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**Orion 1800**

# **Orion 1800 Series Optional Modules**

INSTRUCTION MANUAL

# SIGNAL CONDITIONER MODULE

## Orion 180001

For your convenience, the optional signal conditioner module (Orion 180001) has been factory installed in all "AO" versions of monitors. Read section **Setting Module Output** and if you need to change the factory settings, see **Removing Installed Module**.

When factory settings are correct for your slave instruments ("00" versions), then proceed to section **Electrical Connections Optional Signal Conditioning Module**.

### Unpacking and Preparation

1. Ensure power to the Series 1800 Monitor is turned off at power source.
2. Open door of electronic assembly. Use No. 2 Phillips screwdriver to remove four screws on decorative panel.
3. Remove optional module keypad assembly from shipping box.
4. Unscrew module keypad from the black brackets using the two screws on the keypad.
5. Make certain the plungers are pulled back so that the grommets are in a closed position.
6. Proceed to section **Setting Module Output**.

### Removing Installed Module

1. Ensure power to the Series 1800 Monitor is turned off at power source.
2. Unscrew module keypad from the black brackets using the two screws on the keypad.
3. Make certain the plungers are pulled back so that the grommets are in a closed position.
4. Slide out module far enough to access DIP switches.

### Setting Module Output

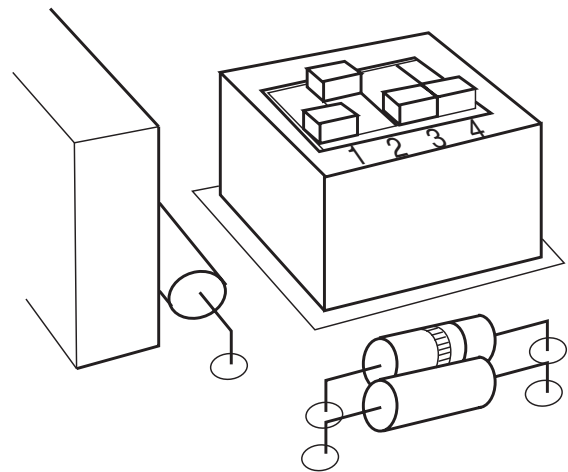
The signal conditioner has two voltage outputs (0-5 or 0-10 volts) and two current outputs (4-20 or 0-20 mA isolated). Switches are preset by manufacturer at 0-5 volts and 4-20 mA but can be reset by a DIP switch (see **Figure 1**) on signal conditioner printed circuit board. When required, alter preset output values before sliding the module into the monitor, as follows (also refer to **Table 1**):

1. Current output, factory set at 4-20 mA. 0-20 mA is obtained when switching S1-2 into "OFF" position and S1-3 into "ON" position.
2. Voltage output, factory set at 0-5V DC. 0-10V DC is obtained when switching S1-1 into "ON" position.
3. Slide PC board onto instrument guide rails. Rear of PC board should touch back plane and plug should fit securely into its socket. Check that module bracket is against both rails.
4. Push plungers in.
5. Make certain flex cable is attached to keypad and to PC board. If not, carefully slide header into socket.

**Table 1**  
**Signal Conditioner Output Modes**

|                | S1-1 | S1-2 | S1-3 | S1-4 |
|----------------|------|------|------|------|
| <b>0-5V</b>    | OFF  |      |      | X    |
| <b>0-10V</b>   | ON   |      |      | X    |
| <b>4-20 mA</b> |      | ON   | OFF  | X    |
| <b>0-20 mA</b> |      | OFF  | ON   | X    |

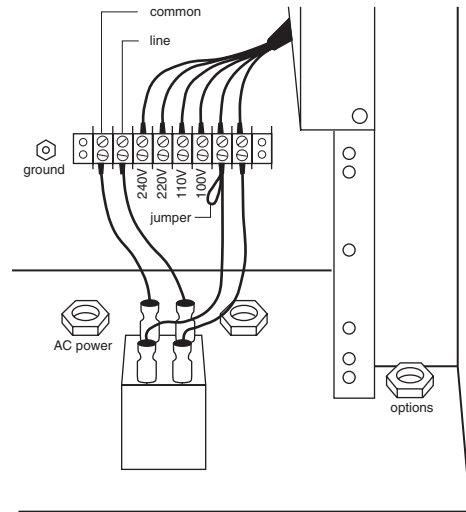
X = No Effect



**Figure 1**  
**DIP Switches on Signal Conditioner PC Board**

### Electrical Connections Optional Signal Conditioning Module

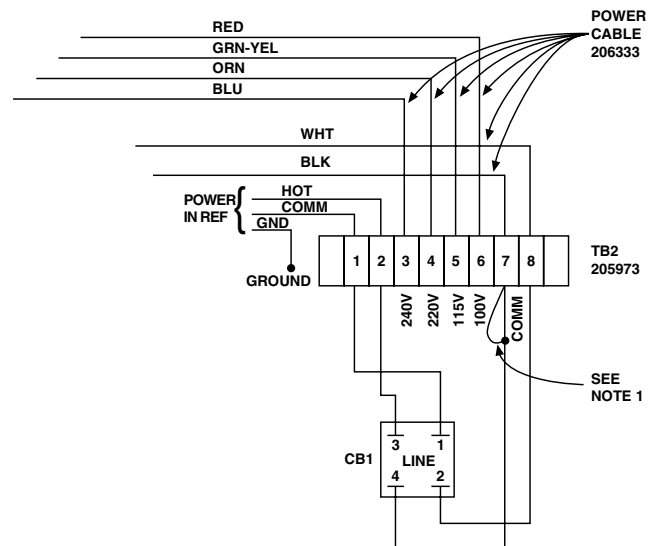
1. If module keypad is still attached, then unscrew module keypad from black brackets using the two screws on the keypad.
2. Feed wire through hole in chassis bottom labeled "options" (see **Figure 2**).
3. Run wire along wire through to signal conditioner.
4. Connect wires to voltage (0-5V or 0-10V) or current (0-20 mA or 4-20 mA) output (see **Figure 3**, and **Table 2**).
5. Double check the flex cable connections.
6. Screw the keypad on the black metal brackets.
7. Double check the flex cable connections.
8. Measure to ensure appropriate number of panels have been removed.
9. Align decorative panel against four stand-offs and re-attach with Phillips screws. Decorative panel should not cover any optional module.



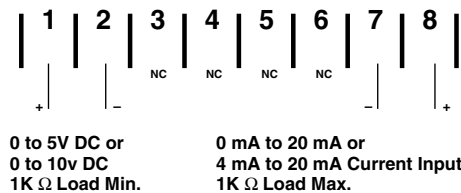
**WARNING: For safety reasons, the Series 1800 Monitor should not be operated without the decorative panel in place. Failure to replace the panel could expose the user to dangerous voltages.**

**Table 2**  
Outputs Of Signal Conditioner Module & Terminals

| Output Terminals |   |
|------------------|---|
| Voltage (+)      | 1 |
| (-)              | 2 |
| Current (-)      | 7 |
| (+)              | 8 |



**Figure 2**  
Electrical Wiring Of 1800 Series Monitors



**Figure 3**  
Wiring Diagram Of Signal Conditioner Module

## Description Of Signal Conditioner Module Controls

**Set Zero** Sets lower level concentration output. In this mode LED above **set zero** is active. To set output to either linear or logarithmic, hold key down to toggle between these two output forms.

**Set Full Scale** Sets upper level concentration output. In this mode LED above **set full scale** is active.

**Test** Generates zero or full scale output to set up an external recording device. Test key deactivates signal conditioner module and either **set zero** or **full scale** LED will be active. After pressing **test** key, there will be an output delay of up to three seconds. Press **sample** key to reactivate module.

**Mode Indicating LED** (Located on left of module keypad.) Indicates linear or logarithmic signal output. When **set zero** key is held, the mode toggles between these output forms.

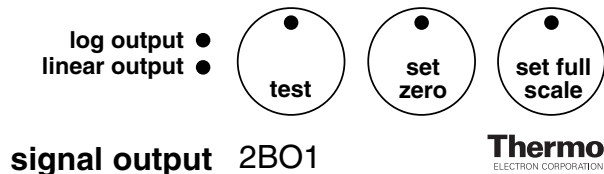


Figure 4  
Signal Conditioner Keypad

## Programming Measuring Range

1. Press **set zero** key. LED above set zero will activate and LCD will display current programmed value.
2. Alter value by using **▲** and **▼** keys.
3. Press **enter/done** key when correct value is displayed.
4. Set upper range by pressing **set full scale** then follow above procedure. Note that it is not possible to set zero value higher than full scale, and a range of at least two decades should be used.
5. To send 0% and 100% of full scale signal to an external recording device, press **test** key on signal conditioner module. The first time causes 0% signal to be sent, the second causes full scale signal. Remember, there may be up to a three second delay when **test** key is pressed.
6. To alternate from log to linear mode: Press **set zero** key. The output mode will toggle between log and linear, indicated by the LED. The log and linear zero and full scale are independent and should be set separately.

# OPTIONAL ALARM MODULE

## Orion 180011

The Series 1800 Monitors alarm circuit is unique. If the instrument logic detects sample concentration is increasing at such a rate that alarm 2 value will be reached within an hour, a warning signal is activated. This signal is a one second alarm every four seconds which increases in frequency as a concentration approaches alarm level. Also, if absolute sample concentration is 90% of alarm 2 value, intermittent warning signal is activated to alert operator that high concentration limit is being approached. If this feature is not desired, the alarm 1 should be used to set external alarm.

### Installation

The optional module is mounted in the instrument in the following manner.

1. Ensure power to the Monitor is turned off at power source.
2. Open door of electronic assembly. Use No. 2 Phillips screwdriver to remove four screws on decorative panel.
3. Remove optional module keypad assembly from shipping box.
4. Unscrew module keypad from the black brackets using the two screws on the keypad.
5. Make certain the plungers are pulled back so that the grommets are in a closed position.

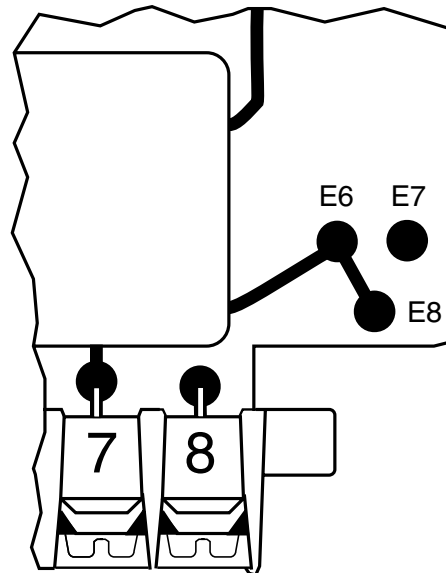
### Setting Alarm Output

For both alarms 1 and 2, NO and NC conditions are available simultaneously. For "alarm disabled" condition, either NO (factory set) or NC is available. To change factory setting, perform the following steps:

1. Solder the appropriate jumper, to change between the NO and NC mode for an "alarms disabled" remote indication (terminals 7 and 8). See **Figure 5**.
2. Place PC board onto instrument guide rails. Rear of PC board should touch backplane and plug should fit securely into its socket. Check that module bracket is against both rails.
3. Make certain flex cable is attached to keypad and to PC board. If not, carefully slide header into socket.

**Table 4**  
**Terminals 7 and 8 alarms disabled**

| Mode | Jumper                 |
|------|------------------------|
| NO   | E7 to E8 (factory set) |
| NC   | E6 to E8               |



**Figure 5**  
**Jumper Connections On Alarm Module PC Board.**

## Electrical Connections Optional Alarm Module

1. Feed wire through hole in chassis bottom labeled "options" (see **Figure 2**).
2. Run wire along wire through to alarm module.
3. Connect wires output as required (see **Figure 6**, and **Table 3**).
4. Double check the flex cable connections.
5. Screw the keypad on the black metal brackets.
6. Double check the flex cable connections.
7. Measure to ensure appropriate number of panels have been removed.
8. Align decorative panel against four stand-offs and re-attach with phillips screws. Decorative panel should not cover any optional module.

**WARNING: For safety reasons, the Series 1800 Monitor should not be operated without the decorative panel in place. Failure to replace the panel could expose the user to dangerous voltages.**

**Table 3**  
**Outputs Of Alarm Module And Terminals**

| Outputs |       | Terminals |
|---------|-------|-----------|
| Alarm 1 | NC    | 1         |
|         | Comm  | 2         |
|         | NO    | 3         |
| Alarm 2 | NC    | 4         |
|         | Comm  | 5         |
|         | NO    | 6         |
| Disable | Comm  | 7         |
|         | NO/NC | 8         |

## Description Of Alarm Module Controls

**Set alarm 1** Sets alarm 1 parameter. When **set alarm 1** is pressed, LED on key is active. \*

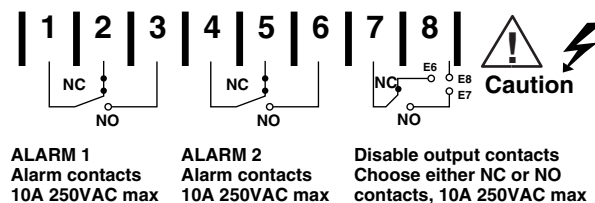
**Set alarm 2** Sets alarm 2 parameter. When **set alarm 2** is pressed, LED on key is active.\*

\* See **Appendix** in appropriate 1800 Series Instruction Manual for default values.

**Test** Activates and deactivates alarm 1 and alarm 2. Test LED will be lit along with corresponding mode key. To reactivate module press **sample** key on front panel keypad.

**Mode Indicating LED** (located to left of keypad) Indicates if either alarm goes off. If alarms are not active, *deactivated* LED blinks; for example, during calibration. For both alarms, the LED indicating activation is on whenever concentration is above the set point. Since each alarm output has a normally open and normally closed position, any external alarm can be set to go off when concentration is either above or below the set point.

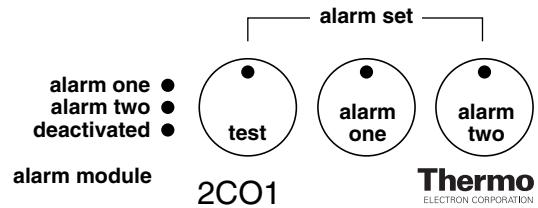
*NOTE: The corresponding LED for either alarm turns on when the concentration exceeds the set point. Simultaneously, the relay closes and the NO position closes.*



**Figure 6**  
**Wiring Diagram Of Alarm Module**

## Alarm During Calibration

During calibration the alarm module is automatically deactivated. After the completion of calibration the Series 1800 Monitor automatically enters the sample mode, however, the alarm module remains deactivated. To reactivate, press **sample** key. The alarm module is deactivated to avoid the high concentration alarm that would result from the standards used to calibrate.



**Figure 7**  
**Alarm Module Keypad**

## Alarm After Power Failure

After a power failure, the alarm module remains deactivated until the **sample** key on the front panel keypad is depressed. The alarm settings are not affected by power failures. When the alarm module is deactivated a signal is provided for remote indication.

## Setting Alarms 1 and 2

1. Press **set alarm 1** key. LED above set alarm 1 will activate and LCD will display present alarm 1 value.
2. Change displayed value by using **▲** and **▼** keys.
3. Press **enter/done** key when correct value is displayed. Alarm 1 value is now set.
4. Press **set alarm 2** key (earlier versions may say **set high**). LED above set alarm 2 will activate and LCD will display present alarm 2 value.
5. Change displayed value by using **▲** and **▼** keys.
6. Press **enter/done** key when correct value is displayed. Alarm 2 is now set.
7. If an external alarm circuit is to be tested, press **test** key. The first press of the test key deactivates both alarms, second press activates alarm 1, and third press activates alarm 2. Press **sample** key to exit test key.

## **Environmental Instruments**

Water Analysis

### **North America**

166 Cummings Center  
Beverly, MA 01915 USA  
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Int'l. e-mail: [intcs1@thermoorion.com](mailto:intcs1@thermoorion.com)

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