SELECTION AND APPLICATION OF K-DON® CIRCUIT BREAKERS

The following step by step procedure is to be used as a guide for proper circuit breaker and fuse selection.

A. CIRCUIT-BREAKER SELECTION

1—Determine the system short-circuit capacity in symmetrical rms amperes.

2—Determine from Table 4, columns 3, 4 and 5 respectively the approximate continuous current rating and the time delay and instantaneous overcurrent trip settings.

3—Select from Table 5, columns 1, 2, 3 and 4 respectively the proper coil rating, frame size, time-delay and instantaneous settings as follows:

(a) The coil rating should be equal to or greater than the value determined in Table 4, column 3.

(b) When there is a choice of breaker frame size the larger will provide maximum flexibility in case of load growth.

(c) Time delay setting should be set at a value nearest to that determined in Table 4, column 4.

(d) Instantaneous setting should be set at a value nearest to that determined in Table 4, column 5. However, this value may have to be adjusted downward to coordinate with Amp-trap† to be selected in step B.

TABLE 4

① Type of Application		② Purpose of Circuit Breaker	③ Continuous Current Rating of Circuit Breaker	④ Settings of Overcurrent Trip Device	
				Time Delay	⑤ Instantaneous
Service entrance (general)		(a) To protect source transformer windings from overheating, due to overload of fault current flow. (b) To protect circuit conductors from effects of overcurrent flow. (c) To provide safe and rapid means for connecting and disconnecting of load circuit.	Based upon 125% of the transformer current rating	125% of the transformer current rating	1000% of circuit breaker current rating
Service feeder (general)		(a) To protect circuit conductors from effects of overcurrent flow. (b) To protect connected electrical equipment from effects of fault current flow.	Based upon 115% of estimated load current	115% of estimated load current	1000% of circuit breaker current rating
BRANCH CIRCUITS (GENERAL)	Individual motor circuit	(a) To protect motor windings from overheating due to overcurrent or fault current flow. (b) To protect circuit conductors and other connected electrical equipment from overload or fault current flow. (c) To provide safe and rapid means of connecting and disconnecting motor circuit.	Based upon 115% of rated full load current of motor	115% of rated full load current of motor	1000% of circuit breaker current rating
	Group motor circuit	(a) To protect circuit conductors from overheating. (b) To protect circuit conductors, motor windings and other connected electrical equipment from fault current flow. (c) To provide safe and rapid means of connecting and disconnecting common motor circuit from supply source.	Based upon 115% of largest motor full load current plus sum of other motor currents	100% of circuit breaker current rating	1000% of circuit breaker current rating
	Combined motor and lighting circuit	(a) To protect circuit conductors from overheating. (b) To protect circuit conductors, motor windings and other connected electrical equipment from fault current flow. (c) To provide safe and rapid means of connecting and disconnecting common load circuit from supply source.	Based upon 115% of largest motor full load current plus sum of other motor and lighting load currents	100% of circuit breaker current rating	1000% of circuit breaker current rating
	Lighting circuit	(a) To protect circuit conductors from effects of overload or fault current flow. (b) To provide safe and rapid means of connecting and disconnecting lighting circuit from supply source.	Based upon 125% of estimated maximum lighting current	100% of circuit breaker current rating	1000% of circuit breaker current rating

† Reg. TM—The Chase-Shawmut Co.

B. AMP-TRAP SELECTION

1—When all equipment protected by the breaker has a short-circuit withstand rating equal to or greater than the breaker selected in step A,† the maximum fuse size in Table 5, column 5 may be used. This assures maximum coordination and flexibility of instantaneous breaker settings with minimum fuse blowing. However, where economy over-rules maximum flexibility any lower rated fuse size down to the one directly to the right of the instantaneous trip setting selected from column 4 may be chosen. Fuse sizes below this value will not coordinate with trip setting.

2—When the equipment to be protected by the breaker has a short-circuit withstand rating less than the breaker,† Figure 1 must be used to determine maximum fuse size to adequately protect this equipment. Two values must be known.

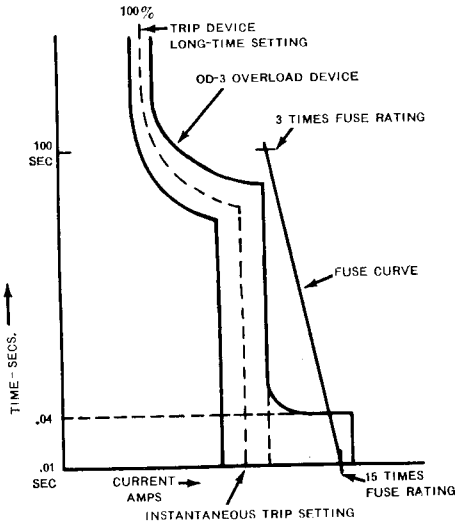
(a) System short-circuit capacity—symmetrical rms amperes (this value was determined in step A-1).

(b) Peak amperes—this value is determined by multiplying the short circuit withstand rating of the equipment in symmetrical rms ampere by 2.3, 1.72 or 1.4 depending on circuit power factor.

Select a maximum fuse size from Figure 1 which lies equal to or below the intersection of the short-circuit ampere and peak ampere coordinates. Check this maximum fuse size against the instantaneous setting selected in Table 5, column 4. If the instantaneous setting is too high to coordinate with this fuse the instantaneous setting must be adjusted downward to insure coordination or see Table 5, Note 4.

Note—Common applications such as Protection of Molded-Case Breakers and Bus Duct have been tabulated and appear in Tables 6 and 7.

† K-Don-600, 42,000 A Sym.; K-Don-1600, 65,000 A Sym.



Typical Breaker Amp-trap coordination curve

TABLE 5

① Breaker Coil Rating	② Breaker Frame Size	③ Trip Device Long-Time Settings	④ Trip Device Instantaneous Settings	⑤ Coordinating Fuse Size Note 1
70	K-Don-600	40 50 60 70 90	250 500 750 1100	300 300 300 300–600
125	K-Don-600	70 90 100 125 160	450 800 1200 1900	300 300 400 600–1000
225	K-Don-600	120 150 175 200 225 285	750 1500 2400 3400	300 400 600 1000–1600
400	K-Don-600	250 300 350 400 500	1250 2000 4000 6000	400 600 1200 1600–2000
600	K-Don-600	400 500 600 750	2500 4000 6000 9000	800 1200 1600–2000 Note 2
225	K-Don-1600	120 150 175 200 225 285	750 1500 2400 3400	300 400 600 1000–1600
400	K-Don-1600	250 300 350 400 500	1250 2000 4000 6000	400 600 1200 1600–3000
800	K-Don-1600	400 500 600 800 1000	2500 5000 8000 12,000	800 1600 2500 Note 2
1600	K-Don-1600	800 1000 1200 1600 2000	5000 10,000 16,000 24,000	2000 3000 Note 2 Note 2

NOTES:

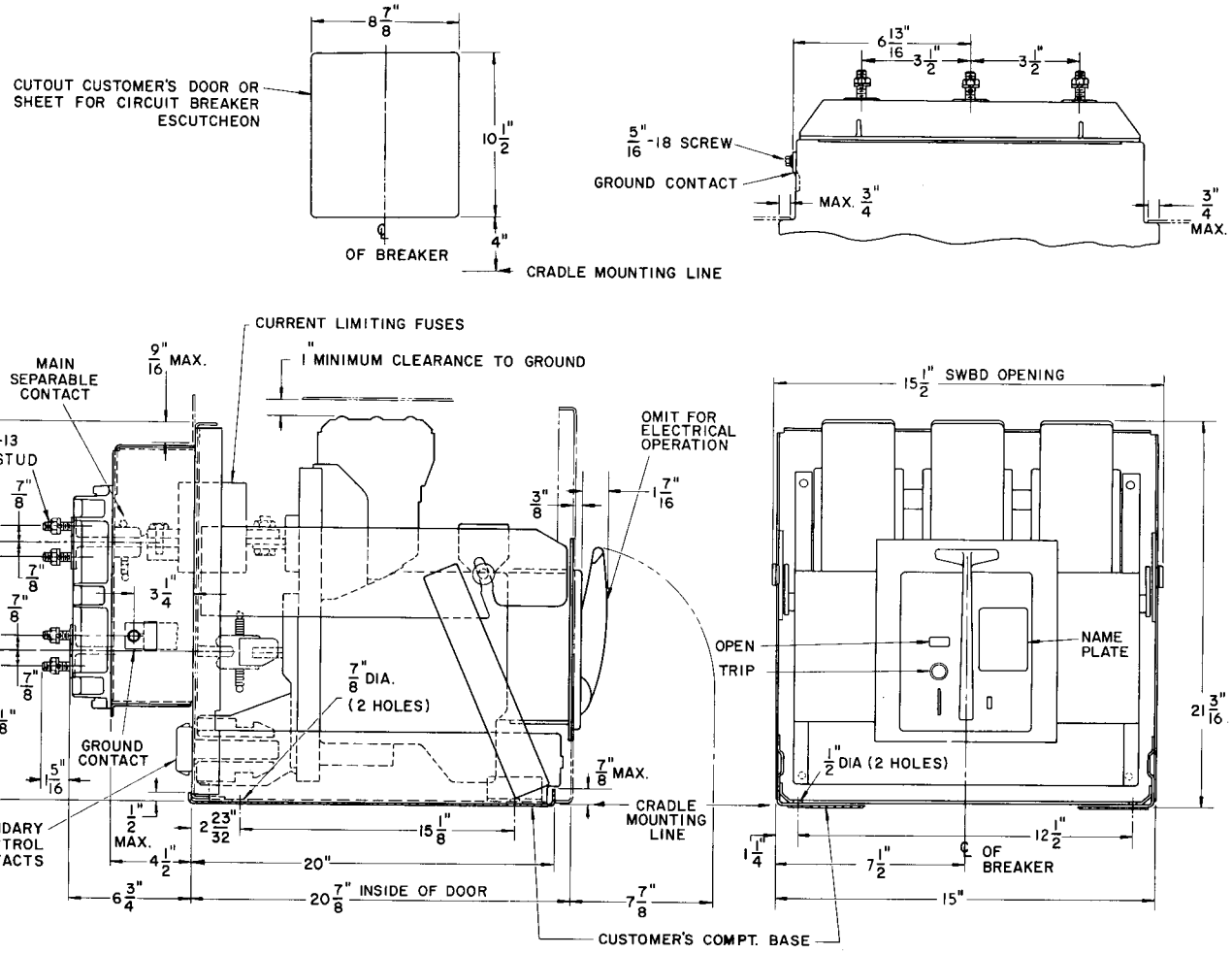
1. The lower fuse size listed is the minimum size which will coordinate with the instantaneous breaker setting directly alongside of it. The maximum fuse size listed may be used with any setting as necessary for coordination.
2. The maximum fuse for the frame size will not coordinate with the instantaneous setting noted. (See Note 4.)
3. The instantaneous setting selected should not be less than five nor more than 15 times the long-time pickup setting selected.
4. When the selected settings and indicated fuse size will not coordinate with other equipment, the following applies.
   (a) When the coil rating is less than the frame size of the breaker, the largest fuse listed for the particular coil rating can be selected from the coordination table.
   (b) If the coil rating is equal to the frame size of the breaker, the maximum fuse size is limited as shown. Therefore, decide if the degree of overlap is critical in terms of needless fuse blowing versus probability and expense. If not critical, accept the overlap.
   (c) If deemed critical, then utilize a short-time delay element in conjunction with the long-time and instantaneous elements to achieve coordination.

DIMENSIONS

Dwg. S-16734—Rev. 1

K-DON®-600

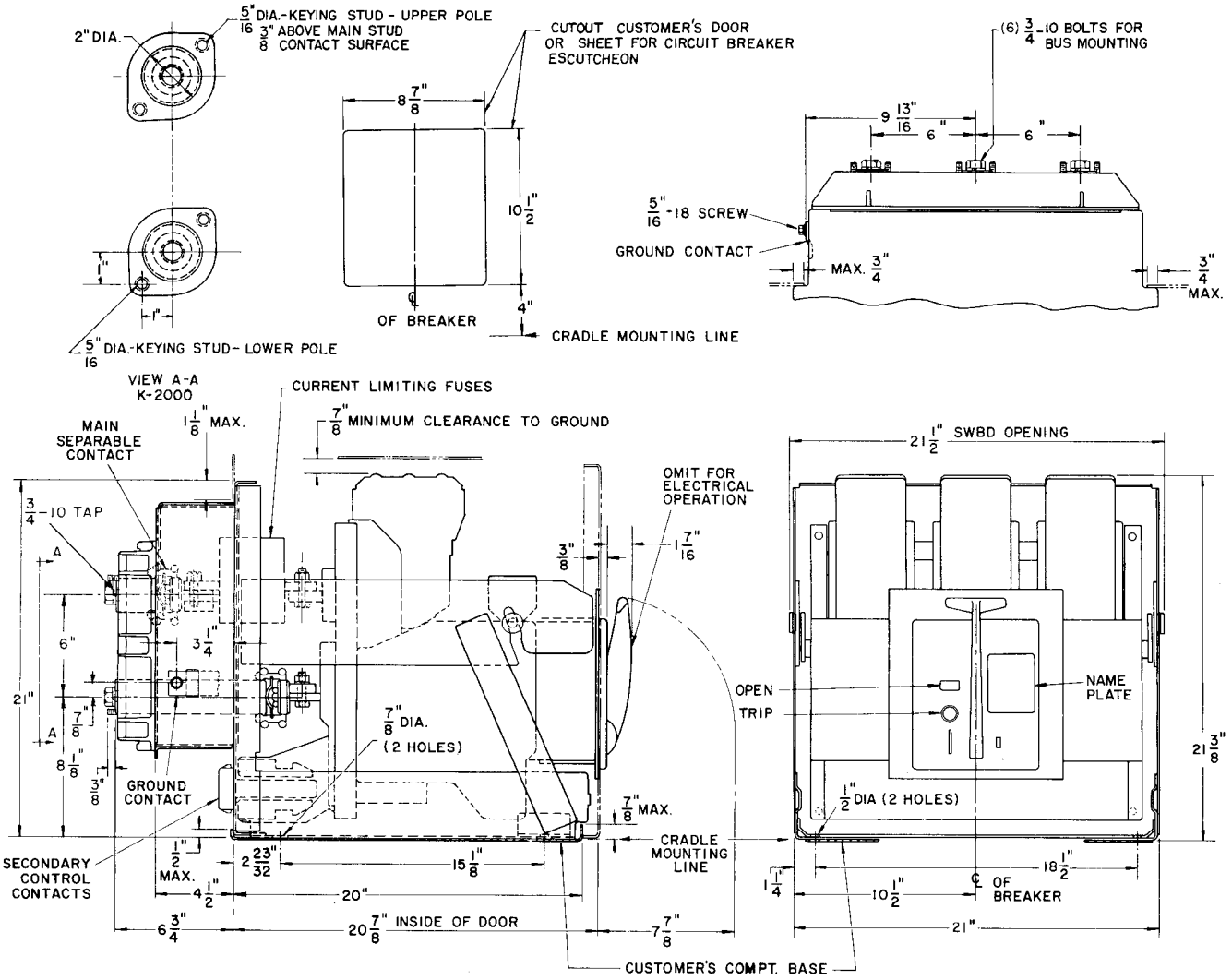
DRAWOUT CRADLE



Dwg. S-16735—Rev. 1

DIMENSIONS

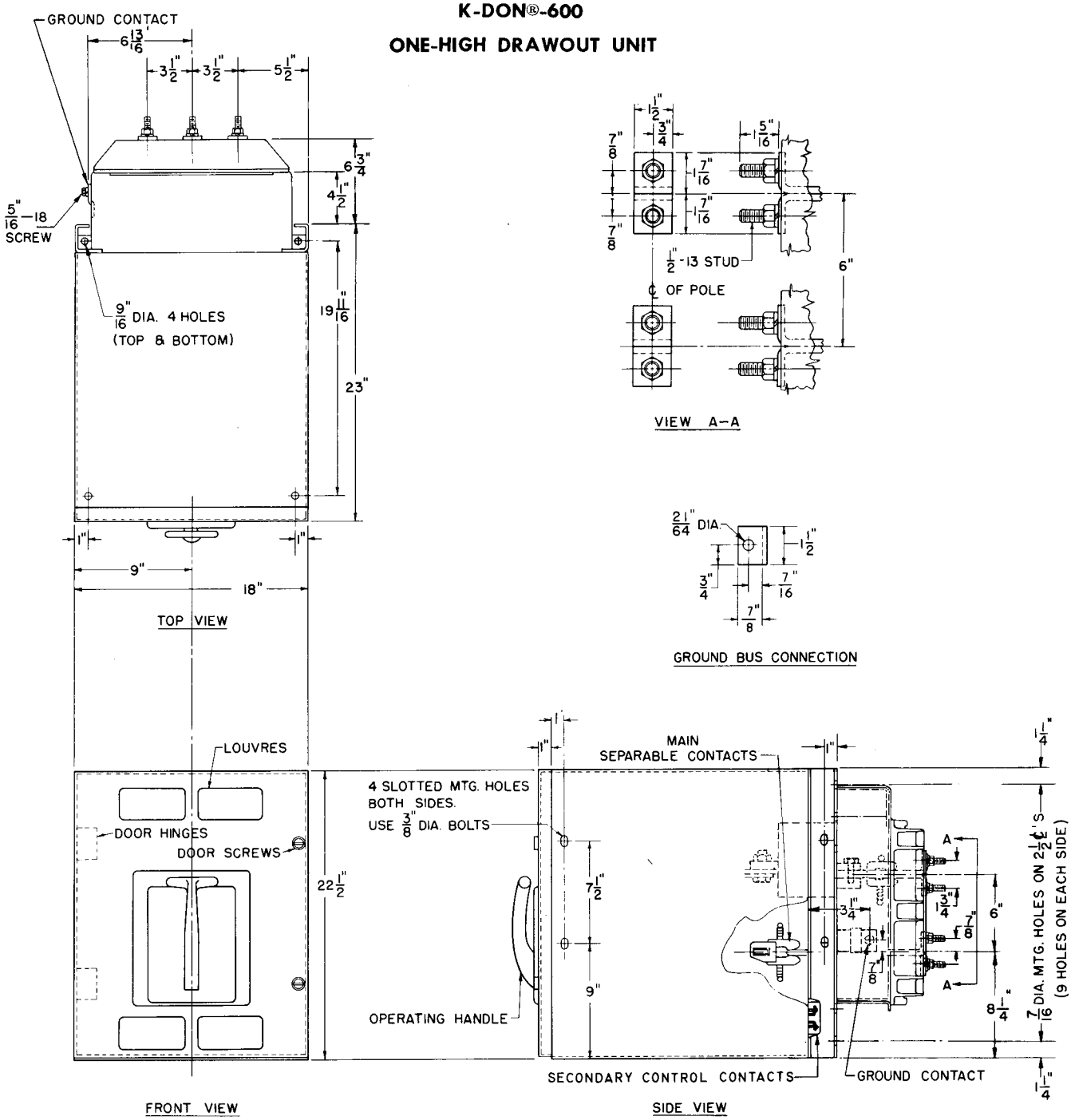
K-DON-1600
DRAWOUT CRADLE



DIMENSIONS

Dwg. S-16813 --Rev. 0

K-DON®-600
ONE-HIGH DRAWOUT UNIT



GENERAL INFORMATION

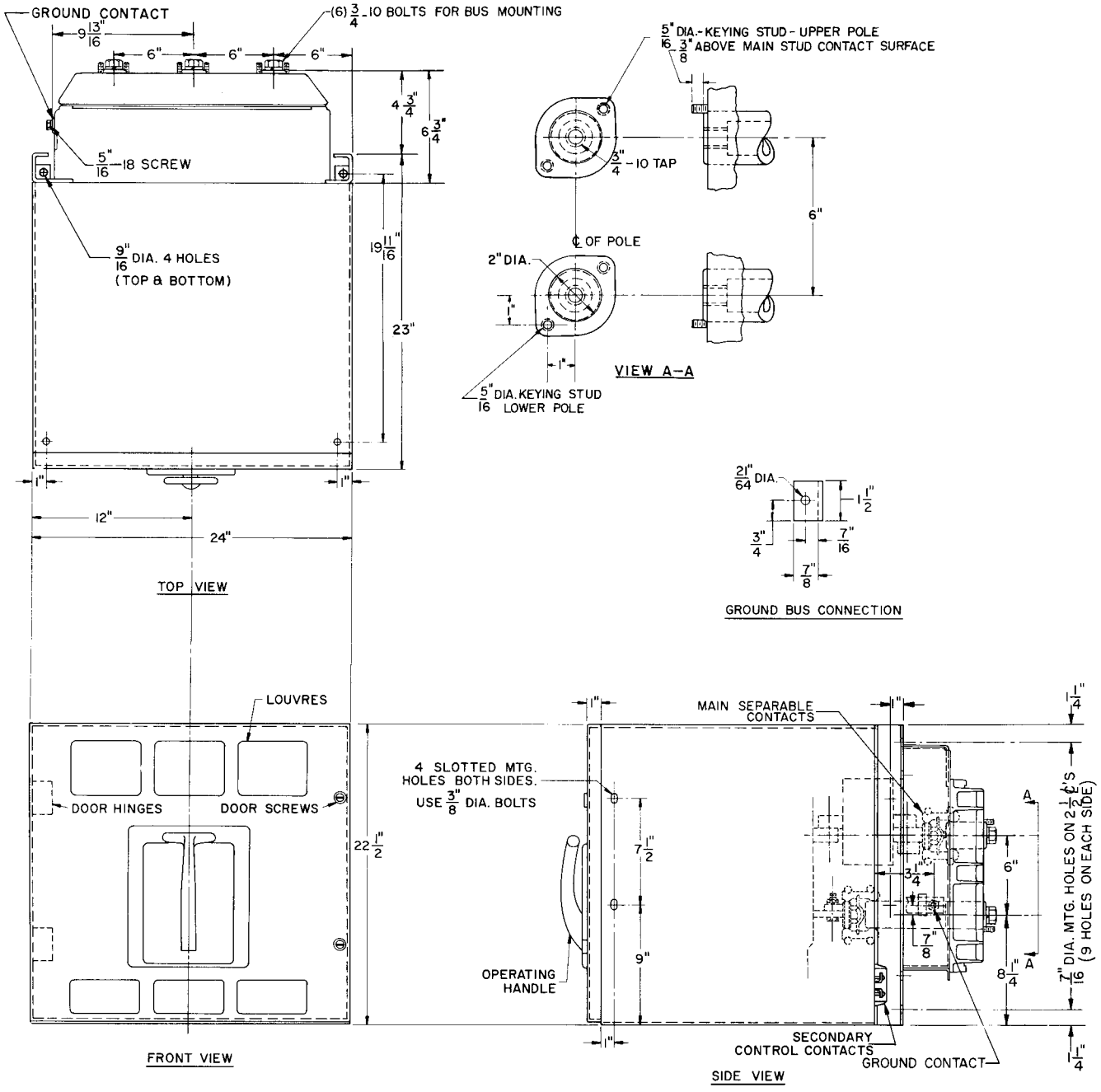
ARRANGEMENT OF CIRCUIT BREAKER POLES:
THREE POLE AS SHOWN, TWO POLE - CENTER POLE OMITTED.
FINISH: LIGHT GRAY.

Dwg. S-16814—Rev. 1

DIMENSIONS

K-DON-1600

ONE-HIGH DRAWOUT UNIT



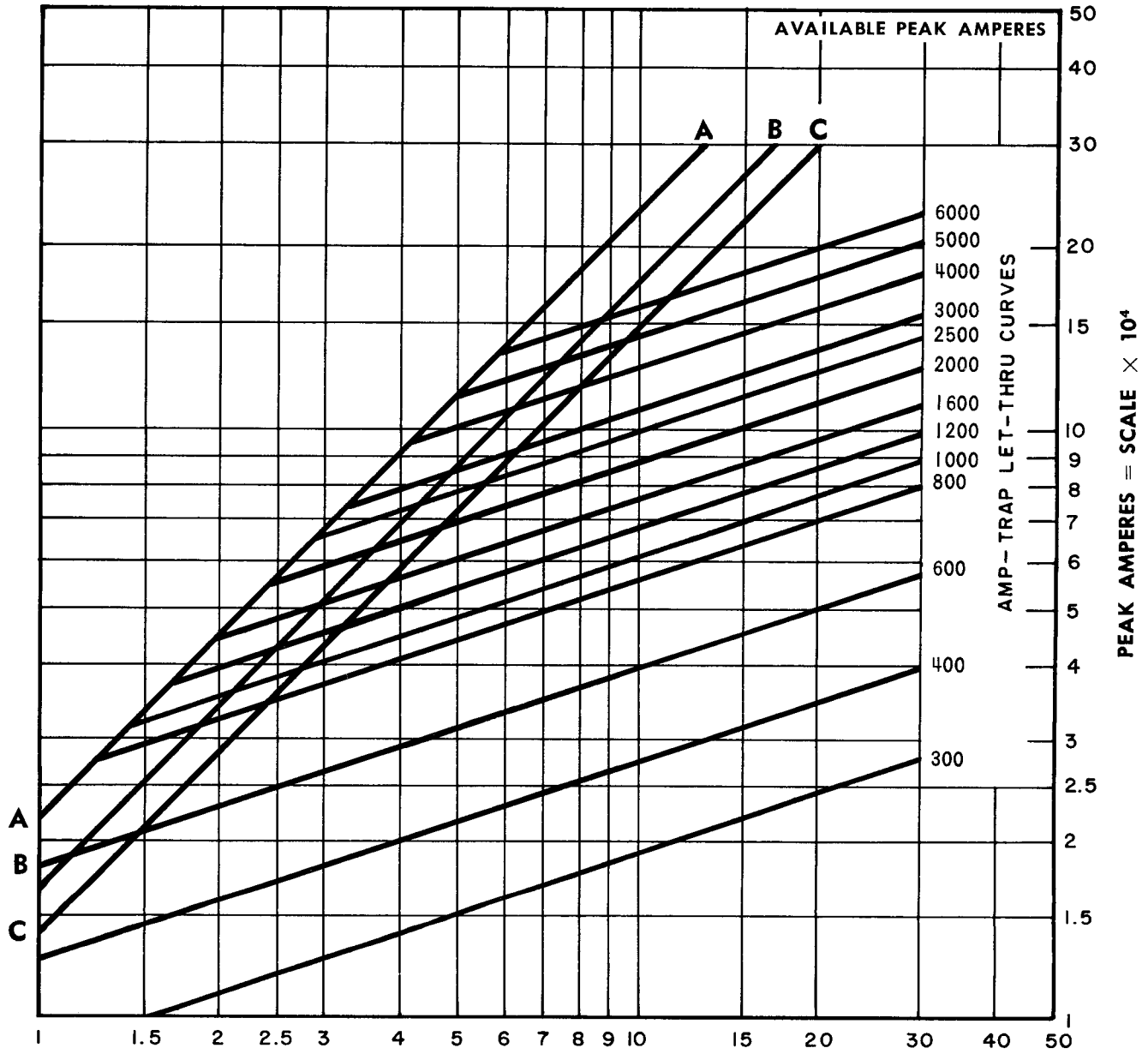
GENERAL INFORMATION

ARRANGEMENT OF CIRCUIT BREAKER POLES:
THREE POLE AS SHOWN, TWO POLE - CENTER POLE OMITTED.

FINISH:
LIGHT GRAY.

AMP-TRAP† LET-THRU CURVES

FIGURE 1



A. 2.3 Ratio at ½ Cycle with 15% Power Factor.
B. 1.72 Ratio at ½ Cycle with 45% Power Factor.
C. 1.4 Ratio at ½ Cycle with 100% Power Factor.

† Reg. TM—The Chase-Shawmut Co.

TABLE 6—PROTECTION OF MOLDED-CASE CIRCUIT BREAKERS IN SWITCHBOARDS, MOTOR CONTROL CENTERS AND PANELBOARDS
100,000 Amperes* @ 480V

Molded-Case Circuit Breaker		K-DON®-600		K-DON-1600	
Type	Rating	Coil Rating Max.	Amp-trap Rating Max.	Coil Rating Max.	Amp-trap Rating Max.
EF	15–100	125	300	—	—
FJ	70–150	400	600	—	—
FJ	175–225	600	1000	800	1000
JKL	70–125	600	1200	800	1200
JKL	150–225	600	1600	1600	1600
JKL	250–400	600	2000	1600	2000
KM	125–275	600	1000	800	1000
KM	300–800	—	1200	800	1200
HF	15–40	400	600	—	—
HF	50–100	600	800	800	800
HJKL	125	600	1200	800	1200
HJKL	150–175	600	1600	1600	1600
HJKL	200–400	600	2000	1600	2000
HLM	400–800	—	—	1600	3000

TABLE 7—PROTECTION OF BUS DUCT SYSTEMS
100,000 Amperes*

Bus Duct	K-DON-600		K-DON-1600	
Ampere Rating Plug-In Type	Coil Rating Max.	Amp-trap Rating Max.	Coil Rating Max.	Amp-trap Rating Max.
225	400	800	—	—
400	600	1200	—	—
600	600	1600	800	1600
800	—	—	1600	2000
1000	—	—	1600	3000
1250	—	—	1600	3000
1500	—	—	1600	3000
LO-X Type				
600	600	2000	800	2000
800	—	—	1600	2500
1000	—	—	1600	3000
1350	—	—	1600	3000
1600	—	—	1600	3000
2000	—	—	—	—
2500	—	—	—	—
3000	—	—	—	—
4000	—	—	—	—

* For available fault currents above 100,000 Amperes symmetrical, consult the factory.