# HPSA 1500- Electronic Sensor Circuit (ESC)

**TECHNICAL DATA SHEET**

May 2022

## GENERAL DESCRIPTION

The HPSA1500 ESC is a MEMS (Micro Electronic Mechanical System), that converts the pressure hemodynamic waveform into electrical signal which can be displayed on the monitor or used for further signal processing.
Standard HPSA1500 ESC configuration consists of piezo resistive pressure sensor with attached calibrated and compensated components, electrical connections: Excitation – supply voltage (2 contacts) and output – electrical response proportional to the excited pressure (2 contacts).

## APPLICATIONS

- Invasive blood and physiological pressure monitoring
- Medical instrumentation
- Infusion and other pumps

## FEATURES

- Fully Tested and Calibrated
- Constructed with biocompatible components
- Primary Dielectric Gel Barrier

## QUALITY AND REGULATORY REQUIREMENTS

- HYB d.o.o. Quality Management System is certified according to ISO 13485 and ISO 9001 standards
- Product is DEHP free and does not contain natural rubber latex
- Compliant[1] with requirements of IEC 60601-2-34 and ANSI/AAMI BP 22 standard
- All materials are beta, gamma and EtO sterilization compatible[1]

[1] The HPSA 1500 ESC is OEM product and cannot be fully certificate to mentioned standard because it is not assembled to final housing. Customer must perform custom qualification with final housing and electrical connection.
The HPSA 1500 ESC is used with hybymed® HMT20 IC Disposable Pressure Transducer and successfully qualified with mentioned standards.

# HPSA 1500- Electronic Sensor Circuit (ESC)

## TECHNICAL DATA SHEET

May 2022

## TECHNICAL DATA

| | Parameter | Value |
|---|---|---|
| **1.** | Sensitivity | 5 µV/V/mmHg, ±2% (typically <±1%) |
| **2.** | Input Impedance | 270 to 4500 Ohms |
| **3.** | Output Impedance | 270 to 450 Ohms |
| **4.** | Excitation Voltage and Frequency | 2 V to 10 V DC or 2 V to 10 V AC RMS, up to 5kHz |
| **5.** | Unbalance | ≤ ± 25 mmHg |
| **6.** | Zero Thermal Effect | ≤ ±0.3% mmHg/°C |
| **7.** | Thermal Coefficient | ≤ ± 0.1%/°C |
| **8.** | Zero Drift with Time | ≤ ±1.0 mmHg/8 hours after 10 seconds warm-up time |
| **9.** | Non-Linearity and Hysteresis | -50 to 200 mmHg: < ±1% of reading or < ±1 mmHg, whichever is greater<br>above 200 mmHg: < ±3% |
| **10.** | Storage Temperature | -25°C to +70°C |
| **11.** | Operating Temperature | 15°C to 40°C |
| **12.** | Operating Pressure Range | -50 to +300 mmHg<br>*Tested from -400 to +1000 mmHg |
| **13.** | Overpressure Protection | -400 to +4000 mmHg |
| **14.** | Leakage Current | [2] |
| **15.** | Phase Shift | [2] |
| **16.** | Light Sensitivity | < 1 mmHg |
| **17.** | Natural frequency | [2] |
| **18.** | Contact Surface | Gold Surface |
| **21.** | Defibrillation Withstand | [2] |
| **22.** | Max Half-Sine Shock Acceleration | 4.5 G |
| **23.** | Volumetric displacement | Not Applicable |
| **24.** | Operating life | [2] |

[2] Also depends on the final HPSA 1500 ESC integration to housing and final implementations.

## MECHANICAL AND ELECTRICAL DATA

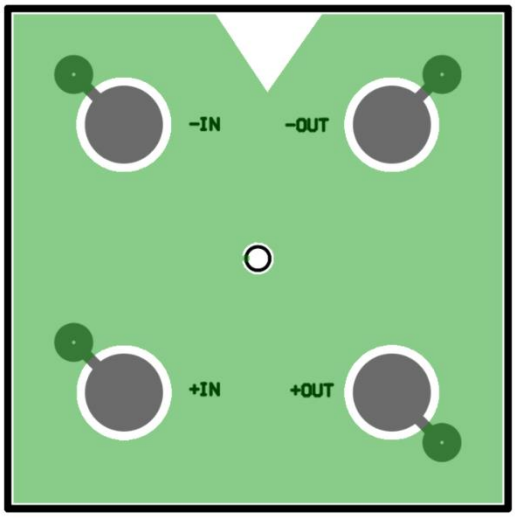
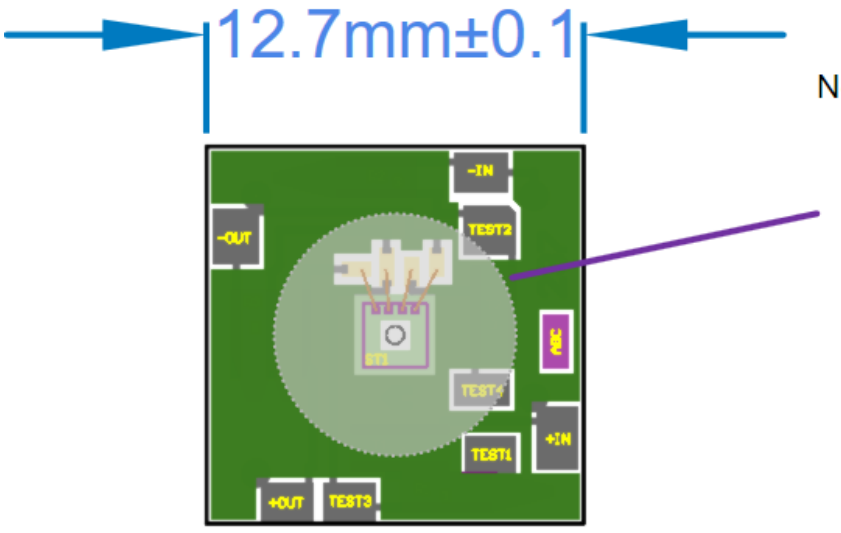



*Figure 1: HMT20 ESC – BOTTOM view pinout*




Note:

1. Sensor DIE protected by biocompatible gel

*Figure 2: HMT20 ESC – TOP view*

## Connection requirements

The following contacts are important for the user.

| Contact | Symbol | Min. | Typ. | Max. | Units | Note |
|---|---|---|---|---|---|---|
| Excitation voltage positive pol | +IN | 0 | 5 | 12 | V | (*3) |
| Excitation voltage negative pol | -IN | | | | | |
| Positive output | +OUT | | 5 | | uV/V/mmHg | (*4) |
| Negative output | -OUT | | | | | |

Table 1: Contacts descriptions

Note:

3-

- Do not exceed this voltage.
- The reverse polarity or alternative voltage supply is allowed.

4-

a. Sensitivity of the circuit is calibrated
   - Sensitivity definition:
     - Plugging the sensor to 1V power supply and expose it to 1mmHg will output 5 micro Volts.

b. The temperature compensation is included.