Panasonic
INDUSTRY

Your Committed Enabler

# Servo Drives

## MINAS A6 Series





# IN Your Innovation


**Application areas:** ..... **4**
**Automation products from Panasonic Industry** ..... **5**
**MINAS A6 Multi series** ..... **6**
**Servo drive applications** ..... **8**
**MINAS A6 series – Features** ..... **10**
**MINAS A6 series – Overview** ..... **15**
Servo drivers and motors ..... 15
Connections and interfaces ..... 18
Overview of MINAS A6 motors, servo drivers and accessories 200V AC ..... 20
Overview of MINAS A6 motors, servo drivers and accessories 400V AC ..... 22
MINAS A6 motors, MINAS A6 Multi servo drivers and accessories 400V AC ..... 24
**MINAS A6 Series – Network series** ..... **26**
MINAS A6N with RTEX protocol ..... 26
MINAS A6B with EtherCAT protocol ..... 26
**MINAS A6 series – Other technical data** ..... **27**
**MINAS A6V series (24/48V DC)** ..... **28**
**MINAS A6 series – Accessories** ..... **30**
Cables ..... 30
Other accessories: ..... 35
EMC filters ..... 36
**RTEX Positioning units** ..... **37**
RTEX – the multi-axis Ethernet servo system ..... 37
**Software** ..... **38**
Motion control libraries for Control FPWIN Pro (PLC) ..... 38
Modbus RTU protocol ..... 39
Direct access to servo drive parameters from the PLC ..... 40
Software Configurator PM for RTEX ..... 41
Configuring servo drivers ..... 42
Software for designing drives ..... 43
**Quick start guides** ..... **44**
**Comprehensive motion control solutions by Panasonic** ..... **45**
**Motion controller GM1 series** ..... **46**

# IN Your Innovation

## Application areas:

- Pick-and-place machines
- Handling systems
- Machine tools
- Robots
- Printing machines
- Automated machines
- Materials handling
- Packaging machinery



### Service

Panasonic Industry Europe's comprehensive service includes an

> expert hotline,

> workshops and

> on-site service,

to ensure the reliable and effective use of our servo drives.

## Automation products from Panasonic Industry

With over 100 years of innovation and manufacturing expertise, Panasonic Industry Europe remains committed to its vision of creating “A Better Life, A Better World.” Panasonic can look back on decades of experience in the electronics industry and, thanks to its dedicated customer orientation, is a competent and reliable partner for customers throughout Europe when it comes to technical expertise in combination with solution orientation. As a provider of tailor-made solutions, we focus on offering our customers products and services in the Mobility, Living Space and Business sectors that make a difference thanks to our proprietary innovations.

### Smart automation technology

The factory of the future will achieve new levels of productivity, effectiveness and profitability through comprehensive networking. Equipment and components from Panasonic Industry Europe offer leading-edge Industry 4.0 features, as connectivity, energy efficiency, reliability and sturdiness play a pivotal role in modern production environments.

The Panasonic Industry Europe portfolio not only offers key electronic components, devices, modules and software but also complete solutions for production lines in a wide variety of industries. Panasonic Industry‘s comprehensive know-how along the entire value chain, combined with a corporate culture geared to customer needs, enables it to offer customer-specific solutions.

Our experience as a manufacturer and a sales partner for components and products allows us to share our experience with our customers. Customer wishes are specifically integrated into the development of new products, so that we can surpass our role as a supplier and become a competent, long-term partner for our customers.

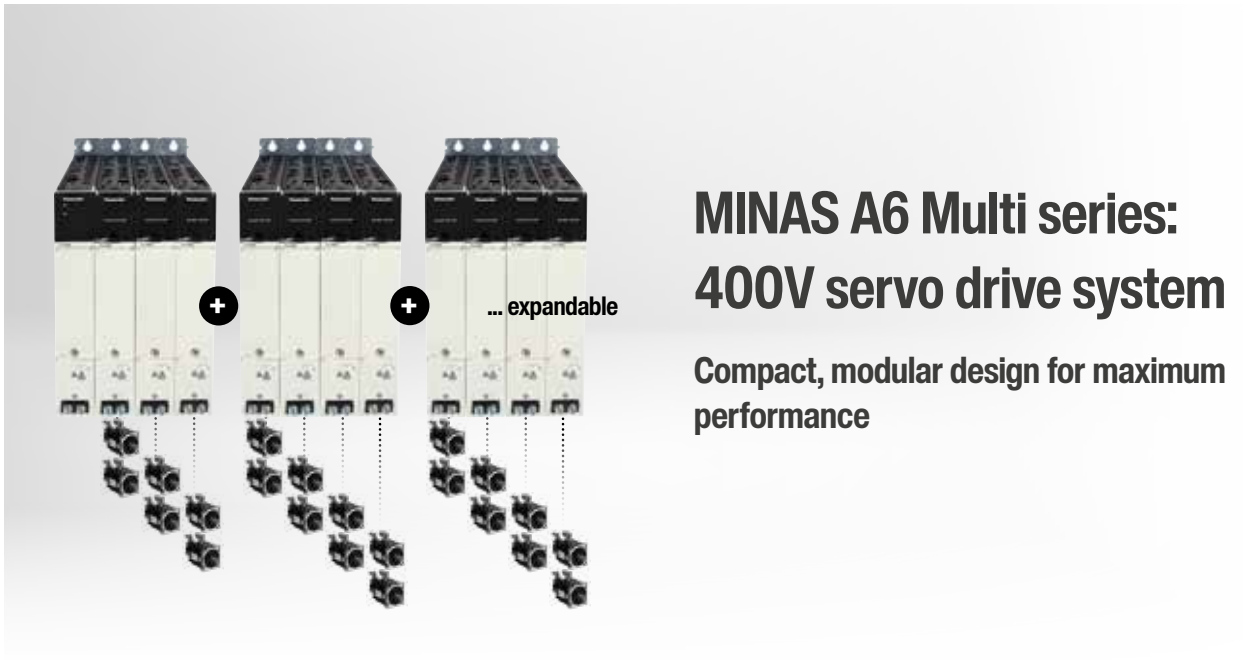
### The most modern servo drives: the MINAS A6 series

With its MINAS A6 series, Panasonic Industry offers a highly dynamic servo driver family with a wide power range from 50W to 15kW for many different areas of applications.
The servo drivers and motors of the MINAS A6 series are characterized by a consistently compact and robust but also lightweight design. In addition, they have been equipped with innovative functions for damping resonance frequencies and to eliminate vibration tendencies.

### Highly dynamic drive technology in a 400V network for maximum performance

With around 70% market share, 400V applications represent the largest segment in industrial automation. Take advantage of the 400V three-phase network by using the servo drives from Panasonic, which cover a power range from 0.4–5kW (in future up to 22kW).

Proven technology paired with innovative functions and versatile control features such as pulse, analog and network technology with real-time communication characterize our solutions.




# MINAS A6 Multi series: 400V servo drive system

## Compact, modular design for maximum performance

## 400V servo drive system

- **Compact servo drive in book format:** Only 25mm width per axis on the two-axis-unit
- **Modular design:** One power supply unit supports several servo drivers
- **DC link bus system:** Reliable connection without tools
- **Quick servo control technology:** A frequency response of 3.2kHz enables high-speed operation for maximum productivity
- **Anti-vibration technology:** Suitable for highly precise applications thanks to vibration damping.
- **State-of-the-art network technology:** High-speed communication via EtherCAT with up to 100Mbit/s
- **18 advanced safety functions:** MINAS A6 Multi achieves safety class SIL3
- **Setup via EtherCAT:** Easy configuration and programming over EtherCAT (EoE) using the software tool PANATERM
- **Robust connectors:** Servo motors with round connectors according to IEC, CENELEC, and IEEE

## Industries

**Packaging industry**

**Plastics and metal processing**

**Presses**

### Quick-connect technology

The MINAS A6 Multi can be wired at the top and bottom. No tools are needed.



### DC link bus

Beneath the front cover lies the DC link bus. Thanks to the screwless power bus system it allows quick and easy expansion of the servo drivers.



### Modular construction

Several two-axis servo drivers (50mm) can be coupled to just one compact power supply unit (50mm or 100mm width). Thanks to the DC link bus, the expansion is fast and reliable.



### Power supply units

| Product no. | Size | Input voltage | Rated power |
|---|---|---|---|
| MADMPN14 | A | 3-phase 380–480V AC | 15kW |

### Servo driver units

| Product no. | Size | Number of axes | Rated power |
|---|---|---|---|
| MADM2A4KBX | A | 2 | For motors 0.4–0.75kW** |
| MADM2A6KBX | A | 2 | For motors 0.75–1.5kW** |
| MADM2AAKBX | A | 2 | For motors 1.5–3.0kW** |
| MBDM1ABKBX | B | 1 | For motors 3.0–5.0kW |

** Also combinable

# SERVO DRIVE APPLICATIONS

## The MINAS product family changes the world of industrial machine automation



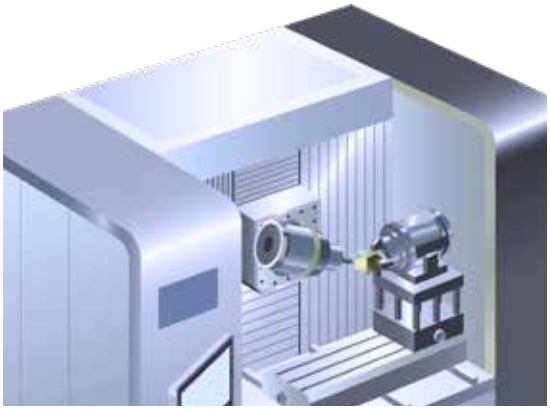
### Robots

A robot is required to operate stably independent of the constantly changing position, workload, or other condition affecting the robot arm. The MINAS A6 servo drive family guarantees stable operation by reducing the effects of loads to a minimum with the help of "adaptive load control".



### Processing machines

With metal-processing machines, it is very difficult to manufacture polygonal bodies with a mirror-like finishing. The MINAS A6 servo drive family realizes a frequency response of 3.2kHz to improve the feedback and to enable a mirror-like finish without lines or streaks.



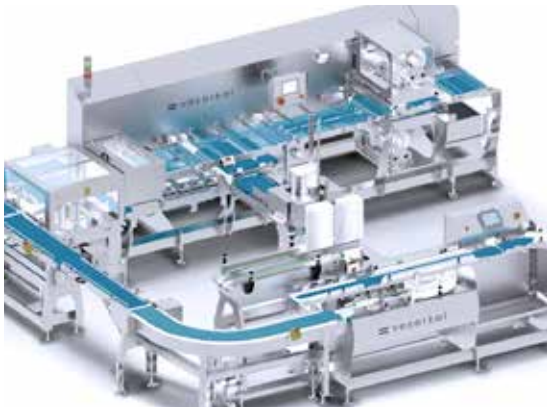
### Pick-and-place machines

The MINAS A6 servo drive family shows its versatility especially when used with pick-and-place machines where speed and positional accuracy are a must.
In addition to the high-frequency response, the servo drives deal with random disturbances with the help of the built-in "adaptive load control", thus keeping productivity high.



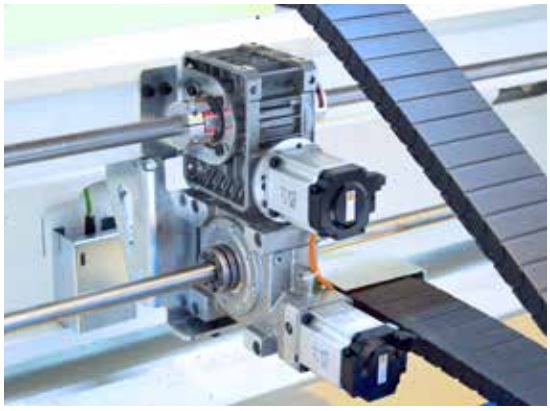

### CNC milling machine

Equipped with servo motors of the MINAS LIQI series for controlling 3 axes (X, Y, Z) and safety light curtains from Panasonic.



### Packaging machine for hamburgers and minced meat

Equipped with MINAS A5 servo motors, FP7 programmable controllers, inverters, touch terminals and sensors from Panasonic.



### Press brake for metal sheet

Machine system equipped with MINAS A5 motors with EtherCAT for moving back gauges.

The MINAS A6 series is also available in the EPLAN Data Portal!

# MINAS A6 SERIES – FEATURES

Panasonic's MINAS A6 series follows in the footsteps of the highly successful predecessor, the MINAS A5 series. The A6 series has been improved further. At the same time, compatibility with the A5 series has been maintained.

› **Simple communication connection**
Modbus RTU (see also page 39)

› **One of the smallest and lightest motors**
Up to 30% shorter than for MINAS A5

› **Suitable for peak top performance demands**
Improved response frequency



**Analog/pulse type MINAS A6 servo driver**



**MINAS A6 servo motor**
Rated power: 50W to 5kW



**Network types MINAS A6N (RTEX) and MINAS A6B (EtherCAT) servo drivers**

| | 200/400V AC | | | | 400V AC |
|---|---|---|---|---|---|
| **MINAS A6 series** | **A6SE** | **A6SG** | **A6SF** | **A6N/A6B** | **A6 Multi** |
| |  |  |  |  |  |
| Rated power | 50W–1.5kW (200V AC), 1kW–5kW (400V AC) | | | | 400W–5kW |
| Supply voltage | 1/3-phase (200V AC), 3-phase (400V AC) | | | | 3-phase |
| Bandwidth (velocity response) | 3200Hz | | | | |
| Rated rotational speed | 2000–3000rpm | | | | |
| Max. rotational speed | 3000–6500rpm | | | | |
| Rated torque | 0.16–15.9Nm (200V AC), 0.64–23.9Nm (400V AC) | | | | |
| Peak torque | 0.48–47.7Nm (200V AC), 2.23–71.6Nm (400V AC) | | | | |
| Control functions | Position control | | Position, velocity, torque control | | |
| IP degree of protection (motor) | IP67 | | | | |
| Control input | Pulse | | Pulse, analog | Network | Network |

## Compatible with MINAS A5 series

### Connections designed for compatibility

The A5 series connector cables and connectors can also be used for the A6 series (except for MHMF motors 50W–1000W).



MINAS A5

### Identical accessories

EMC filter and braking resistor can be used for both the MINAS A5 series and the MINAS A6 series.



MINAS A6

### Compatible flange dimensions

The motor can be exchanged 1:1 at the machine or gear flange.



## Improvements and new features of the MINAS A6 series

### Even more compact design

Thanks to the split core structure and a new housing, we have been able to reduce not only the length by 30%, but also the weight by up to 15%.



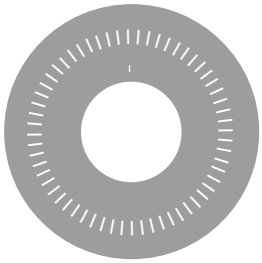
MHMF + MDMF models

**200V: 10% lighter, 30% shorter**

**400V: 15% lighter and shorter**

### High-resolution 23-bit encoder – can be used as an absolute or incremental rotary encoder

The 20-bit encoder (1048576 pulses per revolution = ppr) has been upgraded to 23 bit (8388608ppr).

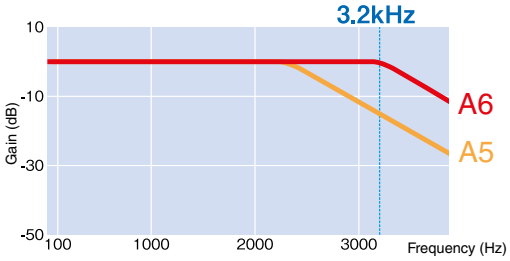


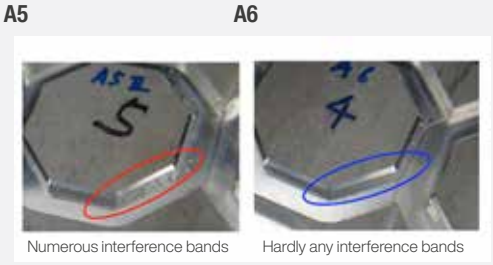
# MINAS A6 SERIES – FEATURES

## Improvements and new features of the MINAS A6 series

### Advanced controller settings

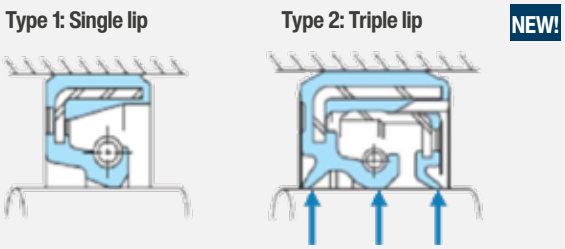
3.2kHz frequency response



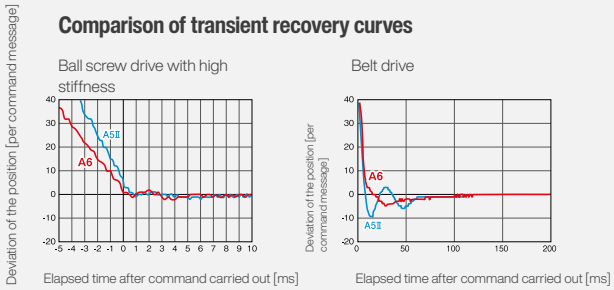

### Available with two different seals (single/triple lip)

An oil seal with triple lip has just been developed.
It is ideally suited for protection against ingress of dust and oil in ambient environments with a high degree of pollution.

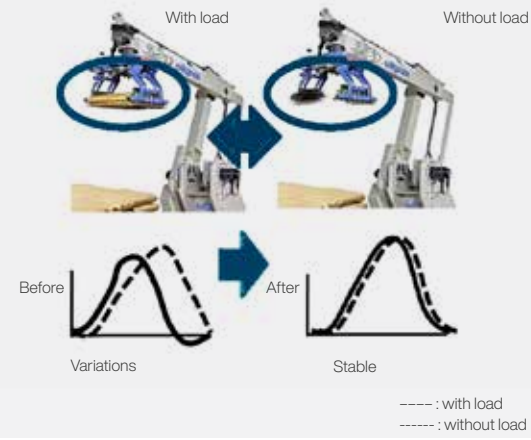



### Improved suppression of vibrations

The tendency to vibrate when braking to a standstill is significantly reduced. This has shortened the transient recovery time.




### Improved reaction and adjustment to load variations

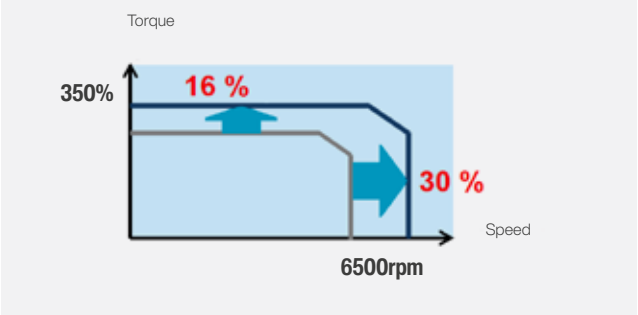


### Max. torque

Up to 350% of the nominal torque (MHMF model)

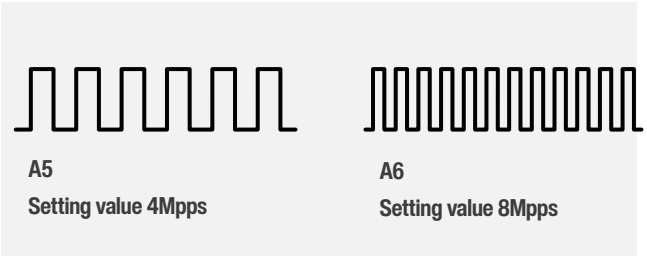
### Max. speed

Raised to max. 6500rpm (MHMF model)




### Semi/fully enclosed position control loop

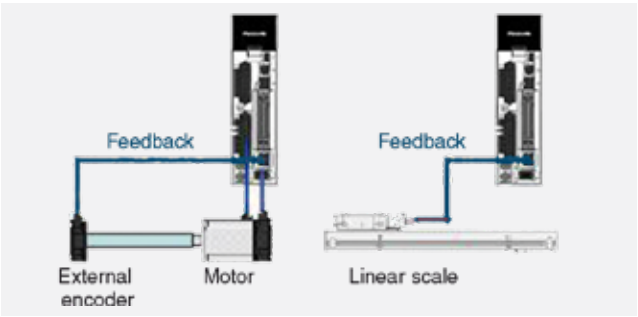
The A6 series enables a setting value of 8Mpps and a response with 4Mpps. This allows for high resolution as well as high-speed operation.




## General features

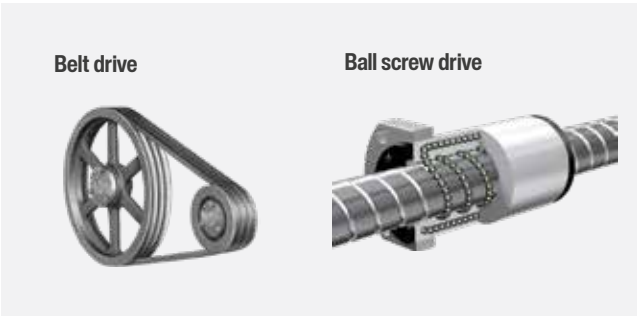
### External encoders for full-closed control

Using an external encoder or linear displacement measuring system ensures high-precision position control.



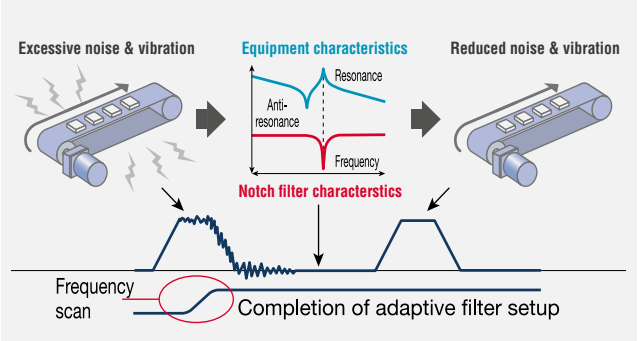

### Real-time auto-gain tuning

Automatic tuning after completion of multiple operations. The automatic vibration suppression function minimizes damage to the equipment. Additional mode and stiffness parameters enable easy response frequency-optimization for specific machine types such as high-friction, belt-driven machines or machines with low-friction ball screw drives.




### Manual and automatic notch filters

Highly sensitive notch filters log resonance frequencies and adapt them automatically.

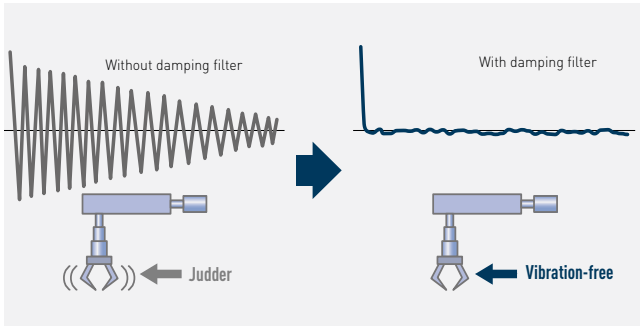


# MINAS A6 SERIES – FEATURES

## General features

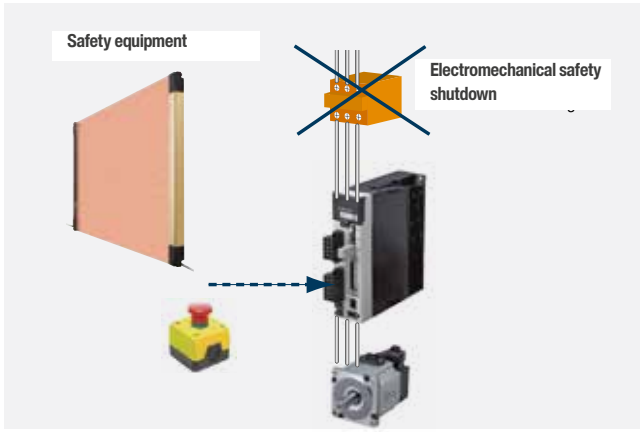
### Manual and automatic damping filters

Damping filters that can be set automatically suppress the equipment's resonance, which greatly reduces axis vibration at machine stoppage.




### Integrated safety function STO (Safe Torque Off)

Safety functions based on safety standards:
ISO13849-1(PL e, CAT3), EN61508(SIL3), EN62061(SILCL3), EN61800-5-2(SIL3, STO), IEC61326-3-1, IEC60240-1.




### Dynamic brake

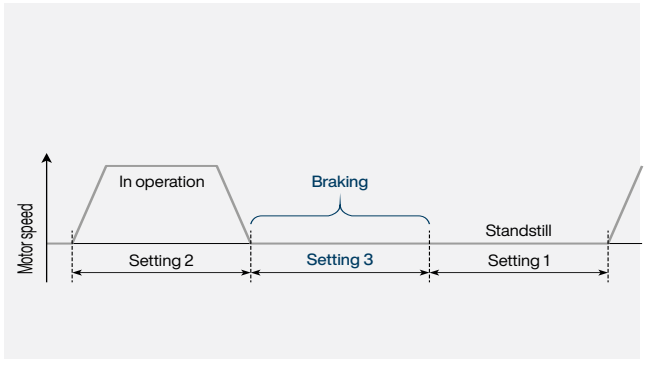
For dynamic braking that protects material.

### Torque limit

Torque limit is an indispensable function for torque-controlled applications or generally for protection against mechanical damages.

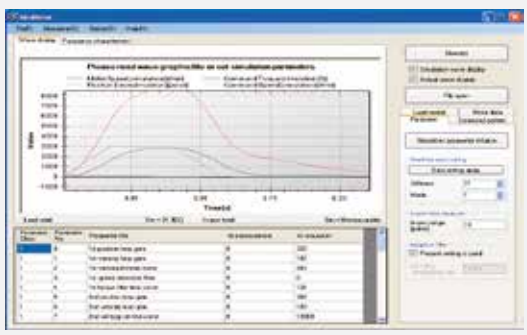
### 3-step control setting

Control parameters are activated according to the operating condition (deceleration during operation, stopping during fast positioning, standstill). By controlling the motion it is possible to perform even faster positioning with a lower vibration tendency.




### Software tool PANATERM with motion simulation

PANATERM reads response frequency data from the actual machine. A simplified simulation function allows you to check gain and filter effects without you having to adjust the actual parameter settings of the equipment.



## Servo drivers and motors

| | | 200/400V AC | | | | | 400V AC |
|---|---|---|---|---|---|---|---|
| | Model | Standard | RS485 communication | Multifunction | Network | | 400V AC modular |
| | | A6SE | A6SG | A6SF | A6N | A6B | A6 Multi |
| | |  |  |  |  | |  |
| Servo drivers | RTEX | - | - | - | x | - | - |
| | EtherCAT | - | - | - | - | x | x |
| | External encoder | - | - | x | x | | x |
| | Safety function STO | - | - | x | x | | x |
| | Advanced safety function | - | - | - | - | | x |
| | RS232/485 (Modbus) | - | x | x | - | | - |
| | Velocity control, torque control | - | - | x | x | | x |
| | Position control with dig. I/O (like MINAS A4P) | x | x | x | - | | - |
| | Position control | x | x | x | x | | x |

| | | Model | MSMF | | MDMF | | MHMF | |
|---|---|---|---|---|---|---|---|---|
| | | | Low inertia | | Medium inertia | | High inertia | |
| | | |  |  |  | |  |  |
| | | Rated power W | Flange size ☐ mm | Rated rotational speed (max.) rpm | Flange size ☐ mm | Rated rotational speed (max.) rpm | Flange size ☐ mm | Rated rotational speed (max.) rpm |
| Servo motors | 200V AC | 50 | 38 | 3000 (6000) | – | – | 40 | 3000 (6500) |
| | | 100 | | | – | – | | |
| | | 200 | 60 | | – | – | 60 | |
| | | 400 | | | – | – | | |
| | | 750 | 80 | | – | – | 80 | 3000 (6000) |
| | | 1000 | 80/100 | 3000 (6000)/ 3000 (5000) | 130 | 2000 (3000) | 80/130 | 3000 (6000)/ 2000 (3000) |
| | | 1500 | 100 | 3000 (5000) | | | 130 | 2000 (3000) |
| | 400V AC | 200 | - | - | - | - | 60 | 3000 (6500) |
| | | 400 | - | - | - | - | | |
| | | 750 | - | - | - | - | 80 | 3000 (6000) |
| | | 1000 | 100 | 3000 (5500) | 130 | 2000 (3500) | 80/130 | 3000 (6000)/ 2000 (3500) |
| | | 1500 | | | | | 130 | 2000 (3500) |
| | | 2000 | | | | | 176 | |
| | | 3000 | 120 | | | | | |
| | | 4000 | 130 | 3000 (5000) | 176 | | | |
| | | 5000 | | | | 2000 (3000) | | 2000 (3000) |
| | | Features | Low to high power range, low inertia, suitable for all kinds of applications, also suitable for high-speed applications, especially for machinery with high rigidity and repetition rate | | Medium to high power range, medium inertia, suitable for belt-driven machinery with low rigidity | | Low to high power range, high inertia, suitable for belt-driven machinery with low rigidity | |
| | | Applications | Equipment for transistor production (like bonders, SMD machinery), packaging machines, machines for food production, etc. | | Conveyor machinery, robots, textile machines, etc. | | Conveyor machinery, robots, machines for LCD production, etc. | |

# MINAS A6 SERIES – OVERVIEW

## Servo driver model codes 100/200/400V AC

| MAD | L | N | 1 | 5 | S | E |
|---|---|---|---|---|---|---|

**Frame:**
MAD: A
MBD: B
MCD: C
MDD: D
MED: E
MFD: F

**L: A6 series**

**Safety function:**
N: Without STO
T: With STO

**Maximum rated current:**

| | |
|---|---|
| 0: 6A | 5: 40A |
| 1: 8A | 8: 60A |
| 2: 12A | A: 100A |
| 3: 22A | B: 120A |
| 4: 24A | |

**Supply voltage:**
1: 1-phase, 100V AC
3: 3-phase, 200V AC
5: 1-/3-phase , 200V AC
4: 3-phase, 400V AC

**Network type:**
NE: Without STO (RTEX)
NF: With STO (RTEX)
BE: Without STO (EtherCAT)
BF: With STO (EtherCAT)

**Type:**

**Pulse/analog type:**
SE: Standard (pulse)
SF: Multifunction (pulse, analog)
SG: RS485 (pulse)

## Servo motor model codes 100/200V AC

| MSM | F | 5A | Z | L | 1 | A1 |
|---|---|---|---|---|---|---|

**Motor model**
MSM:
Low inertia
MDM:
Medium inertia
MHM:
High inertia

**F: A6 series**

**Rated power:**

| | |
|---|---|
| 5A: 50W | 08: 750W |
| 01: 100W | 09: 1kW (Ø 80mm) |
| 02: 200W | 10: 1kW (Ø 100/130mm) |
| 04: 400W | 15: 1.5kW |

**Supply voltage:**
1: 100V
2: 200V
Z: 100V/200V

**Motor specifications:**
(shaft type, holding brake, oil seal, encoder clamp):
A-D, G, H, S-V; 1-8

**1: Standard**

L: Standard absolute encoder (connector type)
A: Absolute encoder without battery (lead-wire type)

## Servo motor model codes 400V AC

| MSM | F | 10 | 4 | A1 | G | 9 | M |
|---|---|---|---|---|---|---|---|

**Motor model**
MSM: Low inertia
MDM: Medium inertia
MHM: High inertia

**F: A6 series**

**Rated power:**
10: 1kW
15: 1.5kW
20: 2kW
30: 3kW
40: 4kW
50: 5kW

**Supply voltage:**
4: 400V AC

**Oil seal:**
9: Single lip
A: Triple lip

M: Magnet

**Shaft type:**
G: Without key-way shaft, without holding brake
H: With key-way shaft, with holding brake

**Encoder type:**
L1: Standard (connector type)
A1: Encoder without battery (lead-wire type)

## Power supply model codes A6 Multi

| MAD | M | P | N | 1 | 4 |
|---|---|---|---|---|---|

**Frame:**
MAD: A

**M: A6 Multi series**

**Module type:**
P: Power supply

**Supply voltage:**
4: 3-phase, 400V AC

**Rated power:**
1: 15kW

**Safety function:**
N: Without safety function

## Servo driver model codes A6 Multi 400V AC

| MAD | M | 2 | A | 4 | K | B | X |
|---|---|---|---|---|---|---|---|

**Frame:**
MAD: A
MBD: B

**M: A6 Multi series**

**Axis unit type**
1: 1-axis unit
2: 2-axis unit

**Safety function:**
A: With STO

**Other Features:**
X: Advanced safety function

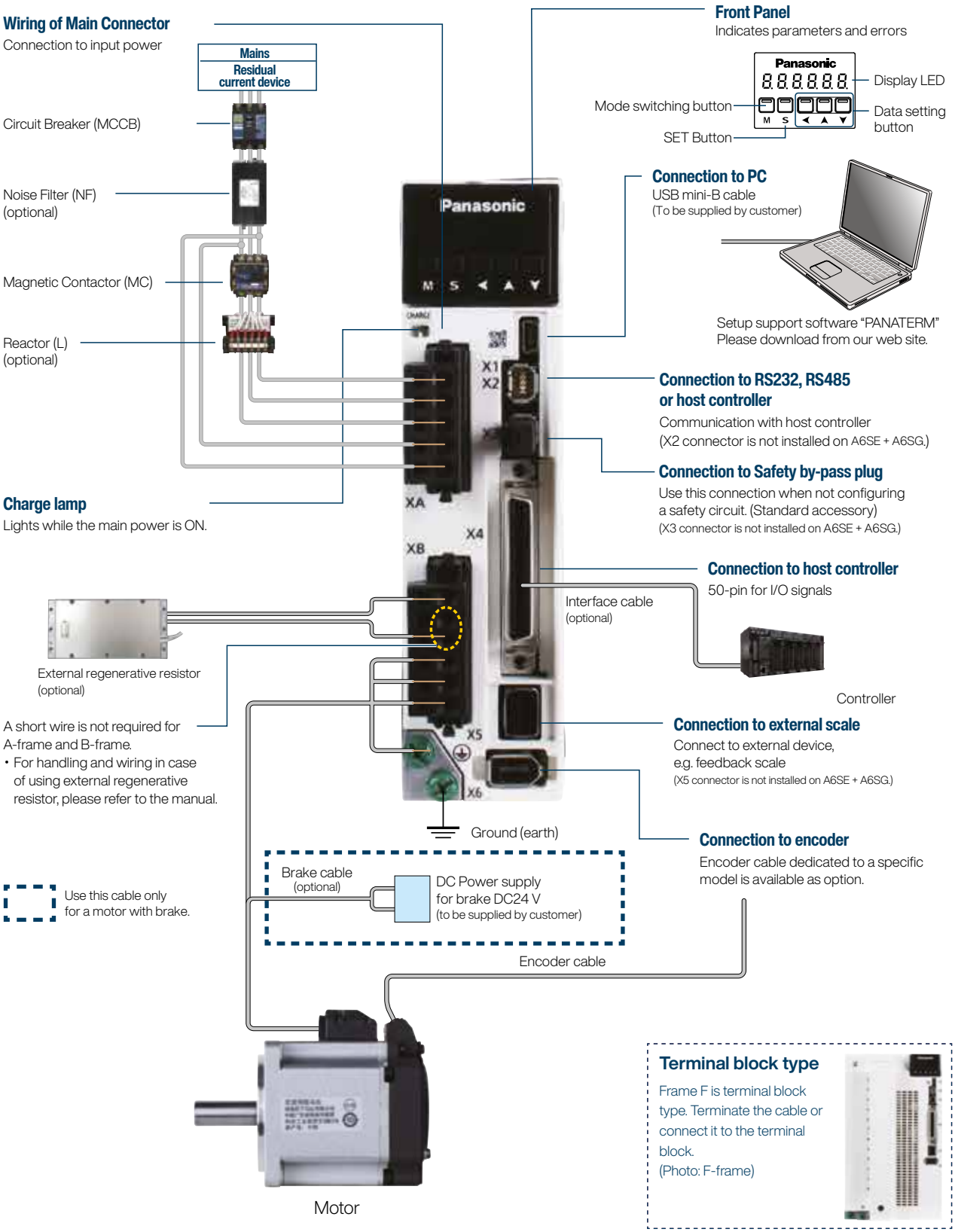
**Network type:**
B: EtherCAT

**Supply voltage:**
K: 560V DC

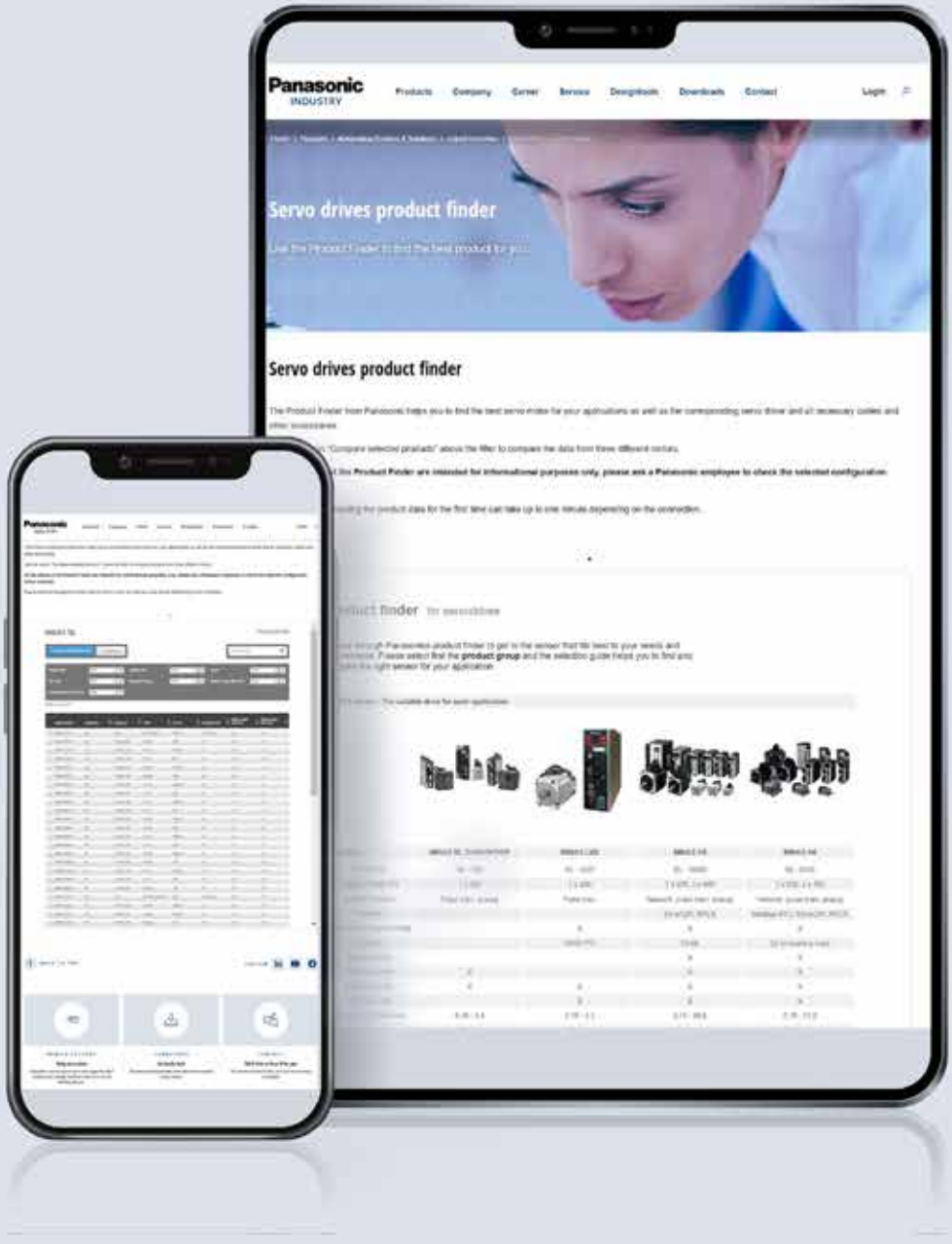
**Rated power:**
4: 750W
6: 1.5kW
A: 3kW
B: 5kW

## Connections and interfaces

Connector type (200V DC: frame A – F)



# **Product Finder:** For Servo Drives




Find the best servo drive within seconds!

## Overview of MINAS A6 motors, servo drivers and accessories 200V AC

| | Servo motor | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Rated power W | Flange size ☐ mm | Max. torque Nm | Max. nom. rotation speed rpm | Motor | Holding brake | Degree of protection IP67 | Key shaft | Encoder | |
| **Low inertia 200V AC class** | | | | | | | | | | |
| Low inertia | 50 | 38 | 0.16 (0.48) | 3000 (6000) | MSMF5AZL1U1 | | x | x | 23-bit encoder 8388608ppr | |
| | | | | | MSMF5AZL1V1 | x | x | x | | |
| | 100 | | 0.32 (0.95) | | MSMF012L1U1 | | x | x | | |
| | | | | | MSMF012L1V1 | x | x | x | | |
| | 200 | 60 | 0.64 (1.91) | | MSMF022L1U1 | | x | x | | |
| | | | | | MSMF022L1V1 | x | x | x | | |
| | 400 | | 1.27 (3.82) | | MSMF042L1U1 | | x | x | | |
| | | | | | MSMF042L1V1 | x | x | x | | |
| | 750 | 80 | 2.39 (7.16) | | MSMF082L1U1 | | x | x | | |
| | | | | | MSMF082L1V1 | x | x | x | | |
| | 1000 | | 3.18 (9.55) | | MSMF092L1U1 | | x | x | | |
| | | | | | MSMF092L1V1 | x | x | x | | |
| | | 100 | 3.18 (9.55) | 3000 (5000) | MSMF102L1G5 | | x | x | | |
| | | | | | MSMF102L1H5 | x | x | x | | |
| | 1500 | | 4.77 (14.3) | | MSMF152L1G5 | | x | x | | |
| | | | | | MSMF152L1H5 | x | x | x | | |
| **Medium inertia 200V AC class** | | | | | | | | | | |
| Medium inertia | 1000 | 130 | 4.77 (14.3) | 2000 (3000) | MDMF102L1G5 | | x | x | 23-bit encoder 8388608ppr | |
| | | | | | MDMF102L1H5 | x | x | x | | |
| | 1500 | | 7.16 (21.5) | | MDMF152L1G5 | | x | x | | |
| | | | | | MDMF152L1H5 | x | x | x | | |
| **High inertia 200V AC class** | | | | | | | | | | |
| High inertia | 50 | 40 | 0.16 (0.56) | 3000 (6500) | MHMF5AZL1U1 | | x | x | 23-bit encoder 8388608ppr | |
| | | | | | MHMF5AZL1V1 | x | x | x | | |
| | 100 | | 0.32 (1.11) | | MHMF012L1U1 | | x | x | | |
| | | | | | MHMF012L1V1 | x | x | x | | |
| | 200 | 60 | 0.64 (2.23) | | MHMF022L1U1 | | x | x | | |
| | | | | | MHMF022L1V1 | x | x | x | | |
| | 400 | | 1.27 (4.46) | | MHMF042L1U1 | | x | x | | |
| | | | | | MHMF042L1V1 | x | x | x | | |
| | 750 | 80 | 2.39 (8.36) | 3000 (6000) | MHMF082L1U1 | | x | x | | |
| | | | | | MHMF082L1V1 | x | x | x | | |
| | 1000 | | 3.18 (11.1) | | MHMF092L1U1 | | x | x | | |
| | | | | | MHMF092L1V1 | x | x | x | | |
| | | 130 | 4.77 (14.3) | 2000 (3000) | MHMF102L1G5 | | x | x | | |
| | | | | | MHMF102L1H5 | x | x | x | | |
| | 1500 | | 7.16 (21.5) | | MHMF152L1G5 | | x | x | | |
| | | | | | MHMF152L1H5 | x | x | x | | |

**Motor type:** ☐☐☐☐L1☐ = standard,
☐☐☐☐A1☐ = encoder without battery
(For further information, please refer to the 'Catalogue of batteryless absolute encoder motor)

| Servo drivers | | Cables | | | | Filter | Brake resistor |
|---|---|---|---|---|---|---|---|
| Model | Frame | Motor cable | | Encoder cable | | EMC filter | Model |
| | | For motors without holding brake | For motors with holding brake | 23-bit incremental | 23-bit absolute | | |
| **Low inertia 200V AC class** | | | | | | | |
| MADL□05□□ | A | MFMCA0□□0WJD | -- | MFECA0□□0WJD | MFECA0□□0GJE (with battery box) | FN2080-6-06 or FS21238607 | BWD250100 |
| | | -- | MFMCA0□□0WJD* | | | | |
| | | MFMCA0□□0WJD | -- | | | | |
| | | -- | MFMCA0□□0WJD* | | | | |
| MADL□15□□ | | MFMCA0□□0WJD | -- | | | | BWD250072 |
| | | -- | MFMCA0□□0WJD* | | | | |
| MBDL□25□□ | B | MFMCA0□□0WJD | -- | | | | |
| | | -- | MFMCA0□□0WJD* | | | | |
| MCDL□35□□ | C | MFMCA0□□0WJD | -- | | | | |
| | | -- | MFMCA0□□0WJD* | | | | |
| MDDL□45□□ | D | MFMCA0□□0WJD | -- | | | FN2090-10-06 | BWD500035 |
| | | -- | MFMCA0□□0WJD* | | | | |
| MDDL□55□□ | | MFMCD0□□2GCD | -- | MFECA0□□0GTD | MFECA0□□0GTE (with battery box) | | |
| | | -- | MFMCA0□□2HCD | | | | |
| | | MFMCD0□□2GCD | -- | | | | |
| | | -- | MFMCA0□□2HCD | | | | |
| **Medium inertia 200V AC class** | | | | | | | |
| MDDL□45□□ | D | MFMCD0□□2GCD | -- | MFECA0□□0GTD | MFECA0□□0GTE (with battery box) | FN2090-10-06 | BWD500035 |
| | | -- | MFMCA0□□2HCD | | | | |
| MDDL□55□□ | | MFMCD0□□2GCD | -- | | | | |
| | | -- | MFMCA0□□2HCD | | | | |
| **High inertia 200V AC class** | | | | | | | |
| MADL□05□□ | A | MFMCA0□□7WFD | -- | MFECA0□□0WJD | MFECA0□□0GJE (with battery box) | FN2080-6-06 or FS21238607 | BWD250100 |
| | | -- | MFMCA0□□7XFD | | | | |
| | | MFMCA0□□7WFD | -- | | | | |
| | | -- | MFMCA0□□7XFD | | | | |
| MADL□15□□ | | MFMCA0□□0WFD-EU | -- | | | | BWD250072 |
| | | -- | MFMCA0□□0XFD | | | | |
| MBDL□25□□ | B | MFMCA0□□0WFD-EU | -- | | | | |
| | | -- | MFMCA0□□0XFD | | | | |
| MCDL□35□□ | C | MFMCA0□□0WFD-EU | -- | | | | |
| | | -- | MFMCA0□□0XFD | | | | |
| MDDL□55□□ | D | MFMCA0□□0WFD-EU | -- | | | FN2090-10-06 | BWD500035 |
| | | -- | MFMCA0□□0XFD | | | | |
| MDDL□45□□ | | MFMCD0□□2GCD | -- | MFECA0□□0GTD | MFECA0□□0GTE (with battery box) | | |
| | | -- | MFMCE0□□2HCD | | | | |
| MDDL□55□□ | | MFMCD0□□2GCD | -- | | | | |
| | | -- | MFMCE0□□2HCD | | | | |

□ .. □□ **Servo driver type**, see page 16

□□ = **Cable length** (m)

* For MSMF motors with a holding brake < 1.5kW, an additional brake cable MFMCB0□□0RJT-EU is required for the motor cable.

# MINAS A6 SERIES – OVERVIEW

## Overview of MINAS A6 motors, servo drivers and accessories 400V AC

| | Servo motor | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Rated power W | Flange size ☐ mm | Max. torque Nm | Rated rotational speed (max.) rpm | Motor | Holding brake | Degree of protection IP67 | Key shaft | Encoder | |
| **Low inertia 400V AC class** | | | | | | | | | | |
| **Low inertia** | 1000 | 100 | 3.18 (9.55) | 3000 (5500) | MSMF104☐G9M | | x | x | 23-bit encoder 8388608ppr | |
| | | | | | MSMF104☐H9M | x | x | x | | |
| | 1500 | | 4.77 (14.3) | | MSMF154☐G9M | | x | x | | |
| | | | | | MSMF154☐H9M | x | x | x | | |
| | 2000 | | 6.37 (19.1) | | MSMF204☐G9M | | x | x | | |
| | | | | | MSMF204☐H9M | x | x | x | | |
| | 3000 | 120 | 9.55 (28.7) | | MSMF304☐G9M | | x | x | | |
| | | | | | MSMF304☐H9M | x | x | x | | |
| | 4000 | 130 | 12.7 (38.2) | 3000 (5000) | MSMF404☐G9M | | x | x | | |
| | | | | | MSMF404☐H9M | x | x | x | | |
| | 5000 | | 15.9 (47.8) | | MSMF504☐G9M | | x | x | | |
| | | | | | MSMF504☐H9M | x | x | x | | |
| **Medium inertia 400V AC class** | | | | | | | | | | |
| **Medium inertia** | 1000 | 130 | 4.77 (14.3) | 2000 (3500) | MDMF104☐G9M | | x | x | 23-bit encoder 8388608ppr | |
| | | | | | MDMF104☐H9M | x | x | x | | |
| | 1500 | | 7.16 (21.5) | | MDMF154☐G9M | | x | x | | |
| | | | | | MDMF154☐H9M | x | x | x | | |
| | 2000 | | 9.55 (28.7) | | MDMF204☐G9M | | x | x | | |
| | | | | | MDMF204☐H9M | x | x | x | | |
| | 3000 | | 14.3 (43.0) | | MDMF304☐G9M | | x | x | | |
| | | | | | MDMF304☐H9M | x | x | x | | |
| | 4000 | 176 | 19.1 (57.3) | | MDMF404☐G9M | | x | x | | |
| | | | | | MDMF404☐H9M | x | x | x | | |
| | 5000 | | 23.87 (71.6) | 2000 (3000) | MDMF504☐G9M | | x | x | | |
| | | | | | MDMF504☐H9M | x | x | x | | |
| **High inertia 400V AC class** | | | | | | | | | | |
| | 200 | 60 | 0.64 (2.23) | 3000 (6500) | MHMF024☐U9M | | x | x | 23-bit encoder 8388608-ppr | |
| | | | | | MHMF024☐V9M | x | x | x | | |
| | 400 | 60 | 1.27 (4.46) | 3000 (6500) | MHMF044☐U9M | | x | x | | |
| | | | | | MHMF044☐V9M | x | x | x | | |
| | 750 | 80 | 2.39 (8.36) | 3000 (6000) | MHMF084☐U9M | | x | x | | |
| | | | | | MHMF084☐V9M | x | x | x | | |
| | 1000 | | 3.18 (11.1) | | MHMF094☐U9M | | x | x | | |
| | | | | | MHMF094☐V9M | x | x | x | | |
| **High inertia** | 1000 | 130 | 4.77 (14.3) | 2000 (3500) | MHMF104☐G9M | | x | x | | |
| | | | | | MHMF104☐H9M | x | x | x | | |
| | 1500 | | 7.16 (21.5) | | MHMF154☐G9M | | x | x | | |
| | | | | | MHMF154☐H9M | x | x | x | | |
| | 2000 | 176 | 9.55 (28.7) | | MHMF204☐G9M | | x | x | | |
| | | | | | MHMF204☐H9M | x | x | x | | |
| | 3000 | | 14.3 (43.0) | | MHMF304☐G9M | | x | x | | |
| | | | | | MHMF304☐H9M | x | x | x | | |
| | 4000 | | 19.1 (57.3) | | MHMF404☐G9M | | x | x | | |
| | | | | | MHMF404☐H9M | x | x | x | | |
| | 5000 | | 23.9 (71.6) | 2000 (3000) | MHMF504☐G9M | | x | x | | |
| | | | | | MHMF504☐H9M | x | x | x | | |

☐ **Motor type** (L1 = standard, A1 = encoder without battery)

| Servo drivers | | | Cables | | | | Filter | Brake resistor |
|---|---|---|---|---|---|---|---|---|
| | Model | Frame | Motor cable | | Encoder cable | | EMC filter | Model |
| | | | For motors without holding brake | For motors with holding brake | 23-bit, incremental | 23-bit, absolute | | |
| | **Low inertia 400V AC class** | | | | | | | |
| | MDDL□64□□ | D | MFMCA0□□4YUD | -- | MFECA0□□0YYE | MFECA0□□0YYD (with battery box) | FN3268-7-44 | BWD500150 |
| | | | -- | MFMCA0□□4ZUD | | | | |
| | | | MFMCA0□□4YUD | -- | | | | |
| | | | -- | MFMCA0□□4ZUD | | | | |
| | MEDL□84□□ | E | MFMCA0□□4YUD | -- | | | | BWD500100 |
| | | | -- | MFMCA0□□4ZUD | | | | |
| | MFDL□A4□□ | F | MFMCA0□□5YUD | -- | | | FN3268-16-44 | BWD600047 |
| | | | -- | MFMCA0□□5ZUD | | | | |
| | MFDL□B4□□ | | MFMCA0□□5YUD | -- | | | | |
| | | | -- | MFMCA0□□5ZUD | | | | |
| | | | MFMCA0□□5YUD | -- | | | | |
| | | | -- | MFMCA0□□5ZUD | | | | |
| | **Medium inertia 400V AC class** | | | | | | | |
| | MDDL□54□□ | D | MFMCA0□□4YUD | -- | MFECA0□□0YYE | MFECA0□□0YYD (with battery box) | FN3268-7-44 | BWD500150 |
| | | | -- | MFMCA0□□4ZUD | | | | |
| | MDDL□64□□ | | MFMCA0□□4YUD | -- | | | | |
| | | | -- | MFMCA0□□4ZUD | | | | |
| | MEDL□84□□ | E | MFMCA0□□4YUD | -- | | | | BWD500100 |
| | | | -- | MFMCA0□□4ZUD | | | | |
| | MFDL□A4□□ | F | MFMCA0□□5YUD | -- | | | FN3268-16-44 | BWD600047 |
| | | | -- | MFMCA0□□5ZUD | | | | |
| | MFDL□B4□□ | | MFMCA0□□5YUD | -- | | | | |
| | | | -- | MFMCA0□□5ZUD | | | | |
| | | | MFMCA0□□5YUD | -- | | | | |
| | | | -- | MFMCA0□□5ZUD | | | | |
| | **High inertia 400V AC class** | | | | | | | |
| | MDDL□44□□ | D | MFMCA0□□3YUD | -- | MFECA0□□0YYE | MFECA0□□0YYD (with battery box) | FN3268-7-44 | On request |
| | | | -- | MFMCA0□□3ZUD | | | | |
| | | | MFMCA0□□3YUD | -- | | | | |
| | | | -- | MFMCA0□□3ZUD | | | | |
| | MDDL□54□□ | | MFMCA0□□3YUD | -- | | | | BWD500150 |
| | | | -- | MFMCA0□□3ZUD | | | | |
| | MDDL□64□□ | | MFMCA0□□3YUD | -- | | | | |
| | | | -- | MFMCA0□□3ZUD | | | | |
| | MDDL□54□□ | | MFMCA0□□4YUD | -- | | | | |
| | | | -- | MFMCA0□□4ZUD | | | | |
| | MDDL□64□□ | | MFMCA0□□4YUD | -- | | | | |
| | | | -- | MFMCA0□□4ZUD | | | | |
| | MEDL□84□□ | E | MFMCA0□□4YUD | -- | | | | BWD500100 |
| | | | -- | MFMCA0□□4ZUD | | | | |
| | MFDL□A4□□ | F | MFMCA0□□5YUD | -- | | | FN3268-16-44 | BWD600047 |
| | | | -- | MFMCA0□□5ZUD | | | | |
| | MFDL□B4□□ | | MFMCA0□□5YUD | -- | | | | |
| | | | -- | MFMCA0□□5ZUD | | | | |
| | | | MFMCA0□□5YUD | -- | | | | |
| | | | -- | MFMCA0□□5ZUD | | | | |
| | □,□□ **Servo driver type**, see page 16 | | □□ = **Cable length** (m) | | | | | |

## MINAS A6 motors, MINAS A6 Multi servo drivers and accessories 400V AC

**Servo motor**

| | Rated power W | Flange size ☐ mm | Max. torque Nm | Rated rotational speed (max.) rpm | Motor | Holding brake | Degree of protection IP67 | Key shaft | Encoder |
|---|---|---|---|---|---|---|---|---|---|
| **Low inertia MINAS A6 Multi 400V AC class** | | | | | | | | | |
| | 1000 | 100 | 3.18 (9.55) | 3000 (5500) | MSMF104☐G9M | | x | x | 23-bit encoder 8388608ppr |
| | | | | | MSMF104☐H9M | x | x | x | |
| | 1500 | | 4.77 (14.3) | | MSMF154☐G9M | | x | x | |
| | | | | | MSMF154☐H9M | x | x | x | |
| | 2000 | | 6.37 (19.1) | | MSMF204☐G9M | | x | x | |
| | | | | | MSMF204☐H9M | x | x | x | |
| | 3000 | 120 | 9.55 (28.7) | | MSMF304☐G9M | | x | x | |
| | | | | | MSMF304☐H9M | x | x | x | |
| | 4000 | 130 | 12.7 (38.2) | 3000 (5000) | MSMF404☐G9M | | x | x | |
| | | | | | MSMF404☐H9M | x | x | x | |
| | 5000 | | 15.9 (47.8) | | MSMF504☐G9M | | x | x | |
| | | | | | MSMF504☐H9M | x | x | x | |
| **Medium inertia MINAS A6 Multi 400V AC class** | | | | | | | | | |
| | 1000 | 130 | 4.77 (14.3) | 2000 (3500) | MDMF104☐G9M | | x | x | 23-bit encoder 8388608ppr |
| | | | | | MDMF104☐H9M | x | x | x | |
| | 1500 | | 7.16 (21.5) | | MDMF154☐G9M | | x | x | |
| | | | | | MDMF154☐H9M | x | x | x | |
| | 2000 | | 9.55 (28.7) | | MDMF204☐G9M | | x | x | |
| | | | | | MDMF204☐H9M | x | x | x | |
| | 3000 | | 14.3 (43.0) | | MDMF304☐G9M | | x | x | |
| | | | | | MDMF304☐H9M | x | x | x | |
| | 4000 | 176 | 19.1 (57.3) | | MDMF404☐G9M | | x | x | |
| | | | | | MDMF404☐H9M | x | x | x | |
| | 5000 | | 23.87 (71.6) | 2000 (3000) | MDMF504☐G9M | | x | x | |
| | | | | | MDMF504☐H9M | x | x | x | |
| **High inertia MINAS A6 Multi 400V AC class** | | | | | | | | | |
| High inertia | 400 | 60 | 1.27 (4.46) | 3000 (6500) | MHMF044☐U9M | | x | x | 23-bit encoder 8388608ppr |
| | | | | | MHMF044☐V9M | x | x | x | |
| | 750 | 80 | 2.39 (8.36) | 3000 (6000) | MHMF084☐U9M | | x | x | |
| | | | | | MHMF084☐V9M | x | x | x | |
| | 1000 | | 3.18 (11.1) | | MHMF094☐U9M | | x | x | |
| | | | | | MHMF094☐V9M | x | x | x | |
| | 1000 | 130 | 4.77 (14.3) | 2000 (3500) | MHMF104☐G9M | | x | x | |
| | | | | | MHMF104☐H9M | x | x | x | |
| | 1500 | | 7.16 (21.5) | | MHMF154☐G9M | | x | x | |
| | | | | | MHMF154☐H9M | x | x | x | |
| | 2000 | 176 | 9.55 (28.7) | | MHMF204☐G9M | | x | x | |
| | | | | | MHMF204☐H9M | x | x | x | |
| | 3000 | | 14.3 (43.0) | | MHMF304☐G9M | | x | x | |
| | | | | | MHMF304☐H9M | x | x | x | |
| | 4000 | | 19.1 (57.3) | | MHMF404☐G9M | | x | x | |
| | | | | | MHMF404☐H9M | x | x | x | |
| | 5000 | | 23.9 (71.6) | 2000 (3000) | MHMF504☐G9M | | x | x | |
| | | | | | MHMF504☐H9M | x | x | x | |

**☐ Motor type** (L1 = standard, A1 = encoder without battery)

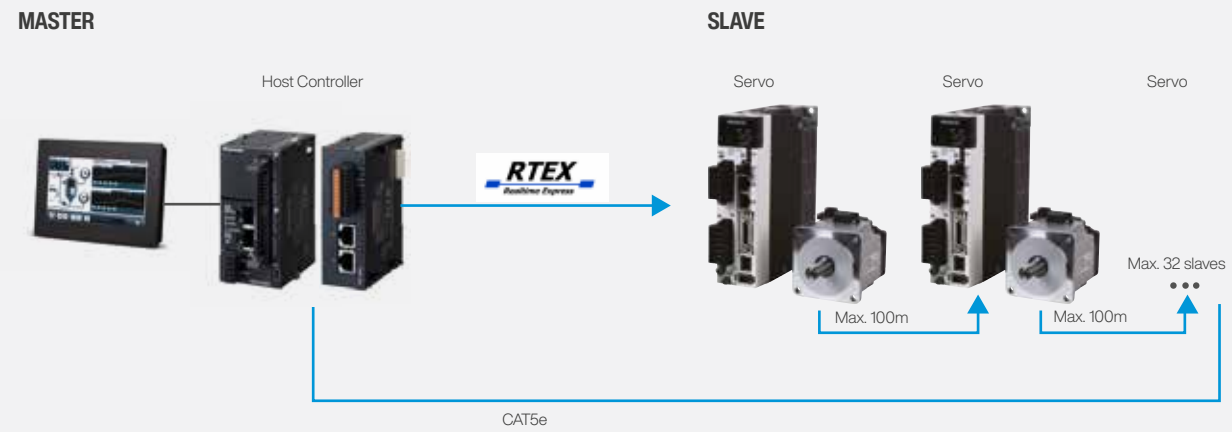
| Servo drivers | | | Cables | | | | Filter | Brake resistor |
|---|---|---|---|---|---|---|---|---|
| | | | Motor cable | | Encoder cable | | | |
| | Model | Frame | For motors without holding brake | For motors with holding brake | 23-bit, incremental | 23-bit, absolute | EMC filter | Model |
| **Low inertia MINAS A6 Multi 400V AC class** | | | | | | | | |
| | MADM2A6KBX | A | MFMCA0☐☐1YUD | -- | MFECA0☐☐0YYE | MFECA0☐☐0YYD (with battery box) | Depends on configuration | Motor design depends on application |
| | | | -- | MFMCA0☐☐1ZUD | | | | |
| | MADM2AAKBX | | MFMCA0☐☐1YUD | -- | | | | |
| | | | -- | MFMCA0☐☐1ZUD | | | | |
| | | | MFMCA0☐☐2YUD | -- | | | | |
| | | | -- | MFMCA0☐☐2ZUD | | | | |
| | MBDM1ABKBX | B | MFMCA0☐☐2YUD | -- | | | Depends on configuration | |
| | | | -- | MFMCA0☐☐2ZUD | | | | |
| | | | MFMCA0☐☐2YUD | -- | | | | |
| | | | -- | MFMCA0☐☐2ZUD | | | | |
| **Medium inertia MINAS A6 Multi 400V AC class** | | | | | | | | |
| | | A | MFMCA0☐☐1YUD | -- | MFECA0☐☐0YYE | MFECA0☐☐0YYD (with battery box) | Depends on configuration | Motor design depends on application |
| | | | -- | MFMCA0☐☐1ZUD | | | | |
| | | | MFMCA0☐☐1YUD | -- | | | | |
| | | | -- | MFMCA0☐☐1ZUD | | | | |
| | MADM2AAKBX | | MFMCA0☐☐1YUD | -- | | | | |
| | | | -- | MFMCA0☐☐1ZUD | | | | |
| | | | MFMCA0☐☐2YUD | -- | | | | |
| | | | -- | MFMCA0☐☐2ZUD | | | | |
| | MBDM1ABKBX | B | MFMCA0☐☐2YUD | -- | | | Depends on configuration | |
| | | | -- | MFMCA0☐☐2ZUD | | | | |
| | | | MFMCA0☐☐2YUD | -- | | | | |
| | | | -- | MFMCA0☐☐2ZUD | | | | |
| **High inertia MINAS A6 Multi 400V AC class** | | | | | | | | |
| | MADM2A4KBX | A | MFMCA0☐☐0YUD | -- | MFECA0☐☐0YYE | MFECA0☐☐0YYD (with battery box) | Depends on configuration | Motor design depends on application |
| | | | -- | MFMCA0☐☐0ZUD | | | | |
| | MADM2A4KBX, | | MFMCA0☐☐0YUD | | | | | |
| | | | -- | MFMCA0☐☐0ZUD | | | | |
| | MADM2A6KBX | | MFMCA0☐☐0YUD | -- | | | | |
| | | | -- | MFMCA0☐☐0ZUD | | | | |
| | | | MFMCA0☐☐1YUD | -- | | | | |
| | | | -- | MFMCA0☐☐1ZUD | | | | |
| | MADM2A6KBX, MADM2AAKBX | | MFMCA0☐☐1YUD | -- | | | | |
| | | | -- | MFMCA0☐☐1ZUD | | | | |
| | MADM2AAKBX | | MFMCA0☐☐1YUD | -- | | | | |
| | | | -- | MFMCA0☐☐1ZUD | | | | |
| | MADM2AAKBX, MBDM1ABKBX | | MFMCA0☐☐2YUD | -- | | | | |
| | | | -- | MFMCA0☐☐2ZUD | | | | |
| | | B | MFMCA0☐☐2YUD | -- | | | Depends on configuration | |
| | | | -- | MFMCA0☐☐2ZUD | | | | |
| | | | MFMCA0☐☐2YUD | -- | | | | |
| | | | -- | MFMCA0☐☐2ZUD | | | | |
| | | | ☐☐ = **Cable length** (m) | | | | | |

## MINAS A6N with RTEX protocol

### RTEX (Realtime Express)

Thanks to its high transmission speed and sampling rate, this fast, real-time Ethernet bus for automation is particularly well suited for highly dynamic single and multiple axes position control tasks. The communication between master and slaves happens in real time.

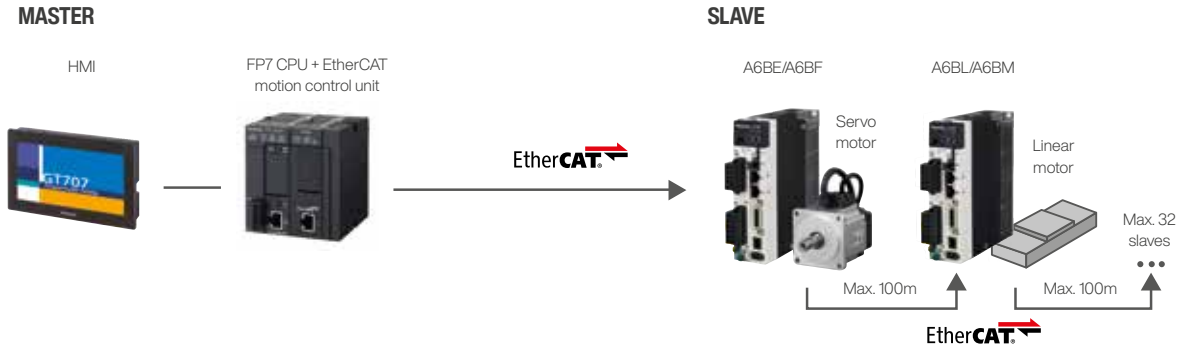
### Easy mounting and reliable connections thanks to ring topology




## MINAS A6B with EtherCAT protocol

### EtherCAT (Ethernet for Control Automation Technology)

This Ethernet-based field bus system offers similiarly outstanding features like RTEX. However, unlike RTEX, EtherCAT is an open, standardized field bus. This has the advantage that data can be exchanged with other servo drivers if they have an EtherCAT port.



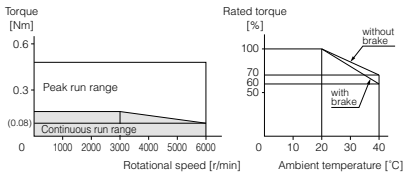

| Features | MINAS A6N RTEX | | MINAS A6B EtherCAT |
|---|---|---|---|
| General features | Supports position, velocity and torque control | | |
| | Manual and automatic vibration suppression (adjustable in the driver) | | |
| | Conforms to the following safety standards: ISO13849-1(PL e, CAT3), EN61508(SIL3), EN62061(SILCL3), EN61800-5-2(SIL3, STO), IEC61326-3-1, IEC60240-1 | | |
| | Easy wiring using standard Ethernet cables (CAT5e, up to 100m between units) | | |
| Real-time communication 100Mbit/s | RTEX protocol | | CAN over EtherCAT (CoE) |
| Full control of | up to 16 axes | up to 8 axes | up to 64 axes |
| PLC + Compatible positioning units | FP0H + AFP0HM4N / AFP0HM8N | AFPXHM8N16PD | FP7 + AFP7MC16EC / AFP7MC32EC / AFP7MC64EC |

For more data about MINAS A6 servo controllers and motors such as technical data, dimensional diagrams, and torque characteristics, please use this download link:

## Examples of servo motor torque characteristics

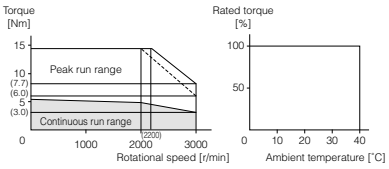
**Motor with low inertia:**

| MSMF5AZL1☐☐ | With oil seal |
|---|---|



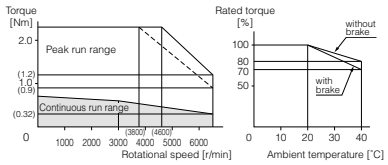

**Motor with middle inertia:**

| MDMF102L1☐☐ | With oil seal |
|---|---|




**Motor with high inertia:**

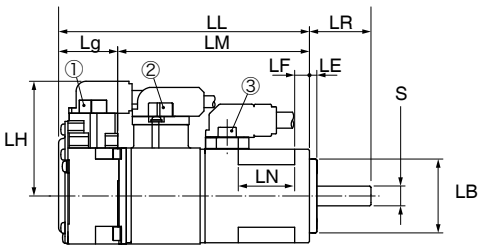
| MHMF022L1☐☐ | With oil seal |
|---|---|

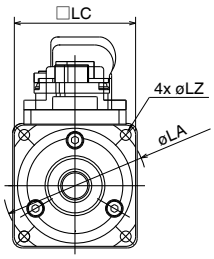


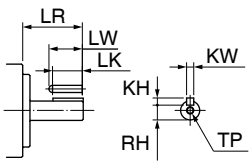

## Examples of servo motor dimension diagrams

**MSMF – low inertia** (50-1500W, 200V AC)

| 50-100W | Side | Front | Key-way dimensions |
|---|---|---|---|

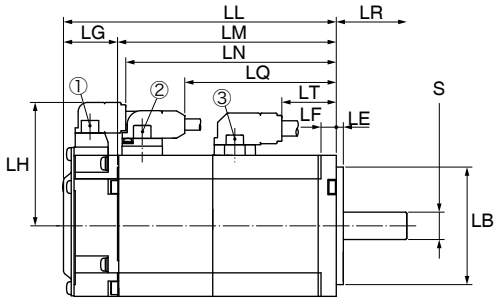


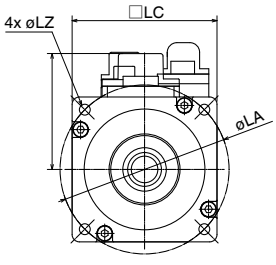



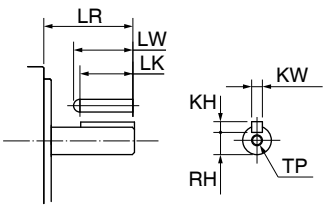




1) Encoder connector (JN2)
2) Brake connector
3) Motor connector

| 200-1000W | Side | Front | Key-way dimensions |
|---|---|---|---|




1) Encoder connector (JN2)
2) Brake connector
3) Motor connector



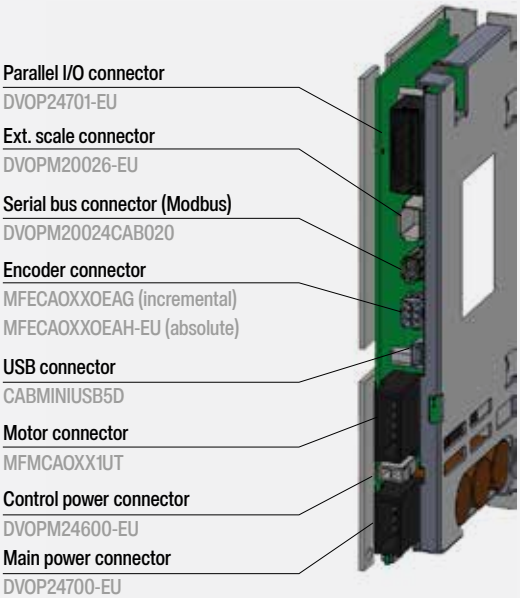
# MINAS A6V servo drives (24/48V DC)

## Low voltage, high performance

**Features:**

- Servo drives and servo motors
- 24/48V DC input voltage
- 50/100/133/200/266W
- 23-bit absolute encoder
- Modbus RTU communication
- Network types: EtherCAT, RTEX (Realtime Express)
- Position, velocity, and torque control
- Rated rotational speed up to 3000rpm

DC-powered servo drives are very common in drive technology for applications where there is no AC or three-phase current network available. Especially in the area of drive technology for vehicles and the medical field there is a need for motors with battery voltages. These motors round off Panasonic's portfolio of drive technology products.



## Servo driver specifications:

| Type | A6V | |
|---|---|---|
| Input voltage | 24V DC | 48V DC |
| Rated power | 50, 100, 133W | 50, 100, 200, 266W |
| Control mode | Position control, velocity control, torque control, fully closed control with external encoder or linear scale | |
| Encoder feedback | 23-bit absolute, serial | |
| Communication | USB, RS232, RS485 | |
| Network | EtherCAT, RTEX | |
| Inputs (multifunction type) | 5 multifunction inputs, 2 pulse inputs, 1 analog input, Modbus | |
| Inputs (network type) | 8 multifunction inputs | |
| Outputs (multifunction type) | 3 multifunction outputs, 1 analog output, A/B/Z-phase pulse output | |
| Outputs (network type) | 2 multifunction outputs, A/B/Z-phase pulse output, 1 alarm output | |
| Weight | 0.35kg approx. | |
| Dimensions (W x H x D in mm) | 89 x 30 x 180 | |

## Servo motor specifications:

| | | MSMF (low inertia) | | | | MHMF (high inertia) | | | | | MQMF (flat type) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Rated power | | 50W | 100W | 50W | 100W | 133W | 50W | 100W | 200W | 266W | 100W | 133W | 100W | 200W | 266W |
| Supply voltage | | 24V DC | | 48V DC | | 24V DC | 48V DC | | | | 24V DC | | 48V DC | | |
| Flange size | | ☐ 38mm | | | | ☐ 60mm | ☐ 40mm | | ☐ 60mm | | ☐ 60mm | ☐ 80mm | ☐ 60mm | ☐ 80mm | |
| Rotational speed (rpm) | Rated | 3000 | 3000 | 3000 | | 2000 | 3000 | | 3000 | 2000 | 3000 | 2000 | 3000 | 3000 | 2000 |
| | Max. | 5000 | 4600 | 6000 | | 3500 | 6500 | | 4500 | 3000 | 6500 | 3500 | 6500 | 5000 | 3500 |
| Torque (Nm) | Rated | 0.16 | 0.32 | 0.16 | 0.32 | 0.64 | 0.16 | 0.32 | 0.64 | 1.27 | 0.32 | 0.64 | 0.32 | 0.64 | 1.27 |
| | Peak | 0.48 | 0.95 | 0.48 | 0.95 | 1.91 | 0.56 | 1.11 | 2.23 | 4.46 | 1.11 | 2.23 | 1.11 | 2.23 | 4.46 |
| Motor length (without shaft)* | | 72mm | 92mm | 72mm | 92mm | 67.5mm | 53.5mm | 67.5mm | 67.5mm | 84.5mm | 56.2mm | 62.3mm | 56.2mm | 62.3mm | 74.8mm |
| Encoder resolution | | 23-bit absolute | | | | 23-bit absolute | | | | | 23-bit absolute | | | | |
| Brake | | with / without | | | | with / without | | | | | with / without | | | | |

* Without brake/oil seal

## Types:

| Supply voltage | Driver | | | Motor | | | |
|---|---|---|---|---|---|---|---|
| | Pulse | EtherCAT | RTEX | Rated power | Low inertia | High inertia | Flat type |
| 24V DC | MVDLN4CSF (Multifunction) | MVDLN4CBE | MVDLN4CNE | 50W | MSMF5ACL1☐2 | -- | -- |
| | MVDLN4CSG (RS485) | | | | | | |
| | MVDLN5CSF (Multifunction) | MVDLN5CBE | MVDLN5CBE | 100W | MSMF01CL1☐2 | -- | MQMF01CL1☐2 |
| | MVDLN5CSG (RS485) | | | 133W | -- | MHMF1ECL1☐2 | MQMF1ECL1☐2 |
| 48V DC | MVDLN4BSF (Multifunction) | MVDLN4BBE | MVDLN4BNE | 50W | MSMF5ABL1☐2 | MHMF5ABL1☐2 | -- |
| | MVDLN4BSG (RS485) | | | 100W | MSMF01BL1☐2 | MHMF01BL1☐2 | MQMF01BL1☐2 |
| | MVDLN5BSF (Multifunction) | MVDLN5BBE | MVDLN5BNE | 200W | -- | MHMF02BL1☐2 | MQMF02BL1☐2 |
| | MVDLN5BSG (RS485) | | | 266W | -- | MHMF2JBL1☐2 | MQMF2JBL1☐2 |

## Applications:



Medical technology, laboratories



Robots



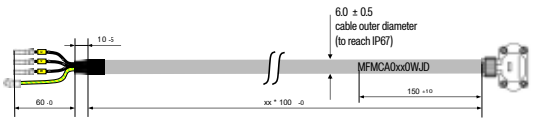
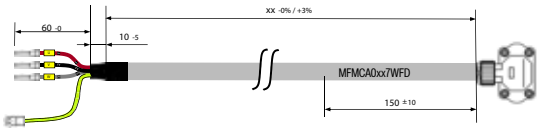
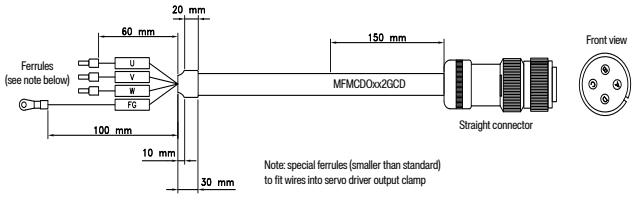
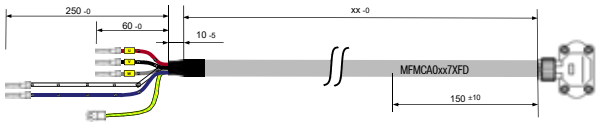
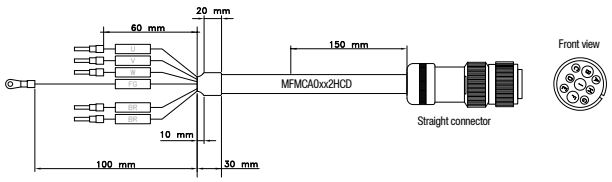
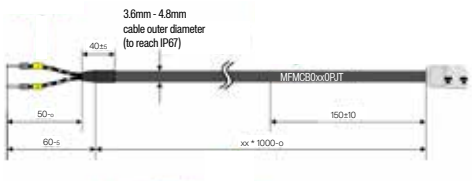
AGVs (automated guided vehicles in households and warehouses, lawnmowers, etc.)

☐ = Motor specification

| Oil seal | Brake | Shaft | |
|---|---|---|---|
| | | Round | With key-way |
| Without | Without | A | S |
| | With | B | T |
| With | Without | C | U |
| | With | D | V |

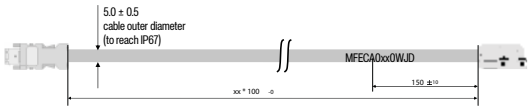
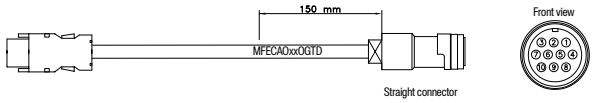
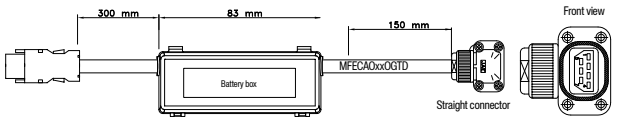
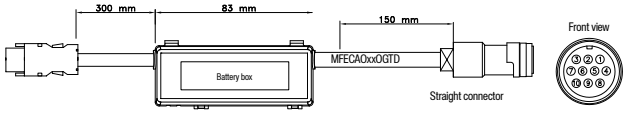
All dimensions are in mm

## Cables

| Motor cable MINAS A6 200V AC | | | | |
|---|---|---|---|---|
| For motors without holding brake | MFMCA0☐☐0WJD<br><br>(Please see also related brake cable: *) | MSMF | 50W–1kW |  |
| | MFMCA0☐☐7WFD | MHMF | 50W–100W |  |
| | MFMCA0☐☐0WFD-EU | MHMF | 200W–1kW | |
| | MFMCD0☐☐2GCD | MSMF,<br>MDMF,<br>MHMF | 1kW–2kW |  |
| For motors with holding brake | MFMCA0☐☐7XFD | MHMF | 50W–100W |  |
| | MFMCA0☐☐0XFD | MHMF | 200W–1kW | |
| | MFMCA0☐☐ 2HCD | MSMF,<br>MDMF,<br>MHMF | 1kW–2kW |  |
| *Brake cable | MFMCB0☐☐0PJT-EU | MSMF | 50W–1kW |  |
| | ☐☐ and xx in pictures = cable length (m) | | | |

All dimensions are in mm

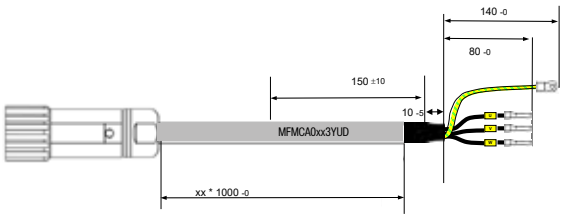
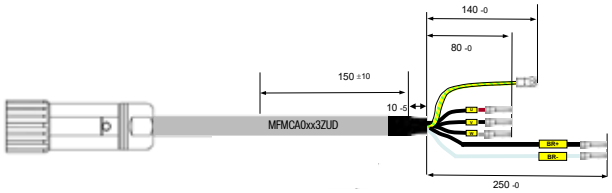
**Encoder cable MINAS A6 200V AC**

| | | | | |
|---|---|---|---|---|
| For motors with 23-bit incremental encoder | MFECA0☐☐0WJD | MSMF, MHMF | 50W–1kW |  |
| | MFECA0☐☐0GTD | MSMF, MDMF, MHMF | 1kW–5kW |  |
| For motors 23-bit absolute encoder (with battery box) | MFECA0☐☐0GJE | MSMF, MHMF | 50W–1kW |  |
| | MFECA0☐☐0GTE | MSMF, MDMF, MHMF | 1kW–5kW |  |
| | ☐☐ and xx in pictures = cable length (m) | | | |

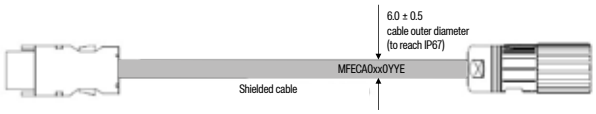
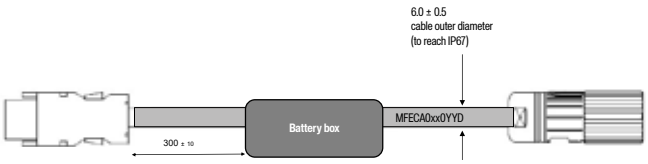
# MINAS A6 SERIES – ACCESSORIES

All dimensions are in mm

## Motor cable MINAS A6 400V AC

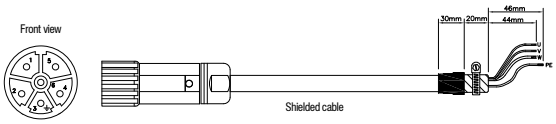
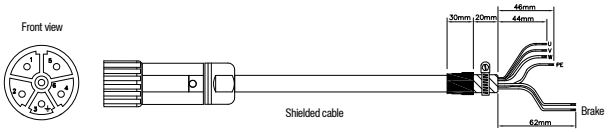
| | | | |
|---|---|---|---|
| For motors without holding brake | MFMCA0☐☐3YUD | 200W–1kW |   |
| | MFMCA0☐☐4YUD | 1kW–2kW | |
| | MFMCA0☐☐5YUD | 3kW–5kW | |
| For motors with holding brake | MFMCA0☐☐3ZUD | 200W–1kW |   |
| | MFMCA0☐☐4ZUD | 1kW–2kW | |
| | MFMCA0☐☐5ZUD | 3kW–5kW | |
| | ☐☐ and xx in pictures = cable length (m) | | |

## Encoder cable MINAS A6 400V AC & MINAS A6 Multi

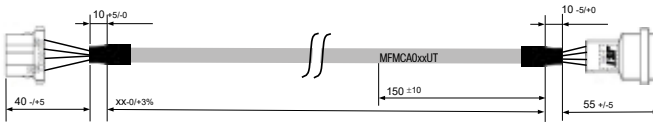
| | | | |
|---|---|---|---|
| For motors with 23-bit incremental encoder | MFECA0☐☐0YYE | 200W–5kW |   |
| For motors with 23-bit absolute encoder (with battery box) | MFECA0☐☐0YYD | 200W–5kW |   |
| | ☐☐ and xx in pictures = cable length (m) | | |

All dimensions are in mm

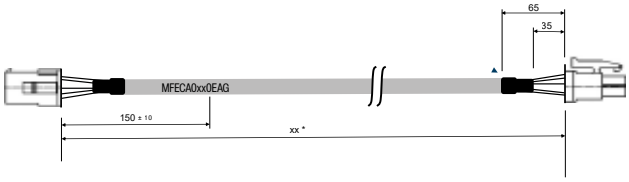
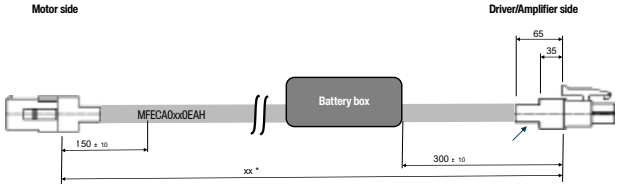
## Motor cable MINAS A6 Multi

| | | | |
|---|---|---|---|
| For motors without holding brake | MFMCA0☐☐0YUD | 400W–1kW |   |
| | MFMCA0☐☐1YUD | 1kW–1.5kW | |
| | MFMCA0☐☐2YUD | 2kW–5kW | |
| For motors with holding brake | MFMCA0☐☐0ZUD | 400W–1kW |   |
| | MFMCA0☐☐1ZUD | 1kW–1.5kW | |
| | MFMCA0☐☐2ZUD | 2kW–5kW | |
| | ☐☐ = cable length (m) | | |

## Motor cable MINAS A6V 24/48V DC

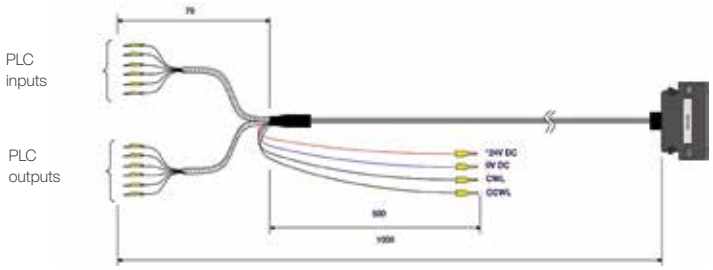
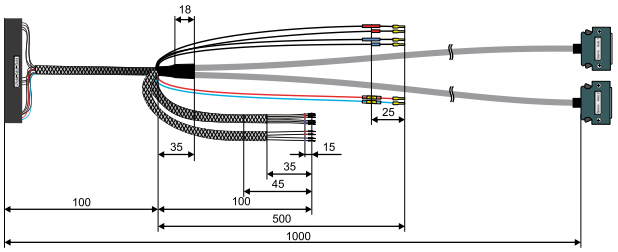
| | | | |
|---|---|---|---|
| For motors with/without holding brake | MFMCA0☐☐UT | 200/400W |   |
| | ☐☐ and xx in pictures = cable length (m) | | |

## Encoder cable MINAS A6V 24/48V DC

| | | | |
|---|---|---|---|
| For motors with 23-bit incremental encoder | MFECA0☐☐0EAG | 200/400W |   |
| For motors 23-bit absolute encoder (with battery box) | MFECA0☐☐0EAH-EU | 200/400W |   |
| | ☐☐ and xx in pictures = cable length (m) | | |

# MINAS A6 SERIES – ACCESSORIES

All dimensions are in mm

| Control cable (PLC – MINAS A6 servo driver), 200/400V AC | | | |
|---|---|---|---|
| For direct connections with FP series programmable controllers | FP0H,<br>FP0R | For 1 axis<br>DV0P0988WP-1<br>(PNP types) | PLC inputs<br>PLC outputs<br> |
| | FP7<br>positioning unit | For 2 axes<br>DV0P0976W1<br>(line driver)<br>DV0P0975W1<br>(transistor) |  |

## Other accessories:

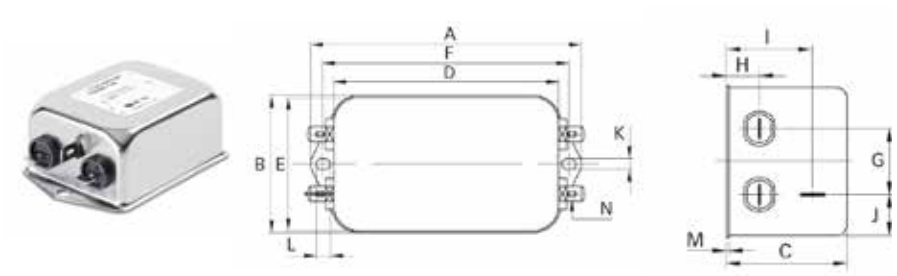
| | Product no. | Details/Comments/Dimensions | | | |
|---|---|---|---|---|---|
| Cables | **Control cable 200/400V AC** | | | | |
| | DV0P4360 | 50W–5kW | 50-pin | I/O cable X4, loose wires, 2m | |
| | DVOP4360P | 50W–5kW | 50-pin | I/O cable X4, loose wires, 2m, position control | |
| | DVOP4360V | 50W–5kW | 50-pin | I/O cable X4, loose wires, 2m, velocity control | |
| | DV0PM20024CAB020 | 50W–5kW | 8-pin | Communication cable X2, RS485, RS232, loose wires, 2m | |
| | DV0PM20025CAB020 | 50W–5kW | 8-pin | Safety function cable X3, loose wires, 2m | |
| | DV0P0800-EU | 50W–5kW | 26-pin | I/O cable X4, loose wires, 2m | |
| | **Programming cable 200/400V AC** | | | | |
| | CABMINIUSB5D | 50W–5kW | USB | | |
| Connector set | **Connector set for servo driver 200V AC** | | | | |
| | DV0P4350-EU | 50W–5kW | 50-pin | I/Os, X4 | |
| | DV0P0770-EU | 50W–5kW | 26-pin | I/Os, X4 | |
| | DV0PM20026-EU | 50W–5kW | – | External encoder connector X5 | |
| | **Connector set encoder, servo motor without holding brake 200V AC** | | | | |
| | DV0PM24581-EU | 50/100W | – | MINAS A6 MHMF, IP67 | |
| | DV0PM24582-EU | 200W-1kW | – | MINAS A6 MHMF, IP67 | |
| | DV0PM20035-EU | 50W-1kW | – | MINAS A6 MSMF, IP67 | |
| | DV0PM20036-EU | 1kW-2kW | – | MINAS A6 MSMF, MDMF; MHMF 1–1,5kW | |
| | DV0PM20036A | 1kW-2kW | – | Angled type; MINAS A6 MSMF, MDMF; MHMF 1–1,5kW | |
| | **Connector set encoder, servo motor with holding brake 200V AC** | | | | |
| | DV0PM20040-EU | 50W-1kW | – | MINAS A6 MSMF, IP67 | |
| | DV0PM20038-EU | 1kW-2kW | – | MINAS A6 MSMF, MDMF; MHMF 1–1,5kW | |
| | DV0PM20038A | 1kW-2kW | – | Angled type; MINAS A6 MSMF, MDMF; MHMF 1–1,5kW | |
| | **Connector set for servo drives 400V AC & MINAS A6 400V Multi** | | | | |
| | DV0PM14576-EU | 1kW–5kW | – | For cables used to connect motors and encoders | |
| Miscellaneous | **EMC filter 200V AC** | | | | |
| | FN2080-6-06 | 50W-750W | 1-phase | 250V AC | |
| | FN2090-10-06 | 1kW-1.5kW | 1-/3-phase | 250V AC | |
| | FS21238607 | 50W-750W | 1-phase | Footprint filter, 250V AC | |
| | FN3268-7-44 | 1kW-3kW | 3-phase | 400V AC | |
| | FN3268-16-44 | 4kW-5kW | 3-phase | 400V AC | |
| | DV0P1460 | 50W-22kW | 1-phase | Ferrite core, noise filter | |
| | **Braking resistors 200V AC** | | | | |
| | BWD250100 | 50W-100W | 1-phase | 100Ω, 100W, 600V AC | 110 x 80 x 15 (L x W x D in mm) |
| | BWD250072 | 200W-750W | 1-phase | 72Ω, 100W, 600V AC | |
| | BWD500035 | 1kW-1.5kW | 1-phase | 35Ω, 200W, 600V AC | 216 x 80 x 15 (L x W x D in mm) |
| | **EMC filter 400V AC** | | | | |
| | FN3268-7-44 | 1kW-2kW | 3-phase | 400V AC | |
| | FN3268-16-44 | 3kW-5kW | 3-phase | 400V AC | |
| | **Braking resistors 400V AC** | | | | |
| | BWD500150 | 1kW-1.5kW | 3-phase | 150Ω, 100W, 600V AC | 216 x 80 x 15 (L x W x D in mm) |
| | BWD500100 | 2kW | 3-phase | 100Ω, 100W, 600V AC | 216 x 80 x 15 (L x W x D in mm) |
| | BWD600047 | 3kW-5kW | 3-phase | 47Ω, 240(400)W, 600V AC | 216 x 80 x 30 (L x W x D in mm) |
| | **Braking resistors MINAS A6 Multi 400V AC** | | | | |
| | Motor design depending on application | | | | |
| | **Miscellaneous MINAS A6 Multi 400V AC** | | | | |
| | DV0PM24621-EU | USB license dongle “PANATERM for Safety” | | | |

## EMC filter

All dimensions are in mm

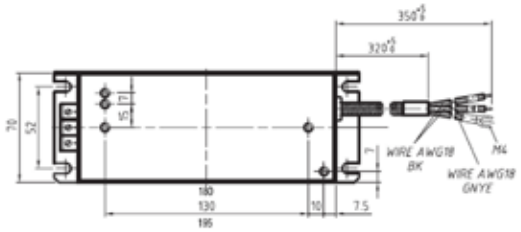
## 200V AC:

**FN2080-6-06 for servo driver MINAS A6 50–750W, 1-phase / FN2090-10-06 for servo driver MINAS A6 1–1.5kW, 1-phase**

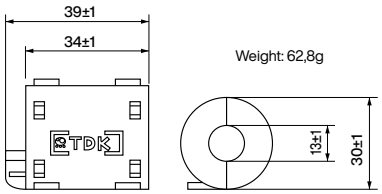



| Dimensions (mm) | FN2080-6-06 | FN2080-10-06 |
|---|---|---|
| A | 113.5 | 156 |
| B | 57.5 | 57.5 |
| C | 45.4 | 45.4 |
| D | 94 | 130.5 |
| E | 56 | 56 |
| F | 103 | 143 |
| G | 25 | 25 |
| H | 12.4 | 12.4 |
| I | 32.4 | 32.4 |
| J | 15.5 | 15.5 |
| K | 4.4 | 5.3 |
| L | 6 | 6 |
| M | 1 | 1 |
| N | 6.3 x 0.8 | 6.3 x 0.8 |

**FS21238607 for servo driver MINAS A6 50–750W, 1-phase**



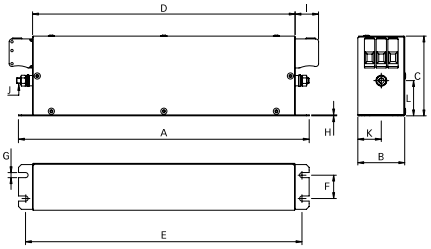

**DV0P1460 with ferrite core**




## 400V AC:

**FN3268-7-44 for servo driver MINAS A6 1–2kW, 3-phase / FN3268-16-44 for servo driver MINAS A6 3–5kW, 3-phase**

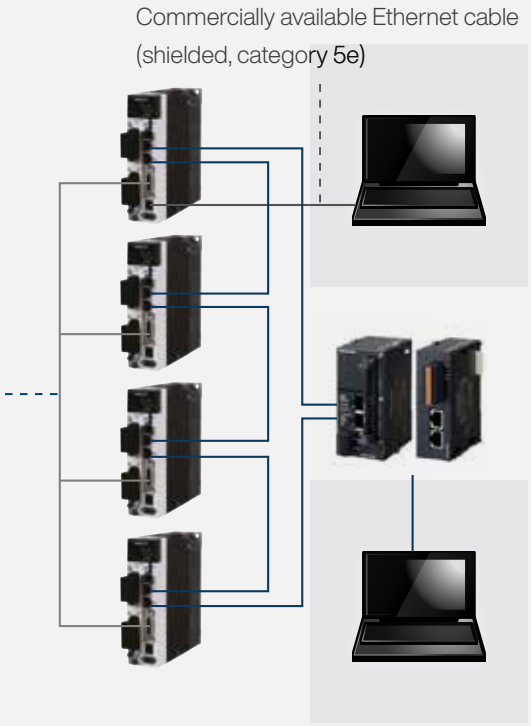





| Dimensions (mm) | FN3268-7-44 | FN3268-16-44 |
|---|---|---|
| A | 190 | 250 |
| B | 40 | 45 |
| C | 70 | 70 |
| D | 160 | 220 |
| E | 180 | 235 |
| F | 20 | 25 |
| G | 4.5 | 5.4 |
| H | 1 | 1 |
| I | 22 | 22 |
| J | M5 | M5 |
| K | 20 | 22.5 |
| L | 29.5 | 29.5 |

## RTEX – the multi-axis Ethernet servo system

The RTEX positioning units support MINAS A6N network servo drives. A mutually optimized system consisting of PLC and servo driver greatly simplifies installation and reduces time needed for design.




### The main advantages of the RTEX positioning units:

- **Unique:** Allows easy control of network servos with an ultra-compact PLC.
- Allows **highly accurate** control of multi-axis position control using high-speed 100Mbit/s communication.
- **Minimization** of wiring costs by using commercially available Ethernet cables.
- **Position control** of 4 or 8 axes for servo drivers with Ethernet (RTEX) interface.
- **Easy** configuration with the software Control Configurator PM instead of complex programming.
- Includes manual pulser input allowing support for **precision teaching**.

### System configuration

Panasonic's compact PLC FP0H can be easily expanded with up to 2 RTEX positioning units (max. 2 x 8 axes + 4 axes (CPU)).

| Product | Number of axes | Output type | | Product no. |
|---|---|---|---|---|
| Positioning units FP0H  | 4 | RTEX Ethernet | Electronic gear, electronic clutch, electronic cam control | AFP0HM4N |
| | 8 | | | AFP0HM8N |
| Control Configurator PM | For all RTEX units | | | AFPS66510 |

## Motion control libraries for Control FPWIN Pro (PLC)




The motion control library contains the most important function blocks, e.g.

- for relative or absolute position control
- and for home returns with linear axes.

Panasonic offers libraries for all motion control tasks.

### CPU Motion Control Library

Position control with FP series control units (FP0R, FP-X, FPXH, FP0H, FP7)

### PP Motion Control Library

- Positioning with PP motion control unit FP0H
- FP7: Library is included in the PLC programming software Control FP-WIN Pro.

### RTEX Motion Control Library

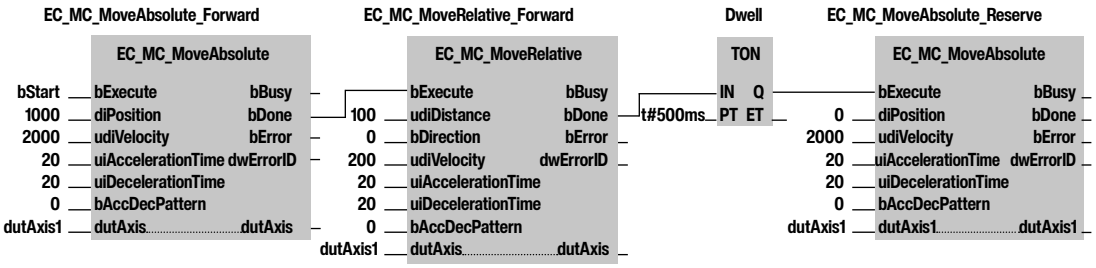
Positioning with RTEX positioning unit FP0H

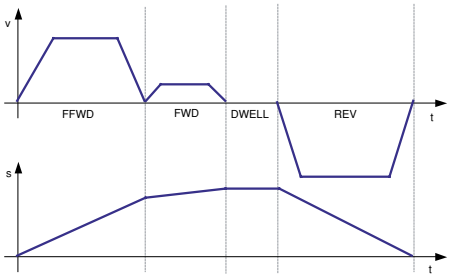
Simply download the software from the Panasonic website: https://industry.panasonic.eu/downloads

### Advantages of PLC programs using the Motion Control Library

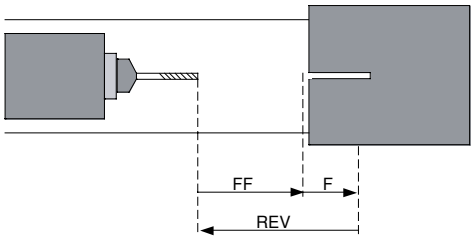
- **Free** – just download it from Panasonic's website
- **Simple** – easy programming and installation
- **Efficient** – ready-made function blocks, set parameters instead of writing complex programs
- **Compliant** – compliant with IEC 61131- 3
- **Universal** – hardware-independent (works for every Panasonic PLC)
- **Flexible** – expandable for up to 256 axes
- **Fast** – fast and easy commissioning (ready-to-use example programs)

**Function block from the MC_CPU_Library Motion library used for an application**




Time chart




Drilling setup

# Modbus RTU protocol

Field Bus

## Advantages

### Improved performance

- No position deviation caused by lost pulse signals (considerably improved reliability)

### Improved functions

- Editing parameters (moment of inertia, damping frequency)
- Servo data logging (collection of data related to the utilization factor and torque for remote monitoring of machines)

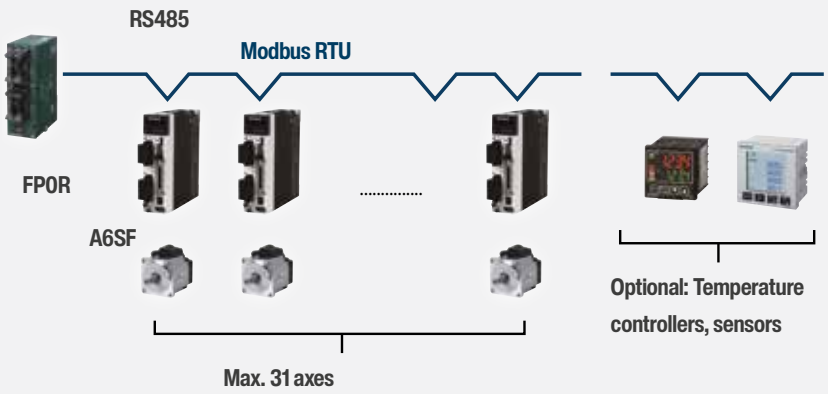
### Reduced cost

- Easy adding and removing of axes (simplified wiring thanks to bus system)
- Less time needed for commissioning, e.g. thanks to instantaneous registration of the axis position

## Features

- MINAS A6 series field bus
- Modbus RTU is an open, serial (RS232 or RS485) protocol based on a master/slave or client/server architecture.
- Widely used protocol due to its ease of operation and reliability
- Cost-effective solution for programmable controllers based on RS485
- Controlling a servo drive system based on the CANopen motion control profile CiA is possible

### Simple complete motion control solution with one Panasonic compact PLC




### Modbus RTU library for Motion Control



## Direct access to servo drive parameters from the PLC




### Libraries

**The libraries enable serial communication (RS232, RS485) between the FP series PLCs and servo drivers of the MINAS A6 series.**

- The communication protocols for the drivers are also included in the libraries.
- The libraries allow full read and write access to the parameters.
- They also record the status and position data of the axes.
- The RS232 interface (optional RS485) is already included with the FP series.
- With RS232 connections, the first driver can be used as a gateway to downstream drivers so that all drivers can communicate with the PLC.

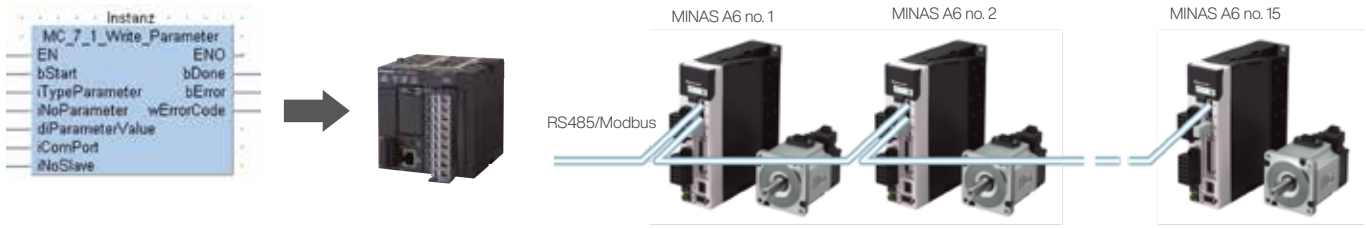
### Communication via RS232

**Communication software** **FP series PLCs**




### Communication via RS485

**Communication software** **FP series PLCs**




Download the software free of charge from Panasonic's website: https://industry.panasonic.eu/downloads

## Software Configurator PM for RTEX




### User-friendly, user-friendly commissioning

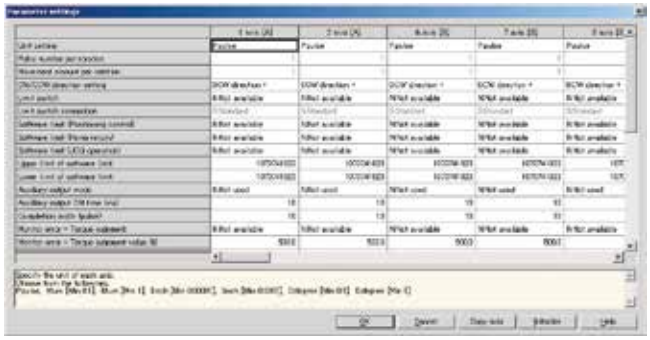
### The Configurator PM offers numerous configuration options

- Axis and parameter settings
- Data table creation
- JOG operations
- Home return
- Data monitor settings
- and other settings for easy test operation

### Parameter settings

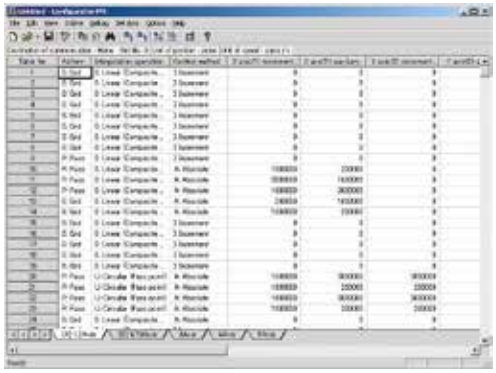
The details of the settings can be displayed in a table.
Details on how to create settings for each category are explained in the box below. Parameters can be copied between axes.

**Advantage:** In instances where many settings are shared among the axes, this can reduce the number of repeat inputs.



### Data table creation

- User-friendly data entry similar to an Excel sheet
- Data tables are displayed in an easy-to-understand manner
- Export of data tables to CSV format for document management systems, etc.
- Data ranges of a CSV file can be added to a table quickly with cut and paste
- A separate table for each axis (or each set of interpolation axes)

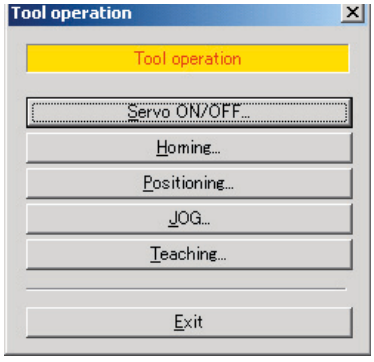


**Advantage**: Data is clearly arranged for fast easy handling

### Tool operations

Each axis can be operated by test sequences independently of the operation modes (PROG and RUN) of the RTEX unit (or the programmable controllers).
JOG operation and teaching can be carried out easily to index positioning points. Test operation is possible without having to create a rudder program.

**Advantage:** Trial operation in advance saves time



## Configuring servo drivers

PANATERM

### PANATERM configuration software

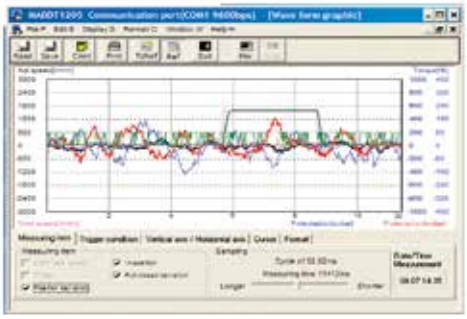
#### For MINAS AC servo motors & drive amplifiers

PANATERM assists users in making parameter and control settings as well as creating and analyzing data tables during operation. The software can be installed on any commercially available personal computer. The connection to the MINAS series is established via the USB port.



#### Setup and basic functions

- Auto-tuning
- Gain adjustment and inertia ratio measurement
- Line graph display
  The line graph diagram shows command and current velocity, torque, and the tracking error.
- Display of the absolute encoder settings
- Parameter setting
  After a parameter has been defined on the screen, it will immediately be sent to the driver. Frequently used parameters can be listed separately in a second display.



Line graph display

#### Monitoring function

Parameters and status can be monitored, e.g. operation mode, speed, torque, error and warning. overview of command/feedback pulses, load ratio, regenerative resistive load ratio and many more.



Monitor

#### Analysis of mechanical operation data (frequency analysis)

Frequency characteristics of a machine can be measured for display in a Bode diagram.

Simply download the software from Panasonic's website: https://industry.panasonic.eu/downloads

## Software for designing drives




### M-SELECT software

M-SELECT is a software program to help you select the correct motor capacity and servo driver from Panasonic's MINAS series. Find the optimal type of motor with regards to the mechanical layout and the dynamic requirements. It is a very valuable tool for mechanical engineering as it also provides CAD data in 2D and 3D. The software offers a complete analysis and detailed usage instructions for the MINAS series in all sizes.

### Selecting the motor capacity in just four steps:

**1. Select mechanical parts and input their parameters (figure 1)**
The user can select parts from a database with all mechanical standard parts (gears, coupling, spindle axis, etc.).

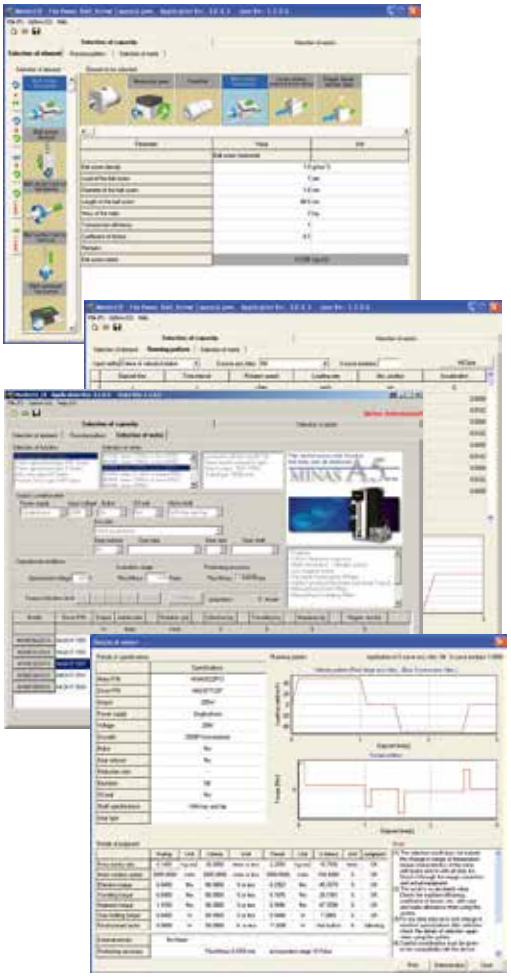
**2. Determine the motion profile (figure 2)**
Display and determine speed, position and ramps, etc.

**3. Select the correct motor series (figure 3)**

- 1- or 3-phase
- Input voltage
- Specify torque, etc.

The software calculates the parameters for the selected series. The various criteria are evaluated with OK or NG (not good).

**4. Result (figure 4)**
Check and print result



Simply download the software from Panasonic's website:
https://industry.panasonic.eu/downloads

# QUICK START GUIDES FREE!

## Quick start guides

The Quick start guides are intended to help you set up a MINAS servo drive system.

They are based on information from the MINAS series manuals and the practical experience of our engineers.
Step-by-step instructions will guide you through connecting a PLC to a MINAS servo driver and setting the most important parameters in the PC configuration software PANATERM.

**Available Quick start guides in our download center (also in other languages):**

Easy download from the Panasonic website: https://industry.panasonic.eu/downloads

**QS2000, Position control by pulse and direction signals (MINAS A5/A5E/A6SG/A6SF)**

**QS2001, Position control by block operation using input signals (MINAS A6SG/A6SF)**

**QS2002, Position control by block operation using Modbus commands (MINAS A6)**

**QS2003, Position control in EtherCAT networks (MINAS A5B/A6B)**

**QS2004, Position control using RTEX (MINAS A5N/A6N)**

**QS3000, Velocity control (MINAS A5/A6F)**

**QS4000, Torque control (MINAS A5/A6)**

**QS5000, PANATERM – Trial run**

**QS5001, PANATERM – Auto-tuning**

**QS5002, PANATERM – Fit gain tuning**

**QS10000, Position control with Beckhoff host controller over EtherCAT (MINAS A6 Multi)**

**QS10001, PANATERM – Ethernet over EtherCAT (EoE) (MINAS A6 Multi)**

**QS10002, PANATERM for Safety – Safe Torque Off (STO) (MINAS A6 Multi)**

**QS10003, PANATERM for Safety – Safe Stop 1 (SS1) (MINAS A6 Multi)**

**QS10004, PANATERM for Safety – Safe Speed Monitoring (SSM) (MINAS A6 Multi)**

**QS10005, Position control with Omron host controller over EtherCAT (MINAS A6 Multi)**

**QS10006, Position control with TRIO host controller over EtherCAT (MINAS A6 Multi)**

More Quick start guides for the MINAS series are being prepared.

# MOTION CONTROL COMPREHENSIVE SOLUTIONS

### MINAS A6 series servo drives

Highly dynamic servo drives with state-of-the-art technology. Large power range (50W to 15kW) combined with a light-weight and compact design. Innovative functions for damping resonance frequencies and to eliminate vibration tendencies. Multiple control features such as pulse, analog, and network technology in real-time communication (100Mbit/s).
With the MINAS A6V series (24V or 48V DC input voltage) and the MINAS A6 Multi in book size format, Panasonic rounds off its portfolio of drive technology products.

3 Year Warranty

### FP series PLCs

The PLC comes already equipped with the functionality required for position control tasks. FP0R is capable of controlling up to 4 axes independently. The FP-XH has an integrated Ethernet-based communication bus (RTEX), and the CPU of the FP0H can be expanded with modular positioning units to control up to 20 axes. The modular FP7 series can control 64 axes independently or synchronously in the network.



### Motion control libraries, configuration and programming software

The PLC programming software Control FPWIN Pro (compliant with IEC 61131-3) and the free configuration software PANATERM, M-SELECT and GM Programmer shorten the time required for commissioning. In addition, you can download motion control libraries for free including special function blocks, with which complex positioning tasks can be solved quickly and efficiently.

### HM 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 operators. Panasonic's innovative 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 terminal to a color 21" display for sophisticated applications.

### Motion Controller GM1

Motion controllers offer a compact solution for complex motion control applications. Panasonic Industry presents the first motion controller in its comprehensive lineup: the GM1 combines features of motion functions with the functionality of a PLC like a positioning unit, a network unit, an I/O unit, and a high-frequency counter in one compact controller. The space-saving "all-in-one" solution reduces the occupied space in the cabinet and allows for response times to be as low as 0.5ms. For the integration in an Industry 4.0 environment, the GM1 motion controller is equipped with OPC UA client and server functions.

# IN Your Innovation

## Motion controller
## GM1 series

**Combines programmable logic and motion control in one device (supports EtherCAT/RTEX communication protocols)**

- **High-speed response for fast data exchange and networking**
  Shortest command cycle: 0.5ms
- **Synchronous control for complex multi-axis systems**
  EtherCAT type: max. 32 axes
  RTEX type: max. 16 axes
- **All in one – motion, network, I/O**
  General-purpose I/O: 16 inputs and 16 outputs
  High-speed counter: 2 channels
- **Two independent Ethernet connectors**
  for e. g. EtherNet/IP, CODESYS protocol, OPC UA, Modbus-TCP
- **Easy programming**
  Configuration software GM Programmer based on CODESYS (compliant with IEC 61131-3)

RTEX type

EtherCAT type



Panasonic
INDUSTRY

| Sales region | Telephone number |
|---|---|
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