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PSC8



PSC16



PSC24

1. GENERAL DESCRIPTION

The pressure scanners from the PSC series are suitable for simultaneous acquisition of multiple pressure signals. The standard variants PSC8, PSC16 and PSC24 allow the connection of 8, 16 and 24 differential pressures respectively.

The PSC series is a very flexible system and can be customized. Up to 3 different pressure ranges can be realized in one device. The number of reference ports can also be defined by the customer. By default, the reference pressures of all channels are combined on one port. However, it is also possible to group the reference ports or to give each channel its own reference port.


For all interfaces except CAN, data is transmitted as ASCII text in the unit Pascal [Pa]. By means of a simple protocol the transmission rate can be set in the range between 1 and 100Hz (PSC8) or 50Hz (PSC16, PSC24).

A TARA function for automatic deduction of the offset can be triggered either by pressing the TARA button on the back panel or via a software command. The 8-channel version is optionally available with built-in solenoid valves, which allows automatic zeroing of the sensors when pressure is applied.

The pressure scanner is powered via the USB port. For the version with solenoid valves and CAN or LAN interface an external power supply is necessary (7-24VDC, 1A), which is included in delivery.

The USB pressure scanners register themselves in a PC-system as a virtual COM port. Thus, any software that supports the RS232 protocol can be used. The network variant sends the data via TCP-IP. A direct connection can be established via Telnet (port 10001). (Under Windows for example via the program putty.exe). If LabVIEW® (National Instruments) is used, the use of the VISA class is recommended, because it allows access to USB devices as well as to the network devices.

Drivers for LabVIEW® are included in the scope of delivery.

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2. TECHNICAL DESCRIPTION

2.1. PRESSURE RANGES

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

Mode *)	Range	Unit	Range	Unit	Range	Unit	Suffix
B/U	125	Pa	1,25	mbar	0,0181	PSI	125
B/U	250	Pa	2,5	mbar	0,0363	PSI	250
B/U	500	Pa	5	mbar	0,0725	PSI	500
B/U	1	kPa	10	mbar	0,145	PSI	1000
B/U	1,25	kPa	12,5	mbar	0,1813	PSI	1250
B/U	2,5	kPa	25	mbar	0,3625	PSI	2500
B/U	5	kPa	50	mbar	0,725	PSI	5000
B/U	7,5	kPa	75	mbar	1,0875	PSI	7500
B/U	10	kPa	100	mbar	1,45	PSI	10000
B/U	15	kPa	150	mbar	2,175	PSI	15000
B/U	20	kPa	200	mbar	2,9	PSI	20000
B/U/A	35	kPa	350	mbar	5,075	PSI	35000
A	50	kPa	500	mbar	7,25	PSI	50000
B/U/G/A	100	kPa	1	bar	14,5	PSI	100E3
G/A	200	kPa	2	bar	29	PSI	200E3
G	300	kPa	3	bar	43,5	PSI	300E3
G/A	400	kPa	4	bar	58	PSI	400E4
G	700	kPa	7	bar	101,5	PSI	700E3
G	1000	kPa	10	bar	145	PSI	10E5
G	1600	kPa	16	bar	232	PSI	16E5

*) Mode:


B: Bidirectional differential (measuring range from -range to +range)

U: Unidirectional differential (measuring range from 0 to +range)

G: Unidirectional referenced to ambient pressure (gauge) (measuring range from 0 to +range)

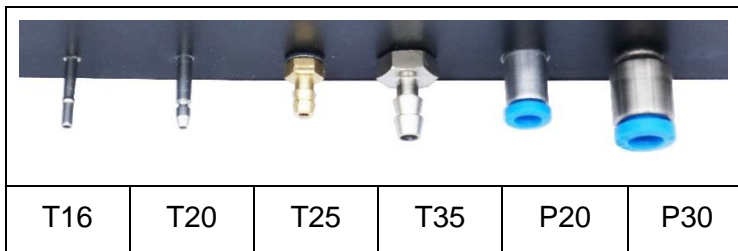
A: Absolute pressure (referenced to vacuum)

The measurement uncertainty is 0.25% of the measuring range (span min max). During factory calibration, a deviation from the nominal value significantly smaller than 0.1% of the measuring range is achieved.

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2.2. PRESSURE PORTS

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



Some ports are not suitable for all pressure ranges. For packaging reasons there are additional restrictions for the PSC24 devices.

Ref.	Diameter [mm]	Tube type (recommended)	Inner tube diameter [mm]	Max. pressure	Suitable for
T16	1,6	Silikon, PE, PVC	1,0 ... 1,5	100kPa	All versions
T20	2,0	Silikon	1,5 ... 1,8	35kPa	All versions
T25	2,5	Silikon	1,8 ... 2,2	35kPa	All with a common reference
T35	3,5	Silikon	2,2 ... 3,0	15kPa	All with a common reference
P20	2,0	PE, PU, PA		1,6MPa	All with a common reference
P30	3,0	PE, PU, PA		1,6MPa	PSC8, PSC16

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2.3. HOUSING

Frontpanel

The front panels are available in various designs. Both the grouping of the reference pressure ports and the type of ports can be customized.



24 pressure ports with shared reference




24 pressure ports with individual reference ports



Customized version with 2 channel groups



Customized version with additional high pressure ports

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Backpanel

On the back panel are the electrical connections, the interfaces and the "TARA" button.



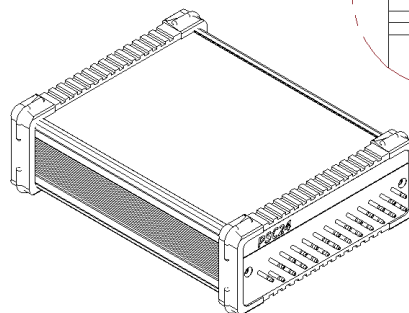
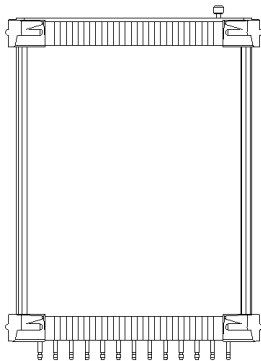
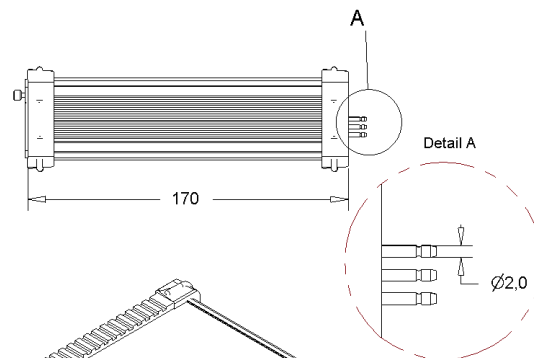
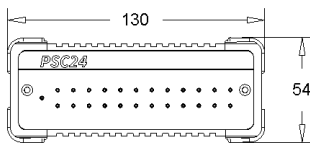
USB and LAN interfaces



USB and RS232 interfaces



USB and CAN Interfaces



2.4. INTERFACES

All devices have a USB interface as standard. The following additional interfaces are available as options:

- LAN
- RS232
- CAN

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

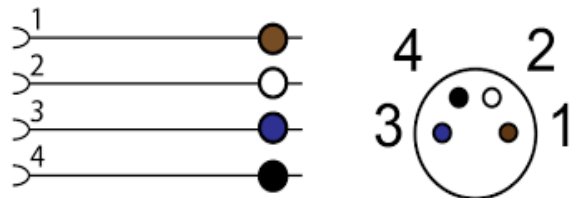
For operation with CAN bus, the power supply must be provided by an external power supply unit.

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



RS232

SubD – RS232 Pinout

Pin	Function
2	TX
3	RX
5	GND

Power supply

Pin	Function	Pin
1	+ Supply (7-24V)	Middle pin
2	- Supply (GND)	Shield




The USB versions (PSC8/16/24-USB) and the CAN variants (PSC8/16/24-CAN) are supplied with power directly via the USB interface from the PC or via the CAN interface. The variant with solenoid valves and the network variants (PSC8/16/24-LAN) require an external supply of 7-24V with 1A.

Hardware-Trigger (optional)

For devices with trigger input, a trigger signal can be applied to the BNC connector on the rear of the device to synchronize measurements with other devices. To activate the trigger function, the sampling rate must be set to zero via the "RATE 0" command.

The rising edge of the trigger signal triggers the acquisition of the measured values and the data transmission.

The trigger input is galvanically isolated.

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BNC

Pin	Function	Pin
1	+ Trigger (3-24V)	Middle pin
2	- Trigger (GND)	Shield



2.6. ENVIRONMENTAL CONDITIONS

Temperature	5° C...50° C
Humidity	0...95%, non condensing
Medium	Air and 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

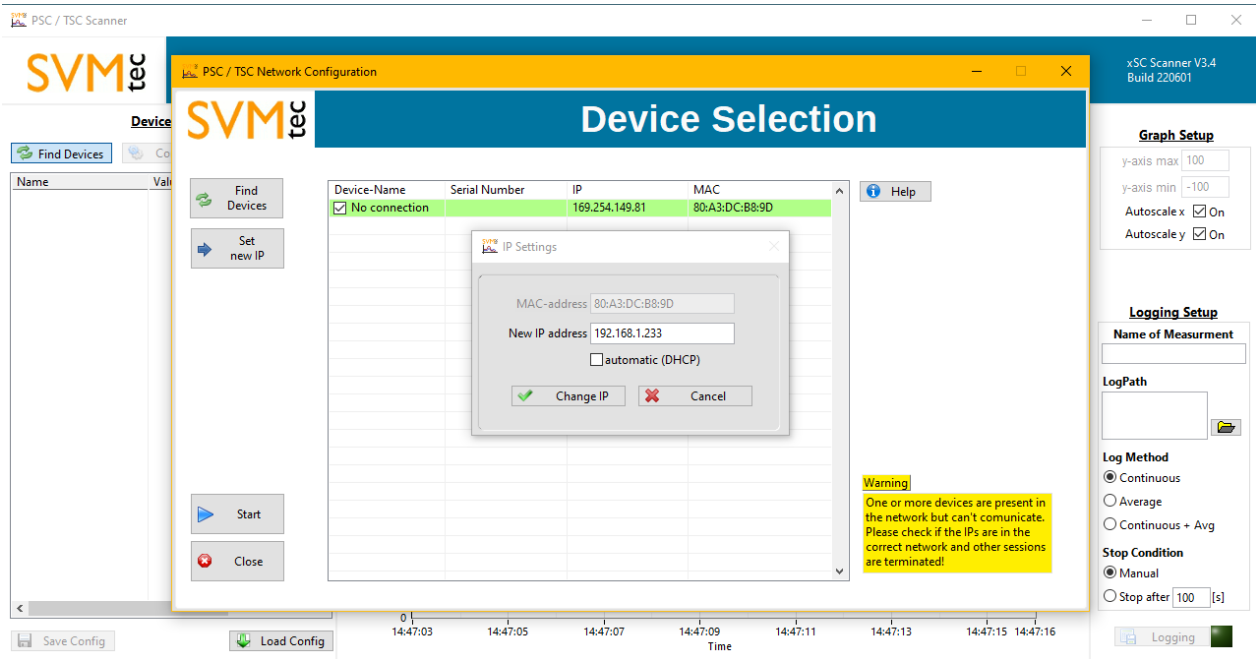
As soon as the device is connected to the computer via the USB port, a virtual COM port is created. Thus it can be used with any program that supports the RS-232 protocol.

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

For configuration of the network version, the supplied software xSC-Logger can be used. With the program PSCx-LAN devices can be found in the network and the IP addresses can be changed.

(Find Devices -> Set new IP)

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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 sensor 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 SERIAL No e.g.: 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

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TX x	Enable/disable serial output x = 0: deactivate output x = 1: enable output	#TX OFF / #TX ON
?	Request values	0.00 0.00 0.00 ...
*RST	Restore default values	#RESET
SCAN_A x SCAN_B x SCAN_C x	Define a scanlist (channel list) binary value, each bit corresponds to a channel, see Table 4	#OK
TARA	Perform zero compensation measurement	#TARA
FILTER x	Exponential filter setting x = 0: automatic through „RATE” setting x > 0: IIR filter in [ms]	#FILTER
MUX x	Input multiplexer switch (only available in MUX-versions) MUX 0 deactivates all inputs	#MUX x
MUX?	Read current MUX settings	#MUX 11010001

- only PSC-CAN versions -		
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. In each case 8 channels are summarized in a list. The PSC24 scanner thus has three separate lists (SCAN_A, SCAN_B and SCAN_C), while the PSC8 only evaluates the first scan list (SCAN_A).

For 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_n x command.

The reset command *RST automatically reactivates all channels.

As an example, the following table shows configuration options for the first two scan lists.

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Channel (Scan_A)	1	2	3	4	5	6	7	8	x
Ex. a)	1 (ON)	0 (OFF)	0 (OFF)	0 (OFF)	0 (OFF)	0 (OFF)	0 (OFF)	0 (OFF)	1
Ex. b)	1 (ON)	1 (ON)	1 (ON)	0 (OFF)	0 (OFF)	0 (OFF)	0 (OFF)	0 (OFF)	7
Ex. c)	1 (ON)	1 (ON)	1 (ON)	0 (OFF)	0 (OFF)	0 (OFF)	0 (OFF)	1 (ON)	135
Ex. d)	1 (ON)	1 (ON)	1 (ON)	1 (ON)	1 (ON)	1 (ON)	1 (ON)	1 (ON)	255

Table 4 Example for calculation the scanlist-value x

Channel (Scan_B)	9	10	11	12	13	14	15	16	x
Ex. a)	1 (ON)	1 (ON)	0 (OFF)	0 (OFF)	0 (OFF)	0 (OFF)	0 (OFF)	0 (OFF)	3
Ex. b)	0 (OFF)	0 (OFF)	0 (OFF)	0 (OFF)	0 (OFF)	0 (OFF)	0 (OFF)	1 (ON)	128
Ex. c)	1 (ON)	1 (ON)	0 (OFF)	0 (OFF)	1 (ON)	1 (ON)	0 (OFF)	1 (ON)	179
Ex. d)	0 (OFF)	0 (OFF)	1 (ON)	1 (ON)	1 (ON)	1 (ON)	1 (ON)	1 (ON)	252

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 10, 22, 23 and 24 are in use, they will be sorted in ascending order and transmitted at places 1, 2, 3 and 4.

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EG Konformitätserklärung

EU Declaration of Conformity

Name des Herstellers:	SVMtec GmbH
<i>Name of Manufacturer:</i>	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)