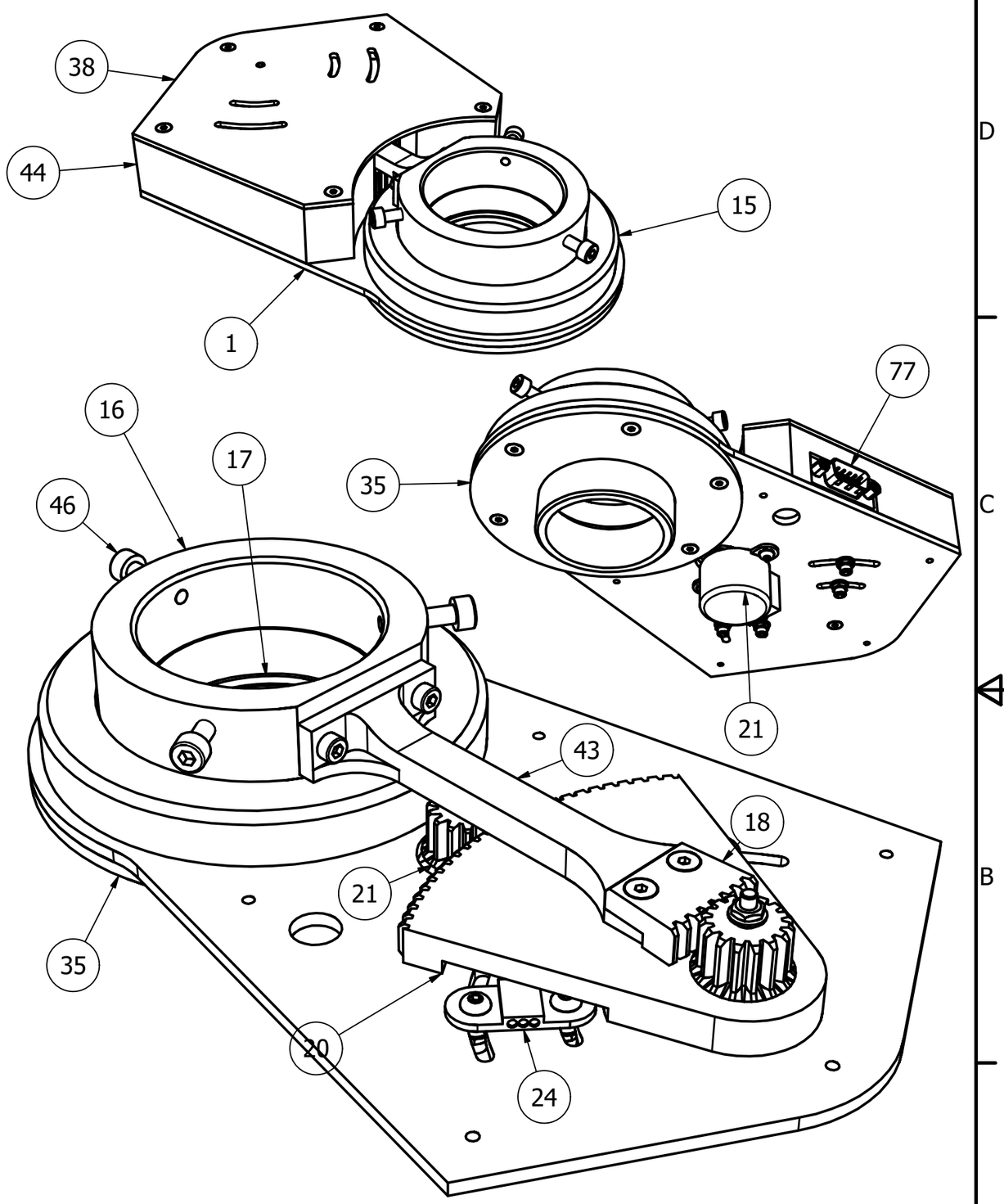
PARTS LIST

| ITEM | QTY | PART NUMBER | DESCRIPTION |
|---|---|---|---|
| 1 | 1 | rotator_plate | 3 mm machined aluminium |
| 15 | 1 | bearing_fixed_flange | Machined bearing interface |
| 16 | 1 | camera_flange | Machined aluminium |
| 17 | 1 | inner_retaining_ring | Machined aluminium or steel component |
| 18 | 1 | output_cam | 3D printed resin component |
| 19 | 1 | plastic_washer | Teflon or ABS washer |
| 20 | 1 | main_gear | 3D printed resin component |
| 21 | 1 | motor | 64:1 geared unipolar stepper motor, 4096 steps/rev |
| 23 | 1 | pinion | 3D printed resin component |
| 24 | 2 | 55100_h_sensor | Hall sensor limit switch |
| 25 | 1 | magnet | Ye olde fridge magnet |
| 33 | 1 | brass_spacer | Main gear axis Mechanism |
| 35 | 1 | telescope_adaptor_flange | Machined aluminium |
| 38 | 1 | cover_plate | Aluminium with precision holes |
| 42 | 1 | SKF61812 | Deep groove ball bearings, single row |
| 43 | 1 | arm | Machined aluminium |
| 44 | 1 | abs_sidewall | 3D printed ABS |
| 45 | 2 | ISO 4762 - M3 x 8(1) | Hexagon Socket Head Cap Screw |
| 46 | 3 | ISO 4762 - M4 x 16(1) | Hexagon Socket Head Cap Screw |
| 47 | 6 | ISO 10642 - M3x30 | Hexagon socket countersunk head cap screws |
| 50 | 3 | ISO 4035 - M3(4) | Hexagon thin nuts (chamfered) - Product grades A and B |
| 51 | 4 | ISO 7380-1 - M3 x 10 | Hexagon Socket Button Head Screw - Product grade A |
| 52 | 7 | ISO 7089 - 3 | Plain washers - Normal series - Product grade A |
| 53 | 4 | ISO 7040 - M3 | Hex Nut with Torque Part. Product grades A and B |
| 54 | 6 | DIN 7991 - M3x16 | Hexagon socket countersunk head cap screws |
| 55 | 8 | DIN 7991 - M3x8 | Hexagon socket countersunk head cap screws |
| 56 | 1 | polymer_spring | Preload spring for optical axis |
| 57 | 2 | DIN 6797 - A 3.2 | Toothed Lock Washer |
| 58 | 2 | ISO 7380-1 - M3 x 6 | Hexagon Socket Button Head Screw - Product grade A |
| 76 | 2 | 93655A091 | Small standoff for D-SUB connector |
| 77 | 1 | 78087 | D-SUB E9 male connector, panel mount |

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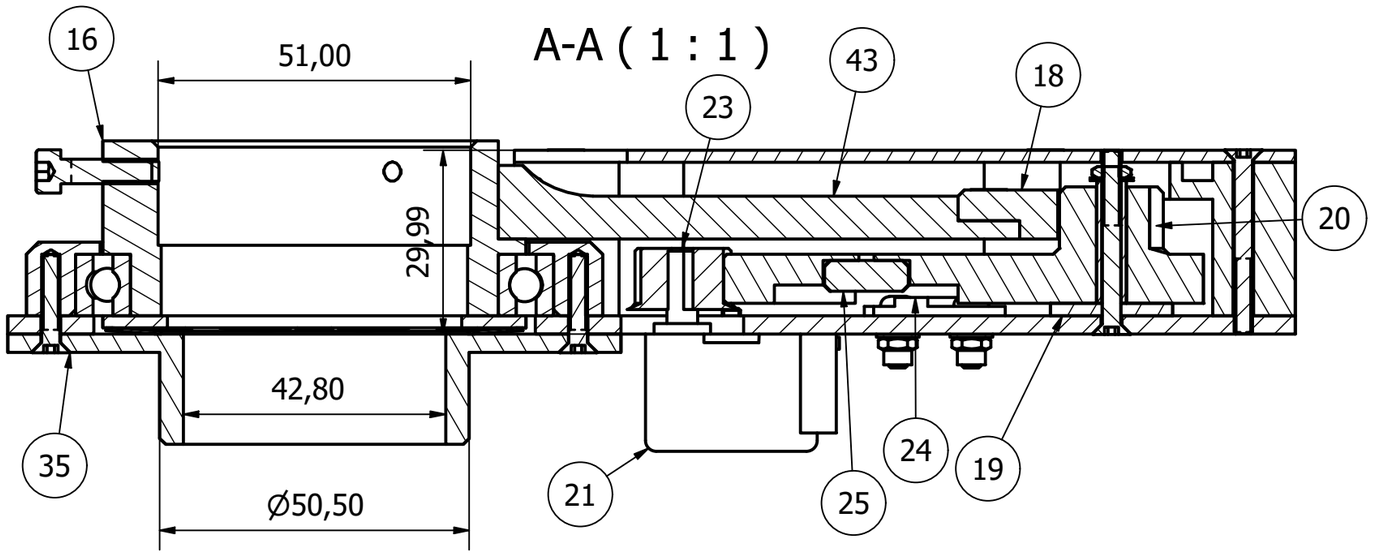
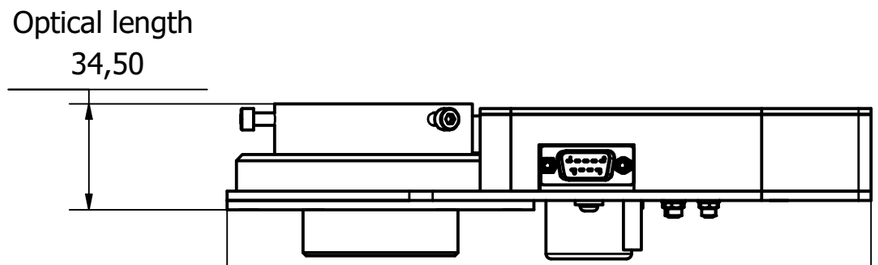
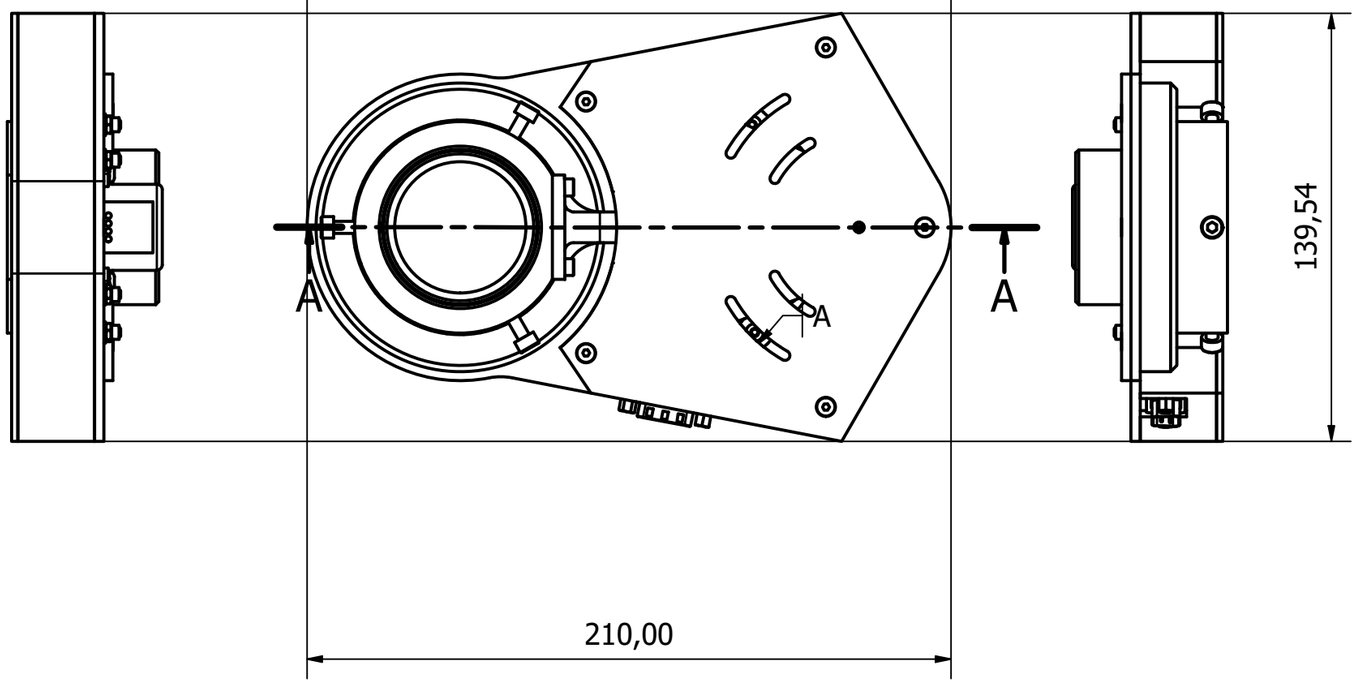
|---|---|---|---|
| IRISC | Field rotator | | |
| | Field_rotator | Edition | Sheet 1 / 9 |




## Field rotator

The field rotator connects between the telescope and the camera and provides approximately 2 degrees of rotation in either direction. The telescope adaptor flange (35) and camera mount (16) are designed to interface with standard 2 inch telescope components. A magnet (25) and two hall effect switches (24) provide limit sensing to trigger re-centering.

It is actuated by a 5V bipolar stepper motor (21) through an integrated gearbox and a set of plastic gears (23, 20) and a gear cam (18) on a leverage arm (43).

The total ratio is 9408:1 which gives a total of 602212 steps per revolution or an angular resolution of 2.152 arcsec/step.

The camera is supported on a SKF61812 deep grove bearing that is under slight axial preload by a polymer disk spring acting on the inner race.

Backlash is eliminated by a small spring. The friction force of the polymer disc spring and tension on the backlash spring is assumed to be negligible compared to the torque provided by the motor.

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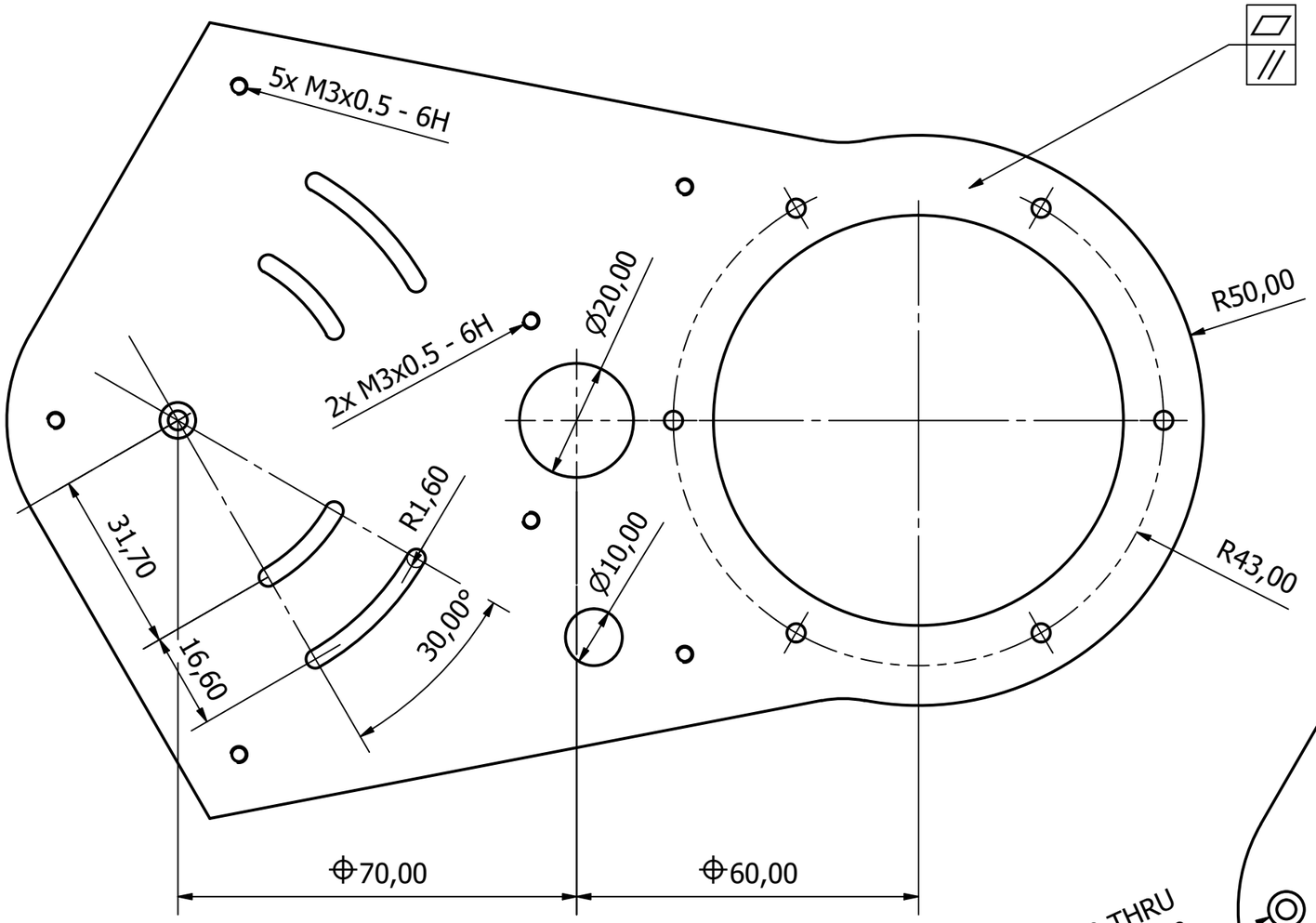
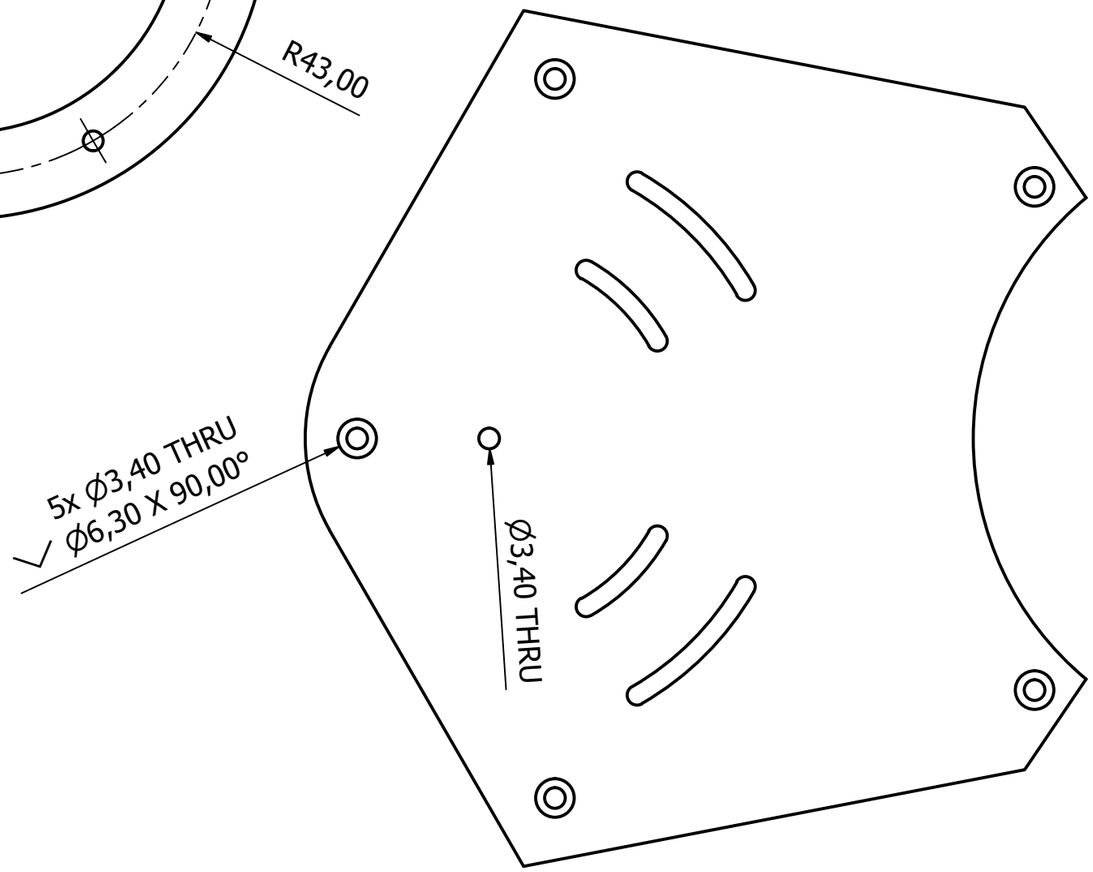
| | | | | Field_rotator | Edition | Sheet 2 / 9 |

**Aluminium components**




**Top plate**
Use 2 mm 6061 aluminium or equivalent.




**Base plate, bottom view**
Use 3 mm 6061 aluminium or equivalent.
Machine down flange interfaces as required to make flat and parallel.

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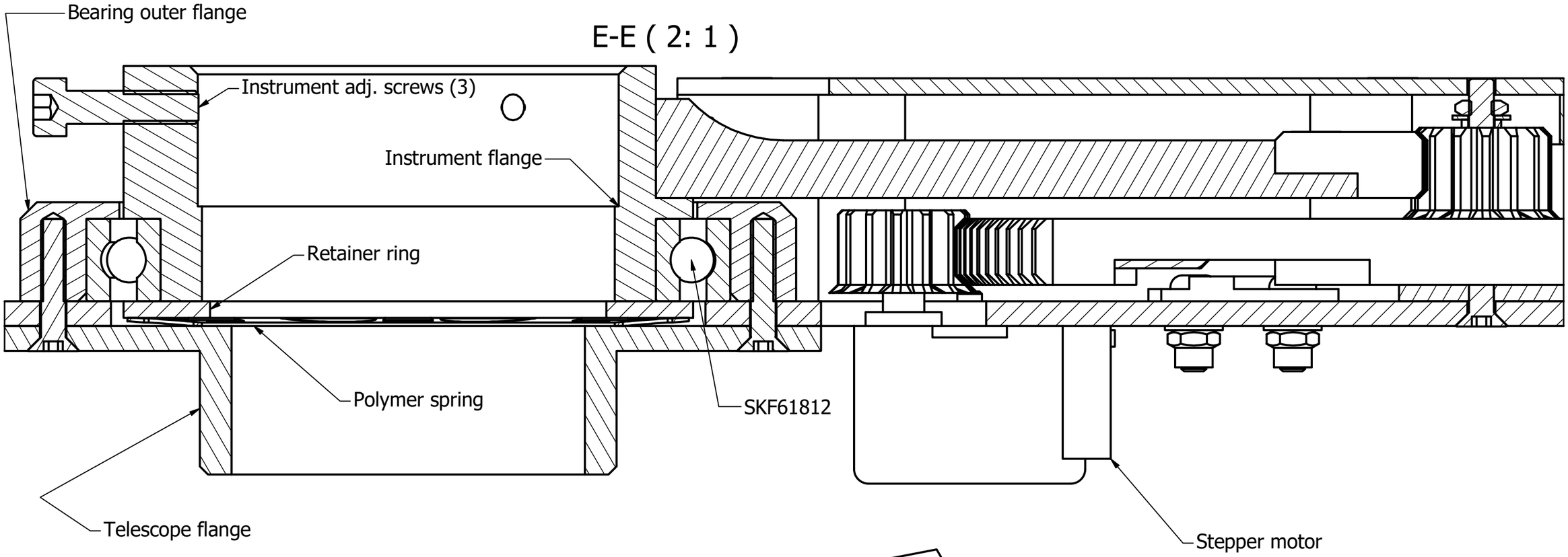
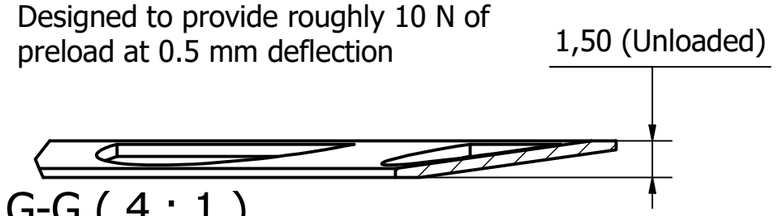
| | Field_rotator | Edition | Sheet 3 / 9 |

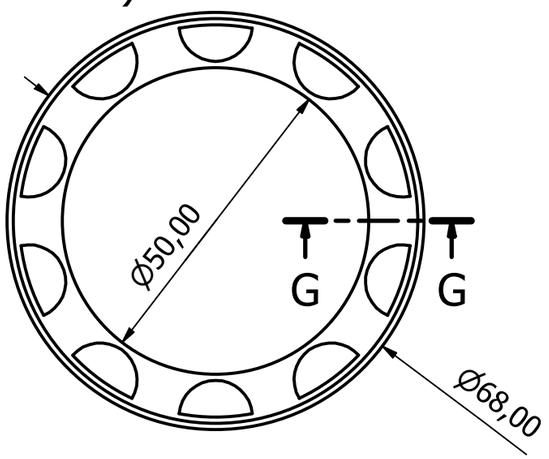
E-E ( 2: 1 )

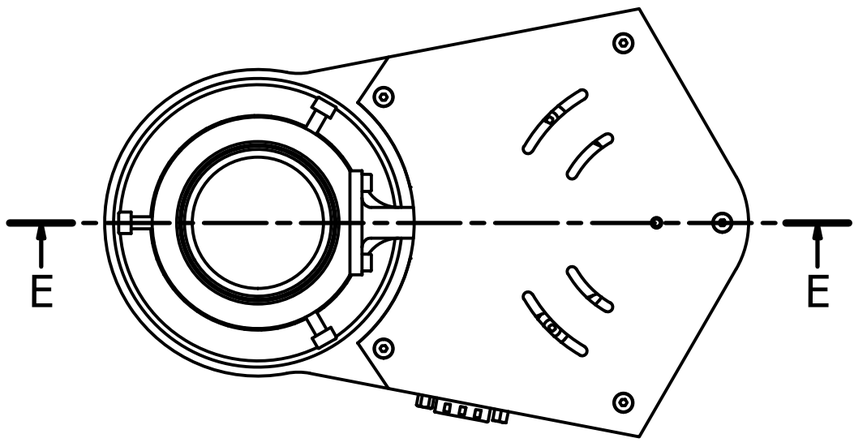



**Polymer spring**
3D printed ABS component
Designed to provide roughly 10 N of preload at 0.5 mm deflection




G-G ( 4 : 1 )




**Bearing arrangement detail**

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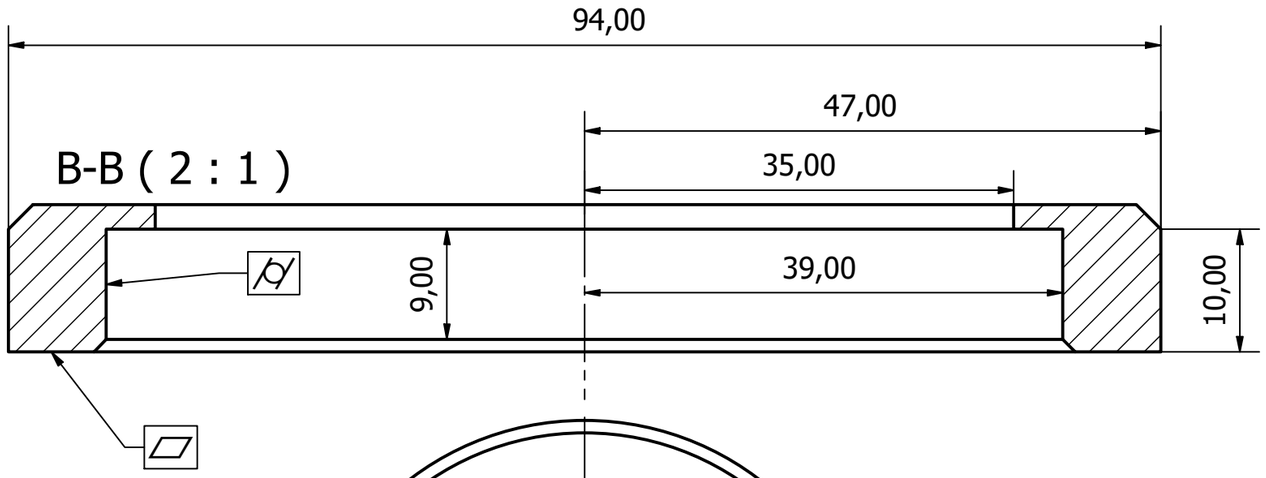
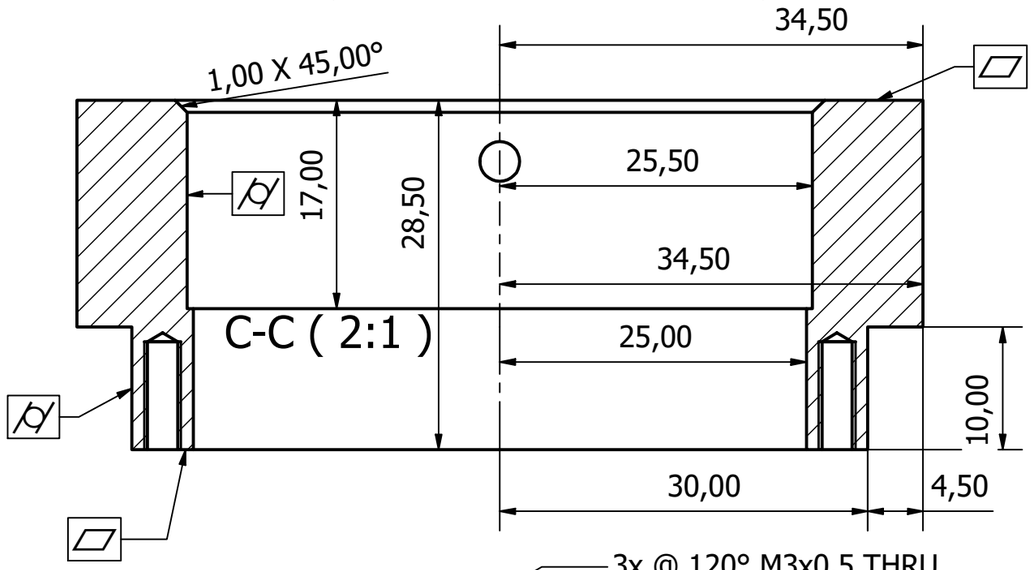
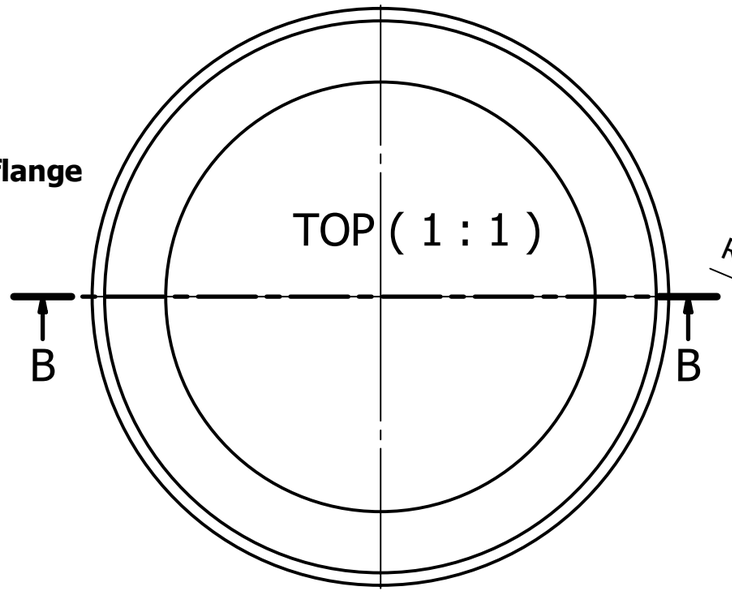
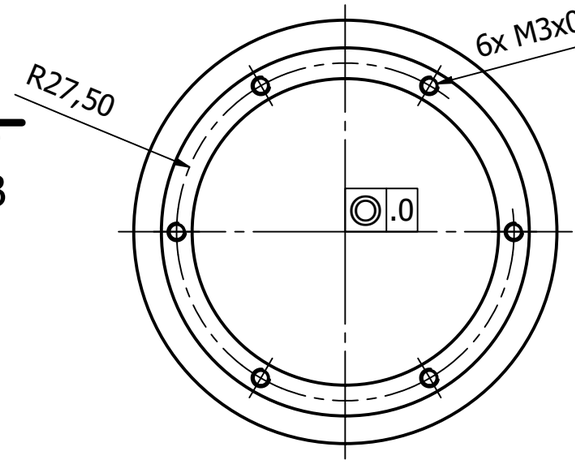
|---|---|---|---|
| IRISC | Field rotator | | |
| | Field_rotator | Edition | Sheet 4 / 9 |

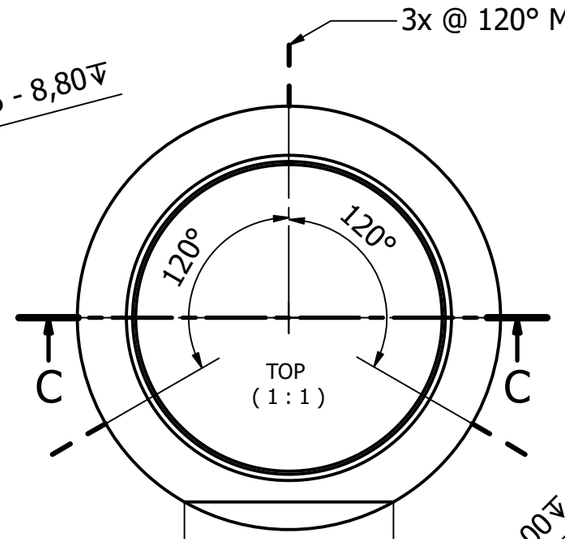


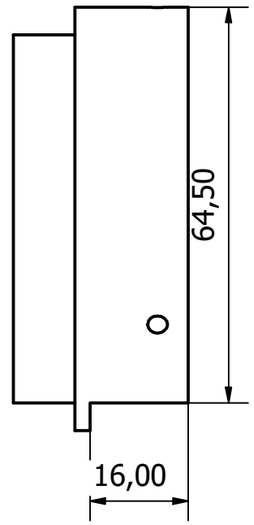



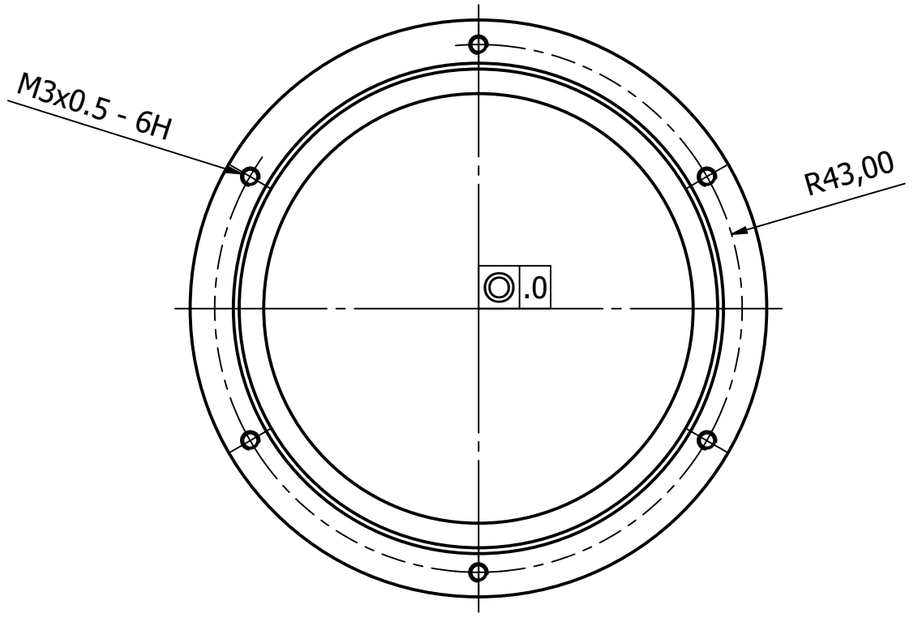

**Bearing flange**
SKF61812



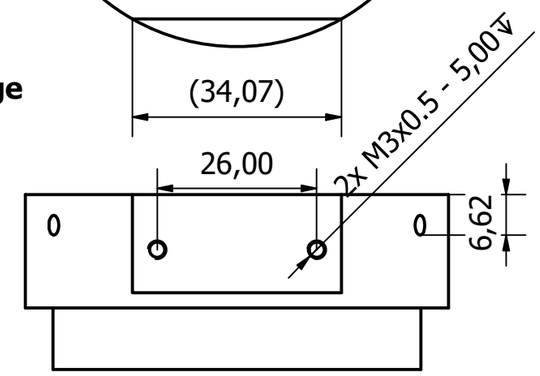




**Instrument flange**
Standard 2" fitting

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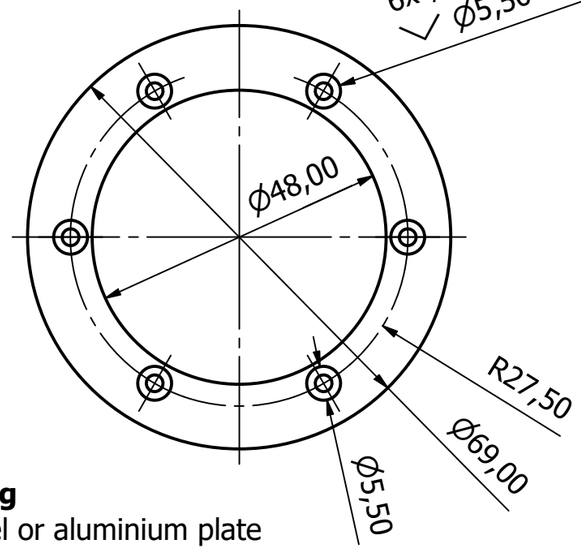
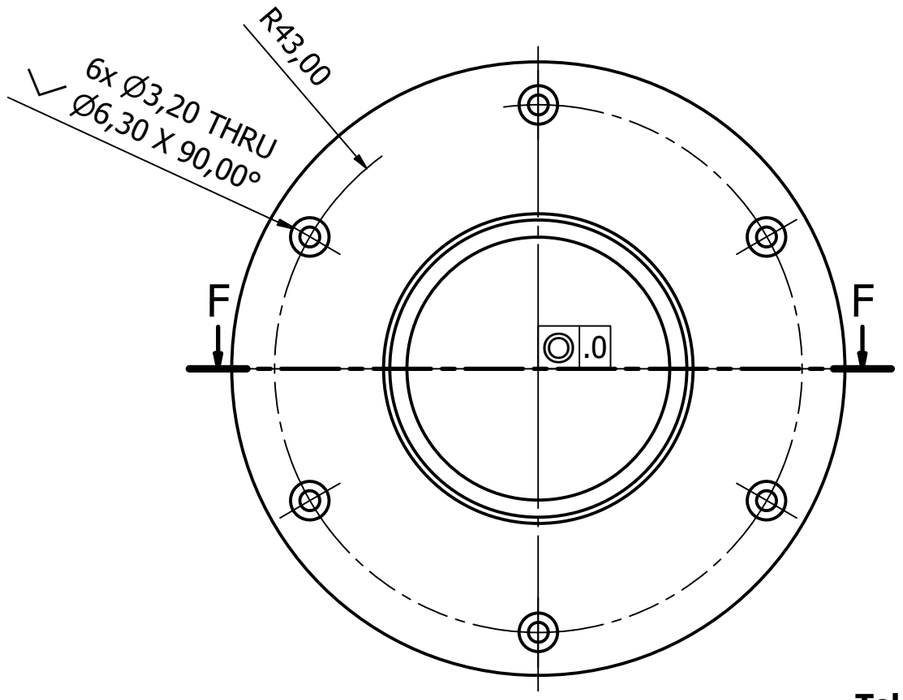
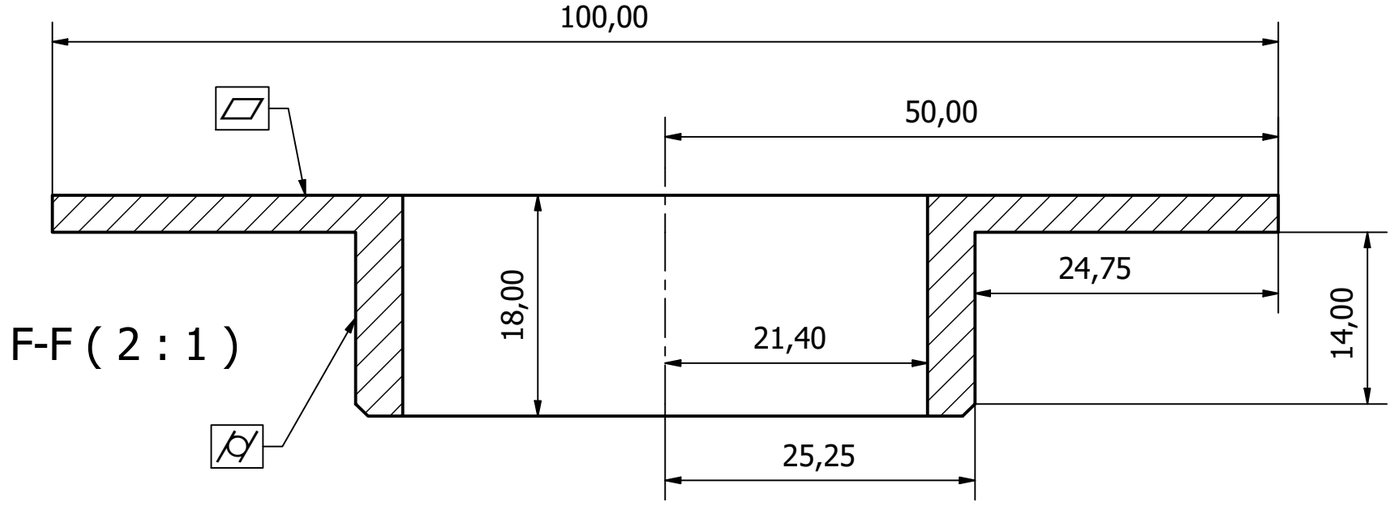
| IRISC | Field rotator | | |
| | Field_rotator | Edition | Sheet 5 / 9 |




**Retainer ring**
2,00 mm steel or aluminium plate
Mating surface reasonably planar.




**Telescope flange**
Aluminium or steel
Mating surfaces critical




F-F ( 2 : 1 )

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| | Field_rotator | Edition | Sheet 6 / 9 |

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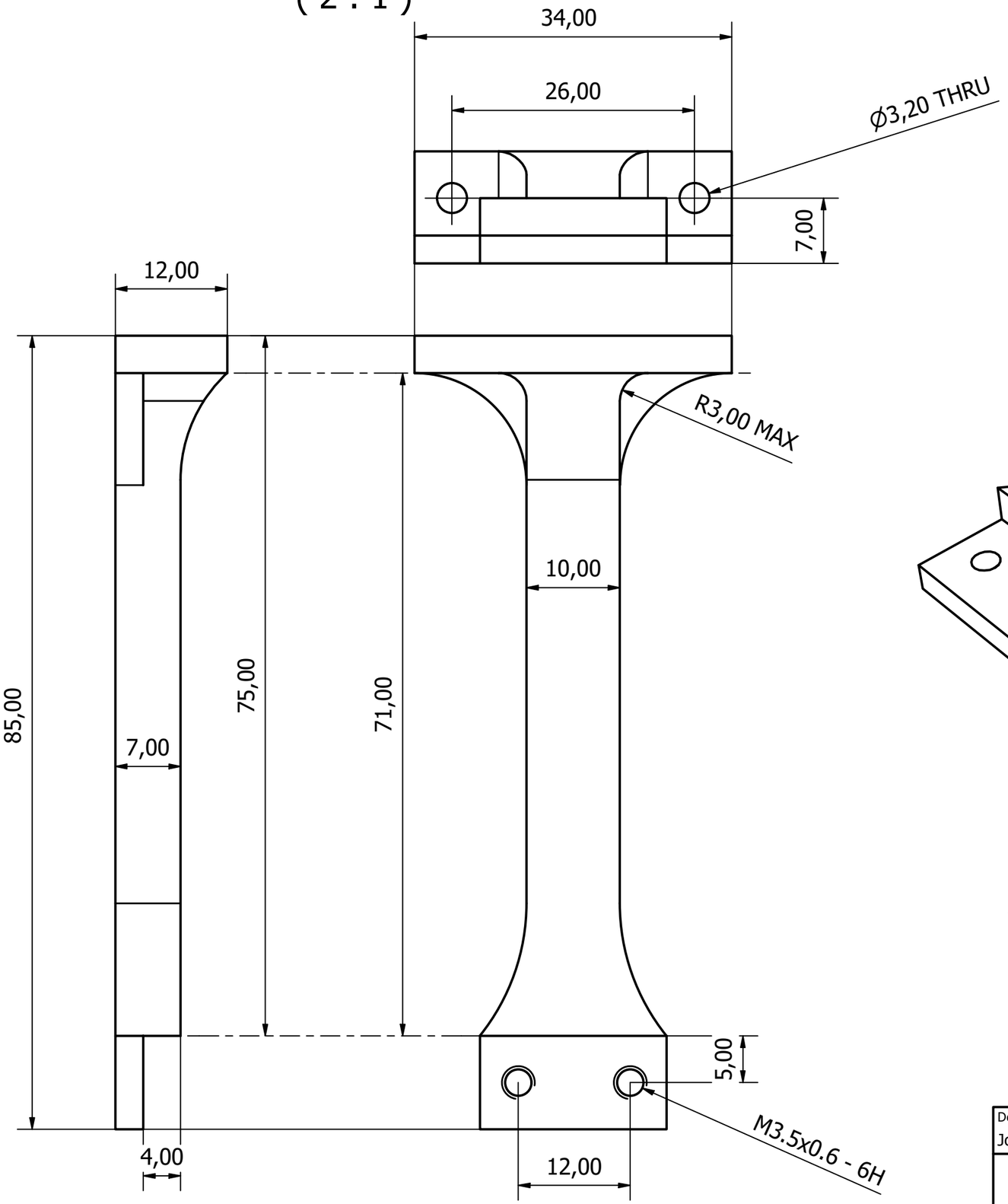


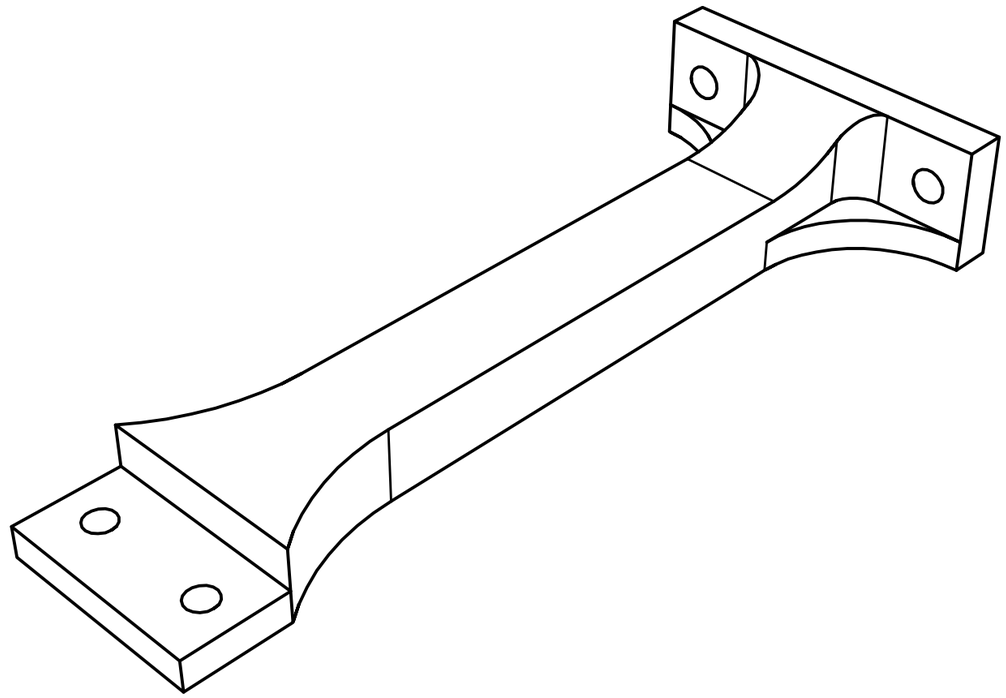

**Rotator arm**
Aluminium 6061 or equivalent

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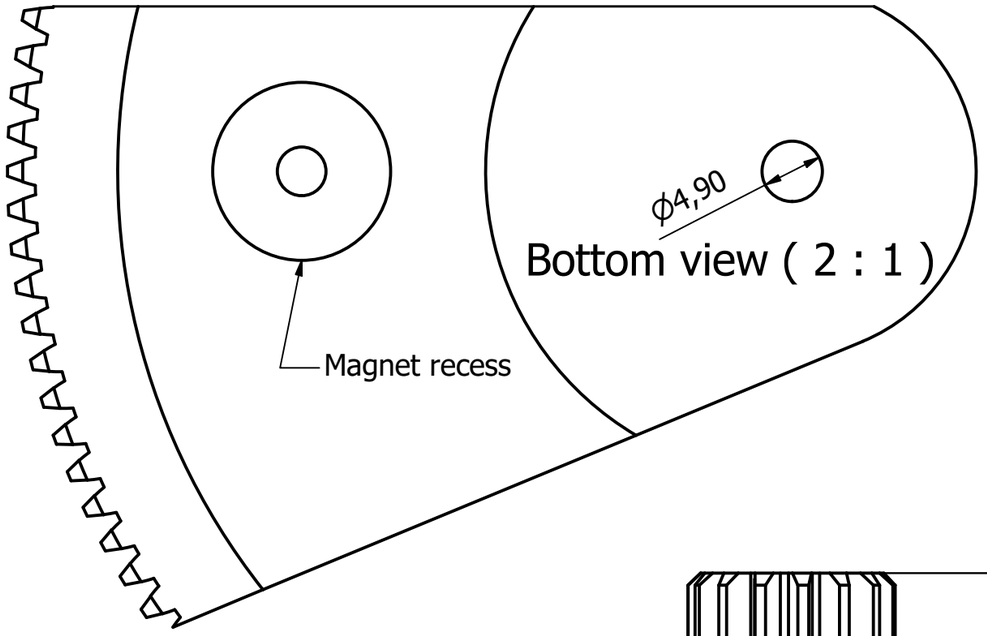
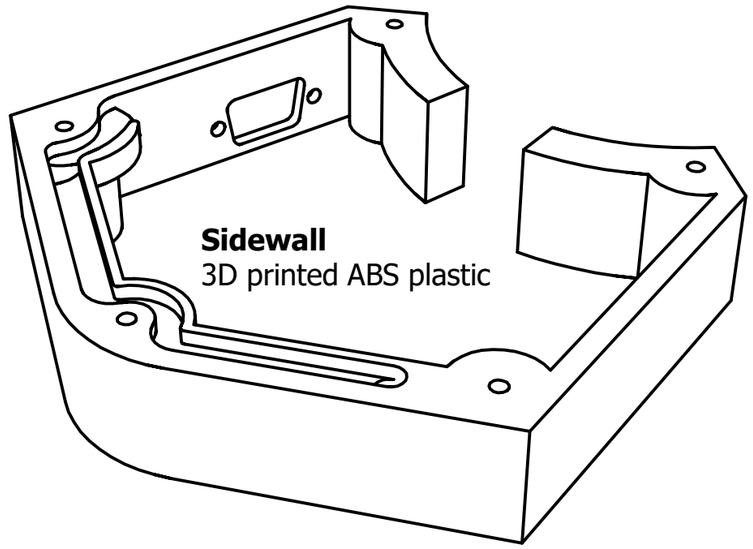
| IRISC | Field rotator | | |
| | Field_rotator | Edition | Sheet 7 / 9 |

**3D printed components**

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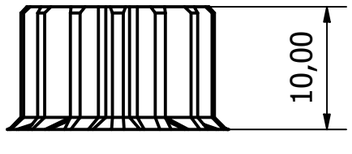
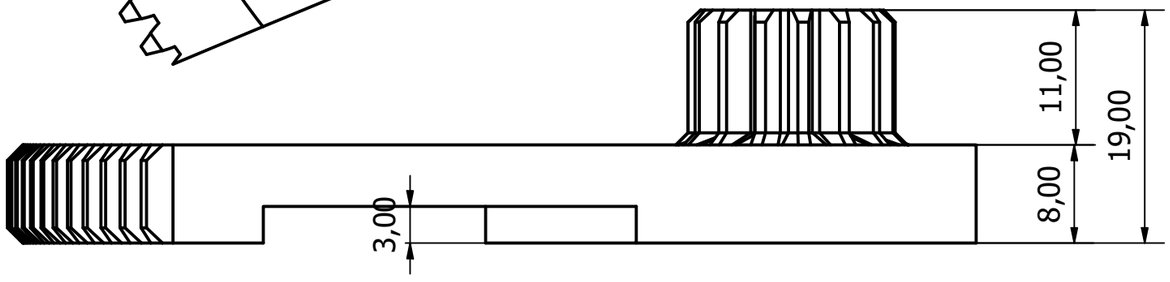
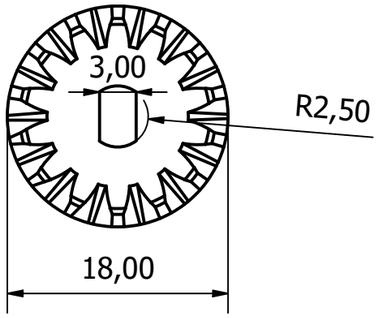


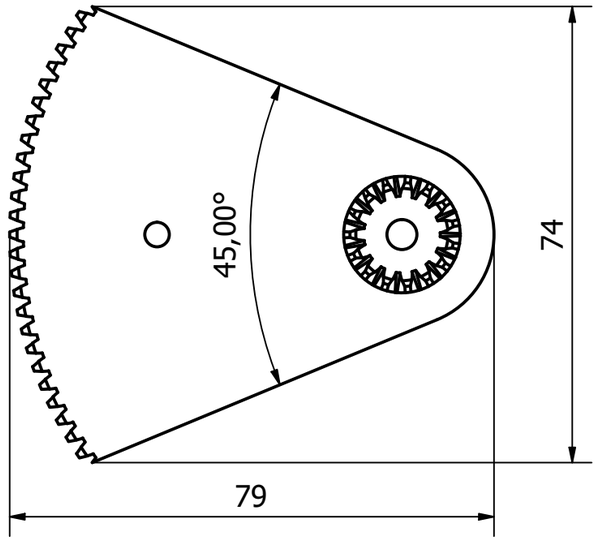



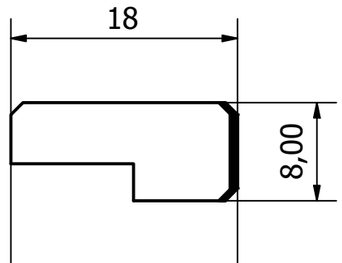

**Pinion**
14T mod 1.0
3D printed resin




**Main gear**
126T mod 1.0 45° section
15T pinion mod 1.0
3D printed resin

( 2 : 1 )

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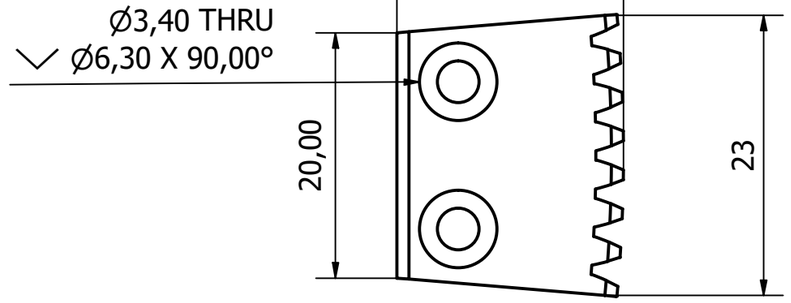


**Output cam**
245T mod 1.0 approx 10° section
3D printed resin

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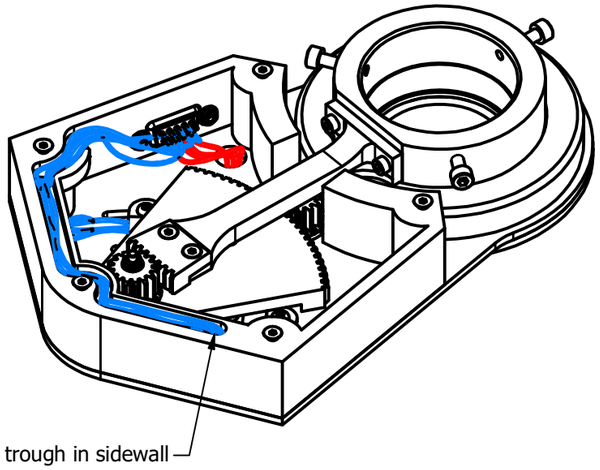
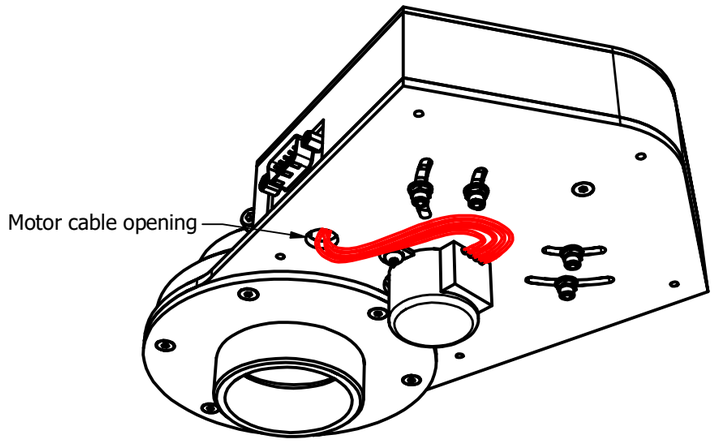
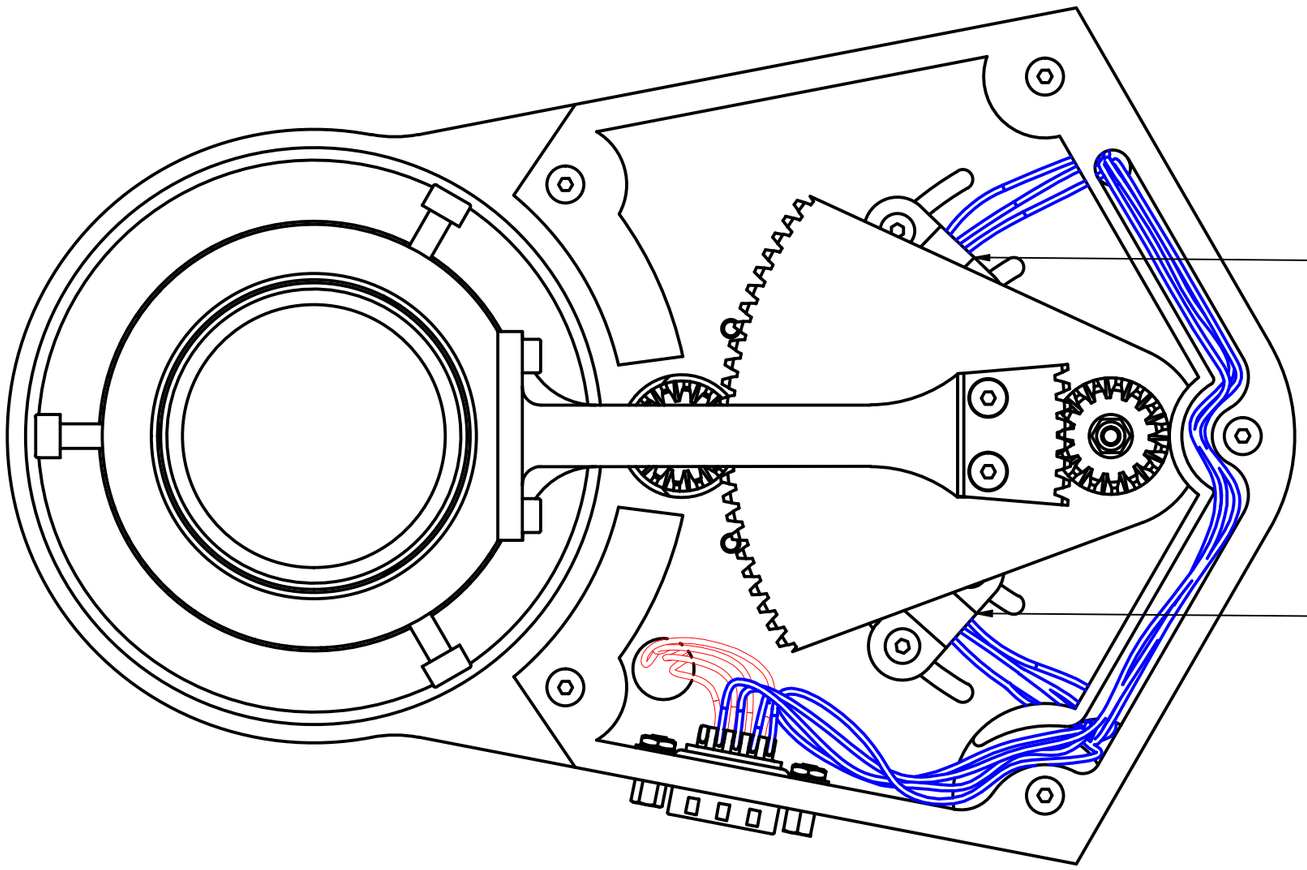
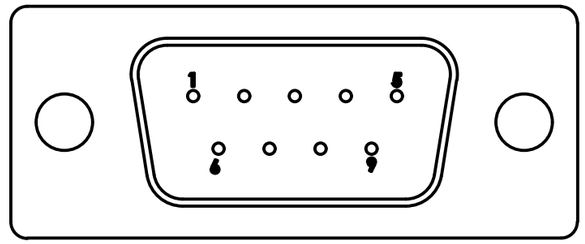
| IRISC | Field rotator | | |
| | Field_rotator | Edition | Sheet 8 / 9 |




**Wire harness and connector specification**
D-SUB 9P type E male connector with solder cups. Sensor cables should allow for sensor adjustment.




| D-SUB 9 PINOUT | | |
|---|---|---|
| Pin | Con | Wire color |
| 1 | NC | - |
| 2 | SW1 | Blue |
| 3 | SW2 | Blue |
| 4 | GND | Black |
| 5 | PWR | Red |
| 6 | M4 | Pink |
| 7 | M3 | Yellow |
| 8 | M2 | Blue |
| 9 | M1 | Red |

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| | | | | Field_rotator | Edition | Sheet 9 / 9 |