Install Guide

Micro800™
2 Ch High Current Digital Output Module
(Catalog Number 2080sc-OW2IHC)

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For More Information

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http://www.spectrumcontrols.com

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Environment and Enclosure

This equipment is intended for use in a Pollution Degree 2 industrial environment, in overvoltage Category II applications (as defined in IEC publication 60664-1), at altitudes up to 2000 meters (6562 ft) without derating.

This equipment is considered Group 1, Class A industrial equipment according to IEC/CISPR Publication 11. Without appropriate precautions, there may be potential difficulties ensuring electromagnetic compatibility in other environments due to conducted as well as radiated disturbance.

This equipment is supplied as open-type equipment. It must be mounted within an enclosure that is suitably designed for those specific environmental conditions that will be present and appropriately designed to prevent personal injury resulting from accessibility to live parts. The enclosure must have suitable flame-retardant properties to prevent or minimize the spread of flame, complying with a flame spread rating of 5VA, V2, V1, V0 (or equivalent) if non-metallic. The interior of the enclosure must be accessible only by the use of a tool. Subsequent sections of this publication may contain additional information regarding specific enclosure type ratings that are required to comply with certain product safety certifications.

In addition to this publication, see:

- Industrial Automation Wiring and Grounding Guidelines, Allen-Bradley publication 1770-4.1, for additional installation requirements.
- NEMA Standards publication 250 and IEC publication 60529, as applicable, for explanations of the degrees of protection provided by different types of enclosure.
Prevent Electrostatic Discharge

Electrostatic discharge can damage integrated circuits or semiconductors if you touch bus connector pins. Follow these guidelines when you handle the module:

- Touch a grounded object to discharge static potential.
- Wear an approved wrist-strap grounding device.
- Do not touch connectors or pins on component boards.
- Do not touch circuit components inside the module.
- If available, use a static-safe work station.
- When not in use, keep the module in its static-shield box.

To comply with the CE Low Voltage Directive (LVD), all connected I/O must be powered from a source compliant with the following: Safety Extra Low Voltage (SELV) or Protected Extra Low Voltage (PELV).
Environnements dangereux

Cet équipement est conçu pour être utilisé dans des environnements de Classe I, Division 2, Groupes A, B, C, D endroit dangereux ou non dangereux. La mise en garde suivante s'applique à une utilisation dans des environnements dangereux.

DANGER D'EXPLOSION

1. La substitution de composants peut rendre cet équipement impropre à une utilisation en environnement de Classe 1, Division 2.
2. Ne pas remplacer de composants ou déconnecter l'équipement sans s'être assuré que l'alimentation est coupée ou que l'endroit soit dépourvu de concentrations inflammables.
3. Ne pas connecter ou déconnecter des composants sans s'être assuré que l'alimentation est coupée.
4. Ce produit doit être installé dans une armoire.
5. Tout le câblage doit agréer la norme N.E.C. article 501-4(b).

Parts List

Your package contains one Micro800 High Current Digital Output Plug-in Module and one Quick Start guide.

- This equipment is considered Group 1, Class A industrial equipment according to IEC/CISPR 11. Without appropriate precautions, there may be difficulties with electromagnetic compatibility in residential and other environments due to conducted and radiated disturbance.
- Be careful when stripping wires. Wire fragments that fall into the controller could cause damage. Once wiring is complete, make sure the controller is free of all metal fragments before removing the protective debris strip.
- Do not wire more than 2 conductors on any single terminal.
- If you insert or remove the plug-in module while power is on, an electrical arc can occur. This could cause an explosion in hazardous location installations. Be sure that power is removed or the area is nonhazardous before proceeding.
- Cable length should be less than 10 meters.
- Do not insert or remove the plug-in module while power is applied, otherwise, permanent damage to equipment may occur.
Insert Module into Controller

Follow the instructions to insert and secure the plug-in module to the controller.

1. Position the plug-in module with the terminal block facing the front of the controller as shown.

2. Snap the module into the module bay.

3. Using a screwdriver, tighten the 10…12 mm (0.39…0.47 in.) M3 self tapping screw to torque specifications.

Hazardous Location Considerations

This equipment is suitable for use in Class I, Division 2, Groups A, B, C, D hazardous locations or non-hazardous locations only. The following WARNING statement applies to use in hazardous locations.

EXPLOSION HAZARD

- Substitution of components may impair suitability for Class I, Division 2.
- Do not replace components or disconnect equipment unless power has been switched off or the area is known to be free of ignitable concentrations.
- Do not disconnect equipment unless power has been removed or the area is known to be non-hazardous.
- This product must be installed in an enclosure.
- All wiring must comply with N.E.C. article 501-4(b).
Micro800™ 2 Ch High Current Digital Output Module

Environmental Tests | Industry Standards | Test Level Limits
---|---|---
EFT/B immunity | IEC 61000-4-4* | Signal Ports:  
- ± 3 kV @ 5 kHz for 5 minutes  
- ± 2 kV @ 5 kHz for 5 minutes  
Power Ports:
- ± 3 kV @ 5 kHz for 5 minutes  
- ± 2 kV @ 5 kHz for 5 minutes
Surge transient immunity (Performance Criteria B) | IEC 61000-4-5 | Signal Ports:  
- ± 2 kV line-earth  
Power Ports:  
- ± 2 kV CM  
- ± 1kV DM
Conducted RF immunity (Performance Criteria A) | IEC 61000-4-6 | 10V rms with 1 kHz sine wave  
80%AM from 150 kHz…80 MHz on signal and power ports
Magnetic Field (Performance Criteria A) | IEC 61000-4-8 | 30Arms/m
AC Mains Voltage Dips, Interruptions and Variations | IEC 61000-4-11 | Standard

Safety Tests | Industry Standards | Test Level Limits
---|---|---
cUL CSA C22.2 No. 142 -M1987 Process Control Equipment May 1987 | As required
UL Hazardous Locations | ULH ANSI/ISA-12.12.01-2007 Nonincendive Electrical Equipment for Use in Class I, Division 2 Hazardous (Classified) Locations  
cULH CSA C22.2 No. 213-M1987 - Non-incendive Electrical Equipment for use in Class I Division 2 Hazardous Locations - March 1987 | As required

Wire the Module

Follow the wiring diagrams below to wire the module.

Note: In the diagram above, terminals with the same label are internally shorted together. Example, CM0 (Top Row) and CM0 (Bottom Row) are internally shorted together.

Configuring the Module

The 2080sc-OW2IH does not really require configuration. It only needs to be placed into run mode. Write a value of 165 decimal to memory location 17 (MOD_MODE_CONTROL). See Table 3 for more information.

Module Input Data

General module status can be read from memory location 16. Refer to Table below for possible responses.

Table 1 (General Module Status)

<table>
<thead>
<tr>
<th>Bit Number</th>
<th>Description</th>
</tr>
</thead>
</table>
| 0-1 | These 2 bits define module operation mode,  
0: Idle: Module is ready to RUN, and I/O is off.  
1: RUN: Module is under RUN, and I/O is on.  
2: Error: Error happens, and I/O is off.  
3: Busy: Module is busy, cannot go to RUN, and I/O is off. |
Module Output Data

The two output channels on the OW2IHC are controlled by memory location 64, bits 0 and 1 control channels 0 and 1 respectively. See Table 3 for memory location offsets. The table below describes the state of each output channel in relation to the control bits.

<table>
<thead>
<tr>
<th>Channel #</th>
<th>Bit state</th>
<th>Output State</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>OPEN</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>CLOSED</td>
</tr>
<tr>
<td>1</td>
<td>0</td>
<td>OPEN</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>CLOSED</td>
</tr>
</tbody>
</table>

Adding the OW2IHC to CCW

The 2080sc-OW2IHC is configured for CCW (Connected Components Workbench) using the PLUGIN_READ and PLUGIN_WRITE instructions for generic plug-in modules.

The configuration, output data, and status structures discussed in the sections above, are stored at different memory locations in the module. The following table lists the memory location offset for each parameter which is used when configuring the PLUGIN_READ, WRITE, and INFO instructions.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Offset (Dec)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>MOD_ID_LO</td>
<td>0</td>
<td>Module ID</td>
</tr>
<tr>
<td>MOD_ID_HI</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>VENDOR_ID_LO</td>
<td>2</td>
<td>Vendor ID</td>
</tr>
<tr>
<td>VENDOR_ID_HI</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>PRODUCT_TYPE_LO</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>PRODUCT_TYPE_HI</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>PRODUCT_CODE_LO</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>PRODUCT_CODE_HI</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>MOD_REV_LO</td>
<td>8</td>
<td>Minor revision, 1-255</td>
</tr>
<tr>
<td>MOD_REV_HI</td>
<td>9</td>
<td>Major revision, 1-127</td>
</tr>
<tr>
<td>CONTR_OPS_STATUS</td>
<td>11</td>
<td>Controller operation status information (see Table 4)</td>
</tr>
<tr>
<td>MOD_STATUS</td>
<td>16</td>
<td>Module status register (see Table 1)</td>
</tr>
</tbody>
</table>

Environmental Specifications

<table>
<thead>
<tr>
<th>Environmental Tests</th>
<th>Industry Standards</th>
<th>Test Level Limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature (Operating)</td>
<td>IEC60068-2-1: (Test Ad, Operating Cold), IEC60068-2-2: (Test Bd, Operating Dry Heat), IEC60068-2-14: (Test Nb, Operating Thermal Shock)</td>
<td>-20 to 65°C (-4 to 149°F)</td>
</tr>
<tr>
<td>Temperature (Non-operating)</td>
<td>IEC60068-2-1: (Test Ad, Unpackaged Non-operating Cold), IEC60068-2-2: (Test Bd, Unpackaged Non-operating Dry Heat), IEC60068-2-14: (Test Nb, Unpackaged Non-operating Thermal Shock)</td>
<td>-40 to 85°C (-40 to 185°F)</td>
</tr>
<tr>
<td>Operating Altitude</td>
<td>2000 meters (6561 feet)</td>
<td>Not tested</td>
</tr>
<tr>
<td>Humidity (Operating)</td>
<td>IEC60068-2-30: (Test Db, Unpackaged Damp Heat)</td>
<td>5 to 95% non-condensing</td>
</tr>
<tr>
<td>Vibration (Operating)</td>
<td>IEC60068-2-6: (Test Fc, Operating)</td>
<td>5G</td>
</tr>
<tr>
<td>Shock (Operating)</td>
<td>IEC60068-2-27: (Test Ea, Unpackaged Shock)</td>
<td>10 g</td>
</tr>
<tr>
<td>Radiated Emissions</td>
<td>CSIPR 11; Group 1, Class A</td>
<td>30MHz – 1GHz</td>
</tr>
<tr>
<td>Conducted Emissions</td>
<td>IEC 61000-6-4:2007 Group 1, Class A (AC Mains)</td>
<td>150kHz – 300MHz</td>
</tr>
<tr>
<td>ESD immunity</td>
<td>IEC 61000-4-2</td>
<td>4kV Indirect (Coupling Plate) 4kV Contact Discharge (to points of initial contact) 8kV Air Discharge (to points of initial contact)</td>
</tr>
<tr>
<td>Radiated RF immunity</td>
<td>IEC 61000-4-3: Level 3</td>
<td>10 V/M with 1 kHz sine-wave 80%AM from 80...2000 MHz 10 V/M with 200 Hz sine-wave 50% Pulse 100%AM @900 MHz 10 V/M with 200 Hz sine-wave 50% Pulse 100%AM @1800 MHz 3 V/M with 1 kHz sine-wave 80%AM from 2000...2700 MHz</td>
</tr>
</tbody>
</table>
Minimum Load: 10mA at 5VDC per point. (This value can change due to the switching frequency, environmental conditions, and desired reliability level, therefore it is recommended to check this with the actual load.)

Initial Contact Res. of Relay: < 5mΩ typical, 30 mΩ max

Expected Life of Electrical Contacts: 100k operations @ 20 times/min, at rated resistance and temperature.

Switching Frequency: Maximum 1 cycle/s at rated load (1.5s on, 1.5s off)

Bounce Time: 1.2 ms average

Maximum Off State Leakage: 1.5mA Maximum

Output Delay Time: 10ms maximum on/off (5 ms typical) excluding bounce time

Status Indicators: 2 yellow Status Indicators (I/O)

Power source: 3.3 VDC, 24 VDC from backplane

Input to backplane isolation: 250 VAC continuous, tested at 2300VAC for 1 min.

Channel to channel isolation: 250 VAC continuous, tested at 1500VAC for 1 minute

Power consumption: <=35 mA at 3.3V, <=20 mA at 24V, <1.5 W

Fusing: Use external if desired

Terminal block size: #16 - #30 AWG

Terminal block torque: 0.19 Nm (1.7 lb-in)

Mounting torque: 0.2 Nm (1.48 lb-in)

Manufacturing RoHS compliant

Dimensions: 58.4mm x 29.3mm x 25mm

Status Indicators: Individual OFF/ON Status for each I/O point

Table 4 (Controller Operation Status Register)

<table>
<thead>
<tr>
<th>Bit Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-3</td>
<td>Controller Error info:</td>
</tr>
<tr>
<td></td>
<td>0x00: no Error;</td>
</tr>
<tr>
<td></td>
<td>0x01: Operation Error;</td>
</tr>
<tr>
<td></td>
<td>0x02: Fatal Error</td>
</tr>
<tr>
<td></td>
<td>0x03-0x0F: reserved ;</td>
</tr>
<tr>
<td>4-5</td>
<td>Controller mode:</td>
</tr>
<tr>
<td></td>
<td>0x00: non-RUN mode;</td>
</tr>
<tr>
<td></td>
<td>0x01: RUN mode;</td>
</tr>
<tr>
<td></td>
<td>0x02-0x03 : reserved ;</td>
</tr>
<tr>
<td>6-7</td>
<td>Controller Power info:</td>
</tr>
<tr>
<td></td>
<td>0x00: Power O.K.;</td>
</tr>
<tr>
<td></td>
<td>0x01: power failure triggered;</td>
</tr>
<tr>
<td></td>
<td>0x02-0x03: reserved</td>
</tr>
</tbody>
</table>

The following sample program, written in structured text, demonstrates how to configure the module in CCW.

```c
u800Slot := 1; (* Slot number for module. *)
(* This section of code is to handle the controller with Firmware earlier than rev 1.13 *)
SYS_INFO_FW(True);
IF (SYS_INFO_FW,Sts.OSMajRev = 1 and SYS_INFO_FW,Sts.OSSmallerRev <=12) THEN
  IF SYS_INFO_FW.Sts.MajErrCode = 0 THEN
    WriteControllerStatus(True,u800Slot,11,1,ControllerStatus);
    END_IF;
    END_IF;
RUNMode[1] = 16#A5; (* Initialize RunMode register *)
WriteModModeControl(true,u800SlotSlot,17,1,RunMode); (* Write A5 Hex to MOD_MODE_CONTROL for run mode *)
ReadModStatus(true,u800SlotSlot,16,1,OW2IHC_S1_ModStatus); (* Read general module status *)
WriteOutputs(true,u800SlotSlot,64,1,OW2IHC_S1_Outputs); (* Write Output states *)
```

Table 5 (CCW Program Variables)

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Data Type</th>
<th>Dimension</th>
</tr>
</thead>
<tbody>
<tr>
<td>U800Slot</td>
<td>UINT</td>
<td>NA</td>
</tr>
<tr>
<td>SYS_INFO_FW</td>
<td>SYS_INFO</td>
<td>NA</td>
</tr>
<tr>
<td>ControllerStatus</td>
<td>USINT</td>
<td>[1..1]</td>
</tr>
<tr>
<td>WriteControllerStatus</td>
<td>Plugin_Write</td>
<td>NA</td>
</tr>
<tr>
<td>WriteModModeControl</td>
<td>Plugin_Write</td>
<td>NA</td>
</tr>
<tr>
<td>RunMode</td>
<td>USINT</td>
<td>[1..1]</td>
</tr>
<tr>
<td>ReadModStatus</td>
<td>Plugin_Read</td>
<td>NA</td>
</tr>
<tr>
<td>OW2IHC_S1_ModStatus</td>
<td>USINT</td>
<td>[1..1]</td>
</tr>
<tr>
<td>WriteOutputs</td>
<td>Plugin_Write</td>
<td>NA</td>
</tr>
<tr>
<td>OW2IHC_S1_Outputs</td>
<td>USINT</td>
<td>[1..1]</td>
</tr>
</tbody>
</table>
The sample project on the previous page, can be downloaded from our website at [http://www.spectrumcontrols.com/downloads.htm](http://www.spectrumcontrols.com/downloads.htm)

## Electrical Specifications

### Relay Output Specifications

<table>
<thead>
<tr>
<th>Description</th>
<th>2 channel relay output module.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Relay Functionality</strong></td>
<td>Form A normally open</td>
</tr>
</tbody>
</table>

### Relay Output Specifications

- **Relay Functionality:**
  - Form A normally open

#### Output Current Rating

<table>
<thead>
<tr>
<th>(at rated power)</th>
<th>Resistor load at up to 30°C</th>
<th><strong>10A @ 5-30V dc</strong></th>
<th><strong>10A @ 125V ac</strong></th>
<th><strong>10A @ 250V ac</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Resistor load at up to 65°C</strong></td>
<td>6A @ 5-30V dc</td>
<td>6A @ 125V ac</td>
<td>6A @ 250V ac</td>
<td></td>
</tr>
</tbody>
</table>

#### Output Power Rating (Resistive)

- **Resistor load at up to 30°C**
  - 300W Maximum for 30.0VDC
  - 1250VA Maximum for 125VAC
  - 2500VA Maximum for 250VAC

### Inductive Loads

#### UL Pilot Duty Contact Ratings (Power factor 0.35 or less for AC):

<table>
<thead>
<tr>
<th>AC Contact Rating Code Designation</th>
<th>Thermal continuous test current (A)</th>
<th>Max. current (A)</th>
<th>120 VAC</th>
<th>240VAC</th>
<th>Max. VA</th>
</tr>
</thead>
<tbody>
<tr>
<td>B300</td>
<td>Make</td>
<td>Break</td>
<td>Make</td>
<td>Break</td>
<td>Make</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>30</td>
<td>3</td>
<td>15</td>
<td>1.5</td>
</tr>
</tbody>
</table>

**Notes:**
- *Power factor 0.35 or less
- For maximum ratings at voltages between the maximum design value and 120 volts, the maximum make and break ratings are to be obtained by dividing the volt-amperees rating by the application voltage. For voltages below 120 volts, the maximum make current is to be the same as for 120 volts, and the maximum break current is to be obtained by dividing the break volt-amperes by the application voltage, but these currents are not to exceed the thermal continuous test current.

#### DC Contact Rating Code Designation

<table>
<thead>
<tr>
<th>DC Contact Rating Code Designation</th>
<th>Thermal continuous test current (A)</th>
<th>Max. make/break current (A)</th>
<th>125 VDC</th>
<th>250VDC</th>
<th>Max. make / break VA</th>
</tr>
</thead>
<tbody>
<tr>
<td>R150</td>
<td>1.0</td>
<td>0.22</td>
<td>-</td>
<td>28</td>
<td></td>
</tr>
<tr>
<td>R300</td>
<td>1.0</td>
<td>0.22</td>
<td>0.11</td>
<td>28</td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**
- *The maximum make and break ratings are to be obtained by dividing the volt-amperees rating by the application voltage, but the current values are not to exceed the thermal continuous test current.
- Inductive loads as specified in Section 8.2.7 of Industrial Control and Systems; Control Circuit and Pilot Devices, ANSI/NEMA ICS5-1993.

#### Additional UL ratings:

- 1/3 hp, 125 V ac, 250V ac
- 30V dc Make / Break 2A (Pilot Duty)
- 250V ac, Make 20A / Break 2A (Pilot Duty)
- 2A, 250V ac, Tungsten Lamp
- 2A, 30V dc, Tungsten Lamp

1 Connecting surge suppressors across your external load will extend the life of the relay contacts.