SVMtec	Manual	**Version** 1.2 **Date** 04.08.2022 **Agent** M.Talmann

PSC Multichannel Pressure Scanner – PSC4 / PSC5

1. GENERAL DESCRIPTION

The pressure scanners from the PSC series are suitable for simultaneous acquisition of multiple pressure signals. The miniature versions PSC4 and PSC5 allow the connection of 4 or 5 differential or absolute pressures. The PSC5B version also has a built-in barometer.

All sensors of a device have the same pressure range. The reference pressures of all channels are combined on one port. Optionally, each channel can be equipped with its own reference port.

Data transmission is via the USB or CAN bus interface in the unit Pascal [Pa]. Using a simple protocol, the transmission rate can be set in the range between 1 and 100Hz (via USB) or 1 to 500Hz (via CAN). The CAN bus is implemented according to the CAN 2.0A or CAN 2.0B specifications. Baud rates up to 1Mbaud/s are supported. A DBC file (vector format) is supplied for easy integration into the respective measurement environment. When connected via USB, the pressure scanner logs onto the system as a virtual COM port. This means that any software that supports a serial protocol can be used. A sample programme for use with LabVIEW® is included.

A TARA function can be triggered via a software command.

Power is supplied to the pressure scanners via USB or the CAN bus connection (M8 connector). Therefore, only one common power supply is necessary for all devices in the CAN bus (7-24V, 1A).

Optionally, an additional PT100 connection with M8 connector can be selected. In this case, one of the two CAN connections on the rear of the device is omitted.

2. TECHNICAL DESCRIPTION

2.1. PRESSURE RANGES

The following table shows the standard pressure ranges. Other ranges can also be realised on request.

1)	p-Min2)	p-Max3)	Δp4)		Proof5)	Burst6)	
Bi-directional							
D	-125	125	0,02	[Pa]	25	75	[kPa]
D	-250	250	0,04	[Pa]	25	57	[kPa]
D	-500	500	0,07	[Pa]	25	57	[kPa]
D	-1,25	1,25	0,0002	[kPa]	50	57	[kPa]
D	-2,5	2,5	0,0004	[kPa]	50	57	[kPa]
D	-5,0	5,0	0,0007	[kPa]	50	125	[kPa]
D	-7,5	7,5	0,001	[kPa]	50	125	[kPa]
D	-15	15	0,002	[kPa]	50	200	[kPa]
D	-25	25	0,004	[kPa]	100	100	[kPa]
D	-50	50	0,008	[kPa]	100	100	[kPa]
D	-100	100	0,015	[kPa]	300	1000	[kPa]
D	-250	250	0,04	[kPa]	720	1700	[kPa]
D	-500	500	0,08	[kPa]	1200	1700	[kPa]
D	-1000	1000	0,16	[kPa]	1700	1700	[kPa]
Uni-directional							
D	0	250	0,02	[Pa]	25	75	[kPa]
D	0	500	0,04	[Pa]	25	75	[kPa]
D	0	1,25	0,0001	[kPa]	50	75	[kPa]
D	0	2,5	0,0002	[kPa]	50	75	[kPa]
D	0	5,0	0,0004	[kPa]	50	125	[kPa]
D	0	7,5	0,0005	[kPa]	50	125	[kPa]
D	0	15	0,001	[kPa]	50	200	[kPa]
D	0	25	0,002	[kPa]	100	100	[kPa]
D	0	50	0,004	[kPa]	100	100	[kPa]
D	0	100	0,008	[kPa]	300	1000	[kPa]
D	0	250	0,02	[kPa]	720	1700	[kPa]
D	0	500	0,04	[kPa]	1200	1700	[kPa]
D	0	1000	0,08	[kPa]	1700	1700	[kPa]
Absolute pressure							
A	0	34	0,003	[kPa]	100	100	[kPa]
A	0	100	0,007	[kPa]	200	1,0	[MPa]
A	0	200	0,013	[kPa]	800	1,7	[MPa]
A	0	400	0,025	[kPa]	1,3	1,7	[MPa]
A	60	110	0,004	[kPa]	--	1,7	[MPa]

1) D: differential, pressure difference can be applied via 2 ports.
The reference side (min) can also be applied together to one port
A: absolute, measurement of absolute pressure, an open measuring point indicates the actual air pressure, if the pressure is within the measuring range

2) Nominal smallest possible measured value
3) Nominal largest possible measured value
4) Resolution of digitization (rounded)
5) Maximum pressure that does not yet cause damage to the sensor
6) Maximum differential pressure against environment that the internal sensor housing can withstand. At a higher pressure, the housing may crack. However, damage to the sensor occurs when the PROOF pressure is reached.

2.2. PRESSURE PORTS

The PSC pressure scanners can be supplied with the pneumatic connections shown below.

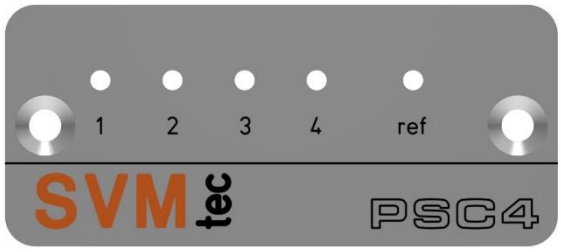
T16	T20

Name	DI [mm]	Hose material (recommended)	Max. pressure	Suitable for
T16	1,3 … 1,6	Silicon, PE, PVC	0,1MPa	All versions
T20	1,5 … 2,0	Silicon	15kPa	All versions

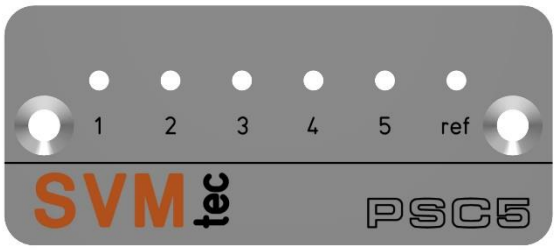
2.3. HOUSING

Frontpanel

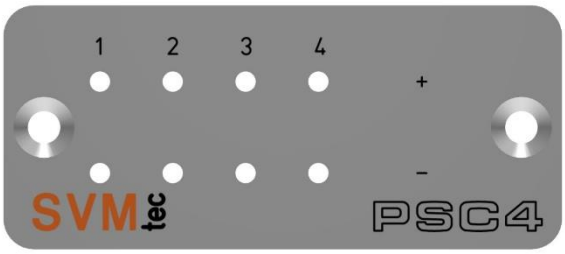
The front panels are available in versions with a common reference connection or one reference connection per channel.



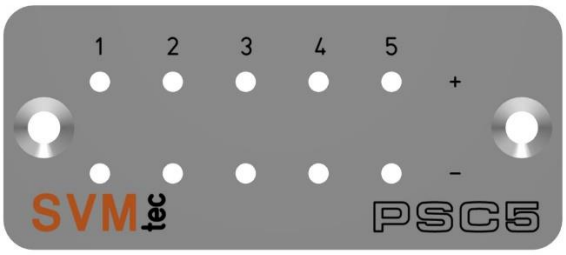
4 pressure ports with common reference



5 pressure ports with common reference



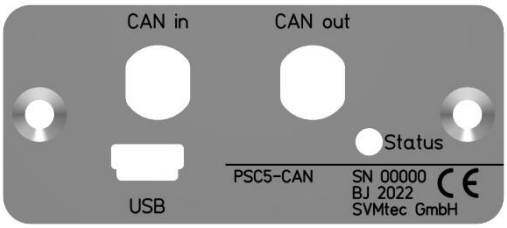
4 pressure connections with reference connection per channel



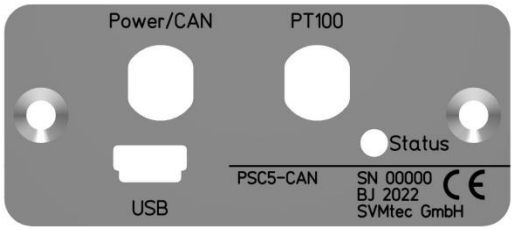
5 pressure connections with reference connection per channel

Backpanel

On the backpanel there is a status LED, USB and CAN connector and PT100 connector.



USB-mini and two CAN connectors



USB-mini, CAN and PT100 connector

Housing version

The PSC4/5 pressure scanners are also available in a housing with protection class IP65 (dust-tight, protected against water jets).

2.4. INTERFACES

All devices have a USB-mini interface as standard.

The CAN bus and the USB interface cannot be operated simultaneously. If the device is connected to the computer via the USB interface, the CAN interface is disabled.

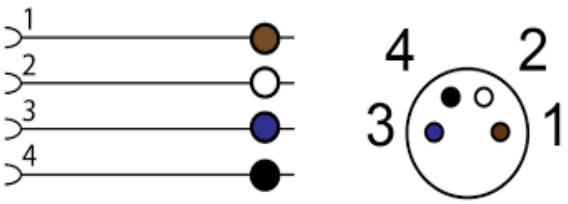
For operation in the CAN bus, the device must be powered by an external power supply unit. Using so-called "daisy chaining", up to ten units can be connected in series without an additional power supply.

2.5. ELECTRICAL CONNECTIONS AND INTERFACES

CAN

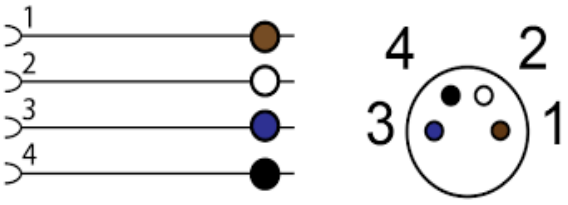
M8 - CAN Pinout

Pin	Function	Cable color
1	+ Supply	brown
2	CAN low	white
3	- Supply (GND)	blue
4	CAN high	black



M8 – PT100 Pinout

Pin	Function	Cable color
1	F+	brown
2	T+	white
3	T-	blue
4	F-	black



2.6. TECHNICAL DATA

CAN Bus Communication

Rate	Max. 1MBAUD/s
Protocol	CAN2.0A, CAN2.0B

Power Supply

Supply Voltage PSC4 / PSC5	Via CAN connector, 7-24V, 70mA

Genauigkeit und Abtastraten

Range (depends on selected sensors)	+/-0,025…50kPa
Accuracy	Min. +/- 0,25% FSS
Sample rate per channel	1-500 Hz

Dimensions

Housing	60 x 30 x 80 mm (W x H x D)
Pressure ports	D = 1,6mm / D = 2mm
Recommended hoses	Soft-PE- und Silicon hoses 3,5 x 1,5mm / 3 x 1mm

Environmental Conditions

Temperature	5 … 50 °C
Humidity	0 … 95 %, non condensing
Medium	Air and other noncorrosive gases

3. SOFTWARE

The free xSC-Logger program for the Windows operating system is supplied with the devices. With this program all devices can be configured via the USB interface. The recording and saving of the measured values can also be done via the program with the exception of the CAN interface.

A driver package is provided for the graphical programming language LabVIEW from National Instruments.

The devices can also be operated under Linux.

3.1. INTERFACE SETUP

As soon as the device is connected to the computer via the USB port, a virtual COM port is created. Thus it can be used with any program that supports the RS-232 protocol.

If not known, the corresponding COM port can be determined via the Windows device manager.

3.2. SERIAL PROTOCOL

The virtual COM port can be operated with any baud rate. Recommended is 19200, 8 data bits, no parity, 1 stop bit. DTR (Data Terminal Ready) must be set.

The following are the available commands for configuring the pressure scanner.

Command	Function	Reply
CAL a x	Set scaling factor for senor a to a value of x Caution: This overwrites the factory calibration!	#Scaler=.... Offset=....
CAL? a	Read the scaling factor of sensor **a**	#Scaler=.... Offset=....
EE_LOAD	Load calibration data from EEPROM	#EEPROM:loaded
EE_SAVE	Save calibration data to EEPROM	#EEPROM:saved
**IDN?*	Read device id	TYPE FW-VERSION SERIENNUMMER zB: *PSC8-USB 1.8 #SN3xxxx*
RATE x	Define sample rate Range x = 10...5000 [ms] Default*: 1000[ms] ~> 1[Hz]*	#Rate=x ms #Error: Rate-Range
RATE 0	Activate Request-Mode Actual values are read only after manual command „?“ is sent	#Request-Mode active
TX x	Enable/disable serial output x = 0: deactivate output x = 1: enable output	#TX OFF / #TX ON
?	Request values	
*RST	Restore default values	#RESET
SCAN_A x	Define a scanlist (channel list) binary value, each bit corresponds to a channel, see next page	-
TARA	Perform zero compensation measurement	#TARA
FILTER x	Exponential filter setting x = 0: automatic through „RATE” setting x > 0: IIR filter in [ms]	#FILTER
CAN_ID x	Set CAN-ID	#OK
CAN_IT x	Set the frame format x = 0: Normal (11bit, CAN 2.0A) x = 1: Extended (23bit, CAN 2.0B)	#OK
CAN_SPEED x	x=0: 125 kBaud x=1: 250 kBaud x=2: 500 kBaud x=3: 1 MBaud	#OK
CAN?	Request CAN configuration	#ID:0x[...]_Speed:[baud]_IT:[0,1]

A command is always terminated with a line break (CR or LF or CR+LF).

The sensor numbering starts in all cases with the number "1".

The values in the "Calibration" and "Scanlist" area can be changed during operation. These parameters remain valid as long as the scanner is connected to a power supply.

Only after the EE_SAVE command has been sent, the parameters are stored permanently and are available even after the power supply has been switched off.

Channels that are not used can be defined and deactivated via a so-called scan list (`SCAN_A`).

or this purpose, the binary listing of the individual channels is converted into a decimal number ("x") and transmitted to the print scanner with the `SCAN_A x` command.

The reset command `*RST` automatically reactivates all channels.

As an example, configuration options of the scan list are shown in the following table:

Channel (Scan_A)	**1**	2	3	**4**	**5**	**x**
Ex. a)	**1 (ON)**	0 (OFF)	0 (OFF)	0 (OFF)	0 (OFF)	**1**
Ex. b)	**1 (ON)**	**1 (ON)**	**1 (ON)**	0 (OFF)	0 (OFF)	**7**
Ex. c)	0 (OFF)	0 (OFF)	0 (OFF)	**1 (ON)**	**1 (ON)**	**24**
Ex. d)	**1 (ON)**	**1 (ON)**	**1 (ON)**	**1 (ON)**	**1 (ON)**	**31**

Caution: *By default, all channels are activated and transmitted in ascending order. While using the scanlist, deactivated channels are skipped to reduce overall data volume.*

If, for example, channels 1, 3, and 5 are in use, they will be sorted in ascending order and transmitted at places 1, 2 and 3.

EG Konformitätserklärung

EU Declaration of Conformity

Name des Herstellers:	SVMtec GmbH
Name of Manufacturer:	Ingenieurbüro für Strömungsmechanik, Versuchs- und Messtechnik
Anschrift des Herstellers:	Bergnelkenstr. 7
Adress of Manufacturer:	70563 Stuttgart (Germany)

Für das folgende Produkt wird hiermit bestätigt, dass es den Schutzanforderungen entspricht, die in den Richtlinien des Rates zur Angleichung der Rechtsvorschriften der Mitgliedstaaten bezüglich elektromagnetischer Verträglichkeit (2004/108/EG) festgelegt sind:

It is hereby confirmed in respect of the following designated product that it comply with protection requirements specified in the Directive of the Council for Harmonization of the Statutory Provisions of the Member States for Electromagnetic Compatibility (2004/108/EG):

Bezeichnung / name:	SVM / Mehrkanaldruckscanner der PSC-Serie ***SN 46000 - 46999***

Zur Beurteilung des Produkts wurden folgende harmonisierte Normen herangezogen:

Reference was made to the following harmonised standards:

EN 61326-1:2006	Elektrische Mess-, Steuer-, Regel- und Laborgeräte EMV-Anforderungen - Teil 1: Allgemeine Anforderungen

Stuttgart, den 04.08.2022

Dr.-Ing. Detlef Bergmann (Geschäftsführer)