# ELECTRICAL INDICATING INSTRUMENTS AND METERS MOUNTED IN POWER PLANTS

## 1. GENERAL

1.001 This addendum supplements Section A401.562, Issue 2-D.

1.002 This addendum is reissued to omit KS specification instruments from column 2 of Table 1 and to add a paragraph covering the use of Anstac 2-M cleaner.

## 2. REQUIREMENTS

The following changes apply to Part 2 of the section:

(a) 2.01 - revised
(b) 2.04(a) - revised
(c) Table 1 - revised

2.01 General: Column 2 of Table 1 lists the manufacturer's name and code of electrical indicating instruments which should be checked for accuracy limits. However, instruments to which KS specification numbers have been assigned are also covered but are not referred to as such in the column. On KS specification instruments, the KS number as well as the manufacturer's name and model or type number appears on the dial face of the instrument. Instruments shall be checked in place on their respective panels without being removed.

2.04 Accuracy

(a) The indication of a voltmeter used for showing float voltage of a battery, when compared with the standard, shall match the standard at the nearest minor scale division to the specified floating value.

Table 1

| Rated Accuracy and Service (1) | Manufacturer and Model or Type (2) | Divisions on Scale (3) | Maximum Permissible Error in Scale Divisions (4) | (5) |
|---|---|---|---|---|
| 1 per cent Direct Current | Triplett, Model 420 Ammeters<br>Weston, Model 11, 24, 57, 269, 271, 273, and 741, Type 6<br>Western Electric, Type S, Type D Voltmeters | 40 | 1/2 | 2-1/4 |
| | | 50 | 3/4 | 2-1/2 |
| | | 60 | 3/4 | 3-1/4 |
| | | 75 | 1 | 4 |
| | | 100 | 1-1/4 | 5-1/2 |
| | | 150 | 2 | 8 |
| 2 per cent Direct Current | Triplett, Model 321L, 324, and 327T<br>Triplett, Model 420 Voltmeters<br>Weston, Model 301<br>Western Electric, Type A, B, G, H, J, and AA<br>Type D Ammeters | 30 | 3/4 | 1-3/4 |
| | | 40 | 1 | 2-1/4 |
| | | 50 | 1-1/4 | 3 |
| | | 60 | 1-1/2 | 3-1/4 |
| | | 65 | 1-1/2 | 3-1/2 |
| | | 75 | 2 | 4 |
| | | 80 | 2 | 4-1/4 |
| | | 100 | 2-1/2 | 5-1/2 |
| | | 150 | 3-1/2 | 8 |
| 1 per cent Alternating Current | Weston, Model 151, 156, 216, 260, 261, 429, 578, 610, 641 642, and 744<br>Westinghouse, Type DY<br>Roller-Smith, Type FA | 25 | 1/2 | 1-1/2 |
| | | 30 | 1/2 | 1-3/4 |
| | | 40 | 1/2 | 2-1/4 |
| | | 50 | 3/4 | 2-1/2 |
| | | 60 | 3/4 | 3-1/4 |
| | | 65 | 1 | 3-1/2 |
| | | 75 | 1 | 4 |
| 2 per cent Alternating Current | Weston, Model 476 | 25 | 3/4 | 1-1/2 |
| | | 30 | 3/4 | 1-3/4 |
| | | 40 | 1 | 2-1/4 |
| | | 50 | 1-1/4 | 2-3/4 |
| 5 per cent Alternating Current Rectifier Type | Weston, Model 301<br>Western Electric, Type C, D, G, H, J, S, and AA | 50 | 2-3/4 | 2-3/4 |
| | | 75 | 4 | 4 |

Note

On engine-alternator sets, instruments resembling the Weston Model 301 in appearance, but of other manufacture, and currently being supplied. They should be checked under the requirements applying to the Weston Model 476.

## 3. ADJUSTING PROCEDURES

The following changes apply to Part 3 of the section:

(a) 3.001 - revised
(b) 3.03 and 3.04(1) and (2) - revised
(c) 3.04 (106) - added

### 3.001 List of Additional Tools and Materials

| Code or Spec No. | Description |
|---|---|
| Tools | |
| KS-6854 | 3-1/2-inch Screwdriver |
| Materials | |
| KS-2423 | Cloth |
| - | Anstac 2-M Cleaner (Chemical Development Corp.) |

3.03 Freedom of Movement (Rq 2.03)
3.04 Accuracy (Rq 2.04)

DC Voltmeters

Suppressed Zero Type

(1) Connect the standard, with the VOLTS switch on the appropriate point, in parallel with the instrument being checked. In some cases, it is possible and permissible to adjust the regulator of the associated charging source until the pointer of the standard falls on the nearest scale line to the voltage concerned. The instrument under test is then adjusted to indicate exactly, or as nearly as possible, the same value as shown on the standard instrument. The accuracy with which the instrument is set depends on its use. Usually, however, it is undesirable or impossible to use the plant voltage to check the accuracy of the voltmeter. The plant voltage adjustment procedure may be complicated or the nature of load variations may cause an unsteady voltage. Therefore, it is suggested that a 35-type test set be used when testing or readjusting the accuracy of these voltmeters. First, remove voltage from the meter to be tested by removing the VM fuse or by any other convenient means. Then, using the method shown in 3.04(5) to (18) adjust the instrument under test to indicate exactly, or as nearly as possible, the same value as shown on the standard instrument. Also see 3.04(2). The accuracy with which the instrument is set depends on its use. Observe the pointer for freedom of movement.

(2) Some suppressed zero voltmeters have the zero adjusters appearing on the outside of the cover. This adjuster is connected to the abutment lever and may be used to adjust the position of the pointer when the meter is compared with a standard. Other suppressed zero voltmeters manufactured by Weston usually have zero adjusters appearing on the outside of the cover, but without connection to the abutment lever by means of which the indication of the instrument is adjusted. In such a case, remove the cover and shift the abutment lever manually, as required, as shown in Fig. 2. In some older models, no zero adjuster appears on the outside of the cover and a straight lever is provided within for adjusting the indication. After the cover has been removed, loosen the two clamping screws and shift the lever manually, as required. Tighten the screws firmly before replacing the cover, as shown in Fig. 3. Suppressed zero voltmeters manufactured by Western Electric are without the zero adjuster. To adjust the indication it will be necessary to remove the cover and shift the member to which the spring is attached. It is held by friction and is not clamped. After adjusting a zero adjuster, it is desirable to seal it by means of a piece of scotch tape or masking tape to discourage unauthorized adjustments.

Static Charges on S-type Meter Cases Made of Methyl Methacrylate (Lucite)

(106) During cleaning operations, static surface charges may be produced on a methyl methacrylate meter case of sufficient intensity to interfere with the proper operation of the meter. This static charge problem may be generally overcome by wiping the meter face with a clean KS-2423 cloth slightly moistened with Anstac 2-M cleaner. Allow the moistened surface to dry and then wipe with a dry clean KS-2423 cloth. Further applications of the cleaner should be made as required to overcome any static charges. Occasionally, this procedure may not be entirely effective. When this condition exists, apply Anstac 2-M cleaner in the same manner as covered above to the inside and outside of the entire meter case. To do this, remove the meter from service and, if necessary, draw it forward sufficiently to provide access to the case mounting screws. Use the KS-6854 screwdriver to remove the four flathead machine screws which hold the case to the base of the meter. Care must be exercised so as not to damage the screw slots and the bushings which mount under the screw heads.