



## 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 × 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                            |

### 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
- Encoder motion control

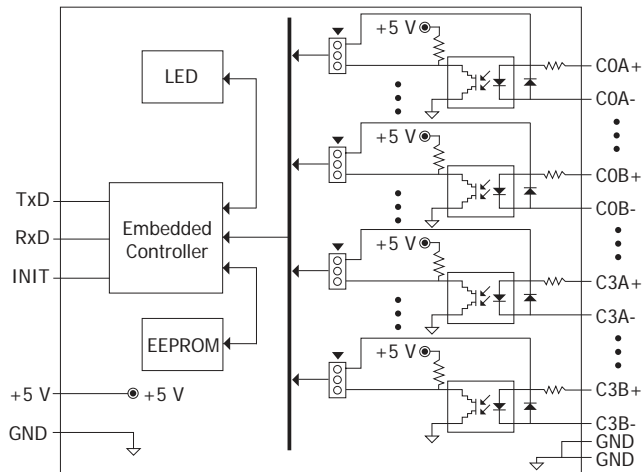
### I/O Specifications

| 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)<br>200 kHz ~ 1 MHz = ±0.1% of Input Frequency  |   |
| Virtual Battery Backup to preserve Counter Values | Yes  |   |

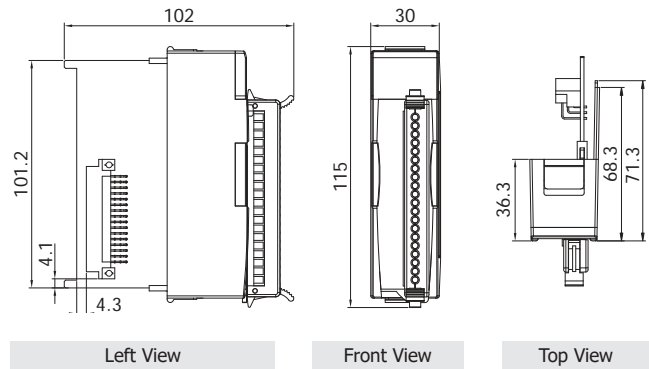
Note1:

| 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



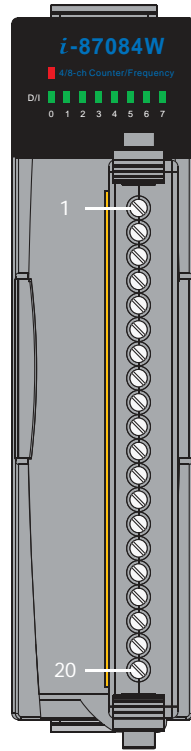
## Dimensions (Units: mm)



## 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

|                      |   |
|----------------------|---|
| <b>I-87084W-G CR</b> | 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) |
|-----------|--|