

# Compact Gas Sample Probe Series SP<sup>®</sup>

**SP180-H-EX1 T2**

**SP180-H-EX1 T3**

**SP180-H-EX1 T4**

**Ex II 2G Ex eb mb IIC T2/T3/T4 Gb**

Instruction Manual

Version 1.01.01



**Dear customer,**

Thank you for buying our product. In this instruction manual you will find all necessary information about this M&C product. The information in the instruction manual is fast and easy to find, so you can start using your M&C product right after you have read the manual.

If you have any question regarding the product or the application, please don't hesitate to contact M&C or your M&C authorized distributor. You will find all the addresses in the appendix of this manual.

For additional information about our products and our company, please go to M&C's website [www.mc-techgroup.com](http://www.mc-techgroup.com). There you will find the data sheets and manuals of all our products in German and English.

**Disclaimer**

This manual does not claim to be complete and it may be subject to technical modifications.

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With the release of this version all older manual versions will no longer be valid. The German instruction manual is the original instruction manual. In case of arbitration only the German wording shall be valid and binding.

**SP**® is a registered trademark.

Version: 1.01.01

## Table of Contents

<b>1</b>	<b>General information</b> .....	<b>4</b>
<b>2</b>	<b>Declaration of conformity</b> .....	<b>4</b>
<b>3</b>	<b>Safety instructions</b> .....	<b>5</b>
3.1	Intended Use.....	5
<b>4</b>	<b>Warning signs and definitions</b> .....	<b>6</b>
<b>5</b>	<b>Information regarding the usage in explosive atmospheres</b> .....	<b>8</b>
<b>6</b>	<b>Warranty</b> .....	<b>9</b>
<b>7</b>	<b>Introduction</b> .....	<b>10</b>
7.1	Serial numbers.....	10
7.2	Power supply.....	10
<b>8</b>	<b>Technical Data</b> .....	<b>11</b>
<b>9</b>	<b>Applications</b> .....	<b>12</b>
<b>10</b>	<b>Description</b> .....	<b>13</b>
<b>11</b>	<b>Probe design</b> .....	<b>14</b>
<b>12</b>	<b>Receiving the sample probe</b> .....	<b>15</b>
<b>13</b>	<b>Preparation for Installation</b> .....	<b>15</b>
<b>14</b>	<b>Installation</b> .....	<b>16</b>
14.1	Connecting the heated sample line.....	18
14.2	Connecting the test gas line.....	18
<b>15</b>	<b>Electrical Connection</b> .....	<b>19</b>
<b>16</b>	<b>Preparations for commissioning</b> .....	<b>20</b>
<b>17</b>	<b>Starting up</b> .....	<b>20</b>
<b>18</b>	<b>Maintenance</b> .....	<b>21</b>
<b>19</b>	<b>Decommissioning</b> .....	<b>24</b>
<b>20</b>	<b>Proper disposal of the device</b> .....	<b>24</b>
<b>21</b>	<b>Spare parts and consumables</b> .....	<b>24</b>
<b>22</b>	<b>Risk assessment</b> .....	<b>25</b>
<b>23</b>	<b>Appendix</b> .....	<b>27</b>

## Table of Figures

Figure 1	Dimensions and construction of the SP180-H-EX1 T*.....	14
Figure 2	Mounting of the SP180-H-EX1 T*.....	17
Figure 3	Electrical connection diagram.....	19
Figure 4	Opening of the insulation cap.....	22
Figure 5	Replacing the filter element.....	23
Figure 6	Overview risk assessment.....	25

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## 1 General information

The product described in this manual has been built and tested in our production facility.

All M&C products are packed to be shipped safely. To ensure the safe operation and to maintain the safe condition, all instructions and regulations stated in this manual need to be followed. This manual includes all information regarding proper transportation, storage, installation, operation and maintenance of this product by qualified personnel.

Follow all instructions and warnings closely.

Read this manual carefully before commissioning and operating the device. If you have any questions regarding the product or the application, please don't hesitate to contact M&C or your M&C authorized distributor.

## 2 Declaration of conformity



The product described in this operating manual complies with the following EU directives:

### ATEX-Directive

The product described in this manual is produced in accordance with the EU directive for devices and protection systems for appropriate use in hazardous areas 2014/34/EU appendix II.

### EMC-Instruction

The requirements of the EU directive 2014/30/EU "Electromagnetic compatibility" are met.

### Low Voltage Directive

The requirement of the EU directive 2014/35/EU "Low Voltage Directive" are met.  
The compliance with this EU directive has been examined according to DIN EN 61010.

### Declaration of conformity

The EU Declaration of conformity can be downloaded from the **M&C** homepage or directly requested from **M&C**.

### 3 Safety instructions

#### **Follow these safety directions and instructions regarding installation, commissioning and operation of the SP180-H-EX1 T\*:**

Read this manual before commissioning and operating the product. Make sure to follow all safety instructions.

Installation and commissioning of electrical devices must be carried out only by qualified skilled personnel in compliance with the current regulations.

The installation and commissioning of the device must conform to the requirements of VDE 0100 (IEC 364) 'Regulations on the Installation of Power Circuits with Nominal Voltages below 1000 V' and must be in compliance with all relevant regulations and standards.

Attention should be paid to all relevant national and international regulations and standards regarding the usage of the device in potentially explosive atmospheres.

Before connecting the device, please make sure to compare the supply voltage with the specified voltage on the product label.

Protection against damage caused by high voltages:

Disconnect the power supply before opening the device for access. Make sure that all external power supplies are disconnected.

Operate the device only in the permitted temperature and pressure ranges. For details please refer to the technical data sheet or manual.

Install the device only in protected areas, sheltered from rain, sun and moisture. The product should not be exposed to the elements.

Installation, maintenance, inspections and any repairs of the devices must be carried out only by qualified skilled personnel in compliance with the current regulations.

#### **3.1 Intended Use**

The **SP180-H-EX1** gas sample probe must be operated properly under the conditions described in chapters 5 and 8. Only use the **SP180-H-EX1** in permissible temperature and pressure ranges.

Refrain from any use other than for this purpose.

Improper use can lead to serious injuries, see the safety instructions at the appropriate point.

## 4 Warning signs and definitions



**Danger**

The 'Danger' warning sign indicates that death, serious injury and/or significant material damage will be the consequence, if the appropriate precautions should not be taken.



**Warning**

The 'Warning' warning sign indicates that death, serious injury or damage to property may occur if the relevant precautionary measures are not observed.



**Caution**

The 'Caution' warning sign indicates that slight personal injury can occur if the appropriate safety precautions are not observed.



**Toxic!**

Acute toxicity (oral, dermal, inhalation)! Toxic when in contact with skin, swallowed or inhaled.



**Corrosive!**

These substances destroy living tissue and equipment upon contact. Do not breathe vapors; avoid contact with skin and eyes.

**Caution**

'Caution' indicates that damage to property can occur if the appropriate safety precautions are not observed.



**Note**

'Note' indicates important information relating to the product or highlights parts of the documentation for special attention.

**Qualified personnel**

'Qualified personnel' are experts who are familiar with the installation, commissioning, maintenance and operation of these types of products. The following knowledge is at least required for the work:

- Instructed person in EX-protection
- Trained person in the electrotechnical field
- Detailed knowledge of the manual and the applicable safety regulations



'Ex' indicates important information about the product or about the corresponding parts in the instruction manual, relating to usage in potentially explosive atmospheres.



High voltages!

Protect yourself and others against damage which might be caused by high voltages.



Hot surface!

Contact may cause burn! Do not touch!



Wear protective gloves!

Working with chemicals, sharp objects or extremely high temperatures requires wearing protective gloves.



Wear safety glasses!

Protect your eyes while working with chemicals or sharp objects. Wear safety glasses to avoid getting something in your eyes.



Wear protective clothes!

Working with chemicals, sharp objects or extremely high temperatures requires wearing protective clothes.



Wear safety footwear!



Use safety helmet and full protective goggles!

## 5 Information regarding the usage in explosive atmospheres

The device can be operated in potentially explosive atmosphere of explosive zone 1 (see Ex certification in the appendix)

The Ex marking for the SP180-H-EX1 T\* is:

 II 2G Ex eb mb IIC T2/T3/T4 Gb

The sample gas probe is certified by DEKRA EXAM GmbH.

You will find a copy of the Type Examination Certificate in the appendix of this instruction manual. Follow closely all specified conditions and installation instructions stated in the Type Examination Certificate (see appendix) regarding the installation and operation of the sample probe.



Only by complying to all requirements stated in the Type Examination Certificate, safe operation in explosive atmospheres is ensured.

Any modification of the standard configuration of the sample probe with parts, which are not approved by M&C and not explicitly specified for usage in explosive atmospheres, will void the Type Examination Certificate. This also refers to any repair work and service using parts which are not M&C approved and not specified for usage in explosive atmospheres.

Please don't hesitate to contact M&C or your M&C distributor if you have any questions about parts, repair work and services of the SP180-H-EX1 T\*.



**Warning**



Protect yourself and others against damage which might be caused by high voltage. Disconnect power supply before opening the device for access. Make sure that all external power supplies are disconnected.

Always clean protection cover with damp cleaning wipes.

Prevent electrostatic discharge during installation and operation! Avoid buildup of electrostatic electricity caused by operation, maintenance or cleaning of the device.



## 6 Warranty

In case of a device failure, please contact immediately M&C or your M&C authorized distributor.

We have a warranty period of 12 months from the delivery date. The warranty covers only appropriately used products and does not cover the consumable parts. Please find the complete warranty conditions in our terms and conditions.

The warranty includes a free-of-charge repair in our production facility or the free replacement of the device. If you return a device to M&C, please be sure that it is properly packaged and shipped with protective packaging. The repaired or replaced device will be shipped free of delivery charges to the point of use.

## 7 Introduction

M&C gas sample probes provide direct insitu ultra-fine filtration during continuous gas sampling for analytic measurements. In this way, part of the necessary maintenance work for a system is concentrated on a single point. This filter technology has the major advantage that dust mixtures consisting of ultra-fine and coarse dusts can be optimally retained with the least possible maintenance work.

Optimal adaptation of the sample probe to processing conditions and to measurement work is a necessary condition for a measurement system to work smoothly. Basically, the gas sample should be kept to a necessary minimum. This is made possible thanks to optimised downstream gas processing using M&C components. Only in this way it is possible to reduce maintenance to a minimum while ensuring maximum availability.

The SP180-H-EX1 T\* is certified for appropriate use in the specified Ex zones.



Only operate the gas sample probe according the specifications stated in this instruction manual and in the extended manufacturer documents.

The gas sample probe is classified for three different temperature classes:

Version	Operating temperatur in °C [°F] from -20 to 80 °C [-4 to 176 °F] ambient temperatur	Max. surface temperatur in °C [°F]
<b>SP180-H-EX1 T2</b>	180 [356 °F]	240 [464 °F]
<b>SP180-H-EX1 T3</b>	155 [311 °F]	180 [356 °F]
<b>SP180-H-EX1 T4</b>	100 [212 °F]	130 [266 °F]



**Table 1 SP180-H-EX1 T\* temperature classification**

A one alarm contact (low temperature alarm) is available to monitor the temperature of the gas sample probe:

- Switching temperature: version **SP180-H-EX1 T2 / T3** < 90 °C [194 °F]
- Switching temperature: version **SP180-H-EX1 T4** < 90 °C [194 °F]

### 7.1 Serial numbers

The product label with the serial number is located inside the terminal box of the sample probe.

Please refer to this serial number if you have any questions about your sample probe or if you need to order spare parts or consumables.

### 7.2 Power supply

The probe can be operated on alternating current in the range of 110 V AC to 240 V AC, 50 to 60 Hz.

## 8 Technical Data

Gas Sample Probe Series SP®	SP180-H-EX1 T2	SP180-H-EX1 T3	SP180-H-EX1 T4
Part No.	02S1874	02S1872	02S1870
Protective cover	Yes		
Outdoor mounting	Yes		
Sample temperature	Max. 600 °C* [1112 °F*]		
Sample pressure	0.4 to 6 bar abs.		
Ambient temperature	-20 to +80 °C [-4 to 176 °F]		
Dust load	Up to 1 g/m <sup>3</sup> *		
Filter chamber volume	70 ml		
Filter element	S-2K, filter porosity 2 µm, ceramic (others on request)		
Probe heating	150 to 180 °C [302 to 356 °F] self-regulated	120 to 160 °C [248 to 320 °F] self-regulated	90 to 120 °C [194 to 248 °F] self-regulated
Ready for operation	After 2 hours		
Low temperature alarm contact, alarm point	< 90 °C [194 °F], NO	< 90 °C [194 °F], NO	< 90 °C [194 °F], NO
Low temperature alarm contact, contact rating	250 V-1.5 A AC, 0.5 A DC		
Connection sample gas outlet	1/4"-NPT inside, with Ø 6 mm (DN 4/6) Swagelok® tube connector		
Connection calibration gas	Ø 6 mm (DN 4/6) Swagelok® tube connector, connection including sealing plug		
Power supply	110 V AC up to 240 V 50 to 60 Hz, rated current 3.5 A		
Power consumption	During operation: 100 VA, fuse: 6 A		
Electrical connection	Terminals max. 2.5 mm <sup>2</sup> , cable glands: 1 x M 20 and 1 x M 16		
Mounting flange	DN 65 PN 6, B stainless steel 316Ti		
Material of sample contacting parts	SS 316/316Ti, FKM, ceramic		
Degree of protection/ Electrical equipment standard	IP54, EN 60529/EN 61010,		
Ex Certification	Ex II 2G Ex eb mb IIC T2 Gb	Ex II 2G Ex eb mb IIC T3 Gb	Ex II 2G Ex eb mb IIC T4 Gb
	EXAM BVS 18 ATEX E 043		
IECEx Certification	IECEx BVS 18.0034		
Ex Standards	EN 60079-0:2012 + A11:2013, EN 60079-7:2015, EN 60079-18:2015		
IECEx-Standards	IEC60079-0:2011 6 Edition, IEC60079-7:2015 5 Edition, IEC60079-18:2014 4Edition		

Gas Sample Probe Series SP®	SP180-H-EX1 T2	SP180-H-EX1 T3	SP180-H-EX1 T4
Part No.	02S1874	02S1872	02S1870
Dimensions (W x H x D)	230 (w/o calibration gas connection) x 280 x 225 mm [≈ 9.1" (w/o calibration gas connection) x 11.0" x 8.9"]		
Weight	Approx. 7.5 kg [≈ 16.5 lbs]		
Gas flow rate	Max. 500 NI/h		
<b>Option</b>			
Part No.: 02S9200	Insitu probe tube out of stainless steel 316Ti type SP210/SS, connection G3/4" o, ø 10/12, length 1 m* [3.28 ft.]*, incl. flange gasket.		

\* Standard, other versions on request.

<b>ΔP und T<sub>90</sub> at flow of:</b>	100	200	500	NI/h
ΔP pressure loss with new filter element S-2K:	4	7	15	mbar
T <sub>90</sub> time-with sample tube SP210/SS-	4.0	2.5	< 1.0	Sec.

Swagelok® is a registered trademark for tube fittings by Swagelok Company, USA.

Please note: NI/h and NI/min refer to the German standard DIN 1343 and are based on these standard conditions: 0 °C [32 °F], 1013 mbar.

## 9 Applications

The electrically heated M&C gas sample probe SP180-H-EX1 T\* is used for continuous gas sampling in processes with dust densities of up to 1 g/m<sup>3</sup>, operating pressure of up to max. 6 bar abs., temperatures of up to a maximum of 600 °C [1112 °F] or for high gas humidity. Thanks to its compact design it requires only limited space. The gas sample probe SP180-H-EX1 T\* is equipped with a new protective cover and can be used for outdoor mounting.

Do not use the sample gas probe to extract gases or gas compositions, which could be potentially explosive without the presence of air. Do not use gases or gas compositions which can alter the relevant safety-related material properties of the probe materials. The gas or gas composition needs to be free of particles which could cause, in combination with the materials of the gas sample probe, sparks by friction or impact.



This also applies to specific gases or gas compositions, which enter the gas sample probe via the calibration gas adapter connection. Make sure that all gases or gas compositions which enter the sample gas probe, do not react with the environment or the process.

Prevent any potential source of ignition (for example burning or smoldering particles, small smoldering fires, foreign objects) from entering the gas sample probe during operation.

## 10 Description

The sample probe is designed for easy installation, reliable operation and trouble-free maintenance. Advantages are:

- Gas sampling with dust-laden processes;
- low volume, fast response time;
- filter elements can be changed without tools and without disconnecting the (heated) sample line;
- the filter chamber can be easily cleaned;
- the probe tube can be cleaned without dismantling the probe;
- self-regulated electrical heating with undertemperature alarm contact, and different probe tubes and pre-filters as option;
- with calibration gas connection as standard.

The 75 mm [ $\approx$  2.95"] ceramic filter element with a porosity of 2  $\mu$ m and a large surface is located inside the heated stainless steel filter housing of the probe. The gas sample probe can be heated to a maximum temperature of 120 °C [248 °F]/155 °C [311 °F]/180 °C [356 °F] (see temperature-classifications in the technical data table). using a special self-regulated heating element. No thermostat or temperature limiter is necessary. A separate thermo switch is provided for under temperature monitoring (NO).

## 11 Probe design

The probe head with its new all-round enclosing heat insulating protection cover forms a complete unit with the filter housing, the standard mounting flange DN 65 PN 6 and the junction box which is attached to the side.

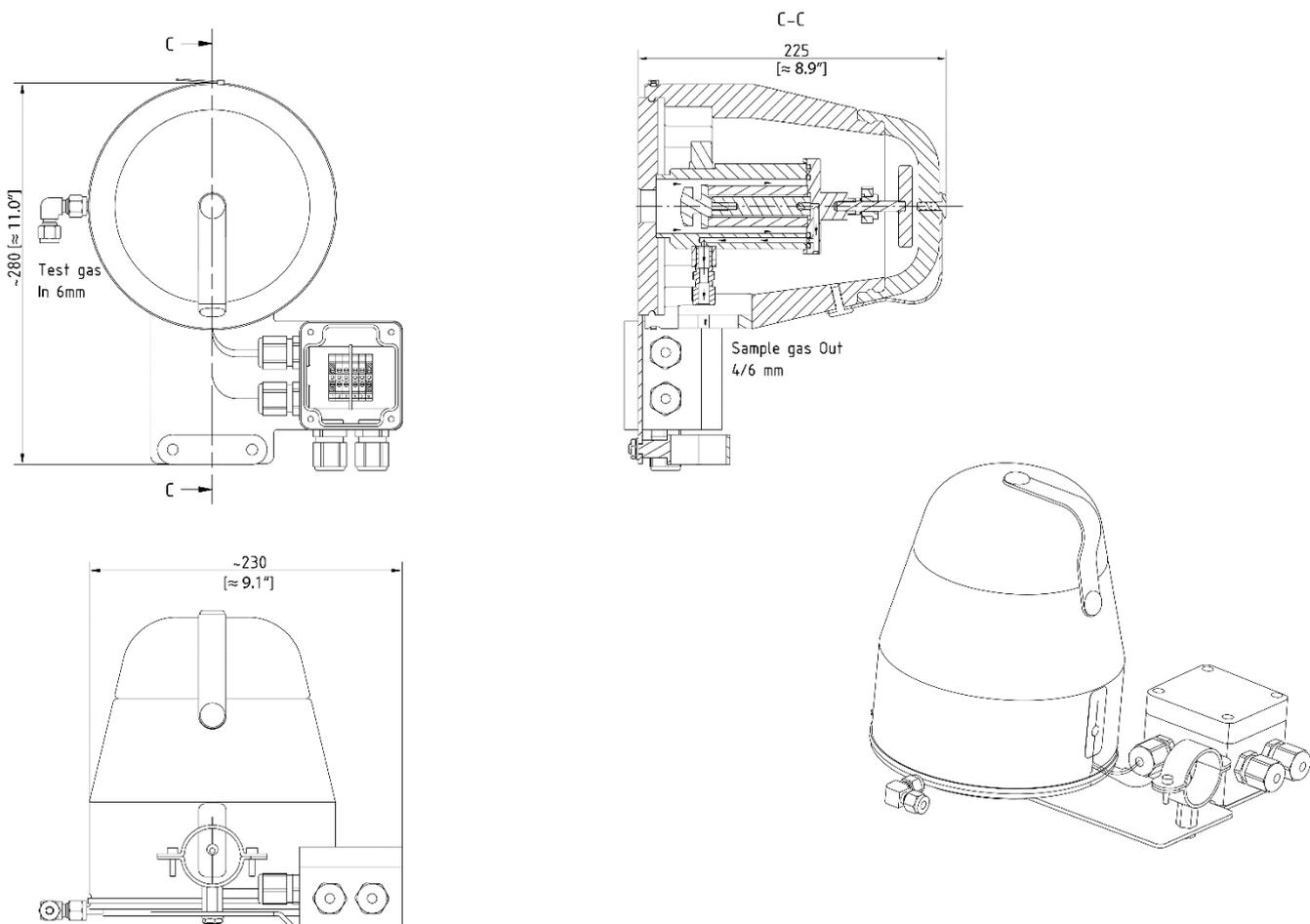
A mounting clamp and a tube connector are located at the bottom of the probe for the connection of heated M&C sampling lines with outer diameters of 40 mm [ $\approx 1.57$ "] to a max. of 55 mm [ $\approx 2.17$ "].

Please feel free to contact us in order to select an appropriate heated M&C sample line for your application.

The sample gas outlet at the probe is designed for a 6 mm (DN 4/6) tube.

The stainless steel sampling tube of one meter length (Part No. 02S9200) can optional be provided and is connected to the G 3/4" thread of the mounting flange. The maximum operating temperature for the stainless steel sampling tube is 600 °C [1112 °F]. The modular system of our sample probes allows the usage of all M&C sample tubes and prefilters with G 3/4" connection thread. This guarantees an optimum adaptation to the process conditions.

The following cross-sectional drawing shows the probe SP180-H-EX1 T\*.



**Figure 1** Dimensions and construction of the SP180-H-EX1 T\*

## 12 Receiving the sample probe

The gas sample probe is usually delivered in two packaging units:

- The gas sample probe with the required screws, nuts and flange sealing.
- Sample tube with gasket (optionally).

Please remove the gas sample probe carefully from the packaging. Check the scope of the delivery specified on the delivery note. Please make sure that you have received all items stated on the delivery note. Please check the unit for any transport damage after receipt and report any complaints to the transport company immediately.

## 13 Preparation for Installation



**Warning**



Make sure that the temperature classification of the gas sample probe corresponds to the ignition temperature of the combustion gases/vapors.

- Select the optimum sampling point in accordance to the generally applicable guidelines or by consulting the relevant person or department.
- Choose the sampling point location, while keeping in mind that this location has adequate space for inserting and removing of the probe. Please consider the insertion length of the probe tube when you choose the location of the sampling point.
- The probe needs to be easily accessible for all necessary maintenance work.
- The temperature of the sample probe connections needs to be always above the acid dew point in order to avoid corrosion and problems with blockage. If this is not possible, a heated SP35/SP30 probe tube is recommended for cold connections.
- If the ambient temperature in the area of the connections is  $> 80\text{ °C}$  [ $> 176\text{ °F}$ ] as a result of radiant heat, a reflector needs to be installed to protect the probe.
- The mounting flange connector of the sample probe should be in compliance with DN 65 PN 6. If other connection sizes are required, a special adapter flange /S010 can be ordered optional.
- The probe needs to be fitted to the existing operating conditions before mounting.

The following existing operational parameters need to be checked prior to installing the sample probe:

<b>Weatherproof mounting position</b>	_____provided	_____needs to be installed	
<b>Under / over pressure situation</b>	mbar	bar	
<b>Process temperature</b>	°C, Min.	°C, Max.	
<b>Dust loading</b>	g/m <sup>3</sup>		
<b>Dust composition - grain size</b>	µm		
<b>Gas composition</b>	corrosive	toxic	explosive
<b>Which parameters should be measured, e.g. O<sub>2</sub>, CO, SO<sub>2</sub>, NO<sub>x</sub>, ...</b>	vol%	mg/Nm <sup>3</sup>	ppm
<b>Required amount of gas</b>	l/h, Min.	l/h, Max.	
<b>Necessary T<sub>90</sub> time</b>	sec.		

<b>Operating parameters of combustion gas</b>			
<b>Gas composition</b>	<input type="checkbox"/> corrosive	<input type="checkbox"/> toxic	<input type="checkbox"/> explosive
<b>Zone classification of process conditions</b>			
<b>Zone classification of ambient conditions</b>			
<b>Ignition temperature of gases or vapours</b>	°C (> max. surface temperature from table 1)	<b>Corresponds to temperature classification</b> .....	
<b>Explosion group</b>	<input type="checkbox"/> IIA	<input type="checkbox"/> IIB	<input type="checkbox"/> IIC

## 14 Installation



**Warning**

Do not install sample gas probe while potentially explosive atmosphere is present.



The process and the environment of the probe needs to be explosion-free (explosion-free zone) during installation. A zone is declared as explosion-free zone, if it is free of explosive atmosphere.



**Warning**

Connect the probe to earth (electrical bonding terminal).  
The bleeder resistor needs to have an overall value of <math>< 10^6 \Omega</math>. The protection cover does not need to be connected to earth. Following the maintenance procedure, the protection cover needs to be cleaned by damp cleaning wipes.

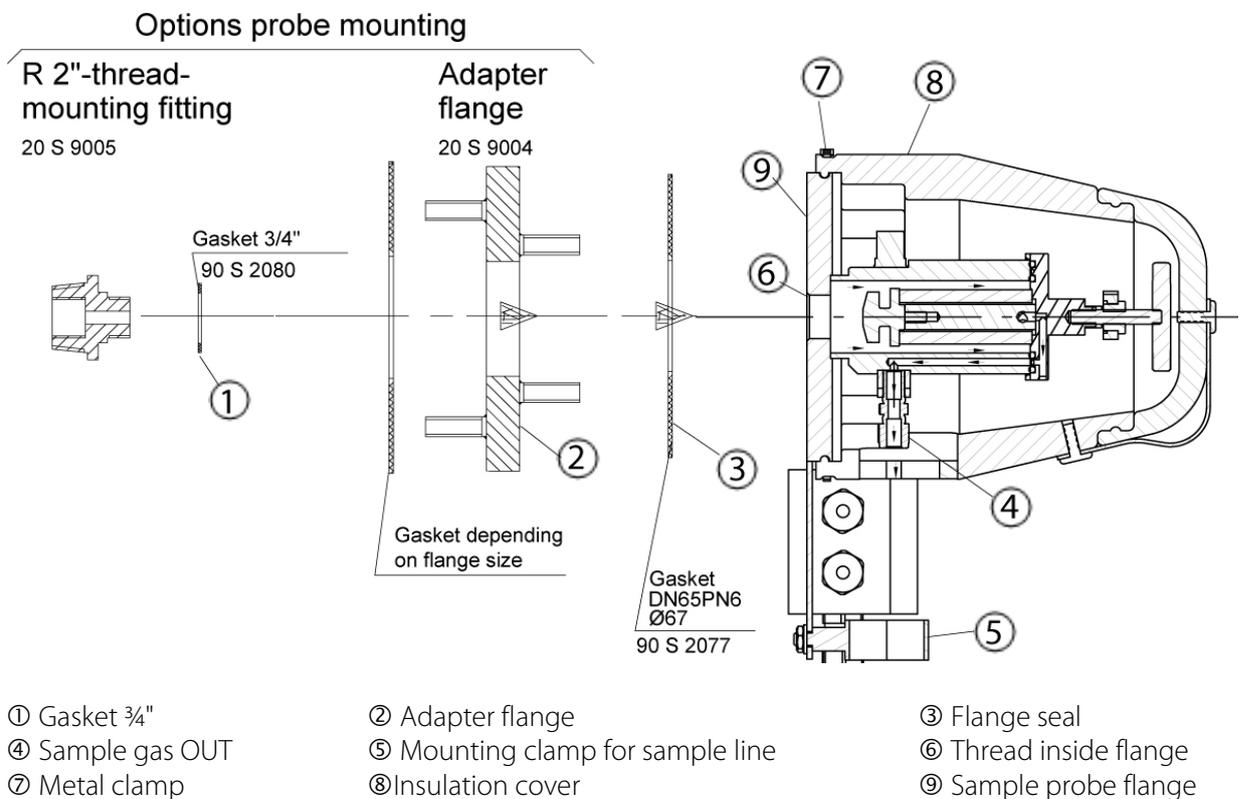
The M&C SP180-H-EX1 T\* probe is designed for stationary use. The professional choice of the right sample probe for the application and the professional installation guarantees a long service life and minimum maintenance work. The ideal position for mounting the sample probe is horizontally with a tilt angle of 10° towards the process. Please follow these installation steps and see details in Figure 2.

1. Screw the sample probe tube directly into the ¾" inner thread ⑥ of the probe flange and tighten it.
2. To mount the SP180-H-EX1 T\* at the sampling flange, please loosen the metal clamp ⑦ around the heat insulating protection cover and remove the cover ⑧.
3. If the probe connection is not the same size as the standard flange connection DN 65 PN 6, an adapter flange ② (optional) should be mounted to the probe (see Figure 2). Place the gasket ③ between the adapter flange and the probe flange.
4. If the heated probe tube type SP30/35 is used then the probe is to be screwed to its flange (with welded threaded bolt). First insert the flange seal ③ between the two flanges.
5. Attach the flange seal ③ to the probe connection.
6. Insert sample probe with mounted probe tube into the connection piece and fasten the probe using the supplied bolts and nuts.
7. After mounting of the probe at the sampling flange put the heat insulating protection cover ⑧ over the probe flange again and secure it with the metal clamp ⑦.



#### Note

For the preferred mounting position of the probe, the sample gas outlet is pointing downwards. This is just the preferred mounting position, it is not necessary for correct operation.



**Figure 2** Mounting of the SP180-H-EX1 T\*

## 14.1 Connecting the heated sample line

To connect the sample line, a threaded tube connector ④ with  $\varnothing$  6 x 1 mm is available – other diameters available on request.

1. Open metal clamp ⑤.
2. Insert the tube connection piece into the bolted pipe joint ④ and connect them.
3. If you use a PTFE tube as sample line, a metal tubing sleeve for pneumatic fittings needs to be inserted at the end of the tube to prevent it of being pressed together.
4. The temperature-resistant, stainless steel connector ④ from M&C has a double-blade ring system to ensure reliable sealing. First finger-tight the nut of this connector, then use a flat spanner to turn the nut exactly 1¼-turns. The nut is now correctly mounted.
5. Place the heated sample line into the open metal clamp ⑤ and close the clamp.



**Note**

Make sure that the connection is leakproof!

## 14.2 Connecting the test gas line

To connect the test gas line, a threaded tube connector with  $\varnothing$  6 x 1 mm (DN 4/6) is available (see Figure 1)

1. Remove the sealing plug from the calibration gas connection.
2. If you use a PTFE tube as sample line, a metal tubing sleeve for pneumatic fittings needs to be inserted at the end of the tube to prevent it of being pressed together.
3. The temperature-resistant, stainless steel connector ④ from M&C has a double-blade ring system to ensure reliable sealing. First finger-tight the nuts of these connectors, then use a flat spanner to turn the nuts exactly 1¼-turns. The nuts are now correctly mounted.



When selecting the gases or gas mixtures to be applied to the probe via the calibration adapter connection, reactions with the environment and the process must be excluded.

## 15 Electrical Connection



**Warning**



When connecting the equipment, make sure that the supply voltage is identical with the information provided on the model type plate.

Setting up of electrical power installations must be conform to the requirements of IEC 364 (DIN VDE 0100) 'Regulations on the Installation of Power Circuits with Nominal Voltages below 1000 V', and must be in compliance with all relevant regulations and standards.



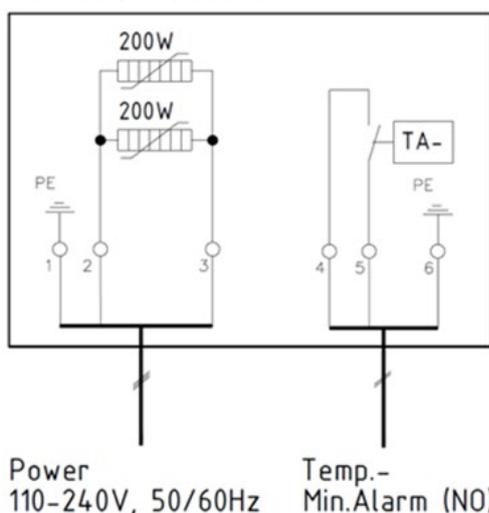
**Note**

We recommend the use of temperature resistant cable! A main switch and matching fuse must be provided externally! The main circuit must be equipped with a fuse corresponding to the nominal current (over current protection); for electrical details see '8 Technical Data'. We recommend to always use the low temperature alarm contact to stop the gas flow through the probe in case of an alarm and therefore protect the downstream components.

The junction box is mounted on the side of the probe. The wiring plan is inside the lid of the junction box. Two separate cord grips are available for the mains and the signal cable.

Please follow the following steps to connect the equipment:

1. Remove the lid of the junction box.
2. Insert the power cord through the cord grip M 20. Connect the mains cable to the appropriate terminals as shown below.
3. Insert the signal cable through the other cord grip M 16 and connect it to the appropriate terminals as shown in the wiring below.
4. Tighten both cord grips to secure the inserted cables and prevent cable pull out.
5. If you don't use a signal cable, the cord grip M 16 needs to be closed with a hole plug (not included).
6. Screw lid back on.



**Figure 3** Electrical connection diagram



**Note**

The function of the self-regulating heating cartridge with PTC effect cannot be checked with an ohmmeter.

## 16 Preparations for commissioning

Before initial startup, all plant- and process-specific safety measures must be observed. It is mandatory for the operator to complete the enclosed risk assessment of the product.

The gas exposure risk must be assessed by the operator with regard to the hazards posed by process and calibration gas and the setup at the installation site (e.g. tubing, system cabinet/container/plant). If the risk assessment reveals increased exposure hazards, further measures are required.

A visible label must be attached to the installation site in accordance with the risk assessment provided by the operator.

## 17 Starting up



**Warning**

Do not start-up the sample gas probe while potentially explosive atmosphere is present.

The process and the environment of the probe needs to be explosion-free (explosion-free zone) during start-up. A zone is declared as explosion-free zone, if it is free of explosive atmosphere.



**Warning**

Connect the probe to earth (electrical bonding terminal).

The bleeder resistor needs to have an overall value of  $< 10^6 \Omega$ . The weather protection hood is not affected by this and must always be cleaned with a damp cloth in accordance with the maintenance description.

Make sure that the supply voltage matches the specified voltage on the product label of the probe, before connecting the device.

- Switch on mains power supply. The total heating-up time is approximately 2 hours. After about 1 hour the temperature of the probe is already higher than the temperature failure alarm value (160 °C [320 °F]), but it still takes about another hour until operation temperature has been reached.
- After the minimum heating-up time of 2 hours, the gas sample probe can start to extract the sample gas.

## 18 Maintenance

Before starting any maintenance work, please make sure that any work done on the device is in compliance with all relevant regulations and standards.



**Warning**

Disconnect power supply before opening the device for access.

Make sure that all external power supplies are disconnected.



This also applies to any external alarm or control circuits which may be connected.



Do not carry out any maintenance work at the sample gas probe while potentially explosive atmosphere is present. The process and the environment of the probe needs to be explosion-free (explosion-free zone) during maintenance. A zone is declared as explosion-free zone, if it is free of explosive atmosphere.



**Danger**

Inhalation hazard possible, if using toxic or asphyxiant gases! Purge sample gas probe with inert gas or air before opening!

If the sample gas probe is used for toxic gas or asphyxiant (oxygen-displacing) gas, it needs to be purged with inert gas or air before opening. Follow closely all relevant occupational safety regulations during operation.



**Warning**

Connect the probe to earth (electrical bonding terminal).

The bleeder resistor needs to have an overall value of  $< 10^6 \Omega$ . The protection cover does not need to be connected to earth. Following the maintenance procedure, the protection cover needs to be cleaned by damp cleaning wipes.

The intervals between servicing are dependent on the process and system conditions in your facility. The facility QA/QC plan should address the frequency for maintenance and should be updated based on your operations.

An indication that maintenance work of the sample probe might be necessary, is a steady decrease of the amount of sample gas going out to your analysis system.

The routine maintenance work consists mainly of replacing filter elements and checking seals.



**Note**

The function of the self-regulating heating cartridge with PTC effect cannot be checked with an ohmmeter.



**Warning**

When working during operation: High surface temperatures!



Touching the device can cause severe burns!



Wear protective gloves! Secure the device against unauthorized access.

To start the maintenance work, follow these steps:

1. Remove insulation cap ① by squeezing and lifting the cap (see Figure 4).

### Caution

Don't use the green retaining strap to remove the insulation cap. The insulation cap will be damaged by using the retaining strap!



**Figure 4** Opening of the insulation cap

2. Loosen filter lid by turning handle ② to the left. Then pull out the filter lid with o-rings ③, filter element sealings ④, filter element ⑤ with filter element holder ⑦ and filter's knurled head thumb screw ⑥.



### Warning

Electrostatic discharge possible!

Always clean the probe with a damp cloth to prevent electrostatic discharge (ESD).

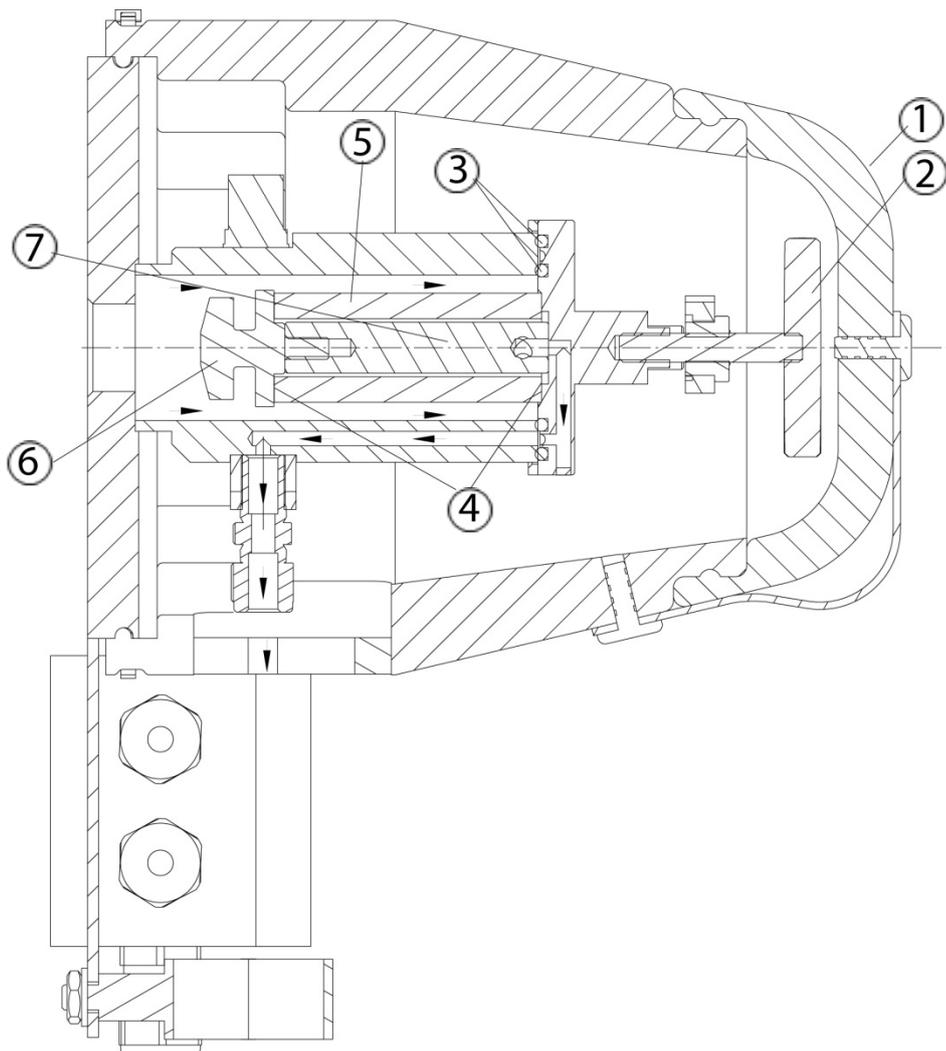


### Note

To remove the filter lid, please hold the filter lid clamp against the studs and turn the handle to the left until the filter lid loosens.

3. Unscrew the knurled head thumb screw ⑥ of the filter and remove the filter element ⑤.
4. Check the seals of the filter element ④ and replace if necessary.

5. Check o-rings of the filter lid ③ and replace if necessary.
6. Place new filter element ⑤ on the filter element holder ⑦.
7. Screw-on the knurled head thumb screw ⑥ again.
8. Clean the filter chamber. Now, while the filter lid with the filter element is removed, you can clean the inside of the probe tube to remove residue.
9. To assemble the sample probe, please insert the filter lid with the new filter element back into the probe. To tighten the filter lid, put the filter lid clamp against the studs and turn the handle ② to the right.
10. Place insulation cap back on the sample probe.



- |                         |                            |                          |
|-------------------------|----------------------------|--------------------------|
| ① Insulation cap        | ② Handle of the filter lid | ③ Filter lid o-rings     |
| ④ Filter element seals  | ⑤ Filter element           | ⑥ Filter retaining screw |
| ⑦ Filter element holder |                            |                          |

**Figure 5** Replacing the filter element

## 19 Decommissioning

Flush gas sample probe with inert gas or air before decommissioning the gas sample probe (turning off the heating). This will prevent condensation of aggressive components of the process gas.

## 20 Proper disposal of the device

At the end of the service life of our products, it is important to take care of the appropriate disposal of obsolete electrical and non-electrical devices. To help protect our environment, follow the rules and regulations of your country regarding recycling and waste management.

## 21 Spare parts and consumables

The replacement interval for spare parts and consumables depends on the specific operating condition of the probe. The quantities recommended in the following table are based on experience. Your replacement intervals will be based on your operating conditions.

Gas sample probe SP180-H-EX1 T*						
(C) Consumable parts (R) Recommended spare parts (S) Spare parts						
						recommended amount based on number of years of operation [years]
Part No.	Description	C/R/S	1	2	3	
90S0015	Ceramic filter element S-2K, 2 µm, 75 mm [≈ 2.95"] ⑤	C	6	12	18	
93S0045	Viton®-gasket (30) ④	R	4	8	12	
93S0020	O-ring lid sealing (39) Material: Viton® ③	R	2	4	6	
93S0025	O-ring lid sealing (55) Material: Viton® ③	R	2	4	8	
90S2080	Novapress® gasket 3/4" ( <i>blue</i> ), max. 600 °C [max. 1112 °F]	R	1	2	3	
90S2077	Novapress® flange gasket DN 65 PN 6 (67 mm i.)	R	1	1	1	
90S2075	Flange gasket set for DN 65 PN 6B, consisting of Novapress® gasket (67 mm i.) and screws set M12	S	1	1	1	
90S5060	HEX4/SP180-H Alarm switch Ex 135 °C [275 °F]	R	-	-	1	
90S5065	HEX4/SP180-H Alarm switch Ex 180 °C [356 °F]	R	-	-	1	
BH0036	Heater cartridge, HLP R 240, 230 V, 10 mm, 85 mm, T2	R	2	2	4	
BH0038	Heater cartridge, HLP R 240, 230 V, 10 mm, 85 mm, T4	R	2	2	4	
BH0039	Heater cartridge, HLP R 240, 230 V, 10 mm, 85 mm, T3	R	2	2	4	

Viton® is a registered trademark for fluoroelastomers by DuPont Performance Elastomers, USA.

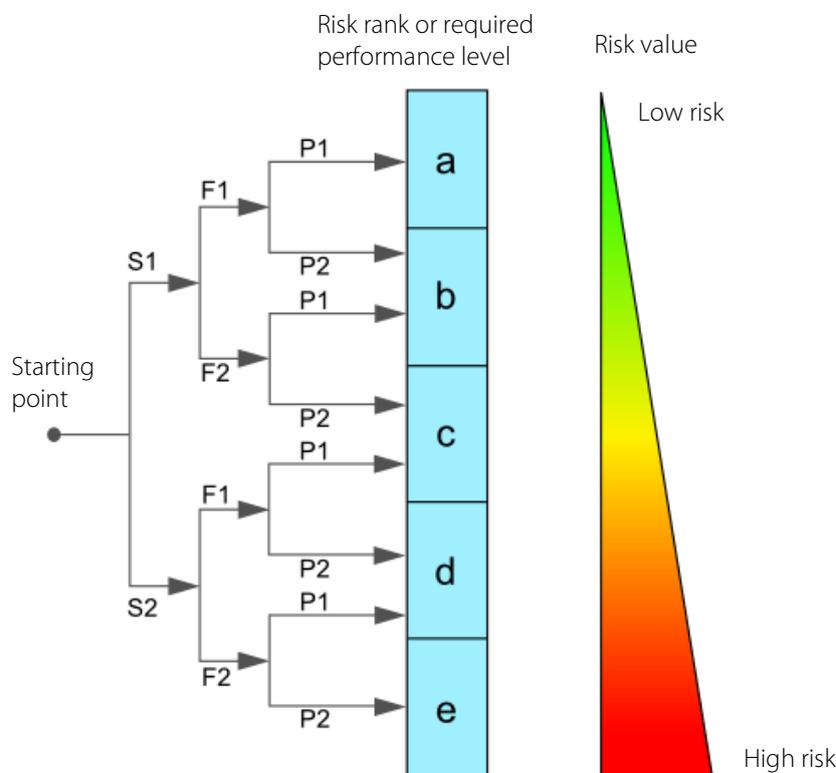
Novapress® is a registered trademark for elastomer-bonded gasket material by Frenzelit GmbH, Germany.

## 22 Risk assessment

The risk assessment provided in this chapter is intended for all work activities on the product. The hazards can occur in the work steps of assembly, commissioning, maintenance, disassembly and in the event of a product fault. During normal operation, the product is protected by a system cabinet or appropriate covers. Only qualified personnel is permitted to perform the work. The following minimum knowledge is required for the work:

- Employee instruction provided in process engineering
- Employee instruction provided in electrical engineering
- Detailed knowledge of the instruction manual and the applicable safety regulations

The product complies with the current regulations according to state-of-the-art science and technology. Nevertheless, not all sources of danger can be eliminated while observing technical protective measures. Therefore, the following risk assessment and the description of exposure hazards refer to the work steps mentioned above.



### Severity of injury:

S1 = 1 = minor (reversible injury)

S2 = 2 = serious (irreversible injury, death)

### Frequency and duration:

F1 = 1 = infrequent or short exposure to hazard

F2 = 2 = frequent (more than once per hour/shift)

### Possibility of preventing or limiting the damage

P1 = 1 = possible

P2 = 2 = hardly possible

**Figure 6** Overview risk assessment



### Aggressive condensate possible

#### Risk rank group A

Chemical burns due to aggressive media possible!

This applies to all liquids in vessels and in the product.

In general, for electrical and mechanical work on the product, wear personal protective equipment (PPE) in accordance with the risk assessment.



### Caution hot surfaces

#### Risk rank group A

The temperature inside the product can be higher than  $> 180\text{ }^{\circ}\text{C}$ .

The hot parts are shielded by mechanical devices. Before opening the products, they must be disconnected from the power supply and a cooling time of more than  $> 180$  minutes must be observed. In general, for electrical and mechanical work on the product, wear personal protective equipment (PPE) in accordance with the risk assessment.



### Caution electric shock

#### Risk rank group C

When installing high-power systems with nominal voltages of up to 1000 V, the requirements of VDE 0100 and their relevant standards and regulations must be observed!

This also applies to any connected alarm and control circuits. Before opening the products, they must always be disconnected from the power supply.



### Gas hazard

#### Risk rank group A-B-C

The hazard potential mainly depends on the gas to be extracted.

If toxic gases, oxygen displacing or explosive gases are conveyed with the product, an additional risk assessment by the operator is mandatory.

In principle, the gas paths must be purged with inert gas or air before opening the gas-carrying parts.

The escape of potentially harmful gas from the open process connections must be prevented.

The relevant safety regulations must be observed for the media to be conveyed. If necessary, flush the gas-carrying parts with a suitable inert gas. In the event of a gas leakage, the product may only be opened with suitable PPE or with a monitoring system.

Furthermore, the work safety regulations of the operator must be observed.



### Caution crushing hazard

#### Risk rank group A

The work must be performed by trained personnel only.

This applies to products weighing less than  $< 40$  kg [ $\approx 88.2$  lbs]:

The product can be transported by 1 to 2 person(s). The instructions for appropriate personal protective equipment (PPE) must be observed.

The weight specifications are contained in the technical data of this product.

Furthermore, the work safety regulations of the operator must be observed.

## 23 Appendix

- EU-Type Examination Certificate (German original and English translation)
- IECEx Certificate of Conformity



**Further product documentation is available on our home page:**

<http://www.mc-techgroup.com>

- Data sheets : sample tubes series SP®
- Datasheet: prefilter series SP®

# 1 EU-Baumusterprüfbescheinigung

2 **Geräte zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen**  
Richtlinie 2014/34/EU

3 Nr. der EU-Baumusterprüfbescheinigung: **BVS 18 ATEX E 043**

4 Produkt: **Gasentnahmesonde Typ SP180 H-EX1 T2, SP180 H-EX1 T3, SP180 H-EX1 T4**

5 Hersteller: **M&C TechGroup Germany GmbH**

6 Anschrift: **Rehhecke 79, 40885 Ratingen, Deutschland**

7 Die Bauart dieses Produktes sowie die verschiedenen zulässigen Ausführungen sind in der Anlage zu dieser Baumusterprüfbescheinigung festgelegt.

8 Die Zertifizierungsstelle der DEKRA EXAM GmbH, benannte Stelle Nr. 0158 gemäß Artikel 17 der Richtlinie 2014/34/EU des Europäischen Parlaments und des Rates vom 26. Februar 2014, bescheinigt, dass das Produkt die wesentlichen Gesundheits- und Sicherheitsanforderungen für die Konzeption und den Bau von Produkten zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen gemäß Anhang II der Richtlinie erfüllt.  
Die Ergebnisse der Prüfung sind in dem vertraulichen Prüfprotokoll BVS PP 18.2078 EU niedergelegt.

9 Die wesentlichen Gesundheits- und Sicherheitsanforderungen werden erfüllt durch Übereinstimmung mit den Normen:

**EN 60079-0:2012 + A11:2013 Allgemeine Anforderungen**  
**EN 60079-7:2015 Erhöhte Sicherheit „e“**  
**EN 60079-18:2015 Vergusskapselung „m“**

10 Falls das Zeichen „X“ hinter der Bescheinigungsnummer steht, wird in der Anlage zu dieser Bescheinigung auf besondere Bedingungen für die sichere Anwendung des Produktes hingewiesen.

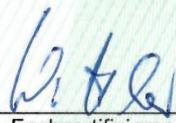
11 Diese EU-Baumusterprüfbescheinigung bezieht sich nur auf den Entwurf und Bau der beschriebenen Produkte.  
Für den Herstellungsprozess und die Abgabe der Produkte sind weitere Anforderungen der Richtlinie zu erfüllen, die nicht durch diese Bescheinigung abgedeckt sind.

12 Die Kennzeichnung des Produktes muss die folgenden Angaben enthalten:

 **II 2G Ex eb mb IIC T2/T3/T4 Gb**

DEKRA EXAM GmbH  
Bochum, den 30.05.2018

  
Zertifizierer

  
Fachzertifizierer

Seite 1 von 2 zu BVS 18 ATEX E 043  
Dieses Zertifikat darf nur vollständig und unverändert weiterverbreitet werden.



DEKRA EXAM GmbH, Dinnendahlstraße 9, 44809 Bochum, Deutschland  
Telefon +49.234.3696-105, Telefax +49.234.3696-110, zs-exam@dekra.com



### 13 Anlage zur

### 14 EU-Baumusterprüfbescheinigung BVS 18 ATEX E 043

### 15 Beschreibung des Produktes

#### 15.1 Gegenstand und Typ

Gasentnahmesonde Typ SP180 H-EX1 T2, SP180 H-EX1 T3, SP180 H-EX1 T4

#### 15.2 Beschreibung

Die Gasentnahmesonde dient zur Staubfiltration von Messgas.  
Sie besteht aus einer Heizpatrone in der Zündschutzart Erhöhte Sicherheit und einem Temperaturalarm in der Zündschutzart Vergusskapselung.  
Heizung und Temperaturalarm sind immer durch eine metallische Haube abgedeckt.

#### 15.3 Kenngrößen

##### 15.3.1 Elektrische Daten

Versorgung			
Versorgungsspannung	110-240	V	
Frequenz	50/60	Hz	
Leistung	200	VA	
Bemessungsstrom	3,5	A	
Alarmkontakt			
Spannung	250	V	
Strom	AC 1,5	A	
	DC 0,5	A	

##### 15.3.2 Thermische Daten

Umgebungstemperatur -20 °C...80 °C

Temperaturklassen

Temperaturklasse	Betriebstemperatur [°C]	Max. Heizleistung des Heizstabs [°C]
T2	180	240
T3	155	180
T4	100	130

### 16 Prüfprotokoll

BVS PP 18.2078 EU, Stand 30.05.2018

### 17 Besondere Bedingungen für die Verwendung

Keine

### 18 Wesentliche Gesundheits- und Sicherheitsanforderungen

Die wesentlichen Gesundheits- und Sicherheitsanforderungen sind durch die unter Abschnitt 9 gelisteten Normen abgedeckt.

### 19 Zeichnungen und Unterlagen

Die Zeichnungen und Unterlagen sind in dem vertraulichen Prüfprotokoll gelistet.

Seite 2 von 2 zu BVS 18 ATEX E 043

Dieses Zertifikat darf nur vollständig und unverändert weiterverbreitet werden.



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## Translation

# 1 EU-Type Examination Certificate

2 **Equipment intended for use in potentially explosive atmospheres**  
**Directive 2014/34/EU**

3 EU-Type Examination Certificate Number: **BVS 18 ATEX E 043**

4 Product: **Gas sampling probe type SP180 H-EX1 T2, SP180 H-EX1 T3, SP180 H-EX1 T4**

5 Manufacturer: **M&C TechGroup Germany GmbH**

6 Address: **Rehhecke 79, 40885 Ratingen, Germany**

7 This product and any acceptable variations thereto are specified in the appendix to this certificate and the documents referred to therein.

8 DEKRA EXAM GmbH, Notified Body number 0158, in accordance with Article 17 of Directive 2014/34/EU of the European Parliament and of the Council, dated 26 February 2014, certifies that this product has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of products intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in the confidential Report No. BVS PP 18.2078 EU.

9 Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

**EN 60079-0:2012 + A11:2013**    **General requirements**  
**EN 60079-7:2015**                **Increased Safety "e"**  
**EN 60079-18:2015**               **Encapsulation "m"**

10 If the sign "X" is placed after the certificate number, it indicates that the product is subject to the Special Conditions for Use specified in the appendix to this certificate.

11 This EU-Type Examination Certificate relates only to the design and construction of the specified product. Further requirements of the Directive apply to the manufacturing process and supply of this product. These are not covered by this certificate.

12 The marking of the product shall include the following:

 **II 2G Ex eb mb IIC T2/T3/T4 Gb**

DEKRA EXAM GmbH  
Bochum, 2018-05-30

Signed: Jörg Koch

\_\_\_\_\_  
Certifier

Signed: Dr Michael Wittler

\_\_\_\_\_  
Approver



Page 1 of 3 of BVS 18 ATEX E 043  
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telephone +49.234.3696-105, fax +49.234.3696-110, zs-exam@dekra.com



### 13 Appendix

### 14 EU-Type Examination Certificate BVS 18 ATEX E 043

### 15 Product description

#### 15.1 Subject and type

Gas sampling probe type SP180 H-EX1 T2, SP180 H-EX1 T3, SP180 H-EX1 T4

#### 15.2 Description

The Gas sampling probe is for dust filtration of measuring gas.  
It consists of a heating cartridge in type of protection Increased Safety and a temperature alarm in type of protection Encapsulation.  
Heating and temperature alarm are always covered by a metallic hood.

#### 15.3 Parameters

##### 15.3.1 Electrical data

Supply			
Supply voltage	110-240	V	
Frequency	50/60	Hz	
Power	200	VA	
Rated current	3.5	A	
Alarm contact			
Voltage	250	V	
Current	AC 1.5	A	
	DC 0.5	A	

##### 15.3.2 Thermal data

Ambient temperature -20 °C...80 °C

##### Temperature class

Temperature class	Service temperature [°C]	Max. power heating cartridge [°C]
T2	180	240
T3	155	180
T4	100	130

Page 2 of 3 of BVS 18 ATEX E 043

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16 **Report Number**

BVS PP 18.2078 EU, as of 2018-05-30

17 **Special Conditions for Use**

None

18 **Essential Health and Safety Requirements**

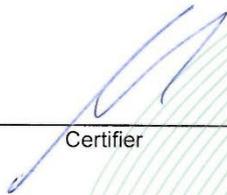
The Essential Health and Safety Requirements are covered by the standards listed under item 9.

19 **Drawings and Documents**

Drawings and documents are listed in the confidential report.

We confirm the correctness of the translation from the German original.  
In the case of arbitration only the German wording shall be valid and binding.

DEKRA EXAM GmbH  
Bochum, dated 2018-05-30  
BVS-Pe/Nu A 20180228

  
\_\_\_\_\_  
Certifier

  
\_\_\_\_\_  
Approver

Page 3 of 3 of BVS 18 ATEX E 043  
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## IECEX Certificate of Conformity

### INTERNATIONAL ELECTROTECHNICAL COMMISSION IEC Certification Scheme for Explosive Atmospheres

for rules and details of the IECEx Scheme visit [www.iecex.com](http://www.iecex.com)

Certificate No.:	IECEX BVS 18.0034	Issue No: 0	<u>Certificate history:</u> Issue No. 0 (2018-06-05)
Status:	<b>Current</b>	Page 1 of 3	
Date of Issue:	<b>2018-06-05</b>		
Applicant:	<b>M&amp;C TechGroup Germany GmbH</b> Rehhecke 79 40885 Ratingen <b>Germany</b>		
Equipment:	<b>Gas sampling probe type SP180 H-EX1 T2, SP180 H-EX1 T3, SP180 H-EX1 T4</b>		
<i>Optional accessory:</i>			
Type of Protection:	<b>Equipment protection by encapsulation "m", Equipment protection by increased safety "e"</b>		
Marking:	Ex eb mb IIC T2/T3/T4 Gb		

*Approved for issue on behalf of the IECEx  
Certification Body:*

Jörg Koch

*Position:*

Head of Certification Body

*Signature:  
(for printed version)*

*Date:*

1. This certificate and schedule may only be reproduced in full.
2. This certificate is not transferable and remains the property of the issuing body.
3. The Status and authenticity of this certificate may be verified by visiting the [Official IECEx Website](http://www.iecex.com).

Certificate issued by:

**DEKRA EXAM GmbH**  
Dinnendahlstrasse 9  
44809 Bochum  
Germany

 **DEKRA**  
On the safe side.



## IECEX Certificate of Conformity

Certificate No:	IECEX BVS 18.0034	Issue No: 0
Date of Issue:	<b>2018-06-05</b>	Page 2 of 3
Manufacturer:	<b>M&amp;C TechGroup Germany GmbH</b> Rehhecke 79 40885 Ratingen <b>Germany</b>	

Additional Manufacturing location(s):

This certificate is issued as verification that a sample(s), representative of production, was assessed and tested and found to comply with the IEC Standard list below and that the manufacturer's quality system, relating to the Ex products covered by this certificate, was assessed and found to comply with the IECEx Quality system requirements. This certificate is granted subject to the conditions as set out in IECEx Scheme Rules, IECEx 02 and Operational Documents as amended.

#### STANDARDS:

The apparatus and any acceptable variations to it specified in the schedule of this certificate and the identified documents, was found to comply with the following standards:

<b>IEC 60079-0 : 2011</b> Edition:6.0	Explosive atmospheres - Part 0: General requirements
<b>IEC 60079-18 : 2014</b> Edition:4.0	Explosive atmospheres – Part 18: Equipment protection by encapsulation "m"
<b>IEC 60079-7 : 2015</b> Edition:5.0	Explosive atmospheres – Part 7: Equipment protection by increased safety "e"

*This Certificate **does not** indicate compliance with electrical safety and performance requirements other than those expressly included in the Standards listed above.*

#### TEST & ASSESSMENT REPORTS:

*A sample(s) of the equipment listed has successfully met the examination and test requirements as recorded in*

Test Report:

[DE/BVS/EXTR18.0036/00](#)

Quality Assessment Report:

[DE/BVS/QAR17.0009/00](#)



## IECEx Certificate of Conformity

Certificate No: IECEx BVS 18.0034

Issue No: 0

Date of Issue: 2018-06-05

Page 3 of 3

### Schedule

#### EQUIPMENT:

*Equipment and systems covered by this certificate are as follows:*

#### Subject and type

Gas sampling probe type SP180 H-EX1 T2, SP180 H-EX1 T3, SP180 H-EX1 T4

#### Description

The Gas sampling probe is for dust filtration of measuring gas.  
It consists of a heating cartridge in type of protection Increased Safety and a temperature alarm in type of protection Encapsulation.  
Heating and temperature alarm are always covered by a metallic hood.

#### Parameters

See Annex

**SPECIFIC CONDITIONS OF USE: NO**

#### Annex:

[BVS\\_18\\_0034\\_M&CTechGroup\\_Annex.pdf](#)



## IECEX Certificate of Conformity



**Certificate No.:** **IECEX BVS 18.0034**  
**Annex**  
**Page 1 of 1**

### Parameters

#### Electrical data

Supply			
Supply voltage	110-240	V	
Frequency	50/60	Hz	
Power	200	VA	
Rated current	3.5	A	
Alarm contact			
Voltage	250	V	
Current	AC 1.5	A	
	DC 0.5	A	

#### Thermal data

Ambient temperature -20 °C...80 °C

#### Temperature class

Temperature class	Service temperature [°C]	Max. power heating cartridge [°C]
T2	180	240
T3	155	180
T4	100	130