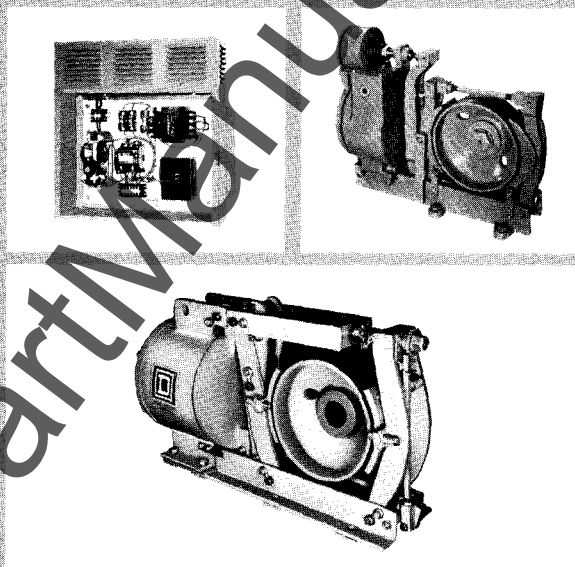




Brakes

CONTENTS

Description	Class	Pages
Selection Guide		2
Application Guide		3-7
DC Magnetic Brakes	5010	5-12
Adjustable Torque Brakes	5060	13-16

**SQUARE D COMPANY**

CLASS
5000

BRAKES APPLICATION DATA

JANUARY, 1981

DC MOTOR DATA AISE FRAME 600 AND 800 MOTORS

CLASS
5010

DC MAGNETIC BRAKES PRICING INFORMATION

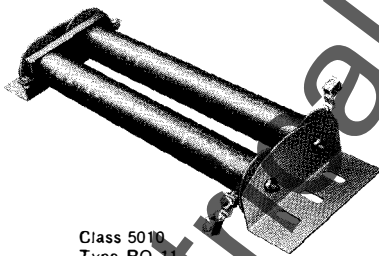
JANUARY, 1981

TABLE II SHUNT BRAKES ▶

Brake Size (Wheel Dia. in Inches)	Maximum Torque Lb. Ft.		Type	Price With Standard Wheel	Price Without Standard Wheel
	1 Hour	8 Hour			
8	100	75	F-0857	\$ 2350.	\$ 1986.
10	200	150	F-1057	3000.	2548.
13	550	400	F-1355	4050.	3378.
16	1000	750	F-1654	5366.	4414.
19	2000	1500	F-1959	8414.	6918.
23	4000	3000	F-2354	12542.	10030.
30	9000	6750	T-3051	26890.	22134.

▶ Must be used with resistor in Table III for standard dc shunt brake applications or with resistor and relay in Tables IV and V for high speed shunt brake applications.

D9A DISCOUNT



Class 5010
Type RO-1
Resistor

TABLE III
RESISTORS FOR STANDARD DC SHUNT BRAKES

Volts DC	Brake Size	1 Hour Service		8 Hour Service	
		Open Type		Open Type	
		Type	Price	Type	Price
230	8	RO-125	Included in Brake Price	RO-126	Included in Brake Price
	10	RO-124		RO-115	
	13	RO-123		RO-114	
	16	RO-106		RO-111	
	19	RO-132		RO-146	
	23	RO-134		RO-137	

D9A DISCOUNT

TABLE IV RESISTORS FOR
HIGH SPEED SHUNT BRAKES

Volts DC	Brake Size	Open Type	
		Type	Price
230	8	RO-127	Included in Brake Price
	10	RO-52	
	13	RO-119	
	16	RO-118	
	19	RO-148	
	23	RO-116	
	30	RO-57	

D9A DISCOUNT

TABLE V
RELAYS FOR HIGH SPEED SHUNT BRAKES

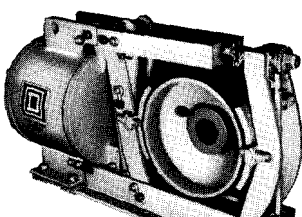
Volts DC	Brake Size	Class 7001 Type KFO-01	
		Form	Price
230	8	F-8	\$340.
	10	F-10	340.
	13	F-13	340.
	16	F-16	340.
	19	F-19	340.
	23	F-23	340.
	30	T-30	480.*

* Price includes 1 - Class 7004 Type MDO-1 contactor and 1 - Class 7001 Type KIO-01 relay.

D1B DISCOUNT

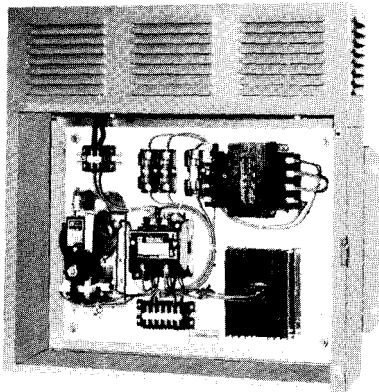
TABLE VI RECTIFIER OPERATED BRAKES ▶

Brake Size (Wheel Dia. in Inches)	Maximum Torque Lb. Ft. (Any Duty)	Single Brake	Two Brakes in Series	Price With Standard Wheel	Price Without Standard Wheel
		Type	Type		
8	100	F-0853	F-0851	\$ 2350.	\$ 1986.
10	200	F-1052	F-1050	3000.	2548.
13	550	F-1350	F-1365	4050.	3378.
16	1000	F-1650	F-1666	5366.	4414.



Class 7001 Type KFO-01 Relay
for High Speed Shunt Brake

DC MAGNETIC BRAKES PRICING AND ORDERING INFORMATION

**CLASS
5010**


Class 5010 Type QW-110
Brake Rectifier Controller

**TABLE VIII
BRAKE RECTIFIER CONTROLLERS**

Volts 60 Hz.	Brake Size	Outdoor Enclosure NEMA Type 3R			
		For Single Brake		For Two Brakes in Series	
		Type	Price	Type	Price
230 - 460	8	QW-108	\$1960.	QW-208	\$2392.
	10	QW-110	1960.	QW-210	2392.
	13	QW-113	1960.	QW-213	2872.
	16	QW-116	2440.	QW-216	3696.
	19	QW-119	2440.	QW-219	3696.
	23	QW-123	2440.	QW-223	3696.
	30	QW-130	3264.	....	....

**TABLE IX
BRAKE RECTIFIER CONTROLLER FOR
USE WITH CLASS 6401 STATA® HOIST CONTROL ▶**

Volts 60 Hz.	Brake Size	Outdoor Enclosure NEMA Type 3R			
		For Single Brake		For Two Brakes in Series	
		Type	Price	Type	Price
230 - 460	8	QW-308	\$1960.	QW-408	\$2392.
	10	QW-310	1960.	QW-410	2392.
	13	QW-313	1960.	QW-413	2872.
	16	QW-316	2440.	QW-416	3696.
	19	QW-319	2440.	QW-419	3696.
	23	QW-323	2440.	QW-423	3696.
	30	QW-330	3264.	....	....

▶ For use only with Class 6401 STATA® hoist control being used with a Class 6170 YOUNGSTOWN® Limit Switch.

MODIFICATIONS TO BRAKE RECTIFIER CONTROLLER

Modification	Price
For NEMA Type 12 enclosure substitute the letter A in place of W in the type number.	\$400.

TABLE X BRAKE MODIFICATIONS

For Optional Features:	8	10	13	16	19	23	30
Form B - Conduit Connection Box	\$108.	\$136.	\$142.	\$148.	\$256.	\$344.	\$544.
Form S - Self-Adjuster	180.	284.	336.	396.	620.	900.	...
Form V - Vertical Mounting	240.	240.	240.	240.	240.	...	...

ORDERING INFORMATION REQUIRED:

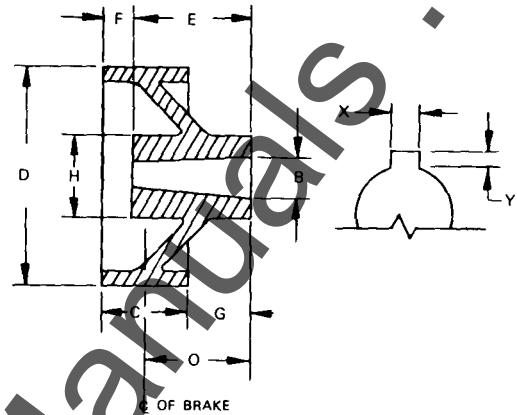
- For dc magnetic brake:
 - Class
 - Type
 - Modifications: specify form letters
 - Torque setting if different from maximum
 - Voltage if different from standard
- For resistor for standard shunt brake (if required)
For resistor or relay for high speed shunt brake (if required):
 - Class
 - Type
- For brake rectifier controller (if required):
 - Class
 - Type
 - Voltage and Frequency
- For brake wheel purchased with brake:
 - If an AISE standard brake wheel for a 600 or 800 frame dc mill motor or an AC frame ac mill motor is required specify frame number.
 - For all other applications supply the dimensions required for ordering wheels above.
- For brake wheels only.
When purchased separately, the brake wheel is considered to be a replacement part. Furnish the original Square D brake wheel part number or the dimensions required for ordering wheels above. Consult the nearest Square D sales office for the price.



APPROXIMATE DIMENSIONS—DUCTILE IRON BRAKE WHEELS

STANDARD SEMI-FINISHED WHEEL DIMENSIONS ▲

Wheel Dimensions							Machining Limitations		
							F	O	M ■
D	C	E	F	G	H	O	Max.	Min.	
8"	3.25	3.0	2.6	2.4	3.25	4.05	2.7	2.6	.38
	3.25	6.9	0.2	3.9	3.25	5.55	2.7	2.6	.38
	3.25	5.6	0.8	3.1	3.7	4.75	2.6	2.4	.38
10"	3.75	3.5	2.6	2.4	4.0	4.25	3.1	2.8	.50
	3.75	6.3	1.5	4.0	4.0	5.85	3.1	2.8	.50
	3.75	6.0	1.5	3.8	4.7	5.65	2.8	2.5	.50
13"	5.75	4.5	3.7	2.5	5.5	5.35	4.5	3.4	.63
	5.75	8.6	0.9	3.8	5.5	6.65	4.5	3.4	.63
	5.75	5.5	3.0	2.8	6.5	5.65	4.1	3.0	.63
16"	6.75	4.5	5.4	3.1	5.5	6.45	6.0	5.4	.63
	6.75	8.5	2.9	4.6	5.5	7.95	6.0	5.4	.63
	6.75	5.8	4.1	3.1	6.5	6.45	5.4	4.9	.63
19"	8.75	5.0	6.9	3.1	6.6	7.45	7.0	6.0	.75
	8.75	7.8	5.0	4.0	6.6	8.35	7.0	6.0	.75
	8.75	9.3	3.5	4.0	9.0	8.35	6.1	4.9	.75
23"	11.25	6.0	8.4	3.1	8.0	8.7	8.8	6.9	1.0
	11.25	9.2	5.3	3.2	8.0	8.8	8.8	6.9	1.0
	11.25	10.2	5.4	4.2	10.0	15.6	8.1	6.2	1.0
30"	14.25	7.3	10.6	3.6	12.5	10.7	10.5	9.4	1.38
	14.25	10.1	7.8	3.6	12.5	10.7	10.5	9.4	1.38



▲ An extra charge may be made for special wheels which cannot be machined from the standard semi-finished wheels detailed above. Consult factory for pricing.

■ Minimum material required over keyway.

DIMENSIONS REQUIRED FOR ORDERING WHEELS

NOTES:

BASIC WHEEL DIMS.: BORE DIMENSIONS:

KEYWAY DIMENSIONS:

1. For Semi-Finished Wheel (Solid Hub: No Bore or Keyway):

D = _____

B = _____

X = Width = _____

a. State "Semi-Finished Wheel is required" on order.

E = _____

T = Bore Taper (Indicate One):

Y = Depth = _____

b. Supply D, E & F dims. ONLY.

F = _____

_____ Straight

_____ Tapered 1.25"/Ft.

_____ Tapered 1.219"/Ft.

2. For any set of wheel dimensions E + F MUST = 1/2 C + O.

3. Formula for maximum bore: $B_{max} = H - 2(M + Y)$

GENERAL INFORMATION

Brake Type	Connection	Brake Coil Duty Rating	Typically Used as	Minimum Current or Voltage Required for Release at Maximum Rated Torque
Series Brake	In Series with 1/2 Hr. Rated Series Motor	1/2 Hr. Duty Equivalent To 1 Min. On-2 Min. Off	Holding Brake	40% of Full Load Motor Current Brake Will Remain Released Down To 10% of Full Load Motor Current
	In Series With 1 Hr. Rated Series Motor	1 Hr. Duty Equivalent To 1 Min. On-1 Min. Off		
Standard Shunt Brake	Across Line Voltage With Resistor in Series With Coil	1 Hr. Duty Equivalent To 1 Min. On-1 Min. Off	Holding or Stopping Brake	80% of Nominal Line Voltage
		8 Hr. Continuous Duty	Holding Brake	
High-Speed Shunt	Across Line Voltage With Protective Relay and Resistor in Series With Coil	Any Duty	Stopping Brake	80% of Nominal Line Voltage
AC Rectifier Operated Shunt Brake	Used With Brake Rectifier	Any Duty	Stopping Brake Or Holding Brake	80% of Nominal Line Voltage

VERTICAL MOUNTING

Brakes equipped for vertical mounting are designed to be mounted in vertical plane with the magnet case up.

RATINGS, WEIGHT AND WHEEL DATA

Brake Size (Wheel Diameter in Inches)	Maximum Torque Ratings in Lbs. Ft.					WR ² or Wheel (Lbs.-Ft. ³)	Thickness of Molded Brake Block in Inches	Approx. Net Weight Pounds	
	Series-Wound Brakes		Shunt-Wound Brakes					Brake Only	Wheel Only
	½ Hour Rating	1 Hour Rating	1 Hour Rating	8 Hour Rating	High Speed and Rectifier Operated				
8	100	65	100	75	100	1	¼	135	17
10	200	130	200	150	200	2.7	⅜	205	25
13	550	365	550	400	550	10	½	420	60
16	1000	650	1000	750	1000	30	⅝	630	110
19	2000	1300	2000	1500	2000	72	11/16	1025	175
23	4000	2600	4000	3000	4000	176	¾	2100	300
30	9000	6000	9000	6750	9000	600	¾	3050	765



DC MAGNETIC BRAKES

APPLICATION DATA

CLASS
5010

BRAKE TORQUE SELECTION

Brakes are selected by the amount of brake torque required for the particular application. Generally, the full load torque of the motor is used as a basis for determining the brake torque required. This can be calculated by using the following formula for both ac or dc motors.

$$\text{Torque} = \frac{\text{Rated HP} \times 5252}{\text{Rated RPM}}$$

Depending on the characteristics of the drive, the brake torque required may be more or less than the full load torque of the motor.

Once the required brake torque is determined, choose a brake size from the rating table below that has a maximum torque rating of not less than the brake torque required. In addition, if the running speed of the motor is over 600 rpm and the brake service is severe, do not exceed 90% of the maximum rated torque.

The brake torque for all of the brakes listed can be accurately adjusted down to 50% of their maximum ratings. For applications other than crane hoist drives where the required torque setting is less than 50% of the maximum rating, the brake can be supplied with a 50% torque spring. This optional feature is listed in Table X, page 7.

HOIST BRAKE SELECTION

AISE Standard No. 6 and OSHA Regulations state that the hoist brake is to be selected based on the torque required to hoist rated crane load at the point where the brake is applied.

selected based on motor full load torque at the point where the brake is applied.

CMAA Specification No. 70 states that the hoist brake is to be

All three standards require that a hoist drive handling hot metal be equipped with two brakes.

	Basis for Selection of Brake Torque	Brake Torque Rating			
		Hoist Drive with Single Brake		Hoist Drive with Two Brakes	
		With Control Braking ■	With Mechanical Load Brake	Handling Hot Metal	Not Handling Hot Metal
CMAA	Motor Full Load Torque	125%	100%	100%	100%
OSHA	Torque Required to Hoist Rated Load	125%	100%	100%	100%
AISE	Torque Required to Hoist Rated Load	150%	150%	125%	100%

■ Control braking is dynamic lowering, counter torque or eddy current load brake.

BRIDGE AND TROLLEY BRAKE SELECTION

The three Standards provide guidelines for the application of brakes to bridge and trolley drives.

APPLICATION	INTERPRETATION	RECOMMENDATION
Cab-Operated Cranes with the cab located on the Bridge	Bridge A bridge brake of the stopping or holding type is required. Trolley A trolley brake is not required but one may be used to eliminate creep with the power off.	OSHA defines a brake as "a device used for retarding or stopping motion by friction or power means". "A drag brake is a brake which provides retarding force without external control". "A holding brake is a brake that automatically prevents motion when power is off". AISE and OSHA specify that stopping brakes be selected to (1) stop the drive within a distance in feet equal to ten percent of full load speed in feet per minute when traveling at full speed with full load. (2) stop the drive from full load free running speed to zero speed at a deceleration rate equal to the acceleration rate for the drive.
Cab-Operated Cranes with the cab located on the Trolley	Bridge A bridge brake of the holding type is required. Trolley A trolley brake of the stopping or holding type is required.	
Floor, Remote and Pulpit-Operated Cranes	Bridge A bridge brake of the stopping or holding type or non-coasting mechanical bridge drive is required. Trolley A trolley brake is not required but one may be used to eliminate creep with the power off.	



DC MAGNETIC BRAKES

APPLICATION DATA

JANUARY, 1981

BRIDGE AND TROLLEY BRAKE SELECTION (CONT'D)

Application	Brake Torque Ratings*			
	Bridge		Trolley	
	AISE	CMAA	AISE	CMAA
Cab-Operated cranes with the cab located on the bridge	—	100%	50%	50%
Cab-operated cranes with the cab located on the trolley	100%	75%	—	100%
Floor, Remote and Pulpit-operated cranes	100%	50%	50%	50%

* Ratings are based on motor full load torque.

OSHA does not specify brake torque rating in percent of motor full load torque for bridge and trolley drives. Usually the limiting factor for selection of the brake size is the thermal capability of the brake wheel for the frequency of operation required by the service.

BRAKE SELECTION — THERMAL CAPABILITY

In addition to being selected to meet the torque requirements of the particular application, the dc magnetic brake used for stopping must be selected to prevent overheating of the brake wheel when operated on the anticipated duty cycle.

To calculate how often a stop can be made from full speed without overheating the brake wheel:

$$\frac{(kl) \times (CWL) \times (SL)^2}{(B) \times (M)} = \text{Seconds}$$

(M) = Number of motors

(B) = Number of brakes per motor

CWL = Crane weight

CL = Crane load (tons)

CWL = Crane weight loaded (tons) (CWU + CL)

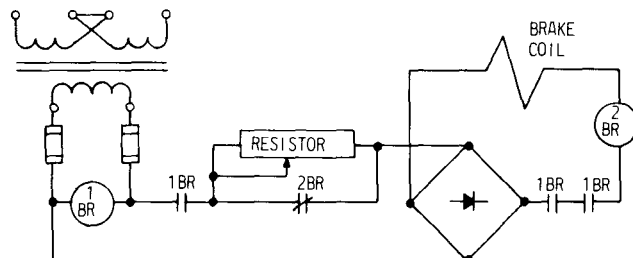
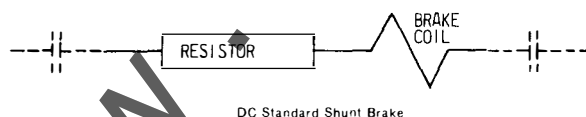
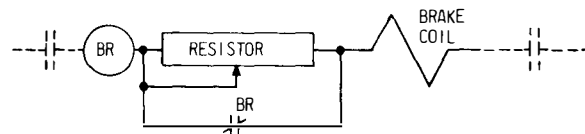
(SU) = Free-running speed unloaded (FPM)

(SL) = Free-running speed loaded (FPM)

Brake Size	(kl)
8	26.50×10^{-6}
10	15.90×10^{-6}
13	9.34×10^{-6}
16	6.10×10^{-6}
19	4.30×10^{-6}
23	3.00×10^{-6}
30	1.76×10^{-6}

A stop can be made from full speed this often without overheating the brake wheel. Four times as many stops can be made from half speed in this time interval. For unloaded crane conditions (CWL) and (SL) are replaced by (CWU) and (SU).

ELEMENTARY DIAGRAMS FOR STANDARD BRAKE CIRCUITS

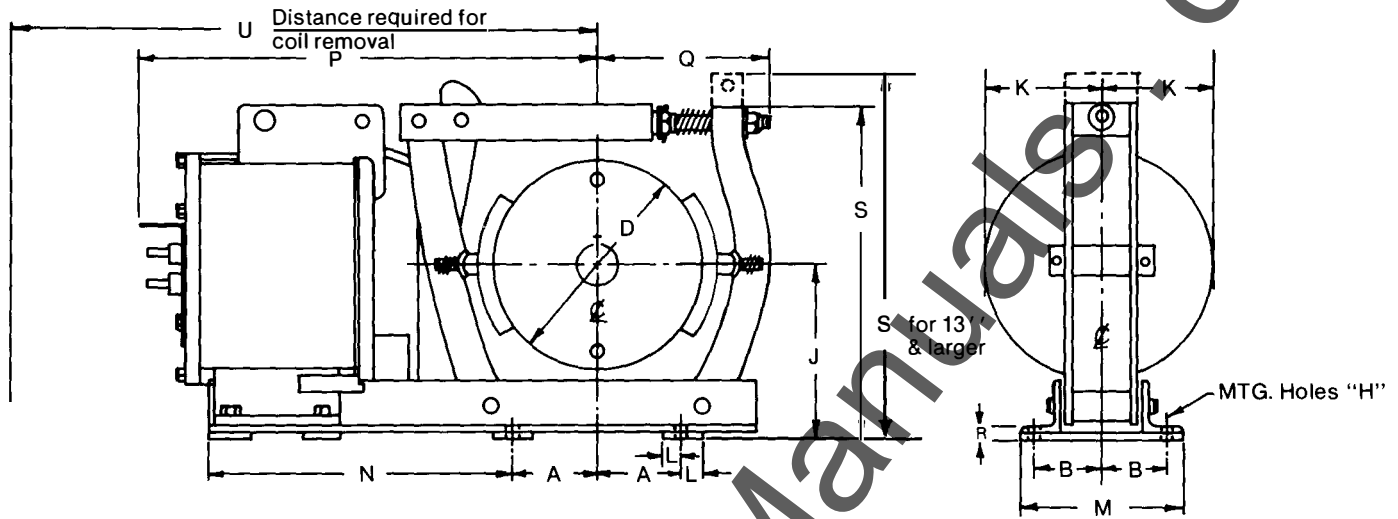


DC MAGNETIC BRAKES

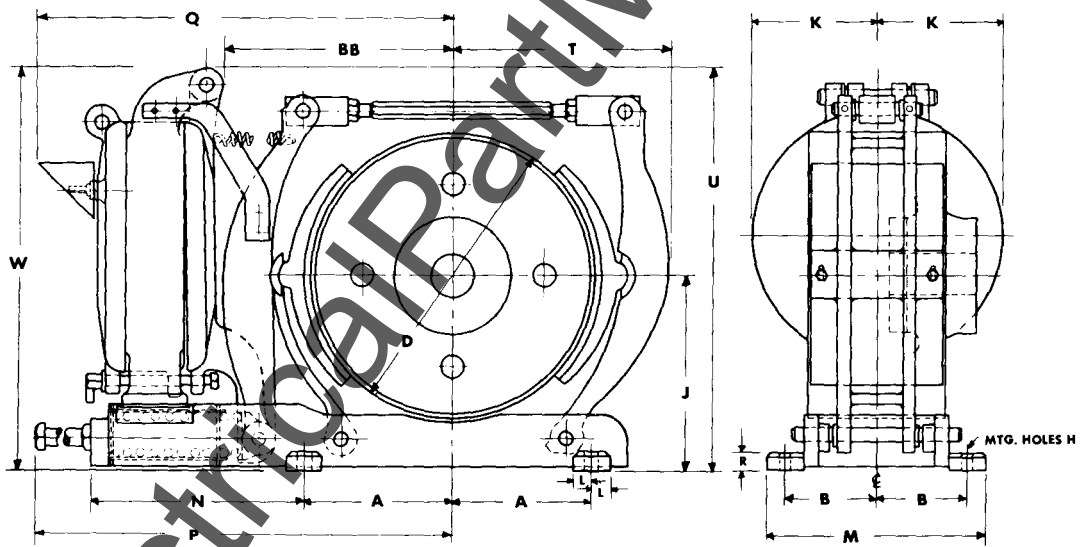
APPROXIMATE DIMENSIONS

CLASS
5010

8-INCH THROUGH 23-INCH



30-INCH



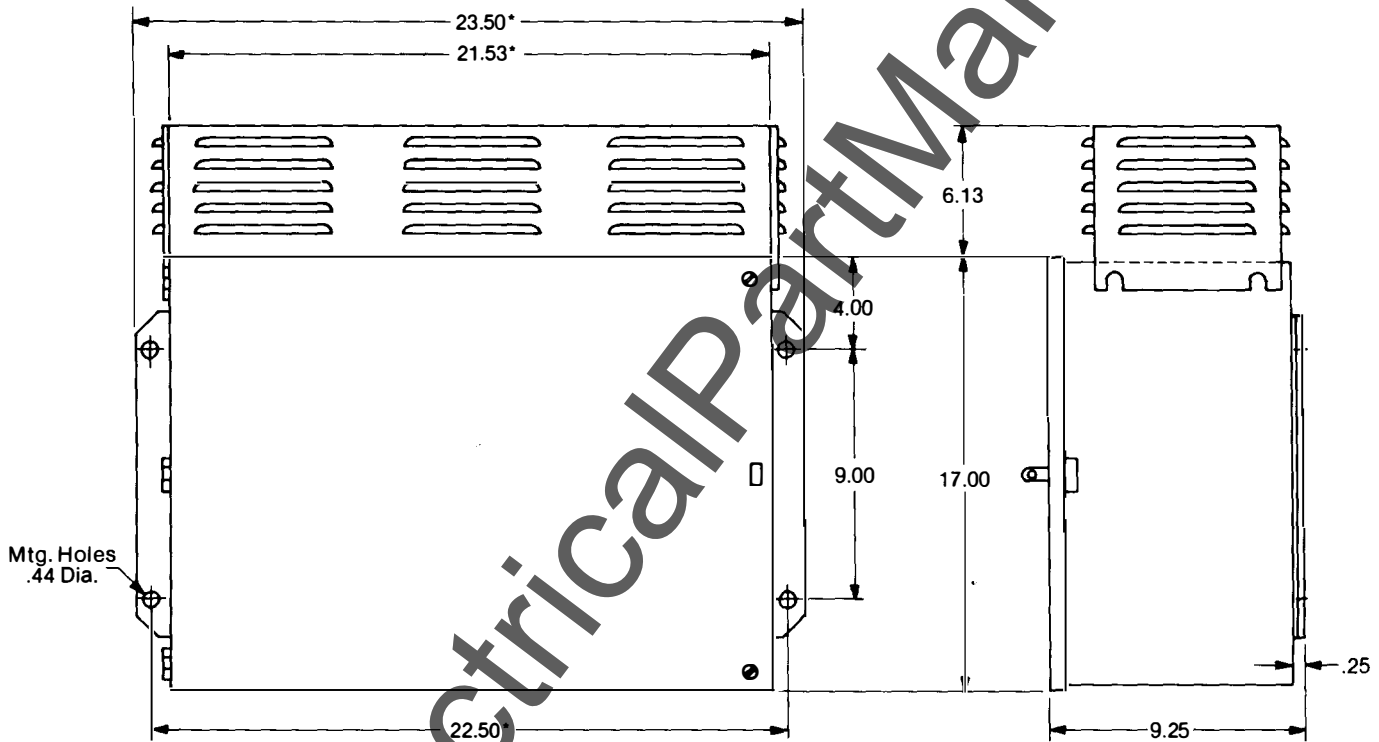
Brake Size (Wheel Dia. in inches)	A	B	D	H	J	K	L	M	N	P	Q	R	S	T	U	V	W	BB
8	3.25	2.87	8.00	.69	7.00	4.75	.875	7.56	11.30	17.65	7.25	.56	13.81	....	23.85	....	....	....
	83	73	204	17	178	121	22	192	287	448	.84	14	351	....	606	....	....	....
10	4.00	3.12	10.00	.69	8.37	5.50	1.00	7.88	15.62	22.22	8.63	.63	16.20	....	31.80	....	....	....
	101	79	254	17	213	140	25	200	397	564	219	16	411	....	808	....	....	....
13	5.75	4.50	13.00	.81	9.88	7.00	1.00	10.50	17.01	25.36	11.21	.75	20.00	....	36.40	....	....	....
	146	114	330	21	251	178	25	267	432	644	285	19	508	....	925	....	....	....
16	7.50	5.37	16.00	1.06	12.12	8.00	1.25	13.00	19.25	29.35	12.95	.88	25.50	....	40.80	....	....	....
	191	137	406	27	308	203	32	330	489	745	329	22	651	....	1036	....	....	....
19	9.25	6.50	19.00	1.06	13.25	9.25	1.75	16.50	20.06	33.25	16.50	1.12	28.50	....	44.4	....	....	....
	235	165	483	27	337	235	44	419	510	845	419	28	724	....	1127	....	....	....
23	11.75	8.00	23.00	1.31	15.87	11.00	1.25	19.00	23.75	39.75	19.50	1.25	34.87	....	53.0	....	8.00	....
	299	203	584	33	403	279	32	483	603	1010	495	32	886	....	1346	....	203	....
30	15.00	9.50	30.00	1.56	20.75	13.38	2.00	23.00	25.00	44.63	44.50	2.00	....	23.50	42.50	....	42.50	24.50
	381	241	762	40	527	340	51	584	635	1134	1130	51	....	597	1080	....	1080	622

 Dual Dimensions: **INCHES**
 Millimeters

 PRINTED
 IN
 U.S.A.

APPROXIMATE DIMENSIONS AND WEIGHTS

BRAKE RECTIFIER CONTROLLER
(For Types QW 108 Through QW 223)



*For Type QW 308 Through QW 423 Add 7.0 Inches.

ADJUSTABLE TORQUE BRAKES

GENERAL INFORMATION AND PRICING

CLASS
5060

Adjustable torque brakes are electrically controlled stopping and holding brakes. They can be used on crane bridge or trolley drives to provide a fixed torque for holding and an adjustable torque for controlled stopping. They are commonly used on floor operated cranes.

- ALL ELECTRICALLY CONTROLLED
- SMOOTH, CONTROLLED STOPPING FEATURE
- SPRING SET PARKING FEATURE

A complete adjustable torque brake system consists of:

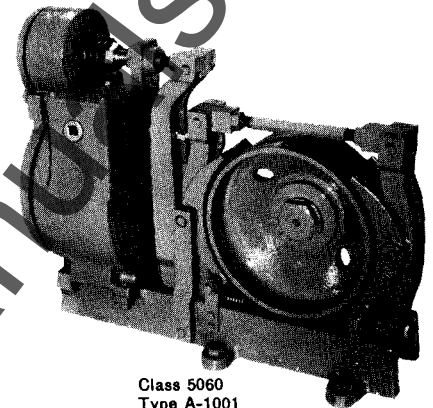
- 1—Or more adjustable torque brakes (see Table I, page 13)
- 1—Enclosed controller (see Table II and III, page 14)
- 1—Push button station (see Table III, page 14)
- 1—Foot switch (see Table IV, page 14)

TABLE I ADJUSTABLE TORQUE BRAKE

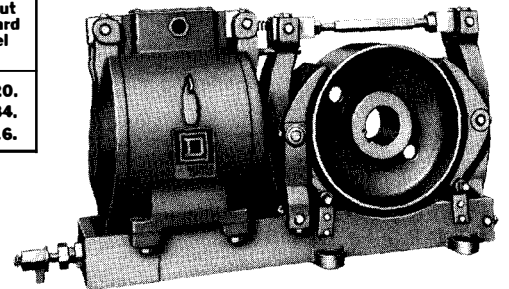
Brake Size (Wheel Dia. In Inches)	For Simplex Brake System (One Brake)		For Duplex Brake System (Two Brakes)		For Quadraplex Brake System (Four Brakes)		Price Per Brake With Standard Wheel	Price Per Brake Without Standard Wheel
	Type For DC System	Type For AC System	Type For DC System	Type For AC System	Type For DC System	Type For AC System		
10	A-1001	A-1001	A-1001	A-1001	A-1001	A-1001	\$5072.	\$4620.
13	A-1301	A-1361	A-1301	A-1301	A-1304	A-1304	7256.	6584.
16	A-1601	A-1661	A-1601	A-1661	A-1601	A-1601	8168.	7216.

MODIFICATIONS TO BRAKES ONLY

Modification	Price
Class 9007 AW Limit switch mounted on the brake and used to indicate mechanical release of brake.	\$348.



Class 5060
Type A-1001
10" Brake



Class 5060
Type A-1301
13" Brake

ORDERING INFORMATION REQUIRED:

- For adjustable torque brake:
 - Class
 - Type
 - Special features
 - Torque if different from standard
- For brake controller:
 - Class
 - Type
 - Special features
 - Information on system—cab, pendant and radio operation
- For push button station or foot switch (if required):
 - Class
 - Type
- For brake wheel purchased with brake:
 - If an AISE standard brake wheel for a 600 or 800 frame dc series wound or AC frame ac mill motor is required specify frame number.
 - For all other applications supply the dimensions required for ordering wheels on page 8 of the class 5010 catalog sheets.
- For brake wheels only:

When purchased separately, the brake wheel is considered to be a replacement part. Furnish the original Square D brake wheel part number or the dimensions required for ordering wheels on page 8 of the class 5010 catalog sheets.



ADJUSTABLE TORQUE BRAKES

GENERAL INFORMATION AND PRICING

JANUARY, 1981

A complete set of adjustable torque brake equipment consists of one or more brakes, a controller and for cab mounted cranes, a push button and foot switch.

TABLE II-A DC CONTROLLERS FOR ADJUSTABLE TORQUE BRAKE

Volts DC	Brake Size	For Simplex Brake System				For Duplex Brake System				For Quadraplex Brake System			
		General Purpose Enclosure NEMA Type I		Outdoor Enclosure NEMA Type 3R		General Purpose Enclosure NEMA Type I		Outdoor Enclosure NEMA Type 3R		General Purpose Enclosure NEMA Type I		Outdoor Enclosure NEMA Type 3R	
		CONTROLLER		CONTROLLER		CONTROLLER		CONTROLLER		CONTROLLER		CONTROLLER	
		Type	Price	Type	Price	Type	Price	Type	Price	Type	Price	Type	Price
230	10	ADG-101	\$2720.	ADW-101	\$3152.	ADG-102	\$2720.	ADW-102	\$3152.	ADG-104	\$4512.	ADW-104	\$4946.
	13	ADG-131	2880.	ADW-131	3312.	ADG-132	2880.	ADW-132	3312.	ADG-134	4512.	ADW-134	4946.
	16	ADG-161	3462.	ADW-161	3894.	ADG-162	3462.	ADW-162	3894.	ADG-164	4512.	ADW-164	4946.

D9A DISCOUNT

TABLE II-A AC CONTROLLERS FOR ADJUSTABLE TORQUE BRAKE

Volts AC 60 Hertz	Brake Size	For Simplex Brake System				For Duplex Brake System				For Quadraplex Brake System			
		General Purpose Enclosure NEMA Type I		Outdoor Enclosure NEMA Type 3R		General Purpose Enclosure NEMA Type I		Outdoor Enclosure NEMA Type 3R		General Purpose Enclosure NEMA Type I		Outdoor Enclosure NEMA Type 3R	
		CONTROLLER		CONTROLLER		CONTROLLER		CONTROLLER		CONTROLLER		CONTROLLER	
		Type	Price	Type	Price	Type	Price	Type	Price	Type	Price	Type	Price
230- 460	10	AAG-101	\$4000.	AAW-101	\$4432.	AAG-102	\$4000.	AAW-102	\$4432.	AAG-104	\$7490.	AAW-104	\$7924.
	13	AAG-131	4480.	AAW-131	4912.	AAG-132	4480.	AAW-132	4912.	AAG-134	7490.	AAW-134	7924.
	16	AAG-161	4702.	AAW-161	5250.	AAG-162	4702.	AAW-162	5250.	AAG-164	7490.	AAW-164	7924.

D9A DISCOUNT



Class 5060
Type ADG-101
Controller

MODIFICATIONS TO CONTROLLER ONLY

Modification	Price
For NEMA I gasketed enclosure substitute the letter "S" in place of "G" in the type number.	\$136.

D9A DISCOUNT

TABLE III SET-RELEASE PUSH BUTTON STATIONS

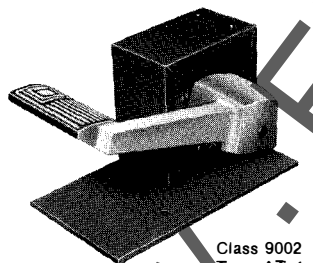
Class	Type	Price
9001	KYK-38	\$136.

D1B DISCOUNT

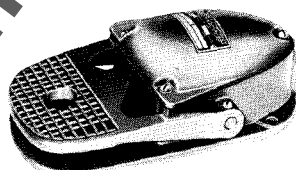
TABLE IV FOOT SWITCHES

Class	Type	Price
9002	AW-21	\$161.
9002	AT-4	684.

D1B DISCOUNT



Class 9002
Type AT-4
Foot Switch



Class 9002
Type AW-21
Foot Switch

PRESSURE REQUIRED TO OPERATE FOOT SWITCH FOR MAXIMUM SERVICE TORQUE

Class 9002 Type AW-21 10 lbs.

Class 9002 Type AT-4 20 lbs.



BRAKE SELECTION — THERMAL CAPABILITY

In addition to being selected to meet the torque requirements of the particular application, the brake system must be selected to prevent overheating of the brake wheel when operated on the anticipated duty cycle.

To calculate how often a stop can be made from full speed without overheating the brake wheel:

$$\frac{(kl) \times (CWL) \times (SL)^2}{(B) \times (M)} = \text{Seconds}$$

(SU) = Free-running speed unloaded (FPM)

(SL) = Free-running speed loaded (FPM)

(M) = Number of motors

(B) = Number of brakes per motor

CWU = Crane weight

CL = Crane load (tons)

CWL = Crane weight loaded (tons) (CWU + CL)

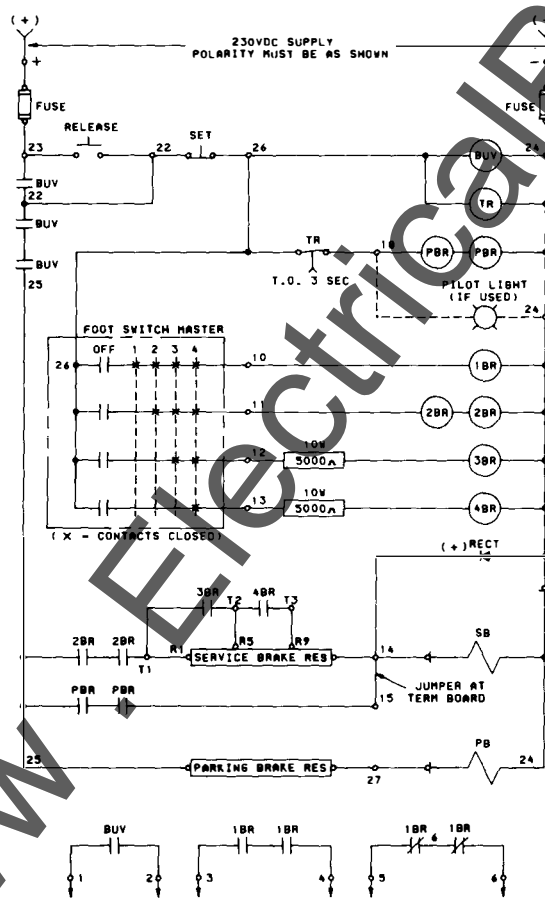
Brake Size	(KI)
10	15.90×10^{-6}
13	9.34×10^{-6}
16	6.10×10^{-6}

A stop can be made from full speed this often without overheating the brake wheel. Four times as many stops can be made from half speed in this time interval. For unloaded crane conditions (CWL) and (SL) are replaced by (CWU) and (SU).

TORQUE RATINGS AND WHEEL DATA

Brake Size (Wheel Dia. in Inches)	Parking Torque (lb. Ft.)		Service Torque (lb. Ft.)			WR ² Wheel
	Minimum	Maximum	Minimum	Maximum	Standard	
10	50	200	20	300	20-100-220	2.7
13	150	550	50	850	50-290-540	10
16	250	1000	100	1500	100-470-1000	30

ELEMENTARY DIAGRAM FOR DC CONTROLLERS

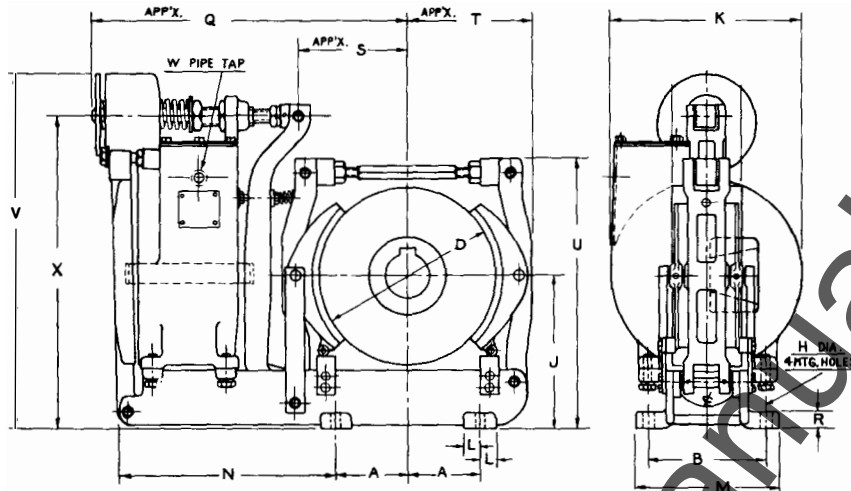


ADJUSTABLE TORQUE BRAKES

APPROXIMATE DIMENSIONS & WEIGHTS

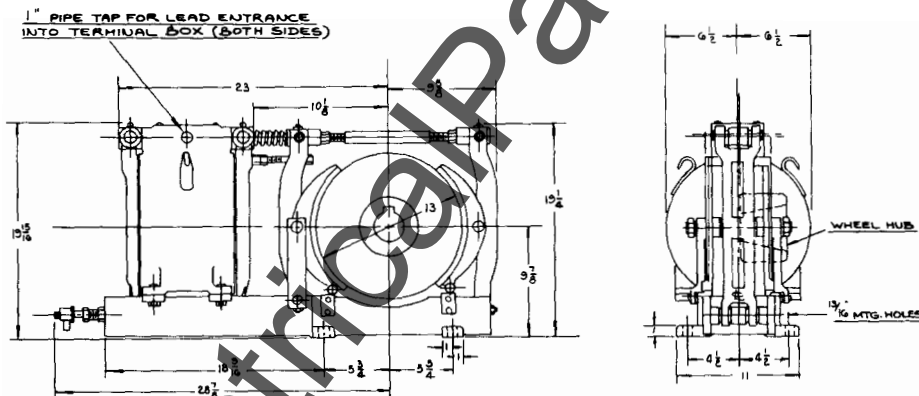
JANUARY, 1981

10" AND 16" ADJUSTABLE TORQUE BRAKE



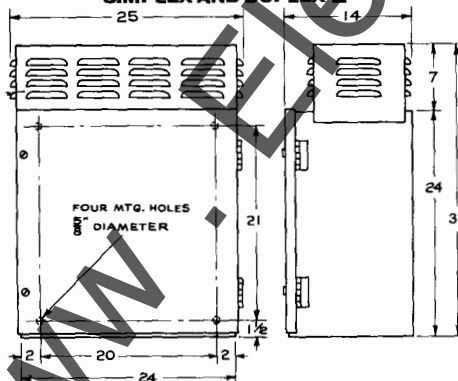
Brake Size (Wheel Dia. in inches)	A	B	D	H	J	K	L	M	N	Q	R	S	T	U	V	W	X	Net Weight (Lbs.)	
																		Wheel Only	Brake Only
10	4	6 1/4	10	1 1/8	8 3/8	10 3/4	7/8	8	12 3/16	17 7/8	3/4	6	7 1/16	14 5/8	18 1 5/16	3/4	17 3/16	25	250
16	7 1/2	10 3/4	16	1 1/8	12 1/8	15 1/4	1 1/8	13	19 1/8	25 3/8	1 1/4	11 1/4	12 1/4	22 3/8	27 1/8	1	23 3/8	110	640

13" ADJUSTABLE TORQUE BRAKE



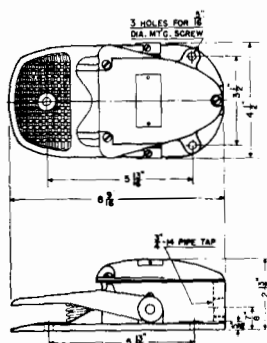
Net weight of wheel only 61 lbs.
Net weight of brake only 570 lbs.

ADJUSTABLE TORQUE BRAKE CONTROL PANEL SIMPLEX AND DUPLEX



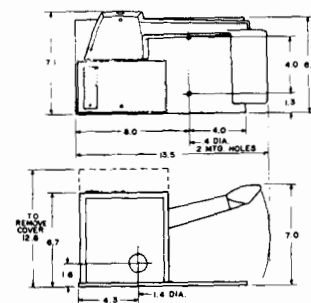
Net weight 430 lbs.

AW-21 FOOT SWITCH



Net weight 5 lbs.

AT-4 FOOT



Net weight 18 lbs.

Consult factory for quadraplex controller dimensions

