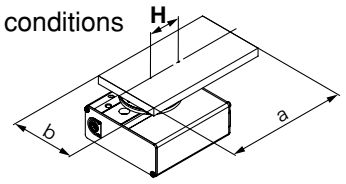
Rotary type

RF type

Selecting a model

Selecting a model

Operating conditions



Rotary type: RF03
Installation posture: Horizontal
Kind of load: Inertial load Ta
Shape of load: 150mm × 80mm (rectangular plate)
Oscillating angle θ: 180°

Acceleration/deceleration $\dot{\omega}$: 1,000°/sec²
Speed ω: 420°/sec
Load mass m: 2.0kg
Distance between shaft and center of gravity H: 40mm

Step1 Moment of inertia Acceleration/deceleration

1 Calculating the moment of inertia.

2 Checking the moment of inertia vs.acceleration/deceleration.

Select an appropriate model from the moment of inertia vs. acceleration/deceleration while referring to the moment of inertia acceleration/deceleration graph.

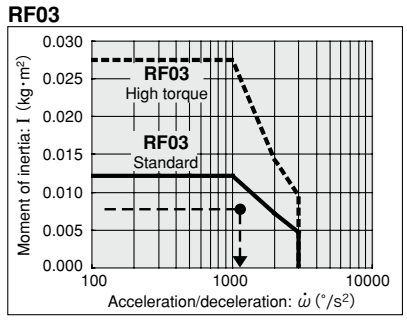
Calculation formula

$I = m \times (a^2 + b^2)/12 + m \times H^2$

Selection example

$I = 2.0 \times (0.15^2 + 0.08^2)/12 + 2.0 \times 0.04^2$
$= 0.00802 kg \cdot m^2$

RF03



Step2 Selecting a torque

1 Kinds of loads
- Static load: Ts
- Resistance load: Tf
- Inertial load: Ta

2 Checking the effective torque

Check that the speed can be controlled by the effective torque by the speed while referring to the effective torque speed graph.

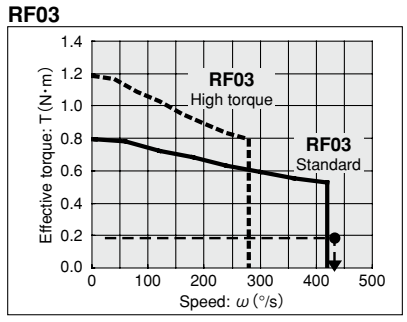
Calculation formula

Effective torque ≥ Ts
Effective torque ≥ Tf × 1.5
Effective torque ≥ Ta × 1.5

Selection example

Inertial load: Ta
$Ta \times 1.5 = I \times \dot{\omega} \times 2\pi/360 \times 1.5$
$= 0.00802 \times 1{,}000 \times 0.0175 \times 1.5$
$= 0.21 N \cdot m$

RF03



Step3 Allowable load

1 Checking the allowable load
- Radial load
- Thrust load
- Moment

Calculation formula

Allowable thrust load ≥ m × 9.8
Allowable moment ≥ m × 9.8 × H

Selection example

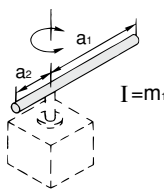
●Thrust load
2.0 × 9.8 = 19.6N < Allowable load OK
●Allowable moment
2.0 × 9.8 × 0.04
= 0.784N•m < Allowable moment OK

List of moment of inertia calculation formulas (Calculation of moment of inertia I)

I: Moment of inertia kg·m² m: Load mass kg

1 Thin rod

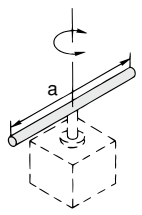
Position of rotation axis:
Passes through one end perpendicularly to the rod.



$I = m_1 \cdot \frac{a_1^2}{3} + m_2 \cdot \frac{a_2^2}{3}$

2 Thin rod

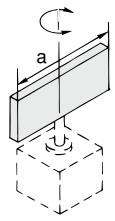
Position of rotation axis:
Passes through the center of gravity of the rod.



$I = m \cdot \frac{a^2}{12}$

3 Thin rectangular plate (rectangular parallelepiped)

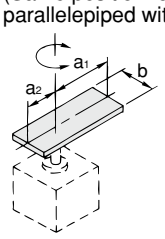
Position of rotation axis:
Passes through the center of gravity of the plate.



$I = m \cdot \frac{a^2}{12}$

4 Thin rectangular plate (rectangular parallelepiped)

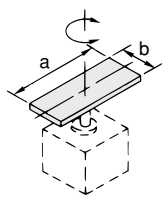
Position of rotation axis:
Passes through one end perpendicularly to the plate.
(Same position for the rectangular parallelepiped with the plate thickened.)



$I = m_1 \cdot \frac{4a_1^2 + b^2}{12} + m_2 \cdot \frac{4a_2^2 + b^2}{12}$

5 Thin rectangular plate (rectangular parallelepiped)

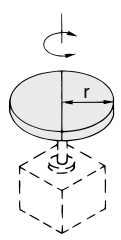
Position of rotation axis:
Passes through one end perpendicularly to the plate.
(Same position for the rectangular parallelepiped with the plate thickened.)



$I = m \cdot \frac{a^2 + b^2}{12}$

6 Cylinder (including thin disc)

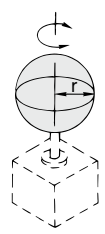
Position of rotation axis:
Central axis



$I = m \cdot \frac{r^2}{2}$

7 Solid ball

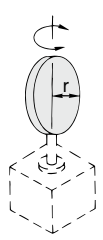
Position of rotation axis:
Diameter



$I = m \cdot \frac{2r^2}{5}$

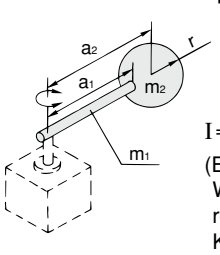
8 Thin disc

Position of rotation axis:
Diameter



$I = m \cdot \frac{r^2}{4}$

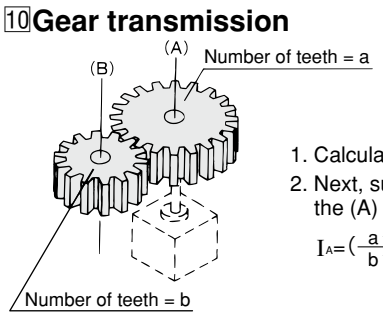
9 Load at lever tip



$I = m_1 \cdot \frac{a_1^2}{3} + m_2 \cdot a_2^2 + K$

(Example)
When the shape of m_2 is a ball, refer to [7] to obtain the following.
$K = m_2 \cdot \frac{2r^2}{5}$

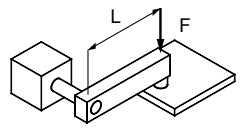
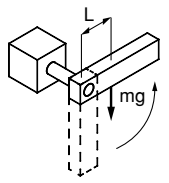
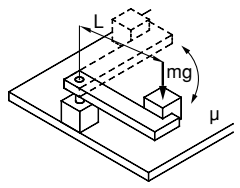
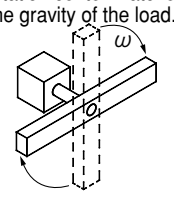
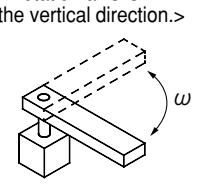
10 Gear transmission



1. Calculate the moment of inertia I_B around the (B) axis.
2. Next, substitute I_B for the moment of inertia around the (A) axis to calculate I_A as follows.

$I_A = (\frac{a}{b})^2 \cdot I_B$

Selecting a model

Kinds of loads		
Static load: Ts	**Resistance load: Tf**	**Inertial load: Ta**
Only push force is needed (clamp, etc.).	Gravity or friction force applies in the rotation direction.	Load with inertia needs to be rotated.
	<Gravity applies.>  <Friction force applies.> 	<Rotation center matches to the gravity of the load.>  <Rotation axis is in the vertical direction.> 
Ts = F·L Ts : Static load (N·m) F : Clamp force (N) L : Distance from oscillating center to clamp position (m)	Gravity applies in the rotation direction. Tf = m·g·L Friction force applies in the rotation direction. Tf = μ·m·g·L Tf : Resistance load (N·m) m : Mass of load (kg) g : Gravity acceleration 9.8 (m/s²) L : Distance from oscillating center to gravity or friction force action point (m) μ : Friction coefficient	$Ta = I \cdot \dot{\omega} \cdot 2\pi / 360$ $(Ta = I \cdot \dot{\omega} \cdot 0.0175)$ Ta : Inertial load (N·m) I : Moment of inertia (kg·m²) $\dot{\omega}$: Acceleration/deceleration (°/sec²) ω : Speed (°/sec)
Required torque T=Ts	Required torque T=Tf×1.5 Note1)	Required torque T=Ta×1.5 Note1)

● **Load becomes the resistance load.**
Gravity or friction force applies in the rotation direction.

Example 1) The rotation center of the rotation axis does not match to the center of gravity of the load in the horizontal direction.

Example 2) The load slips on the floor to move it.

＊The required torque is the total of the resistance load and inertial load.
T = (Tf + Ta) × 1.5

● **Load does not become the resistance load.**
Gravity or friction force does not apply in the rotation direction.

Example 1) The rotation axis is vertical.

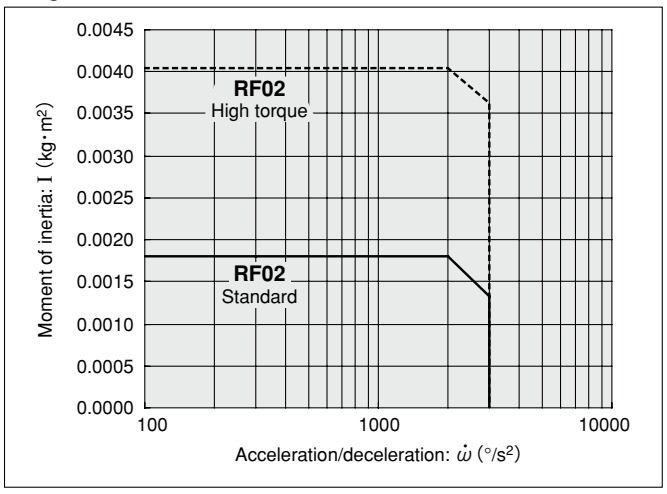
Example 2) The rotation center of the rotation axis does not match to the center of gravity of the load in the horizontal direction.

＊The required torque is only the inertial load.
T = Ta × 1.5

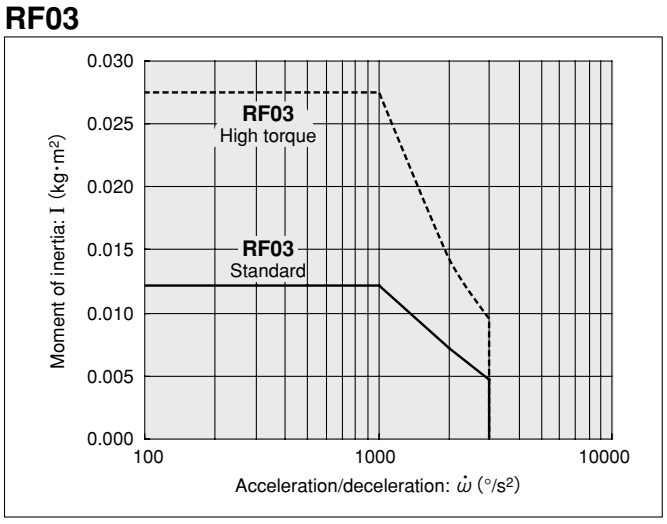
Note 1) An allowance is required for Tf and Ta to make the speed adjustment.

Moment of inertia Acceleration/deceleration

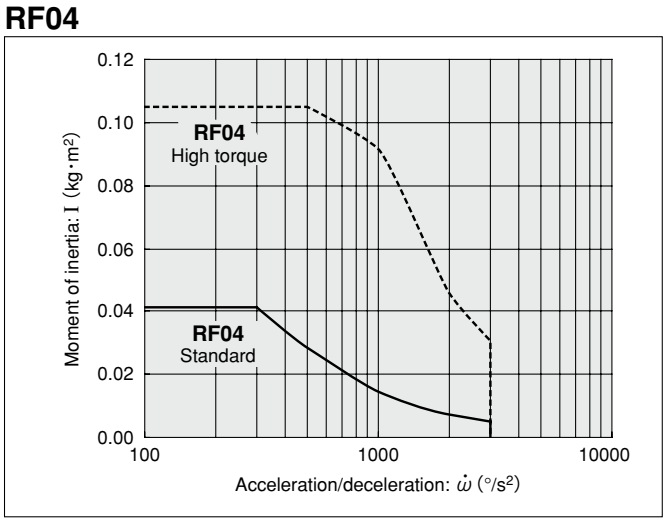
RF02



RF03

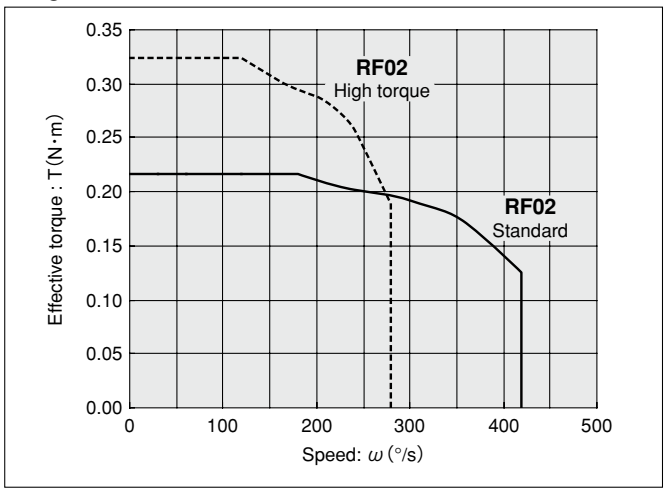


RF04

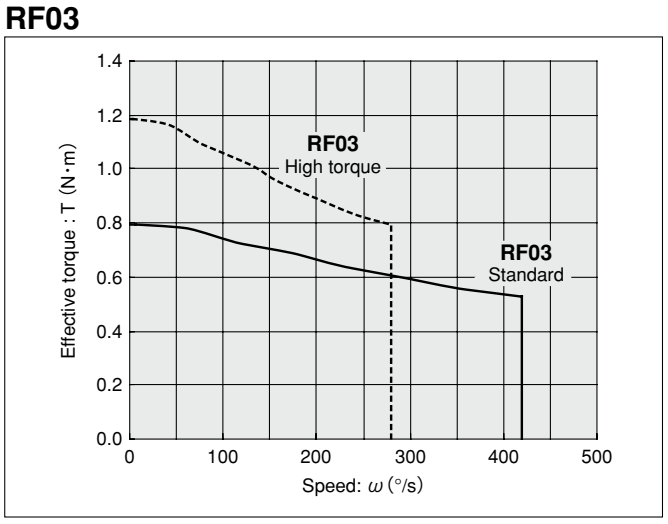


Effective torque Speed

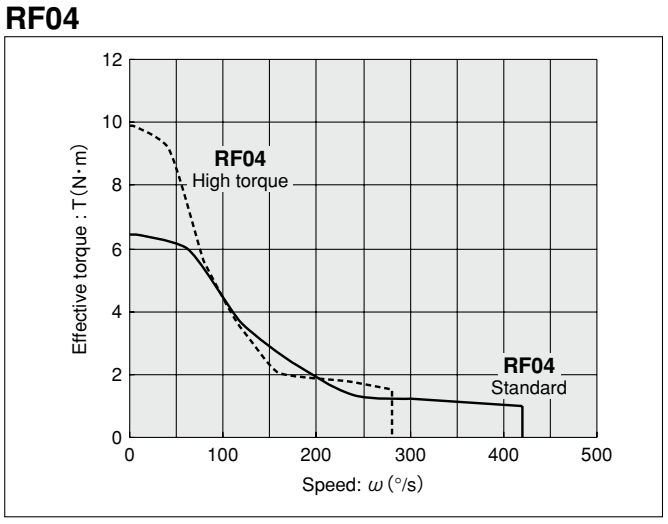
RF02



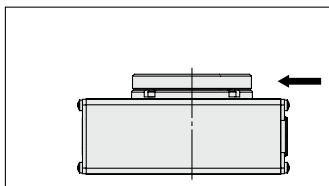
RF03

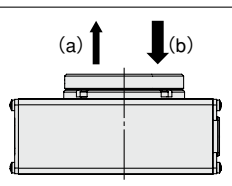


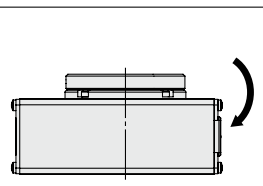
RF04



Allowable load







Size	Allowable radial load (N)		Allowable thrust load (N)				Allowable moment (N·m)	
			(a)		(b)			
	Standard model	High precision model	Standard model	High precision model	Standard model	High precision model	Standard model	High precision model
02	78	86	74		78	107	2.4	2.9
03	196	233	197		363	398	5.3	6.4
04	314	378	296		398	517	9.7	12.0

It is necessary to set the parameters for the controller. For details, see TRANSERVO Series User's Manual.

RF02-N

Rotary type / Limit rotation specification

CE compliance | Rotation range : 310°

Ordering method

RF02	N			L		
Model	Return-to-origin method	Bearing	Torque	Cable entry location	Rotation direction	Cable length Note 1
	N: Stroke end (Limit rotation)	N: Standard H: High rigidity	N: Standard torque H: High torque	L: From the left	N: CCW Z: CW	1K: 1m 3K: 3m 5K: 5m 10K: 10m

S2

Robot positioner	I/O
S2: TS-S2 Note2	NP: NPN PN: PNP CC: CC-Link DN: DeviceNet™ EP: EtherNet/IP™ PT: PROFINET GW: No I/O board Note 3

SH

Robot positioner	I/O	Battery
SH: TS-SH	NP: NPN PN: PNP CC: CC-Link DN: DeviceNet™ EP: EtherNet/IP™ PT: PROFINET GW: No I/O board Note 3	B: With battery (Absolute) N: None (Incremental)

SD — **1**

Robot driver	I/O cable
SD: TS-SD	1: 1m

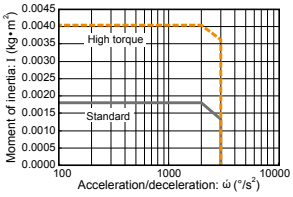
Note 1. The robot cable is flexible and resists bending.
Note 2. See P.600 for DIN rail mounting bracket.
Note 3. Select this selection when using the gateway function.

Basic specifications

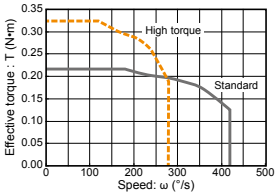
Motor	20 □ Step motor	
Resolution (Pulse/rotation)	4096	
Repeatability Note 1 (°)	+/-0.05	
Drive method	Special warm gear + belt	
Torque type	Standard	High torque
Maximum speed Note 2 (°/sec)	420	280
Rotating torque (N•m)	0.22	0.32
Max. pushing torque (N•m)	0.11	0.16
Backlash (°)	+/-0.5	
Max. moment of inertia Note 3 (kg•m²)	0.0018	0.004
Cable length (m)	Standard: 1 / Option: 3, 5, 10	
Rotation range (°)	310	

Note 1. Positioning repeatability in one direction.
Note 2. The maximum speed may vary depending on the moment of inertia. Check the maximum speed while referring to the "Moment of inertia vs. Acceleration/deceleration" graph and the "Effective torque vs. speed" graph (reference).
Note 3. For moment of inertia and effective torque details, see P.711.

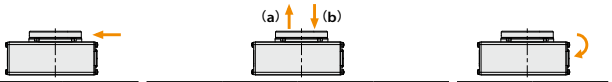
Moment of inertia Acceleration/deceleration



Effective torque vs. speed



Allowable load



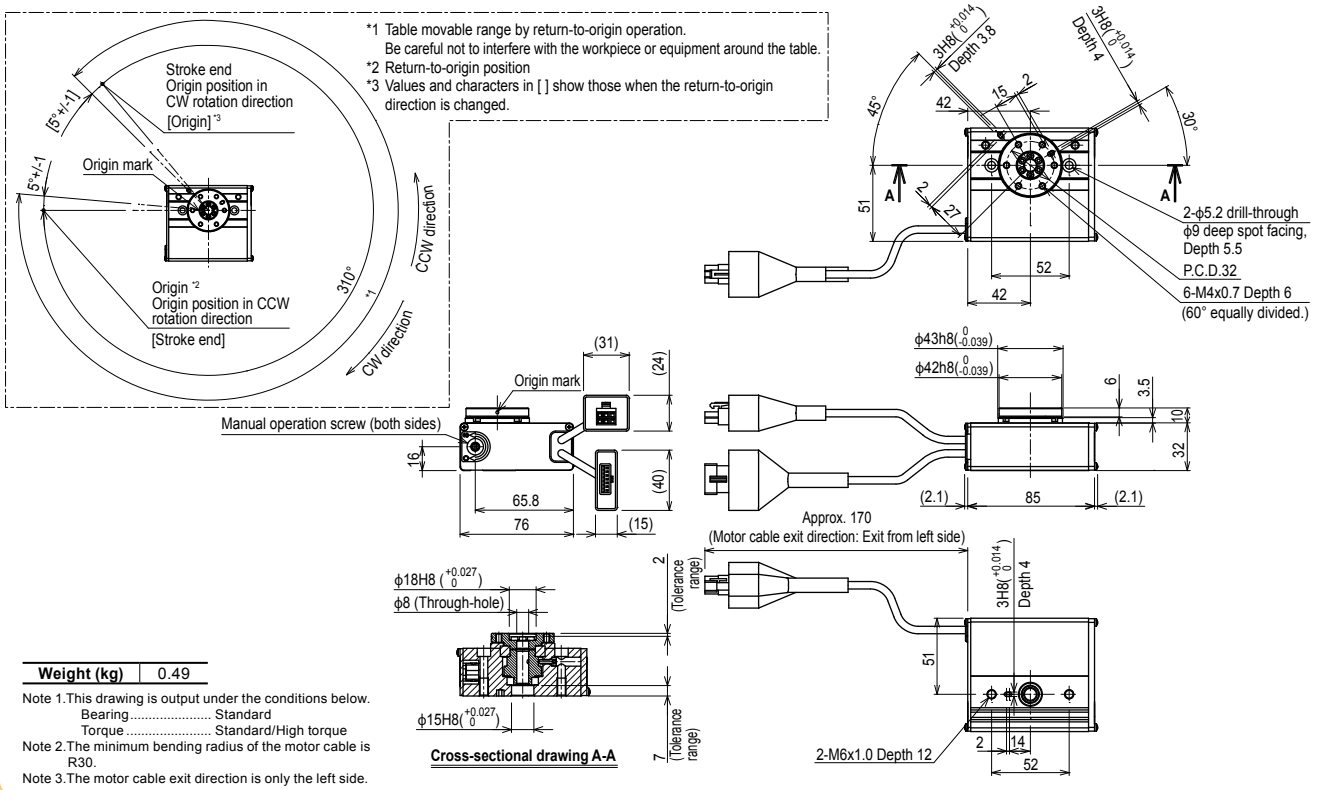
Allowable radial load (N)		Allowable thrust load (N)				Allowable moment (N•m)	
		(a)		(b)			
Standard model	High rigidity model	Standard model	High rigidity model	Standard model	High rigidity model	Standard model	High rigidity model
78	86	74		78	107	2.4	2.9

Note. When purchasing the product, set the controller acceleration while carefully checking the "Moment of inertia vs. Acceleration/Deceleration" and "Effective torque vs. Speed" graphs.
For details, please refer to the TRANSERVO Series User's Manual.

Controller

Controller	Operation method
TS-S2 TS-SH	I/O point trace / Remote command
TS-SD	Pulse train control

RF02-NN Limit rotation specification – Standard model

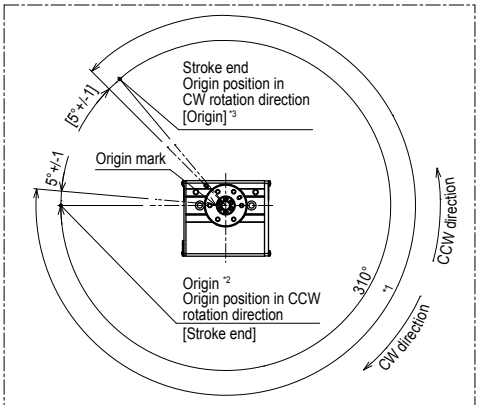


Weight (kg)	0.49

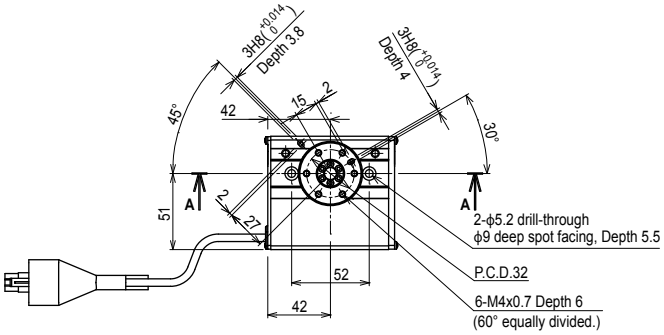
Note 1.This drawing is output under the conditions below.
Bearing..... Standard
Torque..... Standard/High torque
Note 2.The minimum bending radius of the motor cable is R30.
Note 3.The motor cable exit direction is only the left side.

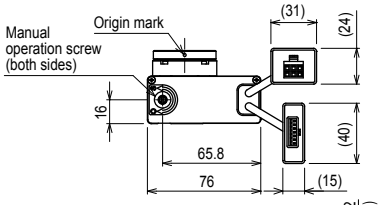
Controller TS-S2 ▸ 592 | TS-SH ▸ 592 | TS-SD ▸ 602

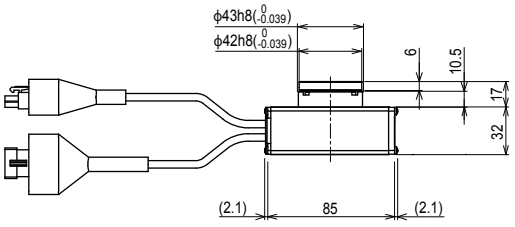
RF02-NH Limit rotation specification – High rigidity model

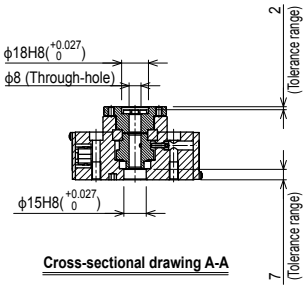


*1 Table movable range by return-to-origin operation.
Be careful not to interfere with the workpiece or equipment around the table.
*2 Return-to-origin position
*3 Values and characters in [ ] show those when the return-to-origin direction is changed.

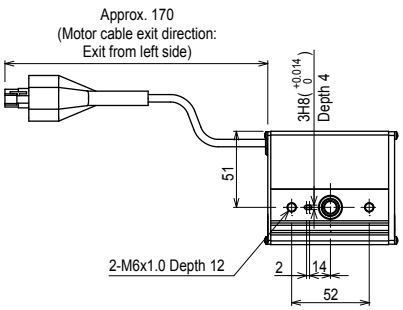








Cross-sectional drawing A-A



Weight (kg)	0.52

Note 1.This drawing is output under the conditions below.
Bearing..... High rigidity
Torque ..... Standard/High torque
Note 2.The minimum bending radius of the motor cable is R30.
Note 3.The motor cable exit direction is only the left side.

RF02-S

Rotary type / Sensor specification

CE compliance　Limitless rotation

Ordering method

RF02 – [S] – [ ] – [ ] – [L] – [ ] – [ ] – [ ]

Model	Return-to-origin method	Bearing	Torque	Cable entry location	Rotation direction	Cable length Note 1
RF02	S: Sensor (Limitless rotation)	N: Standard H: High rigidity	N: Standard torque H: High torque	L: From the left	N: CCW Z: CW	1K: 1m 3K: 3m 5K: 5m 10K: 10m

S2S

Robot positioner	I/O
S2S: TS-S2S Note 2	NP: NPN PN: PNP CC: CC-Link DN: DeviceNet™ EP: EtherNet/IP™ PT: PROFINET GW: No I/O board Note 3

SHS

Robot positioner	I/O	Battery
SHS: TS-SHS	NP: NPN PN: PNP CC: CC-Link DN: DeviceNet™ EP: EtherNet/IP™ PT: PROFINET GW: No I/O board Note 3	B: With battery (Absolute) N: None (Incremental)

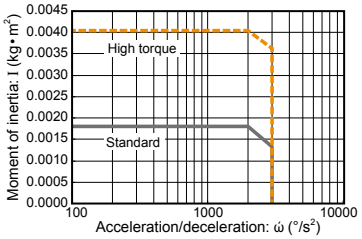
Note 1. The robot cable is flexible and resists bending.
Note 2. See P.600 for DIN rail mounting bracket.
Note 3. Select this selection when using the gateway function.

Basic specifications

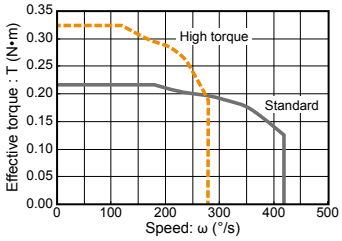
Motor	20□ Step motor	
Resolution (Pulse/rotation)	4096	
Repeatability Note 1 (°)	+/-0.05	
Drive method	Special warm gear + belt	
Torque type	Standard	High torque
Maximum speed Note 2 (°/sec)	420	280
Rotating torque (N•m)	0.22	0.32
Max. pushing torque (N•m)	0.11	0.16
Backlash (°)	+/-0.5	
Max. moment of inertia Note 3 (kg•m²)	0.0018	0.004
Cable length (m)	Standard: 1 / Option: 3, 5, 10	
Rotation range (°)	360	

Note 1. Positioning repeatability in one direction.
Note 2. The maximum speed may vary depending on the moment of inertia. Check the maximum speed while referring to the "Moment of inertia vs. Acceleration/deceleration" graph and the "Effective torque vs. speed" graph (reference).
Note 3. For moment of inertia and effective torque details, see P.711.

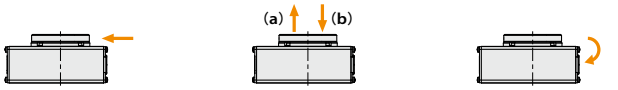
Moment of inertia Acceleration/deceleration



Effective torque vs. speed



Allowable load



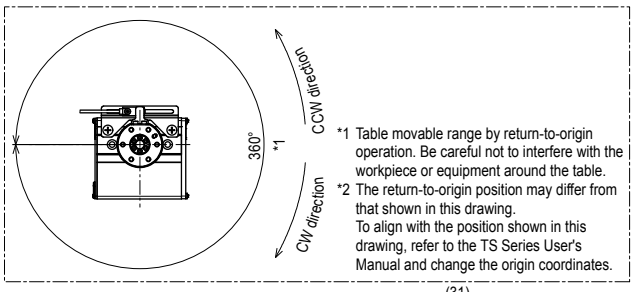
Allowable radial load (N)		Allowable thrust load (N)				Allowable moment (N•m)	
		(a)		(b)			
Standard model	High rigidity model	Standard model	High rigidity model	Standard model	High rigidity model	Standard model	High rigidity model
78	86	74		78	107	2.4	2.9

Note. When purchasing the product, set the controller acceleration while carefully checking the "Moment of inertia vs. Acceleration/Deceleration" and "Effective torque vs. Speed" graphs.
For details, please refer to the TRANSERVO Series User's Manual.

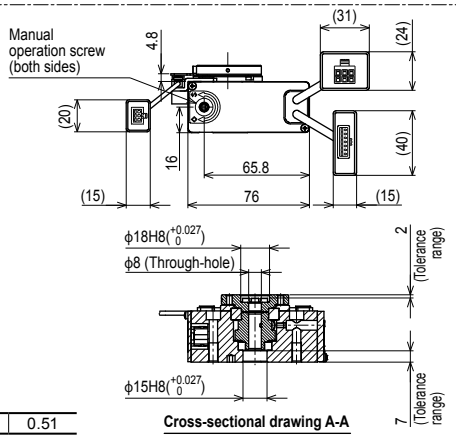
Controller

Controller	Operation method
TS-S2S	I/O point trace / Remote command
TS-SHS	

RF02-SN　Sensor specification – Standard model

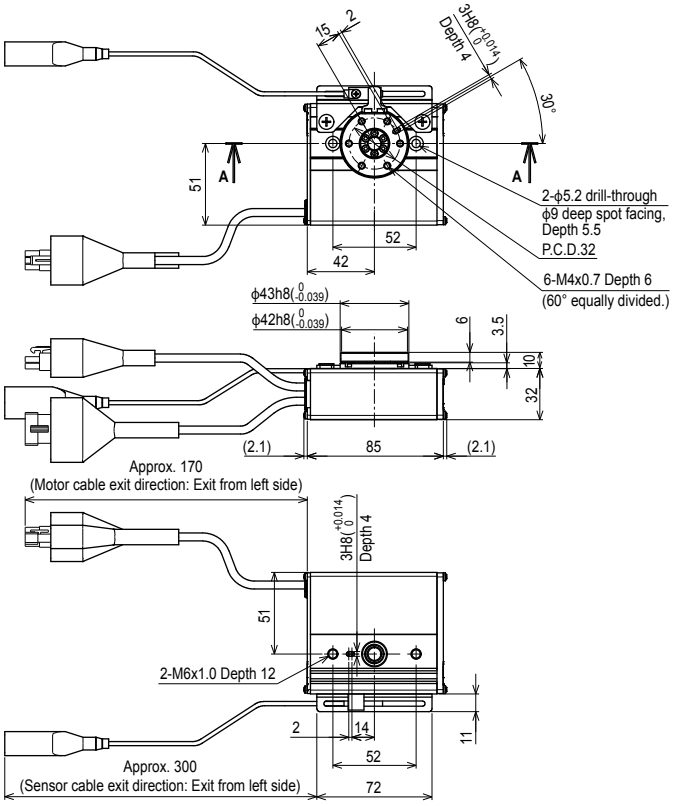


*1 Table movable range by return-to-origin operation. Be careful not to interfere with the workpiece or equipment around the table.
*2 The return-to-origin position may differ from that shown in this drawing. To align with the position shown in this drawing, refer to the TS Series User's Manual and change the origin coordinates.



Weight (kg)	0.51

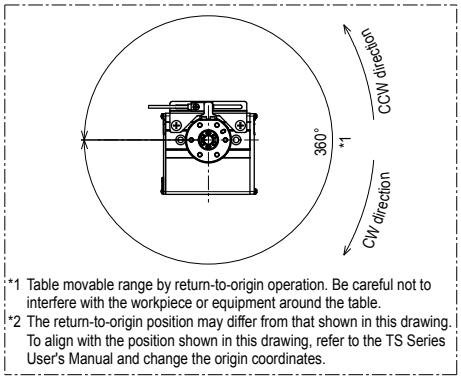
Cross-sectional drawing A-A



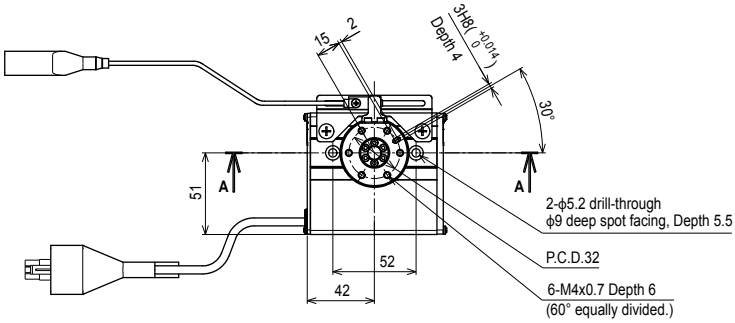
Note 1. This drawing is output under the conditions below.
Bearing..... Standard
Torque..... Standard/High torque
Note 2. The minimum bending radii of the motor cable and sensor cable are R30.
Note 3. The motor cable exit direction is only the left side.

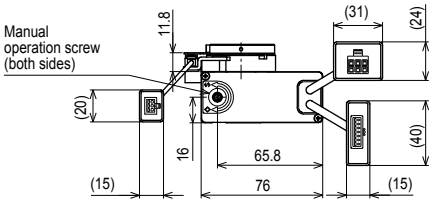
Controller TS-S2 ▶ 592 TS-SH ▶ 592

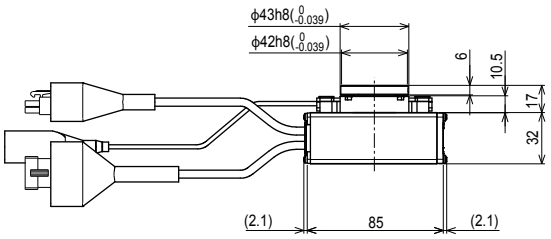
RF02-SH Sensor specification – High rigidity model

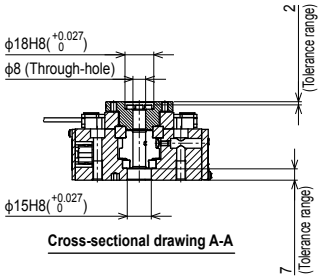


*1 Table movable range by return-to-origin operation. Be careful not to interfere with the workpiece or equipment around the table.
*2 The return-to-origin position may differ from that shown in this drawing. To align with the position shown in this drawing, refer to the TS Series User's Manual and change the origin coordinates.

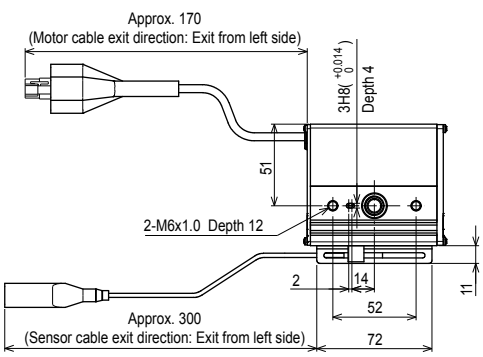








Cross-sectional drawing A-A



Weight (kg)	0.55

Note 1. This drawing is output under the conditions below.
Bearing..... High rigidity
Torque ..... Standard/High torque
Note 2. The minimum bending radii of the motor cable and sensor cable are R30.
Note 3. The motor cable exit direction is only the left side.

Controller TS-S2 ▶ 592 TS-SH ▶ 592

RF03-N

Rotary type / Limit rotation specification

CE compliance | Rotation range : 320°

Ordering method

RF03	N						
Model	Return-to-origin method	Bearing	Torque	Cable entry location	Rotation direction	Cable length Note 1	
	N: Stroke end (Limit rotation)	N: Standard H: High rigidity	N: Standard torque H: High torque	R:From the right L: From the left	N: CCW Z: CW	1K: 1m 3K: 3m 5K: 5m 10K: 10m	

S2

Robot positioner	I/O
S2: TS-S2 Note2	NP: NPN PN: PNP CC: CC-Link DN: DeviceNet™ EP: EtherNet/IP™ PT: PROFINET GW: No I/O board Note 3

SH

Robot positioner	I/O	Battery
SH: TS-SH	NP: NPN PN: PNP CC: CC-Link DN: DeviceNet™ EP: EtherNet/IP™ PT: PROFINET GW: No I/O board Note 3	B: With battery (Absolute) N: None (Incremental)

SD — **1**

Robot driver	I/O cable
SD: TS-SD	1: 1m

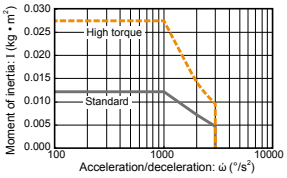
Note 1. The robot cable is flexible and resists bending.
Note 2. See P.600 for DIN rail mounting bracket.
Note 3. Select this selection when using the gateway function.

Basic specifications

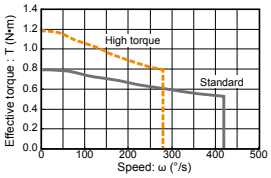
Motor	28 □ Step motor	
Resolution (Pulse/rotation)	4096	
Repeatability Note 1 **(°)**	+/-0.05	
Drive method	Special warm gear + belt	
Torque type	Standard	High torque
Maximum speed Note 2 **(°/sec)**	420	280
Rotating torque (N•m)	0.8	1.2
Max. pushing torque (N•m)	0.4	0.6
Backlash (°)	+/-0.5	
Max. moment of inertia Note 3 **(kg•m²)**	0.012	0.027
Cable length (m)	Standard: 1 / Option: 3, 5, 10	
Rotation range (°)	320	

Note 1. Positioning repeatability in one direction.
Note 2. The maximum speed may vary depending on the moment of inertia. Check the maximum speed while referring to the "Moment of inertia vs. Acceleration/deceleration" graph and the "Effective torque vs. speed" graph (reference).
Note 3. For moment of inertia and effective torque details, see P.711.

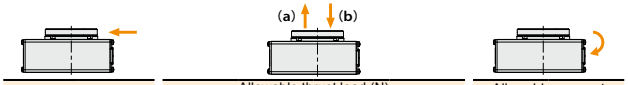
Moment of inertia Acceleration/deceleration



Effective torque vs. speed



Allowable load



Allowable radial load (N)		Allowable thrust load (N)				Allowable moment (N•m)	
		(a)		(b)			
Standard model	High rigidity model	Standard model	High rigidity model	Standard model	High rigidity model	Standard model	High rigidity model
196	233	197		363	398	5.3	6.4

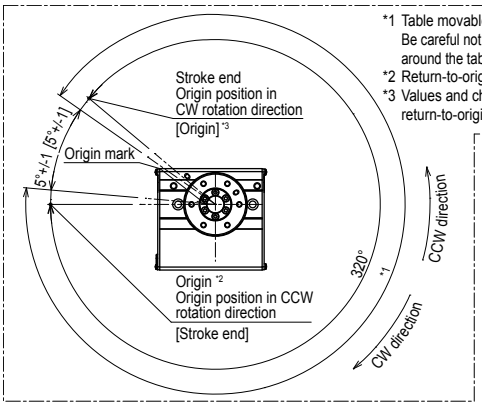
Note. When purchasing the product, set the controller acceleration while carefully checking the "Moment of inertia vs. Acceleration/Deceleration" and "Effective torque vs. Speed" graphs.
For details, please refer to the TRANSERVO Series User's Manual.

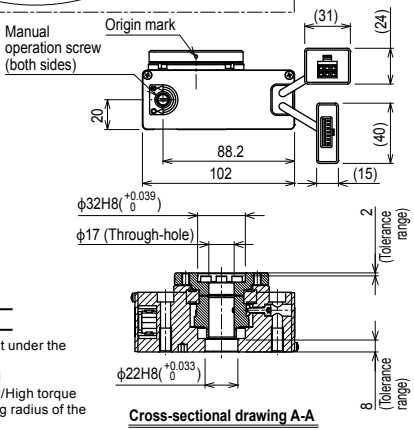
Controller

Controller	Operation method
TS-S2 TS-SH	I/O point trace / Remote command
TS-SD	Pulse train control

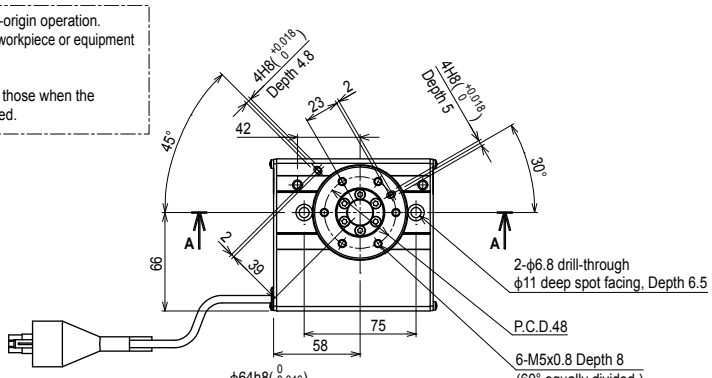
RF03-NN Limit rotation specification – Standard model

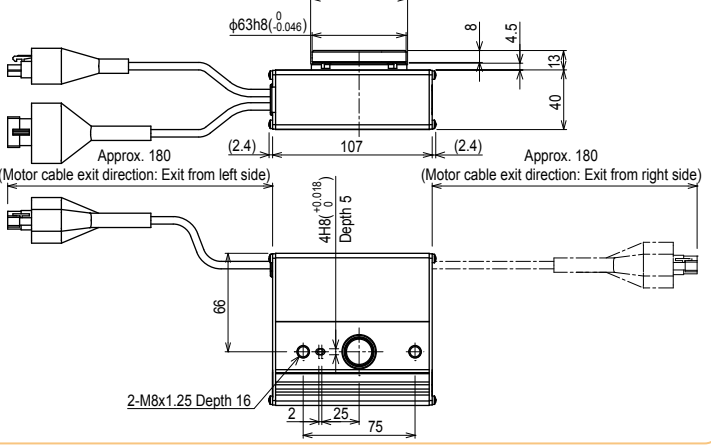
*1 Table movable range by return-to-origin operation. Be careful not to interfere with the workpiece or equipment around the table.
*2 Return-to-origin position
*3 Values and characters in [ ] show those when the return-to-origin direction is changed.





Cross-sectional drawing A-A



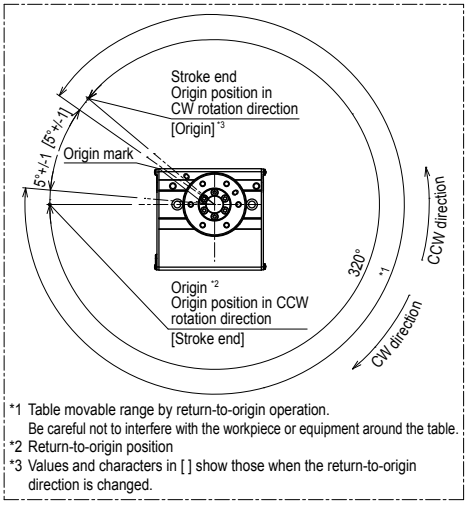


Weight (kg)	1.1

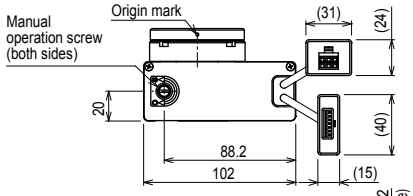
Note 1.This drawing is output under the conditions below.
Bearing ... Standard
Torque..... Standard/High torque
Note 2.The minimum bending radius of the motor cable is R30.

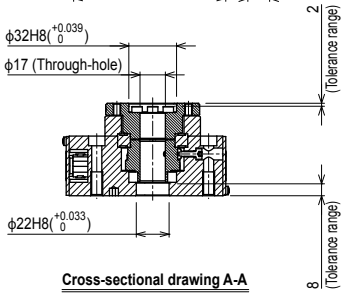
Controller TS-S2 ▸ 592 | TS-SH ▸ 592 | TS-SD ▸ 602

RF03-NH Limit rotation specification – High rigidity model

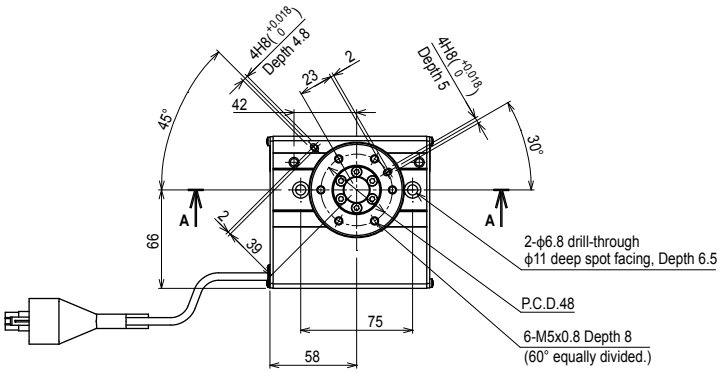


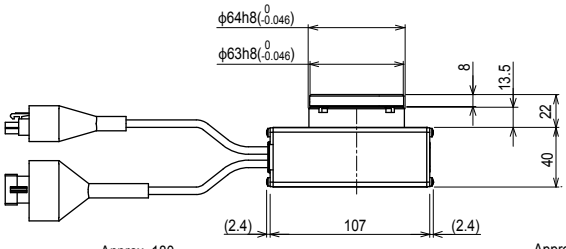
*1 Table movable range by return-to-origin operation.
Be careful not to interfere with the workpiece or equipment around the table.
*2 Return-to-origin position
*3 Values and characters in [ ] show those when the return-to-origin direction is changed.

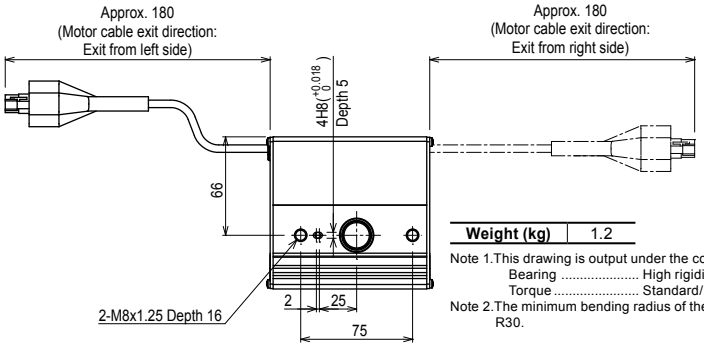




Cross-sectional drawing A-A







Weight (kg)	1.2

Note 1.This drawing is output under the conditions below.
Bearing ..... High rigidity
Torque ..... Standard/High torque
Note 2.The minimum bending radius of the motor cable is R30.

RF03-S

Rotary type / Sensor specification

CE compliance | Limitless rotation

Ordering method

RF03	S					
Model	Return-to-origin method	Bearing	Torque	Cable entry location	Rotation direction	Cable length Note 1
	S: Sensor (Limitless rotation)	N: Standard H: High rigidity	N: Standard torque H: High torque	R: From the right L: From the left	N: CCW Z: CW	1K: 1m 3K: 3m 5K: 5m 10K: 10m

S2S

Robot positioner	I/O
S2S: TS-S2S Note2	NP: NPN PN: PNP CC: CC-Link DN: DeviceNet™ EP: EtherNet/IP™ PT: PROFINET GW: No I/O board Note 3

SHS

Robot positioner	I/O	Battery
SHS: TS-SHS	NP: NPN PN: PNP CC: CC-Link DN: DeviceNet™ EP: EtherNet/IP™ PT: PROFINET GW: No I/O board Note 3	B: With battery (Absolute) N: None (Incremental)

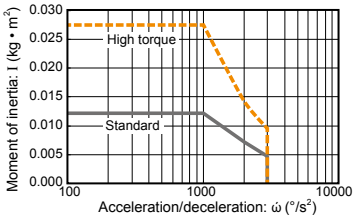
Note 1. The robot cable is flexible and resists bending.
Note 2. See P.600 for DIN rail mounting bracket.
Note 3. Select this selection when using the gateway function.

Basic specifications

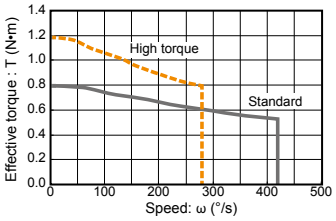
Motor	28 □ Step motor	
Resolution (Pulse/rotation)	4096	
Repeatability Note 1 **(°)**	+/-0.05	
Drive method	Special warm gear + belt	
Torque type	Standard	High torque
Maximum speed Note 2 **(°/sec)**	420	280
Rotating torque (N•m)	0.8	1.2
Max. pushing torque (N•m)	0.4	0.6
Backlash (°)	+/-0.5	
Max. moment of inertia Note 3 **(kg•m²)**	0.012	0.027
Cable length (m)	Standard: 1 / Option: 3, 5, 10	
Rotation range (°)	360	

Note 1. Positioning repeatability in one direction.
Note 2. The maximum speed may vary depending on the moment of inertia. Check the maximum speed while referring to the "Moment of inertia vs. Acceleration/deceleration" graph and the "Effective torque vs. speed" graph (reference).
Note 3. For moment of inertia and effective torque details, see P.711.

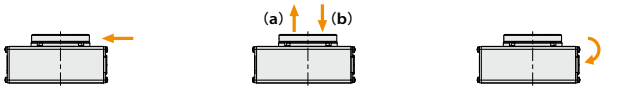
Moment of inertia Acceleration/deceleration



Effective torque vs. speed



Allowable load



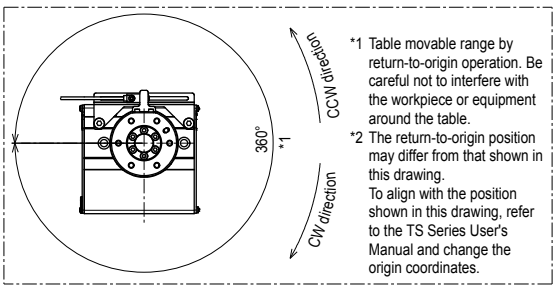
Allowable radial load (N)		Allowable thrust load (N)				Allowable moment (N•m)	
		(a)		(b)			
Standard model	High rigidity model	Standard model	High rigidity model	Standard model	High rigidity model	Standard model	High rigidity model
196	233	197		363	398	5.3	6.4

Note. When purchasing the product, set the controller acceleration while carefully checking the "Moment of inertia vs. Acceleration/Deceleration" and "Effective torque vs. Speed" graphs.
For details, please refer to the TRANSERVO Series User's Manual.

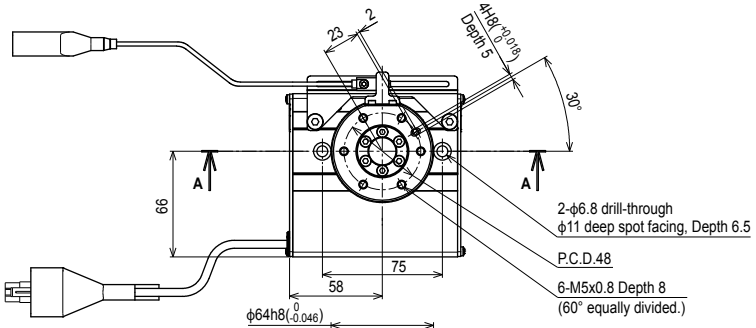
Controller

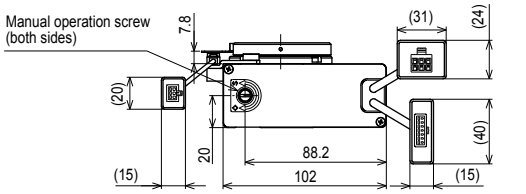
Controller	Operation method
TS-S2S	I/O point trace / Remote command
TS-SHS	

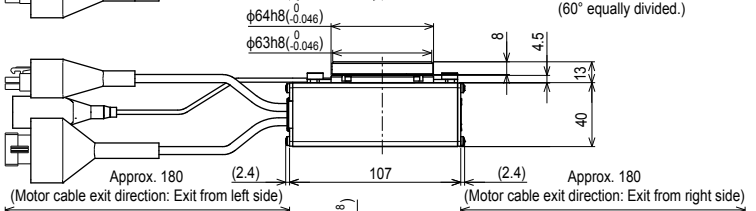
RF03-SN Sensor specification – Standard model

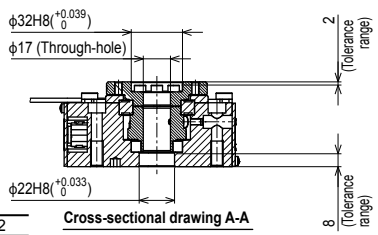


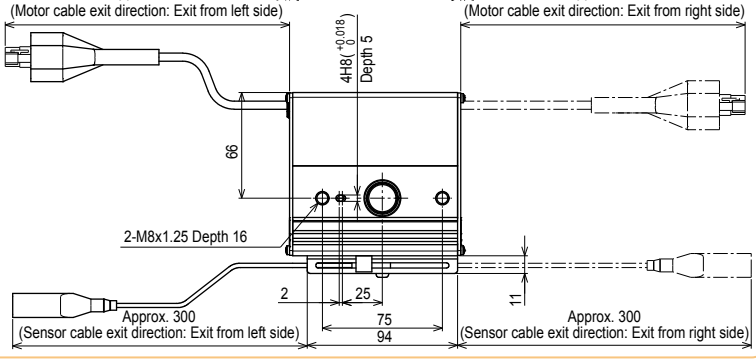
*1 Table movable range by return-to-origin operation. Be careful not to interfere with the workpiece or equipment around the table.
*2 The return-to-origin position may differ from that shown in this drawing.
To align with the position shown in this drawing, refer to the TS Series User's Manual and change the origin coordinates.









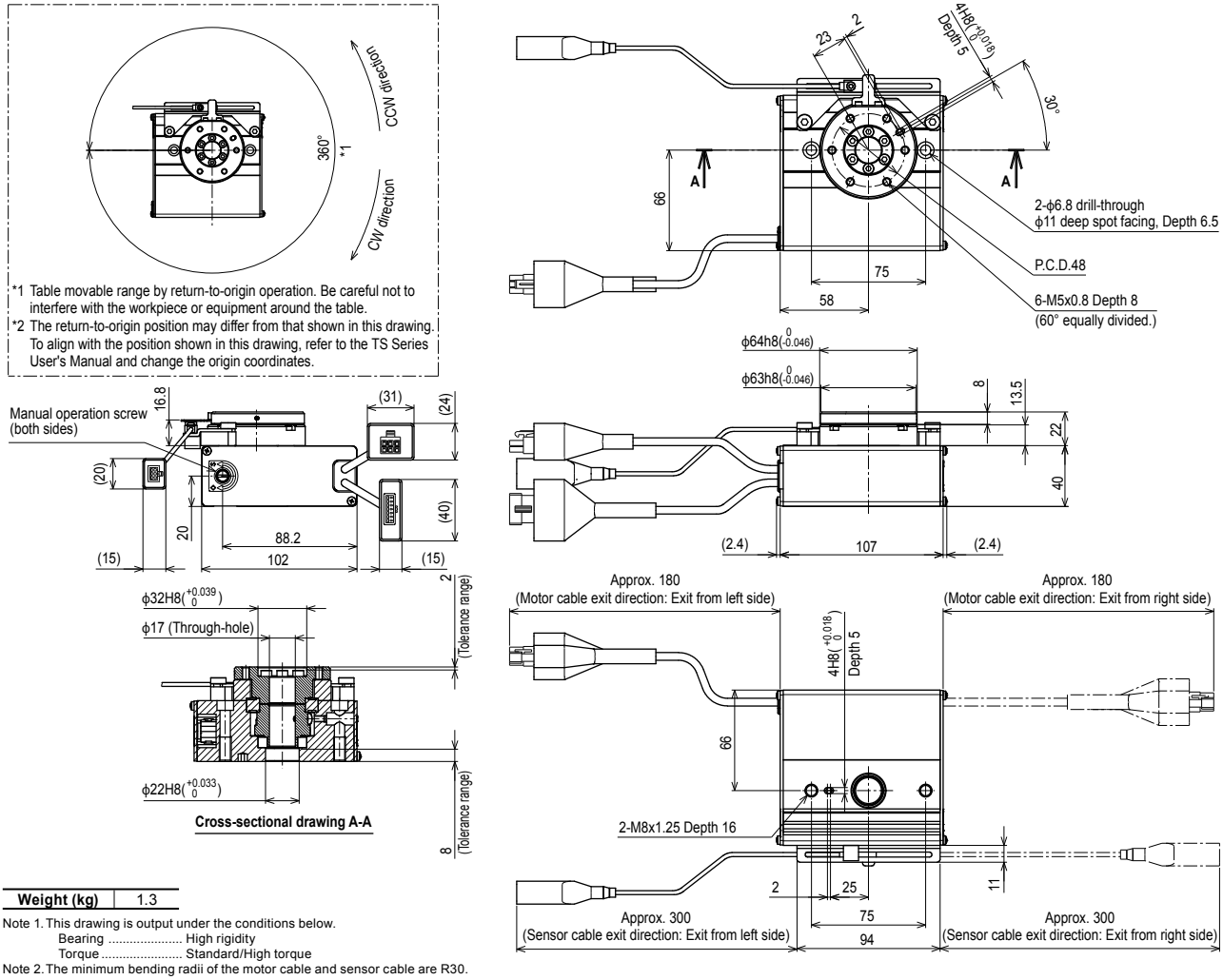


Weight (kg)	1.2

Cross-sectional drawing A-A

Note 1. This drawing is output under the conditions below.
Bearing..... Standard
Torque..... Standard/High torque
Note 2. The minimum bending radii of the motor cable and sensor cable are R30.

RF03-SH Sensor specification – High rigidity model

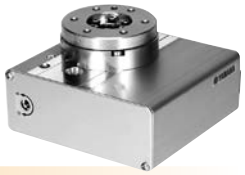


Weight (kg)	1.3

Note 1. This drawing is output under the conditions below.
Bearing ..... High rigidity
Torque ..... Standard/High torque
Note 2. The minimum bending radii of the motor cable and sensor cable are R30.

RF04-N

Rotary type / Limit rotation specification



- CE compliance
- Rotation range : 320°

Ordering method

Model	Return-to-origin method	Bearing	Torque	Cable entry location	Rotation direction	Cable length [Note 1]
RF04	N					
	N: Stroke end (Limit rotation)	N: Standard H: High rigidity	N: Standard torque H: High torque	R: From the right L: From the left	N: CCW Z: CW	1K: 1m 3K: 3m 5K: 5m 10K: 10m

S2

Robot positioner	I/O
S2: TS-S2 [Note 2]	NP: NPN PN: PNP CC: CC-Link DN: DeviceNet™ EP: EtherNet/IP™ PT: PROFINET GW: No I/O board [Note 3]

SH

Robot positioner	I/O	Battery
SH: TS-SH	NP: NPN PN: PNP CC: CC-Link DN: DeviceNet™ EP: EtherNet/IP™ PT: PROFINET GW: No I/O board [Note 3]	B: With battery (Absolute) N: None (Incremental)

SD — **1**

Robot driver	I/O cable
SD: TS-SD	1: 1m

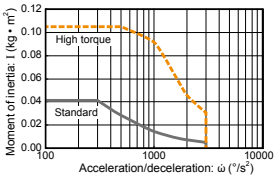
Note 1. The robot cable is flexible and resists bending.
Note 2. See P.600 for DIN rail mounting bracket.
Note 3. Select this selection when using the gateway function.

Basic specifications

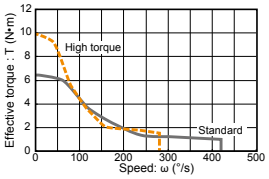
Motor	42 □ Step motor	
Resolution (Pulse/rotation)	20480	
Repeatability [Note 1] (°)	+/-0.05	
Drive method	Special warm gear + belt	
Torque type	Standard	High torque
Maximum speed [Note 2] (°/sec)	420	280
Rotating torque (N•m)	6.6	10
Max. pushing torque (N•m)	3.3	5
Backlash (°)	+/-0.5	
Max. moment of inertia [Note 3] (kg•m²)	0.04	0.1
Cable length (m)	Standard: 1 / Option: 3, 5, 10	
Rotation range (°)	320	

Note 1. Positioning repeatability in one direction.
Note 2. The maximum speed may vary depending on the moment of inertia. Check the maximum speed while referring to the "Moment of inertia vs. Acceleration/deceleration" graph and the "Effective torque vs. speed" graph (reference).
Note 3. For moment of inertia and effective torque details, see P.711.

Moment of inertia Acceleration/deceleration



Effective torque vs. speed



Allowable load

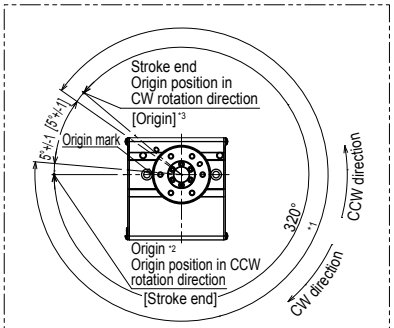
Allowable radial load (N)		Allowable thrust load (N)				Allowable moment (N•m)	
		(a)		(b)			
Standard model	High rigidity model	Standard model	High rigidity model	Standard model	High rigidity model	Standard model	High rigidity model
314	378	296		398	517	9.7	12.0

Note. When purchasing the product, set the controller acceleration while carefully checking the "Moment of inertia vs. Acceleration/Deceleration" and "Effective torque vs. Speed" graphs.
For details, please refer to the TRANSERVO Series User's Manual.

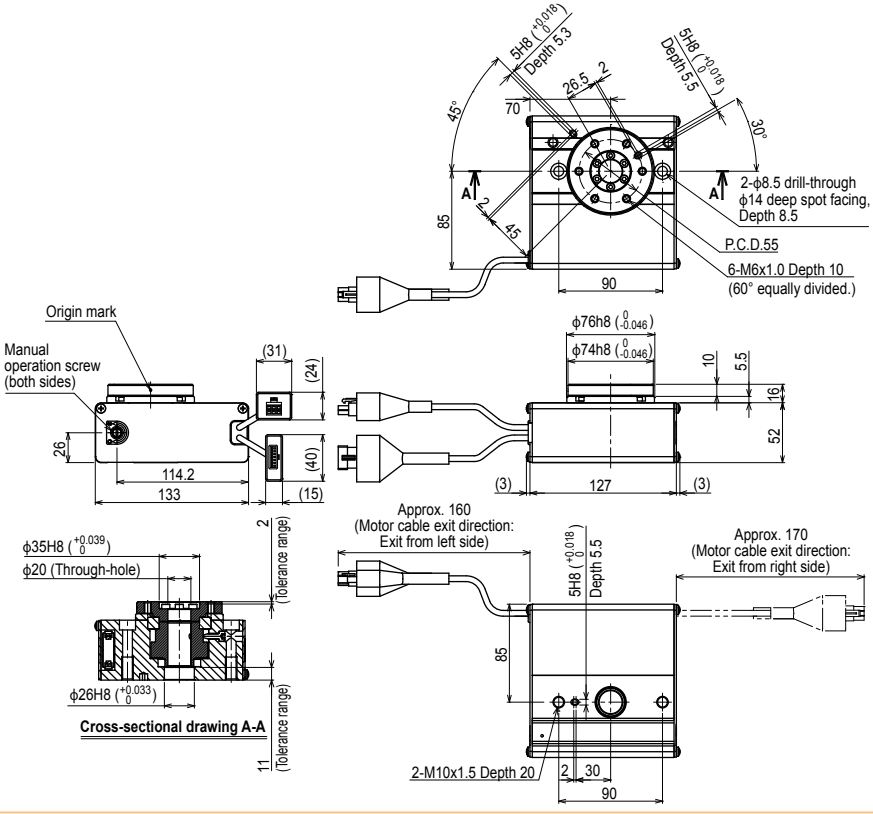
Controller

Controller	Operation method
TS-S2 TS-SH	I/O point trace / Remote command
TS-SD	Pulse train control

RF04-NN Limit rotation specification – Standard model



*1 Table movable range by return-to-origin operation. Be careful not to interfere with the workpiece or equipment around the table.
*2 Return-to-origin position
*3 Values and characters in [ ] show those when the return-to-origin direction is changed.

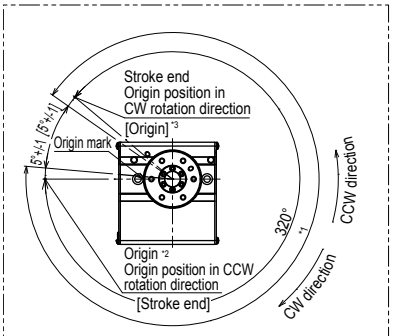


Weight (kg)	2.2

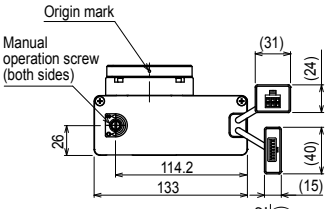
Note 1.This drawing is output under the conditions below.
Bearing..... Standard
Torque ..... Standard/High torque
Note 2.The minimum bending radius of the motor cable is R30.

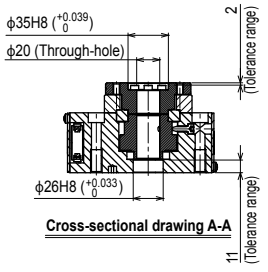
Controller TS-S2 ▸ 592 | TS-SH ▸ 592 | TS-SD ▸ 602

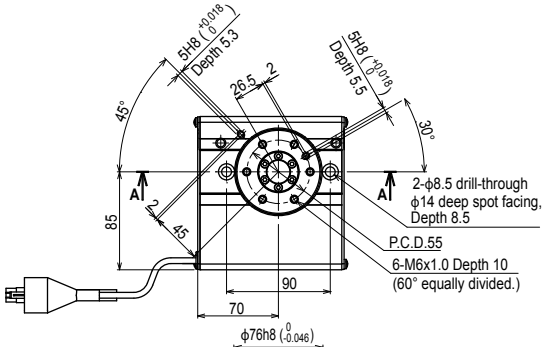
RF04-NH Limit rotation specification – High rigidity model

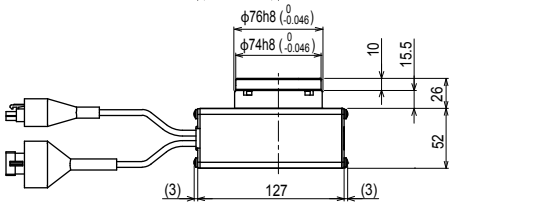


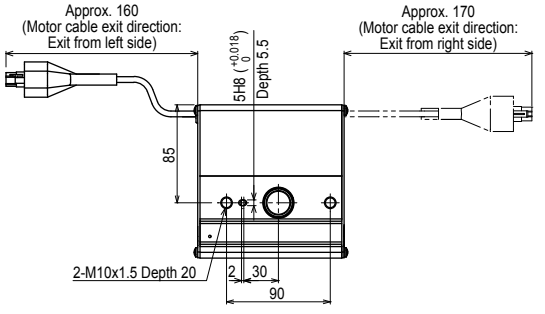
*1 Table movable range by return-to-origin operation. Be careful not to interfere with the workpiece or equipment around the table.
*2 Return-to-origin position
*3 Values and characters in [ ] show those when the return-to-origin direction is changed.











Weight (kg)	2.4

Note 1.This drawing is output under the conditions below.
Bearing..... High rigidity
Torque ..... Standard/High torque
Note 2.The minimum bending radius of the motor cable is R30.

RF04-S

Rotary type / Sensor specification

CE compliance | Limitless rotation

Ordering method

RF04 – **S** – [ ] – [ ] – [ ] – [ ] – [ ] – [ ]

Model	Return-to-origin method	Bearing	Torque	Cable entry location	Rotation direction	Cable length Note 1
RF04	S: Sensor (Limitless rotation)	N: Standard H: High rigidity	N: Standard torque H: High torque	R: From the right L: From the left	N: CCW Z: CW	1K: 1m 3K: 3m 5K: 5m 10K: 10m

S2S

Robot positioner	I/O
S2S: TS-S2S Note 2	NP: NPN PN: PNP CC: CC-Link DN: DeviceNet™ EP: EtherNet/IP™ PT: PROFINET GW: No I/O board Note 3

SHS

Robot positioner	I/O	Battery
SHS: TS-SHS	NP: NPN PN: PNP CC: CC-Link DN: DeviceNet™ EP: EtherNet/IP™ PT: PROFINET GW: No I/O board Note 3	B: With battery (Absolute) N: None (Incremental)

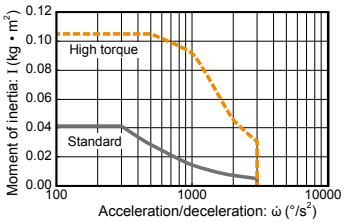
Note 1. The robot cable is flexible and resists bending.
Note 2. See P.600 for DIN rail mounting bracket.
Note 3. Select this selection when using the gateway function.

Basic specifications

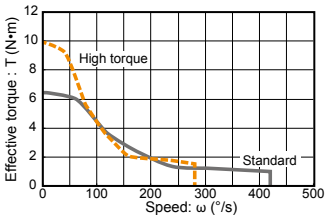
Motor	42 □ Step motor	
Resolution (Pulse/rotation)	20480	
Repeatability Note 1 (°)	+/-0.05	
Drive method	Special warm gear + belt	
Torque type	Standard	High torque
Maximum speed Note 2 (°/sec)	420	280
Rotating torque (N•m)	6.6	10
Max. pushing torque (N•m)	3.3	5
Backlash (°)	+/-0.5	
Max. moment of inertia Note 3 (kg•m²)	0.04	0.1
Cable length (m)	Standard: 1 / Option: 3, 5, 10	
Rotation range (°)	360	

Note 1. Positioning repeatability in one direction.
Note 2. The maximum speed may vary depending on the moment of inertia. Check the maximum speed while referring to the "Moment of inertia vs. Acceleration/deceleration" graph and the "Effective torque vs. speed" graph (reference).
Note 3. For moment of inertia and effective torque details, see P.711.

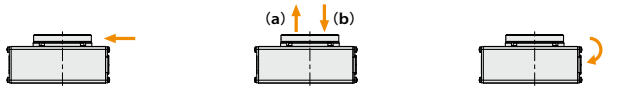
Moment of inertia Acceleration/deceleration



Effective torque vs. speed



Allowable load



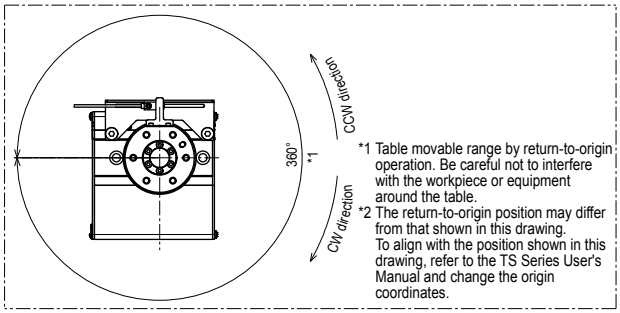
Allowable radial load (N)		Allowable thrust load (N)				Allowable moment (N•m)	
		(a)		(b)			
Standard model	High rigidity model	Standard model	High rigidity model	Standard model	High rigidity model	Standard model	High rigidity model
314	378	296		398	517	9.7	12.0

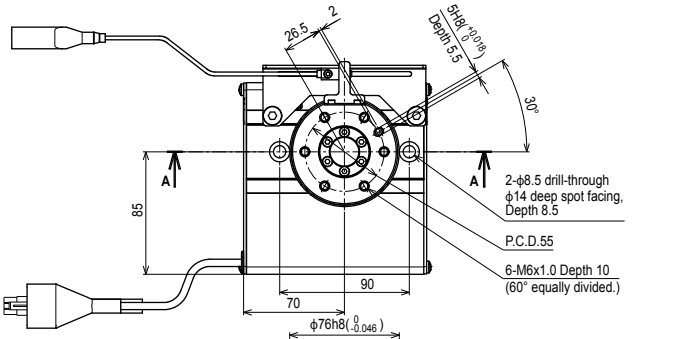
Note. When purchasing the product, set the controller acceleration while carefully checking the "Moment of inertia vs. Acceleration/Deceleration" and "Effective torque vs. Speed" graphs.
For details, please refer to the TRANSERVO Series User's Manual.

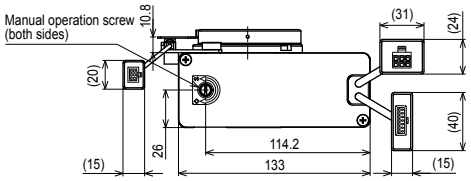
Controller

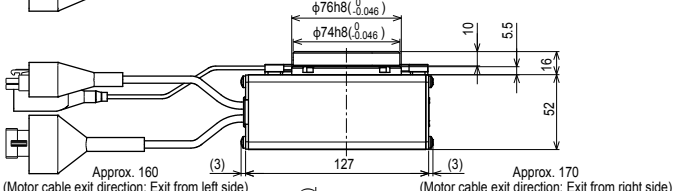
Controller	Operation method
TS-S2S	I/O point trace / Remote command
TS-SHS	

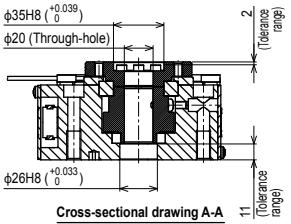
RF04-SN Sensor specification – Standard model

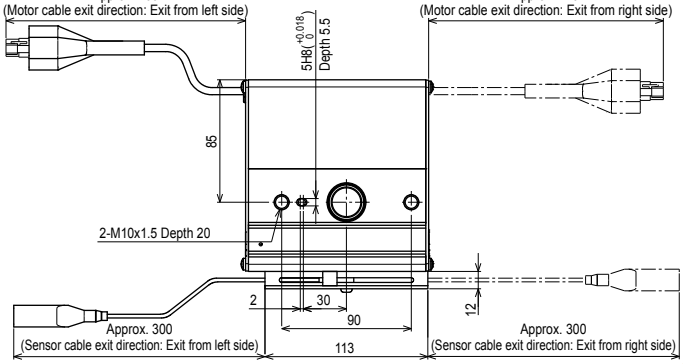










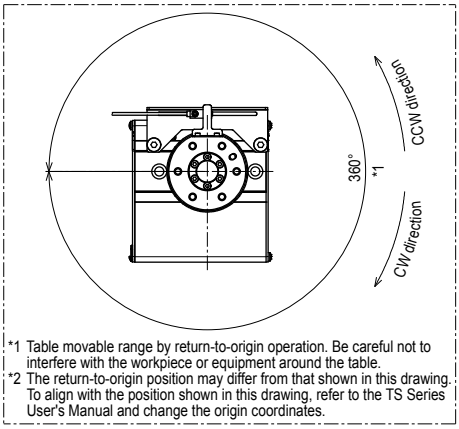


Weight (kg)	2.3

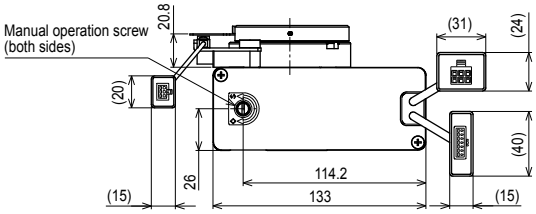
Note 1. This drawing is output under the conditions below.
Bearing..... Standard
Torque ..... Standard/High torque
Note 2. The minimum bending radii of the motor cable and sensor cable are R30.

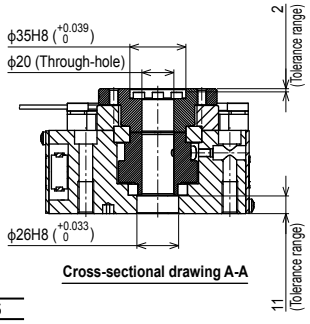
Controller TS-S2 ▶ 592 TS-SH ▶ 592

RF04-SH Sensor specification – High rigidity model



*1 Table movable range by return-to-origin operation. Be careful not to interfere with the workpiece or equipment around the table.
*2 The return-to-origin position may differ from that shown in this drawing. To align with the position shown in this drawing, refer to the TS Series User's Manual and change the origin coordinates.





Cross-sectional drawing A-A

Weight (kg)	2.5

Note 1. This drawing is output under the conditions below.
Bearing..... High rigidity
Torque ..... Standard/High torque
Note 2. The minimum bending radii of the motor cable and sensor cable are R30.