

Power Take Off



**AUTOMOTIVE PRODUCTS
DRIVELINE TECHNOLOGY**

Maximum Clutch Torque Capacity

The torque capacities shown are the maximum clutch capacities, and include safety factors dependant upon the type of application.

Clutch Size		Clutch Torque Capacity								Max. Safe Speed rpm	Approx weight lbs.
		Extra Light Duty		Light Duty		Medium Duty		Heavy Duty			
Inches	mm	lb.ft.	Nm.	lb.ft.	Nm.	lb.ft.	Nm.	lb.ft.	Nm.		
10	254	330	450	250	340	165	225	125	170	3600	142 - SAE 1
											127 - SAE 4
11.5	292	490	665	370	500	245	335	185	250	3600	151 - SAE 1
											141 - SAE 3
11.5 double	292	910	1235	685	930	455	620	340	460	3600	188 - SAE 1 178 - SAE 3
14	355	835	1135	625	850	420	570	315	430	2500	260
14 double	355	1625	2205	1220	1655	815	1105	610	830	2500	390 - SAE 0
											350 - SAE 1
14 triple	355	2400	3255	1800	2440	1200	1630	900	1220	2500	500 - SAE 0
											460 - SAE 1

$$\text{Torque (lb.ft.)} = \frac{5252 \times \text{HP}}{\text{RPM}} \quad \text{or} \quad \text{Torque (Nm.)} = \frac{9549 \times \text{HP}}{\text{RPM}}$$

Torque Calculation:

Use these formulas and the appropriate safety factor to determine the correct clutch size for any application.

Clutch size requirement should be determined based on peak torque capability of the engine.

$$\text{Clutch Torque Capacity} = \frac{\text{Gross Torque Capacity}}{\text{Safety Factor}}$$

Duty Classification Selection Guide

<u>Extra Light Duty</u>	<u>Light Duty</u>	<u>Medium Duty</u>	<u>Heavy Duty</u>
Pumps - Centrifugal	Cereal Dryers	Agitators - solid or semi solids	Cranes & Hoist - working clutch
Hydraulic Pumps w/o priming	Elevators - Bucket	Blowers & fans centrifugal & lobe.	Crushers - ore & stone
Irrigation Pumps	Machines, general - all types with uniform loads, non reversing	Compressors - all centrifugal, screw	Chipper - wood
		Elevators - bucket, non-uniformly loaded or fed	Drums - barking
		Mixers - continuous	Compressors - lobe rotary plus three or more cylinder reciprocal type.
		Pumps - two or more cylinders	Machines - impact load types
		conveyors - uniformly loaded	Mills - ball type
		Dredge Pumps (allow for shock loading)	Mud pumps

INNOVATION

APPLICATION

SOLUTION

Installation Reference Dimensions & SAE Housings (Dimensions in inches)

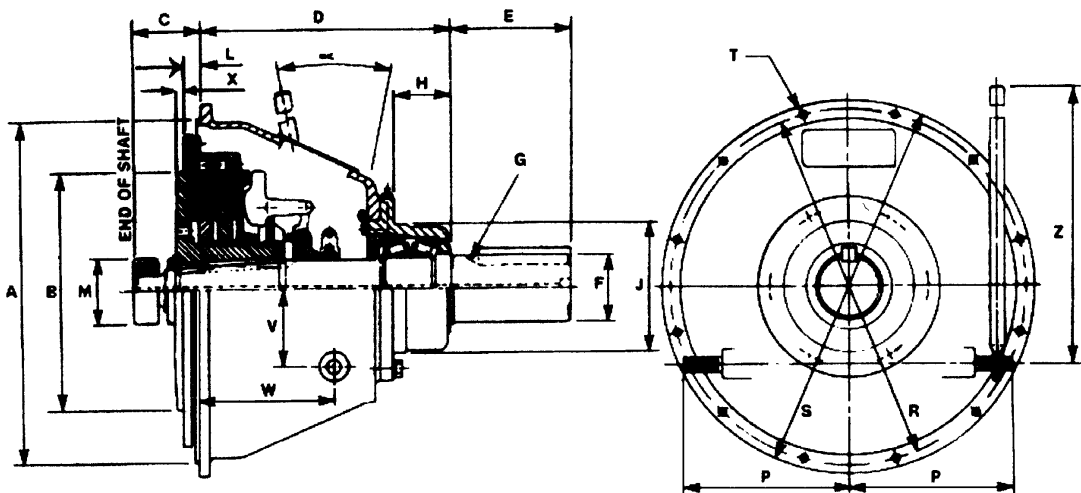
PTO TYPE MODEL	SHAFT				B PTO DIA.	C	H	J	M-DIA INCHS - (MM) +0.0000 -0.0005	D	V	W	X Max.	L	Z	Degrees Operating Lever Travel
	F DIA.	E LENGTH	G KEY SIZE	N KEY STAND UP												
10" single S10	2.25	6.00	5/8x5/8	2.520 2.508	10.0	3.85	3.55	5.5	2.8346 - (72)	8.85	3.0	3.50	0.37	2.13	25.0	16°30'
11.5" single S11	2.25	6.00 4.53	5/8x5/8	2.520 2.508	11.5	3.85	3.55	5.5	2.8346 - (72)	8.85	3.0	3.60	0.82	1.56	25.0	16°30'
11.5" double D11	2.50	6.50 4.53	5/8x5/8	2.771 2.759	11.5	3.85	3.37	6.3	2.8346 - (72)	9.62	3.0	4.45	0.82	1.56	25.0	16°30'
14" single S14	3.00	8.60	3/4x3/4	3.329 3.317	14.0	3.85	3.80	7.5	3.1496 - (80)	12.30	4.0	6.00	0.96	1.00	25.0	20°
14" double D14	3.50	10.10 7.12	7/8x7/8	3.879 3.867	14.0	3.85	3.36	7.5	3.1496 - (80)	13.65	4.0	7.31	0.85	1.00	25.0	20°
14" triple T14	3.94	10.00	1x1	4.370 4.353	14.0	3.90	3.36	7.5	3.1496 - (80) 3.9370 - (100)	14.43	4.5	7.75	0.46	1.00	25.0	17°30'

Dimensions are for standard range of PTO's.

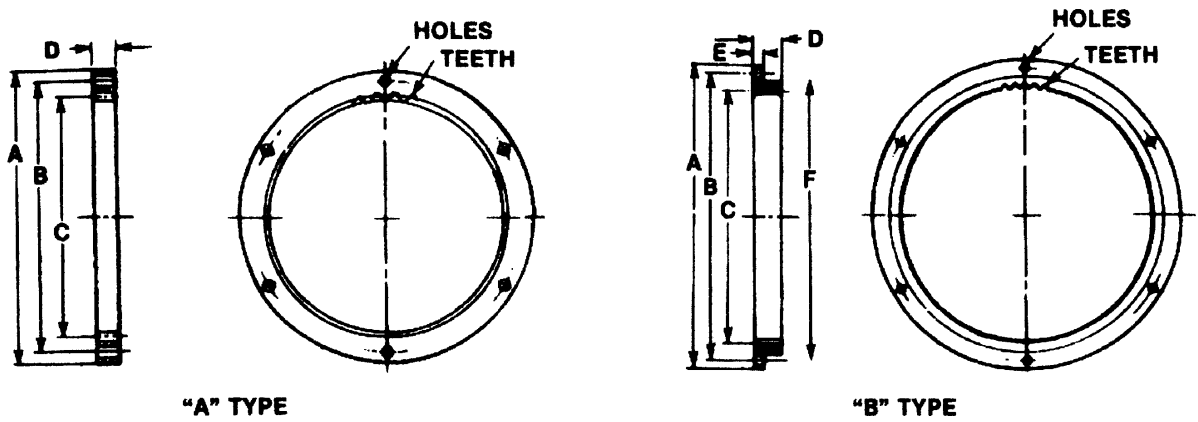
Pilot bearing (M diameter) supplied on application.

Support plates are required for double and triple plate 14" PTO's on side loaded applications, and recommended for in-line applications.

SAE Housing Number	A Diameter	R Bolt Circle Diameter	S O.D.	T (Bolt Holes)		P Shaft Length	Degrees
				Number	Diameter		
0	25.500	26.750	28.00	16	0.53	12.75	11°15'
1	20.125	20.875	21.75	12	0.53	9.75	15°
2	17.625	18.375	19.25	12	0.40	9.75	15°
3	16.125	16.875	17.75	12	0.40	8.13	15°
4	14.250	15.000	15.87	12	0.40	8.13	15°

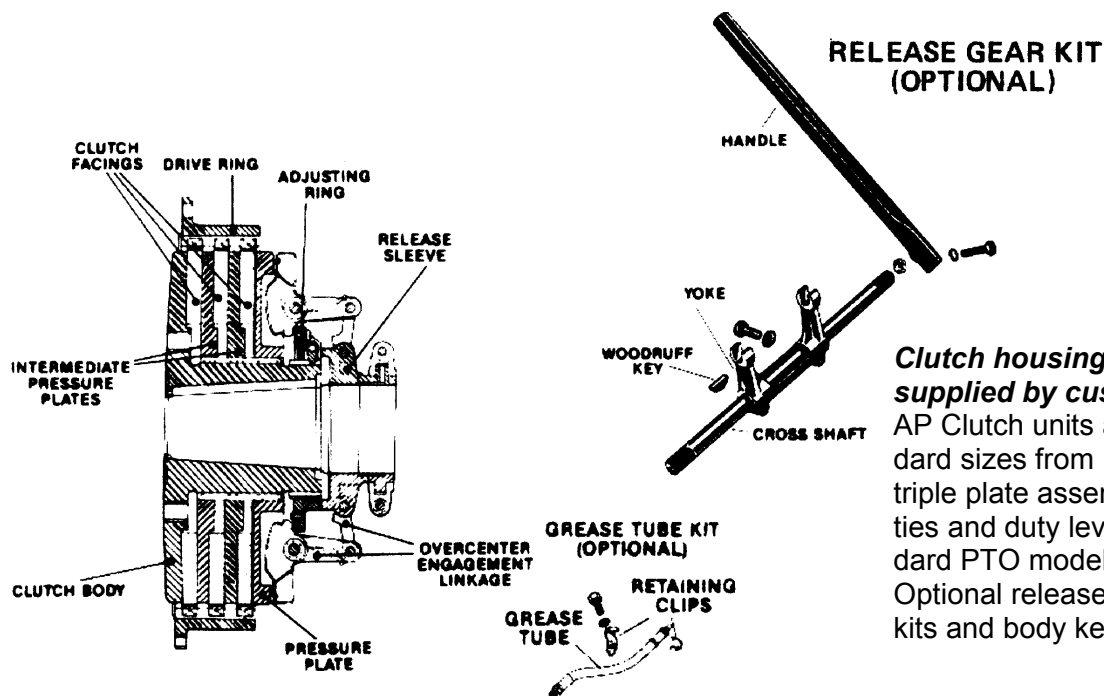


Drive Rings (Dynamically Balanced)



Description	Ring Type	A O.D.	B Bolt Circle	C Nominal Pitch Diameter	D	E	F	Holes		Approx. Weight (lbs.)
								Number	Sizes	
10" single S10	A	12.374 12.369	11.630 11.620	10.515 10.510	1.24	-	-	8	13/32	9
11.5" single S11	A	13.874 13.869	13.130 13.120	12.015 12.010	0.88	-	-	8	13/32	9
11.5" double D11	A	13.874 13.869	13.130 13.120	12.015 12.010	1.80	-	-	8	13/32	17
14" single S14	B	18.374 18.367	17.255 17.245	14.765 14.760	1.13	0.50	16.00	8	17/32	18
14" double D14	B	18.374 18.367	17.255 17.245	14.765 14.760	2.13	0.50	16.00	8	17/32	25
14" triple T14	B	18.374 18.367	17.255 17.245	14.765 14.760	3.25	0.50	16.00	8	17/32	33

Typical Clutch Unit & Release Mechanism



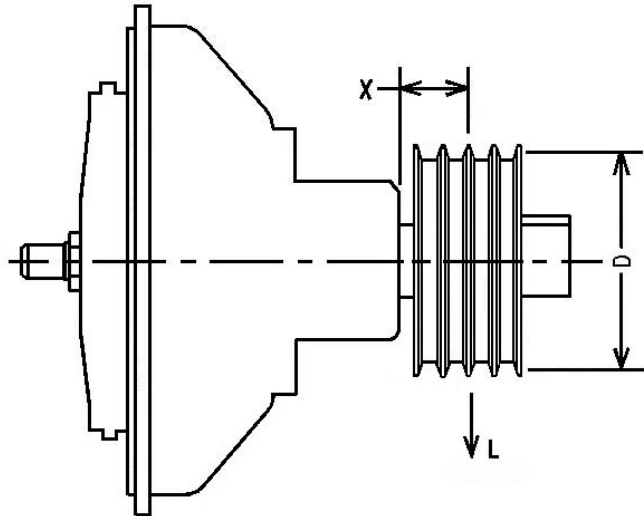
Clutch housing & drive shaft to be supplied by customer.
 AP Clutch units are available in all standard sizes from 10" single plate to 14" triple plate assemblies. Torque capacities and duty levels are identical to standard PTO models. Optional release gear kits, grease tube kits and body keys are available.

Side Loads

Allowable side-pull loads for PTO's.
The following formula should be used for determining the allowable side load "L" (lbs.).

$$L = \frac{126,000 \times \text{HP} \times \text{FL}}{N \times D}$$

L = Allowable side load (lbs.)
N = Shaft speed (RPM)
D = Pitch dia. of pulley, chain or gear (inches)
FL = Load factor
1.0 for single chain or gear
1.25 for double chain
1.5 for V-belt drive
2.0 for single ply belt
2.5 for double ply belt
3.0 for triple ply belt



Important: A support plate for double and triple 14" PTO's is required in side pull applications and is recommended for inline applications.

Allowable Side-Pull Load

PTO	RPM	X distance in inches									
		1		2		3		4		5	
		N	LBF	N	LBF	N	LBF	N	LBF	N	LBF
10"	1500	10000	2247	8300	1865	7275	1635	6325	1421	5600	1258
	2500	8650	1944	7250	1629	6300	1416	5495	1235	4900	1101
11.5"	1500	10000	2247	8300	1865	7275	1635	6325	1421	5600	1258
	2500	8650	1944	7250	1629	6300	1416	5495	1235	4900	1101
11.5" double	1500	12700	2854	10425	2342	9100	2045	8125	1825	7000	1573
	2500	11100	2494	9050	2033	7925	1781	7050	1584	6125	1376
14"	1500	22800	5123	20775	4668	19400	4359	18200	4089	17000	3820
	2500	19350	4340	17600	3955	16500	3708	15200	3415	14350	3225
14" double	1500	26880	6040	23025	5174	20250	4550	17825	4005	16130	3625
	2500	23450	5270	20075	4511	17700	3977	15675	3522	14150	3180
14" triple	1500	26000	5843	23825	5353	22000	4944	20425	4589	19000	4270
	2500	22300	5011	20275	4556	18750	4213	17275	3882	16150	3629



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