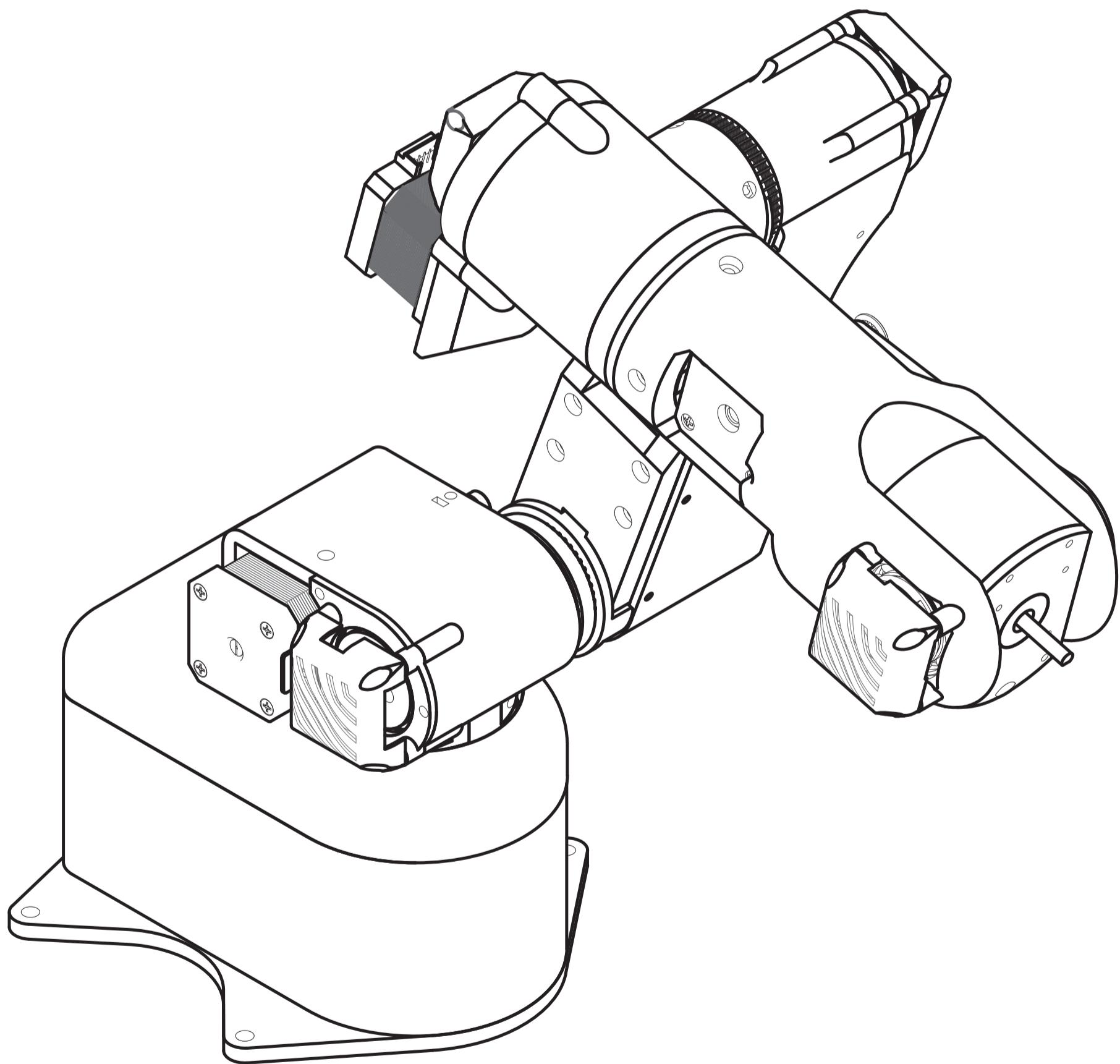


# HELENE V4

Aufbauanleitung







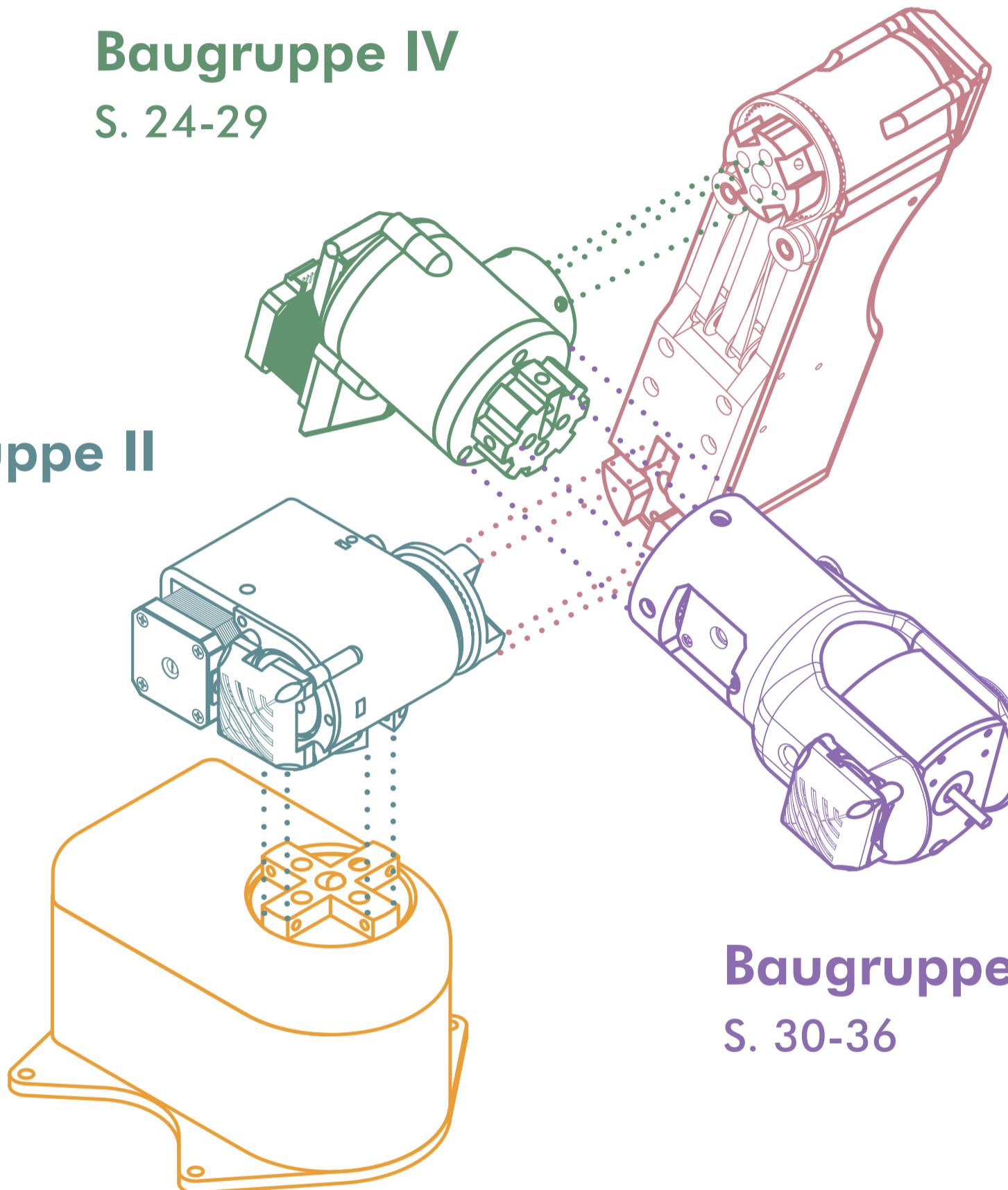
# Baugruppen

**Baugruppe III**  
S. 18-23

**Baugruppe IV**  
S. 24-29

**Baugruppe II**  
S. 11-17

**Baugruppe V**  
S. 30-36



**Baugruppe I**  
S. 4-10

# Teileliste

## Normteile

### Threaded Inserts - CNC kitchen

M3 - M3 Gewindeinsert

M3k - M3 Gewindinsert kurz

M4 - M4 Gewindeinsert

M4k - M4 Gewindeinsert kurz

M5 - M5 Gewindeinserts

### Muttern

SM1 - M3 Sechskantmutter

SM2 - M3 Vierkantmutter

SM3 - M4 Sechskantmutter

### Weitere Normteile

N1 - Motor Nema 23

N2 - Motor Nema 17HS15

N3 - Motor Nema 17HS4401S

N4 - Zahnriemen 232mm GT2 6mm Breite

N5 - Zahnriemen 207mm 3M 6mm Breite

N6 - Zahnriemen 420mm 3M 6mm Breite

N7 - Zahnriemen 267mm 3M 6mm Breite

N8 - Zahnriemen 280mm GT2 6mm Breite

N9 - Rillenkugellager 6009 2RS

N10 - Miniaturkugellager 623 ZZ/2Z

N11 - Miniaturkugellager 608 2RS

N12 - Rillenkugellager 6806/61806 2RS

N13 - GT3 Timing Pulley 9mm 20 Zähne

N14 - GT2 Timing Pulley 5mm 20 Zähne

N15 - AS5048A Magnet Encoder

N16 - GT2 Pulley ohne Zähne

N17 - Stromversorgung NAC3MPA

N18 - USB-Anschluss 2.0-Micro-B

N19 - NdFeB N45 Scheibenmagnet

N20 - Platine

### Schrauben

S1 - M2,5x8 mit Bohrspitze

S2 - M3x5 mit Bohrspitze

S3 - M3x6

S4 - M3x8

S5 - M3x10

S6 - M3x12

S7 - M3x16

S8 - M3x20

S9 - M3x45

S10 - M4 Madenschraube

S11 - M4x6

S12 - M4x10

S13 - M4x16

S14 - M4x20

S15 - M4x30

S16 - M5x16

# Druckteile

## Baugruppe I

B1 - Basis\_Main  
B2 - Basis\_Welle  
B3 - Basis\_Lagerdecke  
B4 - Basis\_Pulley\_groß  
B5 - Basis\_Pulley\_klein  
B6 - Basis\_Pulley\_klein2  
B7 - Basis\_Bodenplatte

## Baugruppe II

## Baugruppe III

B8 - Basis\_Riemenabdeckung  
  
B9 - Gelenk 2\_Main  
B10 - Gelenk 2\_Pulley\_Gewindeeinsatz  
B11 - Gelenk 2\_Welle  
B12 - Gelenk 2\_Festlager  
B13 - Gelenk 2\_Welle\_Abschluss  
B14 - Gelenk 2\_Lagerdecke  
  
B15 - Gelenk 3\_Hauptteil\_unten  
B16 - Gelenk 3\_Hauptteil\_oben  
B17 - Gelenk 3\_Welle  
B18 - Gelenk 3\_Pulley  
B19 - Gelenk 3\_Pulley\_klein  
B20 - Gelenk 3\_Welle\_Abschluss  
B21 - Gelenk 3\_Motorhalter  
B22 - Gelenk 3\_Deckel

## Baugruppe IV

B23 - Gelenk 4\_Main  
B24 - Gelenk 4\_Welle  
B25 - Gelenk 4\_Motorhalter  
B26 - Gelenk 4\_Pulley  
B27 - Gelenk 4\_Lagerdeckel  
B28 - Gelenk 4\_5\_Übergang

## Baugruppe V

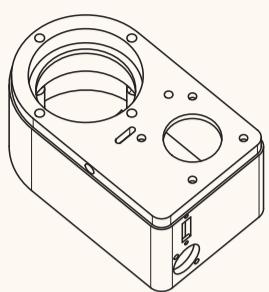
B29 - Gelenk 5\_Main  
B30 - Gelenk 5\_Welle  
B31 - Gelenk 5\_Pulley  
B32 - Gelenk 5\_Kabelhalter  
B33 - Gelenk 6\_Main  
B34 - Gelenk 6\_Deckel

## Weitere Druckteile

B35 - Deckel Elektronik  
B36 - Lagerabstand

# Baugruppe I

1



1x B1



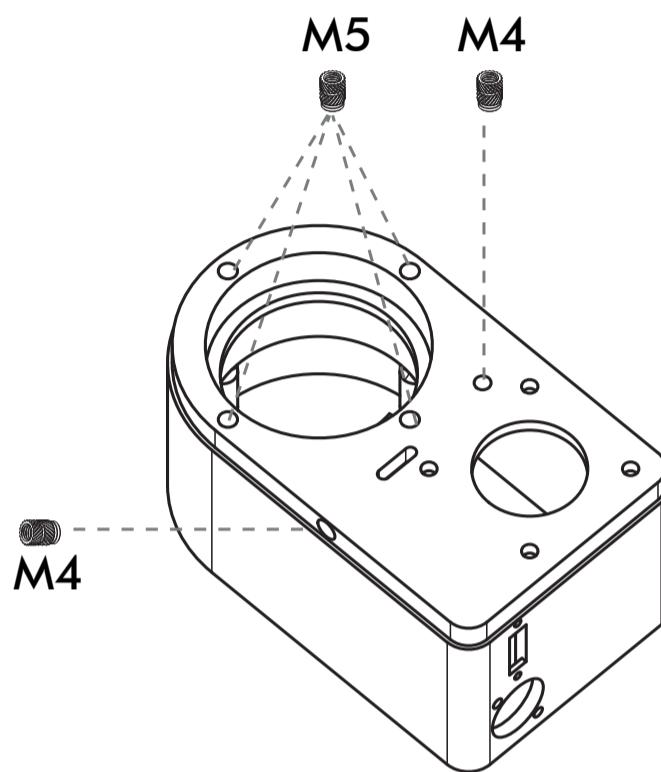
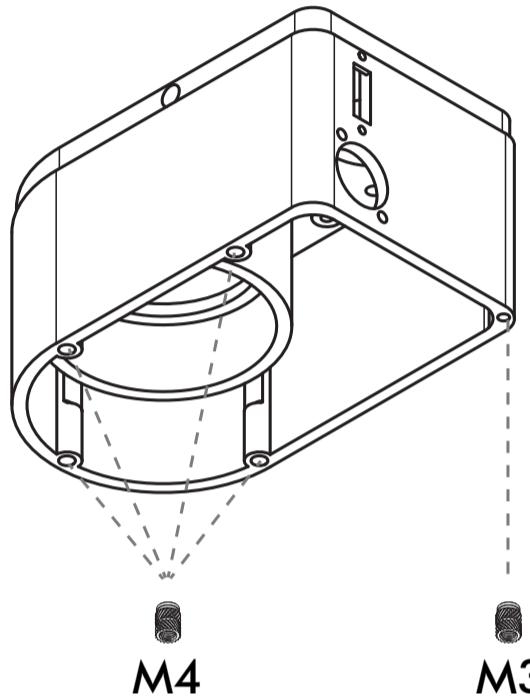
6x M4



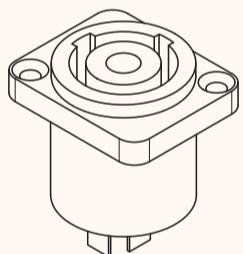
1x M3



4x M5



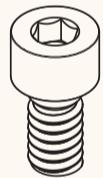
2



1x N17



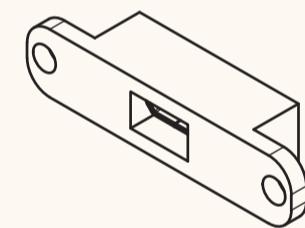
2x SM1



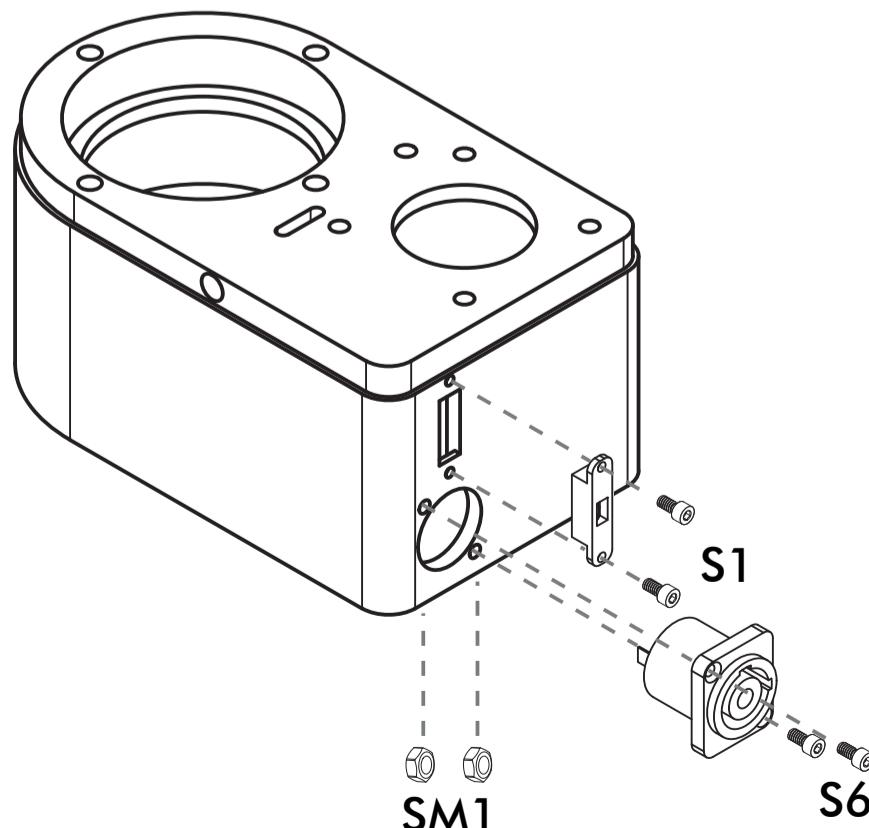
2x S6

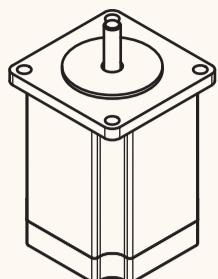
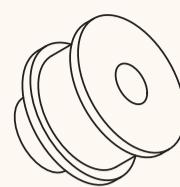
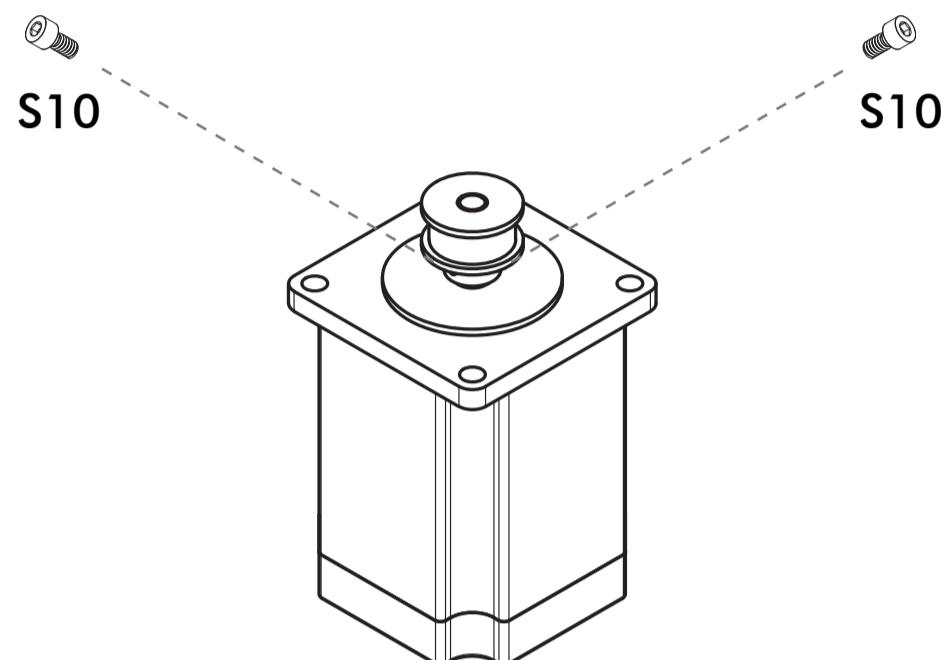
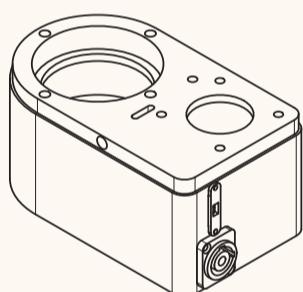


2x S1

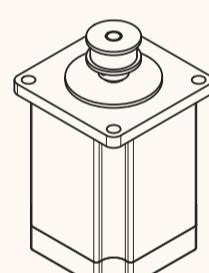


1x N18

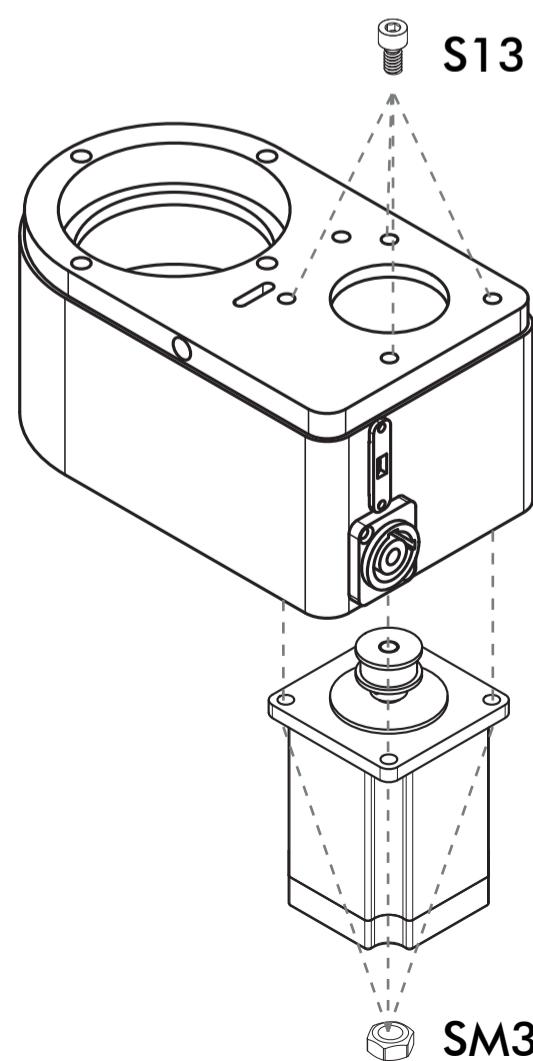


**3**1x **N1**1x **N13**2x **S10****4**

Bauschritt 2

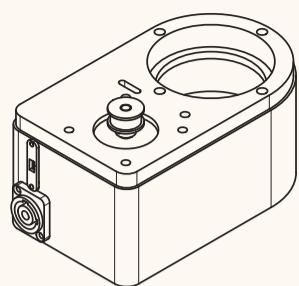


Bauschritt 3

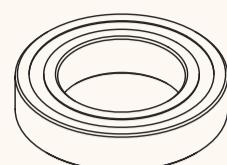
4x **S13**4x **SM3****Hinweis**

Schrauben dürfen noch nicht  
vollständig festgezogen werden.

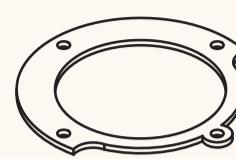
**5**



Bauschritt 4



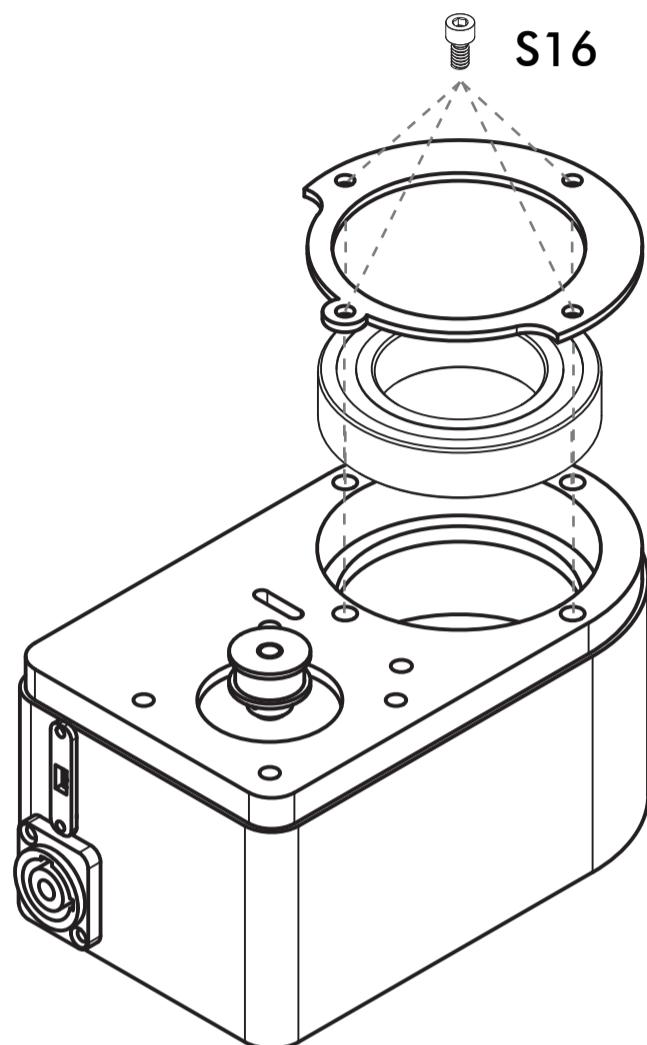
1x N9



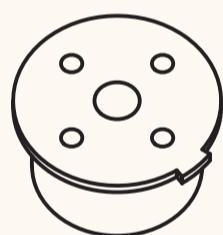
1x B3



4x S16



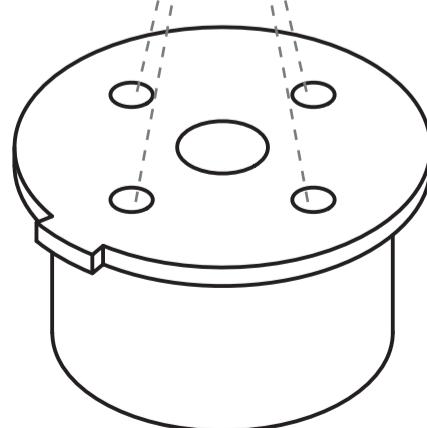
**6**



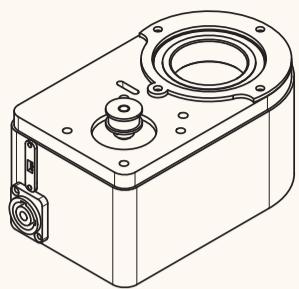
1x B2



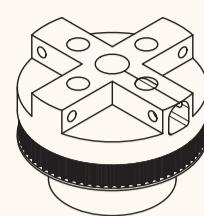
4x M4



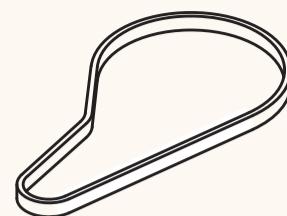
**7**



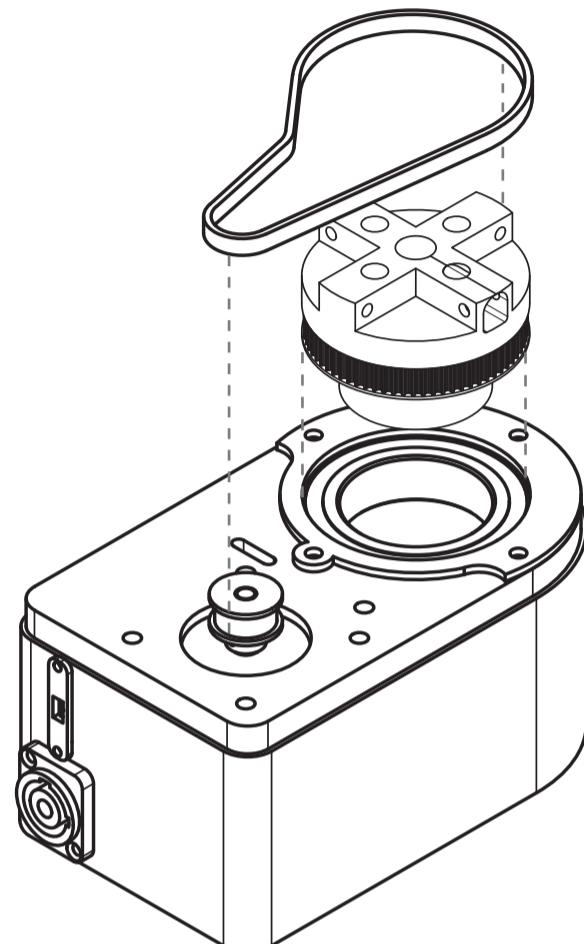
Bauschritt 5



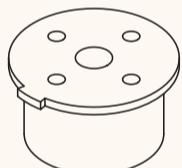
1x B4



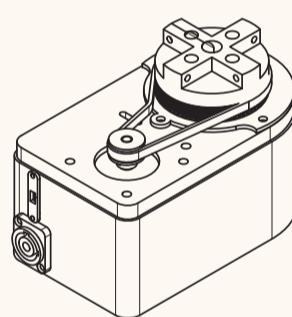
1x N4



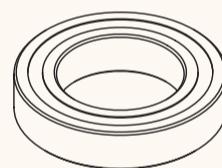
**8**



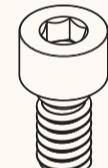
Bauschritt 6



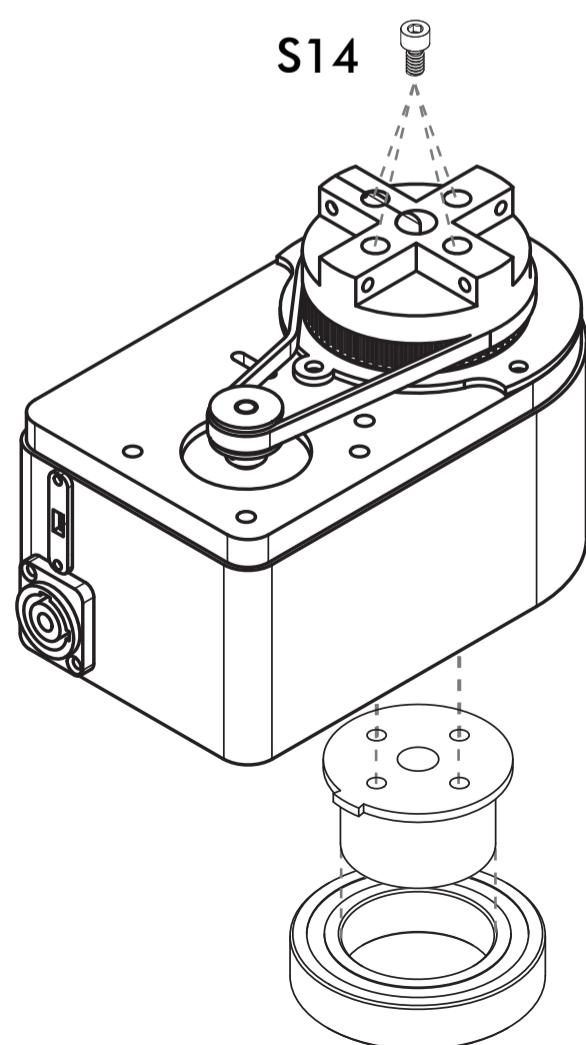
Bauschritt 7

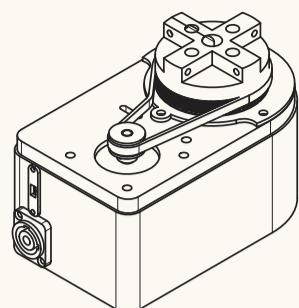


1x N9

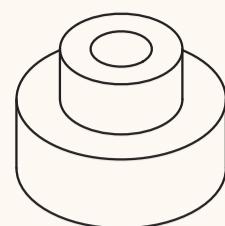


4x S14

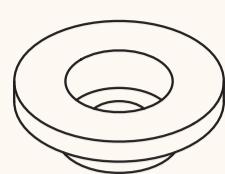


**9**

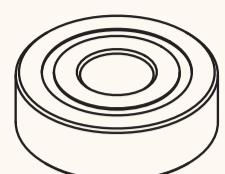
Bauschritt 8



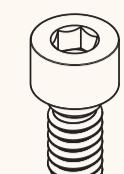
1x B5



1x B6



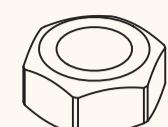
1x N11



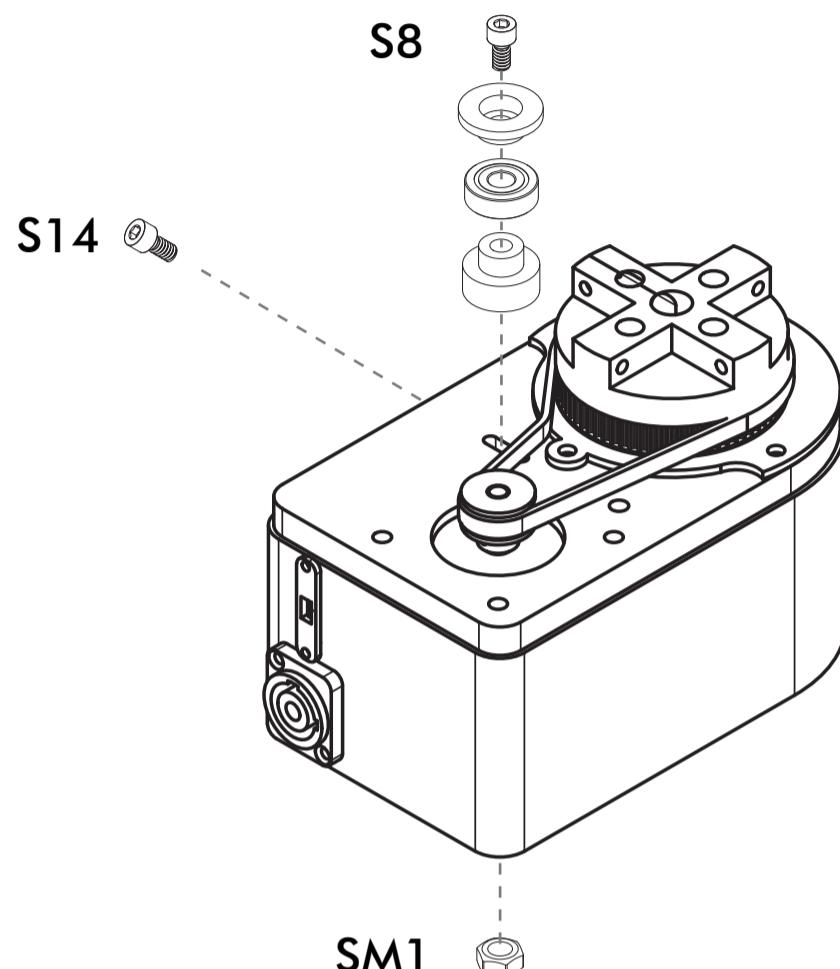
1x S14



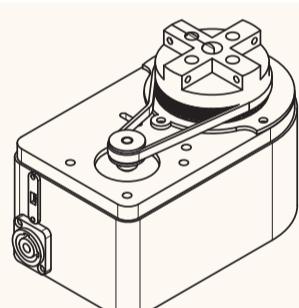
1x S8



1x SM1

**Hinweis**

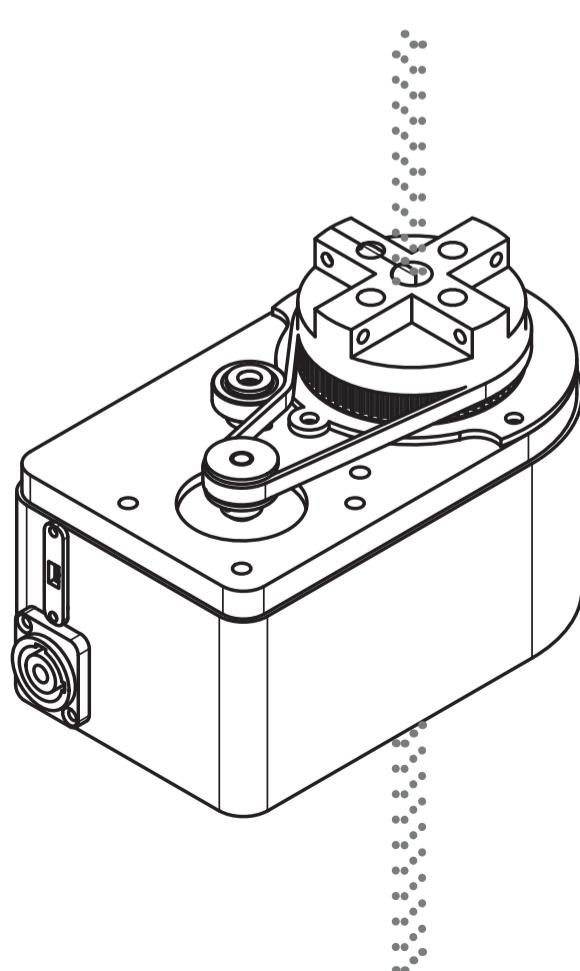
Schrauben zur Befestigung  
des Motors (siehe Bauschritt 4)  
vollständig festziehen.

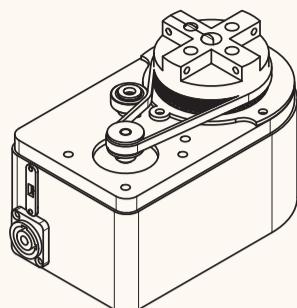
**10**

Bauschritt 9

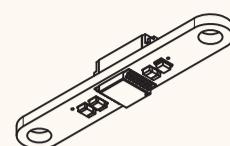
**Hinweis**

Sämtliche Kabel durch B2 und B4  
ziehen. Auf beiden Seiten genug  
Überstand lassen.



**11**

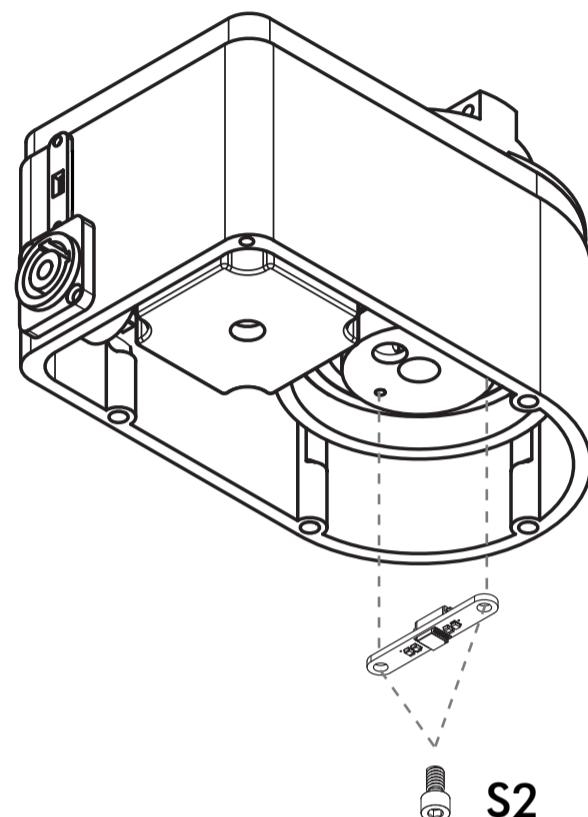
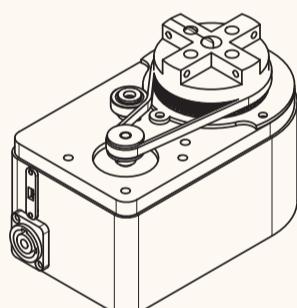
Bauschritt 10



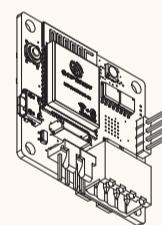
1x N15



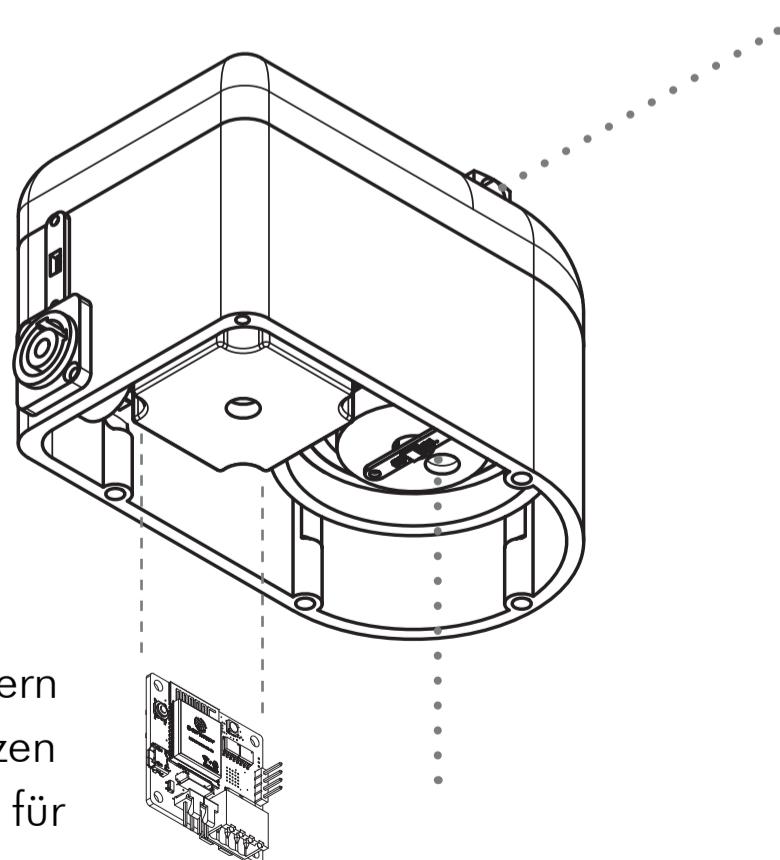
2x S2

**12**

Bauschritt 11



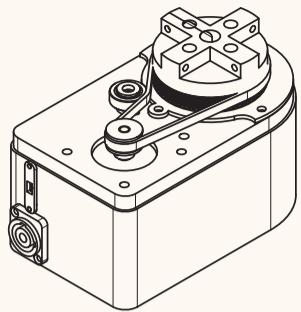
1x N20



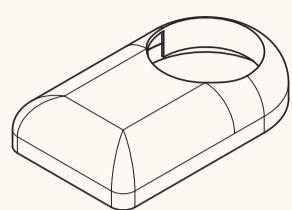
### Hinweis

Kabel an unterer Seite mit Steckern versehen. Platine in Basis einsetzen und entsprechend der Anleitung für die Elektronik verkabeln.

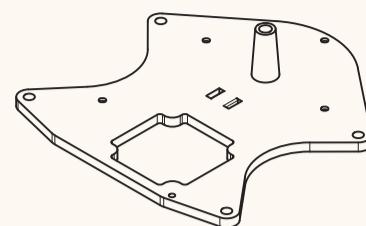
**13**



Bauschritt 12



1x **B8**



1x **B7**



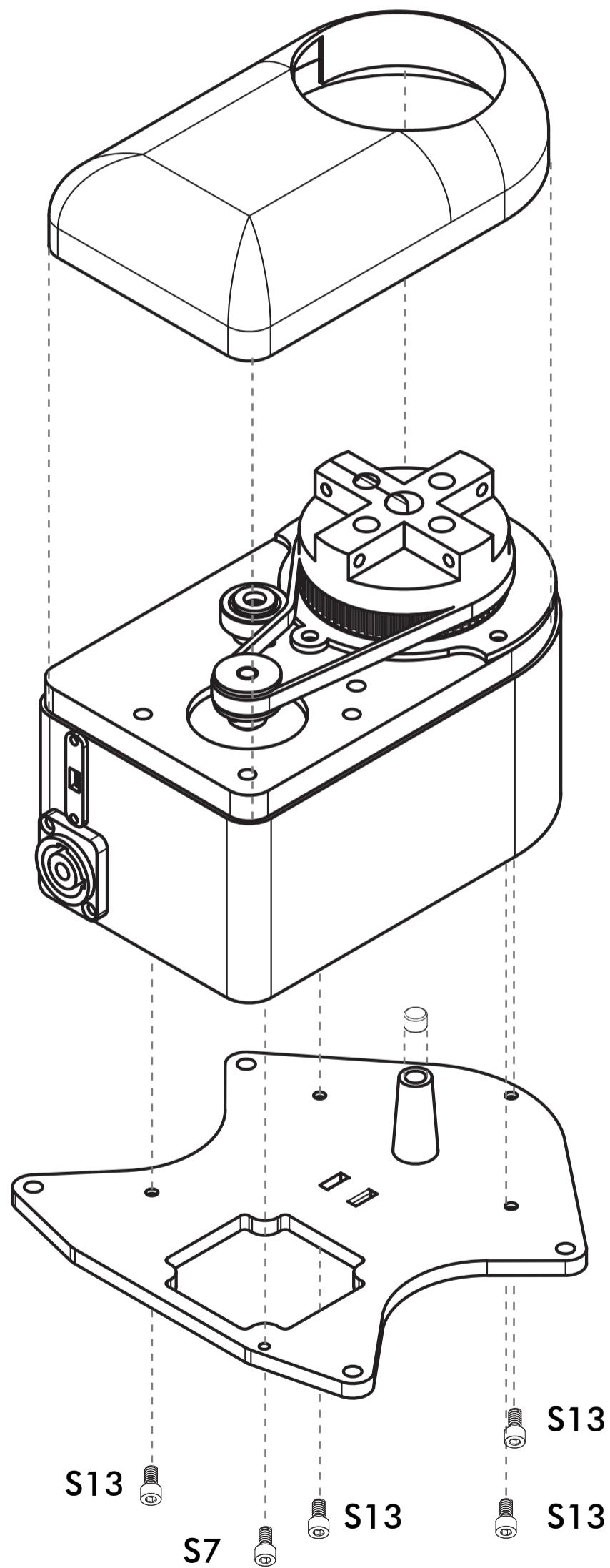
1x **N19**



1x **S7**

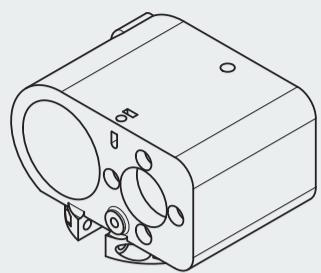


4x **S13**



# Baugruppe II

1



1x B9



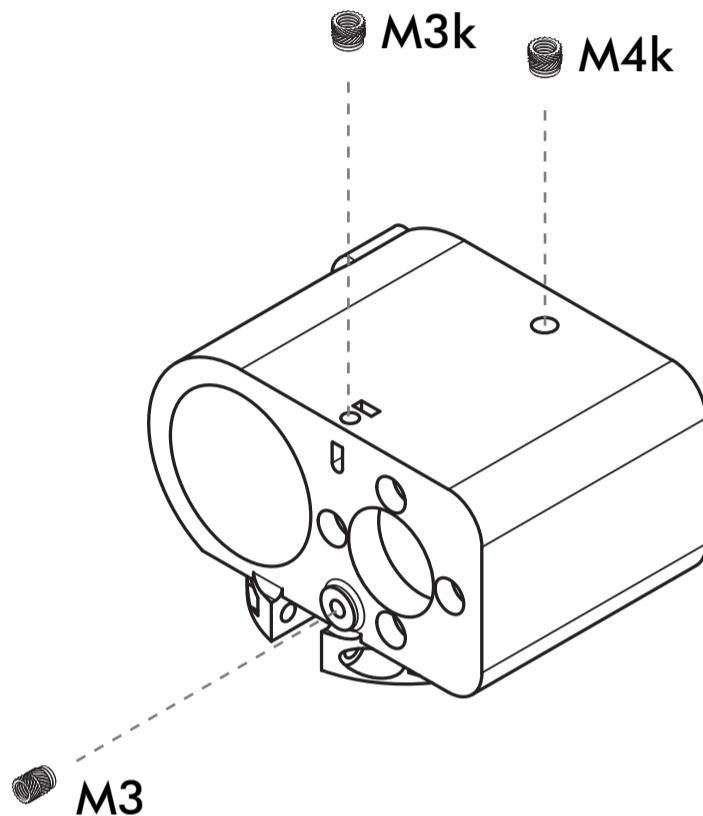
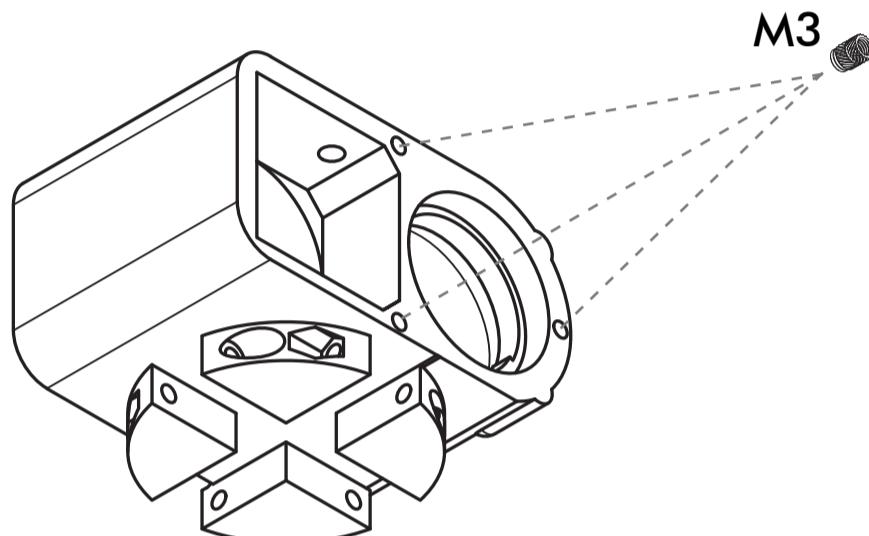
1x M3k



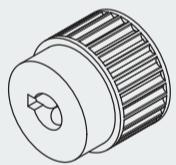
1x M4k



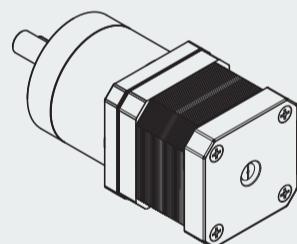
4x M3



2



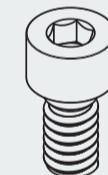
1x B10



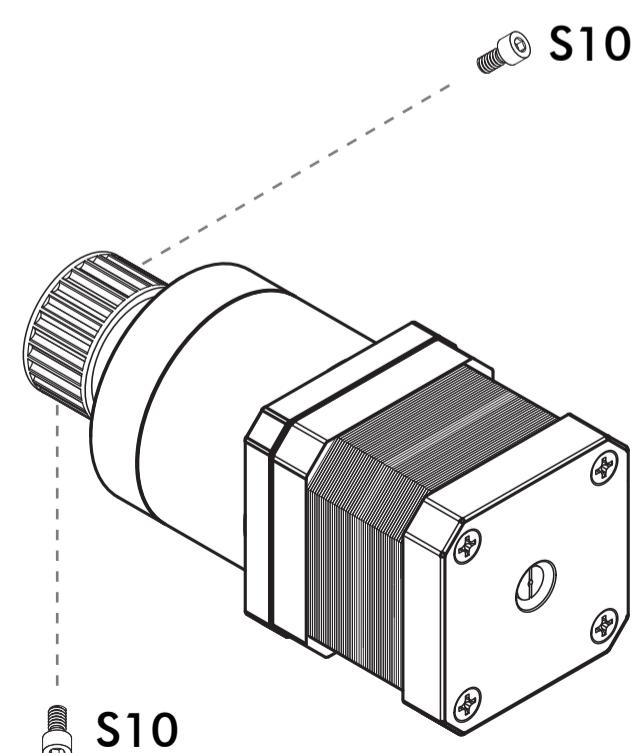
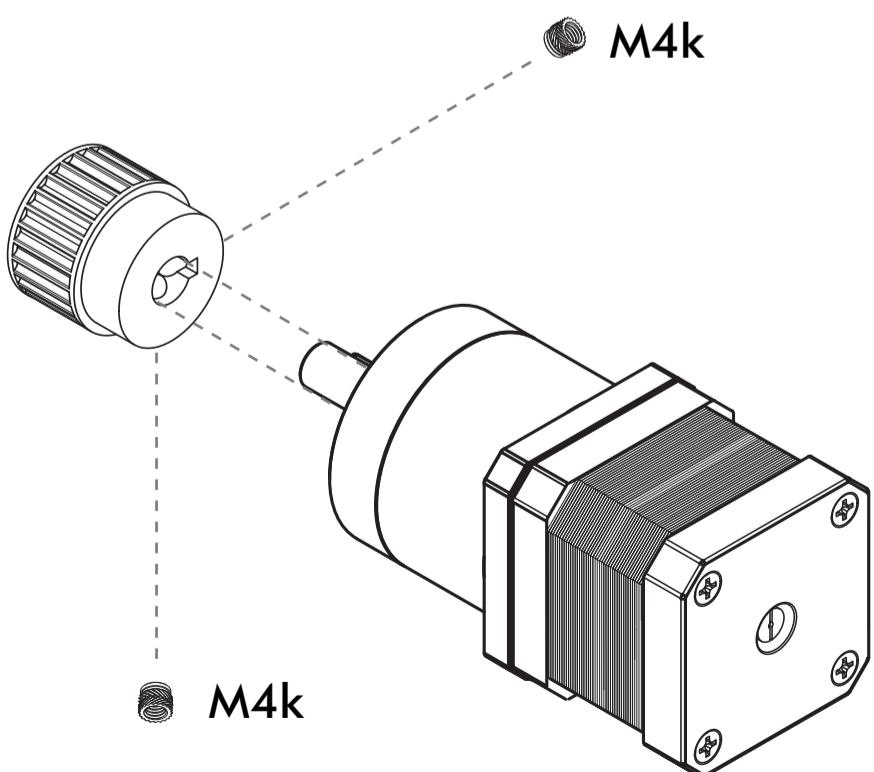
1x N2



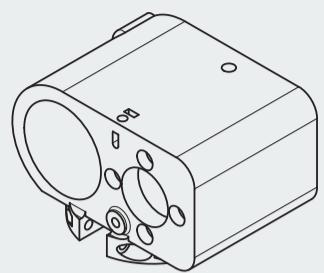
2x M4k



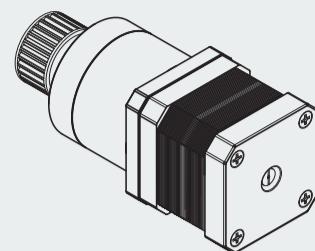
2x S10



**3**



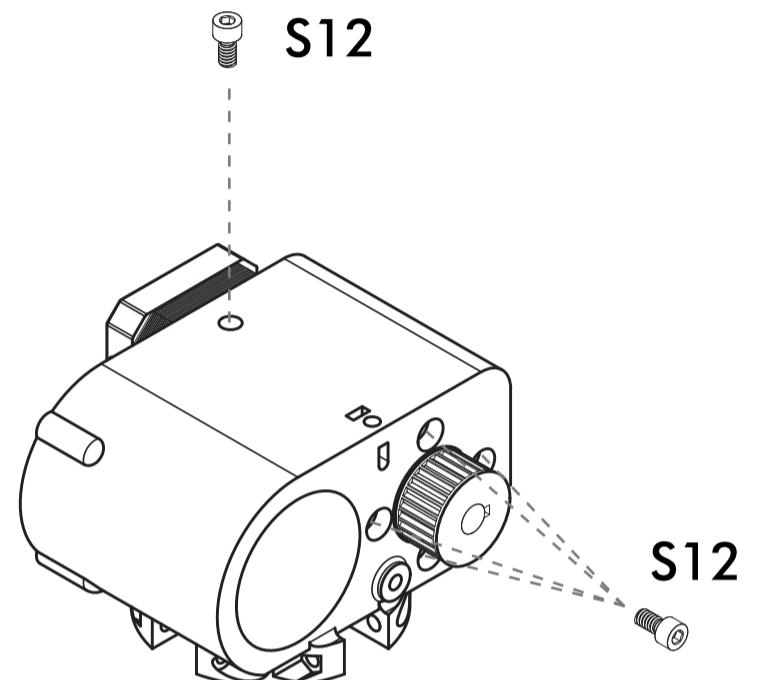
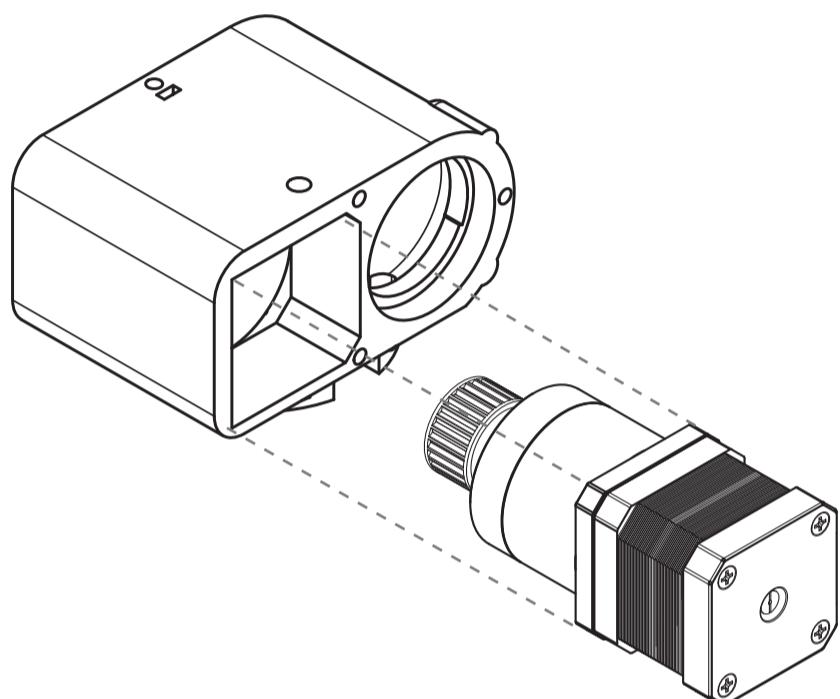
Bauschritt 1



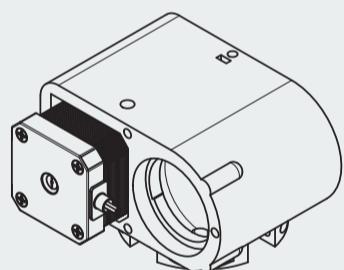
Bauschritt 2



5x S12



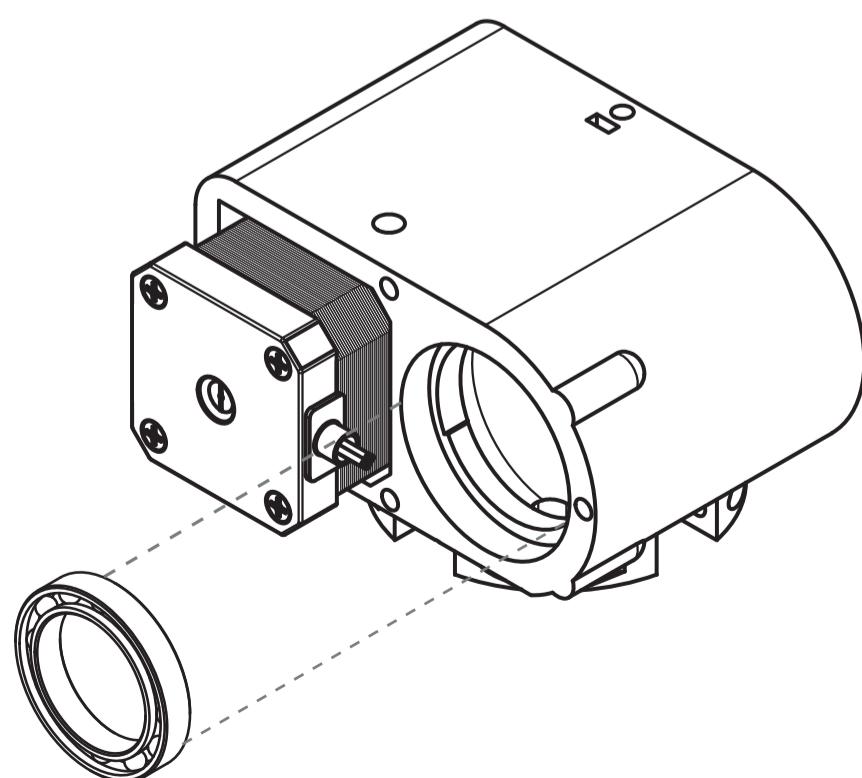
**4**

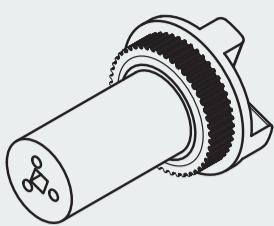


Bauschritt 3



1x N12



**5**

1x B11



1x B12



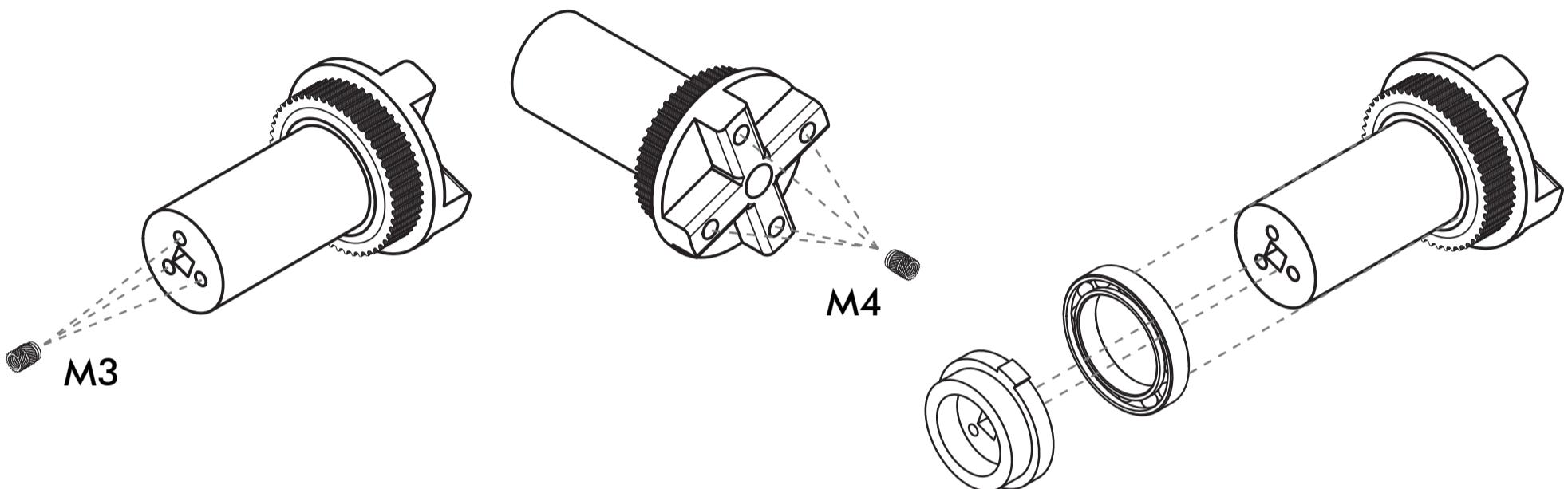
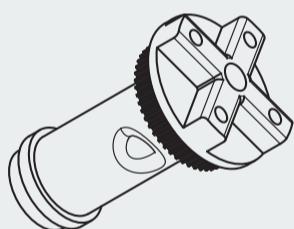
1x N12



4x M4



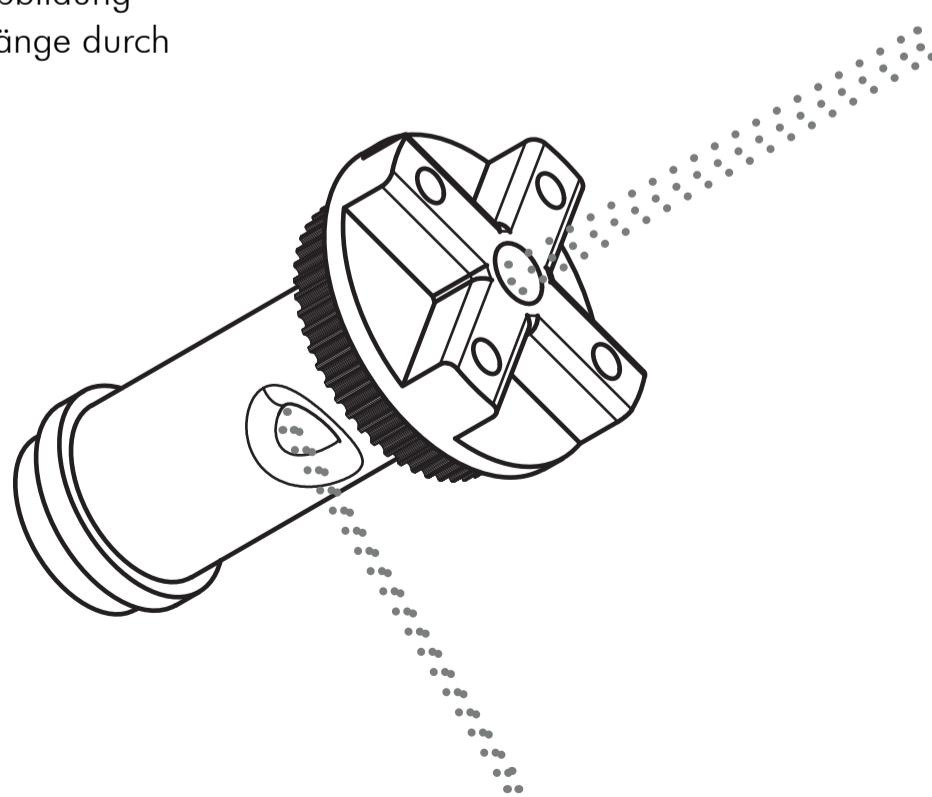
3x M3

**6**

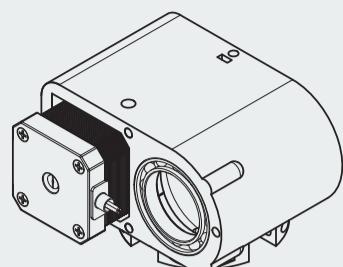
Bauschritt 5

**Hinweis**

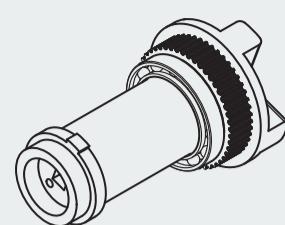
Die Kabel müssen, wie in der Abbildung dargestellt, mit ausreichender Länge durch B11 geschoben werden.



7



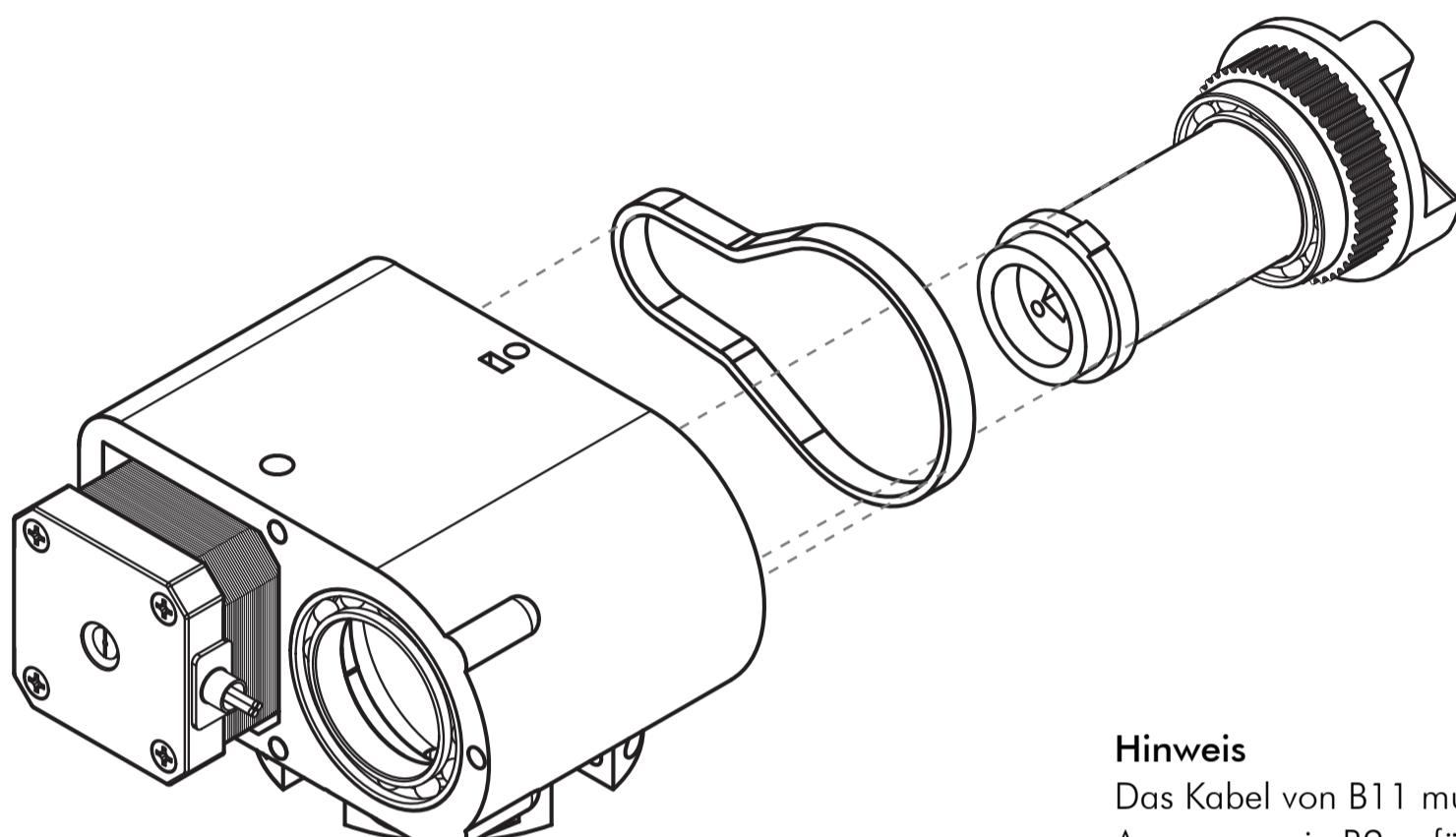
Bauschritt 4



Bauschritt 6

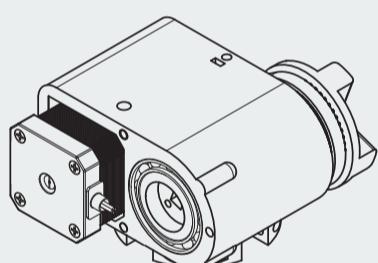


1x N5

**Hinweis**

Das Kabel von B11 muss durch die Aussparung in B9 geführt werden.

8



Bauschritt 7



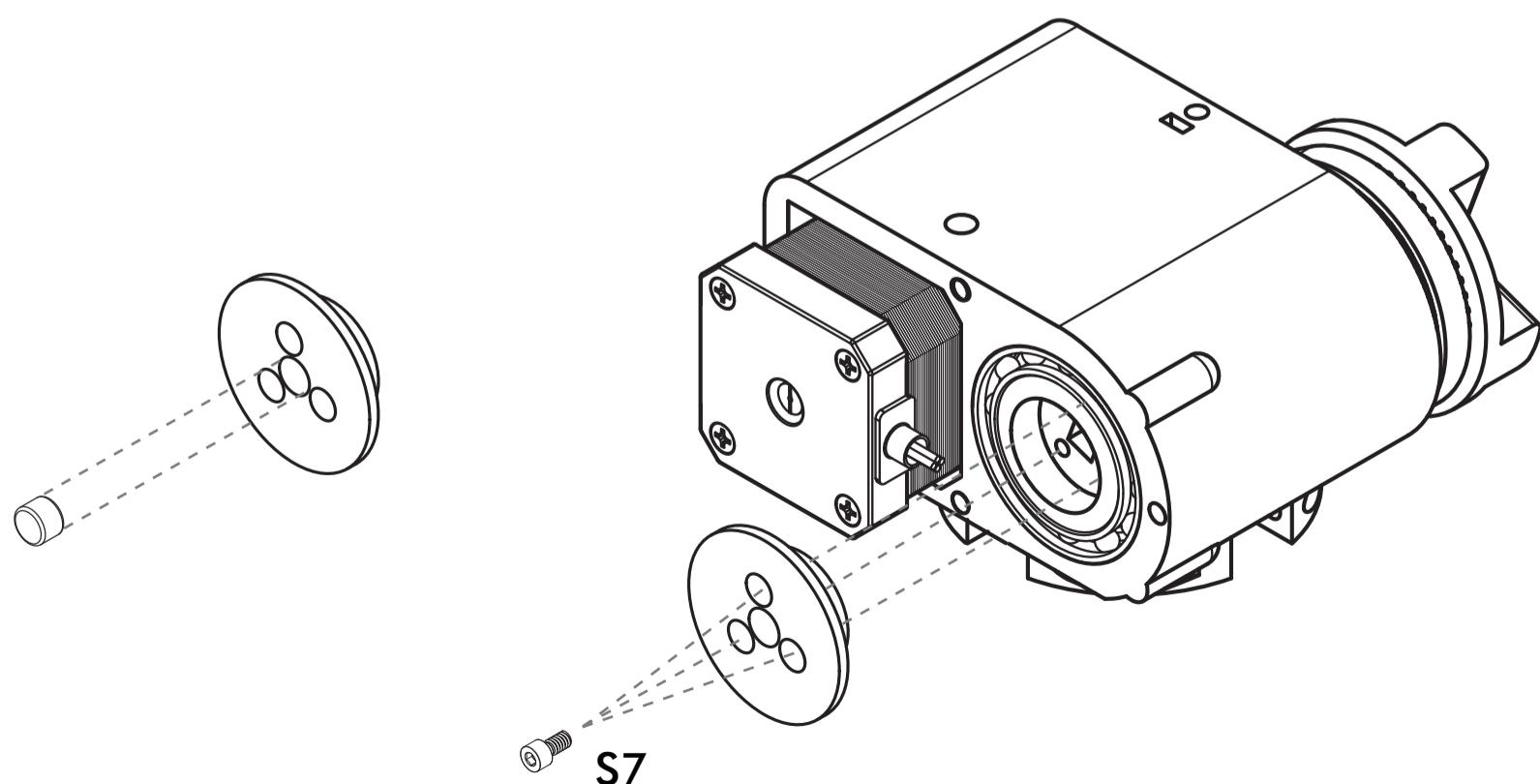
1x B13

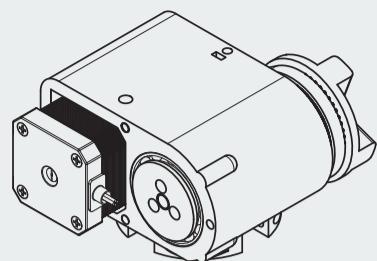


1x N19

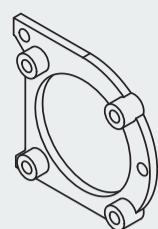


3x S7



**9**

Bauschritt 8



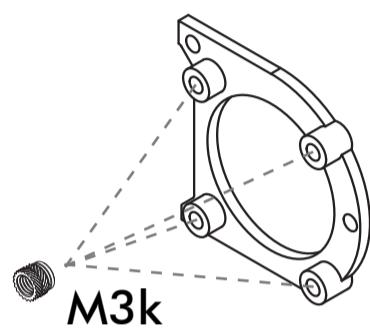
1x B14



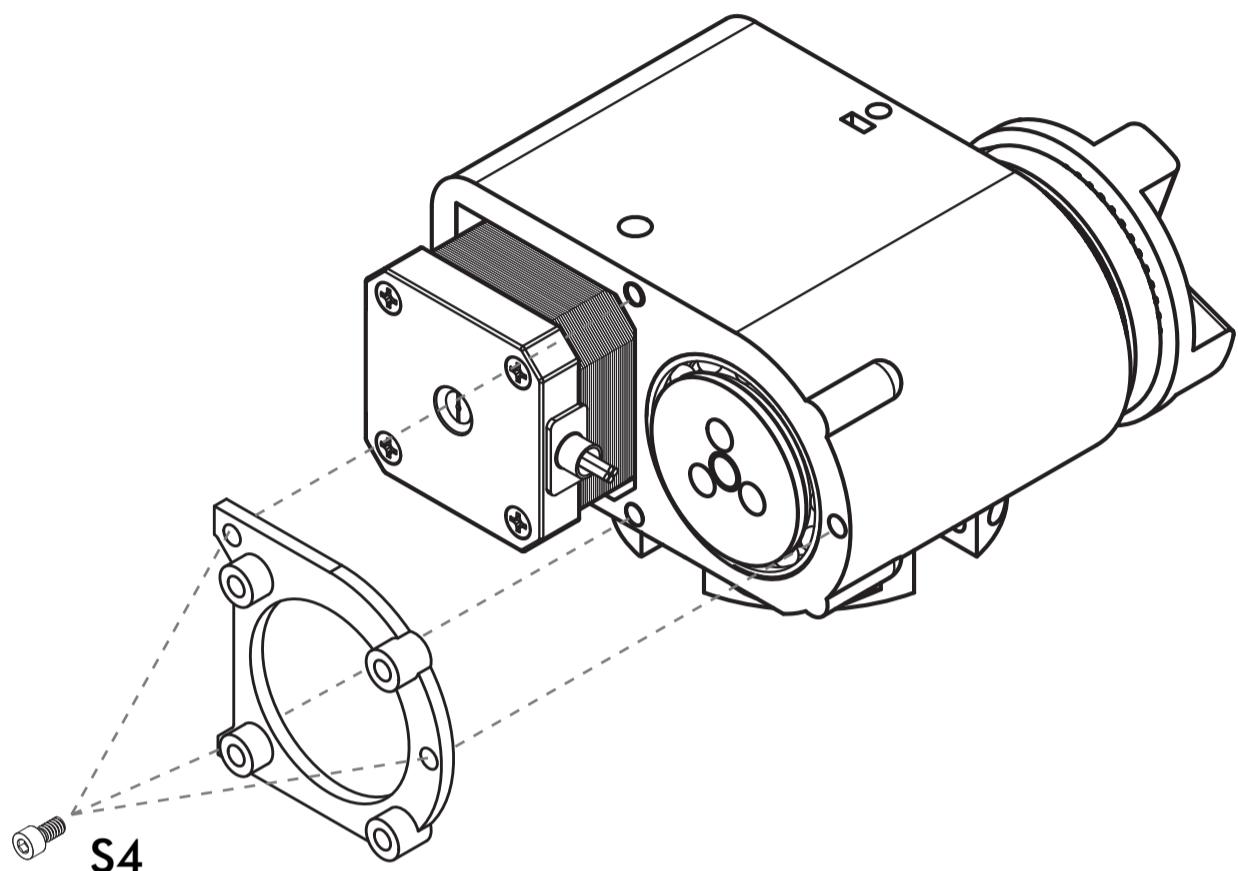
4x M3k



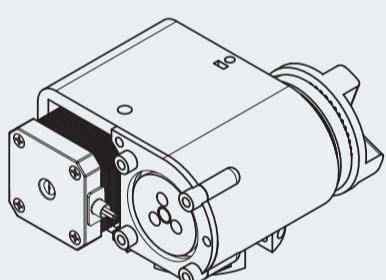
3x S4



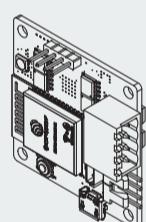
M3k



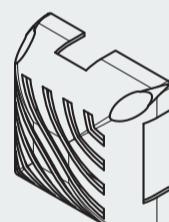
S4

**10**

Bauschritt 9



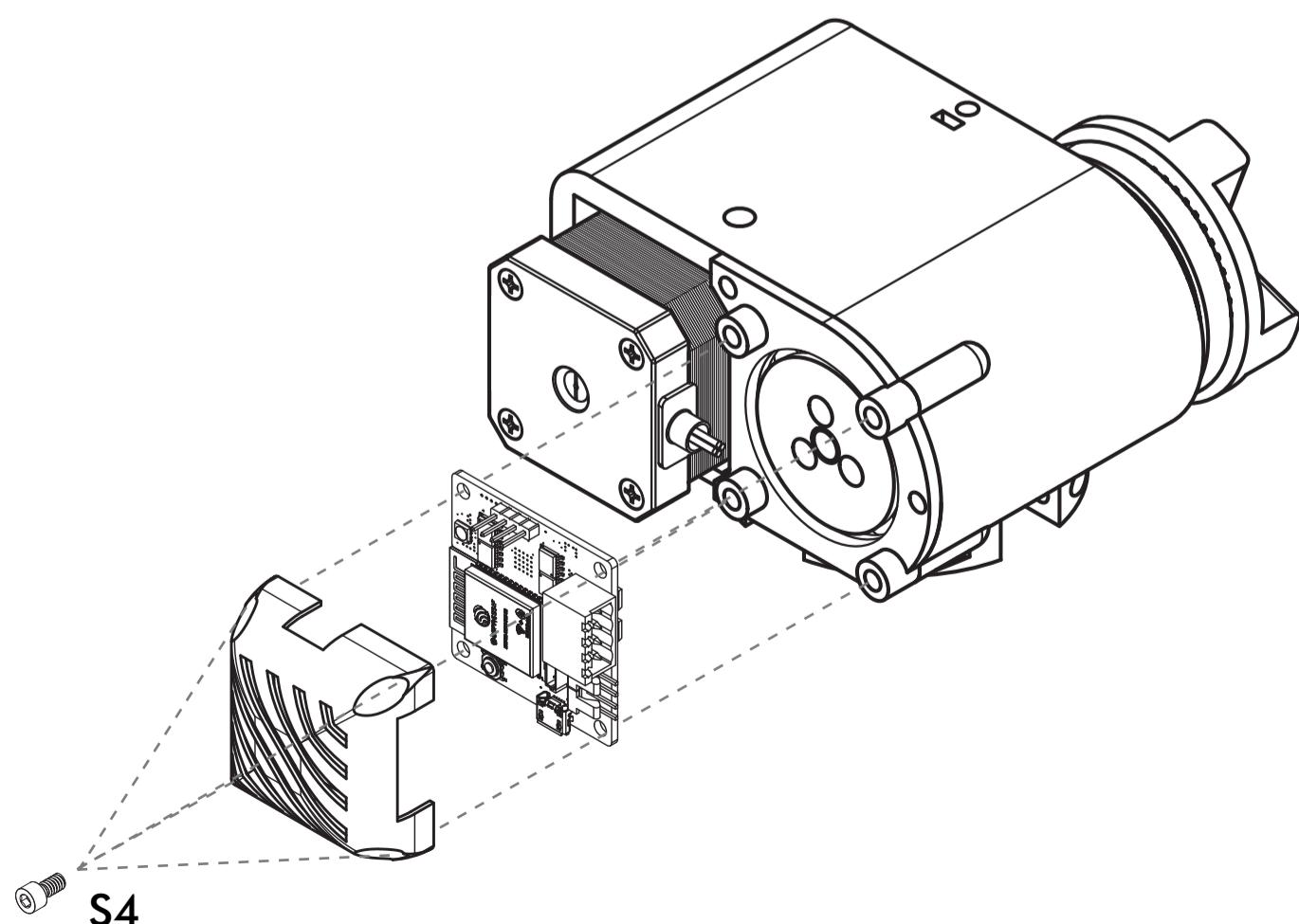
1x N20



1x B35

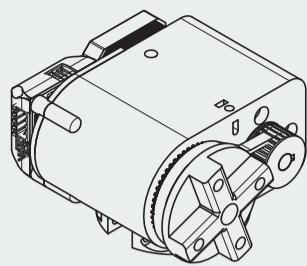


4x S4



S4

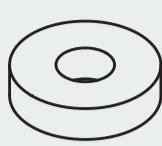
11



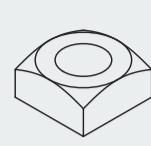
Bauschritt 10



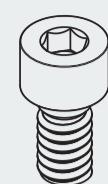
4x N10



1x B36



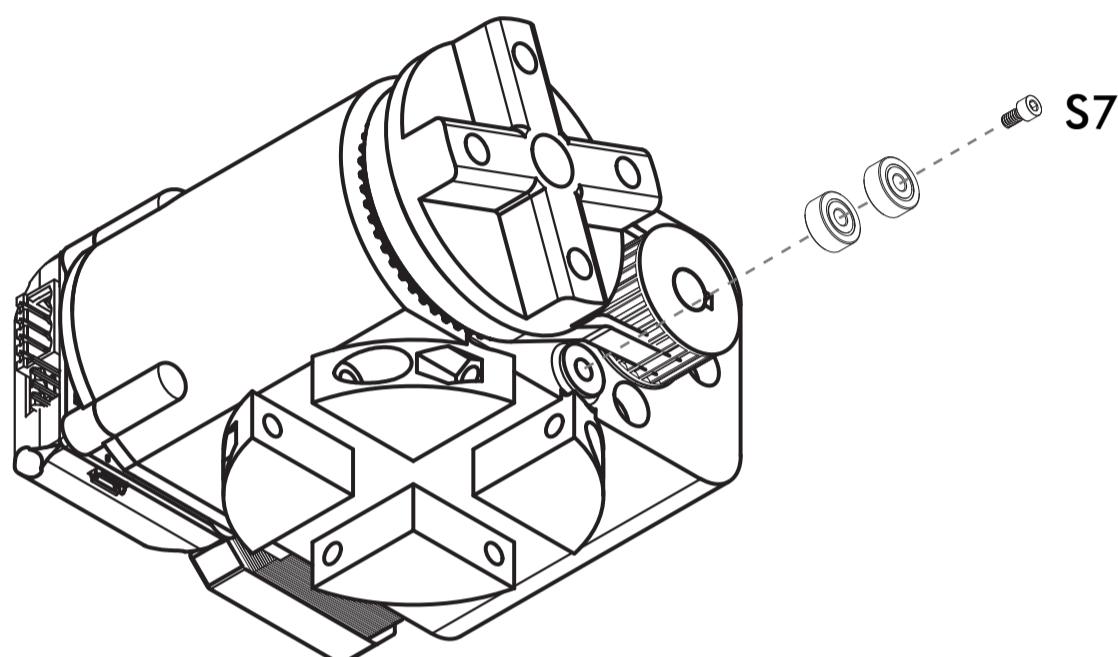
1x SM2



2x S7

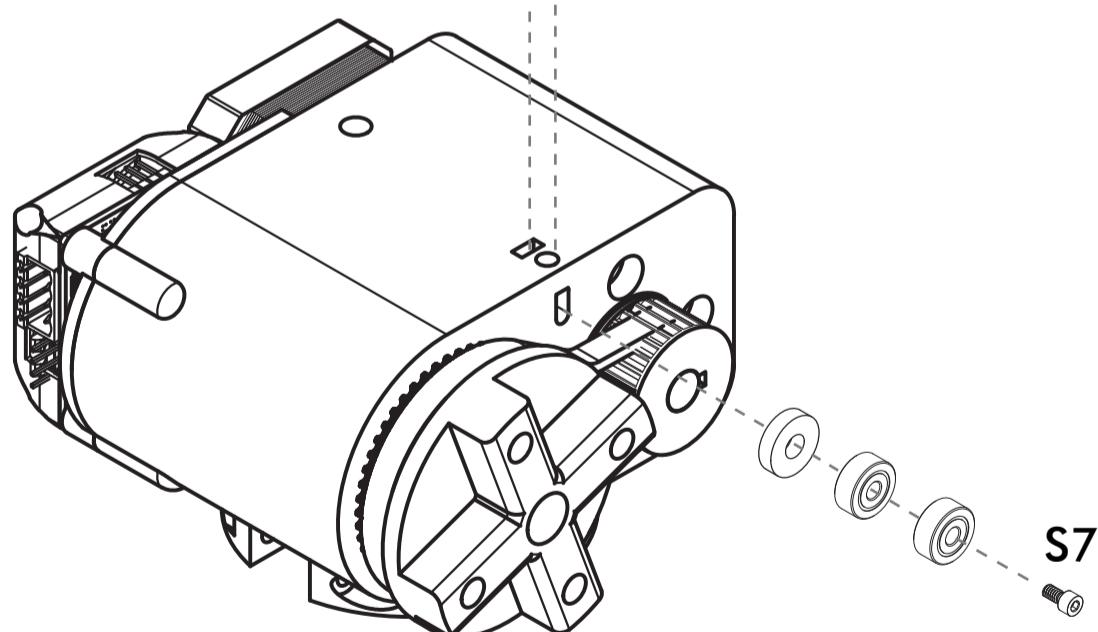


1x S6



S6

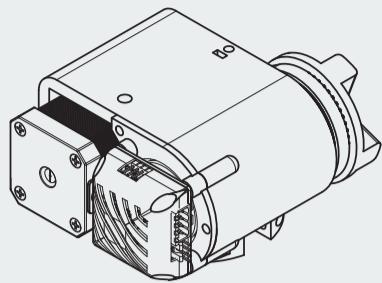
SM2



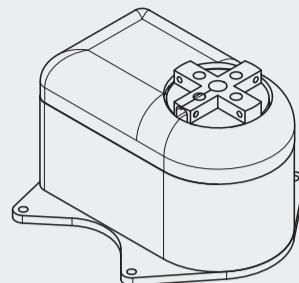
#### Hinweis

Die Schrauben S7 müssen vor S6 angebracht werden. S7 erst nach dem Anziehen von S6 vollständig festziehen.

12



Baugruppe I



Baugruppe II



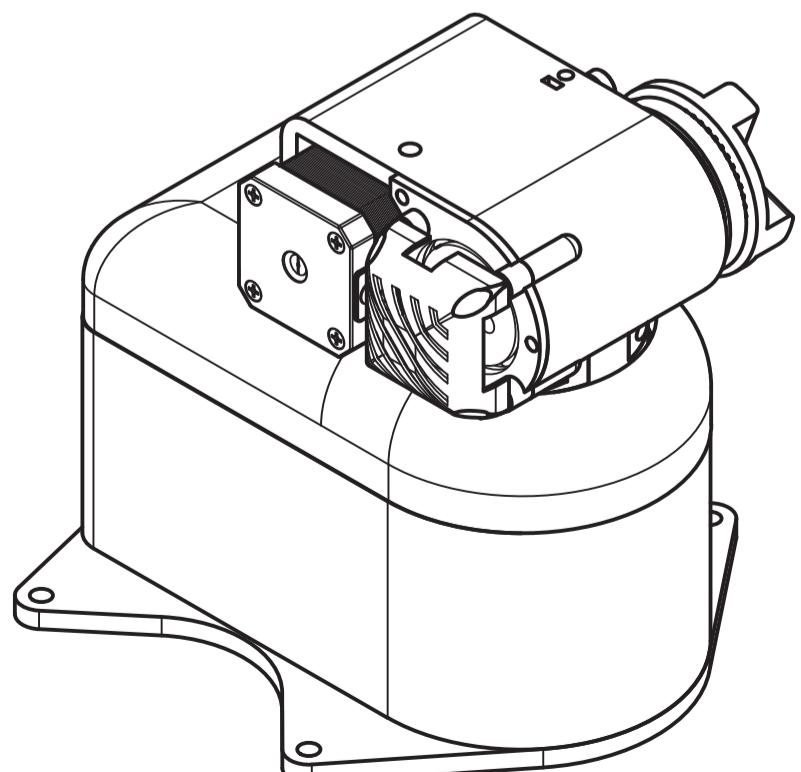
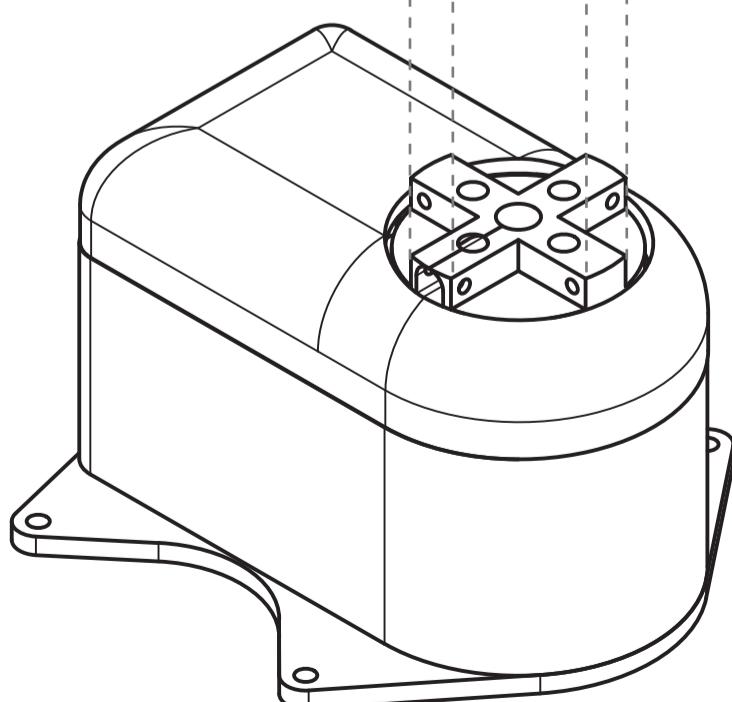
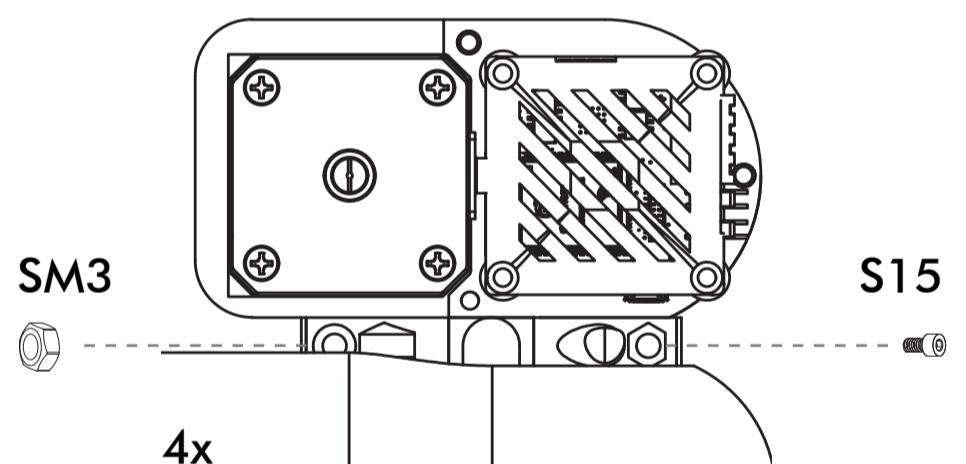
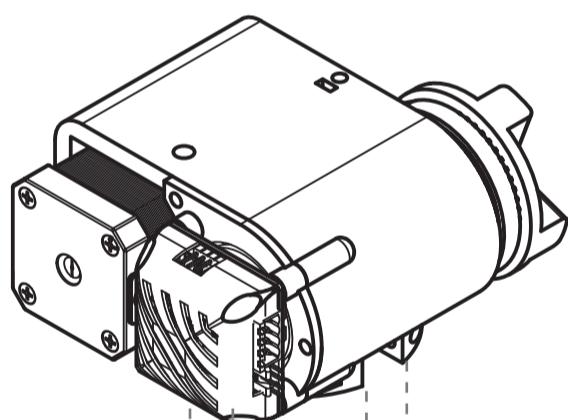
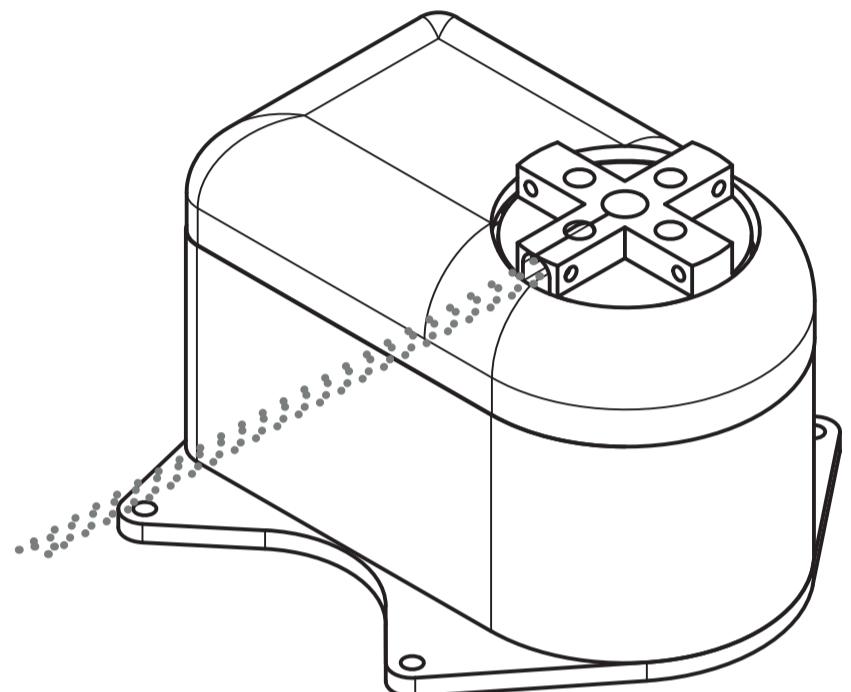
4x S15



4x SM3

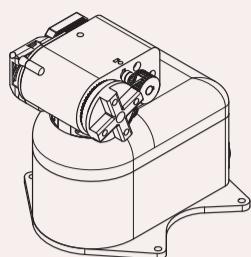
**Hinweis**

Auf die Ausrichtung zwischen Baugruppe I und II bezüglich der Kabelführung ist zu achten.

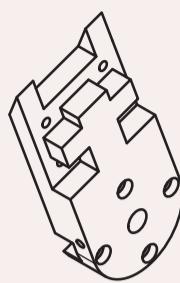


# Baugruppe III

1



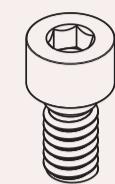
Baugruppe I+II



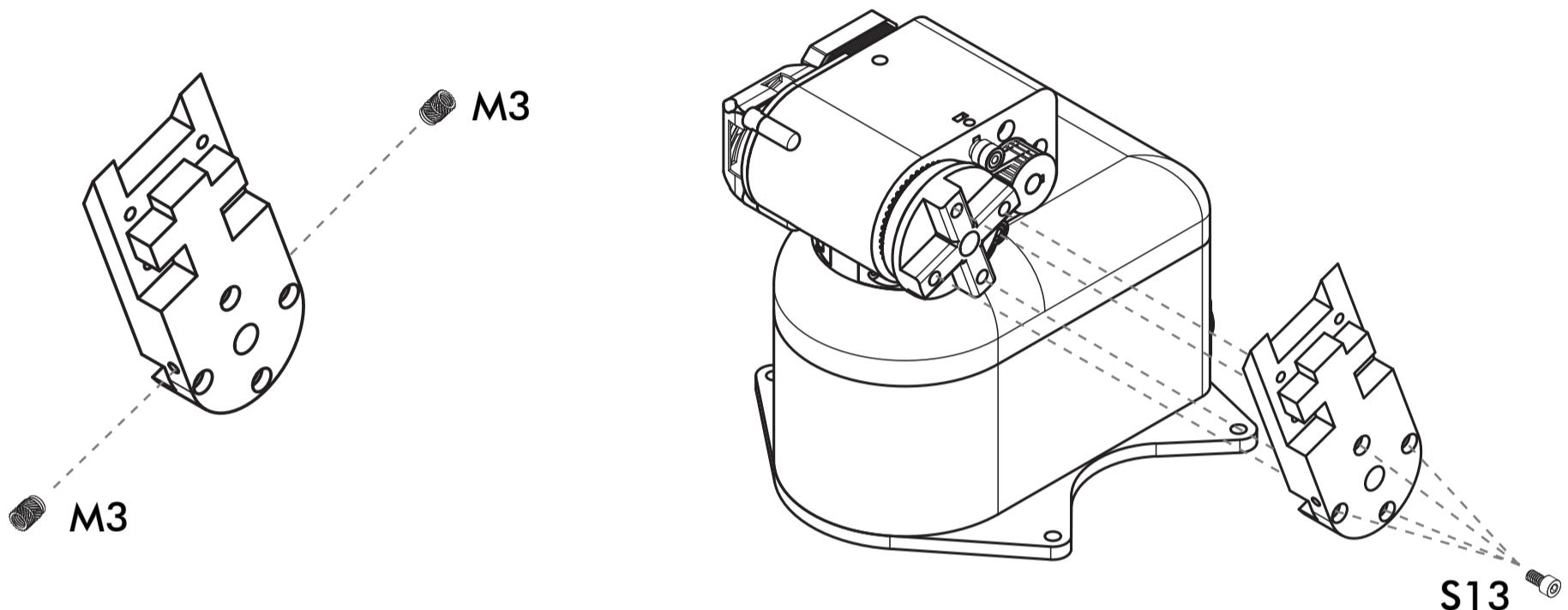
1x B15



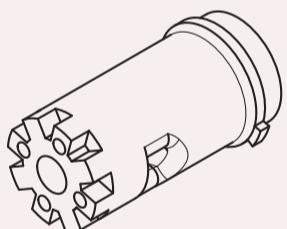
2x M3



4x S13



2



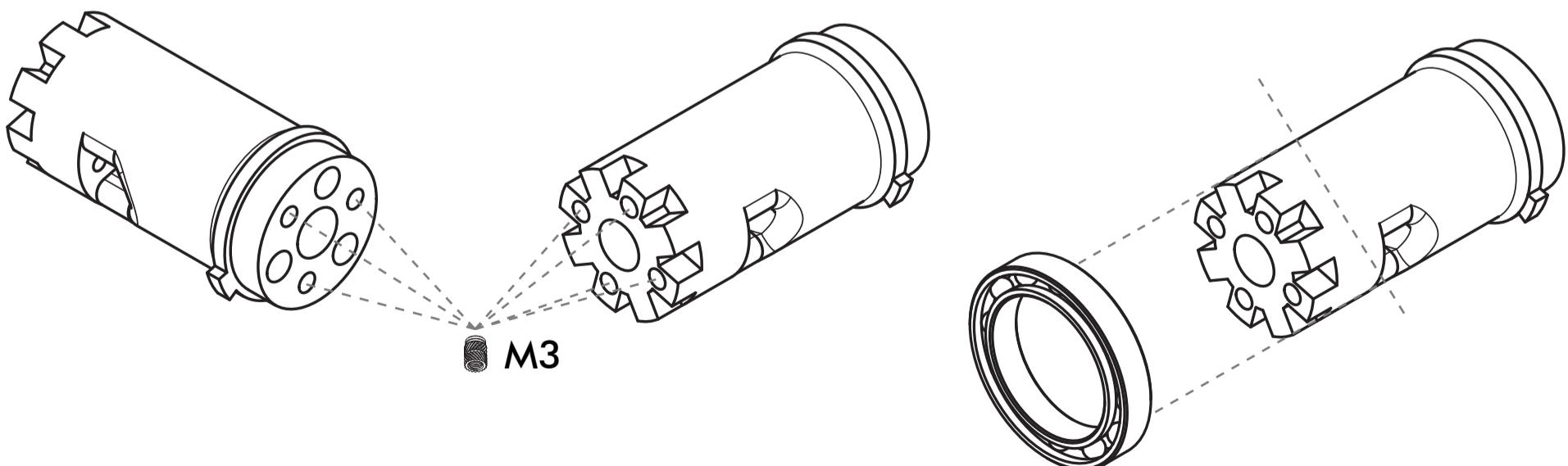
1x B17

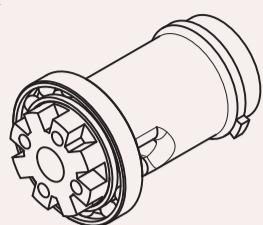


7x M3

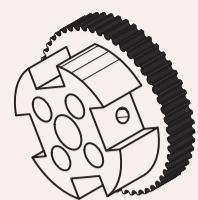


1x N12



**3**

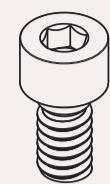
Bauschritt 2



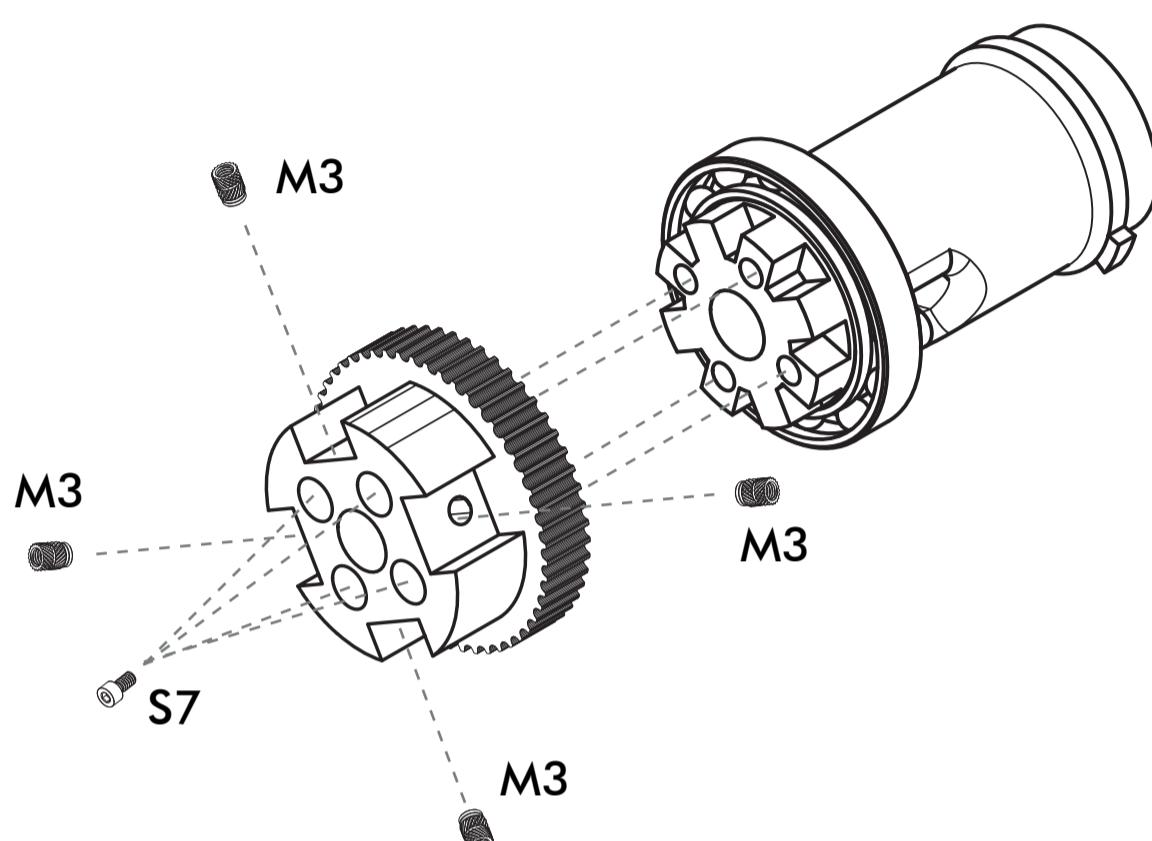
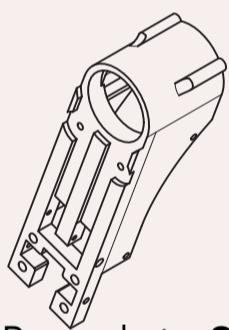
1x B18



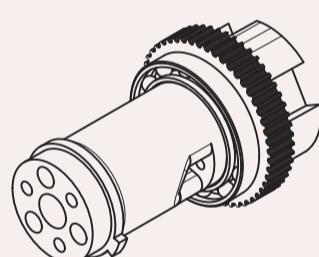
4x M3



4x S7

**4**

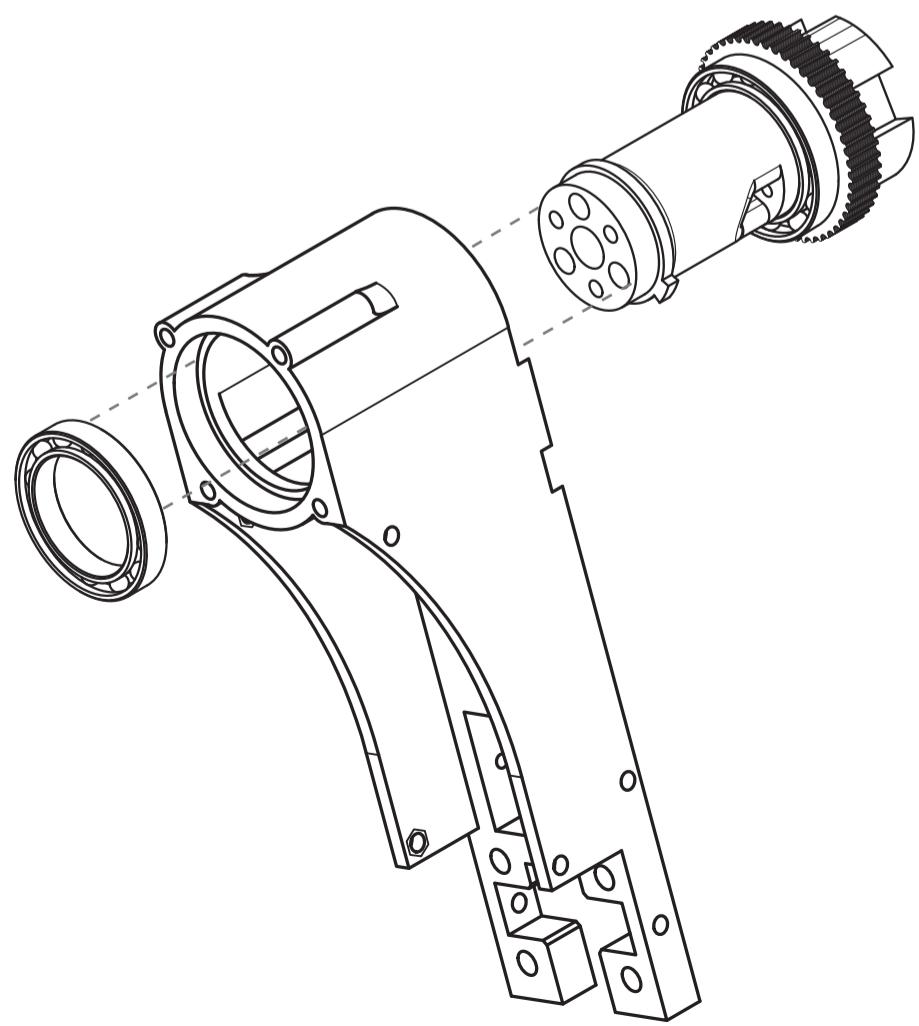
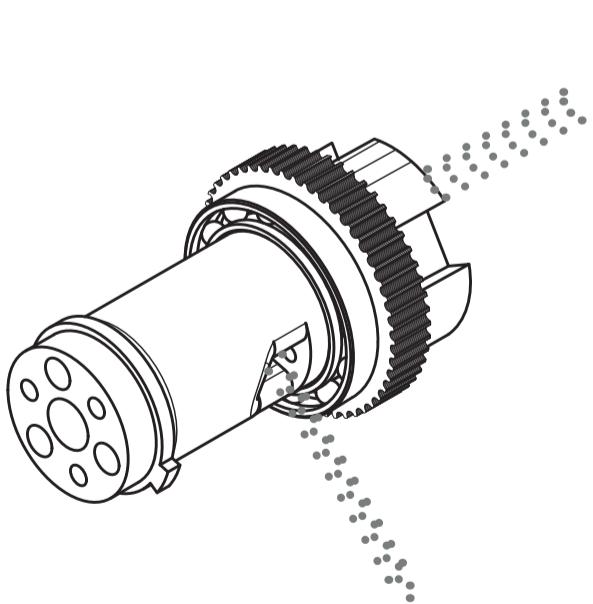
Bauschritt 3



1x B16

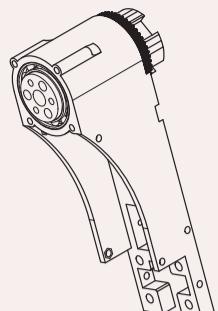


1x N12

**Hinweis**

Vor dem Einsetzen von Bauschritt 3  
sollten die Kabel mit ausreichender Länge  
durch die Bohrung von B17 und B18, wie  
in der Abbildung gezeigt, geführt werden.

**5**



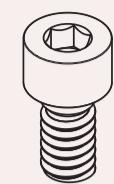
Bauschritt 4



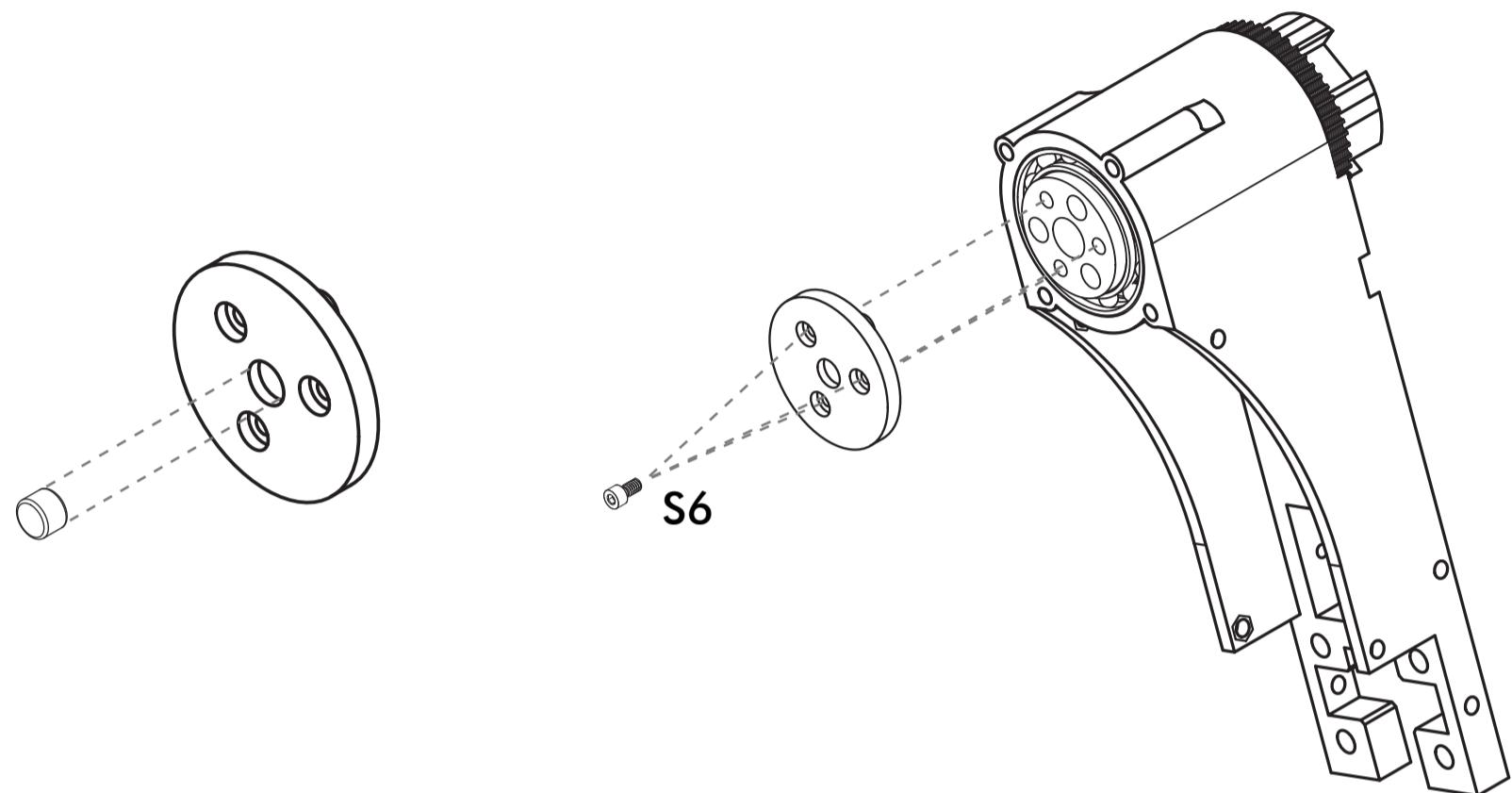
1x B20



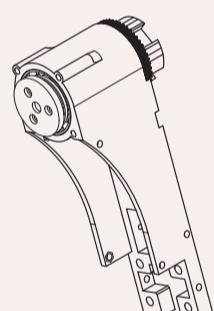
1x N19



3x S6



**6**



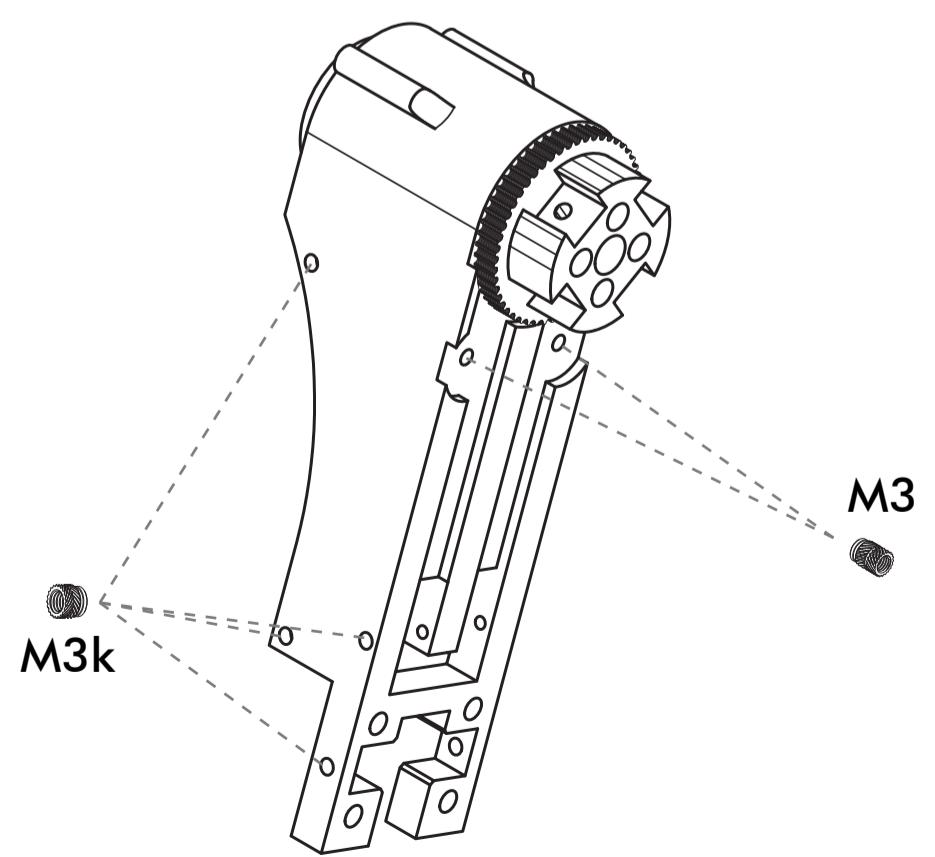
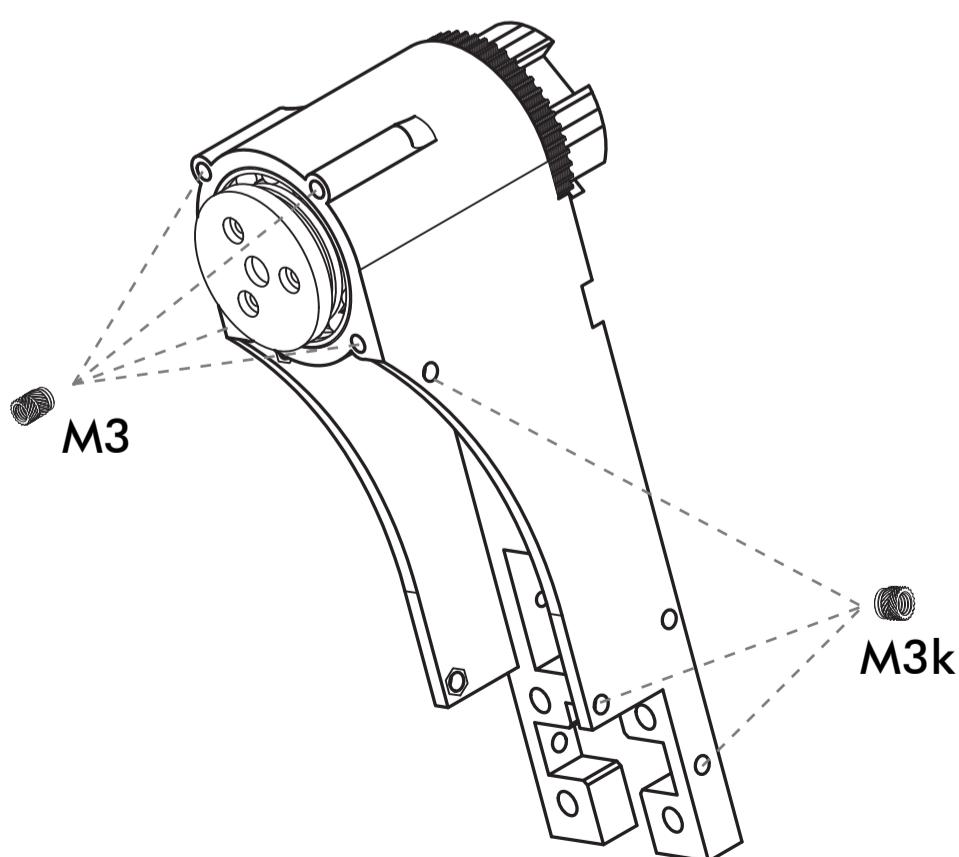
Bauschritt 5

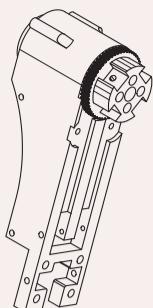


6x M3



7x M3k



**7**

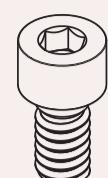
Bauschritt 6



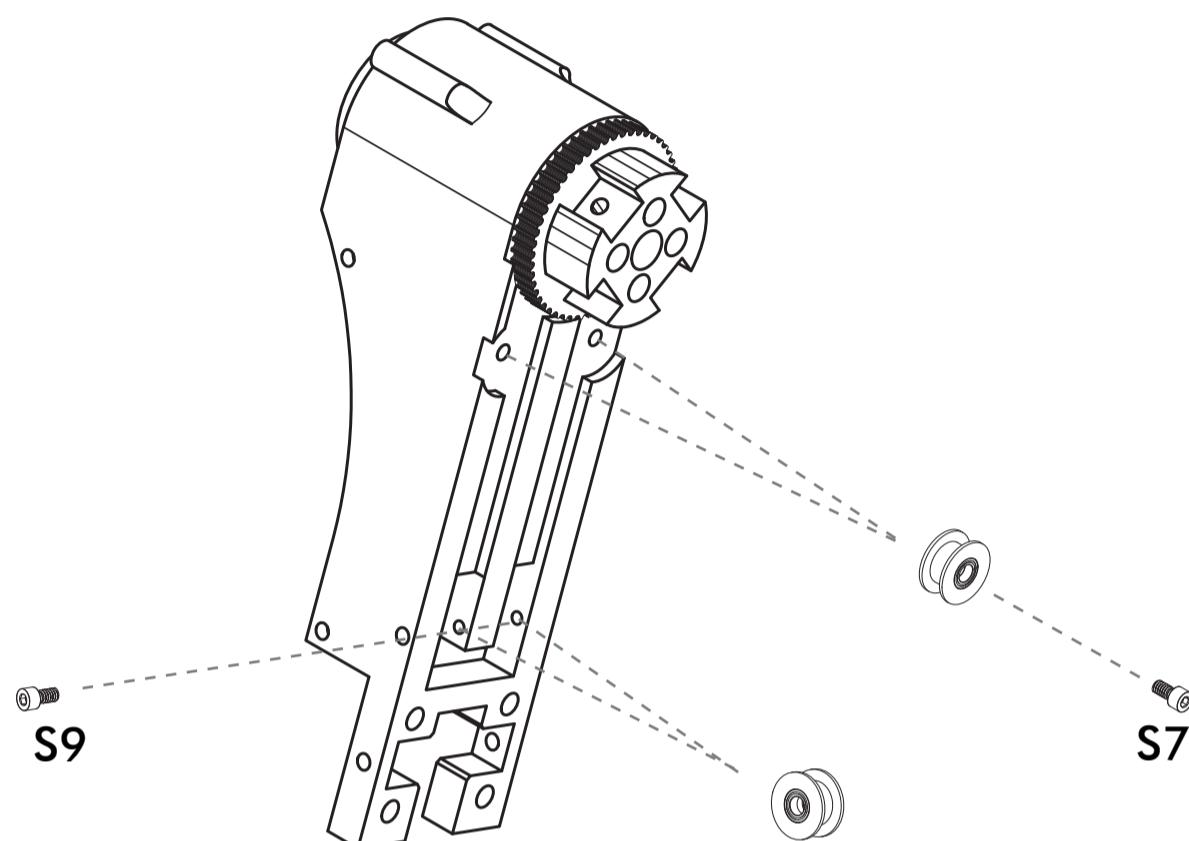
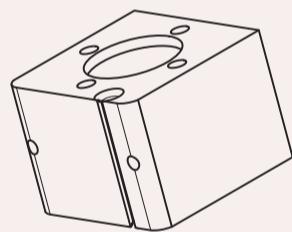
4x N16



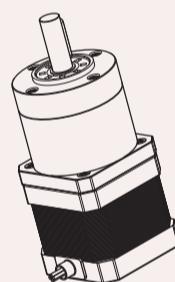
1x S9



2x S7

**8**

1x B21



1x N2



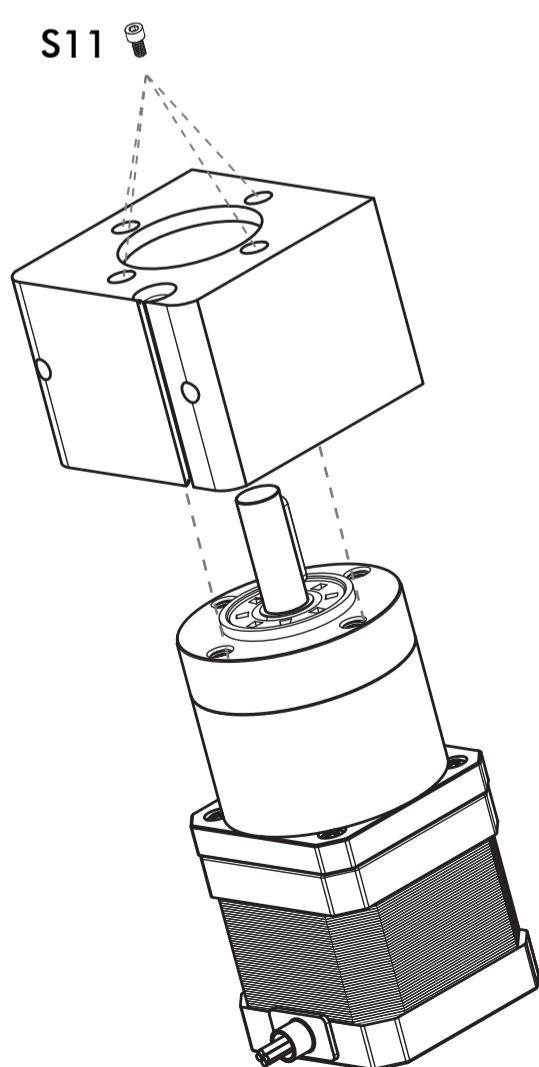
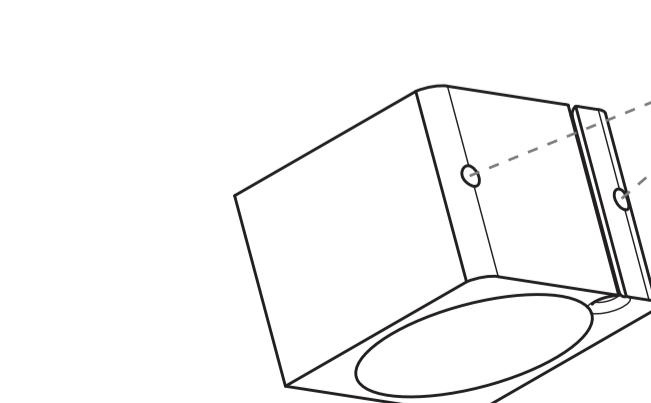
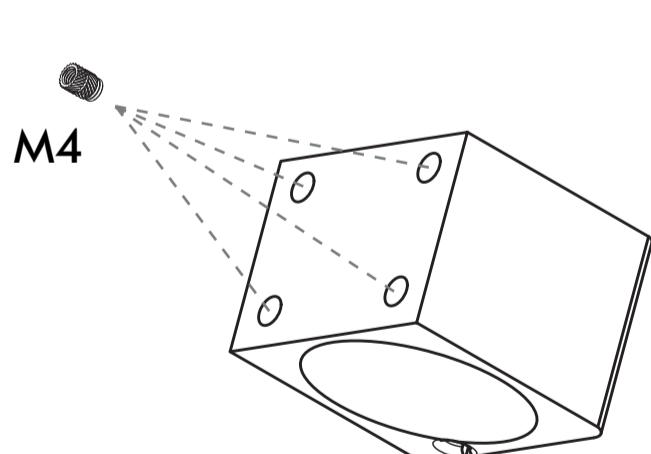
4x M4

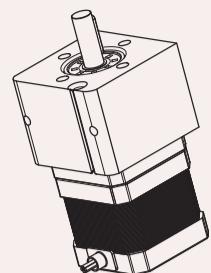


2x M3

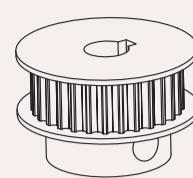


4x S11



**9**

Bauschritt 8



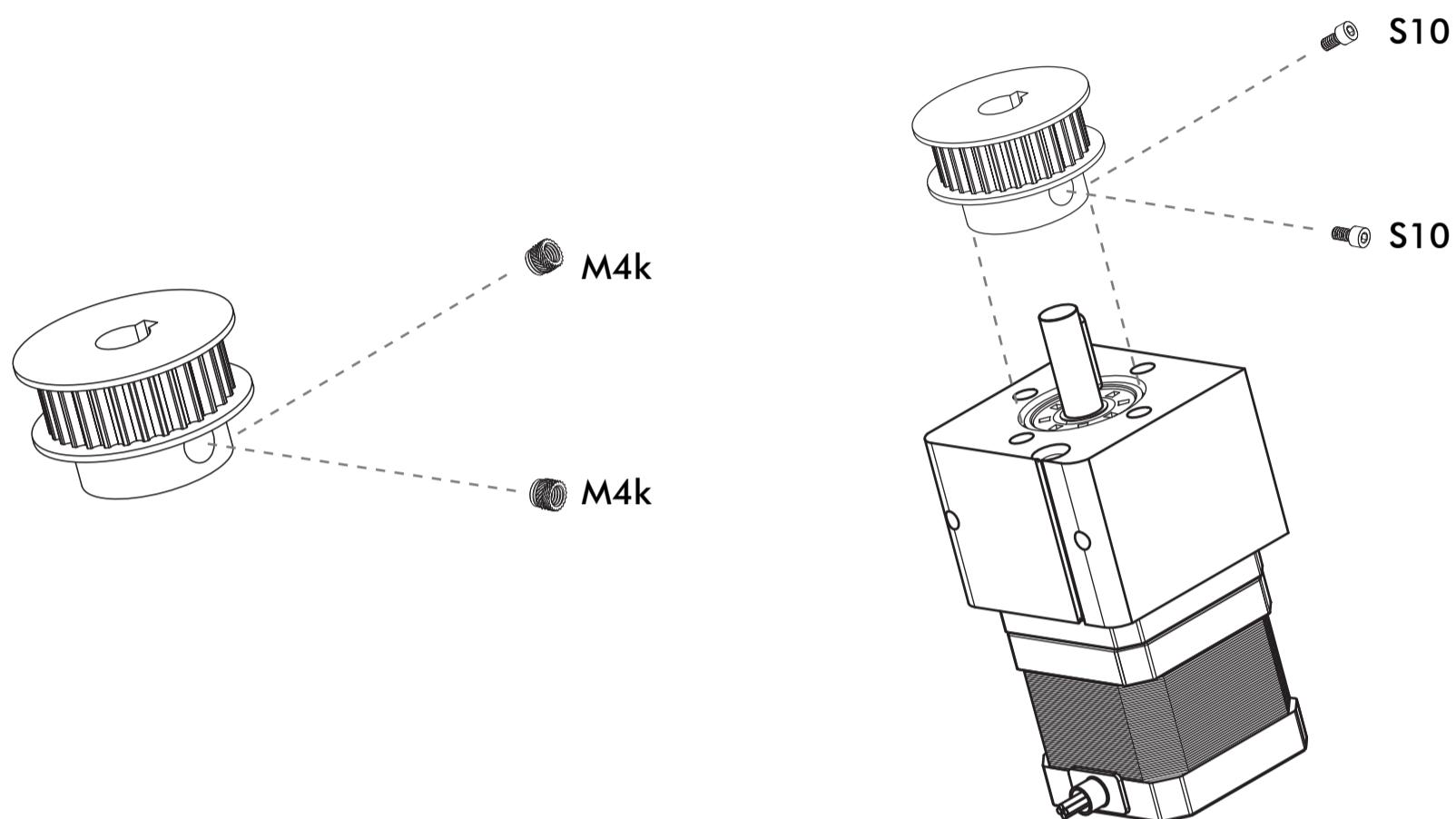
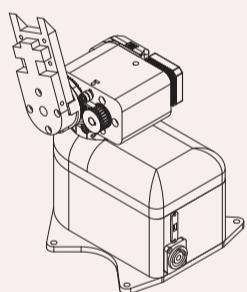
1x B19



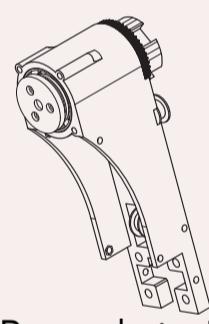
2x M4k



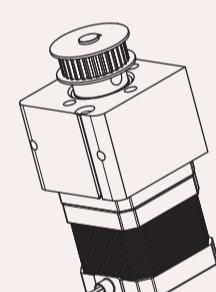
2x S10

**10**

Bauschritt 1



Bauschritt 7



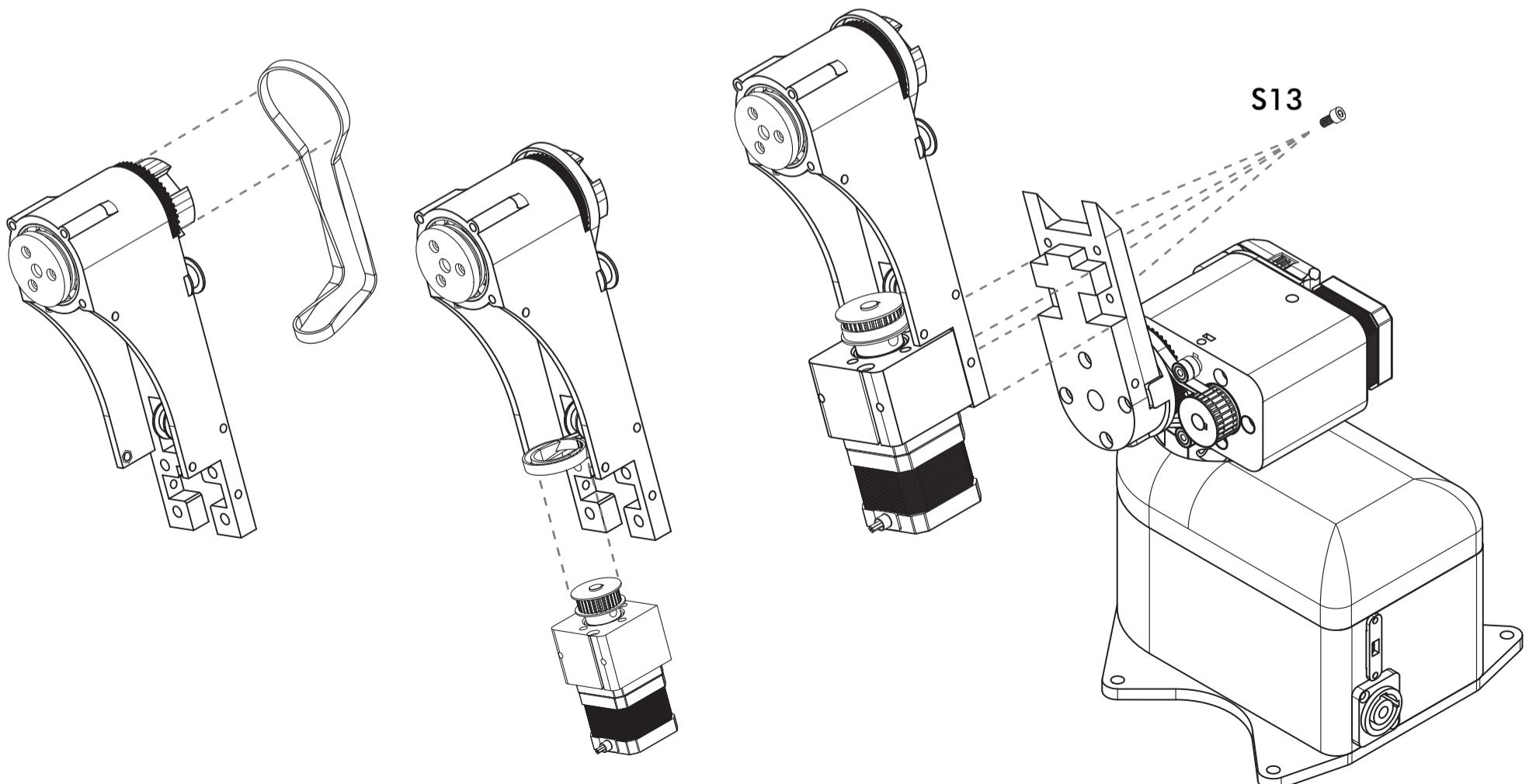
Bauschritt 9



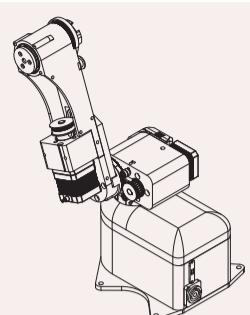
1x N6



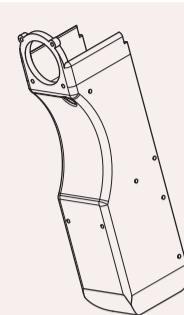
4x S13



11



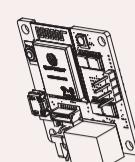
Bauschritt 10



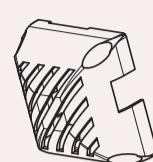
1x B22



4x B36



1x N20



1x B35



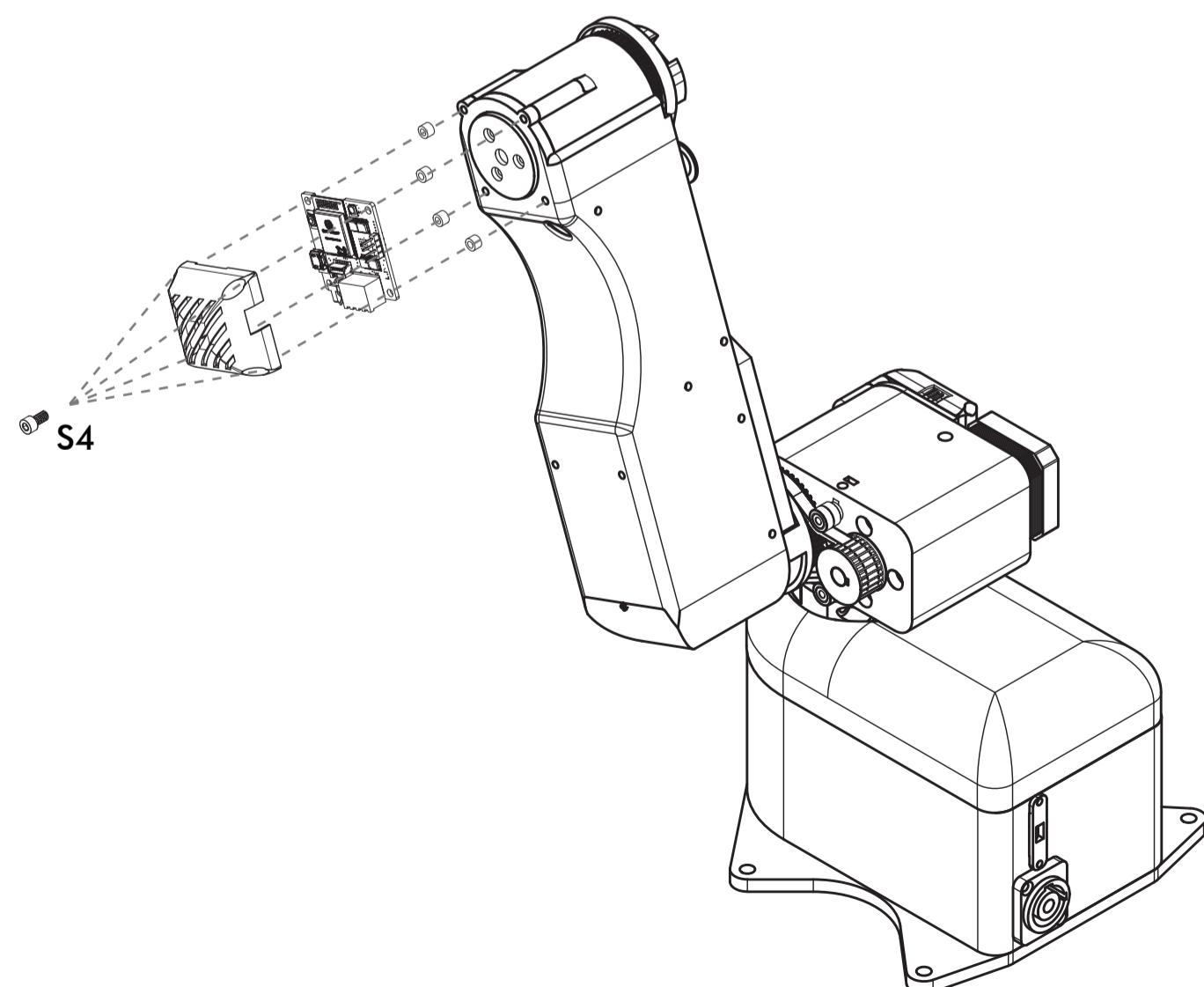
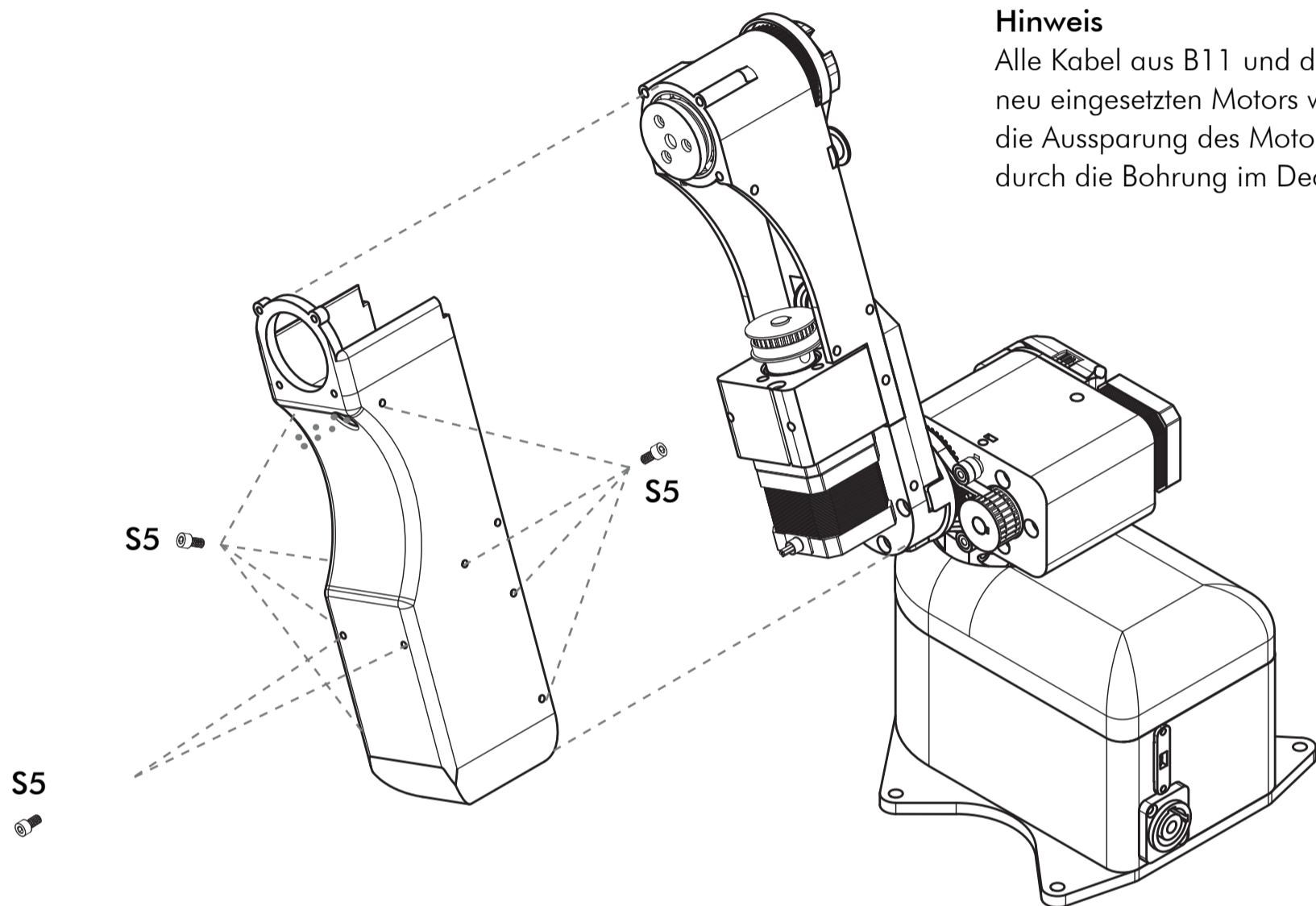
4x S4



10x S5

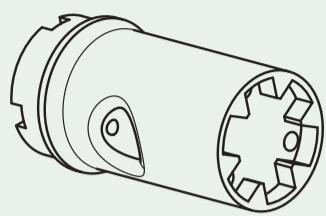
#### Hinweis

Alle Kabel aus B11 und die Kabel des neu eingesetzten Motors werden durch die Aussparung des Motorhalters und durch die Bohrung im Deckel geführt.



# Baugruppe IV

1



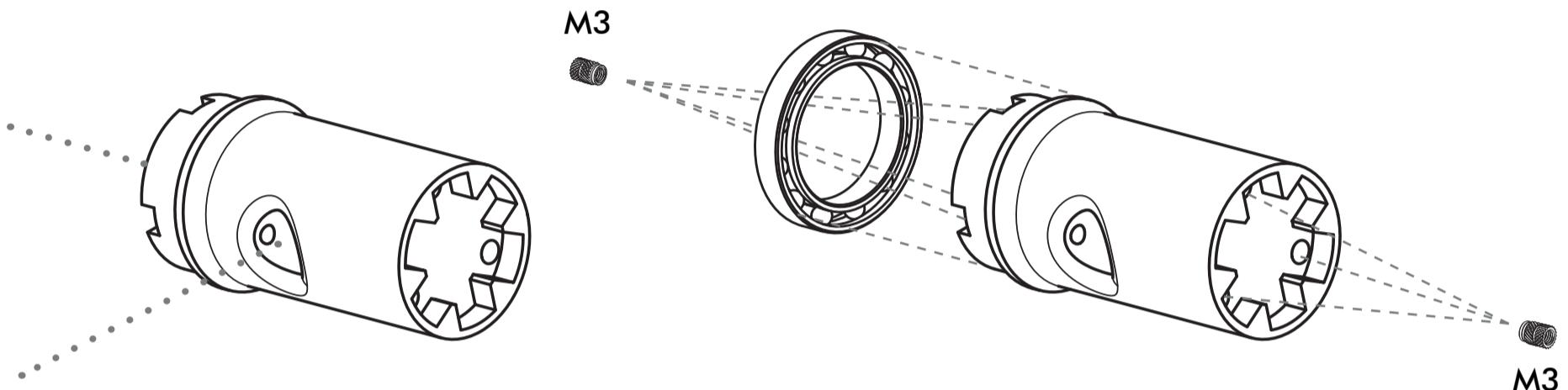
1x B24



1x N12



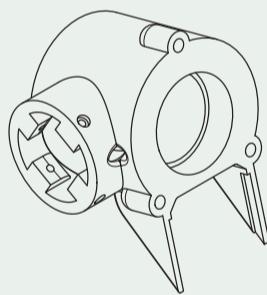
7x M3



## Hinweis

Die Kabel werden mit ausreichender Länge (siehe Baugruppe V Bauschritt 8) durch die Bohrung von B24 geführt.

2



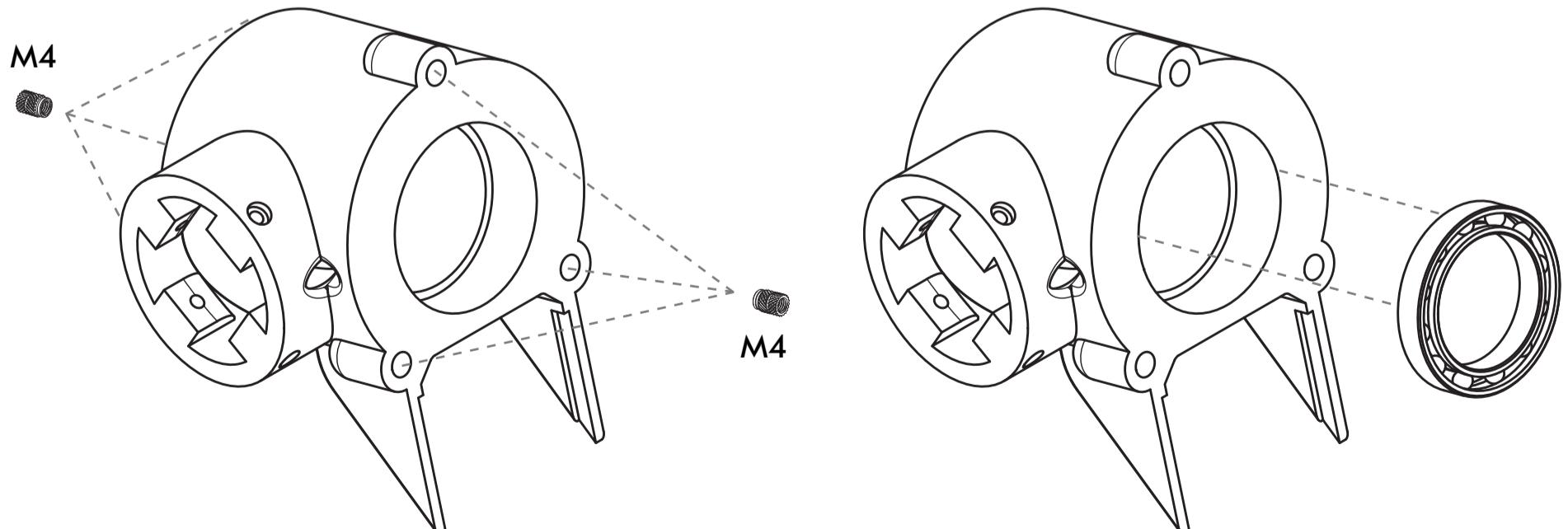
1x B23

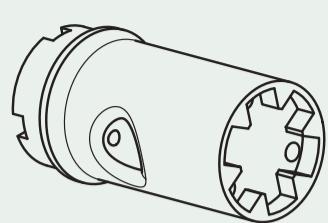


1x N12

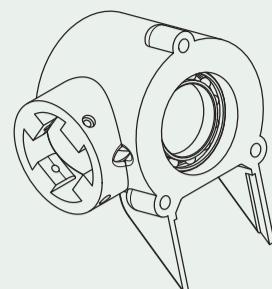


6x M4

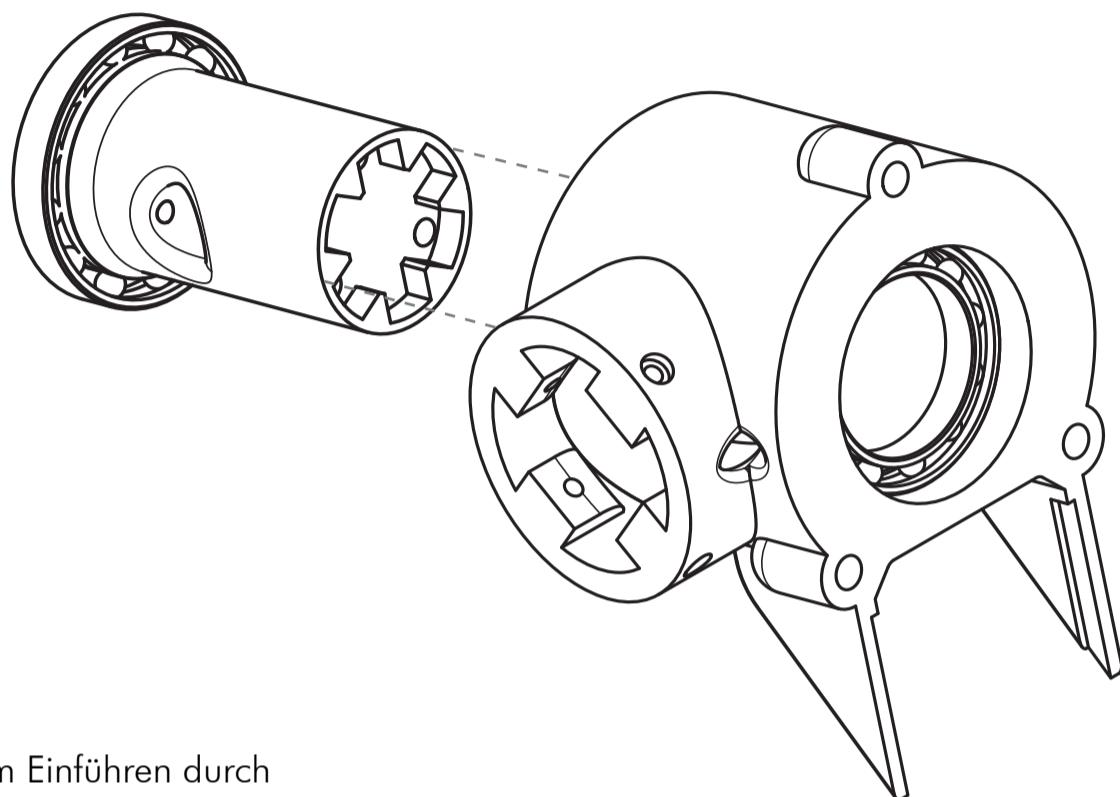


**3**

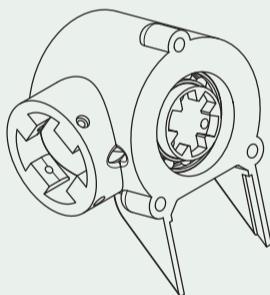
Bauschritt 1



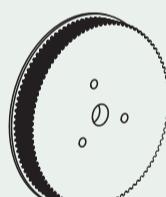
Bauschritt 2

**Hinweis**

Die Kabel aus B24 vor dem Einführen durch die seitliche Aussparung in B23 führen.

**4**

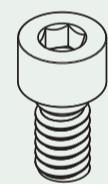
Bauschritt 3



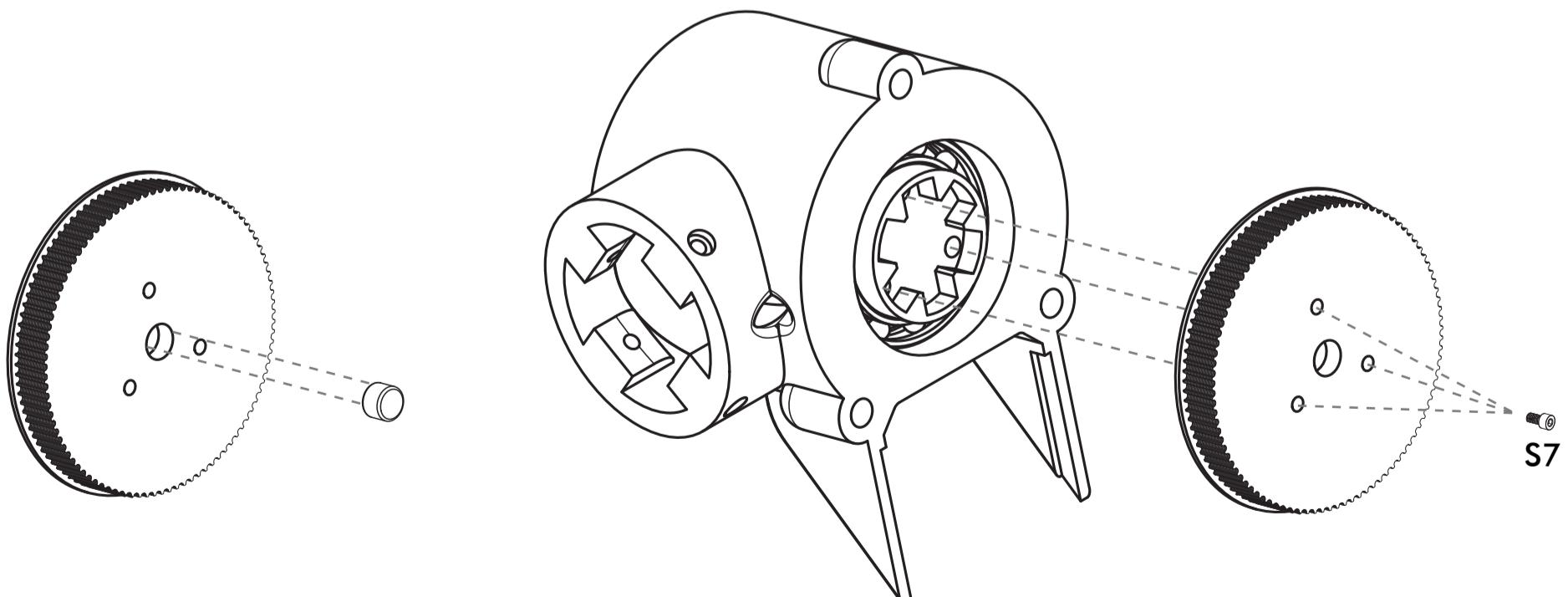
1x B26



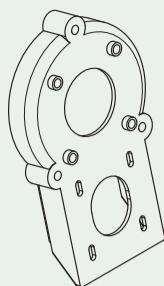
1x N19



3x S7



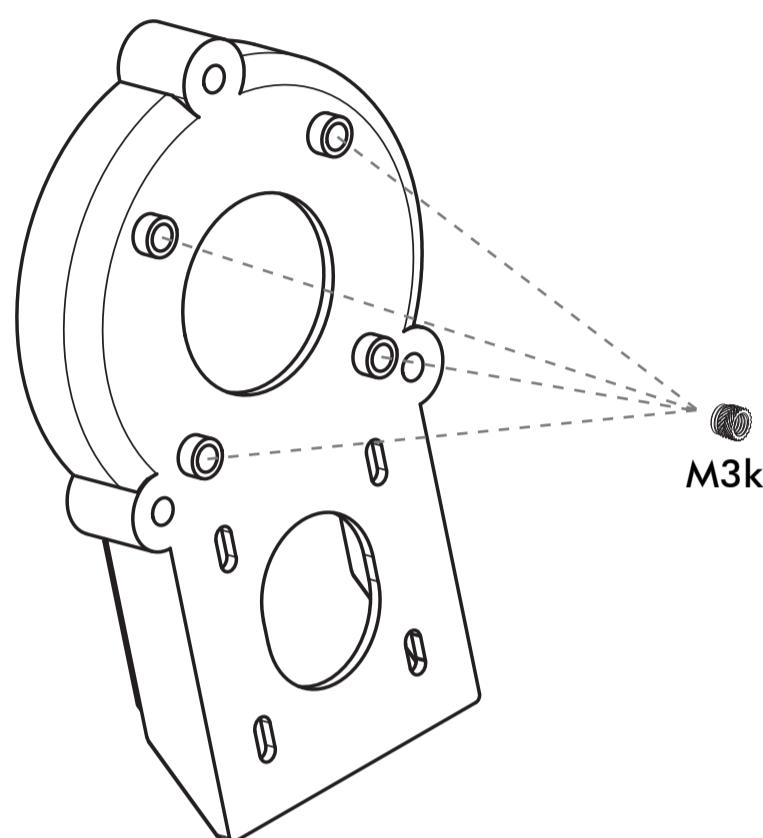
5



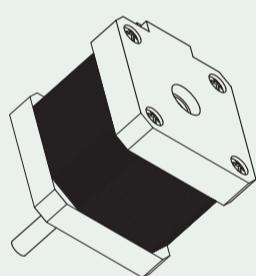
1x B25



4x M3k



6



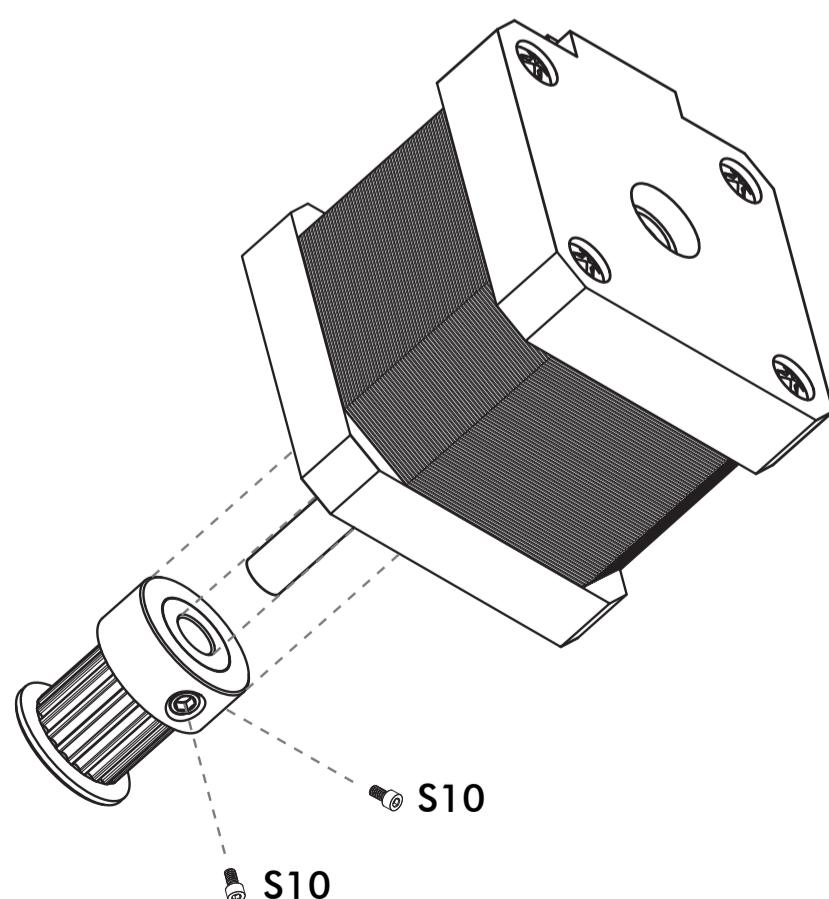
1x N3



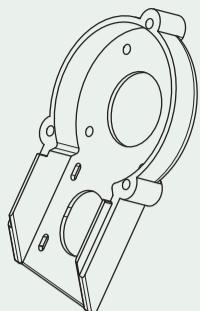
1x N14



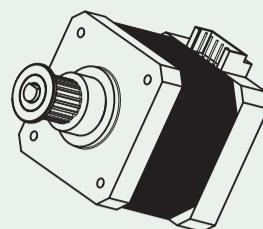
2x S10



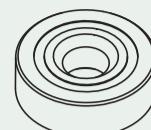
7



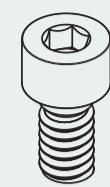
Bauschritt 5



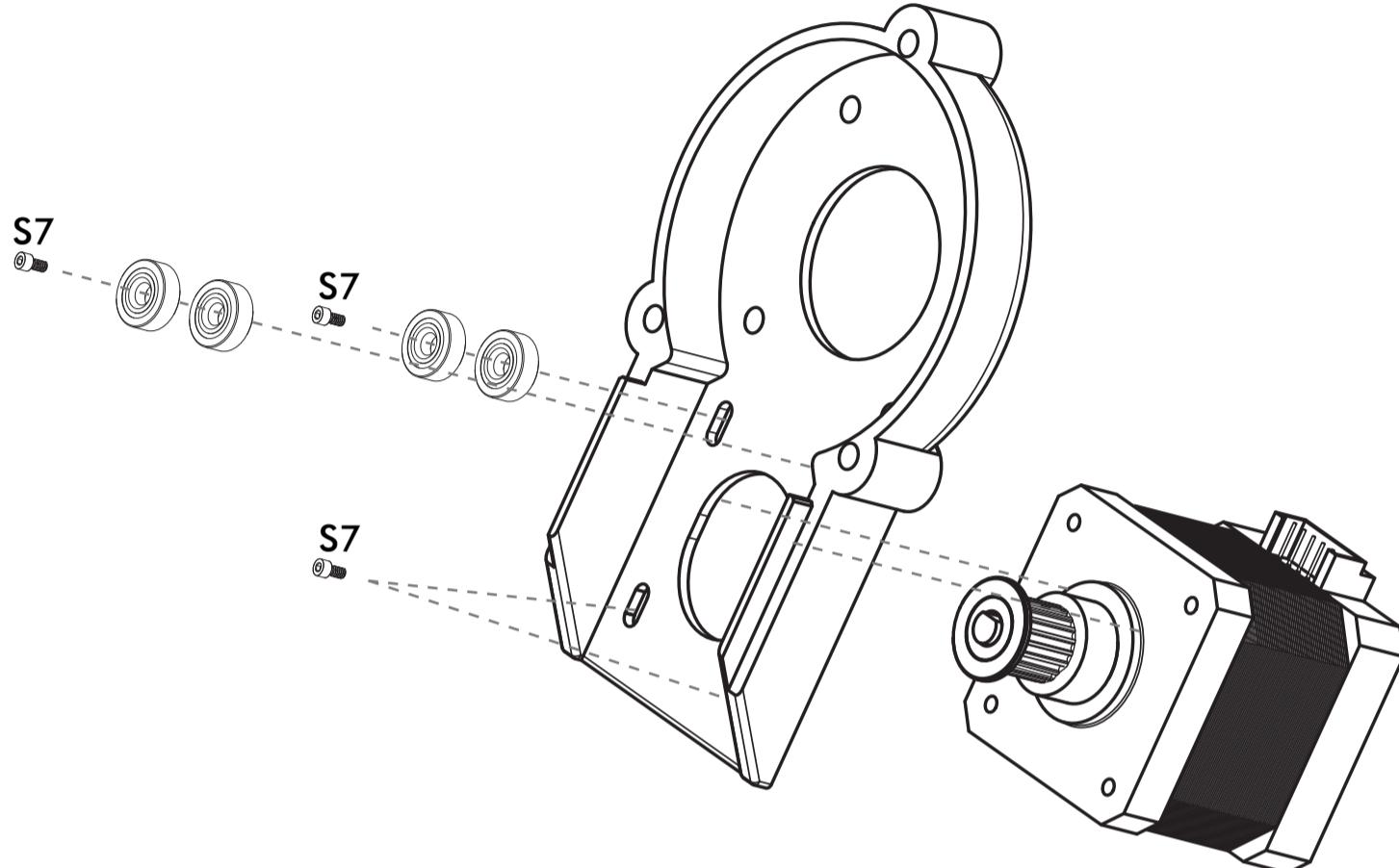
Bauschritt 6



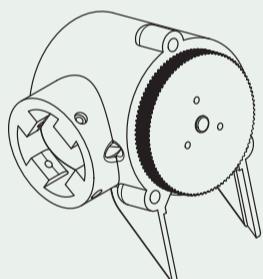
4x N10



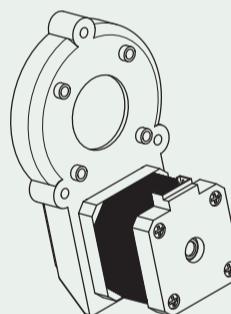
4x S7



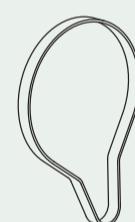
8



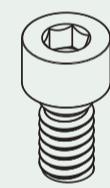
Bauschritt 4



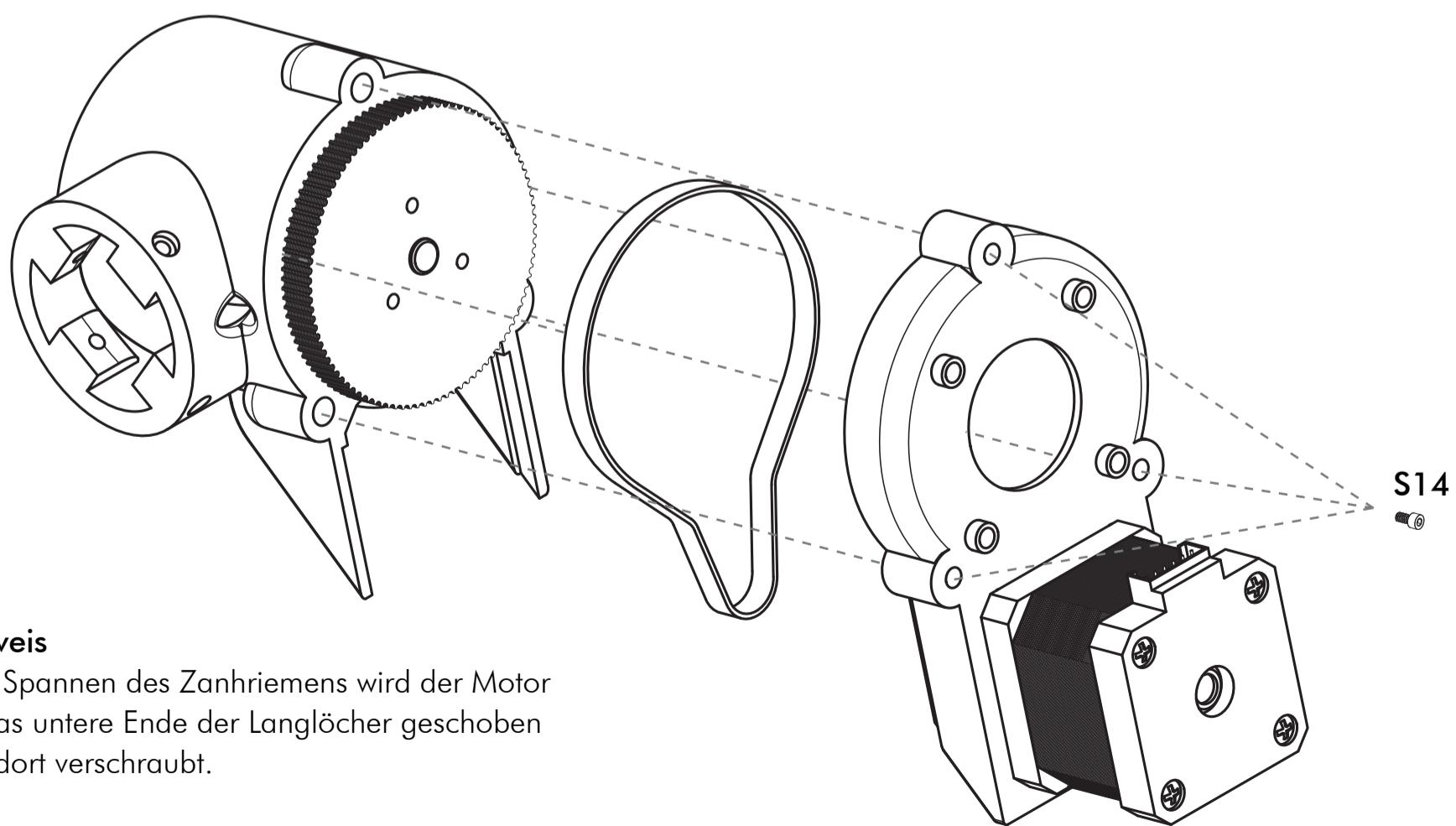
Bauschritt 7



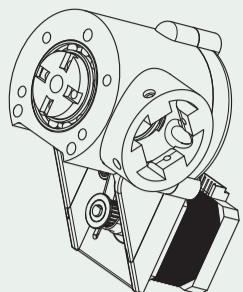
1x N7



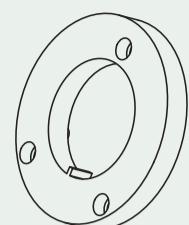
3x S14

**Hinweis**

Zum Spannen des Zanhriemens wird der Motor an das untere Ende der Langlöcher geschoben und dort verschraubt.

**9**

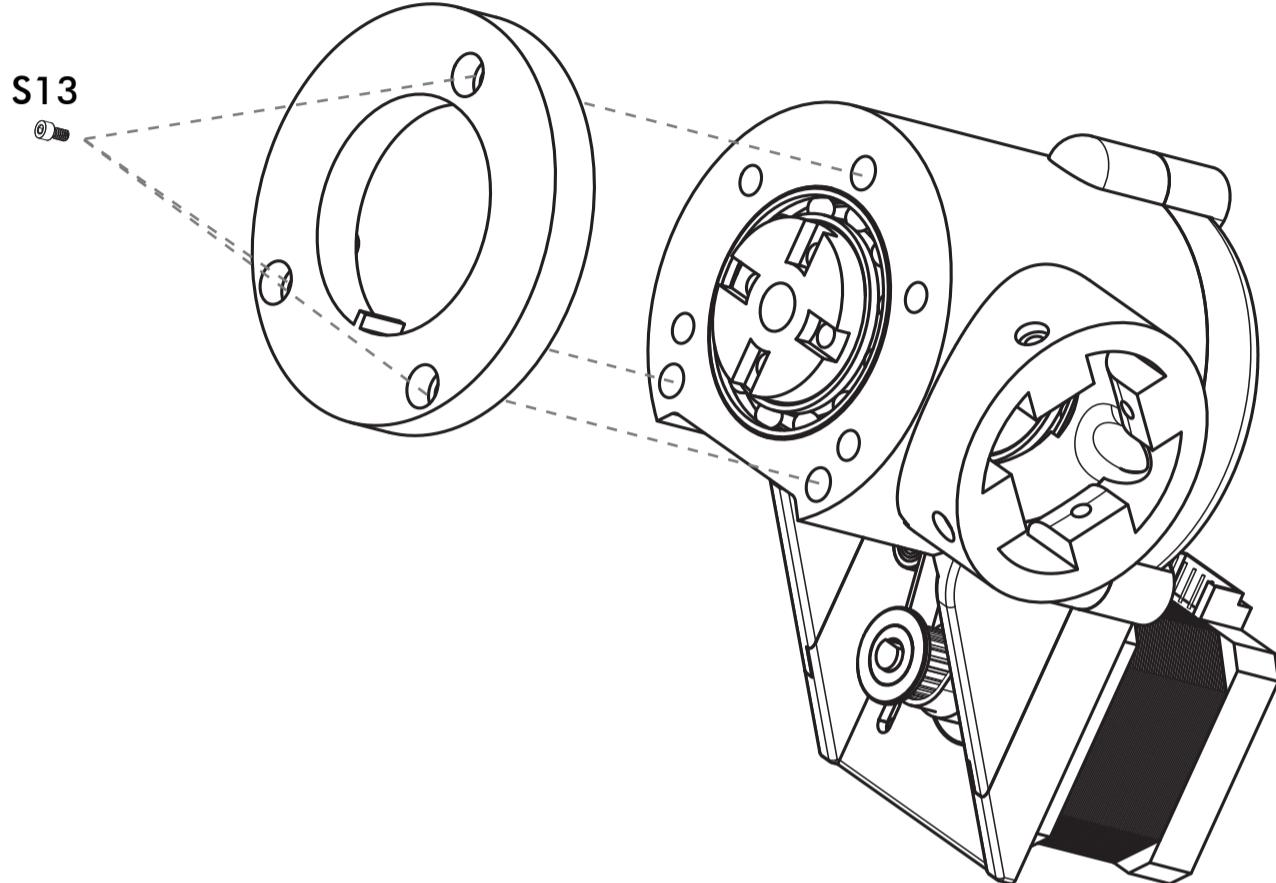
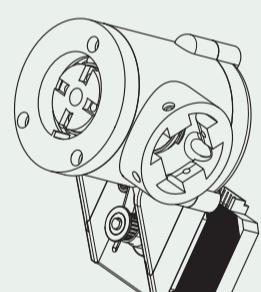
Bauschritt 8



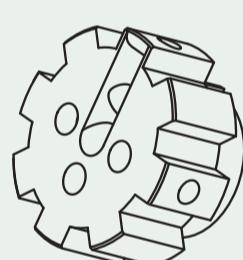
1x B27



3x S13

**10**

Bauschritt 9



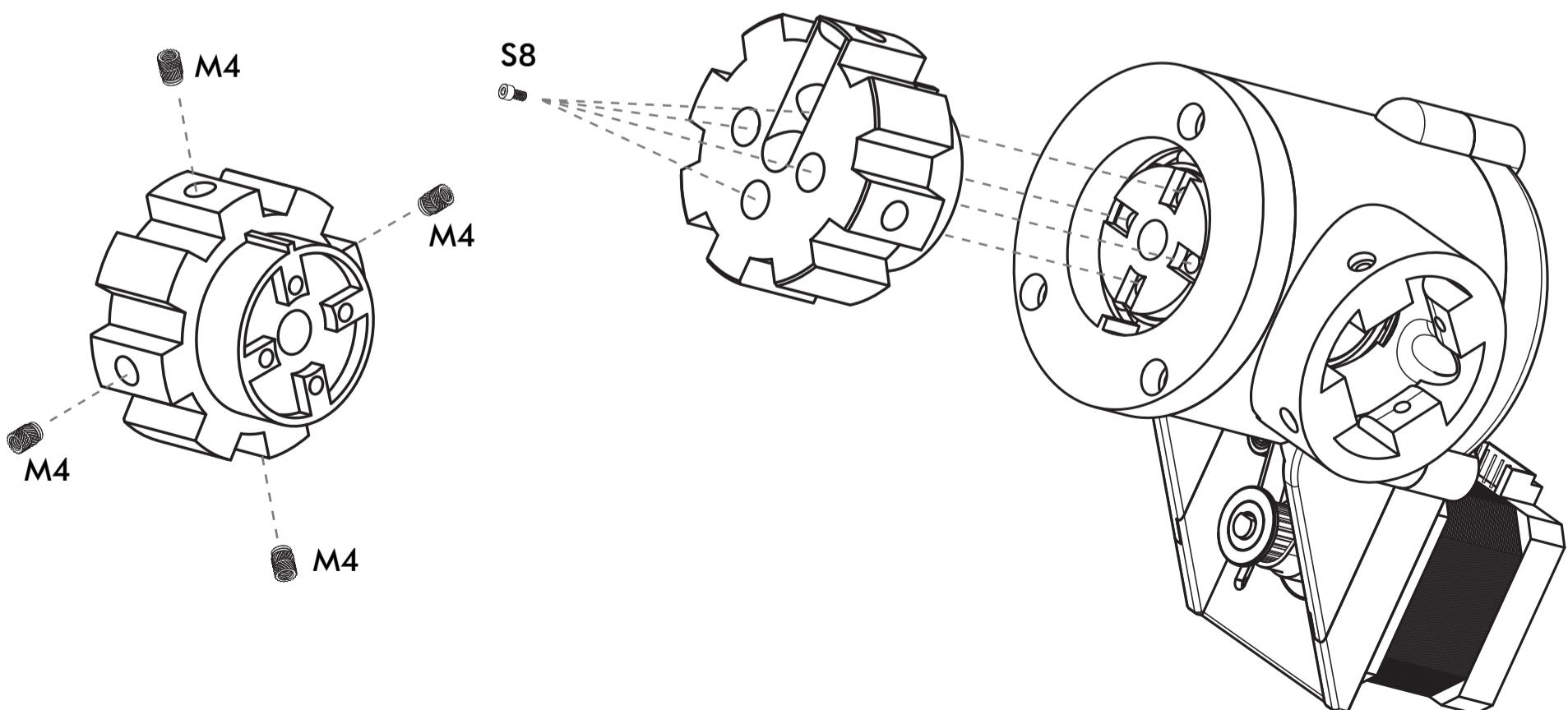
1x B28

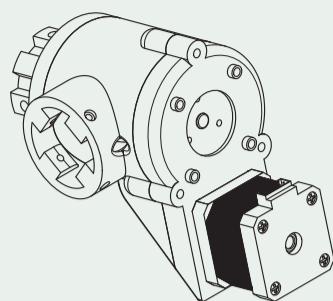


4x M4

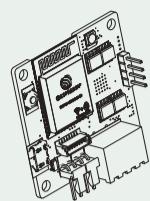


4x S8

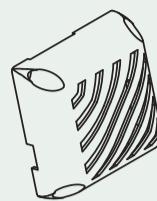


**11**

Bauschritt 10



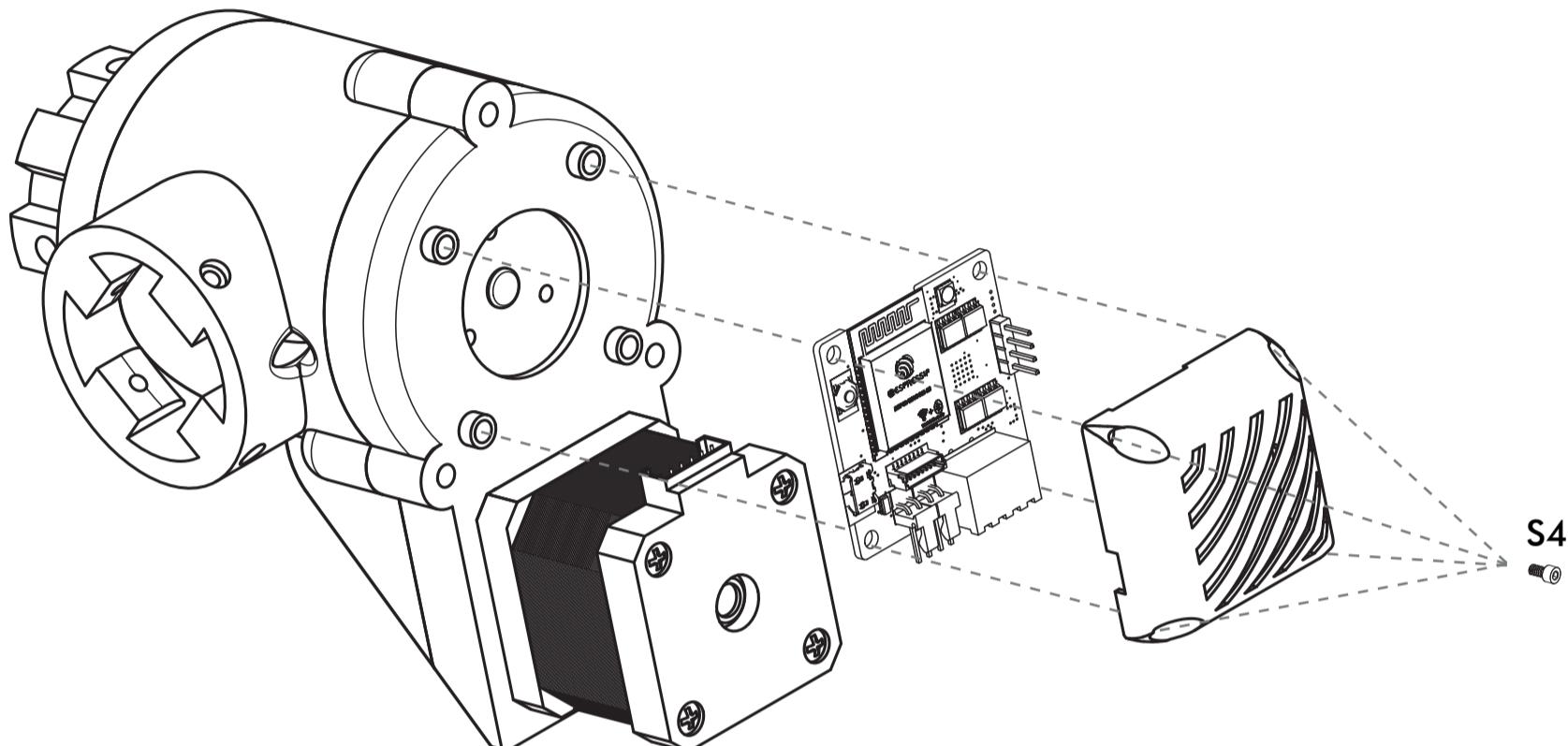
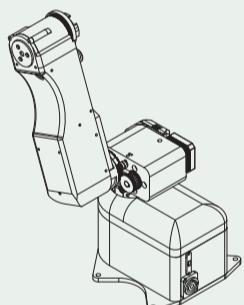
1x N20



1x B35



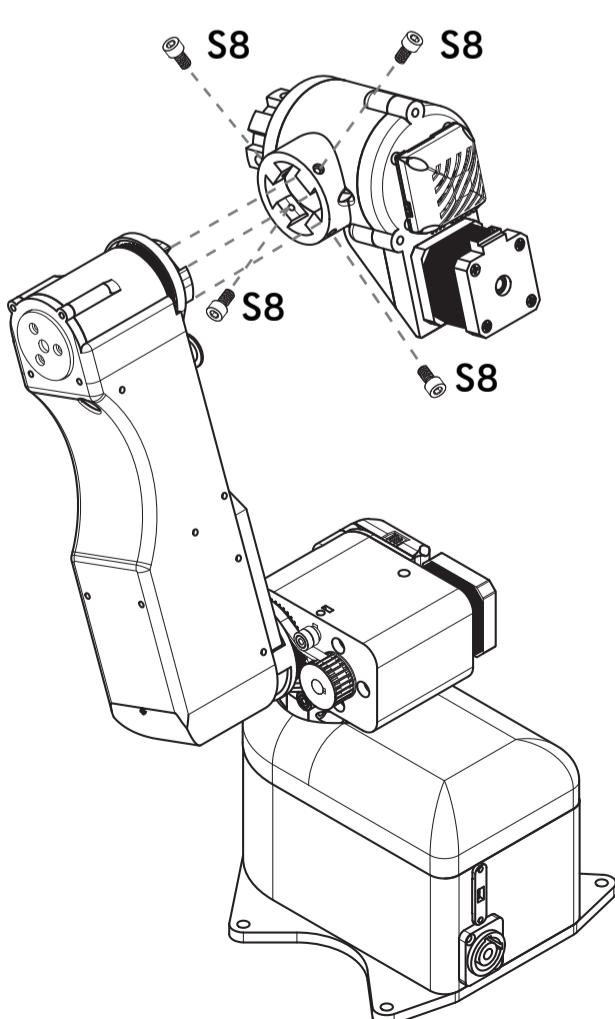
4x S4

**12**

Baugruppe I-III



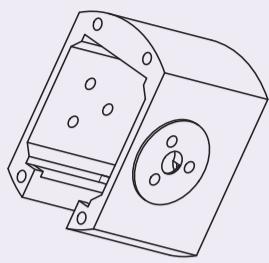
4x S8

**Hinweis**

Vor dem Zusammenfügen werden die Kabel der Baugruppe I-III ebenfalls durch die Aussparung in B23 geführt.

# Baugruppe V

1



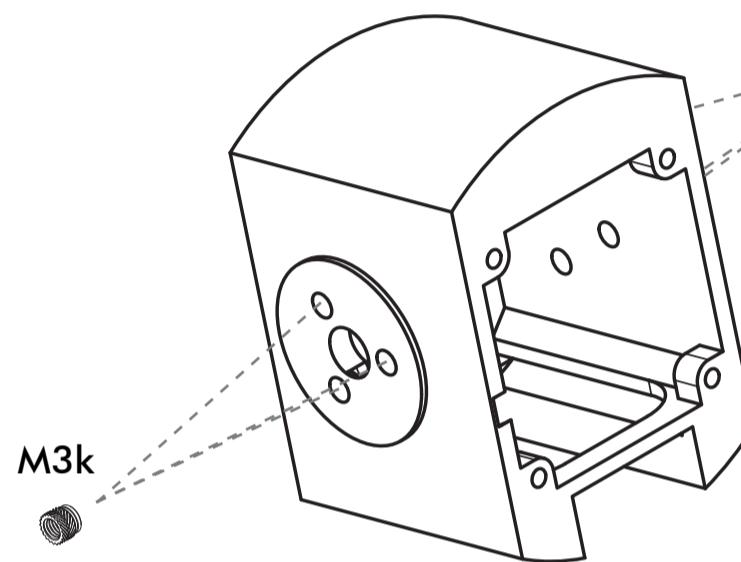
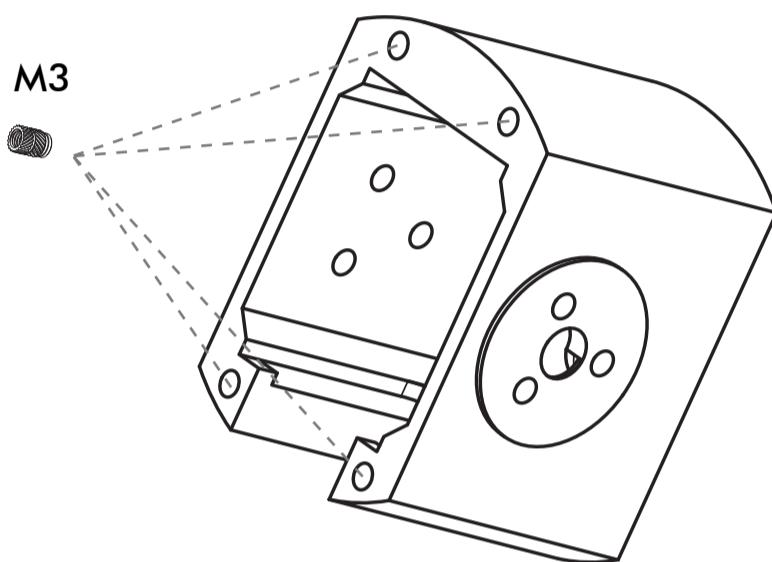
1x B33



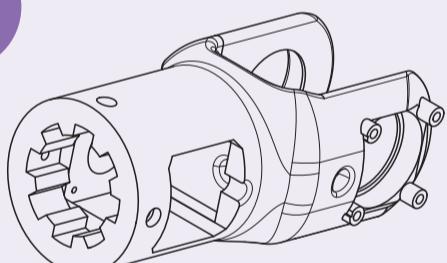
6x M3k



4x M3



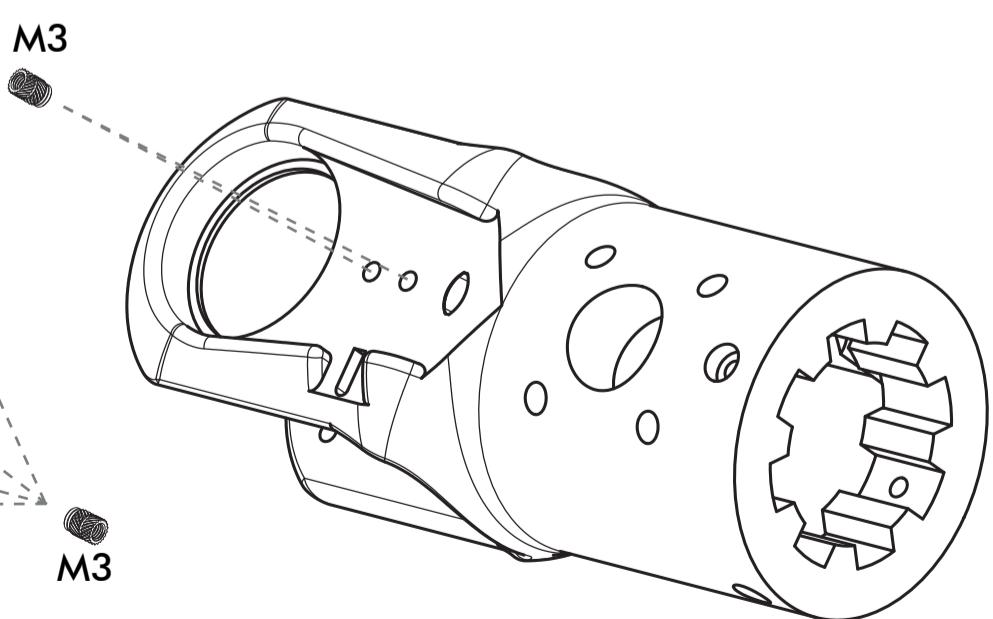
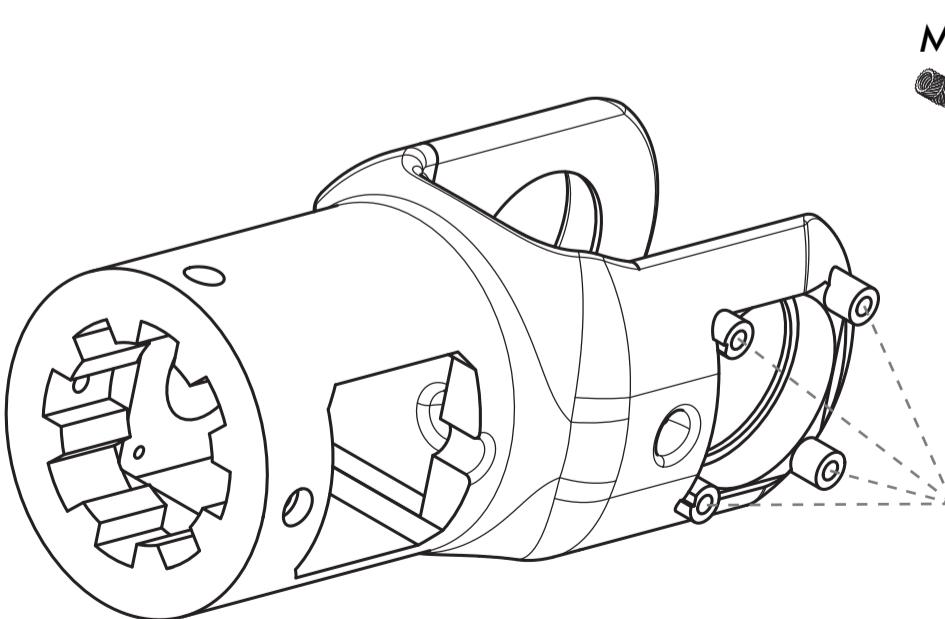
2



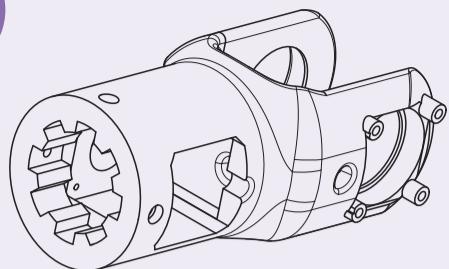
1x B29



6x M3



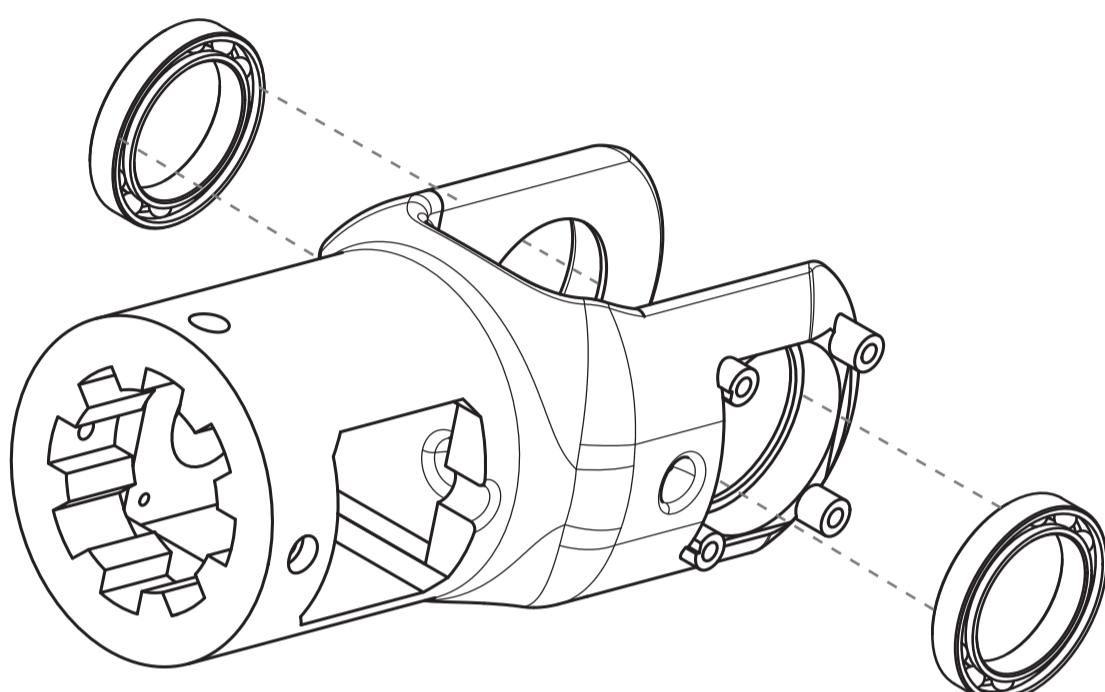
3



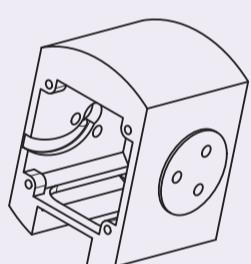
Bauschritt 2



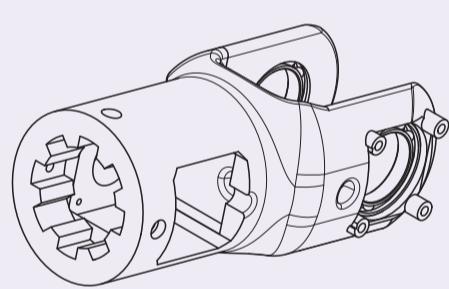
2x N12



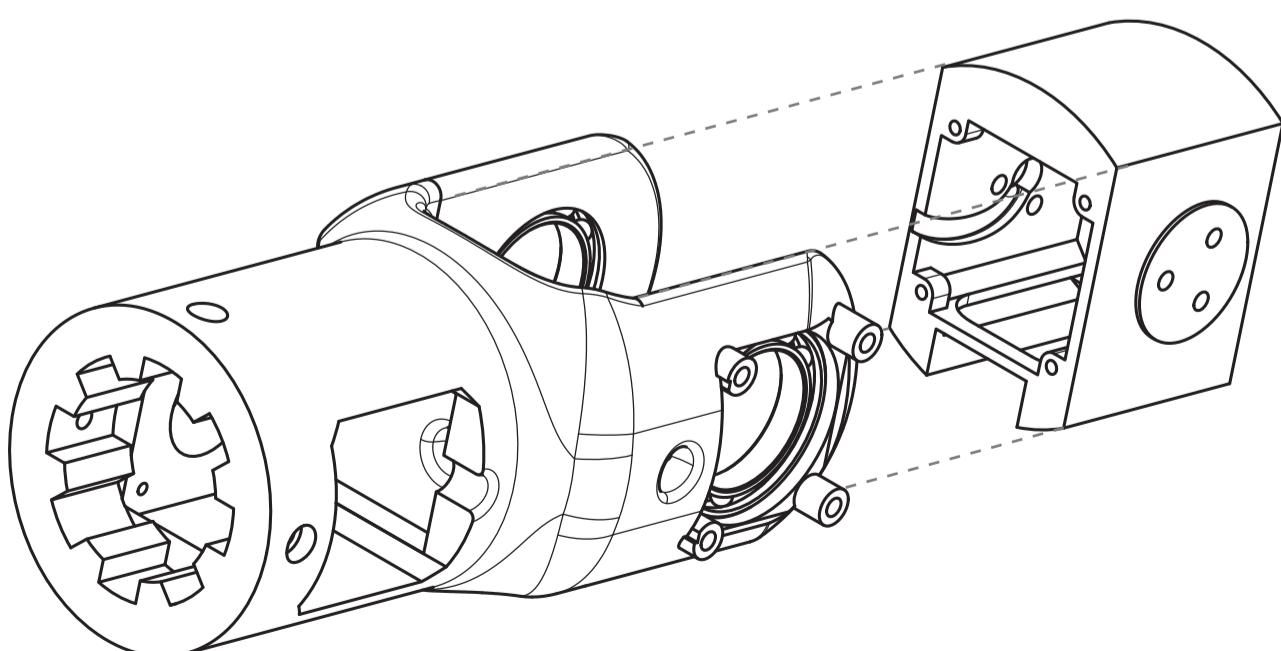
4



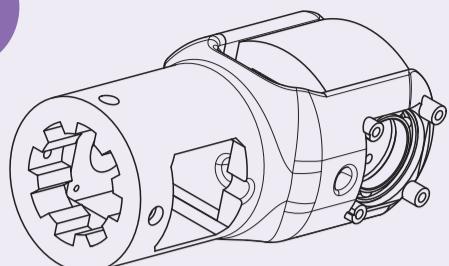
Bauschritt 1



Bauschritt 3



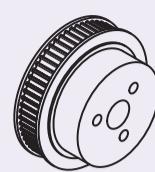
5



Bauschritt 4



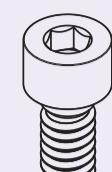
1x B30



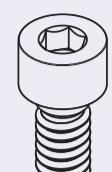
1x B31



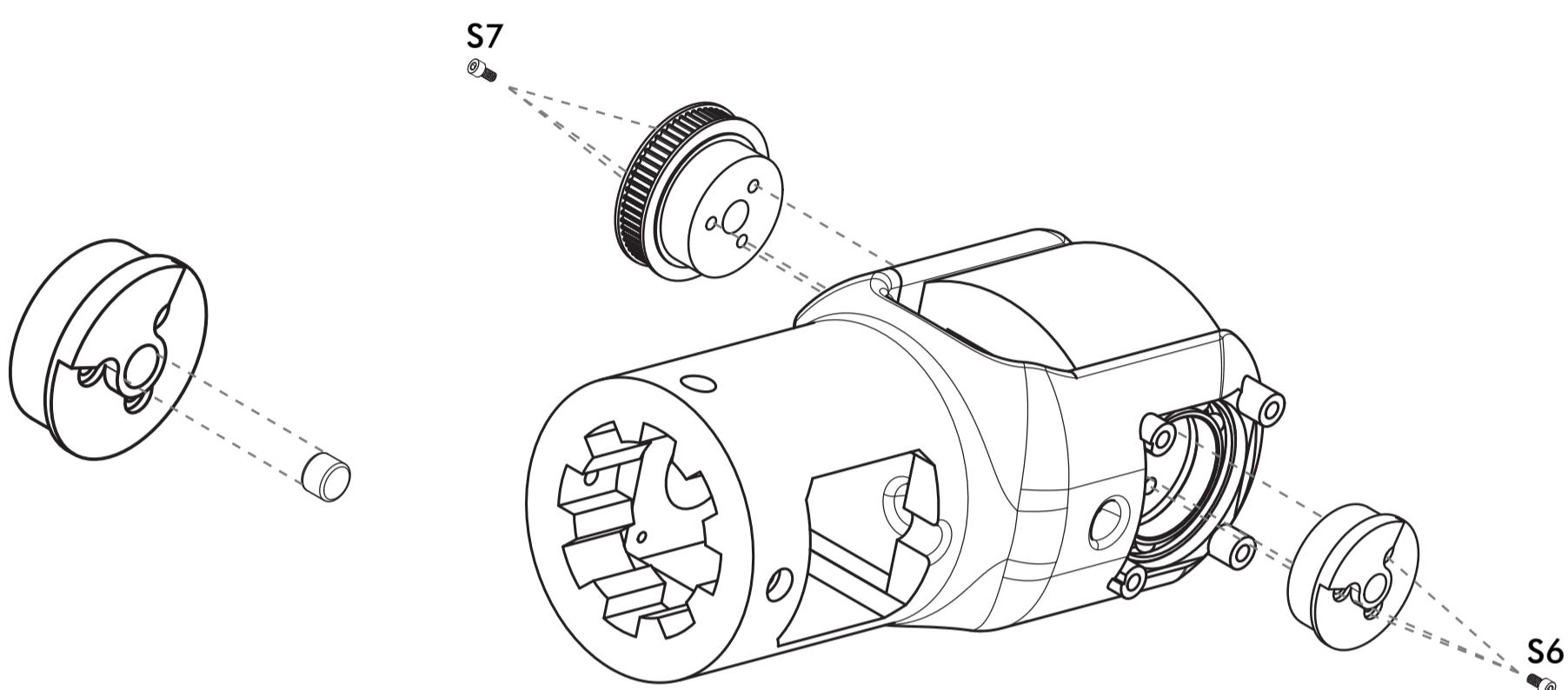
1x N19



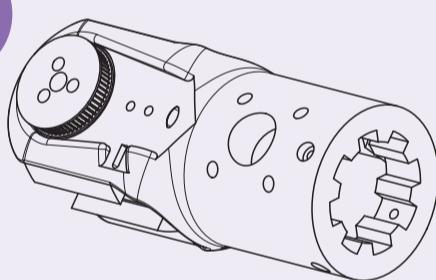
3x S6



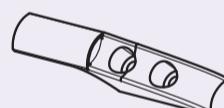
3x S7



6



Bauschritt 5

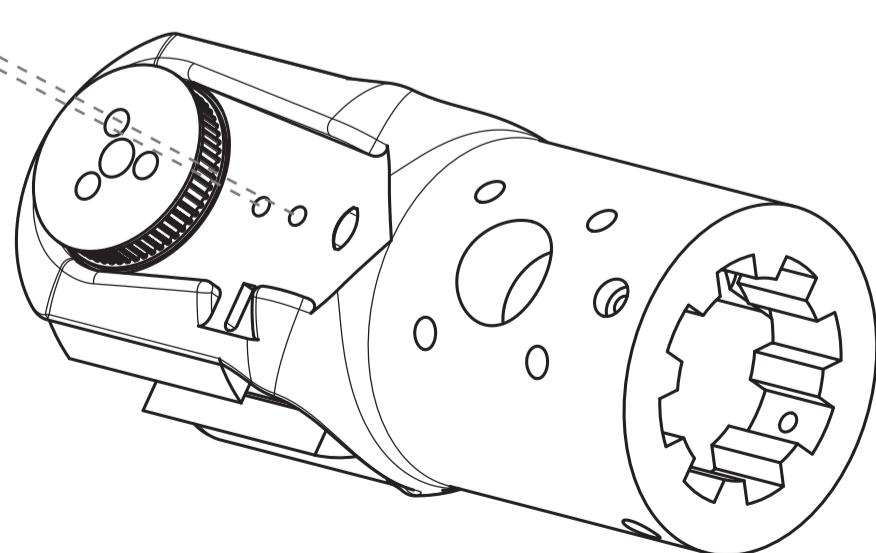
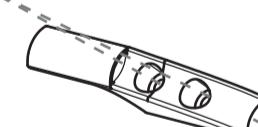


1x B32

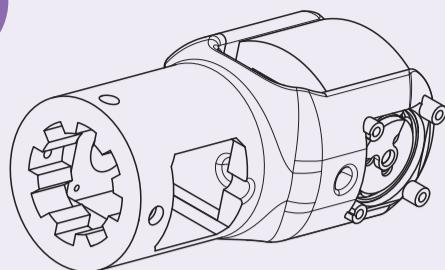


2x S5

S5



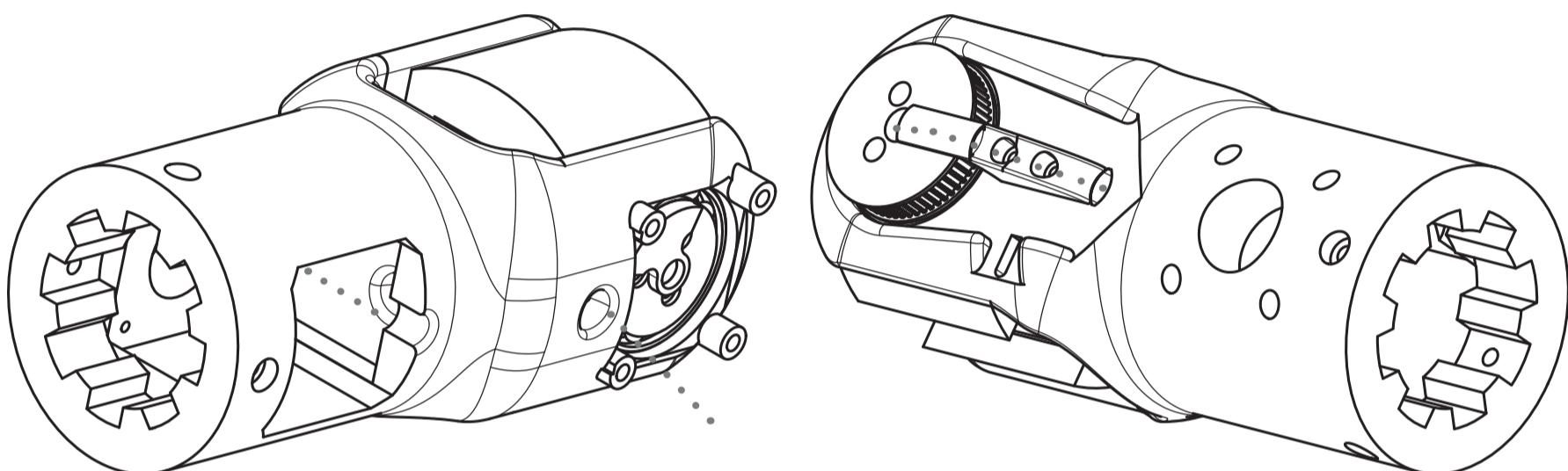
7



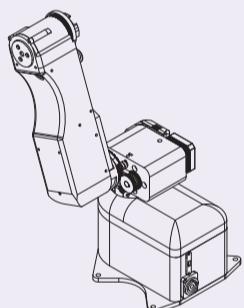
Bauschritt 6

**Hinweis**

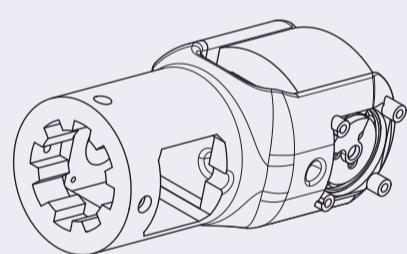
Die Kabel zwischen B29 und B33 mit ausreichender Länge auf dem gezeigten Pfad und durch die Bohrung in B31 nach Innen führen.



8



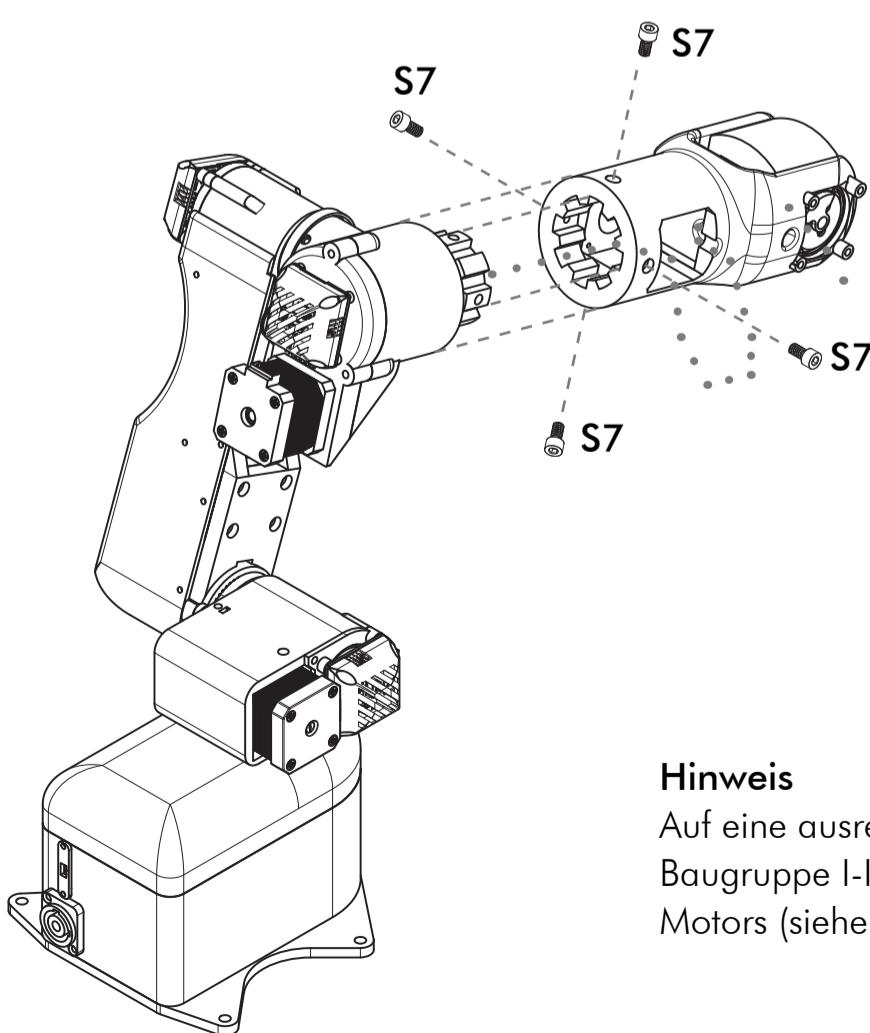
Baugruppe I-IV



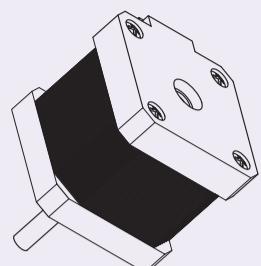
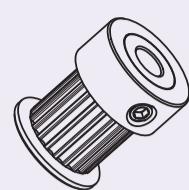
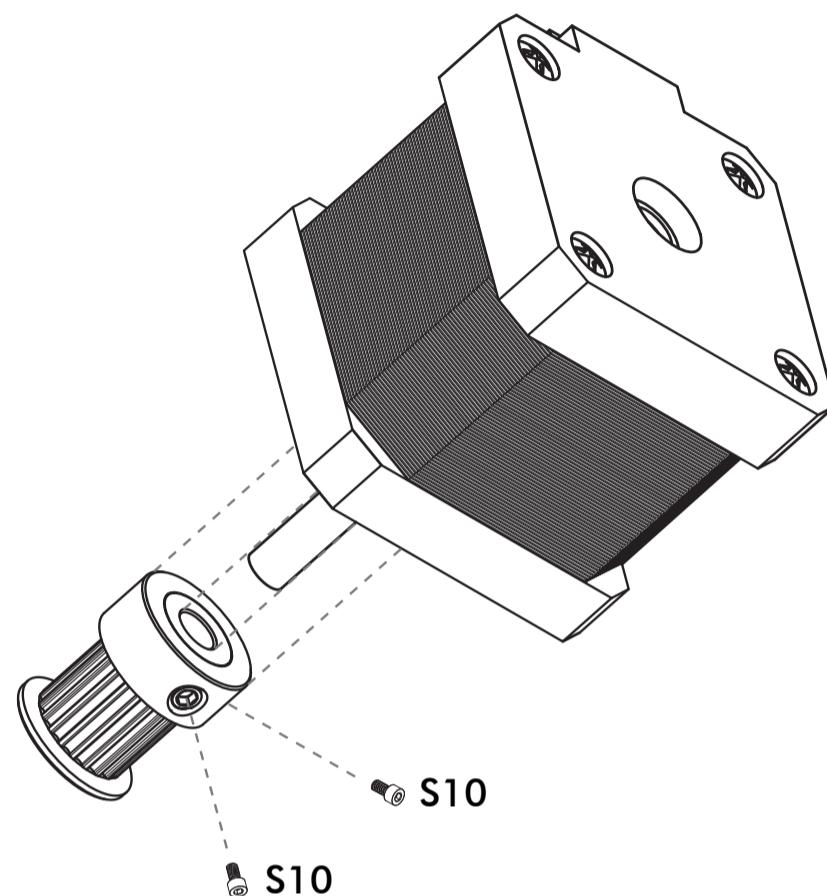
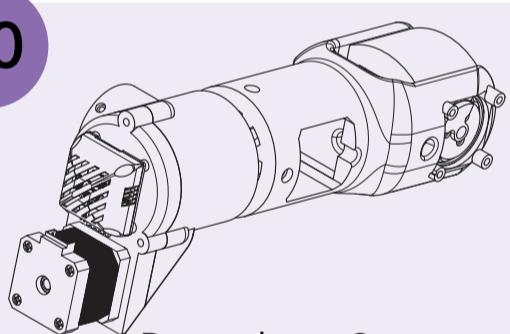
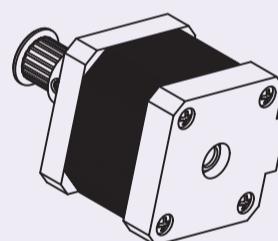
Bauschritt 7



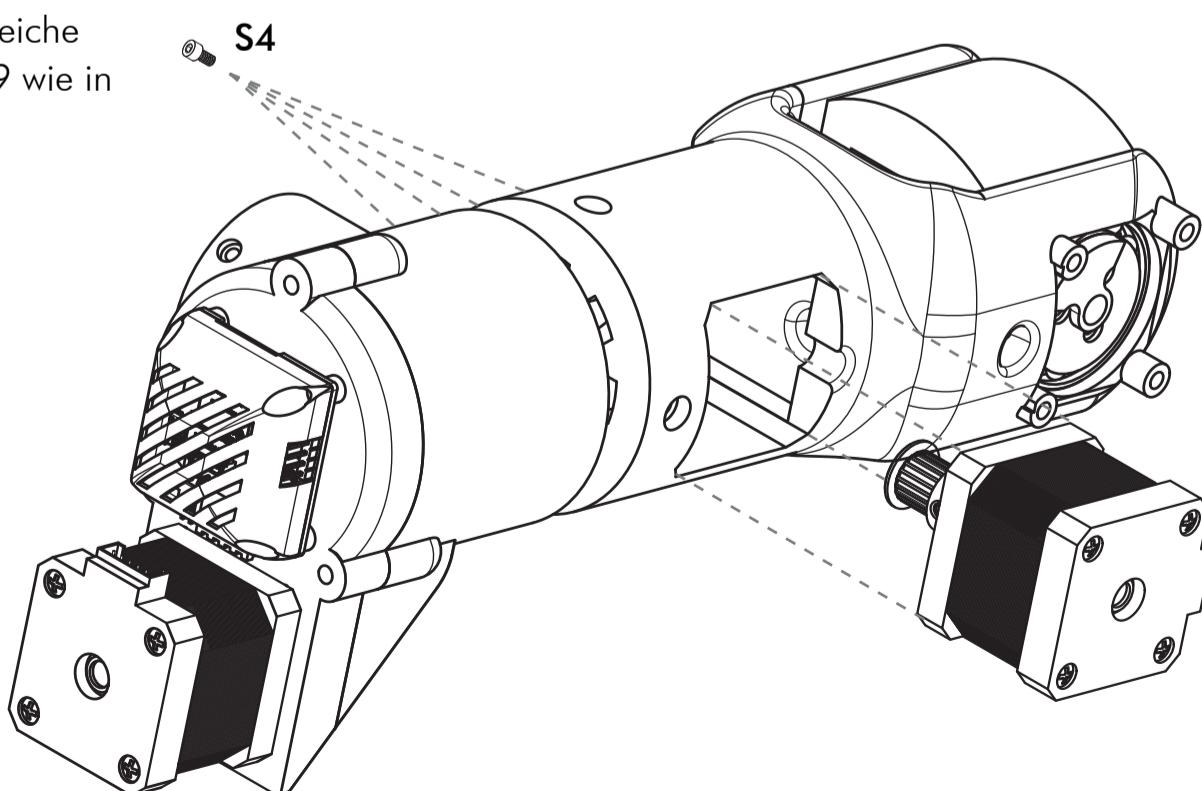
4x S7

**Hinweis**

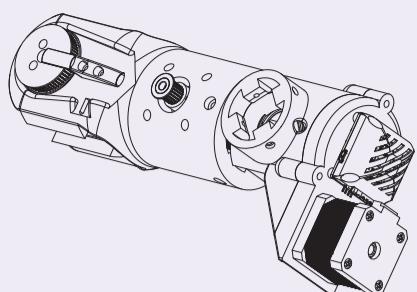
Auf eine ausreichende Länge der Kabel von Baugruppe I-IV achten, damit der Einbau des Motors (siehe Bauschritt 10) möglich ist.

**9**1x **N3**1x **N14**2x **S10****10**Bauschritt **8**Bauschritt **9**4x **S4****Hinweis**

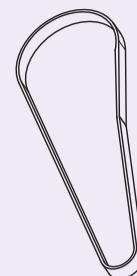
Die Kabel des Motors werden durch die gleiche Aussparung von B29 wie in Bauschritt 8 geführt.



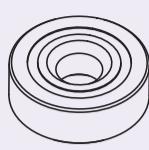
11



Bauschritt 10



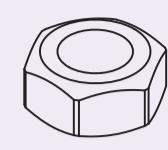
1x N8



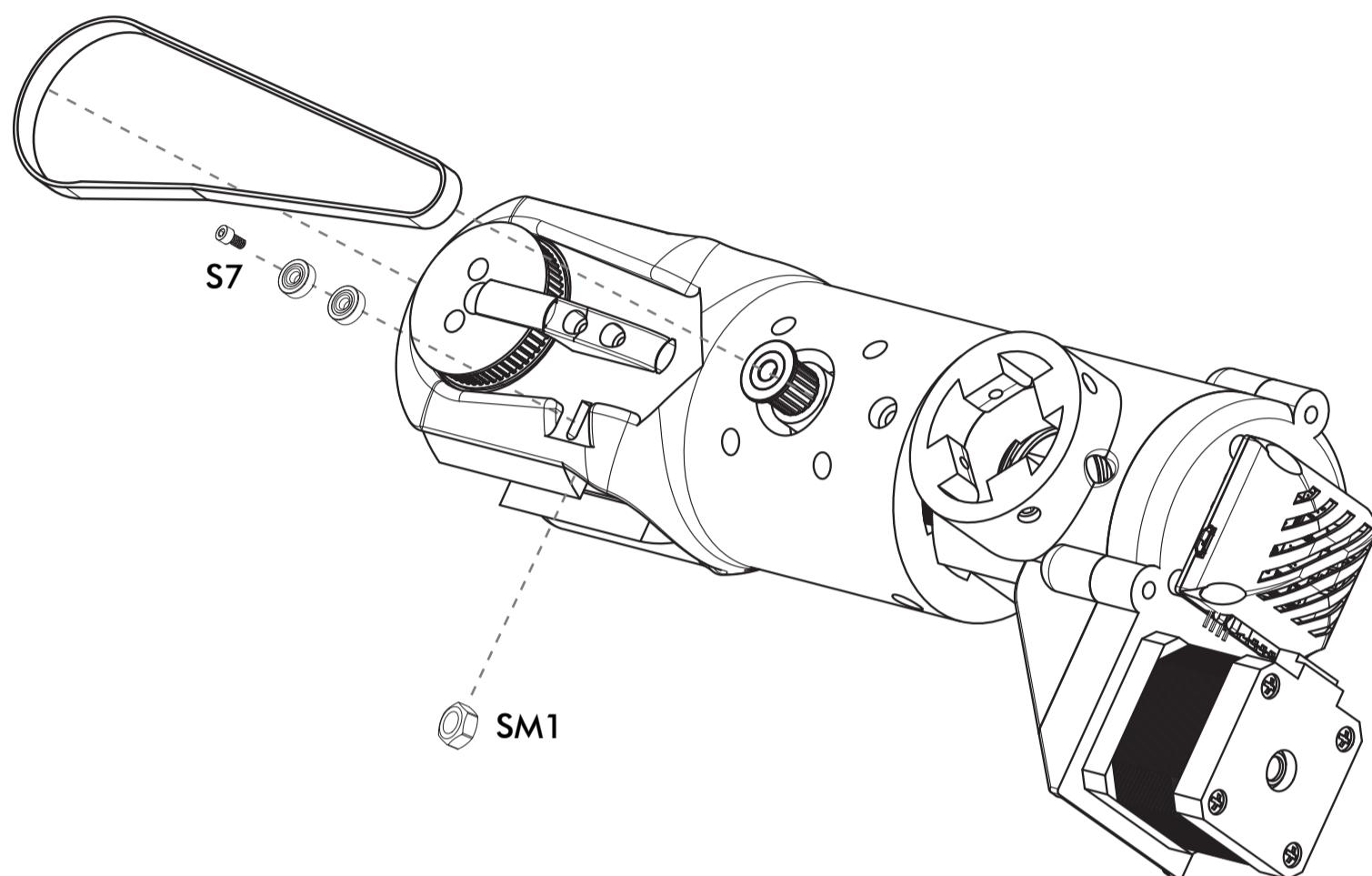
2x N10



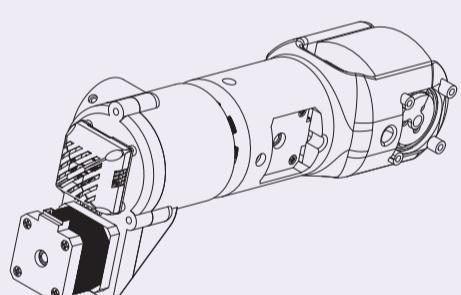
1x S7



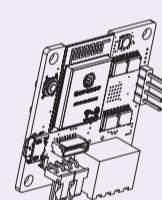
1x SM1



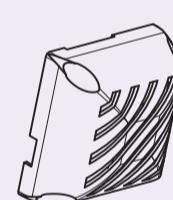
12



Bauschritt 11



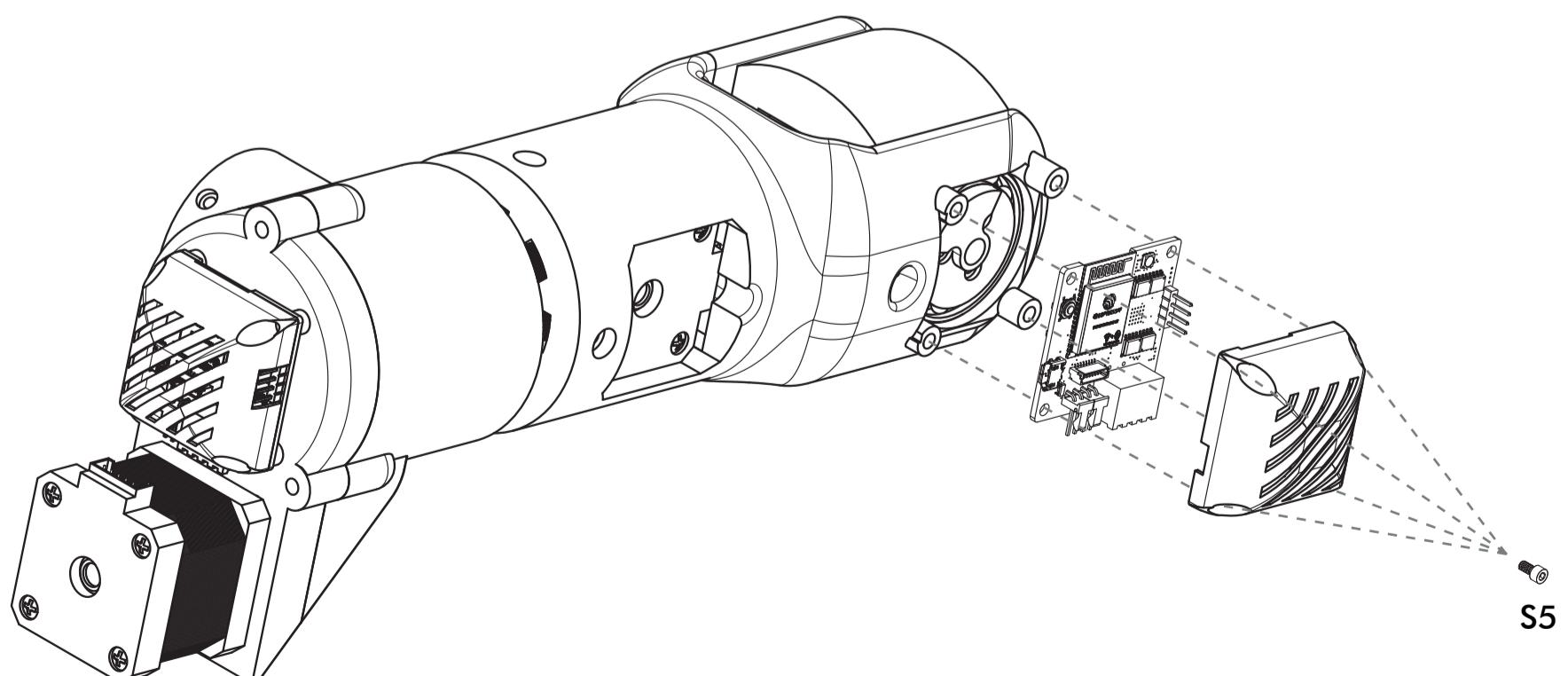
1x N20



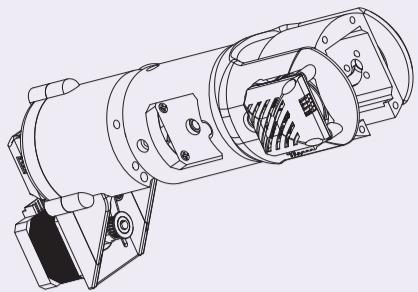
1x B35



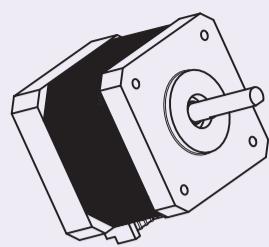
4x S5



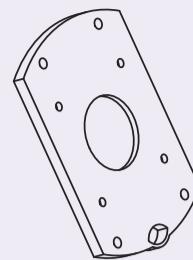
13



Bauschritt 12



1x N3



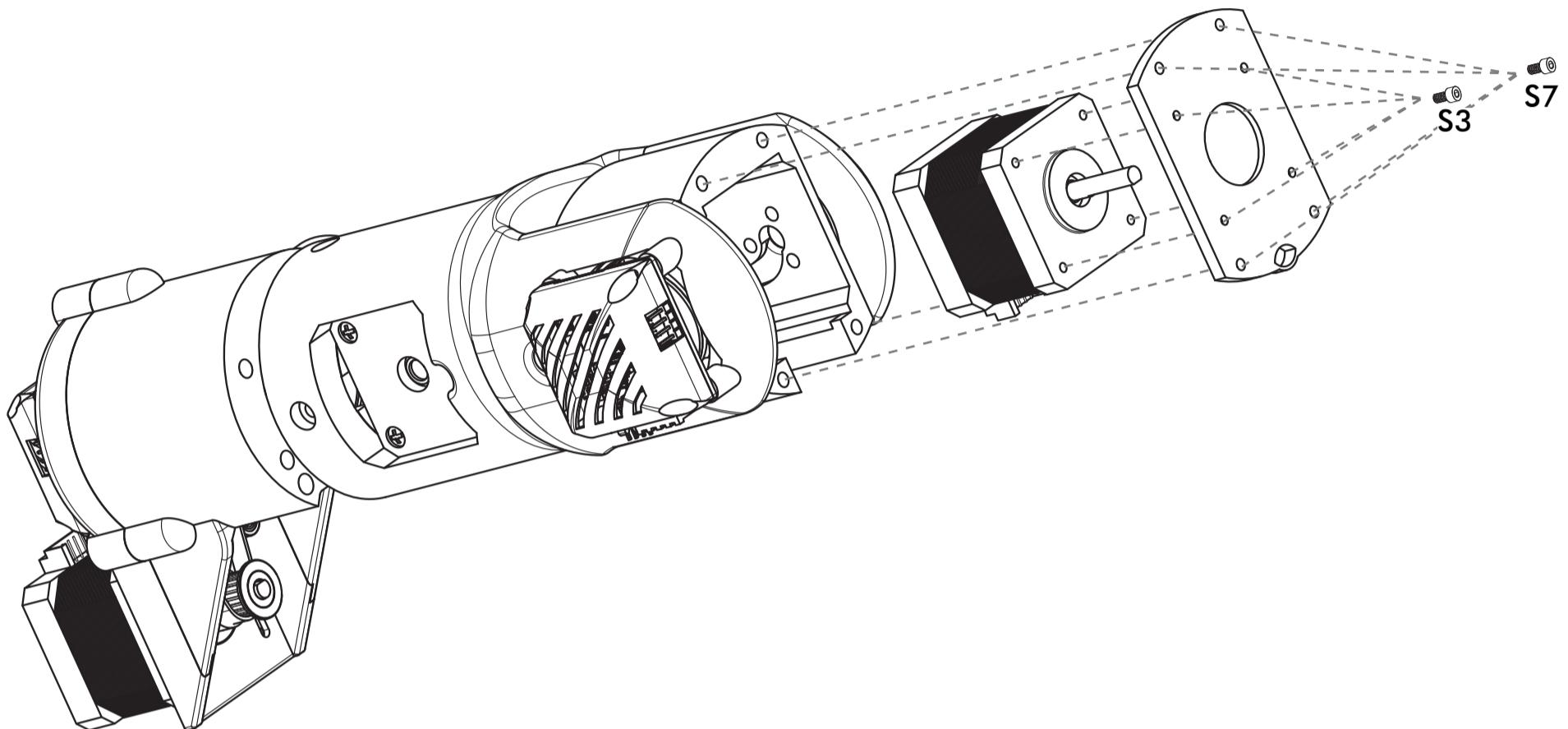
1x B34



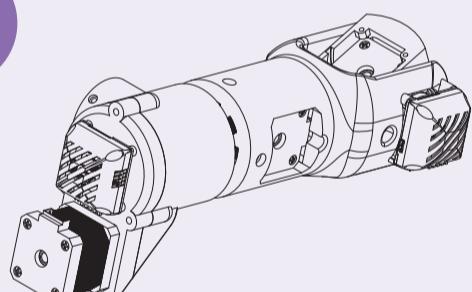
4x S7



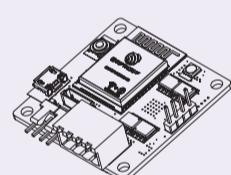
4x S3



14



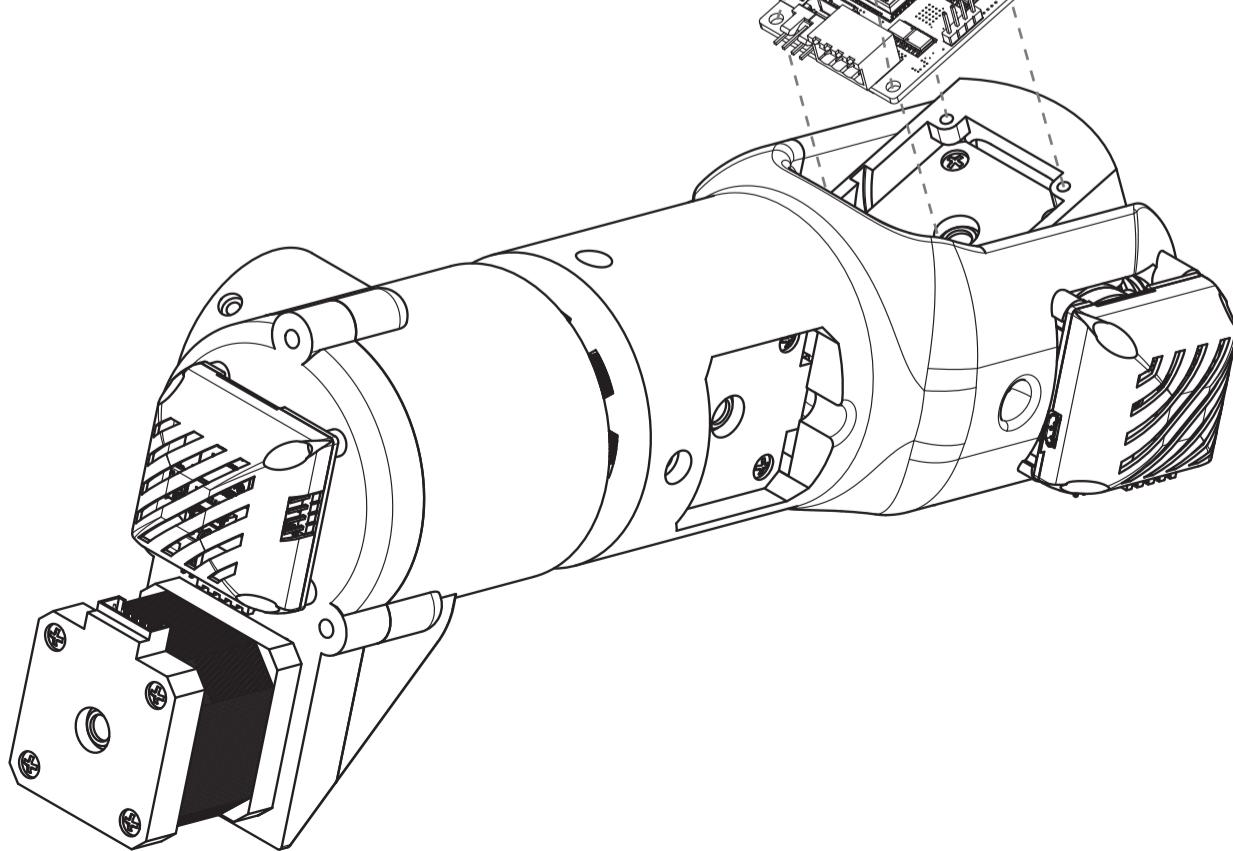
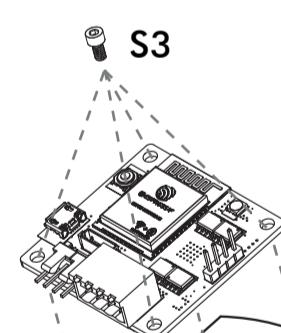
Bauschritt 13



1x N20



4x S3



# Fertig.

