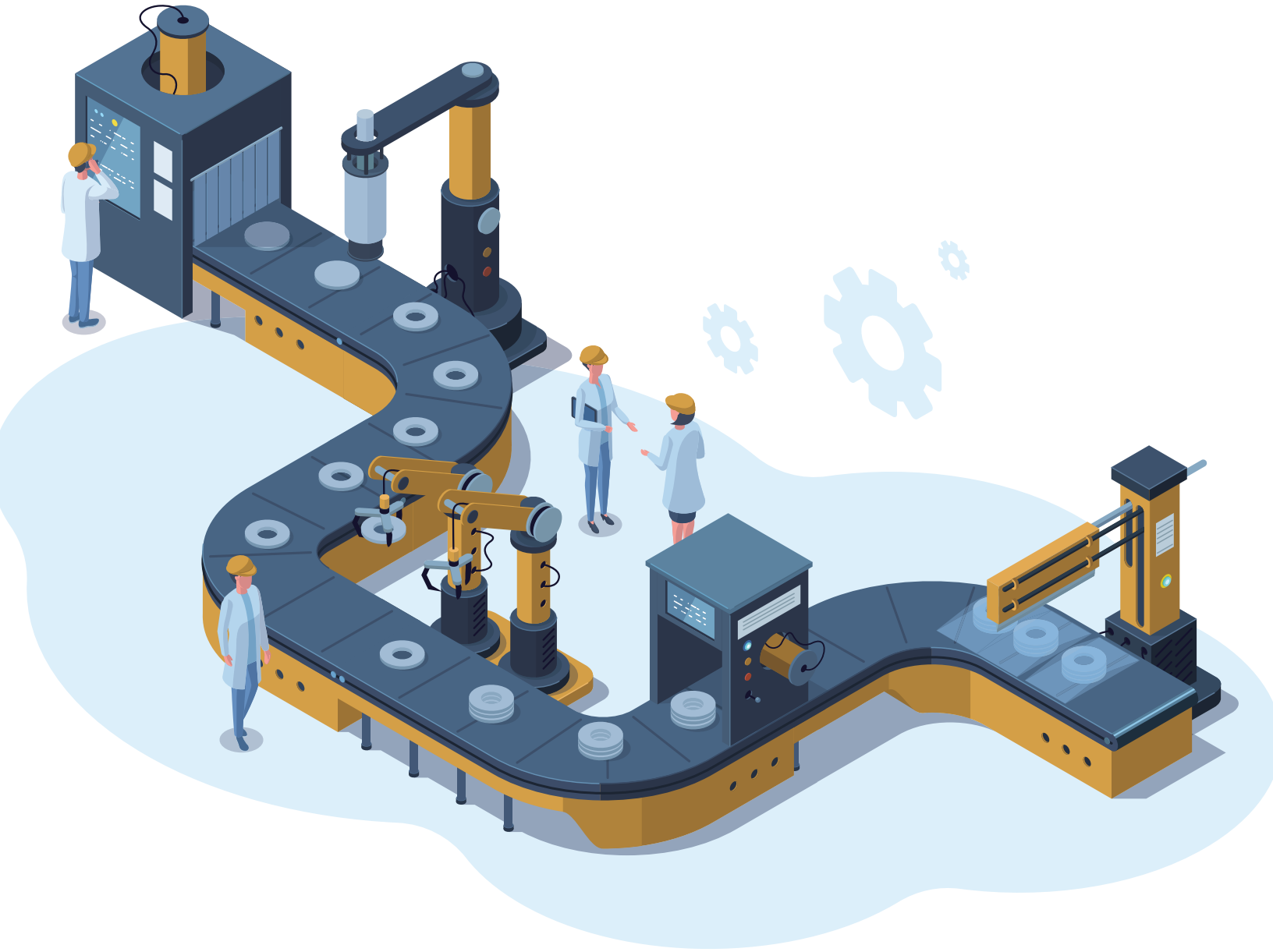
Oriental motor

SPEED CONTROL

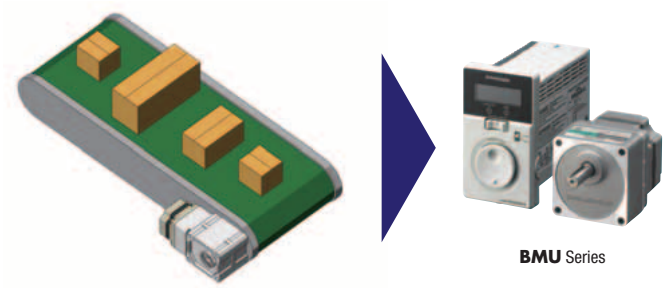


Brushless DC Motors & AC Motors

Simple or Advanced Speed Control

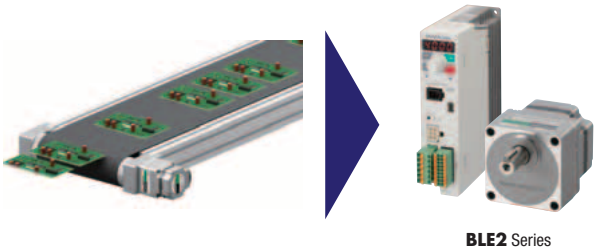
For applications where variable speeds are necessary, typically an AC motor with an inverter or brush motors are used. Brushless DC motors are an advanced option due to their wide speed range, high efficiency, closed-loop speed regulation, and long maintenance-free life.
Speed can be controlled by built-in potentiometer, external analog voltage, digital setting, or by network command. Gearhead configurations to meet specific requirements, designs, and budgets are available. Common variable speed applications and their recommended motion solutions are outlined below.

Conveyor with Variable Loads



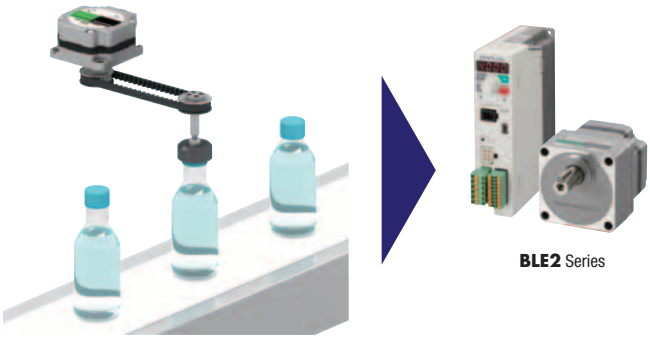
Speed Stability can be Maintained with Flat Torque

Conveyor with Multiple Speed Settings



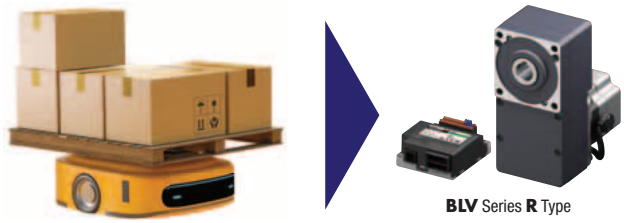
Speed can be Slowed Down to Pass Through Specific Processes and Sped Up to Increase Throughout

Torque Sensing



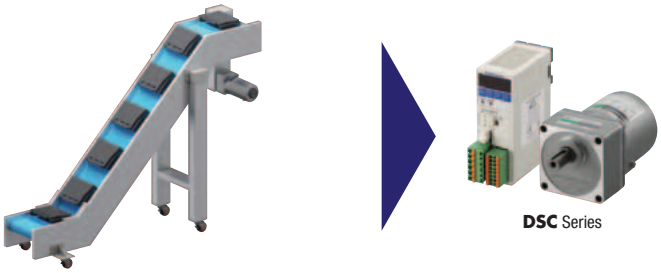
Torque Limiting Functions

AGV & AMRs



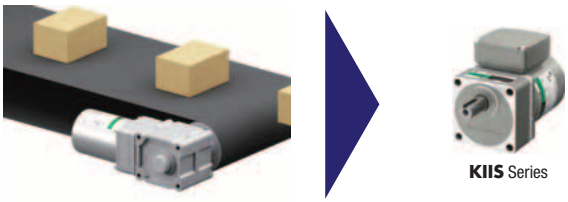
Hollow Shaft Flat Gearheads and Compact Drivers are Ideal in Low Floor Designs

Inclined Conveyor



Deceleration Control and Electromagnetic Brake

Conveyor with Adjustable Speed

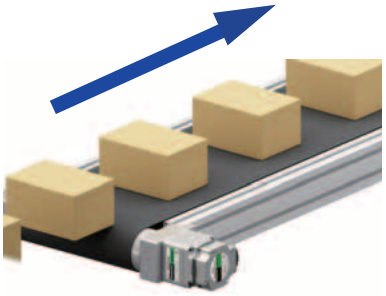


Save Space with Hollow Shaft Gearheads

Product Selection

Continuous Operation

This is a product selection guide for applications that operate continuously at constant or variable speeds, such as conveyor systems.

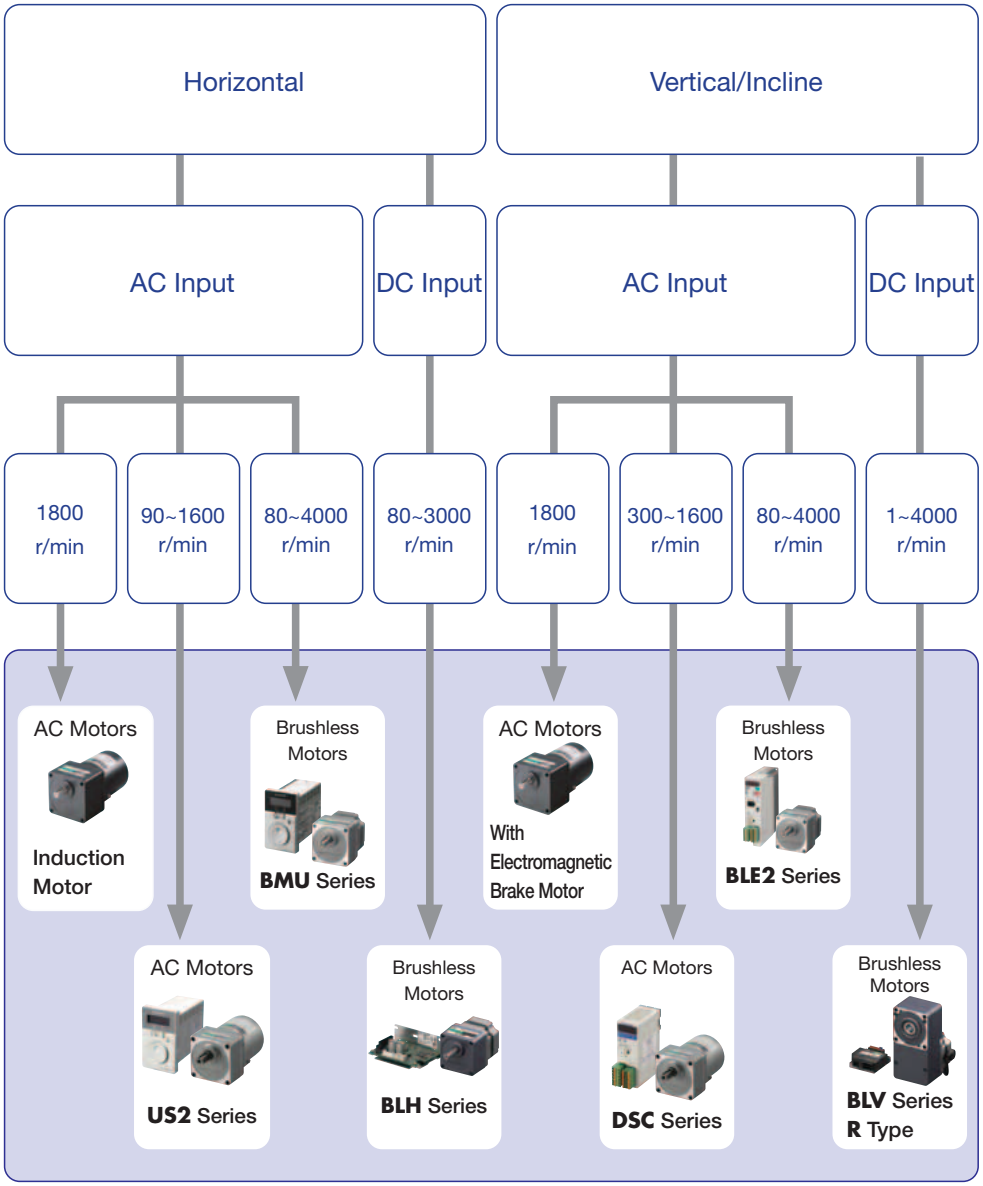


STEP 1 Select Movement Direction

STEP 2 Select Power Supply Input

STEP 3 Select Setting Speed (Range)

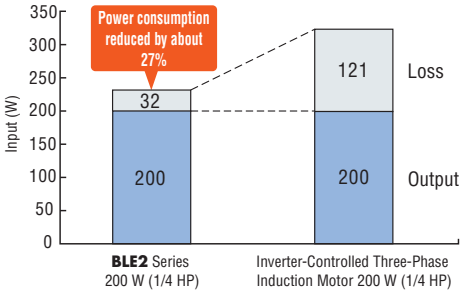
GOAL Product Series Determined



Choosing Between AC Motors and Brushless DC Motors

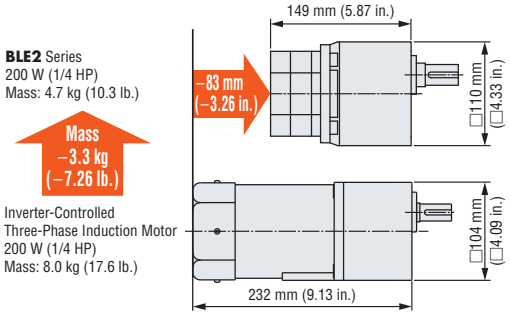
Efficiency

Both motors experience power loss in the form of I-R losses. To minimize this loss, brushless DC motors utilize permanent magnets in the rotor, whereas AC motors require more power for electromagnetic induction.

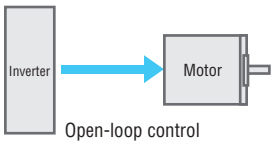
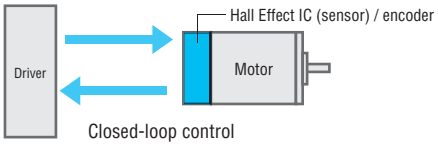
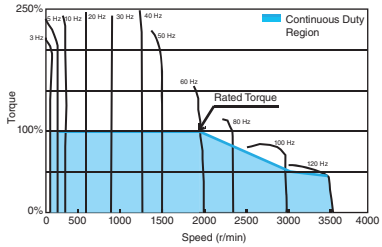
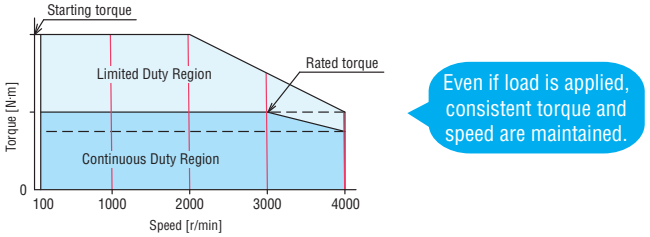


Size

Brushless DC motors provide high torque density due to their high efficiency. When space is limited, they serve as an excellent alternative to AC motors.

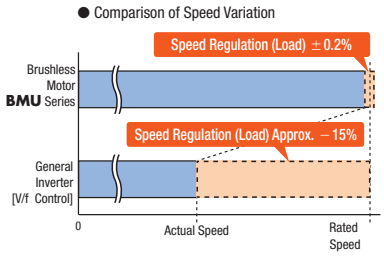


Comparison of Speed Control Options

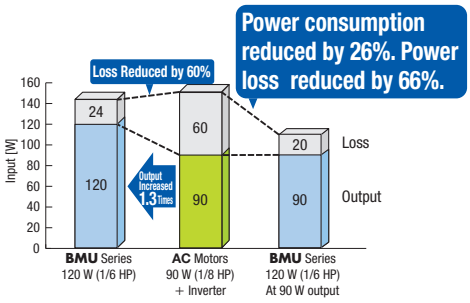
	Inverter + Three Phase Motor	Brushless DC Motor
Composition / Structure / System	Three-phase induction motor + General-purpose inverter (Sold separately)	Sensor mounted to magnet motor (SPM type) +Dedicated driver
	The same as the servo motor except that Hall Effect IC (sensor) detects rotor position.	
		
Control Function	Speed control with accuracy not required	Speed control (Torque control)
Rotation Speed (speed ratio)	90–3600 r/min (1:40)	80–4000 r/min (1:50)
Torque		
Motor Exterior Shape	Induction motor	The same mounting as induction motor. Length (depth on the size of motor) is very short.
Efficiency / Energy Saving Performance	Efficiency of induction motors is not high	High efficiency thanks to permanent magnet motor
Speed Regulation (load)	−3~−15%	±0.05~±0.1%
Responsiveness	Low	High
Overrun	Yes, large variations	Yes, controlled
Suitable Operations	• The main use is for operation at a fixed speed • Allows for speed adjustments	• When speed changes, torque and speed are kept stable • Multi-speed operation

Brushless DC Motors and Drivers

Speed Stability

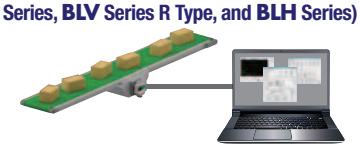


Save Energy



MEXE02 Support Software

(Free Download. Available for the BLE2 Series, BXII Series, BLV Series R Type, and BLH Series)



Features of the **MEXE02** Software:

- Teaching and Remote Operations
- I/O Testing
- Waveform Monitoring
- Alarm Monitoring
- Status Monitoring
- Multi-Monitoring Capability

AC Input Motor and Driver: Leading Performance

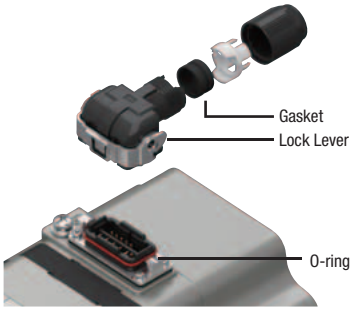
BMU Series
Simple Control

BLE2 Series
Advanced Control

- Power supply: Single-phase 100-120 or Single-phase/Three-phase 200-240 VAC
- Output power: 30 W (1/25 HP) ~ 400 W (1/2 HP)
- Parallel Shaft / Right-Angle Hollow Shaft Gearhead / Hollow Shaft Flat Gearhead / Round Shaft (no gear)
- IP66 & IP67 types available
- Digital display built into driver
- Speed control range: 80 ~ 4000 r/min
- IP66 rated H1 food grade grease type available

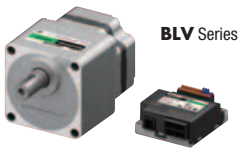
● Standardized Stainless Steel Shaft (SUS303)

● Connector Structure



DC Input Motor and Driver: High Strength

BLH Series

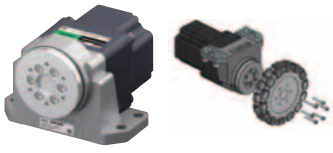


BLV Series **R** Type

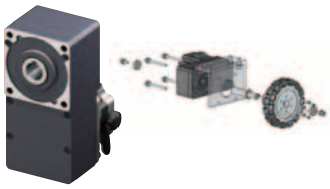
- Power supply: 24/48VDC
- Output power: **BLH** Series 15 W (1/50 HP) ~ 100 W (1/8 HP)
  BLV Series **R** Type 60 W (1/12 HP) ~ 400 W (1/2 HP)
- Parallel Shaft Gearhead / Hollow Shaft Flat Gearhead / Round Shaft (no gear)
- Compact and lightweight drivers
- Electromagnetic brake is available
- RS-485 communication is available

● Low Platform and Thin Design

Face surface mounting with the Flange Drive Adapter



Side-mounting with the Hollow Shaft Flat Gearhead

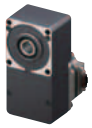
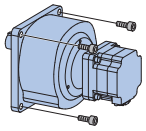
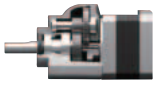
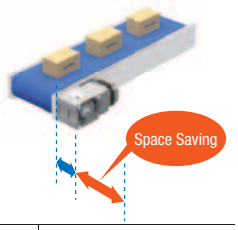


Product Series Comparison

Category		AC Power Supply Input			DC Power Supply Input	
Product Series		**BMU** Series 	**BLE II** Series 	**BX II** Series 	**BLH** Series 	**BLV** Series **R** Type 
Features		• Easy Data Setting • Digital Speed Display • Panel Mounted Driver • Simple Operation	• Easy Data Setting • Digital Speed Display • Stainless Steel Shaft	• Servo Control • Speed or Position Control • Linked Operation • High Speed Regulation	• Compact Board Driver • Simple Operation • Digital or Analog Driver • Connector Type Motor Available	• Compact, Lightweight Driver • Network Compatible • Accepts Battery Power • Ideal for AGVs
MEXE Support Software		–	●	●	●	●
Power Supply Input		Single-Phase 100-120 VAC Single-Phase 200-240 VAC Three-Phase 200-240 VAC	Single-Phase 100-120 VAC Single-Phase 200-240 VAC Three-Phase 200-240 VAC	Single-Phase 100-120 VAC Single-Phase 200-240 VAC Three-Phase 200-240 VAC	24 VDC	24/48 VDC
Output Power	15 W (1/50 HP)	–	–	–	●	–
	30 W (1/25 HP)	●	●	●	●	–
	60 W (1/12 HP)	●	●	●	●	●
	120 W (1/6 HP)	●	●	●	●	●
	200 W (1/4 HP)	●	●	●	–	●
	300 W (2/5 HP)	●	●	–	–	–
	400 W (1/2 HP)	●	●	●	–	●
Speed Control Range		80~4000 RPM	80~4000 RPM	2~4000 RPM	80~3000 RPM	1~4000 RPM
Speed Ratio		50:1	50:1	2000:1	37.5:1	4000:1
Speed Regulation (Load)		+/-0.2%	+/-0.2%	+/-0.05%	+/-0.2%	+/-0.01%
Speed Setting Method	Potentiometer	Internal	Internal/External	Internal/External	Internal/External	–
	Digital Setting	●	●	●	–	–
	Analog Setting	–	●	●	●	–
	Modbus (RTU)	–	–	–	●	●
	CANopen	–	–	–	–	●
	MEXE02	–	●	●	●	●
Functions	Digital Display	●	●	●	–	–
	Instantaneous Stop	●	●	●	●	●
	Acceleration/Deceleration	●	●	●	●	●
	Multi-Speed Operation	4 Speeds	16 Speeds	16 Speeds	2/8 speeds	256 Speeds
	Electromagnetic Brake for Load Holding	–	●	●	●	●
	Multi-Axis Speed Synchronization	–	●	●	●	●
	Protective Functions	●	●	●	●	●
	Accepts Sink/Source	●	●	●	–	●
	Maximum Motor Extension	10.5 Meters	20 Meters	30 Meters	5 Meters	3.5 Meters
	Extended Functions	Load Factor Speed Limits Holding Torque Speed Attainment Band	Torque/Speed Limits Holding Torque Load Factor Speed Teaching Status Monitor	Torque/Speed Limits Servo Lock Load Factor Speed Teaching Status Monitor	Torque Limiting Various Stop Modes Quiet Operation Status Monitor	Torque Limiting Low Battery Mode Vector Mode RS-485/CANopen Status Monitor
Gearhead Options	Parallel Shaft	●	●	●	●	●
	Hollow Shaft Flat	●	●	●	●	●
	Right Angle Hollow Shaft	●	●	–	–	–
Safety Standards		cULus CE	cULus CE	cULus CE	cULus CE	cULus CE
RoHS Directive		RoHS	RoHS	RoHS	RoHS	RoHS
Motor IP Rating		IP65/66/67	IP65/66/67	IP54	IP40/65	IP40/65

Brushless DC Motor Gear Options

These gearheads can be combined with brushless DC motors and offer a wide variety of gear ratio variations and high strength types, expanding the available options.

Gearhead Type		Parallel Shaft Gearhead				Right-Angle Gearhead	Hollow Shaft Flat Gear
		GFV Gears **GFS** Gears	**JV** Gears	**JB** Gears	**CS** Geared Motor	**JH** Gears	**FR** Gears
External View							
Features		・Long Life, High Strength ・Output Shaft: Iron, Stainless Steel	・High Gear Ratio up to 1/450 ・Flange Installation ・Output Shaft: Stainless Steel	・High Gear Ratio up to 1/1200 ・Does not Saturate ・Permissible Torque ・Leg Installation	・Increased Load-bearing Capacity (Compared to a parallel shaft gearhead) ・Center Shaft	・Space Saving, Low Cost ・High Strength ・Output Shaft: Stainless Steel	・Space Saving, Low Cost ・Does not Saturate ・Permissible Torque
Advantages of Installation		・Install on Flange Face 		・No Mounting Brackets Required 	・The Output Shaft Protrudes from the Center, so Design is Easy 	・Space Saving ・Can be Connected Directly to the Drive Shaft 	
Output Power of Combinable Motors	AC Input	30 W, 60 W, 120 W, 200 W, 300 W, 400 W	200 W, 300 W, 400 W	200 W, 300 W, 400 W	–	60 W, 120 W, 200 W, 300 W, 400 W	30 W, 60 W, 120 W, 200 W, 300 W, 400 W
	DC Input	15 W, 30 W, 50 W, 60 W, 100 W, 200 W, 400 W	–	–	30 W, 50 W, 60 W	–	30 W, 50 W, 60 W, 100 W, 200 W, 400 W
Gear Ratio		**5** to **200**	**100** to **450**	**5** to **1200**	**5** to **20**	**5** to **200**	**5** to **200**
Rated Life		10000 hours*	5000 hours	5000 hours	10000 hours	5000 hours	10000 hours
Permissible Radial Load/ Permissible Axial Load		1400 N/400 N	3123 N/480 N	3672 N/577 N	200 N/70 N	2405 N/550 N	2040 N/800 N
Permissible Torque		70 N·m	198 N·m	518 N·m	2.9 N·m	82.8 N·m	54 N·m

*The rated life for 15 W is 5,000 hours.
The values for permissible radial load, permissible axial load, and permissible torque are for the following operating conditions. They will vary based on the combined motor output power and gearhead gear ratio.
・Output Power : 200 W (For **CS** geared motors, values are for 50 W models.)
・Motor Shaft Speed: 3000 r/min
・Gear Ratio : Maximum gear ratio for each gearhead (Example: For **GFV** gear, the gear ratio is 200)

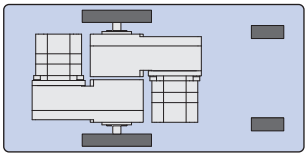
Hollow Shaft Flat Gearhead

[Internal Gearhead Structure]

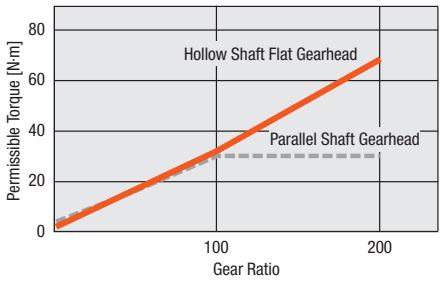
Improved gear case rigidity and larger diameters for gears and bearings lead to high permissible torque and long life.

[Characteristic Configuration]

Wheel drive units, etc. can be arranged in a compact configuration with alternating directions.
*Now available in smaller sizes.



[Frame Size 90 mm]



Speed Control AC Motors & Gear Motors

AC Speed Control Motors

Choose from a simple, user-friendly speed control package or an advanced multifunction capability package.

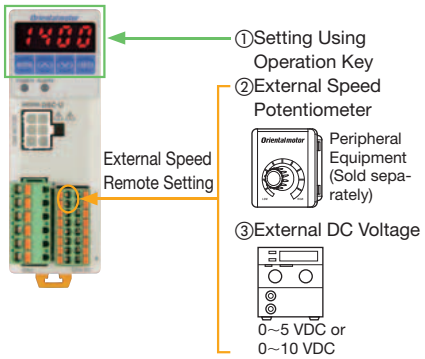
- Easy set up and wiring
- Compact speed controller
- High reliability

US2 Series

DSC Series

● **US2** Series: Easy Operation by Turning the Dial and Pressing

● **DSC** Series: External Speed Setting Input is Possible



3-Phase AC Motors for Inverters

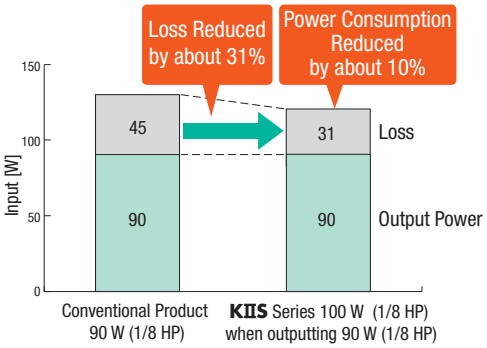
Choose from several high-efficiency, three-phase AC motors compatible with inverters to meet your IP protection rating, power, and torque requirements.

- 30 W (1/8 HP) to 3 HP
- High strength
- Long-life

KIIS Series

FPW Series

Brother ie3 **MMD** Series



Fuji Electric FRENIC-Mini (C2) Inverters / VFD

FRENIC-Mini (C2) inverters elevates the performance of a wide range of equipment.

For use with 1/8 HP up to 3 HP, Three-Phase Motors
Single-Phase 115 VAC or 230 VAC input, Three-Phase 230 VAC or Three-Phase 460 VAC input.

Standard functions:

- Auto-tuning / torque boost
- Flexibly remote / local operation
- Dynamic torque vector control
- Fastest CPU in its class
- Network compatibility
- Efficiency setting / side by side mounting

Frenic-Mini (C2) Inverters

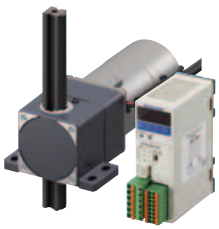
Product Series Comparison

Category		AC Power Supply Input			DC Power Supply Input	
		KIIS Series	Brother **MMD** Series	**FPW** Series	**DSC** Series	**US2** Series
Product Series						
Features		• High Torque • High Speed • High Efficiency • Speed Stability • Designed for Inverters/ VFD's	• High Power • High IE3 Efficiency • Efficient Hypoid Gear • Electrocoat Paint • Stainless Steel Shaft	• Watertight • Dust-Resistant • Oil Shield Protection • Anti-Corrosive Epoxy Coating • Stainless Steel Shaft	• Easy to Use • Closed-Loop Control • Speed Setting Input by External DC Voltage • Speed Synchronization • Vertical Operation Possible with Electromagnetic Brake	• Easy to Use • Closed-Loop Control • Operate by Setting Dial • Simple Wiring • High Reliability
Power Supply Input		Three-Phase 220~415 VAC	Single-Phase 115 VAC Single-Phase 220 VAC Single-Phase 230 VAC Three-Phase 208/230/460 VAC	Single-Phase 110/115 VAC Single-Phase 220/230 VAC Three-Phase 200/220/230 VAC	Single-Phase 110/115 VAC Single-Phase 220/230 VAC	Single-Phase 110/115 VAC Single-Phase 220/230 VAC
Output Power	1/125 HP (6 W)	–	–	–	●	●
	1/50 HP (15 W)	–	–	–	●	●
	1/30 HP (25 W)	–	–	●	●	●
	1/25 HP (30 W)	●	–	–	–	–
	1/19 HP (40 W)	●	–	●	●	●
	1/12 HP (60 W)	●	–	●	●	●
	1/8 HP (90 W)	–	–	●	●	●
	1/8 HP (100 W)	●	–	–	–	–
	1/4 HP (200 W)	●	–	–	–	–
	1/2 HP (400 W)	–	●	–	–	–
	1 HP	–	●	–	–	–
	2 HP	–	●	–	–	–
	3 HP	–	●	–	–	–
Recommended Speed Control Range (Motor RPM)		90~3600 RPM (3~120 Hz)*	150~3,600 rpm (5~120 Hz)	300~2,400 RPM (10~80 Hz)	90~1600 RPM	90~1600 RPM
Speed Ratio		40:1	24:1	8:1	18:1	18:1
Available Options	Round Shaft (No Gear)	●	–	–	●	●
	Parallel Solid Shaft Gearhead	●	●	●	●	●
	Right Angle Hollow Shaft Gearhead	●	●	–	●	●
	Electromagnetic Brake	●	●	–	●	–
	Terminal Box	●	●	–	–	–
Safety Standards		cULus CE	cULus CE	cULus CE	cULus CE	cULus CE
RoHS Directive		RoHS	RoHS	RoHS	RoHS	RoHS
Motor IP Rating		IP20/66	IP44/65	IP67	IP20	IP20

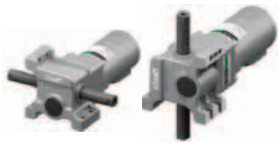
✻100 W Parallel shaft: 90~3,600 RPM (3 to 120 Hz)
100 W Right angle shaft: 90~2400 RPM (3 to 80 Hz)
200 W: 90~3,000 RPM (3 to 100 Hz)

AC Speed Control Motors with Rack and Pinion Systems

Easily build a linear mechanism with the **L** Series rack and pinion system equipped with the **DSC** Series or with the **LJ** Series linear head rack and pinion mechanism attached to a **KIIS** AC motor. The use of AC speed control motors allow for speed controlled linear motion.



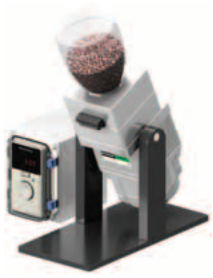
- Vertical movement
- 3 rack speeds available: 10, 20 or 45 mm/s
- Electromagnetic brake included
- **DSC** Series speed controller (sold separately)



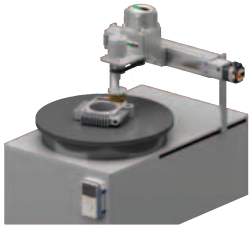
- Horizontal or vertical movement
- 200 Kg mass transportable mass
- Electromagnetic brake optional

IP67 Degree of Protection Watertight, Dust-Resistant Motors

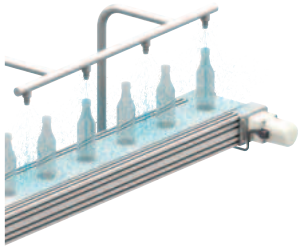
Application Examples



Coffee Mill



Grinding/Brushing

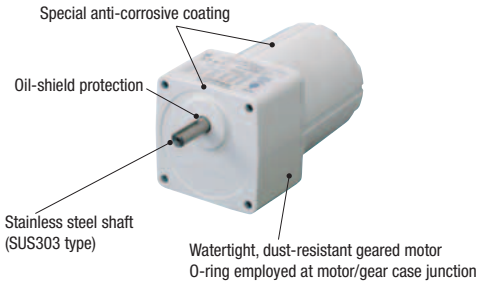


Washdown Conveyor

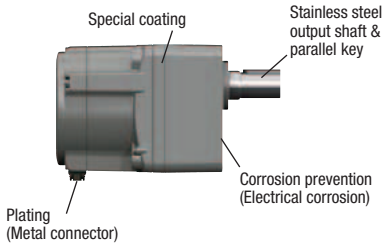
Stirring

Structure

FPW Series



IP67 Brushless Motors



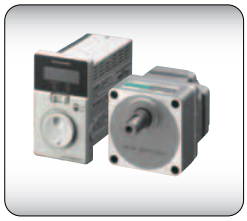
AC Gear Motor

FPW Series

Output Power: 25 W (1/30 HP) to 90 W (1/8 HP)
Constant Speed: 1800 r/min (60 Hz)
Use with Inverter to Control Speed

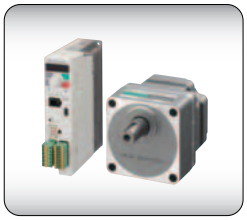
Brushless DC Motors

BMU Series
AC Input



Output Power: 200 W (1/4 HP) to 400 W (1/2 HP)
Speed Control Range: 80 to 4000 r/min
Simple Set Up and Wiring
Easy to Use
Digital Display / Panel Mount

BLE2 Series
AC Input



Output Power: 200 W (1/4 HP) to 400 W (1/2 HP)
Speed Control Range: 80 to 4000 r/min
16 Speed Settings
Torque Control
Advanced Performance
Digital Display

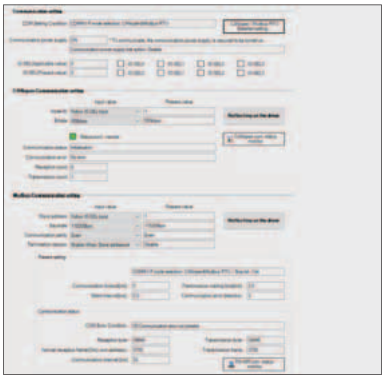
Support Software **MEXE02**

The **MEXE02** support software is a universal motion control and monitor software that can be used with the brushless DC drivers from **BLE2** Series, **BXII** Series, **BLV** Series **R** Type, and **BLH** Series (digital setting and RS-485 communication types). By using **MEXE02**, data setting, actual operation, and confirmation via monitor can be performed easily on a computer. The support software can be downloaded for free from the Oriental Motor website.

Startup Functions that Support Programing at Setup

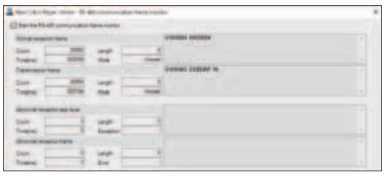
●Simple Settings

Various communication settings can be made using the "Simple communication settings".



●Communication Frame & Status Monitoring

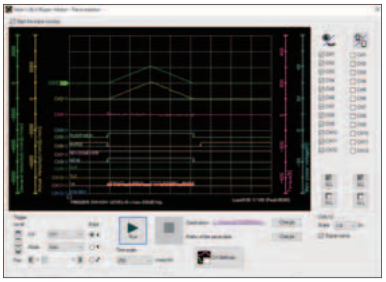
All communication frames and statuses can be monitored. This is useful for host program startup and debugging.



Operation Functions that Support Adjustments

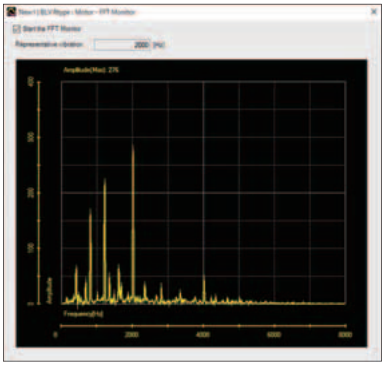
●Waveform Monitoring

The operating status of the motor (command speed, torque, I/O signal, etc.) can be checked like an oscilloscope.



●FFT Monitoring

Mechanical resonance is visualized by analyzing the frequency using FFT analysis. Noise and vibration can be reduced by adjusting the resonance suppression parameter.



●Gain Tuning

Motor tracking can be adjusted according to the command.

Maintenance Functions that Support Diagnostics and Maintenance

●Trace Monitoring

The operating status of the motor can be continuously measured for 24 hours or longer.

Merit

Data is saved for a long period of time, making it easy to determine the cause of a problem.

www.orientalmotor.com

ORIENTAL MOTOR U.S.A. CORP.

Western Sales and Customer Service Center
Tel: (310) 715-3301
Fax: (310) 225-2594
Los Angeles
Tel: (310) 715-3301
San Jose
Tel: (408) 392-9735

Eastern Sales and Customer Service Center
Tel: (781) 848-2426
Fax: (781) 848-2617
Boston
Tel: (781) 848-2426
Toronto
Tel: (905) 502-5333

Midwest Sales and Customer Service Center
Tel: (847) 871-5900
Fax: (847) 472-2623
Chicago
Tel: (847) 871-5900

Technical Support
Tel: (800) 468-3982
8:30 A.M. to 5:00 P.M., P.S.T. (M-F)
7:30 A.M. to 5:00 P.M., C.S.T. (M-F)
Se Habla Español
Tel: (847) 871-5931
E-mail:
techsupport@orientalmotor.com

Obtain Specifications, Online Training and Purchase Products at:
www.orientalmotor.com

Specifications are subject to change without notice.
This catalog was published in June 2024.

For more information please contact:

This printed material uses paper from responsibly managed forests and Enviro/Tech inks.

Printed in USA 24T #606