# HYDRAULIC ROBOTARM

Assembly & Instruction

# Manual

**Montagehandleiding**

# Contents


Product Introduction ..... 1

Tools You May Need ..... 1

Mechanical Parts List ..... 2

Plastic Parts ..... 3

Mechanical Assembly

- Gripper Unit Assembly ..... 6
- Stand & Control Base Assemily ..... 7
- Main Body Assembly ..... 13
- How To Oil The Parts ..... 20
- H0~H5 Cylinder Assembly ..... 20
- I1 ~ I5 Cylinder Assembly ..... 26
- How To Cut The Tube ..... 35
- How To Fill Up The Cylinder With Water ..... 36
- How To Fit Tube ..... 37
- Hydraulic Cylinder Module Assembly ..... 37
- Lever Controller Assembly ..... 49
- Controller Module Assembly ..... 51
- Robot Arm Module Assembly ..... 66

How To Play ..... 76

Trouble Shooting ..... 86


# Inhoud


Inleiding.....1

Benodigde gereedschappen..... 1

Mechanische onderdelen..... 2

Plastic onderdelen.....3

Montage

- Montage grijper..... 6
- Montage voet & besturingseenheid.....7
- Montage hoofdeenheid.....13
- Hoe de onderdelen oliën.....20
- Montage HO-H5-cilinder..... 20
- Montage I1-I5-cilinder..... 26
- Hoe de slang knippen..... 35
- Hoe de cilinder met water vullen.....36
- Hoe de slang bevestigen..... 37
- Montage hydraulische cilinder..... 37
- Montage hendel..... 49
- Besturingsmodule..... 51
- Robotarm.....66

Hoe spelen.....76

Problemen en oplossingen.....86

# HYDRAULIC ROBOT ARM

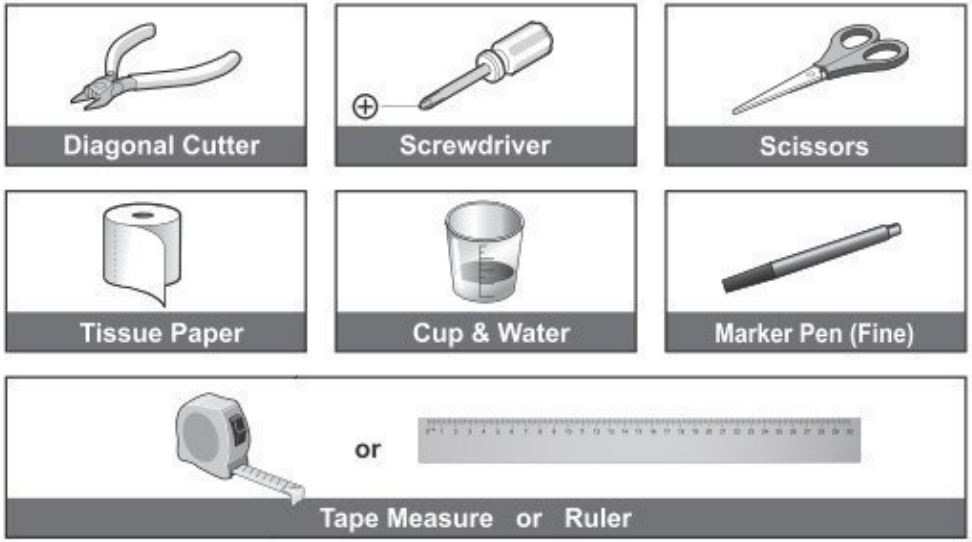
## Product Introduction

This Robot Arm has made a little more interesting and hydro-mechanically fun.

With Hydraulic Arm Edge, command six axes of varied movements: the gripper to open and close up to 1.89 inches, wrist rotation of 180 degrees, wrist mobility of 98 degrees, elbow range of 44 degrees, base rotation of 270 degrees, and shoulder motion of 45 degrees. With a vertical reach of 16.35 inches, horizontal reach of 12.42 inches, and lifting capacity of 50g, your robotic friend is ready for your genius to erupt. With the removal of the gripper, you can activate the suction apparatus. This feature enables the user to elevate objects with a larger surface area (like a small mobile phone). Another prodigious attribution is a braking system that is integrated in the lever controllers to execute all commands accurately. WOW!

How does Hydraulic Robot Arm equate to fun? Children will have total command and visual manipulation using the science principles of a Hydraulic system and its application. Easy to follow instructions with detailed graphic illustrations pave the way for successful and satisfying kit building of 229 pieces. Compliment your engineering, math, science, and technology learning strategy. No battery or motor required. It is powered by water; thus, the "Hydraulic" significance and how it manipulates axes movement via lever controllers. Hydraulic Robot Arm is recommended for ages 10 and up, but with its 229 assembly parts, it will challenge the beginner engineering enthusiasts.

## Tools You May Need






## Inleiding

Deze robotarm maakt hydromechanica leuk en interessant.

De hydraulische arm stuurt 6 assen met verschillende bewegingen aan: grijper opening: max. 4.8 cm (1.89"), rotatie van de pols: 180°, beweeglijkheid van de pols: 98°, bereik van de elleboog: 44°, rotatie van de basis: 270° en beweging van de schouder: 45°. verticaal bereik:

41.5 cm (16.35"), horizontaal bereik: 31.5 cm (12.42") en hijsvermogen: 50 g. Wanneer u de grijper verwijdert, kunt u de zuignap activeren. Met deze functie kunt u voorwerpen met een groter oppervlak hijsen (bv. kleine smartphone). Bovendien is een remsysteem ingebouwd in de hendels om alle bedieningen heel nauwkeurig uit te voeren. WAUW!

Kinderen leren de beginselen van hydraulische systemen en hun toepassingen. Eenvoudige instructies met gedetailleerde illustraties maken het bouwen gemakkelijk (229 onderdelen in totaal). Verbeter uw vaardigheden in techniek, wiskunde, wetenschap of technologie. Geen batterij of motor nodig: de robotarm wordt volledig aangedreven door water (hydraulisch). De hydraulische arm is geschikt voor kinderen vanaf 10 jaar, maar de set met 229 onderdelen is ook geschikt voor de beginnende techniekliefhebbers.

## Benodigdheden

| | | |
|---|---|---|
| Zijkniptang | Schroevendraaier | Schaar |
| Keukenrol | Beker & water | Markeerstift (fijn) |
| Rolmaat of liniaal | | |

## Mechanical Parts List

! Product contains functional edges and sharp points.

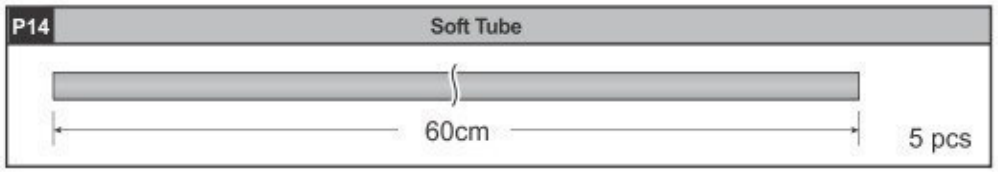
| | | |
|---|---|---|
| P1 | Tapping Screw(Short) | 9 pcs |
| P2 | Tapping Screw(Long) | 28 pcs |
| P3 | Iron Bar (Short) | 1 pc |
| P4 | Iron Bar (Long) | 1 pc |
| P5 | Brake Pad | 10 pcs |
| P6 | Cap (Small) | 5 pcs |
| P7 | Cap (Big) | 6 pcs |
| P8 | Suction Cup | 1 pc |
| P9 | Sponge | 1 pc |
| P10 | Spring(Smallest) | 5 pcs |
| P11 | Spring(Short) | 1 pc |
| P12 | Spring(Medium) | 1 pc |
| P13 | Spring(Long) | 1 pc |

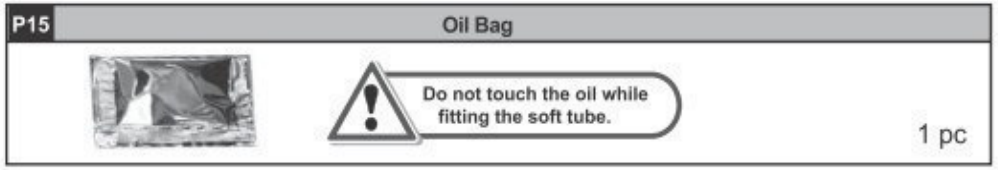


## Mechanische onderdelen

Product bevat functionele scherpe hoeken en punten.

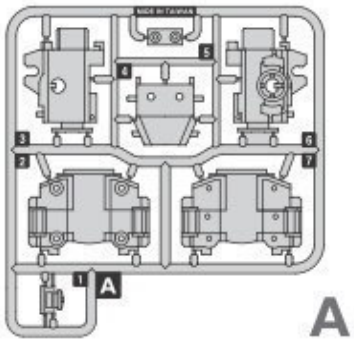
| | |
|---|---|
| P1 | Zelftappende schroef (kort) |
| P2 | Zelftappende schroef (lang) |
| P3 | Metalen staaf (kort) |
| P4 | Metalen staaf (lang) |
| P5 | Remblokje |
| P6 | Kapje (klein) |
| P7 | Kapje (groot) |
| P8 | Zuignap |
| P9 | Spons |
| P10 | Veer (klein) |
| P11 | Veer (kort) |
| P12 | Veer (medium) |
| P13 | Veer (lang) |

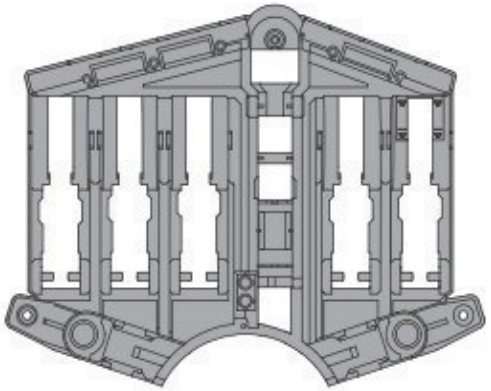


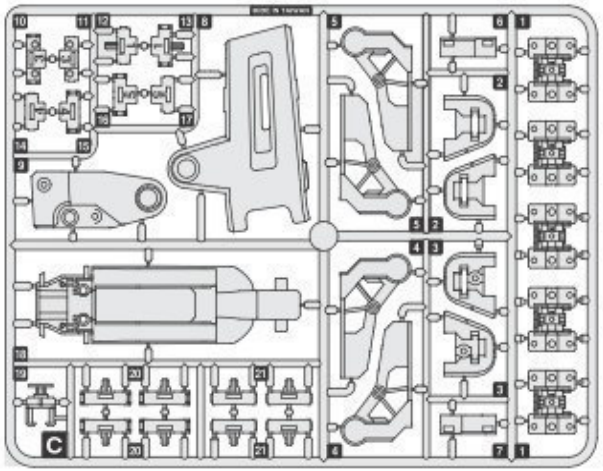




## Plastic Parts

Cut the plastic parts when they are required.
Do not cut them in advance.



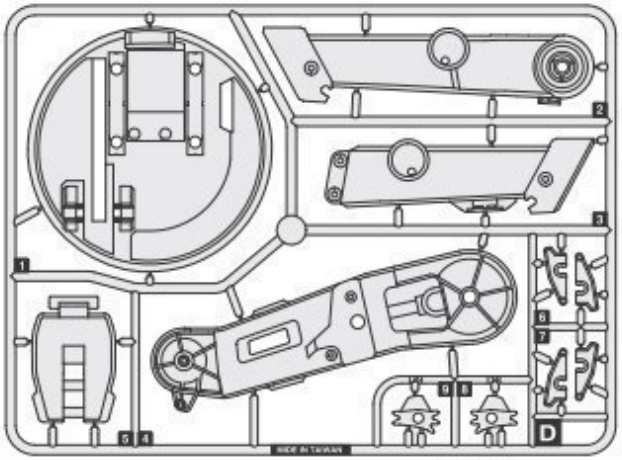


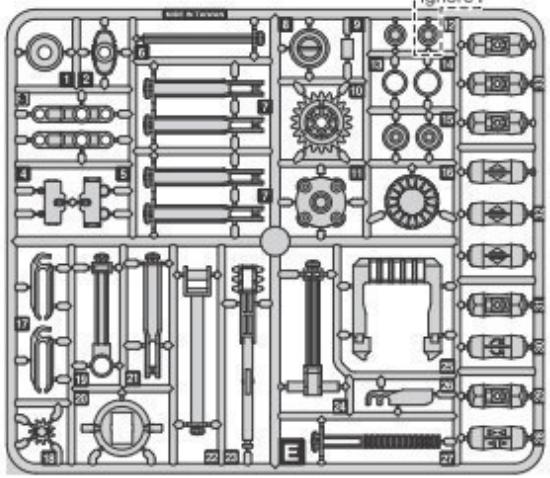

P14 Flexibele slang
P15 Zakje olie

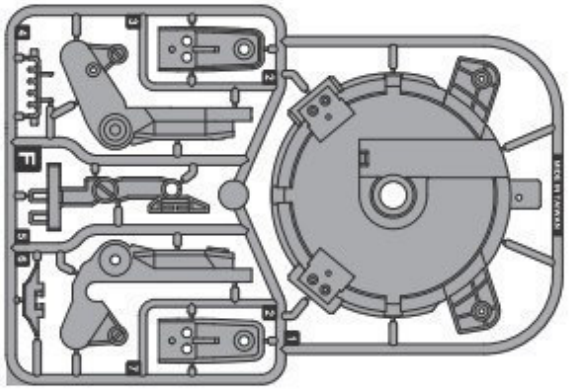
Raak de olie niet aan tijdens het monteren van de flexibele slang.

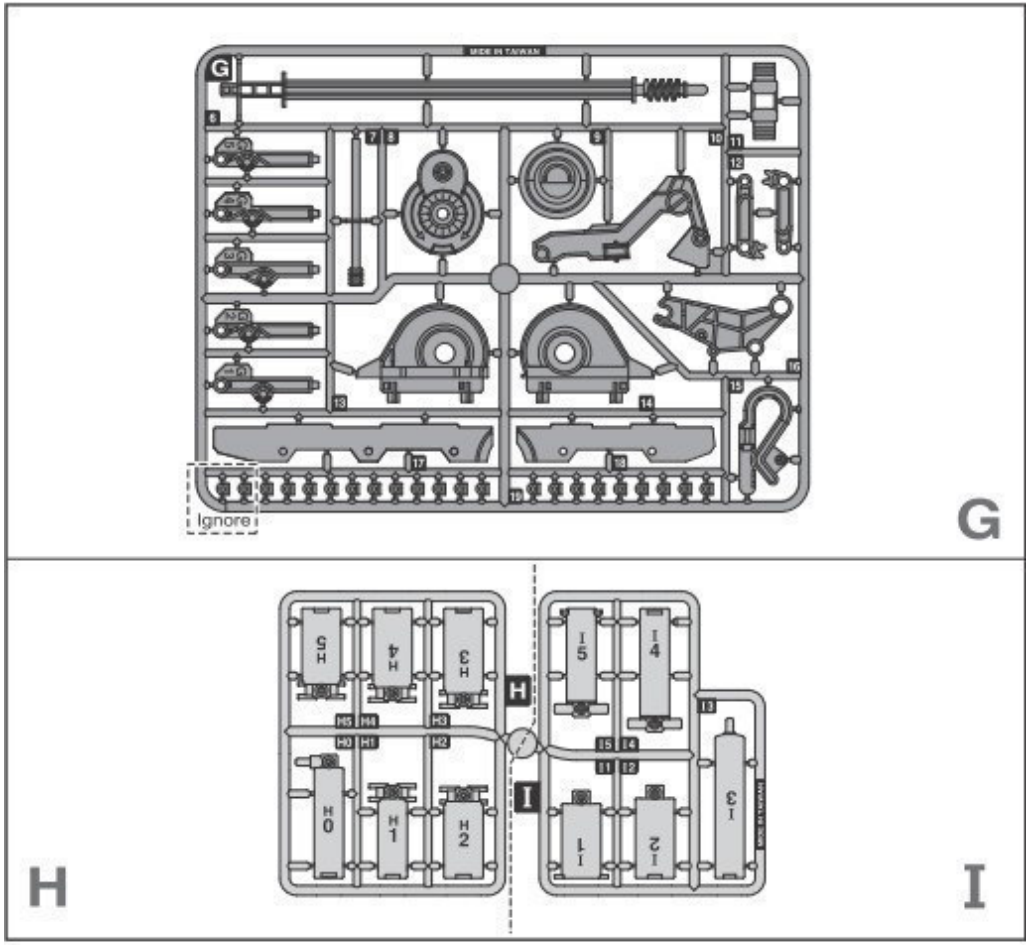
## Plastic onderdelen

Knip de plastic onderdelen pas uit op het moment dat u ze nodig hebt.
Knip de onderdelen niet uit op voorhand uit.

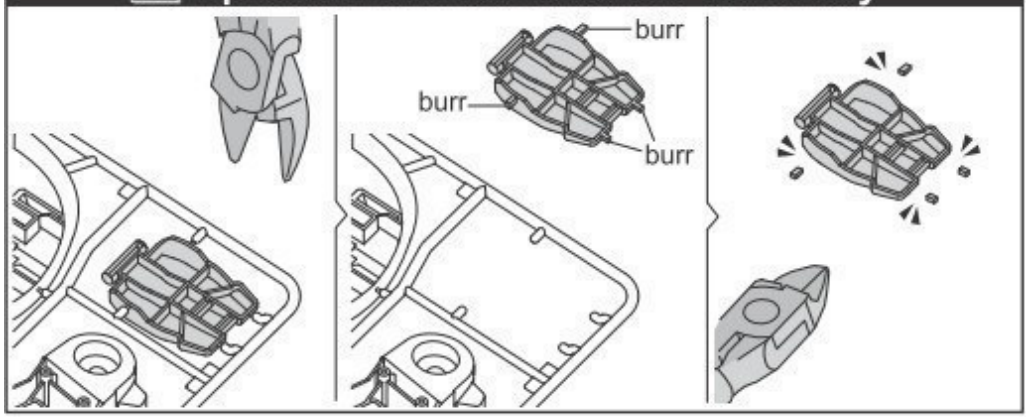

D


Ignore
E


F

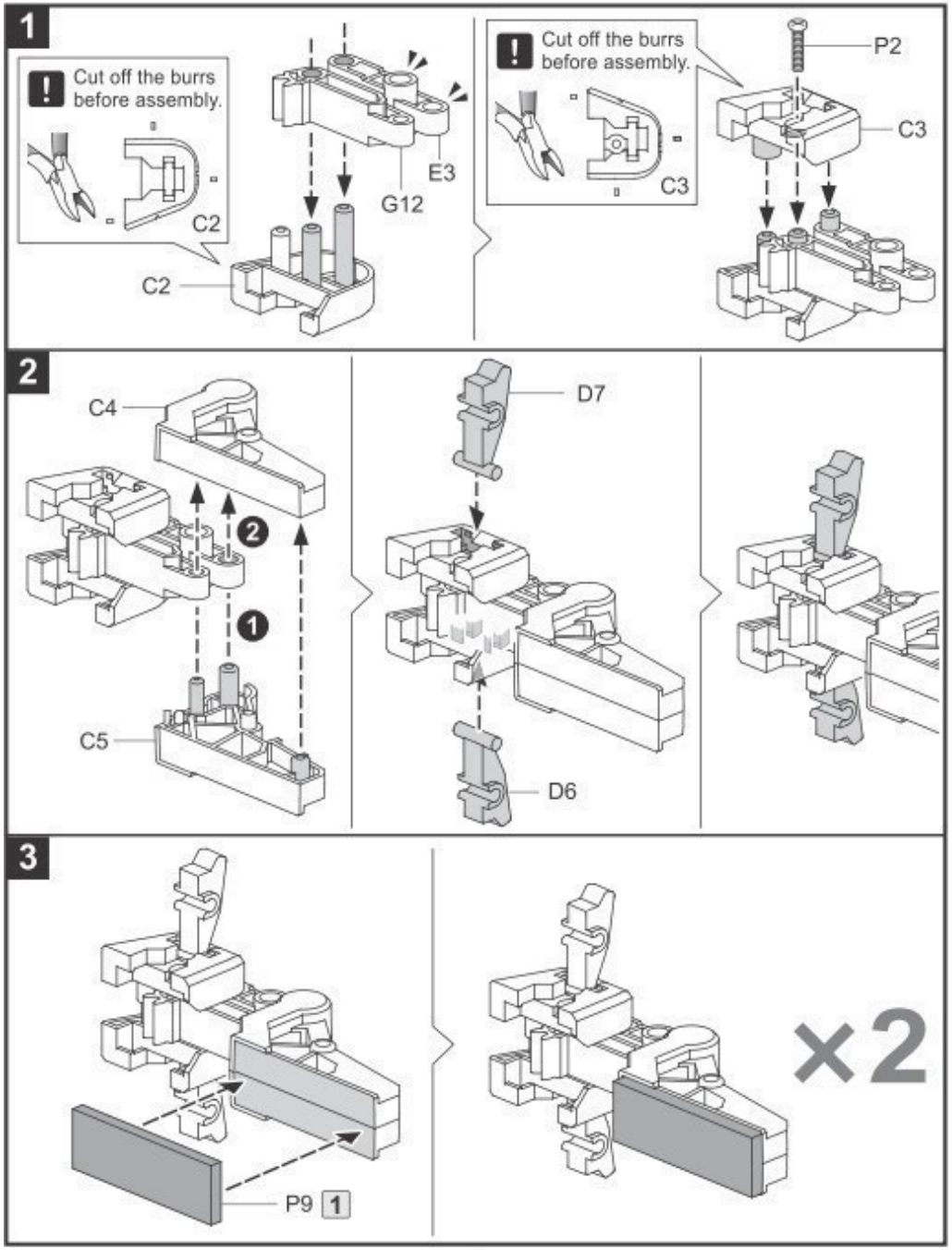



## Tip:cut off the burrs before assembly




## Tip: knip de bramen af voor de montage

## Gripper Unit Assembly

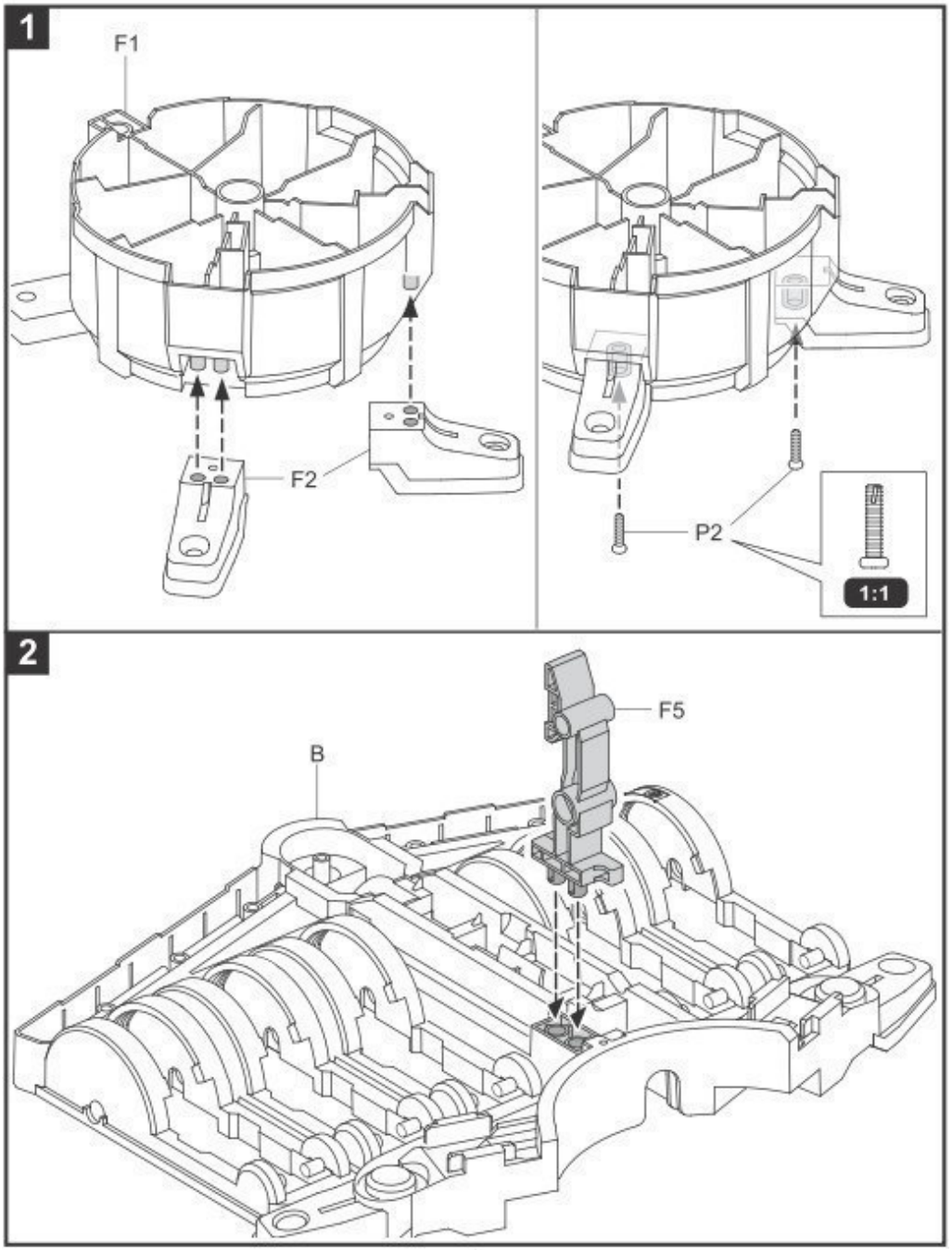




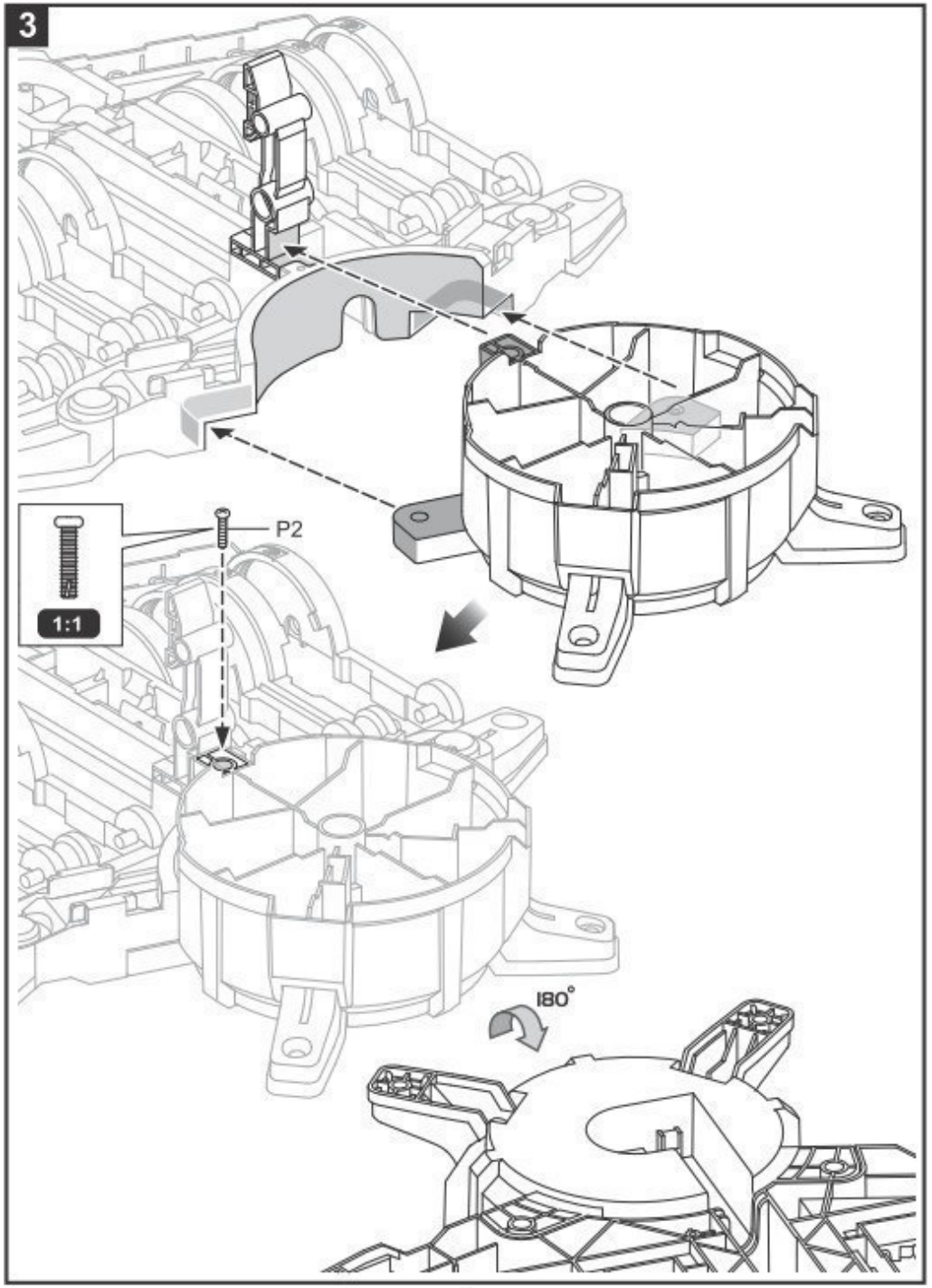

## Montage grijper

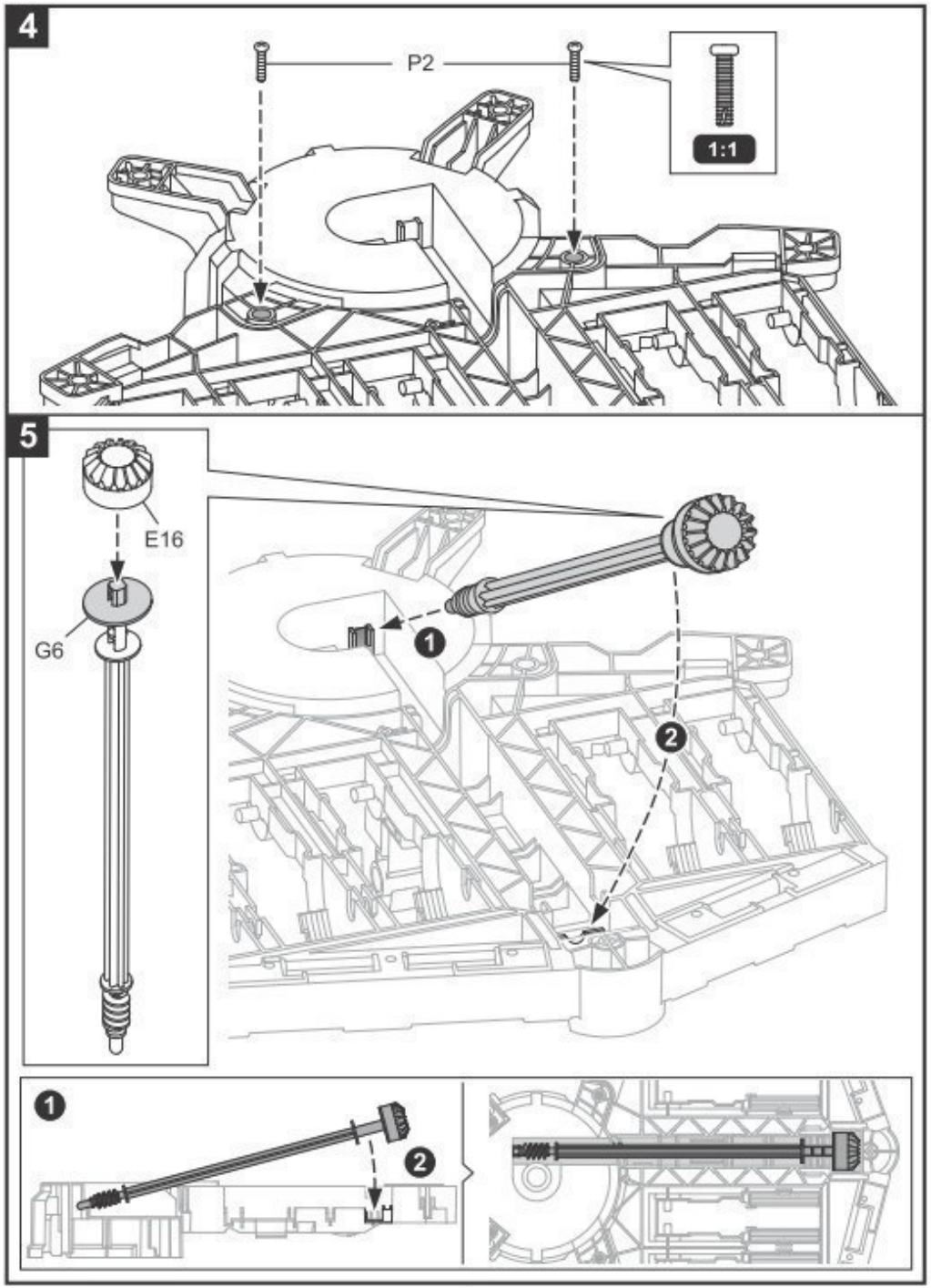
Knip de bramen af voor de montage.

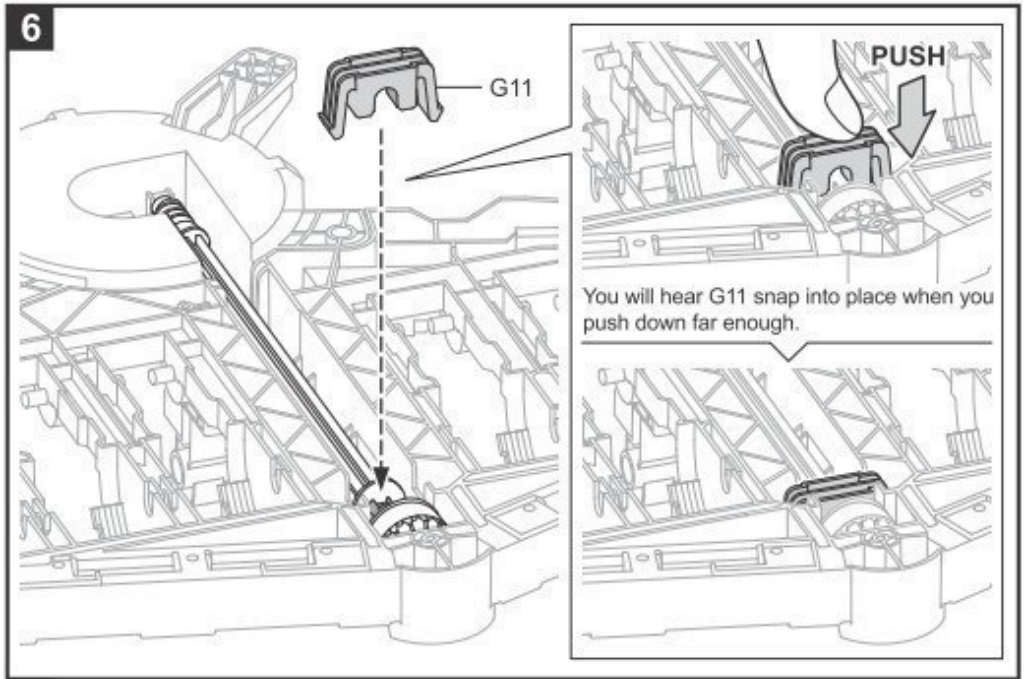
## Stand & Control Base Assembly

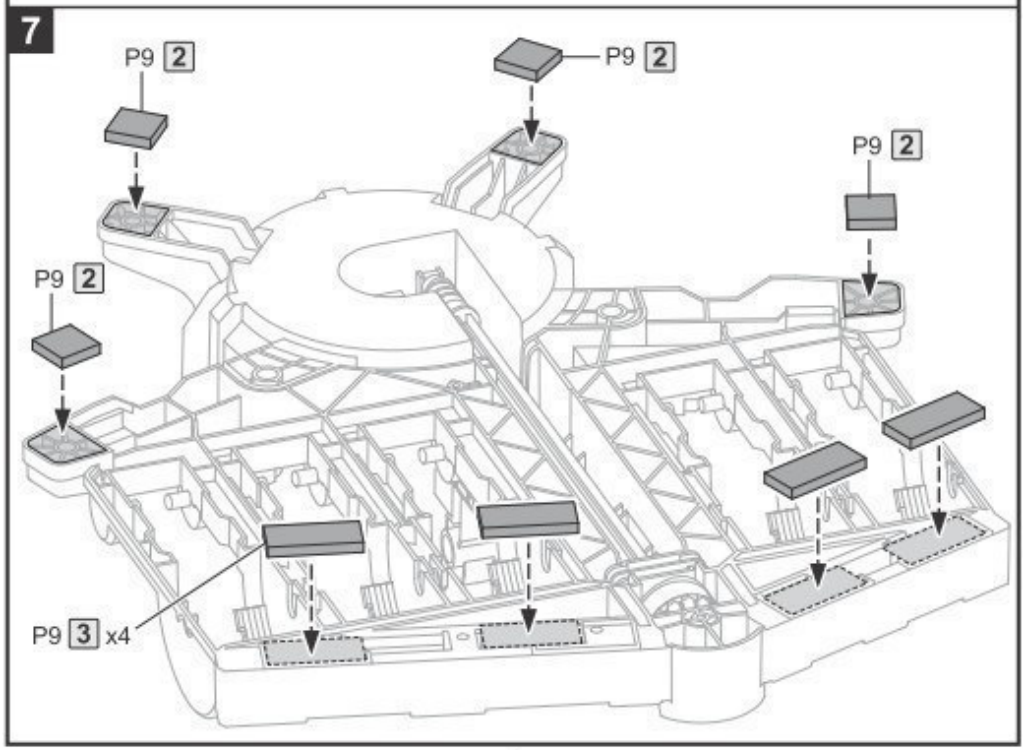



## Voet & Besturingseenheid


3
P2
1:1
180°

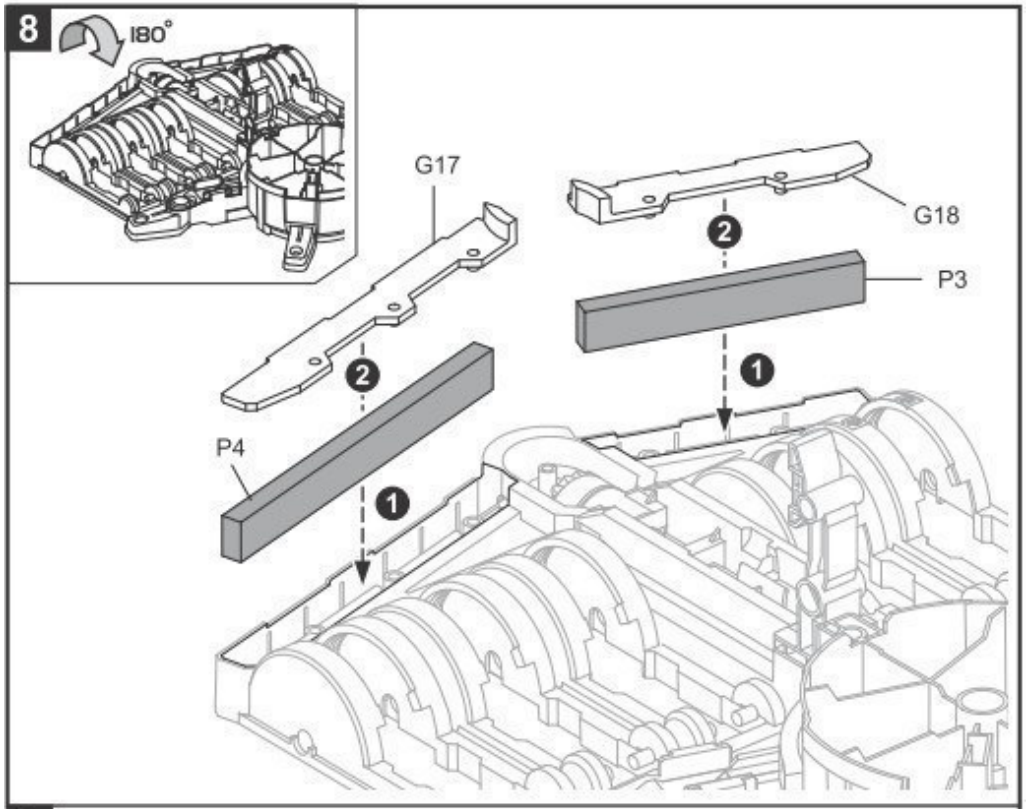

4
P2
1:1
5
E16
G6
1
2
1
2

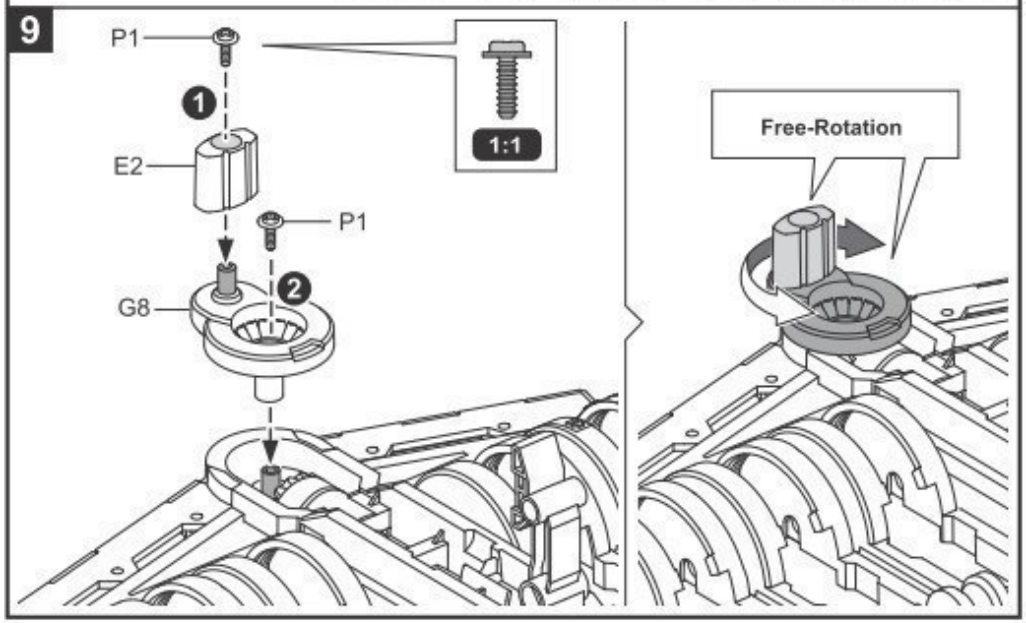


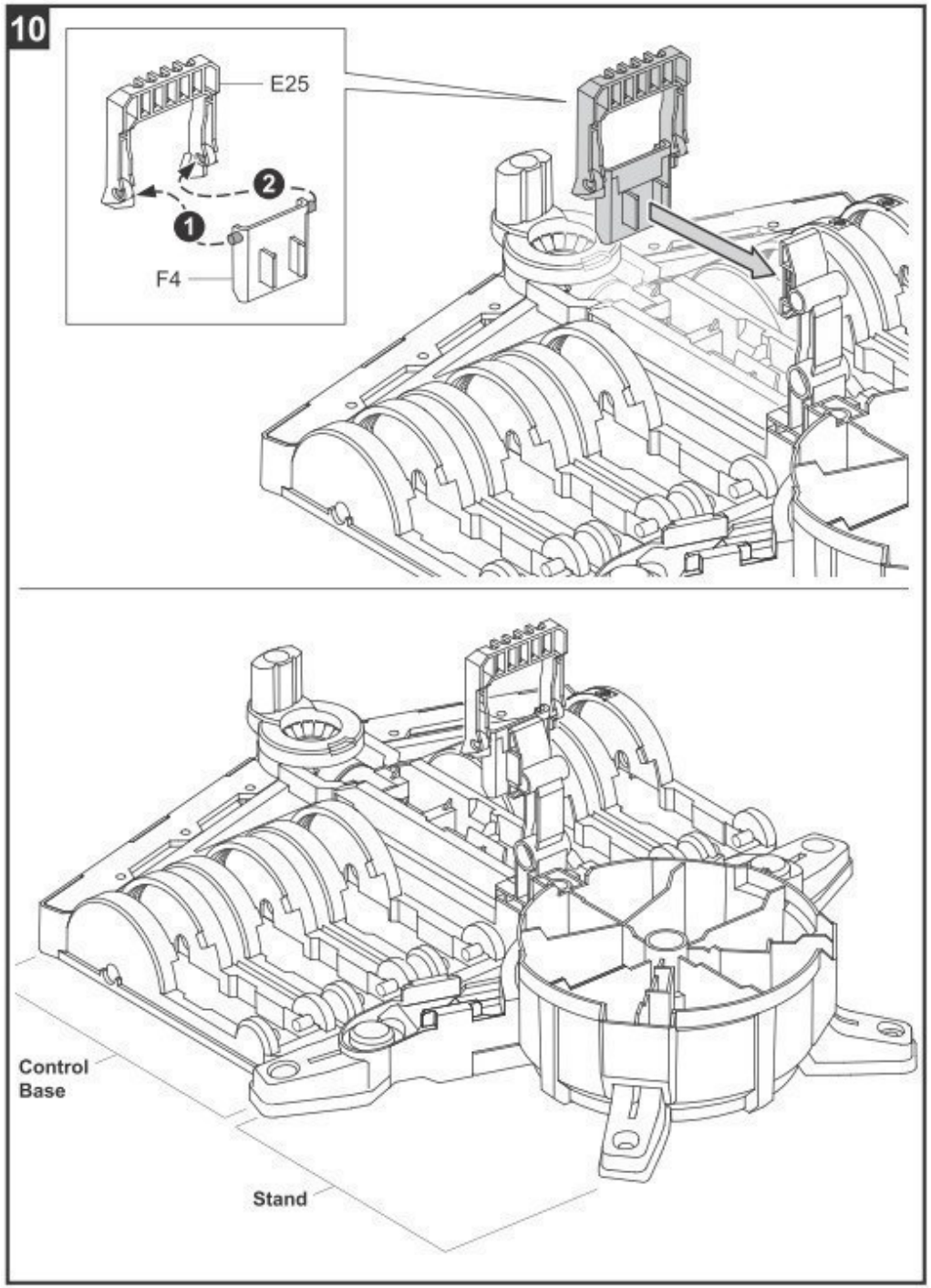

DUWEN

U hoort een klikgeluid wanneer G11 vastklikt.



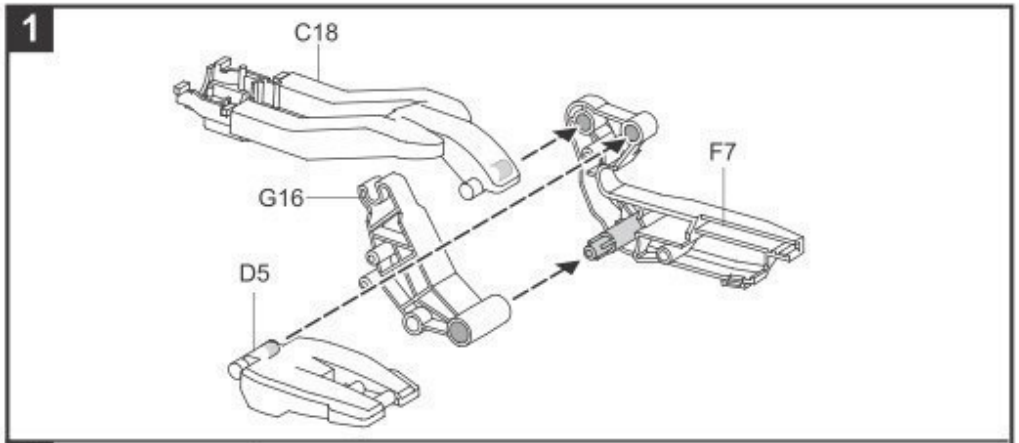

Vrije rotatie

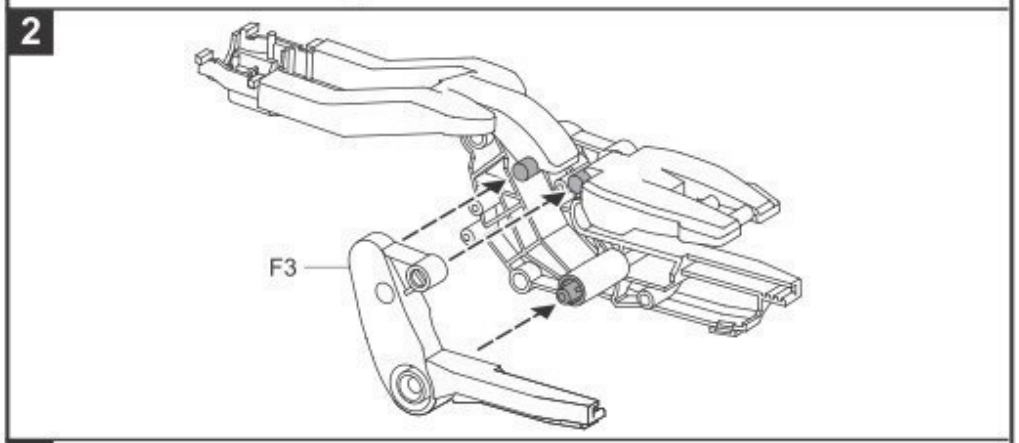


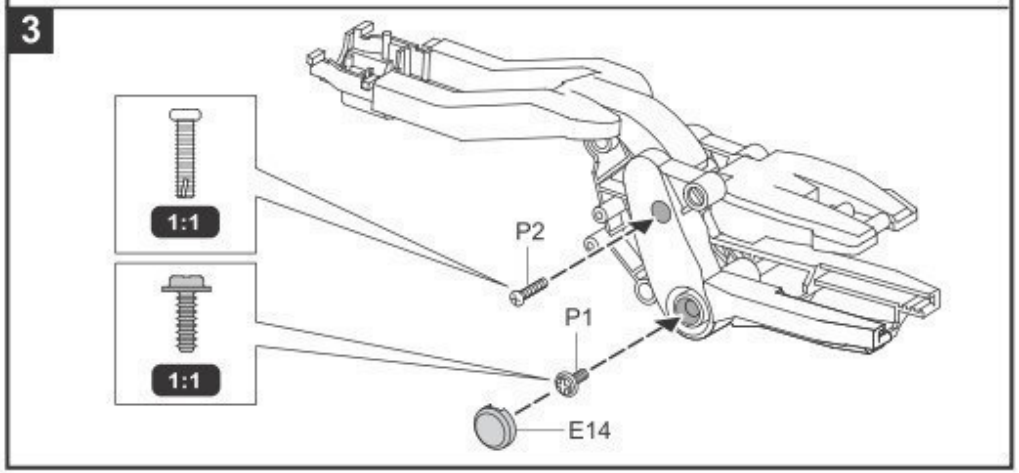

Besturingseenheid

Voet

## Main Body Assembly

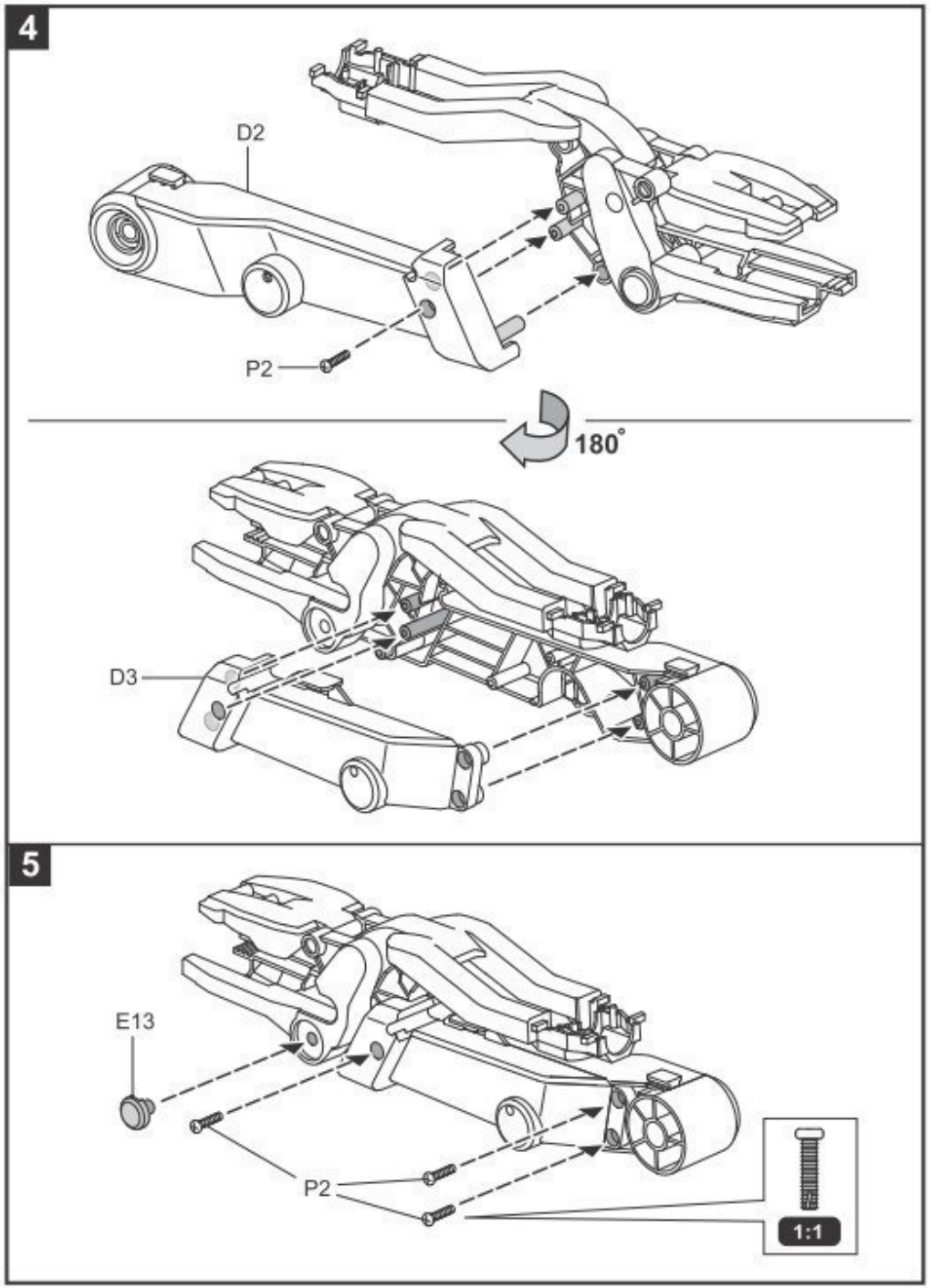


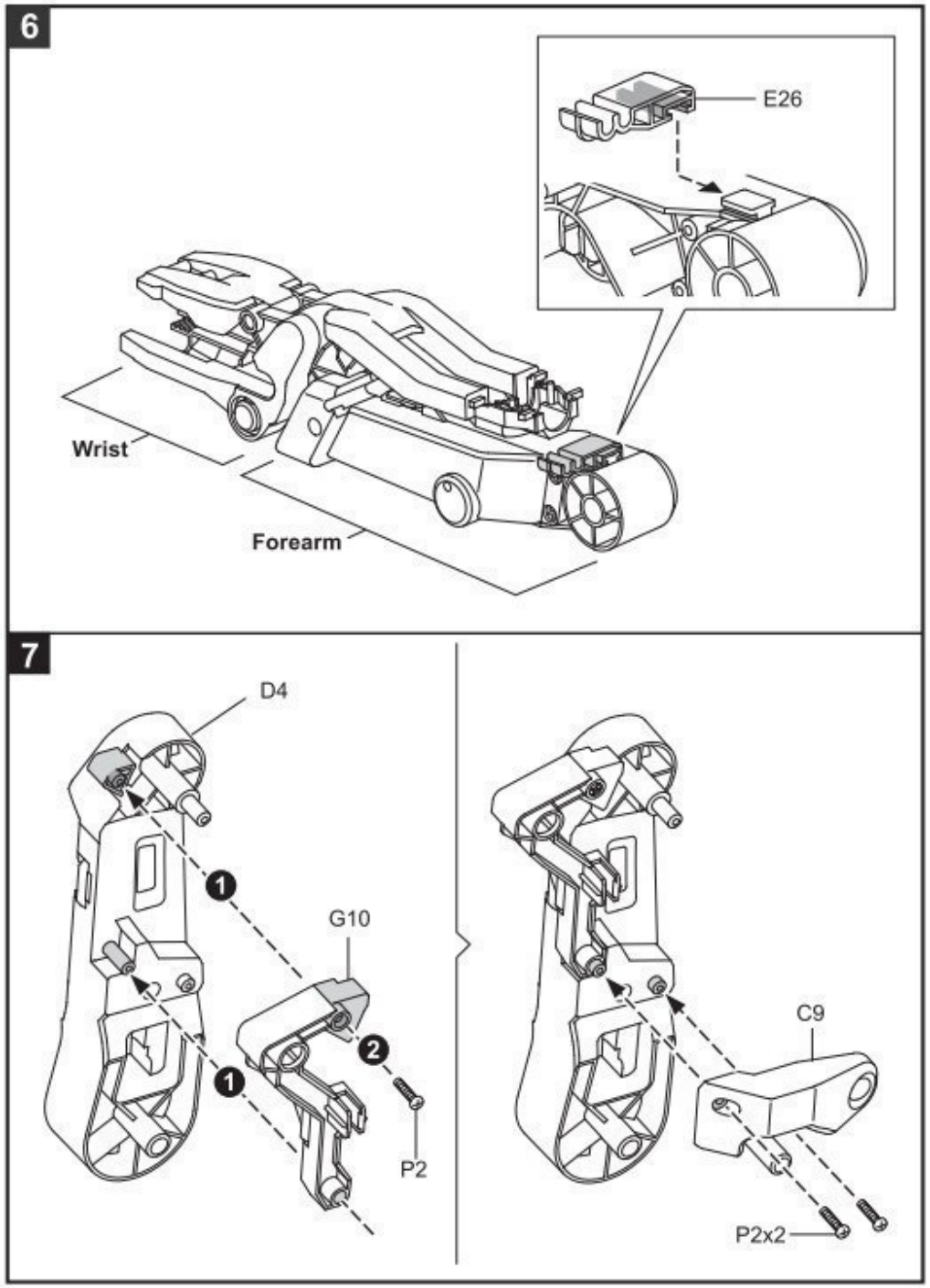





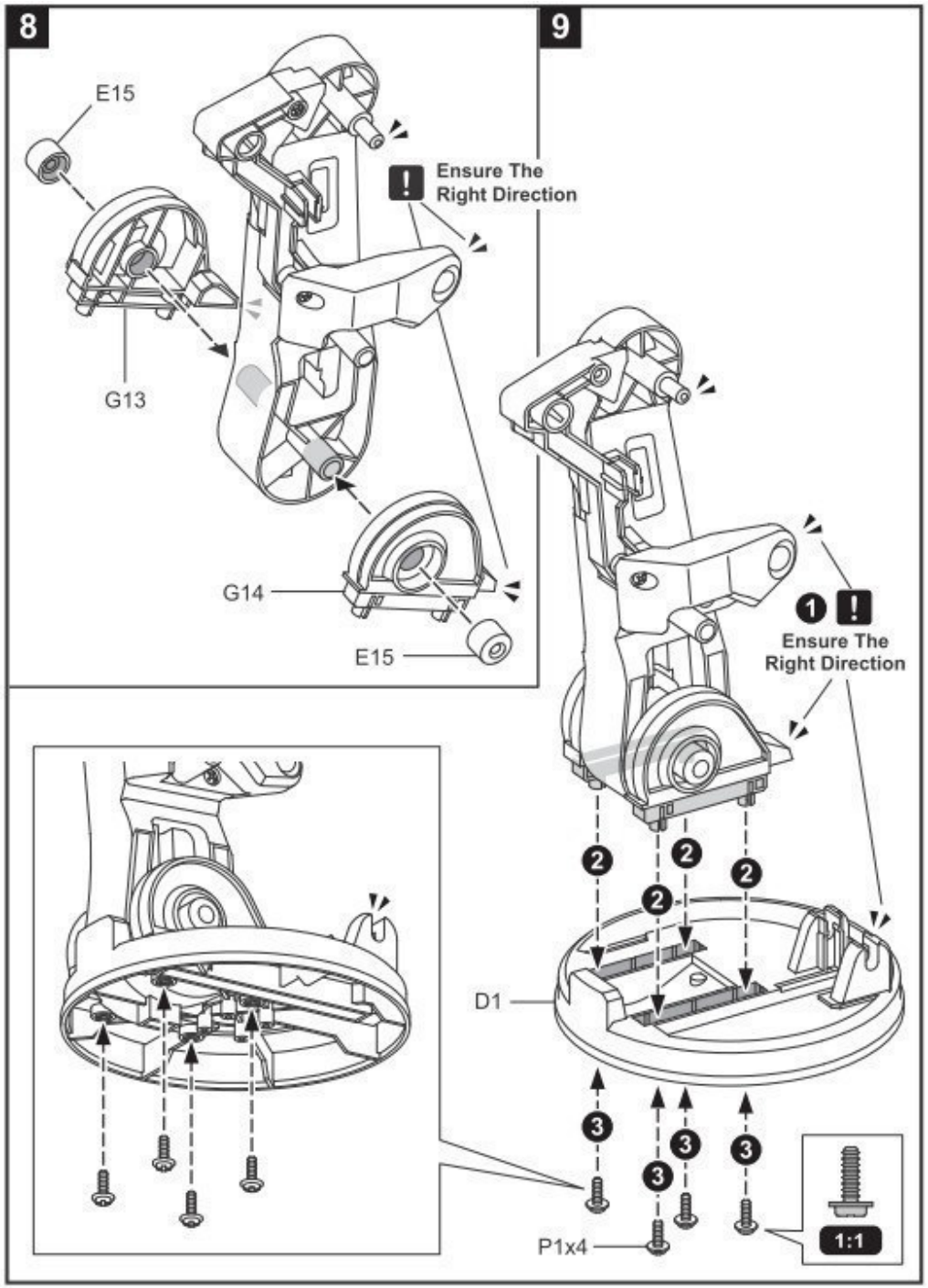

## Montage hoofdeenheid


4
D2
P2
180°
D3
5
E13
P2
1:1



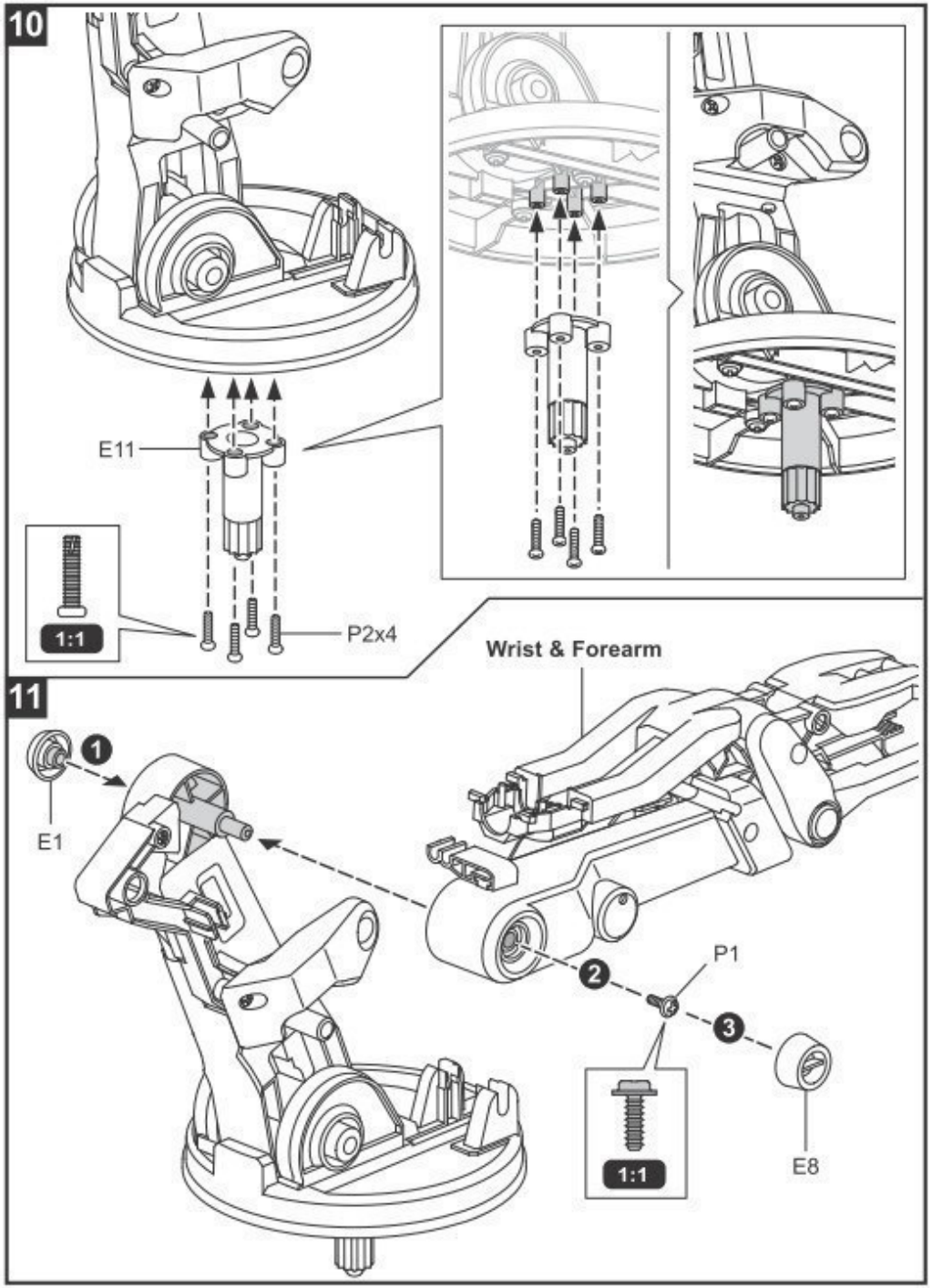

Pols

Onderarm

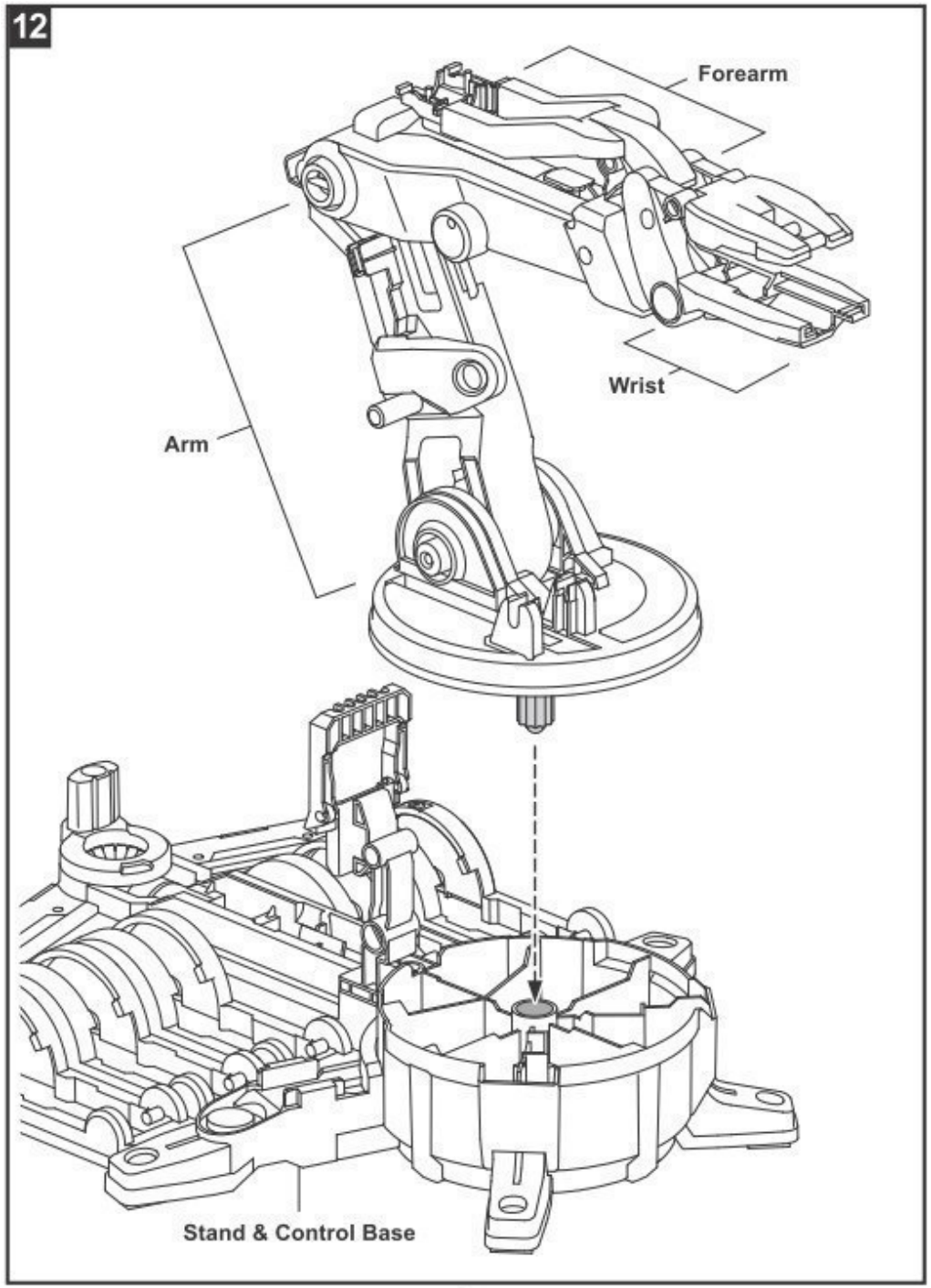



Let op de correcte montagerichting.

Let op de correcte montagerichting.




Pols & Voorarm

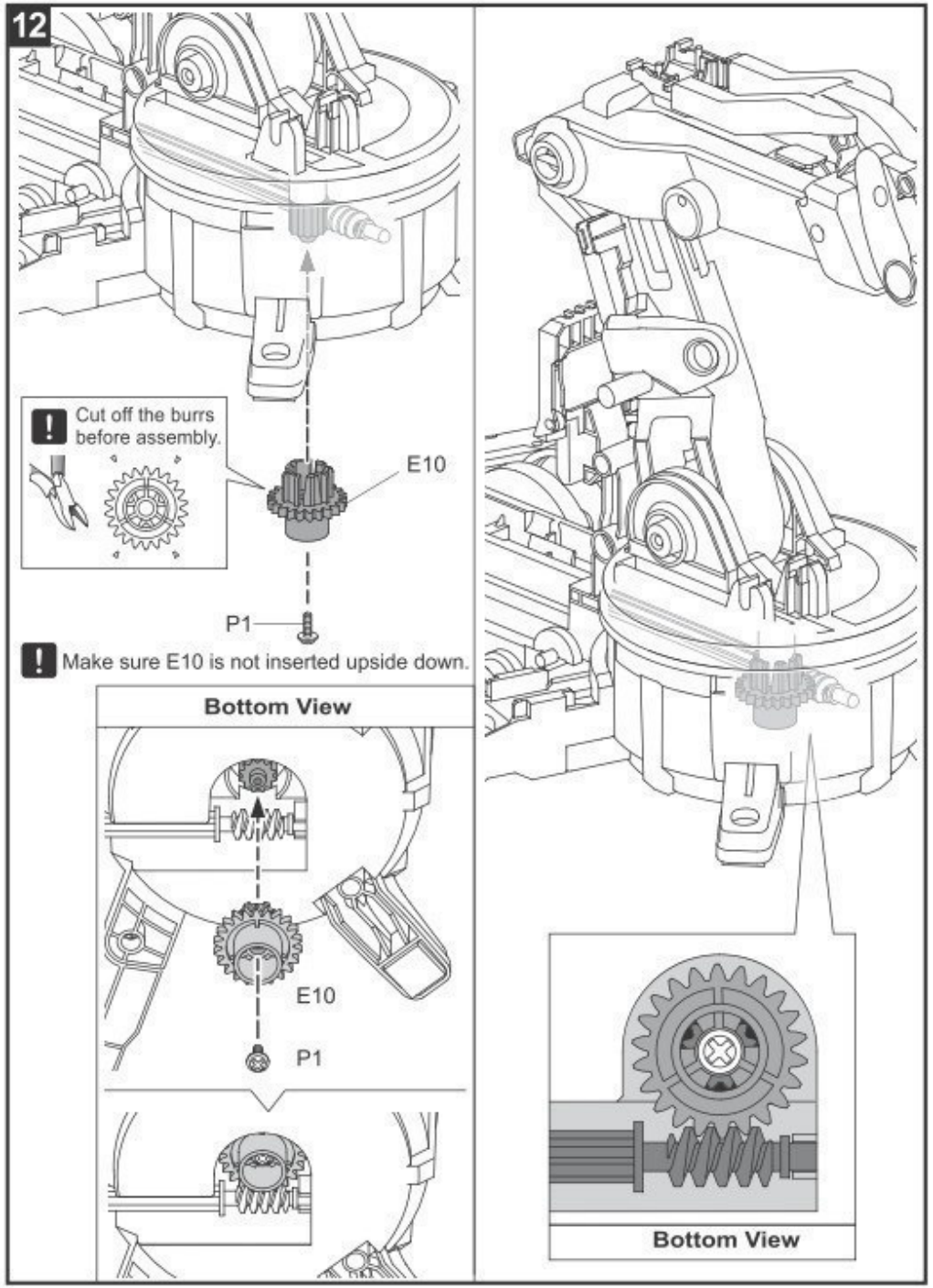



Onderarm

Pols

Arm

Voet & Besturingseenheid

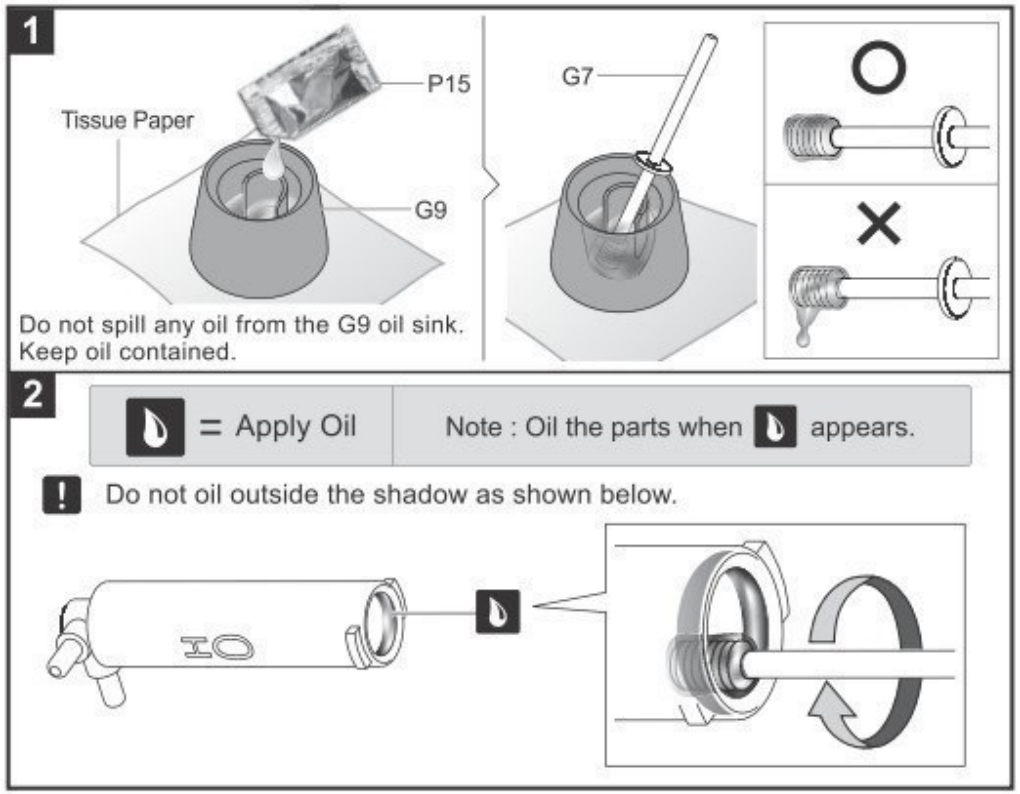



Knip de bramen af voor de montage.

Zorg ervoor dat E10 niet ondersteboven wordt geplaatst.

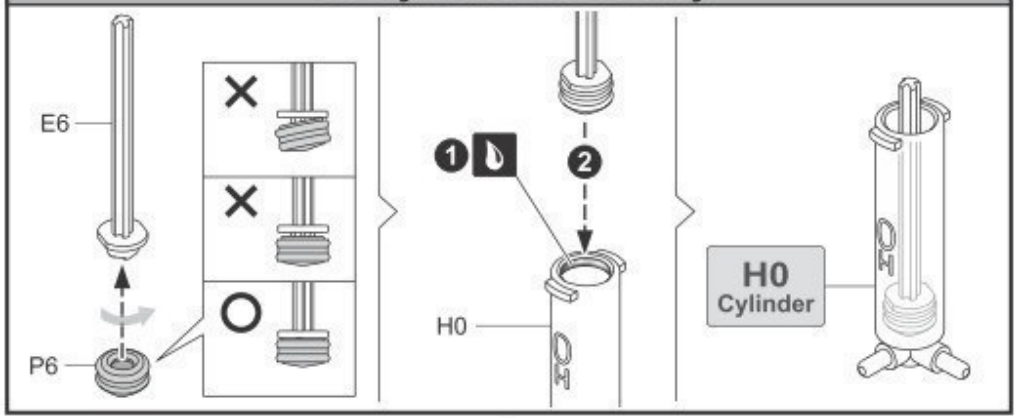
Onderkant

## How To Oil The Parts




## H0~H5 Cylinder Assembly

### H0 Cylinder Assembly






## Hoe de onderdelen oliën

Vel keukenpapier

Mors geen olie uit het G9-oliereservoir.
Sluit het zakje met olie.

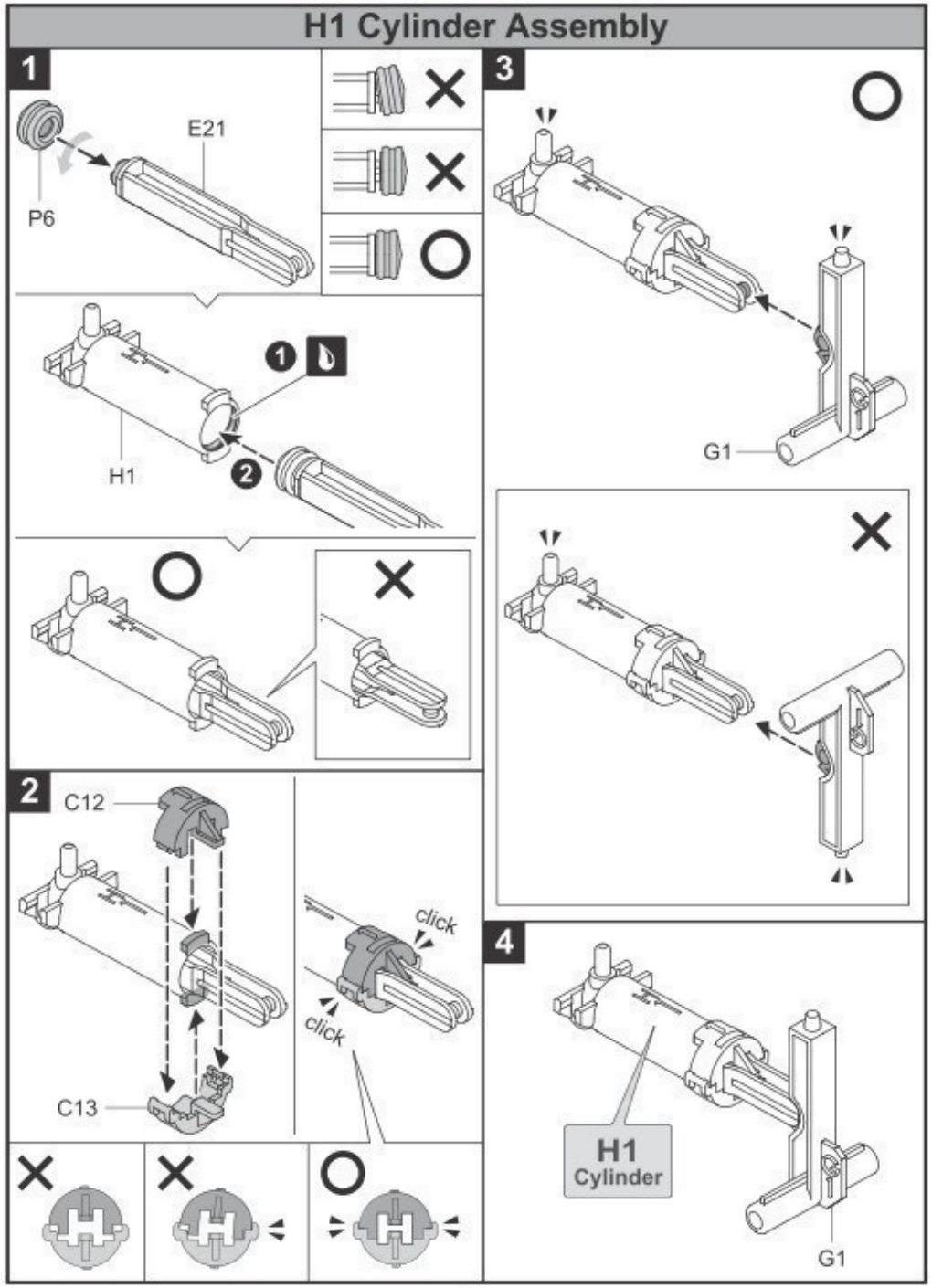
= Breng olie aan

Opmerking: Smeer de onderdelen in met olie wanneer -- verschijnt.

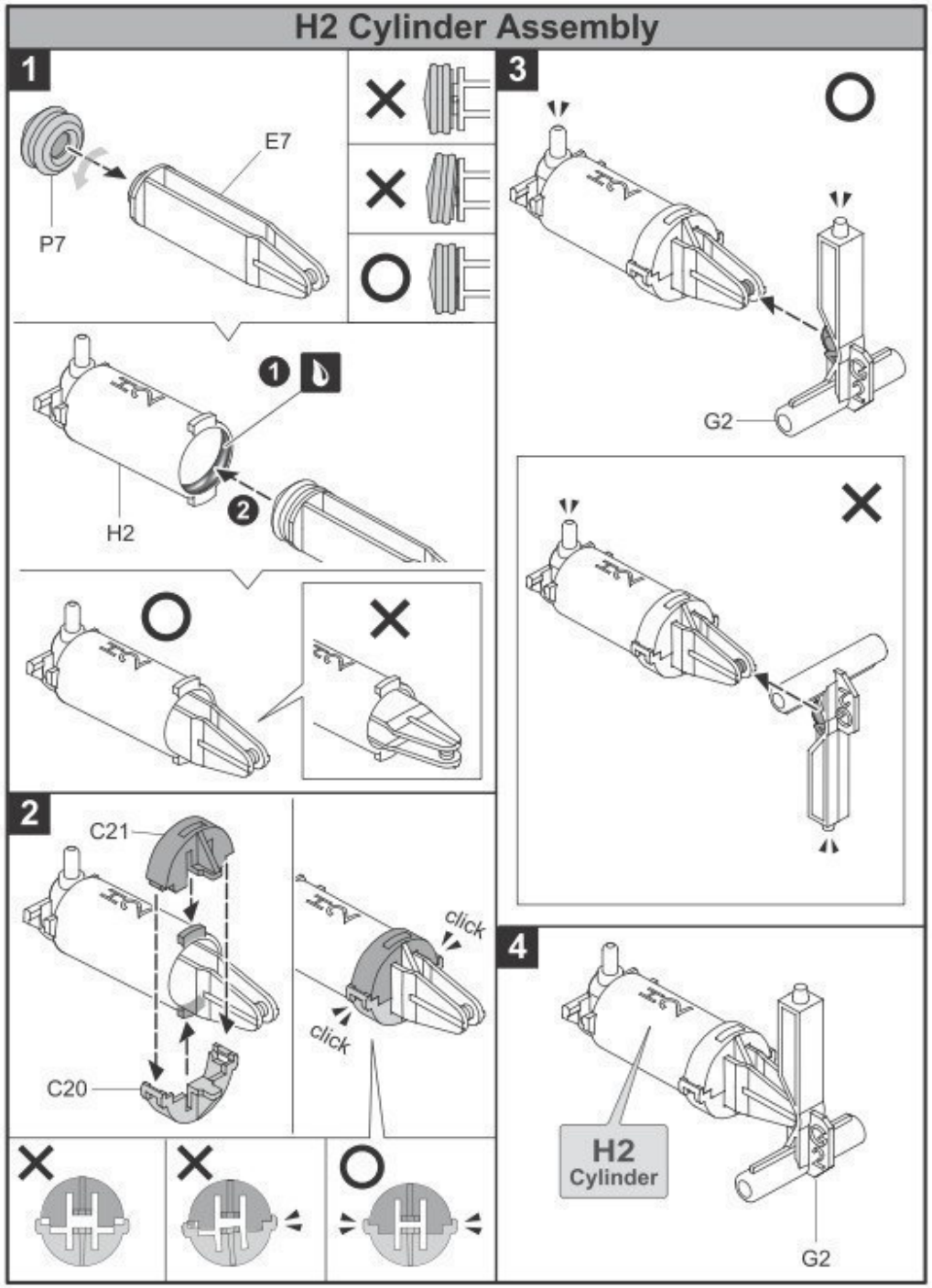
Smeer niet buiten de schaduw (zie hieronder).

## Montage HO-H5-cilinder

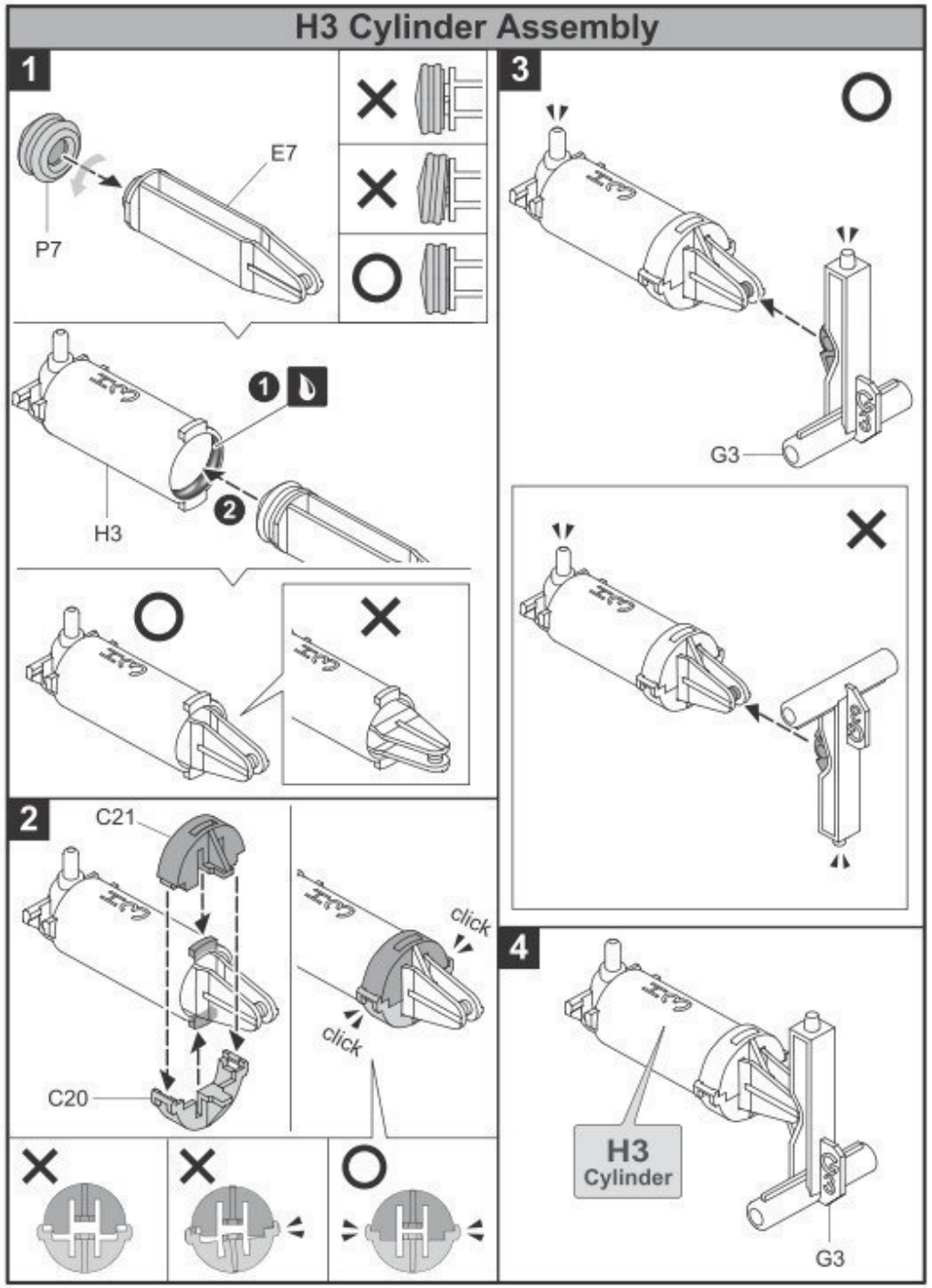
### Montage H0-cilinder



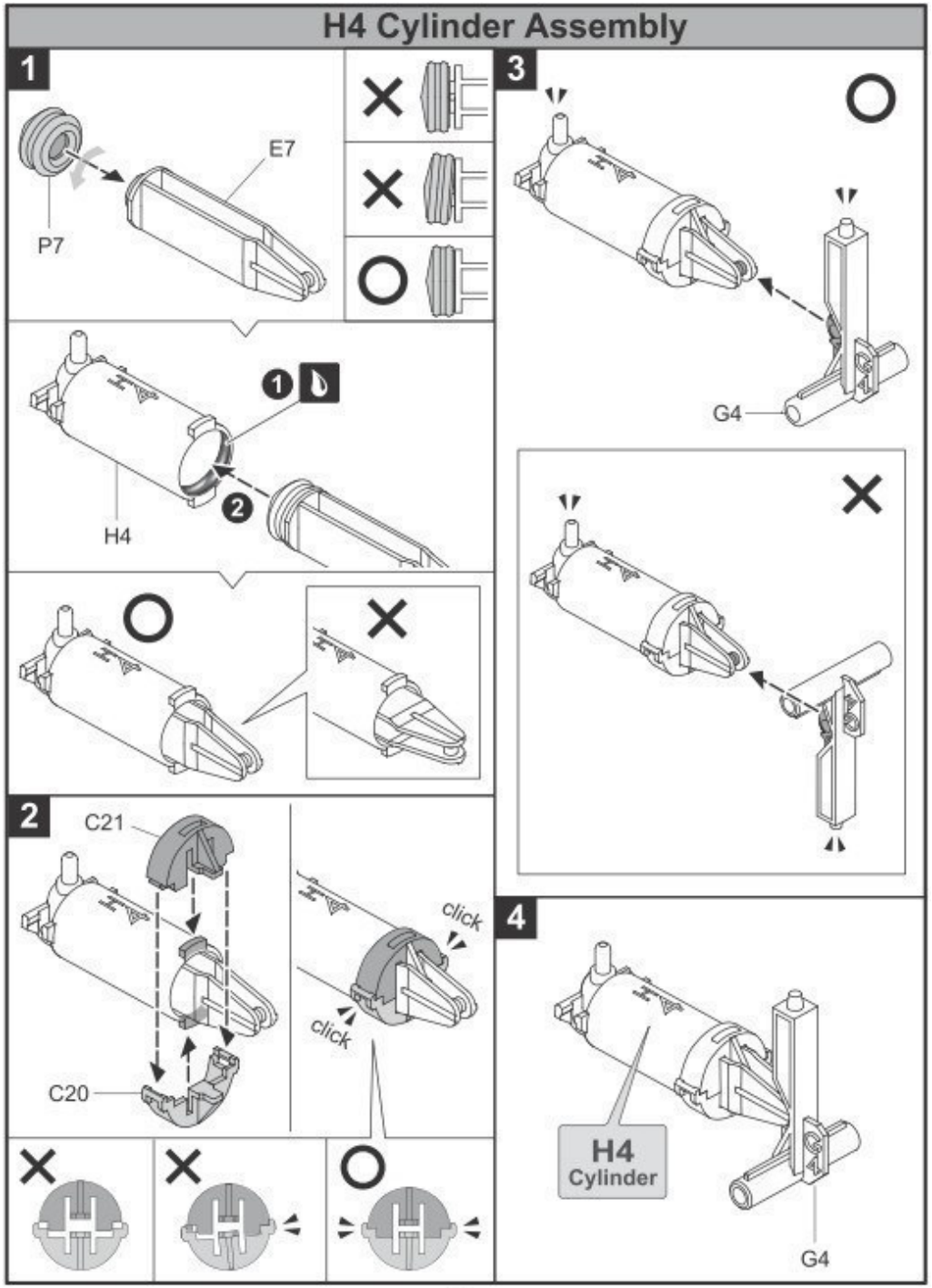

# Montage H1-cilinder



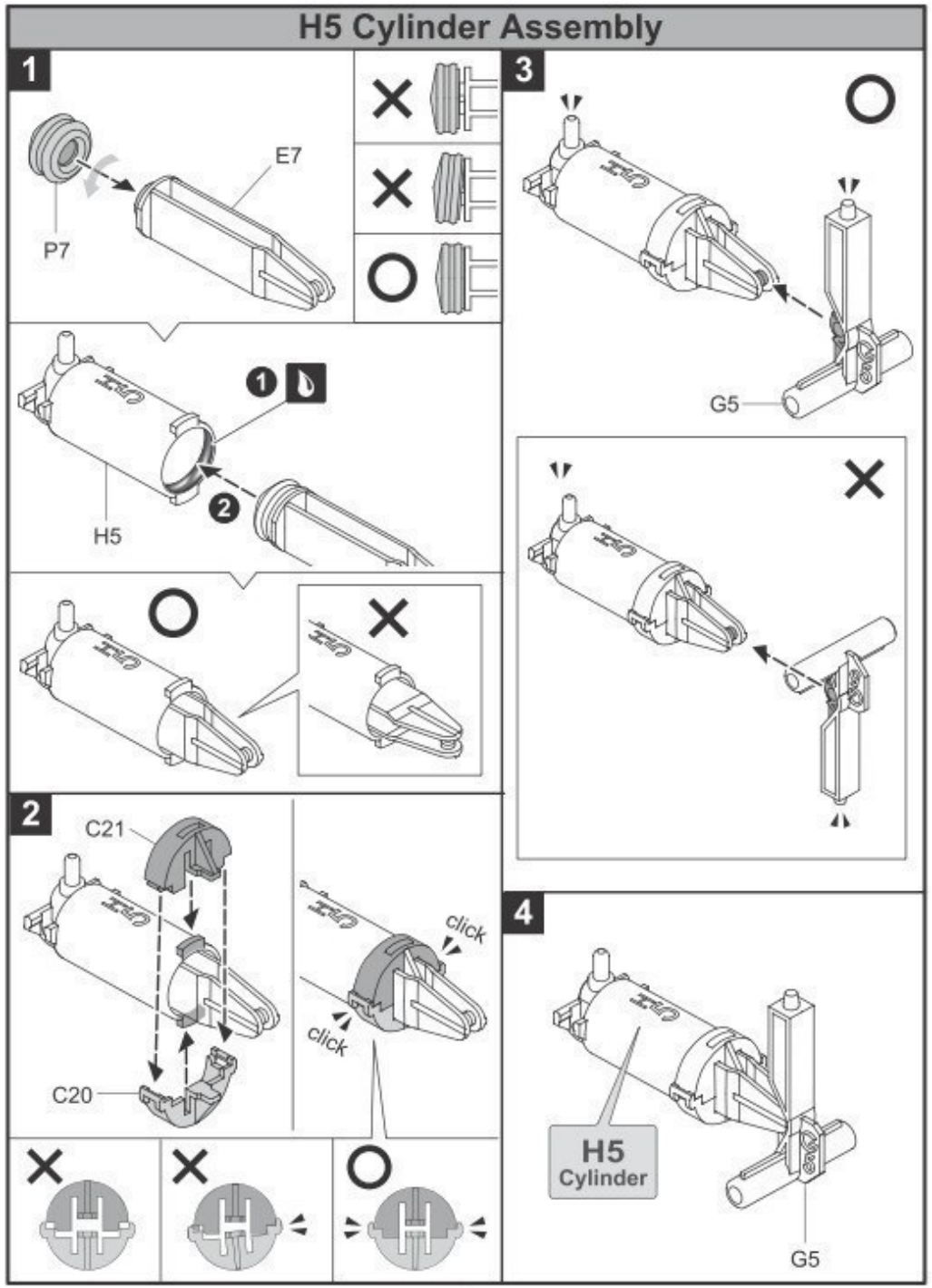

# Montage H2-cilinder




# Montage H3-cilinder



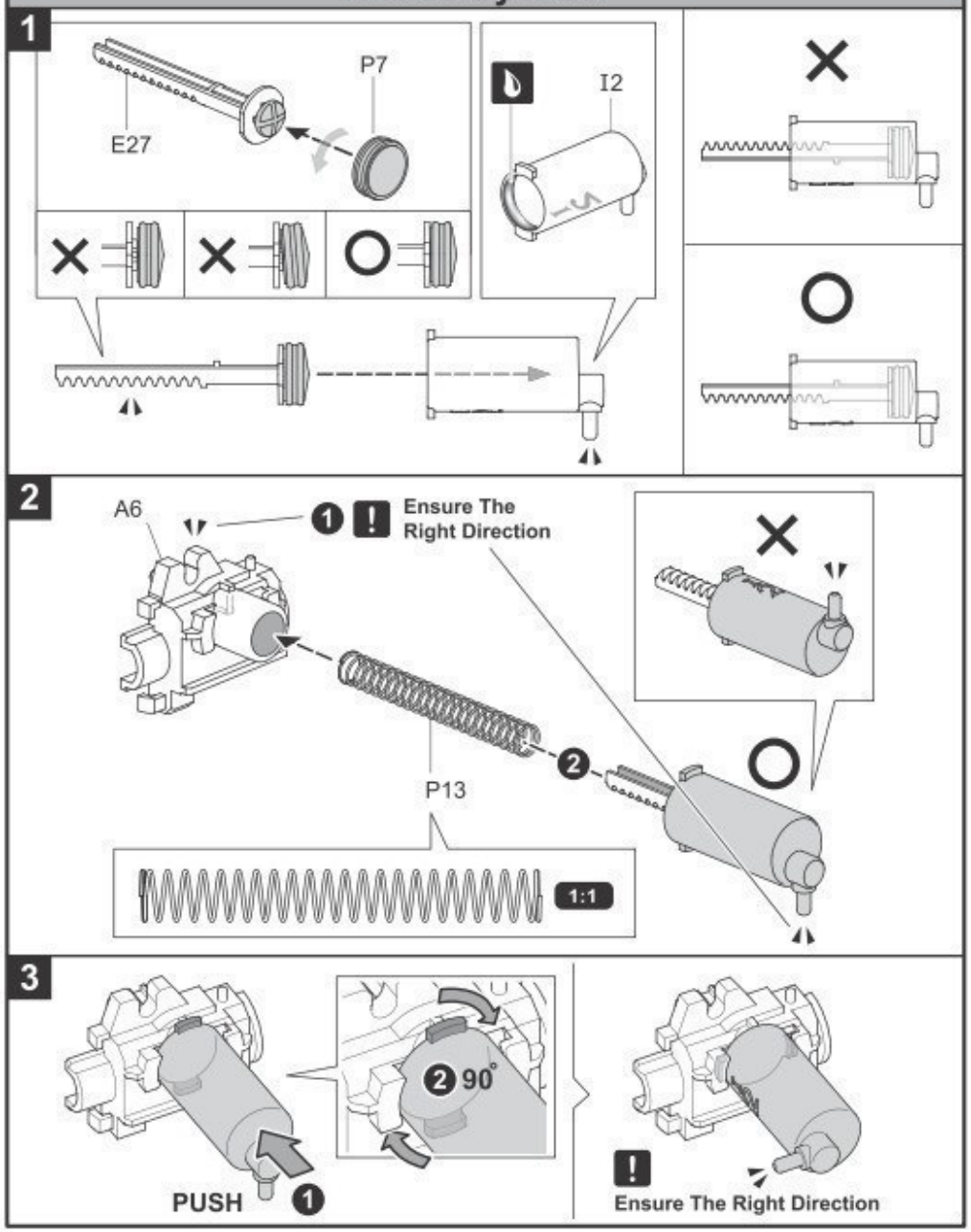

# Montage H4-cilinder




# Montage H5-cilinder

# I1 ~ I5 Cylinder Assembly

## I1 & I2 Cylinder





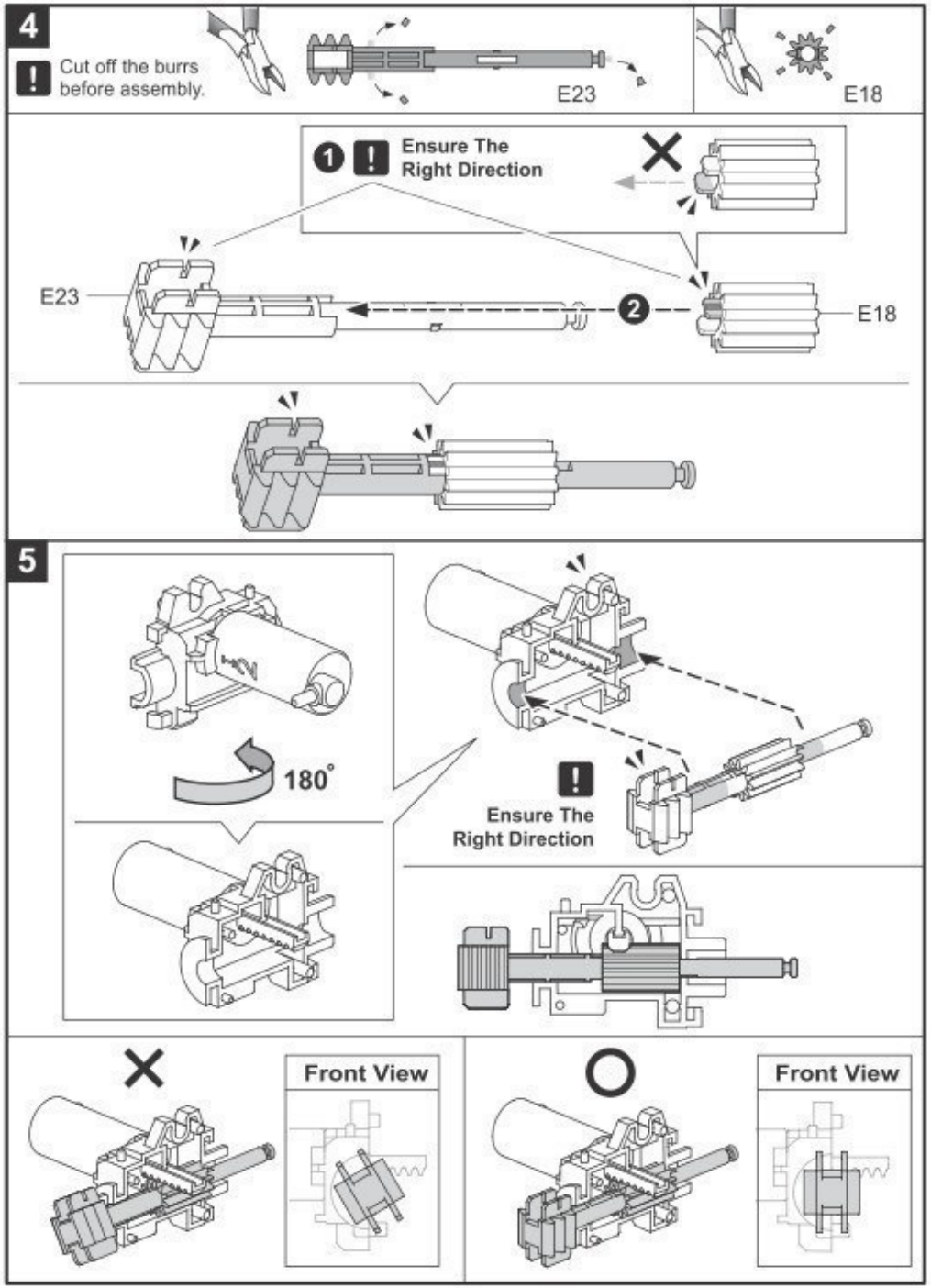

# Montage I1-I5-cilinder

## I1-I2-cilinder

Let op de correcte montagerichting.

DUWEN

Let op de correcte montagerichting.

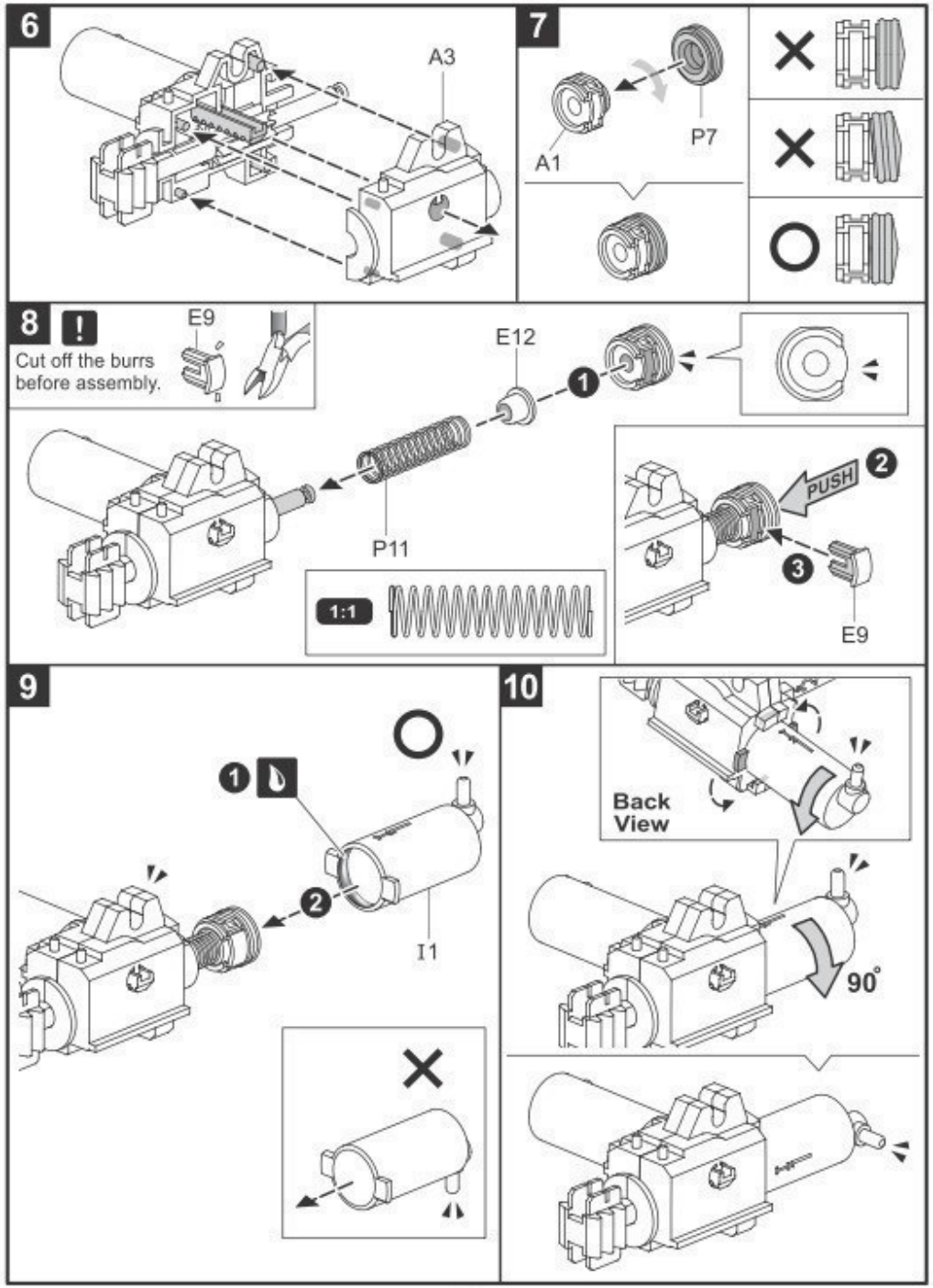



Knip de bramen af voor de montage.

Let op de correcte montagerichting.

Let op de correcte montagerichting.

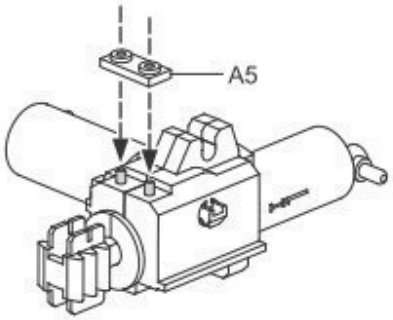
Voorkant

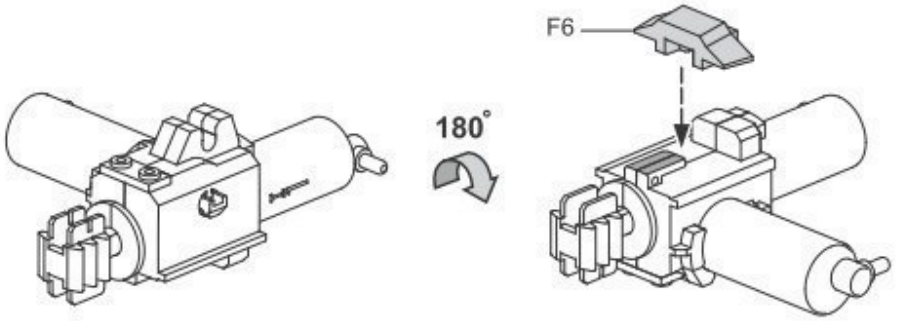


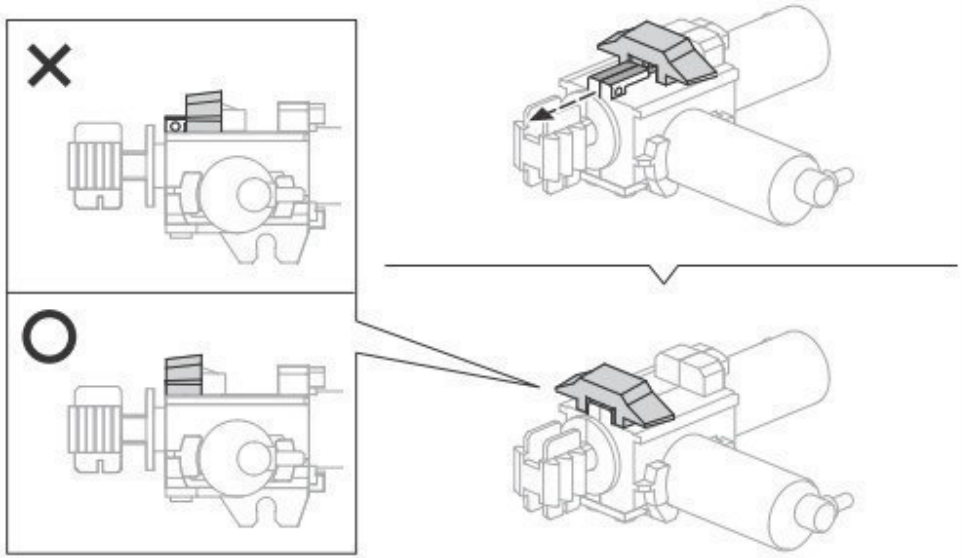

Knip de bramen af voor de montage.

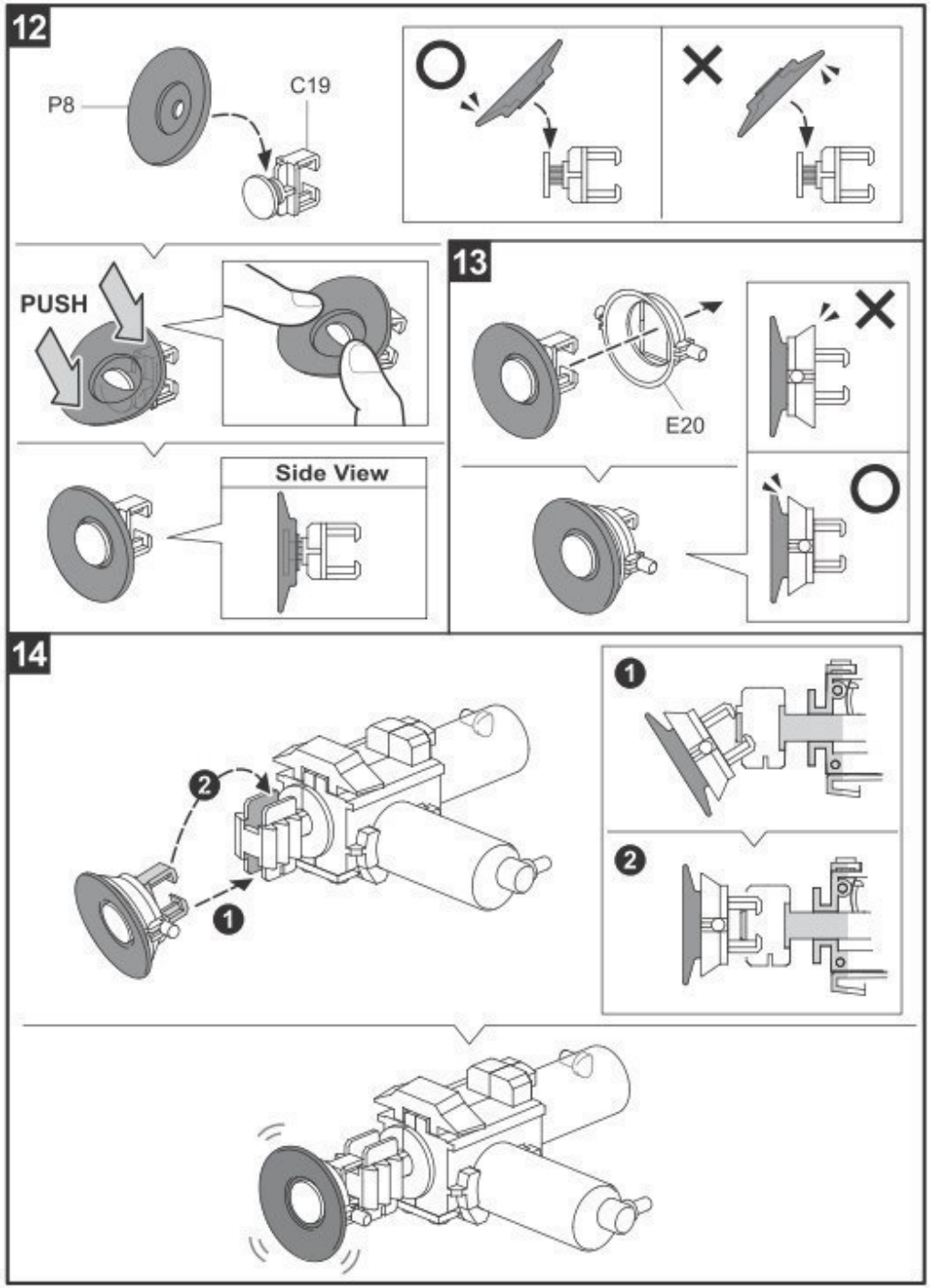
Achterkant

**11**



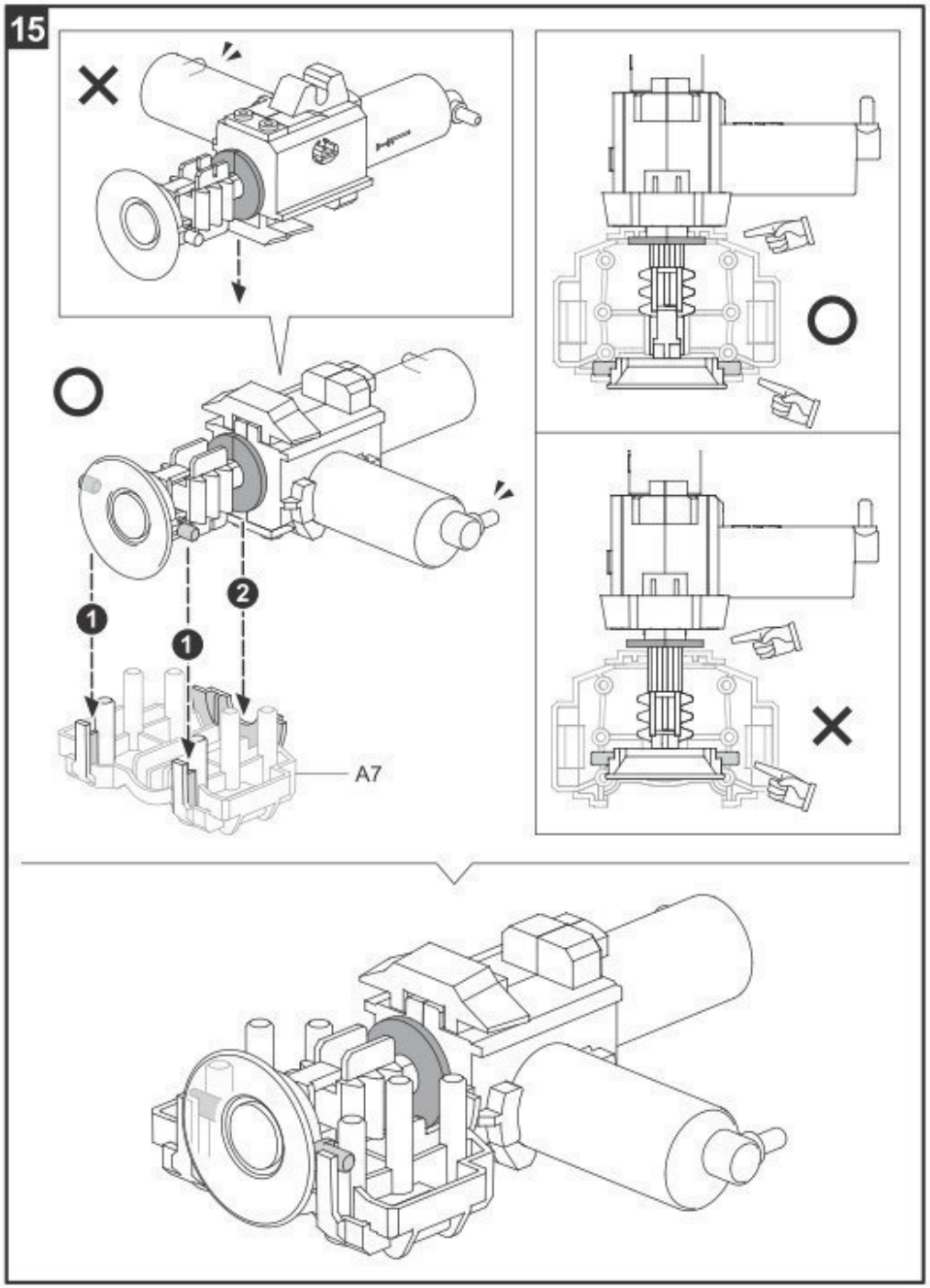



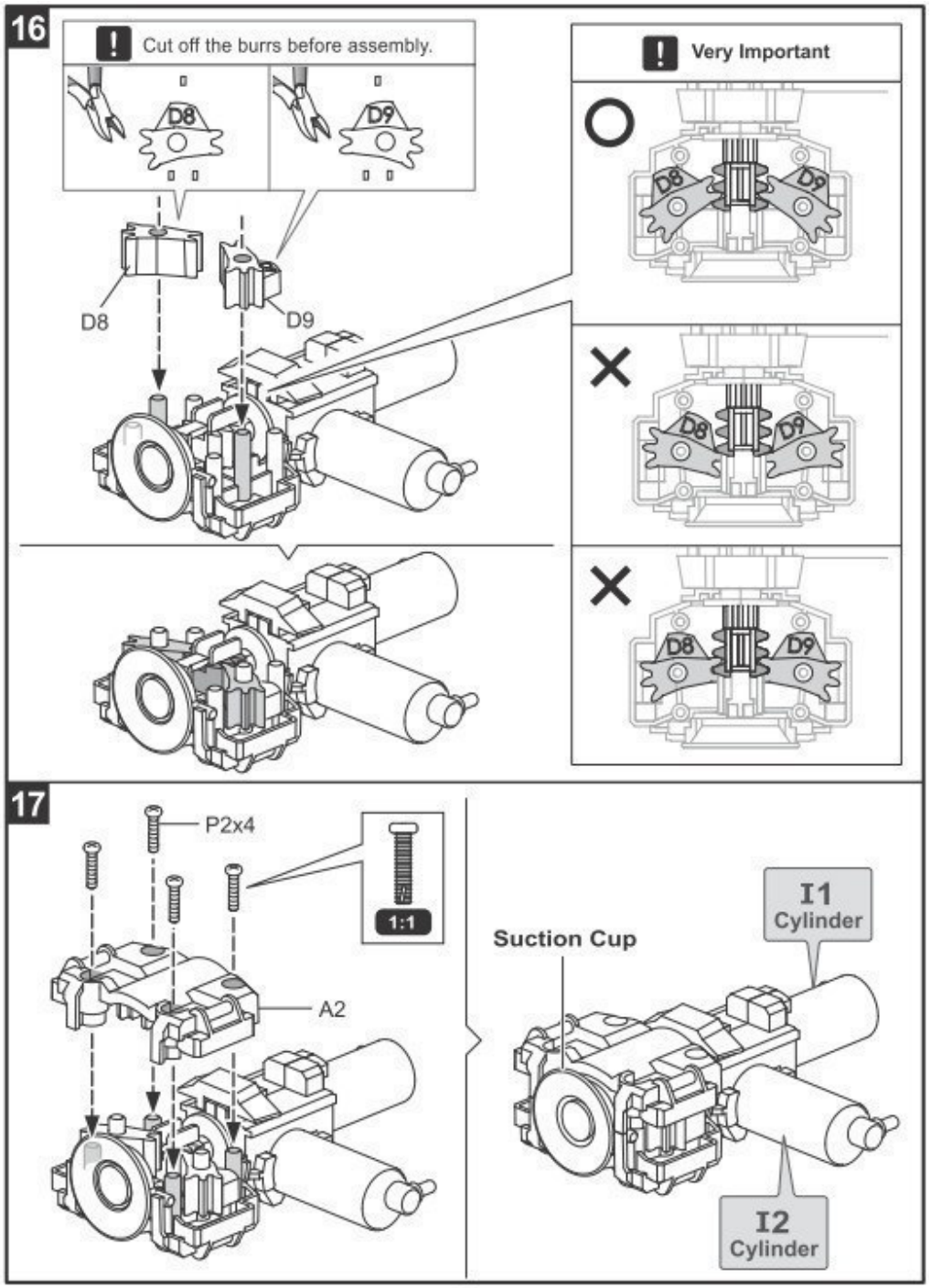






DUWEN

Zijkant

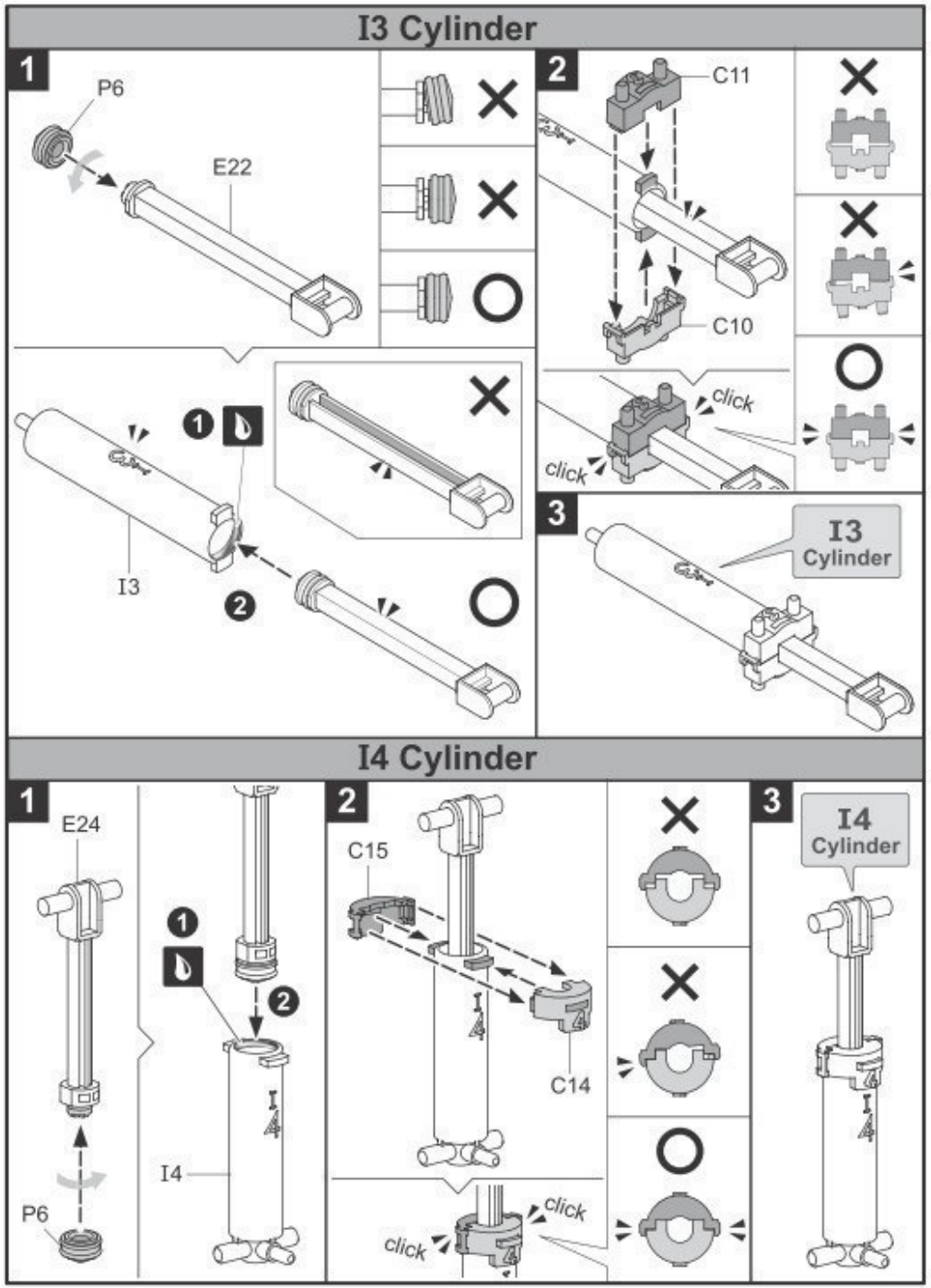

15
1
1
2
A7




Knip de bramen af voor de montage.

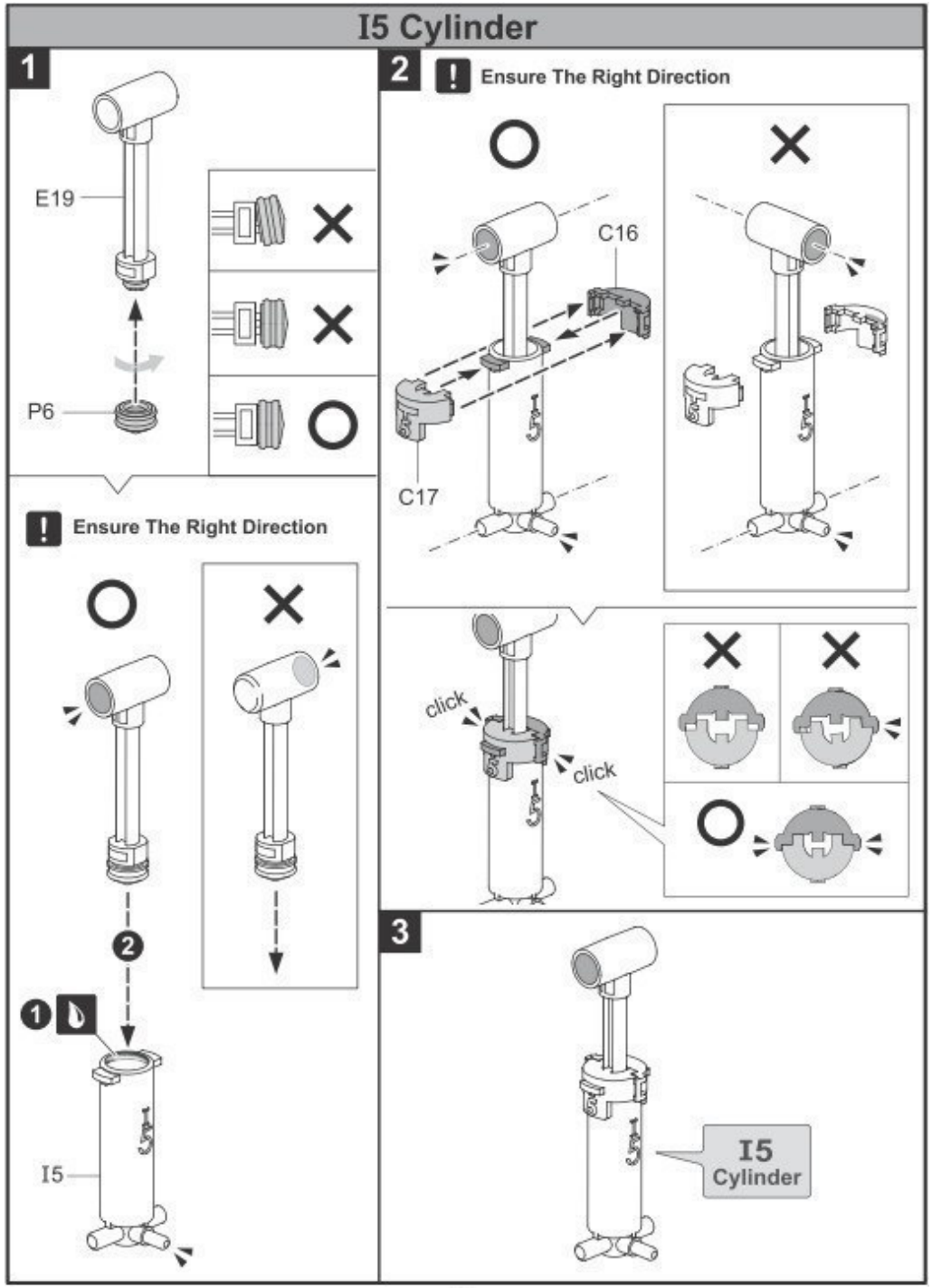
Zeer belangrijk

Zuignap




## I3-cilinder

## I4-cilinder

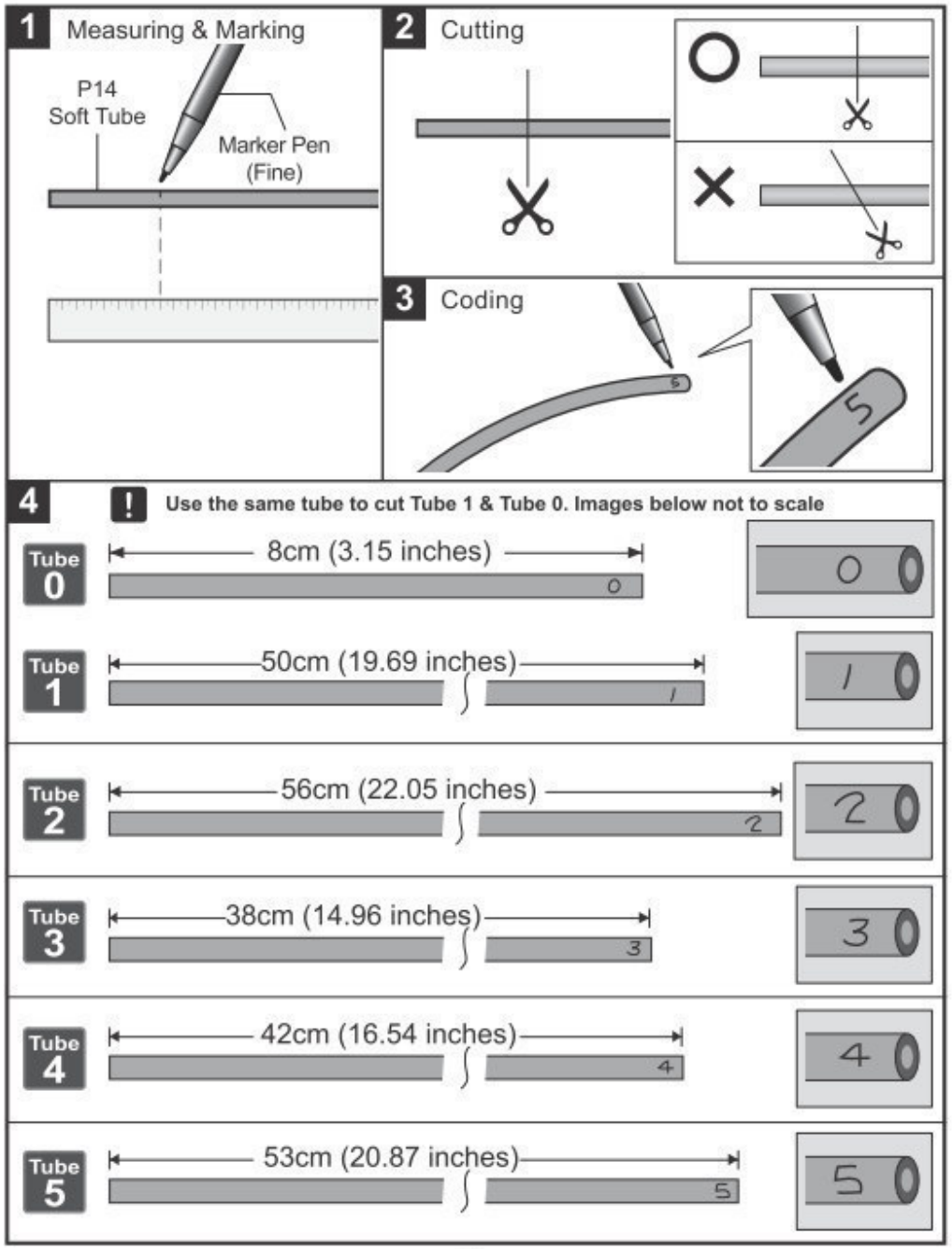



# I5-cilinder

Let op de correcte montagerichting.

Let op de correcte montagerichting.

## How To Cut The Tube






## Hoe de flexibele slang knippen

**1**

Meten & markeren

P14 Korte buis

Markeerstift (fijn)

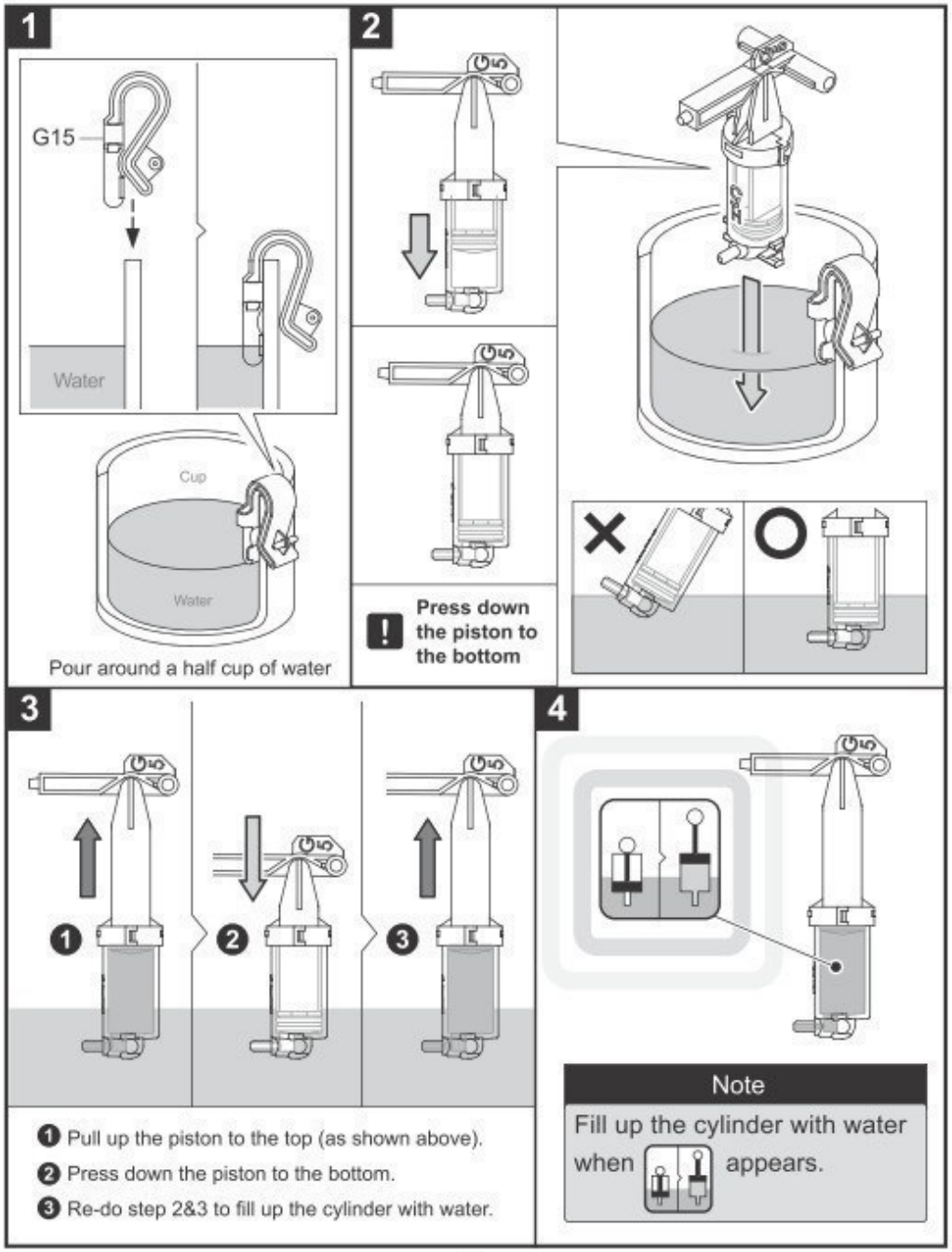
**2** Knippen

**3** Nummeren

**4**

Gebruik dezelfde slang voor slang 1 en slang 0. De onderstaande afbeeldingen zijn niet op schaal.

## How To Fill Up The Cylinder With Water






## Hoe de cilinder met water vullen

**1**

Vul een half kopje water

**!** Duw de zuiger omlaag.

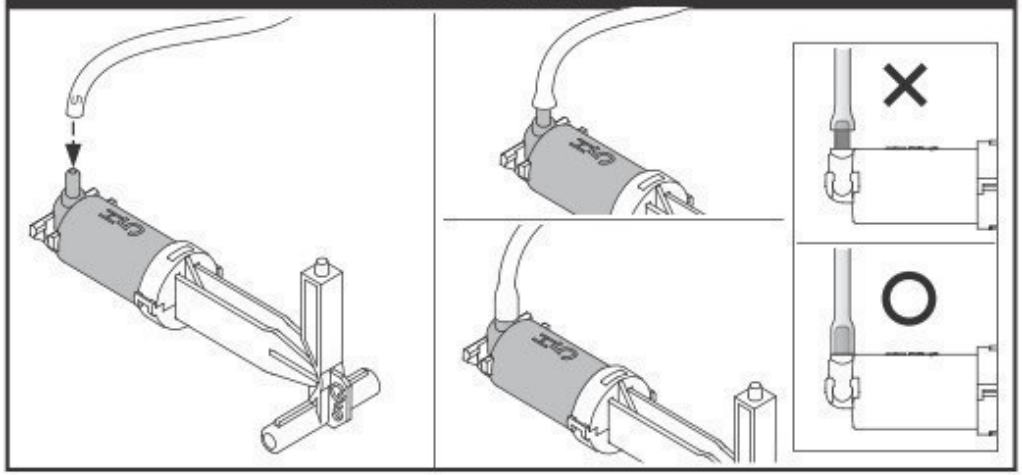
**3**

1. Trek de zuiger omhoog (zie boven).
2. Duw de zuiger omlaag.
3. Herhaal de stappen 2 & 3 om de cilinder met water te vullen.

**4**

Opmerking
Vul de cilinder met water wanneer -- verschijnt.

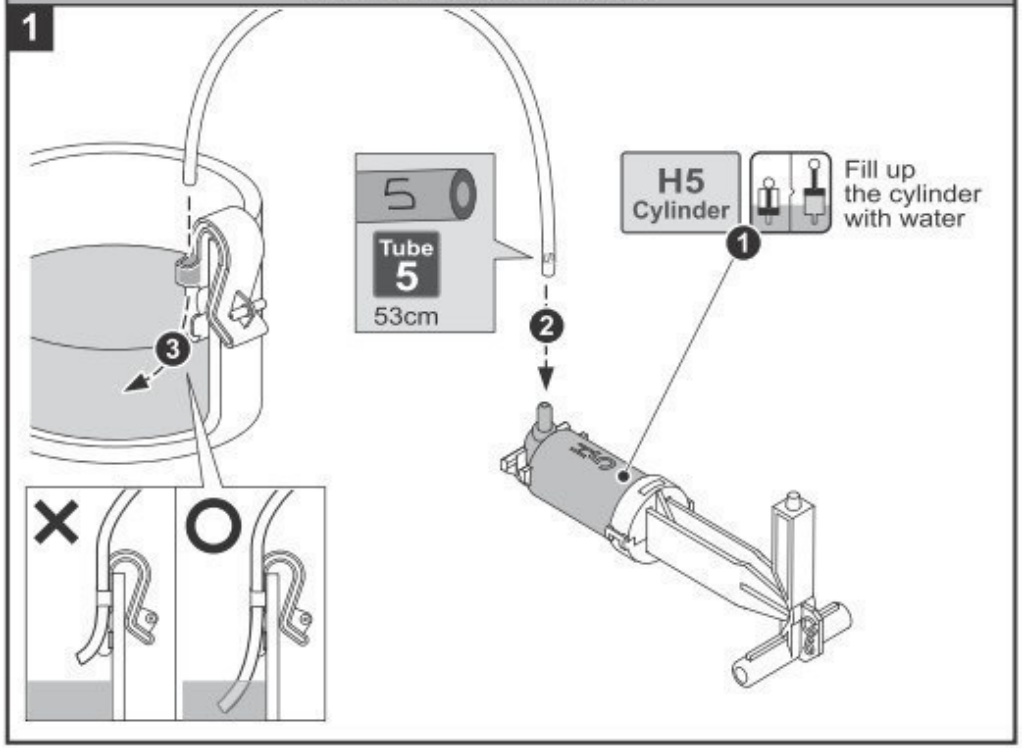
## How To Fit Tube



## Hoe de slang bevestigen

## Hydraulic Cylinder Moduel Assembly

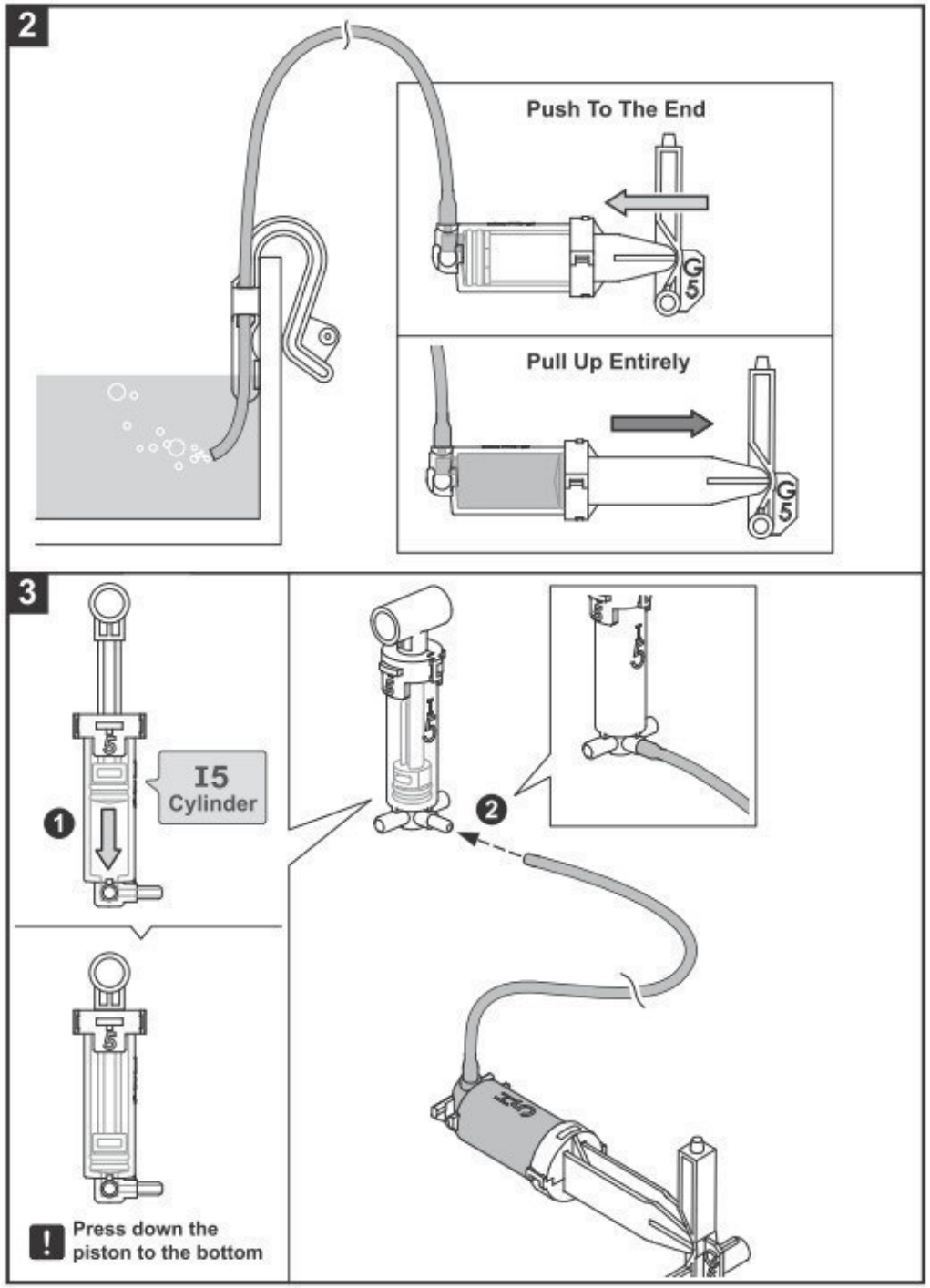
### Connect H5 With I5




## Montage hydraulische cilinder

### Sluit H5 aan op I5

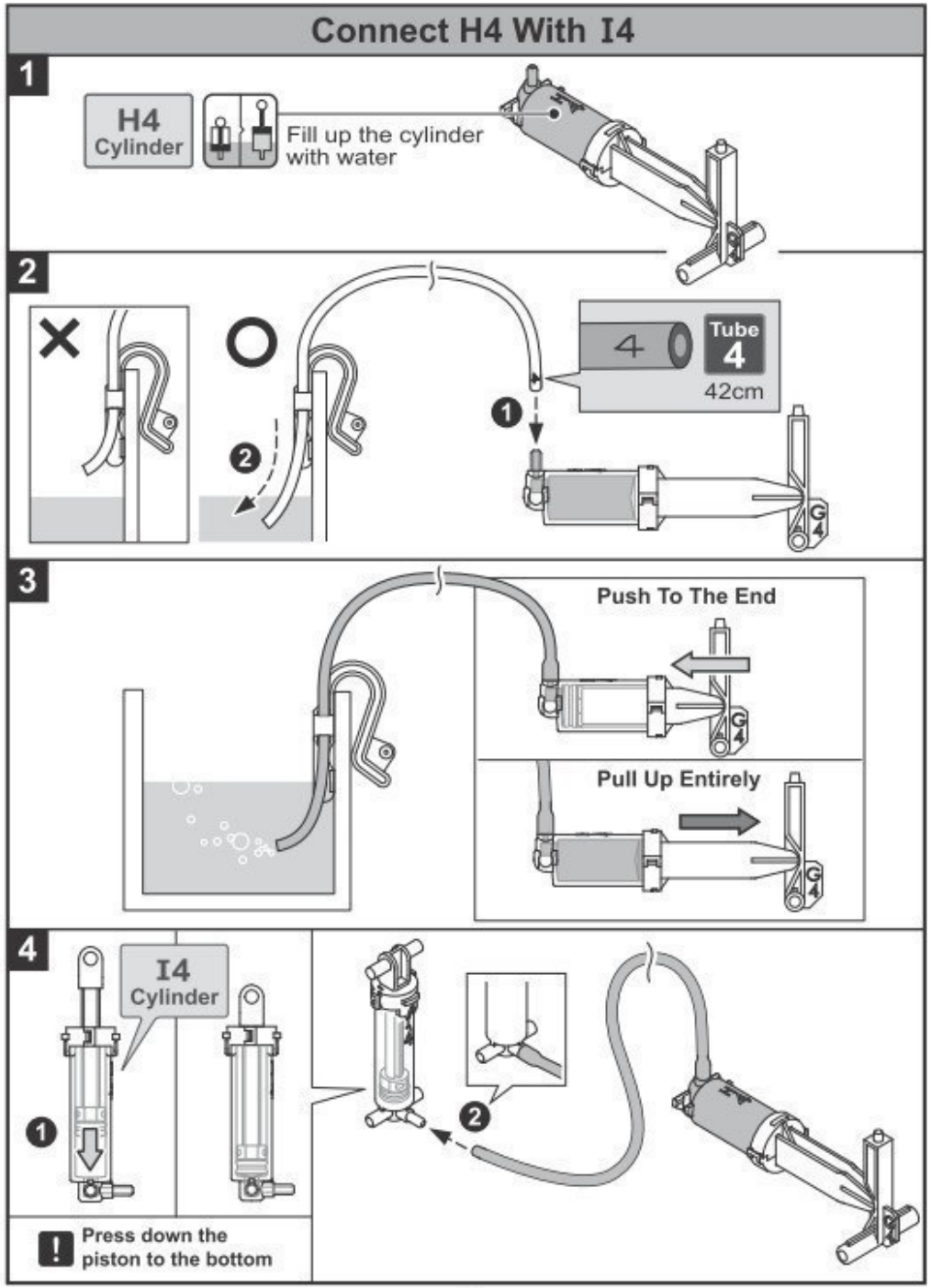
Vul de cilinder met water




Duw helemaal naar voor

Trek helemaal naar achter.

Duw de zuiger omlaag.



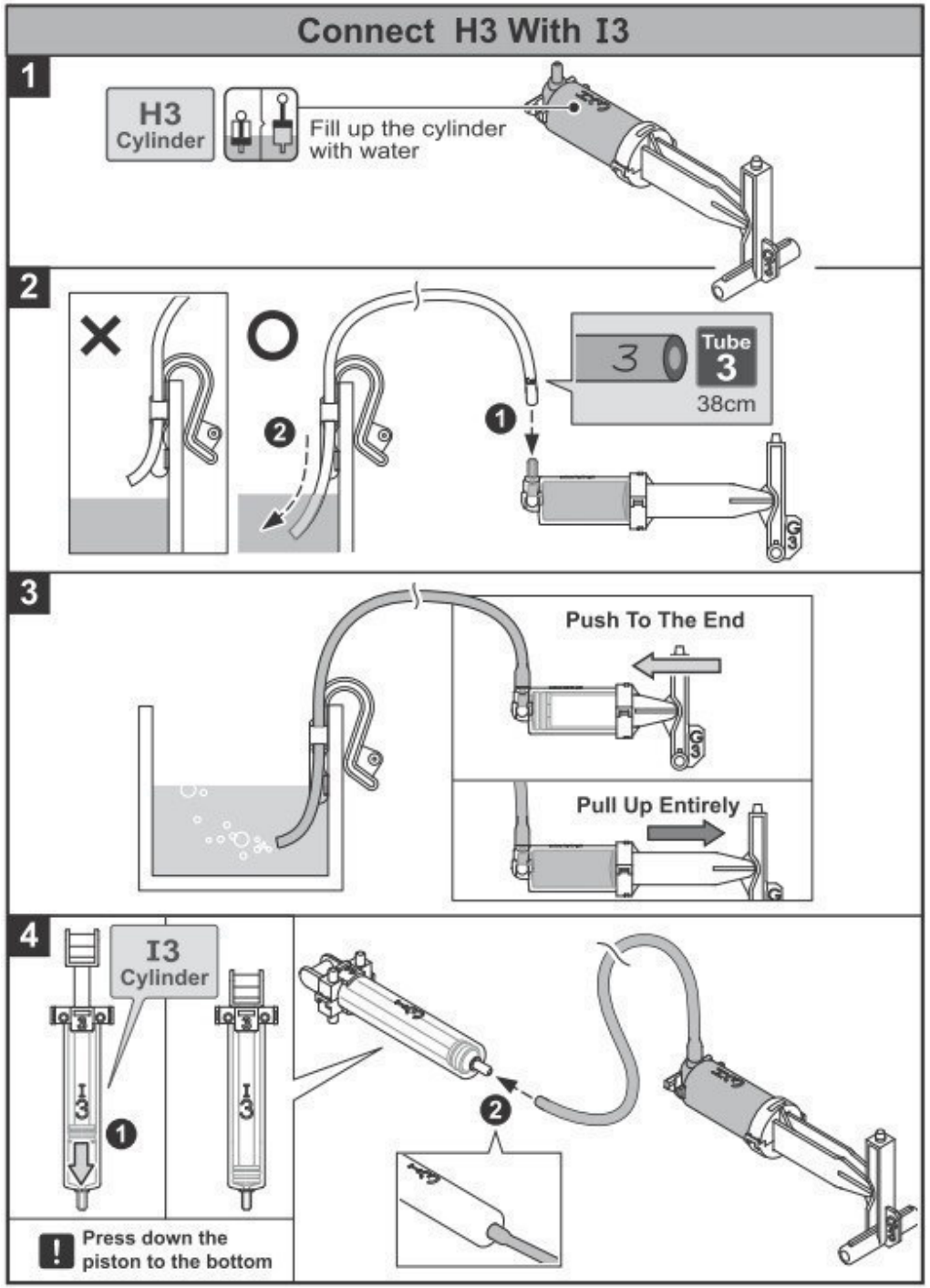

## Sluit H4 aan op I4

Vul de cilinder met water

Duw helemaal naar voor

Trek helemaal naar achter.

Duw de zuiger omlaag.



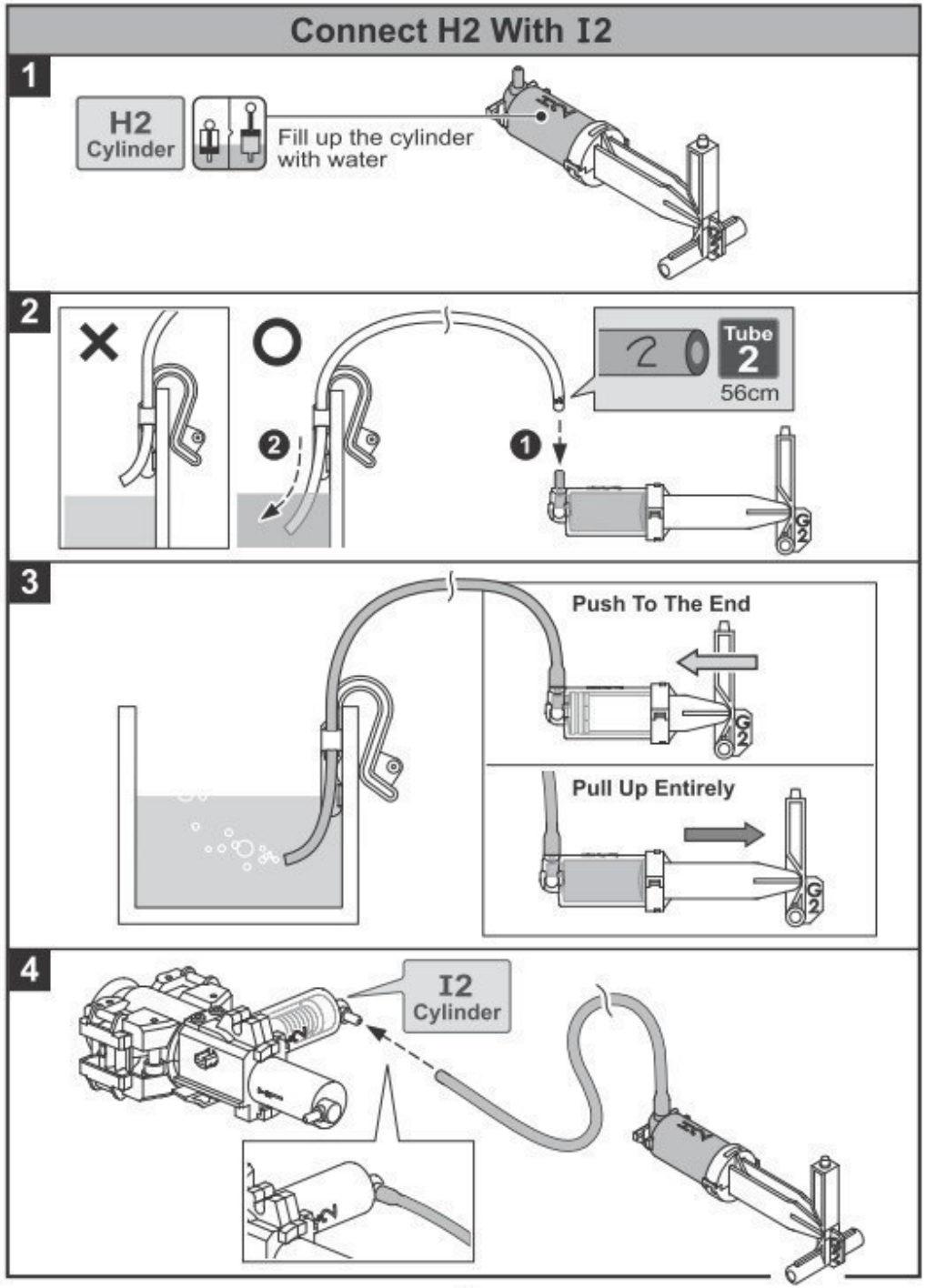

## Sluit H3 aan op I3

Vul de cilinder met water

Duw helemaal naar voor

Trek helemaal naar achter.

Duw de zuiger omlaag.

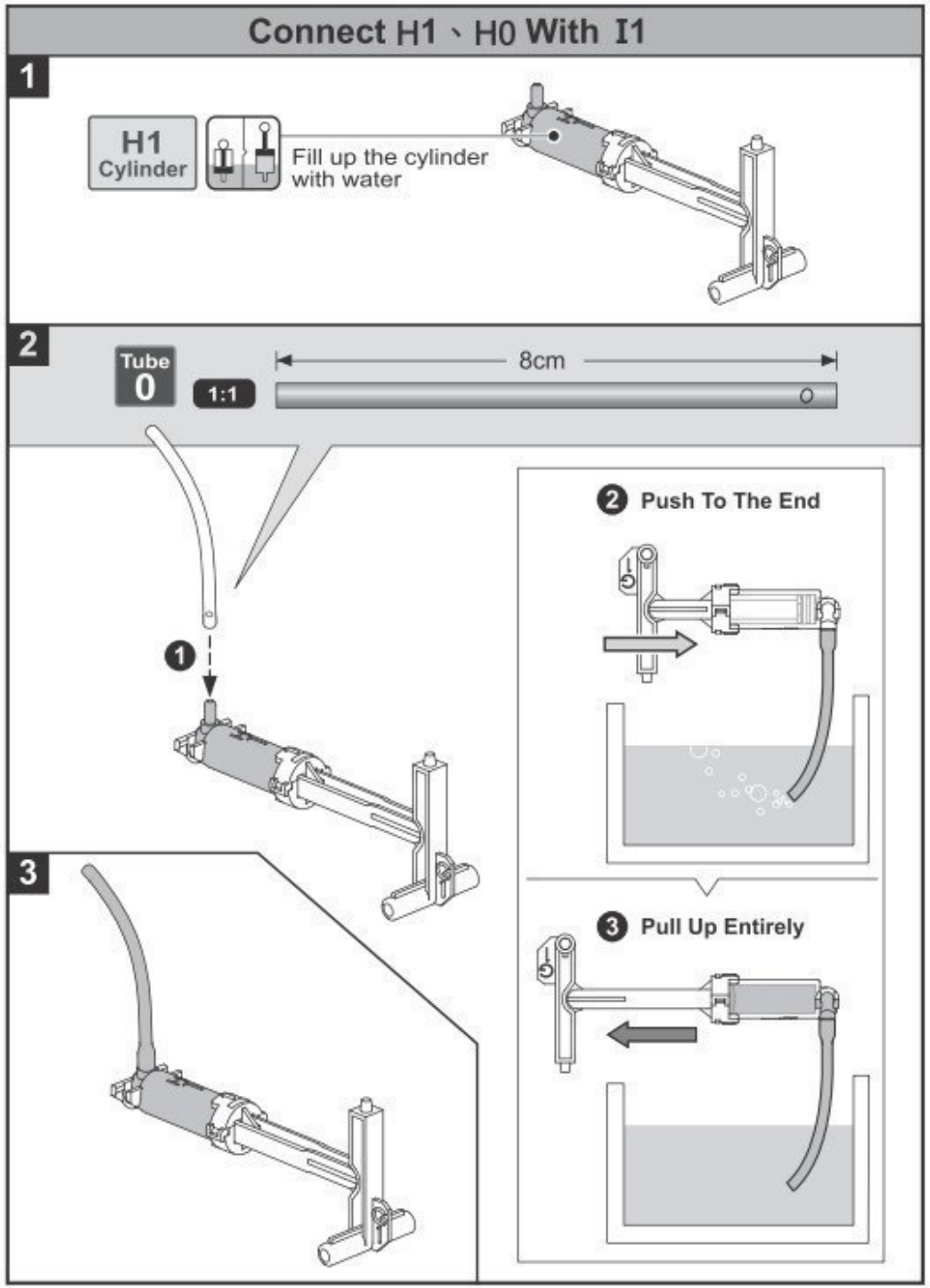



## Sluit H2 aan op I2

Vul de cilinder met water

Duw helemaal naar voor

Trek helemaal naar achter.



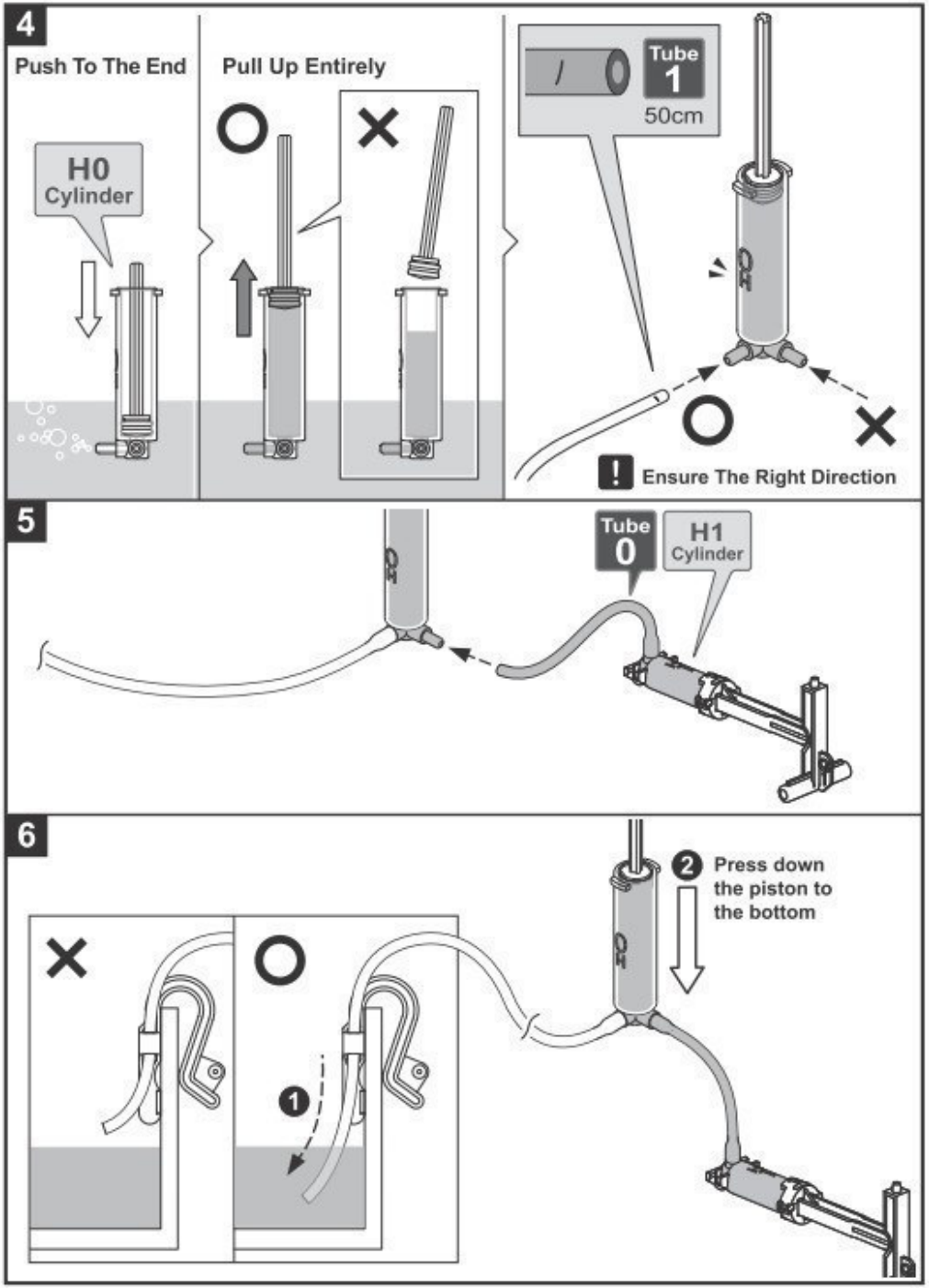



## Sluit H1 H0 aan op I1

Vul de cilinder met water

Duw helemaal naar voor

Trek helemaal naar achter.

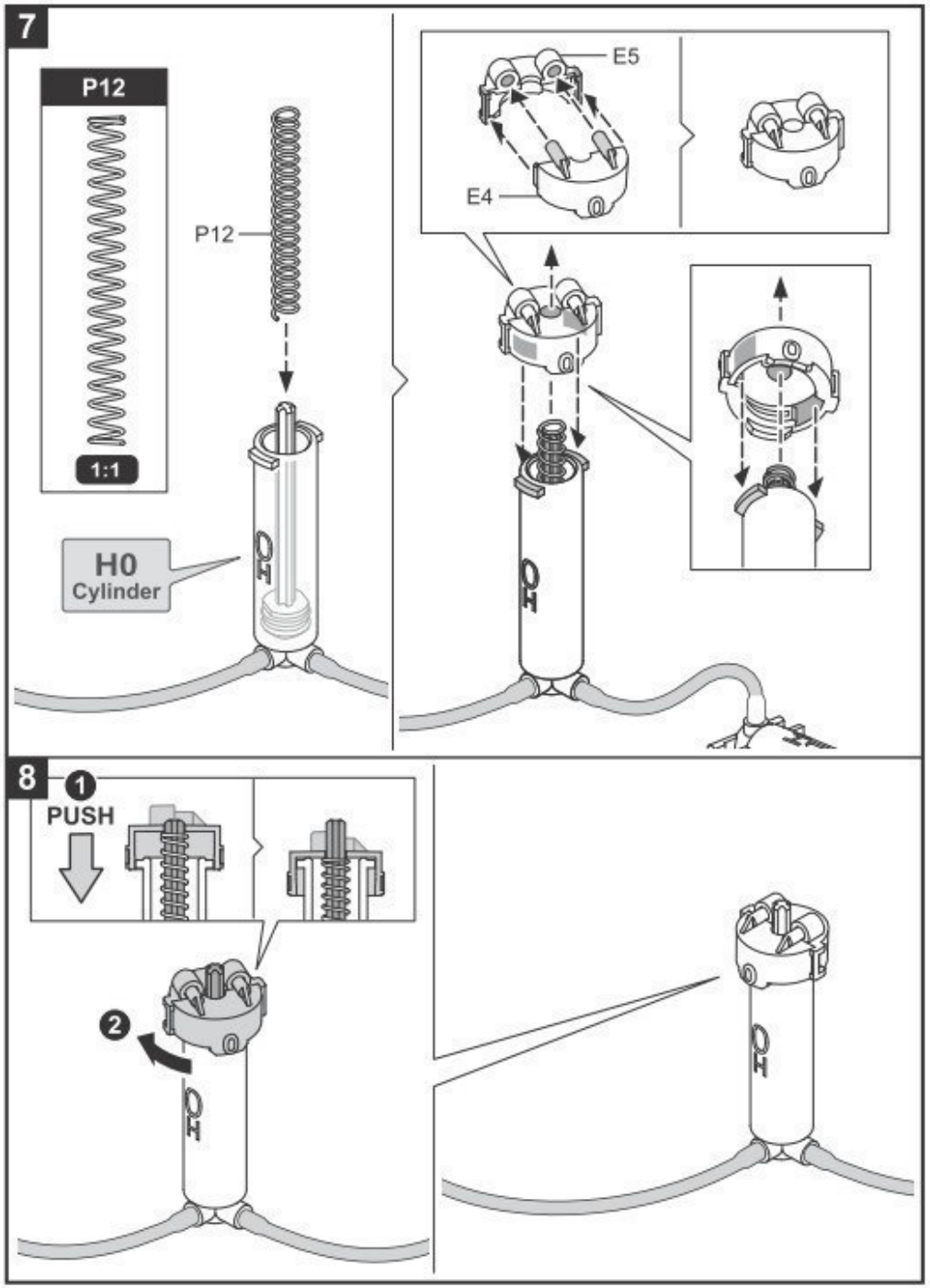



Duw helemaal naar voor

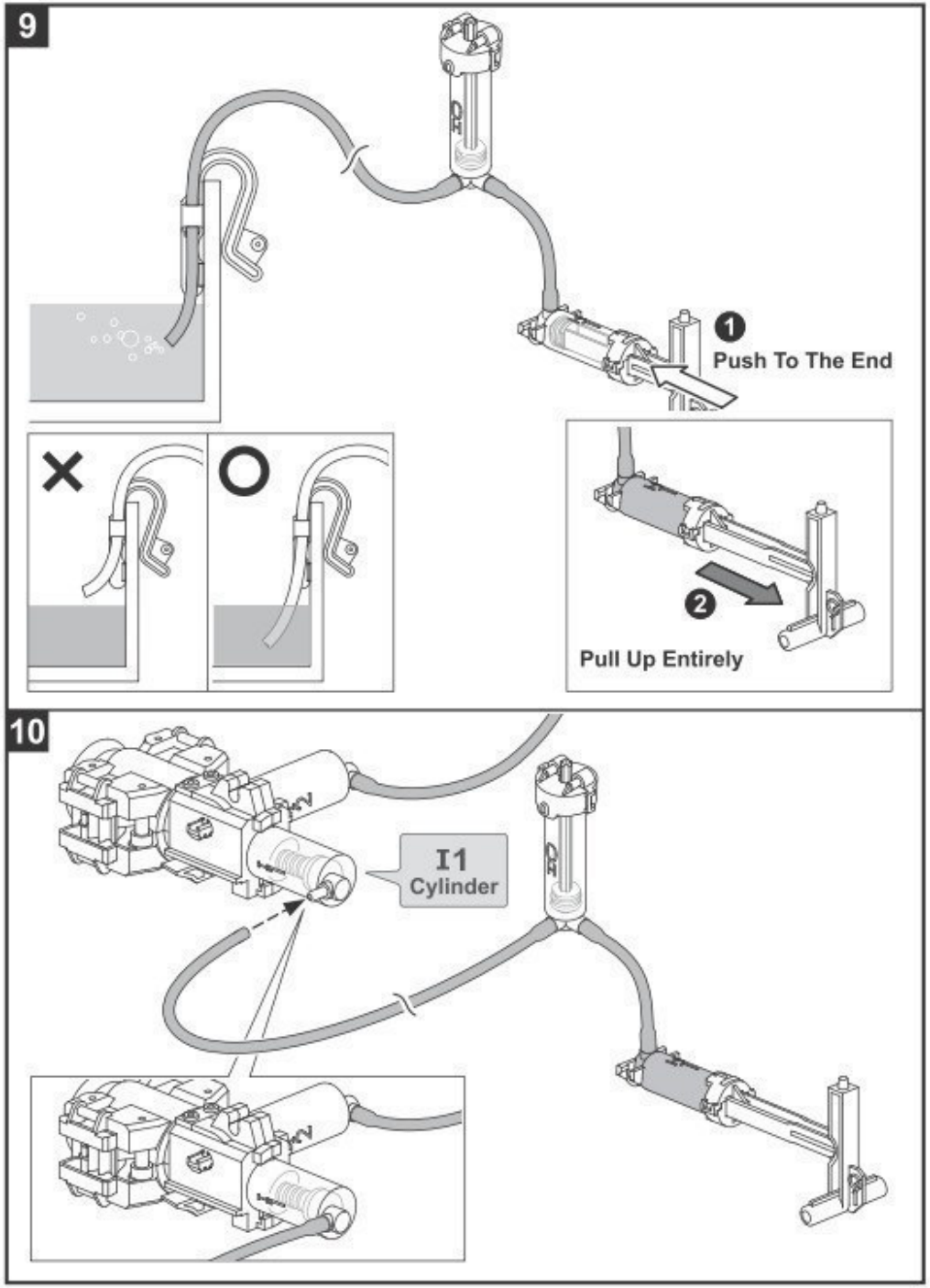
Trek helemaal naar achter.

Let op de correcte montagerichting.

Duw de zuiger omlaag.




DUWEN

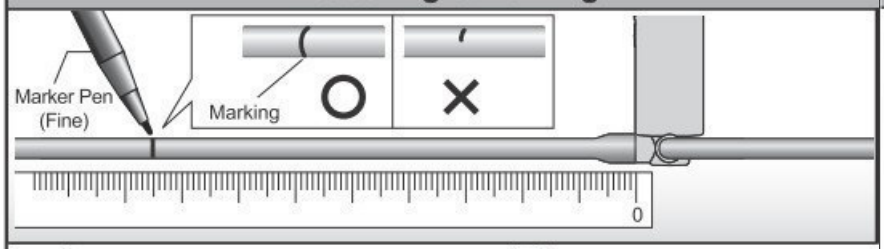


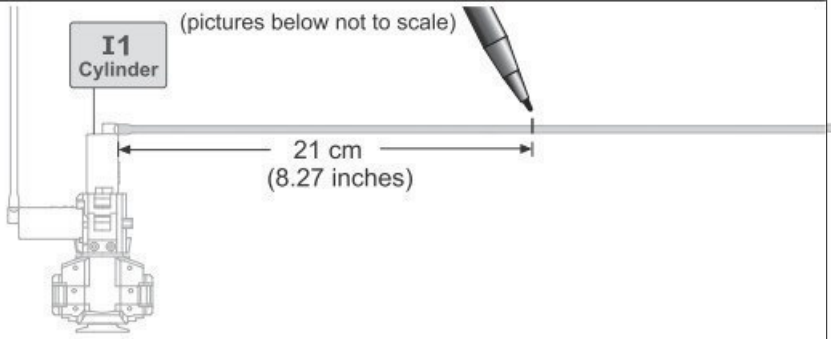

Duw helemaal naar voor

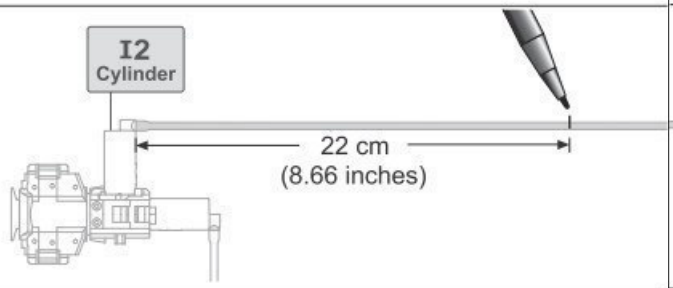
Trek helemaal naar achter.

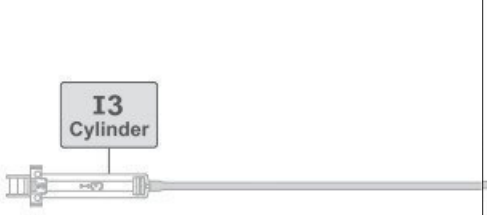
**De onderstaande afbeeldingen zijn niet op schaal.**

## Measuring & Marking

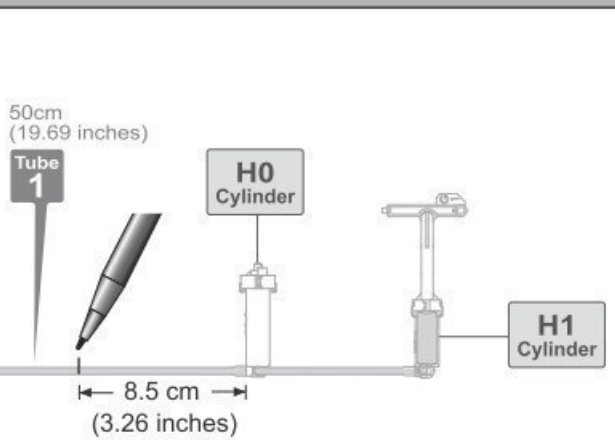


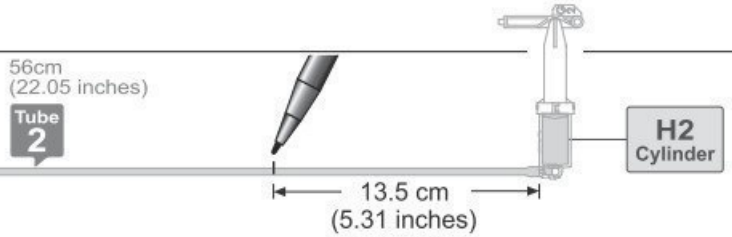



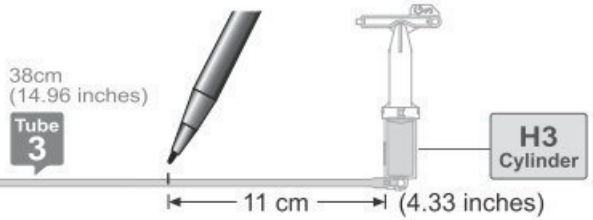



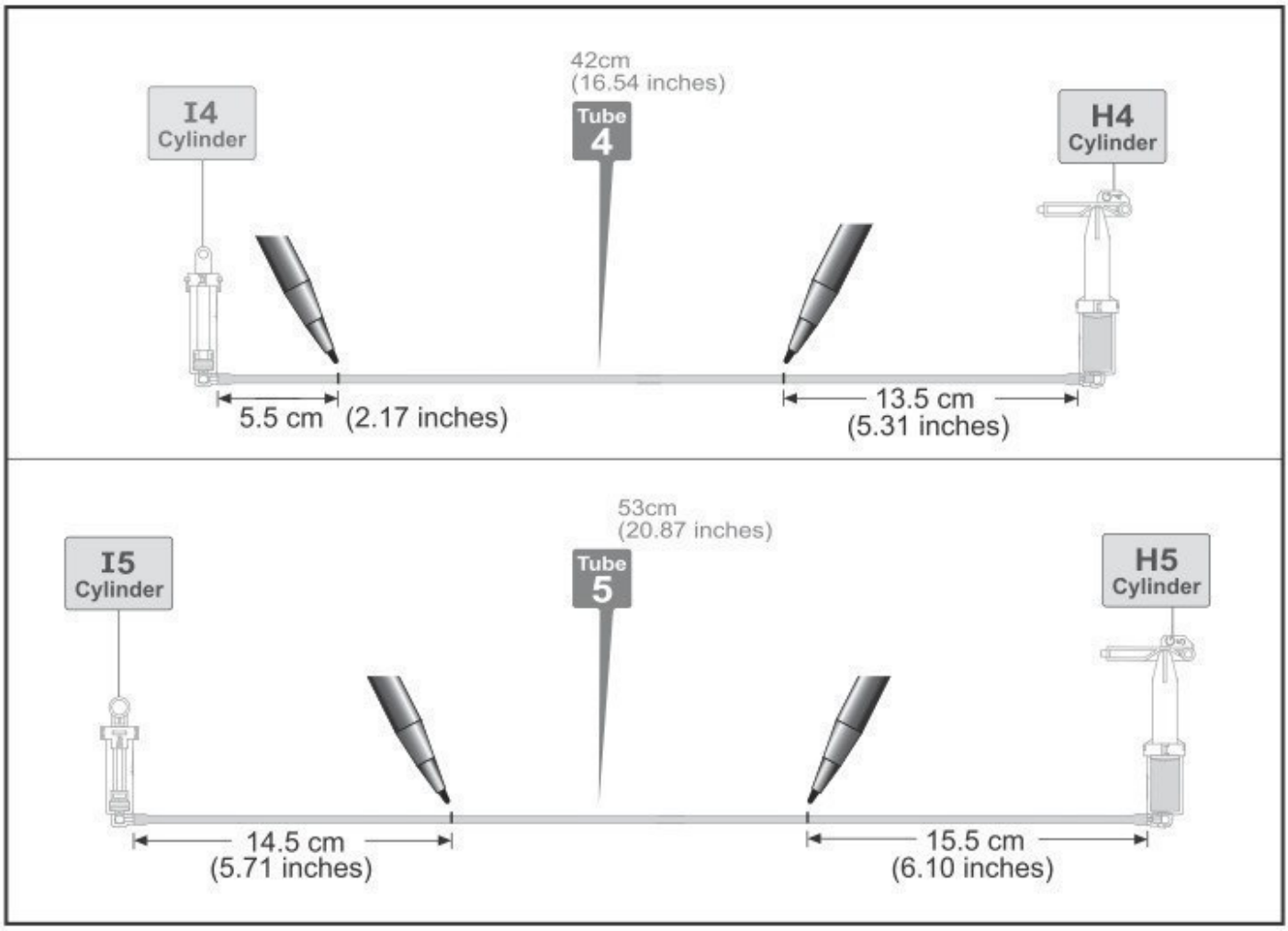





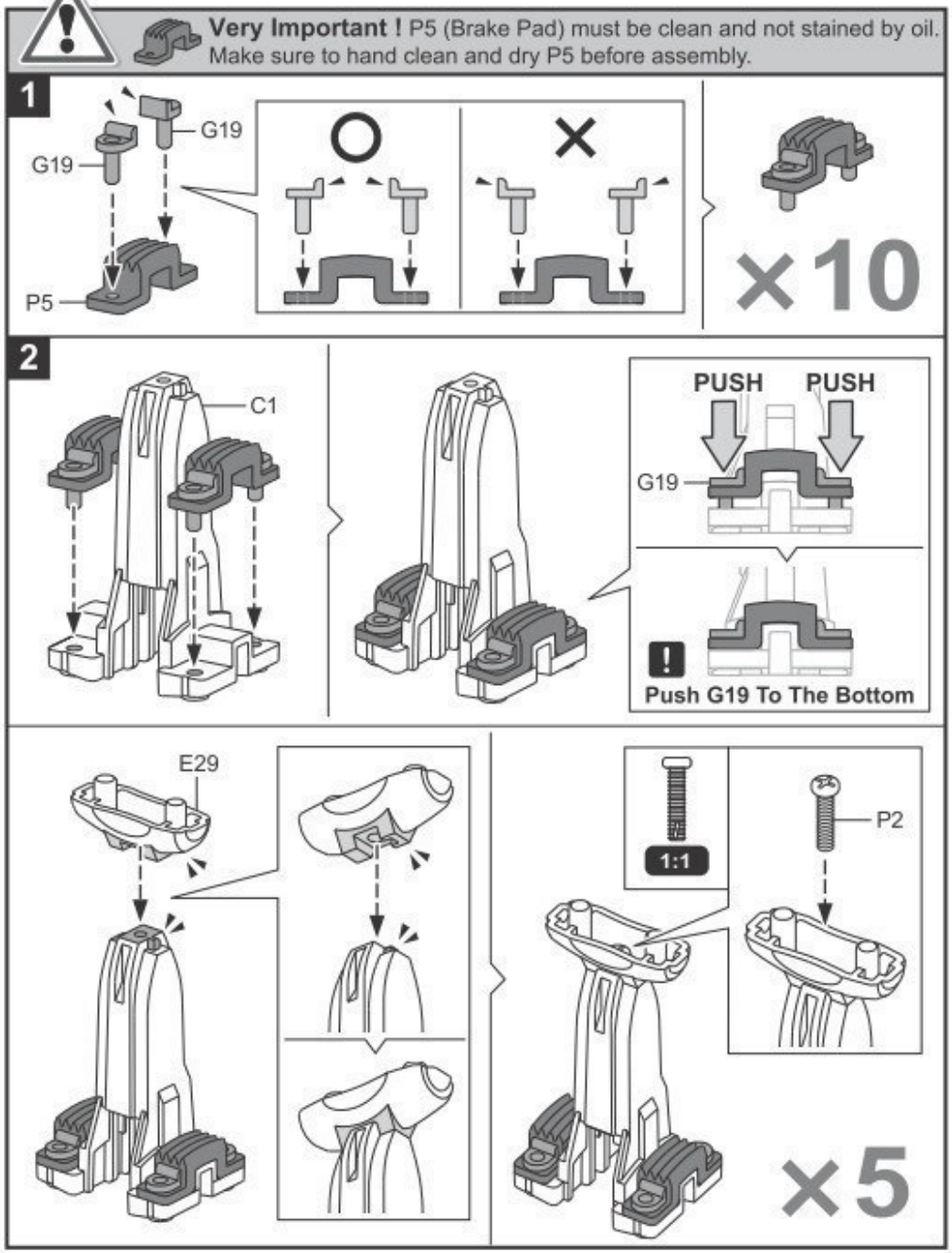




42cm
(16.54 inches)
I4
Cylinder
Tube
4
H4
Cylinder
5.5 cm
(2.17 inches)
13.5 cm
(5.31 inches)
53cm
(20.87 inches)
I5
Cylinder
Tube
5
H5
Cylinder
14.5 cm
(5.71 inches)
15.5 cm
(6.10 inches)

## Lever Controller Assembly



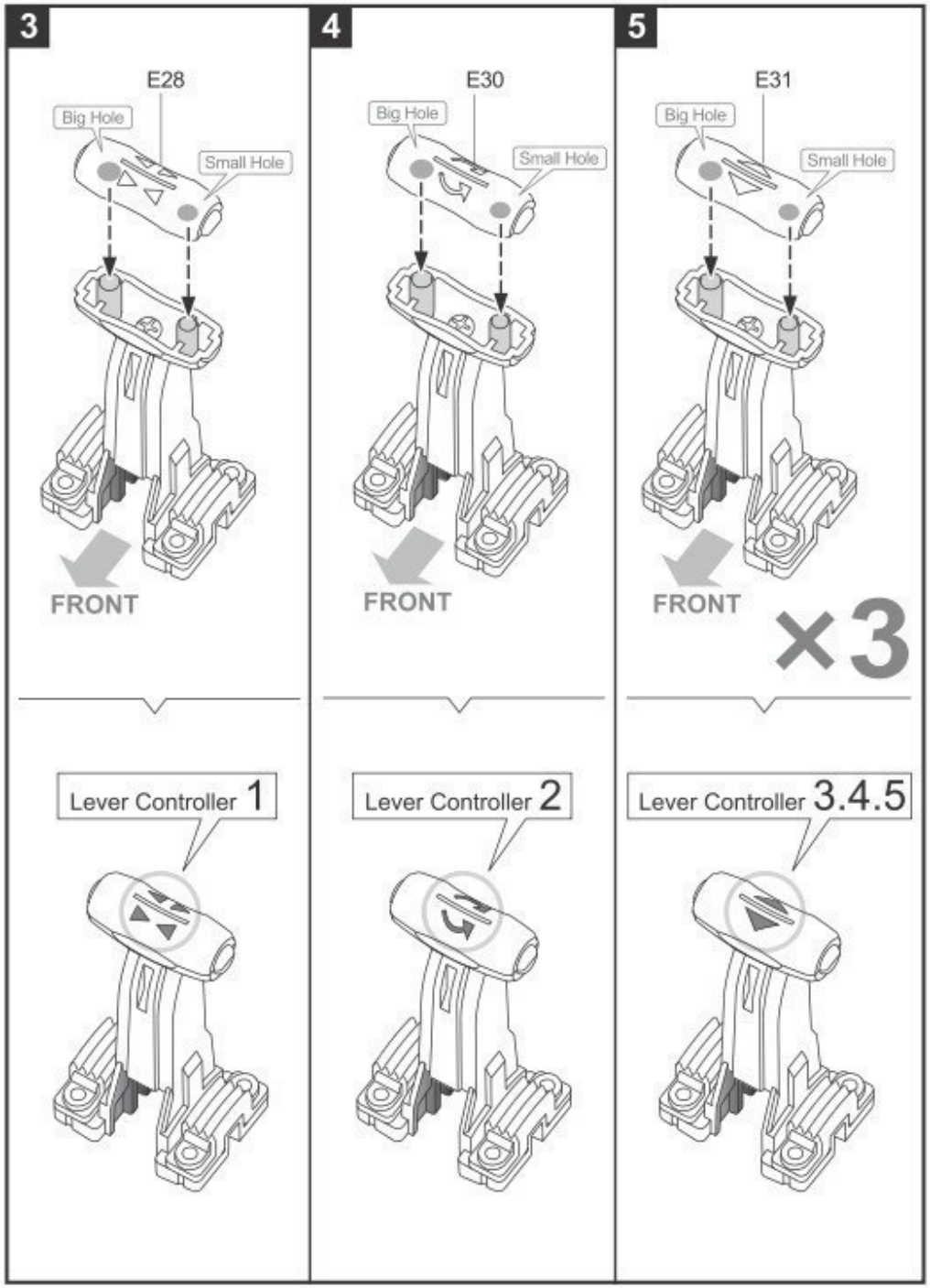



## Montage hendel

Zeer belangrijk
P5 (Remblokje) moet proper en vetvrij zijn.
Zorg ervoor dat P5 proper en droog is voor de montage.

DUWEN

Duw G19 omlaag.




Grote opening
kleine opening

VOORKANT

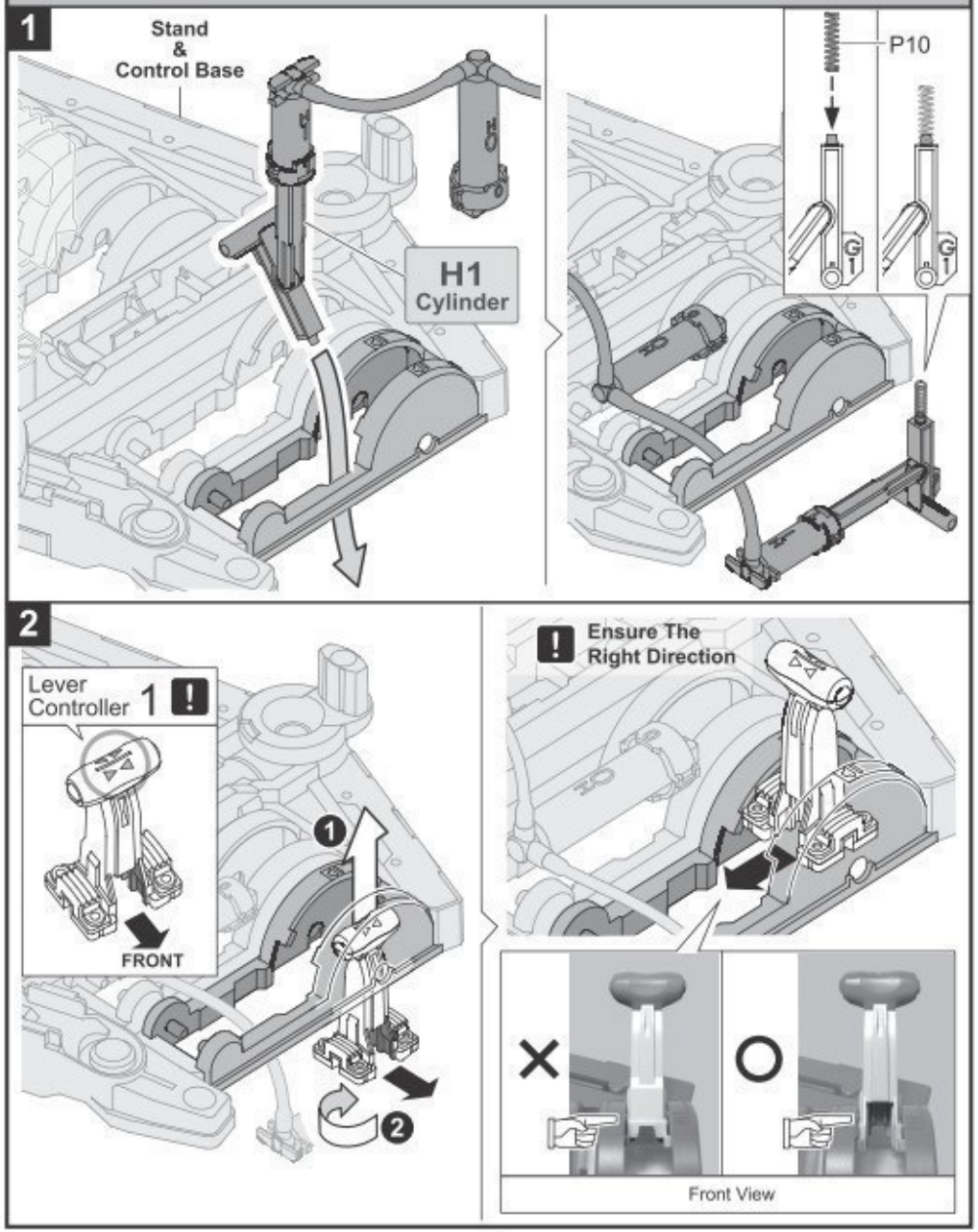
Hendel 1

Hendel 2

Hendel 3, 4, 5

# Control Moduel Assembly

## Unit 1: H0.H1 Cylinder & Lever Controller 1






# Besturingsmodule

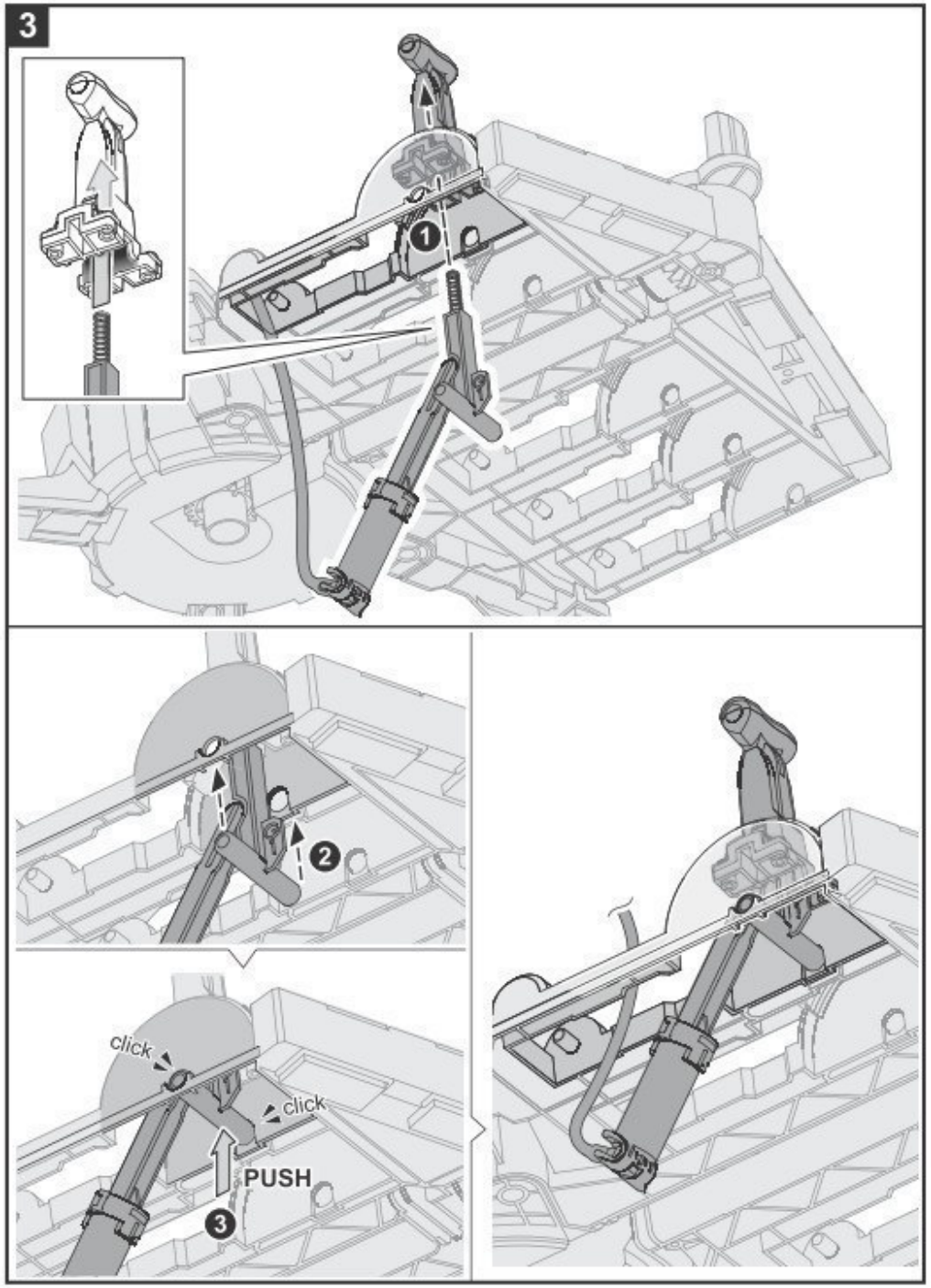
## Eenheid 1: H0.H-cilinder & hendel 1

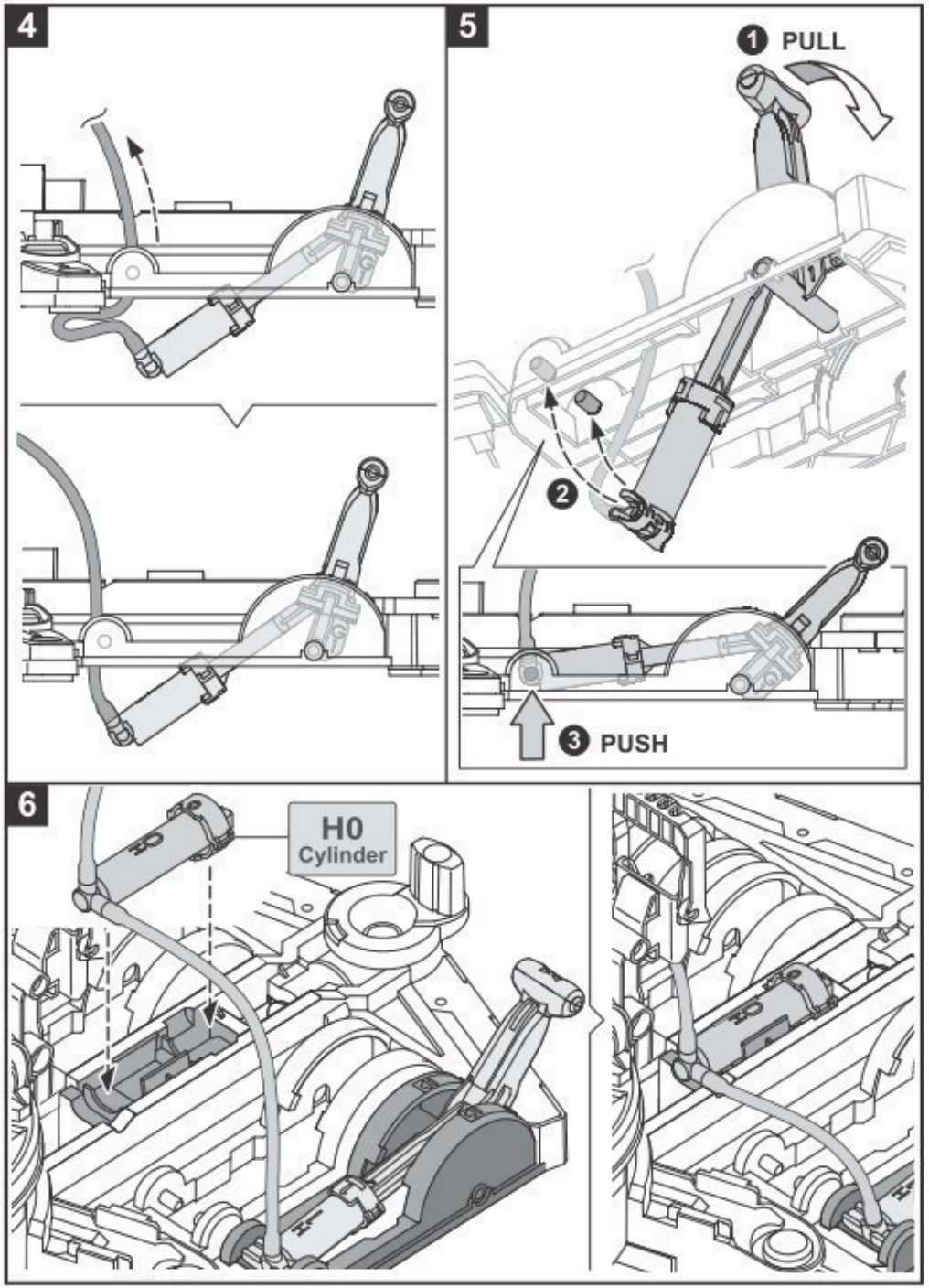
Voet & Besturingseenheid

Hendel 1

Let op de correcte montagerichting

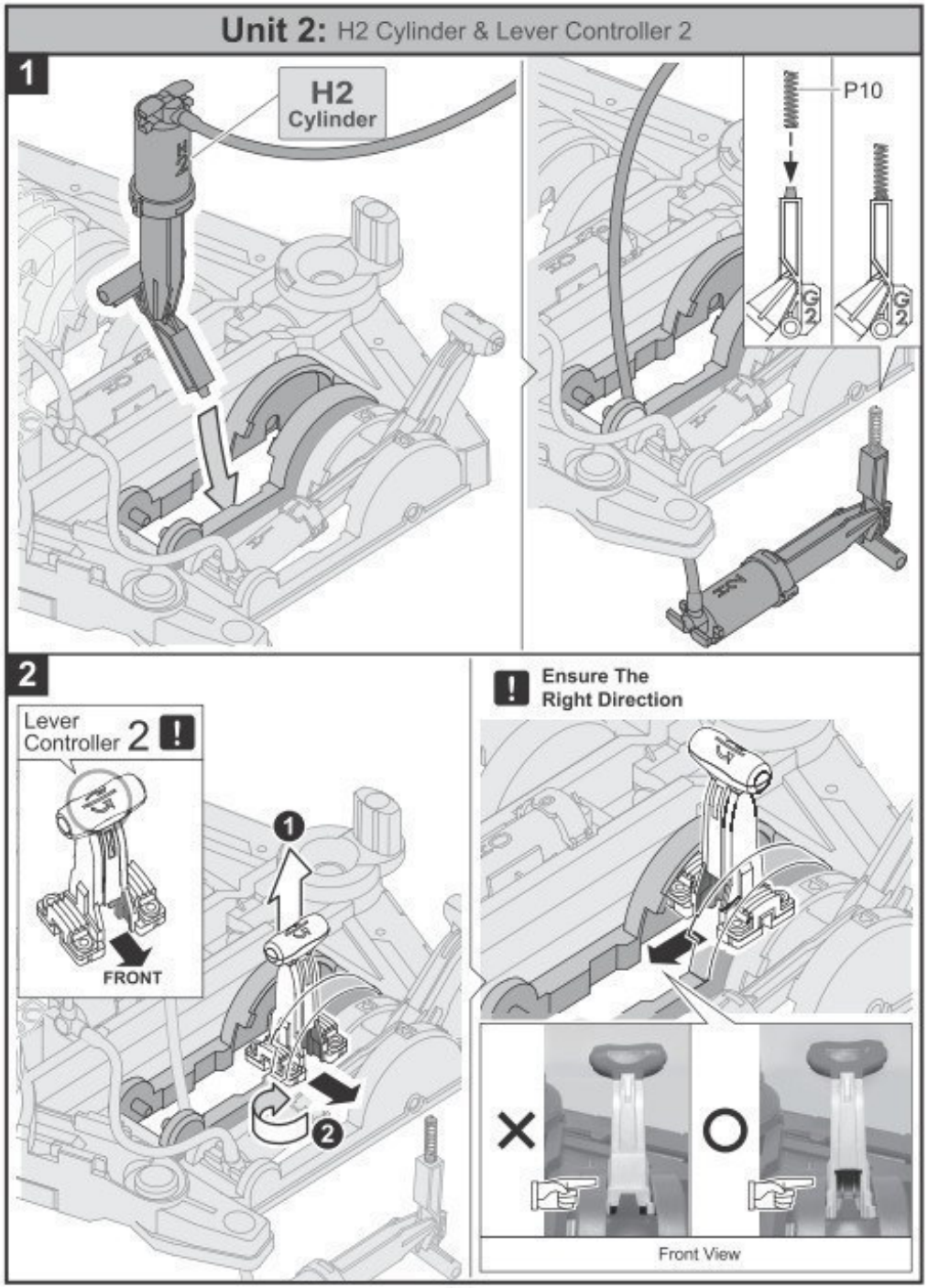
Voorkant


3
1
2
click
click
PUSH
3




TREKKEN

DUWEN



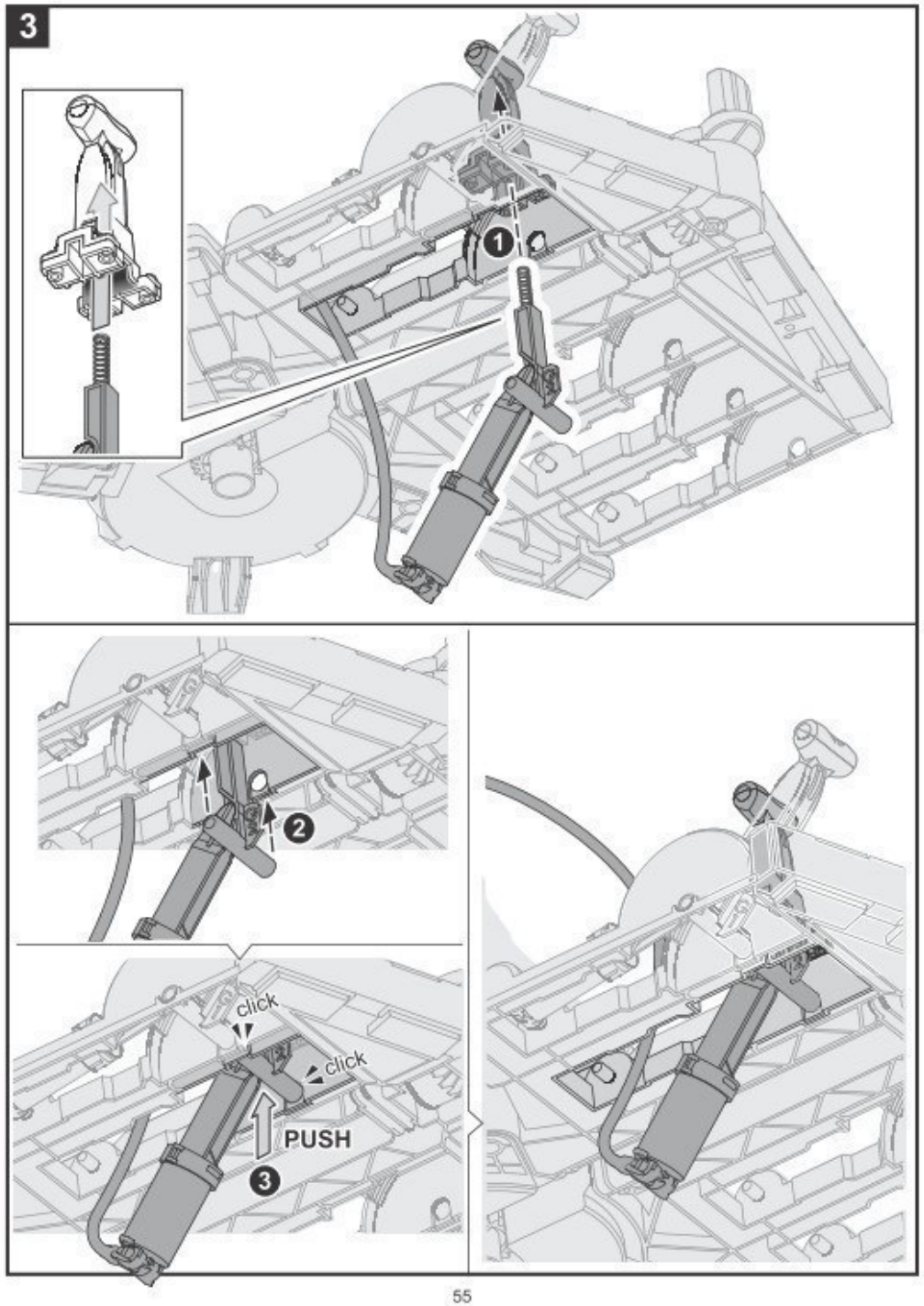



# Eenheid 2: H2-cilinder & hendel 2

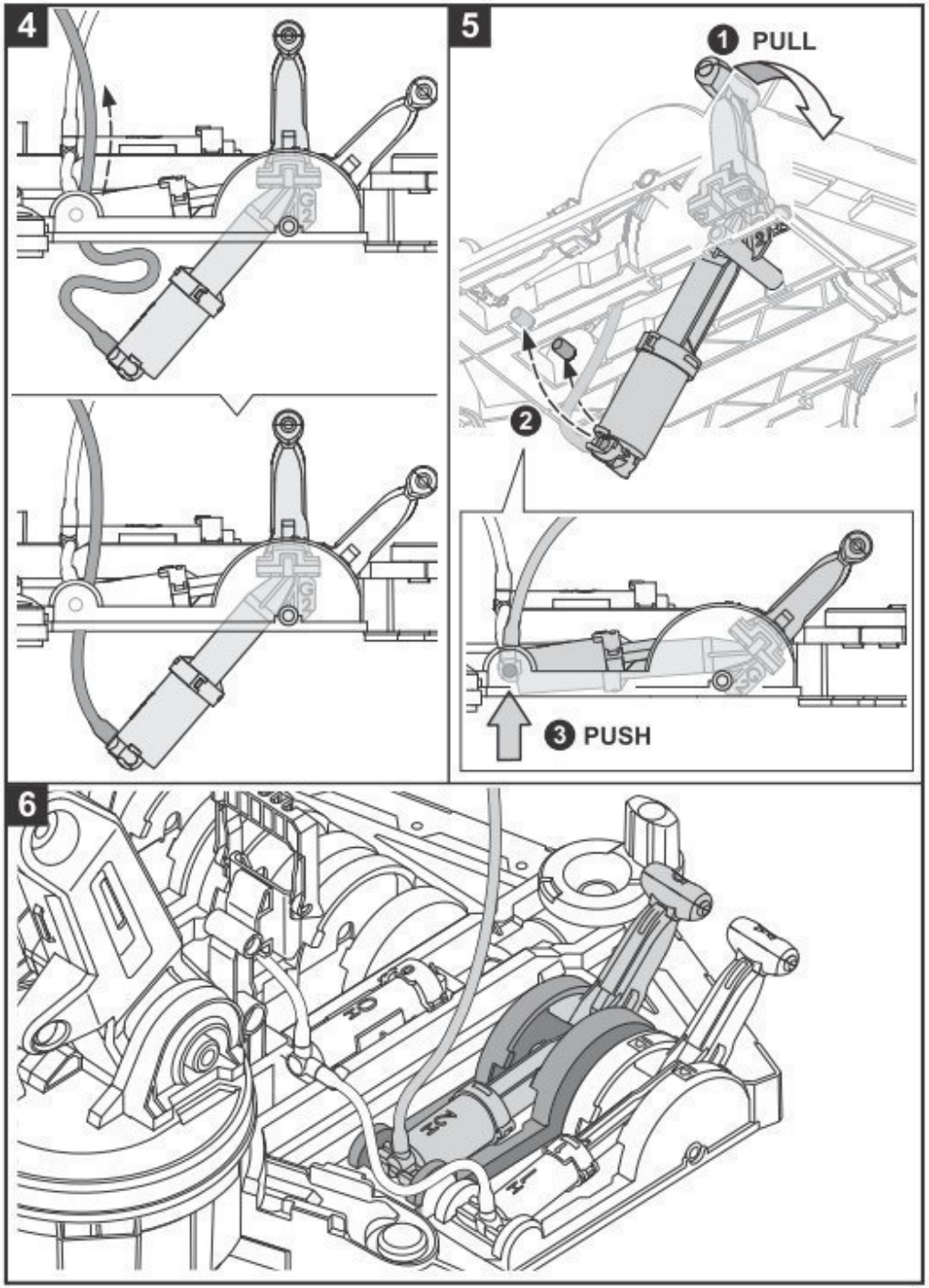
Hendel 2

Let op de correcte montagerichting

Voorkant

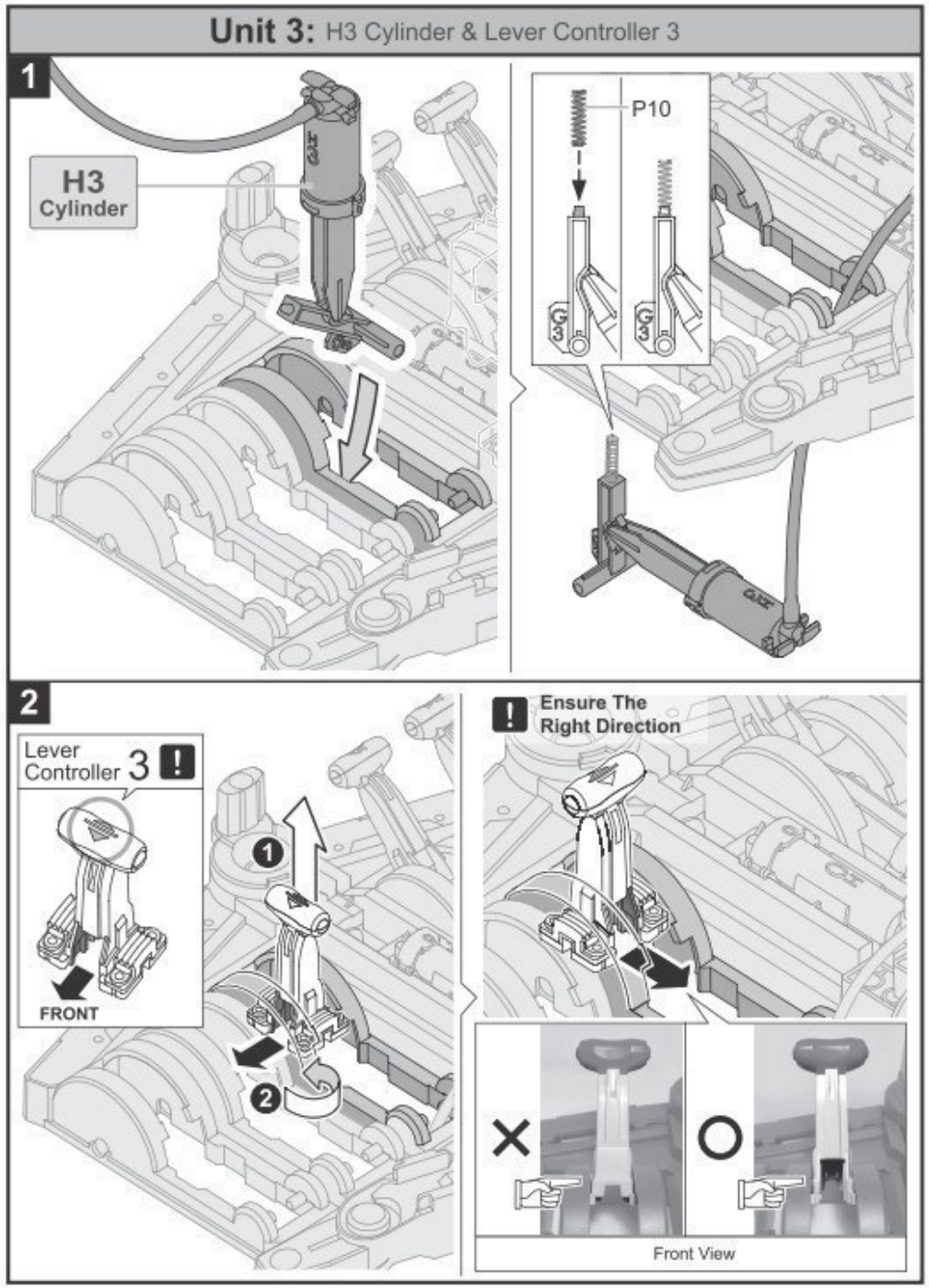



DUWEN




TREKKEN

DUWEN



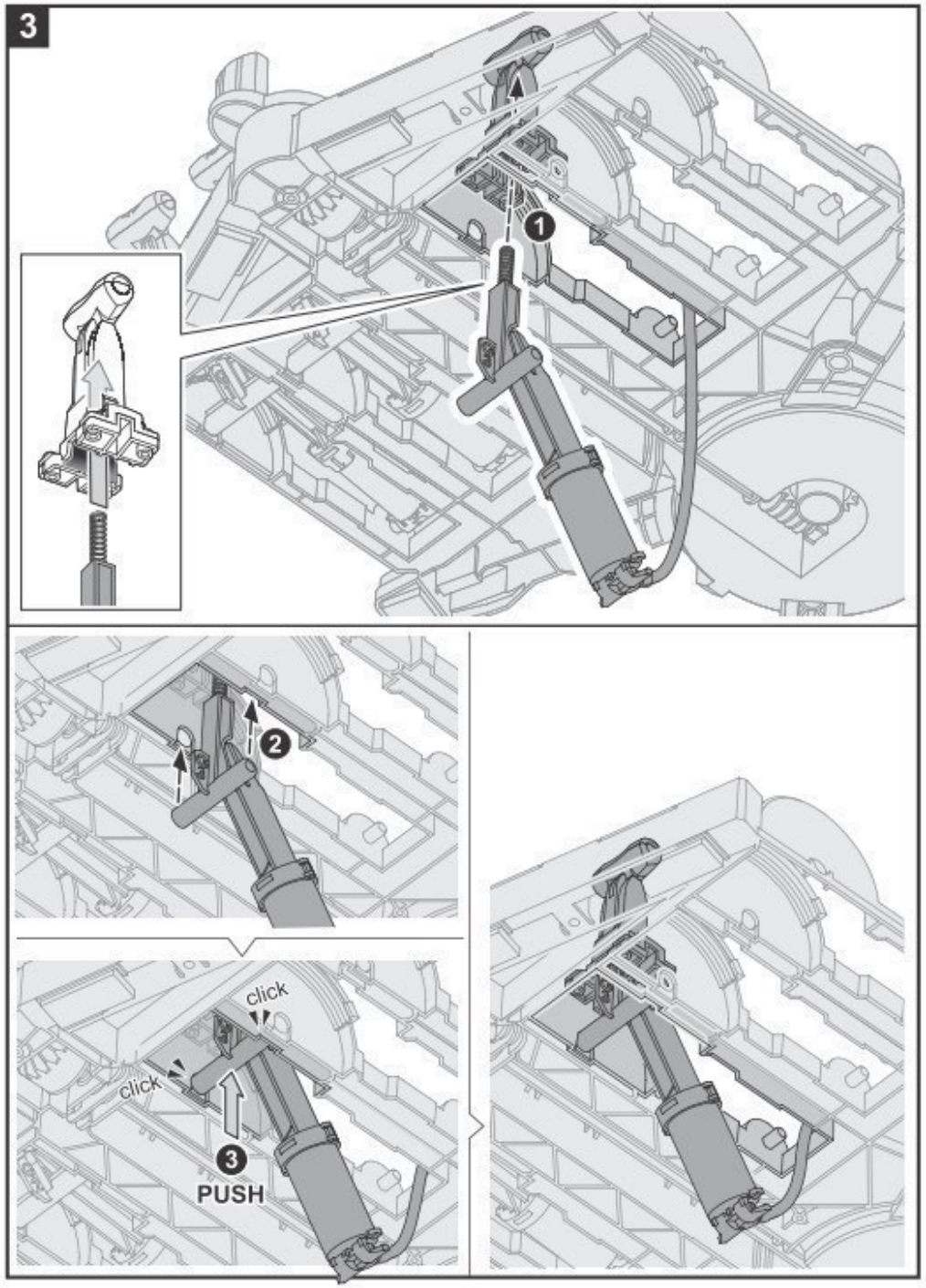



# Eenheid 3: H3-cilinder & hendel 3

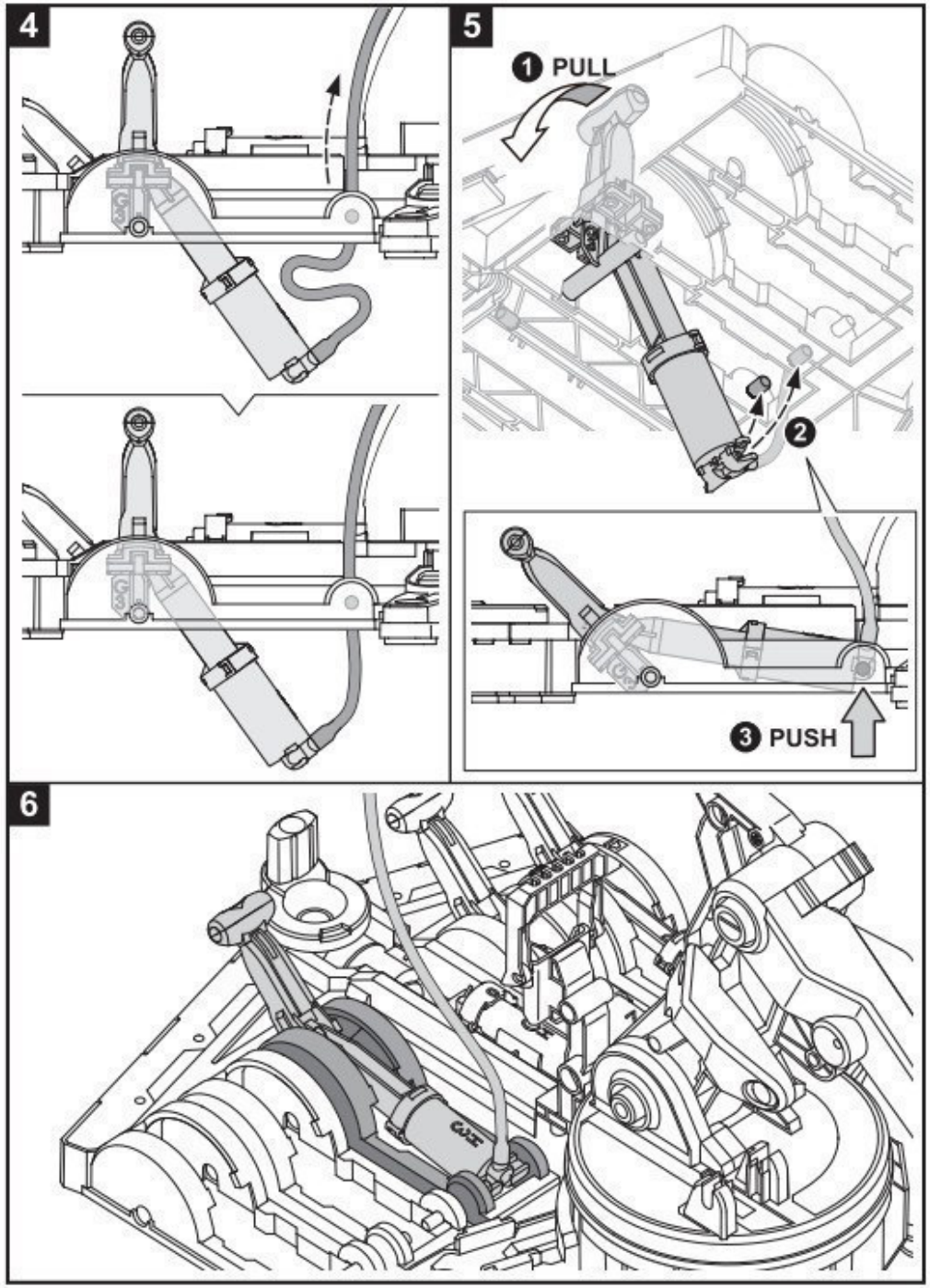
Hendel 3

Let op de correcte montagerichting

Voorkant

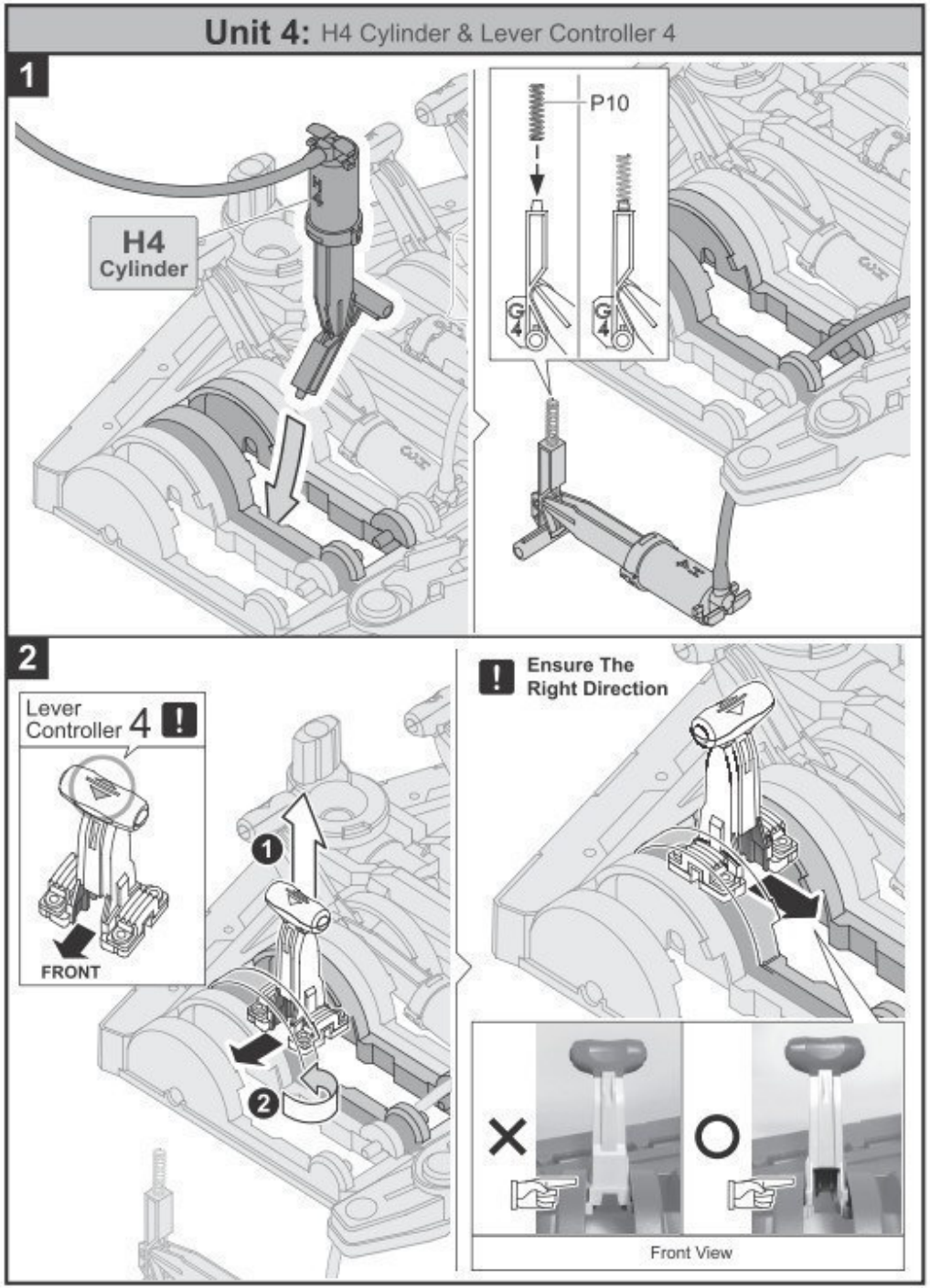



DUWEN




TREKKEN

DUWEN



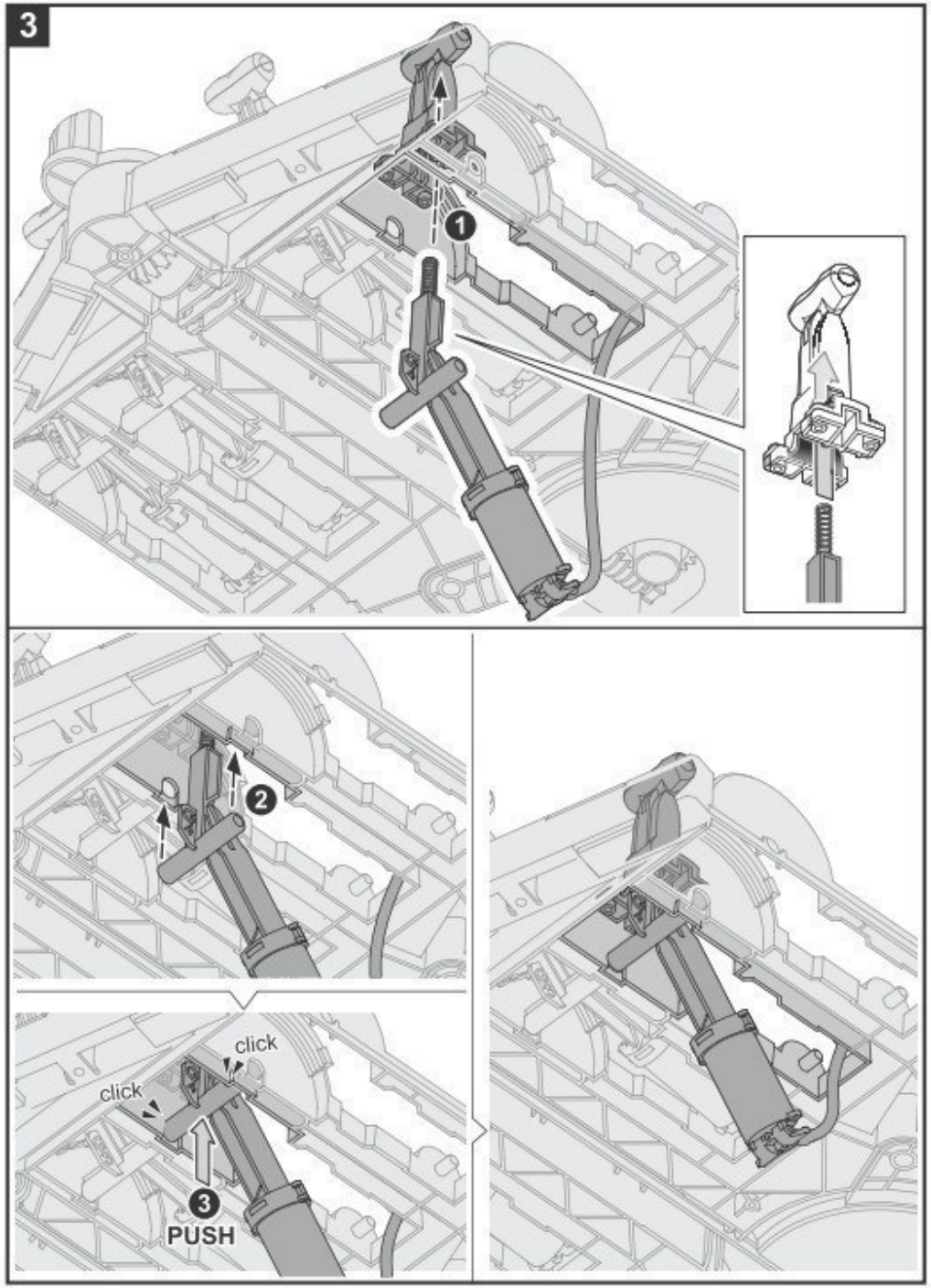



# Eenheid 4: H4-cilinder & hendel 4

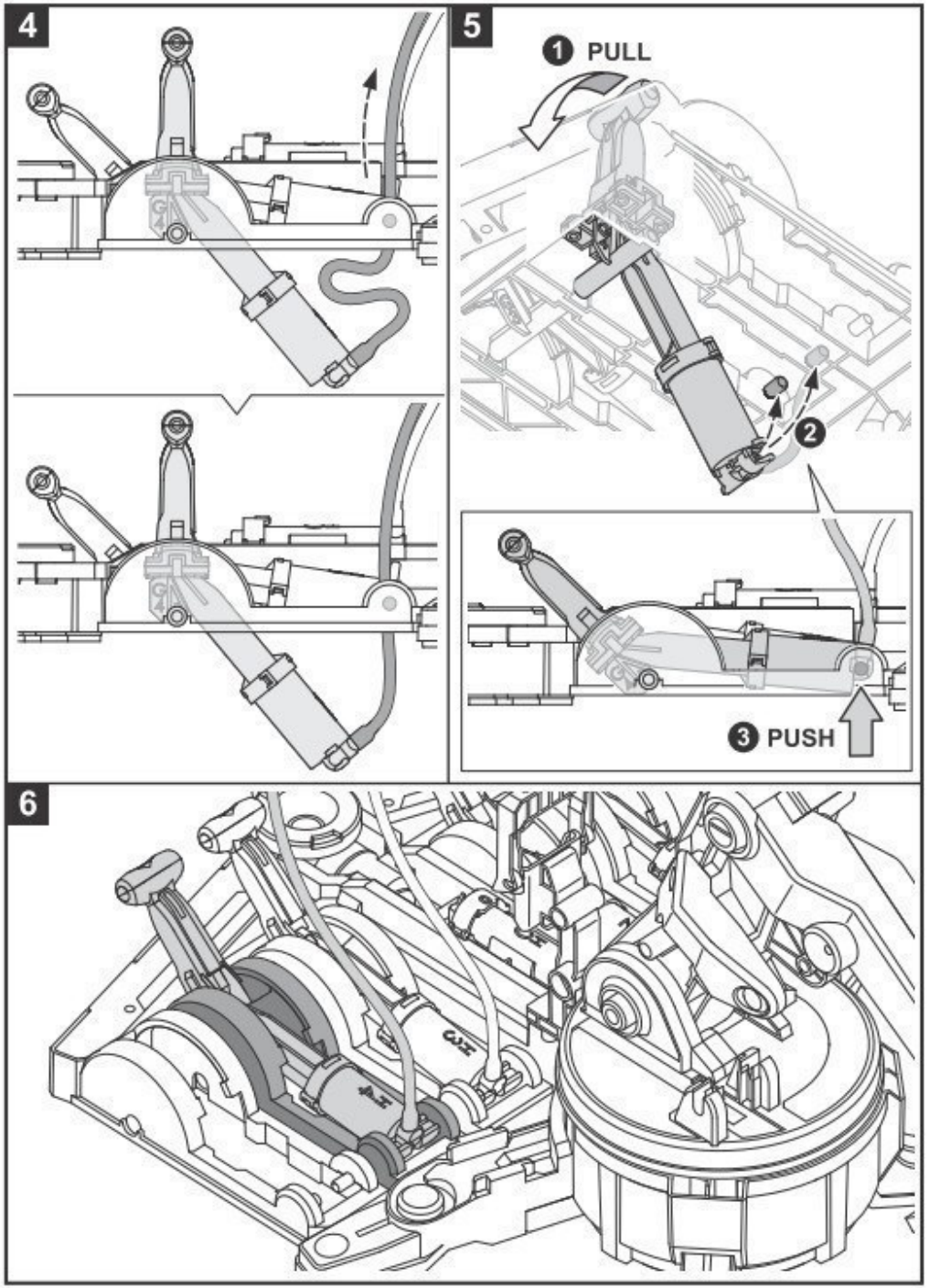
Hendel 4

Let op de correcte montagerichting

Voorkant

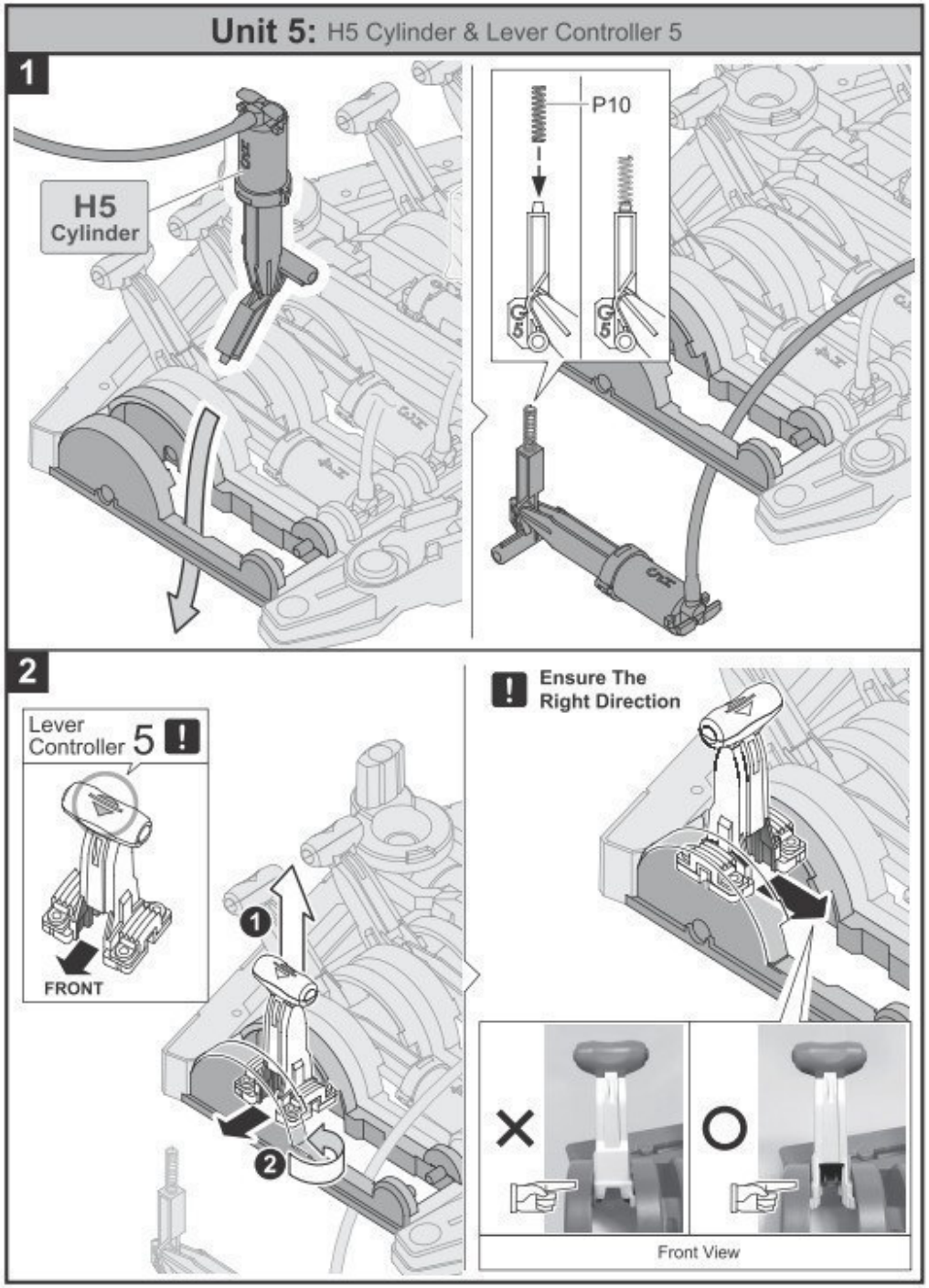



DUWEN




TREKKEN

DUWEN



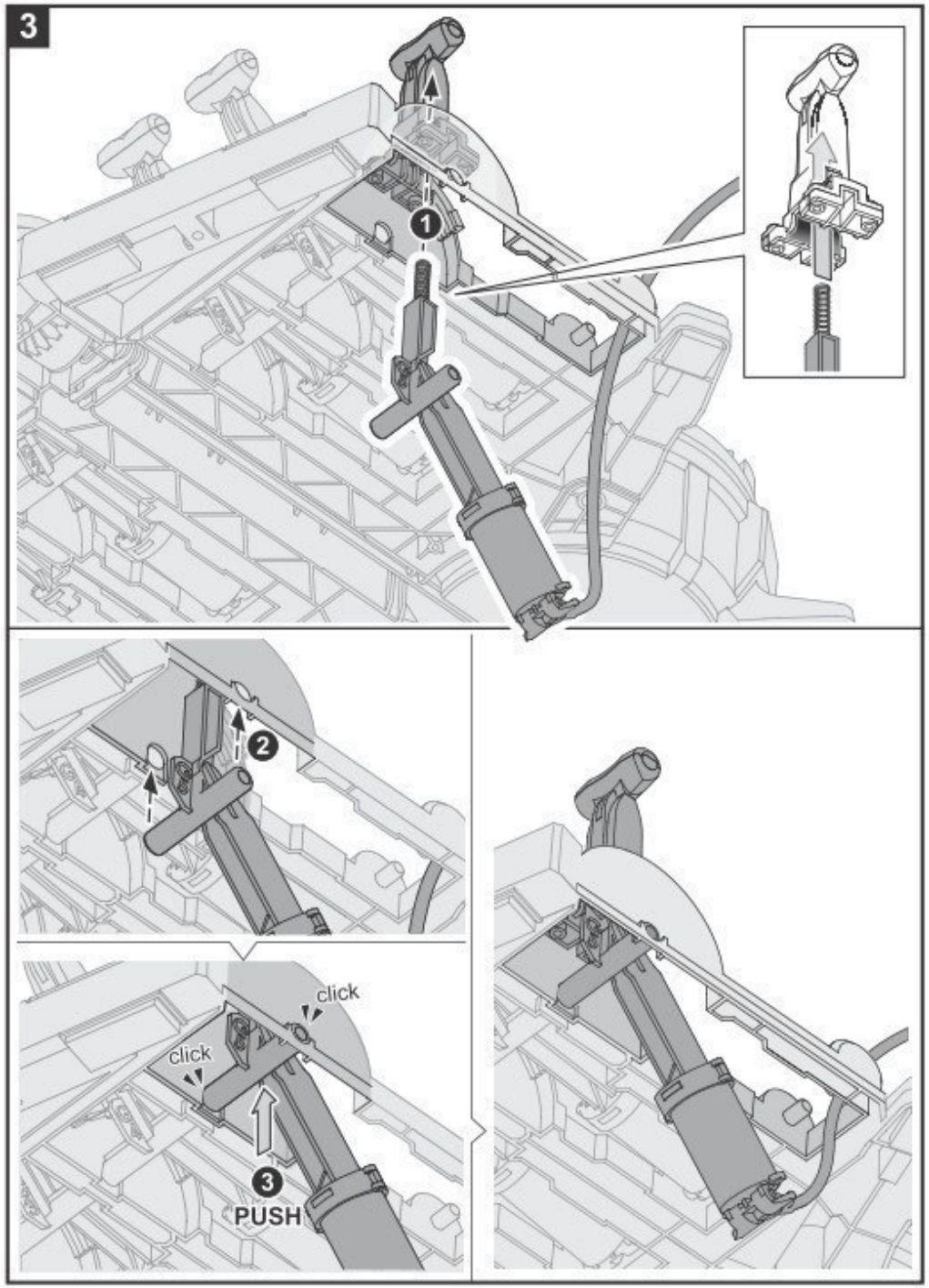



# Eenheid 5: H5-cilinder & hendel 5

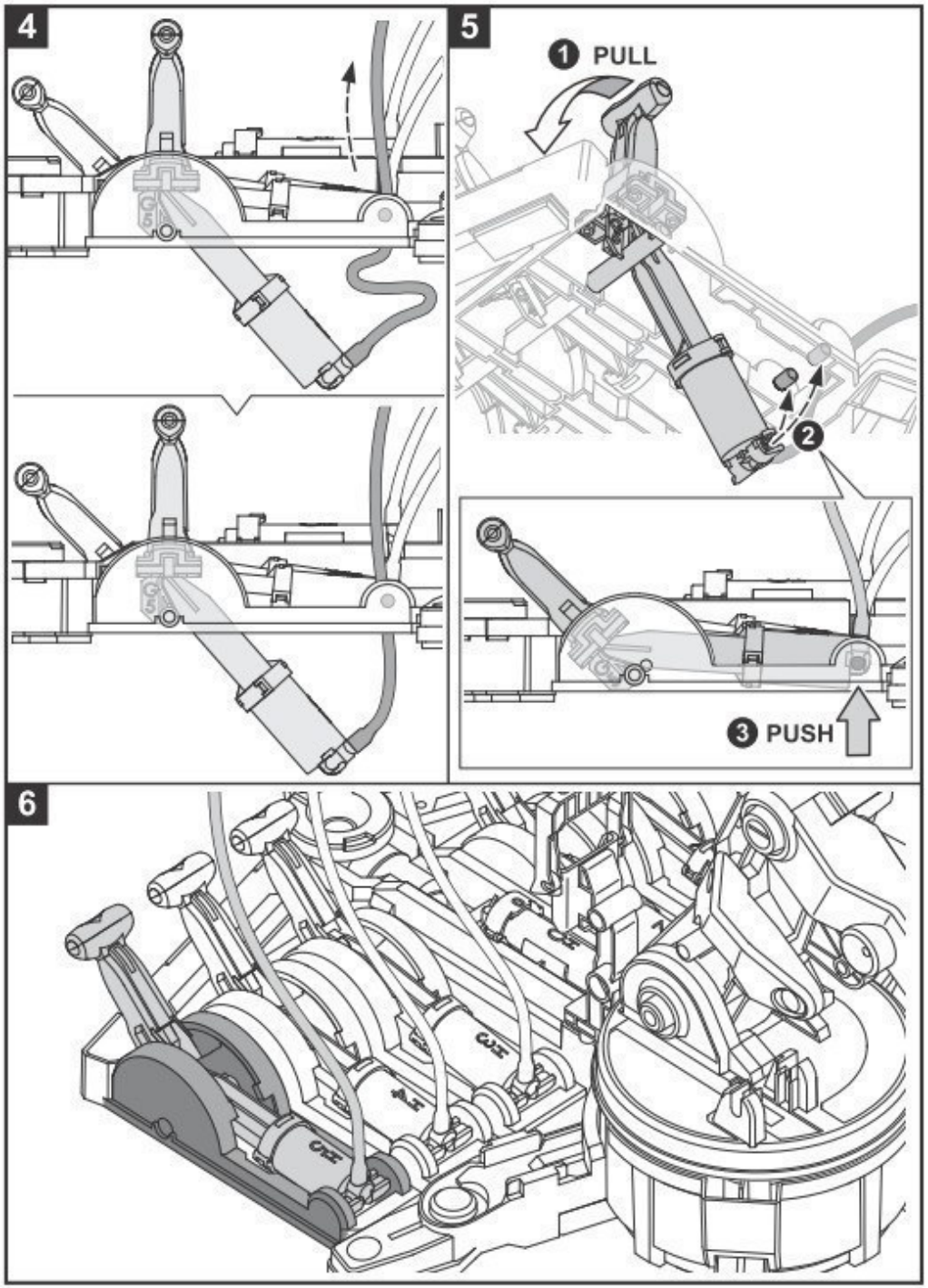
Hendel 5

Let op de correcte montagerichting

Voorkant



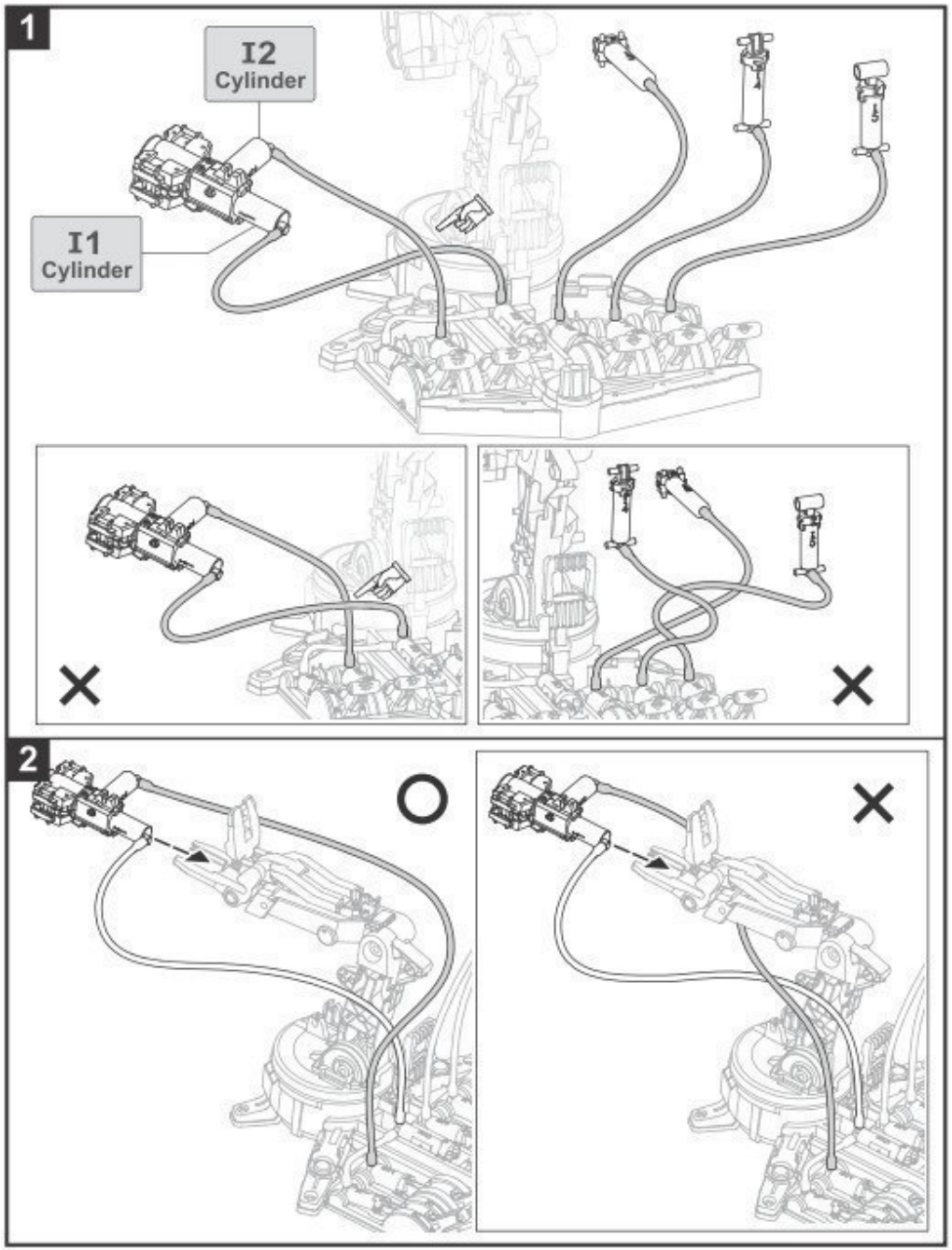

DUWEN




TREKKEN

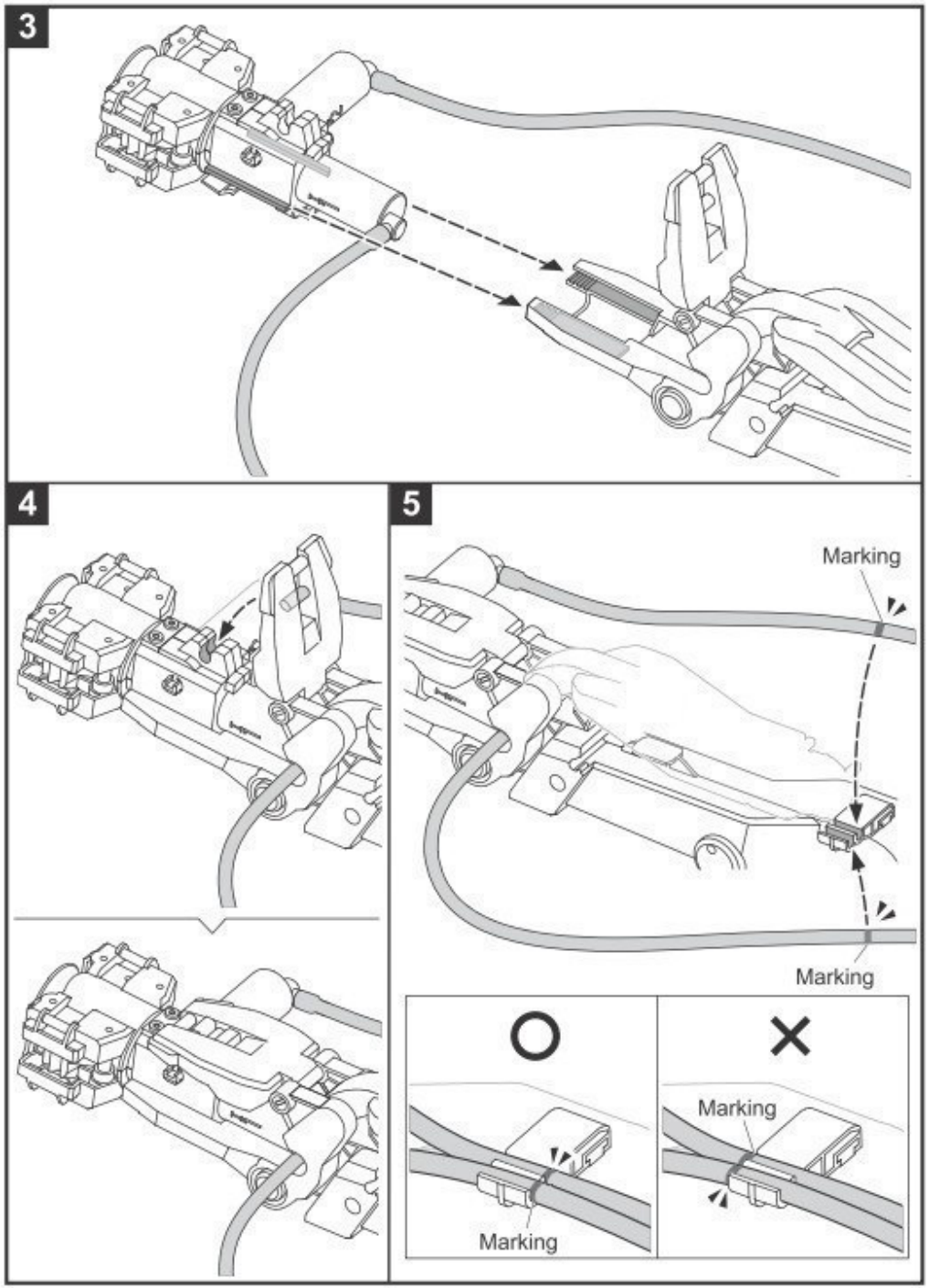
DUWEN

## Robot Arm Module Assembly



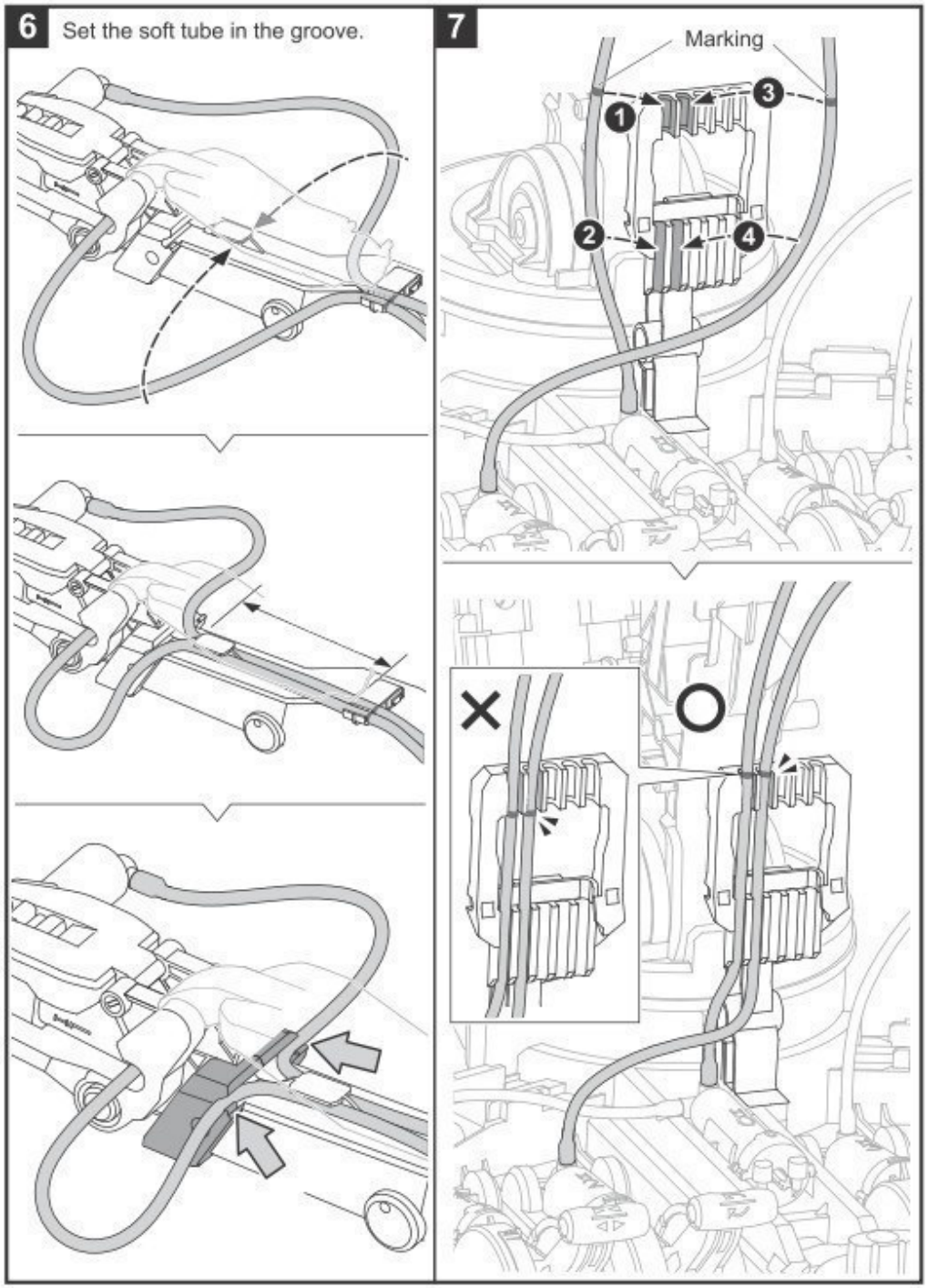



## Robotarm



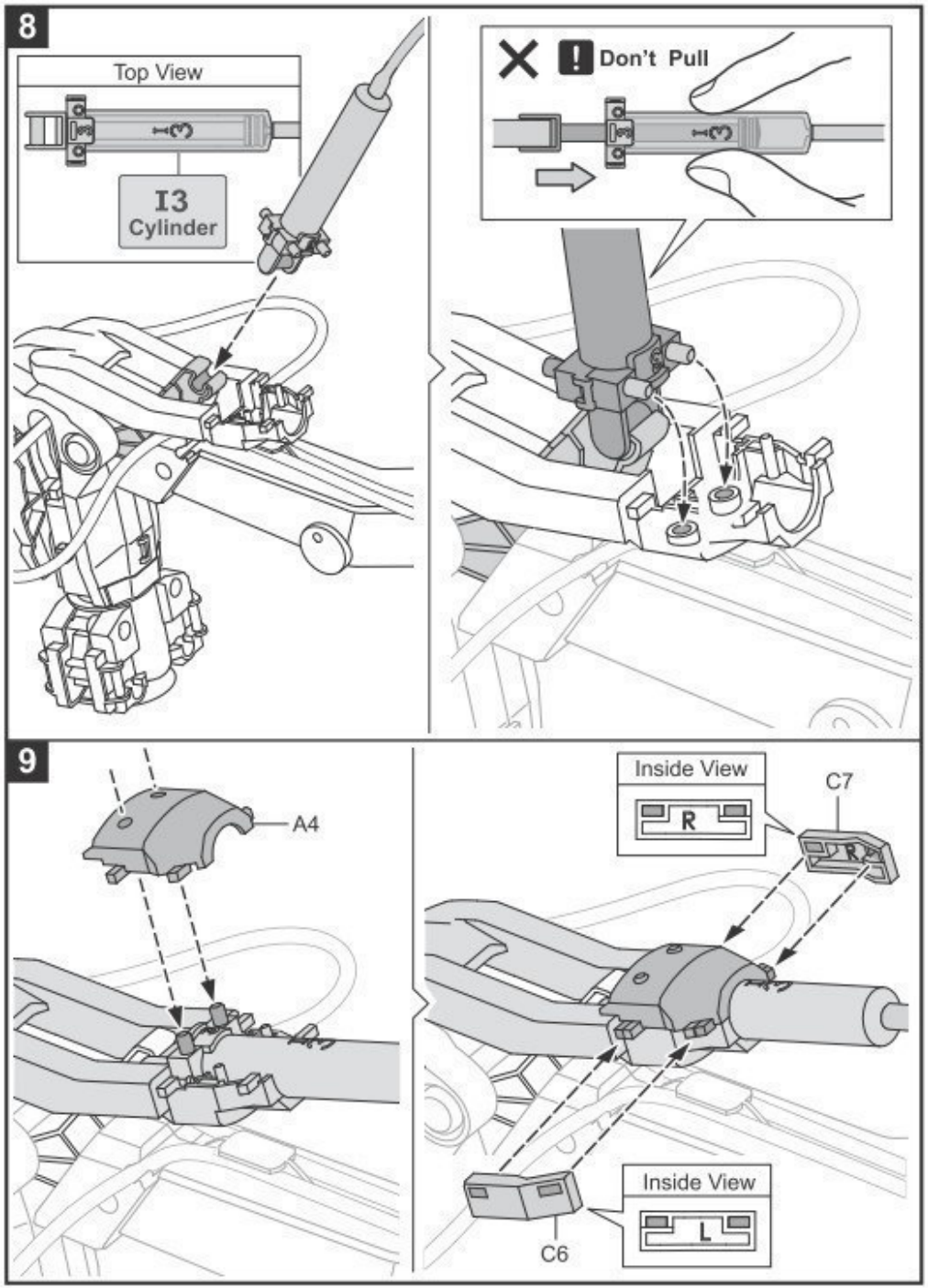

Symbolen

Symbolen




Plaats de flexibele slang in de gleuf.

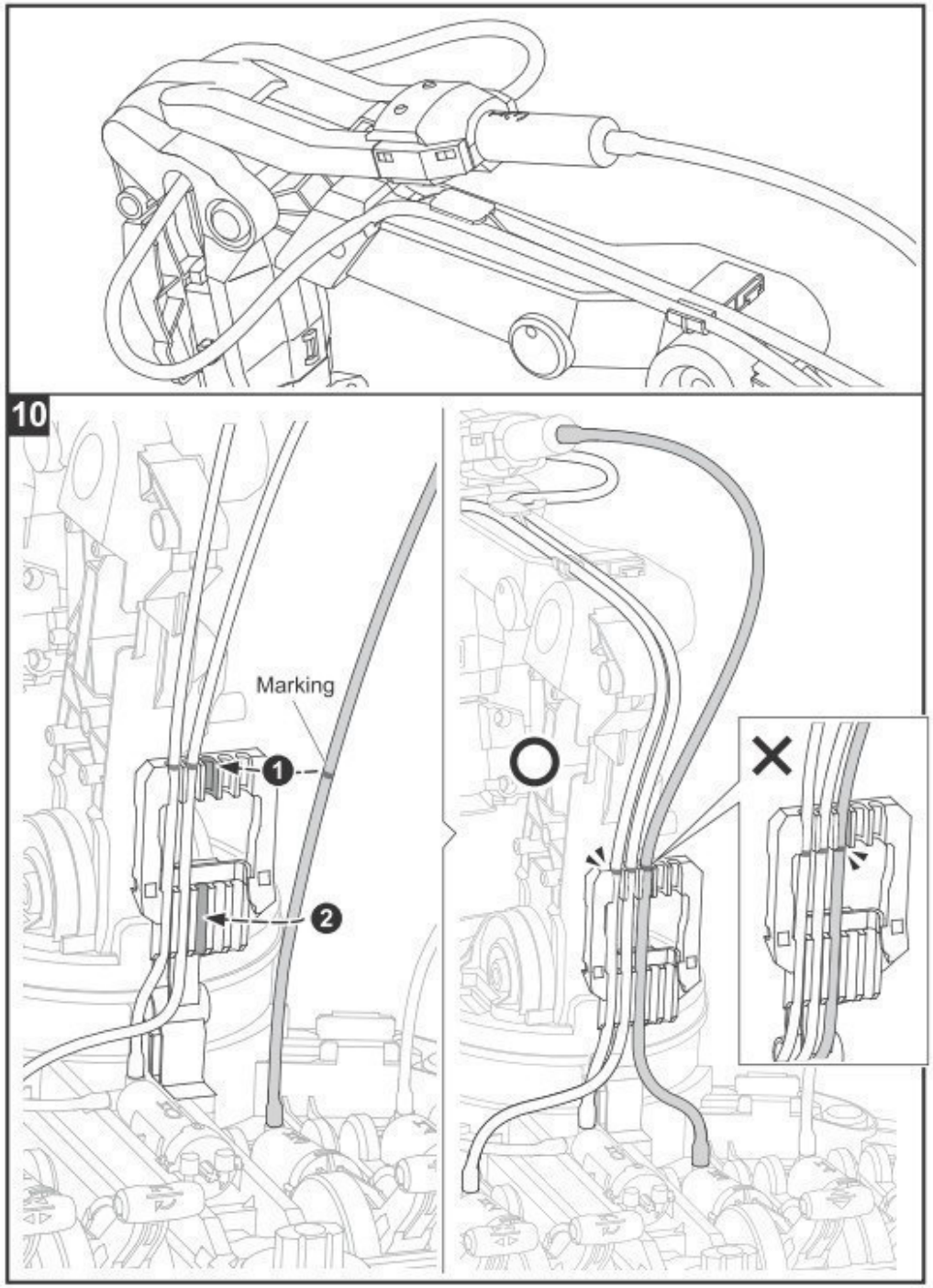
## Symbolen



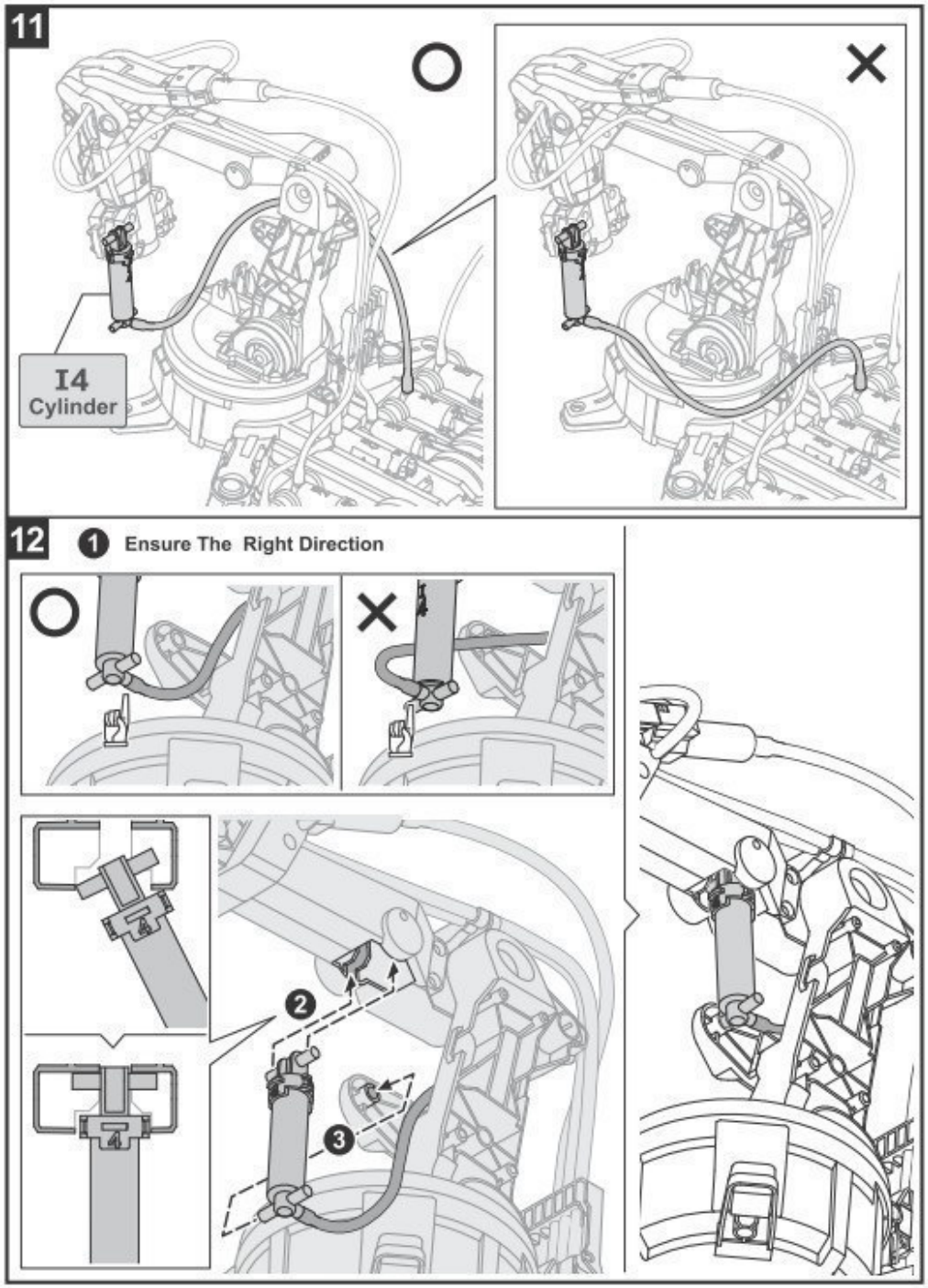

Bovenkant

Niet trekken

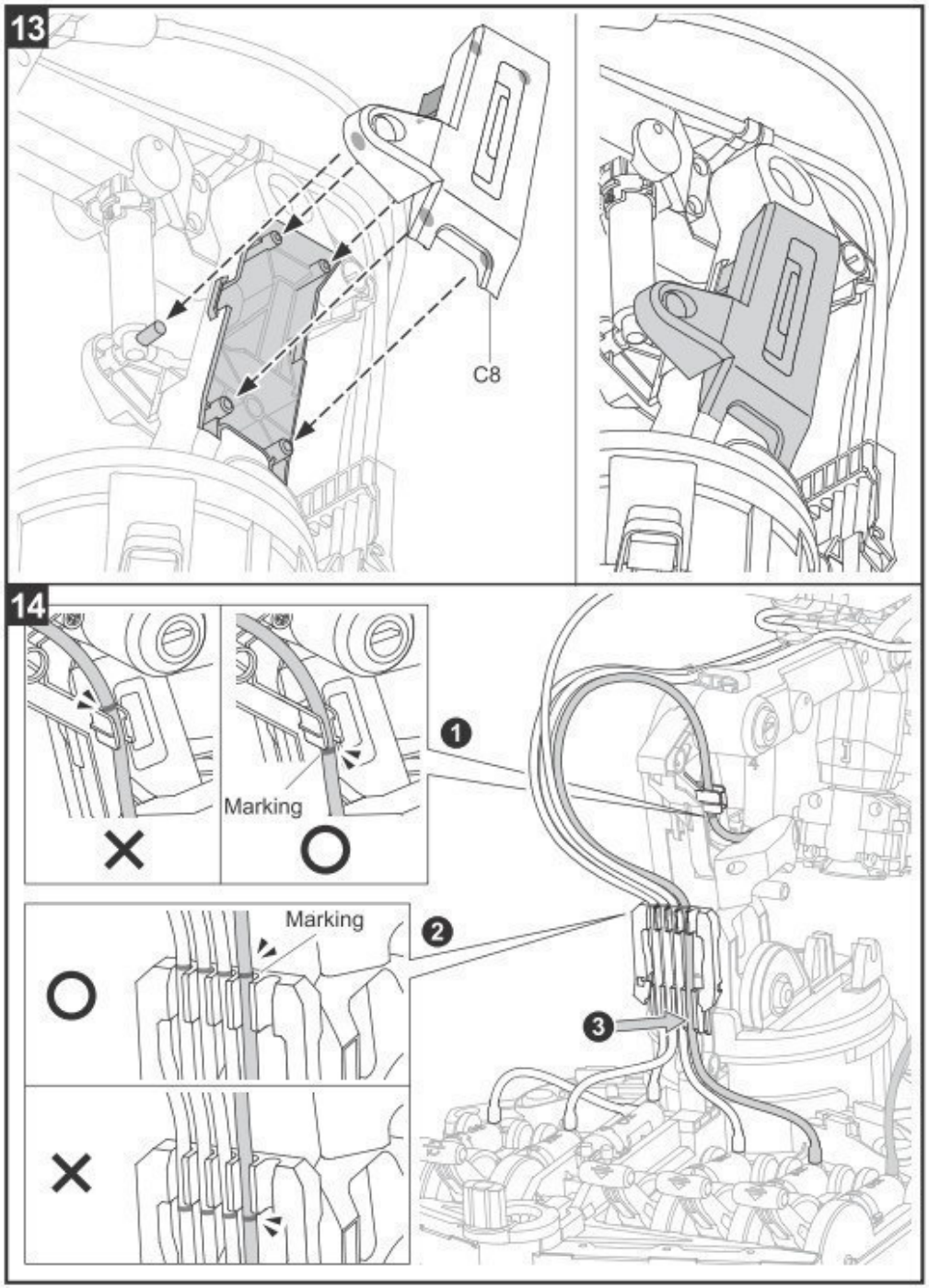
Binnenkant



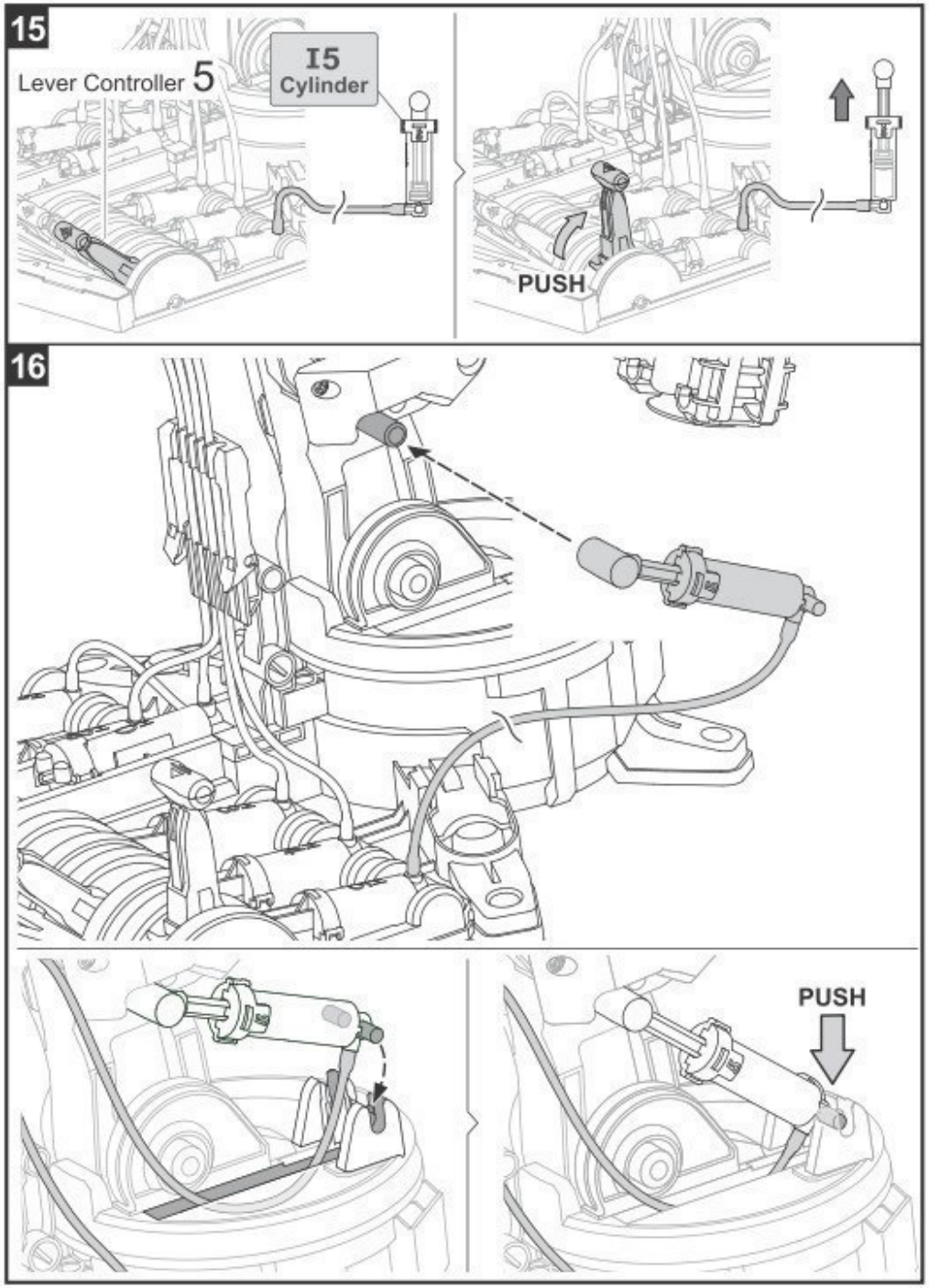

Symbolen




Let op de correcte montagerichting.



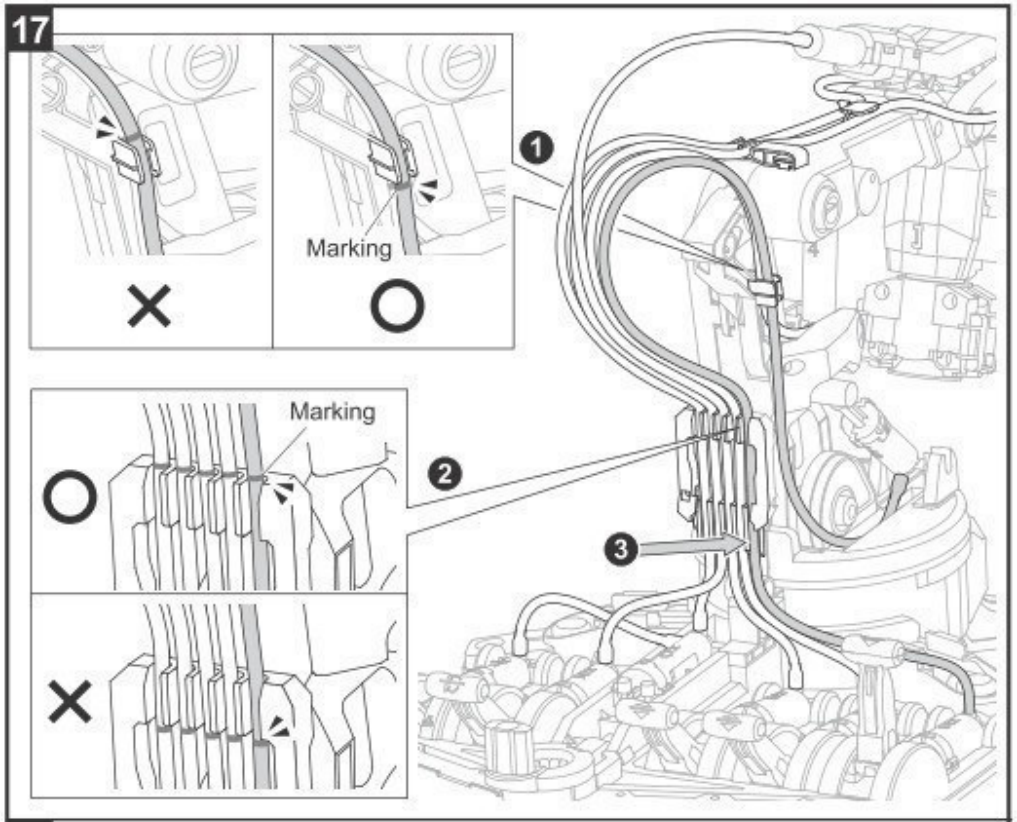

Symbolen



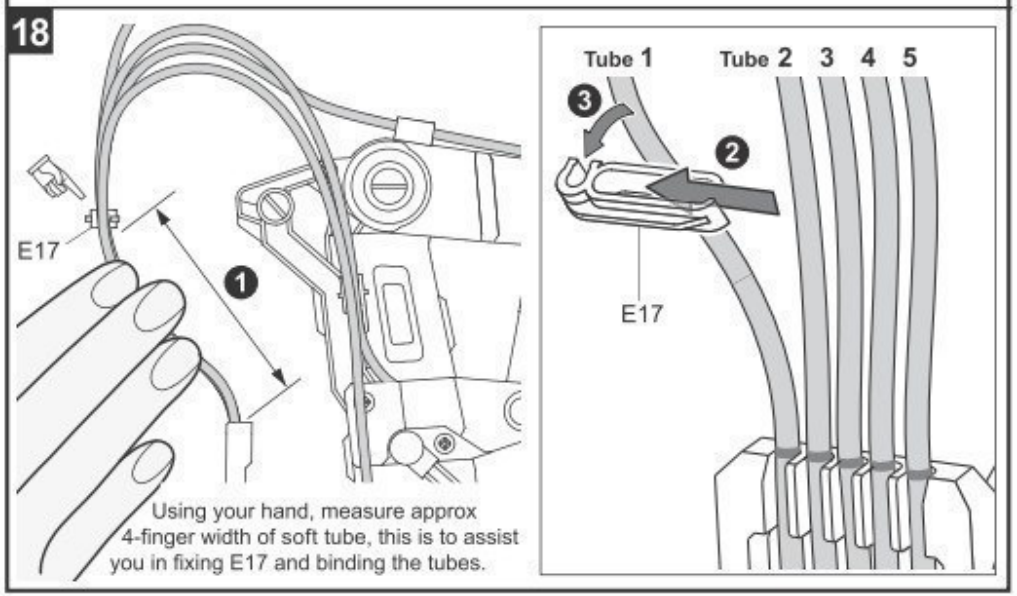

Hendel 5

DUWEN

DUWEN

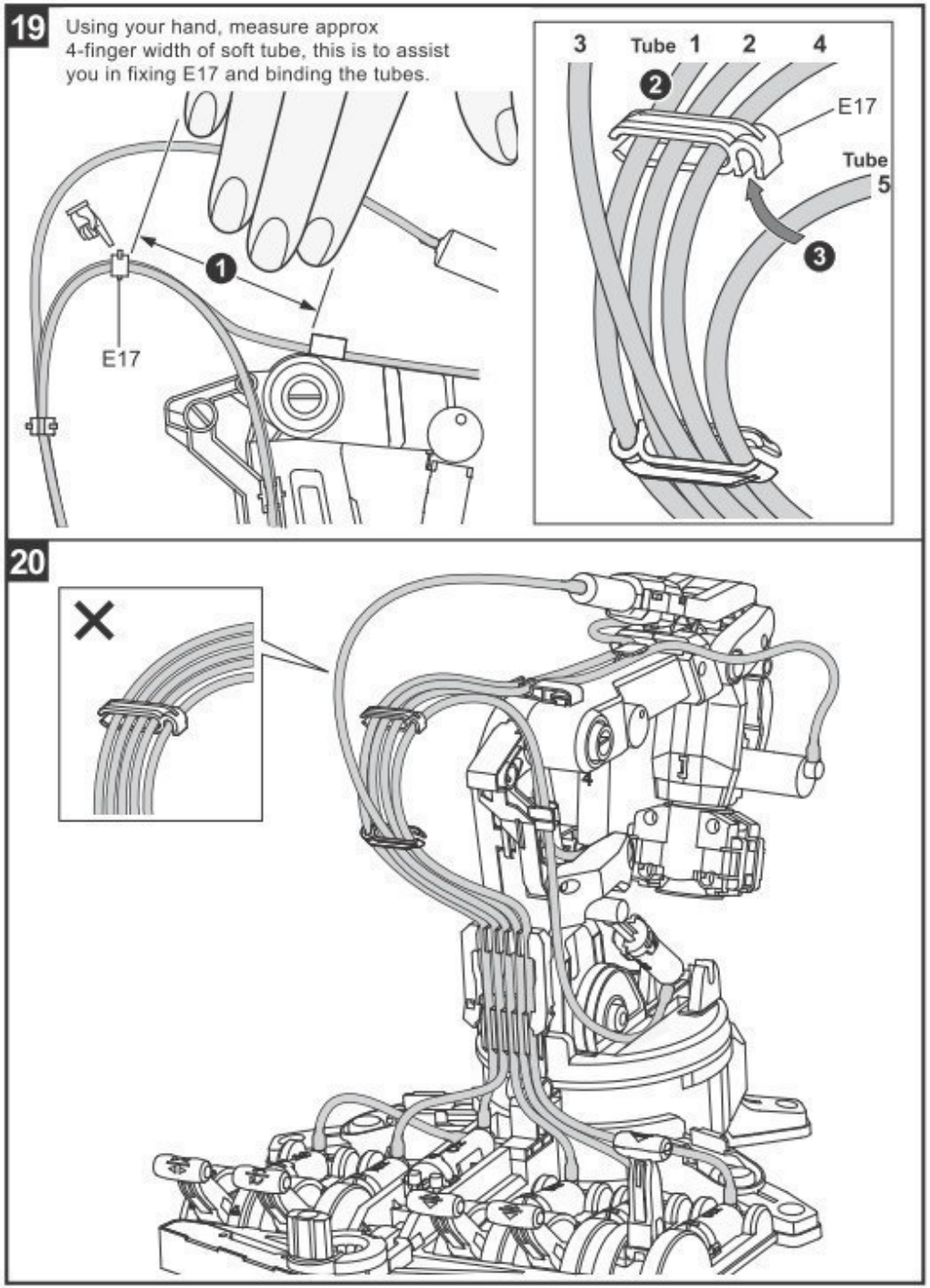



Symbolen




Slang 1 – 2 – 3 – 4 – 5

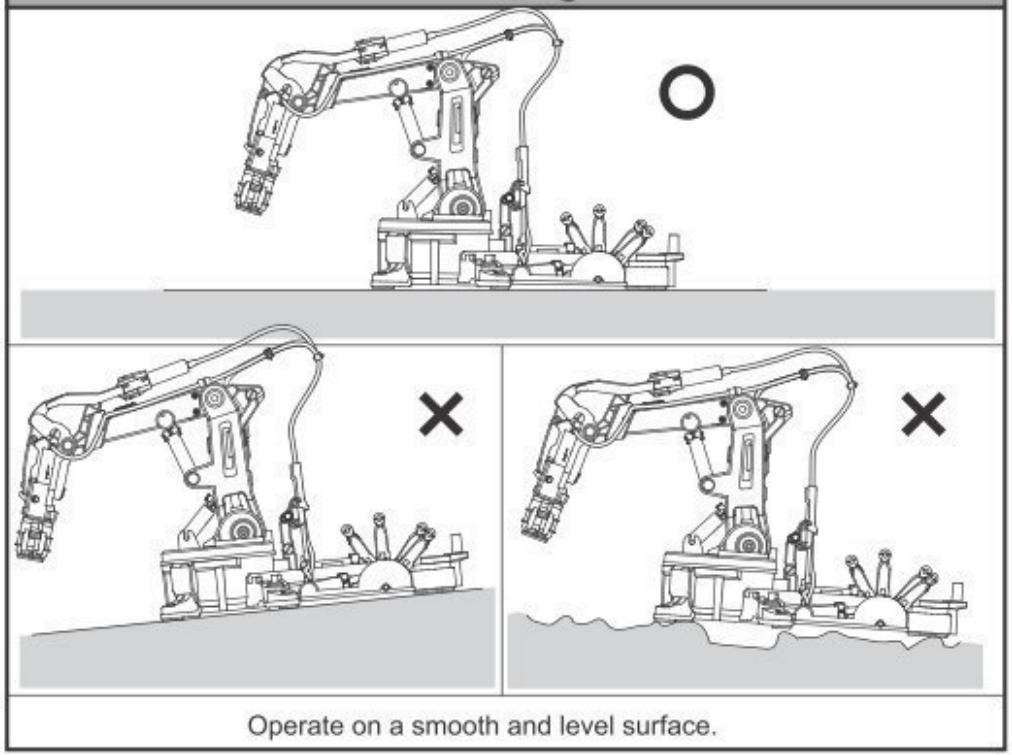
Gebruik uw hand, neem ongeveer 4 vingers breedte om de flexibele slang aan E17 te bevestigen.



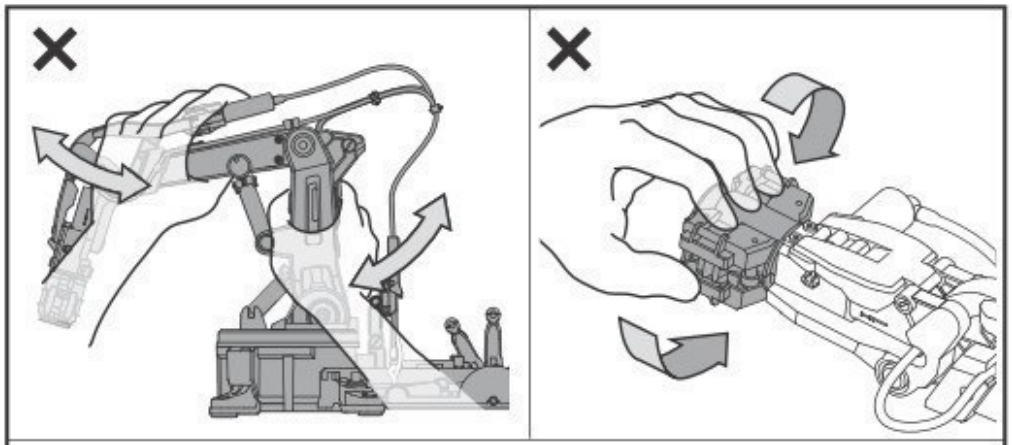

Gebruik uw hand, neem ongeveer 4 vingers breedte om de flexibele slang aan E17 te bevestigen.

# How To Play

## Warning



Operate on a smooth and level surface.



Handle the arm with care and do not mistreat as shown above



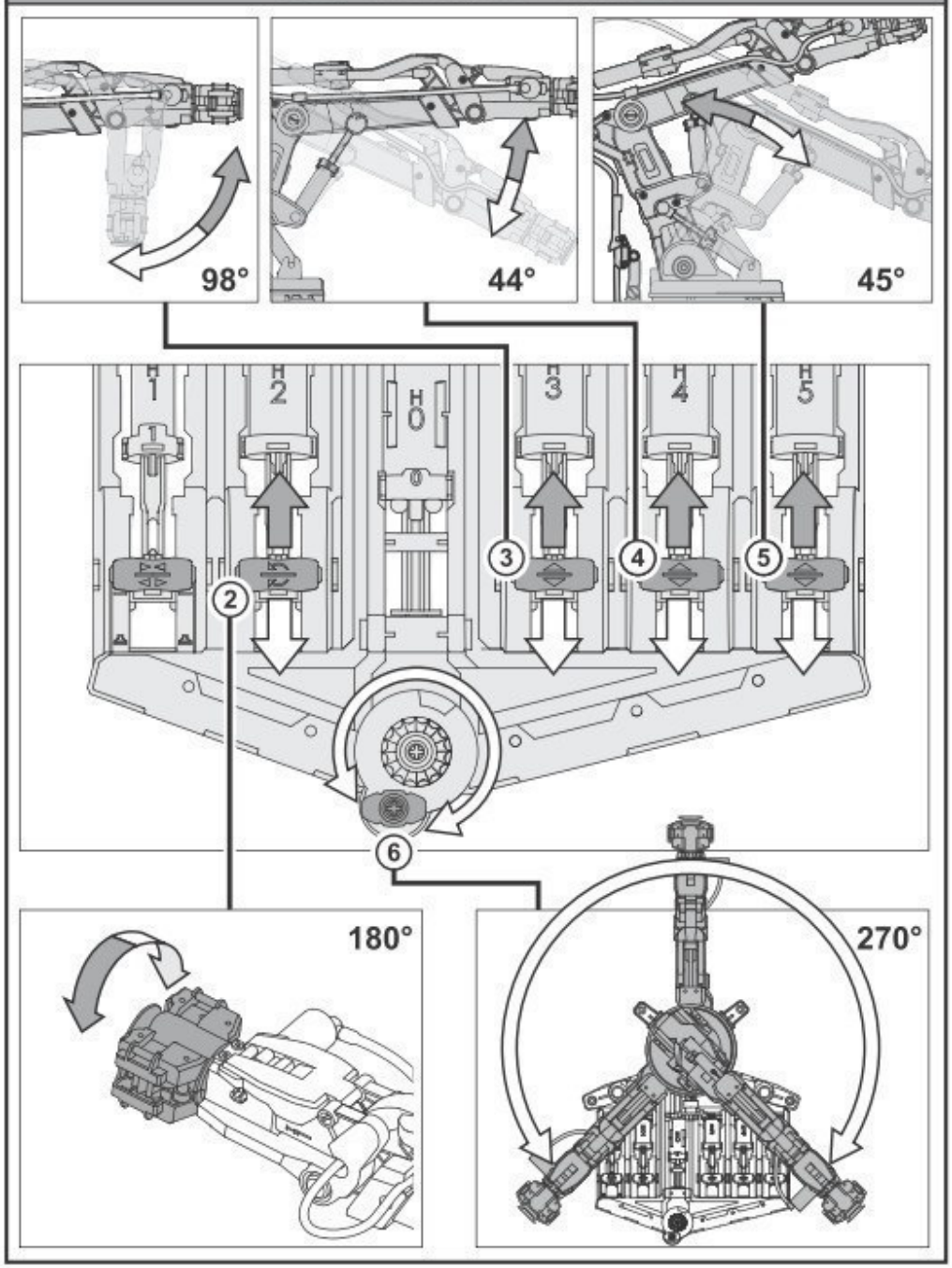
# Hoe spelen

## Waarschuwing

Bedien het toestel op een effen en horizontaal oppervlak.

Wees voorzichtig met de arm en gebruik geen kracht (zie boven).

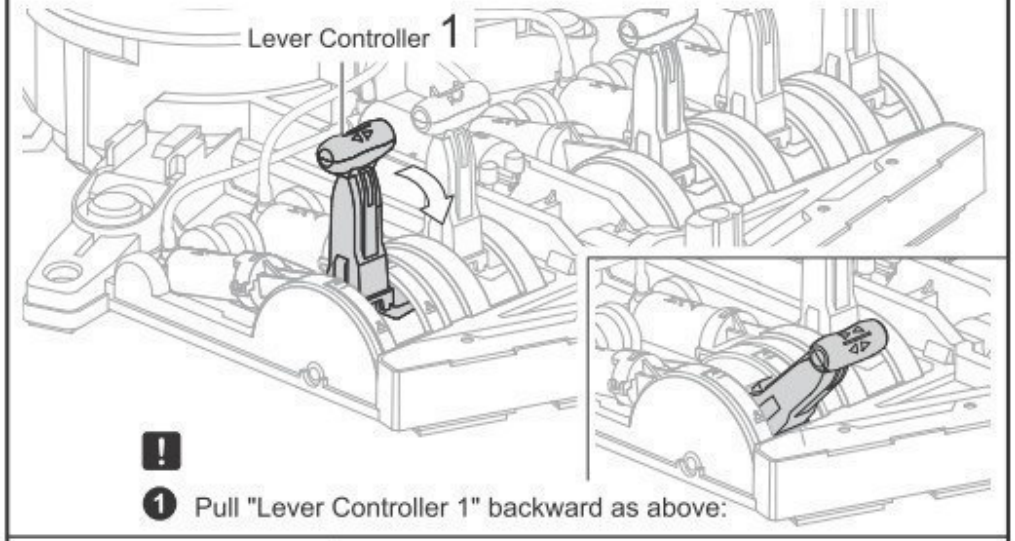
## How To Play: 2~6 AXES

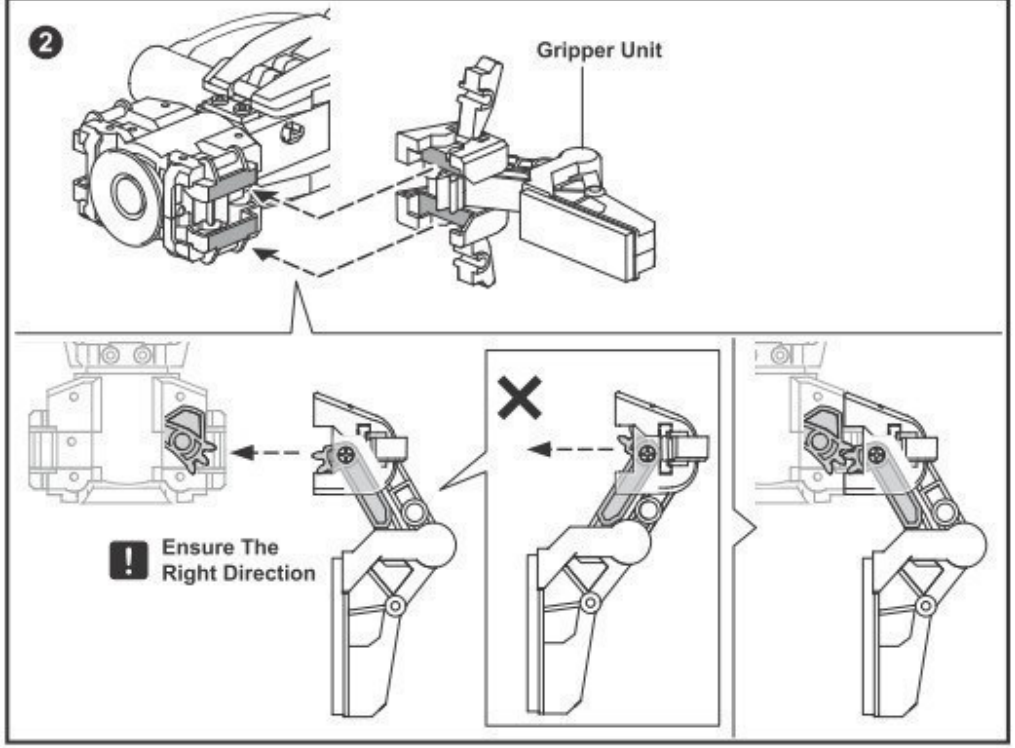



## Hoe spelen: 2-6 ASSEN

## How To Play-Gripper Mode

### 1 Installation






## Hoe spelen - Grijper

Montage

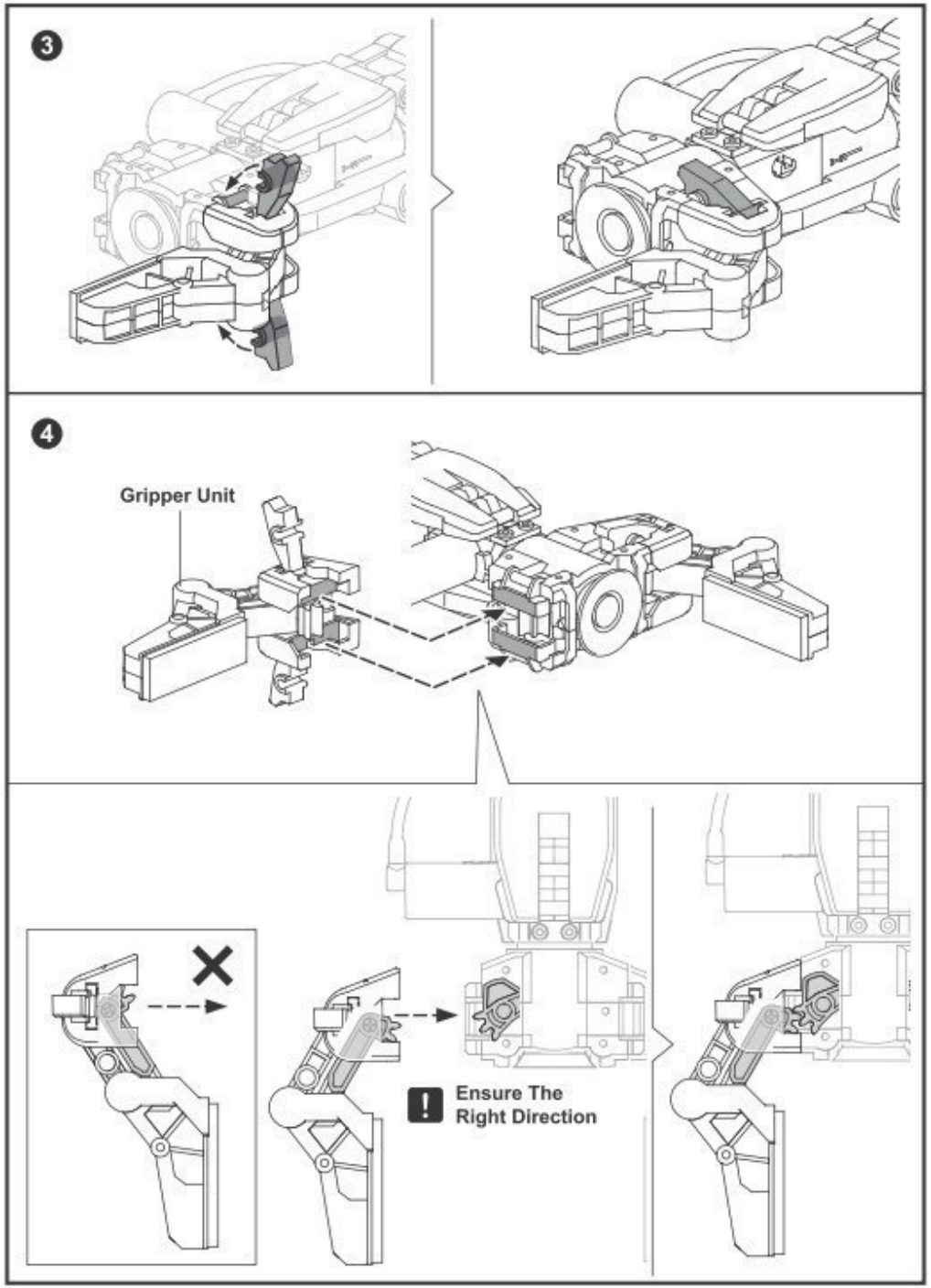
Hendel 1

1 !

Trek hendel 1 naar achter (zie boven).

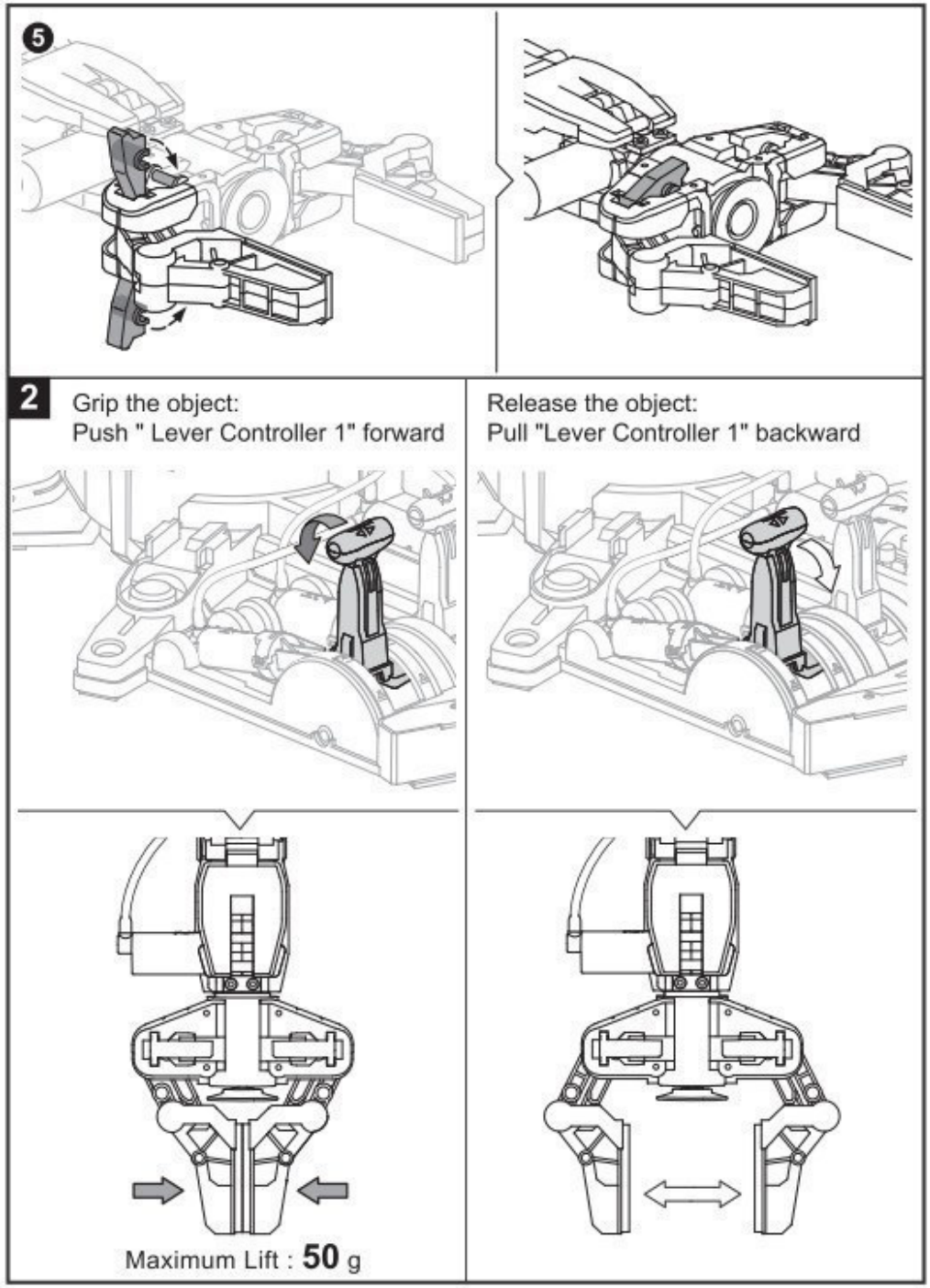
Grijper

Let op de correcte montagerichting.




Grijper

Let op de correcte montagerichting.



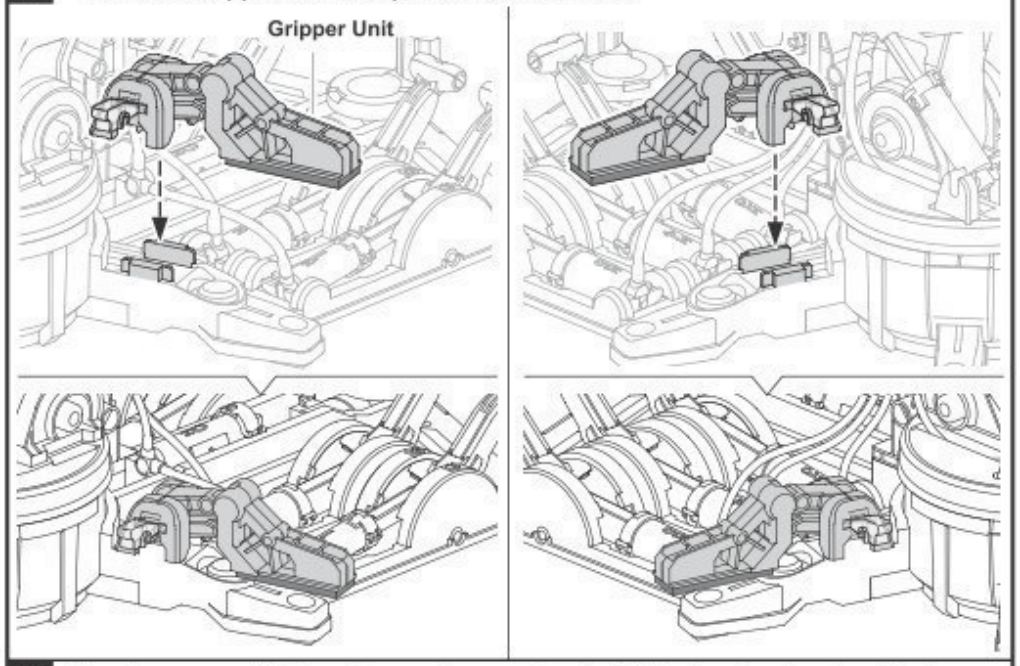

Grijp het voorwerp: Duw hendel 1 naar voor.

Laat het voorwerp los: Trek hendel 1 naar achter.

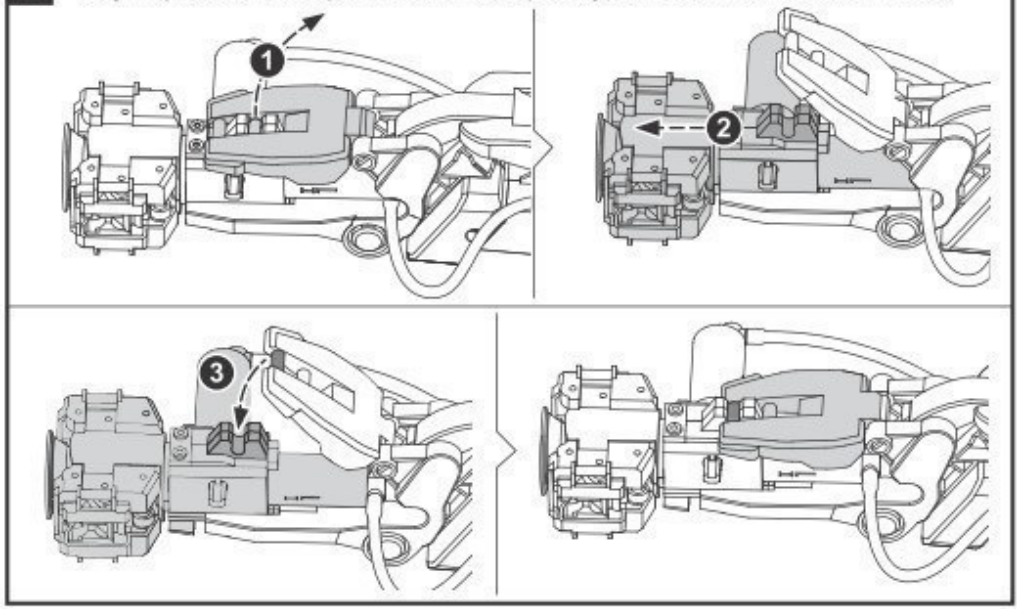
Max. last: 50 g

## How To Play- Suction Mode

**1** Release Gripper unit and put it aside as below




**2** Very Important !! Step 2 must be completely fulfilled under Suction Mode.



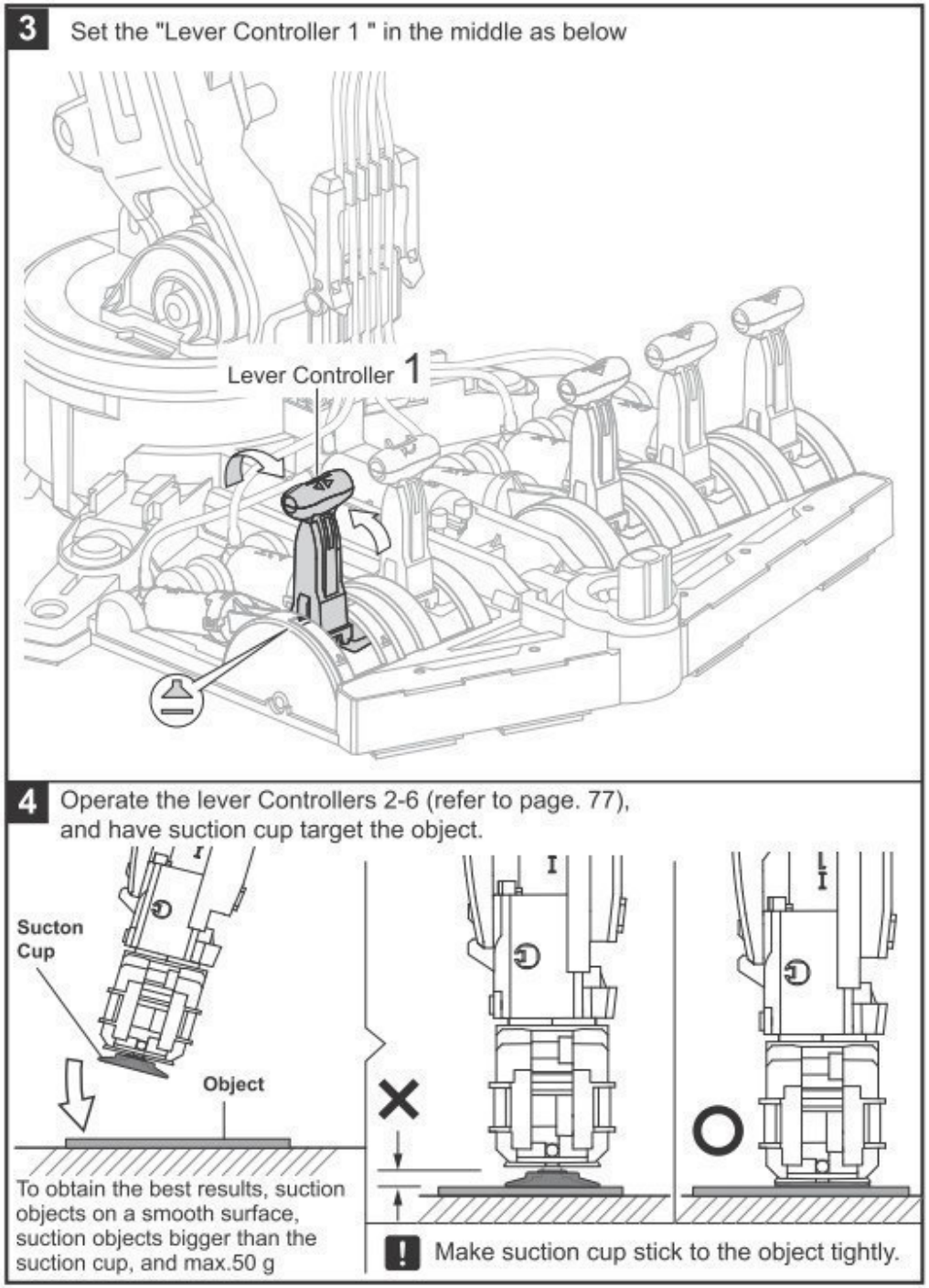



## Hoe spelen - Zuignap

Laat de grijper los en monteer deze aan de zijkant (zie onder).

Grijper

Zeer belangrijk - Stap 2 moet volledig uitgevoerd worden voor de zuigmodus.



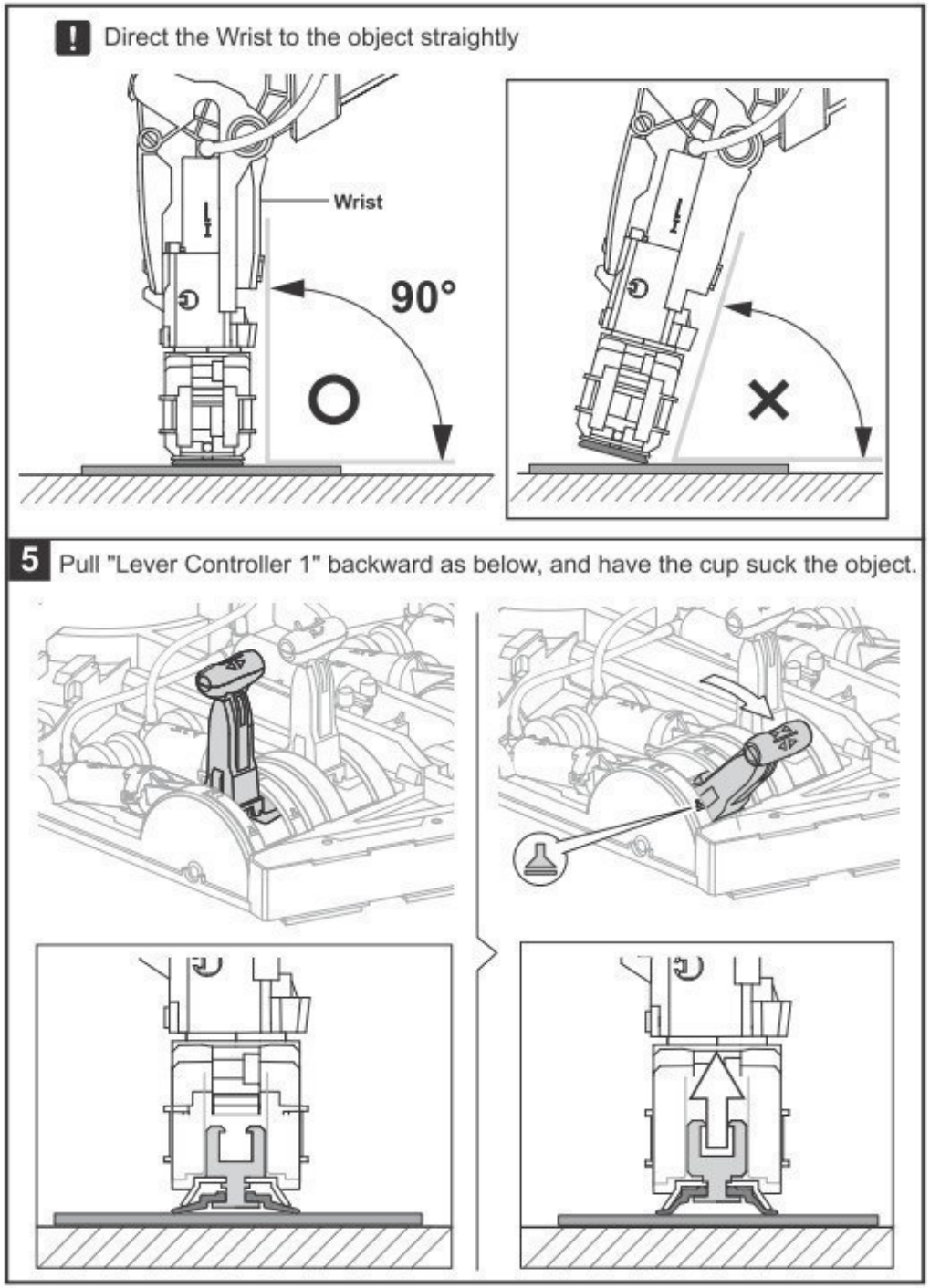

Duw hendel 1 naar het midden (zie onder).

Bedien de hendels 2-6 (zie p. 77) en breng de zuignap in de richting van het voorwerp.

Zuignap
Voorwerp

Voor de beste resultaten: plaats op een effen oppervlak, het voorwerp moet groter zijn dan de zuignap en minder dan 50 gram wegen.

! Zorg ervoor dat de zuignap stevig aan het voorwerp vast zit.



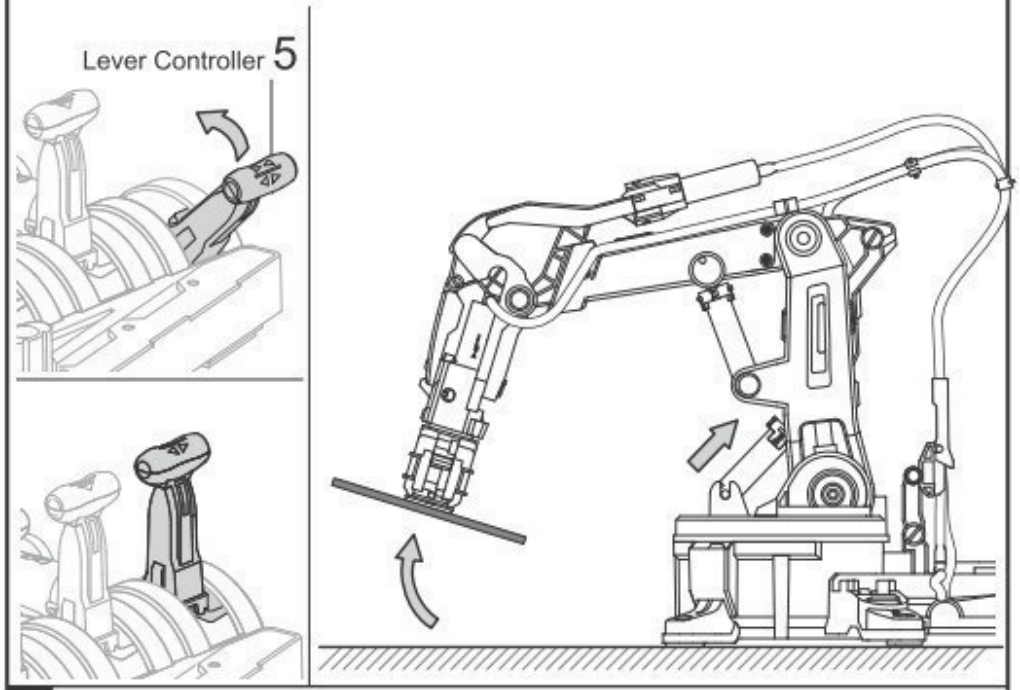



Beweeg de pols in de richting van het voorwerp.

Pols

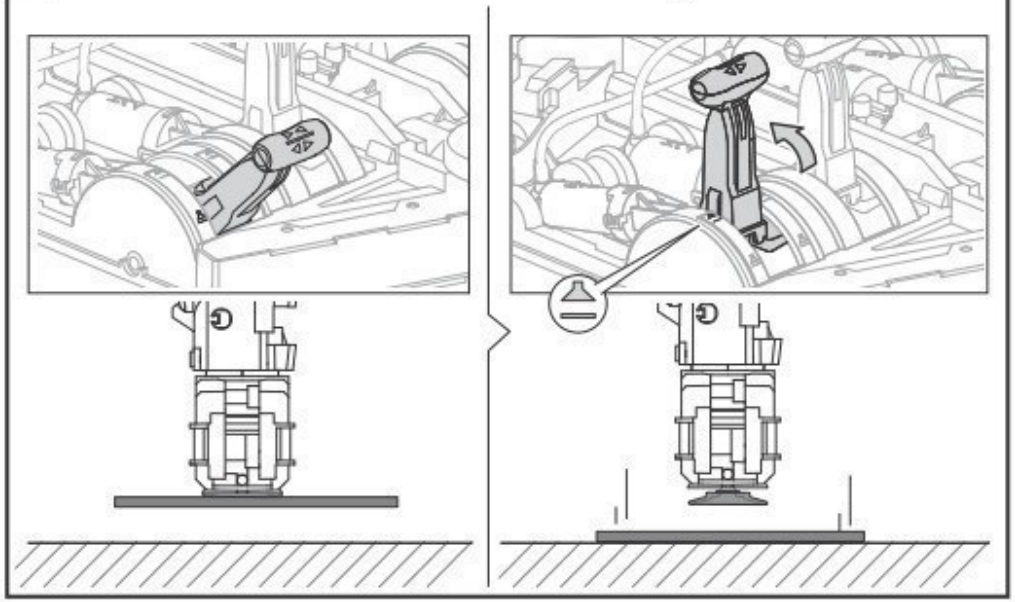
Trek hendel 1 naar achter (zie onder) en pak het voorwerp vast met de zuignap.

**6** Push "Lever Controller 5 " forward to lift the object.



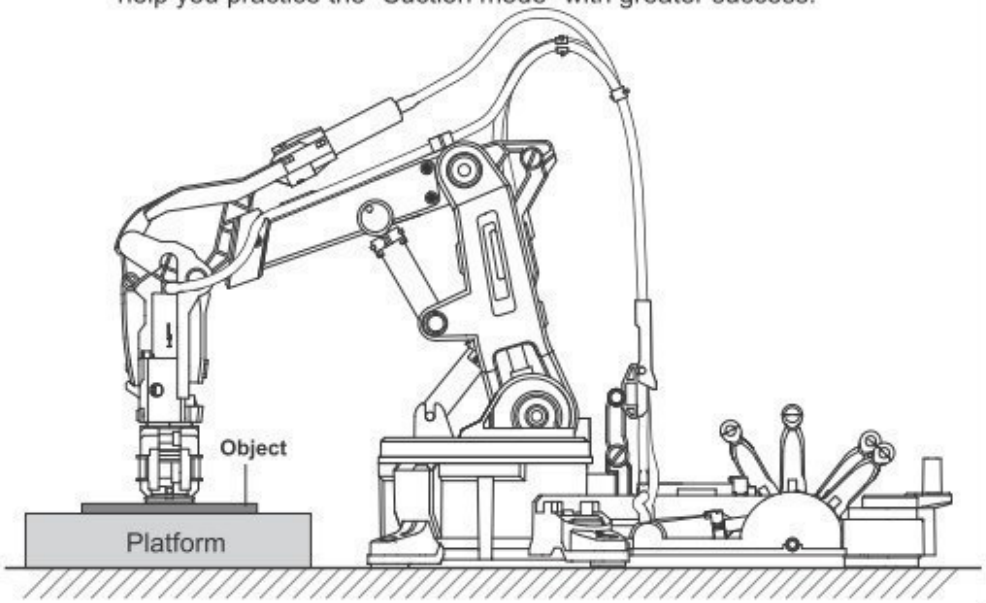

Duw hendel 5 naar voor om het voorwerp op te hijsen.

**7** Set " Lever Controller 1" in the middle to release object.



Duw hendel 1 naar het midden om het voorwerp los te laten.

**8** Tip: Put the object under a slightly higher/and smoother platform, it may help you practice the "Suction mode" with greater success.

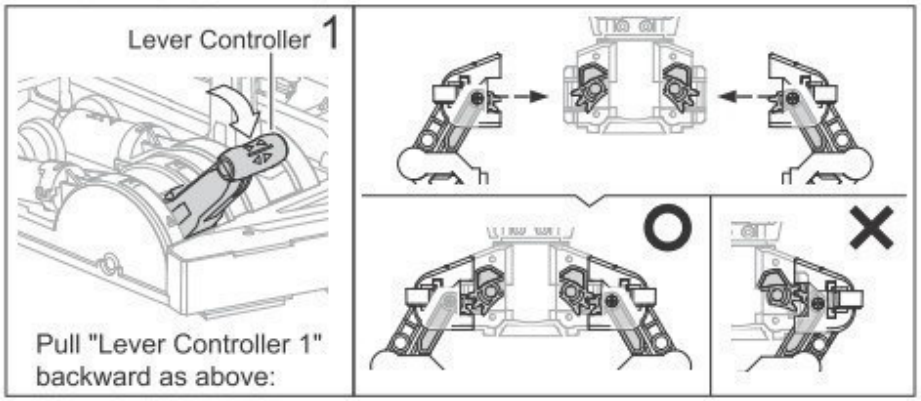



Tip: Leg het voorwerp op een effen en verhoogd platform, zodat de zuignap het voorwerp beter kan oppakken.

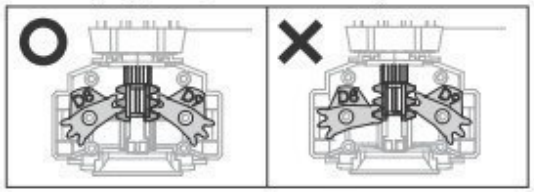
## Trouble Shooting

● **If gripper unit does not work (open or close) functionally, please check following steps.**

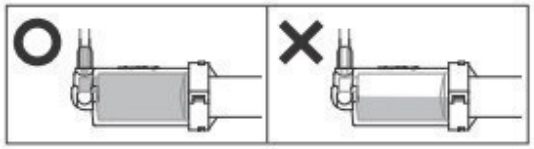
1. Check if gripper unit is installed in the correct position and direction ( as below pics in pages 78,79)




2. Back to page 32, and check step 16 is correct.



3. Check if there is excess air inside the Cylinder H1, I1 and Tube 1. In the case, back to pages 42-45 to re-assemble."



● **If sunction cup cannot suck the objects under suction mode.**

1. Back to pages 81~84, and check if all steps 2~6 are installed correctly.
2. Check if there are excess air inside the Cylinder H1, I1 and Tube 1. In the case, back to pages 42-45 to re-assemble.



## Problemen en oplossingen

• **Als de grijper niet correct functioneert (zich opent of sluit), controleer de volgende punten.**

1. Controleer of de grijper correct gemonteerd is (zie afb. 78-79).

Trek hendel 1 naar achter.

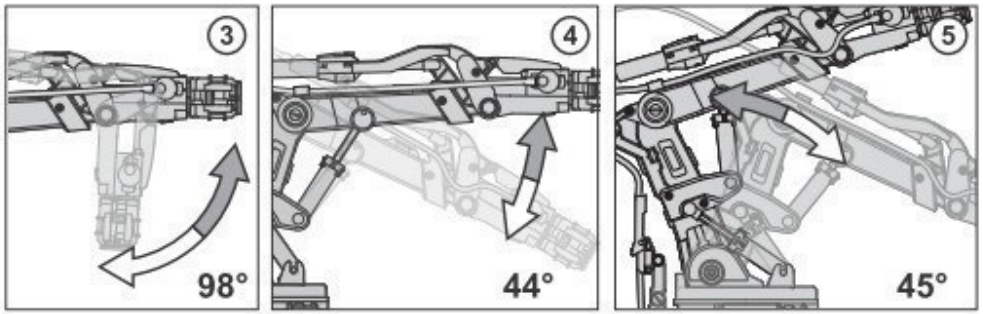
2. Controleer of stap 16 correct is uitgevoerd (zie p. 32).

3. Controleer of er geen lucht meer aanwezig is in cilinder H1, I1 en slang 1. Is dit het geval, monteer opnieuw (zie p. 42-45).

• **Als de zuignap de voorwerpen niet kan oppakken.**

1. Controleer of alle stappen 2-6 correct zijn uitgevoerd (zie p. 81-84).
2. Controleer of er geen lucht meer aanwezig is in cilinder H1, I1 en slang 1. Is dit het geval, monteer opnieuw (zie p. 42-45).

## ● If operation angle on the Axes 3/4/5 is unable to extend to the max.



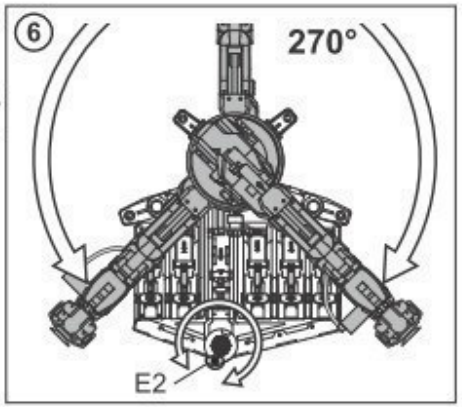

1. Check if there is excess air inside the Cylinder H3/4/5, I3/4/5, and Tube 3/4/5, in that case, back to pages 37~40 to re-assemble.

2. Check if all tubes are routing and not twisting during assembly. In the case of twisted tubes.
(a) back to pages 66~75 " Robot Arm Module Assembly " to check if all markings on the tubes are installed in the right position.
(b) back to Pages 46~48 " Measuring & Marking " to check if all lengths of tubes are cut and marked correctly.

## ● Poor movement of the 6th Axe.

1. If 6th Axe doesnot move when rotating E2, back to Page 19, Step 13 and check if E10 is intalled in the right position.

E10




2. Check if all tubes are routing and not twisting during assembly. In the case of twisted tubes,
(a) back to pages 66~75 "Robot Arm Module Assembly" to check if all markings on the tubes are installed in the right position.
(b) back to Pages 46~48 " Measuring & Marking" to check if all lengths of tubes are cut and marked correctly.



**• Als de werkingshoek van de assen 3/4/5 niet in max. positie kan gezet worden**

1. Controleer of er geen lucht meer aanwezig is in cilinder H3/4/5, I3/4/5 en slangen 3/4/5. In dit geval, monteer opnieuw (zie p. 37-40).
2. Controleer of alle slangen juist lopen en niet gedraaid zijn. Bij gedraaide slangen:
(a) zie p. 66-75 "Montage robotarm" om te controleren of de markeringen op de slangen correct geplaatst zijn.
(b) zie p. 46-48 "Meten & Markeren" om te controleren of de slangen op de juiste lengte geknipt en gemarkeerd zijn.

**• Slechte beweging van de 6de as**

1. Als de zesde as niet beweegt wanneer E2 ronddraait, controleer of E10 correct geïnstalleerd is (zie p. 19, stap 13).

2. Controleer of alle slangen juist lopen en niet gedraaid zijn. Bij gedraaide slangen:
(a) zie p. 66-75 "Montage robotarm" om te controleren of de markeringen op de slangen correct geplaatst zijn.
(b) zie p. 46-48 "Meten & Markeren" om te controleren of de slangen op de juiste lengte geknipt en gemarkeerd zijn.