



October 2000

## AC Power Accessory for the Microshield O/C Relay

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### Introduction:

The AC Power Accessory for the Microshield O/C Time-Overcurrent Relay (“MSOC”) is used in applications where a dc battery control power source is not available.

These instructions do not purport to cover all details or variations in equipment, nor to provide for every possible contingency to be met in conjunction with installation, operation, or maintenance. Should particular problems arise which are not covered sufficiently for the purchaser’s purposes, the matter should be referred to ABB. Refer to Instruction Book IB 7.2.1.7-16 for details of the MSOC relay.

### Application:

Some medium-voltage switchgear applications are of a nature that it is not practical to use a dc substation battery and companion charger to provide dc control power. This may be due to the small size of the installation, or lack of personnel to maintain the batteries, or due to a high shock and vibration environment such as seen by portable skid-mounted mining equipment.

In these applications a Capacitor Trip Device is typically used to provide energy to trip the shunt trip of the circuit breaker upon closure of the tripping contact of an associated protective relay. In this device the ac voltage source is rectified and the capacitor is charged to the peak voltage received from the rectifier. The capacitor is sized such that sufficient energy is stored, typically, to allow two trip operations.

This capacitor trip device must not be used as the source of dc control power for protective relays that have a continuous drain on their control power input. A relay with continuous drain will tend to discharge the capacitor trip unit during the overcurrent timing period such that there may not be sufficient energy left to trip the breaker upon closure of the protective relay’s trip contact.

Since the Type MSOC overcurrent relay does have a continuous drain in order to power its electronic circuitry, the AC Power Accessory provides an alternative for these cases. This device converts 120 or 240vac from the control power transformer source to a nominal 48vdc to continuously supply dc control power to one Type MSOC overcurrent relay. The accessory includes sufficient energy storage to provide for at least 3.5 seconds of operation of the MSOC after complete loss or severe depression of the ac voltage source, such as might occur on a severe overcurrent fault. This allows the MSOC to maintain proper coordination timing with downstream protection, and still be able to provide a trip contact closure at the end of the timing interval. Only the tripping contact of the MSOC is connected to the Capacitor Trip Unit in the switchgear, so that there is no drain of it from the MSOC.

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### **Precautions**

1. The MSOC relay used with this accessory must have a control voltage rating of 18-60vdc.
2. On failure of the ac control voltage source (control power transformer failure, blown fuse) the MSOC relay will not be operable after the initial 5 second hold-up period. A loss-of-control-voltage alarm should be used to alert operating personnel of this condition. Where appropriate upstream backup protection is not available, consideration should be given to tripping on loss of ac by a circuit-breaker undervoltage trip device.
3. Wait at least 5 minutes after the ac source is disconnected before handling this unit to insure the discharge of the large internal dc storage capacitors. (See information on Testing for additional details)
4. Jumper links must be properly positioned on the terminals of the unit depending if ac supply is rated 110/120vac or 220/240vac nominal. See Drawing 604781.

Caution: since testing and troubleshooting entails working with energized equipment, care should be taken to avoid personal shock. Only competent technicians familiar with good safety practices should service these devices.

### **Mounting the Unit**

Refer to Drawing 604782 on page 4 and follow this procedure:

1. Insert the companion Microshield O/C relay from the front side of the panel into the panel cutout.
2. Looking from the rear of the panel, install the mounting hardware onto the two mounting studs on the right side of the MSOC relay. (Mounting hardware from bag # 104: flat washer, lock washer, nut)
3. Remove the 2 nuts from the ground stud of the MSOC relay at the rear terminal block.
4. Install 2 standoffs from bag # 303 onto the left side studs of the MSOC relay.
5. Hold the AC Accessory unit up to the left side of the MSOC and engage the two front mounting tabs onto the standoffs, and the rear tab onto the ground stud. With the AC Accessory unit held fully forward toward the panel, determine by visual inspection if an additional washer is needed on the ground stud behind the mounting tab. (This washer compensates for variations in front panel thickness.) If necessary back the accessory unit off and add the washer. (wave-washer from bag # 303)
6. Install the mounting hardware (lockwasher and screw from bag # 303) onto the two left side standoffs and tighten.
7. Install the nut on the ground stud of the MSOC and finger tighten until the ground wire lug is in place. Final tightening should not exceed 10 in-lbs

### **Connections:**

Drawing 604781 on page 5 shows the typical control connections for an application using the AC Power Accessory. Note that the placement of the jumper link or links depends on the nominal source voltage of the ac supply.

The use of an MSOC relay with AC Voltage inputs at terminals 11-12-13-14 is optional, and the purpose is to provide complete metering functionality. See Section 8 in the MSOC instruction book.

The drawing also shows the optional connections to use the programmable inputs. The programmable inputs require dc control, and the AC Power Accessory has sufficient capacity to supply both of the inputs. See Section 6 in the MSOC instruction book for more information on these inputs.

**Ratings and Specifications:**

Catalog Number: 613880-T1

**Input Rating:**

Nominal: Selectable by jumper links for 110/120 or 220/240 vac, 50/60Hz. nominal input.

Nominal drain: 7VA (with MSOC relay connected to the output)

Maximum Continuous: 135v for the 110/120v link position  
270v for the 220/240v link position

10 Second Rating: 185v for the 110/120v link position  
370v for the 220/240v link position

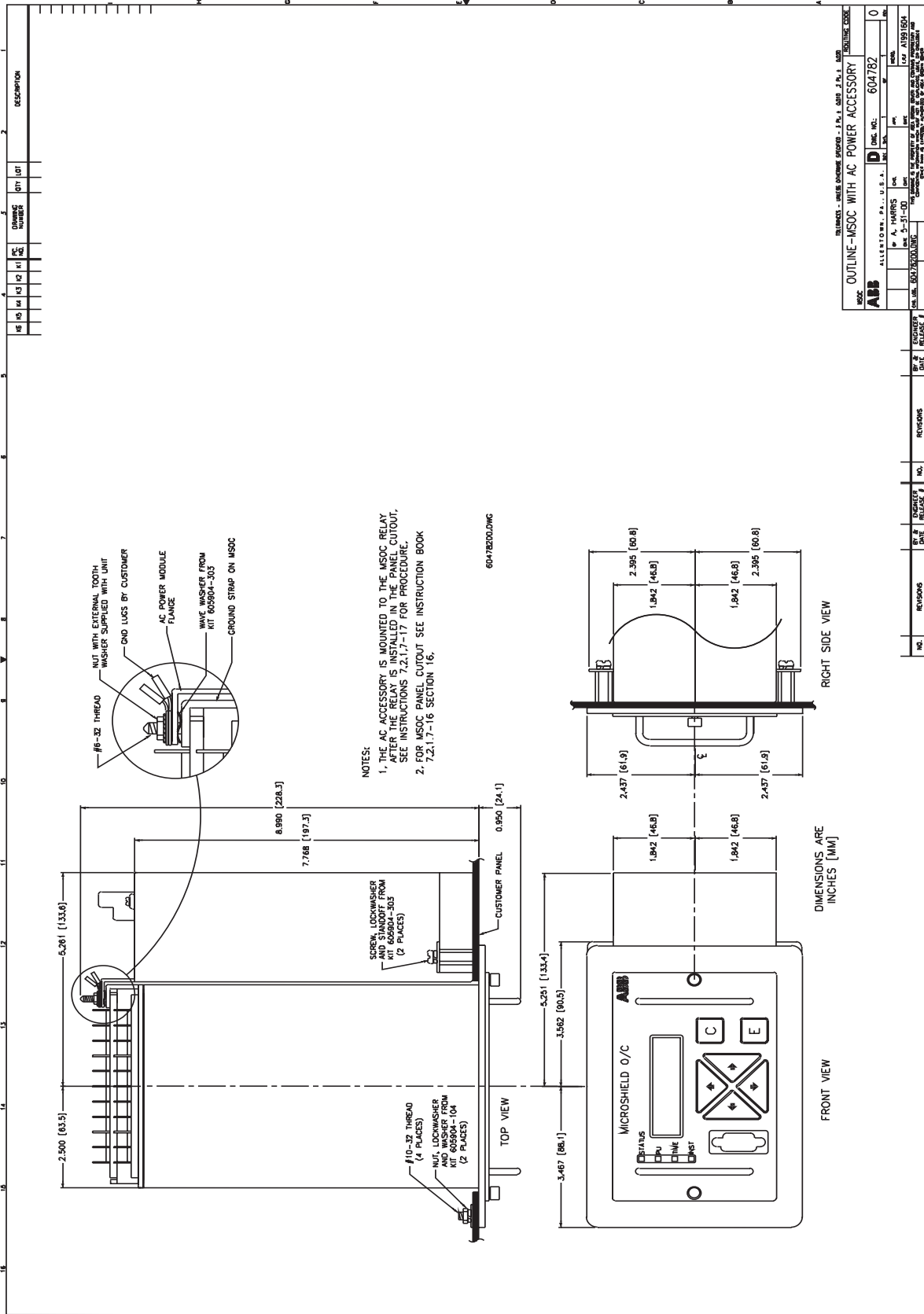
Output Rating: Nominal 6VA at 48vdc, suitable for (1) unit MSOC with dc rating 18-60vdc.

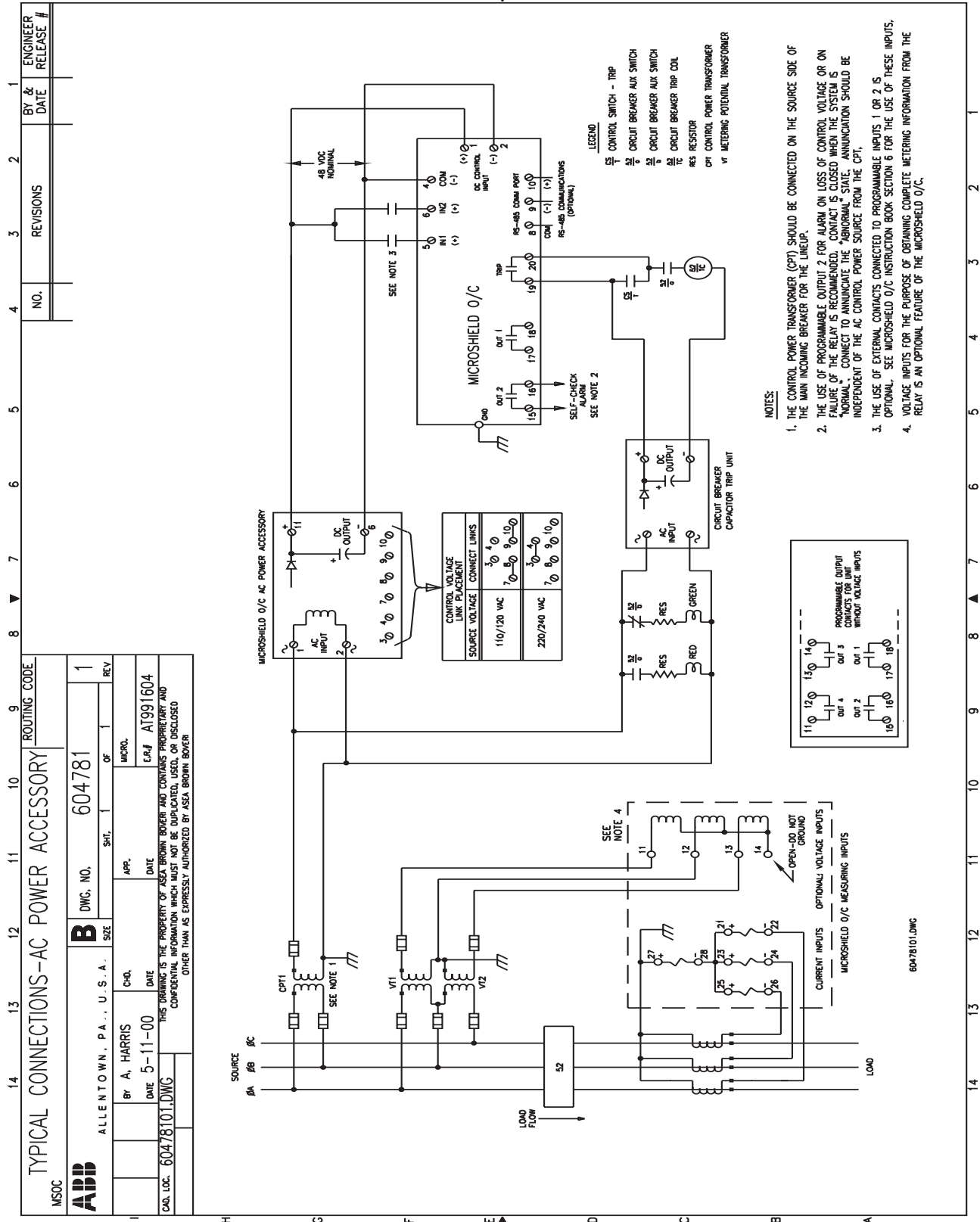
Hold-up Time for the MSOC: with nominal voltage applied and then suddenly removed, minimum 6 seconds when both programmable inputs of the MSOC are connected and the MSOC is in its maximum consumption mode (all output relays energized).

Dielectric Withstand: 2000vac, 50/60Hz, 60 seconds, all circuits to ground.

Weight: accessory unit - 3.5 lbs. (1.6 kg)  
boxed for shipment - 4 lbs. (1.8 kg)

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### **Acceptance Test Procedure**

With the accessory unit wired to an MSOC relay, and the links on the accessory in the proper position for the nominal AC source voltage, apply the source voltage and wait 30 seconds. Measure the dc voltage at the terminals 1 and 2 of the MSOC. The voltage should be in the range 44 to 52vdc. The MSOC should be operating with a green Status light illuminated.

Interrupt the AC source voltage, and measure the time until the green Status light goes out. This time should be greater than 5 seconds if the ac source voltage is within +/-5% of the nominal value.

### **Maintenance and Testing:**

No routine maintenance is required for this accessory. Periodic tests should be conducted to confirm the functionality of the unit.

**Caution:** the AC Accessory unit has a large internal storage capacitor which is charged to 48vdc nominal. If the unit is connected to an MSOC overcurrent relay, discharge of this capacitance will occur in about 20 seconds once the ac source is disconnected. However, if no MSOC is connected, or if the MSOC relay has been withdrawn from its case, then the discharge period will be about 5 minutes. Shorting of the output terminals is not recommended as a means to discharge the capacitor.



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