

Floor drilling for the installation of BGV Demonstrator components

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Abstract

A first floor drilling campaign took place in June 2014 in order to prepare the installation of the BGV vacuum chambers [1] and detector support frame. The goal of this document is to list all other BGV elements planned for installation, along with their floor fixation requirements.

Changelog

v0.1	29/09/2014	Initial draft.
v0.2	03/10/2014	Updates concerning the floor marking drawings and the drilling procedure (discussion with Bernd, Gerhard and Paolo).
v0.3	06/10/2014	Document consistency updates. Added the notes from the discussion with J. Sakkinen.
v0.4	21/10/2014	Update after the production of a draft drilling drawing by N. Joannon.
v0.5	23/10/2014	Minor updates to Table 1: added number of holes for the cable trays.
v0.6	27/11/2014	Add "id" column in Table 1. Add info about the floor fixation plates of the scintillator and ventilator supports.

1 Introduction

Official reference information about the BGV Demonstrator can be found in the BGV Demonstrator ECR [2].

The floor marking and drilling campaign of June 2014 prepared the installation of the support structures for the BGV vacuum chambers (Girder and Upstream support) and the SciFi detector modules. The relevant information can be found in [1]. Later on, the design of the detector support frame was modified, requiring new holes (none of the old ones can be used). Drawing LHCBGVDA0003 was modified in the beginning of October 2014 to indicate the correct position of the holes. The change is that the old holes need to be moved by 45 mm outwards longitudinally.

2 Definition of drilling points

This document considers the floor marking and drilling for the installation of various components of the BGV Demonstrator: detector support, electronics patch panels, L0 scintillators, etc. A development version of the layout (not showing all discussed components) can be seen in Fig. 1. The work foreseen includes also the arrangement of cables and the installation of cable trays to guide them.

The full list of components that require floor drilling marks is given in Table 1.

A first version of the floor drilling drawing produced by N. Joannon can be found at https://edms.cern.ch/document/LHCLJ_4U0019. The initial reference points that will be used to mark the drilling points are (see Fig. 2, and also <https://indico.cern.ch/event/344793/contribution/0/material/slides/0.pdf>):

1. DCUM 9770.7542 – downstream end of chamber VCDAN. Reference point sitting on the mid-beam-line
2. DCUM 9777.1722 – downstream end of chamber LHCBGVCA0003. Reference point sitting on the mid-beam-line

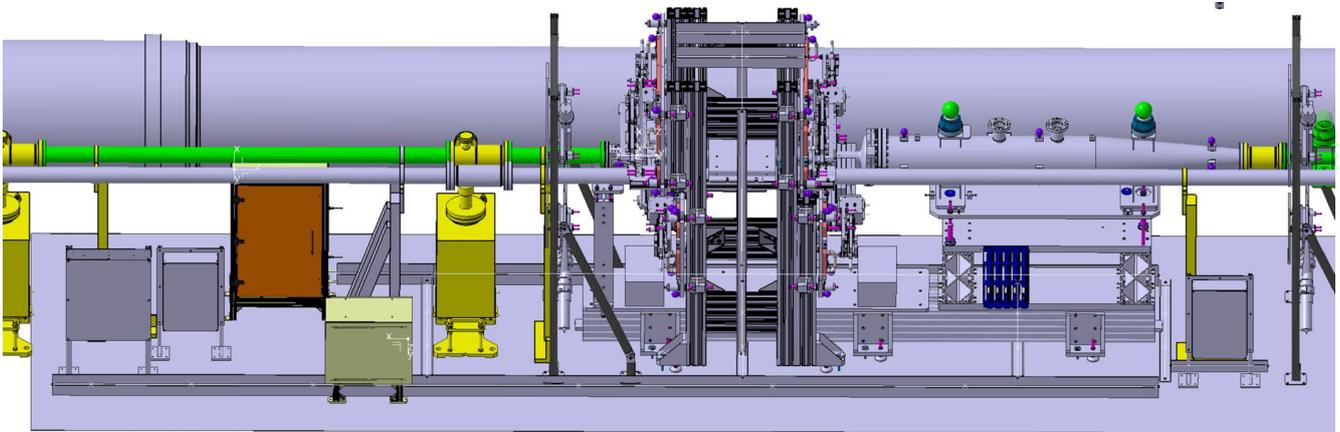


Figure 1: Electronics components to be installed around the BGV.

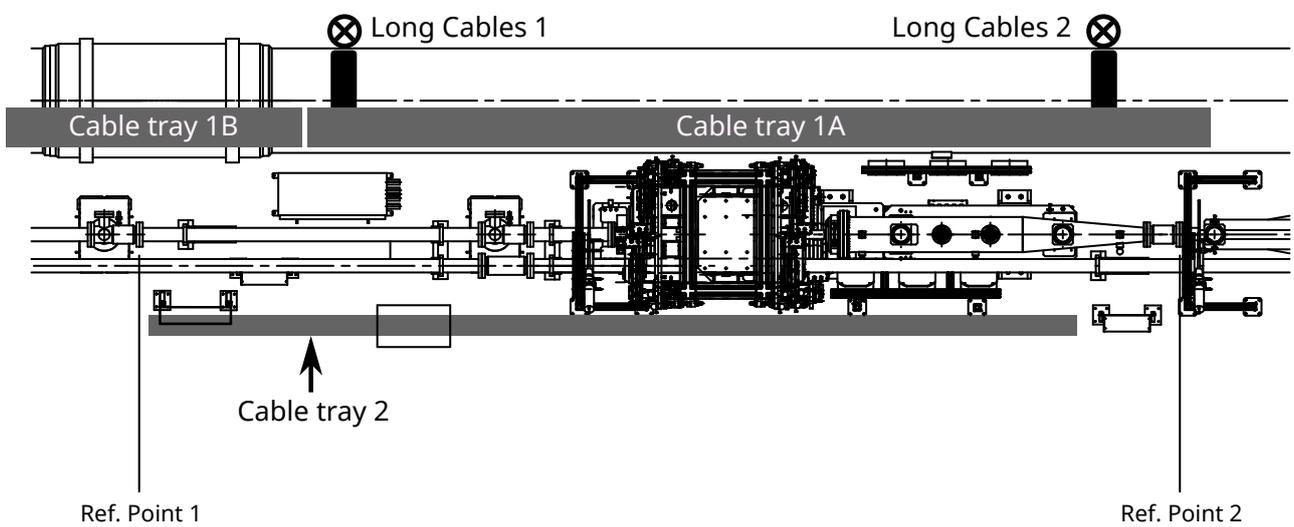


Figure 2: Top view of the BGV setup, indicating cable trays "1A" (already installed), "1B" and "2".

Table 1: Components to be installed and their floor fixation requirements.

ID	Element	Holes number and size	Present in the DD	Comment
• Patch Panels				
1	LV panel	8 × M6	Yes	
2	Bias & Temp Dstr.	8 × M6	Yes	
3	RPT Dstr.	4 × M6	Yes	
4	Manifold	4 × M6	Yes	
5	RPT Upstr.	0	No	Fixed on the girder (how?)
6	Bias & Temp Upstr.	8 × M6	Yes	
7	Gas Tank temperature box	0	No	Fixed on the girder (how?)
• Others				
8	BGV detector support	4 × M12	No	Position given in LHCBGVDA0003. Move old holes by 45 mm outwards longitudinally.
9	Trigger scintillators Dstr. and Upstr.	2 × 16 × M12	Yes	Fixation plates: Ø 13 holes (LHCBGVDA0039)
10	Support for chamber cooling fans	2 × 8 × M12	Yes	Fixation plates: Ø 13 holes (LHCBGVCA0082)
11	Displaced stand. cham. support	2 × M12	No	Move by 140 mm downstream
• Cable Trays				
				W×D×L [mm]
12	Under QRL ("1B")	4 × ?	No	1 Cablofil: 200 × 50 × 3000. See Fig. 2
13	In front of BGV ("2")	4+3 × ?	No	2 Cablofils: 50 × 50 × (3000 + 2000). See Fig. 2
14	In front of BGV ("2S")	3 × ?	No	1 Cablofil: 100 × 50 × 1500

3 Floor drilling

Requested from EN-MEF-SI.

Notes from the discussion with J. Sakkinen (06/10/14):

- The procedure will be as in the first drilling campaign (13 June)
 - We define: how many holes and what size. We make the marks on the floor.
 - EN-MEF-SI take care of the rest: drilling, vacuum cleaner, fixation material, etc.
- The anchors that will be installed for M6 screws are mechanical and not chemical (chemical anchors are put starting from M10). One mechanical anchor holds up to 150–200 kg. For making it more robust, a little bit of the chemical substance is usually added.
- Drilling under the beam pipe / the QRL: not an issue. Small drilling machines, as well as right-angle-shaped ones, are available
- Given the large number of holes, the price will be determined based on the time needed to perform the job, and not per hole. If all goes well (e.g. no steel in the concrete) one day should be sufficient for the ~100 holes we need. In this case the price will be between 1000 and 1500 CHF
- The exact time of the drilling depends on the marking readiness and the LSS4 access conditions. The current plan is to perform the marking on Mon–Tue in week 45 and the drilling on the next day
- About 1 week is needed by EN-MEF-SI to get the fixation material, so the number and size of the screws need to be finalized soon

4 Material to be obtained

- Cable trays: agree length, width, depth
- Plates for the fixation of the cable trays

References

- [1] P. Hopchev et al., "Floor marking for the installation of the BGV Demonstrator Chambers", EDMS No. 1408898, <https://edms.cern.ch/document/1408898>
- [2] G. Bregliozzi et al., "Beam Gas Vertex (BGV) Demonstrator of a Beam Profile Monitor in LHC", Engineering Change Request LHC-BGV-EC-0002 v.1.0, <https://edms.cern.ch/document/1324635/1.0>