# Model a gearbox housing with bearing bosses, bolt flange and mounting lugs

**Software:** Siemens NX

## Task statement

Create a 3D solid model and an associated drawing of a cast gearbox housing in millimetres. Work from the supplied dimensioned diagrams diagram_01.png, diagram_01_detail01.png, diagram_01_detail02.png, diagram_01_detail03.png and diagram_01_detail04.png.

The housing is an open-top rectangular box. Its main features are:

- **Top bolt flange.** A continuous flange runs around the top, with rounded corners (R10) and a vertical bolt hole at each of the four corners. Cylindrical bosses run down the inside corners of the cavity under these holes.
- **Bearing bosses.** Each long side wall carries two circular bearing bosses of R40, with their centres 64 apart. Each boss has a central bore of R14 (Ø28) surrounded by four equally spaced bolt holes. The boss pair sits on a U-shaped raised pad on the wall.
- **Bore height.** The bore axes are 57 above the base and 45 below the top face.
- **Mounting lugs.** A triangular lug projects from each end of the base. Each lug has a rounded tip of R18 and a vertical Ø16 through hole with a Ø28 counterbore (2X each).
- **Base relief.** The underside has a shallow relief between the lugs.

Key dimensions:

- Overall length: 263.96.
- Body length: 166.
- Lug projection: 48.98 each side.
- Bore centres from the lug tips: 99.98 each side.
- Overall width: 96.
- Overall height: 102.
- Overall envelope: about 264 × 96 × 102 mm.

The finished part shall be a single closed solid body, built only from planar and cylindrical faces. Its volume shall be approximately 618,019 $mm^3$.

Save the part as Dual-Port_Valve_Housing.prt. Create the drawing in Dual-Port_Valve_Housing_dwg1.prt, referencing the part.

The drawing shall be a single sheet in third-angle projection, containing:

- Top, front, side and isometric views.
- Dimensions including the overall length, the 166 body length, the 102 height and the 96 width, and the R40, R18, Ø16 and Ø28 callouts.
- A title block with a title, a drawing number and sheet 1 OF 1.
- A note that dimensions are in millimetres.

## Rubrics

- **R1:** The model shall have an overall bounding size of approximately 264 × 96 × 102 mm (263.96 long, 96 wide, 102 high).
- **R2:** The model shall be an open-top hollow box with a continuous top flange having four corner bolt holes

and R10 corner rounding.

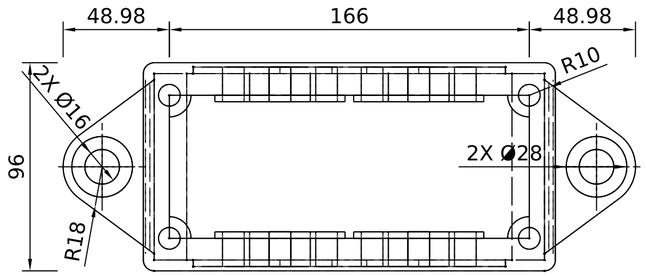
- **R3:** The model shall have two circular bearing bosses of R40 on each long side wall, with centres spaced 64 apart.
- **R4:** Each bearing boss shall have a central bore of R14 (Ø28) surrounded by four equally spaced bolt holes.
- **R5:** The bearing bore axes shall lie within 1 mm of 57 above the base and 45 below the top face.
- **R6:** The model shall have a triangular mounting lug at each end projecting 48.98 beyond the 166 long body, with an R18 rounded tip.
- **R7:** Each mounting lug shall contain a Ø16 through hole with a Ø28 counterbore.
- **R8:** The model shall have a volume of approximately 618,019 $mm^3$.
- **R9:** The model shall consist only of planar and cylindrical faces.
- **R10:** The drawing shall contain top, front and isometric views and a side view, in third-angle projection.
- **R11:** The drawing shall dimension the overall length (about 264) and the 166 body length.
- **R12:** The drawing shall dimension the height 102 and the width 96.
- **R13:** The drawing shall carry the callouts R40, R18, Ø16 and Ø28.
- **R14:** The drawing title block shall show a title, a drawing number and sheet 1 OF 1, and the drawing shall state that dimensions are in millimetres.
- **R15:** The model shall be a single solid body in millimetre units saved as Dual-Port_Valve_Housing.prt.
- **R16:** The drawing shall be saved as Dual-Port_Valve_Housing_dwg1.prt with views referencing the Dual-Port_Valve_Housing part.

## Input files

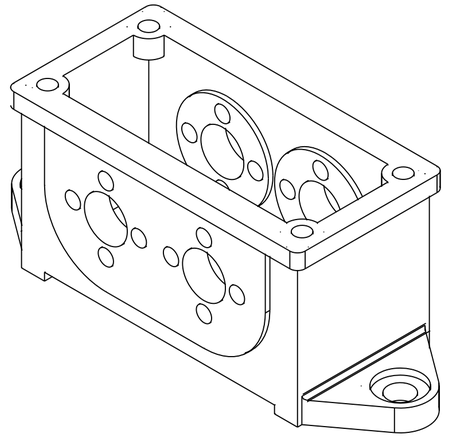
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- task_files/diagrams/diagram_01.png
- task_files/diagrams/diagram_01_detail01.png
- task_files/diagrams/diagram_01_detail02.png
- task_files/diagrams/diagram_01_detail03.png
- task_files/diagrams/diagram_01_detail04.png

## Deliverables

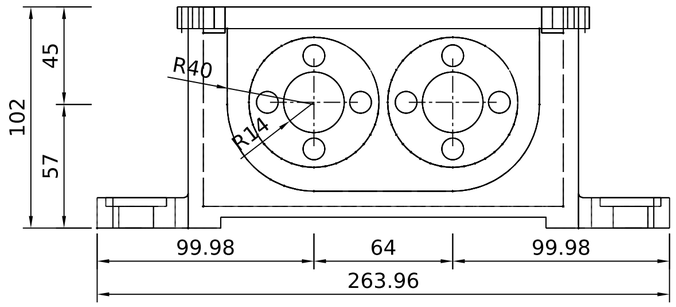
- **.prt:** output_files/project_files/Dual-Port_Valve_Housing.prt: The deliverable is a millimetre NX part file containing the single-solid gearbox housing, plus a separate NX drawing file holding a dimensioned sheet with views of that part.
- **.prt:** output_files/project_files/Dual-Port_Valve_Housing_dwg1.prt: The deliverable is a millimetre NX part file containing the single-solid gearbox housing, plus a separate NX drawing file holding a dimensioned sheet with views of that part.
- **.stp:** output_files/project_files/Dual-Port_Valve_Housing.stp: STEP export of the model in the same units.



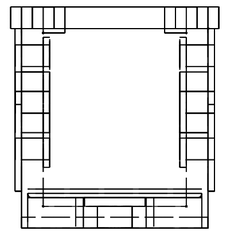

TOP VIEW



ISOMETRIC VIEW




FRONT VIEW



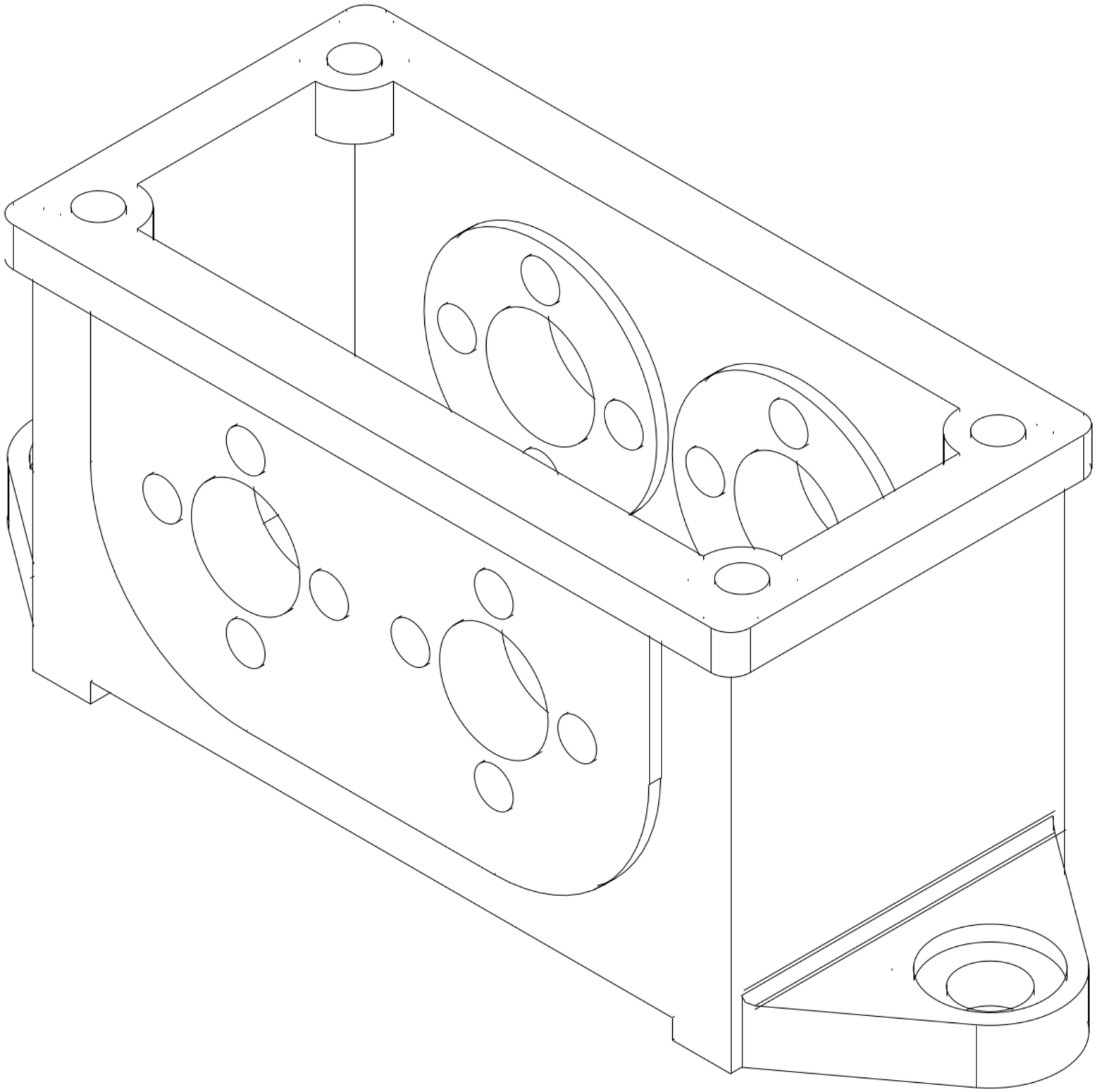
RIGHT SIDE VIEW

**NOTES**
1. ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE STATED.
2. DO NOT SCALE THE DRAWING; USE THE FIGURED DIMENSIONS.
3. VIEWS IN THIRD ANGLE PROJECTION.

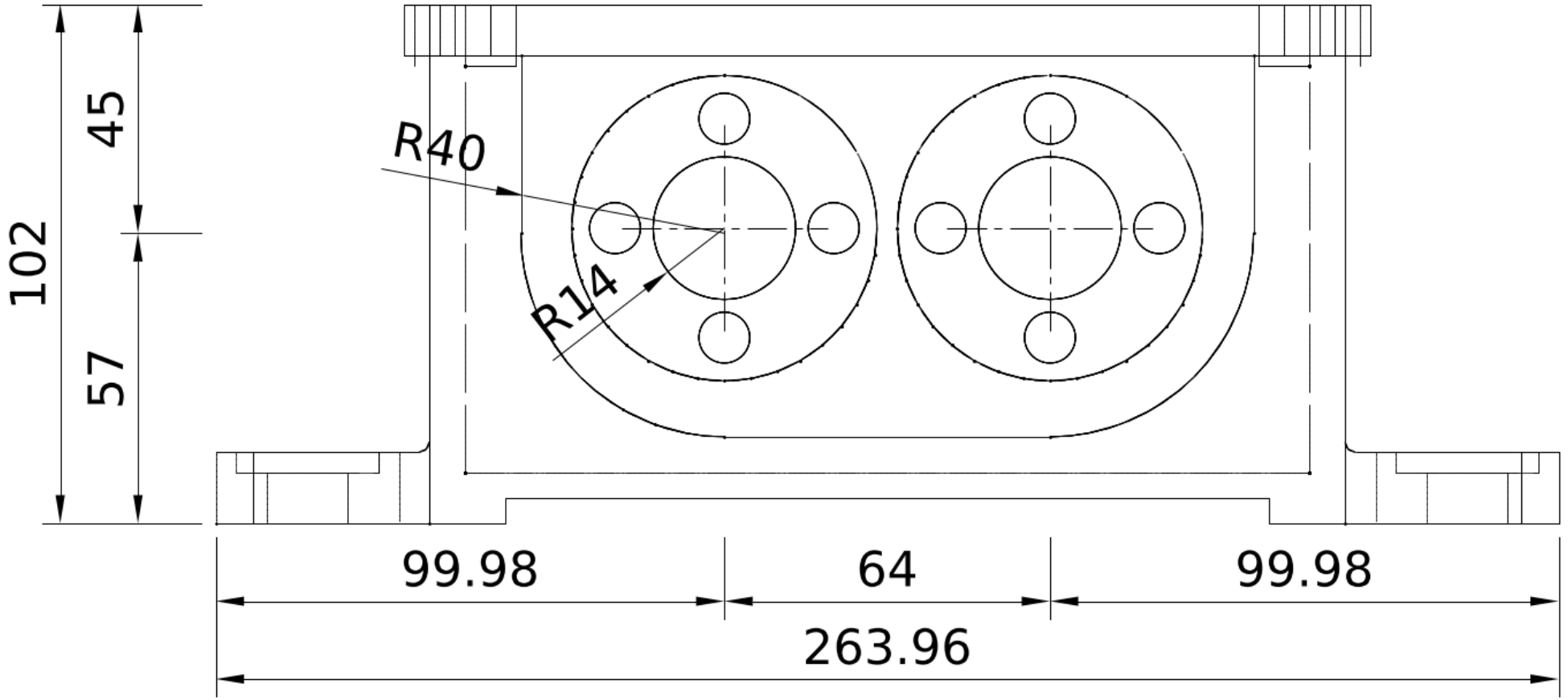
| UNITS | SCALE | PROJECTION |
|---|---|---|
| MILLIMETRES | **1:2** | |

| TITLE | SIZE |
|---|---|
| **GEARBOX HOUSING WITH BEARING BOSSES, BOLT FLANGE AND MOUNTING LUGS** | **A2** |

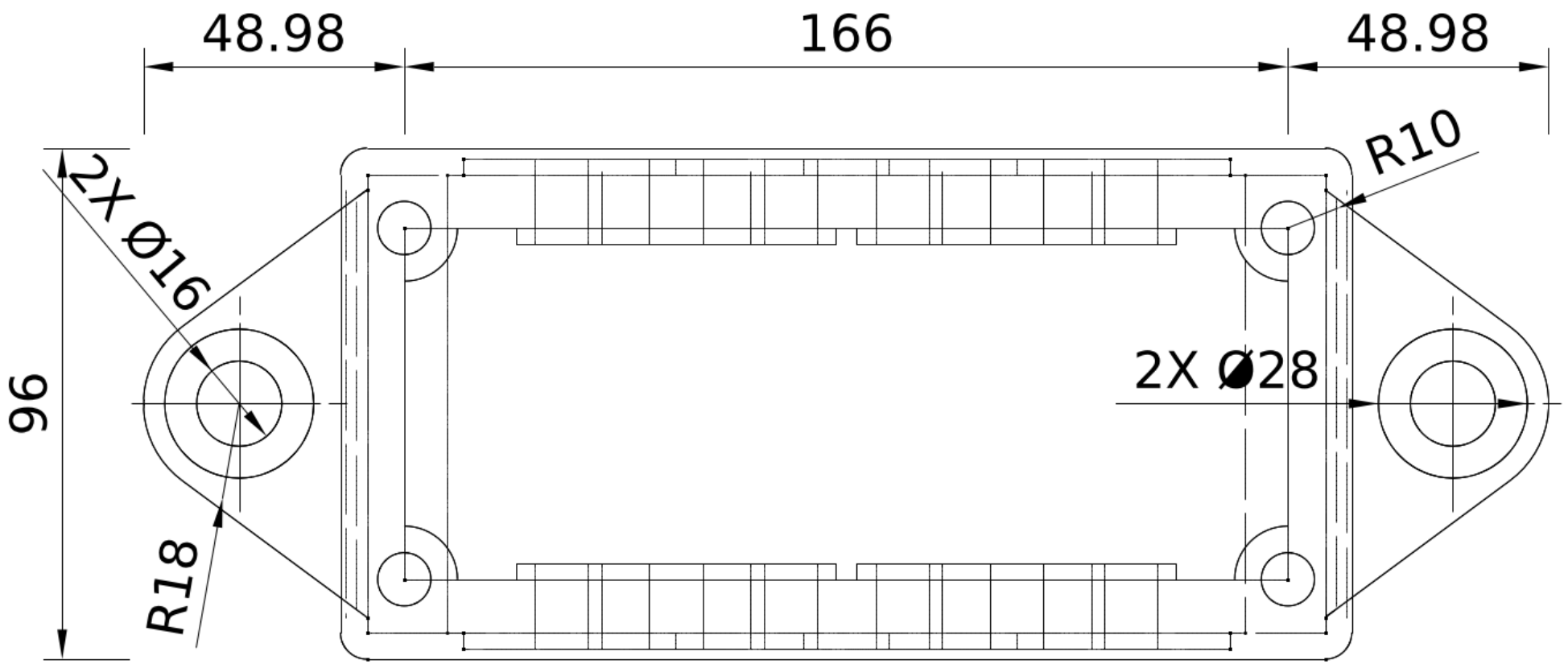
| DRAWING NO. | REV | SHEET |
|---|---|---|
| **MKV-83616DF3-01** | **0** | **1 OF 1** |



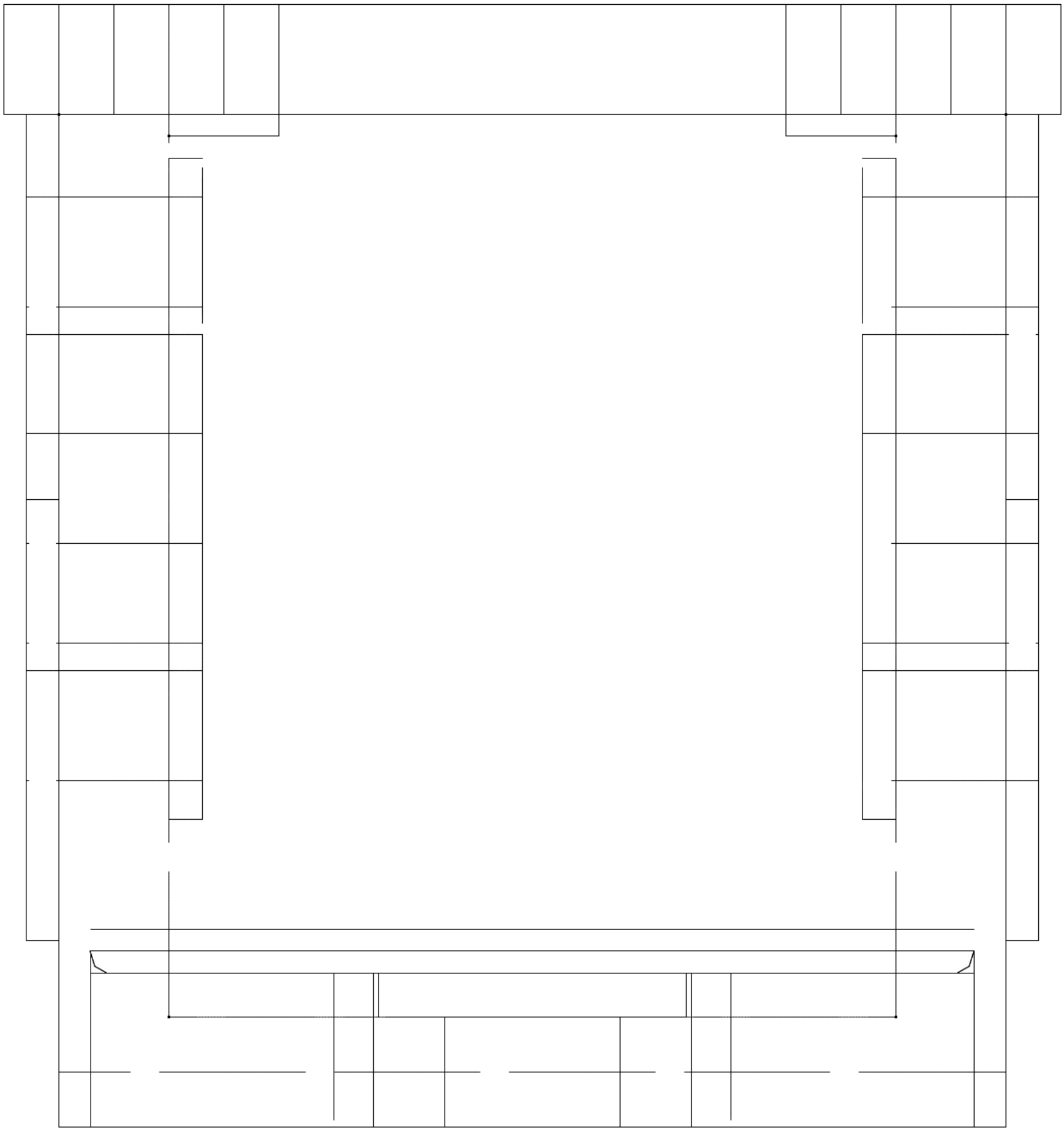
# ISOMETRIC VIEW




FRONT VIEW




# TOP VIEW



**DETAIL 4 · VIEW 4 · SHEET ZONES E8-F9**