



# Mapping Terminal Series

### **Mapping System**



Improved Productivity Standardization







#### What are mapping sensors?

In the semiconductor wafer industry and liquid crystal industry, the presence or absence of wafers is detected by mapping sensors before and after the process to ensure that wafers and glass are not damaged or defective in each process. These mapping sensors are installed on devices such as transfer units and handling robots.

#### **Problems of mapping sensors**

As typified by the liquid crystal industry, the size of work has recently increased with the enlargement of displays. As a result, transparent photoelectric sensors have become difficult to adjust due to longer detection distances. In addition, mapping sensors installed on liquid crystal glass loaders and unloaders are required to adapt to movements in the up, down, left, and right directions and have the problem of handling cable bundles. The liquid crystal glass industry is said to be standardizing mapping sensors due to varied pitches between detecting sensors and different mechanical components and wiring lengths.

#### Reduction in Construction Period

Number of designs, installation steps reduced by Sho-Haisen (wiring saving)

#### **Resource Saving**

Tackling renewal by reduction/reuse of cable resources and materials

#### Labor Saving

Inefficient personnel operations cut by automatization

未来が変わる。日本が変える。 AnyWire is a participating member of the "Challenge 25 Campaign."

#### **AnyWire is Environmental-Responsive**

チャレンジ

AnyWire is a participating member of the "Challenge 25 Campaign." The positioning of the AnyWire Sho-Haisen System is the part nearest to the sensor and the number of cables is the largest. By using the AnyWire Sho-Haisen System, cable resources to be newly installed can be reduced and cables used in existing systems can be reused. In addition, as a result of our proposal of a cable-free wiring saving system to manufacturers of various types of equipment and industrial devices, recycling-considered design has been introduced. By implementing such a design, we will contribute significantly to resource saving and increase recycling efficiency.

The goal of AnyWire is to realize a recycling-oriented society by working towards recycling of used products and resource reduction for various automation fields.

#### Installable without changing the existing system! Assembly with complete control without concern for the pitch!



#### **AnyWire**

Sho-Haisen of AnyWire Corporation is used in every kind of field including automobiles, foods, chemicals and semiconductor distribution centers.

In addition, the Company will continue to supply products adaptable to various fields in consideration of our future society.

Since AnyWire Sho-Haisen continues to make advancements and evolve, we look forward to exceeding your expectations.

#### **Mapping Terminal series**

The Mapping Terminal series adopts the Sho-Haisen (wiring saving) system that combines the signals of up to 180 mapping sensors into two cables.

In addition, these Mapping Terminal series are compatible with various open networks including the CC-Link in the liquid crystal manufacturing equipment to which support for networks is vital. Consequently, they are adopted by many panel manufacturers.

In addition, wiring saving can reduce stress during design, construction, and maintenance without concern for cable type and wiring material handling according to the pitch.



# **Product Outline**

### Simple connection with Sho-Haisen sensors

CE

Most suitable on a glass substrate

- Highly sensitive and detectable even at varied distances from glass
- Compatible with various pitches
- Support for various open networks including



#### Safe error monitoring function mounted

The error detection function can pinpoint the location when any of the following comb errors occur:

- When a comb is removed
- When power is not supplied to a comb
- When a transmission signal is not delivered to a comb
- When an electronic component in a comb has a failure

Sho-Haisen requires only one two-core cable!

#### What Are Mapping Terminals?



The pitch between the stages of stockers to stock seventh-generation FPD glass is 100 mm or more. However, demand for detection at a narrow pitch such as a 10-mm pitch between each stage for 70 stages or more has recently increased to raise stock efficiency.

The AnyWire Mapping Terminal can meet demand requirements from a short pitch to a long pitch by realizing a 2.75 mm thickness of the sensor portion with our proprietary technology.

### Mapping System with interference prevention function combined with wiring saving function

Slave sensor unit

Slave sensor unit

Address sen

Even in the case of multi-stage connection of 70 stages or more, stress reduction on moving parts, improvement of maintainability, large reductions in cost, and reductions in wiring man-hours can be realized by use of "Bitty Technology," our proprietary wiring-saving technology which can limit the external connecting cable to two cores. This allows the reliability of devices to be improved. Since wiring between each sensor is also saved, it is also possible for customers to purchase a complete set of parts and construct the unit at any pitch.



#### Advantages of Sho-Haisen sensor

### Selectable 3 length types

Most suitable for detecting transparent glass for flat panel displays (FPD)

As the slave sensor unit, the type with a convenient collective sensitivity setting function and the type

with a sensitivity self-setting function which allows individual fine settings are selectable. It is also possible to combine both types.

The address sensor unit is common to either type of slave sensor units.



#### Characteristics of Mapping Terminal

#### Connectable only with one two-core cable

External connection can be performed only by connecting a two-core robot cable.

In the case of acquisition of a multi-channel detection signal for moving parts, the use of the Mapping Terminal can reduce the number of wirings in the bent portion. Accordingly, the disconnection failure frequency and wiring man-hours can be reduced greatly and reliability can be improved in addition to the device cost reductions.

#### **Reliable detection at varied distances**

The AnyWire Mapping Terminal realizes a detection distance of 1 to 30 mm. With the adoption of a differential displacement light receiving circuit, the

amount of displacement is detected while the reference point of the light receiving circuit is automatically followed to disturbance (outside light). Therefore, the Mapping Terminal is subject to less disturbance.

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		30mm
	1mm	
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#### Stable operation even for tilt or deformation

Glass substrates have recently grown in size with a corresponding increase in the amount of deformation. The AnyWire Mapping Terminal is a diffuse reflection detection system in which multiple diffuse light emitting/photo acceptance units are arranged. It can therefore adapt to a maximum tilt or deformation of  $\pm 20^{\circ}$ .

By thinking outside of the box and driving with the several-fold light emitting current, the detection distance and detection angle are larger and the tilt angle of the glass surface or surface treatment does not present a problem.



#### Various open networks supported

The AnyWire Mapping Terminal can be simply connected to open networks including the CC-Link. In addition, it can be seamlessly connected to various host system networks such as each company's programmable controller (PLC) and motion controller, PC and Ethernet.

### Collective sensitivity setting function realizes sensitivity setting by one unit



#### Mountable at various pitches

The AnyWire Mapping Terminal realizes a 2.75 mm thickness of the sensor portion and adapts to a pitch of 15 mm as a standard. In addition, it also supports a pitch of 11 mm at minimum by replacing the socket portion and installing a substrate. Varied demands can be met from a short pitch to a long pitch.



#### Thin and lightweight

The new AnyWire Mapping Terminal is made thinner by 40%<sup>\*</sup> from the conventional product. The comb of the Mapping Terminal is an ultrathin type (Edge t = approximately 2.75 mm) which is compatible with a wire cassette. It flexibly supports a structure with exacting dimensions.



## **Handling Method**

#### Structure of Mapping Terminal

Assembly







#### Sensor Unit Connection



#### Address of Sensor Unit

#### Address assignment of each sensor unit in Mapping Terminal

As the basic configuration, the "address sensor unit" and "slave sensor units" are cascade-connected with a "bus cable" (CNM-04-□□). In addition, the end connector (CNM-ED)" to ensure normal connection is connected to the terminal of the last slave sensor unit.

In the case of configuration according to the figure on the right (connection order), the value of the "address setting switch" located on the address sensor unit becomes the first address of the mapping sensor.

Subsequently, addresses of the slave sensor units are automatically assigned in the order of connection (upward direction).

#### Automatic address recognition of Mapping Terminal

The first address of the Mapping Terminal is registered by the "automatic address recognition" operation of the master unit and detected during disconnection. The registration classification at this time is "900 – 9FF (Bitty input unit)." For the "automatic address recognition," refer to the User's Manual for each master unit.

- The address number is set for each sensor unit to correspond to the controller' s I/O memory map.
- · Bit operation terminal

The value set with the terminal address setting switch indicates the first address number of the Mapping Terminal for the AnyWire transmission frame. Subsequent to that number, the channel number of addresses are continuously assigned as the addresses of each point. This terminal performs bit-by-bit data verification and update.

- · Setting by one point is available.
- The switch is set by pulling the sensor module cover toward you. After setting it, make sure to return the cover until you hear it click.

#### Installation of Sensor Units

#### Mounting of sensor units

Connected sensor units are fixed on the mounting plate (customers not ordering a set should prepare separately). For each sensor unit, slave sensor units connected by a bus cable with an address sensor unit as a base point are fixed on the mounting plate. At that time, fix each part in numerical order in the figure. ((1) to (10) in the figure below.)

With regard to the sensor module, install it at the last stage after performing address setting (sensitivity setting as needed). Since this cover has a difficult-to-remove structure, no sensor unit can be fixed when it is installed.





#### Address Setting list

ŭ									
Rit Addroop		Address Setting Switch							
DIL AUUIESS	1	2	4	8	16	32	64	128	
0									
:	:	:	:	:	:	:	:	:	
6		0	0						
:	:	:	:	:	:	:		:	
240					0	0	0	0	

No speed setting

\*Set each address in such a way that the maximum number of transmission points will not be exceeded including the number of points in the terminal.



#### Spacer installation

A spacer is placed between the address sensor unit and slave sensor unit and between each slave sensor unit.

The spacer is designed to fit into the groove on the side of the sensor unit socket portion.

According to the numbers in the figure, fit the spacer into the lower groove (2-1), pressing it to the plate while hiding the bus cable (2-2), fitting it into the groove on the side of the upper sensor unit socket portion, and fix it with the mounting screw (0).



## **Configuration Example / List of Products**

#### Configuration of CC-Link Compatible System





GG-Limk



#### Information on CC-Link Bit Distributed I/O Terminal Register

As input information, there is "each channel detection information" and "each channel error information." Such information is written in the remote register and defined as

shown in the table below.

configuration and	status of	remo	ote r	egisi	ter												
AB023-C1L Setting	Address								В	it							
CC-LINK 4 Station Setting	Register																
Mapping Sensor	ch.	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Detection	RWr0	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0
Information	ch.	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
ON→	RWr1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1
With glass OFF→	ch.	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32
Without glass	RWr2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	ch.	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48
	RWr3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	ch.	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65	64
	RWr4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	ch.	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81	80
	RWr5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	ch.	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97	96
	RWr6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	ch.	127	126	125	124	123	122	121	120	119	118	117	116	115	114	113	112
	RWr7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mapping Sensor	ch.	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Each Ch. Error information	RWr8	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1
	ch.	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
ON→Normal	RWr9	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1
OFF→Abnormai	ch.	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32
	RWrA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	ch.	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48
	RWrB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	ch.	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65	64
	RWrC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	ch.	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81	80
	RWrD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	ch.	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97	96
	RWrE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	ch.	127	126	125	124	123	122	121	120	119	118	117	116	115	114	113	112
	RWrF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

 $\diamondsuit$  Each error detection function allows the following status of each comb to be monitored with a higher order controller.

When a comb is removed

 $\cdot$  When power is not supplied to a comb

· When a transmission signal is not delivered to a comb

· When an electronic component in a comb has a failure

Open Terminal , Mapping Terminal & Accessories

#### List of Products



Product Name	Input	Mounting pitch	Model	Standard Price (¥)	
Mapping Terminal Kit The kit model is a set of parts required for assembly (with no mounting plate). The required number of sensor units, end covers, end connectors, bus cables, spacers and others are included.	Diffuse reflection type input	15 mm at minimum Adaptable to a pitch of 11 - 14 mm. Consult with us separately.	A032C	Internal use only (Reference No.) Internal use only (Customer No.)	Made-to-order

Mainten	ance Parts									
Product Name			Input	Mounting pitch	Total Length of	Unit	Current Consumption	Model	Dimensions (mm)	Standard Price (¥)
Address Ser	nsor Unit	Diffuse reflection		15 mm	100mm		9mA	A032SB-MX100-03-STP	45×100×15	Made-to-order
with collective	sensitivity	type input		at minimum	150mm		9mA	A032SB-MX150-03-STP	45×150×15	Made-to-order
Setting function	• • • • • • • • • • • • • • • • • • •			*	165mm		9mA	A032SB-MX165-03-STP	45×165×15	Made-to-order
Slave Senso	r Unit 🛛 💦 💦	Diffu	se reflection	15 mm	100mm		9mA	A032SB-SX100-03-STP	45×100×15	Made-to-order
with collective	sensitivity	ty	/pe input	at minimum	150mm		9mA	A032SB-SX150-03-STP	45×150×15	Made-to-order
setting function				*	165mm		9mA	A032SB-SX165-03-STP	45×165×15	Made-to-order
Slave Senso	r Unit 🛛 🙈	Diffuse reflection		15 mm	100mm		9mA	A032SB-SV100-03-STP	45×100×15	Made-to-order
with sensitivity self-setting		type input		at minimum	150mm		9mA	A032SB-SV150-03-STP	45×150×15	Made-to-order
function				*	165mm		9mA	A032SB-SV165-03-STP	45×165×15	Made-to-order
				*Adaptable to	a pitch of 1	1 - 14	4 mm. Co	nsult with us separately	/.	
Product Name	Specifications		Model	Standard Price (¥)	Product Name			Specifications	Model	Standard Price (¥)
End cover	er Carlo Cover: For the side of the socket portion of the top sensor unit		A032-EC	Made-to-order	Bus cable	Ç	For connecti For connecti	on between sensor units: Length 100 on between sensor units: Length 60	0 mm CNM-04-10 mm CNM-04-06	Made-to-order Made-to-order
End         Image: Second connector         For the terminal of the final slave sensor unit         CNM-ED         Mage: Second connector         Mage: Second connector         Second connector		Made-to-order	Spacer	Spacer For protection of the bus cable between sensor units			A032-SP-□□[ ※3	☐ Made-to-order ※		
**Length to be included in  of the spacer model.										
Mapping	g Monitor				Please c	rder	by length	l.		
_				0 10 11					<b>D</b>	0

Product Name	e	Specifications	Model	Dimensions (mm)	Standard Price (¥)
Mapping Monitor		Built-in operation check display LED: 32 ch. at maximum *Address settable	A032-DP32	40×140×30	Made-to-order
Terminator					
Product Name		Specifications	Model	Dimensions (mm)	Standard Price (¥)
Terminator Fo		For Bitty Line terminal, with polarity (attachment holder included)	AT0	44×57×12	Open

Comb Type Mapping Terminal

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#### Specifications of Comb Type Mapping Terminal



#### **General Specifications of Comb Type Mapping Terminal**

Address Sensor Unit	A032SB-MX165-03-STP	A032SB-MX150-03-STP	A032SB-MX100-03-STP						
Slave Sensor Unit (Collective setting) (Self-setting)	A032SB-SX165-03-STP A032SB-SV165-03-STP	A032SB-SX150-03-STP A032SB-SV150-03-STP	A032SB-SX100-03-STP A032SB-SV100-03-STP						
Sensor Unit Mounting Pitch	15 mm at minimum (Adaptable to a pitch of 11 - 14 mm. Consult with us separately.)								
Detection Distance	1 - 30 mm (Distance from sensor unit surface: in the case of transparent glass)								
Object to Be Detected	Transparent glass, evaporated glass, p	Transparent glass, evaporated glass, printed glass							
Detection Method	Diffuse reflection type								
Detection Direction	Upper/Lower selectable by sensor unit	mounting direction							
Light Source	Infrared LED								
Photo Acceptance Unit	Photo transistor								
Ambient Illumination	Upward detection: 3000 lux or less, Do	wnward detection: 5000 lux or less							
Power Supply	17-27V DC (Power supply setting volta	17-27V DC (Power supply setting voltage: 26.4V)							
Current Consumption	(9 mA x Number of channels) + 300 mA (for one system)								
Input Mode	ON during detection								
Operation Display	Detection: LED (Both sides of sensor unit), Power/Transmission: LED (One side of sensor unit)								
Sensitivity Setting	A032SB-MX								
	A032SB-SV - 03-STP : Sensitivity self-setting variable volume (One side of sensor unit)								
Number of Detection Channel Connections	128 channels for one system (AnyWire	Bus Bitty)							
Connection Method	Connection of Mapping Terminal : Mul Connection in Mapping Terminal : Cas	ti-drop, T-branch, Tree-branch cade connection (Dedicated bus cable)							
Comb Length (Sensor Module Length) Mass (Single Sensor unit)	149mm, 25g	134mm, 21g	84mm, 14g						
Mounted on	Flat plate with width of 45 mm or more	(prepared by customer), Dedicated rib reinf	orced flat plate (manufactured by AnyWire)						
Connected to	CC-Link (AB023-C1L), Devicenet (AB0	)23-D1)							
Sho-Haisen Connection Distance	50 m at maximum (Total extension)								
Sho-Haisen Supply Current	2A at maximum (AnyWireBus Bitty)								
Transmission Cycle Time	Where the standard clock is 31.3 kHz, one cycle time is 4.8 ms per 128 channels. Note) The transmission cycle time is a value between 1- 2 cycles.								
Operating Temperature Range	5~40°C								
Standard	CE, RoHS								

#### **Sensor Unit Dimensional Outline Drawing**



A032SB-MX150-03-STP A032SB-SX/SV150-03-STP





5.0

Operation display

Sensitivity setting volume

E D'G

15.0

12.0

The slave sensor unit has the same dimensions as those of the address sensor unit.
 In case of the address sensor unit, there is the address setting switch.

Emitter axis

#### **Example of Tapped Holes for Mounting Sensor Units**





\*This product is still under development. Therefore, its configuration and specifications are subject to change.

#### Characteristics of Transparent Mapping Terminal

#### Driving unit not required

Since this Transparent Mapping Terminal has no driving unit in contrast to the conventional Comb Type Mapping Terminal, it is not required to consider the terminal driving range. Simply installing the product allows you to use it.

#### Stable detection

Our own scanning detection method allows you obtain stable detection results although the terminal is of the transparent type. (Patent obtained)

#### Simple construction by wiring saving

Construction is very simple by "Sho-Haisen" which requires a small wiring number even for multi-channels.

#### Easy maintenance

The sensor portion has a module linked structure by connector connection. Accordingly, partial replacement is available and operations of maintenance and replacement can be quickly performed.

#### **Collective sensitivity setting**

Sensitivity setting is available according to actual field conditions. (Sensitivity setting is not required during normal use.)

#### **Error detection function**

When an error such as disconnection or a sensor failure occurs, it is notified by the higher-order. (Under development)

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- Make sure to read the product manual for each type of equipment in advance in order to use the product described in this catalog properly. Use the product within the predetermined range.
- AnyWire system is designed for general industrial use. It therefore does not always retain reliable functionality in regard to usage which requires higher levels of safety such as safety equipment or accident prevention systems. In such cases, make sure to consult with us in advance.
- In case the system is to be used under the following conditions or environments, please contact our sales representative while considering keeping the usage allowance against ratings and functionality as well as implementing safety measures such as fail-safe devices.
- ① Usage under conditions or environments that are not described in the DB Series or Bitty Series Technical Manual.
- ② Application of systems for nuclear-power control, railroad facilities, air-navigation facilities, vehicles, combustion devices, medical devices, amusement equipment, safety equipment, etc.
- ③ Application of systems for purposes where significant impact upon human life and property is predicted, and for purposes where safety is especially required.



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