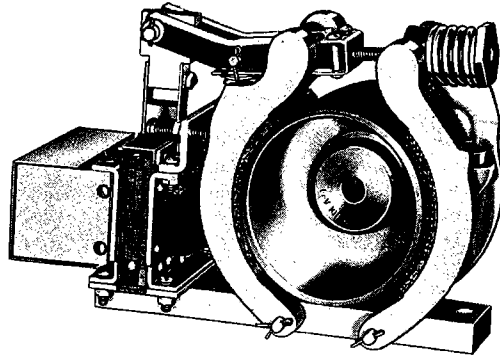
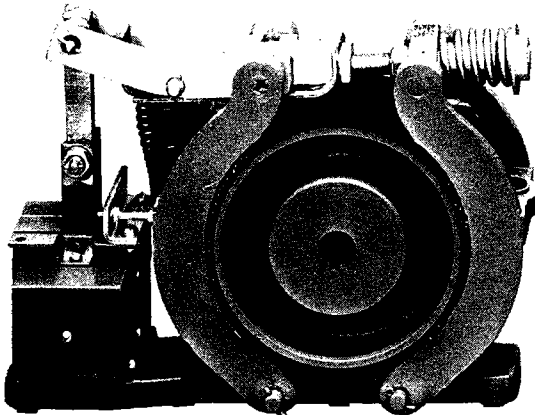


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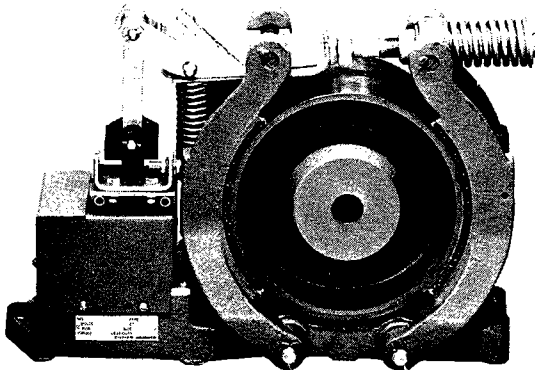
Supersedes TIP 511

Pages 1, 2, 5 & 6, dated 11/1/77  
Pages 3 & 4, dated 10/2/78**MAGNETIC BRAKES****Type "S" — A-c and D-c  
Solenoid Operated Brakes****T**ECHNICAL  
**I**NFORMATION  
**P**UBLICATION  
**511**

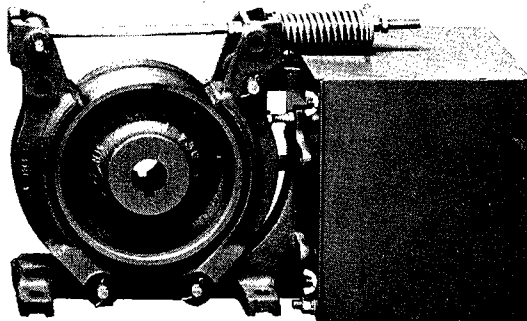
SIZE S-4 BRAKE AND WHEEL



SIZE S-7 BRAKE AND WHEEL



SIZE S-8½ BRAKE AND WHEEL

SIZE S-10 BRAKE AND WHEEL  
WITH MAGNET COVER**DESIGN CHARACTERISTICS**

- **Sizes** — Available in 4, 5½, 7, 8½ and 10 inch brake wheel sizes.
- **Operation** — Brake is electrically released and spring applied for "fail-safe" operation.
- **Operating Mechanism** — Solenoid type operating mechanism on sizes through S-8½. S-10 brakes use a clapper type magnet assembly.
- **Brake Linings** — Replaceable, non-asbestos molded linings used on all sizes. Linings attached to shoes by removable flathead groov-pins.
- **Adjustments** — Separate adjustments are provided for Braking Torque and Lining Clearance.
- **Brake Wheels** — Standard 4, 5½ and 7 inch wheels constructed of high strength cast iron — 8½ and 10 inch wheels made of ductile iron. All wheels accurately machined and balanced at factory.
- **Mounting** — Designed for floor mounting only.
- **Electrical Connection** — Terminal cover provided for conduit connection.
- **Enclosures** — Optional:  
NEMA 2-3R — Dripproof, Rainproof (not available on 10" brake)

**APPLICATION**

Typical applications include Conveyors, Hoisting Equipment, Machine Tools, Printing Presses, Small Cranes, Overhead Doors, Dumb Waiters, Vacuum Molding Machines and Carnival Rides.

**DESCRIPTION****General**

Cutler-Hammer Type S brakes are electrically released and spring applied providing "fail-safe" operation. The retarding torque developed is directly proportional to the spring pressure. Shunt wound brakes, either A-c or D-c will release (magnet pick-up and seal) at 85% of full line voltage.

The brake wheel is of relatively large size in relation to the torque developed by the brake. This permits use of a larger brake shoe lining and lower shoe pressures. Low shoe pressure, equally distributed over a large lining area, results in even wear of the friction surfaces and even braking torque. The over-size wheel type construction also permits use of a smaller operating solenoid that requires less current for a given torque rating.

Low stresses on all of the pins and pivot points and reduced maintenance costs through minimum stressing of parts and lining are further advantages obtained by low shoe pressure.

The installation and use of Cutler-Hammer products should be in accordance with the provisions of the U.S. National Electrical Code and/or other local codes or industry standards that are pertinent to the particular end use. Installations or use not in accordance with these codes and standards could be hazardous to personnel and/or equipment.

**MAGNETIC BRAKES**

12/15/88

**Type "S" — A-c and D-c  
 Solenoid Operated Brakes**

 Supersedes TIP 511  
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**DESCRIPTION (continued)**

All brakes through size S-8½ are solenoid operated, the size S-10 is operated by a clapper-type magnet. Clapper-type magnets have a characteristic *hammer blow* sound on pick up and, to a lesser degree, on drop out. The noise is normal and does not indicate faulty operation.

The size S-8½ and S-10 brakes are designed for A-c service only.

**Brake Linings**

All brakes are supplied with molded non-asbestos lining material. The material is medium to high friction material that has high heat resistance and maintains a constant friction coefficient over a wide temperature range.

**Manual Release Kits**

An external manual operating lever kit is available for field installation on sizes S-4 through S-7 A-c and D-c enclosed brakes. With this lever installed the brake can be manually released without removing the enclosure cover and without electric power.

The kit for the open type sizes S-4 through S-7 A-c and D-c brakes, mechanically holds the brake open or released by means of a spring loaded pin mounted on the solenoid frame. The spring pin can be released either manually or electrically by energizing the brake coil.

**Adjustments**

Adjustments for torque and lining wear are conveniently and quickly made. Braking torque and lining wear adjustments are made at the top of the brake. A set screw and locking nut located on top of the solenoid frame provide adjustment for equalizing clearance between the brake shoes to prevent dragging when the brake is released.

**D-c Brakes**

Standard D-c brakes are equipped with shunt coils. The magnet coil circuit on D-c brakes consists of two separate windings and a protective switch. In operation, the low resistance "pick-up" winding is used to provide maximum power when the plunger is being pulled in. Near the end

**BRAKE RATINGS AND MAGNET COIL DATA**

A-C BRAKES										
Brake Size	Torque - Lbs. Ft.		60 Cycles				50 Cycles			
			Inrush		Sealed		Inrush		Sealed	
	Continuous	Intermittent	Volt Amps.	Watts	Volt Amps.	Watts	Volt Amps.	Watts	Volt Amps.	Watts
S-4	3	3	595	320	96	19	465	290	65	15
	10	10	595	320	96	19	465	290	65	15
	—	15	1,150	560	118	38	1,110	600	120	40
S-5½	25	25	1,990	680	174	53	1,790	780	160	50
	—	35	2,510	1,000	245	90	2,350	1,010	220	65
S-7	50	50	2,470	840	220	80	1,790	780	160	50
	—	75	2,990	1,000	336	113	2,450	900	300	100
S-8½	85	85	4,404	1,900	264	83	4,301	2,085	287	87
	—	110	5,580	2,850	358	113	5,478	2,925	442	118
S-10	125	125	8,360	750	1,540	220	6,820	820	968	150
	—	160	11,000	1,200	2,420	350	9,900	1,300	1,848	240

D-C BRAKES						
Brake Size	Torque - Lbs. Ft.		Volt Amperes			
			Inrush		Sealed	
	Continuous	Intermittent	120 V.	240 V.	120 V.	240 V.
S-4	3	3	570	580	10	11
	10	10	570	580	10	11
	—	15	570	580	10	11
S-5½	25	25	780	860	10	9
	—	35	780	860	10	9
S-7	50	50	780	860	10	9
	—	75	1,100	1,080	8	9

See note on installation and use of this product at bottom of page 1.

## MAGNETIC BRAKES

TECHNICAL  
INFORMATION  
PUBLICATION  
**511**

12/15/88

Supersedes TIP 511  
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### Type "S" — A-c and D-c Solenoid Operated Brakes

#### DESCRIPTION (continued)

of the stroke, the plunger actuates the protecting switch which connects a high resistance type second winding in series with the "pick-up" winding. The combined resistance of these two windings serves to limit the current to the solenoid coil preventing excessive heat build-up in the coil. The resultant lower current is sufficient to hold the solenoid plunger in the sealed position.

#### Coil Duty Classification

Shunt brake coils are rated either for Intermittent or Continuous duty. Intermittent duty indicates that the coil can be placed across the line for a maximum of one hour without excessive heating, but then must remain inoperative for one hour. This is equivalent to 1/2 time duty or one minute on and one minute off. Coils rated for continuous duty can be connected across the line continuously, within their rated voltage, without exceeding safe temperature limits.

#### Mounting

Type S brakes are designed and recommended for use and mounting only in the floor position. Side or vertical mountings are not recommended because the solenoid loading is altered resulting in accelerated wear and premature coil failure.

#### Brake Wheels

The rim and wed thickness of Type S brake wheel is designed to be as small as practical to keep the WK<sup>2</sup> of the wheel to a minimum. The WK<sup>2</sup> of Type S brake wheels is as follows:

Wheel Dia. (in)	4	5½	7	8½	10
WK <sup>2</sup> (lb. ft. <sup>2</sup> )	0.057	0.26	0.77	1.54	3.1

All brake wheels are bored and balanced before shipment. Since a pilot bore is required for the balancing operation, unbored wheels cannot be supplied.

All size wheels have both a minimum and maximum recommended bore dimension.

Wheel Bore Dia. (In)	4	5½	7	8½	10
Minimum Bore (In)	½	¾	1	1½	1¾
Maximum Bore (In)	1¾	2	2¼	2¾	2⅞

It is important the minimum and maximum recommended dimensions be adhered to. The high braking torque developed may cause a motor shaft of lesser dimensions to fail when the brake is applied. Conversely, a wheel bore in excess of recommended dimension would reduce the strength of the hub to a point where hub failure could result upon application of the brake.

Standard straight bores are manufactured within a tolerance of -0.001 inch. For tapered bores the tolerance is -0.005 inch. The standard taper is 1.250 inches per foot on diameter. The keyway tolerance is +0.005 inch on the width and +0.016 inch on the depth.

#### Brake Selection

The method most generally used to determine the required braking torque is to calculate the full load motor torque by means of the following formula:

$$T = \frac{5252 \times \text{HP}}{\text{R.P.M.}}$$

T = Full load motor torque in lbs. ft.

HP = Motor horsepower.

R.P.M. = Speed of shaft on which brake wheel is mounted.

The torque rating of the brake selected should be at least equal to the full load motor torque for the duty considered.

For a stop within a given time limit the brake should be selected on the basis of the total inertia to be retarded. Where the inertia to be retarded can be determined accurately, torque requirements may be determined as follows:

$$T = \frac{\text{WK}^2 \times \text{R.P.M.}}{308 \times t}$$

T = Torque in lb.-ft.

WK<sup>2</sup> = Inertia of rotating load in lb. ft.<sup>2</sup>

R.P.M. = Speed of rotating wheel.

t = Time, in seconds, to stop.

In some applications where the brake must stop or hold abnormal loads on the driving equipment, the braking torque must be determined using the extreme operating conditions. In these cases, the braking torque is determined by calculating the maximum load and translating it into lbs. ft. torque at the shaft on which the brake is mounted.

See note on installation and use of this product at bottom of page 1.

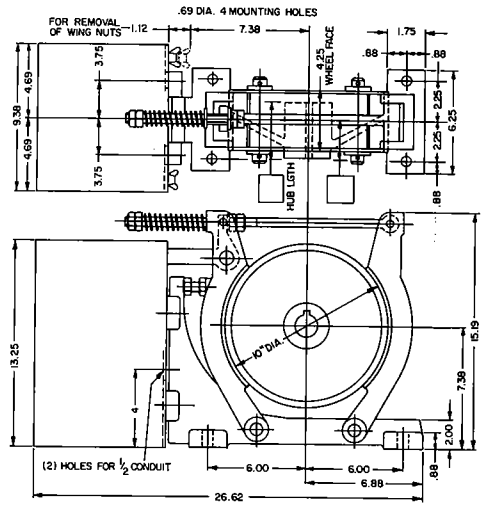
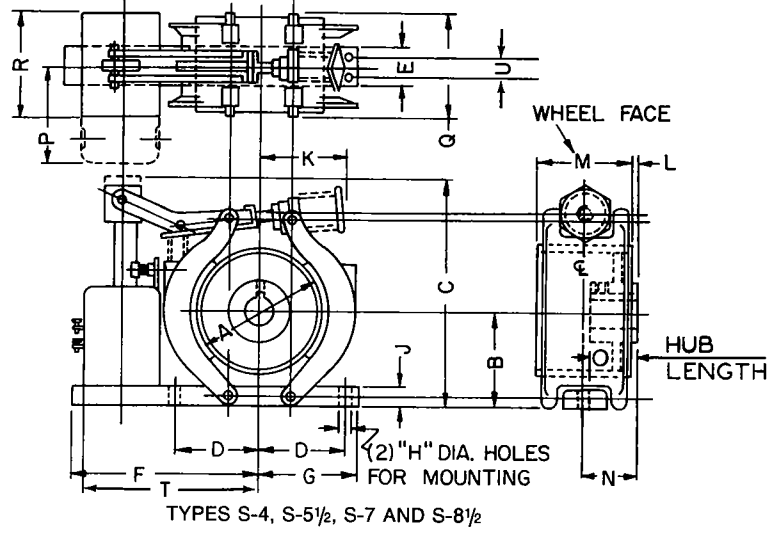
# MAGNETIC BRAKES

TECHNICAL  
INFORMATION  
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**511**

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## Type "S" — A-c and D-c Solenoid Operated Brakes OPEN TYPE

### APPROXIMATE DIMENSIONS AND SHIPPING WEIGHTS

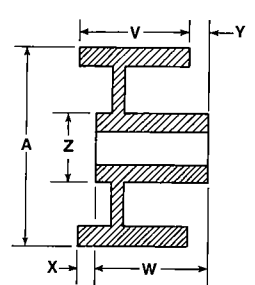


WEIGHTS — Brake with Wheel, 200 lbs.  
Wheel, 38.5 lbs. — Boxed, Brake and Wheel, 225 lbs.

Brake Size	Torq. Rat'g. Ft. - Lbs.	Dimensions in Inches																			Weight in Lbs.		
		A	B $\phi$	C	D	E	F	G	H	J	K	L	M	N	O	P	Q	R	T	U	Brake With Wheel		Net - Wheel Only
		Net		Boxed																			
<b>TYPE "S" A-C SHOE BRAKES</b>																							
S-4	3	4	27/8	7 1/2	2 5/8	1 1/4	7 1/2	3 3/8	3/8	5/8	27/8	1/4	2 3/4	1 5/8	1 5/8	27/8	3	3 3/8	—	—	16	17	4
S-4	10	4	27/8	7 1/2	2 5/8	1 1/4	7 1/2	3 3/8	3/8	5/8	27/8	1/4	2 3/4	1 5/8	1 5/8	27/8	3	3 3/8	—	—	16	17	4
S-4	15	4	27/8	7 1/2	2 5/8	1 1/4	7 1/2	3 3/8	3/8	5/8	27/8	1/4	2 3/4	1 5/8	1 5/8	27/8	3	3 3/8	—	—	16	17	4
S-5 1/2	25	5 1/2	4	9 1/2	3 1/2	2	8 3/8	4 1/8	7/16	1	4 7/8	3/8	3 1/4	2	2	3 1/8	3 3/4	3 1/8	—	—	33	36	8
S-5 1/2	35	5 1/2	4	9 1/2	3 1/2	2	8 3/8	4 1/8	7/16	1	4 7/8	3/8	3 1/4	2	2	3 1/8	3 3/4	3 1/8	—	—	33	36	8
S-7	50	7	5	11 1/2	4 3/8	2 1/2	9 1/2	5	9/16	1	6	—	4 1/4	2 1/8	3	3 1/8	4 3/4	3 1/8	—	—	52	55	19
S-7	75	7	5	11 1/2	4 3/8	2 1/2	9 1/2	5	9/16	1	6	—	4 1/4	2 1/8	3	3 1/8	4 3/4	3 1/8	—	—	52	55	19
S-8 1/2	85	8 1/2	5 7/8	12 3/4	5 1/2	—	12 7/8	6	9/16	1 1/2	7 13/64	—	6 1/2	3 1/4	2 7/8	3 1/4	6 1/2	6 1/2	11 7/8	2 1/2	80	114	25
S-8 1/2	110	8 1/2	5 7/8	12 3/4	5 1/2	—	12 7/8	6	9/16	1 1/2	7 13/64	—	6 1/2	3 1/4	2 7/8	3 1/4	6 1/2	6 1/2	11 7/8	2 1/2	80	114	25
<b>TYPE "S" D-C SHOE BRAKES</b>																							
S-4	3	4	37/16	8	2 5/8	1 1/4	7 9/16	3 1/4	3/8	3/4	27/8	1/4	2 3/4	1 5/8	1 5/8	2 5/8	3	4 1/16	—	—	18	20	4
S-4	10	4	37/16	8	2 5/8	1 1/4	7 9/16	3 1/4	3/8	3/4	27/8	1/4	2 3/4	1 5/8	1 5/8	2 5/8	3	4 1/16	—	—	18	20	4
S-4	15	4	37/16	8	2 5/8	1 1/4	7 9/16	3 1/4	3/8	3/4	27/8	1/4	2 3/4	1 5/8	1 5/8	2 5/8	3	4 1/16	—	—	18	20	4
S-5 1/2	25	5 1/2	4	9 7/16	3 1/2	2	8 3/8	4 1/8	7/16	3/4	4 7/8	3/8	3 1/4	2	2	2 13/16	3 3/4	4 1/16	—	—	35	38	8
S-5 1/2	35	5 1/2	4	9 7/16	3 1/2	2	8 3/8	4 1/8	7/16	3/4	4 7/8	3/8	3 1/4	2	2	2 13/16	3 3/4	4 1/16	—	—	35	38	8
S-7	50	7	5	11 7/16	4 3/8	2 1/2	9 7/16	5	9/16	3/4	6	—	4 1/4	2 1/8	3	2 13/16	4 7/8	4 1/16	—	—	54	58	19
S-7	75	7	5	11 7/16	4 3/8	2 1/2	9 7/16	5	9/16	3/4	6	—	4 1/4	2 1/8	3	2 13/16	4 7/8	4 1/16	—	—	54	58	19

● Open type brake only.

### STANDARD BRAKE WHEEL SIZES



A	Dimensions in Inches					Bore	
	V	W $\phi$	X	Y	Z	Maximum	Minimum
4	2 3/4	1 5/8	1 3/8	—	2 1/2	1 3/8	1/2
5 1/2	3 1/4	2	1 5/8	3/8	3 1/4	2	3/4
7	4 1/4	3	1 1/4	—	4	2 1/4	1
8 1/2	4 1/4	2 7/8	1 1/2	3/16	4 1/2	2 3/4	1 1/8
10	4 1/4	3 1/4	1 1/4	1/4	4 7/8	2 7/8	1 3/8

● Hub lengths other than standard are not available.

See note on installation and use of this product at bottom of page 1.

**MAGNETIC BRAKES**

**T**ECHNICAL  
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**P**UBLICATION  
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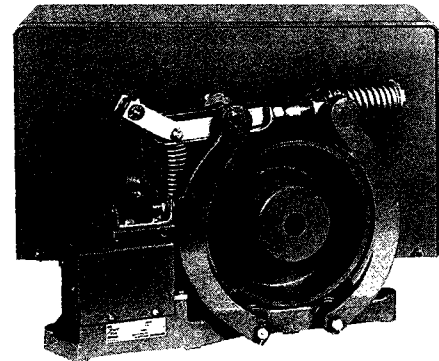
**Type "S" — A-c and D-c  
Solenoid Operated Brakes**

**NEMA 2-3R DRIPTIGHT, WEATHER-RESISTANT ENCLOSURE**

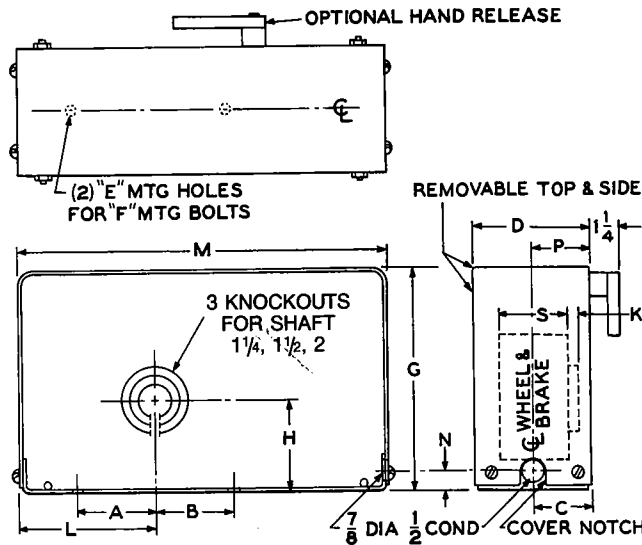
**DESCRIPTION**

This enclosure is designed for applications where the brake is subjected to the weather, falling moisture or dirt. Since the enclosure must be mounted at installation in the field, the assembly has a minimum number of parts. The side panels are provided with knockouts suitable to shaft size requirements.

A manual release is available as a kit for field installation. It is available for sizes S-4, S-5½ and S7.



**APPROXIMATE DIMENSIONS**



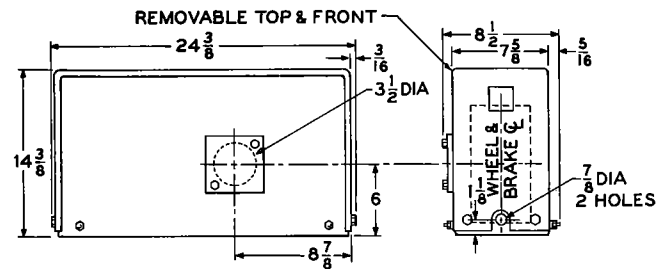
**Enclosure for S-4, S-5½ and S-7 Brakes**

Brake Size	Dimensions, Inches							
	A	B	C	D	E	F	G	H
S-4	2 <sup>5</sup> / <sub>8</sub>	2 <sup>5</sup> / <sub>8</sub>	2 <sup>7</sup> / <sub>16</sub>	4 <sup>7</sup> / <sub>8</sub>	1 <sup>1</sup> / <sub>32</sub>	5 <sup>1</sup> / <sub>16</sub>	8 <sup>3</sup> / <sub>4</sub>	4 <sup>1</sup> / <sub>8</sub>
S-5½	3 <sup>1</sup> / <sub>2</sub>	3 <sup>1</sup> / <sub>2</sub>	2 <sup>5</sup> / <sub>8</sub>	5 <sup>1</sup> / <sub>4</sub>	1 <sup>3</sup> / <sub>32</sub>	3 <sup>3</sup> / <sub>8</sub>	9 <sup>7</sup> / <sub>8</sub>	4 <sup>1</sup> / <sub>8</sub>
S-7	4 <sup>3</sup> / <sub>8</sub>	4 <sup>3</sup> / <sub>8</sub>	3	6	9 <sup>1</sup> / <sub>16</sub>	1 <sup>1</sup> / <sub>2</sub>	12 <sup>3</sup> / <sub>16</sub>	5 <sup>1</sup> / <sub>8</sub>

• A-C - 3", D-C - 3<sup>9</sup>/<sub>16</sub>"

Brake Size	Dimensions, Inches					
	K	L	M	N	P	S
S-4	1 <sup>3</sup> / <sub>16</sub>	4	13	7 <sup>7</sup> / <sub>8</sub>	1 <sup>5</sup> / <sub>8</sub>	2 <sup>3</sup> / <sub>4</sub>
S-5½	3 <sup>3</sup> / <sub>8</sub>	6	16 <sup>11</sup> / <sub>32</sub>	7 <sup>7</sup> / <sub>8</sub>	2	3 <sup>3</sup> / <sub>4</sub>
S-7	0	6 <sup>3</sup> / <sub>4</sub>	18 <sup>1</sup> / <sub>4</sub>	15 <sup>1</sup> / <sub>16</sub>	3	4 <sup>1</sup> / <sub>4</sub>

The S-8½ brake enclosure has a mounting bed designed to accommodate conduit entrance at either end. The brake is mounted through the bed plate - the top is an "inverted-u" shaped cover that includes the end covers and bolts to the bed plate. The side panels are interchangeable for either left or right shaft opening and also bolt to the bed plate. The side panels are removable for inspection.



Dimensions are approximate — do not use for construction.

See note on installation and use of this product at bottom of page 1.