

TOTEM special run at small distance to the beam

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Scope

This document specifies the conditions and interlock configuration (changes) for a special TOTEM at very small distance to the beam.

Operating conditions

The special run will be performed at 3.5 TeV and β^* of 3.5 m.

- The **VERTICAL TCPs** in IR7 will be set to a distance of **4-4.5 sigma** from the beam (nominal beam sigma).
- The **VERTICAL roman pots of TOTEM** will be set to a distance of **TCP+2 sigma** from the beam, i.e. 6-6.5 sigma depending on the final TCP setting.
- The **HORIZONTAL roman pots of TOTEM** will be set to a distance of ≥ 16 sigma from the beam.
- The maximum bunch configuration is **4 bunches of 7-8E10 protons/bunch** and **1 low intensity probe bunch of 1E10 protons/bunch**.
- The mode will be set to **ADJUST**.
- All other machine conditions will be identical to normal STABLE BEAMS conditions: orbit, tune, crossing angles, collimator settings.

Interlock configuration

The following modifications must be made to the interlocks as compared to normal STABLE BEAMS conditions:

- The VERTICAL TCP (IR7) position interlock reference must be adapted to the small gap size.
- The TOTEM roman pot limits must be adapted to the closer distance to the beams.
- The interlock settings of the orbit correctors in LSS5 (up to Q10) will be lowered to 5 microrad (default 12 microrad) to exclude any local steering during this special run.

Since the total intensity of 3-4E11 is well above the Setup Beam Limit (SBF) all BIS and SIS interlocks will be active and no interlock can be masked.

The orbit interlock (by SIS) at the TOTEM roman pots will be active and set to a standard tolerance of 0.8 mm, corresponding to 2 sigma in the vertical and 4 sigma in the horizontal plane.

At the end of the run:

- The collimation team has the responsibility to restore the initial position interlock settings for the vertical TCPs and the TOTEM roman pots.

- The SIS team has the responsibility to restore the orbit corrector interlock tolerances.
- The changes must be documented in the LHC eLogbook.