

# Panasonic

## OVERVIEW

AC SERVO DRIVES &  
MOTION CONTROL



## **D** GT and HM500 series touch terminals

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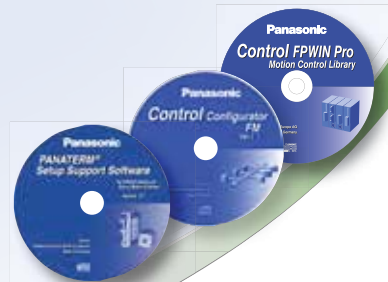
## **A** MINAS A5 series servo drives

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## **B** Motion control libraries, configuration and programming software

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## **C** FP series PLCs

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## **A** MINAS A5 series servo drives

Highly dynamic servo drives with state-of-the-art technology. Large power range (50W–15kW) combined with a light-weight and compact design. Innovative functions to suppress resonance frequencies and vibrations. Multiple control features such as pulse, analog, and network technology in real-time communication (100Mbit/s).

## **B** Motion control libraries, configuration and programming software

PLC programming software Control FWIN Pro (compliant with IEC 61131-3). The free configuration software PANATERM and M-SELECT support users in the system setup, thus shortening the time required for commissioning. In addition, you can download motion control libraries for free. With the libraries' predefined function blocks, it is easy to solve even complex positioning tasks.

## **C** FP series PLC

The PLC comes already equipped with the hardware required for positioning tasks. FP0R, FPΣ (Sigma), and FP-X are capable of controlling up to 4 axes independently. By using positioning units, the system can be expanded to control up to 10 axes. The FP7 can even control up to 64 axes. Add network technology in the shape of RTEX or EtherCAT positioning units, and the FP series allows you to control up to 256 axes with the real-time Ethernet bus.

## **D** GT and HM500 series touch terminals

Touch terminals allow humans and machines to interact with each other. The machine's role therein is to display data, results, messages, etc. and to receive instructions and execute tasks assigned by people. Panasonic's new touch terminals are ideally suited for these tasks. They are optimally suited both for factory and building automation. Panasonic HMIs cover a wide spectrum, ranging in size from a compact 3" touch panel to a color 13" display for sophisticated applications.

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MINAS series		LIQI	A5E	A5	A5N	A5B
Rated power		50–1000W	50–5000W	50–15000W		
Supply voltage	up to 1500W	1-phase 200V AC		1-/3-phase 200V AC		
	from 1000W	–		3-phase 400V AC		
Bandwidth (velocity response)		1000Hz		2000Hz		
Rated rotational speed		1500–3000 (rpm)				
Max. rotational speed		2000–6000 (rpm)				
Rated torque		0.16–3.2Nm	0.16–23.9Nm	0.16–99.5Nm		
Peak torque		0.48–9.5Nm	0.48–71.6Nm	0.48–224Nm		
Control functions		Position control		Position, velocity, and torque control		
IP degree of protection (motor)		IP65		IP67		
Control input		Pulse		Pulse, analog	Network	

# Applications

With its power range of 50 to 15,000W, Panasonic servo drives are ideally suited to solve both small (1 or 2 axes) and complex tasks (up to 256 axes) easily and quickly.

The following industries make use of servo drives: packaging, textile, plastics, wood, paper, metal and mounting, and processing.

## **Application examples:**

### **Packaging machine**

A complete solution with PLC, touch terminal, and servo drives from Panasonic. Our compact drives offer a great advantage over competitor's products for packaging machines (labeling, packing, etc.).



### **X-Y table**

Positioning XY axes to apply adhesive.

One FP $\Sigma$  (Sigma) controls 2 servo drives as well as the adhesive-dispensing device according to the predefined profile.



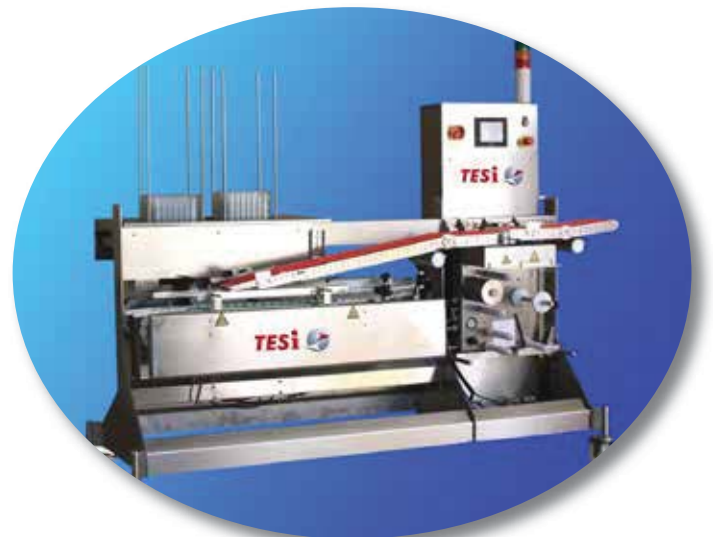
### **Cutting machine**

The FP2SH PLC controls the positioning so that the machine can cut at high speed and with an accuracy of 10 micrometers.



### **Food processing machine**

This solution from Panasonic includes an FP0R PLC, a GT32 touch terminal, a MINAS A5 driver, and a VF0 inverter. To make burgers, the movement of three axes has to be precisely synchronized.



## MINAS LIQI

MINAS LIQI, the simple and cost-effective servo drive solution from Panasonic. Especially for dynamic applications MINAS LIQI offers many advantages as far as reliability, speed, and precision is concerned compared to stepping motors, asynchronous motors or pneumatic solutions. As for the MINAS A5 series, the PANATERM software and the MINAS SELECTION TOOL assist users in setting up and configuring the MINAS LIQI series. The series is optimally suited for the processing industries involving food, packaging, printing, metals, and plastics.



### Features

- Incremental encoder: 2500 pulses per revolution
- Response frequency: 1kHz bandwidth (velocity response)
- PANATERM: Free software for configuration and motion simulation via USB port
- Real-time autotuning function during operation
- Damping (1-200Hz) and notch filters (50-5000Hz)
- Rotary switch (RSW): to set the stiffness manually



Driver (50W–1000V AC 1-phase)								
Driver	MINAS LIQI	Type	MBDJT2207			MBDJT2210	MCDJT3220	
	Frame	mm	B (D: 55.5 x H: 150 x W: 150)				C (D: 65.5 x H: 150 x W: 190)	
Rated power		W	50	100	200	400	750	1000
Motor (MSMD***J1* low inertia)								
Motor	Type	MSMD5AZJ1□	MSMD012J1□	MSMD022J1□	MSMD042J1□	MSMD082J1□	MSMD102J1□	
Nominal torque (peak torque)	Nm	0.16 (0.48)	0.32 (0.95)	0.64 (1.91)	1.3 (3.8)	2.4 (7.1)	3.2 (9.5)	
Rated rotational speed (max. rotational speed)	rpm	3000 (5000)				3000 (4500)	3000 (4000)	
Inertia (with holding brake)	x10 <sup>-4</sup> kg · m <sup>2</sup>	0.025 (0.027)	0.051 (0.054)	0.14 (0.16)	0.26 (0.28)	0.87 (0.97)	1.16 (1.26)	
Encoder	2500ppr, incremental, resolution: 10000							
Degree of protection	IP65 (excluding shaft feedthrough and connectors)							

□ = Motor type

T = With holding brake

S = Without holding brake

# MINAS LIQI driver functions

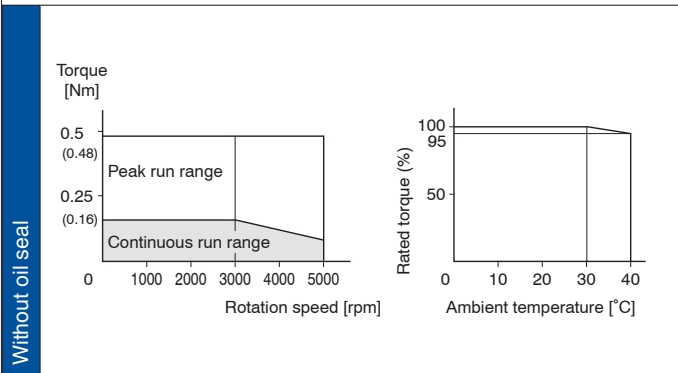
			Frame	MINAS LIQI
Supply voltage	Main circuit	200V	B	1-phase, 220–240V +5%, -10%, 50/60Hz
			C	1-phase, 220-240V (+5%, -10%), 50/60Hz
	Control circuit		B	1-phase, 220-240V (+5%, -10%), 50/60Hz
			C	1-phase, 220-240V (+5%, -10%), 50/60Hz
Operating conditions	Temperature		0–50°C, storage temperature: -20 to +65°C (max. temperature 80°C for 72 h)	
	Ambient humidity		Operation and storage: 20–85% RH (non-condensing)	
	Altitude		Max. 1000m above sea level	
	Vibration		Max. 5.88m/s <sup>2</sup> , 10–60Hz (no continuous use at resonance frequency)	
Control method			IGBT sinusoidal PWM	
Encoder	Incremental (default)		2500ppr (resolution 10000, serial incremental encoder)	
Control signals	Input points		6 (multifunctional, customizable)	
	Output points		3 (multifunctional, customizable)	
Pulse signals	Input points		2 (photocoupler, line driver)	
	Output points		3 line driver (A, B and Z-phase) and 1 open collector (Z-phase)	
Interface	USB		Interface to PC, etc.	
Front panel			2 digital 7-segment LED displays, 2 digital rotary switches	
Braking resistor			External braking resistor only	
Dynamic brake			Built-in	
Control mode			Position control	

			MINAS LIQI	
Position control	Control input		1. Clear deviation counter 2. Command pulse inhibition 3. Damping control switching	
	Control output		Positioning complete etc.	
	Pulse input	Line driver		500kpps
		Signal format		Differential input/square-wave pulse
		Electronic gear		Scaling of pulse frequency from 1/1000 to 1000 times
		Smoothing filter		Primary delay filter or FIR filter, customizable
Damping control		Available		
Other features	Autotuning		Automatic adjustment of the servo controller's rigidity to the vibration behavior of the mechanical parts and changes to the load	
	Division of encoder feedback pulse		Any value up to the max. number of encoder pulses	
	Protective function	Error messages causing switch-off		Overvoltage, undervoltage, overspeed, overload, overheat, overcurrent and encoder error, etc.
		Error messages requiring acknowledgement		Excessive position deviation, command pulse division error, EEPROM error, etc.
	Alarm history		Can be logged for reference	

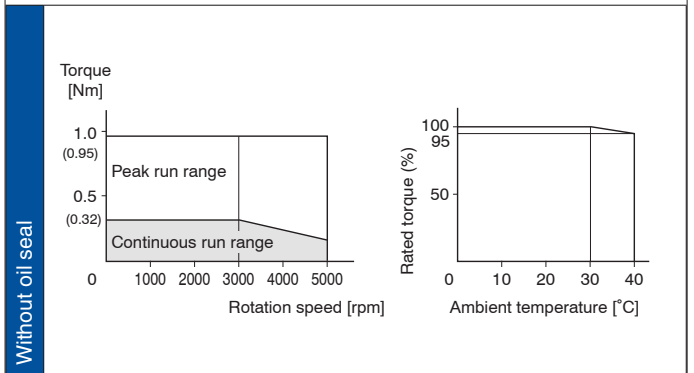
□ = Motor type, please refer to page 10.

# MINAS LIQI torque characteristics

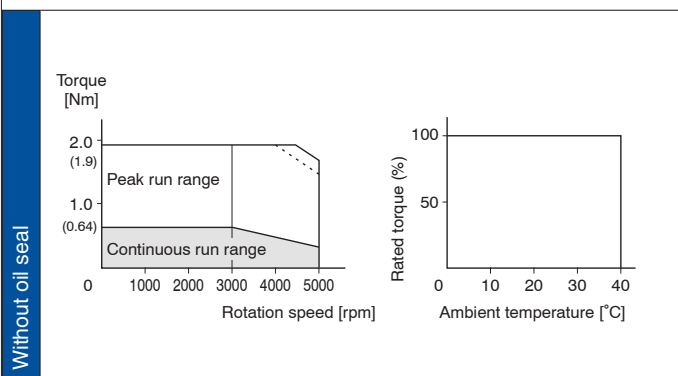
## MSMD5AZJ1□



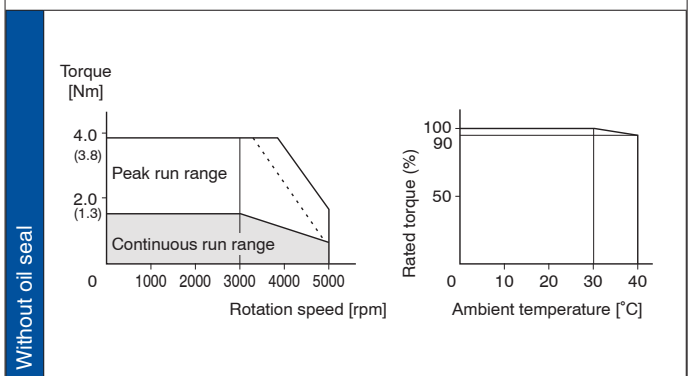
## MSMD012J1□



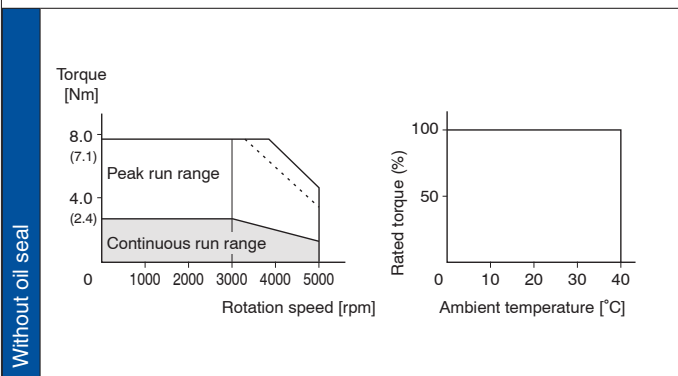
## MSMD022J1□



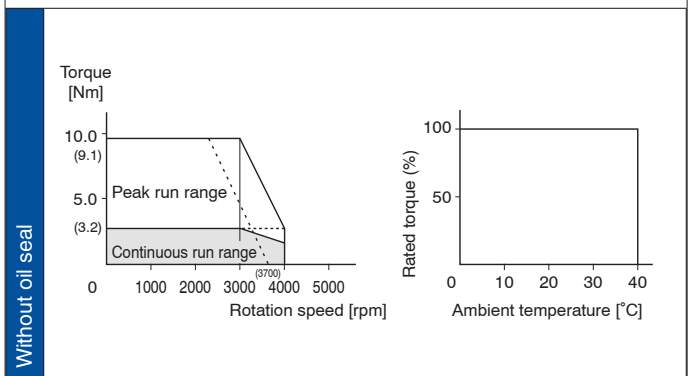
## MSMD042J1□



## MSMD08J1□

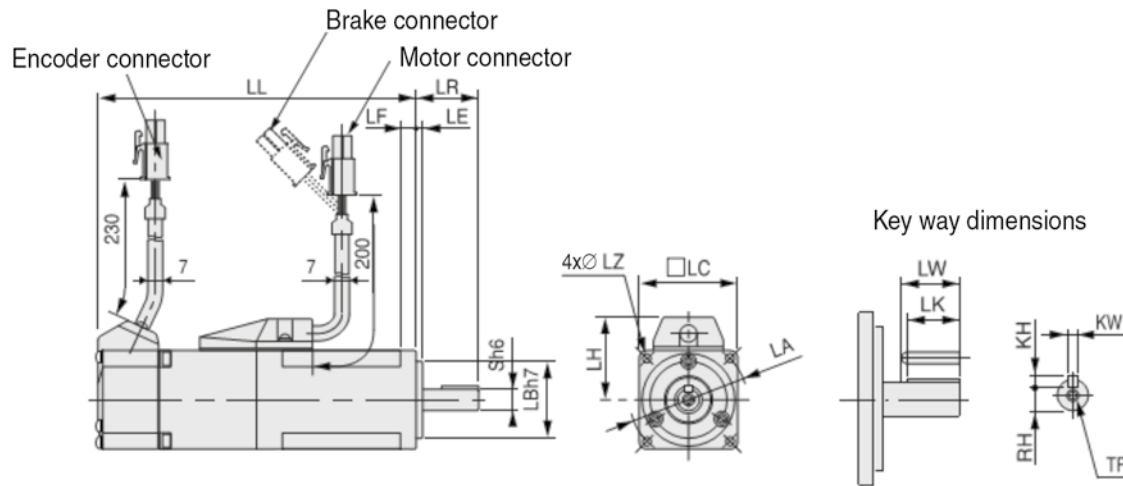


## MSMD102J1□



□ = Motor type, please refer to page 10.

# MINAS LIQI motor dimensions



MINAS LIQI motors (low inertia)														
Motor	Type	MSMD5AZJ1□	MSMD012J1□	MSMD022J1□	MSMD042J1□	MSMD082J1□	MSMD102J1□	2500ppr, incremental, resolution: 10000						
Motor with/without holding brake		With- out	With	With- out	With	With- out	With	With- out	With	With- out	With	With- out	With	
LL	mm	72	102	92	122	79.5	116	99	135.5	112	149.2	127.2	164.2	
LR	mm	25				30				35				
S	mm	∅ 8 h6				∅ 11 h6		∅ 14 h6		∅ 19 h6				
LA	mm	∅ 45 ± 0.2				∅ 70 ± 0.2				∅ 90 ± 0.2				
LB	mm	∅ 30 h7				∅ 50 h7				∅ 70 h7				
LC	mm	38				60				80				
LE	mm	3												
LF	mm	6				6.5				8				
LZ	mm	4 x ∅ 3.4				4 x ∅ 4.5				4 x ∅ 6				
Key way	LW	mm	14				20		25		25			
	LK	mm	12.5				18		22.5		22			
	KW	mm	3 h9				4 h9		5 h9		6 h9			
	KH	mm	3				4		5		6			
	RH	mm	6.2				8.5		11		15.5			
	TP	mm	M3 depth 6				M4 depth 8		M5 depth 8		M5 depth 10			
Weight	kg	0.32	0.53	0.47	0.68	0.82	1.30	1.2	1.7	2.3	3.1	2.8	3.6	

□ = Motor type, please refer to page 10.



## Motor cables (motor – servo driver)

All dimensions are in mm

MSME motors 50–750W	MFMCA0□□0WJD	
MSME motors 1–2kW MDME motors 1–2kW MHME motors 1-1.5kW	MFMCD0□□2GCD	
MHME motors 2kW	MFMCE0□□2GCD	
MSME motors 3–5kW MDME motors 3–5kW MHME motors 3–5kW	MFMCA0□□2GCT	
MSME motors 1–2kW 200V with holding brake MDME motors 1–2kW 200V with holding brake	MFMCA0□□2HCD	
MSME motors 1–2kW 400V with holding brake MDME motors 1–2kW 400V with holding brake MHME motors 1–2kW 400V with holding brake	MFMCE0□□2HCD	
MSME motors 3–5kW with holding brake MDME motors 3–5kW with holding brake MHME motors 3–5kW with holding brake	MFMCA0□□2HCT	
MSMD motors 50–750W MHMD motors 200–750W MINAS LIQI motors 50W–1kW	MFMCA0□□0EEL	

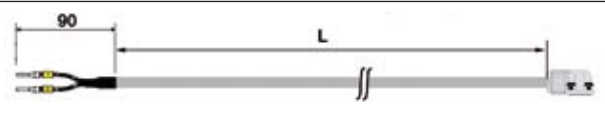
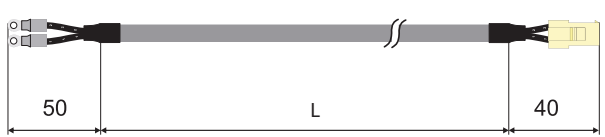
□□ = Length

□01 = 1m

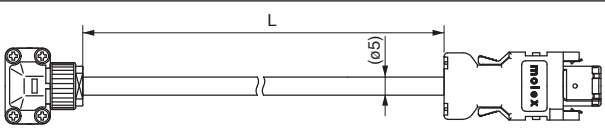
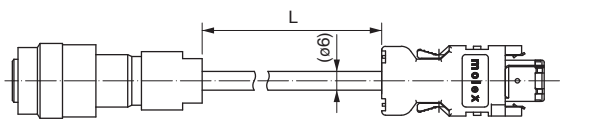

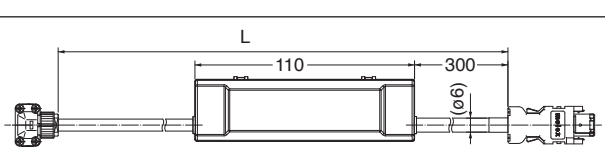
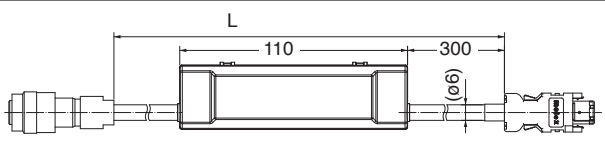
□10 = 10m

## Brake cable (motor – servo driver)

All dimensions are in mm

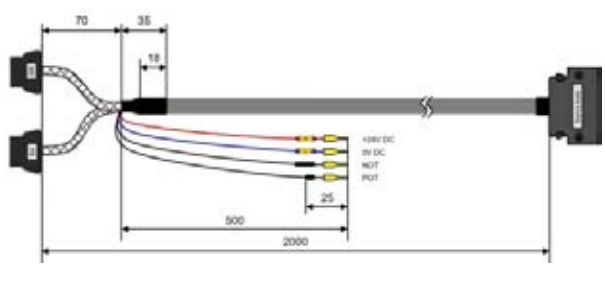
MSME motors 50–750W	MFMCB0□□0PJT	
MSMD motors 50–750W MHMD motors 200–750W MINAS LIQI motors 50W–1kW	MFMCB0□□0GET	

## Encoder cable (motor – servo driver)

MSME motors 50–750W with 17/20-bit incremental encoder	MFECA0□□0WJD	
MSME, MDME, MHME motors 900W–15kW with 17/20-bit incremental encoder	MFECA0□□0GTD	
MINAS LIQI motors 50W–1kW MHMD, MSMD motors 200W–750W	MFECA0□□0EAM	
MSME motors 50–750W with 17-bit absolute encoder (battery box)	MFECA0□□0GJE	
MSME, MDME, MHME motors 900W–15kW with 17-bit absolute encoder (battery box)	MFECA0□□0GTE	

## Control cable (PLC – MINAS LIQI driver)

### Direct connection to FP series PLCs

FPΣ (Sigma), FP0R	For 1 axis DV0P0800T01 (PNP types)	
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□□ = Length

01 = 1m

10 = 10m

**Control cable (PLC – MINAS A5 driver)**

All dimensions are in mm

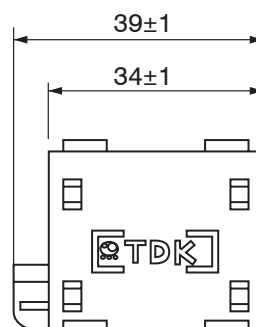
**Direct connection to FP series PLCs**

<p>FPΣ (Sigma)</p>	<p>For 1 axis DVOP0980W-1 (NPN types) DVOP0982W-1 (PNP types)</p>	
<p>FPΣ (Sigma), FP0R</p>	<p>For 1 axis DV0P0988W-1 (PNP types) DV0P0989W-1 (NPN types)</p>	
<p>FPΣ (Sigma)</p>	<p>For 2 axes DVOP0981W-1 (NPN types) DVOP0983W-1 (PNP types)</p>	
<p>FPΣ (Sigma) Positioning unit FP2SH Positioning units</p>	<p>For 2 axes DVOP0985W1 (transistor) DVOP0986W1 (line driver)</p>	
<p>FP7 Positioning unit</p>	<p>For 2 axes DV0P0976W1 (line driver) DV0P0975W1 (transistor)</p>	

# Accessories

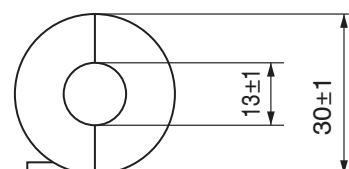
Product no.	Details/Comments/Dimensions			
<b>Control cable</b>				
DV0P4360	50W–15kW	50-pin type	I/O cable X4, loose wires, 2m	
DVOP4360P	50W–15kW	50-pin type	I/O cable X4, loose wires, 2m, position control	
DVOP4360V	50W–15kW	50-pin type	I/O cable X4, loose wires, 2m, velocity control	
DV0PM20024CAB020	50W–15kW	8-pin type	Communication cable X2, RS485, RS232, loose wires, 2m	
DV0PM20025CAB020	50W–15kW	8-pin type	Safety cable X3, loose wires, 2m	
DV0P0800T02	50W–15kW	26-pin type	I/O cable X4, loose wires, 2m	
<b>Programming cable</b>				
CABMINIUSB5D	50W–15kW	USB		
<b>Connector set for servo driver</b>				
DVOP4350	50W–15kW	50-pin type	I/Os, X4	
DVOP0770	50W–15kW	26-pin type	I/Os, X4	
DV0PM20026	50W–15kW	–	External encoder connector X5	
<b>Connector set encoder, motor without holding brake</b>				
DVOP4380	50W–1kW	–	MINAS LIQI/A4	
DV0PM20035	50W–750W	–	MINAS A5, IP67	
DV0PM20036	1kW–2kW	–	MINAS A5 MSME, MDME, MHME 1–1.5kW	
DV0PM20036A	1kW–2kW	–	Angled type; MINAS A5 MSME, MDME, MHME 1–1.5kW	
DV0PM20037	2kW–5kW	–	MINAS A5 MSME 3–5kW, MDME, MHME	
DV0PM20037A	2kW–5kW	–	Angled type; MINAS A5 MSME 3–5kW, MDME, MHME	
DV0PM20056	7.5kW–15kW	–	MINAS A5 MDME; MHME 7.5kW	
<b>Connector set encoder, motor with holding brake</b>				
DVOP4390	50W–1kW	–	MINAS LIQI/A4	
DV0PM20040	50W–750W	–	MINAS A5, IP67, holding brake connector kit	
DV0PM20038	1kW–2kW	–	MINAS A5 MSME, MDME, MHME 1–1.5kW	
DV0PM20038A	1kW–2kW	–	Angled type; MINAS A5 MSME, MDME, MHME 1–1.5kW	
DV0PM20039	2kW–5kW	–	MINAS A5 MSME 3–5kW, MDME, MHME	
DV0PM20039A	2kW–5kW	–	Angled type; MINAS A5 MSME 3–5kW, MDME, MHME	
DV0PM20057	7.5kW–15kW	–	MINAS A5 MDME; MHME 7.5kW	
<b>EMC filter</b>				
FN2080-6-06	50W–1000W	1-phase	250VAC, MINAS A5 50W–750W, MINAS LIQI 50W–1000W	
FS21238607	50W–750W	1-phase	Footprint filter, 250VAC	
FN2080-10-06	1kW–1.5kW	1-/3-phase	500V AC	
FN3268-7-44	1kW–3kW	3-phase	500V AC	
FN3268-16-44	4kW–5kW	3-phase	500V AC	
FN3258-30-33	15kW	3-phase	400V AC	
DVOP1460	50W–15kW	1-phase	Ferrite core, noise filter	
<b>Braking resistors</b>				
BWD250100	50W–100W	1-phase	100Ω, 100W, 600VAC	110 x 80 x 15 (L x W x D in mm)
BWD250072	200W–750W	1-phase	72Ω, 100W, 600VAC	
BWD500035	1kW–1.5kW	1-phase	35Ω, 200W, 600VAC	216 x 80 x 15 (L x W x D in mm)
BWD500150	1kW–1.5kW	3-phase	150Ω, 200W, 600VAC	
BWD500100	2kW	3-phase	100Ω, 200W, 600VAC	
BWD600047	3kW–5kW	3-phase	47Ω, 240W, 600VAC	
BWD600027	7.5kW	3-phase	27Ω, 240W, 600VAC	
BWD600027K02LV	11/15kW	3-phase	13,5Ω, 480W, 600VAC	

Braking resistor



Ferrite core: DVOP1460

Weight: 62.8g

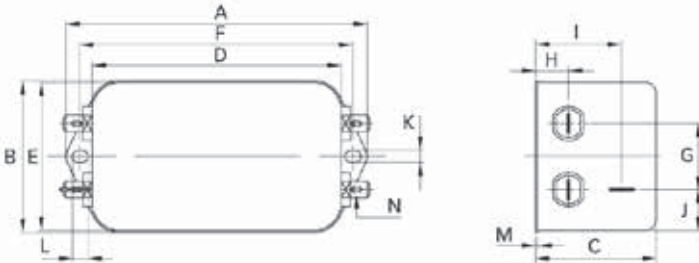


All dimensions are in mm.

# EMC filter

200V AC:

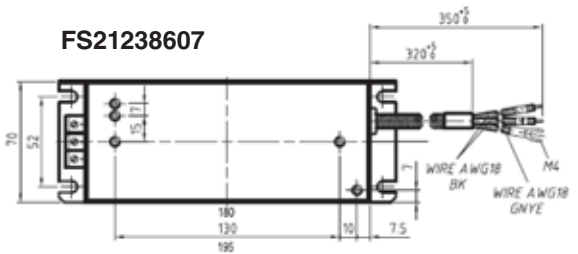
**FN2080-6-06 and FS21238607 for MINAS A5 50–750W and MINAS LIQI 50–1000W 1-phase drivers**



Dimensions (mm)	FN2080-6-06
A	113.5
B	57.5
C	45.4
D	94
E	56
F	103
G	25
H	12.4
I	32.4
J	15.5
K	4.4
L	6
M	0.9
N	6.3 x 0.8

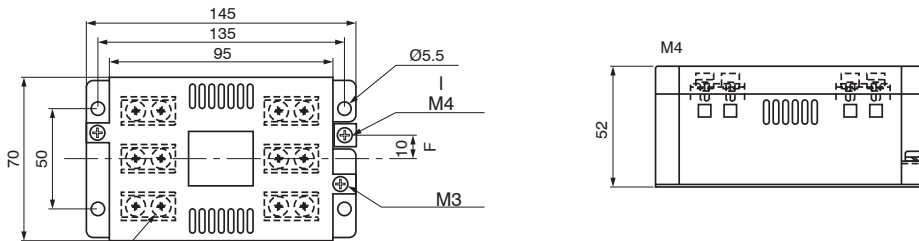
All dimensions are in mm.

**FN2080-6-06**



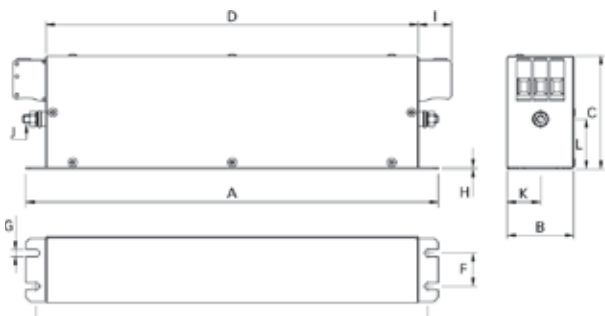
200V AC:

**FN2080-10-06 for 1–1.5kW 1-phase driver**



400V AC:

**FN3268-7-44 for 1–3kW 3-phase driver, FN3268-16-44 for 4–5kW 3-phase driver**



Dimensions (mm)	FN3268-7-44	FN3268-16-44
A	190	250
B	40	45
C	70	
D	160	220
E	180	235
F	20	25
G	4.5	5.4
H	1	
I	22	
J	M5	
K	20	22.5
L	29.5	

