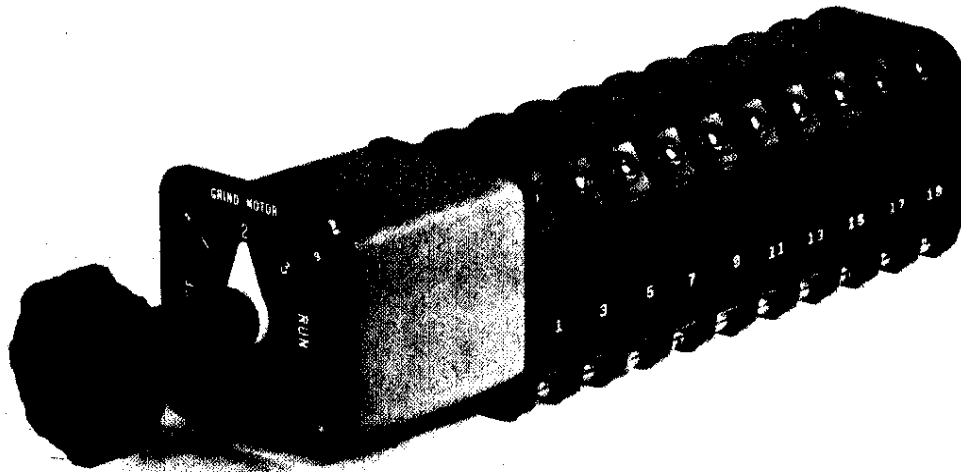




INSTRUCTIONS

CONTROL AND TRANSFER SWITCH

Type SBM



GE Meter and Control
205 Great Valley Parkway
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GEH-2038

CONTROL AND TRANSFER SWITCH

TYPE SBM

DESCRIPTION

INTRODUCTION

The Type SBM switches are cam-operated devices having two mechanically and electrically separate contacts per stage. The switch is totally enclosed, having no cover. The contact terminals are brought out to the corners, allowing screw connections to be made over a large angle. The switch is so constructed as to allow the addition of 1 or 2 extra stages to the switch with a minimum of effort.

APPLICATION

The Type SBM switches are intended primarily for the control of electrically operated devices such as circuit breakers, small motors and magnetic switches, and for the transfer of meters, instruments and relays.

OPERATION

The Type SBM switches are rotary cam-operated switches. Rotation of the shaft causes contacts to open or close, depending upon the shape and setting of the cams. Each stage consists of two mechanically and electrically separate contacts. This is accomplished by means of two cams and two cam followers, assembled with moving contacts.

Each cam is constructed so as to have two operating surfaces. These surfaces operate on the cam follower. The cam follower has two tips which are located in offset horizontal planes lining up with the two cam operating surfaces. Thus, as the cam is rotated, one surface operates against the closing cam follower tip, while the opening cam follower tip is relieved. Both cam follower tips are always in contact with the cam surfaces. This allows for a positive closing and opening action not dependent upon springs.

Each cam follower has a spring-loaded moving contact assembled to it. The compression spring acts to give adequate contact pressure when a contact is closed. The moving contact is held to the cam follower by a pin passing through a hole in the cam follower and through an angled slot in the moving contact. As the contacts close, the moving contact slides along this slot while compressing the spring, thus causing relative motion or "wipe" between moving and stationary contacts.

These instructions do not purport to cover all details or variations in equipment nor to provide for every possible contingency to be met in connection with installation, operation or maintenance. Should further information be desired or should particular problems arise which are not covered sufficiently for the purchaser's purposes, the matter should be referred to the General Electric Company.

To the extent required the products described herein meet applicable ANSI, IEEE and NEMA standards, but no such assurance is given with respect to local codes and ordinances because they vary greatly.

Some applications, particularly of momentary contact switches, which have a torsion spring to return the switch to a central-neutral position, require a contact action which lags behind the switch motion (lost motion or slip contacts). Such contacts use cams with a special loose fit on the shaft. When the shaft has turned far enough to close or open these contacts, it can be rotated 45 degrees in the reverse direction without moving the cams, but beyond this point, the cam moves with the shaft and the contacts either open or close as the case may be.

Momentary contact switches have a torsion spring (See inset, Figure 1) that returns the switch shaft to a central or neutral position when the handle is released, after operation to a side position or positions. This torsion spring is designed for a maximum of 90 degrees operation to each side of the central position. The torsion spring may have one end cut off or tied back in such a manner as to be effective on one side of the central position only. That is, the switch may have momentary contact to one side of the central position and maintained contacts to the other side.

In some momentary contact (spring return) switches, a locking device is provided by which the shaft may be held, against the action of the torsion spring, by pulling the handle outwards when the switch is turned to one of the side positions.

Positioning

A star-shaped detent wheel, mounted on the square shaft and acted upon by a spring-loaded rocker arm, gives positive positioning action to the switch.

Removable Handles

The removable handle option may be obtained with up to 3 keyways in the escutcheon. The keyway locations are at the discretion of the customer. The handle is removable in one position. Any style handle can be used for this operation (See handle options in Figure 2).

Add-A-Stage

A shaft extension is provided to enable an additional stage to be coupled to the existing switch in the event that more contacts are required after the switch is in the hands of the customer.

RATINGS

- * The electrical rating is 600 volts, 20 amperes continuous. The interrupting rating depends on several factors; namely, voltage, current and inductance of the circuit. It may be necessary to use two or more contacts in series to ensure adequate interrupting ability on highly inductive circuits. The interrupt ratings are shown in Table I.

* Indicates revision

TABLE I
INTERRUPTING RATINGS

Circuit Voltage	Non-Inductive Circuit		Inductive Circuit	
	Number of Contacts			
	1	2(in ser)	1	2(in ser)
24 DC	10.0	30.0	8.0	25.0
48 DC	8.0	25.0	6.0	18.0
125 DC	5.0	15.0	4.0	10.0
250 DC	1.0	3.0	1.0	2.5
600 DC	0.4	0.8	0.3	0.7
115AC	40.0	75.0	24.0	50.0
230 AC	25.0	50.0	12.0	25.0
460 AC	12.0	25.0	5.0	15.0
600 AC	10.0	20.0	8.0	12.0

CONSTRUCTION

The Type SBM switch is built up with a series of stages that are nested into each other, an operating shaft, a front support and a rear support.

The complete stack is tied together with two tie bolts threaded into the front support. These tie bolts also act as a bearing for the cam followers in each stage. Each stage consists of two cam follower assemblies made up of two stationary contacts and one moving contact, (double break construction) one cam and one cam follower. The cams are mounted on the operating shaft. When only one contact is required in a stage, one of the cam follower assemblies is omitted.

CONTACT IDENTIFICATION

The contacts are marked for identification, using a standard system. On each side of the switch, midway on the barriers, is a confined marking strip (See Figure 4). These strips are located between the two terminal screws which define a contact. The marking strip on the right side, front view, looking toward the rear, is numbered 1, 3, 5, etc., starting at the panel end. Those on the left side are marked 2, 4, 6, etc. If a contact is omitted, the terminal screws are also omitted for that contact.

ENCLOSURES AND MOUNTING

The basic switch is totally enclosed except for an opening in the bottom to allow for a visual inspection of the contacts. (See Figure 3)

All switches are furnished for mounting in panels 3/32 to 1/4 inch thick. Variation in panel thickness is taken up by the use of two saddle washers mounted between the handle and escutcheon.

INSTALLATION

RECEIVING

Immediately upon receipt of a switch, examine it for any damage sustained in transit. If injury or rough handling is evident, file a damage claim at once

with the transportation company, and promptly notify the nearest General Electric Apparatus Sales Office. The switches are completely assembled and packed in individual cartons before shipment.

If the switches are for stock purposes or not for immediate installation, they should be left in the shipping carton and stored in a clean, dry location.

MOUNTING

For panel-mounted switches, holes should be provided in the panel as shown in Figure 2.

To mount a switch on a panel, first remove the handle and escutcheon, including, where provided, the position-indicating pointer and the curved spring washers (saddle spring). Next, hold the switch in place on the back of the panel and insert the mounting screws through the escutcheon, panel, and spacers (if used) into the switch front support, but do not tighten the mounting screws. Attach the pointer, saddle springs and handle. Align the escutcheon on the panel.

When mounting removable-handle switches, be certain that the shaft of the switch is properly positioned so the handle is easily removed; then tighten the mounting screws.

MAINTENANCE

SERVICING

CONTACT CLEANING

At regular intervals, the switch contacts should be inspected for wear and burning. An opening at the bottom of the switch has been provided for this. (See Figure 3) If the contacts are slightly pitted or coated with sulphide, they should be cleaned with a flexible burnishing tool similar to that included in the XRT relay tool kit.

CAUTION

Since many of the parts of this switch are molded of a polycarbonate material, DO NOT use any lubricants and/or cleaning agents in any form (including aerosol sprays commonly available). Hydrocarbons (oils and related products) may chemically attack such parts, resulting in possible switch failure.

REPAIR AND REPLACEMENT

In some cases it is desirable either to replace a contact stage or to add additional contacts.

In such cases, it might be advantageous not to disturb the existing switch, but to add directly to the present switch. In order to do this, the proper contact sequence should be ordered (no more than two stages), noting that this is for adding to an existing switch. These parts will be received assembled with a U-shaped bracket, and a coupling with a square hole will also be received. Figure 4 shows a Type SBM switch with an additional stage already in position.

To install these additional contacts, loosen the two tie bolts at the rear of the switch about 3/32 inch. Slide the new bracket over the shaft and tie bolts so that the inner part of the bracket slot rests on the tie bolts between the tie bolts and nameplate. Tighten the tie bolts. Slide the square-hole coupling over the shaft extension on the present switch, then slide the shaft extension on the new barrier assembly into the coupling, keeping the shaft of the new barriers in the proper position to give the correct contact sequence corresponding to the handle position. This should cause the side holes in the two U-shaped brackets (one attached to the new contact assembly, the other attached, as directed above, to the old switch) to line up. All the inspection openings should be at the bottom of the switch. Fasten the brackets together with the hardware supplied.

If it is desired to disassemble the switch for any reason, the following procedure should be followed: Remove handle and any position pointers and saddle washers. Place an identifying mark on the handle end of the shaft corresponding to a position on the escutcheon such as 12 o'clock. Remove the escutcheon. Remove the three screws fastening the front plate to the front support. If there are stops behind it, in the front support, their position relative to the shaft identification mark should be noted; then remove the stops, spacer and star-shaped positioning wheel if they are present.

Unscrew the tie bolts and remove the front support. If any torsion springs are present, pull one tie bolt back far enough so that one arm of the torsion spring can be sprung away from the spring actuator. Remove any spacers present, the sleeve, the spring, and the spring actuator. Remove the molded barrier/cover plate, exposing the contacts of the first stage.

Each cam has one number and seven letters around the shaft opening on one side of the cam and eight letters on the other side of the cam. When removing cams, mark the letter of the cam which corresponds to the shaft identification mark. Cam and cam followers are removed in succession, marking the position of each cam in turn. This is done to each succeeding barrier.

When reassembling, it is only necessary to stack the cams back onto the shaft in the same order as taken off, keeping the proper cam letter lined up with the shaft identification mark.

Before tightening the tie bolts into the front support, make sure that all the barriers are properly nested.

The parts which fit into the front support may now be assembled, placing the stops, if present, in their proper position with respect to the shaft identification mark.

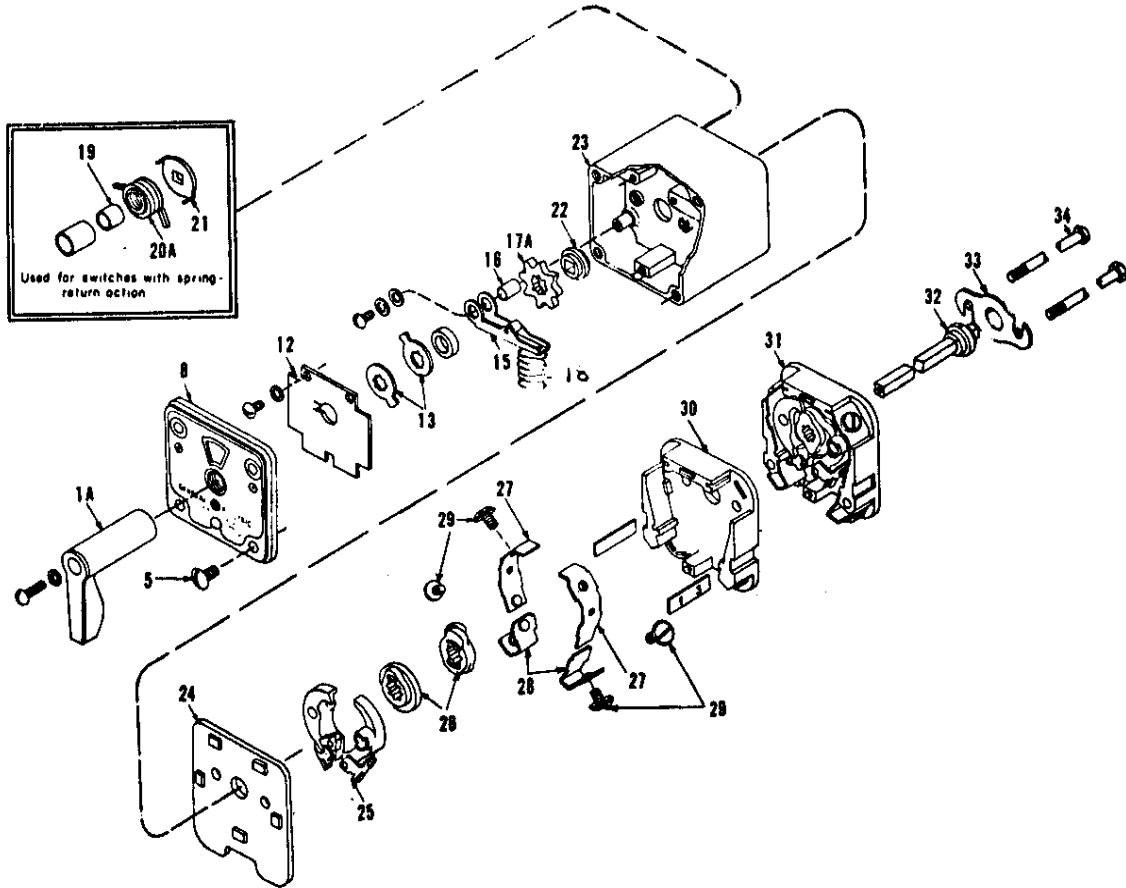
RENEWAL PARTS

It is recommended that sufficient quantities of renewal parts be carried in stock to enable the prompt replacement of any that are worn, broken or damaged.

When ordering renewal parts, address the nearest Utility Sales Office of the General Electric Company, specifying quantity required and name of part wanted, and giving complete nameplate data.

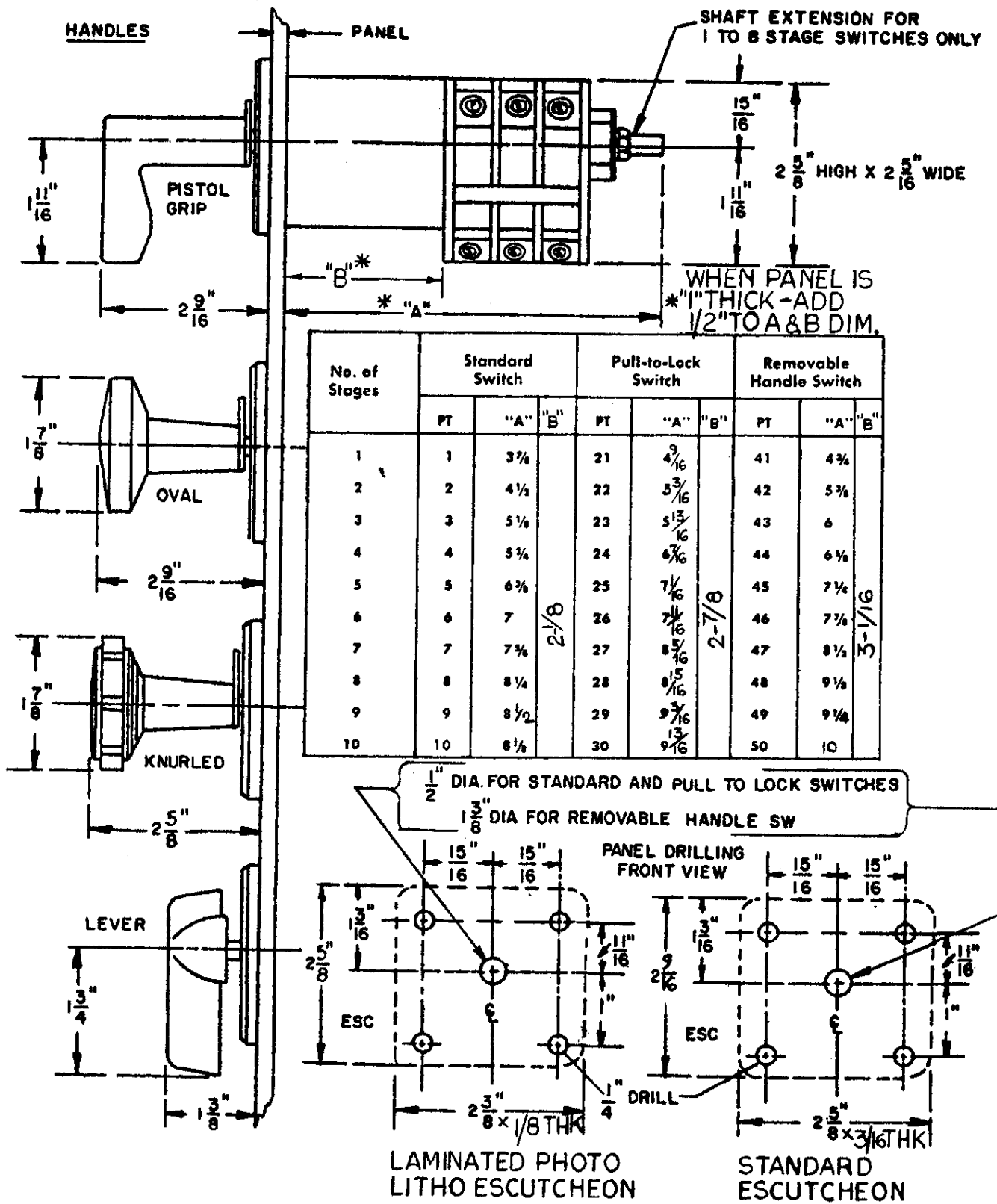
**TYPE SBM
CONTROL SWITCHES**

GEF-4167A



- | | | | |
|-----|--------------------|----|--|
| 1A | Handle | 22 | Front Bearing |
| 5 | Mounting Screw | 23 | Front Support |
| 8 | Target Escutcheon | 24 | Barrier Cover |
| 12 | Front Plate | 25 | Cam Follower and Moving Contact Assembly |
| 13 | Stops | 26 | Cams for Contacts |
| 15 | Rocker Arm | 27 | Upper Stationary Contact |
| 16 | Sleeve | 28 | Lower Stationary Contact |
| 17A | Positioning Wheel | 29 | Terminal Screw |
| 18 | Positioning Spring | 30 | Barrier |
| 19 | Sleeve | 31 | Barrier Assembly |
| 20A | Torsion Spring | 32 | Rear Bearing |
| 21 | Spring Actuator | 33 | Bearing Retainer |
| | | 34 | Tie Bolt |

Figure 1 - (0184B5484) Exploded View of Type SBM Switch



* Figure 2 - (127A6779 [8]) Outline and Panel Drilling of Type SBM Switch

* Revised since last issue

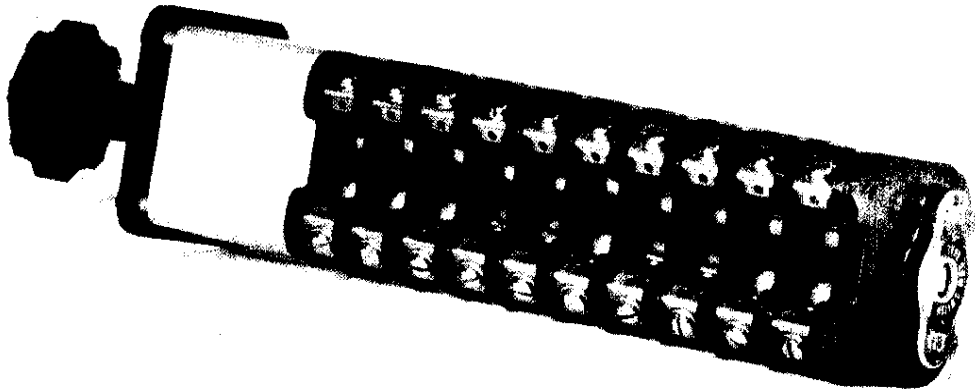


Figure 3 - (8027023) Bottom View of Type SBM Switch

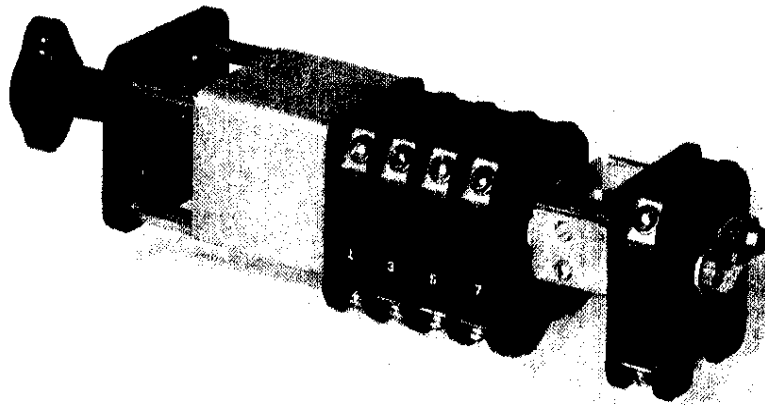


Figure 4 - (8027022) View of Type SBM Switch with Additional Stage in Position



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