

# MB DT Chambers installation. Cradle design.

## The installation cradle.

The cradle is a rigid frame which lodges the chamber keeping the “extension” rails structurally connected together, straight, parallel and at the given relative distance, and, once fixed to the iron face, can support the chamber gravity load, with negligible deformations.

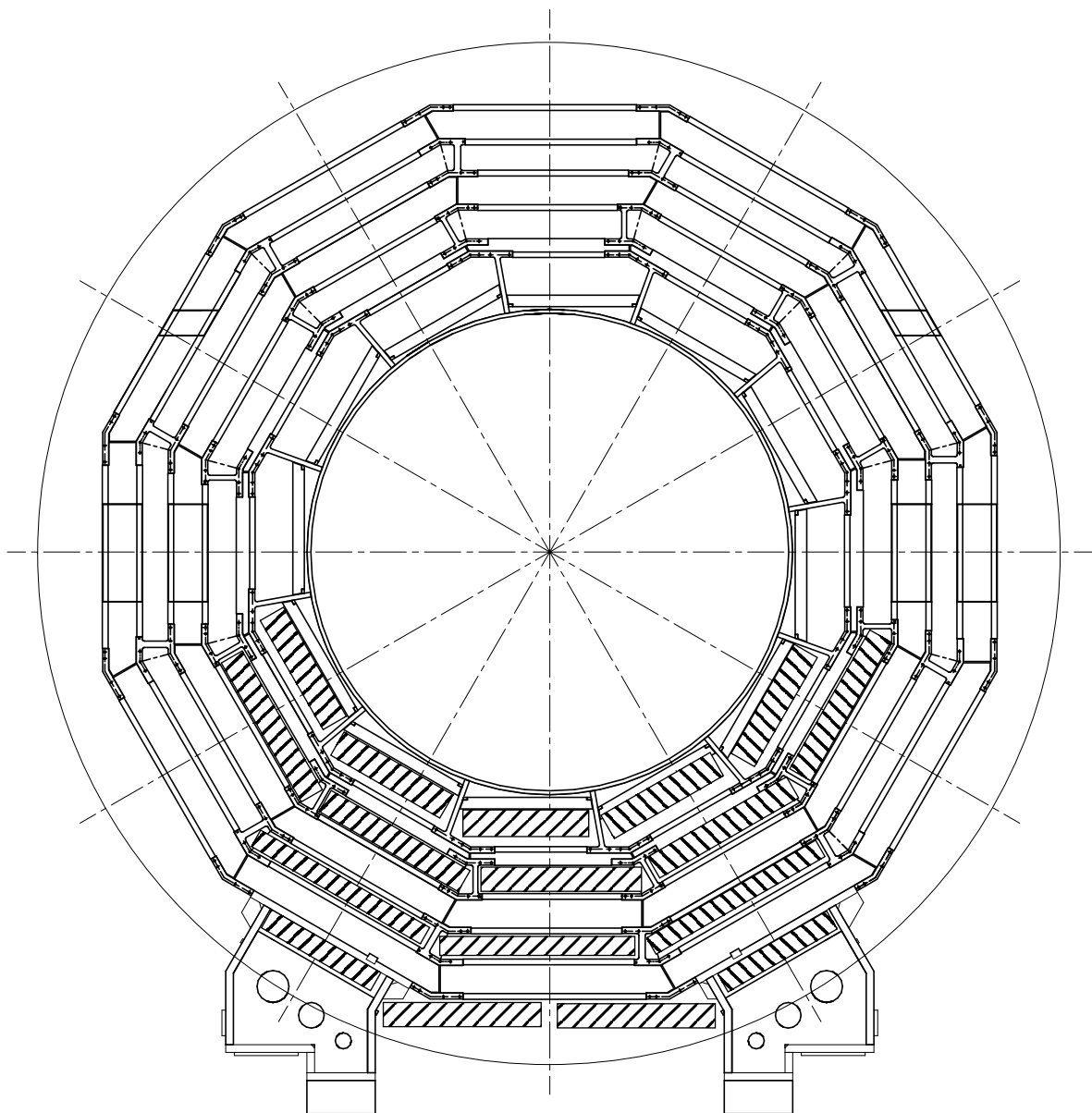
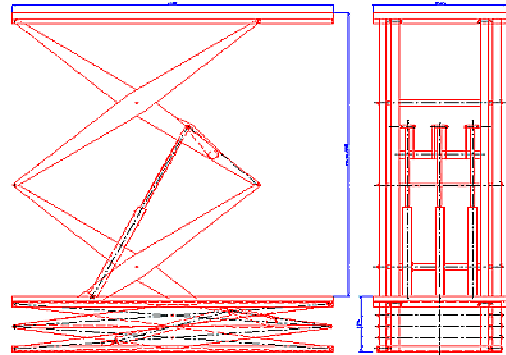
## Some requirements:

- 1) many dimensions of chambers, => 6 different distances between extensions rails;
- 2) chambers with opposite (left/right) position of the rails (cylindrical/prismatic);
- 3) chambers to be installed/removed in/from opposite directions (along z);
- 4) different inclinations, different orientation;
- 5) handling via crane and handling via “platform” (under the vacuum tank shadow);
- 6) very limited dimension along z (3 m?);
- 7) tapped holes reference holes on iron in cumbersome positions;
- 8) handling inside the cavern, between balconies and crane.

## Some design aspects.

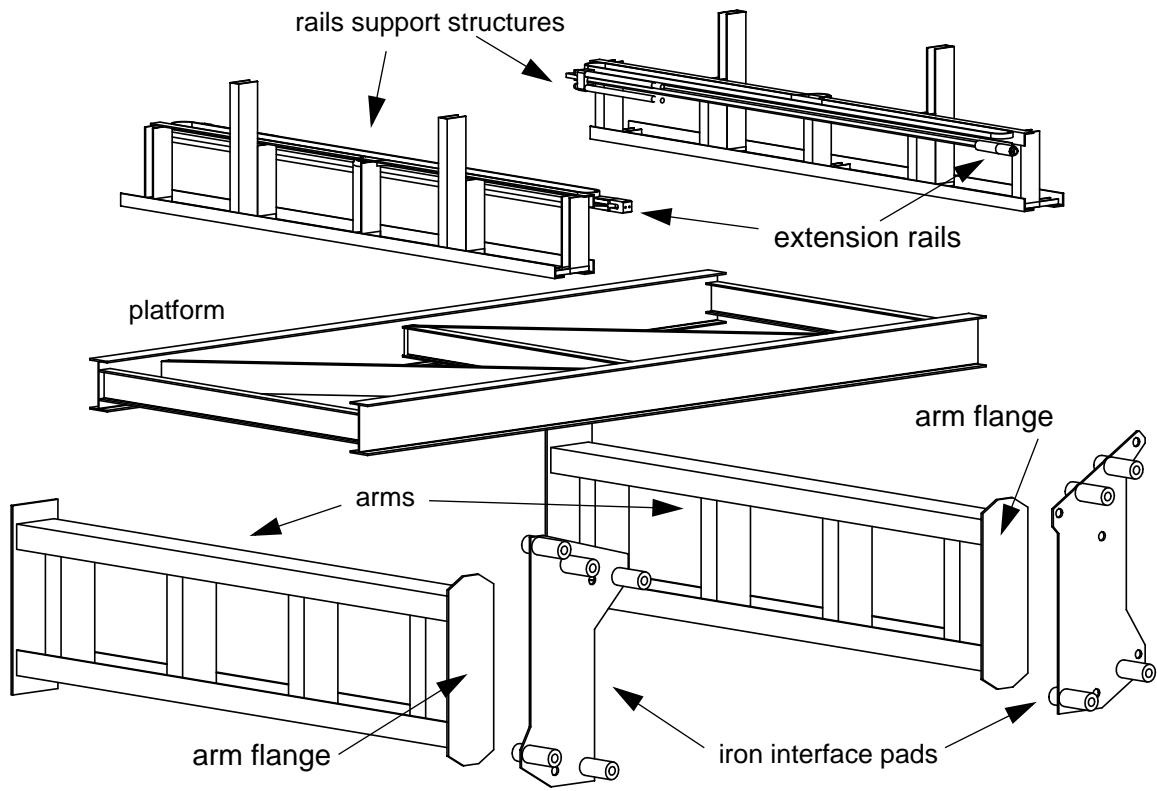
- a) Modularity, symmetry and interchangeability of most of the cradle parts;
- b) interface pads, protecting services, mounted on the iron before the cradle;
- c) precise positioning of the extension rails w.r.t. the rails on the iron;
- d) handling and rotating mechanisms and procedures;
- e) mechanism(s) for fine tuning of the hooking point(s) w.r.t. the barycentre;
- f) lifting platform (specs, ...)
- g) chamber pushing/pulling devices;
- h) calculations, norms, cern rules, TIS check and approval; basket(s) for personnel?
- i) Accessibility to the theta endcaps;
- j) Insertion of the chamber on the cradle (or vice versa);
- k) Set-up of the chamber before insertion on the cradle; RPCs installation.

The sectors under the vac-tank are not accessible for the installation using the crane, therefore a lifting device (e.g. scissor platform) will be used to lift the chambers of sector 10, 9, 11 and MB1 (and MB2?) chambers of sector 8,12.

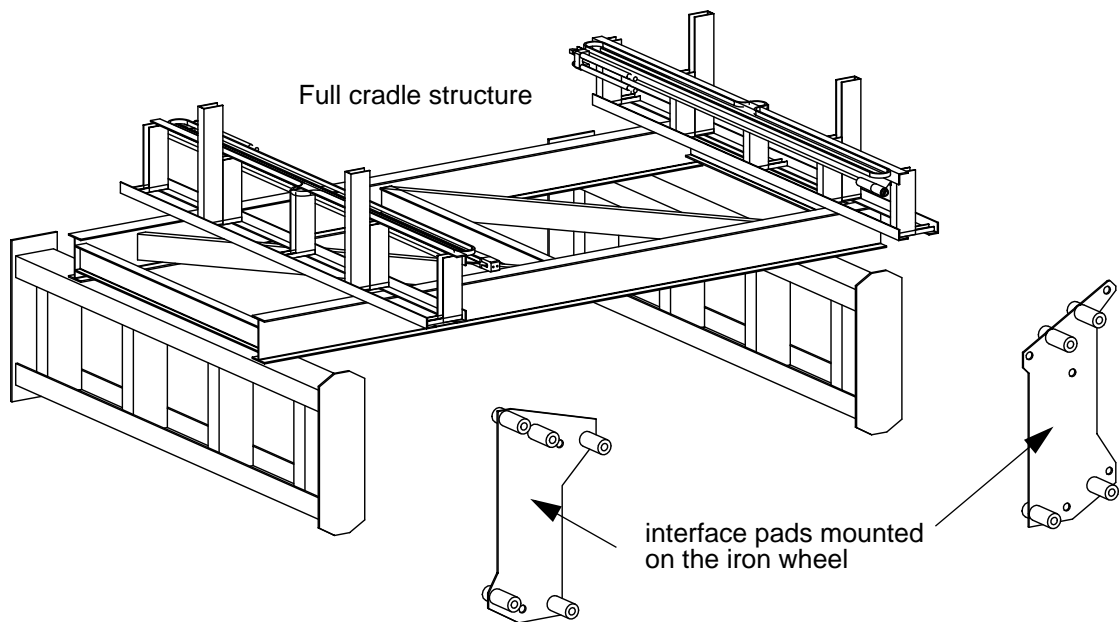


Chambers which should be lift from the floor, e.g. by meaning of "scissor platform" or equivalent one.

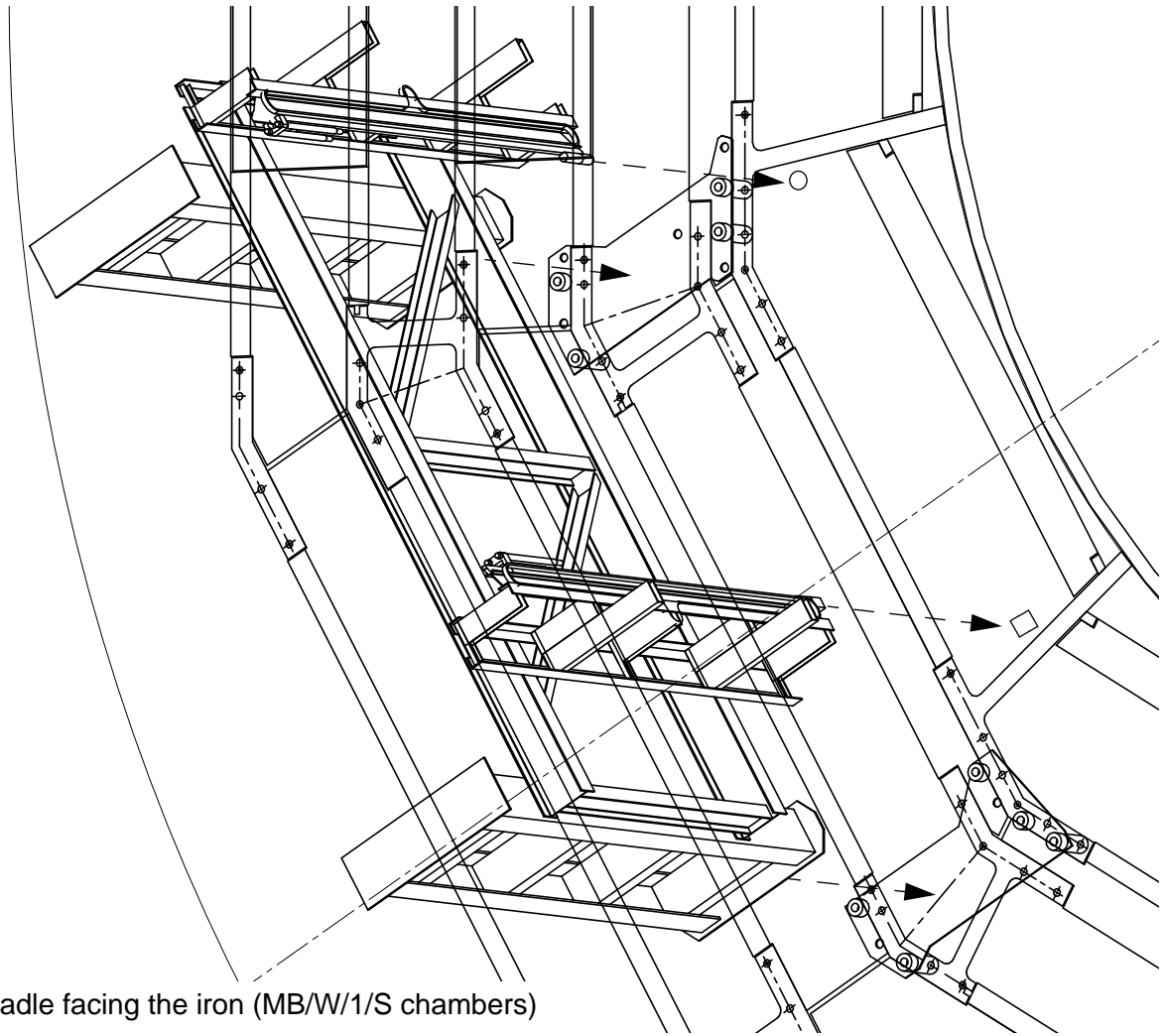
# Proposal of cradle structure (conceptual design)



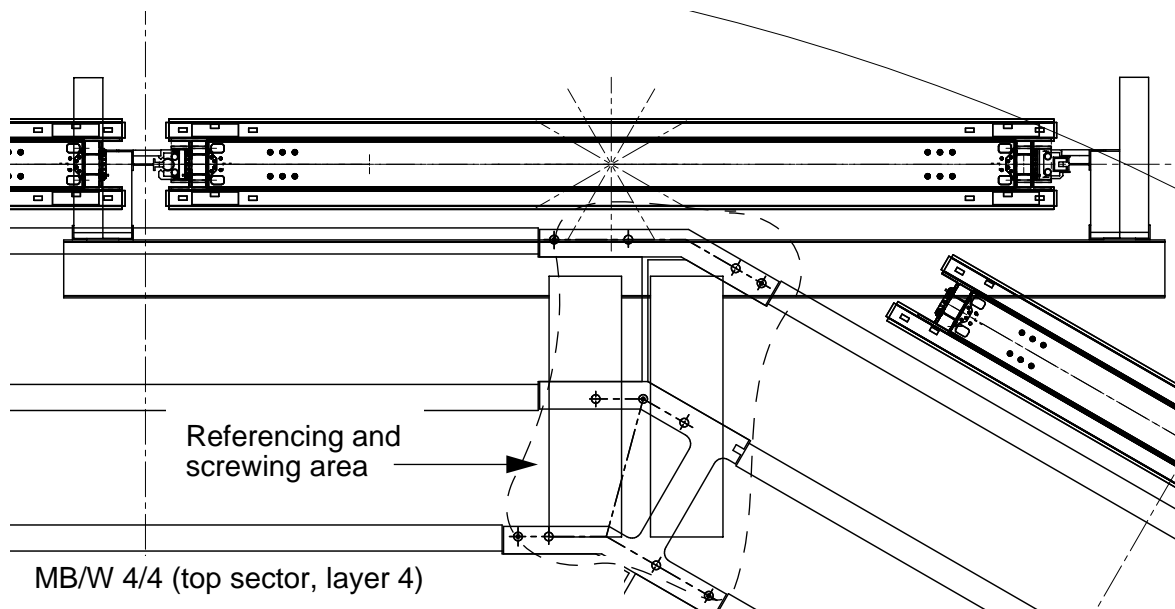
Main elements of the cradle structure



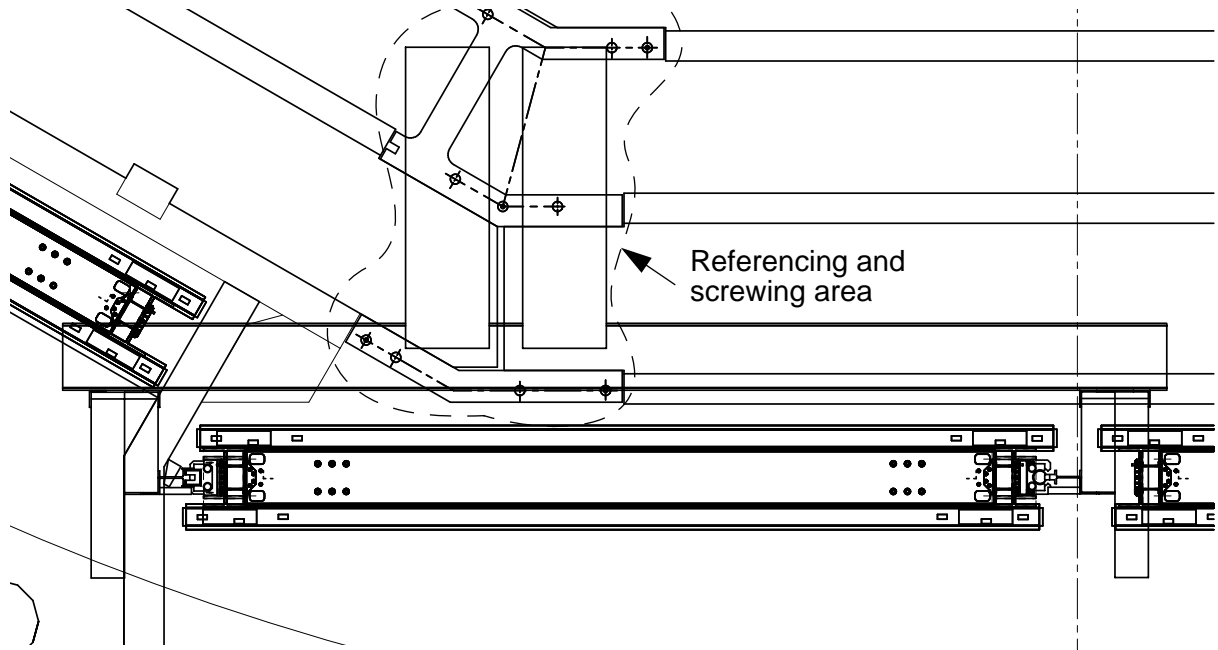
View of the cradle structure.



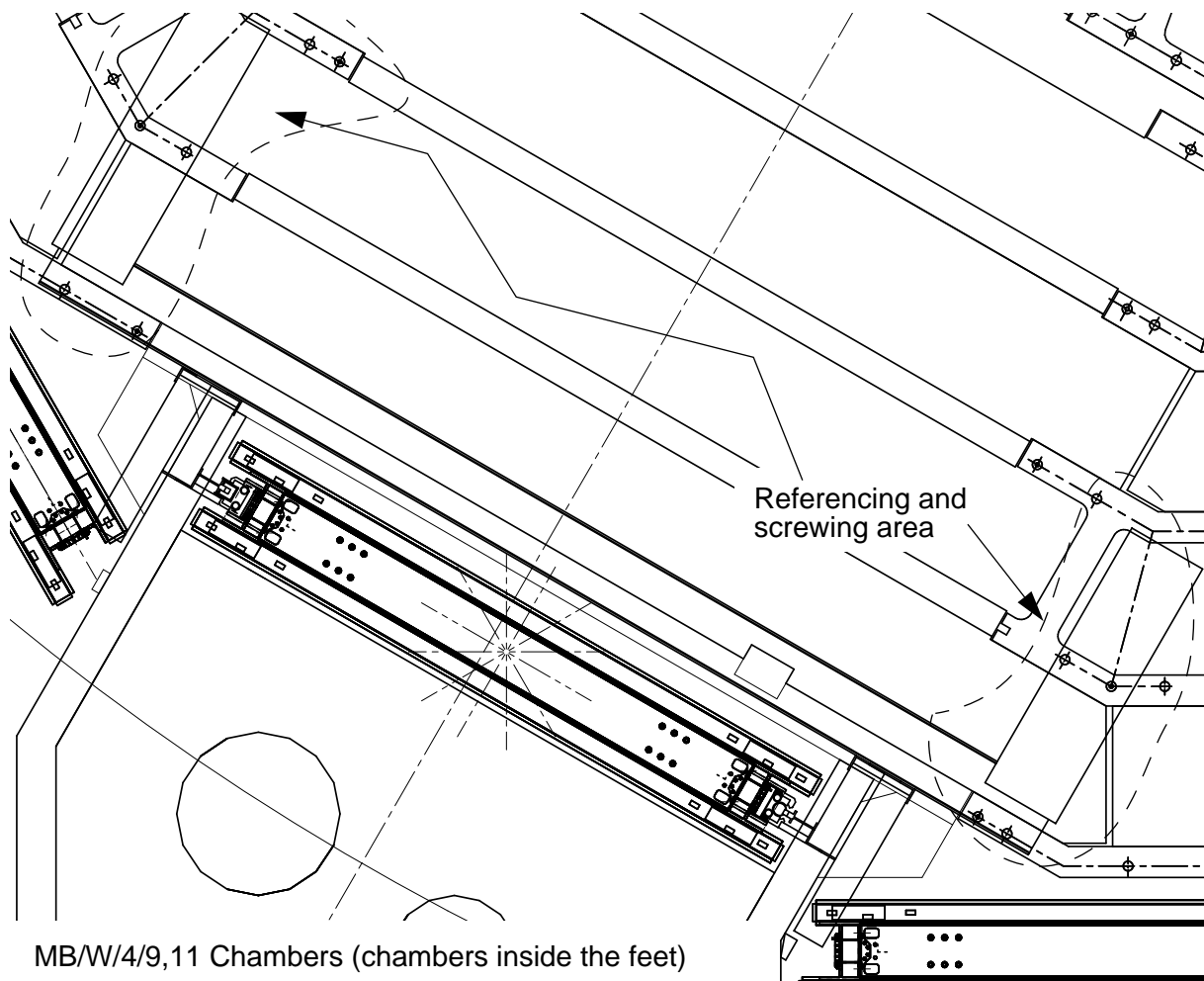
Cradle facing the iron (MB/W/1/S chambers)



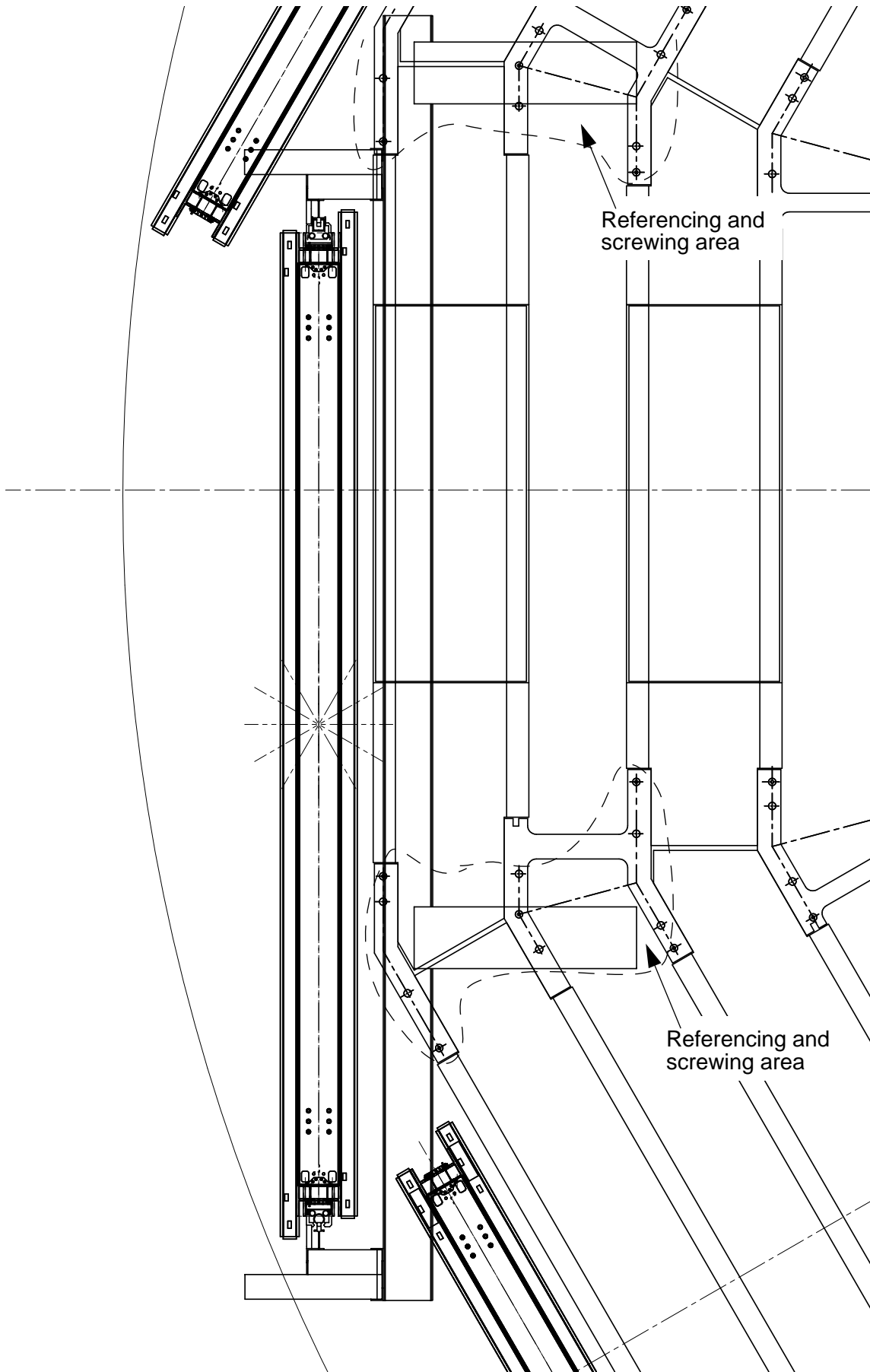
MB/W 4/4 (top sector, layer 4)



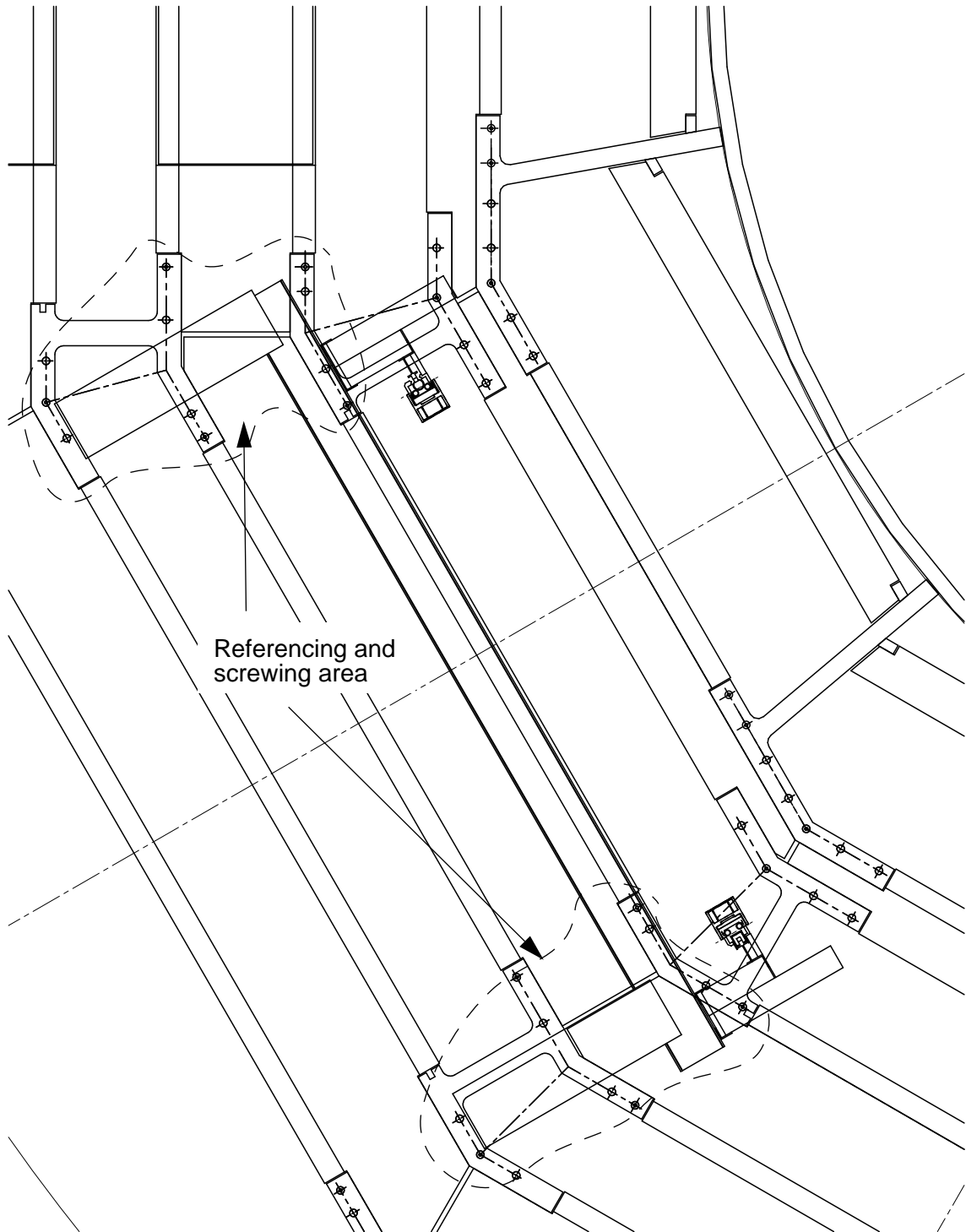
MB/W/4/10 Chambers (chambers of bottom sector, layer 4)



MB/W/4/9,11 Chambers (chambers inside the feet)



MB/W/4/S chambers (the 4 m long chambers of the layer 4)



MB/W/2/S chambers