



Digitized Automation for a Changing World

# Delta Smart Screwdriving System



# Little Things Make a Big Difference

Along with the technological innovation and booming development of electronics such as automotive electronics, quality demands in the industry are becoming higher than ever. Therefore, high precision, zero-defect management, and product traceability requirements are rising in electronics manufacturing. To reach the zero-defect goal, any detail, even the tightening results for every small screw is critical for product quality management.

Delta has leveraged its accumulated technological capabilities in motion control to integrate servo systems, reducers, torque sensors, and industrial robots to introduce a screw-driving solution featuring real-time status checks and tightening problem elimination. With precise output torque and angle control, Delta's screw-driving solution can prevent quality issues caused by screw driving, such as stripped and underdriven screws. Users can also connect the solution to an MES system to control parameters by host controllers that prevent human errors and save the tightening information for traceability and torque management.

Facing the fast-changing high-tech manufacturing industry, Delta has started with a small screw to help customers enhance product and service quality, while leveraging zero-defect goals and the vision of "Digitization for a Changing World".



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# Delta Smart Screwdriving System

Integrates the key technologies of servo motors, torque detection, and software control with Delta's manufacturing experience. The screwdriving solution meets precision and quality requirements for various scenarios

## Smart Screwdriving Controller

- 1 high-performance controller supports 2 screwdrivers\*<sup>1</sup> (specific feature for dual-tool controller ASD-SD3041B-2)
- 10.1-inch display for easier examination and operation
- Large memory capacity stores up to 200,000 results and curve graphs
- Offers various tightening strategies for different scenarios



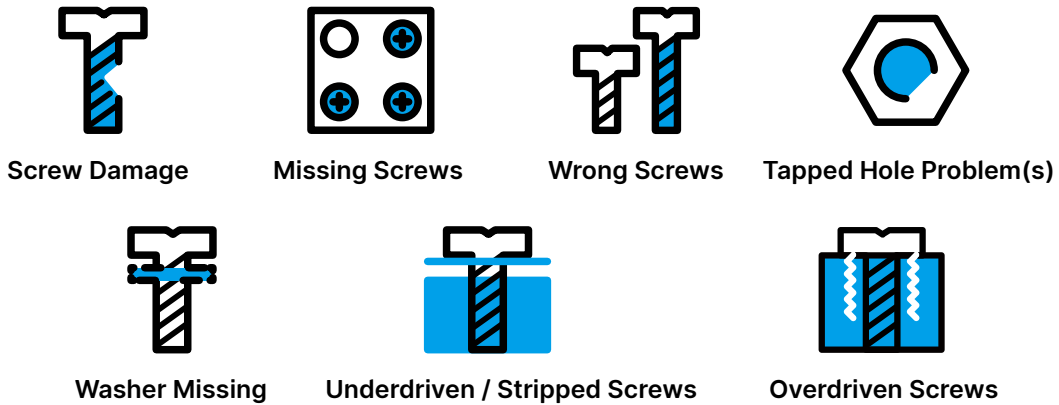
## Smart Screwdriver

- Torque sensor signals are directly fed to the full closed-loop control, high-precision of  $\pm 3\%$
- Low cogging torque of the DC servo motor
- Light indicator shows tightening status
- Front LED work light eliminates shading during operation
- Easy mounting on robots or machines with a flange

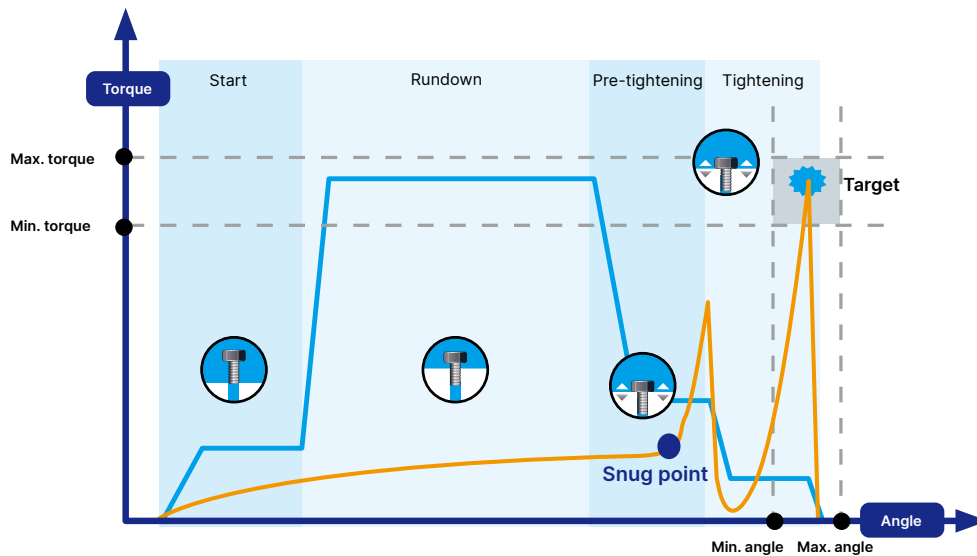
# Delta Smart Screwdriving System

## Product Features

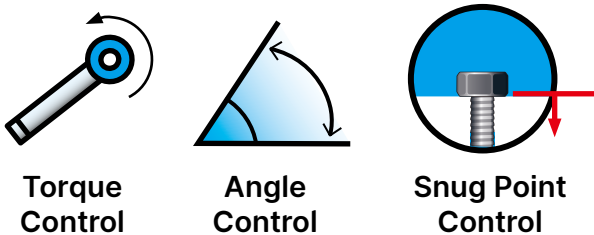
### Detects / Eliminates common screwdriving problems



### Monitors torques and angles to ensure a correct tightening process



### 3 control modes for various screwdriving scenarios



### Large memory capacity to store operation results

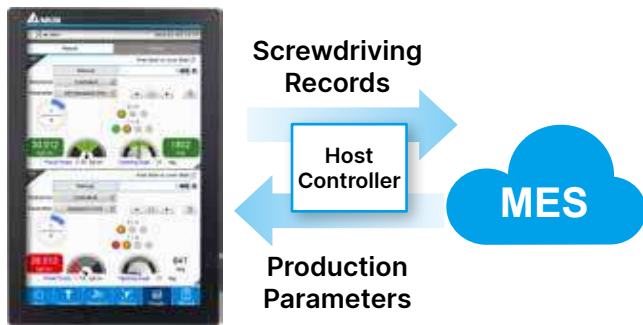


- 500 sets of parameters
- 500 sets of tightening sequences
- Up to 200,000 entries of report (incl. torques, angles, curve graphs, and more)

# Delta Smart Screwdriving System

## Product Features

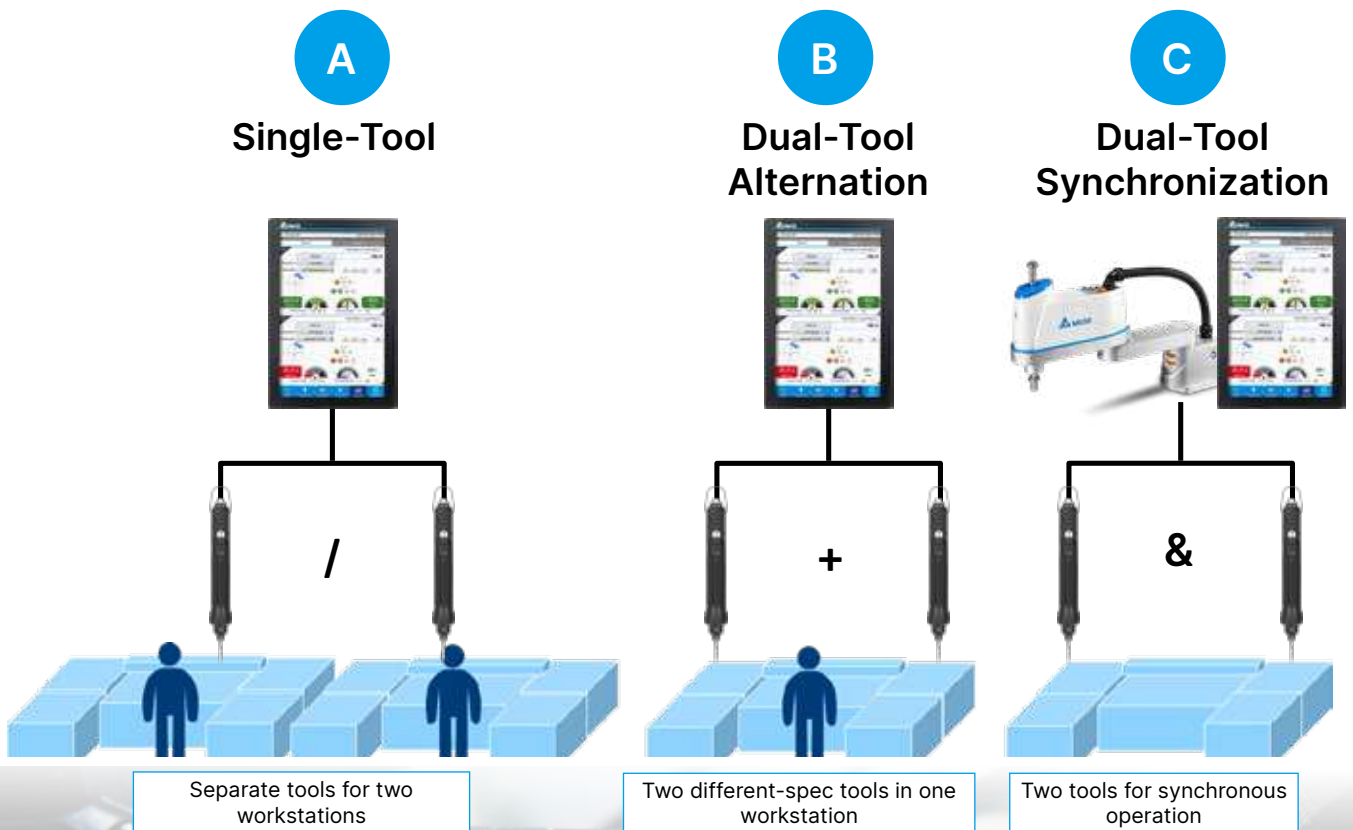
Production data can be updated to MES for real-time management



Applies corresponding parameters with a scanner to reduce human errors



One controller drives two screwdrivers for flexible production line implementation (specific feature for dual-tool controller ASD-SD3041B-2)



## Functions and User Interface

### Dual-tool operation with one controller

- A dual-tool controller (ASD-SD3041B-2) controls two smart screwdrivers to save space and costs
- Provides single-tool, dual-tool alternation, and dual-tool synchronization modes for flexible production line implementation

### Sets and monitors key quality parameters

- Monitors angle, torque, rotation speed, time limit, quantity of screws, loosening count, and tightening sequences to ensure quality

### Detects quality issues

- Detects underdriven / stripped / missing screws, torque/angle errors and others

### Capable of host controller connection

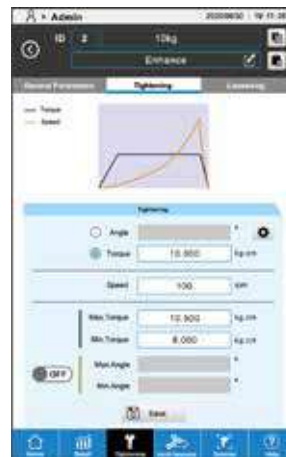
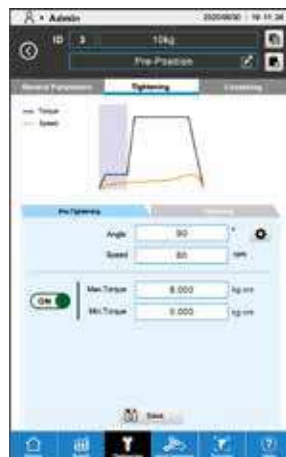
- Alarm notifications
- Changes parameters based on commands from the host controller
- Stores and uploads screwdriving records

### Various tightening strategies for figuring out the ideal solution

- Standard Strategy: Separate tightening process into four stages to meet most scenarios
- Pre-Position Strategy: Fix screw position in the workpiece without clamping
- Enhanced Strategy: Tighten the screws or further tighten the screws with higher torque
- Self-Defined Strategy: Arrange the tightening process as needed

### Intuitive parameter configuration

- Simple display design and large touch screen for easy operation



# Delta Smart Screwdriving System

## Functions and User Interface

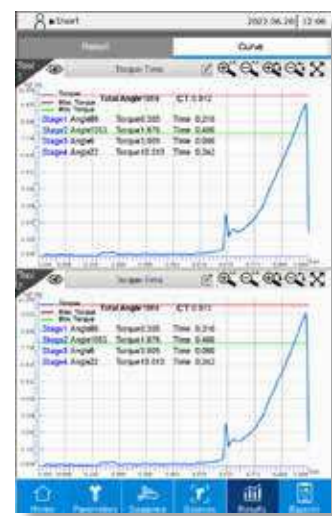
### Clear display

- Hierarchic display for users to quickly know the status, torque, and quality information as well as to check the model and tightening information

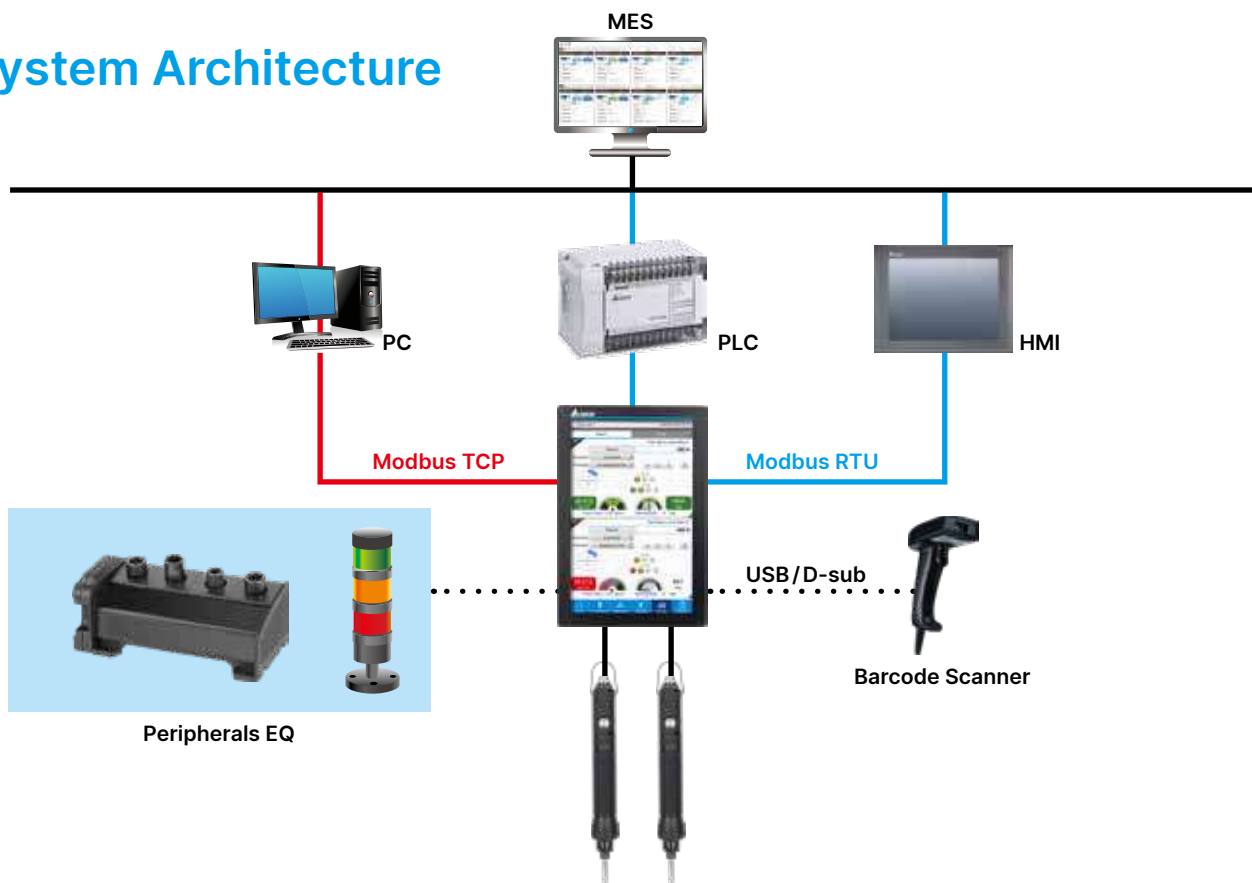


### Complete results and reports

- Records complete process with torques, angles, and tightening strategies for each screwdriving for traceability and analysis



## System Architecture



# Specifications

## Smart Screwdriver

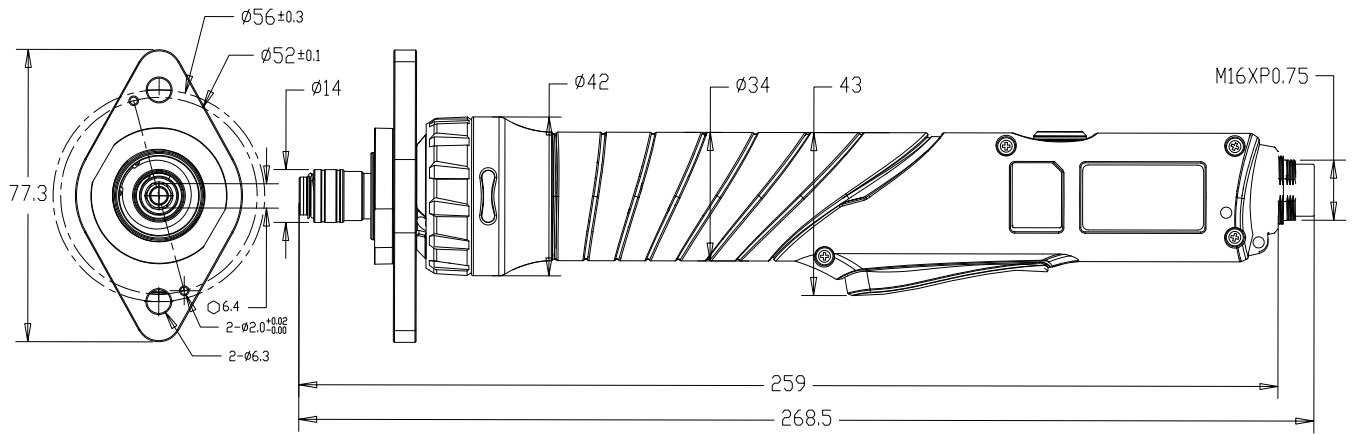
Model	ECM-SD3-F12S0 ECM-SD3-F12S1	ECM-SD3-F30S0 ECM-SD3-F30S1	ECM-SD3-F50S0 ECM-SD3-F50S1	ECM-SD3-F75S0 ECM-SD3-F75S1
Input Voltage	38 V <sub>DC</sub>			
Torque Range (kgf-cm)	2.4 ~ 12	6 ~ 30	10 ~ 50	15 ~ 75
Precision	±3%			
Max. Rotation Speed	2000 rpm	1100 rpm	700 rpm	500 rpm
Tool Length	268.5 mm			
Weight	560 g			
Handheld Diameter	34 mm			
Bit Specification	6.35 mm hex head for the model name that ends with 0 5 mm hex head for the model name that ends with 1			
Operating Temperature	0°C (32°F) to 40°C (104°F)			
Storage Temperature	0°C (32°F) to 60°C (140°F)			
Humidity	0 ~ 90 % RH (non-condensing)			
IP Rating	IP40			

## Smart Screwdriving Controller

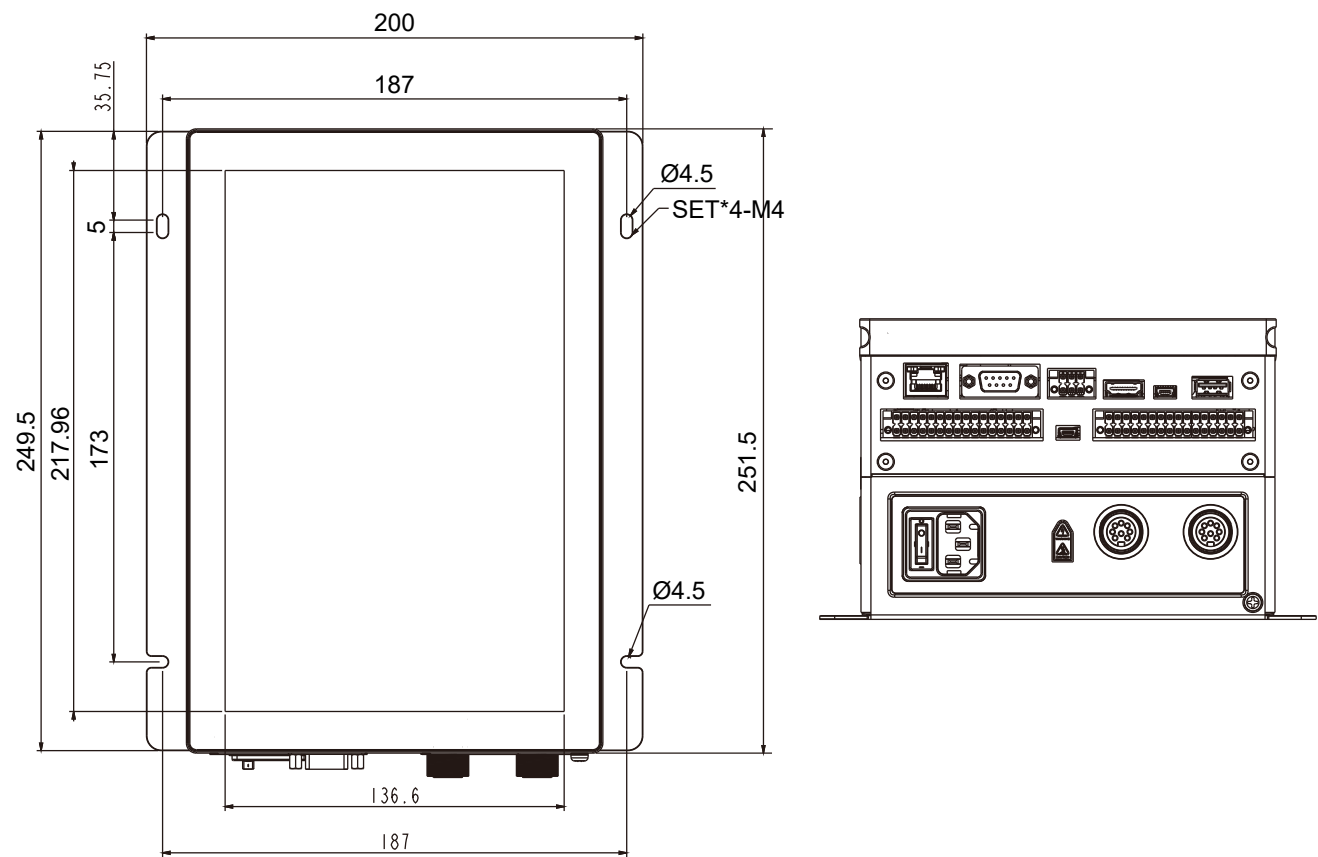
Controller	ASD-SD3021B-1 (Single-Tool Controller)	ASD-SD3041B-2 (Dual-Tool Controller)
Input Voltage	100 ~ 240 V <sub>AC</sub>	
DC Bus Voltage	38 V <sub>DC</sub>	
Rated Output Current	3.7 Arms	
Max. Instantaneous Output Current	15 Arms	
Rated Power Output	100 W / one tool	200 W / two tools
Screen Size	10.1" (Touchscreen)	
Dimensions	200 x 252 x 121 mm	

# Dimensions

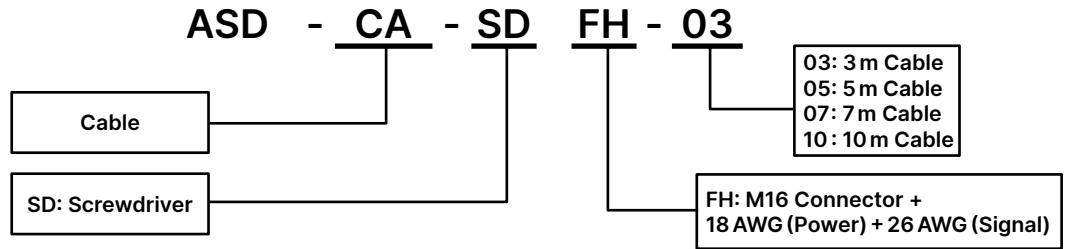
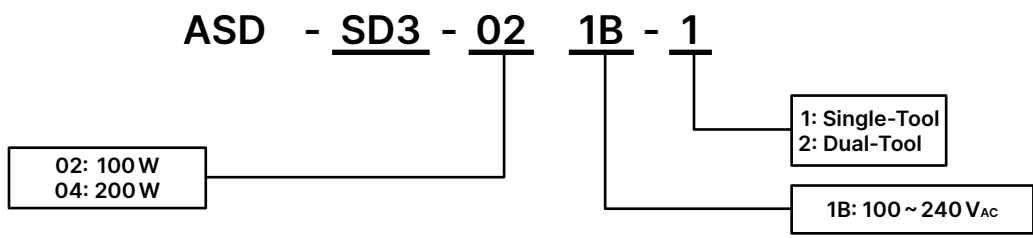
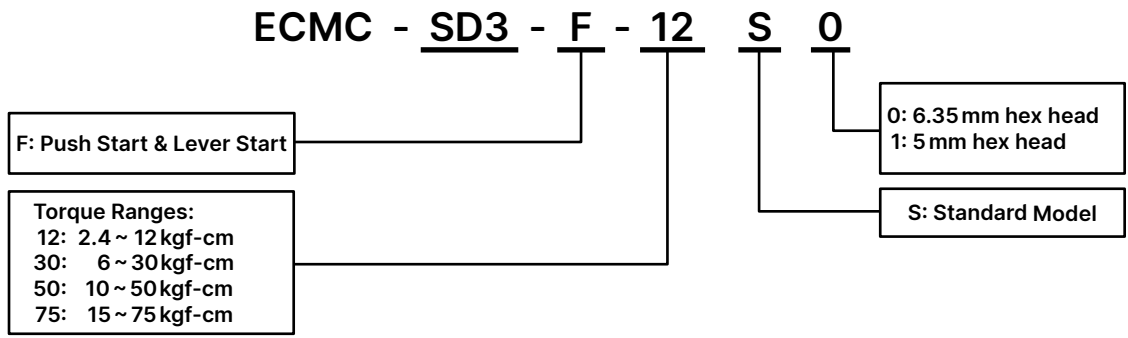
## Smart Screwdriver



## Smart Screwdriving Controller



## Model Name Explanation



## Ordering Information

Smart Screwdriving System Models	Specifications
ECM - SD3 - F12S0	2.4 ~ 12 kgf-cm, 6.35 mm Hex head
ECM - SD3 - F30S0	6 ~ 30 kgf-cm, 6.35 mm Hex head
ECM - SD3 - F50S0	10 ~ 50 kgf-cm, 6.35 mm Hex head
ECM - SD3 - F75S0	15 ~ 75 kgf-cm, 6.35 mm Hex head
ECM - SD3 - F12S1	2.4 ~ 12 kgf-cm, 5 mm Hex head
ECM - SD3 - F30S1	6 ~ 30 kgf-cm, 5 mm Hex head
ECM - SD3 - F50S1	10 ~ 50 kgf-cm, 5 mm Hex head
ECM - SD3 - F75S1	15 ~ 75 kgf-cm, 5 mm Hex head
ASD - SD3021B-1	100 ~ 240 V <sub>AC</sub> , 100 W, Single-Tool
ASD - SD3041B-2	100 ~ 240 V <sub>AC</sub> , 200 W, Dual-Tool
ECM - SD3 - ACSSR	Flange module for fixing the smart screwdriver to a machine
ACS3 - CASDFH03	Cable between screwdriver and controller - 3 m
ACS3 - CASDFH05	Cable between screwdriver and controller - 5 m
ACS3 - CASDFH07	Cable between screwdriver and controller - 7 m
ACS3 - CASDFH10	Cable between screwdriver and controller - 10 m
ACS3 - CAPW311A	US-standard power cable with 3-pin plug
ACS3 - CAPW311C	CN-standard power cable with 3-pin plug



Smarter. Greener. Together.

## Industrial Automation Headquarters

### Taiwan: Delta Electronics, Inc.

Taoyuan Technology Center  
No.18, Xinglong Rd., Taoyuan District,  
Taoyuan City 330477, Taiwan  
TEL: +886-3-362-6301 / FAX: +886-3-371-6301

## Asia

### China: Delta Electronics (Shanghai) Co., Ltd.

No.182 Minyu Rd., Pudong Shanghai, P.R.C.  
Post code : 201209  
TEL: +86-21-6872-3988 / FAX: +86-21-6872-3996  
Customer Service: 400-820-9595

### Japan: Delta Electronics (Japan), Inc.

Industrial Automation Sales Department  
2-1-14 Shibadaimon, Minato-ku  
Tokyo, Japan 105-0012  
TEL: +81-3-5733-1155 / FAX: +81-3-5733-1255

### Korea: Delta Electronics (Korea), Inc.

1511, 219, Gasan Digital 1-Ro., Geumcheon-gu,  
Seoul, 08501 South Korea  
TEL: +82-2-515-5305 / FAX: +82-2-515-5302

### Singapore: Delta Energy Systems (Singapore) Pte Ltd.

4 Kaki Bukit Avenue 1, #05-04, Singapore 417939  
TEL: +65-6747-5155 / FAX: +65-6744-9228

### India: Delta Electronics (India) Pvt. Ltd.

Plot No.43, Sector 35, HSIIDC Gurgaon,  
PIN 122001, Haryana, India  
TEL: +91-124-4874900 / FAX: +91-124-4874945

### Thailand: Delta Electronics (Thailand) PCL.

909 Soi 9, Moo 4, Bangpoo Industrial Estate (E.P.Z),  
Pattana 1 Rd., T.Phraksa, A.Muang,  
Samutprakarn 10280, Thailand  
TEL: +66-2709-2800 / FAX: +66-2709-2827

### Australia: Delta Electronics (Australia) Pty Ltd.

Unit 2, Building A, 18-24 Ricketts Road,  
Mount Waverley, Victoria 3149 Australia  
Mail: IA.au@deltaww.com  
TEL: +61-1300-335-823 / +61-3-9543-3720

## Americas

### USA: Delta Electronics (Americas) Ltd.

5101 Davis Drive, Research Triangle Park, NC 27709, U.S.A.  
TEL: +1-919-767-3813 / FAX: +1-919-767-3969

### Brazil: Delta Electronics Brazil Ltd.

Estrada Velha Rio-São Paulo, 5300 Eugênio de  
Melo - São José dos Campos CEP: 12247-004 - SP - Brazil  
TEL: +55-12-3932-2300 / FAX: +55-12-3932-237

### Mexico: Delta Electronics International Mexico S.A. de C.V.

Gustavo Baz No. 309 Edificio E PB 103  
Colonia La Loma, CP 54060  
Tlalnepantla, Estado de México  
TEL: +52-55-3603-9200

## EMEA

### EMEA Headquarters: Delta Electronics (Netherlands) B.V.

Sales: Sales.IA.EMEA@deltaww.com  
Marketing: Marketing.IA.EMEA@deltaww.com  
Technical Support: iatechnicalsupport@deltaww.com  
Customer Support: Customer-Support@deltaww.com  
Service: Service.IA.emea@deltaww.com  
TEL: +31(0)40 800 3900

### BENELUX: Delta Electronics (Netherlands) B.V.

Automotive Campus 260, 5708 JZ Helmond, The Netherlands  
Mail: Sales.IA.Benelux@deltaww.com  
TEL: +31(0)40 800 3900

### DACH: Delta Electronics (Netherlands) B.V.

Coesterweg 45, D-59494 Soest, Germany  
Mail: Sales.IA.DACH@deltaww.com  
TEL: +49(0)2921 987 0

### France: Delta Electronics (France) S.A.

ZI du bois Challand 2, 15 rue des Pyrénées,  
Lisses, 91090 Evry Cedex, France  
Mail: Sales.IA.FR@deltaww.com  
TEL: +33(0)1 69 77 82 60

### Iberia: Delta Electronics Solutions (Spain) S.L.U

Ctra. De Villaverde a Vallecas, 265 1º Dcha Ed.  
Hormigueras – P.I. de Vallecas 28031 Madrid  
TEL: +34(0)91 223 74 20  
Carrer Llacuna 166, 08018 Barcelona, Spain  
Mail: Sales.IA.Iberia@deltaww.com

### Italy: Delta Electronics (Italy) S.r.l.

Via Meda 2-22060 Novedrate(CO)  
Piazza Grazioli 18 00186 Roma Italy  
Mail: Sales.IA.Italy@deltaww.com  
TEL: +39 039 8900365

### Russia: Delta Energy System LLC

Vereyskaya Plaza II, office 112 Vereyskaya str.  
17 121357 Moscow Russia  
Mail: Sales.IA.RU@deltaww.com  
TEL: +7 495 644 3240

### Turkey: Delta Greentech Elektronik San. Ltd. Sti. (Turkey)

Şerifali Mah. Hendem Cad. Kule Sok. No:16-A  
34775 Ümraniye – İstanbul  
Mail: Sales.IA.Turkey@deltaww.com  
TEL: + 90 216 499 9910

### MEA: Eltek Dubai (Eltek MEA DMCC)

OFFICE 2504, 25th Floor, Saba Tower 1,  
Jumeirah Lakes Towers, Dubai, UAE  
Mail: Sales.IA.MEA@deltaww.com  
TEL: +971(0)4 2690148

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