

WESTINGHOUSE  
TYPE HZM-3 DISTANCE RELAY  
INSTRUCTIONS

APPLICATION

This type HZM-3 relay is used in the type HZM carrier selective-pole tripping scheme as an impedance type fault detector looking into the line. Its function is to supervise operation of the selective elements in the type TS auxiliary relay for phase-to-phase and two phase-to-ground faults.

CONSTRUCTION AND OPERATION

The type HZM-3 relay consists of three identical impedance elements and three solenoid-type auxiliary d.c. switches. In addition, there are several resistors and capacitors associated with the impedance and auxiliary elements.

The construction and operation of the impedance elements is given in I.L. 41-412.1. The auxiliary d.c. switches consist of a plunger type armature which operates a leaf spring rigidly fastened at one end and having a silver moving contact on the other end. In the de-energized position, the spring pushes the moving contact firmly against a stationary contact fastened to the insulated frame of the relay. When the coil is energized, the plunger travels upward, breaking the contact. These d.c. relays are energized by the operation of their respective impedance elements.

CHARACTERISTICS

The impedance elements of this relay are the same as the standard HZM relay except for the current coil which is suitable for only line current (5 amp. max.) and has a larger number of turns to have a higher impedance range.

The impedance elements have an impedance range of 2 to 20 ohms. The tap and core screw markings are as follows:

Taps	12	18	27	40	60	90
Core screw	1.4	1.6	1.8	2.0	2.2	

The auxiliary unit used with this relay to get an offset impedance circle is electrically the same as the HZM auxiliary unit except that it has only three elements instead of nine. The formulas and curves in IL.41-412.1 also apply to the three-element unit.

SETTINGS

The impedance elements must be set to operate for any fault that causes tripping through the carrier relay contacts. This means that the impedance elements must reach through the protected line section and somewhat beyond for a factor of safety. A setting of the same ohms reach as  $Z_2$  of the associated HZM relays will be satisfactory.

The correct tap and core screw settings for an impedance element receiving star current can be determined by the following formula:

$$TS = \frac{17.3 Z R_c}{R_v}$$

The nomenclature is the same as in I.L. 41-412.1.

The setting of the auxiliary unit for the ohms displacement of the impedance elements is made according to I.L. 41-412.1 since the auxiliary unit still receives delta current, and only the radius of the impedance circle is changed by using line current instead of delta current on the impedance element.

#### ADJUSTMENT AND MAINTENANCE

The adjustments of the impedance elements are the same as given in I.L. 41-412.1 for the standard relay.

The three auxiliary switches A1, B1 and C1 have adjustable plunger travel. Adjust the two nuts on the bottom of the fixed shaft so that the plunger has 1/8" travel after the lower contact makes. The plunger should have 1/64" travel in the opposite directions after the upper contacts make. This is accomplished by screwing down the set screw on top of the switch until the upper contact makes just as the plunger hits the upper stop. Then back off this screw 1/2 turn and lock in place.

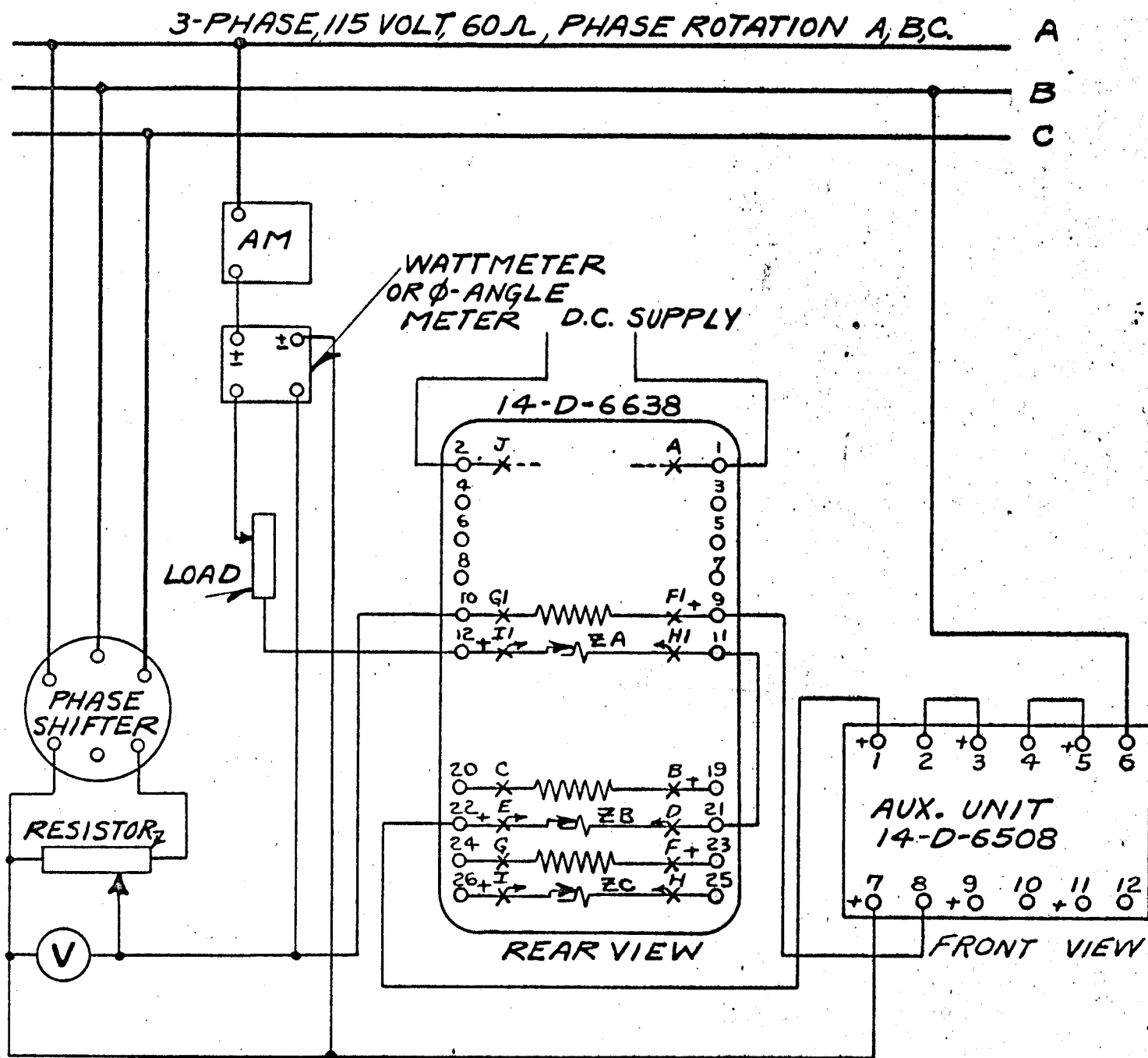
For an electrical check, apply 80 volts (for a 125 volt relay or 160 volts for a 250 volt relay) across terminals 1 and 2. Close two impedance element contacts. Both contactor switches will pick up and open their back contacts.

The relay contacts should be cleaned periodically with a fine file. S#1002110 is recommended for this purpose.

#### REFERENCE DRAWINGS

Internal schematic of HZM-3 relay	14-D-6638
Outline of HZM-3 relay	9-B-1905
Internal schematic of 3 element auxiliary unit	14-D-6508
Outline of 3 element aux. unit	14-D-6507
Test connections of HZM-3 relay	17-D-3268

# TEST CONNECTIONS FOR TYPE HZM-3 RELAY IN TYPE FT CASE



CONNECTIONS SHOWN FOR TEST OF ONE ELEMENT ONLY