



## Product Data

Bulletin MN-2A

Page 1 of 24

Date 7/1/78

File 6150

Subject: **FLIP CHART — METAL-CLAD 5-15KV SWITCHGEAR  
WITH SOLENARC® CIRCUIT BREAKERS**

Square D 5-15KV metal-clad switchgear using the unique SOLENARC DSE power circuit breaker offers the ultimate in system and circuit protection. Ideal for distribution or service entrance applications, this metal-clad switchgear with SOLENARC DSE circuit breaker is available with nominal ratings of 4.16KV, 7.2KV and 13.8KV. **Designated for flip chart presentation, this bulletin points out some of the many advantages of the Square D line as compared with our competitors.**

In early 1974, Square D introduced the newest member of its metal-clad switchgear line to the industry - featuring the SOLENARC circuit breaker. Combining the best designs of the past with the continuing advance of modern technology, the DSE SOLENARC breaker offers the best of both worlds by utilizing the most efficient operating system now available with a tried and true arc interruption principle. By using this principle, the SOLENARC breaker requires 91% less operating power than its closest competitor, thus earning itself the nickname **'The energy conserving breaker'**. Here's how it works.

The DSE breaker has eliminated the heavy magnetic blowout coils and uses ambient air for current interruption. The lightweight scientifically designed arc chutes consist of an assembly of unusual ceramic splitter plates arranged to allow the arc to twist into a helical form and provide its own magnetic blowout circuit.

Although the breaker is relatively new, the SOLENARC principal of arc interruption is not. Developed for metal-clad switchgear use about 1950, this method of arc interruption has been in wide spread use for over a quarter of a century throughout much of Europe and Canada. It has also gained immediate and widespread acceptance in the United States.

SOLENARC'S DSE metal-clad switchgear is engineered for the user's individual needs of today. We offer a greater variety of breakers than any other manufacturer while maintaining the high standards that have come to be expected by our customers. It's the finest switchgear line on the market today. After reviewing some of the highlights covered in this bulletin, we believe that you will agree.

JH/

Middletown Headquarters Sales Dept.

**SQUARE D COMPANY**

Supersedes Product Data Bulletin MN-2  
Dated 2-1-77

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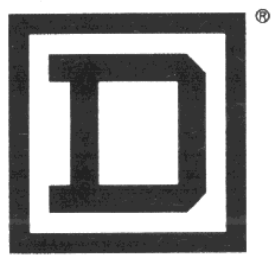
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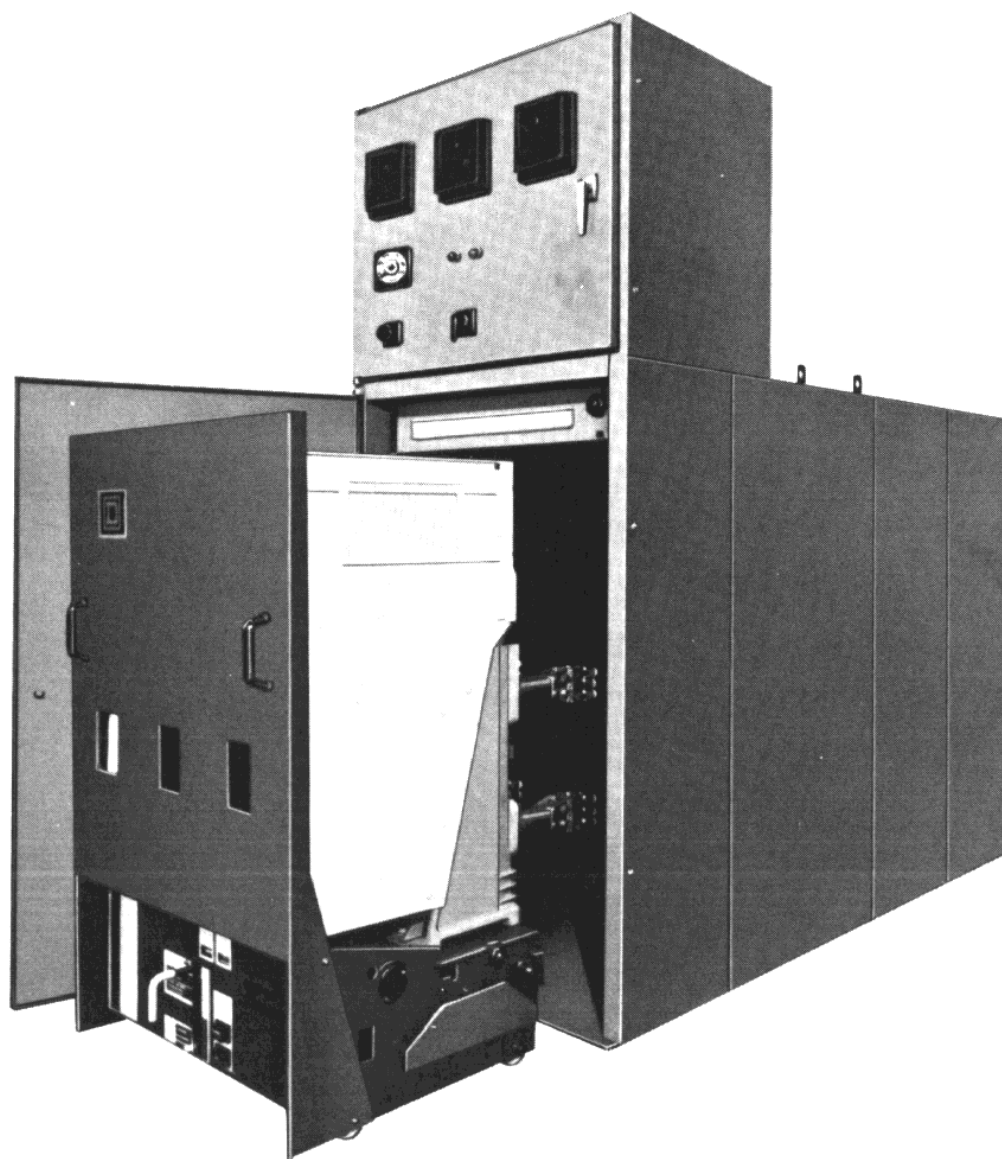
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# **SOLENARC<sup>®</sup> DSE CIRCUIT BREAKER SWITCHGEAR**



SOLENARC is a registered Trademark in the U.S.A.

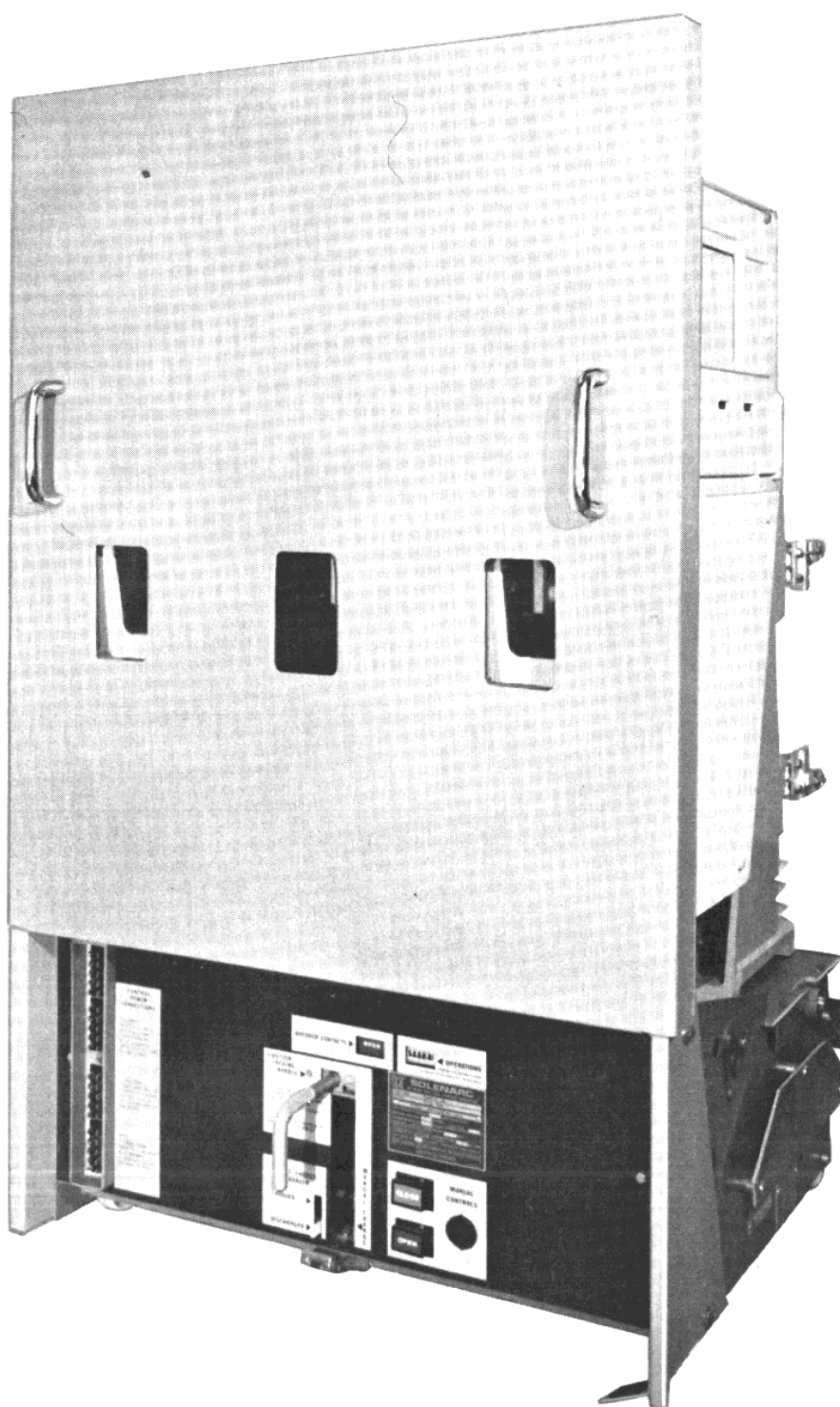
© Square D Co., 1977

**SQUARE D COMPANY**

# SOLENARC DSE CIRCUIT BREAKERS

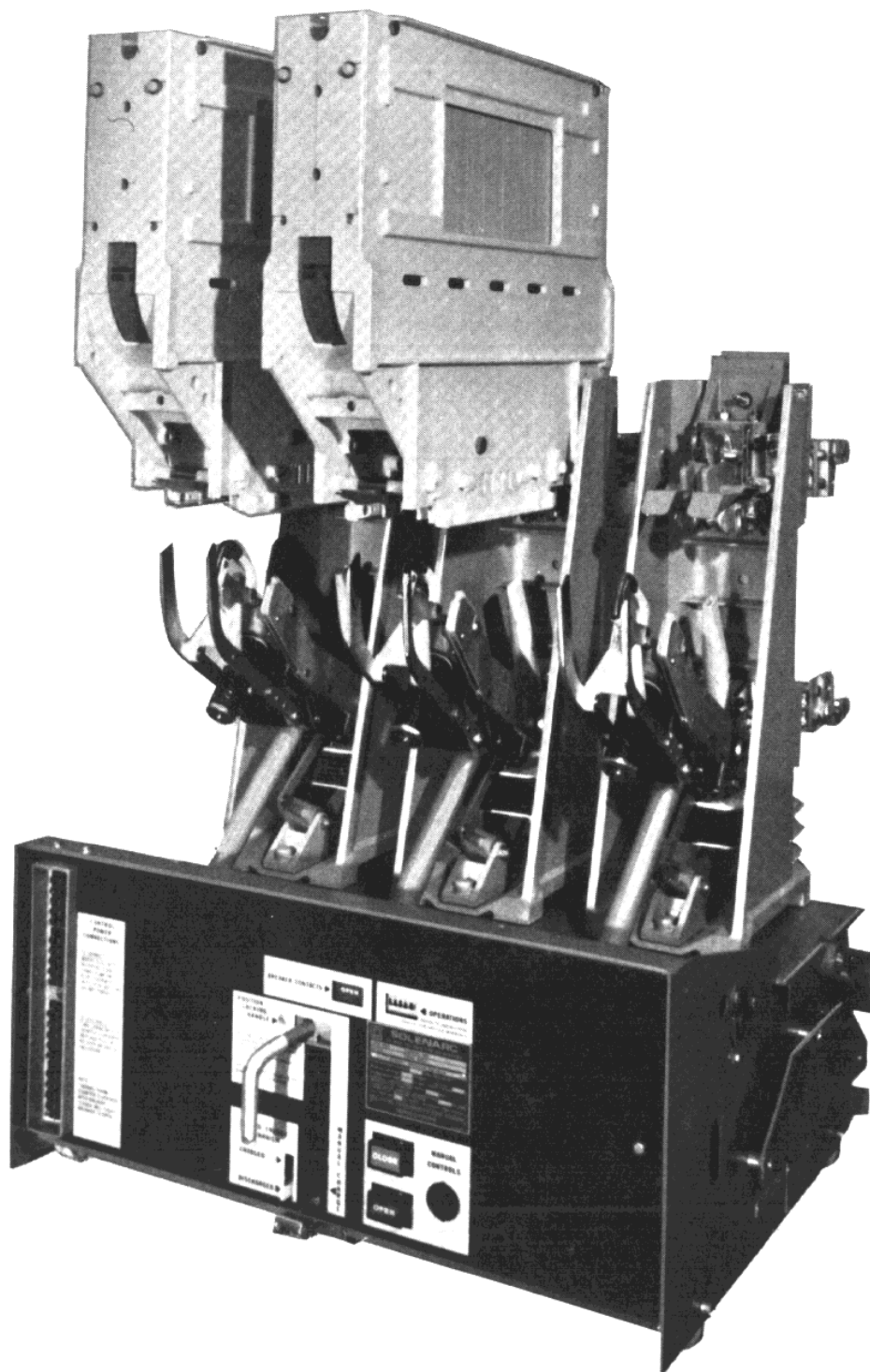
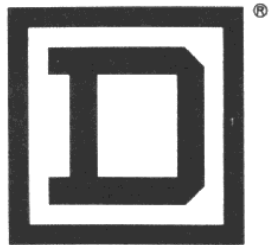


With the  
**SOLENARC**  
Interrupting  
Principle



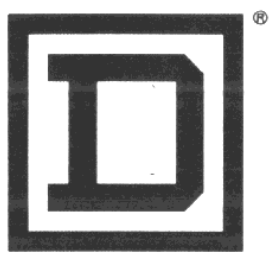
**SQUARE  COMPANY**

# DSE DRAWOUT CIRCUIT BREAKER FEATURES

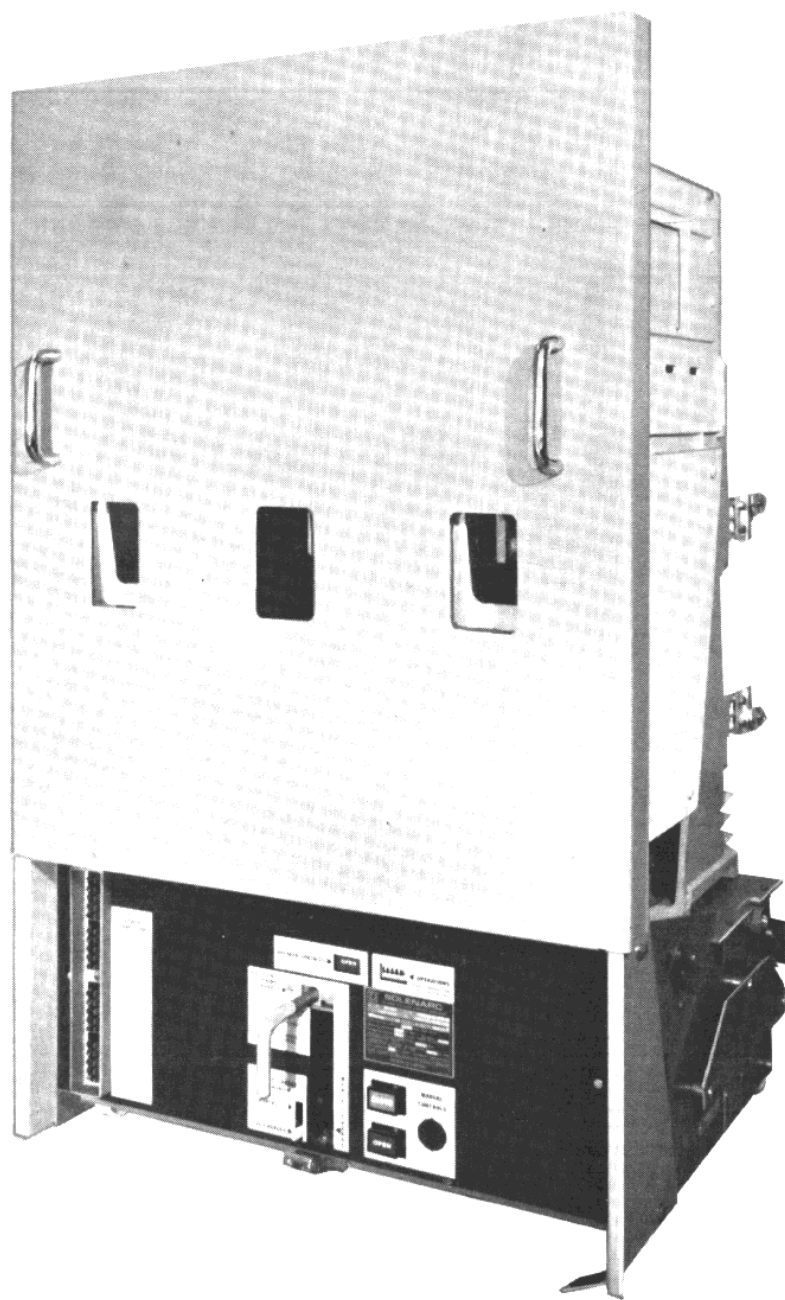


**SQUARE D COMPANY**

# VISIBLE BLADES



**SOLENARC DSE  
FROM SQUARE D**



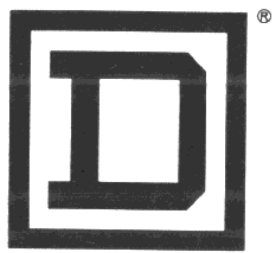
**Lexan viewing windows  
allow mode and condition  
inspection.**

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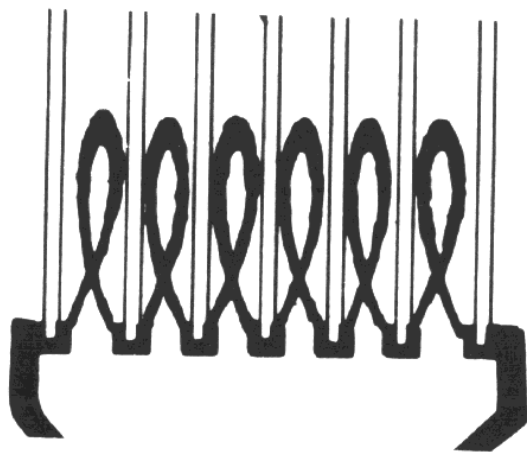
**INDUSTRY**

# NO!

# ARC CHUTE



**SOLENARC DSE  
FROM SQUARE D**



SOLENARC circuit breaker arc chutes are designed so the arc provides its own electromagnetic blow-out by making many helical arcs, each forming its own individual magnetic field. This unique electrodynamic design in arc interruption technique allows the arc chute to be lighter and simpler in construction.

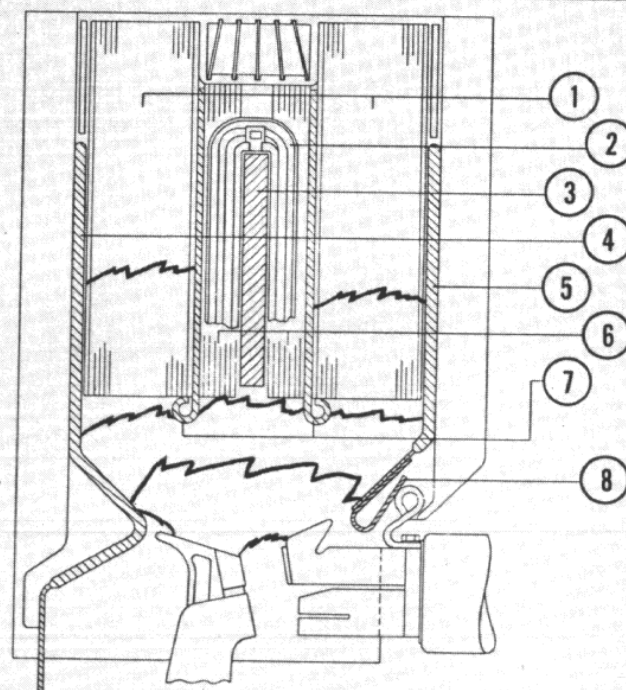
**WEIGHT 57-84 lbs. each**

## SAME ANSI RATINGS

### INDUSTRY

- |                            |                       |
|----------------------------|-----------------------|
| 1. Main Interrupter Stacks | 6. Transfer Stacks    |
| 2. Blow-out Coils          | 7. Center Arc Horns   |
| 3. Blow-out Magnet Core    | 8. Rear Arc Horn      |
| 4. Front Arc Horn          | Disconnecting Contact |
| 5. Rear Arc Horn           |                       |

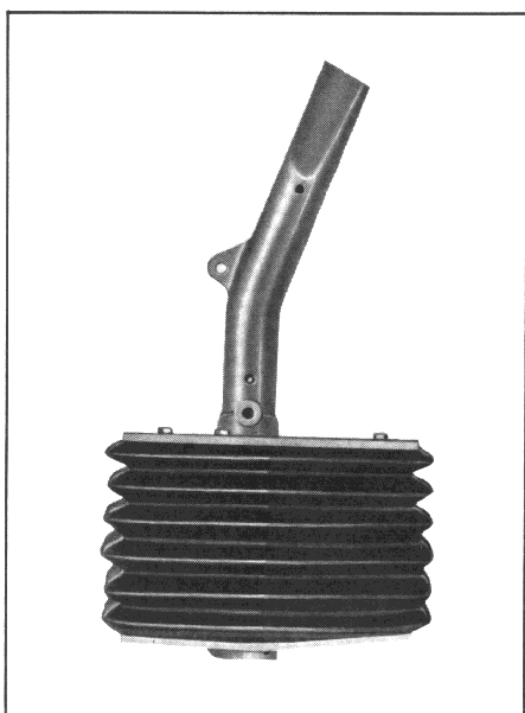
**WEIGHT 95-360 lbs. each**



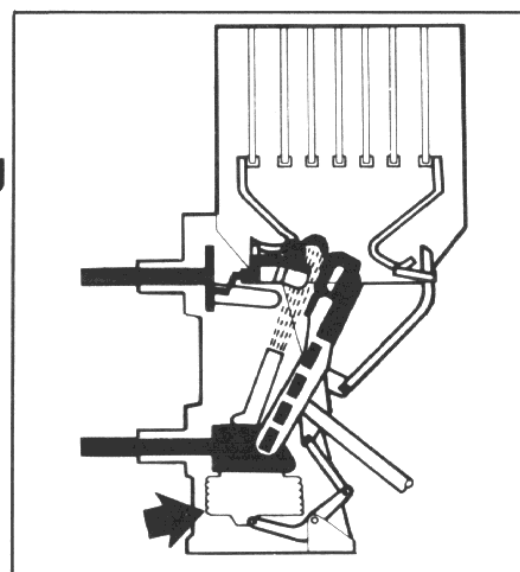
# PUFFERS



## SOLENARC DSE FROM SQUARE D

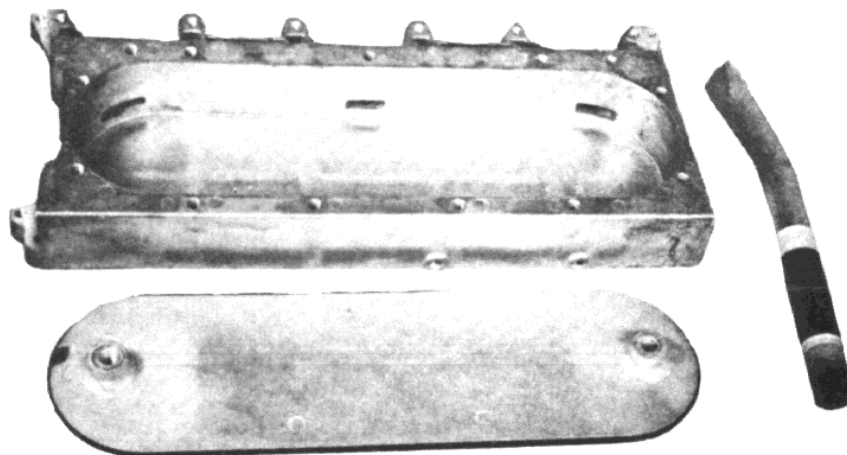


One large capacity bellows for each pole directly linked to a moving contact arm provides continuous air flow throughout the complete opening sequence.

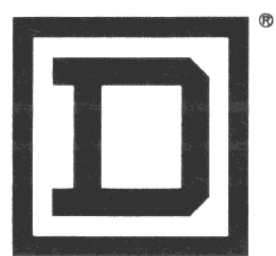


### INDUSTRY

Some with only one Puffer per device to provide air for all three poles at instant of contact parting.



# OPERATING POWER AT 115V AC



SOLENARC DSE\*  
FROM SQUARE D

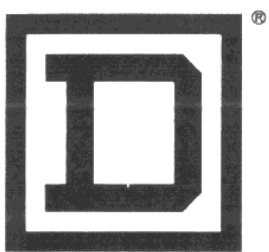
FUNCTION			
<u>SPRING CHARGING</u>	<u>SOLENOID CLOSING</u>	<u>CLOSING COIL</u>	<u>OPENING COIL</u>
250 VA	—	67 VA	48 VA

\*The energy conserving circuit breaker

## INDUSTRY

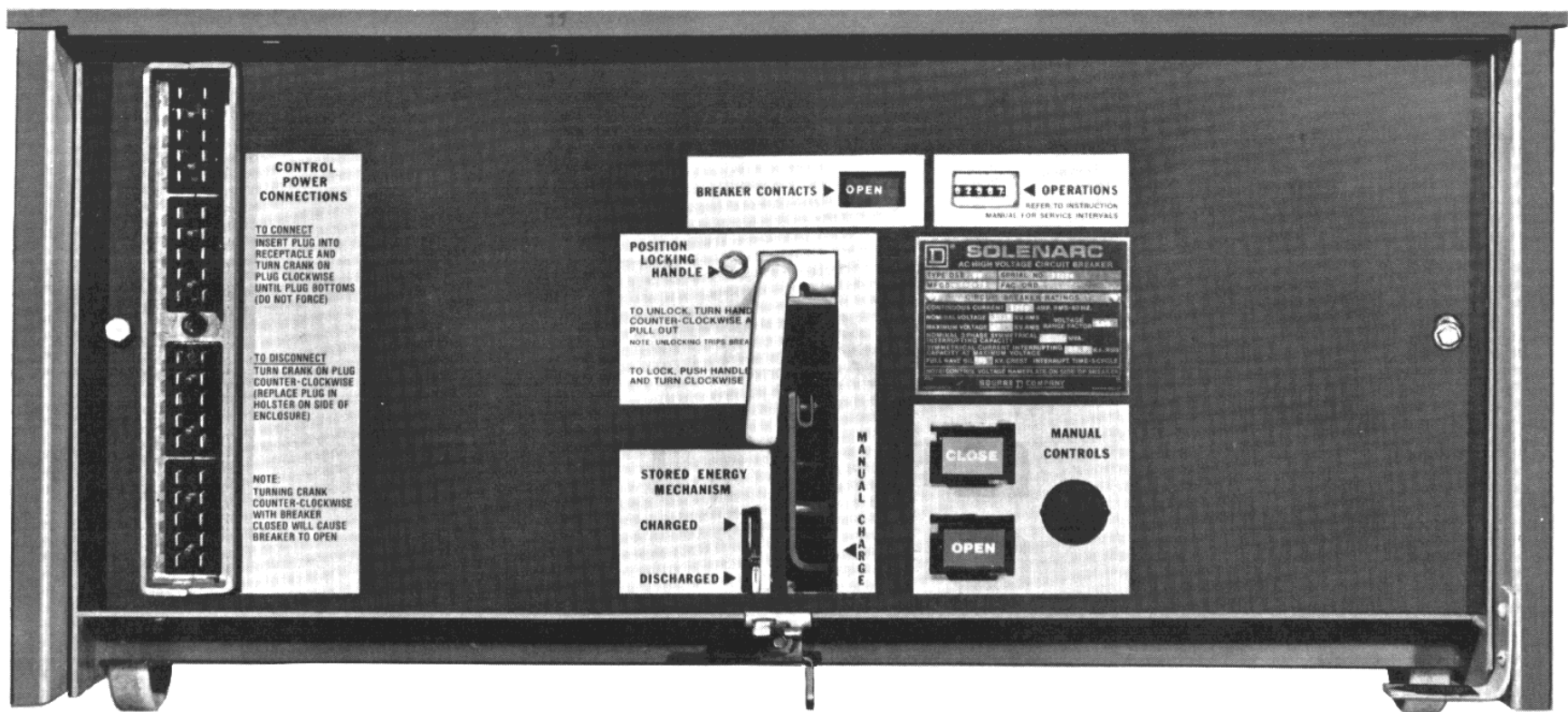
450- 2185 VA	9775- 14875 VA	520- 1150 VA	520- 2650 VA
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# MANUAL (LOCAL) CONTROLS



## SOLENARC DSE FROM SQUARE D

FRONT VIEW BREAKER  
ESCUTCHEON

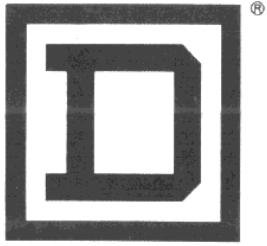


CLEARLY MARKED AND ACCESSIBLE

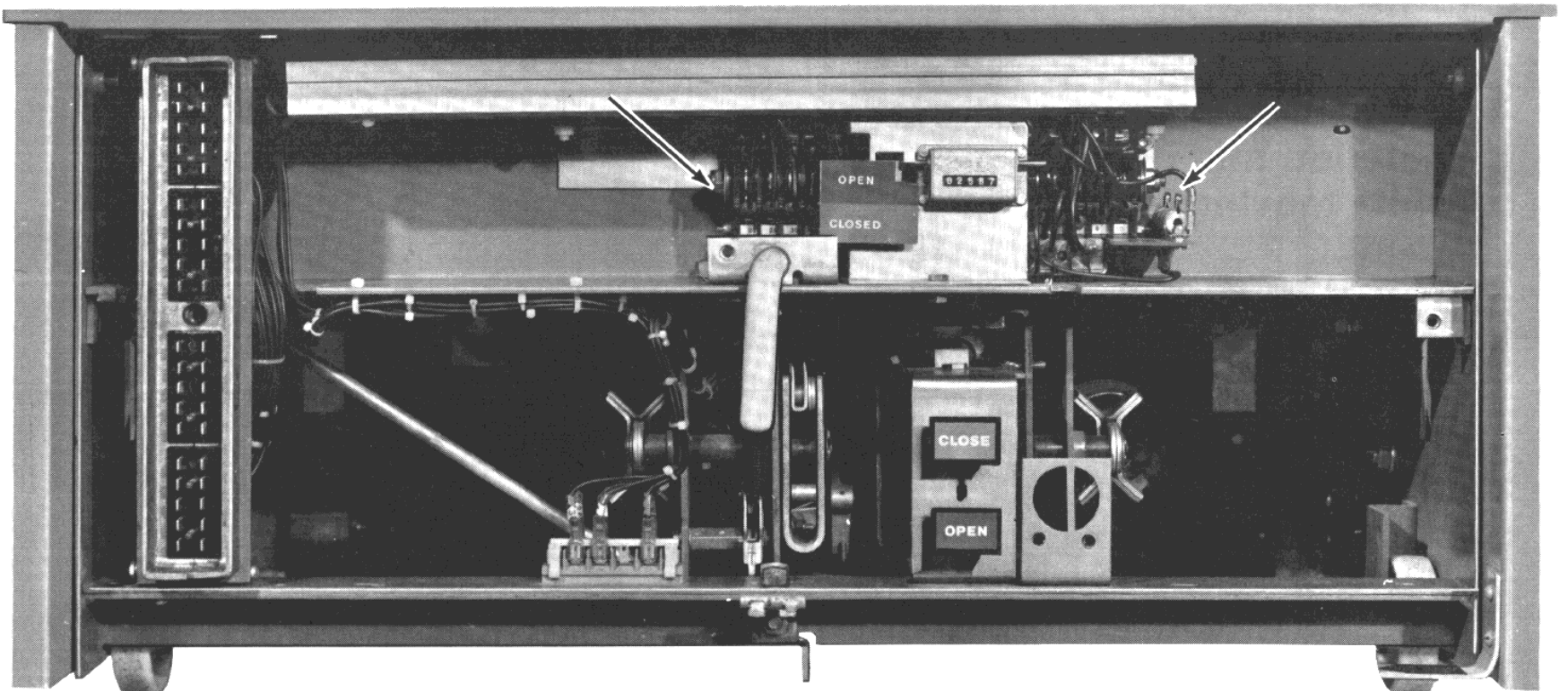
### INDUSTRY

- Levers and buttons accessible through finger holes.
- Buttons under flip covers requiring two-hand operation.
- Finger pull slides.
- Lanyard pulls.

# AUXILIARY CONTACTS



Front View — Cover Removed



SOLENARC DSE provides 3-a and 2-b auxiliary contacts for normal breaker operation plus 2-a and 3-b spare auxiliary contacts wired out for customer use as standard. Additional contacts available as an option.

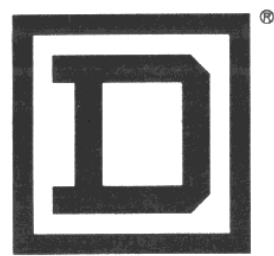
Rated at 250V dc and 240V ac, the SOLENARC auxiliary contacts are mounted up front and are readily accessible.

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## INDUSTRY

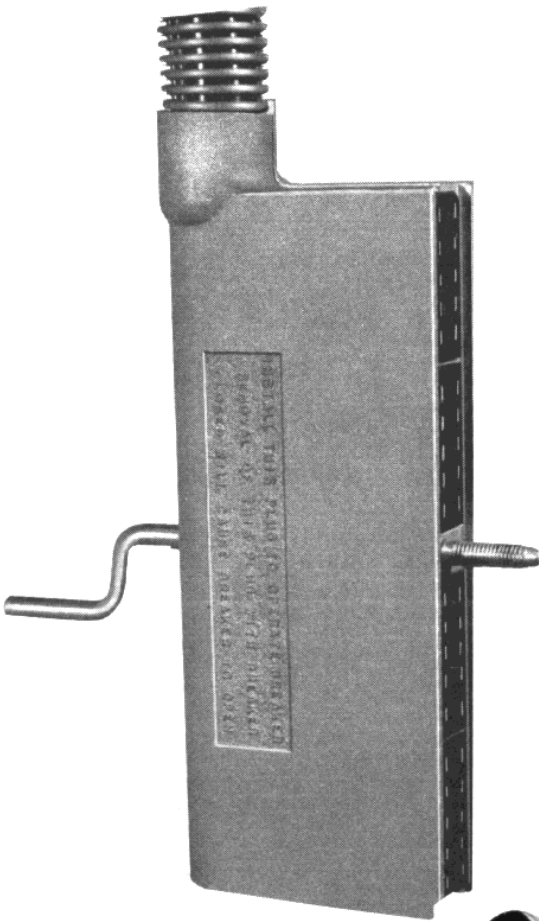
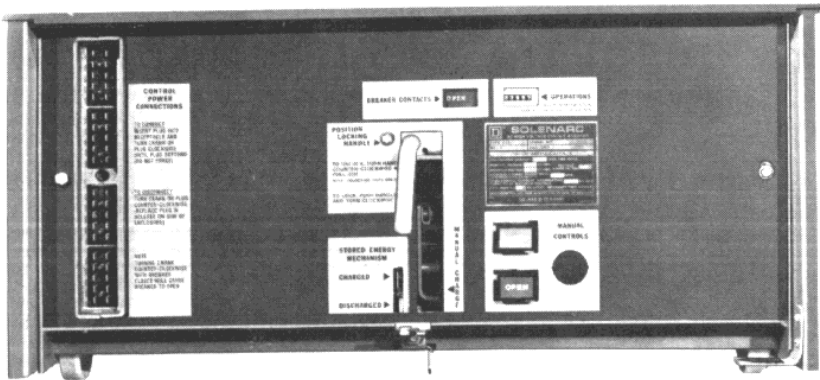
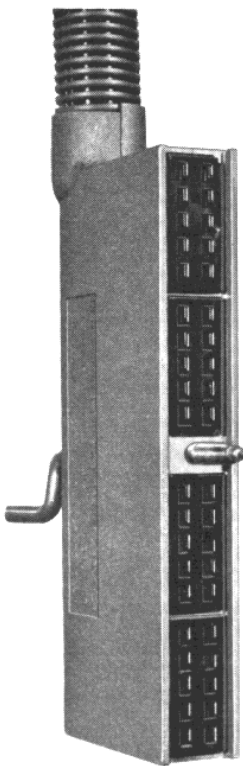
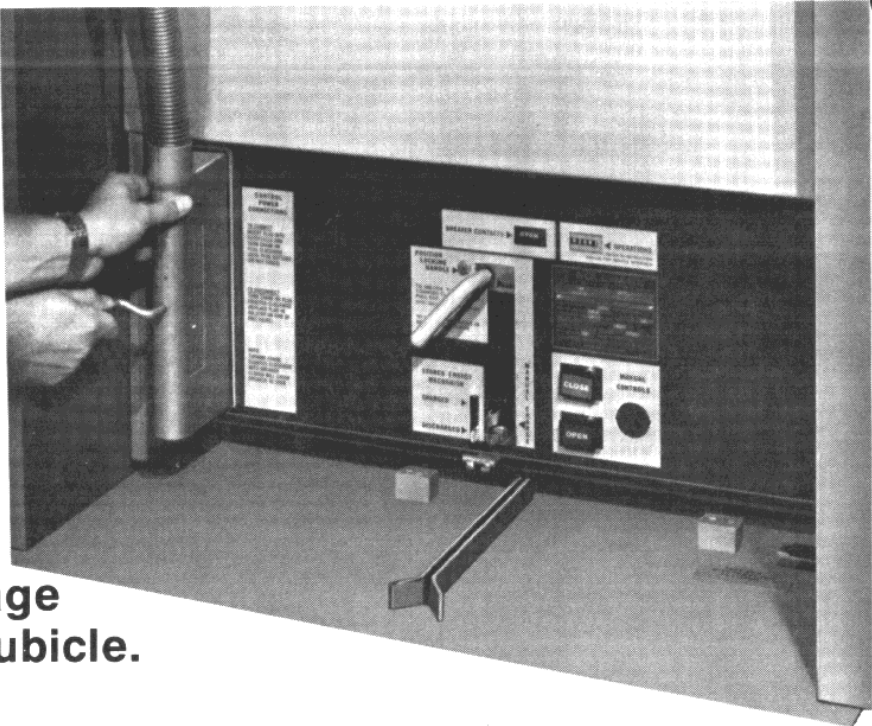
Industry practice is to mount contacts either on the side or the rear of the breaker. Normally, a maximum of 2-a and 2-b contacts are available for customer use.

# SECONDARY CONTROL CONTACTS



Connection visible after breaker is installed and is not subject to breakage while moving breaker in and out of cubicle.

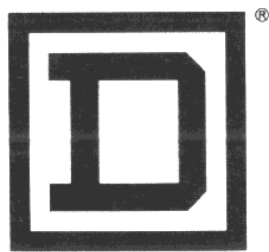
# SOLENARC DSE FROM SQUARE D



# DEPENDABILITY!

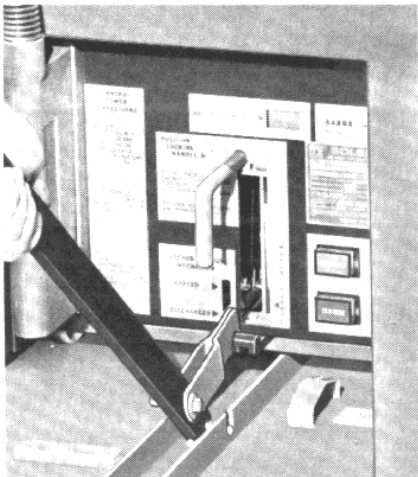
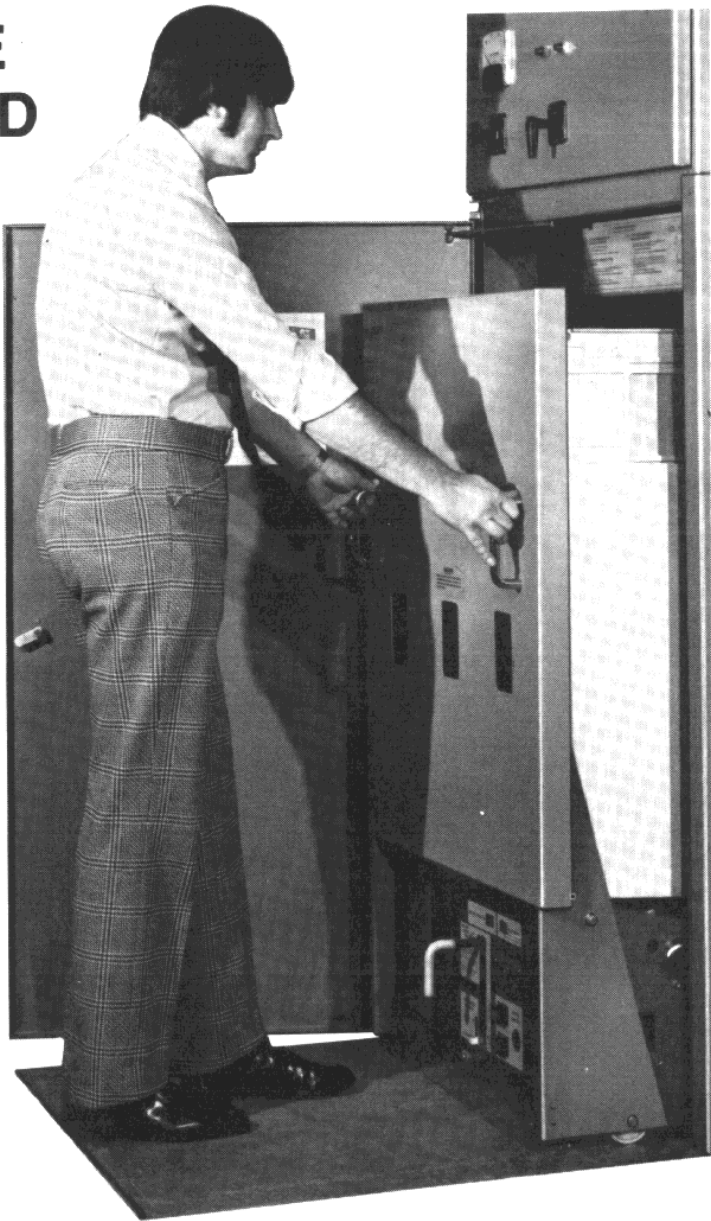
**SQUARE D COMPANY**

# LEVERING OR RACKING



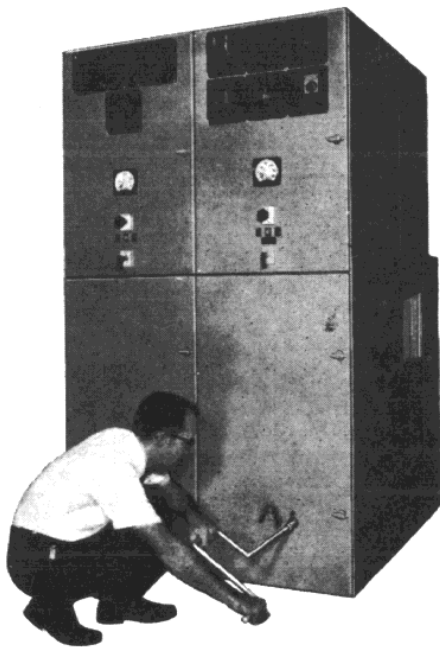
**SOLENARC DSE  
FROM SQUARE D**

**Simple, Easy  
And Safe**

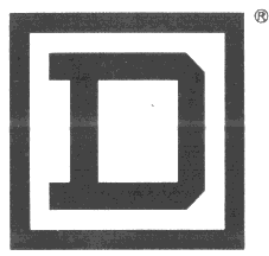


## INDUSTRY

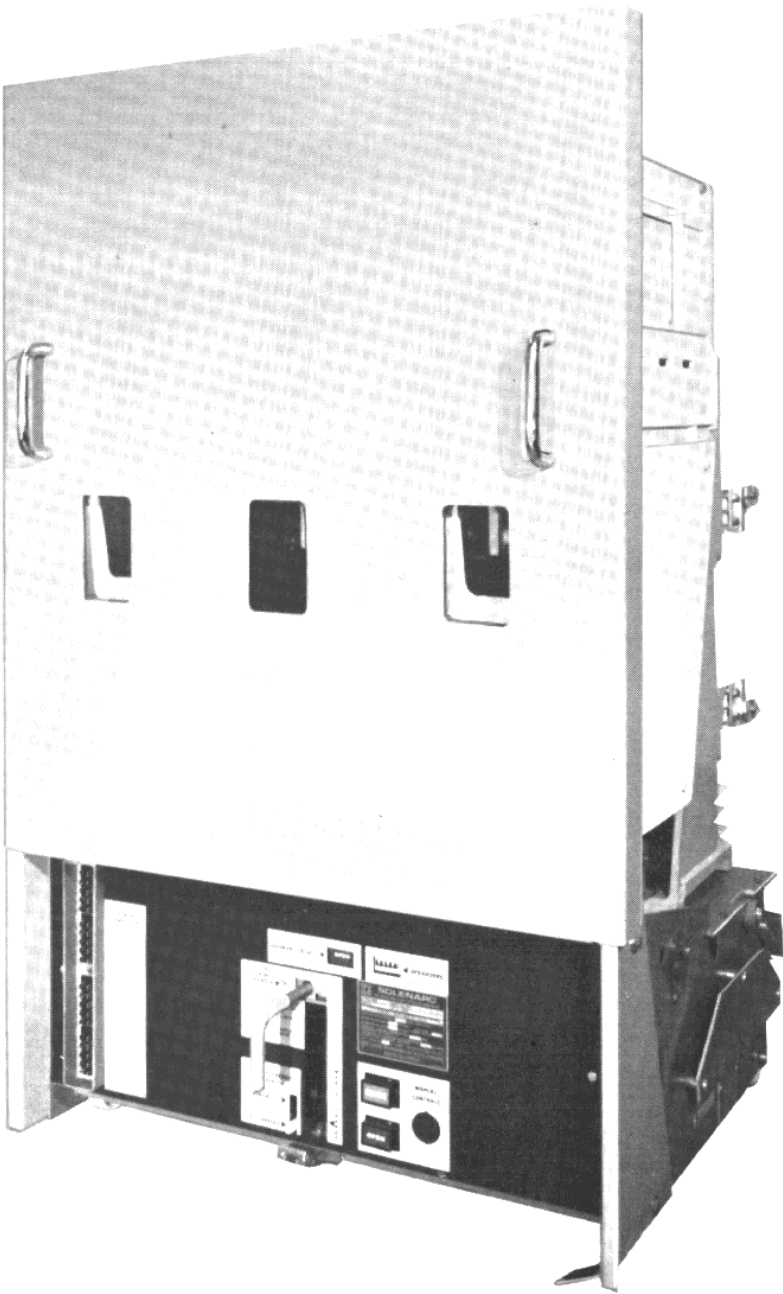
**Difficult**



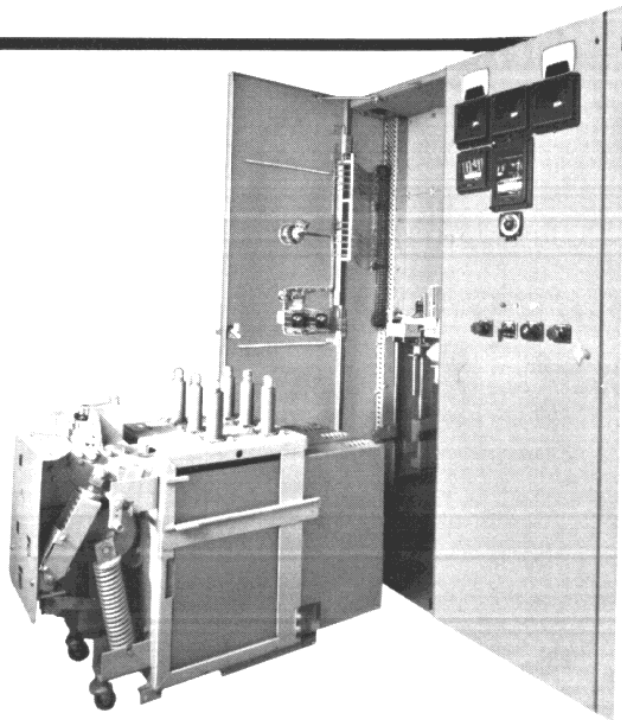
# BREAKER SAFETY SHIELDS



**SOLENARC DSE  
FROM SQUARE D**



**Safety Shield Cannot  
Be Removed While the  
Breaker is in Cell.**



**Some designs  
do not provide  
safety shields**

**INDUSTRY**

**DANGER**  
This Barrier Must  
Not Be Removed While  
Breaker is in Cell.

**Some Even  
Have This  
Warning**

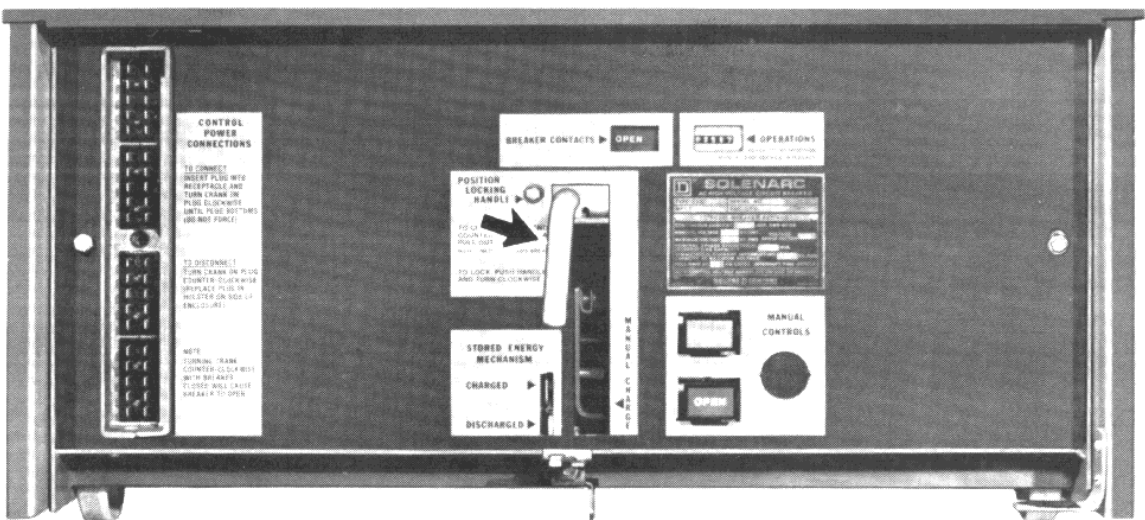
**... And Some Shields Are  
Held to the Breaker by Springs  
And Clips**

# MECHANICAL INTERLOCK

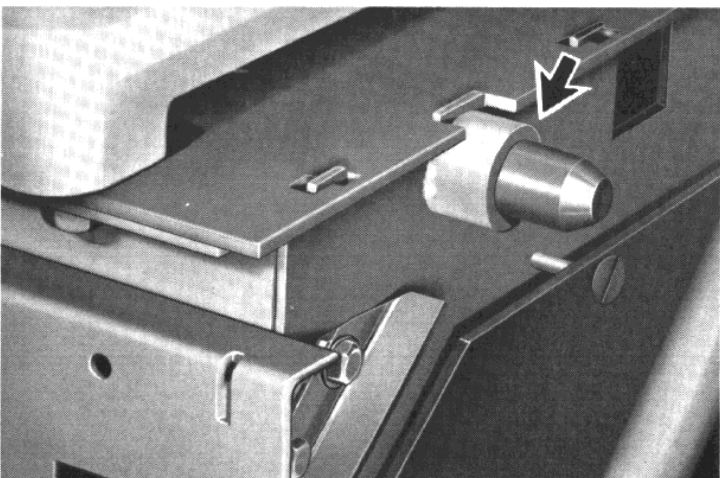
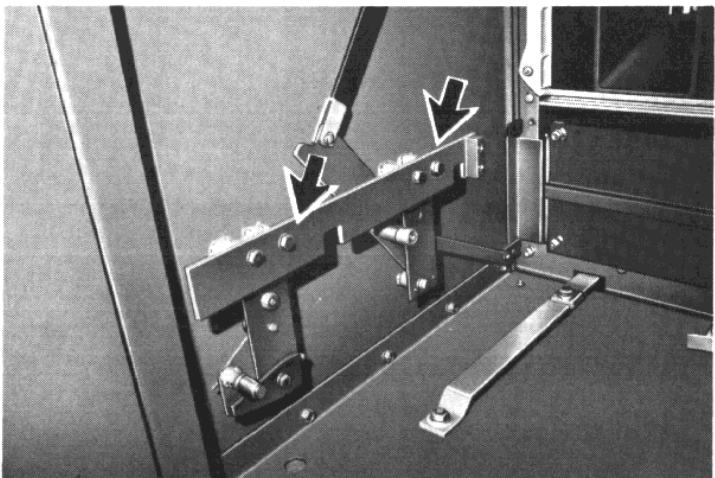
TO PREVENT RACKING WITH BREAKER CLOSED



**SOLENARC DSE  
FROM SQUARE D**



One-inch diameter pins, operated by the breaker position locking handle, extend into welded brackets to lock the breaker element into both the connected and test positions.

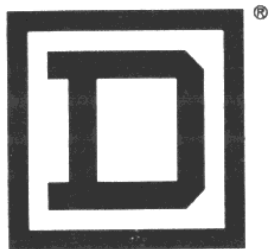


## INDUSTRY

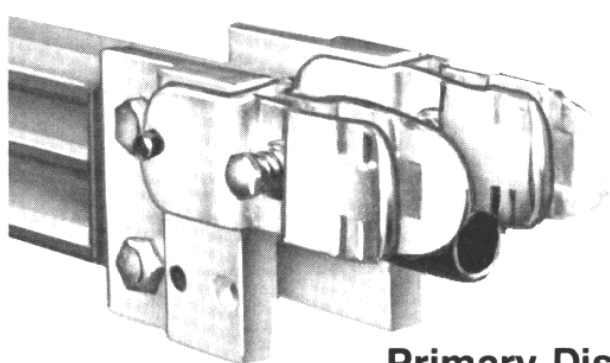
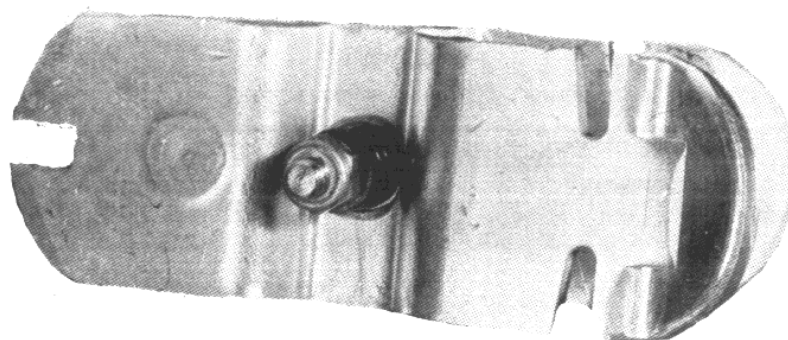
Manual release levers that can easily be removed.

Electric limit switches. What happens if control power is lost?

# PRIMARY DISCONNECTING CONTACTS



**SOLENARC DSE  
FROM SQUARE D**

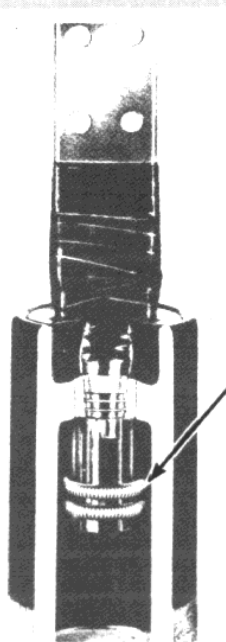


**Primary Disconnecting Contacts**

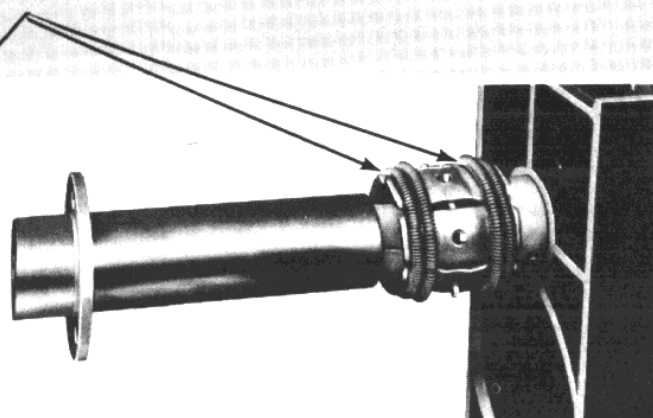
- Blade and Jaws
- "Blow-on" Design
- Line Contact
- Spring under Compression
- Average 10°C Cooler than ANSI Requirements

## INDUSTRY

**Hidden  
Fingers  
and  
Springs**



**Spring  
Under  
Tension**

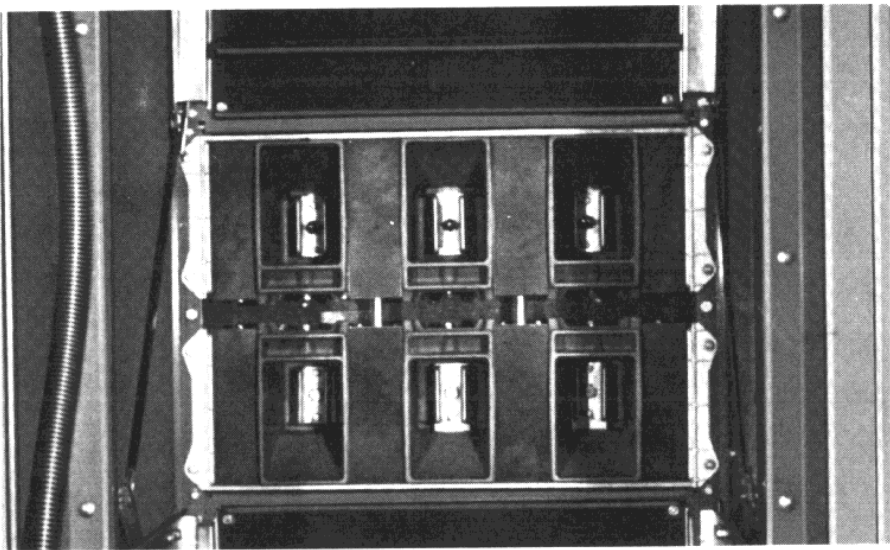
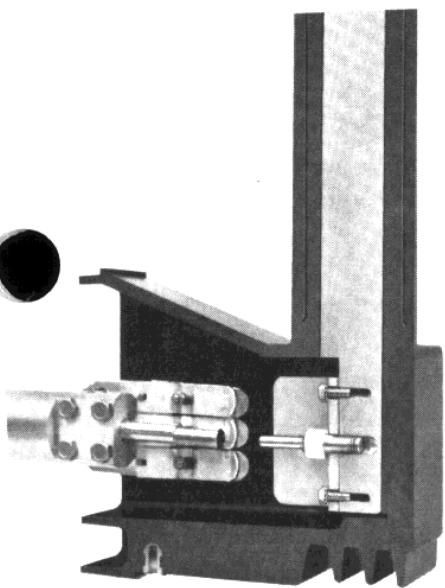
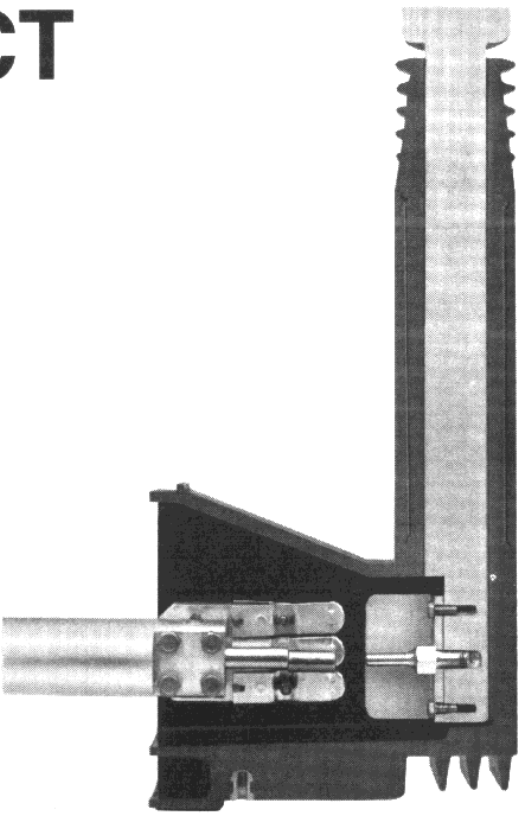


**Multiple Fingers  
and Springs**

# PRIMARY CONTACT GUIDE



SOLENARC DSE  
FROM SQUARE D

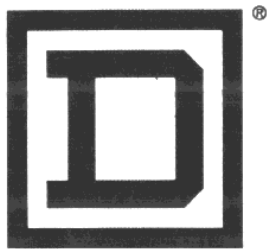


POSITIVE CONTROL ALIGNMENT

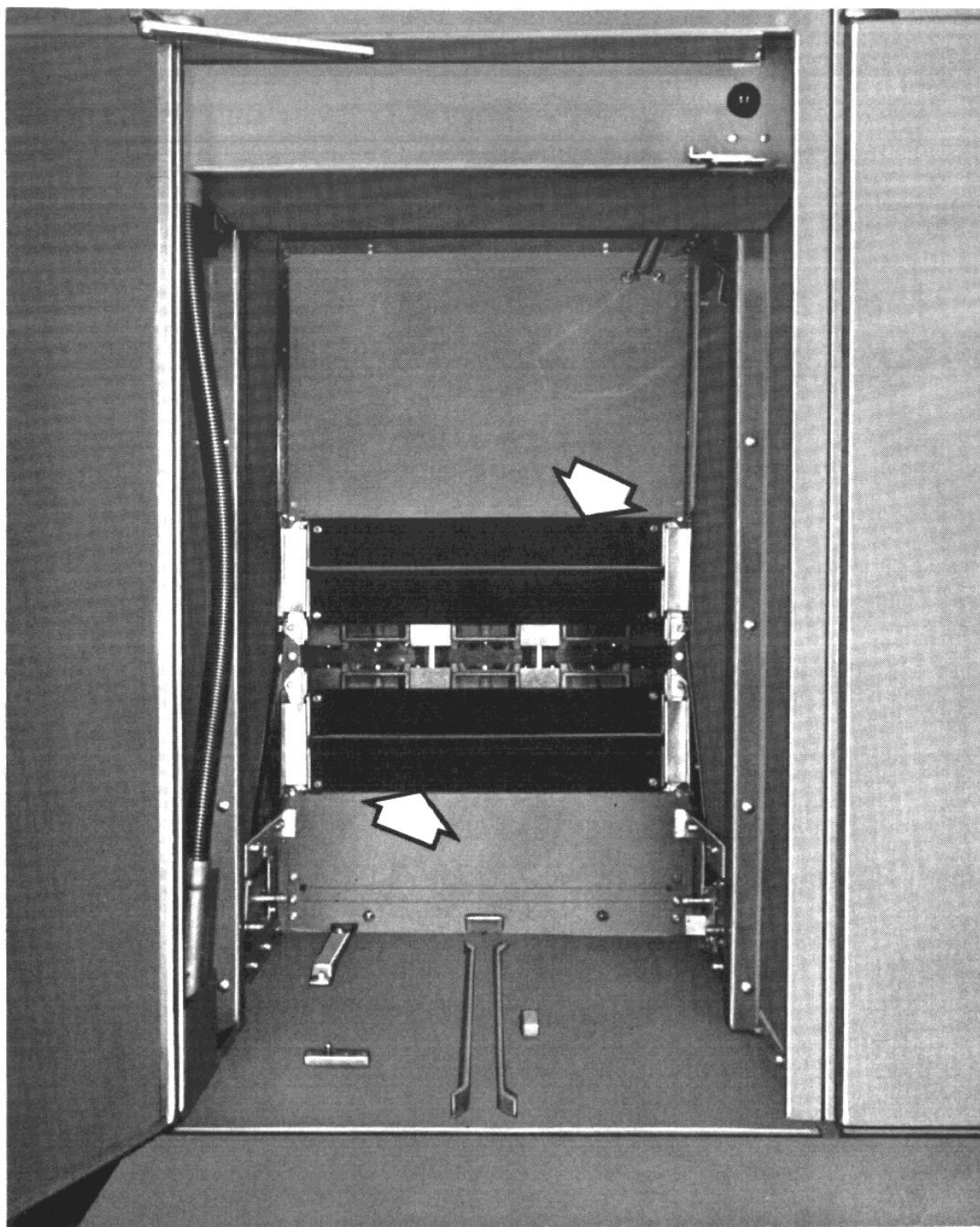
INDUSTRY

nothing!

# SAFETY SHUTTERS



**SOLENARC DSE  
FROM SQUARE D**

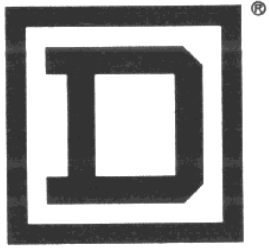


**Grounded steel shutters over live operating parts require two distinct operations to open.**

## INDUSTRY

- **Can be Easily Opened Manually with One Hand.**
- **Some Polyester Without Grounding Protection.**

# **BASIC SWITCHGEAR INSULATION SYSTEM**



**SOLENARC DSE  
FROM SQUARE D**

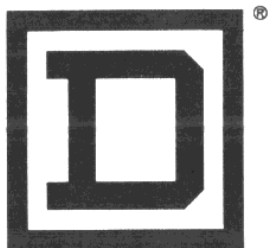
- **Cast Cycloaliphatic Epoxy**
- **High Resistance to Tracking**
- **High Mechanical Strength**
- **High Dielectric Strength**
- **Non-Hydroscopic**

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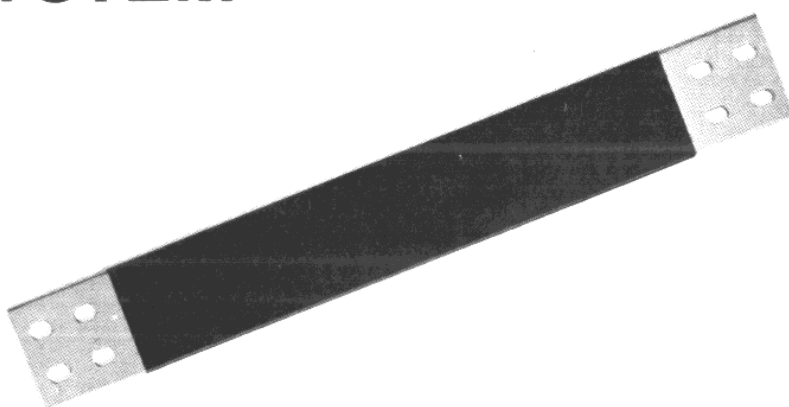
## **INDUSTRY**

- **One All Porcelain**
- **Others Have Combinations of  
Polyesters, Porcelain  
and Cast Epoxy**

# BUS INSULATION SYSTEM



**SOLENARC DSE  
FROM SQUARE D**



**Fluidized bed epoxy-  
powder-coated to eliminate  
air voids between bus bar  
and insulation**

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## INDUSTRY

**Polyester sleeves**

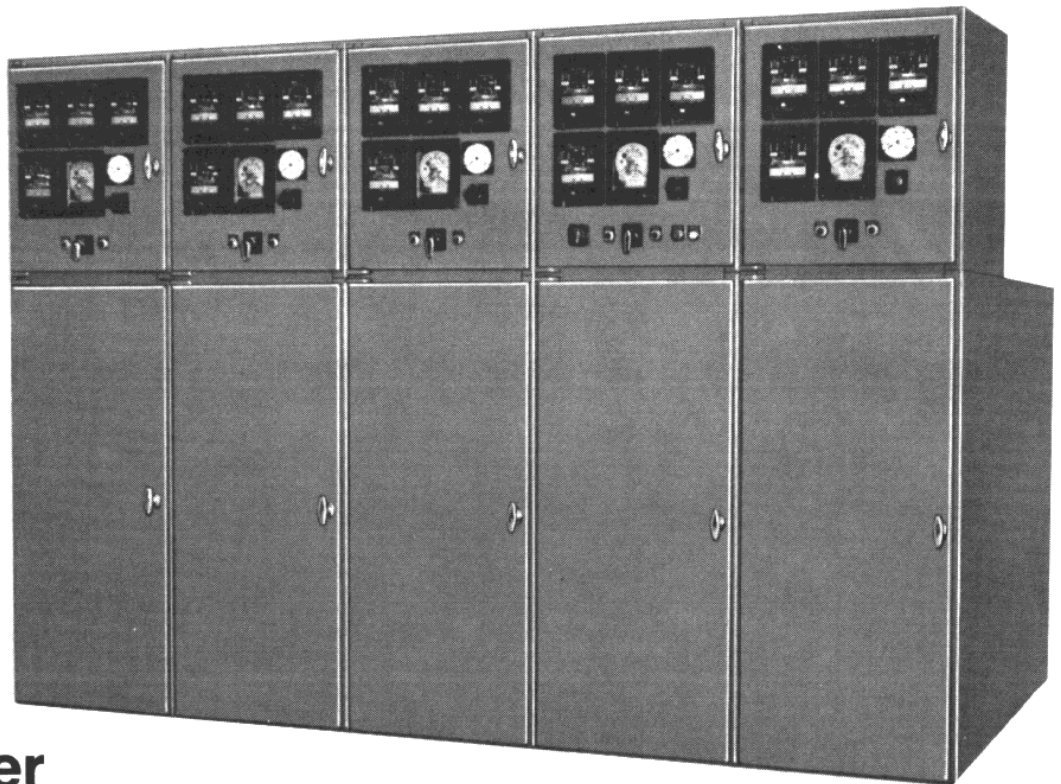
**Micarta sleeves**

**PCV sleeves**

**Epoxy sleeves (extra cost)**

# LET SOLENARC HELP YOU

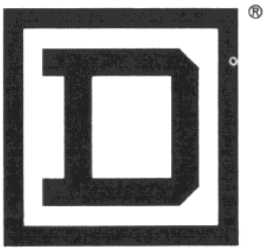
About  
Square D  
knowhow —



For over sixty years, Square D has been a leading manufacturer of quality electrical control and distribution equipment.

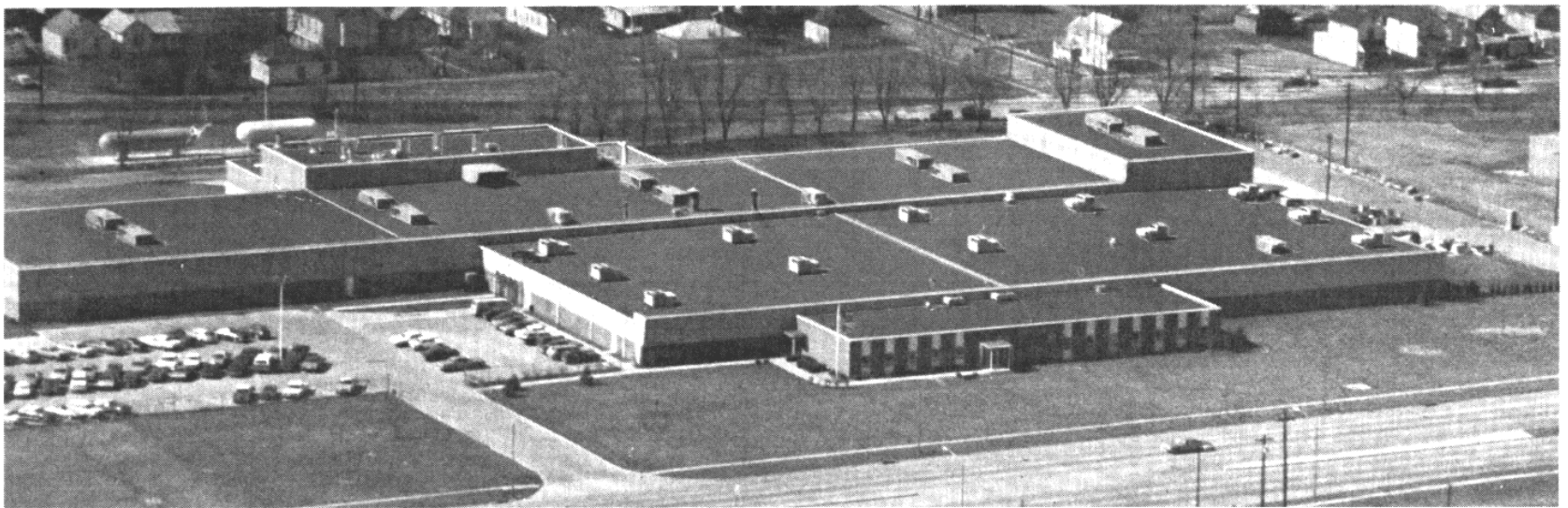
SOLENARC DSE Switchgear continues this proud tradition. With sales offices in over 160 cities throughout the U.S. and abroad, we've got the experience and knowhow to do the job for you.

Ask Our Square D Sales Engineer How We Can Assist You!



**SOLENARC DSE  
CIRCUIT BREAKER  
SWITCHGEAR**

**SQUARE D COMPANY**

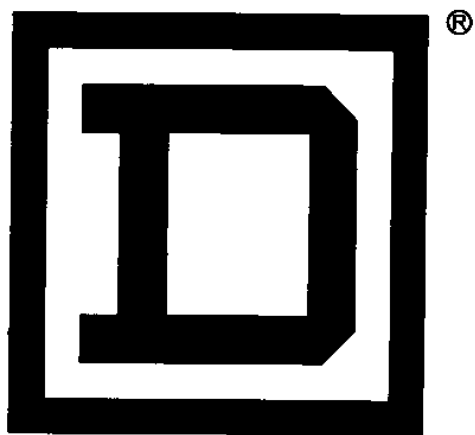


**SOLENARC DSE Switchgear Headquarters • Square D Co., Middletown, Ohio**

**SUPPLEMENTAL LITERATURE:**

- Presentation Bulletin SB-11
- Catalog 6150A
- Product Data Bulletin D-382, Insulation Systems
- Product Data Bulletin D-366C, Type DSE 5-15KV Switchgear
- Product Data Bulletin D-374, Suggested Specifications
- Product Data Bulletin MN-3, User Listing (Restricted).

Order copies from Square D Co., Advertising Dept.,  
P. O. Box 558, Middletown, Ohio 45042.



**SQUARE D COMPANY**

P.O. Box 558 • Middletown, Ohio 45042