

# SCP for Combustion Engines

## Signal Conditioning System, with optional PiezoSmart®

Types 2853A..., 2854A...,  
4665, 5064B...,  
5225A1, 5227A...,  
5247, 5271, 5613A...,  
5269

The "Signal Conditioning Platforms" SCP and SCP Compact are modular systems for the conditioning of a wide range of different measuring signals, such as signals from piezoelectric and piezoresistive pressure sensors. They are specifically well suited for combustion pressure measurements on engine test beds and in-vehicle applications.

The key features for SCP and SCP Compact are:

- Modular design for maximum flexibility (up to 32 channels)
- Improved interference resistance of measuring signals
- Remote controlled via any PC
- Power supply with voltage range from 100 ... 240 VAC and 10 ... 36 VDC
- Graphical User Interface (GUI)
- Function and signal compatible with all combustion analyzers
- PiezoSmart sensor identification for increased process reliability and improved data quality

### • Description

The SCP and SCP Compact largely consists of a base unit and function-specific measuring modules. For combustion pressure measurements and combustion analysis on engines, a wide range of different and interchangeable measuring modules for front-end 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.

Though 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 Compact is most suited for in-vehicle testing.



SCP for 8 Measuring Modules Type 2853A...



SCP Compact for 6 Measuring Modules Type 2854A...



SCP Compact for 4 Measuring Modules Type 2854A...

### Available Software Interfaces (in Preparation)

- FEV CAS
- D2T OSIRIS
- A&D CAS
- ONO SOKKI DS-2000
- (AVL INDICOM)
- (DEWETRON)

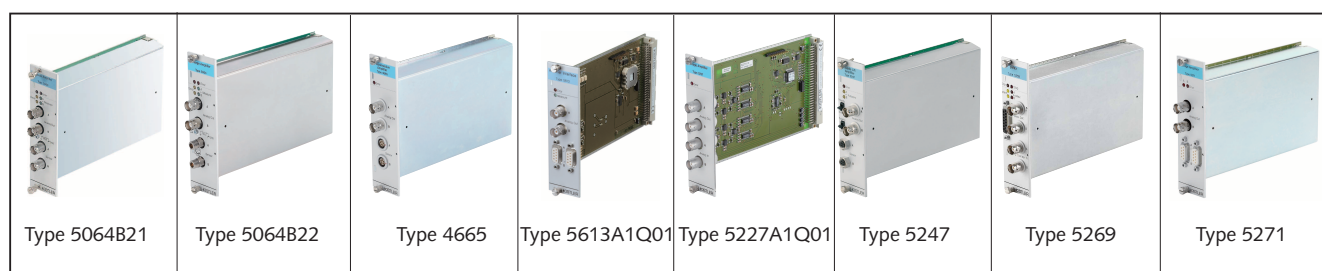
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### Modules for Signal Conditioning System

The following function specific measuring modules are available:

- Charge amplifier without sensor identification Type 5064B21
- Charge amplifier with sensor identification Type 5064B22
- Piezoresistive amplifier with sensor identification Type 4665
- Amplifier interface Type 5613A1Q01
- Voltage amplifier Type 5227A1Q01
- Needle hub amplifier Type 5247
- pMax Module Type 5269
- Bridge amplifire Type 5271

### Available Measuring Modules



### Universal Base Units



SCP 19"-Desktop version Type 2853A120, 8 slots



SCP Compact 19"-Rack mounting Type 2854A111, 6 slots



SCP 19"-Rack mounting Type 2853A110, 8 slots



SCP Compact Type 2854A131, 4 slots

## Technical Data, SCP Base Unit Type 2853A...

### Chassis

Module cards	max.	8
Channels per Rack	max.	16
with rack combination	max.	32
Degree of protection	IP	40
Dimensions 19"-Rack mounting		
Height	HE (mm)	3 (132,5)
Width	TE (mm)	84 (426,7)
Depth (incl. outgoing cable)	mm	min. 350
Weight (without modules)	kg	≈5,6
Software	Graphical User Interface (GUI) COM components for Micro- soft Windows, 2000, XP	

### AC Power Supply

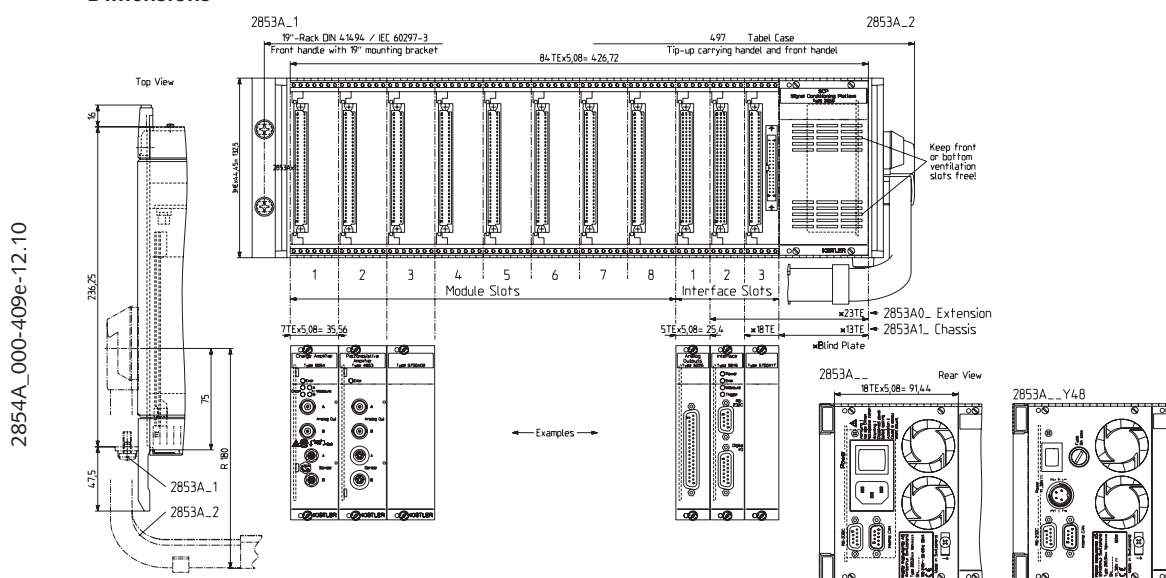
Power	VAC	100 ... 240 ±10%
Power line frequency	Hz	48 ... 62
Power consumption max.	VA	95
Fuse	A	1A (slow-blow) (SPT)
Operating temperature range <sup>1)</sup>	°C	0 ... 60
Min/Max temperature range <sup>1)</sup>	°C	-40/60
Power connector (2P+E, Protection class I)	IEC 320C14	

### DC Power Supply Type 2553A...Y48

Power supply	VDC	11 ... 36
Max. power consumption	W	80
Inrush current	A	≈15
Fuse	8A (slow-blow) (SPT)	
Operating temperature range <sup>1)</sup>	°C	0 ... 50
Min/Max temperature range <sup>1)</sup>	°C	-40/50

<sup>1)</sup> non condensing

## Dimensions



## Technical Data, Interfaces

### Analog Interface Card (Type 5225A1)

Analog outputs	32	
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.

### CPU Interface Card Type 5615 (Type 2853A110 and Type 2853A120)

Interface	Type	RS-232C
Connection	Type	D-Sub 9 pin neg.
Trigger/Operate input (Optokoppler)	–	connected to type 5225A1 via optocouplers (only trigger)
High	V	3 ... 30
Low	V	<2
Current input High	mA	2 ... 29
Pull-up on +24 V (connectible)	kΩ	10
Pull-down on EGND (connectible)	kΩ	1
Connection	Type	D-Sub 9 pin neg.
Digital outputs	–	isolated solid state relay
DOUA1 ... B4		
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, SCP Base Unit Type 2854A...

### Chassis

Module cards	max.	4/6
Channels per Rack	max.	8/12
Power supply		
Standard	VDC	10 ... 36
With external power supply	VAC	100 ... 240 ±10 %
Power consumption max.	VA	70
Inrush current	A	≈15
Degree of protection	IP	40
Fuse	8A (slow-blow) (SPT)	
Operating temperature range <sup>1)</sup>	°C	0 ... 50
Min/Max temperature range <sup>1)</sup>	°C	-40 ... 50
Dimensions Type 2854A111/121 (rack version)		
Height	HE (mm)	2 (88,6)
Width	TE (mm)	84 (426,72)
Depth	mm	min. 400
Dimensions Type 2854A131/132 (table version)		
Height	HE (mm)	107,6
Width	TE (mm)	302,4
Depth	mm	min. 400
Weight (without modules)	kg	≈3,5
Software		
Graphical User Interface (GUI)		
COM components for		
Microsoft Windows 2000, XP		

<sup>1)</sup> non condensing

## Interfaces

### Analog Output

Analog outputs		8/12
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.

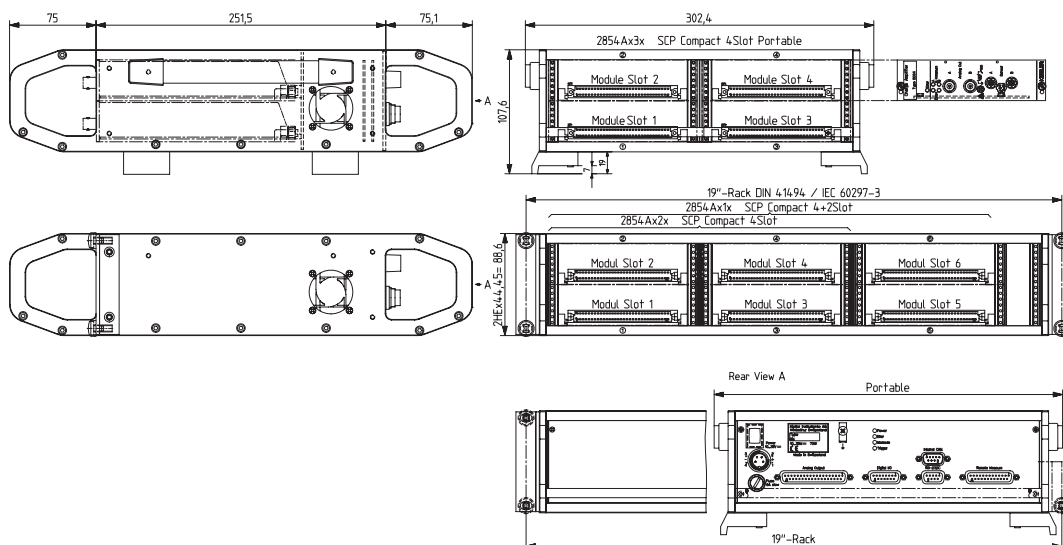
### CPU Interface

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

### Digital I/O

Trigger/Operate input (Optokoppler)	–	Connected to type 5225A1 via optocouplers (only trigger)
High	V	3 ... 30
Low	V	<2
Current input High	mA	2 ... 29
Pull-up on +24 V (connectible)	kΩ	10
Pull-down on DGND (connectible)	kΩ	1
Connection	Typ	D-Sub 9 pin neg.
Digital outputs	–	isolated solid state relay
DOUTA1 ... B4		
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.

## Dimensions



## Technical Data Valid for all Modules

All values for setting the parameters are stored in a non-volatile 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 <sup>1)</sup>	°C	0 ... 60
Min./max. temperature <sup>1)</sup>	°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	128,7x35,0
	HE	3
	TE	7

<sup>1)</sup> non condensing

## Charge Amplifier Type 5064B21

The amplifier module Type 5064B21 is a microprocessor controlled 2-channel charge amplifier with analog signal conditioning.

Apart from the sensor-specific data to be entered, it is also possible to preselect different low-pass filters as well as a -8 V offset with simultaneous signal gain with a factor of 1,8 for full utilization of the analog/digital converter.

LED's on the module indicate the following operating conditions:

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

A differential amplifier stage prevents ground loops in each channel. The connecting screw M2,5 (on the front of the amplifier module) connects the signal ground at the input to the protective ground (instrument case).



## Technical Data

### Charge Amplifier Type 5064B21

Number of channels	—	2
Measuring range	pC	±100 ... ±100 000
Error (0 ... 60 °C)	%	<±0,5
typical	%	<±0,1
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 <sub>pp</sub>	<8
typical	mV <sub>pp</sub>	<4
Frequency range (20 V <sub>pp</sub> )	kHz	≈0 ... >200
Group delay time	μs	<3
Low-pass filter (2 <sup>nd</sup> order, selectable)	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
Common mode noise rejection (0 ... 100 Hz)	dB	>70
Crosstalk attenuation Ch1, Ch2	dB	>70
Power supply (module)	—	via SCP
Weight	kg	≈0,42

### Connections

Signal inputs	Type	BNC neg.
Signal outputs	Type	BNC neg.
Actuation, outputs, supply	Type	64 pin DIN 41612



### Charge Amplifier Type 5064B22

This charge amplifier is a signal conditioning unit which is exactly identical to Type 5064B21 but includes sensor identification. This amplifier enables the recording of sensor operating hours and pressure cycles when using PiezoSmart sensors.

Apart from the sensor-specific data to be entered, it is also possible to preselect different low-pass filters as well as a -8 V offset with simultaneous signal gain with a factor of 1,8 for full utilization of the analog/digital converter.

LED's on the module indicate the following operating conditions:

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

A differential amplifier stage prevents ground loops in each channel. The connecting screw M2,5 (on the front of the amplifier module) connects the signal ground at the input to the protective ground (instrument case).



### Technical Data

Number of channels	—	2
Measuring range	pC	±100 ... 100 000
Error (0 ... 60 °C)	%	<±0,5
typical	%	<±0,1
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 <sub>pp</sub>	<8
typical	mV <sub>pp</sub>	<4
Frequency range (20 V <sub>pp</sub> )	kHz	≈0 ... >200
Group delay time	μs	<3
Low-pass filter (2 <sup>nd</sup> order, selectable)	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
Common mode noise rejection (0 ... 100 Hz)	dB	>70
Crosstalk attenuation Ch1, Ch2	dB	>70
Power supply (module)	—	via SCP
Weight	kg	≈0,42

### Interface, Sensor Detection

Connection according to IEEE1451.4	—	—
Max. length for triax extension cable	m	10
Temperature range for PiezoSmart-coupling	°C	-20 ... 85

### Connections

Signal inputs	Type	TRIAx
Signal outputs	Type	BNC neg.
Actuation, outputs, supply	Type	64 pin DIN 41612

### Piezoresistive Amplifier Type 4665

The measuring module Type 4665 is a microprocessor-controlled 2-channel amplifier for piezoresistive sensors with analog signal conditioning, automatic sensor identification PiezoSmart, adjustable value, supply current sensor and zeropoint.

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

In addition to the input of sensor-specific data, parameter settings also allow selection of three different low-pass filters, a -8V or -10 V.



### Technical Data

Number of channels	—	2
Gain	—	10 ... 270
Additional gain	—	1 ... 10 (in 0,1)
Error (0 ... 60 °C)	%	<±0,3
typical	%	<±0,1
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) Amplif. ≤100 Filter off	mV <sub>pp</sub>	<20
(0,1 Hz ... 1 MHz) Amplif. ≤100 Filter 30kHz	mV <sub>pp</sub>	<10
(0,1 Hz ... 1 MHz) Amplif. ≤270 Filter off	mV <sub>pp</sub>	<40
(0,1 Hz ... 1 MHz) Amplif. ≤270 Filter 30kHz	mV <sub>pp</sub>	<20
Frequency range (20V <sub>pp</sub> ), up to Amplif. 10 ... 270 kHz		0 ... >90
Low-pass filter	kHz	3, 10, 30
Linearity adjustment, second power	%	-3 ... 3 (in 0,1)
"Overload" threshold	V	≈±10,5
Additional zero point shift	V	-8 or -10
or taring range	V	0 ... -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)	kΩ	5
Minimum load (I ref: 1 mA)	kΩ	20

### Interface, Sensor Detection

Connection according to IEEE 1451.4	—	—
Max. length for extension cable	m	10
Temperature 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

## Needle Lift Amplifier Type 5247

The needle lift measurement is used to determine the injection point (start, duration, end) in Diesel engines. In order to be able to measure the needle lift in injection nozzles, the needle holder in the injection nozzle must be fitted with a Hall sensor. The voltage change at the Hall sensors provides information on the movement of the injection needle. The needle lift function is a standard measurand for Diesel engine or injection system development.

The microprocessor-controlled 2-channel needle lift amplifier has differential inputs as well as a power supply for Hall sensors. An automatic zero correction which can be activated provides compensation for the temperature-dependent zero point of the Hall sensor. An autorange device also facilitates amplifier adjustment. Interference suppression is guaranteed by a differential amplifier input stage.



## Technical Data

Number of channels	–	2
Input voltage range, absolute	V	0 ... ±12
Gain		0,8 ... 75
Error		
with gain <2	%	<±1,5
with gain >2	%	<±1
Input voltage range, differential	V <sub>pp</sub>	0 ... 10
Output voltage	V	0 ... ±10
Output current	mA	0 ... ±2
Output impedance	Ω	10
Frequency range (20 V <sub>pp</sub> )	Hz	0 ... 90 000
Adjustable output offset in 1 V steps	V	+1 ... –8
Max. voltage between sensor-GND and output/supply-GND	V	<±50
Power supply (module)	–	via SCP

## Sensor

Supply voltage	V	12
Error	%	<±2
Maximum supply current	mA	15

## Connections

Actuation, outputs, supply	Type	64 pin DIN41612
Sensor	Type	Binder Serie 711
Analog output	Type	BNC

## Automatic Amplifier Adjustment

On activation of the automatic gain adjustment, the output signal is amplified to maximum 80 % of FS (8 V or –8 V). Depending on the output signal, Autorange lasts for several cycles and up to 600 ms. This function is carried out via the CAN bus or by pressing a button. With button actuation a message appears via the CAN bus.

## Automatic Zero Point Correction

The automatic zero point correction determines the cycle period duration of the injections and corrects the output signal in the middle of the period to zero. A single or continuous automatic zero point correction is possible. This function is performed via the CAN bus or at the press of a button. With button actuation, a single zero point correction takes place with a message via the CAN bus.

## Included Accessories

- 2 cable connector 4 pin Binder serie 711

## Art. No.

5.510.419



### pMax Module Type 5269 for Measuring and Monitoring Maximum Pressures

The new two-channel pMax module Type 5269 offers an ideal expansion for the universal Signal Conditioning Platform (SCP) for continuous monitoring and measurement of the cylinder peak pressure pmax on Diesel and spark ignition engines. The SCP charge amplifiers Type 5064B... supply the pMax module with a voltage signal proportional to the cylinder pressure. When a specified threshold value is reached, a warning or a digital emergency stop signal is generated. At the same time, the unit produces an output voltage signal which is proportional to the maximum cylinder pressure of the last combustion cycle. This signal can simply be picked off via the usual analog inputs of the test stand measuring setup. As a result, the pMax module is ideal for the monitoring and measurement of endurance running. Expensive combustion analysis systems can often be replaced. Signal noise, e.g. due to pipe oscillations and valve vibrations, can be effectively suppressed by using a high performance filtering system on the input signal.



### Functional Description

The pressure signal measured, which comes from the amplifier, is investigated with regard to the pmin and pmax values in each combustion cycle. The dataquisition of the pmin and pmax value is done by an analogue peak value memory. These values are recorded and used to determine the peak-peak value of the combustion cycle concerned. A distinction is made between three measuring modes: "peak – peak", "(peak – peak) + pInlet" and "(peak – peak) + const. pInlet". Depending on the measuring method selected, the maximum pressure which is output represents the pure peak-peak value of the combustion cycle or a peak-peak value corrected by either the constant induction-pressure value or the measured induction pressure value. The maximum pressure values measured can be averaged over a selectable number of combustion cycles (n = 1 ... 50) for the analog output. The pressure signal measured is constantly monitored in relation to various criteria. When certain events are recorded, an "emergency stop

signal" is triggered. An action (shutting off the engine, changing the rate of injection etc.) can thereby be initiated manually or automatically. Three thresholds are used for signal monitoring: the min. threshold, the max. threshold and the emergency stop threshold. These thresholds can be set with respect to one another so that a large number of possible situations can be monitored according to individual requirements. A cycle monitoring system investigates the quality of the pressure signal and indicates if a "meaningful" pressure signal is no longer detected, because for example the measuring chain breaks down or the speed drops below 100 1/min. If the max. threshold is exceeded by more than a selectable number (based on the last 50 cycles), an emergency stop is triggered. If the emergency threshold is exceeded on any one occasion, an emergency stop signal is likewise output. Failure of the cycle detection also leads to a stop signal, since in this case monitoring can no longer be guaranteed. In addition, an overload at the input of the pMax module produces an emergency stop. The measurement which has been started with the command "Measure" on the Graphical User Interface (GUI), also continues to run in the event of an emergency stop until a "Reset" is carried out. Analog output of the pmax values can, on the one hand, take place continuously via the two BNC connections (pmax Out) or via SCP analog output card Type 5225A1. On the other hand, the 40 pmax values before and the 10 values after an emergency event are recorded in a memory and remain available until a reset or a new measurement is carried out. This history allows the reasons for an emergency event to be investigated and any appropriate adjustments made. For the monitoring, individual pmax values of a combustion cycle are always observed. The various statuses of the pmax monitoring are additionally visually indicated with LEDs. The various ancillary functions can be utilized using the integral D-Sub 15 neg. connector. For example, the cycle monitoring can be switched off, the analog inlet of the induction pressure measured can be undertaken and an emergency stop circuit via several pMax modules can be set up with the digital output for the emergency signal.

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## Technical Data

### Inputs for pMax Analysis

Number of cylinder pressure channels (input for p cylinders A & B)	–	2
Input for boost pressure (pInlet)	–	1
Analog input voltage (p cylinder A, p cylinder B, pInlet)	V	0 ... ±10

### Signal Processing

Input voltage ranges FS range (3 ranges)	V	0 ... 10 –8 ... 10 –10 ... 10
Speed range	1/min	100 ... >6 000
TP-SC filter (5th order, Bessel)	kHz	5, 10, off
Frequency range with TP filter "off"	kHz	0 ... ≈17
Resolution (AD-converter for all outputs)	bit	12
Number of combustion cycles for creating pmaxppav by averaging pmaxpp	ASP	1 ... 50
Sampling rate per channel (analog peak value memory)	/ASP	1
Number of overranges th_pmax for emergency stop	/50 ASP	1 ... 50
Threshold values for (th_pmax, th_pmin, th_pstop), per channel	–	3
threshold pmax_A, pmax_B	M.U.*	1,0 ... 4 350
threshold pmin_A, pmin_B	%pmax	1 ... 99
threshold pstop	M.U.	1,0 ... 4 350
Input overload at...	V	FS Range ±0,5

### Analog Outputs for Peak-Peak Pressure

Output voltage ranges (pmax Out A/B) selectable	V	0 ... 5 0 ... 10 –8 ... 10 –10 ... 10
Output current	mA	0 ... ±2
Output resistance	Ω	10
Error	%	<±1
Output interference signal (0,1Hz ... 1MHz)	mV <sub>pp</sub>	<10
Zero error	mV	±10

\* M.U. = Mechanical Units (eg. bar)

### Digital Outputs

Digital warning outputs	–	4 (2/Kanal)
Digital stop output	–	1 /Modul
Current loading (constant)	mA	<100
Pulsed current loading (<0,1 s)	mA	<300
Resistance in the powered-up condition	Ω	<50 (typ. 30)
Continuous voltage	V	<±42
Voltage between outputs and protective ground	V <sub>rms</sub>	<30

### Digital Inputs

Cycle monitoring	deactivate	V	3 ... 30
	activate	V	<2
	or Input open		
Trigger current	mA		0,6 ... 9

### General Information

Weight	kg	0,3
Display		
LED for warning signals		
MinChA, MinChB	–	(yellow) 2
MaxChA, MaxChB	–	(red) 2
LED for emergency stop signal		
Stop	–	(red) 1
LED for error display		
Error	–	(red) 1

### Connections

Signal inputs and outputs (boost pressure, Emergency stop etc.)	Typ	D-Sub 15 pin neg.
Signal inputs (input cylinders A & B)	Typ	BNC neg.
Signal outputs	Typ	BNC neg.
Trigger, supply	Typ	64 pin DIN 41612

### Included Accessoires

- D-Sub connector 15 pin pos.  
with soldered connection

**Type/Art. No.**

7.640.049

### Optional Accessories

- D-Sub connector 15 pin pos.  
with screw connection
- Connecting cable BNC pos., l = 0,2 m

**Type/Art. No.**

5.510.422

1601B0,2

## Bridge Amplifier Type 5271

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 5271 can be utilized in a wide range of applications

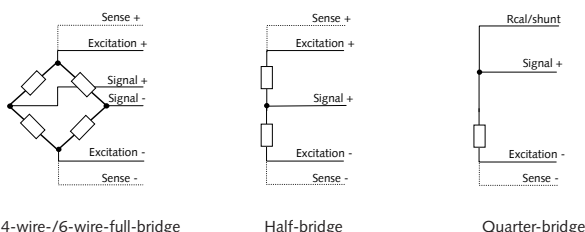


### Product Features

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)
- Automatical zero adjustment (tare)
- Prepared for automatic sensor identification (PiezoSmart®)

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



### Technical Data

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)	%	<±0,1
typical (25 °C)	%	<±0,05
Zero point error	%	<10 mV
Linearity error	%	<±0,01
Zero adjustment (tare)	%	0 ... ±100

Low-pass filter (2nd order, selectable/Butterworth)	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	mV/V	2 ... 2 000
	= 2,5 V	mV/V	0,8 ... 800
	= 5 V	mV/V	0,4 ... 400
	= 10 V	mV/V	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 <sub>pp</sub>	<15
Gain <1 000	mV <sub>pp</sub>	<40
Gain ≥1 000	mV <sub>pp</sub>	<180
Frequency range (20 V <sub>pp</sub> , –3 dB)	kHz	0 ... >120
Power supply (module)	–	via SCP
Weight	kg	≈0,4

### Connections

Voltage output	Type	BNC-neg.
Sensor input	Type	DB9 female
Actuation, outputs, supply	Type	64 pin DIN41612

### Optional Accessories

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

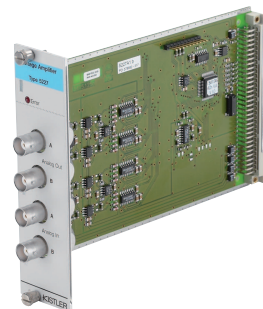
### Amplifier Interface Type 5613A1Q01

The measuring module Type 5613A1Q01 is a microprocessor-controlled 2-channel amplifier with analog signal conditioning and is used for interfacing to external at-side amplifiers or transmitters. With the amplifier interface Type 5613A1Q01, a piezoresistive injection pressure measuring system can be operated with Type 4067...A0/A2 and Type 4618. In this case, the amplifier interface Type 5613A1Q01 supplies the piezoresistive amplifier Type 4618 with its power supply, in which the output signal in Type 5613A1Q01 is simply looped through.



### Voltage Amplifier Type 5227A1Q01

The measuring module Type 5227A1Q01 is a microprocessor-controlled 2-channel voltage amplifier with analog signal conditioning. It is equipped with differential inputs with a common ground and is used mainly when signal sources have different potentials. With four permanently set gain values, it is suited to amplify any voltage signals.



#### Technical Data

Number of channels	–	2
Measuring range	V	±10
Gain	–	1
Error (0 ... 60 °C)	%	<±0,1
Input impedance	kΩ	>300
Output voltage	V	0 ... ±10
Output current	mA	0 ... ±2
Output impedance	Ω	10
Zero point error	mV	<±2
Output interference signal (0,1 Hz ... 1 MHz)	mV <sub>pp</sub>	<10
Frequency range (20 V <sub>pp</sub> )	kHz	0 ... >50
Power supply (module)	–	via SCP
Weight	kg	0,16

#### Power Supply of the At-Site Amplifier

Power supply	VDC	24
Current consumption per at-site amplifier	mA	<45

#### Connections

Signal inputs (on-site amplifier)	Type	D-Sub 9f
Signal outputs	Type	BNC neg.
Actuation, outputs, supply	Type	64 pin DIN 41612
Connecting cable to Amplifier Type 4618A...	Type	1200A29

#### Technical Data

Number of channels	–	2
Measuring range (when gain = 1)	V	±10
Gain, adjustable	–	1/2/5/10
Error (0 ... 60 °C)	%	<±0,5
Input impedance	MΩ	10
Output voltage	V	0 ... ±10
Output current	mA	0 ... ±2
Output impedance	Ω	10
Zero point error	mV	<±10
when gain = 10	mV	<±20
Output noise signal (0,1 Hz ... 1 MHz)	mV <sub>pp</sub>	<10
Frequency range (20 V <sub>pp</sub> )		
–3 dB	kHz	0 ... >50
–5 %	kHz	0 ... >30

Max. voltage between sensor GND and output/supply GND

	V	<±50
Common mode noise rejection (0 ... 100 Hz)	dB	>70
Weight	kg	0,21
Power supply (module)	–	via SCP

#### Connections

Signal inputs	Type	BNC neg.
Signal outputs	Type	BNC neg.
Actuation, outputs, supply	Type	64 pin DIN 41612



### Order form with Ordering Code

Signal Conditioning Platform Base Unit

SCP Type 2853A... und SCP Compact Type 2854A...

Please always place your order with this form.

SCP without Modules	SCP Compact without Modules																																				
<p><b>Ordering Code</b></p> <p style="text-align: right;">Type 2853A <input style="width: 50px;" type="text"/></p> <div style="display: flex; align-items: center;"> <div style="flex: 1;"> </div> <div style="flex: 1; text-align: center;"> </div> </div> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>19"-Rack Mounting</td> <td></td> </tr> <tr> <td>System (Master)</td> <td>110*</td> </tr> <tr> <td>Extension (Slave)</td> <td>010**</td> </tr> <tr> <td>System (Master)</td> <td>110Y48</td> </tr> <tr> <td>DC power supply</td> <td></td> </tr> <tr> <td>Extension (Slave)</td> <td>010Y48</td> </tr> <tr> <td>DC power supply</td> <td></td> </tr> </table> <div style="display: flex; align-items: center;"> <div style="flex: 1;"> </div> <div style="flex: 1; text-align: center;"> </div> </div> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>19" Desktop Version</td> <td></td> </tr> <tr> <td>System (Master)</td> <td>120*</td> </tr> <tr> <td>Extension (Slave)</td> <td>020**</td> </tr> <tr> <td>System (Master)</td> <td>120Y48</td> </tr> <tr> <td>DC power supply</td> <td></td> </tr> <tr> <td>Extension (Slave)</td> <td>020Y48</td> </tr> <tr> <td>DC power supply</td> <td></td> </tr> </table> <p><small>*Integrated: - CPU output with RS-232C interface, Type: 5615 - Analog interface, Typ 5225A1 **Integrated: - Analog output interface, Type 5225A1</small></p>	19"-Rack Mounting		System (Master)	110*	Extension (Slave)	010**	System (Master)	110Y48	DC power supply		Extension (Slave)	010Y48	DC power supply		19" Desktop Version		System (Master)	120*	Extension (Slave)	020**	System (Master)	120Y48	DC power supply		Extension (Slave)	020Y48	DC power supply		<p><b>Ordering Code</b></p> <p style="text-align: right;">Type 2854A <input style="width: 50px;" type="text"/></p> <div style="display: flex; align-items: center;"> <div style="flex: 1;"> </div> <div style="flex: 1; text-align: center;"> </div> </div> <p><b>19"-Rack Mounting</b> Power supply 10 ... 36 VDC</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>6 slots/2HE</td> <td>111</td> </tr> </table> <div style="display: flex; align-items: center;"> <div style="flex: 1;"> </div> <div style="flex: 1; text-align: center;"> </div> </div> <p><b>19"-Rack Mounting</b> Power supply 10 ... 36 VDC</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>4+2 slots/2HE</td> <td>121</td> </tr> </table> <div style="display: flex; align-items: center;"> <div style="flex: 1;"> </div> <div style="flex: 1; text-align: center;"> </div> </div> <p><b>Base Chassis</b> Power supply 10 ... 36 VDC</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>4 slots/2HE</td> <td>131</td> </tr> <tr> <td>4 slots/2HE with external AC-Adapter</td> <td>132</td> </tr> </table>	6 slots/2HE	111	4+2 slots/2HE	121	4 slots/2HE	131	4 slots/2HE with external AC-Adapter	132
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### Modules for the Base Units SCP and SCP Compact

Quantity	Type	
<input type="text"/>	5064B21	2-channel charge amplifier without sensor identification
<input type="text"/>	5064B22	2-channel charge amplifier with sensor identification
<input type="text"/>	4665	2-channel piezoresistive amplifier with sensor identification
<input type="text"/>	5247	2-channel needle lift amplifier for hall sensors
<input type="text"/>	5269	2-channel pMax Module
<input type="text"/>	5271	2-channel bridge amplifier
<input type="text"/>	5613A1Q01	2-channel amplifier interface
<input type="text"/>	5227A1Q01	2-channel voltage amplifier
<input type="text"/>	5700A09	Dummy front plate



• **Included Accessories**

for SCP and SCP Compact

- SCP instruction manual 002-291  
incl. CD-ROM with configuration Software
- Power cable
- Null modem cable wire to connect  
SCP and PC/Host  
(not included with extension rack)
- Power supply (AC Adapter)  
90 ... 260 VAC/50 ... 60 Hz  
only for Type 2854A132
- CAN-Bus connecting cable of the  
extension unit,  
only for Type 2853A010, 2853A020
- Connector for DC power supply,  
only for Type 2853A...Y48, 2854A111,  
2854A121 and 2854A131

**Type/Art. No.**

1200A27

5781A1

5.590.239

5.511.384

• **Optional Accessories**

Input adapter for the connection of piezoelectric sensors with-  
out sensor identification to amplifiers with sensor identifica-  
tion.

for SCP and SCP Compact

- 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
- Adapter M3x0,35 neg. → TRIAX neg. 1704A5
- PiezoSmart Extension cable  
(TRIAX neg. – TRIAX pos.) 1987B...
- CAN-Bus connecting cable of the  
extension unit, l = 0,5 m 5.590.239
- Power supply (AC Adapter)  
90 ... 260 VAC/50 ... 60 Hz  
only for Type 2854A111, 2854A121,  
2853A...Y48 5781A1
- Null modem cable wire to connect SCP  
and PC/Host (cable length 1 ... 10 m) 1200A27sp
- USB/RS-232C Adapter 2867
- TEDS Editor for PC 2839A-01-003
- TEDS Editor for Pocket PC 2839A-01-013
- 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

**Type/Art. No.**