Best Motors for Transport Vehicles

BLV Series Brushless Motors for Smooth Travel, Reduced Size, High Load Capacity, and High Towing Capacity

The demand for using machines to automate simple operations is increasing more than ever.

In particular, many transport vehicles have been used for transport operations in factories and warehouses.

Our **BLV** Series brushless motors satisfy the needs of AGVs and other transport vehicles for speed stability and load capacities.

With capabilities designed for transport vehicles, these motors can contribute to higher operational efficiency at your facilities.

Oriental motor

Prevents weaving while offering smooth travel

High speed stability

The speed difference between the left and right wheels may cause the transport vehicle to weave. A motor with less speed fluctuations can reduce the speed difference between the left and right wheels and helps prevent weaving.

Load **Temperature** **Voltage**

Speed regulation ±0.5% or less
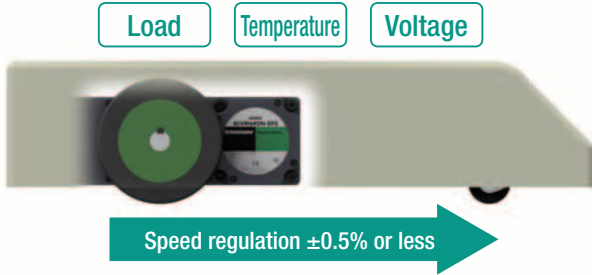
<<Conditions>>
Load: 0～rated torque, rated speed, rated voltage, normal ambient temperature
Voltage: Rated voltage +10%, rated speed, no load, normal ambient temperature
Temperature: 0～+40°C, rated speed, no load, rated voltage

Stable speed while traveling down a slope

The vector control delivers stable speed control when the vehicle travels down a slope.

Direction of Regenerative Torque

Direction of Motoring Torque

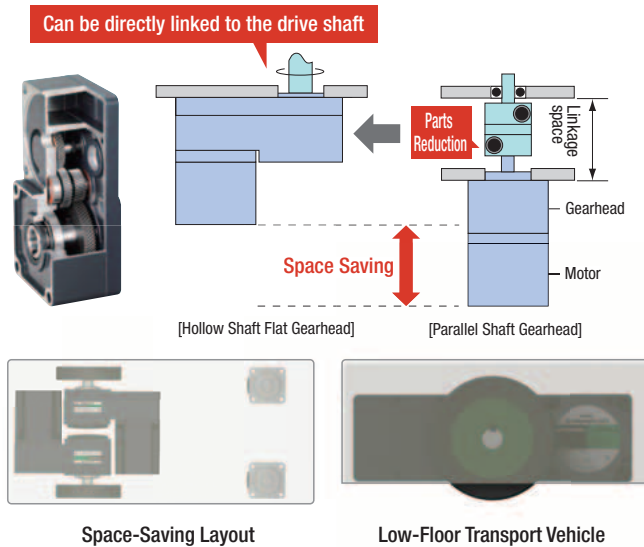Traveling Direction of Transport Vehicle
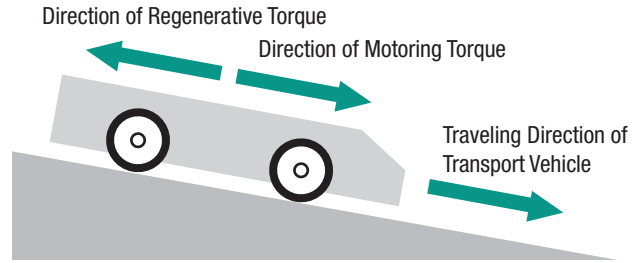
●When the motor shaft is rotated by an external force while the vehicle is traveling down a slope or in case of a sudden stop, regenerative energy is generated. Because the driver is not equipped with a function that processes regenerative energy, the protective function for the power supply and driver may be activated. Use a power supply or battery with adequate output capacity and overvoltage tolerance.

Compact design as well as high load capacity and high towing capacity

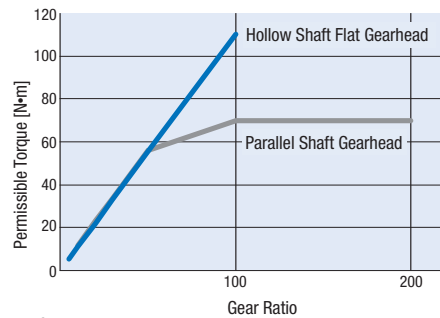## Space-saving gear and motor directly connected to the drive shaft

The compact motor features high-rigidity gears that can be directly connected to the drive shaft without using a connecting part, which helps minimize equipment footprint.

Can be directly linked to the drive shaft

Parts Reduction

Linkage space

Gearhead

Motor

Space Saving

[Hollow Shaft Flat Gearhead]   [Parallel Shaft Gearhead]

Space-Saving Layout

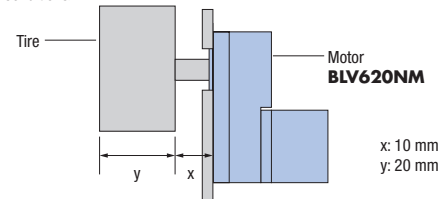**Low-Floor Transport Vehicle**

High torque and high permissible radial load

The gear motor delivers high torque and high permissible radial load thanks to the rigid gear case design and larger diameter gear bearing.

●**Unsaturated permissible torque** At 400 W, 3000 r/min or less

Permissible Torque [N•m]

Hollow Shaft Flat Gearhead

Parallel Shaft Gearhead

Gear Ratio

<Calculation Conditions>

Tire

Motor
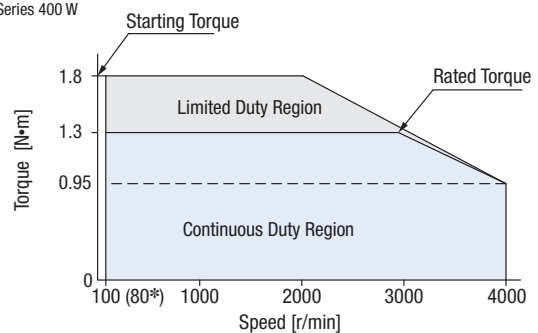**BLV620NM**

x: 10 mm
y: 20 mm

Wide Travel Speed Range

Motor shaft speed 80*～4000 r/min

Fast torque increase and high response. This mechanism ensures that the motor drives at a stable speed over its entire speed range from low to high.

＊These specifications apply when an **OPX-2A** control module (sold separately) or communication is used for data setting.

BLV Series 400 W

Starting Torque

Rated Torque

Torque [N•m]

1.8

1.3

0.95

Limited Duty Region

Continuous Duty Region

100 (80*) 1000 2000 3000 4000

Speed [r/min]

Precision Stopping and Braking Function

Deceleration Control for Precision Stopping

The motor can be decelerated to a stop. Decelerating the motor to a stop can prevent shock to the equipment or load on the transport vehicle and improve stop position accuracy.
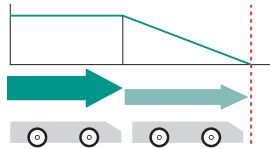
Deceleration Control for Precision Stopping

[Measurement Conditions]
Motor 400 W
Gear ratio 1/30
Wheel diameter 200 mm
Measure with the max. permissible load inertia installed on the motor

Vehicle speed before stopping	(motor shaft speed)	Overrun amount after stop command is entered
62.76 m/min	[3000 r/min]	335 mm
10.5 m/min	[500 r/min]	7.95 mm~9.21 mm
1.68 m/min	[80 r/min]	0.83 mm~1.88 mm

This is a reference value obtained by converting the overrun amount on the motor shaft into the overrun amount on the wheel.

Stopping and Holding with Electromagnetic Brake

Use a motor with a built-in electromagnetic brake to securely hold the stop position of the vehicle while transferring or processing the load.
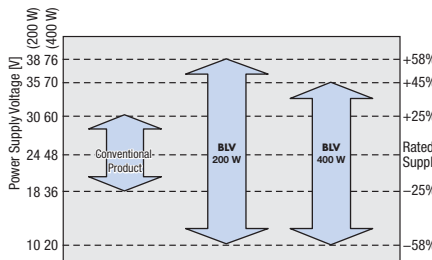
STOP

Brake Hold
MB-FREE input to cancel
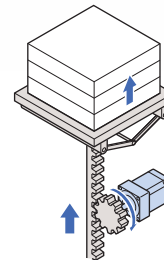
In addition, the electromagnetic brake can also be used for vertical operation.

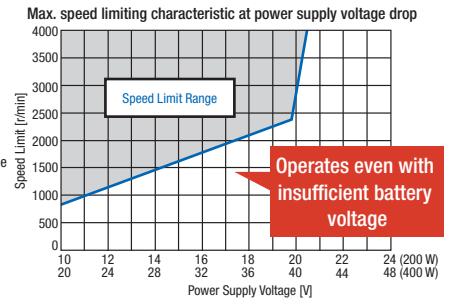# Corresponding to Battery Supply Fluctuations

Actions Corresponding to Battery Voltage Fluctuations

A limit is placed on the max. speed according to the input voltage to prevent the motor from stopping due to a dead battery. When the power supply voltage falls below the set level, a warning is output. This warning can prevent the motor from stopping due to a voltage drop and can be used as an indication to recharge the battery.

Wide operating voltage range

Power Supply Voltage [V] (200 W) (400 W)

38 76	+58%
35 70	+45%
30 60	+25%
24 48	Rated Power Supply Voltage
18 36	−25%
10 20	−58%

Conventional Product · BLV 200 W · BLV 400 W

Continuous operation with reduced speed

Max. speed limiting characteristic at power supply voltage drop

Speed Limit [r/min]

Speed Limit Range

Operates even with insufficient battery voltage

Power Supply Voltage [V]

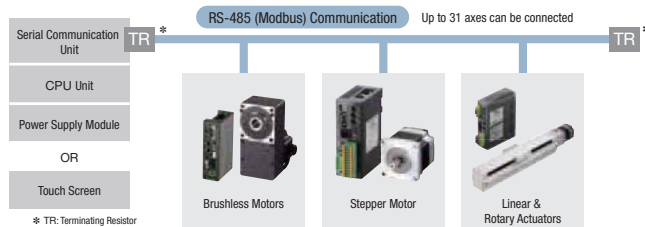| 10 / 20 | 12 / 24 | 14 / 28 | 16 / 32 | 18 / 36 | 20 / 40 | 22 / 44 | 24 (200 W) / 48 (400 W) |

Network Compatible

Supported Communication Protocol

Wheels on the transport vehicle, conveyor on the transport vehicle, and other axes of motion can be integrated into one system.

Monitoring via Network!
• Wheel shaft speed
• Undervoltage information
• Overload signal

Direct connection with RS-485 (Modbus)

RS-485 (Modbus) Communication   Up to 31 axes can be connected

Serial Communication Unit   TR *
CPU Unit
Power Supply Module
OR
Touch Screen

TR *

∗ TR: Terminating Resistor

Brushless Motors   Stepper Motor   Linear & Rotary Actuators

Only the **BLV** Series can be connected when the network converter is used.

Connectable networks via network converters

CC-Link
MECHATROLINK
EtherCAT

Other Functions

Torque Limiting Function

The output torque can be limited to prevent damage to the mechanism or motor. Also, TLC signals are output when the set limiting value is reached. The signals are detected and utilized on the PLC side.

Signal Output   **Limits Output Torque**   **Obstacle**

Alarm Output/Warning Output/Monitoring Function

| Alarm	Stops the operation and outputs signals
	Overload, overheat, overvoltage, undervoltage, etc.
Warning	Outputs signals when a desired value is reached before an alarm is issued.
	Circuit overheat, undervoltage, overload, etc.
Monitoring	Outputs various motor statuses *
	Actual motor speed, load factor, I/O, alarm, etc.

Selection Examples

<<Selection Conditions>>

Weight capacity m = 500 kg

Wheel diameter r = 200 mm x dual axis

Wheel friction coefficient μ = 0.01

Acceleration/deceleration time t1 = 5 sec

Traveling speed t2 = 60 m/min

● The tire weight is 2 kg/shaft

▶ <<Selection Result>>

BLV Series 200 W/Gear ratio 30
(Product name: **BLV620NM30F**)

83.5   104   218   104   124   67
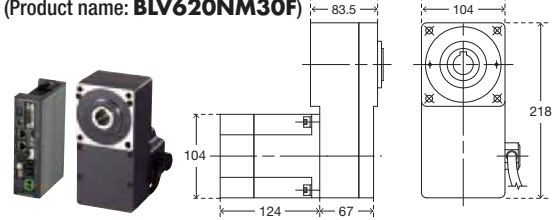
■**BLV** Series Product Specifications

Speed Control Range	(80*) 100～4000 r/min
Speed Regulation (Load)	±0.5% (±0.2%*)
Output/ Motor Frame Size	100 W/□90 mm 200 W/□104 mm, 400 W/□104 mm
Power Supply	100 W 24 VDC 200 W 24 VDC, 400 W 48 VDC
Electromagnetic Brake	Available
Speed Setting Method	Potentiometer External DC Voltage Network RS-485 communication ① Modbus (RTU) ② FA network (via converters)
Speed Output Type	Resolution: 30 p/r Type: Pulse output, network
Torque Limiting	Can be set between 0～200% of rated torque

■Other DC Input Products

Suitable for Space Saving Devices

BLH Series Brushless Motors

Analog, RS-485*, or Digital Setting* type drivers.24 VDC board type driver suitable for devices that require a space-saving design.
Output: 15/30/50/100 W
Speed Control Range: 100～3000 r/min
Speed Regulation: ±0.5% (±0.2% Digital driver)
Speed Setting Method: Potentiometer/external DC voltage/Software (Digital driver)
*Available for 15, 30, 50 W motors only

Higher Precision Stopping Capability

Hybrid Control System α*STEP*
AR/**AZ** Series (DC input)

Consider the stepper-motor-based hybrid control system "α*STEP*" if precision stopping capability higher than brushless motors is required. The "α*STEP*" features high responsiveness with the positioning accuracy of ±0.05° or less. With **AZ** Series, its battery-less absolute sensor <**ABZO**> achieves control that does not require any external sensors. It is equipped with an interface connectable with various host systems and a built-in pulse generator function. A simple sequence can be set and executed without PLC.

✴ The value when **OPX-2A** or communication is used.

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Quick & Easy AGV Motor Sizing Tool Available Online   (Free)

Simply input your parameters, and the motor sizing tool will calculate your torque, speed, and load inertia requirements for your specific AGV. A detailed report can also be generated.

If you need help with product selection, our knowledgeable technical support engineers will be happy to assist.

1-800-GO-VEXTA (468-3982) *(M-F 7:30am CST to 5:00pm PST)*