

# Speed controller

Unit type



- ▼ Quick-connect speed controller
- ▼ Industry's first digital speed controller
- Digital control, digital display
- Quick conversion of gear head speed and conveyor speed
- Soft-start, soft-down
- Set locking function

### • Features

#### <UX series>

- Provided with quick-connect socket
- Can be extended up to 5 m through extension cable (option)
- The CPU enables the following various functions:
  1. Digital setting of revolving speeds
  2. Instantaneous conversion of gear head speed and conveyor speed
  3. Digital display of actual speed
  4. Soft-start, soft-down
  5. Backup of setting conditions
  6. Set locking

#### <US series>

- Provided with quick-connect socket
- Can be extended up to 5 m through extension cable (option)

### • Part No.

Capacity	Voltage	UX series	US series
6 W	100 V	DVUX606L	DVUS606L
	200 V	DVUX606Y	DVUS606Y
15 W	100 V	DVUX715L	DVUS715L
	200 V	DVUX715Y	DVUS715Y
25 W	100 V	DVUX825L	DVUS825L
	200 V	DVUX825Y	DVUS825Y
40 W	100 V	DVUX940L	DVUS940L
	200 V	DVUX940Y	DVUS940Y
60 W	100 V	DVUX960L	DVUS960L
	200 V	DVUX960Y	DVUS960Y
90 W	100 V	DVUX990L	DVUS990L
	200 V	DVUX990Y	DVUS990Y

### • Specification

	UX series	US series
<b>Output</b>	6 W : 15 W : 25 W : 40 W : 60 W : 90 W	6 W : 15 W : 25 W : 40 W : 60 W : 90 W
<b>Rated voltage</b>	single-phase 100 VAC / single-phase 200 VAC	single-phase 100 VAC / single-phase 200 VAC
<b>Power frequency</b>	50 Hz / 60 Hz	50 Hz / 60 Hz
<b>Speed control range</b>	90 to 1400 min <sup>-1</sup> / 90 to 1700 min <sup>-1</sup>	90 to 1400 min <sup>-1</sup> / 90 to 1700 min <sup>-1</sup>
<b>Speed variation</b>	5% (standard value)	5% (standard value)
<b>Speed setting</b>	Digital	Analog
<b>Operating temperature</b>	0 to 40°C	-10 to 40°C
<b>Storage temperature</b>	-10 to 60°C	-20 to 60°C
<b>Soft-start/soft-down time</b>	0.1 to 30 sec	—

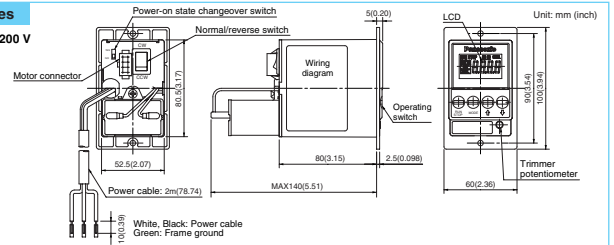
• 90 W version is provided with thermal burn-out protector.

\* Please read your User's manual carefully so that you will understand the operation and safety precautions before attempting to operate the system.

### • Outline drawing

#### UX series

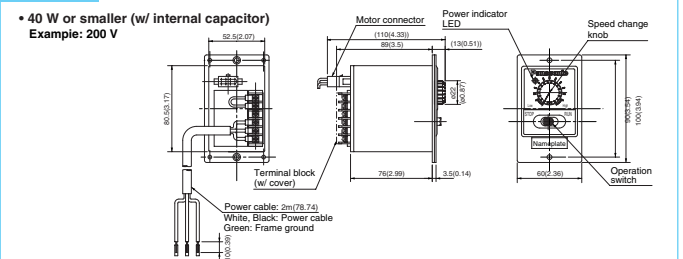
Example: 200 V



#### US series

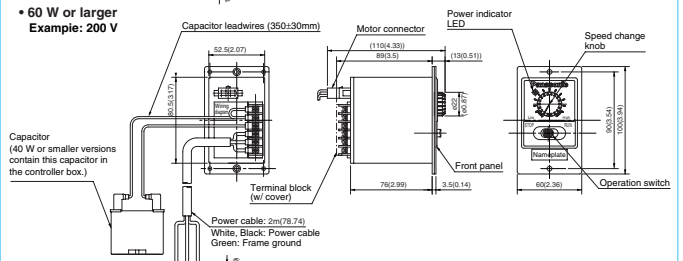
• 40 W or smaller (w/ internal capacitor)

Example: 200 V

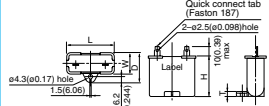


• 60 W or larger

Example: 200 V



#### Capacitor



Designation	Capacitor part No.	Unit: upper (mm) / lower (inch)			
		L	W	D	H T
MUSN960GL 100 V	M0PC20M20	50.2 (1.98)	26.7 (1.05)	37 (1.46)	36 (1.42) 4 (0.16)
MUSN960GY 200 V	M0PC5M40	50 (1.97)	30.5 (1.20)	41 (1.61)	41.5 (1.63) 4 (0.16)
MUSN990GL 100 V	M0PC25M20	50.2 (1.98)	31 (1.22)	41 (1.61)	42 (1.65) 4 (0.16)
MUSN990GY 200 V	M0PC6.2M37	50 (1.97)	30.5 (1.20)	41 (1.61)	41.5 (1.65) 4 (0.16)

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## Names and functions

**UX series**

**Example: 200 V**

- Stop Select from RUN/STOP
- Run Select from RUN/STOP
- Indication magnification (Select from **MODE** key)
- Revolution speed (Select from **MODE** key)
- Revolution speed (Select from **MODE** key)
- RUN/STOP** key
- MODE** key
- ▲** key Increases the set value.
- ADJ control Use this trimmer potentiometer if discrepancy is found between the preset and the actual rotation speeds.
- Power-on state changeover switch

Factory setting: 1.000, 90, NO, CW

Indicates that the soft-start time is being set or soft-start process is activated. (To enter SS mode, press and hold **MODE** key for at least 1 second.)

Indicates that the soft-down time is being set or soft-down process is activated. (Press the **MODE** key while in SS mode.)

Set lock indication (To enter the set lock mode, simultaneously press **MODE**, **▲** and **▼** keys.)

Settings/revolving speed

Power-on state setting (In the SET mode, set the revolving speed to the max. and then press and hold **▲** key for 5 seconds or more. "YES" or "NO" is displayed.)

Unit of revolving speed (Displayed when **RATIO** is set to 1 or more.)

Indicates that the reading is motor revolving speed. (Active only when **RATIO** is set to 1 or more.)

**▼** key Decreases the set value.

Motor connector

Normal/reverse switch

Capacitor for motor

**<CAUTION>**

- When using a gear head, check the direction of rotation of its output shaft. The direction is not common to all models.
- The fan of a fan-cooled motor starts to run as the controller is turned on.

White, Black: Power cable  
Green: Frame ground

**US series**

- Power indicator
- RUN/STOP** switch
- ADJ With the speed setting knob turned fully clockwise, adjust the trimpot (normally covered with the front panel) for the revolutions shown below:  
50 Hz: 1400 min<sup>-1</sup>  
60 Hz: 1700 min<sup>-1</sup>
- Speed setting knob
- Front panel (removable)

**Wiring diagram**

Circuit breaker (NFB)  
: 5A

**<Caution>**  
Install a ground-fault circuit interrupter in the power supply.

Power supply

Power switch

Controller

Extension cord

Motor

Capacitor cap

Capacitor (supplied with the motor)

Ground the return circuit to the earth terminal. (100 Ω or smaller, ø1.6 mm or more). Tightening torque: 1.0 to 1.5 N·m

**<Recommended circuit breakers>**  
Sanki Airpar Co., Ltd  
Type single-phase: IELH-1-11-63-5A-M  
Rated current 5 A, current breaking characteristic DELAY63  
Recommended current breaking characteristic DELAY61-6  
East Japan: 0462-83-7575  
West Japan: 06-6312-8716

**<National specifications: Option>**  
Specifications compliant with overseas standards: Attachment of a capacitor cap is optional. The models with a model number to which "A" is suffixed (not equipped with a capacitor cap) are not sold or available in Japan.

For connection to the capacitor, see the motor instruction manual.

\* Please read your User's manual carefully so that you will understand the operation and safety precautions before attempting to operate the system.

## Modes of operation (UX series)

**▶ RATIO mode**

By setting the speed in unit of motor revolving speed multiplied by the factor or by displaying the actual speed, gear head output shaft speed or belt conveyor travel speed can be converted. The **RATIO** mode is used to set the factor. Selection of indication magnification can be made from **▲** and **▼** keys.

The reduction ratios of Panasonic gear head are stored in the unit, choose the suitable one by using **▲** and **▼** keys:  
1.000 → 3 → ... 100 → 202 → ... 1000 → ... 2020

Multiple number setting value (to display the settings in terms of the speed of belt conveyor)  
<"SET" or "REAL" reading = motor revolving speed multiplied by multiplication factor>

Reduction gear ratio setting value (to display the settings in terms of gear head output shaft speed)  
<"SET" or "REAL" reading = motor revolving speed divided by gear reduction settings>

Multiplication can be set by the factor of 0.005 to 0.995: select the desired one from **▲** and **▼** keys.  
1.000 → 0.995 → ... → 0.015 → 0.010 → 0.005 (in unit of 0.005)

**▶ SET mode**

In this mode, the revolving speed can be set to a value within the range shown below, by using **▲** and **▼** keys. [With reading magnification 1.000]  
Value can be set in unit of 10 min<sup>-1</sup>.

**<Example>**

- Power frequency 50 Hz : 90 → 100 → 110 → ... → 1400 min<sup>-1</sup>
- Power frequency 60 Hz : 90 → 100 → 110 → ... → 1400 ... 1700 min<sup>-1</sup>

[With reading magnification other than 1.000]  
Readings are based on the reading magnification setting in **RATIO** mode and gear reduction ratio setting. Desired value can be selected among the values shown below, by using **▲** and **▼** keys.

**<Example>** Reduction gear ratio = 3  
Selection unit is 10/3 min<sup>-1</sup>. The reading rounds off fraction.  
• Power frequency 50 Hz : 29.9 → 33.3 → 36.6 → ... → 466.6 min<sup>-1</sup>  
• Power frequency 60 Hz : 29.9 → 33.3 → 36.6 → ... → 466.6 → ... → 566.6 min<sup>-1</sup>

**<Example>** Magnification = 0.500  
Selection unit is 10 x 0.500. The reading rounds off fraction.  
• Power frequency 50 Hz : 45.0 → 50.0 → 55.0 → ... → 700.0  
• Power frequency 60 Hz : 45.0 → 50.0 → 55.0 → ... → 700.0 ... 850.0

**[Note]** Exception: reading magnification 1.000  
"MOTOR SPEED r/min" is displayed.  
Only "r/min" is displayed when the value exceeds 1.000. Otherwise, nothing is displayed.

**▶ REAL mode**

In the **REAL** mode, motor's real revolutions multiplied by the reading magnification is displayed. [Reading magnification 1.000]  
The speed is displayed in unit of 5 min<sup>-1</sup>.

**<Example>**  
0 → 5 → ... → 90 → 100 → 110 → ... → 1400 → ... → 1700 min<sup>-1</sup>  
[With reading magnification other than 1.000]  
Readings are based on the reading magnification setting in **RATIO** mode and gear reduction ratio setting.

**<Example>** Reduction gear ratio = 3  
Selection unit is 5/3 min<sup>-1</sup>. The reading rounds off fraction.  
0 → 1.6 → ... → 29.9 → 33.3 → 36.6 → ... → 466.6 → ... → 566.6 min<sup>-1</sup>

**<Example>** Magnification = 0.500  
Selection unit is 10 x 0.500. The reading rounds off fraction.  
0 → 2.5 → ... → 45.0 → 50.0 → 55.0 → ... → 700.0 → ... → 850.0

**[Note]** Exception: reading magnification 1.000  
"MOTOR SPEED r/min" is displayed.  
Only "r/min" is displayed when the value exceeds 1.000. Otherwise, nothing is displayed.

**▶ RATIO mode**

The soft-start time is set in this mode from **▲** and **▼** keys in unit of 0.1 sec, up to 30 sec.  
0 → 0.1 → 0.2 → 0.3 → 0.4 → ... → 29.9 30.0 sec

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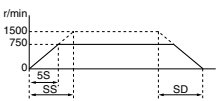
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## SD setting mode

The soft-down time is set in this mode from **[ ]** and **[ ]** keys in unit of 0.1 sec, up to 30 sec.

**Note 1)** Soft-start/down



The soft-start/down time is defined as the time required to change revolving speed between 0 min<sup>-1</sup> and 1500 min<sup>-1</sup>.

**<Example>**

When the soft-start time is set to 10 seconds and "SET" revolving speed is 750 min<sup>-1</sup>, then,

$$10 \times \frac{750 \text{ min}^{-1}}{1500 \text{ min}^{-1}} = 5$$

This means that 5 seconds are required to change from 0 min<sup>-1</sup> to 750 min<sup>-1</sup>. The same applies to "SD".

**Note 2)**

In the practical application, speed change time will be longer than the set soft-start/down time if the load inertia is large.

## Power-on state setting

The state of the unit upon power-up can be preset from the power-on state setting switch.

(1) "YES"

Upon power-on, the unit reproduces the state as it was turned off.

(2) "NO"

Upon power-on, the unit is in stop mode regardless of the state at the previous power off. To restart, operate RUN-STOP key.

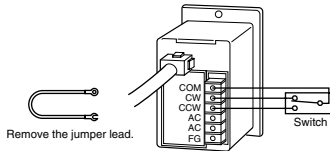
Previous state	Upon power-on
"RUN"	→ Startup (after approx. 1 sec)
"STOP"	→ Stop

Previous state	Upon power-on
"RUN"	→ Stop
"STOP"	→ Stop

## Operating method (US series)

1. Connect the "motor connector".
2. Make sure that the **[RUN/STOP]** switch is in "STOP" position. Connect the power cable to the AC source.
3. Turn on power. "Power" indicator will light.
4. Place the **[RUN/STOP]** switch in "RUN" position, and the motor starts.  
**CAUTION:** Do not place the switch lever in between RUN and STOP.
5. To stop the motor, move the lever to "STOP" position.  
Note that the **[RUN/STOP]** switch does not turn on/off power supply: when not using the motor for a long period, turn off the main power switch.
6. The electric fan, if used with the motor, rotates as the power to the speed controller is turned on and stops as the controller power source is turned off.

## Changing direction of rotation (US series)



### Switch specification

- Single-pole double-throw: ON-OFF-ON
- 100 V power: 5 A at 200 VAC or more
- 200 V power: 3 A at 400 VAC or more

### Direction when viewed from motor output shaft end

Clockwise	Connect COM to CW
Counterclockwise	Connect COM to CCW

### Unidirectional rotation

Terminal "CW" or "CCW" on the controller rear panel should be left open.

**[Note]**

When a gear head is connected, the direction of its output shaft may or may not be the same as that of motor shaft depending on the reduction ratio.

### Normal/reverse rotation

When it is necessary to select the rotating direction, connect the switch as shown in the figure.

**[Note]**

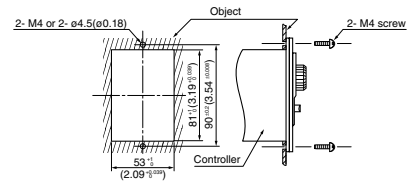
Do not operate this switch while the motor is running.

## Mounting method (UX series, US series)

### <Mounting through square holes>

#### UX series, US series

Unit: mm (inch)



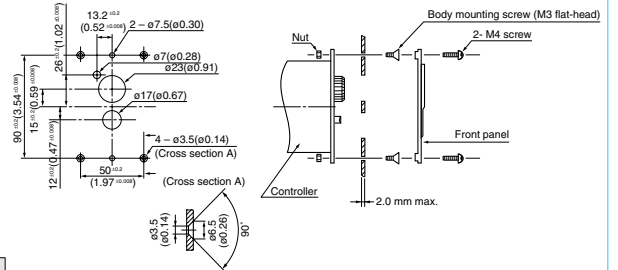
### Mounting procedure

1. Drill 2 square holes in the object.
2. Secure the controller and front panel with 2 M4 screws.

### <Mounting without using square hole>

#### US series only

Unit: mm (inch)



### Caution

Wall thickness of the equipment where the controller is to be mounted should be 2 mm or less.

### Mounting procedure

1. Drill 2 square holes in the wall of the object.
2. Remove the front panel from the controller.
3. Secure the controller body with M3 flat-head screws and nuts.
4. Place the front panel on the wall and secure the panel with M4 screws and nuts.

### <To install controller and motor separately>

When installing the speed controller at a distance more than 1 m from the motor, use optional "extension cord" that is supplied as standard accessory (allowable distance 5 m). Refer to page D-4 (Option).

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