HALL PROBES DRIVER

Model : HPD 4.1

Ver. March 2003

Technical manual

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www.fotons.cz

Technical parameters:

Hall Probe Driver Module 2301 – HPD-H

- **Input amplifier Gain :** 1×, 10×, 100×, 1000 ×
- **Total gain :** 10×, 100×, 1000×, 10000 ×
- **Input voltage :** 0 ÷ ± 0,5 V
- **Max. output voltage :** ± 0,5 V
- **High-pass filter :** 10 Hz
- **Low-pass filter :** 1kHz, 10kHz, 100 kHz, 350 kHz
- **Order of active low-pass filter :** 4
- **Output current :** 0 ÷ 200 mA
- **Output current stability**[1] **:** 1 %
- **Setting accuracy**[2] **:** ±1%
- **Standard accuracy**[3] **:** 0,3 %
- **Additional accuracy**[4] **:** 0,01 % / °C for total gain 10
  0,01 % / °C for total gain 100
  0,02 % / °C for total gain 1000
  0,03 % / °C for total gain 10000
- **Setting time**[5] **:** 10 min

Temperature Module 2302 – HPD-T

- **Temperature probe :** Pt100
- **Temperature Range :** -200 ÷ 200 °C
- **Calibrated Range :** 0 ÷ 100 °C
- **Output voltage :** 0°C ⇔ 0 V @ 10mV / °C
- **Standard accuracy**[6] **:** ± 0,3 % ± 1 digit
- **Additional accuracy :** 0,02 % / K

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[1] For $\Delta R = 50\ \Omega$
[2] Real value vs value on the potentiometer scale
[3] Main accuracy
[4] Caused by temporal changes
[5] Recommended time after power-on before exact measurement
[6] For 0 ÷ 100 °C

System unit – HPD-SYS

- Power : AC 230 V, 50/60 Hz
- Fuse : 600 mA, 5×20 mm
- Dimmension : 19“ × 3U × 280 mm
- Weight : 3 kg

Operation instructions :

Please, start the operation by pressing green On/Off switch in the right part of front panels. Power on is indicated by lightening of this switch.
It is recommended to wait 10 minutes before the precise measurements.

The control elements on Hall probe driver module is shown in Fig. 1 :

1 – Output current

2 – On/Off for current output

3 – Gain

4 – Balance

5 – Balance indicators

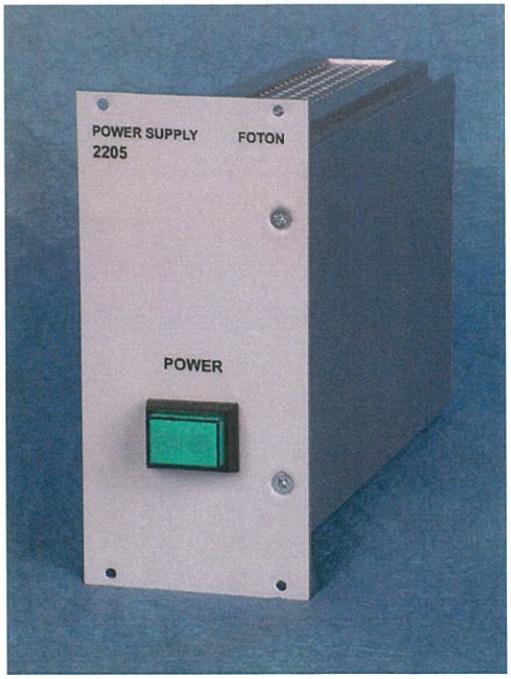
6 – Output

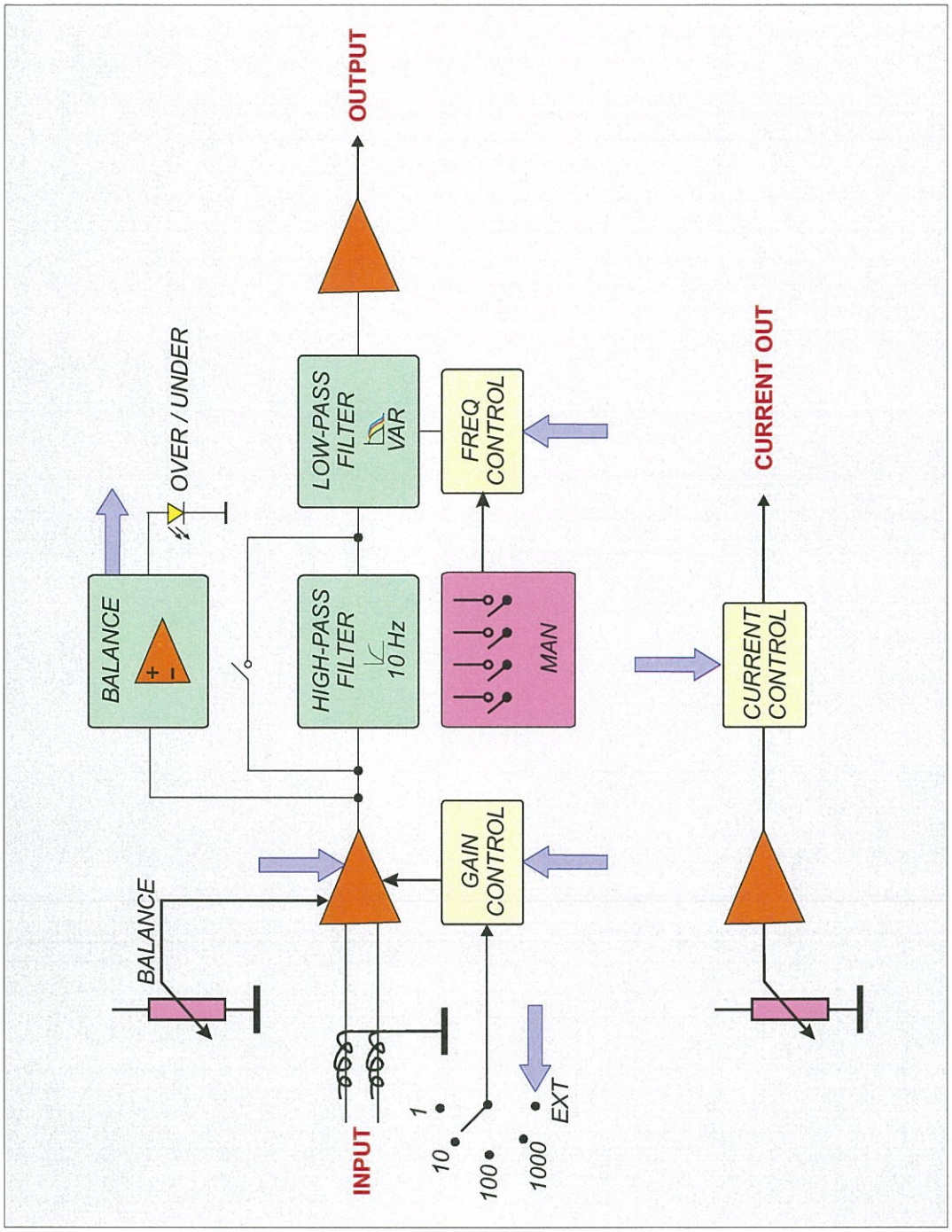
7 – Auxiliar connector (not connected)

8 – D-sub mixed input connector

TEMPERATURE MODULE :

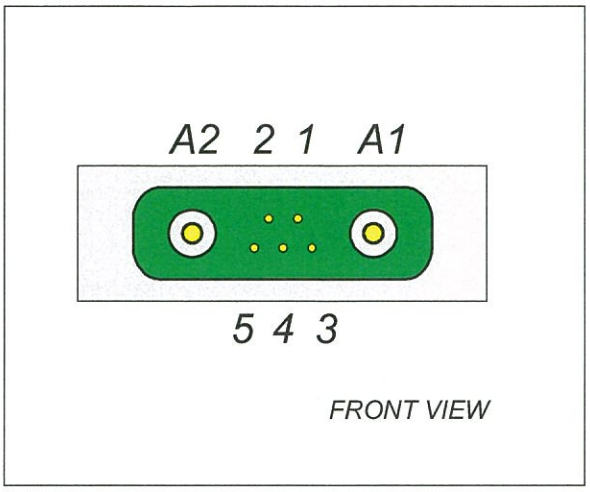
POWER MODULE :





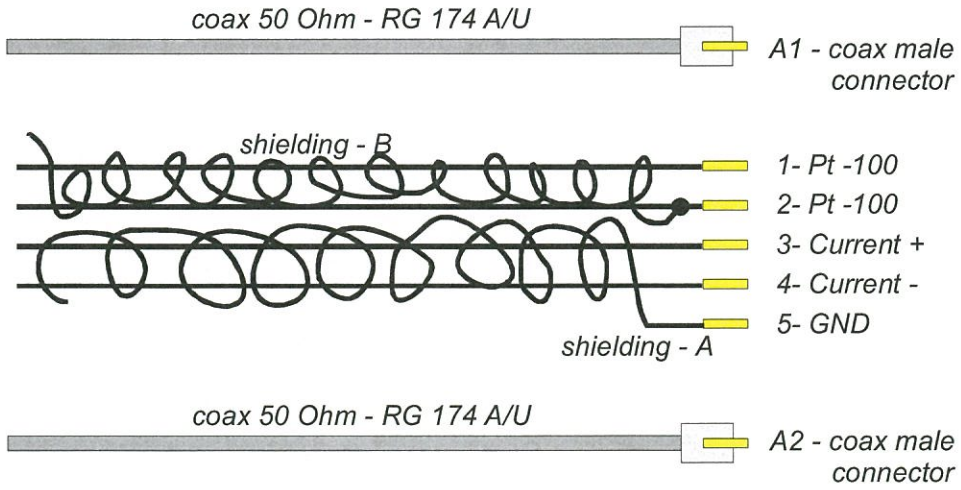
Block scheme of HPD-H Module

Input connector :



A1 (coax) :	Hall probe input #1
A2 (coax) :	Hall probe input #2
1 :	Pt-100 signal #1
2 :	Pt-100 signal #2
3 : probe - positive	Current output for hall
4 : probe - negative	Current output for hall
5 :	GND

Recommended cable system



PROBE SIDE

Not connect shielding here !!

HPD 4.1 DRIVER SIDE

Shielding -A ... connect to pin 5
Shielding -B ... connect to pin 1 together with live signal Pt100

HALL PROBES DRIVER :

Current setting

Hall probes are supplied by DC current. This current is set by multi-turn precision potentiometer. The max value is 100 (number 10 in the "window" and zero on the scale). This value 100 corresponds to the DC current 200 mA. Thus, the factor is 2 (this factor is indicated on the front panel), max. current is 200 mA. The current output (negative and positive, insulated with respect to GND) is on pins 3 and 4 of input connector (see fig. of input connector and Recommend cable system section).

Current on / off

The electric current for Hall-probes is switched by pushbutton switch near the potentiometer. The „PUSH" position corresponds to current on, while „PULL" position is current off.

Input gain

Electric voltage signals proportional to magnetic field is amplified by input amplifier. The gain of this amplifier is 1×, 10×, 100× and 1000× while the total gain (output voltage signal to the input voltage signal) is magnified by 10, i.e. total amplification is from 10× to 10000×. The level of input gain is set by rotary switch. The fifth position indicated as EXT is for remote control (see details later).

Balance

The DC offset of output signal is compensated by rotary potentiometer. The unbalance signal is indicated by two LEDs. The intensity of light of these LEDs is proportional to the offset. If balance is OK (signal is compensated), both LEDs do not light. It is recommended to make balance correction before every change of input gain.

High-pass filter

The Hall probe driver module yields frequency corrections. There are high-pass filter and four low-pass filters there. Both type of filters are active filters with modern design. The high-pass filter is either active (cut-off frequency 10 Hz, -3dB), or non-active (for DC measurement). The default set-up (from the manufacturer) is DC. Exactly, it means that DC signal is not filtered, however the AC signals is detected, amplified and not affected by this filter. The high-pass filter is activated or disactivated by jumper setting inside the module (see figures later). For the release of the module is recommended to take-off the nearest blend front panel.

Low-pass filters

There are four active low-pass filters of the 4th order. The filters have cut-off frequencies 1kHz, 10kHz, 100kHz and 350 kHz. The filters are set by the piano-DIL switch inside the module (see figures on the following pages).

Remote control

The useful feature of the Hall Probes Driver System is a remote control. The remote control is realised by a special remote control module. This module is not implemented in HPD 4.1, but

the system is prepared for future application of such a module. The parameters which can be set-up or measured by the remote module : current output (set-up), gain set-up (required position EXT), balance set-up, balance indication (measured), low-pass filter selection (set-up), temperature measurement. To operate under remote control the device requires EXT position on gain switch and remote control jumper in proper position (inside te module).

Temperature measurement

The temperature module enables to make a temperature measurement by means of Pt100 sensor. The calibrated range is 0 °C ÷ 100 °C (see technical data). The input is either directly on the temperature module (insulated BNC) or via mixed D-sub input connectors. All four positions for Hall probe driver module can be used for temperature measurement, but it is recommended to use module in the first or second position (from left) or direct input on the temperature module. The output signal is 10 mV / °C and 0V for 0 °C.

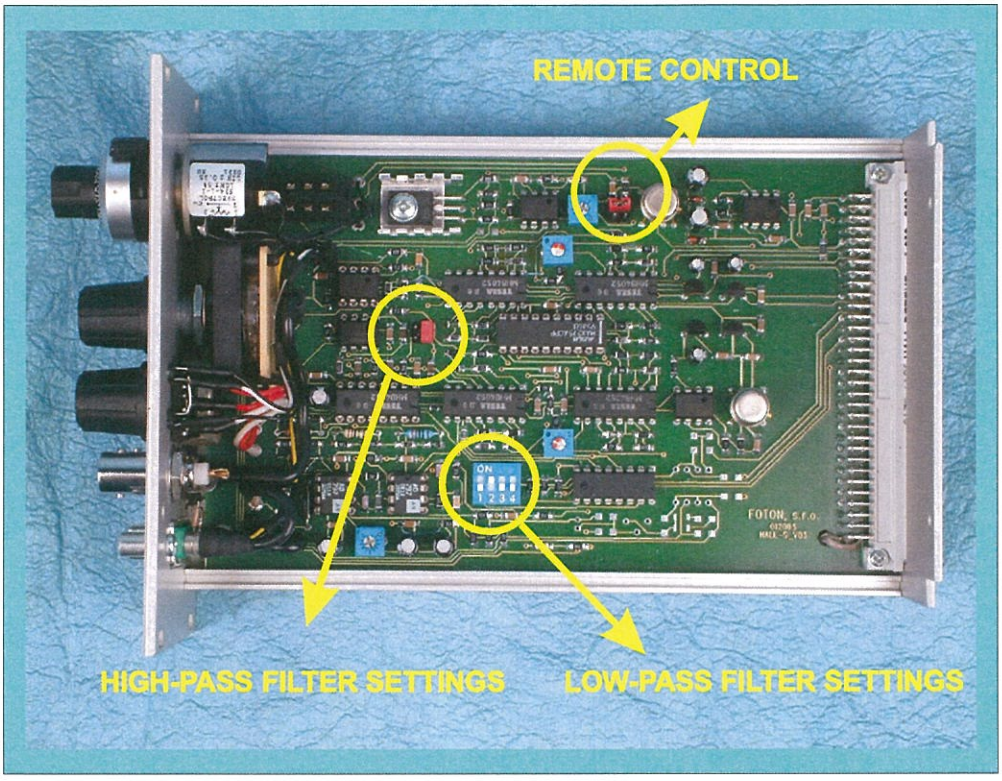
Cable system, grounding

To reach the best performance is recommended to follow this instructions:
The output signals from Hall-probes go through coaxial cables (RG 174 A/U, 50 Ω). Two coax lines are used (differential input), shielding is connected on insertion part of coax connector **only** on the side of HPD 4.1. Current output DC signals are shielded together, this shielding is connected to a special pin (no.5) on driver side. **Not connect** shielding on probe side. The signal lines from Pt100 are shielded (common shielding), shielding is connected to pin no.2 together with live signal Pt100.
The cable system and grounding is schematically discribed in the following pages.
It is recommended to power (230 V AC) this HPD 4.1 driver and the data acquisition system which is connected to the output of HPD 4.1 from the same power point.

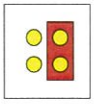
Powering

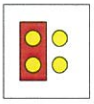
Net : 1/N/PE AC 230V 50/60 Hz
ČSN EN 61010-1
IP 20

INTERNAL SETTINGS



HIGH-PASS FILTER SETTINGS

DC 

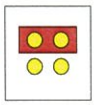
10 Hz High-Pass 

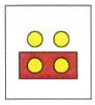
LOW-PASS FILTER SETTINGS

1 kHz :	1: OFF, 2: OFF, 3: OFF, 4:OFF
10 kHZ :	1: OFF, 2: ON, 3: OFF, 4:OFF
100 kHz :	1: ON, 2: OFF, 3: OFF, 4:OFF
350 kHz :	1: ON, 2: ON, 3: OFF, 4:OFF

10 kHz is default setting

REMOTE CONTROL SETTINGS

OFF 

ON 

RED VALUES ARE SET BY MANUFACTURER