Magnescale®

表示ユニット/Counter Unit/Anzeigeeinheit LT10A/LT11A Series

お買い上げいただき、ありがとうございます。 ご使用の前に、この取扱説明書を必ずお読みください。 ご使用に際しては、この取扱説明書どおりお使いください。 お読みになった後は、後日お役に立つこともございますので、必ず保管してください。

Read all the instructions in the manual carefully before use and strictly follow them. Keep the manual for future references.

Lesen Sie die ganze Anleitung vor dem Betrieb aufmerksam durch und folgen Sie beim Betrieb des Geräts den Anweisungen. Bewahren Sie diese Bedienungsanleitung zum späteren Nachlesen griffbereit auf.

取扱説明書 / Instruction Manual / Bedienungsanleitung

[For U.S.A. and Canada]

THIS CLASS A DIGITAL DEVICE COMPLIES WITH PART15 OF THE FCC RULES AND THE CANADIAN ICES-003. OPERATION IS SUBJECT TO THE FOLLOWING TWO CONDITIONS.

- (1) THIS DEVICE MAY NOT CAUSE HARMFUL INTERFERENCE, AND
- (2) THIS DEVICE MUST ACCEPT ANY INTERFERENCE RECEIVED, INCLUDING INTERFERENCE THAT MAY CAUSE UNDERSIGNED OPERATION.

CET APPAREIL NUMÉRIQUE DE LA CLASSE A EST CONFORME À LA NORME NMB-003 DU CANADA.

Safety Precautions

Magnescale Co., Ltd. products are designed in full consideration of safety. However, improper handling during operation or installation is dangerous and may lead to fire, electric shock or other accidents resulting in serious injury or death. In addition, these actions may also worsen machine performance.

Therefore, be sure to observe the following safety precautions in order to prevent these types of accidents, and to read these "Safety Precautions" before operating, installing, maintaining, inspecting, repairing or otherwise working on this unit.

Warning Indication Meanings

The following indications are used throughout this manual, and their contents should be understood before reading the text.

\land Warning

Failure to observe these precautions may lead to fire, electric shock or other accidents resulting in serious injury or death.

▲ Caution

Failure to observe these precautions may lead to electric shock or other accidents resulting in injury or damage to surrounding objects.

Symbols Requiring Attention





DO NOT DISASSEMBLE

(E) **(1)**

🕂 Warning



- Do not use this unit with voltages other than the specified supply voltage as this may result in fire or electric shock.
- Do not handle the I/O connector with wet hands as this may result in electric shock.



- Do not open the cover of the counter unit to disassemble or modify the unit, as this may result in burns or injury. These actions may also damage the internal circuitry.
- This device operates with DC power supply. Absolutely do not connect an AC power supply to the I/O connector as this may result in fire or electrical shock. Doing so may also damage the internal circuitry.

▲ Caution



- The unit does not have an explosion-proof structure. Therefore, do not use the unit in an atmosphere charged with inflammable gases as this may result in fire.
- Be sure to turn off the power before connecting or disconnecting power and signal connectors in order to prevent damage or misoperation.
- The unit does not have an earthquake-proof structure. Therefore, do not use the unit in moving areas or areas exposed to strong shocks.

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1. Note to users

1-1. General precautions

When using Magnescale Co., Ltd. products, observe the following general precautions along with those given specifically in this manual to ensure proper use of the products.

- Before and during operations, be sure to check that our products function properly.
- Provide adequate safety measures to prevent damage in case our products should develop a malfunction.
- Use outside indicated specifications or purposes and modification of our products will void any warranty of the functions and performance as specified for our products.
- When using our products in combination with other equipment, the functions and performance as noted in this manual may not be attained, depending upon the operating environmental conditions. Make a thorough study of the compatibility in advance.
- Design and specifications are subject to change without notice.

1-2. Handling instructions

- Do not open the cover of this device or put your hand inside. Otherwise the internal circuit may be broken by static electricity.
- To prevent malfunctions caused by static electricity, always turn off the power when touching other parts than the key switches.
- Do not route the connecting cable through the same duct as the machine power line.
- To prevent misoperation of surrounding equipment due to noise emitted from this counter unit and vice versa, connect the power cable in a twisted manner when supplying DC power.
- When providing DC power, be sure to use within the specified voltage range.
- Absolutely do not connect an AC power supply to the I/O connector. Doing so may damage the internal circuits.
- Do not use connection prohibited I/O connector pins as relay pins.
- When connecting the BCD connector, be sure to wire the connector correctly.

Failure to do so may damage the internal circuits.

- Place the counter unit more than 0.5 m (20") away from a high voltage source, large current source, large power relay, etc.
- For installation of the counter unit, avoid a location exposed to chips, cutting oil, or machine oil. If unavoidable, take adequate countermeasures.
- Do not put a vinyl cover directly over the counter unit or put it in a closed container.
- The ambient temperature should be in the range of 0 °C to 40 °C (32 °F to 104 °F). Avoid exposure to direct sunlight, hot air currents, or heated air.

1-3. Cautions on operation

Carry out the key operations or I/O (BCD, etc.) connections and operations in line with the explanations given in the appropriate sections. Failure to correctly operate this device may result in a malfunction.

1-4. Instructions for connecting to the measuring unit

- The LT10A/LT11A is a counter unit designed for the DT series measuring unit.
- When the LT10A/LT11A is connected to a DT series and turned on, the digits corresponding to the channel connected may flash. This shows that initialization is required to calibrate the new pairing of both device and unit. Here you should move the measuring unit at least 1 mm, as shown in the figure, and then press the reset key on the LT10A/LT11A corresponding to the channel. The device will now return to its normal measuring state.



Note

Once this procedure has been carried out the digits will not flash while the device is connected to that measuring unit, even if the power is turned off.

2. Summary

The counter unit LT10A/LT11A series is designed to be incorporated into assembly lines or jigs, and to be used for measuring components or Go/No Go.

Use in combination with a DT series measuring unit. Types are available to suit various uses.

Madal	Resolution	Number of	Output		
Model	(mm)	input channel	Go/No Go	BCD	RS-232C
LT10A-105			0		
LT10A-105B		1	0	0	
LT10A-105C	0.005		0		0
LT10A-205			0		
LT10A-205B		2	0	0	
LT10A-205C			0		0
LT11A-101			0		
LT11A-101B		1	0	0	
LT11A-101C	0.001		0		0
LT11A-201			0		
LT11A-201B		2	Ō	Ó	
LT11A-201C			0		0

2-1. Features

- Compact size suited to inclusion in systems. DIN size (72×72 mm). Can be panel-mounted.
- Devices such as PLCs are connectable from the counter unit.

Go/No Go output is standard to all models. Models capable of BCD and/or RS-232C also outputs are available.

Resolution

LT10A series : 0.005 mm (0.0002") LT11A series : 0.001 mm (0.0001")

- As well as the current value, maximum and minimum values and peak-to-peak values can also be measured.
- Add/Sub calculation is standard feature (only for 2 channel models).

Can measure the widths or steps.

• Can carry out Go/No Go test on different lots. (BCD output models.)

Four different upper and lower limits can be stored in memory for the Go/No Go comparison.

Power is compatible to DC 9 to 24V.
 Provided via the power input connector.
 Use a power cable less than 10 meters long.

2-2. System structure



LT10A / LT11A Series

3. Connecting and installating

3-1. Connecting the cables

- Secure all connecting cables so as to prevent accidental disconnection.
- Make certain the counter unit's power is off before connecting or disconnecting the measuring unit.

3-2. Installing the counter unit

When mounting in a panel

- 1. Cut out an opening to match the dimensions shown (Fig. 2).
- 2. Insert the counter unit into the cut-out opening in the panel from the front.
- 3. Attach the supplied counter stopper from the rear.
- 4. Press in the counter stopper until it touches the panel.

Note

When attaching the counter stopper to the counter unit, leave enough space (min. 30 mm/1.18") between the top and bottom. (Fig. 3)



Cut-out dimensions



(E) 5

4. Name and function of each part

4-1. Front panel

1 CH input model : LT10A-105/105B/105C LT11A-101/101B/101C

MAX MIN P - P C P H1 234
RESET P MODE COMP A



1 🕴 : Go/No Go test result indicator

Gives the result of comparing the displayed value to the comparator's upper and lower limits. Δ Over upper limit, \bigcirc between upper and lower limit, ∇ under lower limit.

- $(2) \quad \underset{A}{\text{RESET}} \quad \underset{B}{\overset{\text{RESET}}{\overset{\text{RESET}}{\overset{\text{}}{\text{}}}} : \textbf{Reset key}$
 - Resets the displayed value to zero.
 - When a value has been preset it returns to this.
- ③ P: Preset key

Enters the preset mode. (For the current value, maximum value, and minimum value.)

- ④ Image: Measuring mode setting key Key to enter the mode for selecting one of maximum, minimum, peak-to-peak (maximum-minimum), or current values.
- 5 comparator value setting key

Key to enter the mode for setting the comparator upper or lower limit.

- 6 **SET** : Setting key Set a mode or a value.
- ⑦ A: Number selection key

Selects the number for the digit chosen.

- 8 E: Digit selection key
 - Selects the digit to change when setting numeric values.
 - Normally, when it is held down for 5 seconds, key lock is established; alternatively, if key lock is already established, it is released.

Main display

Displays the measured data, setting data for various modes, or alarms, etc.

Preset status indicator



Selected channel indicator (2 channel model)

Choose one of these four

Upper	Α	A+B	A+B	A+B
Lower	В	А	В	-

- A : data from measuring unit, input channel A
 - B : data from measuring unit, input channel B

A+B: sum of data from channel A and B

• In order to carry out calculations such as A-B or -A+B, change the direction of A or B to "+" or "-". (Initial settings)

Note

- If upper display A+B and lower display A have been selected, the comparator setting values of channel A will be applied on both the upper and lower limits.
- When the upper display A+B is selected, the lower display only shows the current value of the selected channel and no operation can be made on the lower display.

Preset status indicator

When **P** is displayed the preset value is set.

Peak-hold indicator

When MAX/MIN/P-P is displayed the data shown is the maximum/minimum/maximum-minimum value. When neither of the them is shown, the current value is displayed.

Comparator upper limit setting indicator

Displayed when the comparator value has been set. The upper digits are the upper limit.

Comparator lower limit setting indicator

Displayed when the comparator value has been set. The lower digits are the lower limit.

- Up to four different comparator upper and lower limit settings (CPH1 to CPH4 and CPL1 to CPL4) can be stored in the memory for LT10A-105B/205B and LT11A-101B/201B.
- LT10A-105/205/105C/205C and LT11A-101/201/101C/ 201C have only one setting each.

Kev lock indicator

Lighted when key lock is established; off when key lock is released.

4-2. Rear panel





LT10A-105B, LT11A-101B



LT10A-105C, LT11A-101C



LT10A-205C, LT11A-201C

2 channel-models

1 Power input connector

Connected to the external power supply (+9 V to +24 V DC).

Use a power cable less than 10 meters long. Connector used : MC1.5/3-ST-3.5 (provided) made by Phoenix Contact



No. 1 2 3

No.	Signal name	Signal
1	FG	Frame ground
2	+ V	Main DC power (+9 V to +24 V) input
3	0 V	GND for power

② I/O connectors→See "6. I/O connector".

There are three kinds of I/O connectors: one type is used for channel A, one for channel B and one for both channels A and B.

Input : Reset, Peak-hold start, Peak-hold pause, RS trigger.

Output: Go/No Go output.

- 3 Measuring unit input : SIG. IN A
- ④ Measuring unit input : SIG. IN B (2 channel models)

56 BCD Output

With the 2 channel models the upper and lower selections of the front panel's main display correspond to the BCD OUT. A/BCD OUT. B. So if "A+B" is selected the output is to BCD OUT. A.

The following operations are possible when BCD input/output terminal is used.

- Input : Comparator value selection (4 settings), measuring mode (current value, maximum value, minimum value, peak-to-peak values) selection
- Output: 5 digits

Outputs one of the current, maximum, minimum, and peak-to-peak values selected via the keys on the front panel and the external input. Alarm output

⑦ RS-232C interface

(See "8. RS-232C Interface".)

Reset, peak-hold start, setting/recall of preset values, setting the comparator value, selecting and outputting the current value/maximum value/minimum value/ peak-to-peak value.

4-3. Function description

4-3-1. Reset key

Counter unit	Operation performed when reset key is pressed
Measuring mode (Current value, maximum value, minimum value, peak-to-peak value)	Display is set to zero. When a preset value has been set, it is recalled.
Preset mode (P and the selected digit will flash.)	Preset value is set to zero.
"Error" is displayed	"Error" is canceled and then returnes to the measuring state.
All the numbers for the channel with an error flash.	Automatically carries out initialization to calibrate the device to a new measuring unit. (Before resetting the measuring unit must be moved at least 1 mm.)

4-3-2. Preset functions

- It is possible to set preset values for each of the current, maximum, and minimum value measuring modes.
- For instructions on setting the preset value, please refer to P18, "5-2-1. Setting the preset value."

4-3-3. Result evaluation

- Go/No Go test is carried out by comparing data from the current measuring mode (current value, maximum value, minimum value, or peak-to-peak value) to the comparator upper and lower limits.
- This result is displayed on the front panel and output from the I/O connector (See "6. I/O connector".).

Result	Display	Condition	
High	Δ	Data > upper limit	
Go	0	Upper limit \geqq data \geqq lower limit	
Low	∇	Lower limit > data	

4-3-4. Peak-hold function

- Stores the maximum, minimum, and peak-to-peak (maximum-minimum) values of the measured values.
- The above mentioned measuring mode is set using the keys on the front panel.
- The device starts storing values either when a start signal is supplied to the start/latch pins (channel A: pin ②, channel B: pin ④) of the lower 7-pin I/O connector (common) (See "6. I/O connector".) or when the reset key has been pressed.

Operation	Result
I/O connector (common) A CH: starts on "L" (ON) signal from pin ②; I/O connector (common) B CH: starts on "L" (ON) signal from pin ④.	Starts storing from the current value.
Reset key is pressed	Starts storing from zero. When a preset value is set the device starts storing from the preset value.

4-3-5. Peak-hold pause function

- Pause the storing of the maximum, minimum and peakto-peak (maximum-minimum) values of the measured values.
- When the peak-hold function is to be paused, set the pause pin of the lower 7-pin I/O connector (common) to ON; to resume storing, set it to OFF.



Peak value data update stop (pause)

When pause is ON

The peak value updating is stopped. The current value is constantly updated.

If the maximum value mode, minimum value mode or peakto-peak value mode is set as the measuring mode, the Go/ No GO judgment output and the output data are not updated even when the measuring unit is operated.

When pause is OFF

The peak values are constantly updated.



4-3-6. Latch functions

In the current value mode, this function holds output data and Go/No GO output for that value.

[Latch conditions]

- The start input signal is set as the latch input by the parameter setting.
- Current value mode

Note

This function does not operate when the measuring mode is peak value mode.



5. Operation

This sections uses the 2 channel model in its explanations. The 1 channel model is the same as the 2 channel model without the B channel.

BCD and RS-232C models are noted in the text.

5-1. Initial settings

An initialization is carried out at the time of shipping; however it is possible to make the following selections depending on intended use. Details of the settings at the time of shipping are given in each section.

Changing between inches/mm

Turn on power while holding down *the series* and press *the key*. Press *to change between inches/mm*.

Tess i to change between inches/mm.

 $\ensuremath{\texttt{Press}}$ $\ensuremath{\texttt{set}}$ to set and return to the measuring state.

- Device is set to mm at the time of shipping.
- To change the initial settings hold down the set key and press the key for approximately 2 seconds.

Basic operation

- : to the next item.
- : Select item.
- SET : Set item.

Note

- Even if you select an item with the ▲ key, no changes will be mode until you press the set key.
- Once the initial setting mode has been entered it is not possible to return to the measuring state partway through. Press the image key repeatedly to skip the items.

5-1-1. Basic settings

1. Setting the display

(2 channel models) One of the following may be

CHOSEN.					. \
Upper	Α	A+B	A+B	A+B	7
Lower	В	А	В	-	



factory-set

When the upper display A+B is selected, the lower display only shows the current value of the selected channel and no operation can be made on the lower display.

2. Setting the display resolution or direction (channel A)

0.001/0.005/0.01/-0.001/-0.005/ -0.01 mm

- With the measuring unit's spindle pushed in:
 - +: positive direction



factory-set (LT11A)

* When set to inches, values are chosen from 0.0002, 0.0005, -0.0002, and -0.0005.

Note

With the LT10A series, 0.001 mm and –0.001 mm (0.0001" and –0.0001") are not available.

3. Setting the display resolution or direction (channel B, 2 channel models)

0.001/0.005/0.01/-0.001/-0.005/-0.01 mm.

- With the measuring unit's spindle pushed in:
 +: positive direction
 - +: positive direction
 - -: negative direction
- When displaying A+B: If you set the direction of A to "–" the data displayed is the calculation "–A+B". The same can be done with B.

Note

- With the LT10A series, 0.001 mm and -0.001 mm (0.0001" and -0.0001") are not available.
- When the addition A+B is chosen the direction for B can be selected, but its resolution will be the same as that of A.

4. Selecting the start input terminal (I/O connector) function

(See "6. I/O connector".)

SΕ

: Start function Setting this terminal to "L" (ON) sets the peak-hold value to the current value and restarts the storing procedure.



factory-set

LREH: Latch function

When using the current value measuring mode, setting this terminal to "L" (ON) stores the output and display of the Go/No Go comparison at that point in time.

Note

When the latch is ON, display and Go/No Go output storage by the DRQ input for the BCD model and RS-TRG input for the RS-232C model is invalidated.

Initial settings are now complete for the standard model.

 $\begin{array}{l} \textbf{BCD model} \rightarrow Go \ to \ section \ 5\text{-}1\text{-}2. \\ \textbf{RS-232C model} \rightarrow Go \ to \ section \ 5\text{-}1\text{-}3. \end{array}$

5-1-2. BCD model (only LT10A-105B/205B, LT11A-101B/ 201B)

Proceeds to the next setting mode from "5-1-1. Basic settings" step 4.



Setting the BCD output format. DUL: BCD is output according to the DRQ signal input, and the resulting status is held even if the DRQ signal goes off.



factory-set

- DF : BCD is output according to DRQ signal input, and assumes highimpedance status when there is no DRQ signal input.

3. Automatic BCD output time interval

This mode is established when $R_{IJ}E_D$ has been set in step 2. Select one of the eight time intervals listed below. 1/2/4/8/16/32/64/128 ms (See "7-2. Signal timing" for the BCD input/output timing)



factory-set

Initial settings are now complete for the BCD model.

Press we to return to the measuring state.

LT10A / LT11A Series

5-1-3. RS-232C model (only LT10A-105C/205C, LT11A-101C/ 201C)

Proceeds to the next setting mode from "5-1-1. Basic settings" step 2.

1.	Setting t	the output data format			
	Norñ	: Normal outp	: Normal output		
		1st byte	: Channel name (A or B)		
		2nd byte	: Sign ("+"* or "–")		
		3rd to 8th by	tes: Numerical data		
		-	(ex.12.345)		
	PAr A	: Outputting information	with measurement mode		
		1st byte	: Channel name (A or B)		
		2nd byte	: Current mode		
			(N: Current value,		
			P: Peak-to-peak value,		
			I: Minimum value,		
			A: Maximum value)		
		3rd byte	: Unit (M: mm, I: inch)		
		4th byte	: Sign ("+"* or "–")		
		5th to 10th byt	es : Numerical data		
			(ex.00.000)		

_PArA	: Outputting with and comparato	measuring mode information r Go/No Go result
	1st byte	: Channel name (A or B)
	2nd byte	: Current mode
		(N: Current value,
		P: Peak-to-peak value,
		I: Minimum value,
		A: Maximum value)
	3rd byte	: Unit (M: mm, I: inch)
	4th byte	: Comparator Go/No Go
		result
		U : Upper limit over
		G : Within range
		L : Lower limit under
		E : When an alarm has
		occurred
	5th byte	: Sign ("+"* or "–")
	6th to 11th bytes	: Numerical data
_	_	(ex.00.000)
40	: Outputting acc	ording to the mode 1 format
	(statistical ca	alculations) of the digital

printer P40 (End of sales).

Whether, with the 2 channel model, to output B channel data following a space or to divide it with the delimiter is selected by step 9. (except for P40 mode)

Note

Р

Ε

When set to *무닉*[] mode even the 2 channel model only outputs the A channel.

*: ("+" or space)



factory-set

2. Setting the data signalling rate

 P_{5} is displayed and the data signalling rate can be selected. 600/1200/2400/4800/9600/19200/38400 bps



3. Setting the data length

 $d_{1}E_{1}$ is displayed and the data can be set to 7 or 8 bits.



4. Setting the stop-bit

 $5E_{D}P$ is displayed and the stop bit can be set to one or 2 bits.



factory-set

5. Setting the parity

Note

When the data length is set to 7 bits in step 3, select "Parity".

- 6. Selecting odd or even parity
 - Switches to this mode when in is chosen above. odd : Odd parity

EPER : Even parity



factory-set



factory-set

7. Selecting the function for the RS-TRG terminal

- L[] : Mode for inputting mechanical contact outputs (such as relay and switch outputs).
- H: : Mode for inputting electronic circuit outputs (such as transistor outputs).
- [Y[]E : To output at a set interval.



The RS-TRG input cannot be used when [] J [] E has been selected.



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8. Selecting the output time interval.

This mode is selected when [Y][LE has been chosen in step 7.

One of the following eight intervals can be chosen. 0.2/0.5/1.0/5.0/10/30/60/300 s



factory-set

9. Selecting the data transmission format (2 channel models)

 $R__{L}$ is displayed and one of the following is chosen. SPREE : format (a) given below Er_LF : format (b) given below



factory-set

• To output from channel A –12.345, and from channel B 67.891:

(a) A-12.345 B+67.891 CR LF (b) A-12.345 CR LF B+67.891 CR LF

Note

 \Box means a space.

10. Plus sign setting of the output data

When the output data is positive, output characters will be set as a plus sign.

This setting will also be reflected in the input data (preset value, comparator value).



- $P_{l_1} = 0$: Outputs plus as a sign.
- 5PRE : Outputs space as a sign. (compatible to previous model)

Initial settings are now complete for the RS-232C model.

Press we to return to the measuring state.

5-2. Various settings

In the setting modes there is always an indicator flashing in the main display.

5-2-1. Setting the preset value



1 Push P to select. The A channel preset value setting mode.



- Push ▲ to select a sign.
 Push ► to select a digit to be set.
 The selected digit flashes.
 Push ▲ to select a numeral.
- 3 Push set.▶ for A channel flashes.
- Push P to select B channel preset value setting mode.
 B channels sign flashes "+".
 Single channel models return to the measuring state.
- **5** Same as 2.
- 6 Push set to set. Both A/B channel P flashes.
- 7 Push P to returns to the measuring state. Both A/B channel P lights.

Note

- If set is not pressed the previous setting is kept.
- If the maximum value mode, minimum value mode or peak-to-peak value mode is set as the measuring mode, the peak value of each mode has been set is set to the preset value when the preset value is set to the value which has more than the peak value.

5-2-2. Setting the measuring mode



- 1 Push we to select the mode for setting a measuring mode (current value, maximum value, minimum value, or peak-to peak value) for channel A.
 - * Each of there modes are indicated "A", "MAX", "MIN" and "P-P", respectively.



2 Push relation to select a measuring mode. The selected mode's indicator flashes. Push set.
 Set mode flashes.
 The other channel A modes disappear.



- **4** Push est to select the setting mode for channel B. Currently set channel B mode flashes.
- 5 Same as 2.
- 6 Push set. Modes set for channels A and B flash.



7 Push est to return to the measuring state. Modes set for channels A and B light.

Note

If you do not press set the previous settings will be kept.

5-2-3. Setting the comparator values



1 Push comparator values. Start from the CPH (comparator upper limit) setting.



2 Push ▲ to select a sign. Push ► to select digits. A selected digit flashes. Push ▲ to select a number.

- **3** Push <u>set</u> to set. "CPH" flashes.
- 4 Push control to select the CPL comparator lower limit setting mode. Sign of the CPL value flashes.
- 5 Same as 2.
- 6 Push set. "CPH" and "CPL" flash.
- **7** Push are to select the mode for setting the channel B comparator values.
 - * Single channel models return to the measuring state.



13 Push we to return to the measuring state.

Note 1

With the BCD models four different settings can be stored in memory. The operations are as follows.



- When the 4 settings are not required press ever repeatedly.
- Changing the 4 different setting values is carried out via the BCD connector input terminal.
- When the BCD connector is not connected the setting is CPH1 and CPL1.

Note 2

Note 3

When the set key is pressed to set the CPL the sign ("+" or "-") of the CPH value may flash. This is because the CPH (upper limit) is less than the CPL (lower limit), and the device is in the CPH setting mode. In this case, return to and start from the CPH setting.

5-2-4. Setting the key lock

Set the key lock to invalidate the key operations. This stores the displayed values or set values should a key is hit by accident. The key lock can be set during normal operations.

Setting

1. Press and hold ► (for about 5 seconds). Keep pressing until the key lock indicator in the main display changes from flashing to on.

Note

The setting is not performed unless the key is pressed while the indicator is flashing.



Key lock indicator

Release

1. Press and hold ► (for about 5 seconds). Keep pressing until the key lock indicator in the main display changes from flashing to off.

Note

The release is not performed unless the key is pressed while the indicator is flashing.

is not pressed the previous setting is maintained.

6. I/O connector

The I/O connector on the rear panel of the counter unit has functions for Go/No Go output based on the comparator function, start input, pause input, RS-232C trigger input and reset input.

6-1. Connector pin assignment



Rear of counter unit

• Use a shielded cable for connection to the FG pin on the rear of the counter unit.

(Prepare a shield cable by yourself.)

Cross section of the cable



Connector used : MC1.5/7-ST-3.5 (provided) made by Phoenix Contact

Signal

(See "4-3. Function description".)

I/O connector A

Pin No.	Signal name	IN/OUT	Signal
1	GND	-	
2	NC	-	Connection prohibited
3	RESET (A)	IN	Reset input (A CH)
4	LO (A)	OUT	Go/No Go output Low (A CH)
5	GO (A)	OUT	Go/No Go output Go (A CH)
6	HI (A)	OUT	Go/No Go output High (A CH)
7	GND	-	

I/O connector B (not provided for 1-channel models)

Pin No.	Signal name	IN/OUT	Signal
1	GND	-	
2	NC	-	Connection prohibited
3	RESET (B)	IN	Reset input (B CH)
4	LO (B)	OUT	Go/No Go output Low (B CH)
5	GO (B)	OUT	Go/No Go output Go (B CH)
6	HI (B)	OUT	Go/No Go output High (B CH)
7	GND	-	

I/O connector (common)

Pin No.	Signal name	IN/OUT	Signal
1	GND	-	
2	START (A)	IN	Start/latch input (A)
3	PAUSE (A)	IN	Pause input (A)
4	START (B)	IN	Start/latch input (B) *1
5	PAUSE (B)	IN	Pause input (B) *1
6	RS-TRG	IN	RS-232C data output/trigger input *2
7	GND	-	

- *1 : The connection of this pin is prohibited for 1-channel models.
- *2 : The connection of this pin is prohibited except in RS-232C models.

Go/No Go output

High:	displayed value > upper limit	\rightarrow "L" (ON)
Go :	upper limit \geq displayed value \geq lower limit	\rightarrow "L" (ON)

Low : lower limit > displayed value \rightarrow "L" (ON)

Note

All Go/No Go outputs are "H" (OFF) when an alarm is set.

Start/latch input

- The "L" (ON) signal sets the maximum, minimum, and peak-to-peak values to the current value and restarts their storing. (Start function)
- If, when the initial setting of 5½ which was set at the time of shipping is changed to LREH, the current value mode serves as the measuring mode, the "L" (ON) signal will hold the Go/No Go output (I/O connector) and display. (Latch function)

Note

While the Go/No Go output is at the "L" level, reset/preset value recall cannot be effected by reset key or external reset/preset value recall input.

Reset input

"L" (ON) sets the measured value to zero. When there is a preset value this is recalled.

Note

Even when the "L" level is held, the Go/No Go output (I/O connector) and the display are not held.

6-2. I/O circuitry (I/O connector area)

Output circuit



Output signal rating

On: VoL = MAX. 1.4 V (when output current IoL = 10 mA) Off: VoH = MAX. 26.4 V (output current IoH = MAX. 50 μ A)

Intput circuit



 Output specifications NPN open collector output DC+5 to +26.4 V 10 mA or less (150 mW or less)

Note

When connecting a device such as a relay to output pins, first check the operational coil rating of the relay. Be sure to connect a back-voltage absorption diode in parallel with the coil.

Input specifications
 OFF voltage: +4 to +26.4 V or open
 ON voltage : +0.8 V or less
 Between IN and GND, either open (OFF) or short (ON) is possible

6-3. Signal timing

Start input to I/O connector (common) pins 24 Reset input to I/O connector A pin 3, B pin 3



I/O connector A pins (45)6 B pins (45)6



Note

When the initial settings of the start/latch pins (2) and (4) of the I/O connector (common) are LRELH, the "L" (ON) signal will hold the Go/No Go output and display value immediately before.



Note

High-speed sampling is performed where the Go/No Go output is updated every 50 $\mu s.$

For this reason, when the count value is close to the comparator setting value, the ON-OFF time may be output repeatedly every 50 μ s. Be careful because reception may not be possible, depending on the sampling time on the connected device side. In this situation, use the latch function to first store the Go/No Go output and then receive the result.

7. BCD output (only BCD model)

The current value, maximum value, minimum value, and peak-to-peak value data is output from the BCD connector. There are also features for alarm output, comparator value selection input and measuring mode (current value, maximum value, minimum value, peak-to peak value) selection input. The output is all an open collector equivalent to the IC "74LS06". With the 2 channel model, both channel A and B have the same features.

7-1. Connector pin assignment

As seen from the rear of the counter unit.



Connector to be procured

Manufactured by Hirose Electric, Co., LTD DX10-36S (Counter unit receptacle) DX40-36P (Plug: accessory) DX-36-CV (Plug case: accessory)

Signal

Pin No.	Signal	Pin No.	Signal
1	1st digit Q1 (A)	19	Q3 (C)
2	Q2 (B)	20	Q4 (D)
3	Q3(C)	21	MOD 0
4	Q4 (D)	22	MOD 1
5	2nd digit Q1 (A)	23	M-VALID
6	Q2 (B)	24	Connection prohibited
7	Q3 (C)	25	Connection prohibited
8	Q4 (D)	26	GND
9	3rd digit Q1 (A)	27	GND
10	Q2 (B)	28	GND
11	Q3 (C)	29	SIGN output
12	Q4 (D)	30	DRQ input
13	4th digit Q1 (A)	31	READY output
14	Q2 (B)	32	Start input
15	Q3 (C)	33	Reset input
16	Q4 (D)	34	Alarm output
17	5th digit Q1 (A)	35	Comparator value selection A
18	Q2 (B)	36	Comparator value selection B

Note

• The counter unit's least significant digit (rightmost digit) is the first digit.

The letters in parentheses have the following meanings A: 1, B: 2, C: 4, D: 8.



BCD output

In the out mode, or mode

(See "7-2. I/O timing".)

When DRQ has been received from at (30), and when the READY output at (31) goes "L" (ON), the BCD data is output. In the $R_{\mu} \ge 0$ mode

The data is output at the output time interval which was set as the initial setting even when DRQ is not input.

Output logic

True logic or false logic can be selected. (See "5-1-2. BCD model") True logic : "L" (ON) is "0". "H" (OFF) is "1".

Output format

Whether to hold the BCD output data or to assume high-impedance when there is no DRQ signal input can be selected.

(See "5-1-2. BCD model")

In the \mathcal{R}_{μ} mode, the unit cannot enter the high-impedance state.

Measuring mode selection input

Current value, maximum value, mimimum value, peak-to peak value can be selected.

Measuring mode	2)pin (MOD 0)	22pin (MOD 1)	②pin (M-VALID)
Current value	L	L	
Maximum value	Н	L	I
Minimum value	L	Н	L
P-P values	Н	Н	
According to the key switch settings	×	×	н

 \times : Either setting possible

SIGN output

Tells whether the output data is positive or negative. With true logic "H" (OFF) is "--", and "L" (ON) is "+".

Start input

When the peak-hold function has been chosen the "L" (ON) input will cause the maximum value and minimum value, to be come the current value (peak-to-peak value = 0) and restart their storing.

Reset input

"L" (ON) sets the measured value to zero.

When there is a preset value this is recalled.

Note

Even when the "L" level is held, the Go/No Go output (terminals) and the display are not held.

Alarm output

"H" (OFF) is output when the unit enters the alarm state. This is set to "L" (ON) by pressing the reset key or by the I/O connector reset input after eliminating the various causes of the alarm.

Comparator value selection input

The four comparator value pairings set in the counter unit can be selected.

Pin 35	Pin 36	Comparator value (Upper limit CPH, lower limit CPL)	
Н	Н	CPH1, CPL1	
L	н	CPH2, CPL2	
н	L	CPH3, CPL3	
L	L	CPH4, CPL4	

DRQ display/output hold feature

While the DRQ signal is "L" (ON) the display and output (BCD, Go/No Go output of I/O connector) of termianls are stored.

(When the BCD output form is set to aut^{L} , only the BCD output data is held on DRQ becoming "H" (OFF).)

However, when the initial settings of pins (2) and (4) of the I/O connector (common) are changed from 5½ which was set at the time of shipping to $L \Pi L \Sigma H$, the hold function for the display and I/O connector Go/No Go output is enabled only for pins (2) and (4) of the I/O connector (common), and the DRQ hold is valid only for the BCD output data.

7-2. Signal timing

1-20 Data, 30 DRQ input, 31 READ output

• When Initial setting Dut (See P15 for factory-set.)



• When Initial setting or



• When Initial setting Ruto



3536 Comparator value selection input



7-3. Interface cable

• Use a shielded cable with thickness less than ϕ 8.7 mm, and length under 2 m.

In addition, connect the shielded cable of the connected equipment to frame GND.

• The plug case is connected to FG of the counter unit. Connect the braided wire to the case after folding back and securing with the metal clips.

Note

Be sure to insulate (with insulation tubes, etc.) the soldered areas of the plug and cable to prevent a malfunction caused by contact between the case and plug pins.

Assembling the plug provided



7-4. BCD input/output circuits

Output circuit



Output signal rating

On: VoL = MAX. 1.4 V (when output current IoL = 10 mA) Off: VoH = MAX. 26.4 V (output current IoH = MAX. 50 μ A)

Input circuit



- Output specifications NPN open collector output DC+5 to +26.4 V 24 mA or less
- Input specifications OFF voltage: +4 to +26.4 V or open ON voltage : +0.8 V or less Between IN and GND, either open (OFF) or short (ON) is possible

8. RS-232C Interface (only RS-232C model)

The counter unit is connected to a personal computer to use the computer to control the counter unit. (See "5-1-3. RS-232C model".)

8-1. Terminal pin assignment



Signal Connected • RS-232C equipment side Pin Signal I/O Signal No. N.C 1 _ 2 SG (Signal GND) SG 3 RXD (Received data) TXD Т \leftarrow 4 0 TXD (Transmit data) RXD \rightarrow 5 L. CTS (Clear to send) RTS \leftarrow 0 RTS (Request to send) \rightarrow CTS 6 7 +10 V DSR 8 N.C

 RS-TRG (I/O connector (Common)) An "L" (ON) input 1 causes the measured values to be output via the RS-232C connector.

8-2. Connecting a personal computer

Use a DZ252 or DZ253A RS-232C cable (sold seperately) for connecting personal computers. (See "8-6. Commands".)

Note

The shielded cables of the DZ252 and DZ253A connectors are connected to FG of the counter unit.

The DZ252 and DZ253A connectors for the personal computer side are 9 and 25-pin Dsub connectors, respectively. Please check the form of the personal computer's RS-232C connector before purchasing the cable for connection. For further information please consult your dealer.

Pin No. Pin No. Pin No. Pin No. 1 1 1 1 2 2 2 2 3 З 3 3 4 4 4 4 5 5 5 5 6 6 6 6 7 7 7 7 8 8 8 to Case 9 Case Shield 25 Case 8pin mini DIN 8pin mini DIN cable Shield Case 9pin Dsub cable Female 25pin Dsub Male Personal I T10A/ Personal I T10A/ computer side computer side LT11A side LT11A side DZ252 DZ253A

Connection

8-3. RS-232C Interface

1. Signals (Conforming to EIA-RS-232C)

Signals	: Asynchronous, start-stop system,
	full duplex system
Data signalling rate	: 600, 1200, <u>2400</u> , 4800, 9600,
	19200, 38400 bps
Data length	: Switchable between 7 or <u>8 bits</u>
Parity	: <u>None</u> , odd, or even selectable.
Stop bits	: Switchable between 1 or 2 stop bits
Cable length	: Max.15 m

- Switching of the various parameters is performed in the initial settings (P16).
- The above underlined items are the settings at the time of shipping.

8-4. RS-TRG circuit

Input circuit : Common I/O connector pin (6)



8-5. Output

To output measured data from the RS-232C choose one of the following four methods.

1. Input to the RS-TRG terminal (1)

Initial setting: L^{\square} (set at time of shipping) This mode is for inputting mechanical contact outputs (such as relay and switch outputs). Data is output 20 ms after an "L" level signal has been received.



2. Input to the RS-TRG terminal (2)

Initial setting: H |

This mode is for inputting electronic contact outputs (such as transistor outputs).

However, there must be no chattering in the input signal. Data is output after an "L" level signal has been received.



Initial setting: [4][2]EEight intervals available, 0.2/0.5/1.0/5.0/10/30/60 and 300 s.

* This interval is set with the initial settings. (See "5-1-3. RS-232C model".)

4. Commands

Data is output by input ASCII code commands. For more details see section 8-6.

Commands are received even in the output method 1, 2 and 3 modes.

• Holding display and output.

While the RS-TRG signal is "L" (ON), the display and output (RS-232C data and I/O connector Go/No Go) are held. However, when the initial settings of pins ② and ④ of the I/O connector (common) are changed from 5L which was set at the time of shipping to LRLLH, the hold function for the display and I/O connector Go/No Go output is enabled for the inputs of pins ② and ④ of the I/O connector (common), and the RS-TRG input is canceled.

8-6. Commands

1. (Command	table	(Converted	to	ASCII code)	1
------	---------	-------	------------	----	-------------	---

Command	Operation
*P-P	Switch to peak-to-peak value mode.
*MAX	Switch to maximum value mode.
*MIN	Switch to minimum value mode.
*REAL	Switch to current value mode.
*RCL	Recall the preset value.
*RES	Reset.
*START	Start.
*P= ¥¥¥¥¥/*P=?	Set/read preset value.
*CH= ¥ ¥ ¥ ¥ ¥ ¥/*CH=?	Set/read comparator upper limit.
*CL= ¥ ¥ ¥ ¥ ¥ ¥/*CL=?	Set/read comparator lower limit.
* r	Request for output for one channel.
R	Request for outputs for 2 channels.
KEYON	Allow use of front panel key.
KEYOFF	Prohibit use of front panel key.
*PAUON	Stop peak value update
*PAUOFF	Release peak value update stop
*LCHON	Latch the current value.
*LCHOFF	Release the current value latch
VER=?	Read software version

- For the 1 channel model or the 2 channel model A channel use "A", for the 2 channel model B channel use "B".
- ¥ : Value to be set. (Example: 12.345)

36 (E)

Note

- When there is a preset value the "reset" command will set the value to zero. To recall the preset value input the "recall preset value" command.
- The data set by the commands given in the table will not be stored by the counter unit.

If the power is turned off the settings must be repeated.

• Provide intervals of at least 5 ms between command inputs.

However, input the commands after data output is completed for operations accompanied by data output.

2. Example of data transmission

- External device \rightarrow counter unit To preset 12.345 for A channel AP=12.345 CR LF
- Counter unit \rightarrow external device
 - When a 1 channel model has received the "R" command, or a 2 channel model has received the "Ar" command : During normal operation : A+*12.345 CR LF (Output the A channel value of 12.345)

When an alarm is triggered : AE CR LF

② When a 2 channel model has received the "R" command :

During normal operation :

- (a) A-12.345 B+*67.891 CR LF
- (b) A-12.345 CR LF B+*67.891 CR LF (Output the A channel value of -12.345 and the B channel value of 67.891)

When an alarm is triggered :

- (a) AE□BE C_R L_F
- (b) AE CR LF BE CR LF

(a) or (b) can be chosen with the initial settings. (See "5-1-3. RS-232C model".)

Note

 \Box means a space.

3. The output data format

Changing according to the initial settings (See P16.). (1) Normal condition Initial setting : Doco Normal output (set at time of shipping) : Channel name (A or B) 1st byte : Sign ("+"* or "-") 2nd byte 3rd to 8th bytes : Numerical data (ex.12.345) Initial setting : $PB_{-}B_{-}$ (Outputting with measurement mode information) 1st byte : Channel name (A or B) 2nd byte : Current mode (N: Current value. P: Peak-to-peak value, I: Minimum value. A : Maximum value) 3rd byte : Unit (M: mm, I: inch) : Sign ("+"* or "-") 4th byte

5th to 10th bytes : Numerical data (ex. 00.000)

*: ("+" or space)

Initial setting : E_PA_A Outputting with and comparato 1st byte 2nd byte 3rd byte 4th byte	measuring mode information or Go/No Go result : Channel name (A or B) : Current mode (N: Current value, P: Peak-to-peak value, I: Minimum value, A: Maximum value) : Unit (M: mm, I: inch) : Comparator Go/No Go result	 ② When an alarm is tri Initial setting : ☐□rn For an overflow 1st byte 2nd byte 3rd byte 4th to 9th byte 1st byte 2nd non-over 1st byte 2nd byte 	iggered w alarm : Channel name (A or B) : Sign ("+"* or "") : F es : Numerical data rflow alarm : Channel name (A or B) : E
5th byte 6th to 11th bytes	U : Upper limit over G : Within range L : Lower limit under E : When an alarm has occurred : Sign ("+"* or "-") : Numerical data (ex.00.000)	Initial setting : <i>P뮤- 뮤</i> 1st byte 2nd byte 3rd byte	: Channel name (A or B) : E : F (For an overflow alarm) O (For a non-overflow alarm)
		*: ("+" or space)	

Initial setting : PHD

Outputting according to the mode 1 format (statistical calculations) of the digital printer P40 (P40 is sold separately).

Note

- For the 2 channel model, whether to output B channel data following a space or to divide it with the delimiter is selected by the initial setting (See P18, step 9.).
- When set to P4[] mode even the 2 channel model only outputs the A channel data only.

Initial setting : $E_PR_PR_P$ For an overflow alarm : Channel name (A or B) 1st byte 2nd byte : Current mode (N: Current value, P: Peak-to-peak value, I: Minimum value. A : Maximum value) 3rd byte : Unit (M: mm, I: inch) 4th byte : E 5th byte : Sign ("+"* or "-") 6th byte : F 7th to 11th bytes: Numerical data (ex.2.345)

For a non-overflow alarm

 1st byte
 : Channel name (A or B)

 2nd byte
 : Current mode (N : Current value, P : Peak-to-peak value, I : Minimum value, A : Maximum value)

 3rd byte
 : Unit (M: mm, I: inch)

 4th byte
 : E

 5th to 11th bytes: "□Error□"

Initial setting : PHD

Outputting according to the mode 1 format (statistical calculations) of the digital printer P40 (End of sales).

Note

• \Box means a space.

*: ("+" or space)

9. Alarm display/output

1.05	Item	Output			Causa	Oslution
LCD		I/O connectors	BCD	RS-232C (Note)	Cause	Solution
	Measuring unit is not connected or	All "H"	Alarm terminal is "H"	∗E ^C R ^L F output. (∗ is A or B.)	The measuring unit was exchanged with the power on.	Reset
	connection has been cut.				Measuring unit is not connected or connection has been cut	Fix problem and reset.
SError	Speed over				The measuring unit's spindle exceeded the maximum response speed.	Reset
LError	Signal disorder or connection cut				Abnormality in measuring unit's output signal or connection has been cut.	Fix problem and reset.
F Fifth digit is F	Overflow	_	True logic: fifth digits are all "H". False logic: fifth digits are all "L".	<pre>*△FX.XXX CR LF output. (* is A or B, △ is a plus sign[*] or a minus sign, X is a numeral.) *: ("+" or space)</pre>	Value exceeded 5 digits.	Limit input to 5 digits and reset.
Value for axis is flashing.	Initialization is required.	All "H"	Alarm terminal is "H"	*E ^C R ^L F output. (* is A or B.)	Initialization is required to calibrate the new pairing of both device and measuring unit.	Move the measuring unit at least 1 mm and reset.

(Note) When the output data format is the initial setting $\prod_{D \in \overline{D}}$. See P38, 39 for other formats.

Note

If the alarm is again displayed/output after solving the problem

Has the measuring unit or its spindle received some strong shock? Try replacing with the measuring unit used for the other channel.

10. Specifications

10-1. LT10A/LT11A (Specifications)

	Model	LT10A-105	105B	105C	205	205B	205C			
Iter	n	LT11A-101	101B	101C	201	201B	201C			
Dis	play	5 digit backlit LCD, mode display								
	Measuring unit input		1 channel	2 channel						
	I/O connectors *1			C)					
Q	BCD *2	—	0	—	—	0	—			
-	RS-232C *3	-	_	0	-	_	0			
	RS-TRG *4	-	-	0	-	_	0			
Re	set function	Reset key or external input (I/O connectors)								
		_	BCD terminal	RS-232C command	_	BCD terminal	RS-232C command			
Preset function		Preset value set with preset key, recalled with reset key.								
		_	Recalled with BCD reset terminal	Set or recalled with RS-232C command	_	Recalled with BCD reset terminal	Set or recalled with RS-232C command			
Co	nparetor function	Three-level comparator Comparator value set with keys on the front panel. Result evaluation: LED and I/O connector output (photocoupler)								
		_	Up to 4 values can be set for comparator (key input). Switched with BCD terminal.	Set with RS-232C command	_	Up to 4 values can be set for comparator (key input). Switched with BCD terminal.	Set with RS-232C command			

* 1: I/O connector

Input : Reset, peak-hold start, peak-hold pause, RS trigger (RS-232C models only)

Output: Result evaluation (photocoupler)

* 2: BCD (36 pin half-pitch connector)

Input : Reset, peak-hold start, comparator value selection (4 settings) Output: five digits (open collector) One of current value/maximum value/minimum value/peak-to-peak value selected and output. Alarm output

Model	LT10A-105	105B	105C	205	205B	205C		
Item	LT11A-101	101B	101C	201	201B	201C		
Peak hold function	Maximum, minimum, and peak-to-peak values. Measuring started by the start input of the I/O connector; update stop by pause input.							
	_	Can be started with the BCD terminal.	RS-232C can set or start.	_	Can be started with the BCD terminal.	RS-232C can set or start.		
Resolution	0.001	mm, 0.005 mm, 0	.01 mm selectable	(0.001 mm (0.0001	") is LT11A series	only.)		
Direction			Can be s	switched				
Maximum response speed		100 m/min			80 m/min			
Addition and subtraction function	A+B, A–B, B–A can be set with the direction setting.							
Alarm	Displayed on LCD or the I/O connector's comparator outputs are all "H" (OFF).					-).		
	_	BCD alarm terminal "H" (OFF)	_	_	BCD alarm terminal "H" (OFF)	_		
Data storage	Resolution, direction, comparator value, preset value, modes, etc.							
	_	BCD sign	Data signalling rate, etc.	_	BCD sign	Data signalling rate, etc.		
Temperature	Operating temperature: 0 to 40°C Storage temperature: -10 to 50°C							
Power consumption *5	1.8 W	2.9 W	2.0 W	2.3 W	4.0 W	2.5 W		
Mass	Approx. 200 g	Approx. 230 g	Approx. 220 g	Approx. 210 g	Approx. 270 g	Approx. 230 g		
Power voltage	Power input connector (3 pins) : DC9.0 to 26.4 V.							
Compatible measuring unit	DT series							

* 3: RS-232C (8 pin mini-DIN connector)

Reset, preset value setting/recall, peak-hold start, peak-hold pause, current value hold, software version read, comparator value setting, current value/maximum value/minimum value/peak-to-peak measuring mode selection and output, key lock and release.

* 4: RS-TRG pin

Trigger input for RS-232C data output

* 5: With measuring unit connected.

10-2. Accessories

Instruction Manual	1
Counter stopper	1
BCD output connector plug	1 (1 ch BCD models only)
	2 (2 ch BCD models only)
I/O connectors (7-pin)	
	3 (2 ch models)
Power input connector (3-pin)	1

10-3. Options

RS-232C connection cable (2 m)	
• Round 8-pin ↔ D-sub 9-pin	DZ252
• Round 8-pin ↔ D-sub 25-pin	DZ253A
 Round 8-pin ↔ open-end 	DZ254

10-4. Dimensions







LT10A / LT11A Series

11. Troubleshooting

When the unit does not work properly, check the following before calling Magnescale Co., Ltd. Representative for service





■ Cleaning



LT10A / LT11A Series

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株式会社マグネスケール

〒259-1146 神奈川県伊勢原市鈴川45

Magnescale Co., Ltd.

45 Suzukawa, Isehara-shi, Kanagawa 259-1146, Japan

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