

Meeting the Demands of Compact or In-House Built Robots

Hybrid Control System

α STEP AZ Series

A Compact Hybrid Control System with Built-In Absolute Sensor to Meet the Needs of Manufacturing Facilities

The need for robots that can replace repetitive tasks is increasing. As a result, there has been more interest in designing robots to do this work while incorporating requirements to make robots smaller.

The α STEP AZ Series is a compact Hybrid Control System with a built-in mechanical sensor that allows for the configuration of a battery-free absolute system.

It provides an answer to the expanding needs for downsizing and fabrication of robots.

Common Robotic problems:

- A **smaller** robot would be better
- Making adjustments to the robot is **tedious** and difficult
- Creating a simple, single function **robot** is time consuming

The AZ Series is Ideal for Creating Simple Compact Robots!

POINT
1

Allows Compact Configurations

Battery-free absolute sensor contributes to compactness

POINT
2

Can Be Used Safely for Long Periods

On-board functions increase operational safety and stability

POINT
3

Good Responsiveness and Easy Adjustment

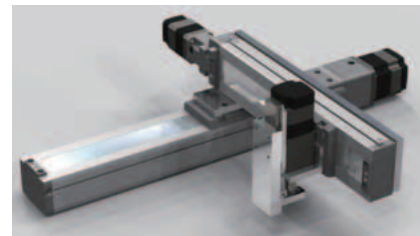
Hybrid control decreases adjustment work

POINT
4

Reduces Design Time

Wide variety of actuators equipped with **AZ** Series

A Wide Range of Robots Can Be Created to Match Any Need

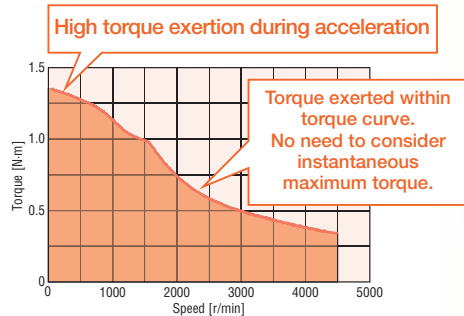


The AZ Series is Ideal for Creating Small Robots

Improved Operational Safety and Stability

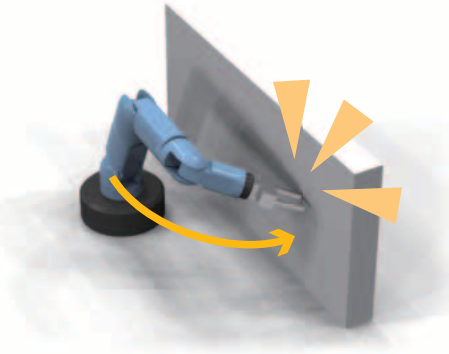
No Excessive Torque

This Hybrid Control System torque curve is ideal for quick starting and stopping. Peak torque limiting is possible.



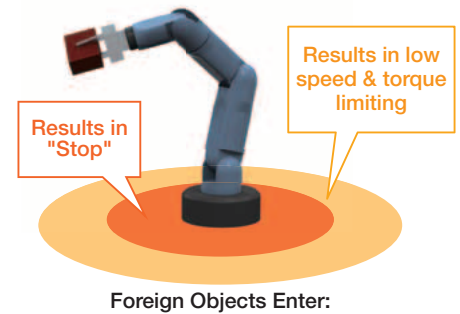
Pre-Alarm Abnormality Detection/Stop

Use the torque and position information to predictively detect abnormalities prior to an alarm. Use of the output signals allows for the system configuration for an instant stop.



Control Speed & Torque by Operation Area

If signals based on the information from external sensors are input, it is possible to switch operations to previously determined torque and speed values.

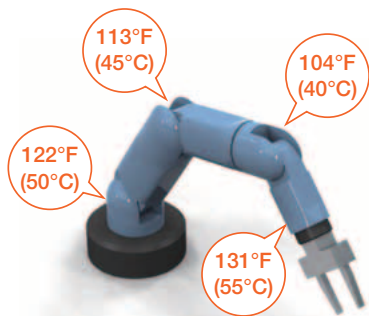


Motor Status Monitoring and Collection

By setting threshold values in advance, the status from the feedback can be used to output a signal when the threshold value is exceeded. This can be used to increase the equipment's safety and for preventative maintenance.

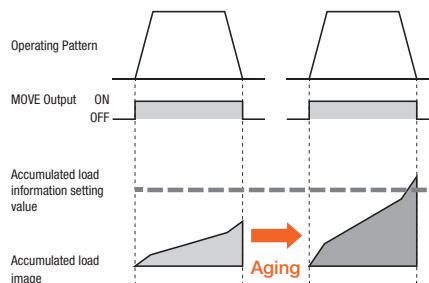
Motor Temperature Monitor

Even if the robot is covered by a case, real time temperature feedback and monitoring is possible.



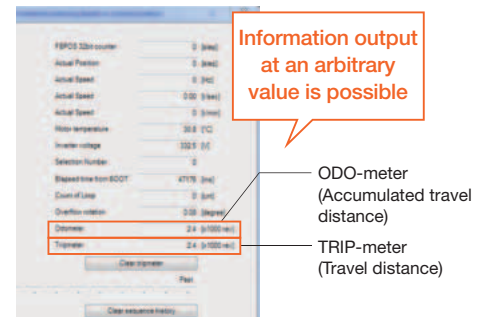
Accumulated Load Monitor

In addition to monitoring the instantaneous load factor, the load factor area for a single motor operating pattern can be understood and detected as a value, making it possible to understand long-term load increases as a result of deterioration over time.



ODO/TRIP Monitor

The accumulated number of rotations can be monitored, just like the instrumentation on a car. An information signal can be output when a set threshold has been exceeded. This can be used for maintenance and other purposes.



Supports Multi-Axis Interpolated Operation

Interpolated operation is possible by combining pulse input type drivers or various FA network compatible multi-axis drivers.

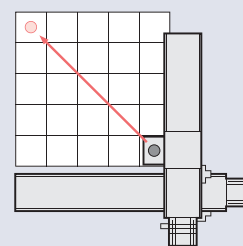


Network Compatible Multi-Axis Driver

*Only DC power supply input type products



Interpolation Operation



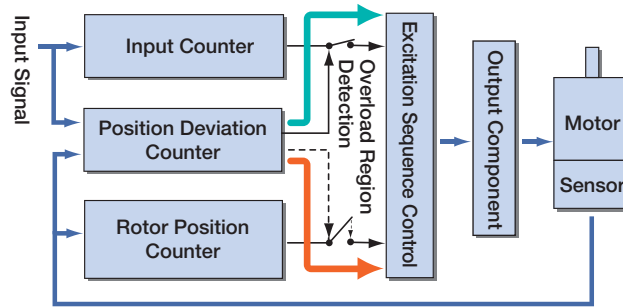
Multi Axis robot



SCARA robot

Open Loop Performance + Closed Loop Control = Hybrid Control System

αSTEP motor units have a built-in rotor position detection sensor. These are hybrid control motors, which combine the advantages of both open loop performance and closed loop control. It provides high response operation synchronized with commands using open loop control during normal conditions. In an overload condition, it switches immediately to closed loop control to correct the position.



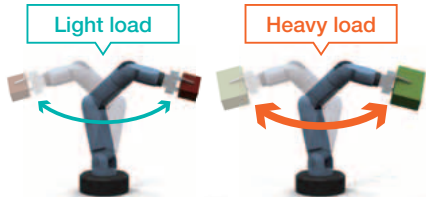
Normal Condition
Motor is controlled in open loop mode like a stepper motor.

Overload Condition
The closed loop mode is engaged to maintain the positioning operation.

Rotor Position Counter:
Indicates the excitation sequence that would generate the max. torque for a given rotor position.

Nimble Movement & Tracking for Load Fluctuations

With no time lag for commands, the responsiveness of open loop control allows for nimble movement. Severe load fluctuations are handled with closed loop control.



Motor Status is Always Known

The motor's status is constantly monitored through the use of the ABZO sensor built into the motor. Abnormalities can be detected and handled.

- Normal** Torque monitor
Load factor monitor
- Change** Warning output
Information output
- Abnormality** Alarm Output

Gain Adjustment Not Required

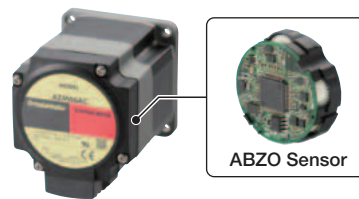
Even though it provides fast responsiveness, because open loop control is normally used, no gain adjustments are necessary.



<ABZO> Battery-Free Absolute Sensor Installed

Because it is an absolute system, external sensors such as a home sensor can be reduced, which contributes to reduced wiring and a compact configuration.

No battery for data saving is required because the <ABZO> mechanical multi-turn absolute sensor is used. There's no need to worry about the cost, problems or maintenance which a battery requires.



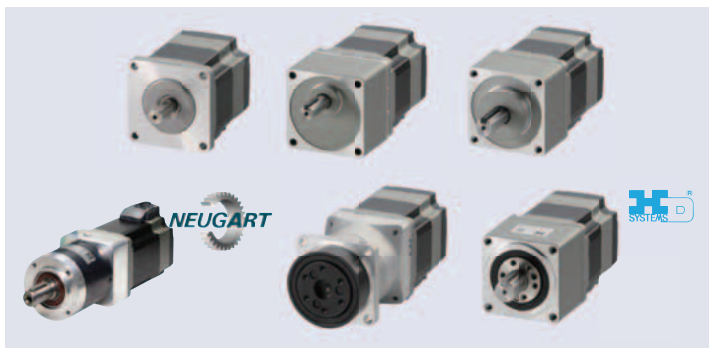
No battery backup or home sensor required



Large Variety of Frame Sizes, Gear Types and Actuators Available

Frame sizes start as small as 20 mm (0.79 in.), with geared types starting at 28 mm (1.10 in.) including planetary gear and harmonic gear types.

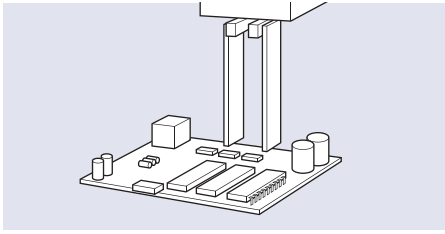
In addition, the **AZ** Series actuator products uses the **AZ** Series driver and motor Hybrid Control System, providing common control characteristics.



The Use of End Effectors is Growing

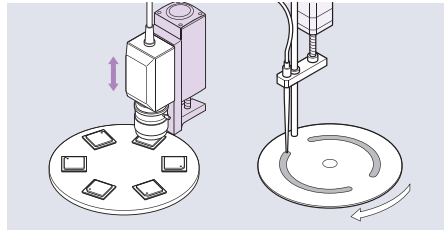
Because the **AZ** Series includes small, light motors, they are used in a broad selection of end effector applications.

Application Examples



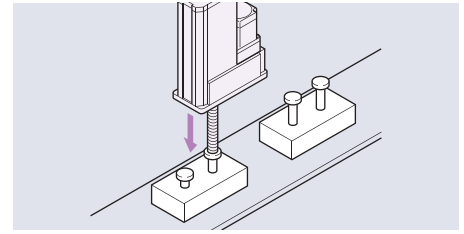
Chuck

Push (holding force) control, torque limiting



Vertical Operation of Cameras Dispensers

Accurate focus adjustment, control for minute discharge amounts, holding force



Screw Tightening Press Fitting

Torque control, signal output when set torque reached during tightening

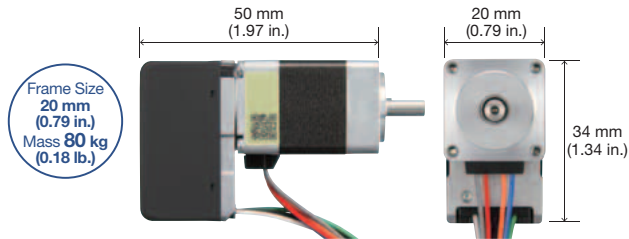
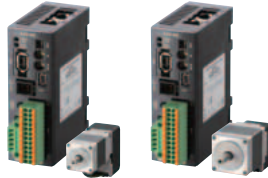
Compact & Light Weight Motors with the Battery-Free Absolute System

Compact Product Line

(DC power input)

Frame size: 20 mm (0.79 in.)

Frame size: 28 mm (1.10 in.)



Frame Size
20 mm
(0.79 in.)
Mass 80 kg
(0.18 lb.)

Geared and Linear Drive Actuators with the Battery-Free Absolute System

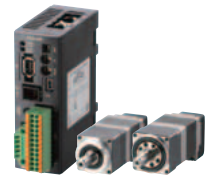
Compact Geared Product Line

(DC power input)

Frame size:

PS geared type □28 mm (1.10 in.)

Harmonic geared type □30 mm (1.18 in.)



Compact Linear Actuator

DRS2 Series

Frame size – Stroke

□42 mm (1.65 in.), 40 mm (1.57 in.)

□60 mm (2.36 in.), 50 mm (1.97 in.)



Built-in Controller Type Drivers are also Recommended

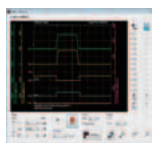
● With this driver type, the operating data is set in the driver, and is then selected and executed from the host system.

● Easy data setting and monitoring is possible via data setting software. (Software is available for free download)

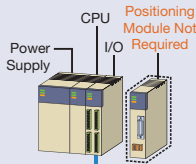
Setting Operating Data Changing Parameters

Data Setting Software
MEXE02

Setting using RS-485 communication is also possible.

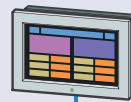


When Controlling with I/O



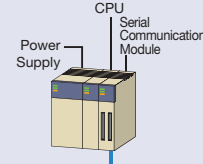
I/O

When Controlling from Computer or Touch Screen



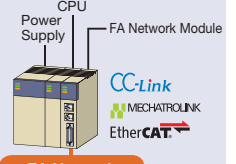
Modbus (RTU)

When Controlling with Serial Communication



Modbus (RTU)

When Controlling with FA Network



FA Network

Network Converters

RS-485



Because the driver has the information necessary for motor operation, the burden on the host PLC is reduced. The system configuration when using multi-axis control has been simplified.

Setting can be done by data setting software or RS-485 communication.

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