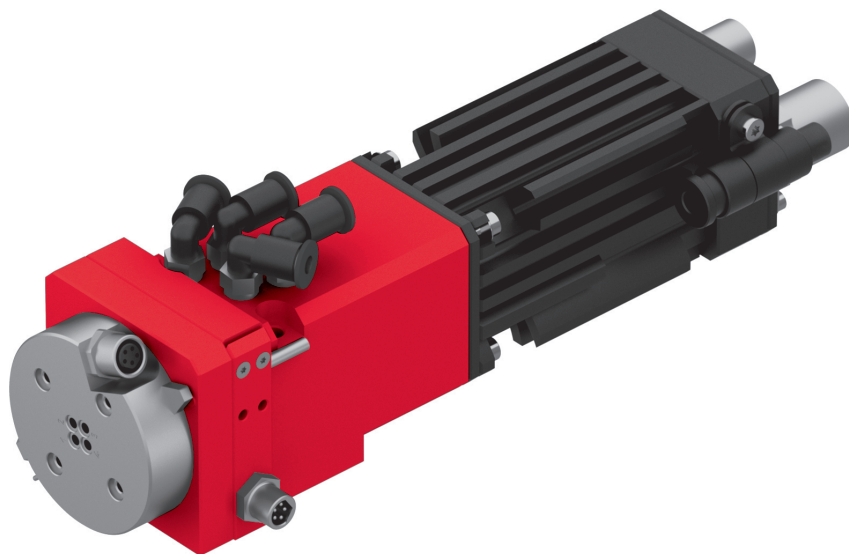
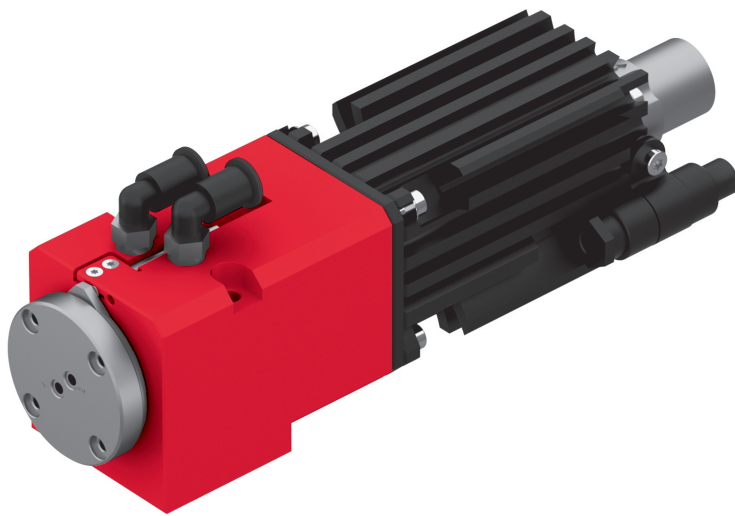


# Rotary axes RA-40

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



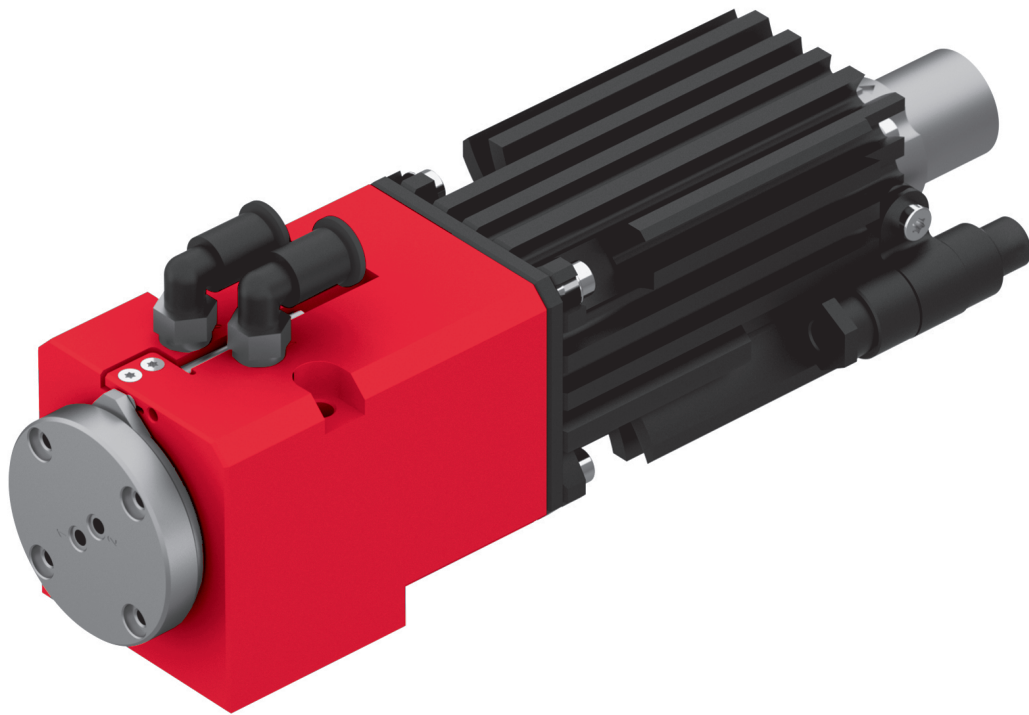
## Table of contents: RA-40

<b>Rotary axes RA-40</b>	<b>Page</b>
RA-40-2F	257
RA-40-4F	261
Accessories RA	271



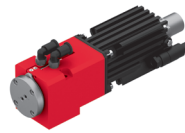
# Rotary axes RA-40

## RA-40-2F



- 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





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

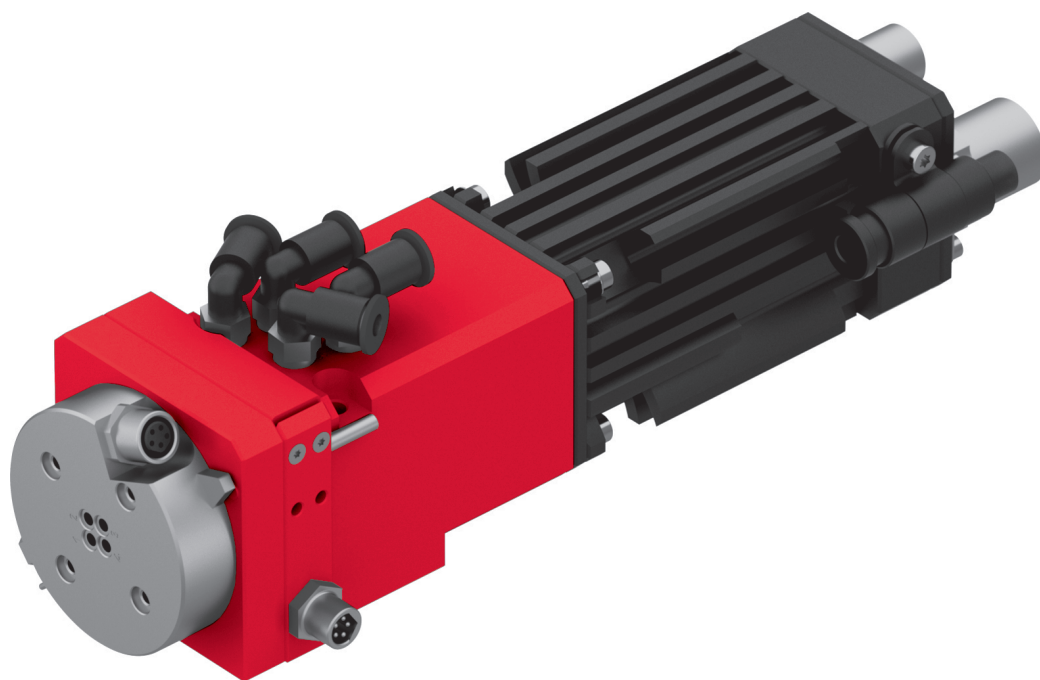
(Catalogue HT accessories)

- Additional motor cables
- Additional controllers
- Additional power supplies



# Rotary axes RA-40

RA-40-4F



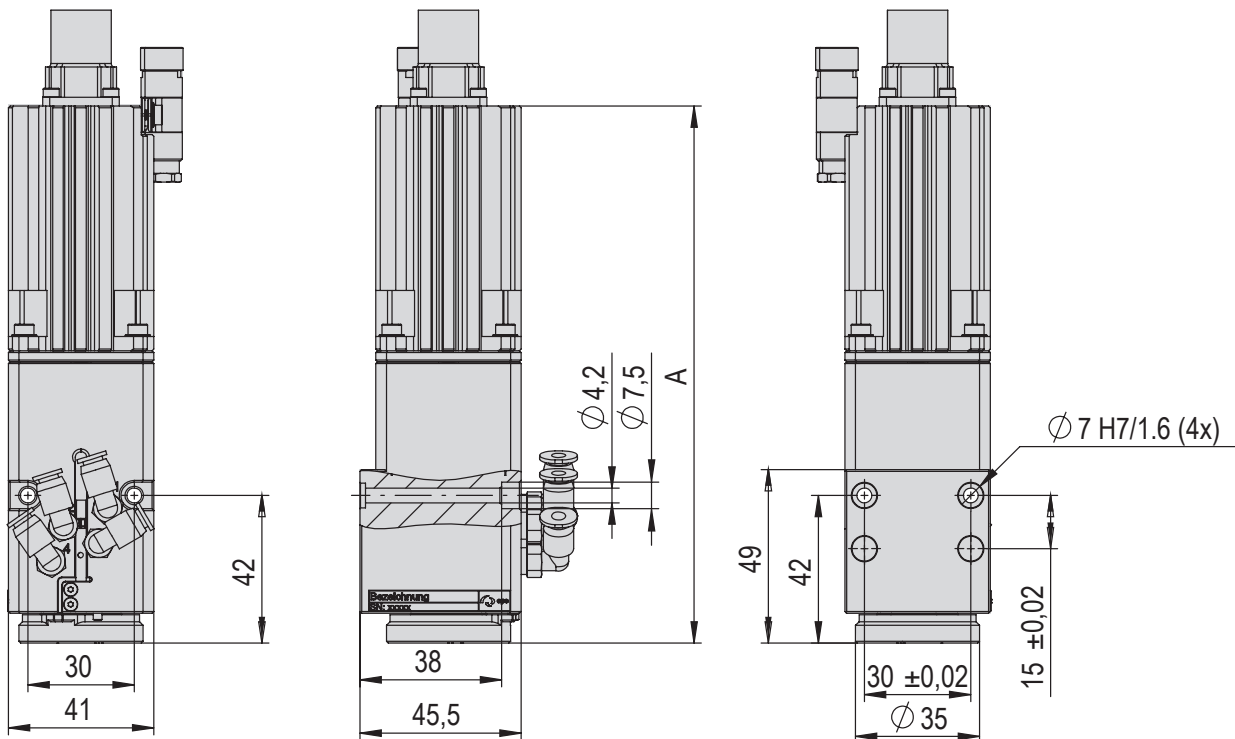
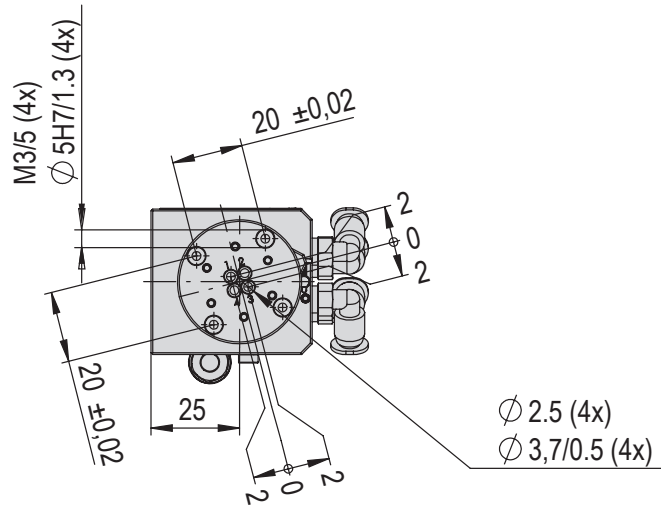
- Dynamic, electrical rotational axis with 4 Nm peak torque at just 690 g net weight
- Endless rotation without moving cables, due to integrated electrical and fluid passages
- High-quality, backlash-free harmonic drive gear for very high repeat accuracies



# 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)

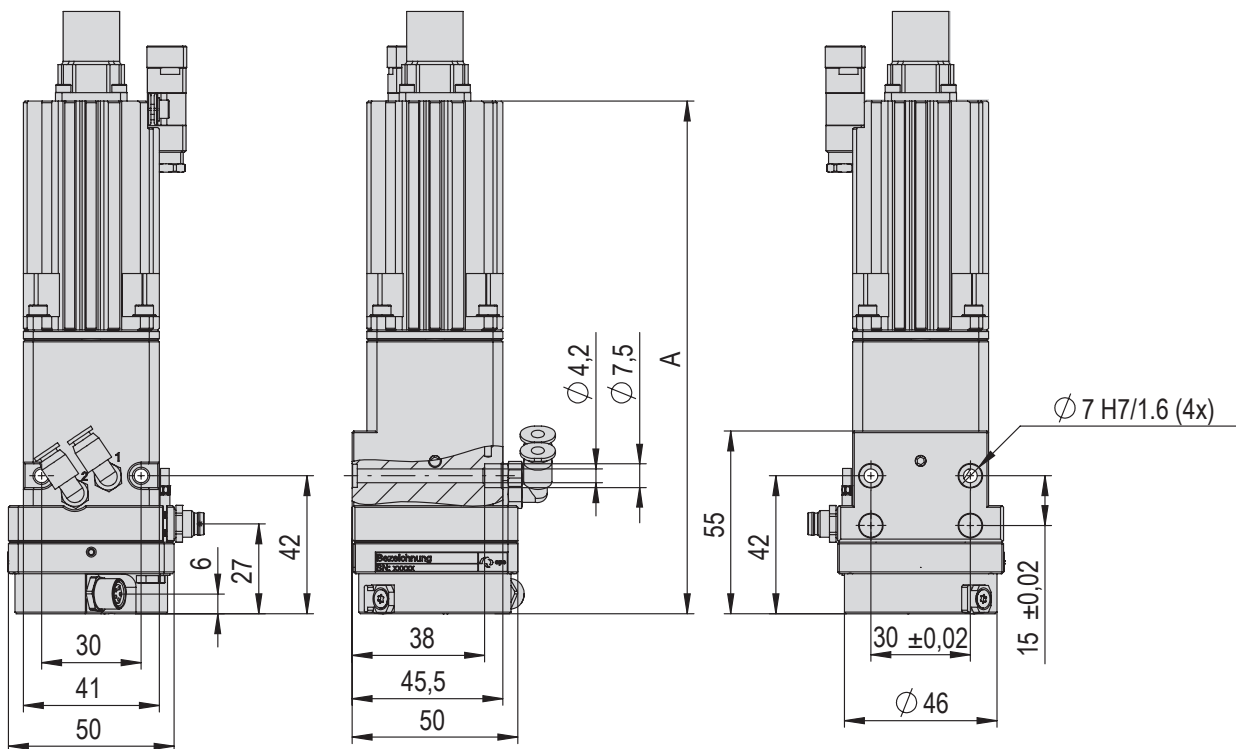
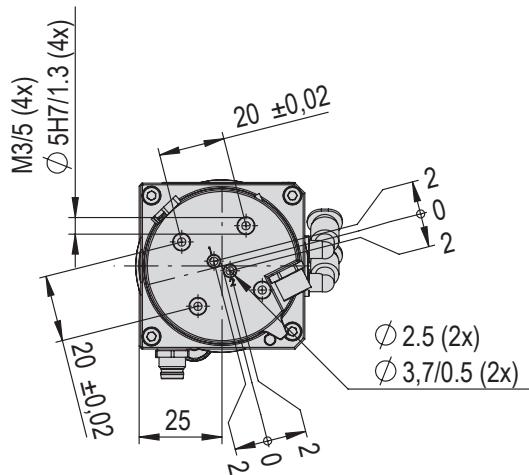
In the article description of a rotary axis the "F" stands for fluid passages and the "E" for electrical feed-through. There are two version of motor plugs. A „G" in the article description of the rotary axis stand for a straight and the „W" for an angular plug. Also see order key for RA-40.

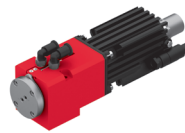
- Included in the delivery**  
(Catalogue HT accessories)
- 2x Centering bushing Ø7x3
  - 4x O-ring 2.5x0.62 mm

- 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

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

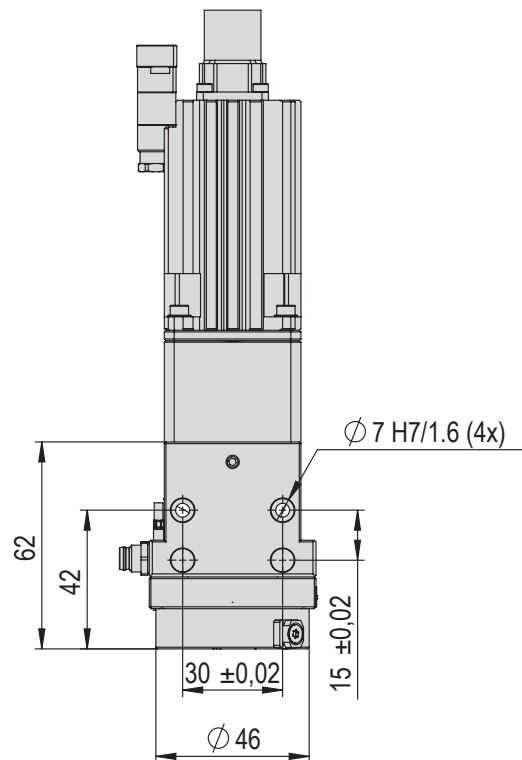
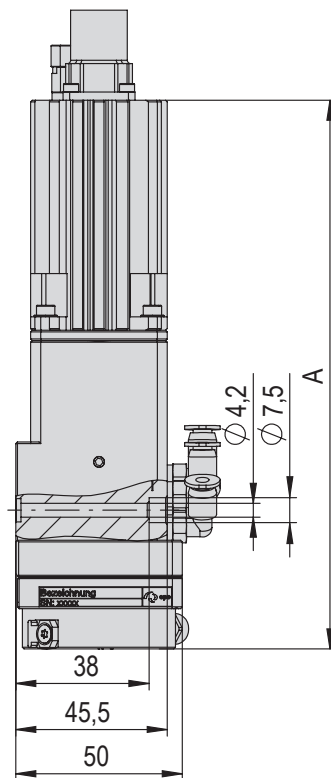
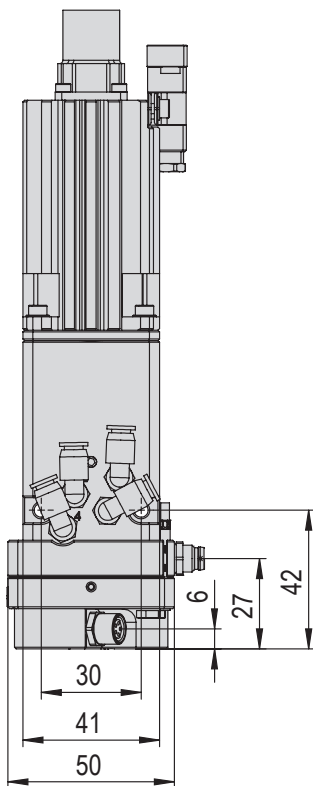
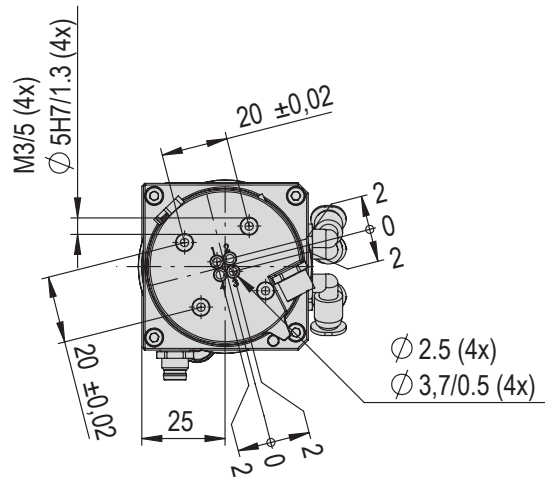
(Catalogue HT accessories)

- Additional motor cables
- Additional controllers
- Additional power supplies

# Dimensions and dimension drawings

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

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





<b>RA-40-4F-5E</b>	
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

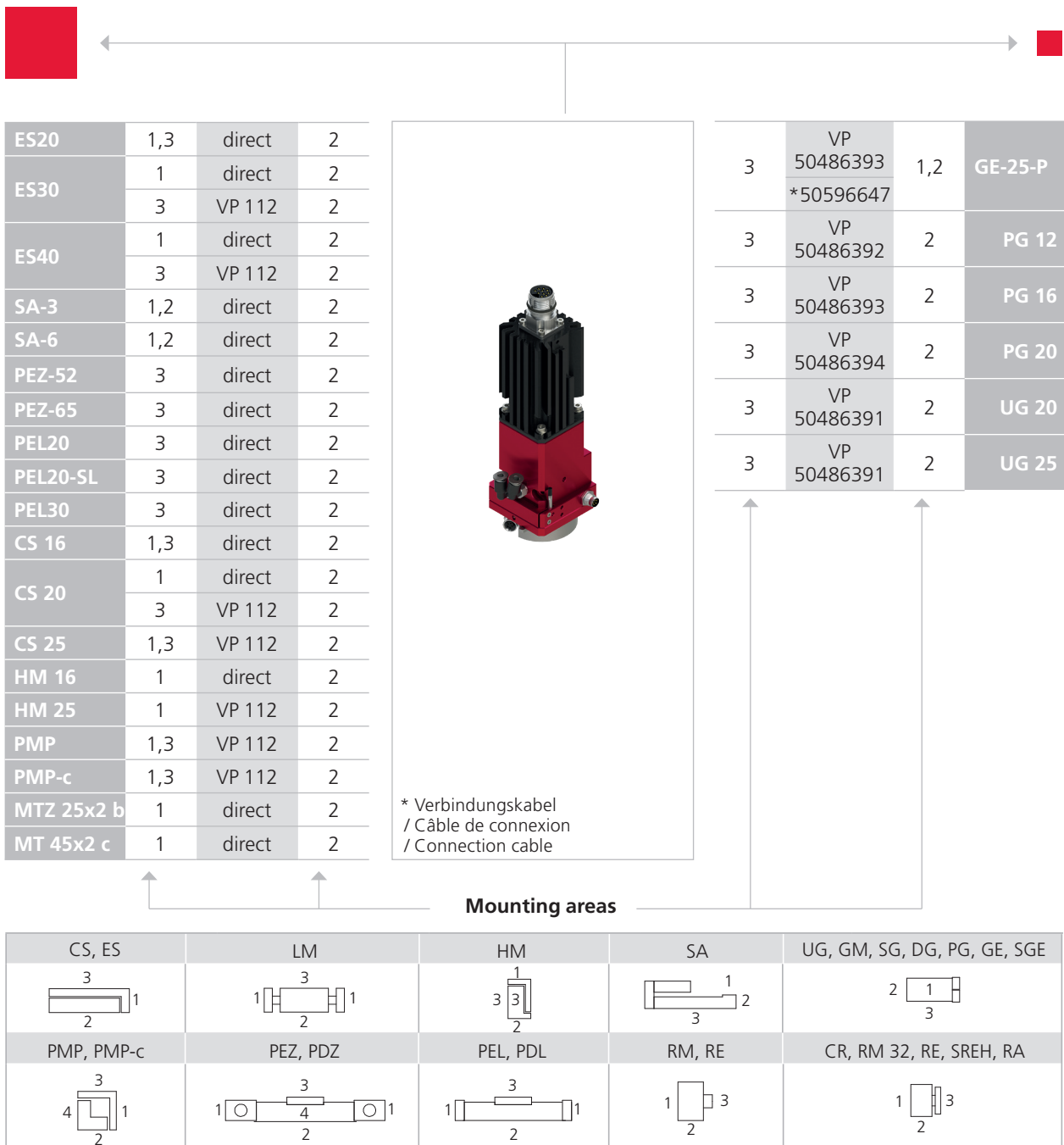
(Catalogue HT accessories)

- 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)

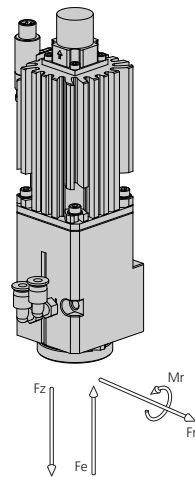
- Additional motor cables
- Additional controllers
- Additional power supplies



Note that there might be different mounting positions from one module to another one.

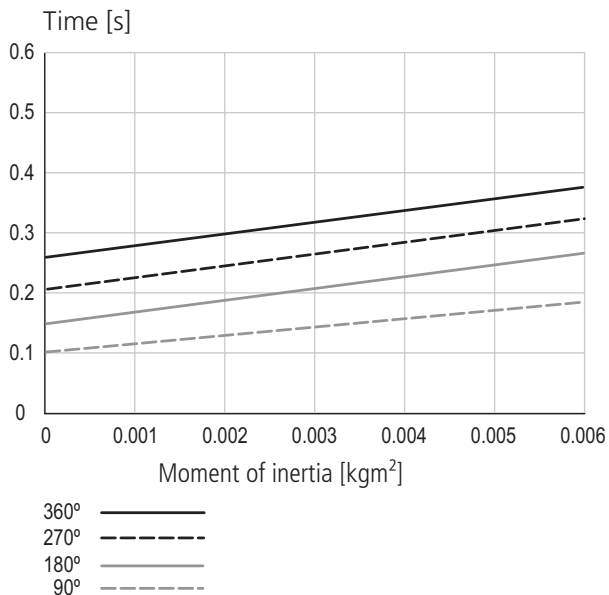
The required connection elements and the range of support columns are depicted in the catalogue HT accessories.

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

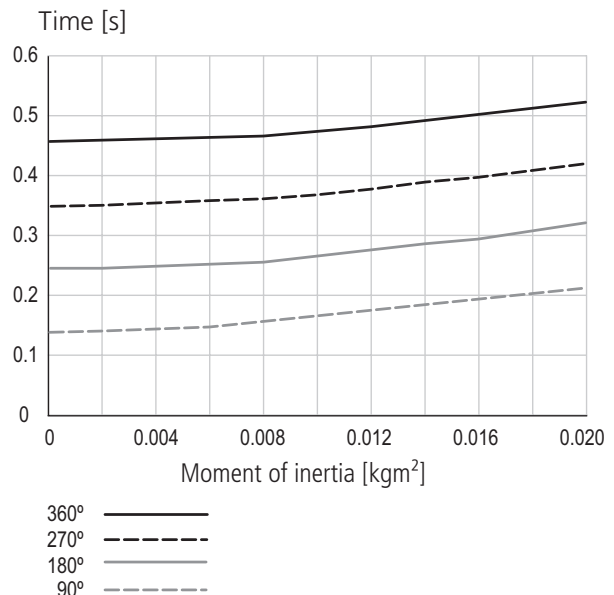


## Rotation time diagrams

RA-40 with 30:1-gear



RA-40 with 50:1-gear



The times refer to break times of 600 ms.

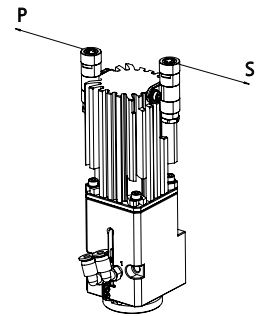


Order form	RA-40	xxxxxxxx	x	x
		Rotary axis	Rotation limiter	Plug holder reference sensor

### Coordinate system

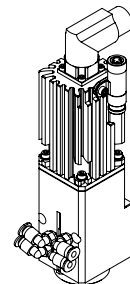
The coordinate system allows you to define the position of the plug holder of the reference sensor.

- P= left
- S= right



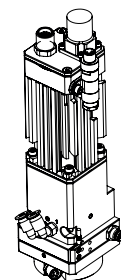
Ordering example 1 with 4-fold fluid passages, angular motor plug, gear ratio  $i=50$  and rotation limiter

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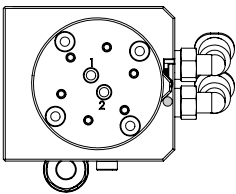
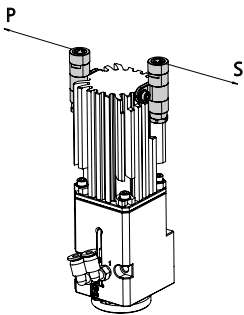
Ordering example 2 with 2-fold fluid passages, straight motor plug, 5-fold electrical rotary feed-through, additional encoder and gear ratio  $i=30$

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

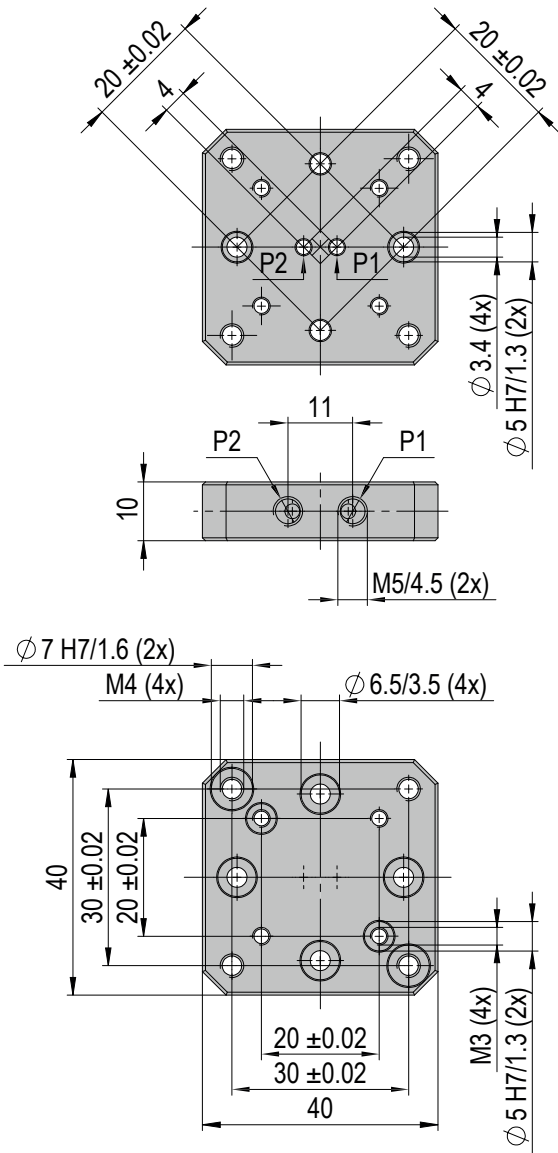
A rotation limiter is recommended when extensions to the rotary axis have to be supplied with additional cables. This will avoid a shearing and ripping of the wire.

# Accessories RA

## Adapter RA-40-UG20 UG25

**Order number** 50486391

**Net weight** 0.037 kg



### Included in the delivery

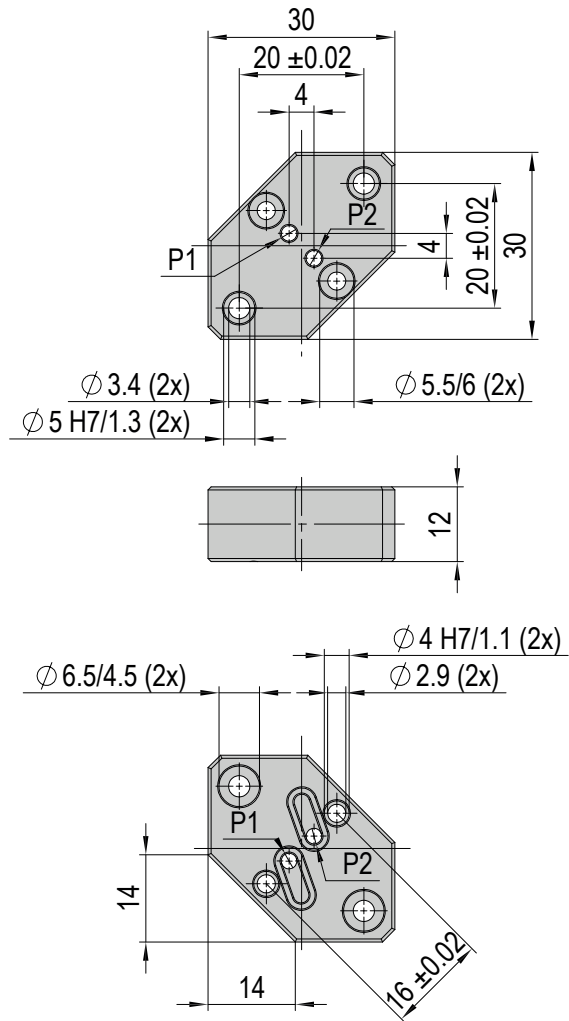
(Catalogue HT accessories)

- 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

Connection cable RA-40-GE-25-P

**Order number** 50596647

Net weight 0.036 kg

