DIS-7000 Series

Data Acquisition System for Crash Test

Multi-channel on-board data logger that can be built for purpose

- Channels: Max. 1056*1
- Impact resistance: 100 G
- CAN/CAN FD data recording compatible (DIC-706B)

*1. Up to 999 channels if using DIS-70A

This compact crash test measurement system can be loaded in vehicles during automotive crash testing to measure sensors and signals, and record data to built-in memory.
It also supports trigger synchronization with previous DIS-5000 Series devices.

■Lineup

Master Module*1

DIS-7000A

Expansion Module*1

Signal Conditioner Module
DIS-724A-T
(Square connector type)

DIS-724A-L
(Round connector type)

Airbag Timer Module
DIA-708A

CAN FD Measurement Module
DIC-706B

Control Software
DIS-70A

PC (Option)

*1 Up to 15 expansion modules are connectable per single master module. Please contact us for details.

DIS-7000A Specifications

Expansion Connection	
Target	Expansion modules of the DIS-7000 series
Number of Units	Max. 15
Input/Output Connector	
LAN Connector	1 (0B series, LEMO made)
	Connects the PC via a communication cable.
[DC=IN] Connector	1 (2B series, LEMO made)
	Connects the (Kyowa's recommended)
	external power supply via the power cable.
[TRIGGER IN] Connector	1 (1B series, LEMO made)
	Connects trigger input cables including
	tape switches.
[CONT.] Connector	2 (0B series, LEMO made)
	Connects master modules via a cascade cable.
	Connects the external LED unit for the DIS-7000A.
[EXP. CONT. OUT] Connector	1 (1B series, LEMO made)
	Connects the conventional products via a
	cascade cable.
[DIGITAL IN 1/2] Connector	2 (2B series, LEMO made)
	Connects a digital input cable or digital input
	junction box.
[TRIGGER OUT] Connector	4 (1B series, LEMO made)
	Connects cameras, etc. via trigger distribution
	output cables.
[DOWN] Connector	1 (D-sub connector, Japan Aviation Electronics
	Industry, Limited)
	Connects a expansion module directly.
	*Cables and various devices, connected to the above
	connectors, are optional accessories.
Switch	
[POWER] Switch	Turns ON/OFF the DIS-7000A and modules,
	connected to the DIS-7000A.
[SELECT] /[ENTER] Switch	Selects the LED indicator description.
LED Indicator/Buzzer	
LED	Status LED
LED Indicator	Indicates the DIS-7000A status and modules
	statuses, connected to the DIS-7000A in
	8 alphanumeric.
Buzzer	Alarm buzzer built-in
Status Output	Connects the external LED unit (optional
	accessory) for the DIS-7000A.
	The external LED unit indicates statuses
	(waiting for the trigger, recording, error).
Digital Input	
Channels	16 × 2 (Total 32)
Input Format	Non-voltage contact
Sampling Method	All channels synchronization
Sampling Frequency	100, 200, 500, 1 k, 2 k, 5 k, 10 k, 20 k, 50 k,
	100 k Hz
Synchronous Operation	
Method	Trigger
Trigger Type	Switch Trigger: Non-voltage contact input: 2 (Isolated input)
	Cascade Trigger: Operated by cascade signals issued from the other units.
	Software Trigger: Operated by commands issued from a control software.
Number of Unit	Max. 48 (Including up to 4 master modules)
	Each master module controls 15 expansion modules (max).
Connection Method	Between master modules:
	Through a cascade cable (up to 10 m)
	Between master module (or expansion module) and expansion Module:
	· Direct connection through a D-sub connector
	· Through an extension cable for modules (up to 2 m)
	*Excluding the power supply.
	Between master module and conventional product:
	· Through a cascade cable (up to 10 m)
	(Able to use the conventional cascade cables.)
Data Recorder	
Mode	Ring buffer mode
	Recognizes the switch trigger 1 or switch
	trigger 2 as the "Event point" and records data
	before and after the "Event point."
	Recorder mode
	Records data from the point where the switch
	trigger 1 is recognized and handles the switch
	trigger 2 as the "Event point."
Memory Type	Flash memory
Memory Capacity	500 M data/channel
Recording Time	Approx. 80 minutes (at 100 kHz)
Trigger Distribution Output	
Channels	4
Format	Each channel has the following 3 formats.
	· Open collector (ON: Closed): Up to 24 V/30 mA
	· TTL (Positive logic 0 V → 5 V): Up to 15 mA
	· TTL (Negative logic 5 V → 0 V): Up to 15 mA
Timing	Sets a delay time, required for outputting after
	recognizing trigger inputs, of each channel.
Range	Real time or 0.1 to 9999 ms
	Less than 100 ms: 0.1-ms step
	100 ms or more, less than 1000 ms: 1-msec step
	1000 ms or more, less than 9999 ms: 10-msec step
Accuracy	Less than 100 ms: Within ±20 μs
	100 ms or more, less than 1000 ms: Within ±200 μs
	1000 ms or more, less than 9999 ms: Within ±2.0 ms
	*The trigger output timing may delay due to level
	trigger operations.
Check Function	Memory checking/battery checking/trigger checking
Interface	Conforming to 10BASE-T/100BASE-TX
Log Function	Records the DIS-7000A operating statuses
	(including power supply and trigger).
Environmental Conditions	
Operating Temperature	0 to 50°C
Operating Humidity	20 to 80% (Non-condensing)
Storage Temperature	−10 to 60°C
Storage Humidity	10 to 90% (Non-condensing)
Impact Resistance	980.7 m/s^2 (100 G), 10 ms half-sine
	X-, Y-, Z-axis direction, each 1000 times
Vibration Resistance	29.4 m/s^2 (3 G), 5 to 200 Hz
	Each in X, Y, and Z direction, 10 minutes/cycle
Built-in Battery	
Type	Lithium-ion battery
	· United Nations Recommendations on the Transport of Dangerous
	Goods 38.3 tests: Passed
	· Certification for Safe Transport of Chemical Goods (Test Report) issued
	by the Shanghai Research Institute of Chemical Industry: Received
Chargeable Temperature	
	5 to 35°C
Charging Time	Approx. 3.5 hours (Power OFF, Operating
	Temperature: 10 to 35°C)
	Max. 7 hours (Power OFF, Operating Temperature:
	5 to 35°C)
	Approx. 5 to 9 hours (Power ON)
Continuous Operation Time	
	Approx. 30 minutes
	(All digital input channels: shot circuit,
	operating temperature: 0 to 40°C, non degradation)
Power Supply	
Input Range	15 to 28 VDC (TYP.24 V)
	*Make sure the external power supply (optional
	accessory) is 24 VDC.
	Or, some items (including the number of units)
	do not meet the specifications.
Current Consumption	550 mA
	(Power supply: 24 V, all digital input channels:
	short circuit, including charging currents)
Others	LED Indicator on the master module:
	Indicates battery remaining capacities and
	statuses of each module.
	External Power Supply: Kyowa's recommended
	external power supply only
Appearance	
Dimensions	Approx. 45 W × 210 D × 100 H mm
	(Excluding protrusions and options)
Weight	Approx. 1100 g

DIS-724A Specifications

Analog Input	
Channels	24
Input Connector	Either of the followings
	DIS-724A-T: 3RT01-RW7F
	(TAJIMI ELECTRONICS made,
	applicable plug: 3RT01-PE7M)
	DIS-724A-L: EGG.1B.307
	(LEMO made, applicable plug: FGG.1B.307)
Input Format	Balanced differential input
Input Resistance	Bridge sensor measurement:
	Approx. (50 MΩ + 50 MΩ)
	Voltage measurement: Approx. (100 kΩ +100 kΩ)
Input Voltage	Within ±20 V
Gain	×0.1 to 0.9 (× 0.1 step)
	×1 to 5000 (× 1 step)
Gain Accuracy	Within ±0.2% FS
Nonlinearity	Within ±0.1% FS
Balancing Adjustment	Gain
	× 0.1 to 0.9: Within ± 20 V
	× 1 to 9: Within ± 2 V
	× 10 to 99: Within ± 200 mV
	× 100 to 5000: Within ± 20 mV
Bridge Excitation	
Voltage Apply Method	Each channel on/off switchable.
Voltage	10, 5, 2 VDC Within ±0.1%
Bridge Configuration	Half bridge system/Full bridge system
Bridge Resistance	120 to 5 kΩ (10 kΩ can be supported.)
Current	Within 30 mA/channel
Low-pass Filter	
Transfer Characteristic	5 th order Butterworth
Cutoff Frequency	50, 100, 200, 400, 1k, 2k, 4k, 10k, 20k Hz
Amplitude Ratio at the Cutoff Point	
	Within -3 ±1 dB
Attenuation Characteristic	
	Within -30 ±3 dB/oct
AD Converter	
Resolution	16 bits
Sampling Method	All channels synchronization
Sampling Frequencies	100, 200, 500, 1 k, 2 k, 5 k, 10 k, 20 k, 50 k,
	100 k Hz
Signal-noise Ratio	50 dB or more (Filter: 1 kHz)
Trigger	
Type	Cascade trigger:
	Operated by cascade signals issued from the other units.
	Analog (level) trigger:
	Operated by level of arbitrary 3 channels.
	Software trigger:
	Operated by commands issued from a control software.
Data Recorder	
Mode	Ring buffer mode
	The connected master module recognizes a switch trigger
	1 or switch trigger 2 as the "Event point" and records data
	before and after the "Event point."
	Recorder mode
	The connected master module records data from the point
	where the switch trigger 1 is recognized and handles the
	switch trigger 2 as the "Event point."
Memory Type	Flash memory
Memory Capacity	500 M data/channel
Recording Time	Approx. 80 minutes (at 100 kHz)
TEDS Function	IEEE1451.4 (Mixed Mode Transducer Interface
	Class2) supported
	Sensor ID supported
Check Functions	Bridge excitation checking/sensor checking
	(tip parallel resistance method) / gain checking/
	input terminal resistance checking/open circuit checking/
	memory checking/battery checking/trigger checking
Indicator	Status LED
Interface	Conforming to 10BASE-T/100BASE-TX
Log Function	Records the DIS-724A operating statuses
	(including power supply and trigger).

Environmental Conditions	
Operating Temperature	0 to 50°C
Operating Humidity	20 to 80% (Non-condensing)
Storage Temperature	-10 to 60°C
Storage Humidity	10 to 90% (Non-condensing)
Impact Resistance	980.7 m/s² (100 G), 10 ms half-sine
	X-, Y-, Z-axis direction, each 1000 times
Vibration Resistance	29.4 m/s² (3 G), 5 to 200 Hz
	Each in X, Y, and Z direction, 10 minutes/cycle
Built-in Battery	
Type	Lithium-ion battery
	· United Nations Recommendations on the Transport of Dangerous Goods 38.3 tests: Passed
	· Certification for Safe Transport of Chemical Goods (Test Report) issued by the Shanghai Research Institute of Chemical Industry: Received
Chargeable Temperature	
	5 to 35°C
Charging Time	Approx. 3.5 hours (Power OFF, in 10 to 35°C)
	Max. 7 hours (Power OFF, in 5 to 35°C)
	Approx. 5 to 9 hours (Power ON)
Continuous Operation Time	
	Approx. 30 minutes
	(Bridge excitation: 10 V,
	load: 350 Ω/24 channels,
	operating temperature: 0 to 40°C, non degradation)
Power Supply	
Input Range	15 to 28 VDC (TYP.24 V)
	*Make sure the external power supply (optional accessory) is 24 VDC.
	Or, some items (including the number of units) do not meet the specifications.
Current Consumption	Max. 800 mA
	(Power supply: 24 V, bridge excitation: 5 V,
	load: 350 Ω/24 channels, including charging currents)
Applicable Standards	ISO 6487/SAE J211-1
Others	The DIS-724A is turned ON/OFF by the master module.
	External power supply: Kyowa's recommended external power supply only
Appearance	
Dimensions	Approx. 35 W × 210 D × 100 H mm
	(Excluding protrusions and options)
Weight	Approx. 1100 g

DIA-708A Specifications

Ignition Current	
Output Channels	8
Connector Type	Mainframe: ECP.0S.302 (LEMO made)
	Plug: FFA.0S.302 (LEMO made)
Output Current	Setting range: 0.5 to 3.0 A and OFF
	(Selectable with 0.1 A steps)
	Accuracy: Within ±0.05 A
Output Voltage	Approx. 18 V
Load Resistance	1 to 9 Ω (Including cable resistance value to the inflator)
	*However, the actual upper limit of the resistance value is obtained from the following.
	Actual upper limit of resistance value (Ω) = Maximum output voltage 18 (V) ÷ Preset current value (A)
Output Time	Setting range: 0.2 to 5 ms (Selectable with 0.1 ms)
	Accuracy: Within ±0.1 ms (During maintaining 90% of the preset current)
	Rise: Within 50 μs (During maintaining 0 to 90% of the preset current)
	*However, the actual upper limit of the output time is obtained from the following.
	Preset current value (A) × Preset current value (A) × Resistance value (Ω) × Output time (msec) ≤ 180
Delay Time	Setting range:
	0.1 to 999.9 ms (Selectable with 0.1 ms)
	1000 to 9999 ms (Selectable with 1 ms)

	Accuracy:
	Within ±0.01 ms (When setting 0.1 to 99.9 ms)
	Within ±0.1 ms (When setting 100.0 to 999.9 ms)
	Within ±1 ms (When setting 1000 to 9999 ms)
Recording Current Waveform	
Resolution	16 bits
Measuring Accuracy	Within ±3% FS (FS=5.0 A)
Sampling Method	All channels synchronization
Sampling Frequency	10k, 20k, 50k, 100k Hz
Memory type	Flash memory
Memory capacity	250 M data / channel
Recording Time	Approx. 40 minutes (at 100 kHz)
Trigger	
Mode	Ring buffer mode:
	The connected master module recognizes
	the switch trigger 1 or switch trigger 2 as the
	"Event point" and records data before and
	after the "Event point."
	Recorder mode:
	The connected master module records data
	from the point where the switch trigger 1 is
	recognized and handles the switch trigger 2 as
	the "Event point."
Type	Cascade trigger:
	Operated by triggers from the other devices.
	Software trigger:
	Operated by commands issued from a control
	software.
Check Function	Memory checking/battery checking/trigger
	checking/current output checking
Safety Function	
SAFTY Function	In a state with the SAFETY plug inserted to the
	SAFETY connector, no trigger signal can be input.
	In addition, the current output terminals
	are shorted in the DIA-708A so as not to flow
	the accidental current to the inflator.
Load Resistance Measurement	
	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
Resistance measurement before the test	
	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-708A becomes waiting for trigger state to continue
	the test.
Resistance measurement after the test	
	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.
CH Status	Displays the status of the DIA-708A with the LED on the
	front panel.
Buzzer	The buzzer which a DIS-7000A has build-in issues
	alarm in the following incident.
	• Charging the capacitor for current output.
	• Detects error when measuring resistance.
	• Detects error when checking current output.
	• Built-in battery remaining capacity lowered.
Interface	Conforming to 10BASE-T/100BASE-TX
Log Function	Records the DIA-708A operating statuses
	(including power supply and trigger).

Environmental Conditions	
Operating Temperature	0 to 50°C
Operating Humidity	20 to 80% (Non-condensing)
Storage Temperature	-10 to 60°C
Storage Humidity	10 to 90% (Non-condensing)
Impact Resistance	980.7 m/s² (100 G), 10 ms half-sine
	X-, Y-, Z-axis direction, each 1000 times
Vibration Resistance	29.4 m/s² (3 G), 5 to 200 Hz
	in Each X, Y, and Z directions, each 10 minutes / cycle
Built-in Battery	
Type	Lithium-ion battery
	• United Nations Recommendations on the Transport of
	Dangerous Goods 38.3 tests: Passed
	• Certification for Safe Transport of Chemical Goods (Test Report)
	issued by the Shanghai Research Institute of Chemical Industry:
	Received
Chargeable Temperature	
	5 to 35°C
Charging Time	Approx. 3.5 hours (Power OFF, in 10 to 35°C)
	Max. 7 hours (Power OFF, in 5 to 35°C)
	Approx. 5 to 9 hours (Power ON)
Continuous Operation Time	Approx. 30 minutes
	(In 0 to 40°C, non degradation)
Power Supply	
Input Range	15 to 28 VDC (TYP.24 V)
	*Make sure the external power supply (optional
	accessory) is 24 VDC.
	Or, some items (including the number of units)
	do not meet the specifications.
Current Consumption	Max. 550 mA
	(Power supply: 24 V)
Others	The DIA-708A is turned ON/OFF by the master module.
	External power supply: Kyowa's recommended external power supply only
Dimensions	Approx. 35 W × 210 D × 100 H mm
	(Excluding protrusions and options)
Weight	Approx. 1000 g

DIC-706B Specifications

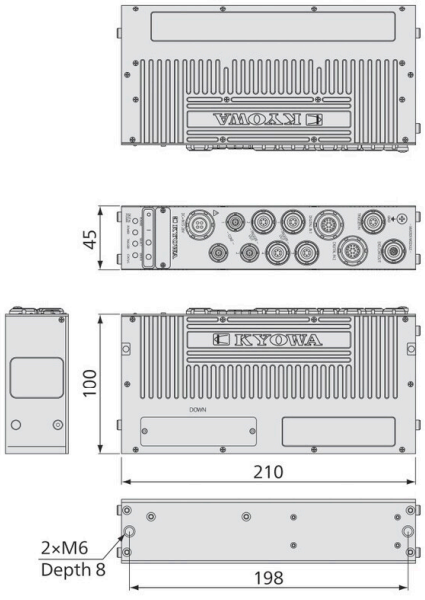
CAN	
Channels	6
Connector Type	ECB.1B.303 (LEMO made)
Physical Layer	High speed CAN
Isolation	Every channel
CAN Controller	CAN FD supported (ISO/DIS 11898-1)
Nominal Bit Rate	1000, 800, 500, 250, 125 kbps
Data Bit Rate	5, 4, 2, 1, 0.5 Mbps*
	*Limited by nominal bit rate.
	100/800 kbps: 2, 1 Mbps
	125 kbps: 2/1/0.5 Mbps
Terminator	Select ON/OFF
Listen Only Mode	Select ON/OFF
Recording CAN Data	
Frame to Record	Data frame (CAN identifier and Data only)
Recording Mode	Dump mode (All CAN ID on the CAN bus
	is recorded.)
	Selected CAN ID mode
Sampling Method	Recording CAN (FD) data with timestamp added
Timestamp Resolution	0.1, 0.05, 0.02, 0.01 ms
Memory Type	Flash memory
Memory Capacity	Approx. 200 Mega Frames (6 Channel total)
Recording Time	Depends on frame quantities and
	channel number
	*For example, when 6 channel measurement
	is performed on CAN ID type number 100
	and frame output cycle 10 ms, since the
	number of frames received per second is
	60000 frames in total of 6 channel.
	200 Mega / 60000 = recording time about
	55 minutes.

Sending CAN Data	Data frames of arbitrary CAN ID and Data can be instantly output to arbitrary Channel by control command.
Trigger	
Mode	Ring buffer mode: The connected master module recognizes the switch trigger 1 or switch trigger 2 as the "Event points" and records data before and after the "Event point." Recorder mode: The connected master module records data from the point where the switch trigger 1 is recognized and handles the switch trigger 2 as the "Event point."
Type	Cascade trigger: Operated by cascade signals issued from the other units. Software trigger: Operated by commands issued from a control software.
Check Function	Memory checking, battery checking, trigger checking, CAN ID checking
Channel Status	Displays the status of the DIC-706B with the LED on the panel face.
Buzzer	The buzzer which a DIS-7000A has built-in issues alarm in the following incident. ・Built-in battery remaining capacity lowered.
Interfaces	Conforming to 10BASE-T/100BASE-TX.
Log Function	Records the DIC-706B operating statuses (including power supply and trigger).
Environmental Conditions	
Operating Temperature	0 to 50°C
Operating Humidity	20 to 80% (Non-condensing)
Storage Temperature	−10 to 60°C
Storage Humidity	10 to 90% (Non-condensing)
Impact Resistance	980.7 m/s² (100 G), 10 ms half-sine X-, Y-, Z-axis directions, each 1000 times
Vibration Resistance	29.4 m/s² (3 G), 5 to 200 Hz Each in X, Y, and Z directions, 10 minutes/cycle

Built-in Battery	
Type	Lithium-ion battery ・United Nations Recommendations on the Transport of Dangerous Goods 38.3 tests: Passed ・Certification for Safe Transport of Chemical Goods (Test Report) issued by the Shanghai Research Institute of Chemical Industry: Received
Chargeable Temperature	5 to 35°C
Charging Time	Approx. 3.5 hours (Power OFF, in 10 to 35° C) Max. 7 hours (Power OFF, in 5 to 35° C) Approx. 5 to 9 hours (Power ON)
Continuous Operation Time	Approx. 30 minutes (In 0 to 40°C, non degradation)
Power Supply	
Input Range	15 to 28 VDC (TYP.24 V) *Make sure the external power supply (optional accessory) is 24 VDC. Or, some items (including the number of units) do not meet the specifications.
Current Consumption	Max. 480 mA (Power supply: 24 V)
Others	The DIC-706B is turned ON/OFF by the master module. External power supply: Kyowa's recommended external power supply only
Dimensions	Approx. 35 W × 210 D × 100 H mm (Excluding protrusions and options)
Weight	Approx. 0.9 kg

*Specifications and design are subject to change without notice.
*Please contact us for information on product warranties.

Dimensions



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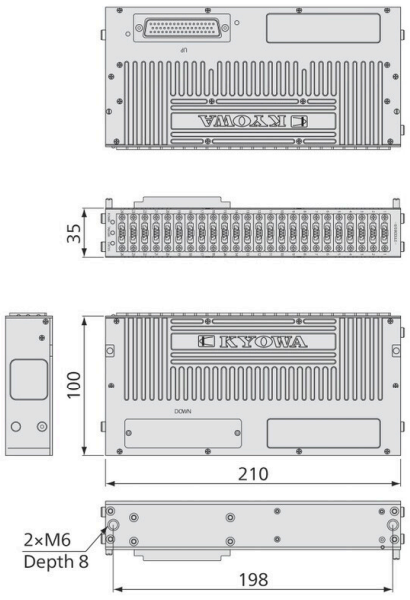

DIS-724A-T*

*DIS-724A-L, DIA-708A, and DIC-706B are the same in size, but difference in input connectors.