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INTELLIGENT ACTUATOR

RS

Rotary System Series



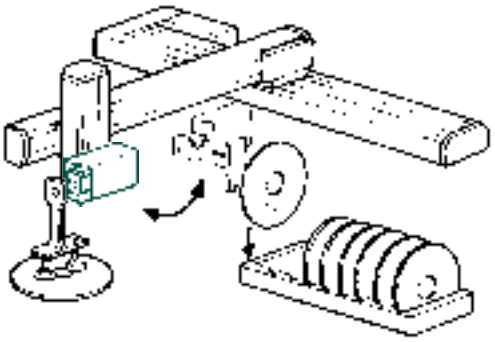
Rotary Actuator

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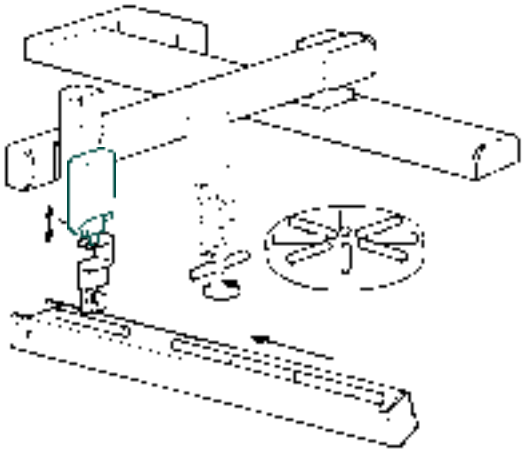
Features

- We offer 6 basic models and 11 different types of rotary actuator to choose from.
  4 DC servo models
  2 AC servo models
  * Speed reduction ratio of 1/100, 1/50 (1/10)
- The RS Series rotary actuator is compact in design and lightweight.
- The RS Series can be used as a Theta axis together with our AS and FS Series actuators in a multi-axis positioning system.
- When used with our M-SEL (standard DC servo version) or M-ACSEL (AC servo version) controller, the RS Series rotary actuator can provide simultaneous motion.
- The RS Series rotary actuator can be installed easily using the standard T-slots on our AS Series actuators.
  (Some models require the use of installation brackets.)
- Arms or other end-effectors are easily attached. Some application examples are shown to the right.
- A "Key-Slot" option is also available. (Except for the RS-35, economy type)

Application Examples



Disk Loading and Unloading



Palletizing

Model

12RS - 30 - 360 - 50 - AC - K
1 2 3 4 5 ⌖

1 Type

2 Motor Output

20 : 20W
30 : 30W
35 : 35W (Economy Type)
50 : 50W
60 : 60W

3 Movement Range

360 : 360 degree

4 Speed Reduction Ratio

10 : 1/10 (Kobatec)
50 : 1/50 (Harmonic)
100 : 1/100 (Harmonic)

5 Motor Type

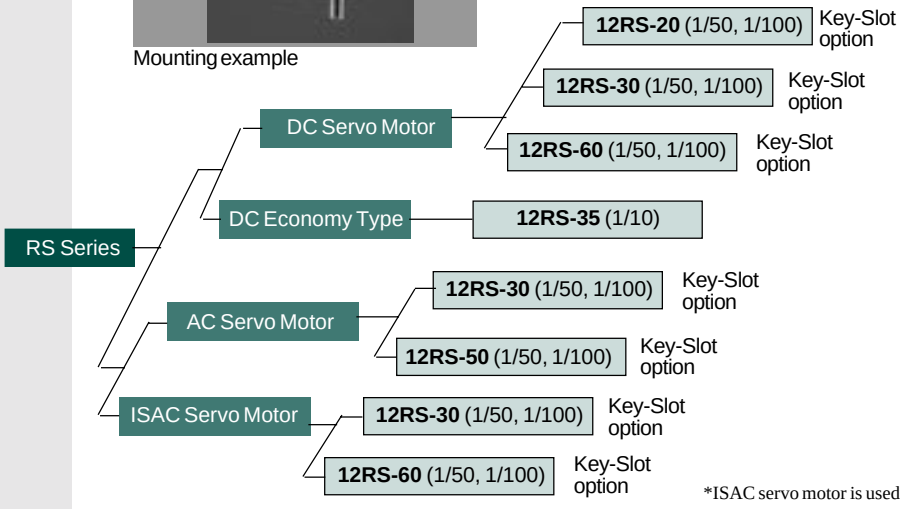
DC (or no indicator): DC motor
AC: AC motor
ISAC: AC motor for IS actuator

⌖ Options

K : Key-Slot Option (Output Shaft)



Mounting example



*ISAC servo motor is used with the IS Series actuators

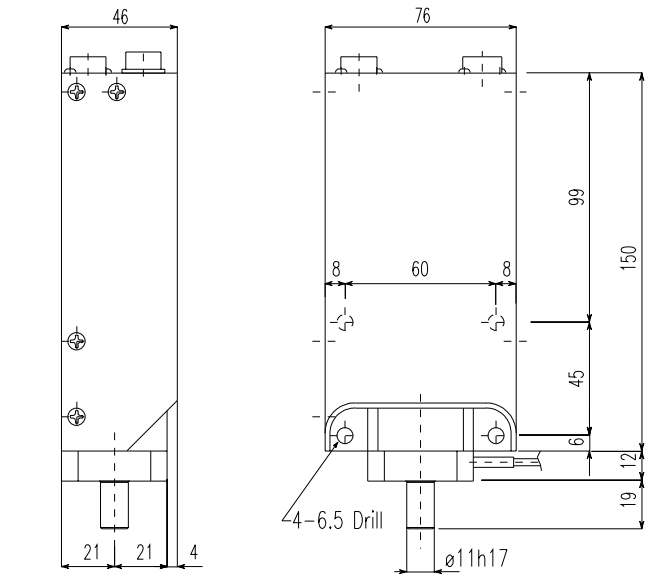
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DC Type

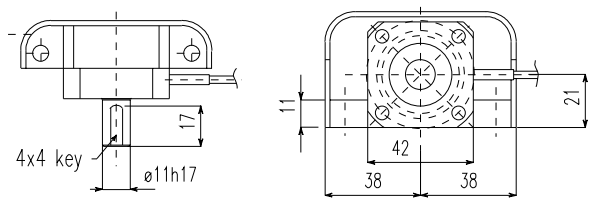
Specifications and Dimensions

Model			12RS-20-DC	12RS-30-DC	12RS-60-DC	12RS-35-DC
Speed Reduction			Harmonic drive • 1/50, 1/100			Kobatec • 1/10
Movement Range	degree		0 ~ 360°			
Rated Output	W		20	30	60	35
Rated Speed	degree/sec	1/50	300	360		1800
		1/100	150	180		
Rated Torque	N-m(Kgf-cm)	1/50	2.1(21)	3.3(34)	6.7(68)	0.87(8.91)
		1/100	4.1(42)	6.3(64)	13.3(136)	
Repeatability	degree		±0.028			±0.15
Weight	kg		1.1	2.2	3.7	1.2
Maximum Speed	degree/sec	1/50	450			2400
		1/100	225			
Maximum Torque	N-m(Kgf-cm)	1/50	4.9(50)	6.3(64)	13.3(136)	1.98(20.25)
		1/100	7.8(80)	12.5(128)	26.7(272)	
Load Moment	N-m(Kgf-cm)		4.9(50) or less	98(100) or less	24.5(250) or less	9.8(10) or less
Load Inertia	kg · m² (Kgf-cm-s²)	1/50	0.0306(0.3125) or less	0.0578(0.59) or less	0.196(2) or less	0.00469 or less
		1/100	0.1225(1.25) or less	0.2303(2.35) or less	0.784(8) or less	(0.04789) or less

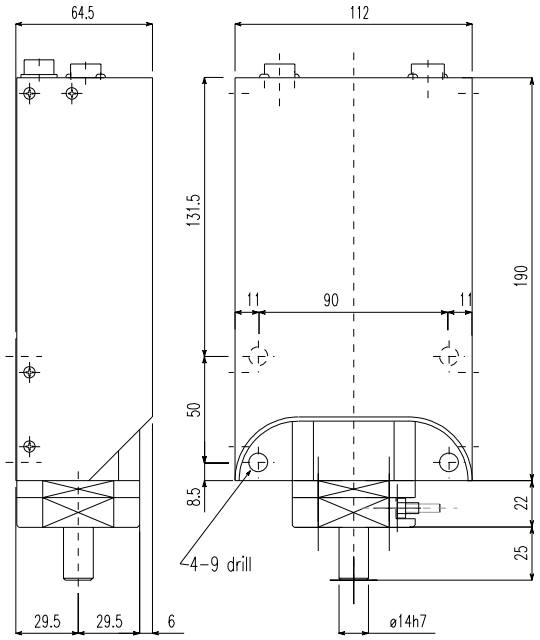
12RS-20-DC



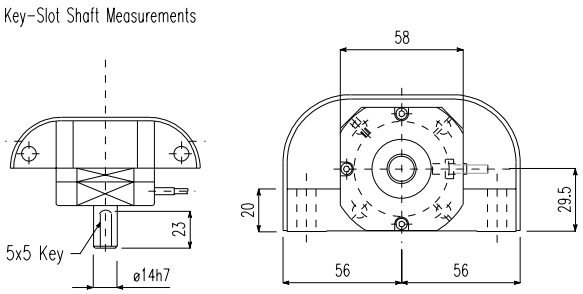
Key-Slot Shaft Measurements



12RS-30-DC



Key-Slot Shaft Measurements

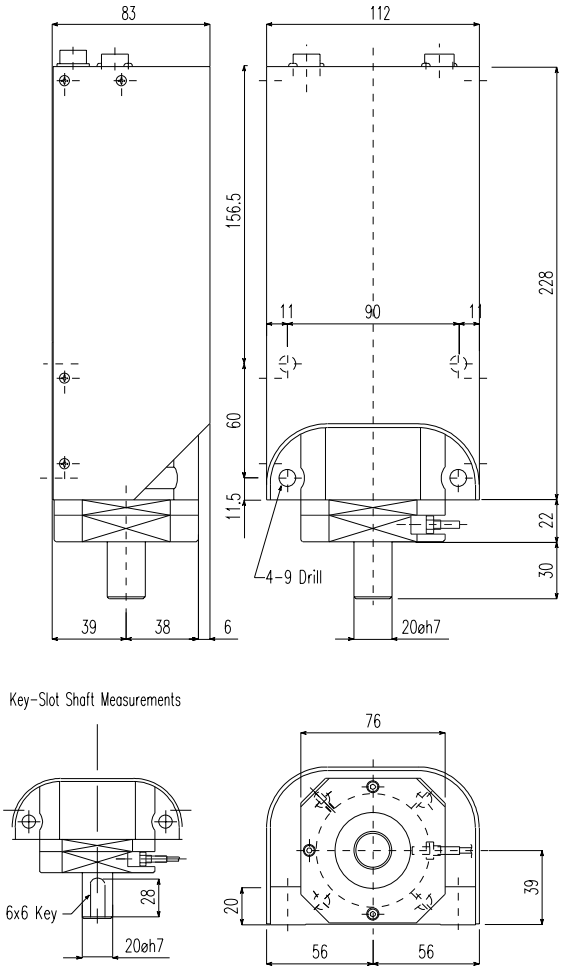


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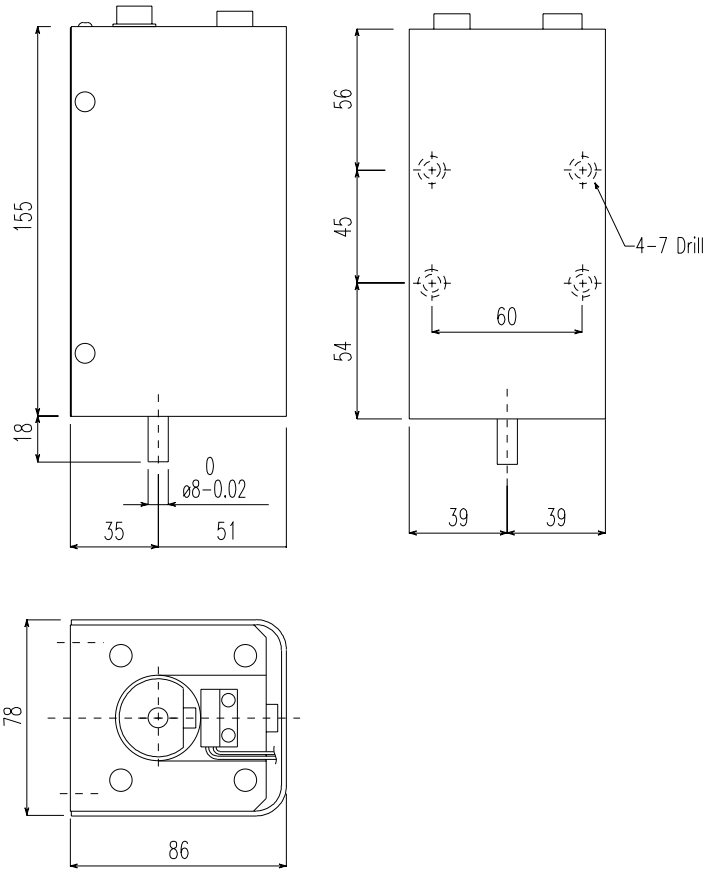
DC Type

Dimensions

12RS-60-DC

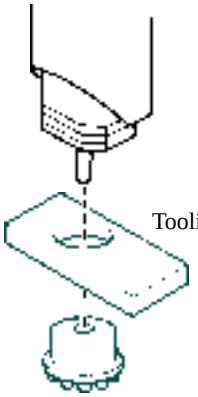


12RS-35-DC

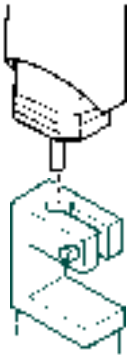


Installation of Arm or Other End-Effectors

To install an arm or other end-effectors onto your RS Series rotary actuator, use a split clamping method or a shaft-hub locking device as shown below:



Power-lock



Grippers or other End-Effectors



Rotary Actuator
RS SERIES

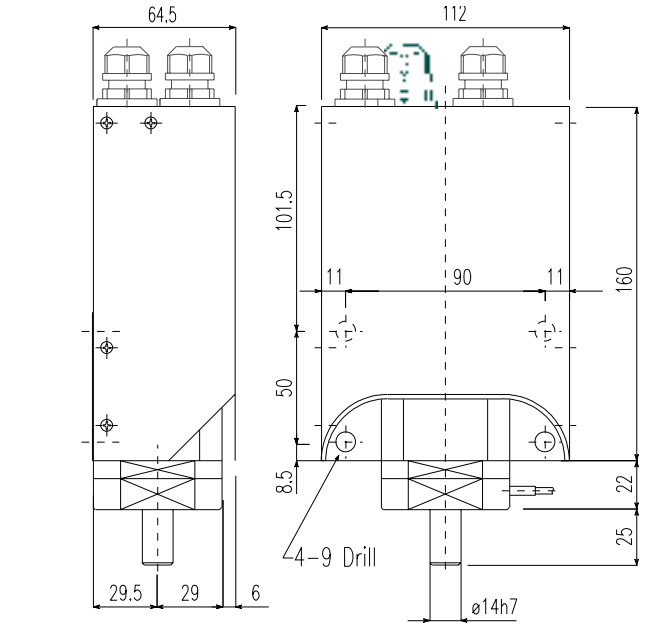
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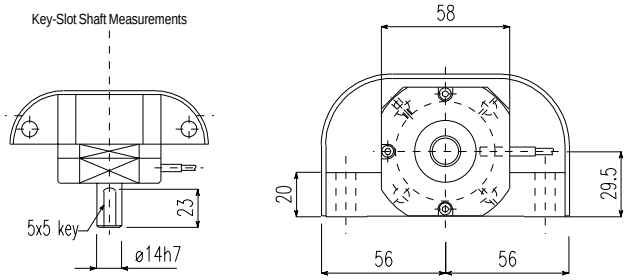
AC Type

Specifications and Dimensions

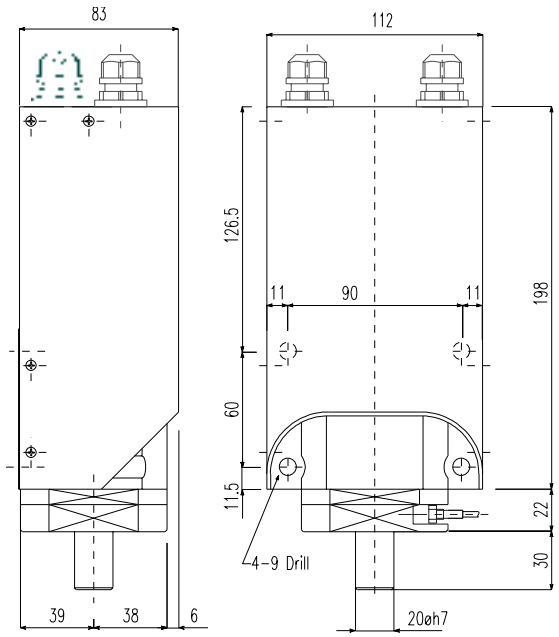
Model			12RS-30-AC[ISAC]	12RS-50[60]-AC[ISAC]
Speed Reduction			Harmonic drive • 1/50, 1/100	
Movement Range	degree		0 ~ 360°	
Rated Output	W		30	50
Rated Speed	degree/sec	1/50	360	
		1/100	180	
Rated Torque	N-m(Kgf-cm)	1/50	3.3(34.1)	5.58(57)
		1/100	6.65(68.2)	11.1(113)
Repeatability	degree		±0.028	
Weight	kg		2.0	3.2
Maximum Speed	degree/sec	1/50	450	
		1/100	225	
Maximum Torque	N-m(Kgf-cm)	1/50	6.6(68.2)	11.17(114)
		1/100	13.3(136.4)	22.28(226.8)
Load Moment	N-m(Kgf-cm)		9.8(100) or less	23.5(240) or less
Load Inertia	kg · m² (Kgf-cm-s²)	1/50	0.0578(0.59) or less	0.108(1.1) or less
		1/100	0.2303(2.35) or less	0.421(4.3) or less

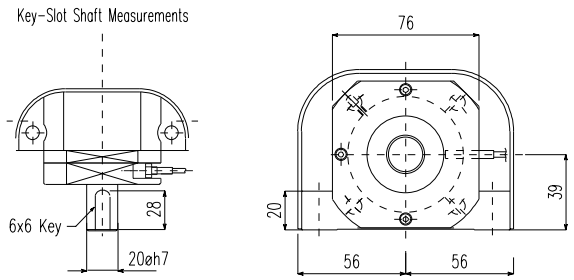
12RS-30-AC[ISAC]





12RS-50[60]-AC[ISAC]





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Selecting the Right RS Series Model for Your Particular Application

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	12RS-20-DC		12RS-30-DC		12RS-60-DC		12RS-30-AC [ISAC]		12RS-50[60] AC[ISAC]		12RS-35-D-C
Speed Reduction Ratio	1/50	1/100	1/50	1/100	1/50	1/100	1/50	1/100	1/50	1/100	1/10 (economy)
Rated Speed (degree/s)	300	150	360	180	360	180	360	180	360	180	1800
Maximum Speed (degree/s)	540	225	450	225	450	225	450 [360]	225 [180]	450 [360]	225 [180]	2400
Load Inertia kg• m^2 (kgf-cm-S^2)	0.031 (0.31)	0.123 (1.25)	0.058 (0.59)	0.23 (2.35)	0.2 (2)	0.78 (8)	0.058 (0.59)	0.23 (2.35)	0.11 (1.1)	0.42 (4.3)	0.0047 (0.048)

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, 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.

$F = M \bullet \alpha$

F : Force N(kgf)
M : Weight (kg)
α : Acceleration (cm/s^2)

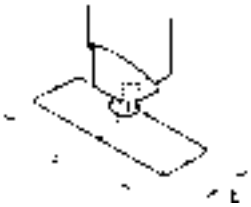
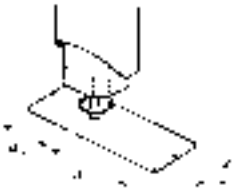
In a rotational motion, when torque is applied to a body which has a load inertia, angular acceleration is generated. Therefore, the load capacity of a rotary actuator is expressed in terms of load inertia.

$T = J \bullet \omega$

T : Torque N·m(kgf-cm)
J : Load Inertia kg·m^2 (kgf-cm-s^2)
ω : Angular Acceleration (rad/s^2)

Determining the Load Inertia of a Typical Shaped Body

J : Load Inertia (kg·m^2) W : Load Weight (kg) g : Gravity Speed (9.8m/s^2)

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



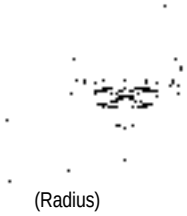
12RS-60-DC[ISAC] 12RS-50-AC | 12RS-30-DC 12RS-50-AC[ISAC] | 12RS-20-DC | 12RS-35-DC

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Guidelines for Rotary Actuator Model Selection

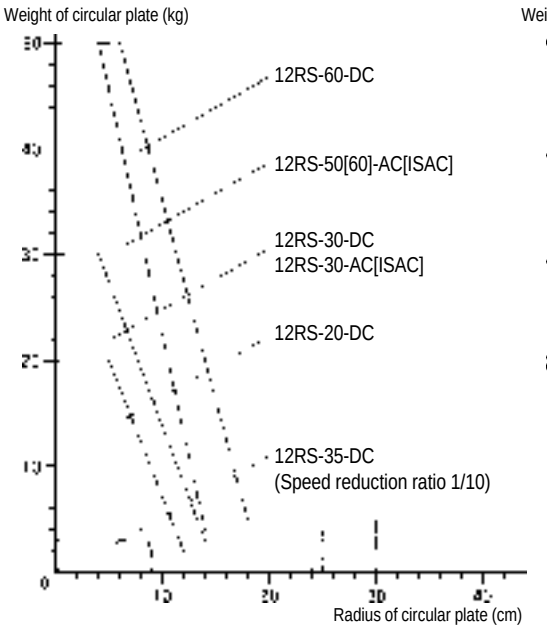
To select the right RS Series actuator for your application, consider the position of the payload to be attached to the output shaft of the actuator. Refer to the model selection guidelines below:

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

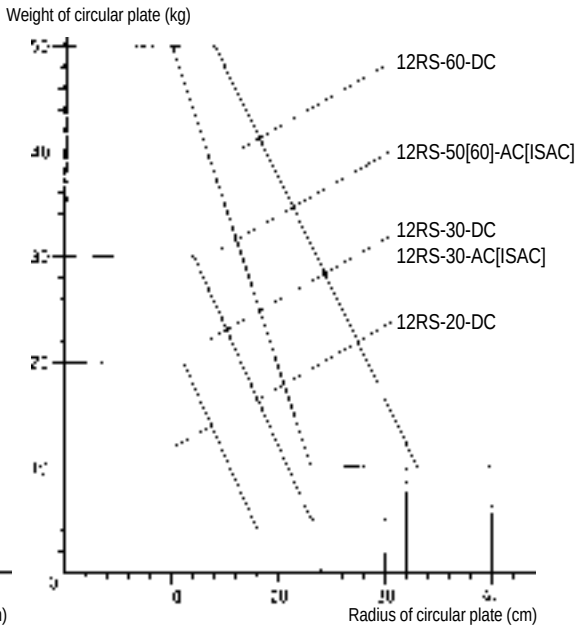


(Radius)

$$J = M \bullet \frac{r^2}{2}$$

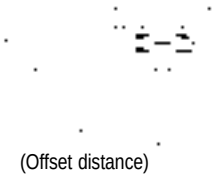


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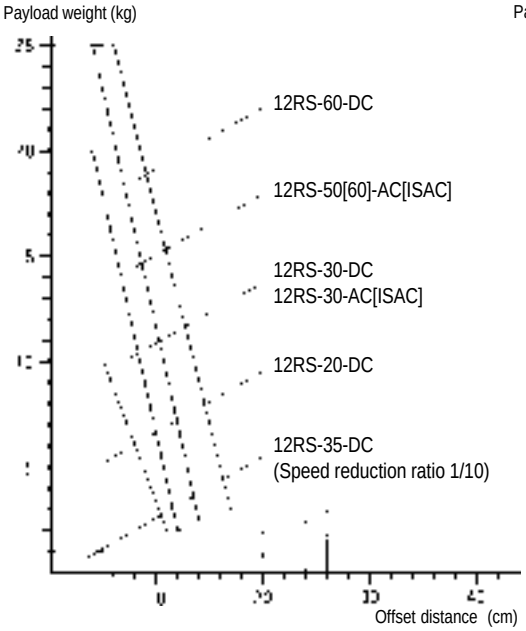
<Reduction Ratio 1/100>

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

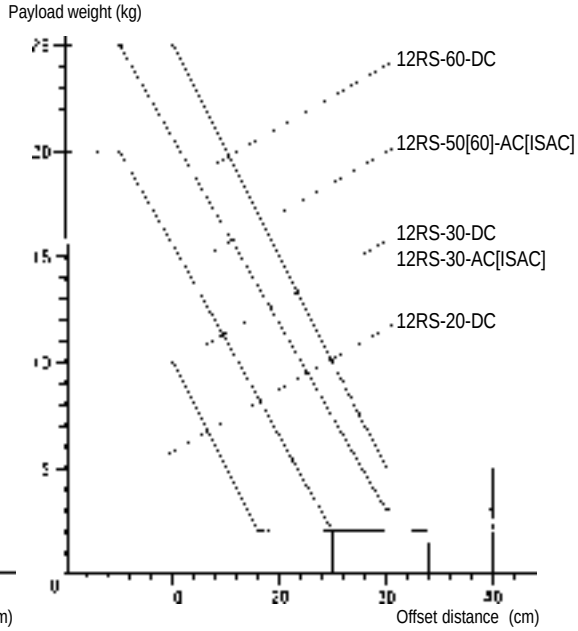


(Offset distance)

$$J = M \bullet r^2$$



<Reduction Ratio 1/50>



<Reduction Ratio 1/100>

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