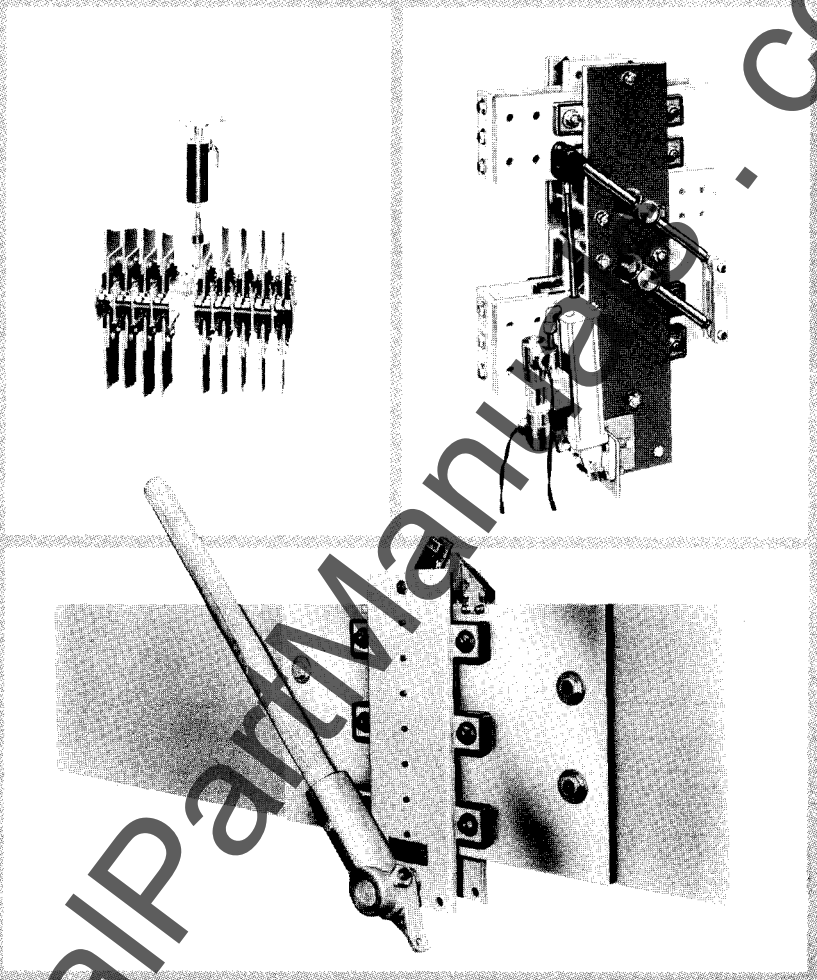
Class 9860
(Formerly Class 9840)
FEBRUARY, 1985



# DB Switches

## For High-Current Industrial Applications

CONTENTS



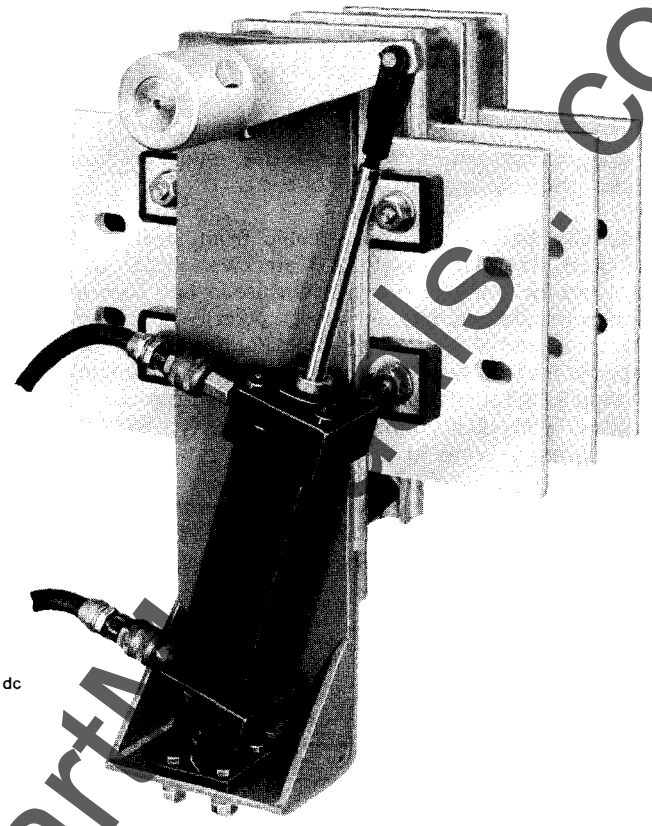
FILE: Distribution Products Catalog

SQUARE D COMPANY

# TYPE DB HIGH CURRENT SWITCHES



Combinations of the modular basic units, shown on page 3, are available in ampere ratings of 10,000 to 36,000 amperes and larger. The listings below are for the least number of units for the particular ampere rating. Other combinations are available to meet various bus arrangements, such as; two - 3000 ampere units for a 6000 ampere application, three - 4000 ampere units for 12,000 amperes, four - 4000 ampere units for 16,000 amperes, four - 5000 ampere units for 20,000 amperes, etc.



Bus Disconnect Switch
15,000 Amperes 250 Volts dc
Pneumatically Operated

**SINGLE-POLE, SINGLE-THROW, PNEUMATICALLY OPERATED SWITCHES**

| *Nominal Ampere Rating | No. of Units | ◆Load Switching 6 Volts dc Maximum ● Type | Non-Load Switching 250 Volts dc Maximum Type | Non-Load Switching 1000 Volts dc Maximum Type |
|---|---|---|---|---|
| 10,000 | 2 | DB11102P★ | DB12102P★ | DB13102P★ |
| 12,000 | | DB11122P★ | DB12122P★ | DB13122P★ |
| 14,000 | | DB11142P★ | DB12142P★ | DB13142P★ |
| 16,000 | | DB11162P★ | DB12162P★ | DB13162P★ |
| 18,000 | | DB11182P★ | DB12182P★ | DB13182P★ |
| 20,000 | 3 | DB11203P★ | DB12203P★ | DB13203P★ |
| 24,000 | | DB11243P★ | DB12243P★ | DB13243P★ |
| 28,000 | 4 | DB11284P★ | DB12284P★ | DB13284P★ |
| 30,000 | | DB11304P★ | DB12304P★ | DB13304P★ |
| 36,000 | | DB11364P★ | DB12364P★ | DB13364P★ |

* Ratings are conservative values for continuous duty service. If switch is to be subjected to intermittent service or unusual ambient conditions, it is recommended that full details be forwarded to the factory for analysis.

★Complete the type number by adding appropriate air cylinder mounting method letter E or F, as described on page 5.

◆ Can be used for load switching when in parallel with an electrolytic cell (cell shorting), where the voltage drop across the cell is not more than 6 volts dc

● Consult the factory for load break ratings up to 50 V. dc

Refer to page 3 for modifications and special features.

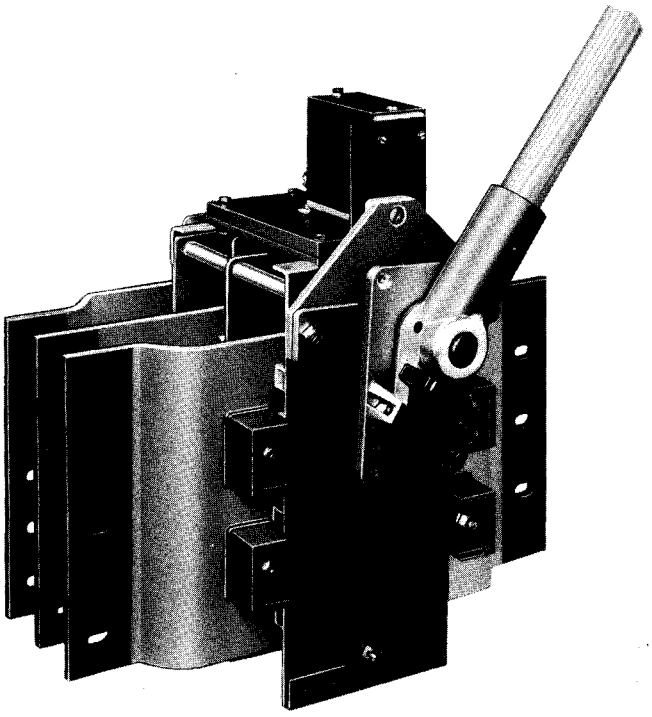
## REFER ALL PRICE INQUIRIES TO FACTORY

### ORDERING INFORMATION REQUIRED

1. Class, Type number and Form letters (if any) of switch.
2. For manually operated switches, listed on page 3, complete the Type number by replacing symbol (▲) with appropriate handle operation method letter A, B, C or D, as described on page 5.
3. For pneumatically operated switches listed on this page, complete the Type number by replacing symbol (★) with appropriate air cylinder mounting method letter E or F, as described on page 5, and advise available air pressure for the air cylinder.
4. Voltage, ampere rating and duty cycle of switch application.
5. Cross-sectional dimensions of terminating bus, material of which it is made, whether installed edgewise or flatwise, space between bars of multi-bus system and allowable temperature rise of bus.
6. Ambient conditions of the application, such as ventilated or non-ventilated area, high humidity, ambient temperature at switch location, corrosive atmosphere, etc.

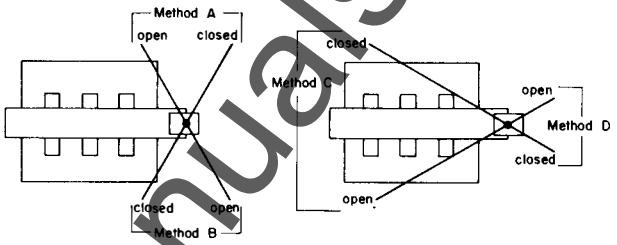
# TYPE DB HIGH CURRENT SWITCHES



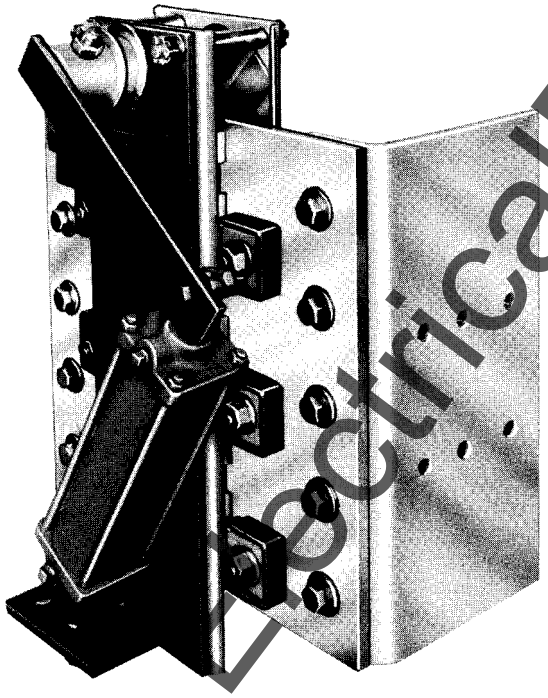


Manual Operator

**Manual Operator:** The manual operator consists of a cast indicating plate with stops, indicating OPEN and CLOSED, and a cast hub that has a socket for the wood handle. The hub has a pull-to-turn latch at both positions. The four methods of furnishing the manual operator are shown below:

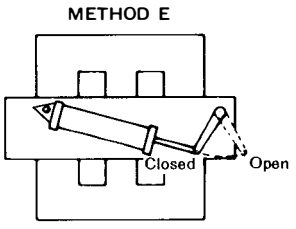



NOTE: The cover, indicating plate and handle hub are at bus potential when switch is closed. The handle length varies to provide approximately 40 pounds operating effort.

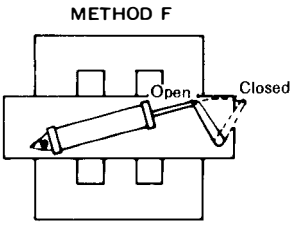


Pneumatic Operator

**Pneumatic Operators:** Some applications of DB switches require their use in the normally open position, others in the normally closed position. When pneumatically operated, the air cylinders are continually subjected to air pressure to avoid drifting of the switch. Air cylinders are mounted as shown in the two configurations below; i.e., with the piston rods retracted into the cylinders for the position, open or closed, that is normal for the switch. This is done to minimize dirt collection and corrosion of the piston rod.




SWITCH USED IN NORMALLY CLOSED POSITION




SWITCH USED IN NORMALLY OPEN POSITION

**Ampere ratings** of the switches listed on pages 3 and 4 are based on one pair of moving contacts per 1000 amperes. The temperature rise of the switch depends on the bus temperature since they will equalize and the switch cannot run cooler than the bus. On intermittent duty it may be possible to use a smaller rated switch depending on the open and close intervals, bus temperature and ambient conditions.

Air cylinders are sized to provide a safety factor with the recommended or specified pressure rating. Dry lubricated instrument air is recommended.

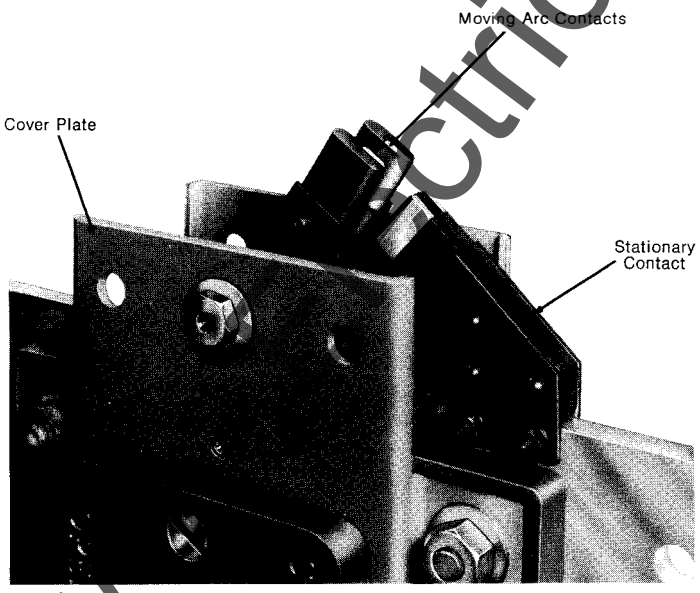
For typical dc applications the switch cover-plate, air cylinder mounting, air cylinder and linkage are at bus potential when the switch is closed. Flexible insulated air lines are required. If solenoid operated valves are used, the conduit must be insulated and flexible.

**Auxiliary Switches:** There are two basic uses for auxiliary switches depending upon the application. They are as follows:

General indication—Indicates **approximate** position of main switch contacts, within 30° of travel: e.g., when the auxiliary contacts are closed with the main contacts closed, the auxiliary contacts will open within 30° of the opening stroke of the main switch. When the auxiliary contacts are closed with the main contacts open, the auxiliary contacts will open within 30° of the closing stroke. Typical use is pilot light indication.

Specific indication—Indicates **exact** position of main switch contacts, open or closed, within 10° of travel: e.g., when the auxiliary contacts are closed with the main contacts closed, the auxiliary contacts will open before the main switch contacts separate on the opening stroke. When the auxiliary contacts are closed with the main contacts open, the auxiliary contacts will open as the main switch contacts just start to move toward the closed position. Besides the fully opened and closed positions, auxiliary switches can be located at various points along the arc of travel of the main movable contacts. Typical uses are interlocking or sequencing of auxiliary equipment such as pumps or fans; **Not** to be used to initiate the electrical control circuit of the load switching device; e.g., electrically operated circuit breaker or circuit interrupter.


Auxiliary Switch




Arcing Contacts

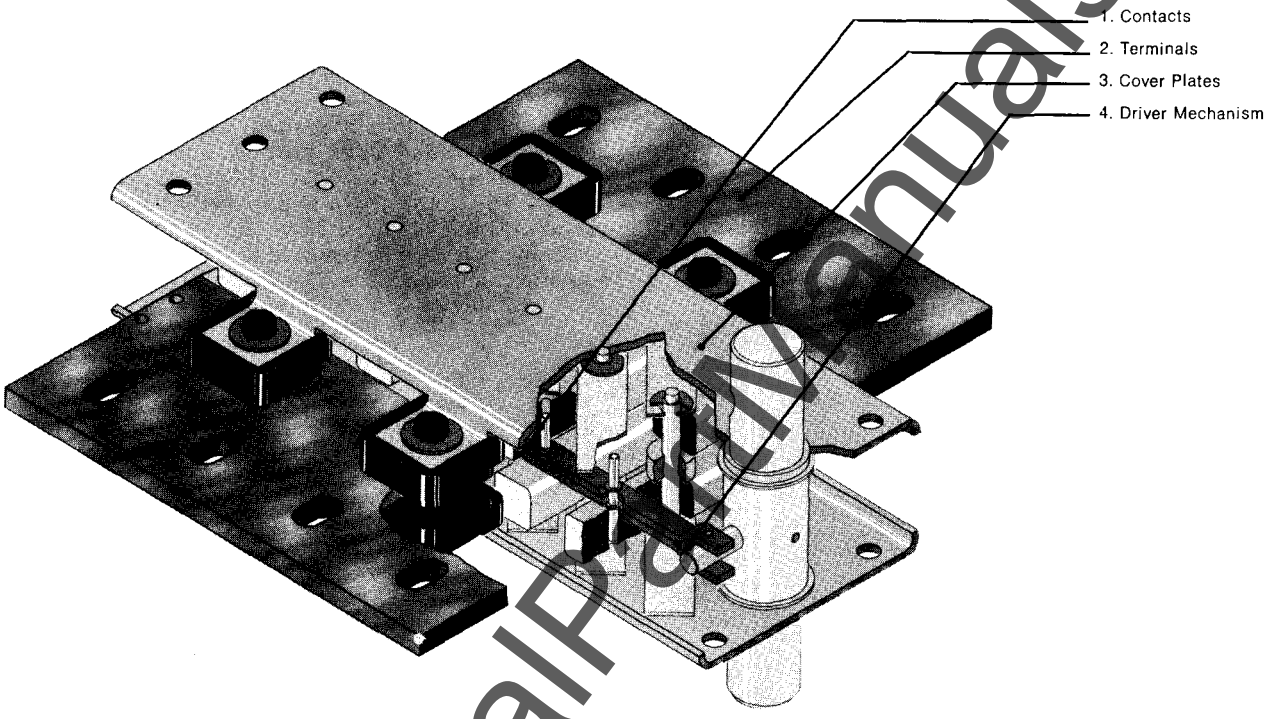
**Load Switching Arc Contacts** as supplied on the 6 volt dc switches consist of one stationary and two moving arc contacts all having tungsten alloy arc tips. They provide initial contact before the main contacts on closing and break contact after the main contacts on opening. They are of rugged construction, factory adjusted and easily replaced.

# TYPE DB HIGH CURRENT SWITCHES



**Modular Construction.** Basic switch modules are available in nominal ratings of 3000 to 9000 amperes, in 1000 ampere increments. Higher ampere ratings are obtained by combining two or more modules into one assembly. Modules can be factory assembled to provide single-pole, double-throw as well as multiple-pole devices. Configurations can be developed to match special bus structures.

**Type DB** high-current switches were developed to provide a reliable, uncomplicated and economical means of switching circuits which carry large ac or dc currents. Typical applications are as non load-break disconnects for electric furnaces, rectifiers, metal plating apparatus, and large dc motors; also as load-break shorting switches for electro-chemical industry cells and similar installations which demand high-current capacity and dependable performance under adverse conditions.




**Contacts** of Square D Type DB switches are double-break with a wiping action that is self-cleaning. The double rows of contact bars, one above and one below the terminals, are self-aligning. Each contact bar has its own stainless steel pressure spring which assures proper contact pressure under the most adverse operating conditions. Parallel construction of the movable contacts provides magnetic forces which supplement the contact pressure of the stainless steel springs.

**Terminals** are silver plated copper bars with slotted holes to make field alignment of multiple switches a simple matter. The end of each terminal which connects with the main moving contacts is beveled to make the switch close easily. They are silver plated for greater contact efficiency and protection against corrosion.

**Cover Plates** for dc switches are constructed of sturdy steel with protective coatings to withstand the corrosive environments frequently encountered in this type of switch application.

Cover plates for ac switches are made of glass polyester to avoid eddy-current losses and to provide additional insulation for the higher voltages which are common to ac installations.

**Driver Mechanism** is arranged so that the switch cannot be damaged due to overtravel. In the closed position there is no tendency of the contact springs to bias the contacts toward the open position because spring action of the contacts is not in the same plane as the motion of the driving mechanism.

Adjustment of the mechanism is not critical. Installation with as much as plus or minus ten degrees from 'dead center' closed position can be tolerated without reducing contact area or contact pressure.

**Easy Maintenance.** Husky bolts clamp the terminals between the cover plates and insulators. All other principal parts are positioned and held in place by this unique construction of the switch.

If maintenance is required, Type DB switches can be easily reassembled without special jigs or tools. The telescoping insulators, together with the cover plates, automatically align the terminals without the gauging or adjustment of parts.





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# TYPE DB HIGH CURRENT SWITCHES



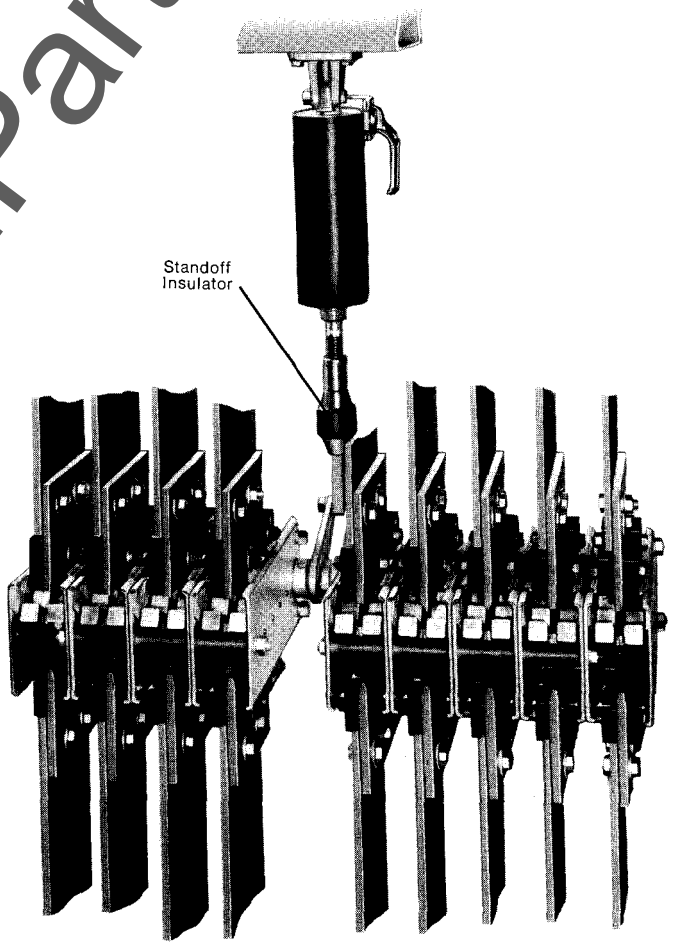
**Specific applications:** The Type DB (double-break) switches were originally designed for cell shorting switches in the chlor-alkali industry, where any number of units could be gang operated with an air cylinder. (For any cell shorting switch applications, furnish complete specifications and bus arrangements to the factory, through the local Square D field office, for quotation.)

140,000 Ampere 4.5 Volts dc Cell Shorting Switch Designed for the Chlor-alkali Industry.

Some of the earliest as well as the most extensive applications of Square D Type DB switches are as cell shorting switches for the chemical industry. An example is in chlorine manufacture, where dependable operation is a necessity and where highly corrosive atmospheres exist.

The reciprocating tubular pushrod operator used to actuate multiple module units, provides simultaneous action of all units since there is no deflection in this type of linkage. This construction also makes installation or removal of a module quite easy. Only terminal bolts and one crank bolt need be removed to free the module from a multiple unit switch.

Another application of the Type DB switch is its use as a rectifier disconnect switch. The switch, in the illustration to the right, is pneumatically operated. Note the standoff insulator which is used to isolate the air cylinder from switch potential.

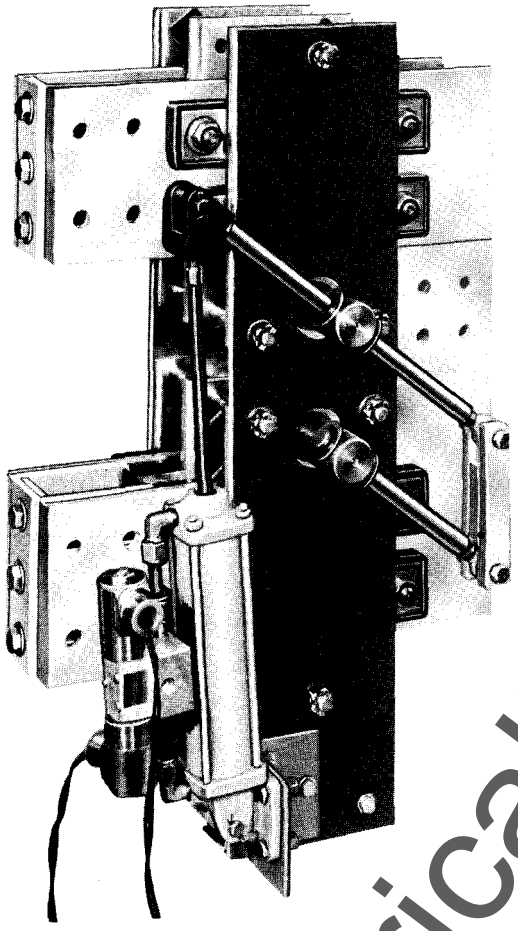



Rectifier Disconnect Switch
36,000 Amperes, 250 Volts dc
with Pneumatic Operator

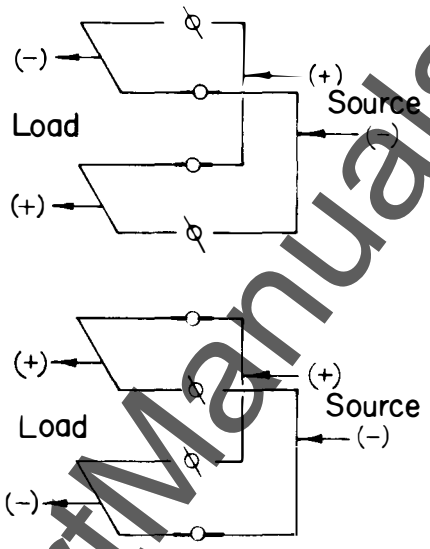
# TYPE DB HIGH CURRENT SWITCHES



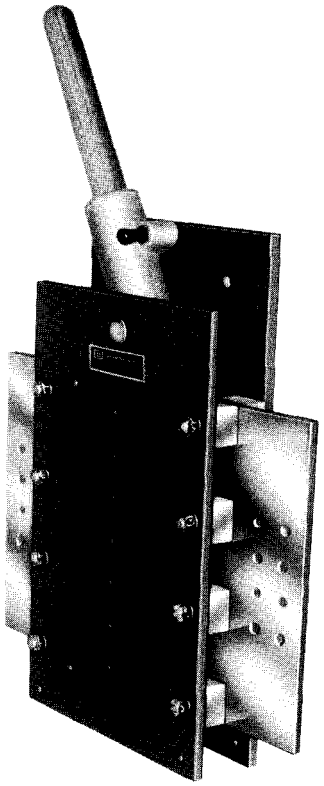
Type DB switches are also used for polarity reversing applications. Four Type DB switch units, factory assembled and bussed together, as shown below, make up a polarity reversing switch. The sketch below, right, shows the paths of current travel with the switch in its two positions.



Polarity Reversing Switch
3000 Amperes, 5 Volts dc
with Pneumatic Operator




**High-Current Disconnect Applications.** Steel mills, foundries and other similar industries find high voltage ac versions of the Type DB switch well suited to electric furnace applications. When power supplies to a furnace must be transferred from one source to another, or for isolation of an electric furnace for maintenance, the Square D Type DB switch answers the need perfectly.



600 Amp 2800 Volts ac
with Manual Operator





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# TYPE DB HIGH CURRENT SWITCHES

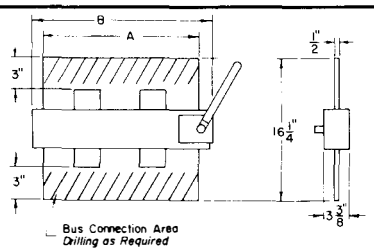


**APPROXIMATE DIMENSIONS**

**NOT FOR CONSTRUCTION UNLESS ENDORSED**

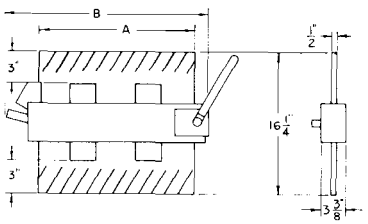
## TYPE DB MANUALLY OPERATED, SINGLE-POLE, SINGLE-THROW SWITCHES

### 250 VOLTS DC & UNDER, NON-LOAD SWITCHING



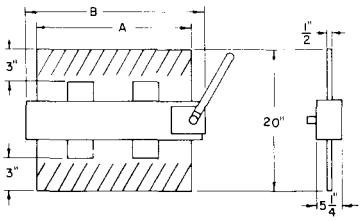

| Ampere Rating | A | B | Weight (Lbs) |
|---|---|---|---|
| 3,000 | 6 | 11 | 70 |
| 4,000 | 8 | 13 | 85 |
| 5,000 | 10 | 15 | 105 |
| 6,000 | 12 | 17 | 120 |
| 7,000 | 14 | 19 | 140 |
| 8,000 | 16 | 21 | 155 |
| 9,000 | 18 | 23 | 175 |

### 6 VOLTS DC & UNDER, LOAD SWITCHING*




| Ampere Rating | A | B | Weight (Lbs) |
|---|---|---|---|
| 3,000 | 6 | 13 | 80 |
| 4,000 | 8 | 15 | 95 |
| 5,000 | 10 | 17 | 115 |
| 6,000 | 12 | 19 | 130 |
| 7,000 | 14 | 21 | 150 |
| 8,000 | 16 | 23 | 165 |
| 9,000 | 18 | 25 | 185 |

### 1000 VOLTS DC, NON-LOAD SWITCHING

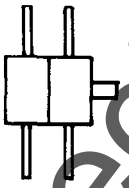



| Ampere Rating | A | B | Weight (Lbs) |
|---|---|---|---|
| 3,000 | 8 | 13 | 90 |
| 4,000 | 10 | 15 | 105 |
| 5,000 | 12 | 17 | 125 |
| 6,000 | 14 | 19 | 145 |
| 7,000 | 16 | 21 | 165 |
| 8,000 | 19 | 24 | 185 |
| 9,000 | 21 | 26 | 210 |

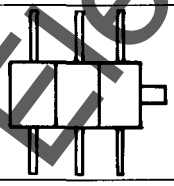
***NOTE:** Switches furnished with arcing contacts can be mounted in any plane except with arcing contacts at bottom.

## TYPE DB PNEUMATICALLY OPERATED, SINGLE-POLE, SINGLE-THROW SWITCHES

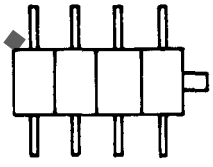
### MULTIPLE UNITS FOR 10,000 AMPERES AND OVER, 250 VOLTS DC, NON-LOAD SWITCHING



| Ampere Rating | No. of Units | Weight (Lbs) |
|---|---|---|
| 10,000 | 2—5000A | 225 |
| 12,000 | 2—6000A | 255 |
| 14,000 | 2—7000A | 295 |
| 16,000 | 2—8000A | 325 |
| 18,000 | 2—9000A | 365 |



| | | |
|---|---|---|
| 20,000 | 3—7000A | 440 |
| 24,000 | 3—8000A | 485 |



| | | |
|---|---|---|
| 28,000 | 4—7000A | 580 |
| 30,000 | 4—8000A | 640 |
| 36,000 | 4—9000A | 720 |

**NOTE:** Contact the factory, through the local Square D Field Office, for dimensions of 250 volts dc, 6 volts dc and 1,000 volts dc pneumatically operated switches.

# TYPE DB HIGH CURRENT SWITCHES

CLASS 9840

## Ordering Information Required On All Class 9840 Type DB Switches

1. APPLICATION—

2. AMPERES_____

3. VOLTAGE_____AC._____DC.

4. TEMPERATURE RISE_____

5. BUS SIZE_____

6. LOAD BREAK OR NON-LOAD BREAK (CIRCLE ONE)
   NOTE: Must be Non-Load Break Over 10 Volts dc and All ac Must Be Non-Load Break.
   (For Load Break voltage ratings up to 50 V. dc consult factory)

7. OPERATOR:
   (A) Manual
   Handle Postion . . . . . Method: A_____
   B_____
   C_____
   D_____

   (B) Pneumatic . . . . . Method E or F (Circle One)
   Air Pressure: _____Max. P.S.I.
   _____Min. P.S.I.
   Control Required: Yes_____Check One
   No_____

   (If Yes, Specify)

8. INSTALLATION:
   Must Be Indoors

9. AUXILIARY SWITCHES:
   General Indication (Form X1)
   Specific Indication (Form X2) Check One

10. KEY INTERLOCK:
    Provision For_____
    Mounted_____
    (If Mounted, Specify Locking Sequence, End User, Coordinating Lock—P.O. Number Etc.)

11. SPECIAL HANDLE EXTENSION_____

12. SPECIAL MOUNTING INFORMATION_____

13. SPECIAL APPLICATION INFORMATION
    (Atmosphere, Ambient Conditions, Duty Cycle, Etc.)

SQUARE D COMPANY

4/85 PS 22M

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