

M14x1,25 Measuring Spark Plug with Integrated 3 mm Cylinder Pressure Sensor

Type 6118C...

The measuring spark plug Type 6118C... enables cylinder pressure measurement without requiring a separate measuring bore. The world's smallest piezoelectric, high temperature cylinder pressure sensor is integrated into the measuring spark plug Type 6118C... The sensor is installed flush-mounted, ensuring that the acoustic natural frequency of the system is approx. 60 kHz. Hence, the Type 6118C... is very suitable for measurements at high engine speeds, or for knock detection applications.

- Modular structure: Sensor cable and ceramics are exchangeable
- High dielectric strength – up to ignition voltages of 40 kV
- Flush-mounted sensor, highest level of accuracy
- Platinum-platinum ignition system for long service life
- A selection of heat values and spark position are available

Description

The Kistler measuring spark plug Type 6118C... is available in various heat values, spark positions, and geometries (examples in Fig. 2 and 3). The electrical connection is made via an SAE cable connector nut, or a CUP cable connector nut. The ceramic insulators are available with a diameter of 7,7 mm, 9 mm or 10,5 mm, as per the requirements.

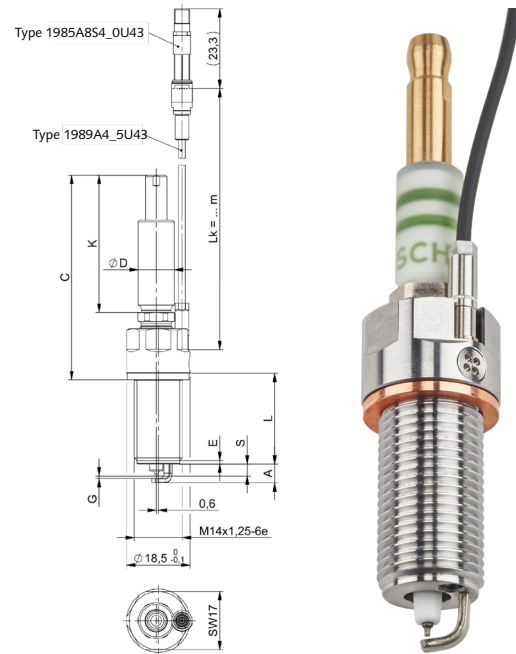
The space required for the sensor installation is created via a slightly eccentric position of the spark ceramic (0,6 mm). A perforated screw, which simultaneously serves as flame protection, fastens the sensor to the underside of the measuring spark plug. The automatic sensor identification PiezoSmart®, which facilitates efficient parameterisation of measuring chain, is available as an option (more information in the PiezoSmart® brochure, doc. no. 100-421).

The stability of the measuring spark plug was significantly improved in comparison with its predecessor, Type 6118B..., the design of the measuring spark plug is capable of reliably protecting against flashovers and misfires.

The signal cable of the sensor is screw mounted and can be easily replaced (by the user). Due to the modular design, it is possible to replace the insulator and the sensor. This would be handled in a Kistler Tech Center if required.

Variants

Please complete the questionnaire on page 5 and discuss with your local Kistler distributor in order to determine the ideal measuring spark plug for your application.



Technical Data

Measuring range	bar	0 ... 200
Calibrated partial ranges 200 °C	bar	0 ... 50
		0 ... 100
		0 ... 150
Overload	bar	250
Sensitivity at 200 °C	pC/bar	≈-10
Natural frequency	kHz	>120
Natural frequency (acoustic)	kHz	≈65
Linearity, all ranges (at 23 °C)	%FSO	<±0,5
Sensor operating temperature range	°C	-20 ... 350
Cable operating temperature range	°C	-20 ... 250
Thermal sensitivity shift		
200 ±50 °C	%	<±1
Acceleration sensitivity	mbar/g	<0,001
Thermal shock error		
(at 1 500 min 1/min, IMEP = 9 bar)		
Δp (short-term drift)	bar	<±0,6
ΔIMEP	%	<±3
Δp _{max}	%	<±1,5
Spark plug insulation resistance (at 23 °C)		
between central electrode and spark plug body at 1 000 V	MΩ	>100

Technical Data (Continuation)

Dielectric strength (system at RT)	kV	>40
Measuring spark plug tightening torque	N·m	see table
Capacitance of sensor with 1 m cable	pF	110
Weight (without connector and cable)	g	approx. 50...

Application

Cylinder pressure measurement by means of the measuring spark plug is applicable when a separate measuring bore is not appropriate. The effort required for the installation of the measuring spark plug is minimal. A high signal quality is achieved without pipe oscillation due to the front-flush sensor installation. A typical example application would be in-vehicle measurement for vehicle benchmarking, where an engine measurement bore is difficult to implement.

Installation

The measuring spark plug is fitted into the existing spark plug bore using the mounting wrench (for assignment, see optional accessories as well as Fig. 1). During installation, it is important

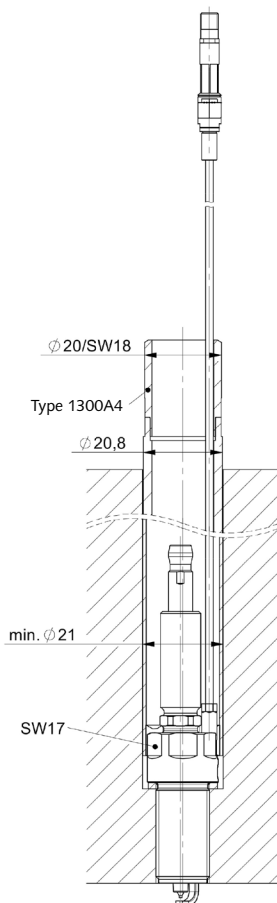


Fig. 1: Installation with mounting tool Type 1300A4

that the signal cable does not become crushed or wedged. In order to mount the ignition coil or the spark plug terminal, the insulator must be assembled with a thin layer of mounting grease Type 1067. This ensures a good insulation performance and facilitates dismounting. The length of the spark plug terminal or the ignition coil must be checked and possibly reworked (silicone/rubber grommet). If the silicone or rubber grommet is too long, then the signal cable could be dislodged and damaged. Also it could cause misfiring during operation, as the connector is no longer correctly latched.

Cylinder Head Material

Seal	Cast iron	Light metal
Flat	20 ... 35 N·m	15 ... 30 N·m
Conical	15 ... 25 N·m	12 ... 20 N·m

Table 1: Installation torque

Heat Value (HV)

The heat value is a measurement for the thermal loading capacity of the spark plug. Kistler measuring spark plugs are classified according to the BOSCH heat value:

10	9	8	7	6	5	4	3	09	08	07
Hot			Medium				Cold			

Note that a different numbering system is used depending on the manufacturer of the original spark plug. Cross-comparisons should be carried out using a standard reference. The original heat value should be used whenever possible. If this is not possible, then a measuring spark plug can be used with a colder heat value (but not with a warmer value). For example, a spark plug with the heat value 6 can be replaced by a spark plug with the heat value 5, but not vice versa.

Maintenance

The electrode spacing should be checked regularly and readjusted if necessary. Kistler recommends an annual calibration from the first use of the measuring spark plug. You can find further information in the Instruction Manual or from your Kistler distributor.

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Mounting Examples

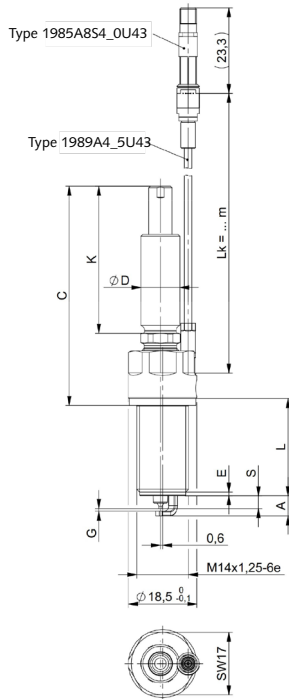


Fig. 2: Example of measuring spark plug with a flat seal

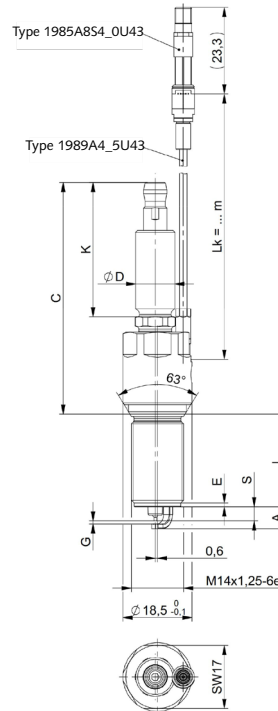


Fig. 3: Example of measuring spark plug with a conical seal



Fig. 4: Torque wrench Type 1300A11 and fork wrench insert Type 1300A15

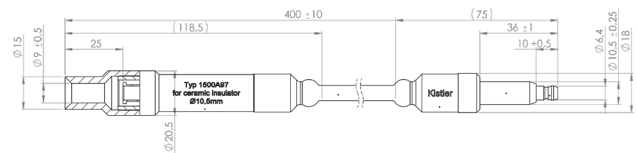


Fig. 5: Ignition cable extension Type 1500A97 (Ø = 10,5 mm)

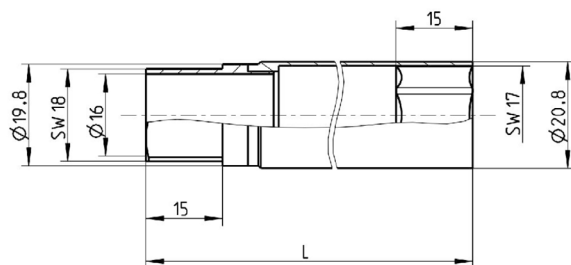


Fig. 6: Mounting tool Hex17/18 Type 1300A4/1300A4Q01/1300A4SP100-400

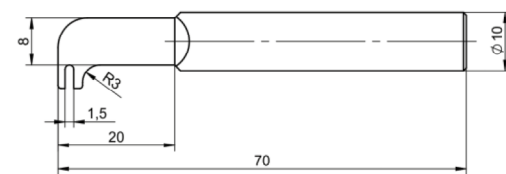


Fig. 7: Electrode spacing adjustment tool Type 1253A

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Included Accessories

- Clutch 10-32 neg. – BNC pos.
(for non-PiezoSmart® version)
- Insulation grease spark plug term.
(5 ml)
- Copper seal

Type/Art. No.
1721

1067
1100A47

Accessories (optional)

- Triax adapter – BNC pos.
- FPM connecting cable
 - L = 1 m
 - L = 2 m
 - L = 3 m
 - with PiezoSmart® L = 1 m*
 - with PiezoSmart® L = 2 m*
 - with PiezoSmart® L = 3 m*
- PiezoSmart® extension cable
 - L = 1 m
 - L = 2 m
 - L = 10 m
- Mounting wrench for spark plug (17)
- Mounting wrench for spark plug (17)
- Mounting wrench for spark plug,
customer specific length (17)
- Fork wrench for installation cable
3,5 65007991
- Torque wrench for installation
measuring spark plug
- Fork wrench Hex18 for torque
wrench Type 1300A11
- Electrode spacing adjustment tool
- Ignition extension cable for
SAE connection and 10,5 mm ceramic
diameter
- Adapter for pressure generator Type 6904
 - flat seal
 - conical seal

Type/Art. No.
1704A4

1989A415U43
1989A425U43
1989A435U43
1985A8S411U43
1985A8S421U43
1985A8S431U43

1987B1
1987B2
1987B10

1300A4
1300A4Q01
1300A4SP100-400

1300A11
1300A15
1253A

1500A97
6587A
6588A

Ordering Key

Type 6118C Q

Seal Type

Flat seal	F
Conical seal	C

Heat Value (Bosch)

	-4
	-5
	-6
	-8

Ceramics D = 9 mm Terminal SAE	A
Ceramics D = 9 mm Terminal CUP	B
Ceramics D = 10,5 mm Terminal SAE	C
Ceramics D = 10,5 mm Terminal CUP	D
Ceramics D = 7,7 mm Terminal SAE	E
Ceramics D = 7,7 mm Terminal CUP	F

Customized

Specification	01
	...

PiezoSmart®

Without PiezoSmart® (standard)	-
With PiezoSmart® (standard)	S

Cable Type

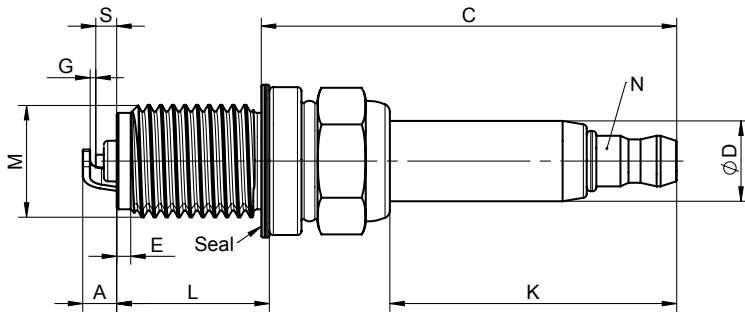
FPM	4
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Cable Length

1 m (standard)	-1
2 m (standard)	-2
3 m (standard)	-3

* with manufacturer's calibration, enter SN when ordering

Selecting a Measuring Spark Plug



_____ Date

_____ Sales Center

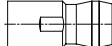

_____ Kistler Account Manager

_____ Customer

Questions Regarding the Engine

Brand/type			
Spark plug bore: Minimum diameter	mm	Shape:	straight bent
Fuel	Gasoline / E0 - E10	E85 / E100	CNG / LPG

Questions Regarding the Spark Plug

Brand/type					
Thread	M	M	x	Thread length	L mm
Spark position	S		mm	Maximum depth	A mm
Electrode spacing	G		mm	Insulator diameter	D mm
Isolator length	K		mm	Length from seal	C mm
Thread retreat	E		mm	Heat value (Bosch/OEM)	
Cable length (indicate)		1 m	2 m	3 m	PiezoSmart (indicate): Yes No
Ground electrode shape factor		none	Roof electrode	Roof electrode with needle Side electrode(s)	
Seal type	SEAL	flat	conical		
Cable connection nut	N	SAE		CUP	
Defined ground electrode system (indexed mounting)		no (standard)		yes (please send OEM spark plug)	
Initial order amount		Piece			
Customer contact person				Signature	

Note

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