

## TMO2D with Fault Alarm and Event Log

Your TMO2D oxygen analyzer has been modified to provide a *Fault Alarm* relay contact and an *Event Log*. However, before you can access these features, the TMO2D must be installed and programmed as instructed in your basic *User's Manual*.

Depending on the specific software version installed in your unit, the details for using the *Fault Alarm* and *Event Log* differ somewhat. After verifying your software version, proceed directly to one of the following sections:

- Software Version 4B or earlier - go to the section below
- Software Version 4C or later - go to the section on page 7

### Software Version 4B (or Earlier)

If the software installed in your analyzer is Version 4B or earlier, proceed with this section. However, if software Version 4C or later is installed in your analyzer, skip this section and proceed directly to the section on page 7.

### Using the Fault Alarm

The *Fault Alarm* relay is energized during normal operation. If a fault or a power failure occurs, the relay is de-energized. This is known as *failsafe* operation. The relay has Form-C contacts, so that a fault can be indicated with either an open contact or a closed contact.

The failsafe *Fault Alarm* trips when one or more of the following fault events occurs:

- power failure
- RAM checksum failure (memory corruption)
- transmitter under range
- transmitter over range
- no calibration curve

The TMO2D indicates a fault event by de-energizing the relay. If multiple faults occur simultaneously, the TMO2D indicates the fault from highest precedence (power failure) to lowest (no calibration curve), in the order listed above. When all fault conditions have been removed, the fault relay is re-energized.

Faults are detected only when the TMO2D is in *Operate Mode* (displaying data). When in *Menu Mode* (during programming), the detection and signaling of faults is suspended. In this case, the *Fault Alarm* holds its last state (energized or de-energized) until the unit has been returned to *Operate Mode*.

Using the Fault Alarm  
(cont.)

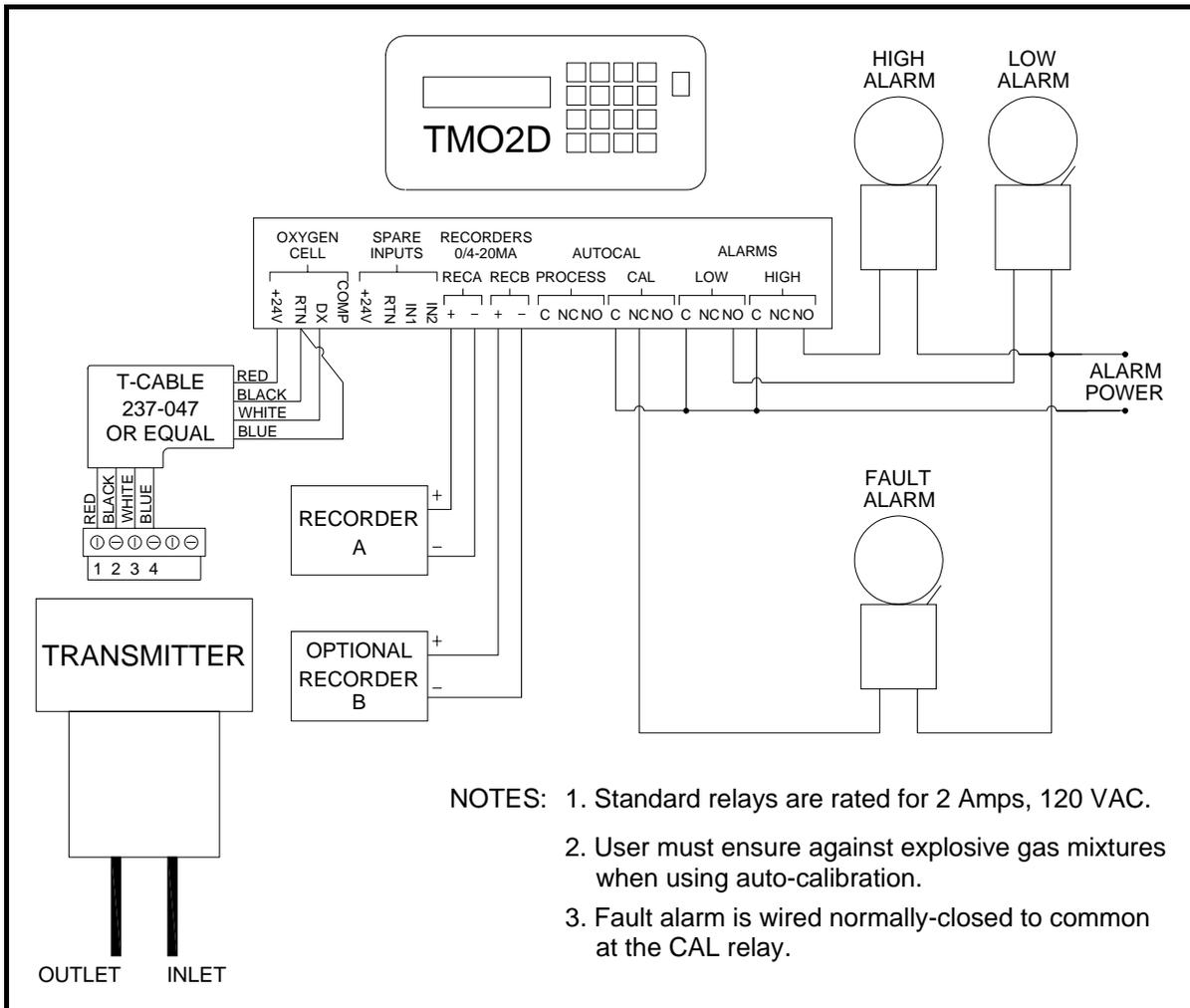
To provide power-failure detection, the *Fault Alarm* relay is energized (ON) during normal operation and de-energized (OFF) during a fault condition. Therefore, when testing the alarm relay, select “ON” to indicate a normal operating condition and “OFF” to indicate a fault condition (see Table 1 below).

**Table 1: Fault Alarm Relay Conditions**

Condition	Alarm State	Alarm Test Selection
normal operation	energized	ON
fault	de-energized	OFF

Wiring the Fault Alarm

Your TMO2D uses the relay labeled “CAL” for the *Fault Alarm*. Wire the *Fault Alarm* as shown in Figure 1 below.



**Figure 1: Wiring the TMO2D with Fault Alarm (Software Version 4B or Earlier)**

## Testing the Fault Alarm

The *Fault Alarm* is tested in the same way as the other alarms (refer to Table 1 on page 2 for a summary of the *Fault Alarm* relay conditions). Follow the instructions in Chapter 4 of your *User's Manual* under *Alarms Test* to enter the [Alarms Test] menu. Notice that the display below now shows [fault] as an additional choice.

Select alarm to test: [HIGH] low fault done
--

Use the [NO] or arrow keys to select [FAULT].

Select alarm to test: high low [FAULT] done
--

Press [YES] to confirm your selection.

Turn Fault Alarm: [ON] off done
------------------------------------

Use the [NO] or arrow keys to select [ON]. Then press [YES] to turn the *Fault Alarm* ON (non-fault condition).

**Note:** When [YES] is pressed above, the alarm relay turns ON (non-fault condition), and the selection brackets move to [OFF].

Turn Fault Alarm: on [OFF] done
------------------------------------

Press [YES] to turn the *Fault Alarm* OFF (fault condition).

**Note:** When [YES] is pressed above, the alarm relay turns OFF (fault condition), and the selection brackets move to [ON].

Turn Fault Alarm: on off [DONE]
------------------------------------

When you finish testing the *Fault Alarm*, use the [NO] or arrow keys to select [DONE]. Then, press [YES] to exit the *Fault Alarm* test menu.

Exit the [Alarms Test] menu as described in your *User's Manual*.

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## Using the Event Log

Your modified TMO2D maintains an *Event Log* in battery-backed memory. Among other things, this log indicates the nature of any fault signaled by the *Fault Alarm* relay by recording the type, date, and time of the relevant events.

The *Event Log* can record up to 25 events of the following types:

- factory initialization
- system power on
- system RESET
- RAM checksum failure (memory corruption)
- transmitter under range
- transmitter over range
- no calibration curve
- return to normal operation

**Note:** *Testing the Fault Alarm does not appear in the Event Log.*

The TMO2D stores only the 25 most recent events in its memory. When additional events occur, the TMO2D discards the oldest event from the log to make room for the new event.

## Viewing the Event Log

The *Event Log* may be viewed on the TMO2D display or transmitted to a computer, printer or other data acquisition system via the RS232 serial port. To view the *Event Log* on the TMO2D display, press [NO], and the following prompt appears:

Enter Code: *** 50.0% Alarm:
---------------------------------

Using the keypad, enter the system passcode (123). An asterisk is displayed as each digit is entered.

MAIN MENU Setup?
---------------------

Press [NO] until the *System Log?* prompt appears.

MAIN MENU System Log?
--------------------------

Press [YES].

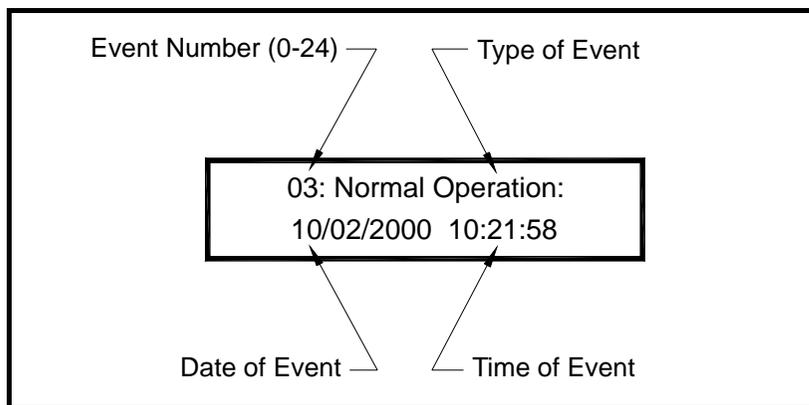
SYSTEM LOG MENU Display System Log?
--

Press [NO] until the *Display System Log?* prompt appears. Then, press [YES].

03: Normal Operation: 04/04/1997 10:21:58
--

The most recent event in the *Event Log* is displayed.

At the above prompt, use the arrow keys to scroll through the logged events ([←] for the previous event, [→] for the next event). When done, press [NO] to exit the *Event Log*. See Figure 2 below for a description of the components of the event log screen.



**Figure 2: The Event Log Display Screen**

## Printing the Event Log

To print the *Event Log*, enter the [System Log] menu, as described in the previous section. The following display appears:

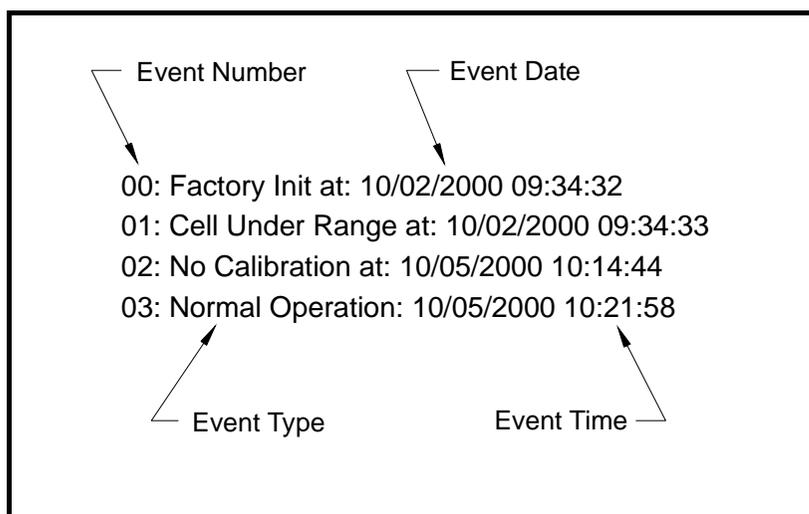
```
SYSTEM LOG MENU
Display System Log?
```

Press [NO].

```
SYSTEM LOG MENU
Print System Log?
```

Press [YES] and the entire log is transmitted via the RS232 serial port.

The *Event Log* printout looks similar to the example shown in Figure 3 below.



**Figure 3: A Typical Event Log Printout**

## Exiting the [System Log] Menu

To exit the [System Log] menu, proceed as follows:

```
SYSTEM LOG MENU
Print System Log?
```

Press [NO] until the *Done?* prompt appears

```
SYSTEM LOG MENU
Done?
```

Press [YES] to return to the Main Menu.

## Software Version 4C (or Later)

If the software installed in your analyzer is Version 4C or later, proceed with this section. However, if software Version 4B or earlier is installed in your analyzer, skip this section and proceed directly to the section on page 1.

## Using the Fault Alarm

The *Fault Alarm* relay is energized during normal operation. If a fault or a power failure occurs, the relay is de-energized. This is known as *failsafe* operation. The relay has Form-C contacts, so that a fault can be indicated with either an open contact or a closed contact.

The failsafe *Fault Alarm* trips when one or more of the following fault events occurs:

- power failure
- RAM checksum failure (memory corruption)
- transmitter under range
- transmitter over range
- no calibration curve
- AutoCal Total drift
- AutoCal Drift/Cal

The TMO2D indicates a fault event by de-energizing the relay. If multiple faults occur simultaneously, the TMO2D indicates the fault from highest precedence (power failure) to lowest (no calibration curve), in the order listed above. When all fault conditions have been removed, the fault relay is re-energized.

Faults are detected only when the TMO2D is in *Operate Mode* (displaying data). When in *Menu Mode* (during programming), the detection and signaling of faults is suspended. In this case, the *Fault Alarm* holds its last state (energized or de-energized) until the unit has been returned to *Operate Mode*.

To provide power-failure detection, the *Fault Alarm* relay is energized (ON) during normal operation and de-energized (OFF) during a fault condition. Therefore, when testing the alarm relay, select “ON” to indicate a normal operating condition and “OFF” to indicate a fault condition (see Table 2 below).

**Table 2: Fault Alarm Relay Conditions**

Condition	Alarm State	Alarm Test Selection
normal operation	energized	ON
fault	de-energized	OFF

## Wiring the Fault Alarm

Your TMO2D uses the relay labeled “HIGH” for the *Fault Alarm*. Wire the Fault Alarm as shown in Figure 4 below.

**Note:** With this software version, the “LOW” alarm relay handles both the low alarm trip point and the high alarm trip point.

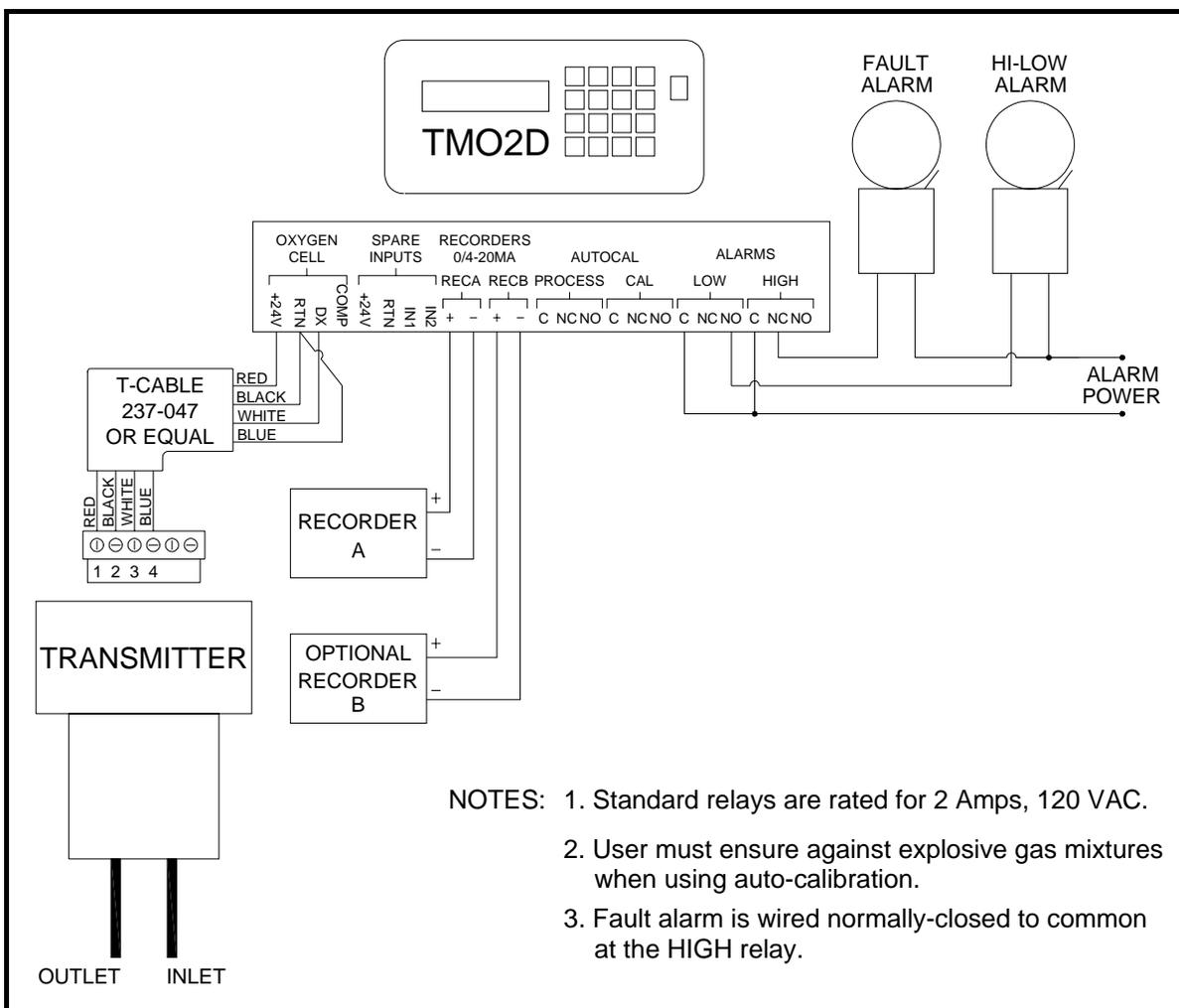


Figure 4: Wiring the TMO2D with Fault Alarm (Software Version 4C or Later)

## Testing the Fault Alarm

The *Fault Alarm* is tested in the same way as the other alarms (refer to Table 2 on page 7 for a summary of the *Fault Alarm* relay conditions). Follow the instructions in Chapter 4 of your *User's Manual* under *Alarms Test* to enter the [Alarms Test] menu. Notice that the display below now shows [fault] as an additional choice.

Select alarm to test: [HI-LOW] fault done
--

Use the [NO] or arrow keys to select [FAULT].

Select alarm to test: hi-low [FAULT] done
--

Press [YES] to confirm your selection.

Turn Fault Alarm: [ON] off done
------------------------------------

Use the [NO] or arrow keys to select [ON]. Then press [YES] to turn the *Fault Alarm* ON (non-fault condition).

**Note:** When [YES] is pressed above, the alarm relay turns ON (non-fault condition), and the selection brackets move to [OFF].

Turn Fault Alarm: on [OFF] done
------------------------------------

Press [YES] to turn the *Fault Alarm* OFF (fault condition).

**Note:** When [YES] is pressed above, the alarm relay turns OFF (fault condition), and the selection brackets move to [ON].

Turn Fault Alarm: on off [DONE]
------------------------------------

When you finish testing the *Fault Alarm*, use the [NO] or arrow keys to select [DONE]. Then, press [YES] to exit the *Fault Alarm* test menu.

Exit the [Alarms Test] menu as described in your *User's Manual*.

## Using the Event Log

Your modified TMO2D maintains an *Event Log* in battery-backed memory. Among other things, this log indicates the nature of any fault signaled by the *Fault Alarm* relay by recording the type, date, and time of the relevant events.

The *Event Log* can record up to 25 events of the following types:

- factory initialization
- system power on
- system RESET
- RAM checksum failure (memory corruption)
- transmitter under range
- transmitter over range
- no calibration curve
- return to normal operation
- AutoCal Total drift
- AutoCal Drift/Cal

**Note:** *Testing the Fault Alarm does not appear in the Event Log.*

The TMO2D stores only the 25 most recent events in its memory. When additional events occur, the TMO2D discards the oldest event from the log to make room for the new event.

## Viewing the Event Log

The *Event Log* may be viewed on the TMO2D display or transmitted to a computer, printer or other data acquisition system via the RS232 serial port. To view the *Event Log* on the TMO2D display, press [NO], and the following prompt appears:

Enter Code: \*\*\*  
50.0% Alarm:

Using the keypad, enter the system passcode (123). An asterisk is displayed as each digit is entered.

MAIN MENU  
Setup?

Press [NO] until the *System Log?* prompt appears.

MAIN MENU  
System Log?

Press [YES].

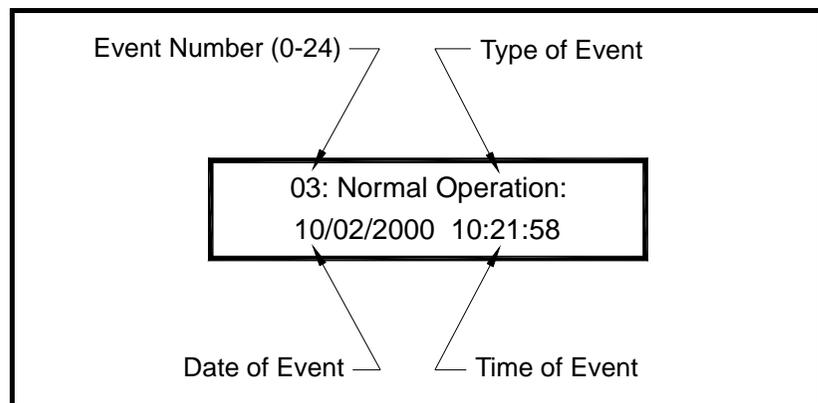
SYSTEM LOG MENU  
Display System Log?

Press [NO] until the *Display System Log?* prompt appears. Then, press [YES].

03: Normal Operation:  
04/04/1997 10:21:58

The most recent event in the *Event Log* is displayed.

At the above prompt, use the arrow keys to scroll through the logged events ([←] for the previous event, [→] for the next event). When done, press [NO] to exit the *Event Log*. See Figure 5 below for a description of the components of the event log screen.



**Figure 5: The Event Log Display Screen**

## Printing the Event Log

To print the *Event Log*, enter the [System Log] menu, as described in the previous section. The following display appears:

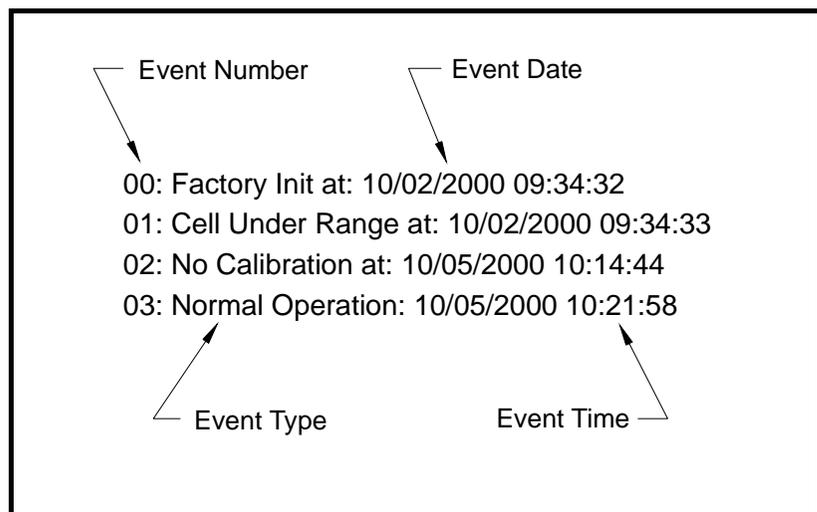
```
SYSTEM LOG MENU
Display System Log?
```

Press [NO].

```
SYSTEM LOG MENU
Print System Log?
```

Press [YES] and the entire log is transmitted via the RS232 serial port.

The *Event Log* printout looks similar to the example shown in Figure 6 below.



**Figure 6: A Typical Event Log Printout**

## Exiting the [System Log] Menu

To exit the [System Log] menu, proceed as follows:

```
SYSTEM LOG MENU
Print System Log?
```

Press [NO] until the *Done?* prompt appears

```
SYSTEM LOG MENU
Done?
```

Press [YES] to return to the Main Menu.