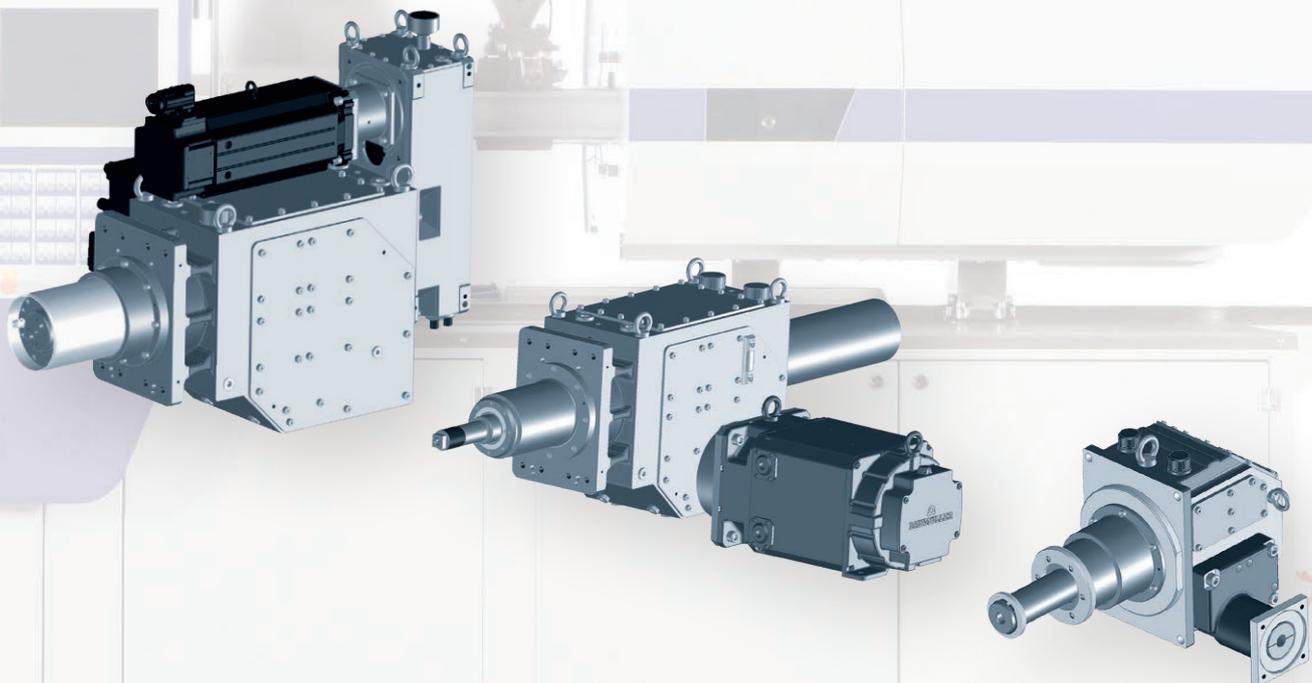


# Compact Drive Solutions for All-electric Injection Moulding Machines

Model range ZS-I / FZ – Drive for Injection and Plasticizing

Model range ZS-C – Clamping Unit Drive

Model range ZS-E – Ejector Drive



## Drive for injection and plasticizing – Model range ZS-I / FZ

### Injection units for all-electric injection moulding machines

The demand for energy efficiency and low noise was the reason for the development of fully electrical injection moulding machines, that is the logical result.

There is the achievement of short cycle times with high injection speeds and forces of crucial importance.

These requirements are fulfilled with the new drive concept of the linear movement via toothed racks as well as the rotation for metering in a compact design.

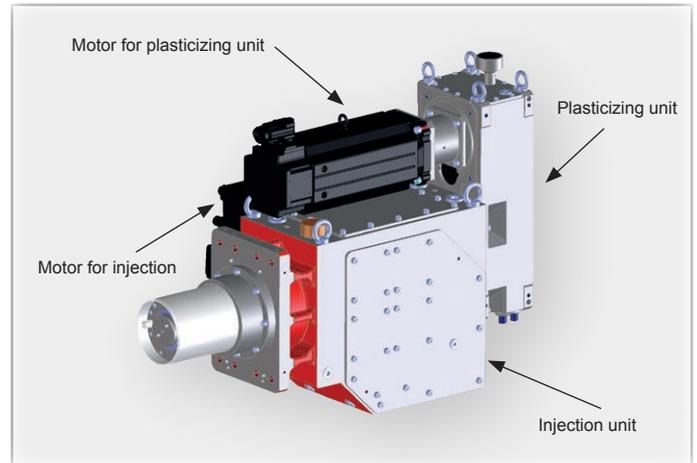
### Linear unit

To achieve similar power densities as with hydraulic drives, our system uses a multiple meshing on the toothed racks. These racks have maximum carrying capacity and force equalization by herringbone.

Synchronous servo motors with a countershaft transmission have small inertia and ensure extremely dynamic driving.

### Plasticizing unit

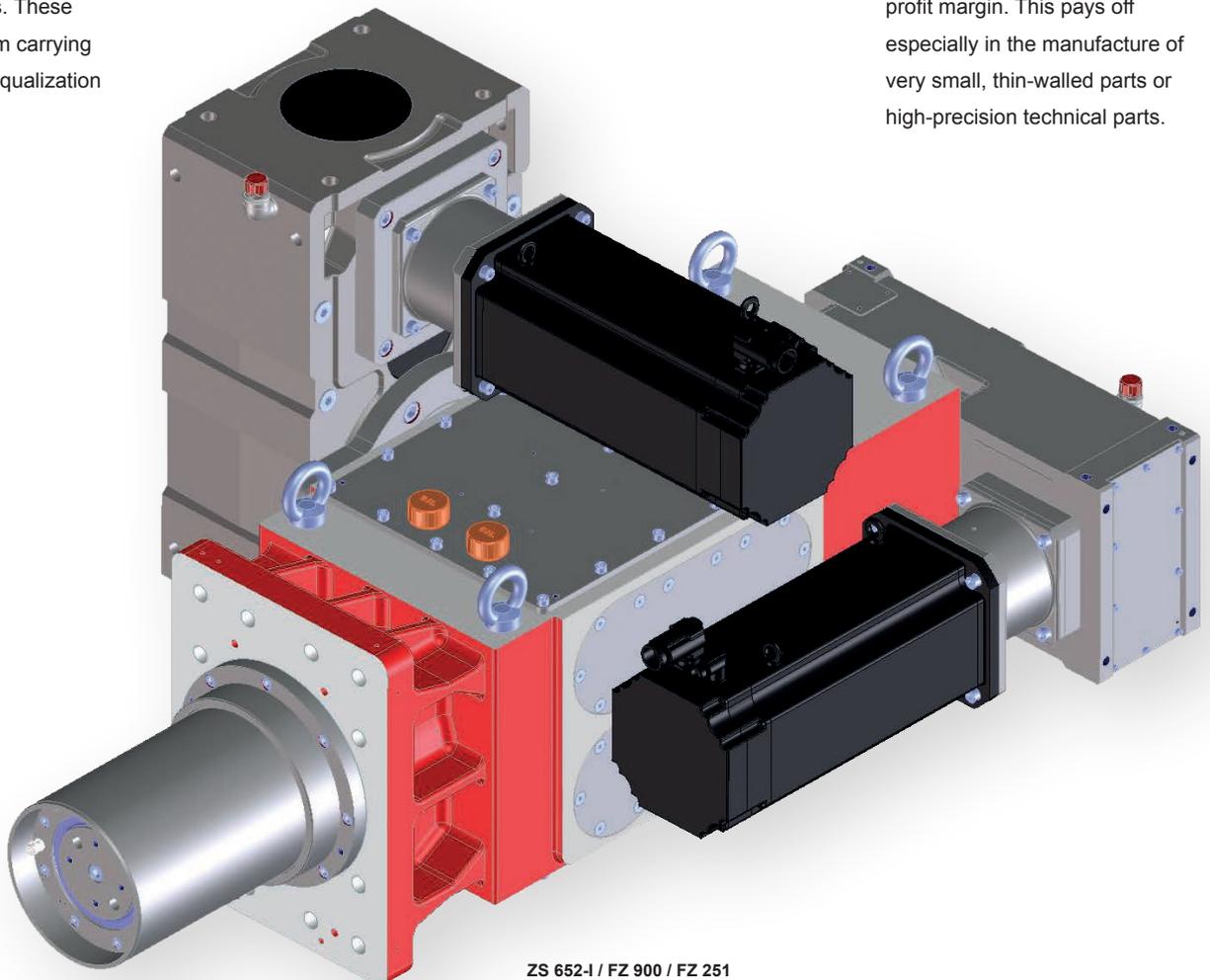
Directly with the injection unit, the metering for the screw drive is connected. We use the best of the plasticizing gears series FZ 81.3 - FZ 901.3. These are flanged directly to the injection gear. Various motor brands can be installed via IEC flanges.



### Force measurement and axial bearing

The pistons for the back-pressure injection storage and a load cell are integrated, which provides means of amplifier measurement and control signals.

Compact and efficient – combining the linear movement with the rotational movement results in shorter cycle times and therefore higher cost effectiveness. The high precision and repetitive accuracy ensure minimisation of defective parts and an optimised profit margin. This pays off especially in the manufacture of very small, thin-walled parts or high-precision technical parts.



ZS 652-I / FZ 900 / FZ 251

## Drive for injection and plasticizing – Model range ZS-I / FZ

### Gear choice

The following tables list the gearbox sizes according to torques.

The tables represent a selection; deviating models upon request.

Dimension sheets in PDF format or as CAD data in different 2D or 3D formats can be retrieved for structural editing. Please contact our Sales department for more information.

### Cooling

Integrated cooling coils for water cooling in the plasticizing gear ensure a safe operating.

In order to achieve the high injection forces of up to 1,300 kN, the injection unit is operated with two or four toothed racks with 4- or 8-fold tooth engagement.

This principle ensures the high dynamics and efficiency of this drive, with absolutely low noise operation

### Performance data

Injection								
Size		ZS 81-I	ZS 201-I	ZS 331-I	ZS 451-I ZS 452-I	ZS 652-I	ZS 902-I	ZS 1302-I
<b>Injection force</b>	F (kN)	80	200	330	450	650	900	1,300
<b>Stroke</b>	h (mm)	100	160	200	240	320	375	450
<b>Injection speed max.</b>	v (m/s)	0.5	0.5	0.5	0.5	0.5	0.5	0.3

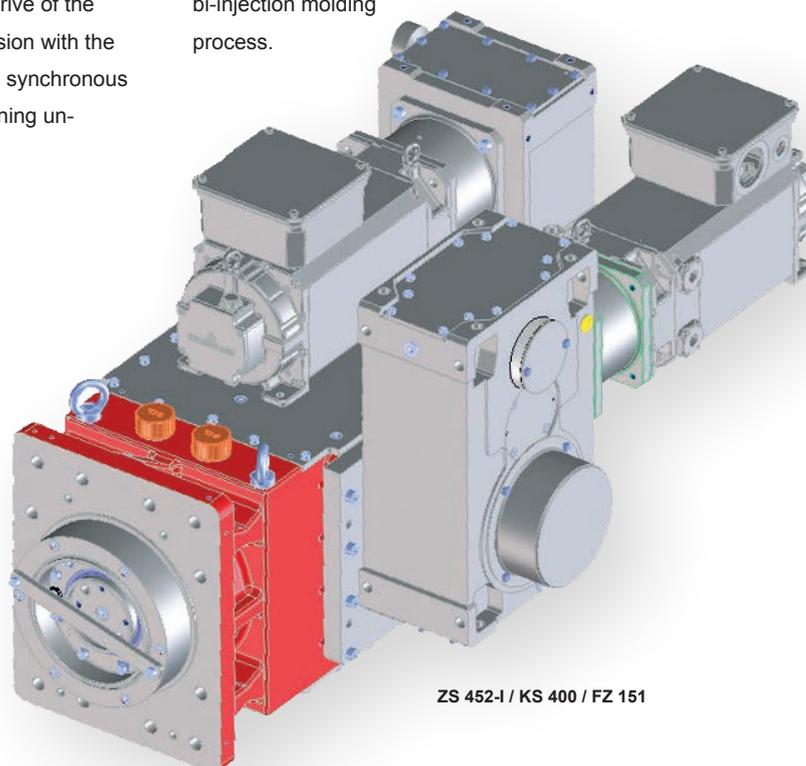
Plasticizing								
Size		FZ 81.3	FZ 121.3	FZ 151.3	FZ 251.3	FZ 501.3	FZ 601.3	FZ 901.3
<b>Mounting on injection gearbox</b>		ZS 81	ZS 81, ZS 201, ZS 331	ZS 452	ZS 652	ZS 652	ZS 902	ZS 902, ZS 1302
<b>Screw diameter</b>	D <sub>s</sub> (mm)	20 - 40	30 - 50	45 - 60	50 - 70	60 - 80	70 - 90	70 - 100
<b>Output torque</b>	M <sub>2 max</sub> (Nm)	900	1,200	1,800	2,500	6,000	8,000	11,500

For the sizes ZS 452-I to ZS 1302-I an additional countershaft transmission is mounted, a shaft-mounted gear unit from the FZ model range.

In this way, more dynamics are achieved for the drive of the injection transmission with the drive power of the synchronous servomotor remaining unchanged.

### Special designs

Many things are possible in a constructive way, e.g. the execution of the countershaft transmission as helical bevel gear unit. So two drives can be installed next to each other in a bi-injection molding process.

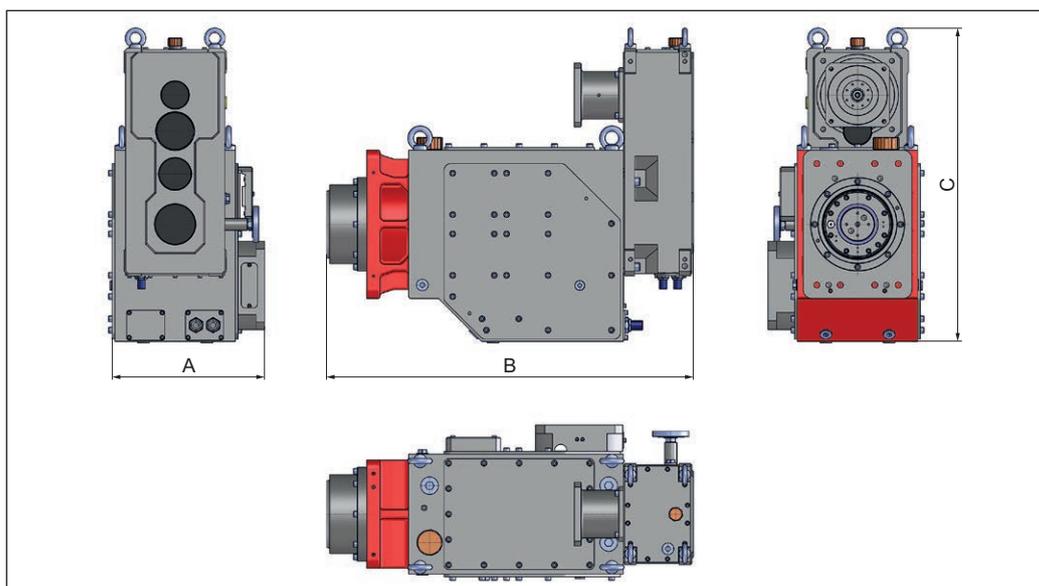


ZS 452-I / KS 400 / FZ 151

## Drive for injection and plasticizing – Model range ZS-I / FZ

### Main Dimensions and Weights ZS 81-I - ZS 331-I

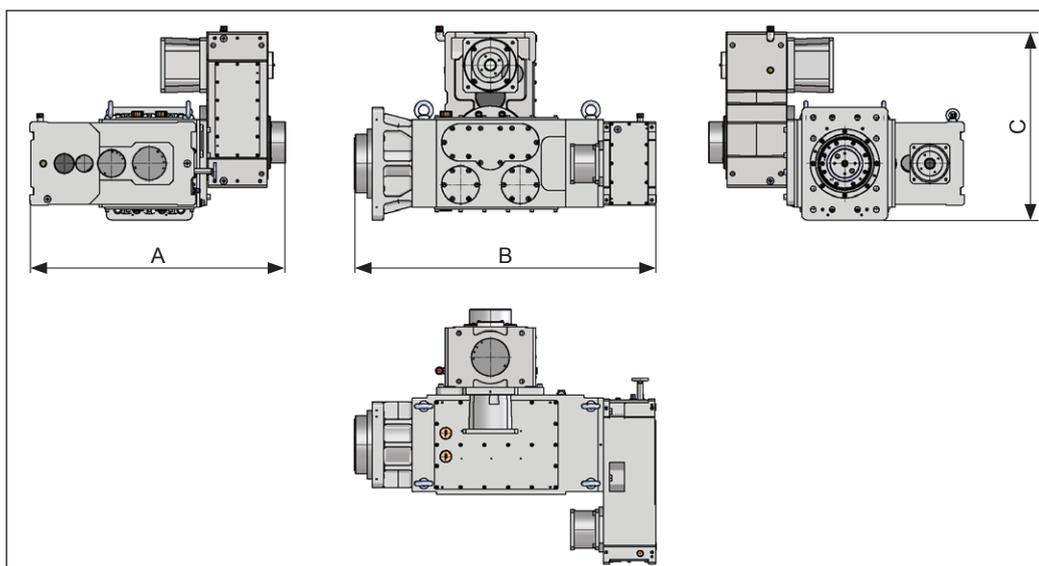
Size	ZS 81-I / FZ 81.3	ZS 81-I / FZ 121.3	ZS 201-I / FZ 121.3	ZS 331-I / FZ 121.3
A (mm)	272	273	345	618.5
B (mm)	676	658	810	943.5
C (mm)	585	642	698	591
Weight (kg)	203	220	420	700



The specified weights are recommended values and may vary depending on the version. All dimensions refer to the standard design of the model range ZS 81-I to ZS 331-I, the dimensions for different designs like the ones below must be taken from the dimensions sheet.

### Main Dimensions and Weights ZS 452-I - ZS 1302-I

Size	ZS 452-I/FZ 400/FZ 151	ZS 652-I/FZ 900/FZ 251 ZS 652-I/FZ 900/FZ 501	ZS 902-I/FZ 1600/FZ 601 ZS 902-I/FZ 1600/FZ 901	ZS 1302-I/FZ 2400/FZ 901
A (mm)	957	1,134 1,217	1,351 --	1,570
B (mm)	1,087	1,432 1,435	1,680 --	2,025
C (mm)	750	901 901	1,055 --	1,248
Weight (kg)	900	1,650 1,720	3,120 --	5,500

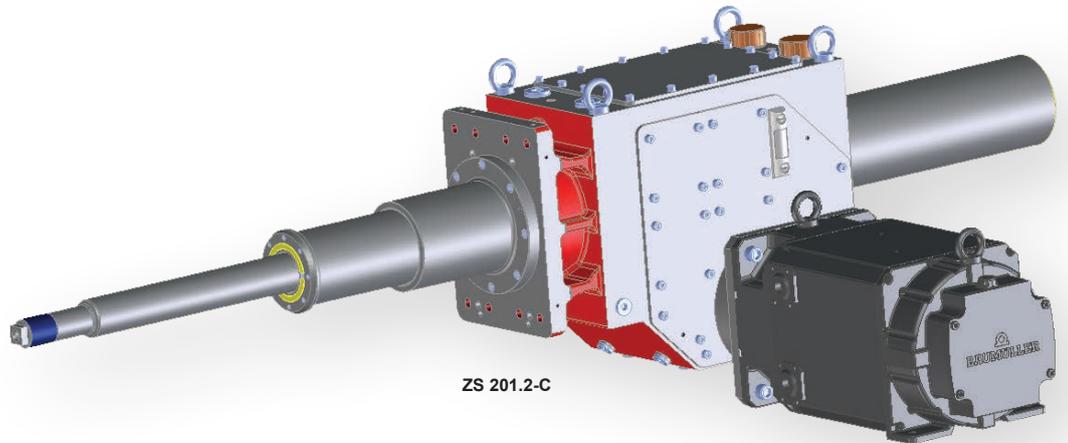


For the sizes ZS 452-I to ZS 1302-I dimension sheets in PDF format or as CAD data in different 2D or 3D formats can be retrieved for structural editing. Please contact our Sales department for more information.

## Clamping unit drive model range ZS-C

Once the solution of a rack drive with preceding reduction stage had been introduced successfully for the injection movement, it made obvious sense to develop this principle further for the positive locking. Previous electrical solutions normally use a ball screw drive but a rack drive has essential advantages over this with regard to the efficiency and development of noise.

Synchronous servomotors with 2- or 4-fold tooth engagement on the rack ensure the necessary performance density and dynamic response. In order to



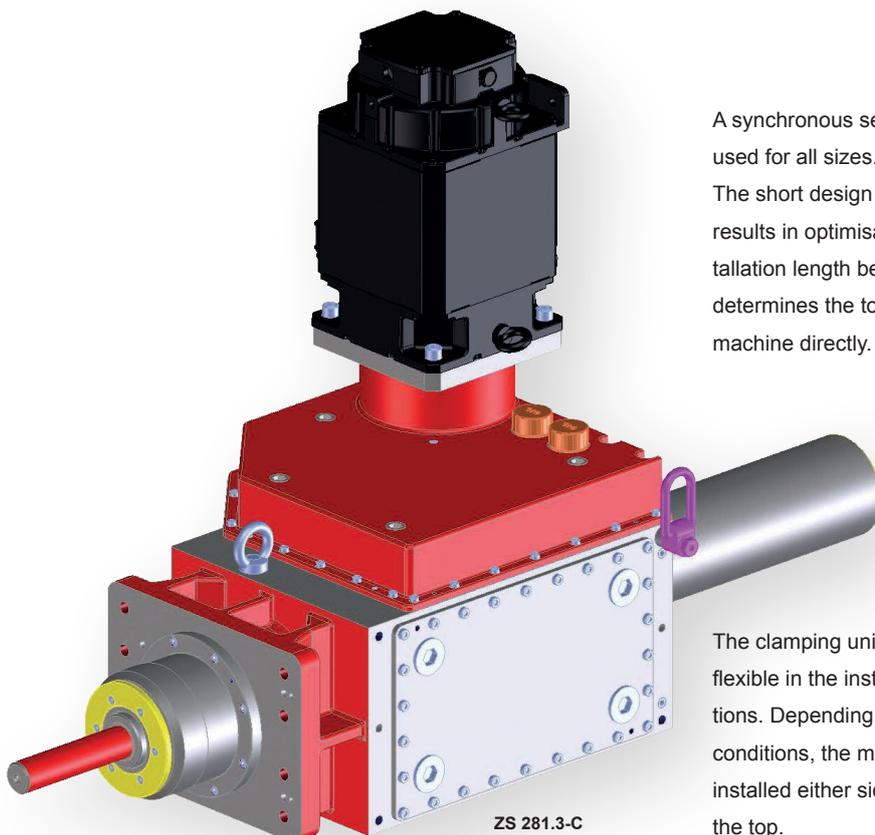
ZS 201.2-C

achieve a short design despite the comparatively large stroke, a telescopic seal was developed which encloses the extended

rack oil-tight with telescopic sleeves and is flexibly configurable depending on the required stroke.

### Performance data

Size		ZS 25.2-C	ZS 40.2-C	ZS 60.2-C	ZS 81.2-C	ZS 141.2-C	ZS 201.2-C	ZS 281.3-C	ZS 401.3-C	ZS 551.3-C
Axial force max.	$F_a$ (kN)	25	40	60	80	105	140	210	285	370
Stroke ( $\pm 10$ mm)	h (mm)	235	355	455	500	565	615	615	795	975
Speed	v (m/s)	1	1	1	1	1	1	1	1	1



ZS 281.3-C

A synchronous servo motor is used for all sizes. The short design of the drive results in optimisation of the installation length because the drive determines the total length of the machine directly.

The appropriate IEC lanterns are available for the mounting of various motors. Our drive specialists will be pleased to advise you for the best suitable electric drive.

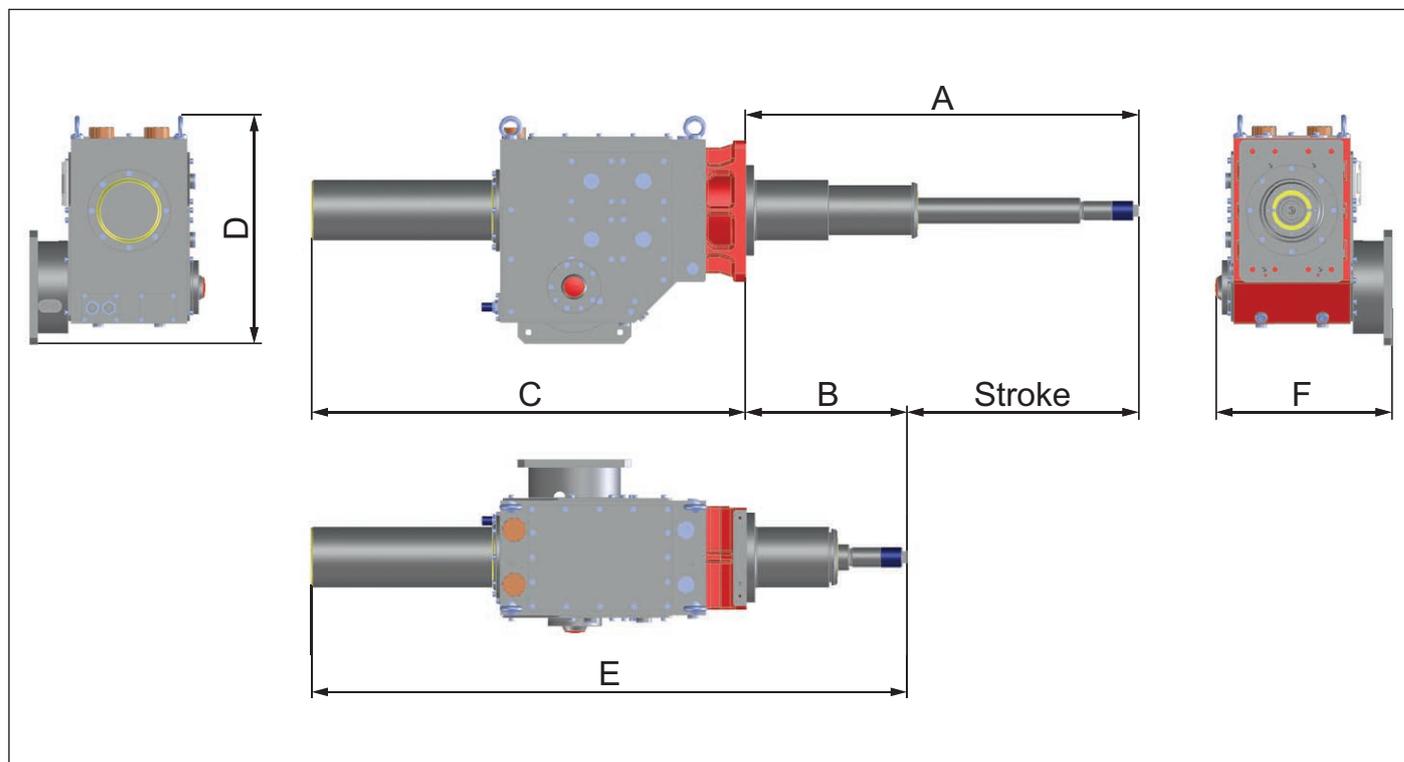
From size ZS 81-C, the gearbox is cooled with water using an integrated cooling coil.

To monitor the oil temperature, an optional resistance thermometer or temperature monitor can be installed.

The clamping unit drive is also flexible in the installation positions. Depending on the space conditions, the motor can be installed either sideways or at the top.

## Clamping unit drive model range ZS-C

### Main Dimensions

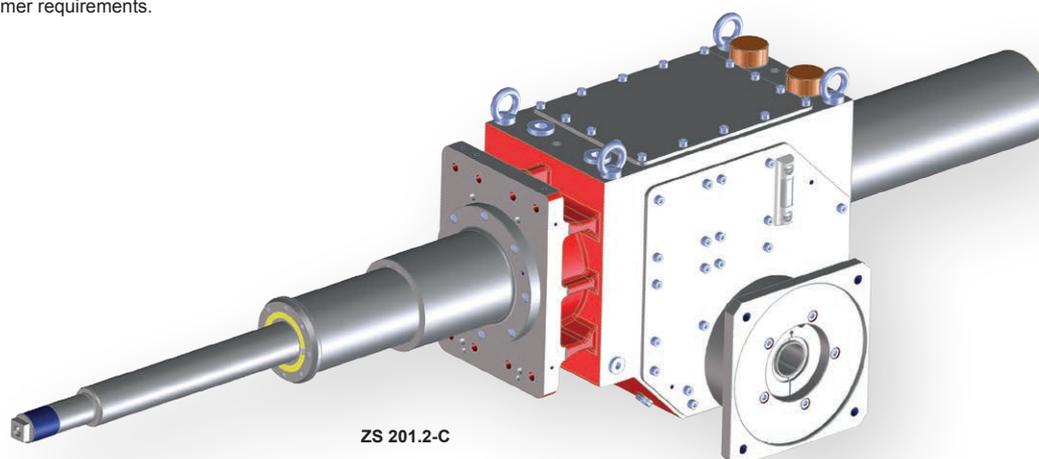


Size	ZS 25.2-C	ZS 40.2-C	ZS 60.2-C	ZS 81.2-C	ZS 141.2-C	ZS 201.2-C	ZS 281.3-C	ZS 401.3-C	ZS 551.3-C
Stroke (mm)*	235	355	455	500	590	615	615	795	975
A (mm)	461	548	698	807	858	883	975	1,245	1,194
B (mm)	226	193	245	307	268	268	160	215	219
C (mm)	355	505	643	796	963	1,003	1,236	1,548	1,770
D (mm)	293	380	403	396	588	520	586	798	776
E (mm)	581	698	888	1,103	1,231	1,271	1,396	1,763	1,989
F (mm)	257	311	323	287	369	402	662	743	720

\* The stroke may vary depending on customer requirements.

All dimensions refer to the standard designs and are given as guide values.

For all sizes dimension sheets in PDF format or as CAD data in different 2D or 3D formats can be retrieved for structural editing. Please contact our Sales department for more information.

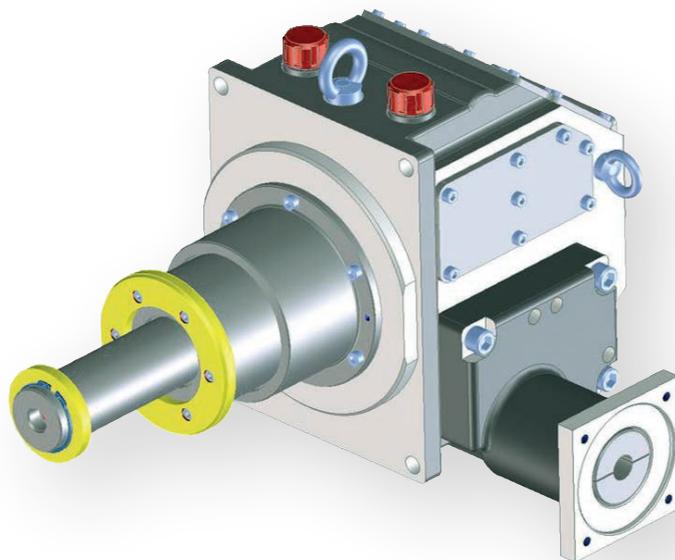


ZS 201.2-C

## Ejector drive model range ZS-E

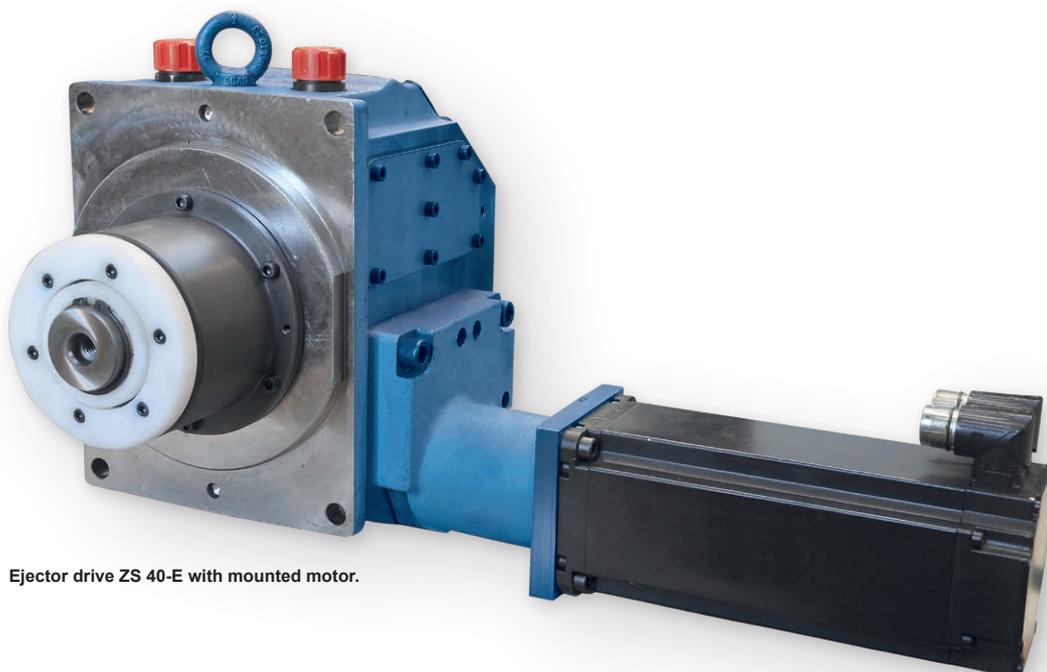
The ZS series is completed by the ejector drive. The challenge here is the small installation space given by the space conditions with the toggle lever moved in. This rack drive also has much greater efficiency in comparison with ball screw drives and therefore significantly improves the energy balance. This drive also features low-noise operation.

The comparatively low forces and the required speed are achieved with a synchronous servo motor and a rack with double tooth engagement. To achieve a small size, a telescopic seal is also used here although the strokes are not comparable with those in the positive locking drive.



### Performance data

Size		ZS 25-E		ZS 40-E	ZS 60-E
Ejection force	$F_a$ (kN)	25		40	60
Stroke	h (mm)	100	125	165	185
Speed	v (m/s)	0.3		0.3	0.3



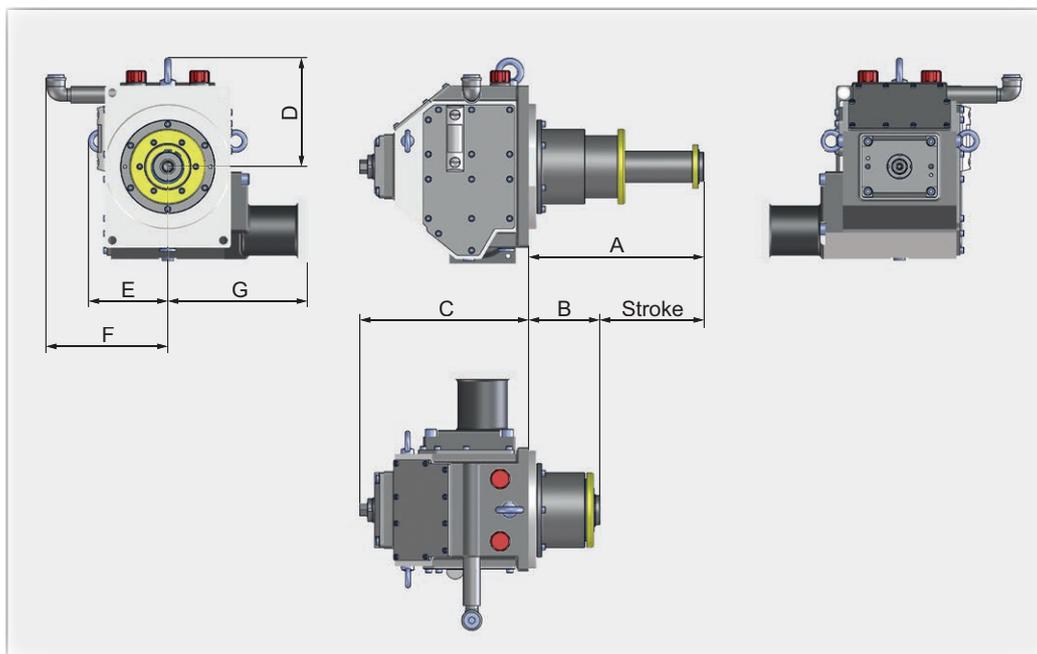
Ejector drive ZS 40-E with mounted motor.

With the synchronous servo motor, the corresponding reduction to the two rack pinions and the telescope, the enormously compact design was made possible.

The dimensions and weights of the ejector drive can be found on the next page.

## Ejector drive model range ZS-E

### Dimensions and Weights



Size	ZS 25-E		ZS 40-E	ZS 60-E
Stroke (mm)	100	125	165	185
A (mm)	184	222	279	327.5
B (mm)	84	97	114	142.5
C (mm)	221		268	275.5
D (mm)	approx. 151		approx. 174	approx. 197
E (mm)	approx. 113		-	-
F (mm)	-		approx. 194	approx. 212
G (mm)	215		222	265.5
Weight (kg)	40	43	64	88

### Consulting service

Call us if a standard gear is unsuitable for your area of application. Our experts will gladly advise you and help you to find the right solution for every technical challenge. We will also be happy to send you dimension sheets in PDF format in advance.



### Further information

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