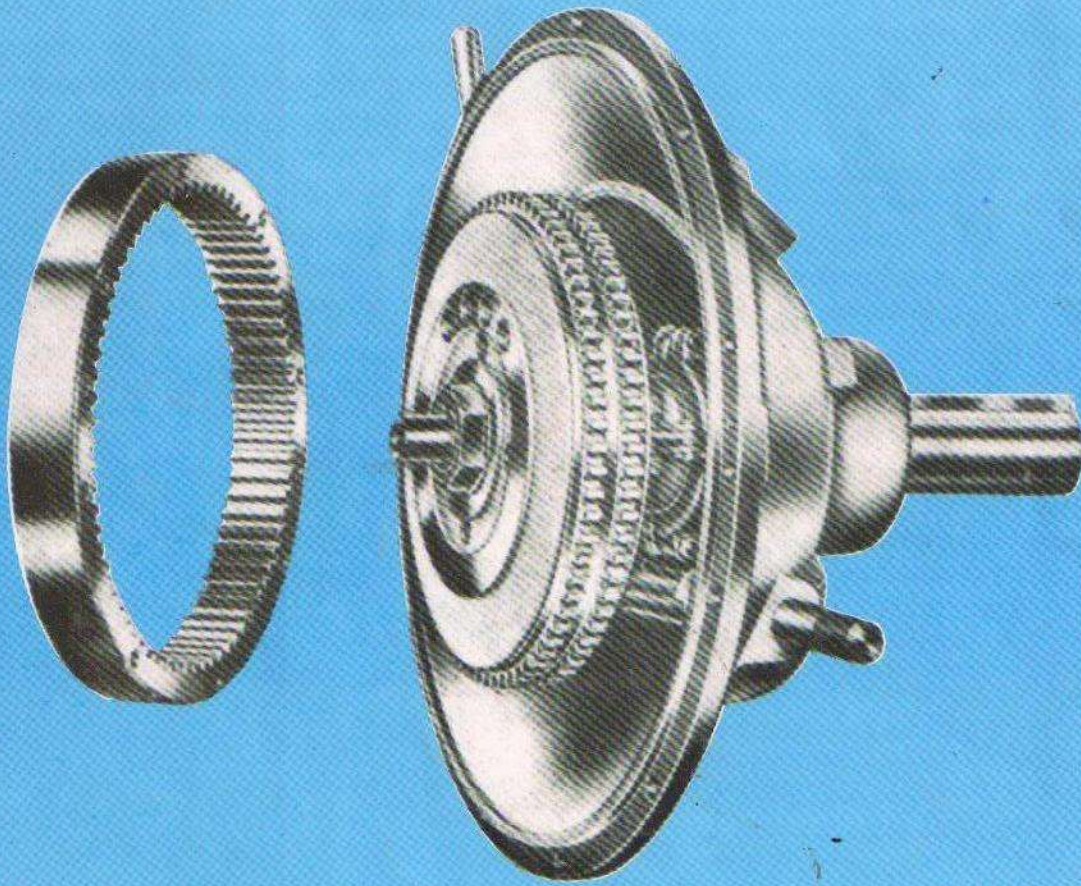




GHATGE PATIL POWER TAKE-OFFS



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STANDARD POWER TAKE-OFFS

for internal combustion engine light duty application up to 740 hp

The Power Take-Off is a device which is used between the prime-mover and the driven unit. It acts as a coupling with a disconnect arrangement, which is necessary for the following reasons :

- For the starting of the prime-mover without load
- For connecting load to the prime-mover, as and when required, without stopping the same
- To facilitate the running of one or both units simultaneously

There are a variety of industrial applications which involve a high start-up inertia. In these cases, Power Take-Offs are used to separate the diesel engine from the driven unit. When the engine attains full-operating speed, the driven unit is connected to the diesel engine through the Power Take-Offs.

Construction

A GHATGE-PATIL POWER TAKE-OFF is essentially a clutch coupling, mounted on a shaft and contained in a cast iron housing with bearings. This feature makes it highly suitable for direct mounting on diesel engines (I. C. engines). The Clutch unit is a dry friction disc type, single plate to three plate construction. The plate sizes vary from 4 1/2" to 18" in diameter.

The clutch plates are of the gear-tooth type and remain in a constant mesh with the driving ring. For convenience at the time of replacement, the friction plate is split up into 3 segments in some models. However, solid friction plates are used in applications which involve high-operating speeds. The different Power Take-Offs are available in different SAE housings depending on the clutch size.

Installation

The Power Take-Off is normally mounted on the flywheel end of the diesel engine. In this case the driving ring is fixed to the flywheel. The cast iron housing of the Power Take-Off is mounted on the engine bell housing and the pilot end of the shaft is supported in the pilot bearing. The pilot bearing is housed either directly in the flywheel or in a separate housing which is fitted into the flywheel. Sometimes, in order to adapt standard Power Take-Offs to certain engines, an adaptor ring for the flywheel or the bell housing may be necessary.

Selection

For selection of Power Take-Offs the following minimum data should be considered :

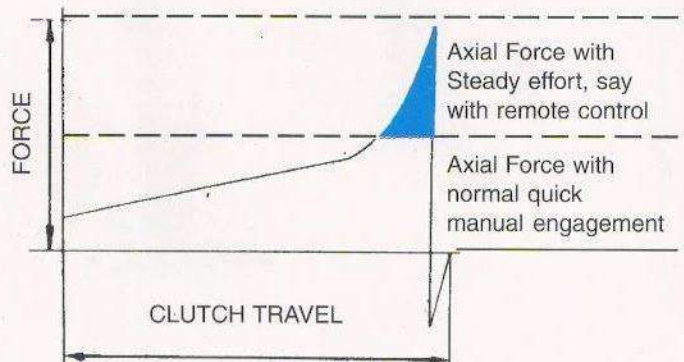
- Engine ratings
- Engine bell housing SAE number
- Duty service classification of the driven unit
- Type of drive between the Power Take-Off and the driven unit.
- Frequency of engagement
- Usage of the remote lever mechanism for the operation of the clutch.

Other Features

- Engagement Force

The force required on hand lever provided with the Power Take Off, for engaging the Clutch, is given in the 'Specifications Chart' on Page 4. This is an approximate figure and should be used as a guide-line only, since the engaging force depends upon the degree of adjustment, amount of vibration present and degree of lubrication at pins, levers, etc. Though the clutch can be engaged with normal effort, the amount of force may seem to be high.

This phenomenon is explained by referring the graph below which illustrates the force that is exerted at any one point over the length of the clutch travel.



It will be noted that the actual force figured above is not the maximum force for all the time. The additional force above the normal efforts is so small (illustrated by shaded area) that it can result in quick engagement with the inertia force of the operator. As the engagement operation continues, the operator automatically leans over the lever releasing enough force to effect easy engagement.

When other mechanical linkages are used, the force required for engagement is atleast twice the force listed in this catalogue. The reason mainly being, these linkages do not have sufficient in built force to provide maximum force required in engagement and usually have considerable losses due to friction.

● Side Pull Load

For installations in which drive from the Power Take-Off Shaft to the driven unit is taken through a pulley or a sprocket / gearwheel, care should be taken to limit the side pull load exerted on the shaft. Excessive side pull loads will cause a premature failure of the pilot bearing and other consequential breakdown. Hence, refer to the permissible side pull load

values tabulated in this bulletin. For the actual applied load, an empirical formula is also given. In order to limit the side pull load the only variable factors are pulley pitch diameter and 'X' distance i. e. between the centre line of the pulley and the Power Take-Off housing end. Care should be taken to choose these parameters in such a manner so that the actual applied load is within the specified limits of the side pull load.

LIGHT DUTY

LIGHT DUTY : The clutch is used primarily to disconnect and pick-up of light inertia loads, but does more work during engagements than 'cut-off' duty.

The clutch should engage within two (2) seconds, starts the load less than six (6) times per hour and never heat the pressure plate outer surface above hand holding temperature.

The clutch must be selected according to its horse-power absorption capability.

AGITATORS, pure liquid

BLOWERS, centrifugal, vane

CONVEYORS, uniformly loaded or fed, all types except reciprocating and vibrating.

GENERATORS

ELEVATORS, BUCKET, uniformly loaded or fed, all types.

FEEDERS, disc type.

PUMPS, centrifugal.

SCREENS, rotary, uniformly fed.

MACHINES, of all types with uniform loads non reversing.

NORMAL DUTY

NORMAL DUTY : The clutch is used to start inertia loads with frequencies upto thirty (30) engagements per hour. Even more important is that the clutch can start the heaviest inertia load within three (3) seconds, and that the product of seconds of clutch slip per engagement and the number of engagements per hour be under ninety (90).

The Normal Duty application may raise the outer clutch surface temperature to under 100° F above the ambient air temperature.

The clutch must be selected according to its horse-power absorption capability.

FEEDERS, (under bins, hoppers etc.) apron, belt, screw rotary vane.

HOISTS

KILNS, DRYERS, rotary.

MILLS, balls pebble tube

PUMPS, reciprocating (3 or more cylinders)

MACHINES, of all types with moderate pulsating load, non reversing.

AGITATORS, (solids or semi solids)

COMPRESSORS, centrifugal reciprocating (3 or more cylinders)

CONVEYORS, not uniformly loaded or fed, all types except reciprocating and vibrating

ELEVATORS, BUCKET, not uniformly loaded or fed.

HEAVY DUTY

HEAVY DUTY : The clutch is used to start inertia loads with frequencies upto sixty (60) engagements per hour. Even more important is that the clutch can start the heaviest inertia load within four (4) seconds, and that the product of seconds of clutch slip per engagement and the number of engagements per hour be under one hundred & eighty (180).

Heavy Duty application may raise the clutch outer surface temperature to under 150° F above the ambient air temperature.

The clutch must be selected according to its horse-power absorption capability.

FEEDERS, reciprocating

MILLS, hammer, rolling

PAPER MACHINERY, -

MACHINES, of all types with severe impact loads or speed vibration and reversing type.

COMPRESSORS, reciprocating (single or 2 cylinders)

CONVEYORS, reciprocating and vibrating (natural frequency)

CRUSHERS

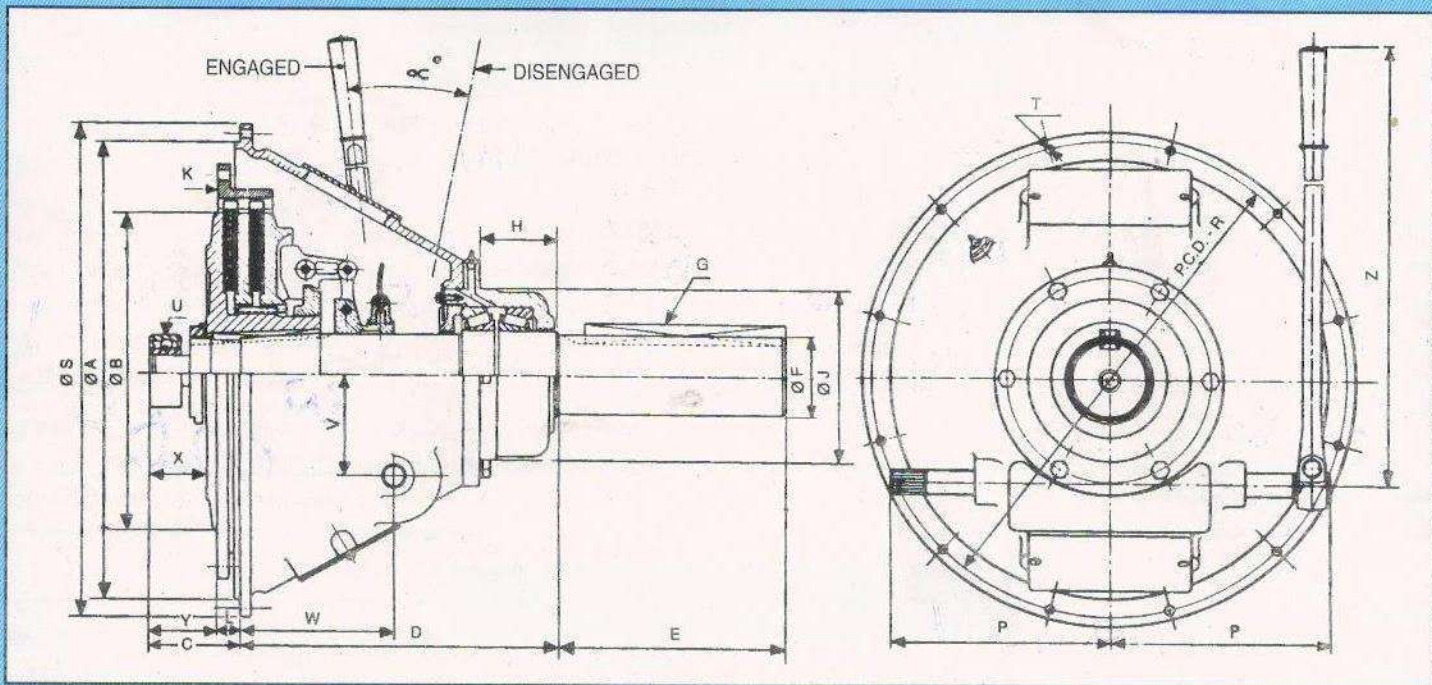
EXTRA HEAVY DUTY : The clutch is used to start inertia loads requiring over four (4) seconds to start the heaviest load with longest slip period engagement not exceeding ten (10) seconds. Also, when the product of seconds of clutch slip per engagement and the number of engagements per hour exceeds 180, it is extra heavy duty.

The clutch must be selected according to its horse-power absorption capability. For this type of service "Product Engineering Department" must be consulted.

SPECIFICATIONS

PTO Model	Drawing Number	Available SAE Housing Number	Clutch Dia. ins/mm	No. of Clutch Plates	Max. Torque Recommended lb - ft/kg	Force on op. lever to engage Clutch lb/kg	Max. engine H.P. / M.H.P. Recommended			Max. safe operating speed (RPM)		Approx. Net Weight lb / kg
							Light duty	Normal duty	Heavy duty	Solid Plate	Split Plate	
GP-1060 CP	GP 83170	3, 4, 5, 6	6 1/2 165.10	1	119 16.48	73 33	36 36.50	28 28.39	20 20.28	3500	2850	53 24.00
GP-1070 CP	GP 83170	3, 4, 5, 6	7 1/2 190.50	1	131 18.14	73 33	48 48.67	38 38.53	26 26.36	3200	3000	55 24.92
GP-1080 CP	GP 84190 A	3, 4, 5	8 203.20	1	172 23.82	80 36	55 55.77	43 43.60	30 30.42	3100	2550	72 32.62
GP-1100 CP	GP 82490	1, 2, 3, 4	10 254.0	1	246 34.16	98 44	86 87.20	67 67.94	47 47.66	2675	2100	115 52.10
GP-1110 SP	GP 95820	1, 2, 3	11 3/8 288.9	1	341 47.22	120 54	111 112.55	87 88.22	61 61.85	2325	1800	141 63.88
GP-2110 SP	GP 96810	1, 2	11 3/8 288.9	2	682 94.45	120 54	203 205.84	129 130.80	80 81.12	2325	1800	155 70.23
GP-1440 SP	GP 96430	0, 1	14 355.6	1	810 112.18	150 68	169 171.37	131 132.83	92 93.29	2400	1950	260 117.80
GP-2140 SP	GP 98030	0, 1	14 355.6	2	1620 223.97	150 68	308 312.51	196 198.74	122 123.71	2500	1900	328 148.61
GP-3140 SP	GP 95850	0, 1	14 355.6	3	2430 336.56	150 68	447 453.26	261 264.65	151 153.11	2500	1800	408 184.86

INSTALLATION DETAILS



Model Number	Drawing Number	Housing Length D	Shaft			Clutch dia. B	C	H	J	Pilot Bearing U		type	V	W	X	Y	L	Hand Lever Travel	Z	Driving Ring Number K
			Dia. F +0.000 -0.001 +0.000 -0.025	Length E	Keyway G					±0.000 +0.0005 +0.0005 -0.0125	Width									
GP-1060 CP	GP 83170	5 9/16	1 7/16	3 1/2	3/8 x 3/16	6 1/2	2 13/16	7/8	4 1/2	2.0472	0.5856	205 SF	3	2 1/8	1 5/16	1 5/8	1 3/16	13°	15 3/8	6939
		141.30	36.50	88.9	9.52 x 4.76	165.1	71.44	22.22	114.3	51.99	14.87									
GP-1070 CP	GP 83170 A	5 9/16	1 7/16	3 1/2	3/8 x 3/16	7 1/2	2 13/16	7/8	4 1/2	2.0472	0.5856	205 SF	3	2 1/8	1 5/16	1 5/8	1 3/16	13°	15 3/8	6661
		141.30	36.50	88.9	9.52 x 4.76	190.5	71.44	22.22	114.3	51.99	14.87									
GP-1080 CP	GP 84190	7 1/8	1 3/4	6	1/2 x 1/4	8	3 15/16	2 11/31	5	2.4409	0.6643	305 SF	3	1 7/8	1 1/4	1 1/2	2 7/16	17°	15 3/8	5805
		179.40	44.45	152.40	12.7 x 6.35	203.20	100.0	59.53	127.0	61.99	18.87									
GP-1100 CP	GP 82490	8 5/8	2 1/4	5 1/2	5/8 x 5/16	10	3 15/16	3 3/4	5 3/4	2.8346	1.1825	306 SFFC	3	2	1 9/16	1 13/16	2 1/8	15°	15 3/8	6187 A
		219.07	57.15	139.70	5.87 x 7.94	254.0	100.0	95.25	146.05	71.99	30.03									
GP-1100 SP	GP 95820	9 1/4	2 1/4	6 1/2	5/8 x 5/16	11 3/8	3 15/16	3 3/4	5 3/4	2.8346	1.1825	306 SFFC	3	3 3/16	1 15/16	2 3/8	1 9/16	15 1/2°	15 3/8	6825 A
		234.95	57.15	165.10	5.87 x 7.94	288.92	100.0	95.25	146.05	71.99	30.03									
GP-2110 SP	GP 96810	9 5/8	2 1/2	6 1/2	5/8 x 5/16	11 3/8	3 15/16	3	6 1/2	2.8346	1.1825	306 SFFC	3 3/4	4 1/16	2	2 3/8	1 9/16	15 1/2°	15 3/8	6931
		244.47	63.50	165.10	5.87 x 7.94	288.92	100.0	76.20	165.10	71.99	30.03									
GP-1140 SP	GP 96430	12 1/8	3	8 1/2	3/4 x 3/8	14	3 15/16	3 7/16	6 21/32	3.1496	1.370	307 SFFC	4 1/2	5 7/16	2 9/16	2 15/16	1	18°	23 3/8	5712
		307.97	76.20	215.90	9.05 x 9.52	355.6	100.0	87.31	190.50	79.99	34.80									
GP-2140 SP	GP 98030	13 3/4	3 1/2	10	7/8 x 7/16	14	3 15/16	3 3/8	7 1/2	3.1496	1.370	307 SFFC	4 1/2	6 5/8	2 7/16	2 15/16	1	18°	23 3/8	5712
		349.25	88.90	254.00	22.22 x 11.11	355.6	100.0	87.31	189.50	79.99	34.80									
GP-3140 SP	GP 95850	14 1/2	3 15/16	10	1 x 1/2	14	3 15/16	3 3/8	7 1/2	3.1496	1.370	307 SFFC	4 1/2	7 3/4	2 1/2	2 15/16	1	18°	23 3/8	A 6518
		368.30	100.00	254.00	25.4 x 12.7	355.6	100.0	35.72	190.50	79.99	34.80									

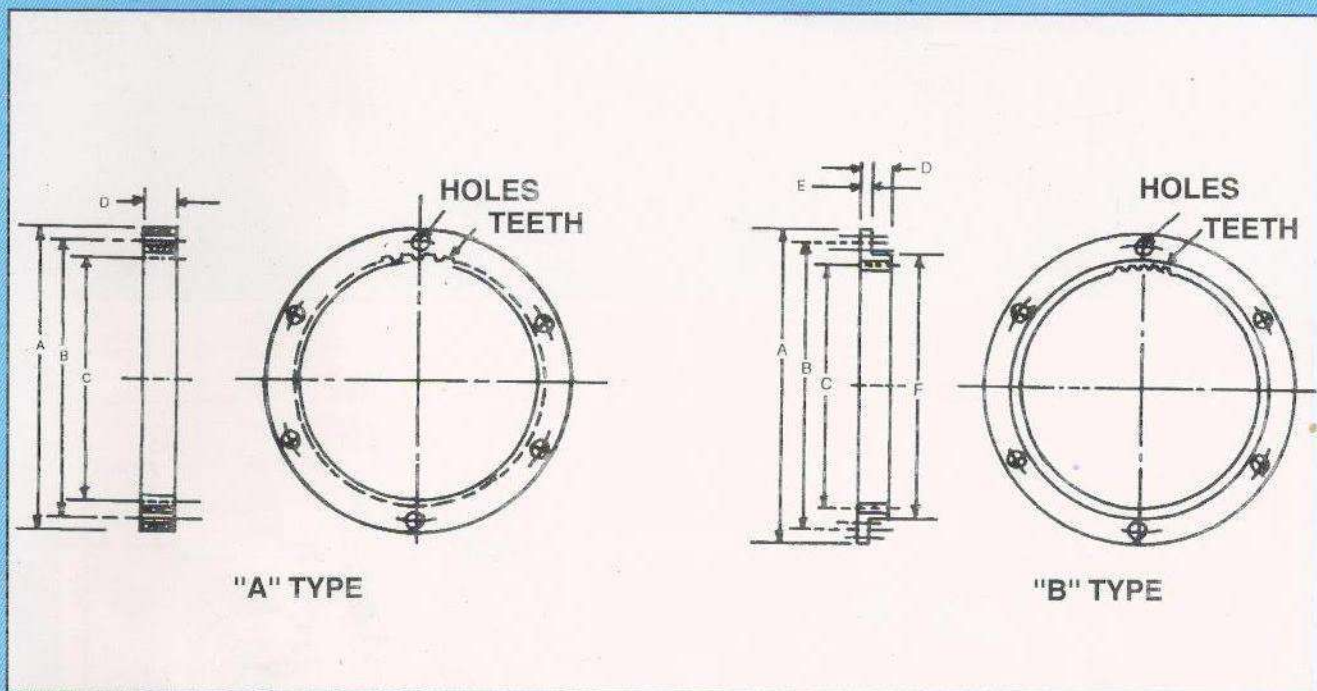
HOUSING MOUNTING DETAILS

SAE Housing Number	A	R	S	T		P
				No.	Dia.	
6	10 1/2 266.7	11 1/4 285.7	12 1/8 307.9	8	13/32 10.3	7 3/4 196.8
5	12 3/8 314.3	13 1/8 333.3	14 355.6	8	13/32 10.3	7 3/4 196.8
4	14 1/4 361.9	15 381	15 7/8 403.2	12	13/32 10.3	7 3/4 196.8
3	16 1/8 409.5	16 7/8 428.6	17 3/4 450.8	12	13/32 10.3	9 3/4 247.6

SAE Housing Number	A	R	S	T		P
				No.	Dia.	
2	17 5/8 447.6	18 3/8 466.7	19 1/4 488.9	12	13/32 10.3	9 3/4 247.6
1	20 1/8 511.2	20 7/8 530.2	21 3/4 552.4	12	15/32 11.9	9 3/4 247.6
0	25 1/2 647.7	26 3/4 679.4	28 711.2	16	17/32 13.5	12 3/4 323.8
00	31 787.4	33 1/2 850.9	34 3/4 882.6	16	17/32 13.5	12 3/4 323.8

ADAPTER RINGS

Part Number	From SAE Engine Housing	To SAE PTO Housing
6680	1	2
8407	0	1
6954	00	0

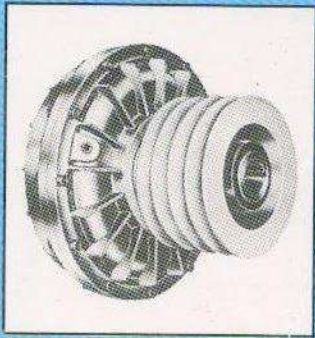


DRIVING RING DETAILS

PTO Model Number	PTO Drawing Number	Driving Ring Number	Driving Ring Type	A +0.000 +0.005 +0.000 +0.125	B	C Normal	D	E	F	Holes		Teeth 20° PA		Approx. Weight lb / kg
										No.	Size	No.	P	
GP-1060 CP	GP 83170	69390	A	8 1/2 215.9	7 7/8 200.0	7 177.8	5/8 15.8	-	-	6	21/64 8.33	42	6/8	2 3/4 1.25
GP-1070 CP	GP 83170	66610	A	9 1/2 241.3	8 3/4 225.4	7 13/16 198.4	5/8 15.8	-	-	8	21/64 8.33	47	6/8	3 3/8 1.53
GP-1080 CP	GP 83170 A	58050	A	10 3/8 263.5	9 5/8 244.5	8 1/2 215.9	5/8 15.8	-	-	6	13/32 10.3	51	6/8	4 1/4 1.93
GP-1100 CP	GP 82490	61870 A	A	12 3/8 314.3	11 5/8 295.3	10 1/2 266.7	7/8 22.2	-	-	8	13/32 10.3	63	6/8	7 3.17
GP-1110 SP	GP 95820	66250 A	A	13 7/8 352.4	13 1/8 333.4	12 304.8	7/8 22.2	-	-	8	13/32 10.3	72	6/8	8 3.62
GP-2110 SP	GP 96810	69310	A	13 7/8 352.4	13 1/8 333.4	12 304.8	1 7/8 47.6	-	-	8	13/32 10.3	72	6/8	18 8.16
GP-1140 SP	GP 96430	57120	B	18 3/8 466.7	17 1/4 438.1	14 3/4 374.6	1 1/8 28.6	1/2 12.7	16 406.4	8	17/32 13.5	59	4/5	16 1/2 7.48
GP-2140 SP	GP 99030	57130	B	18 3/8 466.7	17 1/4 438.1	14 3/4 374.6	2 3/8 60.33	1/2 12.7	16 406.4	8	17/32 13.5	59	4/5	25 3/4 11.67
GP-3140 SP	GP 95850	A 65190	B	18 3/8 466.7	17 1/4 438.1	14 3/4 374.6	3 3/8 85.73	1/2 12.7	16 406.4	8	17/32 13.5	59	4/5	32 5/8 14.78
GP-3140 SP	GP 96710	69260 A	B	22 1/2 571.50	21 3/4 552.45	18 3/4 476.25	4 1/4 107.95	5/8 15.87	20 1/8 511.17	6	21/32 17.46	75	4/5	37 16.76

Note - Figures in colour are in mm.

We also manufacture



Fluid Couplings

Different models from 0.25 hp to 400 hp. Available for in-line transmission; for use with 'V' -Belt drives; and for all applications in Textile, Industrial, Mining Equipments etc.



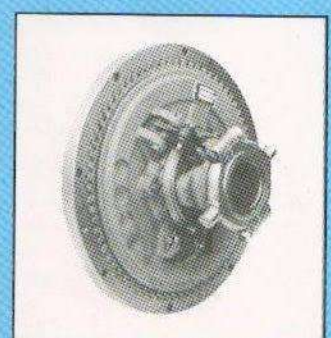
Electromagnetic Clutches & Brakes

Available in different sizes as Clutch and / or Brake. They can be used on Machine Tools, Textile Machines and other Industrial Equipments.



Automotive Power Take - Offs

Various models available for jeeps and commercial Vehicles. They can be used for auxillary drives in side - mounted and split - shaft versions. Applications : auxillary pumps, generators, winches, dumpers and fire engines.



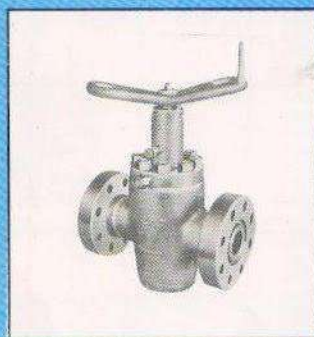
Mechanical Clutches

25 models from 6 hp to 740 hp available in single, two or three plate constructions. Higher hp Clutches also available if a considerable quantity is ordered. Duplex Clutch arrangements also available in most models.



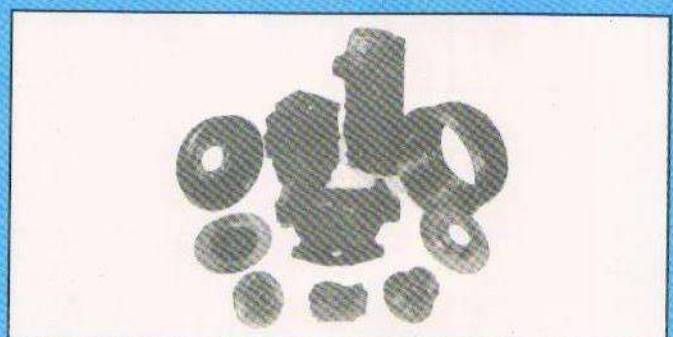
Marine Gear Boxes

Available in three models from 45 hp to 140 hp with 2:1, 3:1 & 4:1 reductions. Typical Applications for Fishing Trawlers, Cargo Vessels, Passenger & Ferry Launches.



Industrial Gate Valves :

API-6A approved product. Available in two sizes 2.1/16" & 2.9/16" in both Flanged & Screwed end version for 3000 / 5000 PSI cold working pressure. In Line serviceability due to Top entry desing. Zero leakage due to mechanically energised sealing mechanism. Applications - Christmas trees in Oil fields.



Castings :

High Precision Thin Walled Grey Iron and S. G. Iron castings manufactured on Automatic High Pressure Moulding Line with a Synchronised sand plant. S. G. Iron castings are produced by the patented George-Fischer process of Switzerland.

Product Range includes Brake Drums, Transmission Cases, Cylinder Blocks, Cylinder Heads, Flywheel Housings, Wheel Hubs, Rear Axle Housings, Differential Cases and are supplied to leading O. E. manufacturers of Trucks, Tractors, Cars etc.