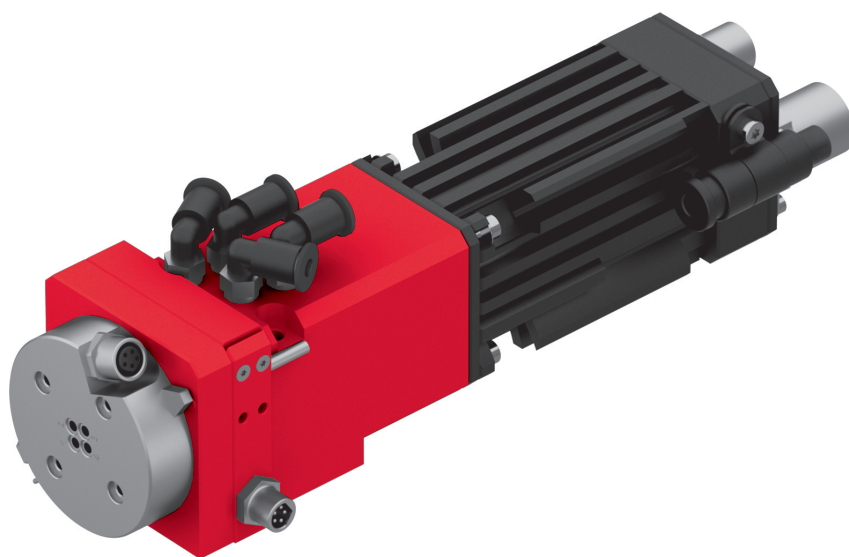
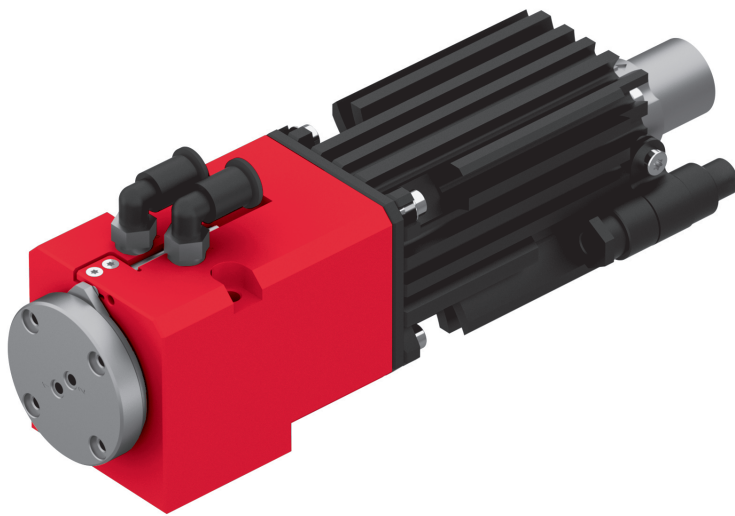


# Rotary axes RA-40

RA-40-2F & RA-40-4F



# Table of contents: RA-40

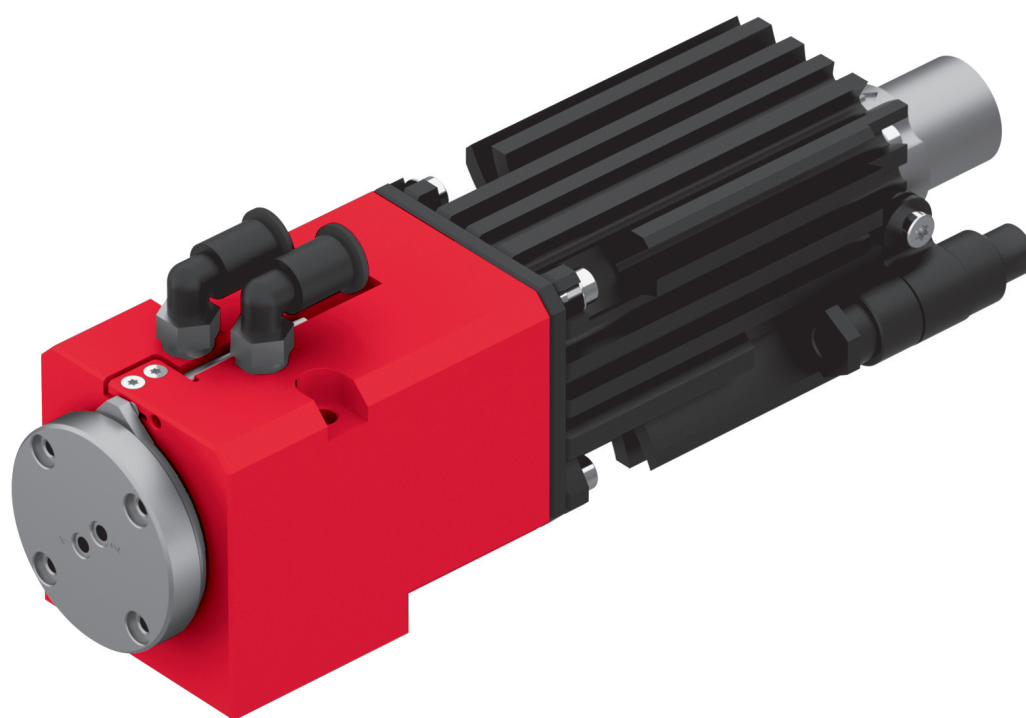
<b>Rotary axes RA-40</b>	<b>Page</b>
RA-40-2F	252
RA-40-4F	256
Accessories RA	266



# Rotary axes RA-40

## RA-40-2F

10

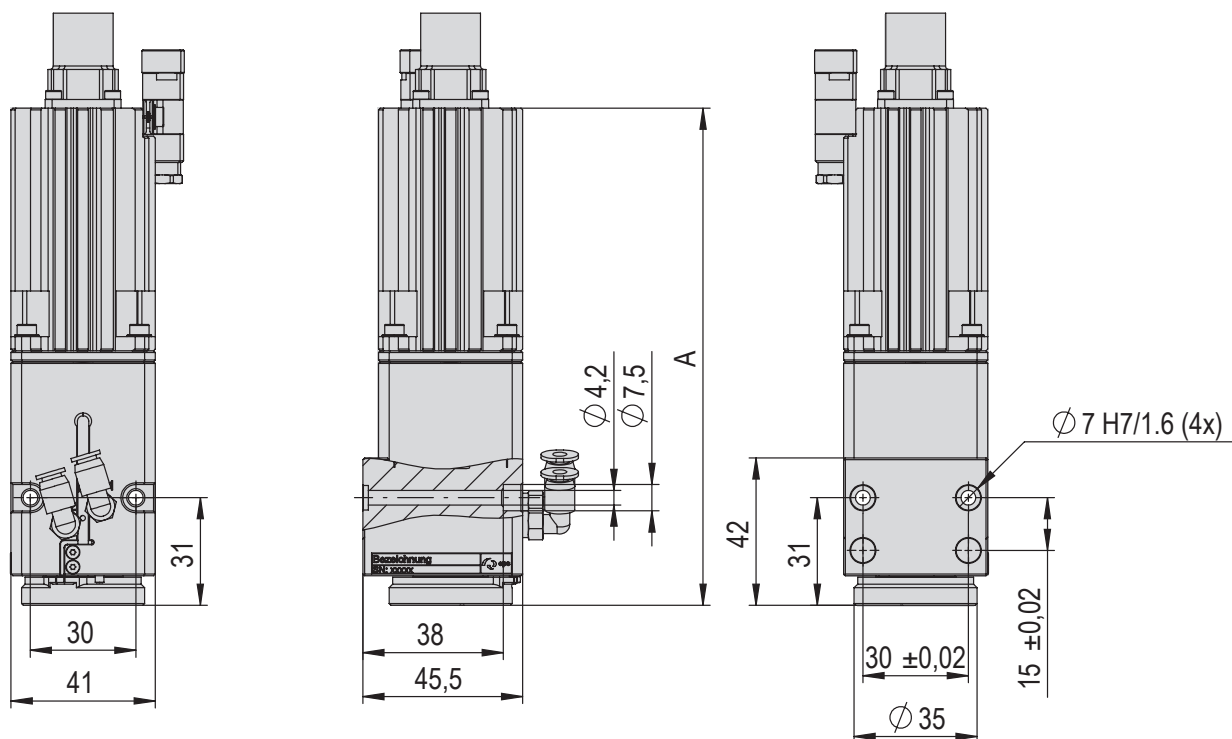
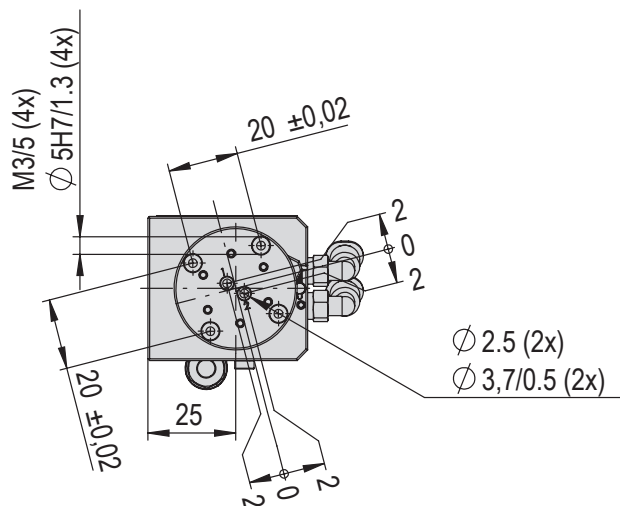


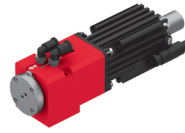
- Dynamic, electrical rotational axis with 4 Nm peak torque at just 690 g net weight
- Endless rotation without moving cables, due to integrated electrical and fluid passages
- High-quality, backlash-free harmonic drive gear for very high repeat accuracies

# Dimensions and dimension drawings

**RA-40-2F**

Type	RA-40-2F	RA-40-2F (ZE)
A	141 mm	159 mm





RA-40-2F	
Operating temperature	0 - 50 °C
Storage temperature	0 - 50 °C
Humidity	< 90 %

Type	RA-40-2F-30-G	RA-40-2F-30-W	RA-40-2F-30-G-ZE	RA-40-2F-30-W-ZE
<b>Order number</b>	<b>50473180</b>	<b>50473182</b>	<b>50473183</b>	<b>50473184</b>
Net weight	0.69 kg	0.69 kg	0.74 kg	0.74 kg
Angle of rotation	∞	∞	∞	∞
Max. rotational speed	280 rpm	280 rpm	280 rpm	280 rpm
Fluid passages	2	2	2	2
Continuous torque	1.2 Nm	1.2 Nm	1.2 Nm	1.2 Nm
Max. output torque	2.4 Nm	2.4 Nm	2.4 Nm	2.4 Nm
Ratio	30:1	30:1	30:1	30:1
Repeat accuracy	+/- 0.0017 °	+/- 0.0017 °	+/- 0.0017 °	+/- 0.0017 °
Encoder (optional)			SV-TLL ABZ, 61440 Inc/U	SV-TLL ABZ, 61440 Inc/U
Mounting position	✦	✦	✦	✦

Type	RA-40-2F-50-G	RA-40-2F-50-W	RA-40-2F-50-G-ZE	RA-40-2F-50-W-ZE
<b>Order number</b>	<b>50473185</b>	<b>50473186</b>	<b>50473187</b>	<b>50473188</b>
Net weight	0.69 kg	0.69 kg	0.74 kg	0.74 kg
Angle of rotation	∞	∞	∞	∞
Max. rotational speed	140 rpm	140 rpm	140 rpm	140 rpm
Fluid passages	2	2	2	2
Continuous torque	2 Nm	2 Nm	2 Nm	2 Nm
Max. output torque	4 Nm	4 Nm	4 Nm	4 Nm
Ratio	50:1	50:1	50:1	50:1
Repeat accuracy	+/- 0.0017 °	+/- 0.0017 °	+/- 0.0017 °	+/- 0.0017 °
Encoder (optional)			SV-TLL ABZ, 102400 Inc/U	SV-TLL ABZ, 102400 Inc/U
Mounting position	✦	✦	✦	✦

The technical data pertains to Afag standard test conditions.  
Air purity class 5 (ISO 14644-1)  
Cleanroom class: 10 000 (Federal Standard 209E)

In the article description of a rotary axis the "F" stands for fluid passages and the "E" for electrical feed-through. There are two version of motor plugs. A „G" in the article description of the rotary axis stand for a straight and the „W" for an angular plug. Also see order key for RA-40.

### Included in the delivery

(Catalogue HT accessories)

- 2x Centering bushing Ø7x3
- 2x O-ring 2.5x0.62 mm

### Accessories

(Product-specific accessories)

- Adapters

(Catalogue HT accessories)

- Motor cable-M16
- Controller C1xxx-1S
- Plug kit for C1xxx-1S
- USB-RS232 Converter for controllers
- Power supply S01-72/500, 1-phase

### Alternative accessories

(Catalogue HT accessories)

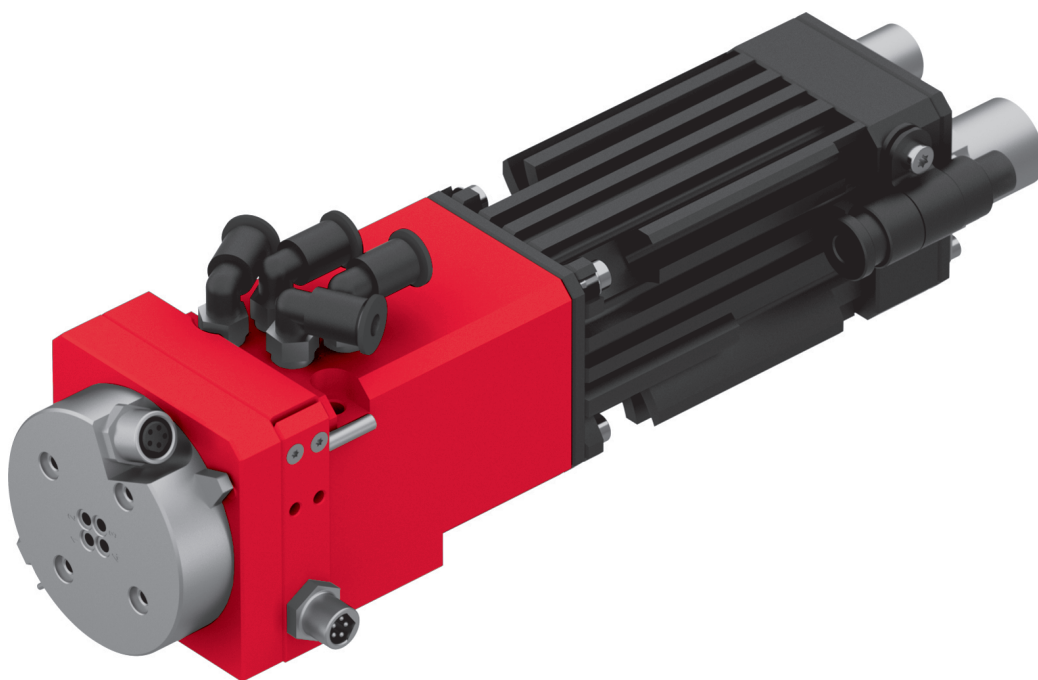
- Additional motor cables
- Additional controllers
- Additional power supplies

Warranty: 24 months following commissioning, but a maximum of 27 months following delivery



# Rotary axes RA-40

## RA-40-4F



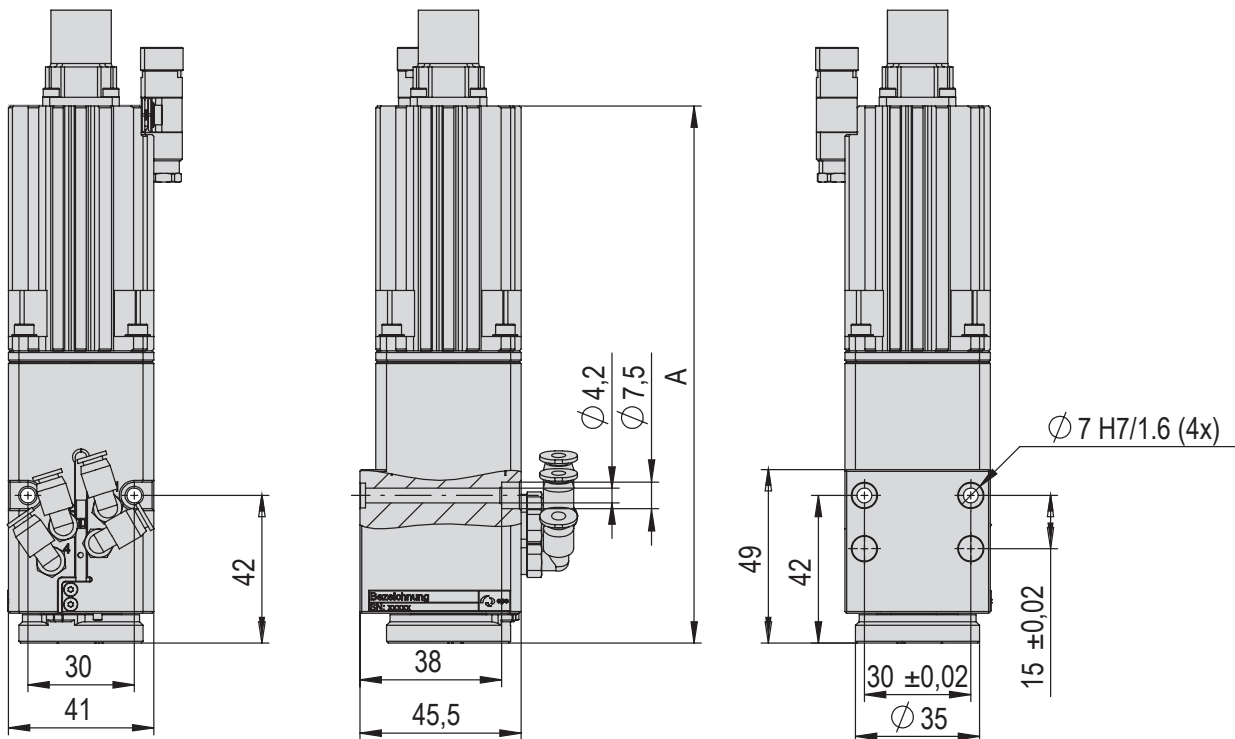
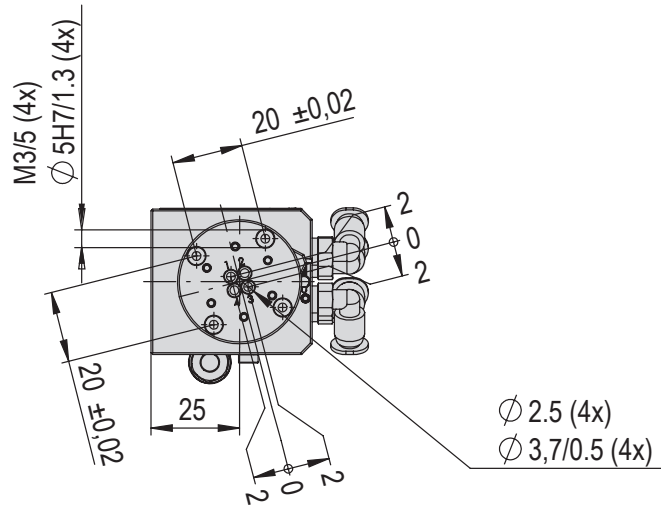
- Dynamic, electrical rotational axis with 4 Nm peak torque at just 690 g net weight
- Endless rotation without moving cables, due to integrated electrical and fluid passages
- High-quality, backlash-free harmonic drive gear for very high repeat accuracies



# Dimensions and dimension drawings

**RA-40-4F**

Type	RA-40-4F	RA-40-4F (ZE)
A	151 mm	169 mm





RA-40-4F	
Operating temperature	0 - 50 °C
Storage temperature	0 - 50 °C
Humidity	< 90 %

Type	RA-40-4F-30-G	RA-40-4F-30-W	RA-40-4F-30-G-ZE	RA-40-4F-30-W-ZE
<b>Order number</b>	<b>50473189</b>	<b>50473190</b>	<b>50473191</b>	<b>50473192</b>
Net weight	0.74 kg	0.74 kg	0.79 kg	0.79 kg
Angle of rotation	∞	∞	∞	∞
Max. rotational speed	280 rpm	280 rpm	280 rpm	280 rpm
Fluid passages	4	4	4	4
Continuous torque	1.2 Nm	1.2 Nm	1.2 Nm	1.2 Nm
Max. output torque	2.4 Nm	2.4 Nm	2.4 Nm	2.4 Nm
Ratio	30:1	30:1	30:1	30:1
Repeat accuracy	+/- 0.0017 °	+/- 0.0017 °	+/- 0.0017 °	+/- 0.0017 °
Encoder (optional)			SV-TLL ABZ, 61440 Inc/U	SV-TLL ABZ, 61440 Inc/U
Mounting position	✦	✦	✦	✦

Type	RA-40-4F-50-G	RA-40-4F-50-W	RA-40-4F-50-G-ZE	RA-40-4F-50-W-ZE
<b>Order number</b>	<b>50473193</b>	<b>50473194</b>	<b>50473195</b>	<b>50473196</b>
Net weight	0.74 kg	0.74 kg	0.79 kg	0.79 kg
Angle of rotation	∞	∞	∞	∞
Max. rotational speed	140 rpm	140 rpm	140 rpm	140 rpm
Fluid passages	4	4	4	4
Continuous torque	2 Nm	2 Nm	2 Nm	2 Nm
Max. output torque	4 Nm	4 Nm	4 Nm	4 Nm
Ratio	50:1	50:1	50:1	50:1
Repeat accuracy	+/- 0.0017 °	+/- 0.0017 °	+/- 0.0017 °	+/- 0.0017 °
Encoder (optional)			SV-TLL ABZ, 102400 Inc/U	SV-TLL ABZ, 102400 Inc/U
Mounting position	✦	✦	✦	✦

The technical data pertains to Afag standard test conditions.  
Air purity class 5 (ISO 14644-1)  
Cleanroom class: 10 000 (Federal Standard 209E)

In the article description of a rotary axis the "F" stands for fluid passages and the "E" for electrical feed-through. There are two version of motor plugs. A „G" in the article description of the rotary axis stand for a straight and the „W" for an angular plug. Also see order key for RA-40.

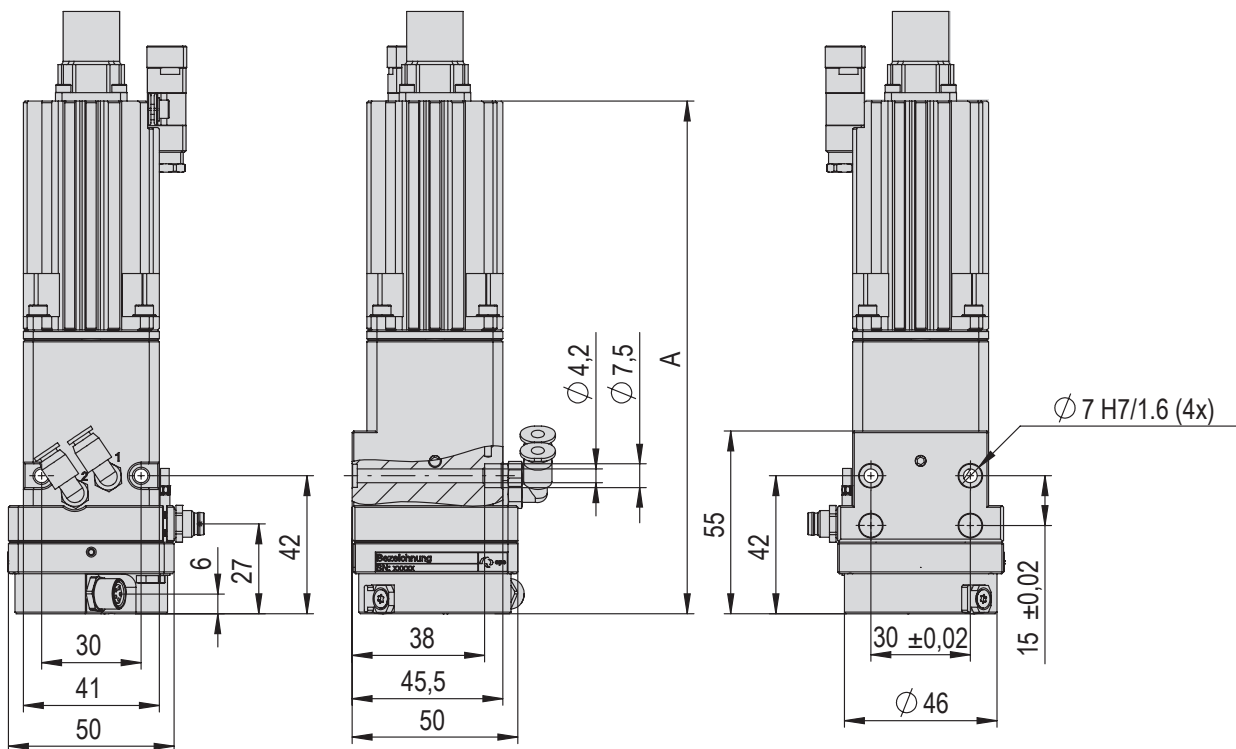
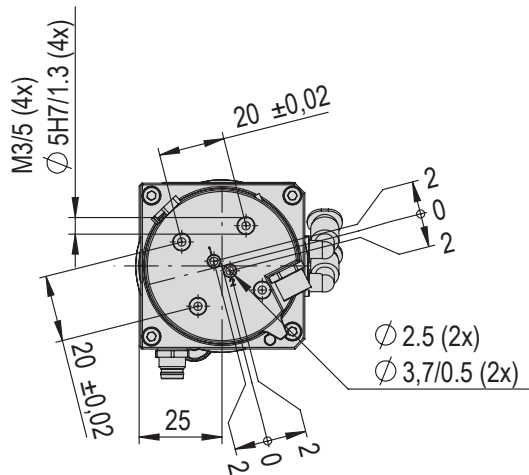
- Included in the delivery**  
(Catalogue HT accessories)
- 2x Centering bushing Ø7x3
  - 4x O-ring 2.5x0.62 mm

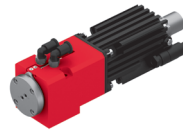
- Accessories**  
(Product-specific accessories)
- Adapters
- (Catalogue HT accessories)
- Motor cable-M16
  - Controller C1xxx-1S
  - Plug kit for C1xxx-1S
  - USB-RS232 Converter for controllers
  - Power supply S01-72/500, 1-phase

- Alternative accessories**  
(Catalogue HT accessories)
- Additional motor cables
  - Additional controllers
  - Additional power supplies

Warranty: 24 months following commissioning, but a maximum of 27 months following delivery

Type	RA-40-2F-5E	RA-40-2F-5E (ZE)
A	155 mm	173 mm





RA-40-2F-5E	
Operating temperature	0 - 50 °C
Storage temperature	0 - 50 °C
Humidity	< 90 %

Type	RA-40-2F-5E-30-G	RA-40-2F-5E-30-W	RA-40-2F-5E-30-G-ZE	RA-40-2F-5E-30-W-ZE
<b>Order number</b>	<b>50473197</b>	<b>50473198</b>	<b>50473200</b>	<b>50473201</b>
Net weight	0.84 kg	0.84 kg	0.89 kg	0.89 kg
Angle of rotation	∞	∞	∞	∞
Max. rotational speed	280 rpm	280 rpm	280 rpm	280 rpm
Electrical feed-through	5 x 2 A	5 x 2 A	5 x 2 A	5 x 2 A
Fluid passages	2	2	2	2
Continuous torque	1.2 Nm	1.2 Nm	1.2 Nm	1.2 Nm
Max. output torque	2.4 Nm	2.4 Nm	2.4 Nm	2.4 Nm
Ratio	30:1	30:1	30:1	30:1
Repeat accuracy	+/- 0.0017 °	+/- 0.0017 °	+/- 0.0017 °	+/- 0.0017 °
Encoder (optional)			SV-TLL ABZ, 61440 Inc/U	SV-TLL ABZ, 61440 Inc/U
Mounting position	✦	✦	✦	✦

Type	RA-40-2F-5E-50-G	RA-40-2F-5E-50-W	RA-40-2F-5E-50-G-ZE	RA-40-2F-5E-50-W-ZE
<b>Order number</b>	<b>50473202</b>	<b>50473203</b>	<b>50473204</b>	<b>50473205</b>
Net weight	0.84 kg	0.84 kg	0.89 kg	0.89 kg
Angle of rotation	∞	∞	∞	∞
Max. rotational speed	140 rpm	140 rpm	140 rpm	140 rpm
Electrical feed-through	5 x 2 A	5 x 2 A	5 x 2 A	5 x 2 A
Fluid passages	2	2	2	2
Continuous torque	2 Nm	2 Nm	2 Nm	2 Nm
Max. output torque	4 Nm	4 Nm	4 Nm	4 Nm
Ratio	50:1	50:1	50:1	50:1
Repeat accuracy	+/- 0.0017 °	+/- 0.0017 °	+/- 0.0017 °	+/- 0.0017 °
Encoder (optional)			SV-TLL ABZ, 102400 Inc/U	SV-TLL ABZ, 102400 Inc/U
Mounting position	✦	✦	✦	✦

The technical data pertains to Afag standard test conditions.  
Air purity class 5 (ISO 14644-1)  
Cleanroom class: 10.000 (Federal Standard 209E)

In the article description of a rotary axis the "F" stands for fluid passages and the "E" for electrical feed-through. There are two version of motor plugs. A „G“ in the article description of the rotary axis stand for a straight and the „W“ for an angular plug. Also see order key for RA-40.

### Included in the delivery

(Catalogue HT accessories)

- 2x Centering bushing Ø7x3
- 2x O-ring 2.5x0.62 mm

### Accessories

(Product-specific accessories)

- Adapters
  - Proximity switch cables/-extensions
- (Catalogue HT accessories)
- Motor cable-M16
  - Controller C1xxx-1S
  - Plug kit for C1xxx-1S
  - USB-RS232 Converter for controllers
  - Power supply S01-72/500, 1-phase

### Alternative accessories

(Catalogue HT accessories)

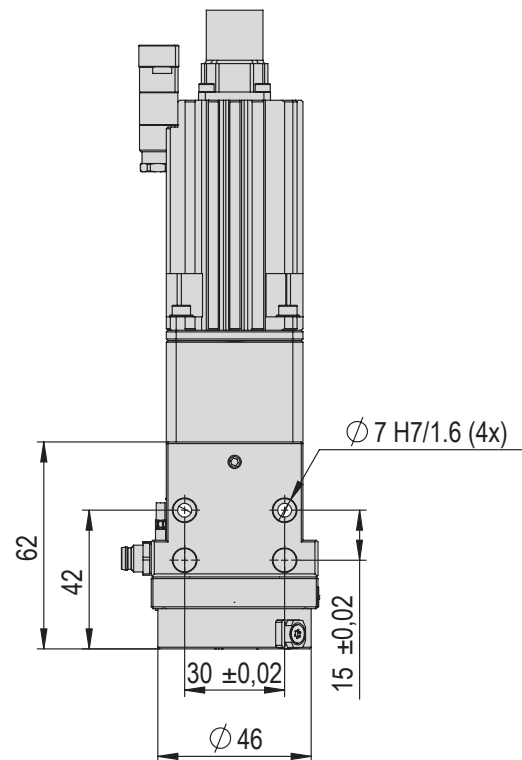
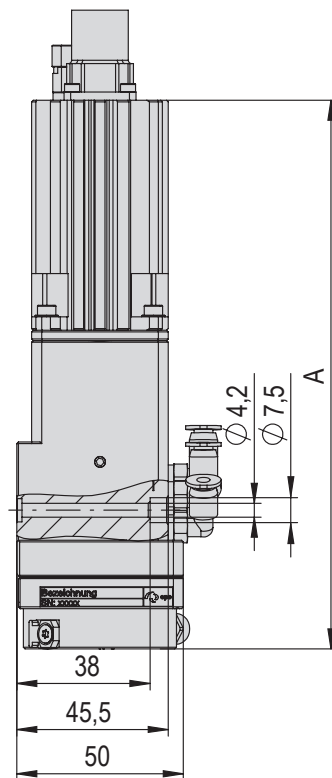
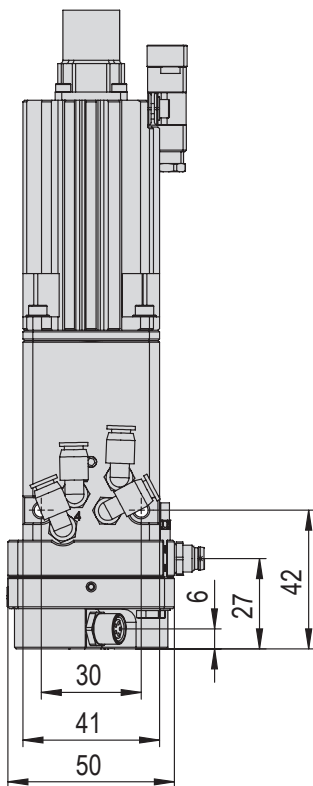
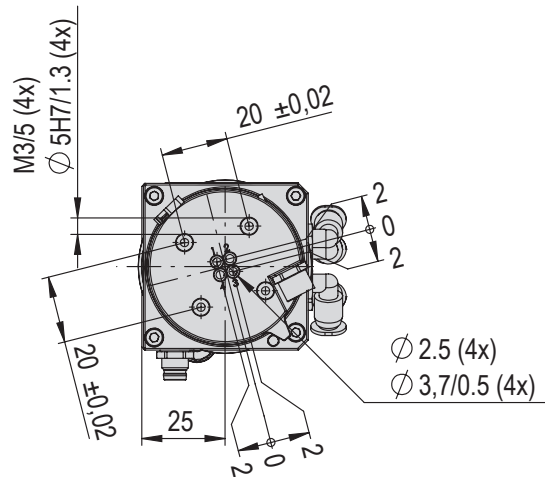
- Additional motor cables
- Additional controllers
- Additional power supplies

Warranty: 24 months following commissioning, but a maximum of 27 months following delivery

# Dimensions and dimension drawings

**RA-40-4F-5E**

Type	RA-40-4F-5E	RA-40-4F-5E (ZE)
A	165 mm	183 mm





RA-40-4F-5E	
Operating temperature	0 - 50 °C
Storage temperature	0 - 50 °C
Humidity	< 90 %

Type	RA-40-4F-5E-30-G	RA-40-4F-5E-30-W	RA-40-4F-5E-30-G-ZE	RA-40-4F-5E-30-W-ZE
<b>Order number</b>	<b>50473206</b>	<b>50473207</b>	<b>50473208</b>	<b>50473209</b>
Net weight	0.89 kg	0.89 kg	0.94 kg	0.94 kg
Angle of rotation	∞	∞	∞	∞
Max. rotational speed	280 rpm	280 rpm	280 rpm	280 rpm
Electrical feed-through	5 x 2 A	5 x 2 A	5 x 2 A	5 x 2 A
Fluid passages	4	4	4	4
Continuous torque	1.2 Nm	1.2 Nm	1.2 Nm	1.2 Nm
Max. output torque	2.4 Nm	2.4 Nm	2.4 Nm	2.4 Nm
Ratio	30:1	30:1	30:1	30:1
Repeat accuracy	+/- 0.0017 °	+/- 0.0017 °	+/- 0.0017 °	+/- 0.0017 °
Encoder (optional)			SV-TLL ABZ, 61440 Inc/U	SV-TLL ABZ, 61440 Inc/U
Mounting position	✦	✦	✦	✦

Type	RA-40-4F-5E-50-G	RA-40-4F-5E-50-W	RA-40-4F-5E-50-G-ZE	RA-40-4F-5E-50-W-ZE
<b>Order number</b>	<b>50473210</b>	<b>50473211</b>	<b>50473212</b>	<b>50473213</b>
Net weight	0.89 kg	0.89 kg	0.94 kg	0.94 kg
Angle of rotation	∞	∞	∞	∞
Max. rotational speed	140 rpm	140 rpm	140 rpm	140 rpm
Electrical feed-through	5 x 2 A	5 x 2 A	5 x 2 A	5 x 2 A
Fluid passages	4	4	4	4
Continuous torque	2 Nm	2 Nm	2 Nm	2 Nm
Max. output torque	4 Nm	4 Nm	4 Nm	4 Nm
Ratio	50:1	50:1	50:1	50:1
Repeat accuracy	+/- 0.0017 °	+/- 0.0017 °	+/- 0.0017 °	+/- 0.0017 °
Encoder (optional)			SV-TLL ABZ, 102400 Inc/U	SV-TLL ABZ, 102400 Inc/U
Mounting position	✦	✦	✦	✦

The technical data pertains to Afag standard test conditions.  
Air purity class 5 (ISO 14644-1)  
Cleanroom class: 10 000 (Federal Standard 209E)

In the article description of a rotary axis the "F" stands for fluid passages and the "E" for electrical feed-through. There are two version of motor plugs. A „G" in the article description of the rotary axis stand for a straight and the „W" for an angular plug. Also see order key for RA-40.

### Included in the delivery

(Catalogue HT accessories)

- 2x Centering bushing Ø7x3
- 4x O-ring 2.5x0.62 mm

### Accessories

(Product-specific accessories)

- Adapters
  - Proximity switch cables/-extensions
- (Catalogue HT accessories)
- Motor cable-M16
  - Controller C1xxx-1S
  - Plug kit for C1xxx-1S
  - USB-RS232 Converter for controllers
  - Power supply S01-72/500, 1-phase

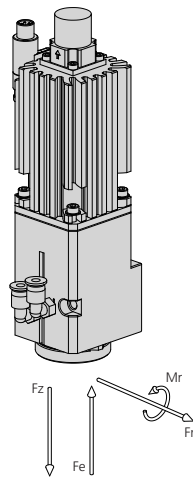
### Alternative accessories

(Catalogue HT accessories)

- Additional motor cables
- Additional controllers
- Additional power supplies

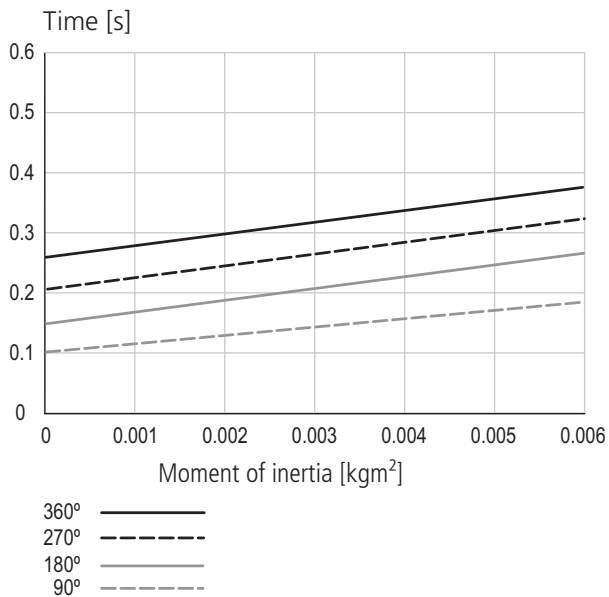
Warranty: 24 months following commissioning, but a maximum of 27 months following delivery

Type	RA-40
Max. torque $M_r$	10 Nm
Max. press-in force $F_e$	800 N
Max. radial force	$\pm 700$ N
Max. pulling force $F_z$	350 N

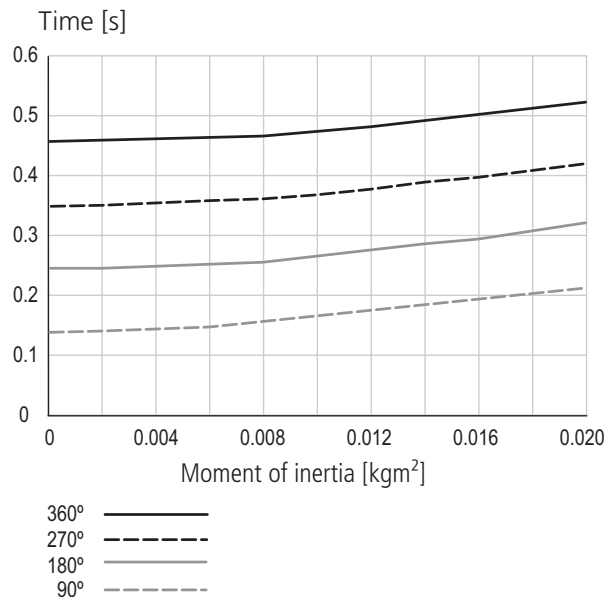


### Rotation time diagrams

RA-40 with 30:1-gear



RA-40 with 50:1-gear



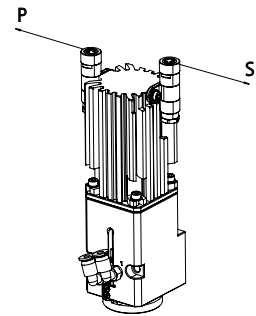
The times refer to break times of 600 ms.

Order form	RA-40	XXXXXXXX	X	X
		Rotary axis	Rotation limiter	Plug holder reference sensor

### Coordinate system

The coordinate system allows you to define the position of the plug holder of the reference sensor.

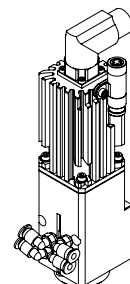
- P= left
- S= right



10

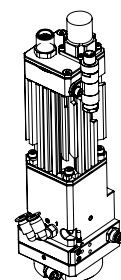
Ordering example 1 with 4-fold fluid passages, angular motor plug, gear ratio  $i=50$  and rotation limiter

RA-40	50473194	D	S
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Ordering example 2 with 2-fold fluid passages, straight motor plug, 5-fold electrical rotary feed-through, additional encoder and gear ratio  $i=30$

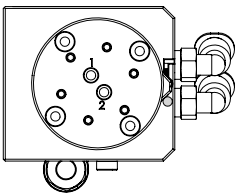
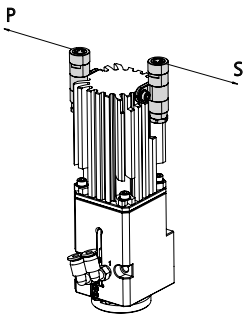
RA-40	50473200	X	S
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### Ordering process

- Select the desired rotary axis from the order key.
- Enter the corresponding red order numbers in the order form in the place of the cross.
- If you want an rotation limiter select the order number in the order form in the place of the cross.
- To define the position of the plug connection and the reference sensor, enter the corresponding red order number in the order form in the place of the cross.



	RA-40		i		i-ZE		x	x		
	Fluid passages	Plug type	30	50	30-ZE	50-ZE				
Rotary axis	2-fold fluid passages	Straight	50473180	50473185	50473183	50473187				
		Angular	50473182	50473186	50473184	50473188				
	4-fold fluid passages	Straight	50473189	50473193	50473191	50473195				
		Angular	50473190	50473194	50473192	50473196				
	Additional 5-fold electrical rotary feed-through (5E)		5E-i		5E-i-ZE					
	Fluid passages	Plug type	5E-30	5E-50	5E-30-ZE	5E-50-ZE				
	2-fold fluid passages	Straight	50473197	50473202	50473200	50473204				
		Angular	50473198	50473203	50473201	50473205				
4-fold fluid passages	Straight	50473206	50473210	50473208	50473212					
	Angular	50473207	50473211	50473209	50473213					
Rotation limiter	Without						X			
										
With rotation limiter (rotational angle approx. 330°)						D				
Plug holder reference sensor							P			
								S		

i= Gear ratio      E= Electrical rotary feed-through      G= Straight plug      W= Angular plug  
 ZE= Additional encoder

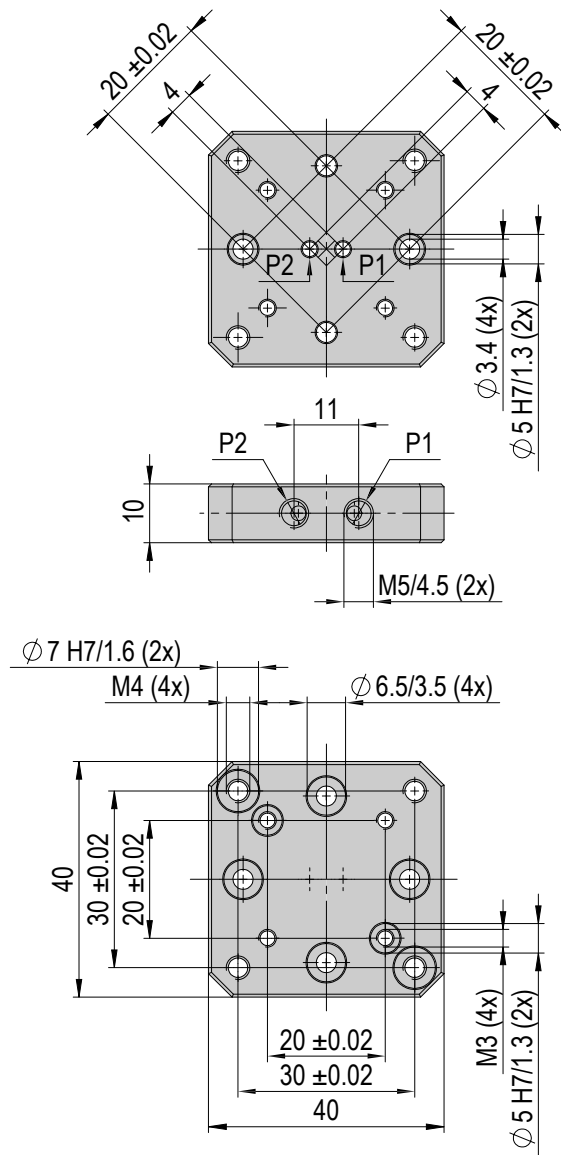
A rotation limiter is recommended when extensions to the rotary axis have to be supplied with additional cables. This will avoid a shearing and ripping of the wire.

# Accessories RA

## Adapter RA-40-UG20 UG25

**Order number** 50486391

**Net weight** 0.037 kg



### Included in the delivery

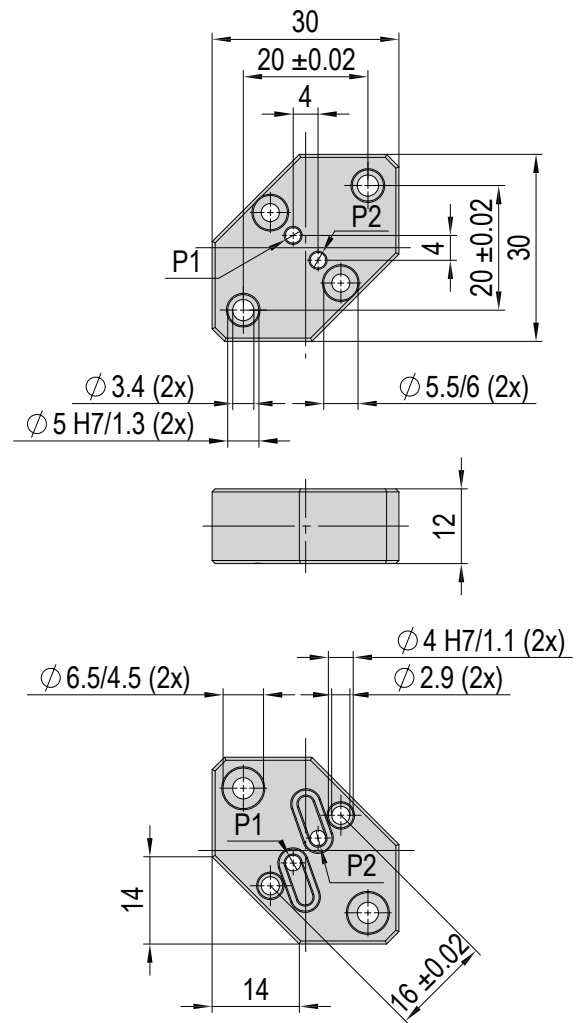
(Catalogue HT accessories)

- 2x Mounting screw M3x10
- 2x Centering bushing Ø5x2.5

## Adapter RA-40-PG 12

**Order number** 50486392

**Net weight** 0.02 kg



### Included in the delivery

(Catalogue HT accessories)

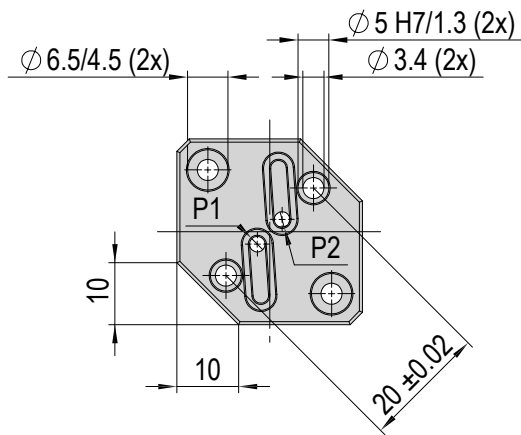
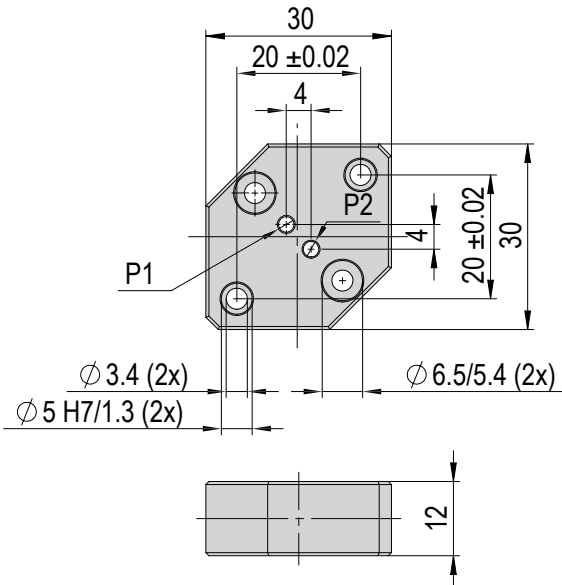
- 2x Mounting screw M3x12
- 2x Centering bushing Ø5x2.5
- 2x O-ring 6x1 mm

# Accessories RA

## Adapter RA-40-PG 16

**Order number** 50486393

**Net weight** 0.022 kg



### Included in the delivery

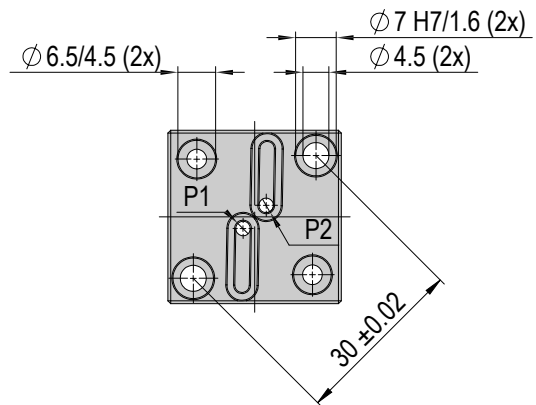
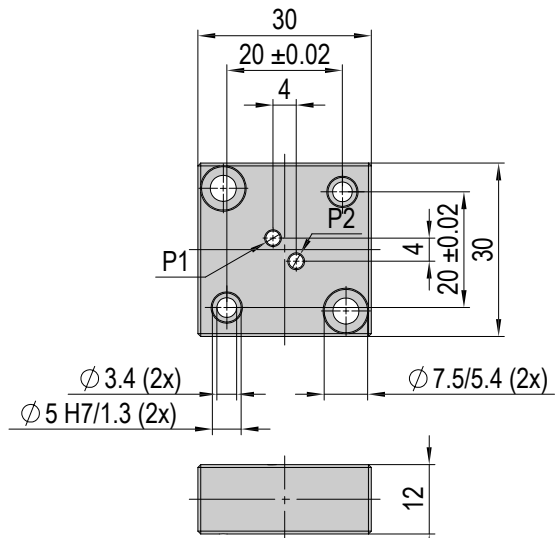
(Catalogue HT accessories)

- 2x Mounting screw M3x12
- 2x Centering bushing Ø5x2.5
- 2x O-ring 8x1 mm

## Adapter RA-40-PG 20

**Order number** 50486394

**Net weight** 0.025 kg



### Included in the delivery

(Catalogue HT accessories)

- 2x Mounting screw M3x12
- 2x Centering bushing Ø5x2.5
- 2x O-ring 10x1 mm

