

SCP Slim for engine indication

Signal conditioning system, with optional PiezoSmart

Type 2852B..., 4665B1,
5064E1..., 5271Y51

The 'Signal Conditioning Platform' SCP Slim Type 2852B... is a modular system for the conditioning of a wide range of different measuring signals, such as signals from piezoelectric and piezoresistive pressure sensors. It is specifically well suited for combustion pressure measurements on engine test beds and in-vehicle applications.

The key features for SCP Slim are:

- Modular design for maximum flexibility (up to 16 channels)
- Ethernet interface
- Remote controlled via PC
- Power supply with voltage range from 100 ... 240 VAC and 10 ... 36 VDC
- Improved Graphical User Interface (GUI)
 - Table overview with all amplifier and sensor relevant data
 - Parameters selectable (editing & copying) in table.
 - Via Ethernet easy export function of amplifier settings and TEDS data
 - Histogram of pmax distribution including working cycles
- Signal compatible with all combustion analyzers
- PiezoSmart sensor identification for increased process reliability and improved data quality

Description

The SCP Slim consists of a base unit and functionspecific measuring modules. For combustion pressure measurements and combustion analysis on engines, a wide range of different and interchangeable measuring modules for frontend signal conditioning is available.

If the automatic sensor identification PiezoSmart is used, all relevant data of an individual sensor are stored on a TEDS (Transducer Electronic Data Sheet) and are available for automatic setting of parameters and adjustments.

Process reliability of test procedures and quality of measurement data are significantly improved by simultaneously simplifying test bed setup and test preparations.

Application

With the function-specific modules, measuring tasks within combustion pressure and gas exchange, as well as injection pressure and general pressure measurements are efficiently accomplished.

Due to the small dimensions and low voltage power supply, SCP Slim is well suited for in-vehicle testing.



SCP Slim Type 2852B11 for 2 measuring modules



SCP Slim 19" tray consisting of 2 SCP Slim Type 2852B11 and 2852B01 mounted on support plate Type 5746A12 for 4 measuring modules



SCP Slim consisting of Base-Chassis Type 2852B11 and expansion chassis Type 2852B01 for 8 measuring modules, with optional chassis legs Type 5746A3

Software interfaces for

- FEVIS
- OSIRIS
- A&D CAS
- ONO SOKKI DS-2000
- DEWETRON

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Measure modules for SCP Slim

- Charge amplifier without sensor identification Type 5064E11
- Charge amplifier with sensor identification Type 5064E12 and 5064E13
- Piezoresistive amplifier with sensor identification Type 4665B1
- Bridge amplifier Type 5271Y51



Configuration possibilities of SCP Slim



SCP Slim Type 2852B11



SCP Slim Type 2852B11, with optional chassis legs
 Type 5746A3



SCP Slim 19" tray consisting of 2 SCP Slim Type 2852B11 and 2852B01
 mounted on support plate Type 5746A12 for 4 measuring modules



SCP Slim consisting of base chassis Type 2852B11 and expansion chassis
 Type 2852B01 with optional chassis legs Type 5746A3

2852B_003-204e-03_23

Technical data SCP Slim Type 2852B...

Chassis

Module cards	max.	2
Channels per rack		4
With rack combination	max.	16
Power supply		
Standard (single module)	VDC	10 ... 36
Standard (cascading up to 4 modules)		11 ... 36
With external power supply	VAC	100 ... 240, ±10 %
Power consumption max.	W	20
Inrush current (Main with 3 Extensions)	A	≈13
Degree of protection	IP	40
Fuse		8A slow-blow (SPT)
Operating temperature range ¹⁾	°C	0 ... 50
Min. / max. temperature range ¹⁾	°C	–40/50
Dimensions Type 2852B01		
Height	HE (mm)	1 (41)
Width	mm	220
Depth	mm	230
Weight	kg	≈1.6
Software	Graphical User Interface (GUI) COM components for Microsoft Windows 10, 11	

¹⁾ non condensing

Connections on rear side

Analog output/interface (integrated)

Analog outputs		4
Voltage	V	0 ... ±10
Current (per channel)	mA	0 ... ±2
Error	%	<±0.1
Trigger output (optocouplers)		
High	V	>2.4
Low	V	<0,8
Pull-up on +5 V RS	kΩ	10
Connection	Type	D-Sub 37 pin neg.

Communication interface

Interface	Type	RS-232C
Connection	Type	D-Sub 9 pin neg.
Interface	Type	Ethernet
Connection	Type	RJ-45

CAN bus interface

Number	1
Max. transmission rate	1 Mbit/s max.

Digital I/O

Digital I/O Trigger / Operate	–	Trigger via optocoupler on analog output guided connection
High	V	3 ... 30
Low	V	<2
Current input High	mA	2 ... 29
Pull-up on +24 V (connectable)	kΩ	10
Pull-down on DGND (connectable)	kΩ	1
Connection	Type	D-Sub 9 pin neg.
Digital output DOUTA1 ... B4	–	isolated solid with PhotoMos relay
Current load (continuous)	mA	<100
Voltage (continuous)	V	<±42
Voltage for external devices	V	24
Current draw max.	mA	50
Connection	Type	D-Sub 15 pin neg.

Technical data valid for all modules

All values for setting the parameters are stored in a nonvolatile data memory and are automatically loaded on initial startup. Operating the system and setting the parameters are performed exclusively with a PC via GUI or with a host computer.

Operating temperature range ¹⁾	°C	0 ... 60
Min./max. temperature	°C	-40/60
Vibration resistance (20 ... 2 000 Hz, duration 16 min, cycle 2 min)	gp	10
Shock resistance (1 ms)	g	200
Sound resistance	dBA	120
Degree of protection (EN 60529)	IP	40
Front panel dimensions	mm	106.5x35.0
	TE	7

¹⁾ non condensing

Charge amplifier Types 5064E11, 5064E12, 5064E13

The amplifier modules Types 5064E11, 5064E12, 5064E13 are microprocessor controlled 2-channel charge amplifiers with analog signal conditioning. The Types 5064E12, 5064E13 include the function for automated sensor identification (PiezoSmart).

These amplifiers enable the recording of sensor operating hours and pressure cycles when using PiezoSmart sensors. In addition they have the ability to determine when a cylinder pressure sensor is exposed to extreme operating conditions. Important information such as sensor operation hours, pressure cycles and pMax can be calculated and automatically saved to the TEDS chips (Transducer Electronic Data Sheet) located in the sensor connector. The recorded pMax-values are classified in 6 different pressure ranges, (<100 bar/<150 bar/<200 bar/<250 bar/<300 bar/≥300 bar) which give a clear indication of the sensor load profile during the application.

A further feature is the cyclic detection of the pMax values, the output of which is a digital signal via the CAN bus interface (CAN2) of the SCP. In addition, the pMax values are output as an analog signal via the analog outputs (C and D).

The pMax detection range corresponds to the double pressure range of ±2FS. The scaling of the detection range is adjustable between ±2FS and ±1FS. (Type 5064D has a fix scaling of ±1FS)

Along with the input of the sensor-specific data, the parameterization allows the selection of different low-pass filters as well as a -8 V offset with simultaneous amplification of the signal by a factor of 1,8 for a better utilization of analogue inputs with -8 ... 10 V.

LEDs on the module indicate the following operating conditions:

- Exceeding the overload threshold
- Drift compensation with cycle detection (Drco/short, Drco/long)
- Measure/reset

The amplifier has separated input grounds of channel A and channel B in order to prevent signal interference. A differential amplifier stage prevent ground loops between any input ground and the output ground.



Type 5064E12

Technical data

Charge amplifier Type 5064E1...

Number of channels		2
Measuring range	pC	±100 ... 100 000
Error (0 ... 60 °C)	%	<±0.5
typical (25 °C)	%	±0.1
Measuring models	Short, Long, Drco*/Short, Drco*/Long	
Drift 'Long'		
at 0 ... 60 °C	pC/s	<±0.2
at 25 °C	pC/s	<±0.05
typical	pC/s	<±0.03
Reset-operate transition	pC	<±1.5
Time constant ('Long')	s	>100 000
Drift compensation	1/min	≈100 ... 20 000
Output voltage	V	0 ... ±10
Output current	mA	0 ... ±2
Output impedance	Ω	10
Zero point error (reset)	mV	<±5
Output noise (0,1 Hz ... 1 MHz)	mV _{pp}	<8
typical	mV _{pp}	<4
Frequency range (20 V _{pp} , -3 dB)	kHz	≈0 ... >200
Group delay time	μs	<3
Low-pass filter (Butterworth, 2 nd order, selectable, -3 dB)	kHz	0,3/1/3/5/10/ 30/50/100/off
'Overload' threshold	V	≈±11
Offset adjustable (gain 1,8)	V	-8,0 ±0.04
Crosstalk attenuation chan. A, chan. B	dB	>60

Technical data (continuation)

pMax function

pMax detection range			
(adjustable scaling)	FS		$\pm 1/\pm 2$
pMax output (digital)	-		CAN bus
Frequency range	kHz	3/5/10/30/50/100	
Resolution	bit		12
pMax output (analog)	-		channel C & D
Frequency range	kHz	3/5/10/30/50/100	
Recording on TEDS			
Frequency range	kHz		0 ... ≈ 100
Speed range (4 clock engine)	1/min		100 ... 20 000
Errors absolute	%FS		± 2
Power supply (module)	-		via SCP
Weight	kg		≈ 0.42

Connections

	Type	
Signal inputs	5064E11	BNC neg.
	5064E12*	TRIAx pos.
	5064E13*	Fischer TRIAX pos.
Signal outputs		BNC neg.
Actuation, outputs, supply		64 pin DIN41612

* with automated sensor identification PiezoSmart

Piezoresistive amplifier Type 4665B1

The measuring module Type 4665B1 is a microprocessor-controlled 2-channel amplifier for piezoresistive sensors with analog signal conditioning. The amplifier is particularly recommended for high-accuracy measurements with temperature digital compensated and analog compensated sensors.

- Automatic sensor identification PiezoSmart
- Compatible with all piezoresistive pressure sensors from Kistler
- Analog signal output for pressure and temperature
- Digital signal output for temperature via CAN-BUS
- Support of digital temperature compensation for maximum measuring accuracy
- Simple absolute pressure adjustment
- Recording of working time synchron with charge amplifier Type 5064E1... or via trigger signal

This measuring module is used for signal amplification of piezoresistive pressure sensors and is used typically for measuring injection pressure or hydraulic oil pressure as well as the pressures in the inlet/exhaust of combustion engines.



Technical data

Piezoresistive amplifier

Type 4665B1

Number of channels	-	2
Gain	-	10 ... 270
Additional gain	-	1 ... 10 (in 0.1)
Error (0 ... 60 °C)	%	$< \pm 0.3$
typical (25 °C)		
Group delay (Input-Output)	μ s	< 5
Output voltage	V	0 ... ± 10
Output current	mA	0 ... ± 2
Output impedance	Ω	10
Zero point adjustment range		
referred to input	mV	-100 ... 500
Output interference signal		
(0,1 Hz...1 MHz) amp. ≤ 100 filter off	mV _{pp}	
(0,1 Hz...1 MHz) amp. ≤ 100 filter 30 kHz	mV _{pp}	
(0,1 Hz...1 MHz) amp. ≤ 270 filter off	mV _{pp}	
(0,1 Hz...1 MHz) amp. ≤ 270 filter 30 kHz	mV _{pp}	
Frequency range (20 V _{pp} , -3 dB)	kHz	0 ... > 90
up to amplifier 10 ... 270 kHz		
Low-pass filter (Butterworth, 2 nd order, selectable, -3 dB)	Hz	10,30,100,300
	kHz	2,3,10,30
Linearity adjustment, second power	%	-3 ... 3 (in 0.1)
'Overload' threshold	V	$\approx \pm 11$
Temperature output analog		
Sensitivity	mV/°C	10
Frequency	Hz	1
Max. error	°C	± 2.5
Temperature output digital		
Temperature output	-	CAN bus
Frequency range	kHz	0 ... ≈ 5
Resolution	bit	12
Additional zero point shift	V	-8 or -10
Power supply (module)	-	via SCP
Weight	kg	0.32

Sensor

Sensor supply (I ref)	mA	1 or 4
Maximum load (I ref: 4 mA)	k Ω	5
Maximum load (I ref: 1 mA)	k Ω	20

Interface, sensor detection

Connection according to IEEE 1451.4	-	-
Max. length for extension cable	m	10
Temp. range for PiezoSmart-coupling	°C	-20 ... 85

Connections

Signal inputs	Type 103 (Fischer, 5 pin)
Signal outputs	Type BNC neg.
Actuation, outputs, supply	Type 64 pin DIN41612
Signal inputs and outputs (trigger for working time recording, temperature)	Type D-Sub 9 pin neg.

Bridge amplifier Type 5271Y51

This 2-channel bridge amplifier has two differential inputs and is designed for bridge sensors and especially for strain gauge sensors.

The amplifier provides an adjustable and stabilized voltage supply for piezoresistive sensors. High bandwidth electronics with selectable filters ensure that the Type 5271Y51 can be utilized in a wide range of applications

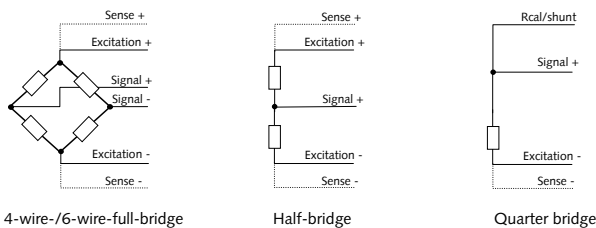


Type 5271Y51

Product features

- For universal applications for strain gage sensors and piezoresistive sensors with voltage excitation
- Variable bridge excitation 1 ... 12 Volt
- Voltage amplifier (with variable gain up to 5 000)
- Automated zero adjustment (tare)
- Prepared for automatic sensor identification (PiezoSmart)

The bridge amplifier Type 5271Y51 is suitable for the following connections:



4-wire/-6-wire-full-bridge

Half-bridge

Quarter bridge

Technical data (continuation)

Number of channels	–	2
Input voltage range (differential)	V	0 ... ±10
Gain	–	0.5 ... 5 000
Input resistance	MΩ	>100
Gain error (0 ... 60 °C)	%	<±0.2
typical (25 °C)	%	±0.05
Zero point error	%	<10 mV
Linearity error	%	<±0.01
Zero adjustment (tare)	%	0 ... ±100

This information corresponds to the current state of knowledge. Kistler reserves the right to make technical changes. Liability for consequential damage resulting from the use of Kistler products is excluded.

Low-pass filter (2 nd order, selectable/Butterworth, –3 dB)	Hz	10/30/100/300
	kHz	1/3/10/30/100

Sensor excitation (bridge voltage)

Sensor excitation voltage	V	1,0 ... 12,0
Voltage error (>2,5 V)	%	<±0,1
Output current	mA	<50

Bridge completion (amplifier internal)

Half-bridge (completion)	Ω	10 000
Quarter-bridge (completion)	Ω	120/350/1 000

Sensor bridge resistance

Sensor excitation	= 1 V	Ω	20 ... 10 000
	= 2.5 V	Ω	50 ... 10 000
	= 5 V	Ω	100 ... 10 000
	= 10 V	Ω	200 ... 10 000

Sensor sensitivity

Sensor excitation	= 1 V	Ω	2 ... 2 000
	= 2.5 V	Ω	0.8 ... 800
	= 5 V	Ω	0.4 ... 400
	= 10 V	Ω	0.2 ... 200

Output signals

Output voltage (short circuit proof)	V	0 ... ±10
Output current	mA	0 ... ±5
Output impedance	Ω	10

Output noise signal

(0.1 Hz ... 1 MHz)

Gain <100	mV _{pp}	<15
Gain <1 000	mV _{pp}	<40
Gain ≥1 000	mV _{pp}	<180

Frequency range (20 V _{pp} , –3 dB)	kHz	0 ... >120
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Power supply (module)	–	via SCP
Weight	kg	≈0.4

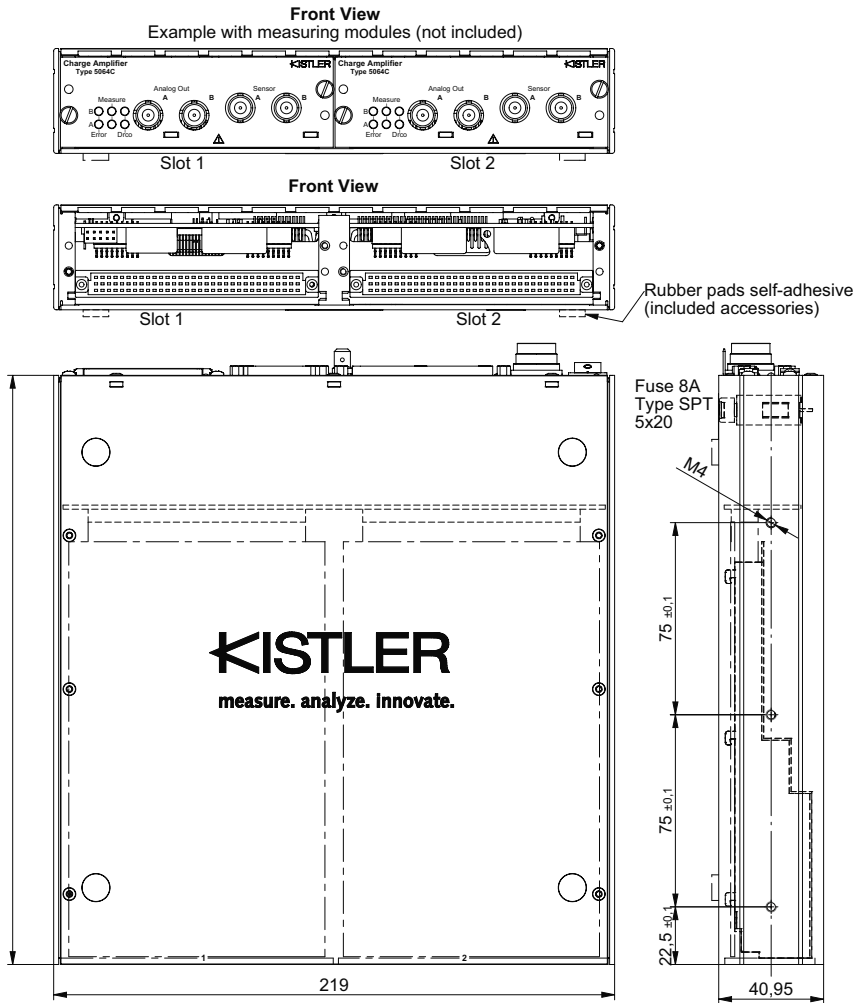
Connections

Voltage output	Type	BNC neg.
Sensor input	Type	D89 female
Actuation, outputs, supply	Type	64 pin DIN41612

Optional accessories

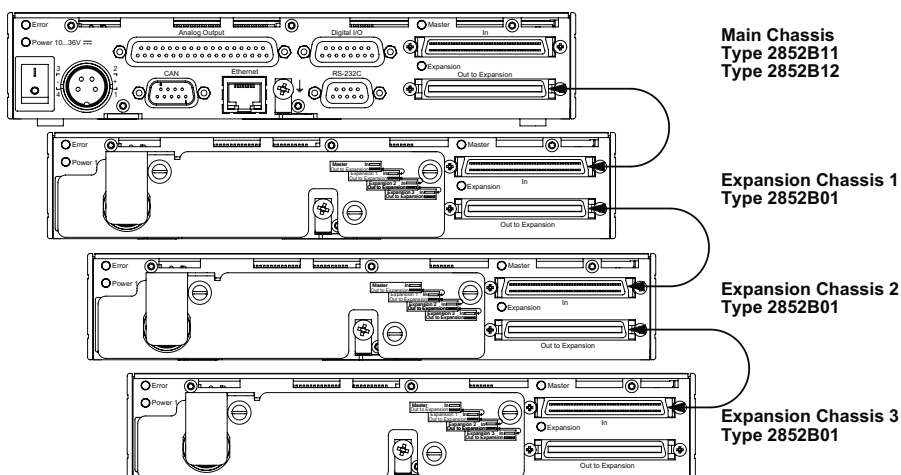
• D-Sub connector 9 pin pos. with soldered connection	Type/Art. No.	7.640.048
• Extension cable D-Sub 9 pin pos. with open ends, L = 5 m		5.590.183
• D-Sub connector 9 pin pos. with screw connection		5.510.337

Dimensions



Cascading for SCP Slim

Rear View
System Expansion up to 4 Units, 8-Slot, 16-Channels

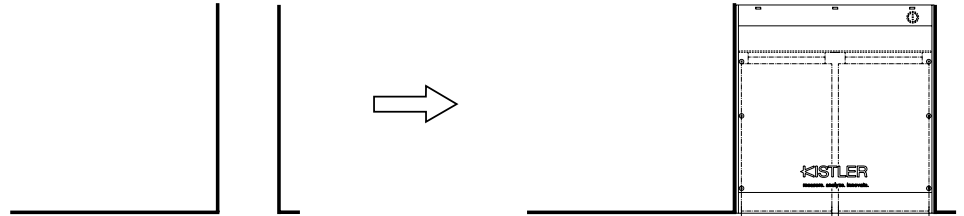


2852B_003-204e-03.23

Expansion facilities for the SCP Slim for the 19" module

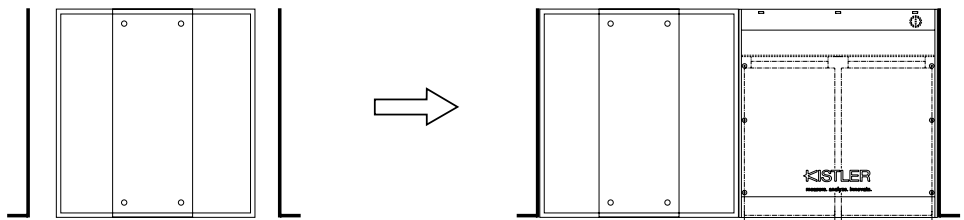
19" mounting kit for 1 SCP Slim, Type 5746A10

19" mounting kit consisting of 2 brackets for mounting an SCP Slim Type 2852B... in a 19" rack.



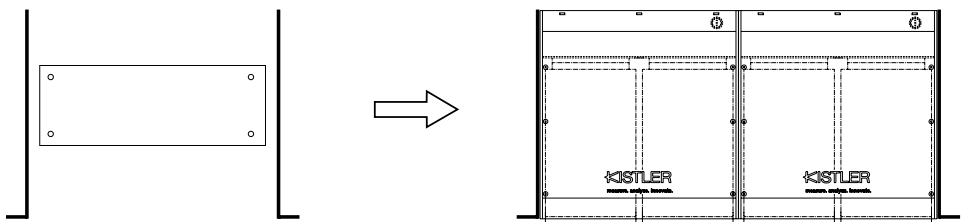
19" mounting kit for 1 and 2 SCP Slim, Type 5746A11

19" mounting kit consisting of 1 empty case and 2 brackets for mounting an SCP Slim Type 2852B... in a 19" rack. This kit includes a base plate which can be used for mounting a second SCP Slim in a 19" rack.



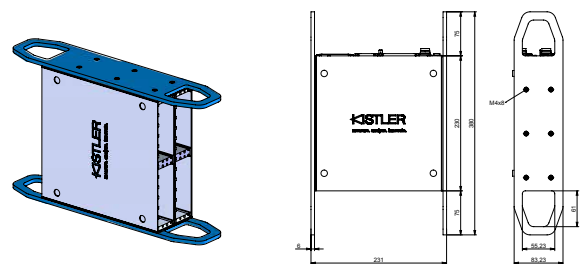
19" mounting kit for 2 SCP Slim, Type 5746A12

19" mounting kit consisting of 2 brackets and 1 base plate for mounting 2 SCP Slim Type 2852B... in a 19" rack.



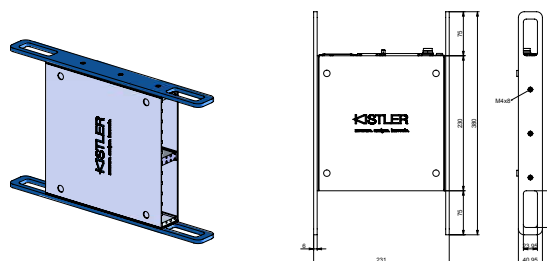
Connecting plates set for 2 x SCP Slim, Type 5746A8

Mounting kit consisting of 2 connecting plates for compact mounting of 2 x 2852B...



Connecting plates set for 1 x SCP Slim, Type 5746A7

Mounting kit consisting of 2 connecting plates for compact mounting of 1 x 2852B...



2852B_003-204e-03.23

Included accessories

for SCP Slim

- Power cable on request
- Ethernet cable to connect SCP and PC/ Host (not included with extension rack Type 2852B01) 65010017
- Power supply (AC Adapter) 90 ... 260 VAC/50 ... 60 Hz, only for Type 2852B12 5781A1
- Expansion-kit for cascading SCP Slim (cascading cable l = 0,4 m), cover plate for plugs including mounting material, only for Type 2852B01 5746A4
- 4 rubber pads self-adhesive for SCP Slim chassis 5.211.238
- Connector for DC power supply, only for Type 2852B11 5.511.384

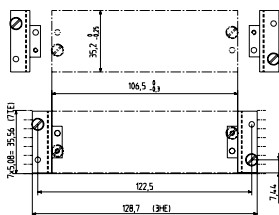
Optional accessories

for SCP Slim

- Adapter BNC neg. → TRIAX neg. 1704A1
- Adapter KIAG 10-32 neg. → TRIAX neg. 1704A2
- Adapter M4x0.35 neg. → TRIAX neg. 1704A3
- Adapter TRIAX pos → BNC pos. 1704A4

- PiezoSmart extension cable for Type 5064E12 (TRIAX neg.–TRIAX pos.) 1987B2,
1987B7,
1987B10
- PiezoSmart connecting cable for Type 5064E13 (Fischer TRIAX neg.–TRIAX pos.) 1987BFT3,5

- Chassis legs 5746A3
- Expansion kit for cascading SCP Slim (cascading cable L = 0.4 m), cover plate for plugs including mounting material 5746A6
- Adaption kit to fit SCP Slim Modules into SCP Types 2853B... 5746A5



2852B_003-204e-03_23

Optional accessories

- Power supply (AC adapter) 90 ... 260 VAC/50 ... 60 Hz 5781A1
- Null modem cable to connect SCP and PC/Host via RS-232C 1200A27
- USB/RS-232C adapter 2867
- TEDS editor for PC 2839A-01-003
- D-Sub connector 37 pin (pos.) 7.640.062
- Remote switch (measure/reset) connectable to digital I/O interface Z20979
- Remote switch, L = 2.0 m (measure/reset) connectable to digital I/O interface Z20979-10

Order form with ordering code

SCP Slim chassis (without modules)

Type 2852B

Associated facility 10 (11) ... 36 VDC

2 slot expansion chassis	01
2 slot base chassis	11
2 slot base chassis with external AC adapter	12

Modules for SCP Slim

Number	Type	Description
_____	4665B1	2 channel piezoresistive amplifier with sensor identification
_____	5064E11	2 channel charge amplifier without sensor identification, signal input: BNC
_____	5064E12	2 channel charge amplifier with sensor identification, signal input: TRIAX
_____	5064E13	2 channel charge amplifier with sensor identification, signal input: Fischer TRIAX
_____	5271Y51	2 channel bridge amplifier
_____	5700A27	Dummy front plate for SCP Slim

19" mounting kit

_____	5746A10	for 1 SCP Slim
_____	5746A11	for 1 and 2 SCP Slim
_____	5746A12	for 2 SCP Slim

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