

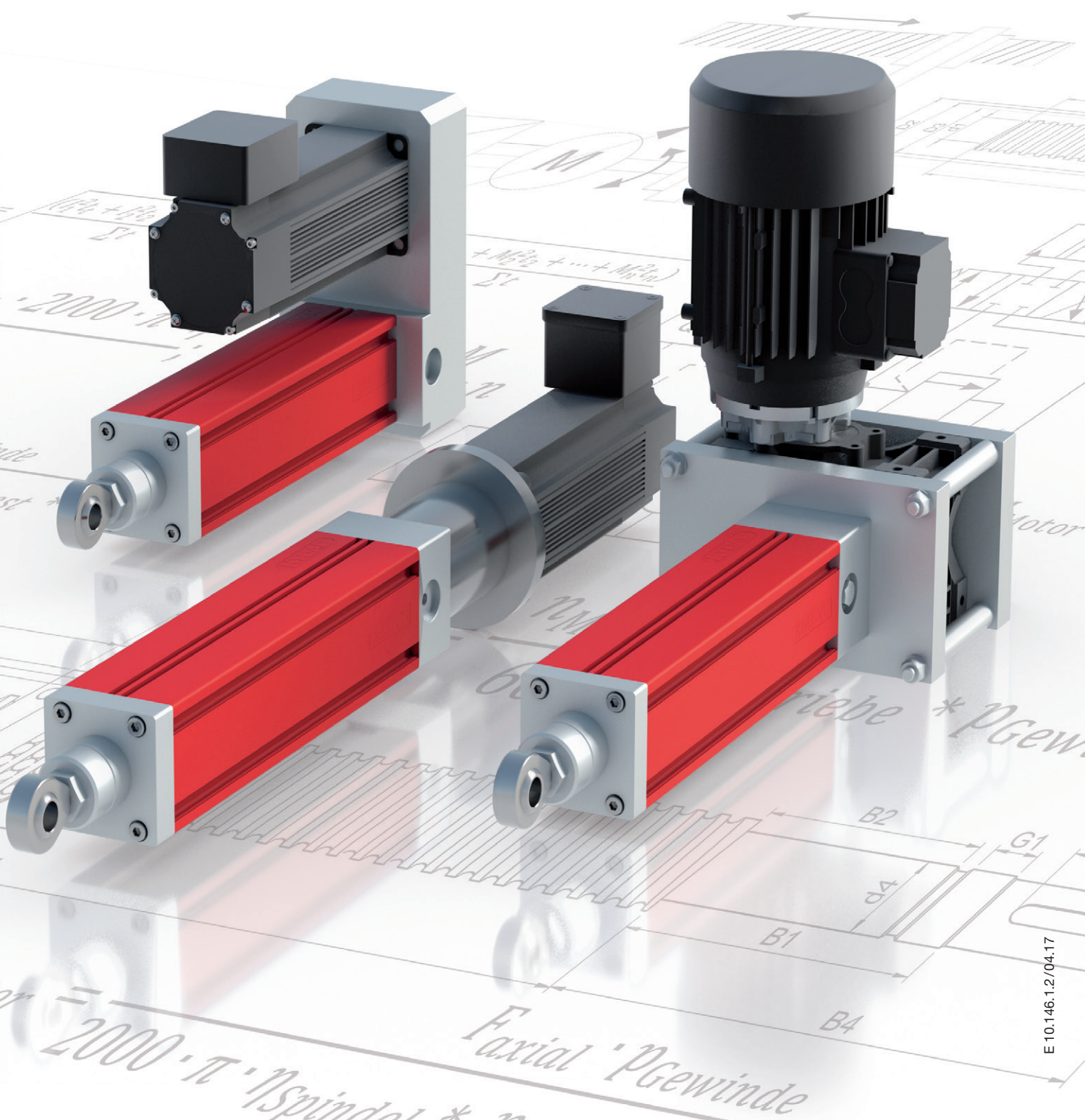
HYDAC INTERNATIONAL

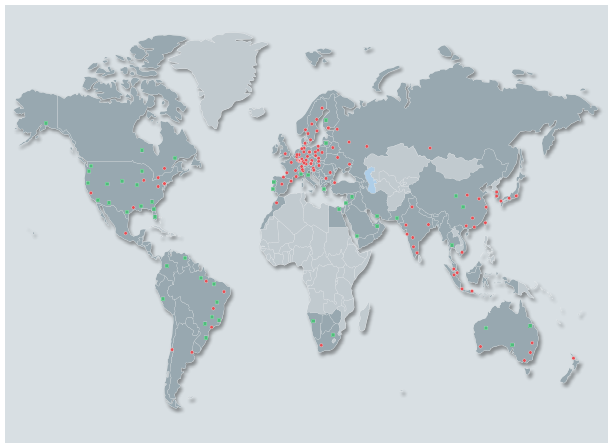


KINESYS

HYDAC KineSys

Electric Cylinders HEZ





HYDAC was founded in 1963 in Sulzbach/Neuweiler in Germany, which is still the company's head office today. With over 8,000 employees worldwide, HYDAC is one of the leading companies for fluid power, hydraulics and electronics.

With over 45 subsidiaries outside of Germany and more than 500 sales and service partners, HYDAC is within easy reach of its customers and is a reliable partner worldwide.

With the breadth and depth of its product range, combined with its recognised expertise in development, manufacturing, sales and service, HYDAC designs and manufactures modern and reliable drive systems.

HYDAC KineSys stands for kinematic systems which are notable for their perfect symbiosis of hydraulic and electromechanical engineering.

Customers increasingly require modern machines and systems which offer high productivity combined with efficient use of resources. Against a background of steadily rising costs for energy and for raw materials, the efficient design of the drive system is an important factor when considering overall life cycle costs. This means that modern drive technology represents a competitive advantage.

Using the experience gained from many international projects, our industry and product specialists can analyse your application. Together we can quickly and accurately work out cost-effective solutions.

Depending on the application, different strategies are chosen for the drive task concerned, ranging from simple control through to a highly dynamic control system.

We can make use of numerous test benches and simulation systems. It is of no consequence whether it concerns the custom development and manufacture of stationary or mobile systems, or the implementation of series solutions.

With access to the entire range of HYDAC products we can provide you with the best solution for your requirements. This streamlines the design and ensures maximum efficiency for the operation of your machine and system.

Providing you with the best solution is our goal.



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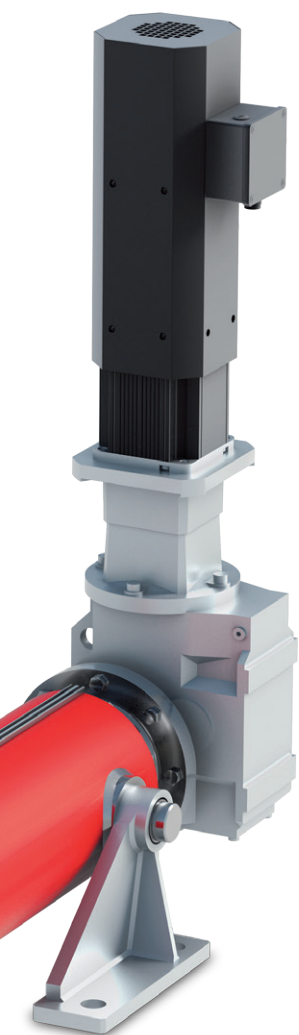
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Note

The information in this brochure relates to the operating conditions and applications described. For applications and operating conditions not described, please contact the relevant technical department. Subject to technical modifications.



Function

As they are easy to integrate and need no maintenance, HYDAC electric cylinders (HEZ) allow simple implementation of linear movements. In an HEZ unit, the rotation of its electric motor is converted into a linear movement using a screw drive.

The gearing and the drive can be selected to realize different positioning, forces, speeds and duty cycles. Just as the KineSys variable speed drive for hydraulic systems, various types of drives can be selected. The range extends from a simple drive to a high precision positioning drive.

The different versions have different connections for the electric motor, offering diverse installation variants.

Design

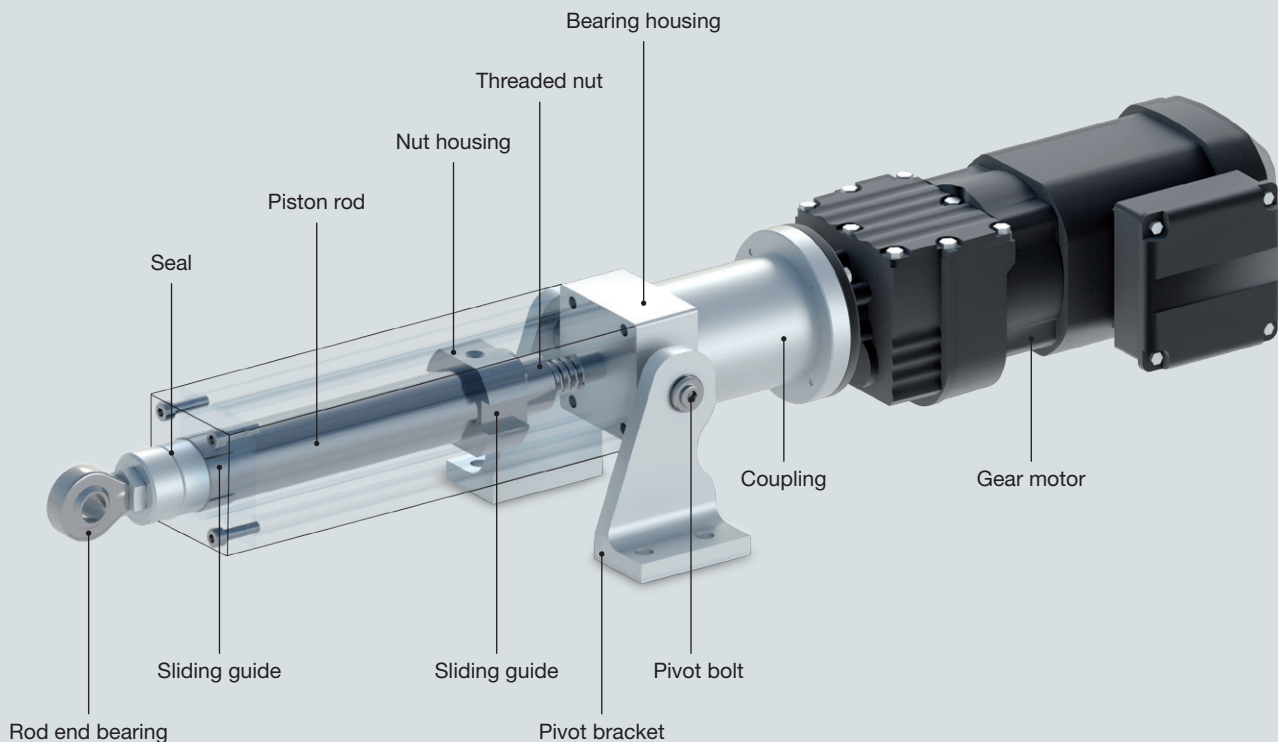
Via a coupling, a gear motor drives the threaded spindle, which is fixed in the bearing housing via a ball bearing. The threaded nut converts the threaded spindle's rotation into a linear movement.

The threaded nut is connected to the piston rod via the nut housing.

The piston rod passes through a sealing ring and a plain bearing.

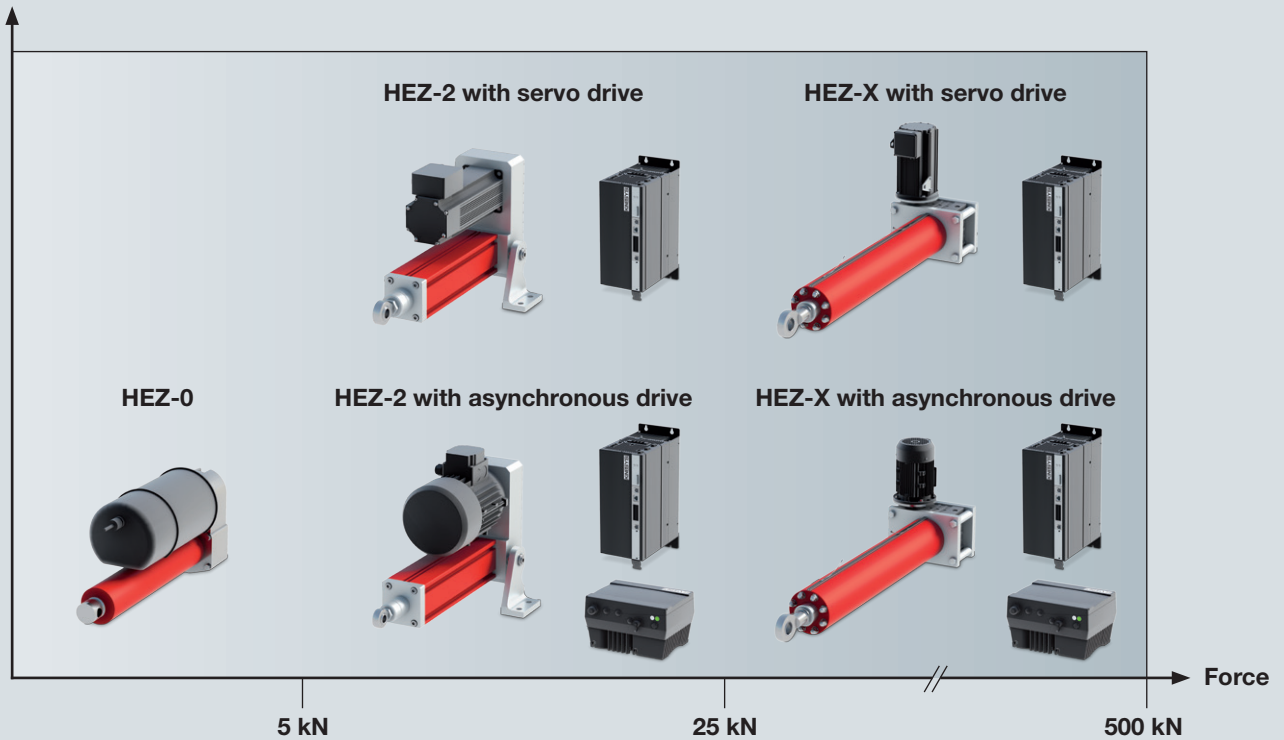
The plain bearing prevents the nut housing from twisting.

To fasten the unit, there is a pivot bracket on the bearing housing and a rod end bearing on the piston rod.



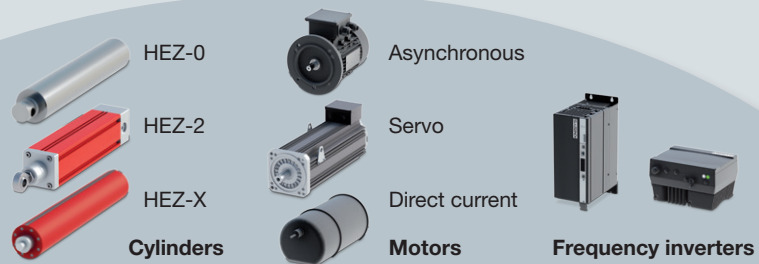
Performance overview

Dynamics

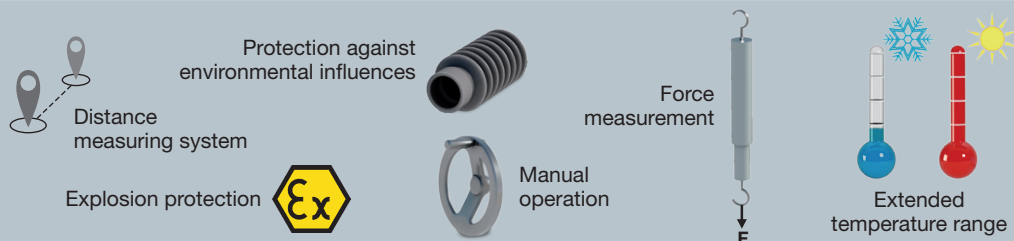


Portfolio

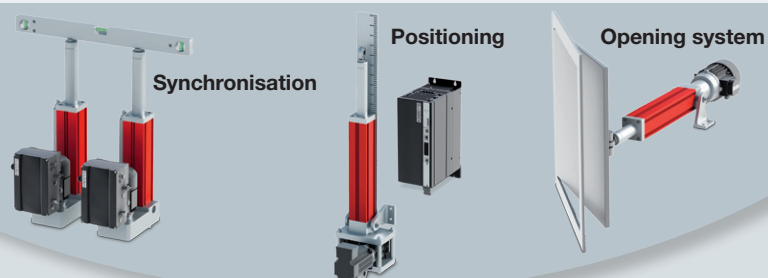
Components



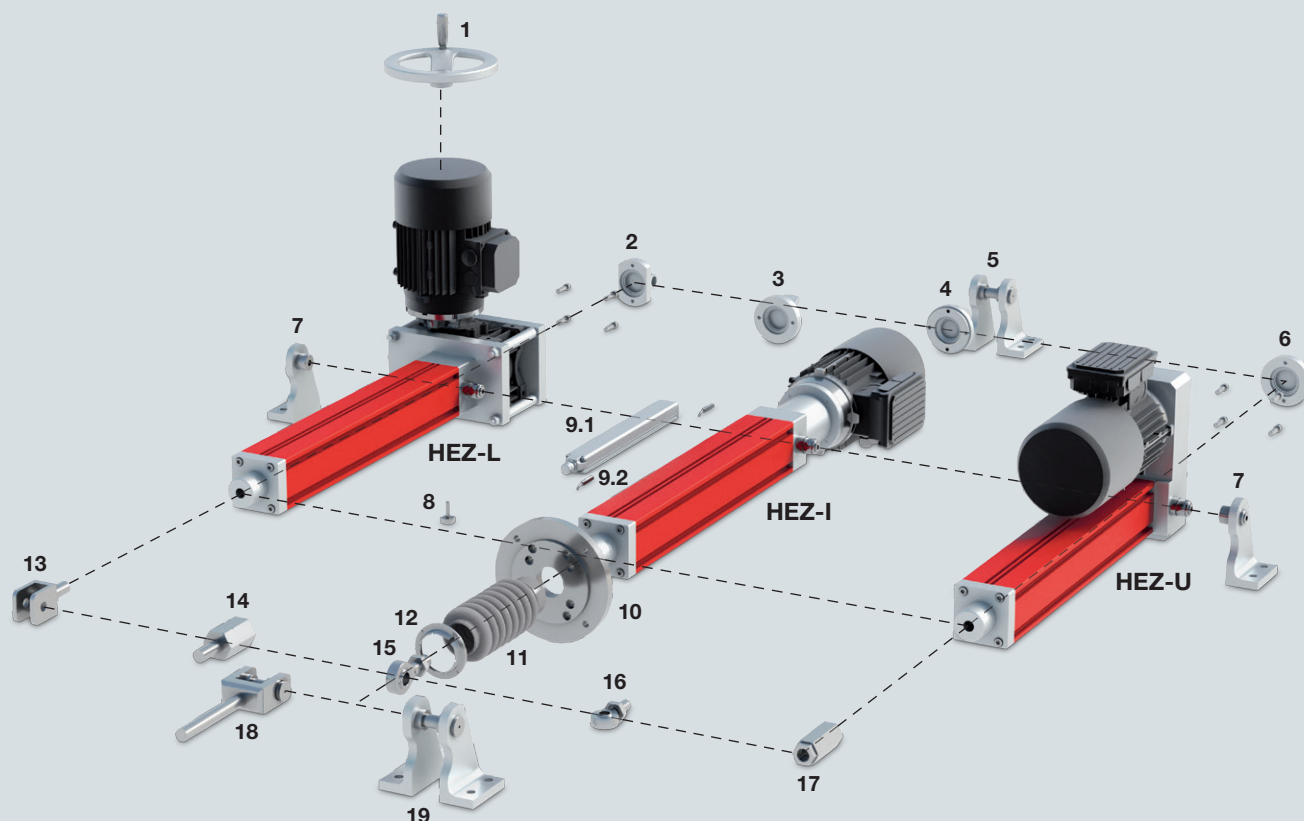
Options



Solutions



Overview of peripheral components



1	Handwheel
2	Rod end bearing 0°
3	Rod end bearing 90°
4	Fork 0°
5	Bracket
6	Fork 90°
7	Bracket
8	Hex manual control
9.1	Distance measuring system
9.2	Limit switch
10	Flange
11	Bellows
12	Ice scraper
13	Fork

14	Thread, external
15	Rod end bearing 90°
16	Rod end bearing 0°
17	Thread, internal
18	Trunnions
19	Bracket

Further options:

- Hydraulic steel structure version
- Stainless steel version
- Sensors: proximity switch; absolute encoder
- Damper
- Other fastenings according to customer requirements possible

Spindle types

Depending on the operating conditions, a trapezoidal thread drive, ball screw drive or planetary roller screw drive can be used.

Trapezoidal thread drive

Application of trapezoidal thread spindles:

- low positioning speed ($< 35 \text{ mm/s}$)
- low duty cycle ($< 50 \%$)
- impact load possible
- possibility of self-locking
- cost-effective applications
- medium positioning accuracy ($\geq 0.1 \text{ mm}$)

Ball screw drive

Application of ball screw spindles:

- high positioning speed
- high duty cycle
- high degree of efficiency ($> 85 \%$)
- highly dynamic applications
- high positioning accuracy ($\geq 0.05 \text{ mm}$)

Planetary roller screw drive

Application of planetary roller screw spindles:

- demanding applications
- impact load possible
- designed for high powers



Because of their high efficiency, the ball and planetary screw drives of the HEZ have no self-locking function. For this reason, the cylinders are delivered with a motor brake.

Motor types

Asynchronous motor

For simple lifting applications, without precise stroke regulation:

- cost-effective
- retraction and extension
- with reversing contactor switch
- with proximity switches and frequency inverter (for description see page 8)

Synchronous motor

Suitable for applications with control and regulation processes performed via frequency inverter:

- accurate positioning via distance measuring system or encoder
- highly dynamic operation
- short-time overload capacity (to overcome holding torque and abrupt torque changes)
- speed/velocity control and regulation

DC motor

Suitable for low-power, portable drive solutions:

- inexpensive
- mobile
- small

To control the HEZ electric cylinders, there are several variants to choose from. The configuration is chosen on the basis of the particular application. We will be happy to help you select the most suitable drive concept.

Operation with decentralised HYDAC surface-mounted frequency inverter (HFI-MM) and asynchronous motor

For drive solutions with simple control requirements, a frequency inverter is supplied, mounted directly on the electric motor.

Properties:

- Smooth start-up
- Variable feed speeds and travel profiles
- Simple positioning tasks
- Analogue and digital inputs/outputs, and optional common bus systems
- Free-of-charge parameterisation software HMM Start-Up
- System tailored to customer application

Operation with HYDAC switch cabinet frequency inverter (HFI-CM) and asynchronous motor

For more demanding applications, a more powerful inverter is used for control. This inverter is installed outside the HEZ, in a switch cabinet.

Properties:

- More complex travel profiles
- Advanced positioning tasks
- Various inputs/outputs possible, including bus systems
- Free-of-charge parameterisation software HFI-CM Start-Up
- System tailored to customer application

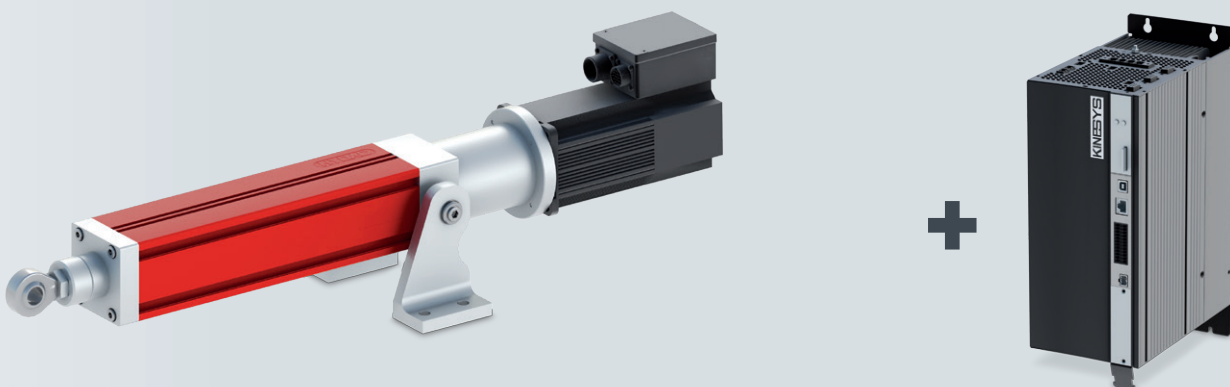
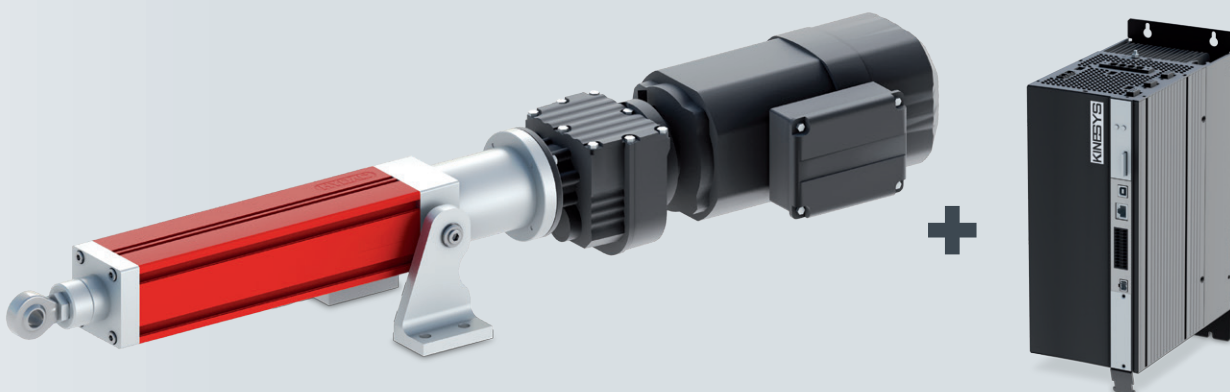
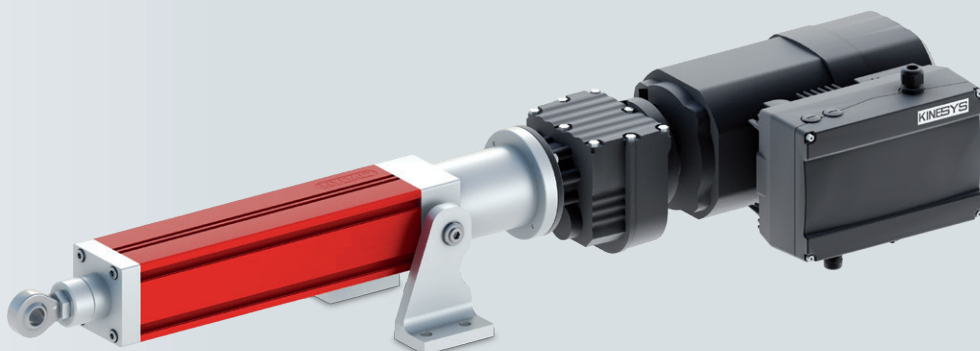
Position-regulated operation with HYDAC switch cabinet frequency inverter (HFI-CM) and HYDAC servo motor (HSM)

For high-precision control, regulation and positioning, the servo motor is the ideal drive. For high powers with a wide range of speeds and loads, extremely high positioning accuracy can be achieved.

The frequency inverter is mounted externally, in a switch cabinet.

Properties:

- Maximum positioning accuracy
- Maximum system dynamics
- A cam disc function can be mapped
- Various inputs/outputs possible, including bus systems
- Free-of-charge parameterisation software HFI-CM Start-Up
- System tailored to customer application



The technical data can be found in the project planning documents or in the confirmation of your order, and on the unit's name plate.

For all queries, please always provide the model code for the HEZ unit and its identification number.

Model code

HEZ - 2 - I - K - 32 x 10 x 250 - 1,1 A 1420 / 8,5 - XXXX

Designation

HYDACElektroZylinder (HYDAC Electric Cylinder)

Size

- 0 = Compact cylinder
- 2 = Standard aluminium square profile
- X = Round steel tube

Design

L, I, U

Thread type

- T = Trapezoidal thread spindle
- K = Ball screw spindle
- P = Planetary roller screw spindle

Spindle dimensions [mm]

Diameter
Pitch
Stroke

Motor power [kW]

Motor type

- A = Asynchronous motor
- S = Synchronous motor
- D = DC motor

Nominal speed [rpm]

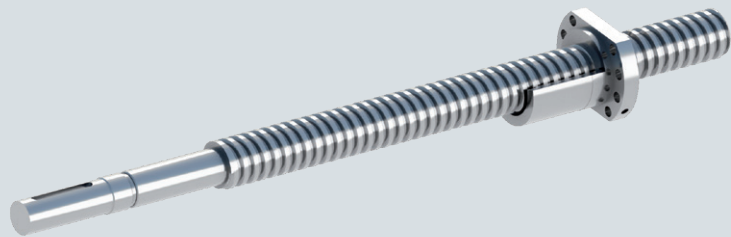
Speed reduction

Version

Fastening
Measuring system
Further options

Spindle data

Trapezoidal thread spindle

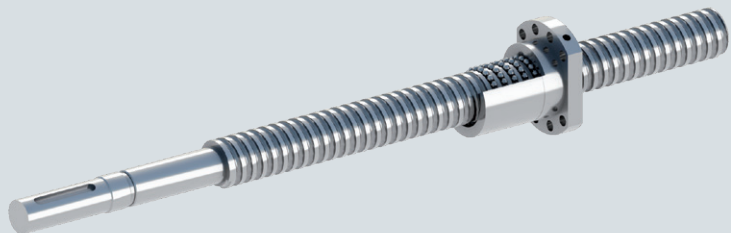


	20 x 4	26 x 5	36 x 6	48 x 8
Diameter [mm]	20.0	26.0	36.0	48.0
Thread pitch [mm]	4.0	5.0	6.0	8.0
Max. load [kN]	5.0	15.0	25.0	50.0
Max. speed [mm/s]	36.0	35.0	29.0	29.0

Ball screw

Standard nuts made of fully hardened steel (100 Cr6-NFA 35.565 for diameters over 20 mm and carbon steel for below 20 mm).

The ball deflectors of the standard ball screw drives are made of composite material.

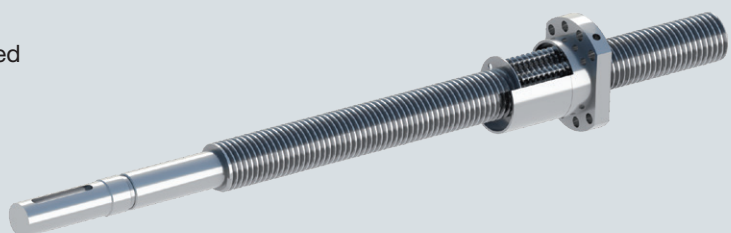


	20 x 5	25 x 5	25 x 10	25 x 25	32 x 5	32 x 10
Diameter [mm]	20.0	25.0	25.0	25.0	32.0	32.0
Thread pitch [mm]	5.0	5.0	10.0	25.0	5.0	10.0
Max. load [kN]	5.0	15.0	15.0	15.0	33.0	25.0
Dynamic load capacity C_{dyn} [kN]	14.8	20.4	19.9	12.8	23.3	33.5
Static load capacity C_{stat} [kN]	20.7	33.7	31.8	32.6	45.5	52.0
Max. speed [mm/s]	375.0	375.0	666.0	1,850.0	360.0	720.0

	32 x 40	40 x 20	50 x 10	63 x 10	63 x 20	80 x 10
Diameter [mm]	32.0	40.0	50.0	63.0	63.0	80.0
Thread pitch [mm]	40.0	20.0	10.0	10.0	20.0	10.0
Max. load [kN]	25.0	50.0	50.0	80.0	80.0	130.0
Dynamic load capacity C_{dyn} [kN]	11.5	34.2	97.8	109.7	121.9	121.9
Static load capacity C_{stat} [kN]	33.5	57.0	213.2	275.6	375.0	375.0
Max. speed [mm/s]	2,100.0	830.0	470.0	370.0	530.0	290.0

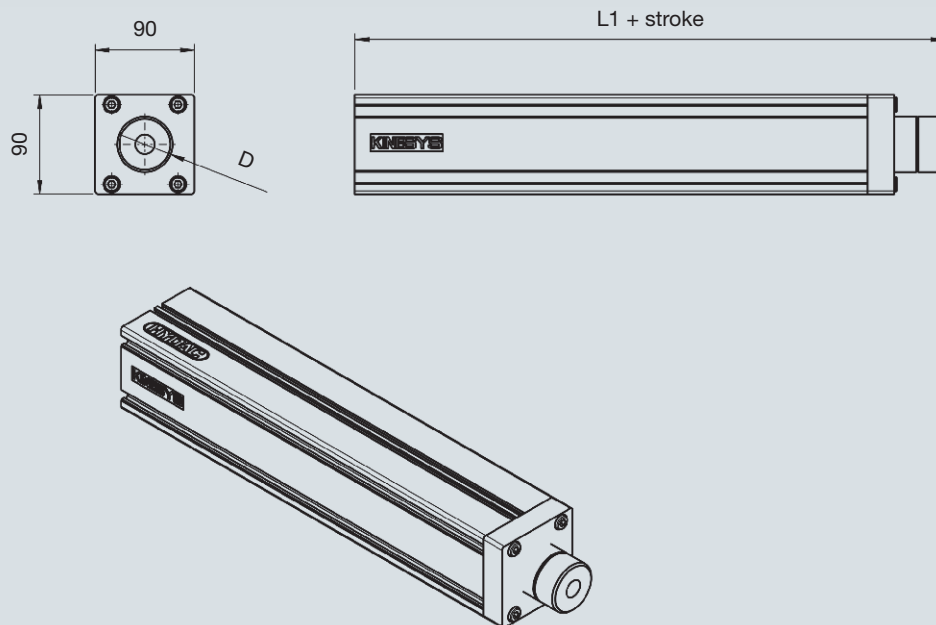
Planetary roller screw drive

Planetary roller screw drives are individually designed according to customer requirements.



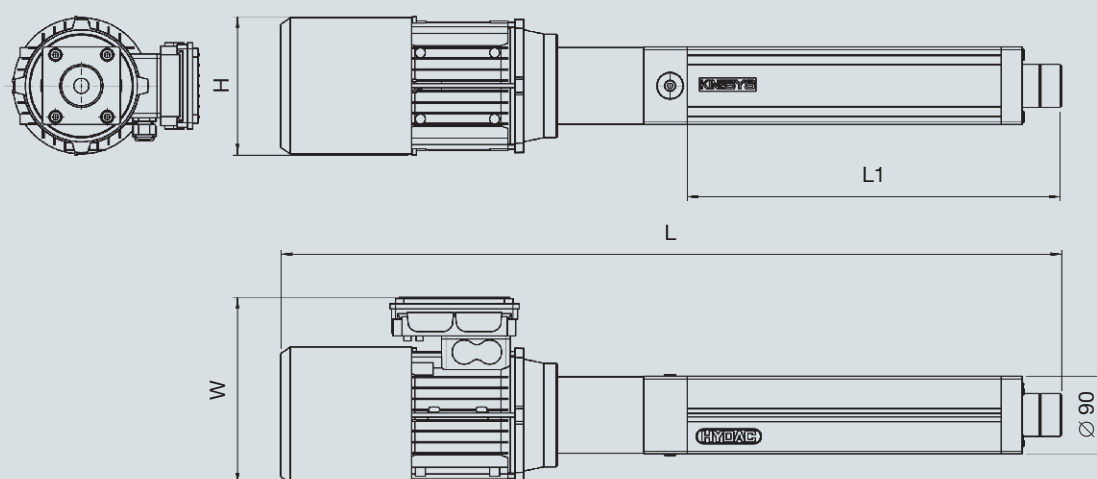
Base cylinder HEZ-2

The standard cylinder **HEZ-2** has a square profile with the dimensions 90 x 90 mm.



The lengths of the different HEZ-2 versions vary according to the power requirements of the application.

Electric cylinder HEZ-2-I



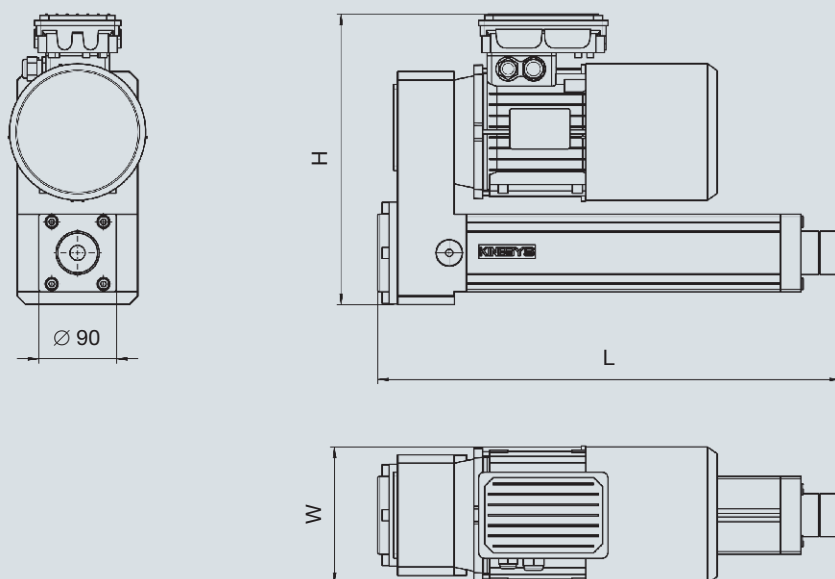
The approximate dimensions of axial version "I" are within the following ranges:

650 mm < L < 900 mm + stroke

175 mm < W < 210 mm

125 mm < H < 175 mm

Electric cylinder HEZ-2-U



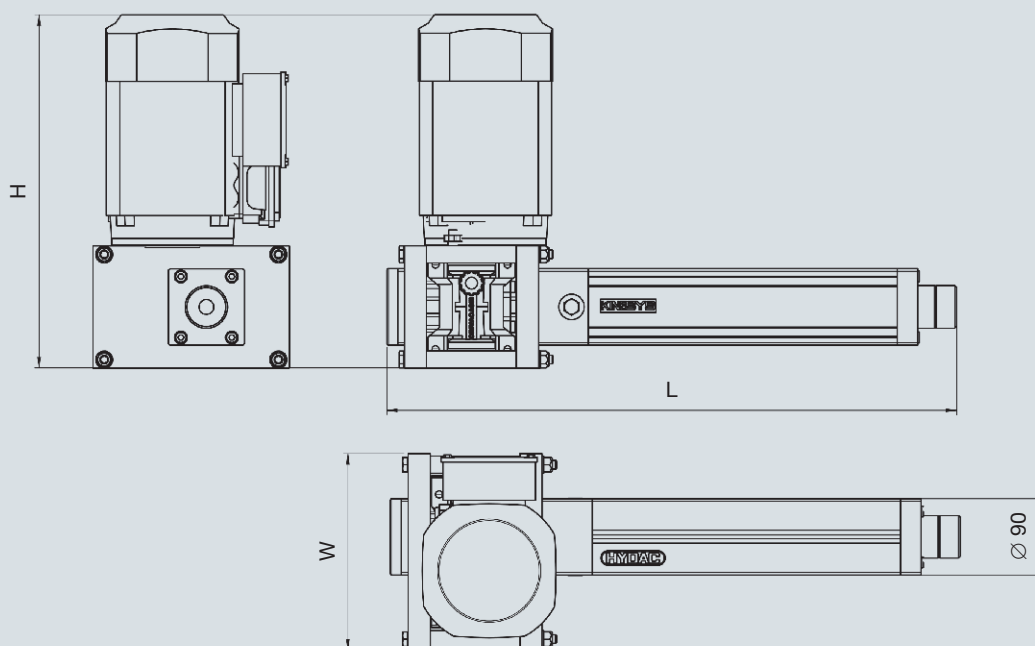
The approximate dimensions of parallel version “U” are within the following ranges:

$250 \text{ mm} < L < 350 \text{ mm} + \text{stroke}$

$175 \text{ mm} < W < 210 \text{ mm}$

$250 \text{ mm} < H < 400 \text{ mm}$

Electric cylinder HEZ-2-L



The approximate dimensions of orthogonal version “L” are within the following ranges:

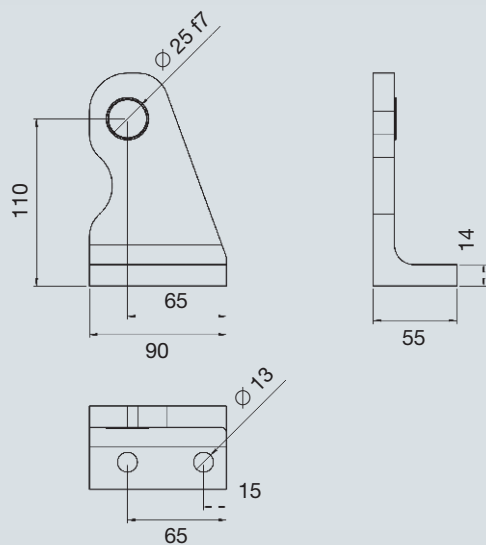
$345 \text{ mm} < L < 475 \text{ mm} + \text{stroke}$

$150 \text{ mm} < W < 250 \text{ mm}$

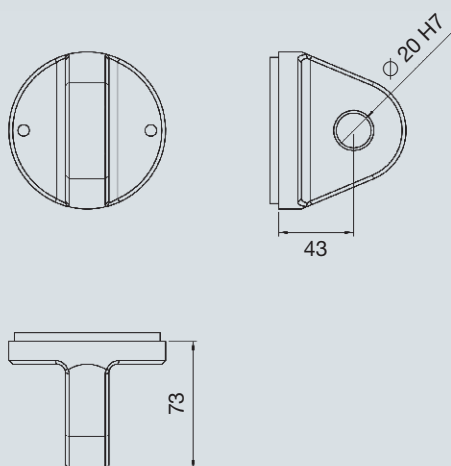
$325 \text{ mm} < H < 500 \text{ mm}$

Options

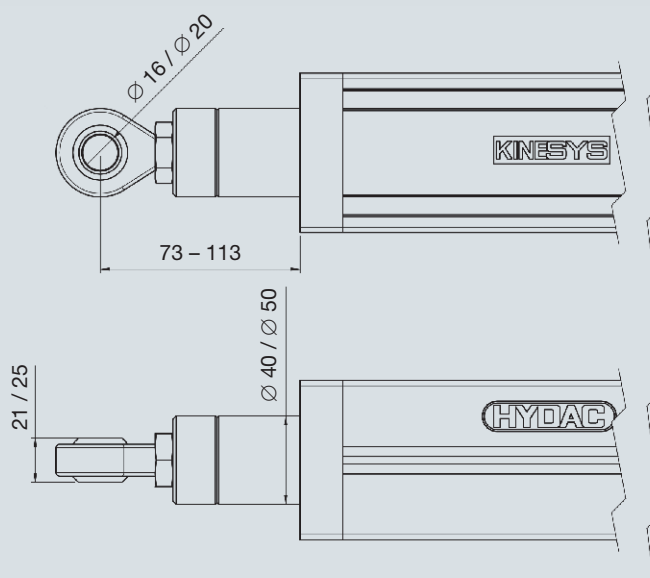
Bracket



Rear eye

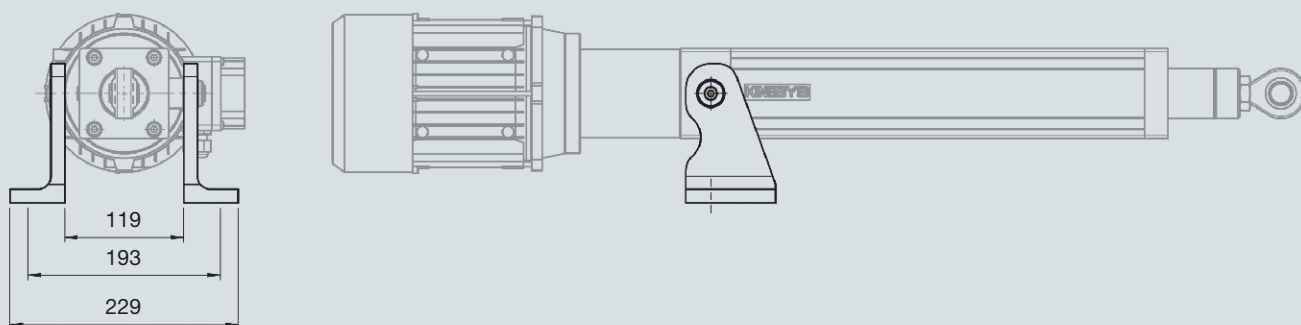


Front eye



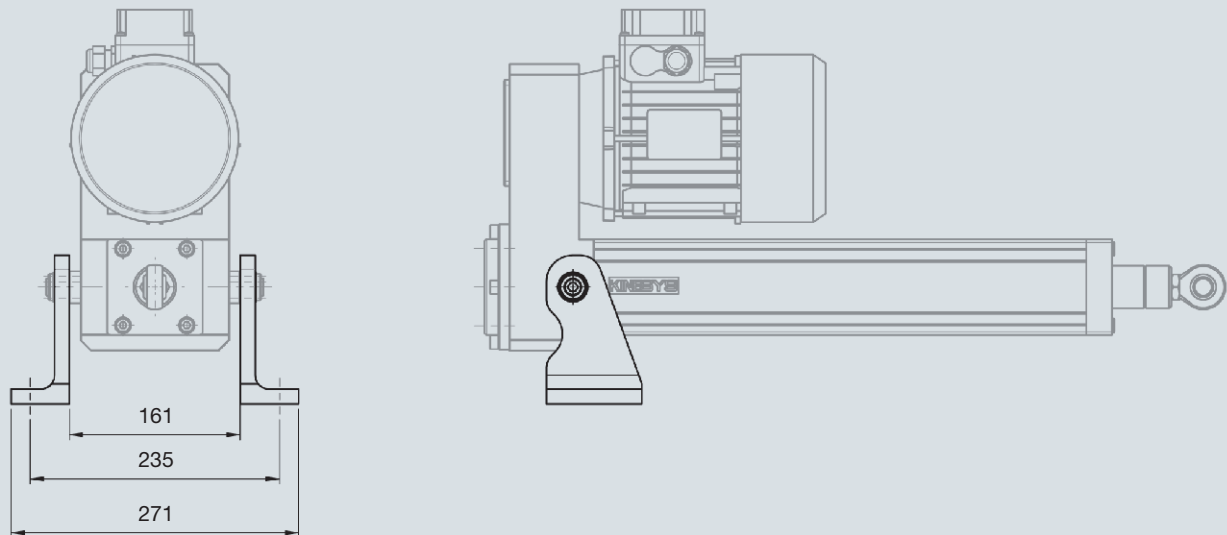
HEZ-2-I

Type "I" electric cylinders are optionally available with a bracket.



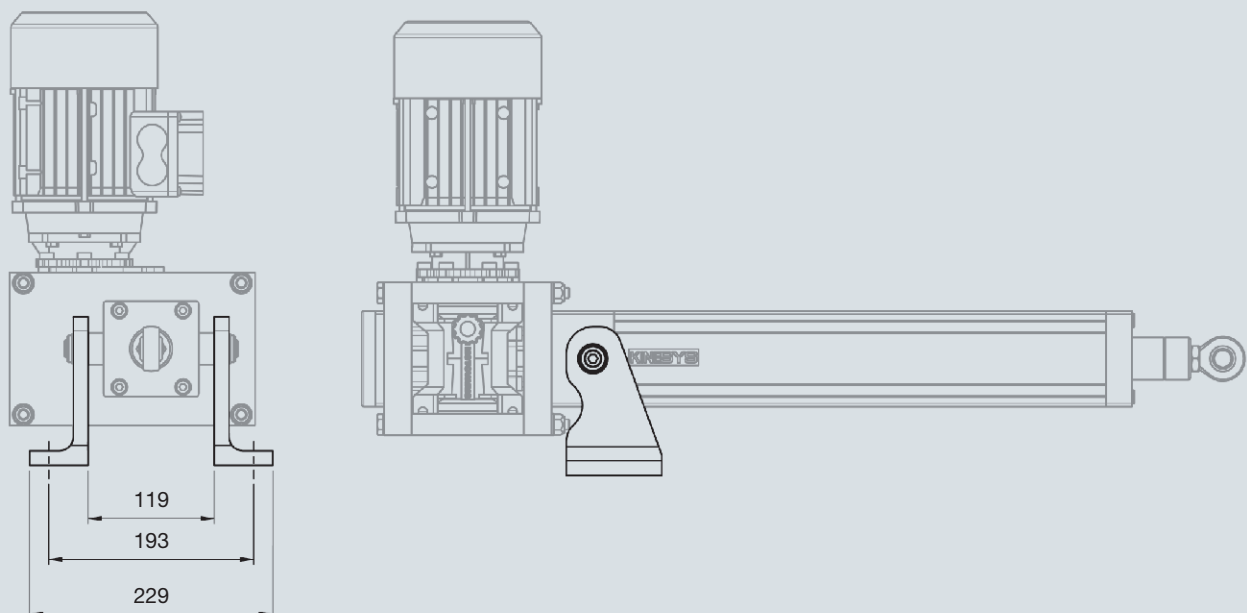
HEZ-2-U

Type “U” electric cylinders are optionally available with a bracket or a rear eye.



HEZ-2-L

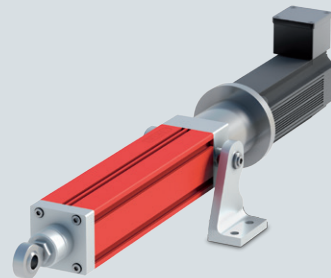
Type “L” electric cylinders are optionally available with a bracket or a rear eye.



Application examples

HEZ-2 for test bench

Positioning force:	10 kN
Positioning speed:	1 – 50 mm/s
Stroke:	250 mm
Duty cycle up to:	100 %
Options:	Limit switch, positioning accuracy up to 0.125 mm, force measurement



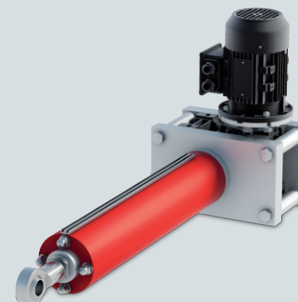
HEZ-0 for heliostat positioning

Positioning force:	4 kN
Positioning speed:	6 mm/s
Stroke:	250 mm
Duty cycle up to:	100 %
Options:	Limit switch, DC motor 12/24 V DC, positioning system



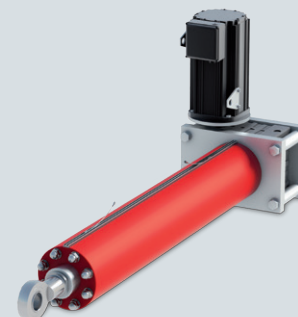
HEZ-X for tempering of pit coal (clamping)

Positioning force:	13 kN
Positioning speed:	7 mm/s
Stroke:	130 mm
Duty cycle up to:	25 %
Option:	Stainless steel version



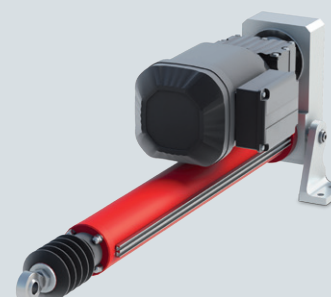
HEZ-X for servo ejector

Positioning force:	120 kN
Positioning speed:	150 mm/s
Stroke:	150 mm
Duty cycle up to:	100 %
Options:	Limit switch, servo motor, distance measuring system, cam disc function



HEZ-X for door flap for coal conveyor belt in power plants

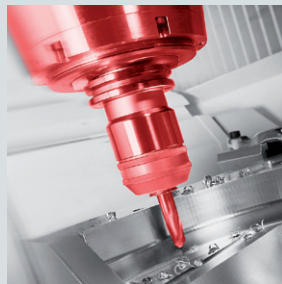
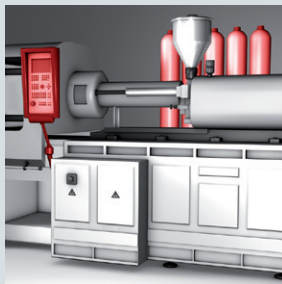
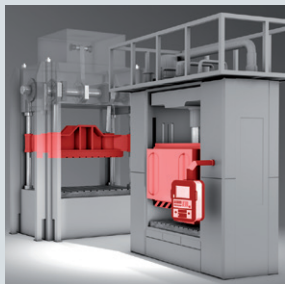
Positioning force:	20 kN
Positioning speed:	15 mm/s
Stroke:	600 mm
Duty cycle up to:	25 %
Options:	Limit switch, emergency operation, bellows, ATEX version



Areas of application

As they are easy to integrate and need no maintenance, HYDAC Electric Cylinders HEZ allow simple implementation of linear movements. Various types of drives can be selected, from a simple drive to a high precision positioning drive.

They are suitable for a wide range of applications, in standard and also special customised versions:



Mechanical engineering

- Punching, bending, ramming
- Pressing, drawing, forming
- Sawing, planing
- etc.



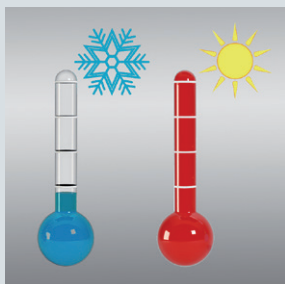
Assembly systems

- Joining, connecting
- etc.



Food industry

- Opening/closing
- Conveying
- etc.



Low and high-temperature applications

- Cold stores
- Furnaces
- etc.



Hydraulic steel structures

- Opening/closing (prevention of contamination with oil)
- etc.



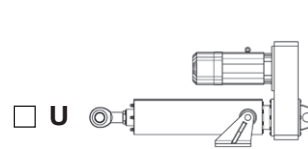
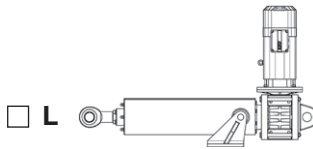
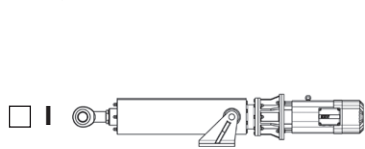
Mobile applications

- Lifting in mobile operations 12/24 V DC
- etc.

Customer: _____ Date: _____

Project: _____ Requirement: _____ pieces/year

Design:



Extension/retraction	Stroke	Speed	Time	Positioning force
	mm	mm/s	s	kN
	mm	mm/s	s	kN
	mm	mm/s	s	kN
	mm	mm/s	s	kN
	mm	mm/s	s	kN
	mm	mm/s	s	kN

Inverter operation planned: ☐ yes ☐ noMotor voltage: ☐ 400 V / 50 Hz ☐ 230 V / 50 Hz ☐ _____Protection class: ☐ standard (IP54) ☐ IP: _____Ambient temperature: ☐ standard: 0 °C to 40 °C ☐ other: _____

Further ambient conditions: _____

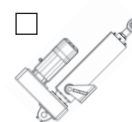
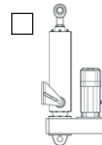
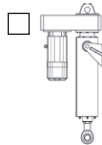
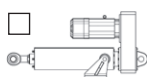
Limit switch: ☐ on cylinder ☐ external (not supplied with unit)

Positioning accuracy: _____ mm Additional sensors: _____

Desired service life: _____ cycles

Shear force on cylinder: ☐ no ☐ yes: _____ N Note: Shear forces should be avoided where possibleFastening (see page 6): ☐ eye ☐ bracket ☐ pivot bolt ☐ other: _____

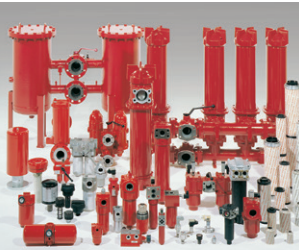
Mounting position:



Application and comments:



Accumulator Technology 30,000



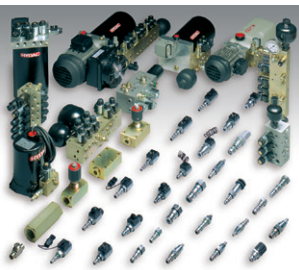
Filter Technology 70,000



Process Technology 77,000



Filter Systems 79,000



Compact Hydraulics 53,000



Accessories 61,000

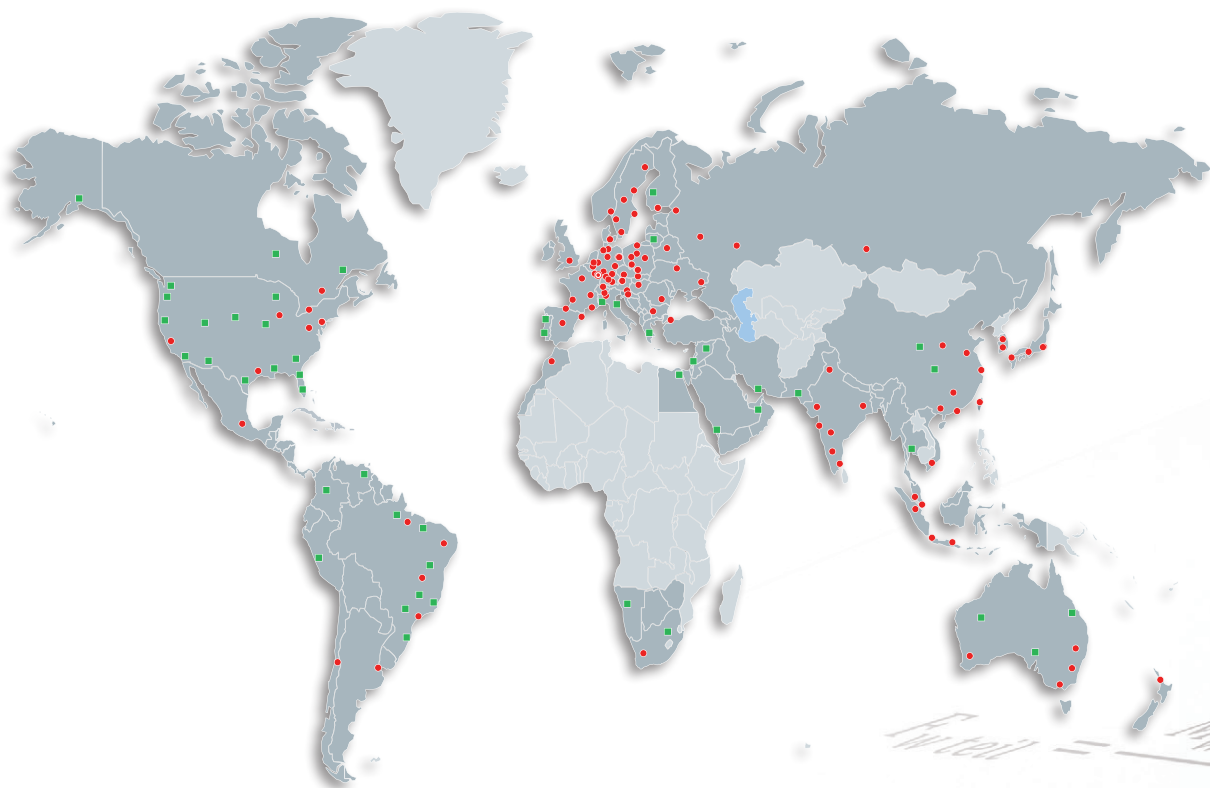


Electronics 180,000



Cooling Systems 57,000

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- HYDAC Companies
- HYDAC Sales and Service Partners

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