

TEST SWITCH—TYPE M

INSTRUCTIONS

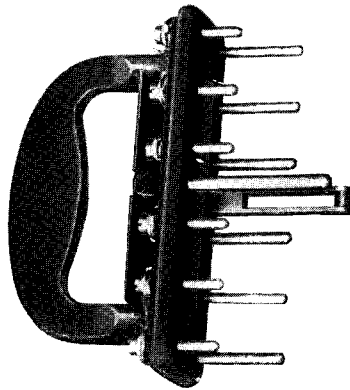


FIG. 1—“SEPARATE SOURCE” TEST PLUG

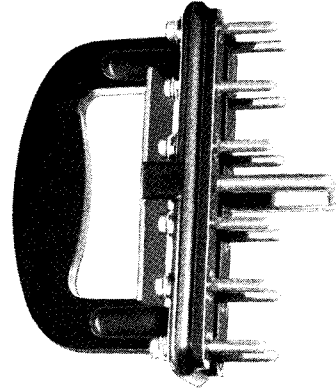


FIG. 2—“SERIES” TEST PLUG

Application

The type M test switch is a modern device for multi-circuit testing of switchboard instruments, meters and relays by any conventional system. It is available with four or six independent single-pole circuits which may be used for current, potential or trip circuits. The nominal rating is 250 volts, 10 amperes, a-c.

The use of these test switches eliminates the hazard of accidentally tripping the circuit interrupting device when making test connections since no wiring changes are made on the switchboard. Instruments and meters can be checked and calibrated against portable standards connected in series with the instrument or meter being tested under service conditions or by means of a phantom load. Relays are generally tested by the use of a phantom load or loading transformer and cycle counter.

Mounting and Wiring

Type M test switches are suitable for mounting either vertically or horizontally. The words “TEST” and “LINE” are moulded in the switch covers for convenient identification of the switch terminals. Care should be exercised

when installing the switches that the equipment to be tested is connected to the test side, and the instrument transformers, to the line side. Opening of the current transformer secondaries may result when testing if this is not done.

Types of Plugs

Two types of plugs—one for “SEPARATE SOURCE” testing and the other for “SERIES” testing—are available for type M test switches. These are shown in Figs. 1 and 2 respectively. The former provides for short circuiting the current transformer secondaries and “break before make” action for cutting in separate sources of energy. The “SERIES” test plug is used where a calibrating instrument or meter is to be connected in series with the equipment to be tested. It provides “make before break” transfer of current transformer circuits.

Identification of Plugs

The two types of plugs can be readily identified by either referring to the label on the plug or examining the plug contacts or prongs. Those for the “SEPARATE SOURCE” test plug are of unequal length, and for the “SERIES”

test plug, the same length. Extreme care must be used to see that the type of plug being used is suitable for the test scheme since a separate source plug can not be used for the series method or vice versa.

Both types of plugs have a keyed guide and operating arm so that they can be inserted only in the proper position. The operating arm is slotted and carries on its end a roller which engages the actuating cam on the rotor of the test switch. Multi-conductor cable connected to the terminals on the handle side should be used between the plug and test equipment.

Operation

In operating the type M test switch, suitable connections are first made from the testing equipment to the plug and on the plug itself. These will depend upon the type of plug used and the circuit to be tested. The testing can be greatly expedited if a separate plug with permanent connections is provided for each type of equipment requiring different test connections. All that is then necessary is to remove the coverplate from the test switch by a few turns of the thumb nut secured to it and plug the proper test plug in and out of service.

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INSTRUCTIONS—Continued

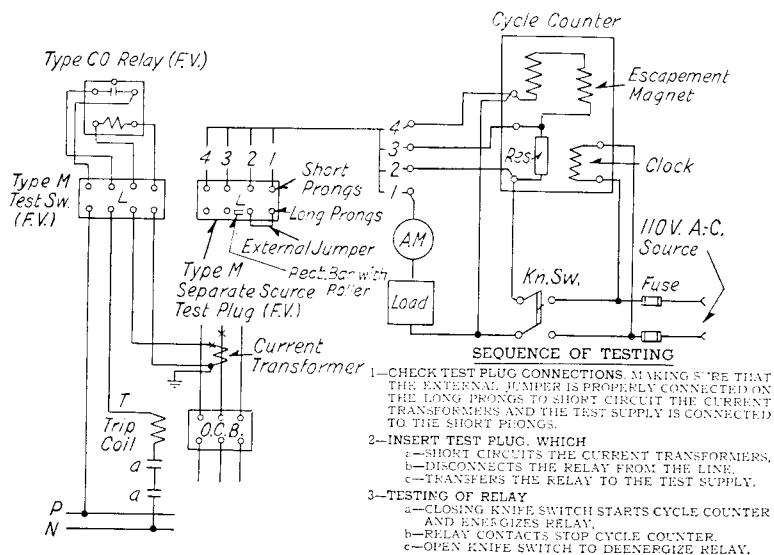


FIG. 3—DIAGRAM OF CONNECTIONS FOR TESTING TYPE CO RELAYS WITH PHANTOM LOAD AND CYCLE COUNTER, USING TYPE M "SEPARATE SOURCE" TEST PLUG

Separate Source Testing

Fig. 3 shows typical connections for testing a type CO relay, using a "SEPARATE SOURCE" test plug. It will be noted that jumper connections have to be made on the plug in addition to those between the plug and the testing equipment.

When inserting the plug, its contacts, during the first part of their travel, short circuit the current transformers connected to the equipment being tested. As the plug continues its travel, the plug roller engages the actuating cam and turns the rotor. This opens, through the

switch, the normal circuits of the equipment being tested. When the complete "in" position is reached, the test contacts of the plug engage the switch contacts connected to the equipment to be tested. Note that the plug should be all the way in for the test, there being no intermediate or inoperative point. In withdrawing the plug, the roller hooks the actuating cam on the opposite side and returns the rotor and circuits to the normal closed or operating position.

Series Testing

Fig. 4 shows typical connections for testing a two element watt-hour meter, using a standard polyphase watt-hour meter and Type M "SERIES" test plug.

using a "SERIES" test plug. Jumper connections have to be made on the plug in addition to those between the plug and standard meter.

The operation when using a "SERIES" test plug, although generally the same, differs in that the contacts operate to insert the test equipment in the current transformer circuits before breaking the normal or operating circuits.

Replace Covers After Test

On completion of the test, the test switch covers should be put in place and fastened with the thumb screws.

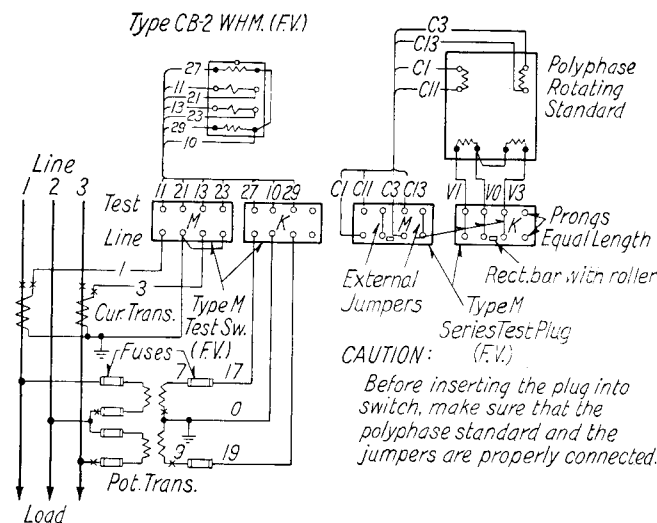


FIG. 4—DIAGRAM OF CONNECTIONS FOR TESTING TWO ELEMENT WATTHOUR METER, USING STANDARD POLYPHASE WATTHOUR METER AND TYPE M "SERIES" TEST PLUG