Universal Controller
SCX10

For details on this product please refer to our website, contact technical support or your nearest Oriental Motor sales office.
www.orientalmotor.com

Equipped with program editing and execution functions, the highly-functional and sophisticated **SCX10** controller is now available. Use the **SCX10** as a stored program controller to connect to any of Oriental Motor's standard pulse input drivers. The **SCX10** is also able to control the motor via various serial ports such as USB, RS-232C and CANopen.

CE RoHS

●For detailed product safety standard information including standards, file number and certification body, please visit www.orientalmotor.com.

Features

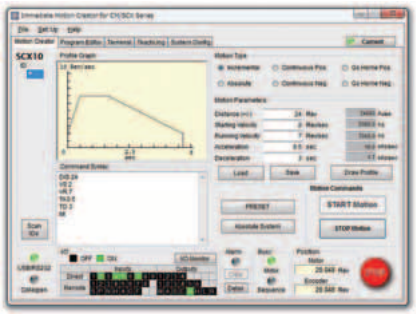
●100 Sequence Programs can be Stored

The **SCX10** can store up to 100 programs and execute various operations, from simple movements like "repeated positioning operation" to complicated controls like "operation by calculating the value based on external inputs".

●Easy Operation

The convenient and easy-to-use PC software, "Immediate Motion Creator for **CM/SCX** Series", is provided with the **SCX10**. Easily start an operation with the click of a button or start key by setting the travel amount and speed. The GUI allows for easy program creation by selecting commands from the commands list. Other functions available include: real time monitor for the teaching position, current position and I/O status, system parameter setting and I/O assignment.

PC software
"Immediate Motion Creator for **CM/SCX** Series" (Included)

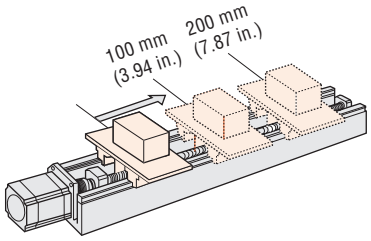


●USB Port as Standard Equipment

The **SCX10** has a mini USB port on the front panel which can directly connect to a PC through a commercially available mini USB cable. No special cable or converter is required.

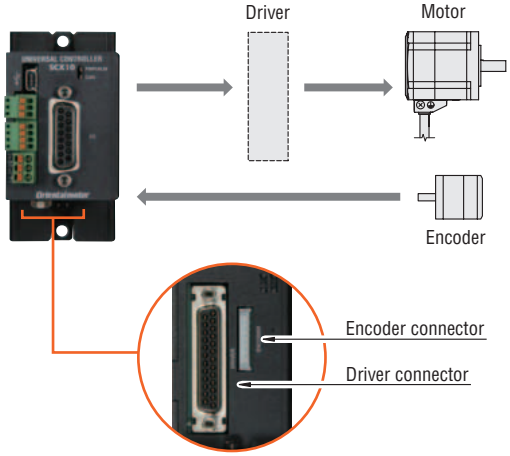
●Intelligent Setting

Program data for speed and travel amounts by setting the "User Unit" parameter. Data can be programmed in units such as "mm", "inch" and "revolution".

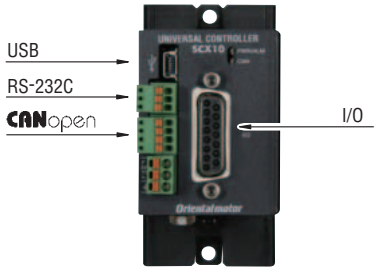


●External Encoder Input

The **SCX10** has a function for external encoder inputs which enables continuous monitoring of the feedback position and position error. Line driver, open collector and TTL inputs are compatible.

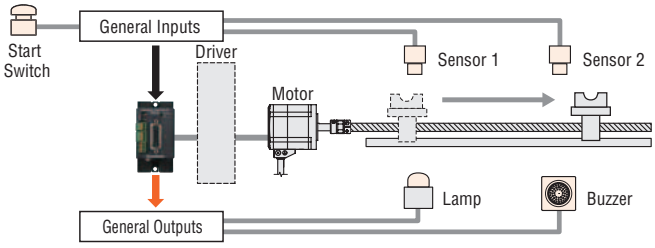


●Various Interfaces for Operation



◇Stand-Alone Operation Using Sensors and Switches

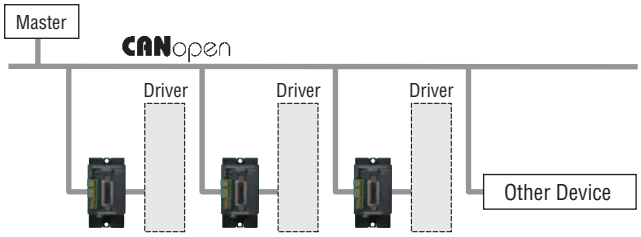
The **SCX10** can operate as a stand-alone controller, without a PC or programmable controller by utilizing 9 general inputs and 4 general outputs to select the desired sequences.



◇Direct Command Operation via CANopen

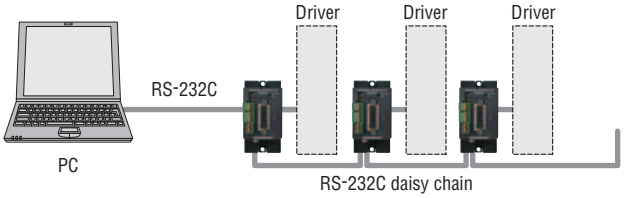
The **SCX10** has a standard built-in interface for CANopen.

✻CANopen for the **SCX10** is certified by CiA (CAN in Automation).



◇Operation Using a PC

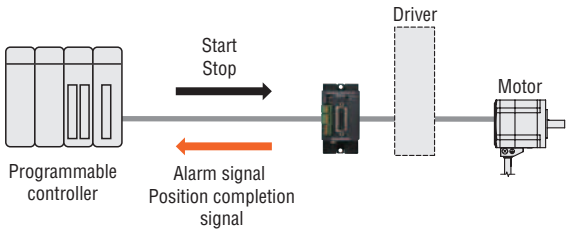
The **SCX10** can connect to a PC via RS-232C or USB*. The **SCX10** can also be connected via an RS-232C daisy chain connection for multi-axis control with another **SCX10** or other products such as the **ASX** Series all-in-one closed loop αSTEP motor.



✻Multi-axis control via USB is configured with multiple USB ports.

◇Operation Using a Programmable Controller

The **SCX10** can communicate a wide variety of signals via I/O to a programmable controller. Serial communications is also available if the programmable controller has a USB or RS-232C interface built-in.



●Two Types of Operations

◇Executing Sequence Operation [Stored Program Function]

This function is available for conditional branching using general-purpose I/O, wait processes using internal timers and other operations based on sequence control including setting the positioning and speed data. The **SCX10** can store up to 100 different programs that can be selected and executed via USB, RS-232C, CANopen and I/O port.

[Example program]

Seq 1

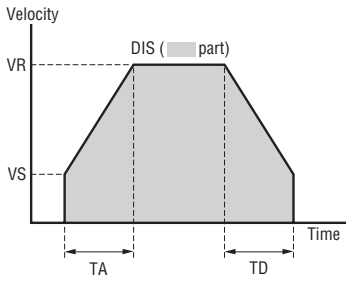
[1]	VS 1	: Starting Velocity*
[2]	VR 9	: Running Velocity*
[3]	TA 1	: Acceleration Time
[4]	TD 2	: Deceleration Time
[5]	DIS 2	: Incremental Motion Distance*
[6]	LOOP 3	: Begin Counted LOOP Block
[7]	MI	: Move Incremental Distance
[8]	MEND	: Wait for Motion End
[9]	WAIT 1	: Wait for Specified Time
[10]	ENDL	: End of LOOP Block
[11]	MA 0	: Move to Absolute Position
[12]	MEND	: Wait for Motion End
[13]	END	: End Sequence

✻Set the speed and travel amount as the unit of your actual motion such as “mm”, “inch” and “revolution”.

◇Direct Command Operation

Operate a motor directly by sending commands via the serial port (USB, RS-232C, CANopen) from a PC or programmable controller. This function is suitable for applications where positioning data is updated frequently or managed all at once by the PC or programmable controller.

```
>DIS=60
 DIS=60 mm
>VR=5
 VR=5 mm/sec.
>VS=1
 VS=1 mm/sec.
>TA=0.5
 TA=0.5
>TD=0.5
 TD=0.5
>MI
>
```



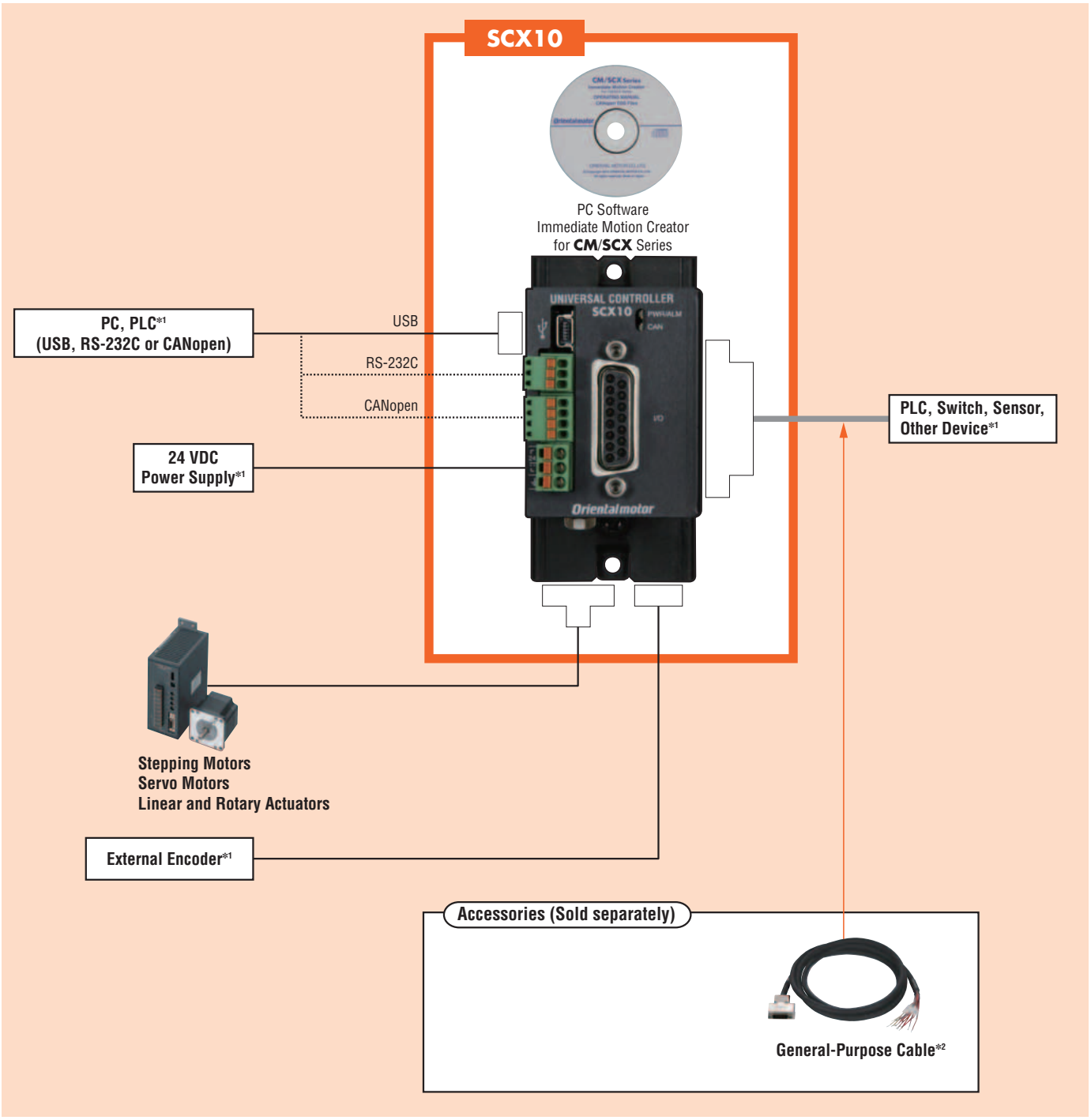
[Example Commands]

DIS	: Incremental Motion Distance
VR	: Running Velocity
VS	: Starting Velocity
TA	: Acceleration Time
TD	: Deceleration Time
MI	: Move Incremental Distance
MA	: Move to Absolute Position
MCP	: Move Continuously, Positive
MCN	: Move Continuously, Negative
MGHP	: Seek Mechanical Home Position
ALMCLR	: Clear Alarm Condition

⋮

System Configuration

An example of a system configuration with the **SCX10** controller.



●**Example of System Configuration**

Universal Controller		Sold Separetaly General-Purpose Cable
SCX10	+	**CC15D1**

●The system configuration shown above is an example. Other combinations are available.

*1 Not supplied

*2 For accessory details on these products please either refer to our website, contact technical support or your nearest Oriental Motor sales office. www.orientalmotor.com

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Product Line

Model
SCX10

The following items are included in a product

Controller, CD-ROM, Connector Set (included RS-232C Connector, CANopen Connector and Power Connector), Encoder Connector Housing/Contact, Startup Manual

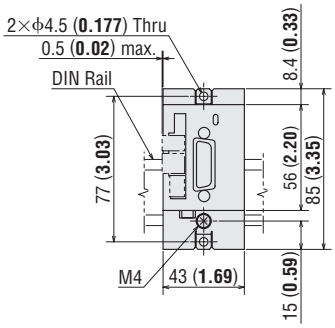
Specifications RoHS

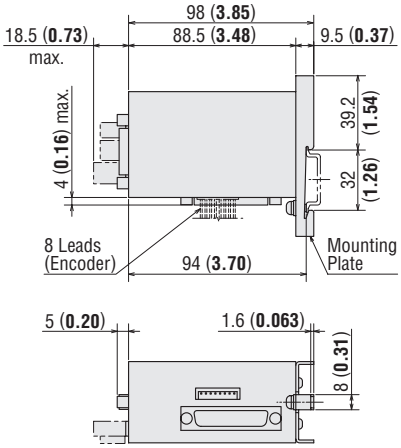
CE

Model		SCX10
Operation Mode		Immediate command/Stored program
Sequence Programs	Number of sequence programs	Max.100
	Program size	6 kB Maximum for total compiled sequences 6 kB Maximum for 1 sequence (text data)
	Programming Method	Immediate Motion Creator for **CM**/**SCX** Series [supplied software] or General terminal software
	Function Example	Subroutines, Math/Logical operators, User variables
Control	Number of Control axis	Single axis
	Control Modes	Positioning operation (INDEX operation) Return to mechanical home operation (HOME operation) Continuous operation (SCAN operation) 1-pulse Operation (JOG operation)
	Operating mode	Incremental/Absolute
	Starting Velocity	0～1.24 MHz (1 Hz increments)
	Speed range	1 Hz～1.24 MHz (1 Hz increments)
	Acceleration time	0.001～500 sec (0.001 sec increments)
	Position range	−2 147 483 648～+2 147 483 647 pulses maximum
	Mode for mechanical home seeking	3 sensor mode, 2 sensor mode, 1 sensor mode (+LS, −LS, Home, Sensor, Timing)
	Features	User Unit, Teaching Positions, Linked Motion, Multi Axis Operation, External encoder input, Protective Functions
Driver Interface	Pulse Output	1 Pulse Mode/2 Pulse Mode Line Driver Output (Line receiver input /Photo-coupler input compatible)
	Input	5 Signals Photo-coupler input Input voltage 4.25-26.4 VDC Input resistance 3 kΩ Built-in 5/24 VDC power supply Sink logic/Source logic compatible
	Output	8 signals Photo-coupler open-collector outputs 30 VDC 20 mA or less Built-in 5/24 VDC power supply Sink logic/Source logic compatible
	Encoder Input	A-phase, B-phase, Index Max. Frequency 1 MHz
External Encoder Input		A-phase, B-phase, Index Max. Frequency 1 MHz Line-driver, Open collector and TTL compatible Built-in 5 VDC power supply
I/O	Input	9 signals (configurable) Photo-coupler inputs Input voltage 4.25-26.4 VDC Input resistance 5.4 kΩ
	Output	4 signals (Configurable) Photo-coupler open-collector outputs 30 VDC 20 mA or less
Serial Communications	USB	USB2.0 compatible (Virtual COM port) Mini USB terminal 9600, 19200, 38400, 57600, 115200 bps (9600 is default.)
	RS-232C	Start-stop synchronous method, NRZ (Non-Return Zero), full-duplex 8 bits, 1 stop bit, no parity 9600, 19200, 38400, 57600, 115200 bps (9600 is default.) Daisy-Chain compatible (up to 36 axis)
	CANopen	CiA 301 Ver4.02 compliant 10 kbps, 20 kbps, 50 kbps, 125 kbps, 250 kbps, 500 kbps, 800 kbps, 1 Mbps
Power Input	Voltage	24 VDC±10%
	Current	0.26 A
Mass		0.33 kg (0.73 lb.)
Environmental Condition	Ambient Temperature	0～+50°C (+32～+122°F) (non-freezing)
	Ambient Humidity	20～85% (non-condensing)

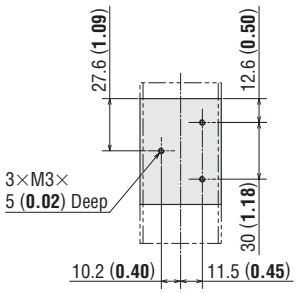
● When using the **SCX10** with either the **CSK** Series or **UMK** Series 2-phase motor driver packages, the **SCX10** and the driver need to be set to "2-Pulse input mode", CW and CCW pulse input.

Dimensions Unit = mm (in.)





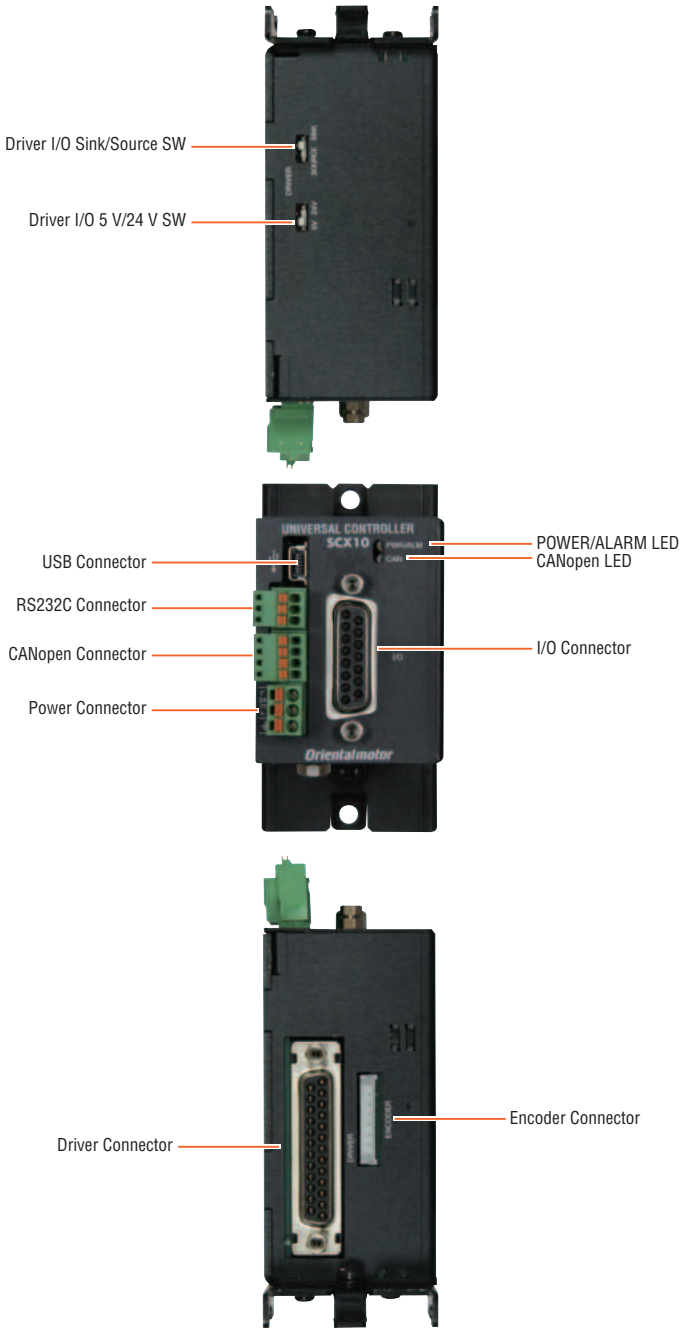
Remove Mounting Plate



- The **SCX10** can be installed onto a metal plate from the bottom with screws if you remove the mounting plate.

Connection and Operation

Names and Functions of Controller Parts



Name	Description
POWER/ALARM Status LED (green/red)	Green: Lit when the power is on. Red: The LED blinks when a protective function is triggered. The cause triggering the protective function can be identified by number of blinks the LED emits.
CANopen Status LED (green/red)	Green: Run Red: Error
Power Connector	Connects to the power supply cable
I/O Connector	Connects to the sensors, switches and/or master controller
RS-232C Connector	Connects to the RS-232C cable
USB Connector	Connects to the USB cable
CANopen Connector	Connects to the CANopen cable
Encoder Connector	Connects to the external encoder
Driver Connector	Connects to the driver
Driver I/O Sink/Source SW	Set the logic of the driver connector
Driver I/O 5V/24V SW	Set the voltage of the driver connector

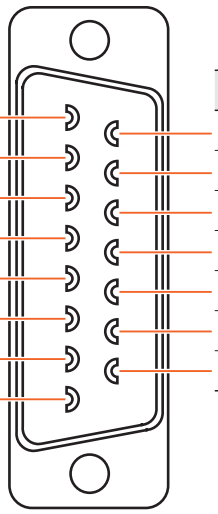
●Connecting the I/O Signals

Connect the PLC, switch, sensor etc. to the I/O connector (D-sub connector on the front panel of the **SCX10**).

◇Pin Assignments and Connector Function Table

At the time of shipment, specific signals are not assigned to the I/O connector, which functions as general input "IN1 to IN9" and general output "OUT1 to OUT4." As necessary, assign signals and connect accordingly. The connector is not supplied. Provide a 15 Pin D-Sub connector separately. See the following pin assignments for a solder type connector.

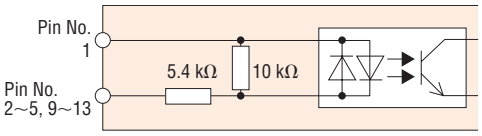
Description	Signal	Pin No.
Input common	IN-COM	1
General input	IN2	2
General input	IN4	3
General input	IN6	4
General input	IN8	5
General output	OUT1	6
General output	OUT3	7
Output common	OUT-COM	8



Pin No.	Signal	Description
9	IN1	General input
10	IN3	General input
11	IN5	General input
12	IN7	General input
13	IN9	General input
14	OUT2	General output
15	OUT4	General output

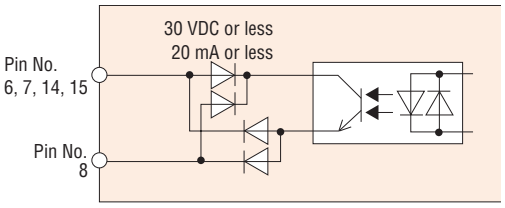
◇Internal Input Circuit

All input signals of the device are photo coupler inputs. The signal state represents the "ON: Carrying current" or "OFF: Not carrying current" state of the internal photo coupler rather than the voltage level of the signal.



◇Internal Output Circuit

All output signals of the device are open-collector outputs. The signal state represents the "ON: Carrying current" or "OFF: Not carrying current" state of the internal transistor rather than the voltage level of the signal.

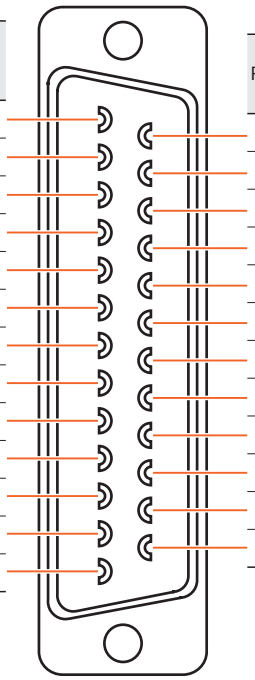


●Connecting the Driver

◇Pin Assignments and Connector Function Table

Connect the I/O signal cable to the connector while checking the pin numbers in Connector Function Table provided below. (The connector is not supplied. Provide a 25 Pin D-Sub connector separately.)

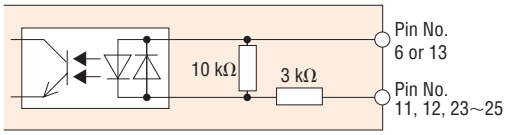
Driver general I/O when cancelling assignment	Discription	Signal name	Pin No.
–	Pulse/CW Pulse output	PLS/CW+	1
–	Direction/CCW output	DIR/CCW+	2
–	ASG Differential input	ASG+	3
–	BSG Differential input	BSG+	4
IN7	Timing/ZSG Differential input	TIMD+	5
–	Ground Connection	GND	6
OUT2	Motor Current On output	CON	7
OUT4	Resolution Selection	CS	8
OUT6	Magnetic Brake Free output	MBFREE	9
OUT8	General output	OUT8	10
IN2	Positioning Complete input	END	11
IN4	Limiting Condition input	LC	12
–	5V/24V output	5V/24V OUT	13



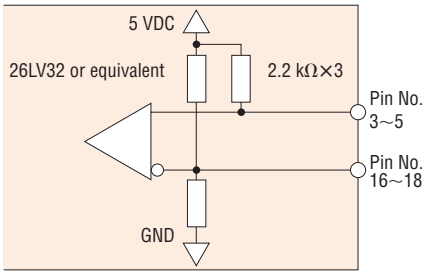
Pin No.	Signal name	Discription	Driver general I/O when cancelling assignment
14	PLS/CW–	Pulse/CW Pulse output	–
15	DIR/CCW–	Direction/CCW output	–
16	ASG–	ASG Differential input	–
17	BSG–	BSG Differential input	–
18	TIMD–	Timing/ZSG Differential input	IN7
19	COFF	Motor Current Off output	OUT1
20	ACL/DCL	Alarm Clear/Deviation Counter Clear output	OUT3
21	FREE	Motor Shaft Free output	OUT5
22	TL	Torque Limiting output	OUT7
23	ALARM	Alarm input	IN1
24	TIMS	Timing/ZSG Signal Ended input	IN3
25	READY	Operation Ready input	IN5

◇Internal Input Circuit

All input signals for the driver except for the encoder inputs are photo coupler inputs. The signal state represents the "ON: Carrying current" or "OFF: Not carrying current" state of the internal photo coupler rather than the voltage level of the signal.



The encoder inputs are line receiver inputs. These inputs can be connected to line driver, open collector and TTL output encoders, since the resistors are configured as shown in the figure.

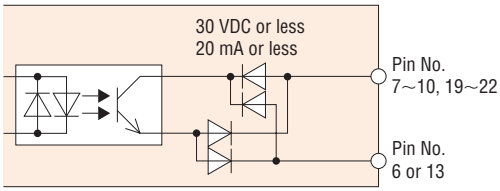


Note

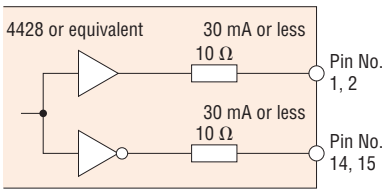
● When this input is used, connect the GND on the **SCX10** and the GND on the driver. Otherwise the **SCX10** may be damaged by a potential difference.

◇Internal Output Circuit

All output signals for the driver except for the pulse outputs are open-collector outputs. The signal state represents the "ON: Carrying current" or "OFF: Not carrying current" state of the internal transistor rather than the voltage level of the signal.



The pulse outputs employ differential outputs. This output can be connected to photocoupler inputs and line receiver inputs.

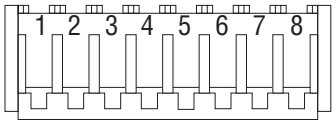


Connecting the External Encoder

Use the terminal and housing provided in the package for the external encoder connection.

◇Pin Assignments and Signal Table

Pin No.	Signal Name	Description
1	EXTA +	External encoder ASG input
2	EXTA −	
3	EXTB +	External encoder BSG input
4	EXTB −	
5	EXTZ +	External encoder ZSG input
6	EXTZ −	
7	Encoder power +	External encoder power output (+5 VDC)
8	Encoder power −	External encoder power output (0 V)

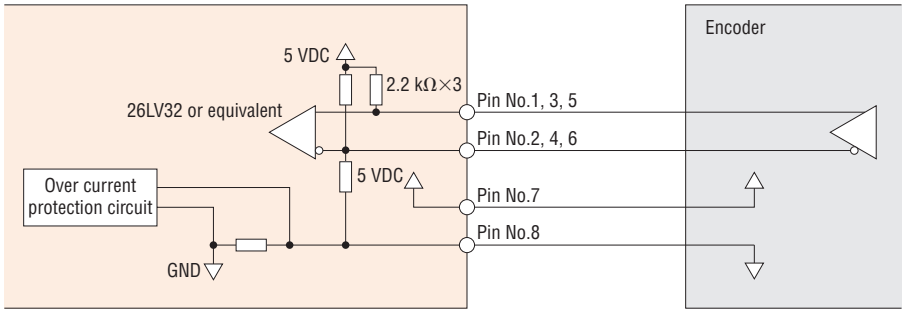


Notes

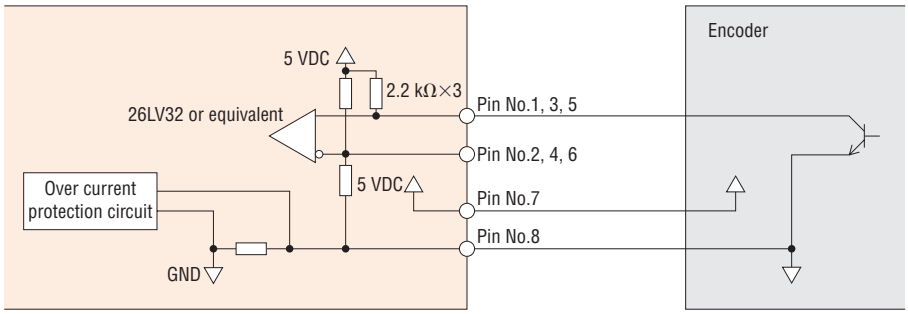
- This encoder power output should be used for the external encoder only.
- Connect the encoder input power "–" (ground) line to the "Encoder Power –" terminal as instructed below. Do not connect it to the "GND" terminal on the other connectors on the **SCX10**. The **SCX10** has a dedicated encoder power supply and the protection circuit on the "Encoder Power –" line detects the over current.

◇Connection Example

Line Driver Output Encoder Connection

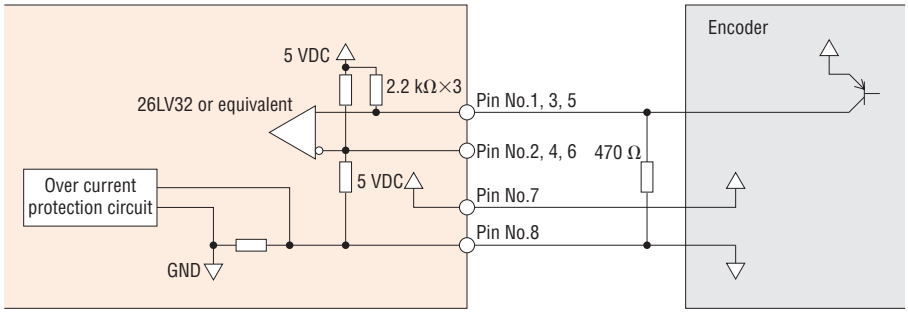


Open Collector Output Encoder Connection (NPN Type)

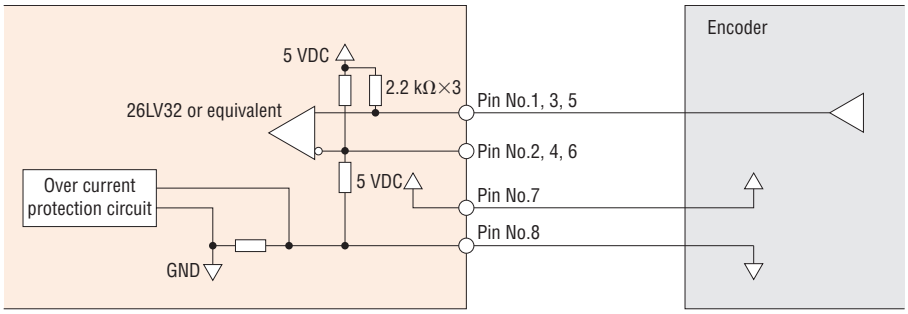


Open Collector Output Encoder Connection (PNP Type)

Connect a pull-down resistor (470 Ω). The pull-down resistors are not provided.



TTL Output Encoder Connection



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