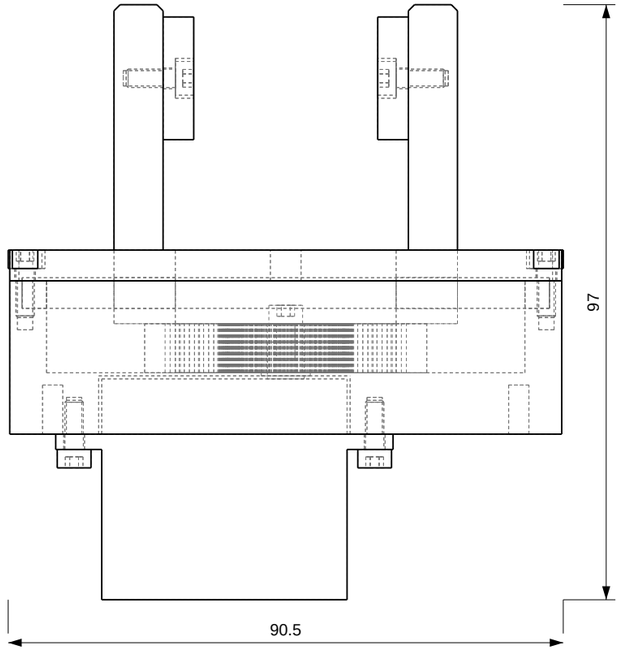
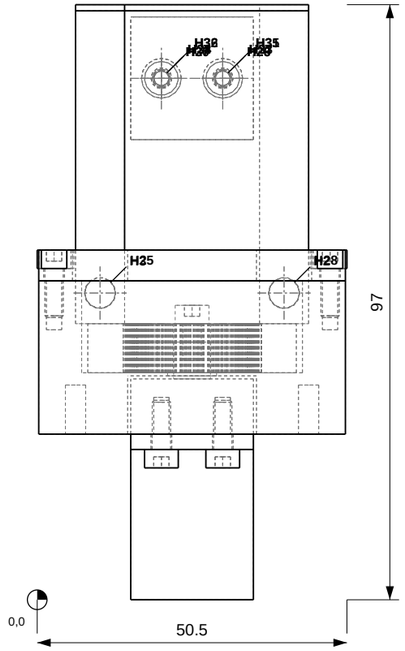
## FRONT VIEW



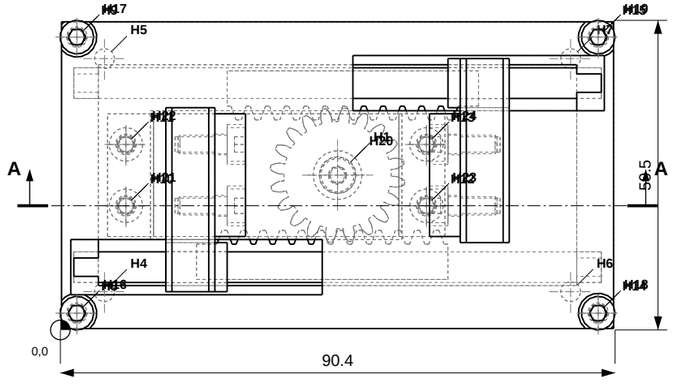

## LEFT SIDE VIEW




## DRIVING DIMENSIONS

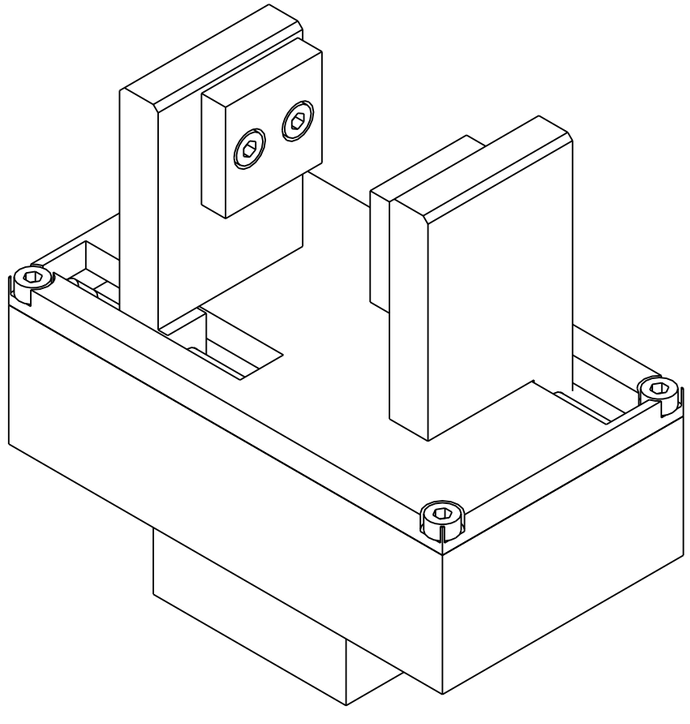
| Parameter | Value | Unit |
|---|---|---|
| Body length | 90 | mm |
| Body width | 50 | mm |
| Body height | 25 | mm |
| Cover thickness | 5 | mm |
| Pocket l | 78 | mm |
| Pocket w | 36 | mm |
| Pocket floor | 10 | mm |
| Module | 1 | mm |
| Pinion teeth | 20 | teeth |
| Pressure angle | 20 | mm |
| Pinion t | 8 | mm |
| Pinion bore | 6 | mm |
| Rack back y | 17 | mm |
| Rack len | 41 | mm |
| Rack front ofs | 3 | mm |
| Carrier l | 10 | mm |
| Carrier w | 8 | mm |
| Carrier y | 15 | mm |

## TOP VIEW




Dimensions in mm · unspecified tolerances ISO 2768-m · surface Ra 3.2 unless noted · break sharp edges 0.5 × 45° · machining

## ISOMETRIC



Hidden lines omitted · not to scale

## PARTS LIST

| Pos | Part | Qty | Standard / mass |
|---|---|---|---|
| 1 | body | 1 | 165.6 g |
| 2 | cover | 1 | 49.7 g |
| 3 | pinion | 1 | 6.0 g |
| 4 | servo | 1 | 80.0 g |
| 5 | jaw_right | 1 | 33.8 g |
| 6 | jaw_left | 1 | 33.8 g |
| 7 | pad_right | 1 | 4.8 g |
| 8 | pad_left | 1 | 4.8 g |
| 9 | guide_rod_right | 1 | 4.6 g |
| 10 | guide_rod_left | 1 | 4.6 g |
| 11 | Socket head cap screw M3x8 | 12 | cover_screw |
| 12 | Socket head cap screw M3x6 | 1 | pinion |

## NOTES

1. Shaft guide rod: safety 1 below 2.5 - increase to at least Ø7 mm or use a stronger steel (C45 / 42CrMo4)
2. Gear pinion: contact stress 314 MPa above ~230 MPa - wider face, larger gears or hardened steel (e.g. 42CrMo4 induction hardened)
3. Jaw gripping force acts 40-60 mm above the guide rod: moment is reacted over only a 10 mm carrier bushing length -> consider a longer carrier or dual rods for heavy loads
4. Servo body protrudes 27 mm behind the back face; the robot flange adapter needs a servo clearance pocket or standoffs
5. Rack extends to x = ±38 at full opening, 1 mm clearance to pocket wall - do not exceed 60 mm opening
6. Backlash in servo gear train directly affects jaw position repeatability
7. Servo = standard-size MG996R class (40x20x36 body, 55 mm ear span, shaft offset 10 mm, ~1.0 Nm, M3 output screw)
8. Pinion pitch radius 10 mm -> 30 mm jaw travel = 171.9° servo rotation
9. Body split into machined base (25 mm) + 5 mm cover plate = 30 mm total, so the rack/pinion pocket can be milled from the front

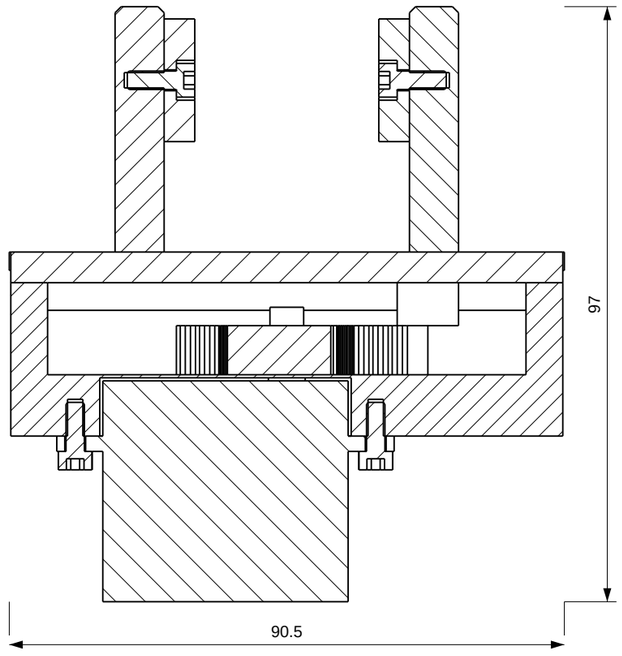
TITLE

# Rack-and-pinion parallel servo gripper

LUXXO

| | | |
|---|---|---|
| DRAWN BY<br>Luxxo AI design engineer | DATE<br>2026-11-14 | PROJECTION<br>ISO first angle [\|O] -O |
| MATERIAL<br>Aluminium (6061) | GENERAL TOLERANCE<br>ISO 2768-m ± 0.2 mm | MASS (calc.)<br>391.6 g |
| SCALE<br>1 : 1 | SHEET<br>1 / 2 A3 | DRAWING No.<br>LX-D2164F-v1 |

## SECTION A-A




A-A (1 : 1) cutting plane y = -5 mm, viewed from the front

## HOLE TABLE (X / Y from datum 0,0 of the view F / S / T on sheet 1)

| Tag | Ø | X | Y | Depth | View | Thread / fit / note |
|---|---|---|---|---|---|---|
| H1 | Ø8 | 45.2 | 25.2 | THRU | T | Drilled |
| H2 | Ø5 | 40.2 | 50 | 86 | S | M6-6H, tap drill Ø5 |
| H3 | Ø5 | 10.2 | 50 | 86 | S | M6-6H, tap drill Ø5 |
| H4 | Ø3.3 | 7.2 | 6.2 | 8 | T | M4-6H, tap drill Ø3.3 |
| H5 | Ø3.3 | 7.2 | 44.2 | 8 | T | M4-6H, tap drill Ø3.3 |
| H6 | Ø3.3 | 83.2 | 6.2 | 8 | T | M4-6H, tap drill Ø3.3 |
| H7 | Ø3.3 | 83.2 | 44.2 | 8 | T | M4-6H, tap drill Ø3.3 |
| H8 | Ø2.5 | 2.7 | 2.7 | 8 | T | M3-6H, tap drill Ø2.5 |
| H9 | Ø2.5 | 2.7 | 47.7 | 8 | T | M3-6H, tap drill Ø2.5 |
| H10 | Ø2.5 | 10.7 | 20.2 | 6 | T | M3-6H, tap drill Ø2.5 |
| H11 | Ø2.5 | 10.7 | 30.2 | 6 | T | M3-6H, tap drill Ø2.5 |
| H12 | Ø2.5 | 59.7 | 20.2 | 6 | T | M3-6H, tap drill Ø2.5 |
| H13 | Ø2.5 | 59.7 | 30.2 | 6 | T | M3-6H, tap drill Ø2.5 |
| H14 | Ø2.5 | 87.7 | 2.7 | 8 | T | M3-6H, tap drill Ø2.5 |
| H15 | Ø2.5 | 87.7 | 47.7 | 8 | T | M3-6H, tap drill Ø2.5 |
| H16 | Ø3.4 | 2.7 | 2.7 | THRU | T | M4-6H, tap drill Ø3.3 |
| H17 | Ø3.4 | 2.7 | 47.7 | THRU | T | M4-6H, tap drill Ø3.3 |
| H18 | Ø3.4 | 87.7 | 2.7 | THRU | T | M4-6H, tap drill Ø3.3 |
| H19 | Ø3.4 | 87.7 | 47.7 | THRU | T | M4-6H, tap drill Ø3.3 |
| H20 | Ø6 | 45.2 | 25.2 | THRU | T | Ø6 H7 (+0.012 / 0) pinion bore on servo boss |

+ 18 more holes - full list in the app

## FITS & TOLERANCES (ISO 286)

| Feature | Size | Max / min | Fit |
|---|---|---|---|
| guide rod seat | Ø5 H7 | 5.012 / 5.0 | H7/m6 transition |
| carrier bushing | Ø5 H7 | 5.012 / 5.0 | H7/g6 clearance |
| pinion bore on servo boss | Ø6 H7 | 6.012 / 6.0 | H7/k6 transition |

## ENGINEERING CHECKS (simplified hand calculations)

!! guide rod: Ø5: T = 1 N·m, M = 2.8 N·m → σv = 238.8 MPa, safety 1 vs. Re 240 MPa (need 2.5), min. Ø6.8

!! pinion: m1 z20 b8: Ft = 100 N, tooth root σF = 39.2 MPa (allow ~90), contact σH = 314 MPa (limit ~230)

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|---|---|---|
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| MATERIAL<br>Aluminium (6061) | GENERAL TOLERANCE<br>ISO 2768-m ± 0.2 mm | MASS (calc.)<br>391.6 g |
| SCALE<br>1 : 1 | SHEET<br>2 / 2 A3 | DRAWING No.<br>LX-D2164F-v1 |

Section hatching per ISO 128-50 · hole coordinates from the datum symbol · fits ISO 286-2 · weld symbols ISO 2553 · weld preparation EN ISO 9692-1