GENERAL ELECTRIC METER RELAYS

INTRODUCTION

These instructions cover the installation of General Electric Type 195 (Big Look) Meter Relays in three sizes and Type 196 (Horizon Line) Meter Relays in two sizes.

General Electric Meter Relays consist of two separate units; an indicator set-point unit and a control unit. The indicator set-point unit is basically an electric indicating panel instrument, to which has been added control point indication and initiation. The indicator set-point unit has a control point adjustment knob(s), control point indication pointer(s), light switch(es), lamp and light shield. The control unit consists of load relay(s) and supplies power to the lamp and light switch(es) in the indicator set-point unit.

In addition to DC and AC (rectifier) models, pyrometer models can be supplied. Pyrometer models have bi-metal, cold junction compensation and may be supplied with or without a thermocouple break protecting circuit.

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.

As a measurement, control or protection device or system, customer should note that a failure of this instrument or system for whatever reason, may leave the monitored process unprotected. It is suggested that the customer review the need for further redundant or other alternate means of protection.

Fig. 1. GENERAL ELECTRIC METER RELAYS
SPECIFICATIONS  
(CONTROL FUNCTION)

ACCURACY: (at 77°F)  
Set Point; ± 2% F.S.  
(referred to indicating pointer)

REPEATABILITY  
0.3% F.S.

VOLTAGE INFLUENCE  
0.75% max. change with 10 volt change (from 117V reference)

INDICATING POINTER TRAVEL  
The indicating pointer will indicate accurately above or below either set-point.

LOAD RELAY  
a. Double pole-double throw for each set-point.

b. Rating; 5 amps AC non-inductive at 120V; 5 amps DC non-inductive at 28V.

MOUNTING POSITION  
Indicator Set-Point Unit;  
Standard; scale vertical  
Optional; Any with special calibration  
Control Unit; no position influence

POWER SUPPLY FOR CONTROL UNIT (See note A)  
Nominal:- 117V, 50/60 cps, 7.0 V.A. max  
for either single or double set-point unit.

Max.: 127V, 50/60 cps  
Min.: 107V, 50/60 cps

NOTE A:  
If the load being controlled causes a voltage drop of more than 2 volts in the voltage supply for the controller, this supply should come from a different source to eliminate "hunting".

DEAD BAND  
±0.5% F.S.

FREQUENCY INFLUENCE  
0.3% max. change, 60 cps to 45 cps or 60 cps to 65 cps.

CONTROL ACTION  
Automatic On-Off action (Automatic Reset). If Alarm Action (Manual Reset) is desired the user can convert to this by removing jumper wire and add momentary contact or pushbutton switches as shown in fig. 2.

LAMP  
Expected life 5 years.

DIELECTRIC TEST  
Live parts to face and panel-2600V RMS.

INSTALLATION  

MOUNTING  

NOTE: All drilling of the panel should be completed before the unit is mounted.

The General Electric Meter Relays are sturdily constructed and will withstand reasonable amounts of vibration and handling.
The 3 1/2 and 4 1/2 inch sizes may be mounted as a unit (see Fig. 5, 6, 8 and 9) or the control unit may be mounted separately from the indicator set-point unit (see Fig. 7 for separate mounting of the control unit). The 2 1/2 inch size (Big Look Only) requires separate mounting of the control unit with a bracket and a connection cable, which are furnished with this size (see Fig. 7).

The indicator set-point unit is of self-shielded construction and may be mounted in magnetic or non-magnetic panels without special calibration.

In cases where panel vibration is of a magnitude to cause false pointer indication, this can usually be eliminated by mounting the control unit separately.

**CONNECTIONS**

**Indicator Set-Point Unit**

Connections to the circuit being measured are made to terminal studs on the back of the case of the indicator set-point unit (see Fig. 4). The left hand stud (rear view) is always positive. The contact surface of nuts, washers, and cable terminals must be thoroughly clean to insure good contact.

Connections between the indicator set-point unit and the control unit are made through a built-in connector and socket as the control unit is mounted to the indicator set-point unit (3 1/2 and 4 1/2 inch size) or by a pre-wired cable assembly for the 2 1/2 inch size.

**Control Unit**

Terminals for the 117V, 60 cps power supply, for the double pole - double throw relay (one per set point), and for the alarm control action are on the back of the control unit. Each terminal is supplied with a #6-32 pan head machine screw. (See Fig. 3 for terminal layout).

The relay terminals are entirely passive and are completely isolated from either the measured circuit or the power supply circuit. (See Table A and Fig. 2 for relay operation).

**ADJUSTMENTS**

**Adjustment of Indicating Pointer with Zero Adjuster**

The following adjustment may be necessary in some cases due to a shift in zero position because of shock in transportation.

The Meter Relay should be in its operating position when any such adjustment is made.

**A. Electric Quantity Meter Relay**

1. Zero on scale - adjust pointer to zero with no power applied.

2. Suppressed Zero - apply end scale power and adjust pointer to correct indication.

**B. Pyrometer Meter Relays**

1. Without Thermocouple Break Protection - pointer should indicate ambient temperature, adjust zero set as required.

2. With Thermocouple Break Protection

   a. Control unit unenergized - with or without T/C: - pointer is off scale below zero - do not adjust zero set.

   b. Control unit energized without T/C: - pointer is off scale above full scale - do not adjust zero set.
c. Control unit energized - with adjusted T/C connected but at ambient temperature: - pointer should indicate ambient temperature (after 1/2 hour warm-up) adjust zero set as required.

Adjustment of Thermocouple Resistance

Note: Total thermocouple resistance may be equal to or less than the lead resistance printed on the scale of the indicator set-point unit.

A small resistor is mounted on the back of the case of the indicator set-point unit. This resistor is connected in series with the thermocouple and its resistance is adjusted until the resistance of the thermocouple plus resistor is equal to the lead resistance printed on the scale of the indicator set-point unit. (See Fig. 4.)

A. Method of Adjustment

Connect negative (-) thermocouple wire to the smaller of the two terminals which support the resistor. Connect an ohmmeter to the larger of the two terminals, which support the resistor, and to the positive (+) thermocouple wire.

DO NOT connect the positive (+) thermocouple wire to the instrument until resistance adjustment is complete.

The resistor is a double wound, pull off style of approximately 10 ohms. Wire can be removed from the body of the resistor without unsoldering. Resistance of the thermocouple-resistor combination is reduced by unwrapping the looped end of wire from the resistor and shorting between the wires. Continue to remove wire and shorting between the wires until the resistance of the thermocouple and resistor equals the resistance specified on the scale.

Connect the positive (+) thermocouple wire to the positive (+) terminal of the indicator set-point unit.

ADJUSTMENT OF CONTROL POINT

This adjustment is made using the knob(s) mounted on the cover of the indicator set-point unit. The setting of the control point(s) is indicated by the position of the set pointer. Control will occur as the indicating pointer matches the set pointer(s).

The set pointer(s) may be adjusted to any position, from zero to full scale, and do not interfere in any way with the movement of the indicating pointer. Double set-pointers may be positioned to within two angular degrees of each other which is approximately 2% of full scale. Unless otherwise specified on the order, the operation of the set-points may overlap when the set points are brought to their minimum mechanical distance apart.

For best accuracy, allow at least 10 minutes warm-up (with lamp energized) before making final set-point adjustment. This improves the accuracy approximately 0.5%. To check set-point accuracy; a 117V, 60 cps supply must be used.

MAINTENANCE

To clean the plastic window, wash it with soap and water. To remove grease or oil, use kerosene sparingly. DO NOT use acetone, benzene, carbon tetrachloride, fire-extinguisher fluids, lacquer thinners, or window sprays containing these solvents, since they will smear or soften the window.

It is recommended that the window be wiped or blotted periodically with a clean damp chamois. Do not rub the window with a dry cloth as this is likely to cause scratches and to build up an undesirable electrostatic charge which will cause erroneous readings. After cleaning, an antistatic agent, such as GE Spec. No. A50W321, should be applied to the window to neutralize any electrostatic charges present.

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PARTS REPLACEMENT

Lamp - Cat. No. 4868K32-001
(See below)

In the event of lamp failure, the lamp may be removed by removing control unit, loosening the two screws at the rear of the indicator set-point unit, then rotate the lamp cover and pull out the lamp holder. (See Fig. 4.) Replace the lamp with GE Cat. No. 4868K32-001 (Purchase from Instrument Dept., General Electric Company, 40 Federal Street, W. Lynn, Mass. only).

To arrange for other repairs, consult the nearest General Electric sales office.

TABLE A

<table>
<thead>
<tr>
<th>Inst. Pointer Relative to Set Points</th>
<th>Downscale from Set Point</th>
<th>High Set Point Relay</th>
<th>Low Set Point Relay</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energized</td>
<td>De-energized</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between Set Point Scales</td>
<td>Energized</td>
<td>Energized</td>
<td></td>
</tr>
<tr>
<td>Upscale from Set Point</td>
<td>De-energized</td>
<td>Energized</td>
<td></td>
</tr>
</tbody>
</table>

**As a general rule select conductor size so that resistance of each conductor is 0.1-ohm or less. The following table lists some possibilities.

<table>
<thead>
<tr>
<th>AWG. SIZE</th>
<th>MAX. CABLE LENGTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>18</td>
<td>19 feet</td>
</tr>
<tr>
<td>20</td>
<td>12 feet</td>
</tr>
<tr>
<td>22</td>
<td>7 feet</td>
</tr>
<tr>
<td>24</td>
<td>4.5 feet</td>
</tr>
<tr>
<td>26</td>
<td>3.0 feet</td>
</tr>
</tbody>
</table>

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ACCESSORY FOR REMOTE MOUNTING OF CONTROL UNIT

Cat. No. 1012K10G700**
Includes plug, socket, connection diagram, bracket and hardware--customer can make cable of any desired length by soldering insulated wires to plug and socket.

Cat. No. 1012K10G701*
Includes 6 ft. cable with plug and socket connectors attached, plus bracket and hardware.

*Cable assembly, bracket and hardware (Cat. No. 1012K10G701) is furnished as standard equipment with the 2 1/2" meter relay.

Fig. 2. External Connections (Cont. Unit)
NOTE: Relays shown de-energized (no power to instrument)
Type 195 and Type 196 Meter Relay

Fig. 3. Rear view of control unit showing spacing of screw-type connections

Fig. 4. Typical rear view of indicator set-point unit

Fig. 5. Outline and panel cut-out dimensions for Type 195 meter relay, 4 1/2-inch size, with control unit piggy-back mounted.

Fig. 6. Outline and panel cut-out dimensions for Type 195 meter relay, 3 1/2-inch size, with control unit piggy-back mounted.
Fig. 7. Outline and panel cut-out dimensions for Type 195 meter relay, 2 1/2-inch size, control unit remote mounted as required due to small-size indicator set-point unit. (This Figure shows remote mounting of control unit for both Type 195 and Type 196 meter relays, as desired.)

Fig. 8. Outline and panel cutout dimensions for Type 196 meter relay, 3 1/2-inch size, front mounted.

Fig. 9. Outline and panel cutout dimensions for Type 196 meter relay, 3 1/2-inch size, built-in.
Type 195 and Type 196 Meter Relay

Fig. 10. Outline and panel cutout dimensions for Type 196 meter relay, 4 1/2-inch size front mounted.

Fig. 11. Outline and panel cutout dimensions for Type 196 meter relay, 4 1/2-inch size, built-in.

Fig. 12. Schematic for meter relay, single (high) set-point

Units are shipped from factory with jumper wire across terminals 1 and 2 which provides on/off (automatic reset) control action; for alarm type (manual reset) control action, remove jumper and substitute switch as shown.

Thermocouple-break circuit (if supplied) is shown by — — lines.
Type 195 and Type 196 Meter Relay

Fig. 13. External connections of Meter Relay with current transformer

Fig. 14. External connections of Meter Relay with rheostat

Fig. 15. Dimensions of external rheostat for meter relay