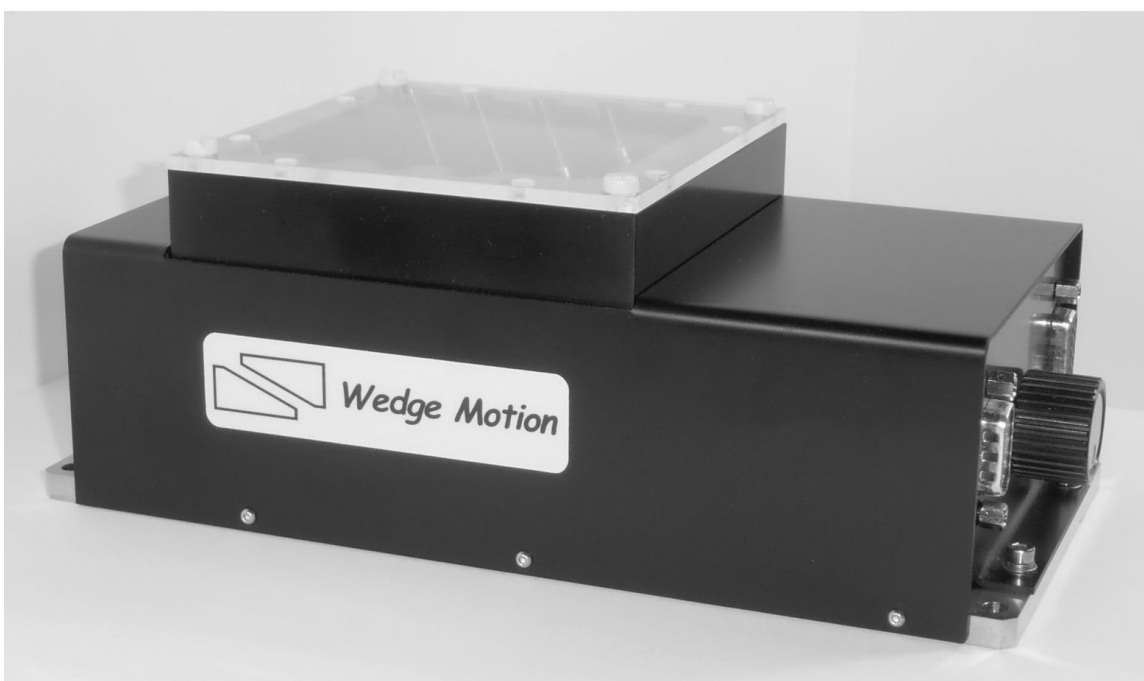


WMZ Precision Lift Stage



Introduction

The WMZ is a precision vertical lift stage suited for applications requiring a low profile. A wedge is used to perform the lift action. The wedge is actuated by a ball-screw coupled to a stepper or brushless motor. The WMZ table includes two limit switches. As an option, a knob can be added for manual control. The design, which makes use of flexures, enables a smooth operation and guarantees a longer life to the bearings.

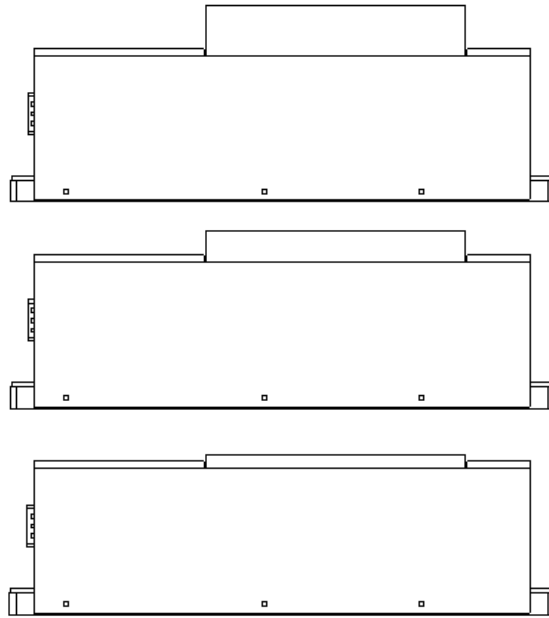


Fig.1: Illustration showing the plateau's lift action

Specifications

Moving plateau = 100mm x 100mm

Total length = 210mm

Total width = 104mm

Total height = from 61mm (lower position) to 75mm (higher position)

Total weight = 2.7kg

Maximum load = 5kg

Lift per motor revolution = 1mm/rev

Lift coefficient = 0.4 (21.8deg)

Backlash = none (ball-screw technology)

Machined parts made out of steel (base) and aluminum alloy

Nominal vertical lift = 14mm

Maximal vertical speed = 10mm/sec

Z resolution = $0.5\mu\text{m}$ (based on encoder and motor control)

Repeatability = $\pm 2\mu\text{m}$ (unidirectional and bidirectional)

Z accuracy = $\pm 5\mu\text{m}$ (at 1kg and after calibration of the lift coefficient)

Lateral error (Y) < $\pm 10\mu\text{m}$

Longitudinal error (X) < $\pm 10\mu\text{m}$

Parallelism between base and plateau < $\pm 15\mu\text{m}$

Roll error = $\pm 20\mu\text{rad}$ (for all loads)

Pitch error = $\pm 20\mu\text{rad}$ (1kg centered and $25\mu\text{rad/kg}$ beyond)

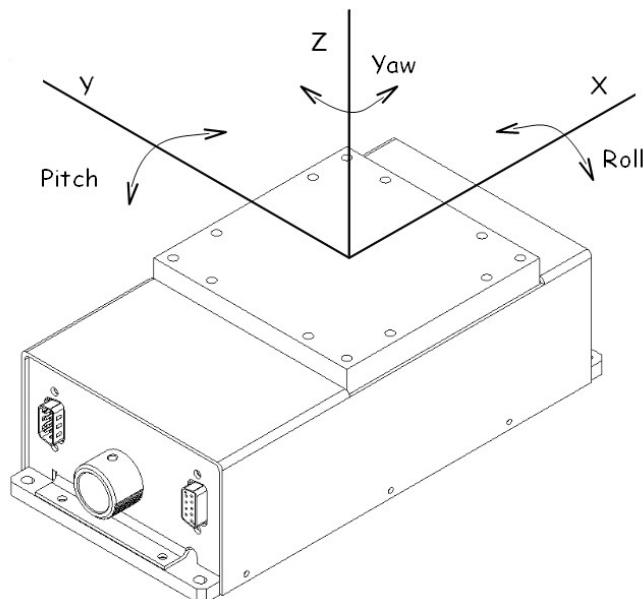


Fig.2: Roll, pitch and yaw definitions

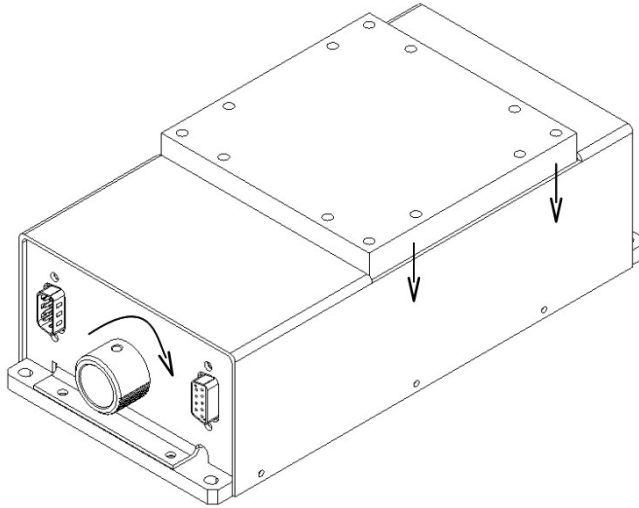


Fig.3: Motion direction

Drawings

The following drawings show the main dimensions of the product. The base plate mounts using four (4) through holes for M4 screws. Those holes have a slightly elongated shape so as to accommodate both metric (200mm x 90mm) and imperial (7.875" x 3.5") systems.

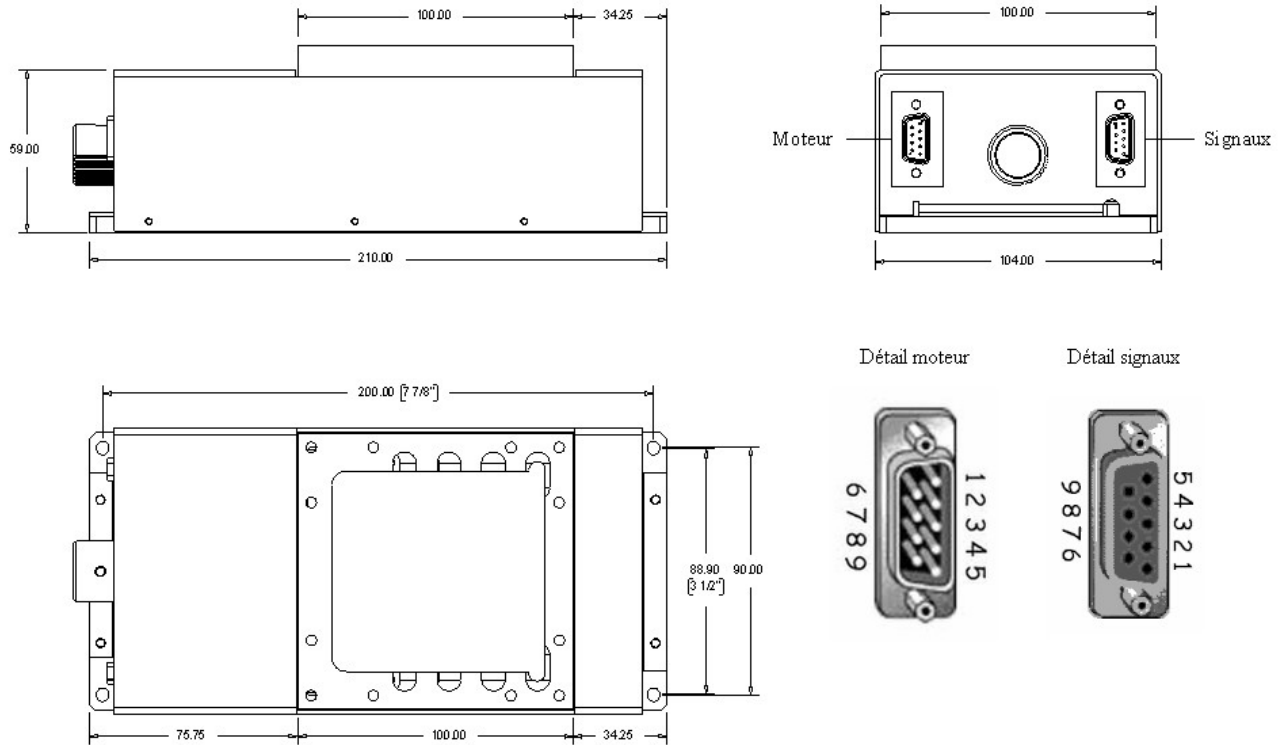


Fig.4: Principal views and dimensions

The plateau has twelve (12) threaded M4 holes. See figure 5.

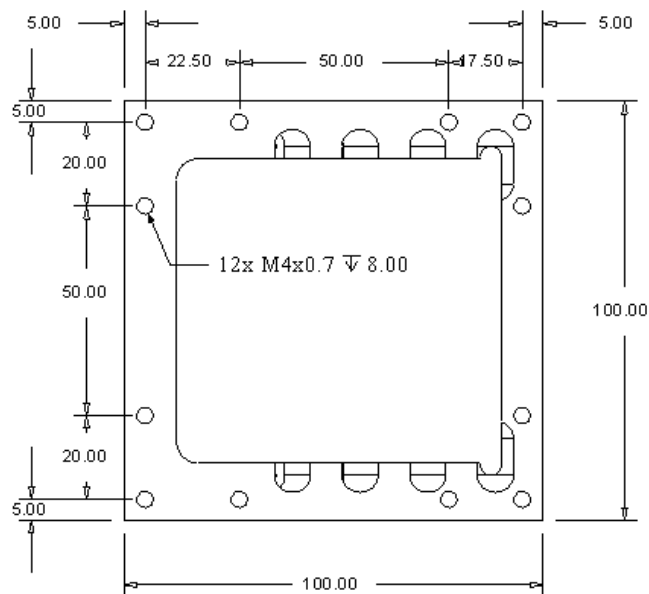


Fig.5: Detailed view of the plateau

Connections

Two (2) DSUB9 connectors are used to connect the motor and the signals (limit switches and encoder). Figures 6-7 depict the connections.



Fig.6: motor connections

Case of the stepper motor:

Pin 1: Phase A
Pin 2: Phase A
Pin 3: NC*
Pin 4: Phase B
Pin 5: Phase B
Pin 6: NC
Pin 7: NC
Pin 8: NC
Pin 9: NC

Case of the brushless motor:

Pin 1: Hall Vcc
Pin 2: Hall A
Pin 3: Hall B
Pin 4: Hall C
Pin 5: Hall GROUND
Pin 6: NC*
Pin 7: Phase A
Pin 8: Phase B
Pin 9: Phase C

*NC : not connected

Hall effect sensor:

- Power supply = 5V
- Current = 20mA
- Open collector output without pullp-up resistor

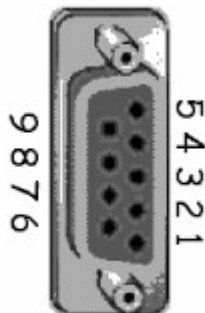


Fig.7: signals (limit switches + encoder)

Limit switches and encoder:

Pin 1: Encoder Vcc

Pin 2: Encoder phase A

Pin 3: Encoder phase B

Pin 4: Encoder index

Pin 5: Encoder 0V

Pin 6: Limit switch Vcc

Pin 7: Limit switch upper position

Pin 8: Limit switch lower position

Pin 9: Limit switch 0V

Limit switches:

- Power supply from 5 to 24V.
- Maximum DC current = 50mA
- Open collector output without pullp-up resistor

Encoders:

- Power supply = 5V
- TTL compatible output without pull-up resistor

Ordering Instructions

To place an order, please use the color-coded model: WMZ 

Size of the moving plateau:

WMZ¹⁰⁰ : 100x100mm

WMZ¹⁵⁰ : 150x150mm (future product)

Motor options:

STEPPER : standard stepper motor (see specifications at end of document)

SERVO : standard brushless motor (see specifications at end of document)

CUSTOM : your personalized motor (please specify vendor and model number)

Limit switch options:

Blank or **NC** : default setting is normally closed

NO : normally opened

Encoder option:

Blank : default version is without encoder

ENC : version with rotary incremental 500CPR encoder

Knob option:

Blank : default version is without knob

KNOB : version with manual knob

Order example: WMZ ¹⁰⁰**STEPPER**

The product is fitted with the standard NEMA17 stepper motor, without encoder. Two limit switches are installed. The limit switches are connected to be normally closed (opens at limits).

Order example: WMZ ¹⁰⁰**STEPPER****KNOB**

The product is fitted with the standard NEMA17 stepper motor, without encoder. Two limit switches are installed. A knob is installed so as to also move the table manually.

Order example: WMZ ¹⁰⁰**STEPPER****NO**

The product is fitted with the standard NEMA17 stepper motor, without encoder. Two limit switches are installed. The limit switches are connected to be normally opened (closes at limits).

Order example: WMZ ¹⁰⁰**SERVO****ENC**

The product is fitted with the standard NEMA17 brushless motor and rotary 500CPR encoder to control position and speed. Two limit switches are installed. The limit switches are connected to be normally closed (opens at limits).

Order example: WMZ ¹⁰⁰**CUSTOM**

The product is fitted with a personalized motor (NEMA17 size) chosen by the customer. For example, this can be a motor with integrated controller and driver.

Assembly

The product is provided with a temporary acrylic top to be removed during implementation.

Maintenance

The table WMZ requires an annual lubrication using a Lithium-based grease (fluid grease NLGI=00 for cross-roller bearings and soft grease NLGI=2 for ball-screw and linear guides). The table is greased at the factory and ready for use upon delivery. Ensure that the cover is put back in place after maintenance.

Warranty

The product is guaranteed for one year. See warranty terms and conditions.

Stepper motor specifications

Type of motor: NEMA 17 bipolar

Length: 39mm

Holding torque: 0.5 N.m

Step angle: 1.8°

Current per phase: 1.5A (RMS)

Nominal voltage: 24V

Brushless motor specifications

Type of motor : DC brushless motor NEMA 17

Length: 41mm

Rated voltage: 24V

Rated power = 26W

Rated torque = 63 mN.m (8.9 oz.in)

Rated speed = 4000 rpm

Rated current = 1.8 A

Torque constant = 35 mN.m/A (4.96 oz.in/A)

speed constant = 273 rpm/V = 29 (rad/sec)/V