EDQ series 3-Finger Round Body Electric Gripper

Product features/ Code of order

CHELIC

Feature

- Worm wheel and gear movement
- Feedback signal
- High precision

Specification

Item \ Model		EDQ 25	EDQ 42
Gripping force	N	22	102
Gripper stroke	mm	10	14
Max speed	mm/s	40	50
Actuation type		Worm, Double-helical, Helical rack gears	
Ambient and fluid temperature	°C	5~40	
Operating humidity range	%	35~85	
Motor size		25□	42□
Position repeatability	mm	±0.02	
Finger backlash(one side)	mm	0.3	0.4
Idling stroke(one side)	mm	0.15	

Note : 1. Idling stroke:Reference value when correcting the error caused by reciprocating motion.
2. The speed and thrust will change base on the length of the wire, load weight and mounting conditions...etc. If the length of the wire over 5m, the speed and thrust will reduce 10% per 5m.
3. If the load weight over the recommended value, the lifetime will shorter.
4. The speed must be set at 5mm/s during clamping.

Code of order **EDQ - 25 – 03 - P**

1 2 3

1

Mark	Motor size □
25	25
42	42

2

Mark	Wire length(m)
01	1
03	3
05	5
10	10

● Standard: 3M

3

Mark	Actuator
P	P-servo

● Standard component Refer to P6-1.89

Confirm the gripping force

Conditions Confirmed → The gripping force is therefore calculated by → Choose the model throug the gripping force chart → Select Gripping Speed

Example

Mass of Workpiece: 0.1kg →

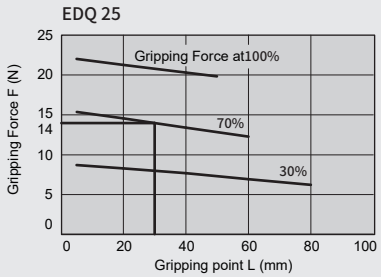
- Model should be selected based on 7 to 13 times of the weight of the workpiece according to the diverse COFs and shapes of the annexes and workpieces.
  ※For further details, please refer to the calculation of gripping force.
- Additionally, considering the acceleration and impact force when transporting workpiece, a SF must be established.

Ex. The required gripping force=0.1kg x 13 x 9.8m/s ≒ 12.7N if the gripping force is set for at least 20 times the weight of the workpiece

Gripping Force: 40% →

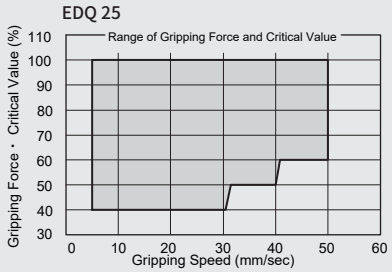
Distance of Gripping Point:30mm →

Gripping Speed: 30mm/sec →



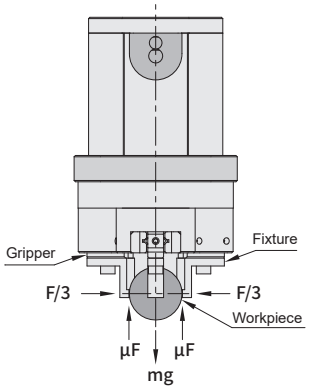
When choosing EDQ 25 Series

- From the distance of the gripping point L=30mm, and the intersection point positioned at 70% of the thrust force, we can learn that the gripping force is 14N.
- The gripping force is 14 times of the weight of the workpiece, which satisfies the required setup of gripping force for 13 times above.



- According to the intersection of 70% of the gripping force and 30mm/sec of the gripping speed, the latter is thereby judged to meet the requirement.
- Confirm the range of gripping speed based on the specified gripping force (%).

The gripping force is therefore calculated by



Gripping a workpiece, as shown in the left figure

F : Gripping Force (N)
μ : COF between Annex and Workpiece
m : Mass of Workpiece (kg)
g : Acceleration of Gravity (=9.8m/s²)
mg : Weight of Workpiece (N)

The condition of that the workpiece does not fall is Fμ > mg;

Hence $F > \frac{mg}{\mu}$

Provided SF is a, then F is

$F = \frac{mg}{\mu} \times a$

About “7 to 13 Times above the Weight of Workpiece”

The data “ 7 to 13 Times above the Weight of Workpiece” recommended by the Company is calculated through the impact force during transport when SF=4.

μ = 0.2	μ = 0.1
$F = \frac{mg}{3 \times 0.2} \times 4 = 6.7 \times mg$	$F = \frac{mg}{3 \times 0.1} \times 4 = 13.3 \times mg$

7 Times of the Weight of Workpiece

13 Times of the Weight of Workpiece

<Reference>COF μ (variable depending on different usage environments or surface pressure)

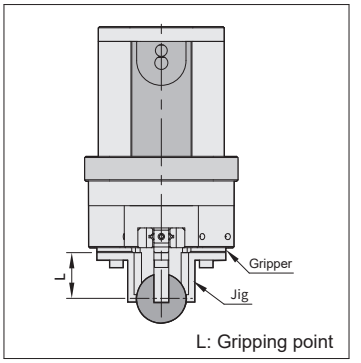
COF μ	Material Quality of Annex and Workpiece (standard)
0.1	Metal (surface roughness Rz is under 3.2)
0.2	Metal
Above 0.2	Rubber, Resin, etc.

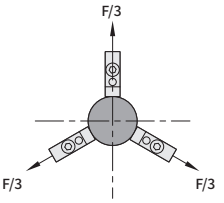
- When the COF μ is higher than 0.2, please select the model of which the weight is 7 times to 13 times of the workpiece for safety concern.
- Considering the larger acceleration and impact force when transporting the workpiece, it is ecessary to increase the SF.

Demonstration of gripping force

- The figure below shows the gripping force is applied by the complete touch by the two grippers, annex and workpiece, which is represented by **F**.
- Working position of grip: **L** please perform it within the range designated in the figure below.

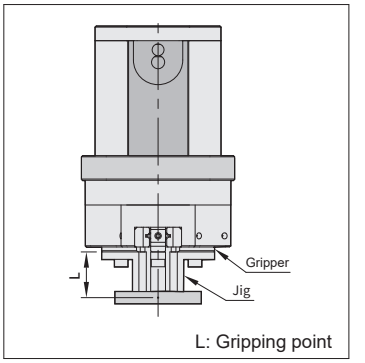
Outer Diameter Grip

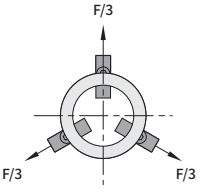




F: Gripping force

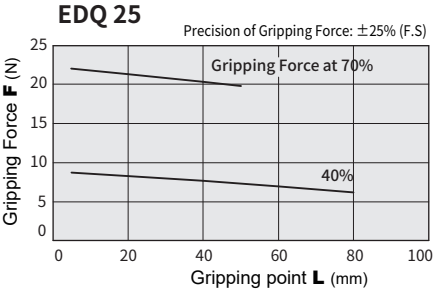
Inner Diameter Grip

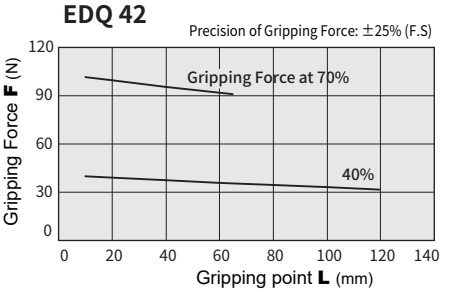




F: Gripping force

Curve Graph of gripping force and gripping point

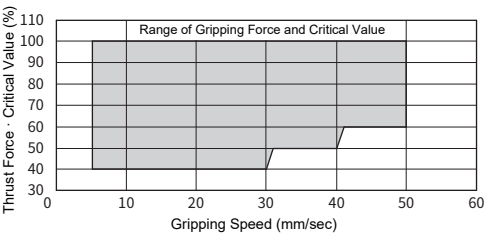




Gripping force is an input vale of the drive information

Setup of Gripping Speed

• Please use the fundamental model within the range designated in the figure below when setting the gripping force and critical value.



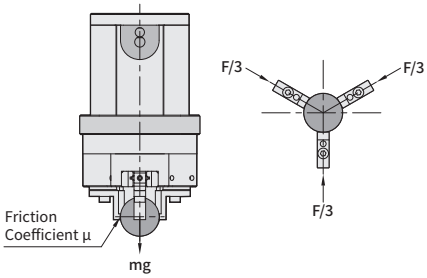
Gripper is used in combination with jig for opening object

1.Verify actual gripping force
2.Verify gripping point
3.Verify external force exerted on the Gripper

If safety factor is a, then F is:

$$F > \frac{mg}{\mu} \times 2 \text{ (safety value)}$$

- F: Gripping force (N)
- μ: Friction coefficient between accessory and workpiece
- m: Mass of workpiece
- g: Acceleration of gravity (=9.8m/s2)
- mg: Weight of workpiece



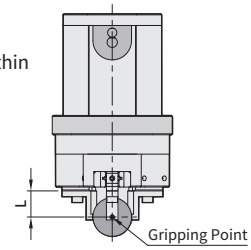
Verify gripping point distance

Distance between gripper installation face and gripping point shall be controlled within the following range. Exceeding the limit range will cause excessive torque to gripper moving part and internal mechanism, therefore reducing its service lifespan.

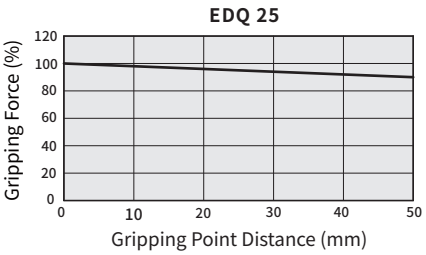
Outward Extension (L)

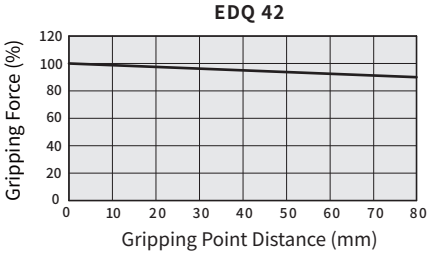
EDQ 25 ⟶ L＜50mm

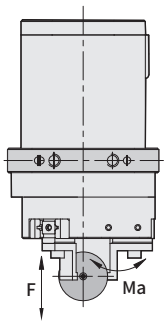
EDQ 42 ⟶ L＜80mm

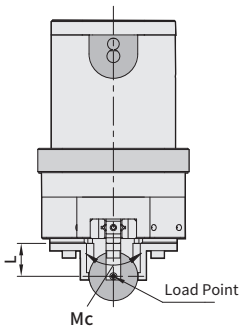


Gripping point distance and change of gripping force



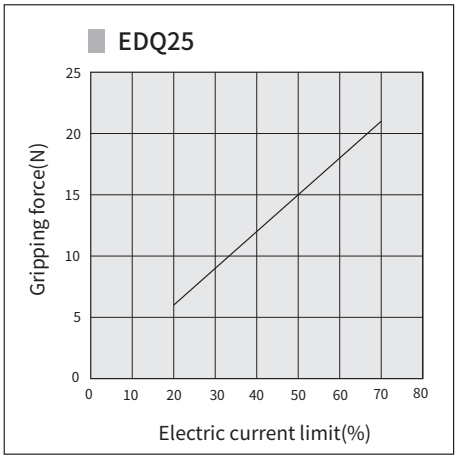


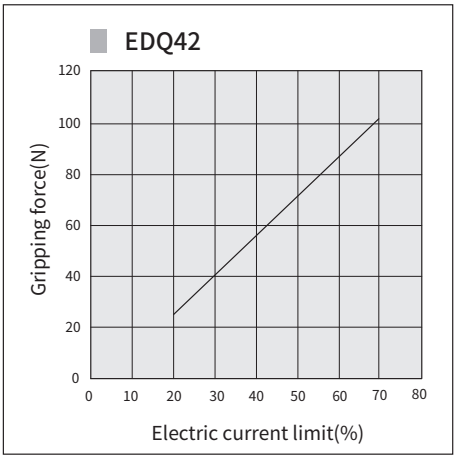




Spec	Allowable Vertical Load F (N)	Allowable Load Torque (N-m)		
		Ma	Mb	Mc
EDQ 25	169	3.8	3.8	3.0
EDQ 42	253	6.3	6.3	5.7

Gripping force-current value graph





Side mounting

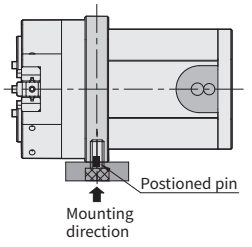
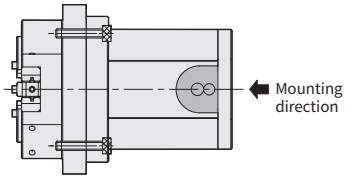
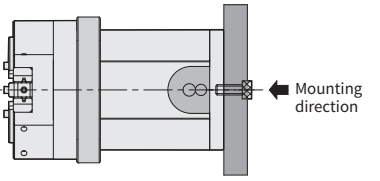


Plate mounting



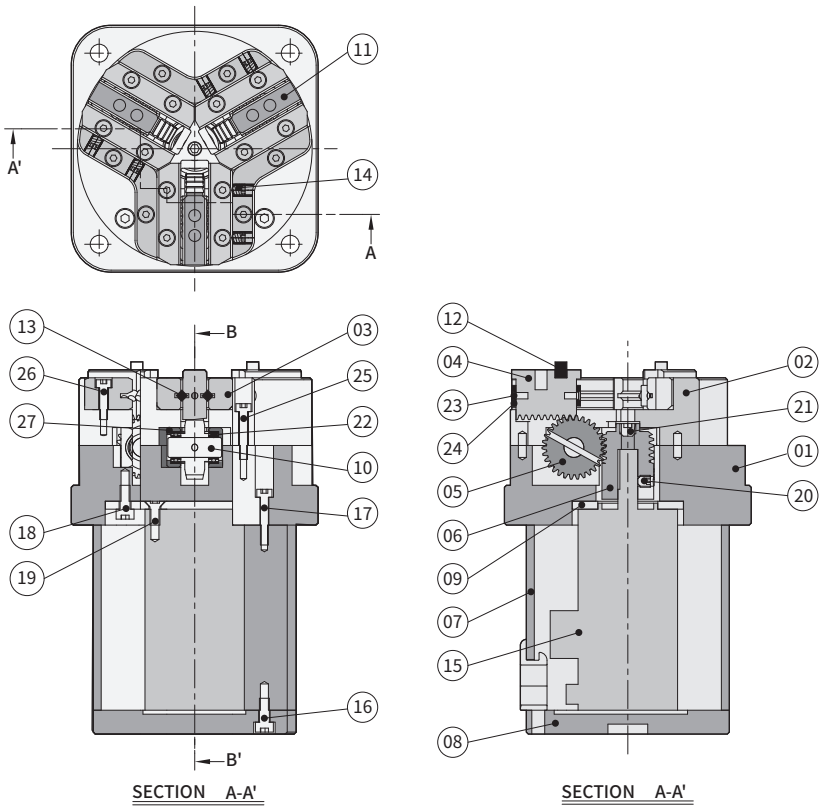
Bottom mounting



Product weight

Item \ Model	25	42
Weight (kg)	0.5	1.0

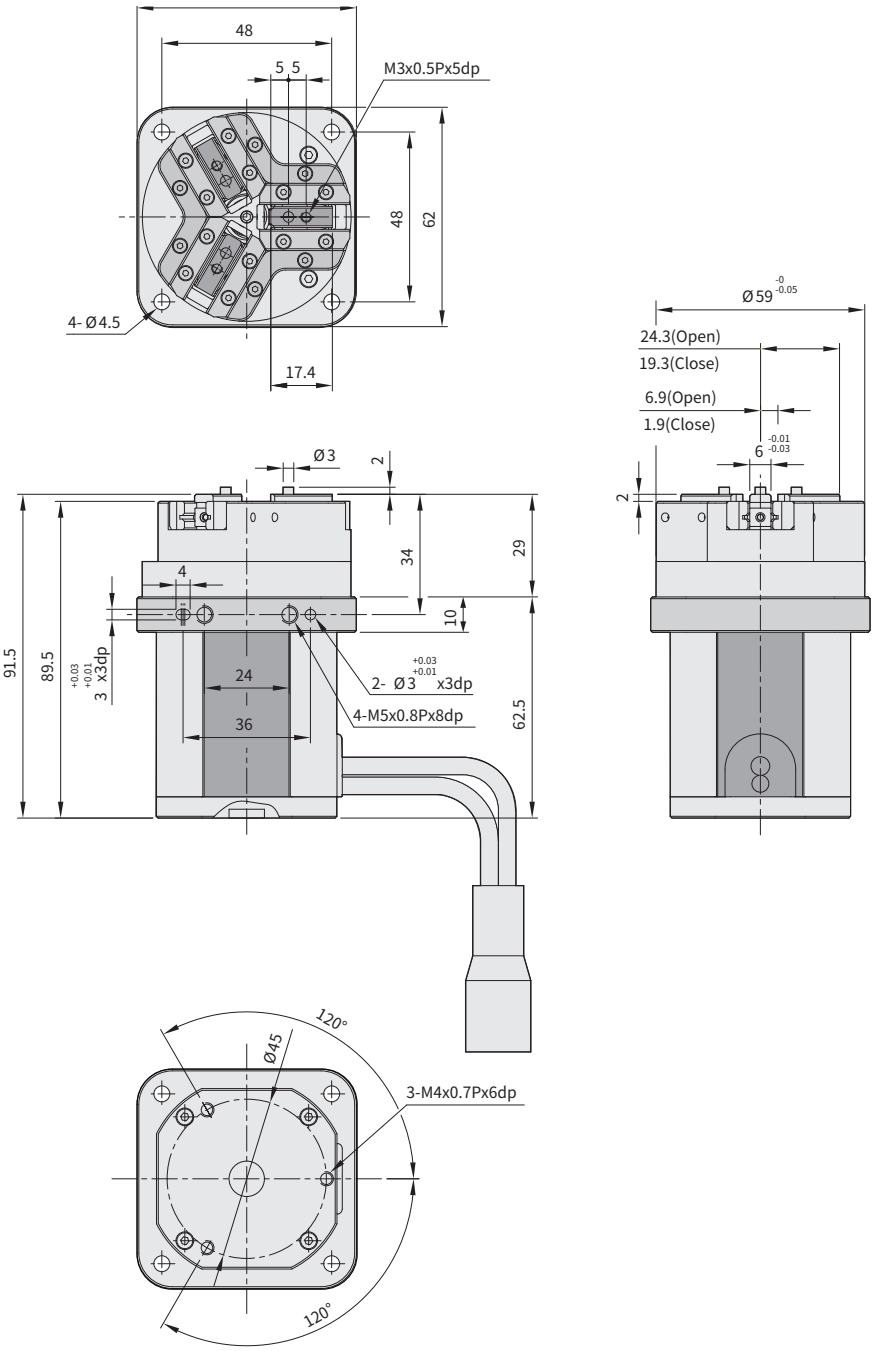
EDQ25, EDQ42



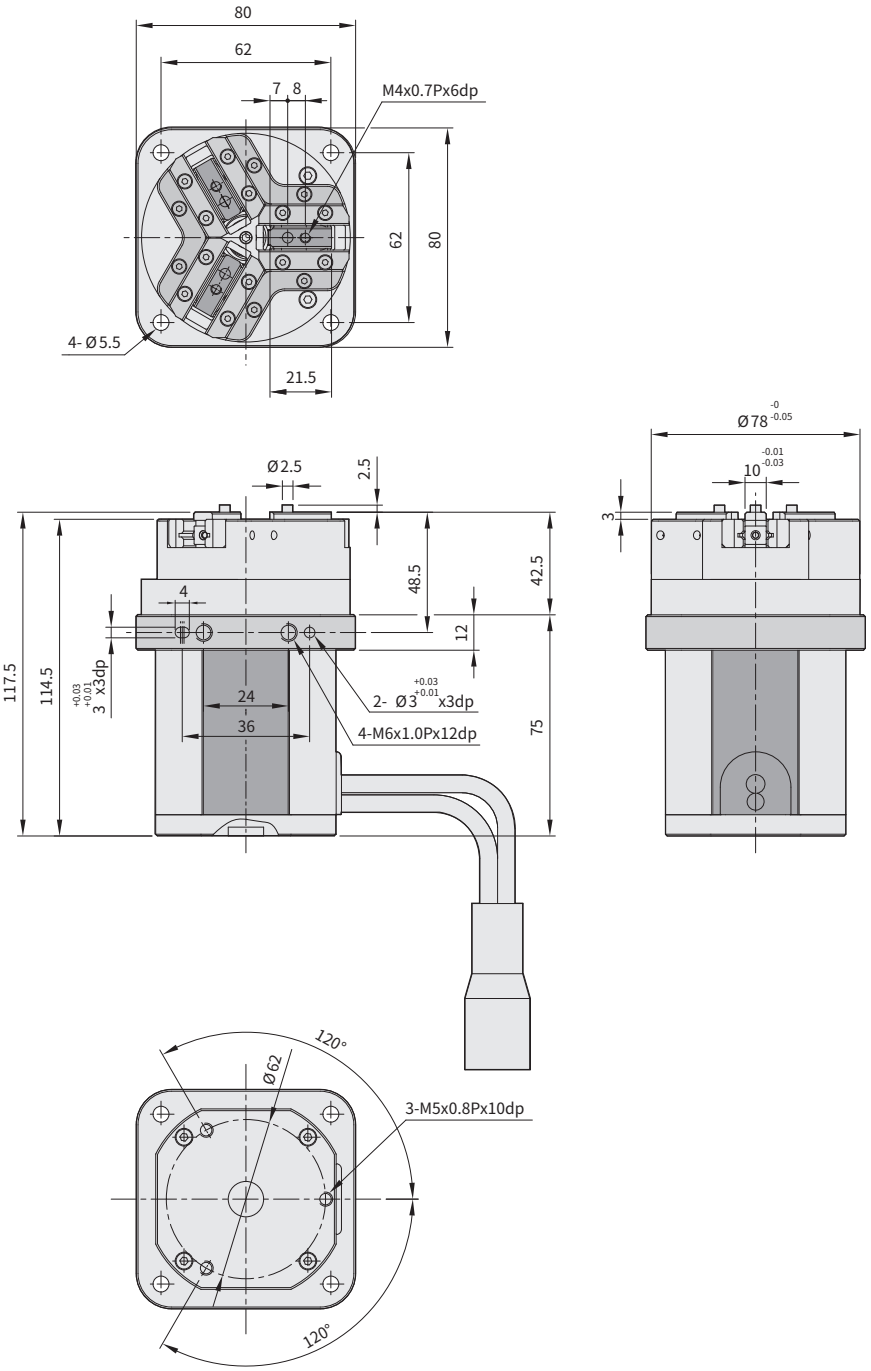
Components and material list

No.	Name	Material	No.	Name	Material
01	Body	Aluminum alloy	15	Motor	Customized
02	Side Rail Holder	Aluminum alloy	16	Bottom Plate Fixing Screw	Alloy steel
03	Side Rail	Stainless	17	Body Fixing Screw	Alloy steel
04	Finger Plate	Stainless	18	Adapter Plate Fixing Screw	Alloy steel
05	Gear	Stainless	19	Motor Fixing Screw	Alloy steel
06	Screw	Customized	20	Motor Set Screw	Alloy steel
07	Housing	Aluminum alloy	21	Screw Set Screw	Alloy steel
08	Bottom Plate	Aluminum alloy	22	Radial Bearing	Bearing steel
09	Motor Adapter	Aluminum alloy	23	Ball Stop Fixing Screw	Alloy steel
10	Shaft	Stainless	24	Ball Stop	Stainless
11	Finger Plate-2	Stainless	25	Side Rail Holder Fixing Screw	Alloy steel
12	Finger Plate Fixing Pin	Alloy steel	26	Side Rail Fixing Screw	Alloy steel
13	Finger Plate Roller	Bearing steel	27	Bearing Holder	Aluminum alloy
14	Side Rail Set Screw	Alloy steel			

EDQ25


48
5.5
M3x0.5Px5dp
48
62
4-Ø4.5
17.4
Ø59 -0 -0.05
24.3(Open)
19.3(Close)
6.9(Open)
1.9(Close)
6 -0.01 -0.03
2
Ø3
2
34
29
4
10
91.5
89.5
3 +0.03 +0.01 x3dp
24
36
2- Ø3 +0.03 +0.01 x3dp
4-M5x0.8Px8dp
62.5
120°
Ø45
3-M4x0.7Px6dp
120°

EDQ42


80
62
7
8
M4x0.7Px6dp
62
80
4- Ø5.5
21.5
Ø2.5
2.5
48.5
42.5
4
12
117.5
114.5
3 +0.03 +0.01 x3dp
24
36
2- Ø3 +0.03 +0.01 x3dp
4-M6x1.0Px12dp
75
Ø78 -0 -0.05
10 -0.01 -0.03
3
120°
Ø62
3-M5x0.8Px10dp
120°