

Digitized Automation for a Changing World

# Delta Servo Motor for Hydraulic Systems with Rotary Encoder MSJ-E Series

## Delta Servo Motor for Hydraulic Systems with Rotary Encoder MSJ-E Series

### Interior magnet rotor designed specifically for hydraulic servo

The MSJ-E Series is the perfect fit for hydraulic power systems and the low-rotating-speed thermoplastic melting process by the gearbox. It is suitable for injection molding machines, blow molding machines, bottle blowing machines, extruders, bending machines, and more.





## Table of Contents

---

<b>Features</b>	<b>3</b>
<b>Model Overview</b>	<b>4</b>
<b>Specifications</b>	<b>5</b>
<b>Dimensions</b>	<b>6</b>
<b>Wiring</b>	<b>6</b>
<b>Torque-speed Characteristics</b>	<b>8</b>

# Delta Servo Motor for Hydraulic Systems with Rotary Encoder MSJ-E Series

The MSJ-E Series Motor is specifically designed for hydraulic power systems in the rubber and plastic industry. It was developed based on criteria from injection molding machines, various tonnages, and rotating speed ranges. For optimal performance, the required pressure and flow of each weight are calculated respectively.



### Energy-saving

IE4 classified and compliant with IEC60034-30-2



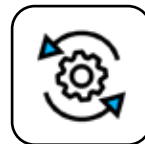
### Excellent Overload Capacity

Momentary overload reaches 250%, which is better than common standards (180 - 200 %)



### Low Current

Saves 15 - 18 % current compared with others when integrated with Delta's drives and control system



### Reliable High-Speed Operation

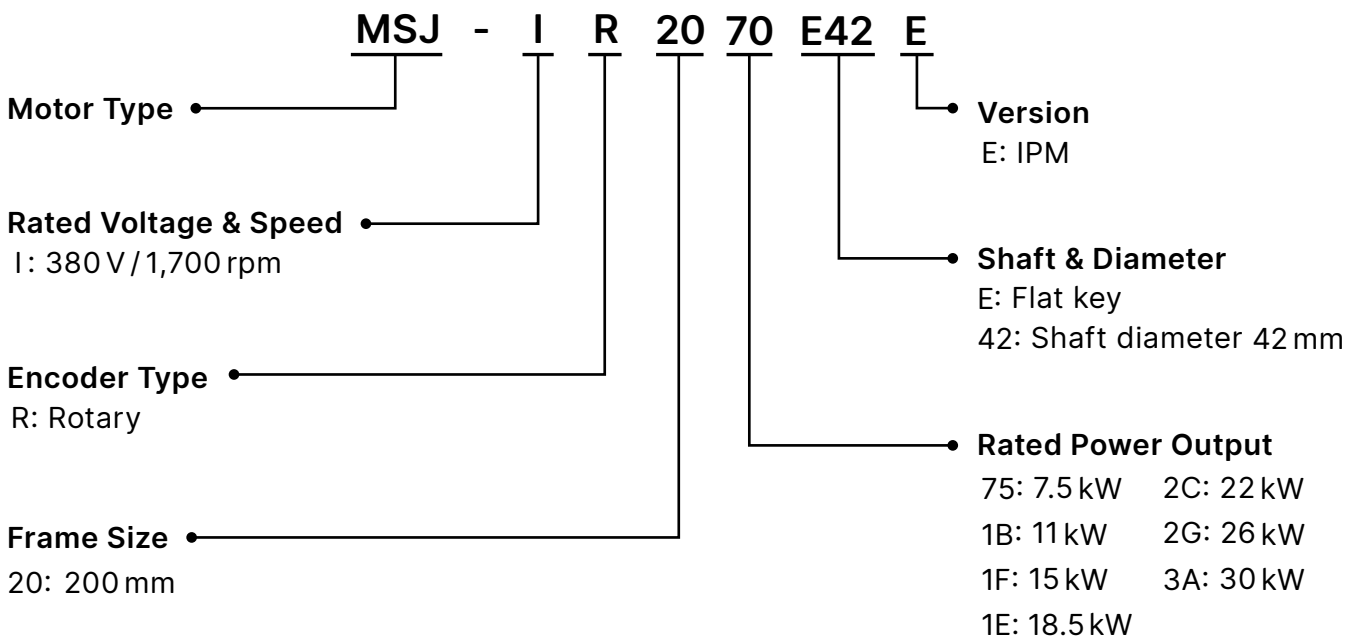
Unique motor and drive integration achieves low torque attenuation rate to optimize high-speed performance



### Low Rising Temperature

For high-speed control, it was designed at 80°C to protect the motor from overload and improve reliability

## Model Names



## Model Overview

Model	Rated Voltage <sup>*1</sup>	Rated Torque <sup>*1</sup>	Overload Torque <sup>*2</sup>	Rated Speed	Rated Current	Frame Size
	kW	Nm	Nm	rpm	A	mm
MSJ-IR2075E42E	7.5	42.1	84.2	1,700	13.8	200
MSJ-IR201BE42E	11	61.8	123.6		20.3	
MSJ-IR201FE42E	15	84.3	168.6		27.5	
MSJ-IR201IE42E	18.5	104	208		35.5	
MSJ-IR202CE42E	22	124	248		40.5	
MSJ-IR202GE42E	26	146	292		49.5	
MSJ-IR203AE42E	30	169	338		55.5	

\*1. High performance operating points tested with higher standard: Temperature rise being less than 80°C at steady thermal state (de facto standard as 100°C). Refer to the motor specifications for more details

\*2. Max. overload torque is 250%. The result in this table is under 200% overload with long duration (180sec per time)



# Specifications

## Electric Details

Frame Size 200 mm	Model	MSJ-IR20 75E42E	MSJ-IR20 1BE42E	MSJ-IR20 1FE42E	MSJ-IR20 1IE42E	MSJ-IR20 2CE42E	MSJ-IR20 2GE42E	MSJ-IR20 3AE42E
<b>Voltage</b>	V	380						
<b>High Performance Rated Power<sup>*1</sup></b>	kW	7.5	11	15	18.5	22	26	30
<b>Power <math>\Delta T=100^{\circ}\text{C}</math></b>	kW	9.5	15	18.5	22	26	29.5	36
<b>Poles</b>		8						
<b>Rated Torque<sup>*1</sup></b>	Nm	42.1	61.8	84.3	104	124	146	169
<b>Rated Current<sup>*1</sup></b>	A	13.9	20.3	27.5	35.5	40.5	49.5	56.3
<b>Overload Torque<sup>*2</sup></b>	Nm	84.2	123.6	168.6	208	248	292	338
<b>Overload Current</b>	A	34.1	46.9	61.3	74.7	88.5	103.8	124
<b>Rated Speed</b>	rpm	1,700						
<b>Max. Speed<sup>*3</sup></b>	rpm	2,500						
<b>Torque Constant<sup>*1</sup></b>	Nm/A	3.03	3.04	3.06	2.93	3.06	2.95	3
<b>Back EMF Constant</b>	V/krpm	187	187	187	182	187	182	187
<b>Wire Resistance</b>	ohm	1.073	0.621	0.385	0.281	0.223	0.178	0.158
<b>Q-axis Inductance</b>	mH	18.8	11.15	8.3	6.25	5.55	5.41	4.1
<b>D-axis Inductance</b>	mH	9.2	5.75	4.14	3.13	2.8	2.39	2
<b>Rotation Inertia</b>	kg-cm <sup>2</sup>	62	87	112	137	160	187	213
<b>Weight</b>	kg	39.5	46	53	59.5	67.5	74	83.6
<b>Efficiency</b>	%	93.3	93.9	94.4	94.7	94.9	95.1	95.3
<b>Frame Size</b>	mm	200 x 200						
<b>Insulation Class</b>		Class F (Winding: Class H)						
<b>Protection Level</b>		IP54						
<b>Efficiency Level</b>		IE4/China Energy Label Grade 1 (GB30253-2013)						
<b>Cooling Method</b>		Forced air-cooling AC Fan 220 V <sub>AC</sub>						
<b>Encoder Type</b>		Rotary encoder (Resolver 2 Poles)						
<b>Motor Temperature Protection</b>		PTC130 thermistor and KTY84-130 temperature sensor						
<b>Operating Environment</b>		Temperature: -15 - 40°C; humidity: 20 - 90% (non-condensing); altitude: < 1,000m						
<b>Installation Type</b>		Flange/Support legs						
<b>International Certification</b>		CE						

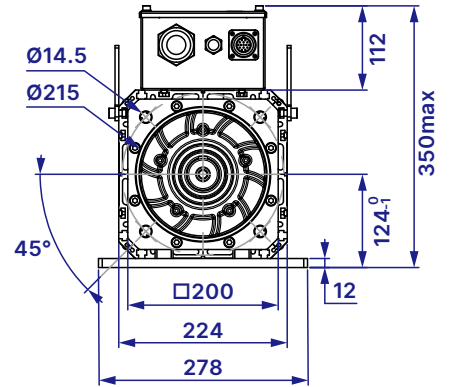
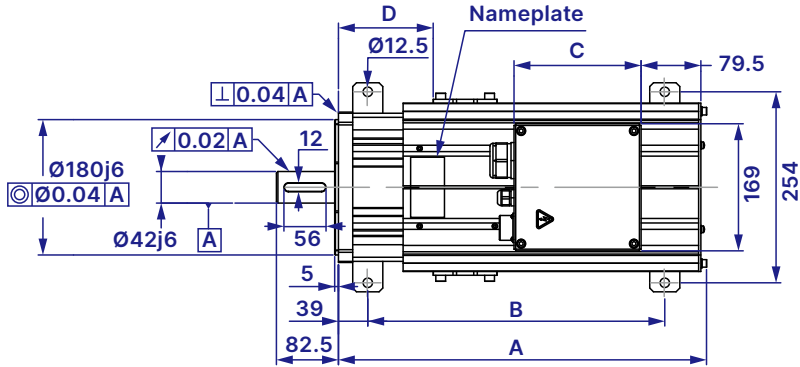
\*1: High performance operating points tested with higher standard: Temperature rise being less than 80°C at steady thermal state (de facto standard as 100°C).

\*2: Periodic overload torque at 1,700rpm: Recommended to be twice of rated torque. For operation conditions please refer to the overload capacity chart of the motor characteristic curve. Actual max. torque can reach 250% while lasting time is shorter and is subject to certain operation restrictions.

\*3: Actual max. speed can be elevated by the field-weakening capability of the drive. 2,250rpm is a suggested value and does not stand for the maximum number.

# Dimensions

## Frame Size 200 mm

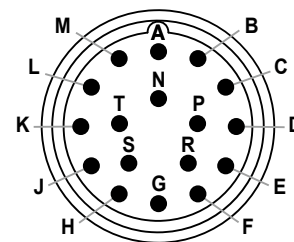


Model MSJ-	IR2075E42E	IR201BE42E	IR201FE42E	IR201IE42E	IR202CE42E	IR202GE42E	IR203AE42E	
A	mm	345	381	417	453	489	525	575
B	mm	265	285	310	350	395	430	470
C	mm	169						204
D	mm	95	110	130	150	160	180	200

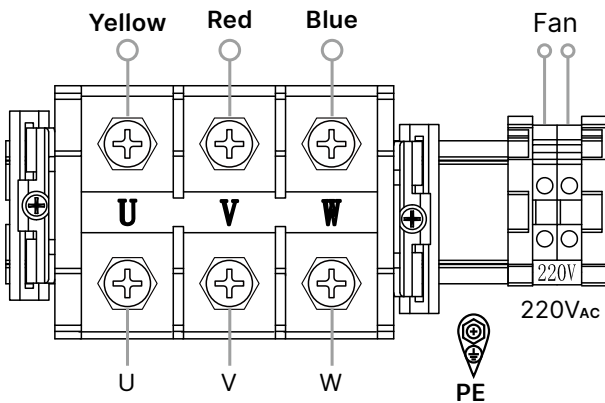
\* Size B can be adjusted to needs

# Wiring

## Junction Box



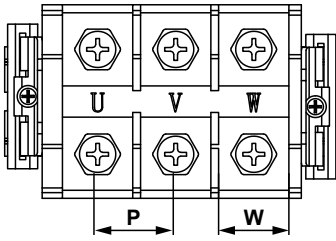
To Motor Winding



To Delta Hybrid Servo Controllers

Motor Side Military Connector Pin Assignments			
PIN	Signal/Color	PIN	Signal/Color
A	Sin+ /Yellow	K	KTY/Brown
B	Sin- /Blue	L	-
C	Cos+ /Red	M	-
D	Cos- /Black	N	-
E	-	P	-
F	-	R	Resex/Ylw Wht
G	PTC/Light Blue	S	Resex/Red Wht
H	PTC/Light Blue	T	-
J	KTY/White		-

## Mechanism Diagram



Frame Size	Screw Size	P	W	Tightening Torque
		mm	mm	Nm
200 mm	M6	19	16.7	4

Note: Please tighten screws with an outer hexagon socket

## Wiring

### Motor Power Cables (U, V, M):

Copper wires with thermal class above 90°C are recommended

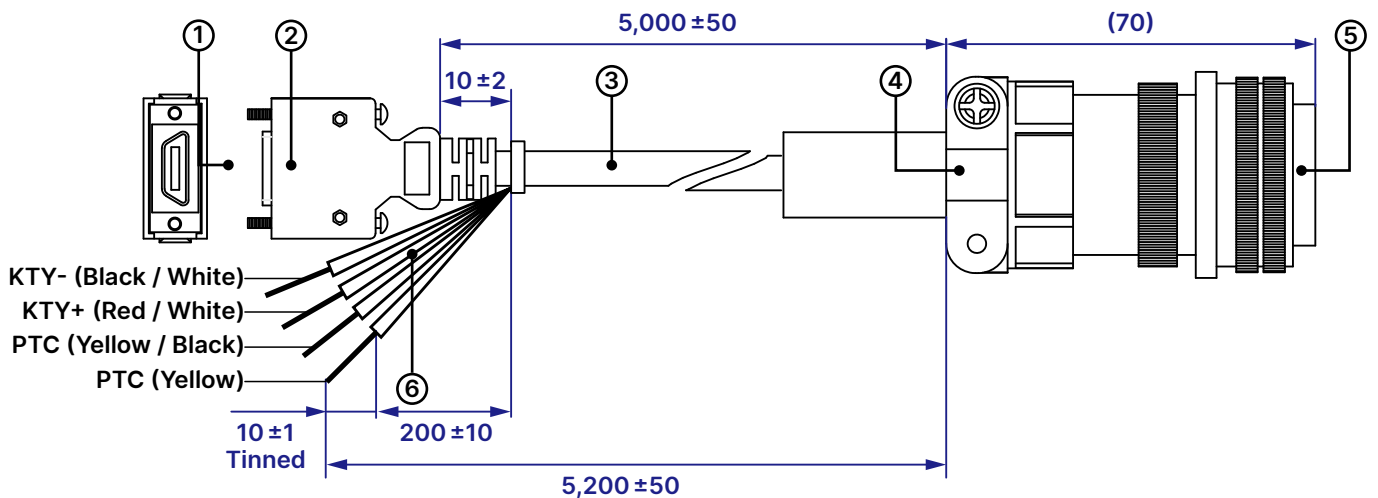
Model		MSJ-IR20 75E42E	MSJ-IR20 1BE42E	MSJ-IR20 1FE42E	MSJ-IR20 1IE42E	MSJ-IR20 2CE42E	MSJ-IR20 2GE42E	MSJ-IR20 3AE42E
Min. Wire Gauge	AWG	11	9	8	7	6	5	5
	mm <sup>2</sup>	4.2	6.6	8.4	10.5	13.5	17	17

\*Power cables can be reduced by a level if the cables are under good heat release conditions and the wires with thermal class above 105°C are implemented.

## Encoder Cables

Part number: HSP-SP151002175C

Unit: mm



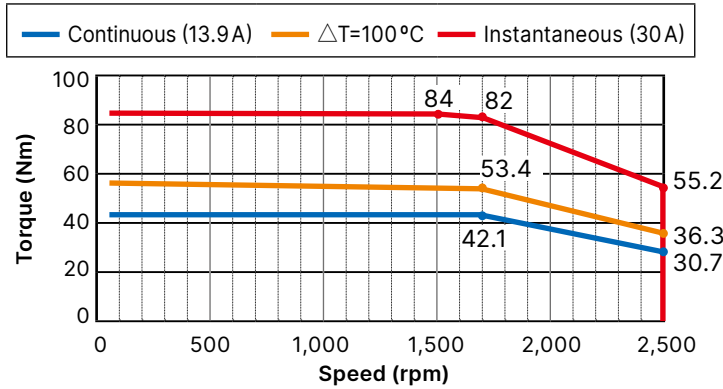
1	SCSi Terminal <Drive Side>	3	Cable	5	Military Connector <Motor Side>
2	SCSi Terminal Block	4	Cable Clamp	6	Cable Tie



# Torque-Speed Characteristics

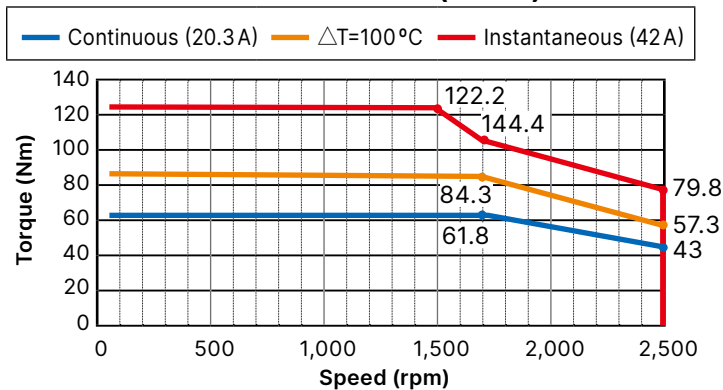
## Frame Size 200 mm

**T-N Curve  
MSJ-IR2075E42E (7.5 kW)**



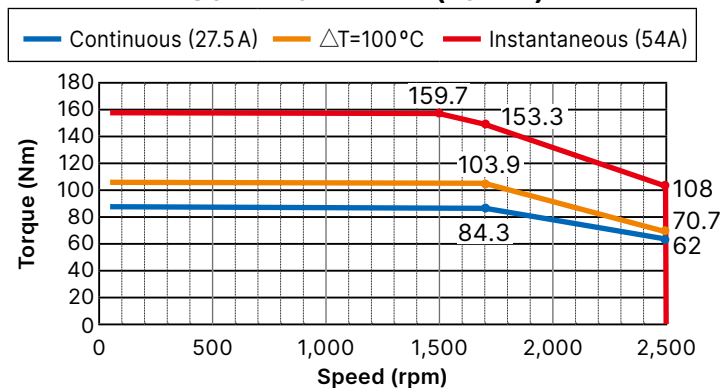
Loading	Torque	Duty	One Time Limit
%	Nm	%	sec
100	42.1	100	No limit
125	52.6	100	No limit
150	63.2	42	600
175	76.7	30	300
200	84.2	20	180

**T-N Curve  
MSJ-IR201BE42E (11 kW)**



Loading	Torque	Duty	One Time Limit
%	Nm	%	sec
100	61.8	100	No limit
125	77.3	100	No limit
150	92.7	42	600
175	108.1	30	300
200	123.6	20	180

**T-N Curve  
MSJ-IR201FE42E (15 kW)**

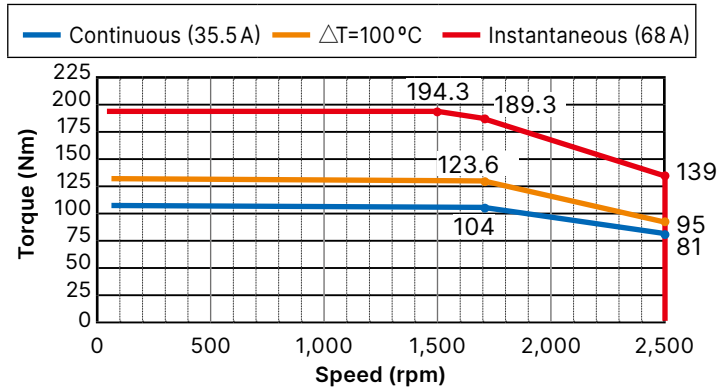


Loading	Torque	Duty	One Time Limit
%	Nm	%	sec
100	84.3	100	No limit
125	105.4	96	3,600
150	126.5	42	600
175	147.5	30	300
200	168.6	20	180

# Torque-speed Characteristics

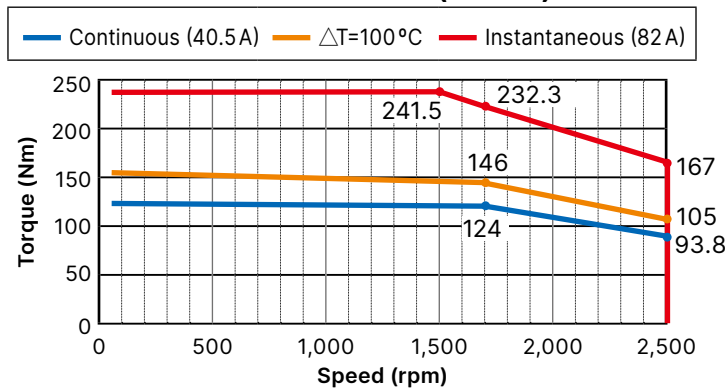
## Frame Size 200 mm

**T-N Curve  
MSJ-IR201IE42E (18.5 kW)**



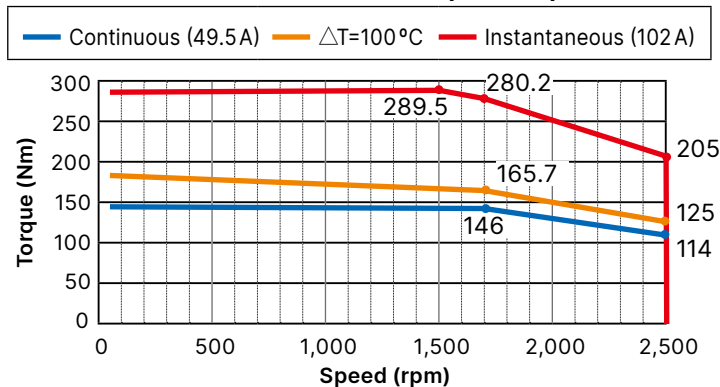
Loading	Torque	Duty	One Time Limit
%	Nm	%	sec
100	104	100	No limit
125	130	90	1,800
150	156	42	600
175	182	30	300
200	208	20	180

**T-N Curve  
MSJ-IR202CE42E (22 kW)**



Loading	Torque	Duty	One Time Limit
%	Nm	%	sec
100	124	100	No limit
125	155	88	1,800
150	186	42	600
175	217	30	300
200	248	20	180

**T-N Curve  
MSJ-IR202GE42E (26 kW)**

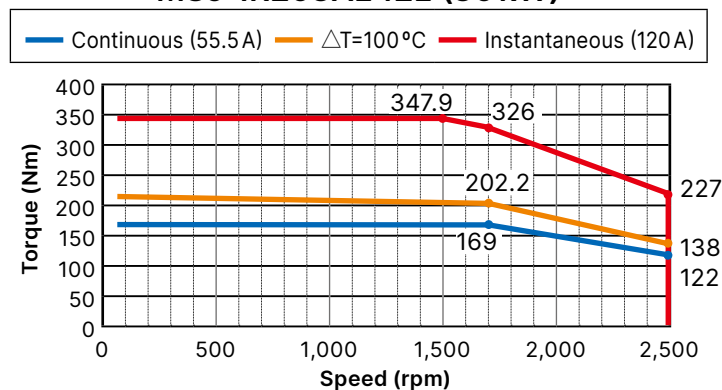


Loading	Torque	Duty	One Time Limit
%	Nm	%	sec
100	146	100	No limit
125	182.5	80	1,800
150	219	42	600
175	255.5	30	300
200	292	20	180

# Torque-speed Characteristics

## Frame Size 200 mm

**T-N Curve**  
**MSJ-IR203AE42E (30 kW)**



Loading	Torque	Duty	One Time Limit
%	Nm	%	sec
100	169	100	No limit
125	211	90	1,800
150	254	42	550
175	296	30	300
200	338	20	180

## Order Information

Model	Power	Rated Torque
	kW	Nm
MSJ-IR2075E42E	7.5	42.1
MSJ-IR201BE42E	11	61.8
MSJ-IR201FE42E	15	84.3
MSJ-IR201IE42E	18.5	104
MSJ-IR202CE42E	22	124
MSJ-IR202GE42E	26	146
MSJ-IR203AE42E	30	169



Smarter. Greener. Together.

## Industrial Automation Headquarters

### Taiwan: Delta Electronics, Inc.

Taoyuan Technology Center  
No.18, Xinglong Rd., Taoyuan District,  
Taoyuan City 33068, 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

\*We reserve the right to change the information in this catalogue without prior notice.