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With our vast network of locations around the world, Twin Disc offers you unprecedented global sales and service support. We can put engineering and service expertise on location virtually anywhere. We'll work with you on your particular application and product to ensure optimum results.
We're more than just a name you know,
Twin Disc is a name you can trust.

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MECHANICAL POWER TAKE-OFFS

SELECTION GUIDE

TWIN DISC®

WE PUT HORSEPOWER TO WORK®

TWIN DISC SETS THE STANDARD IN POWER TAKE-OFFS

Power take-offs (PTOs) are used as a standard method for transmitting the power of engines in a great variety of industrial applications such as air compressors, agricultural machinery, crushers, road building machinery, cranes, shovels, pump drives and oil field service. A power take-off consists of a complete clutch assembly with shaft and bearings mounted in a cast-iron housing for easy engine installation.

Twin Disc offers power take-offs for all industrial engines. The IBF line is designed especially for today's high inertia applications and presently is offered in two- and three-clutch plate construction. This multiple-plate, ventilated design assures ample cooling area to withstand heat, and with solid friction plates, these PTOs can effectively handle the stress of higher engine speeds. The IBF units feature oil lubricated tapered roller bearings that extend lubrication intervals.

An extra margin of strength

Actual design torque capacity of the clutches used in Twin Disc power take-offs is in excess of the horsepower rating listed. This permits Twin Disc power take-offs in proper adjustment to withstand temporary torque overloads. Rated torque can be transmitted while moderately slipping during short periods without permanent damage.

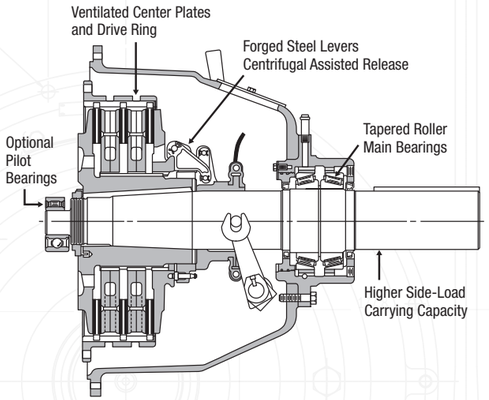
Specifications

- Suitable for Duty Class II industrial applications with internal combustion engines up to 1667 horsepower and with standard SAE flywheel housing dimensions from No. 6 through No. 00.
- Contain clutches ranging in size from one plate 6½" to one plate 14"; in two-plate size from 11" to 18"; and three-plate size from 11" to 21".
- Standard sealed pilot ball or roller bearings eliminate the lubrication requirement and shaft rifle-drilling normally encountered with standard pilot bearings. Also available as options: ball bearing throw-out collars and finger springs.
- Horsepower and torque capacities listed can be increased by the use of sintered-iron clutch plates, which are available as optional equipment in the 8" through 21" sizes.
- All bearings, shafts and other parts are designed with liberal safety factors to maximize life under normal operating conditions.*

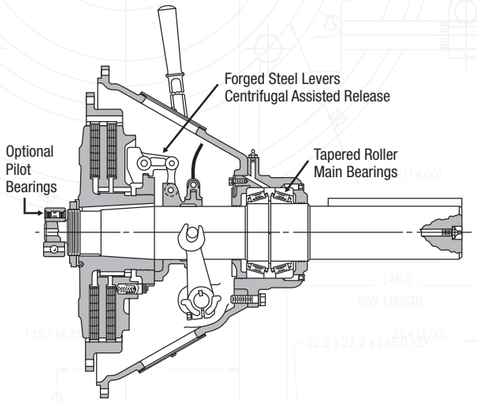
Note: All dimensions given in inches unless noted.

*To avoid overloading the shaft and bearings, use the allowable side-pull load data in this bulletin, and calculate the side load. The resultant value should be less than the corresponding maximum value listed for each power take-off. In questionable cases, consult the Twin Disc Application Department, Twin Disc, Incorporated, Racine, Wisconsin.

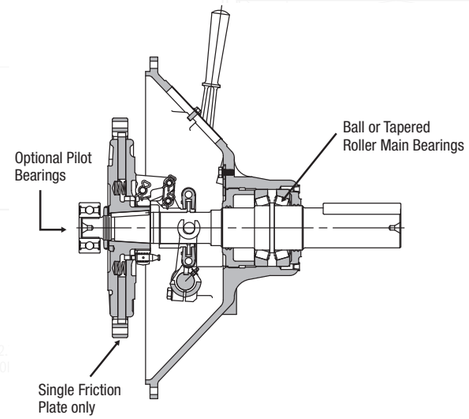
IB TYPE POWER TAKE-OFF



SP TYPE POWER TAKE-OFF



C(X) TYPE POWER TAKE-OFF



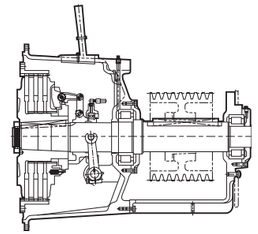
SPECIAL POWER TAKE-OFFS

Special power take-offs are available from Twin Disc. These include the innovative straddle bearing concept and a limited-attendance PTO that contains a positive throw-out collar clearance mechanism and extended lubrication intervals.

For original equipment manufacturers, Twin Disc can design other special power take-offs to meet individual requirements when sufficient volume is indicated. Design variations can range from minor changes to entirely new concepts.

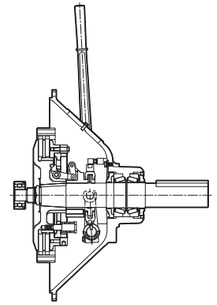
Straddle Bearing Power Take-Offs

- SP & PO Models
- High side-load applications
- No pilot bearing
- 14" & 18" flywheel connection
- SAE #0 & SAE #1 Input Housing
- 180° sheave housing rotatable by 90° increments



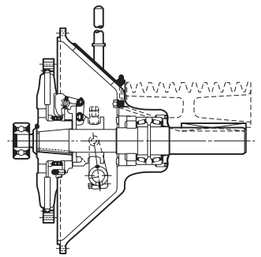
Spring Loaded Power Take-Offs

- SL & TC Models
- Self-adjusting spring-loaded clutch
- Ideal for high frequency engagements
- Single- and double-friction plates
- 11", 13", 14" flywheel connection
- SAE #1 through SAE #4 Input Housing



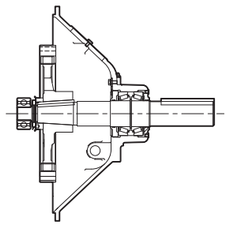
Limited-Attendance Power Take-Offs

- Modified SP & C Models
- Special grease on main bearings
- Sealed pilot bearings
- Lubrication interval can be extended to 6 months
- Positive clearance mechanism to reduce collar wear
- SAE #0 through SAE #6 Input Housing
- 6" through 14" flywheel connection



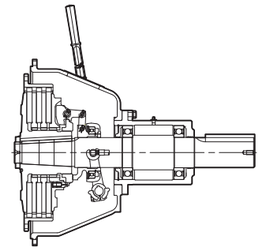
Rubber Block Drive Power Take-Offs

- RBD Models
- Direct drive / Clutchless
- Absorbs torsional activity
- Single row 11" rubber blocks
- Double row 14" rubber blocks
- SAE #0 through SAE #2 Input Housing



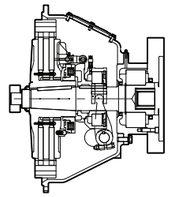
Inline Power Take-Offs

- SP, IB, & CA Models
- Bearings designed for in-line only duty
- Sealed pilot bearings
- Lubrication interval can be extended to 6 months
- SAE #0 & SAE #1 Input Housing
- 180° sheave housing rotatable by 90° increments



Pump Mount Power Take-Offs

- BDP & BDSP Models
- Single SAE pad on output of PTO
- SAE "A" through SAE "D" pads available
- SAE #1 through SAE #4 Input Housing
- 11.5" flywheel connection
- Optional keyed stub shaft input for remote mount applications



HOW TO CHOOSE THE APPROPRIATE PTO

Several factors must be considered in the selection process in addition to duty service, such as:

SPEED LIMITS • SIDE-LOAD LIMITS • CLUTCH TORQUE LIMITS

The selections are usual dry clutch disconnect type applications where engagements are infrequent and are at low (idle) input speed. Once engaged operation continues for one hour or more, engaging the clutch at higher input speed will reduce component life. Refer to the following duty classifications and examples.

Application Data*:

SAE Housing Size
SAE Flywheel Size
Number of Engagements
Sheave Pitch Diameter
Pilot Bearing Diameter
Input Power to Clutch
Input Torque to Clutch
Maximum Output Shaft RPM
Load Center-Line "X" Dimension (side-load applications)

*refer to attached PTO data sheet located in back cover

Determine duty classification (page 5)

PTO Selection Procedure

1. Calculate NET Input Power or Torque to PTO

2. Calculate imposed side-load using the following formula (side-load only):

$$L = \frac{126{,}000 \times HP}{N \times D} \times F \times LF$$

L = Actual Applied Load (lbs)
N = Shaft Speed (rpm)
D = Sheave Pitch Diameter (in)
F – Load Factor
1.0 for Chain / Gear Drive
1.5 for Timing Belts
2.5 for All V Belts
3.5 for Flat Belts

LF = 2.1 for reciprocating compressors and other Severe Shock Drives and 1.8 for Large Inertia Type Drives (crushers, chippers, planers, etc.)

3. Use the PTO rating table on page 6 and the side-load tables on pages 7-8 with the following information:

NET input power or torque to clutch
SAE flywheel size
SAE housing size
maximum PTO output shaft speed
calculated side-load (side-load applications)

Find proper duty class along top row and SAE housing & flywheel size along left-hand column of the rating table on page 6. A PTO that has a power or torque rating greater than the calculated application power or torque rating is suitable for the application. The PTO output shaft speed should be at or under the listed ratings for the drive rings.

Use PTO output shaft speed and calculated side-load and refer to tables on pages 7-8 to verify that the side-load is at or under the load at the given speed.

PTO SIZING EXAMPLE – *Select the proper Twin Disc PTO for this application*

A disconnect PTO is required to drive a rotary screw compressor which is a Duty Class III application. The prime mover is a diesel engine rated for 200 hp @ 2,000 rpm. The engine has a SAE #2 flywheel housing and SAE 11.5" flywheel with a 72 mm pilot bearing bore. The sheave pitch diameter mounted to the PTO shaft will be 13" and "V" belts are used for power transmission. The centerline of the load imposed "X" dimension will be 4". Assume 5% parasitic losses from the engine for this specific application.

1. Determine the NET horsepower to the clutch (assume 5% parasitic losses.)
200 hp gross x 0.95 = 190 hp NET

2. Calculate the imposed side-load utilizing the following formula:

$$L = \frac{126{,}000 \times HP \times F \times LF}{N \times D}$$

L = Actual Applied Load (lbs)
N = Shaft Speed (rpm)
D = Sheave Pitch Diameter (in)
LF = 2.1 for reciprocating compressors and other severe shock drives and 1.8 for large inertia type drives (crushers, chippers, planers...)

F = Load Factor
1.0 for Chain/Gear Drive
1.5 for Timing Belts
2.5 for All V Belts
3.5 for Flat Belts

$$L = \frac{126{,}000 \times 190\ hp}{2{,}000\ rpm \times 13"} \times 2.5 = 2{,}302\ lbs$$

3. Use the following data and compare to the PTO rating and allowable side-load tables:
– 190 hp NET to clutch
– SAE 11.5" flywheel
– SAE #2 housing
– 2,302 lbs of side-load
– 2,000 rpm PTO shaft speed

The SP311P has a Class III rating of 247 hp and max speed rating of 3,000 rpm with nodular iron drive rings. The application requires 190 hp into the clutch @ 2,000 rpm, which are within the limits of the SP311P.

The side-load required for the application is 2,302 lbs at an "X" dimension of 4". The side-load capacity of the SP311P at an "X" dimension of 4" for any rpm is 2,720 lbs. The application side-load of 2,302 lbs @ 4" is within the capacity of the SP311P.

THE SP311P IS ACCEPTABLE FOR THIS APPLICATION AND IS AVAILABLE WITH A 72MM PILOT BEARING.

MODEL NUMBER DESIGNATION

SP 3 11 P 3 XX

BOM Number

SAE Housing – SAE 0, 1, 2, 3, etc.

Output Configuration
P – Standard
SP – Special
SB – Straddle Bearing
HP – Heavy Duty
OP – Oil Lubricated
IL – Inline

Clutch Size – Diameter in inches

Number of Clutch Plates – 1, 2 or 3

Type of Clutch
C – Positive overcenter clutch suitable for power transmission applications
CA – Positive overcenter for inline irrigation applications
IBF – Inverted lever action clutch
SP – Counter balanced toggle action overcenter clutch

SELECTION GUIDE TO DUTY CLASSIFICATION

CLASS I (Disconnect)
1. Pumps – centrifugal
2. Hydraulic pumps (without pre-charge)
3. Feeders – disc type
4. Agitators – pure liquids
5. Irrigation pumps

Duty Class I: The clutch is used for disconnecting the power from the load. When engaging, so little work is done that the clutch shows no temperature increase at the pressure plate outer surface. Use maximum input torque from the Class I Table, disregard horsepower. The mechanism is operated one or more hours before disconnecting.

Examples: Engagement of clutches with the driven equipment having WR2 less than that of the clutch and whose torque demand curve is similar to that of a centrifugal pump.

CLASS II (Light Duty)
1. Cookers – cereal
2. Elevators – bucket, uniformly loaded all types
3. Kettles – brew
4. Line shafts – light duty
5. Machines, general – all types with uniform loads, non-reversing
6. Bow thrusters
7. Generators (non-welding)

Duty Class II: The clutch is used primarily for disconnect, but does more work during engagement than in Duty Class I. The clutch will engage within two seconds, never heat the pressure plate more than 50ºF (28ºC) above ambient, and once engaged is operated for one or more hours before disconnecting. The maximum horsepower which the clutch can absorb is given in Class II Table.

Examples: Power shovel master clutches, generators, line shafts and similar light-duty drives.

CLASS III (Normal Duty)
1. Agitators – solid or semi-solids
2. Batchers – textile
3. Blowers and fans – centrifugal and lobe
4. Bottling machines
5. Compressors – all centrifugal, screw
6. Elevators – bucket, non-uniformly loaded or fed
7. Feeders – apron, belt, screw or vane
8. Filling machines – can-type
9. Mixers – continuous
10. Pumps – two or more cylinders
11. Conveyors – uniformly loaded
12. Dredge pumps (allow for shock loading)
13. Locomotive railroad shuttles

Duty Class III: The clutch will engage within three seconds, never heat the pressure plate more than 100ºF (56ºC) above ambient, and once engaged is operated for one or more hours before disconnecting. The maximum horsepower which the clutch can absorb is given in Class III Table.

Examples: Engine PTO starting average loads, and clutches whose starting load is up to 1.4 times the running load. Blowers, fans, screw compressors, conveyors and similar normal-duty drives.

CLASS IV (Heavy Duty)
1. Cranes and hoists – working clutch
2. Crushers – ore and stone
3. Chippers – wood tub grinders*
4. Drums – barking*
5. Compressors – lobe rotary plus 3 or more cylinder reciprocating type
6. Haulers – car puller and barge-type
7. Machines – impact load types*
8. Mills – ball-type
9. Paper mill machinery – except calendars and driers
10. Presses – brick and clay
11. Mud pumps
12. Road planers

Duty Class IV: The clutch will engage within four seconds, never heat the pressure plate more than 150ºF (83ºC) above ambient, and once engaged is operated for one or more hours before disconnecting. The maximum horsepower which the clutch can absorb is given in Class IV Table.

Examples: Engine PTO starting heavy loads such as rock crushers, mud pumps, and other large inertia machinery and clutches whose starting load is up to 1.8 times the running load typical of heavy-duty drives.

CLASS V (Extreme Heavy Duty)
DUTY CLASS V REQUIRES FACTORY REVIEW
1. Compressors – one and two cylinder reciprocating
2. Calenders and driers – paper mill
3. Mills – hammer-type
4. Shakers – reciprocating-type
5. Automobile shredders

Duty Class V: The clutch is used to start large inertia loads which require four seconds to start the largest load, with the longest slip period per engagement not to exceed ten seconds. The clutch must be selected according to its horsepower absorption capability. Clutch applications in this Duty Class, or those which require frequent engagements, require factory review. Contact General Products Application department for consultation on the drive.

For reciprocal compressors and applications where high torsionals can be experienced, a flexible coupling may be mounted between clutch and flywheel.

*** BEWARE OF OPERATOR MISUSE**

SPECIFICATIONS

PTO Model Number	Drawing Assembly Number	Available Housing Sizes SAE	Application Duty Classification: Class I Maximum Input Torque[2] lb-ft	Application Duty Classification: Clutch Maximum HP Rating (See note 2) Class II	Class III	Class IV	Maximum Safe Operating Speed[1]: Solid Plate Drive Ring	Maximum Safe Operating Speed[1]: Split Plates Drive Ring	Approximate Net Weight lbs
CX-106SP	X8317	6, 5, 4	159	40	27	20	3500	3500	53
CX-107SP	X8317	6, 5, 4	175	54	36	27	3200	3200	55
CX-108SP	X8419A	5, 4, 3	230	61	41	31	3100[5]	3100[5]	72
CX-110HP	X8249	4, 3, 2, 1	328	96	64	48	3930[5]	3500[5]	115
CX-111HP	X8249	4, 3, 2, 1	387	124	82	62	3600[5]	3200[5]	120
SP-111P	X9619	3, 2, 1	455	124	82	62	3600[5]	3200[5]	129
SP-111HP	X9582	3, 2, 1							141
SP-1110P	X9818	3, 2							145
SP-211HP	X9681	3, 2, 1	909	247	165	124	3500[5]	3160[5]	155
SP-2110P	X9894B	2, 1					3000[5]	3000[5]	175
SP-311P	XA7570	2, 3	1620	371	247	186	3000[5]	NA	220
SP-114P	X9643	1, 0	810	188	125	94	3000[5]	2750[5]	260
SP-214P	X9803	1, 0	1620	376	251	188	3000[5]	2750[5]	328
SP-2140P	X9845						2400[5]	2400[5]	340
IB-2140P	X9745E	1, 0	1620	395	264	197	2400[5]	NA	470
IB-2140P	X9745F								
SP-314P	X9585	1, 0	2430	564	376	282	3000[5]	2700	408
SP-314P	X9585A								
IB-3140P	XA7149	1, 0	3040	741[3]	494	371[3]	2400[5]	NR	595
IB-3140P	XA7149A								
IB-3140P	XA7149B								
SP-2180P	XA7190	0, 00	4000	933	415	311	1950	1550	660
SP-2180P	XA7190A								
SP-318P	X9671	0	6000	933	622	467	2350[5]	2100[5]	700
IB-3180P	X9918	0	7500	1224	816[3]	612[3]	2200[5]	NR	920
IB-3180P	X9918A								
IB-3180P	X9918B								
SP-321P	X9691A	00	6730	1270	847	635	1800	1400	1110
IB-3210P	X9919	00	8400	1667[3]	11113	834[3]	2200[5]	NR	1210

NOTES:
1. NA (Not available). NR (Not recommended).
2. Horsepower and torque ratings may be increased by specifying optional sintered iron-type clutch plates. Available 8" through 21" sizes.
3. Sintered iron clutch plates with ventilated-type center plates are standard in IBF-314, IBF-318 and IBF-321 PTO units. These plates should not be used in applications where torsionals or vibrations are prevalent. Consult Twin Disc General Products Application Department, Racine, WI.
4. Compound drives and power-engaged PTO applications require written factory review for warranty to apply.
5. Nodular Iron.

GENERAL INFORMATION NOTES
1. Capscrews to mount PTO and driving ring to prime mover are not Twin Disc supplied.
2. Installation of support plate to PTO housing requires bearing carrier capscrews be properly retorqued to prevent damage. Refer to applicable Care and Operation service manual.
3. Clutch maximum input torque values in specification chart is for properly adjusted clutch assemblies. Refer to applicable Care and Operation service manual.

IMPORTANT NOTICE: Disregarding system torsional compatibility could cause damage to components in the drive train resulting in loss of mobility or power transmission for which the drive is intended. At minimum, system incompatibility could result in unwanted noise and vibration at low speeds.

The responsibility for ensuring that the torsional compatibility of the system is satisfactory rests with the assembler of the drive and driven equipment.

Torsional vibration analysis can be made by the engine builder, independent consultants and others. Twin Disc is prepared to assist in finding solutions to potential torsional problems that relate to the power take-off, pump mount PTO or rubber block drive.

ALLOWABLE SIDE-PULL LOADS FOR STANDARD POWER TAKE-OFFS

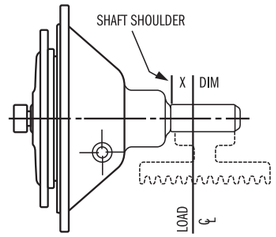
PTO MODEL AND DRAWING NUMBERS	RPM	"X" DISTANCE, INCHES (see sketch)								
		1	2	3	4	5	6	7	8	9
CX-106SP X8317 (M141A)	1000	835	625	475						
	2000	665	595							
	3000	585	525							
CX-107SP X8317 (M141A)	1000	835	625	475						
	2000	665	595							
	3000	585	525							
CX-108SP X8419A (M163A)	1000	1495	1110	885	735	630				
	2000									
	3000									
CX-110HP X8249 (M224A)	1000	2740	2190	1730	1430	1216				
	1500	2420	2190							
	2000	2230	2070							
	2600	2050	1910							
CX-111HP X8249 (M224A)	1000	2740	2190	1730	1430	1216				
	1500	2420	2190							
	2000	2230	2070							
	2600	2050	1910							
SP-111P X9619 (M224A)	1000	3050	2550	2000	1650	1400				
	1200	2900	2550	2000						
	1800	2560	2370	2000						
	2400	2340	2170	2000						
	2800	2235	2070	1925						
SP-111HP X9582 (M224A)	1000	2790	2600	2240	1840	1570				
	1200	2630	2450	2240	1840					
	1800	2330	2170	2030	1840					
	2400	2140	1990	1865	1750					
SP-111OP X9818 (M2467A)	1000	3290	3060	2870	2700	2540	2240			
	1200	3190	2970	2780	2610	2460	2240			
	1800	2810	2620	2450	2300	2170	2050			
	2400	2530	2370	2220	2090	1970	1860			
	3000	2320	2160	2030	1890	1800	1700			
SP-211HP X9681 (M224A)	1000	4540	3395	2710	2255	1930	1690			
	1200	4370	3395							
	1800	3900	3395							
	2400	3550	3330							
	2800	3390	3165							
SP-211OP X9894B (M224A)	1000	4728	3558	2852	2380	2042	1788			
	1200	4728								
	1800	4656								
	2400	4273								
	3000	3993								
SP-211OP X9894B (M2467A)	1000	5454	4104	3292	2747	2357	2063			
	1200	5251	4104							
	1800	4651	4104							
	2400	4268	4001							
	3000	3989	3739							
SP-311P XA7570 (M224A)	1000	4935	3880	3200	2720	2365	2090	1875	1700	
	1800	4935								
	2500	4935								
	3000	4750								
SP-114P X9643 (M1985A)	1000	3390	2600	2120	1780	1535	1350	1210	1090	
	1500									
	2000									
	2200									
SP-214P X9803 (M1985A)	1000	5980	4700	3880	3290	2870	2540	2270	2060	
	1500									
	2000									
	2200									
SP-214OP X9845 (M2529)	1000	7750	6730	5480	4630	4000	3530	3160	2850	2600
	1200	7330	6730	5480						
	1800	6480	6130	5480						
	2400	5950	5650	5350						

The following general formula should be used for determining the actual applied load.

$$L = \frac{126{,}000 \times HP \times F \times LF}{N \times D}$$

WHERE:
L = Actual Applied Load (lbs)
N = Shaft Speed (RPM)
D = Pitch Diameter (in) of Sheave, etc.
F = Load Factor
1.0 for Chain or Gear Drive
1.5 for Timing Belts
2.5 for All V Belts
3.5 for Flat Belts
LF = 2.1 for Reciprocating Compressors and other Severe Shock Drives and 1.8 for Large Inertia Type Drive (crushers, chippers, planers).

Compound drives and power engaged power take-off applications must have written factory review.



$$HP = \frac{(TORQUE)(RPM)}{5252}$$

or $\frac{(Nm)(RPM)}{7121}$

or $\frac{kW}{.746}$

NOTE: Allowable side pull given are for standard PTOs as shown (page 3). Deviations will require adjustment to the allowable side-pull limits.

PTO MODEL AND DRAWING NUMBERS	RPM	"X" DISTANCE, INCHES (see sketch)								
		1	2	3	4	5	6	7	8	9
IB-2140P X9745E (M2137)	1000	8000	7550	7000	5875	5100	4500	4025	3675	3350
	1200	7550	7150	6800	5875	5100				
	1800	6700	6325	6000	5750	5100				
	2400	6150	5800	5500	5250	5025				
IB-2140P X9745F (M1985A)	1000	6590	5160	4250	3600	3130	2760	2470	2250	2050
	1200	6590								
	1800	6590								
	2400	6150								
IB-2140P X9745E (M2713)	1000	8000	7550	7200	6850	6350	5600	4950	4560	4150
	1200	7550	7150	6800	6500	6200	5600		4560	
	1800	6700	6325	6050	5750	5500	5300		4560	
	2400	6125	5800	5500	5250	5050	4850		4475	
IB-2140P X9745F (M2529)	1000	8000	6550	5300	4500	3900	3450	3100	2800	2550
	1200	7550	6550							
	1800	6700	6330							
	2400	6150	5800							
SP-314P X9585 (M1985A)	1000	6170	5120	4200	3570	3100	2740	2460	2220	2035
	1500	5350	5120							
	2000	5025	4750							
	2200	4850	4650							
SP-314P X9585A (M2137)	1000	6170	5850	5580	4720	4110	3630	3260	2945	2690
	1500	5350	5120	4850	4650	4110				
	2000	5025	4750	4450	4250	4110				
	2200	4850	4650	4350	4150	4000				
IB-3140P XA7149 (M2713)	1000	8969	8557	8182	7838	6878	6080	5448	4935	4510
	1200	8494	8104	7748	7423	6878	6080	5448		
	1800	7522	7176	6862	6574	6309	6080	5448		
	2400	6903	6586	6296	6033	5790	5556	5358		
IB-3140P XA7149A (M2529)	1000	8978	8048	6616	5616	4879	4313	3865	3501	3200
	1200	8503	8048	6616						
	1800	7530	7186	6616						
	2400	6911	6595	6307						
IB-3140P XA71498 (M1969A)	1000	6007	4707	3869	3285	2854	2523	2260	2047	1871
	1200									
	1800									
	2400									
SP-2180P XA7190 (M2713)	1000	9099	8701	8336	8000	7407	6539	5854	5298	4839
	1200	8617	8240	7894	7576	7283	6539	5854		
	1800	7631	7297	6991	6709	6450	6210	5854		
	2400	7004	6697	6416	6158	5920	5699	5494		
SP-2180P XA7190 (M2327)	1000	9099	8701	7785	6594	5720	5050	4521	4092	3731
	1200	8617	8240	7785	6594					
	1800	7631	7297	6991	6594					
	2400	7004	6697	6416	6158					
SP-2180P XA7190A (M2977)	1000	9099	8701	8336	8000	7690	7404	6937	6278	5734
	1200	8617	8240	7894	7576	7283	7012	6760	6278	5734
	1800	7631	7297	6991	6709	6450	6210	5987	5779	5585
	2400	7004	6697	6416	6158	5920	5699	5494	5304	5126
SP-318P	1000	8000	7650	7340	7040	6790	6530	6120	5580	5100
	1200	7600	7300	7000	6700	6450	6210	6000	5580	5100
	1800	6620	6350	6080	5840	5620	5400	5220	5030	4850
IB-3180P X9918 (M2977)	1000	16306	15683	13225	11295	9856	8742	7855	7131	6529
	1200	15442	14852	13225						
	1800	13675	13153	12669						
	2000	13253	12747	12278						
	2200	12871	12380	11924						
IB-3180P X9918A (M2713)	1000	16316	13479	11175	9544	8328	7387	6637	6025	5517
	1200	15452	13479							
	1800	13683	13162							
	2000	13261	12756							
	2200	12880	12389							
IB-3180P X99188 (M2529)	1000	12036	9555	7921	6765	5903	5236	4704	4271	3910
	1200									
	1800									
	2000									
	2200									
SP-321P X9691A (M2156)	500	12900	12400	11900	11100	9660	8550	7600	6950	6350
	1000	10250	9820	9450	9100	8750	8450	7600		
	1200	9750	9350	9000	8650	8350	8050	7600		
	1500	9200	8900	8500	8200	8000	7700	7400		
IB-3210P X9919 (M21568)	1000	16295	15670	15092	13635	11898	10554	9482	8608	7882
	1200	15432	14840	14292	13635	11898				
	1800	13666	13142	12657	12206	11786				
	2000	13244	12737	12266	11829	11423				
	2200	12863	12369	11913	11488	11093				

STANDARD POWER TAKE-OFFS

Dimensions of Twin Disc industrial PTOs with drive ring and overcenter clutch conform to the recommendations of SAE J621 (latest revision) unless noted.

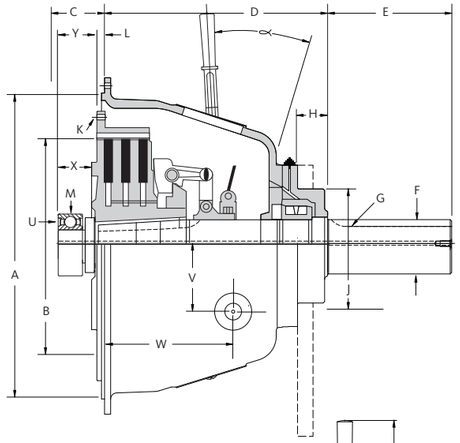
DIMENSIONAL DATA (all dimensions in inches unless noted)										
PTO Model Number	Drawing Assembly Number	D	SHAFT F Diameter +.000 −.001	SHAFT E Length	SHAFT G Keyway	B Clutch Diameter	C (See Footnote 8)	H	J Diameter	M Diameter (in-mm) +.0000 −.0005
CX-106SP	X8317	5.56	1.438	3.50	3/8 x 3/16	6.50	2.81	0.88	4.50	2.0472 - 52
CX-107SP						7.50				
CX-108SP	X8419A	7.06	1.750	6.00	1/2 x 1/4	8.00	3.94	2.34	5.00	2.4409 - 62
CX-110HP	X8249	8.63	2.250	5.50	5/8 x 5/16	10.00	3.94	3.75	5.75	2.8346 - 72
CX-111HP						11.50				
SP-111P	X9619	8.13	2.250	5.50	5/8 x 5/16	11.38	3.94	2.75	5.38	2.8346 - 72
SP-111HP	X9582	9.25		6.50				3.75	5.75	2.8346 - 72
SP-111OP	X9818	9.25		6.50				1.75	5.38	2.8356 - 72
SP-211HP	X9681	9.63	2.500	6.50	5/8 x 5/16	11.38	3.94	3.00	6.50	2.8356 - 72
SP-211OP	X9894B	10.69						2.86	10.75	
SP-311P	XA7570	13.89	3.500	10.00	7/8 x 7/16	11.38	3.94	3.38	7.50	2.8346 - 72
SP-114P	X9643	12.13	3.000	8.50	3/4 x 3/8	14.00	3.94	3.44	6.66	3.1496 - 80
SP-214P	X9803	13.75	3.500	10.00	7/8 x 7/16	14.00	3.94	3.38	7.50	3.1496 - 80
SP-214OP	X9845							0.61		3.1506 - 80
IB-214OP	X9745E	14.75	3.938	10.00	1 x 1/2	14.00	3.94	3.63	12.50	3.9370 - 100
IB-214OP	X9745F									3.1496 - 80
SP-314P	X9585	14.50	3.938	10.00	1 x 1/2	14.00	3.94	3.38	7.50	3.1496 - 80
SP-314P	X9585A									3.9370 - 100
IB-314OP	XA7149	16.77	3.938	10.00	1 x 1/2	14.00	3.94	3.63	12.50	3.93843 - 100
IB-314OP	XA7149A									3.1506 - 80
IB-314OP	XA7149B									2.8346 - 72
SP-218OP	XA7190	17.89	3.938	10.00	1 x 1/2	18.00	3.94	3.63	12.50	3.93843 - 100
SP-218OP	XA7190A									4.72443 - 120
SP-318P	X9671	18.25	4.500	10.00	1 x 1/2	18.00	3.94	2.66	10.00	4.72443 - 120
IB-318OP	X9918	21.20	4.688	10.00	1 1/4 x 5/8	18.00	3.94	3.48	10.50	4.72443 - 120
IB-318OP	X9918A									3.93843 - 100
IB-318OP	X9918B									3.1506 - 80
SP-321P	X9691A	19.88	4.750	10.00	1 1/4 x 5/8	21.00	3.94	2.84	11.00	5.11815 - 130
IB-321OP	X9919	21.20	4.688	10.00	1 1/4 x 5/8	21.00	3.94	3.48	10.50	5.11815 - 130

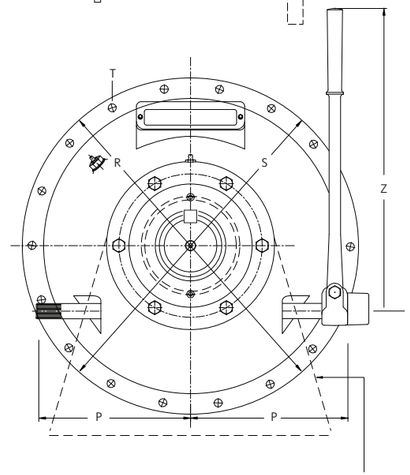
[1] Dimension shown is for No. 4 and No. 6 Housings; 2.63" for No. 5.
[2] Dimension shown is for No. 1, No. 2 and No. 3 housings; 2.16" for No. 4.
[3] +.0000 and -.0006.
[4] Furnished with spherical roller main bearings.
[5] +.0000 and -.0008.
[6] Sealed roller bearing.
[7] 2.13" DIM is non SAE std. For 11.5" OC clutch.
[8] Face of flywheel housing to bottom of pilot bore in flywheel.

HOUSING FLANGES						
SAE Housing No.	A +.000 −.005	R B.C.	S Diameter	T Holes No.	T Holes Dia.	P
6	10.500	11.25	12.13	8	.41	7.75
5	12.375	13.13	14.00	8	.41	7.75
4	14.250	15.00	15.88	12	.41	7.75
3	16.125	16.88	17.75	12	.41	9.75
2	17.625	18.38	19.25	12	.41	9.75
1	20.125	20.88	21.75	12	.47	9.75
1/2	23.000	24.38	25.50	12	.53	9.75
0	25.500	26.75	28.00	16	.53	12.75
00	31.000	33.50	34.75	16	.53	16.75

V	W	X	Y	L	Hand Lever Travel (Degrees)	Z
3.00	2.131	1.31	1.68	1.19	13”	15.38
3.00	1.88	1.18	1.44	2.44	17”	15.38
3.00	2.002	1.50	1.75	2.12	15”	15.38
				2.12		
3.00	3.19	1.73	2.26	1.56	15.50”	15.38
		1.83	2.26			
		1.88	2.31			
3.75	4.06	1.92	2.31	1.56	15.50”	15.38
		1.95				
4.50	6.62	2.32	2.26	1.56	18”	23.38
4.50	5.44	2.44	2.82	1.00	18”	23.38
4.50	6.63	2.38	2.82	1.00	18”	23.38
		2.44	2.82			
4.50	7.66	2.41	2.82	1.00	17.75”	23.38
4.50	7.75	2.44	2.82	1.00	18”	23.38
4.50	9.67	2.53	2.82	1.00	17.75”	23.38
5.50	9.69	2.77	3.20	0.62	20”	30.00
5.50	10.50	2.88	3.20	0.62		30.00
5.50	13.50	2.75	3.20	0.62	20”	42.00
5.50	11.75	3.22	3.82	0.00	20”	42.00
5.50	13.50	3.10	3.82	0.00	20”	42.00

FOOTNOTE 8





SUPPORT PLATE MOUNTING TO FIT 360º PILOT, REF “J.” SEE IMPORTANT NOTICE.

ADAPTER RINGS (SPACELESS)		
Part Number	From SAE Engine Housing	To SAE Clutch Housing
B6320	2	4
6880	1	2
A7210	1/2	1
8407	0	1
6964	00	0

USE A CERTIFIED PRINT FOR INSTALLATION

NOTE: PTO models with **OP** designation have oil-lubricated main bearings.
All other models have grease-lubricated main bearings.

IMPORTANT NOTICE

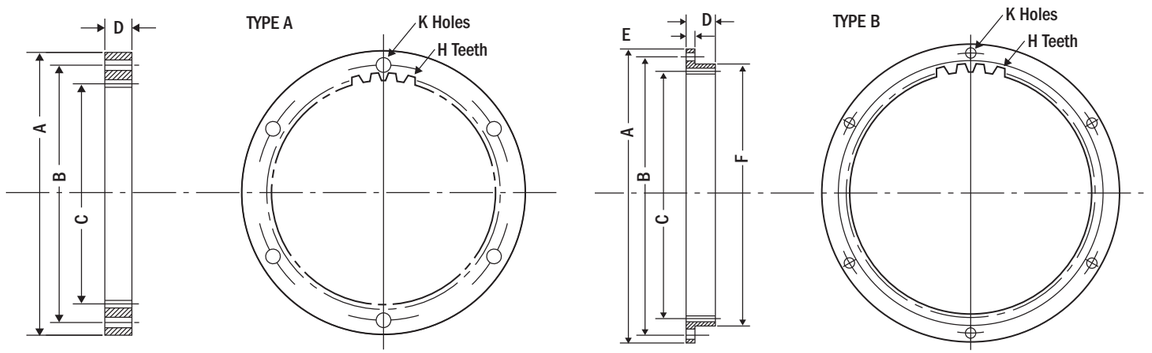
1. A support plate for one-plate 14" and smaller PTOs (except SP-311P) is not required.
2. A support plate for three-plate 11" and two- and three-plate 14" PTOs is required in side-load applications and is recommended for in-line applications.
3. A support plate for 18" and larger PTOs is required for both side-load and in-line applications.

DYNAMICALLY-BALANCED DRIVING RINGS

Dimensions of Twin Disc industrial PTOs with drive ring and overcenter clutch conform to the recommendations of SAE J621 (latest revision) unless noted.

DIMENSIONAL DATA (all dimensions in inches unless noted)													
PTO Model Number	Drawing Number	Driving Ring Drawing Number	Type Ring	A Diameter +.000 -.005	B B.C.	C Nominal Pitch Diameter	D	E	F	K Holes No.	K Holes Size	H Teeth 20° P. A. No.	H Teeth 20° P. A. P.	Approximate Weight lbs
CX-106SP	X8317	6639	A	8.500	7.88	7.00	0.63	—	—	6	0.33	42	6/8	2.8
CX-107SP	X8317	6661	A	9.500	8.75	7.83	0.63	—	—	8	0.33	47	6/8	3.4
CX-108SP	X8419A	5805	A	10.375	9.63	8.50	0.63	—	—	6	0.41	51	6/8	4.3
CX-110HP	X8249	6187A	A	12.375	11.63	10.50	0.88	—	—	8	0.41	63	6/8	7.0
CX-111HP	X8249	6625A	A	13.875	13.13	12.00	0.88	—	—	8	0.41	72	6/8	8.1
SP-111P	X9619													
SP-111HP	X9582													
SP-1110P	X9818	6625D[1]	A	13.875	13.13	12.00	0.88	—	—	8	0.41	72	6/8	8.3
SP-211HP	X9681	6931	A	13.875	13.13	12.00	1.88	—	—	8	0.41	72	6/8	18.1
SP-2110P	X9894B													
SP-311P	XA7570	6625N[1,2]	B	13.875	13.13	12.00	3.13	—	—	8	0.41	72	6/8	29.5
SP-114P	X9643	5712	B	18.375	17.25	14.75	1.13	0.50	16.00	8	0.53	59	4/5	16.5
SP-214P	X9803	5713	B	18.375	17.25	14.75	2.38	0.50	16.00	8	0.53	59	4/5	25.8
SP-2140P	X9845													
IB-2140P	X9745E	A6518C[1]	B	18.375	17.25	14.75	3.38	0.50	16.13	8	0.53	59	4/5	31.3
IB-2140P	X99745F													
SP-314P	X9585	A6518	B	18.375	17.25	14.75	3.38	0.50	16.00	8	0.53	59	4/5	32.6
SP-314P	X9585A													
IB-3140P	XA7149	B5835[1]	B	18.375	17.25	14.75	5.38	0.50	16.13	8	0.53	59	4/5	44.3
IB-3140P	XA7149A													
IB-3140P	XA7149B													
SP-2180P	XA7190	6925	B	22.500	21.38	18.75	3.06	0.63	20.00	6	0.66	75	4/5	42.2
SP-2180P	XA7190A													
SP-318P	X9671	6926A	B	22.500	21.38	18.75	4.25	0.63	20.13	6	0.66	75	4/5	56.8
IB-3180P	X9918	B5352[1]	B	22.500	21.38	18.75	5.75	0.63	20.13	6	0.66	75	4/5	61.0
IB-3180P	X9918A													
IB-3180P	X9918B													
SP-321P	X9691A	6875	B	26.500	25.25	21.75	5.00	0.63	23.38	12	0.66	87	4/5	89.3
IB-3210P	X9919	9917[1]	B	26.500	25.25	21.75	5.95	0.63	23.38	12	0.66	87	4/5	95.5

[1] Nodular Iron Driving Ring
[2] SAE Grade 8 Attachment Capscrews Required



USE A CERTIFIED PRINT FOR INSTALLATION

Correct and proper installation is very important. Procedures are described in Care and Operation Manuals and Tech Talk Service Letters 71-1, 71-2, 73-2 and 77-5. Copies are available upon request.

PTO APPLICATION DATA SHEET

PLEASE RETURN TO:
Twin Disc, Incorporated
Industrial Applications
Phone: +1 (262) 638-4000
Fax: +1 (262) 638-4482
Email: applications@twindisc.com

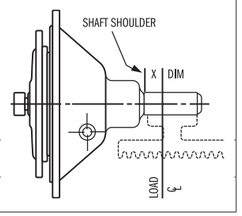
Date: _____
Company: _____
Contact Name: _____
City: _____
State: _____ Country: _____
Phone: _____
Email: _____

TYPE AND MODEL OF MACHINE	SKETCH OF INSTALLATION

PRIME MOVER						
Manufacturer:			Model:			
Rated HP:	@	RPM	SAE Flywheel Size:			
Max. Intermittent HP:	@	RPM	SAE Flywheel Housing Size:			
Peak Torque LB FT:	@	RPM	Flywheel Pilot Bearing:	MM	IN	
Notes:						

DESCRIPTION
Description or Duty Class Cycle:
Duty Classification:

PRIME MOVER				
Side Load "X" Dimension				
Belt Type:	☐ Chain	☐ Timing	☐ "V"	☐ Flat
Sheave Diameter:	MM		IN	



APPLICATION DETAILS				
Net Input HP to Clutch:	HP @	RPM	How is Clutch Actuated?	
Maximum Torque to Clutch:		LB FT	Maximum Engagements:	per (min) (hour) (day)
WR^2 of Driven Machinery:		$LB\ FT^2$	BTU Input to Clutch:	
Maximum Safe RPM Published by Twin Disc for Unit Recommended:		RPM	Maximum Input RPM Expected This Installation:	RPM
Back Drive Possible This Installation?			Maximum RPM	

OTHER INFORMATION

MORE PRODUCTIVITY. MORE RELIABILITY. AND A WORLD OF PRODUCT SUPPORT.

Twin Disc has the best ways to transform power into productivity. Our wide range of power transmission products and nearly a century of applications make OEM "engineering in" or aftermarket replacement easy and economical. Plus, all Twin Disc products offer renowned reliability, low operating costs and a global support network of distributors and service dealers. For more information, visit twindisc.com/productsupport. For assistance regarding a specific application, please contact sales@twindisc.com.

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WE PUT HORSEPOWER TO WORK®

HYDRAULIC & MECHANICAL PTOS | GEAR BOXES | CLUTCHES | PUMP DRIVES | TORQUE CONVERTERS | TRANSMISSIONS

NOTES