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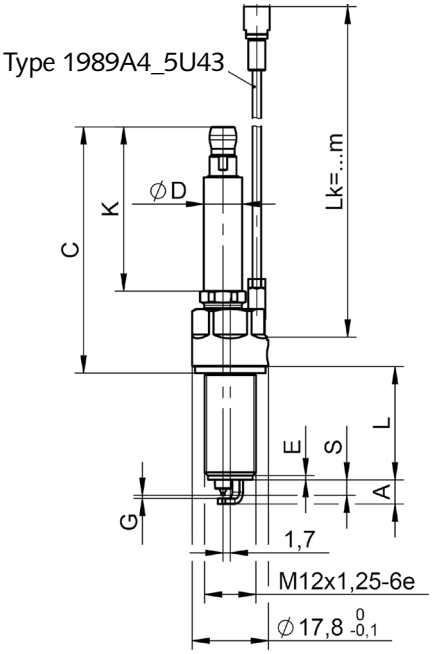
M12x1.25 measuring spark plug

Type 6115C...

with integrated 3 mm cylinder pressure sensor

The measuring spark plug Type 6115C... 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 6115C... The sensor is flush-mounted, ensuring that the acoustic natural frequency of the system is approx. 65 kHz. This means that the Type 6115C... is very suitable for measurements at high engine speeds, or for knock detection applications.

- Plug and Play, no engine modification necessary
- Flush-mounted pressure sensor for highest accuracy
- High dielectric strength up to ignition voltages of 45 kV
- Platinum-Platinum ignition system for high durability
- Application specific geometries and heat values
- Serviceable thanks to the modular structure



Description

The Kistler measuring spark plug Type 6115C... is available in various heat values, spark positions, and geometries. The electrical connection is either in form of a SAE cable connector nut, or a CUP cable connector nut. The ceramic insulators are available in a diameter of 9 mm or 10.5 mm, as per the original equipment requirements.

The space required for the sensor installation is achieved by a slightly eccentric position of the spark ceramic (1.7 mm). A perforated screw that also functions as flame guard, fixes 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. The stability of the measuring spark plug was significantly improved in comparison with its predecessor, Type 6115B…, the optimized design of the ceramic diameter protects the spark plug from flashovers and misfiring.

The signal cable of the sensor is attached via a screwed connector and can easily be replaced by the end user. Thanks to the modular design, it is possible to replace the insulator and the sensor. This must be replaced in a Kistler Tech Center if required.

Variants

Please complete the request sheet on page 6 and discuss with your local Kistler representative in order to determine the ideal measuring spark plug for your application.

Technical data

Measuring range	bar	0 ... 200
Calibrated ranges	bar	0 ... 50
(23°C, 200°C)		0 ... 100
		0 ... 150
		0 ... 200
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	<1
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

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Technical Data (Continuation)

Dielectric strength (system at RT)	kV	>45
Measuring spark plug tightening torque	N·m	see table 1
Capacitance of sensor with 1 m cable	pF	110
Weight (without connector and cable)	g	approx. 50

Application

Cylinder pressure measurement with the measuring spark plug can be done if a separate measuring bore is not possible or desirable. Adjustments are not needed to install the measuring spark plug. Due to the front flush-mounted sensor no oscillation and a high signal quality is achieved. A typical application is 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 a mounting key (for example, see optional accessories as well as Fig. 1 to 4).
Fig. 1 and 2 shows standard installations in bore diameters of ≥20 mm resp. ≥18 mm.
Fig. 3 and 4 shows installations in special installation conditions.
Important: the maximum permitted torque of the individual mounting wrenches must not be exceeded.

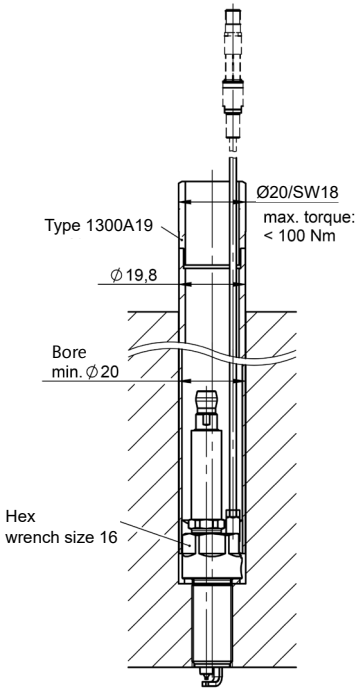

Fig. 1: Standard installation:
Bore diameter ≥20 mm
with mounting wrench
Type 1300A19

During installation, it is important that the signal cable does not become crushed. In order to mount the ignition coil or the spark plug terminal, the insulator must be covered with a thin layer of mounting grease Type 1067. This ensures a good insulation performance and allows an easy dismounting. The length of the spark plug terminal or the ignition coil must be checked and possibly adapted (silicone/rubber grommet). The cable can get damaged or dislodged if the silicone or rubber grommet is too long. Also it can cause misfiring during operation as the connector is no longer correctly latched.

Cylinder Head Material

Seal	Cast iron	Light metal
Flat/Conical	ca. 15 ... 25 N·m	ca. 10 ... 15 N·m

Table 1: Installation torque

Heat Value (HV)

The heat value is a rate of the thermal loading capacity of the spark plug.
Kistler measuring spark plugs are classified according to the BOSCH heat values.
Note that a different chart may be 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 with a colder heat value can be used (but not with a warmer value). For example, an original spark plug with the heat value 6 can be replaced by a measuring 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 Doc. No. 002-797 or from your Kistler representative.

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Mounting Examples

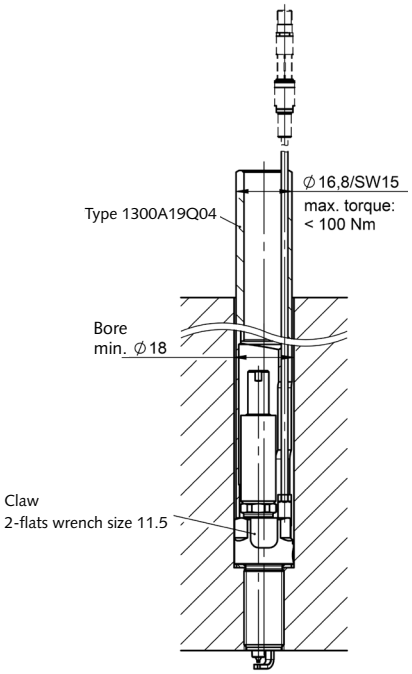

Fig. 2: Standard installation:
Bore diameter ≥18 mm
with mounting wrench
Type 1300A19Q04

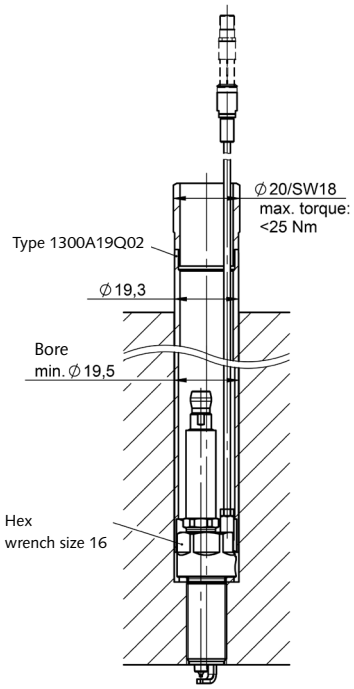

Fig. 3: Special installation:
Bore diameter ≥19.5 mm
with mounting wrench
Type 1300A19Q02

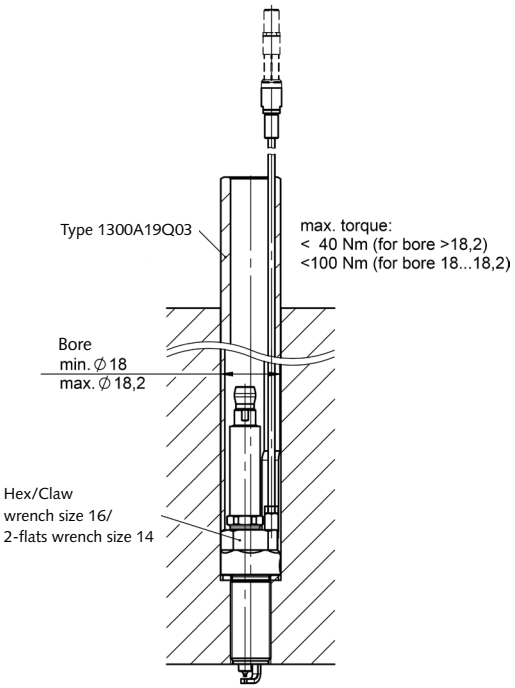

Fig. 4: Special installation:
Bore diameter 18.0 ... 18.2 mm
with mounting wrench
Type 1300A19Q03

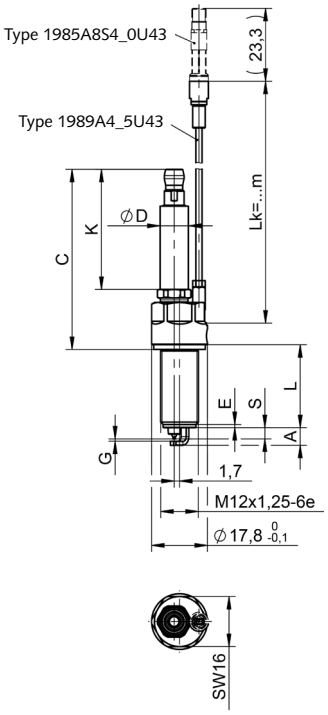

Fig. 5: Example of measuring spark plug with a flat seal

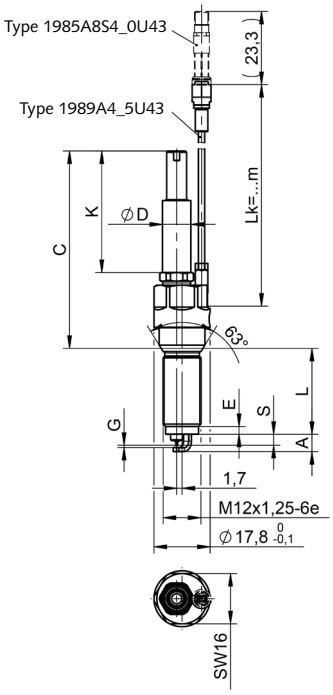

Fig. 6: Example of measuring spark plug with a conical seal

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Fig. 7: Torque wrench Type 1300A11 and fork wrench insert Type 1300A15

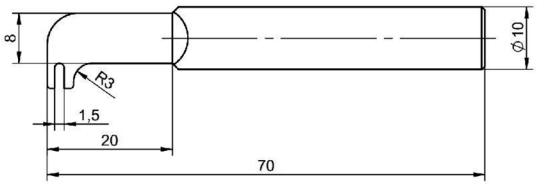

Fig. 8: Electrode spacing adjustment tool Type 1253A

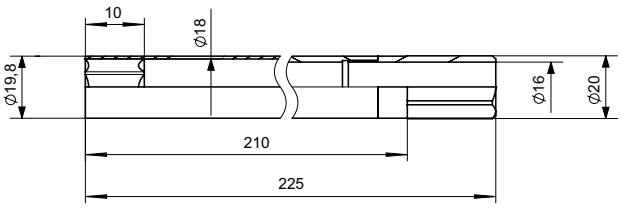

Fig. 9: Mounting wrench Hex size 18/16 Type 1300A19

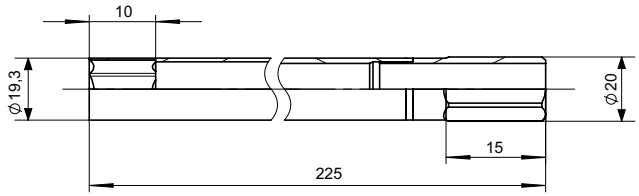

Fig. 10: Mounting wrench Hex size 18/16 Type 1300A19Q02

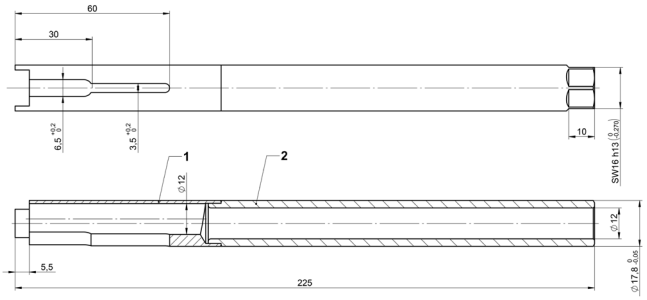

Fig. 11: Mounting wrench Hex size 16/2-flats wrench size 14 Type 1300A19Q03

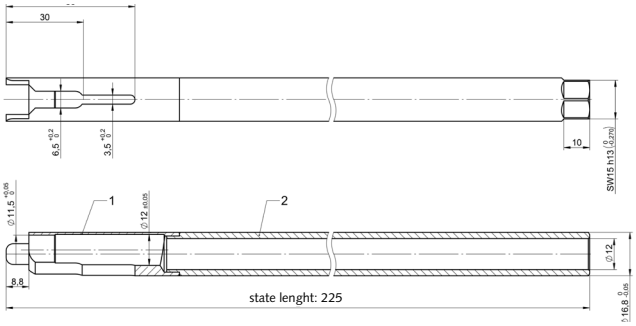

Fig. 12: Mounting wrench Hex size 15/2-flats wrench size 11.5 Type 1300A19Q04

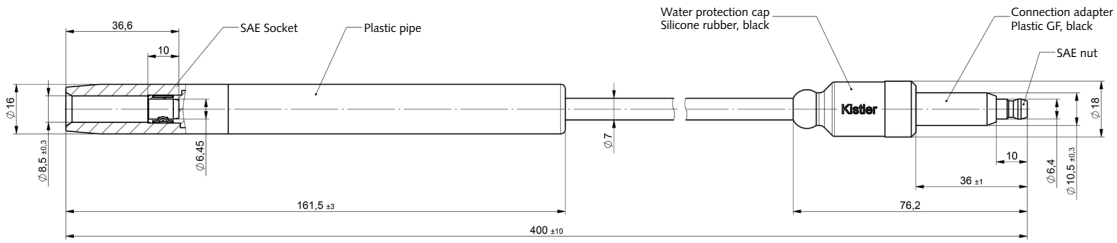

Fig. 13: Ignition extension cable for SAE connection Type 1500B97A1/1500B97A2

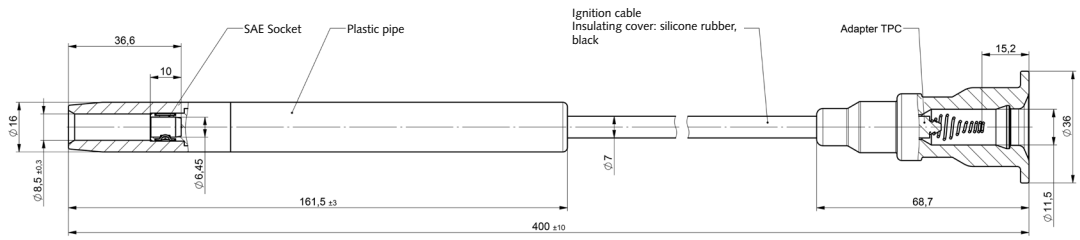

Fig. 14: Ignition extension cable for SAE connection with TPC Adapter Type 1500B97A3/1500B97A4

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Included Accessories	Type/Art. No.
• Adaptor 10-32 neg. – BNC pos. (for non-PiezoSmart version)	1721
• Insulation grease spark plug term. (5 ml)	1067
• Copper seal, various sizes	1100A

Accessories (optional)	Type/Art. No.
• Triax adapter – BNC pos.	1704A4
• FPM connecting cable	
– L = 1 m	1989A415U43
– L = 2 m	1989A425U43
– L = 3 m	1989A435U43
– with PiezoSmart L = 1 m*	1985A8S411U43
– with PiezoSmart L = 2 m*	1985A8S421U43
– with PiezoSmart L = 3 m*	1985A8S431U43
• PiezoSmart extension cable	
– L = 1 m	1987B1
– L = 2 m	1987B2
– L = 10 m	1987B10
• Mounting wrench Hex size 18/16 D20x225	1300A19
• Mounting wrench Hex size 16/18 D20x225	1300A19Q02
• Mounting wrench Hex size 16 / 2-flats 14	1300A19Q03
• Mounting wrench Hex size 15 / 2-flats 11.5	1300A19Q04
• Fork wrench SW3,5 for mounting signal cable	65007991
• Fork wrench insert Hex 18 for torque wrench Type 1300A11	1300A15
• Electrode spacing adjustment tool	1253A
• Ignition extension cable for SAE connection	
– Ø9 mm Insulator	1500B97A1
– Ø10,5 mm Insulator	1500B97A2
• Ignition extension cable for SAE connection with TPC Adapter Top Coil/Napf connection	
– Ø9 mm Insulator	1500B97A4
– Ø10.5 mm Insulator	1500B97A3
• Adapter for Pressure Generator Type 6904	
– flat seal	6593
– conical seal	6578

* with manufacturer's calibration, enter SN when ordering

Ordering key

Type 6115C □□□Q□□□□

Seal Type

Flat seal	F
Conical seal	C

Heat Value (Bosch)

	–3
	–4
	–5
	–6
	–7

Insulator/connection

Ceramics D =9 mm with SAE	A
Ceramics D =9 mm with CUP	B
Ceramics D =10.5 mm with SAE	C
Ceramics D =10.5 mm with CUP	D

Customized

Specification	01...
	...99

PiezoSmart

Without PiezoSmart	–
With PiezoSmart	S

Cable Type

FPM	4

Cable Length

1 m	–1
2 m	–2
3 m	–3

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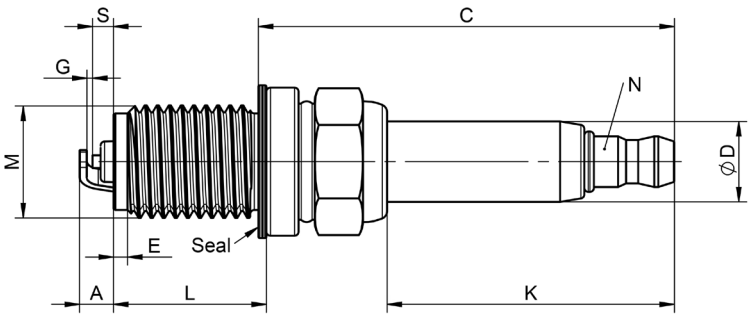
Selecting a Measuring Spark Plug

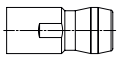
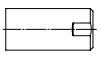


Date	
Sales Center	
Kistler Account Manager	
Customer	

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 ☒ Compression seal		☒ conical ☒ Solid seal (thickness ____ mm)	
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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