MEIDEN

Quality connecting the next

Electric Components for Motor-powered Vehicles

E c o n o m i c a l C O N t r o l l e r

Helping Motor-powered Vehicles Going AC

Since the 1960s, Meidensha Corporation (“MEIDEN”) has developed chopper control equipment for battery-operated forklift trucks and related motors.
In recent year, MEIDEN was among the first to offer the products necessary for such Motor-powered vehicles going AC and has many supply records.
Draiving on its "advanced motor control technology" resources as proven by the top market share of such products, we will continue to offer you our safe, secure, and high-quality Economical Controller.

Features

Top share in Japan markets:

We have many supply records of motor controllers for battery-operated forklift trucks.
For more than ten years, we have supplied AC motors and controllers for forklift trucks in japan markets. We are keeping the top share in sales in Japan markets.

(Note) Products of forklift truck makers are excluded.

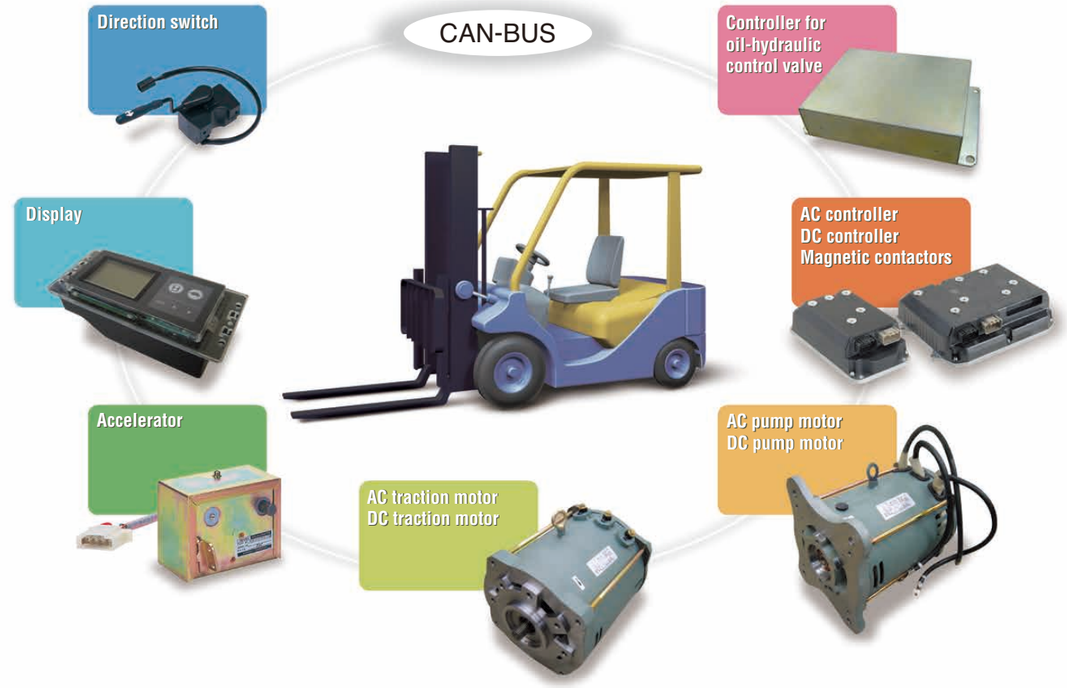
High reliability:

Considering rigorous operating environments, we placed the reliability as top design factor. Each product went through various evaluation tests taking into account of the applicable conditions. We provide the high reliability products.

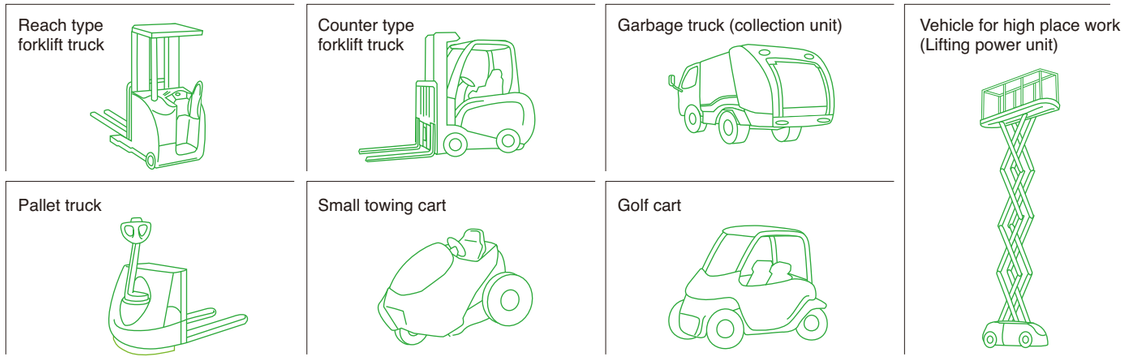
Meet the customizing needs:

In addition to standard products, we have know-hows to meet for various customizing needs of the customers and we parsue the best product experiences for the customers.

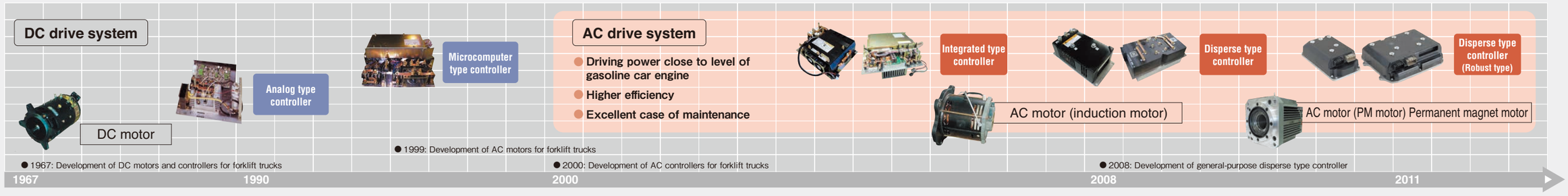
Product Lineups



Motor Drive Applications



List of technical achievements



Controller

AC400 Series

The AC400 Series involves the latest AC motor controllers featuring compact design and high efficiency. Two types, Type S and Type L, are available, and you can chose according to capacity.

Type S

Type L

AC400 Series / Product Outlines

- This is a high-efficiency AC controller to be used for motor-powered vehicles such as electric forklift trucks using low-loss MOS FETs .
- With increased IEC international Protection (IP) level, this equipment can easily be incorporated in motor-powerd vehicles.
- There are four series. Two types of current capacities (small/large capacity) and two types of battery voltages (48V/72V) are available. It provides wider application range, ranging from small to large motor-powerd vehicles.

AC400 Series / Control Functions

Motor control	Feasibility of application to IM/PM motors (vector control)
	Regenerative braking (accelerator OFF regeneration, brake pedal regeneration, direction regeneration)
	Inching control (Reduction of torque with simultaneous actuation of accelerator and brake)
	Slope descending restraint control
	Operation enabled with a signal input (pulse, analog) for oil-hydraulic power steering during hydraulic motor control
Control functions	System structuring possible (operation enabled with a direct connection of signals for accelerator, etc.) without master controller (vehicle management controller)
	Function of residual battery power meter available (BDI control)
	Driving output of magnetic brake coils
Security and protective functions	Independent operation enabled even in the case of CAN line error (in safe cases)
	Operation (motor, controller main circuit) of temperature detection and protection (reduced output)
	Operation to reduce output when battery voltage is lowered
	Protection against a sudden operation change in the case of motor revolution sensor breakdown
	Pitching control (Restraint control for vehicle wobbling during running)
	Various self-diagnostic protections and error message data communication (CAN communications)
Communication functions	Feasibility of parameter (relating to operational feeling) adjustments by means of CAN line
	Feasibility of internal program rewriting by means of CAN line

AC400 Series / Features

Can work with IM and PM motors;

This is a motor controller applicable to general-purpose industrial vehicles. The standard setting is made for IM (induction motor) control. With optional setting, it can work with PM (permanent magnet) motors.

Compact design:

This equipment is still compatible with Meidensha conventional products (Type S) in terms mounting design. Yet, the volumetric size is reduced to about 75% of conventional model.

Self-diagnostic feature:

This product is provided with a self-diagnostic function. With the aid of an on-board LED display, error indications can be given without using any other special diagnostic tools. Diagnostic data can also be transmitted through the CAN line. The following items can be checked by the self-diagnostic function.

Source voltage error | Accelerator VR check for disconnection and short-circuiting | Overheat detection | Main circuit open/short detection | Vehicle speed sensor breakage detection | etc.

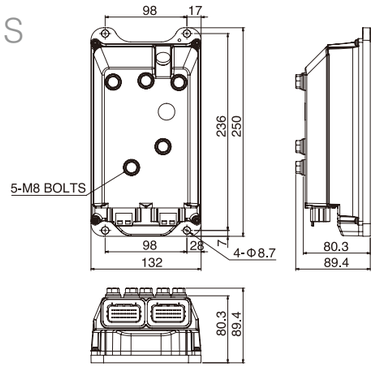
Can customize

If requirement characteristics of voltage, capacity, etc., are within the specification range, and by tuning this product can flexibly work with motors made by other suppliers. It best works with Meiden motors and it could provide the best performance.

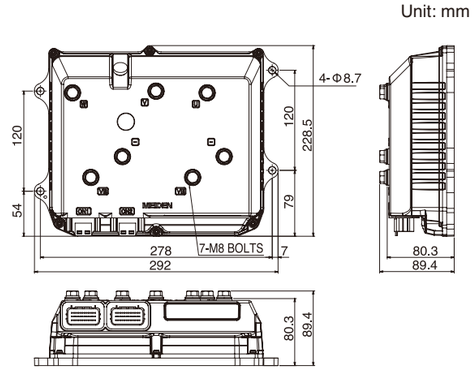
AC400 Series / Outline Drawing

Unit: mm

Type S



Type L



AC400 Series / Specifications

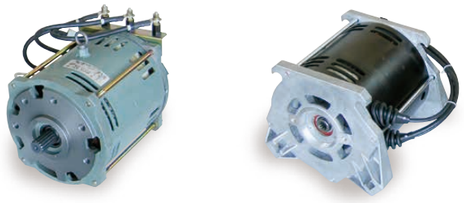
	AC400-S		AC400-L	
Battery voltage	48 V (36 V)	72 V & 80 V	48 V (36 V)	72 V & 80 V
Max. current [3-minute current ratings, base temperature 80°C or below]	330Arms	250Arms	500Arms	370Arms
Dimensions / weight (without terminal bolts)	W132.0 × H80.3 × D250.0mm / 2.4kg		W292.0 × H80.3 × D228.5mm / 3.8kg	
Applicable motor / motor frequency	3-phase induction motor / 0~250Hz			
Control mode	Speed, torque control			
Operating ambient temperature Storage temperature	−20℃ ~ +40℃ (starting possible at −40℃) /−40℃ ~ +85℃			
Sealing	IP54			
Cooling system	Heat radiation to vehicle counterweight / Forced air-cooled (optional: heat sink, fan)			
Installation place	Inside the vehicle cabin (freedom from roughness on mounting surface and application of heat dissipation grease)			
Communication	CAN-BUS, RS232C			
Standard	Conformance to UL583 (acquired for the vehicle as a whole, not for the controller alone) EN1175-1			

Motors for Motor-Powered Vehicles

* Applicable only to mass-produced products.

Among motors for electric forklift trucks, we are a top producer in Japan (in production volume) and receive the high product review on reliability from the market.

AC motor:

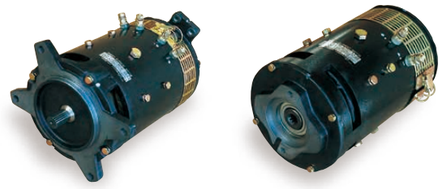


Traction motor　　Pump motor

AC motor for forklift truck

- Wide product range from IM motors to PM motors
- Special design to cope with customer specifications
- Best matching with our controllers
- Production ability applicable to mass-produced products
- Individual designing policy conforming to each customer's specifications

DC motor:



Traction motor　　Pump motor

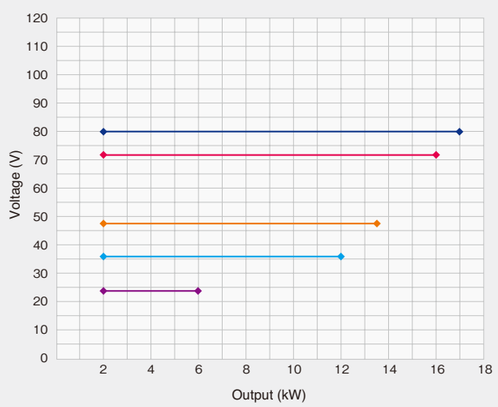
DC motor for forklift truck

- Optimal product design for motor-powered vehicles based on past achievements for motors for forklift trucks
- Improved commutation performance with the use of low-friction, long-life brushes and molded commutator with good safety factor
- Improved connection reliability resulting from the adoption of our TIG welding technique for all models in order to ensure connection between armature winding and commutator
- A variety of product lineups to meet customer requirements

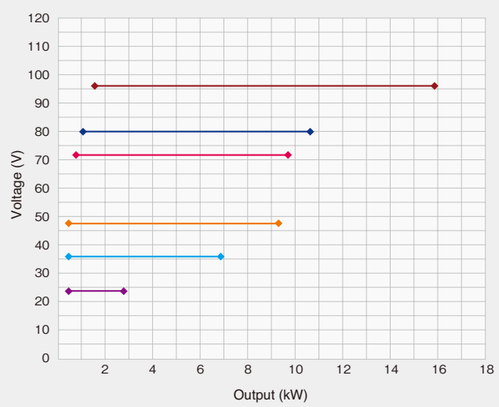
Production Range

* Applicable only to mass-produced products.

Production range for AC motors [60-minute rating]



Production range for DC motors [60-minute rating]



Indicators and others

* Applicable only to mass-produced products.

To meet the customer's application needs, we provide the various peripheral units.

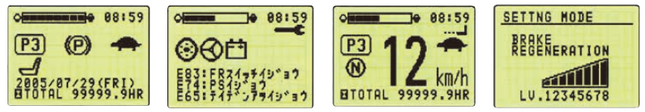
Display: 128×64-dot monochromatic LCD display

* Applicable only to mass-produced products.

- 4 display modes conforming to the status of a vehicle (run, stop, errors, setup)
- Vehicle parameter setup enabled
- Calendar functions incorporated
- CANbus communication possible with Meidensha's applicable controller
- Contents of display: Traction speed, residual battery power, work time, traction distance, error info, etc.

4 display modes conforming to the status of a vehicle

■ Stop　■ Error　■ Run　■ Setup mode



Specifications

Item	Specifications	Remarks
Indicator	128×64 full-dot monochromatic LCD module (STN)	
DI/O	Operation switch input	
	External input (key switch, battery electrolyte, etc.)	
	External output (alarm buzzer, etc.)	
Source voltage	Battery DC 38~48V	Power is picked up from a mid-point tap for 72V.
Operating environment	On forklift truck	
	Operating ambient temperature	
	Operating ambient humidity: 90% RH max. at 40°C	
Overseas standards	Conformance to UL583	

Accelerator:

* Applicable only to mass-produced products.

Two types of tread-on type and manual operation type are available.

For the tread-on type, a potentiometer and two micro-switches (detection of two positions: AC1 for start of tread-on and AC2 for end of tread-on) are incorporated.

Tread-on type accelerator

Manual operation type accelerator

Direction switch:

* Applicable only to mass-produced products.

Various switches are available for forward/backward movements, auxiliary machines, warning horns, and power steering.

Direction switch
(horn switch provided)

Direction switch
(horn switch not provided)

Magnetic contactor:

* Applicable only to mass-produced products.

Contact operation: Hinge type

- MY: 100A continuous
- MZ, MA: 150A continuous

MY11M

MZ11A

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Overseas Offices & Group Companies

China
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MEIDEN HANGZHOU DRIVE SYSTEMS CO., LTD.
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Germany
MEIDEN EUROPE GmbH.
TRIDELTA MEIDENSHA GmbH.

The United States
MEIDEN AMERICA, INC.
MEIDEN TECHNICAL CENTER NORTH AMERICA LLC

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