

	www.basler.com +1 618.654.2341 (USA) info@basler.com	Model	IT-2
		Description	Isolation Transducer

Introduction

The IT-2 Isolation Transducer electrically isolates a DECS-2100 or ECS2100 excitation control system from power parameters monitored by the system. Each IT-2 can monitor two parameters. Typical parameters monitored by an IT-2 may include the bridge power input voltage, field voltage, or field current (measured through a metering shunt). The output of each IT-2 channel is a pulsed digital signal with a frequency that is proportional to the monitored input signal. These fiber optic channel outputs can be provided to the system Bridge Control Module, ECM-2 Excitation Control Module (DECS-2100 systems), or Firing Control Interface Module (ECS2100 systems).

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

Specifications

Power Supply Requirements

Voltage: +24 Vdc nominal (17-36 Vdc)
Current: 230 mAdc maximum

Pin Assignments

PS1: 7 (+), 8 (-), 9 (GND)
PS2: 10 (+), 11 (-), 12 (GND)

Sensing Inputs

High Voltage (HV): 2,000 Vdc (1,414 Vac) max.
Low Voltage (SH): 200 mVdc (141 mVac) max.

Pin Assignments

Input 1: 1-2 (HV+), 3 (SH+), 4 (SH-) 5-6 (HV-)
Input 2: 13-14 (HV+), 15 (SH+), 16 (SH-), 17-18 (HV-)

Outputs

Type: Fiber optic link
Connectors: F1, F2

CE and UKCA Compliance

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

EC Directives:

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

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

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China RoHS

The following table serves as the declaration of hazardous substances for China in accordance with PRC standard SJ/T 11364-2014. The EFUP (Environment Friendly Use Period) for this product is 40 years.

PRODUCT: IT-2										
零件名称 Part Name	有害物质 Hazardous Substances									
	铅 Lead (Pb)	汞 Mercury (Hg)	镉 Cadmium (Cd)	六价铬 Hexavalent Chromium (Cr ⁶⁺)	多溴联苯 Polybrominated Biphenyls (PBB)	多溴二苯醚 Polybrominated Diphenyl Ethers (PBDE)	邻苯二甲 酸二丁酯 Dibutyl Phthalate (DBP)	邻苯二甲 酸丁苄酯 Benzyl butyl phthalate (BBP)	邻苯二甲 酸二酯 Bis(2- ethylhexyl) phthalate (BEHP)	邻苯二甲 酸二异丁 酯 Diisobutyl phthalate (DIBP)
金属零件 Metal parts	O	O	O	O	O	O	O	O	O	O
聚合物 Polymers	O	O	O	O	O	O	O	O	O	O
电子产品 Electronics	X	O	O	O	O	O	O	O	O	O
电缆和互连配 件 Cables & interconnect accessories	X	O	O	O	O	O	O	O	O	O
绝缘材料 Insulation material	O	O	O	O	O	O	O	O	O	O

本表格依据 SJ/T11364 的规定编制。

O: 表示该有害物质在该部件所有均质材料中的含量均在 GB/T 26572 规定的限量要求以下。

X: 表示该有害物质至少在该部件的某一均质材料中的含量超出 GB/T 26572 规定的限量要求。

This form was prepared according to the provisions of standard SJ/T11364.

O: Indicates that the hazardous substance content in all homogenous materials of this part is below the limit specified in standard GB/T 26252.

X: Indicates that the hazardous substance content in at least one of the homogenous materials of this part exceeds the limit specified in standard GB/T 26572.

Environment

Temperature

Operating: -40 to 60°C (-40 to 140°F)

Storage: -40 to 65°C (-40 to 149°F)

Ingress Protection Class: IP21

Humidity: 0 to 95%, non-condensing

Physical

Weight: 2.7 lb (1.22 kg)

Size (WxHxD): 9.776 x 10.38 x 1.763 inches (248.3 x 263.7 x 44.8 mm)

FCC Requirements

This product complies with FCC 47 CFR Part 15.

Installation

The IT-2 is typically preinstalled in the excitation control system. If replacement is necessary, carefully label and document each of the connections to the IT-2 in order to properly reconnect the new module. IT-2 connectors and indicators are illustrated in Figure 1. Locator letters in Figure 1 correspond to the lettered descriptions in Table 1.

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The IT-2 must be monitored and adjusted to fit the specific application at initial startup, whether it is a new unit or a replacement.

IT-2 Connections

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

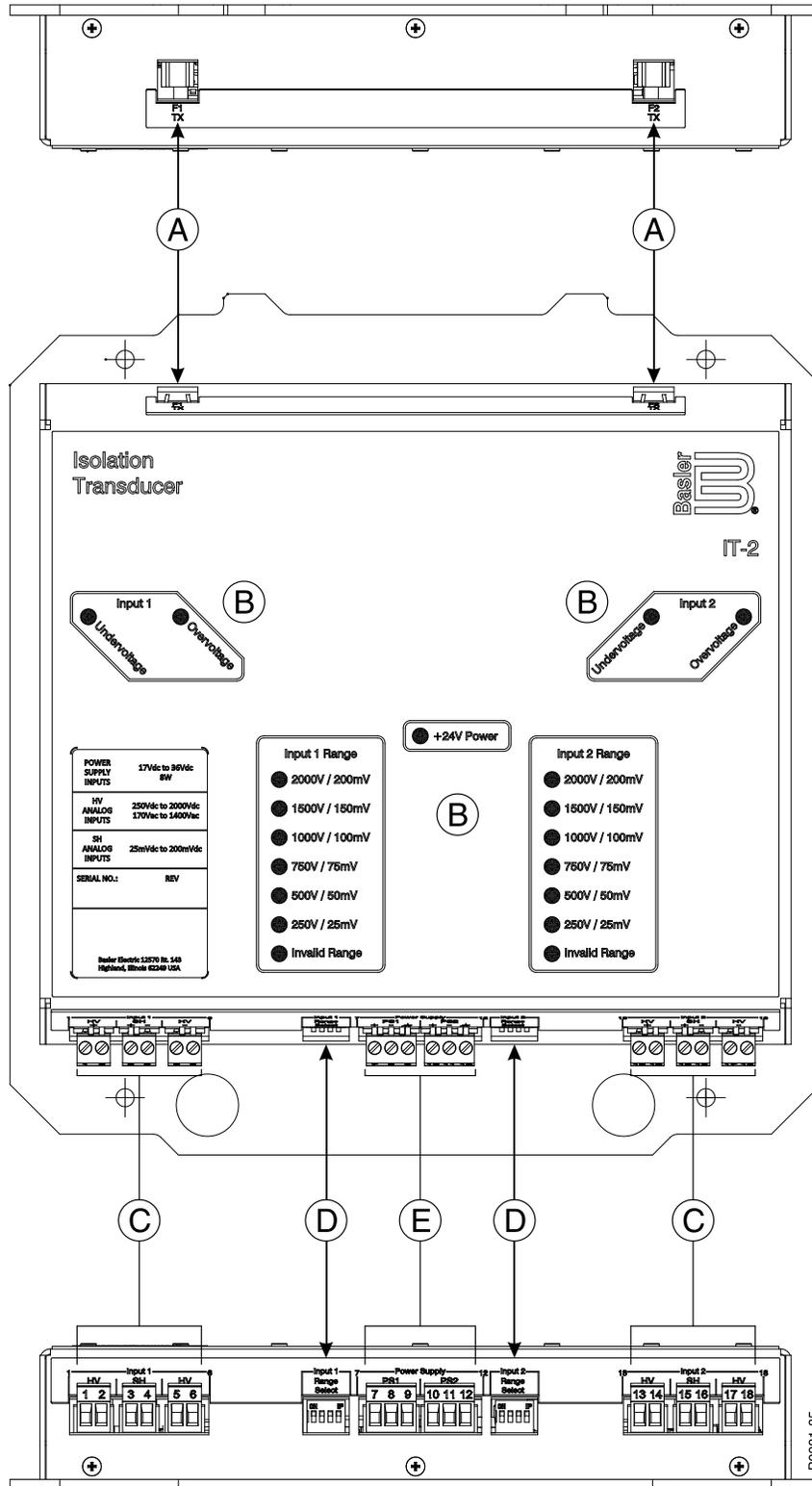


Figure 1. IT-2 Connectors and Indicators

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Screw Terminal Connectors

Connectors with screw-down compression terminals are used for the sensing inputs 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 IT-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 transmit an isolated, digital signal with frequency proportional to the input voltage to the ECM-2 or FCIM and BCM-2 or BCM.

Table 1. IT-2 Connector and Indicator Descriptions

Locator (See Figure 1)	Description
A	Fiber optic output connectors. F1 and F2 connect to ECM-2 or FCIM and BCM-2 or BCM.
B	Over/Undervoltage, Power Supply, and Range Selection LED indicators. See <i>Monitoring</i> for more information.
C	Sensing input connectors: Input 1 and Input 2.
D	Range Selection switches for Input 1 and Input 2.
E	Redundant power supply input connectors: +24 V PS1 and +24 V PS2

Operation

The IT-2 has two isolated, voltage-controlled oscillator (VCO) channels. Each channel creates an output frequency proportional to the input voltage for that channel. The transfer function for each channel is:

$$F_{out} = 650 \text{ kHz} + 250 \text{ kHz} \times \frac{V_{in}}{V_{range}}$$

The accuracy of the transducer frequency is $\pm 3\%$ of full scale. No adjustment is provided within the IT-2. However, each of the modules that receive signals from the IT-2 may be configured using BESTCOMS™ Pro software. This software provides adjustment for each specific input and is compatible with ECS2100 and DECS-2100 excitation systems.

Sensing Inputs

A high-voltage connector and a low-voltage connector are provided for each channel. The high-voltage connectors accept up to 2,000 Vdc and 1,414 Vac. Low-voltage connectors accept up to 200 mVdc and 141 mVac. Each channel accepts only a high- or low-voltage input at one time. High-voltage connectors are labeled HV+ and HV-. They are located on either side of the SH± connector for each channel and the two pins in each high-voltage connector are electrically tied.

Range Selection Switches

The sensing input range is established by a four-position DIP switch for each channel. The selectable ranges and their corresponding switch position settings are shown in Table 2. See Figure 1 for the locations of the switches.

To assist with transferring the input range settings from an IT card to an IT-2 module, a conversion chart is provided (Figure 2). Each row contains a maximum input voltage, the corresponding IT jumper configuration, and the corresponding IT-2 DIP switch configuration.

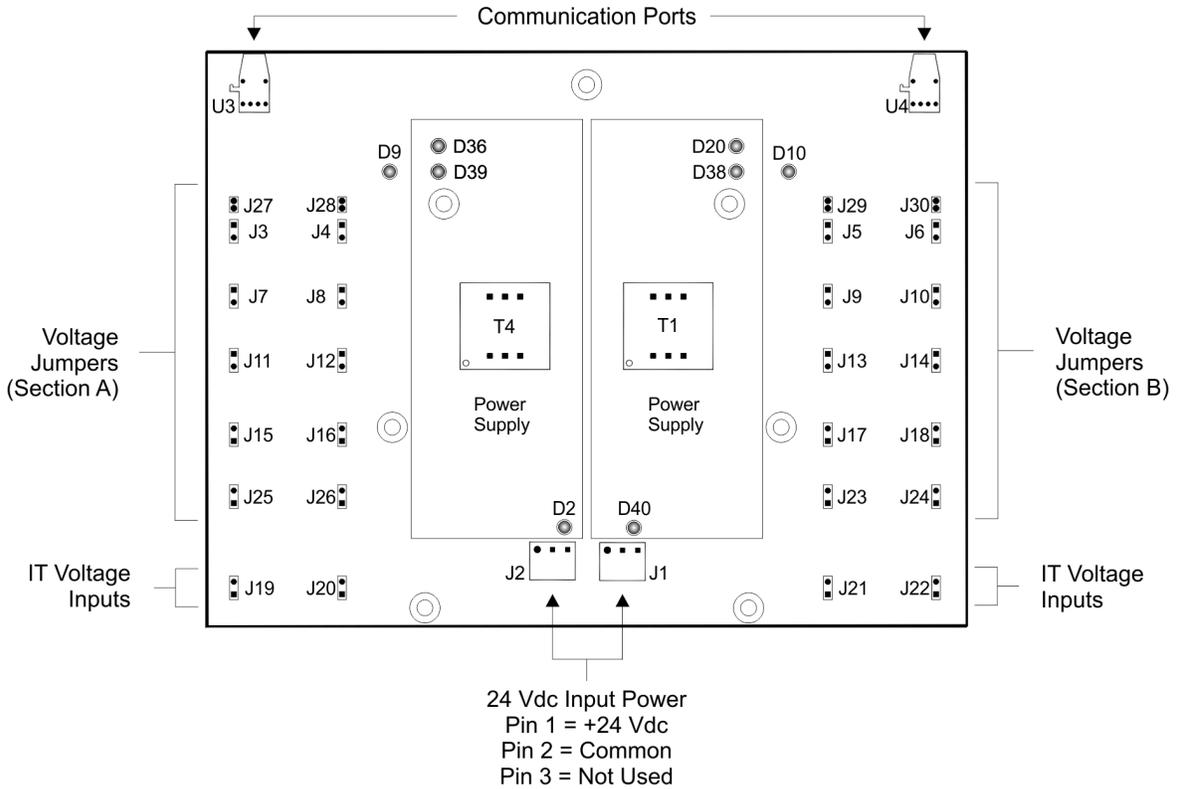
Fiber Optic Outputs

Two fiber optic output channels transmit isolated, digital signals with frequency proportional to the input voltage to the ECM-2 or FCIM and BCM-2 or BCM.

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Operating Power

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



Voltage Selection Jumper Legend

Max. Input	IT Jumper Positions, Section A	IT Jumper Positions, Section B	IT-2 Inputs 1 / 2
100 mV	J3-J25, J4-J26, J27-J28	J5-J23, J6-J24, J29-J30	
200 mV	J3-J25, J4-J26	J5-J23, J6-J24	
250 V	J3-J15, J4-J16	J5-J17, J6-J18	
500 V	J3-J11, J4-J12	J5-J13, J6-J14	
750 V	J3-J7, J4-J8, J15-J25, J16-J26	J5-J9, J6-J10, J17-J23, J18-J24	
1000 V	J3-J7, J4-J8	J5-J9, J6-J10	
1500 V	J11-J25, J12-J26	J13-J23, J14-J24	
2000 V	No Jumpers Installed	No Jumpers Installed	

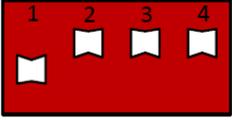
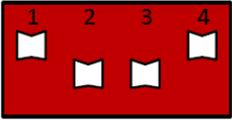
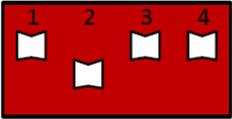
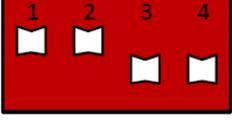
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Figure 2. IT to IT-2 Input Range Conversion Chart

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Table 2. Input Range Selection Switch Positions

Switch Positions	Maximum DC High Voltage	Maximum DC Low Voltage	Maximum AC High Voltage	Maximum AC Low Voltage
	2,000 V	200 mV	1,414 V	141 mV
	1,500 V	150 mV	1,061 V	106 mV
	1,000 V	100 mV	707 V	71 mV
	750 V	75 mV	530 V	53 mV
	500 V	50 mV	354 V	35 mV
	250 V	25 mV	177 V	18 mV

Monitoring

IT-2 monitoring consists of 19 LED indicators. All LED indicators are located on the IT-2 front panel. See Figure 1 for their locations.

Overvoltage and Undervoltage Indicators

One red Overvoltage LED indicator and one red Undervoltage LED indicator are provided for each channel. An Overvoltage LED lights when the input voltage differential is positive and exceeds the selected range. An Undervoltage LED lights when the input voltage differential is negative and exceeds the selected range.

Input Range Indicators

Twelve green LEDs (six for each channel) indicate the selected sensing range. Only dc voltage ranges are shown on the front panel overlay, the ac voltage equivalents are listed in Table 2.

A red Invalid Range LED lights when the Range Selection switch is set to a value that does not correspond to a valid voltage range. See Table 2 for valid range selection settings.

+24V Power Indicator

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

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.

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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 IT-2 is removed. It is recommended that at least one IT-2 is stocked.

Safety

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.

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.

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.

Glossary

BCM, BCM-2

Bridge Control Module. This module 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.

ECM

Exciter Control Module, used only in ECS2100 excitation systems. Provides excitation control, limiting, protection, and communication.

ECM-2

Excitation Control Module, used only in DECS-2100 excitation systems. Contains the excitation control, limiting, protection, and communication software. It processes the ac source waveforms and firing angle command and determines when to fire each power bridge SCR.

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.

Flash Memory

Nonvolatile memory storage that can be electrically erased and reprogrammed.

IT, IT-2

Isolation Transducer. This module transmits two isolated, digital signals with frequency proportional to the analog input voltage to the ECM-2 or FCIM and BCM-2 or BCM.

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Power Bridge

An array of SCRs that convert ac current to dc current.

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