



## I-87084W

4-/8-channel Counter/Frequency/Encoder Module

### Introduction

The I-87084W-G is a 32-bit high-speed Counter/Frequency/Encoder input module that offers a variety of mode options, including "Up Counter", "Frequency Input", "Up/Down Counter", "Direct/Pulse Counter" and "A/B Phase Counter" modes. The mode combinations can be individual set for all 8 channels, where some channels can be set to "Up Counter" mode and other channels can be simultaneously set to "Frequency", "Up/Down Counter" or "Encoder input" mode. The built-in digital filter is valid for both non-isolated and isolated and can filter out noise where the high/low pulse width is smaller than the minimum high/low width of the digital filter. The I-87084W-G provides a virtual battery backup function in counter mode, and isolated or non-isolated mode is jumper-selectable.

### 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) |
| LED Indicators/Display                 |   |
| System LED Indicators                  | Yes, 1 as Power/Communication Indicator                 |
| I/O LED Indicators                     | 8 as Digital Input Indicators                           |
| Isolation                              |   |
| Intra-module Isolation, Field-to-Logic | 2000 Vdc  |
| EMS Protection                         |   |
| ESD (IEC 61000-4-2)                    | ±4 kV Contact for each Terminal                         |
|  | ±8 kV Air for Random Point                              |
| Power                                  |   |
| Power Consumption                      | 0.6 W   |
| Mechanical                             |   |
| Dimensions (L x W x H)                 | 115 mm x 30 mm x 102 mm                                 |
| Environment                            |   |
| Operating Temperature                  | -25 to +75°C  |
| Storage Temperature                    | -40 to +85°C  |
| Humidity                               | 10 to 95% RH, Non-condensing                            |

### Features

- 8 Up Counter/Frequency Channels or 4 Encoder Input Channels
- Programmable Digital Filter
- Isolated or Non-isolated Input
- 32-bit Counter
- Individual Channel Configuration
- Virtual Battery Backup to Preserve Counter Values
- Maximum Frequency of up to 1 MHz
- ±4 kV ESD Protection
- Preset Values for Counter Input
- RoHS Compliant
- Wide Operating Temperature Range: -25 to +75°C



### Applications

Counter Measurement, Frequency Measurement and Encoder Motion Control.

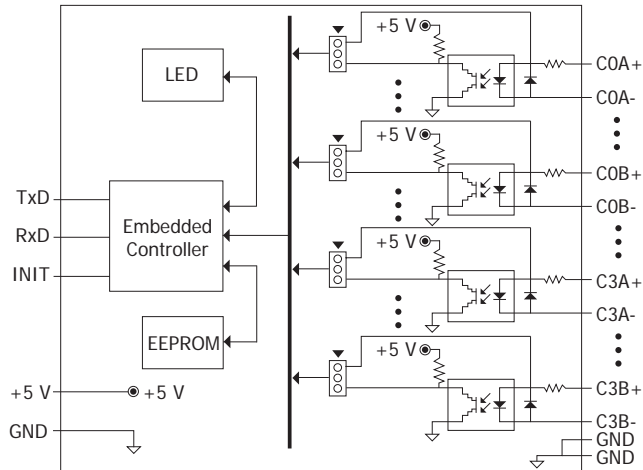
### I/O Specifications

| Counter/Frequency/Encoder Input                   |  |   |
|---|--|---|
| Channels  | 4-channel Up/Down Counter (CW/CCW)<br>4-channel Dir/Pulse Counter (Bi-direction)<br>4-channel A/B Phase (Quadrant Counting)<br>8-channel Up Counter<br>8-channel Frequency |   |
| Contact   | Wet  |   |
| Sink/Source (NPN/PNP)                             | Sink   |   |
| Types   | Counter, Frequency or Encoder  |   |
| Counter/Encoder-bits                              | 32-bit (4,294,967,295)   |   |
| Isolated  | ON Voltage Level   | +3.5 Vdc ~ +30 Vdc                                    |
|   | OFF Voltage Level  | +1 Vdc Max.   |
| Non-isolated                                      | ON Voltage Level   | +2.4 Vdc ~ +5 Vdc                                     |
|   | OFF Voltage Level  | +0.8 Vdc Max.   |
| Programmable Digital Filter                       | 1 ~ 32767 μs   |   |
| Individual Channel Configuration                  | Yes  |   |
| Counter Mode                                      | Up or Up/Down  |   |
| Encoder Mode                                      | CW/CCW, Dir/Pulse, AB Phase  |   |
| Frequency Mode                                    | Yes  |   |
| Max. Speed  | Isolated   | 3.5 Vdc ~ 10 Vdc: 200 kHz<br>10 Vdc ~ 30 Vdc: 150 kHz |
|   | Non-isolated   | 1 MHz   |
| Frequency Accuracy                                | 1 Hz~200 kHz = ±0.025% of Input Frequency (Note1)  |   |
|   | 200 kHz~1 MHz = ±0.1% of Input Frequency   |   |
| Virtual Battery Backup to preserve Counter Values | Yes  |   |

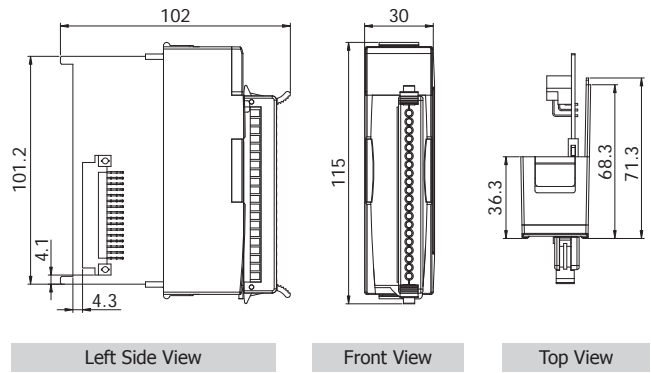
#### Note1:

| Frequency Range   | Frequency Error (typical) |
|-------------------|---------------------------|
| 1 Hz ~ 10 Hz      | 0.01 Hz                   |
| 10 Hz ~ 10 KHz    | 0.5 Hz                    |
| 10 KHz ~ 100 KHz  | 15 Hz                     |
| 100 KHz ~ 200 KHz | 30 Hz                     |

Internal I/O Structure



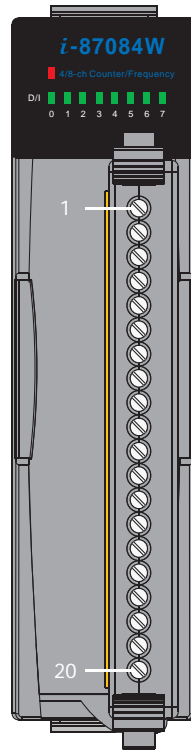
Dimensions (Units: mm)



Wire Connections

| Counter Type   | Isolated   | Non-isolated                                      |
|----------------|--|---|
| Dir/Pulse      | Pulse+ CxA+<br>Pulse- CxA-<br>Dir+ CxB+<br>Dir- CxB-     | Pulse+ CxA+<br>Dir+ CxB+<br>Pulse- & Dir- GND     |
| Up/Down        | Up+ CxA+<br>Up- CxA-<br>Down+ CxB+<br>Down- CxB-         | Up+ CxA+<br>Down+ CxB+<br>Up- & Down- GND         |
| Up             | Up0+ CxA+<br>Up0- CxA-<br>Up1+ CxB+<br>Up1- CxB-         | Up0+ CxA+<br>Up1+ CxB+<br>Up0- & Up1- GND         |
| A/B Phase      | A0+ CxA+<br>A0- CxA-<br>B0+ CxB+<br>B0- CxB-             | A0+ CxA+<br>B0+ CxB+<br>A0- & B0- GND             |
| Frequency Type | Isolated   | Non-isolated                                      |
| Frequency      | Freq0+ CxA+<br>Freq0- CxA-<br>Freq1+ CxB+<br>Freq1- CxB- | Freq0- CxA+<br>Freq1- CxB+<br>Freq0- & Freq1- GND |

Pin Assignments



| Terminal No. | Pin Assignment |
|--------------|----------------|
| 01           | C0A+           |
| 02           | C0A-           |
| 03           | C0B+           |
| 04           | C0B-           |
| 05           | C1A+           |
| 06           | C1A-           |
| 07           | C1B+           |
| 08           | C1B-           |
| 09           | C2A+           |
| 10           | C2A-           |
| 11           | C2B+           |
| 12           | C2B-           |
| 13           | C3A+           |
| 14           | C3A-           |
| 15           | C3B+           |
| 16           | C3B-           |
| 17           | GND            |
| 18           | GND            |
| 19           | N.C            |
| 20           | N.C            |

Ordering Information

|               |   |
|---------------|---|
| I-87084W-G CR | 4-/8-channel Counter/Frequency/Encoder Module (Gray Cover) (RoHS) |
|---------------|---|

Accessories

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