

RS-30

Single-axis robot Small size rotary type 30W

Model Specification Items

RS	_
Series	

Encoder type A: Absolute specification I: Incremental specification



Motor type Speed reduction ratio Movement range Applicable controller Cable length 360: 360 degrees

T1: XSEL-J/K T2: SCON SSEL XSEL-P/Q

Options N: None Refer S:3m table M:5m X□□: Specified length Refer to the options table below.



Model Number/Specification

Model number	Encoder type	Motor output (W)	Speed reduction ratio	Movement range (degree)	Speed (degree/s)	Load inertia (Note1) (kg•m²)	Rated torque (N•m)
RS-①-30-50-360-②-③-④-L	Absolute	30	1/50	0~360	1~360	0.0578	3.3
RS-①-30-100-360-②-③-④-L	Incremental	30	1/100	0.4300	1~180	0.2303	6.65

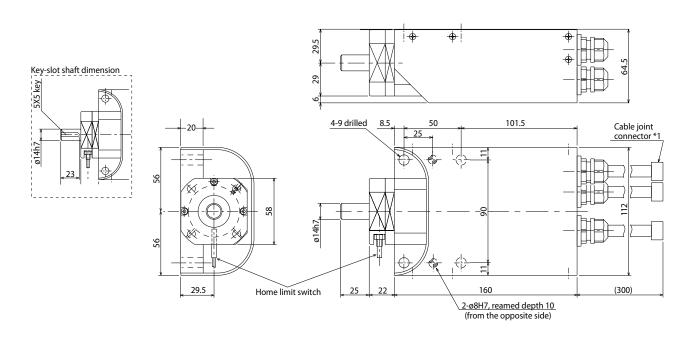
* In the above model numbers, 🗓 indicates the encoder type, 🗵 indicates the applicable controller, 🖫 indicates the cable length, and 📵 indicates the option(s).

Option							
Name	Model number	Reference page	Notes				
Key-slot option (output shaft)	K	Refer to the diagram below					
Home limit switch	L	Refer to the diagram below	Standard feature				

^{*} The home limit switch (L) is standard feature of the RS Series.

Common Specifications	
Positioning repeatability	±0.028 degree
Speed reducer	Harmonic drive
Allowable dynamic load moment	9.8 N•m
Mass	2.0 kg
Applicable controller	T1: XSEL-J/K T2: XSEL-P/Q, SSEL, SCON
Cable length (Note 2)	N: None, S: 3m, M: 5m, X□□: Specified length
Ambient operating temperature/humidity	0 to 40°C, 85%RH (non-condensing)

Diagram



Connect the motor cable, encoder cable, and limit switch cable. Refer to P. RS-4 & RS-5 for the cables.

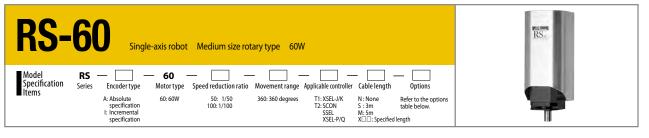
Applica	Applicable Controller Specifications								
	Maximum number of controlled axes		Operating method	Power-supply voltage	Reference page				
X-SEL-P/Q	6 axes		Program	Single/three- phase 200 VAC					
X-SEL-J/K	4 axes	Absolute/							
SSEL	2 axes	incremental		Single-phase 100/200 VAC					
SCON	1 axis		Positioner pulse train control						



(Note 1)

The load inertia is to be calculated based on the application conditions. The calculated load inertia is not to exceed the actuator's load inertia. (Please see P. RS-3 for further details.)

(Note 2) The maximum cable length is 30 m. Specify a desired length in meters. (Example. X08 = 8 m)



Model Number/Specification

Model number	Encoder type	Motor output (W)	Speed reduction ratio	Movement range (degree)	Speed (degree/s)	Load inertia (Note1) (kg•m²)	Rated torque (N•m)
RS-①-60-50-360-②-③-④-L	Absolute	60	1/50	0~360	1~360	0.108	5.58
RS-①-60-100-360-②-③-④-L	Incremental		1/100	0300	1~180	0.421	11.1

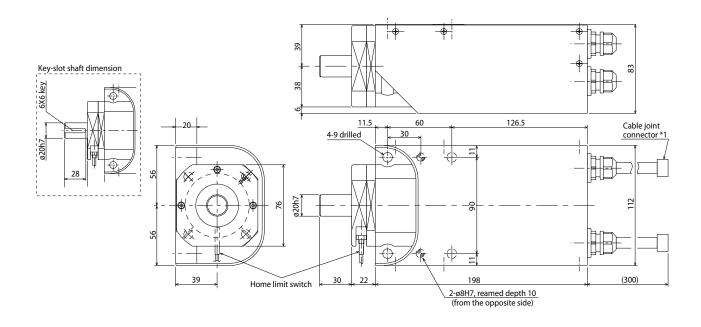
^{*} In the above model numbers, ① indicates the encoder type, ② indicates the applicable controller, ③ indicates the cable length, and ④ indicates the option(s). * If higher torque is needed, custom order can be arranged.

Option							
Name	Model number	Reference page	Notes				
Key-slot option (output shaft)	K	Refer to the diagram below					
Home limit switch	L	Refer to the diagram below	Standard feature				

 $^{{}^{*}}$ The home limit switch (L) is standard feature of the RS Series.

Common Specifications					
Positioning repeatability	±0.028 degree				
Speed reducer	Harmonic drive				
Allowable dynamic load moment	23.5 N•m				
Mass	3.2 kg				
Applicable controller	T1: XSEL-J/K T2: XSEL-P/Q, SSEL, SCON				
Cable length (Note 2)	N: None, S: 3m, M: 5m, X□□: Specified length				
Ambient operating temperature/humidity	0 to 40°C, 85%RH (non-condensing)				

Diagram



Connect the motor cable, encoder cable, and limit switch cable. Refer to P. RS-4 & RS-5 for the cables.

Applica	Applicable Controller Specifications								
	Maximum number of controlled axes	Connectable encoder type	Operating method	Power-supply voltage	Reference page				
X-SEL-P/Q	6 axes			Single/three- phase 200 VAC					
X-SEL-J/K	4 axes	Absolute/	Program						
SSEL	2 axes	incremental		Single-phase 100/200 VAC					
SCON	1 axis		Positioner pulse train control						



(Note 1)

The load inertia is to be calculated based on the application conditions. The calculated load inertia is not to exceed the actuator's load inertia. (Please see P. RS-3 for further details.)

(Note 2)

The maximum cable length is 30 m. Specify a desired length in meters. (Example. X08 = 8 m)

RS-2 RS-60



Rotary Shaft (RS Series) Selection Guide

For selecting the right RS Series model for your particular application, check the following points:

Speed and Load Inertia

First, determine the actuator speed required in your application. Second, determine the load inertia based on the shape and the weight of the arm, chuck, or other end-effector to be attached to the rotating axis of your RS Series rotary actuator. Third, refer to the table below and select an actuator model with a larger load inertia than that required in your system.

Model	RS-30W		RS-6	50W
Speed Reduction Ratio	1/50	1/100	1/50	1/100
Rated Speed (degree/s)	360	180	360	180
Load Inertia kg·m² (kgf•cm-s²)	0.058 (0.59)	0.23 (2.35)	0.11 (1.1)	0.42 (4.3)

● Load Capacity and Load Inertia of the Motor

Load inertia is determined by the weight and the shape of the body, and is expressed as $J = \int r^2 dM$. The load inertia of a simple shaped body is expressed as $J = MK^2$.

With the RS Series rotary actuators, a rotating force is applied to the payload which causes it to spin around. This rotating force is expressed as torque. Torque is also called the moment of force. **In linear motion**, when force is applied to a weight (inertia), acceleration is generated in the direction of the force.

 $F = M \cdot a$ F : Force N (kgf) M : Weight (kg) $a : Acceleration <math>(cm/s^2)$

In a rotational motion, when torque is applied to a body which has a load inertia, angular acceleration is generated. Therefore, the load capacity of a rotary actuator is expressed in terms of load inertia.

T = J • **ω** T : Torque N·m (kgf-cm)

J : Load Inertia kg·m² (kgf•cm-s²) **ω** : Angular Acceleration (rad/s²)

• Determining the Load Inertia of a Typical Shaped Body

J: Load Inertia (kg·m²) M: Load Weight (kg) $r, a, a_1, a_2, b:$ Distance (m)

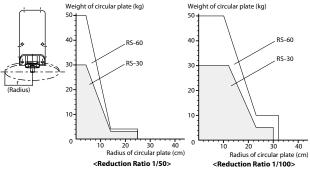
① Cylinder (includes Thin Circular Plate)	② Thin Rectangle (Rectangular Parallelepiped)	③ Thin Rectangle Plate (Rectangular Parallelepiped)
Rotating axis is at the center of the axis.	Rotating axis goes through the center of gravity of the plate, and is perpendicular to the axis.	Rotating axis goes through a point on the plate, which is perpendicular to the axis.
$J = M \cdot \frac{r^2}{2}$	$J = M \cdot \frac{a^2 + b^2}{12}$	$J = M_1 \cdot \frac{4a_1^2 + b^2}{12} + M_2 \cdot \frac{4a_2^2 + b^2}{12}$



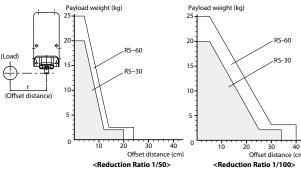
Guidelines for Rotary Actuator Model Selection

To select the right RS Series actuator for your application, consider the position of the payload to be attached to the output shaft of the actuator. Refer to the model selection guidelines below:

A. Payload is centered and located directly below the actuator.



B. Payload is offset from the rotating axis shaft of the actuator.



Reduction Ratio 1/100>
Technical Reference



Motor Cable / Encoder Cable

These are joint cables to connect the actuator cable joint connector and the controller.

There are two kinds of cables; a motor cable for the motor power, and an encoder cable for the encoder signals.

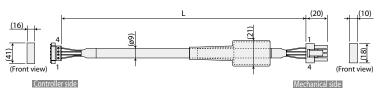
Also, when you use the cable with a cable track, please use the robot cable which is heavy-duty and has excellent bending resistance. (*)

(*) For motor/encoder cables for single-axis robots, all the standard cables are robot cables.



Model: **CB-X-MA**

* \square is the cable length (L); supports up to 30m. Example: 080 = 8m



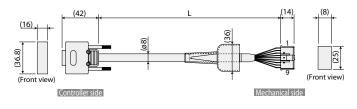
Minimum bend radius R: r = 51mm or larger (for movable use)

Wire	Color	Signal	No.		No.	Signal	Color	Wire
	Green	PE	1	\vdash	1	Ü	Red	
0.75sa	Red	U	2	\vdash	2	V	White	0.75sq
0.75SQ	White	V	3		3	W	Black	(crimped)
	Black	W	4	\vdash	4		Green	, ,

Encoder cable (for XSEL-J/K)

Model: CB-X-PA

* \square is the cable length (L); supports up to 30m. Example: 080 = 8m



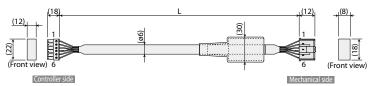
Minimum bend radius R: r = 44mm or larger (for movable use)

				•				
Wire	Color	Signal	No.					
	_	_	1					
	_	_	2					
	_	_	3					
	_	_	4					
		_	5					
	_	_	6		No.	Signal	Color	Wire
0.15sq	Blue	SD	7		1	BAT+	Black	
(crimped)	Orange	SD	8		2	BAT-	Yellow	
	Black	BAT+	9		3	SD	Blue	
	Yellow	BAT-	10	H::U::-/ N	4	SD	Orange	0.15s
	Green	VCC	11		5	VCC	Green	
	Brown	GND	12	$\vdash \vdash \vdash \lor \vdash \vdash \vdash$	6	GND	Brown	(crimpe
	Gray	BK-	13		7	FG	Ground	
	Red	BK+	14		8	BK-	Gray	
	_	_	15		9	BK+	Red	
The shield	is clam	oed to th	e hood	Braided ground & s	hield	wire		

Limit switch cable (for XSEL-J/K)

Model: CB-X-LC

* □□□ is the cable length (L); supports up to 30m. Example: 080 = 8m



Minimum bend radius R: r = 33mm or larger (for movable use)

Wire	Color	Signal	No.	No.	Signal	Color	Wire
	Light Blue	24VOUT	6	1	24VOUT	Light Blue	
	Pink	N	5	2	N	Pink	
AWG24	Light Green	LS	4	3	LS	Light Green	AWG24
AWG24	Orange	CREEP	3	4	CREEP	Orange	(crimped)
	Gray	OT	2	5	OT	Gray	
	1B/Light Blue	RSV	1	6	RSV	1B/Light Blue	

Note) 1B indicates one black dot mark.

RS-4

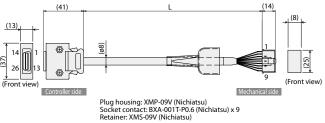
Spare Part



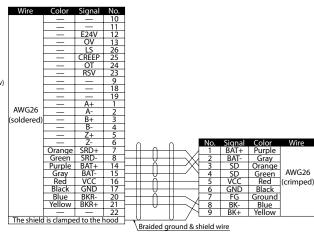
Encoder cable (for XSEL-P/Q, SSEL, SCON)

Model: **CB-X1-PA**

* \square is the cable length (L); supports up to 30m. Example: 080 = 8m



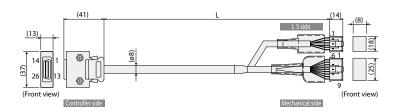
Minimum bend radius R: r = 44mm or larger (for movable use)



Encoder Cable (for XSEL-P/Q, SSEL, SCON, and LS equipped connection)

Model: CB-X1-PLA

* _ _ is the cable length (L); supports up to 30m. Example: 080 = 8m



Minimum bend radius R: r = 54mm or larger (for movable use)

Wire	Color	Signal	No.	١,	Λ		Λ					
		_	10									
		_	11						No.	Signal	Color	Wire
	White/Blue	E24V	12	\vdash	\vdash	n –	+		1	E24V	White/Blue	
	White/Yellow	OV	13	\vdash	\vdash	Ų.	+		2	OV	White/Yellow	
	White/Red	LS	26	\vdash	+-	n –	+		3	LS	White/Red	AWG26
	White/Black	CREEP	25	\vdash	+	Ų.	+		4	CREEP	White/Black	(crimped
	White/Purple	OT	24		\vdash	\cap	+		5	OT	White/Purple	
	White/Gray	RSV	23	\vdash	+	₩	+-		6	RSV	White/Gray	
	_	_	9									
	_		18									
		_	19									
	_	A+	1									
							11					
AWG26		A-	2]								
(soldered)		A- B+	2	}								
		B+	3									
		B+ B-	3 4						No.	Signal	Color	Wire
		B+ B- Z+	3 4 5			∩		~ /	1	BAT+	Color Purple	Wire
		B+ B- Z+ Z-	3 4 5 6			0_		\rightarrow				Wire
		B+ B- Z+ Z- SRD+	3 4 5 6 7					>	1	BAT+ BAT- SD	Purple	Wire
	Green	B+ B- Z+ Z- SRD+ SRD-	3 4 5 6 7 8					X	1 2 3 4	BAT+ BAT- SD SD	Purple Gray Orange Green	Wire
	Green Purple	B+ B- Z+ Z- SRD+ SRD- BAT+	3 4 5 6 7 8 14			Λ			1 2 3	BAT+ BAT- SD	Purple Gray Orange	AWG26
	Green Purple Gray	B+ B- Z+ Z- SRD+ SRD- BAT+ BAT-	3 4 5 6 7 8 14			Λ		 X Example 1 X X X X X X X X X X	1 2 3 4 5	BAT+ BAT- SD SD VCC GND	Purple Gray Orange Green Red Black	
	Green Purple Gray Red	B+ B- Z+ Z- SRD+ SRD- BAT+ BAT- VCC	3 4 5 6 7 8 14 15					X	1 2 3 4 5	BAT+ BAT- SD SD VCC	Purple Gray Orange Green Red	AWG26
	Green Purple Gray Red Black	B+ B- Z+ Z- SRD+ SRD- BAT+ BAT- VCC GND	3 4 5 6 7 8 14 15 16					× =	1 2 3 4 5	BAT+ BAT- SD SD VCC GND	Purple Gray Orange Green Red Black	AWG26

Braided ground & shield wire (White/Blue in cable color indicates the colors of line/insulator.)