Westinghouse

Type TM Dc Brake Specifications

Frames 43 to 3014
With Rectifier Available for Ac Operation

This application data lists type TM brake features, both standard (included at list price) and special (requiring a list price addition), but does not necessarily differentiate. Therefore, for pricing purposes, refer to price list 5220.

Index

Reference to Other Data

Descriptive Bulletin – DB 5204
Instruction Leaflet – IL 5204-1A
Price List – PL 5220, page 15
Dimension Sheets – DS 5240, pages 29 thru 39
Renewal Parts Data – RPD 5204A1

Tabulated Outline Drawings

	Dwg. No.	Dimension Sheet
Wheel cover	641C441	5240, page 33
Weatherproof-drip-proof cover	822D885	5240, pages 35-36
Watertight-dust-tight cover	834D528	5240, page 37
Open-type hand release lever	834D251	5240, page 39

Definition

Features – see pages 2 and 3 for details of features

The standard Westinghouse dc magnetic brake is the type TM brake and incorporates the following features:

1. Ratings
Rated as per table 2 on page 4. Ratings of the TM 83 through the TM 3014 are standard AISE-NEMA ratings. There are no industry standard ratings for the TM 43 and TM 63 sizes. (AISE standards specify mounting and wheel dimensions as well as torque ratings. The type TM brake is mechanically interchangeable with competitive brakes built to AISE-NEMA standards.)

2. Operation
Spring set, electromagnetically released.

3. Time
May be rated either continuous or intermittent torque. The order reading must specify the time rating since the torque adjustment is made prior to shipment and the nameplate is marked with the correct setting.

4. Ambient
Suitable for operation at ambient temperatures between −30°C and +50°C at any altitude up to 3300 feet.

5. Insulation
Class B rated. Magnet coils are resin encapsulated.

6. Conduit Box
TM 83 and larger shunt brakes are supplied with a conduit box with a ¾ inch pipe tap. The conduit box is mounted on the side of the brake nearest the motor. TM 43 and 63 brakes do not include a conduit box but bring leads out to the brake base.

7. Voltage
Low voltage shunt coils are standard and require a line dropping resistor.

8. Series Leads
Series wound coils are terminated with strap leads clamped to the brake base.

9. Wheels
Supplied with cast iron brake wheel capable of heat dissipation as given in table 3 on page 4. Wheel is machined all over to achieve balance.

10. Wheel Dimensions
Wheel will be machined to suit order requirements within limits of standard castings. A tapered gibhead key is supplied to lock a wheel with straight bore. A locking plate is included for a wheel with tapered bore.

11. Rotation
Brake is equally effective in either direction of rotation.

12. Lining
Brake lining is moulded asbestos American Brake Blok No. 64B or equivalent. Lining is attached to the brake shoes with brass rivets. Renewal parts linings are shipped undrilled.

13. Mounting
Standard TM brake is intended for horizontal foot mounting.

14. Lead Location
Right hand mounting is supplied unless otherwise specified.

15. Enclosure
Standard brake is open construction.

16. Bearings
Pivot pins are hardened steel operating in porous bronze bushings.

17. Lifting Lugs
Lifting lugs are provided on sizes TM 83 through TM 3014.

18. Paint
Styrenated alkyd corrosion and weather resistant enamel (ASA No. 49 grey).

19. Ac Operation
May be supplied with rectifier power pack for operation from ac supply.

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E, D, C/1769/DB

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Details of Features 1 thru 19

As listed on page 1, under definition
Feature numbers are shown with suffix "A" as detailed below:

1A, 2A, and 3A: Ratings—Operation
Brake is spring set and electro-magnetically released. Braking torque varies directly with the force of the main spring acting through the brake linkage to exert a force on the brake lining. The brake shoes can remain set on the wheel continuously without harmful effects to the lining, linkage or brake coil. The spring setting may be adjusted to obtain either intermittent or continuous torque rating. The brake coil must, however, release the magnet against the spring force and the ampere turns in the coil must be increased to accommodate any increase in spring force. Such an increase in coil current increases coil heating and decreases the allowable coil energized time. Shunt wound brakes are rated either intermittent or continuous. Series wound brakes are rated either 1 hour or ½ hour. Time ratings, therefore, refer to the brake released time or the coil energized time. See table 2 on page 4.

4A: Ambient
TM brake coils are very conservatively rated. NEMA 1C 1-2.43 for a 40°C ambient allows a temperature rise of 85°C for class A coils and 105°C rise for class B coils, as measured by resistance method. Navy MIL-B-16392C allows 80°C rise for class B insulation over 50°C ambient. TM brake coils are well within these limits.

5A: Insulation
TM brake coils are wound over insulation material wrapped and cemented directly over the inner core of a magnet half. Coil is then vacuum impregnated and encapsulated in a high temperature resin in the outer ring of the magnet. The coil and magnet then become one solid mass. Because the coil and magnet assembly is sealed to protect against damage from dust, water, grease, oil, chemicals and mechanical impact, the coil winding is not readily repairable.

6A: Conduit Box
TM 83 through 3014 shunt wound brakes are supplied with a Crouse-Hinds condulet as a conduit box. This box has a ¾ inch pipe tap at each end and four brake coil leads are brought into the box through rubber grommets. Two leads are connected and taped at the factory to place the two coil windings in series. Customer needs only to connect to the two remaining leads to complete wiring. Coil leads are highly flexible contactor shunt material to allow brake coils to move. Leads are replaceable in case of failure. Conduit box is mounted on the side of the brake base nearest the motor conduit box where indicated, see 14A. TM 43 and 63 frames have single coils and no conduit box. Two leads are brought out to clamps on brake base.

7A: Voltage
The standard line voltage for TM brakes is 250 volts dc. For fast response all TM shunt brake coils are wound for 64 volts continuous or 80 volts intermittent at the brake terminals. It is necessary that a line dropping resistor be connected in series with shunt coils to obtain rated coil voltage and reasonable operating times. Line dropping resistors are not supplied unless specified on the order. The use of discharge resistors tends to slow down brake operation and so, discharge resistors are not recommended. However, individual customers may feel a need for discharge resistors to extend contactor life. Special coils are used for line voltage in excess of 250 volts. See table 4 on page 5 for standard resistors, and table 5 on page 5 for field forcing information.

Shunt wound coils are designed to release the brake at 80% of rated voltage or less and to stay released when the coil voltage drops to 20% or less of rated voltage. This statement holds true even with hot coil and at the worn lining condition.

8A: Series Leads
TM brakes can also be supplied with series wound coils. The two coils are connected in parallel so that ½ of the motor armature current flows through each coil. Frames 43 through 1035 series wound brakes are supplied with leads similar to the shunt wound version. On the larger frame TM brakes, lead sizes become too large for convenient use of a conduit box and flexible strap leads are brought out from the brake coils and clamped at the brake base (one on each side). The customer brings his leads up to the brake leads and insulates with tape.

Series wound coils are designed to release the brake at 40% of rated motor current or less and to stay released when the armature current drops to less than 10% of rated current. This statement holds true even when the magnet air gap is open to the worn-lining condition. Series wound brakes are faster operating than shunt brakes due to lower inductance of the brake coils. Line dropping resistors or separate contactors are not required for control of series wound brakes.

9A: Wheels
Cast iron has been the primary material for brake wheel and drum applications for many years because it has a number of desirable features. Of all material tested Westinghouse high strength cast iron (Westinghouse specification No. 2800-2) was found to have the highest coefficient of friction. In addition, it is outstanding for ease of machining and heat stability. Wearability is satisfactory. In general, cast iron is the best all around material for brake wheels and only lacks some of the margin of safety available with some of the more ductile materials.

When specified on the order, ductile iron wheels are supplied in place of cast iron. The advantage gained is greater strength and ductility for high speed applications at a slight penalty in coefficient of friction, wearability and heat stability. All wheel surfaces are machined to achieve balance in lieu of a separate balancing operation. Experience over many years has shown this method to give excellent service. Brake wheel bore and outside diameter are machined in the same shop operation to achieve a very close degree of concentricity to limit wheel runout.

10A: Wheel Dimensions
The actual configuration of a particular brake wheel depends on the motor or other shaft on which the wheel is to be mounted. Dimensions for TM brake wheels to be used with MC 600 frame mill motors are standardized according to AISE Standard No. 11.

A number of non-standard combinations are also listed on dimension sheet 5240, page 30. For open brakes with motors other than MC 600 mill motors, determine the centerline distance between the motor and brake by adding the L dimension of the motor (distance from centerline of motor to end of bearing housing) plus the CE dimension of the brake (centerline of brake to end of mounting feet per dimension sheet 5240, pages 29 and 31). Since watertight-dust-tight enclosures extend beyond the brake CE dimension, the L + CE system does not apply. Further, for fan cooled motors with the blower at the brake end, the enclosures must be moved away from the motor air inlet approximately three inches to allow entry of cooling air. Centerline dimension for these non standard combinations are established on an individual order basis and are certified on the outline transmittal.

Once the position of the wheel on the motor shaft is established, a brake wheel casting is selected for the required hub offset, diameter and material. See page 6 for standard offset hub castings and for standard symmetrical hub castings.

Brake wheels are normally supplied with either a tapered or straight bore to suit the shaft requirements. Tapered bores are sup-

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plied with a straight keyway and a sheet steel locking plate to be inserted into the wheel keyway and bent over the shaft nut.

A straight bore presents a different problem. Unless the bore tolerance is specified by the customer, we machine the wheel bore to the same tolerance as the motor shaft with a resulting fit somewhere between .001 inch clearance to .001 inch of interference. A tapered gib-head key is supplied with this type of wheel for locking purposes. Set screw holes are not usually provided except when requested on the customer order.

11A: Rotation
Brake is equally effective in either direction of rotation.

12A: Lining
Heat absorption and dissipation capacity of the brake wheel depend mainly on the surface area of the wheel and the material. Brake lining wear becomes accelerated with elevated temperatures and the frictional coefficient fades when temperatures reach about 400°F. Although many grades of brake lining are available which may improve wearability or allow high temperature operation, tests indicate that the best all-around compromise for satisfactory lining material is American Brake Blok No. 64 moulded asbestos. Lining is riveted to the brake shoes and is replaceable. We do not at present, offer optional bonded lining or choice of lining grade. Heat capacity of TM brake wheels is listed in table 3, on page 4.

13A: Mounting
Horizontal foot mounting of TM brakes is standard. Tests have shown that a standard brake can be mounted on its side and used with a vertical shaft. It is expected, however, that maintenance in this position would be somewhat more awkward and bearings would wear slightly faster than in the horizontal position. When wall mounting is required with the magnet up or down, additional adjustable stops are required at the lower end to prevent the upper brake shoe from dragging. Exact mounting position must be specified on the order if other than horizontal. The TM 3014 frame should be mounted in the horizontal position only.

14A: Lead Location
The standard brake assembly is right hand. That is, when facing the front (brake) end of the motor, the motor conduit is on the right side. The brake magnet is on the same side as the motor leads and the brake conduit entrance is on the motor side of the brake. Brake shoe bolt heads are oriented to allow removal by pulling away from the motor. Left hand (opposite standard) mounting would reverse the position of the brake conduit box and shoe bolts. See page 5 for clarification.

15A: Enclosure
Although adequately protected against physical damage and in fact, designed to be suitable for use in general mill applications without additional protection, it is often necessary to enclose the TM brake for special conditions. The most common optional enclosures as listed in NEMA 1C 1-2.68 are:

1. NEMA Type 1 – Wheel cover, to protect personnel from the rotating wheel and to keep foreign materials off the wheel and lining. See dimension sheet 5240, page 33.
2. NEMA Type 2 – Weatherproof, dripproof cover. A louvered enclosure covering the entire brake but open at the bottom. A slotted shaft opening available on either or both sides of the cover. The cover is removed by vertically lifting from the brake. See dimension sheet 5240, pages 35 and 36.
3. NEMA types 4 and 5, watertight, dusttight – The same design enclosure is used for both types. It consists of a diagonally split, gasketed box with removable top half held in place by wing nuts and toggle bolts. Sealing at the shaft opening is accomplished with a Garlock type shaft seal or by bolting the cover up against the motor bracket through a gasket. Lead entrance is provided through a pipe tap hole in the back of the cover near the magnet end. This type of cover usually requires a longer-than-standard motor shaft with an unkeywayed section for the seal fit. Some fan cooled motors may further require that the brake enclosure be moved away about three inches to avoid blocking of cooling air.

   Shaft seals in both sides of the enclosure for through shafts can be provided but are not recommended. If this type of unit is required, at least 12 inches of clear shaft is required to slide the top part away for maintenance. See dimension sheet 5240, page 37.
4. TM brakes are also available with a hand release lever which allows gradual, partial or complete release of braking torque such as would be required in lowering of a crane load in case of power failure. This type of release is shown for open brakes on dimension sheet 5240, page 39. The same type of hand release may be provided on enclosed brake with the addition of an access plate in the top cover.

Designs for some TM frame size enclosures and hand release levers are not available. This is particularly true on the TM 3014 which presents a formidable problem due to the large size and high spring load.

16A: Bearings
The standard TM brake is supplied with hardened steel pivot pins which are given a manganese phosphate treatment affording a high degree of corrosion resistance. Porous bronze bushings are provided in the base and lever arms. Top bearings in the lever arms are milled into the steel arms and are not replaceable. These bearings are uneffected by wear, however, since there is no reversal of thrust and springs take up backlash. Where added corrosion resistance is required, stainless steel pivot pins can be provided.

17A: Lifting Lugs
Mention is made here of lifting lugs since this is a plus feature which competitive brakes lack and can be a time saver and safety factor during handling and installation.

18A: Paint
Styrenated alkyd corrosion and weather resistant enamel (ASA No. 49 grey).

19A: Ac Operation
Rectifier operation – To operate the standard shunt TM brake from an ac power source, a special rectifier power pack is available. For the TM 83 and larger, the control system is such as to force the standard shunt brake at about 170 volts dc. A current sensing relay reduces this voltage to approximately the 25 volts required for holding. The 170 volts is sufficient to operate the brake whether the spring is adjusted for the continuous or the intermittent rating. Since in either case the holding voltage is approximately 25 volts, it is possible to hold the intermittent rated brake open continuously.

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Application Data

Table 1: Typical Release and Setting Time for TM Shunt Brakes

Brake Frame	Normal Magnet Gap in Inches	Dc Line Volts	Coil Volts ①	Release Time in Seconds	Setting Time in Seconds from Indicated Coil Volts	Setting Time in Seconds from 30 Volts
TM 83	1/16	250	64	.09	.17	.12
			80	.11	.12	.09
			250	.07	.15	.09
TM 1035	1/16	250	64	.13	.19	.13
			80	.14	.14	.10
			250	.10	.17	.10
TM 1355	1/8	250	64	.18	.21	.13
			80	.20	.16	.11
			250	.15	.19	.11
TM 1665	1/8	250	64	.27	.23	.14
			80	.29	.18	.11
			250	.21	.21	.11
TM 1985	1/8	250	64	.39	.25	.15
			80	.41	.20	.12
			250	.30	.23	.12
TM 2311	5/32	250	64	.56	.28	.16
			80	.57	.22	.13
			250	.42	.26	.13
TM 3014	3/16	250	64	.80	.31	.17
			80	.80	.25	.14
			250	.60	.29	.14

① Coil volts indicate the voltage across coils after steady state conditions are attained when operated from a 250 volt dc line with necessary dropping resistors. The 64 volt data indicates continuous rating spring settings, the 80 volt data indicates the intermittent rating spring settings, and the 250 volt data indicates the forcing scheme (table 5 on page 5) and at the intermittent rating spring setting.
Manufacturing tolerances, adjustment of the brakes and lining wear may change these values appreciably.

Table 2: AISE Standard Torque Ratings (Torque in lbs. ft.)

Brake Frame	Series Brake ②(Released Time)		Shunt Brake ②(Released Time)	
	½ Hr.	1 Hr.	1 Hr.	8 Hr.
①TM 43	25	15	25	15
①TM 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

① No standards exist covering the TM 43 and 63 torque ratings.
② Released time is length of time brake coils are energized. Eight hour shunt coils may be energized continuously. One hour coils are rated ½ time on – they may be energized continuously for up to one hour but must be allowed to cool for at least one hour. ½ hr. coils are rated ⅓ time on – they may be energized continuously for up to ½ hr. but must be allowed to cool for at least 1 hour.

Selection of Frame Size for Torque Rating

1. Determine the rated torque of the motor by use of the formula:

$$T = \frac{hp \times 5250}{rpm}$$

T = rated torque of motor
Hp = rated horsepower of motor
Rpm = rated base speed of motor

Brake torque ratings are usually specified to be 150% of rated motor torque.

2. Gear ratios must be considered to determine brake torque if brake wheel is not mounted on motor shaft.

3. Special circumstances such as overhauling torque must also be considered if present in the system.

Time Required To Stop:

$$t = t_1 + \frac{WK^2 \times rpm}{308\ T} \text{ seconds}$$

t = total stopping time in seconds
t_1 = time between signal and when brake lining makes contact with wheel, approximately 0.15 to 0.4 seconds for dc shunt brakes.
WK^2 = Total WK^2 in system including motor, load and brake wheel as referred to brake wheel rpm.
Rpm = Speed in rpm of brake wheel
T = Brake torque available after considering overhauling torque, friction or normal deceleration of system.

Energy absorbed by brake wheel:

Hp-sec. per min. =

$$\frac{WK^2 \times (rpm)^2 \times \text{no. of stops/min.}}{3{,}220{,}000}$$

This value is not to exceed values given in table 3 below.

Table 3: Allowable Heat Absorption for Brake Wheels

Brake Frame	1 Stop Emergency Hp-Sec.	In Hp-Sec. Per Stop, One Stop Every:				
		1 Min. (Rated)	5 Min.	15 Min.	30 Min.	60 Min.
TM 43	90	12	45	51	59	68
TM 63	150	20	75	85	99	114
TM 83	236	30	120	135	155	180
TM 1035	362	52	180	206	240	275
TM 1355	805	100	390	460	530	610
TM 1665	1980	152	800	1130	1300	1500
TM 1985	3510	225	1200	2000	2320	2670
TM 2311	5730	330	2000	3330	3820	4350
TM 3014	8500	550	3000	4850	5600	6460

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Table 4: TM Brake Shunt Coil Data – 250 Volt Line, 2 Coils Connected In Series, and External Resistor (Standard) – All Values Cold

Coil Style Number	Brake Frame	Resis. 2 Coils (Cold 25°C)	Continuous Rating		Intermittent Rating		External Resistor (Standard)		
			Amps	Volts	Amps	Volts	Style Number	Ohms Continuous	Ohms Intermittent
645C545G16③	TM 43	73	.877	64	1.1	80	423A298G07	213	158
645C173G16③	TM 63	59.4	1.08	64	1.35	80	423A298G08	171	126
637C504G16	TM 83	64.6	.987	64	1.24	80	423A298G01	188	138
635C328G16	TM 1035	49.6	1.29	64	1.61	80	423A298G02	144	107
637C384G16	TM 1355	39.8	1.61	64	2.01	80	423A298G03	115	84
635C247G17	TM 1665	18.1	3.54	64	4.42	80	423A298G04	51	37
635C256G17	TM 1985	17.3	3.7	64	4.62	80	423A298G04	51	37
637C373G16	TM 2311	12.6	5.06	64	6.33	80	423A298G05	37	27
641C818G16	TM 3014	9.0	7.12	64	8.9	80	423A298G06	26	19

③ TM 43 and 63 brakes have single coil.

Table 5: External Resistor (Forcing Scheme)

Brake Frame	Style Number	High Resis. Ohms	Low Resis. Ohms	Coil Volts		Coil Amps	
				Inrush	Hold	Inrush	Hold
TM 43	423A299G08	720	26	185	22.5	2.53	.306
TM 63	423A299G09	585	22	182	22.5	3.06	.375
TM 83	423A299G01	625	24	182	22.7	2.82	.351
TM 1035	423A299G02	460	22	173	23.5	3.5	.47
TM 1355	423A299G03	380	13	188	23.1	4.73	.577
TM 1665	423A299G04	165	6.5	184	23.8	10.3	1.32
TM 1985	423A299G05	165	6.5	182	23	10.5	1.33
TM 2311	423A299G06	120	4.7	182	23	14.4	1.82
TM 3014	423A299G07	77	3.4	182	25	20.2	2.78

Dimensions, TM Brake Assembly

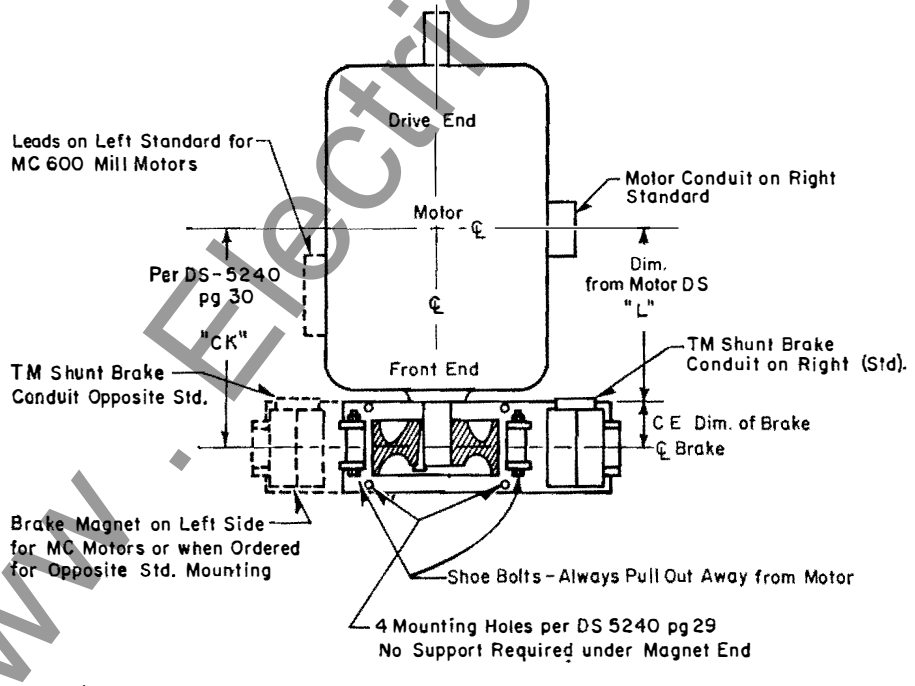

Figure 1

Field Forcing Brake Coils

Often, it is desirable to force magnet coils with a higher-than-rated voltage to obtain a faster response time. Table 5 shows typical resistors which can be used to obtain satisfactory results. The control circuit must be arranged so that when first energized, the high resistance section is shorted out causing a high voltage to be impressed across the low voltage brake coil. After a short time delay (adjusted to ½ to 1 sec.), a relay inserts the high resistance section in series with the brake coil reducing the holding voltage to about 25 volts. Forcing and holding voltages are not critical. Forcing at a voltage higher than that required for release at the intermittent torque setting and, holding released at a lower voltage than the rated continuous coil voltage, allows operation at the intermittent rating continuously. This is similar to the rectifier operated brakes described in 19A. Both release and setting times are faster than standard.

Note:

1. For centerline dimensions refer to item 10A.
2. (a) The solid line sketch of the brake in figure 1 represents the mounting arrangement of the brake which will be supplied for all orders (except for use on MC motors) unless otherwise specified. See item 14A.

   (b) The dotted line sketch of the brake in figure 1 represents the mounting arrangement of the brake which will be supplied for all applications to MC motors unless otherwise specified. See item 14A.

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Dimensions, TM Brake Wheel Hubs

Hub length and diameter shown below are the maximum obtainable from standard casting.

Standard wheels are of high strength cast iron.

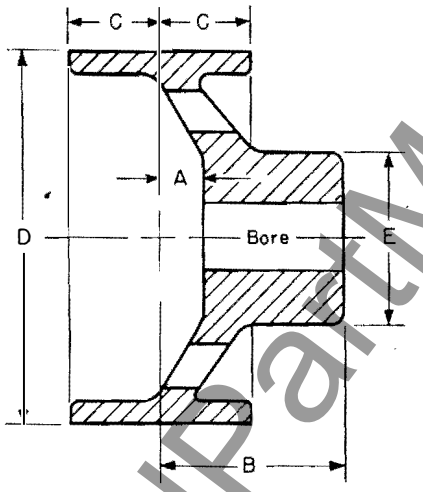

Figure 2: Offset Hub

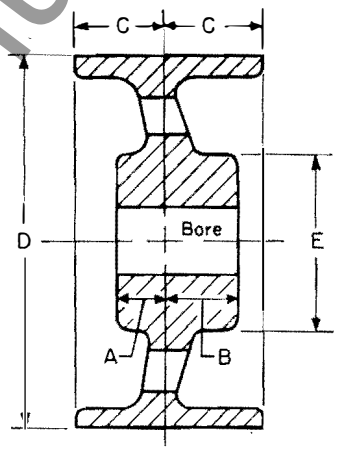

Figure 3: Symmetrical Hub

Brake Frame	A	B	C	D	E	Max. Bore Dia.	Min. Rough Bore Dia. ①	Max. Safe Rpm	Pattern Number
Offset Hub, Figure 2									
43	⅝	2⅜	1 9/16	4½	2¾	1⅝	½	8000	35A1694A11
63	0	2½	1 9/16	6	2¾	1⅝	⅝	5500	834D992J01
83	1⅛	4	1⅝	8	3	2	¾	3800	41A1542A1
1035	⅞	4¼	1⅞	10	3¾	2¼	1	3000	35A1698C2
1355	⅞	5⅜	2⅛	13	5¾	3¾	1¾	2400	29B5033A1
1665	2	6½	3⅜	16	7	4⅝	2¼	1900	26B7660C1
1985	1½	7½	4⅜	19	7	4½	3	1600	39A9145A1
2311	1 7/16	8¾	5⅝	23	8½	5½	3⅞	1300	39A9147A1
3014	1½	10¾	7¼	30	13	9	4½	900	574D688J04
Symmetrical Hub, Figure 3									
43	1 1/16	1 9/16	1 9/16	4½	2⅜	1⅜	½	8000	35A1694B13
63	1 1/16	1 9/16	1 9/16	6	2¾	1⅝	⅝	5500	834D992J05
83	1 9/16	2 7/16	1⅝	8	3¾	2¼	¾	3800	12A1638A1
1035	2 7/16	2 1/16	1⅞	10	4⅜	2⅜	1	3000	35A1698B1
1355	2 9/16	3 1/16	2⅛	13	5½	3½	1⅝	2400	714805F1
1665	2	3⅜	3⅜	16	7	4⅝	1¾	1900	714864E1
1985	1⅝	4⅜	4⅜	19	8½	6	2¾	1600	722478H1
2311	1⅜	5⅝	5⅝	23	8½	5½	3½	1300	25A2377A24
3014	...	....	...	...	...	...	...	....	.....

① If finish bore is not specified on order, brake wheel will be supplied with rough bore of sufficient diameter to clean up cored hole.

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Dimensions, TM Brake Approximate Maintenance Clearance Requirements

Refer to Instruction Leaflet 5204-1A for further information.

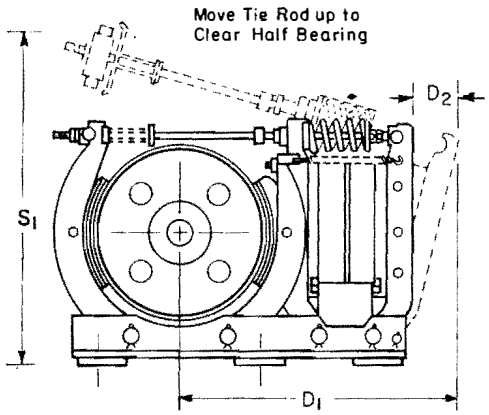

Figure 4

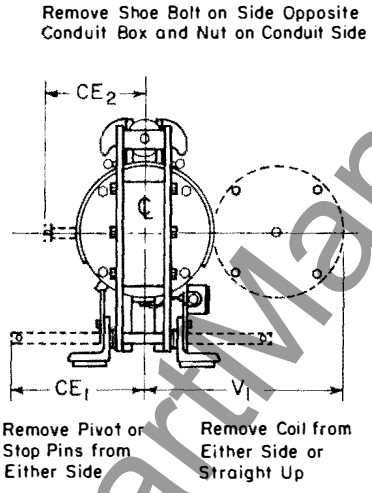

Figure 5

Brake Frame	Figure 4					Figure 5				
	S①	S_1	D①	D_1	D_2	CE①	CE_1	CE_2	½ V①	V_1
TM 83	13⅛	17½	14¾	19	4⅛	3¾	7¼	5⅞	3⅝	9 15/16
TM 1035	15¾	21	17	22	5	3¾	7¼	5⅞	4⅝	12 15/16
TM 1355	19	25⅞	19⅞	25¾	5⅜	5¾	9¾	8⅜	5 7/16	16 5/16
TM 1665	22¾	32½	21½	26¾	5¼	7	12¼	9¾	6⅛	18⅜
TM 1985	25⅝	38⅜	26½	32¼	5¾	7⅞	16⅜	14⅛	6 15/16	20 13/16
TM 2311	30⅜	40½	30½	36¼	5¾	9¼	20⅝	17¾	7⅞	23⅝
TM 3014	40¼	56¾	41⅝	50⅞	9¼	11⅜	19¼	18	9⅝	29⅝

① Dimensions S, D, CE, ½ V are taken from dimension sheet 5240, page 29.

Note:

1. All dimensions are approximate – wrench clearance is not shown.

2. Only the most obvious maintenance techniques are shown. Flexibility of TM design allows some choice of disassembly procedure for most major components.

Example: With less head room than indicated by S^1, tie rod can be removed straight back at magnet end if more space than D^2 is available to move magnet arms away from the bearing. Tie rod or brake adjustment need not be disturbed when changing either coil unless coil must be lifted straight up.

Dc Mill Motor Brake Standard

Reprint of AISE Standard No. 11
Adopted September, 1952, Revised, September, 1957.

Published by: Association of Iron and Steel Engineers, 1010 Empire Building, Pittsburgh 22, Pa.

1. General

a. The development of the AISE 600 series mill motor for frames No. 2, 602, 603, 604, 606, 608, 610, 612, 614, 616, and 618, which is covered by AISE Standard No. 1, made desirable revisions in the design of the brakes used for such motors, and AISE Standard No. 11 was adopted in September, 1952 for this purpose.

b. The addition of three additional frames, No. 620, 622, and 624, to AISE Standard No. 1 in 1957 has necessitated revising AISE Standard No. 11 to include brakes for these additional frames.

c. This dc mill motor brake standard has been developed by a combined AISE-NEMA group. Brakes for motor frames, No. 2, 602, 603, 604, 606, 608, 610, 612, 614, 616, and 618, covered by AISE Standard No. 1 "DC Mill Motor Standards," have been previously approved by NEMA and also issued as "Torque Ratings and Dimensions of DC Operated Brakes for the 600 Series of Mill Motors" – IC 1-20.13. Additional brakes described in Table 1 for frames No. 620, 622, and 624 will be added to this NEMA standard contingent upon approval by the necessary NEMA groups.

d. The objective is to standardize dc mill motor brakes for AISE 600 series motors so that all manufacturers brakes are interchangeable with respect to mounting dimensions, torque ratings and wheel dimensions.

e. All brakes must be designed so that they can be applied to the AISE standard dc mill motors in such a way that the height from the center line of the wheel to the base of the brake shall be at least ⅛ in. less than the height from the center line of the shaft to the base of the motor. Thus, no well will be required to mount the brake.

f. Brake standards covering frames No. 2, 602, 603, 604, 606, 608, 610, 612, 614, 616, and 618 are classified as a permanent standard. Brake standards covering frames 620, 622, and 624 are tentative for one year at the end of which period they will be reviewed for adoption as a final standard with or without revision.

2. Design

a. Unit stresses are not to exceed those in existing brakes.

b. As far as possible, the design of the brakes is to be such that they can be used on previous series of AISE dc mill motors.

3. Ratings

a. Brake ratings will be in accordance with those given in Table I. Ratings are given for ½ hr. series and 1-hr. shunt, 1-hr. series and 8-hr. shunt.

4. Dimensions

a. Wheel and mounting dimensions are given in Table I, on page 8.

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Type TM Dc Brake Specifications

Frames 43 to 3014
With Rectifier Available for Ac Operation

Dimensions, AISE Dc Mill Motor Brake Ratings Reprint of AISE Standard No. 11

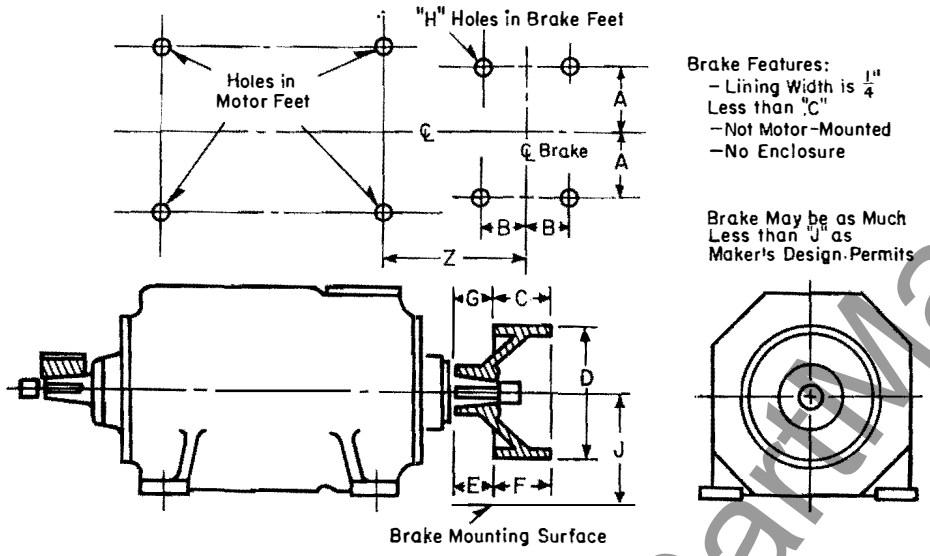

Table I

Motor	Series Motor Torque Lb-Ft. ½ Hr.	1 Hr.	Brake Rating Lb-Ft. ½ Hr. Series	1 Hr. Series	1 Hr. Shunt	8 Hr. Shunt	Mounting A	B	H	Z	J	Wheel D	C	E	F	G
Ratings: Covered by Present Standards																
2	46	29	100	65	100	75	3¼	2⅜	1 1/16	8¼	7	8	3¼	3	2⅝	2¾
602	78	49	100	65	100	75	3¼	2⅜	1 1/16	8¼	7	8	3¼	3	2⅝	2¾
603	116	72	200	130	200	150	4	3⅛	1 1/16	9¼	8¾	10	3¾	3½	2⅝	2¾
604	166	121	200	130	200	150	4	3⅛	1 1/16	9¾	8¾	10	3¾	3½	2⅝	2¾
606	337	228	550	365	550	400	5¾	4½	1 3/16	10½	9⅞	13	5¾	4	3⅞	2⅛
608	502	350	550	365	550	400	5¾	4½	1 3/16	11	9⅞	13	5¾	4½	3¾	2½
610	765	525	1000	650	1000	750	7½	5¾	1 1/16	12¾	12⅛	16	6¾	4½	5¾	3⅛
612	1220	830	2000	1300	2000	1500	9¼	6½	1 1/16	14¼	13¼	19	8¾	5	6⅞	3⅛
614	1780	1140	2000	1300	2000	1500	9¼	6½	1 1/16	15¼	13¼	19	8¾	5	6⅞	3⅛
616	2625	1750	4000	2600	4000	3000	11¾	8	1 5/16	17¼	15⅞	23	11¼	5½	8¾	2⅝
618	3615	2560	4000	2600	4000	3000	11¾	8	1 5/16	17¼	15⅞	23	11¼	6	8¾	3¼
Ratings: New, Tentative																
620	5550	3900	9000	6000	9000	①	15	9½	1 7/16	18¾	20¾	30	14¼	6¾	10⅝	3⅛
622	8460	5790	9000	6000	9000	①	15	9½	1 7/16	18½	20¾	30	14¼	7¼	10⅝	3⅝
624	11800	8210	9000②	②	9000②	①	15	9½	1 7/16	19¼	20¾	30	14¼	9¼	8⅝	3⅝

① No 8 hr. rating established by manufacturers.
② Applies only to 1 hr. shunt brakes.

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