GIMSON ROBOTICS

Gimson Robotics Ltd
Unit 31 Filwood Green Business Park, 1 Filwood Park Lane, Bristol, BS4 1ET
Company Registered in England No. 08708521 VAT No. GB166536781
support@gimsonrobotics.com www.gimsonrobotics.co.uk

GLA800-N 12V DC Actuator – Summary Specifications 2023

Updated 13.04.2023

Gimson Robotics Model	**GLA800-N**
Motor	12V DC standard, brushed permanent magnet (*24V option also available*)
Maximum Rated Load	800N (81kg)
No-load Speed, Current	14.5mm/s, 1.0A
Speed, Current for Max. Load	7.5mm/s, 5.7A
Stroke Length	Standard sizes: 400mm, 700mm, 800mm *Other sizes are available on a made-to-order basis*
Installation Length	400mm stroke: 545mm 700mm stroke: 875mm 800mm stroke: 1000mm
Maximum Duty	15% (up-to 2 minutes continuous)
Stall Current	~13A. Motor internal resistance 0.92Ohm. Sustained stall must be prevented, use overcurrent protection on input (current limiting via a controller, and/or a suitably rated fuse)
Transmission	Two-stage low-noise nylon worm-and-wheel. First stage 29:2 ratio (2-start worm), second stage 9:4 ratio (4-start worm), cumulative 32.625:1 ratio. With a 2.5mm pitch 3-start lead screw.
Life Expectancy	40,000 strokes, nominal
Weight	400mm stroke: 1910g 700mm stroke: 2550g 800mm stroke: 2760g
Materials, Enclosure Rating	Body: Cast aluminium and steel (motor), Rod: Stainless Steel IP66
Operating Temperature (Ta)	-15°C ~ +45°C
Cable	2m long 6-core lead (motor wires Brown & Blue 18AWG, encoder wires Red, Black, Yellow & White 22AWG). *Lead length and connectors can be customised*
Sensors	Internal quadrature encoder, 5V supply voltage, 17.4 pulses per channel per millimetre of travel (34.8 pulses/mm across both channels). The encoder signal allows this actuator model to have its position tracked, allowing multiple actuators to be synchronised, when used with a suitable controller
Limit Switches	Built-in, microswitches and diodes to automatically turn the motor current off, unidirectionally, at the 0mm and Stroke Length (full travel) positions
Product Standards	EN 55014-1 RoHS Directive 2015/863 (RoHS 3) EN 55014-2 *Be aware that EMC performance is dependent upon the connected hardware*

Dimensioned Drawing. 'Installation Length' values are provided on page 1, for the standard sizes of this actuator.

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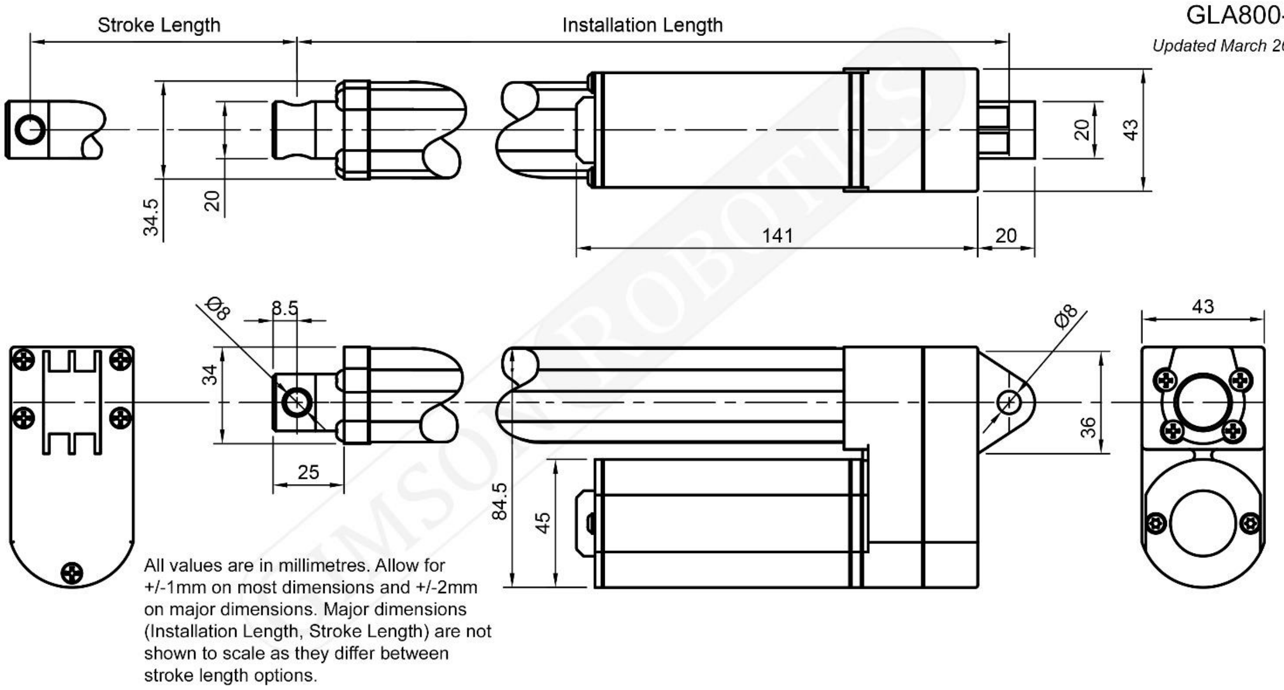
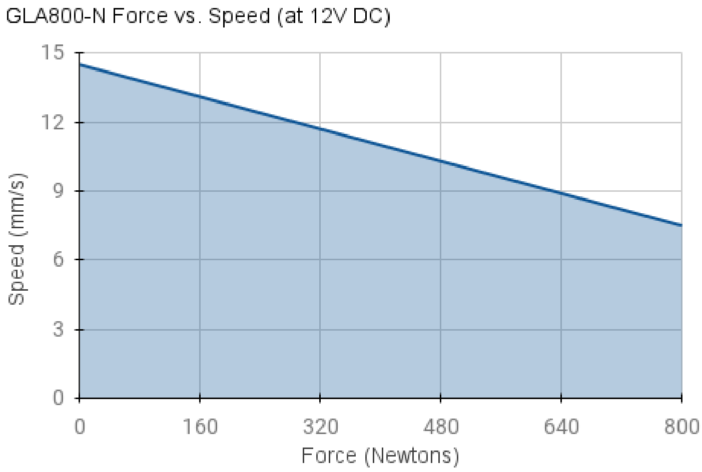
GLA800-N

Updated March 2023



As indicated above, the standard mounting points at either end of the actuator are ⌀8mm (diameter).

Mechanical & Electrical Characteristics



As with any brushed DC permanent magnet motor or actuator, there are some key principles that apply to the GLA800-N, this includes the fact that:

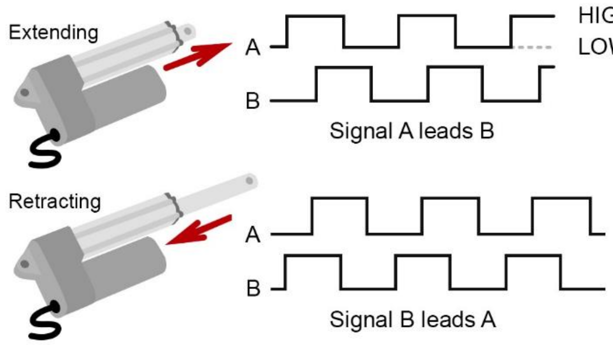
- As load increases, travel speed decreases, this is an approximately linear relationship (see graph to right).
- As load increases, the current draw of the motor also increases, and this increase is also approximately linear between the no-load current up to the full load current.
- The level of measured current can help you to deduce the amount of mechanical load in the system.
- At a complete stall the peak current of the motor can be much greater than the normal load current (up to ~13A for the GLA1500-N at 12V), in this condition the motor can rapidly overheat and be permanently damaged, and so overcurrent protection, and sensible mechanical design, should be used to avoid this.
- By changing the voltage reaching the actuator, the travel speed can be modified. When lower voltages (which can be via PWM duty cycling) are supplied, this does also mean that the current, and therefore the force, of the actuator also fall (e.g. approximately half-speed and half-force if the actuator were run at 12V). The actuator should not be supplied with over 12V (except from a fully charged 12V battery, which is usually OK).

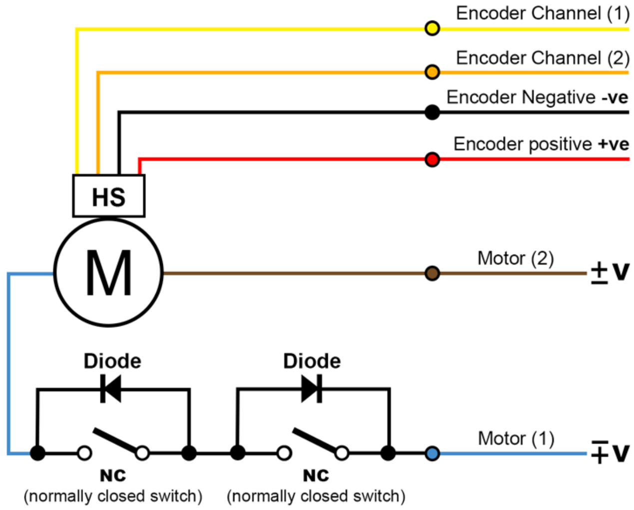
Further considerations include:

a) This actuator is NOT suitable for bending/off-axis loading, and so in the case of a pivoting driven assembly, both ends of the actuator should be allowed to freely pivot with minimal friction, whereas in the case of a linearly-moving assembly, the assembly should be independently supported in the axial direction, in line with the actuator.
b) Shock loads through the mounting points should be avoided (as shock/impact loads may impart a temporary force greater than the rated load through the actuator).
c) Be aware that the IP66 enclosure rating means in practice that the actuator is water resistant, but long-term use fully exposed can still cause damage over time, so when locating it outside it is best to incorporation some shielding/guard against sustained water exposure.

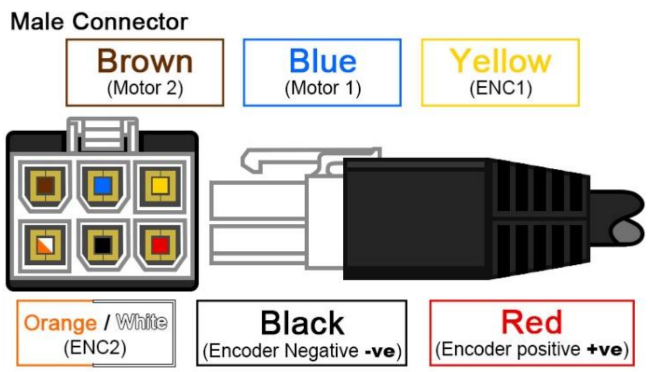
Integrated Encoder, for position detection and synchronisation

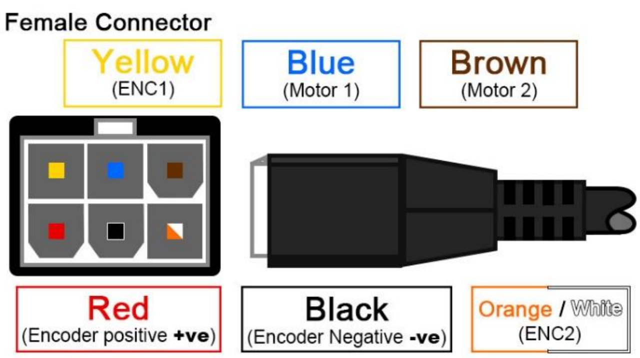
The actuator has a hall-sensor based quadrature encoder built-in to the motor. The encoder is powered by two of the six cores of the main cable (+Vcc **Red**, -GND **Black**) and accepts a supply voltage of between 5-12V. It has a dual-channel output (channel A **Yellow** lead, Channel B **Orange** lead), with each channel generating **17.4** pulses per millimetre of travel (4 complete pulses per motor revolution). One of the channels is out of phase with the other, as such it is possible to tell both the speed (from pulse frequency) and direction (by reading the pulses of one channel and comparing it to the other) of the motor. The nature of the signals that are generated is illustrated below. Given a maximum no-load travel rate of 14.5mm/s for the 12V motor (when run at 12V) the maximum pulse frequency would be around **253Hz** per encoder channel (the frequency rate would be greater than this if your controller is counting all rising/falling edges as opposed to only HIGH / LOW signal state changes). When used with the appropriate controller, the encoder signals can be used for positional control with much greater accuracy and consistency than potentiometer-based actuator feedback systems.





Optional connectors. Where an optional 6-pin connector is added on the actuator lead, it is the Male connector as shown below. The controller would normally have the Female profile connector, also represented below.





Safety Considerations

Linear actuators such as this model are low-voltage electromechanical components that are used in a wide variety of different applications. It is important that the safety of each installation is assessed according to its own requirements, construction, end user and environment.

To ensure that a system utilising these actuator(s) is safe here are some principles that should be followed (*this is not an exhaustive list*):

i. The actuator should not be overloaded mechanically, or run above its specified duty cycle limit. Both it and any connected hardware should be designed with an appropriate safety factor (margin above the design load) for the application.
ii. As actuators such as this are capable of generating a very large force, care should be taken to mitigate any possible entrapment or falling mass hazards that could be created by the assembly that you are installing them into.
iii. Overcurrent protection must be used, ideally tuned to each system (current limiting), but at a minimum an appropriately rated fuse.
iv. Power and control hardware should be appropriately specified to handle the load current required of the actuator.
v. Mechanical overrides should be factored in to a design, where appropriate, due to the self-locking nature of the actuator.
vi. End product and application-specific regulations should be checked, and appropriate risk assessments and compliance testing carried out on the basis of the planned usage.

If you have any questions, would like to place an order, or if you need help in determining the suitability of this item for your application, please contact us at support@gimsonrobotics.com