



Detector Systems GmbH

**OPERATING INSTRUCTIONS
AND
FUNCTION
OF
DETECTOR MAIN AMPLIFIER**

Type : DSG 300



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Main Amplifier DSG 300

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Short Description

The model DSG 300 is a high performance spectroscopy amplifier in a single wide NIM module.

This main amplifier is specially developed for LN-cooled Germanium Coaxial radiation detectors.

But it gives also very good results in use with proportional counters and Scintillation-detectors.

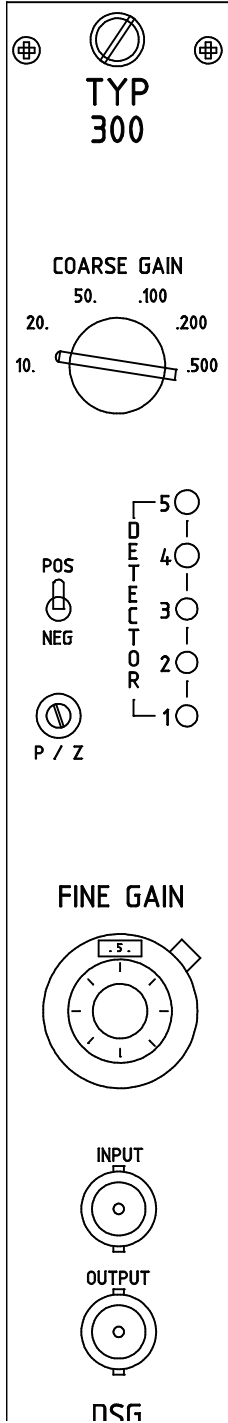
The low noise level, the excellent DC-stability, also with high countrates and the very symetric pulsshape, which is very near by the Gaussian shape, allows to use the DSG 300 for a wide range of applications with very satisfying results.

The LED-chain shows the condition of the detector preamplifier, so the user has more informations about the status of the system (with DSG detectors only).

Specifications

PEAKING TIME:	4 μ sec, 8 μ sec and 12 μ sec
GAIN:	continuously adjustable from 10 to 2500 times
ELECTRONIC NOISE:	smaller 3 μ V at max: Gain and 12 μ sec peaking time
TEMPERATURSTABILITY:	Gain $\leq 0,01\%$ / $^{\circ}$ C, 0 - 50 $^{\circ}$ C DC - Level $\leq \pm 30$ μ V / $^{\circ}$ C, 0 - 50 $^{\circ}$ C
PEAK SHIFT:	A Co 60 peak (1,3325 MeV line) has a typical shift less than 0,02% by 4 μ sec. peaking time between 1KHz and 100KHz samplingrate input ($\approx 85\%$ Output)
POWER SUPPLY:	(without Preamplifier) power supply mainamplifier + 24 V / 150 mA - 24 V / 80 mA ± 12 V, filtered and feeded through

Frontpanel:



Six positions rotary switch selects gain factors from 10 to 500

Fine Gain

Ten-turn precision potentiometer for fine setting of the amplifier gain.

POS / NEG

Frontpanel switch to choose the Inputpolarity.

Detector

A LED- chain shows the condition of the detector preamplifier, i.e. "Normal" / "High count rate" / "Detector has leakage current" (with adjusted DSG detectors only).

P / Z

Potentiometer to adjust pole-zero

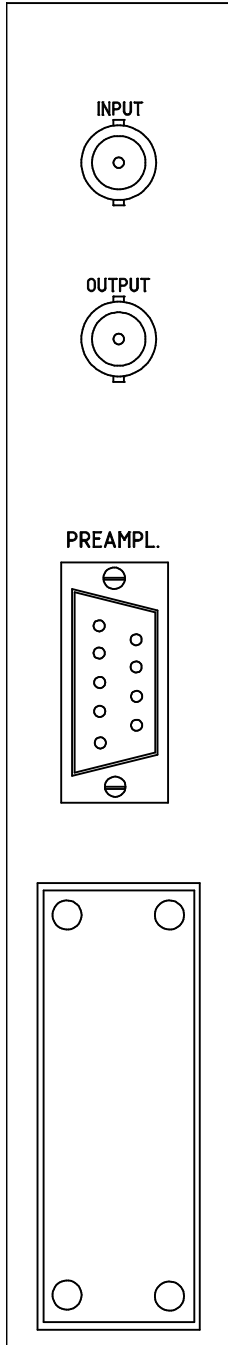
Input

Signal input (BNC-bush)

Output

Signal output (BNC-bush) unipolar

Rearpanel



Input

Signal input (BNC-bush)

Output

Signal output (BNC-bush) unipolar

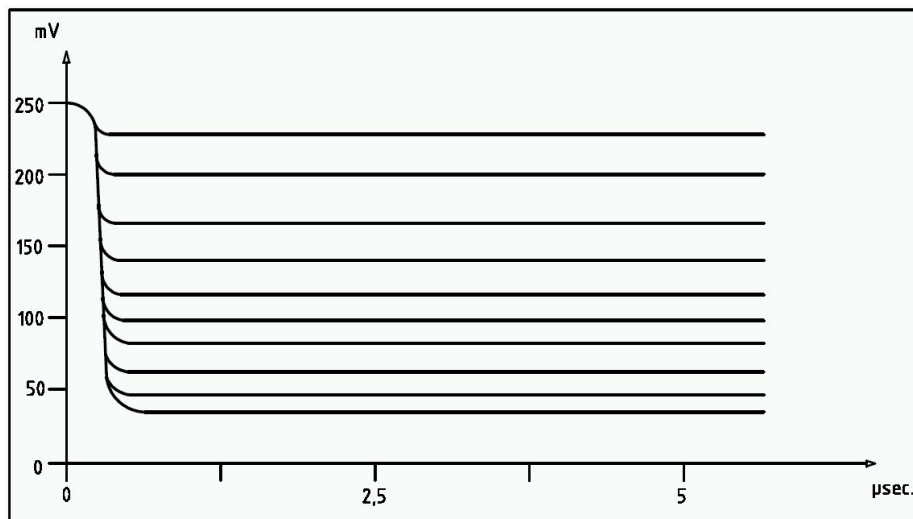
Preamp

power supply for preamplifier
 $\pm 12\text{ V} / \pm 24\text{ V}$

Function of the DSG 300

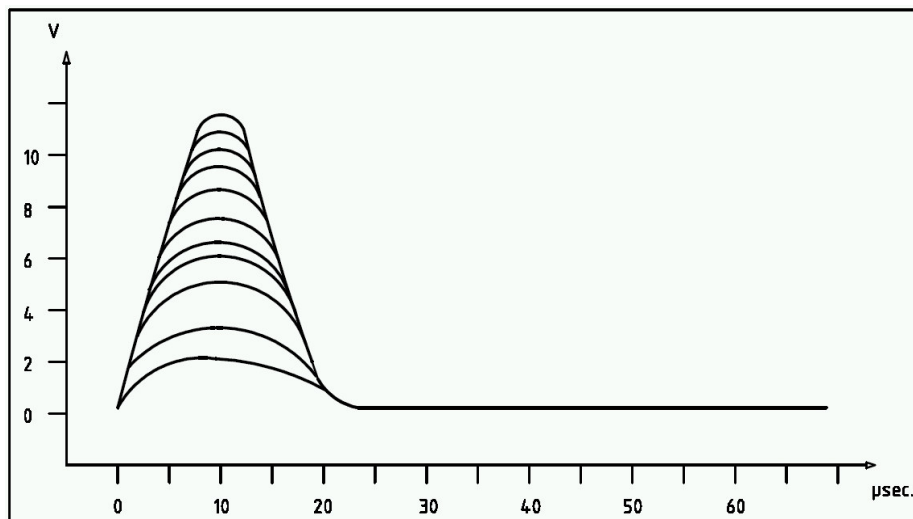
The input signals from the preamplifier, which have normally a risetime of about 50 - 200 nsec, will be converted in nearly Gauss-shaped signals an 5 to 2000 times amplified, depending on the settings of the main amplifier.

Picture 1



Preamplifier Output Signals (Co60 Source), DSG 300 Input Signals

Picture 2



DSG 300 Output Signals (Co60 Source)

Settings: Coarse Gain 100, Fine Gain 0, 8 µsec Peaking Time

Getting started with the DSG 300

Startup-Procedure:

- place the DSG 300 in a free standard NIM-Bin with power supply for $\pm 12V$ and $\pm 24V$
- fix the two panel-screws on the frontside
- please connect DSG 300 \Leftrightarrow detector as shown below

DSG 300		Detector
"Preamp." Sub-D Bush	Power-cable	"Power" Sub-D connector
"Input" BNC-Bush	BNC-cable	"Out" BNC-Bush
"Output" BNC-Bush	BNC-cable	"Signal In" BNC-Bush

LED- Chain:

The DSG 300 is factory-set to match with our detectors, in that case only the lower of the 5 LED's is glowing.

- please set up the recommended high-voltage for your detector
- You will see that some more LED's are beginning to glow and going out after a few seconds.
The glowing of the lower LED means "System normal".
- now, please bring a Co60 source or a photon-source with an energy around 1MeV near to the detector, so that 2 LED's are glowing.
- You see that the LED's are used as an impulsrate indicator. One additional glowing LED means 10 - 20 kHz by 1 MeV, measured after the DSG 300.
- If more than one LED is glowing without a source looking on the detector, the detector has normally too much Leakage-current.
- If always 5 or no LED's are glowing, typically the detector is defect.

Adjustment of the Input polarity

Please check the position of the POS / NEG switch on the frontpanel of the DSG 300.

The polarity of the DSG 300 should always have the opposite polarity of the detector high voltage when used with DSG detectors.

Detector High-Voltage	Inputpolarity DSG 300
POSITIVE	NEGATIVE
NEGATIVE	POSITIVE

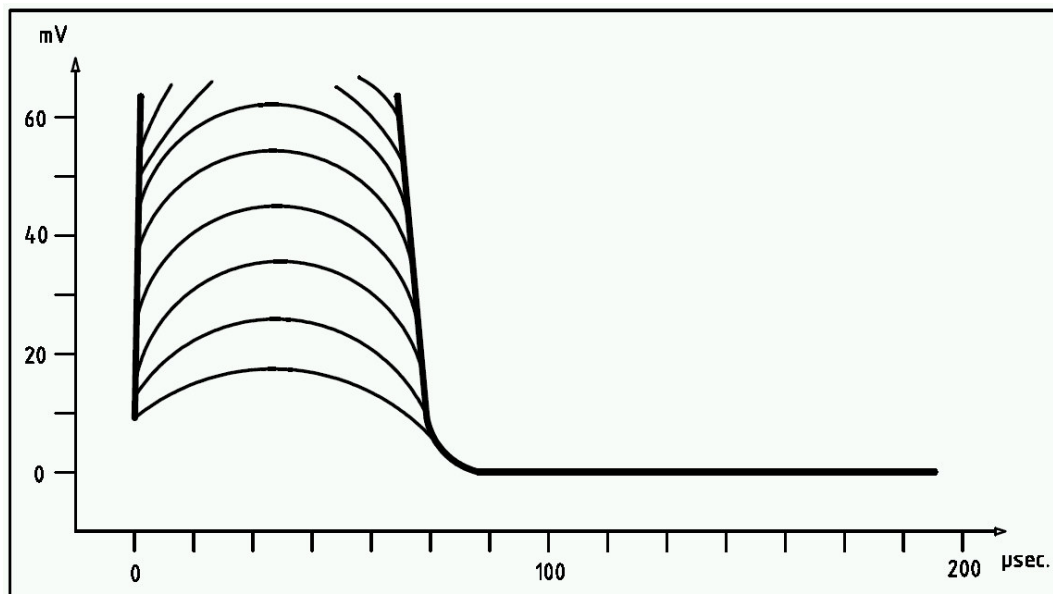
You can check the polarity of your output-signal with a scope.

Pole Zero adjustment DSG 300

For Pole Zero adjustment you need an oscilloscope

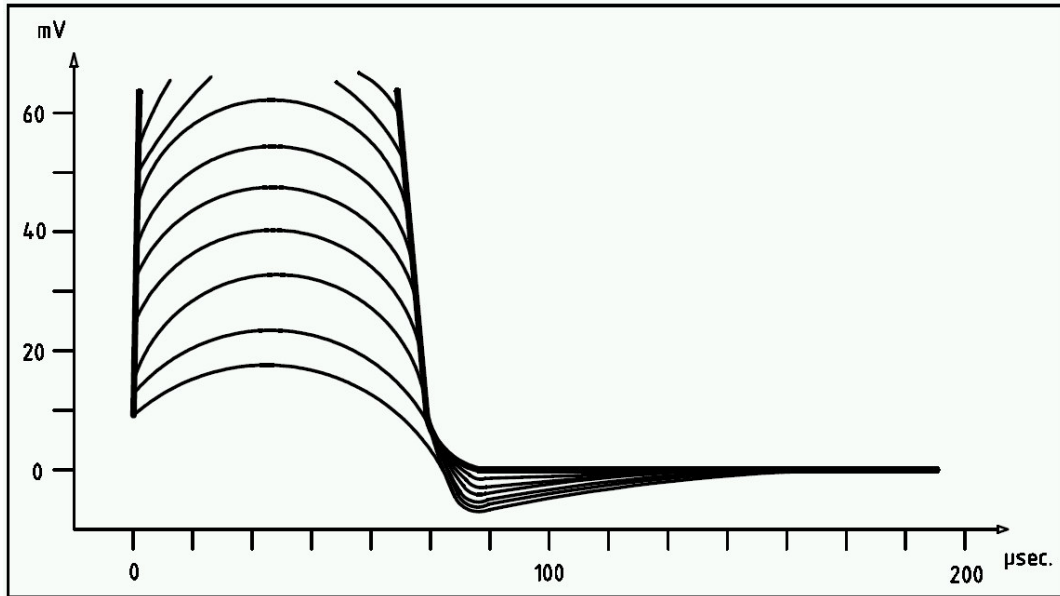
- The adjustment is made by turning the P / Z potentiometer on the frontpanel of the DSG 300
- connect the output BNC-Bush of your DSG 300 via BNC-cable with your oscilloscope.
- Be shure the settings for coarse gain is 100 and fine gain is 10.
- Trigger your scope positive, in the best case you see the following picture:

Picture 3



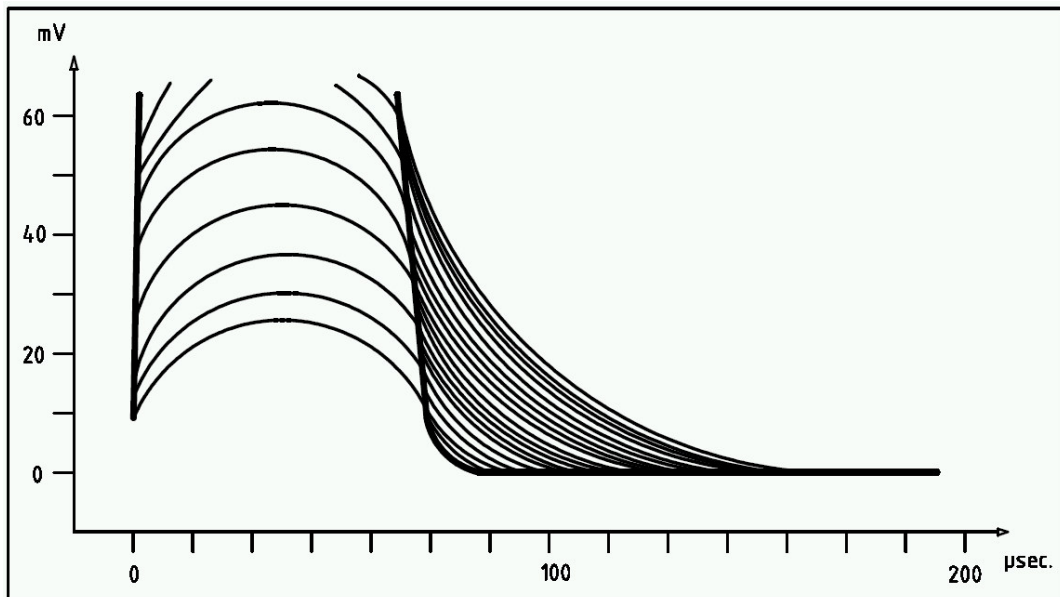
The picture above shows the optimal output signal shape, it needs no correction on P / Z

Picture 4



Picture 4 shows an "Undershot", you have to turn P / Z clockwise (with a small screwdriver), until the signal looks like picture 3.

Picture 5



Picture 5 shows an "Overshot". You have to turn P / Z counterclockwise until the signal shape looks like picture 3.

Peaking Time

The DSG 300 is factory set to a peaking time of 8 μ sec.

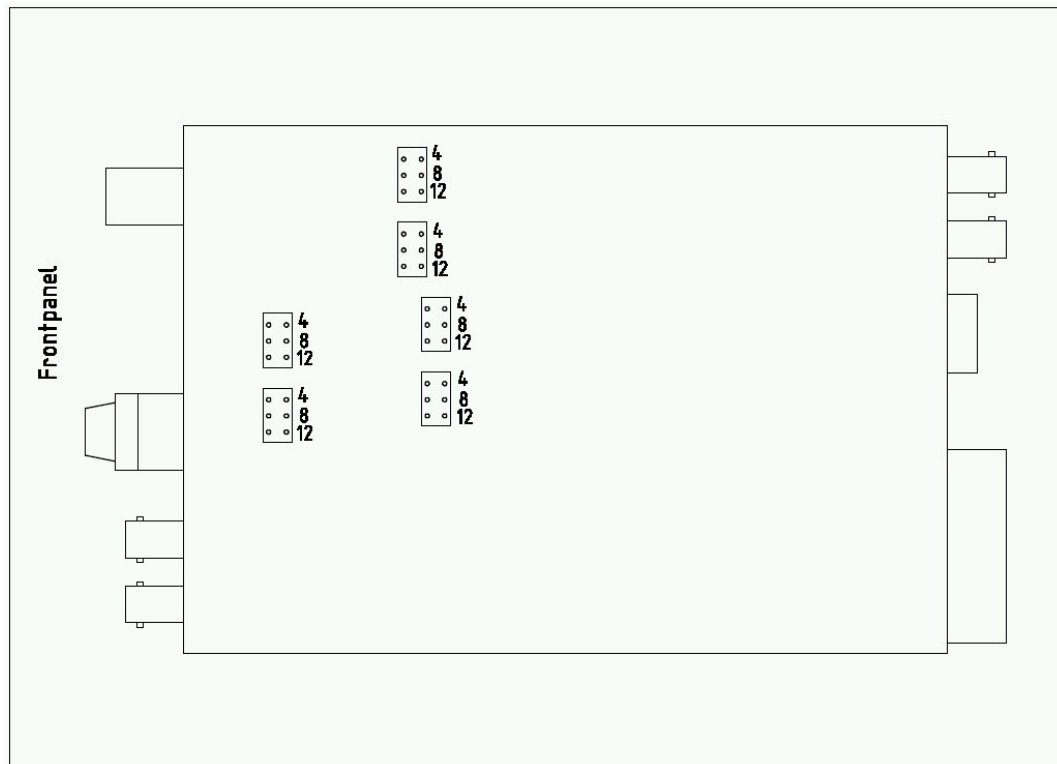
This gives you the optimal performance for counting rates up to 20 KHz by 1 MeV (3 LED's are glowing):

If you wish to handle higher countrates, it is recommended to shorten the peaking time.

Therefore, please remove the sidecover of your DSG 300, set the 6 jumper to your needed peaking time (4, 8, 12 μ sec are available)

Please notice: After changing the peaking time you have to adjust the pole zero.

Picture 6





WARRANTY

Main Amplifier DSG 300

We , the enterprise DSG , warrant the Type DSG 300 against manufacturing or material defects affecting the function for

1 year.

This warranty does not cover defects caused by improper handling.

In the event of complaint, please send the device to the following address:

DSG Detector Systems GmbH
Robert Bosch Straße 38
D - 55129 Mainz

Tel.: ++49 (0)61 31-50 75 30
Fax.: ++49 (0)61 31-50 75 40
E-mail: info@detector-systems.de

DSG Forwarder : Aerotruck c/o Globe Cargo, International Forwarding Inc.,
Airport Frankfurt Fasanenweg 9, 65451 Kelsterbach , Germany
60549 Frankfurt/Main , Airport.
Phone:+49(0) 67 07-98 66 0 Fax::+49(0) 67 07-98 66 49
e-mail: frankfurt@globecargo.de

(or all other Forwarders- for small parcels FedEx)

Transportation charges shall be at the expense of the customer. In the event of warranty or repair send to DSG , all charges prepaid.

Please unpack carefully and check at once. Complaints are to be made immediately accompanied by the delivery note.

Please advise if there is a transport damage within 4 days latest.

Thank you in advance.

LIABILITY:

The enterprise DSG is not liable for consequential damage caused by the device.

IMPORTANT GENERAL NOTE:

Do not open the device by force !