



Automation for a Changing World

Delta EtherCAT Interface Servo Drive ASDA A2-E Series



EtherCAT®

www.deltaww.com

 **DELTA**
Smarter. Greener. Together.

Introduction

Delta's ASDA A2-E, an advanced AC Servo Drive with an EtherCAT communication interface, complies with IEC61158 and IEC61800-7 to enable faster, real-time, and accurate performance in high-end applications.

The ASDA A2-E follows in the footsteps of the successful ASDA A2 series. This new A2-E supports all the modes of the CoE device profile based on CiA402, and all command types of EtherCAT.

In addition to the EtherCAT communication function, A2-E features the integrated Safe Torque Off (STO), short cycle time, and extension digital input port, which makes the A2-E ideal for multi-axis synchronization applications in a wide range of machinery automation fields. This series covers a wide range of rated power to drive the motors, from 400W to 7.5kW for 400V and 100W to 3kW for 220V.

Features

- Touch probe function can be enabled with two dedicated Digital Input (DI) on CN7 or the external encoder.
- Integrated Safe Torque Off (STO) safety function according to the standards of IEC61508, SIL2; IEC62061, SILCL2; ISO13849-1, Cat. 3 PL=d
- Wide power range coverage in both 220V and 400V
- Supports full-closed loop control
- Supports absolute type and incremental type ECMA Series motors

Applications



Specifications of ASDA A2-E_220V Series

ASDA A2-E Series		100W	200W	400W	750W	1kW	1.5kW	2kW	3kW
		01	02	04	07	10	15	20	30
Power Supply	Phase / Voltage	Three-phase / Single-phase 220VAC						Three-phase 220VAC	
	Permissible Voltage Range	Three-phase / Single-phase 200 ~ 230VAC , -15%~10%						Three-phase 200 ~ 230VAC , -15% ~ 10%	
Input Current (3PH) Unit: Arms		0.39	1.11	1.86	3.66	4.68	5.9	8.76	9.83
Input Current (1PH) Unit: Arms		0.69	1.92	3.22	6.78	8.88	10.3	-	-
Continuous Output Current Unit: Arms		0.9	1.55	2.6	5.1	7.3	8.3	13.4	19.4
Cooling Method		Natural Air Circulation			Fan Cooling				
Encoder Resolution (Servo Drive Resolution)		Incremental type: 20-bit (1280000 p/rev) ; Absolute type: 17-bit							
Control of Main Circuit		SVPWM (Space Vector Pulse Width Modulation) Control							
Tuning Modes		Auto / Manual							
Dynamic Brake		Built-in							
Position Control Mode (CSP)	Command Source	External analog signal							
	Smoother Strategy	Low-pass and P-curve filter							
Torque Control Mode (CST)	Electronic Gear	Electronic gear N/M multiple N: 1 ~ 32767, M: 1 : 32767 (1/50 < N/M < 25600)							
	Torque Limit Operation	External analog signal							
Speed Control Mode (CSV)	Feed Forward Compensation	External analog signal / Internal parameters							
	Speed Control Range ^{*1}	1:5000						1:3000	
Speed Control Mode (CSV)	Command Source External Analog Signal	External analog signal							
	Smoother Strategy	Low-pass and S-curve filter							
Torque Control Mode (CST)	Torque Limit Operation	Set by parameters or via analog input							
	Frequency Response Characteristic	Maximum 1 kHz							
Speed Control Mode (CSV)	Speed Accuracy (at rated rotation speed) ^{*2}	0.01 % or less at 0 to 100 % load fluctuation							
	Feed Forward Compensation	0.01 % or less at 0 °C to 50 °C ambient temperature fluctuation							
Torque Control Mode (CST)	Command Source	External analog signal							
	Smoother Strategy	Low-pass filter							
Speed Control Mode (CSV)	Speed Limit Operation	Via analog input							
	Inputs	Servo on, Reset, Gain switching, Pulse clear, Zero speed CLAMP, Command input reverse control, Command triggered, Speed/Torque limit enabled, Position command selection, Motor stop, Speed position selection, Position / Speed mode switching, Speed / Torque mode switching, Torque / Position mode switching, PT / PR command switching, Emergency stop, Forward / Reverse inhibit limit, Reference "Home" sensor, Forward / Reverse operation torque limit, Move to "Home", Electronic Cam (E-Cam), Forward / Reverse JOG input, Event trigger PR command, Electronic gear ratio (Numerator) selection and Pulse inhibit input							
Digital Inputs/Outputs	Outputs	Encoder signal output (A, B, Z Line Driver and Z Open Collector) Servo ready, Servo on, At Zero speed, At Speed reached, At Positioning completed, At Torques limit, Servo alarm (Servo fault) activated, Electromagnetic brake control, Homing completed, Output overload warning, Servo warning activated, Position command overflow, Forward / Reverse software limit, Internal position command completed, Capture operation completed output., Motion control completed output., Master position of E-Cam (Electronic Cam)							
	Protective Functions	Overcurrent, Overvoltage, Undervoltage, Motor overheated, Regeneration error, Overload, Overspeed, Abnormal pulse control command, Excessive deviation, Encoder error, Adjustment error, Emergency stop activated, Reverse/ Forward limit switch error, Position excessive deviation of full-close control loop, Serial communication error, Input power phase loss, Serial communication time out, short circuit protection of U, V, W, and CN1, CN2, CN3 terminals							
Communication Interface		USB / EtherCAT							
Environment	Installation Site	Indoor location (free from direct sunlight), no corrosive liquid and gas (far away from oil mist, flammable gas, dust)							
	Altitude	Altitude 1000 m or lower above sea level							
	Atmospheric Pressure	86kPa ~ 106kPa							
	Operating Temperature	0°C ~ 55°C (If operating temperature is above 45 °C , forced cooling will be required)							
	Storage Temperature	-20°C ~ 65°C							
	Humidity	0 ~ 90% RH (non-condensing)							
	Vibration	9.80665m/s2 (1G) less than 20Hz, 5.88m/s ² (0.6G) 20 to 50Hz							
	IP Rating	IP20							
	Power System	TN System ^{*3}							
Approvals		IEC/EN 61800-5-1, UL 508C, C-tick							

Footnote:

*1 Rated rotation speed: When full load, speed ratio is defined as the minimum speed (the motor will not pause).

*2 When command is rated rotation speed, the speed fluctuation rate is defined as: (Empty load rotation speed – Full load rotation speed) / Rated rotation speed

*3 TN system: A power distribution system having one point directly earthed, the exposed conductive parts of the installation being connected to that point by a protective earth conductor.

Specifications of ASDA A2-E_400V Series

ASDA A2-E Series		400W	750W	1kW	1.5kW	2kW	3kW	4.5kW	5.5kW	7.5kW
		04	07	10	15	20	30	45	55	75
Power Supply	Input Voltage	24VDC, ±10%								
	Input Current	0.43 A				1.18 A			1.66 A	
	Input Power	10.32 W				28.2 W			39.85 W	
Main Circuit Power		Three-phase, 380~480VAC, ±10%								
Input Current Unit: Arms		1.40	2.35	3.02	4.24	5.65	8.01	11.9	14.1	17.27
Continuous Output Current Unit: Arms		2.0	3.35	3.52	5.02	6.66	11.9	20	22.37	30
Cooling Method		Fan Cooling								
Encoder Resolution (Servo Drive Resolution)		Incremental type: 20-bit (1280000 p/rev) ; Absolute type: 17-bit								
Control of Main Circuit		SVPWM (Space Vector Pulse Width Modulation) Control								
Tuning Modes		Auto / Manual								
Dynamic Brake		Built-in								
Position Control Mode (CSP)	Command Source	External analog signal								
	Smoother Strategy	Low-pass and P-curve filter								
Mode (CSP)	Electronic Gear	Electronic gear N/M multiple N: 1 ~ 32767, M: 1 : 32767 (1/50 < N/M < 25600)								
	Torque Limit Operation	External analog signal								
Speed Control Mode (CSV)	Feed Forward Compensation	External analog signal / Internal parameters								
	Speed Control Range ^{*1}	1:5000							1:3000	
	Command Source External Analog Signal	External analog signal								
	Smoother Strategy	Low-pass and S-curve filter								
	Torque Limit Operation	Set by parameters or via analog input								
	Frequency Response Characteristic	Maximum 1 kHz								
	Speed Accuracy (at rated rotation speed) ^{*2}	0.01 % or less at 0 to 100 % load fluctuation 0.01 % or less at 0 °C to 50 °C ambient temperature fluctuation								
	Feed Forward Compensation	0.01 % or less at ±10 % power fluctuation								
Torque Control Mode (CST)	Command Source	External analog signal								
	Smoother Strategy	Low-pass filter								
	Speed Limit Operation	Via analog input								
Digital Inputs/Outputs	Inputs	Servo on, Reset, Gain switching, Pulse clear, Zero speed CLAMP, Command input reverse control, Command triggered, Speed/Torque limit enabled, Position command selection, Motor stop, Speed position selection, Position / Speed mode switching, Speed / Torque mode switching, Torque / Position mode switching, PT / PR command switching, Emergency stop, Forward / Reverse inhibit limit, Reference "Home" sensor, Forward / Reverse operation torque limit, Move to "Home", Electronic Cam (E-Cam), Forward / Reverse JOG input, Event trigger PR command, Electronic gear ratio (Numerator) selection and Pulse inhibit input								
	Outputs	Encoder signal output (A, B, Z Line Driver and Z Open Collector) Servo ready, Servo on, At Zero speed, At Speed reached, At Positioning completed, At Torques limit, Servo alarm (Servo fault) activated, Electromagnetic brake control, Homing completed, Output overload warning, Servo warning activated, Position command overflow, Forward / Reverse software limit, Internal position command completed, Capture operation completed output., Motion control completed output., Master position of E-Cam (Electronic Cam)								
Protective Functions		Overcurrent, Overvoltage, Undervoltage, Motor overheated, Regeneration error, Overload, Overspeed, Abnormal pulse control command, Excessive deviation, Encoder error, Adjustment error, Emergency stop activated, Reverse/ Forward limit switch error, Position excessive deviation of full-close control loop, Serial communication error, Input power phase loss, Serial communication time out, short circuit protection of U, V, W, and CN1, CN2, CN3 terminals								
Communication Interface		USB / EtherCAT								
Environment	Installation Site	Indoor location (free from direct sunlight), no corrosive liquid and gas (far away from oil mist, flammable gas, dust)								
	Altitude	Altitude 1000 m or lower above sea level								
	Atmospheric Pressure	86kPa ~ 106kPa								
	Operating Temperature	0°C ~ 55°C (If operating temperature is above 45 °C , forced cooling will be required)								
	Storage Temperature	-20°C ~ 65°C								
	Humidity	0 ~ 90% RH (non-condensing)								
	Vibration	9.80665m/s2 (1G) less than 20Hz, 5.88m/s² (0.6G) 20 to 50Hz								
	IP Rating	IP20								
	Power System	TN System ^{*3}								
Approvals		IEC/EN 61800-5-1, UL 508C, C-tick   								

Footnote:

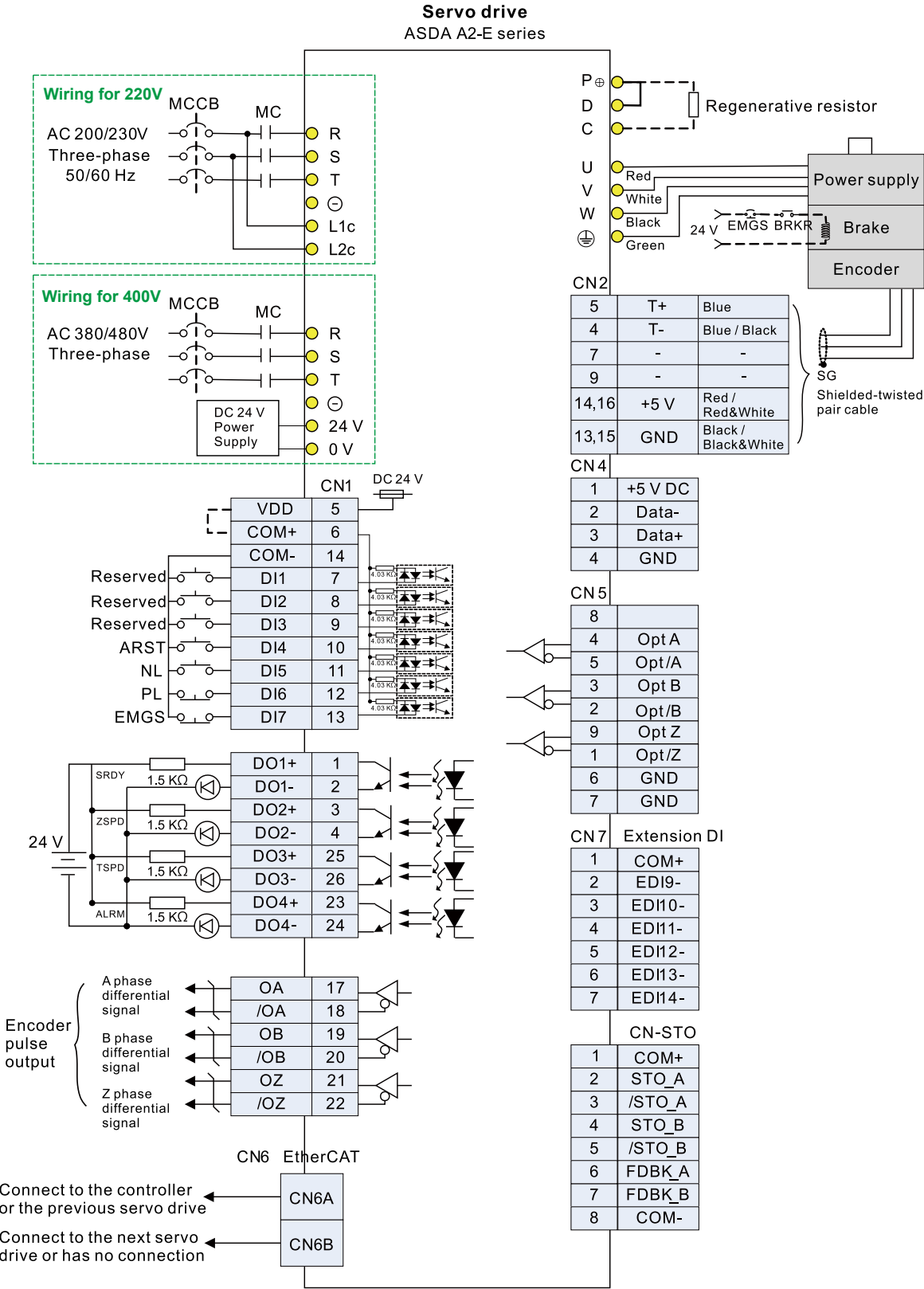
*1 Rated rotation speed: When full load, speed ratio is defined as the minimum speed (the motor will not pause).

*2 When command is rated rotation speed, the speed fluctuation rate is defined as: (Empty load rotation speed – Full load rotation speed) / Rated rotation speed

*3 TN system: A power distribution system having one point directly earthed, the exposed conductive parts of the installation being connected to that point by a protective earth conductor.



Wiring

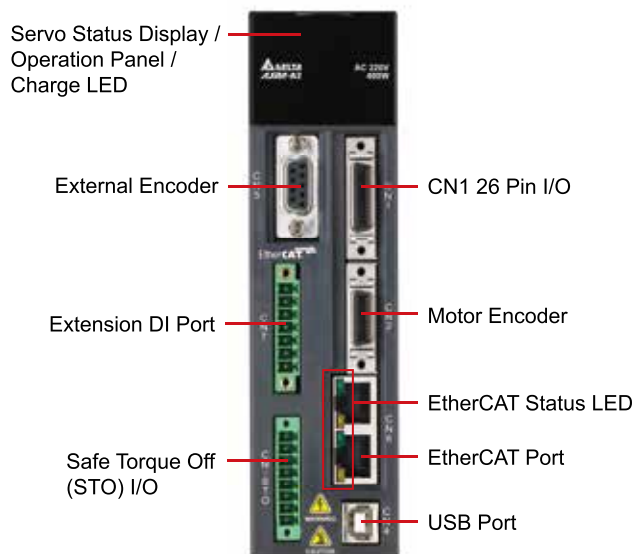


Communication Specifications

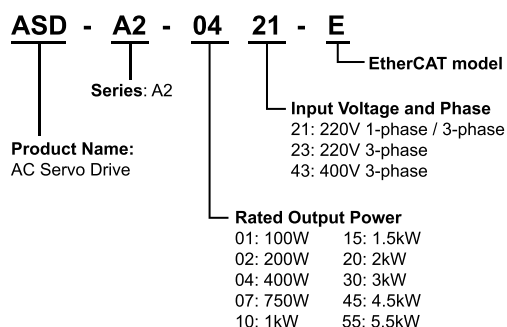
Physical Layer	IEEE802.3u (100 BASE-TX)
Data Link Layer	APRD, FPRD, BRD, LRD, APWR, FPWR, BWR, LWR, ARMW, FRMW, APRW, FPRW, BRW, LRW
Device Profile (CiA402)	Homing Mode, Profile Position Mode, Profile Velocity Mode, Profile Torque Mode, Interpolated Position Mode, Cyclic Syn. Position Mode, Cyclic Syn. Velocity Mode, Cyclic Syn. Torque Mode, Touch Probe Function, Torque Limit Function
Process Data Size	Tx: 8 Object (32 byte, Max.); Rx: 8 Object (32 byte, Max.) Dynamic Mapping supported.
Bus Clock	DC cycle with min. 250 us*
LED Indicator	EtherCAT Link/Activity Indicator (L/A) x 2 EtherCAT RUN Indicator (RUN) x 1 EtherCAT ERROR Indicator (ERR) x 1

* This function will be available in a new version soon to come.

Part Names and Functions



Ordering Information



Accessories for ASDA A2-E

Part Number	ASD-CNSC0026
Description	CN1 connector



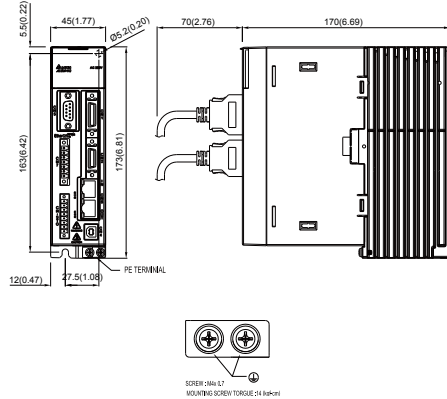
Part Number	ASD-CNFS0808
Description	Pack of connectors used for STO wiring, 8 pcs of connectors in one pack



Dimensions

► 220V Series

100W / 200W / 400W

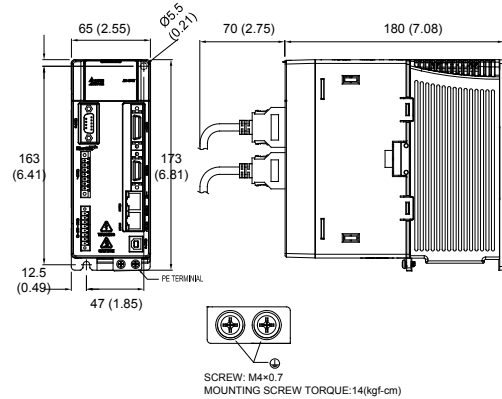


Weight 1.5 (3.3)

Weight

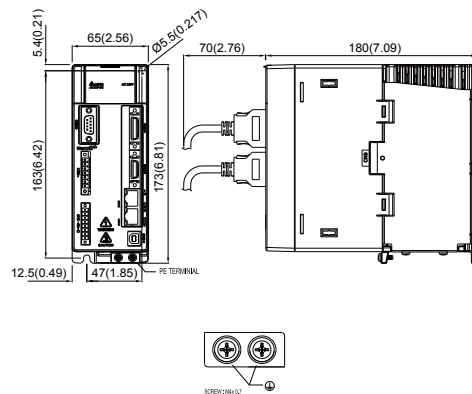
► 400V Series

400W / 750W / 1kW / 1.5kW



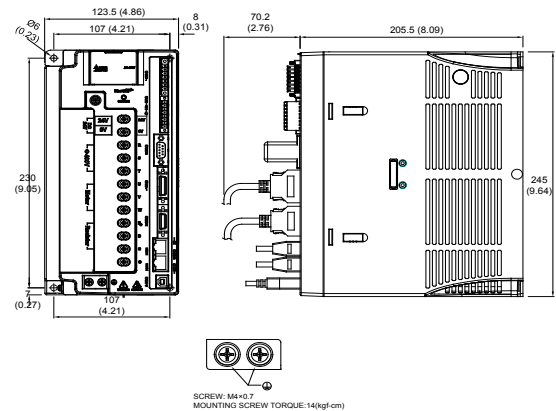
Weight 2.0 (4.4)

750W / 1kW / 1.5kW



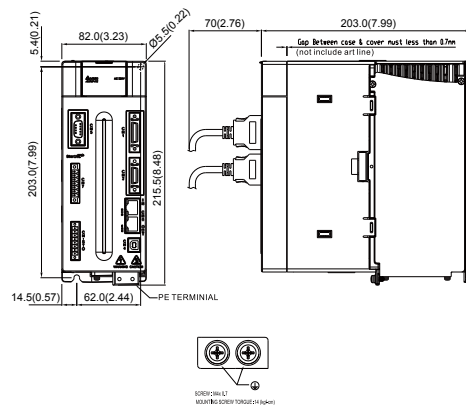
Weight 2.0 (4.4)

2kW / 3kW / 4.5kW / 5.5kW



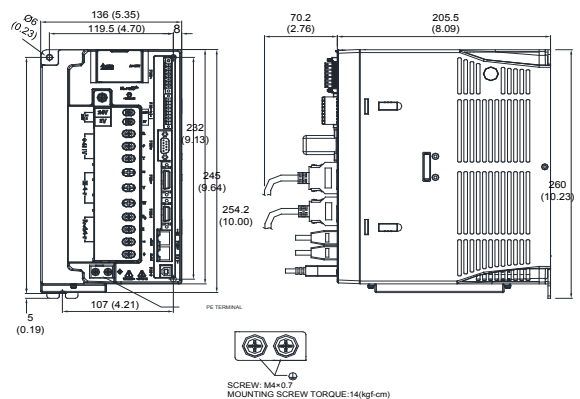
Weight 4.6 (10.1)

2kW / 3kW



Weight 2.89 (6.36)

7.5kW



Weight 5.5 (12.1)

Footnote:

1. Dimensions are in millimeters (inches); Weights are in kilograms (kg) and pounds (lbs)
2. Dimensions and weights of the servo drive may be revised without prior notice.



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