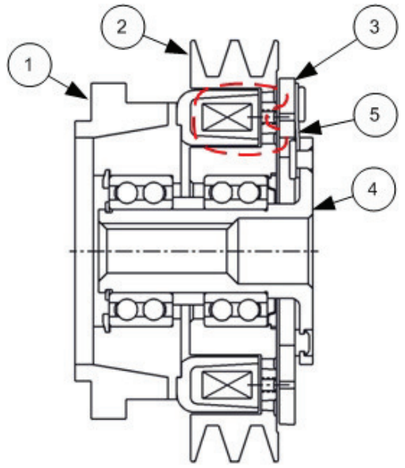
ENGINEERING APPLICATION INFORMATION

LEAF-SPRING RELEASE: Pitts' electric clutches utilize a bi-directional flat spring design to assure perfect, friction-free alignment between the disengaged pulley (rotor) assembly and the armature disc. With such leaf springs, dirt, rust or wear particles cannot bind or affect positive engagement. Disengagement of the clutch is assured without drag.

CLUTCH OPERATION: The stationary field coil (1) is mounted on the frame of the driven unit, concentric with the straight shaft. The pulley, or rotor assembly, is bearing-mounted on the driven shaft. It consists of a pulley or a rotor (2), a disc (3), and a hub (4). The disc and hub are flexibly connected by flat springs (5). The springs prevent contact between the disc and the pulley (rotor) assembly when disengaged.



When electric current flows through the coil a magnetic field is created. The lines of magnetic force bridge the air gap between the stationary field and the rotating pulley (shown by dashed-lines). Continuing dashed-lines show the magnetic path which crosses back and forth between the pulley web and the disc. The "lines of force" at four poles strongly attract the disc against the pulley web, creating a frictional driving torque. This brings the disc and hub in to rotation with the pulley to drive the unit.

BURNISHING: Clutches may need a short burnishing period to generate the rated torque. This is a process of cycling the clutch to slightly wear the friction surfaces. This allows full contact and maximum magnetic attraction required for rated torque (or more). To avoid burning or heat distortion, the following is recommended:

Install clutch and run at 1000 to 1200 RPM. Cycle on/off at the rate of 5 sec. on – 5 sec. off for a total of 25 cycles.

WATTAGE: Each clutch, within its model size, will have approximately the same wattage dissipation, regardless of voltage rating. The following relationships may be used to determine electrical values:

Wattage = Voltage x Amperage

Voltage = Amperage x Resistance

RESISTANCE: Note that electrical resistance builds up when temperature rises. A 40º F rise in the ambient (air) temperature will increase resistance approximately 9%. Tests or applications in high temperature areas may induce clutch torque or engagement problems unless such conditions are considered.

HORSEPOWER TO DRIVE A PUMP

The standard formula for calculating hydraulic (fluid power) horsepower is **HP = PSI x GPM / 1714.** Most positive displacement hydraulic pumps have an efficiency range of 80% to 90%. Figures, in the body of the table below, show the horsepower needed to drive a hydraulic pump having an efficiency of 85%. Therefore, this table is accurate to within 5% of nearly any hydraulic pump. The table below was calculated using this formula:

HP = PSI x GPM / 1456.9 (1714 X 85% efficiency = 1456.9). For pumps, with other than 85% efficiency, this formula can be used by substituting actual efficiency in place of .85.

USING THIS TABLE – The range of 500 to 5000 PSI covers most hydraulic systems, but power requirements can be determined for conditions outside the table, or for intermediate values, by combining values in the table. For example, power at 4000 PSI will be exactly twice the figures shown for 2000 PSI. At 77 GPM, power will be the sum of the figures shown in the 75 and 2 GPM lines, etc.

For systems of less than 500 PSI, horsepower calculations tend to become inaccurate because mechanical friction losses reduce pump efficiency.

RULES-OF-THUMB – Approximate power requirements can be figured with simple mental arithmetic with this rule-of-thumb.

1 HP is required for each 1 GPM @ 1500 PSI

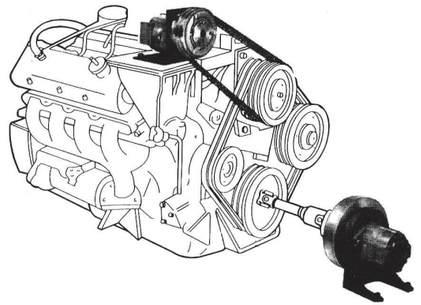
For example, a 5 GPM pump operating at 150 PSI would need 5 HP, or at 3000 would need 10 HP. A 10 GPM pump at 1000 PSI would need 6-2/3 HP, or the same pump operating at 1500 PSI would need 10 HP, etc.

Another rule-of-thumb states that about 5% of the pump maximum rated horsepower is required to idle that pump when it is "unloaded" and the oil is circulating at zero PSI. This amount of power is consumed in flow losses plus mechanical friction losses in bearings and pumping elements.

Figures in table are HP's required to drive a hydraulic pump.

GPM	500 PSI	750 PSI	1000 PSI	1250 PSI	1500 PSI	1750 PSI	2000 PSI	2500 PSI	3000 PSI	5000 PSI
1/2	.172	.257	.343	.429	.515	.600	.686	.858	1.03	1.72
1	.343	.515	.686	.858	1.03	1.20	1.37	1.72	2.06	3.43
1½	.515	.772	1.03	1.29	1.54	1.80	2.06	2.57	3.09	5.15
2	.686	1.03	1.37	1.72	2.06	2.40	2.75	3.43	4.12	6.86
2½	.858	1.29	1.72	2.14	2.57	3.00	3.43	4.29	5.15	8.58
3	1.03	1.54	2.06	2.57	3.09	3.60	4.12	5.15	6.18	10.3
3½	1.20	1.80	2.40	3.00	3.60	4.20	4.80	6.00	7.21	12.0
4	1.37	2.06	2.75	3.43	4.12	4.80	5.49	6.86	8.24	13.7
5	1.72	2.57	3.43	4.29	5.15	6.00	6.86	8.58	10.3	17.2
6	2.06	3.09	4.12	5.15	6.18	7.21	8.24	10.3	12.4	20.6
7	2.40	3.60	4.80	6.00	7.21	8.41	9.61	12.0	14.4	24.0
8	2.75	4.12	5.49	6.86	8.24	9.61	11.0	13.7	16.5	27.5
9	3.09	4.63	6.18	7.72	9.27	10.8	12.4	15.4	18.5	30.9
10	3.43	5.15	6.86	8.58	10.3	12.0	13.7	17.2	20.6	34.3
12	4.12	6.18	8.24	10.3	12.4	14.4	16.5	20.6	24.7	41.2
15	5.15	7.72	10.3	12.9	15.4	18.0	20.6	25.7	30.9	51.5
20	6.86	10.3	13.7	17.2	20.6	24.0	27.5	34.3	41.2	68.6
25	8.58	12.9	17.2	21.4	25.7	30.0	34.3	42.9	51.5	85.8
30	10.3	15.4	20.6	25.7	30.9	36.0	41.2	51.5	61.8	103
35	12.0	18.0	24.0	30.0	36.0	42.0	48.0	60.0	72.1	120
40	13.7	20.6	27.5	34.3	41.2	48.0	54.9	68.6	82.4	137
45	15.4	23.2	30.9	38.6	46.3	54.1	61.8	77.2	92.7	154
50	17.2	25.7	34.3	42.9	51.5	60.0	68.6	85.8	103	172
55	18.9	28.3	37.8	47.2	56.6	66.1	75.5	94.4	113	189
60	20.6	30.9	41.2	51.5	61.8	72.1	82.4	103	124	206
65	22.3	33.5	44.6	55.8	66.9	78.1	89.2	112	134	223
70	24.0	36.0	48.0	60.0	72.1	84.1	96.1	120	144	240
75	25.7	38.6	51.5	64.3	77.2	90.1	103	129	154	257
80	27.5	41.2	54.9	68.6	82.4	96.1	110	137	165	275
85	29.2	43.8	58.3	72.9	87.5	102	117	146	175	292
90	30.9	46.3	61.8	77.2	92.7	108	124	154	185	309
95	32.6	48.9	65.2	81.5	97.8	114	130	163	196	326
100	34.3	51.5	68.6	85.8	103	120	137	172	206	343

The above date is the calculation typically used for an "average" hydraulic pump and system. For a system that may have unusual pressure spikes, non-match components, or other idiosyncrasies, an additional horsepower requirement must be considered. When horsepower requirement has been calculated, refer to the nomograph for horsepower – torque – RPM Correlation. Clutches are rated by LB. FT. of torque.



"H" – SERIES HYDRAULIC PUMP CLUTCH INSTALLATION INSTRUCTIONS

THE FOLLOWING INSTALLATION INSTRUCTIONS AND SERVICE DATA IS FOR PITTS' DIRECT SHAFT DRIVEN AND BELT DRIVEN ELECTROMAGNETIC CLUTCHES. PROPER ASSEMBLY, INSTALLATION AND MAINTENANCE WILL ASSURE OPTIMAL APPLICATION PERFORMANCE AND EXTENDED LIFE. PLEASE READ THE APPROPRIATE SECTION PRIOR TO ASSEMBLY AND OPERATION.

A. DIRECT DRIVEN CLUTCH/BRACKET INSTALLATION

1. If the power driving source, such as vehicle engine, electric motor, etc. has not been equipped with a mounting platform, extended bumper or suitable frame work to support the pump/clutch assembly, this must be fabricated first. Most any method is acceptable as long as the platform will adequately support the total weight of the pump/clutch/bracket assembly. The mounting platform must also allow for close tolerance adjustment and alignment of the clutch center line to the power source shaft center line. This alignment must be within **3º**. Check clutch and bracket dimension **prior** to fabrication of platform.
2. Mount the Pitts Clutch to the appropriate Pitts foot mount bracket with the bolts provided and torque to specified limits.
3. Loosely position the clutch/bracket assembly on the previously fabricated mounting platform. (NOTE: Remember that close alignment is very important – if necessary, use suitable shims between the bracket and mounting platform. An alignment of zero degrees (0º) vertically and horizontally between clutch and power source shaft center line is optimum. Do not exceed 3º.
4. Drill required hoes in platform to correspond to the foot mount bracket on the clutch.
5. Loosely install mount bracket bolts, nuts, and lock washers. Re-check alignment (per item 3 above), and secure all bolts. Torque to specified limits.
6. Remove alignment tools and/or other devices used.
7. Mount pump to foot bracket on opposite side from clutch. (NOTE: Lubrication and cleanliness of the pump shaft and clutch bore is important. Thoroughly clean these areas of any contamination. Apply a thin coating of molybdenum disulfide grease on the shaft and in the bore. This will avoid installation interference, resist corrosion, and reduce friction wear.)

   Use mounting bolts long enough to engage at least three-fourths of the threads in the mounting bracket. Do not use bolts that will touch the clutch housing after tightening. Always use lock washers. Clutches with keyways are provided with two Dorman plugs. When a short shaft hydraulic pump is used, the smaller plug should be tapped into the clutch bore until it bottoms on the pump shaft. If a long shaft hydraulic pump is used, then the larger plug should be installed the same way. (NOTE: It is important to install the Dorman plug(s). This keeps contamination out and prevents the shaft key from moving outward.)
8. Measure and select an appropriate sized universal drive line. (NOTE: Consult with drive line manufacturer's specifications and select a drive line that is adequately sized to accommodate the pump and overall application requirements.) See additional notes on each clutch model page in Pitts' clutch catalog.
9. Install drive line between clutch and power source. Install bolts, nuts and lock washers. Torque to specified limits. (NOTE: Inspect the drive line for proper phasing. This means the flange yoke ears on each end of the shaft must be directly in line. If not, remove and disassemble the shaft at the splined connection and align the flange yoke ears.)
10. If a speed control device is to be used, install per manufacturer's instructions.
11. This portion of the assembly is now complete. Proceed to section "C", final installation.

B. BELT DRIVEN CLUTCH/BRACKET INSTALLATION

1. Assemble the clutch, pump and bracket using bolts that will not bottom on the clutch housing. (NOTE: Lubrication and cleanliness of the pump shaft and clutch bore is important. Thoroughly clean these areas of any contamination. Apply a thin coating of molybdenum disulfide grease on the shaft and in the bore. This will avoid installation interference, resist corrosion and reduce friction wear). Clutches with keyways are provided with two Dorman plugs. When a short shaft hydraulic pump is used, the smaller plug should be tapped into the clutch bore until it bottoms out on the pump shaft. If a long shaft hydraulic pump is used, then the larger plug should be installed the same way.
2. Mounting the pump/clutch/bracket assembly may be accomplished by various methods. You may find that on some vehicle engines there are existing available brackets and/or engine location points whereby a simple fabricated bracket will allow mounting the pump/clutch/bracket assembly with ease. Others may require a more elaborate method to mount the assembly. An alternative to fabricating your own engine mounting bracket is to use a commercially available, air-conditioning mount and drive kit. These kits may be purchased from most auto and truck air-conditioning warehouse supply centers in your area.
3. With a suitable mount/drive bracket in place and all necessary minor adjustments completed, you are now ready to install the pump/clutch/bracket assembly. Make sure that the pulleys are lined up and the shafts are parallel. This can be done by placing a straightedge against the outside edge of the driver pulley and clutch pulley and moving clutch/pump/bracket until the straightedge touches two sides of both pulleys. Use extreme caution and avoid any possible interference with other accessory members and drive belts. Stay clear of the radiator, fan, and hood area. Misalignment causes many problems, some of which are:
   - **STABILITY**: Misaligned belts are subject to turnover or roll-off.
   - **NOISE**: Misaligned belts can create a noisy drive.
   - **WEAR**: Misalignment will accelerate wear on the side of the belt that comes in contact with the pulley first.

- **LIFE**: A significant degree of misalignment rapidly decreases belt life.
- **MULTIPLE BELT DRIVE**: When necessary to use more than one belt on a drive, use a matched set of belts. If all of the belts are not of the same length, the shorter belt will operate under more tension than the longer one and their service life may be correspondingly shortened. Therefore, if a drive is designed to use more than one belt, order the belts in matched sets. Make sure the matched set is of belts from the same manufacturer. If belts of different manufacturers are used, the pitch line location and other construction features will not be the same. This will result in the belts not operating properly together.

4. Position the assembly so that the belts can be put on without force. Although V-Belts are elastic, they are not rubber bands. Forcing a belt over the groove can result in broken tensile cords in the belt and limited belt life. Using a belt tensiometer, tighten belts to 100-110 lbs., per strand.

C. FINAL INSTALLATION INSTRUCTIONS FOR:

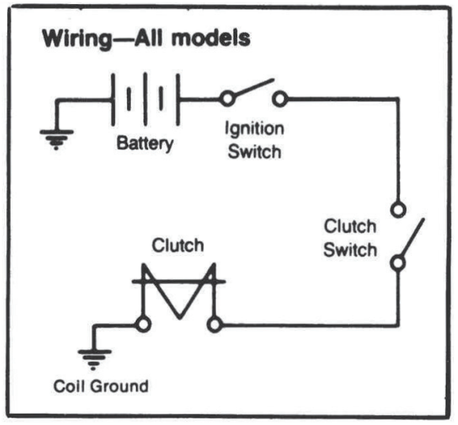
A. DIRECT DRIVE CLUTCHES
B. BELT DRIVE CLUTCHES

1. Completely inspect the entire assembly and installation. Check and secure all areas for loose or removed components during the installation.
2. Proper connection for the clutch coil to the D.C. Electrical System is very important. Locate a circuit controlled by the vehicle ignition switch, if possible. This will prevent the clutch from being engaged when the vehicle is not in use.

   The coil in the field assembly is continuous run wire. One end of the wire is connected to positive (+). The other end to negative (-) (ground). If the coil has only one lead wire protruding from the housing it will be connected to positive (+) as the other end is internally grounded to the case. If **two** lead wires are protruding, connect one to positive (+) and one to negative (-) (ground). Proper clutch operation and clutch life relies on an adequate supply of rated D>C> voltage to the field coil.

LOW VOLTAGE = CLUTCH FAILURE

The wiring circuit may vary, depending upon whether or not a speed control device is used in the system. This schematic illustrates a simple method of connecting the D.C. Circuitry.



3. **Important:** When the system installation is complete, mechanically and electrically, and the pump/clutch can be operated, a functional check is necessary. With the power source running at 1,000 to 1,200 RPM, cycle the clutch on/off at a rate of 5 sec on – 5 sec off for a total of 25 cycles. The armature plate should "Snap" firmly against the rotor. If not, re-check for rated voltage at the lead wire and check for proper grounding.
4. The Pitts Clutch automatically compensates for wear requiring no adjustment throughout the life of the clutch. **DO NOT** lubricate the unit. If the clutch should fail to operate, check the electrical circuit to be sure that the proper voltage is being supplied to the clutch. **DO NOT** attempt to make any mechanical adjustments on the clutch.
5. **CAUTION:** At the moment of engagement, the clutch must pickup all related inertia load of the clutch components and other components being put into rotary motion. This action is correlated to dynamic torque. The larger the clutch and related components the higher the inertia load. High RPM Engagement of the clutch creates an excessive shock load and may cause breakage of the leaf springs and/or clutch slippage and ultimate clutch failure. On direct drive clutches the input drive shaft may also break causing excessive damage to surrounding area. Please refer to these recommendations regarding maximum clutch engagement RPM

Clutch Model	H24	H27	H28	H36	H49	H55
Max engagement RPM	2500	1800	1500	1200	1200	1200

CONCLUSION:

Satisfactory performance and life expectance of your clutch drive system depends on:

- **MATCHED COMPONENTS:** Pump/Clutch/Brackets and Drive Line equally sized to handle the job.
- **ALIGNMENT:** Direct Drive Lines within 3º (0º is optimum). Belt Drives within 1/8" (Pulley to Pulley).
- **NO LEAKS:** Hydraulic Fluid, oil and contamination in and around clutch friction surfaces and bearings equals "Short Life".
- **ELECTRICAL:** Full rated D.C. Voltage must be applied to coil. A loss of 1 volt, on a 12 volt system, equals 9% less torque.
- **SCHEDULED MAINTENANCE:** Inspect the entire drive system periodically for proper operation.
- **HIGH RPM ENGAGEMENT:** Refer to item 5 (above). Use caution signs – train the operator.

PERFORMANCE ASSURANCE

The performance of a PITTS electro-magnetic clutch depends upon the proper application of the product, adequate run-in, installation and maintenance procedures, and reasonable care in operation of the unit.

All torque values listed in our literature are nominal and are subject to the variations normally associated with friction devices. Adequate and reasonable service factors must be applied when selecting units. Although PITTS' application engineers are available for consultation, final selection and performance assurance on the buyer's application is the responsibility of the purchaser. The buyer should take into consideration all variables shown in the applicable specification sheet. Careful selection, adequate testing, and proper operation and maintenance of all PITTS' products should aid in obtaining the best possible performance.

TORQUE:

In determining torque requirements for a given machine application, the following relationship of Torque RPM and horsepower is useful.

Mechanical

$$T = \frac{5252 \times HP}{RPM}$$

Where T = **T**orque (Pound Feet)
HP = **H**orse**P**ower
RPM = Speed (**R**evolutions **P**er **M**inute)

Fluid Power

$$T = \frac{CIR \times PSI}{75.4}$$

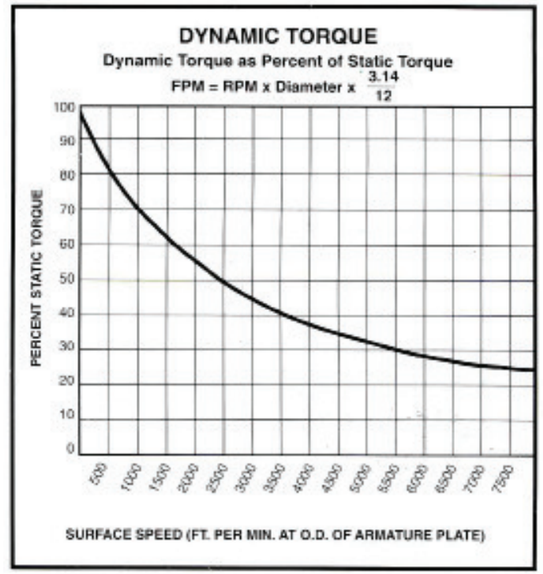
Where CIR = **C**ubic **I**nch per **R**evolution
PSI = **P**ounds per **S**quare **I**nch

STATIC TORQUE:

All references to torque *capacity* are in terms of static torque, the "break-away" torque required to slip a locked-up clutch or brake.

DYNAMIC TORQUE:

Dynamic torque is that applied during the period when the surfaces are sliding into engagement. As a percentage of static torque, dynamic torque varies with surface slip speed and is represented on the accompanying graph.



TORQUE – HORSEPOWER – RPM RELATIONS

- What size clutch do you need for your application?
- Determine RPM of operation at the clutch.
- Determine Horsepower that clutch will drive.
- Determine clutch torque required by using the following formula or read directly from chart below.

To find Torque: use formula: **T = (HP X 5252) / RPM**

	RPM								
HP	**100**	**500**	**750**	**1000**	**1200**	**1500**	**1800**	**2400**	**3000**
1/4	13.1	2.6	1.8	1.3	1.1	0.9	0.7	0.5	0.4
1/3	17.3	3.5	2.3	1.7	1.4	1.2	1	0.7	0.6
1/2	26.3	5.3	3.5	2.6	2.2	1.8	1.5	1.1	0.9
3/4	39.4	7.9	5.3	3.9	3.3	2.6	2.2	1.6	1.3
1	52.5	10.5	7	5.3	4.4	3.5	2.9	2.2	1.8
1 1/2	78.8	15.8	10.5	7.9	6.6	5.3	4.4	3.3	2.6
2	105	21	14	10.5	8.8	7	5.8	4.4	3.5
3	157.6	31.5	21	15.8	13.1	10.5	8.8	6.6	5.3
5	262.6	52.5	35	26.3	21.9	17.5	14.6	10.9	8.8
7 1/2	393.9	78.8	52.5	39.4	32.8	26.3	21.9	16.4	13.1
10	525.2	105	70	52.5	43.8	35	29.2	21.9	17.5
15	788	158	105	78.8	65.7	52.5	43.8	32.8	26.3
20	1,050	210	140	105	87.5	70.0	58.4	43.8	35.0
25	1,313	263	175	131	109	87.5	72.9	54.7	43.8
30	1,576	315	210	158	131	105	87.5	65.7	52.5
40	2,101	420	280	210	175	140	117	87.5	70.0
50	2,626	525	350	263	219	175	146	109	87.5
60	3,151	630	420	315	263	210	175	131	105
75	3,939	788	525	394	328	263	219	164	131
100	5,252	1,050	700	525	438	350	292	219	175
125	6,565	1,313	875	657	547	438	365	274	219
150	7,878	1,576	1,050	788	657	525	438	328	263
200	10,504	2,101	1,401	1,050	875	700	584	438	350
250	13,130	2,626	1,751	1,313	1,094	875	729	547	438

Other useful formulas:

- To find Horsepower: use formula
  HP = (T x RPM) / 5252
- To find RPM Use formula
  RPM = (HP X 5252) / T

SERVICE FACTOR

When actual clutch torque is determined for your application, a service factor (or K-factor) must be added to this value. This K-factor is necessary in order to avoid clutch slippage caused by system pressure spikes and/or high RPM engagement shock load to the clutch. Multiply actual torque value required by the K-factor listed below for your particular application.

For light machines such as drilling, where load is applied after clutch is engaged.	**K = 1 ½ to 2 ½**
For electric motors where (during overloads) clutch stalls the motor, use pullout torque factor from motor catalog, or approximately	**K = 2 to 3**
For engines where clutch should be strong enough to stall engine.	**K = 2 to 4**
For refrigerant and air compressors	**K = 2 to 4**
For hydraulic pumps where pressure may be on the system at instant of engagement.	**K = 2 ½ to 5**
Conveyors and augers, where static load on system must be started by slipping torque of the clutch.	**K = 3 to 5**

The resulting torque requirement, K x T = Required Torque of clutch.

EXAMPLE: Known: 25 HP Hydraulic pump load at 1800 RPM An occasional pressure spike may occur and the pump will be in the max pressure or by-pass condition. K = 3 is selected. From the chart at left, 25 HP At 1800 RPM Calls for 73 lb. ft. or Torque. T = 73. Then, K x T = 219. We would therefore recommend our PITTS Clutch Model H-28, "high torque" rated at 200 lb. ft.

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INSTALLATION AND REMOVAL INSTRUCTIONS

PITTS' ELECTRO-MAGNETIC CLUTCH

The following instructions are for Pitts' 2-piece clutch with stationary mounted coil and belt driven pulley assembly.

I. Stationary Mounted Coil: (Outboard 4-hole or Inboard 3-hole Mount)

A. Be sure that rated DC voltage of coil is same as DC voltage from supply source.

B. Attach coil to mounting surface using "special" 1/4"-20 hex head screws in parts package supplied with clutch.

C. Torque 1/4"-20 supplied screws to 13-17 lb.-ft. (consult with manufacturer if other screws are used.)

Note: Coil must be concentric to shaft on driven device within 0.015 TIR (Total Indicator Runout). Coil face clearance to pulley cavity face must be 3/32 inch.

II. Pulley Assembly: (Tapered or Straight Bore Hub)

A. Thoroughly clean the shaft of driven unit.

B. Check shaft key for proper size and location in shaft keyway.

C. Slide pulley assembly onto shaft. Be sure that clutch hub keyway aligns with shaft key and that shaft key is properly seated and located after pulley installation.

D. Secure pulley assembly in proper location on shaft using 5/16 inch Nylock cap screw and flat washer supplied in parts package or by using other suitable attachments. (Recommended torque for 5/16 inch supplied cap screw is 20 ft-lbs.)

E. Hand spin the pulley and watch for any excessive runout or rubbing interference with the coil or mounting bracket areas. Correct any such problems to operation of clutch assembly.

III. Electrical Connection: (1 or 2 Lead Wire Coils)

A. Connect coil lead wire to DC electrical circuit.

Note: If coil has only one lead wire, the coil is internally grounded through the mounting hardware. If the coil has two lead wires, one wire is to be connected to DC electrical circuit and the other to an external grounding point.

B. Apply rated DC voltage to the coil to engage the clutch. Engage and disengage several times. The disc should "snap" firmly against the pulley face during engagement. If not, check DC voltage circuit and correct as required.

IV. Removal:

A. Remove shaft bolt or other attaching devices from pulley.

B. * Taper Bore Hub – Install 5/8 inch NC (coarse thread) bolt into corresponding threads in front of hub. Turn bolt against shaft and pulley will be forced free.

* Straight Bore Hub – The pulley may slide freely off shaft by hand applied force. If not, use a suitable pulley puller tool.

V. Operation of Clutch:

A. When clutch is ready for functional operation and with drive belts properly installed, start the driving power source (engine, motor, etc.)

B. Observe that all mounting hardware is secured and drive belts are in line and turning properly.

C. Apply rated DC voltage to the coil to engage clutch. Repeatedly engage and disengage the clutch approximately 15-20 times. This procedure will "burnish in" the mating friction surfaces and allow the clutch to yield higher initial torque.

VI. Performance Assurance:

The performance of a Pitts' electro-magnetic clutch depends upon the proper application of the product adequate run-in, installation and maintenance procedures, and reasonable care in operation of the unit.

All torque values listed in our literature are nominal and are subject to the variations normally associated with friction devices. Adequate and reasonable service factors must be applied when selecting units. Although Pitts' application engineers are available for consultation, final selection and performance assurance on the buyer's application is the responsibility of the purchaser. The buyer should take into consideration all variables shown in the applicable specification sheet. Careful selection, adequate testing, and proper operation and maintenance of all Pitts' products should aid in obtaining the best possible performance.

PITTS®
"The Clutch People"

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SEE SERVICE INFORMATION ON REVERSE SIDE

HOW TO AVOID CLUTCH PROBLEMS

What are typical application problems that cause clutch failures? Clutch slippage is the most common complaint, but it's not always readily obvious why the clutch slips. Low voltage and erratic torque demands are probably the most troublesome. Unfortunately, these can both be present at the same time.

When a clutch is removed from the application and set aside for examination, many of the clues to the cause of failure are lost. The best way to analyze a clutch failure is before the clutch is removed from the application as this will often reveal the true cause of failure. Nevertheless, we have experienced enough failure modes over the years to establish a pattern of these “failed clutches”.

Two things happen in these cases: (1) The clutch torque decreases due to application problems; or (2) the application load increases. A normal clutch has more than the required torque capacity to drive an approved application under high load conditions. A normal clutch is one operating with full rated voltage on an approved application (i.e., pump or compressor) in a fairly clean environment. The normal pump does not purge oil onto the clutch face or operate over the manufacturer's rated pressures. Now, these severe conditions can become more severe. The voltage source can decrease; the ambient temperature increase; etc. Even then, it is unlikely that a clutch would slip because of the built in safety factor.

We find that a combination of severe conditions may be superimposed. Consider the following: low voltage – a loss of 1 volt on a 12 volt unit will drop torque 9%; 2 volts may cause partial engagement and drag. High ambient temperature – a 50º F increase in temperature may drop torque 10%. A new clutch, before being cycled-in has 1/3 less torque than after it is cycled.

More unusual causes, but nevertheless serious are these: (1) Poor grounding of the clutch coil; (2) Oil from a pump or hose leak can reduce the friction drastically; (3) Severe contamination can destroy bearings and cause high friction heat and slippage; (4) Bearing failures can also be caused from excessive belt tension and misalignment or from brinelling upon forced installation to the shaft.

Many coil failures are really a result of extensive clutch slippage transferring heat to the coil face thus burning the potting compound and coil winding. If the coil is not mounted concentric to the shaft, interference will result in failure. When a shaft locks up, the clutch is forced to slip. This cause of failure is hard to analyze except by the technician who replaces both assemblies. A service report with the clutch can help in analyzing the conditions.

TROUBLESHOOTING

Some tips that will help the technician diagnose or prevent problems:

1. One tool we recommend be available, and used regularly, is a good DC volt-ohmmeter. Check the clutch voltage at the coil wire connection when the system is operating along with all other lights and accessories operating. The clutch coil must be supplied with required rated voltage. Equally as important is grounding of the clutch coil. Check this circuit as well, to assure full complete grounding.
2. When installing a clutch, be sure it seats on the shaft and key. Use a torque wrench to properly torque the field coil and shaft bolts as specified.
3. Belt tension: Drive belts that are too loose or too tight can cause a variety of problems. Use a belt tension gauge to set or adjust belt tension.
4. Cycle a new clutch as much as practical after installation (1000-1500 RPM – 5 sec on/5 sec off – 25 cycles). This increases the torque greatly.
5. The cause of rubbing of the pulley on the coil is often loose coil screws. Elongated holes, broken coil tabs, etc., may be the result of loose screws. These must be torqued as specified.

REVIEW OF POTENTIAL PROBLEMS

- Low voltage to coil.
- Inadequate coil grounding.
- Compressor seal leak.
- Clutch mounted incorrectly.
- Mounting bolts not torqued.
- Malfunction of other system components.
- Excessive engine vibration.
- Excessive ambient temperature.
- Belt tension-too high/low.

In conclusion, please remember that things are not always as they first appear and just because a failure has occurred, does not always justify blaming the part that failed.

PITTS CLUTCH MODELS AND BASIC SPECIFICATIONS

			Shipping		Static Torq	Operating Voltage		Drive	Clutch Mount Brackets					
Series	Model	Qty/Box	Dims	Weight	(Lb Ft)	12V	24V	Type	Mount Style	Model	P/N	Mount Style	Model	P/N
24	24D75-6	1	7 X 7 X 3	10	75	X	X	Belt	TYPE "A" / "B"					
		6	18 X 7 X 7	60										
28	28A75-7	1	7 X 7 X 3	10	75	X	X	Belt	TYPE "A" / "B"					
		6	18 X 7 X 7	60										
	28A75-7HT	1	7 X 7 X 3	10	120				TYPE "B"					
		6	18 X 7 X 7	60										
AG100	AG100	1	7 X 7 X 3	10	100	X	N/A	Belt	TYPE "B"					
		6	18 X 7 X 7	60										
	AG100L	1	7 X 7 X 3	10			X	Brake	TYPE "A"					
		6	18 X 7 X 7	60										
H24	H24D90	1	6 X 6 X 4	14	90	X	X	Shaft	SAE "A" 2 BOLT	B-H24-H27	13195			
		4	16 X 7 X 7	60										
	H24K90	1	6 X 6 X 4	14			N/A	Belt	SAE "A" 2 BOLT					
		4	16 X 7 X 7	60										
	H24V90	1	6 X 6 X 4	14			X		SAE "A" 2 BOLT					
		4	16 X 7 X 7	60										
H27	H27V150	1	6 X 6 X 4	16	150	X	X	Belt	SAE "A" 2 BOLT					
H28	H28D200	1	9 X 9 X 5	30	200	X	X	Shaft	SAE "B" 2-4	B-H28	13219			
	H28D200G	1							GRESEN					
	H28D300HT	1			300				SAE "B" 2-4					
	H28L200M	1	9 X 9 X 5	27	200	X	X	Brake	SPECIAL					
	H28V200	1						Belt	SAE "B" 2-4					
	H28V200G	1							GRESEN					
	H28V300HT	1			300				SAE "B" 2-4					
	H28W200	1	9 X 9 X 5	19		X		Shaft	TYPE "B"					
H36	H36D400	1	14 X 14 X 10	54	400	X	X	Shaft	SAE "C" 2-4	B-H36-H49-C	13256	SAE "B" 2-4	B-H36-H49-B	13258
	H36D550HT	1			550									
H44	H44D700	1	14 X 14 X 10	74	700	X	X	Shaft						
	H44D850HT	1			850									
H49	H49D1000	1	14 X 14 X 10	84	1,000	X	X	Shaft						
	H49D1200HT	1			1,200									
H55	H55D1500	1	14 X 14 X 10	135	1,500	X	X	Shaft	SAE "D" 2-4	B-H55	14219			
	H55D2000HT	1			2,000									

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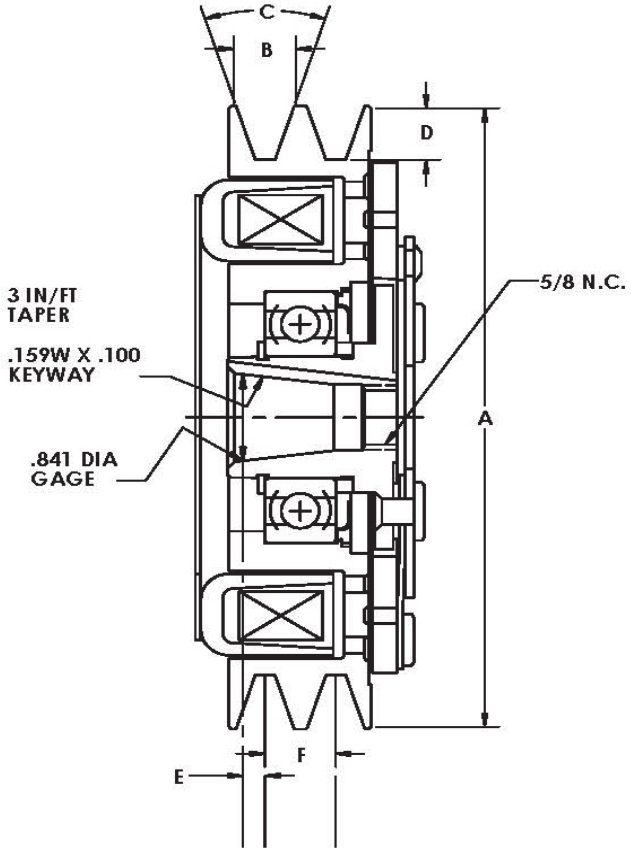
24D75-6 CLUTCH

Hydraulic Pump Drive
12 or 24 Volt D.C. - Belt Driven

Power	Max RPM	Weight
48 Watts	5000	11 Lbs.



Static Rated Torque - 75 Lbs. Ft.

Type "A" Mount (Inboard)		Type "B" Mount (Outboard)								
24V	12V	24V	12V							
Part No.	Part No.	Part No.	Part No.	A	B	C	D	E Gage	F Spacing	No of Grooves
N/A	**10513**	N/A	N/A	6.00	0.38	36°	0.44	0.192		1
N/A	**7238**	**10204**	**7531**	6.00	0.50	36°	0.50	0.192	0.62	2
N/A	**11669**	N/A	N/A	6.00	0.35	40°	0.36	0.192	0.41	3

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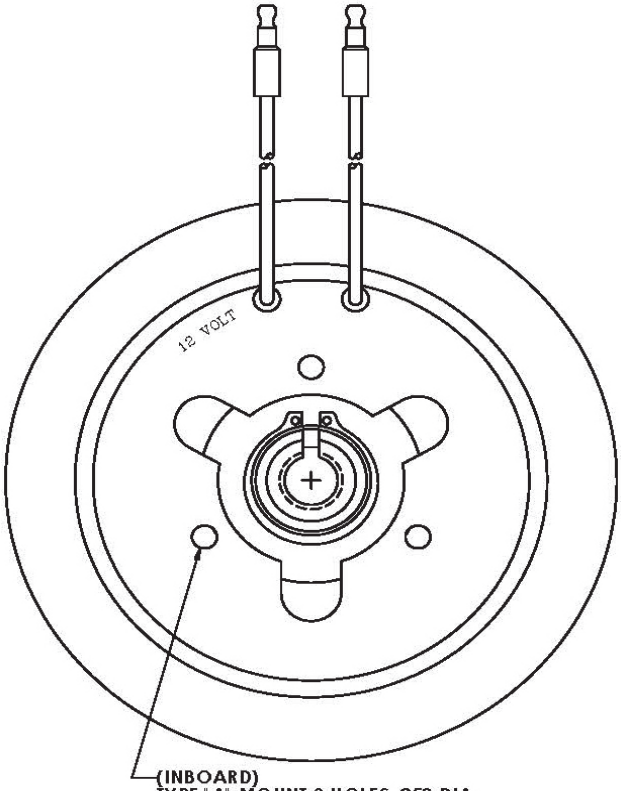
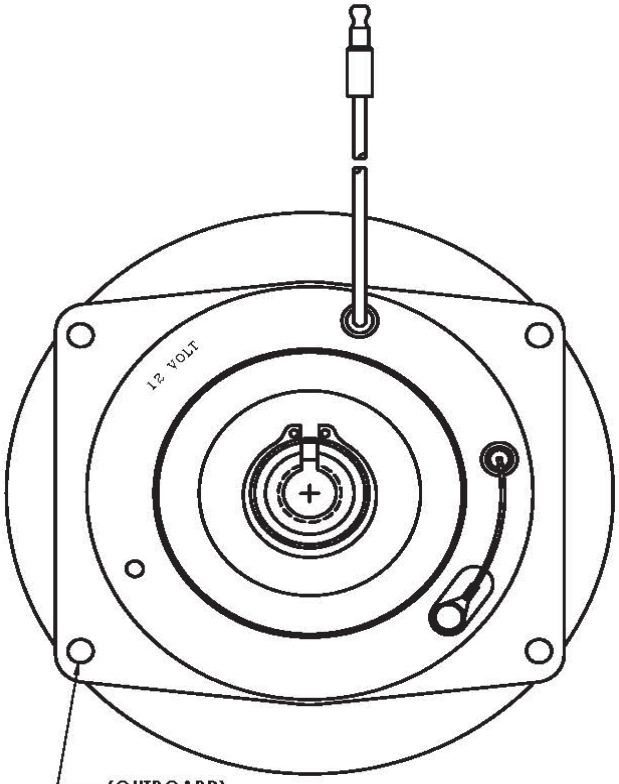
24D75-6 CLUTCH

Mounting Dimensions



(INBOARD)
TYPE "A" MOUNT 3 HOLES .250 DIA
ON 2.437 DIA BOLT CIRCLE



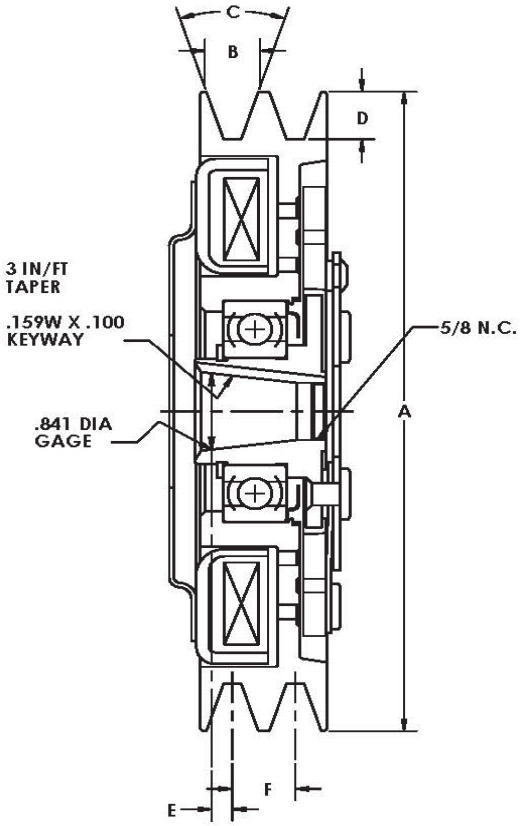
(OUTBOARD)
TYPE "B" MOUNT 4 HOLES .250 DIA
ON 4.562 X 3.396 RECTANGULAR
PATTERN

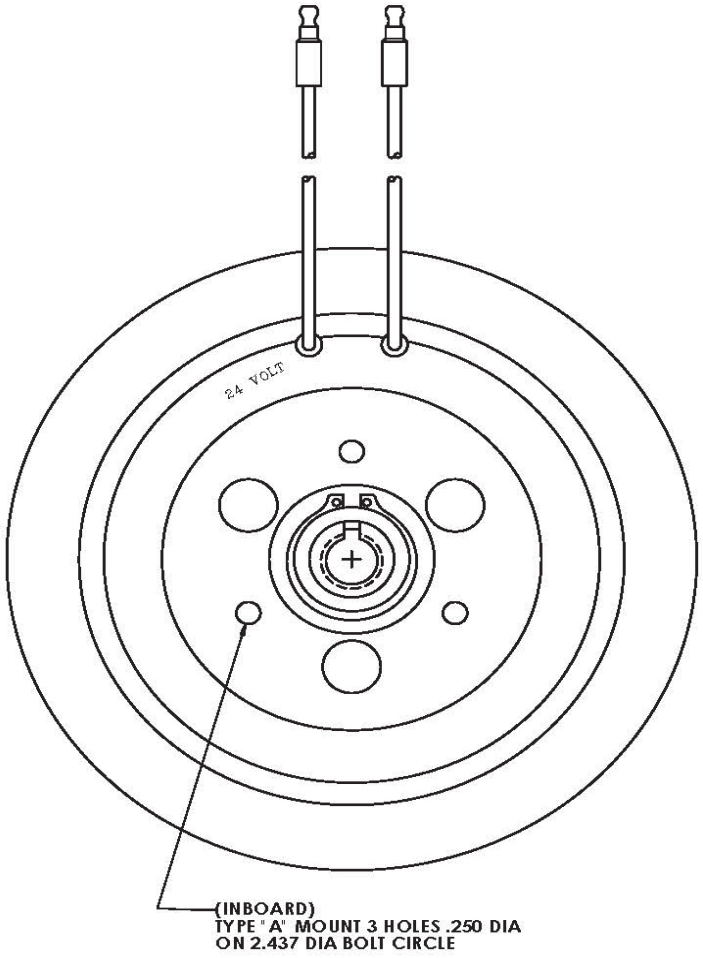
"The Clutch People"

28A75-7 CLUTCH

Taper Bore Hydraulic Pump Drive
12 Volt D.C. - Belt Driven

Power	Max RPM	Weight
48 Watts	5000	11 Lbs.





Static Rated Torque - 75 Lbs. Ft.

Type "A" Mount (Inboard)										
24V	12V									
Part No.	Part No.			A	B	C	D	E Gage	F Spacing	No of Grooves
N/A	7079			7.00	0.50	36°	0.50	0.192	0.62	2

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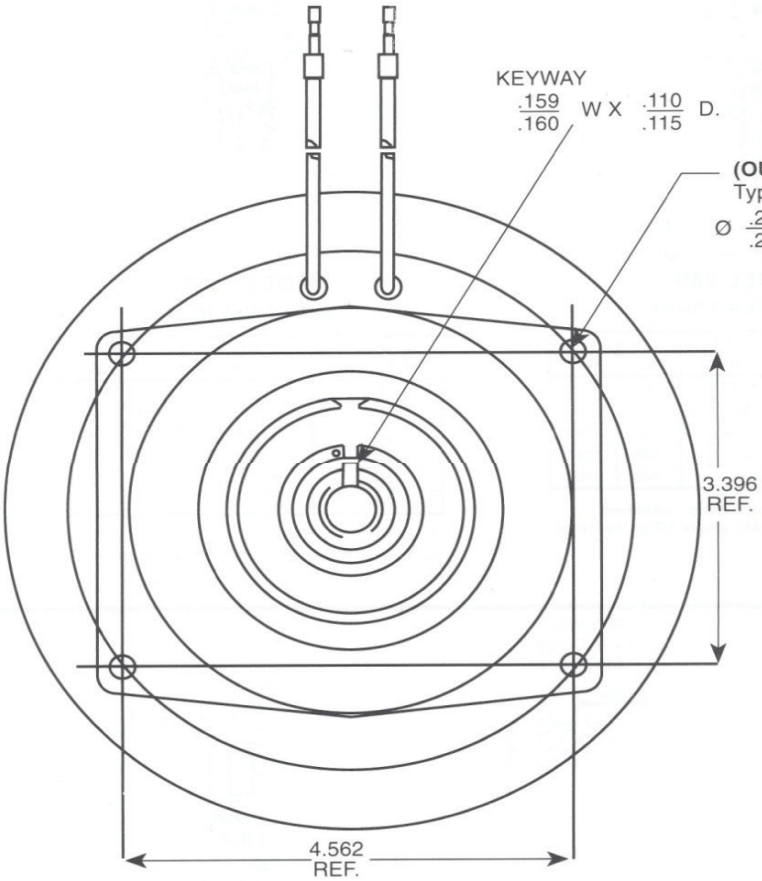
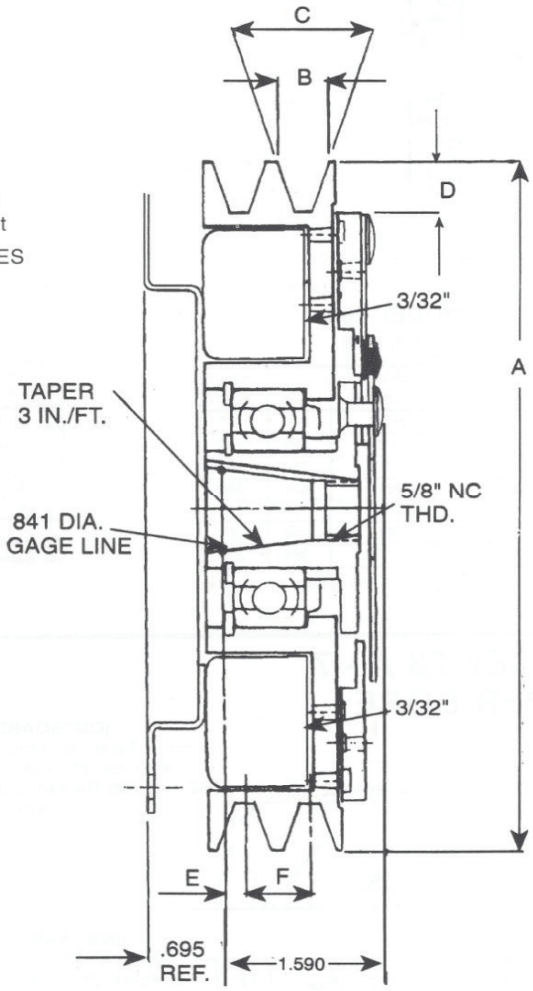
28A75-7HT CLUTCH

Taper Bore High-Torque Hydraulic Pump Drive
12 Volt D.C. - Belt Driven

Power	Max RPM	Weight
48 Watts	5000	11 Lbs.





Static Rated Torque - 120 Lbs. Ft.

		Type "B" Mount (Outboard)								
		24V	12V							
		Part No.	Part No.	A	B	C	D	E Gage	F Spacing	No of Grooves
		N/A	**14149**	7.00	0.50	36°	0.50	0.192	0.62	2

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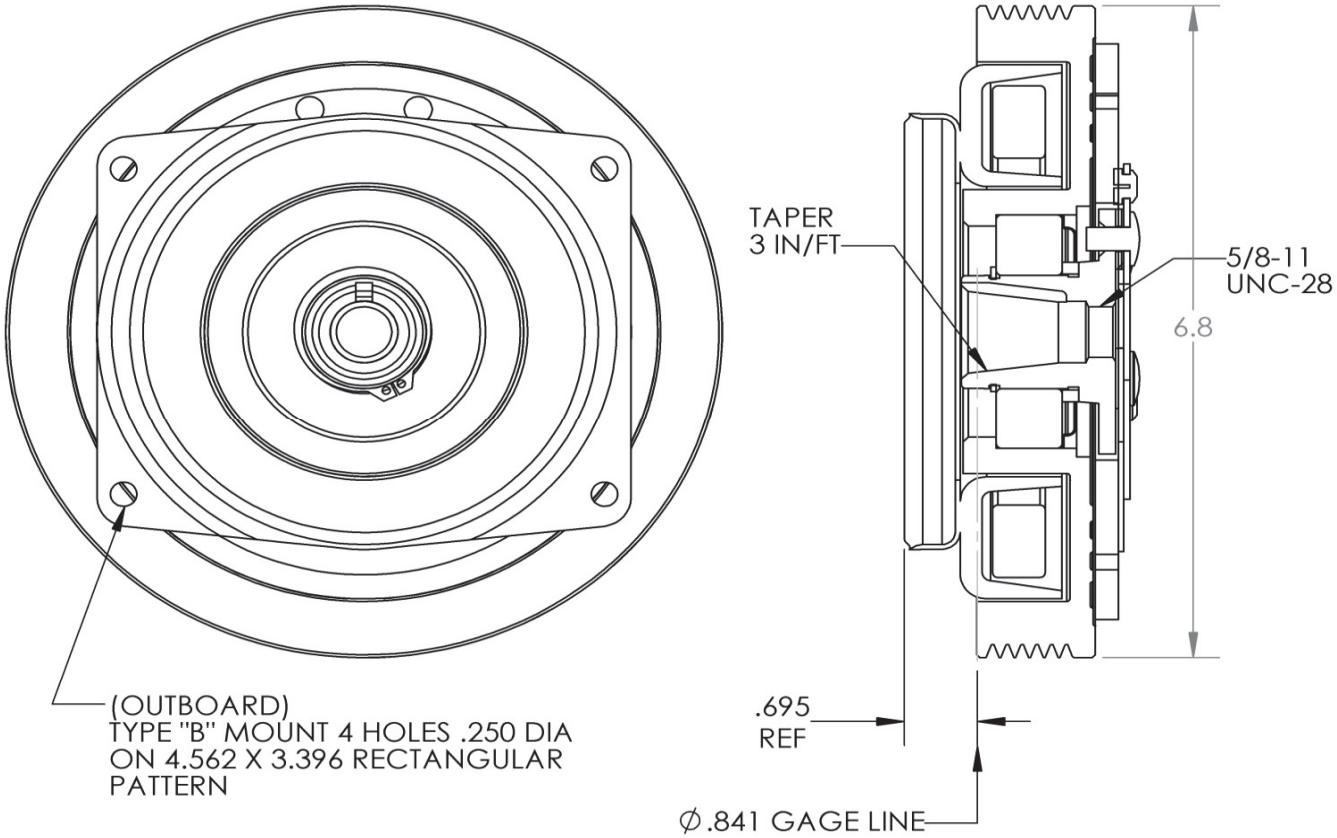
28A75-7HT CLUTCH

Taper Bore High-Torque Hydraulic Pump Drive
12 Volt D.C. - Belt Driven

Power	Max RPM	Weight
48 Watts	5000	11 Lbs.



Static Rated Torque - 120 Lbs. Ft.

		Type "B" Mount (Outboard)			
		24V	12V		
		Part No.	Part No.	POLYGROOVE "K" SECTION	No of Grooves
		N/A	14725		6

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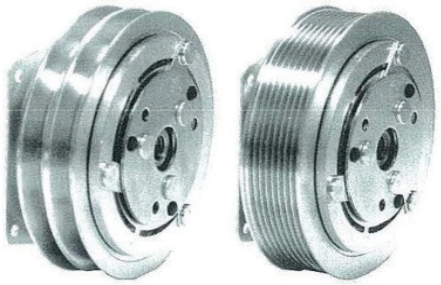
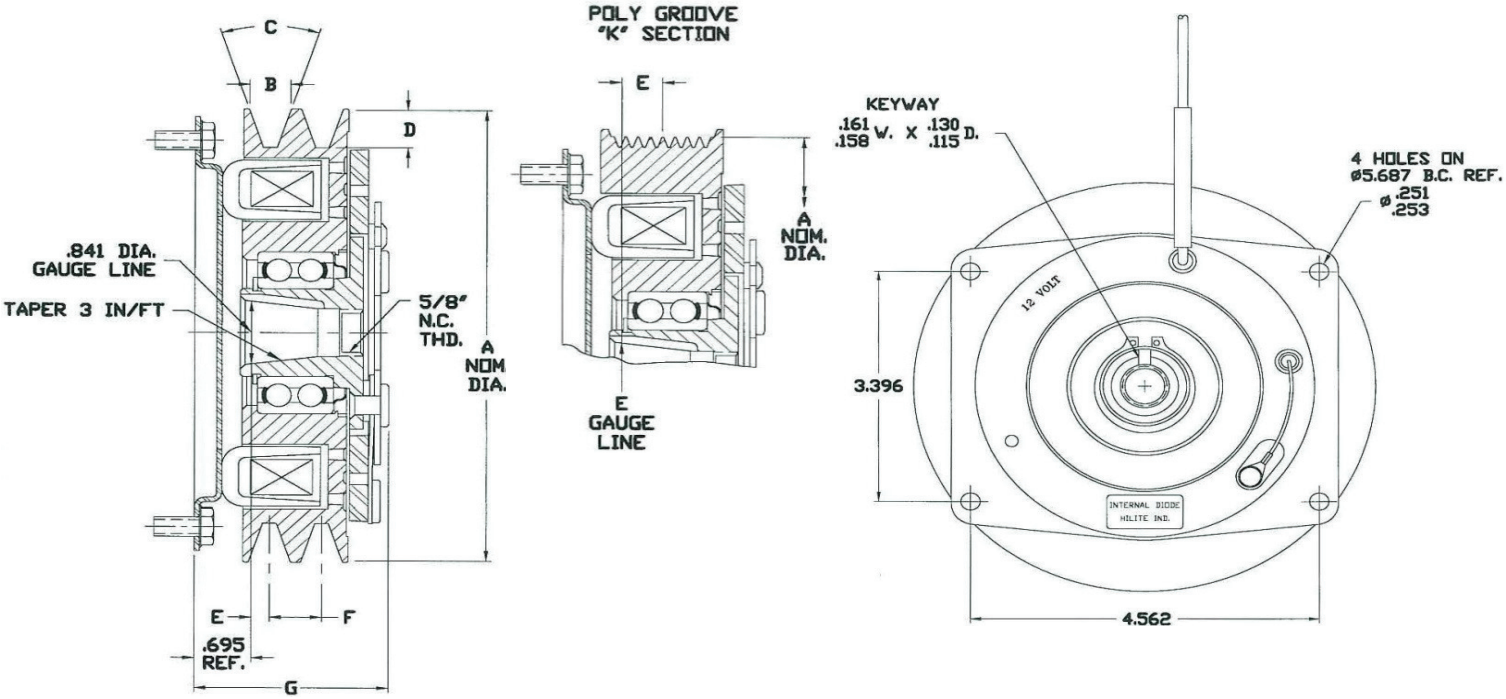


AG100 CLUTCH

Heavy Duty Hydraulic Pump Drive
Taper Bore - 12 Volt D.C. - Belt Driven

Power	Max RPM	Weight
48 Watts	5000	11 Lbs.



Static Rated Torque - 100 Lbs. Ft.

Single Leadwire Part No.	Double Leadwire Part No.	A	B	C	D	E	F	G	No of Grooves
14193	N/A	6.700	0.500	36°	0.500	0.192	0.620	1.650	2
14194	N/A	5.800	0.140	40°	0.140	0.581	0.140	1.650	6
14195	N/A	5.308	0.140	40°	0.140	0.442	0.140	1.650	8
14261	N/A	6.000	0.500	36°	0.500	0.192	0.620	1.650	2
14444	N/A	6.115	0.140	40°	0.140	0.441	0.140	1.650	8

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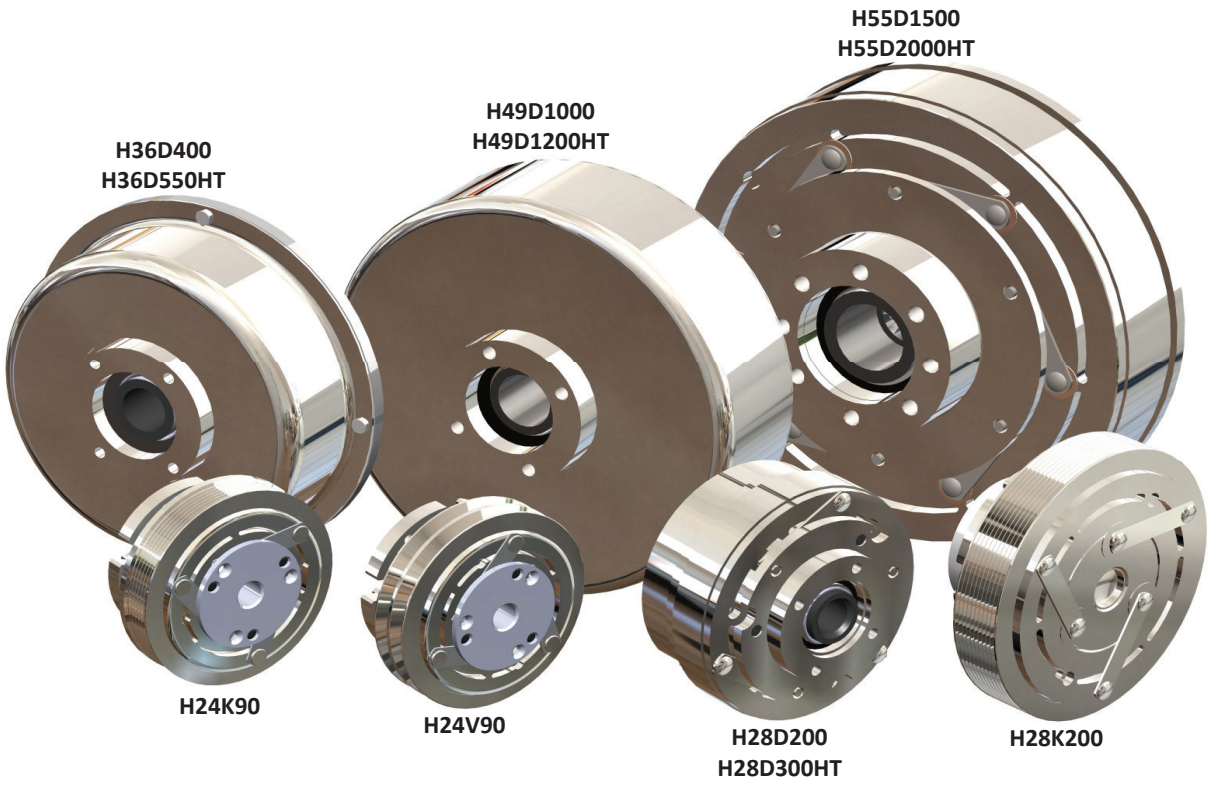
H-SERIES HYDRAULIC PUMP CLUTCHES



Typical applications include:

Fishing Boats	Wreckers	Farm Machinery	Mining Equipment
Snow Plows	Aerial Lifts	Fire Trucks	Fire Boats
Packer Bodies	Dump Bodies	Street Sweepers	Construction

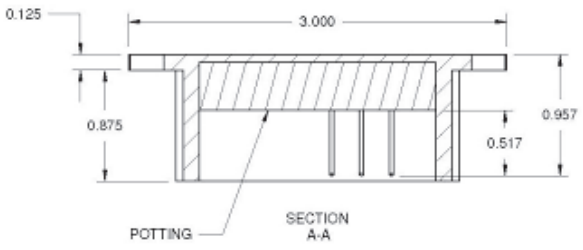
"The Clutch People"

SCM-808 SOFTSTART CLUTCH CONTROLLER

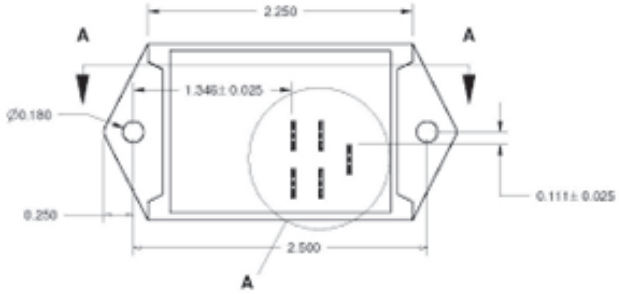
The patented Softstart Clutch Controller offers a simple solution to all of these issues!

- **Mechanical Life:** The Softstart lessens forces to mechanical parts and improves the life of bolts, decks, brackets and other mechanical parts.
- **Belt Life:** Reduce wear and breakage for belts and improve the quality & reputation of the equipment.
- **Engine Stall:** The Softstart eliminates engine stalling and RPM droop by utilizing closed loop RPM monitoring while engaging the electric clutch.
- **Mechanical Jolt:** Smooth engagement means less jolt to the equipment and customers.
- **Engine Cost Savings:** The Softstart Clutch enables OEM's to reduce equipment engine size to save money.

SIDE VIEW



TOP VIEW



Gas Version, Absolute Maximum Ratings - Model 1148081

	Min	Nom	Max	Units
Operating Voltage:	8		16	Volts
Max On resistance:			0.05	Ohms
"On" Response Time:	220	250	280	mS
Soft Start Ramp Time:	900	1000	1100	mS

Tachometer input (for closed loop versions)

	Min	Nom	Max	Units
Impedance:		1.5		Ohms
Input Range:	1000		4000	RPM*

*Note: RPM Input spark pattern 1:1
(1 Pulse per Revolution, other patterns available)

Protection
Load Dump ISO 7637-2 test pulse 5A

	Min	Nom	Max	Units
Over current (13.8VDC)	47	89	131	Amps

Diesel & Electric Version, Absolute Maximum Ratings - Model 1148121

	Min	Nom	Max	Units
Operating Voltage:	8		16	Volts
Max On resistance:			0.05	Ohms
"On" Response Time:	220	250	280	mS
Soft Start Ramp Time:	900	1000	1100	mS

Tachometer input (for closed loop versions)

	Min	Nom	Max	Units
Impedance:		100		Kohms
Trigger (VIL)			3.3	Volts
Trigger (VIH)	4.7			Volts
Frequency Range:	170		700	Hz*

*Note: Other frequency ranges available
Protection

Load Dump ISO 7637-2 test pulse 5A

	Min	Nom	Max	Units
Over current (13.8VDC)	47	89	131	Amps

Pitts Industries P.O. Box 815968 Dallas, TX 75381-5968
www.pittsindustries.com info@pittsindustries.com

SCM-808 SOFTSTART CLUTCH CONTROLLER

The patented Softstart controller senses the exact point at which the friction surfaces contact, then rapidly reduces the current to a level that allows the clutch to safely slip, but not release. Using engine RPM feedback, the patented controller adjusts the clutch current in a manner that drives the engine RPM to fit a desired profile.

Design Features:

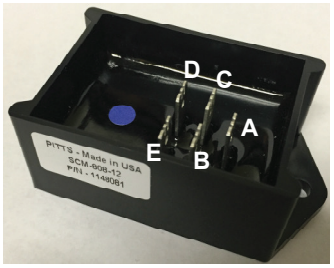
- **Closed loop control for consistent performance throughout the entire clutch life.**
- **Precise current measurement for accurate and repeatable pull-in detection.**
- **Closed loop PWM current control unaffected by charging system voltage.**
- **One controller part number**
  - **Ratiometric RPM control automatically scales to RPM at time of engagement.**
  - **On-the-fly current calibration automatically adapts to different sized clutches.**
- **Default to open loop contol if RPM signal is unavailable.**
- **Optional fixed current calibration possible for special applications.**
- **Short Circuit protected / Load dump protected.**

Operating and Environment Specs:

- **Operating Temperature Range: -40 to +70C**
- **Vibration: 20g's @ 10 – 80 Hz SAE J-1378**
- **Shock 55g's SAE J-1378 (tested and passed to 150g's, which is nearly 3 times the SAE specification)**
- **Humidity: 95% H SAE J-1378**
- **Salt Spray Test: MIL-STD-202G, Method 101E (5% NaCl @ 35C, 48 hrs)**
- **Dust: Unit is 100% encapsulated – dust cannot enter**
- **Immersion: ASAE EP455 5.6 level 2**

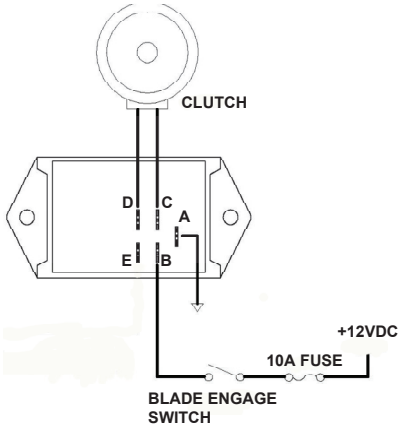
Immerse controller in tap water at temperature of 18C +/- 5C to a component top surface depth of 460mm. Orient in each of 3 orthogonal planes of 5 min in each plane. Upon removal, immediately subject to a cold soak of 19C for 30 min. Return to dry atmosphere of 25C for 60 min. No impaired function, no water entry.

- **Ultraviolet: Q-Sun Xe-1-UV Chamber – 720 Hours**
- **Thermal Shock: Controller stabilized at 70C for 30 min. Removed from oven and immediately immersed in 0C water mixed with UV sensitive dye for a minimum of 5 minutes – repeated for a total of 10 cycles. Controller stabilized at -40C for 30 min. Removed from chamber and immediately immersed into 25C water mixed with UV sensitive dye for a minimum of 5 min – repeated for a total of 10 cycles. No functional failures or ingress of water.**
- **Chemical: ASAE EP455.5.8.2 chemicals brush exposure.**
- **Chemical Test: Apply with a brush over the normally exposed surface area. Repeat once per day for three days. Check for impaired function or detrimental corrosion during the test and at end of 100 hour min interval following exposure to test condition. No defect from wiping the surface with the following chemicals at room temperature: engine oil, transmission fluid, galoline.**



HOOKUP: Gas Powered, Diesel or Electric Versions PIN OUT

A Ground
B +12VDC Supply
C Clutch OUT+
D Clutch RETURN
E RPM Tachometer trigger (for closed loop versions). Inductive for gas equipment, alternator output for diesel, other pickup options available.



OEM Features:

- **Other tachometer feedback (rotating shaft, controller interface, etc.)**
- **Open loop soft start version with no tachometer feedback.**
- **Voltage input options.**
- **Multiple clutch engagement and tachometer profiles.**

PITTS®
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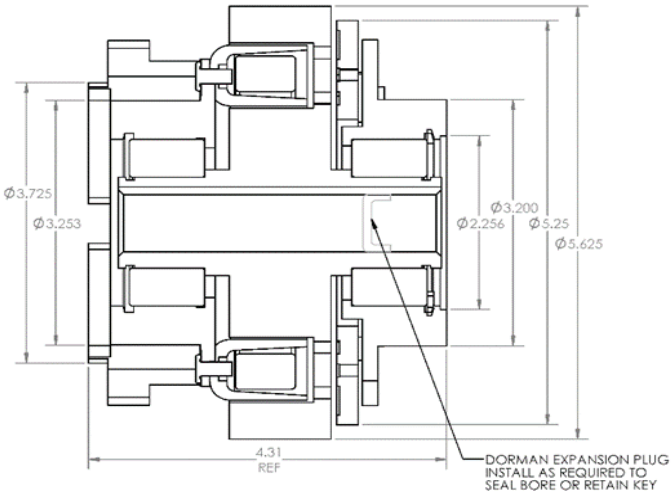
H24D90 CLUTCH

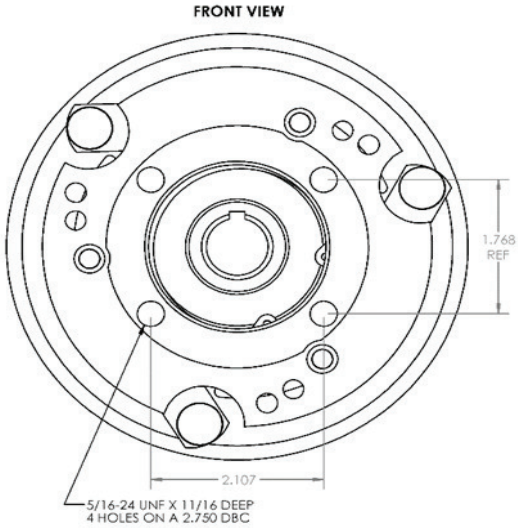
Hydraulic Pump Drive
12 or 24 Volt D.C. - Shaft Driven

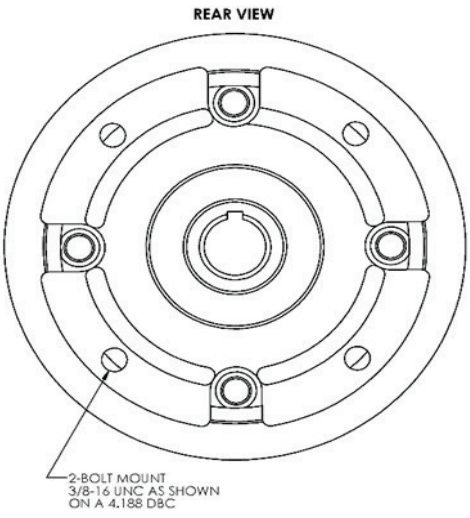
Power	Max RPM	Weight
48 Watts	3600	20 Lbs.



Note:

- Drive flange bolt pattern and pilot diameter on clutch are dimensioned to correlate with "Spicer" type 1000 – 1100 series drive shaft flange connections.
- Proper drive shaft selection is important. Consult with drive shaft manufacturers specifications for each specific application requirements.
- Drive shaft alignment must be within 3°.





US Patent No. 4601378

Static Rated Torque - 90 Lbs. Ft.

24 Volt - 2 Amp Part No.	12 Volt - 4 Amp Part No	For Pump Shaft Size	For Pump Mount Style	Pitts Mount Bracket
14344	13750	3/4" - With 3/16" Keyway	"A" 2 Bolt	13195

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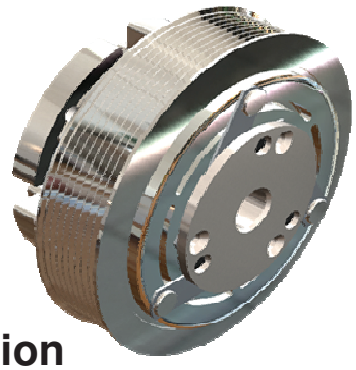
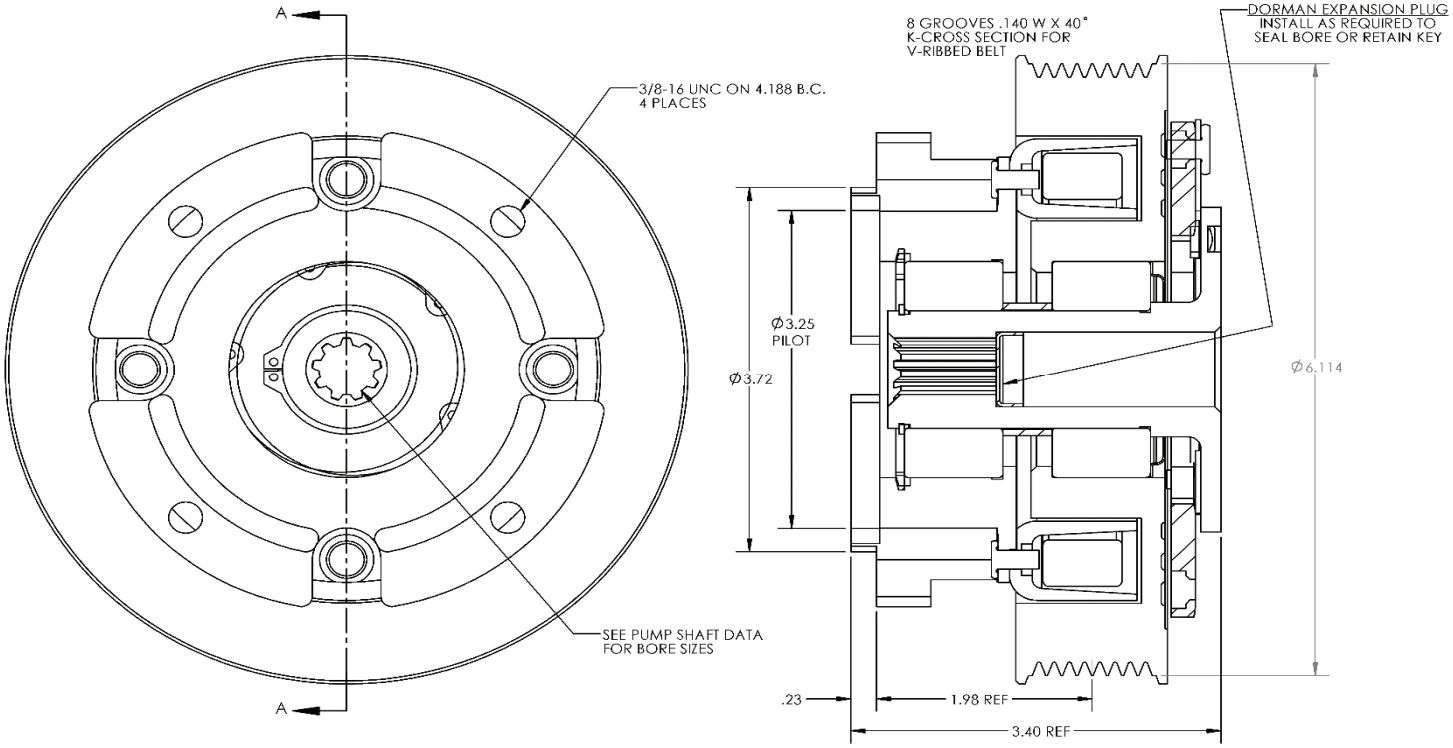


H24K90 CLUTCH

Hydraulic Pump Drive
12 Volt D.C. - Polly Groove "K" Section

Power	Max RPM	Weight
48 Watts	5000	14 Lbs.



US Patent No. 4601378

Static Rated Torque - 90 Lbs. Ft.

24 Volt - 2 Amp Part No.	12 Volt - 4 Amp Part No	For Pump Shaft Size	For Pump Mount Style	Pitts Mount Bracket
N/A	14647	"A" Spline 9T 16/32 DP	"A" 2 Bolt	13195
	13818	3/4" - With 3/16" Keyway		

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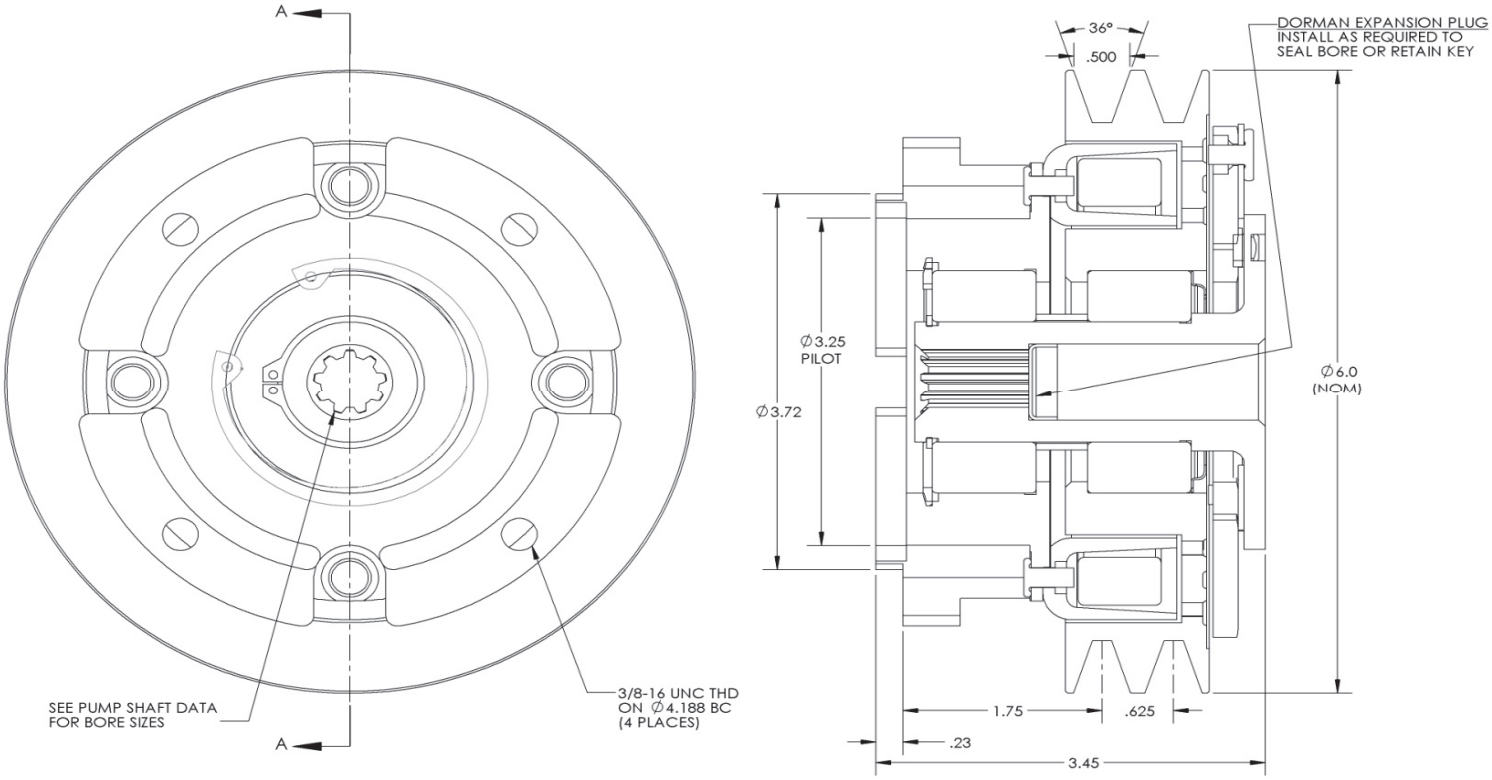
"The Clutch People"

H24V90 CLUTCH

Hydraulic Pump Drive
12 or 24 Volt D.C. - V-Belt Driven

Power	Max RPM	Weight
48 Watts	5000	14 Lbs.



US Patent No. 4601378

Static Rated Torque - 90 Lbs. Ft.

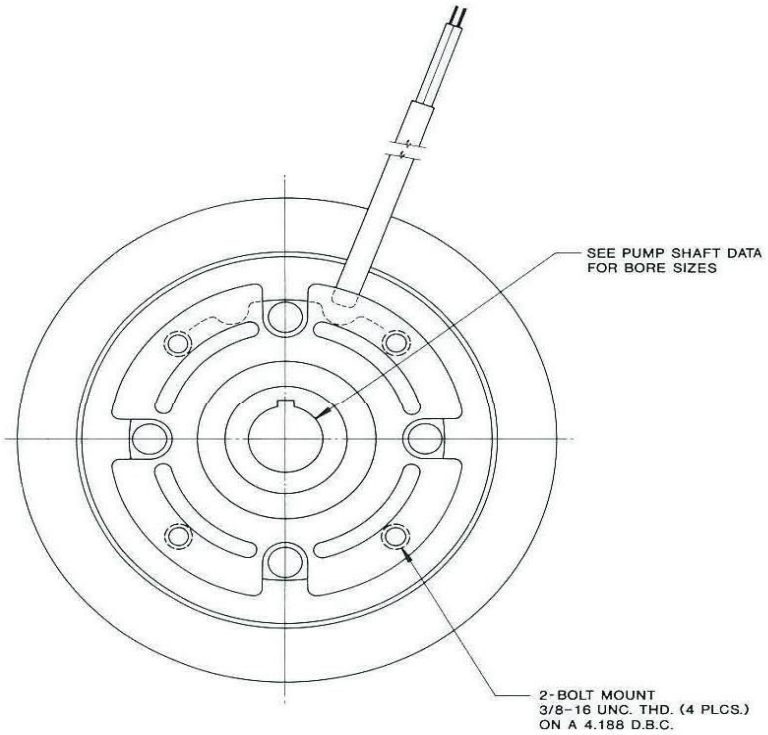
24 Volt - 2 Amp Part No.	12 Volt - 4 Amp Part No	For Pump Shaft Size	For Pump Mount Style	Pitts Mount Bracket
N/A	13157	5/8" - With 5/32" Keyway	"A" 2 Bolt	13195
	13229	"A" Spline 9T 16/32 DP		
13817	13233	3/4" - With 3/16" Keyway		

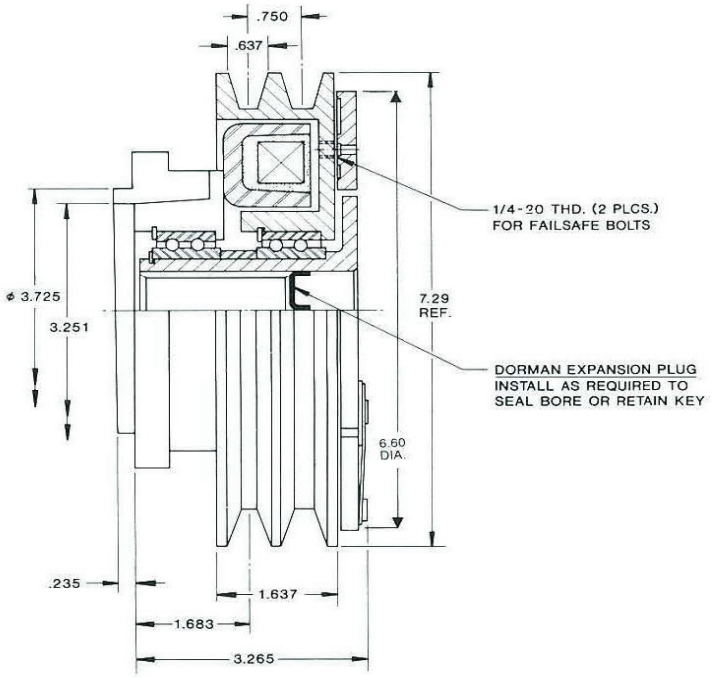
"The Clutch People"

H27V150 CLUTCH

Hydraulic Pump Drive
12 or 24 Volt D.C. - Belt Driven - Power Band "B" Belt

Power	Max RPM	Weight
60 Watts	3600	24 Lbs.





US Patent No. 4601378

Static Rated Torque - 150 Lbs. Ft.

24 Volt - 2.5 Amp Part No.	12 Volt - 5 Amp Part No	For Pump Shaft Size	For Pump Mount Style	Pitts Mount Bracket
N/A	13666	3/4" - With 3/16" Keyway	"A" 2 Bolt	13195

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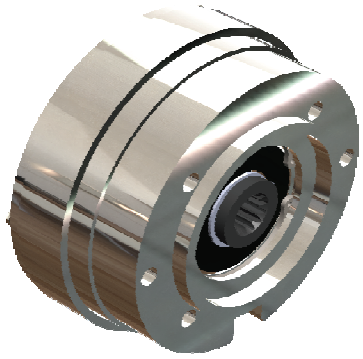
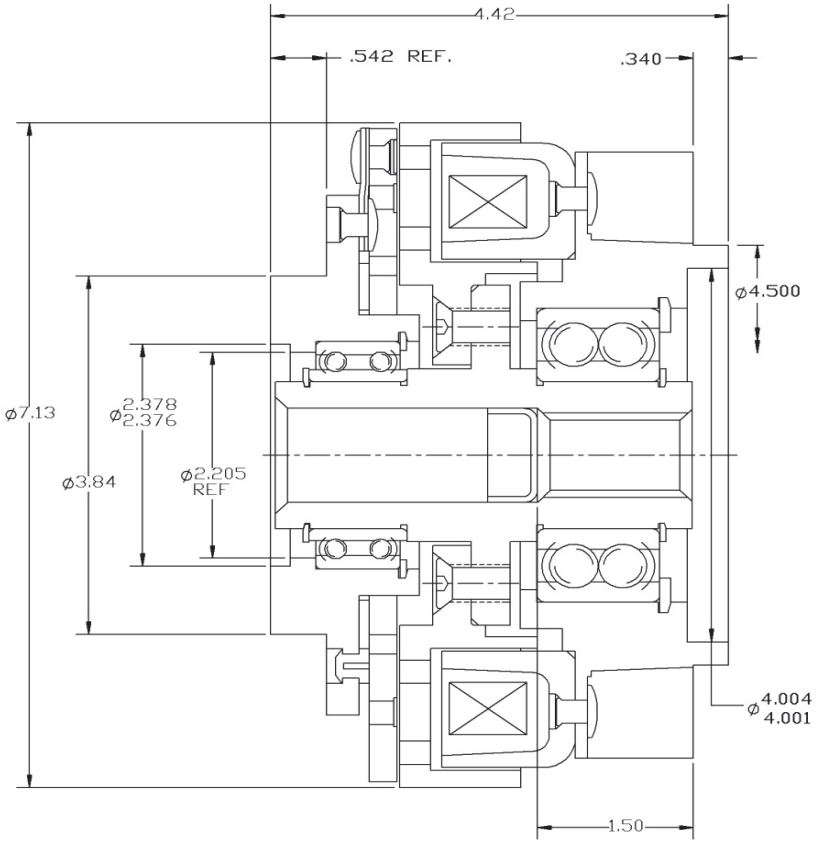


H28D200 CLUTCH

Hydraulic Pump Drive
12 or 24 Volt D.C. - Shaft Driven

Power	Max RPM	Weight
72 Watts	3600	30 Lbs.



US Patent No. 4601378

Static Rated Torque - 200 Lbs. Ft.

Inertia: Rotor Assy..... .39 Lb. Ft.^{2}

Armature Assy..... .18 Lb. Ft.^{2}

24 Volt - 3 Amp Part No.	12 Volt - 6 Amp Part No	For Pump Shaft Size	For Pump Mount Style	Pitts Mount Bracket
13814	13394	"B" Spline 13T 16/32 DP	"B" 2 or 4 Bolt	13219
N/A	13395	7/8" - With 1/4" Keyway		
N/A	13396	1" - With 1/4" Keyway		

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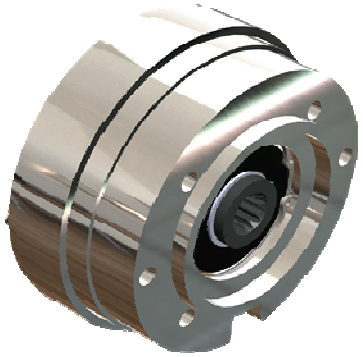
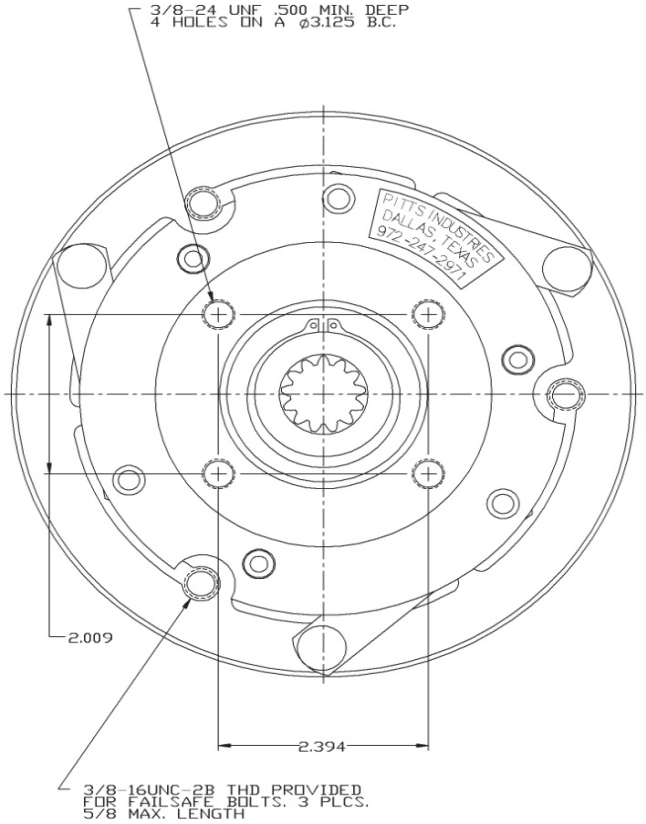


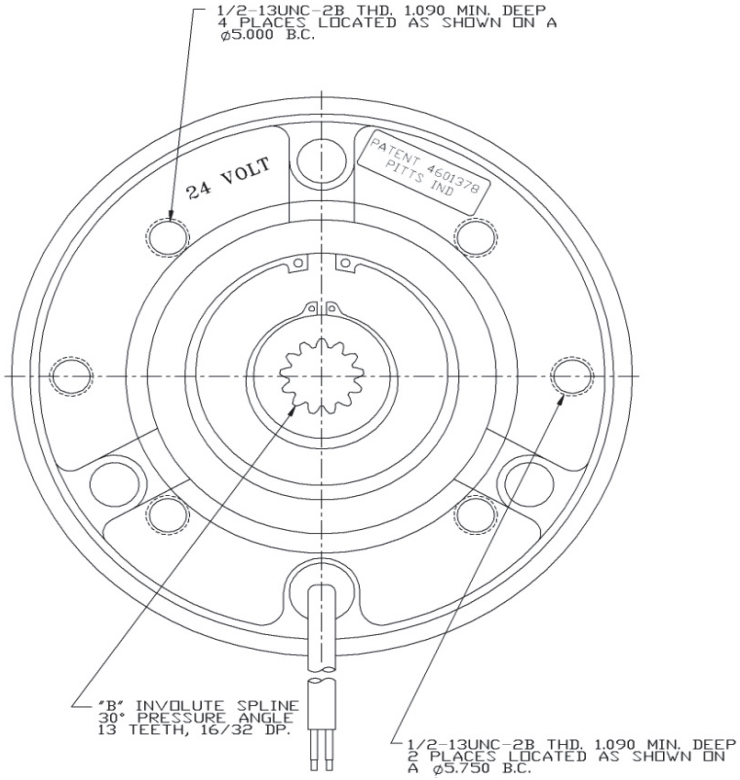
H28D200 CLUTCH

Mounting Dimensions

Front View



Rear View



Note:

- Drive flange bolt pattern and pilot diameter on clutch are dimensioned to correlate with “Spicer” type 1280 – 1310 series drive shaft flange connections.
- Proper drive shaft selection is important. Consult with drive shaft manufacturers specifications for each specific application requirements.
- Drive shaft alignment must be within 3°.

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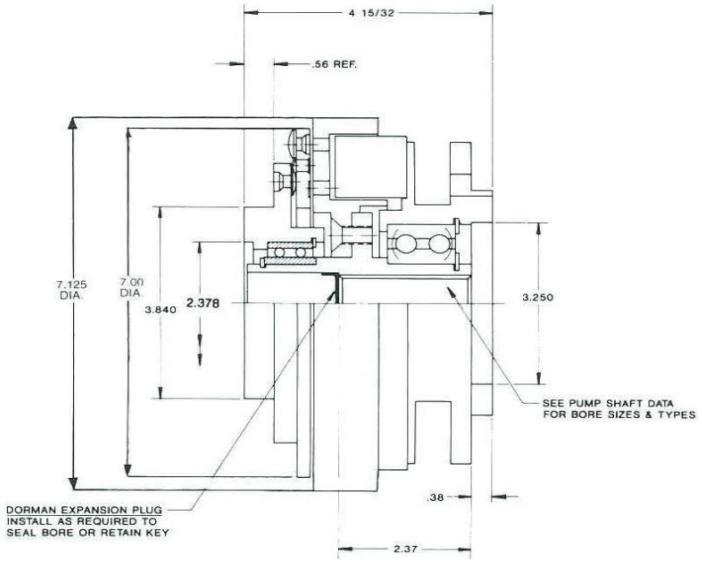
GRESEN PUMP ONLY

H28D200G CLUTCH

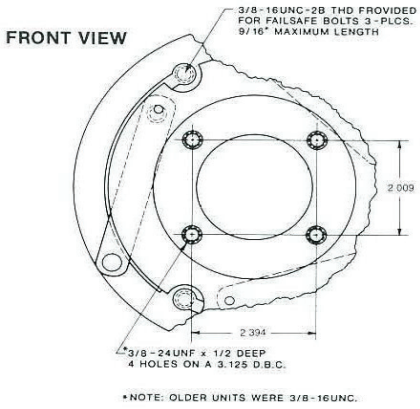
Hydraulic Pump Drive, (Gresen TC)
12 or 24 Volt D.C. - Shaft Driven

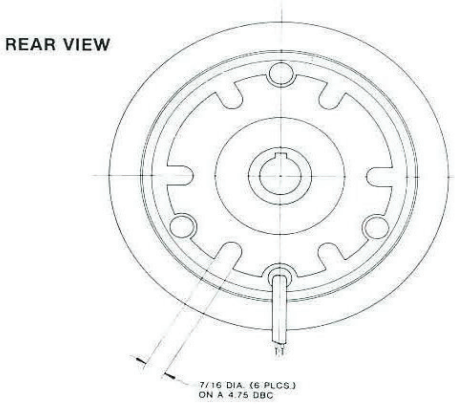
Power	Max RPM	Weight
72 Watts	3600	30 Lbs.



Note:

- Drive flange bolt pattern and pilot diameter on clutch are dimensioned to correlate with "Spicer" type 1280 – 1310 series drive shaft flange connections.
- Proper drive shaft selection is important. Consult with drive shaft manufacturers specifications for each specific application requirements.
- Drive shaft alignment must be within 3°.





US Patent No. 4601378

Static Rated Torque - 200 Lbs. Ft.

Inertia: Rotor Assy..... .39 Lb. Ft.^{2}
Armature Assy..... .18 Lb. Ft.^{2}

24 Volt - 3 Amp Part No.	12 Volt - 6 Amp Part No	For Pump Shaft Size	For Pump Mount Style	Pitts Mount Bracket
13898	13418	1" Straight Keyed - 1/4" Keyway	"A" 6 Bolt	13219

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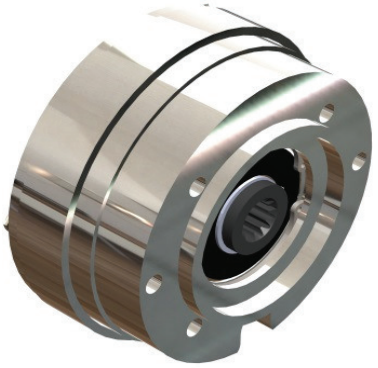
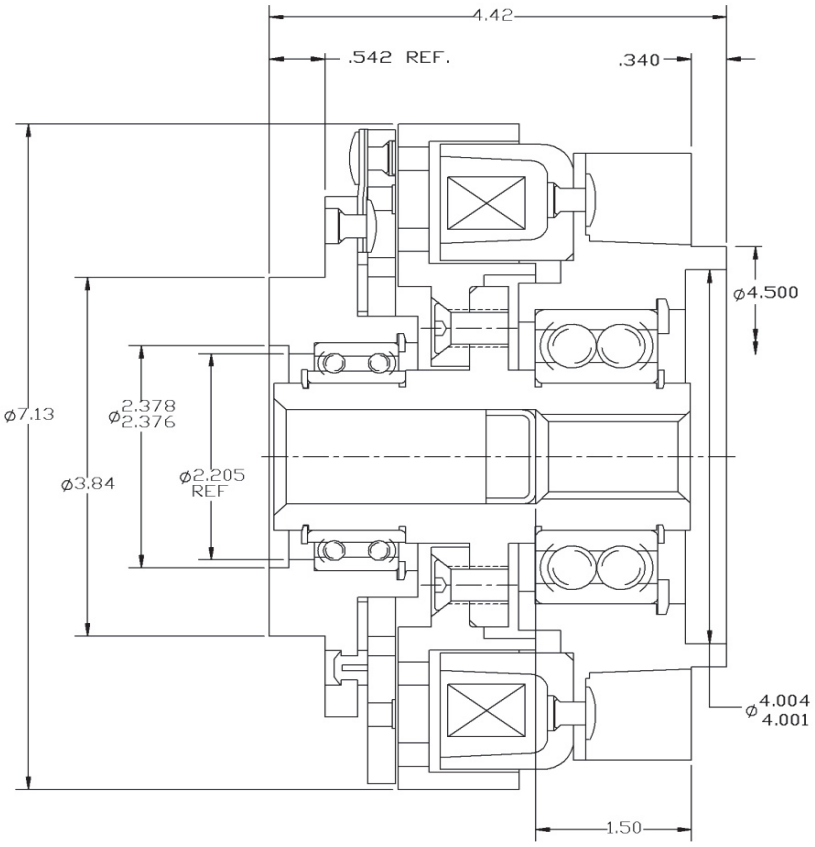


H28D300HT CLUTCH

Hydraulic Pump Drive
12 or 24 Volt D.C. - Shaft Driven

Power	Max RPM	Weight
72 Watts	3600	30 Lbs.



US Patent No. 4601378

Static Rated Torque - 300 Lbs. Ft.

Inertia: Rotor Assy…… .39 Lb. Ft.^{2}

Armature Assy…… .18 Lb. Ft.^{2}

24 Volt - 3 Amp Part No.	12 Volt - 6 Amp Part No	For Pump Shaft Size	For Pump Mount Style	Pitts Mount Bracket
14729	14728	"B" Spline 13T 16/32 DP	"B" 2 or 4 Bolt	13219

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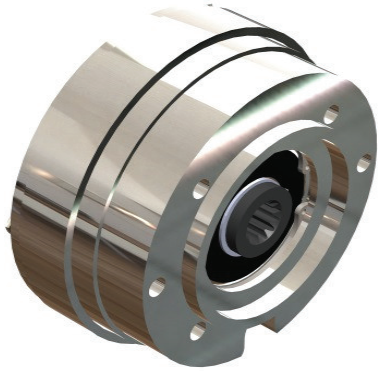
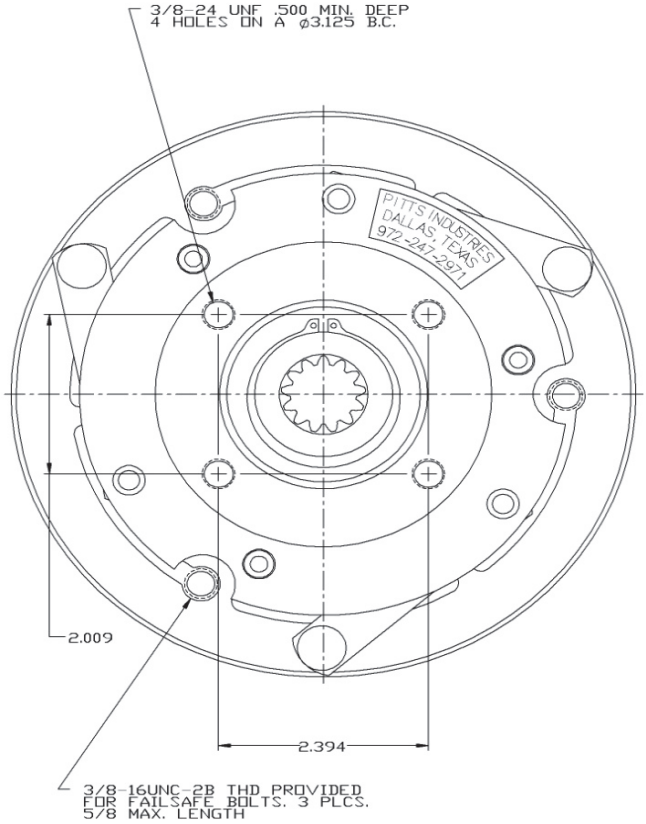
H28D300HT CLUTCH

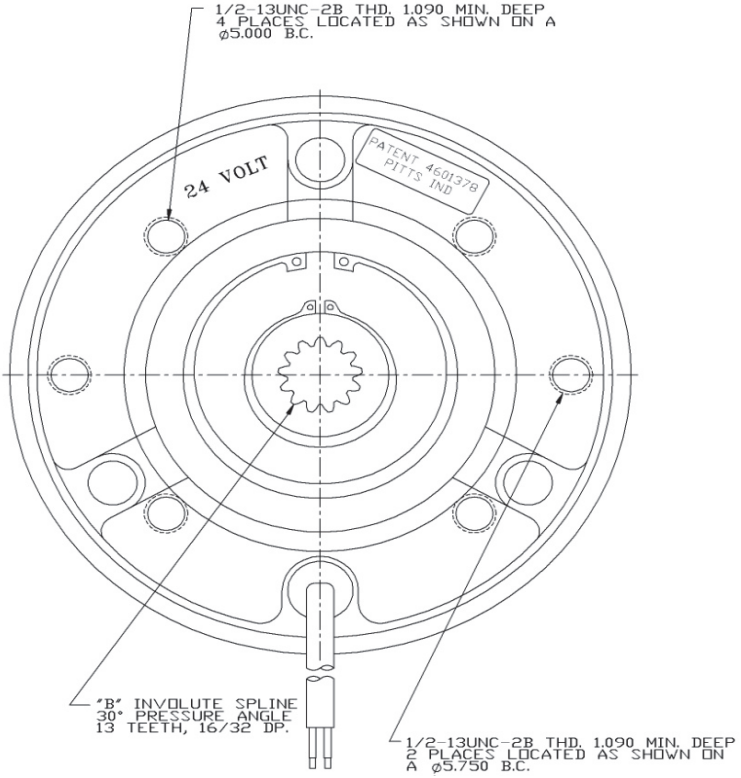
Mounting Dimensions



Front View



Rear View



Note:

- Drive flange bolt pattern and pilot diameter on clutch are dimensioned to correlate with “Spicer” type 1280 – 1310 series drive shaft flange connections.
- Proper drive shaft selection is important. Consult with drive shaft manufacturers specifications for each specific application requirements.
- Drive shaft alignment must be within 3°.

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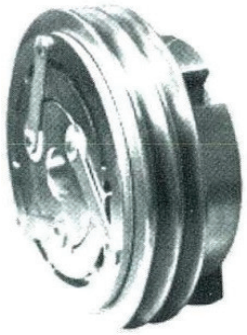
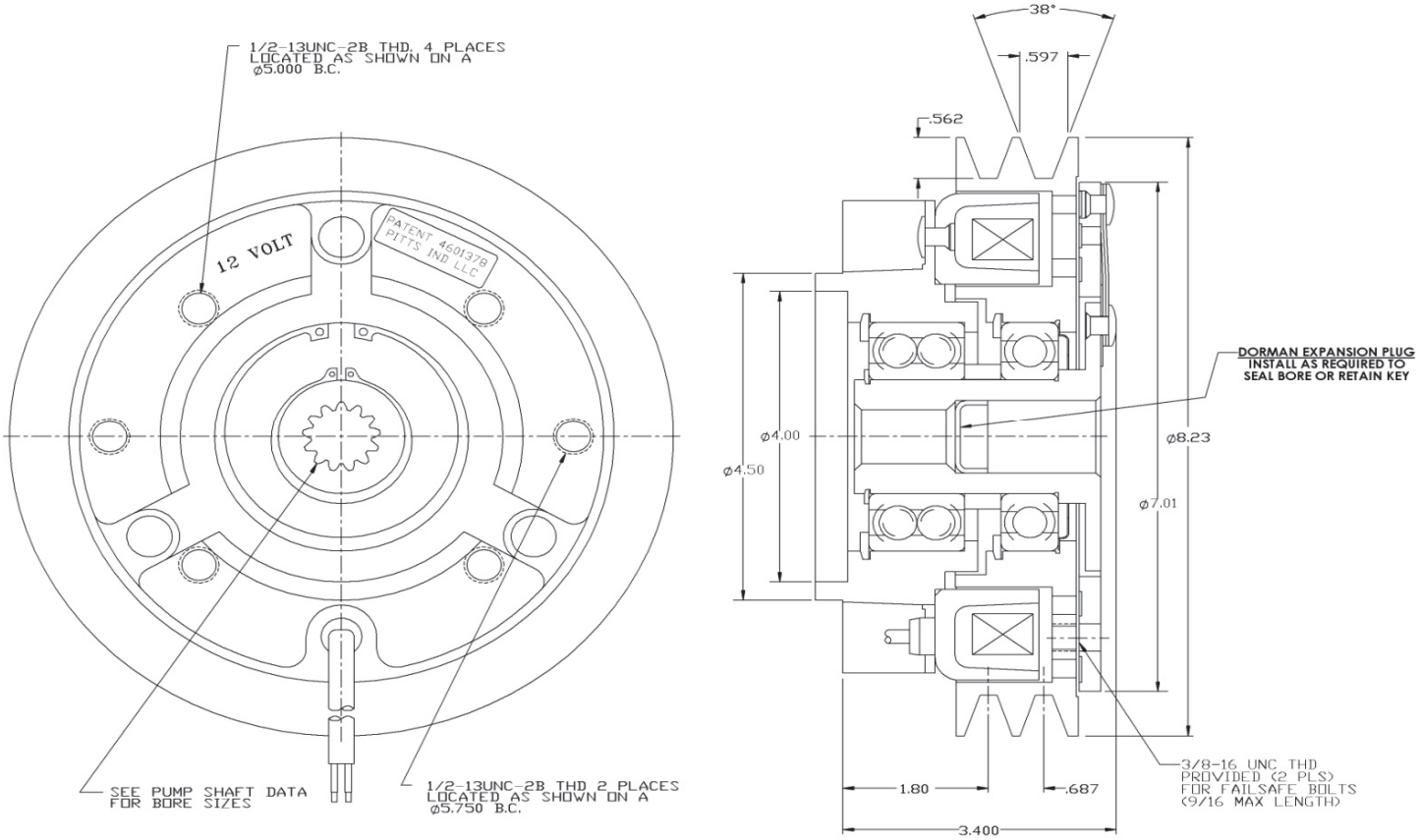


H28V200 CLUTCH

Hydraulic Pump Drive
12 or 24 Volt D.C. - V-Belt Driven - 5/8" Wide Belts

Power	Max RPM	Weight
72 Watts	3600	30 Lbs.



US Patent No. 4601378

Static Rated Torque - 200 Lbs. Ft.

24 Volt - 3 Amp Part No.	12 Volt - 6 Amp Part No	For Pump Shaft Size	For Pump Mount Style	Pitts Mount Bracket
N/A	13244	1" - With 1/4" Keyway	"B" 2 or 4 Bolt	13219
13654	13245	"B" Spline 13T 16/32 DP		
N/A	13246	7/8" - With 1/4" Keyway		

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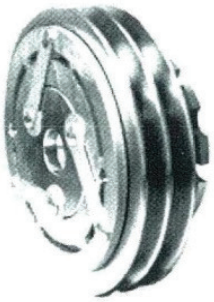
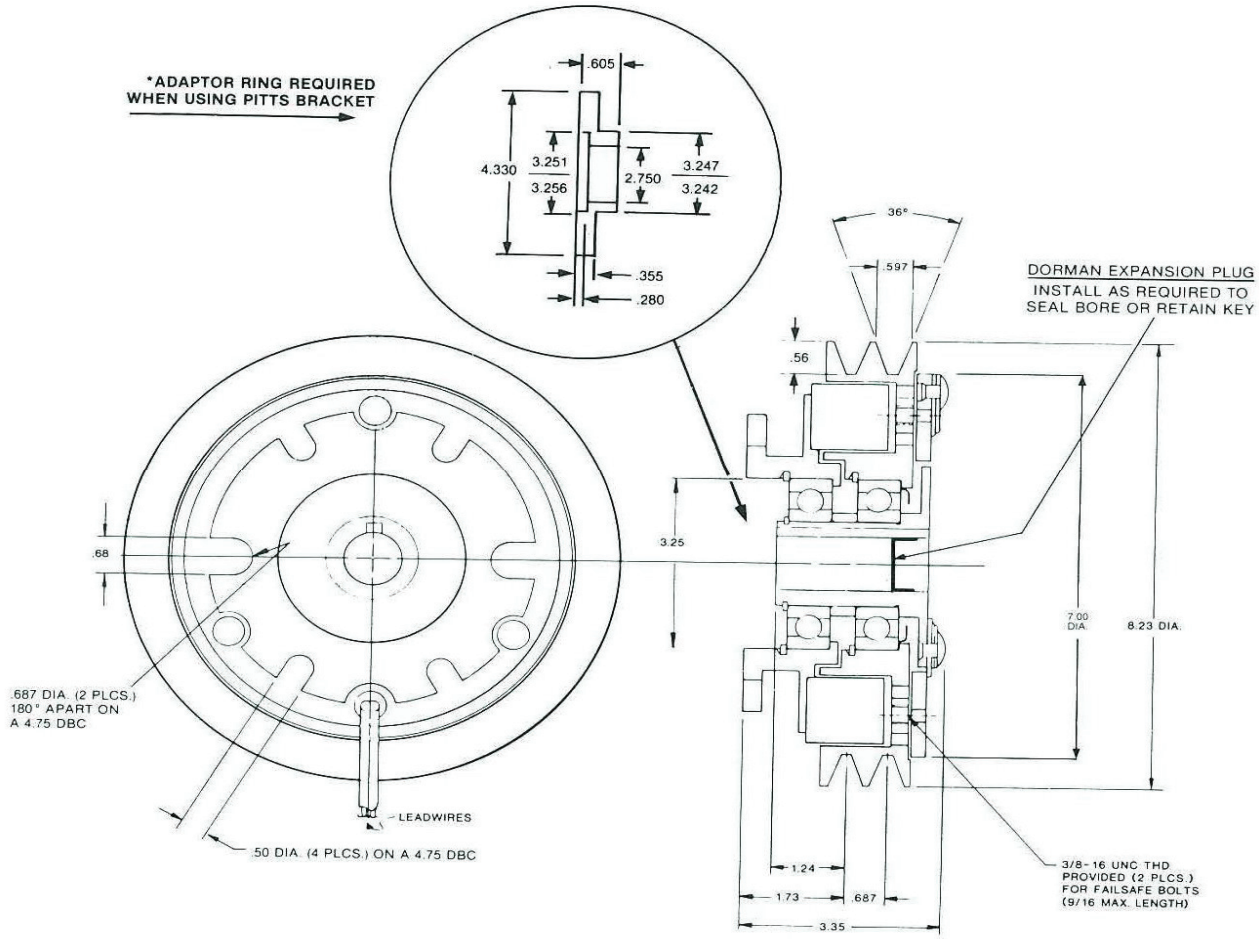


GRESEN PUMP ONLY

H28V200G CLUTCH

Hydraulic Pump Drive
12 or 24 Volt D.C. - V-Belt Driven - 5/8" Wide Belts

Power	Max RPM	Weight
72 Watts	3600	30 Lbs.



US Patent No. 4601378

Static Rated Torque - 200 Lbs. Ft.

24 Volt - 3 Amp Part No.	12 Volt - 6 Amp Part No	For Pump Shaft Size	For Pump Mount Style	Pitts Mount Bracket
13500	13403	1" - With 1/4" Keyway	"A" 6 Bolt	13219

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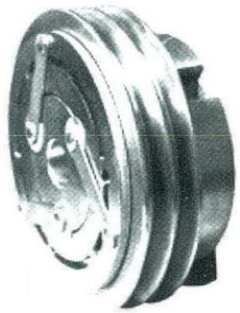
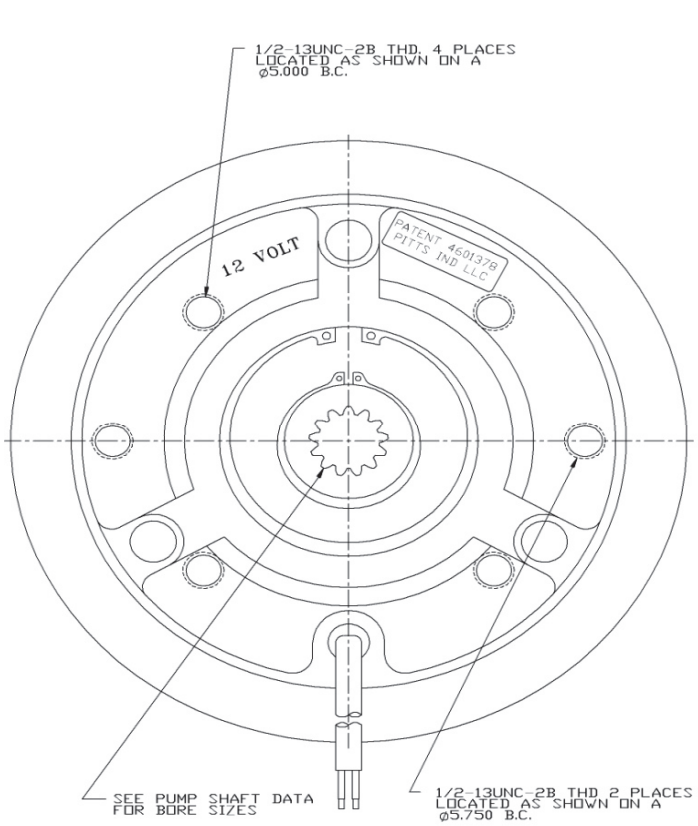
"The Clutch People"

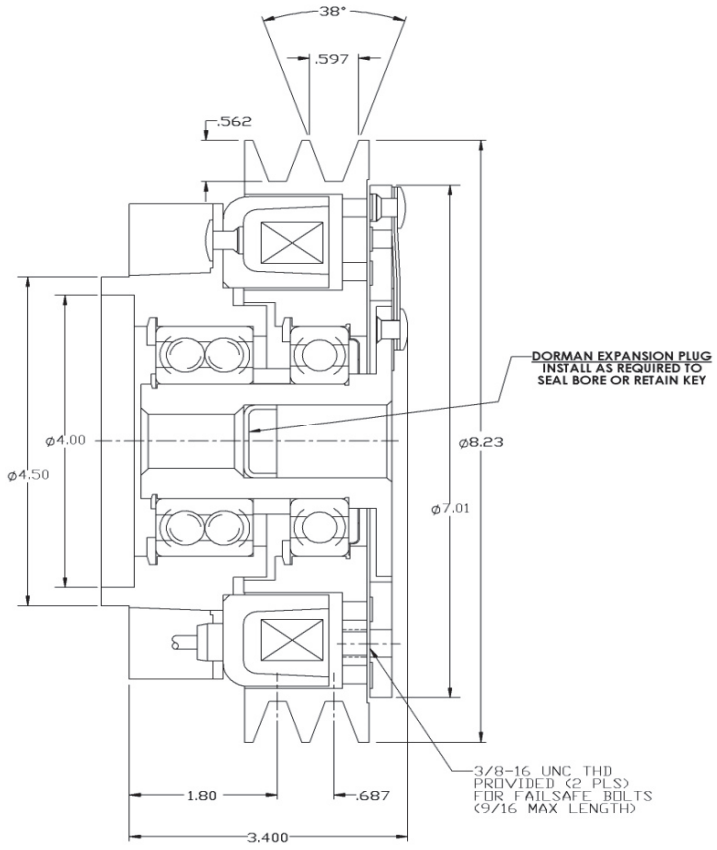


H28V300HT CLUTCH

Hydraulic Pump Drive
12 or 24 Volt D.C. - V-Belt Driven - 5/8" Wide Belts

Power	Max RPM	Weight
72 Watts	3600	30 Lbs.





US Patent No. 4601378

Static Rated Torque - 300 Lbs. Ft.

24 Volt - 3 Amp Part No.	12 Volt - 6 Amp Part No	For Pump Shaft Size	For Pump Mount Style	Pitts Mount Bracket
14731	14730	"B" Spline 13T 16/32 DP	"B" 2 or 4 Bolt	13219

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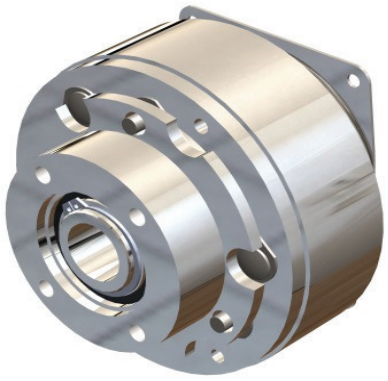
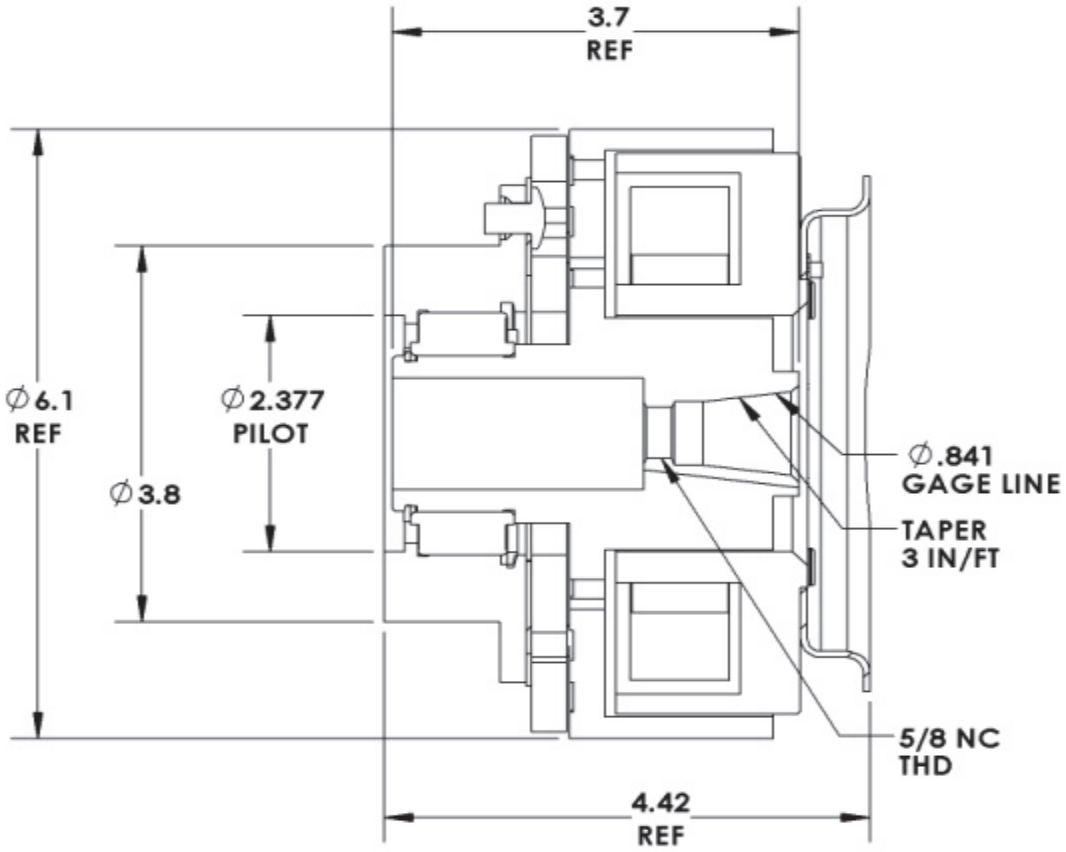


H28W200 CLUTCH

Hydraulic Pump Drive
12 Volt D.C. - Shaft Driven

Power	Max RPM	Weight
59 Watts	3600	25 Lbs.



Static Rated Torque - 200 Lbs. Ft.

24 Volt - 2.5 Amp Part No.	12 Volt - 5 Amp Part No	For Pump Shaft Size	For Pump Mount Style	Pitts Mount Bracket
N/A	14624	Taper Bore, 3.0"/Ft	Type "B" Mount	N/A

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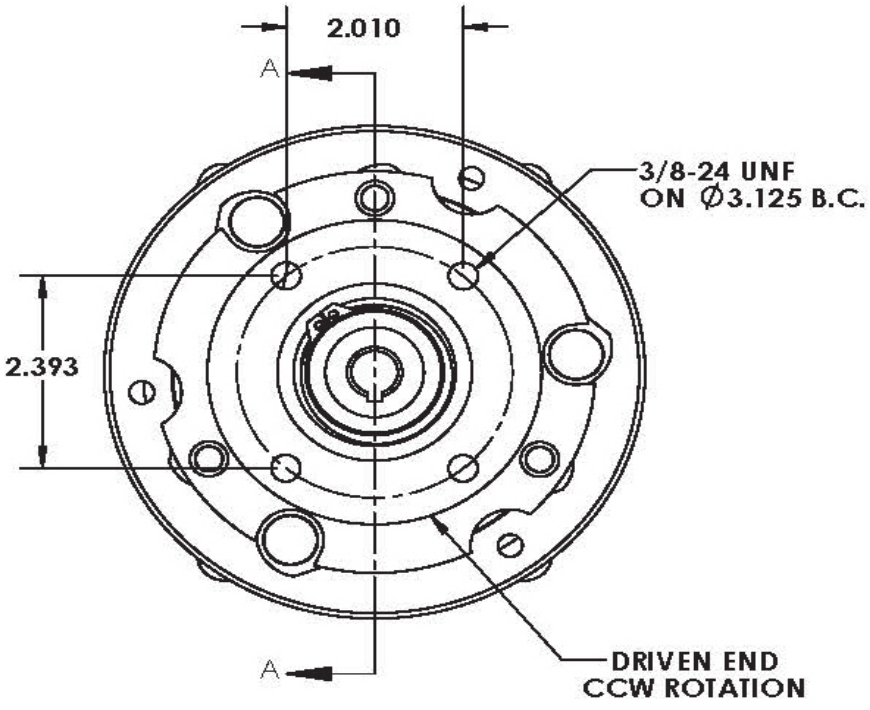
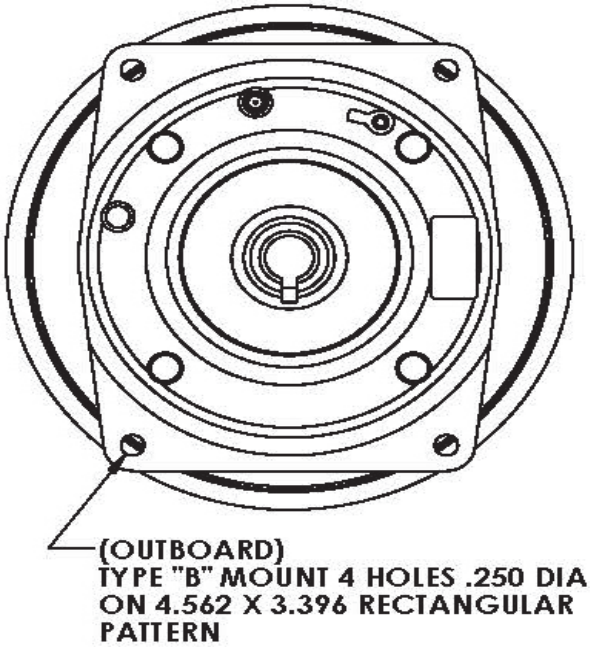
H28W200 CLUTCH

Mounting Dimensions

Front View



Rear View



Note:

- Drive flange bolt pattern and pilot diameter on clutch are dimensioned to correlate with “Spicer” type 1280 – 1310 series drive shaft flange connections.
- Proper drive shaft selection is important. Consult with drive shaft manufacturers specifications for each specific application requirements.
- Drive shaft alignment must be within 3°.

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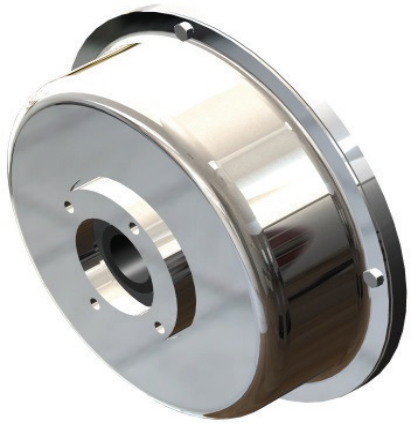
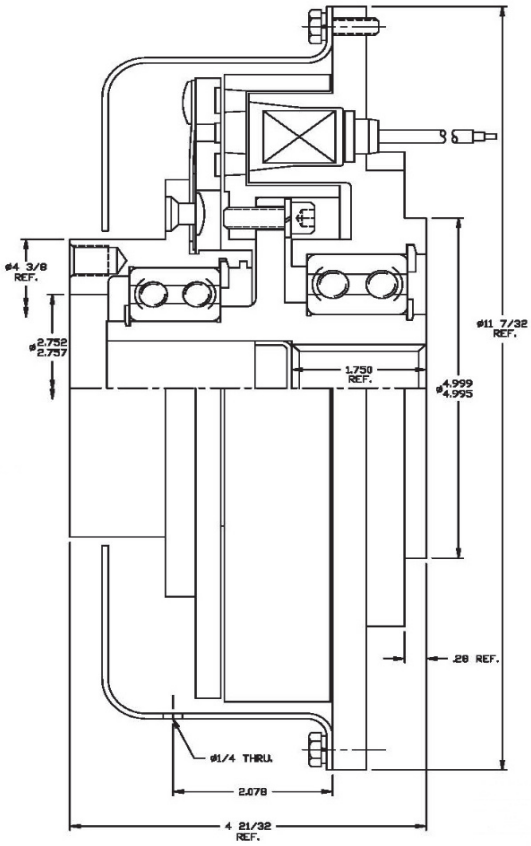


H36D400 CLUTCH

Hydraulic Pump Drive
12 or 24 Volt D.C. - Shaft Driven

Power	Max RPM	Weight
91 Watts	3600	44 Lbs.



US Patent No. 4601378

Static Rated Torque - 400 Lbs. Ft.

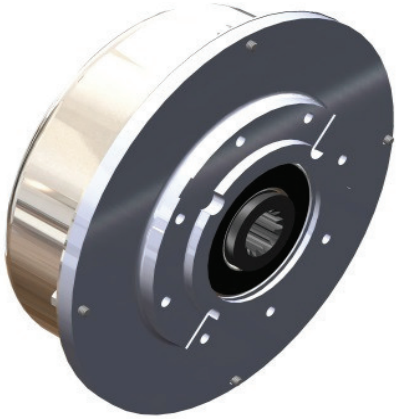
Inertia: Rotor Assy..... .79 Lb. Ft.^{2}

Armature Assy..... .48 Lb. Ft.^{2}

24 Volt - 4 Amp Part No.	12 Volt - 8 Amp Part No	For Pump Shaft Size	For Pump Mount Style	Pitts Mount Bracket
13856	13378	"C" Splined 1-1/4" 14T 12/24 DP	"C" 2-4	13256
13798	13538	"C" - 1-1/4" With 5/16" Keyway		
13859	13589	"B" Splined 7/8" 13T 16/32 DP	"B" 2-4	13258

PITTS®

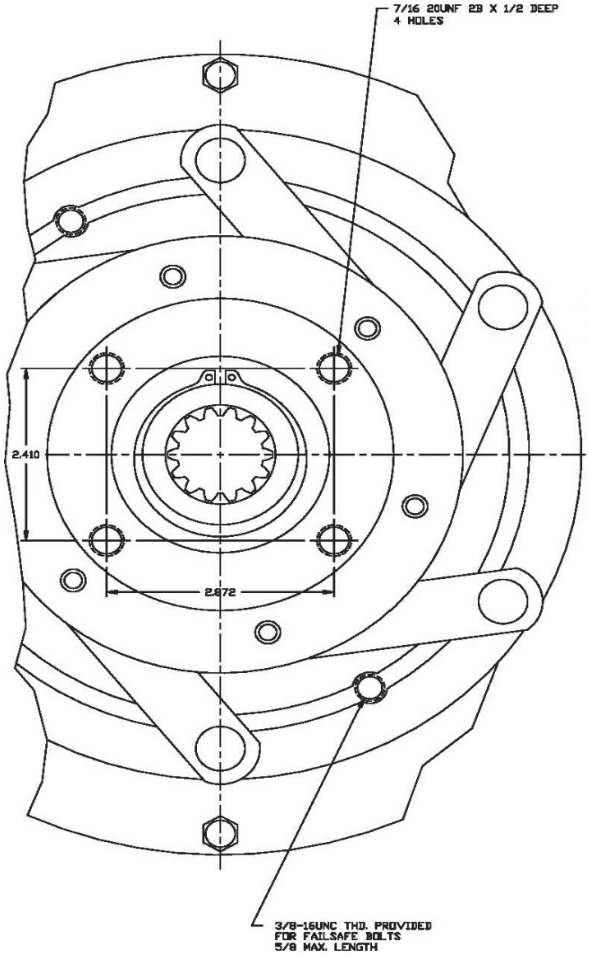
"The Clutch People"



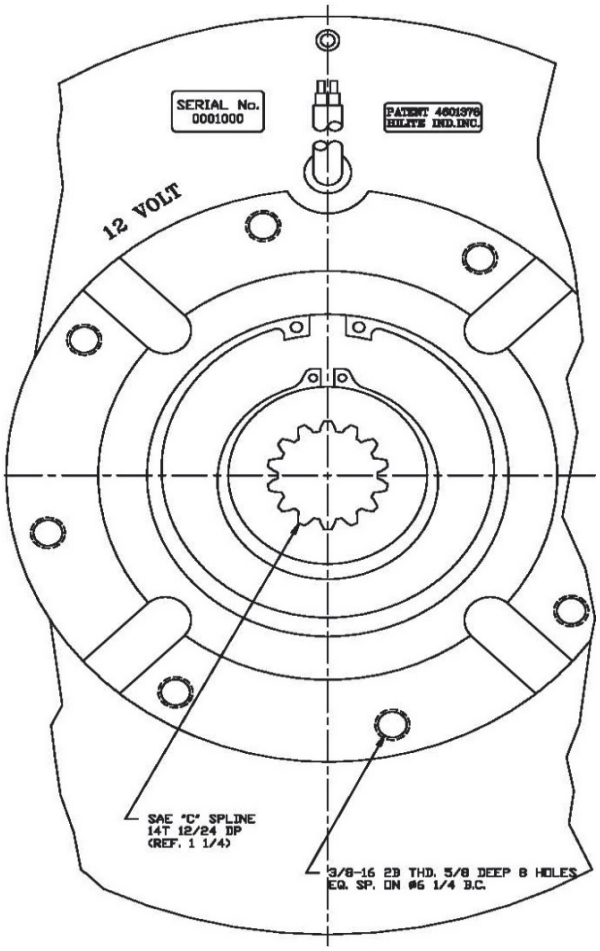
H36D400 CLUTCH

Mounting Dimensions

Front View



Rear View



US Patent No. 4601378

Note:

- Drive flange bolt pattern and pilot diameter on clutch are dimensioned to correlate with “Spicer” type 1350 – 1410 series drive shaft flange connections.
- Proper drive shaft selection is important. Consult with drive shaft manufacturers specifications for each specific application requirements.
- Drive shaft alignment must be within 3°.

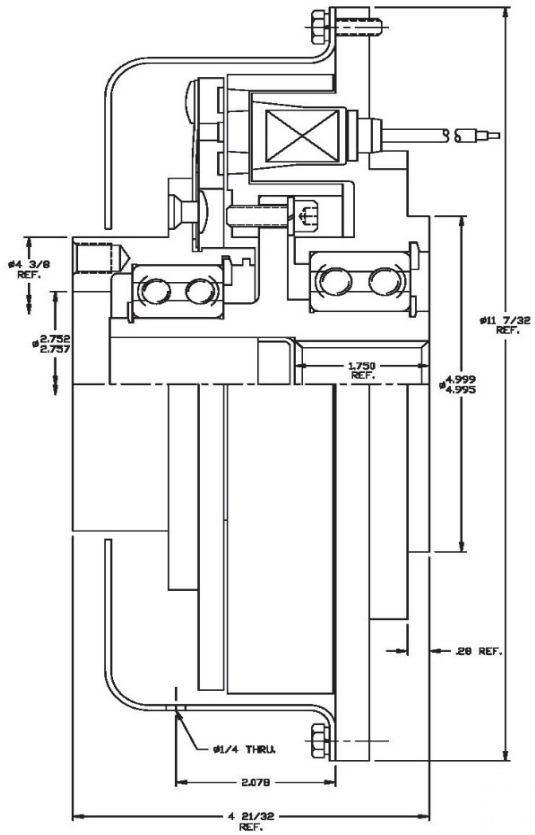
PITTS®

"The Clutch People"

H36D550HT CLUTCH

Hydraulic Pump Drive
12 or 24 Volt D.C. - Shaft Driven

Power	Max RPM	Weight
91 Watts	3600	44 Lbs.



US Patent No. 4601378

Static Rated Torque - 550 Lbs. Ft.

Inertia: Rotor Assy..... .79 Lb. Ft.^{2}

Armature Assy..... .48 Lb. Ft.^{2}

24 Volt - 4 Amp Part No.	12 Volt - 8 Amp Part No	For Pump Shaft Size	For Pump Mount Style	Pitts Mount Bracket
14733	14732	"C" Splined 1-1/4" 14T 12/24 DP	"C" 2-4	13256

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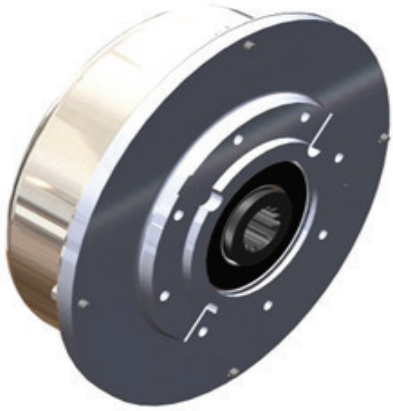
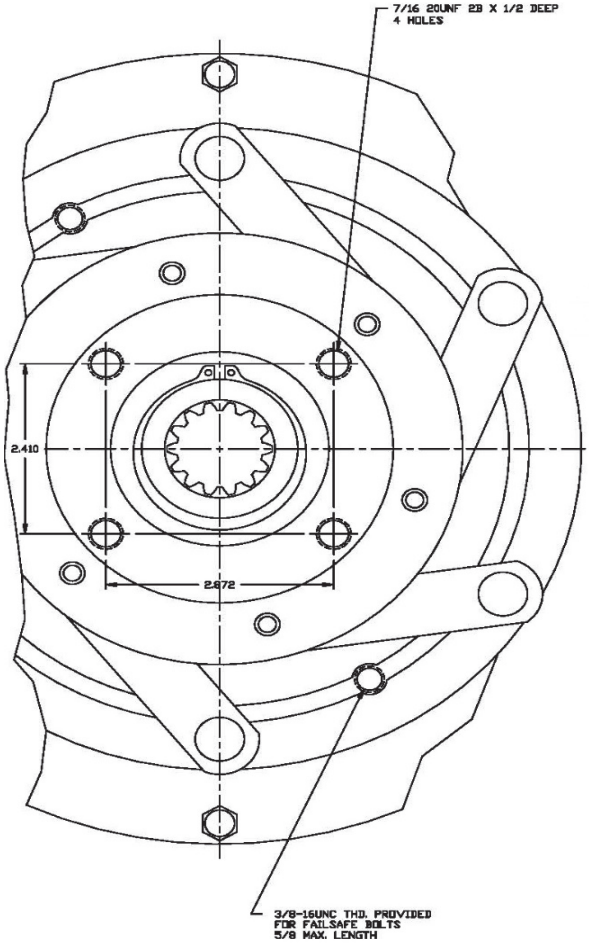


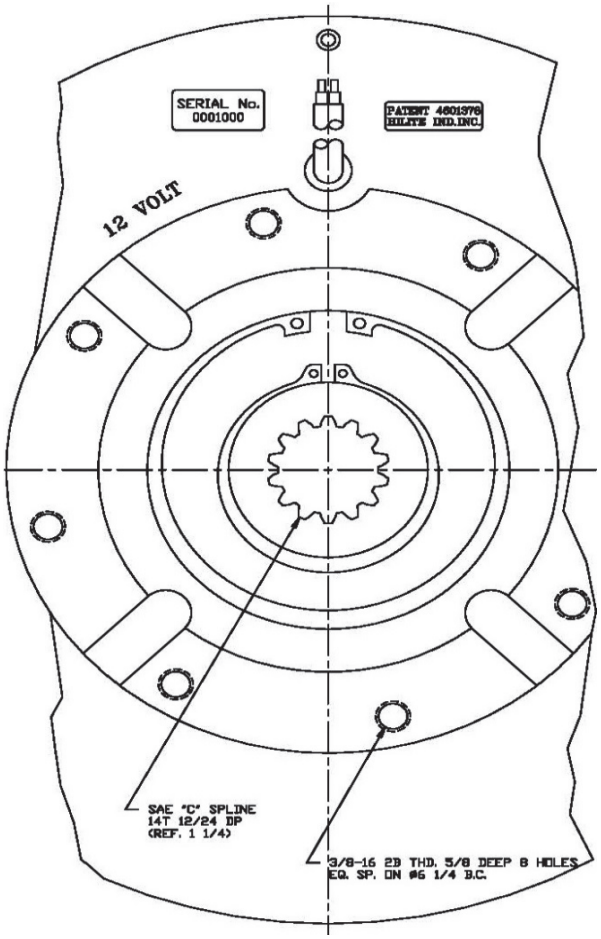
H36D550HT CLUTCH

Mounting Dimensions

Front View



Rear View



US Patent No. 4601378

Note:

- Drive flange bolt pattern and pilot diameter on clutch are dimensioned to correlate with “Spicer” type 1350 – 1410 series drive shaft flange connections.
- Proper drive shaft selection is important. Consult with drive shaft manufacturers specifications for each specific application requirements.
- Drive shaft alignment must be within 3°.

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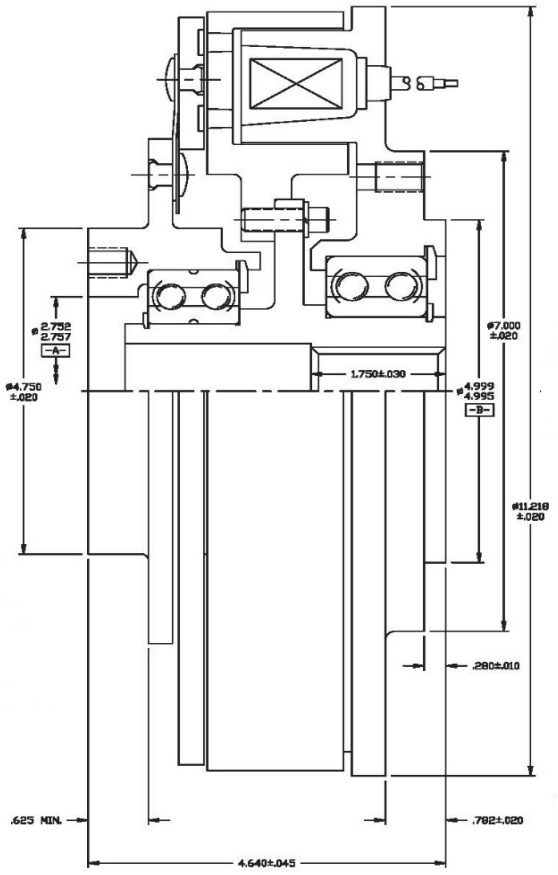
H44D700 CLUTCH

Hydraulic Pump Drive
12 or 24 Volt D.C. - Shaft Driven

Power	Max RPM	Weight
91 Watts	3000	45 Lbs.



US Patent No. 4601378

Static Rated Torque - 700 Lbs. Ft.

Inertia: Rotor Assy……. 1.83 Lb. Ft.^{2}
Armature Assy……. .92 Lb. Ft.^{2}

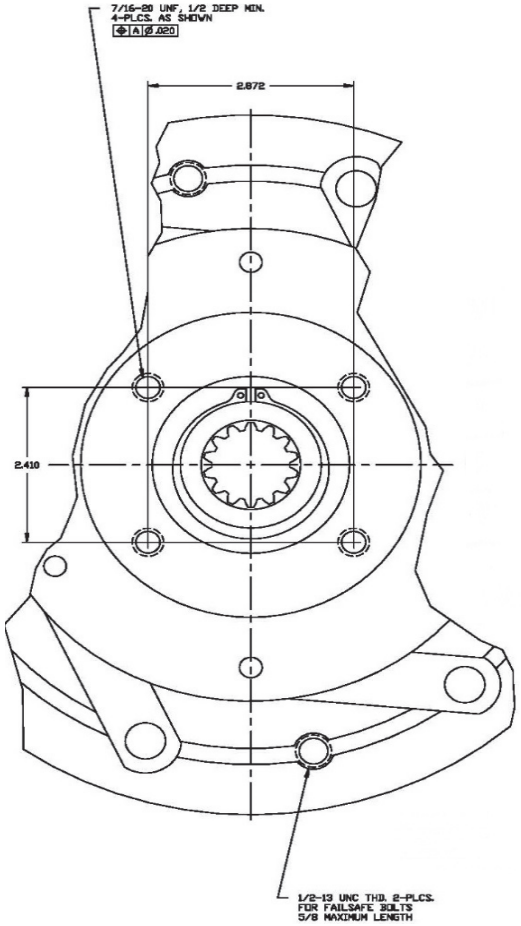
24 Volt - 4 Amp Part No.	12 Volt - 8 Amp Part No	For Pump Shaft Size	For Pump Mount Style	Pitts Mount Bracket
14093	14094	"C" Splined 1-1/4" 14T 12/24 DP	"C" 2-4	13256
			"B" 2-4	13258

"The Clutch People"

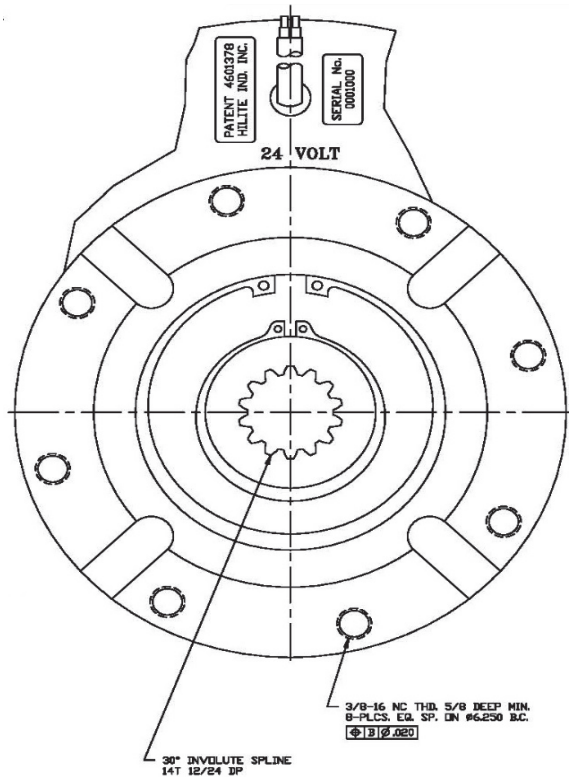
H44D700 CLUTCH

Mounting Dimensions

Front View



Rear View



US Patent No. 4601378

Note:

- Drive flange bolt pattern and pilot diameter on clutch are dimensioned to correlate with “Spicer” type 1350 – 1410 series drive shaft flange connections.
- Proper drive shaft selection is important. Consult with drive shaft manufacturers specifications for each specific application requirements.
- Drive shaft alignment must be within 3°.

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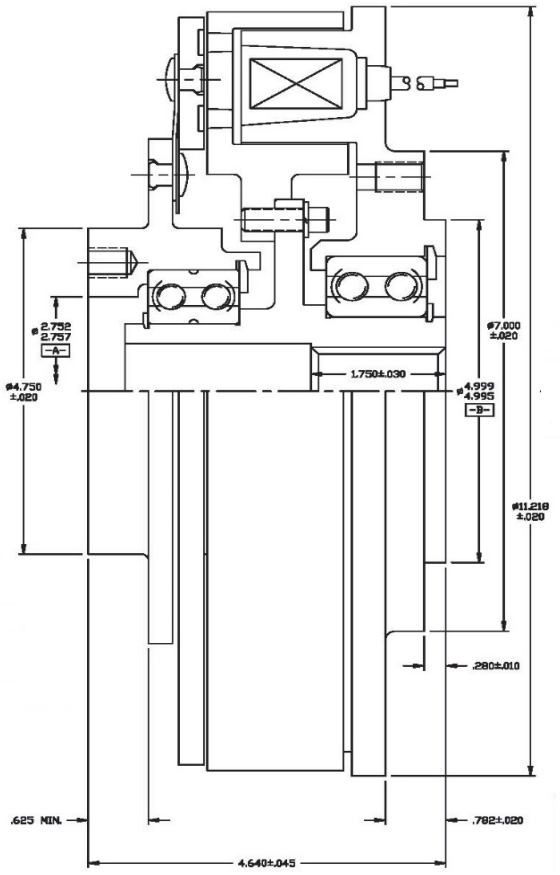
"The Clutch People"

H44D850HT CLUTCH

Hydraulic Pump Drive
12 or 24 Volt D.C. - Shaft Driven

Power	Max RPM	Weight
91 Watts	3000	45 Lbs.



US Patent No. 4601378

Static Rated Torque - 850 Lbs. Ft.

Inertia: Rotor Assy……. 1.83 Lb. Ft.^{2}

Armature Assy……. .92 Lb. Ft.^{2}

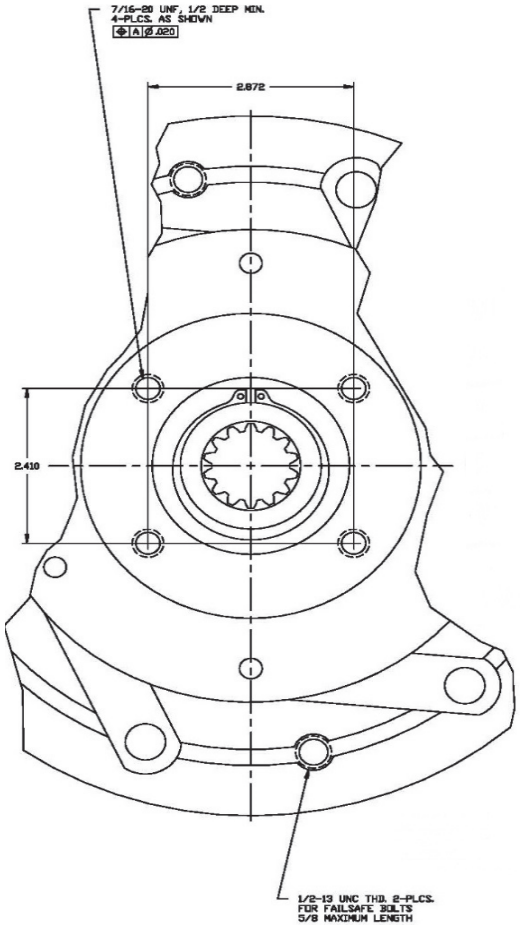
24 Volt - 4 Amp Part No.	12 Volt - 8 Amp Part No	For Pump Shaft Size	For Pump Mount Style	Pitts Mount Bracket
14735	14734	"C" Splined 1-1/4" 14T 12/24 DP	"C" 2-4	13256
			"B" 2-4	13258

"The Clutch People"

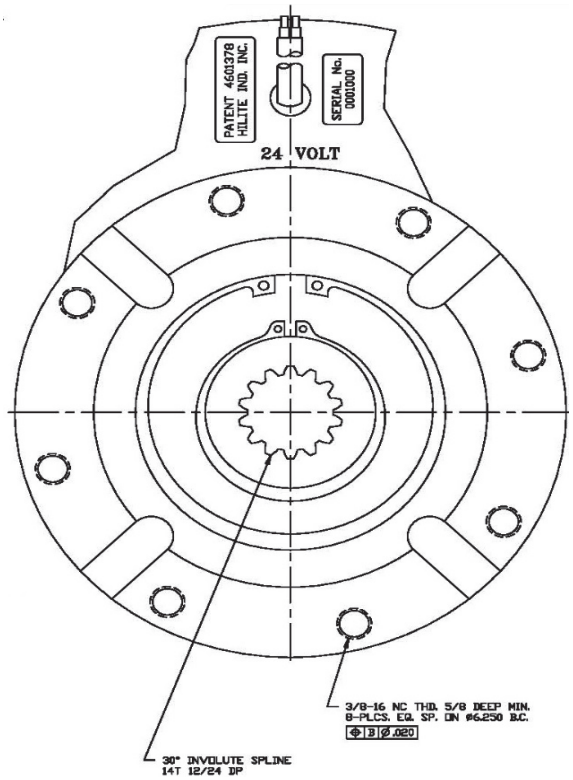
H44D850HT CLUTCH

Mounting Dimensions

Front View



Rear View



US Patent No. 4601378

Note:

- Drive flange bolt pattern and pilot diameter on clutch are dimensioned to correlate with “Spicer” type 1350 – 1410 series drive shaft flange connections.
- Proper drive shaft selection is important. Consult with drive shaft manufacturers specifications for each specific application requirements.
- Drive shaft alignment must be within 3°.

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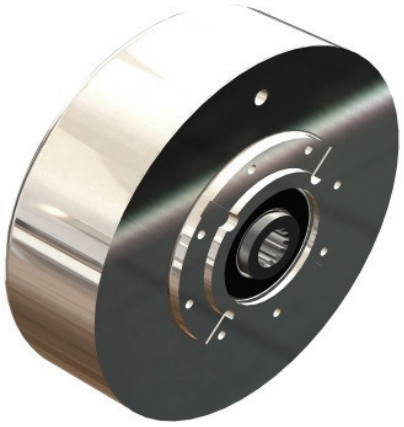
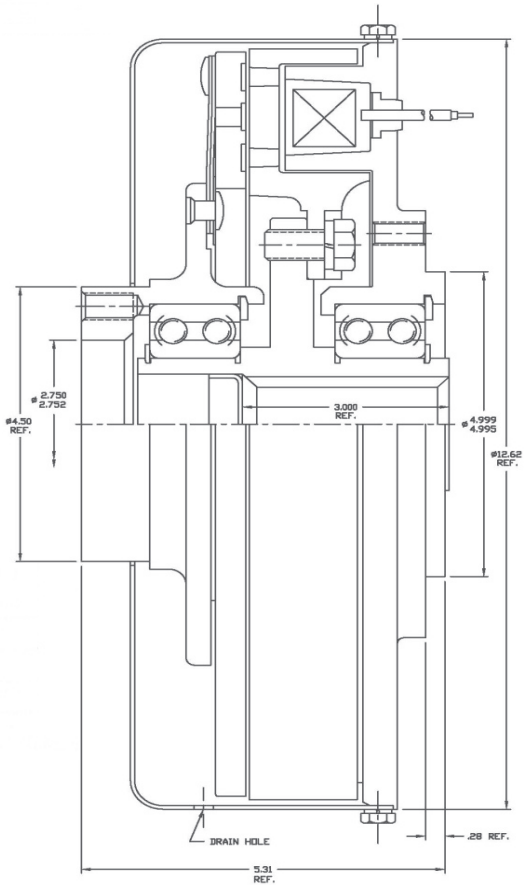


H49D1000 CLUTCH

Hydraulic Pump Drive
12 or 24 Volt D.C. - Shaft Driven

Power	Max RPM	Weight
91 Watts	3000	76 Lbs.



US Patent No. 4601378

Static Rated Torque - 1000 Lbs. Ft.

Inertia: Rotor Assy……. 2.76 Lb. Ft.^{2}

Armature Assy……. 1.88 Lb. Ft.^{2}

24 Volt - 4 Amp Part No.	12 Volt - 8 Amp Part No	For Pump Shaft Size	For Pump Mount Style	Pitts Mount Bracket
13902	13635	"C" Splined 1-1/4" 14T 12/24 DP	"C" 2-4	13256
14144	13557	"C" 1-1/4" With 5/16" Keyway	"B" 2-4	13258

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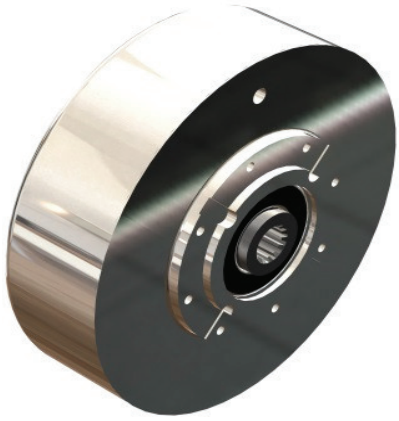
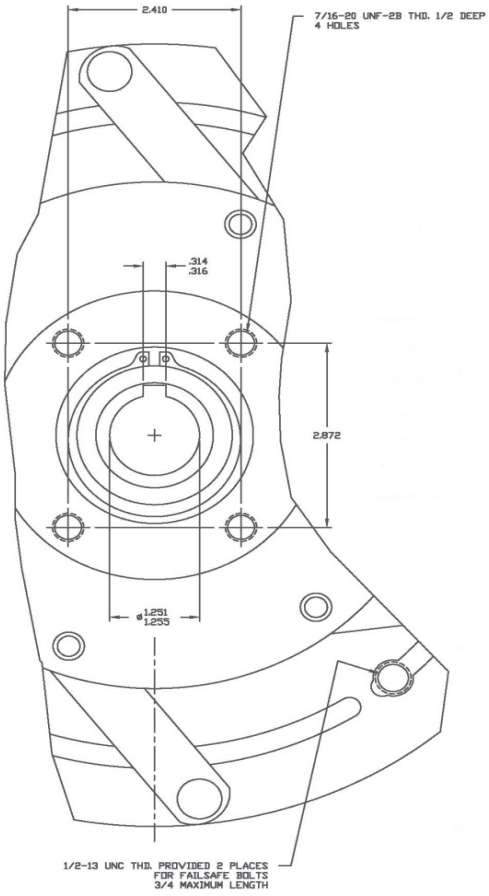


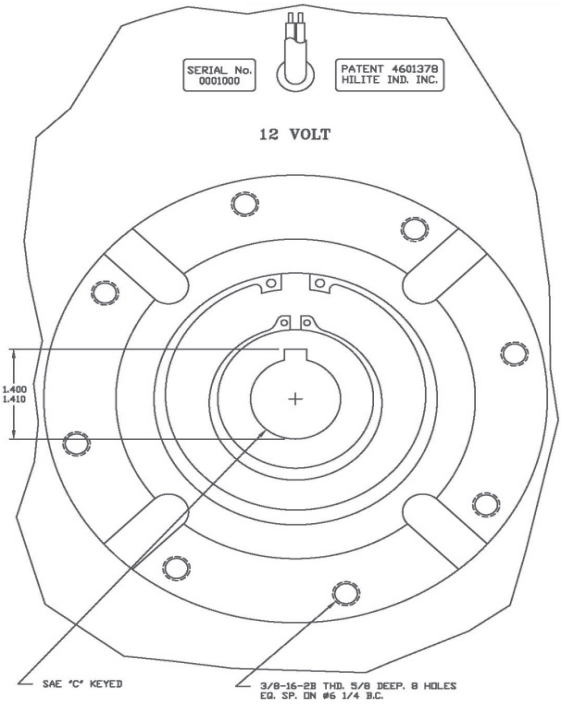
H49D1000 CLUTCH

Mounting Dimensions

Front View



Rear View



US Patent No. 4601378

Note:

- Drive flange bolt pattern and pilot diameter on clutch are dimensioned to correlate with “Spicer” type 1410 series drive shaft flange connections.
- Proper drive shaft selection is important. Consult with drive shaft manufacturers specifications for each specific application requirements.
- Drive shaft alignment must be within 3°.

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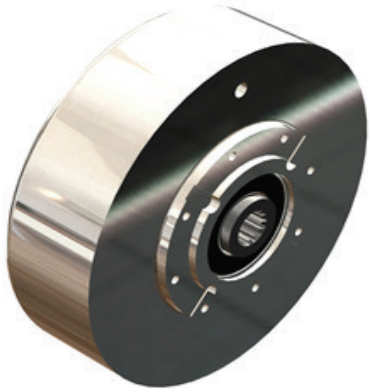
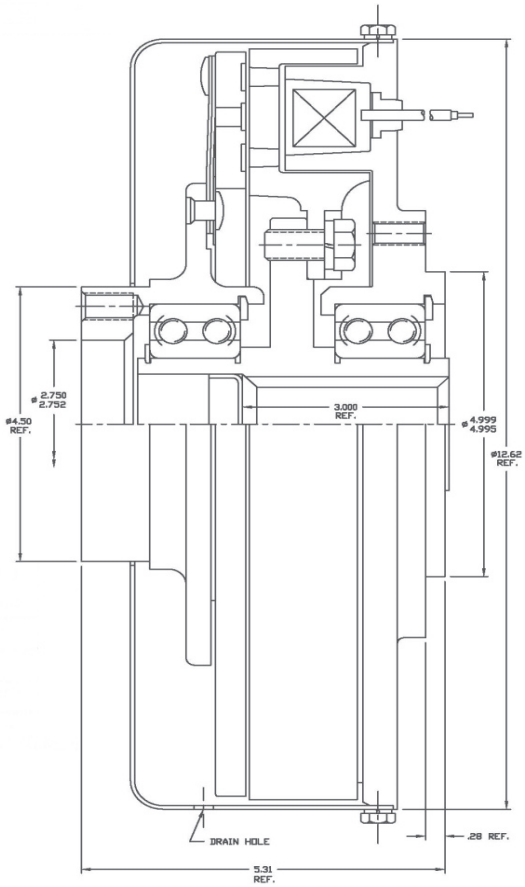


H49D1200HT CLUTCH

Hydraulic Pump Drive
12 or 24 Volt D.C. - Shaft Driven

Power	Max RPM	Weight
91 Watts	3000	76 Lbs.



US Patent No. 4601378

Static Rated Torque - 1200 Lbs. Ft.

Inertia: Rotor Assy……. 2.76 Lb. Ft.^{2}

Armature Assy……. 1.88 Lb. Ft.^{2}

24 Volt - 4 Amp Part No.	12 Volt - 8 Amp Part No	For Pump Shaft Size	For Pump Mount Style	Pitts Mount Bracket
14737	14736	"C" Splined 1-1/4" 14T 12/24 DP	"C" 2-4	13256

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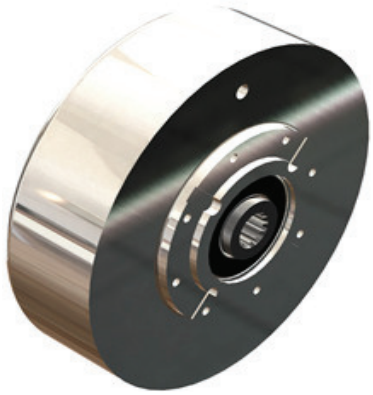
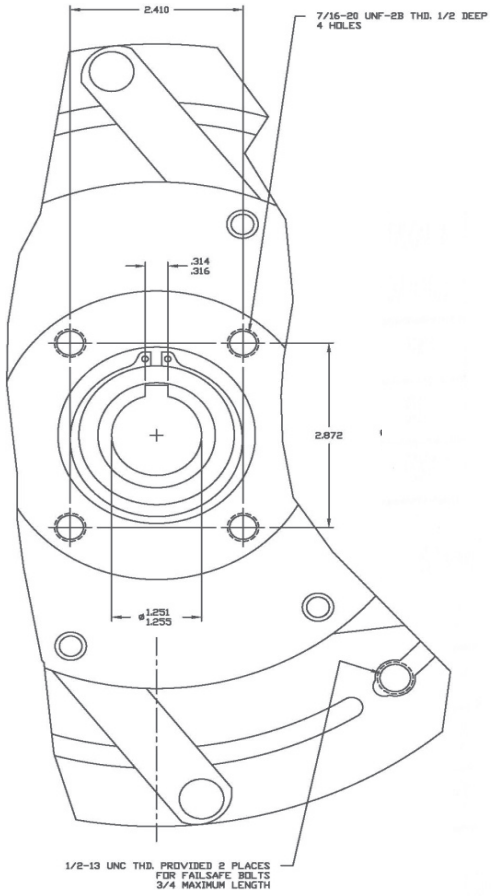


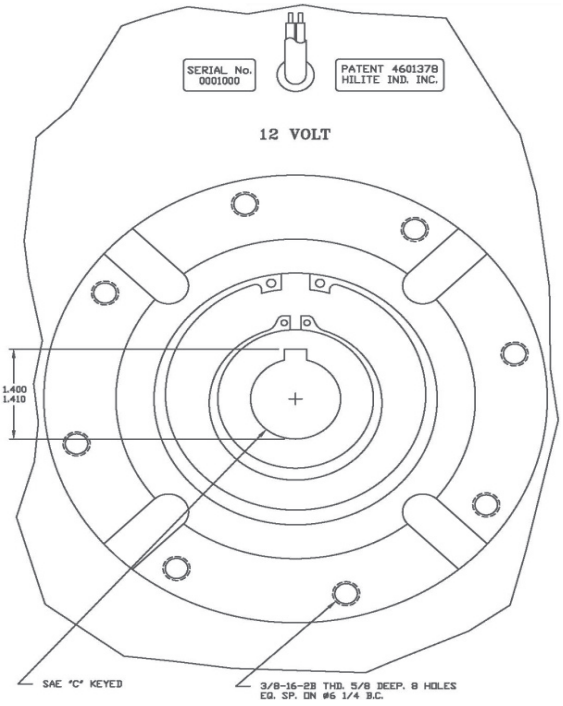
H49D1200HT CLUTCH

Mounting Dimensions

Front View



Rear View



US Patent No. 4601378

Note:

- Drive flange bolt pattern and pilot diameter on clutch are dimensioned to correlate with “Spicer” type 1410 series drive shaft flange connections.
- Proper drive shaft selection is important. Consult with drive shaft manufacturers specifications for each specific application requirements.
- Drive shaft alignment must be within 3°.

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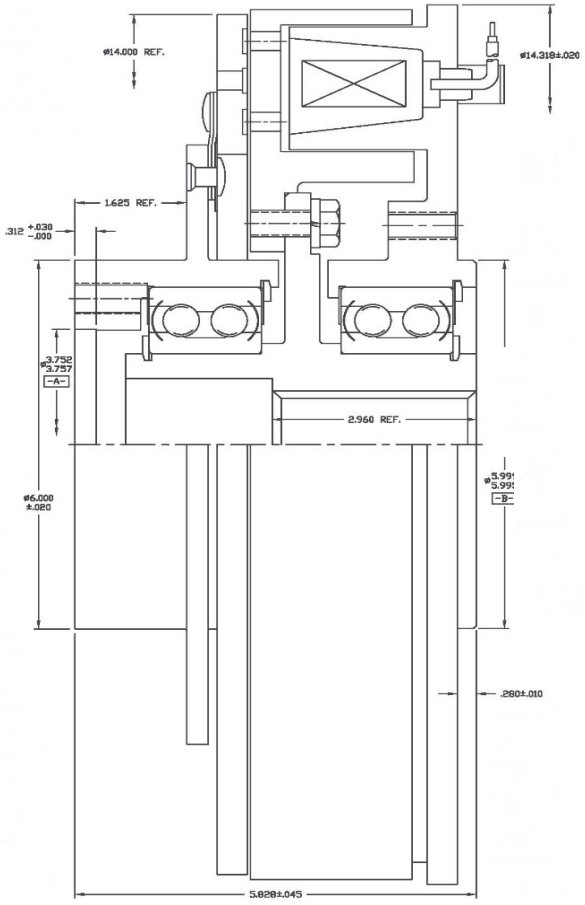
H55D1500 CLUTCH

Hydraulic Pump Drive
12 or 24 Volt D.C. - Shaft Driven

Power	Max RPM	Weight
84 Watts	3000	118 Lbs.



US Patent No. 4601378

Static Rated Torque - 1500 Lbs. Ft.

Inertia: Rotor Assy……. 4.43 Lb. Ft.^{2}

Armature Assy……. 2.47 Lb. Ft.^{2}

24 Volt - 3.5 Amp Part No.	12 Volt - 7 Amp Part No	For Pump Shaft Size	For Pump Mount Style	Pitts Mount Bracket
14154	14153	"D" Splined 1-3/4" 13T 8/16 DP	"D" 2-4	14219
14711	14710	1-3/8" With 3/8" Keyway		

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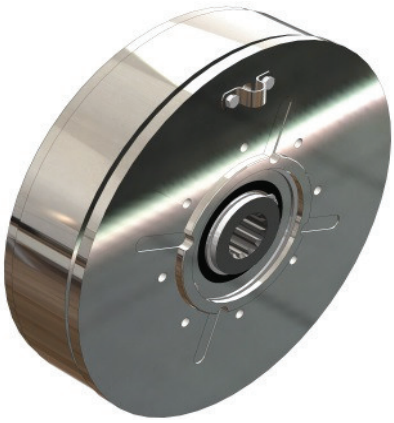
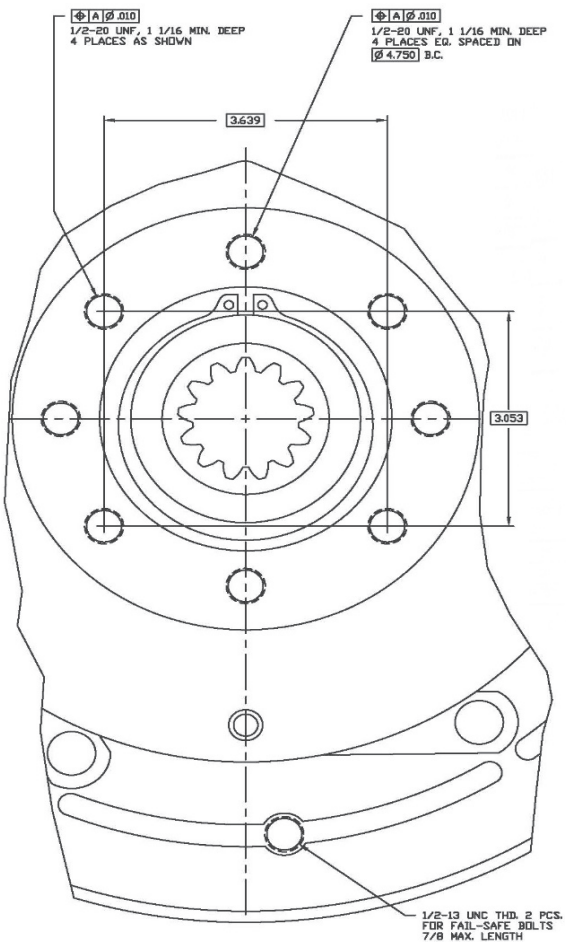


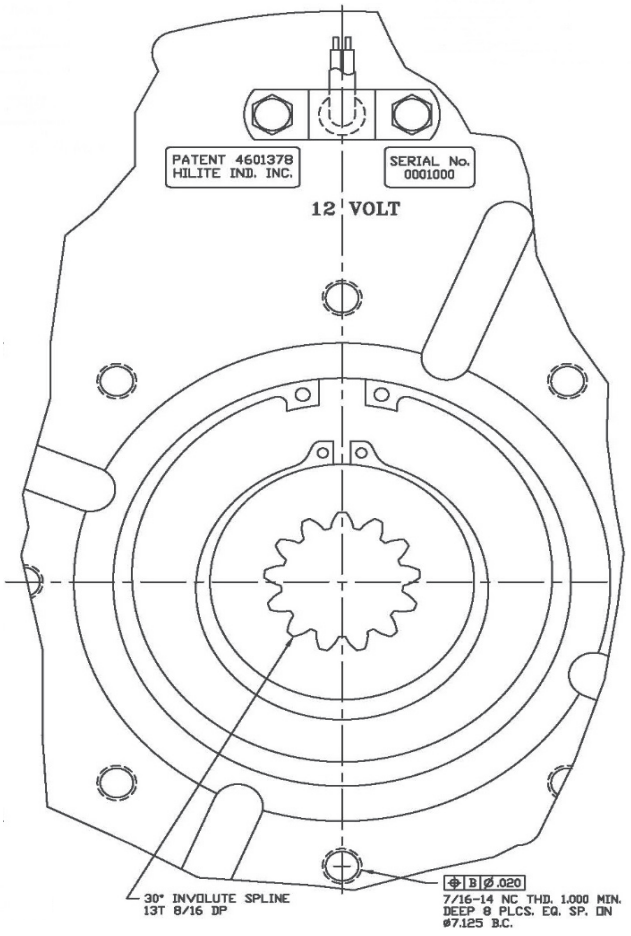
H55D1500 CLUTCH

Mounting Dimensions

Front View



Rear View



US Patent No. 4601378

Note:

- Drive flange bolt pattern and pilot diameter on clutch are dimensioned to correlate with “Spicer” type 1550 series drive shaft flange connections.
- Proper drive shaft selection is important. Consult with drive shaft manufacturers specifications for each specific application requirements.
- Drive shaft alignment must be within 3°.

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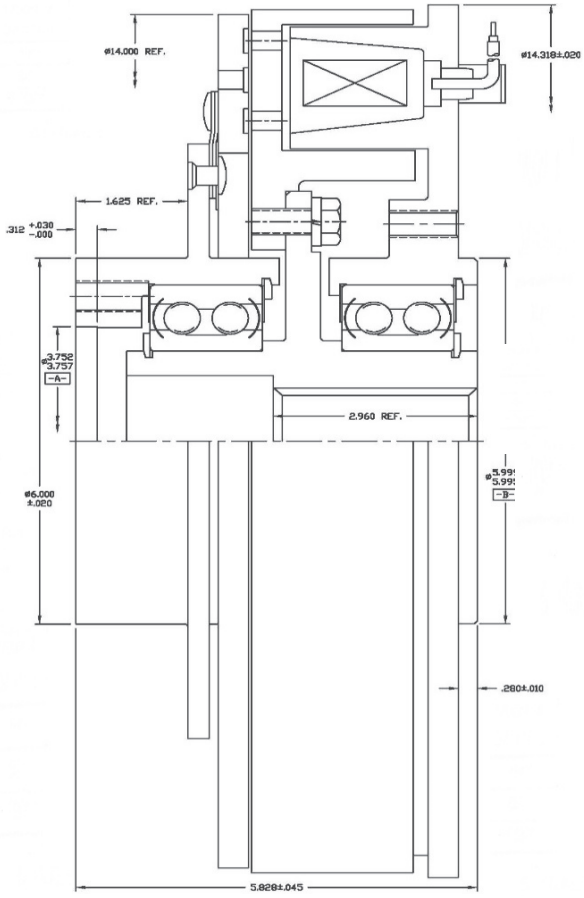
H55D2000HT CLUTCH

Hydraulic Pump Drive
12 or 24 Volt D.C. - Shaft Driven

Power	Max RPM	Weight
84 Watts	3000	118 Lbs.



US Patent No. 4601378

Static Rated Torque - 2000 Lbs. Ft.

Inertia: Rotor Assy..... 4.43 Lb. Ft.^{2}

Armature Assy..... 2.47 Lb. Ft.^{2}

24 Volt - 3.5 Amp Part No.	12 Volt - 7 Amp Part No	For Pump Shaft Size	For Pump Mount Style	Pitts Mount Bracket
14739	14738	"D" Splined 1-3/4" 13T 8/16 DP	"D" 2-4	14219

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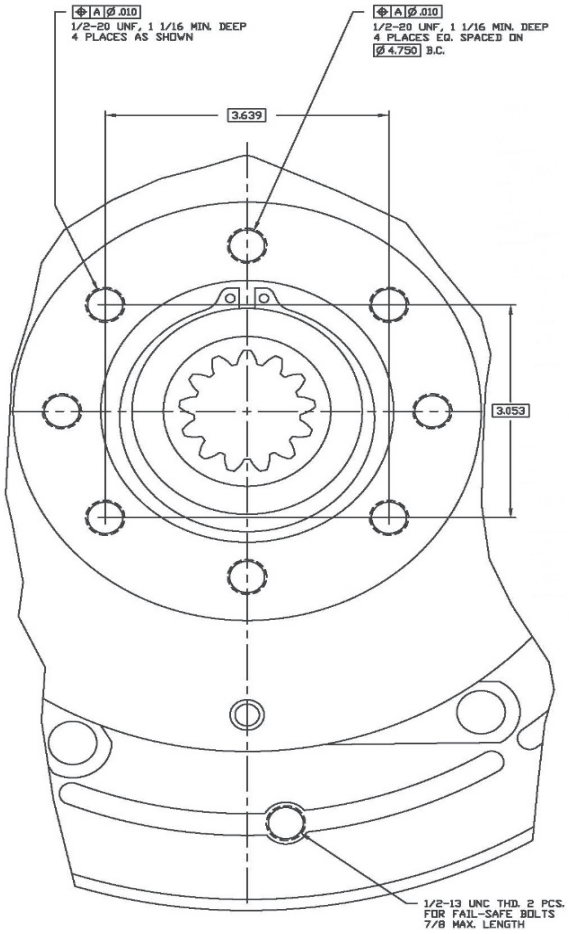
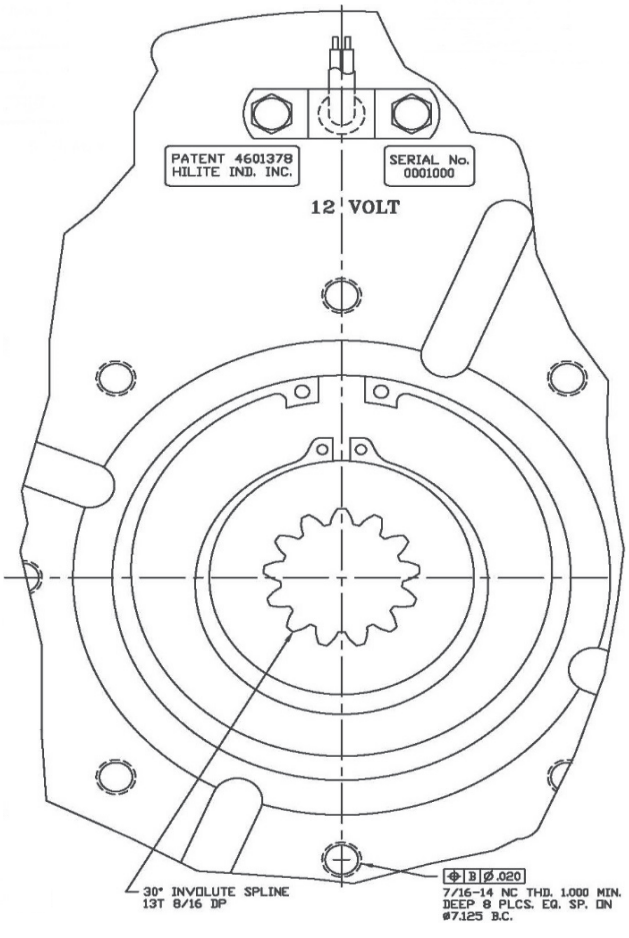
H55D2000HT CLUTCH

Mounting Dimensions

Front View



Rear View



US Patent No. 4601378

Note:

- Drive flange bolt pattern and pilot diameter on clutch are dimensioned to correlate with “Spicer” type 1550 series drive shaft flange connections.
- Proper drive shaft selection is important. Consult with drive shaft manufacturers specifications for each specific application requirements.
- Drive shaft alignment must be within 3°.

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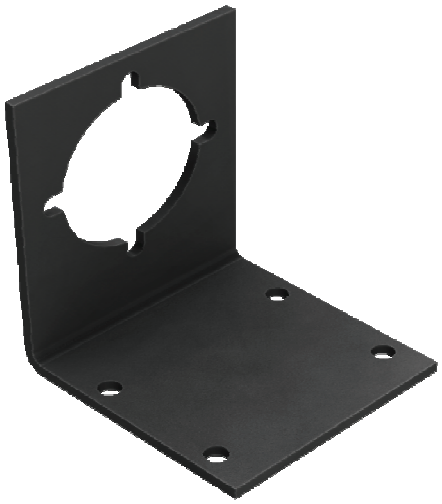
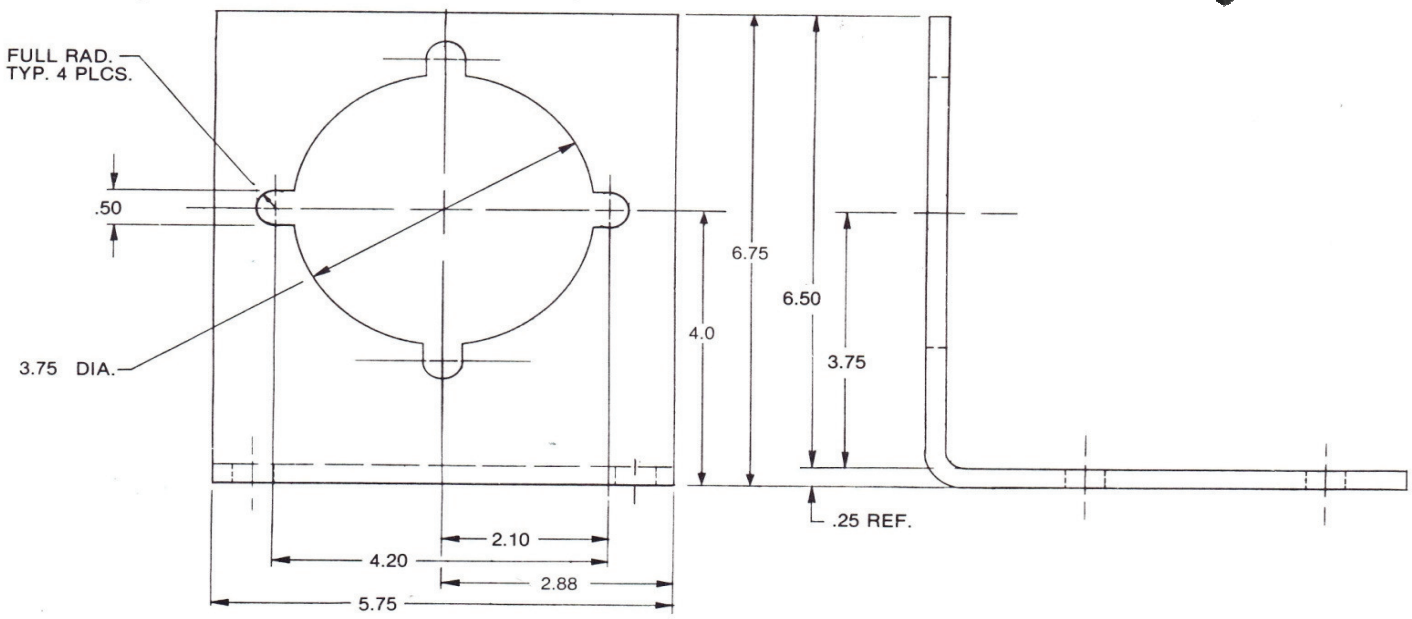
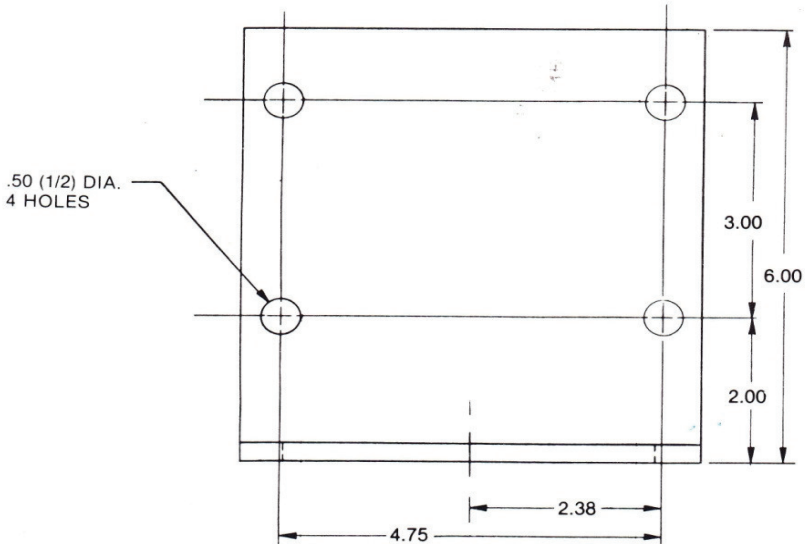


Model B-H24-H27

Clutch Mounting Bracket





PATENT NO. 4601378

Pitts Bracket Part No	Used On	Weight
13195	H24 & H27 Series Clutches	4 Lbs.

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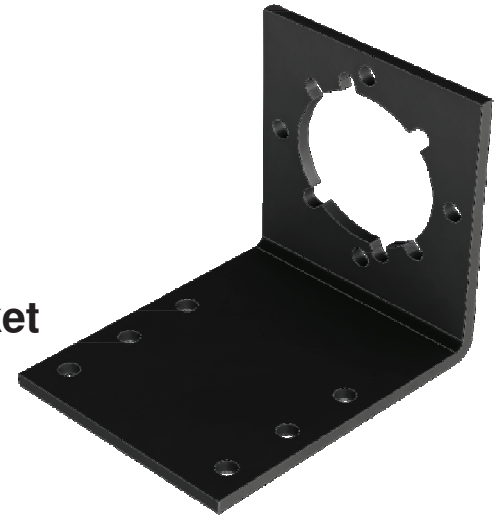
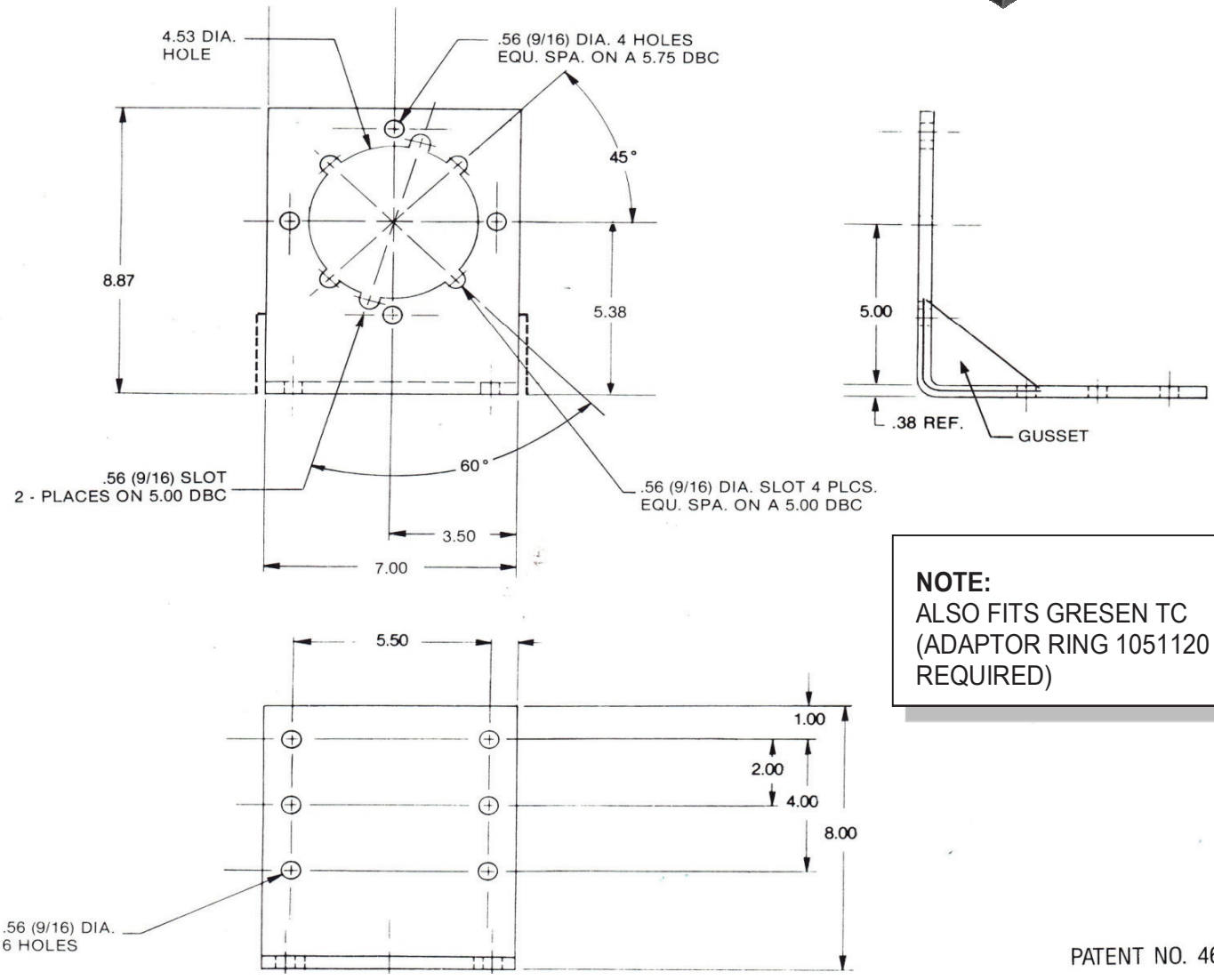
Model B-H28

Clutch Mounting Bracket





NOTE:
ALSO FITS GRESEN TC (ADAPTOR RING 1051120 REQUIRED)

PATENT NO. 4601378

Pitts Bracket Part No	Used On	Weight
13219	H28 Series Clutches	9 Lbs.

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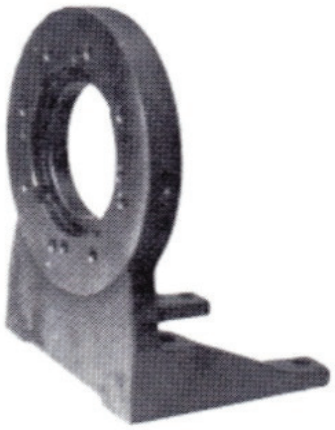
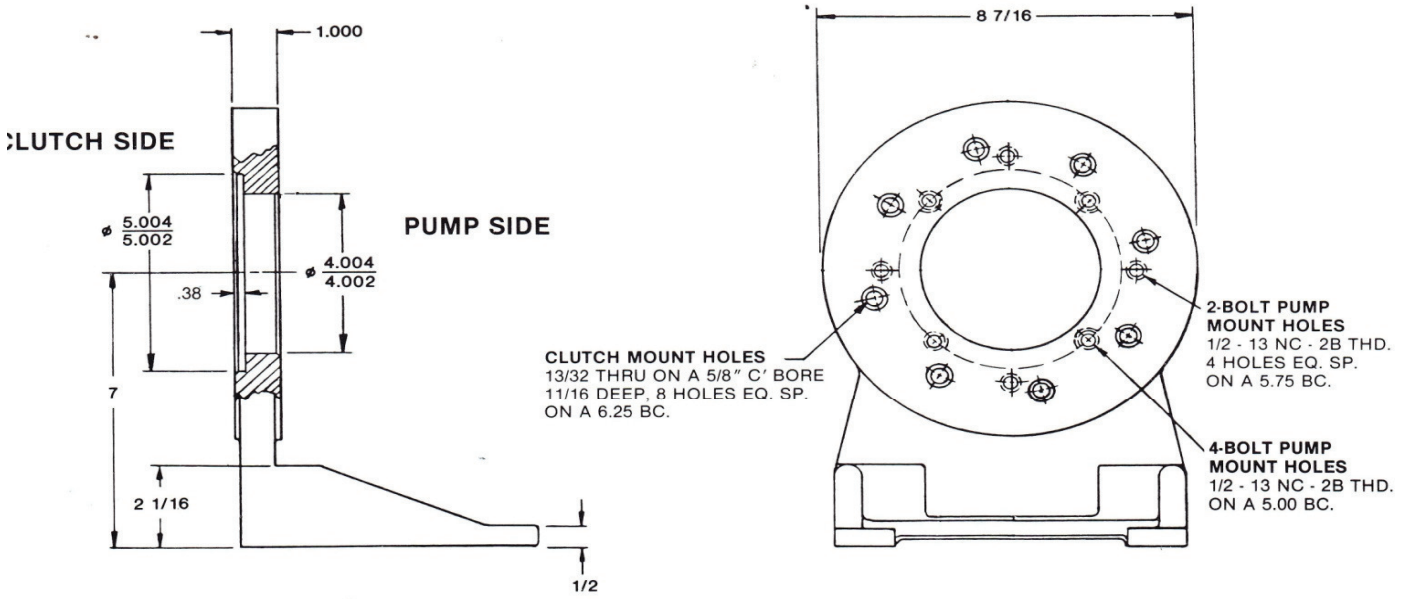
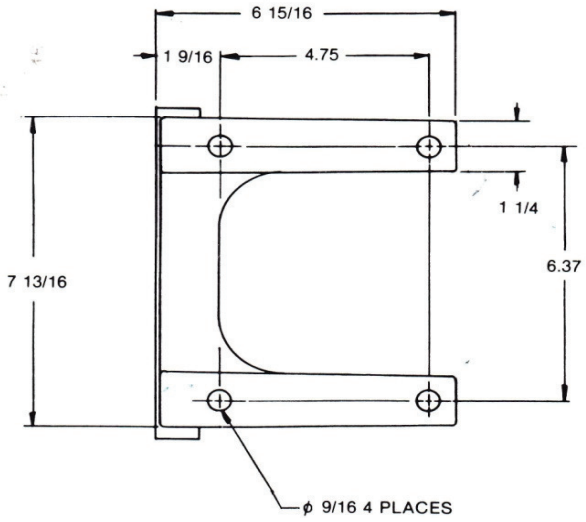


Model B-H36-H49-B

Clutch Mounting Bracket
SAE "B" 2-4 Bolt





PATENT NO. 4601378

Pitts Bracket Part No	Used On	Weight
13258	H36 H44 H49 Series Clutches	21 Lbs.

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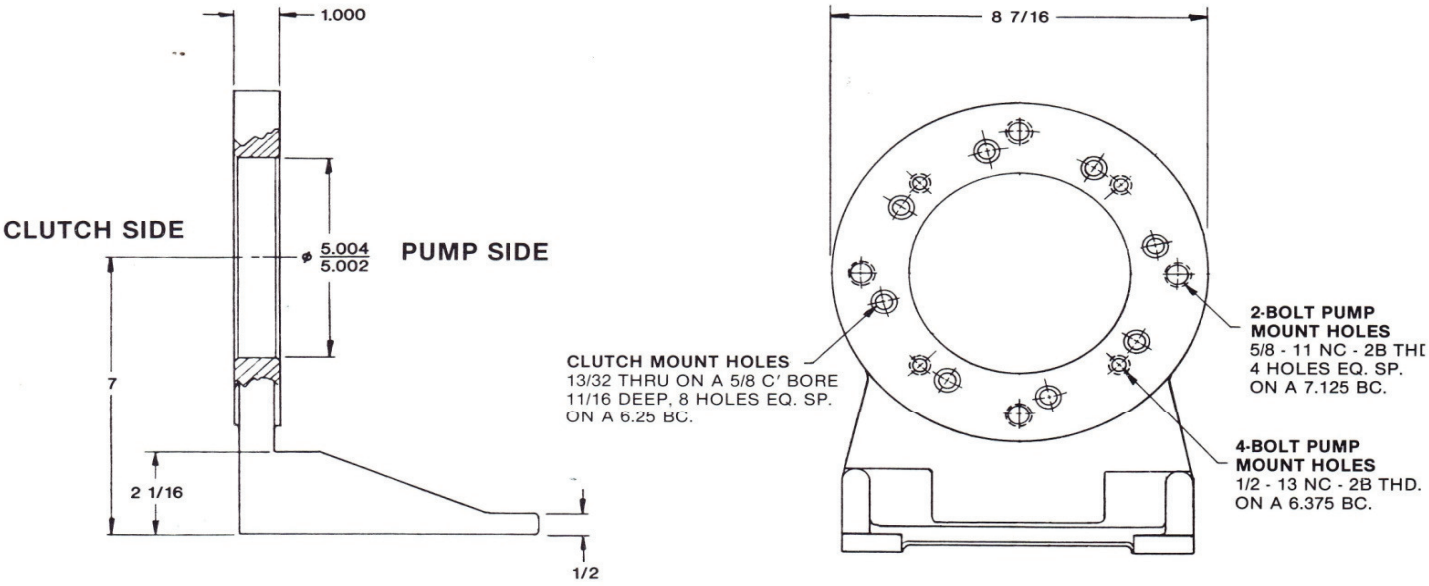
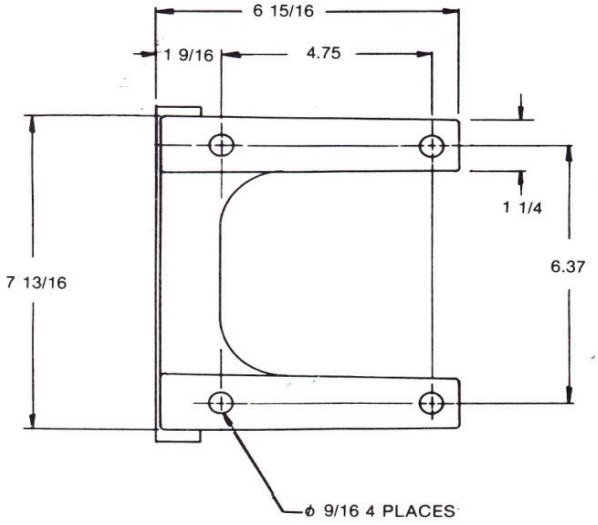
Model B-H36-H49-C

Clutch Mounting Bracket
SAE "C" 2-4 Bolt





PATENT NO. 4601378

Pitts Bracket Part No	Used On	Weight
13256	H36 H44 H49 Series Clutches	21 Lbs.

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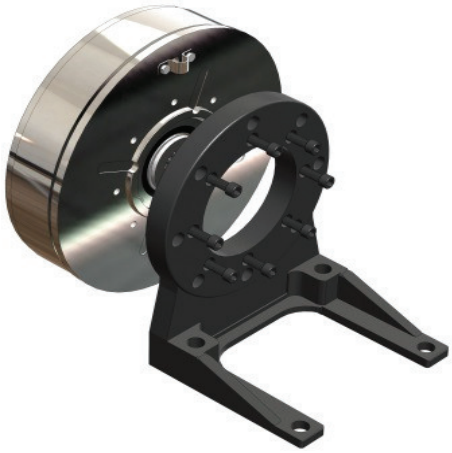
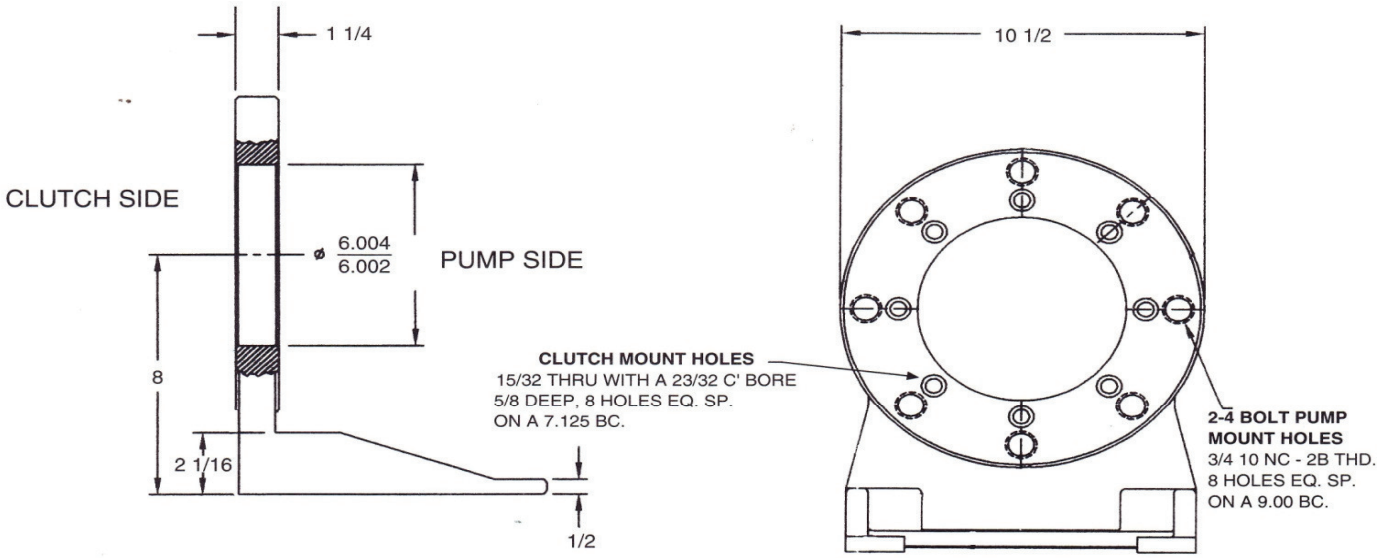
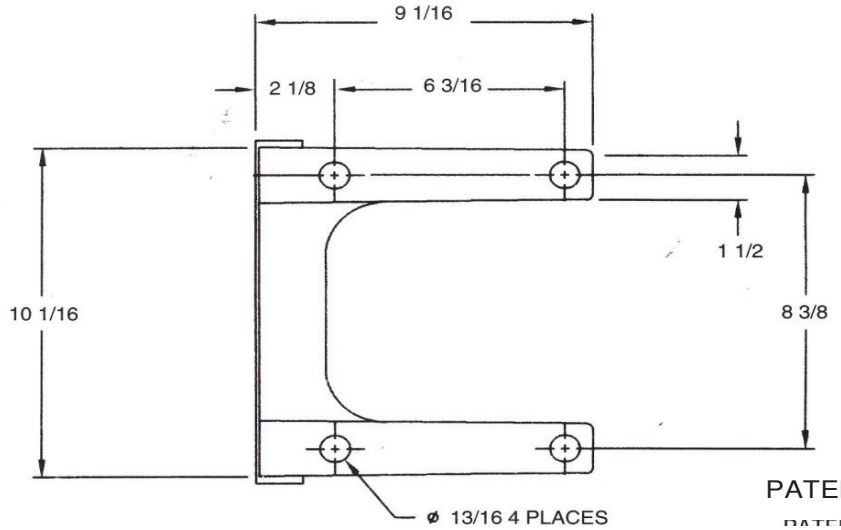


Model B-H55

Clutch Mounting Bracket
SAE "D" 2-4 Bolt





PATENT NO. 4601378

Pitts Bracket Part No	Used On	Weight
14219	H55 Series Clutches	48 Lbs.