	10
Woodstock - Ontario	L255	—	—	L82U163000228	L82U163000228	1
Woodstock - Ontario	L335	—	—	L82U083000093	L82U083000093	1
Woodstock - Ontario	L419	—	—	L82U183000409	L82U183000409	1
Woodstock - Ontario	L460	—	—	L82U693000309	L82U693000309	1
Woodstock - Ontario	L492	—	—	L82U4A3000040	L82U6A3000041	2
Woodstock - Ontario	L778	—	—	L82U2D3001014	L82U2D3001014	1
Woodstock - Ontario (ref. L388)	L209	—	—	L82U153000230	L82U153000230	1
York Regional Transit - Ontario	L562	1080	1082	S92U2A3000420	S92U6A3000422	3
York Regional Transit - Ontario	L572	1083	1094	S92U3A3000569	S92U2A3000580	12
York Regional Transit - Ontario	L654	1370	1390	S92U1D3000946	S92U2D3000986	21
York Regional Transit - Ontario	L761	1391	1396	S92U6D3001008	S92UXD3001013	6

**WARNING**

Follow your internal safety procedures.

PROCEDURE

- 1.1. Use the following checklist published by the manufacturer Bendix to help you diagnose air disc brakes thermal overload. ❖



Start Here

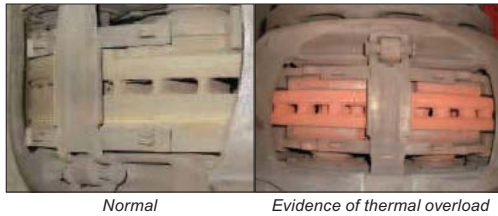
All foundation brakes are designed to convert kinetic energy (energy of motion) into heat and work (to stop the vehicle).
Air disc brakes work the same way and in everyday operation — compared to drum brakes — will produce higher braking temperatures and cool off faster. Also, air disc brakes will often have differences in temperatures at wheel ends on the same axle. The actual temperatures reached will depend on the vehicle configuration, vocation and brake usage.
This document is intended to help technicians identify instances where an individual wheel end has evidence of thermal overload, and check for potential causes.

Bendix® Air Disc Brake Checklist for Identifying Single Wheel End Thermal Overload

Follow all General Safety Guidelines (see final page.)

SECTION ONE: Inspect the Vehicle

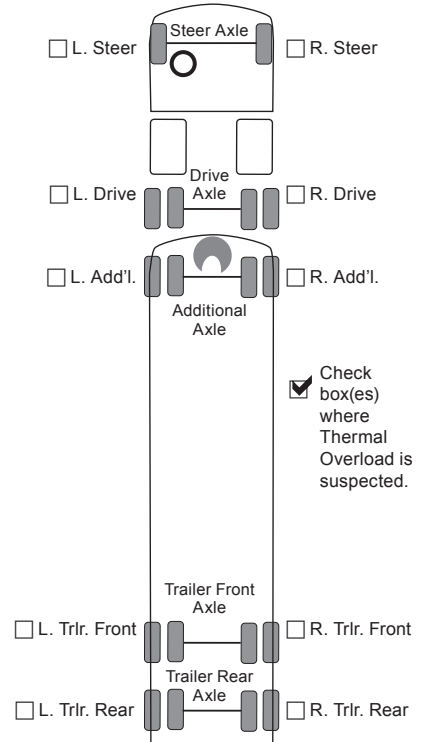
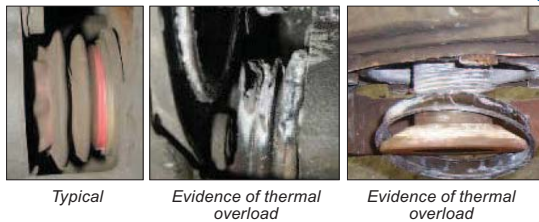
Question One:
Do any of the rotors have bright orange or red color edges?
Check the box(es) on the vehicle diagram to the right for any found.



Question Two:
Are any of the calipers coated with a bright orange or red colored dust? Check the box(es) on the vehicle diagram to the right for any found.



Question Three:
Are any tappets and/or guide pin boots heat damaged? Check the box(es) on the vehicle diagram to the right for any found.



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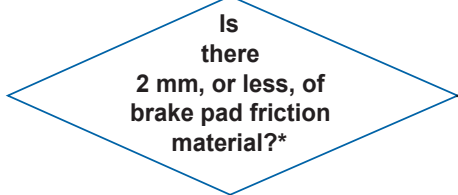
    graph TD
        Q1{Are any boxes checked?} -- NO --> STOP[STOP! Exit this flowchart.]
        Q1 -- YES --> Q2{Are both boxes on a single axle checked?}
        Q2 -- YES --> Note1[This is not a single wheel end Thermal Overload event. When both ends of an axle are affected, a thorough brake system diagnosis is needed, as other factors — such as brake balance, overloaded vehicles, or extreme use — are more likely the source.]
        Q2 -- NO --> Q3{Only one box has a check mark?}
        Q3 -- YES --> Section2[Go to Section Two (over)]
        Q3 -- NO --> STOP
    
```

In cases where more than one wheel end is affected — but on different axles — complete a separate checklist for each brake being examined.

SECTION TWO: Investigate Other Potential External Causes

- Follow all Safe Maintenance Practices (see final page.)

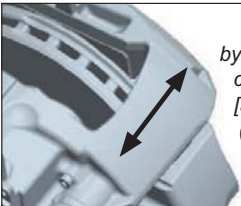
Inspect the brake pads.
(New pads have 21 mm of brake pad, plus a 9 mm backing plate.)



Replace the pads (axle set recommended) after performing all Section Two inspections. (Not a Thermal Overload warranty condition.)

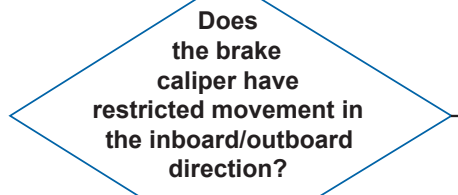
*2 mm of friction material, plus a 9 mm backing plate, for a total of 11 mm.

Inspect the caliper



Push/pull by hand to check the caliper movement [at least 0.75 Inch (20 mm) with the pads removed]

Complete this step on level ground, with the wheels chocked and the parking brake temporarily released!

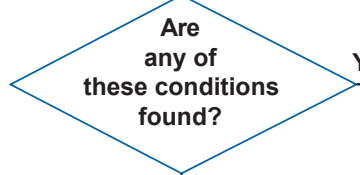


Service the guide pins. Perform all Section Two inspections. (Not a Thermal Overload warranty condition.)

Inspect the air hoses ("jounce lines").

- Is air trapped in the hose?*
- Do the hose(s) pull or push on the caliper? (It is important that the hoses permit the lateral motion of the caliper, the vertical motion of the suspension, and — for steering axles — the full turn of the wheels.)
- Are there any kinks, restrictions?
- Are the hoses in good condition?

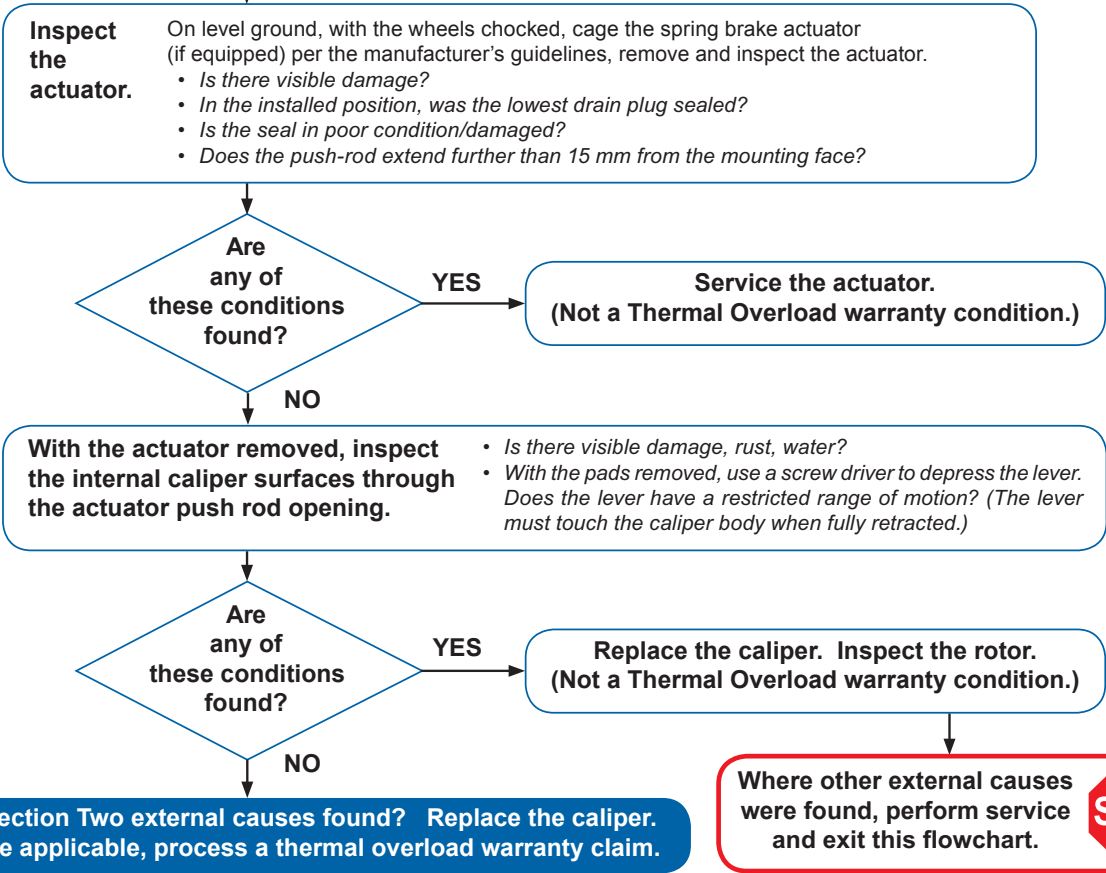
**Take full safety precautions during the inspection for trapped air, to avoid the air hose whipping if air pressure is found to be trapped. Conditions that might cause trapped air include kinked lines, or when an ABS modulator is malfunctioning and not exhausting service air.



Service as needed. Perform all Section Two inspections. (Not a Thermal Overload warranty condition.)

Go to the next page . . .

SECTION TWO Continued



Actions When Replacing a Caliper

Replacement:

- Replace the caliper on the affected wheel end and all the pads at both ends of the axle.
- Inspect the rotor according to the guidelines in Service Data sheet SD-23-7541. See annex 1.

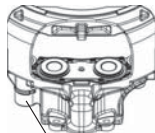
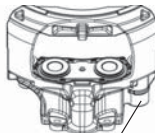
If the brake assembly is still under warranty coverage:

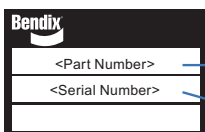
- File a claim. Clearly state the claim is for a single axle thermally overloaded brake. The claim must include photographs of the rotor from both ends of the affected axle.
- Return the caliper from the affected wheel end, and label the caliper with the claim number.
- Return the pads from both sides of the affected axle (LH and RH set of pads). Please clearly label the parts with the wheel position and claim number.
- Please include this completed checklist, the photographs of the rotors, and a copy of the warranty claim with the returned parts.

VIN #: _____ Claim #: _____

Vehicle Make: _____ Vehicle Model: _____

Mileage: _____

Bendix® ADB22X® Air Disc Brake Replacement Part Numbers		
Caliper/Carrier		
Axial Bolt 12 degree	Right Fixed Pin	K081142
	Left Fixed Pin	K081143
Vertical Bolt 12 degree	Right Fixed Pin	K081256
	Left Fixed Pin	K081257
		
<small>Please note that replacement caliper/carrier bolts (available from the vehicle manufacturer) are recommended.</small>		
Caliper Only		
12 degree	Right Fixed Pin	K081258
	Left Fixed Pin	K081259



(Air Disc Brake Label)

Caliper Part Number: _____

Caliper Serial Number: _____

Bendix TechTeam Help Line: 1-800-AIR-BRAKE, (1-800-247-2725), option 2-1. Mon. - Fri., 8 a.m. - 6 p.m.
Reference Document: Service Data: SD-23-7541 Bendix® ADB 22X™, ADB 22X-V™ Air Disc Brakes. Go to the document library at www.bendix.com for free downloads of Service Data Sheets and warranty policies.

SAFE MAINTENANCE PRACTICES

⚠️ WARNING! PLEASE READ AND FOLLOW THESE INSTRUCTIONS TO AVOID PERSONAL INJURY OR DEATH:

When working on or around a vehicle, the following general precautions should be observed at all times:

1. Park the vehicle on a level surface, apply the parking brakes, and always block the wheels. Always wear safety glasses. Where specifically directed, the parking brakes may have to be released, and/or spring brakes caged, and this will require that the vehicle be prevented from moving by other means for the duration of these tests/procedures.
2. Stop the engine and remove ignition key when working under or around the vehicle. When working in the engine compartment, the engine should be shut off and the ignition key should be removed. Where circumstances require that the engine be in operation, **EXTREME CAUTION** should be used to prevent personal injury resulting from contact with moving, rotating, leaking, heated or electrically charged components.
3. Do not attempt to install, remove, disassemble or assemble a component until you have read and thoroughly understand the recommended procedures. Use only the proper tools and observe all precautions pertaining to use of those tools.
4. If the work is being performed on the vehicle's air brake system, or any auxiliary pressurized air systems, make certain to drain the air pressure from all reservoirs before beginning ANY work on the vehicle. If the vehicle is equipped with a Bendix®AD-IS® air dryer system or a dryer reservoir module, be sure to drain the purge reservoir.
5. Following the vehicle manufacturer's recommended procedures, deactivate the electrical system in a manner that safely removes all electrical power from the vehicle.
6. Never exceed manufacturer's recommended pressures.
7. Never connect or disconnect a hose or line containing pressure; it may whip. Never remove a component or plug unless you are certain all system pressure has been depleted.
8. Use only genuine Bendix® brand replacement parts, components and kits. Replacement hardware, tubing, hose, fittings, etc. must be of equivalent size, type and strength as original equipment and be designed specifically for such applications and systems.
9. Components with stripped threads or damaged parts should be replaced rather than repaired. Do not attempt repairs requiring machining or welding unless specifically stated and approved by the vehicle and component manufacturer.
10. Prior to returning the vehicle to service, make certain all components and systems are restored to their proper operating condition.
11. For vehicles with Automatic Traction Control (ATC), the ATC function must be disabled (ATC indicator lamp should be ON) prior to performing any vehicle maintenance where one or more wheels on a drive axle are lifted off the ground and moving.

⚠️ WARNING: Not all wheels and valve stems are compatible with Bendix Air Disc Brakes. Use only wheels and valve stems approved by the vehicle manufacturer to avoid the risk of valve stem shear and other compatibility issues.

⚠️ WARNING: AVOID CREATING DUST. POSSIBLE CANCER AND LUNG DISEASE HAZARD.

While Bendix Spicer Foundation Brake LLC does not offer asbestos brake linings, the long-term effects of some non-asbestos fibers have not been determined. Current OSHA Regulations cover exposure levels to some components of non-asbestos linings, but not all. The following precautions must be used when handling these materials.

- Avoid creating dust. Compressed air or dry brushing must never be used for cleaning brake assemblies or the work area.
- Bendix recommends that workers doing brake work must take steps to minimize exposure to airborne brake lining particles. Proper procedures to reduce exposure include working in a well-ventilated area, segregation of areas where brake work is done, use of local filtered ventilation systems or use of enclosed cells with filtered vacuums. Respirators approved by the Mine Safety and Health Administration (MSHA) or National Institute for Occupational Safety and Health (NIOSH) should be worn at all times during brake servicing.
- Workers must wash before eating, drinking or smoking; shower after working, and should not wear work clothes home. Work clothes should be vacuumed and laundered separately without shaking.
- OSHA Regulations regarding testing, disposal of waste and methods of reducing exposure for asbestos are set forth in 29 Code of Federal Regulations §1910.001. These Regulations provide valuable information which can be utilized to reduce exposure to airborne particles.
- Material Safety Data Sheets on this product, as required by OSHA, are available from Bendix. Call 1-800-247-2725 and speak to the Tech Team or e-mail techteam@bendix.com

Annex 1

Service Data Sheet Bendix SD-23-7541



Service Data

SD-23-7541

Bendix® ADB22X™, ADB22X-V™ Air Disc Brakes

SECTION ONE: AIR DISC BRAKE OVERVIEW

1.1 DESCRIPTION

Bendix® ADB22X™ and ADB22X-V™ Air Disc Brakes (ADB) use a floating caliper design to provide foundation braking on all axles of heavy commercial vehicles, buses and trailers. Bendix Air Disc Brakes provide safety and performance as well as ease of service.

The ADB22X disc brakes mount to the axle's anchor plate (torque plate) using fasteners that are installed parallel to the axle, while the anchor-plate fasteners used for the Bendix® ADB22X-V™ air disc brakes install at right angles to the axle.

Available with or without a combination spring brake unit, these brakes may also include optional wear sensors and wear diagnostic equipment.



FIGURE 1 - BENDIX® ADB22X™ AIR DISC BRAKES

Sections in this Document

Section		Page
1	Overview	1-5
2	Preventive Maintenance and Wheel-on Inspections	6-8
3	Troubleshooting Flowchart	9
4	Wheel-off Maintenance Inspections	10-15
5	Maintenance Kits and Procedures.	16-37

Full Index - see Page 38

1.2 Air Disc Brake Identification

Locate the identification label near the guide pin housing. See below for information about the label fields used.

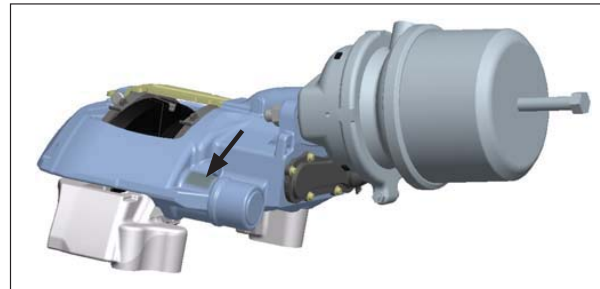


FIGURE 2 - TYPICAL PART NUMBER LABEL LOCATION

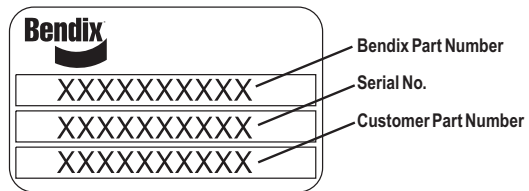


FIGURE 3 - PART NUMBER LABEL INFORMATION

Section One

Section		Page
1.1	Description	1
1.2	Air Disc Brake Identification.	1
1.3	Rotor Identification	3
1.4	Wear Sensor Identification	3
1.5	Operation	3
1.5.1	Brake Release and Adjustment	3

**⚠ GENERAL SAFETY GUIDELINES
WARNING! PLEASE READ AND
FOLLOW THESE INSTRUCTIONS
TO AVOID PERSONAL INJURY OR DEATH:**

When working on or around a vehicle, the following guidelines should be observed AT ALL TIMES:

- ▲ Park the vehicle on a level surface, apply the parking brakes and always block the wheels. Always wear personal protection equipment.
- ▲ Stop the engine and remove the ignition key when working under or around the vehicle. When working in the engine compartment, the engine should be shut off and the ignition key should be removed. Where circumstances require that the engine be in operation, EXTREME CAUTION should be used to prevent personal injury resulting from contact with moving, rotating, leaking, heated or electrically-charged components.
- ▲ Do not attempt to install, remove, disassemble or assemble a component until you have read, and thoroughly understand, the recommended procedures. Use only the proper tools and observe all precautions pertaining to use of those tools.
- ▲ If the work is being performed on the vehicle's air brake system, or any auxiliary pressurized air systems, make certain to drain the air pressure from all reservoirs before beginning ANY work on the vehicle. If the vehicle is equipped with a Bendix® AD-IS® air dryer system, a Bendix® DRM™ dryer reservoir module, or a Bendix® AD-9si™ air dryer, be sure to drain the purge reservoir.
- ▲ Following the vehicle manufacturer's recommended procedures, deactivate the electrical system in a manner that safely removes all electrical power from the vehicle.
- ▲ Never exceed manufacturer's recommended pressures.
- ▲ Never connect or disconnect a hose or line containing pressure; it may whip. Never remove a component or plug unless you are certain all system pressure has been depleted.
- ▲ Use only genuine Bendix® brand replacement parts, components and kits. Replacement hardware, tubing, hose, fittings, etc. must be of equivalent size, type and strength as original equipment and be designed specifically for such applications and systems.
- ▲ Components with stripped threads or damaged parts should be replaced rather than repaired. Do not attempt repairs requiring machining or welding unless specifically stated and approved by the vehicle and component manufacturer.
- ▲ Prior to returning the vehicle to service, make certain all components and systems are restored to their proper operating condition.
- ▲ For vehicles with Automatic Traction Control (ATC), the ATC function must be disabled (ATC indicator lamp should be ON) prior to performing any vehicle maintenance where one or more wheels on a drive axle are lifted off the ground and moving.
- ▲ The power MUST be temporarily disconnected from the radar sensor whenever any tests USING A DYNAMOMETER are conducted on a Bendix® Wingman® Advanced™-equipped vehicle.
- ▲ You should consult the vehicle manufacturer's operating and service manuals, and any related literature, in conjunction with the Guidelines above.

⚠ WARNING: Not all wheels and valve stems are compatible with Bendix Air Disc Brakes. Use only wheels and valve stems approved by the vehicle manufacturer to avoid the risk of valve stem shear and other compatibility issues.

⚠ WARNING: AVOID CREATING DUST. POSSIBLE CANCER AND LUNG DISEASE HAZARD.

While Bendix Spicer Foundation Brake LLC does not offer asbestos brake linings, the long-term affects of some non-asbestos fibers have not been determined. Current OSHA Regulations cover exposure levels to some components of non-asbestos linings, but not all. The following precautions must be used when handling these materials.

- Avoid creating dust. Compressed air or dry brushing must never be used for cleaning brake assemblies or the work area.
- Bendix recommends that workers doing brake work must take steps to minimize exposure to airborne brake lining particles. Proper procedures to reduce exposure include working in a well-ventilated area, segregation of areas where brake work is done, use of local filtered ventilation systems or use of enclosed cells with filtered vacuums. Respirators approved by the Mine Safety and Health Administration (MSHA) or National Institute for Occupational Safety and Health (NIOSH) should be worn at all times during brake servicing.
- Workers must wash before eating, drinking or smoking; shower after working, and should not wear work clothes home. Work clothes should be vacuumed and laundered separately without shaking.
- OSHA Regulations regarding testing, disposal of waste and methods of reducing exposure for asbestos are set forth in 29 Code of Federal Regulations §1910.001. These Regulations provide valuable information which can be utilized to reduce exposure to airborne particles.
- Material Safety Data Sheets on this product, as required by OSHA, are available from Bendix. Call 1-800-247-2725 and speak to the Tech Team or e-mail techteam@bendix.com

1.3 Rotor Identification

See Figure 4 to help you identify which type of rotor is used on the axle being inspected. Note that the maintenance inspection procedure will depend on the type of rotor installed.

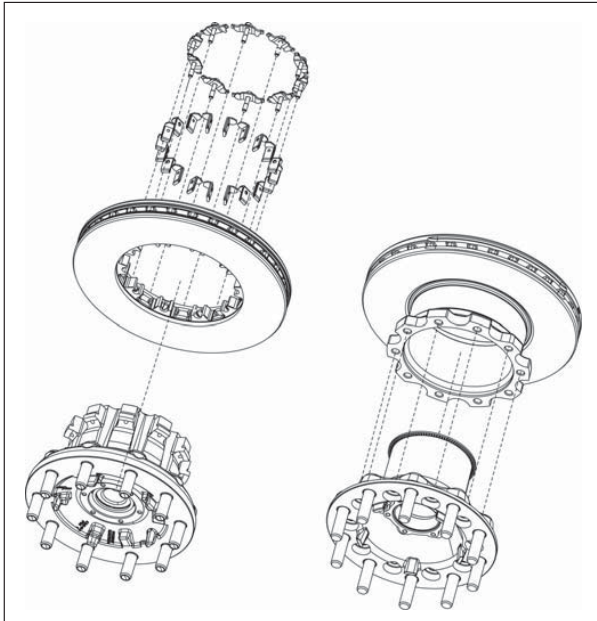


FIGURE 4 - ROTOR IDENTIFICATION

CAUTION: Rotors may not be mixed on a single axle: axles are only permitted to have all conventional or all splined disc rotors.

1.4 Wear Sensor Identification

See Figure 5 for the electronic wear sensor that may be present.

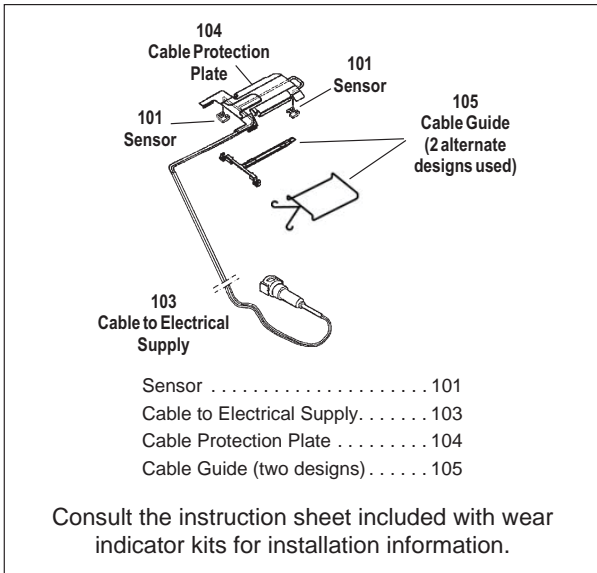


FIGURE 5 - ELECTRONIC WEAR INDICATOR COMPONENTS

1.5 Operation

Bendix air disc brakes convert air pressure into braking force. (See Figure 6.) When the vehicle brakes are applied, air enters the service brake chamber through the supply port, applying pressure within the diaphragm. The pressure expands the diaphragm — applying force to, and moving, the pressure plate and push rod forward. The push rod acts against a cup in the internal lever which pivots on an eccentric bearing moving the bridge. Moving against a return spring, the bridge transfers the motion to two threaded tubes and tappets, which move the inner brake pad. The inner brake pad (from its normal position of having a running clearance between it and the rotor) moves into contact with the brake rotor. Further movement of the bridge forces the caliper — sliding on two stationary guide pins — away from the rotor. That, in turn, pulls the outer brake pad into the rotor. The clamping action of the brake pads on the rotor applies braking force to the wheel.

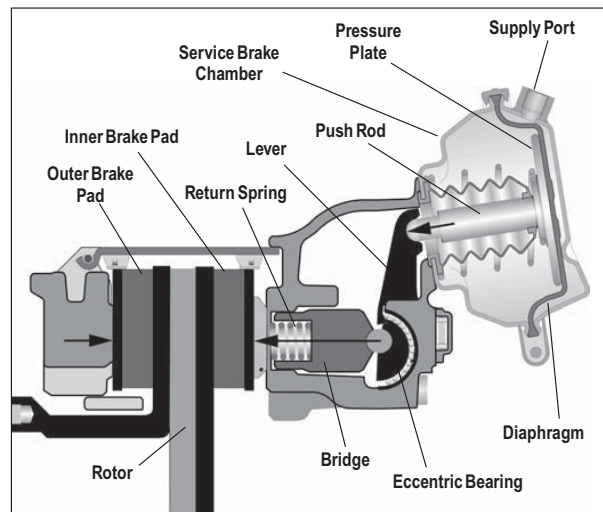


FIGURE 6 - CROSS-SECTION VIEW SHOWING BRAKE OPERATION

1.5.1 Brake Release and Adjustment

When the vehicle brakes are released, the air pressure in the service brake chamber is exhausted and the return springs in the chamber and the bridge return the air disc brake to a neutral, non-braked position. To maintain the running clearance gap between the rotor and the brake pads over time, the non-braked position is mechanically adjusted by a mechanism in the caliper. The adjustment mechanism operates automatically whenever the brakes are activated, to compensate for rotor and brake pad wear and to keep the running clearance constant. During pad or rotor maintenance, the technician manually sets the system's initial non-braked position. The total running clearance (the sum of clearances on both sides of the rotor) should be between 0.024 to 0.043 in. (0.6 to 1.1 mm).

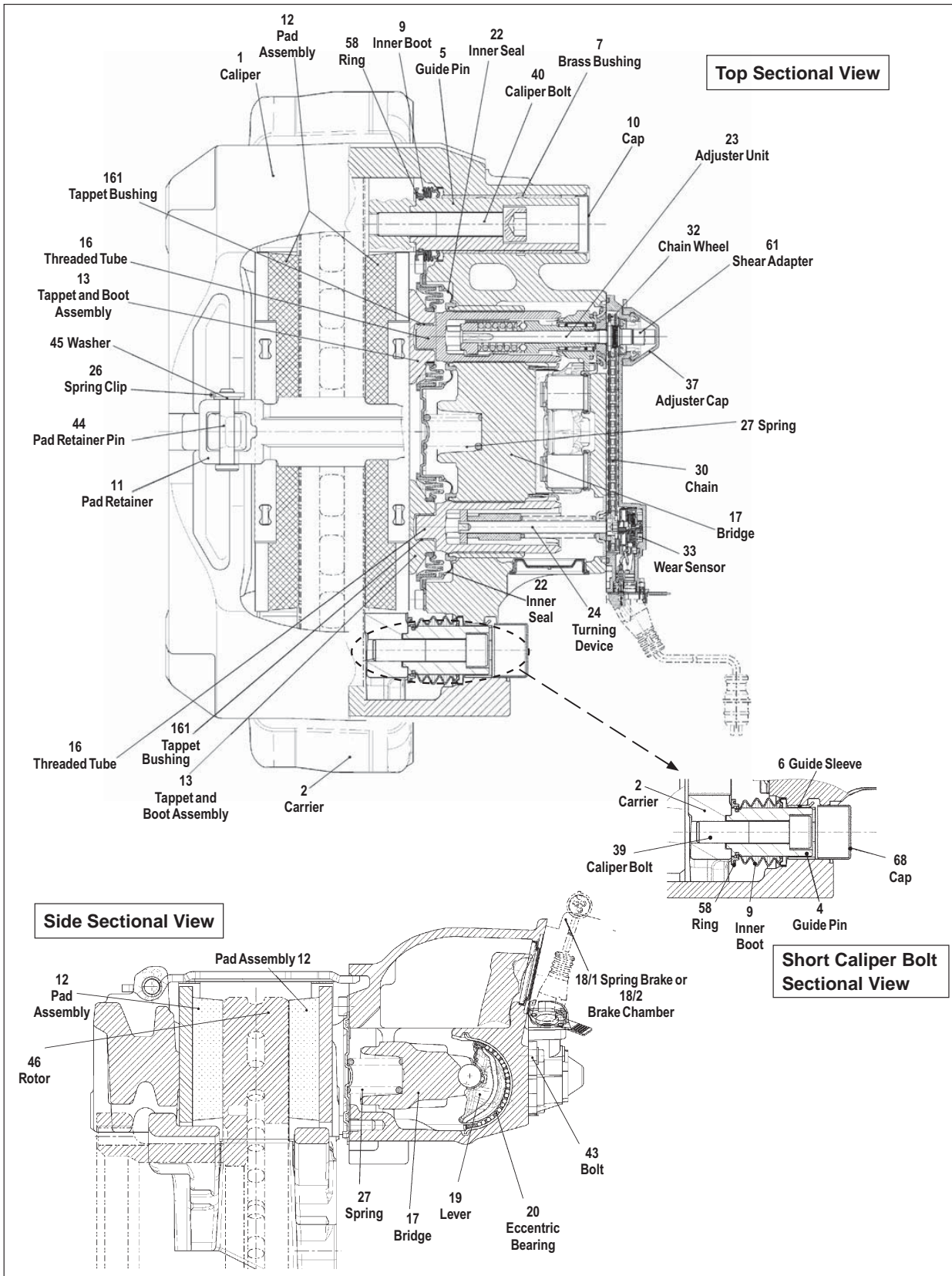


FIGURE 7 - SECTIONAL VIEWS

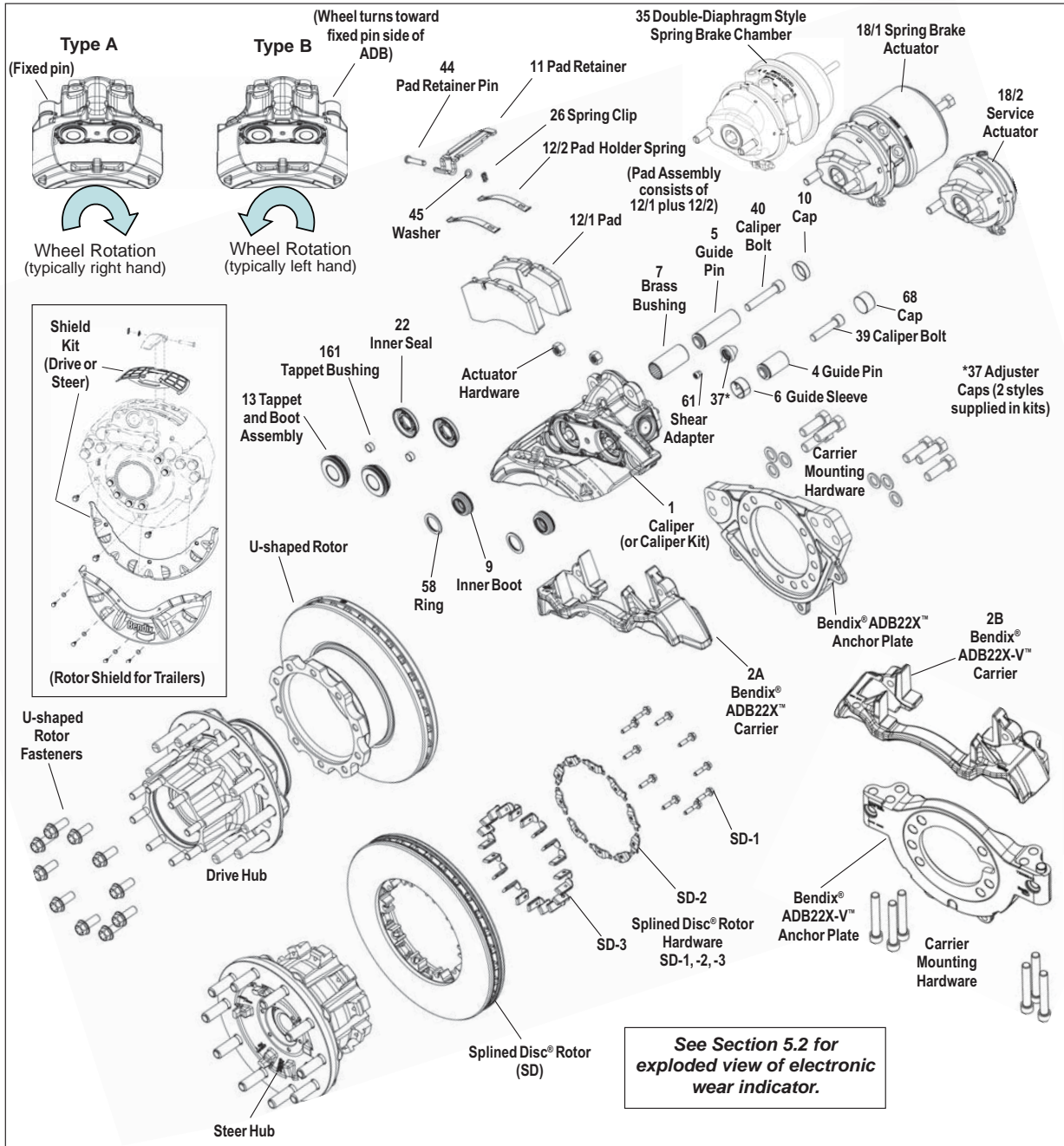


FIGURE 8 - EXPLODED VIEW - BENDIX® ADB22X™ AND ADB22X-V™ AIR DISC BRAKES

INDEX TO FIGURES 7 & 8

Adjuster Caps 37	Chain Wheel 32	Pad Assembly 12	Spring Brake Actuator (Double-Diaphragm style) 35
Adjuster Unit 23	Cap 10	Pad Retainer 11	Spring Clip 26
Bolt 43	Eccentric Bearing 20	Pad Retainer Pin 44	Tappet and Boot Assembly 13
Brass Bushing 7	Guide Pins 4, 5	Ring 58	Tappet Bushing 161
Bridge 17	Guide Sleeve 6	Service Actuator 18/2	Threaded Tube 16
Caliper 1	Inner Boot 9	Shear Adapter 61	Turning Device 24
Caliper Bolt 39, 40	Inner Seal 22	Splined Disc Hardware SD-1, SD-2 and SD-3	Washer 45
Cap 68	Lever 19	Spring 27	Wear Sensor 33
Carrier 2 (A or B)	Pad 12/1	Spring Brake Actuator 18/1	
Chain 30	Pad Holder Spring 12/2		

SECTION TWO: PREVENTIVE MAINTENANCE SCHEDULE AND WHEEL-ON INSPECTIONS

2.0 PREVENTIVE MAINTENANCE


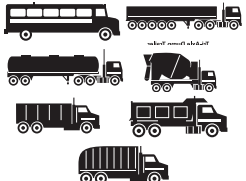
Regular inspection and maintenance of air disc brake components is an important part of vehicle maintenance.

The maintenance practices outlined here are recommended in addition to all standard industry practices (including daily pre-trip inspections.) Also, see the vehicle's manual for recommendations. Keep track of the results of your maintenance inspections to assist you in determining the ideal maintenance intervals for the vehicle.

Use the table below for a guide to maintenance interval planning, however, depending on the particular vehicle's use, more frequent checks of the components may be necessary.

Section Two		Page
Section 2.0	Preventive Maintenance	6
Section 2.1	Brake Pad and Rotor Inspections	7-8
Section 2.2	Running Clearance Quick Inspection	8

*** For vehicles with electronic wear indicators,** use the dash indicator(s) and/or the hand-held diagnostic tool to regularly monitor the pad wear.
See Section 5.2.

Table 1: Inspection Period					
When you check the tire pressures	(4 to 5 times during the pad lifetime)			At the very least, every four (4) months	At least once every year (and at every pad replacement)
	About every four (4) months for over-the-road applications:	About every three (3) months for higher-duty applications:			
	e.g. line haul, RV, open-highway coaches, etc.	e.g. pick-up & delivery, off-highway, construction, logger, concrete mixer, dump truck, city transit bus, refuse, school buses, etc.			
					

Inspections with the wheel mounted (Sections 2.1 - 2.3)					
Inspect the pad thickness by checking the mechanical wear indicators*. See Section 2.1.	✓	✓	✓	✓	
Inspect the running clearances using the quick inspection technique. See Section 2.2.	✓	✓	✓	✓	
Inspect the visible part of the rotors for cracks, etc. See Section 2.3.	✓	✓	✓	✓	
Inspections with wheel removed (Section 4)					
Inspect the pads and entire rotor surfaces for cracks, etc. (Bendix® splined disc® rotors: Inspect retaining hardware and check torques) See Section 2.3.					✓
Inspect the running clearances and adjuster operation. See Sections 2.2 and 4.2.					✓
Inspect the caliper travel. See Section 4.1.					✓
Inspect the tappet and boot assemblies. See Section 4.6.					✓
Inspect all caps, hoses, and brake exterior for damage etc.					✓

2.1 BRAKE PAD AND ROTOR INSPECTIONS

Visual checks of the condition of the brake pad/rotor wear can be made without removing the wheels. Where dust guards are not used, the top of the pads and part of the rotor are visible through the opening at the top of the brake. Other visible portions of the rotor can be inspected at the same time.

Unless a vehicle has been stored for some time, the main rotor surfaces that contact the pads will always appear to be shiny. Surface rust on these surfaces would indicate a malfunctioning brake that should be inspected immediately.

Pads are 1.181 in. (30 mm.) thick when new and must be replaced when they reach 0.433 in. (11 mm.). Rotors are 1.77 in. (45 mm.) thick when new and must be replaced when they reach 1.46 in. (37 mm.). See Section 4.3 for further inspection criteria.

2.1.1 Electronic Wear Indicators

Use the dash indicator(s) and/or a hand-held diagnostic tool to regularly monitor the pad wear. (See Section 5.2.)

2.1.2 Mechanical Wear Indicators

See Figure 9 for the location of the mechanical wear indicators. There are two types (See Figure 10 for Style A and Figure 11 for Style B).

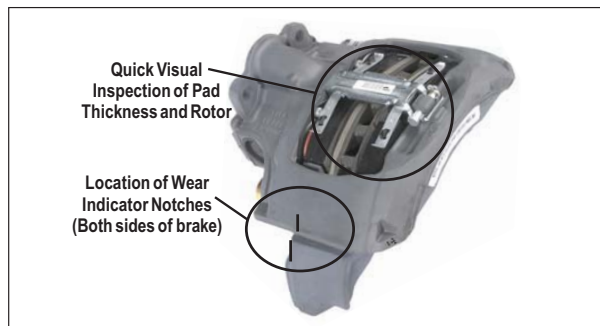


FIGURE 9 - LOCATION OF WEAR INDICATORS

Note: These mechanical wear indicators do not constitute “out-of-service” criteria. These inspections only show when to schedule a full wheel-removed inspection of the brake pads and rotor. The thicknesses of the pad and rotor will both affect the wear indicator position at which maintenance is actually needed.

Wear Indicator Style A:

Where both the carrier and caliper have an indicator notch.

Compare the relative position of two notches cast into the carrier and caliper. When the two notches align, it is time to schedule a full wheel-removed inspection of the pads and rotor.

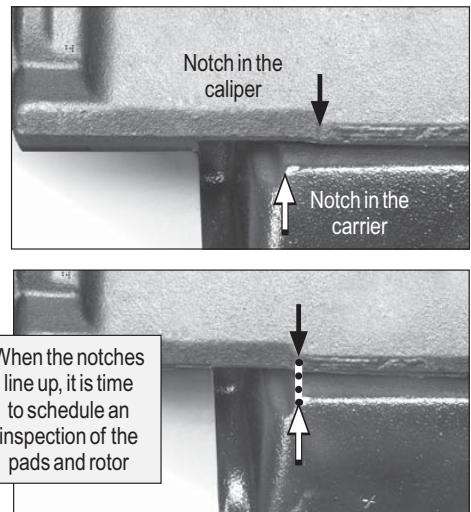


FIGURE 10 - STYLE A - WHEN BOTH CARRIER AND CALIPER HAVE A CAST NOTCH

Wear Indicator Style B:

Where only the caliper has an indicator notch.

When the notch in the caliper aligns with the front edge of the torque plate, it is time to schedule a full wheel-removed inspection of the pads and rotor.

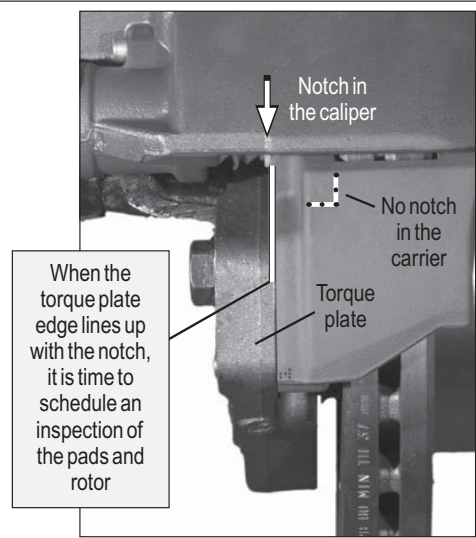


FIGURE 11 - CARRIER WEAR INDICATOR NOTCH AND BACKING PLATE ALIGNMENT

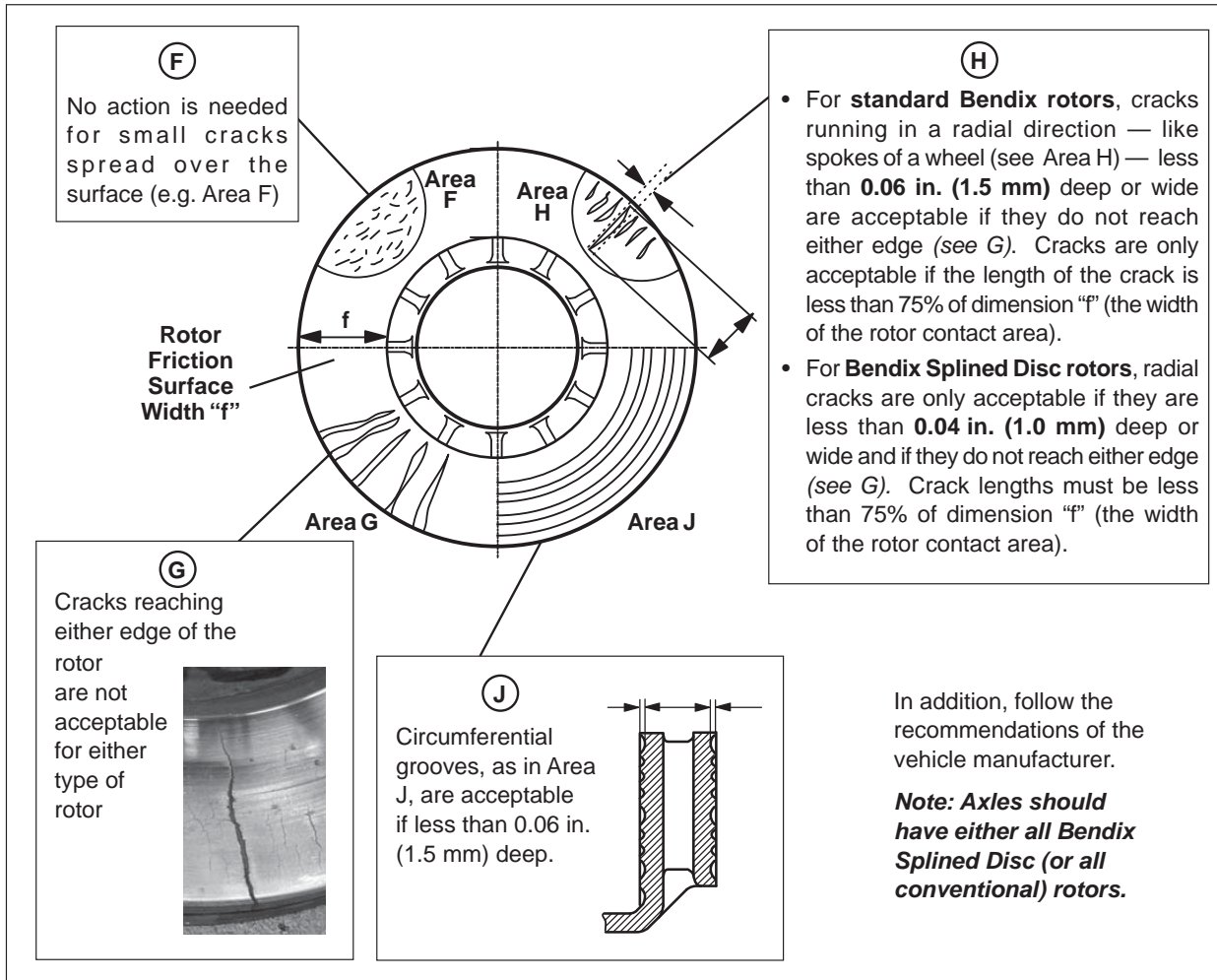


FIGURE 12 - EXAMPLES OF ACCEPTABLE AND NON-ACCEPTABLE ROTOR CRACKS AND GROOVES

2.1.3 Rotor Quick Inspection

See Figure 12. See the various potential rotor conditions that you may find. See the criteria below for whether the rotor needs to be replaced and/or scheduled for a full inspection.

2.2 RUNNING CLEARANCE QUICK INSPECTION

CAUTION: Follow all safe maintenance practices.

On level ground, with the wheels chocked and the parking brake temporarily released, check for movement of the brake caliper. This small movement, less than 0.08" (2 mm) - approximately the thickness of a nickel - in the inboard/outboard direction indicates that the brake is moving properly on its guide pins.

If the caliper has no movement or appears to move greater than the distances noted above, a full wheel-removed inspection will be necessary (See Section 4.1).

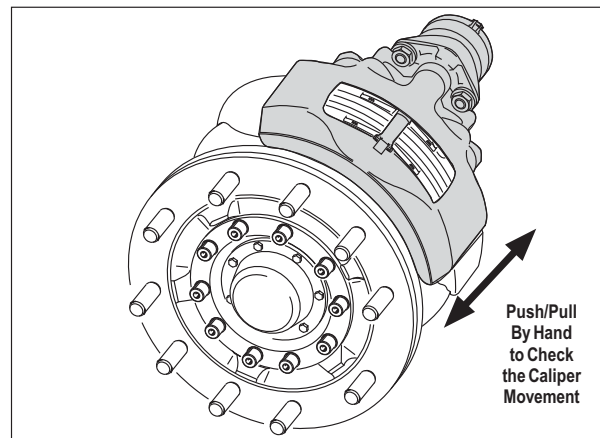


FIGURE 13 - CALIPER RUNNING CLEARANCE (FIGURE DOES NOT SHOW WHEEL)

SECTION THREE: TROUBLESHOOTING PROCEDURE FLOWCHART

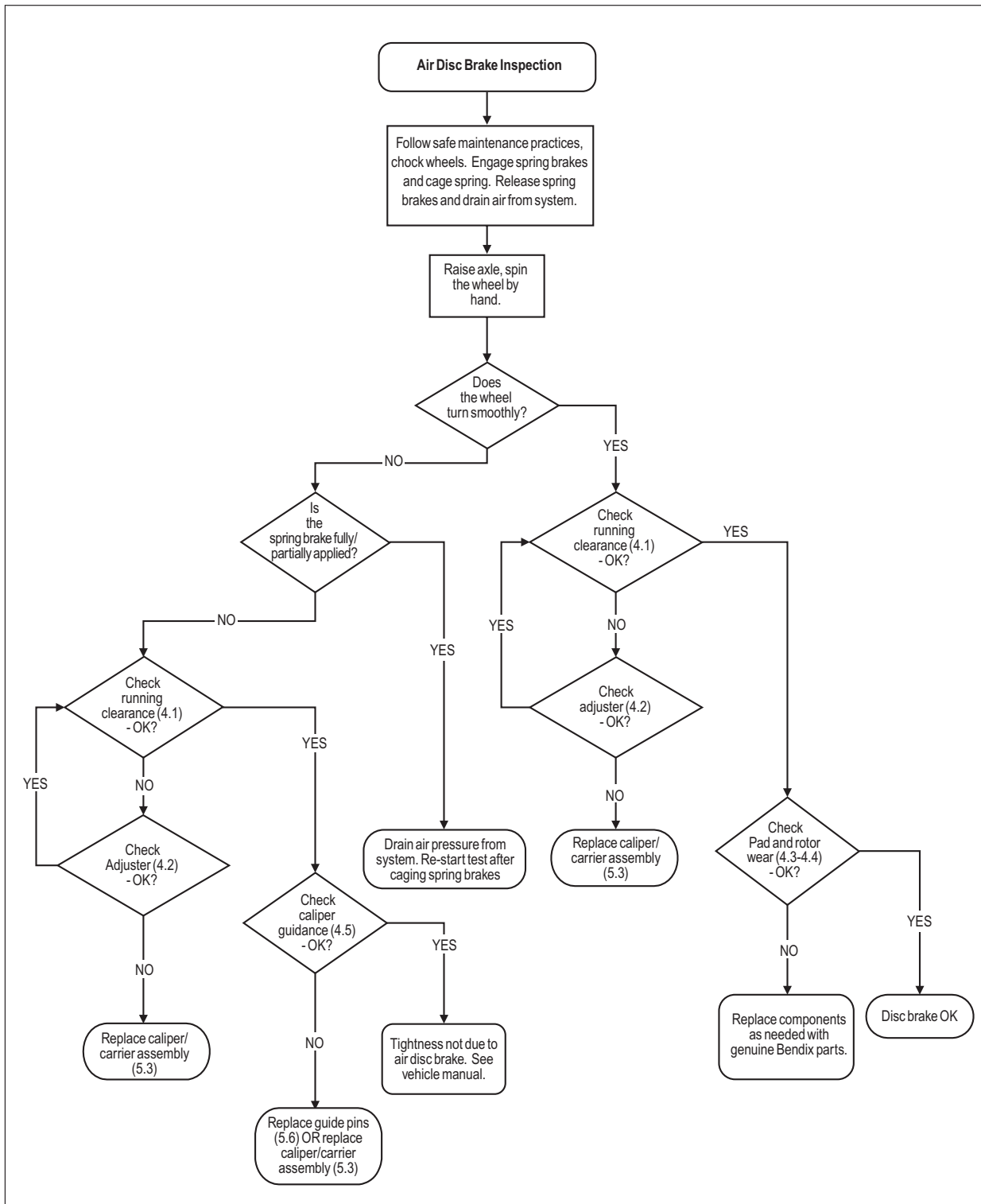


FIGURE 14 - TROUBLESHOOTING BENDIX AIR DISC BRAKES

SECTION FOUR: WHEEL-OFF MAINTENANCE INSPECTIONS

Section Four	
Section	Page
4.0	Wheel-Off Inspections 10
4.1	Caliper Movement Test 10
4.2	Adjuster Mechanism Inspection 11
4.3-4.4	Brake Pads and Rotors 12-14
4.3	Inspect the Brake Pads 12
4.4	Inspect the Rotor 13-14
4.4.3	Machining (Grinding or Turning) Rotors 14
4.5	Guide Pin Bearing Inspection 14-15
4.6	Tappet & Boot Assembly Inspection 15

4.0 WHEEL-OFF INSPECTIONS

CAUTION: During these inspections, follow all safe maintenance practices, including those on page two of this service manual. Also, follow the vehicle manufacturer’s recommendations. When working on foundation brakes, be sure that the vehicle is on level ground, that the vehicle is parked by other means than the foundation brakes, and that the wheels are chocked.

4.0.1 Wheel Removal and Re-Installation

Refer to the vehicle manufacturer’s recommendations for removing the wheel.

Note: When removing the wheel, inspect first to see that there is no contact between the caliper and axle, vehicle, chassis sections or carrier, etc. that may be impeding the free movement of the caliper.

WARNING: Not all wheels and valve stems are compatible with Bendix Air Disc Brakes. Use only wheels and valve stems approved by the vehicle manufacturer to avoid risk of valve stem shear and other compatibility issues. After re-installing a wheel according to the vehicle manufacturer’s recommendations, please ensure that there is sufficient clearance between the tire inflation valve stem, the caliper and the wheel rim, to avoid damage.

4.1 CALIPER MOVEMENT TEST

CAUTION: Follow all safe maintenance practices.

Remove the wheel. With the spring brakes released or caged, push the caliper assembly inboard on its guide pins. *Note: To fully release the spring brakes, assure that the air system pressure is at least 90 PSI.* Using a suitable tool (for example a large flat-blade screwdriver), press the inboard pad (12) away from the tappets. Check that there is no dirt, etc. in the gap, and clean if necessary. Then use two long-blade feeler gauges to measure over the whole tappet surface the gap between them and the inboard pad backplate. (See Figure 16.) The gap should be between 0.024 in. (0.6 mm) and 0.043 in. (1.1 mm). **If the gap is within the range given, the test is complete.**

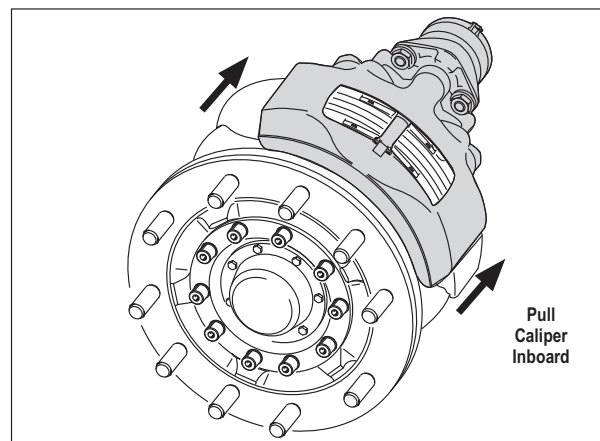


FIGURE 15 - PULL CALIPER INBOARD

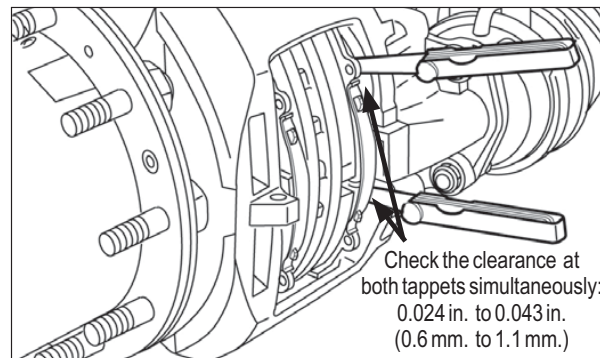


FIGURE 16 - RUNNING CLEARANCE CHECK

CAUTION: If the clearance is too wide, there is a danger of brake failure. If the clearance is too small, or if there is no gap at all, there is a danger of the brake overheating. These conditions must be corrected before returning the vehicle to service.

For further investigation, where there is some gap, go to Section 4.2 and check the adjuster mechanism. Where there is no movement at all (and so no gap to measure), go to Section 4.5 “Guide Pin Inspection.”

4.2 ADJUSTER MECHANISM INSPECTION

CAUTION: Follow all safe maintenance practices.

Aside from the normal maintenance schedule, the adjuster mechanism inspection that follows is also carried out when the Caliper Movement Test (4.1) finds that the running clearance is too small or too large.

4.2.1 With the spring brake released (or caged), remove the adjuster cap (37) using the tab, taking care not to move the shear adapter (61). Note: One of two styles of adjuster cap (stamped metal or plastic adjuster cap) may be used.

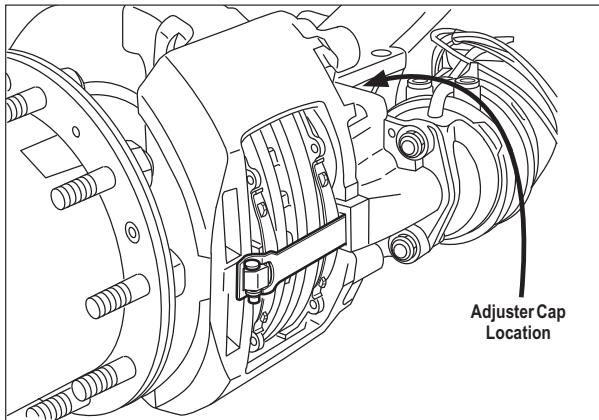
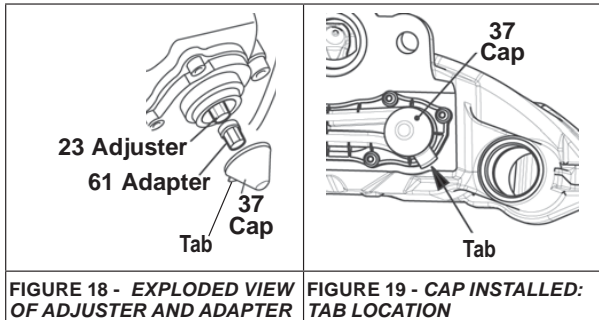


FIGURE 17 - ADJUSTER CAP LOCATION



For illustration purposes, the exploded view (Figure 18) shows the adjuster (23) and shear adapter (61) separated. When using the adjuster mechanism, always have the shear adapter installed on the adjuster.

4.2.2 Using a 10mm. six-point box wrench, turn the Shear Adapter (61) **counter-clockwise** and listen for the sound of 3 clicks as the mechanism backs-off (increases) the running clearance. Note: Do not use an open-ended wrench as this may damage the adapter. See Figure 20.

CAUTION: Never turn the adjuster (23) without the shear adapter (61) installed. The shear adapter is a safety feature and is designed to prevent excessive torque from being applied to the adjuster. The shear adapter will fail (by breaking) if too much torque is applied.

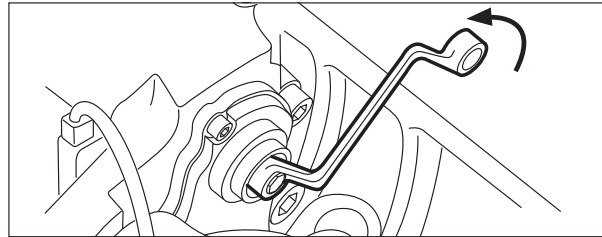


FIGURE 20 - BACKING-OFF (INCREASING) THE RUNNING CLEARANCE

If the shear adapter fails, you may attempt a second time with a new (unused) shear adapter.

Note: Always double-check that the spring brake is released (where applicable) if a shear adapter fails; if this step was missed, the shear adapter will break off, and it may appear that the caliper is seized.

In cases where a second failure of the shear adapter confirms that the adjustment mechanism is seized, the caliper must be replaced.

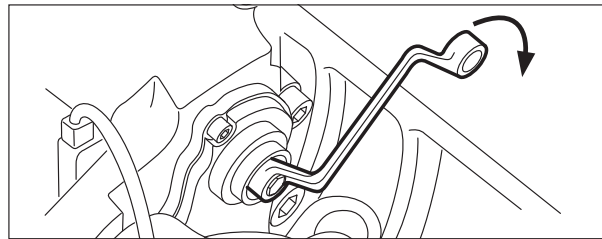


FIGURE 21 - APPLYING MODERATE APPLICATIONS OF THE BRAKES: THE WRENCH MOVES CLOCKWISE AS THE RUNNING CLEARANCE IS DIMINISHED

4.2.3 Where the adjuster mechanism is able to be backed-off normally, position a box-end wrench on the shear adapter so that it can turn clockwise freely without coming into contact with parts of the vehicle (See Figure 21). Make five to ten moderate applications of the brakes [at about 30 psi (2 Bar)], and observe that the box-end wrench or socket should turn clockwise in small increments.

NOTE: As the number of applications increases, the turning movement will decrease (as the brake reaches its normal calibration point).

If the box-end wrench does not: (a) turn at all; (b) turns only with the first application; or (c) turns forward and backward with every application, the automatic adjuster has failed and the caliper/carrier assembly must be replaced.

After completing these wheel-off tests, Bendix recommends installing a new adjuster cap (lightly greased using white, lithium-based grease) when returning the brake to service. Ensure that the tab is in the position shown in Figure 19.

4.3-4.4 BRAKE PADS AND ROTORS

CAUTION: Follow all safe maintenance practices.

If electronic wear sensors are present, see Section 5.2.

If dust covers are present, see Section 5.1.

See Figure 23. While pressing down against the pad retaining bar (11), remove and retain the clip (26), washer (45) and pin (44). Remove the pad retainer bar (11). Bendix recommends that these items should be replaced with new (See available kits and parts, Section 5.0).

Follow the steps in Section 4.2 for backing-off the adjuster mechanism. Slide the caliper inboard then outboard to permit easy removal of the brake pads.

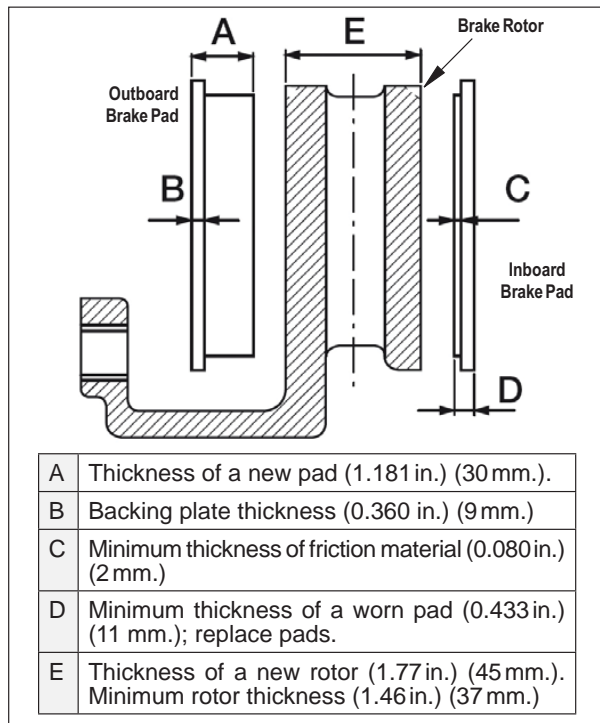


FIGURE 22 - PAD AND ROTOR DIMENSIONS

See Figure 22 for initial brake pad and rotor dimensions, as well as minimum acceptable dimensions.

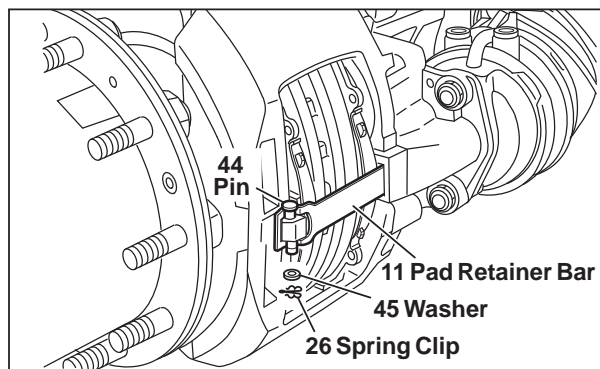


FIGURE 23 - RETAINER BAR REMOVAL

4.3 INSPECT THE BRAKE PADS

Regular inspection of the brake pads (even for vehicles that use an electronic wear indicator) is an important part of vehicle maintenance.

4.3.1 See Figure 22. If the thickness of the friction material — dimension “C” — is less than 0.080 in. (2 mm.), the pads must be replaced.

Bendix® ADB22X™, ADB22X-V™ air disc brakes use 0.35 in. (9 mm.) backing plates, so dimension “D” (the combined pad and backing plate thickness) must be a minimum of 0.43 in. (11 mm.).

4.3.2 Check for uneven end-to-end pad wear. If the difference in wear is greater than 0.080 in. (2 mm.), replace the brake pads and also inspect the guide pins (See Section 4.5).

4.3.3 Compare the thickness of the inboard and outboard pads of each set. If the difference between the inboard and outboard pad thickness is greater than 0.138 in. (3.5 mm.), replace the brake pads and inspect the guide pins (See Section 4.5).

If the results of the pad inspections are within the acceptable range, inspect the pad surface. (See Figure 24).

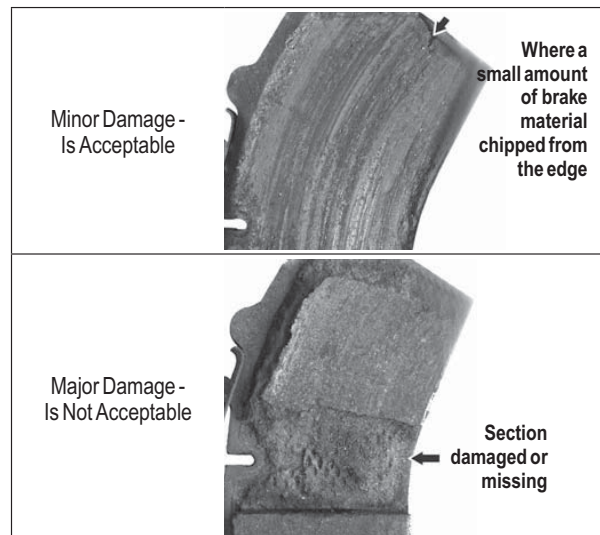


FIGURE 24 - BRAKE PAD SURFACE INSPECTION

Minor damage at the edges is permitted, but replace the pads if major damage on the surface of the pad is found.

When replacing brake pads, Bendix strongly recommends that all the brake pads on an axle be replaced at one time. See Section 5.1 for the pad replacement procedure. Also see the vehicle manufacturer’s recommendations found in the operator’s manual.

Bendix air disc brakes are precision-engineered braking mechanisms. The “friction couple” braking characteristics have been carefully optimized — and the rotor design and materials have been matched with special formulation brake pads for optimal performance. In all cases, use brake pads with the type of backing plate and lining material originally supplied by the vehicle manufacturer.

CAUTION: When replacing brake pads and rotors, use only Bendix® brand replacement pads and rotors and/or those approved by the OEM. Non-approved replacement disc pads or rotors can cause excess wear to brake components, and can increase the risk of rotors cracking, etc.

4.4 INSPECT THE ROTOR

CAUTION: Follow all safe maintenance practices.

Identify if the rotor is a Bendix® Splined Disc®, or Bendix® brand conventional rotor (See Section 1.03). Rotors should be inspected regularly (See Section 2.0 for recommended inspection schedule) and at each pad change.

4.4.1 Measure the thickness of the brake rotor at the thinnest point (Dimension “E” in Figure 22). Avoid measuring near the edge of the rotor as minor burrs may result in inaccurate measurement. **For Bendix® brand rotors, replace the rotor when the minimum thickness of 1.46 in. (37 mm.) is reached.** For other brands of rotors, refer to the rotor manufacturer’s guidelines.

4.4.2 Inspect the rotor surface. See Figure 25. The type of rotor, and also the size, depth and direction of the imperfections, must all be considered.

NOTE: If surface wear conditions F through J are in the permitted range, the rotor is still usable until it reaches the minimum acceptable thickness for the rotor manufacturer’s guidelines.

4.4.3 Machining (Grinding or Turning) Rotors

Bendix® brand rotors are normally service-free. In the case of severe grooving of the entire friction surface, however, **CONVENTIONAL ROTORS** may be turned when changing pads, to increase the load-bearing surface.

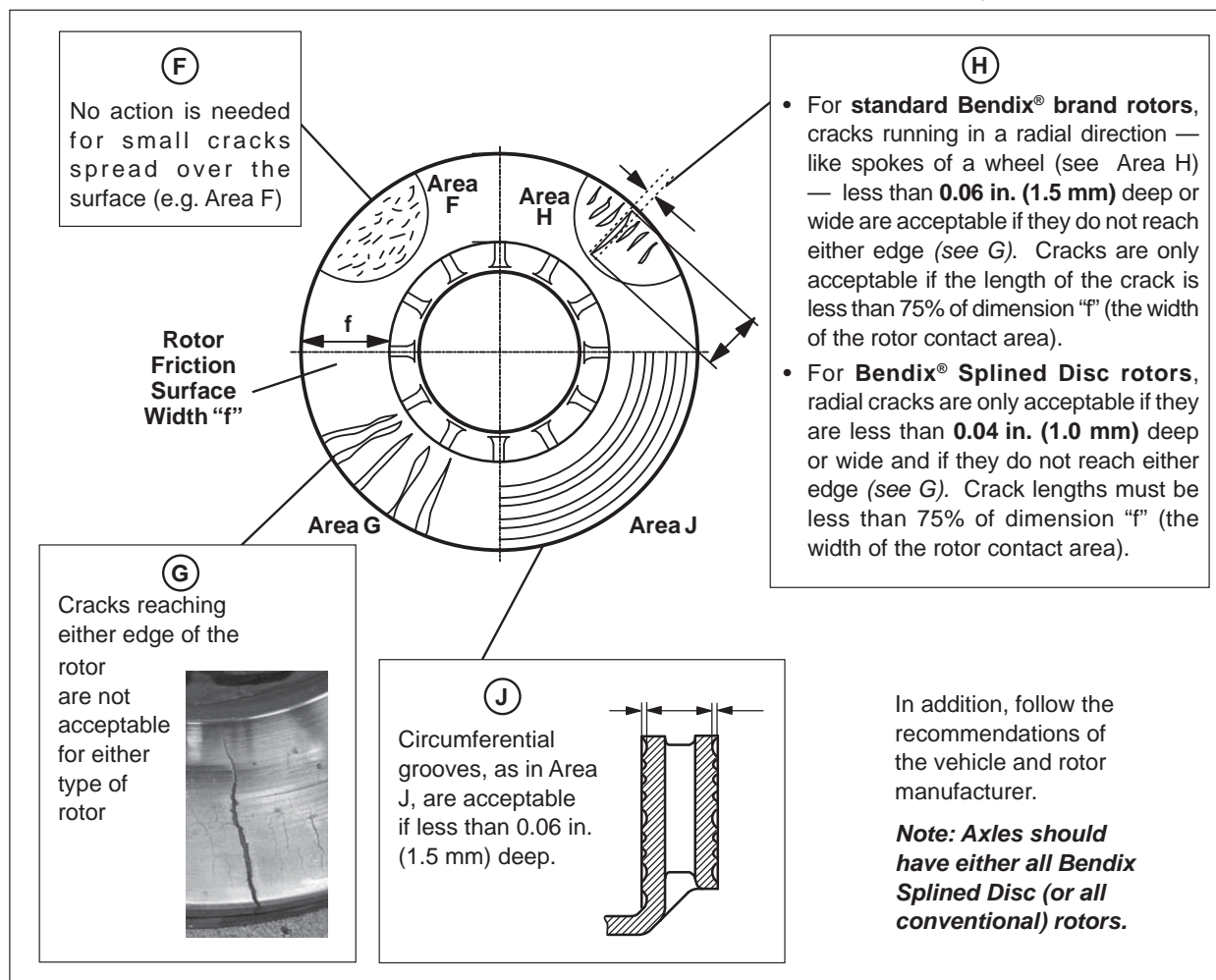


FIGURE 25 - EXAMPLES OF ACCEPTABLE AND NON-ACCEPTABLE ROTOR CONDITIONS

MACHINING OF BENDIX® SPLINED DISC® ROTORS IS NOT PERMITTED.

CAUTION: Always maintain air disc brake pads and rotors within specifications. Excessive pad or rotor wear will degrade braking performance.

Periodic inspection of the Bendix Splined Disc attachment hardware is recommended to ensure optimum braking performance. Bendix recommends verifying the torque on the spring element fasteners whenever a brake inspection is performed.

⚠ WARNING! AFTER MACHINING/TURNING, THE MINIMUM ROTOR THICKNESS FOR BENDIX® BRAND ROTORS MUST BE AT LEAST 1.535 - 1.575 IN. (39 - 40MM.) - FOR OTHER BRANDS, CONSULT THE MANUFACTURER'S GUIDELINES. ALSO, CHECK THE VEHICLE MANUFACTURER'S RECOMMENDATIONS. FAILURE TO COMPLY MAY RESULT IN BRAKE FAILURE AND IN SERIOUS INJURY OR DEATH. MACHINING OF BENDIX SPLINED DISC ROTORS IS NOT PERMITTED.

4.4.4 Rotor Replacement

An axle is permitted to have only all Bendix Splined Disc, or all conventional, rotors.

When replacing rotors, be sure to adhere to the vehicle manufacturer's recommendations, including bolt tightening torques. It is recommended to install only Bendix® brand rotors, and also that the pads should be replaced (as an axle set) at the same time.

Non-Bendix® brand rotors. If a non-Bendix® brand rotor is used, confirm that it complies to the vehicle manufacturer's recommendations.

CAUTION: The use of non-approved brake rotors may reduce levels of safety and invalidate the warranty.

See Section 5.7 for re-installation procedures.

4.5 GUIDE PIN BEARING INSPECTION

CAUTION: Follow all safe maintenance practices.

This guide pin inspection should be carried out if the technician cannot move the caliper during a Caliper Movement Test (Sections 2.2 and/or 4.1).

Measure the range of travel along the guide pin bearings:

- 4.5.1 Remove the Pads (See Section 4.3). Using hand pressure only (no tools), the caliper (1) should slide freely along the whole length of the guide pins. This movement should be at least 0.95 inch (25 mm) when the pads are not present. If the movement is less than this amount, replace the caliper/carrier assembly.

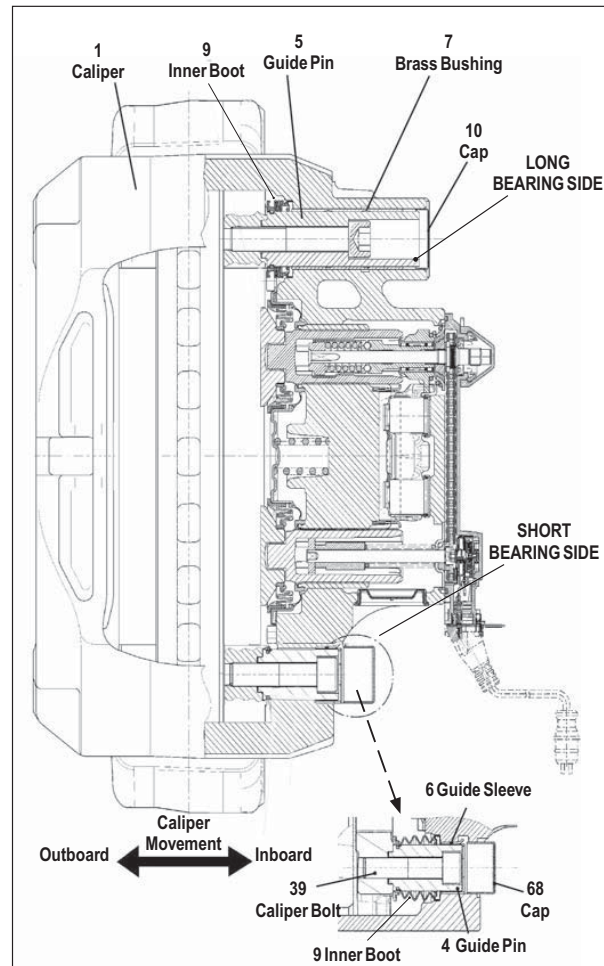


FIGURE 26 - GUIDE PINS

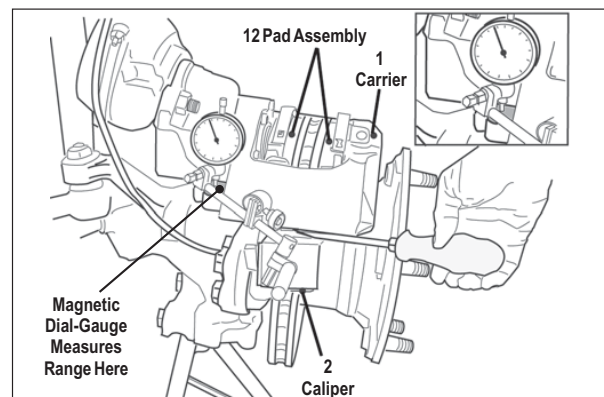


FIGURE 27 - MAGNETIC DIAL-GAUGE IN USE

Measure the “play” (range of movement) in the guide pin bearings:

- 4.5.2 See Figures 26 and 27. With the wheel removed, remove the pad retainer bar (11). Temporarily replace the pads with two new pads (12). Attach a magnetic dial-gauge holder to the carrier (2) on the short bearing side of the caliper (1). Use the measuring point on the caliper (1) - see the callout

in Figure 27. Press the caliper in the direction of the carrier (2) and set the dial-gauge to zero.

- 4.5.3 Place a suitable tool (e.g. a large flat-blade screwdriver) between carrier (2) and caliper (1) and use light hand force to move the caliper away from the carrier, until the movement stops. Read the maximum value on the dial-gauge. See Figure 27.

If the value is greater than 0.039 in. (1.0 mm), replace the guide pin bushings (See Section 5.6) OR replace the caliper/carrier assembly (See Section 5.3).

Inspect the guide pin inner boots:

- 4.5.4 See Figures 28 and 29. With the pads removed, slide the carrier by hand to the inboard position (See Figure 28). By looking through the opening where the pads are installed — and also from below — inspect the inner boot (9) for each of the guide pins. **INSPECT FOR DAMAGE, CUTS AND CRACKS.** Replace damaged boots immediately to prevent dirt and/or moisture affecting the movement of the guide pins (See Section 5.4). Damaged or corroded guide pins will impair the operation of the brake.

In addition, during installation, the boots are compressed to minimize the amount of air trapped within them. Observe as you move the carrier back towards the outboard position; the boots should only expand outwards a small amount due to trapped air. The boots should normally (due to their ribbed construction) contract back into place as the caliper moves on the guide pins. The boots are not airtight and so some trapped air is normal; excess air trapped will dissipate.

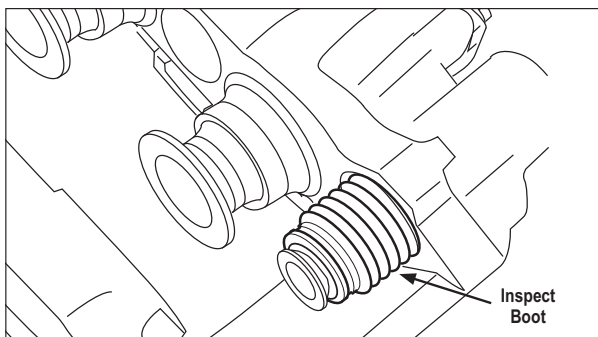


FIGURE 28 - GUIDE PIN BOOT INSPECTION (THIS IMAGE DOES NOT SHOW THE CARRIER)

- 4.5.5 Inspect the original pads (See Section 4.3) and they may be reused if they are in good condition with sufficient pad thickness.

4.6 TAPPET AND BOOT ASSEMBLY INSPECTION

- 4.6.1 In order to inspect the tappet and boot assembly, remove the pads (12) (See Sections 4.3 or 5.2) and advance the shear adapter (61) clockwise.

CAUTION: NEVER EXTEND THE TAPPET MORE THAN 1.75 in. (44.5 mm). See Figure 29. **Over-extending the tappet will result in the tappet losing engagement with the synchronizing mechanism. Since the mechanism can only be set at the manufacturing plant, the caliper/carrier assembly must be replaced if this happens.**

- 4.6.2 **INSPECT THE TAPPET AND BOOT ASSEMBLIES (13) FOR EVIDENCE OF DAMAGE, CUTS, CRACKS, TEARS AND EVIDENCE OF CORROSION, ETC.** Damaged boots lead to the penetration of dirt and moisture, and can lead to corrosion and impair the operation of the brake. Replace as necessary (See Section 5.5).

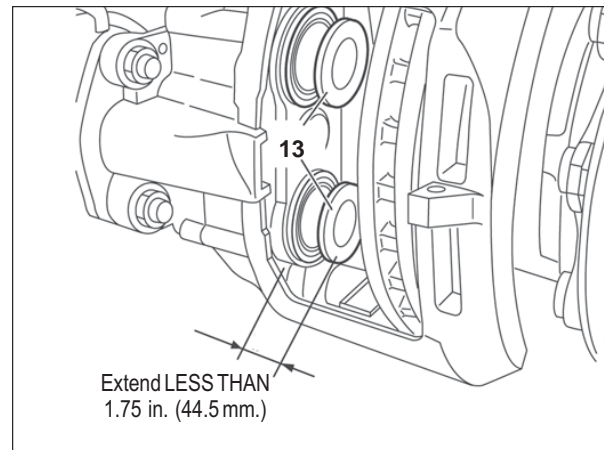


FIGURE 29 - PERMITTED TAPPET EXTENSION

Where the tappets and boots pass the inspection, retract the tappets using the shear adapter.

When installed, the boots are compressed to minimize the amount of air trapped within them. Observe as you move the tappet back using the shear adapter; the boots should only expand outwards a small amount due to trapped air. The boots should normally (due to their ribbed construction) contract back into place as the tappets move. Note: If the bellows have excess air trapped, then with the tappets retracted, remove and re-install the actuator to vent the excess trapped air (See Section 5.4).

Follow the reinstallation steps for the brake pads (See Section 5.2).

SECTION FIVE: MAINTENANCE KITS AND PROCEDURES

Section Five		Page	Section	Page
5.0	Maintenance Kits	16-18	5.4	Spring/Service Brake. 24
5.1	Air Disc Brake Shield Kit	19	5.5	Tappet & Boot, and Tappet Inner Seal 25-28
5.2	Pad Replacement	20	5.6	Guide Pin and Boot Assemblies . . . 29-34
5.3	Caliper/Carrier/Actuator Assembly . .	22-23	5.7	Bendix® Splined Disc® Hub Rotor . . . 35-37

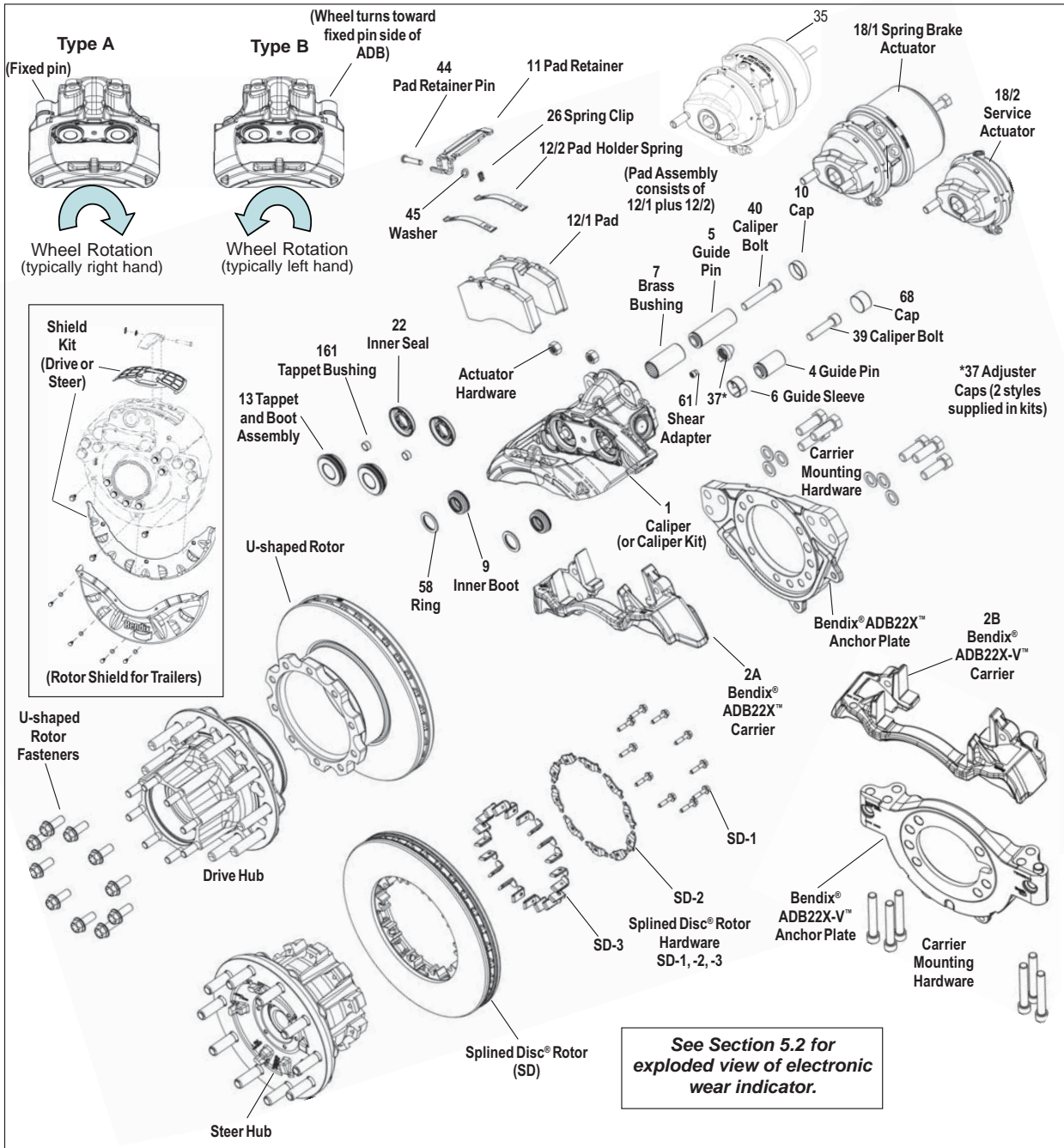


FIGURE 30 - EXPLODED VIEW - BENDIX® ADB22X™ AND ADB22X-V™ AIR DISC BRAKES

5.0 MAINTENANCE KITS FOR BENDIX® ADB22X™ AND 22X-V™ AIR DISC BRAKES

Below is a list of some of the available kits. See Figure 30 for an exploded view showing the components listed.

Kit	Piece Number	Components Included in Kit
Pad Kit (axle set)	K070796	(11, 12/1, 12/2, 26, 37, 44, 45, 61)
Splint Kit (box of 25)	803151	(26)
Shear Adapter (box of 10)	802455	(61)
Tappet/Boot Kit (wheel end kit)	K092079	(13, 22, 161)
Adjuster Cover (box of 10)	802643	(37)
Guide Pin, Seal and Boot Kit (wheel end kit)	803114	(4, 5, 6, 7, 9, 10, 37, 39, 40, 58, 61, 68)
Guide Pin Boot Kit	K023768	(9, 10, 37, 39, 40, 58, 61, 68)
Guide Pin Grease	II14525	White (5 grams)
	K021964	White (500 grams)
Service Actuators	K028039	Bendix® Type 14 Universal (9, 18/2)
	K028226	Bendix® Type 16 Universal (9, 18/2)
	K028022	Bendix® Type 18 Universal (9, 18/2)
	K028225	Bendix® Type 20 Universal (9, 18/2)
	K028238	Bendix® Type 22 Universal (9, 18/2)
	K028252	Bendix® Type 24 Universal (9, 18/2)
NG-3 Piston Style Spring Brake Chambers	K027557	Bendix® Type 18/16 Piston Style Truck/Trailer Universal (1, 18/1)
	K025670	Bendix® Type 18/24 Piston Style Truck/Trailer Universal (1, 18/1)
	K025669	Bendix® Type 20/24 Piston Style Truck/Trailer Universal (1, 18/1)
Double-Diaphragm Style Spring Brake Chambers	K042457	Bendix® Type 16/24 Double Diaphragm Style (35)
	K043329	Bendix® Type 18/24 Double Diaphragm Style (35)
	K041960	Bendix® Type 20/24 Double Diaphragm Style (35)
	K043148	Bendix® Type 22/24 Double Diaphragm Style (35)
	K043270	Bendix® Type 24/24 Double Diaphragm Style (35)
Caliper-Carrier Assembly (Includes 803114)	K081142	12 Degree Steer and Drive Axial "A" (2A, 1)
	K081143	12 Degree Steer and Drive Axial "B" (2A, 1)
	802984	Zero Degree Trailer Axial "A" (2A, 1) [Zero degree dual-beam carrier.]
	802985	Zero Degree Trailer Axial "B" (2A, 1)
	K081256	12 Degree Steer and Drive Vertical "A" (2B, 1)
	K081257	12 Degree Steer and Drive Vertical "B" (2B, 1)
Caliper Kit (rationalized) Includes 803114	K081258	12 Degree Steer and Drive Axle "A" (1)
	K081259	12 Degree Steer and Drive Axle "B" (1)
	K019180	Zero Degree Trailer Axle "A" (1)
	K019181	Zero Degree Trailer Axle "B" (1)
Carrier Kit	K051853	Steer and Drive Axle, Axial (2A, 9, 10, 20, 39, 40, 58, 61, 68)
	K043288	Trailer Axle, Axial (2A, 9, 10, 20, 39, 40, 58, 61, 68)
	K056559	Steer and Drive Axle, Vertical (2B, 9, 10, 20, 39, 40, 58, 61, 68)
Hubs	K020505	Splined Disc® Brake - Aluminum - FF Steer, LMS Bearing Package (Steer Hub)
	803134	Splined Disc® Brake - Aluminum - FL Steer, LMS Bearing Package (Steer Hub)
	802847	Splined Disc® Brake - Aluminum - R Drive, LMS Bearing Package (Drive Hub)
	K020514	Splined Disc® Brake - Aluminum - FF Steer, Standard Bearing Package* (Steer Hub)
	803138	Splined Disc® Brake - Aluminum - FL Steer, Standard Bearing Package* (Steer Hub)
	802859	Splined Disc® Brake - Aluminum - R Drive, Standard Bearing Package* (Drive Hub)
	K045298	Splined Disc® - Aluminum - "TN" Trailer, Standard Bearing Package* (Drive Hub)
	K045297	Splined Disc® - Aluminum - "TP" Trailer, Standard Bearing Package* (Drive Hub)
	See hub supplier for these standard hub products	U-shaped - Iron/Aluminum, LMS/Standard Bearing Packages
		Flat - Iron/Aluminum, LMS/Standard Bearing Packages
Bendix® Splined Disc® Rotor Attaching Kit	K037767	All Splined Disc® Rotor Applications (SD-1, SD-2, SD-3)

TABLE 2 - MAINTENANCE KITS

(CONTINUES OVER)

Kit	Piece Number	Components Included in Kit
Rotors	802081	Severe Duty 138mm U-shaped Rotor and Fasteners
	K038573	Heavy Duty 138mm U-shaped Rotor and Fasteners
	802082	Severe Duty 150mm U-shaped Rotor and Fasteners
	K038574	Heavy Duty 150mm U-shaped Rotor and Fasteners
	802083	Severe-Duty Splined Disc Kit (SD-1, SD-2, SD-3, SD)
	802569	Heavy-Duty Splined Disc Kit (SD-1, SD-2, SD-3, SD)
Shields	803129	(Dana) Trailer Axle Pad & Rotor Shield Kit
	803130	Axial Drive Axle Pad & Rotor Shield Kit
	802948	Pad Shield Kit
	K032135	Vertical Drive Axle Pad & Rotor Shield Kit
	k022168	Vertical Drive Axle Rotor Shield

TABLE 2 - MAINTENANCE KITS (CONTINUED)

See the Bendix Quick Reference Catalog (BW1114) for maintenance kits for other Bendix® brand Air Disc Brakes.

5.0.1 GENERAL INFORMATION ABOUT BENDIX® AIR DISC BRAKE MAINTENANCE

When working on Bendix® Air Disc brakes, please note the following:

- Read and follow the Safe Maintenance Practices on page two.
- Depending on the particular axle, the technician may need to remove the caliper/carrier to allow sufficient access to perform the work.
- **CAUTION:** When using a hoist to support the air disc brake, do not attempt to use the pad retainer bar as a bracing point as it is not designed to support the weight of the brake. Instead use a brace (or chain) wrapped around the entire brake to attach the hoist.

- When replacing bearings — or for any other maintenance procedure where the technician needs to remove the caliper/carrier assembly from the vehicle to perform the maintenance — **replacement caliper/carrier bolts will be required.** Please note that due to the high torque required, the original bolts cannot be reused. The bolts are available from the vehicle manufacturer.
- **WARNING:** Not all wheels and valve stems are compatible with Bendix Air Disc Brakes. Use only wheels and valve stems approved by the vehicle manufacturer to avoid risk of valve stem shear and other compatibility issues.

5.0.2 SERVICE DVD

Order part number **BW7356** for a DVD showing the full set of maintenance procedures included in this Service Data sheet.

Kit	See Section	Remove Brake Pads? Section 5.2	Remove Caliper/Carrier from Vehicle? Section 5.3	Remove Actuator from Caliper? Section 5.4
Dust Shields	Section 5.1	Not Typically	NA	NA
Pad Kit (axle set)	Section 5.2	Yes	No	No
Caliper Kit (rationalized)	Section 5.3	Yes	Yes	Yes
Carrier Kit	Section 5.3	Yes	Yes	Yes
Service Actuator	Section 5.4	No	Not Typically	Yes
Spring Brake Actuator	Section 5.4	No	Not Typically	Yes
Tappet/Boot Kit (wheel end kit)	Section 5.6	Yes	Typically	Typically
Guide Pin, Seal and Boot Kit (wheel end kit)	Section 5.7	Yes	Typically	Typically
Hubs	Section 5.8	Yes	Yes	Yes
Splined Disc® Rotor Attaching Kit	Section 5.9	Yes	Yes	Yes
Rotor	Section 5.10	Yes	Yes	Yes

TABLE 3 - OTHER REQUIRED SECTIONS FOR MAINTENANCE KITS

5.1 AIR DISC BRAKE SHIELD KIT

5.1.1 **CAUTION:** Follow all safe maintenance practices, including those listed on page two of this document. Park the vehicle (by other means than the foundation brakes) on level ground and chock the wheels.

Note: Most torque plates manufactured after January 1, 2007 have the required torque plate tabs to permit these shields to be mounted.

This shield kit includes a brake pad shield, a rotor shield and the required attaching hardware for use in Bendix® ADB22X™ and ADB22X-V™ Air Disc Brake applications where external contamination and excessive road debris is a concern. Brake pad and rotor shields can greatly reduce damage and/or premature wear of pads and rotors under these conditions.

During installation, verify that once the shield(s) are installed they will not come into contact with any vehicle components, suspension, housings, etc. through the full range of motion of the wheel. Keep in mind the particular use of the vehicle, the orientation of the brake on the axle and torque plate, the proximity of other axles, and/or the wheel/tire being used.

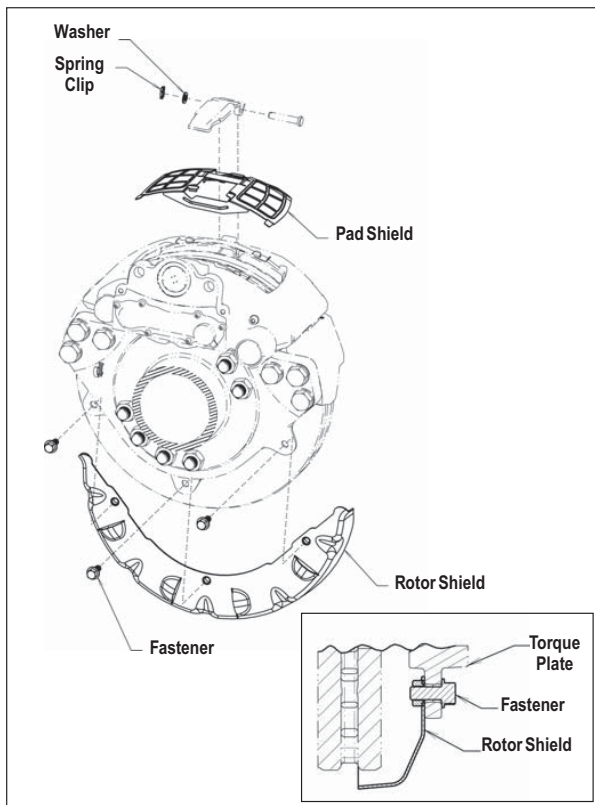


FIGURE 31 - DRIVE OR STEER AXLE EXPLODED VIEW WITH INSET SHOWING ROTOR SHIELD INSTALLATION

5.1.2 Remove and discard the spring clip and washer from the pad retainer pin. Remove and retain the retainer bar and retainer pin. Position the pad shield as shown and re-insert the retainer bar. Install the retainer pin. Use the included spring clip and washer to secure the retainer pin. Check that the pad shield is held securely in place by the retainer bar. See Figure 31 or 32.

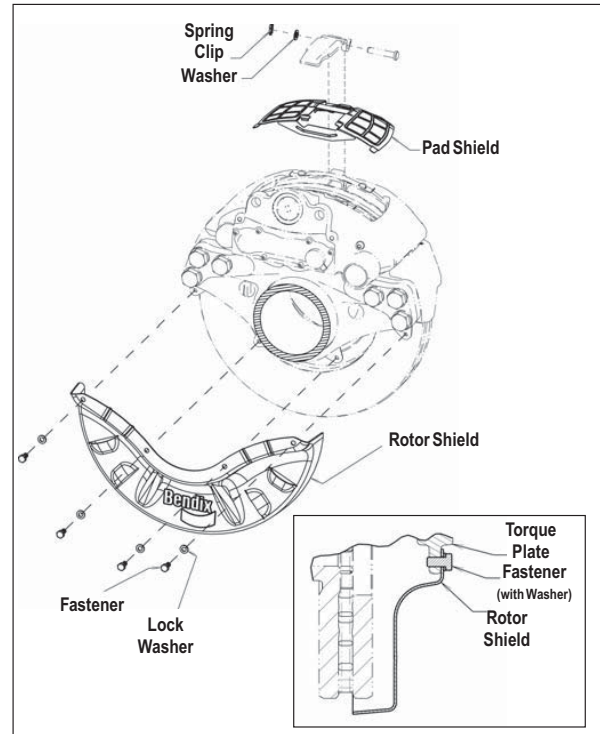


FIGURE 32 - TRAILER AXLE EXPLODED VIEW WITH INSET SHOWING ROTOR SHIELD INSTALLATION

5.1.3 **Drive or Steer Axle Rotor Shields** (See Figure 31). Position the rotor shield *between the torque plate and the rotor*. The supplied cap screws pass through the mounting tabs in the torque plate and install into the shield. Torque cap screws to 44 Ft. Lbs. (528 in. lbs.).

5.1.4 **Trailer Axle Rotor Shields** (See Figure 32). Position the rotor shield with *the torque plate between the shield and the rotor*. With one (supplied) lock washer in place on each cap screw, pass the screws through the shield before mounting onto the threaded torque plate holes. Torque the cap screws to 24 ft. lbs. (288 in. lbs.).

Note: The installation of air disc brake shields does not eliminate the need for periodic maintenance and inspection of the air disc brake and entire wheel end for damage and/or wear. In addition, the truck and trailer manufacturer's specific criteria for the brake shield requirements on air disc brakes should be consulted before either installing or removing air disc brake shields from a wheel end(s).

5.2 PAD REPLACEMENT

5.2.1 **CAUTION:** Follow all safe maintenance practices, including those listed on page two of this document. Park the vehicle (by other means than the foundation brakes) on level ground and chock the wheels.

The Bendix DVD (BW7356) shows this procedure.

Important: If the vehicle is equipped with spring brakes, cage the spring brakes on all axles to be worked on. Consult the vehicle manufacturer's instructions as necessary. For Bendix piston-style, see Section 5.4.

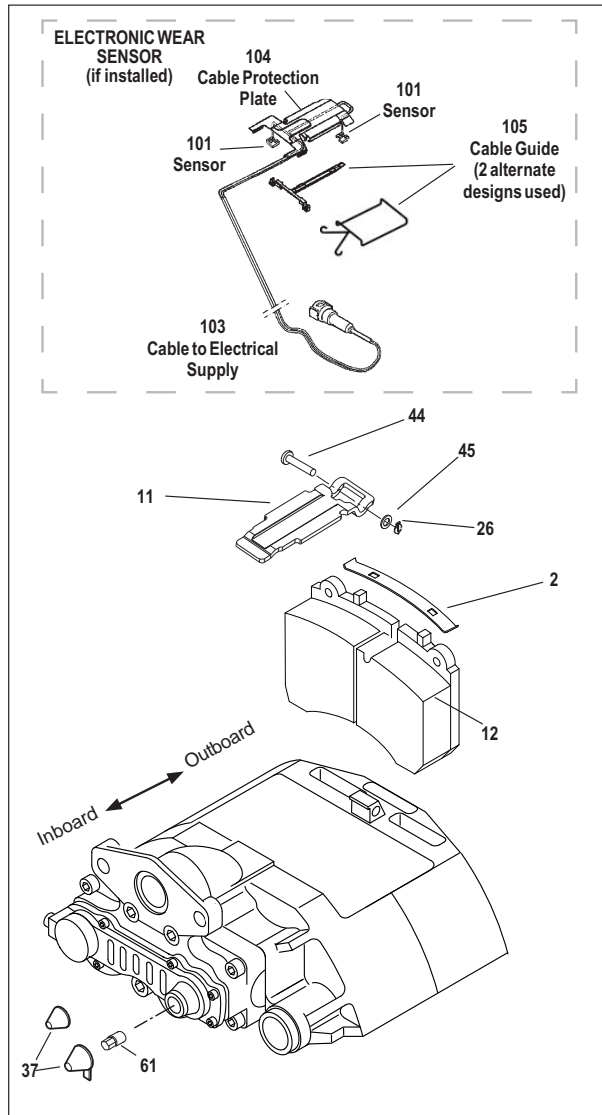


FIGURE 33 - PAD REPLACEMENT

5.2.2 Raise the complete axle to be worked on until the tires clear the ground. See the vehicle maintenance manual instructions for removing the wheels.

5.2.3 If the air disc brake is equipped with an electronic wear sensor indicator (see top of Figure 33), remove

and retain the mounting hardware for the cable protection plate. The cable protection plate can then be set aside while servicing the pads. Note the position of the sensors in the brake pad channels, and carefully remove them. In most cases you do not need to release the cable connector in order to move the sensors away from the pad installation work area. Inspect the wear sensors - replace if damaged or abraded.

5.2.4 See Figure 34. Remove and discard the pin retention clip (26) and washer (5).

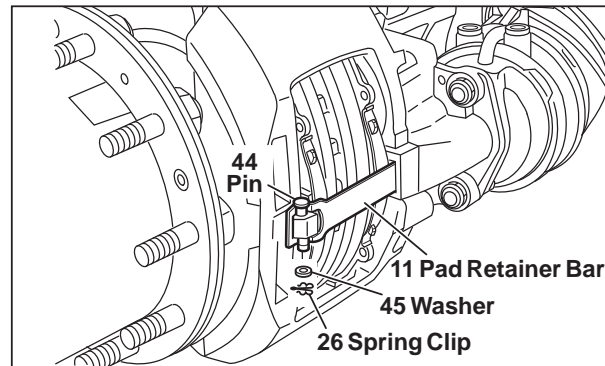


FIGURE 34 - PAD RETAINER BAR REMOVAL

5.2.5 While pressing against the pad retainer bar, remove the pin (11). Discard the pad retainer bar.

5.2.6 With the spring brake released (or caged), remove the adjuster cap (37) using the tab, taking care not to move the shear adapter (61). Note: Two sizes of adjuster cap are supplied in kits; use the same size as before in step 5.2.20.

5.2.7 Inspect the shear adapter (61). If significant corrosion and/or damage is present, remove the adjuster adapter using needle-nose pliers and replace with the adapter supplied in the kit and clean as necessary.

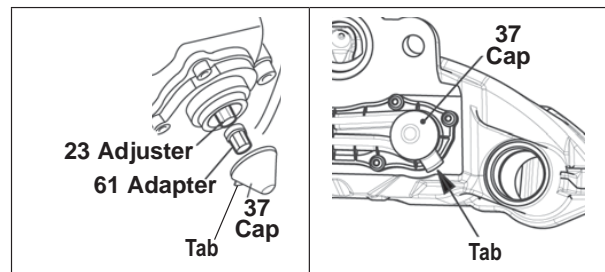


FIGURE 35 - EXPLODED VIEW OF ADJUSTER AND ADAPTER

FIGURE 36 - CAP INSTALLED: TAB LOCATION

For illustration purposes, the exploded view (Figure 35) shows the adjuster (23) and shear adapter (61) separated. When using the adjuster mechanism, always have the shear adapter installed on the adjuster.

CAUTION: Never turn the adjuster (23) without the shear adapter (61) installed. The shear adapter is a safety feature and is designed to prevent too much torque being applied. The shear adapter will fail (by breaking) if too much torque is used.

Note: For wheel-ends with spring brakes, if a shear adapter fails, always double-check to verify that the spring brake has been released (or caged). If the spring brake is applied, release or cage the brake (assure that the air system pressure is at least 90 PSI) and start the procedure again.

If the shear adapter fails, you may attempt a second time with a new (unused) shear adapter. In cases where a second failure of the shear adapter confirms that the adjustment mechanism is seized, the caliper must be replaced.

- 5.2.8 Use a 10 mm., six-point box wrench (See Figure 37) to turn the adjuster counterclockwise until sufficient space exists to remove the brake pads. A clicking noise occurs each time the adjuster turns.

CAUTION! Avoid overloading or damaging the adjuster shaft. Do not use an open-ended wrench since it may damage the adjuster shaft.

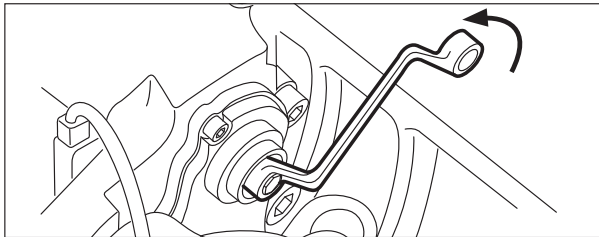


FIGURE 37 - BACKING OFF THE ADJUSTER FOR PAD REMOVAL

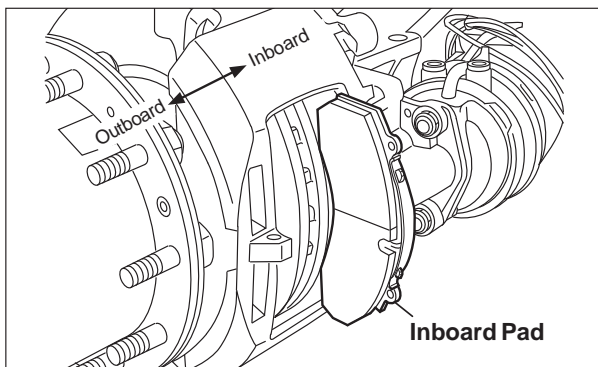


FIGURE 38 - PAD REMOVAL

- 5.2.9 See Figure 38. Move the caliper fully inward and remove the inboard pad, then move the caliper fully outward and remove the outboard pad.
- 5.2.10 Repeat the pad removal procedure for the other end of the axle.
- 5.2.11 To confirm that the guide pins are sliding freely, examine the pads just removed for uneven wear.

Use these two inspections:

- A. Check for uneven end-to-end pad wear. If the difference in wear is greater than 0.080 in. (2 mm.), replace the brake pads and also inspect the guide pins (See Section 4.5).
- B. Compare the thickness of the inboard and outboard pads of each set. If the difference between the inboard and outboard pad thickness is greater than 0.138 in. (3.5 mm.), replace the brake pads and inspect the guide pins (See Section 4.5).

5.2.12 Inspect the Brake Rotor (See Section 4.4).

5.2.13 Inspect the guide pins (See Section 4.5).

Important: To maintain optimal braking, Bendix strongly recommends that whenever brake pads are replaced, the complete axle set be replaced together. Use only pads which are permitted by the vehicle manufacturer, axle manufacturer, and/or disc brake manufacturer. Failure to comply with this may invalidate the vehicle manufacturer's warranty.

Before installing the brake pads, use the adjuster to fully retract the tappets to provide adequate clearance.

5.2.14 Clean the surfaces that will come in contact with the brake pad.

Caution: When installing pads and retaining springs, where appropriate, use heavy duty gloves and always keep fingers away from potential pinch hazard areas.

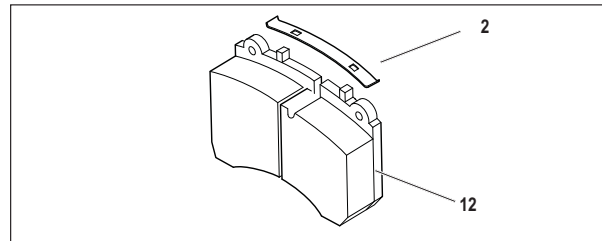


FIGURE 39 - PAD RETAINING SPRING INSTALLATION

- 5.2.15 Install the pad retaining springs(2) onto the brake pads(12) by inserting one end of the spring onto the lug at the top of the brake pad (See Figure 39). Carefully apply enough force to permit the second end lug to fully engage, taking care to keep fingers etc. away from the spring as it seats.
- 5.2.16 Pull the caliper fully outward and install the outboard pad. Move the caliper fully inward and install the inboard pad.
- 5.2.17 To reinstall wear indicators (if used): Insert the wear sensors into position in the new brake pads. Route the sensor cable through the cable protection plate channel and secure the plate with the mounting hardware retained at disassembly. (See Section 5.2.)

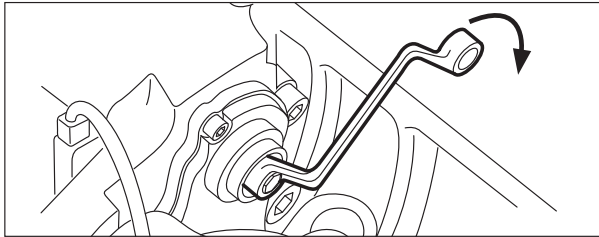


FIGURE 40 - RUNNING CLEARANCE ADJUSTMENT

- 5.2.18 Using a 10 mm., six-point box wrench, turn the Shear Adapter (61) **clockwise** until the pads contact the rotor. Note: Do not use an open-ended wrench as this may damage the adapter. (See Figure 40).
- 5.2.19 Using the same tool, turn the Shear Adapter (61) **counter-clockwise** and listen for the sound of 3 clicks as the mechanism backs-off (increases) the running clearance. (See Figure 37).
- 5.2.20 Select the correct replacement adjuster cap from those supplied with the kit. Lightly grease adjuster cap with Renolit HLT2 white grease (part number I I14525) and install the cap.
- 5.2.21 Push the new pad retainer bar (11) into the groove of the caliper. Press down on the pad retainer bar, and insert the pad retainer pin (44), with the pin pointing downwards, where possible. Install the supplied washer (45) and then the spring clip (26). (See Figure 34).
- 5.2.22 Apply and release the brakes. The hub should turn easily by hand after applying and releasing the brake.
- 5.2.23 Re-check the running clearance. Readjust if necessary.
- 5.2.24 Reinstall the wheel, following the vehicle manual instructions.

⚠ WARNING!

The brake pads and rotor must be maintained within the recommended wear limits. Failure to monitor wear and replace the brake pads and rotor when required may result in diminished brake performance.

5.3 CALIPER/CARRIER/ACTUATOR ASSEMBLY

CAUTION: Follow all safe maintenance practices, including those listed on page two of this document. Park the vehicle (by other means than the foundation brakes) on level ground and chock the wheels.

CAUTION: When using a hoist to support the air disc brake, do not attempt to use the pad retainer bar as a bracing point. It is not designed to support the weight of the brake. Use instead a brace (or chain) wrapped around the entire brake to attach the hoist.

- 5.3.1 In all cases check that the current hose routing arrangement does not restrict the full travel of the caliper before beginning work on the assembly.
- 5.3.2 Remove the brake pads (See Section 5.2).
- 5.3.3 (See Section 5.4). If the actuator used is a spring brake, following the manufacturer's guidelines, cage the spring. With all air pressure drained from the system, disconnect the air hoses from the brake chamber.

Vertical Mounting Bolt Style

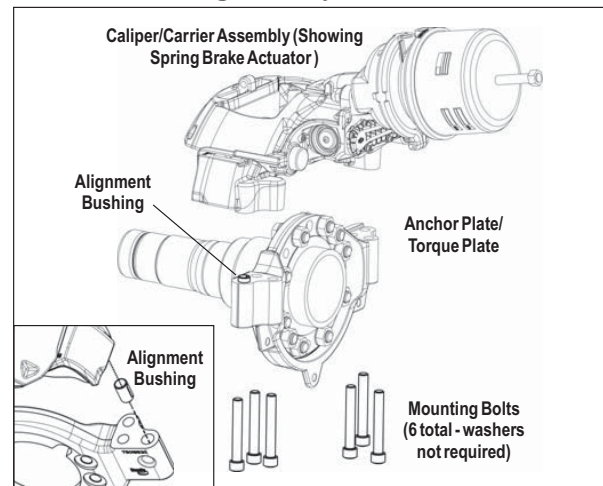


FIGURE 41 - VERTICAL MOUNT CALIPER/CARRIER

- 5.3.4 See Figure 41. Supporting the air disc brake by necessary means, remove the six (6) mounting bolts/washers and discard. Note: Bendix strongly recommends that during re-assembly these bolts are replaced - see your vehicle manufacturer for replacement hardware. Lift the caliper up off the anchor plate.

The vertical bolt assembly includes an alignment bushing. **This bushing must be saved for re-use during re-assembly of the brake.** The bushing mounts in the torque plate and maintains the correct alignment of the brake assembly relative to the rotor.

5.3.5 If the brake assembly does not separate from the anchor plate it may be helpful to install an M16X2.0 screw longer than 120 mm at the bushing locations and tap the end of the bolt with a hammer to free the brake assembly. Remove the assembly.

Axial Mounting Bolt Style

5.3.6 Disconnect the air hose(s) to the brake chamber. See Figure 42. Supporting the air disc brake by necessary means, remove the six bolts attaching the brake to the anchor plate and remove the caliper/carrier assembly from the vehicle.

Note: Bendix strongly recommends that during re-assembly these bolts and washers are replaced. See your vehicle manufacturer for replacement hardware. Remove the assembly.

Re-installation (Both Styles)

5.3.7 Supporting the air disc brake by necessary means, attach the brake to the anchor plate using six (new) bolts. Torque to vehicle manufacturer’s specifications. If torque values and bolts are not specified by the vehicle manufacturer, then select a replacement bolt as shown in Table 4.

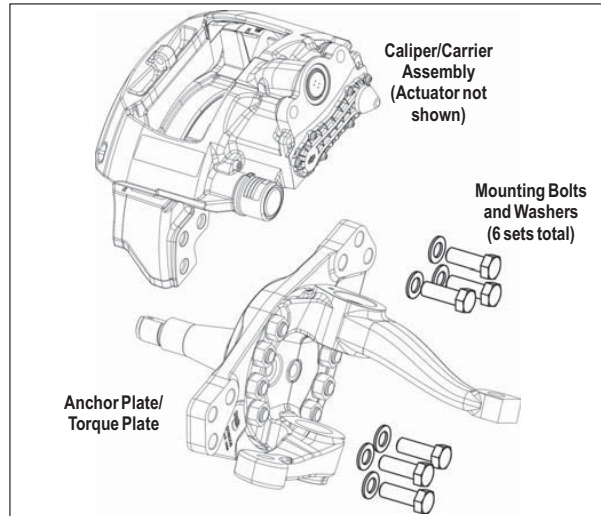


FIGURE 42 - AXIAL MOUNT CALIPER/CARRIER

5.3.8 Re-install the air hoses (See Section 5.4.8-9) and check for leaks.

5.3.9 Inspect and re-install the pads (See Section 5.2).



Air Disc Brake Attachment Hardware		
Torque Plate Manufacturer	Fastener	Torque
Bendix Axial Carrier Torque Plate 	Fastener: M20 x 2.5 x 60 mm Class 10.9 Washer: Requires HARDENED 3 mm (minimum thickness) for each bolt.¹ If the vehicle is using a Bendix manufactured Axial Anchor Plate, with a thickness of 1.14 in. (29 mm) where these bolts are assembled, then a bolt with an overall length of 2.36 in. (60 mm) will meet these requirements	Use the manufacturer's recommendations. If unavailable, use phosphate and oil finish fastener. Pre-Torque: 20-60 ft-lbf [27-81 N·m] Final Torque: 350-400 ft-lbf [475-542 N·m]
Bendix Vertical Carrier Torque Plate 	Fastener: M16 x 2.0 x 110 mm, Class 10.9 Washer: None required.	Use the manufacturer's recommendations. If unavailable, use plain and oil finish fastener. Torque: 200-220 ft-lbf [271-298 N·m]
Trailer Torque Plate	Fastener: M20 x 2.5 x L Class 10.9 Length determination: L = Torque Plate (TP) thickness + Carrier engagement + Washer thickness $L_{min} = TP \text{ thickness} + 24 \text{ mm} + 3 \text{ mm}$ $L_{max} = TP \text{ thickness} + 29 \text{ mm} + 3 \text{ mm}$ Washer: Requires HARDENED 3 mm (minimum thickness) for each bolt.¹	Use the manufacturer's recommendations. If unavailable, use phosphate and oil finish fastener: Pre-Torque: 20-60 ft-lbf [27-81 N·m] Final Torque: 350-400 ft-lbf [475-542 N·m]
CAUTION: The washer outside diameter must be less than 1.5 in (37.5 mm).		

TABLE 4 - TORQUE PLATE FASTENERS AND TORQUE RECOMMENDATIONS (SEE MANUFACTURER’S RECOMMENDATIONS)

5.4 SPRING OR SERVICE BRAKE

5.4.1 **CAUTION:** Follow all safe maintenance practices, including those listed on page two of this document. Park the vehicle (by other means than the foundation brakes) on level ground and chock the wheels.

5.4.2 Use the spring brake manufacturer's recommended safety practices in all cases.

Some spring brake and vehicle manufacturers permit caging the spring brake while the spring brake is engaged.

THE FOLLOWING INSTRUCTIONS ARE FOR BENDIX® BRAND PISTON-STYLE ACTUATORS.

5.4.3 With the vehicle on a level surface and the wheels properly chocked, apply air to release the spring brakes (parking brakes) by using the dash-mounted air control valve. Back out the release bolt (Figure 43, arrow "D"), using a maximum torque of 26 ft. lbs. (35 N·m) to cage the air released spring force on the push rod.

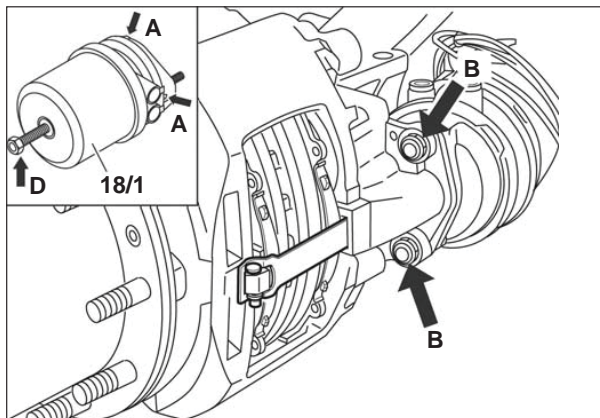


FIGURE 43 - ACTUATOR SPRING CAGING AND REMOVAL

5.4.4 Exhaust the air from the brake chambers by using the dash-mounted air control valve. With all air pressure drained from the system, disconnect the air hoses from the brake chamber. While supporting the brake chamber in position, remove and discard the brake chamber mounting nuts (Figure 45, arrows marked "B"). Remove the brake chamber.

5.4.5 Re-installation. Before installing the brake chamber, the actuator flange (See Figure 46, arrow "C") must be cleaned and inspected. Consult the vehicle manual. The spherical cup in the lever (19) must be greased with white grease (Part No. II14525 or K021964). Add grease to the rubber gasket on the chamber.

CAUTION: Do not use grease containing molybdenum disulfate.

5.4.6 The seal, as well as the push rod area, must be clean and dry.

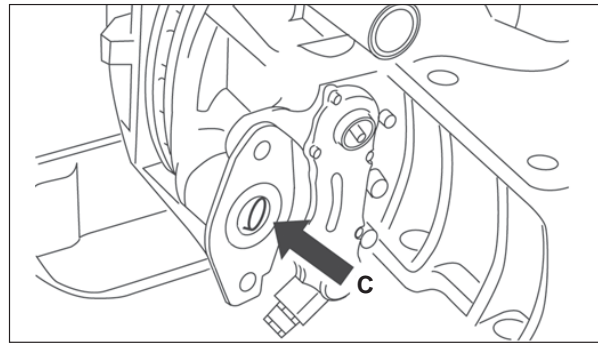


FIGURE 44 - SPRING BRAKE INSTALLATION

CAUTION: Do not use brake chambers with seals that have a thickness less than 0.12 in. (3 mm). Use only actuators which are recommended by the vehicle manufacturer.

5.4.7 Install the brake chamber using new self-locking nuts (EN ISO 10513). Alternately tighten both the nuts step by step up to a final torque of 133 ± 7 ft. lbs (180 ± 10 N·m). **Bendix strongly recommends that new nuts be used.**

5.4.8 Re-connect the air hose(s) and be sure that each hose is not twisted or in contact with moving vehicle components. The air hose routing must allow for full caliper travel. Note that for spring brake service chambers the ports are indicated by: "11" Service Brake Port and "12" Spring Brake Port

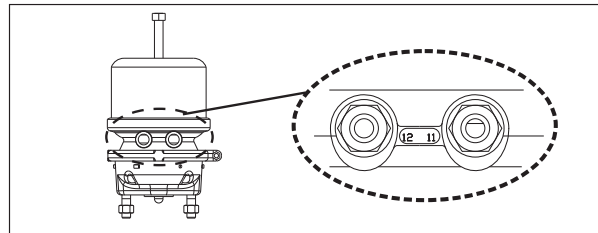


FIGURE 45 - PORT DESIGNATIONS

Note: Where a new spring brake chamber is being installed, note that in some cases drain plugs are installed (See Figure 43, arrows marked "A"). Where drain plugs are present, after installation, remove whichever plug is at the lowest position. The selected drain hole must be aligned downwards (or within $\pm 30^\circ$) when installed on the vehicle. In the case of spring brake chambers, install the pads before uncaging the spring.

5.4.9 Before returning vehicle to service, with the system pressurized, using a soap solution, check for air leakage. Minimal leakage in the area around the diaphragm is permitted (100 SCCM), and a one-inch bubble in one minute at the hose fitting is acceptable. If abnormal leakage is detected, the diaphragm must be replaced, or fitting adjusted, respectively.

5.5 TAPPET & BOOT ASSEMBLIES, AND TAPPET INNER SEAL REPLACEMENT

5.5.1 CAUTION: Follow all safe maintenance practices, including those listed on page two of this document. Park the vehicle (by other means than the foundation brakes) on level ground and chock the wheels.

In some cases, the technician will need to remove the caliper carrier assembly from the vehicle. (See Section 5.3.) Note that new bolts (available from the vehicle manufacturer) will be needed for re-installation.

Important: If the vehicle is equipped with spring brakes, cage the spring brakes on all axles requiring work. Consult the vehicle manufacturer’s instructions as necessary. This procedure may be carried out with the air disc brake installed on, or removed from, the vehicle. In cases where the caliper/carrier assembly is removed from the vehicle, NEW fasteners must be used and properly torqued during re-installation. Use only fasteners approved by the vehicle manufacturer.

Note: This maintenance procedure uses specialized tools. The full Bendix air disc brake tool kit (K029164), or Ken-Tool kit (80000), includes the complete set of tools required for all permitted maintenance procedures. Alternately, for locations where only the tappet and boot replacement procedures will be performed, the smaller Bendix tool kit (K028829), or Ken-Tool kit (80001) will suffice. The DVD (BW7356) shows this procedure.

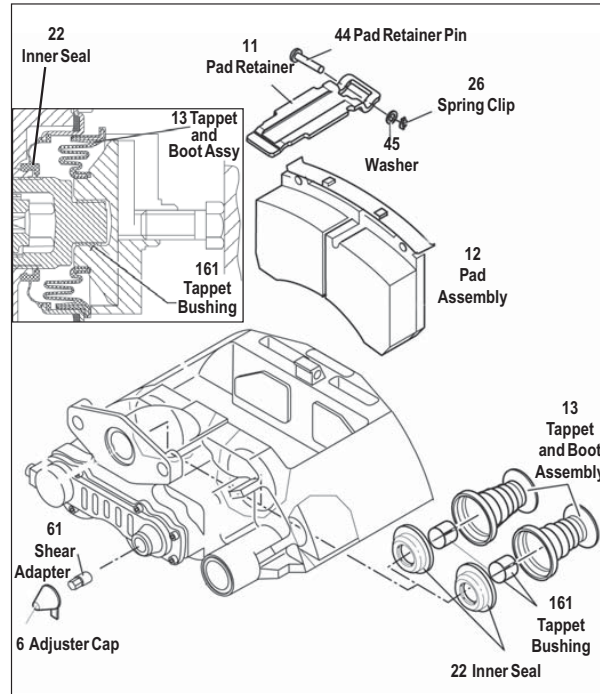


FIGURE 46 - ADB EXPLODED AND SECTION VIEWS

5.5.2 Pad Removal: follow Sections 5.2.1-5.2.11 for removal of the brake pads.

5.5.3 Inspect the Brake Rotor (See Section 4.4).

Tappet and Boot Assembly (13) Removal

CAUTION: NEVER EXTEND THE TAPPET MORE THAN 1.75 in. (44.5 mm). See Figure 47. Over-extending the tappet will result in the tappet losing engagement with the threads of the synchronizing mechanism. Since the mechanism can only be set at the manufacturing plant, the caliper/carrier assembly must be replaced if this happens.

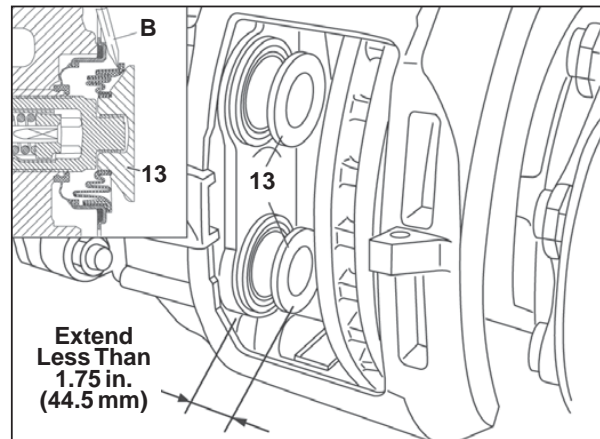


FIGURE 47 - PERMITTED TAPPET EXTENSION

5.5.4 See Figure 47. Extend the tappets — less than 1.75 in. (44.5 mm) — by turning the shear adapter (61) clockwise. A screwdriver (callout “B” in

Bendix Number/ Ken-Tool Number	Description	Typical Tool View
T1 / KT01	Cup	
T2 / KT02	Handle for KT01 cup	
T3 / KT03	Swivel assembly (KT03-1 short body + KT03-2 brass disc + KT03-3 retaining spring)	
T4 / KT04	Long strut	
T9 / KT09	Flange	
T15 / KT015	Fork	
T24 / KT024	Black Nylon Disc	

TABLE 5 - TAPPET AND BOOT REPLACEMENT TOOLS

Figure 47 inset) should be used to move the boot and allow the wedge fork ("A" in Figure 48) to be inserted.

CAUTION: Do not insert the screw driver more than ¼ inch. Take care not to damage the inner sealing face (see arrow "X" in Figure 48). Gouges or grooves will prevent a good seal and will require that the caliper be replaced.

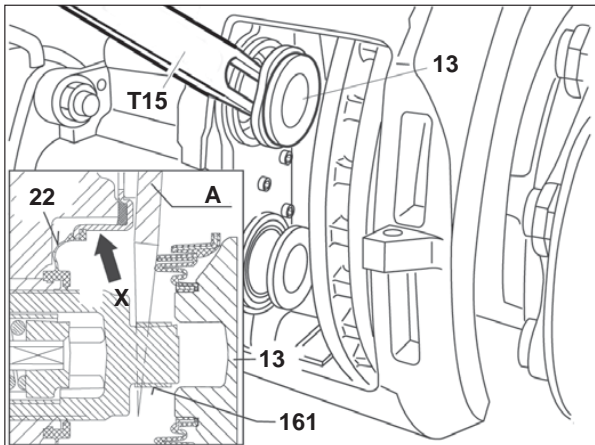


FIGURE 48 - WEDGE TOOL USE

5.5.5 The tappet and boot assemblies (13) can then be removed from the threaded tubes (16) by using the wedge fork (T15). *Be sure to orient the wedge tool with the tapered side towards the tappet.*

5.5.6 Remove the old tappet bushings (161).

5.5.7 Retract the threaded tubes by turning the shear adapter (61) counter-clockwise.

5.5.8 See Figure 49. Carefully remove the inner seal using one or two flat-blade screwdrivers as shown. **Caution: Do not insert the screwdrivers so far that they come into contact with the threaded tubes. Damage to the threaded tubes would require that the brake be replaced.**

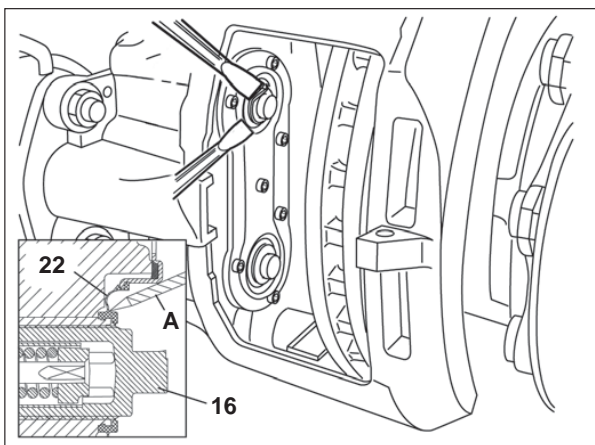


FIGURE 49 - INNER SEAL REMOVAL

5.5.9 Inspect the inner sealing face for damage. If damage is found that would cause the inner seals not to be able to seal properly, the caliper/carrier assembly must be replaced. Clean the area around the inner seal.

5.5.10 Inspect the threaded tubes (16). See Figures 50 and 51. Extend the tubes, but by less than 1.75 in. (44.5 mm), by turning the shear adapter (61) clockwise. Inspect the threads for rust, corrosion, or damage etc. If there is evidence of damage to the threads; significant rust; or corrosion, the caliper/carrier assembly must be replaced.

If the technician is working with the caliper on the vehicle, the technician may place a new brake pad (12) into the outboard gap to help avoid the loss of thread engagement of the threaded tubes. See Figure 50.

If the work is being carried out at a workbench, the technician may insert a 2.76 in. (70 mm) spacer (See callout "E" in Figure 51) into the caliper (1) to help avoid the loss of thread engagement.

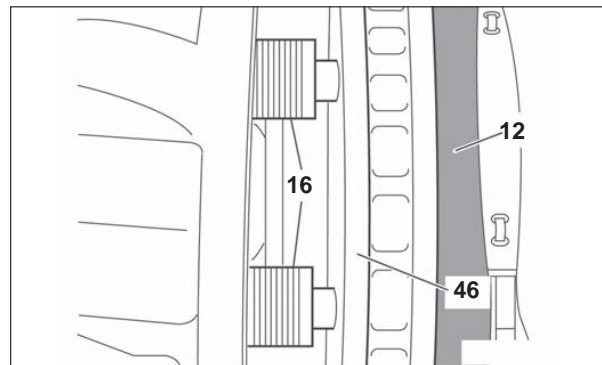


FIGURE 50 - USE OF A NEW BRAKE PAD AS A SPACER

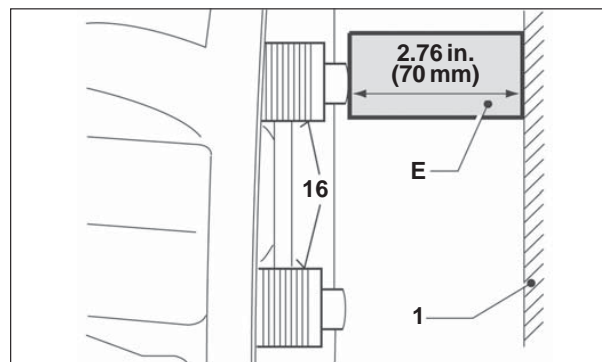


FIGURE 51 - USE OF A SPACER (OFF-VEHICLE INSPECTION)

5.5.11 For threads that are in good condition, grease the threads with white grease (Part No. II14525 or K021964). Before installing the replacement inner seals (22), retract the threaded tubes by turning the shear adapter (61) counter-clockwise.

Note: If the shear adapter fails while you are retracting the threaded tubes, you may try again with another (new) shear adapter. If this also fails, this indicates that the adjuster mechanism is damaged and the caliper must be replaced.

To install inner seals where the caliper is on the vehicle:

5.5.12 Position the replacement inner seal (22) over the threaded tube (16). See Figures 52 and 53 for the tools and installation arrangement used. Position the L1 (T3 + T9) with the short spacer (T3) in position as shown in Figure 53. Guide the tool over the end of the threaded tube (16). Install the new inner seal (22) into position by rotating the adjuster nut on the T3 portion of the tool, using an open-ended wrench.

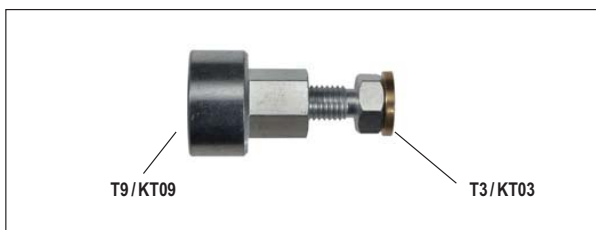


FIGURE 52 - ON-VEHICLE INNER SEAL TOOL (L1)

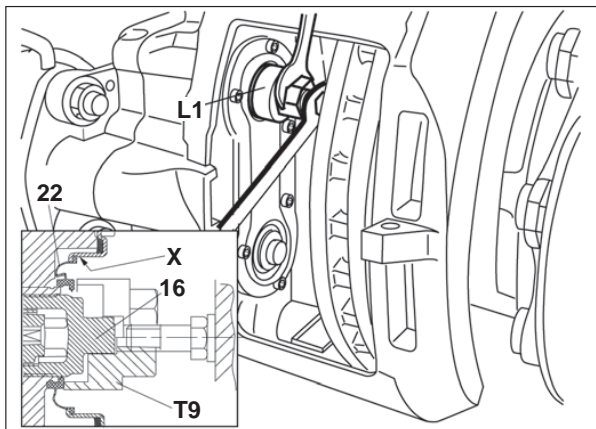


FIGURE 53 - ON-VEHICLE INNER SEAL INSTALLATION

To install inner seals where the caliper has been removed from the vehicle:

5.5.13 Position the replacement inner seal (22) over the threaded tube (16). See Figures 54 and 55 for the tools and installation arrangement used. The threaded tubes need to be retracted to allow the tool to be inserted. Use the combination tool L2 (T4 + T3 + T9) with the long spacer (T4) as shown in Figure 55. Since the installation tool is guided by the center post of the threaded tube, advance the tube a small amount to align the tool and the center post. Install the new inner seal (22) into position by rotating the adjuster nut on the T4 portion of the tool using an open-ended wrench.

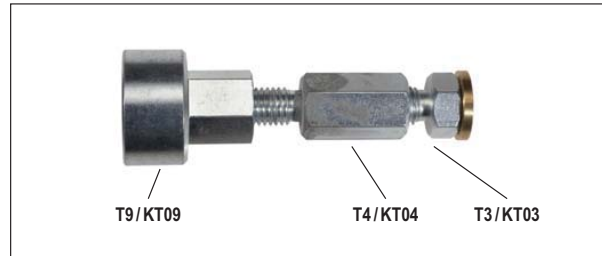


FIGURE 54 - ON-VEHICLE INNER SEAL INSTALLATION TOOL (L2)

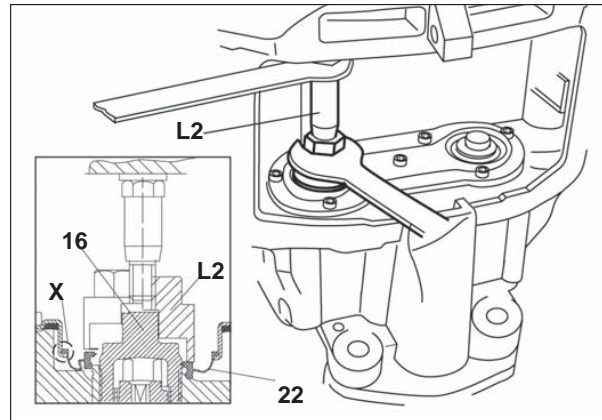


FIGURE 55 - OFF-VEHICLE INNER SEAL INSTALLATION

CAUTION: To confirm that the inner seal has been correctly installed, begin to extend the threaded tubes (16) by turning the shear adapter clockwise by 4-5 turns. Watch as the threaded tube extends. Inner seals that are installed correctly WILL NOT ROTATE as the threaded tube extends.

5.5.14 Note: Inspect the tappet/boot kit to determine if the tappets supplied are already pre-greased (a plastic cover should be present — be sure to remove the cover when installing the tappet). Only in the case of kits that are not pre-greased will the installer need to apply grease to the tappets. In all cases, the threaded portion of the tubes will need to be greased. Retract the threaded tubes.

5.5.15 Install the new tappet bushing (161) onto the center post of each threaded tube (16) by hand. By hand, ease the tappet bushings onto the center post of the threaded tubes and they will snap into position.

5.5.16 The sealing seat in the caliper for tappet and boot assemblies (13) must be clean and free of grease. Wipe the opening with a clean shop rag. Place a tappet and boot assembly (13) in position over the center post and tappet bushing.

To install tappet and boot assemblies where the caliper is on the vehicle:

5.5.17 See Figures 56, 57 and 58. Use tool B1, comprising tools T1, T2, and T3 to press the boot into position. The tool is then reversed, and the nylon disc (T24)

is inserted into the T1 “cup” (combination tool ‘B2’). Holding the T1 handle, turn the nut on the T3 tool to fully install the tappet onto the tappet bushing (161).



FIGURE 56 - ON VEHICLE TAPPET AND BOOT INSTALLATION TOOL (B1 - WITH T24 INSTALLED, B2)



FIGURE 59 - OFF VEHICLE TAPPET BOOT INSTALLATION TOOL (B3, WITH T24 INSTALLED, B4)

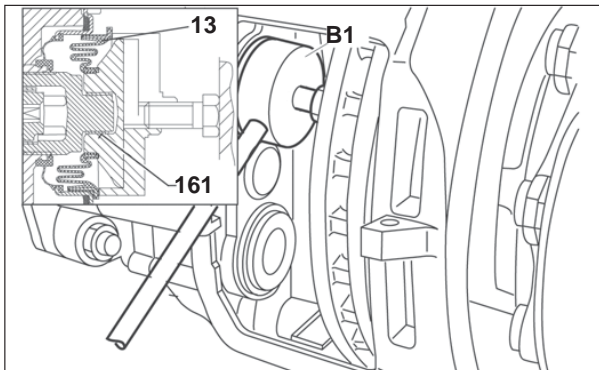


FIGURE 57 - ON VEHICLE TAPPET BOOT INSTALLATION

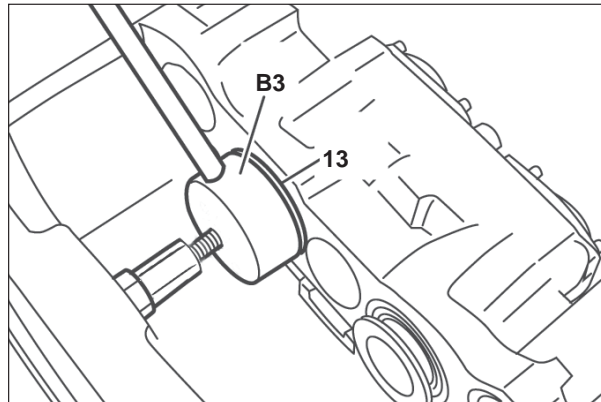


FIGURE 60 - OFF VEHICLE TAPPET BOOT INSTALLATION

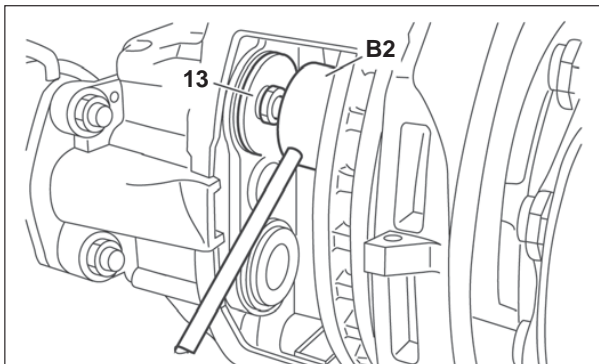


FIGURE 58 - ON VEHICLE TAPPET INSTALLATION

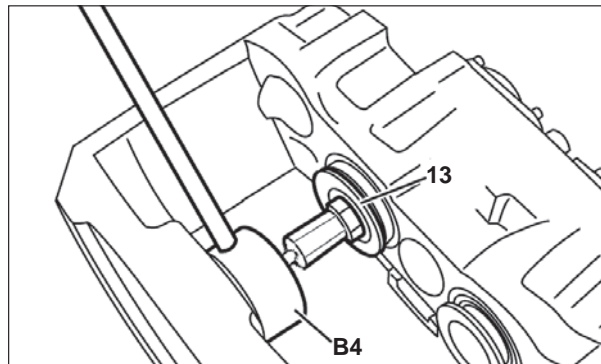


FIGURE 61 - OFF VEHICLE TAPPET INSTALLATION

To install tappet and boot assemblies where the caliper is removed from the vehicle:

5.5.18 See Figures 59, 60 and 61. Retract the tappets, as needed, in order to have room to install the tappets. Use tool B3, comprising tools T1, T2, and T3 to press the boot into position. The tool is then reversed, and the nylon disc (T24) is inserted into the T1 “cup” (combination tool ‘B4’). Holding the T1 handle, turn the nut on the T3 tool to fully seat the tappet onto the tappet bushing (161).

5.5.19 Check that the tappets are firmly attached to the bushings by gripping and pulling lightly on them by hand. Confirm that the tappets are able to rotate a small amount on the tappet bushings by grasping and turning them by hand. Finally, using a box-end wrench on the shear adapter, extend the threaded tubes outward, and check that the boots are held in place. Retract the tappets.

5.5.20 Re-install the caliper/carrier assembly, if it was removed from the vehicle (See Section 5.3).

5.5.21 Re-install the brake pads (See Section 5.2).

5.6 GUIDE PIN AND BOOT ASSEMBLIES

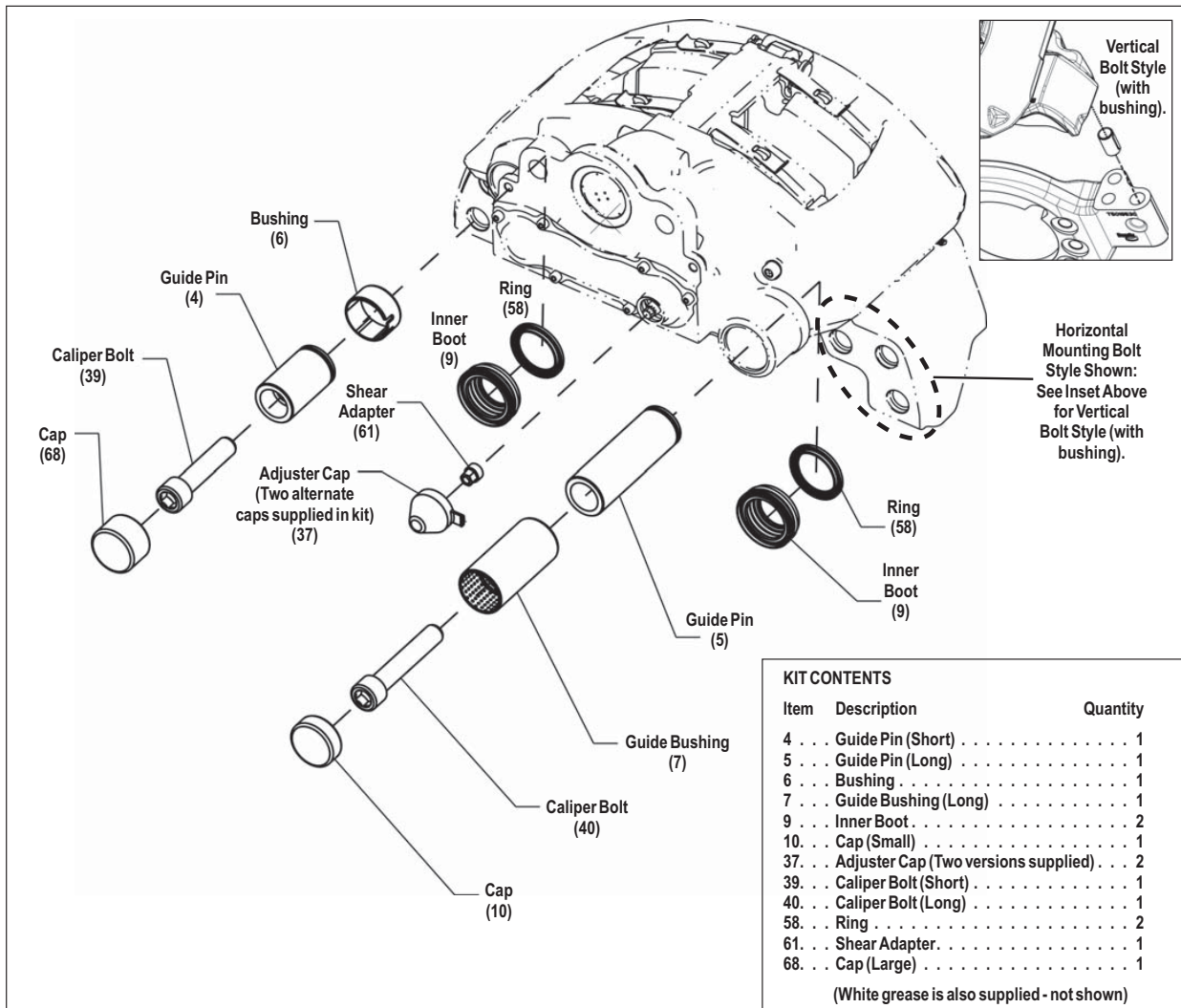


FIGURE 62 - GUIDE PIN EXPLODED VIEW

The Bendix DVD (BW7356) shows this procedure.














5.6.1 **CAUTION:** Follow all safe maintenance practices, including those listed on page two of this document. Park the vehicle (by other means than the foundation brakes) on level ground and chock the wheels.

Important: If the vehicle is equipped with spring brakes, cage the spring brakes on all axles to be worked on. Consult the vehicle manufacturer's instructions as necessary. For Bendix® brand piston-style spring brake chambers, see Section 5.4.

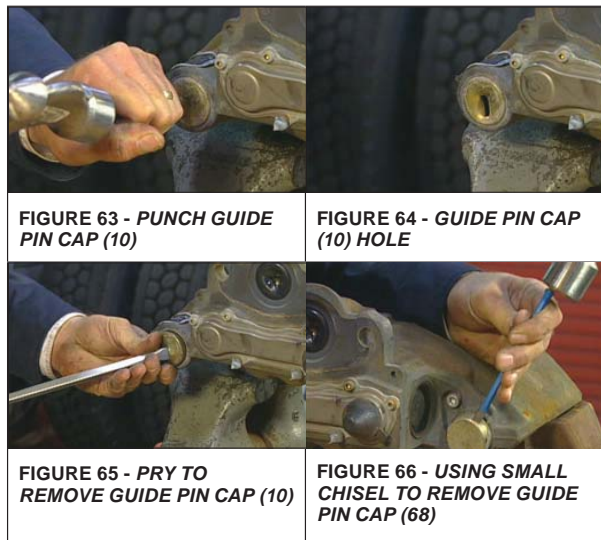
These procedures are typically carried out with the caliper/carrier removed from the vehicle (may be carried out with the air disc brake installed). In cases where the caliper/carrier assembly is removed from the vehicle, NEW fasteners must be used and properly torqued during re-installation. Use only fasteners approved by the vehicle manufacturer.

Note: This maintenance procedure uses specialized tools. The full Bendix air disc brake tool kit (K029164), or Ken-Tool kit (80000), includes the tools needed for the guide pin and boot installation. See Table 6.

Note that a smaller Bendix tool kit (K029107), or Ken-Tool kit (80002) may be used where only the guide pins will be serviced.

Bendix Number/ Ken-Tool Number	Description	Typical Tool View	Bendix Number/ Ken-Tool Number	Description	Typical Tool View
T05 / KT05	1-3/8 in. diameter disc		T14 / KT14	Brass nut	
T06 / KT06	1-1/2 in. diameter disc		T16 / KT16	Dimpling tool	
T07 / KT07	2 in. diameter sleeve		T20 / KT20	8 in. bolt	
T08 / KT08	2-1/8 in. diameter disc		T21 / KT21	Half sleeve	
T10 / KT10	8 in. bolt		T26 / KT26	Cap installation tool	
T12 / KT12	3-7/8 in. long sleeve		T27 / KT27	Cap installation tool	
T13 / KT13	10 in. bolt		TABLE 6 - BENDIX® ADB22X™ AIR DISC BRAKE GUIDE PIN AND SEALS REPLACEMENT TOOLS. (A WASHER IS ALSO INCLUDED)		

- 5.6.2 Remove the wheel. Refer to the vehicle manufacturer's recommendations.
- 5.6.3 Remove the brake pads. See Section 5.2.
- 5.6.4 In most cases, the actuator should be removed. See Section 5.4. In the case of spring brake actuators, they should be caged before removing the brake assembly.
- 5.6.5 In nearly all cases, the air disc brake caliper/carrier will need to be removed from the vehicle in order to complete this procedure. See Section 5.3.
- 5.6.6 Place the brake on a workbench and, using a vice, secure it by the carrier.
- 5.6.7 Use a small chisel or similar tool to punch a hole close to the center of the guide pin cap (10) of the **short guide pin**, taking care to only insert the chisel a small amount. Using the hole just made, pry the cap off and discard. See Figures 63-65.



- 5.6.8 Remove the other cap (68) that covers the long guide pin, by using a small chisel and hammer to apply light blows to the cap, with the chisel aimed away from the casting. See Figure 66. Discard both caps.

5.6.9 Using a 14 mm hex bit socket, remove and discard the two caliper bolts (39) and (40). See Figure 67. By hand, retract both guide pins slightly and then remove the caliper from the carrier.



FIGURE 67 - REMOVE THE CALIPER BOLTS

The guide pins are now only held by the retaining rings (58).

5.6.10 Remove the boot retaining rings (58) and the guide pins (39) and (40). Use a screwdriver to pry out the inner boots (9). See Figure 68. Discard the removed items.



FIGURE 68 - REMOVE THE RETAINING RINGS, GUIDE PINS, AND BOOTS

5.6.11 Clean the caliper upper and lower surfaces around the bushings.

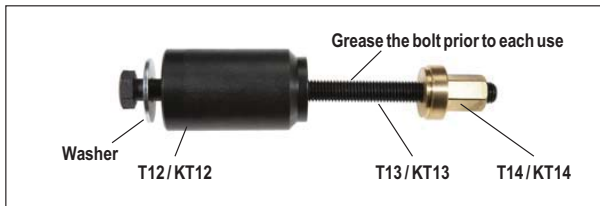


FIGURE 69 - BRASS BUSHING REMOVAL TOOL

5.6.12 Prepare to remove the brass bushing used in the long guide pin side. Assemble the long bolt (T13), washer, and sleeve (T12) as in Figures 69 and 70.

5.6.13 Apply grease to the bolt and — after inserting through the guide pin channel — engage the brass nut (T14). Always double-check that the brass nut is correctly in place in the bushing before beginning to extract the bushing.



FIGURE 70 - INSTALL THE REMOVAL TOOL

5.6.14 Turning the bolt at the top, draw the brass nut up, bring the brass bushing up and out of the channel. Discard the bushing.



FIGURE 71 - REMOVE THE LONG GUIDE PIN

Caution: Keep the removal tool exactly aligned with the guide pin channel to permit the bushing to be removed. See Figure 72.

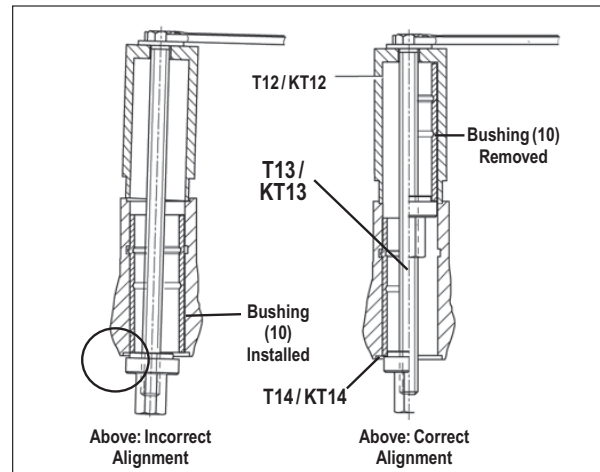


FIGURE 72 - KEEP THE CORRECT ALIGNMENT

5.6.15 Prepare to remove the short guide pin bushing by locating the bushing (6) tab, and using a small chisel (narrower than the tab) or similar tool, remove the tab as shown in Figure 73, by striking low on the base of the tab.



FIGURE 73 - REMOVE THE TAB THAT HOLDS THE BUSHING IN POSITION

Remove the tab with a magnet and use a clean shop cloth to remove any excess debris. Note that in some cases, the tab may be in the opposite (outer) slot in the bore.

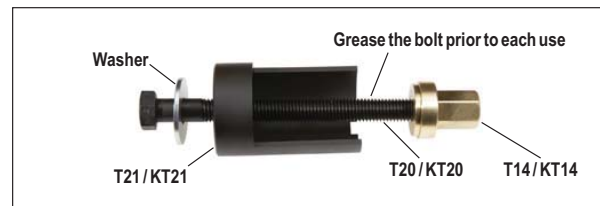


FIGURE 74 - SHORT GUIDE PIN REMOVAL TOOL

5.6.16 Use the tool combination shown in Figures 74 and 75 (comprising T14, T20, T21, and a washer) to remove the bushing (6). Screw nut (T14) onto the assembly by hand, then tighten the bolt (T20) using a box end wrench to draw out the bushing. Discard the removed bushing, and verify that the bore is clean by wiping with a shop cloth.

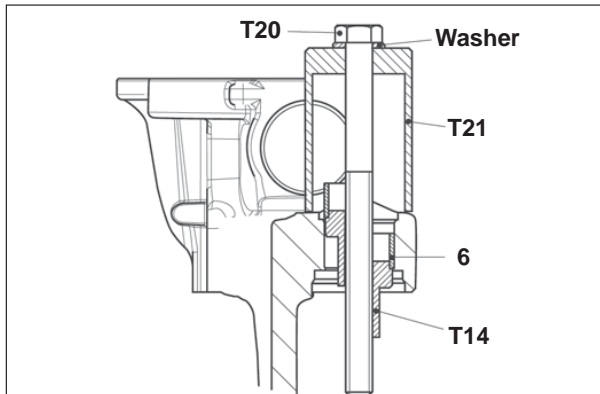


FIGURE 75 - SECTIONAL VIEW: SHORT GUIDE PIN BUSHING REMOVAL

Installation of the Fixed Guide Pin Brass Bushing

5.6.17 Clean the caliper upper and lower surfaces around the bushings.

5.6.18 Clamp the carrier in a vise so that the guide channel is vertically oriented.

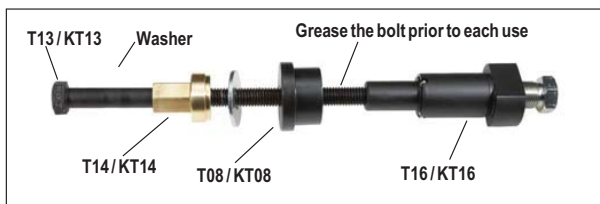


FIGURE 76 - LONG GUIDE PIN BUSHING INSTALLATION AND DIMPLING TOOL

5.6.19 Place the washer and thread the brass nut (T14) on to the bolt (T13) followed by the flange (T08). See Figure 76.

5.6.20 Place a new brass guide bushing (7) on the dimpling tool (T16) and insert it into the caliper bore.

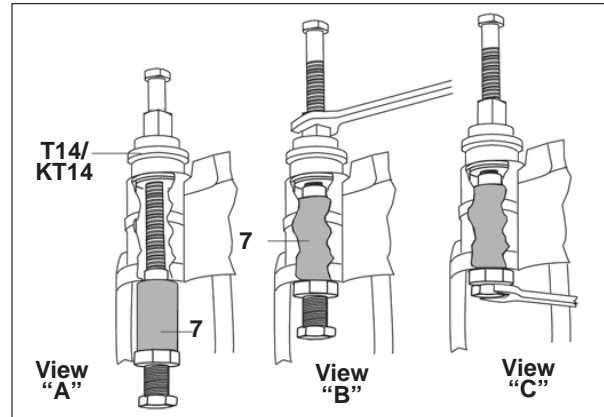


FIGURE 77 - VIEW "A" AND "B": DRAW THE BRASS BUSHING INTO POSITION. VIEW "C": LOCK THE BUSHING INTO POSITION

5.6.21 Check that the flange (T08) is in an upright position at the top of the caliper recess as you draw the brass bushing (7) up, by turning the brass nut (T14), until the dimpling tool bottoms on the caliper. When it reaches the correct position, the brass bushing extends out of the guide pin channel 0.039 in. (1 mm.).

5.6.22 With the dimpling tool (T16) in position, tighten the screw in its base until it contacts the dimpling screw housing. The movement of this screw forces three points outwards, leaving indentations in the brass bushing. See Figure 77, view "C".

5.6.23 Unscrew the dimpling screw out approximately 0.75 inches (20 mm.). Loosen the brass nut (T14) and rotate the dimpling tool (T16) 60 degrees. Repeat the dimpling process by tightening the brass nut (T14) and then tighten the dimpling screw until it contacts the dimpling screw housing. Back out the dimpling screw approximately 0.75 inches (20 mm.). The brass bushing (7) is now held in position by the six dimples made by the tool.

5.6.24 Remove the installation tools and check the brass bushing (7), removing any burrs, being careful not to leave any metal filings in the bushing. Coat the inside of the bushing with the white grease included in the kit.

Installation of the Floating Guide Pin Bushing

5.6.25 To install the bushing (6) into the short guide pin side, first inspect the bore for corrosion, damage etc. Clean as necessary.

5.6.26 Place the new bushing (6) in position so that **when drawn into position, the tab will align with the slot in the casting.** With the tab aligned, place tool (T14) over the bushing and tap lightly. To position the bushing, see Figure 78.



FIGURE 78 - POSITION THE NEW BUSHING

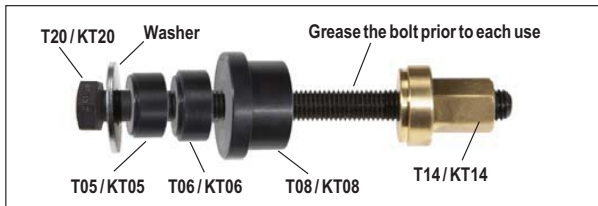


FIGURE 79 - SHORT GUIDE PIN BUSHING INSTALLATION TOOL

5.6.27 Use the tool combination shown in Figure 79 to draw the bushing (6) into the caliper. See also Figure 80, to see the orientation (with tool T14 at the top). Hand tighten the nut (T14) into position. Then tighten the bolt (T20) using a box end wrench or socket to draw the bushing (6) into the caliper until the bushing (6) contacts the machined step in the bore. Remove the tool.

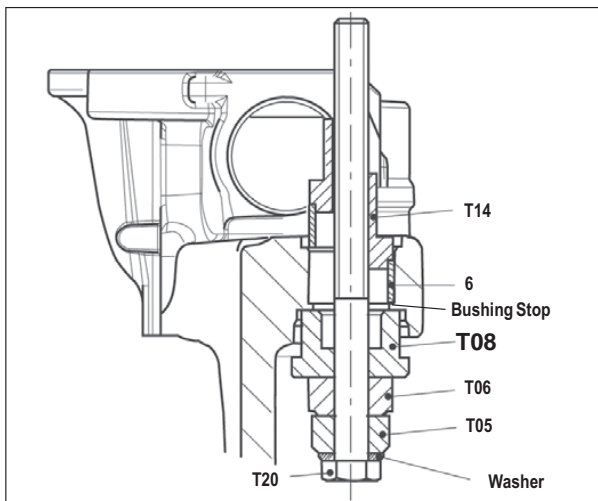


FIGURE 80 - GUIDE PIN BUSHING INSTALLATION

- 5.6.28 Using a punch, bend the tab into the groove by aligning the punch with the upper part of the tab and tapping the punch with a hammer.
- 5.6.29 Coat the inside of the bushing (6) with a light coat of the white grease included in the kit.
- 5.6.30 Install the two identical inner boots (9) by first cleaning the area where the inner boots will be installed and inspect for corrosion. If the sealing

surface of the caliper is damaged, replace the caliper.

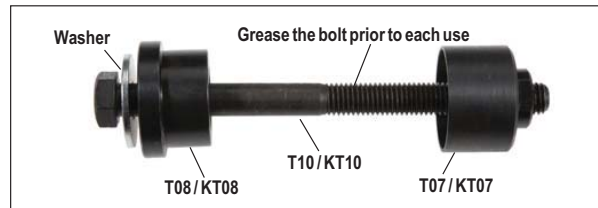


FIGURE 81 - SHORT GUIDE PIN BOOT INSTALLATION TOOL

5.6.31 See Figure 82. Place a boot into the installation tool (T7), making sure that the inner bellows are arranged close to the side walls of the tool and will not be damaged during installation. Also check that the outer edge of the boot rests on the front edge of the tool.



FIGURE 82 - POSITION THE NEW BOOT IN THE INSTALLATION TOOL (T7)

- 5.6.32 Using 70 in. lbs. (8 N-m) of torque maximum, tighten bolt (T10) to install the inner boot.
- 5.6.33 Repeat the installation procedure for the second inner boot.
- 5.6.34 Check that the boots are held securely in place and that no damage occurred during installation.

5.6.35 See Figure 83. To install the guide pins, first lubricate both guide pins with the white grease supplied. Insert the guide pins into their respective bores with the grooved end towards the bellows.



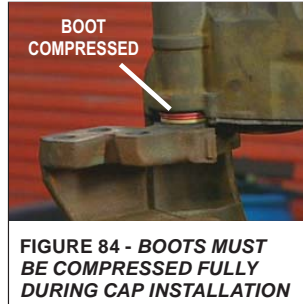
FIGURE 83 - PLACE THE RETAINING RING ONTO THE GROOVE IN THE GUIDE PIN

- Fit the lip in the end of the inner boots (8) into the groove of the guide pins. Push on each ring (7) ensuring that the boot (9) is engaged onto the end of the guide pins (5 or 6).
- 5.6.36 With the caliper resting on a bench, slide the carrier into place with a slight rocking motion, taking care that as you do so, the inner boots and guide pins are seated in their proper place on the carrier.
- 5.6.37 Identify the two caliper bolts (39) and (40). With the shorter bolt placed in the floating pin bushing (4), and the longer bolt placed in the fixed pin bushing (5),

begin to tighten the bolts. With the caliper/carrier in a vice, continue installing the bolts to a torque of 133 ft. lbs. (180 N·m). Finally, tighten each bolt an additional 90° (ninety degrees).

Installation of the Guide Pin Caps

5.6.38 See *Figure 84*. Place the caliper/carrier assembly on a bench so that the inner boots are fully compressed, check that the bores are clean and dry (e.g. free from lubrication).



Note: It is important that the inner boots are fully compressed during this procedure to ensure that the least amount of air is retained within the guide pin channel. If too much air is trapped, the bellows can potentially be damaged during the operation of the brake. *It is also important that the technician double-check that the retaining rings remain in their correct position during this procedure.*

5.6.39 Clean the two caps, and check that the caliper surfaces where the caps will be installed are clean and have no signs of damage.

5.6.40 Select one cap to install. Using the correct press-in tool — the smaller cap (10) installs in the long guide pin side using tool (T26), and the larger cap (68) installs in the short guide pin side using tool (T27) — place the cap in position, using the machined channel in the caliper to assist in centering the tool.



Use a hammer to tap the cap into position. See *Figure 85*. Note that the tool needs to remain perpendicular to the channel to prevent damage during installation. Note that, after installation, the smaller cap (10) extends 0.08 in. (2 mm.), and the larger cap (68) extends 0.61 in. (15.5 mm.).

Repeat for the second cap.

5.6.41 Check that the guide pins move freely when the carrier is moved laterally, and that air is not trapped within the inner boots, and that the boots (9) and ring (58) are in the proper position before continuing with the installation.

5.6.42 Install the caliper/carrier (*See Section 5.3*).

5.6.43 Install the brake chamber (*See Section 5.4*).

5.6.44 Install the brake pads (*See Section 5.2*).

5.7 BENDIX® SPLINED DISC® HUB ROTOR

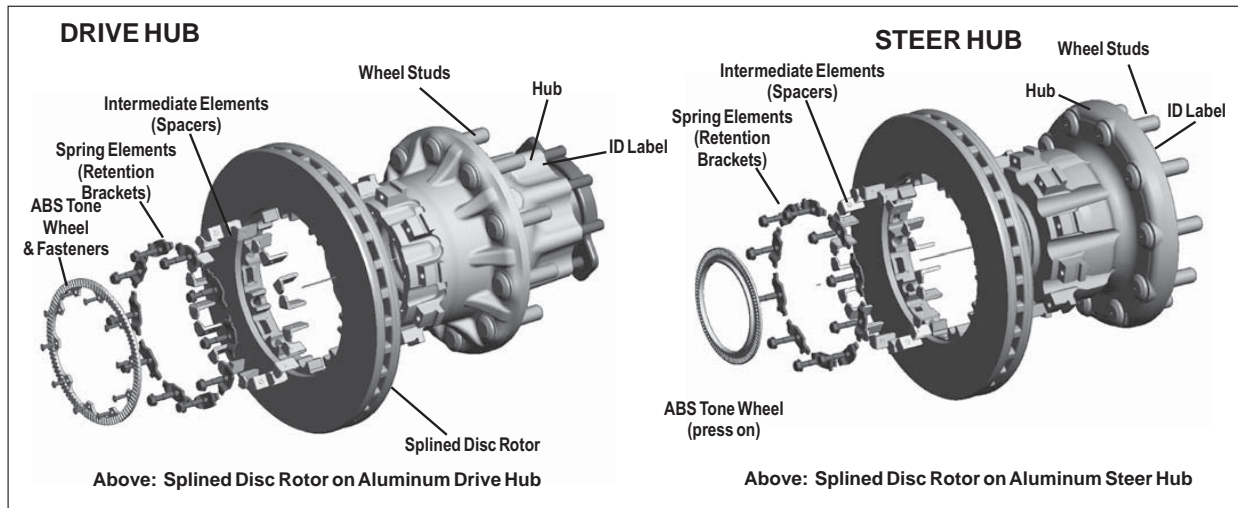


FIGURE 86 - SPLINED DISC ROTOR EXAMPLES - EXPLODED VIEWS

Bendix® Splined Disc® Hub Rotors are designed to assist vehicle maintenance by typically allowing the rotor to be serviced without requiring the entire hub/rotor assembly be replaced.

Periodic inspection of the Splined Disc attachment hardware is recommended to ensure optimum braking performance. Bendix recommends verifying the torque on the spring element fasteners whenever a brake inspection is performed.

NOTE: Anytime that the entire hub/rotor assembly is removed, Bendix recommends that the wheel seal also be replaced at the same time, USING A HIGH-TEMPERATURE SEAL. Follow the wheel seal and/or vehicle manufacturer's guidelines for full installation instructions. Adjust the bearings and refill bearing oil to vehicle manufacturer's specifications.

When replacing a Splined Disc Rotor, Bendix strongly recommends that the brake pads be replaced (as an axle set.) Contact 1-800-AIR-BRAKE for appropriate brake pad kit. Rotor replacement necessitates the removal of the pads.

CAUTION: Follow all safe maintenance practices, including those listed on page two of this document. Park the vehicle (by other means than the foundation brakes) on level ground and chock the wheels. Also read the vehicle manufacturer's recommendations. When installing pads, where appropriate, use heavy duty gloves and always keep fingers away from potential pinch hazard areas.

Bendix Air Disc Brakes are precision-engineered braking mechanisms. The "friction couple" braking characteristics have been carefully optimized and the rotor design and materials have been matched with special formulation brake pads for optimal performance, therefore use only genuine Bendix® brand parts and brake pads.

Rotor Replacement

- 5.7.1 Before removing the brake pads it is strongly recommended that the air disc brake adjuster mechanism be checked for correct operation (See Section 4.1). When replacing brake pads, Bendix strongly recommends that the pads be replaced as an axle set.
- 5.7.2 Refer to the vehicle manufacturer's recommendations and release (or cage) spring brakes and remove the wheel.
- 5.7.3 Remove the pads (See Section 5.2).
- 5.7.4 Remove the air disc brake (See Section 5.3).
- 5.7.5 Remove the hub rotor assembly.

Note: Follow the vehicle manufacturer's guidelines for removal of the wheel hub and rotor assembly from the vehicle in lieu of these instructions, where available.

CAUTION: Be sure to secure both the rotor and hub before removing the retention clips.

- 5.7.6 Remove and discard the ten spring elements.
- 5.7.7 On drive axles, the ABS tone ring must also be removed. (See Figure 86.) Retain for re-installation.
- 5.7.8 Use suitable hand tools to remove the intermediate elements (spacers). Remove all the right-hand intermediate elements (spacers) of each set first and then the rotor can be turned slightly to release

the remaining intermediate elements (spacers). In all cases, take care not to damage the hub and its teeth. Remove and discard the intermediate elements (spacers) and retention clips attaching the rotor. Discard the rotor.

5.7.9 Following industry standards, clean and inspect the hub before installing the rotor. Look for corrosion and/or damage to the hub and inspect the wheel speed tone ring. Where necessary, consult the hub manufacturer's guidelines for more details.

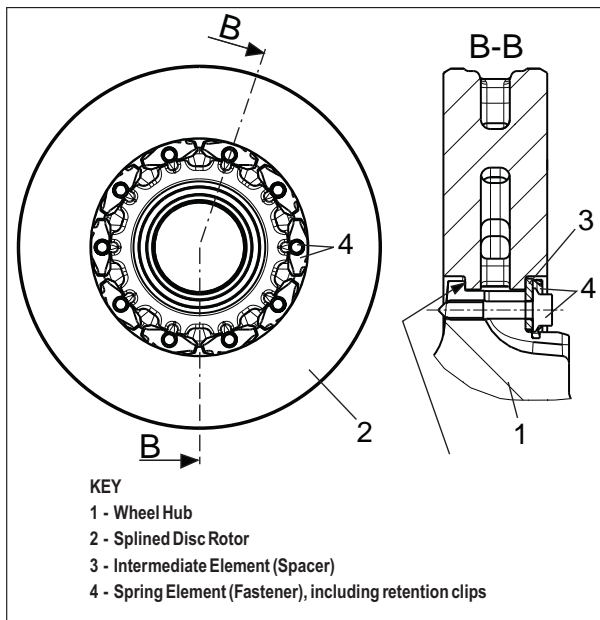


FIGURE 87 - ROTOR WITH CROSS-SECTION VIEW



FIGURE 88 - ROTOR INSTALLATION

ROTOR INSTALLATION

5.7.10 See Figures 87 through 91. Place the rotor into position on the hub. Install the new intermediate elements (spacers) as shown in Figure 89. With all the intermediate elements (spacers) correctly inserted into position, verify that the gap between the intermediate elements (spacers) and the wheel hub does not exceed 0.004 in (0.1 mm). If a gap is found that exceeds this maximum value, verify the installation of new intermediate elements (spacers). Replace the wheel hub if the excess gap cannot

be corrected with proper installation of new rotor retaining hardware.

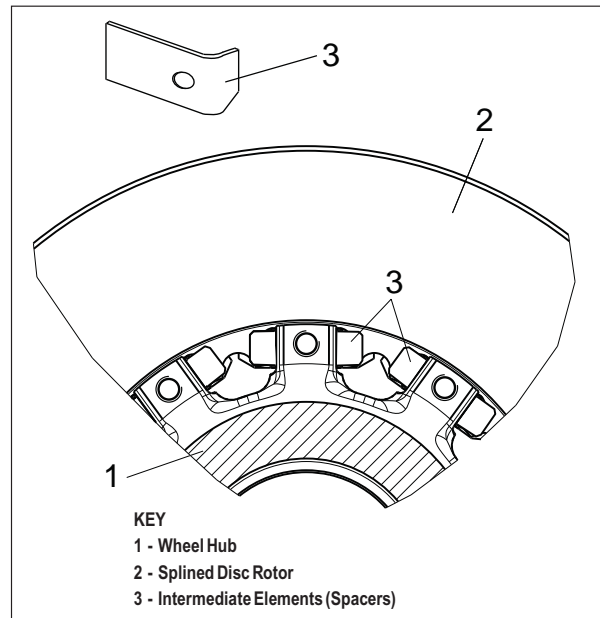


FIGURE 89 - INSTALLING INTERMEDIATE ELEMENTS (SPACERS)



FIGURE 90 - INTERMEDIATE ELEMENTS (SPACERS) INSTALLED

5.7.11 Install the ten new spring elements included in the kit in an evenly-distributed cross-pattern sequence. Torque to 22.1 ft. lbs. (30 N-m.)

5.7.12 Where the tone ring was removed during step 5.7.7, re-install the tone ring. Use a professional grade fastener compound, such as Loctite blue 242, on the fasteners. Torque to 19-22 in. lbs. (2.1-2.5 N-m.)

5.7.13 Re-install the hub rotor assembly using a new high-temperature wheel seal, following the vehicle manufacturer's instructions.

5.7.14 Re-install the air disc brake (See Section 5.3). Supporting the air disc brake by all necessary means, attach the brake to the anchor plate using six bolts and washers as required (Bendix recommends the original bolts not be re-used). Torque to vehicle manufacturer's specifications. If torque values and bolts are not specified by the vehicle manufacturer, then torque according to the chart below. Be sure to select bolts with the same thread pitch, length and grade as originally provided from vehicle manufacturer.



5.7.15 Reinstall the brake pads (See Section 5.2).

FIGURE 91 - FASTENERS INSTALLED



Air Disc Brake Attachment Hardware		
Torque Plate Manufacturer	Fastener	Torque
 <p>Bendix Axial Carrier Torque Plate</p>	<p>Fastener: M20 x 2.5 x 60 mm Class 10.9 Washer: Requires HARDENED 3 mm (minimum thickness) for each bolt.¹ <i>If the vehicle is using a Bendix manufactured Axial Anchor Plate, with a thickness of 1.14 in. (29 mm) where these bolts are assembled, then a bolt with an overall length of 2.36 in. (60 mm) will meet these requirements</i></p>	<p>Use the manufacturer's recommendations. If unavailable, use phosphate and oil finish fastener. Pre-Torque: 20-60 ft-lbf [27-81 N·m] Final Torque: 350-400 ft-lbf [475-542 N·m]</p>
 <p>Bendix Vertical Carrier Torque Plate</p>	<p>Fastener: M16 x 2.0 x 110 mm, Class 10.9 Washer: None required.</p>	<p>Use the manufacturer's recommendations. If unavailable, use plain and oil finish fastener. Torque: 200-220 ft-lbf [271-298 N·m]</p>
<p>Trailer Torque Plate</p>	<p>Fastener: M20 x 2.5 x L Class 10.9 Length determination: L = Torque Plate (TP) thickness + Carrier engagement + Washer thickness $L_{min} = TP \text{ thickness} + 24 \text{ mm} + 3 \text{ mm}$ $L_{max} = TP \text{ thickness} + 29 \text{ mm} + 3 \text{ mm}$ Washer: Requires HARDENED 3 mm (minimum thickness) for each bolt.¹</p>	<p>Use the manufacturer's recommendations. If unavailable, use phosphate and oil finish fastener: Pre-Torque: 20-60 ft-lbf [27-81 N·m] Final Torque: 350-400 ft-lbf [475-542 N·m]</p>
<p>CAUTION: The washer outside diameter must be less than 1.5 in (37.5 mm).</p>		

TABLE 7 - TORQUE PLATE FASTENERS AND TORQUE RECOMMENDATIONS (SEE MANUFACTURER'S RECOMMENDATIONS)

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NOTES

CONTACTING BENDIX

www.foundationbrakes.com

Bendix on-line information is available 24/7/365. It's your complete Bendix resource.

Bendix Technical Assistance Team

For direct personal technical support, call the Bendix TechTeam at

1-800-AIR-BRAKE (1-800-247-2725).

Representatives are available to assist you Monday through Friday, 8:00 A.M. to 6:00 P.M. EST, or e-mail the Bendix Tech Team at:

techteam@bendix.com.

To better serve you, please collect the following information before you call the Bendix TechTeam, or include this information in your e-mail:

- Bendix product model number, part number and configuration.
- Vehicle make and model.
- Vehicle configuration. (Number of axles, tire size, etc.)
- System performance symptoms: When do they occur?
- What troubleshooting/measurements have been performed?
- What Bendix service data literature do you have or need?

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