YASKAWA

MATRIX CONVERTER
VARISPEED AC

200V CLASS 5.5 kW to 45 kW

400V CLASS 5.5 kW to 160 kW

EN
DE
ES
FR
IT

MATRIX CONVERTER

VARISPEED AC MATRIX CONVERTER
YASKAWA INVERTER DRIVE TECHNOLOGY

Contents

Experience & Innovation

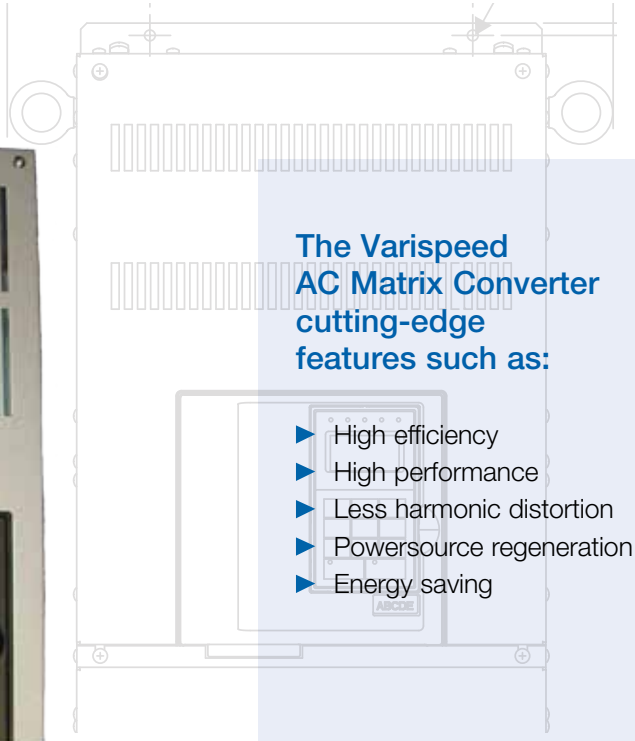
For more than 90 years YASKAWA has been manufacturing and supplying mechatronic products for machine building and industrial automation.

Its standard products as well as tailor-made solutions are famous and have a high reputation for outstanding quality and durability.

A leader in Inverter Drives technology

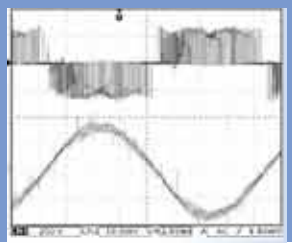
Extensive research and development has allowed YASKAWA to remain at the forefront of motion control and automation technology. This technological leadership has helped to modernise industries such as mining, steel, pulp and paper, chemical, automotive, packaging, machine tool and semiconductor.

The Varispeed AC incorporates innovative technology as the world's first matrix converter to directly convert input AC voltage to output AC voltage.



The Varispeed AC Matrix Converter cutting-edge features such as:

- High efficiency
- High performance
- Less harmonic distortion
- Powersource regeneration function
- Energy saving



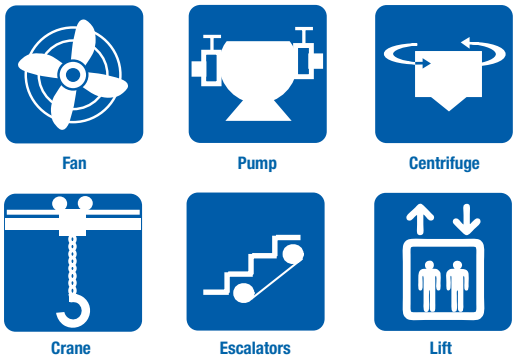
Features & Functions

Focus on application

Variable speed applications in hospitals, schools, office buildings, and so on with strict requirements for harmonics distortion.

Lift applications with heavy repetitive loads and regenerative power.

Applications requiring regenerative power for long periods to decelerate high inertia loads to stop like centrifuges.



Varispeed AC Advantages

High efficiency

- Because of its basic construction, without use of the conventional Rectifier-DC-Bus configuration, the Matrix Converter provides the ability for regenerative power supply. The main power supply is directly switched via 9 bidirectional switching semiconductors to the motor windings.

Power source regenerative function

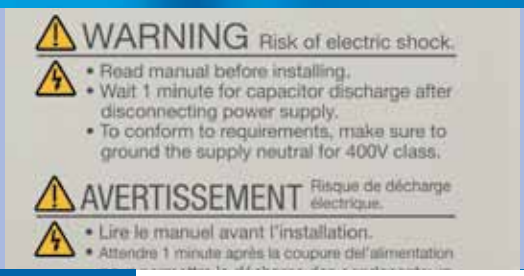
- The matrix converter works for motoring and regenerating without any additional equipment.
- Space saving – no additional equipment for braking necessary
- Energy and cost saving – the regenerative energy is fitted to the main power supply
- No heat from braking resistor

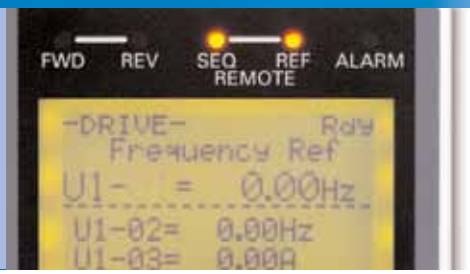
Less Harmonic Distortion

- Friendly to the power supply environment
- Without any additional equipment the matrix converter keeps the input current very similar to the sinus. This helps to reduce the installed power supply and correspondence to the harmonic guideline becomes easy.

High Perfomance

- Same performance and handling as Yaskawa Varispeed 7 series
- Ecologically friendly.
- High dynamic and precise control
- User friendly
- Customisable
- Global specifications

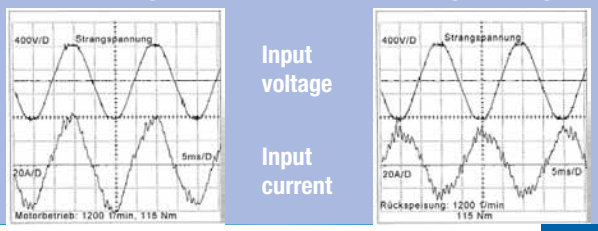




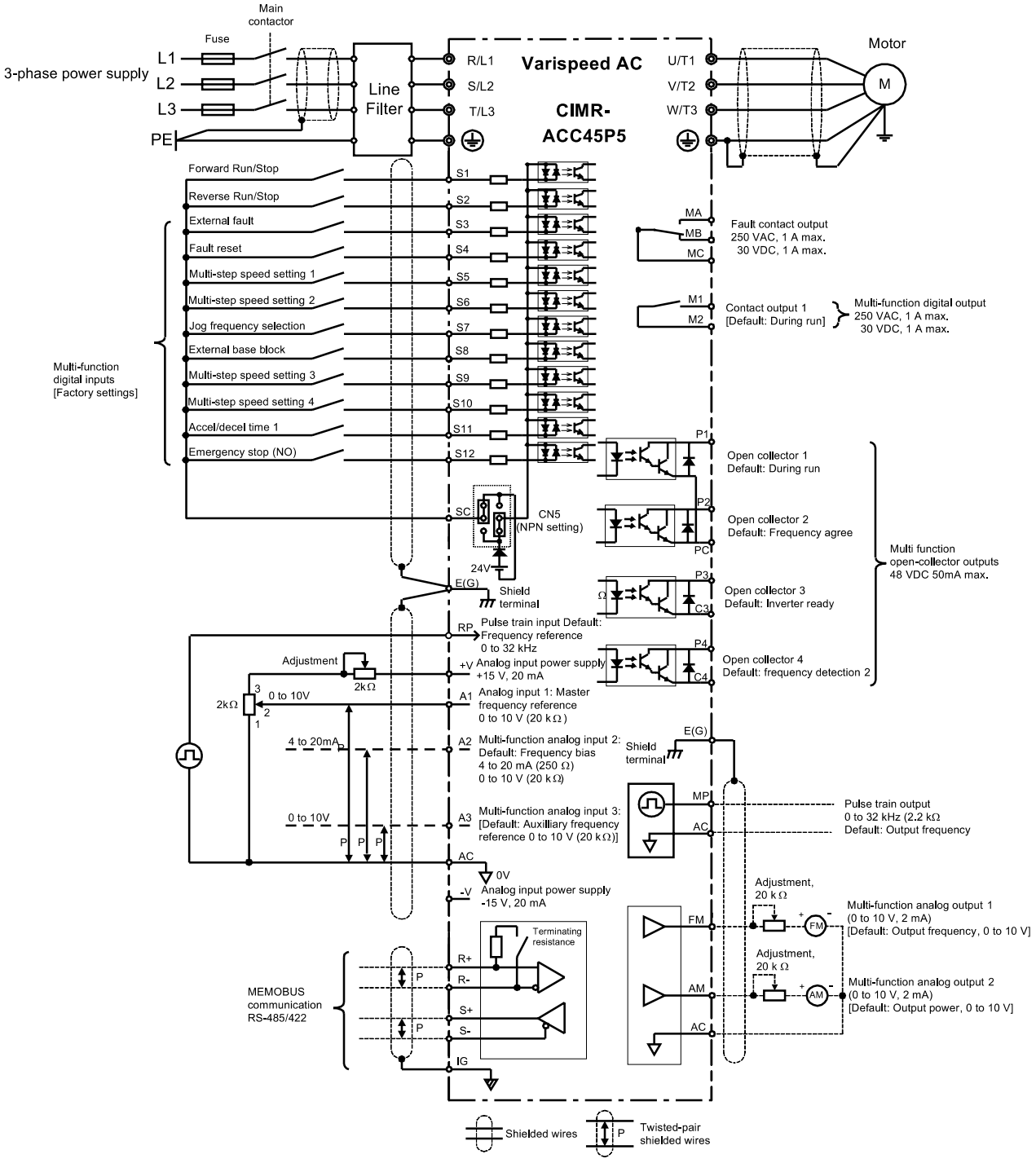
Specifications & Ratings

Voltage Class		200 V				400 V						
Model Number CIMR -ACA ☐☐☐		25P5	2011	2022	2045	45P5	4011	4022	4045	4075	4110	4160
Max. Applicable Motor Output *1	kW	5.5	11	22	45	5.5	11	22	45	75	110	160
Rated Input Current *2	A	26	47	91	174	14	26	49	92	157	228	287
Output Characteristics	Rated Output Capacity kVA	9	17	33	63	10	19	36	67	114	166	209
	Rated Output Current *3 A	27	49	96	183	15	27	52	97	165	240	302
	Max. Output Voltage	95 % of input voltage										
	Max. Output Frequency	Frequencies supported up to 120 Hz using parameter setting										
Power Supply Characteristics	Rated Voltage and Frequency	3-phase, 200/208/220 V, 50/60 Hz				3-phase, 380/400/415/440/460/480 V, 50/60 Hz						
	Allowable Voltage Fluctuation	+10% to −15%										
	Allowable Frequency Fluctuation	±3% (Frequency fluctuation rate : 1 Hz/100 ms or less)										
	Allowable Power Voltage Imbalance between Phases	Within 2%										
	Input Power Factor	0.95 or more (When the rated load is applied.)										
Control Characteristics	Control Method	Sine-wave PWM [Flux vector control, open -loop vector control, V/f control (switched by parameter setting)]										
	Torque Characteristics	150 % / 0 Hz (Flux vector control)*4										
	Speed Control Range	1 : 1000 (Flux vector control)*4										
	Speed Control Accuracy *5	±0.2 % (Open-loop vector control : 25℃ ±10℃)*4, ± 0.05 % (Flux vector control : 25℃ ±10℃)*4										
	Speed Control Response	30 Hz (Flux vector control)*4										
	Torque Limits	Provided for vector control only (4 quadrant steps can be changed by parameter settings.)										
	Torque Accuracy	±10% (Flux vector control : 25℃ ±10℃ with a vector motor, carrier frequency of 4 kHz)*4										
	Frequency Control Range	0.01 Hz to 120 Hz										
	Frequency Accuracy (Temperature Characteristics)	Digital reference : ± 0.01 % (−10℃ to +40℃), Analog reference : ±0.1 % (25℃ ±10℃)										
	Frequency Setting Resolution	Digital reference : 0.01 Hz, Analog reference : 0.03 Hz / 60 Hz (11 bit with no sign)										
	Output Frequency Resolution	0.001 Hz										
	Overload Capacity *6	150 % of rated output current per minute (carrier frequency of 4 kHz)										
	Accel/Decel Time	0.00 to 6000.0 s (4 selectable combinations of independent acceleration and deceleration settings)										
	Braking Torque	Same overload capacity for motoring and regeneration										
	Main Control Functions	Momentary power loss restart, Speed search, Overtorque detection, Torque limit, 17-speed control (maximum), Accel/decel time change, S-curve accel/decel, 3-wire sequence, Autotuning (rotational or stationary), Dwell function, Cooling fan ON/OFF control, Slip compensation, Torque compensation, Jump frequency, Frequency upper/lower limit settings, DC injection braking at start/stop, PID control (with sleep function) , MEMOBUS communication (RS-485 /422, max. 19.2 kbps) Fault restart, Droop control, Parameter copy, Torque control, Speed/torque control switching, etc.										
Protective Functions	Regenerative Function	Provided										
	Motor Protection	Protection by electronic thermal overload relay.										
	Instantaneous Overcurrent	Stops at approx. 200 % of rated output current.										
	Fuse Blown Protection	Stops for fuse blown.										
	Overload Protection	150 % of rated output current per minute (carrier frequency of 4 kHz)										
	Overvoltage Protection	Stops when input power supply voltage is greater than 250 VAC.				Stops when input power supply voltage is greater than 550 VAC.						
	Undervoltage Protection	Stops when input power supply voltage is less than 150 VAC.				Stops when input power supply voltage is less than 300 VAC.						
	Momentary Power Loss	Stops for 2 ms or more. By parameter setting, operation can be continued if power is restored within 2 s. *7										
	Cooling Fin Overheating	Protection by thermistor.										
	Stall Prevention	Stall prevention during acceleration, deceleration, or running.										
	Grounding Protection *8	Protection by electronic circuits.										
	Charge Indicator	Remains lit until DC bus voltage falls below 50 V.										
Environment	Ambient Operating Temperature	−10℃ to +40℃ (Enclosed wall -mounted type), −10℃ to +45℃ (Open chassis type)										
	Ambient Operating Humidity	95% RH max. (with no condensation)										
	Storage Temperature	−20℃ to +60℃ (short-term temperature during transportation)										
	Application Site	Indoor (no corrosive gas, dust, etc.)										
	Altitude	1000 m max.										
	Vibration	10 Hz to 20 Hz : 9.8 m/s² 20 Hz to 55 Hz : 5.9 m/s² (Motor output : 22 kW or less), 2.0 m/s² (Motor output : 45 kW or more).										
Protective Structure		Open chassis type (IP 00) and enclosed wall -mounted type (NEMA Type 1)										

*1 : The motor capacity (kW) refers to a Yaskawa 4-pole motor. The rated output current of the MxC output amps should be equal to or greater than the motor rated current.
*2 : The rated current will vary in accordance with the values of the voltage or impedance of the power supply (including the power transformer, the input reactor, and wires).
*3 : Required to reduce the rated output current in accordance with the values of the carrier frequencies or control method.
*4 : Rotational autotuning must be performed to ensure obtaining the specifications given for open-loop or flux vector control.
*5 : The speed control accuracy depends on the installation conditions and type of motor used. Contact your Yaskawa representative for details.
*6 : Applications with repetitive loads may require derating (reducing the MxC's carrier frequency and rated current, which requires a larger frame size MxC). Contact your Yaskawa representative for details.
*7 : If the CIMR -ACA 25P5, 2011, 2022, 45P5, or 4011 needs two seconds or more to ride through momentary power loss, a back-up capacitor unit is required. If Momentary Power Loss Detection Selection (L2-01) is enabled, MxC will stop 2 ms after momentary power loss occurs. Contact your Yaskawa representative for details about use in trolley cranes and other such application that tend to experience momentary power losses or phase loss.
*8 : Protection may not be provided under the following conditions as the motor windings are grounded internally during run :
・Low resistance to ground from the motor cable or terminal block. MxC already has a short-circuit when the power is turned on.



Connection Diagram



Model Code & Digital Operator

CIMR-	AC	A	4	5P5	0	A

Varispeed AC	
Matrix	AC

Specification	
Standard Model	A

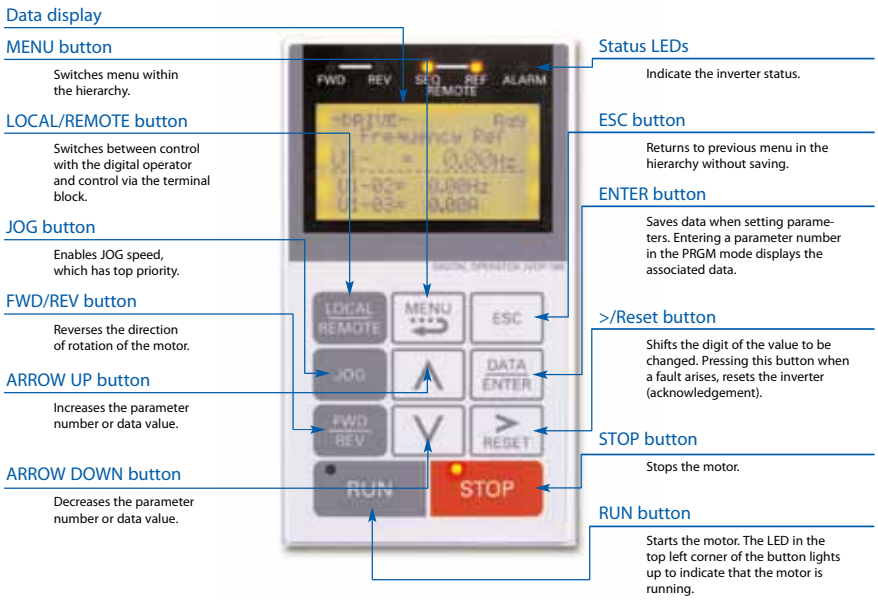
Input Voltage	
Three-phase 230 VAC	2
Three-phase 400 VAC	4

Max. Applicable Motor Output	
5P5	5.5 kW
011	11 kW
022	22 kW
045	45 kW
075	75 kW
110	110 kW
160	160 kW

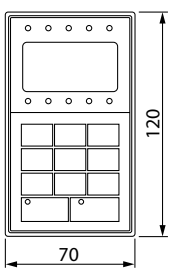
Protective Structure	
0	Open chassis (IEC IP00)
1	Enclosed wall-mounted [IEC IP20, NEMA1(Type1)]

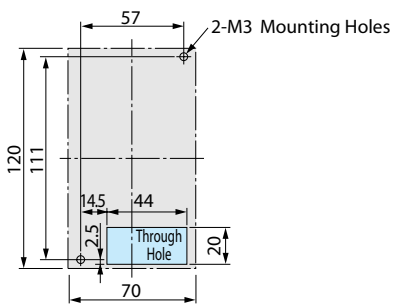
Version	
1st	A

Digital Operator

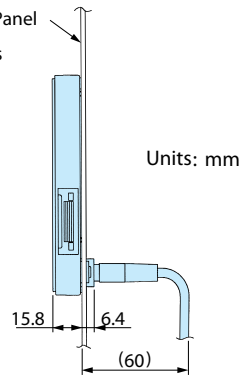


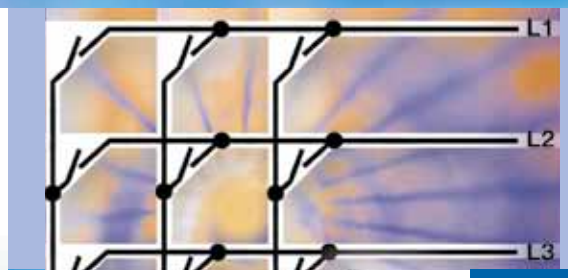
LCD Monitor
Model : JVOP -160
(Attached as Standard)





Panel Cutout





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Dimensions & Options

Enclosures

Standard Matrrix uses IP 00 design.

Open Chassis IEC IP 00 Enclosure

Enclosed Wall - Mounted (NEMA 1 IP 20)

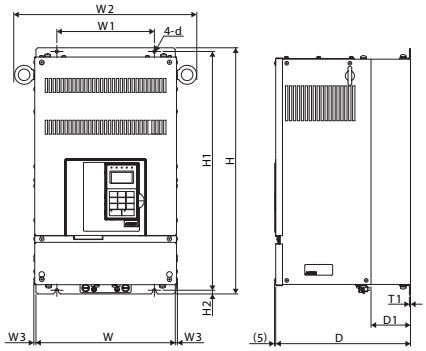

Fig. 1

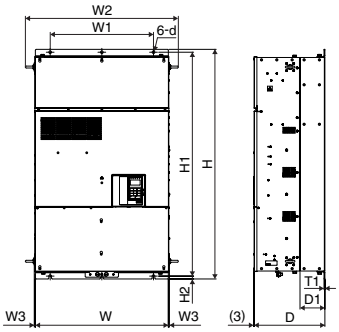

Fig. 2

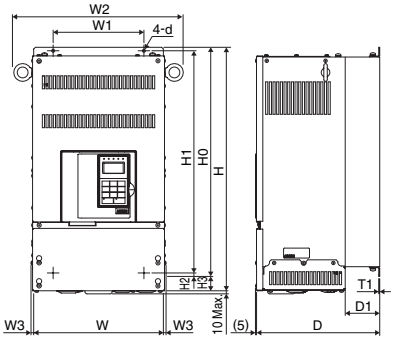

Fig. 3

Voltage Class	Drive Model CIMR-AC□	Figure	Dimensions in mm									Weight (kg)	Cooling
			W	H	D	W1	H1	H2	D1	T1	d		
Three-Phase 200 V Class	2A5P50A	1	300	530	290	210	514	8	85	2.3	M6	28	Fan cooled
	2A0110A		300	530	290	210	514	8	85	2.3	M6	30	
	2A0220A		360	560	300	260	545	7.5	130	2.3	M6	45	
	2A0450A		480	865	403	310	841	12	170	4.5	M10	130	
	2A5P51A	3	300	564	290	210	514	8	85	2.3	M6	30	Fan cooled
	2A0111A		300	564	290	210	514	8	85	2.3	M6	32	
	2A0221A		360	725	300	260	545	7.5	130	2.3	M6	48	
	2A0451A		480	1275	403	310	841	12	170	4.5	M10	140	
Three-Phase 400 V class	4A5P50A	1	300	530	290	210	514	8	85	2.3	M6	29	Fan cooled
	4A0110A		300	530	290	210	514	8	85	2.3	M6	30	
	4A0220A		360	560	300	260	545	7.5	130	2.3	M6	45	
	4A0450A		480	865	403	310	841	12	170	4.5	M10	130	
	4A0750A		480	865	403	310	841	12	170	4.5	M10	135	
	4A1100A	2	695	1200	370	540	1170	15	130	4.5	M12	230	Fan cooled
	4A1600A		695	1200	370	540	1170	15	130	4.5	M12	230	
	4A5P51A	3	300	290	290	210	514	8	85	2.3	M6	31	Fan cooled
	4A0111A		300	290	290	210	514	8	85	2.3	M6	32	
	4A0221A		360	300	300	260	545	7.5	130	2.3	M6	48	
	4A0451A		480	403	403	310	841	12	170	4.5	M10	140	
	4A0751A		480	403	403	310	841	12	170	4.5	M10	145	

YASKAWA Europe GmbH
Drives & Motion Division
Hauptstr. 185
65760 Eschborn
Germany

Tel: +49 (0) 6196 569-300
Fax: +49 (0) 6196 569-399
info@yaskawa.eu.com
www.yaskawa.eu.com

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