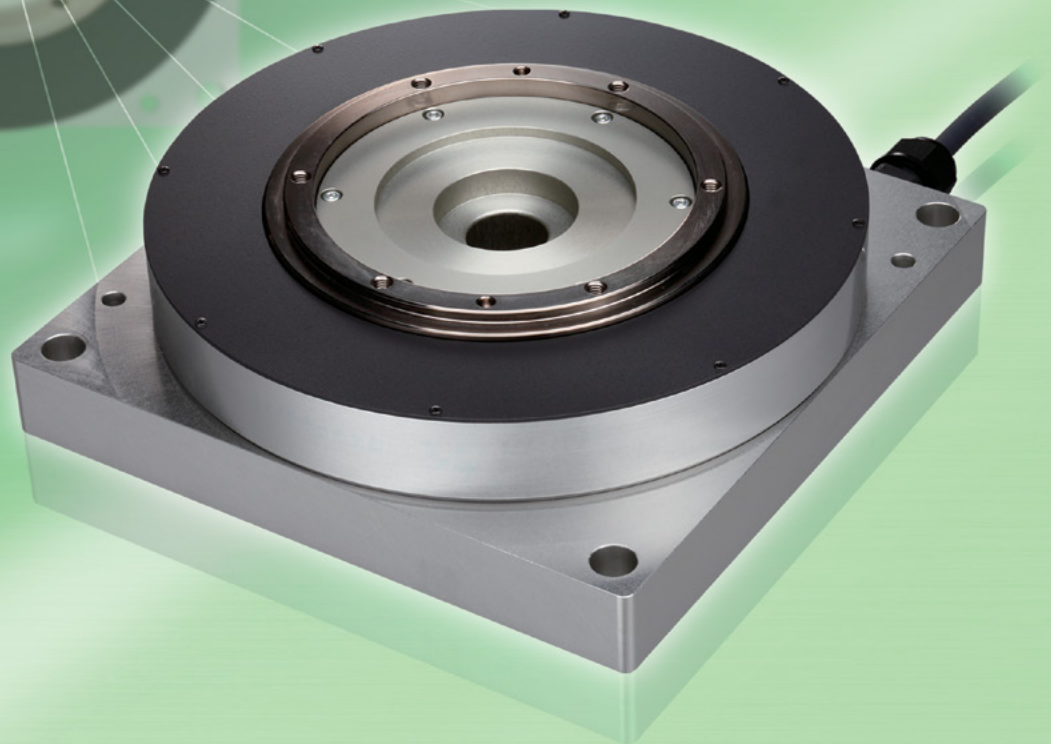# IAI
Quality and Innovation

Direct Drive Motor **DD**

Newest Additions to the Series

- High Torque Type
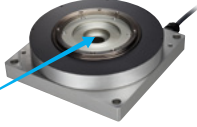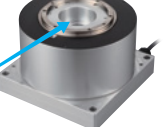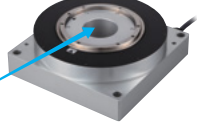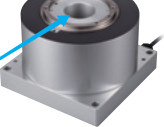- Large Hollow Bore Type
- High Resolution Type

High Speed, High Payload, High Accuracy, Introducing A Direct Drive Motor Boasting

Features

The Direct Drive Motor is a rotary actuator that directly drives a rotary table with a motor without using any speed reducing mechanism such as a belt or reduction gears.

Eliminating the speed reducing mechanism explains why high speed and excellent response can be attained with such a compact frame.

1 High Torque Type, Large Hollow Bore Type — Latest Additions to the Series

	Slim type (Rated torque: 8.4 N·m)	High torque type (Rated torque: 25 N·m)
Standard Hollow bore type	**T18 type** — Hollow bore: ø20.5 mm	**H18 type** — Hollow bore: ø20.5 mm
Large Hollow bore type	**LT18 type** — Hollow bore: ø47.0 mm	**LH18 type** — Hollow bore: ø47.0 mm

2 High Torque, High Payload

The series now includes models designed for high torque and high payload, so you can choose an ideal model for your application.

200 mm × 200 mm
MAX 25 kg

200 mm × 200 mm
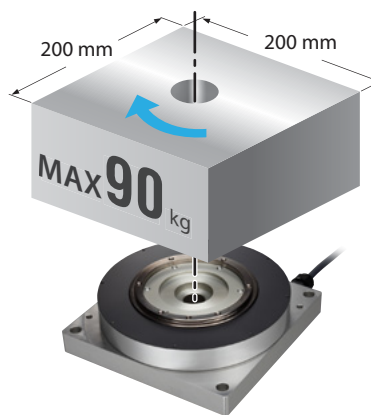MAX 90 kg

200 mm × 200 mm
MAX 270 kg
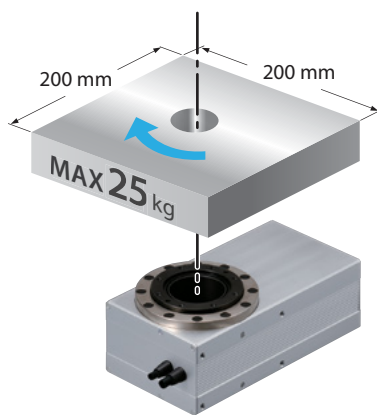
RCS2-RTC12L (reduction ratio 1/30)
Allowable moment of inertia
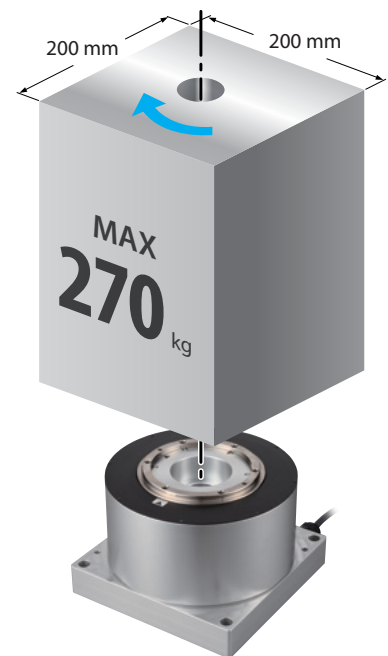**0.17** kg·m²
Max. instantaneous torque 8.6 N·m

DD-T18/LT18 type
Allowable moment of inertia
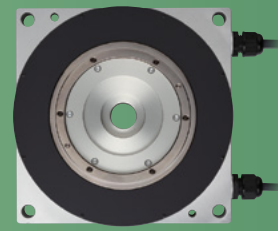**0.60** kg·m²
Max. instantaneous torque 25.2 N·m

DD-H18/LH18 type
Allowable moment of inertia
1.8 kg·m²
Max. instantaneous torque 75 N·m

and Easy to Control!
Ultimate Usability.

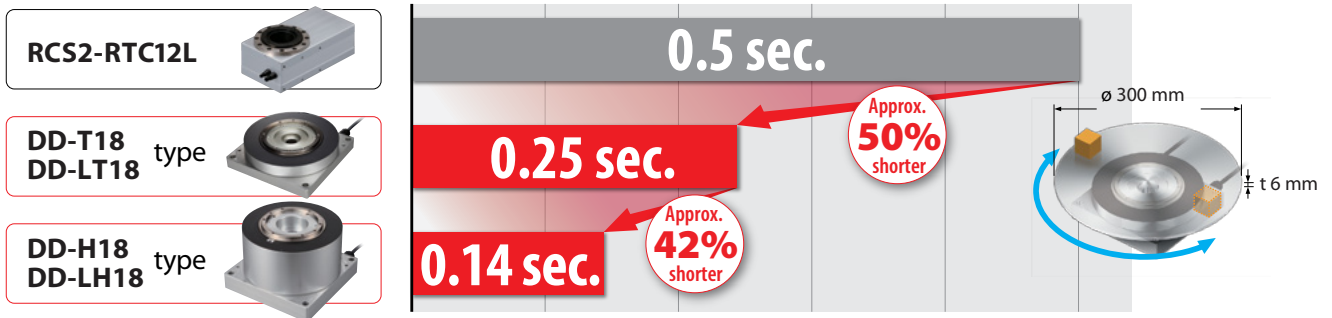## 3 High Speed, High Acceleration/Deceleration

Shorter positioning time means shorter cycle time of your equipment, resulting in greater productivity.

<Comparison of Cycle Times>

Operating conditions: When a work part weighing 100 g is placed on an aluminum disc of 300 mm in diameter and 6 mm in thickness and rotated by 180 deg.

RCS2-RTC12L

DD-T18
DD-LT18 type

DD-H18
DD-LH18 type

0.5 sec.

0.25 sec.

Approx. **50%** shorter

0.14 sec.

Approx. **42%** shorter

ø 300 mm

t 6 mm

4 High Resolution Type Added

	High resolution type **NEW**	Standard type
Model	DD-□18P	DD-□18S
Encoder resolution	20-bit 1,048,576 pulses/rev	17-bit 131,072 pulses/rev
Positioning repeatability	±0.00103 deg ±3.7 arcsec	±0.0055 deg ±19.8 arcsec

5 Index Absolute Type or Multi-rotation Absolute Type Can be Selected

The Direct Drive Motor comes in the index absolute type having an operating range of 0 to 359.999 deg and the multi-rotation absolute type having an operating range of ±9,999 deg. Neither type requires a home return, meaning that once the power has been turned on, the actuator can move directly from the current position. The index type does not need an absolute battery.
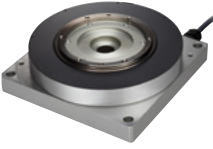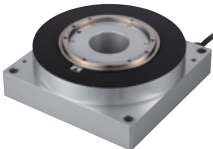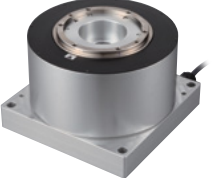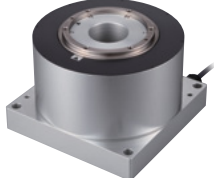
	Index absolute type	Multi-rotation absolute type
Range of operation	0 to 359.999 deg	±9,999 deg
Home return	Not required	Not required
Unlimited rotations	Yes	No
Absolute battery	Not required	Required

* Max. ± 2,520 deg for the 20-bit specifications (T18P/LT18P/H18P/LH18P)

Application Examples

Index table
<Small board inspection system>

Work part transfer
<Transfer of parts from conveyor to conveyor>

Multi-rotation operation
<Transfer of electronic components>
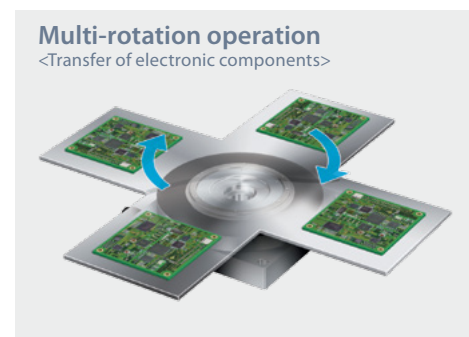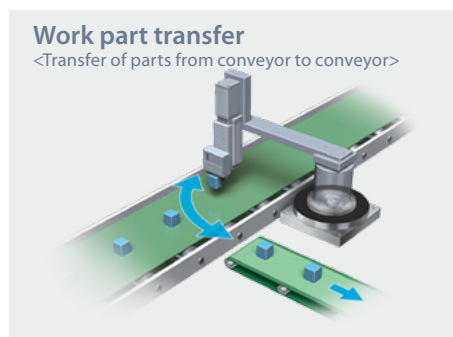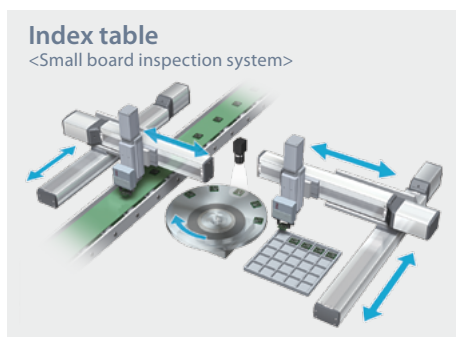
DD Motor Series List

Type	Standard bore, slim type		Large bore, slim type		Standard bore, high torque type		Large bore, high torque type	
Encoder	Standard (17-bit)	High resolution (20-bit)	Standard (17-bit)	High resolution (20-bit)	Standard (17-bit)	High resolution (20-bit)	Standard (17-bit)	High resolution (20-bit)
Model	DD-T18S	DD-T18P	DD-LT18S	DD-LT18P	DD-H18S	DD-H18P	DD-LH18S	DD-LH18P
External view								
Rated torque (N·m)	8.4				25			
Max. instantaneous torque (N·m)	25.2				75			
Rated speed (deg/s)	1,080				1,440			
Maximum speed (deg/s)	1,800				1,440			
Allowable load inertia (kg·m^2)	0.6				1.8			
Motor wattage (W)	200				600			
Size (mm)	180 × 180				180 × 180			
Height (mm)	53		63		125			
Hollow bore (mm)	ø20.5		ø47		ø20.5		ø47	
Weight (kg)	5		6		13.6		13	
Encoder type	Index absolute Multi-rotation absolute							
Applicable controller	XSEL SCON-CA	SCON-CA	XSEL SCON-CA	SCON-CA	XSEL SCON-CA	SCON-CA	XSEL SCON-CA	SCON-CA
Reference page	P4		P5		P6		P7	

Model Description

DD — [Type] — [Encoder type] — [Motor wattage] — **360** Range of operation — **T2** Applicable controller — [Cable length]

DD Series — **Type** — **Encoder type** — **Motor wattage** — **360** Range of operation — **T2** Applicable controller — **Cable length**

	Type	Encoder
T18S	Standard bore, slim	Standard (17-bit)
T18P	Standard bore, slim	High resolution (20-bit)
LT18S	Large bore, slim	Standard (17-bit)
LT18P	Large bore, slim	High resolution (20-bit)
H18S	Standard bore, high torque	Standard (17-bit)
H18P	Standard bore, high torque	High resolution (20-bit)
LH18S	Large bore, high torque	Standard (17-bit)
LH18P	Large bore, high torque	High resolution (20-bit)

AI	Index absolute
AM	Multi-rotation absolute

200	200W
600	600W

360	360 deg

T2	SCON-CA
	XSEL-P/Q
	XSEL-R/S

Note: Only SCON-CA can be selected for the encoder high-resolution type (20-bit).

N	None
S	3m
M	5m
X□□	Specified length

DD-T18

Direct Drive Motor
Standard bore   Slim type

Model Specification Items

DD	—	T18☐	—	☐	—	200	—	360	—	T2	—	☐
Series		Type		Encoder type		Motor wattage		Range of operation		Applicable controller		Cable length

S : Standard (17-bit)
P : High resolution (20-bit)

AI : Index absolute type
AM : Multi-rotation absolute type

200 : 200W

360 : 360 deg

T2 : SCON-CA
XSEL-P/Q
XSEL-R/S
Note : Only SCON-CA
applys for T18P

N : None
S : 3m
M : 5m
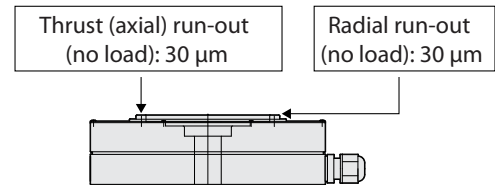X☐☐ : Specified length

Model/ Specifications

Model number	Encoder type	Motor wattage (W)	Range of operation (deg)	Speed (Note 1) (deg/s)	Rated torque (N·m) (*)	Maximum instantaneous torque (N·m)	Allowable load inertia (kg·m²)	Rotor inertia (kg·m²)
DD-T18①-②-200-360-T2-③	Index absolute type Multi-rotation absolute type	200	360	1 to 1,080 (1 to 1,800)	8.4	25.2	0.6	0.001984

Legend   ① Encoder resolution ② Encoder type ③ Cable length   (*) The value when installed on an IAI rated heat dissipating plate. (Please see P9 for further details.)
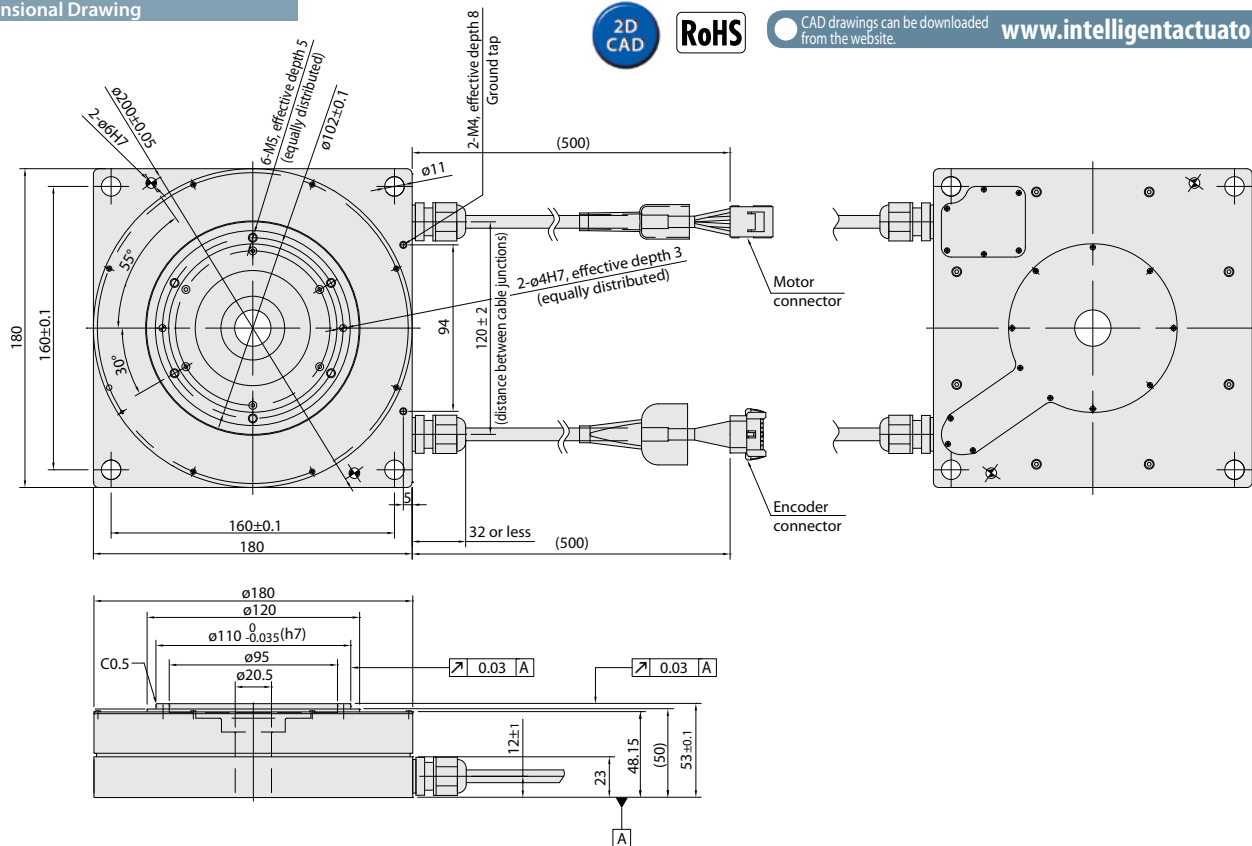
Common Specifications

Drive system	Direct Drive Motor
Positioning repeatability	17-bit: ±0.0055 deg 20-bit: ±0.00103 deg
Allowable dynamic load moment (Note 2)	80 N·m
Encoder resolution	17-bit: 131,072 (pulses/rev) 20-bit: 1,048,576 (pulses/rev)
Allowable thrust load (Note 2)	3,400 N [3,100N for the high resolution type]
Base material	Aluminum
Ambient operating temperature/humidity	0 to 40℃, 20 to 85% (Non-condensing)
Weight	5 kg

Run-out of Output Shaft

Thrust (axial) run-out (no load): 30 μm

Radial run-out (no load): 30 μm

Dimensional Drawing

2D CAD RoHS

CAD drawings can be downloaded from the website. www.intelligentactuator.com

Applicable Controller Specifications

Applicable controllers	Max. number of controlled axes	Operating method	Power supply voltage
SCON-CA	1-axis	Positioner	200VAC Single-phase
XSEL-P/Q/R/S	2-axis Single-phase 8-axis Three-phase	Program	200VAC Single-phase 200VAC Three-phase

Note: For DD-T18P, only SCON-CA controller applys.
Note: For the three-phase XSEL-P/Q type, 6-axes is the maximum number of controlled axes.

⚠ Caution

(Note 1) The value in ( ) indicates the maximum speed.
The maximum speed may not be reached if the moving distance is short.
(Note 2) Assuming that the actuator is operated 8 hours a day at the rated speed and smooth operation without shock, the actuator will reach its life in five years based on this load.
(Note 3) The maximum cable length is 30 m. Specify a desired length in meters. (Example: X08 = 8m)
(Note 4) Please consult IAI if you are considering a 20-bit actuator and using it under conditions where the allowable dynamic moment and allowable thrust load will be exceeded.

4

DD-LT18
Direct Drive Motor
Large bore   Slim type

Model Specification Items

DD – LT18□ – □ – 200 – 360 – T2 – □

| Series | — | Type | — | Encoder type | — | Motor wattage | — | Range of operation | — | Applicable controller | | Cable length |

S : Standard (17-bit)
P : High resolution (20-bit)

Type

AI : Index absolute type
AM : Multi-rotation absolute type

Encoder type

Motor wattage
200 : 200W

Range of operation
360 : 360 deg

Applicable controller
T2 : SCON-CA
XSEL-P/Q
XSEL-R/S
Note : Only SCON-CA applys for LT18P

Cable length
N : None
S : 3m
M : 5m
X□□ : Specified length

Model/ Specifications

Model number	Encoder type	Motor wattage (W)	Range of operation (deg)	Speed (Note 1) (deg/s)	Rated torque (N·m) (*)	Maximum instantaneous torque (N·m)	Allowable load inertia (kg·m²)	Rotor inertia (kg·m²)
DD-LT18①-②-200-360-T2-③	Index absolute type Multi-rotation absolute type	200	360	1 to 1,080 (1 to 1,800)	8.4	25.2	0.6	0.001984

Legend   ① Encoder resolution ② Encoder type ③ Cable length   (*) The value when installed on an IAI rated heat dissipating plate. (Please see P9 for further details.)

Common Specifications

Drive system	Direct Drive Motor
Positioning repeatability	17-bit: ±0.0055 deg 20-bit: ±0.00103 deg
Allowable dynamic load moment (Note 2)	80 N·m
Encoder resolution	17-bit: 131,072 (pulses/rev) 20-bit: 1,048,576 (pulses/rev)
Allowable thrust load (Note 2)	3,400 N [3,100N for the high resolution type]
Base material	Aluminum
Ambient operating temperature/humidity	0 to 40°C, 20 to 85% (Non-condensing)
Weight	6 kg

Run-out of Output Shaft

Thrust (axial) run-out (no load): 30 μm

Radial run-out (no load): 30 μm

Dimensional Drawing

Motor connector

Encoder connector

Applicable Controller Specifications

Applicable controllers	Max. number of controlled axes	Operating method	Power supply voltage
SCON-CA	1-axis	Positioner	200VAC Single-phase
XSEL-P/Q/R/S	2-axis Single-phase 8-axis Three-phase	Program	200VAC Single-phase 200VAC Three-phase

Note: For DD-LT18P, only SCON-CA controller applys.
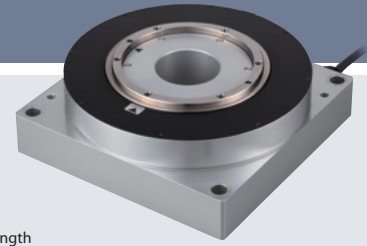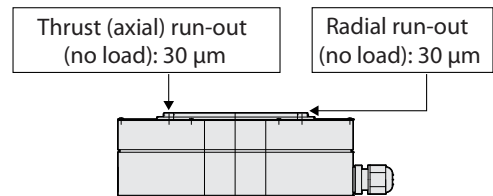Note: For the three-phase XSEL-P/Q type, 6-axes is the maximum number of controlled axes.

⚠ Caution

(Note 1) The value in ( ) indicates the maximum speed.
The maximum speed may not be reached if the moving distance is short.
(Note 2) Assuming that the actuator is operated 8 hours a day at the rated speed and smooth operation without shock, the actuator will reach its life in five years based on this load.
(Note 3) The maximum cable length is 30 m. Specify a desired length in meters.
(Example: X08 = 8m)
(Note 4) Please consult IAI if you are considering a 20-bit actuator and using it under conditions where the allowable dynamic moment and allowable thrust load will be exceeded.

DD-H18

Direct Drive Motor
Standard bore   High-torque type
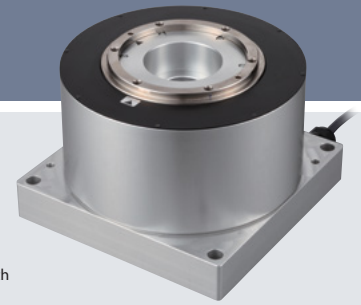
Model Specification Items

DD	–	H18☐	–	☐	–	600	–	360	–	T2	–	☐

Series — Type — Encoder type — Motor wattage — Range of operation — Applicable controller — Cable length

Type
S : Standard (17-bit)
P : High resolution (20-bit)

Encoder type
AI : Index absolute type
AM : Multi-rotation absolute type

Motor wattage
600 : 600W

Range of operation
360 : 360 deg

Applicable controller
T2 : SCON-CA
XSEL-P/Q
XSEL-R/S
Note : Only SCON-CA applys for H18P

Cable length
N : None
S : 3m
M : 5m
X☐☐ : Specified length

Model/ Specifications

Model number	Encoder type	Motor wattage (W)	Range of operation (deg)	Speed (Note 1) (deg/s)	Rated torque (N·m) (*)	Maximum instantaneous torque (N·m)	Allowable load inertia (kg·m²)	Rotor inertia (kg·m²)
DD-H18①-②-600-360-T2-③	Index absolute type Multi-rotation absolute type	600	360	1 to 1,440	25	75	1.8	0.0106

Legend   ① Encoder resolution ② Encoder type ③ Cable length   (*) The value when installed on an IAI rated heat dissipating plate. (Please see P9 for further details.)
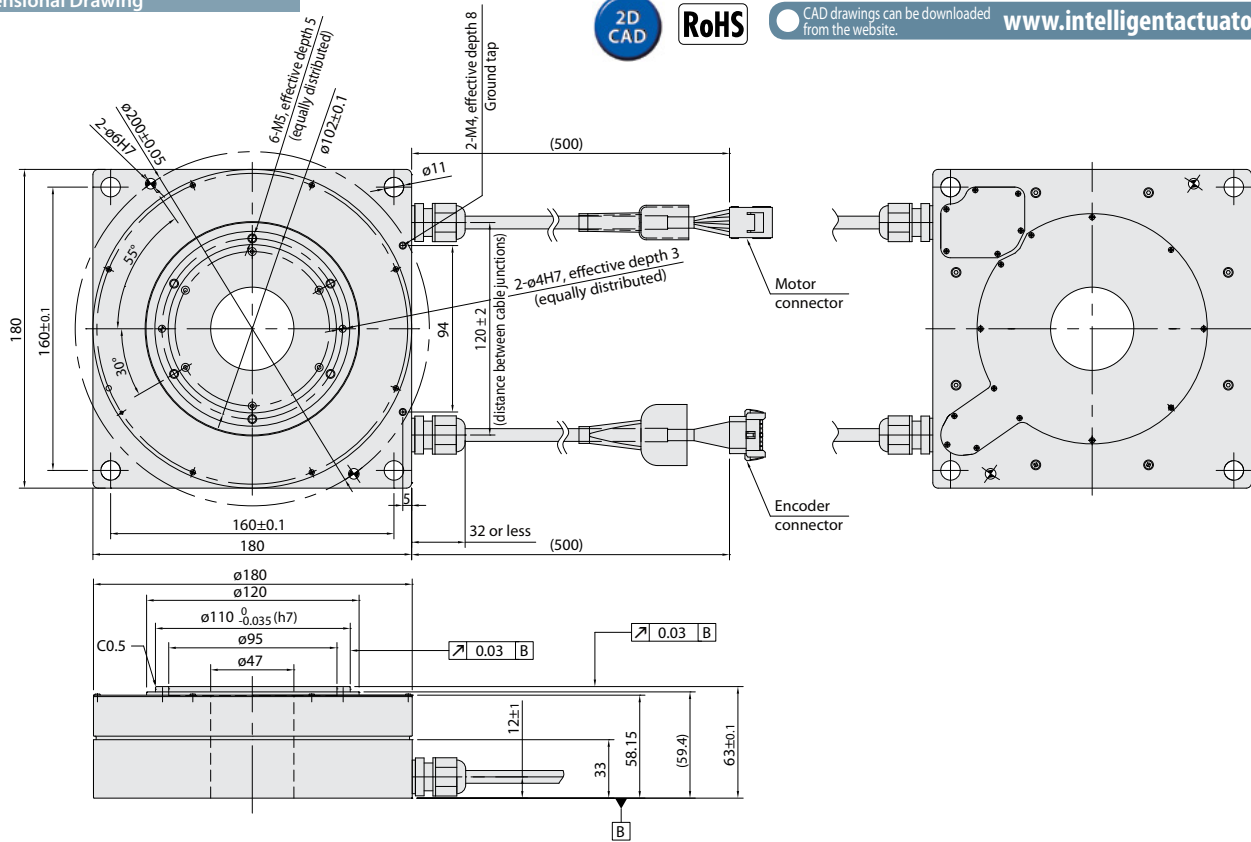
Common Specifications

Drive system	Direct Drive Motor
Positioning repeatability	17-bit: ±0.0055 deg 20-bit: ±0.00103 deg
Allowable dynamic load moment (Note 2)	80 N·m
Encoder resolution	17-bit: 131,072 (pulses/rev) 20-bit: 1,048,576 (pulses/rev)
Allowable thrust load (Note 2)	3,400 N [3,100N for the high resolution type]
Base material	Aluminum
Ambient operating temperature/humidity	0 to 40°C, 20 to 85% (Non-condensing)
Weight	13.6 kg

Run-out of Output Shaft

Thrust (axial) run-out (no load): 30 μm   Radial run-out (no load): 30 μm

Dimensional Drawing

2D CAD   RoHS   CAD drawings can be downloaded from the website.   www.intelligentactuator.com

Applicable Controller Specifications

Applicable controllers	Max. number of controlled axes	Operating method	Power supply voltage
SCON-CA	1-axis	Positioner	200VAC Single-phase
XSEL-P/Q/R/S	1-axis Single-phase 2-axis Three-phase	Program	200VAC Single-phase 200VAC Three-phase

Note: For DD-H18P, only SCON-CA controller applys.

⚠ Caution

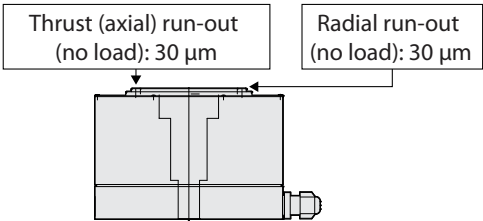(Note 1) The maximum speed may not be reached if the moving distance is short.
(Note 2) Assuming that the actuator is operated 8 hours a day at the rated speed and smooth operation without shock, the actuator will reach its life in five years based on this load.
(Note 3) The maximum cable length is 30 m. Specify a desired length in meters. (Example: X08 = 8m)
(Note 4) Please consult IAI if you are considering a 20-bit actuator and using it under conditions where the allowable dynamic moment and allowable thrust load will be exceeded.

DD-LH18

Direct Drive Motor
Large bore   High-torque type

Model Specification Items

DD	–	LH18☐	–	☐	–	600	–	360	–	T2	–	☐
Series		Type		Encoder type		Motor wattage 600 : 600W		Range of operation 360 : 360 deg		Applicable controller		Cable length

S : Standard (17-bit)
P : High resolution (20-bit)

AI : Index absolute type
AM : Multi-rotation absolute type

T2 : SCON-CA
XSEL-P/Q
XSEL-R/S
Note : Only SCON-CA applys for LH18P

N : None
S : 3m
M : 5m
X☐☐ : Specified length

Model/ Specifications

Model number	Encoder type	Motor wattage (W)	Range of operation (deg)	Speed (Note 1) (deg/s)	Rated torque (N·m) (*)	Maximum instantaneous torque (N·m)	Allowable load inertia (kg·m²)	Rotor inertia (kg·m²)
DD-LH18①-②-600-360-T2-③	Index absolute type Multi-rotation absolute type	600	360	1 to 1,440	25	75	1.8	0.0106

Legend   ① Encoder resolution ② Encoder type ③ Cable length   (*) The value when installed on an IAI rated heat dissipating plate. (Please see P9 for further details.)
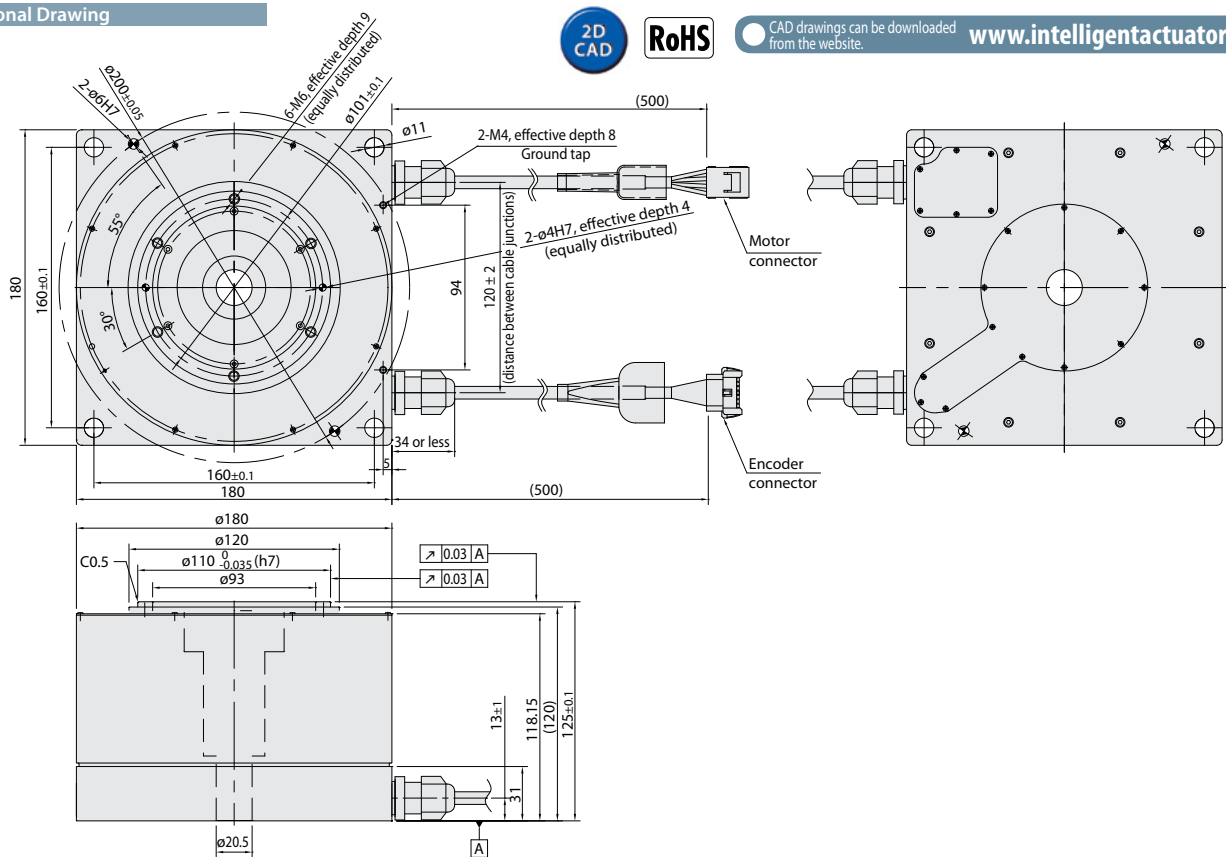
Common Specifications

Drive system	Direct Drive Motor
Positioning repeatability	17-bit: ±0.0055 deg 20-bit: ±0.00103 deg
Allowable dynamic load moment (Note 2)	80 N·m
Encoder resolution	17-bit: 131,072 (pulses/rev) 20-bit: 1,048,576 (pulses/rev)
Allowable thrust load (Note 2)	3,400 N [3,100N for the high resolution type]
Base material	Aluminum
Ambient operating temperature/humidity	0 to 40°C, 20 to 85% (Non-condensing)
Weight	13 kg

Run-out of Output Shaft
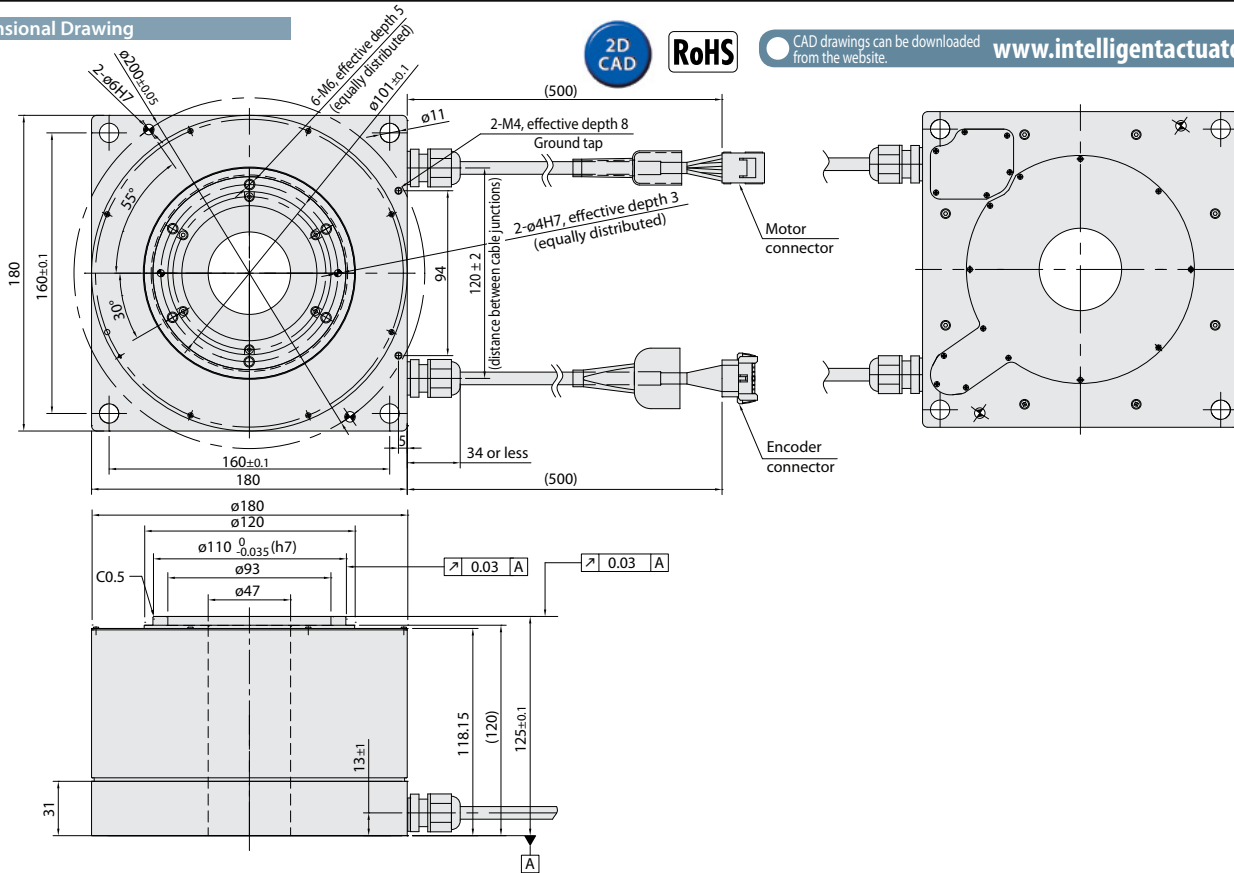
Thrust (axial) run-out (no load): 30 μm

Radial run-out (no load): 30 μm

Dimensional Drawing

2D CAD   **RoHS**   CAD drawings can be downloaded from the website.   **www.intelligentactuator.com**

Applicable Controller Specifications

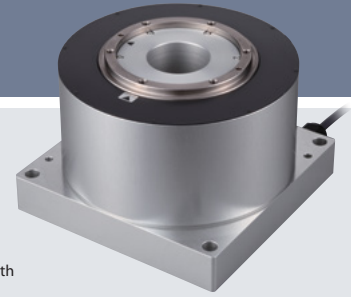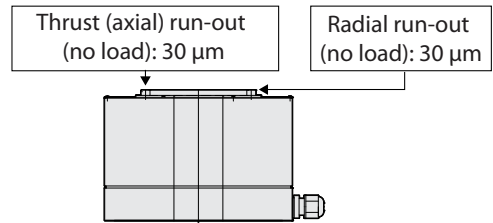| Applicable controllers	Max. number of controlled axes	Operating method	Power supply voltage
SCON-CA	1-axis	Positioner	200VAC Single-phase
XSEL-P/Q/R/S	1-axis Single-phase 2-axis Three-phase	Program	200VAC Single-phase 200VAC Three-phase

Note: For DD-LH18P, only SCON-CA controller applys.

⚠ **Caution**

(Note 1) The maximum speed may not be reached if the moving distance is short.
(Note 2) Assuming that the actuator is operated 8 hours a day at the rated speed and smooth operation without shock, the actuator will reach its life in five years based on this load.
(Note 3) The maximum cable length is 30 m. Specify a desired length in meters. (Example: X08 = 8m)
(Note 4) Please consult IAI if you are considering a 20-bit actuator and using it under conditions where the allowable dynamic moment and allowable thrust load will be exceeded.

Controller Model Numbers

The controller may be selected from the two models described below.

■ Model Number of Positioner Single-axis Type <SCON-CA>

* Because the 200W driver for the SCON-CA for DD motors is larger than the regular 200-watt type, the motor type will be 200S.

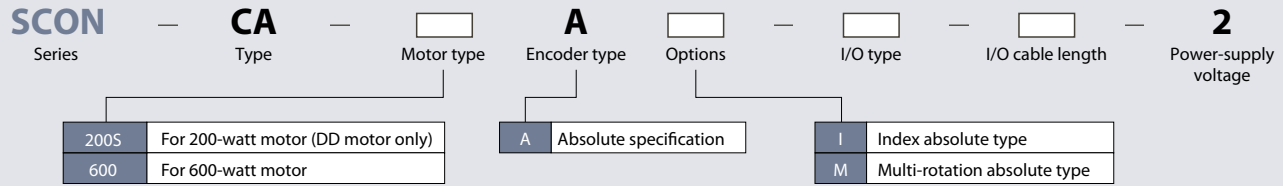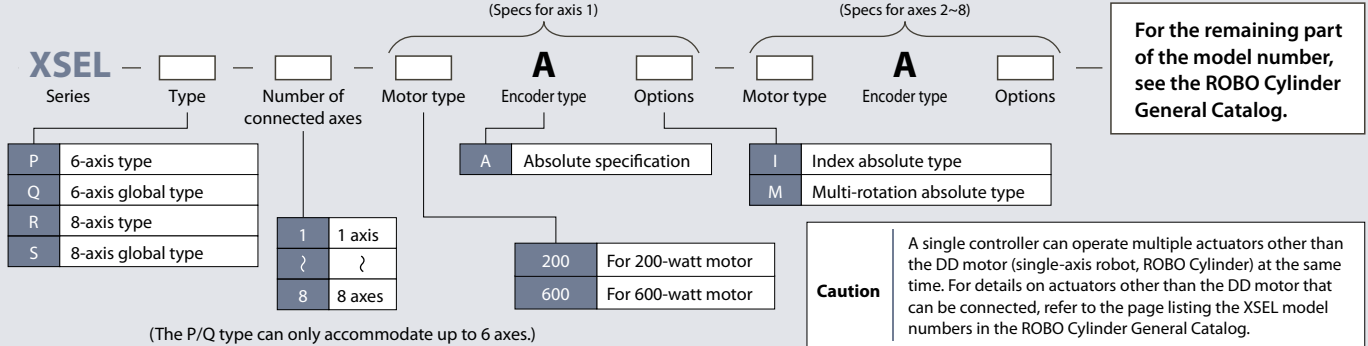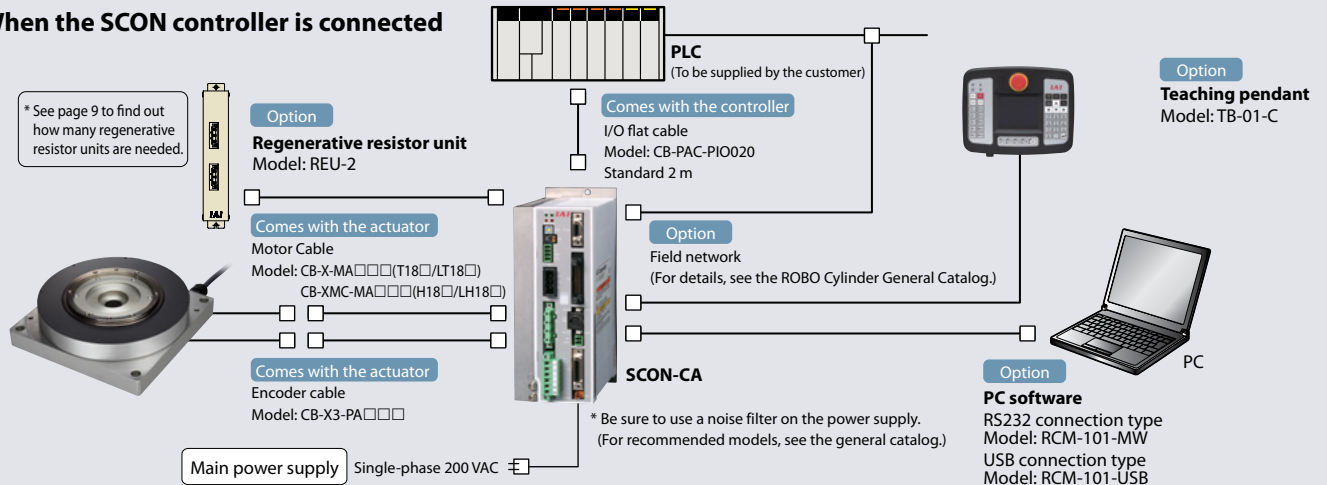| SCON	–	CA	–	☐	A	☐	–	☐	–	☐	–	☐	2
Series		Type		Motor type	Encoder type	Options		I/O type		I/O cable length			Power-supply voltage

200S	For 200-watt motor (DD motor only)
600	For 600-watt motor

A	Absolute specification

I	Index absolute type
M	Multi-rotation absolute type

■ Model Number of Programmable Multi-axis Type <XSEL>

(Specs for axis 1)　　　　(Specs for axes 2~8)

XSEL	–	☐	–	☐	–	☐	A	☐	–	☐	A	☐	–
Series		Type		Number of connected axes		Motor type	Encoder type	Options		Motor type	Encoder type	Options	

For the remaining part of the model number, see the ROBO Cylinder General Catalog.

P	6-axis type
Q	6-axis global type
R	8-axis type
S	8-axis global type

1	1 axis
≀	≀
8	8 axes

(The P/Q type can only accommodate up to 6 axes.)

A	Absolute specification

I	Index absolute type
M	Multi-rotation absolute type

200	For 200-watt motor
600	For 600-watt motor

Caution　A single controller can operate multiple actuators other than the DD motor (single-axis robot, ROBO Cylinder) at the same time. For details on actuators other than the DD motor that can be connected, refer to the page listing the XSEL model numbers in the ROBO Cylinder General Catalog.

System Configuration

■ When the SCON controller is connected

* See page 9 to find out how many regenerative resistor units are needed.

Option
Regenerative resistor unit
Model: REU-2

Comes with the actuator
Motor Cable
Model: CB-X-MA☐☐☐(T18☐/LT18☐)
　　　　CB-XMC-MA☐☐☐(H18☐/LH18☐)

Comes with the actuator
Encoder cable
Model: CB-X3-PA☐☐☐

Main power supply　Single-phase 200 VAC

PLC
(To be supplied by the customer)

Comes with the controller
I/O flat cable
Model: CB-PAC-PIO020
Standard 2 m

Option
Field network
(For details, see the ROBO Cylinder General Catalog.)

SCON-CA

* Be sure to use a noise filter on the power supply.
(For recommended models, see the general catalog.)

Option
Teaching pendant
Model: TB-01-C

PC

Option
PC software
RS232 connection type
Model: RCM-101-MW
USB connection type
Model: RCM-101-USB

■ When the XSEL controller is connected

* See page 9 to find out how many regenerative resistor units are needed.

Option
Regenerative resistor unit
Model: REU-1

Comes with the actuator
Motor Cable
Model: CB-X-MA☐☐☐(T18☐/LT18☐)
　　　　CB-XMC-MA☐☐☐(H18☐/LH18☐)

Comes with the actuator
Encoder cable
Model: CB-X3-PA☐☐☐

Main power supply　Single-phase 200 VAC
　　　　　　　　　Three-phase 200 VAC

PLC
(To be supplied by the customer)

Comes with the controller
I/O flat cable
Model: CB-X-PIO020
Standard 2 m

Option
Field network
(For details, see the ROBO Cylinder General Catalog.)

XSEL

* Be sure to use a noise filter on the power supply.
(For recommended models, see the general catalog.)

Option
Teaching pendant
Model: TB-01-S

PC

Option
PC software
RS232 connection type
Model: IA-101-X-MW
USB connection type
Model: IA-101-X-USBMW

8

Notes

■ Installation

Positioning hole for DD motor
2-ø4, reamed hole, through

Mounting hole for DD motor
4-ø11 drilled, through

ø200

55°

160

160

H

Installation surface

Installation Orientation
Do not install it in a vertical position or hung on the ceiling.

Ceiling mount

Vertical mount

Gravity

Horizontal mount

The height "H" measurements

	T18	LT18	H18	LH18
mm	23	33	31	31

(Note) Use this product by installing it on a mounting surface having heat dissipating characteristics equivalent to those of an aluminum plate of 400 x 400 x t10 mm in size. If the installation conditions necessitate lower heat dissipating characteristics, please consult IAI.

■ Operation Types

Two operation types can be selected to suit specific operating conditions.
Check the features of the different types of DD motors and other notes before use.

* ( ) indicates at 20-bit resolution

Operation type	Index absolute type		Multi-rotation absolute type	
Controller type	SCON-CA	XSEL (*1)	SCON-CA	XSEL (*1)
Operation range	0 to 359.999°		Max. ±9,999° (±2,520°)*	
Maximum travel per travel command	360°	180° (*2)	Within the above operation range	
Infinite rotation	Available (*3)		Not available	
Home return	Not required		Not required (*4)	
Absolute battery	Not required		Required	

(*1) The high resolution specification can be connected only to the SCON-CA.

(*2) When the XSEL absolute index type travels more than 180° from the current position, it rotates in a direction that requires a shorter travel to reach the target position. Therefore, please note that the direction of rotation changes according to the current position and travel.
If you want to specify the direction of travel, use the SCON-CA.

(*3) The index type can be rotated in a given direction infinitely, but it actually cannot continue to rotate in the same direction without stopping, like a regular motor does, because the maximum travel distance per command from the XSEL controller is 180°.
If you want to allow the motor to rotate continuously, use the SCON-CA.

(*4) Home return is required for the multi-rotation absolute encoder during the initial setting and replacement of the absolute battery.

■ Controllers

● The output of the DD motor is 200 watts, but the outside dimensions of the SCON-CA controller are those of the 400-watt type.
(For details on the outside dimensions of the SCON-CA, see the ROBO Cylinder General Catalog.)

● One and two regenerative resistor unit(s) are required for T18□/LT18□ and H18□/LH18□, respectively to operate a DD motor with the SCON-CA.

● When operating DD motor(s) with the XSEL controller, regenerative resistor units are required as shown below:

Number of DD motor(s)		1	2	3	4	5	6	7	8
Number of regenerative resistor units	T18□/LT18□	1		2		3		4	
	H18□/LH18□	2	4	(Cannot be connected)					

● The number of DD motor(s) connectable to the XSEL controller are a max. of 8 units for the T18/LT18 types, and a max. of 2 units for the H18/LH18 types.

● Please note that, when the DD motor is operated with the SCON-CA, the motor cannot be connected to the ROBO Cylinder gateway function of the XSEL controller.

● Calculation the for power supply value:
T18/LT18 types: single-phase 600W • three-phase 200W   H18/LH18 types: single-phase 1,200W • three-phase 600W

Conditions for Selection

The following should be checked to determine whether the DD motor can be used to suit the specific conditions required by the customer:
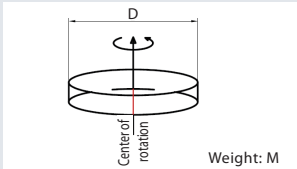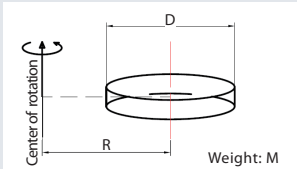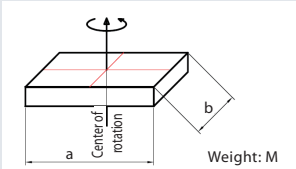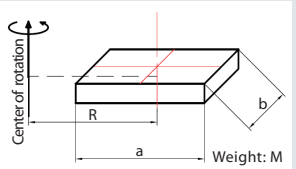
1 Check Load Conditions

The customer should confirm that the following three points under actual use do not exceed their maximum allowable levels as specified for the DD motor.

[1] Thrust load	The **total load** of device(s) mounted on the actuator
[2] Load moment applied	The **total load moment** of device(s) mounted on the actuator
[3] Load inertia	The **load inertia** of device(s) mounted on the actuator

To calculate the load conditions, calculate the load inertia of device(s) mounted on the actuator and check the details with the DD motor selection software. The equations used to calculate the load inertia of typical shapes are shown below for reference purposes.

Download the DD motor selection software from: http://www.intelligentactuator.com/dd-selection-software

$J = 1/8 \times M \times D^2$

$J = M \times R^2 + 1/8 \times M \times D^2$

$J = 1/12 \times M \times (a^2 + b^2)$

$J = M \times R^2 + 1/12 \times M \times (a^2 + b^2)$

2 Check Operating Conditions

Check the distance, speed, acceleration, deceleration, stop time and other conditions in actual operation against the DD motor specifications to determine whether the DD motor can be used under the applicable operating conditions.

To calculate operating conditions, use the DD motor selection software.

Download the DD motor selection software from: http://www.intelligentactuator.com/dd-selection-software

3 Travel Time Guide

The travel time changes according to the load inertia. See the tables below to check the travel time data.
The data in the tables is only intended as a guide, so the travel time is not guaranteed.

DD-T18/LT18

Load inertia lower limit [kg·m²]	0	0.005	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.1	0.2	0.3	0.4	0.5
Load inertia upper limit [kg·m²]	0.005	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.1	0.2	0.3	0.4	0.5	0.6
45° travel time [sec.]	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.17	0.19	0.21	0.23	0.39	0.62	0.70	0.87	1.11
90° travel time [sec.]	0.12	0.12	0.14	0.16	0.17	0.18	0.20	0.22	0.24	0.26	0.29	0.48	0.73	0.83	1.02	1.23
180° travel time [sec.]	0.17	0.17	0.19	0.21	0.23	0.24	0.27	0.29	0.32	0.35	0.37	0.60	0.89	1.01	1.22	1.42
270° travel time [sec.]	0.22	0.22	0.24	0.26	0.27	0.29	0.32	0.35	0.38	0.41	0.44	0.69	1.00	1.14	1.36	1.68

(Note) The time listed in the above table is the duration from the reception of a travel command until convergence within the positioning band of 0.028 degrees (approximately 100 arcseconds).

DD-H18/LH18

Load inertia lower limit [kg·m²]	0	0.005	0.01	0.02	0.02	0.03	0.04	0.06	0.08	0.10	0.15	0.2	0.3	0.4	0.6	0.8	1.0	1.2	1.4
Load inertia upper limit [kg·m²]	0.005	0.01	0.015	0.02	0.03	0.04	0.06	0.08	0.1	0.15	0.2	0.3	0.4	0.6	0.8	1	1.2	1.4	1.8
45° travel time [sec.]	0.098	0.096	0.096	0.097	0.099	0.104	0.113	0.12	0.126	0.14	0.157	0.207	0.257	0.352	0.447	0.53	0.629	0.795	0.875
90° travel time [sec.]	0.129	0.128	0.127	0.128	0.131	0.136	0.144	0.153	0.163	0.184	0.208	0.268	0.329	0.44	0.549	0.646	0.758	0.941	1.035
180° travel time [sec.]	0.192	0.19	0.19	0.191	0.193	0.199	0.207	0.215	0.225	0.249	0.279	0.354	0.428	0.562	0.692	0.806	0.933	1.133	1.257
270° travel time [sec.]	0.254	0.252	0.252	0.253	0.256	0.262	0.27	0.278	0.288	0.312	0.341	0.42	0.504	0.655	0.8	0.925	1.064	1.274	1.415

(Note) The time listed in the above table is the duration from the reception of a travel command until convergence within the positioning band of 0.028 degrees (approximately 100 arcseconds).

The information contained in this product brochure may change without prior notice due to product improvements.