MiniBallWiki: HomePage

Doc For Ionisation Chamber

At the beam line neighbouring to the MB beam line a dE-E-detector is mounted which allows to determine the composition of the beam. The detector consists of an ionisation chamber IC (dE) and a Si detector (E). The ionisation chamber is operated with P10 (90% Argon and 10% Methan). In front of the detector a attenuator reduces the beam intensity roughly by a factor 100.

Contents

The IC Si telescope is now mounted at the 0 degree beamline and equipped with a pressure regulation system. It is now operated with CF4 gas. The older documentation on cabling and DAQ given below remains valid.

Documentation of the pressure regulation system can be found here.

Basic operation instructions

The control unit (NIM module) which controls the piezo valve has two switches:

upper switch
- IST: the actual difference between the pressure in the IC and the reference pressure (prevacuum between prepump of turbo and turbo)
- SOLL: the target pressure value which the control unit should keep

lower switch
- ZU: piezo valve closed, no gas
- V: piezo valve open

!!!!!!!!! A T T E N T I O N !!!!!!!!!

The decimal point of the manometer display of the control unit is misleadingly shifted one position to the left, i.e. if you read 20.0 on the display this means 200 mbar!!!

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Evacuating
- lower switch closed (ZU) or gas bottle closed
- upper switch to IST to control pressure
- yellow valve between prepump and IC closed
- switch on prepump
- open slowly yellow valve

Operation
- prepump running, yellow valve open, lower switch is probably on ZU (closed)
- upper switch to SOLL
- choose the pressure you wish
- upper switch to IST
- yellow valve to value which corresponds to the pressure to be stabilised (see table)
- open gas bottle (1 bar should be sufficient)
- lower switch to V (open)

You'll now see that the control unit stabilises (after some over-/undershoot ...) the chosen pressure ...

End of operation (system remains ready to resume operation)
- high voltage off

- lower switch to ZU
- close yellow valve
- switch off prepump (if you like)

Venting

- high voltage off
- upper switch to IST to control pressure
- close gas (lower switch to ZU) or close gas bottle
- close yellow valve between prepump and IC
- switch off prepump
- disconnect yellow valve from prepump
- open yellow valve carefully and vent IC slowly

Alternatively, you can fill also the IC with gas to atmospheric pressure (SOLL to 9xx mbar)

!!!!!!!!! R E M E M B E R !!!!!!!!

BEFORE venting the beam line, FIRST vent the ionisation chamber!!!

!!!

Switch ON

1. gas in
   - remove the blue gas tube (gas in) from the IC
   - open the valve V1 at the gas bottle; manometre P1 shows the pressure in the bottle
   - open the reduction valve V2 until you feel a light continous flow
   - adjust the valve to a pressure of 1-1.5 bar (read on the left manometre P2)
   - reconnect the blue tube to the IC
   - control that you now feel a light continous flow ... NOT blow (see entry 2497 in the MB logbook)... out of the exhaust tube (white tube). The white tube should NOT be connected to the exhaust system of the pre-pumps (if anyone switches on a pre-pump, it blows into the exhaust system and will also blow INTO the IC!!!)
2. HV on IC
   - +500 V at 1.5 bar which is the currently preferred value (+400 V at 1 bar)
3. HV on Si
   - increase HV slowly to +50 V; the leackage current should be below 500 nA

DAQ

There is a directory ionchamb ("cd ../ionchamb" to reach it from the directory of your current experiment) which contains a special setup of the DAQ only for this detector.

In order to select the correct trigger, some changes in the coincidence unit (R3 C2 S13, label "DAQ trig if DAQ not busy") have to be done

- the first two switches (A and B) have to be switched OFF
- the third switch (... obviously C) has to be switched ON

Read also entry 2140 in the MB logbook.

Operation

Control that the valve V6 of the beam line between the bending magnet and the lens is open.

Before sending the beam to the detector connect the CFD as well as the output of the main amplifier of the IC (the bipolar output can be used) to a scope. Control that the counting rate is NOT more than a few signals per EBIS pulse. Otherwise you will have pileups in your signals and damage the Si detector.

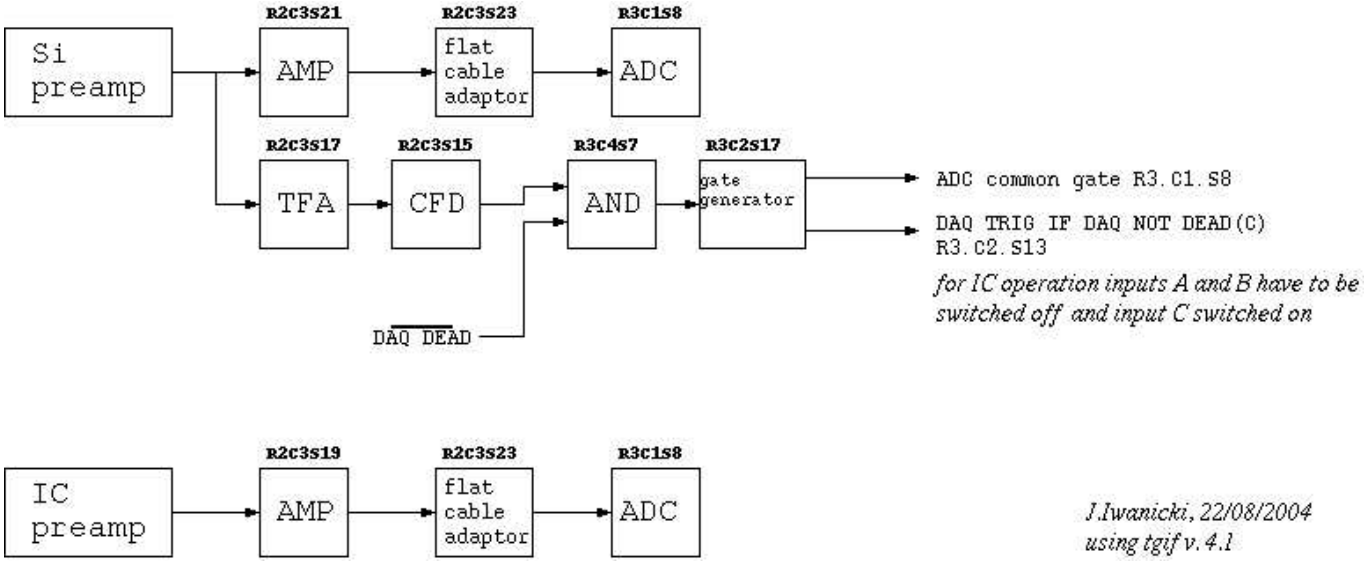
The electronics are the four rightmost NIM modules in the crate where the HV module of the CD is located. Read also entry 2152 and entry 2357 in the MB logbook.

During operation control the pressure of the bottle (read on the right manometre P1). Since there is no gas control system, the consumption of gas will lower the pressure in the bottle. Therefore you might have to open the valve at the bottle further to assure the flux through the IC (read also MB logbook entry 2497).

Switch OFF

- decrease slowly the HV of the Si down to zero
- decrease the HV of the IC down to zero
- switch both channels of HV unit to "Stand by"
- close the valve V1 at the bottle; valve V2 can remain open
- control that the pressure shown on P1 and P2 goes down
- you may now close the valve V6 of the beam line
- switch back the switches in the coincidence unit (A to ON, B to ON, and C to OFF)

After finishing return back to the normal directory of your current experiment, usually named cern-yymmdd, and start the normal DAQ.



Picture uses Nigel's convention of modules numbering: R==rack, C==crate, S==slot

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Last edited on July 9, 2005 2:40 pm.