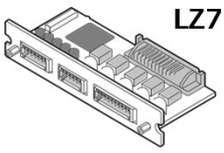
Magnescale
SPEED X PRECISION

LY71 & LZ71-KR

Comparator function
Quick reference manual

LY71

LZ71-KR



1. First of all

By combining LY71 with LZ71-KR (comparator unit), open collector output and relay output of up to 4 levels are possible when the comparator function is selected, and 1 level when the positioning function is selected. It supports both length display and angle display.

This manual mainly describes how to operate the comparator function. For detailed information on LZ71-KR, refer to the instruction manual.

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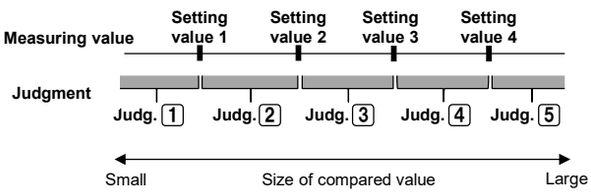
7. Functional comparison between LZ71-KR and old model LZ51-K/R

2. Judgment display and judgment output

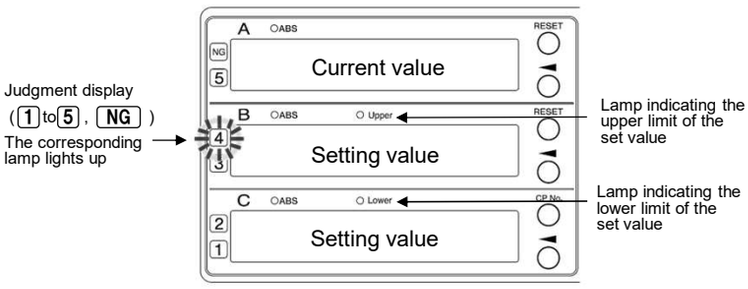
Setting value and judgement (Example of 4-level setting)

Judges the lower and upper limits for the set value



Judgment 4 status display (example)

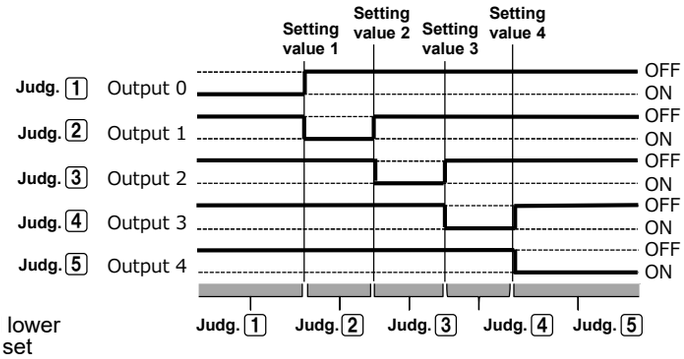
The upper display shows the current value, and the middle and lower rows display the compare setting value. Judgment against the set value is displayed by number and NG.



(Condition: Setting value 3 ≤ Measured value < Setting value 4)

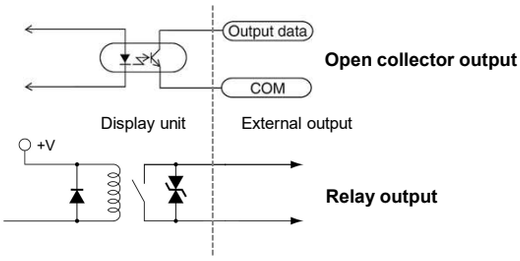
Judgement output (Example of 4-level setting)

Judgment output timing chart



Output circuit (Output 0 to output 4)

Judgment result is open collector output and relay output



LY71 with LX71-KR comparator function

AMI
Automation and Metrology International, LLC
8808 Tyler Blvd, Mentor, OH 44060
1-888-354-2525 | sales@auto-met.com
Request a quote: auto-met.com

3. Display of comparator setting value and judgment result

Condition: When display switching is set to "automatic"

Setting value and judgement

Shows the judgment area for the setting value.

Judgment display and count display

Shows the display for each comparing area.

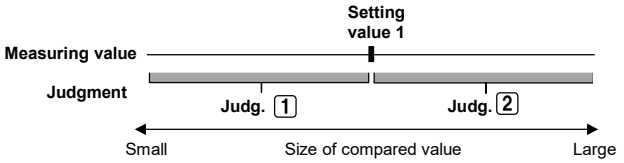
Judgement output

Shows the judgment output of the comparing.

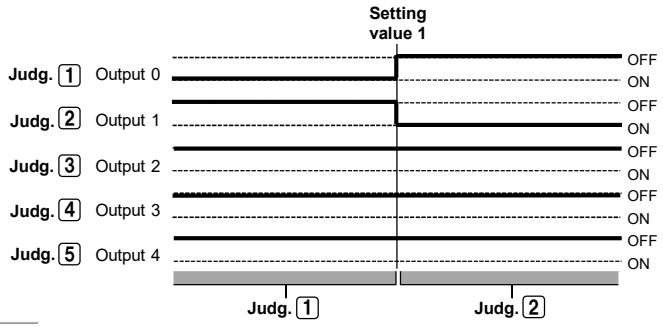
Condition	Judgment output
Measured value < Setting value 1	Output 0
Setting value 1 ≤ **Measured value** ≤ Setting value 2	Output 1
Setting value 2 ≤ **Measured value** ≤ Setting value 3	Output 2
Setting value 3 ≤ **Measured value** ≤ Setting value 4	Output 3
Setting value 4 ≤ **Measured value**	Output 4

When using 1 level

Setting value and judgement

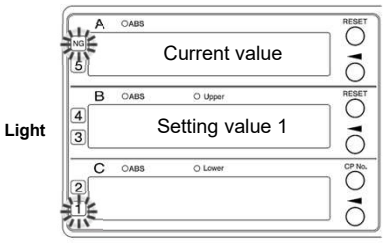


Judgement output



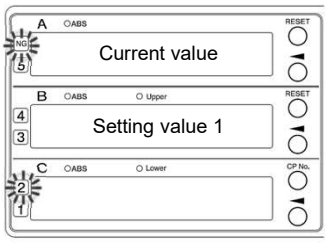
Judgment display and count display

Judgment 1



Measured value < Setting value 1

Judgment 2

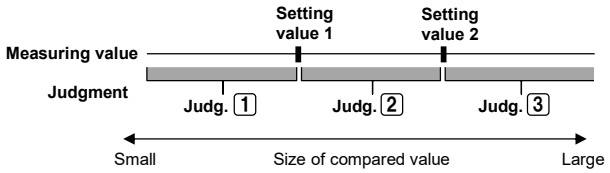


Setting value 1 ≤ Measured value

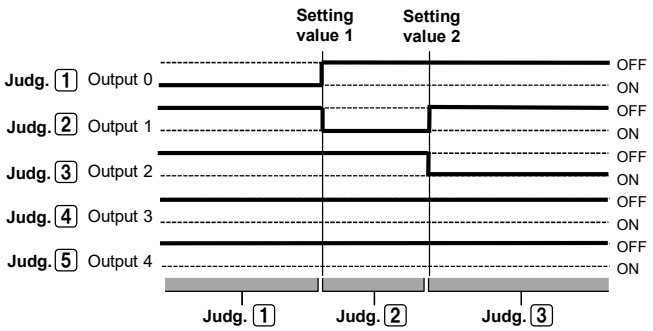
*In the case of 1 level setting, the NG lamp always lights up.

When using 2 level

Setting value and judgement

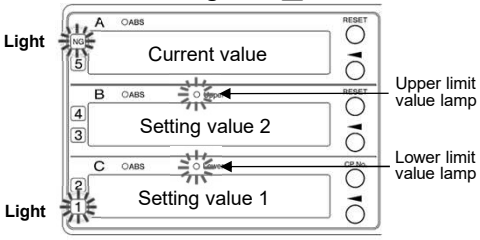


Judgement output



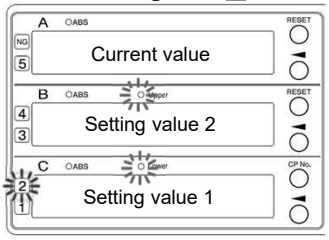
Judgment display and count display

Judgment 1



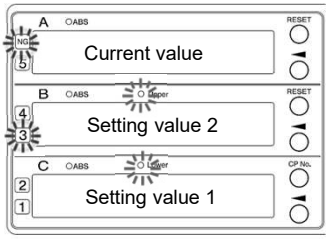
Measured value < Setting value 1

Judgment 2



Setting value 1 ≤ Measured value < Setting value 2

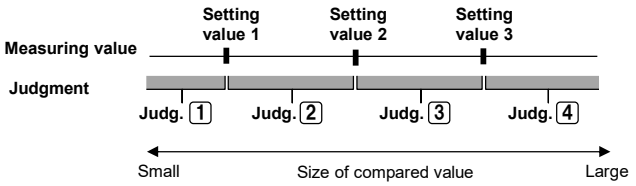
Judgment 3



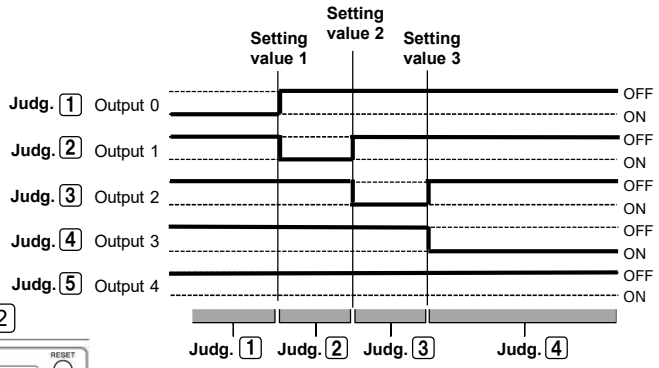
Setting value 2 ≤ Measured value

When using 3 level

Setting value and judgement

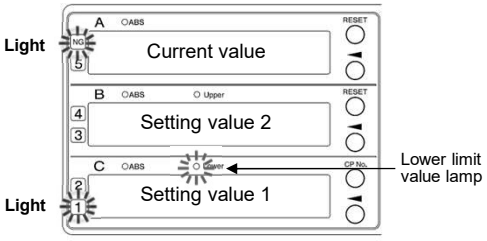


Judgement output



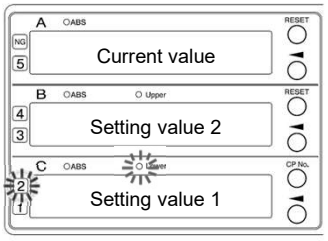
Judgment display and count display

Judgment 1



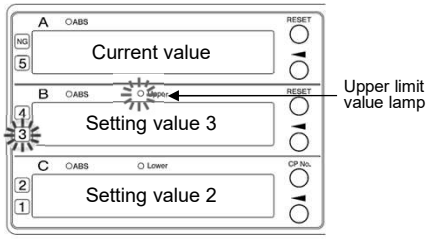
Measured value < Setting value 1

Judgment 2



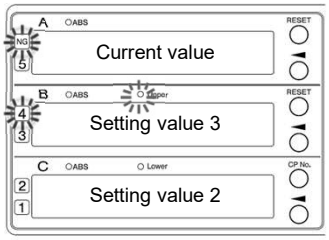
Setting value 1 ≤ Measured value < Setting value 2

Judgment 3



Setting value 2 ≤ Measured value < Setting value 3

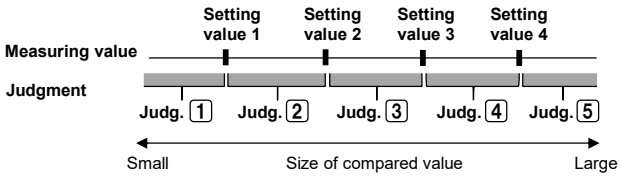
Judgment 4



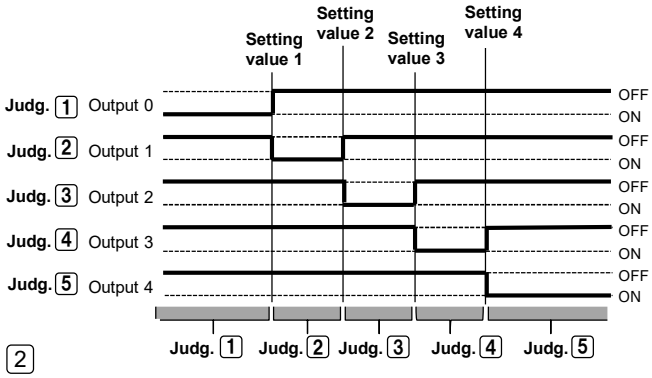
Setting value 3 ≤ Measured value

When using 4 level

Setting value and judgement

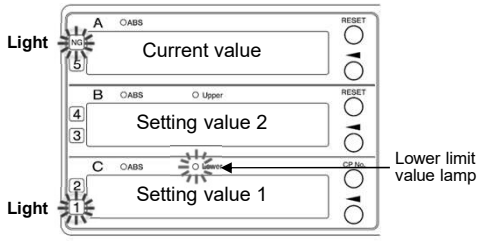


Judgement output



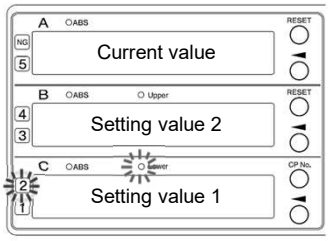
Judgment display and count display

Judgment 1



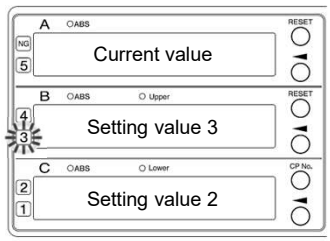
Measured value < Setting value 1

Judgment 2



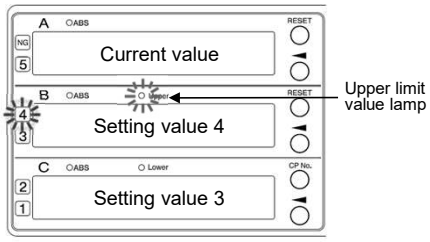
Setting value 1 ≤ Measured value < Setting value 2

Judgment 3



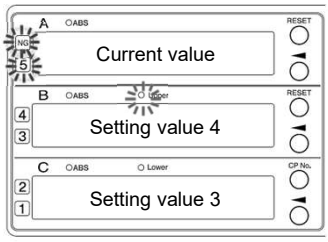
Setting value 2 ≤ Measured value < Setting value 3

Judgment 4



Setting value 3 ≤ Measured value < Setting value 4

Judgment 5



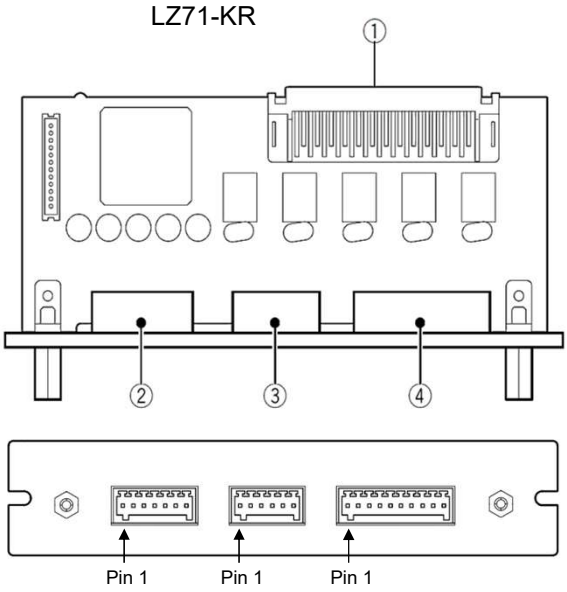
Setting value 4 ≤ Measured value

4. Installation / connection

This section describes the installation of LZ71-KR and the connection of input / output signals.

4-1. Appearance

Number	Explanation
①	60pin connector to connect to the LY71 main unit
②	Input connector (set number, latch input)
③	Output connector (comparing judgment) Open collector output
④	Output connector (comparing judgment) Relay output

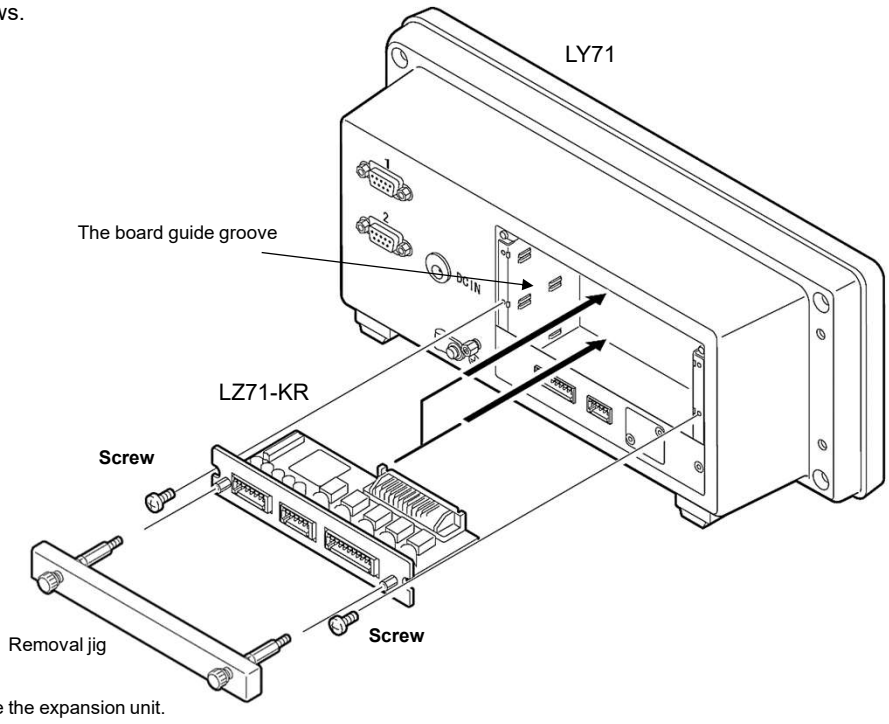


4-2. Insertion of expansion unit

① Remove the blindfold on the back of the LY71. (Fixed with two screws)
There are two slots, but it works regardless of which one you insert.

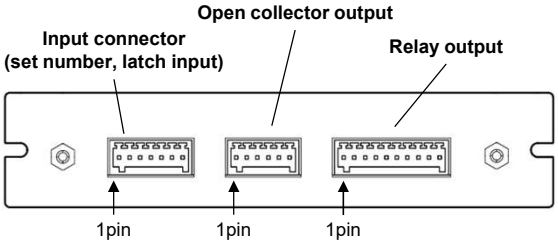
② When inserting, align it with the board guide groove.
Insert it all the way in so that the 60-pin connector fits tightly.

③ Secure the expansion unit with two screws.

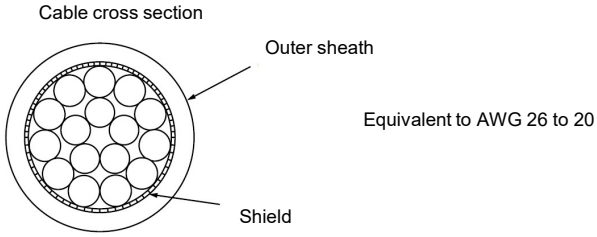


Use the accessory jig to remove the expansion unit.

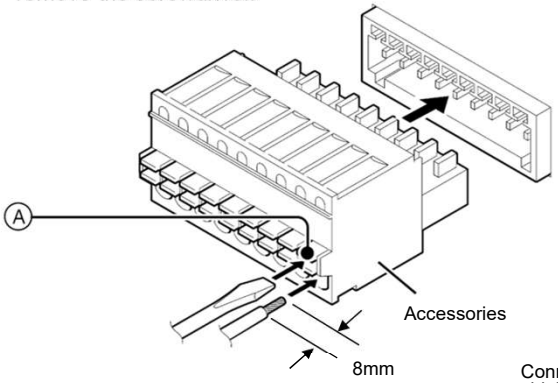
4-3. I/O signal connection



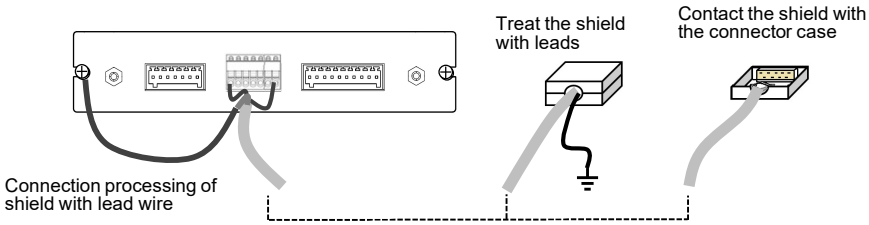
Cable :
For the output cable, use a cable with a shield structure equivalent to AWG26 to 20 as shown in the figure below. Fix the shielded wire to the expansion unit fixing screw on the LY71 side.



Wiring of connector with terminal block :
The wire size that can be connected on this terminal block is AWG26 to 20. Remove 8mm of outer sheath, and while pressing Ⓐ in the terminal hole with a flat-blade screwdriver, insert it until the wire is placed, and then remove the screwdriver.



Shielded wire processing :
Connect the shielded wire on the expansion unit side to either of the two screws that secure the expansion unit. Of course, the LY71 body must be firmly grounded. If the connector case used on the device side is of the type that contacts the FG, connect the shielded wire to the connector case. If not, wire the shield with a lead wire so that it drops on the FG on the device side.



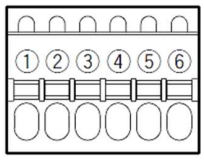
Output connector pin array

Open collector output

Output connector pin assignment

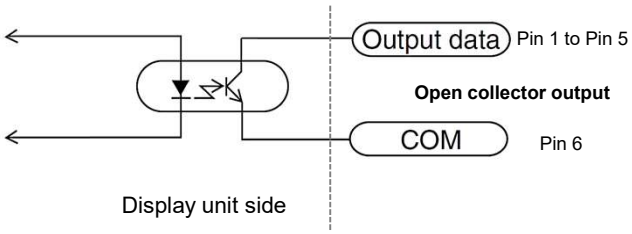
Number	Signal	Judgement
①	*OC0	Output 0
②	*OC1	Output 1
③	*OC2	Output 2
④	*OC3	Output 3
⑤	*OC4	Output 4
⑥	COM	—

Terminal



Output signal rating :
Voltage: DC12V-24V
Current: up to 15mA

Output circuit

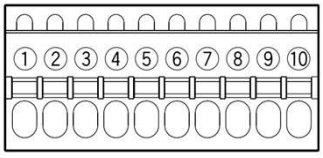


Relay output

Output connector pin assignment

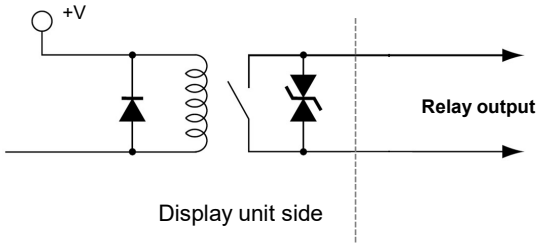
Number	Signal	Judgement
①	*RY0	Output 0
②	*RY0	
③	*RY1	Output 1
④	*RY1	
⑤	*RY2	Output 2
⑥	*RY2	
⑦	*RY3	Output 3
⑧	*RY3	
⑨	*RY4	Output 4
⑩	*RY4	

Terminal



Output signal rating :
Rated working voltage: AC100, DC24V
Rated working current: (resistive load) 0.3A
Operating time: Approximately 2ms
Recovery time: Approximately 1ms
Electrical life: 100,000 times or more

Output circuit

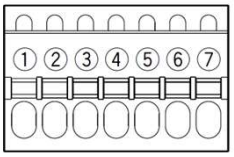


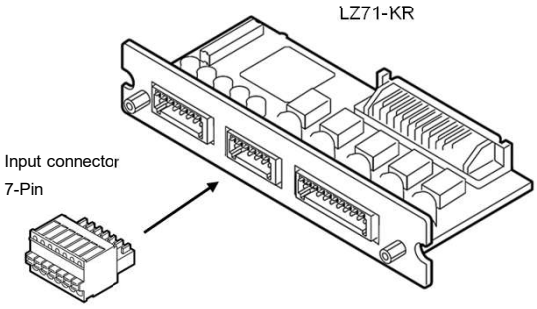
Switching of comparing set number and latch input

Input connector pin assignment

Number	Signal	Input
①	+Vcc	External power input
②	CMP0	Bit0
③	CMP1	Bit1
④	CMP2	Bit2
⑤	CMP3	Bit3
⑥	LATCH	Latch
⑦	COM	Common

Terminal





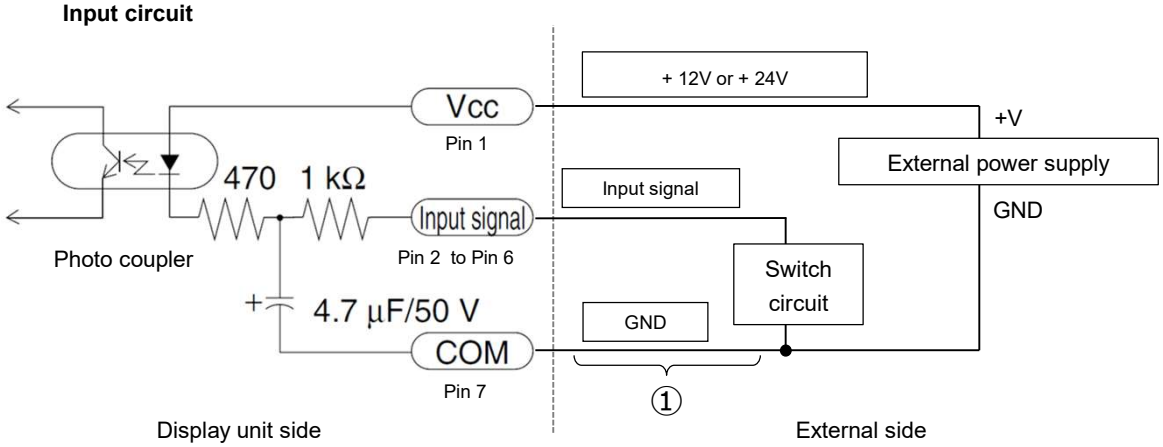
Selection of comparison set number

Signal	Set 00	Set 01	Set 02	Set 03	Set 04	Set 05	Set 06	Set 07	Set 08	Set 09	Set 10	Set 11	Set 12	Set 13	Set 14	Set 15
CMP0	H	L	H	L	H	L	H	L	H	L	H	L	H	L	H	L
CMP1	H	H	L	L	H	H	L	L	H	H	L	L	H	H	L	L
CMP2	H	H	H	H	L	L	L	L	H	H	H	H	L	L	L	L
CMP3	H	H	H	H	H	H	H	H	L	L	L	L	L	L	L	L

* If CMP0 to CMP3 have no signal, set-00 is automatically selected.

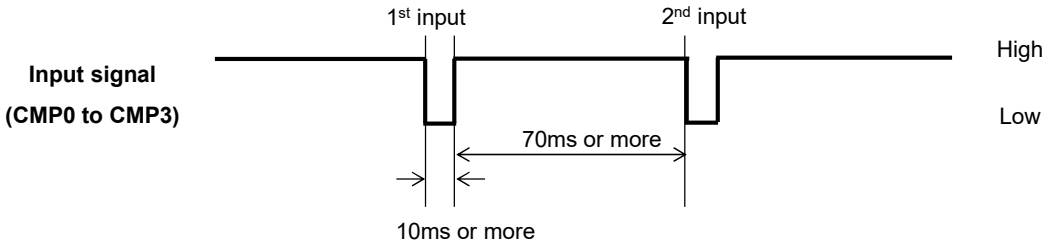
H : High L : Low

Input circuit



Input circuit delay time:
When the external power supply is + 24V and the above ① is connected, the delay time until the photocoupler is turned on is about 350μs.
If the external power supply is + 24V and the above ① is not connected, the delay time until the photocoupler is turned on is about 3μs.
It takes about 3ms at the shortest from turning on the photocoupler to internal operation.

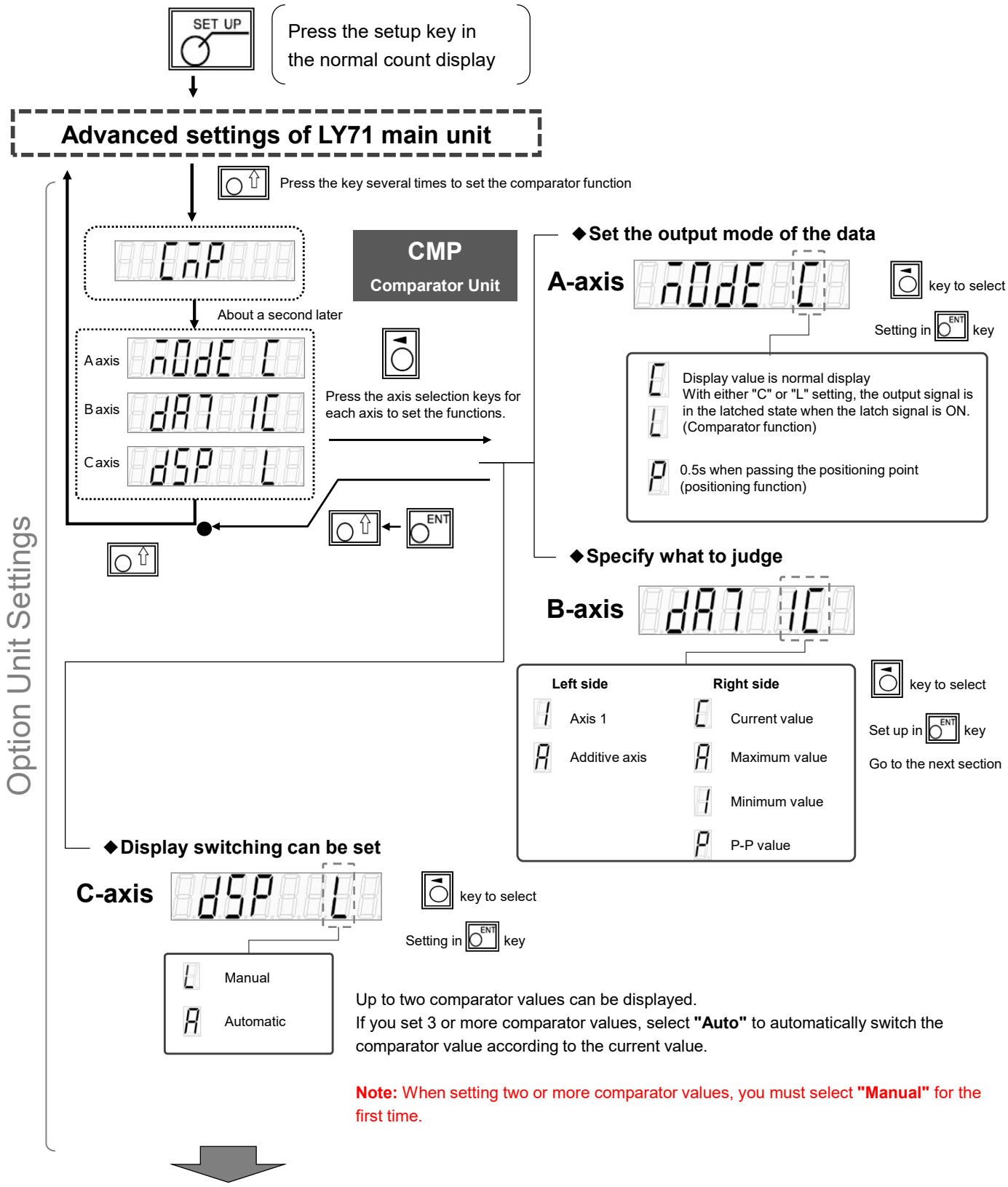
Timing chart



Keep the input signal low for 10ms or more.
Please allow at least 70ms when re-entering.

5. Comparator function settings (in advanced settings)

If you connect the comparator unit LZ71-KR to LY71, you can set the comparator conditions in the LY71 advanced settings.



When the setting is completed, switch to the normal display.

Press RESET key to return to the normal display.

6. Comparator setting operation

The separate setting value can be set up to 4 steps for one set. Up to 16 sets can be set.

Judgment output

Condition	Judgment output
Measured value < Setting value 1	Output 0
Setting value 1 ≤ **Measured value** ≤ Setting value 2	Output 1
Setting value 2 ≤ **Measured value** ≤ Setting value 3	Output 2
Setting value 3 ≤ **Measured value** ≤ Setting value 4	Output 3
Setting value 4 ≤ **Measured value**	Output 4

Combination of comparator setting values

Comparator setting value (Maximum 4 levels)	**X**	16 set

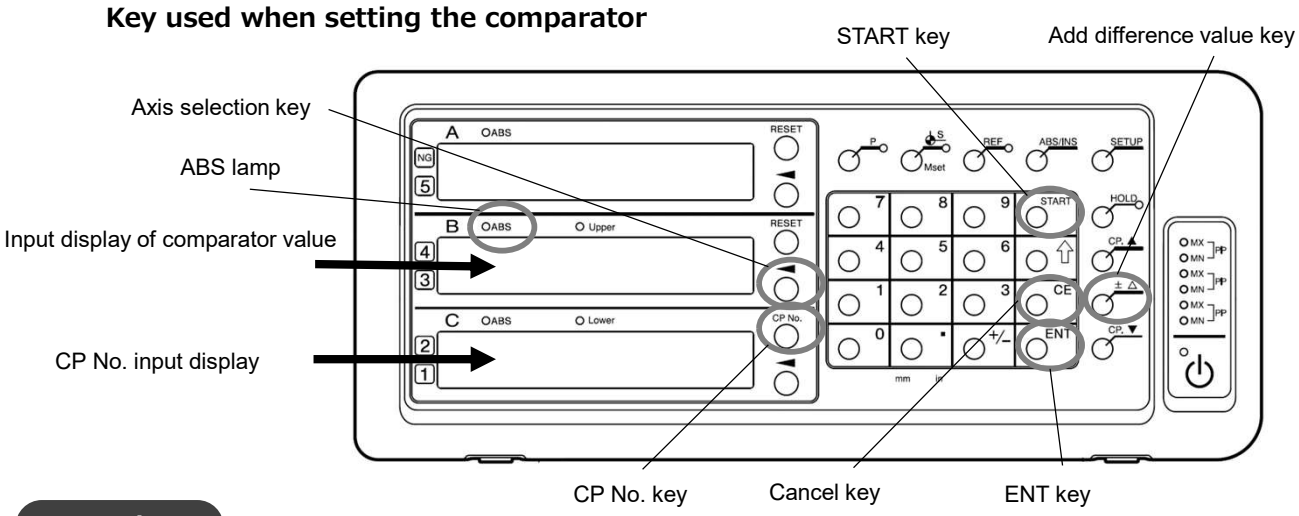
Selection of comparison set number

Signal	Set 00	Set 01	Set 02	Set 03	Set 04	Set 05	Set 06	Set 07	Set 08	Set 09	Set 10	Set 11	Set 12	Set 13	Set 14	Set 15
CMP0	H	L	H	L	H	L	H	L	H	L	H	L	H	L	H	L
CMP1	H	H	L	L	H	H	L	L	H	H	L	L	H	H	L	L
CMP2	H	H	H	H	L	L	L	L	H	H	H	H	L	L	L	L
CMP3	H	H	H	H	H	H	H	H	L	L	L	L	L	L	L	L

* If CMP0 to CMP3 have no signal, set-00 is automatically selected.

H : High L : Low

Key used when setting the comparator

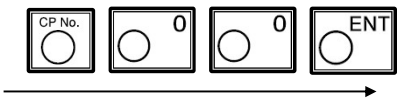


procedure

① Enter the set number of the comparator to be set

CP No. key ➔ Number key ➔ ENT key

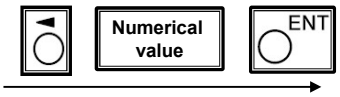
Select Set-00 (example)



② Enter the setting value. <u>If there are two or more values, enter them in ascending order. You cannot enter a number smaller than the number you have already entered.</u> If you want to re-enter, please operate the cancel key or START key (delete).

Operation to directly enter the setting value

Axis selection key ➔ Number key ➔ ENT key



* ABS lamp blinks

Precautions when entering setting values

1: Enter from the smallest setting value

Setting value 1 <Setting value 2 <Setting value 3 <Setting value 4

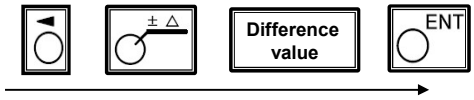
2: If the entered setting value is larger than the later setting value, all the setting values after that are deleted.

3: When setting two or more comparator values, it cannot be set unless **"Manual"** is selected in the comparator function setting of the advanced settings for the first time.

Operation to input the setting value as the difference value

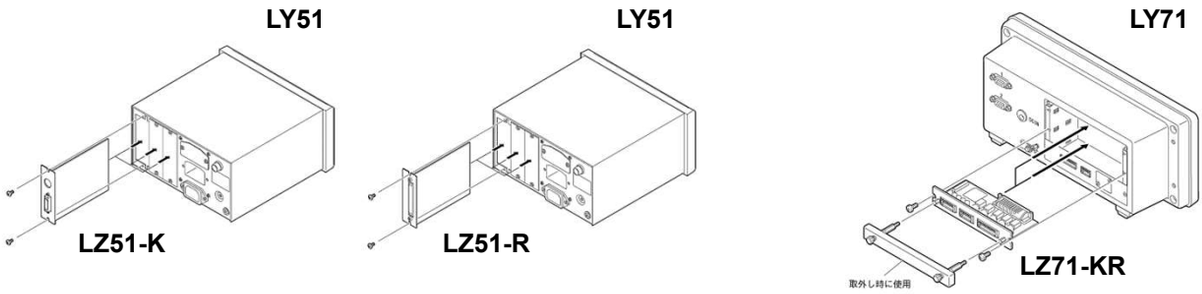
A small setting value has already been entered, and an additional difference value is entered.

Axis selection key ➔ Add difference value key ➔ Difference value ➔ ENT key



* ABS lamp blinks

7. Functional comparison between LZ71-KR and LZ51-K/R(previous model)



Item	LY51		LY71
	LY51-K	LY51-R	LZ71-KR
Comparator target	Current value, maximum value, minimum value, P-P value(For 1st axis or 2nd axis addition value)		
Comparator set selection	Up to 16 sets possible (Button operation or external operation)		
Judgment output	Number of contacts: 5 points Open collector output * Max.300mA / DC24V	Number of contacts: 5 points Relay output *AC100V, DC24V, 0.3A	Number of contacts: 5 points Photocoupler output (Open collector) * Max.15mA / DC12 to 24V Relay output *AC100V, DC24V, 0.3A
Output connector	Open collector output (8pin) Connector used: DIN jack 8P	Relay output (10pin) Connector used: MC1.5/10-STF-3.81(Connector) MC1.5/10-STF-3.81(Terminal part)	Photocoupler output (6pin) Relay output (10pin) Made by Phoenix Contact
External input	Photocoupler input ・Set selection ・Latch ON time 25ms or more Wait time 30ms or more until the next input		Photocoupler input ・Set selection ・Latch ON time 10ms or more Wait time 70ms or more until the next input
External input delay time	With chattering prevention 350us + minimum 10ms (when using 24V) 3ms + minimum 10ms (when using 5V) No chattering prevention 20us + minimum 10ms (when using 24V) 3us + minimum 10ms (when using 5V)		With chattering prevention 350us + minimum 3ms (when using 24V) No chattering prevention 3us + minimum 3ms (when using 24V)
External input connector	20-Pin		7-Pin
External latch	Comparator operation can be selected at the time of external latch input (Latch data or internal count data)		Holds the comparator result when an external latch is input
Positioning function	With function (depending on the initial setting) Output 1 level Set selection: Up to 16 sets		

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