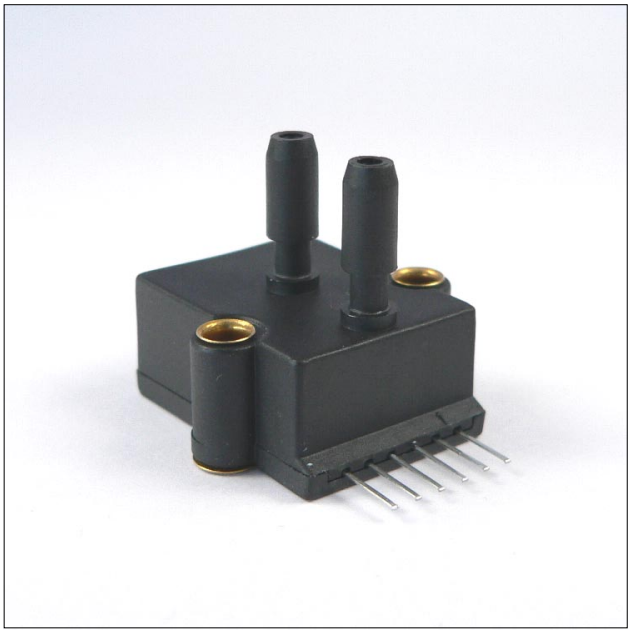
RCE Series
Digital pressure transducers

FEATURES

- **0...25 mbar to 0...5 bar, 0...±10 mbar to 0...±1 bar, barometric range 600...1100 mbar**
- **Absolute, gage or differential pressure**
- **Digital readout via SPI bus**
- **Precision ASIC conditioning**
- **Calibrated and temperature compensated**
- **Total accuracy ±1.0 %FSS**
- **Sensortechnics PRO services**



MEDIA COMPATIBILITY

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

SPECIFICATIONS

Maximum ratings

Supply voltage V_S	4.75 V to 5.25 V_{DC} max. 6.50 V_{DC}
Output current	
Sink	2 mA
Source	2 mA
Lead temperature (2 - 4 sec.)	250°C
Temperature ranges	
Compensated	0 to +85 °C
Operating	-10 to +85 °C
Storage	-20 to +105 °C

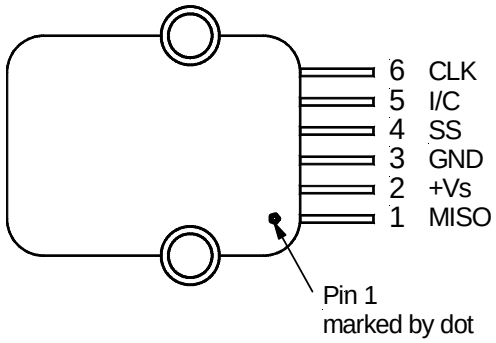
Caution!
The sensor is not reverse polarity protected.

Incorrect applications of excitationvoltage or ground to the wrong pin can cause electrical failure.

Application of supply voltage above themaximum can cause electrical failure.

ELECTRICAL CONNECTION

Bottom view



Note: Pin 5 is an internal device connection and should not be connected for any reason!

MOSI is internally connected to high level. No external port is available.

PRESSURE RANGES SPECIFICATIONS

(V_S = 5.0 V_{DC}, T_A = 25°C)

Part number	Pressure range		Burst pressure[1]		Sensitivity (typ.)	
RCE0611AR	600...1100	mbar(a)	2	bar (a)	6.4	counts/ mbar
RCEB001AU	0...1	bar (a)	2		3.2	
RCEB002AU	0...2		5		1.6	
RCEB005AU	0...5		10		0.6	
RCEM025DU	0...25	mbar (g,d)	0.2	bar (g,d)	128	
RCEM050DU	0...50		0.35		64	
RCEM100DU	0...100		0.35		32	
RCEM250DU	0...250		1		12.8	
RCEM500DU	0...500		1		6.4	
RCEB001DU	0...1	bar (g,d)	2		3.2	
RCEB002DU	0...2		5		1.6	
RCEB005DU	0...5		10		0.6	
RCEM010DB	0...±10	mbar (d)	0.2	bar (d)	160	
RCEM025DB	0...±25		0.2		64	
RCEM050DB	0...±50		0.35		32	
RCEM100DB	0...±100		0.35		16	
RCEM250DB	0...±250		1		6.4	
RCEM500DB	0...±500		1		3.2	
RCEB001DB	0...±1	bar(d)	2		1.6	

Specification notes:

1. If maximum burst pressure is exceeded, even momentarily, the package may leak or burst, or the pressure sensing die may fracture.
2. Full Scale Span (FSS) is the algebraic difference between the output signal for the highest and lowest specified pressure.
3. Total accuracy is the combined error from offset and span calibration, linearity, pressure hysteresis, and temperature effects. Linearity is the measured deviation based on a straight line. Hysteresis is the maximum output difference at any point within the operating pressure range for increasing and decreasing pressure. Calibration errors include the deviation of offset and full scale from nominal values.
4. Delay time between sampling and signal change at the output.

PERFORMANCE CHARACTERISTICS

The output signal is not ratiometric to the supply voltage (V_S = 5.0 V_{DC}, T_A = 25°C)

All RCE...(U,R)

Characteristics	Min.	Typ.	Max.	Units
Offset at lowest specified pressure	1700	2000	2300	counts
Full scale span (FSS)[2]		30000		
Full scale output	31700	32000	32300	

All RCE...B

Characteristics		Min.	Typ.	Max.	Units
Zero pressure offset		16700	17000	17300	counts
Full scale span (FSS)[2]			30000		
Output	at max. specified pressure	31700	32000	32300	
	at min. specified pressure	1700	2000	2300	

All devices

Characteristics	Min.	Typ.	Max.	Units
Total accuracy (0 to 85°C)[3]			±1.0	%FSS
Response delay[4]		500		µs
Current consumption		5		mA
SPI-clock frequency			1	MHz
Input - high level	0.7		1	Vs
Input - low level	0		0.3	
Output - low level			0.1	
Pull-up resistor	500			Ω

SPI - SERIAL PERIPHERAL INTERFACE

INTRODUCTION

The RCE is capable to generate a digital output signal. The device runs a cyclic program, which will store a corrected sensor value with 12-bit resolution about every 250 µs within the output registers of the internal ASIC. This cyclic program runs independent from the bus communication. In order to use the RCE pressure sensor for digital signal readout, it should be connected to a SPI Master device.
SPI specifies four signals: The clock (CLK) is generated by the master and input to all slaves. MOSI carries data from master to slave. MISO carries data from slave back to master. A slave select line (SS) allows individual selection of a slave device.

DIGITAL INTERFACE

SPI Modes:

A pair of parameters called clock polarity (CPOL) and clock phase (CPHA) determine the edges of the clock signal on which the data are driven and sampled. Each of the two parameters has two possible states, which allows for four possible combinations, all of which are incompatible with one another.

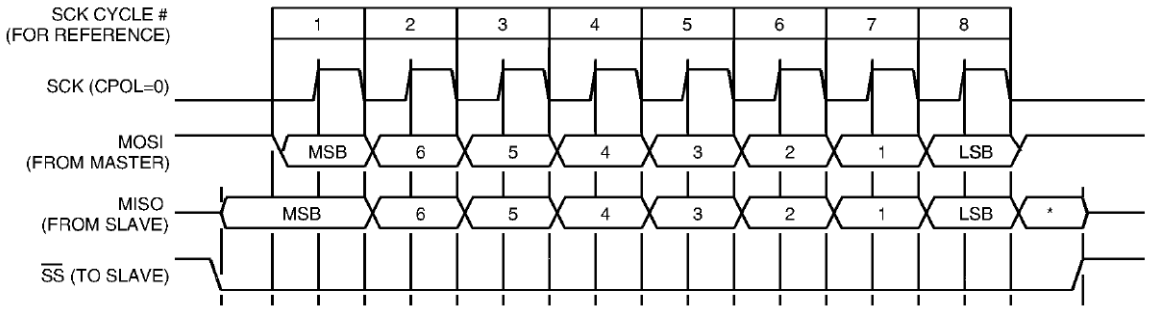
In general the RCE supports all combinations of clock phase (CPHA) and polarity (CPOL). By default it is programmed to CPHA = 0 and CPOL = 0, which means that the data is latched with the rising edge of the clock.

Slave select:

The falling edge of the SS line indicates the beginning of the transfer. Additionally the SS line must not be negated and reasserted between the three bytes to be transmitted.

Data operation:

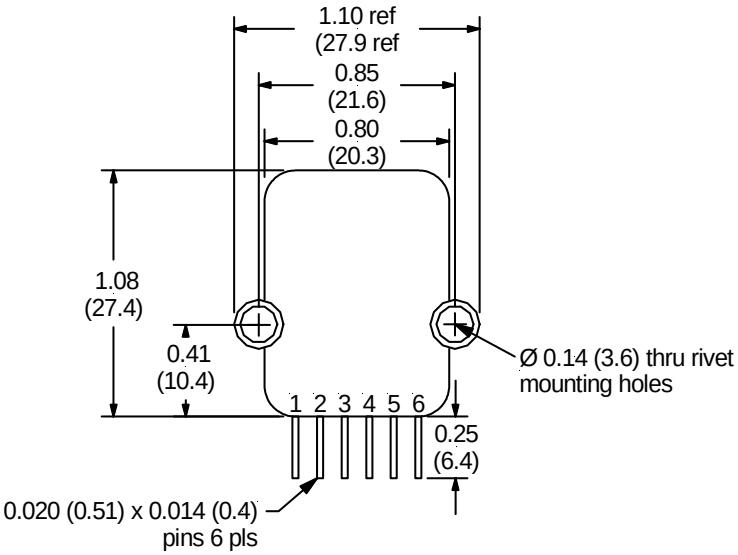
The MOSI is internally connected to high level. So there is no data transmission from master to slave. Because of internal configuration the slave will answer the first byte with an FFxh. The second and third byte contain the 15 bit pressure information (see below).

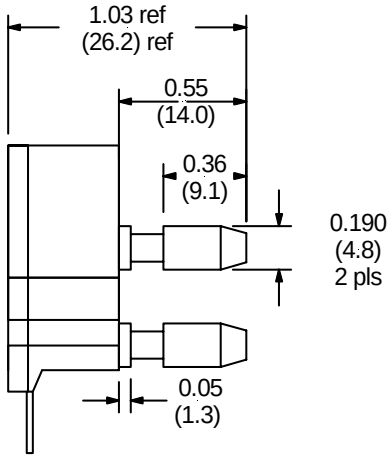


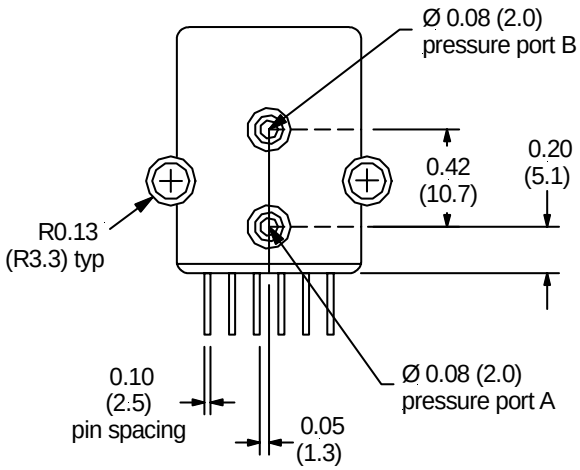
	1. Byte									2. Byte									3. Byte							
MOSI	1	1	1	1	1	1	1	1		1	1	1	1	1	1	1	1		1	1	1	1	1	1	1	1
MISO	x	x	x	x	x	x	x	x		x	E14	E13	E12	E11	E10	E9	E8		E7	E6	E5	E4	E3	E2	E1	E0

FIGURE I: **SPI-BUS Protocol**

PHYSICAL DIMENSIONS







Port B:
High pressure Port for gage and differential devices

Port A:
High pressure Port for absolute devices

third angle projection

dimensions in inches (mm)

ORDERING INFORMATION

Pressure range	Absolute (A)	Differential/Gage (D)
Barometric (R)		
600...1100 mbar	RCE0611AR	
Unidirectional (U)		
0...25 mbar		RCEM025DU
0...50 mbar		RCEM050DU
0...100 mbar		RCEM100DU
0...250 mbar		RCEM250DU
0...500 mbar		RCEM500DU
0...1 bar	RCEB001AU	RCEB001DU
0...2 bar	RCEB002AU	RCEB002DU
0...5 bar	RCEB005AU	RCEB005DU
Bidirectional (B)		
0...±10 mbar		RCEM010DB
0...±25 mbar		RCEM025DB
0...±50 mbar		RCEM050DB
0...±100 mbar		RCEM100DB
0...±250 mbar		RCEM250DB
0...±500 mbar		RCEM500DB
0...±1 bar		RCEB001DB

Sensortechnics PRO services:

- **Extended guarantee period of 2 years**
- **Improved performance characteristics**
- **Custom product modifications and adaptations even for small quantities**
- **Advanced logistics models for supply inventory and short delivery times**
- **Technical support through application engineers on the phone or at your site**
- **Fastest possible technical response for design and QA engineers**

... plus other services on request