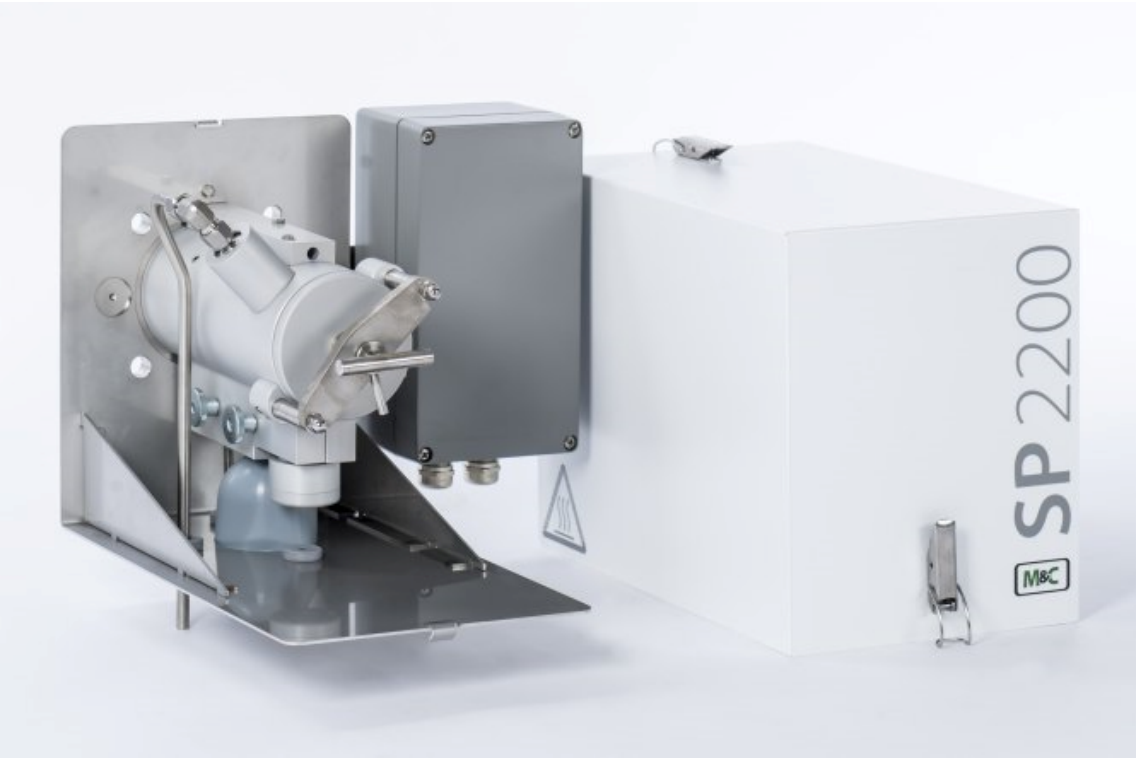
Embracing Challenge

Gas Sample Probe Series SP®

SP2200-H/C/I/BB,
SP2200-H/C/I/BB/F

Instruction Manual
Version 1.00.03



Dear customer,

we have made up this operating manual in such a way that all necessary information about the product can be found and understood quickly and easily.
Should you still have any question, please do not hesitate to contact **M&C** directly or go through your appointed dealer. Respective contact addresses are to be found in the annexe to this operating manual.
Please also contact our homepage **www.mc-techgroup.com** for further information about our products. There, you can read or download the data sheets and operating manuals of all **M&C** products as well as further information in German and English.

Version: 1.00.03

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1 GENERAL INFORMATION

The product described in this operating manual has been examined before delivery and left our works in perfect condition related to safety regulations. In order to keep this condition and to guarantee a safe operation, it is important to heed the notes and prescriptions made in this operating manual. Furthermore, attention must be paid to appropriate transportation, correct storage, as well as professional installation and maintenance work.
All necessary information a skilled staff will need for appropriate use of this product are given in this operating manual.

2 DECLARATION OF CONFORMITY

CE - Certification

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

EMV-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

Please take care of the following basic safety procedures when mounting, starting up or operating this equipment:

Read this operating manual before starting up and use of the equipment. The information and warnings given in this operating manual must be heeded.

Any work on electrical equipment is only to be carried out by trained specialists as per the regulations currently in force.

Attention must be paid to the requirements of VDE 0100 (IEC 364) when setting high-power electrical units with nominal voltages of up to 1000 V, together with the associated standards and stipulations.

Check the details on the type plate to ensure that the equipment is connected to the correct mains voltage.

Protection against touching dangerously high electrical voltages:
Before opening the equipment, it must be switched off and hold no voltages. This also applies to any external control circuits that are connected.

The device is only to be used within the permitted range of temperatures and pressures.

Check that the location is weather-protected. It should not be subject to either direct rain or moisture.

The equipment must not be used in hazardous areas.

Installation, maintenance, monitoring and any repairs may only be done by authorized personnel with respect to the relevant stipulations.

4 WARRANTY

If the equipment fails, please contact **M&C** directly or else go through your **M&C** authorised dealer.
We offer a one year warranty as of the day of delivery as per our normal terms and conditions of sale, and assuming technically correct operation of the unit. Consumables are hereby excluded. The terms of the warranty cover repair at the factory at no cost or the replacement at no cost of the equipment free ex user location. Reshipments must be send in a sufficient and proper protective packaging.

5 USED TERMS AND SIGNAL INDICATIONS

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.

Caution

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

Attention

'Attention' indicates that an unintended result or situation can occur if the corresponding information is not taken into account.

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, mounting, commissioning and operation of these types of products.

Hot surface!

Contact may cause burn! Do not touch!

High voltages!

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

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

Wear protective gloves!

Working with chemicals, sharpe objects or extremly 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.

6 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 is it possible to reduce maintenance to a minimum while ensuring maximum availability.

6.1 SERIAL NUMBERS

The nameplates bearing the serial number are located on the side of the electrical connection box.

Note

Always quote the device's serial number when making enquiries and ordering replacement parts.

6.2 POWER SUPPLY

Depending on the version, the probe is operated with 115 or 230 V AC. Precise details can be found on the device's nameplate.

7 TECHNICAL DATA

Sample Probe Series SP®	**SP2200-H/C/I/BB**	**SP2200-H/C/I/BB/F**
Part No.	20S2010	20S2015
Back-purging into the process	Through filter chamber	Through filter element
Mains supply	230 V 50/60 Hz 800 W*, optional 115 V 60 Hz 800 W	
Electrical connection	Terminals; max 4 mm², 2 x PG 13.5 cable gland	
Protective type	IP54 (EN 60529)*****	
Ambient temperature	Thermostat: -20 °C to 60 °C PT100, thermocouple: -20 °C to 80 °C	
Operating temperature	0-180 °C*****	
Ready for operation	after 2 hours	
Temperature status alarm point	±30 °C to T_{Set}*****	
Alarm contact rating	250 V 3 A AC, 0.25 A DC	
Connection sample outlet	1/4"-NPT i., for max. 10 mm tube connectors	
Connection back-purging	tube fitting 8 mm ø	
Connection calibration gas	tube 6 mm ø	
Filter chamber volume	120 ml	
Sample pressure	0.4 to 6 bar abs.	
Material of sample conducting parts	SS316Ti, Viton®***** alternative = SS316Ti, PTFE	

***** = Standard

Differential pressure and T_{90}-time at different flow rates:						
ΔP and T_{90} at flow of	100	200	500	1000	1500	Nl/hr
ΔP with new filter element S-2K 150 or F-0,1GF150:	0.007	0.011	0.020	0.035	0.04	bar
T_{90}-time without sample tube/pre filter:	6.0	3.5	1.0	<0.5	<0.5	sec.

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

8 APPLICATIONS

The **SP2200...** gas sample probes are used for continuous extraction of gases from dust loaded, high-temperature or humid processes.
A host of different variations in sampling technology as well as some built-in accessories offer a wide range of possible applications for nearly all problems encountered in taking gas samples from processes with high dust content where an effective backflush is necessary. Sampling from processes up to a maximum of 1900 °C are possible with this probe.

9 DESCRIPTION

The sample probes are designed for easy installation, reliable and flexible operation and trouble-free maintenance. Filter elements can be changed without the need for tools and without disconnecting the sample line, the filter chamber can be cleaned easily, the probe tube can be cleaned without removing the probe:
these are just a few of the many advantages offered by this probe.

The filter element, which has a large surface, is located in a stainless steel filter housing.

The following filter elements are available:

Filter element type S-2K-150*	2 micron	ceramic
Filter element type S-3G-150	3 micron	glass
Filter element type S-3SS-150	3 micron	stainless steel 316
Filter element type S-0,1GF-150	0.1 micron	glass fibre

The following sealing materials are used:

Viton*****	Standard	max. 180 °C
PTFE	type /7aT	max. 180 °C

The following types of filter heating and adjustment are possible:

Electrical heating and adjustment with internal capillary tube thermostat*****	type **/H***
Electrical heating and adjustment with external electronic controller	type **/PT100**
Electrical heating and adjustment with external electronic controller	type **/Fe-CuNi**

*Standard
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9.1 PROBE STRUCTURE

The filter housing with its all-round heating element forms a unit with the standard mounting flange DN65 PN6 and the laterally mounted electrical connection box.
The heat-insulated shield is mounted on the stainless steel angle sheet which is mounted on the mounting flange. It is secured with 2 pressure clamps. The cover ensures a uniform distribution of heat over the probe heater and at the same time serves as protection against weather and accidental contact.

The connecting clamp for attaching heated **M&C** sample lines with external dimensions of between 40mm and 50mm is located at the aperture on the underside of the angle sheet, which is closed with a silicon lid. The clamp is mounted on an adjustable mounting bracket which allows adjustment for various sample line diameters.

The standard probe's sample gas outlet connection has a ¼" NPT internal thread to which the customer must connect a suitable size of temperature resistant and threaded connector to connect the sample line in a gas tight manner. These connectors can be supplied by **M&C**.

After the threaded pipe connector and sample line have been mounted, the sample gas outlet connection is enclosed in special heat-conducting jaws in order to avoid temperature failures in the critical connection areas. The size of the heat-conducting jaws allows connection joints up to an external pipe dimension of 10mm.

In the standard version, temperature control is ensured by way of the capillary tube thermostat which is built into the connection box and which has a regulation range between 0°C to 180°C. Rated values can be set to a maximum 180°C. The temperature has an excess temperature limiter which permanently switches off the heating if the set temperature is exceeded by 30°C. The heating can be switched back on again by pressing the **RESET button** which is located below the aperture in the thermostats mounting and which is marked **RESET**.
The thermostat has a temperature failure alarm which activates a contact if the temperature falls 30°C below the set temperature. This status alarm is located on the terminal strip as a potential-free switch over contact.

If temperature control is to be achieved using external electronic equipment, a PT100 (a max. of two can be built in) or an Fe-CuNi thermoelement is provided as a temperature sensor.
For test gas feeding and back purging, check valves are integrated in the gas sample probe. To prevent a flow of test gas back to the process while test gas feeding, a pneumatic isolation valve is mounted in the sample gas outlet. To prevent the analyser from a pressure surge while back flushing the pneumatic isolation valve has to be used as well.

The gas sample probe **SP2200-H/C/I/BB** is designed for back flushing via the filter chamber. The design of the **SP2200-H/C/I/BB/F** allows back flushing via the filter element (see Fig.2).

Depending on the process gas temperature and composition, probe tubes made of different materials are used with ¾" connections:

Material	Type	Process temperature	max. length	Pipe (nipple) o.d.
Stainless steel 316	**SS**	up to max. 600 °C	2.5 m	25 (37) mm ø
Titan	**Ti**	up to max. 400 °C	2.5 m *	25 (37) mm ø
Hastelloy®	**Ha**	up to max. 900 °C	2.5 m *	25 (37) mm ø
Incolloy® 956	**In**	up to max. 1200 °C	2.0 m *	25 (37) mm ø
Kanthal®	**Ka**	up to max. 1300 °C	2.5 m *	25 (37) mm ø
Alu. oxide	**AO**	up to max. 1800 °C	1.5 m *	25 (55) mm ø
PVDF	**PV**	up to max. 90 °C	1.5 m *	25 (37) mm ø
PTFE	**T**	up to max. 160 °C	0.5 m	33 mm ø

1m standard *****

Hastelloy® is a registered trademark by Haynes International, USA.
Incoloy® is a registered trademark by Special Metals Corporation, USA.
Kanthal® is a registered trademark by Sandvik Intellectual Property AB, Sweden.

Depending on the process gas temperature and composition or critical set up situations, heated probe elements made of stainless steel with flange connection DN65 PN6 are used:

Type	Process temperature	max. length	Pipe o.d.
SP30H1, heating max. 320 °C	up to max. 550 °C	2.0 m *	40 mm ø
SP30H2, heating max. 200 °C	up to max. 200 °C	2.0 m *	40 mm ø
SP35H, heating max. 320 °C	up to max. 550 °C	0.175 m	40 mm ø

1m Standard *****

In the case of heavier dust loading of the process gas, by all means we recommend using a prefilter in order to prolong service life. This can be supplied with or without dead volume displacer depending on the response times required. These filters can be screwed directly into the probe flange or via extension tubes fitted with volume displacers (see Fig.10).

We recommend the following prefilters with ¾" connection:

Dust loading	Prefilter Type	Process Temperature	Prefilter o.d.
< 2 g/m³	no filter, only probe tube	see above	
2-10 g/m³	/V20, /V20-0	up to max. 600 °C	ø 46 mm
	/V20-3, /V20-4	up to max. 600 °C	ø 31 mm
	/V20/HC, /V20-0/HC	up to max. 900 °C	ø 46 mm
	/V20-5	up to max. 500 °C	ø 50 mm
	with deflector for high flow speed		60 mm ø
> 10 g/m³	/V20-1, /V20-2	up to max. 600 °C	ø 60 mm
	/V20-1/HC, /V20-2/HC	up to max. 900 °C	ø 60 mm
	/V20-T	up to max. 200 °C	ø 65 mm
	/V20-6	up to max. 500 °C	ø 60 mm
	with deflector for high flow speed		65 mm ø
	/V12-1	up to max. 600 °C	ø 40 mm
	/V12-2, /V12-3	up to max. 600 °C	ø 60 mm
	/V12-1/SS	up to max. 600 °C	ø 40 mm
	/V12-2/SS, /V12-3/SS	up to max. 600 °C	ø 60 mm
	/V12-1/IC	up to max. 1000 °C	ø 40 mm
	/V12-2/IC, /V12-3/IC	up to max. 1000 °C	ø 60 mm

10 RECEIPT OF GOODS AND STORAGE

- The gas sample probe and any special accessories should be removed carefully from the packaging and checked immediately for completeness against the delivery note.
- Check the goods for any damage incurred during transport and if necessary inform your transport insurer of any damage.

The gas sample probe is normally delivered in two packaging units:
1. The gas sample probe with the screws, nuts and flange seal required for mounting.
2. Sample tube or prefilter, if applicable with extension tube.

Note The equipment should be stored in a protected, frost-free room!

11 PREPARATION AND INSTALLATION

Select the optimal sampling point in accordance with the generally applicable guidelines or consult the competent persons.
Locate the sampling point in such a way that there is adequate space for inserting and removing the probe and pay attention to the insertion length of the probe tube.
Make certain that the probe is easily accessible so that you can carry out any subsequent maintenance work without trouble.

Locate the probe connections in such a way that the connections' temperature is always above the acid dew point in order to avoid corrosion and blockage problems. 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 °C as a result of radiated heat, then a radiated-heat deflector must be mounted to protect the probe.
The connection's mounting flange connection should comply with DN65 PN6. If other connection sizes are required, a special adapter flange **/S010** can be supplied as an option.
Instead of flange connection mounting, the probe can also be mounted using an R2" adapter **/S01** on a corresponding threaded sleeve connection. This adapter can be supplied.
The necessary minimum flange size and the minimum connection diameter depends on the diameter of the probe tube or prefilter used.

Before mounting, the probe must be adjusted to the existing operating conditions.

The existing operational parameters are to be checked accordingly prior to commencing mounting work.

Under / over pressure situation	**mbar**	**bar**	
Process temperature	°C Min.	°C Max.	
Dust loading	g/m³		
Dust composition - grain size	µm		
Gas composition	corrosive	toxic	explosive
Which parameters should be measured, e.g. O_2, CO, SO_2, NO_X, ...,	Vol.%	mg/Nm³	ppm
Required amount of gas	l/h, Min.	l/h, Max.	
Necessary T_{90} -time	sec.		

12 MOUNTING

M&C **SP2200..** probes are designed for stationary use and if properly selected and mounted a long service life and minimum maintenance are guaranteed.

1. Remove the probe's protection shield after opening the two clamping devices.
2. Turn the U-bolt at the front end of the filter receptacle several times to the left until the retaining bolt can also be turned sideways to the left.
3. Remove the filter receptacle from the probe and check whether the filter element is screwed on tightly.
4. Then replace the filter receptacle, place the retaining bolt in its original position and tighten the U-bolt.
5. Remove the heat-conducting jaws at the sample gas outlet after loosening the knurled-head screw.
6. In order to connect the sample line, screw in a suitably sized threaded connector with a ¼"-NPT connecting thread using PTFE sealing tape.

Note Make sure that the connection is leakproof!

7. Screw either the probe tube or prefilter supplied directly or using an extension tube into the ¾" inner thread in the flange of the probe with the ¾" flat gasket and tighten.

If the heated probe tube type **SP30/35** or the ceramic prefilter type **V11** is used, then the probe is to be screwed to their flange (with welded threaded bolt). First insert the flange seal between the two flanges.
If the probe connection does not correspond to the standard flange connection DN65 PN6, then the optionally supplied adapter flange should be mounted to the probe in the same way.

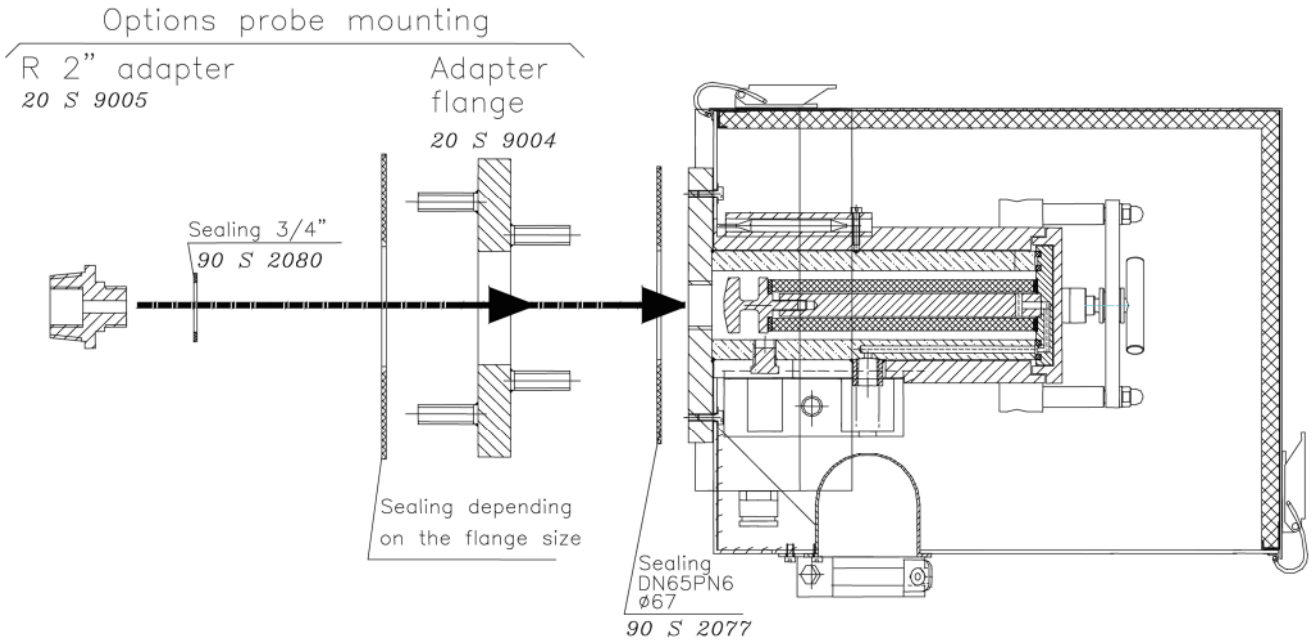


Figure 1 Probe mounting with adapter flange or R2" adapter

8. Now insert the process-internal probe section of the complete probe unit into the probe connection, but first attach the flange seal to the probe connection and screw using the screws and nuts supplied.

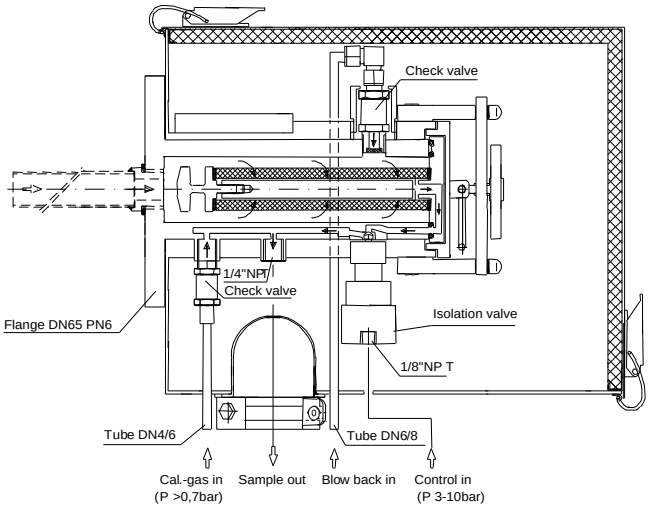
Note

A preferred mounting position is to have the probe with its sample gas outlet pointing downwards, although this is not absolutely necessary for perfect functioning. An advantage as well is mounting the probe with an angle (10°) downwards.

12.1 PNEUMATIC CONNEXIONS

1. Remove the upper part of the sample line's mounting bracket and insert the sample line through the silicon lid into the threaded pipe joint and connect it.
2. The temperature-resistant, stainless steel connectors supplied by **M&C** have a double ferrule system to ensure reliable sealing. After tightening the nuts of these connectors by hand, they should then be tightened exactly 1¼ of a turn using a flat spanner and are then properly mounted.
3. If a PTFE tube is used as sample line, an insert must under all circumstances be inserted in the end of the tube in order to prevent the tube being pressed together.
4. Screw on the upper part of the mounting bracket.
5. In the case of larger sample line diameters, it may be necessary for the central mounting of the sample line to loosen the two screws and move the small mounting bracket of the mounting bracket and then re-tighten them. Now place the heat conducting jaws around the sample gas connection in the retaining slot and fix with the knurled nuts.
6. If the probe has a check valve **/R** for calibration gas feeding or backflush, the corresponding pipe should be connected to the 6mm piping connection.
7. If the probe is fitted with an inlet ball valve with pneumatic drive, the control line for operating the pneumatic controller element is to connected at the 1/8"-NPT connecting thread.
8. For safety reasons, the ball valve is to be closed before mounting the probe.
9. Now replace the protection shield and fasten using the pressure clamps.

SP2200-H/C/I/BB



SP2200-H/C/I/BB/F

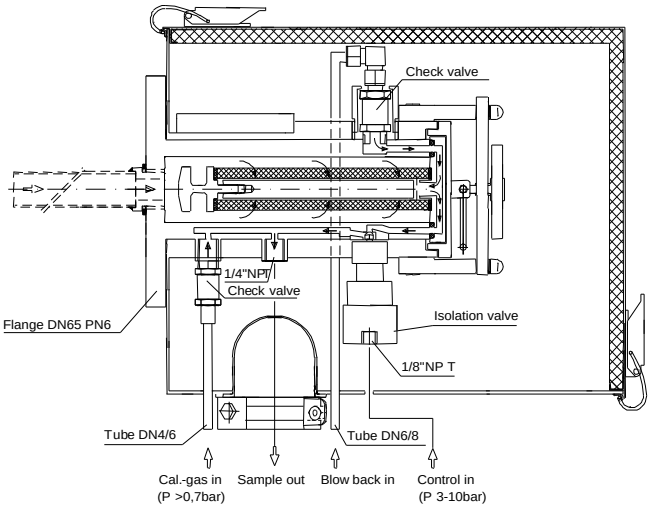


Figure 2 Connexions SP2200-H/C/I/BB and SP2200-H/C/I/BB/F

12.2 NEW FILTER HOUSING LID FROM SERIAL NOS. 10283

The sample probe series SP2000 will be delivered, starting with the serial number 10283, with a new filter housing lid lock, to make filter replacement easier.

The modification consists of a toggle screw „A“, which allows to fasten the filter housing lid by turning the screw clockwise and lifting up the lid by turning it anti-clockwise.
After turning the clamp „B“ to the left hand side, the filter housing lid can be removed.

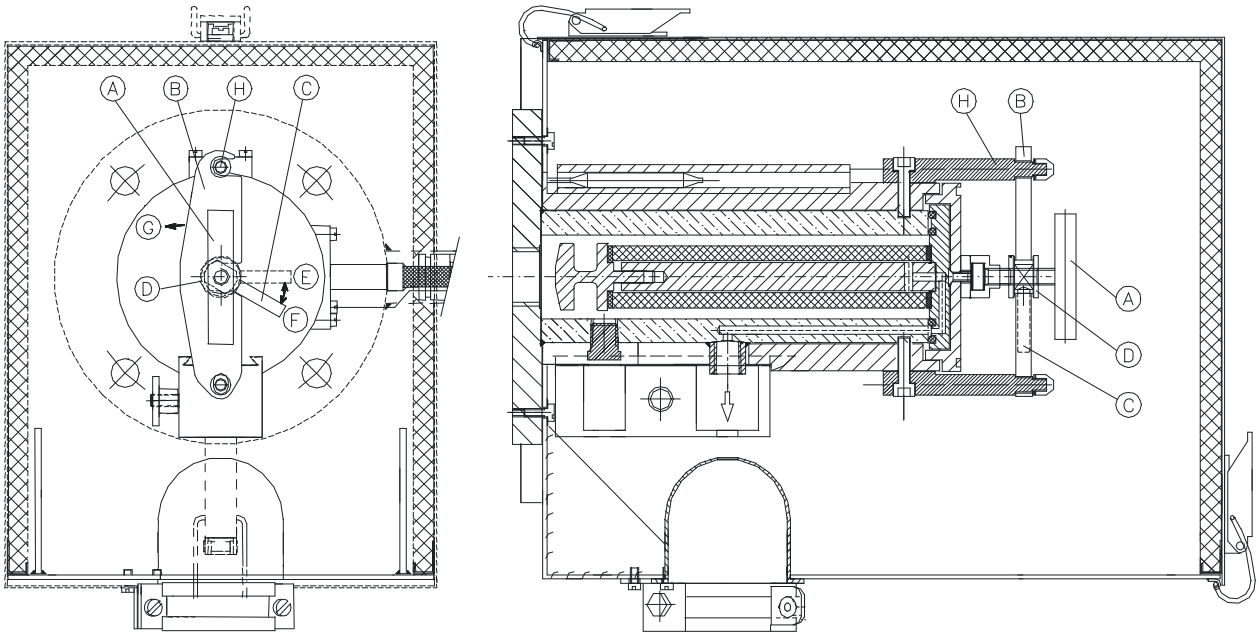
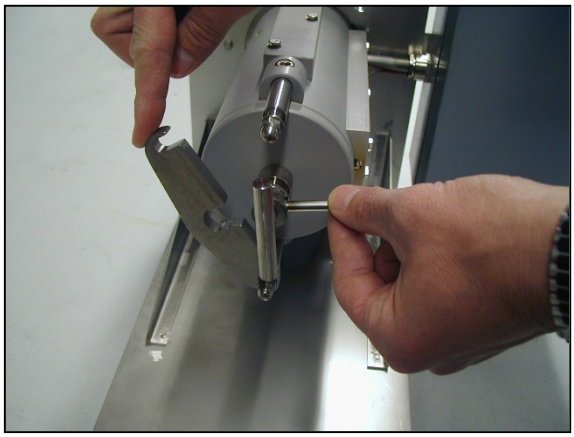


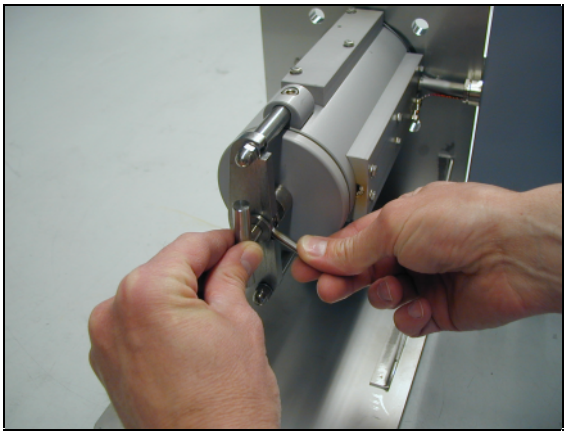
Figure 3 New filter housing lid ex serial number 10283

The following steps are recommended removing the filter housing lid:

1. Turn toggle screw „A“ approx. 1 turn counter-clockwise, that the filter housing lid will lift up;
2. Turn handle „C“ in position „E“;
3. Turn clamp „B“ counter-clockwise in direction „G“;
4. Take toggle screw „A“ an pull out the filter housing lid;
5. Change filter element and possibly the lids;
6. Push in the filter housing lid into the filter area;
7. Turn clamp „B“ clockwise and turn with the handle „C“ the ringsscrew „D“ in position „E“, that the clamp „B“ will latch into the ringscrew „D“ and the threaded bolt „H“. It could be neccessary to move the filter housing lid a little bit forward and backward;
8. Turn handle „C“ in position „F“ and fasten the filter housing lid by turning the toggle screw „A“ clockwise by hand.

The following pictures should explain the above mentioned steps.





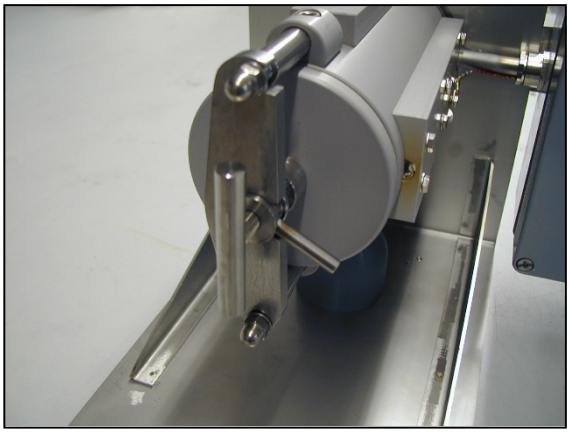


Figure 4 Removing the new filter housing lid

The new locking is available as a complete set for sample probes older than serial number 10283 (part no.: 93S0081).

13 ELECTRICAL CONNECTIONS

Warning

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

Warning

Use always the low temperature alarm. In case of an alarm the flow can be stopped and the components downstream the probe are safe for demage.

Note

Attention must be paid to the requirements of IEC 364 (DIN VDE 0100) when setting high-power electrical units with nominal voltages of up to 1000 V, together with the associated standards and stipulations.

In any case 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 technical data.

13.1 STANDARD VERSION WITH INTERNAL CAPILLARY TUBE THERMOSTAT

1. Remove the lid of the connection box. The electrical connection layout is located in the lid.
2. Insert the mains cable (min. 3 x 1.5 mm^2) through the treaded cable gland and connect to the appropriate terminals.
3. Insert the signal cable through the treaded cable connection and connect to the appropriate terminals.
4. Screw lid back on.

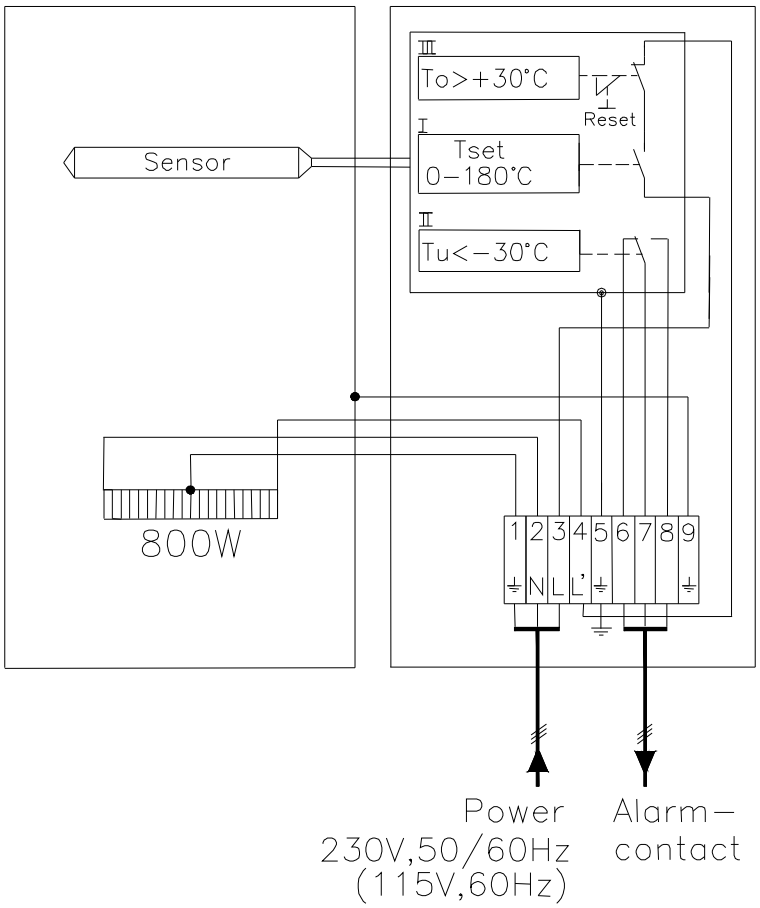


Figure 5 Electrical connection at the capillary tube thermostat

13.2 VERSION WITH EXTERNAL TEMPERATURE CONTROL

1. Remove the lid of the connection box. The electrical connection layout is located in the lid.
2. Insert the mains cable coming from the external temperature controller (min. 3 x 1.5 mm^2) through the threaded cable gland and connect to the appropriate terminals.

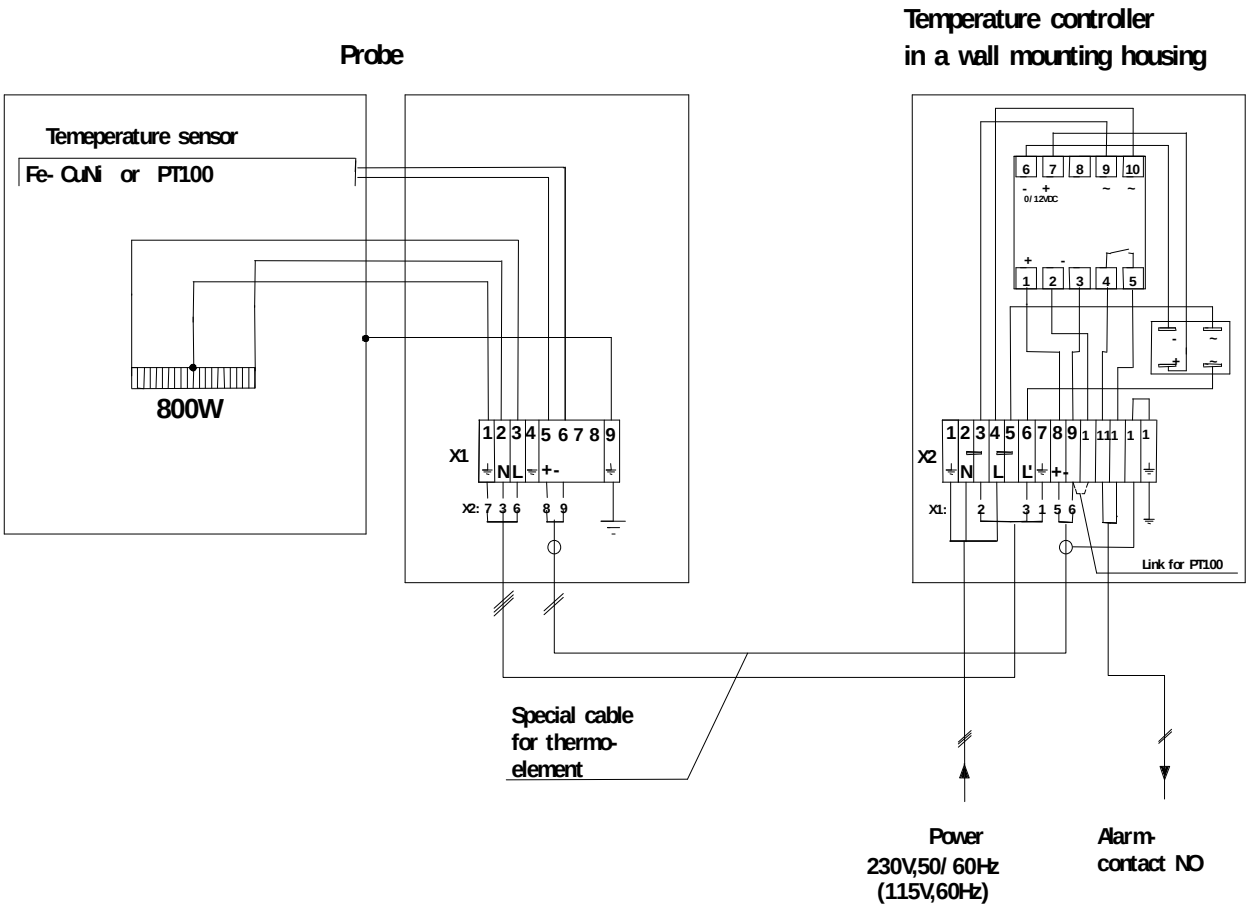


Figure 6 Electrical connexions at the electronic controller 70304G

14 STARTING

1. Before starting up check whether the mains power supply voltage corresponds with the information stated on the probe's nameplate.
2. Check the rated value setting on the built-in thermostat or on the external controller.
3. Switch on mains power supply. The total heating-up time is approximately 2 hours. After about 1 hour the probe is already sufficiently heated for the temperature to have exceeded the temperature failure alarm value (30 °C below rated value), but it still takes about another hour until operating temperature is reached.
4. The sample gas can now be extracted via the probe after this minimum heating-up time of 2 hours.

Note

If the rated value temperature needs to be lowered more than 30 °C in one step during operation, the thermostat's excess temperature switch-off is triggered!

Warning

Be careful when you get in contact with the probe's surface during operation.
The high surface temperatures may cause burnings.

Protective gloves are to be born and any unauthorized access to the probe must be made impossible !

14.1 CALIBRATION GAS FEED AND BACKFLUSHING

In order to backflush the probe tube or the prefilter, flush gas is fed via the backflush valve. The downstream system has to be disconnected with the isolation valve from the probe before back flushing in order to avoid pressure shocks on the system. The check valve's opening pressure is 0.7 bar. To drive the isolation valve a pressure of 3 - 10 bar is necessary.

Note

In order to prevent the probe's interior from cooling down, backflushing should as far as possible only be carried out for a short time (<1 s).

The analysis system remains closed while calibration gas is being fed in. The amount of calibration gas should be at least 25 % greater than the amount of sample gas drawn into the analysis system in order to avoid mixing with the sample gas. This type of calibration gas feeding is not to be used in the case of processes with over pressure. A built-in ball valve in the probe entrance is recommended here.
Basically, a smaller amount of calibration gas is needed in probes with a built-in ball valve as the probe is separated from the system on activating the ball valve and thus there is no danger of mixing with the process gas. In order to close the probe the control grip is to be turned by hand to the right until it reaches the stop.

Note

In the case of low pressure care should be taken that no infiltrated air is drawn in via the unclosed check valve from 300 mbar upwards.

15 MAINTENANCE

The safety instructions specific to the plant and process are to be consulted prior to any maintenance work! It is difficult to give any recommendations as to a particular maintenance cycle. Depending on your process conditions, a meaningful maintenance cycle must be elaborated for the specific application.
An indication that probe-maintenance may be necessary could be shown by a constant decline in the amount of sample gas in the analysis system.
Probe maintenance is restricted essentially to replacing filter elements and checking seals.

WARNING!

Aggressive condensate is possible.

Wear protective glasses and proper protective clothing!

High surface temperatures may cause serious burns!

Wear protective gloves!

Prevent the probe of unauthorized access!

- Changing the filter element see chapter 12.2
- Additionally check O-rings in the lid (PTFE rings for **/7aT**) and change if necessary.
- Clean filter chamber.
- It is now also possible to rod through the probe tube in order to remove deposits. Take care to avoid breakages when handling probe tubes made of alu-oxide.

Note

In order to change prefilters, the entire probe unit must be removed from the process. The prefilters can be cleaned to an extent depending on the manner of soiling mechanically or in a ultra sonic bath and can used again.

Warning

Prior carrying out maintenance work on electrical parts, mains voltage should be disconnected from all poles!

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

16 SWITCHING OFF

Before switching off, i.e. switching off the heating, the probe be flushed with inert gas or air in order to avoid condensation of aggressive components from the process gas.

17 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.

18 SPARE PARTS LIST

Wear, tear and replacement part requirements depend on specific operating conditions.
The recommended quantities are based on experience and they are not binding.

Gas sample probe SP2200-H..					
(C) Consumable parts **(R) Recommended spare parts** **(S) Spare parts**					
		Recommended quantity being in operation [years]			
Part No.	**Indication**	**C/R/S**	**1**	**2**	**3**
90S0020	Filter element **S-2K150, c**eramic, 2 µm, 150 mm	C	6	12	18
90F0125	Filter element **F-0,1GF150**, glass fiber, 0.1 µm, 150 mm	C	6	12	18
93S0045	Gasket (30) for filter element. Material: Viton.	R	4	8	12
93S0051	Adaptor for probe filter element F-0,1GF. Material: PTFE	R	4	8	12
93S0020	O-ring (39) for lid. Material : Viton	R	2	4	8
93S0025	O-Ring (55) for lid. Material : Viton	R	2	4	8
93S0035	Sealing spiral o-ring (39) for lid SP2000/7aT Material : PTFE	R	1	2	3
93S0040	Sealing spiral o-ring (55) for lid SP2000/7aT Material : PTFE	R	1	2	3
90S2080	Gasket 3/4" (blue), max. 600 °C for sample tube. Material Novapress	R	1	2	3
90S2077	Flange gasket DN65PN6 (67 mm i.) Material : Novapress	R	1	1	1
90S2075	Flange gasket set DN65 PN6 B, consisting of gasket (67) and a set of screws 12x60.	S	1	1	1
93S0010	Thermostat (0-180 °C), with over-temperature limiter and low-temperature alarm for probe series SP.	R	-	-	1
93S0015	Heating cartridge 230 VAC/800 W, length 160 mm	R	-	-	1
93S0017	Heating cartridge 115 VAC/800 W, length 160 mm	R	-	-	1
93S0059	PT100 sensor	R	-	-	1
93S0060	Spare thermoelement Fe-CuNi with clamping ring and screw	R	-	-	1
93S0061	Spare thermoelement Ni-CrNi with clamping ring and screw	R	-	-	1

19 APPENDIX

- Electrical plans
- Filter elements – spare parts
- Sample tubes and pre filters
- Solenoid unit 2

More product documentation is available on our Internet catalogue:
www.mc-techgroup.com

- Sample tubes series **SP**
  Document: **2.14**
- Prefilter series **SP**
  Document: **2.17**

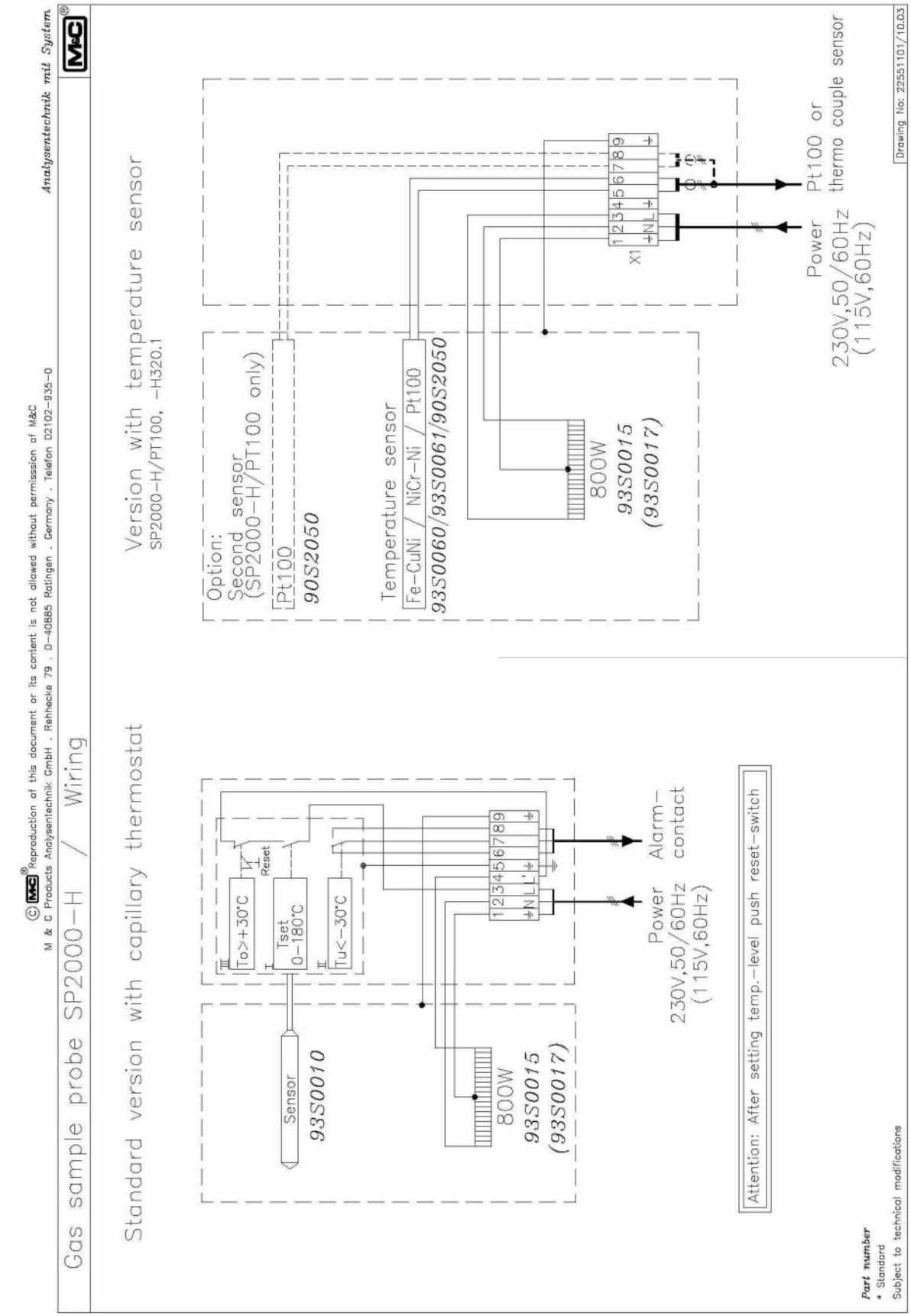


Figure 7 Electrical connexions for SP2200-H.. with thermostate controller

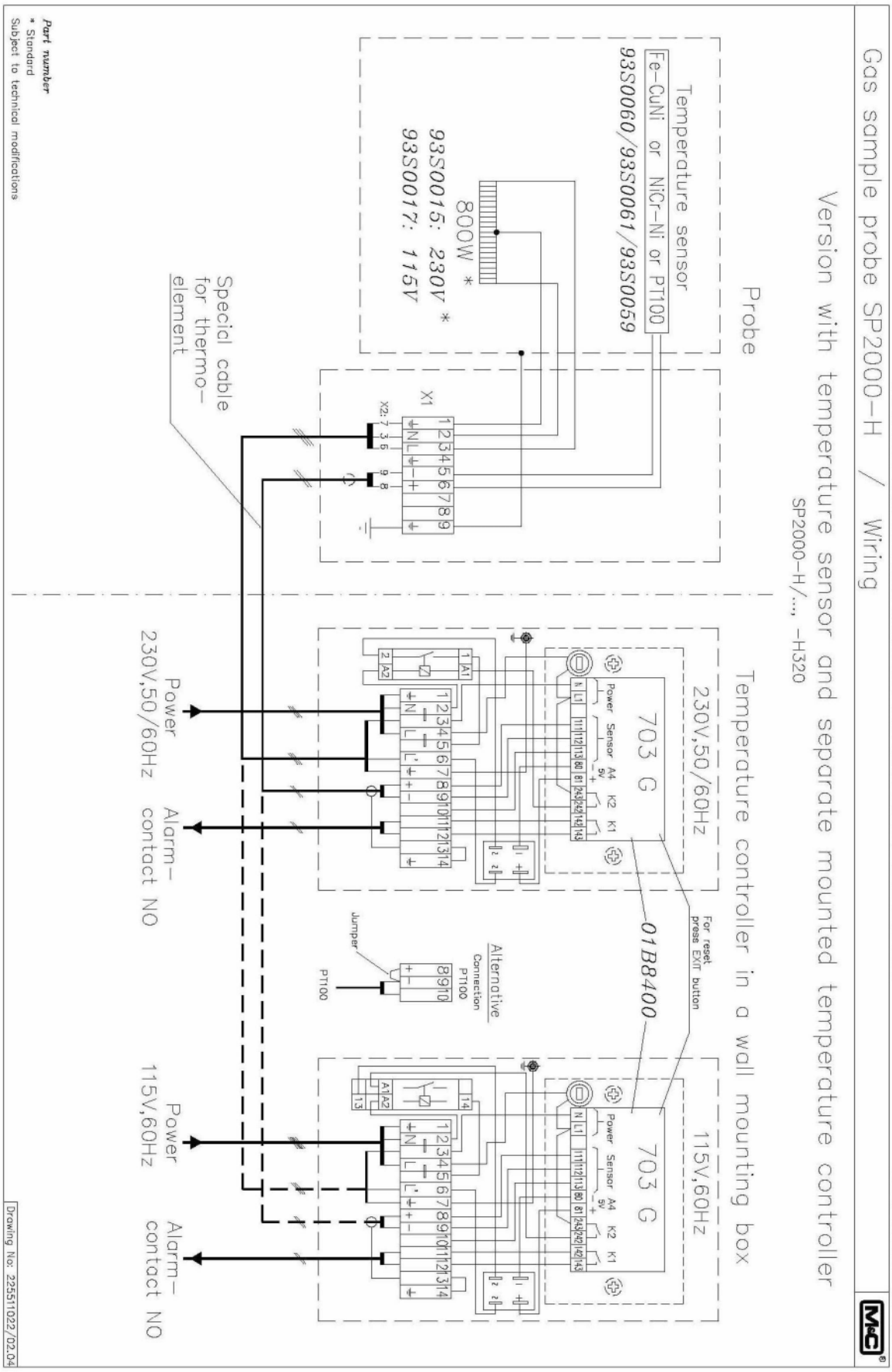


Figure 8 Electrical connexions for SP2200-H.. with electronic controller 70304G

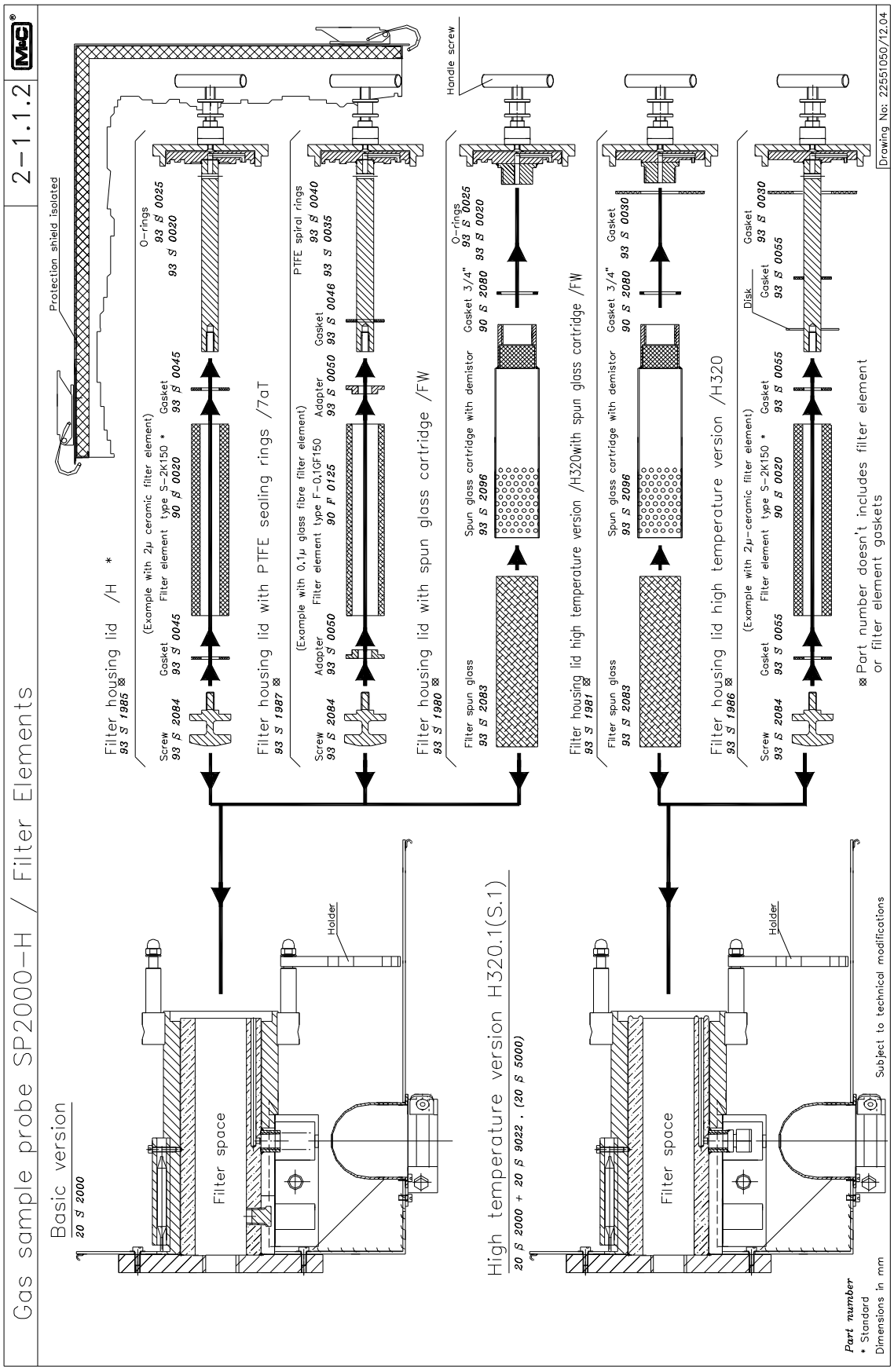


Figure 9 Possible filter elements

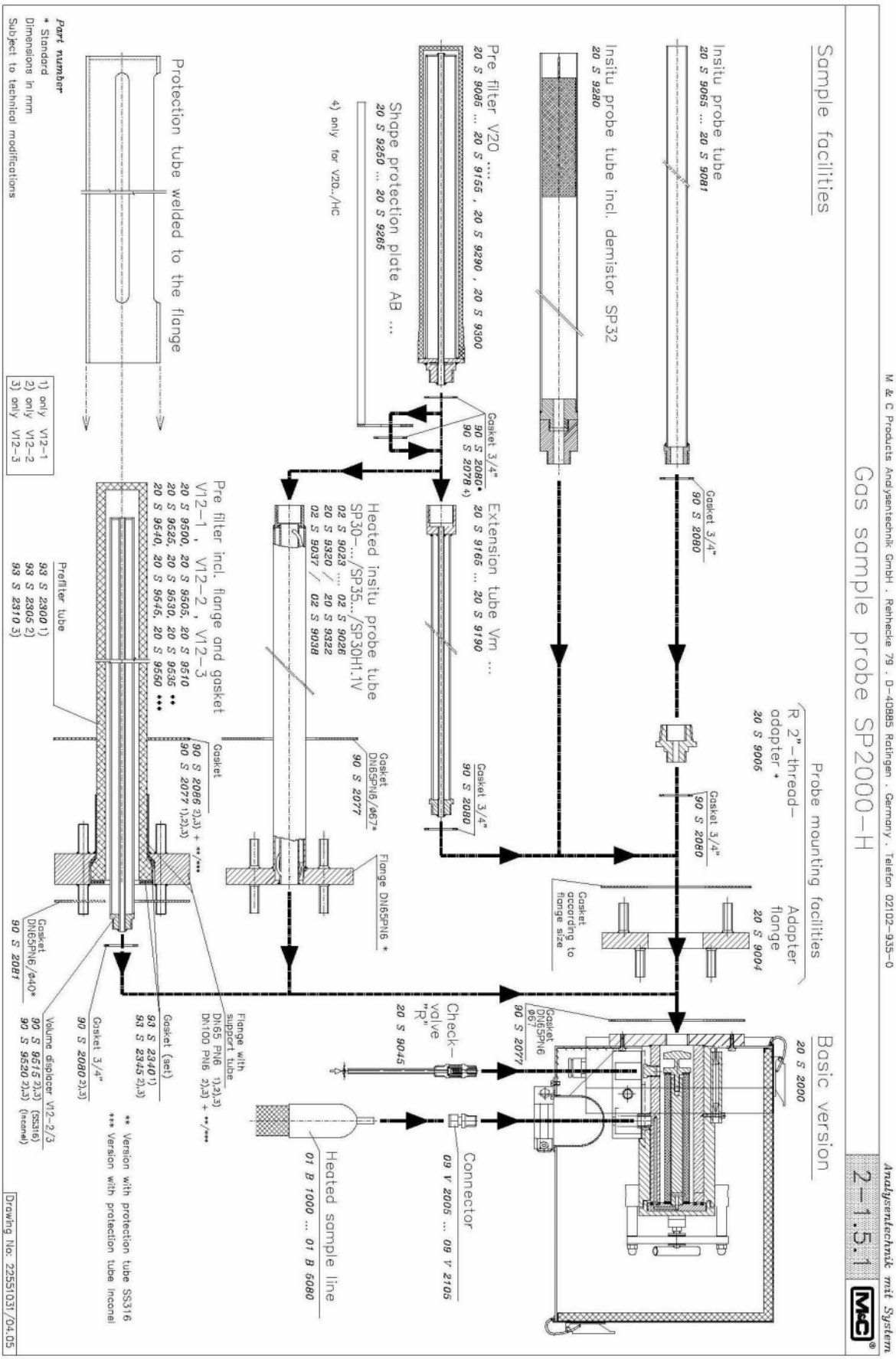


Figure 10 Sample tubes and pre filter

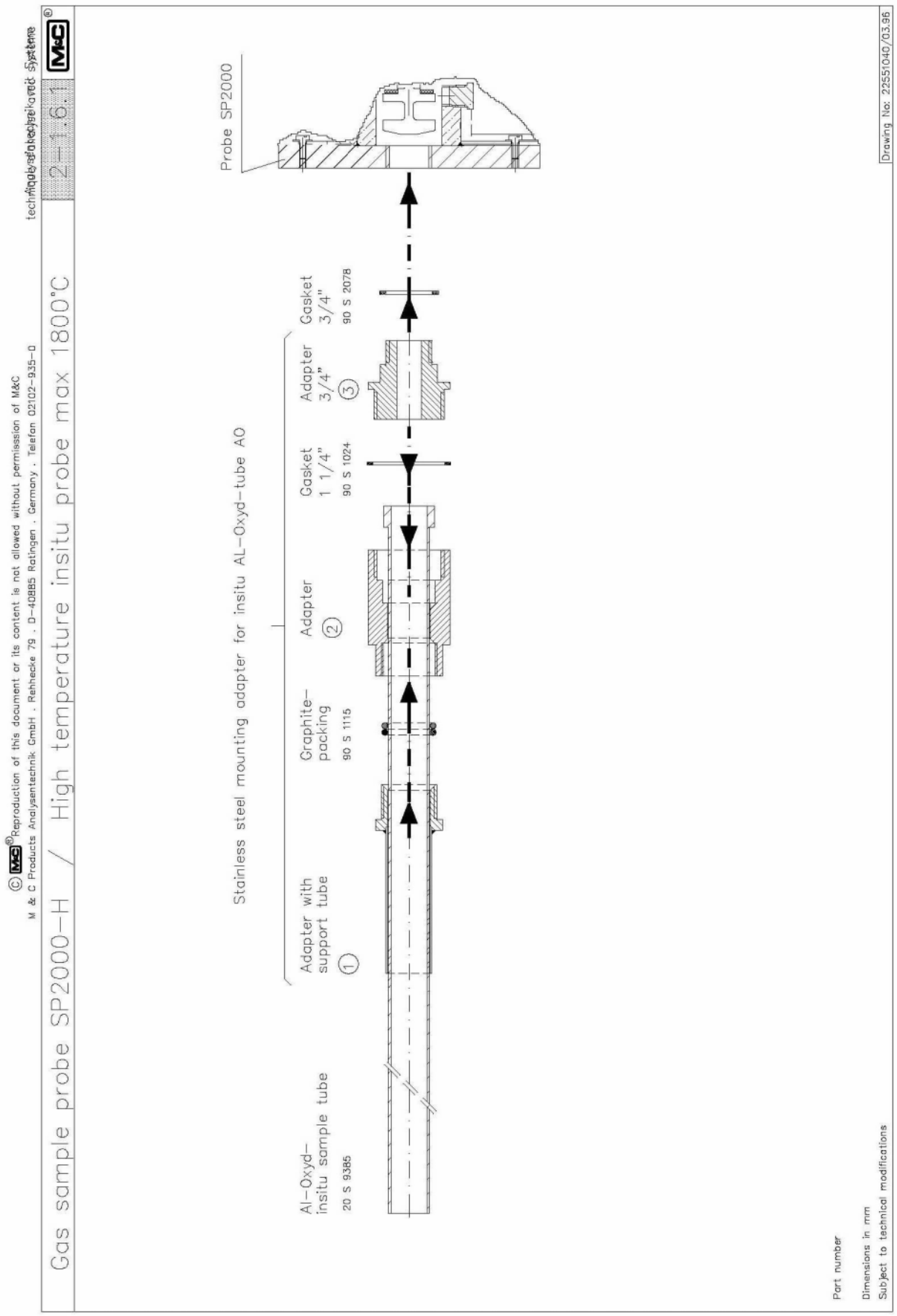
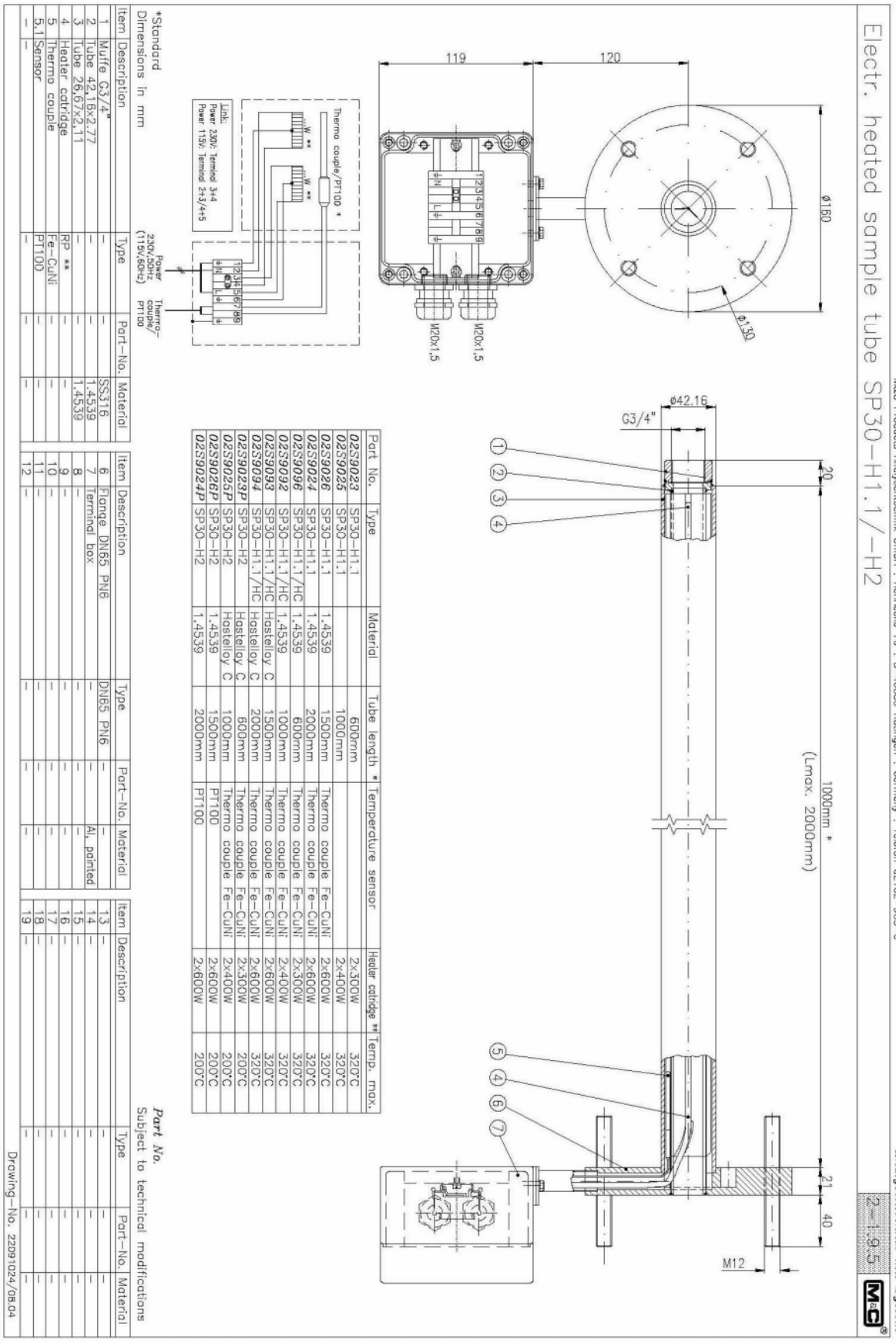


Figure 11 High temperature sample tube out of aluminium oxide



Item	Description	Type	Part-No.	Material
1	Muffe G3/4"	–	–	SS316
2	Tube 42,15x2,77	–	–	1.4539
3	Tube 26,67x2,11	–	–	1.4539
4	Heater catridge	RP **	–	
5	Thermo couple	Fe-CuNi	–	
5.1	Sensor	PT100	–	
–	–	–	–	

Item	Description	Type	Part-No.	Material
6	Flange DN65 PN6	DN65 PN6	–	–
7	Terminal box	–	–	Al, painted
8	–	–	–	–
9	–	–	–	–
10	–	–	–	–
11	–	–	–	–
12	–	–	–	–

Item	Description	Type	Part-No.	Material
13	–	–	–	–
14	–	–	–	–
15	–	–	–	–
16	–	–	–	–
17	–	–	–	–
18	–	–	–	–
19	–	–	–	–

Part No.	Type	Material	Tube length *	Temperature sensor	Heater catridge **	Temp. max.
02S9023	SP30-H1.1		600mm		2x300W	320°C
02S9025	SP30-H1.1	1.4539	1000mm	Thermo couple Fe-CuNi	2x400W	320°C
02S9026	SP30-H1.1	1.4539	1500mm	Thermo couple Fe-CuNi	2x600W	320°C
02S9024	SP30-H1.1	1.4539	2000mm	Thermo couple Fe-CuNi	2x600W	320°C
02S9096	SP30-H1.1/HC	1.4539	600mm	Thermo couple Fe-CuNi	2x300W	320°C
02S9092	SP30-H1.1/HC	1.4539	1000mm	Thermo couple Fe-CuNi	2x400W	320°C
02S9093	SP30-H1.1/HC	Hastelloy C	1500mm	Thermo couple Fe-CuNi	2x600W	320°C
02S9094	SP30-H1.1/HC	Hastelloy C	2000mm	Thermo couple Fe-CuNi	2x600W	320°C
02S9023P	SP30-H2	Hastelloy C	600mm	Thermo couple Fe-CuNi	2x300W	200°C
02S9025P	SP30-H2	Hastelloy C	1000mm	Thermo couple Fe-CuNi	2x400W	200°C
02S9026P	SP30-H2	1.4539	1500mm	PT100	2x600W	200°C
02S9024P	SP30-H2	1.4539	2000mm	PT100	2x600W	200°C

Figure 12 Heated sample tubes SP30..

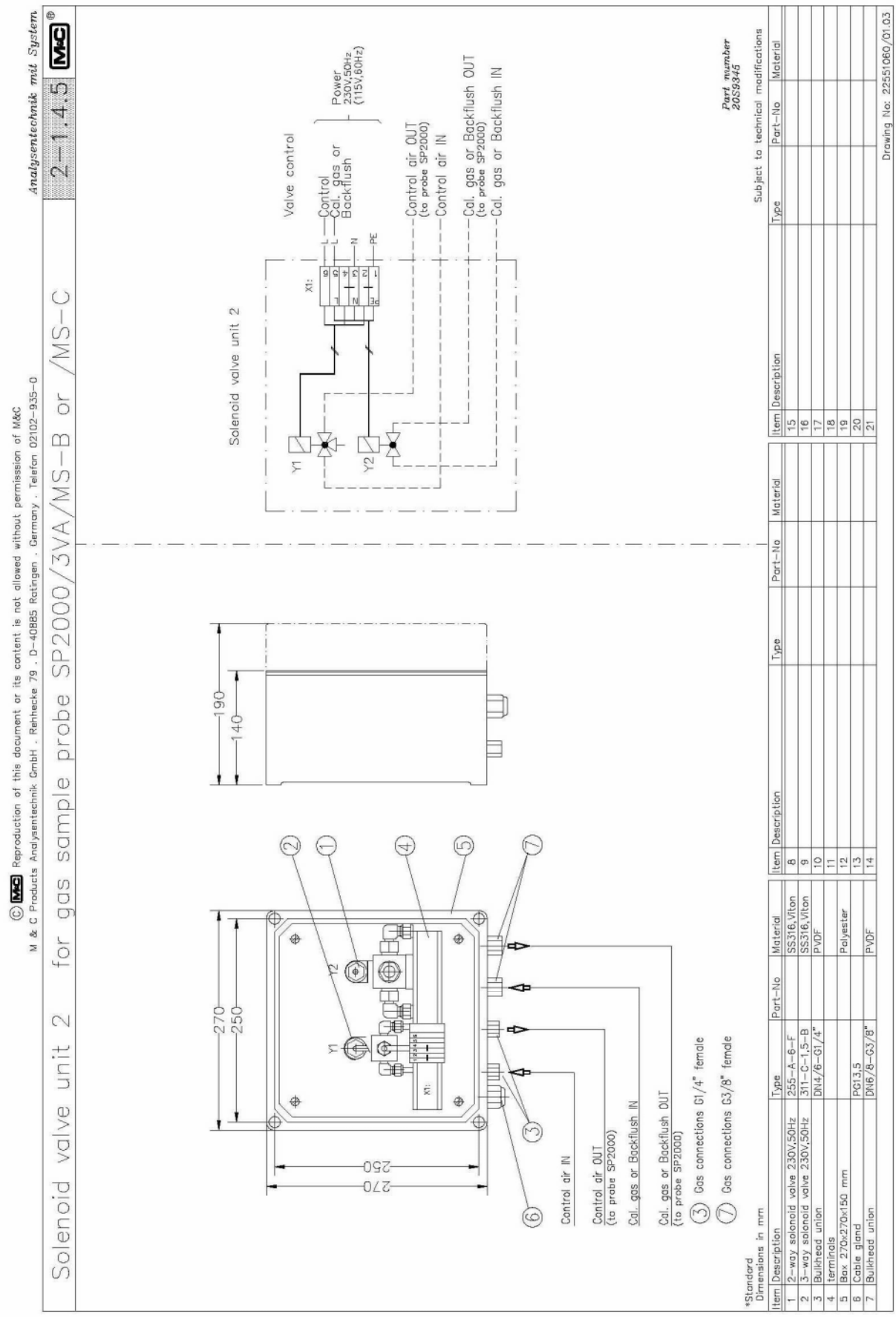


Figure 13 Solenoid valve unit 2