

## Introduction

The DIOM-2 Digital I/O Module provides an additional 24 contact inputs and 16 output contacts to an ECS2100 or DECS-2100 digital excitation control system. DIOM-2 digital inputs and outputs interface with external devices such as pushbuttons, switches, indicators, distributed control systems (DCS), and programmable logic controllers (PLC). An ECM/SIM or ECM-2 excitation control module polls each DIOM-2 for input status and operates output relays through a fiber optic link. Up to two DIOM-2s can be connected in daisy chain configuration to provide a total of 48 contact inputs and 32 output contacts.

The metal enclosure of the DIOM-2 offers electric shock protection from incidental contact. An identical footprint and functional compatibility make for simple replacement of a DIOM with the DIOM-2.

## Specifications

### Power Supply Requirements

Voltage: +24 Vdc nominal (17-36 Vdc)  
Current: 0.4 Adc maximum

### Pin Assignments

PS1: 76 (+), 77 (-), 78 (GND)  
PS2: 79 (+), 80 (-), 81 (GND)

### Contact Inputs

Inputs: 24  
Sensing Range:  $\pm 24$  Vdc or +125 Vdc/120 Vac (factory set, see *Digital Inputs* below for more information.)

### Output Contacts

Outputs: 16, Form-C contacts

### AC Rating (resistive)

Carry: 7.0 Adc at 120 Vac  
Make and Break: 7.0 Adc at 120 Vac

### DC Rating (resistive)

Carry: 7.0 Adc at 24 /125 Vdc  
Make and Break: 7.0 Adc at 24 Vdc  
0.7 Adc at 48 Vdc  
0.2 Adc at 125 Vdc

### Communication Interface

Type: Fiber optic link  
Connectors  
Main: F1, F2, F3  
Redundant: F4, F5, F6  
DIOM: F7, F8, F9

### CE Compliance

This product has been evaluated and complies with the relevant essential requirements set forth by the EU legislation as part of a system, not as a stand-alone device.

### EC Directives

- Low Voltage Devices (LVD) 2014/35/EU
- Electromagnetic Compatibility (EMC) 2014/30/EU
- Hazardous Substances (RoHS2) 2011/65/EU

Publication <b>9500600990</b>	Revision <b>B</b>	<b>Instructions</b>	Date <b>Aug 2025</b>	Page <b>1 of 8</b>
----------------------------------	----------------------	---------------------	-------------------------	-----------------------

### Harmonized Standards used for Evaluation

- IEC 62103:2003 (pertinent EMC sections)
- EN 62477-1:2012
- EN 61000-6-2:2005
- EN 61000-6-4:2007; with AMD 1:2011
- EN 50581:2012, Ed 12

### **Environment**

#### Temperature

Operating: –40 to 60°C (–40 to 140°F)

Storage: –40 to 65°C (–40 to 149°F)

#### Ingress Protection Class

IP20

#### Humidity

0 to 95%, non-condensing

#### Physical

Weight: 2.85 lb (1.3 kg)

Size (WxHxD): 6.89 x 10.20 x 2.81 inches  
(175.1 x 259.2 x 71.5 mm)

### **FCC Requirements**

This product complies with FCC 47 CFR Part 15.

### **Installation**

---

The DIOM-2 is typically preinstalled in the excitation control system. If replacement is necessary, carefully label and document each of the connections to the DIOM-2 in order to properly reconnect the new module. DIOM-2 connectors and indicators are illustrated in Figure 1. Locator letters in Figure 1 correspond to the lettered descriptions in Table 1. The DIOM-2 must be monitored and adjusted to fit the specific application at initial startup, whether it is a new unit or a replacement.

### **DIOM-2 Connections**

DIOM-2 connections consist of screw terminal connectors and fiber optic connectors.

#### Screw Terminal Connectors

Connectors with screw-down compression terminals are used for the contact sensing inputs, output contacts, state select input, and operating power inputs. The connectors, and the headers that they plug into, have a dovetailed edge that ensures proper connector orientation. Similar-sized connectors and headers are uniquely keyed to ensure that a connector mates only with the correct header to prevent damage to the DIOM-2. However, care must still be taken to ensure that the proper connector is inserted into the appropriate header. Connector screw terminals accept a maximum wire size of 12 AWG. The maximum screw torque is 5.3 in-lb or 0.6 N•m.

#### Fiber Optic Connectors

Fiber optic connectors exchange an isolated, digital signal with the ECM-2 or ECM/SIM.

### **Retrofit Compatibility Mode Switch**

The DIOM-2's four-position DIP switch, labeled I/O Select, configures the DIOM-2 to operate as a DIOM. In this mode, only 12 of the 24 contact inputs and 8 of the 16 output contacts are enabled which allows a DIOM-2 to directly replace a DIOM in a daisy chain of up to four DIOMs. When in retrofit mode, only contact inputs 1 through 12 and output contacts 1 through 8 are enabled.

When any one switch is in the up position, the DIOM-2 operates normally. When all four switches are in the down position, the DIOM-2 operates as a DIOM.

Publication <b>9500600990</b>	Revision <b>B</b>	<b>Instructions</b>	Date <b>Aug 2025</b>	Page <b>2 of 8</b>
----------------------------------	----------------------	---------------------	-------------------------	-----------------------

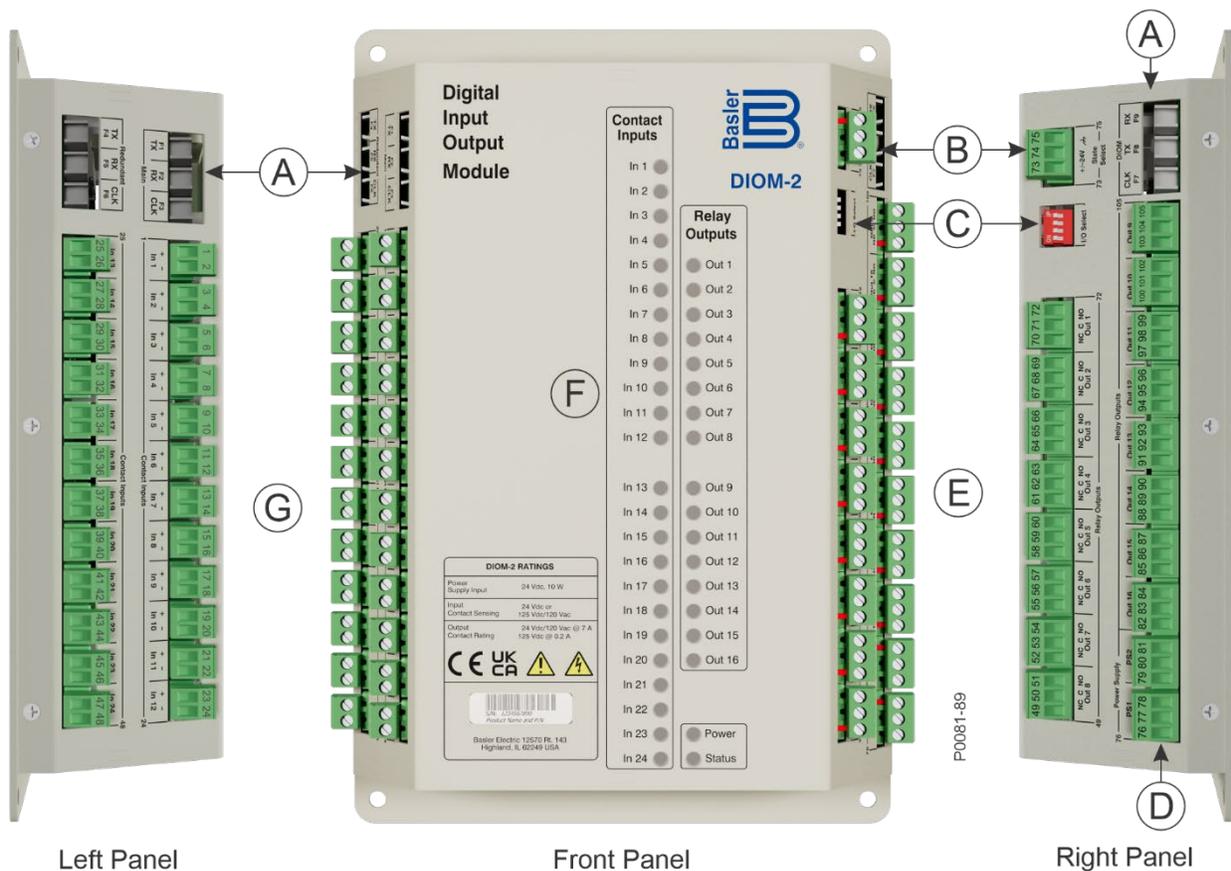


Figure 1. DIOM-2 Connectors and Indicators

Table 1. DIOM-2 Connector and Indicator Descriptions

Locator	Description
A	Fiber optic communication connectors. F1, F2, and F3 connect to the main channel ECM or ECM-2. F4, F5, and F6 connect to the redundant channel ECM or ECM-2. F7, F8, and F9 connect to a second DIOM-2.
B	State select connector. Apply 0 or +24 Vdc for main channel control and -24 Vdc for redundant channel control.
C	I/O Select Switch. Configures retrofit compatibility mode. Any one switch in the up position sets normal DIOM-2 operation. All switches in the down position, sets DIOM operation (only inputs 1 through 12 and outputs 1 through 8 are enabled).
D	Power supply connectors. PS1 and PS2 accept +24 Vdc (17–36 Vdc)
E	Form-C relay output contact connectors Out1 through Out16 accommodate 125 Vdc/120 Vac, maximum.
F	Contact Input, Relay Outputs, Power, and Status LED indicators. See <i>Monitoring</i> , above, for more information.
G	Contact input connectors In 1 through In 24 accommodate 24 Vdc or 125 Vdc/120 Vac.

## Operation

Each DIOM-2 is polled by the ECM or ECM-2 for the status of the module's 24 digital inputs. These inputs are sampled by the ECM every 8 milliseconds and by the ECM-2 every 2 milliseconds. BESTCOMS™ Pro software can be used to connect the DIOM-2 input data to any control logic block input in the ECM or ECM-2. These inputs are commonly used to provide an interface to the excitation control system from pushbuttons, control switches, and relay auxiliary contacts.

Sixteen individually configurable digital outputs are provided on each module. The digital outputs are each connected to form-C relays. The ECM updates the output status every 8 milliseconds and the ECM-2 updates the output status every 2 milliseconds. Utilizing BESTCOMS™ Pro software, the digital output data can be connected to any control logic block output in the ECM or ECM-2. These outputs are commonly used to drive external relays and indicator lights, or to interface with a DCS.

Digital data is exchanged between the DIOM-2 modules and the ECM/SIM or ECM-2 over a fiber optic link which provides isolation and electrical noise mitigation. Each DIOM-2 creates a serial stream of data that consists of the binary status of the DIOM-2's inputs and the data retrieved from a downstream DIOM-2. The DIOM-2 extracts the data for its outputs and passes the remaining output data from the ECM or ECM-2 to the next DIOM-2 downstream.

A maximum of two DIOM-2 modules can be connected in daisy chain configuration using a bidirectional fiber optic link. See Figure 2 for DIOM-2 fiber optic connections.

The DIOM-2 communicates with main and redundant channel ECMs or ECM-2s. This saves space by requiring only one DIOM-2 (or pair of DIOM-2s) to accommodate both channels.

See *State Selection Input* below for details on main and redundant channel communication.

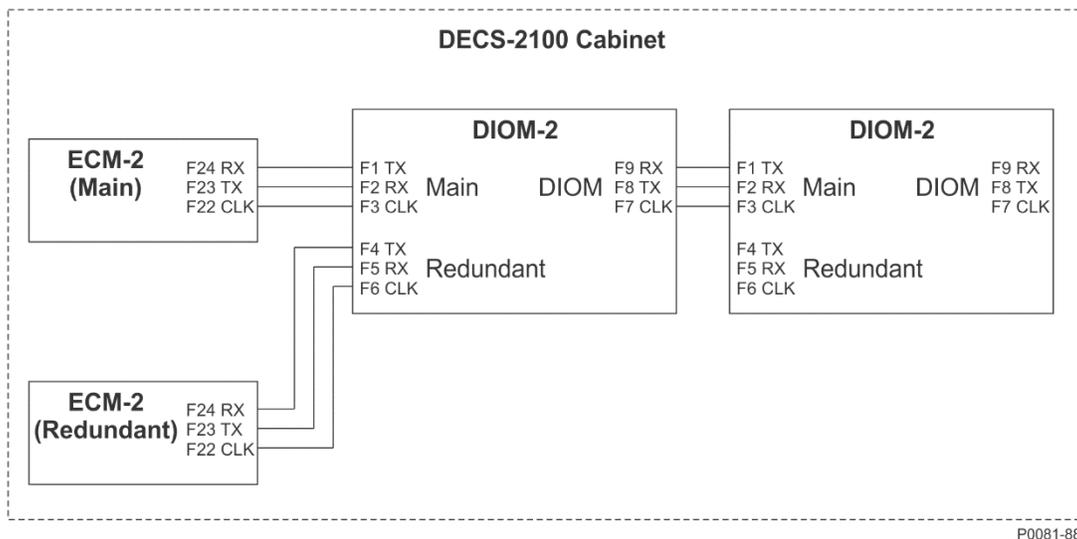


Figure 2. DIOM-2 Fiber Optic Connections

## Operating Power

DIOM-2 operating power is provided through the redundant +24 Vdc PS1 and PS2 connectors.

## Digital Inputs

Twenty-four sets of terminals accept wetted contact inputs from external switches or other system devices. The ECM or ECM-2 can be programmed through BESTCOMS Pro to respond to these contact inputs. Contact input designations are In1 through In24. Refer to Figure 1 for terminal assignments.

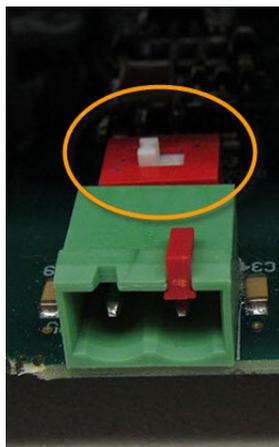
The interrogation voltage for each contact input is switch-selectable and set at the factory for 24 Vdc or 125 Vdc/120 Vac depending on the DECS-2100 or ECS2100 system configuration. If the DIOM-2 is supplied as a stand-alone or replacement unit, the switches should be set according to your system. The switches are accessed just behind the contact input connectors on the left-hand side of the unit (Figure 3).

Publication	Revision	<b>Instructions</b>		Date	Page
<b>9500600990</b>	<b>B</b>			<b>Aug 2025</b>	<b>4 of 8</b>

### Caution

Ensure that the unit is de-energized before attempting to set the contact input switches. A thin non-conductive rod should be used to set the switches.

To configure a contact input for 125 Vdc/120 Vac, set the switch to the left position (toward the positive terminal of the input). To configure a contact input for 24 Vdc, set the switch to the right position (toward the negative terminal of the input).



### Digital Switch Positions

Left: 125 Vdc / 120 Vac (as shown)

Right: 24 Vdc

Figure 3. Input Sensing Range Switch Location

## Outputs

Sixteen pairs of form-C output contacts are provided. The ECM or ECM-2 can be programmed through BESTCOMSPro to control these outputs.

### Note

For units with hardware revision E or later, loss of communication causes outputs to revert to a de-energized state. For earlier revisions, outputs retain their state if communication is lost.

## State Selection Input

This input configures the DIOM-2 to communicate with the main or redundant channel ECM or ECM-2 depending on the voltage applied. Application of 0 Vdc or +24 Vdc at the State Select input (pins 73 and 74) configures the DIOM-2 to communicate with the main channel ECM or ECM-2. Application of -24 Vdc at State Select (pins 73 and 74) configures the DIOM-2 to communicate with the redundant channel ECM or ECM-2.

When the State Select input is set for *main* channel control, an ECM or ECM-2 on the redundant channel may only poll contact input status and cannot operate output contacts. Alternately, when the State Select input is set for *redundant* channel control, an ECM or ECM-2 on the main channel may only poll contact input status and cannot operate output contacts.

## Monitoring

DIOM-2 monitoring consists of 42 LED indicators. All LED indicators are located on the DIOM-2 front panel. See Figure 1 for their locations.

## Digital Input LEDs

Twenty-four yellow LEDs (one for each contact input) light to indicate a sensed contact.

Publication <b>9500600990</b>	Revision <b>B</b>	<b>Instructions</b>	Date <b>Aug 2025</b>	Page <b>5 of 8</b>
----------------------------------	----------------------	---------------------	-------------------------	-----------------------

## Digital Output LEDs

Sixteen yellow LEDs (one for each output relay) light to indicate an energized relay.

## Power

This green LED lights to indicate the presence of DIOM-2 operating power at either of the power supply inputs (PS1 or PS2).

## Status

This green LED lights to indicate proper communication is established with an ECM or ECM-2.

## Verification

---

There are no user adjustments on the DIOM-2. Contact input operation may be verified using a voltage source, an ECM or ECM-2, and BESTCOMS*Pro*. Apply proper sensing voltage to each contact input and verify operation by monitoring the contact input LED indicators located on the front panel of the DIOM-2. Contact input operation may also be verified through an ECM or ECM-2 with BESTCOMS*Pro*.

Output contact operation may be verified using an ECM or ECM-2 and BESTCOMS*Pro*. Toggle each output from false to true using BESTCOMS*Pro* and verify operation by monitoring the output contact LED indicators. Relay operation may also be verified by use of a multimeter.

## Maintenance

---

This device contains long-life aluminum electrolytic capacitors. For devices that are not in service (spares in storage), the life of these capacitors can be maximized by energizing the device for 30 minutes once per year.

## Spare Parts

---

A reasonable stock of spare parts minimizes downtime in the event of malfunction. When ordering spare parts, care should be taken to specify the style numbers (or other identification) which are printed on the nameplate. Careful documentation of the original connections is essential any time the DIOM-2 is removed. It is recommended that at least one DIOM-2 is stocked.

## Safety

---

### Warning!

Bodily injury could result if contact is made with components in this apparatus which carry either line voltage or are subject to abnormally high voltages. References to the circuit diagrams, notably within other documentation, disclose hazardous areas.

As with all electrical equipment, appropriate safety measures must be taken when dealing with excitation equipment. High voltage is present within the excitation cubicles; their magnitudes depend upon the particular system. Opening the sources (e.g., disconnecting device 41) does not completely disconnect the high voltages. As long as the machine is still physically connected to the system, there is a possibility that a safety hazard exists.

Every precaution must be taken when working at the excitation control switchgear to ensure that all high voltages are isolated and avoided by test personnel. In addition to the machine terminal voltage (460 Vac or greater) at the excitation transformer, there may be other sources of power entering the cubicles, such as 125/250 Vdc and/or 120/240 Vac used to feed certain devices. A good rule to follow is to assume that all connections are live and dangerous until proven otherwise and to avoid all body contact with any of these voltages.

Publication <b>9500600990</b>	Revision <b>B</b>	<b>Instructions</b>	Date <b>Aug 2025</b>	Page <b>6 of 8</b>
----------------------------------	----------------------	---------------------	-------------------------	-----------------------

## Glossary

---

### **BCM-2**

Bridge Control Module. The BCM-2 generates the gating pulses for the SCRs in a power bridge.

### **BESTCOMS™ Pro**

A Windows®-based PC application which connects to an ECM-2, FCIM, or BCM-2 for user programming and monitoring of excitation system functions. This software presents table and block diagram representations of the controller logic configuration.

### **DIOM**

Digital I/O Module. Up to four DIOMs can be connected to one ECM or ECM-2.

### **DIOM-2**

Digital I/O Module. Up to two DIOM-2s can be connected to one ECM or ECM-2.

### **ECM**

Exciter Control Module. This contains the excitation control, limiting, protection, and communication software. The ECM is used with the ECS2100 system.

### **ECM-2**

Excitation Control Module. This contains the excitation control, firing control, limiting, protection, and communication software. The ECM-2 is used with the DECS-2100 system.

### **FCIM**

Firing Control Interface Module, used only in ECS2100 excitation systems. Determines when to fire power bridge SCRs based on the ac source waveforms and firing angle commands from the ECM.

### **SIM**

Sensor Input Module, used only in ECS2100 excitation systems. Provides isolated signals from PT, CT, AIOM, and DIOM to the ECM.

Publication <b>9500600990</b>	Revision <b>B</b>	<b><i>Instructions</i></b>	Date <b>Aug 2025</b>	Page <b>7 of 8</b>
----------------------------------	----------------------	----------------------------	-------------------------	-----------------------



Publication <b>9500600990</b>	Revision <b>B</b>	<b><i>Instructions</i></b>	Date <b>Aug 2025</b>	Page <b>8 of 8</b>
----------------------------------	----------------------	----------------------------	-------------------------	-----------------------

For terms of service relating to this product and software, see the *Commercial Terms of Products and Services* document available at [www.basler.com/terms](http://www.basler.com/terms).