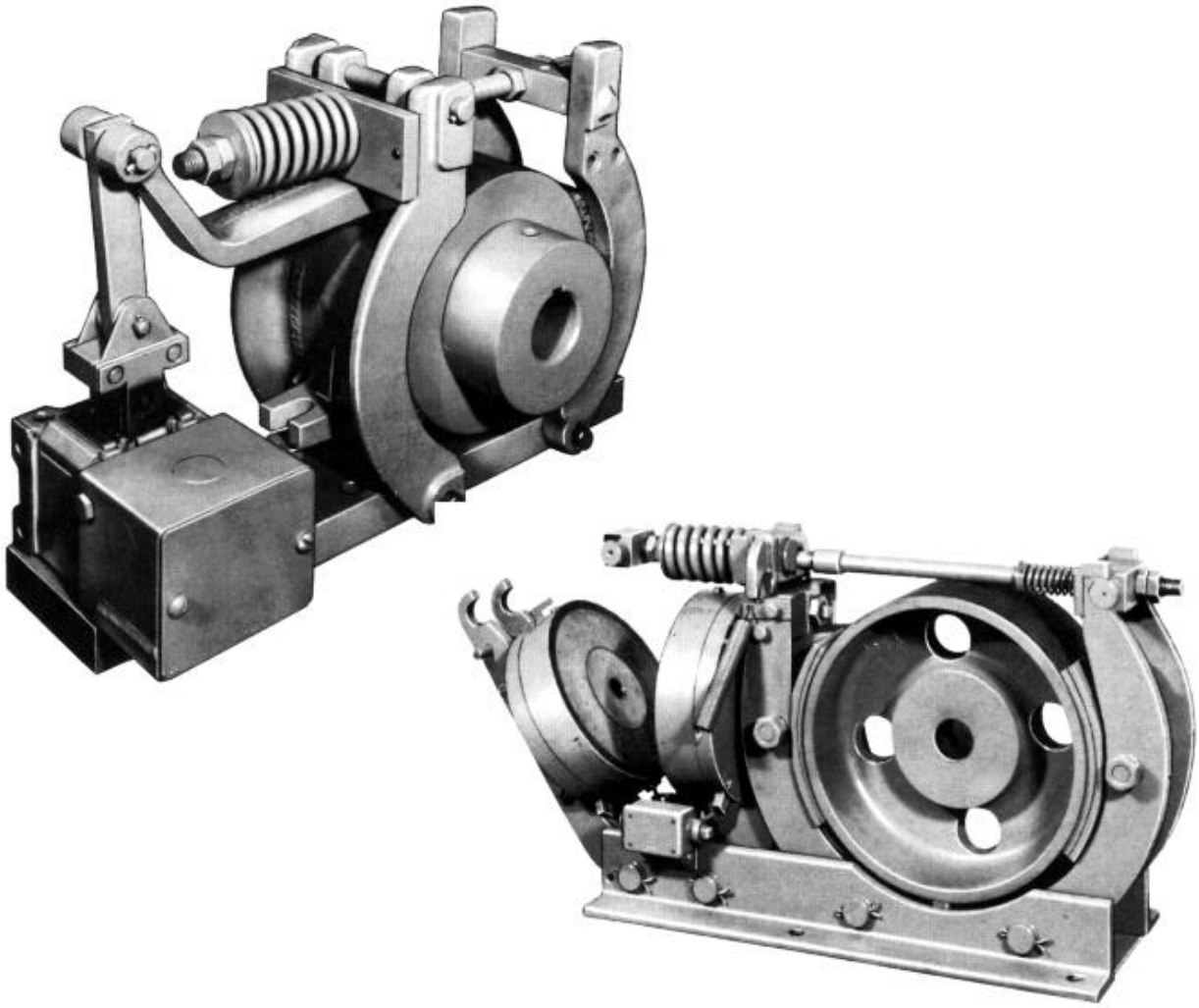
PATRIOT
Sensor Solutions

Gemco™ Industrial Brakes
Magnetic Shoe Brake Systems

Simple and Effective Spring Applied Electric Released AC and DC Brakes



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INTRODUCTION

Application
Shoe brakes are used for both stopping and holding loads. Some of the most common applications include cranes, hoists, conveyors and machine tools.

Design
These magnetic shoe brakes were originally designed and built by Westinghouse and have a proven record of reliability. Consult GEMCO if a cross-reference to the old Westinghouse part numbers are needed.

Operation
Magnetic shoe brakes are spring set, electrically released.

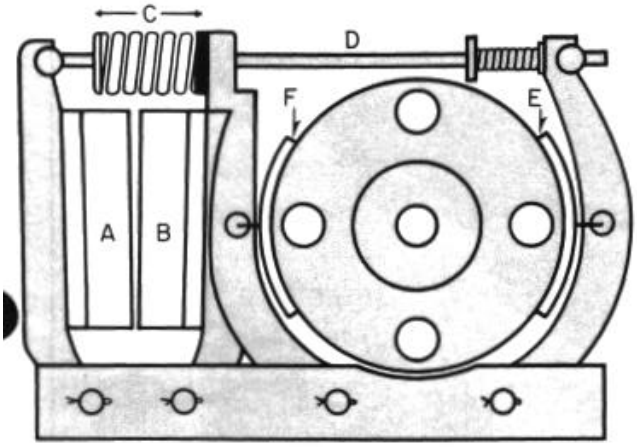
The brake is set when power is removed from the brake's coil. As a safety feature, if power is lost, the brake resets automatically.

The Type TM brake's electrical mechanism consists of one or two Dc magnets, while an Ac solenoid and plunger comprise the Type CB brake's electrical mechanism.

Both the Type TM and Type CB brakes operate similarly, although the CB brake's electrical operating mechanism is a solenoid, as opposed to the TM brake's Dc magnets. The mechanical operation is identical for both brakes.

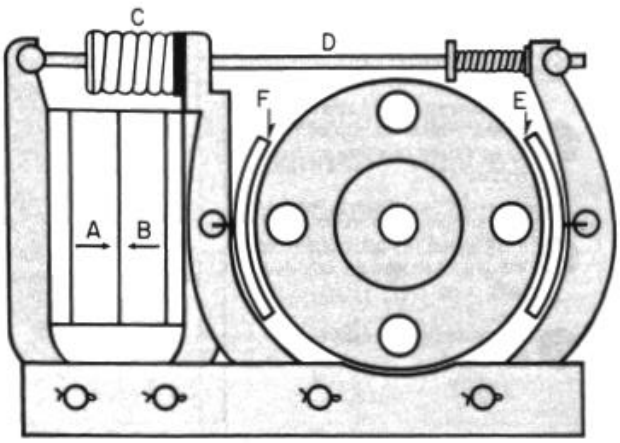
The Type TM brake's operation is illustrated below.

Brake Set (De-energized)



When the twin magnets (A and B) become de-energized, spring C simultaneously moves tie rod D to the left and magnet B to the right, forcing both brake shoes (E and F) to apply brake torque to the wheel at the same time.

Brake Released (Energized)



When the twin magnets (A and B) are energized, they pull together compressing spring C. This action simultaneously moves tie rod D to the right freeing shoe E. At the same instant, the motion of magnet B to the left frees shoe F.

Selection
Torque Rating: The normal practice is sizing a brake's torque rating is to equal or exceed the full load torque of the motor. The formula to calculate full load motor is as follows:

$$T = \frac{5250\ HP}{RPM}$$

T = Full load motor torque in lb. ft.
HP = Motor horsepower
RPM = Speed of motor shaft

In some applications the brake may be subjected to unusual operating conditions against which the brake must be sized to exceed this maximum torque.

The thermal capacity of the magnetic shoe brakes are adequate foremost applications. However, some applications which require frequent stopping of high inertia loads requiring long deceleration periods may extend the thermal capacity of the linings and cause the brake to fade. Such applications should be referred to MagneTek with the WR of the connected load, RPM, and frequency of operation.

CB AC brakes are available with either continuous or intermittent time ratings. Continuous rated brakes can be used on all applications. The intermittent rated brakes indicate that the solenoid can be placed across the line for one hour maximum without damage. It is equivalent to 1/2 time on and 1/2 time off. Since the coil is on for shorter periods of time, the allowable torque rating is higher on the intermittent rating.

TM DC brakes are also available with two torque ratings per frame size. TM brakes with shunt coils have higher one hour ratings than continuous ratings. The TM brakes with series coils are available with either 1/2 hour or 1 hour ratings.

MAGNETIC SHOE BRAKES

CB AC BRAKES

Features:

1. Clean, simple, reliable design with the fewest parts of any AC brake available today.

   Designed for minimum mechanical shock on the operating mechanism and thus greatly increases service life.

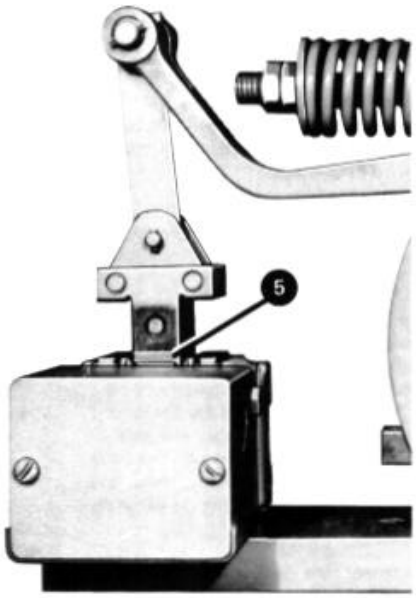
2. Rugged long life solenoid - tested in more than two million operational cycles without electrical failure.

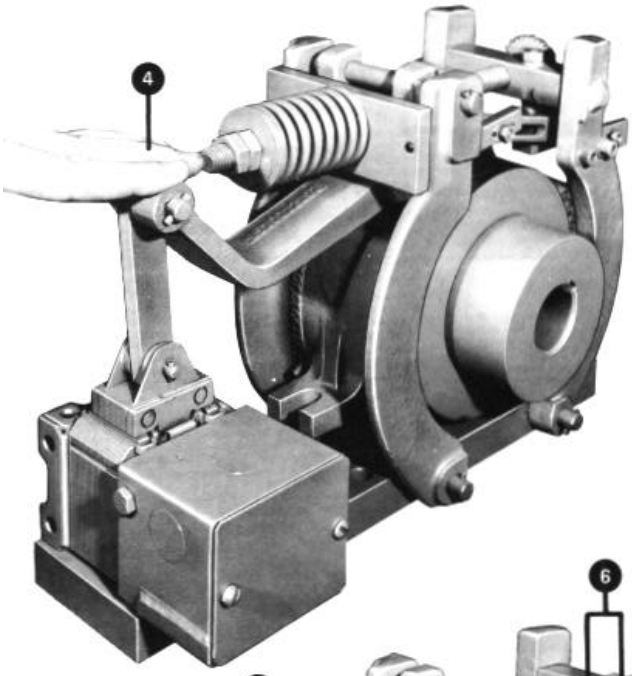
3. Simple one point torque adjustment.

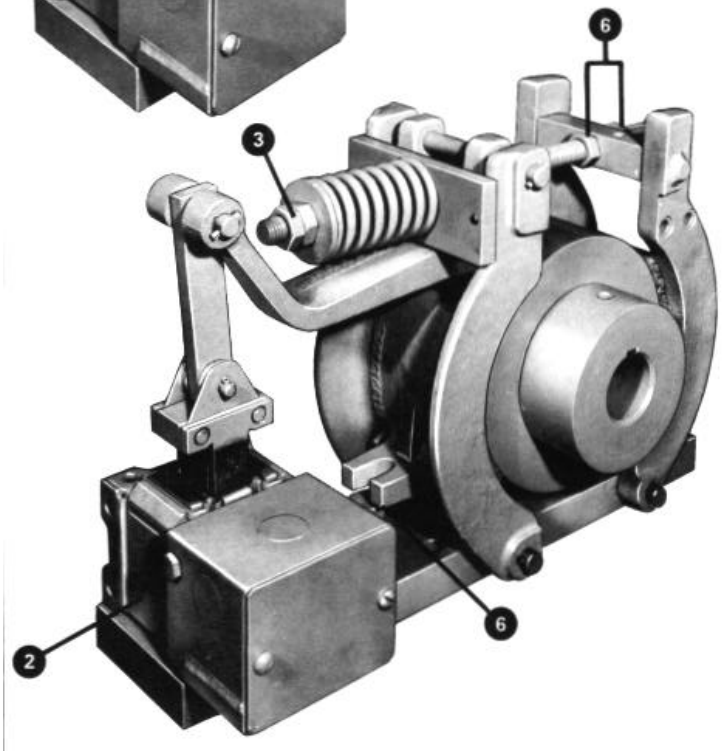
4. No separate hand release is required. The brake can be released by light hand pressure on the solenoid arm.

5. Solenoid plunger travel indicator - a mark on the plunger indicates when the brake should be adjusted for lining wear.

6. Simple two-point adjustment for lining wear.







MAGNETIC SHOE BRAKES
INSTALLATION AND SERVICE INSTRUCTIONS - TYPE CB

General Description
The type CB brakes have an AC solenoid for operation. When the brake solenoid is energized, the lining will clear the wheel, and when de-energized, the linings are pressed against the wheel by means of a compression spring. These brakes are designed with power failure protection; that is, in the event of a power failure, the brake automatically spring-sets.

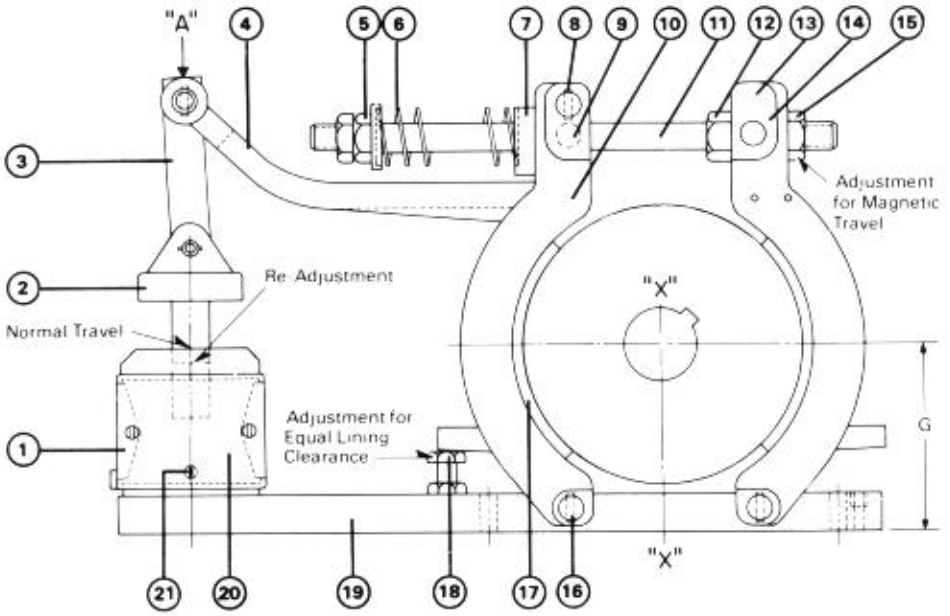


Figure 1 Operation

The power supply must be disconnected before any adjustments or servicing work is performed on the brake.

Operation (See Fig. 1)
1. When brake is de-energized, the compression spring (6) exerts pressure on the brake wheel as follows:

a. The spring force on the inner shoe arm (10) is transmitted through the spring seat (7).

b. The spring force on the outer shoe arm (13) is transmitted from nut (5) on the tie rod (11) to nut (15) to outer tie rod block (14), to outer shoe arm.

2. When brake is energized, pressure is removed from the brake wheel as follows:

The solenoid plunger (2) pulls into the stationary portion of solenoid (1) moving lever arm (4) down. The lever acting about pivot pin (8) forces the inner and outer shoe arms apart by moving the tie rod to the right through tie rod pin (9).

Mounting
If the brake was shipped with the wheel clamped between shoes, remove wheel from shoes by pushing down solenoid lever at point 'A'.

With wheel mounted on shaft, install brake as follows:

1. Brake must be mounted on a flat surface parallel to shaft. Distance from center line of shaft to bottom of base of brake should agree with 'G' dimension within limits of +.03, -0 inch. Center line X-X should pass midway between mounting holes within .03 inches.

Frame	'G'	Frame	'G'
CB15	3.07	CB110	4.75
CB35	3.83	CB160	6.85
CB75	4.75		

2. Release brake by pushing down solenoid lever at point 'A'. Place brake in position over mounting holes, then release solenoid lever to clamp lining on wheel. Insert shims under base if required, then bolt brake to base.

3. The brake should be mounted in the horizontal mounting position for maximum solenoid life.

Adjustment
The solenoid plunger (2) has two lines scribed around its surface. The upper line is an indication of normal travel and the lower line is for readjustment (see Table 2). For normal travel, the upper scribed line should line up with the top of the solenoid frame (1). The brake is set for normal travel at the factory; however, if the adjustment is off, then bring into adjustment by moving adjustment nut (15). Turning this nut in will decrease amount of travel and turning nut out will increase amount of travel. Nut (12) is used to lock this adjustment in place.

Adjustment in stop bolt (18) is used to obtain equal lining opening at both sides of wheel. When the brake is energized the shoe arm

MAGNETIC SHOE BRAKES
INSTALLATION AND SERVICE INSTRUCTIONS - TYPE CB

linkage is pulled towards the solenoid; therefore, the adjustment bolt is required to equalize this movement between shoe arms. Turning bolt in allows more clearance at the inner shoe and backing bolt out allows more clearance at the outer shoe. Stop bolt (18) has a lock nut for maintaining its position. Either using a feeler gauge or rotating the wheel by hand can insure that there is clearance between the wheel and lining. Due to variation in the lining thickness, there may be occasions, at initial installation, when the normal travel setting will not give complete clearance between the lining and the wheel. If this should happen, temporarily increase the solenoid plunger travel beyond the normal travel line. Once the lining has worn in, reset the plunger to the normal travel line.

Torque Adjustment
Brake is adjusted at our factory for the torque rating as given on the nameplate. With brake de-energized and solenoid plunger adjusted for normal travel, the compressed length of spring should be per value in Table 1.

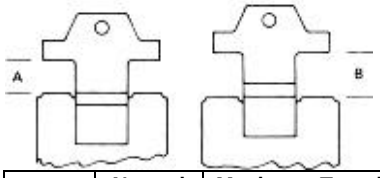
Table 1

Frame	Travel	Torque	Compressed Spring Length	Spring Free Length
CB15	.85	10 15	2.22 2.01	2.75 2.75
CB35	.85	25 35	2.88 2.69	3.50 3.50
CB75	1.17	50 75	4.12 3.85	5.0 5.0
CB110	1.17	85 110	3.74 3.45	5.0 5.0
CB160	.92	125 160	3.65 3.36	5.0 5.0

Readjustment for Lining Wear
The brake solenoid has sufficient power to operate when the solenoid plunger travel is beyond the readjust line; however, to obtain maximum brake life, the travel should be maintained within the limits scribed on the plunger (Table 2).

When lining wear results in travel beyond the readjust line, bring the travel into normal adjustment as described under Adjustment section.

Table 2



	Normal Travel	Maximum Travel Re-adjust
	A	B
CB15	85	1.00
CB35	85	1.00
CB75	117	1.50
CB110	117	1.50
CB160	92	1.50

CB Torque Ratings

Brake Frame Number	Torque Ft./Lbs.	
	Continuous	Intermittent
15	10	15
35	25	35
75	50	75
110	85	110
160	125	160

CB brakes are single phase AC brakes available in the following voltages:

60Hz	50Hz
115V	110v
200V	220V
230V	380V
460V	440V
575V	550V

Relining Shoe Arms
To reline the shoe arms, relieve the spring pressure by backing off spring nut (5). Back off nut (15) and remove roll pins that retain base pins (16). Remove base pins and swing shoe arms away from wheel. The drive rivets holding the lining are easily removed with a drift.

After replacing the lining, reassemble brake and readjust per Adjustment Section. Drive rivets are reusable. Shoes with bonded linings will have to be re-bonded or drilled for rivet type linings.

Coil Connection
All CB brake coils are single phase, single voltage coils. Knockouts are located on each side of the conduit box for attaching the conduit for the power leads. Power leads are connected to screw terminals on the coil.

Removing Coil and Plunger Guides

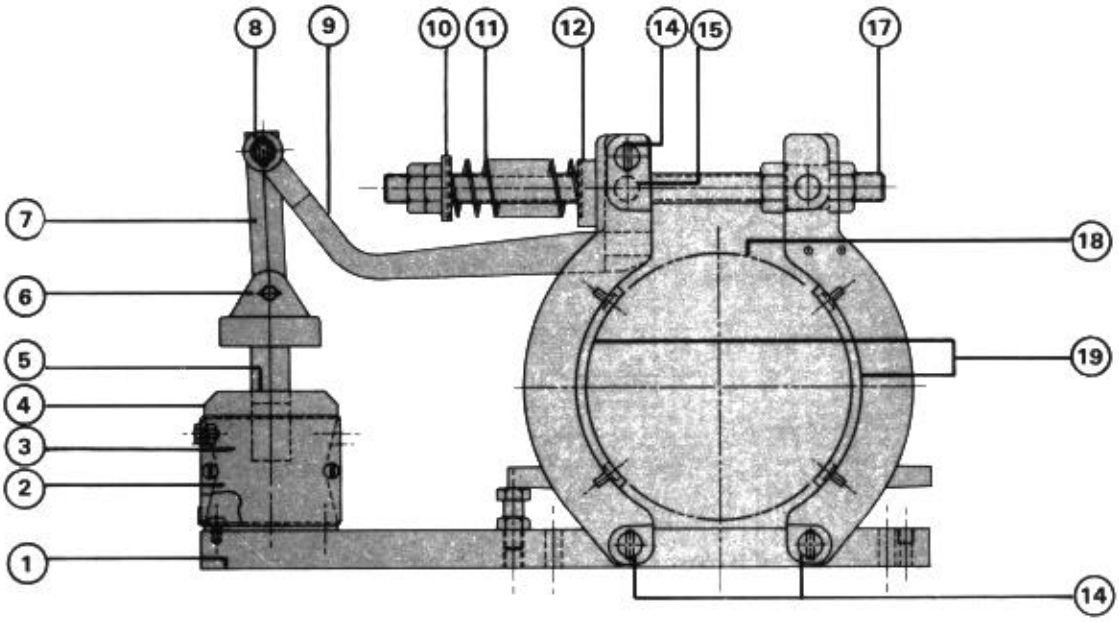
Caution
The power supply must be disconnected before removing coil.

Disconnect power leads from the coil. To remove coil and plunger guides, disconnect link (3) from solenoid plunger (2). Remove plunger from solenoid frame. The plunger guides are held in place by screw (21) located in the bottom of the solenoid frame. Remove this screw and the plunger guides can be pulled out of the solenoid frame. With the guides removed, the coil slides out of the frame.

The same coil is used for either continuous or intermittent duty. It is necessary to specify the
torque rating so that the spring can be properly adjusted.

If the torque ratings of the type CB-AC brake are exceeded and only AC voltage is available, a type TM-DC brake can be supplied with a rectifier (i.e., type TMR-twin magnet rectified).

MAGNETIC SHOE BRAKES
REPLACEMENT PARTS LIST - TYPE CB

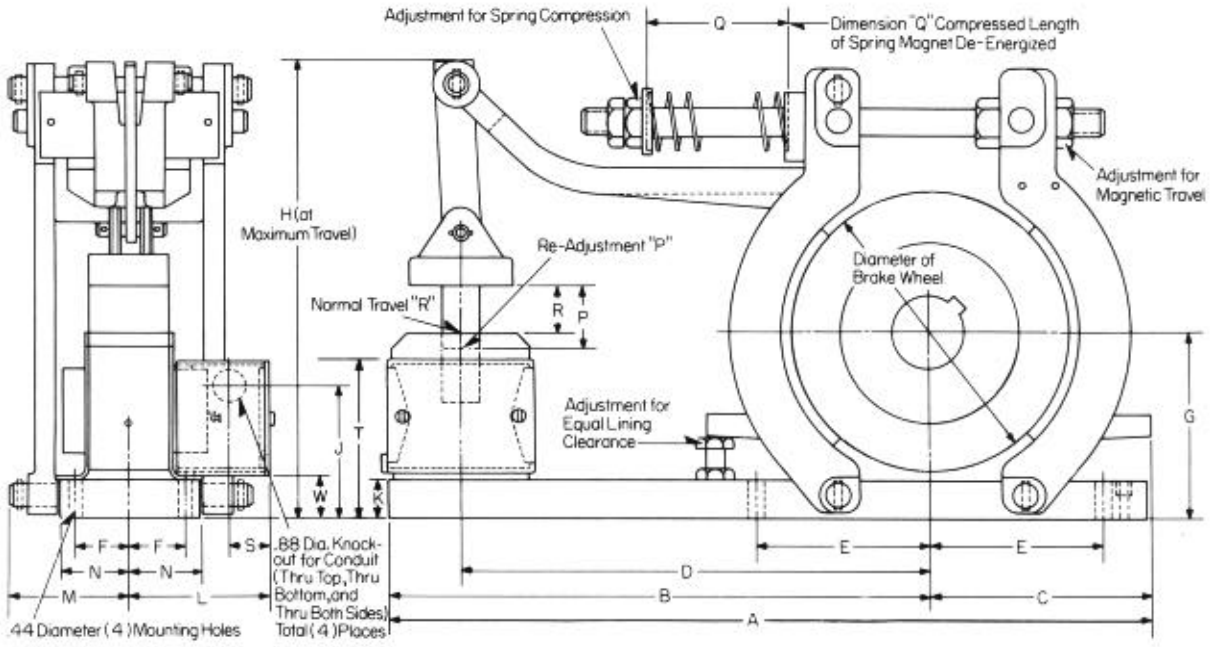


Ref. No.	Description		Style Number Frame CB 15	CB 35	CB 75	CB 110	CB 160	Quantity
1	Base		E004068	E005042	E007069	E007069	E010068	1
2	Coil	115/60	E004104	E005051	E007080	E007087	E007087	1
		230/60	E004105	E005052	E007081	E007088	E007088	1
		460/60	E004102	E005039	E007065	E007066	E007066	1
		575/60	E004106	E005053	E007082	E007089	E007089	1
		200/60	E004107	E005054	E007083	E007090	E007090	1
3	Conduit Box		E005044	E005044	E010069	E010069	E010069	1
4	Solenoid Assy.		E004109	E005055	E007079	E007091	E010103	1
5	Solenoid Guide		E005050	E005050	E007076	E007076	E007076	2
6	Pin		E004056	E005029	E007055	E007055	E010056	1
7	Link		E004062	E005035	E007061	E007062	E010062	1
8	Pin		E004055	E005028	E007054	E007054	E010055	1
9	Lever		E004059	E005032	E007058	E007058	E010059	1
10	Spring Seat		E004063	E005036	E007063	E007063	E007063	1
11	Spring		E004065	E005038	E010064	E010064	E010064	1
12	Spring Plate Assy.		E004111	E005057	E007084	E007084	E010104	1
14	Pin		E004054	E005027	E007053	E007053	E010054	3
15	Pin		E004058	E005031	E007057	E007057	E010058	1
17	Adj. Rod Assy.		E004060	E005033	E007059	E007059	E010098	1
18	Wheel		[1]	[1]	[1]	[1]	[1]	
[2] [3]	Brake Shoe - Inner		E004113	E005048	E007074	E007074	E010106	1
[2] [3]	Brake Shoe - Outer		E004114	E005047	E007073	E007073	E010107	1
[4] 19	Lining & Pin Kit		E004101	E005049	E007078	E007078	E010108	1

1 When ordering, give shop order number from nameplate.
2 Parts not illustrated.
3 Brake Shoe with lining.
4 Lining Kit for old style brakes with rivet type linings.

Note: As of January 1993 brake assemblies and replacement shoes have bonded linings.

MAGNETIC SHOE BRAKES
DIMENSION SHEET
TYPE CB - FRAMES CB 15 TO CB 160



FRAME No.	Brake Wheel			A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	T	W
	Dia.	Face	Max. Bore																		
CB 15	4.50	2.75	1.625	12.00	8.25	3.75	6.62	3.00	.94	3.07	8.31	2.47	.63	3.25	2.06	1.25	1.00	.85	1.13	3.25	.66
CB 35	5.50	3.25	1.625	14.13	9.73	4.38	8.10	3.50	1.03	3.83	9.43	2.72	.88	3.25	2.45	1.50	1.00	.85	1.13	3.50	.91
CB 75	7.00	4.25	1.875	19.25	13.75	5.50	11.78	4.38	1.31	4.75	12.00	3.24	1.00	3.64	2.98	1.75	1.50	1.17	1.12	4.00	1.12
CB 110	7.00	4.25	1.875	19.25	13.75	5.50	11.78	4.38	1.31	4.75	12.00	3.24	1.00	3.64	2.98	1.75	1.50	1.17	1.12	4.00	1.12
CB 160	10.00	4.25	2.250	21.12	14.00	7.12	12.36	6.00	1.38	6.85	15.75	3.24	1.00	3.64	3.62	1.88	1.50	.92	1.12	4.00	1.12

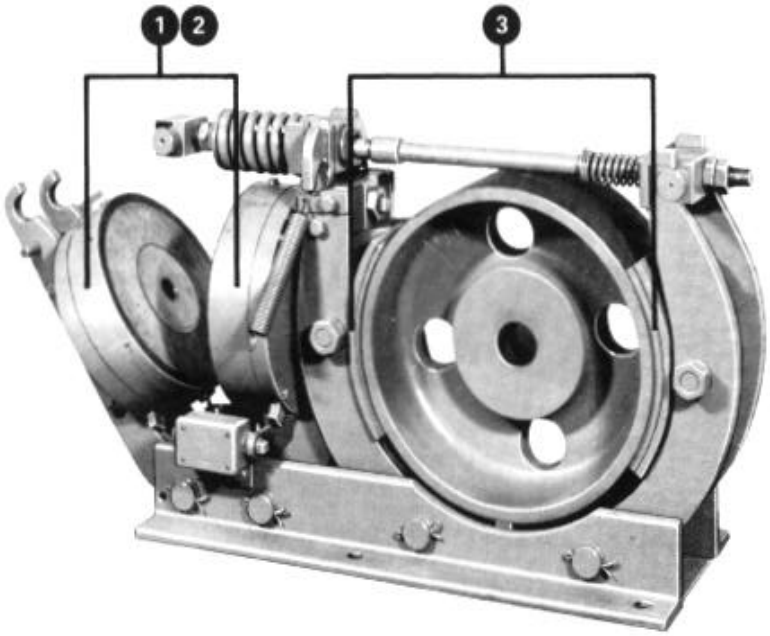
FRAME No.	Torque Ft. Lbs.	Q	Brake Weight Lbs. (Less Wheel)	Wheel Weight Lbs.
CB 15	10	2.22	20	6
CB 15	15	2.01		
CB 35	25	2.88	30	10
CB 35	35	2.69		
CB 75	50	4.12	60	25
CB 75	75	3.85		
CB 110	85	3.74	60	25
CB 110	110	3.52		
CB 160	125	3.65	78	40
CB 160	160	3.36		

NOTE: DIMENSIONS ARE IN INCHES. These dimensions are not to be used for construction purposes unless approved by the factory.

MAGNETIC SHOE BRAKES

TM DC BRAKES

Shunt or Series Wound

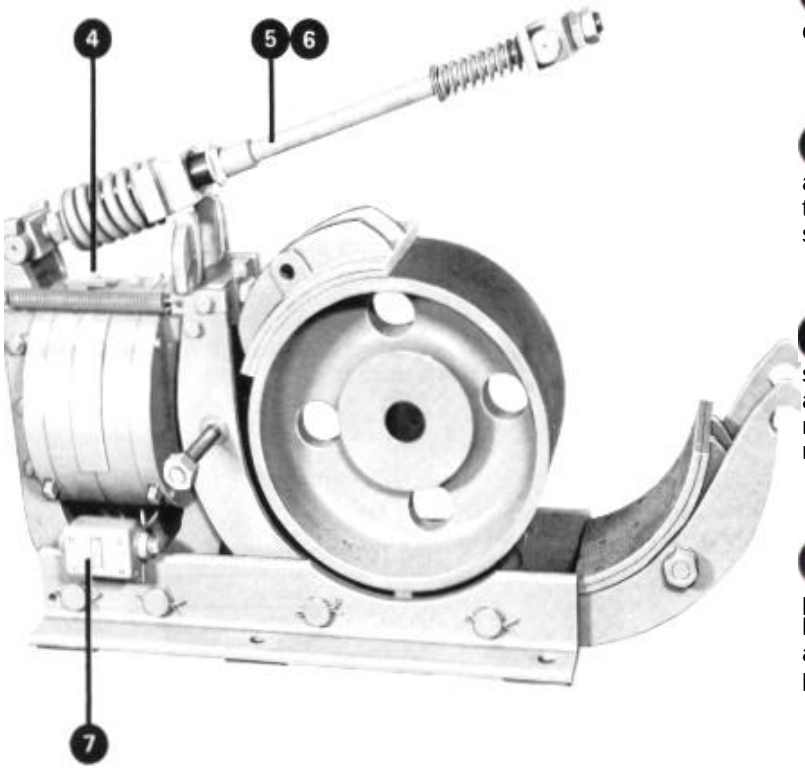


Features:

1 Mechanically independent coils can be removed without releasing the brake shoes. The design of the twin-magnet system results in a real safety features: if the magnet coil should need replacement while the equipment is under load - for example, while a crane is in the middle of a lift - the magnetic assembly can be removed and replaced or repaired without releasing the braking action or disturbing the torque setting. In an emergency, short-time operation on a single coil is possible.

2 Twin-magnet coils are Epoxy-encapsulated for permanent protection against dust, water, grease, oil, chemicals and mechanical impact (except TM43 and 63 have single coil).

3 Self-aligning cast-iron brake shoes are lined with long-wearing molded linings secured with brass rivets. The interchangeable shoes are single-pivot mounted for positive self-alignment upon installation. Once the shoes are aligned, the pivot bolts are tightened, holding the shoes in position to prevent the shoe tips from dragging.



4 Shoe-travel indicator provides a positive visual check of lining wear for quick maintenance-inspection.

5 Over-the-wheel tie rod is a simple, rugged, easily accessible linkage, permitting all adjustments from the top. Only two easy adjustments for shoe wear and spring tension.

6 Unitized tie-rod-and-spring assembly facilitates shoe replacement. The complete assembly removes as a unit, making the shoes accessible for lining replacement in one quick step. The brake can be released manually, if required.

7 Left-or-right-mounted conduit box is an Integral part of the brake frame, allowing either right-hand or left-hand installation. On series coil brakes, Frame 1355 and larger, convenient accessible leads are furnished in place of the conduit box.

MAGNETIC SHOE BRAKES

INSTALLATION AND SERVICE INSTRUCTIONS - TYPE TM

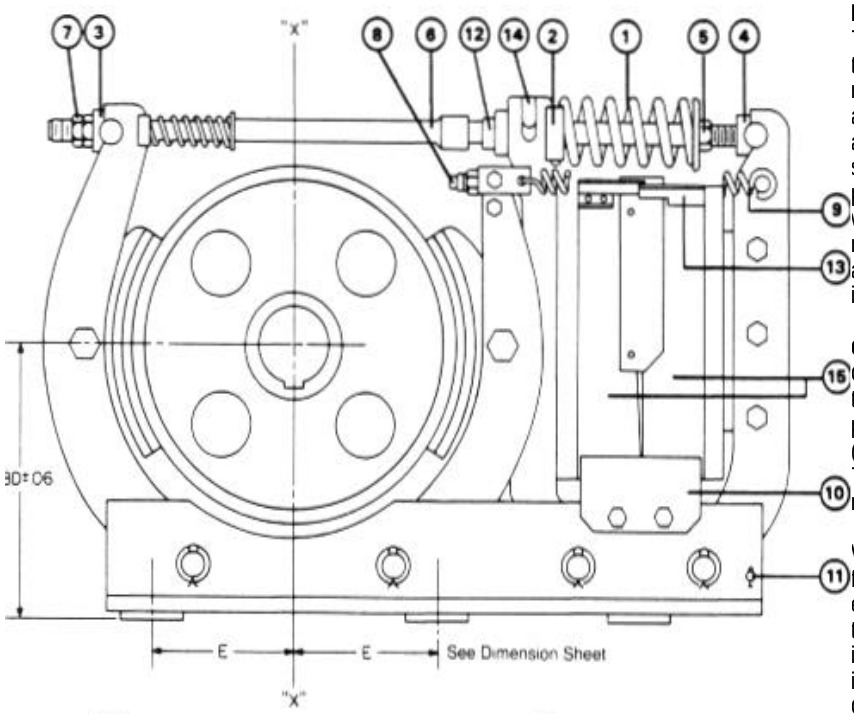


Figure 1

Description
The Type TM Brakes have a direct-current clapper type magnet and are designed so that when the magnet is energized, the shoes will clear the wheel and when de-energized, the shoes are pressed against the wheel by means of a compression spring. The force of the compression spring produces equal pressure of the shoes against the wheel and movement of the magnet results in equal movement of the shoes. Simple, rugged construction allows full accessibility of all parts for visual inspection or maintenance.

Operation (See Figure 1)
Compression spring (1) is contained between trunnion block (2) and nut (5) on tie rod (6) which passes through a clearance hole in trunnion blocks (2) and (3) and is threaded and pinned to block (4). The amount of spring force is adjusted by position of nut (5).

When brake is de-energized, main spring (1) exerts force on nut (5) and trunnion block (2) which, in effect, pulls trunnion (3) and the left shoe arm towards the wheel and pushes trunnion (2) and the inside armature which acts on bolt (8) and forces the inside shoe arms and shoes against the wheel. Geometry of the linkage is such that the shoe forces are exactly equal.

When brake is energized, magnet faces are pulled together by magnetic force, moving trunnion blocks (2) and (4) towards each other by the amount of magnet travel. Spring force is contained between trunnion block (2) and lock nut (5). Right magnet arm pushes outside shoe arm away from wheel and tension springs (9) cause inside shoe arms to follow movement of inside armature away from wheel.

Two adjustments are required during normal service. Nuts (7) and bolt (8) are turned clockwise to compensate for lining wear on outside and inside shoes respectively. Spring compression is adjusted for nameplate torque rating at factory. Readjustment at points (7) and (8) for lining wear will automatically bring spring compression back to initial setting.

Series Brakes
Series Brakes carry the full load current of the motor (specify when ordering). When series wound brakes are applied to torque rating for 1 or 1/2 HR duty to correspond with motor ratings, the brake will release on 40% of full load current and remain released on 10% of full load current. When series brakes are applied on continuous duty motors and so rated, these brakes will release at 80% of full load motor current and remain released on 20% or less.

Shunt Brakes
Shunt Wound Brakes are designed for 1 or 8 hour duty. The shunt coil is designed for 64 volts for 8 hours or 80 volts for 1 hour.
NOTE: TM 83 through TM 3014 Brake Assemblies are A.I.S.E. rated.

TM Torque Ratings

Brake Frame Number	Maximum Torque in Ft./Lbs.			
	Series Brake		Shunt Brake	
	1/2HR	1HR	1HR	8HR
TM 43	25	15	25	15
TM 63	50	40	50	40
TM 83	100	65	100	75
TM 1035	200	130	200	150
TM 1355	550	365	550	400
TM 1665	1000	650	1000	750
TM 1985	2000	1300	2000	1500
TM 2311	4000	2600	4000	3000
TM 3014	9000	6000	9000	6750

MAGNETIC SHOE BRAKES

INSTALLATION AND SERVICE INSTRUCTIONS - TYPE TM

Mounting

Brake must be mounted on a flat surface parallel to shaft whose distance from center line of shaft agrees with BD dimensions for given frame within limits of +/-.06". Center line X-X should pass midway between mounting holes within .06".

Frame	BD	Frame	BD
43	4.25	1665	12.13
63	5	1985	13.25
83	7	2311	15.88
1035	8.38	3014	20.75
1355	9.88		

To remove wheel from brake as received, turn manual release bushing (12) out of trunnion block (2) to jack against collar on tie rod. Continue to turn bushing until wheel is free. If desired, the complete tie rod assembly may be lifted from brake by loosening adjustment nuts (7) until trunnion block (3) may clear half bearing in outside shoe arms. Push tie rod towards outside magnet arms until trunnion block (2) is free of its bearing and lift out complete tie rod assembly. The brake may be mounted without removing the tie rod assembly depending on personal preference. Lift wheel from brake and mount on shaft using tapered key provided if wheel has straight bore and tapered keyway. Loosen shoe bolts and make sure bolt heads will be on side away from motor to allow future shoe removal for relining. Lift brake into position on bedplate using hooks or sling under lifting lugs on inside armature. Insert hold-down bolts hand tight and align brake square with wheel. If tie rod was previously removed, reinstall using reverse technique from that described for removal. With tie rod in place, turn manual release bushing (12) back into trunnion (2) and jam tight to lock in place. Force of main spring is now holding shoes on wheel. Tighten hold-down bolts. Tighten shoe bolts.

Remove conduit box cover on shunt brakes. Bring in two power leads and connect to two bare terminals in box and tape leads. For minimum current on shunt brakes, jumper connection is made at the factory to place coils in series for cumulative magnetic flux, and leads are taped. Connection need not be disturbed except if coil is to be removed from brake. After making power connection, leave sufficient slack in coil leads outside of conduit box and replace conduit box cover.

For brake with high current series coils, one set of coil leads is brought out to each side of the brake and clamped. Connect line to brake coil leads and tape to insulate. Series coils are connected at the factory so that one-half of the line current flows through each coil.

Adjustment - Frames 83 through 3014

Equalizer stop block (10) is intended to insure approximately equal movement of both shoes should the brake be mounted on a surface other than horizontal, or if undue friction should occur at one of the pivot points. Normally, when the brake is properly adjusted, and linkage is free from binding, stop block (10) has no function. Brake linkage is simple to understand and adjustments are not critical. With some practice, the average maintenance person should be able to adjust the brake completely by eye without aid of measuring instruments.

To adjust the brake, only setting of nuts (7) and bolt 8 need to be changed for the outside or inside shoe. When properly adjusted with brake de-energized, the air gap between the tops of the magnets should agree with the nameplate reading (may be observed by lifting part of rubber dust shield off magnet). Magnets should be approximately centered with stop (10). This may be done visually, or if in doubt, with a feeler gauge. Actual adjustment is accomplished as follows:

Lift one side of rubber dust shield off dowel pins, exposing top of magnets.

Loosen lock nuts at (7) and (8), and turn (7) and (8) to reduce air gap to approximately the amount given on the nameplate.

At this time, magnets should be approximately centered about equalizer stop block (10). Replace rubber dust shield on dowel pins and tighten lock nuts at (7) and (8). Compressed length of main spring has automatically been brought back to that given point on the nameplate. When energized, brake shoes should have adequate movement to clear wheel at operating temperature without dragging.

Frames 43 and 63

These smaller frame sizes have a single coil, as opposed to the larger frames which have two. The inside shoe adjustment for lining wear is the only difference between the smaller frames and larger frames; otherwise, the adjustments are identical. When adjusting the inside shoe, loosen the shoe bolt prior to making an adjustment at bolt (8). Re-tighten shoe bolts securely after making the adjustment.

Readjustment for Lining Wear

For optimum operation, brakes of any manufacture should be readjusted to normal magnet travel as often as a reasonable maintenance schedule will allow. Minimum travel will result in fastest, quietest operation with the least amount of shock and bearing wear. The TM brake will operate at a long travel, and if necessary, allows considerable lining wear between adjustments. In lieu of a maintenance schedule, travel indicator brackets (13) on top of the magnet may be used as a visual guide for maximum wear allowable between adjustments. When magnet gap opening progresses to the point where ends of indicator brackets line up, as in Figure 2, it is time to readjust for lining wear (see Adjustment, below).

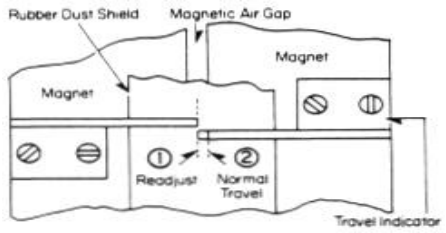


Figure 2: Magnet Travel Indicator

Torque Adjustment

Brake is adjusted at the factory for maximum torque rating for voltage as given on nameplate. With brake de-energized, and magnet air gap adjusted for normal travel, compressed length of spring should be per value in Table 1. Readjustment for lining wear will automatically return spring compression to original setting. If reduced torque is required, back off nut (5) until desired torque is obtained.

Table 1

Frame	Magnet Normal Travel	Compressed Length Spring	Free Length Spring
43	.06	2.81 2.63	3.26
63	.06	3.38 3.25	4.0
83	.06	4.31 4.25 4	5.0
1035	.06	4.31 4.25 4	5.0
1355	.13	5.44 5.38 5.12	6.0
1665	.13	5.38 5.31 5.13	6.0
1985	.13	6.44 6.31 6.13	7.0
2311	.16	8.38 8.31 8.13	9.0
3014	.19	9.69 9.63 9.5	10.26

MAGNETIC SHOE BRAKES

INSTALLATION AND SERVICE INSTRUCTIONS - TYPE TM

Manual Release and Relining Shoes

Brake may be released with a wrench for maintenance by turning release bushing (12) out of trunnion block (2) to jack against collar on tie rod until wheel is free. To return brake to normal operation, screw bushing (12) back into block (2) and jam tight to lock out of way.

To remove shoes for relining, release brake manually and remove tie rod assembly. Remove shoe bolts and slide shoes out around wheel. After relining shoes, reassemble shoes and tie rod and readjust brake. Stow manual release bushing back into block (2). Tighten shoe bolts.

To lift wheel and motor armature vertically, release brake manually and remove tie rod assembly. Remove bolts holding equalizer stop block (10) in place and lean magnets back against stop pin (11). Lift out wheel. After replacing wheel, move magnets back to normal position, replace equalizer block, center approximately between magnets and bolt up tight. Replace tie rod assembly and stow manual release bushing in trunnion block (2).

Coil Connection

The Type TM Brake has two identical coils integrally cast with the magnet outer ring and center core in epoxy resin. Damaged or defective coils are not repairable and must be replaced with the steel parts as a unit. Coils are attached to the brake armatures and each moves one-half of the length of the magnet air gap each time the brake operates. Coil leads are of highly flexible insulated cable. These leads are connected to the coil terminals and covered with Permatex gasket compound at bottom of coil and extend to terminal board or junction box at side of brake for customers connection. If broken or damaged, coil leads are easily replaced.

At installation, power leads are brought into conduit box or terminal board at side of brake and connected to two bare terminals. Two coil leads are already connected at the factory for cumulative magnetic flux. This connection need not be disturbed except when removing coil from brake. After making line connection, leave sufficient slack in leads between coil and conduit box to allow free movement of leads with magnet motion.

Shunt Coil Operation - Shunt brakes are usually supplied with low voltage coils for speedy action unless otherwise specified, and it is necessary to have a resistance in series with the coil. Coil voltage and value of series resistance is given in on page. Coils are connected per Figure 3 with full current flowing through both coils. In case of coil failure, brake may be operated on one coil for shorter time by shorting out defective coil.

Series Coil Operation - Series brakes are operated with coils connected directly in motor circuit. Due to high currents, coils are connected so that 1/2 of the motor current flows through each brake coil as per Figure 4. In case of coil failure, brake may be operated on one coil for shorter time by disconnecting defective coil.

Removing and Replacing Magnet Coils

Either or both coils may be removed and replaced without disturbing brake adjustment or removing spring load from shoes. Each coil is cast directly in magnet half with epoxy resin and is not repairable except for replacement of flexible leads.

Remove rubber dust shield protecting magnet air gap. Disconnect coil leads inside conduit box and pull leads out of box through rubber grommets for shunt coils or disconnect and unclamp leads for series coils. Remove cotter pin from one end of stop pin (11) in magnet end of brake base and remove stop pin. Unhook tension springs (9) from pin on outside armature and swing outside armature assembly down to rest on floor. Remove (4) bolts holding outer magnet ring from outside of armature and one Allen head cap screw in counter bore in face of center magnet core. Lift coil from brake. Large frame magnets have tapped holes at top for use with eyebolt for lifting.

Leads are covered with insulating compound at the coil terminals. If new leads are required, scrape compound from terminal until hardware is exposed. Replace lead and cover terminals with coat of compound. When changing coils, transfer travel indicator to new magnet. Bolt new magnet in place and bring leads into conduit box through rubber grommets for shunt coils or to terminal board. Make connection to power leads per Figure 3 or 4 depending on type of coils being used, and tape leads.

Raise outside armature back up to normal position with bearings of trunnion block (4) engaged in half bearing in outside clapper arms. Hook springs (9) in grooves of spring pin. Replace stop pin (11). Replace rubber dust shield over magnet air gap using new roll pins in magnet if required.

When installing new magnets, magnet faces may not make even contact due to standard machining tolerances. To

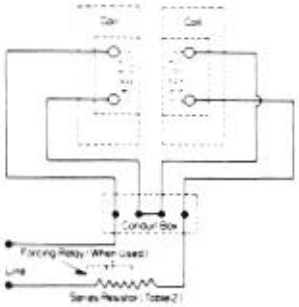


Figure 3: Shunt Coil Connection

avoid stresses and bearing wear resulting from such misalignment.

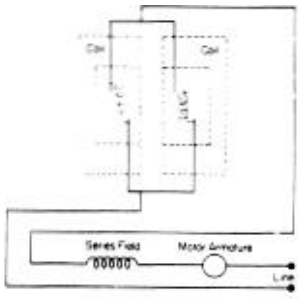


Figure 4: Series Coil Connection

MAGNETIC SHOE BRAKES
INSTALLATION AND SERVICE INSTRUCTIONS - TYPE TM

energize brake to close magnet faces. Loosen bolts holding lever arms to outside armature. This will allow magnets to seat properly. Tighten bolts securely. This operation is required only when replacing either one or both coils.

Right or Left Hand Mounting
Standard mounting is right hand, as in Figure 1, when facing commutator end of motor. Brake magnet is on right side with conduit box next to motor. Shoe bolts are inserted with heads away from motor to allow removal of shoes without dismounting brake.

Left hand or opposite standard mounting with magnet on left involves insertion of shoe bolts from opposite side and interchanging of conduit box and travel equalizer plate. Left hand brake may be ordered as opposite standard from factory or converted in field.

Lubrication
Pivot points in base and lower arms are fitted with porous bronze “oilite” type bearings. A few drops of oil around these bearings occasionally will maintain their lubricated quality. All pivot pins are stainless steel. Pivot pins at top of arms ride in half bearings and are easily accessible. These pins and wear pad contacted by adjusting screw (8) (see Figure 1) should also receive a few drops of oil occasionally.

Failure to Operate
The brake may fail to release for any of the following reasons:

• Lead wire to operating coil may be disconnected.

• Voltage may be below normal.

• Brake may not be adjusted properly. Lining may be worn causing magnet air gap to open beyond point where magnet operates sluggishly or not at all. Readjust per Adjustment paragraph.

• One or both coils may be defective. Check coil resistance against Table 2.

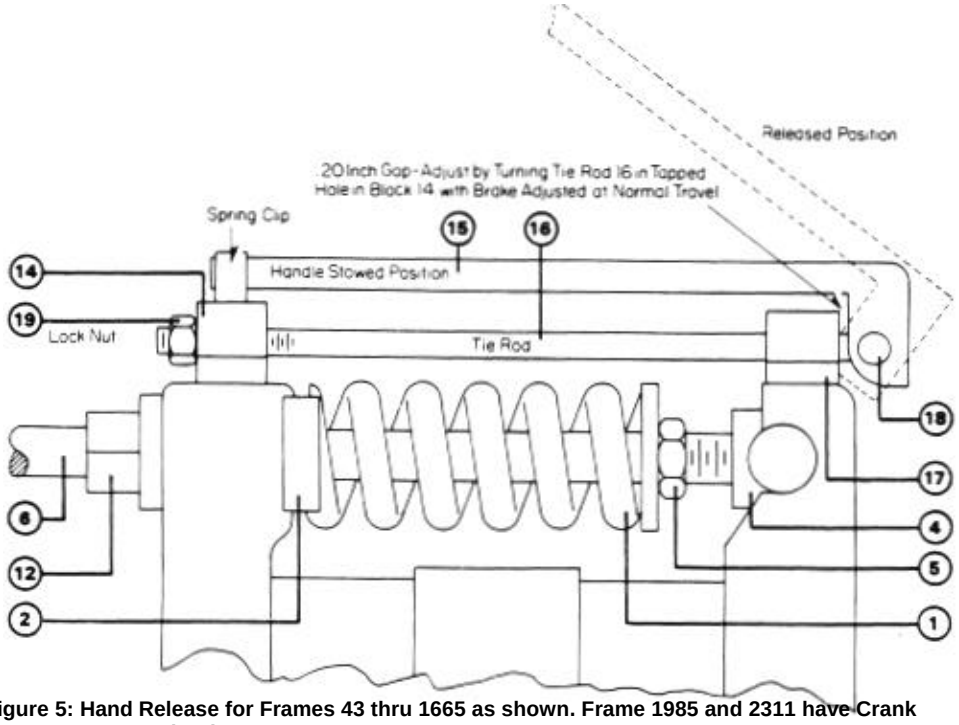


Figure 5: Hand Release for Frames 43 thru 1665 as shown. Frame 1985 and 2311 have Crank Type Hand Release.

Compensate for temperature if coil is hot. If one coil is defective, short time emergency operation is possible on one good coil.

• Coils may be improperly connected with resultant bucking instead of cumulative magnetic flux. Check wiring per Figure 3 or 4.

Brakes with Hand Release
When specified on order, a lever-type hand release is available as optional at extra cost. Figure 5 shows simple mechanism used on open brakes allowing quick release of brake torque as for lowering a load in case of power failure. The standard hand release is non-latching and allows only the minimum amount of shoe clearance to allow the wheel to turn. When brake must be released for longer time or with more shoe clearance as for maintenance or installation, release brake with bushing item (12).

Addition of the hand release complicates brake maintenance since block (14) must be removed in order to remove main tie rod assembly from the brake. Overall dimensions of brake are also slightly increased by the hand release linkage. For enclosed brakes, hand release parts and cam action are basically the same except that cam linkage is modified to suit enclosure.

Adjustment of Hand Release - Since blocks, items (14) and (17), move apart with the magnets as brake lining wears, clearance must be allowed between block (17) and cam on handle (15) to avoid restricting normal brake operation. With brake de-energized and adjusted for normal magnet gap, clearance between items (15) and (17) should be approximately .20 inches and may be measured with feeler. Gap may be varied by removing link pin (18), loosening lock nut (19), and turning rod (16) in block (14) in 180° increments to attain proper clearance.

RECTIFIER OPERATION

DC Magnetic Shoe Brakes

Before checking voltages on the rectifier panel, fully adjust brake.

Input power to the rectifier can be 380, 480, 550 or 600 volts AC. When the rectifier is energized 220 volts DC is applied to the + and - terminals, which are connected to the brake coils. After a time factor of approximately .8 seconds, a holding voltage is applied to the brake to maintain the brake in the released position.

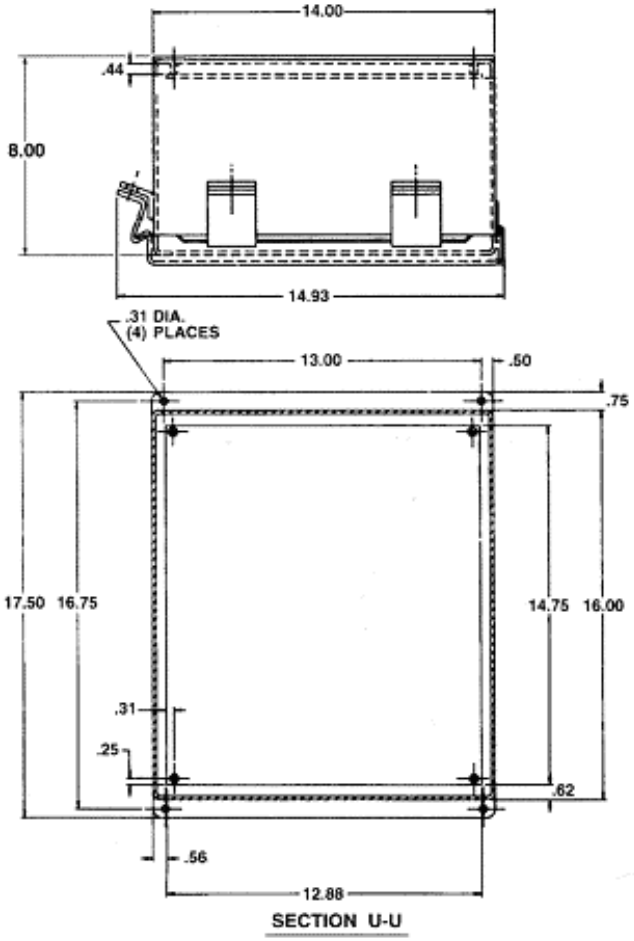
The holding voltage required to “hold in” the brake (released position) is approximately 30 volts DC.

When power to the rectifier is cut-off, the brake will de-energize quickly and the main brake spring will set the brake.

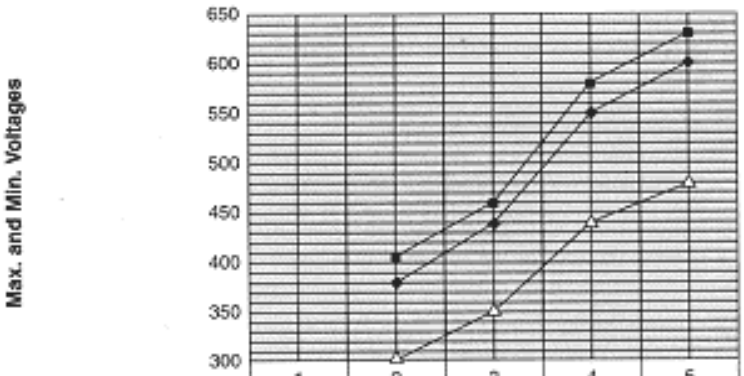
For more information on setting and holding, setting and releasing times, and general electrical information on brakes, see Shunt Brake connections or consult the factory. A wiring diagram will be furnished with each rectifier or upon request.

Two identical brake assemblies can be operated simultaneously by a single rectifier. This applies to TM43, TM63, TM83, TM1035, TM1355, TM1665 and TM1985 brake sizes.

OPTIONAL N4 RECTIFIER ENCLOSURE



Acceptable AC Voltage Ranges by Tap Voltages
All Voltage Ranges are 50/60 Hz

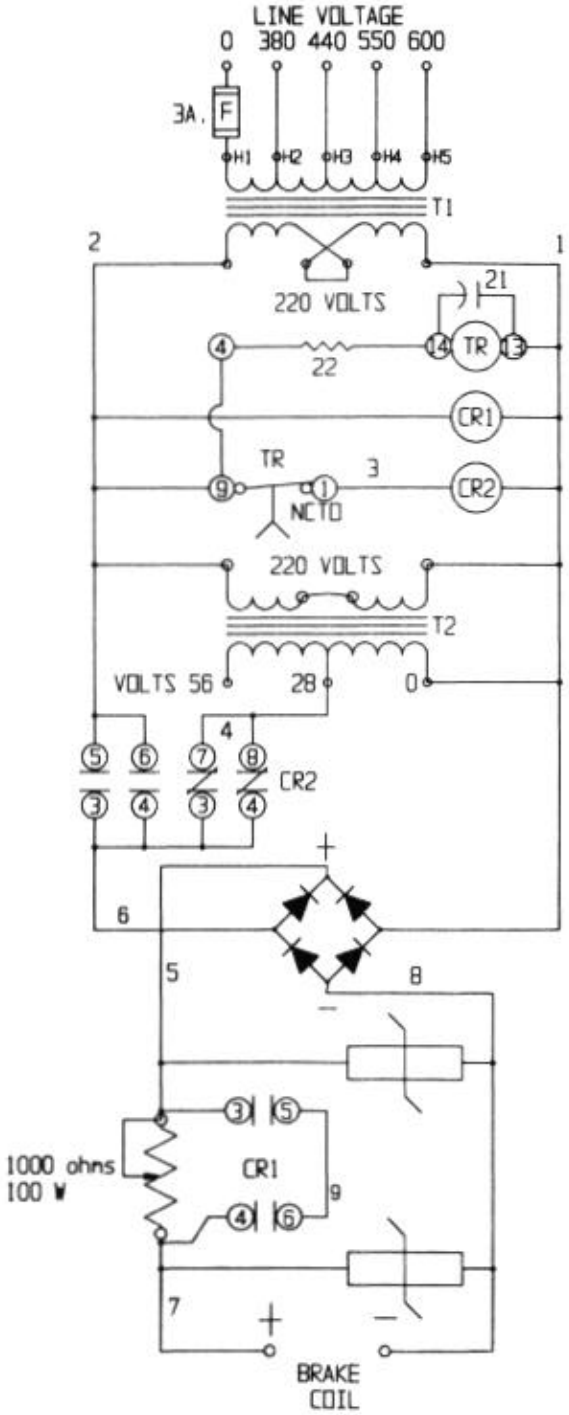


	1	2	3	4	5
AT TAP VOLTAGE		380	440	550	600
AT MAX. VOLTAGE		403	460	580	630
AT MIN. VOLTAGE		304	352	440	480

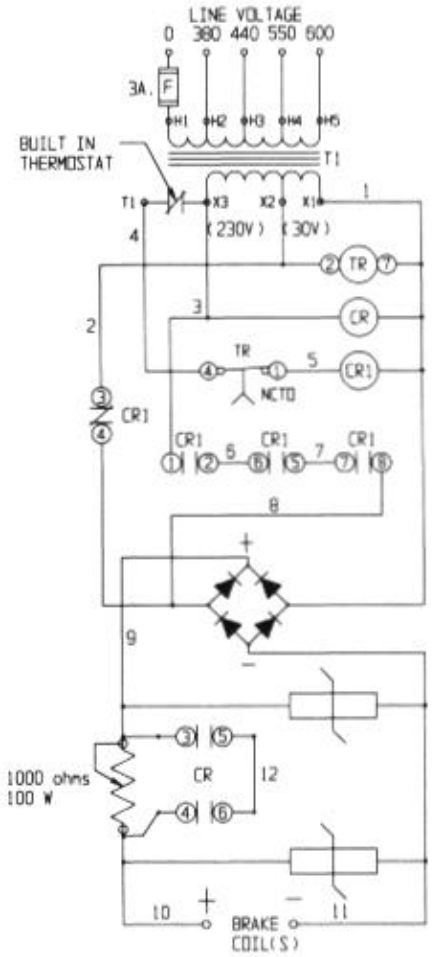
RECTIFIER OPERATION;
TM BRAKE ASSEMBLY (TYPE TMR)

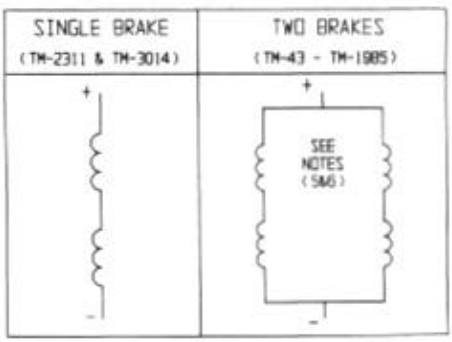
WIRING DIAGRAM

Open Chassis E010327
NEMA 4 E010326
Rectifier Assembly
For TM43 ~ TM1985
(1) Brake



Open Chassis E023205
NEMA 4 E023204
Rectifier Assembly
TM2311 and TM3014
(1) Brake or TM43 ~ TM1985 (2)Brakes





SHUNT BRAKE RESISTORS/ FORCING RESISTORS

SHUNT BRAKE RESISTORS

Shunt brakes are designed for one or eight hour duty and rated at 80 volts (1 hr.) or 64 volts (8 hr.). To operate the brake, it is necessary to have a resistor in series with the brake assembly. Coil voltage and value of series resistor, based on a line voltage of 250 VDC is shown in the following table. The TM brake has two identical coils except the TM43 and TM63 which have only one coil.

STANDARD SHUNT COIL INFORMATION

Frame	Standard Shunt Coil Style No.	Cold Coil Resistance OHMS/ Coil	Coil Volts/Coil		Ohms Resistance Required in Line [1]				Resistor Part Number
					Continuous		Intermittent		
			Cont	Int	OHMS	Amp	OHMS	Amp	
43 [2]	E004051	73	64	80	212	0.88	155	1.1	E004044
63 [2]	E006026	59.4	64	80	171	1.08	125	1.35	E006024
83	E008026	31.3	32	40	177	1.0	132	1.28	E008022
1035	E010049	23.8	32	40	137	1.35	101	1.68	E010044
1355	E013026	19.1	32	40	111	1.68	81	2.1	E013022
1665	E016026	8.83	32	40	51.5	3.6	37.7	4.53	E010622
1985	E019025	8.51	32	40	49.5	3.8	36.2	4.7	E016022
2311	E023026	6.12	32	40	35.6	5.2	26.1	6.54	E023022
3014	E030024	4.5	32	40	26.2	7.12	19.1	8.9	E030022

1 For 250 VDC without discharge resistor.
2 TM 43 and TM63 frames differ from larger TM brakes. Only (1) coil is used.

FORCING SCHEME

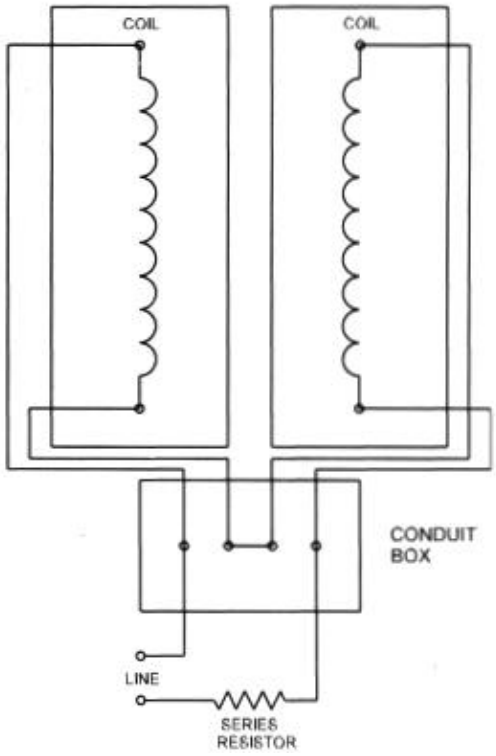
Often, it is desirable to force magnet coils with a “higher-than rated” voltage to obtain a faster response time. The following table shows typical resistors which can be used to obtain satisfactory results. The customer’s control circuit must be designed so that when first energized, the high resistance section is shorted out causing a high voltage to be impressed across the brake. After a short time delay (.8 to 1 second) a relay inserts the high resistance section reducing the holding voltage to approximately 25 to 30 volts. Forcing and hold voltages are not critical. Both release and setting times are faster with a forcing scheme when compared to a standard shunt circuit.

Holding at a low voltage also allows operation at the full brake torque (1 hr. rating) at a continuous duty cycle (8 hr. rating).

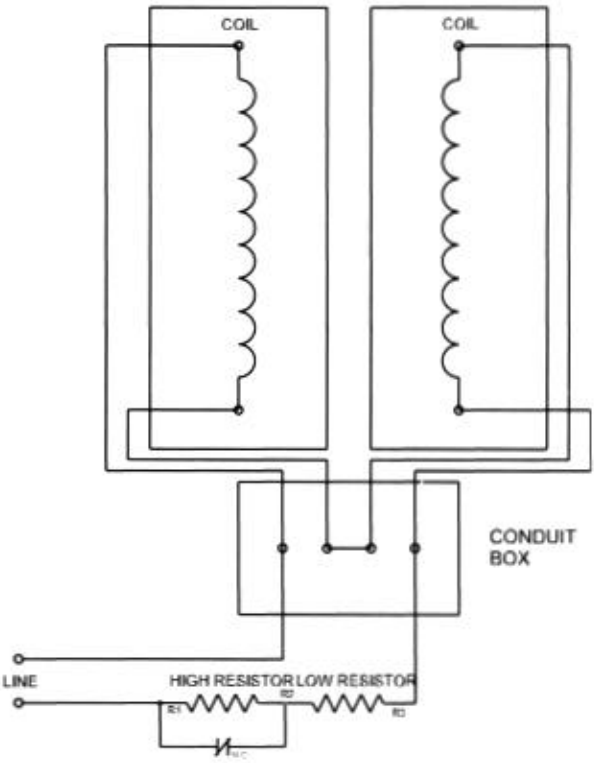
Frame	External Resistor Forced Part Number	High Resistor Ohms R1-R2	Low Resistor Ohms R2-R3	Coil Volts		Coil Amps	
				Inrush	Hold	Inrush	Hold
TM 43	E004045	720	26	185	22	2.5	.30
TM 63	E006025	585	22	182	22	3.0	.37
TM 83	E008023	625	24	182	22	2.8	.35
TM 1035	E010045	460	22	173	23	3.5	.47
TM 1355	E013023	380	13	188	23	4.7	.57
TM 1665	E016023	165	6.5	184	24	10	1.3
TM 1985	E019022	165	6.5	182	23	10	1.3
TM 2311	E023023	120	4.7	182	23	14	1.8
TM 3014	E030023	77	3.4	182	25	20	2.7

SHUNT BRAKE RESISTORS/FORCING RESISTORS

STANDARD SHUNT BRAKE

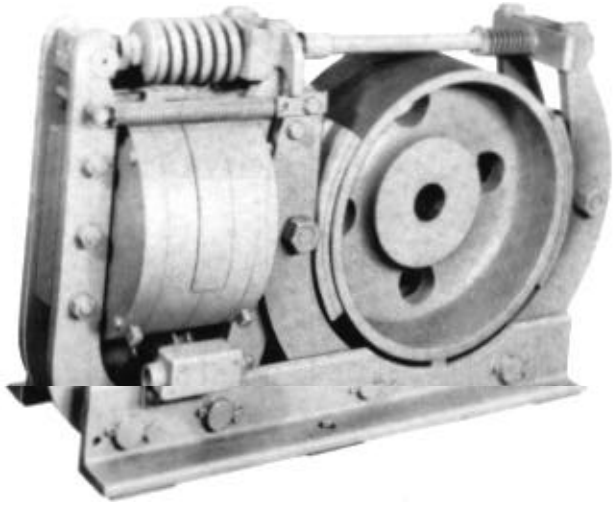


FORCING SCHEME



NOTE: Normally closed contact is to be customer supplied.

COIL DATA SHEET - TYPE TM
FRAMES 43 TO 3014



Series Coil

Frame Size	Coil Amperes		Resistance Ohms 1	Style Number 2
	One Hour	Half Hour		
83	25	36.5	0.086	E008053
	20	27.5	0.143	E008054
	15.5	21.5	0.206	E008055
	10.5	12.5	0.713	E008052
	4.1	5.5	3.13	E008056
1035	38	54	0.0494	E010109
	28.5	38.5	0.099	E010110
	20	27.5	0.209	E010111
	15	21	0.343	E010112
	10	13	0.905	E010113
1355	105	144	0.0137	E013057
	63	85	0.0358	E013058
	46	63	0.0604	E013059
	36	48	0.116	E013060
	30	40	0.1551	E013061
	25	33	0.243	E013062
	13.5	18	0.73	E013063
1665	137	180	0.0099	E016055
	105	150	0.0153	E016056
	90	125	0.021	E016054
	71	98	0.0327	E016057
	63	85	0.0415	E016058
	46	63	0.0797	E016059
1985	178	245	0.0054	E019061
	137	180	0.0117	E019062
	90	123	0.022	E019063
	63	85	0.052	E019064
2311	360	475	0.0027	E023053
	265	360	0.0049	E023054
3014	890	1175	0.0004	E030029
	488	640	0.0014	E030030

1 Average
2 Two required connected in parallel

Shunt Coils

Frame Size	Volts per Coil		Resistance Ohms 1	Style Number 2
	Continuous	Intermittent		
43	64	80	73	E004051 **3**
63	64	80	59.4	E006026 **3**
83	32	40	31	E008026
1035	32	40	24	E010049
1355	32	40	19	E013026
1665	32	40	8.8	E016026
1985	32	40	8.5	E019025
2311	32	40	6.1	E023026
3014	32	40	4.5	E030024

1 Average
2 Two required connected in series.
3 One required.

ORDERING INFORMATION:

- Give style number and name of part.
- Give the complete nameplate reading.
- State method of shipment desired.
- Send all orders or correspondence to nearest sales office of the company.
- Other coils available. Contact nearest sales office.

ELECTRIC/HYDRAULIC BRAKES TYPE TMSCH

The Type TMSCH Brake utilizes a DC Electric Brake (Type TMSC) with a hydraulic actuating cylinder. This brake is spring set and electrically released. When the brake is energized electrically, twin magnets compress the main spring which frees the brake wheel. The hydraulic actuator then becomes usable. Type TMSCH brakes are available in one or two brake systems with a manual control cylinder and pedal, which is typically located in the operators cab. This combination brake can be used electrically with remote control or manually via hydraulic operation.

TMSCH BRAKE SIZE AND TORQUE RATINGS

Size	Style	*Electric Operation		Hydraulic Operation
		Series	Shunt	
8”	TMSCH83	65	75	100
10”	TMSCH1035	130	150	200
13”	TMSCH1355	365	400	550
16”	TMSCH1665	650	750	1000

All TMSCH systems include the necessary brake(s) and hydraulic actuator(s), fluid reservoir/bleeder, bleeder pushbutton, one control cylinder with pedal, armored hoses, tubing, fittings, and brake fluid.

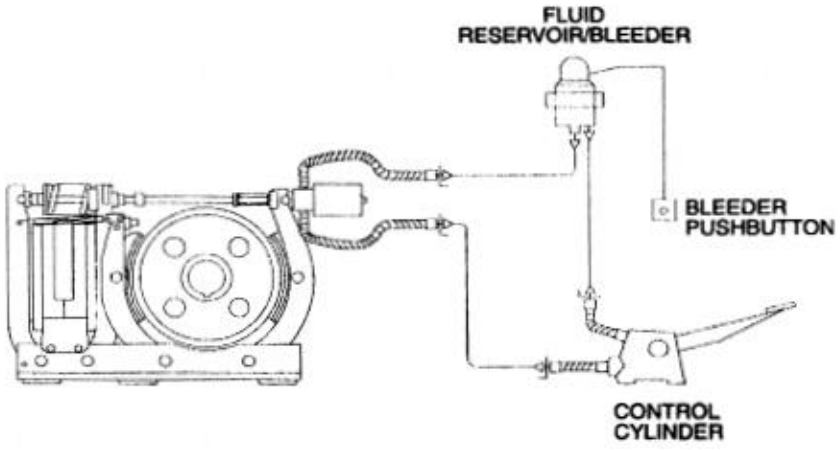
One brake systems include 100 ft. of 5/16” tubing. Two brake systems include 250 ft. of 5/16” tubing.

See page 18 for piping diagrams for the Type TMSCH one and two brake systems.

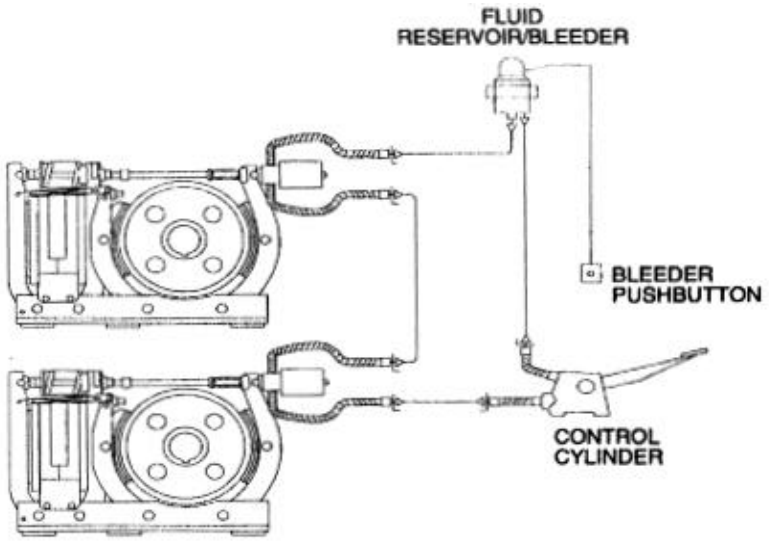
* **Full AISE torque ratings could be applicable depending on application and/or possible use of a rectifier.**

ELECTRIC/HYDRAULIC BRAKES
TYPE TMSCH PIPING DIAGRAM

Type TMSCH one brake system

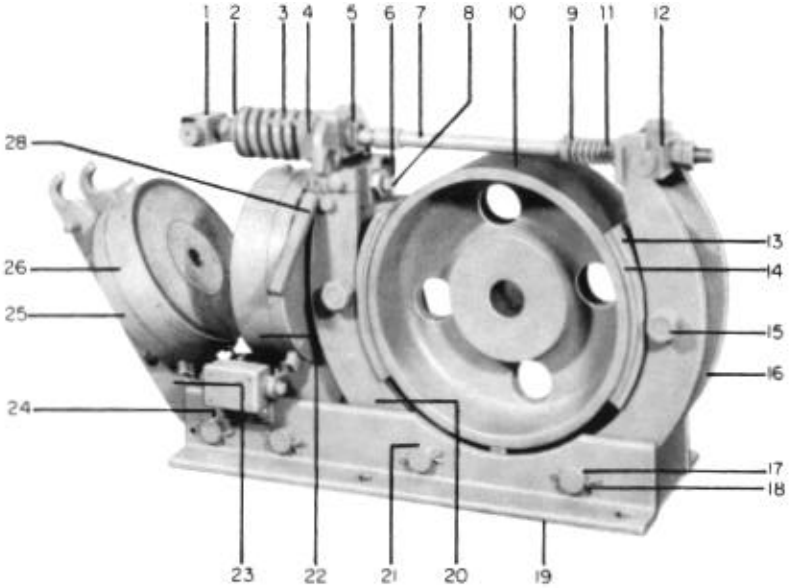


Type TMSCH two brake system



REPLACEMENT PARTS LIST - TYPE TM
FRAMES 43 AND 63

DC Magnetic Shoe Brakes



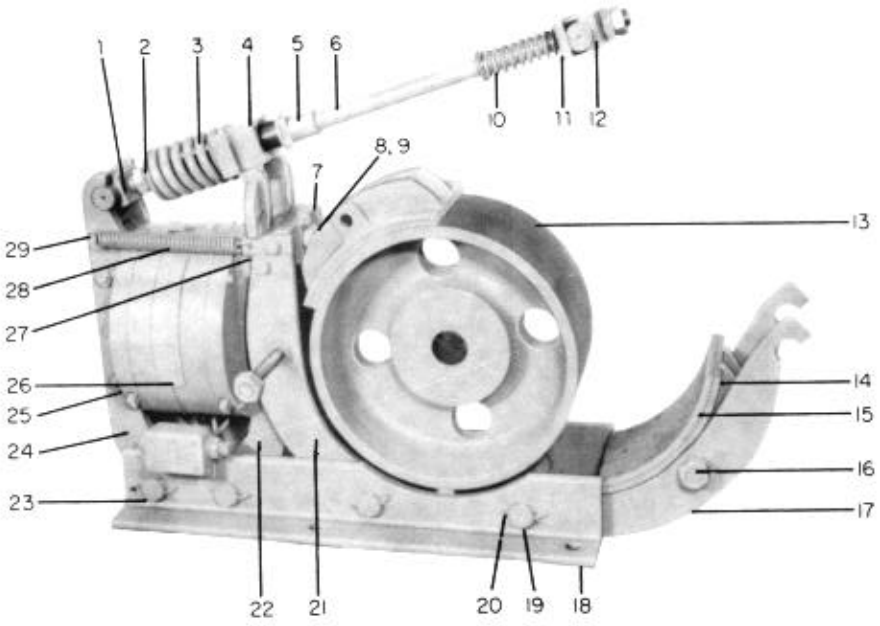
Ref. No.	Description of Part	Part Numbers Frame 43	Frame 63	No. Used
1	Hinge block, magnet end	E004142	E006069	1
2	Main spring seat	E004076	E006034	1
3 *	Main spring	E004079	E006037	1
4	Hinge block, inner	E004074	E006032	1
5	Release bushing	E004075	E006033	1
6	Adjusting bar	E004085	E006045	1
7	Tie rod	E004097	E006049	1
8	Adjusting screw	E004115	E006058	1
9	Wheel end spring seat	E004071	E006028	1
10	Brake wheel	(2)	(2)	
11 *	Wheel end spring	E004078	E006036	1
12	Wheel end hinge block	E004143	E006070	1
13	Brake shoe complete	E004047	E006023	2
14 * (3)	Lining & rivet kit	E004117	E006059	1
15	Brake shoe bolt	E004070	E004070	2
16	Outer brake shoe arm	E004118	E006056	1
17	Bushing	E004098	E004098	2
18	Pivot pin	E006031	E006031	3
19	Base	E004084	E006044	1
20	Inner brake shoe arm	E004119	E006060	1
21	Bushing	E004098	E004098	2
22	Inner clapper	E004088	E006042	1
23	Outer magnet arm	E004093	E006061	1
24	Bushing	E004098	E004098	2
25	Outer clapper	E004090	E006041	1
26 *	Coil and magnet	(2)	(2)	1
(1)	Dust seal for coil	E004077	E006035	1
28 *	Tension spring	E004080	E006038	2

(1) Not illustrated
(2) When ordering, give complete nameplate reading and number stamped on part
***** Recommended for stock
(3) Lining Kit for old style brakes with rivet type lining

Note: As of January 1993 brake assemblies and replacement shoes have bonded linings.

REPLACEMENT PARTS LIST - TYPE TM FRAMES 3 AND 3014

DC Magnetic Shoe Brakes



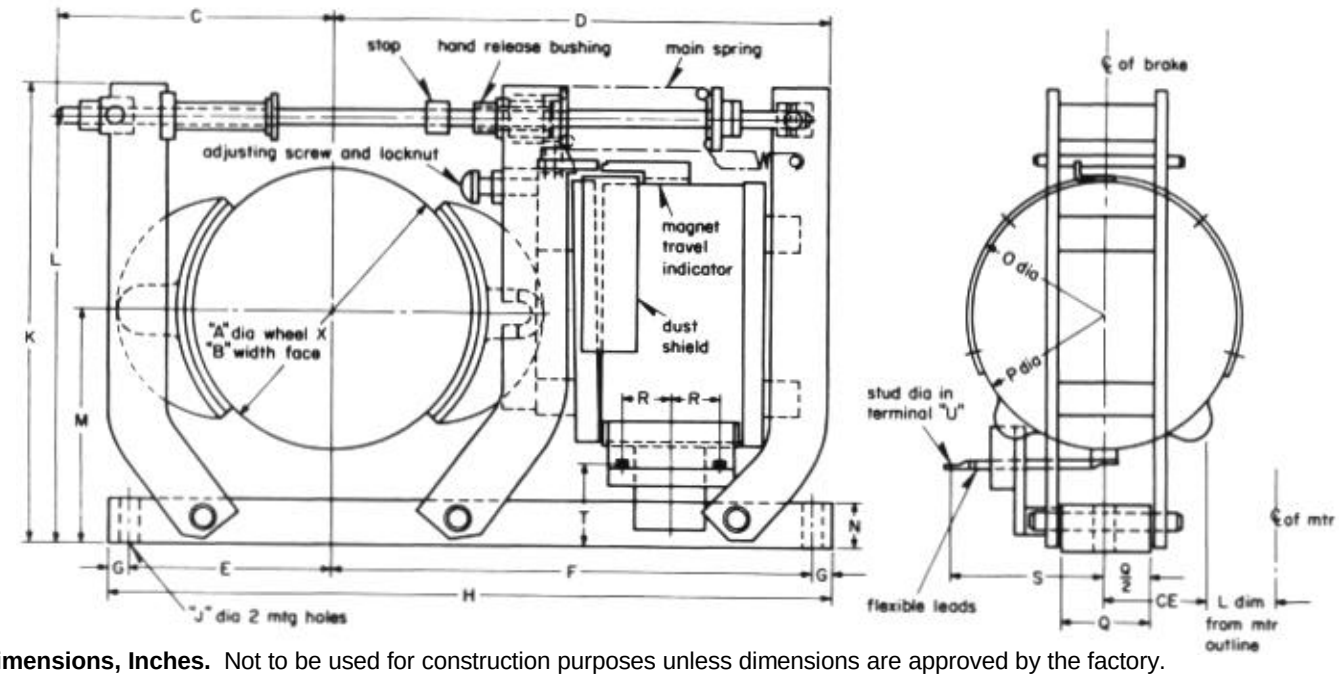
Ref. No.	Description of Part	Part Numbers							No. Used
		Frame 83	Frame 1035	Frame 1355	Frame 1665	Frame 1985	Frame 2311	Frame 3014	
1	Hinge block, magnet end	E008067	E008067	E013125	E016073	E019070	E023062	E030096	1
2	Main spring seat	E008037	E010076	E013039	E016206	E019042	E023038	E030026	1
3 *	Main spring	E008039	E010080	E013042	E016039	E019044	E023045	E030025	1
4	Inner hinge block	E008034	E010074	E013036	E016035	E019038	E023036	E030031	1
5	Release bushing	E010075	E010075	E013037	E013037	E019039	E019039	E030032	1
6	Tie rod	E008049	E010086	E013052	E016200	E019057	E023047	E030033	1
7	Adjusting screw block	E008041	E010083	E013045	E016040	E019048	E023046	E030034	1
8	Adjusting screw	E008035	E008035	E016036	E016036	E019040	E019040	E030035	1
+ 9	Flex locknut	NO LONGER AVAILABLE							
10 *	Wheel end spring	E010079	E010079	E013041	E016207	E023027	E023027	E023027	1
11	Wheel end spring seat	E008031	E008031	E013031	E016203	E019032	E023030	E030036	1
12	Wheel end hinge block	E008068	E008068	E016031	E016205	E019071	E023063	E030097	1
13	Brake wheel	(2)	(2)	(2)	(2)	(2)	(2)	(2)	1
14	Brake shoe complete	E008025	E010047	E013025	E016025	E019024	E023025	E030027	2
15 * (3)	Lining & rivet kit	E008057	E010114	E013055	E016053	E019065	E023055	E030054	1
16	Brake shoe bolt	E010070	E010070	E013053	E016027	E019027	E023028	E030040	2
17	Outer brake shoe arm	E008042	E010115	E013064	E016060	E019058	E023056	E030041	1
(1) *	Bushing	E008028	E008028	E013027	E013027	E019028	E019028	E030045	2
18	Base	E008059	E010116	E013066	E016051	E019066	E023057	E030042	1
19	Bushing	E008028	E008028	E013028	E013028	E019029	E019029	E030045	8
20	Pivot pin	E010072	E010072	E013034	E016033	E019036	E023034	E030043	4
21	Inner brake shoe arm	E008060	E010117	E013067	E016061	E019067	E023058	E030044	1
(1) *	Bushing	E008028	E008028	E013027	E013027	E019028	E019028	E030045	2
22	Clapper and arm	E008061	E010118	E013068	E016052	E019059	E023052	E030046	1
(1) *	Bushing	E008027	E008027	E013027	E013027	E019028	E019028	E030045	2
23	Stop pin	E008029	E008029	E013030	E016028	E019030	E023029	E030047	1
24	Clapper arm	E008045	E010119	E013056	E016063	E019060	E023051	E030048	1
25	Clapper	E008030	E010078	E013029	E016050	E019031	E023040	E030049	1
26 *	Coil and magnet	(2)	(2)	(2)	(2)	(2)	(2)	(2)	2
(1)	Dust seal for coil	E008038	E010077	E013040	E016038	E019043	E023039	E030050	1
27	Spring clip	E008032	E008032	E013032	E016030	E019033	E023031	E030051	2
28 *	Tension spring	E008040	E010085	E013044	E013044	E023044	E023044	E030052	2
29	Tension spring pin	E010073	E010073	E013035	E016034	E019037	E023035	E030053	1

(1) Not illustrated
(2) When ordering, give complete nameplate reading and part number stamped on part
***** Recommended for stock
+ Standard hardware item
(3) Lining Kit for old style brakes with rivet type lining

Note: As of January 1993 brake assemblies and replacement shoes have bonded linings.

MAGNETIC SHOE BRAKES
DIMENSION SHEET
TYPE TM AND TMR - FRAMES 43 AND 63

Single Magnet Type with Rectifier Available for AC Operation



Dimensions, Inches. Not to be used for construction purposes unless dimensions are approved by the factory.

Frame No.	Wheel Dia. A	Width of Face B	C	D	E	F	G	H	J	K	L	M	N	Dia O	Dia P
43	4 1/2	3 1/8	4 11/16	8 3/4	3 3/16	8 11/16	7/16	12 3/4	9/16	8 9/16	7 7/8	4 1/4	1	4 13/16	4 9/16
63	6	3 1/8	5 15/16	10 11/16	4 3/8	10 3/8	7/16	15 5/8	9/16	9 13/16	9 1/8	5	1	5 7/8	5 5/8

Frame No.	Q	R	S	T	Dia U	CE	Weight: Lbs. Brake Without Wheel	Brake Wheel
43	2	1/2	2 7/8	1 3/4	1/4	2 7/8	38	6
63	2	1 1/8	3 1/8	1 3/4	1/4	3 1/2	60	10

NOTE: DIMENSIONS ARE IN INCHES. These dimensions are not to be used for construction purposes unless approved by the factory.

MAGNETIC SHOE BRAKES

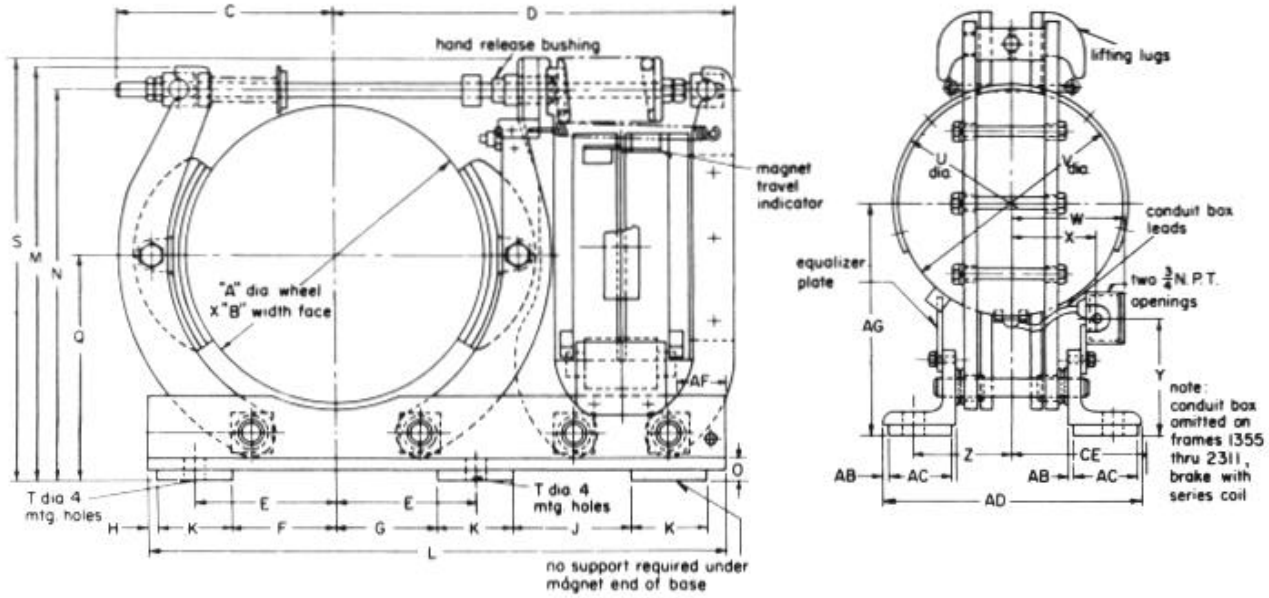
DIMENSION SHEET

TYPE TM AND TMR - FRAMES 83 AND 3014

with Rectifier Available for AC Operation

Frames 83 to 2311 Shunt, Frames 83 and 1035 with Series Coil

Standard right hand mounting shown. Position of conduit box and equalizer plate reversed for left hand mounting.



Dimensions, Inches Not to be used for construction purpose unless dimensions are approved.

Frame No.	Wheel Dia. A	Width of Face B	C	D	E	F	G	H	J	K	L	M	N	O	Q
83	8	3 1/4	6 1/2	14 3/4	3 1/4	2 1/2	2 1/2	1/4	7 1/2	1 1/2	18 1/4	13	12 1/8	5/8	7
1035	10	3 3/4	7 5/8	17	4	3	3	1/4	7 3/4	2	22 1/4	15 1/2	14 5/8	1	8 3/8
1355	13	5 3/4	9 7/8	19 7/8	5 3/4	4 1/2	4 1/2	1/2	5 5/8	2 1/2	26 1/4	18 7/8	17 5/8	27/32	9 7/8
1665	16	6 3/4	11 1/2	21 1/2	7 1/2	5 1/2	5 1/2	1/2	6 3/8	4	30 7/8	22 1/4	21	1 1/4	12 1/8
1985	19	8 3/4	14 1/2	26 1/2	9 1/4	6 5/8	7 1/4	3/8	8 13/16	4	36 13/16	25 3/8	23 5/8	1	13 1/4
2311	23	11 1/4	17 3/4	30 1/2	11 3/4	10	10	1	7 5/16	3 1/2	44 13/16	30 3/8	28 3/8	1 1/4	15 7/8
3014	30	14 1/4	23 3/8	41 5/8	15	12	12	1/2	9 1/2	6	60 1/8	40	37 1/2	1 1/2	20 3/4

Frame No.	S	T	U	V	W	X	V	Z	AB	AC	AD	AF	AG	CE	Weight: Lbs. Brake Without Wheel	Brake Wheel
83	13 1/8	1 1/16	7 1/8	6 5/8	5 1/8	3 3/8	3	2 7/8	1/4	1 1/2	7 1/2	15/16	7 3/16	3 3/4	100	30
1035	15 3/4	1 1/16	9 1/8	8 5/8	5 1/8	3 3/8	3 3/8	3 1/8	..	2	7 1/2	2 1/2	8 11/16	3 3/4	165	40
1355	19	1 3/16	11 1/4	10 7/8	6 3/8	4 5/8	4 1/4	4 1/2	1/4	2 1/2	11 7/16	1 7/8	10 15/32	5 3/4	290	80
1665	22 3/4	1 1/16	12 3/4	12 1/4	6 1/2	4 3/4	6 1/4	5 3/8	1/4	3 1/2	13 15/16	2 9/16	12 5/8	7	490	170
1985	25 5/8	1 1/16	14 3/8	13 7/8	7 7/8	6 1/8	6 1/2	6 1/2	1/4	3	15 11/16	3 5/8	13 15/16	7 7/8	840	260
2311	30 3/8	1 5/16	16 1/4	15 3/4	9 1/4	7 1/2	7 1/16	8	..	3 1/2	18 1/2	4 3/4	17 1/4	9 1/4	1200	450
3014	40 1/4	1 9/16	20 1/4	19 3/4	9 3/8	7 5/8	8 3/16	9 1/2	1/2	5	22 3/4	8 1/8	23 1/2	11 3/8	2450	760

NOTE: DIMENSIONS ARE IN INCHES. These dimensions are not to be used for construction purposes unless approved by the factory.

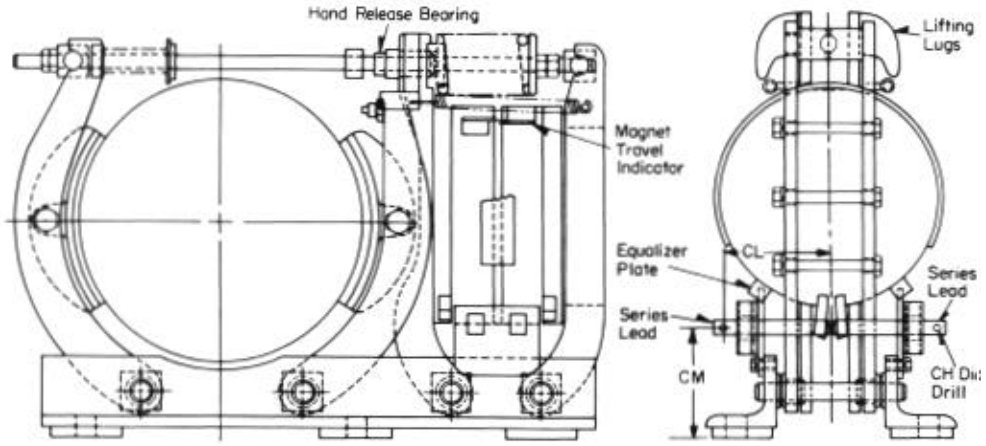
MAGNETIC SHOE BRAKES

DIMENSION SHEET

TYPE TM AND TMR - FRAMES 1355 TO 3014

with Rectifier Available for AC Operation

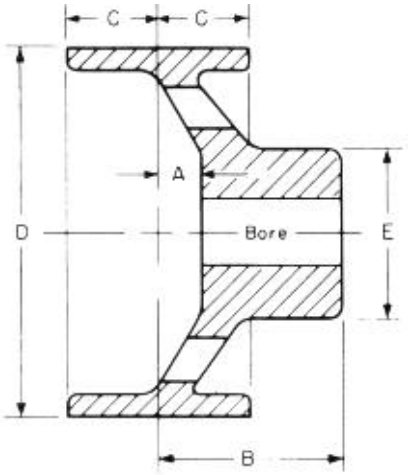
Diagram shown below depicts the dimensions of a TM style brake, frame sizes 1355 through 3014 with a **Series Coil**.



Frame No.	CH	CL	CM
1355	13/32	5 3/4	5 3/8
1665	13/32	6 1/8	6 1/4
1985	13/32	7 1/2	6 9/16
2311	13/32	9 15/16	8 3/8
3014	13/32	8 1/2	8

NOTE: DIMENSIONS ARE IN INCHES. These dimensions are not to be used for construction purposes unless approved by the factory.

MAGNETIC SHOE BRAKES
DIMENSION SHEET
TYPE CB BRAKE WHEELS



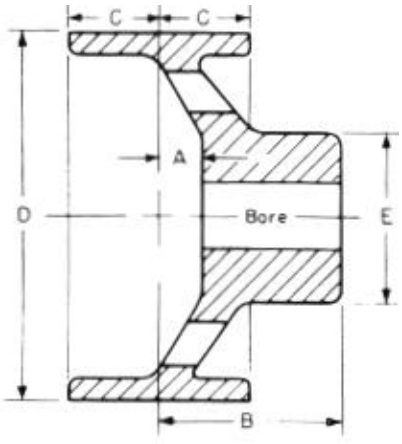
- Hub length and diameter shown are the maximum obtainable from standard casting.
- If finish bore is not specified on order, brake wheel will be supplied with a solid hub.
- Standard wheels are ASTM A 536 ductile iron 80-60-03 or 80-55-06.

FRAME NO.	A	B	C	D	E	* MAX. BORE	* MAX. SPEED	WK^2
CB 15	.44	2.64	1.38	4.50	2.75	1.625	9850	.11
CB 35	.00	2.62	1.62	5.50	2.75	1.625	8050	.30
CB 75	.00	3.26	2.12	7.00	3.12	1.875	6325	.97
CB 110	.00	3.26	2.12	7.00	3.12	1.875	6325	.97
CB 160	.88	4.26	2.12	10.00	3.75	2.250	4425	3.74

* Consult factory if you exceed bore diameter or maximum speed.

MAGNETIC SHOE BRAKES
DIMENSION SHEET
TYPE TM BRAKE WHEELS

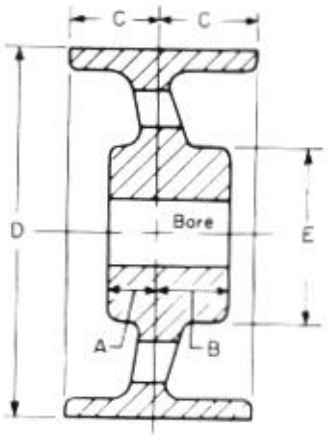
OFFSET HUB



- Standard wheels are ASTM A 536 ductile iron 80-60-03 or 80-55-06.
- Hub length and diameter shown are the maximum obtainable from standard casting.
- If finish bore is not specified on order, brake wheel will be supplied with a solid hub.

FRAME NO.	A	B	C	D	E	* MAX. BORE	* MAX. SPEED	WK^2 LB. FT^2
43	.62	2.62	1.56	4.5	2.75	1.625	9850	.14
63	-.50	3.00	1.56	6.0	3.25	2.00	7375	.44
83	.50	4.25	1.62	8.0	3.75	2.25	5525	1.5
1035	.00	4.25	1.88	10.0	3.75	2.75	4425	3.7
1355	.88	5.38	2.88	13.0	5.75	3.75	3400	13.6
1665	1.00	6.50	3.38	16.0	7.00	4.50	2750	43.8
1985	1.50	7.50	4.37	19.0	7.00	4.625	2350	100.4
2311	1.44	8.75	5.62	23.0	8.50	5.50	1925	237.4
3014	1.50	10.75	7.12	30.0	13.00	7.50	1475	772.8

SYMMETRICAL HUB



- Standard wheels are ASTM A 536 ductile iron 80-60-03 or 80-55-06.
- Hub length and diameter shown are the maximum obtainable from standard casting.
- If finish bore is not specified on order, brake wheel will be supplied with a solid hub.

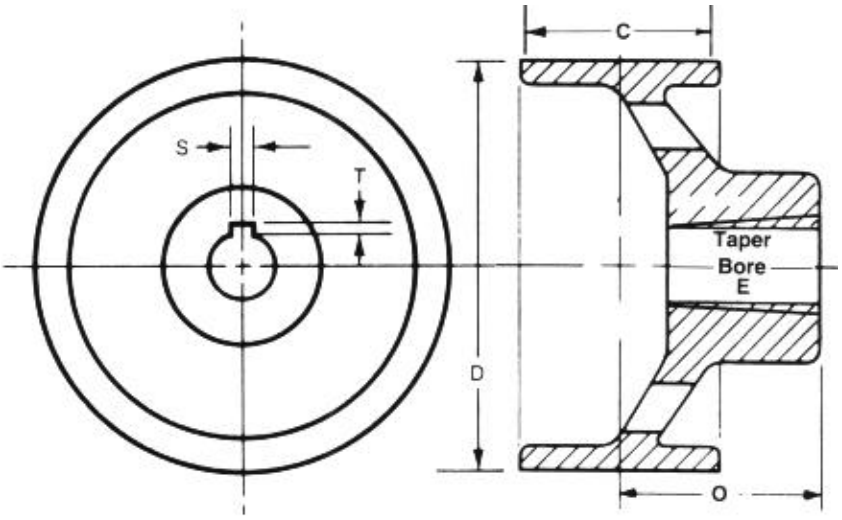
FRAME NO.	A	B	C	D	E	* MAX. BORE	* MAX. SPEED
43	1.06	1.56	1.56	4.5	2.38	1.38	9850
63	1.06	1.56	1.56	6.0	2.75	1.58	7375
83	1.56	2.44	1.56	8.0	3.75	2.25	5525
1035	2.06	2.44	1.88	10.0	4.38	2.88	4425
1355	2.57	3.18	2.88	13.0	5.50	3.50	3400
1665	1.75	3.62	3.62	16.0	7.00	4.50	2750
1985	1.88	4.12	4.62	19.0	8.50	4.625	2350
2311	2.38	4.62	5.62	23.0	8.50	5.50	1925

* Consult factory if you exceed bore diameter or maximum speed.

MAGNETIC SHOE BRAKES
DIMENSION SHEET
TYPE TM BRAKE WHEELS

FINISH BORE BRAKE WHEELS

Finish bore brake wheels are completely machined with 1 1/4 inch per foot tapered bore (plus or minus .003”), keyslot and correct hub length, suitable for current AISE mill type motors. If finish bore wheels tabulated are not suitable, order STOCK bore brake wheels.



WHEEL NUMBER	ELECTRIC AISE							
	Motor Frame	Brake Dia. D	Dimensions in Inches					
			Tapered Bore	Keyway		E	O	C
				Width S	Depth T			
E008514	402-602-802	8”	1.75	.50	.25	3.00	4.00	3.25
E008501	603-803-604-804		2.00	.50	.25	3.50	4.00	3.25
E010517	402-602-802	10”	1.75	.50	.25	3.00	4.25	3.75
E010503	603-803-604-804		2.00	.50	.25	3.50	4.25	3.75
E010535	606-806		2.50	.50	.25	4.00	4.25	3.75
E013543	603-803-604-804	13”	2.00	.50	.25	3.50	5.00	5.75
E013544	606-806		2.50	.50	.25	4.00	5.00	5.75
E013513	608-808		3.00	.75	.25	4.50	5.375	5.75
E013545	610-810		3.25	.75	.25	4.50	5.375	5.75
E013520	612-812		3.625	.75	.25	5.00	5.375	5.75
E016513	606-806	16”	2.50	.50	.25	4.00	6.50	6.75
E016526	608-808		3.00	.75	.25	4.50	6.50	6.75
E016527	610-810		3.25	.75	.25	4.50	6.50	6.75
E016506	612-812		3.625	.75	.25	5.00	6.50	6.75
E016528	614-814		4.25	1.00	.375	5.00	6.50	6.75
E019521	608-808	19”	3.00	.75	.25	4.50	7.50	8.75
E019522	610-810		3.25	.75	.25	4.50	7.50	8.75
E019511	612-812		3.625	.75	.25	5.00	7.50	8.75
E019505	614-814		4.25	1.00	.375	5.00	7.50	8.75
E019523	616-816		4.625	1.25	.375	5.50	7.50	8.75
E023513	612-812	23”	3.625	.75	.25	5.00	8.25	11.25
E023514	614-814		4.25	1.00	.375	5.00	8.25	11.25
E023515	616-816		4.625	1.25	.375	5.50	8.25	11.25
E023516	618-818		5.00	1.25	.50	6.00	8.75	11.25

MAGNETIC SHOE BRAKES

BRAKE WHEEL INSPECTION GUIDE

Brake wheels should be inspected after every two months, 150 hours of operation, or 5,000 stops (whichever comes first), or as required by your specific application. The brake wheel, as well as the brake lining, should be replaced if any of the following conditions are observed:

1. If more than 10% of the original rim thickness has been worn away due to normal service. Measurement of brake wheel diameters, for TM offset hub brake wheels, must not indicate less than the following dimensions:

TM Frame Size	*Wheel Diameter	*Rim Thickness	Minimum Wheel Diameter
43	4.5	.25	4.45
63	6.0	.32	5.94
83	8.0	.38	7.92
1035	10.0	.38	9.92
1355	13.0	.38	12.92
1665	16.0	.62	15.88
1985	19.0	.62	18.88
2311	23.0	.62	22.88
3014	30.0	.75	29.85

*When in new condition.

2. If the brake wheel is scored more than 1/16” deep over more than 25% of the braking surface.

3. If the brake wheel is scored in any area more than 1/8” deep on 16” or larger brake wheels, or more than 3/32” on 4” to 13” brake wheels.

4. If the brake wheel is heat checked or blued over more than 50% of the brake surface. (This condition is caused by overheating; the cause of the overheating should be investigated and corrected.)

5. If a crack is found on the rim, web, or hub, the brake wheel should be replaced immediately.

CROSS-REFERENCE

NEW GEMCO INDUSTRIAL BRAKE PART NUMBERS TO OLD WESTINGHOUSE PART NUMBERS

NEW PT #	OLD PT #	DESCRIPTION
E004047	645C555G02	SHOE & LNG
E004054	2247C08H01	PIN
E004055	2247C08H02	PIN
E004056	2247C08H03	PIN
E004058	2247C08H14	PIN
E004059	2247C09H01	LEVER
E004060	3279B86G01	ADJ. ROD
E004062	3279B92H01	LINK
E004063	3279B94H02	SPRING SEAT
E004064	3279B95H01	LNG. UNDRLD
E004065	3280B02H01	SPRING
E004066	9510D14H01	SHOE LINK
E004068	9510D16H01	BASE
E004070	27D7221H04	BOLT
E004071	318B777H01	SPRING PLATE
* E004072	318B787H01	BLOCK
* E004073	318B788H01	BLOCK
E004074	318B791H01	BLOCK
E004075	318B792H01	RELEASE BSNG
E004076	318B795H01	SPG RETAIN
E004077	318B917H01	SEAL
E004078	438A070H15	SPRING
E004079	438A072H15	SPRING
E004080	438A411H01	SPRING
E004081	450A954H01	IND. BRACKET
E004082	450A955H01	PLATE
E004083	450A957H01	ADAPTOR
E004084	473B344H02	BASE
E004085	473B345H02	ADJ.BAR
E004086	473B354H01	CLAMP
E004087	473B354H02	CLAMP
E004088	473B422G01	CLAPPER
E004089	473B422H04	BLOCK
E004090	473B423G01	CLAPPER
E004093	645C540G01	CLAPPER ARM
E004097	635C104G09	TIE ROD
E004098	52D9008H01	BUSHING
E004099	3280B02H03	SPRING
E004100	3284B67H01	SPRING
E004101	3279B95G01	LINING KIT
E004102	3280B04G03	COIL
E004104	3280B04G01	COIL
E004105	3280B04G02	COIL
E004106	3280B04G04	COIL
E004107	3280B04G17	COIL
E004109	3279B97H01	SOLENOID
E004111	3279B90G01	SPNG. PLATE
E004112	9510D21G01	SUPPORT LINK
E004113	2254C28G01	SHOE, INNER
E004114	2254C27G01	SHOE, OUTER
E004117	961C691G23	LINING KIT
E004118	645C544G01	SHOE ARM
E004119	645C544G02	SHOE ARM
E004120	318B790H01	PIN
E004121	318B778H01	SPRING CLIP
E004125	2257C99H01	LEVER
E004126	3284B33H01	SLOTTED LVR
E004127	3284B39H01	PIVOT BRKT
E004128	2256C33H01	START WHEEL
E004129	3284B40H01	STUD
E004131	3284B44H01	STUD
E004132	3284B31H01	RETAINER
E004133	29D0886H75	SPACER
E004134	29D0886H04	SPACER
E004135	3284B65G01	PLUNGER
E004136	469B755H07	MTG BLOCK
E004137	469B752G05	HANDLE
E004138	469B750G06	EYE BOLT
E004139	450A574H01	SPRING CLIP
E004140	450A576H01	PIN
E004141	469B428H12	MTG BLOCK
E004145	3279B95H05	DRIVE STUD
E005027	2247C08H04	PIN
E005028	2247C08H05	PIN
E005029	2247C08H06	PIN
E005031	2247C08H16	PIN
E005032	2247C09H02	LEVER
E005033	3279B86G02	ADJ. ROD
E005035	3279B92H02	LINK
E005036	3279B94H01	SPRING SEAT
E005037	3279B95H02	LNG. UNDRLD
E005038	3280B02H02	SPRING
E005039	3280B04G07	COIL
E005040	9510D14H02	SHOE LINK
E005042	9510D16H02	BASE
E005044	9510D22G01	CONDULET BOX
E005045	3280B02H04	SPRING
E005046	3284B67H02	SPRING
E005047	2254C27G02	SHOE OUTER
E005048	2247C28G03	SHOE INNER
E005049	3279B95G02	LINING KIT

NEW PT #	OLD PT #	DESCRIPTION
E005050	6753A37H02	SOLENOID GD
E005051	3280B04G05	COIL
E005052	3280B04G06	COIL
E005053	3280B04G08	COIL
E005054	3280B04G18	COIL
E005055	3279B97H02	SOLENOID
E005057	3279B90G02	SPNG PLATE
E005058	9510D21G02	SUPPORT LINK
E005063	2257C99H02	LEVER
E005064	3284B33H02	SLOTTED LEVER
E005065	3284B39H02	PIVOT BRACKET
E005066	3284B40H02	STUD
E005067	3284B65G02	PLUNGER
E005068	3284B31H02	RETAINER
E005069	29D0886H01	SPACER
E005070	2256C33H02	STAR WHEEL
E006023	645C162G02	SHOE & LNG
E006028	318B777H09	SPRING PLATE
* E006029	318B787H09	BLOCK
* E006030	318B788H09	BLOCK
E006031	318B789H01	PIN
E006032	318B791H09	BLOCK
E006033	318B792H09	RELEASE BSNG
E006034	318B795H09	SPG RETAIN
E006035	318B917H09	SEAL
E006036	438A070H14	SPRING
E006037	438A072H14	SPRING
E006038	438A411H06	SPRING
E006039	450A955H02	PLATE
E006040	450A957H02	ADAPTOR
E006041	473B337G01	CLAPPER
E006042	473B338G01	CLAPPER
E006044	473B344H01	BASE
E006045	473B345H01	ADJ. BAR
E006046	473B354H03	CLAMP
E006047	473B354H04	CLAMP
E006049	635C104G01	TIE ROD
E006054	160P283H01	NAME PLATE
E006056	645C120G01	SHOE ARM
E006059	861C691G24	LINING KIT
E006060	645C120G02	SHOE ARM
E006061	645C141G01	CLAPPER ARM
E006062	450A574H02	SPRING CLIP
E006063	318B778H03	SPRING CLIP
E006064	469B752G06	HANDLE
E006065	469B750G07	EYE BOLT
E006066	450A576H06	PIN
E006067	469B755H08	MTG BLOCK
E006068	469B428H13	MTG BLOCK
E007053	2247C08H07	PIN
E007054	2247C08H08	PIN
E007055	2247C08H09	PIN
E007057	2247C08H18	PIN
E007058	2247C09H03	LEVER
E007059	3279B86G03	ADJ. ROD
E007061	3279B92H03	LINK
E007062	3279B92H04	LINK
E007063	3279B93H01	SPRING SEAT
E007064	3279B95H03	LNG. UNDRLD
E007065	3280B04G11	COIL
E007066	3280B04G15	COIL
E007067	9510D14H03	SHOE LINK
E007069	9510D16H03	BASE
E007072	3280B02H05	SPRING
E007073	2254C27G03	SHOE, OUTER
E007074	2254C28G03	SHOE, INNER
E007076	6753A37H03	SOLENOID GD
E007076	6753A37H04	SOLENOID GD
E007078	3279B95G03	LINING KIT
E007079	3279B97H03	SOLENOID
E007080	3280B04G09	COIL
E007081	3280B04G10	COIL
E007082	3280B04G12	COIL
E007083	3280B04G19	COIL
E007084	3279B90G03	SPRING PLATE
E007085	9510D21G03	SUPPORT LINK
E007087	3280B04G13	COIL
E007088	3280B04G14	COIL
E007089	3280B04G16	COIL
E007090	3280B04G20	COIL
E007091	3279B97H14	SOLENOID
E007100	2257C99H03	LEVER
E007101	3284B33H03	SLOTTED LVR
E007102	3284B65G03	PLUNGER
E007103	3284B44H02	STUD
E007104	3284B31H03	RETAINER
E007105	29D0886H05	SPACER
E007106	3284B39H03	PIVOT BRKT
E008025	439C314G01	SHOE & LNG
E008027	31D4114H11	BUSHING
E008028	31D4118H04	BUSHING

NEW PT #	OLD PT #	DESCRIPTION
E008029	318B571H03	PIN
E008030	318B634G01	CLAPPER
E008031	318B777H02	SPRING PLATE
E008032	318B778H02	SPRING CLIP
* E008033	318B788H03	BLOCK
E008034	318B791H02	BLOCK
E008035	318B793H02	ADJ. SCREW
E008037	318B795H02	SPG RETAIN
E008038	318B917H02	SEAL
E008039	438A072H13	SPRING
E008040	438A411H04	SPRING
E008041	438A502H01	BLOCK
E008042	439C319G03	OUTER ARM
E008043	439C319G04	INNER ARM
E008049	635C104G02	TIE ROD
E008057	861C691G16	LINING KIT
E008059	439C330G01	BASE
E008061	439C324G01	CLPR & ARM
E008062	439C329G01	CLAPPER ARM
E008063	469B752G01	HANDLE
E008064	469B428H04	MTG BLOCK
E008065	469B755H09	MTG BLOCK
E008066	469B750G01	EYE BOLT
E010047	635C292G01	SHOE & LNG
E010054	2247C08H10	PIN
E010055	2247C08H11	PIN
E010056	2247C08H12	PIN
E010058	2247C08H20	PIN
E010059	2247C09H04	LEVER
E010062	3279B92H05	LINK
E010063	3279B95H04	LNG, UNDRLD
E010064	3280B01H01	SPRING
E010066	9510D14H04	SHOE LINK
E010068	9510D16H04	BASE
E010069	9510D19G01	CONDULET BOX
E010070	27D7221H14	BOLT
* E010071	318B787H03	BLOCK
E010072	318B789H03	PIN
E010073	318B790H03	PIN
E010074	318B791H03	BLOCK
E010075	318B792H02	RELEASE BSNG
E010076	318B795H03	SPG RETAIN
E010077	318B917H03	SEAL
E010078	318B988G01	CLAPPER
E010079	438A070H13	SPRING
E010080	438A072H11	SPRING
E010081	438A169H02	IND. BRKT.
E010083	438A217H01	BLOCK
E010084	438A388H01	ADAPTOR
E010085	438A411H03	SPRING
E010086	635C104G03	TIE ROD
E010087	635C300G03	BASE
E010088	635C300H06	PLATE
E007076	6753A37H05	SOLENOID GD
E010098	3279B86G04	ADJ. ROD
E010103	3279B97H05	SOLENOID
E010104	3279B90G04	SPRING PLATE
E010105	9510D21G04	SUPPORT LINK
E010106	2254C28G04	SHOE, INNER
E010107	2254C27G04	SHOE, OUTER
E010108	3279B95G04	LINING KIT
E010114	861C691G17	LINING KIT
E010115	635C306G01	SHOE ARM
E010116	635C300G01	BASE
E010117	635C306G02	SHOE ARM
E010118	635C317G01	CLPR & ARM
E010119	635C308G01	CLAPPER ARM
E010120	2257C99H04	LEVER
E010121	3284B33H04	SLOTTED LVR
E010122	3284B39H04	PIVOT BRKT
E010123	3284B65G04	PLUNGER
E010124	3284B44H03	STUD
E010125	29D0886H12	SPACER
E010126	29D0886H13	SPACER
E010127	469B752G02	HANDLE
E010128	469B750G02	EYE BOLT
E010129	450A576H02	PIN
E013025	439C201G01	SHOE & LNG
E013027	31D4114H12	BUSHING
E013028	31D4118H06	BUSHING
E013029	318B560G01	CLAPPER
E013030	318B571H04	PIN
E013031	318B777H04	SPRING PLATE
E013032	318B778H04	SPRING CLIP
* E013033	318B788H04	BLOCK
E013034	318B789H04	PIN
E013035	318B790H04	PIN
E013036	318B791H04	BLOCK
E013037	318B792H04	RELEASE BSNG
E013039	318B795H04	SPG RETAIN
E013040	318B917H04	SEAL

* Obsolete - Consult factory for current part number

CROSS-REFERENCE

NEW GEMCO INDUSTRIAL BRAKE PART NUMBERS TO OLD WESTINGHOUSE PART NUMBERS

NEW PT #	OLD PT #	DESCRIPTION
E010098	3279B86G04	ADJ. ROD
E010103	3279B97H05	SOLENOID
E010104	3279B90G04	SPRING PLATE
E010105	9510D21G04	SUPPORT LINK
E010106	2254C28G04	SHOE, INNER
E010107	2254C27G04	SHOE, OUTER
E010108	3279B95G04	LINING KIT
E010114	861C691G17	LINING KIT
E010115	635C306G01	SHOE ARM
E010116	635C300G01	BASE
E010117	635C306G02	SHOE ARM
E010118	635C317G01	CLPR & ARM
E010119	635C308G01	CLAPPER ARM
E010120	2257C99H04	LEVER
E010121	3284B33H04	SLOTTED LVR
E010122	3284B39H04	PIVOT BRKT
E010123	3284B65G04	PLUNGER
E010124	3284B44H03	STUD
E010125	29D0886H12	SPACER
E010126	29D0886H13	SPACER
E010127	469B752G02	HANDLE
E010128	469B750G02	EYE BOLT
E010129	450A576H02	PIN
E013025	439C201G01	SHOE & LNG
E013027	31D4114H12	BUSHING
E013028	31D4118H06	BUSHING
E013029	318B560G01	CLAPPER
E013030	318B571H04	PIN
E013031	318B777H04	SPRING PLATE
E013032	318B778H04	SPRING CLIP
* E013033	318B788H04	BLOCK
E013034	318B789H04	PIN
E013035	318B790H04	PIN
E013036	318B791H04	BLOCK
E013037	318B792H04	RELEASE BSNG
E013039	318B795H04	SPG RETAIN
E013040	318B917H04	SEAL
E013041	438A070H09	SPRING
E013042	438A072H09	SPRING
E013044	438A411H05	SPRING
E013045	438A456H01	BLOCK
E013051	439C204H07	PLATE
E013052	635C104G04	TIE ROD
E013053	24D6387G04	BOLT
E013055	861C691G18	LINING KIT
E013056	439C203G01	CLAPPER ARM
E013064	439C192G05	SHOE ARM
E013066	439C204G01	BASE
E013067	439C192G06	SHOE ARM
E013068	489C202G01	CLPR & ARM
E013069	469B752G03	HANDLE
E013070	469B750G03	EYE BOLT
E013071	469B755H03	MTG BLOCK
E013072	469B428H06	MTG BLOCK
E013073	450A574H03	SPRING CLIP
E013074	450A576H03	PIN
E016025	635C227G01	SHOE & LNG

NEW PT #	OLD PT #	DESCRIPTION
E016027	24D6387G03	BOLT
E016028	318B571H05	PIN
E016030	318B778H05	SPRING CLIP
E016031	318B787H05	BLOCK
E016033	318B789H05	PIN
E016034	318B790H05	PIN
E016035	318B791H05	BLOCK
E016036	318B793H04	ADJ. SCREW
E016038	318B917H05	SEAL
E016039	438A072H07	SPRING
E016040	438A352H01	BLOCK
E016044	635C235H06	PLATE
E016050	318B907G01	CLAPPER
E016051	635C235G01	BASE
E016052	635C236G01	CLPR & ARM
E016053	861C691G19	LINING KIT
E016060	635C240G01	SHOE ARM
E016061	635C240G02	SHOE ARM
E016062	469B750G04	EYE BOLT
E016063	635C238G01	CLAPPER ARM
E016064	469B752G04	HANDLE
E016065	469B755H04	MTG BLOCK
E016066	469B428H08	MTG BLOCK
E016067	450A574H04	SPRING CLIP
E016068	450A576H04	PIN
E016200	635C104G05	TIE ROD
E016203	318B777H05	SPRING PLATE
* E016204	318B788H05	BLOCK
E016205		BLOCK
E016206	318B795H05	SPG RETAIN
E016207		SPRING
E019024	439C394G01	SHOE & LNG
E019026	152442	GROMMET
E019027	24D6387G01	BOLT
E019028	31D4114H20	BUSHING
E019029	31D4118H19	BUSHING
E019030	318B571H06	PIN
E019031	318B670G01	CLAPPER
E019032	318B777H06	SPRING PLATE
E019033	318B778H06	SPRING CLIP
* E019034	318B787H06	BLOCK
* E019035	318B788H06	BLOCK
E019036	318B789H06	PIN
E019037	318B790H06	PIN
E019038	318B791H06	BLOCK
E019039	318B792H06	RELEASE BSNG
E019040	318B793H06	ADJ. SCREW
E019042	318B795H06	SPG RETAIN
E019043	318B917G06	SEAL
E019044	438A072H05	SPRING
E019045	438A169H01	IND. BRKT.
E019046	438A170H01	MTG. PLATE
E019047	438A171H03	CONDULET BOX
E019050	439A816G02	CONDULET CVR
E019056	439C399H06	PLATE
E019057	635C104G06	TIE ROD
E019058	439C395G01	SHOE ARM

NEW PT #	OLD PT #	DESCRIPTION
E019059	439C397G01	CLPR & ARM
E019060	439C398G03	CLAPPER ARM
E019065	861C691G20	LINING KIT
E019066	439C399G01	BASE
E019067	439C395G02	SHOE ARM
E023025	637C316G01	SHOE & LNG
E023027	24D5096H1 1	SPRING
E023028	24D6387G02	BOLT
E023029	318B571H07	PIN
E023030	318B777H07	SPRING PLATE
E023031	318B778H07	SPRING CLIP
* E023032	318B787H07	BLOCK
* E023033	318B788H07	BLOCK
E023034	318B789H07	PIN
E023035	318B790H07	PIN
E023036	318B791H07	BLOCK
E023038	318B795H07	SPG RETAIN
E023039	318B917H07	SEAL
E023040	319B098G01	CLAPPER
E023044	438A069H05	SPRING
E023045	438A072H03	SPRING
E023046	438A429H01	BLOCK
E023047	635C104G07	TIE ROD
E023051	637C362G01	CLAPPER ARM
E023052	637C343G01	CLPR & ARM
E023055	861C691G21	LINING KIT
E023056	637C324G01	SHOE ARM
E023057	434C392G01	BASE
E023058	637C324G02	SHOE ARM
E030025	438A072H01	SPRING
E030026	318B795H08	SPG RETAIN
E030027	426C041G01	SHOE & LNG
* E030028	318B788H08	BLOCK
E030031	318B791H08	BLOCK
E030032	318B792H08	RELEASE BSNG
E030033	635C104G08	TIE ROD
E030034	450A849H01	BLOCK
E030035	318B793H08	ADJ. SCREW
E030036	318B777H08	SPRING PLATE
* E030037	318B787H08	BLOCK
E030040	450A869G01	BOLT
E030041	641C782G01	SHOE ARM
E030042	641C808G01	BASE
E030043	318B789H08	PIN
E030044	641C782G02	SHOE ARM
E030045	31D4118H20	BUSHING
E030046	641C792G01	CLPR & ARM
E030047	318B571H08	PIN
E030048	641C801G01	CLAPPER ARM
E030049	473B166G01	CLAPPER
E030050	318B917H08	SEAL
E030051	318B778H08	SPRING CLIP
E030052	438A411H08	SPRING
E030053	318B790H08	PIN
E030054	861C691G22	LINING KIT
E030056	438A069H06	SPRING

* Obsolete - Consult factory for current part number.

MAGNETIC SHOE BRAKES

OPTIONAL EQUIPMENT

CB STYLE BRAKE OPTIONS:

- NEMA 3 COVER
- NEMA 4 ENCLOSURE

TM STYLE BRAKE OPTIONS:

- SERIES RESISTORS
- NEMA 3 COVER
- NEMA 4 ENCLOSURE (Seals also available)
- WHEEL COVERS
- RECTIFIER FOR AC VOLTAGE OPERATION
- LIMIT SWITCH INDICATING BRAKE ACTUATION
- HAND-RELEASE
- SELF-CENTERING FEATURE (TMSC) CONSULT FACTORY FOR SIZES
- SPECIAL PAINT, COATINGS, TAGGING, ETC.

For Current List Prices, please contact the Factory.

CONVERSIONS TABLE

	MULTIPLY	BY	TO OBTAIN
MASS	kilogram (kg)	2.205	pound (lb)
FORCE	newton (n)	0.225	pound (lb)
TORQUE	newton-metre (N*m) kilogram-metre kilogram-metre	0.738 7.233 9.807	pound-foot (lb.ft.) pound-foot (lb.ft.) newton-metre (N*m)
LENGTH	metre (m) centimeter (cm) millimeter (mm)	39.370 0.394 0.0394	inch (in) inch (in) inch (in)
POWER	horsepower (hp) horsepower (hp)	0.746 3300	kilowatt (kw) foot-pound/minute (lb.ft./min)
VELOCITY	metre/second (m/s) metre/second (m/s)	196.850 3.281	foot/minute (fpm) foot/second (fps)
INERTIA	moment of inertia $kg*m^2$	23.730	moment of inertia $(lb.ft^2)$