



HCE SERIES – MINIATURE AMPLIFIED PRESSURE SENSORS

The HCE pressure sensors perform precision digital signal conditioning and provide analog and digital output at the same time. The sensors are calibrated, temperature compensated and linearized and achieve very high total accuracies. They are intended to be used with dry and non-corrosive gases. Miniature SMT housings allow for space-saving PCB-mounting and maximum OEM design flexibility. All HCE pressure sensors can be modified according to customer specific requirements.

Features

- Pressure ranges from 10 mbar to 5 bar, absolute, gage or differential pressure
- Barometric pressure ranges
- Digital SPI bus and analog output
- Precision ASIC signal conditioning
- Calibrated and temperature compensated
- Miniature SMD housings

Applications

- Medical devices
- Instrumentation
- HVAC
- Industrial controls
- Pneumatic controls
- Environmental controls

Certificates

- RoHS and REACH compliant

Media compatibility

- To be used with non-corrosive, non-ionic working fluids such as clean dry air, dry gases and the like.

[CLICK HERE ›](#)
CONNECT WITH A SPECIALIST

HCE SERIES – MINIATURE AMPLIFIED PRESSURE SENSORS

Maximum ratings

| Parameter | | Min. | Typ. | Max. | Unit |
|-------------------------------------|---|------|------|-----------|----------|
| Supply voltage V_S ⁽¹⁾ | HCExxx3 | 2.7 | 3 | 3.3 | V_{DC} |
| | HCExxx5 | 4.5 | 5 | 5.5 | |
| Output current | Sink | | 1 | | mA |
| | Source | | 1 | | |
| Lead specifications | Average preheating temperature gradient | | | 2.5 | K/s |
| | Soak time | | | approx. 3 | min. |
| | Time above 217 °C | | | 50 | s |
| | Time above 230 °C | | | 40 | |
| | Time above 250 °C | | | 15 | |
| | Peak temperature | | | 260 | °C |
| | Cooling temperature gradient | | | -3.5 | K/s |
| Temperature ranges ⁽²⁾ | Compensated | 0 | | +85 | °C |
| | Operating | -25 | | +85 | |
| | Storage | -40 | | +125 | |
| Humidity limits (non-condensing) | | 0 | | 95 | %RH |

Pressure sensor characteristics

| Part no. | Operating pressure | Proof pressure ⁽³⁾ | Burst pressure ⁽⁴⁾ |
|----------------|---------------------|-------------------------------|-------------------------------|
| HCEM010xxxBxxx | 0 to ±10 mbar | 250 mbar | 500 mbar |
| HCEM020xxxBxxx | 0 to ±20 mbar | 500 mbar | 750 mbar |
| HCEM050xxxBxxx | 0 to ±50 mbar | 750 mbar | 1.2 bar |
| HCEM100xxxBxxx | 0 to ±100 mbar | 1.2 bar | 2 bar |
| HCEM200xxxBxxx | 0 to ±200 mbar | 2 bar | |
| HCEM500xxxBxxx | 0 to ±500 mbar | | |
| HCEB001xxxBxxx | 0 to ±1 bar | 3 bar | 5 bar |
| HCEM010xxxUxxx | 0 to 10 mbar | 250 mbar | 500 mbar |
| HCEM020xxxUxxx | 0 to 20 mbar | 500 mbar | 750 mbar |
| HCEM050xxxUxxx | 0 to 50 mbar | 750 mbar | 1.2 bar |
| HCEM100xxxUxxx | 0 to 100 mbar | 1.2 bar | 2 bar |
| HCEM200xxxUxxx | 0 to 200 mbar | 2 bar | |
| HCEM500xxxUxxx | 0 to 500 mbar | | |
| HCEB001xxxUxxx | 0 to 1 bar | 3 bar | 5 bar |
| HCEB002xxxUxxx | 0 to 2 bar | 6 bar | 7 bar |
| HCEB005xxxUxxx | 0 to 5 bar | 7 bar | |
| HCE0611ARxxx | 600 to 1100 mbar(a) | 3 bar | 5 bar |
| HCE0811ARxxx | 800 to 1100 mbar(a) | | |

Other pressure ranges are available on request. Please contact your local sensors representative.

HCE SERIES – MINIATURE AMPLIFIED PRESSURE SENSORS

Performance characteristics

($V_S=5.0 V_{DC}$, $T_A=25\text{ }^\circ\text{C}$, analog output signal is ratiometric to V_S , digital output signal is not ratiometric to V_S , pressure applied to high pressure port)

All HCExxx5 devices ($V_S= 5.0 V$)

| Characteristics | | Min. | Typ. | Max. | Unit |
|---|------------------------|------|------|------|------|
| Total accuracy (0 to 85°C) ⁽⁵⁾ | all barometric devices | | | ±1.0 | %FSS |
| | all other devices | | | ±0.5 | |
| Response delay ^(6, 7) | | | 1 | | ms |
| A/D resolution ⁽⁷⁾ | | | 14 | | bit |
| D/A resolution | | | | 11 | |
| Current consumption ⁽⁸⁾ | | | 5 | | mA |

All HCExxxRxxx5 (barometric devices)

| Characteristics | Min. | Typ. | Max. | Unit |
|--------------------------------------|------|------|------|-----------|
| ANALOG | | | | |
| Output at min. specified pressure | 0.21 | 0.25 | 0.29 | V |
| Full scale span (FSS) ⁽⁹⁾ | | 4.00 | | |
| Full scale output | 4.21 | 4.25 | 4.29 | |
| DIGITAL | | | | |
| Output at min. specified pressure | 0560 | 0666 | 076C | Count Hex |
| Full scale span (FSS) ⁽⁹⁾ | | 6666 | | |
| Full scale output | 6BC6 | 6CCC | 6DD2 | |

All HCExxxUxxx5 (Unidirectional devices)

| Characteristics | Min. | Typ. | Max. | Unit |
|--------------------------------------|------|------|------|-----------|
| ANALOG | | | | |
| Zero pressure offset | 0.23 | 0.25 | 0.27 | V |
| Full scale span (FSS) ⁽⁹⁾ | | 4.00 | | |
| Full scale output | 4.23 | 4.25 | 4.27 | |
| DIGITAL | | | | |
| Zero pressure offset | 05E3 | 0666 | 06E9 | Count Hex |
| Full scale span (FSS) ⁽⁹⁾ | | 6666 | | |
| Full scale output | 6C49 | 6CCC | 6D4F | |

HCE SERIES – MINIATURE AMPLIFIED PRESSURE SENSORS

Performance characteristics (cont.)

($V_S=5.0 V_{DC}$, $T_A=25\text{ }^\circ\text{C}$, analog output signal is ratiometric to V_S , digital output signal is not ratiometric to V_S , pressure applied to high pressure port)

All HCExxxBxxx5 (Bidirectional devices)

| Characteristics | Min. | Typ. | Max. | Unit |
|--------------------------------------|----------------------------|------|------|-----------|
| ANALOG | | | | |
| Zero pressure offset | 2.23 | 2.25 | 2.27 | V |
| Full scale span (FSS) ⁽⁹⁾ | | 4.00 | | |
| Output | at max. specified pressure | 4.23 | 4.25 | |
| | at min. specified pressure | 0.23 | 0.25 | 0.27 |
| DIGITAL | | | | |
| Zero pressure offset | 3916 | 3999 | 3A1C | Count Hex |
| Full scale span (FSS) ⁽⁹⁾ | | 6666 | | |
| Output | at max. specified pressure | 6C49 | 6CCC | |
| | at min. specified pressure | 05E3 | 0666 | 06E9 |

Performance characteristics

($V_S=3.0 V_{DC}$, $T_A=25\text{ }^\circ\text{C}$, analog output signal is ratiometric to V_S , digital output signal is not ratiometric to V_S , pressure applied to high pressure port)

All HCExxx3 devices ($V_S= 3.0\text{ V}$)

| Characteristics | Min. | Typ. | Max. | Unit |
|---|------------------------|------|------|------|
| Total accuracy ⁽⁵⁾ (0 to 85°C) | all barometric devices | | ±1.0 | %FSS |
| | all other devices | | ±0.5 | |
| Response delay ^(6, 7) | | 1 | | ms |
| A/D resolution ⁽⁷⁾ | | 14 | | bit |
| D/A resolution | | | 11 | |
| Current consumption ⁽⁶⁾ | | 3 | | mA |

All HCExxxRxxx3 (barometric devices)

| Characteristics | Min. | Typ. | Max. | Unit |
|--------------------------------------|------|------|------|-----------|
| ANALOG | | | | |
| Zero pressure offset | 0.23 | 0.25 | 0.27 | V |
| Full scale span (FSS) ⁽⁹⁾ | | 2.00 | | |
| Full scale output | 2.23 | 2.25 | 2.27 | |
| DIGITAL | | | | |
| Zero pressure offset | 09D0 | 0AAA | 0B85 | Count Hex |
| Full scale span (FSS) ⁽⁹⁾ | | 5555 | | |
| Full scale output | 5F25 | 5FFF | 60D9 | |

HCE SERIES – MINIATURE AMPLIFIED PRESSURE SENSORS

Performance characteristics (cont.)

($V_S=3.0 V_{DC}$, $T_A=25\text{ }^\circ\text{C}$, analog output signal is ratiometric to V_S , digital output signal is not ratiometric to V_S , pressure applied to high pressure port)

All HCExxxUxxx3 (Unidirectional devices)

| Characteristics | Min. | Typ. | Max. | Unit |
|--------------------------------------|------|------|------|-----------|
| ANALOG | | | | |
| Output at min. specified pressure | 0.24 | 0.25 | 0.26 | V |
| Full scale span (FSS) ⁽⁹⁾ | | 2.00 | | |
| Full scale output | 2.24 | 2.25 | 2.26 | |
| DIGITAL | | | | |
| Output at min. specified pressure | 0A3D | 0AAA | 0B17 | Count Hex |
| Full scale span (FSS) ⁽⁹⁾ | | 5555 | | |
| Full scale output | 5F92 | 5FFF | 606C | |

All HCExxxBxxx3 (Bidirectional devices)

| Characteristics | Min. | Typ. | Max. | Unit | |
|--------------------------------------|----------------------------|------|------|-----------|------|
| ANALOG | | | | | |
| Zero pressure offset | 1.24 | 1.25 | 1.26 | V | |
| Full scale span (FSS) ⁽⁹⁾ | | 2.00 | | | |
| Output | at max. specified pressure | 2.24 | 2.25 | | 2.26 |
| | at min. specified pressure | 0.24 | 0.25 | | 0.26 |
| DIGITAL | | | | | |
| Zero pressure offset | 34E8 | 3555 | 35C2 | Count Hex | |
| Full scale span (FSS) ⁽⁹⁾ | | 5555 | | | |
| Output | at max. specified pressure | 5F92 | 5FFF | | 606C |
| | at min. specified pressure | 0A3D | 0AAA | | 0B17 |

SPI - serial peripheral interface (cont.)

| Parameter | Symbol | Min. | Typ. | Max. | Unit |
|---|---------------------|-------------|------|------|---------|
| Input high level | | 90 | | 100 | % of Vs |
| Input low level | | 0 | | 10 | |
| Output low level | | | | 10 | |
| Pull-up resistor | | 500 | | | Ω |
| Load capacitance @ MISO | C_{MISO} | | | 400 | pF |
| Input capacitance @ each pin | C_{SPI_IN} | | | 10 | |
| Signal clock frequency | f_{SCK} | 100* | | 640 | kHz |
| MISO hold time after SCK sample slope | $t_{SPI_HD_MISO}$ | 200 | | | ns |
| MOSI setup time before SCK sample slope | $t_{SPI_SU_MOSI}$ | $2/f_{CLK}$ | | | |
| /SS setup time before SCK sample slope | $t_{SPI_SU_SS}$ | 10 | | | |
| /SS hold time after SCK sample slope | $t_{SPI_HD_SS}$ | $1/f_{CLK}$ | | | |

*recommended

Note: TE Connectivity recommends communication speeds of at least 100 kHz (max. 400 kHz). Please contact us for further information.

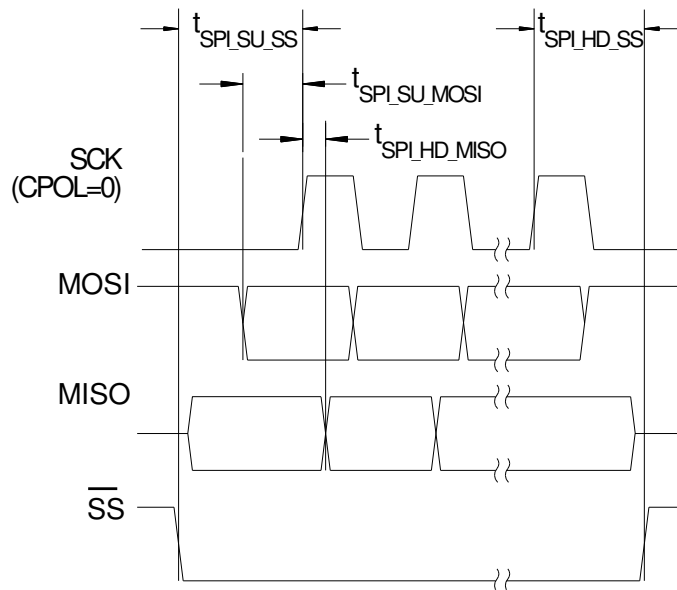
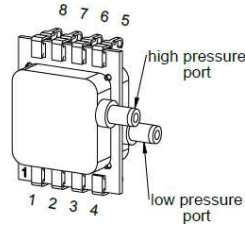
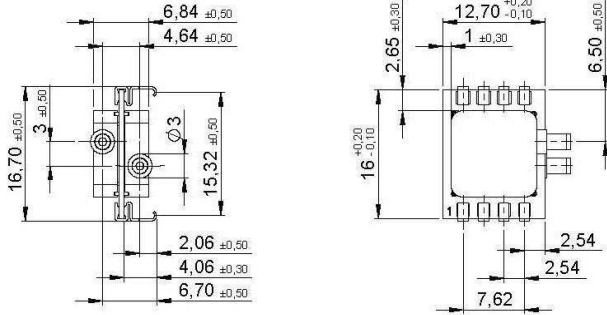


Fig. 3: Timing characteristics

HCE SERIES – MINIATURE AMPLIFIED PRESSURE SENSORS

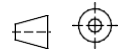
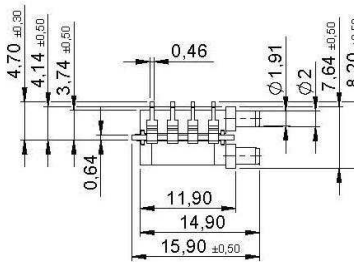
Dimensional drawing ⁽¹⁰⁾

HCExxxE8xxx (SMD dual port, same side, straight ports)



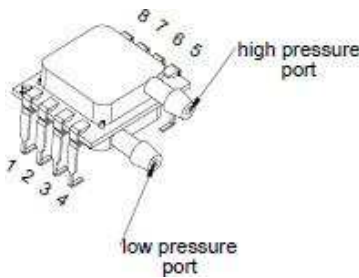
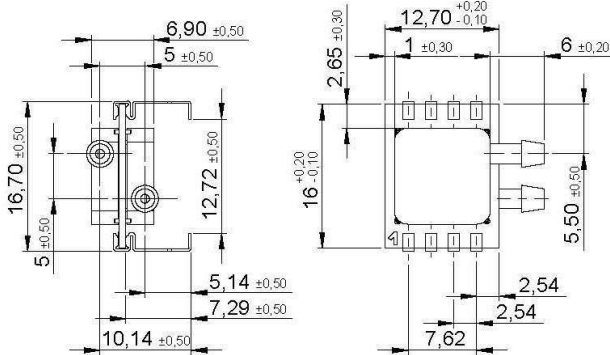
| Pin | connection |
|-----|------------|
| 1 | +Vs |
| 2 | GND |
| 3 | Vout |
| 4 | MISO |
| 5 | CLK |
| 6 | SS |
| 7 | I/C* |
| 8 | MOSI |

* internal connection.
Do not connect for any reason



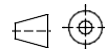
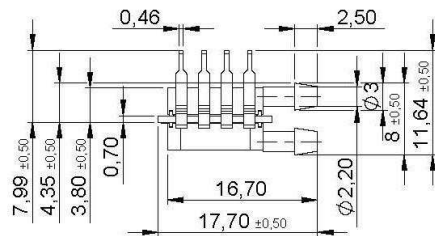
first angle projection
dimensions in mm

HCExxxE9xxx (SMD dual port, same side, barbed ports)



| Pin | connection |
|-----|------------|
| 1 | +Vs |
| 2 | GND |
| 3 | Vout |
| 4 | MISO |
| 5 | CLK |
| 6 | SS |
| 7 | I/C* |
| 8 | MOSI |

* internal connection.
Do not connect for any reason

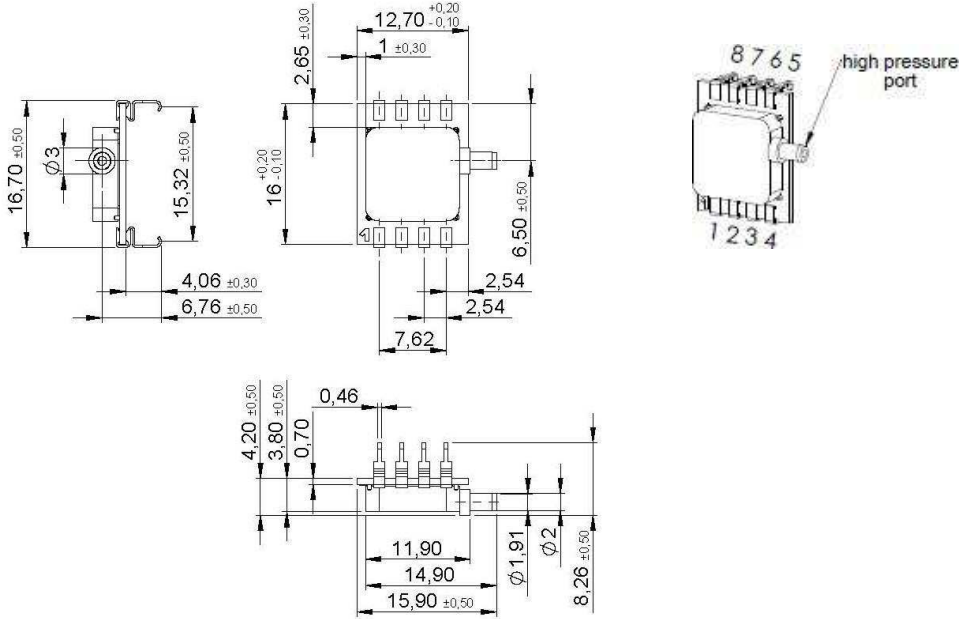


first angle projection
dimensions in mm

HCE SERIES – MINIATURE AMPLIFIED PRESSURE SENSORS

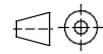
Dimensional drawing ⁽¹⁰⁾

HCExxxH8xxx (SMD single port, straight port)



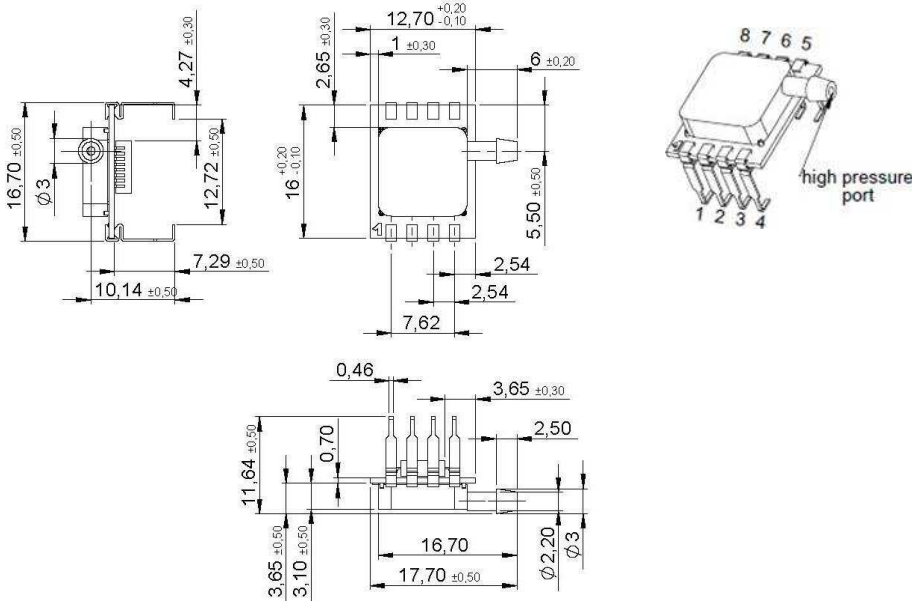
| Pin | connection |
|-----|------------|
| 1 | +Vs |
| 2 | GND |
| 3 | Vout |
| 4 | MISO |
| 5 | CLK |
| 6 | SS |
| 7 | I/C* |
| 8 | MOSI |

* internal connection.
Do not connect for any reason



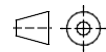
first angle projection
dimensions in mm

HCExxxH9xxx (SMD single port, barbed port)



| Pin | connection |
|-----|------------|
| 1 | +Vs |
| 2 | GND |
| 3 | Vout |
| 4 | MISO |
| 5 | CLK |
| 6 | SS |
| 7 | I/C* |
| 8 | MOSI |

* internal connection.
Do not connect for any reason

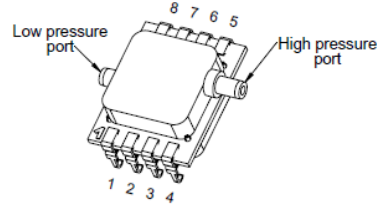
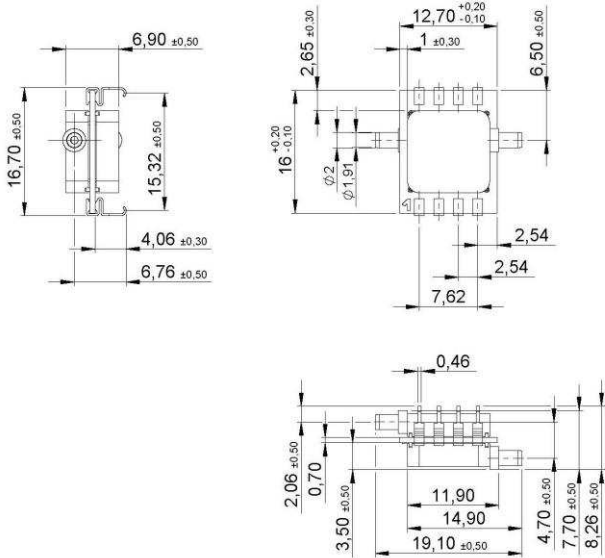


first angle projection
dimensions in mm

HCE SERIES – MINIATURE AMPLIFIED PRESSURE SENSORS

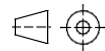
Dimensional drawing ⁽¹⁰⁾

HCExxxQ8xxx (SMD dual port, opposite side, straight ports)



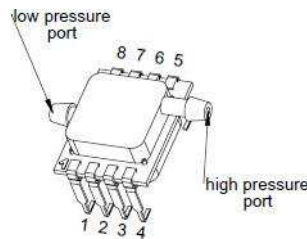
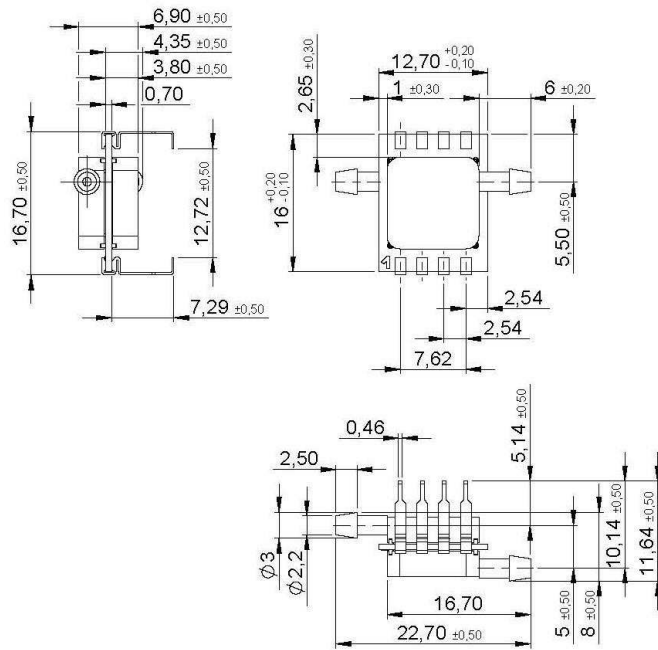
| Pin | connection |
|-----|------------|
| 1 | +Vs |
| 2 | GND |
| 3 | Vout |
| 4 | MISO |
| 5 | CLK |
| 6 | SS |
| 7 | I/C* |
| 8 | MOSI |

* internal connection.
Do not connect for any reason



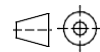
first angle projection
dimensions in mm

HCExxxQ9xxx (SMD dual port, opposite side, barbed ports)



| Pin | connection |
|-----|------------|
| 1 | +Vs |
| 2 | GND |
| 3 | Vout |
| 4 | MISO |
| 5 | CLK |
| 6 | SS |
| 7 | I/C* |
| 8 | MOSI |

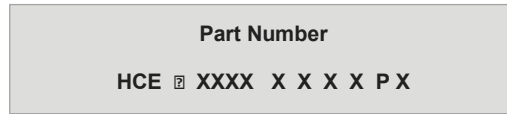
* internal connection.
Do not connect for any reason



first angle projection
dimensions in mm

HCE SERIES – MINIATURE AMPLIFIED PRESSURE SENSORS

Part numbering key



Pressure range

| | |
|-------------|------------------|
| 0611 | 600 to 1100 mbar |
| 0811 | 800 to 1100 mbar |
| M010 | 10 mbar |
| M020 | 20 mbar |
| M050 | 50 mbar |
| M100 | 100 mbar |
| M200 | 200 mbar |
| M500 | 500 mbar |
| B001 | 1 bar |
| B002 | 2 bar |
| B005 | 5 bar |

Pressure mode

| | |
|-----------|--------------|
| A* | Absolute |
| D | Differential |
| G | Gage |

*only for pressure ranges 0611,0811, B001, B002

Calibration

| | |
|-----------|----------------|
| B | Bidirectional |
| U | Unidirectional |
| R* | Barometric |

*only for pressure ranges 0611,0811

Voltage

| | |
|----------|----|
| 5 | 5V |
| 3 | 3V |

Grade

| | |
|----------|-------|
| P | Prime |
|----------|-------|

Porting

| | |
|------------|----------|
| 8* | Straight |
| 9** | Barbed |

* standard for devices up to 500 mbar and barometric ranges

**standard for devices from 1 bar

Housing

| | |
|------------|------------------------------|
| E* | [SMD, 2 ports same side] |
| H** | [SMD, 1 port] |
| Q* | [SMD, 2 ports opposite side] |

Housings Q only available up to 1 bar. Please contact TE Connectivity.

* standard for differential devices, "D"

**standard for absolute and gage devices, "A" and "G"

Order code example: HCEM050DBE8P5

Note: Not all possible sensor configurations are active products. MOQ may apply.

Custom specific pressure ranges and mechanical or electronic sensor modifications are widely available. Please contact your local sensors representative to learn more.

HCE SERIES – MINIATURE AMPLIFIED PRESSURE SENSORS

Ordering information (standard configurations)

| Description | TE Part Number | Pressure Range | Pressure mode | Calibration | Housing | Porting | Grade | Voltage |
|---------------|----------------|------------------|---------------|----------------|--------------------------|----------|-------|---------|
| HCEM100DUE9P5 | 2003204 | 100 mbar | Differential | Unidirectional | [SMD, 2 ports same side] | Barbed | Prime | 5 V |
| HCEM200GUH9P3 | 2003243 | 200 mbar | Gage | Unidirectional | [SMD, 1 port] | Barbed | Prime | 3 V |
| HCEM500DBE8P3 | 2003895 | 500 mbar | Differential | Bidirectional | [SMD, 2 ports same side] | Straight | Prime | 3 V |
| HCEB005DUE9P5 | 2003483 | 5 bar | Differential | Unidirectional | [SMD, 2 ports same side] | Barbed | Prime | 5 V |
| HCE0611ARH8P3 | 2003443 | 600 to 1100 mbar | Absolute | Barometric | [SMD, 1 port] | Straight | Prime | 3 V |

Note:

The above product listings are examples of possible product configurations. More standard product configurations are available on request.

In addition, custom specific pressure and temperature ranges as well as mechanical or electronic sensor modifications are widely available.

Please note, not all possible sensor configurations are active products. MOQ may apply. Please contact your local sensors representative to learn more.