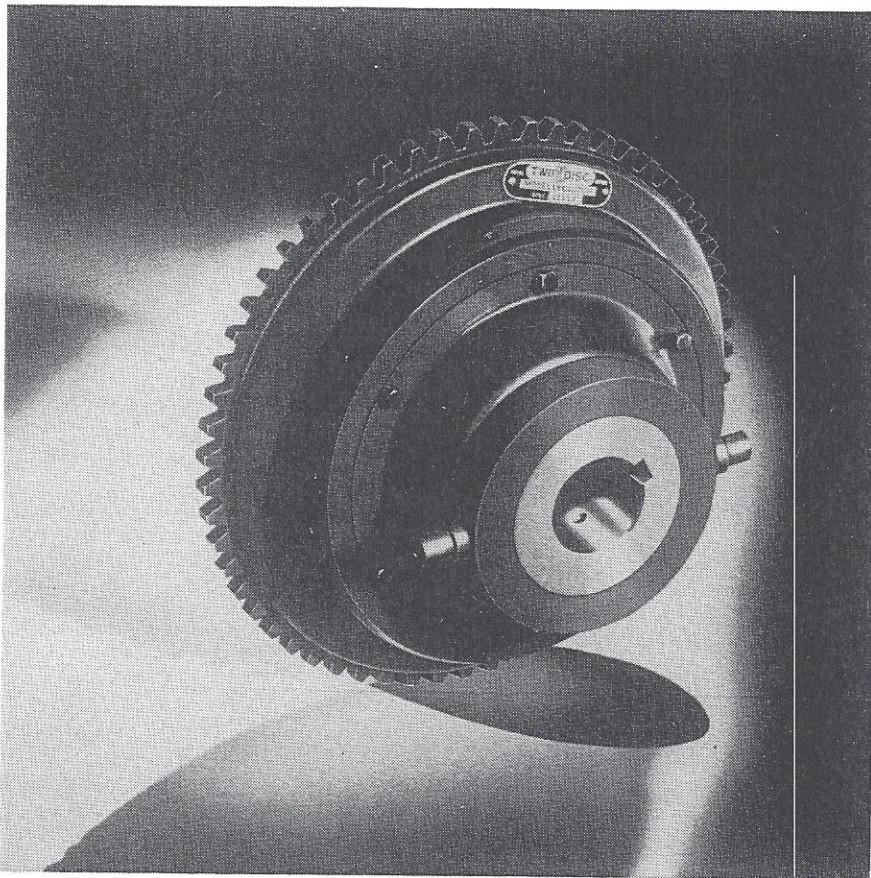


OPERATOR'S MANUAL

OM-508



N.D.S. Drilling Supply
26041 Newton Circle
Elko, MN 55020
Phone # 800-637-1940
Fax # 952-461-3403

**MODEL
E and EH
CLUTCHES**

TWIN DISC
INCORPORATED



Administrative Offices - Racine, Wisconsin • Rockford Works, Rockford, Illinois

SERVICE INFORMATION

Each series of Maintenance Manuals issued by Twin Disc, Incorporated is reviewed for accuracy at regular intervals. When required, changes are made in the manual to provide the latest information regarding current design and maintenance practices of the product.

In addition, individual product Service Bulletins are issued to provide the field with immediate notice of new service information.

These Service Bulletins are distributed to all the Twin Disc Distributorships throughout the United States and in many foreign countries.

To be sure you have the latest Service Information on your Twin Disc product, contact any Twin Disc Distributor for Service Bulletins, or write to the Service Engineering Department, Twin Disc, Incorporated, Racine, Wisconsin, U.S.A.

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Prepared by

TWIN DISC, INCORPORATED

1328 Racine Street

Racine, Wisconsin, U.S.A.

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Fax # 952-461-3403

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“IMPORTANT NOTICE. Because of the possible danger to person(s) or property from accidents which may result from the use of manufactured products, it is important that correct procedures be followed: Products must be used in accordance with the engineering information specified in the catalog. Proper installation, maintenance, operation procedures must be observed. Inspection should be made as necessary to assure safe operations under prevailing conditions. Proper guards and other suitable safety devices or procedures as may be desirable or as may be specified in safety codes should be provided, and are neither provided by Twin Disc, Incorporated nor are the responsibility of Twin Disc, Incorporated.”

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MODEL E & EH CLUTCHES

GENERAL INFORMATION

Twin Disc Model E & EH Clutches incorporate the latest features in clutch design. They meet the need for a heavy-duty, enclosed-type clutch from 14 to 36 inches in diameter. These clutches are used in power transmission applications of many different types, such as: couplings for line shafts, drives for pulleys, or for use with driving spiders carrying gears, sprockets or pulleys.

SIZES AND CAPACITIES

Model E & EH Clutches have working capacities based upon ample safety factors to ensure satisfactory operation under all normal working conditions. The standard sizes (listed below) are built to transmit loads from 17.5 to 393 horsepower per rpm. These ratings should not be exceeded.

Clutch O.D.	Driving Plates	Clutch O.D.	Driving Plates	Clutch O.D.	Driving Plates
14	1,2 or 3	21	1,2 or 3	30	1,2 or 3
16	1,2 or 3	24	1,2 or 3	36	1,2 or 3
18	1,2 or 3	27	1,2 or 3		

CONSTRUCTION

Over-all dimensions of Model E & EH Clutches are held to a minimum, consistent with good design, to conserve the space required for installation. The clutch cover is designed to permit operation in the open without the addition of special protective housings and guards. This minimizes the possibility of any projecting parts being caught during rotation.

The clutch action is counterbalanced through the use of weighted clutch levers. The levers also are equipped with hardened rollers moving on a hardened and ground cone ring.

Wide friction surfaces are used. High-grade, molded-asbestos, friction material and highly-finished

contact surfaces keep wear to a minimum and assure smooth, positive operation.

All Model E & EH Clutches are equipped with gear tooth driving plates.

OPERATION

All Model E & EH Clutches are cone engaged. When the cone assembly is moved towards the clutch, the roller end of the four levers, which contact the cone, travel up the contour of the cone. This action causes the projecting lug of the lever to exert pressure against the pressure ring, adjusting ring and floating plate; hence, the clutch is engaged. When the cone assembly is moved out, the pressure against the floating plate is released, and the clutch is disengaged due to the action of the release springs.

INSTALLATION

Model E & EH Clutches must be properly aligned with the driving member during installation in order to avoid excessive wear or scrubbing of parts. If such unnecessary wear is experienced, the service life of the clutch will be reduced considerably. Immediately upon recognition of a misalignment condition, examine the entire installation for alignment with the aid of a dial indicator.

LUBRICATION

The ball bearing and plain cone collar assemblies on all Model E & EH Clutches are manufactured with drilled and tapped trunnions for the installation of grease fittings. If a Twin Disc driving spider is used, it is factory-equipped with a grease fitting on the hub end of the spider. Bushing driving spider and plain cone collar assemblies should be lubricated daily with a high-grade, high-temperature Grade 2 or better lithium-base grease recommended by anti-friction bearing manufacturers. Ball bearing driving spider and cone collar assemblies should be lubricated with the same type of lubricant every 10 hours of operation.

PREVENTIVE MAINTENANCE

1. Lubricate the cone assemblies and driving spider assemblies as specified in "Lubrication".
2. Make certain transmitted power of engine does not exceed rated capacity of clutch.
3. Make certain the clutch and driving member are aligned within .005-inch total indicator reading.
4. Make certain clutch does not heat up due to improper adjustment.
5. Check bearing temperatures. Maximum is 200 degrees F.

DRIVING PLATE REPLACEMENT

The most common symptoms indicating driving plate replacement are as follows:

1. The adjusting ring cannot be drawn tighter to compensate for driving plate wear.
2. In a clutch with riveted-on friction discs, the rivet heads are flush with the face of the disc.

If molded driving plates are used, the entire plate must be replaced. Driving plates with riveted-on friction discs required only friction disc replacement.

HOW TO ORDER SERVICE PARTS

The exploded view drawing of the Model E & EH Clutches with various driving spider and cone assemblies is shown. The item numbers listed are not part numbers, and only should be used to identify the proper part names. If desired, a parts drawing and a specification sheet for your particular unit may be obtained upon request from your nearest authorized parts source.

When ordering service parts, the specification number must be given in addition to the part name. The specification number of the clutch is stamped on the clutch specification plate (18). If a driving spider assembly is used, the specification number for the driving spider is on the driving spider specification plate (2f or 3g).

NOTE

Engine or motor must be stopped before adjusting the clutch.

ADJUSTMENT FOR STANDARD OVER-LOCKING CONE

A new clutch may require several adjustments when first placed in operation in order to run in the clutch plates and the moving parts. After these initial adjustments, the clutch will operate for a considerable length of time without further adjustment.

If the clutch heats, jumps out of engagement, or does not hold, the clutch must be adjusted.

Disengage the clutch and turn the clutch until the adjusting lock pin (15) can be reached. Pull the pin out, and lock in the "out" position by means of a piece of wire or small nail pushed through the cross-drilled hole in the pin (If the clutch is used without a cover, a washer 1/16-inch thick and of sufficient diameter must be used under the piece of wire or nail during adjustment to compensate for the absent cover.) Turn the adjusting ring (17) clockwise one or two adjusting holes, or until the clutch requires a distinct pressure to engage. Drilled holes are provided in the adjusting ring for the insertion of a drift pin for tapping the ring should it be too snug to move by hand.

ADJUSTMENT FOR SPECIAL NON OVER-LOCKING CONE

IMPORTANT: This clutch has a non over-locking cone. If clutch does not pull and heats, adjustment may be necessary.

ADJUSTMENT: Clockwise turning of the adjusting ring (17) tightens the clutch. Start with the clutch loose enough to permit the rollers to hit the stop on the cone (24c) in the engaged position. Make two marks on the shaft, .125 and .250 from the cone sleeve (24f) towards released position.

Adjust the clutch tight enough to stop the cone and sleeve assembly between these marks on the shaft with full engaging effort applied. A new clutch requires several adjustments until driving plates (friction discs) are worn in.

CAUTION

Prior to operating the clutch, make certain to release and properly engage the adjusting lock pin into the nearest locking hole after removing the piece of wire or nail from the cross-drilled hole.

DISASSEMBLY

The major steps required for the disassembly of Model E & EH Clutches are as follows:

1. Slide the cone assembly (23 or 24) as far back in the disengaged position as possible.
 2. Remove the split clutch cover (20) by removing the six capscrews (21) that secure the cover to the pressure ring (13).
 3. Lock the adjusting lock pin (15) in the "out" position (See "Adjustments" for procedure). Rotate the adjusting ring (17) in a counterclockwise direction until it comes off the threaded pressure ring.
 4. Remove the two pilot pins (14). Rotate the pressure ring until the slots in the bore of the ring are aligned with the finger levers (9a). Remove the pressure ring from the floating plate (12). Remove the floating plate.
 5. In sequence, remove the finger lever assemblies (9), driving plate assemblies (10), and center plate(s) (11) from the hub-and-back plate (8).
 6. Release springs (7) can be removed at this point for replacement, except for the 14 and 16-inch model clutches. It is necessary to remove the hub-and-back plate (8) in order to replace springs in these two sizes.
 7. If necessary to remove hub-and-back plates from shaft, make certain to remove setscrew (4) and nut (5) (or two setscrews 30) from the hub-and-back plate.
- The floating plate (12) is provided with two or three pairs of holes for the pilot pins (14). The position of the pressure ring (13) should be changed each time the clutch is re-assembled. This will change the points of contact of the levers on the pressure ring.

WARNING

This clutch requires checking of adjustment after installation and prior to operation.

CAUTION

Most Twin Disc products are made to be mounted directly on the flywheel of the engine. It is possible, due to mismatch of components or many other reasons, to have flywheel to driven component interference. As a result, it is necessary that engine crankshaft end play be measured before the driven component is installed.

After installation of the driven component, crankshaft end play should again be measured. The second measurement should be the same as the first end play measurement. If it is not the same, it could be an indication of interference. Consequently, the driven component should be removed, the source of interference found and corrected.

Twin Disc will not be responsible for system damage caused by engine to Twin Disc component interference regardless of the cause of interference. This engine crankshaft end play check is considered mandatory.

ORDERING PARTS

Renewal parts, parts service kits and repairs may be obtained from your Authorized Twin Disc Distributor or Service Dealer. You can find him listed under POWER TRANSMISSION EQUIPMENT in the Yellow Pages of most metropolitan telephone directories.

N.D.S. Drilling Supply
26041 Newton Circle
Elko, MN 55020
Phone # 800-637-1940
Fax # 952-461-3403

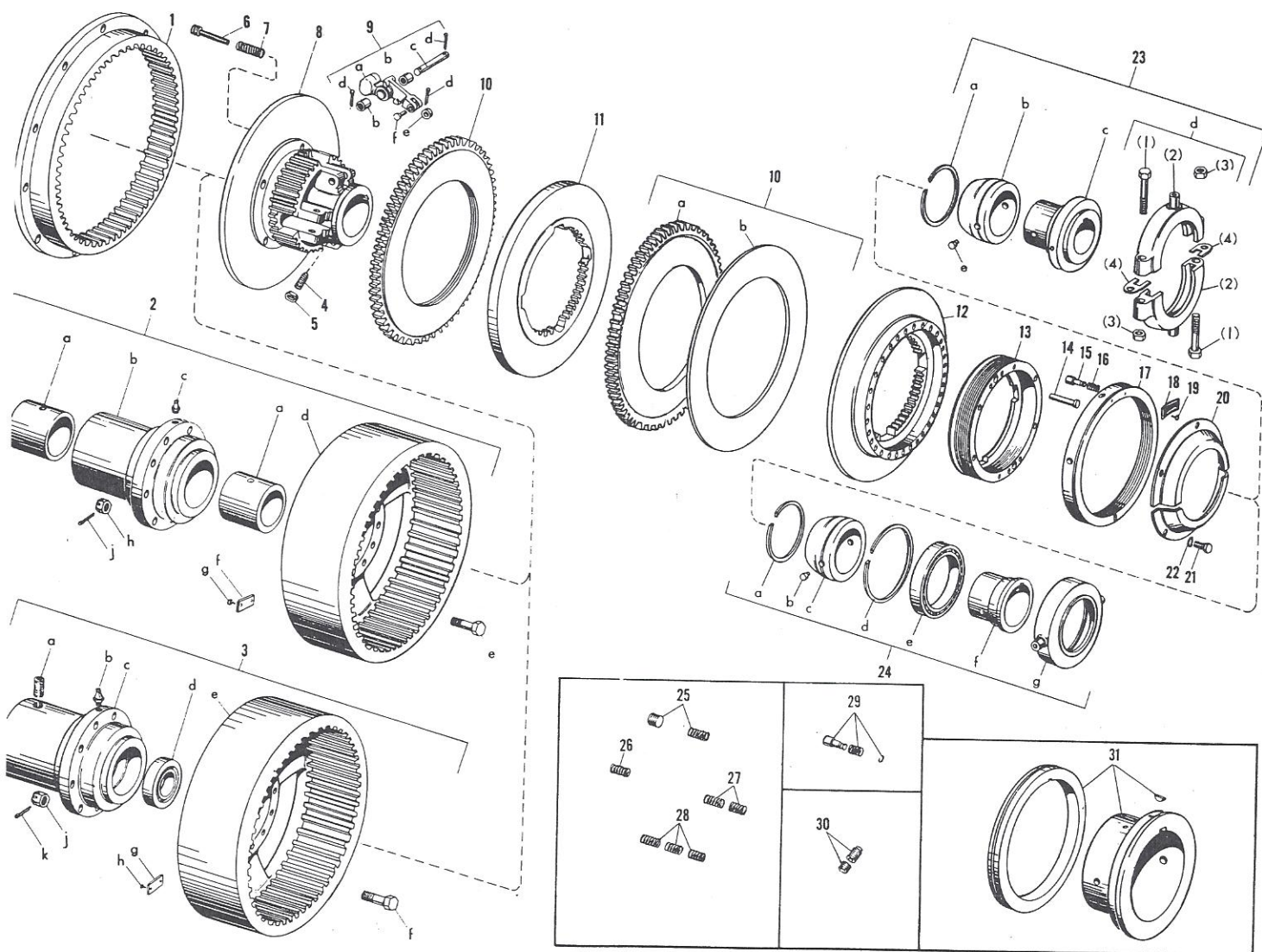
ITEM	DESCRIPTION	QUANTITY
1	RING, driving	1
2	SPIDER, driving, bushing, assembly	1
a	BUSHING, bronze, spider, driving	2
b	HUB, type, bronze	1
c	FITTING, hydraulic	1
d	FLANGE, spider, driving	1
e	CAPSCREW, hex-head	8
f	PLATE, spec., spider, driving	1
g	PIN, drive	2
h	NUT, hex, slotted	8
j	PIN, cotter	8
3	SPIDER, driving ball bearing, assy.	1
a	SETSCREW, cup-point, hex-socket	1
b	FITTING, hydraulic	1
c	HUB, type, ball bearing	1
d	BALL BEARING, spider, driving	1
e	FLANGE, spider, driving	1
f	CAPSCREW, hex-head	8
g	PLATE, spec., spider, driving	1
h	PIN, drive	2
j	NUT, hex, slotted	8
k	PIN, cotter	8
4	SETSCREW, dog-point, headless	1
5	NUT, jam, hex	1
6	PIN, spring, release	4
7	SPRING, release	4
8	PLATE, hub-and-back	1
9	LEVER, finger, assembly	4
a	LEVER, finger	4
b	NEEDLE BEARING	8
c	PIN, lever, finger	4
d	PIN, cotter	12
e	ROLLER, lever, finger	4
f	PIN, roller, lever, finger	4
10	PLATE, driving, assembly	♦
a	PLATE, driving, (Split)	2
b	DISC, friction (Split)	4
11	PLATE, center	♦
12	PLATE, floating	1
13	RING, pressure	1
14	PIN, pilot	2
15	PIN, lock, adjusting	1

♦ As Required

ITEM	DESCRIPTION	QUANTITY
16	SPRING, pin, lock, adjusting	1
17	RING, adjusting	1
18	PLATE, specification, clutch	1
19	PIN, drive	2
20	COVER, clutch, split	1
21	CAPSCREW, hex-head	6
22	WASHER, lock	6
23	CONE, plain, assembly	1
a	RING, snap, ring, cone	1
b	CONE	1
c	SLEEVE, cone	1
d	COLLAR, cone, plain, assembly	1
(1)	CAPSCREW, hex-head	2
(2)	COLLAR, cone, split *	2
(3)	NUT, lock, hex	2
(4)	SHIM, collar	2
e	PIN, lock, cone	2
24	CONE, ball bearing, assembly	1
a	RING, snap, ring, cone	1
b	PIN, lock cone	2
c	CONE	1
d	SPRING, lock	1
e	BALL BEARING, collar, cone	1
f	SLEEVE, cone	1
g	COLLAR, cone, ball bearing	1
25	RETAINER & SPRING. Replaces Items 6 & 7 on Models 114 & 116.	
26	ONE SPRING. Replaces Items 6 & 7 on Models 118, 121, 124, 127, 130, 126	
27	TWO SPRINGS. Replaces Items 6 & 7 on Models 218, 221, 224, 227, 230 and 236.	
28	THREE SPRINGS. Replaces Items 6 & 7 on Models 318, 321, 324, 327, 330 and 336.	
29	PIN, SPRING & RING. Replaces Items 15 & 16 on Models 118, 218, 318, 121, 221, 321, 124, 224, 324, 127, 227, 327, 130, 230, 330, 136, 236 and 336.	
30	TWO SETSCREWS. Replaces Items 4 & 5 on Models 124, 224, 324, 127, 227, 327, 130, 230, 330, 136, 236 and 336.	
31	RING, KEY & SLEEVE. Replaces Item 23c on Models 130, 230, 330, 136, 236, and 336.	

* Cannot be purchased separately.

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Capacity Data

Model	Working Horsepower per 100 RPM	Maximum Engine Horsepower Recommended			Axial Force † (Lbs.)	Working Torque (Lbs.-Ft.)	Maximum Safe Operating Speed ‡		Weight (Lbs.)	Approx. WR ² (Lbs.-Ft. ²)	
		Light Duty	Normal Duty	Heavy Duty			Solid Plates	Split Plates		Clutch Body	Driving Plate
E-114	17.5	170	130	95	986	915	2400	1950	128	13	1.5
E-214	35	310	200	125		1830	2500	1900	176	18	3.0
E-116	21.5	220	175	120	1120	1132	2150	1750	140	18	2.3
E-216	43	400	255	160		2264	2200	1700	210	27	4.6
EH-118	36	280	220	155	1548	1885	1800	1550	228	41	3.2
EH-218	72	510	325	200		3770	1950		292	59	6.4
EH-318	108	740	430	250		5655	2050		356	80	9.6

Maximum Speeds ‡

The maximum speeds listed are safe permissible speeds possible with cast iron driving rings. The driving ring is normally the most critical member because it has the largest diameter. It should be remembered that the maximum speed listed is usually set considerably above the desired operating speed in the average installation.

Steel driving rings are available in most sizes for high speed applications. Consult Twin Disc for availability and speed limitations for clutches equipped with these rings.

Maximum speeds should not be exceeded without Twin Disc approval. Clutch failure due to centrifugal force can be likened to a shrapnel burst. Check each installation to see that backdriven speeds do not exceed calculated forward speeds. Also caution must be used in applying clutches to D.C. series-wound motors or gasoline engines with velocity type governors that might permit an engine runaway if the load is suddenly removed.

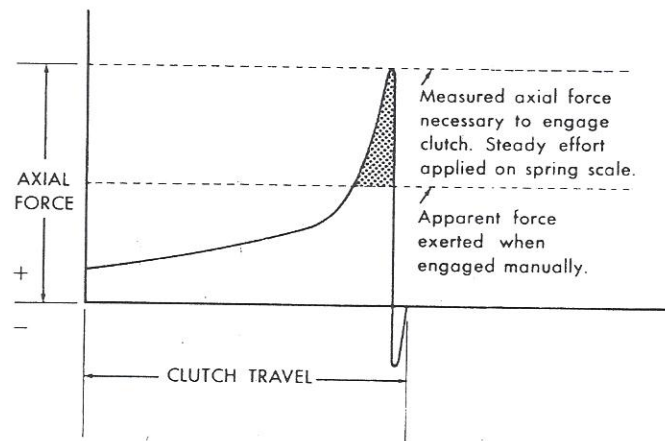
Engagement Forces for Mechanically-Actuated Clutches †

It must be realized that the axial force figures listed are approximate values. They are to be used as a rough guide only.

Axial force figures vary, for a given size clutch, within a wide range (as much as $\pm 50\%$ or more) depending upon clutch adjustment and the type of application. Engaging effort is substantially affected by factors such as whether the clutch body is rotating or at rest when being engaged, the amount of vibration present, degree of lever and pin lubrication, etc.

The listed figures, though approximate, will provide satisfactory operation. However, if the axial force is divided by the mechanical advantage of the lever and throwout fork, the lever force will usually appear to be uncomfortably high.

This apparent discrepancy is explained by consulting the graph below which illustrates the axial force which must be exerted at any one point over the length of the clutch travel.



It will be noted that the actual axial force is not a constant figure, requiring maximum force for only a brief period as the clutch goes over-center. The work or energy expended during this short period (illustrated by the shaded areas) is so small that it is provided in a normal quick engagement by the inertia force resident in the body of the individual working the clutch. As the hand effort builds up, the operator automatically leans into the lever thus releasing sufficient body inertia to affect engagement.

Of course, when remote engaging devices are desired with air or oil cylinders, it is necessary that these be selected with provision to accommodate the full factor, since they normally do not have sufficient inertia force to provide the peak engaging effort required. In addition, linkages of this type usually have considerable friction loss.

It is important also that engaging mechanisms be so designed to relieve the engaging thrust on the throwout collar once engagement is effected.

Duty Service Classifications

Light Duty *	Normal Duty **	Heavy Duty ***	Extra Heavy Duty ****
1) Agitators-pure liquids 2) Cookers-cereal 3) Elevators, bucket-uniformly loaded-all types 4) Feeders-disc type 5) Kettle-brew 6) Line Shafts-light duty 7) Machines, general-all types with uniform loads, non-reversing	1) Agitators-solids or semi-solids 2) Batchers-textile 3) Blowers and Fans-centrifugal and lobe 4) Bottling machines 5) Compressors-all centrifugal 6) Elevators, bucket-non uniformly loaded or fed 7) Feeders-apron, belt, screw or vane 8) Filling Machine-can type 9) Mixers-continuous 10) Pumps-two or more cylinder 11) Conveyors, uniformly loaded	1) Cranes & Hoists-working clutch 2) Crushers-ore and stone 3) Drums-barking 4) Compressors-lobe rotary plus three or more cylinder reciprocating type 5) Haulers-car puller and barge types 6) Machines-impact load types 7) Mills-ball type 8) Paper Mill machinery-except calendars and driers 9) Presses-brick and clay	1) Compressors-one and two cylinder reciprocating 2) Calenders and driers, paper mill 3) Mills-hammer type 4) Shaker-reciprocating type

* Light Duty

The clutch is used primarily for a disconnect and/or to start very light inertia loads. The brake is used for stopping light inertia loads. The clutch or brake engagement cycle should not exceed two seconds and the load starting or stopping is limited to six times per hour.

** Normal Duty

This classification permits load starting or stopping up to 30 engagements per hour. More significantly, the inertia load must be started or stopped within three seconds. The product of slip per engagement times engagement per hour should be under 90.

*** Heavy Duty.

The clutch or brake is used to start or stop inertia loads with frequencies up to 60 engagements per hour. The slip limit should not exceed four seconds duration, the product of seconds slip per engagement times number of engagements per hour must be under 180. Heavy duty applications frequently raise the clutch or brake outer surface temperature up to 150 degrees F. above ambient temperature.

**** Extra Heavy Duty.

Maximum slip per engagement should be limited to 10 seconds. Seconds of slip times number of engagements per hour will exceed 180.

For mechanical presses, press-brakes, shears and paper mill machinery, consult your Twin Disc Distributor.




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TWIN DISC POWER TAKE-OFF WARRANTY

- A. Twin Disc, Incorporated guarantees all assembled products and parts, (except component products or parts on which written warranties issued by the respective manufacturers thereof are furnished to the original purchaser, as to which Twin Disc assumes no liability) against defective materials, or workmanship *for a period of eighteen (18) months from the date of original shipment by Twin Disc to its customer, but not to exceed twelve (12) months or two thousand (2,000) hours of service, whichever occurs first.* The original purchaser does not rely upon any tests or inspections to such products or parts by Twin Disc. No other warranties express or implied are intended or given by Twin Disc, Incorporated.
- B. The exclusive remedy provided by Twin Disc, Incorporated within the applicable warranty period specified in paragraph "A" shall be, at the sole option of Twin Disc, either the repair or replacement of any part or product found by Twin Disc to be defective and the labor to perform the repair or replacement (or equivalent credit). Labor is defined as the flat rate labor hours required to disassemble, inspect and reassemble the Twin Disc product only as published in the Twin Disc flat rate manual. The above is subject to the following terms and conditions:
1. This warranty is effective with parts or products shipped from Twin Disc, Incorporated after June 30, 1973. The effective serial number is 137635.
 2. Complete parts or products must be returned to Twin Disc, Incorporated within the warranty period, transportation charges prepaid.
 3. This warranty is void if, in the opinion of Twin Disc, Incorporated the failure of the returned part or product resulted from abuse or neglect or where such failure has been caused by accident.
 4. Labor or other costs or expenses incurred by the buyer for removal and reinstallation of the Twin Disc part or product is not covered by this warranty and the buyer assumes full responsibility for such costs and charges.
 5. The warranty is void unless the buyer or his agents provides proper transportation and storage facilities and reasonable care of the complete product or part from the date of shipment to the date placed in service.
 6. This warranty is void unless the buyer causes the product or part to be properly installed within the rated capacity of the product or part with installations properly engineered and in accordance with the practices, methods and instructions approved by Twin Disc, Incorporated.
 7. This warranty is valid only if all required replacement parts or products are of Twin Disc origin or equal, and otherwise identical with components of the original equipment.
 8. The warranty is void if any modifications are made to any product or part without the prior written consent of Twin Disc, Incorporated.
- C. In consideration for this warranty buyer agrees to indemnify and hold seller harmless from and against all and any loss, liability, damages or expenses for injury to persons or property, including, without limitation, buyer's employees and property, due to the acts or omissions of the buyer, its agents, and employees in the installation, use and operation of said equipment and shall assert no claim against seller for consequential damages.
- D. Only authorized factory representatives of Twin Disc, Incorporated shall have authority to assume any cost or expense in the service, repair or replacement of any part or product within the warranty period except when such cost or expense is authorized in advance in writing by Twin Disc, Incorporated.
- E. Twin Disc, Incorporated reserves the right to improve the product through changes in design or material without being obligated to incorporate such changes in products of prior manufacture. Buyer will not rely on any such changes as proof of insufficiency or inadequacy of prior designs or material.

12/73

TORQUE VALUES - FOR TIGHTENING CAPSCREWS, BOLTS & PIPE PLUGS.

CAPSCREWS, BOLTS & NUTS (1)			
TORQUE (LB. FT.) FOR COARSE AND FINE THREADS			
NOMINAL THREAD DIAMETER (INCHES)	SAE GRADE 5	SAE GRADE 8 (3)	Screws for Univ. Joint Bearing Caps
	OILED (2)	OILED (2)	OILED (2)
1/4	9-8	13-11	
5/16	17-15	24-21	
3/8	30-27	42-38	
7/16	44-40	62-56	67-60
1/2	68-61	95-86	105-95
9/16	100-90	140-127	
5/8	140-125	195-177	200-180
3/4	240-215	335-305	345-315
7/8	360-325	505-460	535-485
1	545-490	880-792	
1-1/8	690-620	1110-1010	
1-1/4	920-830	1490-1350	
	3 DASHES 120° APART 	6 DASHES 60° APART 	 12 Pt. Head Undercut Body
	SAE STANDARD HEX BOLT HEAD MARKINGS		

Rev. 1/78

PIPE PLUGS		
RECOMMENDED TORQUE (LB. FT.) *		
NPT DIAMETER (INCHES)	IRON, STEEL & BRASS PLUG OR FITTINGS	
	IN CAST IRON OR STEEL	IN ALUMINUM
1/16	6.2-4.5	
1/8	10-7.5	
1/4	20-15	
3/8	25-19	
1/2	47-35	
3/4	59-44	
1	100-80	
1-1/4	130-105	
1-1/2	150-120	

* MUST BE USED WITH COMPOUND,
JOHN CRANE INSOLUBLE PLASTIC
LEAD SEAL NO. 2 OR EQUIVALENT.

THIS TABLE COVERS TIGHTENING
TORQUES FOR LEAK PROOF JOINTS
SEALING OIL UP TO 500 PSI AND AIR
UP TO 100 PSI AND VACUUM LINES.
CAN USE 2/3 OF ABOVE VALUES IF
NOT OVER 5 PSI OIL OR 3 PSI AIR IS
BEING SEALED. TORQUEING HOT
UNITS TENDS TO CAUSE MORE
DIFFICULT PLUG REMOVAL.

(1) TORQUE VALUES FOR CAPSCREWS AND BOLTS ALSO APPLY TO USE IN ALUMINUM PROVIDED THE THREAD ENGAGEMENT IS TWICE THE NOMINAL THREAD DIAMETER AND A HARDENED FLAT STEEL WASHER IS USED UNDER THE HEAD. THIS TABLE COVERS TIGHTENING TORQUES FOR THE MAJORITY OF TWIN DISC'S USE OF CAPSCREWS AND BOLTS IN THREADED STEEL, CAST IRON, ALUMINUM AND BRASS PARTS. INDIVIDUAL ASSEMBLY DRAWINGS WILL SHOW SPECIAL REQUIREMENTS.

(2) USE FOR ALL FASTENERS LUBRICATED WITH MOLY-DISULFIDE, WHEN PLATED WITH ZINC OR CADMIUM, OR WHEN DIPPED IN LUBRICATING OIL.

(3) SOCKET HEAD SCREWS AND 12 POINT HEAD SCREWS WITH FULL BODY ARE ALSO GRADE 8.



Large Mechanical Clutches

Models E & EH—Sizes 14, 16 and 18 inches

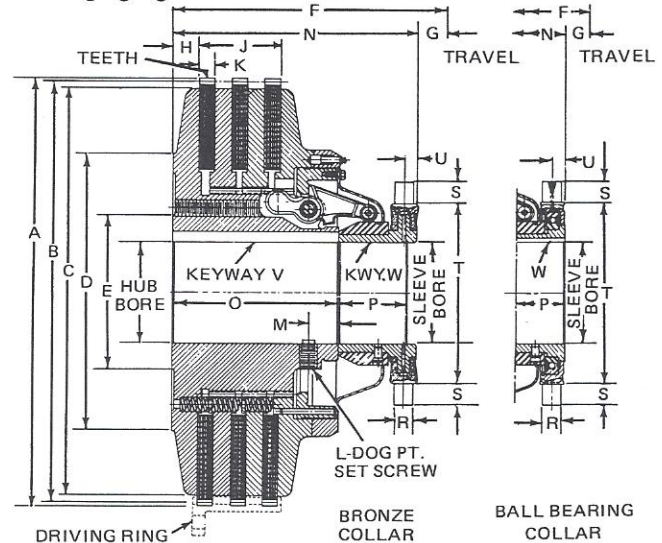
Most Sizes Available in 1, 2 or 3 Plate Construction

Model E and EH Clutches are of the over-center type. They are large, extra-heavy-duty clutches for high-horsepower, high-torque operations where abuse is likely and dependability is a requisite. They incorporate the greatest possible ruggedness that can be built into a mechanically-actuated clutch. The engaging action is provided with hardened and ground parts and the single pivot uses needle bearings to reduce pin friction.

Highest grade asbestos driving plates are used and compensation for wear is made through a simple single-point adjustment feature. Driving plate connection is made through splined gear teeth to a driving ring.

Overall dimensions are held to a minimum so that the room required for installation can be conserved. Maximum bores are large enough to accommodate over-size shafts. Easy engaging action is assured through use

of the needle bearings and hardened ground parts in the engaging mechanism.



Capacity Data

Model	Maximum Prime Mover Horsepower Recommended			Axial Force† (Lbs.)	Working Torque (Lbs.-Ft.)	Maximum Safe Operating Speed‡		Weight (Lbs.)	Approx. WR ² (Lbs.-Ft. ²)	
	Light Duty	Normal Duty	Heavy Duty			Solid Plates	Split Plates		Clutch Body	Driving Plate
E-114	170	130	95	986	915	2400	1950	128	13	1.5
E-214	310	200	125		1830	2500	1900	176	18	3.0
E-116	220	175	120		1132	2150	1750	140	18	2.3
E-216	400	255	160	1120	2264	2200	1700	210	27	4.6
EH-118	280	220	155		1885	1800		228	41	3.2
EH-218	510	325	200		3770	1950	1550	292	59	6.4
EH-318	740	430	250	1548	5655	2050		356	80	9.6

† See page 3 regarding axial force information. ‡ See page 3 regarding maximum speeds.

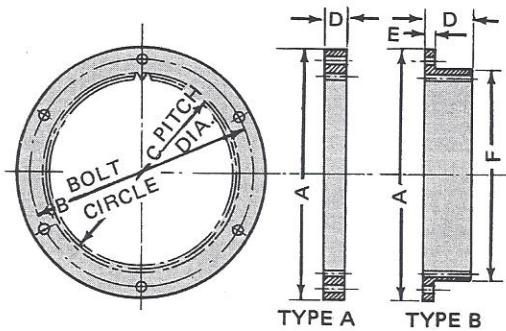
Dimensional Data

Model	Drawing Number		Maximum Hub Bore	Maximum Sleeve Bore	A	B	C	D	E	G	H	J	K	L	M	O	V*	W*
	Bronze Collar	Ball Bearing Collar																
E-114	X8440P	X8440	3.500	3.506	15 ⁵ / ₃₂	14 ³ / ₄	14	10	5	17 ¹ / ₃₂	7 ⁷ / ₈	—	5 ⁵ / ₈	1 ¹ / ₂	5 ⁵ / ₈	3 ¹⁵ / ₁₆	3 ¹ / ₄ X 3 ³ / ₈	1 ¹ / ₄ X 9 ⁹ / ₆₄
E-214	X8458P	X8458	3.499	3.504	15 ⁵ / ₃₂	14 ³ / ₄	14	10	5	17 ¹ / ₃₂	7 ⁷ / ₈	—	5 ⁵ / ₈	1 ¹ / ₂	5 ⁵ / ₈	5 ⁵ / ₁₆	3 ¹ / ₄ X 3 ³ / ₈	1 ¹ / ₄ X 9 ⁹ / ₆₄
E-116	X8441P	X8441	3.500	3.506	17 ⁵ / ₃₂	16 ³ / ₄	16	10	5	17 ¹ / ₃₂	7 ⁷ / ₈	—	5 ⁵ / ₈	1 ¹ / ₂	5 ⁵ / ₈	3 ¹⁵ / ₁₆	3 ¹ / ₄ X 3 ³ / ₈	1 ¹ / ₄ X 9 ⁹ / ₆₄
E-216	X8457P	X8457	3.499	3.504	17 ⁵ / ₃₂	16 ³ / ₄	16	10	5	17 ¹ / ₃₂	7 ⁷ / ₈	—	5 ⁵ / ₈	1 ¹ / ₂	5 ⁵ / ₈	5 ⁵ / ₁₆	3 ¹ / ₄ X 3 ³ / ₈	1 ¹ / ₄ X 9 ⁹ / ₆₄
EH-118	X9271A	X9271	4.500	4.509	19 ⁵ / ₃₂	18 ³ / ₄	18	12 ³ / ₄	6 ¹ / ₂	17 ¹ / ₁₆	1 ¹ / ₈	2 ¹ / ₈	5 ⁵ / ₈	3 ³ / ₄	3 ³ / ₄	4 ¹⁵ / ₁₆	3 ¹ / ₄ X 3 ³ / ₈	3 ³ / ₈ X 13 ¹³ / ₆₄
EH-218	X9272A	X9272	4.499	4.506	19 ⁵ / ₃₂	18 ³ / ₄	18	12 ³ / ₄	6 ¹ / ₂	17 ¹ / ₁₆	1 ¹ / ₈	2 ¹ / ₈	5 ⁵ / ₈	3 ³ / ₄	3 ³ / ₄	6 ⁷ / ₁₆	3 ¹ / ₄ X 3 ³ / ₈	3 ³ / ₈ X 13 ¹³ / ₆₄
EH-318	X9273A	X9273										3 ⁵ / ₈				7 ¹⁵ / ₁₆		

*Keyway sizes are for maximum bores given in the Maximum Bore columns. For keyway sizes of smaller bores, write to Twin Disc, Incorporated, Racine, WI 53403.

Model	BRONZE COLLAR							BALL BEARING COLLAR							TEETH 20° P.A.	
	F	N	P	R	S	T	U	F	N	P	R	S	T	U	NO.	P.
E-114	8 ²¹ / ₃₂	7 ⁷ / ₁₆	3 ¹ / ₂	7 ⁷ / ₈	1	7 ¹ / ₄	5 ⁵ / ₈	8 ¹ / ₄	7 ¹ / ₃₂	3 ³ / ₃₂	3 ³ / ₄	3 ³ / ₄	7 ¹ / ₂	19 ⁹ / ₃₂	59	4/5
E-214	10 ¹ / ₃₂	8 ¹³ / ₁₆						9 ⁵ / ₈	8 ¹³ / ₃₂							
E-116	8 ²¹ / ₃₂	7 ⁷ / ₁₆	3 ¹ / ₂	7 ⁷ / ₈	1	7 ¹ / ₄	5 ⁵ / ₈	8 ¹ / ₄	7 ¹ / ₃₂	3 ³ / ₃₂	3 ³ / ₄	3 ³ / ₄	7 ¹ / ₂	19 ⁹ / ₃₂	67	4/5
E-216	10 ¹ / ₃₂	8 ¹³ / ₁₆						9 ⁵ / ₈	8 ¹³ / ₃₂							
EH-118	10 ¹ / ₄	8 ¹³ / ₁₆	3 ⁷ / ₈	7 ⁷ / ₈	1	8	5 ⁵ / ₈	9 ⁷ / ₈	8 ⁷ / ₁₆	3 ¹ / ₂	7 ⁷ / ₈	1	9	2 ¹ / ₃₂	75	4/5
EH-218	11 ³ / ₄	10 ⁵ / ₁₆						11 ³ / ₈	9 ¹⁵ / ₁₆							
EH-318	13 ¹ / ₄	11 ¹³ / ₁₆						12 ⁷ / ₈	11 ⁷ / ₁₆							

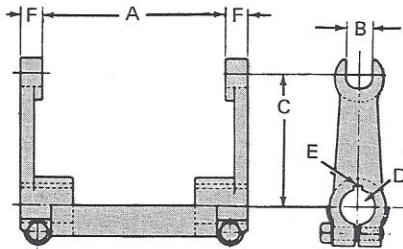
Clutch Accessories



N.D.S. Drilling Supply
26041 Newton Circle
Elko, MN 55020
Phone # 800-637-1940
Fax # 952-461-3403

Clutch Driving Rings

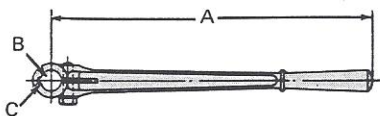
Model	Driving Ring Number	Type Ring	A +.000 -.005	B	C	D	E	F	Holes No.-Size	Teeth 20° P.A.
E-114	5712	B	$18\frac{3}{8}$	$17\frac{1}{4}$	$14\frac{3}{4}$	$1\frac{1}{8}$	$\frac{1}{2}$	16	8 — $\frac{17}{32}$	59 — 4/5 P.
E-214	5713					$2\frac{3}{8}$				
E-116	6623					$1\frac{1}{8}$				
E-216	6624	B	$20\frac{3}{8}$	$19\frac{1}{4}$	$16\frac{3}{4}$	$2\frac{3}{8}$	$\frac{1}{2}$	18	8 — $\frac{17}{32}$	67 — 4/5 P.
EH-118	6924	A	$22\frac{1}{2}$	$21\frac{3}{8}$	$18\frac{3}{4}$	$1\frac{1}{8}$	—	—	6 — $\frac{21}{32}$	75 — 4/5 P.
EH-218	6925	B				$3\frac{1}{16}$				
EH-318	6926A	B				$4\frac{1}{4}$				



Throwout Forks

Model	Type Collar	Fork Number	A	B	C	D	E	F
E-114, E-214, E-116, E-216	Ball Bearing	5091	$7\frac{5}{8}$	.749-.755	$4\frac{1}{2}$	1.003-1.005	$\frac{1}{4} \times \frac{1}{8}$	$\frac{3}{4}$
	Bronze	5270	$7\frac{1}{2}$	.890-.895	$5\frac{1}{8}$	1.003-1.005*		$\frac{15}{16}$
EH-118, EH-218, EH-318	Ball Bearing	6962	$9\frac{1}{4}$	.890-.895	$5\frac{1}{8}$	1.253-1.255	$\frac{3}{8} \times \frac{3}{16}$	$\frac{15}{16}$
	Bronze	A5486	$8\frac{1}{4}$		$5\frac{1}{2}$		$\frac{5}{16} \times \frac{3}{16}$	$\frac{7}{8}$

*Also furnished in 1.253-1.255 bore—Fork Number 5270A.



Hand Levers

Model	Lever Number	A	B	C
E-114, E-214, E-116, E-216	5090	$23\frac{3}{8}$	1.001-1.002*	$\frac{1}{4} \times \frac{1}{8}$
EH-118, EH-218, EH-318	8215A	30	1.251-1.252	$\frac{5}{16} \times \frac{5}{32}$

*Also furnished in 1.251-1.252 bore—Lever Number 5090A.