Controllers for Stepping Motors

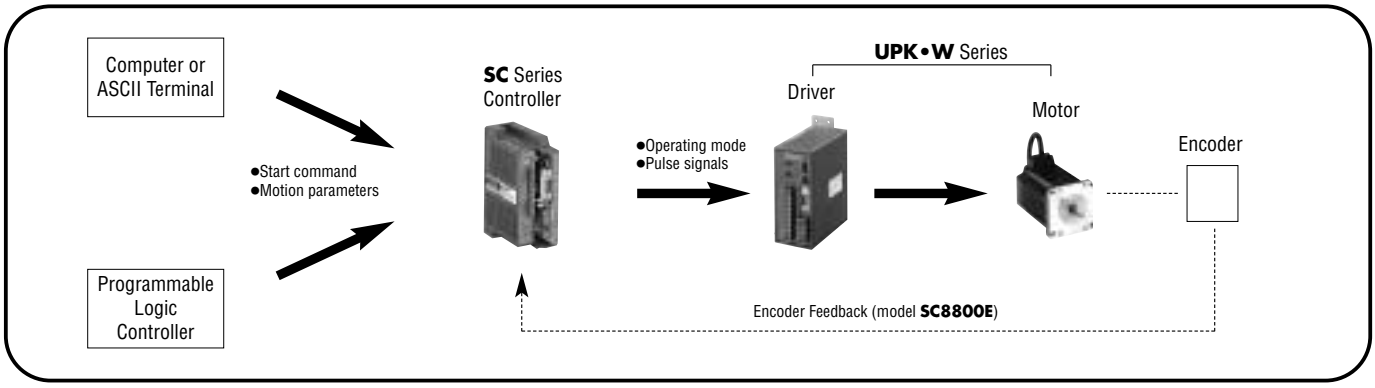
The SC Series
The SG Series

■ THE OPTIMAL CONTROLLER FOR STEPPING MOTORS

The **SC** and **SG** series of stepping motor controllers optimize the functions of the **UPK•W**, **UPK**, **NanoStep**, **UFK•W**, **PMU**, **NanoStep**, **RFK**, **PMC**, **UMK** and **CSK** series stepping motors and drivers.

SC Series

The basic configuration of a stepping motor system that uses the **SC** series controller is illustrated in the figure below.



■ FEATURES

1. Easy-To-Use

- The instruction set software is built into the controller. No need for set-up diskettes.
- Can operate stand-alone so that the unit can be programmed before installation into the machine.

2. Programming Options

- Can be controlled or programmed directly from a computer or ASCII terminal via a standard RS-232C interface.
- Can be controlled by industry standard programmable logic controllers so it can run off any already existing PLC.

3. Feedback Capabilities

Available with an optional encoder input for position verification (model **SC8800E**).

4. Daisy-Chain Capabilities

Up to 35 different axes can be controlled from one computer or ASCII terminal by daisy-chaining up to 35 **SC8800** or **SC8800E** indexers together.

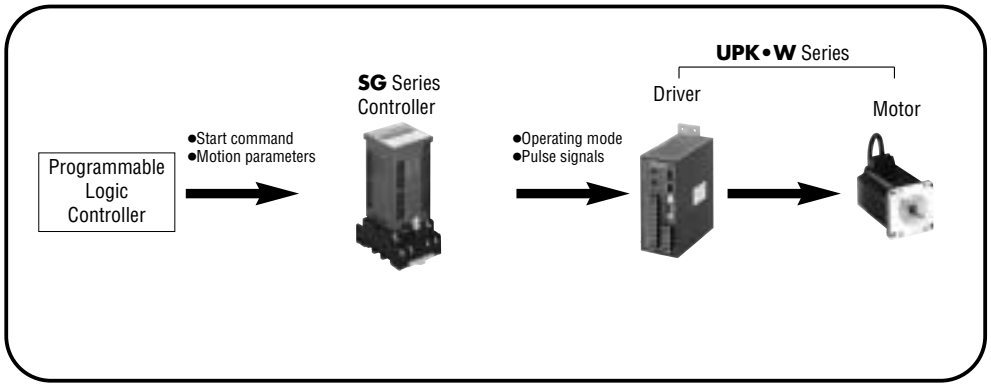
RS-232C Compatible Stepping Motor Controller

SC8800/SC8800E Page B-260

The **SC8800E** is provided with encoder feedback capability.

SG Series

The basic configuration of a stepping motor and **SG** series controller is illustrated in the figure below.



■ FEATURES

1.Direct connection to a PLC

The external controller signal system can be directly connected to a programmable logic controller. Photocoupler isolation is used in the signal I/O circuit for complete electrical isolation between the programmable logic controller and the driver and to make the signal transfer very resistant to noise.

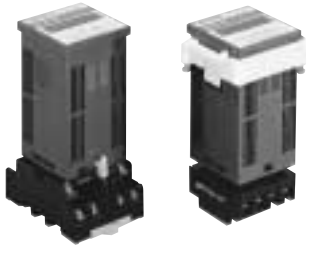
2.Data can be set easily from the front panel

Data is simple to set by using key pads while viewing the settings on the LED. You can start setting data and operating the unit the day you receive it.

Compact & Simple Controller

SG8030J page B-264

An ultra-compact controller that packs functions into a 1.89 in. (48mm) sq. package.



■ DIN Rail-Mount Model
SG8030J-D

■ Panel-Mount Model
SG8030J-U

RS232-C COMPATIBLE CONTROLLER

SC8800
SC8800E

RS-232C Compatible Step Motor Controller

The **SC8800** and **SC8800E** controllers can be programmed from a computer or ASCII terminal via a standard RS-232C port.

FEATURES

Easy-to-Use

- The instruction set software is built into the controller. No need for set-up diskettes.
- Can operate stand-alone so the unit can be programmed before installation into the machine.
- Easy to learn instruction set. Allows for complete system operation.
- End-of-travel and home position can be easily determined by the three dedicated limit switch inputs.
- Operates on 10 to 28 VDC so the unit can be powered by a standard power supply.

Programming Options

- Can be controlled or programmed directly from a computer or ASCII terminal via a standard RS-232C port.
- Can be controlled by industry-standard programmable logic controllers so it can run off any already existing PLC.
- Linear, S-curve and parabolic acceleration/deceleration profiles are available.

Flexible I/O

- There are four programmable inputs and two programmable outputs to give the controller the ability to control other functions within the machine. All inputs and outputs are optically isolated.
- Step and direction signal outputs are industry standard TTL level signals in either 1-pulse or 2-pulse modes so the **SC8800** and the **SC8800E** can be used with any industry-standard stepping motor and driver package.
- All I/O can be driven by an external DC power suppiy of 5 to 24 VDC.

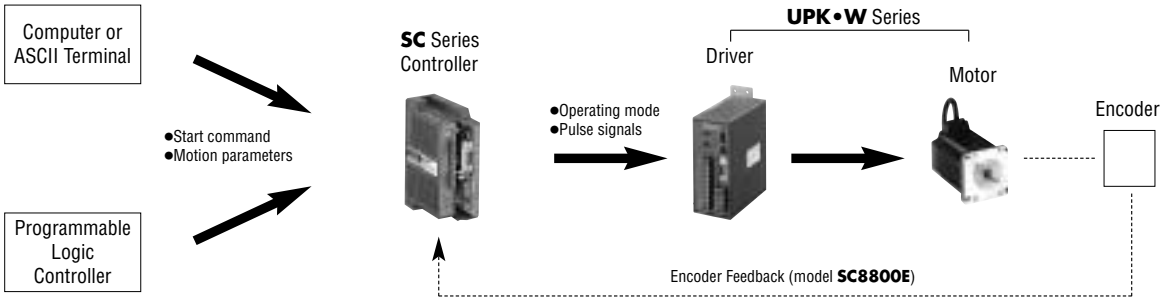
Encoder Feedback Capabilities (Model SC8800E)

- Nearly every known feedback device can be recognized since the indexer can use two or three channels in either single-ended or differential modes.

Daisy-Chain Capabilities

- Up to 35 different axes can be controlled from one computer or ASCII terminal by daisy-chaining up to 35 **SC8800** or **SC8800E** indexers together.
- Available with an optional encoder input for position verification (model **SC8800E**).

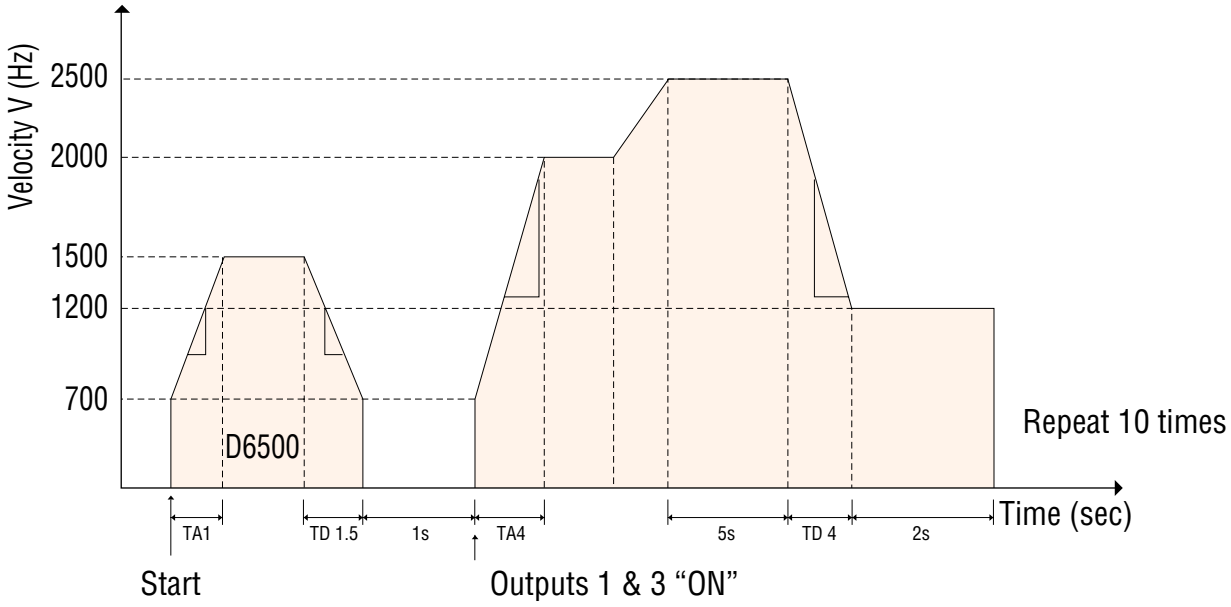
Example of Basic System Configuration



SPECIFICATIONS

PARAMETER			VALUE
Input Power			10~28VDC 3.0 watts max.
Performance	Stepping Accuracy		±0 steps from preset total
	Velocity Accuracy		±0.05% of preset rate
	Velocity Repeatability		±0.01% of max. rate
	Position Range		0 to ±999,999,999 steps, when DSCALE is active
	Velocity Range		1 to 800,000 steps/sec
	Acceleration Rate		0.001 to 10sec
Motion Types	Absolute		Move to specified internal counter position
	Index		Move specified distance
	Continuous		Move at specified speed until commanded to stop
	Go Home		Move to Home limit switch
	Move Time		Move specified distance in specified time
Sequence Execution	Via RS232-C		Sequence may be executed from RS-232C interface with the RUN command
	Via Power-up Auto Run		Execute any sequence, 0~15 upon power-up
	Vla Programmable Input		Sequences may be selected using an external device
Programming Language			Simple, high-level programming language
Non-Volatile Memory	Sequence Length		8k or up to available remaining memory
	Number of Programs		50 max. or up to available memory
Inputs	Command Interface	Type	RS232-C serial type, 3-wire implementation (Tx, Rx, Gnd)
		Parameters	Baud rate fixed at 9600, 8 data bits, 1 stop bit, no parity
		Configuration	35 units max. can be controlled via single port of daisy-chain configuration
	CW, CCW and Home Limits		+5 to +30 VDC, Optically Isolated
	Programmable Inputs		Four to be used for machine interaction and/or sequence selection, +5 to +30 VDC, Optically Isolated
	TIM		Phase zero indicator, +5 to +30 VDC, Optically Isolated
	Encoder		Model SC8800E accepts 2-3 channel, 2-phase quadrature incremental encoders with differential or single ended outputs, 5 VDC TTL compatible, 400 kHz (quadrature), max.
Outputs	Step and Direction		TTL, High: 4~5 VDC, Low: 0~0.5VDC, Pulse width: 0.5 ms min., Rise/Fall time: 0.2 ms max.
	Programmable		Two, Open collector, 1~24VDC, 80mA max.
	Status		Fault & Busy, Open collector, 1~24VDC, 80mA max.
Mechanical	Dimensions		L 3.35 in. (85mm) × W 1.57 in. (40mm) × H 4.72 in. (120mm)
	I/O Connectors		Combination of fixed screw terminal and D-type
Environmental	Cooling Method		Natural Ventilation
	Ambient Temperature Range		+32˚F~+122˚F (0˚C~+50˚C)
	Humidity		0 ~ 95% (noncondensing)
Weight (Mass)			0.68 lb. (0.31 kg)

PROGRAMMING EXAMPLE



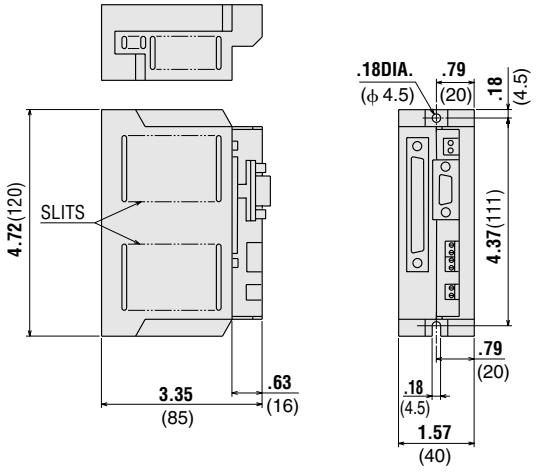
The two moves shown above can be executed with the following program commands :

	COMMANDS	DESCRIPTION
1	LOOP 10	*Loop this program 10 times*
2	SAS Push START to begin	*Echo message to screen*
3	VS700; V1500	*Set start and run velocities for the first move*
4	TA1; TD1.5	*Set Accel time to 1 sec & Decel time to 1.5 sec*
	When start signal is input, program begins	
5	PC0; EC0	*Set position and encoder counters to zero*
6	H+	*Set direction to CW*
7	D6500	*Set distance to 6500 steps*
8	MI	*Execute the Index move*
9	DELAY 1	*Delay 1 second*
10	IF (CP!=0)	*If encoder position is incorrect,*
11	THEN JMP1	*Then, restart program*
12	ELSE DELAY 3	*Else Delay 3 seconds*
13	OUT=101	*Turn on Outputs 1 and 3*
14	V2000	*Set velocity to 2000 steps/sec*
15	T4	*Set Accel & Decel time to 4 sec. for second move*
16	WHILE (IN 1=0)	*While Input #1 is off,*
17	MC	*Move continuously*
18	ENDW	*End the while loop*
19	V2500; MC	*Change speed to 2500 steps/sec*
20	DELAY 5	*Delay 5 seconds*
21	V1200	*Change speed to 1200 step/sec*
22	DELAY 2	*Delay 2 seconds*
23	STOP	*Stop moving*
24	ENDL	*Return to beginning of loop*

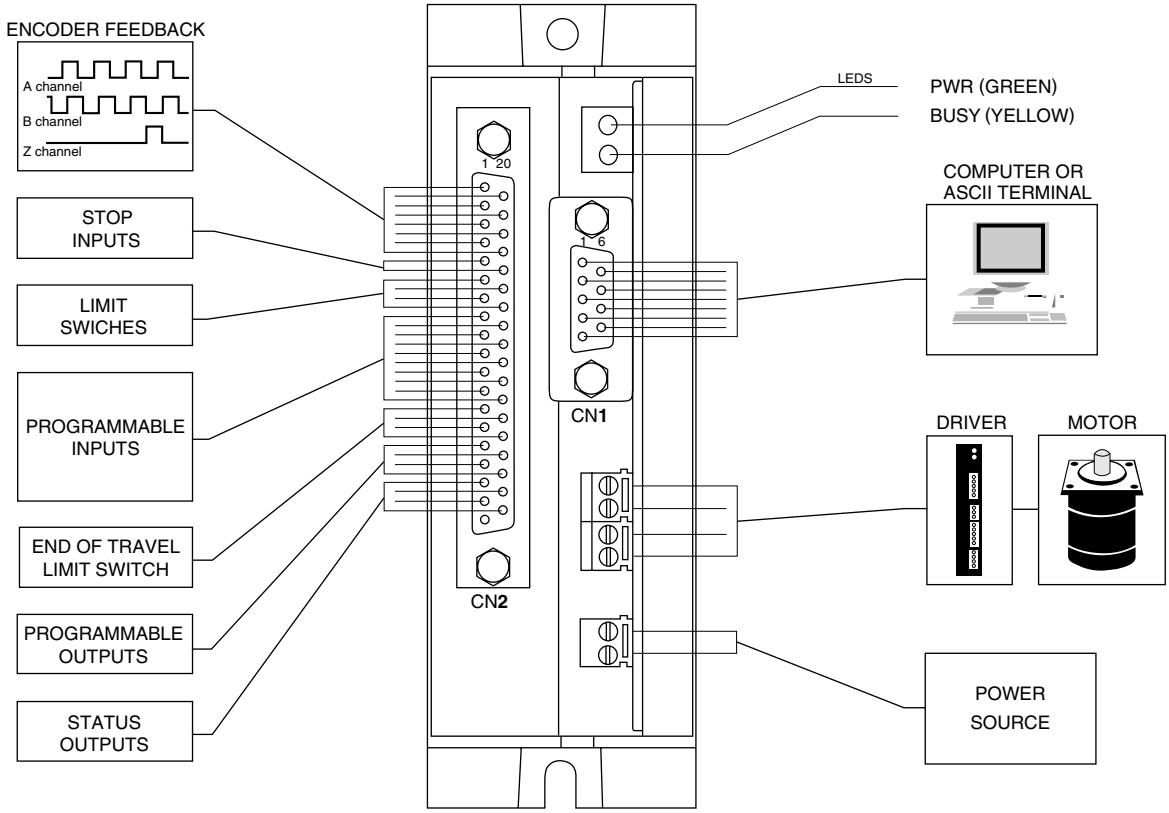
DIMENSIONS scale1/4, unit = inch (mm)

SC8800
SC8800E

Weight 0.68lb. (Mass 0.31kg)



SYSTEM LAYOUT



Compact & Simple Controller

SG8030J

■ DIN Rail-Mount Model
SG8030J-D

■ Panel-Mount Model
SG8030J-U

The SG8030J is a compact controller that switches between two control methods according to the application: sequential positioning and selective positioning.

With sequential positioning mode, you execute up to four positioning control operations in the pre-determined sequence by just inputting the start command from the programmable controller. In selective positioning mode, positioning is controlled by selecting one of four sets of pre-registered positioning data and inputting the start command from the programmable controller.

High-Performance Packed in 1.89in. ×1.89in. Compact Units

■ With dimensions of 1.89in.×1.89in.×3.3in (48mm×48 mm×83.8mm)., these units are the smallest of Oriental Motors controllers. They come in DIN-rail-mount and panel mount versions.

For the acceleration/deceleration pattern, you may select the linear or S-shaped pattern.

■ In addition to the linear acceleration/deceleration pattern, it is now possible to drive acceleration/deceleration along an S-shaped pattern. When you select this S-shaped pattern, the motor can be driven with low vibration.

The control methods can be switched.

■ You can also switch the control between sequential positioning and selective positioning.

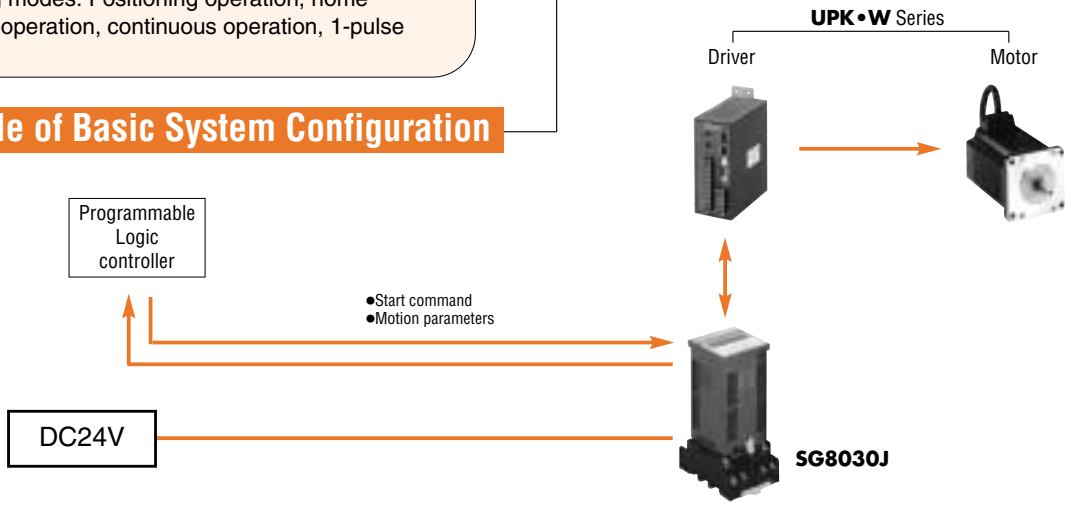
Functions

■ These stepping motor controllers, they have all the most commonly used functions.
- ●Control modes: External input, program, test
- ●Operating modes: Positioning operation, home detection operation, continuous operation, 1-pulse operation

■ MAIN SPECIFICATIONS

Positioning Data	Setting	4 steps
	Setting method	Set data with touch keys on front panel (record in EEP-ROM)
Positioning control		Incremental system (point to point) 1-99,999 pulses per step Operating pulse speed 100-200000 Hz Starting pulse speed 100-10000 Hz Acceleration rate 1-100 ms/kHz
Control modes		External input mode (EXT) Program mode (PROG) Test mode (TEST)
Operating modes		Positioning operation (indexing) Home detection operation (homing) Continuous operation (scanning) 1-pulse operation (jogging-for test mode only)
Home return function		Sets the direction of home detection in the program and detect origin by sensors.
Input signals		DC 24 V photocoupler input, input resistance 4.7 k Ω current sourting input
Output signals		PNP transistor output linked to photocoupler, 24VDC, 25mA or less, Current sinking output
Power supply		DC 24 V±5%, 0.1 A max.
Ambient temperature		32˚F ~ +104˚F (0˚C~+40˚C)
Ambient humidity		20~85% (noncondensing)
Weight (Mass)		0.22lb. (0.098kg)

Example of Basic System Configuration

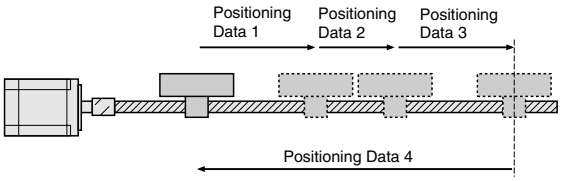


■ OPERATING METHODS

External input mode

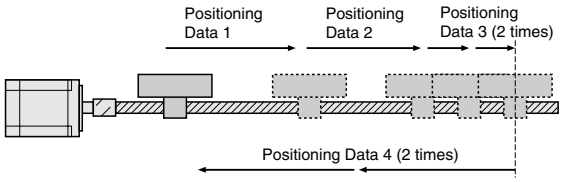
Positioning

Sequential Positioning Type



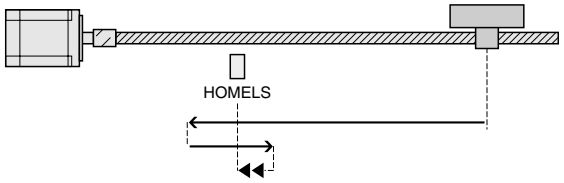
Sequential positioning type performs positioning in order from the first data every time a START signal is input.

Data Selection Positioning Type



Data selection positioning type performs positioning in order after positioning data 1-4 are selected and a START signal is input.

Home detection operation



When a START signal is input, it moves towards the preset sensor at the operating pulse speed (VR), to return to the origin.

Continuous operation

It continuously operates as long as a CW or CCW scan signal is input, no matter what operating mode is set (It reduces the speed and stops when a OFF signal is input).

When operating at the continuous operation mode, it keeps the operation as long as a CW or CCW scan signal is input (It reduces the speed and stops when a OFF signal is input).

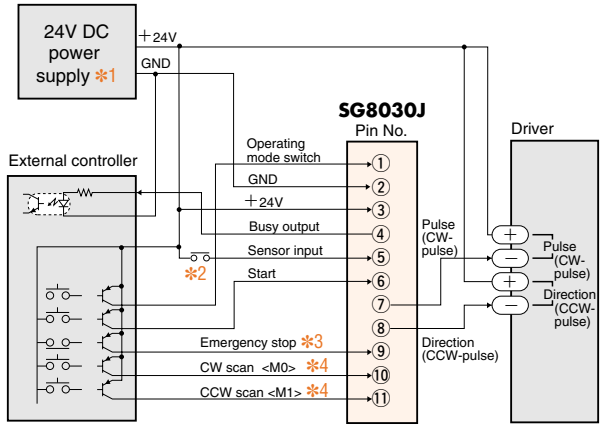
Test mode

Confirmation of operation manually

The next four Operation can be confirmed manually by using the control panel keys.

- Data selection positioning operation
- Continuous operation
- Home detection operation
- 1-pulse operation

■ WIRING DIAGRAM



✻1 The pulse output section uses a constant-current circuit, so no external resistor is required.
Connect +5V power directly to the driver + terminals and connect the 24V DC and 5V DC GND terminals the each other.

✻2 Use 24V DC home sensor.

✻3 This should be conductive (B contact) during normal operation.
When not using the emergency stop input signal, always connect to the +24V terminal.
The "E.StoP" message is displayed when the power supply goes off.

✻4 The names in angle brackets < > signals are for data selection postioning type.

■ SIGNAL TABLE

Signal names and functions of Sequential positioning type and Data selection positioning type differ in Pin No. 1, 10, 11 only.

① When in the Sequential positioning type
② When in the Data selection positioning type

Pin No.	Signal name	Direction	Function
1	Operating mode switch	Input	① : Switching positioning and home detection operation ② : Switching positioning and home detection operation and continuous operation
2	GND	Input	24V DC ground
3	+24V	Input	24V DC input terminal
4	Busy output	Output	Output during pulse oscillation
5	Sensor input	Input	Mechanical home sensor input
6	Start	Input	Start signal for Positioning and Home detection operation
7	Pulse <CW pulse>	Output	Pulse <CW-pulse output terminal>
8	Direction <CCW pulse>	Output	Direction <CCW-pulse output terminal>
9	Emergency stop	Input	Stop all operation [Stop busy output]
10	① : CW scan	Input	① : CW continuous operation
	② : M0 [CW scan]		② : Data select signal [CW continuous operation]
11	① : CCW scan	Input	① : CCW continuous operation
	② : M1 [CCW scan]		② : Data select signal [CCW continuous operation]

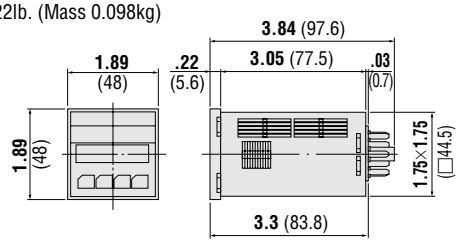
The operating modes given in square brackets [ ] are activated when operation mode select input is on.

The names in angle brackets < > signals are for 2-pulse output.

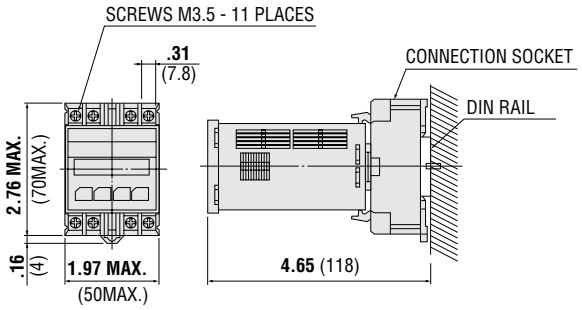
DIMENSIONS scale1/4, unit = inch (mm)

SG8030J

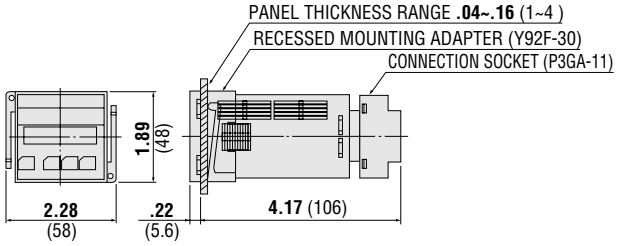
Weight 0.22lb. (Mass 0.098kg)



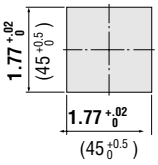
●**SG8030J-D**



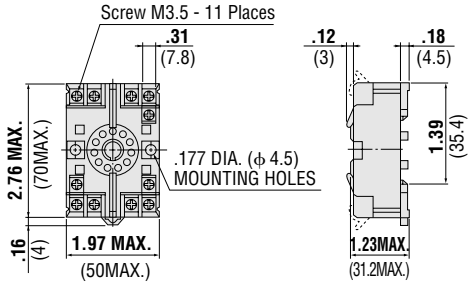
●**SG8030J-U**



●Panel Mounting Hole Dimensions



●DIN Rail Connection Socket P2CF-11 (included)



●Socket Mounting Hole Dimensions