ICP DAS

# I-87016W

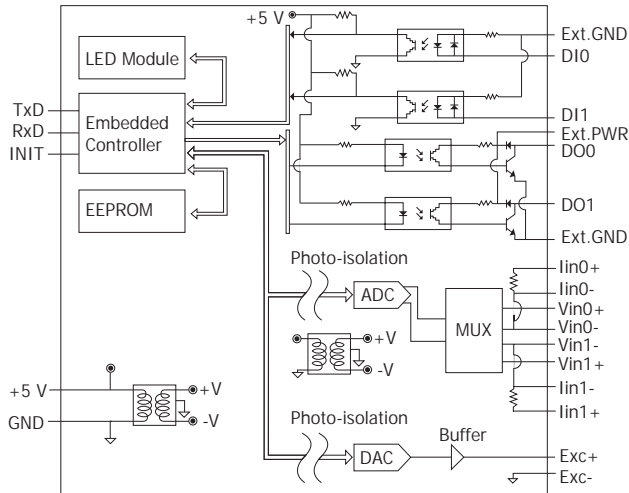## 2-channel Isolated Strain Gauge Input Module

## Features

- Strain Gauge Measurement
- High Resolution: 16-bit
- Excitation Voltage Output : 0 ~ 10 V
- Individual Channel Configuration
- 2-channel Digital Inputs
- 2-channel Digital Outputs
- 3000 V$_{DC}$ Intra-module Isolation
- RoHS Compliant
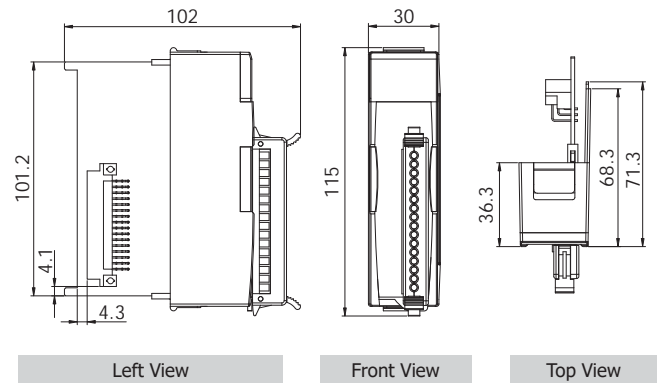- Wide Operating Temperature Range: -25 to +75°C

## Introduction

Around our surroundings, there are numerous examples of converting force into a measurable electrical output; In most cases, we need a strain gauge or a load cell. But the question is that how do we deal with these electrical outputs?

I-87016W is definitely your NO.1 choice! It not only processes the data from load cells or strain gauges, but also features linear mapping that generates intuitive and synchronic results for you; by user-defined corespondent table, I-87016W converts the data into weight directly!

## Applications

- Industrial Automation
- Industrial Machinery
- Building Automation
- Semiconductor Fabrication
- Control Systems

## System Specifications

| Communication | |
|---|---|
| Interface | RS-485 |
| Format | N, 8, 1 |
| Baud Rate | 1200 to 115200 bps |
| Protocol | DCON |
| Dual Watchdog | Yes, Module (1.6 Seconds), Communication (Programmable) |
| Safe Value (When Host Fail or Communication Fail) | Yes |
| Power-on Preset Value | Yes |

| LED Indicators/Display | |
|---|---|
| System LED Indictors | Yes, 1 as Power/Communication Indicator |
| I/O LED Indicators | 4 as Digital Input/Digital Output status Indicators |

| Isolation | |
|---|---|
| Intra-module Isolation, Field-to-Logic | 3000 V$_{DC}$ |

| EMS Protection | | |
|---|---|---|
| ESD (IEC 61000-4-2) | ±4 kV Contact for each Terminal | |
| | ±8 kV Air for Random Point | |

| Power | | |
|---|---|---|
| Power Consumption | Typical | 1.1 W |
| | Maximum | 2.5 W |

| Mechanical | |
|---|---|
| Dimensions (L × W × H) | 115 mm × 30 mm × 102 mm |

| Environment | |
|---|---|
| Operating Temperature | -25 to +75°C |
| Storage Temperature | -40 to +85°C |
| Humidity | 10 to 95% RH, Non-condensing |

## I/O Specifications

| Analog Input | |
|---|---|
| Channels | 2 |
| Range | ±15 mV, ±50 mV, ±100 mV, ±500 mV, ±1 V$_{DC}$, ±2.5 V$_{DC}$<br>-20 mA ~ +20 mA (No External Resistor Required) |
| Strain Gauge Type | Full-bridge, Half-bridge, and Quarter-bridge |
| Resolution | 16-bit |
| Individual Channels Configurable | Yes |
| Accuracy | ±0.05% of FSR (Voltage), ±0.1% of FSR (Current) |
| Sampling Rate | 10 Hz (Total) |
| -3dB Bandwidth | 15.7 Hz (10 Hz mode) |
| Common Mode Rejection | 150 dB min. |
| Normal Mode Rejection | 100 dB |
| Input Impedance | > 400 kΩ (Voltage), 125 Ω (Current) |
| Overvoltage Protection | 30 V$_{DC}$ |
| Long-distance Strain Gauge Measurement | Yes |
| Individual Channel Configurable | Yes |

| Excitation Voltage Output | |
|---|---|
| Channels | 1 |
| Range | 0 ~ +10 V$_{DC}$ |
| Resolution | 16-bit |
| Max. Output Load current | 80 mA |
| Accuracy | ±0.05% of FSR |
| Output Capacity | 10 V$_{DC}$ @ 80 mA |
| Drift | ±50 ppm/°C |

| Digital Input | | |
|---|---|---|
| Channels | | 2 |
| Contact | | Wet |
| Sink/Source (NPN/PNP) | | Sink |
| ON Voltage Level | | +3.5 V$_{DC}$ ~ 50 V$_{DC}$ |
| OFF Voltage Level | | +1 V$_{DC}$ Max. |
| Input Impedance | | 10 kΩ, 0.66 W |
| Event Counter | Channels | 2 |
| | Max. Input Frequency | 50 Hz |
| | Min. Pulse Width | 10 ms |
| Channel-to-Channel Isolation | | Yes |

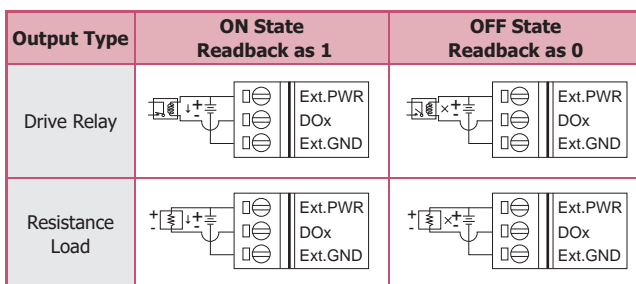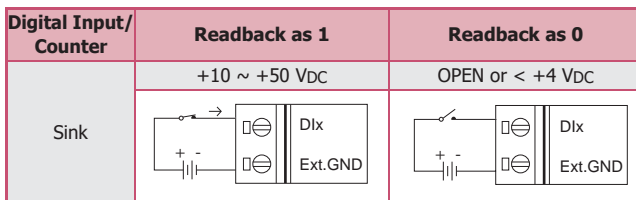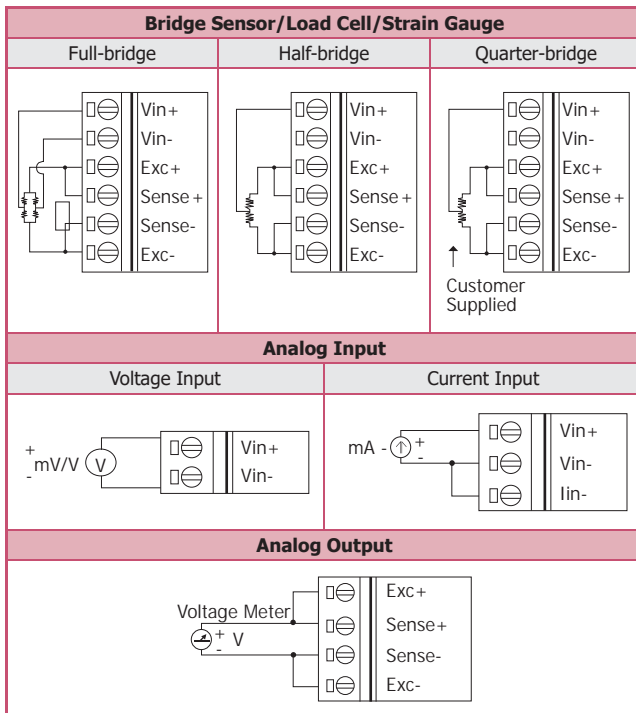| Digital Output | |
|---|---|
| Channels | 2 |
| Type | Open Collector |
| Sink/Source (NPN/PNP) | Sink |
| Load Voltage | +3.5 V$_{DC}$ ~ 50 V$_{DC}$ |
| Max. Load Current | 700 mA/channel |
| External Power Reversed Protection and Short Circuit Protection | Yes |
| Overheating Protection | Yes |

I-87016W

## Internal I/O Structure



## Wire Connections

### Bridge Sensor/Load Cell/Strain Gauge

| Full-bridge | Half-bridge | Quarter-bridge |
|---|---|---|
| Vin+ / Vin- / Exc+ / Sense+ / Sense- / Exc- | Vin+ / Vin- / Exc+ / Sense+ / Sense- / Exc- | Vin+ / Vin- / Exc+ / Sense+ / Sense- / Exc- |
| | | Customer Supplied |

### Analog Input

| Voltage Input | Current Input |
|---|---|
| +mV/V - (V) — Vin+ / Vin- | mA - (+ -) — Vin+ / Vin- / Iin- |

### Analog Output

| Voltage Meter (+ - V) — Exc+ / Sense+ / Sense- / Exc- |
|---|

| Digital Input/Counter | Readback as 1 | Readback as 0 |
|---|---|---|
| | +10 ~ +50 VDC | OPEN or < +4 VDC |
| Sink | DIx / Ext.GND | DIx / Ext.GND |

| Output Type | ON State Readback as 1 | OFF State Readback as 0 |
|---|---|---|
| Drive Relay | Ext.PWR / DOx / Ext.GND | Ext.PWR / DOx / Ext.GND |
| Resistance Load | Ext.PWR / DOx / Ext.GND | Ext.PWR / DOx / Ext.GND |

## Dimensions (Units: mm)



| Left View | Front View | Top View |

## Pin Assignments



| Terminal No. | Pin Assignment |
|---|---|
| 01 | Vin0+ |
| 02 | Vin0- |
| 03 | Iin0- |
| 04 | Vin1+ |
| 05 | Vin1- |
| 06 | Iin1- |
| 07 | Exc+ |
| 08 | Sense+ |
| 09 | Sense- |
| 10 | Exc- |
| 11 | Ext.PWR |
| 12 | DO0/LO |
| 13 | DO1/HI |
| 14 | DI0/EV |
| 15 | DI1/EV |
| 16 | Ext.GND |

## Excitation Voltage

| Strain Gauge | Quarter-bridge | Half-bridge | Full-bridge |
|---|---|---|---|
| 120 R | 9.0 V | 9.0 V | 4.5 V |
| 350 R | 10 V | 10 V | 10 V |

## Ordering Information

| I-87016W-G CR | 2-channel Isolated Strain Gauge Input Module (Gray Cover) (RoHS) |
|---|---|

## Accessories

| SG-770 CR | 7-channel Differential or 14-channel Single-ended Surge Protector (RoHS) |
|---|---|