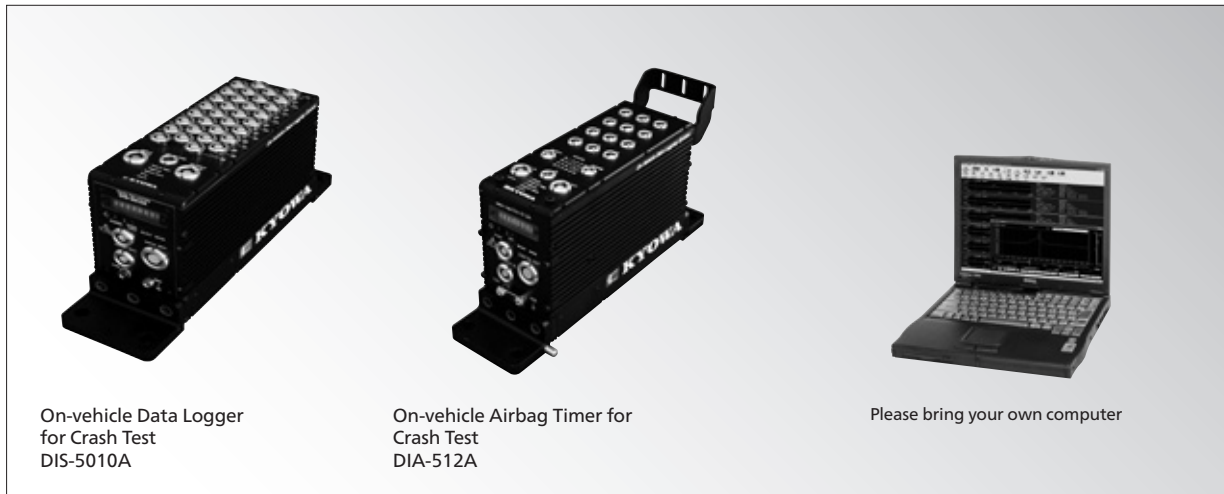


# DIS-5010A, DIA-512A

## Data Acquisition System for Crash Test



On-vehicle Data Logger for Crash Test  
DIS-5010A

On-vehicle Airbag Timer for Crash Test  
DIA-512A

Please bring your own computer

### On-vehicle Data Logger for Crash Test DIS-5010A

On-vehicle unit designed to acquire 32 channels of crash test data with excellent impact resistant.

- Impact resistant, compact & lightweight
- 32 channel/units
- Enables decentralized arrangement
- Built-in battery resulting in no required external power supply during measurement
- Large capacity flash memory (When 10 kHz sampling, recording time is approx. 150 s Max.)
- Enables measurement strain gages, semiconductor strain gages, strain-gage transducers, voltage, and digital signals

The DIS-5010A is an on-vehicle unit designed to acquire 32-channel of crash test data and has impact resistant. It is possible to connect to various sensors: strain gages, strain-gage transducers, piezoresistive transducers, voltage-output sensors, potentiometer type transducers.

### Specifications

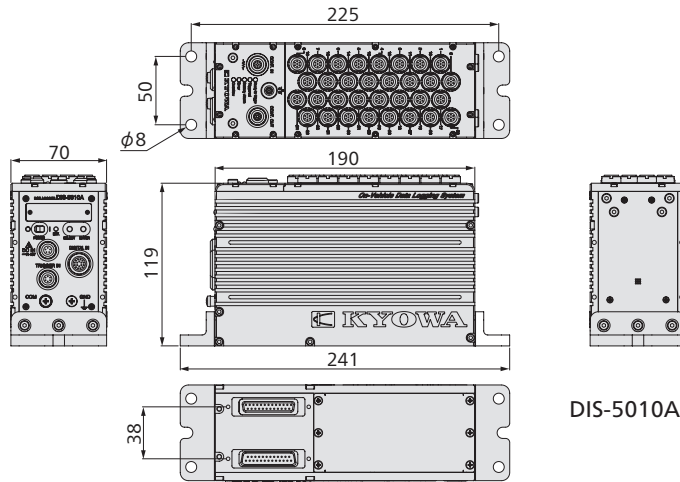
|                       |                                                                                                |
|-----------------------|------------------------------------------------------------------------------------------------|
| <b>■ Analog Input</b> |                                                                                                |
| Channels              | 32                                                                                             |
| Input connector       | ECG.1B.307<br>(Applicable plug: FGG. 1B.307 LEMO made)                                         |
| Input format          | Balance differential input                                                                     |
| Input resistance      | Bridge sensor measurement: Approx. (10 + 10 MΩ)<br>Voltage measurement: Approx. (100 + 100 kΩ) |
| Maximum input voltage | Within ±20 V                                                                                   |
| Gain                  | ×0.1 to 0.9 (×0.1 step)<br>×1 to 5000 (×1 step)                                                |
| Gain accuracy         | Within ±0.2% FS                                                                                |
| Balance Adjustment    | Gain ×0.1 to 0.9: ±10 V<br>×1 to 19: ±1 V<br>×20 to 99: ±50 mV<br>×100 to 5000: ±10 mV         |

|                                                                                                                                                                                                                                         |                                                                                                         |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
| <b>■ Half Bridge/ Full Bridge Systems</b>                                                                                                                                                                                               |                                                                                                         |
| Excitation methods                                                                                                                                                                                                                      | Separated for every channel<br>(ON/OFF control available)                                               |
| Bridge Excitation                                                                                                                                                                                                                       | 10, 5, and 2 VDC                                                                                        |
| Bridge systems                                                                                                                                                                                                                          | Half bridge and full bridge systems                                                                     |
| Bridge resistance                                                                                                                                                                                                                       | 120 Ω to 5 kΩ                                                                                           |
| Accuracy                                                                                                                                                                                                                                | Within ±0.1%                                                                                            |
| Maximum current                                                                                                                                                                                                                         | Within 30 mA                                                                                            |
| <b>■ LPF</b>                                                                                                                                                                                                                            |                                                                                                         |
| Fixed filters                                                                                                                                                                                                                           | SAE standard. Conforming to CFC1000<br>Overshoot 5% or less                                             |
| <b>Variable filters</b>                                                                                                                                                                                                                 |                                                                                                         |
| Transfer characteristics                                                                                                                                                                                                                | 5th order Butterworth                                                                                   |
| Cutoff frequencies                                                                                                                                                                                                                      | Settable range: 50 Hz to 20 kHz                                                                         |
| Amplitude ratio                                                                                                                                                                                                                         | -3 ±2 dB                                                                                                |
| Attenuation                                                                                                                                                                                                                             | -30 dB/oct.                                                                                             |
| <b>■ A/D Conversion</b>                                                                                                                                                                                                                 |                                                                                                         |
| Resolution                                                                                                                                                                                                                              | 16 bits                                                                                                 |
| Sampling methods                                                                                                                                                                                                                        | All channels synchronization                                                                            |
| Sampling frequencies                                                                                                                                                                                                                    | 100, 200, 500, 1 k, 2 k, 5 k, 10 k, 16 k,<br>20 k, 50 k, and 100 k Hz                                   |
| S/N                                                                                                                                                                                                                                     | 50 dB or more (With fixed LPF)                                                                          |
| <b>■ Digital Input</b>                                                                                                                                                                                                                  |                                                                                                         |
| Number of channels                                                                                                                                                                                                                      | 16                                                                                                      |
| Measuring Targets                                                                                                                                                                                                                       | No-voltage contact                                                                                      |
| Input Formats                                                                                                                                                                                                                           | Isolation input                                                                                         |
| <b>■ Data Recording Section</b>                                                                                                                                                                                                         |                                                                                                         |
| <b>Data recording memory</b>                                                                                                                                                                                                            |                                                                                                         |
| 1500 k words/channel, SRAM (Battery backup)<br>(When 10 kHz sampling, recording time is 150 s)                                                                                                                                          |                                                                                                         |
| <b>Data Storage Memory</b>                                                                                                                                                                                                              | 128 MB flash memory                                                                                     |
| <b>Types of Trigger</b>                                                                                                                                                                                                                 |                                                                                                         |
| External triggers                                                                                                                                                                                                                       | No-voltage contact input: 2 points (Isolation input)                                                    |
| Level triggers                                                                                                                                                                                                                          | Operated by level of arbitrary 3 channels                                                               |
| Cascade triggers                                                                                                                                                                                                                        | Operated by trigger output between units<br>or trigger output of conventional device.                   |
| Software triggers                                                                                                                                                                                                                       | Operated by command issued from the external PC                                                         |
| <b>■ Synchronization Connection</b>                                                                                                                                                                                                     |                                                                                                         |
| Trigger synchronization of multiple units is available with either of the following methods.                                                                                                                                            |                                                                                                         |
| <b>Coupling connection</b>                                                                                                                                                                                                              |                                                                                                         |
| Multiple DIS-5010A units are directly connected.<br>Maximum number of connected units: 6<br>Coupling method: Either transverse or base unit coupling method<br>* For the base unit coupling method, a base unit (Optional) is required. |                                                                                                         |
| <b>Cable connection</b>                                                                                                                                                                                                                 | Multiple DIS-5010A units are connected with<br>cascade cables.<br>Maximum number of connected units: 16 |

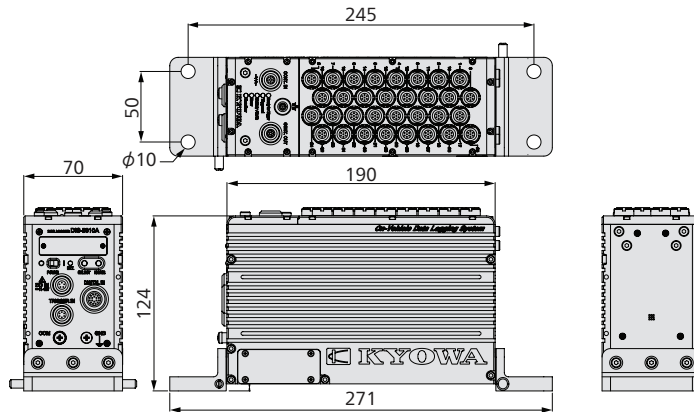
|                       |                                                                                                            |
|-----------------------|------------------------------------------------------------------------------------------------------------|
| ■TEDS Function        | Compatible with IEEE1451.4<br>(Mixed Mode Transducer Interface Class 2)                                    |
| ■Interfaces           | Conforming to 100BASE-TX                                                                                   |
| ■Indicator/Buzzer LED |                                                                                                            |
| LED                   |                                                                                                            |
| Ready for Trigger:    | Waiting to be triggered                                                                                    |
| Triggered:            | Trigger receive completed                                                                                  |
| Battery Alarm:        | Battery remaining capacity lowered                                                                         |
| Error:                | Error occurred in the DIS-5010A                                                                            |
| Overflow:             | Recording data overflowed                                                                                  |
| LED indicator         | Displays DIS-5010A status in 8 alphanumeric.                                                               |
| Buzzer                | Built-in alarm buzzer                                                                                      |
| ■Check Function       | Sensor check, wire break check, battery check, gain check, excitation voltage check, and memory check      |
| ■Power Supply         |                                                                                                            |
| Power supply          | 11 to 15 VDC                                                                                               |
| Consumption current   | Approx. 2.9 A<br>(When power supply: 12 V,<br>Excitation: 2 V, loads: 120 Ω,<br>and while being recharged) |

|                             |                                                                                             |
|-----------------------------|---------------------------------------------------------------------------------------------|
| ■Built-in Battery           |                                                                                             |
| Type                        | Nickel-hydrogen rechargeable battery                                                        |
| Recharge time               | Approx. 3.5 h                                                                               |
| Continuous operation period | Approx. 30 minutes<br>(Half bridge/full bridge systems 2 VDC, Bridge resistance 120 Ω)      |
| ■Operating Environment      |                                                                                             |
| Operating temperature       | 0 to 50°C                                                                                   |
| Operating humidity          | 20 to 80%RH (Non-condensing)                                                                |
| Storage temperature         | -10 to 60°C                                                                                 |
| Storage humidity            | 10 to 90% RH (Non-condensing)                                                               |
| Impact resistant            | 980.7 m/s <sup>2</sup> (100 G) 10 ms half sine<br>X-, Y-, Z-axis directions Each 1000 times |
| Vibration resistant         | 29.4 m/s <sup>2</sup> (3 G), 5 to 200 Hz (While operating)                                  |
| ■Appearance                 |                                                                                             |
| Dimensions                  | 70 W × 119 H × 190 D mm<br>(Excluding protrusions)                                          |
| Weight                      | Approx. 2.8 kg [LEMO type] (Excluding options)                                              |

■DIS-5010A Dimensions



DIS-5010A-LV (Longitudinal connection)



DIS-5010A-LH (Transverse connection)



## ■ On-vehicle Airbag Timer for Crash Test DIA-512A

# On-vehicle unit for crash safety and airbag inflation tests

- Smaller and lighter than conventional models
- Dimensions are the same as the DIS-5010A On-vehicle Data Logger for Crash Test
- Level of igniting current and current output duration are set channel by channel
- Igniting current status are saved in internal memory
- Digital signal output is synchronized to current output timing in each channel
- Digital LED indicator is provided for enhanced status indication
- Setting conditions are logged in nonvolatile memory.

The DIA-512A is an airbag timer which are installed in vehicles for crash safety tests and airbag inflation tests. A trigger signal lets it output airbag igniting current after a preset delay time. The igniting current level and output duration are set channel by channel.

### Specifications

| <b>■ Ignition Current</b>           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                               |                 |        |                     |        |                     |        |                     |        |                     |         |                 |                              |               |        |                 |        |                 |        |                 |        |                 |         |                 |
|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|-----------------|--------|---------------------|--------|---------------------|--------|---------------------|--------|---------------------|---------|-----------------|------------------------------|---------------|--------|-----------------|--------|-----------------|--------|-----------------|--------|-----------------|---------|-----------------|
| Number of output Channels           | 12                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                               |                 |        |                     |        |                     |        |                     |        |                     |         |                 |                              |               |        |                 |        |                 |        |                 |        |                 |         |                 |
| Connector type                      | DIA-512A: ECP. 0S. 302 (LEMO)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                               |                 |        |                     |        |                     |        |                     |        |                     |         |                 |                              |               |        |                 |        |                 |        |                 |        |                 |         |                 |
| Plug                                | FFA. 0S. 302 (LEMO)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                               |                 |        |                     |        |                     |        |                     |        |                     |         |                 |                              |               |        |                 |        |                 |        |                 |        |                 |         |                 |
| Output current                      | Setting range: 0.5 to 3.0 A and OFF<br>(Selectable with 0.1 A steps)<br>Accuracy: Within $\pm 0.05$ A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                               |                 |        |                     |        |                     |        |                     |        |                     |         |                 |                              |               |        |                 |        |                 |        |                 |        |                 |         |                 |
| Maximum output voltage              | Approx. 10 V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                               |                 |        |                     |        |                     |        |                     |        |                     |         |                 |                              |               |        |                 |        |                 |        |                 |        |                 |         |                 |
| Load resistance                     | 1 to 9 $\Omega$ (Including cable resistance value to the inflator)<br>However, the actual upper limit of the resistance value is obtained from the following accepted.<br>Set electric current (A) x Load resistance ( $\Omega$ ) = Maximum output voltage (V). Mean while it is necessary to prevent.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                               |                 |        |                     |        |                     |        |                     |        |                     |         |                 |                              |               |        |                 |        |                 |        |                 |        |                 |         |                 |
|                                     | <table border="1"> <thead> <tr> <th>Output current setting values</th> <th>Load resistance</th> </tr> </thead> <tbody> <tr> <td>0.5 A</td> <td>1.0 to 9.0 <math>\Omega</math></td> </tr> <tr> <td>1.0 A</td> <td>1.0 to 9.0 <math>\Omega</math></td> </tr> <tr> <td>2.0 A</td> <td>1.0 to 5.0 <math>\Omega</math></td> </tr> <tr> <td>3.0 A</td> <td>1.0 to 3.3 <math>\Omega</math></td> </tr> </tbody> </table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Output current setting values | Load resistance | 0.5 A  | 1.0 to 9.0 $\Omega$ | 1.0 A  | 1.0 to 9.0 $\Omega$ | 2.0 A  | 1.0 to 5.0 $\Omega$ | 3.0 A  | 1.0 to 3.3 $\Omega$ |         |                 |                              |               |        |                 |        |                 |        |                 |        |                 |         |                 |
| Output current setting values       | Load resistance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                               |                 |        |                     |        |                     |        |                     |        |                     |         |                 |                              |               |        |                 |        |                 |        |                 |        |                 |         |                 |
| 0.5 A                               | 1.0 to 9.0 $\Omega$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                               |                 |        |                     |        |                     |        |                     |        |                     |         |                 |                              |               |        |                 |        |                 |        |                 |        |                 |         |                 |
| 1.0 A                               | 1.0 to 9.0 $\Omega$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                               |                 |        |                     |        |                     |        |                     |        |                     |         |                 |                              |               |        |                 |        |                 |        |                 |        |                 |         |                 |
| 2.0 A                               | 1.0 to 5.0 $\Omega$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                               |                 |        |                     |        |                     |        |                     |        |                     |         |                 |                              |               |        |                 |        |                 |        |                 |        |                 |         |                 |
| 3.0 A                               | 1.0 to 3.3 $\Omega$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                               |                 |        |                     |        |                     |        |                     |        |                     |         |                 |                              |               |        |                 |        |                 |        |                 |        |                 |         |                 |
| Output time                         | Setting range: 1 to 5 ms (Selectable with 1 ms)<br>Accuracy: Within $\pm 0.2$ ms<br>(During maintaining 90% of the preset current)<br>Rise: Within 100 $\mu$ s<br>(During maintaining 0 to 90% of the preset current)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                               |                 |        |                     |        |                     |        |                     |        |                     |         |                 |                              |               |        |                 |        |                 |        |                 |        |                 |         |                 |
| Delay time Setting                  | 0.1 to 999.9 ms (Selectable with 0.1 ms)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                               |                 |        |                     |        |                     |        |                     |        |                     |         |                 |                              |               |        |                 |        |                 |        |                 |        |                 |         |                 |
|                                     | <p>· When setting external trigger</p> <table border="1"> <thead> <tr> <th>Setting sampling frequencies</th> <th>Setting range</th> </tr> </thead> <tbody> <tr> <td>10 kHz</td> <td>0.6 to 999.9 ms</td> </tr> <tr> <td>16 kHz</td> <td>0.4 to 999.9 ms</td> </tr> <tr> <td>20 kHz</td> <td>0.3 to 999.9 ms</td> </tr> <tr> <td>50 kHz</td> <td>0.2 to 999.9 ms</td> </tr> <tr> <td>100 kHz</td> <td>0.1 to 999.9 ms</td> </tr> </tbody> </table> <p>· When setting cascade trigger</p> <table border="1"> <thead> <tr> <th>Setting sampling frequencies</th> <th>Setting range</th> </tr> </thead> <tbody> <tr> <td>10 kHz</td> <td>1.2 to 999.9 ms</td> </tr> <tr> <td>16 kHz</td> <td>0.8 to 999.9 ms</td> </tr> <tr> <td>20 kHz</td> <td>0.6 to 999.9 ms</td> </tr> <tr> <td>50 kHz</td> <td>0.4 to 999.9 ms</td> </tr> <tr> <td>100 kHz</td> <td>0.2 to 999.9 ms</td> </tr> </tbody> </table> | Setting sampling frequencies  | Setting range   | 10 kHz | 0.6 to 999.9 ms     | 16 kHz | 0.4 to 999.9 ms     | 20 kHz | 0.3 to 999.9 ms     | 50 kHz | 0.2 to 999.9 ms     | 100 kHz | 0.1 to 999.9 ms | Setting sampling frequencies | Setting range | 10 kHz | 1.2 to 999.9 ms | 16 kHz | 0.8 to 999.9 ms | 20 kHz | 0.6 to 999.9 ms | 50 kHz | 0.4 to 999.9 ms | 100 kHz | 0.2 to 999.9 ms |
| Setting sampling frequencies        | Setting range                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                               |                 |        |                     |        |                     |        |                     |        |                     |         |                 |                              |               |        |                 |        |                 |        |                 |        |                 |         |                 |
| 10 kHz                              | 0.6 to 999.9 ms                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                               |                 |        |                     |        |                     |        |                     |        |                     |         |                 |                              |               |        |                 |        |                 |        |                 |        |                 |         |                 |
| 16 kHz                              | 0.4 to 999.9 ms                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                               |                 |        |                     |        |                     |        |                     |        |                     |         |                 |                              |               |        |                 |        |                 |        |                 |        |                 |         |                 |
| 20 kHz                              | 0.3 to 999.9 ms                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                               |                 |        |                     |        |                     |        |                     |        |                     |         |                 |                              |               |        |                 |        |                 |        |                 |        |                 |         |                 |
| 50 kHz                              | 0.2 to 999.9 ms                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                               |                 |        |                     |        |                     |        |                     |        |                     |         |                 |                              |               |        |                 |        |                 |        |                 |        |                 |         |                 |
| 100 kHz                             | 0.1 to 999.9 ms                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                               |                 |        |                     |        |                     |        |                     |        |                     |         |                 |                              |               |        |                 |        |                 |        |                 |        |                 |         |                 |
| Setting sampling frequencies        | Setting range                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                               |                 |        |                     |        |                     |        |                     |        |                     |         |                 |                              |               |        |                 |        |                 |        |                 |        |                 |         |                 |
| 10 kHz                              | 1.2 to 999.9 ms                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                               |                 |        |                     |        |                     |        |                     |        |                     |         |                 |                              |               |        |                 |        |                 |        |                 |        |                 |         |                 |
| 16 kHz                              | 0.8 to 999.9 ms                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                               |                 |        |                     |        |                     |        |                     |        |                     |         |                 |                              |               |        |                 |        |                 |        |                 |        |                 |         |                 |
| 20 kHz                              | 0.6 to 999.9 ms                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                               |                 |        |                     |        |                     |        |                     |        |                     |         |                 |                              |               |        |                 |        |                 |        |                 |        |                 |         |                 |
| 50 kHz                              | 0.4 to 999.9 ms                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                               |                 |        |                     |        |                     |        |                     |        |                     |         |                 |                              |               |        |                 |        |                 |        |                 |        |                 |         |                 |
| 100 kHz                             | 0.2 to 999.9 ms                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                               |                 |        |                     |        |                     |        |                     |        |                     |         |                 |                              |               |        |                 |        |                 |        |                 |        |                 |         |                 |
|                                     | Accuracy: Within $\pm 0.01$ ms<br>(When setting 0.1 to 99.9 ms)<br>Within $\pm 0.1$ ms<br>(When setting 100.0 to 999.9 ms)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                               |                 |        |                     |        |                     |        |                     |        |                     |         |                 |                              |               |        |                 |        |                 |        |                 |        |                 |         |                 |
| <b>■ Recording Current Waveform</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                               |                 |        |                     |        |                     |        |                     |        |                     |         |                 |                              |               |        |                 |        |                 |        |                 |        |                 |         |                 |
| AD resolution                       | 16 bits                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                               |                 |        |                     |        |                     |        |                     |        |                     |         |                 |                              |               |        |                 |        |                 |        |                 |        |                 |         |                 |
| Measuring accuracy                  | Within $\pm 3\%$ FS (FS. = 5.0 A)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                               |                 |        |                     |        |                     |        |                     |        |                     |         |                 |                              |               |        |                 |        |                 |        |                 |        |                 |         |                 |
| Sampling                            | 10 k, 16 k, 20 k, 50 k, and 100 kHz<br>All channels are sampled at the same time.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                               |                 |        |                     |        |                     |        |                     |        |                     |         |                 |                              |               |        |                 |        |                 |        |                 |        |                 |         |                 |
| Maximum recording time              | Approx. 2.5 s. (When sampling frequency is 100 kHz, including preset data)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                               |                 |        |                     |        |                     |        |                     |        |                     |         |                 |                              |               |        |                 |        |                 |        |                 |        |                 |         |                 |
| Recording memory                    | SRAM memory (Battery backup)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                               |                 |        |                     |        |                     |        |                     |        |                     |         |                 |                              |               |        |                 |        |                 |        |                 |        |                 |         |                 |
| Storage memory                      | FLASH memory                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                               |                 |        |                     |        |                     |        |                     |        |                     |         |                 |                              |               |        |                 |        |                 |        |                 |        |                 |         |                 |

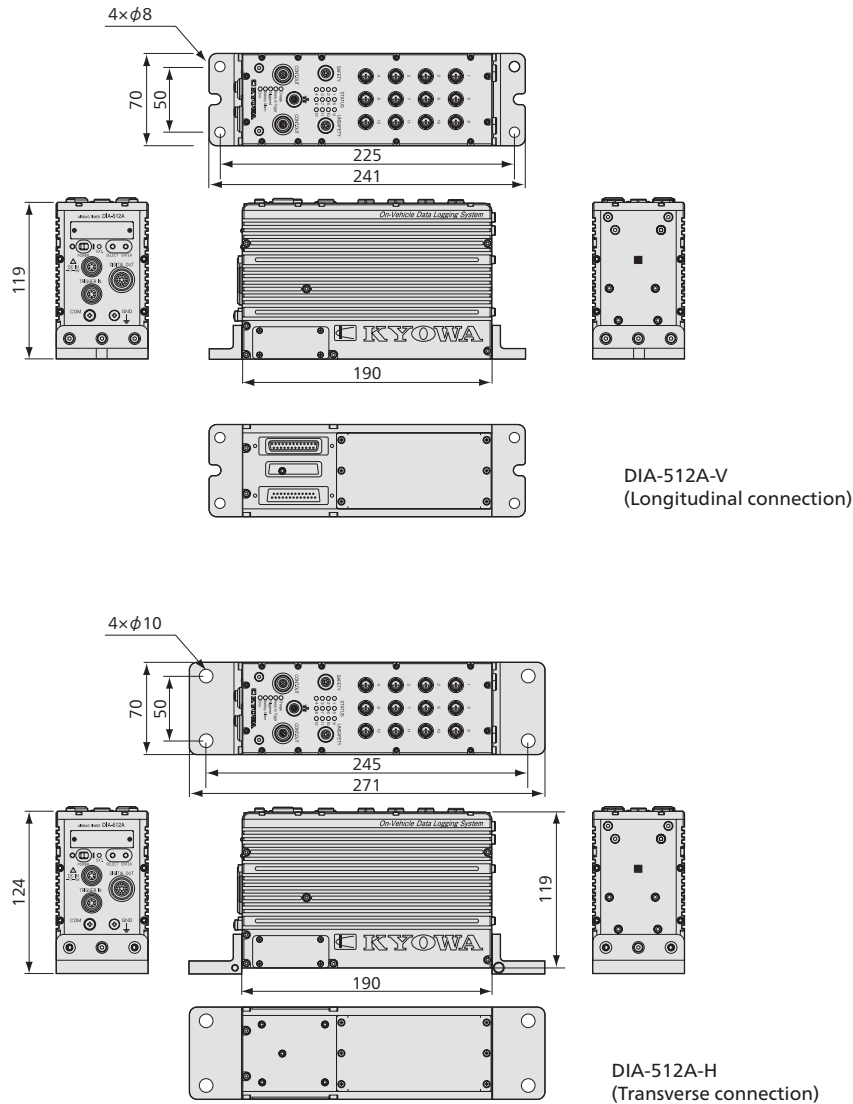
|                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                               |
|------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>■ Digital Output</b>                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                               |
| Number of Channels                                                                                                                       | 16                                                                                                                                                                                                                                                                                                                                                            |
| Output timing                                                                                                                            | Synchronized with the current output of every channel (Total 12)<br>Synchronized with the trigger input signals (Total 4)                                                                                                                                                                                                                                     |
| Output format                                                                                                                            | Open collector output                                                                                                                                                                                                                                                                                                                                         |
| Connector type                                                                                                                           | DIA-512A: ECG. 2B. 318 (LEMO)<br>Plug: FGG. 2B. 318 (LEMO)                                                                                                                                                                                                                                                                                                    |
| <b>■ Synchronous Functions</b>                                                                                                           |                                                                                                                                                                                                                                                                                                                                                               |
| Direct coupling                                                                                                                          | Multiple units are connected by using the coupling connectors<br>Number of connective units Max. 2, besides 4 units of DIS-5010A<br>Coupling method: Either transverse or base unit coupling method<br>* For the base unit coupling method, a base unit (Optional) is required.                                                                               |
| Cable connection                                                                                                                         | Multiple units are connected by cables<br>Number of connective units Max. 2                                                                                                                                                                                                                                                                                   |
|                                                                                                                                          | *Note 1 When using the DIA-512A and DIS-5010A with cascade connection, set the DIA-512A as master and connect the external trigger signal (Tape switch, etc.) to the trigger input connector of the DIA-512A. Or, the delay time accuracy is not satisfied due to the clock error of the trigger signal for cascade connection.                               |
| <b>■ Trigger Input</b>                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                               |
| External triggers                                                                                                                        | 2 points (No-voltage contact input)<br>Connect tape switch, etc.                                                                                                                                                                                                                                                                                              |
| Common triggers                                                                                                                          | 2 points (TTL 3.3 V, negative logic)<br>For coupling operation of the DIA-512A and DIS-5010A                                                                                                                                                                                                                                                                  |
| Software triggers                                                                                                                        | Operated by command issued from the DIA-51A Control Software.                                                                                                                                                                                                                                                                                                 |
|                                                                                                                                          | *Note 2 To determine the error input of the trigger input, trigger signals are recognized as trigger only when more than 6 counts of setting sampling frequency is continuously input.                                                                                                                                                                        |
| <b>■ Trigger Output</b>                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                               |
| Common triggers                                                                                                                          | 2 points (TTL 3.3 V, negative logic)<br>For coupling operation of the DIA-512A and DIS-5010A                                                                                                                                                                                                                                                                  |
| <b>■ Communication</b>                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                               |
| Interfaces                                                                                                                               | Conforming to 100BASE-TX                                                                                                                                                                                                                                                                                                                                      |
| Connector                                                                                                                                | DIA-512A: ECG. 0B. 309 (LEMO)<br>Plug: FGG. 0B. 309 (LEMO)                                                                                                                                                                                                                                                                                                    |
| <b>■ Indication/Buzzer LED</b>                                                                                                           |                                                                                                                                                                                                                                                                                                                                                               |
| Character indicator                                                                                                                      | Displays the status of the DIA-512A, IP address and battery levels on the panel face indicator in 8 characters.                                                                                                                                                                                                                                               |
| LED indicator                                                                                                                            | Displays the status of the DIA-512A with the LED on the panel face.<br>Status: Displays the status and checked result of every channel.<br>Charge: Charging the capacitor for current output.<br>Ready for Trigger: Waiting for triggers.<br>Triggered: Received trigger signal.<br>Battery Alarm: Battery level lowered.<br>Error: A certain error occurred. |
| Buzzer                                                                                                                                   | The buzzer issues alarm in the following incident.<br>Charging the capacitor for current output.<br>Detects error when measuring the resistance.<br>Built-in battery level lowered.                                                                                                                                                                           |
| <b>■ Operation without using PC</b>                                                                                                      |                                                                                                                                                                                                                                                                                                                                                               |
| Capable of operating the follows without using the PC but with the SELECT and ENTER keys and the character indication on the panel face. |                                                                                                                                                                                                                                                                                                                                                               |
| Changing IP address                                                                                                                      | Change the IP address to the preset IP address.                                                                                                                                                                                                                                                                                                               |
| Initializing IP address                                                                                                                  | Initialize the IP address.                                                                                                                                                                                                                                                                                                                                    |
| Refresh                                                                                                                                  | Refresh the built-in battery.<br>*Requires the dedicated discharge unit and external power supply unit.                                                                                                                                                                                                                                                       |
| <b>■ Safety and check function</b>                                                                                                       |                                                                                                                                                                                                                                                                                                                                                               |
| SAFETY function                                                                                                                          | In a state with the SAFETY plug inserted to the SAFETY connector, trigger signal must not be input. In addition, the current output terminals are shorted in the DIA-512A so as not to flow the accidental current to the inflator.                                                                                                                           |

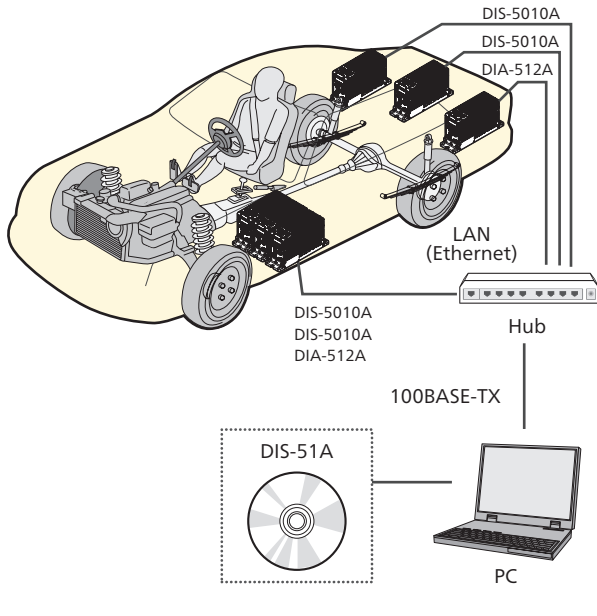


|                                               |                                                                                                                                                                                                                                                                                                                                            |
|-----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Load resistance measurement</b>            | Apply weak current (Approx. 10 mA) to the inflator and measure the resistance. The measured resistance includes the cable resistance to the inflator. Measurement range: 0.0 to 10.0 Ω Resolution: 0.1 Ω Accuracy: Within ±0.3 Ω                                                                                                           |
| <b>Resistance measurement before the test</b> | Just before conducting the test (When moving the SAFETY plug from the SAFETY connector to UNSAFETY connector), automatically measures the load resistance to detect errors such as cable broken. Only when the measured result is within the preset resistance range, the DIA-512A becomes waiting for trigger state to continue the test. |
| <b>Resistance measurement after the test</b>  | After completing the ignition, automatically measures the load resistance for detecting the not ignited inflator. The measured resolution is displayed on the Status LED on the top face.                                                                                                                                                  |
| <b>Trigger check</b>                          | Checks the preset trigger status before conducting the test.                                                                                                                                                                                                                                                                               |
| <b>Battery check</b>                          | Checks the level of the built-in battery before conducting the test.                                                                                                                                                                                                                                                                       |
| <b>Memory check</b>                           | Checks the memory for recording the current output.                                                                                                                                                                                                                                                                                        |
| <b>Log function</b>                           | Records the test setting contents, operating contents of the DIA-512A, and the cumulative number of ignition of every channel.                                                                                                                                                                                                             |

|                              |                                                                                                                                              |
|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Operating temperature</b> | 0 to 50 °C                                                                                                                                   |
| <b>Operating humidity</b>    | 20 to 80% RH (Non-condensing)                                                                                                                |
| <b>Storage temperature</b>   | -10 to 60 °C                                                                                                                                 |
| <b>Storage humidity</b>      | 10 to 90% RH (Non-condensing)                                                                                                                |
| <b>Impact resistant</b>      | 980.7 m/s <sup>2</sup> (100 G) 10 ms half sign<br>X-, Y-, Z-axis directions, each 1000 times                                                 |
| <b>Vibration resistant</b>   | 29.4 m/s <sup>2</sup> (3 G), 5 to 200 Hz (When operated)                                                                                     |
| <b>Others</b>                | Avoid dust and inductive noise from large capacity electric motors, etc.                                                                     |
| <b>Power supply</b>          |                                                                                                                                              |
| <b>Power supply</b>          | 11 to 15 VDC                                                                                                                                 |
| <b>Operating current</b>     | 2.0 A or less (Power supply voltage: 12 V, when built-in battery charged)                                                                    |
| <b>Connector type</b>        | DIA-512A: ECG. 1B. 305 (LEMO)<br>Plug: FGG. 1B. 305 (LEMO)                                                                                   |
| <b>Built-in battery</b>      | Type: Nickel-Hydrogen rechargeable battery<br>Operation time: Approx. 30 minutes<br>(When fully charged)<br>Rechargeable time: Approx. 3.5 h |
| <b>Appearance</b>            |                                                                                                                                              |
| <b>Dimensions</b>            | 70 W × 119 H × 190 D mm<br>(Excluding protrusions)                                                                                           |
| <b>Weight</b>                | Approx. 2.4 kg (Excluding options)                                                                                                           |

■ DIA-512A Dimensions





■ Control Software for Crash Test DIS-51A

Specifications

|                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Applicable models</b>                | DIS-632A, DIS-61A, DIS-5010A, DIS-5210A, and DIA-512A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Number of Controllable Units</b>     | 16 (DIS series), 2 (Airbag timer) in sync.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Test Conditions Setting Items</b>    | Test number, test name, test mode, test objective, test laboratory, test performer, test comment, test date, test time, vehicle model, vehicle number, spec., body type, engine type, transmission type, vehicle weight (kg)                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Channel Conditions Setting Items</b> | DIS series: Target group, target name, seat position, position name, position code, digital filter, polarity, ISO MME channel code, sensor model, serial number, sensor type, rated capacity, rated output (or sensitivity), engineering unit, bridge excitation, resistance, expected value (Gain or range), coefficient, and balance<br>*The gain (or range) is automatically calculated based on the expected value.<br>DIA-512A: On/off, position name, delay time, current output, output time, resistance, lower limited resistance before test, upper limited resistance before test, lower limited resistance after test, and upper limited resistance after test |
| <b>Reading Sensor Information</b>       | TEDS, sensor files                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

|                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Recording Conditions Setting Items</b> | DIS series: Sampling frequency, analog filter*, pretrigger data count, external trigger, cascade trigger, and level trigger<br>*Analog filter is valid for the DIS-632A, DIS-5210A, and DIS-5010A.<br>Note: Above settings are based on the spec. of the target models.                                                                                                                                                                                  |
| <b>Check Functions</b>                    | Gain check*1, bridge excitation check*2, sensor check, burnout check*3, resistance check*4, battery check, trigger check, and overflow check*5<br>*1: The gain check is valid for the DIS-5210A, DIS-5010A.<br>*2: The bridge excitation check is valid for the DIS-632A, DIS-5210A, and DIS-5010A.<br>*3: The burnout check is valid for the DIS-5010A and DIS-5000A.<br>*4:*5: The overflow check is valid for the DIS-632A, DIS-5210A, and DIS-5010A. |
| <b>Monitoring Functions</b>               | Real-time numeric value monitoring, real-time waveform monitoring, and recorded data monitoring<br>*The DIA-512A has no real-time monitor function.                                                                                                                                                                                                                                                                                                      |
| <b>Data File Formats</b>                  | Kyowa's original binary ASII, and ISO MME                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Language</b>                           | English / Japanese                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Operation Environment</b>              |                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>OS</b>                                 | Windows® Vista, 7, 8, 8.1, or 10, English/Japanese 32, 64 bits support                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>CPU</b>                                | Core2Duo, 2 GHz or advanced                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Memory</b>                             | If 32-bit OS, 2 GB or more<br>If 64-bit OS, 4 GB or more                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>HDD</b>                                | Approx. 50 MB for installation, 500 GB or more are recommended                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Display</b>                            | 1024x768 pixels or more                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Interfaces</b>                         | 10BASE-T, 100BASE-TX or advanced, 100BASE-TX is recommended.                                                                                                                                                                                                                                                                                                                                                                                             |

■ Emergency Brake System

- Stops the vehicle immediately upon crash
- There is a way to operate a brake by pressing the brake pedal of the test vehicle with an actuator.

The emergency brake system stops the test vehicle immediately upon crash for the purpose of preventing the relevant installations and the test vehicle from damaging due to accidental driving. It is composed of an onboard controller, 2 indicator lamps, a tape switch, a hydraulic supply, an actuator and a dolly separation detector switch.

The actuator connected to the hydraulic supply operates the brake by pressurizing the brake pipe or pressing the brake pedal. The operating status are visually be confirmed from 2 lamps placed on the top of the vehicle.

■ Emergency Brake System image

