

AW AutomationWare™
brought to you by **IKO**

One step ahead on the future

Mech Series



Mech Series

Automationware

Series: Value – Line – Force – Plus & Extreme

Mech Value Series

Small-sized electric cylinders, for high performance in terms of speed and resistance, based on a sphere recirculation screw technology, available in a normal or parallel version to optimize spaces.

They are equipped with innovative high-speed Stepper motors with encoder or in the Sensorless version, a new technology making use of motor control parameters to detect correct position without installing an encoder, thus reducing costs and sizes.

The cylinder profiles are also designed to include the **AwareVu** technology for detecting vibrations in the installation area. (Ind. 4.0)

Available sizes **16 - 25 - 32**, with direct or delayed Stepper motor for easier adjustability.



| Features/Model | UM | Mech Value 16 | Mech Value 25 | Mech Value 32 |
|--|------|---------------|---------------|---------------|
| Flange Size | mm | 30 mm | 32 mm | 42 mm |
| Diameter / Step Screw | mm | 8/-2-8 | 10/-3-10 | 12/-5-10 |
| Accuracy | mm | ±0.02 | ±0.02 | ±0.02 |
| Maximum axial force | N | 325-50 | 833-105 | 1700-250 |
| Maximum Motor Speed (Stepper) | rpm | 3000 | 3000 | 3000 |
| Maximum screw speed | rpm | 3000 | 3000 | 3000 |
| Maximum axial speed | mm/s | 100-400 | 150-500 | 250-500 |
| Useful Ride* (Non standard available under request) | mm | 50-300 | 50-400 | 50-500 |

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Serie Mech Line

Highly reliable and widespread cylinders, a consolidated product with an excellent price-performance ratio.

They are available on four sizes, **25 - 32 - 50 - 63**, using sphere recirculation screw movement, and are equipped with an anti-rotation device.

They are ISO 15552 compatible.

They can be powered using Stepper or Brushless motors, also with closed-ring control.

Motor power may be direct or delayed.



| Features/Model Line | UM | Mech Line 25 | Mech Line 32 | Mech Line 50 | Mech Line 63 |
|--|------|--------------|--------------|------------------|----------------|
| Flange Size | mm | 32 mm | 47 mm | 65 mm | 75 mm |
| Diameter / Step Screw | mm | 10/3-10 | 12/5-10 | 16/5-10-16 | 20/5-10-20 |
| Dynamic load | kN | 2,8-2,5 | 5,14-3,90 | 10,49-11,81-8,33 | 14,6-11,0-13,4 |
| Axial force 2000km | kN | 0,32-0,43 | 0,69-0,67 | 1,42-2,02-1,67 | 1,98-1,88-2,89 |
| Maximum screw speed | rpm | 4500 | 4500 | 4500 | 4500 |
| Maximum axial speed | mm/s | 750 | 750 | 1200 | 1500 |
| Useful Ride* (Non standard available under request) | mm | 50-300 | 50-400 | 50-500 | 50-500 |

Mech Series

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Series: Value – Line – Force – Plus & Extreme

Mech Force Series

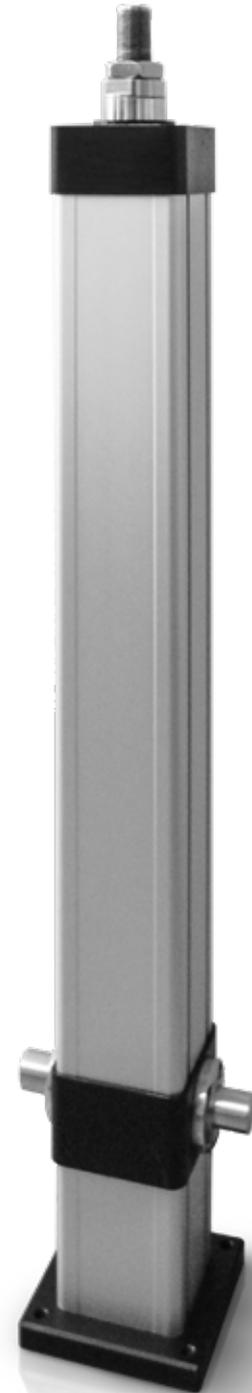
The **Mech Force series** is suitable for the most extreme workloads or in situations where heavy-duty operation is required with a high dynamic load over time.

The profile has a reinforced structure and the driving technology consists in customized sphere recirculation screws, to achieve high dynamic loads offering optimal speed performances thanks to the various step options.

They are ISO 15552 compatible, can be powered by Brushless or Stepper motors, which can also be coupled to gearboxes in order to take up less space and provide a comprehensive solution.

They can include the **AwareVu** device which gives continuous feedback on operation under standard conditions, warning in advance about any maintenance needs.

The **Mech Force 150** version has a Steel structure.



| Features/Model Line | UM | Mech Force 50 | Mech Force 63 | Mech Force 80 | Mech Force 100 | Mech Force 125 | Mech Force 150 |
|---|------|----------------|----------------|----------------|-----------------|----------------|----------------|
| Flange Size | mm | 65 mm | 75 mm | 95 mm | 115 mm | 135 mm | 165 mm |
| Diameter / Step Screw | mm | 20/5-10-20 | 25/5-10-25 | 32/5-10-32 | 40/5-10-40 | 50/10 | 63/10-16-20 |
| Dynamic load | kN | 14,6-11-13,4 | 19,8-16-15,1 | 25,9-29,8-22,7 | 23,9-60,4-44,4 | 76,9 | 87,9-190-141,9 |
| Axial force 2000km | kN | 1,98-1,88-2,89 | 2,69-2,74-3,50 | 3,52-5,1-5,72 | 3,24-10,33-12,0 | 13,15 | 15-38-30,57 |
| Maximum screw speed | rpm | 4500 | 4500 | 4062 | 3250 | 2600 | 2063 |
| Maximum axial speed | mm/s | 1500 | 1875 | 2166 | 2167 | 433 | 688 |
| Useful Ride* (Non standard available under request) | mm | 50-500 | 50-600 | 50-800 | 50-800 | 50-1000 | 50-500 |

Mech Series

Automationware

Series: Value – Line – Force – Plus & Extreme

Mech Plus & Extreme Series

The **Mech Plus series** is suitable for the most extreme loads and adds very compact cylinder features.

In addition, the series has a graft for greasing the screw, in cases of heavy duty where an automatic lubrication is required. In the parallel version, it has a high resistance transmission belt and no backlash (*clearance 0*).

The profile has a reinforced structure and the pushing technology is built with ball screws with high dynamic loads combined with a structure of very compact snail, to always offer maximum performance.

There is a version called **Mech Extreme** with a dynamic load of over 750,000 Newton for high-load applications with extreme durability, based on an ISO 5 rectified screw system, designed to the **Automationware** specification.

This cylinder can be used for continuous loads of years to over 70000 Newton, ideal for extreme applications. (*Reinforced in steel*).

The whole series is ISO 15552 compatible, they can be motorized with Brushless or Stepper devices also coupled to reducers to keep the overall dimensions limited and offer a compact solution.

They can contain the **AwareVu** device to give a continuous feedback on the functioning in normal conditions, warning in advance about any unusual vibrations.



New

| Features/Model Line | UM | Mech Plus 50 | Mech Plus 63 | Mech Plus 80 | Mech Plus 100 | Mech Plus 125 | Mech Plus 160 | Mech Plus Extreme |
|---|------|--------------|--------------|--------------|---------------|---------------|---------------|-------------------|
| Flange Size | mm | 65mm | 75 mm | 100mm | 120mm | 140mm | 180mm | 180mm |
| Diameter / Step Screw | mm | 25P10 | 32P10 | 40P10 | 50P10 | 63P10 | 80P10 -20 | 50P40 ISO 5 |
| Dynamic load | kN | 19,9 | 33,8 | 78,6 | 97,8 | 109,7 | 121,9 - 213,7 | 414 - 752 |
| Axial force 2000km | kN | 3,4 | 5,78 | 13,44 | 16,72 | 18,76 | 20,84 - 46 | 92 - 184 |
| Maximum screw speed | rpm | 4500 | 4375 | 3500 | 2800 | 2222 | 1750 | 1500 |
| Maximum axial speed | mm/s | 750 | 729 | 583 | 467 | 370 | 292 - 583 | 1000 |
| Useful Ride* (Non standard available under request) | mm | 50-600 | 50-800 | 50-900 | 50-1100 | 50-1300 | 50-1500 | 50-1000 |

Mech Series

Automationware

Benefits and Selection Criteria

| Characteristic | Mech Value (New) | Mech Line | Mech Force | Mech Plus |
|---------------------|---------------------|---------------------|---------------------------|----------------------------|
| Size | 16-25-32 | 25-32-50-63 | 50-63-80-100-150 | 50-63-80-100-150 |
| Max Axial Force | 1700 N | 2400 N | 190000 N | 213000 N |
| Accuracy | 0,02 +/- | 0,02 +/- | 0,01 +/- | 0,01 +/- |
| Max Speed | 0,5 m/s | 1,5 m/s | 2 m/s | 0,75 m/s |
| Lubrication | manual | manual | manual (automatic on 150) | automatic (optional on 50) |
| Parallel drive | Y | Y | Y | Y |
| Gearbox | N | optional | optional | optional |
| Anti-rotation | Y | Y | Y | Y |
| Diagnostic Ind. 4.0 | AwareVu™ (optional) | AwareVu™ (optional) | AwareVu™ (optional) | AwareVu™ (optional) |
| Motor | Stepper | Stepper & Brushless | Stepper & Brushless | Brushless |

Applications

Mech Value Series: A revolution on small-sized cylinders

Ideal cylinders for small-scale applications, to replace pneumatic systems and achieve precise and rapid speed modulation, with intermediate positions and adjustable acceleration.

Available with the new Stepper motor, which allows for cost saving and size reduction, **always with a view to precise positioning control.**

Mech Line Series: Ideal for medium-scale industrial applications

Ideal electric cylinders for industrial applications with medium applicable strength, an excellent alternative to pneumatic or hydraulic cylinders with remarkably low operating costs.

They are designed for long life without maintenance, and include a set of accessories suitable for any configuration.

Mech Force & Mech Plus Series: Ind. 4.0 Resistance and Technology, uncompromising

Excellent cylinders for the most extreme applications, where high drive and/or long operation are required.

The dynamic loads of the sphere recirculation screws are among the highest on the market, ensuring top quality as well as cutting-edge drive performance levels.

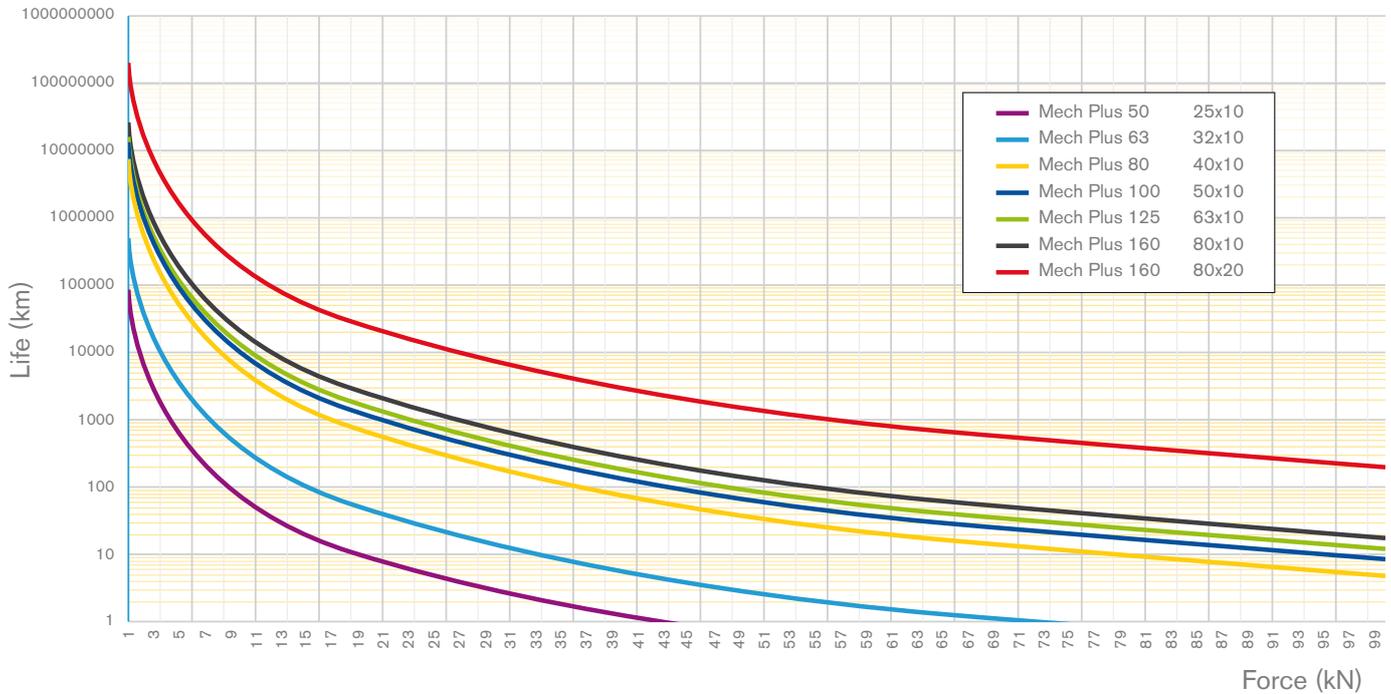
The Plus Series adds Ind. 4.0 technology and compactness as standard.

(Automationware AwareVu patent which prevents three-dimensional vibrations using an electronic system in the base of the cylinder, which can also be controlled via Wi-Fi to check any malfunctioning in the system.)

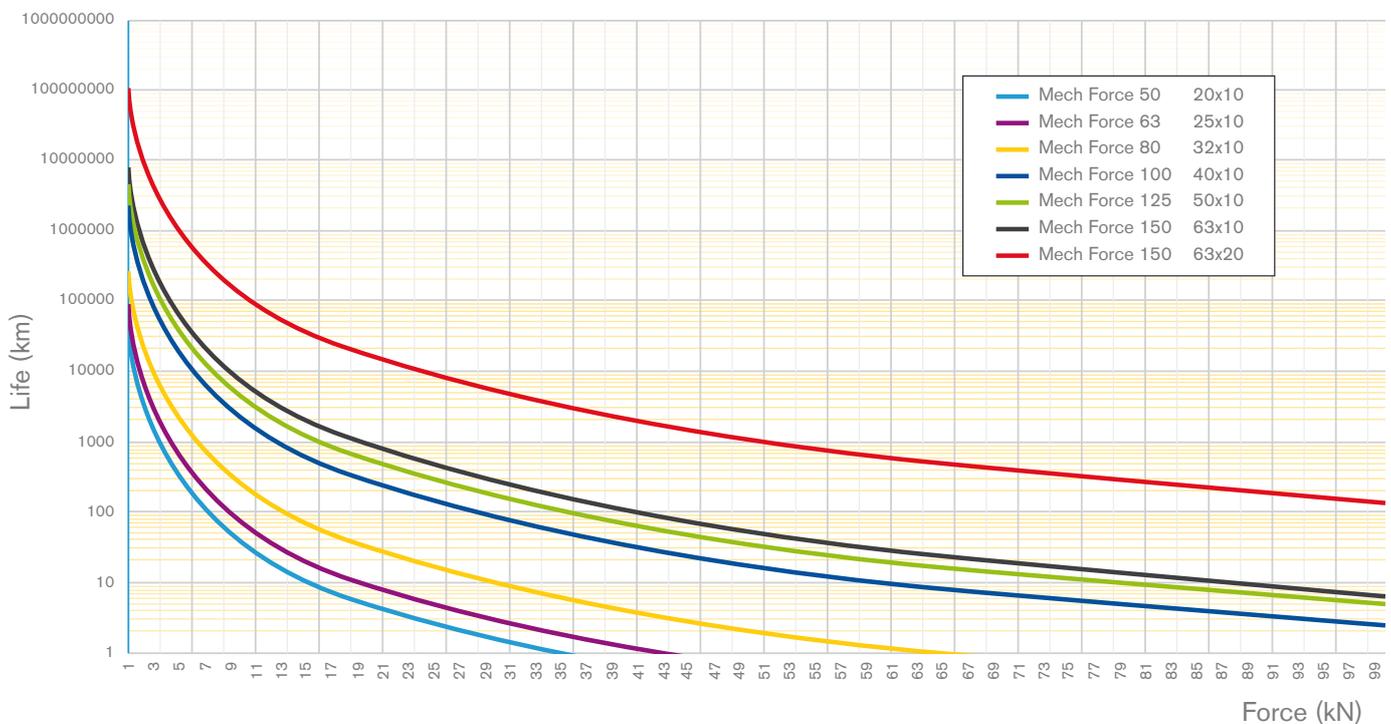
Specifiche

Performance tables for the **Mech Plus** and **Mech Force** series
(Duration as a function of the load)

Mech Plus - Force Vs. Life expressed in km (based at 500 rpm)



Mech Force - Force Vs. Life expressed in km (based at 500 rpm)



The tables in figure show the operational performance levels in km as a function of the loads applied in kNewton (at a speed of 500 rpm).

The tables are merely indicative: we always recommend sizing depending on the work cycle, speed and load applied.

Applications

Automotive and heavy load moving

The automotive industry sector often requires the use of hydraulic cylinders for the production chain and for the components-assembly phase (*Use of the cylinders as press.*)

The easy installation and the easy programming, makes them very useful to avoid complex pneumatic or hydraulic installations.



Diagnostic and Healthcare

The electric cylinder can be very useful for micrometric movements on scanning devices and TAC. The system also maintains the position, even without power supply. In absence of the hydraulic, it is the ideal solution to simplify the design of the compact and transportable medical diagnostic systems.

It allows the accurate positioning of persons and objects for the electronically programmable diagnostics. For the pharmacological production cycles, the electric cylinders prevent each contamination, allow the product packaging in aseptic rooms with precision and minimal maintenance.

Automationware provides also linear axes, combinable with other Pick & Place solutions for the packaging of pharmacological products for automated diagnostic.



Packaging and/or material motion

Very useful for packaging systems, ideal solution for industrial applications, such as the logistics, if the material movement needs high forces, modulate movements, also with high speed.

Aerospace & Defence

Many defence applications need industrial actuators to moderate the investment, maintaining an excellent level of quality and easy use in normal application situations.

Our cylinders offer a very good applicability for different configurations, such as navigation simulators (*also militar*). Very useful also for the logistic applications, if the IP65 protection can be appropriate.

Factory automation

Essential in modern palletising systems, excellent in industrial production chains to find a rapid solution to eventual line problems. Very useful for the warehouses, as extending and upgrading of existing facilities.

Energy

Widely used for the flow control of the hydroelectric turbines, for easy installation and regulability. Widely used also for wind-power applications, for the variation of the incidence angle of the blades.

Very useful also for fuel extraction or fuel production installations, thanks to its easy maintenance and management, also by remote control.

Machine tools

Used as substitutes for hydraulic systems of machines for metal sheets bending.

The easy use and the simplification of systems make them very popular in the applications that need the “press” type operation. They can also be used in very vertical applications, such as tyre-inserting machines, simplifying the hydraulic inserting systems. Machine tools for the production of springs or for the mechanical component insertion, such as bearings, bushings, ringnuts, reducing the complexity of the systems, modulating the pressure with programmed motion.



Mech Plus

Automationware

Designed to offer
the best combination of force performance
with a compact and solid form factor

Gearbox

With very high efficiency using
a best performance helicoidal
planetary system for long life and
low noise level (Backlash ≤ 5)

Permanent Magnetic

system included on the roller screw
ball system for accurate positioning
optimization

Magnetic detectors

Inserted on chassis (no external wires)

Head bearing

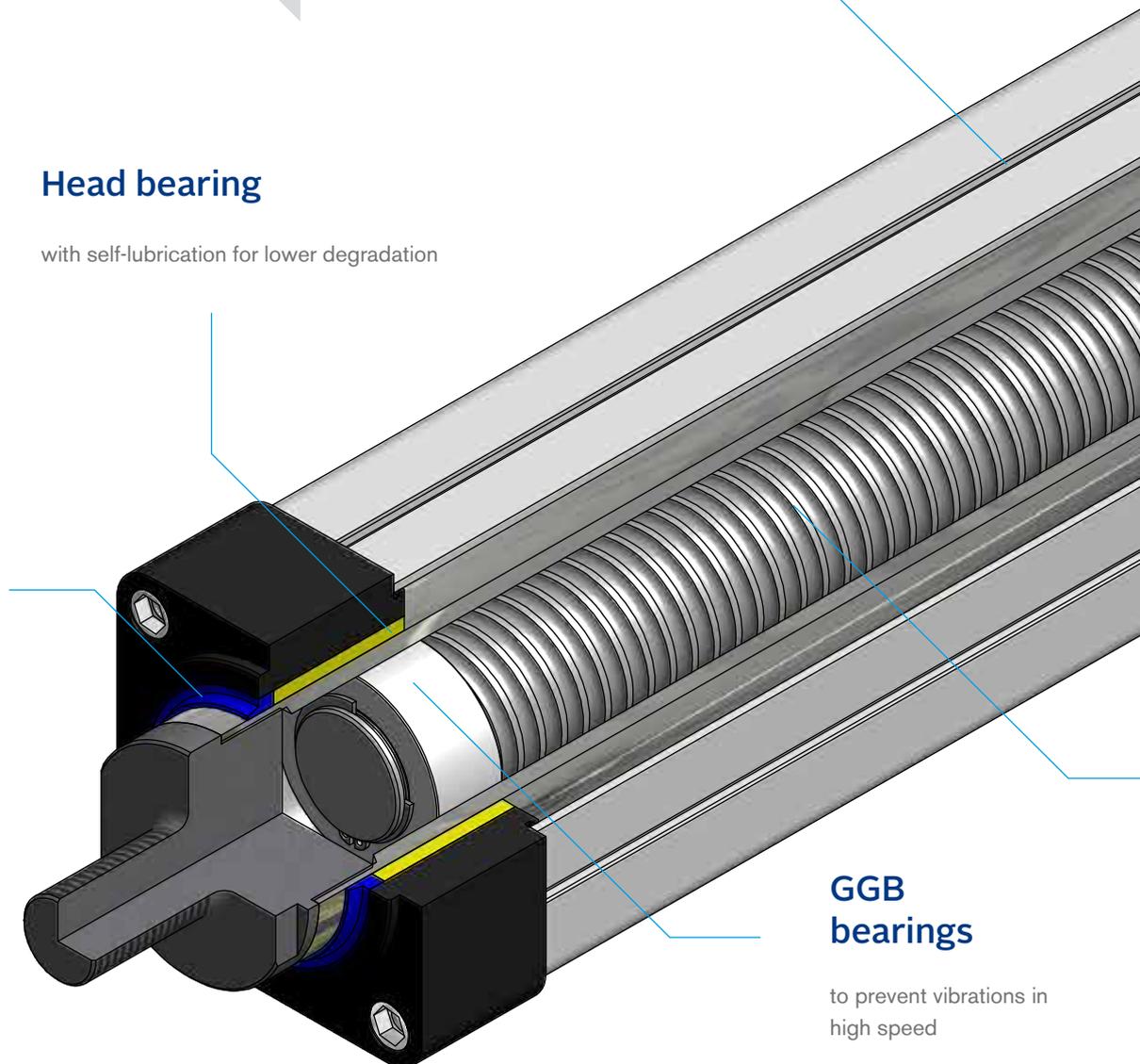
with self-lubrication for lower degradation

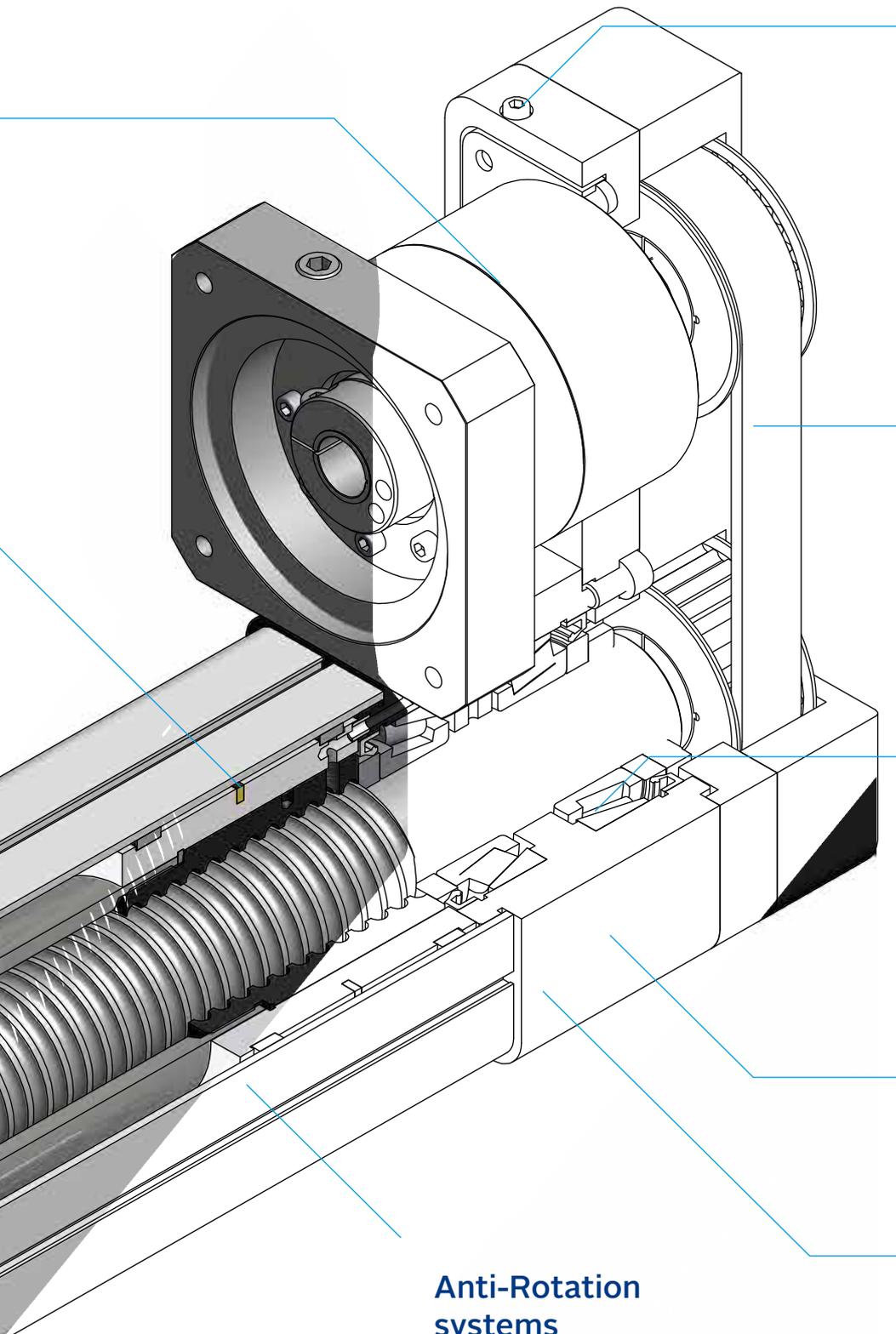
Dust scraper

Seal to avoid
contamination from
external and selected
for severe temperature
variation (degree of
protection IP 65) –
Double protection for
hostile situation

GGB bearings

to prevent vibrations in
high speed





Micrometric Belt tension system

With factory pre-setup for best efficiency and accuracy

High performance Kevlar

belt for high durability stiffness

Lubrication system

Tapered roller bearings, with high capacity torque and pin for centralized lubrication system

Lateral pins

Optional lateral pins for heavy loads operations

Anti-Rotation systems

Cylinder with **anti-rotation** systems included

Roller balls screw ISO 7

(ISO 5 optional), for long life span and heavy load



AwareVu™

Vibration and Temperature Control for Ind. 4.0 Diagnostics

Mech Series

Automationware

Drives and Diagnostics Ind. 4.0

| Motors and Drives | I/O | CANopen | Ethercat | Profinet | Mech Value (New) | Mech Line | Mech Force | Mech Plus |
|-------------------|----------------------------------|---------|----------|----------|-----------------------|-----------------------|-----------------------|-----------------------|
| Drive AW EZI | X | na | optional | na | Stepper (Nema xx) | Stepper (Nema xx) | na | na |
| Drive AW ECMA | X | X | X | na | na | Brushless | Brushless | na |
| Drive AW ServoOne | X | X | X | X | na | na | Brushless High Torque | Brushless High Torque |
| Encoder | Incremental | | | | Sensorless / Optional | Required / Sensorless | Required | Required |
| Easy Software | Move Modelling | | | | Option | Option | Option | Option |
| AwareVu | 3D vibration Diagnostic Ind. 4.0 | | | | Optional | Optional | Optional | Included |

Market Ahead solutions to achieve Ind. 4.0 movement, control and diagnostics on your mechatronic components

All cylinders in the Mech series can be fitted with **Stepper** or **Brushless** motors.

The **Stepper** power system includes the possibility of encoder or **sensorless** control, in order to make the cylinder more compact and economical, always guaranteeing precise positioning thanks to a technology which detects position based on electric operation parameters.

With **Brushless** motors very high axial speeds can be achieved, always with the utmost precision, thanks to a wide range of available encoders.

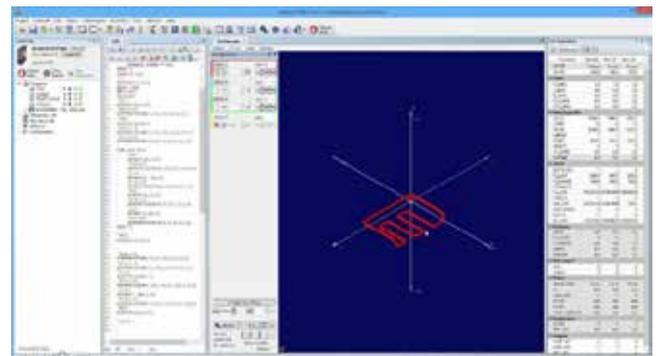
It is based on a full-closed loop control system, with **auto notch filter** which prevents vibrations also at high productivity levels to reduce noise during operation.

The 17-bit encoder guarantees high positioning precision, allowing for a 0.01 mm precision.

If the cylinders need to be used in coordination on several axes (for example in *TRIPOD- Simulator systems*), as an option, we offer a **four-axis** driver with **TRIO software**, in order to allow for advanced motion interpolation.

This axial system control may include our EZI – ECMA -ServoOne drivers, which can all be integrated in a single chassis.

The integrated **E-Cam** connection allows for easy synchronization of motion and positioning with cameras.



For basic applications, **Automationware** has a control software system called **Easy** which can be installed on a standard PC or Tablet and connected via a USB or Serial interface to the control electronics.

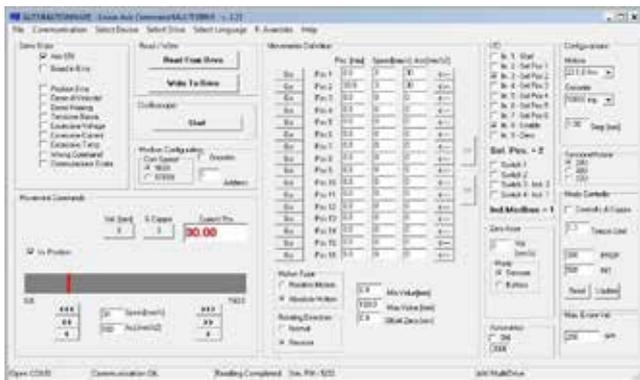
The following figure illustrates the main menu of the **Easy** software.

It is possible to set as many as 64 positions, each of them characterized by adjustable speed and acceleration.

Positioning data can be defined in an absolute or relative way with regard to the current location.

The command selection for the various positions (*in succession or random*) makes it possible to simulate automated operation of the actuator.

If this command is entered, the actuator moves to the required position and a graphical indication is given of the position reached.



Sistema AwareVu™, for Ind. 4.0 diagnostics



Electronic control installed on the base of the electric cylinder (as standard on Mech Plus)

AW has developed a new diagnostic system called **AwareVu™** (Patent Pending).

It allows for actuator monitoring through temperature and vibration checks, in order to identify any faults during operation phases also due to factors external to the cylinder.

The system is designed to trigger a local warning (*Light Alarm*), as well as being collected via WIFI or via USB to the network, which makes it possible to save production parameter data, in the central computer or in cloud.

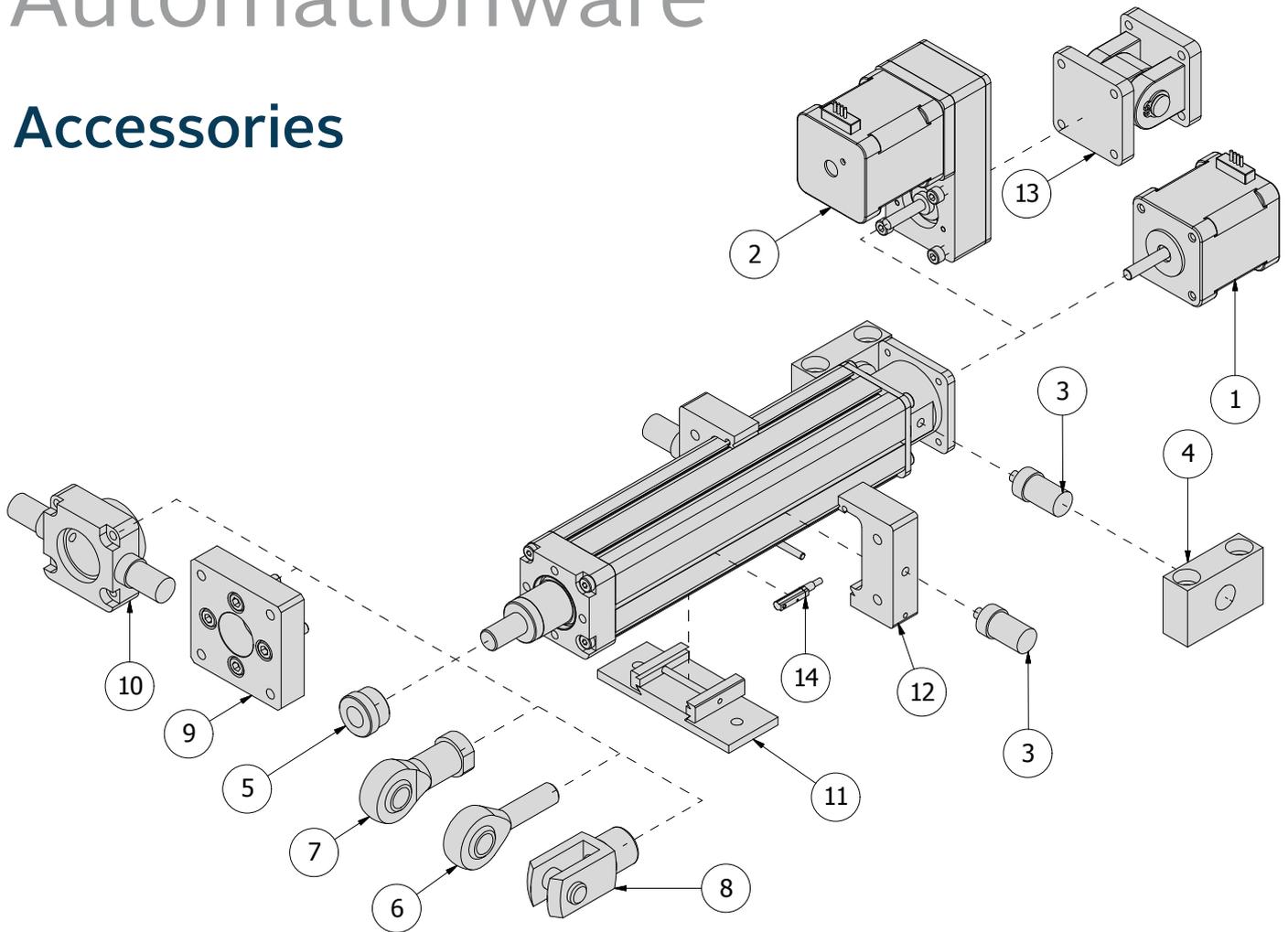
The system also includes Mobile Phone or Tablet applications, in order to warn maintenance operators about possible malfunctioning, with the possibility of displaying data, parameters or alarms on screen.

The system stores and processes signals from vibration and temperature sensors; this produces a frequency profile diagram (*Fourier series*), which allows the client to set threshold values, to be warned in the event of unusual vibrations or excessive temperature variations (*also on an individual system component*).



Mech Value Automationware

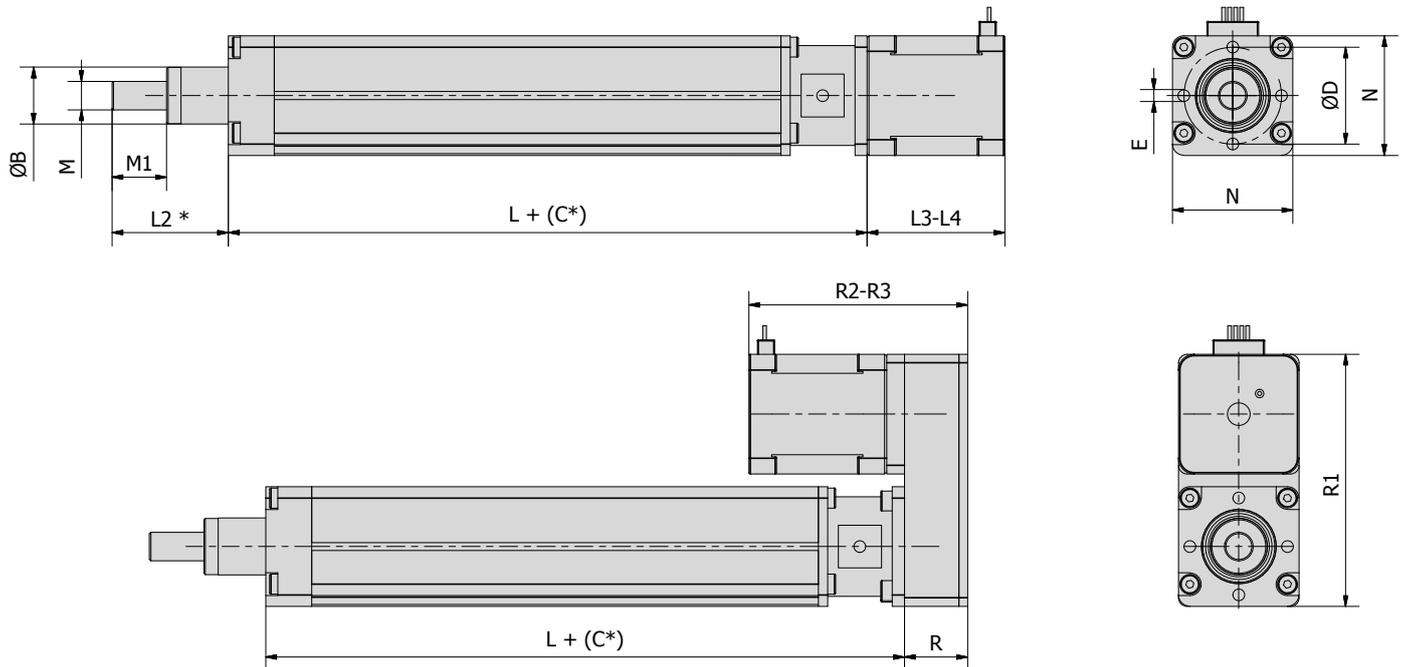
Accessories



MECH VALUE ACCESSORIES

| POSITION | DESCRIPTIONS |
|----------|------------------------------------|
| 1 | Direct drive Kit |
| 2 | Parallel Drive Kit |
| 3 | Lateral PIN kit |
| 4 | Adjustable intermediate zipper kit |
| 5 | Kit pins on poster head |
| 6 | Support kit for pins |
| 7 | Fixing kit on top |
| 8 | Front spherical joint |
| 9 | Threaded anterior spherical joint |
| 10 | Front fork joint |
| 11 | Pierced nipple |
| 12 | Backward joint swinging kit |
| 13 | Front interface plate kit |
| 14 | effect hall sensor |

Dimensions and Components



DIMENSION: Base Version, Direct drive Parallel Drive

| Actuator Size | UM | Mech Value 16 | Mech Value 25 | Mech Value 32 |
|---------------|----|---------------|---------------|---------------|
| Lead screw | mm | 8x3-8 | 10x3-10 | 12x5-10 |
| ØB | mm | 16 | 18 | 20 |
| ØD | mm | 25 | 28 | 34 |
| E | mm | M4x8 | M3x8 | M6x12 |
| L | mm | 88,5 | 105,5 | 122,5 |
| L2* | mm | 28 | 34 | 40,5 |
| L3 | mm | 45 | 38 | 48 |
| L4 | mm | 50 | 53 | 60 |
| M | mm | M6 | M8 | M10x1,25 |
| M1 | mm | 12 | 16 | 19 |
| N | mm | 30 | 32 | 42 |
| R | mm | 17 | 17 | 22 |
| R1 | mm | 60,5 | 75,5 | 88,5 |
| R2 | mm | 69,7 | 62,7 | 76,2 |
| R3 | mm | 74,7 | 77,7 | 88,2 |

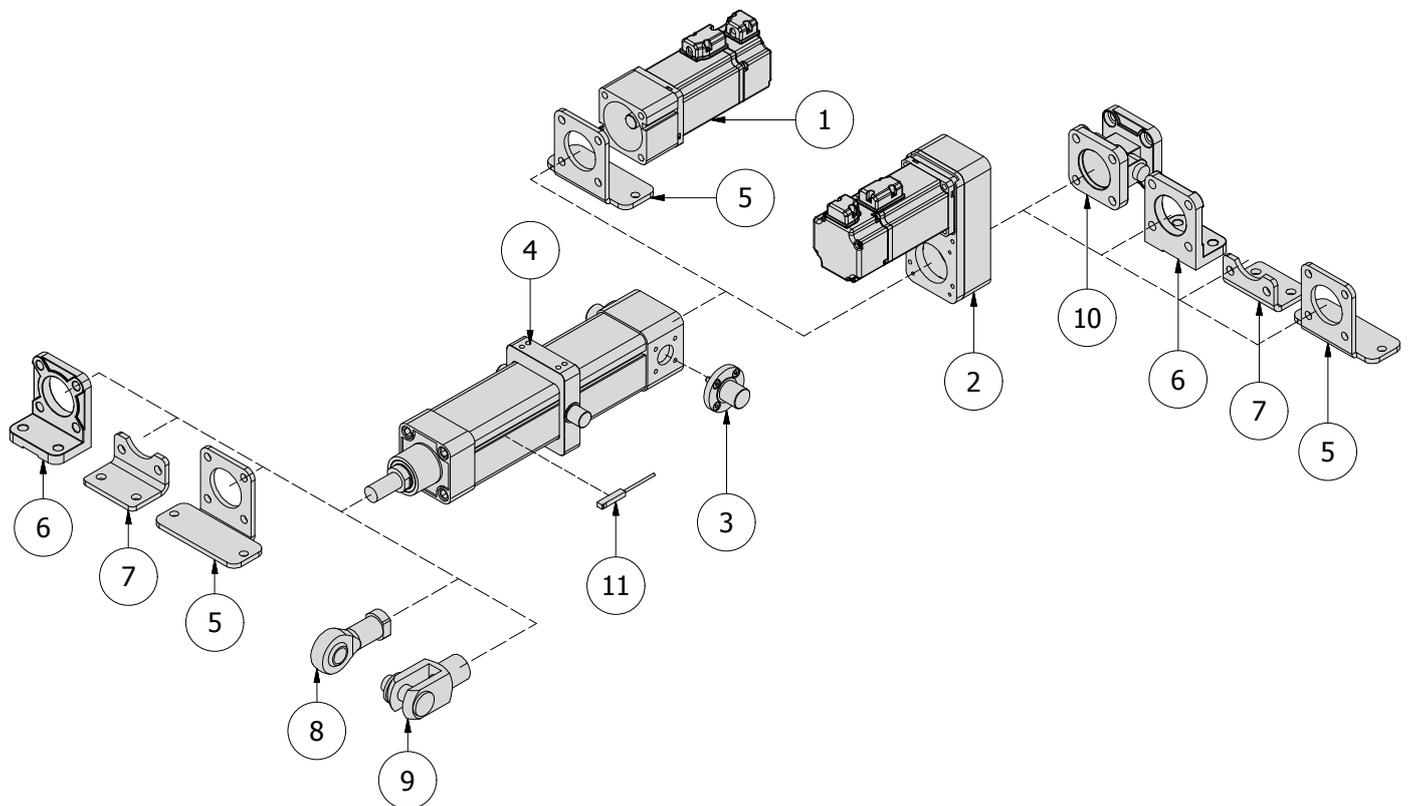
L2*= QUOTA TO BE MODIFIED IN CASE OF INTERFACE FLANGE ADDITION:

Mech 16 = 12 mm Mech 25 = 44 mm Mech 32 = 54,5 mm

L3 = short motor R2 = short motor
 L4 = long motor R3 = long motor

Mech Line/Force Automationware

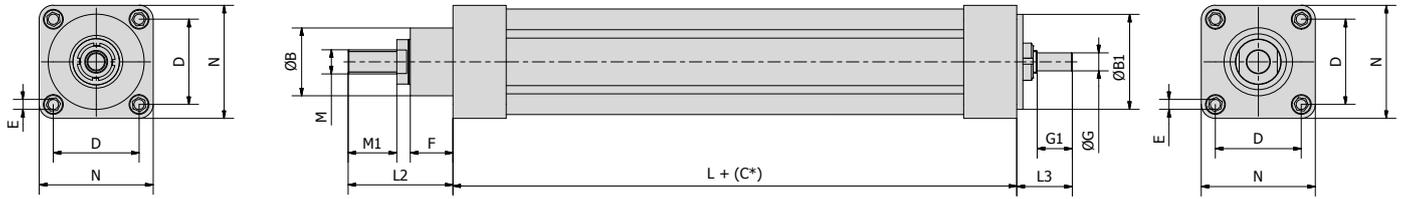
Accessories



MECH LINE/FORCE ACCESSORIES

| POSITION | DESCRIPTIONS |
|----------|--|
| 1 | Direct drive Kit |
| 2 | Parallel Drive Kit |
| 3 | Lateral PIN kit |
| 4 | Lateral flange support for lateral Kit |
| 5 | wider Lateral flange support Kit |
| 6 | flange support Kit |
| 7 | Lower flange support Kit |
| 8 | Clevis rod end |
| 9 | Fork rod end |
| 10 | Backward joint swinging kit |
| 11 | effect hall sensor |
| | Available Gearbox 3-4-5-7-10-16-20 |

Dimensions and Components



DIMENSION: Base Version, Direct drive Parallel Drive

| Actuator Size | UM | Mech Line 25 | Mech Line 32 | Mech Line 50 | Mech Line 63 |
|---------------|----|--------------|--------------|--------------|--------------|
| Lead screw | mm | 12x5-10 | 12x5-10 | 16x5-10-16 | 20x5-10-20 |
| ØB | mm | - | 30 | 40 | 45 |
| ØB1 | mm | 22 | 32 | 50 | 63 |
| D | mm | Ø26 | 32,5 | 46,5 | 56,5 |
| E | mm | N°4 M3x5 | N°4 M6x18 | N°4 M8x15 | N°4 M8x15 |
| ØG | mm | - | 20 | 28 | 28 |
| L | mm | Ø6 h8 | Ø8 h8 | Ø10 h8 | Ø12 h8 |
| L2 | mm | 12,5 | 16,5 | 16 | 23,1 |
| L3 | mm | 97,3 | 129 | 134 | 171 |
| M | mm | 24 | 48 | 41 | 41 |
| M1 | mm | 20 | 25,5 | 27,5 | 36,5 |
| N | mm | M8 | M10x1,25 | M16x1,5 | M16x1,5 |
| M1 | mm | 20 | 20 | 32 | 32 |
| N | mm | 32 | 47 | 65 | 75 |

*C = Corsa

DIMENSION: Base Version, Direct drive Parallel Drive

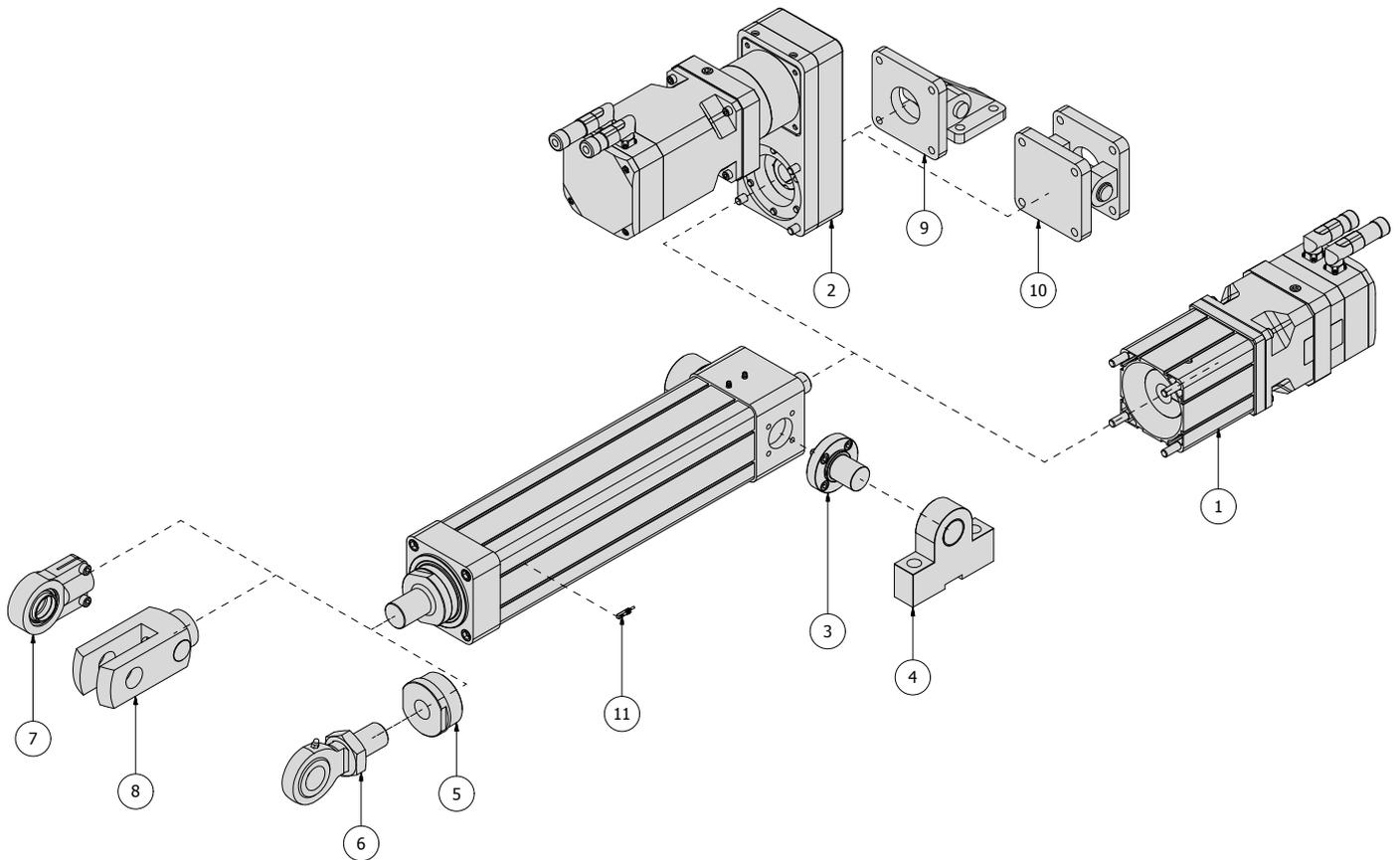
| Actuator Size | UM | Mech Force 50 | Mech Force 63 | Mech Force 80 | Mech Force 100 | Mech Force 125 | Mech Force 150 |
|---------------|----|---------------|---------------|---------------|----------------|----------------|----------------|
| Lead screw | mm | 20x5-10-20 | 25x5-10-25 | 32x5-10-20-32 | 40x5-10-20-40 | 50x5-10-40 | 63x10-16-20 |
| ØB | mm | 40 | 45 | 55 | 70 | 90 | 90 |
| ØB1 | mm | 50 | 63 | 80 | 100 | 125 | 150 |
| D | mm | 46,5 | 56,5 | 72 | 89 | Ø130 | Ø130 |
| E | mm | N°4 M8x18 | N°4 M8x18 | N°4 M10x20 | N°4 M10x20 | N°8 M10x25 | N°8 M16x30 |
| ØG | mm | 3 | 3 | 3 | 3 | 3 | 3 |
| L | mm | Ø12 h8 | Ø14 h8 | Ø17 h8 | Ø24 h8 | Ø32 h8 | Ø32 h8 |
| L2 | mm | 24,5 | 27 | 31 | 40,5 | 48 | 50 |
| L3 | mm | 173 | 182 | 228 | 285 | 300 | 438 |
| M | mm | 45 | 55 | 60 | 70 | 105 | 95 |
| M1 | mm | 34 | 36,4 | 40 | 52,6 | 61 | 64 |
| N | mm | M16x1,5 | M20x1,5 | M20x1,5 | M27x2 | M30x2 | M36x3 |
| M1 | mm | 32 | 40 | 40 | 50 | 60 | 60 |
| N | mm | 65 | 75 | 95 | 115 | 135 | 165 |

*C = Corsa

Mech Plus

Automationware

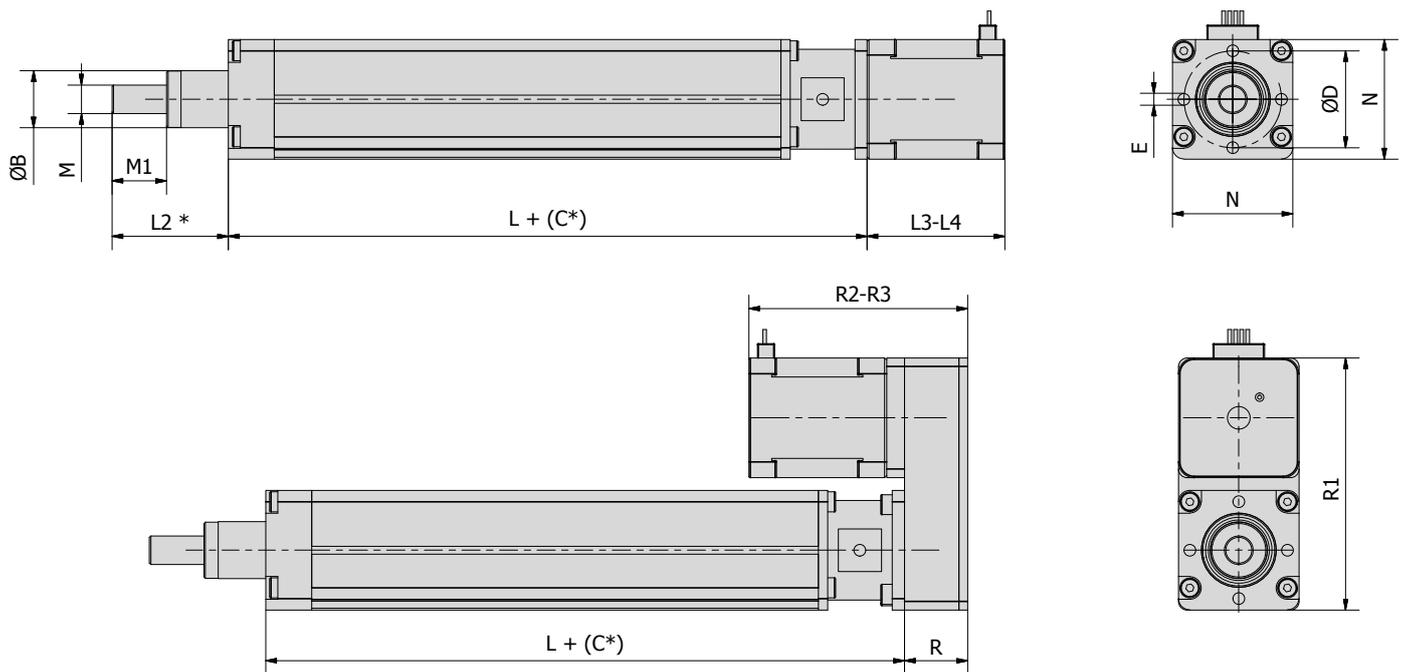
Accessories



MECH PLUS ACCESSORIES

| POSITION | DESCRIPTIONS |
|----------|--|
| 1 | Direct drive Kit |
| 2 | Parallel Drive Kit |
| 3 | Lateral PIN kit |
| 4 | Lateral flange support for lateral Kit |
| 5 | Female threaded |
| 6 | Spherical rod end |
| 7 | Clevis rod end |
| 8 | Fork rod end |
| 9 | 90°Backword joint swinging kit |
| 10 | Backword joint swinging kit |
| 11 | effect hall sensor |
| | Available Gearbox 3-4-5-7-10-16-20 |

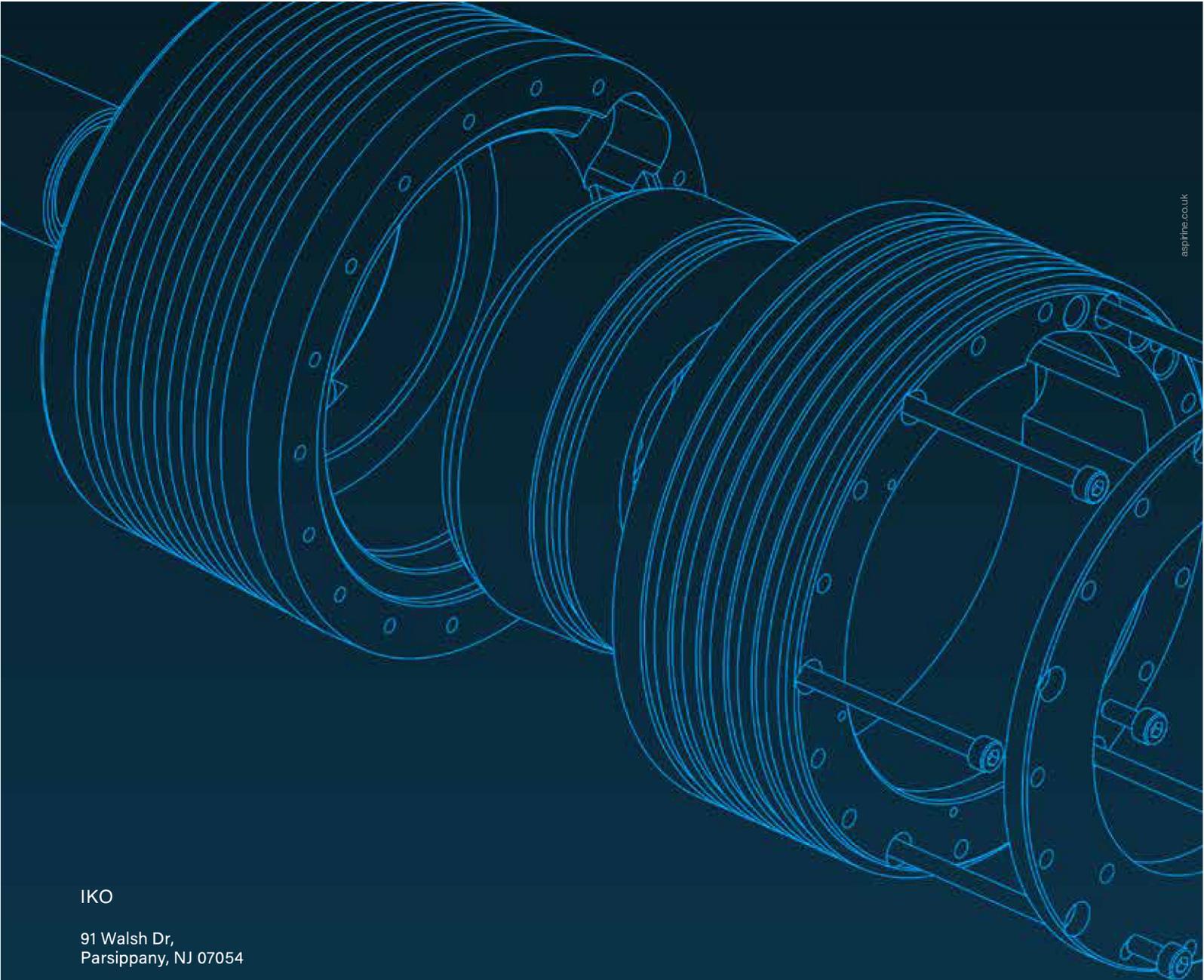
Dimensions and Components



DIMENSION: Base Version, Direct drive Parallel Drive

| Actuator Size | UM | PLUS 050 | PLUS 063 | PLUS 080 | PLUS 100 | PLUS 125 | PLUS 160 | |
|---------------|----|-----------|-----------|-----------|-----------|------------|------------|------------|
| Lead screw | mm | P10 | P10 | P10 | P10 | P10 | P10 | P20 |
| A1 | | 17 | 20 | 23 | 28,5 | 30,5 | 45 | 45 |
| A2 | | 17 | 20 | 23 | 28,5 | 30,5 | 45 | 45 |
| A3 | | 27 | 30 | 41 | 55,5 | 50,5 | 60 | 60 |
| A4 | | 27 | 30 | 39 | 47,5 | 50,5 | 60 | 60 |
| A5 | | 24 | 34 | 40 | 50 | 70 | 80 | 80 |
| ØB | | 50 g6 | 70 g6 | 80 g6 | 100 g6 | 120 g6 | 160g6 | 160g6 |
| ØB1 | | 50 g6 | 63 g6 | 80 g6 | 100 g6 | 125 g6 | 160g6 | 160g6 |
| D | | 46,5 | 56,5 | 72 | 89 | 110 | 140 | 140 |
| ØD | | 45 | 58 | 71 | 88,8 | 112 | 140 | 140 |
| E1 | | M8x18 | M8x18 | M10x20 | M10x20 | M12x20 | M16x30 | M16x30 |
| E2 | | M8x10 | M8x10 | M12x12 | M16x20 | M16x20 | M20x30 | M20x30 |
| E3 | | N°6 M4x12 | N°8 M4x12 | N°8 M4x12 | N°8 M5x12 | N°4 M10x20 | N°8 M10x20 | N°8 M10x20 |
| F | | 3 | 3 | 5 | 6 | 6 | 10 | 10 |
| F1 | | 3 | 6 | 6 | 6 | 6 | 13 | 13 |
| ØG | | 14 h7 | 16 h7 | 22 h7 | 25 h7 | 32 h7 | 35 h7 | 35 h7 |
| G1 | | 22 | 25 | 28 | 38 | 45 | 46 | 46 |
| H | | 5 | 6 | 8 | 10 | 10 | 10 | 10 |
| H1 | | 16 | 20 | 20 | 36 | 40 | 40 | 40 |
| ØI | | 40 | 55 | 65 | 80 | 90 | 120 | 120 |
| ØI1 | | 28 | 38 | 44 | 56 | 75 | 85 | 85 |
| L | | 132 | 147 | 178 | 216 | 219,5 | 270 | 325 |
| L1 | | 176 | 197 | 240 | 292 | 300,5 | 375 | 430 |
| L2 | | 56 | 64 | 70 | 76 | 90 | 118 | 118 |
| L3 | | 36,5 | 46,5 | 49 | 63 | 69 | 80 | 80 |
| M | | M20x1,5 | M20x1,5 | M27x2 | M27x2 | M33x2 | M42X2 | M42X2 |
| M1 | | 35 | 40 | 45 | 45 | 60 | 80 | 80 |
| N | | 65 | 75 | 100 | 120 | 140 | 180 | 180 |
| P | | 157 | 204,5 | 243 | 283,7 | 302 | 356 | 363,5 |
| P1 | | 189 | 225,5 | 231 | 311,5 | 239,5 | 390,5 | 398 |
| R | | 43 | 58 | 58 | 70 | 78 | 107 | 107 |
| R1 | | 65 | 75 | 100 | 120 | 139 | 180 | 180 |
| R2 | | 150 | 190 | 227 | 305 | 320 | 415 | 415 |
| R3 | | 110 | 152 | 177 | 211 | 212 | 264 | 264 |
| R4 | | 142 | 168 | 165 | 238,5 | 328,5 | 298,5 | 298,5 |

*C = Corsa



IKO

91 Walsh Dr,
Parsippany, NJ 07054

Telephone 862 895 6280
Email ikoaw_usa@ikonet.co.jp

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