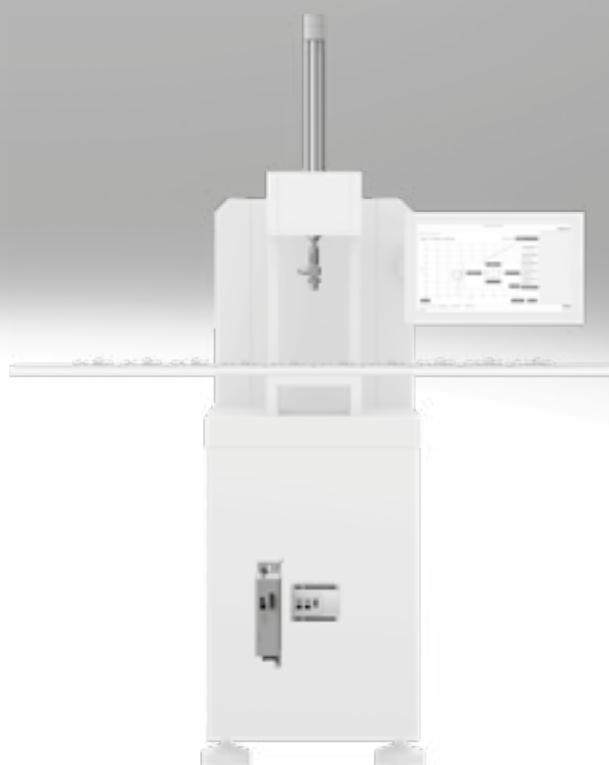# Servo press kits YJKP

FESTO

Characteristics

At a glance

The servo press kit and its associated application software can be used to respond quickly and flexibly to a range of press processes. It is a great alternative to complex and often oversized presses.

The software can be used for continuously monitoring parameters such as moments of force and displacement during joining and press-fitting processes.

Advantages:
- Pressing forces up to 17 kN (higher force ranges on request)
- Very high positioning and repetition accuracy
- Ideal price/performance ratio
- Easy integration into any application
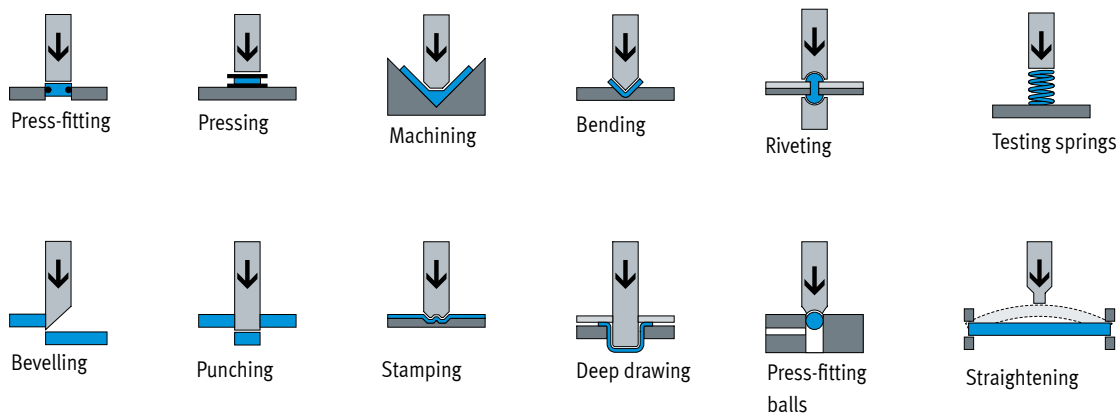
Sample pressing device
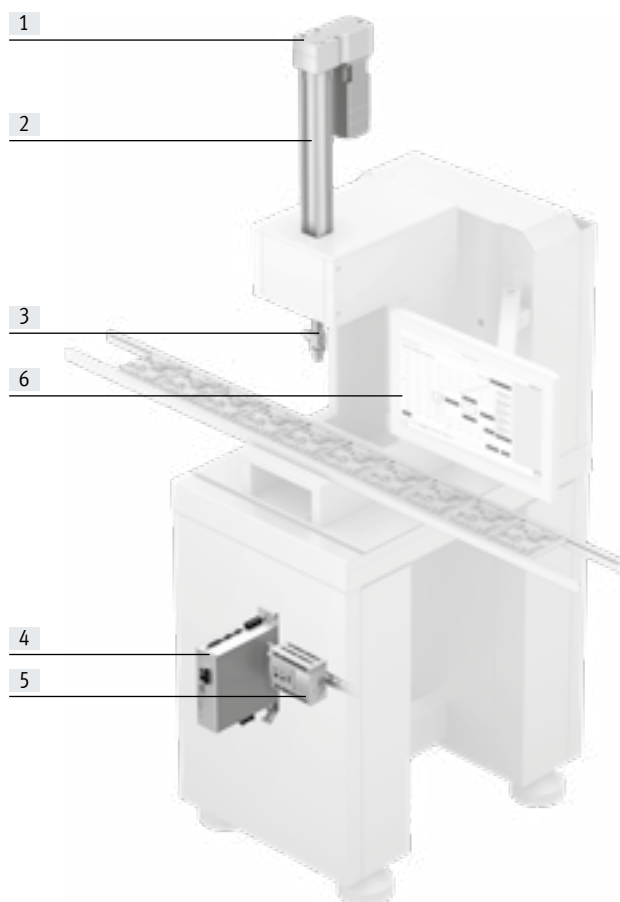
Individual components:

[1]   Servo motor
[2]   Electric cylinder
[3]   Force sensor (incl. inspection record)
[4]   Software package
[5]   Motor controller
[6]   Controller (incl. micro SD memory card)

Motor/encoder cables are included in the scope of delivery.

Areas of application

Press-fitting

Pressing

Machining

Bending

Riveting

Testing springs

Bevelling

Punching

Stamping

Deep drawing

Press-fitting balls

Straightening

Characteristics

Modular application software for configuration, operation and visualisation

- The application is controlled via a web interface, which is also used for configuring the application-specific functions
- No programming skills are required to use the pre-installed, ready-to-use software
- A non-platform-specific software display allows visualisation on all kinds of human-machine interfaces (HMIs) with a web browser, such as touchscreens, PCs, iPads, mobile phones, etc.
- The program sequence itself is controlled by variables and digital control inputs, e.g. by the higher-order controller
- All recorded process data can be interchanged individually with the HOST system
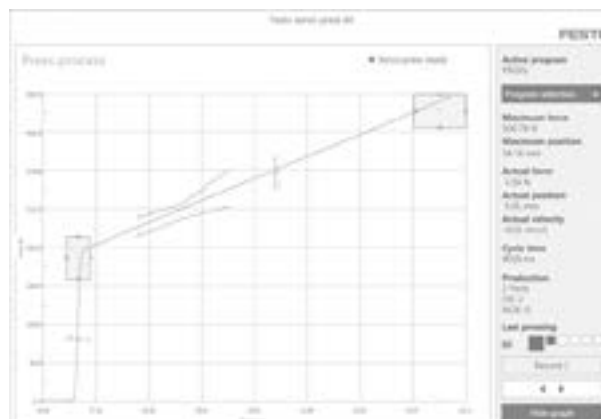
The following software functions are available

Commissioning	Writing a program	Operation	Diagnostics
- Configuring the hardware - Carrying out homing - Taring and adjusting the force sensor - Moving the press manually in "jog" mode - Configuring logging - Making fundamental system settings	- Managing programs - Defining press processes and parameterising and configuring them using the sequencer - Recording/loading reference curves - Configuring the threshold values/ envelopes/windowing evaluation methods - Managing individual variables	- Selecting saved press programs - Recording and displaying reference curves - Allowing OK/NOK evaluation of pressed parts - Logging The interfaces enable the GUI (graphical user interface), the PLC and the host to be selected and defined.	- Process diagnostics - Sensing of various system parameters, system status and statistical values - Enabling the display of current data/ statuses for the various interfaces, such as digital I/Os or data transferred by a host PLC.

Software functions	
Max. number of press programs	20 (expandable using variables)
Max. number of variables	100
Number of digital inputs for program control	
Software inputs	8 inputs/8 outputs
Hardware inputs	8 inputs/4 outputs
Max. possible measurements[1]	5
Max. number of measuring points[1]	200000
Number of envelopes[2]	5
Number of evaluation windows[2]	5
Number of threshold values[2]	5
Max. possible points per envelope	5 top/5 bottom
Evaluation results via	DIO/fieldbus/PC visualisation
Data export via	FTP, SMB

1) Per program
2) Per measurement

Connection to higher-order controller[1]

Function	Programming software	Version	Communication	Hardware
Siemens Host-FB	Step 7 TIA Portal	V14	Profinet IO	S7-300/S7-400, S7-1200/S7-1500
	Step 7 Classic	V5.5	Profinet IO	S7-300/S7-400
Allen Bradley Host-FB	Studio 5000	V26.01	EtherNet/IP	CompactLogix 1769-L24ER-QB1B
OMRON Host-FB	Sysmac Studio	V1.17	EtherNet/IP	NJ101-9000
Codesys Host-FB	Codesys V3	V3.5.7 SP2	Modbus TCP	CPX-CEC-M1-V3
Mitsubishi Host-FB	Melsec Studio GX Works 2	V1.551Z	Modbus TCP	Q03UDVCPU
Beckhoff Host-FB	TwinCat 3	V12.0.21005.1	Modbus TCP	CX5130-0155

1) The function modules can be downloaded for free from the Support Portal.
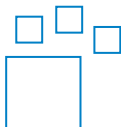
Characteristics

Ordering via the configurator

It is very easy to put together and order a wide range of servo press kits using the configurator.
The "Configuration", "Preassembly" and "Accessories" tabs are used to select the combinations and display them with the correct configuration.
CAD files and ePLAN macros included.

Ordering data – Product options

		Configurable product	The configurator can be found under	Part no.	Type
		This product and all its product options can be ordered using the configurator.	Products on the DVD or at → www.festo.com/catalogue/...	**8077950**	**YJKP**

ePLAN® is a registered trademark of its respective trademark holder in certain countries.

System components

**Included in the scope of delivery of the servo press kit**

Electric cylinder
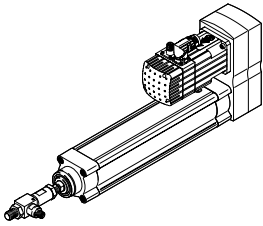
- With force sensor
- Connecting cable to controller (cable lengths of 5, 10, 15 m)

Optionally with:
- Motors with absolute displacement encoder:
  - Single-turn
  - Multi-turn
- Motors with/without holding brake
- Axial or parallel motor attachment (pre-assembled if required)
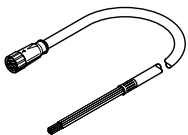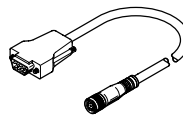
Motor controller
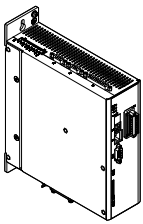
- For servo motor

Controller
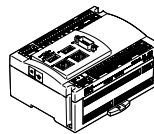
- With special software
- With connecting cable to the motor controller

Motor cable

- Pre-assembled cable

Encoder cable

- Pre-assembled cable

Connecting cable
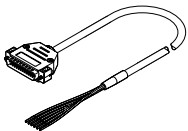
- Pre-assembled cable for commissioning the controller

Connecting cable
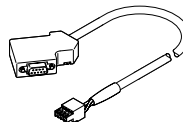
- Pre-assembled cable for CANopen interface

Connecting cable

- Screened cable for force sensor

Micro SD memory card

- 32 GB micro SD card for storing the created press programs and log files

Can be ordered as accessories

Guide unit

→ Page 14

Profile mounting
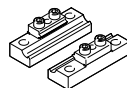
→ Page 12

Flange mounting
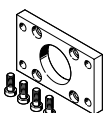
→ Page 13

Clamping element

→ Page 13

System components

Possible combinations of kit and motor, depending on mounting position
Optionally pre-assembled

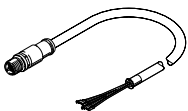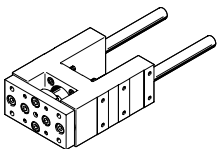The electric cylinder, axial and parallel kit and servo motor are assembled in one application-specific module. This reduces the number of individual components to be managed. This module can be directly integrated in the system thanks to defined mechanical and electrical interfaces. After completion, a full performance test is performed. There is thus no need for the customer to carry out any assembly process.

With axial kit
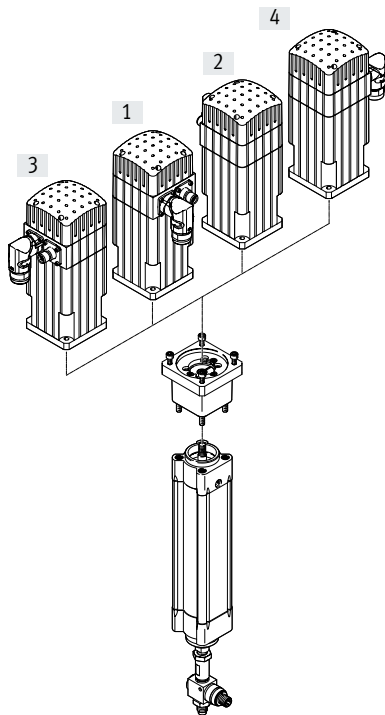
With parallel kit

Possible attachment variants
[1]   Front
[2]   Rear
[3]   Left
[4]   Right
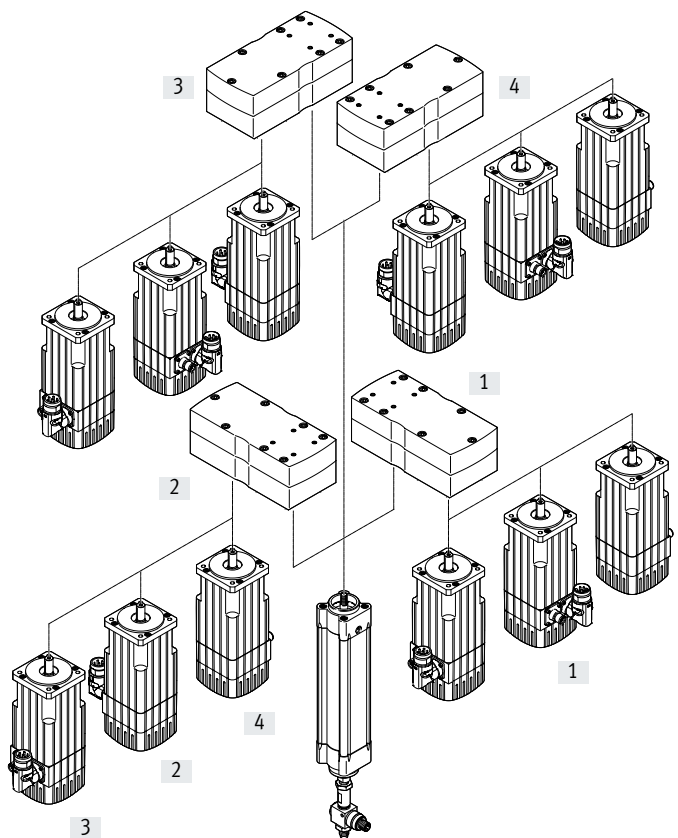
Advanced software package

The software package with selected functions makes it possible to adapt the servo press kit even more specifically to the application and the specific task, such as:
• Force control
• Step function with comparison operations
• OPC-UA connection

Part no.	Type
8082745	GSAY-A4-F0-Z4-L-Y1

Available to purchase via the App World.

www.festo.com/appworld

Data sheet

Bus protocols

EtherNet/IP

Modbus

PROFI NET

- ⬙ - **Note**

Following information are reference values. The individual values depend on your configuration.

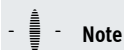| General technical data							
Force range up to	[kN]	0.8	1.5	4	7	12	17
Protection against torsion/guide		With plain-bearing guide					
Working stroke	[mm]	100, 200, 300, 400					
Pressing force[1]	[kN]	0.8	1.5	4	7	12	17
Max. payload[2]	[kg]	19.5	19.5	48	48	95	95
Max. feed speed	[mm/s]	250				160	
Acceleration							
For positioning phase	[m/s^2]	2					
For cushioning phase	[m/s^2]	2					
Repetition accuracy	[mm]	±0.01			±0.015	±0.01	
Scanning frequency of the force sensor	[Hz]	1000					
FS accuracy of the force measurement[3]	[%]	±0.25					
Parameterisation interface		Ethernet					
Fieldbus interface		Modbus TCP					
		EtherNet/IP					
		EtherNet TCP/IP					
		PROFINET IO					
Configuration via visualisation system		Force/displacement diagrams					
		Specification for good/defective parts					
		Visualisation					
Evaluation methods		Threshold value					
		Envelopes					
		Windowing					
Visualisation		At the customer's premises via a web browser					
Mounting position		Any					

1)   Applications in combination with tensile forces on request
2)   Caused by tool weight, for example
3)   Related to the calibration range of the force sensor and/or the force measurement range of the software for the complete system. Example for YJKP with a force range of 0.8 kN: 0.25% x 1200 N

Technical data – Force sensor							
Force range up to	[kN]	0.8	1.5	4	7	12	17
Force measuring range of software	[kN]	−0.2 … 1	−0.2 … 2	−0.5 … 4.5	−0.5 … 7.5	−1 … 13	−1 … 18
Max. overload	[kN]	1.5	3.75	11.25	15	30	37.5
Analogue output	[mA]	4 … 20					

- ⬙ - **Note**

The accuracy of the force measurement is influenced by the following properties of the force sensor:

- Accuracy
- Calibration range
- Nominal signal range
- Overload range

Transverse loads on the force sensor should be avoided as they may lead to false measurement results or damage the sensor.

Data sheet

Electrical data

Force range up to	[kN]	0.8	1.5	4	7	12	17

Motor controller

Input voltage range	[V AC]	100 … 230 ±10%			3x 230 … 480 ±10%		
Max. nominal input current	[A]	3		6	5.5		11
Nominal power	[VA]	500		1000	3000		6000

Controller

Operating voltage	[V DC]	24
Current consumption	[mA]	200

Force sensor

Operating voltage range	[V DC]	10 … 30

Safety characteristics of the motor controller

Safety function to EN 61800-5-2		Safe torque off (STO)
Performance Level (PL) to EN ISO 13849-1		Category 4, Performance Level e
Safety Integrity Level (SIL) to EN 61800-5-2, EN 62061, EN 61508		SIL 3
Certificate issuing authority		German Technical Control Board (TÜV) 0 1/20 5/5262.0 1/14
Proof test interval		20a
Diagnostic coverage	[%]	97
Safe failure fraction (SFF)	[%]	99.2
Hardware fault tolerance		1

Operating and environmental conditions

Ambient temperature	[°C]	0 … 40
Storage temperature	[°C]	−10 … +60
Relative humidity	[%]	0 … 90
Degree of protection		IP20
Duty cycle	[%]	100
Note on materials		Contains paint-wetting impairment substances
		RoHS-compliant

Weights [kg]

Force range up to	0.8	1.5	4	7	12	17

Electric cylinder

Basic weight with 0 mm stroke	0.78	1.24	1.98	3.16	7.39	11.12
Additional weight per 100 mm stroke	0.33	0.47	0.65	0.87	1.55	1.93

Kit

Parallel kit	1.05	2.45	4.99	4.95	11.9	11.8
Axial kit	0.26	0.41	1.14	1.17	2.92	3.46

Motor

Basic weight	1.6	2.1	4.8	6.9	16.2	16.2
Additional weight of brake	0.1	0.2	0.5	0.6	0.8	0.8

Force sensor

Product weight	0.2	0.2	0.3	0.3	0.7	0.7

Motor controller

Product weight	2.1	2.1	2.2	3.8	3.8	3.8

Controller

Product weight	0.4	0.4	0.4	0.4	0.4	0.4

Data sheet

Service life

The service life of the servo press kit depends to a large extent on the lead screw of the cylinder.

To ensure that the balls of the ball screw drive can reliably realign, a stroke of at least 12.5 mm must be carried out at regular intervals (typically during the retracting phase, ideally after each pressing process).

The service life ends after 10 million switching cycles or when the maximum running performance (L) has been reached.

The specifications for running performance (L) are based on experimentally determined and theoretically calculated data (at room temperature).

The running performance that can be achieved in practice can deviate considerably from the specified curves under different parameters (e.g. dirt, temperature).
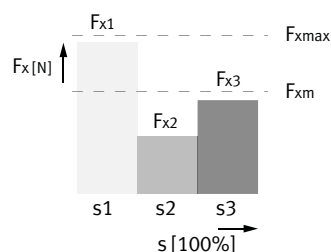
Calculation of the mean feed force F_{xm}

$$F_{xm} = \sqrt[3]{\frac{F_{x1}{}^3 \cdot s_1 + \ldots + F_n{}^3 \cdot s_n}{s_1 + \ldots + s_n}}$$

F_{xm} = Mean feed force
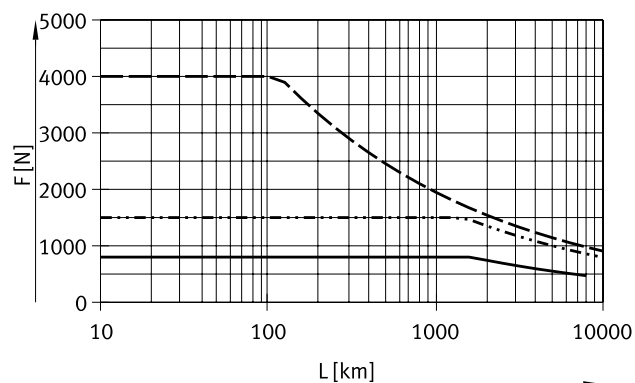$F_{x1/n}$ = Feed force of section
$s_{1/n}$ = Part of movement cycle that is travel

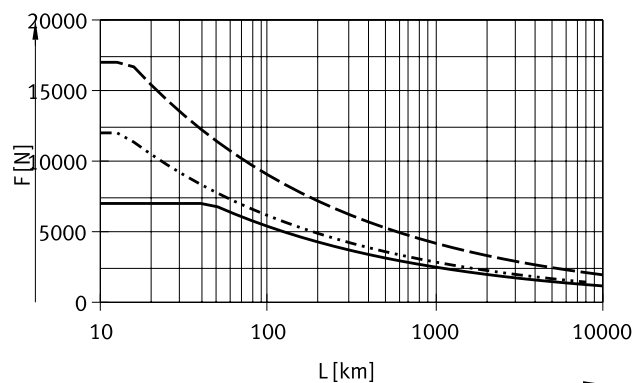

Mean feed force F_{xm} as a function of running performance L and room temperature

Force range up to 0.8/1.5/4	Force range up to 7/12/17

Force range up to 0.8 kN
Force range up to 1.5 kN
Force range up to 4 kN

Force range up to 7 kN
Force range up to 12 kN
Force range up to 17 kN

Data sheet

Dimensions
With parallel kit

Download CAD data ➜ www.festo.com

[1]   Servo motor
[2]   Parallel kit
[3]   Electric cylinder
[4]   Force sensor

+   = plus stroke length
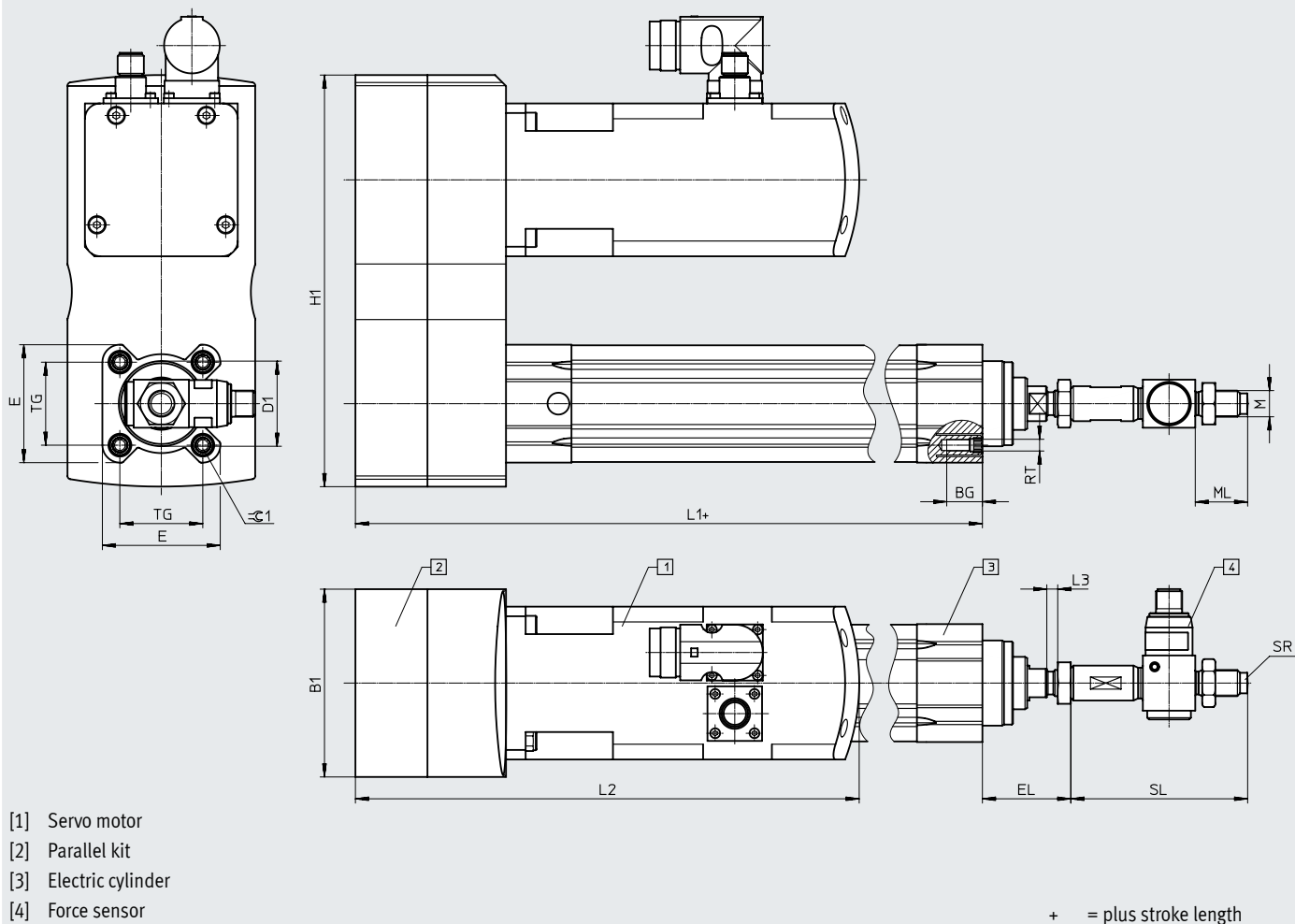
Force range up to [kN]	B1	BG min.	D1 Ø d11	E	EL[1]	H1	L1	L2
0.8	60	16	34	45$^{+0.5}$	35.5	157	178.5	220.4
1.5	86	16	39	54$^{+0.5}$	40.5	188.5	213	230.8
4	110	17	45	64$^{+0.5}$	49.5	225	245	274.3
7	110	17	52	75+0.5/–0.1	50	225	253	325.3
12	145	17	60	93+0.5/–0.1	61	348	303.5	385
17	145	17	70	110+0.5/–0.1	66	348	323.5	385

Force range up to [kN]	L3	M	ML	RT	SL	SR	TG	⫤1
0.8	5	M10x1.25	22	M6	78	60	32.5	6
1.5	5	M12x1.25	24	M6	81	60	38	6
4	5	M16x1.5	32	M8	107	100	46.5	8
7	5	M16x1.5	32	M8	107	100	56.5±0.5	8
12	5	M20x1.5	40	M10	140.5	150	72±0.5	6
17	5	M20x1.5	40	M10	140.5	150	89±0.5	6

1)   With a spacing of 5 mm to the lock nut (in the retracted state)

Data sheet

Dimensions

With axial kit

[1]   Servo motor
[2]   Parallel kit
[3]   Electric cylinder
[4]   Force sensor

Force range up to [kN]	B1	BG min.	D1 ∅ d11	E	EL[1]	H1	L1
0.8	55	16	34	$45^{+0.5}$	35.5	55	336.1
1.5	70	16	39	$54^{+0.5}$	40.5	70	357.8
4	100	17	45	$64^{+0.5}$	49.5	100	439.3
7	100	17	52	$75_{+0.5/-0.1}$	50	100	492.5
12	140	17	60	$93_{+0.5/-0.1}$	61	140	591.5
17	140	17	70	$110_{+0.5/-0.1}$	66	140	619

Force range up to [kN]	L3	M	ML	RT	SL	SR	TG	⊏≣⊐1
0.8	5	M10x1.25	22	M6	78	60	32.5	6
1.5	5	M12x1.25	24	M6	81	60	38	6
4	5	M16x1.5	32	M8	107	100	46.5	8
7	5	M16x1.5	32	M8	107	100	56.5±0.5	8
12	5	M20x1.5	40	M10	140.5	150	72±0.5	6
17	5	M20x1.5	40	M10	140.5	150	89±0.5	6

1)   With a spacing of 5 mm to the lock nut (in the retracted state)
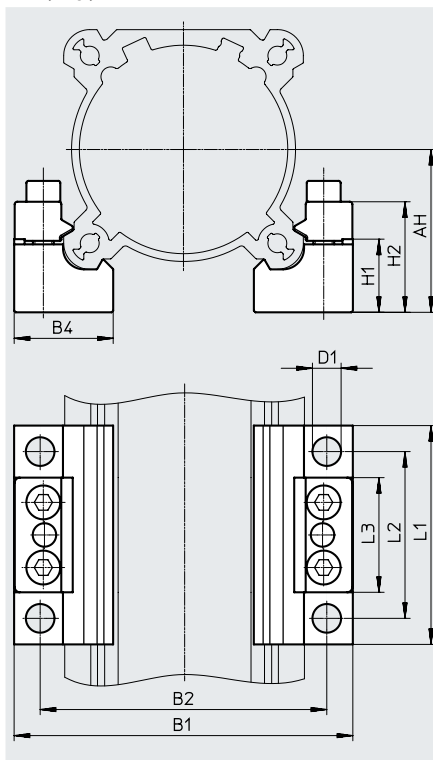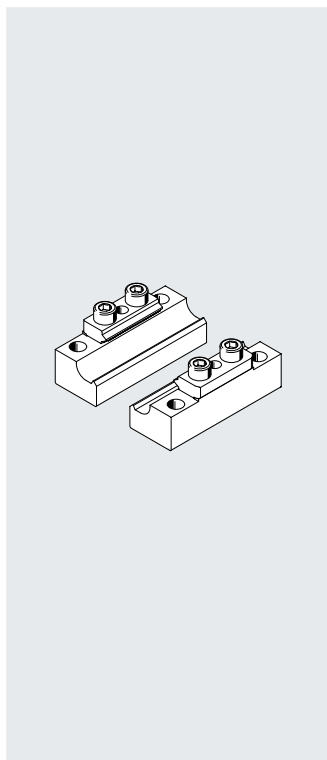
Accessories

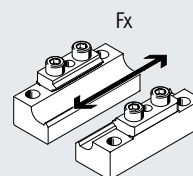**Profile mounting EAHF**   Material: RoHS-compliant

Plate: anodised aluminium
Clamping piece: coated steel

Note

Several profile mountings may have to be used depending on the pressing force.

Fx

Dimensions and ordering data

For force range up to [kN]	AH	B1	B2	B4	D1 ∅	H1	H2
0.8	32	76	60	26	9	16	23.6
1.5	36	84.5	68	26	9	16	23.6
4	44.5	94	81	30	9	22.8	30.4
7	50	105	92	30	9	22.8	30.4
12	62.5	130	110	38	11	28.1	42.5
17	71	147	127	38	11	28.1	42.5

For force range up to [kN]	L1	L2	L3	Weight [g]	Part no.	Type
0.8, 1.5	80	60	34	218	**2838839**	**EAHF-V2-3 2/40-P**
4, 7	80	60	41	340	**1547781**	**EAHF-V2-5 0/63-P**
12, 17	84	64	44	570	**1547780**	**EAHF-V2-8 0/100-P**

Number of profile mountings depending on the stroke

| Force range	Max. possible force peak [N]	Transferable axial force F_x [kN]	Stroke [mm] 100	200	300	400
0.8	1.6	1.6	1	1	1	1
1.5	3.2	1.6	2	2	2	2
4	7.2	3.6	2	2	2	2
7	10.8	3.6	_[1]	3	3	3
12	16	4	_[1]	_[1]	4	4
17	20	4	_[1]	_[1]	5	5

1) Mounting via profile mounting not possible as the required number cannot be attached to the profile.

Accessories

Flange mounting EAHH

Material:
High-alloy stainless steel

RoHS-compliant
Free of copper and PTFE
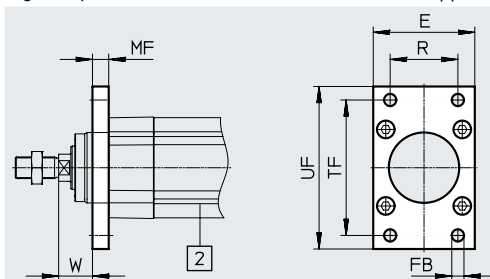
Dimensions and ordering data

For force range up to [kN]	E	FB Ø H13	MF js14	R	TF	UF ±1	W
0.8	45	7	10	32	64	80	15.5
1.5	54	9	10	36	72	90	19.5
4	64	9	12	45	90	110	24.5
7	75	9	12	50	100	120	25
12	93	12	16	63	126	150	30
17	110	14	16	75	150	175	35

For force range up to [kN]	Max. load capacity [kN]	CRC[1]	Weight [g]	Part no.	Type
0.8	1	3	206	**2827587**	**EAHH-V2-32-R1**
1.5	3	3	275	**2827588**	**EAHH-V2-40-R1**
4	5	3	496	**2827589**	**EAHH-V2-50-R1**
7	7	3	633	**1502305**	**EAHH-V2-63-R1**
12	12	3	1360	**1502306**	**EAHH-V2-80-R1**
17	17	3	1880	**1502307**	**EAHH-V2-100-R1**

1)   Corrosion resistance class CRC 3 to Festo standard FN 940070
     High corrosion stress. Outdoor exposure under moderate corrosive conditions. Externally visible parts with primarily functional surface requirements which are in direct contact with a normal industrial environment.

Clamping element EADT
Material:
Plastic
RoHS-compliant

In conjunction with parallel kits, for setting the toothed belt pretension for force ranges 4, 7, 12 and 17 kN.

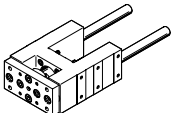High toothed belt pretension forces can be generated with low torques at the clamping element.

Ordering data

Type	Weight [g]	Part no.	Type
EADT-E-U1-110	9	**1461069**	**EADT-E-U1-110**

Accessories

Ordering data – Guide units   Data sheets → Internet: eagf

	Stroke [mm]	Part no.	Type		Stroke [mm]	Part no.	Type
	For force range up to 0.8 kN				**For force range up to 1.5 kN**		
	100	3038083	EAGF-V2-KF-32-170		100	3038089	EAGF-V2-KF-40-170
	200	3038083	EAGF-V2-KF-32-270		200	3038089	EAGF-V2-KF-40-270
	300	3038083	EAGF-V2-KF-32-370		300	3038089	EAGF-V2-KF-40-370
	400	3038083	EAGF-V2-KF-32-470		400	3038089	EAGF-V2-KF-40-470
	For force range up to 4 kN				**For force range up to 7 kN**		
	100	3038094	EAGF-V2-KF-50-190		100	2608521	EAGF-V2-KF-63-190
	200	3038094	EAGF-V2-KF-50-290		200	2608521	EAGF-V2-KF-63-290
	300	3038094	EAGF-V2-KF-50-390		300	2608521	EAGF-V2-KF-63-390
	400	3038094	EAGF-V2-KF-50-490		400	2608521	EAGF-V2-KF-63-490
	For force range up to 12 kN				**For force range up to 17 kN**		
	100	2608528	EAGF-V2-KF-80-220		100	2608532	EAGF-V2-KF-100-220
	200	2608528	EAGF-V2-KF-80-320		200	2608532	EAGF-V2-KF-100-320
	300	2608528	EAGF-V2-KF-80-420		300	2608532	EAGF-V2-KF-100-420
	400	2608528	EAGF-V2-KF-80-520		400	2608532	EAGF-V2-KF-100-520