for a greener tomorrow

MITSUBISHI ELECTRIC
Changes for the Better

FACTORY AUTOMATION

Mitsubishi Electric Tension Controller

LE7-40GU-L Tension Controller

LE7-40GU-L
Tension Controller

All-in-one Type Tension Controller

Full automatic control

AUTO

Multilingual display

With touch panel

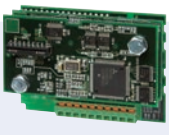
Compact size

Power amplifier output

Compatible with Mitsubishi Electric powder clutches and brakes

Functionality improved with options

Network option
LE7-CCL



Reel diameter calculation option
LE7-DCA

Small and light
Tension
LE7-40GU

Built-in power amplifier

CC-Link V2

CC-Link IE Field Basic

Small, lightweight, all-in-one type tension controller

■ Contains all functions necessary for tension control

Functions necessary for tension control are contained in the small body.
In addition to the control functions, the tension controller has an easy-to-see display and a user-friendly panel.
It has a power amplifier output for powder clutch/brake, and you can easily introduce highly functional tension control.

■ Full of network functions

Comes with Ethernet and RS-485 communication as standard built-in functions and can be connected to an existing FA network. It is applicable to tension control in conjunction with network-compatible driving devices, such as inverters and servo amplifiers.

Comfortable operability with LCD touch panel and dial

■ 3.8" LCD touch panel

A 3.8” high-resolution TFT LCD is used.
You can switch the screen and set values with your finger or a pen.

For large changes, enter the value directly with the numeric keypad. Touch the value to be changed twice, and the numeric keypad will be displayed.
You can operate intuitively.

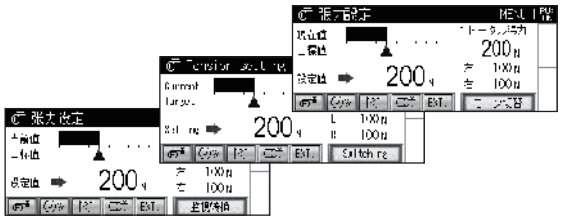
■ Operation with the dial

A flat type dial is used. Since the dial has no protrusions, layout flexibility of the control panel improves.

Screen design for globalization

■ The screen supports three languages as standard

The screen is switchable to Japanese, English and Chinese. Suitable for use in various countries.



■ Easy-to-understand logo design on the panel

Illustrations conforming to international standards are used for the operation buttons.
Operators in any country can operate with the same feeling.

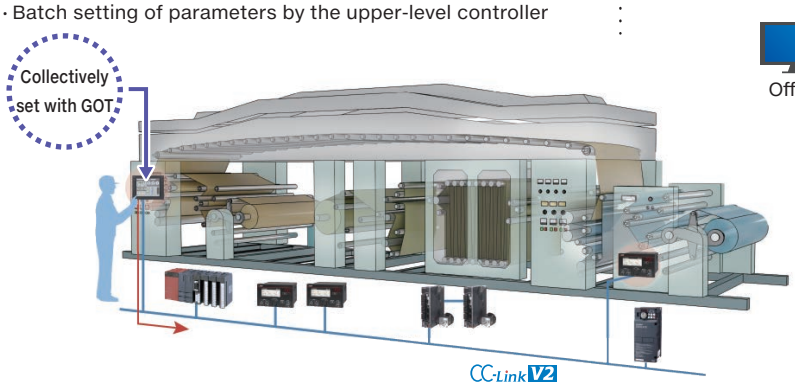
Supports various communications

Provided with Ethernet and RS-485 communication as standard functions

■ Introduce plant visualization also into tension control

The controller can be used on various general-purpose FA networks and can be connected smoothly to the upper-level controller.

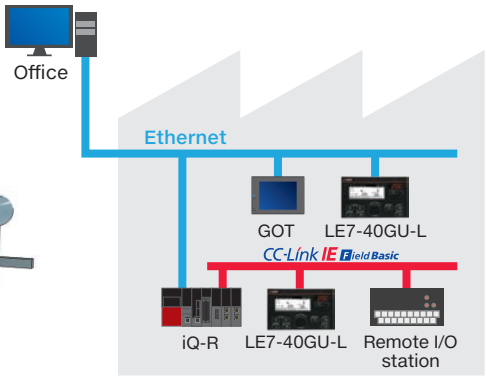
- Real-time monitoring of tension
- Collection of error data
- Batch setting of parameters by the upper-level controller



■ Long-distance transmission from remote locations can be realized

With Ethernet, as general-purpose communication cable can be used without wire processing, connection to an existing network can be established with less wiring work and man-hours.

- Connected to an existing Ethernet network
- Operation and monitoring from remote locations



The setup of large equipment can be changed with a single button. The controller is equipped with built-in Ethernet and RS-485 as standard communication functions and conforms to a wide range of network specifications.

CC-Link IE Field Network Basic

FA network using general-purpose Ethernet. Data is transferred periodically (cyclic transmission) between the master and slave stations.

SLMP

Up to 7 units

Seamless communication from a personal computer can be achieved by using SLMP that is a general-purpose Ethernet-based common protocol.

Simple link between PCs

Communication for automatically transferring data through RS-485.
This method can be used for communication using MELSEC iQ-F/FX Series PLC as an upper-level controller.

MODBUS communication

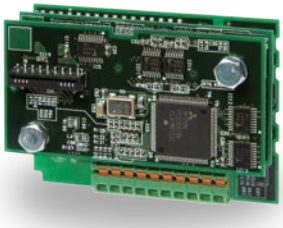
Up to 4 units

Compatible with MODBUS communication (RTU, ASCII, and TCP)
Parameters can be read and written from other manufacturers' PLCs.

Addition of the network option enables connection with CC-Link V2 remote device stations

Option

A network option that can be added to the body is available.
If you have established CC-Link V2 network, you can connect and use the controller immediately.

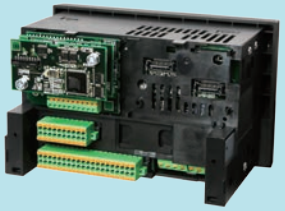


Network option
LE7-CCL

Simple installation

Network option can be connected to the body simply by inserting into the rear.
It can be attached to the body, and additional space is not required.

[Rear of LE7-40GU-L]

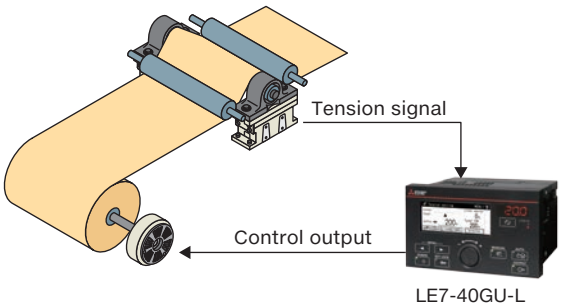


Various control systems are realized with this single controller

Feedback Control

While the material tension is directly monitored with the tension detector, feedback control is performed to match the target tension.

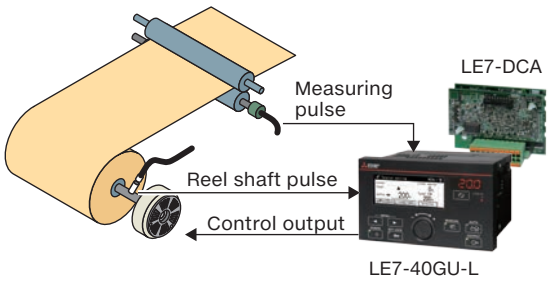
Examples of application · Film processing · Carbon fiber, etc.



Open-Loop Control*1

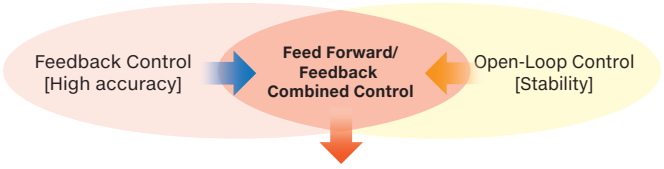
This method keeps the tension constant by controlling the torque according to changes in the reel diameter which are calculated using the signal from the sensor.

Examples of application · Screen printing · Laminator · Coater, etc.



Feed Forward/Feedback Combined Control*1

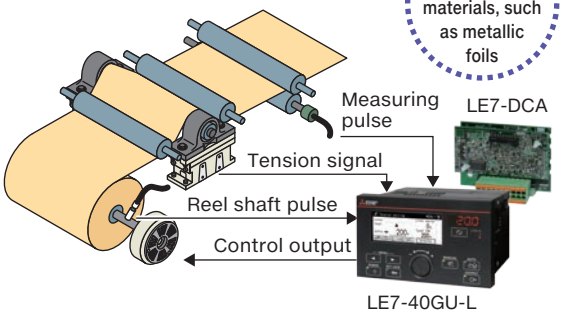
This method combines highly stable open-loop control and high-precision feedback control to implement more advanced tension control.



<High accuracy and stable tension control>

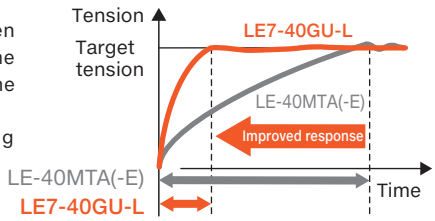
Achievement of high accuracy and stability
Improvement of acceleration/deceleration response by feed forward inertia compensation

Suitable for controlling heavy materials, such as metallic foils



High Control Responsiveness

Thanks to high control responsiveness, the tension is stabilized even during acceleration/deceleration such as starting and stopping the material line. Various functions are standard equipment so that the product can be used more reliably for diverse applications.
Advanced functions can be introduced easily simply by setting parameters without programming.

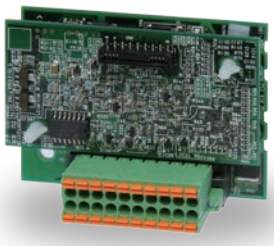


Response time Approx. 1/3*2 or less

The reel diameter calculation option realizes more advanced control

Option

The reel diameter calculation option realizes advanced tension control, such as reel diameter detection, polygonal line taper tension control and constant slip control.
The taper tension control is intended to reduce the control tension as the reel diameter of rewound material increases to keep the intrinsic stress of the material constant.



Reel diameter calculation option
LE7-DCA

List of functions of LE7-DCA

- Constant slip control
- Stall/new reel preset automatic calculation
- Automatic calculation of inertia compensation
- Polygonal line taper tension control
- Reel diameter/length measurement timing detection
- Peripheral speed synchronization signal
- Pre-drive output
- Feed forward/feedback combined control

etc.

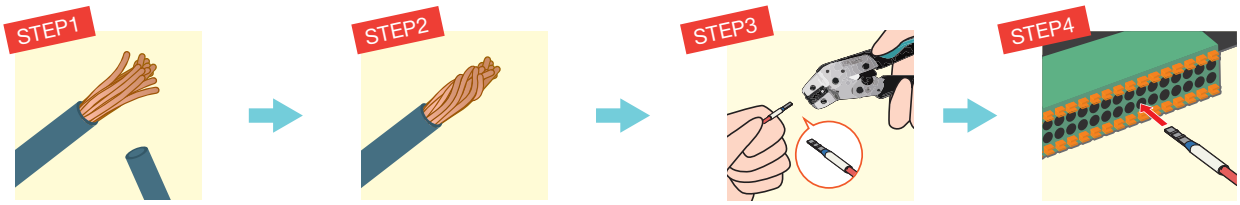
*1 The reel diameter calculation option, LE7-DCA, is required.

*2 This is the result of measuring the response time from tension = 0 to full scale tension with the tension controller initial setting value. (Compared LE-40MTA(-E))

Excellent wiring ability

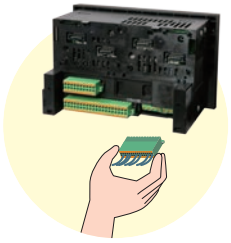
Use of spring clamp terminal blocks

Spring clamp terminal blocks are used to reduce the wiring man-hours.
The use of the terminal blocks is effective in reducing the man-hours for retightening and maintenance.



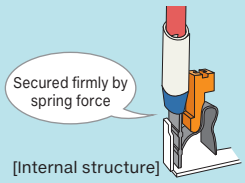
Stripping　Twisted wire　Crimping of rod terminal　Insertion of wire

Quick wiring simply by inserting the removable terminal block. When the controller breaks down, it can be replaced quickly with reduced man-hours because the existing terminal blocks can be used.



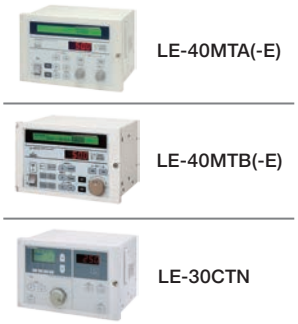
Improved vibration resistance and maintainability !

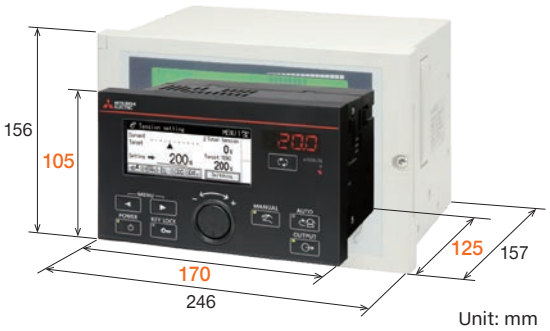
The wire conductor is secured with the force of the spring in the terminal block.
The conductor is secured with a constant force, so that the disconnection of the wire due to vibration can be prevented.
Retightening and maintenance are unnecessary even during long-term use.



Replacement of a conventional model

Smaller size than conventional models





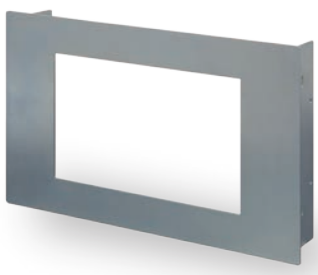
LE7-40GU-L

- Area occupied on the panel — Approx.53% reduction
- Product cubic volumel — Approx.63% reduction
- Product mass — Approx.71% reduction

No changes in panel cutting size are required

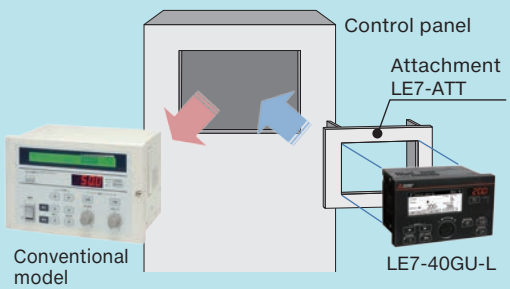
Option

Some replacement attachments are available. The controller can be replaced without changing the panel cutting size.
The replacement manual is available. (→Transition from LE-40MT Series, LE-30CTN(A) to LE7-40GU-L Handbook)



Attachment
LE7-ATT

Image of replacement



Option

LE7-DCA reel diameter calculation option

■ Basic specifications

Item		Specifications
External dimensions		50(H) × 68(W) × 35(D) mm
Weight		Approx. 0.2 kg
Power supply	Input	No input (supplied from LE7-40GU-L)
	Output	12 V DC for encoder
		12 V DC for proximity switch
Input	Reel shaft pulse input	Input for reel shaft pulse sensor, 2 points
	Measuring pulse input	Input for measuring pulse sensor
	Contact input*	Reverse rotation/forward rotation, reel diameter reset, measurement length/residual length reset, memory hold, 5 points for pre-drive
Output	Contact output*	Timing detection, 3 points For reel diameter, measurement length/remaining length, switchable
		Peripheral speed synchronization

* LE7-40GU-L input/output signals are used for the contact input and contact output. Refer to the following manual for the input/output specifications.
→LE7-40GU-L APPLICATION MANUAL (SH-170022ENG)

■ External specifications

Item	Specifications
Target line velocity	V = 0.1 to 1,000 m/min
Acceleration	a = V/t = 1 to 50 m/min/sec t = acceleration/deceleration time
Reel diameter	D = 0 to 2,000 mmϕ
Material thickness	T = 0.1 µm to 10 mm
Measurement length/ remaining length	0 to 65,000 m
Reel shaft rotational speed	N = 0 to 3,600 r/min
Measuring pulse frequency	1.5 Hz to 30 kHz
Reel shaft pulse frequency	0 to 200 Hz

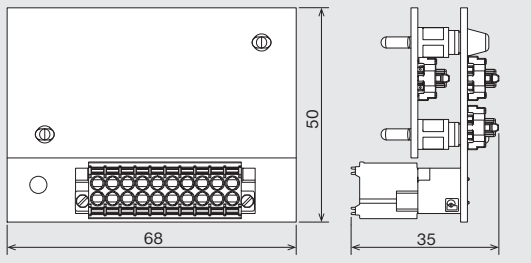
■ Terminal layout

NC	NC	0V	0V	SPRA	12V	SLD	SLD	SPL	12V
NC	NC	0V	0V	SPS/S	12V	⏚	SLD	SPRB	12V

Terminal names	Description
12V	Power terminal for sensor, for pulse input
0V	0 V terminal
SPL	Measure pulse input terminal
SPRA	Reel shaft pulse input (A-axis) terminal
SPRB	Reel shaft pulse input (B-axis) terminal
SPS/S	Pulse input sink/source switching terminal
SLD	Shield connection terminal
⏚	Ground terminal
NC	Not used (Do not wire.)

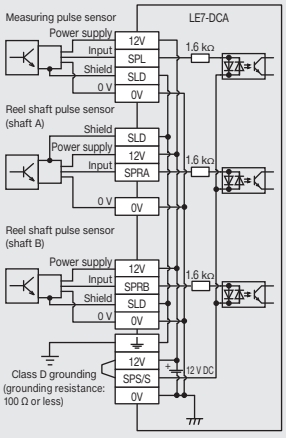
■ External dimension diagram

Unit: mm

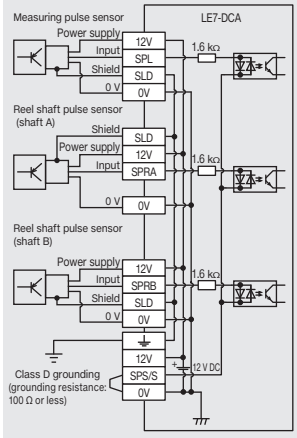


■ Wiring drawing

• Sink input wire



• Source input wire



LE7-CCL network option

■ Basic specifications

Item	Specifications
External dimensions	50(H) × 68(W) × 38(D) mm
Weight	Approx. 0.2 kg
Power supply | Input	No input (supplied from LE7-40GU-L)
Communication	CC-Link Ver. 1.10/Ver. 2.00 remote device station

■ Communication specifications

Item	Specifications
CC-Link supported version	Ver. 2.00 (Ver. 1.10 also supported)*
Station type	Remote device station
Station No.	1 to 64
Transmission speed	156 Kbps/625 Kbps/2.5 Mbps/5 Mbps/10 Mbps
Transmission distance	According to the CC-Link specifications. For details, refer to the manual of the master station.
Number of occupied stations	2 or 4
Setting items	Station number, transmission speed, number of occupied stations, and version setting
Transmission topology	Bus (RS-485)
Transmission format	HDLC compliant
Transmission cable	Cables dedicated to CC-Link (Ver. 1.10 compatible)

* When 1 is selected in the version setting, the product runs with CC-Link Ver. 1.10.
When 2 is selected in the version setting, the product runs with CC-Link Ver. 2.00.

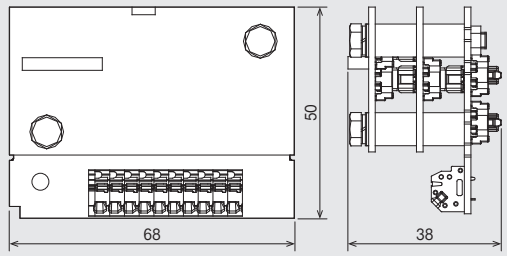
■ Terminal layout

⏚	SLD	SLD	NC	DG	DB	DA	DG	DB	DA

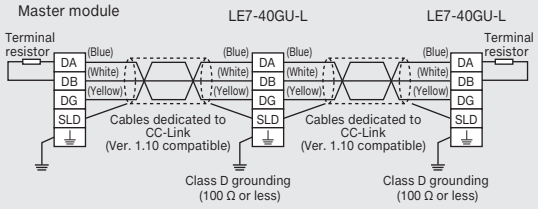
Terminal names	Description
DA	Communication signal
DB	
DG	Communication ground common
SLD	For shield connection
⏚	Ground terminal
NC	Not used (Do not wire.)

■ External dimension diagram

Unit: mm

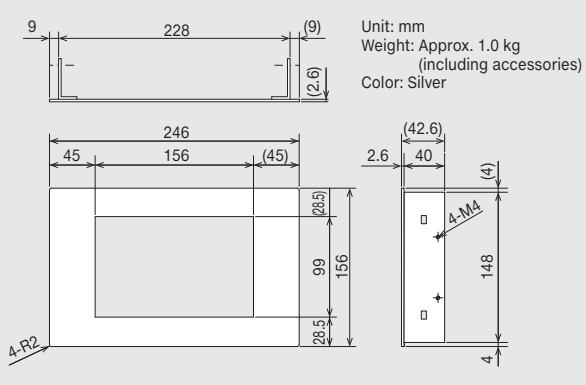


■ Wiring diagram



LE7-ATT attachment

■ External dimension diagram



Mitsubishi Electric Tension Controller

LE7-40GU-L Tension Controller

■ Basic specifications

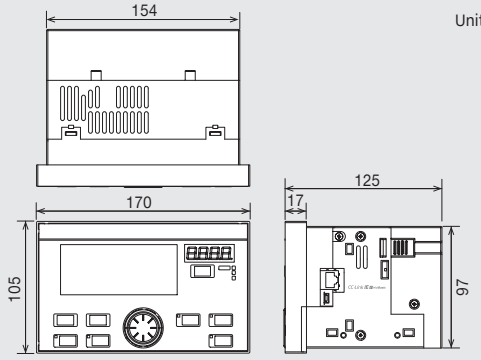
Item		Specifications
External dimensions		105(H) × 170(W) × 125(D) mm
Weight		Approx. 1.0 kg
Installation method		Panel mounting, floor mounting
Terminal block		Spring clamp 24 to 16 AWG (0.2 to 1.5 mm²)
Power supply	Input	100 to 240 V AC
	Output	For tension detector and potentiometer: 5 V DC Contact input: 24 V DC
Display	LCD	320 × 128 dots TFT monochrome Touch panel
	7-segment LED (for monitor)	4 digits (1 set)
Contact signal		General-purpose input: 6 points (sink/source selectable) General-purpose output: 2 points (sink output)
Analog signal		General-purpose input: 3 points, General-purpose output: 2 points
Tension detector input		For LX type tension detector or for strain gauge (range switching)
Control output	Output for 24 V DC clutch/brake	0 to 24 V DC, 2.7 A for control, constant voltage/constant current control selectable
		For pre-drive/old reel stop. Total 0 to 24 V DC control is 2.7 A or less
	Voltage output for servo amplifier and inverter	±2.7 V DC, ±5 V DC, ±8 V DC, ±10 V DC, selectable
		For pre-drive/old reel stop. ±2.7 V DC, ±5 V DC, ±8 V DC, ±10 V DC, selectable
	Current output for electropneumatic regulator	0 to 20 mA DC, 4 to 20 mA DC, selectable
Optional components	Extension option	LE7-DCA type reel diameter calculation option and LE7-CCL type network option
	External memory cassette	LD-8EEPROM type EEPROM cassette
Regulations and official standards (applicable standards)		Compliant with EU RoHS Directive

■ General specifications (common to LE7-40GU-L, LE7-DCA, and LE7-CCL)

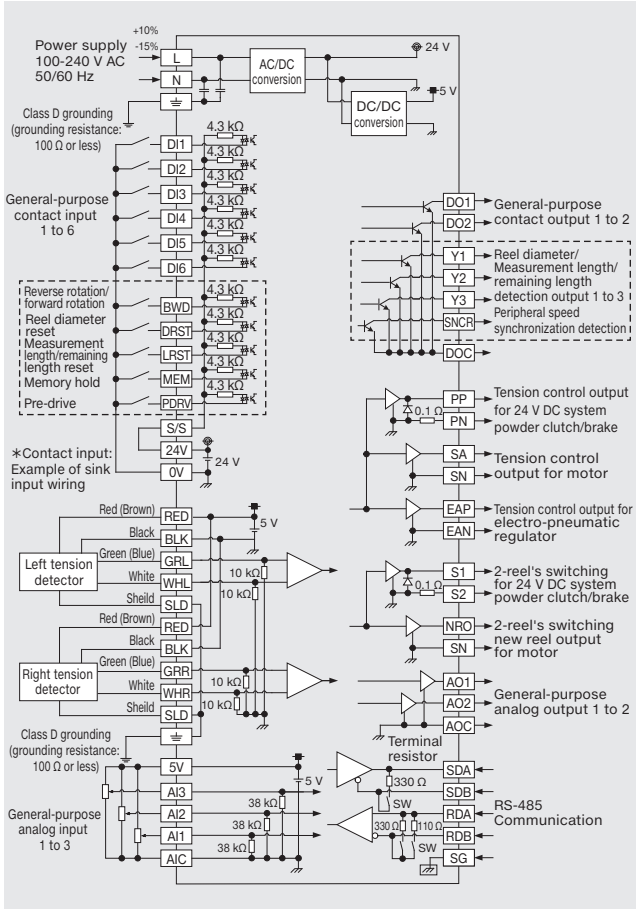
Item	Specifications				
Operating ambient temperature/ humidity	Temperature: 0 to +40°C Humidity: 35 to 85%RH (non condensing)				
Storage ambient temperature/ humidity	Temperature: -20 to +60°C Humidity: 35 to 85%RH (non condensing)				
Vibration resistance*1		Frequency	Acceleration	Half amplitude	10 times in each of X, and Z directions (80 minutes in total)
	Panel mounting	5 to 8.4 Hz	-	1.75 mm	
		8.4 to 150 Hz	4.9 m/s²	-	
	Floor mounting	5 to 8.4 Hz	-	3.50 mm	
		8.4 to 150 Hz	9.8 m/s²	-	
Impact resistance*1	147 m/s², action time 11 ms				
Noise tolerance	Noise voltage: 1000 Vp-p, Noise width: 1 µs				
Withstand voltage*2	1500 V AC for 1 minute				
Insulation resistance*2	5 MΩ or more using 500 V DC insulation resistance tester				
Grounding	Class D grounding (100 Ω or less, common grounding with strong power field not possible)				
Operating atmosphere	Free of corrosive, flammable or conductive gases, and low levels of dust				

*1 Evaluation criteria are based on IEC 61131-2. *2 SLD terminal is excluded.

■ External dimension diagram



■ Wiring diagram



■ Terminal layout

• Powder clutch/brake output signal terminal block (CN2)

S2	S1	PN	PP

• Power terminal block (CN1)

⏚	NC	N	L

• Signal terminal block 1 (CN3) (right half)

AO2	AO1	AI2	5V	SLD	SLD	WHL	GRL	BLK	RED
AOC	AIC	AI3	AI1	⏚	SLD	WHR	GRR	BLK	RED

• Signal terminal block 1 (CN3) (left half)

0V	S/S	24V	DI6	DI5	DI4	DI3	DI2	DI1	NC
DOC	DO2	DO1	NC	SN	NRO	SN	SA	EAN	EAP

• Signal terminal block 2 (CN4)

SG	RDA	SDA	NC	NC	NC	SNCR	Y3	Y2	Y1
RDB	SDB	NC	NC	NC	PDRV	MEM	LRST	DRST	BWD

*** : Input system terminal *** : Output system terminal

⚠ Safety Warning

To ensure proper use of the products in this document, please be sure to read the instruction manual prior to use.

Registration

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