Calibrate MSR178DP Multifunctional Safety Timer at 242-A Evaporator

USQ # Routine Maintenance

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1.0 PURPOSE AND SCOPE

1.1 Purpose

This procedure provides instructions for calibrating Allen-Bradley MSR178DP Multifunctional Safety Timer.

1.2 Scope

This procedure applies to Allen-Bradley MSR178DP Multifunctional Safety Timers as configured for operation in the 242-A Evaporator.

This procedure may only be performed when 242-A Evaporator is in SHUTDOWN mode.

2.0 INFORMATION

2.1 Terms and Definitions

- TDR Time Delay Relay.

2.2 General Information

2.2.1 The Safety Timers are located inside the 242-A Evaporator’s shift office inside of panel CA1-ENCL-205. The performance of this procedure will require removal of the Plexiglas barrier.

2.2.2 In this procedure the term Time Delay Relay (TDR) and Multifunctional Safety Timer are used interchangeably.
3.0 PRECAUTIONS AND LIMITATIONS

3.1 Personnel Safety

3.1.1 If working around live circuits, extreme caution should be used. Failure to follow electrical safety practices as outlined in DOE-0359, Hanford Site Electrical Safety Program could result in serious injury.

3.1.2 During the performance of this procedure, compliance with the DOE-0336, Hanford Site Lockout/Tagout Procedure is required.

3.1.3 Failure to use protective equipment when working on or near energized systems could result in serious injury. Job specific protective equipment requirements should be addressed during the pre-job brief and be in accordance with TFC-ESHQ-S_IS-C-02.

3.2 Radiation and Contamination Control

Work in radiological areas will be performed using a radiological work permit following review and Risk Screening by Radiological Control per ALARA Work Planning procedure TFC-ESHQ-RP_RWP-C-03.
4.0 PREREQUISITES

4.1 Special Tools, Equipment and Supplies

The following supplies may be needed to perform this procedure:
- Digital Multimeter (DMM)
- Stop watch, for each unit being tested
- Other tools, equipment and supplies as identified by Shift Manager/OE/FWS/User.

4.2 Performance Documents

The following documents may be needed to perform this procedure:
- DOE-0336, Hanford Site Lockout/Tagout Procedure.

4.3 Field Preparation

4.3.1 REQUEST Operations configure system to allow for performance of this procedure.

4.3.2 ENSURE lockout/tagout and overlocking requirements have been satisfied per DOE-0336, Hanford Site Lockout/Tagout Procedure.

4.3.3 REMOVE Plexiglas barrier from panel 205, located in the shift office.
5.0 **PROCEDURE**

NOTE - Time delay relays are located inside panel 205 in the shift office.

- A picture of the Allen-Bradley MSR178DP Multifunctional Safety Timer, which is referred to in this procedure as a TDR, is available for reference in Figure 2.

**Special Instructions**

The subsections within 5.0 can be worked independently, concurrently, in parallel, or not at all as directed by the field work supervisor and explained on Work Record

Configure/Simulate STA associated with Timer under test such that Timer is in reset condition (i.e. input 4-20 mA into STA to clear tripped alarms).

5.1 **Calibrating Multifunctional Safety Timer/TDR1**

5.1.1 **CONNECT** Ohmmeter to the following TDR1 output contact pairs, one pair at a time, **AND**

**CHECK** that contacts are in a closed state.

- Contacts 17 & 18
- Contacts 27 & 28.

5.1.2 **DISCONNECT** Ohmmeter from the last TDR1 contact pair tested.

5.1.3 **IF** any contact pair is in an open state, **STOP AND NOTIFY** FWS for resolution.

**NOTE** - When the fuse associated with the TDR is removed the LED’s associated with CH1 and CH2 will go out. LED’s CHT1 and CHT2 will start to blink and continue blinking until the “time delay period” has passed.

- TDR1 should time out in less than 60 seconds.

5.1.4 **REMOVE** fuse FU1 **AND**

**USING** the stop-watch, **SIMULTANEOUSLY START** timing.

5.1.5 **PERFORM** this Step during the “time delay period”, **CONNECT** Ohmmeter to TDR1 contact pair 17 & 18 **AND**

**IF** contacts change to an open state before the “time delay period” has passed, **STOP AND NOTIFY** FWS for resolution.
5.1 Calibrating Multifunctional Safety Timer/TDR1 (Cont.)

5.1.6 WHEN LED’s CHT1 and CHT2 stop blinking, STOP timing.

5.1.7 CONNECT Ohmmeter to the following TDR1 output contact pairs, one pair at a time, AND CHECK that contacts are in an open state.
   - Contacts 17 & 18
   - Contacts 27 & 28.

5.1.8 DISCONNECT Ohmmeter from the last contact pair tested.

5.1.9 IF any contact pair is in a closed state, STOP AND NOTIFY FWS for resolution.

5.1.10 RECORD results in As Found column on Data Sheet.

5.1.11 IF TDR1 timed out in less than 60 seconds it is within tolerance, RECORD As Found time in As Left column of Data Sheet AND INSTALL fuse FU1.

5.1.12 IF TDR1 timed out in greater than 60 seconds, PERFORM the following:

   5.1.12.1 RESET MCS- High differential pressure (S1 RESET).
   5.1.12.2 CHECK that LED’s CH1 and CH2 are illuminated.
   5.1.12.3 CHECK that LED’s CHT1 and CHT2 are not blinking.

NOTE - TDR1 is configured with a span of 295 seconds (5-300 second range). A setting of 58 seconds is approximately 18 % of span.

   5.1.12.4 USING the dial, SET TDR1 to a value of ≈18 % (≈58 seconds).
5.1 Calibrating Multifunctional Safety Timer/TDR1 (Cont.)

5.1.12.5 **REPEAT** Steps 5.1.4 through 5.1.11.

**OR**

**IF** Steps 5.1.4 through 5.1.12.5 have been performed and TDR1 is still out of tolerance, **PERFORM** the following:

a. **NOTIFY** FWS of pending equipment replacement/repair.

b. **FWS NOTIFY** Shift Manager and contact planning for BOM.

c. **REQUEST** Planning to print new Data Sheet(s).

d. **IF** Lockout/Tagout is required, **COMPLY** with the DOE-0336, Hanford Site Lockout/Tagout Procedure.

e. **REPLACE** Instrument.

f. **CONFIGURE** jumpers on replacement TDR per Figure 3 – TDR Jumper Configuration.

g. **PERFORM** Section 5.1.

5.1.13 **RESET** MCS- High differential pressure (S1 RESET).
5.2 Calibrating Multifunctional Safety Timer/TDR2

5.2.1 CONNECT Ohmmeter to the following TDR2 output contact pairs, one pair at a time, AND

CHECK that contacts are in a closed state.
- Contacts 17 & 18
- Contacts 27 & 28.

5.2.2 DISCONNECT Ohmmeter from the last contact pair tested.

5.2.3 IF any contact pair is in an open state, STOP AND NOTIFY FWS for resolution.

NOTE - When the fuse associated with the TDR is removed the LED’s associated with CH1 and CH2 will go out. LED’s CHT1 and CHT2 will start to blink and continue blinking until the “time delay period” has passed.

- TDR2 should time out in less than 60 seconds.

5.2.4 REMOVE fuse FU2 AND

USING the stop-watch, SIMULTANEOUSLY START timing.

5.2.5 PERFORM this Step during the “time delay period”, CONNECT Ohmmeter to TDR2 contact pair 17 & 18 AND

IF contacts change to an open state before the “time delay period” has passed, STOP AND NOTIFY FWS for resolution.

5.2.6 WHEN LED’s CHT1 and CHT2 stop blinking, STOP timing.

5.2.7 CONNECT Ohmmeter to the following TDR2 output contact pairs, one pair at a time,

AND CHECK that contacts are in an open state.
- Contacts 17 & 18
- Contacts 27 & 28.

5.2.8 DISCONNECT Ohmmeter from the last contact pair tested.

5.2.9 IF any contact pair is in a closed state, STOP AND NOTIFY FWS for resolution.

5.2.10 RECORD results in As Found column on Data Sheet.
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5.2 Calibrating Multifunctional Safety Timer/TDR2 (Cont.)

5.2.11 **IF** TDR2 timed out in less than 60 seconds it is within tolerance, **RECORD** As Found time in As Left column of Data Sheet **AND**

**INSTALL** fuse FU2.

5.2.12 **IF** TDR2 timed out in greater than 60 seconds, **PERFORM** the following:

5.2.12.1 **RESET** MCS- High differential pressure (S1 RESET).

5.2.12.2 **CHECK** that LED’S CH1 and CH2 are illuminated.

5.2.12.3 **CHECK** that LED’s CHT1 and CHT2 are not blinking.

**NOTE** - TDR2 is configured with a span of 295 seconds (5-300 second range). A setting of 58 seconds is approximately 18 % of span.

5.2.12.4 **USING** the dial, **SET** TDR2 to a value of ≈18 % (≈58 seconds).

5.2.12.5 **REPEAT** Steps 5.2.4 through 5.2.11.

**OR**

**IF** Steps 5.2.4 through 5.2.12.5 have been performed and TDR2 is still out of tolerance, **PERFORM** the following:

a. **NOTIFY** FWS of pending equipment replacement/repair.

b. **FWS NOTIFY** Shift Manager and contact planning for BOM.

c. **REQUEST** Planning to print new Data Sheet(s).

d. **IF** Lockout/Tagout is required, **COMPLY** with the DOE-0336, Hanford Site Lockout/Tagout Procedure.

e. **REPLACE** Instrument.

f. **CONFIGURE** jumpers on replacement TDR per Figure 3 – TDR Jumper Configuration.

g. **PERFORM** Section 5.2.

5.2.13 **RESET** MCS- High differential pressure (S1 RESET).
5.3 Calibrating Multifunctional Safety Timer/TDR3

5.3.1 CONNECT Ohmmeter to the following TDR3 output contact pairs, one pair at a time, AND

CHECK that contacts are in a closed state.
- Contacts 17 & 18
- Contacts 27 & 28.

5.3.2 DISCONNECT Ohmmeter from the last contact pair tested.

5.3.3 IF any contact pair is in an open state, STOP AND NOTIFY FWS for resolution.

NOTE - When the fuse associated with the TDR is removed the LED’s associated with CH1 and CH2 will go out. LED’s CHT1 and CHT2 will start to blink and continue blinking until the “time delay period” has passed.

- TDR3 should time out in less than 30 minutes.

5.3.4 REMOVE fuse FU7 AND

USING the stop-watch, SIMULTANEOUSLY START timing.

5.3.5 PERFORM this Step during the “time delay period”, CONNECT Ohmmeter to TDR3 contact pair 17 & 28 AND

IF contacts change to an open state before the “time delay period” has passed, STOP AND NOTIFY FWS for resolution.

5.3.6 WHEN LED’s CHT1 and CHT2 stop blinking, STOP timing.

5.3.7 CONNECT Ohmmeter to the following TDR3 output contact pairs, one pair at a time,

AND CHECK that contacts are in an open state.
- Contacts 17 & 18
- Contacts 27 & 28.

5.3.8 DISCONNECT Ohmmeter from the last contact pair tested.

5.3.9 IF any contact pair is in a closed state, STOP AND NOTIFY FWS for resolution.

5.3.10 RECORD results in As Found column on Data Sheet.
5.3 Calibrating Multifunctional Safety Timer/TDR3 (Cont.)

5.3.11 IF TDR3 timed out in less than 30 minutes it is within tolerance, RECORD As Found time in As Left column of Data Sheet AND INSTALL fuse FU7.

5.3.12 IF TDR3 timed out in greater than 30 minutes, PERFORM the following:

5.3.12.1 RESET MCS- Flam Gas 1&2 (S2 RESET).

5.3.12.2 CHECK that LED’S CH1 and CH2 are illuminated.

5.3.12.3 CHECK that LED’s CHT1 and CHT2 are not blinking.

NOTE - TDR3 is configured with a span of 29 minutes (1-30 minute range). A setting of 27 minutes is approximately 90 % of span.

5.3.12.4 USING the dial, SET TDR3 to a value of ≈90 % (≈27 minutes).

5.3.12.5 REPEAT Steps 5.3.4 through 5.3.11.

OR

IF Steps 5.3.4 through 5.3.12.5 have been performed and TDR3 is still out of tolerance, PERFORM the following:

a. NOTIFY FWS of pending equipment replacement/repair.

b. FWS NOTIFY Shift Manager and contact planning for BOM.

c. REQUEST Planning to print new Data Sheet(s).

d. IF Lockout/Tagout is required, COMPLY with the DOE-0336, Hanford Site Lockout/Tagout Procedure.

e. REPLACE Instrument.

f. CONFIGURE jumpers on replacement TDR per Figure 3 – TDR Jumper Configuration.

g. PERFORM Section 5.3.

5.3.13 RESET MCS- Flam Gas 1 & 2 (S2 RESET).
5.4 Calibrating Multifunctional Safety Timer/TDR4

5.4.1 CONNECT Ohmmeter to the following TDR4 output contact pairs, one pair at a time, AND

CHECK that contacts are in a closed state.
- Contacts 17 & 18
- Contacts 27 & 28

5.4.2 DISCONNECT Ohmmeter from the last contact pair tested.

5.4.3 IF any contact pair is in an open state, STOP AND NOTIFY FWS for resolution.

NOTE - When the fuse associated with the TDR is removed the LED’s associated with CH1 and CH2 will go out. LED’s CHT1 and CHT2 will start to blink and continue blinking until the “time delay period” has passed.

- TDR4 should time out in less than 30 minutes.

5.4.4 REMOVE fuse FU7 AND

USING the stop-watch, SIMULTANEOUSLY START timing.

5.4.5 PERFORM this Step during the “time delay period”, CONNECT Ohmmeter to TDR4 contact pair 17 & 18 AND

IF contacts change to an open state before the “time delay period” has passed, STOP AND NOTIFY FWS for resolution.

5.4.6 WHEN LED’s CHT1 and CHT2 stop blinking, STOP timing.

5.4.7 CONNECT Ohmmeter to the following TDR4 output contact pairs, one pair at a time,

AND CHECK that contacts are in an open state.
- Contacts 17 & 18
- Contacts 27 & 28.

5.4.8 DISCONNECT Ohmmeter from the last contact pair tested.

5.4.9 IF any contact pair is in a closed state, STOP AND NOTIFY FWS for resolution.

5.4.10 RECORD results in As Found column on Data Sheet.
5.4 Calibrating Multifunctional Safety Timer/TDR4 (Cont.)

5.4.11 IF TDR4 timed out in less than 30 minutes it is within tolerance, RECORD As Found time in As Left column of Data Sheet AND INSTALL fuse FU7.

5.4.12 IF TDR4 timed out in greater than 30 minutes, PERFORM the following:

- **5.4.12.1** RESET MCS- Flam Gas 1 & 2 (S2 RESET).
- **5.4.12.2** CHECK that LED’S CH1 and CH2 are illuminated.
- **5.4.12.3** CHECK that LED’s CHT1 and CHT2 are not blinking.

**NOTE** - TDR4 is configured with a span of 29 minutes (1-30 minute range). A setting of 27 minutes is approximately 90 % of span.

- **5.4.12.4** USING the dial, SET TDR4 to a value of ≈90 % (~27 minutes).
- **5.4.12.5** REPEAT Steps 5.4.4 through 5.4.11.

**OR**

- **5.4.13** RESET MCS- Flam Gas 1 & 2 (S2 RESET).

  IF Steps 5.4.4 through 5.4.12.5 have been performed and TDR4 is still out of tolerance, PERFORM the following:

  a. NOTIFY FWS of pending equipment replacement/repair.
  b. FWS NOTIFY Shift Manager and contact planning for BOM.
  c. REQUEST Planning to print new Data Sheet(s).
  d. IF Lockout/Tagout is required, COMPLY with the DOE-0336, Hanford Site Lockout/Tagout Procedure.
  e. REPLACE Instrument.
  f. CONFIGURE jumpers on replacement TDR per Figure 3 – TDR Jumper Configuration.
  g. PERFORM Section 5.4.
5.5  Calibrating Multifunctional Safety Timer/TDR5

5.5.1  CONNECT Ohmmeter to the following TDR5 output contact pairs, one pair at a time, AND

CHECK that contacts are in a closed state.

• Contacts 17 & 18
• Contacts 27 & 28.

5.5.2  DISCONNECT Ohmmeter from the last contact pair tested.

5.5.3  IF any contact pair is in an open state, STOP AND NOTIFY FWS for resolution.

NOTE - When the fuse associated with the TDR is removed the LED’s associated with CH1 and CH2 will go out. LED’s CHT1 and CHT2 will start to blink and continue blinking until the “time delay period” has passed.

- TDR5 should time out in less than 30 minutes.

5.5.4  REMOVE fuse FU7 AND

USING the stop-watch, SIMULTANEOUSLY START timing.

5.5.5  PERFORM this Step during the “time delay period”, CONNECT Ohmmeter to TDR5 contact pair 17 & 18 AND

IF contacts change to an open state before the “time delay period” has passed, STOP AND NOTIFY FWS for resolution.

5.5.6  WHEN LED’s CHT1 and CHT2 stop blinking, STOP timing.

5.5.7  CONNECT Ohmmeter to the following TDR5 output contact pairs, one pair at a time,

AND CHECK that contacts are in an open state.

• Contacts 17 & 18
• Contacts 27 & 28.

5.5.8  DISCONNECT Ohmmeter from the last contact pair tested.

5.5.9  IF any contact pair is in a closed state, STOP AND NOTIFY FWS for resolution.

5.5.10 RECORD results in As Found column on Data Sheet.
5.5 Calibrating Multifunctional Safety Timer/TDR5 (Cont.)

5.5.11 IF TDR5 timed out in less than 30 minutes it is within tolerance, RECORD As Found time in As Left column of Data Sheet AND INSTALL fuse FU7.

5.5.12 IF TDR5 timed out in greater than 30 minutes, PERFORM the following:

5.5.12.1 RESET MCS- High differential pressure (S1 RESET).

5.5.12.2 CHECK that LED’s CH1 and CH2 are illuminated.

5.5.12.3 CHECK that LED’s CHT1 and CHT2 are not blinking.

NOTE - TDR5 is configured with a span of 29 minutes (1-30 minute range). A setting of 27 minutes is approximately 90 % of span.

5.5.12.4 USING the dial, SET TDR5 to a value of ≈90% (≈27 minutes).

5.5.12.5 REPEAT Steps 5.5.4 through 5.5.11 OR IF Steps 5.5.4 through 5.5.12.5 have been performed and TDR5 is still out of tolerance, PERFORM the following:

a. NOTIFY FWS of pending equipment replacement/repair.

b. FWS NOTIFY Shift Manager and contact planning for BOM.

c. REQUEST Planning to print new Data Sheet(s).

d. IF Lockout/Tagout is required, COMPLY with the DOE-0336, Hanford Site Lockout/Tagout Procedure.

e. REPLACE Instrument.

f. CONFIGURE jumpers on replacement TDR per Figure 3 – TDR Jumper Configuration.

g. PERFORM Section 5.5.

5.5.13 INSTALL Plexiglas barrier.

5.5.14 RESET MCS- High differential pressure (S2 RESET).
5.6 Calibrating Multifunctional Safety Timer/TDR6

5.6.1 CONNECT Ohmmeter to the following TDR6 output contact pairs, one pair at a time, AND

CHECK that contacts are in a closed state.
- Contacts 17 & 18
- Contacts 27 & 28.

5.6.2 DISCONNECT Ohmmeter from the last contact pair tested.

5.6.3 IF any contact pair is in an open state, STOP AND NOTIFY FWS for resolution.

NOTE - When the fuse associated with the TDR is removed the LED’s associated with CH1 and CH2 will go out. LED’s CHT1 and CHT2 will start to blink and continue blinking until the “time delay period” has passed.

- TDR6 should time out in less than 30 minutes.

5.6.4 REMOVE fuse FU7 AND

USING the stop-watch, SIMULTANEOUSLY START timing.

5.6.5 PERFORM this Step during the “time delay period”, CONNECT Ohmmeter to TDR6 contact pair 17 & 18 AND

IF contacts change to an open state before the “time delay period” has passed, STOP AND NOTIFY FWS for resolution.

5.6.6 WHEN LED’s CHT1 and CHT2 stop blinking, STOP timing.

5.6.7 CONNECT Ohmmeter the following TDR6 output contact pairs, one pair at a time,

AND CHECK that contacts are in an open state.
- Contacts 17 & 18
- Contacts 27 & 28.

5.6.8 DISCONNECT Ohmmeter from the last contact pair tested.

5.6.9 IF any contact pair is in a closed state, STOP AND NOTIFY FWS for resolution.

5.6.10 RECORD results in As Found column on Data Sheet.
5.6 Calibrating Multifunctional Safety Timer/TDR6 (Cont.)

5.6.11 IF TDR6 timed out in less than 30 minutes it is within tolerance, RECORD As Found time in As Left column of Data Sheet AND

INSTALL fuse FU7.

5.6.12 IF TDR6 timed out in greater than 30 minutes, PERFORM the following:

5.6.12.1 RESET MCS- Flam Gas 1 & 2 (S2 RESET).

5.6.12.2 CHECK that LED’S CH1 and CH2 are illuminated.

5.6.12.3 CHECK that LED’s CHT1 and CHT2 are not blinking.

NOTE - TDR6 is configured with a span of 29 minutes (1-30 minute range). A setting of 27 minutes is approximately 90 % of span.

5.6.12.4 USING the dial, SET TDR6 to a value of ≈90 % (≈27 minutes).

5.6.12.5 REPEAT Steps 5.6.4 through 5.6.11.

OR

IF Steps 5.6.4 through 5.6.12.5 have been performed and TDR6 is still out of tolerance, PERFORM the following:

a. NOTIFY FWS of pending equipment replacement/repair.

b. FWS NOTIFY Shift Manager and contact planning for BOM.

c. REQUEST Planning to print new Data Sheet(s).

d. IF Lockout/Tagout is required, COMPLY with the DOE-0336, Hanford Site Lockout/Tagout Procedure.

 e. REPLACE Instrument.

f. CONFIGURE jumpers on replacement TDR per Figure 3 – TDR Jumper Configuration.

g. PERFORM Section 5.6.

5.6.13 INSTALL Plexiglas barrier

5.6.14 RESET MCS- Flam Gas 1 & 2 (S2 RESET).
5.7 Calibrating Multifunctional Safety Timer/TDR7

5.7.1 CONNECT Ohmmeter to the following TDR7 output contact pairs, one pair at a time, AND

CHECK that contacts are in a CLOSED state.
- Contacts 17 & 18
- Contacts 27 & 28.

5.7.2 DISCONNECT Ohmmeter from the last contact pair tested.

5.7.3 IF any contact pair is in an OPEN state, STOP AND NOTIFY FWS for resolution.

5.7.4 INSTALL test wire jumper from TB6-1 to TB6-2 (24VDC).

NOTE - When the fuse associated with the TDR is removed the LED’s associated with CH1 and CH2 will go out. LED’s CHT1 and CHT2 will start to blink and continue blinking until the “time delay period” has passed.
- TDR7 should time out in less than 30 minutes.

5.7.5 REMOVE fuse FU7 AND

USING the stop-watch, SIMULTANEOUSLY START timing.

5.7.6 PERFORM this Step during the “time delay period”, CONNECT Ohmmeter to TDR7 contact pair 17 & 18 AND

IF contacts change to an open state before the “time delay period” has passed, STOP AND NOTIFY FWS for resolution.

5.7.7 WHEN LED’s CHT1 and CHT2 stop blinking, STOP timing.

5.7.8 CONNECT Ohmmeter to the following TDR7 output contact pairs, one pair at a time,

AND CHECK that contacts are in an open state.
- Contacts 17 & 18
- Contacts 27 & 28.

5.7.9 DISCONNECT Ohmmeter from the last contact pair tested.
5.7 Calibrating Multifunctional Safety Timer/TDR7 (Cont.)

5.7.10 IF any contact pair is in a closed state, STOP AND NOTIFY FWS for resolution.

5.7.11 REMOVE test wire jumper from TB6-1 to TB6-2 (24VDC).

5.7.12 RECORD results in As Found column on Data Sheet.

5.7.13 IF TDR7 timed out in less than 30 minutes it is within tolerance, RECORD As Found time in As Left column of Data Sheet AND INSTALL fuse FU7.

5.7.14 IF TDR7 timed out in greater than 30 minutes, PERFORM the following:

5.7.14.1 RESET MCS- Flam Gas 1 & 2 (S2 RESET).

5.7.14.2 CHECK that LED’S CH1 and CH2 are illuminated.

5.7.14.3 CHECK that LED’s CHT1 and CHT2 are not blinking.

NOTE - TDR7 is configured with a span of 29 minutes (1-30 minute range). A setting of 27 minutes is approximately 90 % of span.

5.7.14.4 USING the dial, SET TDR7 to a value of ≈90 % (≈27 minutes).
5.7 Calibrating Multifunctional Safety Timer/TDR7 (Cont.)

5.7.14.5 **REPEAT** Steps 5.7.5 through 5.7.13.

**OR**

**IF** Steps 5.7.5 through 5.7.14.5 have been performed and TDR7 is still out of tolerance, **PERFORM** the following:

a. **NOTIFY** FWS of pending equipment replacement/repair.

b. **FWS NOTIFY** Shift Manager and contact planning for BOM.

c. **REQUEST** Planning to print new Data Sheet(s).

d. **IF** Lockout/Tagout is required, **COMPLY** with the DOE-0336, Hanford Site Lockout/Tagout Procedure.

e. **REPLACE** Instrument.

f. **CONFIGURE** jumpers on replacement TDR per Figure 3 – TDR Jumper Configuration.

g. **PERFORM** Section 5.7.

5.7.15 **RESET** MCS- Flam Gas 1 & 2 (S2 RESET).
5.8 Calibrating Multifunctional Safety Timer/TDR8

5.8.1 CONNECT Ohmmeter to the following TDR8 output contact pairs, one pair at a time, AND

CHECK that contacts are in a closed state.
- Contacts 17 & 18
- Contacts 27 & 28.

5.8.2 DISCONNECT Ohmmeter from the last contact pair tested.

5.8.3 IF any contact pair is in an open state, STOP AND NOTIFY FWS for resolution.

5.8.4 INSTALL test wire jumper from TB6-3 to TB6-4 (24VDC).

NOTE - When the fuse associated with the TDR is removed the LED’s associated with CH1 and CH2 will go out. LED’s CHT1 and CHT2 will start to blink and continue blinking until the “time delay period” has passed.
- TDR8 should time out in less than 30 minutes.

5.8.5 REMOVE fuse FU7 AND

USING the stop-watch, SIMULTANEOUSLY START timing.

5.8.6 PERFORM this Step during the “time delay period”, CONNECT Ohmmeter to TDR8 contact pair 17 & 18 AND

IF contacts change to an open state before the “time delay period” has passed, STOP AND NOTIFY FWS for resolution.

5.8.7 WHEN LED’s CHT1 and CHT2 stop blinking, STOP timing.

5.8.8 CONNECT Ohmmeter to the following TDR8 output contact pairs, one pair at a time,

AND CHECK that contacts are in an open state.
- Contacts 17 & 18
- Contacts 27 & 28.

5.8.9 DISCONNECT Ohmmeter from the last contact pair tested.
5.8 Calibrating Multifunctional Safety Timer/TDR8 (Cont.)

5.8.10 IF any contact pair is in a closed state, STOP AND NOTIFY FWS for resolution.

5.8.11 REMOVE test wire jumper from TB6-3 to TB6-4 (24VDC).

5.8.12 RECORD results in As Found column on Data Sheet.

5.8.13 IF TDR8 timed out in less than 30 minutes it is within tolerance, RECORD As Found time in As Left column of Data Sheet AND INSTALL fuse FU7.

5.8.14 IF TDR8 timed out in greater than 30 minutes, PERFORM the following:

5.8.14.1 RESET MCS- Flam Gas 1&2 (S2 RESET).

5.8.14.2 CHECK that LED’S CH1 and CH2 are illuminated.

5.8.14.3 CHECK that LED’s CHT1 and CHT2 are not blinking.

NOTE - TDR8 is configured with a span of 29 minutes (1-30 minute range). A setting of 27 minutes is approximately 90 % of span.

5.8.14.4 USING the dial, SET TDR8 to a value of ≈90 % (≈27 minutes).
5.8 Calibrating Multifunctional Safety Timer/TDR8 (Cont.)

5.8.14.5 **REPEAT** Steps 5.8.5 through 5.8.13.

**OR**

**IF** Steps 5.8.5 through 5.8.14.5 have been performed and TDR8 is still out of tolerance, **PERFORM** the following:

a. **NOTIFY** FWS of pending equipment replacement/repair.

b. FWS **NOTIFY** Shift Manager and contact planning for BOM.

c. **REQUEST** Planning to print new Data Sheet(s).

d. **IF** Lockout/Tagout is required, **COMPLY** with the DOE-0336, Hanford Site Lockout/Tagout Procedure.

e. **REPLACE** Instrument.

f. **CONFIGURE** jumpers on replacement TDR per Figure 3 – TDR Jumper Configuration.

g. **PERFORM** Section 5.8.

5.8.15 **RESET** MCS- Flam Gas 1 & 2 (S2 RESET).
5.9 Restoration

5.9.1 IF any problems were encountered with calibration, INFORM FWS.

5.9.2 IF not already removed, DISCONNECT AND REMOVE Test Equipment.

5.9.3 INSTALL Plexiglas barrier in panel 205.

5.9.4 RECORD the Test Equipment information and calibration status on Data Sheet.

5.9.5 CHECK equipment restoration by observing indications are consistent with expected conditions.

5.9.6 NOTIFY Operations that testing is complete and system may be returned to desired configuration.

5.10 Acceptance Criteria

Acceptance Criteria has been met when Steps in this procedure have been satisfactorily performed and As-Left values meet the specifications and tolerance(s) per the Data Sheet.

5.11 Review

5.11.1 INFORM FWS test is complete.

5.11.2 FWS REVIEW AND ENSURE the following:
  • Completed Data Sheets meet the acceptance criteria.
  • Comments sections are filled out appropriately.
  • Work requests needed as a result of this procedure are identified and generated.
  • Work request number(s) of any work documents generated as a result of this procedure, are recorded in the Comments/Remarks section of the Data Sheet (if applicable).
5.12 Records

The performance of this procedure generates no records. However, PM Data Sheets associated with the procedure are records and are maintained in the work package as record material.

The record custodian identified in the Company-level Records Inventory and Disposition Schedule (RIDS) is responsible for record retention in accordance with TFC-BSM-IRM_DC-C-02.
Figure 1 – TDR Connection Diagram
Calibrate MSR178DP Multifunctional Safety Timer at 242-A Evaporator

Figure 2 – Allen-Bradley MSR178DP Multifunctional Safety Timer
Figure 3 – TDR Jumper Configuration

Excerpt from Drawing. H-2-836463 Sheet 4, Rev 0.