

Screw driver with AC servo motor

KX·NX Driver



F A S T E N I N G I N N O V A T I O N
f o r T H E F U T U R E



With the cushion attachment



With the vacuum attachment



Mounted to the single
screw driving



Mounted to the arm driver

**Supports wide range
applications from the
manual operation
to the robot.**



Mounted to the automatic
screw driving

Screw driver with AC servo motor KX / NX series

KX Driver SD550 series

Optimum fastening with accurate driver control

With the original AC servo motor, KX driver can set the torque and speed individually, by which the driver can be controlled accurately for each screw and workpiece. It achieves good performance for the plastic material, thin steel plate and the precision screw fastening which is difficult for the existing electric driver. Torque value to be set up by percentage (%) of current against maximum torque of the motor.

Feature

- The value of Torque, Speed, Time and Angle can set individually.
- The fastening condition can select on a point-by-point basis. (16 types)
- The waveform analysis function is available as option. It detects the fastening fault which cannot be found by only torque judgement.

Maximum rotation speed
420~3,000min⁻¹

Torque range
0.08~45N·m



NX Driver SD550T series

Improved reliability with the torque sensor equipped to the driver

Mounting torque sensor to the proven KX driver, NX driver improved reliability of fastening operation. It supports highly accurate tightening required by the important security parts assembly and so on.

Feature

- The value of Torque, Speed, Time and Angle can set individually.
- The fastening condition can select on a point-by-point basis. (16 types)
- OK-NG judgement and torque result can be displayed on the moment of fastening.
- The fastening result can transmit by serial data.
- The waveform analysis function is available as option. It detects the fastening fault which cannot be found by only torque judgement.

Maximum rotation speed
220~1,200min⁻¹

Torque range
0.2~80N·m

Torque accuracy
3~5%



NX Driver SD600T series

High end model aspiring for further accuracy and higher function

Not only improving basic performance, SD600T series also actualize safe and reliable operation with data collection and wave form analysis functions.

Feature



- The value of Torque, Speed, Time and Angle can set individually.
- The fastening condition can select on a point-by-point basis. (32 types)
- The waveform analysis function is available as standard. It detects the fastening fault which cannot be found by only torque judgement.
- Ethernet is equipped to collecting data so that enable a traceability and analysis the fastening fault.
- Adapted to CE mark (Machinery, EMC, Low Voltage and RoHS Directive) ※1

Maximum rotation speed
420~1,100min⁻¹

Torque range
0.5~45N·m

Torque accuracy
2~3%



※1 NX200T3 and NX500T3 are not applicable to CE.

Function comparison chart by series

Inside of [] below is a option

		Screw driver with AC servo motor KX Driver SD550 series	Screw driver with torque transducer NX Driver SD550T series	Screw driver with torque transducer NX Driver SD600T series
Specifications	Torque range	0.08~45N·m	0.2~80N·m	0.5~45N·m
	Torque accuracy	—	3σ/¯x=3%(5%) or less	3σ/¯x=2%(3%) or less
	Torque detecting method	Current measurement	Torque sensor (strain gauge)	Torque sensor (strain gauge)
	Number of programs (channels)	16ch	16ch	32ch
Port	USB	One port (type B)	One port (type B)	One port (type mini B)
	RS485	One port	One port	One port
	Ethernet	—	—	One port
	CAN	—	—	One port
Fastening condition	Fastening method (Torque)	○	○	○
	Fastening method (Angle)	○	○	○
	Fastening method (Torque / Angle)	○	○	○
	Synchronous fastening	○	○	○
	Torque judgment	—	○	○
	Judgment of the final fastening angle	○	○	○
	Judgment of the height by Z encoder	○	○	○
Function	Waveform analysis	[○]	[○]	○
	Data collection (CAN) ※1	—	—	○
	Data collection (Ethernet)	—	—	○
	Serial communication to be output the fastening result	○	○	○
Communication software	Edit function of setting value	○	○	○
	Support (help) function of setting	—	—	○
	Waveform display	[Time]-[Current value, Rotating speed] [Angle]-[Current value]	[Time]-[Torque, Rotating speed] [Angle]-[Torque]	[Time]-[Torque, Rotating speed, Rotating angle] [Angle]-[Torque]
	Comparison of waveforms	Three waveforms ※2	Three waveforms ※2	20 waveforms
	Check the waveform variations range	[○] ※3	[○] ※3	○
	Fastening result monitor	—	—	○
	I/O monitor	—	—	○
	Edit function of waveform setting	[○] ※3	[○] ※3	○
	Data collection	—	—	○
Details of the standard component	Tool unit 1pc	○	○	○
	Controller 1pc	○	○	○
	Motor cable ※4 1pc	○	○	○
	Encoder cable ※4 1pc	○	○	○
	Sensor cable ※4 1pc	—	○	○
	Power connector ※5 1pc	○	○	○
	I/O connector ※5 1pc	○	○	○
	Network connector (485) 1pc	○	○	○
	CAN connector 1pc	—	—	○

※1 Compatble function of SD500T a series (old model)

※2 Only [Time]-[Current value], [Time]-[Torque] waveform

※3 It's processed by waveform analysis software

※4 Cable is selectable from 2,[3],5,7.5,[10]m

※5 It doesn't include a cable which is optional. [Cable is selectable from 2,3,4,7,10m]



1/ Fastening method

The various fastening method as standard, which can be selected to meet various requirements

Available fastening method to use as standard are two stage fastening, tapping fastening, bolt fastening, nut fastening, just clockwise rotate, anti-clockwise rotate and synchronous fastening. and the setting of fastening isn't require the complex programs, which it can be fastened easily with only put in the data to designated table.

1/-2 Two stage fastening

What is the two stage fastening?

It's the standard fastening method for KX and NX driver.

The actual torque might be exceeded the target torque with one stage fastening because of the impact torque arose at the seating point.

On the other hand, two stage fastening can fasten screw with the setting of the first and final, which can reduce the impact torque and achieve fast and accurate fastening.

Check the initial rotating:

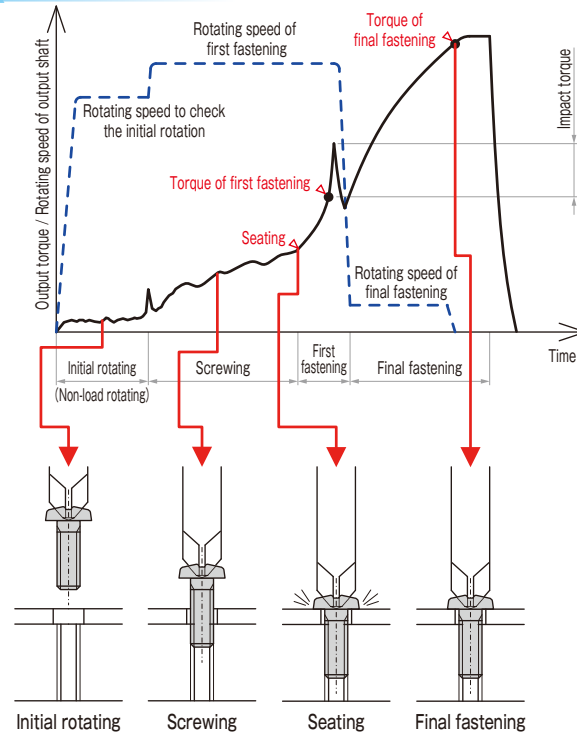
It can check the increasing level of rotational resistance whether the driver system is being normal condition with the non-load rotation.

Initial fastening:

from screwing position until seating position, the driver fastens with the condition of high speed and low torque, which will reduced the impact torque.

Final fastening:

from seating position until reached target torque, the driver fastens with the condition of low speed and high torque, by which the torque variability will be minimized.



[The sample waveform of two stage fastening]

1/-2 Tapping screw fastening

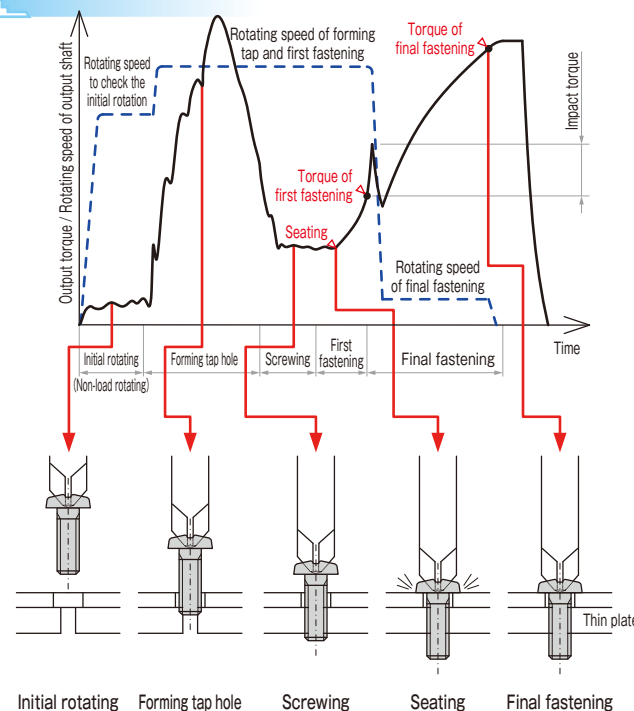
What is the tapping screw fastening?

Fastening method to fasten selftapping screw to the thin plate with forming tap (female threads).

In case of standard 2(two) stage fastening, when the torque reached the target torque, it might have the fastening completed even if actual fastening is not completed yet, under condition that required torque for tap forming is higher than setting torque.

Moreover, it might be broken the workpiece because of the over torque from target if the torque is set to need for forming tap.

To solve these problems, it can be fastened to the specified torque without relation to the torque value to forming tap by the addition of forming tap process to the standard 2 stage fastening.



[The sample waveform of tapping screw fastening]

2/ Data communicating function

Display the fastening result on the touch panel or save to PLC

The fastening result can be transmitted as a serial data to the external device (PLC etc.) automatically after the fastening is completed.

The data stored in the PLC can be also displayed on the touch panel or stored to the storages like SD card and so on with the system made by customer.

Data to be transmitted : Torque value (NX) or current value (KX), final fastening angle, height check, judgement result.

Connecting way : Connect the RS485 cable between a serial port of controller and external device (PLC etc.) by one to one.

KX(SD550)	NX(SD550T)	NX(SD600T)
●	●	●



The image of touch panel screen

3/ Data collecting function

Best for the traceability !!

Saves all data of the fastening result and waveform to PC

Fastening data can be collected with Ethernet connection using [SD600T communication software] installed in the PC. The software is effective to establish the traceability and to analyze the cause of screw fastening fault.

- The fastening result data and waveform data are taken and displayed on a screen and these data can be saved as CSV file.
- The saving data can be selected from fastening results. [Only OK/NG or All]
- The saved data can be read to the Excel file.

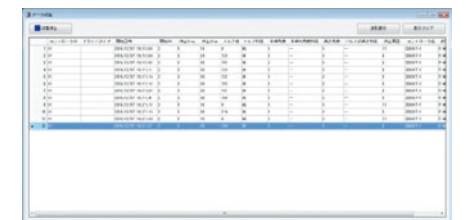
Collection data : ● Fastening information [Torque value, Final fastening angle, Height angle, Fastening time, Judgement result, Start date, Start CH, Waveform data]
● Setting value information
● Error information [Process number, Stop step, Stop factor]

Connecting way : Connect the LAN cable between the controller and PC.

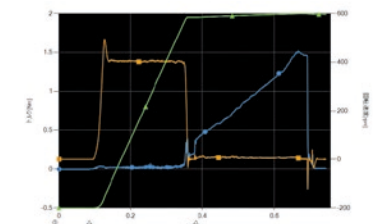
Available connecting number : Max. 4 controllers. It need to use the network hub in case of the multiple connection.

※Max. 8 controllers, when upload fastening results without waveform data.

KX(SD550)	NX(SD550T)	NX(SD600T)
—	—	●



List of the fastening results



Display of the fastening waveform

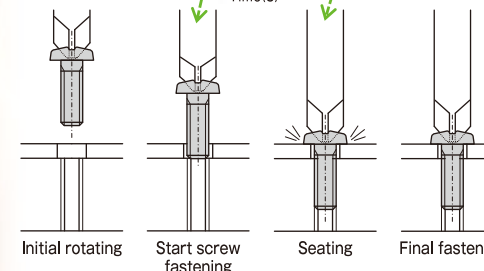
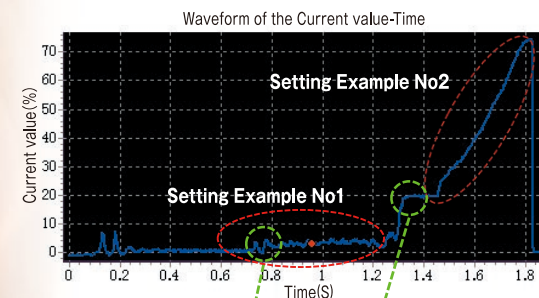
4/ Waveform analysis

The abnormal fastening condition can be detected with fastening waveform judgement, which could have ever be detected

Fastening failure can be judged comparing the relation between OK area which set up in controller and real-time waveform. With this function, abnormal fastening condition can be detected, which cannot be found by torque value judgement.

Reference waveform of KX Driver

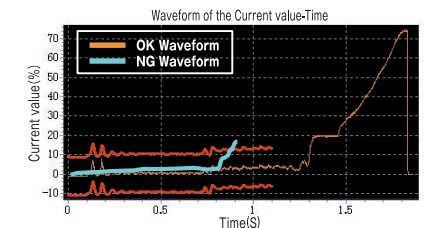
(Comparison relation between waveform and fastening process)



Setting Example No1

(OK area which is configure by Red waveform)

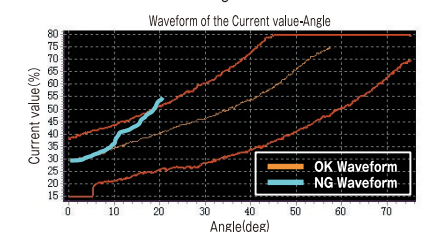
The abnormal fastening condition like cross thread can be detected at first step of fastening.



Setting Example No2

(OK area which is configure by Red waveform)

It can be detected the difference of sitting surface condition as come with spring washer or so.



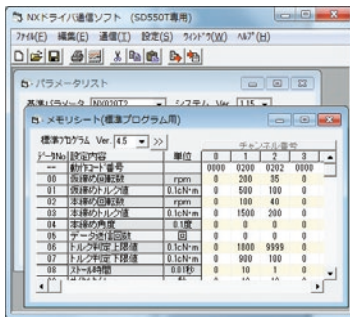
Be prepared the communication software to maintenance for each series

5/-1 Editing function of the setting value

KX(SD550)	NX(SD550T)	NX(SD600T)
●	●	●

The display of memory sheet

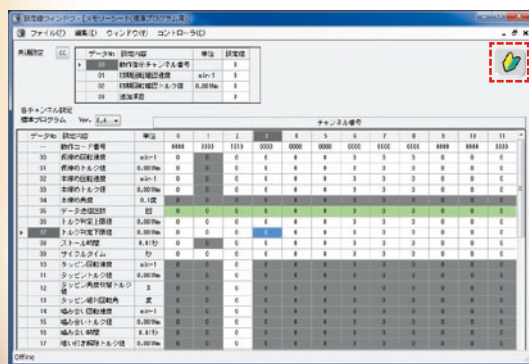
[SD550・SD550T]



Edit the setting value of Torque, Rotating Speed or others

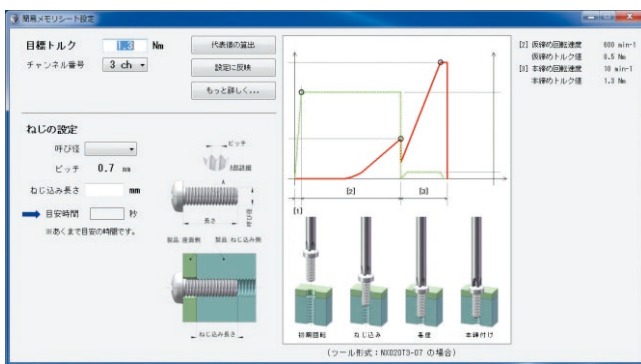
- Easy edit with display a list of setting value
- Save the data into a file to back up
- the item to be setting necessary is display with color coding (only SD600T)

[SD600T]



Easy to set up with the display of simple memory sheet (only SD600T)

- Automatic calculate a setting value when once key in a target torque value.
- Show up reference fastening time when key in a screw size and length.



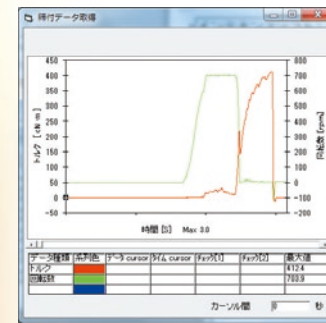
5/-2 Waveform display function

KX(SD550)	NX(SD550T)	NX(SD600T)
●	●	●

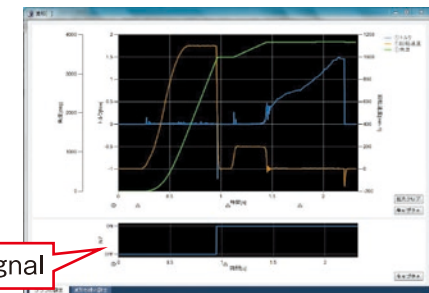
Analyze the fastening condition by displayed the waveform of the actual fastening with the workpiece

Image of the fastening waveform

Waveform of SD550, SD550T
[Current value/Torque value, Rotating Speed-Time]



Waveform of SD600T
[Torque, Rotating Speed, Rotating Angle-Time]



Input signal

※Trigger signal is display with the waveform

5/-3 Monitoring functions

KX(SD550)	NX(SD550T)	NX(SD600T)
—	—	●

Communication software checks driver condition

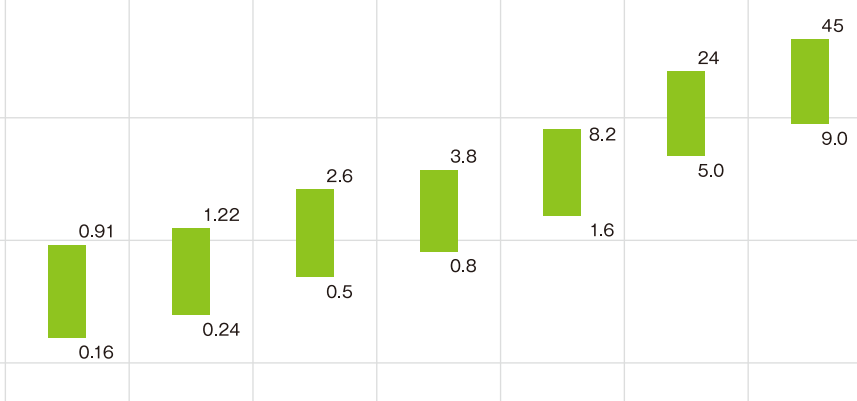
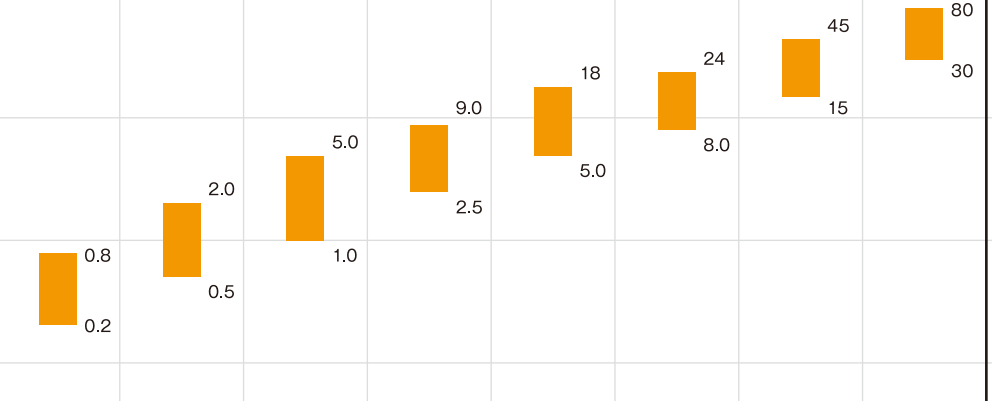
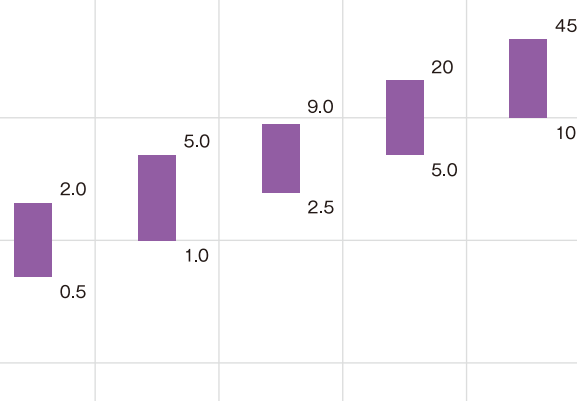
I/O monitor which can check the condition of each I/O just by looking.

Fastening result monitor which can check following the conditions, fastening torque, angle, time and failure information.

Operation monitor which can also rotate a driver motor with software.

Model selection chart

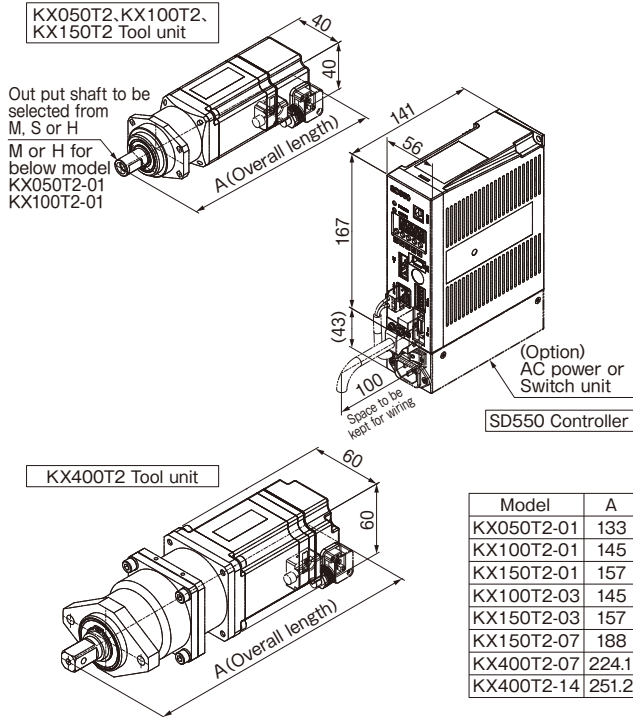
Inside of [] below is a option

Torque of output shaft	KX Driver SD550 series								NX Driver SD550T series								NX Driver SD600T series				
																					
Tool unit model	050T2-01	100T2-01	150T2-01	100T2-03	150T2-03	150T2-07	400T2-07	400T2-14	008T2-03	020T2-07	050T2-07	100T2-07	180T2-05	250T2-07	500T2-0E	800T2-1B	020T3-07	050T3-07	100T3-07	200T3-06	500T3-0A
Setup torque range(N·m)	0.08~0.45	0.16~0.91	0.24~1.22	0.5~2.6	0.8~3.8	1.6~8.2	5.0~24	9.0~45	0.2~0.8	0.5~2.0	1.0~5.0	2.5~9.0	5.0~18	8.0~24	15~45	30~80	0.5~2.0	1.0~5.0	2.5~9.0	5.0~20	10~45
Recommend torque range(N·m)	0.15~0.30	0.3~0.6	0.6~1.0	1.0~2.0	2.0~3.2	3.2~7.0	7.0~20	20~40													
Max. rotation speed(min ⁻¹)	3,000			1,360		635	840	420	1,200	840			1,100	840	420	220	1,100			1,000	420
Output torque accuracy	—								3σ/̄x=5% or less		3σ/̄x=3% or less						3σ/̄x=3% or less	3σ/̄x=2% or less			
Tool unit weight(kg)	0.45	0.55	0.65	0.66	0.76	0.87	2.1	2.9	0.6	1.0	1.1	1.2	2.0	2.4	2.6		1.1	1.2	1.3	3.2	3.7
Applicable controller model	SD550N05						SD550N10		SD550T03			SD550T05	SD550T10				SD600T03		SD600T05	SD600T10	
Power source	Single phase AC200~230V ±10% 50/60Hz [AC100~115V] ※1						Single phase AC200~230V ±10% 50/60Hz		Single phase AC200~230V ±10% 50/60Hz [AC100~115V] ※1				Single phase AC200~230V ±10% 50/60Hz				Single phase AC200~230V ±10% 50/60Hz				
Max. power requirement(kVA)	0.35	0.5	0.65	0.5	0.65		1.2		0.6	0.45	0.6	0.75	1.3				0.45	0.6	0.75	1.4	
Controller weight(kg)	0.75						0.95		0.75				0.95				1.4			1.5	
Adaptable CE mark	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	○	○	○	—	—

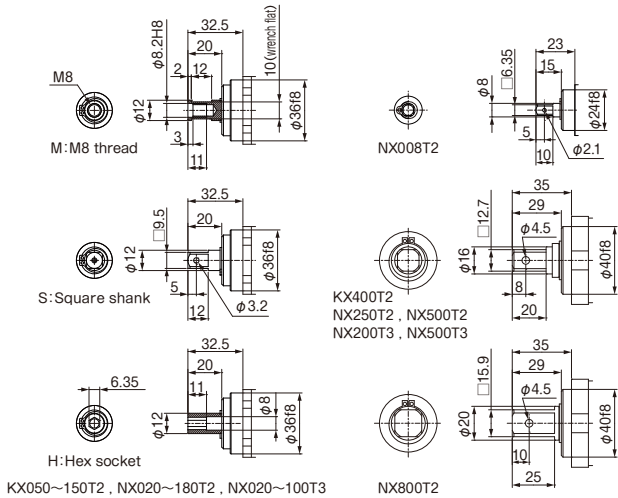
※ 1 Option (Additional AC power supply unit will be attached.)

Dimensions

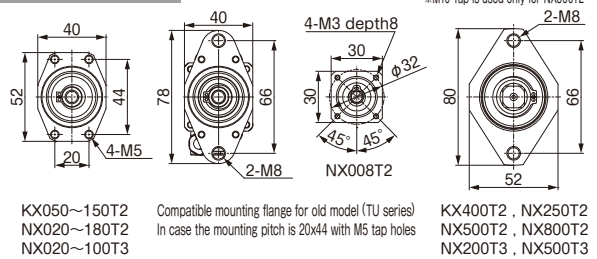
KX Driver SD550 series



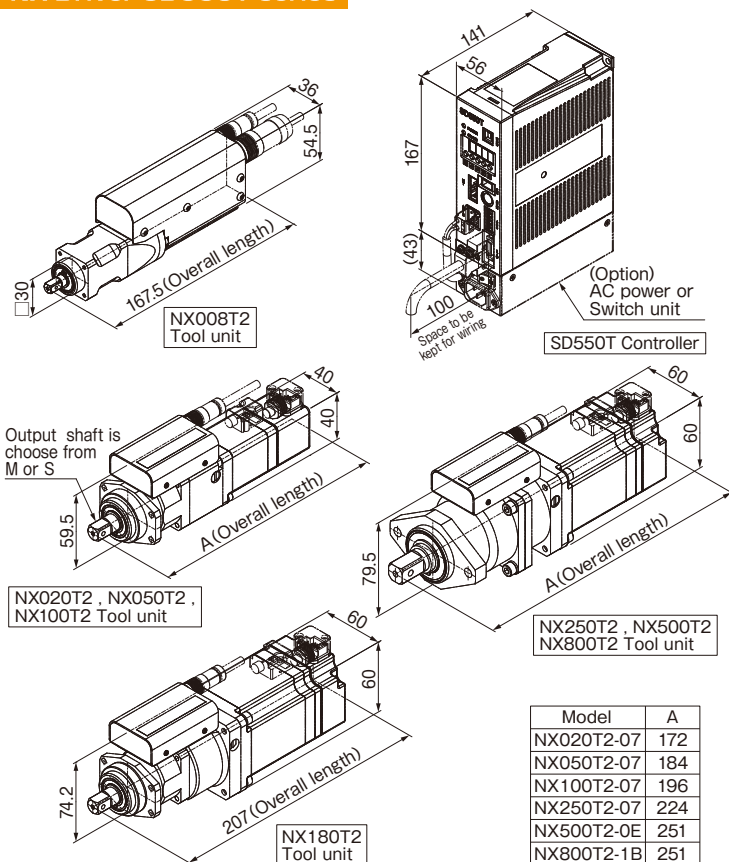
Output shaft dimension



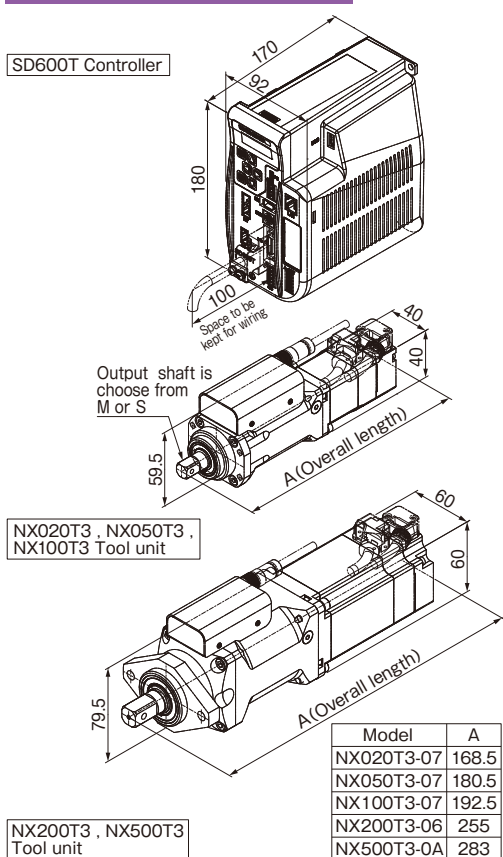
Mounting dimension



NX Driver SD550T series



NX Driver SD600T series



※CAD data of the outline view can be downloaded through a homepage

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