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Disc Type Clutches and Brakes

D

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Element Descriptions

General

Airflex hydraulic clutches are available in three different styles; AR, AS and CH, to accommodate a variety of applications. They are multiple disc units ideally suited for mounting within transmission boxes and can be either air or hydraulically actuated. These clutches have been used for synchronizing, indexing, speed changing, marine main propulsion and mooring winch applications.

Types AR and AS

Both types are wet friction clutches designed for use within a transmission. A transmission lube pump is generally adequate as a source of actuating pressure. The clutch hub is custom bored and keyseated for shaft mounting. Torque transfer from the driving to the driven member is accomplished by means of an externally slotted

driven cup which engages external lugs on the driving discs. Friction material is of a sintered bronze type.

Type AR is designed to provide maximum torque within a minimum space envelope. In this design, the actuating cylinder rotates with the clutch. Actuation is accomplished through internal shaft and clutch passages.

Type AR clutches are available in two sizes providing a maximum torque to 22400 lbin (2530 Nm).

Type AS utilizes a bearing mounted, stationary actuating cylinder which permits a direct external connection to the clutch. This design eliminates any centrifugal head on the actuating fluid which could prevent clutch disengagement.

Actuating fluid is allowed to bleed into the clutch thrust bearing for lubrication. If the actuating media is different than the transmission box oil, clutches must be specified without the automatic lubricating feature. External bearing lubrication must then be provided. Air actuated clutches should incorporate air-line lubricators.

Type AS clutches are available in six sizes having torque ratings to 26000 lbin (2550 N-m).

Type AS Features

Stationary Piston - Cylinder

Piloted on angular contact ball-bearing - provides precise radial positioning and retains axial thrust.

Release Springs

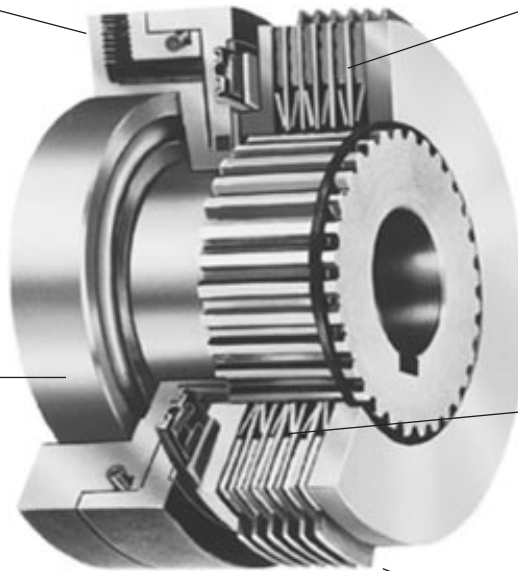
Low stress, long-life - provide fast uniform release and positive disc separation.

Needle Thrust Bearing

Transfers the stationary cylinder thrust to the rotating disc pack. Automatically lubricated by actuating fluid.

Driving Discs

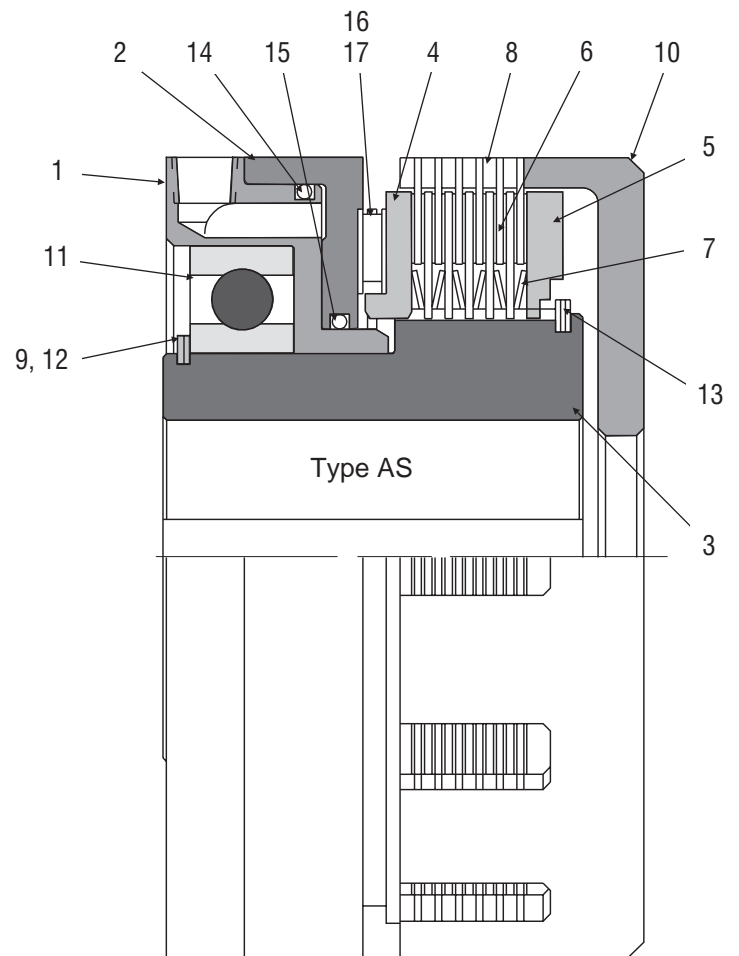
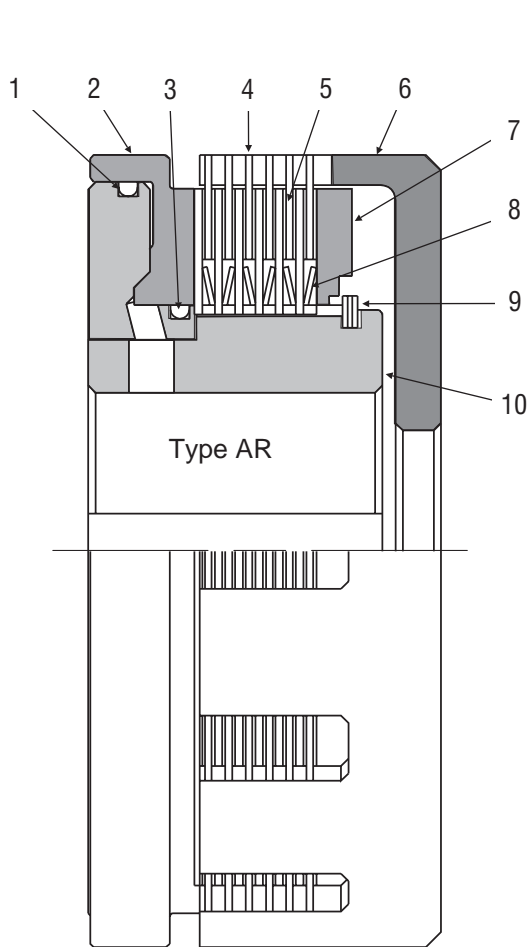
Heat treated steel-splined to hub for minimum backlash and maximum torque capacity.



Friction Discs

Steel core with external drive lugs - sintered-metal facings grooved for oil control.

Component Parts



Type AR	
Item	Description
1	"O" Ring
2	Piston
3	"O" Ring
4	Friction Disc Assembly
5	Separator Disc
6	Drive Cup
7	Backplate
8	Release Spring
9	Snap Ring
10	Hub Assembly

Notes:

- ① Drive cup furnished by customer or by request only and is to be reworked for mounting by customer.

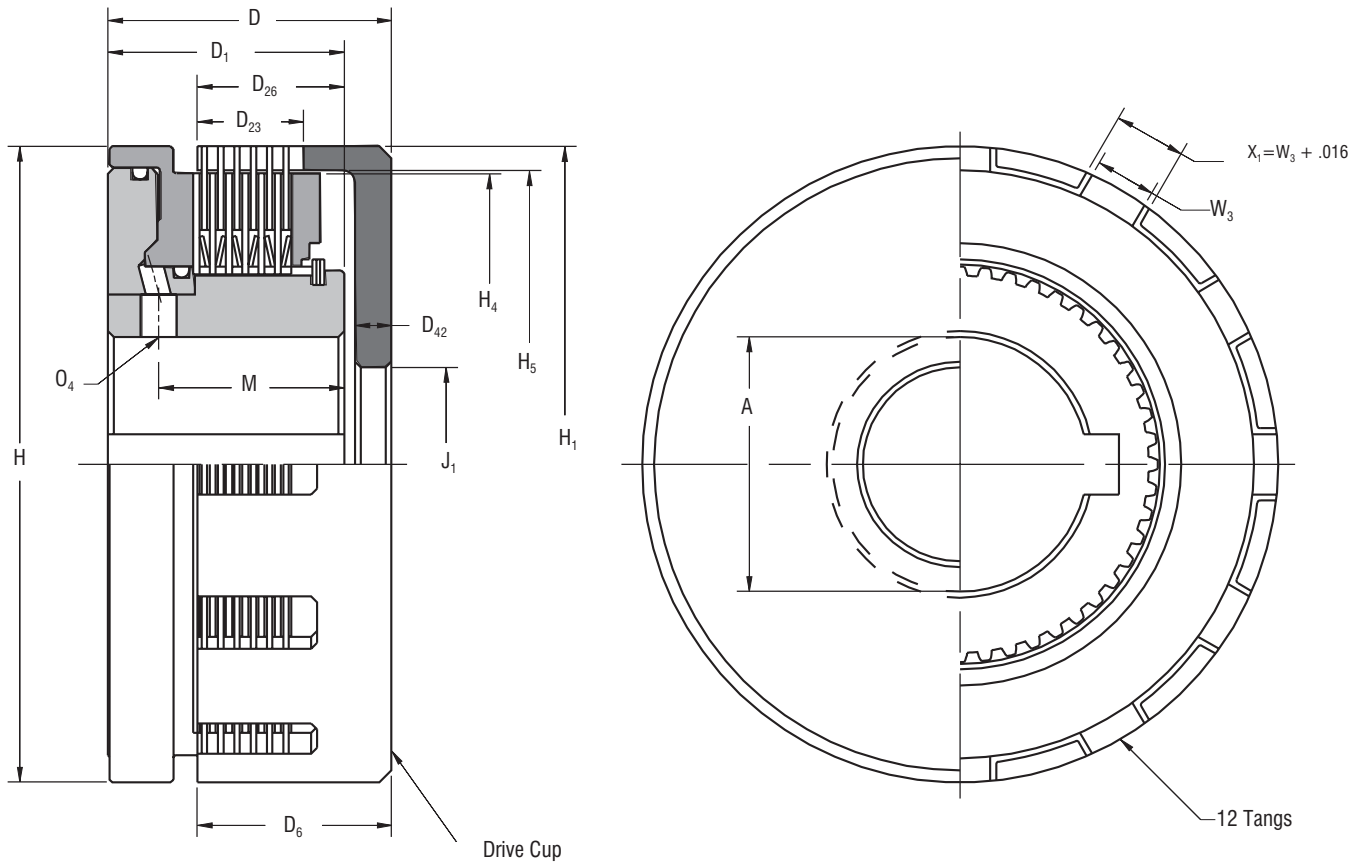
Type AS	
Item	Description
1	Cylinder
2	Piston
3	Hub
4	Pressure Plate
5	Backplate
6	Separator Disc
7	Release Spring
8	Friction Disc Assembly
9	Shim
10	Drive Cup
11	Ball Bearing
12	Snap Ring
13	Snap Ring
14	"O" Ring
15	"O" Ring
16	Thrust Race
17	Thrust Bearing

Airflex® Type AR Hydraulic Clutches



Form AR 1302

Dimensional Data



English	Dimensions in inches															
AR 600	2.63	2.92	2.435	2.00	1.23	1.52	0.38	6.56	6.56	6.00	6.062	2.000	1.81	1	0.38	0.609
AR 800	3.38	3.81	3.120	2.41	1.53	1.72	0.38	8.63	8.69	8.00	8.062	2.500	2.51	3	0.44	0.734
Size	A Max Bore	D	① D ₁	D ₆	D ₂₃	D ₂₆	D ₄₂	H	H ₁	H ₄	H ₅	J ₁	M	No. Size		W ₃
														O ₄ ②		
No.	Size															
AR 600	67	74	61,8	51	31	38	10	167	167	152	154,0	50,8	46	1	10	15,5
AR 800	86	97	79,2	61	39	44	10	219	221	203	204,8	63,5	64	3	11	18,6
SI	Dimensions in millimeters															

Notes:

① Tolerance +0.005/-0.000 in (+0,13/-0,00 mm)

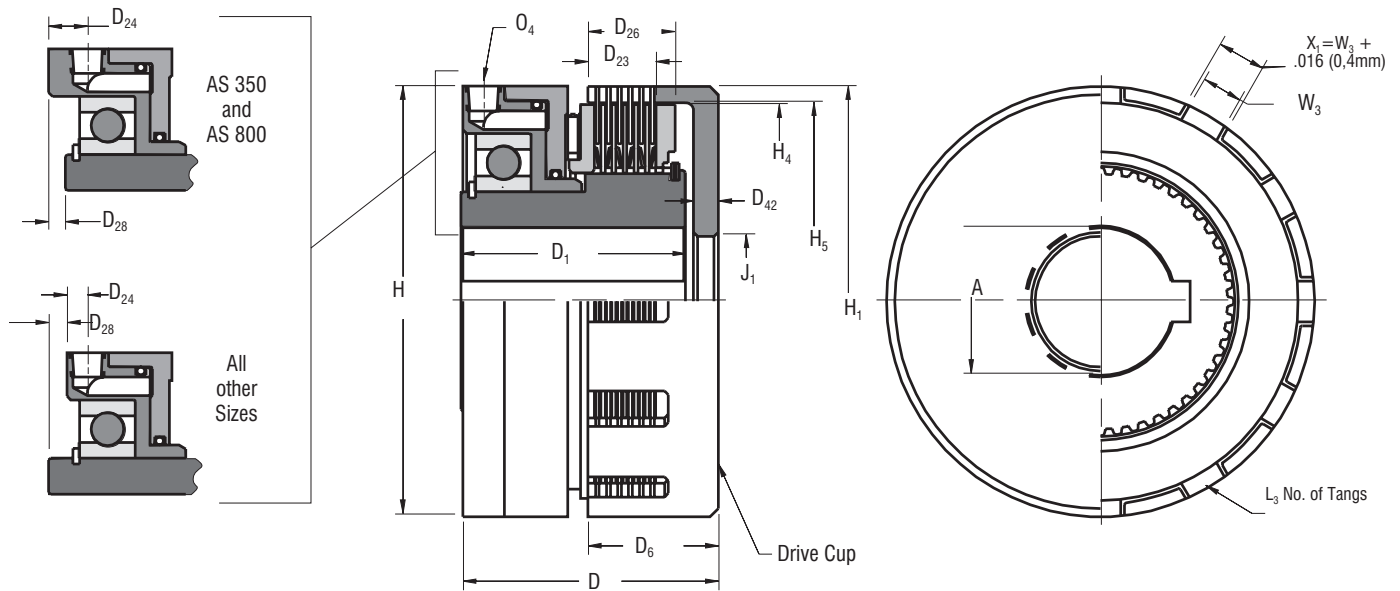
② Located 60° counterclockwise from keyway when facing drive cup end of clutch for size 600. Size 800 has three inlets located at 60°, 180° and 300° from keyway.

Airflex® Type AS Hydraulic Clutches



Form AS 1301

Dimensional Data



English	Dimensions in inches																
AS350	1.19	2.82	2.383	1.33	0.84	0.27	0.94	0.031	0.22	3.81	3.88	3.50	3.562	1.00	6	1/8-27	0.734
AS450	1.81	3.33	2.880	1.66	1.00	0.27	1.19	0.000	0.28	4.88	4.88	4.50	4.562	1.00	6	1/8-27	0.796
AS550	2.25	3.71	3.260	1.86	1.17	0.32	1.38	0.017	0.31	6.00	6.00	5.50	5.562	2.00	12	1/4-18	0.609
AS600	2.63	3.92	3.445	2.00	1.23	0.34	1.50	0.015	0.38	6.56	6.56	6.00	6.062	2.00	12	1/4-18	0.609
AS700	3.13	4.32	3.785	2.17	1.36	0.35	1.62	0.004	0.38	7.63	7.69	7.00	7.062	2.00	12	1/4-18	0.734
AS800	3.38	4.98	4.160	2.41	1.53	0.41	1.62	0.030	0.38	8.63	8.69	8.00	8.062	2.50	12	1/4-18	0.734
AS900	3.94	5.87	5.228	2.97	2.00	0.46	2.25	0.063	0.44	9.75	9.88	9.00	9.155	2.50	12	3/8-18	1.235
Size	A Max Bore	D	① D ₁	D ₆	D ₂₃	D ₂₄	D ₂₆	② D ₂₈	D ₄₂	H	H ₁	H ₄	H ₅	J ₁	L ₃	O ₄	W ₃
AS350	30	72	60,5	34	21	7	24	0,8	6	97	99	89	90,5	25	6	1/8-27	18,6
AS450	46	85	73,2	42	25	7	30	0,0	7	124	124	114	115,9	25	6	1/8-27	20,2
AS550	57	94	82,8	47	30	8	35	0,4	8	152	152	140	141,3	51	12	1/4-18	15,5
AS600	67	100	87,5	51	31	9	38	0,4	10	167	167	152	154,0	51	12	1/4-18	15,5
AS700	80	110	96,1	55	35	9	41	0,1	10	194	195	178	179,4	51	12	1/4-18	18,6
AS800	86	126	105,7	61	39	10	41	0,8	10	219	221	203	204,8	64	12	1/4-18	18,6
AS900	100	149	132,8	75	51	12	57	1,6	11	248	251	229	232,5	64	12	3/8-18	31,4
SI	Dimensions in millimeters																

Notes:

① Tolerance for size AS350: +0.005/-0.000 in (+0,13/-0,00 mm)
All other sizes: ±0.005 in (±0,13 mm)

② Tolerance for size AS350: +0.027/-0.000 in (+0,69/-0,00 mm)
All other sizes: +0.030/-0.000 in (+0,76/-0,00 mm)

Airflex® Types AR and AS Hydraulic Clutches



Technical Data

English		lb in @150 psi	lb	lb ft ²		in ²	in ³	GPM	rpm	lb @ 150 psi	
AR 600	146018	6340	14.5	0.61	0.35	114	3.46	9	3500	1800	2450
AR 800	146020	14210	38.2	1.5	1.18	255	6.04	15.7	2900	1400	4460
Size	① Part Number	② M, Torque Rating	③ Weight Mass	Wk ²		Friction Area	④ Cylinder Volume	⑤ Actuating Flow	Max Speed	Maximum Disengaged Speed	Axial Thrust
				③ Gear Side	Cup Side						
				J							
AR 600	146018	716	6,6	0,03	0,01	735	0,06	34	3500	1800	10898
AR 800	146020	1610	17	0,06	0,05	1645	0,10	59	2900	1400	19838
SI		Nm @10,3 bar	kg	kg m ²		cm ²	dm ³	dm ³ pm	rpm	N @ 10,3 bar	

English		lb in @150 psi	lb	lb ft ²		in ²	in ³	GPM	rpm	GPM	lb @ 150 psi
AS 350	146002	1650	5.2	0.02	0.03	46	1.42	3.7	3000	0.04	1030
AS 450	146004	3480	12.9	0.2	0.09	73	1.54	4	2400	0.04	1530
AS 550	146006	5240	15.5	0.22	0.23	108	2.66	6.9	2000	0.04	2220
AS 600	146007	7140	23.1	0.28	0.35	114	3.89	10.1	1800	0.04	2760
AS 700	146008	12960	28.5	0.6	0.69	155	4.23	11	1600	0.04	3720
AS 800	146009	15360	51.2	1.09	1.18	255	6.54	17	1400	0.04	4820
AS 900	146010	24600	99.1	2.21	2.45	291	10.01	26	1300	0.04	5790
Size	① Part Number	② M, Torque Rating	③ Weight Mass	Wk ²		Friction Area	④ Cylinder Volume	⑤ Actuating Flow	Max. Speed	⑥ Leakage Rate	Axial Thrust
				③ Gear Side	Cup Side						
				J							
AS 350	146002	186	2,4	0,0008	0,0012	297	0,02	14	3000	0,15	4581
AS 450	146004	393	5,8	0,01	0,0037	471	0,03	15	2400	0,15	6805
AS 550	146006	592	7,0	0,01	0,01	697	0,04	26	2000	0,15	9875
AS 600	146007	807	10,46	0,01	0,01	735	0,06	38	1800	0,15	12276
AS 700	146008	1460	12,91	0,03	0,03	1000	0,07	42	1600	0,15	16547
AS 800	146009	1740	23,19	0,05	0,05	1645	0,11	64	1400	0,15	21439
AS 900	146010	2780	44,89	0,09	0,10	1877	0,16	98	1300	0,15	25754
SI		Nm @10,3 bar	kg	kg m ²		cm ²	dm ³	dm ³ pm	rpm	dm ³ pm	N @ 10,3 bar

Notes:

- ① Drive cup not included with basic part number and must be ordered separately. Drive cup furnished with bore listed on dimension page and without provision for mounting.
- ② Dynamic torque shown. Static torque 50% greater.
- ③ Based upon minimum bore.
- ④ Absolute actuating cylinder volume. Volume increases 75% at maximum lining wear.
- ⑤ Based upon actuating time of 0.1 second.
- ⑥ Standard unit allows actuating fluid to bleed into bearings for lubrication. If actuating media is different than the transmission box oil, units without bleed hole must be specified and external lubrication provided.