

02/17



JCT
ANALYSENTECHNIK GMBH

BEDIENUNGSANLEITUNG
OPERATING MANUAL



JFID

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Remark: All mentioned models correspond to the related model codes of the original Thermo-FID product by SK-Elektronik GmbH, Leverkusen. Any mentioned approvals are held by the original manufacturer SK-Elektronik GmbH, Leverkusen.

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• QUICK STARTUP GUIDE

• General advice before start-up

Pneumatic

- ◆ Check that all gas supply valves and regulators are closed at this time
- ◆ Please check all gas tubing for leakages (especially double check Hydrogen supply!)
- ◆ Please check all pressure settings, adjust to the required setting if needed
- ◆ Please provide exhaust conditions (back pressure free, to the environment or appropriate exhaust pipe)

Main Power

- ◆ Please check main power supply and setting (double check order and application notes concerning 115VAC supply for cat heater and heated sample line!)
- ◆ Switch on power
- ◆ The display shall now show >instrument warm up<

Press Service-Bottom NOW - Please follow self-guiding menu structure for further set up information!

Factory Set Up

- ◆ The JFID comes with a standard factory set up. Customized end user set up may be performed during training or be specified for special factory setting at order placement.
- ◆ Please double check your application against factory set up conditions before measuring.
- ◆ Before start up and calibration please enter Span Gas Concentration (engineering units % or ppm) and number of Carbon atoms. Please refer to the label on your span gas bottle.
- ◆ Please notice that the standard span gas concentration was entered and used during factory test (500ppm).

• Instrument Start Up

- ◆ Please Open gas supply, valves etc. . (Please refer to set up procedure for gas supplies and double check pressure readings)

Self Test & Diagnostic:

- ◆ Once the instrument reaches the proper temperature, the instrument start self check and calibration procedure.
- ◆ The following diagnostic information is used and double checked for start up performance test:
 - ◆ Self test set point temperatures
 - ◆ Self test of all sensors
 - ◆ Electronically adjustments needed for best performance
- ◆ If the instrument does not perform correctly during start up self test, a 'clear text' message is displayed and the LED is indicating >action request<.
- ◆ Once instrument is in proper operational condition indicated on the display, the internal gas sampling system will be automatically started.
- ◆ Please double check Hydrogen supply again.
- ◆ The instrument is now performing the flame ignition and exact flame adjustment to the optimum operation and performance required.
- ◆ Calibration will be started after the flame conditions are performing to specification.

FACTORY SERVICE

We strive to provide efficient and professional service any time an instrument or single component is returned to the factory for repair.

Your assistance can help us to achieve the service you expect from us.

To ensure that we process your factory repair and return goods efficiently, please be prepared to provide the following information to us:

Your name and Telephone/Fax number in order to reach you

Your company name

Shipping address and contact name of the person receiving the shipment in order to return the goods

Model number & S/N of the instrumentation (or goods)

A description of the problem you are experiencing and the status information print out available from the service/status menu

A description of any components the device might be contaminated with for the safety of our service department.

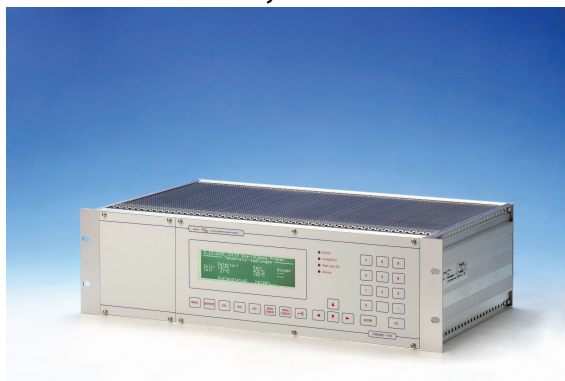
Your assistance in this matter will enable us to serve you efficiently and we appreciate your cooperation and support.

Overview Flame-Ionization-Detector, JFID

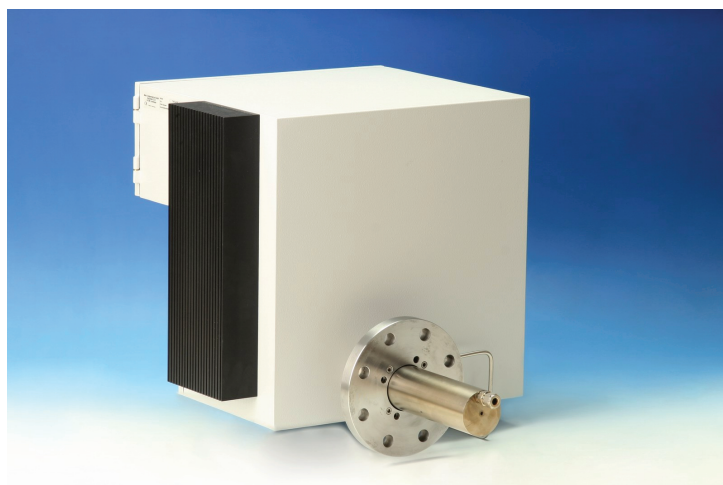
Model TG, Desk Top



Model 19", Rack Mount



Model MK, On Stack



Main Features: Fully automated, self calibrating and self start up maintenance free hydrocarbon measuring equipment

Models available:

JFID - portable version, model PT

JFID - desk top version, model TG

JFID - emission systems, model ES

JFID - field housing, model FE (optional "Ex version")

JFID – field housing/closed coupled probe on stack, model MK (optional "Ex version")

• Introduction JFID

• Key Features

- ◆ Determination of Org.C according to the 17th BImSchV (waste incinerators)
TÜV Köln-936/806016; Published at GMBL 1997 N°29, page 464; BMU 08.07.1997 IGIR 51134/2
- ◆ Determination of Org.C at overheated steam and condensate (please consult factory for application details)
- ◆ Multi Point sampling (please consult factory for details)
- ◆ Integrated Flame Trap, class Ex s IIC, Type 02-13-005;BVS 96; Y.6006 dated 10.09.1996 (consult factory for details)
- ◆ LEL (1,2) according to KEMA-Arnheim (NL) approval, report N°95114-KPG/TCM 98-3051
- ◆ Microprocessor controlled sample gas flow
- ◆ Microprocessor controlled driving voltage potential
- ◆ Microprocessor controlled Flame including fully automated flame ignition at start up
- ◆ Automated adjustment of flame
- ◆ Self calibrating without additional valves and special equipment
- ◆ Wide linear range without switching
- ◆ Close coupled Detector, FID amplifier and A/D converter (no cable)
- ◆ Built into Thermo-Catalyst (zero gas, Stripper, etc.)
- ◆ Clear Text Operation-, Failure-, Service- and Alarm status information
- ◆ 2 x RS232 interface (status information, read out, remote control, etc.)
- ◆ Optional RS422 interface (data bus)
- ◆ Optional Methane/None Methane catalyst
- ◆ Optional Status & Alarm Interface including fully galvanic isolated (600 Ohm) analog outputs and relay interfaces

• Portable JFID-PT

- ◆ The JFID- PT introduces a complete plug and play portable analyzer measuring Org.C components from high range (LEL) to very low range (ppm). The portable unit includes gas bottles compartment and pressure regulators for both, Hydrogen & Span Gas. The instrument provides a built in temperature regulator and mains supply for the standard external heated sample line (probe).
- ◆ **Options:**
- ◆ heated sample line: The portable unit can be fitted with an up to 7 meter (@220V/50Hz, max. 3 meter @110V/50Hz) standard length heated sample line including corrosion free sample filter and fittings (see details price list)
- ◆ built onto external temperature regulator and mains supply for 5 plus meter heated sample line including feedback loop for status information (please consult factory for specials)
- ◆ Status- & Alarm card (only available using 84TE sized housing)
- ◆ Methane/None Methane catalyst (only available using 84TE sized housing plus status- & alarm card)



- **JFID-TG, Desk Top model, overview**
- **JFID-ES, 19" Rack Mount model, overview**

The JFID-TG & JFID-ES introducing the standard instrument configuration able to fit into a 19" system rack or to be used as a standalone analyzer, measuring Org.C form high range (LEL) to low range (ppm). All gas fittings and connector for main power supply are located at the back panel of the instrument.

◆ **Options:**

- ◆ heated sample line: The TG & ES unit can be fitted with a 5 meter (@220V/50Hz, max. 3 meter @110V/50Hz) standard length heated sample line including corrosion free sample filter and fittings (see details price list)
- ◆ built onto external temperature regulator and mains supply for 5 plus meter heated sample line including feedback loop for status information (please consult factory for specials)
- ◆ Status- & Alarm Card (see details IN-OUTPUT Interface, X2 to X5 connectors)
- ◆ Methane/None Methane catalyst (only available including status- & alarm card)
- ◆ Methanizer
- ◆ Microprocessor controlled multipoint sample switching up to 16 samples

◆ **Front Panel View**



◆ **Back Panel View**



• JFID-FE Field Housing

The JFID- FE introduces the standard instrument configuration (i.e. model TG) built into an IP45 rated field enclosure perfectly suited to fulfil industrial field installation requirements. The JFID- FE measures Org.C components from high range (LEL) to very low range (ppm). The JFID-FE can be offered optional in IP65 enclosure and for Ex-P Zone1 & 2 (see price list, consult factory for details).

All gas fittings, signal and main power connections are located at the bottom of the instrument enclosure.

◆ Options:

- ◆ Microprocessor controlled multipoint sampling gear
- ◆ Low temperature sampling/Work place for 1x up to 16x samples
- ◆ High temperature (180°C/355°F) for 1x up to 8x samples
- ◆ High temperature (steam, max 15 bar) for 1x up to 8x samples
- ◆ Notice: Standard instrument configuration model FE includes built into temperature controller with PT100, 230V/50Hz, 4 Amp, including feedback loop and status information. Optional controller exceeding 4 Amp each are included with each option if needed.
- ◆ Microprocessor controlled sampling system for condensate and drain water including 'Stripper'
- ◆ Methanizer
- ◆ Status- & Alarm Card (see details IN-OUTPUT Interface, X2 to X5 connectors)
- ◆ Methane/None Methane catalyst (only available including status- & alarm card)

Front View Field Enclosure IP65



• JFID-MK, Close Coupled Probe On Stack

The JFID-MK combines the features of the model FE (IP45 rated field enclosure) with a close coupled heated sampling probe for on stack mounting. The analyzer measures Org.C components from high range (LEL) to very low range (ppm).

The sample probe can be heated from 60 °C up to 200 °C (140 °F to 390 °F) and consists of DN80 flange (DIN 2527, PN16) direct mounted onto the field housing and the detector assembly. No further sample conditioning system is needed.

Maintenance interval, i.e. sample filter change, can be determined by using the status and remote control functions of the model MK.

All gas fittings, signal and main power connections are located at the bottom of the instrument enclosure.

Application Notice:

The pressure conditions at the sample point should be between 800 and 1600 mbar abs..

Main gas supplies such as Hydrogen, Span gas and Instrument Air are needed.

The Instrument air supply should be oil & water free with minimum dew point at -20 °C (-4 °F) and should be supplied @ 4 bar.

◆ Options:

- ◆ Back Purge main filter/sampling system
- ◆ Dilution Probe built into flange assembly



• Installation Notice & Safety Instructions

• Safety Instructions

Please read all safety and installation instructions in order to avoid any damage to you or/and the instrumentation.

Warning: The instrument and all electrical components should not be installed at any location with huge temperature variations, high environmental dust content, and/or high moisture content without proper weather enclosure. Before servicing the instrument, disconnect all main power supply!

• Prepare your own safety

- ◆ Please read the operation and installation instructions before providing main power and switching on the instrument.
- ◆ Please make sure you have read all safety instruction on the instrument.
- ◆ Please make sure your main power supply does match the main power configuration of the instrument (see label at the instrument, see factory set up and test report).
- ◆ Please make sure that all operating and servicing personnel is proper trained by the manufacturer or by authorized service people.

• Prepare your instrument

- ◆ Please make sure to comply against all safety instructions and requirements handling H2.
- ◆ Please make sure to comply against all national electrical safety codes (e.g. VDE0100)
- ◆ Power must be supplied by using an appropriate power plug according to national standards. The ground must not be defeated and an adequate ground must be connected to the instrument. If the instrument is not properly grounded and electrical power is applied in violation of the national electrical code, the company Mess- & Analysentechnik GmbH assumes no responsibility for any injury or damage to personnel or property.
- ◆ Power extension cable must be of adequate quality and performance in order to avoid damage to the personnel and instrumentation.
- ◆ In case of liquid or unexpected components inside the instrument, please disconnect all power and supply gases 'except purge air' and provide proper service before switching on the instrument again.

• Specifications

JFID -PT, -ES, -TG, -FE, -MK, FE -MSU, FE -MSU -HT

• Technical Data:

Main Power	115 - 230V/50-60Hz (model MK & cat.heater 115V <u>or</u> 230V)
Power consumption	250VA
Additional temperature controller for external heated sample probe	1000VA
1 x analog INPUT (for H ₂ – control)	4 - 20mA
1 x serial printer interface	RS232 EPSON compatible
1 x serial interface, Remote Control/Service	RS232/485 on COM2
1 x standard analog OUTPUT measurement reading	0/4-20mA, 600Ω (not galvanic isolated)
optional 4 x analog OUT (readings/alarms)	0/4-20mA, 600Ω, <u>galvanic isolated</u>
OUTPUT Engineering Units (selectable)	ppm, mg/m ³ , g/m ³ , Vol.%, %UEG
Instrument Range (Full Scale)	0-1...500 000 mg org.C/m ³
Measurement Range (free selectable)	Linear to Full Scale
Lower Detectable Limit	< 0.01mg org.C/m ³
Response Time T ₉₀ (90%-reading, gas input at instrument)	< 0.5 sec. @reading >20mg org. C/m ³ [TÜV requirement T ₉₀ = less than 5 seconds]
Response time T ₉₀ (model „MK“ probe length 0.5m)	< 3 sec. @reading >20mg org. C/m ³ [TÜV requirement T ₉₀ = less than 7,5 seconds]
Sample Flow (ejector pump driven)	2, 5, 25 or 90l/hr (@1013mbar)
Ejector pump pressure	800 - 1600mbar abs.
Gas pressure using external/internal membrane sample pump	800 - 1200mbar abs.
Detector temperature (free selectable)	95 °C - 200 °C (203 °F-392 °F)
Probe temperature range (free selectable)	60 °C - 200 °C (140 °F-392 °F)
Probe temperature controller	Pt100, 230V/50Hz, 4 Amp
Environmental temperature (model PT, TG, ES, 19")	-5 °C to +40 °C (23 °F -104 °F) (for other temp. range consult factory)
Gas Supply:	
Instrument Air (dust & water free, dew point ≥ -40 °C, remaining oil ≤ 0,01mg/m ³)	@4bar, 2Nm ³ /hr
Hydrogen, quality 5.0 (preferred: bottled)	@1bar, approx. 40-60ml/min
Span gas	@2.5bar, about 130NI/hr
Zero gas & burning air	supplied across built into catalyst
Optional external Zero Gas (N ₂)	@2.5bar/ about 130 l/hr
Optional Burner Air (synth.air)	@1bar/approx. 50 NL/hr

Dimension: (without packaging)

Model 19" rack mount, 'ES' (84TU wide, 3HU height)	W=483mm, H=132.5mm, D=271mm Weight about 9 Kg (20 lb)
Model desk top, 'TG'	W=463mm, H=135mm, D=275mm Weight about ca. 9 Kg (20 lb)
Model Field Housing, 'FE', 'FE-MSU' (& 'FE-MSU-HT'), 'MK'	W=440mm, H=450mm, D=400mm Weight about 27-29 Kg (60-64 lb)
Model field housing, 'MK' (dimensions without probe, flange)	W=440mm, H=450mm, D=400mm Weight about 30 Kg (66 lb)
Model portable, 'PT' (gas bottle compartment, pressure reg.) (weight includes 2 bottles, 1 l)	W=342mm, H=266mm, D=271mm Weight about 17 Kg (37 lb)

• Options

Status- & Alarm Card

- ◆ 3 x digital OUTPUT Failure, Service, Maintenance (potential free contacts)
- ◆ 4 x analog OUTPUT measurement value N°1 to 4, 0/4-20 mA, galvanic isolated, 600 Ohm
- ◆ 4 x relay contacts free selectable limits for measuring values (potential free contacts)
- ◆ 2 x analog INPUT gas supply control, including power supply
- ◆ 2 x digital OUTPUT 24VDC/ 500mA, in order to drive Hydrogen supply switching
- ◆ 2 x digital INPUT for Auto-Calibration-Start & Auto-Calibration-Stop
- ◆ 2 x digital INPUT free selectable status parameters
- ◆ 1 x digital OUTPUT 24VDC/ 500mA, free selectable timer

Multipoint sample controller 'MSU-Card digital'

- ◆ (multi point sample controller, max. 8 samples each card, max. 2 x MSU-Card per instrument)
- ◆ 8 x digital OUTPUT 24VDC/500mA (valve driver 8 x)
- ◆ 8 x relay contacts selectable limits for measuring values (potential free contacts)
- ◆ 8 x digital INPUT remote sample control (NAMUR)

optional:

- ◆ 8 x analog OUTPUT 0/4-20mA, 600 Ohm (measurement values 8x)

Multipoint sample controller 'MSU-Pneumatic'

- ◆ MSU-work place and environmental applications (none aggressive gases only)
- ◆ MSU-8 8 x pneumatic sample controller, instrument driven sample supply
- ◆ Including bypass pump
- ◆ MSU-aggressive gas components
- ◆ MSU-HT4 4 x pneumatic sample controller, heated (electrical or steam) up to 180 °C
- ◆ MSU-HT8 8 x pneumatic sample controller, heated (electrical or steam) up to 180 °C
- ◆ MSU-Vapor/Steam
- ◆ MSU-HT-V4 4 x pneumatic sample controller, pressure 2-10bar
- ◆ MSU-HT-V8 8 x pneumatic sample controller, pressure 2-10bar

Steam/Vapor trap

- ◆ Relaxing steam/vapor pressure (2-10bar) in order to measure org.C/m3 from steam/vapour conditions

Sample Probe heated according to 17th BImSchV

- ◆ All material coming in contact with the sample gas: 'Hasteloy C4, PTFE, CrNi
- ◆ Heated sample line/probe temperature up to 180 °C (356 °F), integrated heated sample pre filter, calibration gas INPUT at the tip of the probe in order to calibrate the complete system (cal. Gas IN at sample point)
- ◆ Max 4m @115V/50Hz with internal temp. controller (PT100, 4A, about 100W/m)
- ◆ Max 7m @230V/50Hz with internal temp. controller (PT100, 4A, about 100W/m)
- ◆ Other lengths (up to 30 meter) available with external/built onto temp. controller (please consult factory)

• Response factors JFID

Substance	Responsefactor
n-butane	1.00
methane	1.06
propane	1.00
n-hexane	0.83
Iso-octane	0.97
ethane	1.28
propene	0.97
methanol	0.87
ethanol	0.84
acetic acid	1.08
methylacetate	0.58
benzole	0.93
ethylbenzene	1.00
p-xylol	1.02
dichlormethane	0.87
trichlorethylen	1.08
tetrachlorethylen	1.19
chloroform	0.75
chlorbenzole	1.09
n-heptane	1.03
cyclohexane	0.96
2-propanol	0.76
toluene	1.01
acetone	0.77
ethylacetate	0.76
iso-butylacetate	0.95

• Application notes and customized equipment

The JFID is a modular built instrument which measures Total, or Methane/NonMethane Hydrocarbons performing a wide dynamic range (%LEL, 0-1, 0-500000 mg org.C/m³)

• Typical Applications

- ◆ Ambient air quality (THC, Methane/None Methane)
- ◆ MAK & TRK control measurements
- ◆ LEL control measurements
- ◆ Manufacturing and production facilities, tank farms
- ◆ Work place and none aggressive gases (multi point sampling)
- ◆ Exhaust and flue gas (i.e. at waste incinerators, intake/outtake scrubbers, etc.)
- ◆ Clean room control C, CO, CO₂ at ppb levels (using JFID Methane catalyst, only in Nitrogen & Argon)
- ◆ org.C measurements in Steam/Vapor
- ◆ org.C measurements in Condensate and drain water (using JFID stripper)

• Engineering specials

Please consult factory for details and engineering capacity.

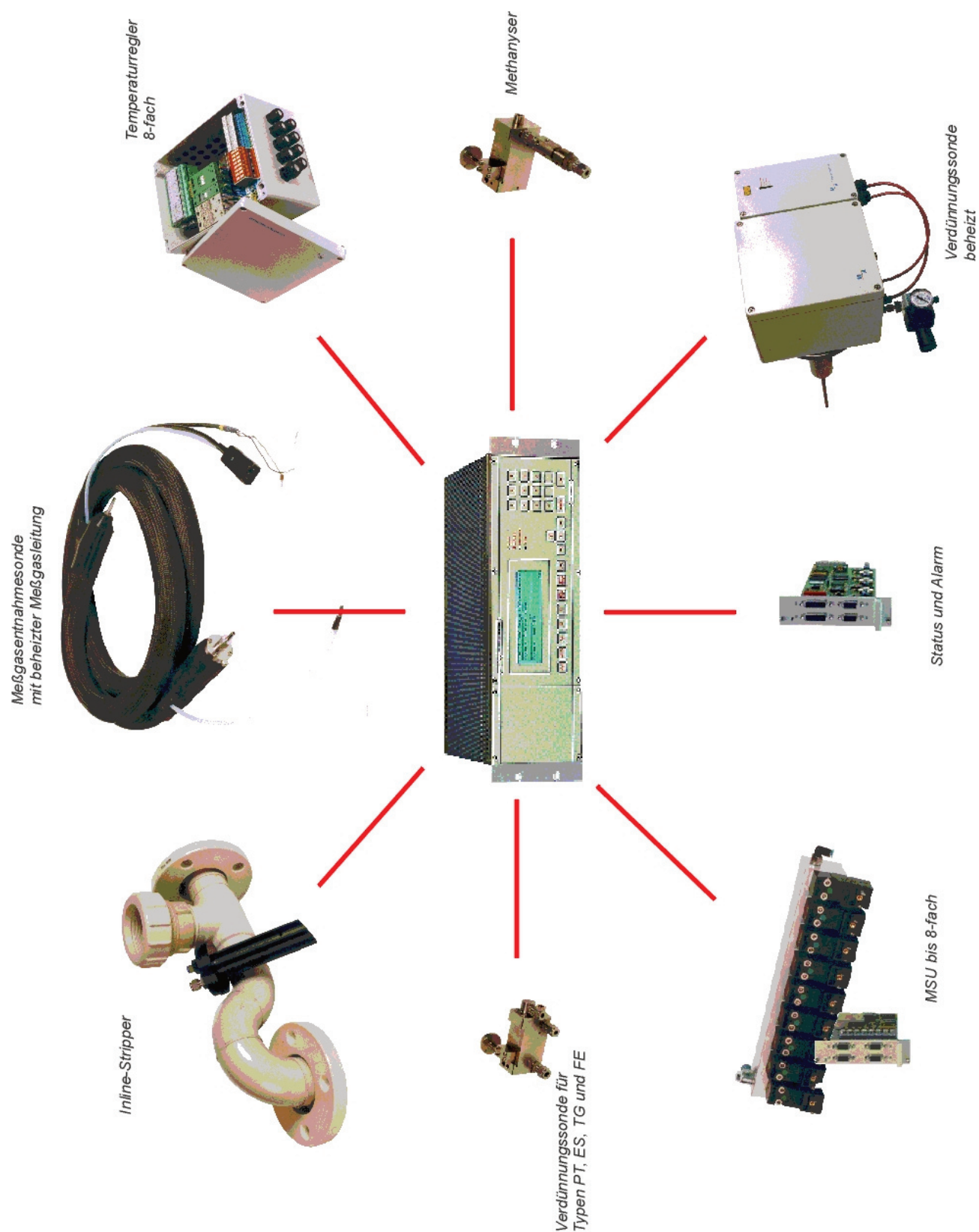
JCT manufactures complete turnkey plug and play systems, each installed on mounting plates or in appropriate enclosures.

JCT offers a variety of special customized solutions and provides full applications and systems configuration according to customer's specifications. Please consult factory for price and details.

• Quality Notice sampling system

The quality of the sampling conditioning equipment in front of the JFID reflects a critical part concerning the quality of the measurement and the long term operation of the instrument. Any damage to the instrument caused by the improper sample conditioning is not covered under warranty!

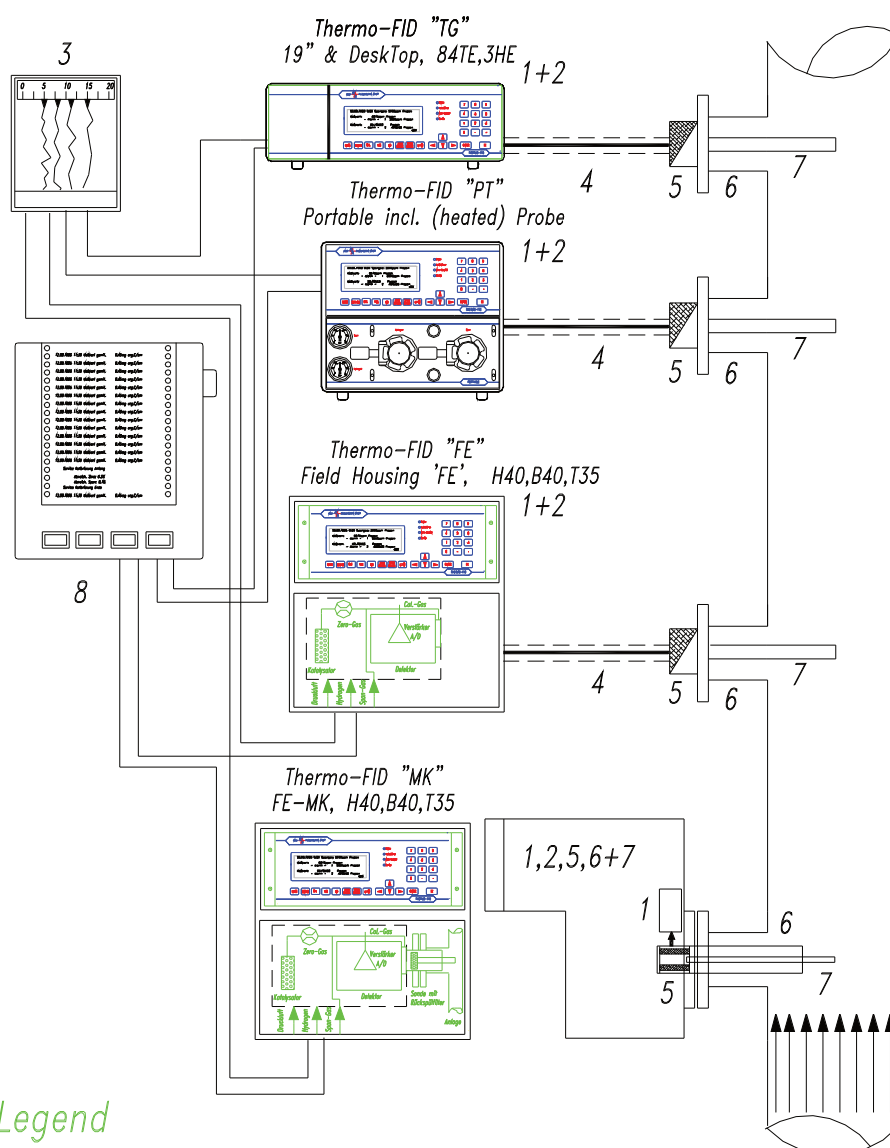
• Options Overview



• Application Notes & Solutions

Installations approved according to 17th BImSchV (Overview)

Installation Overview approved according to 17th BImSchV Regulation

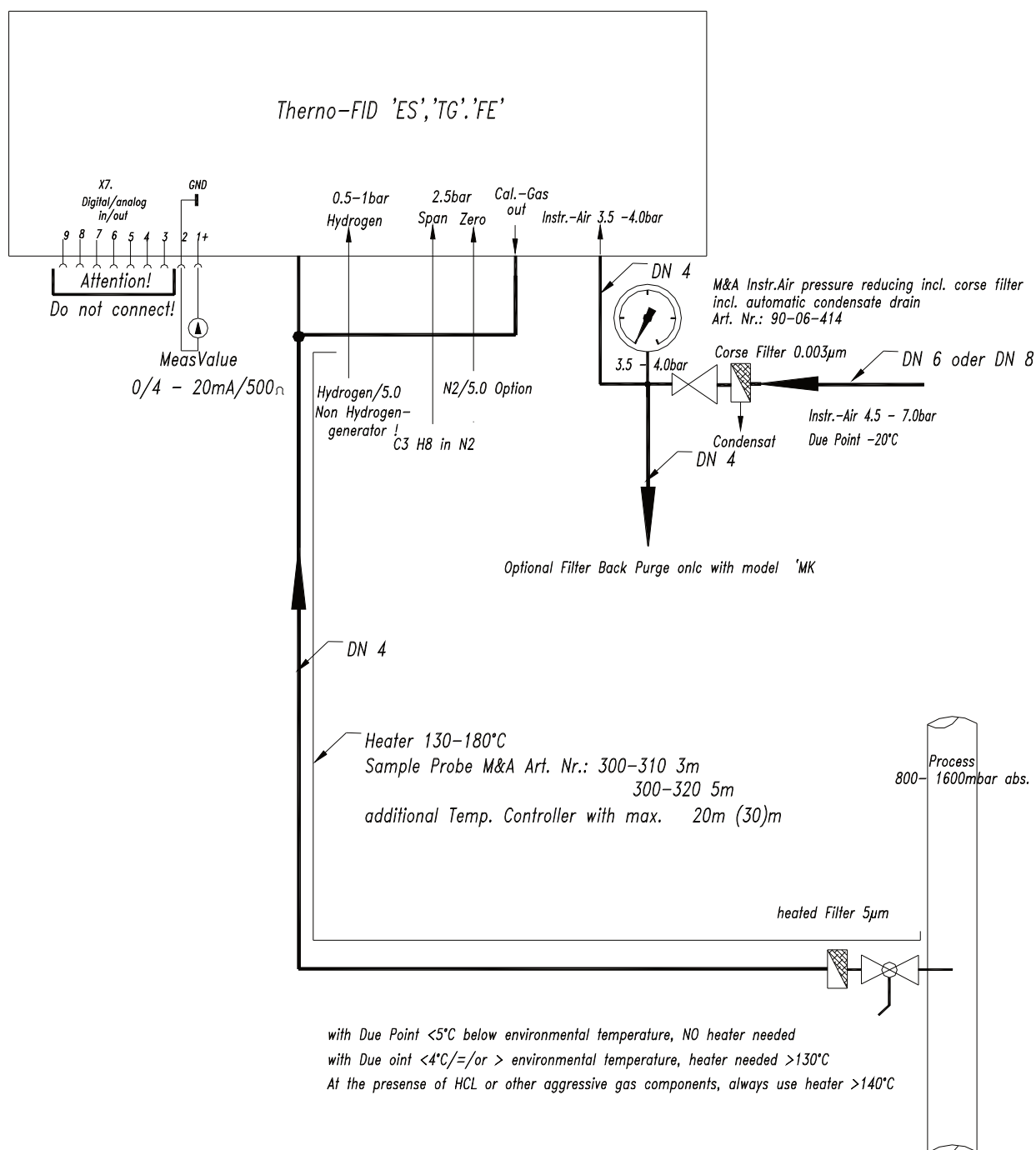


Legend

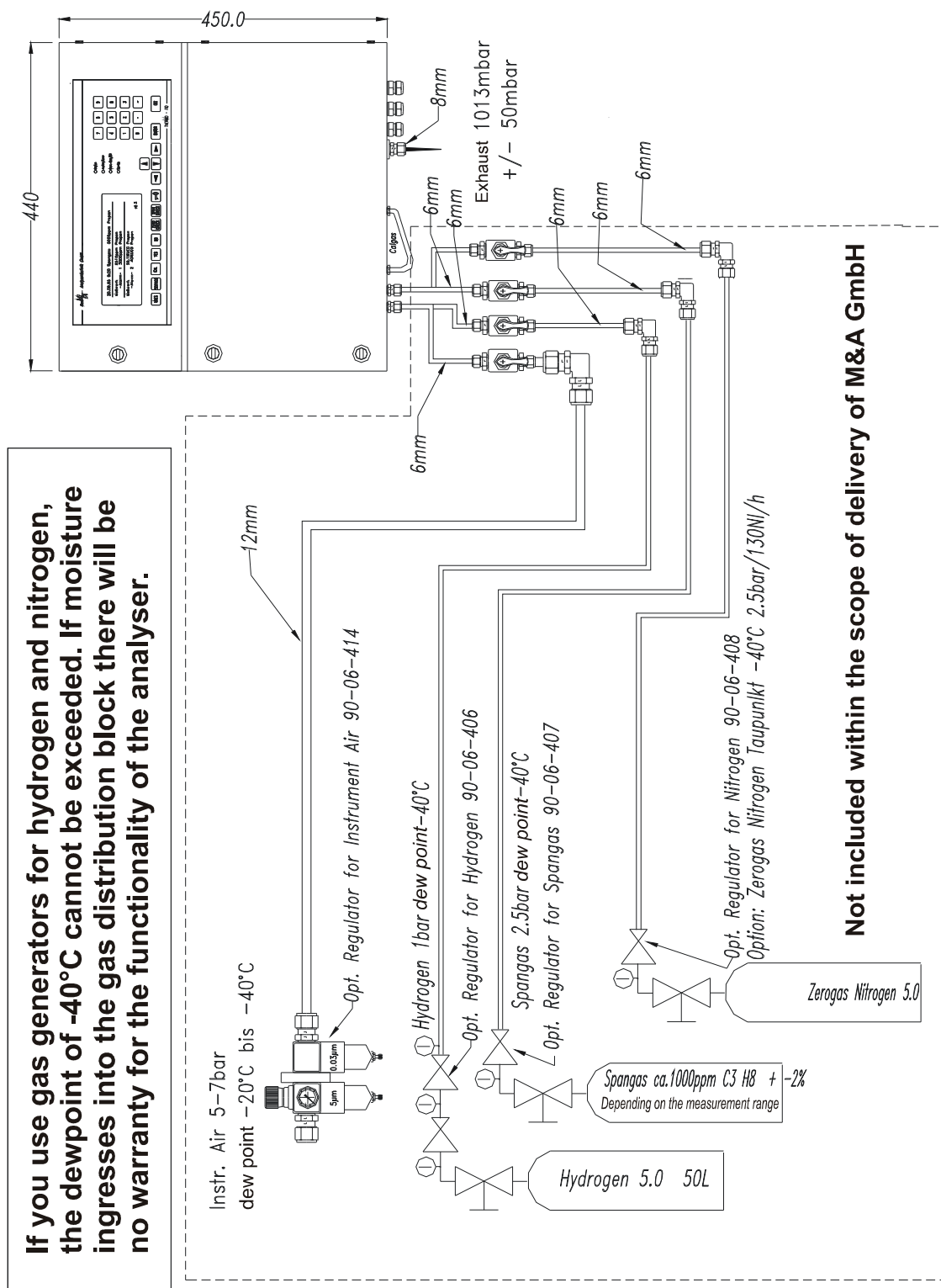
- 1 Analyzer
- 2 Data Control, Alarm Interface, Calibration
- 3 Chart Recorder/Logger
- 4 heated Sample Probe/Sample Line
- 5 heated Sample Filter
- 6 Probe Flange; with model MK heated Probe Flange
- 7 Probe; with model MK heated Probe
- 8 Printer Status Information and Measurement Values
 Print of 1/2 hr, 1 hr, 1 Day, 1 Month and 1 Year Average Values (selectable)

General Installation JFID

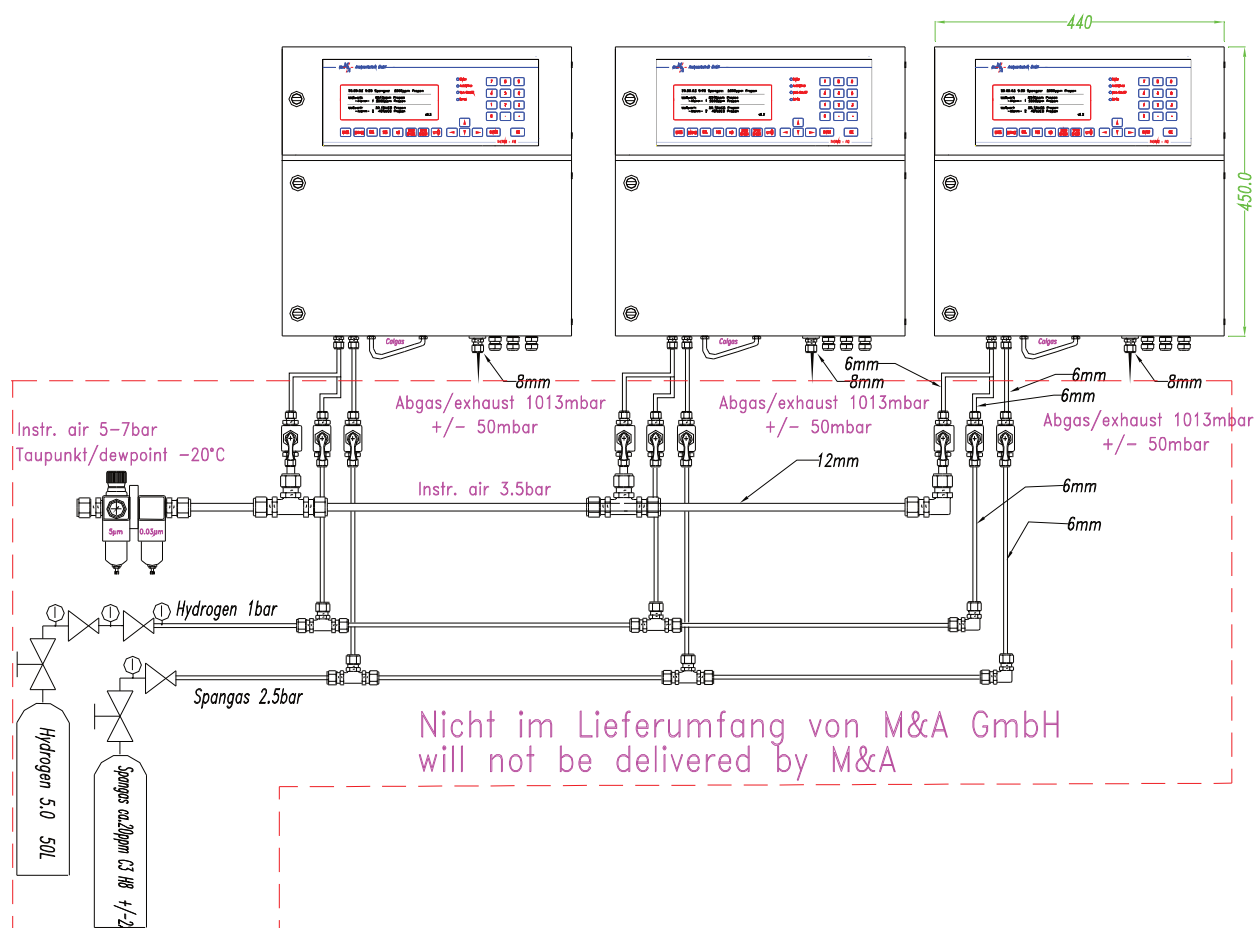
Installation Advice Thermo-FID



Installation of model 'FE'/'MK



Multi Installation of model 'FE'/'MK



• THC, Methane / None Methane

• Introduction Catalyst

The Methane/None Methane JFID features the JFID-Catalyst converting org.C into $\text{CO}_2 + \text{H}_2\text{O}$ without Methane at the presence of minimum 8% Oxygen content in the sample gas.

The catalyst is positioned in front of the sample input to the detector. The measurements are taking place as 'with' and 'without' the catalyst switched in/out. The sample flow is switched between the two streams (2/3-way valve) with a minimum cycle time of 30 seconds each stream. The cycle time is an operational parameter and can be configured by the operator between min. 30 seconds and max. 24 hours. Best catalyst performance is guaranteed by microprocessor controlled temperature stabilisation to $\pm 1^\circ\text{C}$.

The microprocessor controlled JFID allows to measure THC or THC without Methane on channel 1 + 2, and to measure Methane only on channel 3 + 4 (see output signal configuration).

Calibration is performed by using Methane in Air as Span Gas.

The JFID runs a complete calibration each channel. Any differences in concentration readings across the catalyst will be automatically compensated. The exact performed calibration will be logged after 2 x complete cycle loops only.

Technical Data

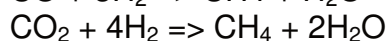
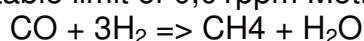
- Range	menu driven, free selectable each channel
- THC	10 to 1.000 ppm C_3H_8 using Zero Gas across the catalyst 2 to 1.000 ppm C_3H_8 using external Zero Gas (Nitrogen)
-Methane	10 to 1.000 ppm CH_4 using Zero Gas across the catalyst 2 to 1.000 ppm CH_4 using external Zero Gas (Nitrogen) [with THC <100ppm => C_3H_8 failure Methane <1ppm]
Linearity	<1% of reading
Drift @Zero	<1% of reading / 24 hrs
Drift @Span	<1% of reading / 24 hrs
LDL	+/-5% of range
Response time T_{90}	THC <15 seconds CH_4 <30 seconds
O_2 cross interference	<4% (@ min 8Vol% O_2 up to 25Vol% O_2)
Sample flow	25 or 90 liter/h (ejector pump set up) 25 liter/h using membrane pump
Sample pressure	800 up to 1.600mbar abs. (using ejector pump) 800 up to 1.200mbar abs. (using membrane pump)
Analog OUTPUT	2 x 0/4-20mA, channel THC at 1+2 2 x 0/4-20mA, channel CH_4 at 3+4
Power supply	internal using probe temp. controller, 230/115V/50-60Hz, 1,6Amp

• CO/CO₂ – Methane Catalyst (Methanyser)

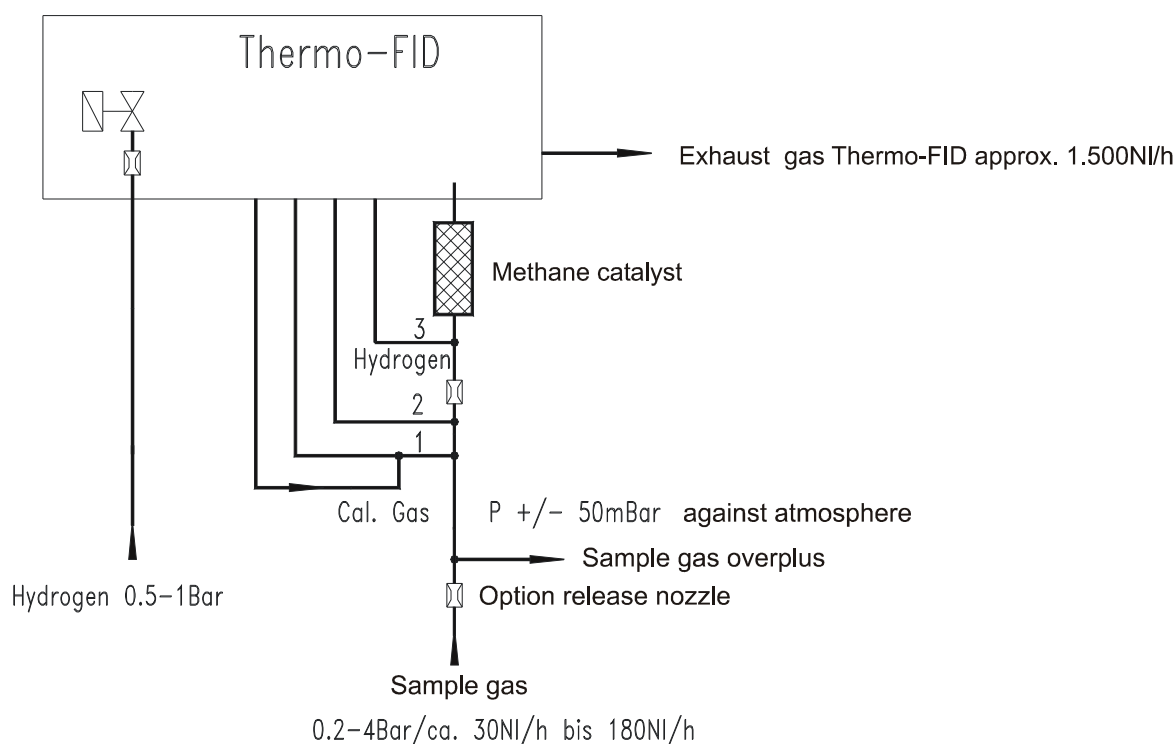
The CO/CO₂ – Methane Catalyst (Methanyser) features the conversion of CO + CO₂ at the temperature of 350 °C (370 °C) into Methane at the presence of Hydrogen.

The catalyst is in front of the sample input to the detector. Best catalyst performance is guaranteed by controlling the catalyst temperature at ± 1 °C.

By using the CO/CO₂ – Methane Catalyst (Methanyser) the JFID allows to measure CO and CO₂ concentrations between 0,01 up to 300ppm (including Hydrocarbons) reflecting the lower detectable limit of 0,01ppm Methane.



Notice: The JFID does not have any cross interference to the water behind the catalyst.

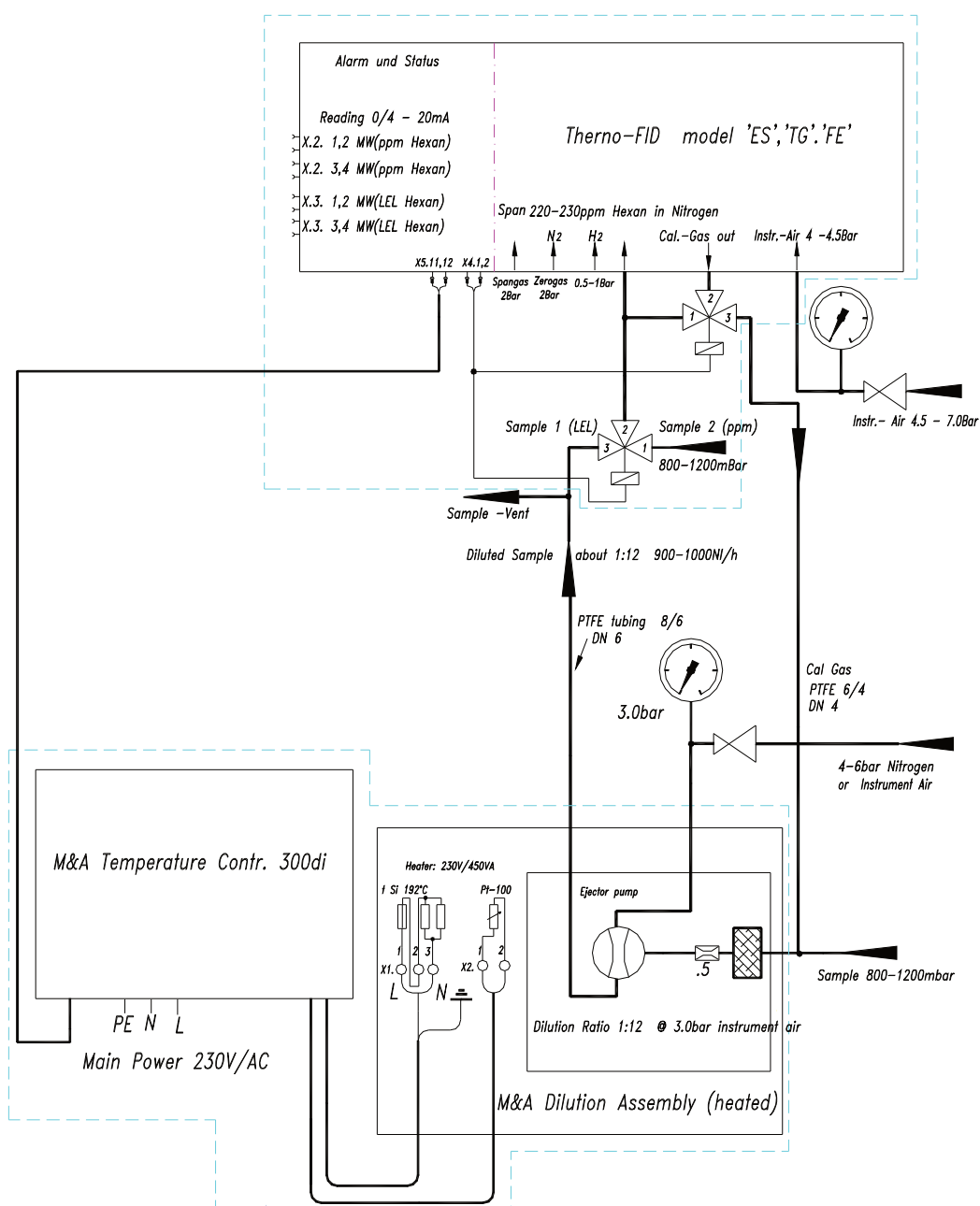


The JFID integrated temp. controller is used to regulate the catalyst temperature. Additional temp. controller can be installed. By operating the JFID under vacuum in using ejector pumps, no explosive gas mixture concentration of air/hydrogen can be present. By using the external Hydrogen supply 'without' the optional alarm/status PCB, the installation must be completed by the appropriate vent of the sample gas (gas mixture) to the environment or through a safe exhaust vent.

General Installations & Sampling Options

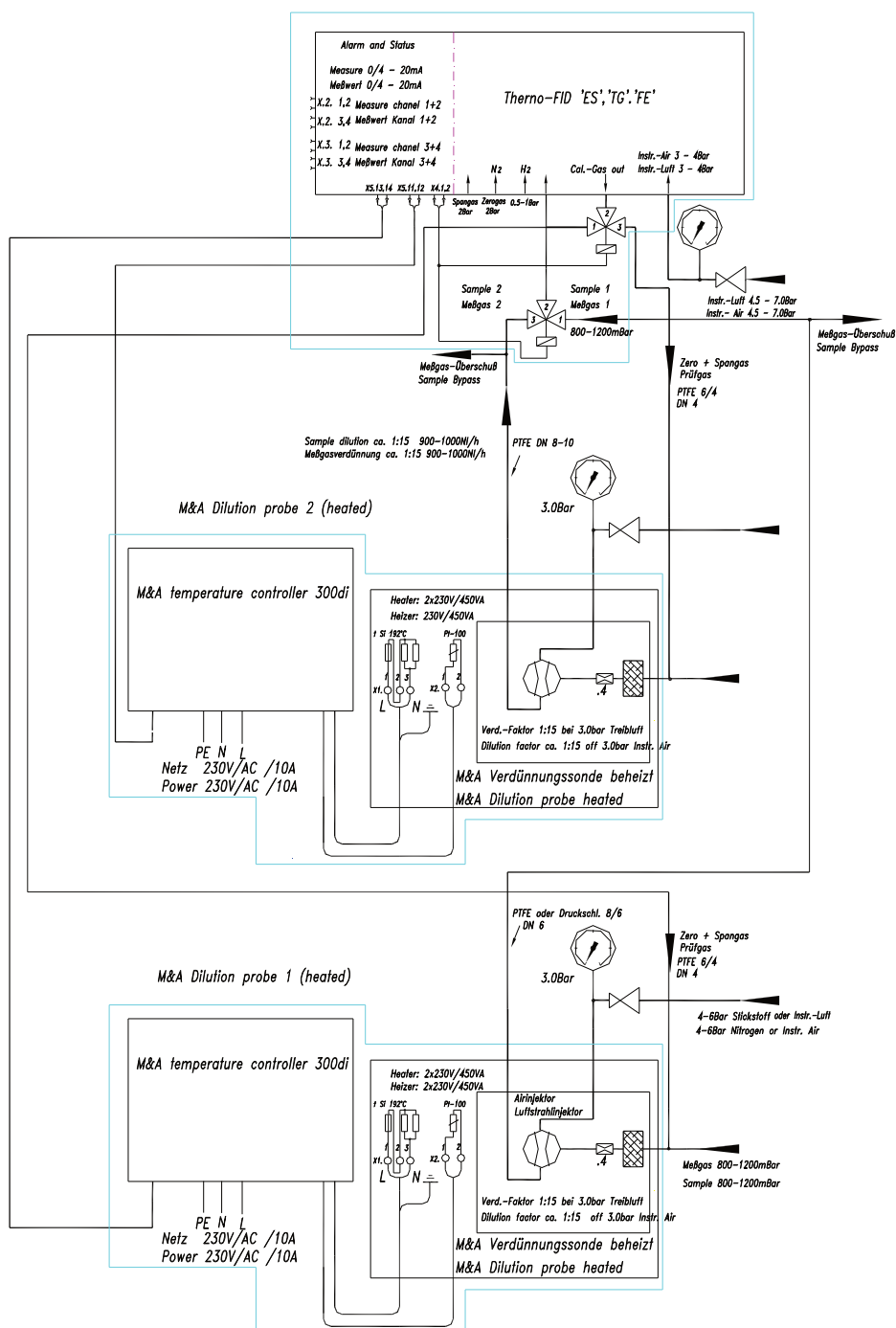
JFID, 2x Probe Sampling (MSU2), with/without Dilution

Thermo-FID with 2 x multi sampling (MSU) plus dilution probe



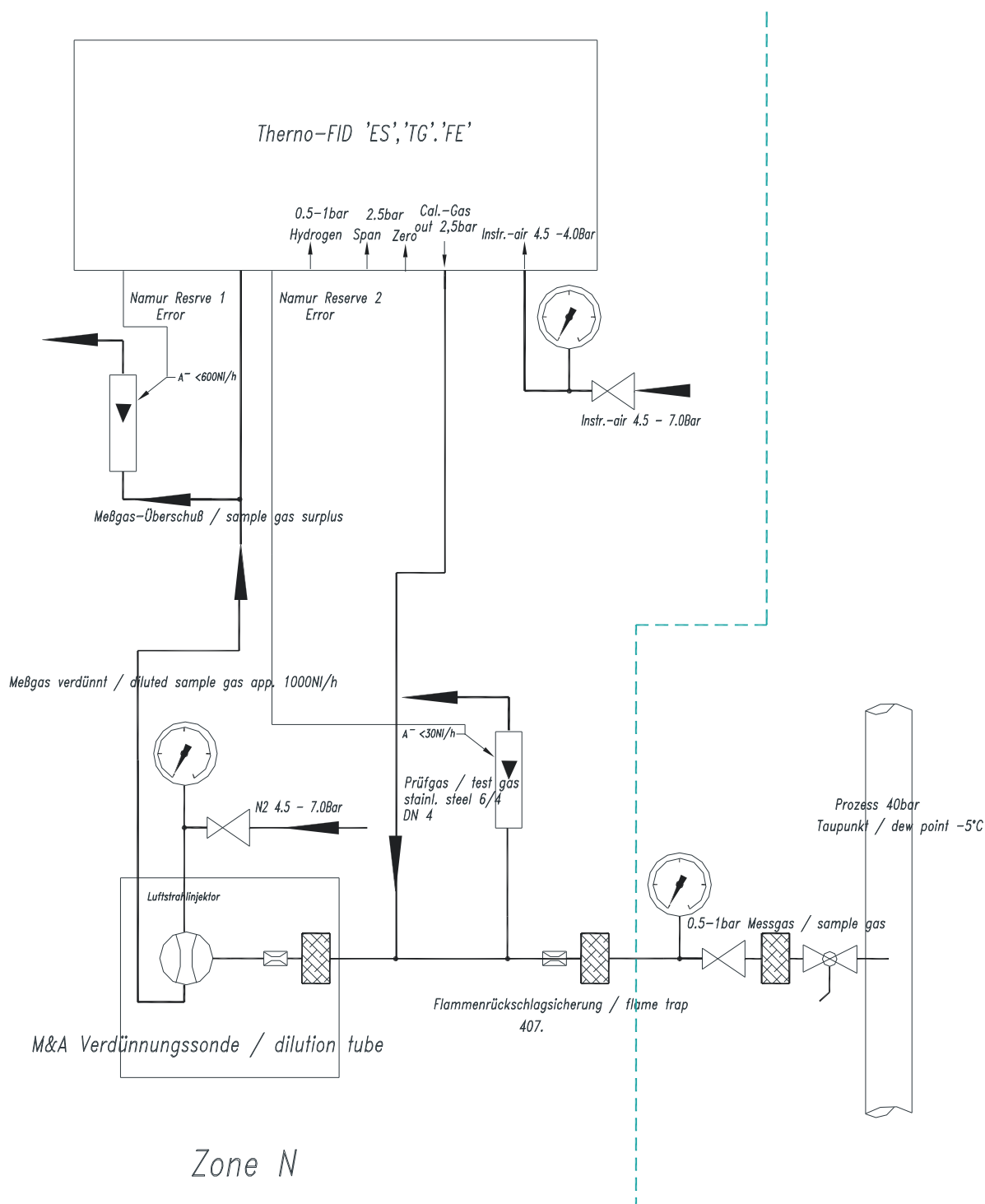
JFID, 2x Probe Sampling (MSU2), 2 x Dilution

Thermo-FID 2x MSU and 2 Dilution probes
 Thermo-FID 2-fach MSU und 2 Verdünnungssonden



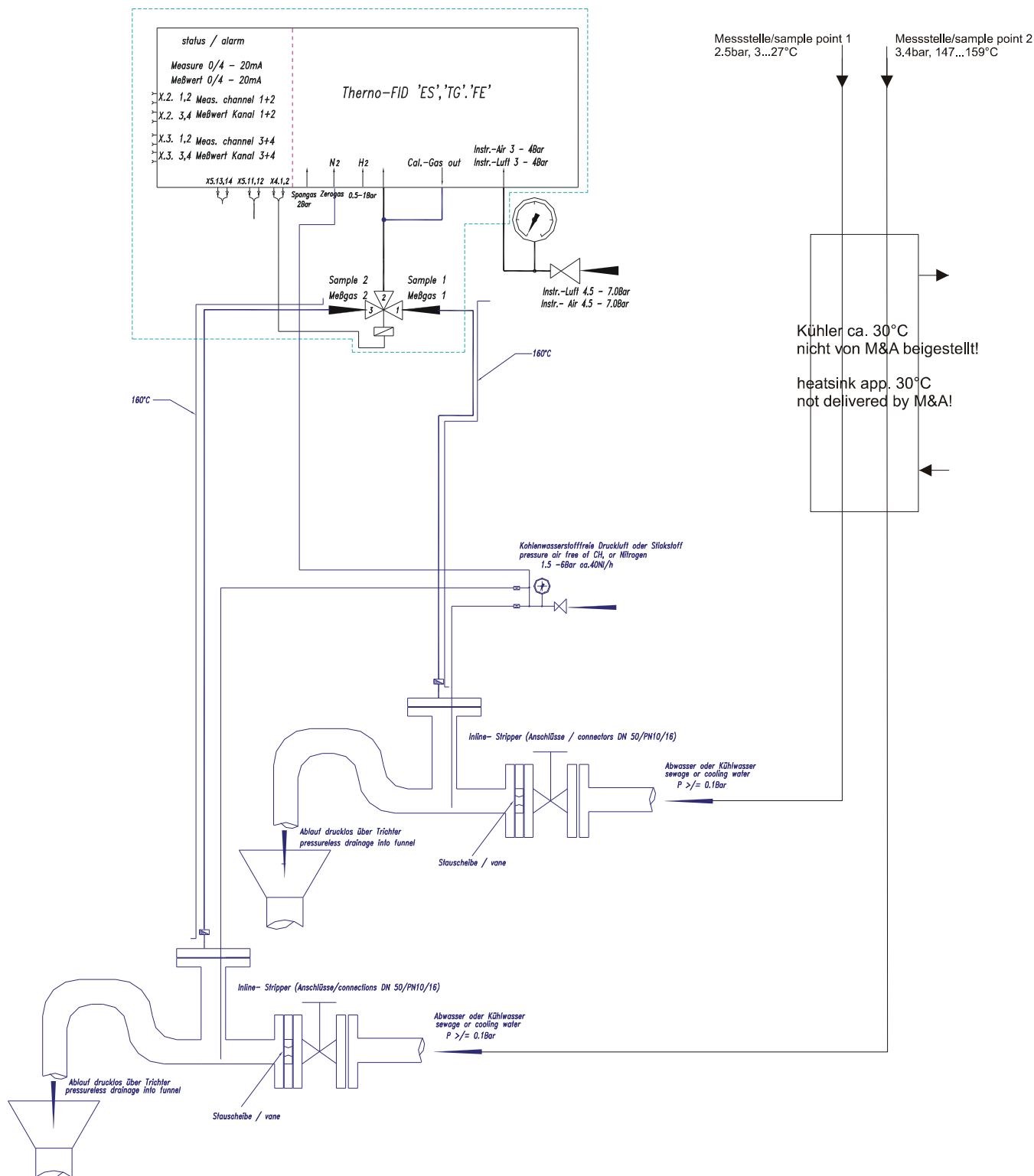
JFID, Probe Sampling from EEx area 2/T3, Dilution

Thermo-FID mit Verdünnungssonde / dilution tube



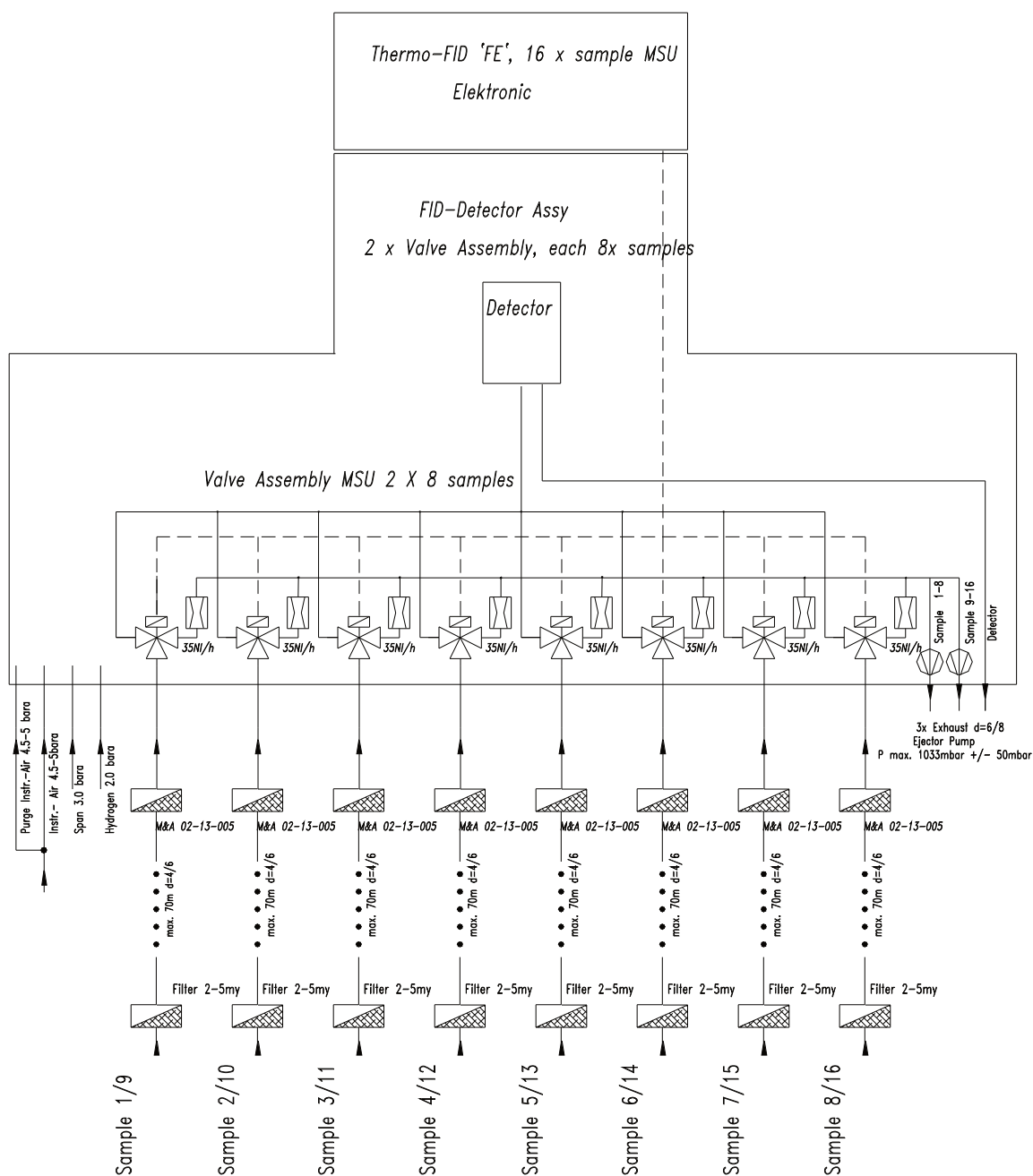
JFID, 2x Probe Sampling (MSU2) from Waste Water, 2 x Stripper

Thermo-FID mit 2fach-MSU and 2 Strippern
Thermo-FID mit 2fach-MSU Strippern



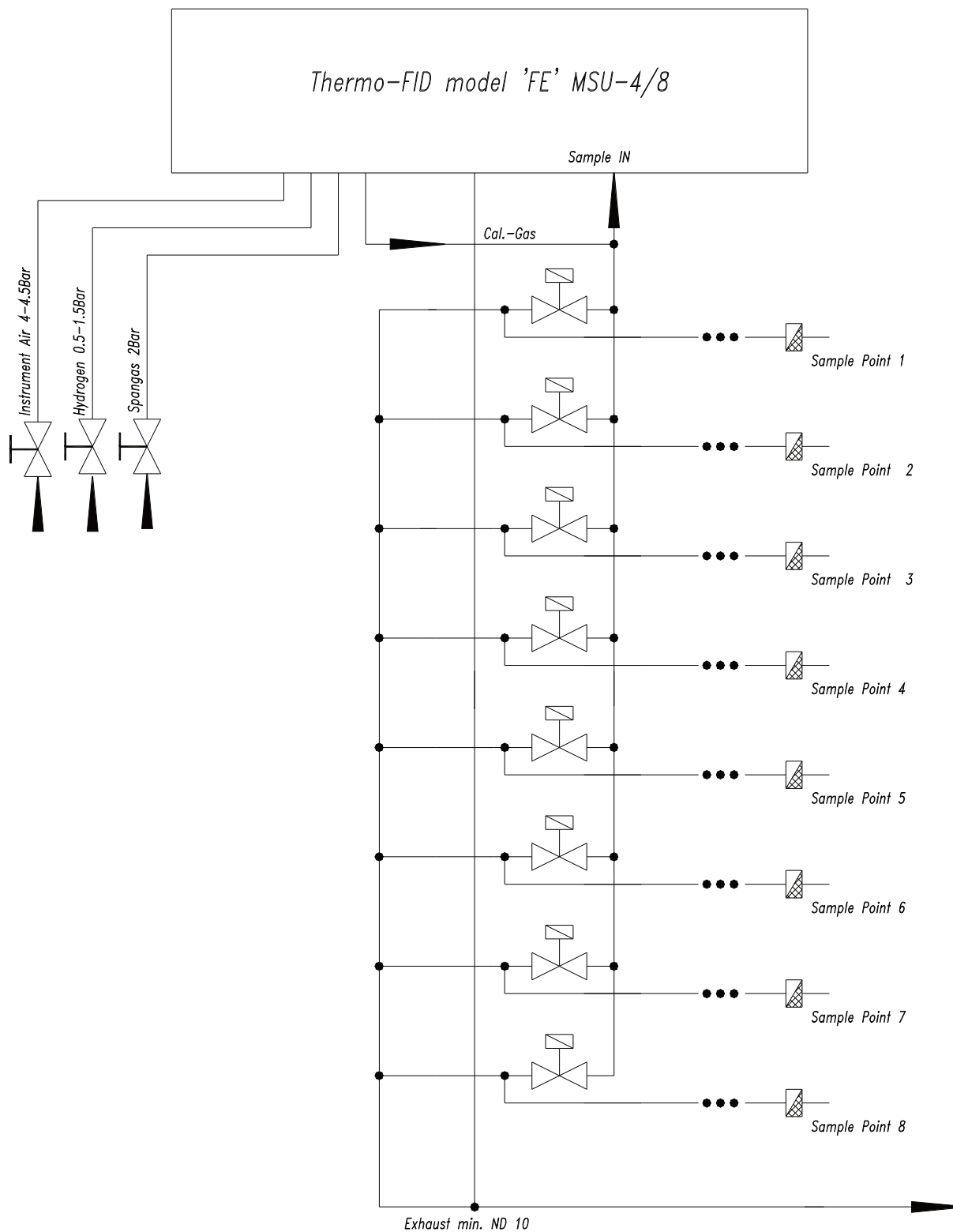
JFID, 16 x Sampling (MSU16-parallel) 'Work Place' / 'Ambient'

16 x Multi Point Sample Assy, parallel sampling uncluding
flow control at each sample point



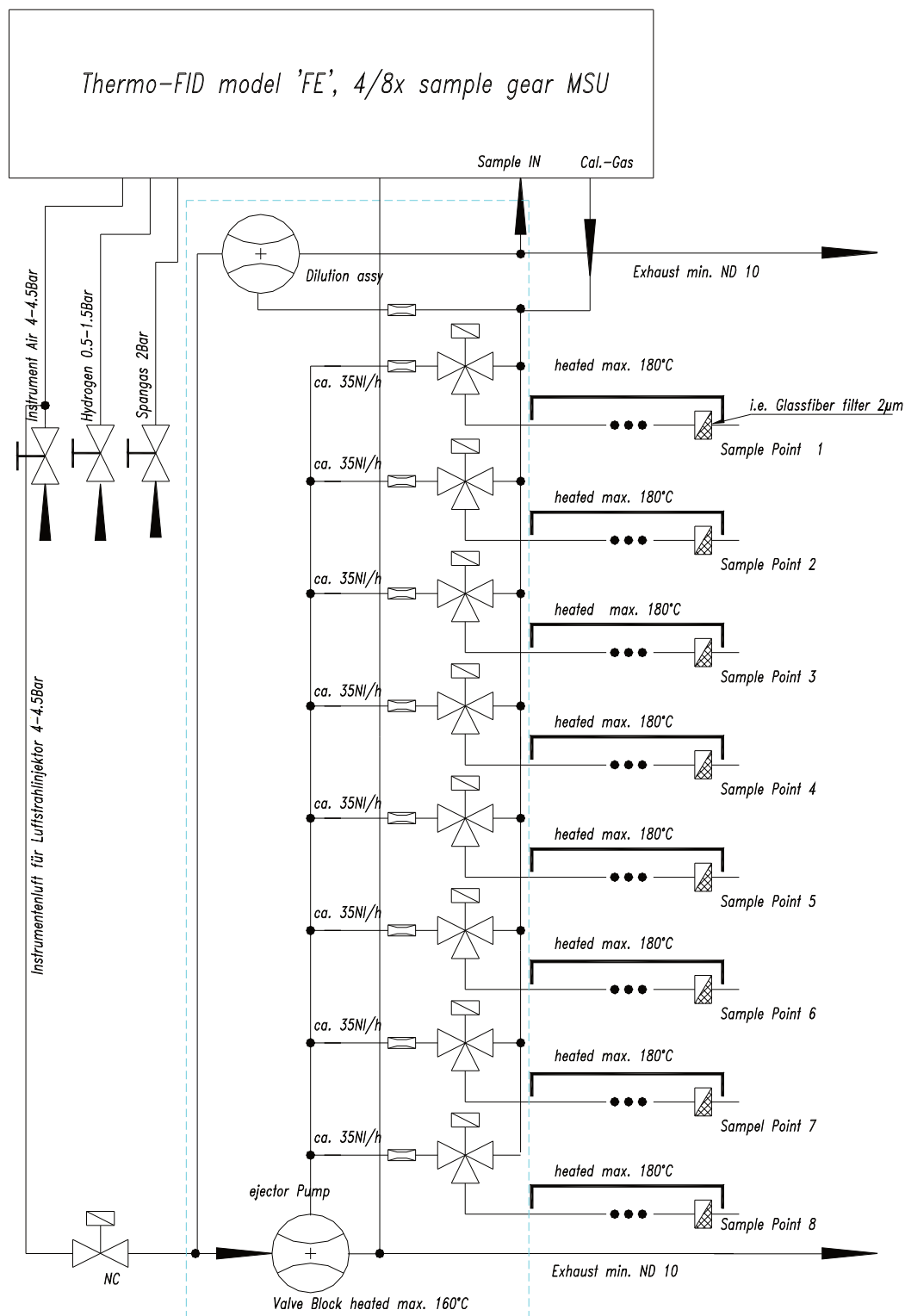
JFID, 8x Probe Sampling (MSU8)

Thermo-FID with 4 / 8 x sample gear (MSU), heated up to 180°C

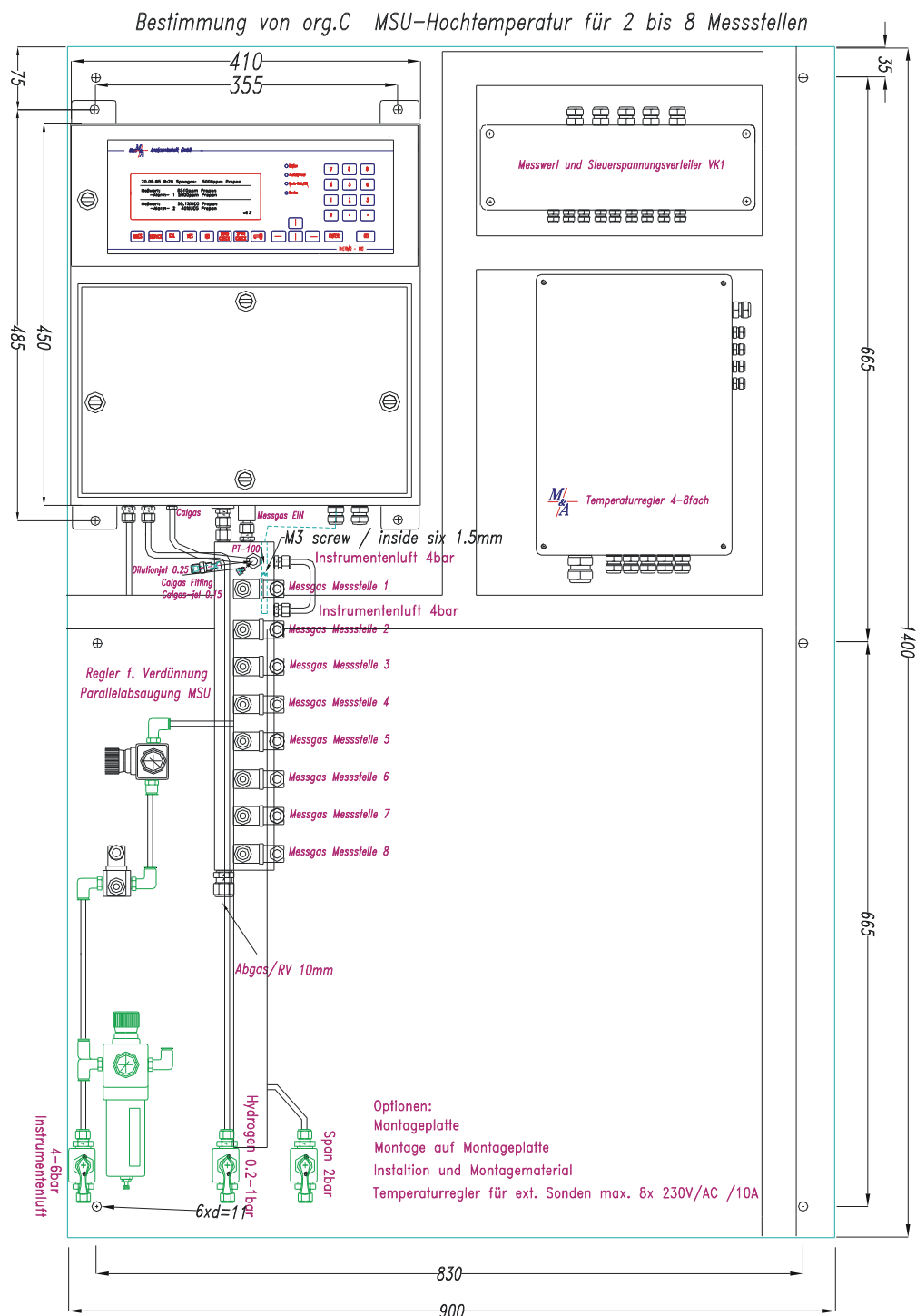


JFID, 8x 'heated' Probe Sampling, plus Dilution

Thermo-FID with 4/8x sample gear (MSU) heated (up to 180°C) incl. Dilution assy

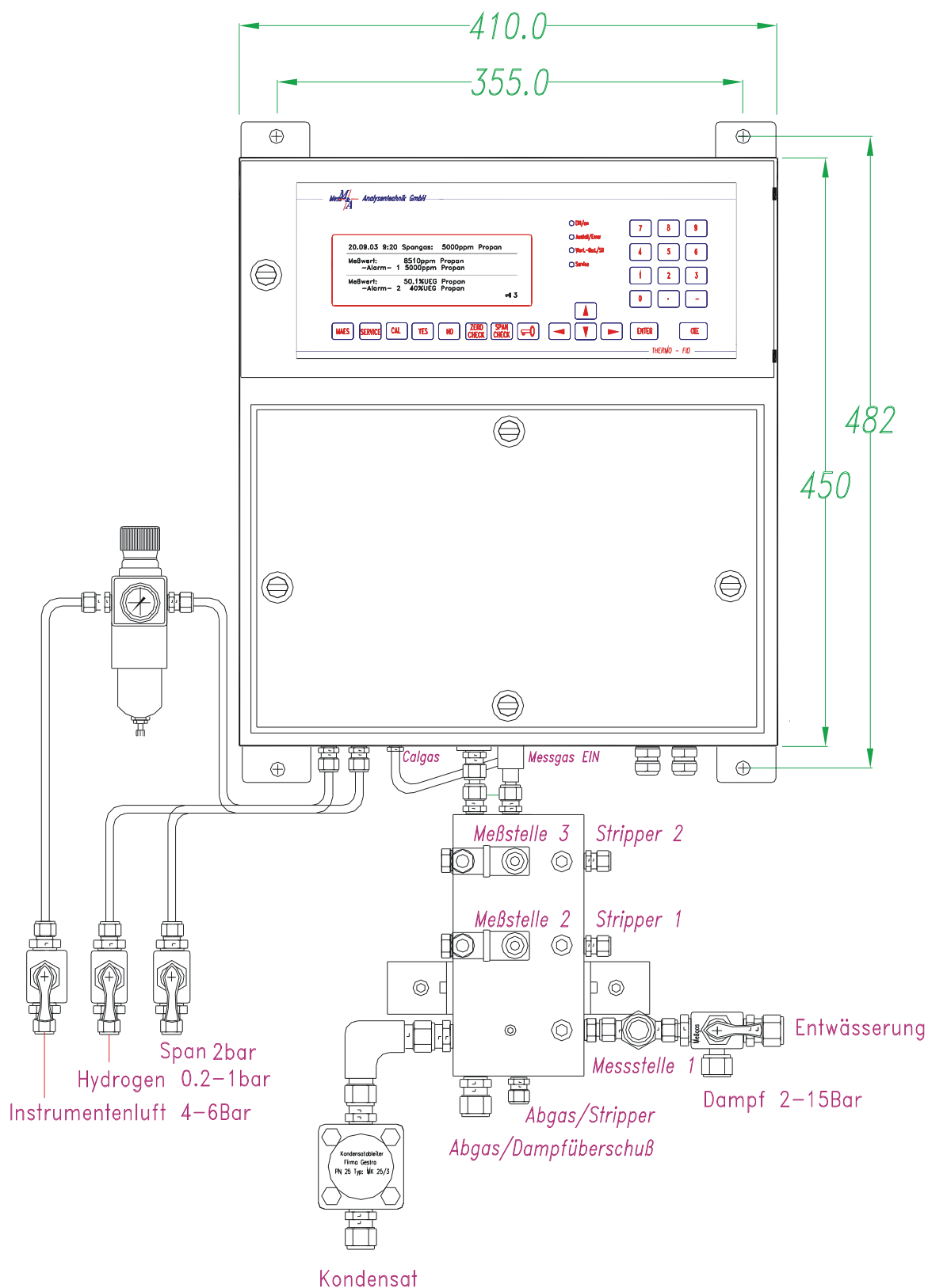


JFID, 8x High Temp. Sampling (MSU8-HT)



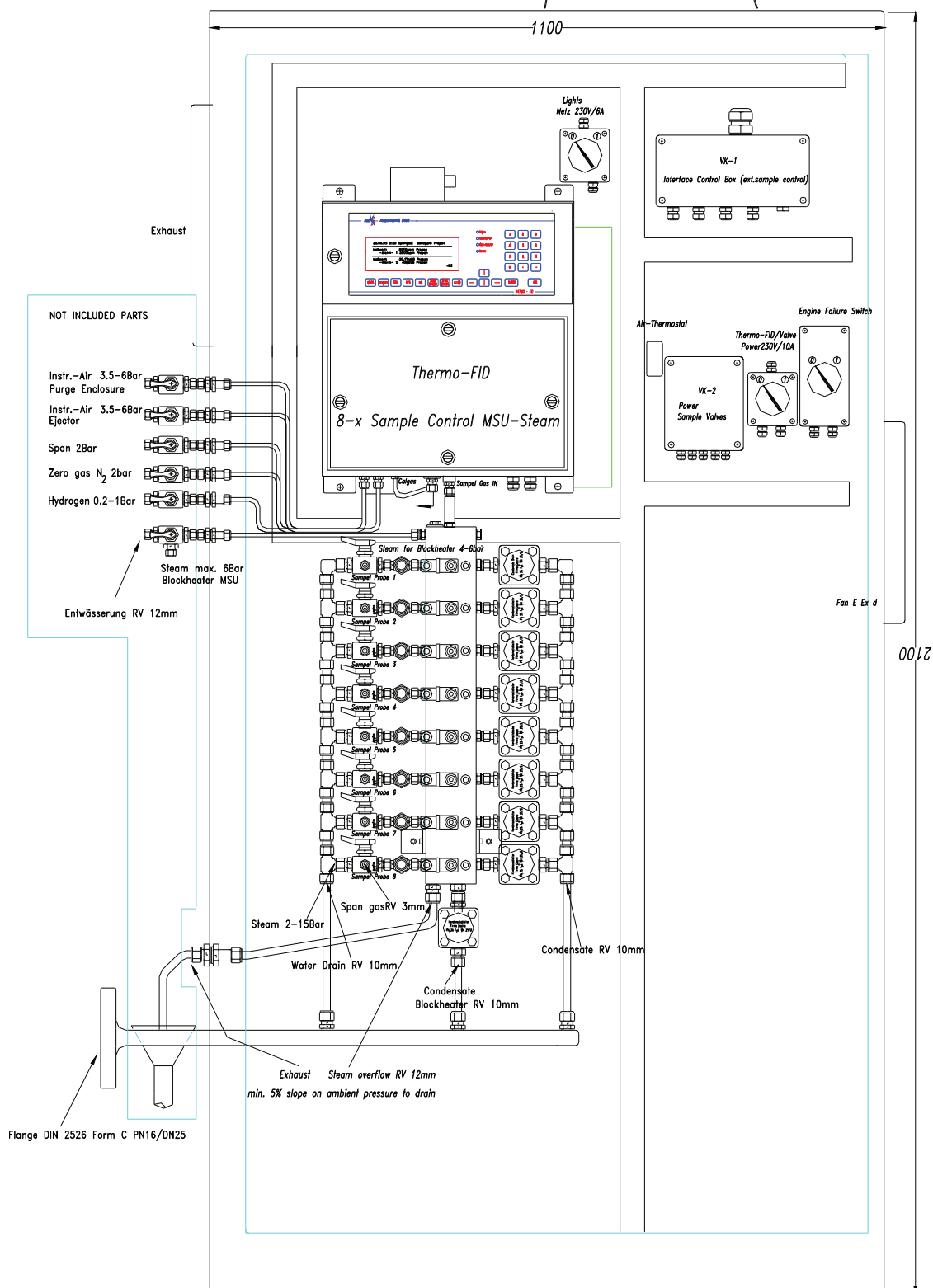
Montageplatte:
Trespa 10mm dick, Farbe lichtgrau oder
Aluminium 3mm dick gekantet und pulverbeschichtet, Farbe lichtgrau

JFID, Sampling from Steam



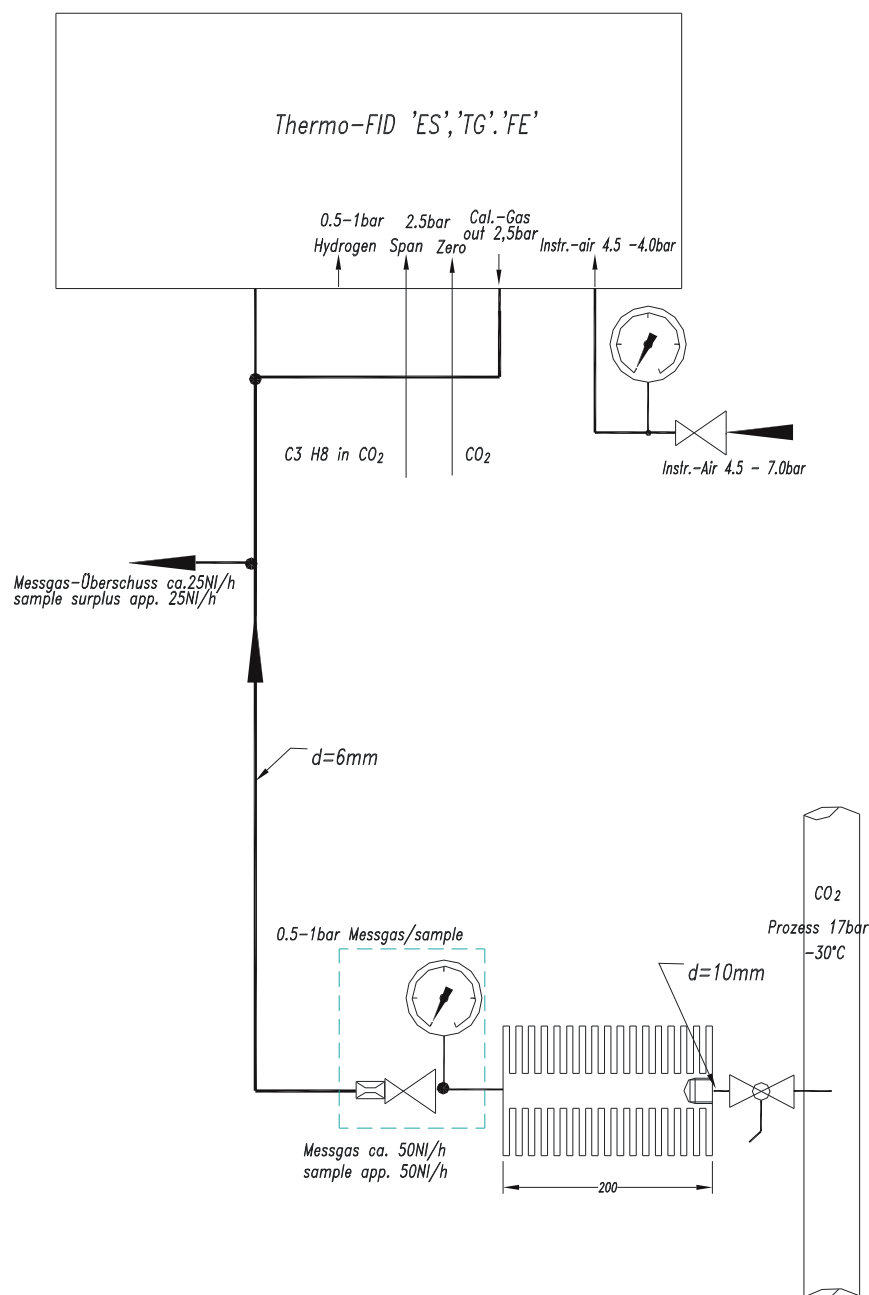
JFID, 8x Steam Probe Sampling (MSU8-Steam)

Thermo-FID incl. 8x Steam Sample Control (MSU-Steam 8x)

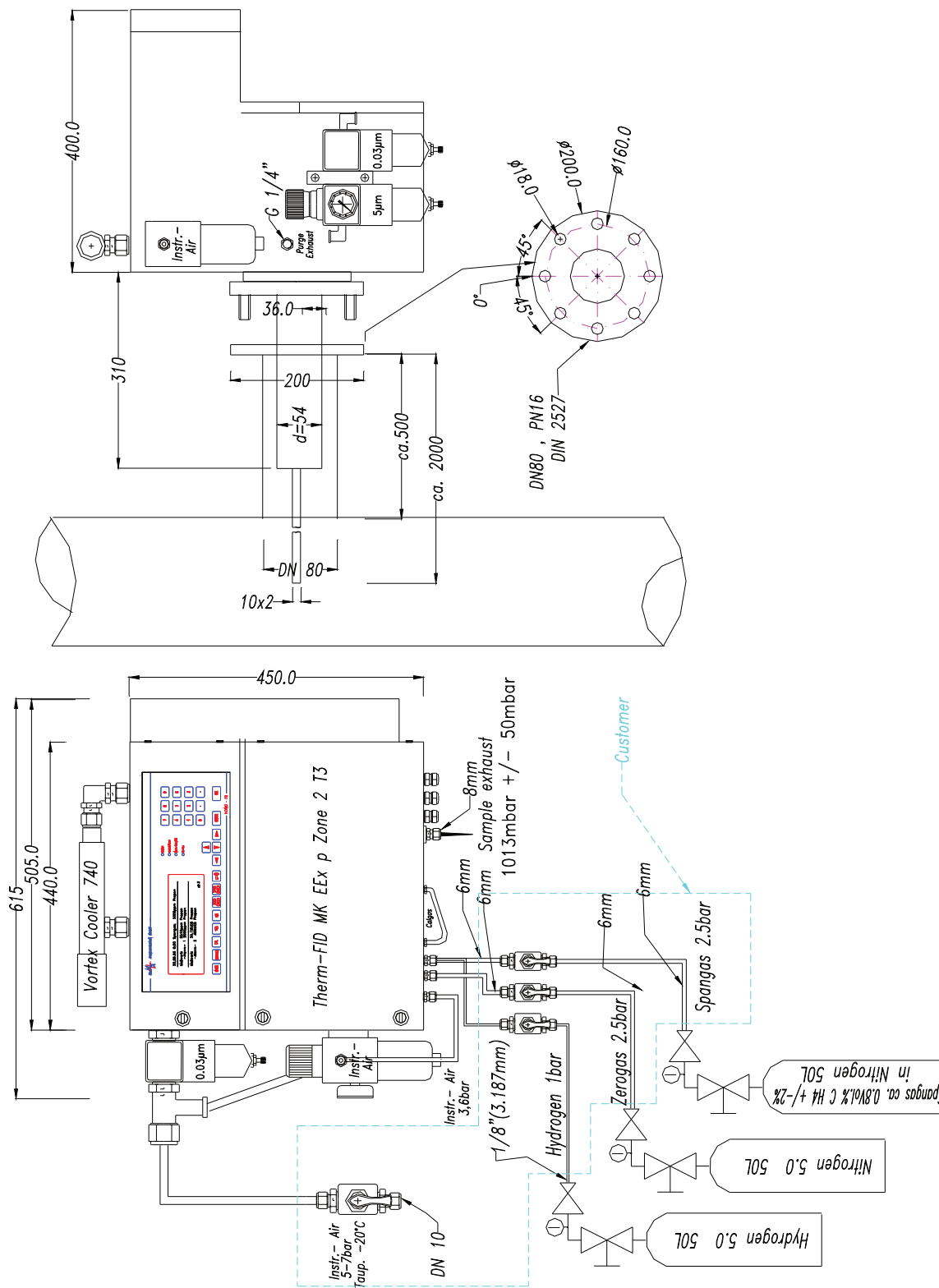


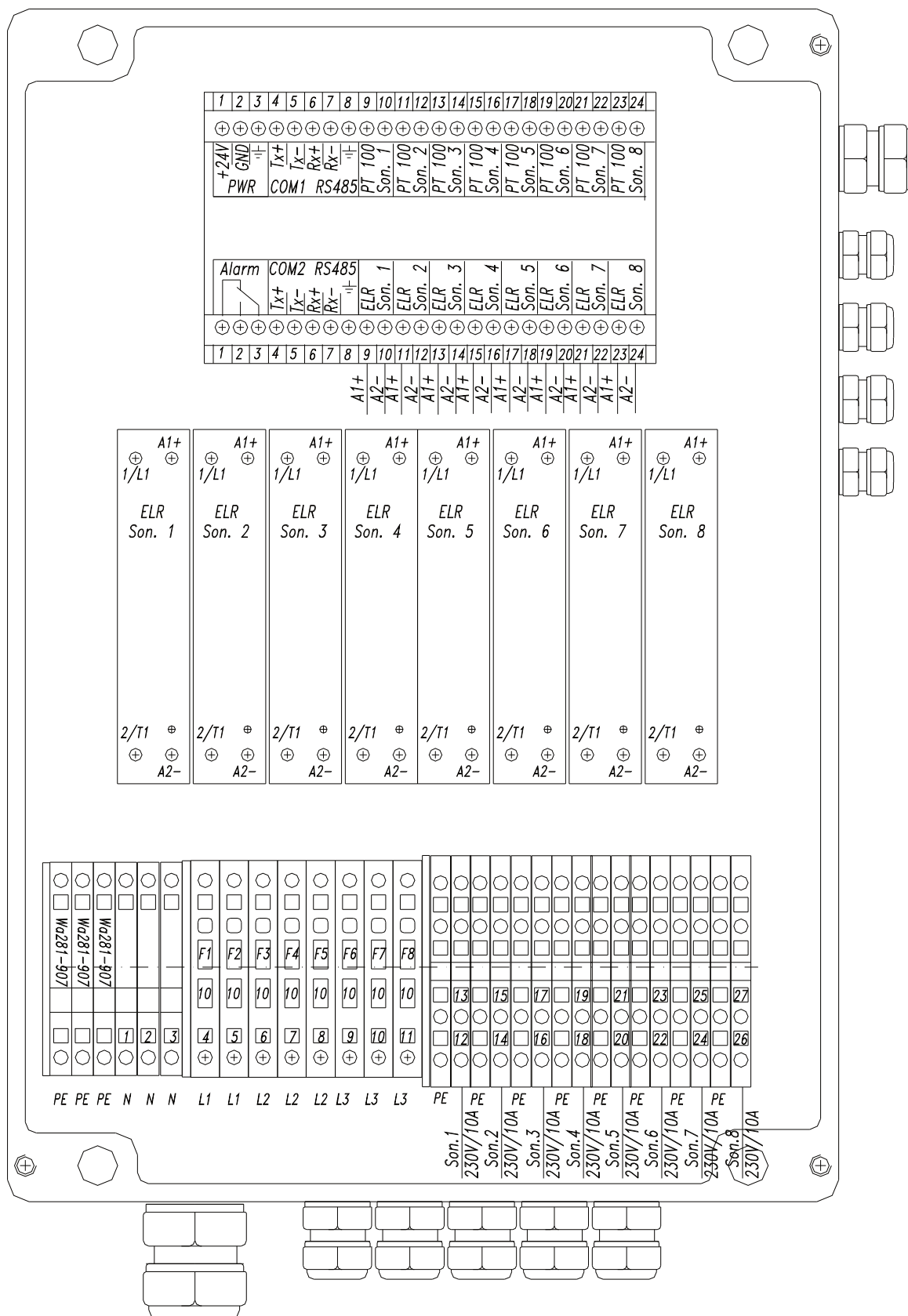
JFID, Sampling CO₂, Heat Exchanger

Thermo-FID mit Wärmetauscher / with heat exchanger



JFID at hot environment, Vortex Cooling, Purge



SK-Elektronik 8x Temperature Controller


• JFID Measuring Principle

• General Features

- ◆ The JFID is used in a variety of industrial applications, environmental measurement systems and R&D projects. Typical use of the JFID are LEL control, flue/exhaust gas at waste incinerators or the petro- and chemical industry, ambient air analysis, work place control MAK/TRK-limits and process control optimisation.
- ◆ The microprocessor controlled JFID provides menu driven 'clear text' user friendly interface information on an alphanumeric display. All operational and self diagnostic data are also available on RS232 and/or analog/digital outputs (status alarm PCB, optional). Additional application oriented functions can be integrated and/or added to the standard analyzer. A fully automated and continuous self diagnostic and log book entries for all operation and calibration data guarantees an optimized analyzer up time. The unique close couple detector design (no cables, etc.) provides a low drift operation and a wide dynamic range with always optimum signal noise ratio.
- ◆ All digital input feature are designed according NAMUR guidelines, all digital outputs are potential free contacts.
- ◆ Analog output signals are offered as standard 1 x 0/4-20mA, 600 Ohm load (not galvanic isolated), optional 4 x 0/4-20mA, optional galvanic isolation available on the status & alarm PCB.
- ◆ Instrument operation, configuration and remote control is also available on 2 x RS232 .

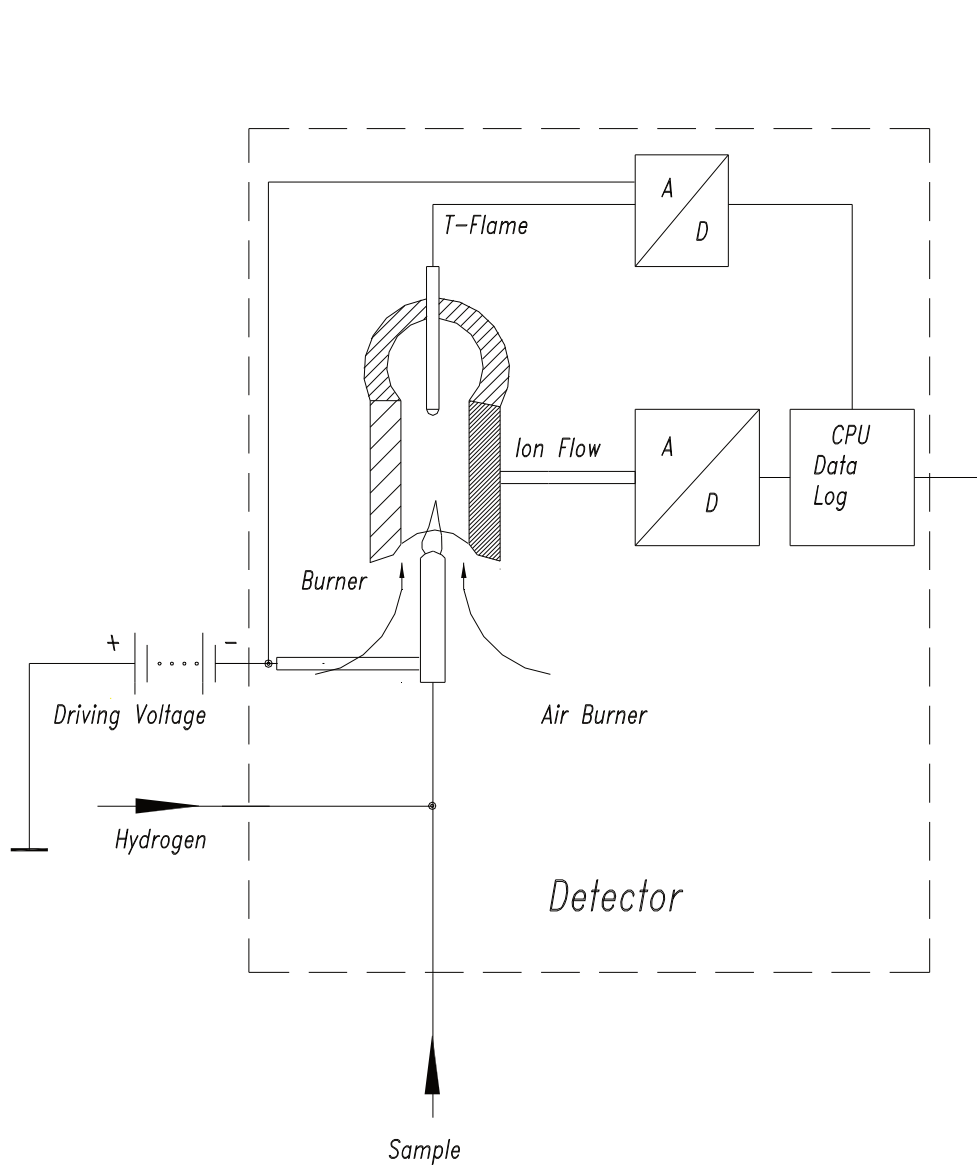
• Principle of Operation JFID

- ◆ Burning organic components in a hydrogen flame creates negative ions which are measured by having a negative driven voltage (potential) across the burner nozzle and an electrode. The current measured value is directly proportional to the content of org.C in the sample/burning flame.
- ◆ A flame is created by burning pure hydrogen plus cleaned air (burner air) in a temperature controlled burning chamber. An additional constant feed of measuring sample is added to the burning chamber. Flow and pressure conditions of the burning process are 'constant' and allows long term stability/low drift behavior.
- ◆ The allowed sample pressure variations at site are from 800mbar abs. up to 1600mbar abs.
- ◆ Instead of using heated sample pumps, not heated ejector pumps are installed (portable is incl. not heated membrane pump) behind the burning chamber. This unique design prevents any sample condensation and any direct contact of the sample to pressure and flow sensors through out the analyzer. In addition, the very small dead volume provides fast response time of the analyzer.
- ◆ The temperature setting of the measurement chamber is between 120 °C (standard) and up to 200 °C (optional)

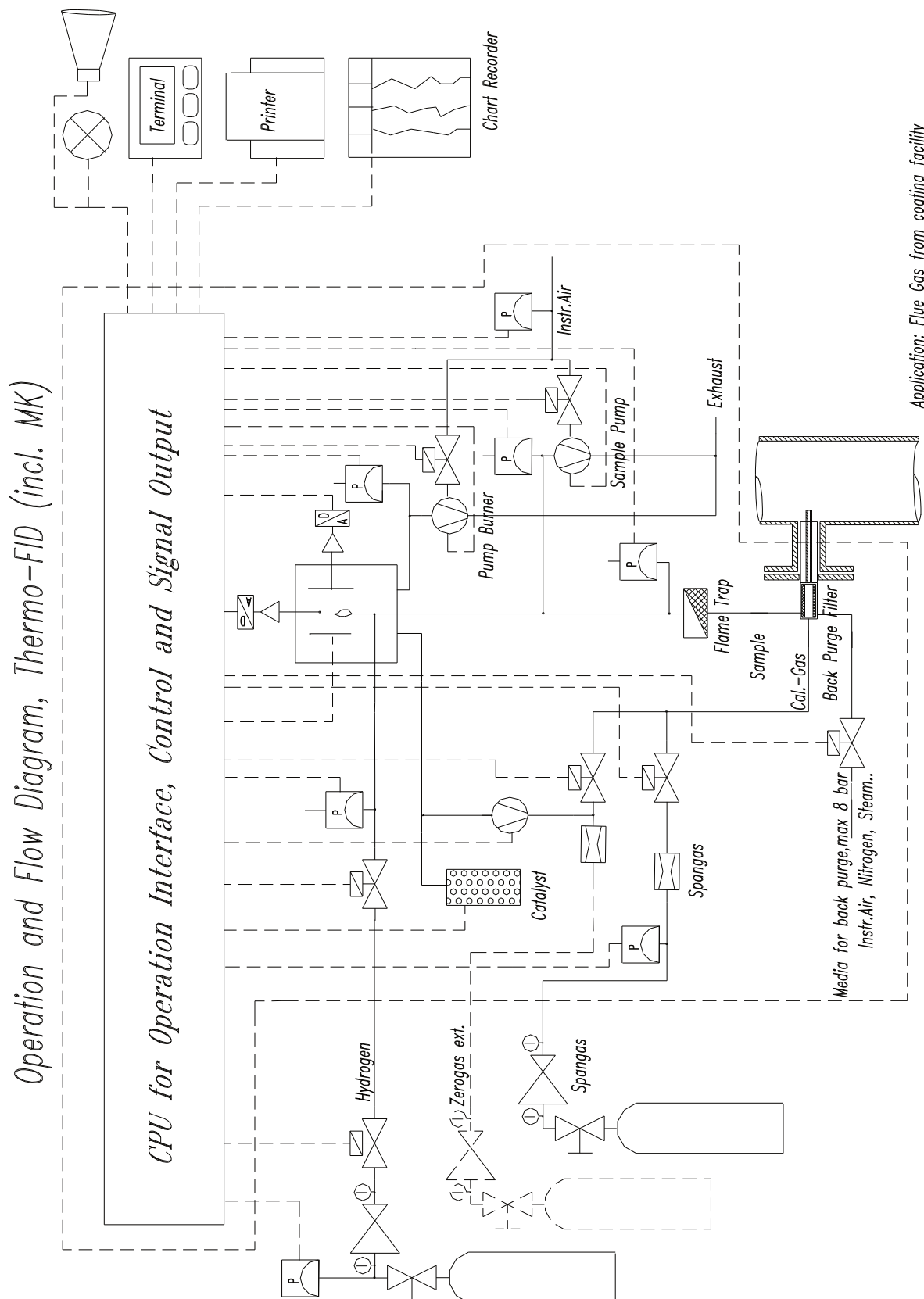
• Principle of operation

- ◆ The measurement principle of the JFID is based on the ionization of hydrocarbons in a hydrogen flame.
- ◆ Since the pure hydrogen flame creates only a very small basic the burning of hydrocarbons results in an ionization current being decades higher than one created by the pure hydrogen flame.
- ◆ Thus an exceptional constant sample gas flow and a constant hydrogen stream are drawn to the burner nozzle which being on a negative potential (approx. - 80 to - 400 VDC) measured by the close coupled detector. In the temperature controlled burning chamber, the mixture is burned by adding hydrocarbon free air in relation of approx. 10 : 1.
- ◆ The resulting ions are collected on a polarized electrode, amplified and prepared to be shown on the display.
- ◆ Best measurement performance is provided by offering a very constant sample mass flow and pressure conditions to the chamber. Due to the optimum design of the instrument, pressure variation at the sample point are allowed between 800mbar abs. up to 1600mbar abs. without lack of performance.
- ◆ The JFID features two separate microprocessor controlled pressure compensations in order to avoid any influence from environmental or sample conditions to the measurement.
- ◆ Instead of using conventional heated sample pumps, instrument air driven heated ejector pumps (except portable version) are used providing trouble free, maintenance free and exceptional stable sample flow conditions. Very fast response time is achieved by an optimum sample loop and minimum dead volume design. The sample flow can be set between 2 and 90 NI/hr depending on customers response time expectation and/or application needs (i.e. LEL, flue gas conditions etc.). The standard sample flow is between 10 and 25 NI/hr. The JFID is equipped with a flame trap also used as a heated sample inlet filter.
- ◆ All materials coming in contact with the sample gas as well as the measuring chamber are heated between 120°C and 200°C in order to avoid any kind of condensation and/or corrosion.

Operation Principle drawing



Principle Flow Diagram



• Installation of JFID

Instrument Location:

- ◆ Easy access to the instrument
- ◆ Choose appropriate weather enclosure for the instrument
- ◆ Avoid water, dust, direct sun light and other extreme environmental conditions to the analyzer
- ◆ **Please notice that the standard environmental conditions should be between –5 °C and +40 °C (optional –20 °C up to +40 °C for model 'MK').**
- ◆ **Please notice that optional equipment and installation advice is available for installation in EEx applications.**

Main Power:

- ◆ The Main Power provided to the instrument must be specified before order is placed. A universal power supply is operating at 115V...230V/50...60Hz.
- ◆ **The heater for the catalyst and heated sample line/heated probe must be specified/changed according to the main power supply.**

Power Consumption:

- | | |
|--|---------------|
| ◆ Model 'PT', 'ES' and 'FE' (without sample conditioning) | 250 VA |
| ◆ FID including flange/heated line/sample conditioning) | about 1500 VA |
| ◆ FID model MK incl. heated flange/sample probe | up to 1050 VA |
| ◆ Additional controller and power consumption Multi Point Sampling | not specified |

Analog/Digital IN/OUT:

Power for external/remote control available

- ◆ 115...230VAC, max 4A
- ◆ 24VDC, 400mA (optional by using status&alarm PCB)

Signal IN/OUT is available

- ◆ Standard analog 0/4-20mA, load 600 Ohm (not galvanic isolated)
- ◆ 1 x RS232
- ◆ PT100 IN for external temp. reading

Optional Status & Alarm PCB

- ◆ 4 x analog 0/4-20mA, optional galvanic isolated (on status & alarm PCB only)
- ◆ 4 x potential free relay contacts
- ◆ 1 x Each potential free relay contact for
- ◆ Failure
- ◆ Maintenance Request
- ◆ Service Request
- ◆ 1 x RS232 for remote control
- ◆ NAMUR signal IN

Pneumatic:

Gas Connections

- ◆ All gas and supply connections are either on the back panel of the instrument (model 'ES', 'TG') or from the bottom panel on the field enclosure (model 'FE', 'MK').

Material

- ◆ **Please notice that all supplied material should be free of particulates, oil, water, and any contamination which can cause instrument failures.**
- ◆ Flexible tubing should be of PTFE or Polyethylene (Please notice temperature limitations to PTFE at about 220-220 °C)

Pressure Regulator

- ◆ Appropriate pressure regulators are needed to provide stable operational conditions. JCT is offering a special designed pressure regulator avoiding mismanagement and set up difficulties (please consult factory for details).

Sample Inlet Filter

- ◆ A sample inlet filter (min 5 µm) at the sampling point is needed for the model 'TG', 'ES', 'PT' and 'FE' to avoid any contamination. Special fine-filter are available from JCT.
- ◆ Please refer also to the optional equipment such as heated sample line, heated probe etc. offered by JCT.
- ◆ A Filter Back Purge Option is available for probe systems (model 'MK').

Dimensions & Material Pneumatic Connections

- ◆ For easy installation and compatibility, all fittings and gas supply connections are G1/8"-ISO-228/1 (inner thread).
- ◆ Optional gas connections are available from JCT:
 - ◆ - Aluminum (anodized) 4x6 mm
 - ◆ - SS 6mm O.D.

Gas connections at instrument

- ◆ Sample IN SS-Fitting O.D. 6 mm
 SS-Fitting O.D. 8 mm
- ◆ Exhaust SS-Fitting O.D. 8 mm

Gas Supply

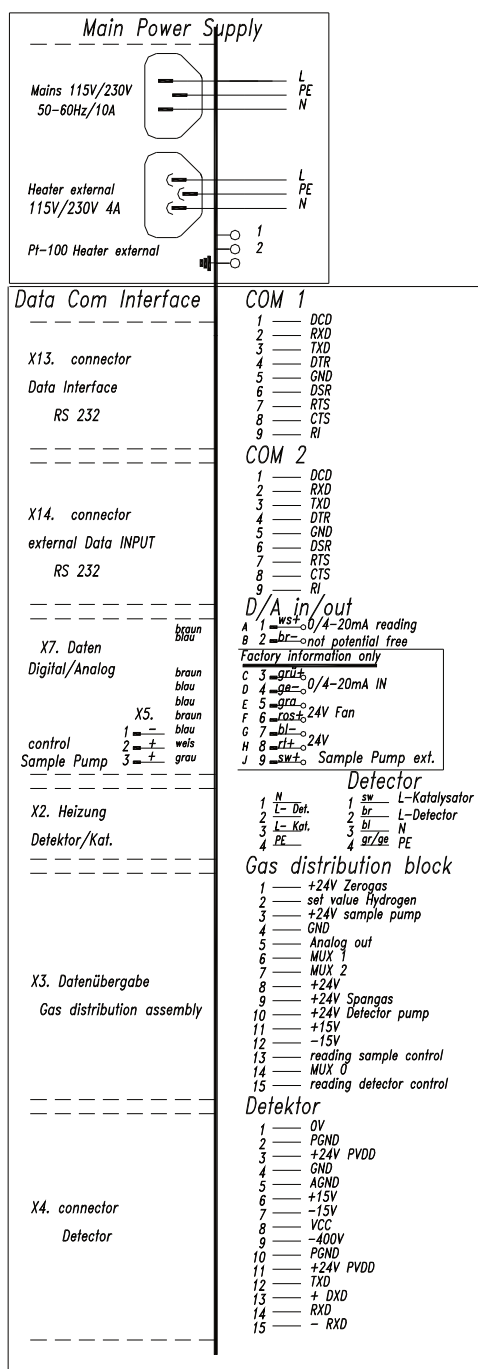
- ◆ Hydrogen 1 bar (required quality: 5.0)
- ◆ **Please notice that the use of a Hydrogen Generator is not recommended. Please always use bottled gas.**
- ◆ Span gas 2,5 bar (accuracy according to range and application set up)
- ◆ Instrument air 3,5 to 4,0 bar (oil and water free, dew point -20 °C)
- ◆ external Zero gas 2,5 bar (i.e. Nitrogen with quality 5.0)

• Electrical Interface PCBs

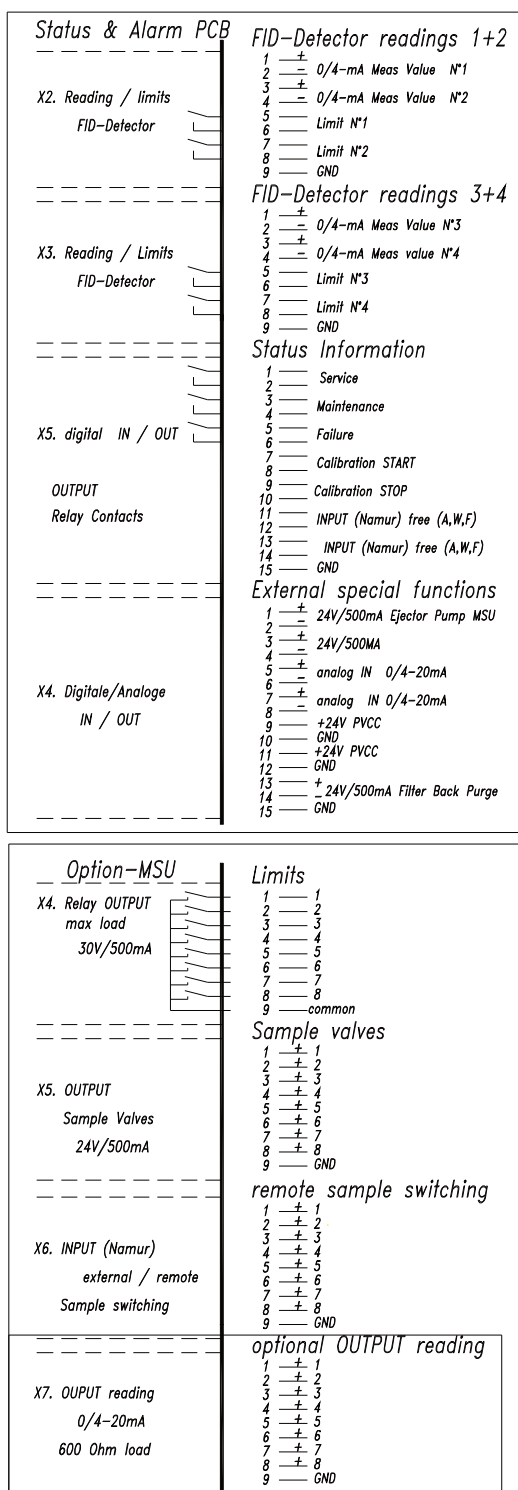
• Analog & Digital IN/OUT, General

INPUT / OUTPUT Thermo-FID, maximum configuration

Standard

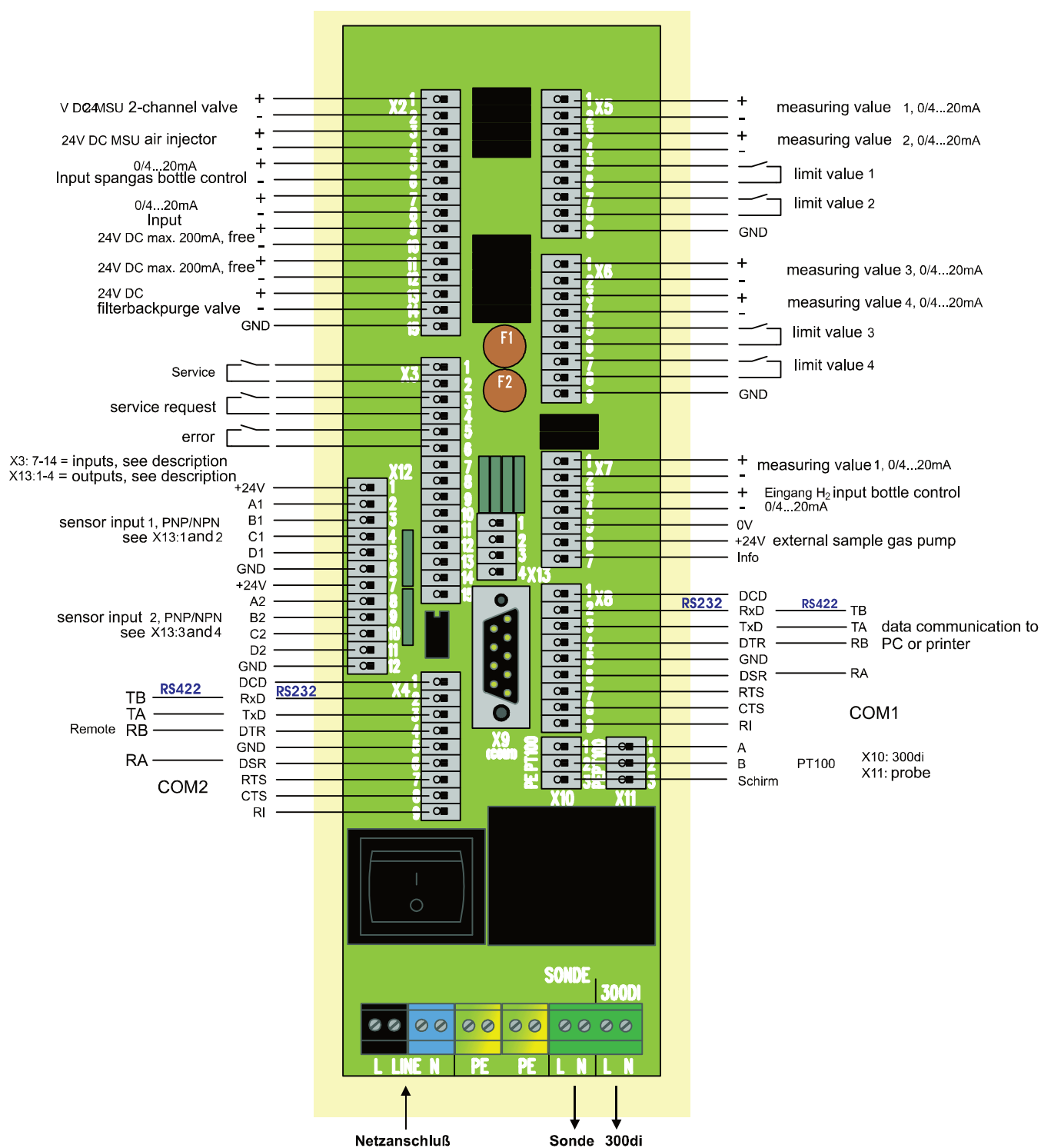


Options



Thermo-FID\ANSCHL19 28.04.96

• Analog & Digital IN/OUT for model 'FE' & 'MK'



Pin	Signal	Function	Reference	Ext. connection
1	+	Combined measurement / MSU 2 channel valve 24V DC	1	Internal use
2	-			
3	+	MSU Air injector 24V DC (ATEX-analyzers: controlling of the external valve H2)		
4	-			
5	+	input Spangas controlling of bottles: 0 (4) bis 20 mA		
6	-			
7	+	input: 0 (4) bis 20 mA		
8	-			
9	+	24V DC, max. 200mA		
10	-			
11	+	24V DC, max. 200mA		
12	-			
13	+	Back purge 24V DC		
14	-			
15	GND			Internal use
X3				
Pin	Signal	Function	Reference	Ext. connection
1	COM	Service: potential free NO / NC	1	
2	NO/NC			
3	COM	Maintenance: potential free NO / NC		
4	NO/NC			
5	COM	Error: potential free NO / NC		
6	NO/NC			
7	+	Input NAMUR 1: Start cal.		
8	-			
9	+	Input NAMUR 2: Stop cal.		
10	-			
11	+	Input NAMUR 3: not in use		
12	-			
13	+	Input NAMUR 4: not in use		
14	-			
15	GND			Internal use
X4 (RS-232), COM2				
Pin	Signal	Function	Reference	Ext. connection
1	DCD	Remote Interface, Modem	4	
2	RXD			
3	TXD			
4	DTR			
5	GND			
6	DSR			
7	RTS			
8	CTS			
9	RI			
X4 (RS-422), COM2				
Pin	Signal	Function	Reference	Ext. connection
1		Remote Interface, Modem	5	
2	TB (TX+)			
3	TA (TX-)			
4	RB (RX+)			
5				
6	RA (RX-)			
7				
8				
9				

X5				
Pin	Signal	Function	Reference	Ext. connection
1	+	Value 1: 0 (4) bis 20 mA	1	
2	-			
3	+	Value 2: 0 (4) bis 20 mA		
4	-			
5	COM	Alarm 1: potential free NO / NC		
6	NO/NC			
7	COM	Alarm 2: potential free NO / NC		
8	NO/NC			
9	GND			Internal use

X6				
Pin	Signal	Function	Reference	Ext. connection
1	+	Value 3: 0 (4) bis 20 mA	1	
2	-			
3	+	Value 4: 0 (4) bis 20 mA		
4	-			
5	COM	Alarm 3: potential free NO / NC		
6	NO/NC			
7	COM	Alarm 4: potential free NO / NC		
8	NO/NC			
9	GND			Internal use

X7				
Pin	Signal	Function	Reference	Ext. connection
1	+	Value 1: 0 (4) bis 20 mA	2	
2	-			
3	+	Input controlling of H2: 0 (4) bis 20 mA	2	
4	-			
5	0V	Ext. sample gas pump	3	Internal use
6	+24V			
7	Info			

X8, X9 (RS-232), COM1				
Pin	Signal	Function	Reference	Ext. connection
1	DCD	Data transmission to printer or computer failure history and parameters	6	
2	RXD			
3	TXD			
4	DTR			
5	GND			
6	DSR			
7	RTS			
8	CTS			
9	RI			

X8, X9 (RS-422), COM1				
Pin	Signal	Function	Reference	Ext. connection
1		Data transmission to printer or computer failure history and parameters	7	
2	TB (TX+)			
3	TA (TX-)			
4	RB (RX+)			
5				
6	RA (RX-)			
7				
8				
9				

X10				
Pin	Signal	Function	Reference	Ext. connection
1	A	PT 100 Additional temp. controller 300DI	8,9	
2	B			
3	Filter GND			

X11				
Pin	Signal	Function	Reference	Ext. connection
1	A	PT 100 Sonde	10	
2	B			
3	Filter GND			

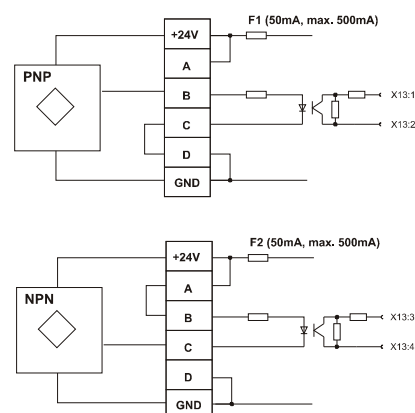
X12				
Pin	Signal	Function	Reference	Ext. connection
1	+24V	Input sensor 1: PNP / NPN (see X13:1 and X13:2)	11	
2	A1			
3	B1			
4	C1			
5	D1			
6	GND	Input sensor 2: for PNP / NPN (see X13:3 and X13:4)	11	
7	+24V			
8	A2			
9	B2			
10	C2			
11	D2			
12	GND			

X13				
Pin	Signal	Function	Reference	Int. Zielfunction X3
1	+	Output sensor 1: Namur	12	X3:
2	-			X3:
3	+	Output sensor 2: Namur		X3:
4	-			X3:

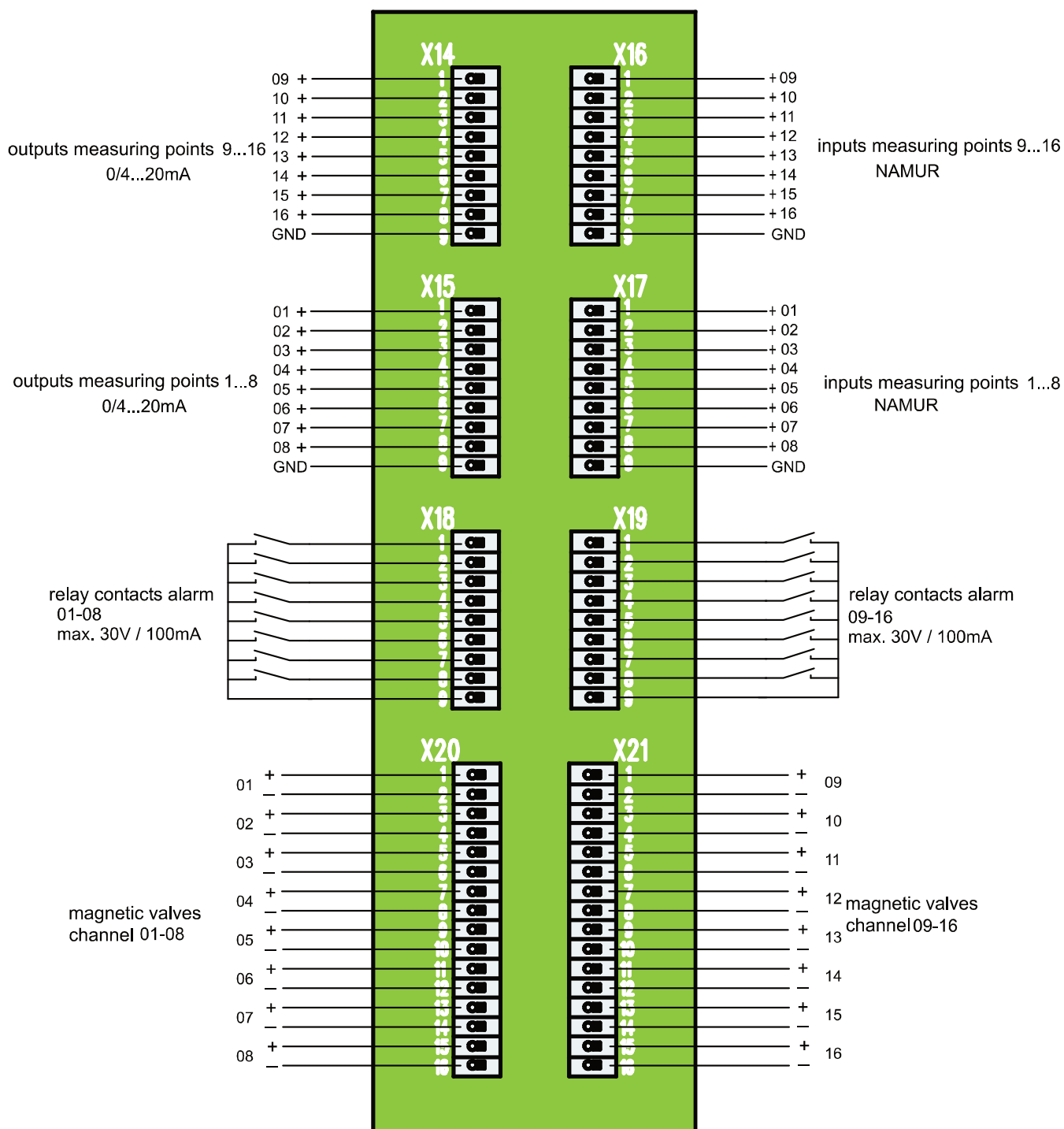
Reference:

- 1: only for Status and Alarm 407.950033.D
- 2: not galvanically separated
- 3: max 200mA
- 4: RS-232 Interface board 407.950051, interface board slot 1
- 5: only for use with RS-422 Interface board 407.980015.A Slot 1
- 6: only for use with RS-232 Interface board 407.950051 Slot 2
- 7: only for use with RS-422 Interface board 407.980015.A Slot 2
- 8: only for use with Additional temp. controllers 300DI (19") 207.050239.A
- 9: not in use by 8 channel or 4 channel MSU analyzers
- 10: „MK“ internal usage
- 11: see example
- 12: has to be connected to one of the 4 additional inputs X3

Beispiel für den Anschluss von Sensoren an X12



• Electrical Interface Multi Point Sample Control (MSU)



X14				
Pin	Signal	Function	Reference	Ext. connection
1	+	Output sample point09	1	
2	+	Output sample point10		
3	+	Output sample point11		
4	+	Output sample point12		
5	+	Output sample point13		
6	+	Output sample point14		
7	+	Output sample point15		
8	+	Output sample point16		
9	GND	common GND		

X15				
Pin	Signal	Function	Reference	Ext. connection
1	+	Output sample point01	1	
2	+	Output sample point02		
3	+	Output sample point03		
4	+	Output sample point04		
5	+	Output sample point05		
6	+	Output sample point06		
7	+	Output sample point07		
8	+	Output sample point08		
9	GND	common GND		

X16				
Pin	Signal	Function	Reference	Ext. connection
1	+	Input sample point09	2	
2	+	Input sample point10		
3	+	Input sample point11		
4	+	Input sample point12		
5	+	Input sample point13		
6	+	Input sample point14		
7	+	Input sample point15		
8	+	Input sample point16		
9	GND	common GND		

X17				
Pin	Signal	Function	Reference	Ext. connection
1	+	Input sample point01	2	
2	+	Input sample point02		
3	+	Input sample point03		
4	+	Input sample point04		
5	+	Input sample point05		
6	+	Input sample point06		
7	+	Input sample point07		
8	+	Input sample point08		
9	GND	common GND		

X18				
Pin	Signal	Function	Reference	Ext. connection
1	NO	Alarm channel 01	3	
2	NO	Alarm channel 02		
3	NO	Alarm channel 03		
4	NO	Alarm channel 04		
5	NO	Alarm channel 05		
6	NO	Alarm channel 06		
7	NO	Alarm channel 07		
8	NO	Alarm channel 08		
9	COM	common		

X19				
Pin	Signal	Function	Reference	Ext. connection
1	NO	Alarm channel 09	3	
2	NO	Alarm channel 10		
3	NO	Alarm channel 11		
4	NO	Alarm channel 12		
5	NO	Alarm channel 13		
6	NO	Alarm channel 14		
7	NO	Alarm channel 15		
8	NO	Alarm channel 16		
9	COM	common		

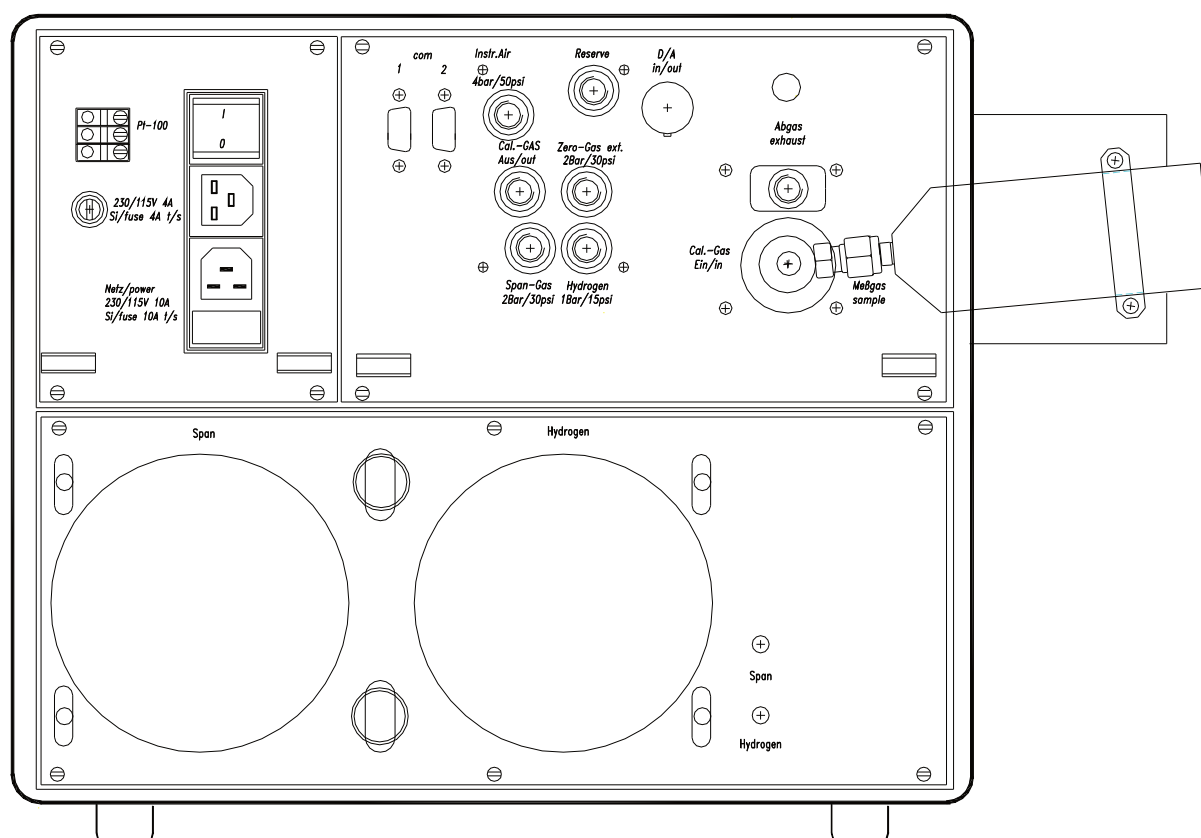
X20				
Pin	Signal	Function	Reference	Ext. connection
1	+	Magnetic valve 01	4	
2	-			
3	+	Magnetic valve 02		
4	-			
5	+	Magnetic valve 03		
6	-			
7	+	Magnetic valve 04		
8	-			
9	+	Magnetic valve 05		
10	-			
11	+	Magnetic valve 06		
12	-			
13	+	Magnetic valve 07		
14	-			
15	+	Magnetic valve 08		
16	-			

X21				
Pin	Signal	Function	Reference	Ext. connection
1	+	Magnetic valve 09	4	
2	-			
3	+	Magnetic valve 10		
4	-			
5	+	Magnetic valve 11		
6	-			
7	+	Magnetic valve 12		
8	-			
9	+	Magnetic valve 13		
10	-			
11	+	Magnetic valve 14		
12	-			
13	+	Magnetic valve 15		
14	-			
15	+	Magnetic valve 16		
16	-			

- 1 Outputs 0/4...20mA
- 2 Inputs according NAMUR
- 3 Contacts max. 30V / 100mA
- 4 Magnetic valves max. 24V / 500mA

• Gas and Main Supply, Back Panel Interfaces

Portable JFID , model PT'



Dimensions:

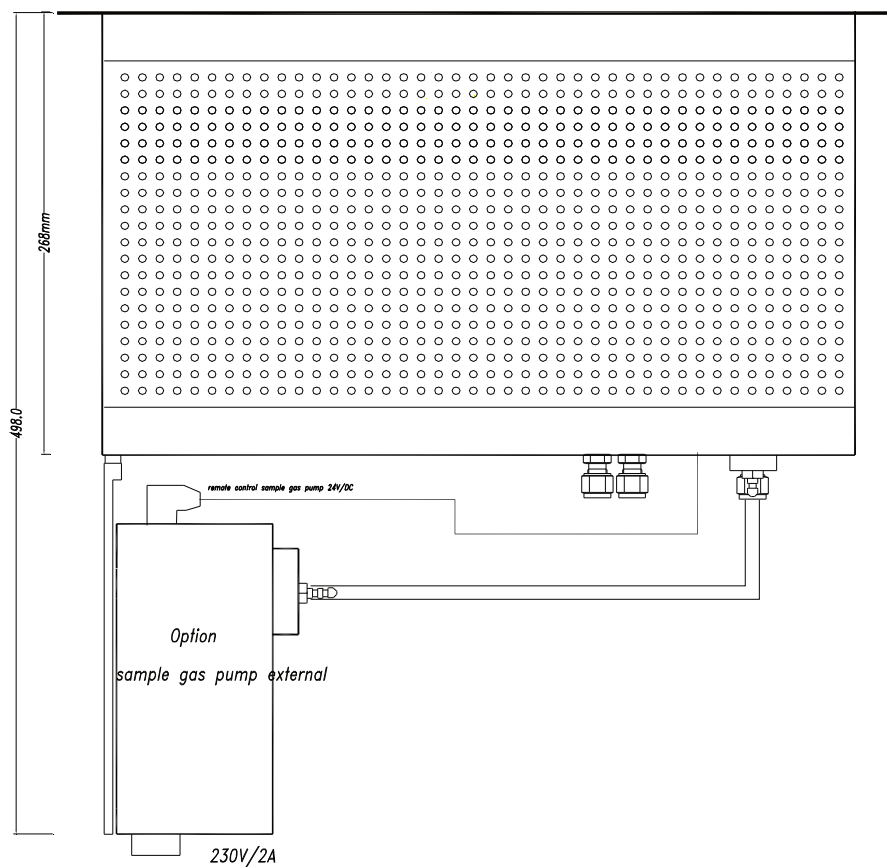
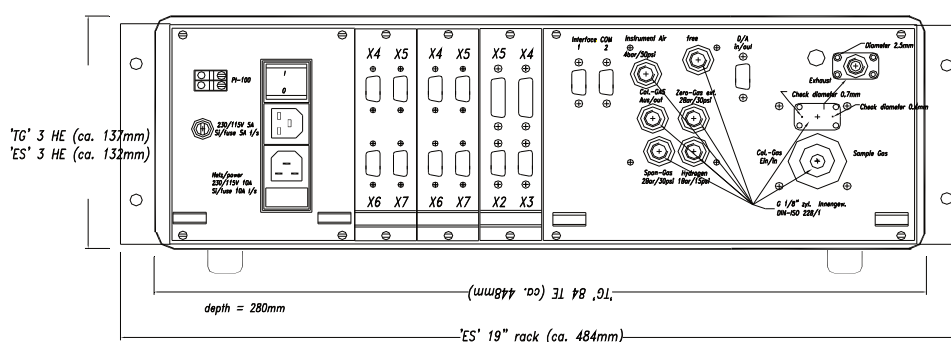
Width: 63TE, 342mm (optional 84TE available)

Height: 6 HE, 266mm

Depth: 271mm

Desk Top & 19" Rack Mount, model 'TG' & 'ES'

Back Panel Thermo-FID model 19" rack mount 'ES', and desk top 'TG'



Thermo-FID model field housing 'FE'

440

400

Instrument Air
4 bar/50psi

Purge

Cal-Gas
Med/Out

Spur-Gas
2 bar/30psi

Medgas
1 bar/50psi

Cal-Gas
Entry IN

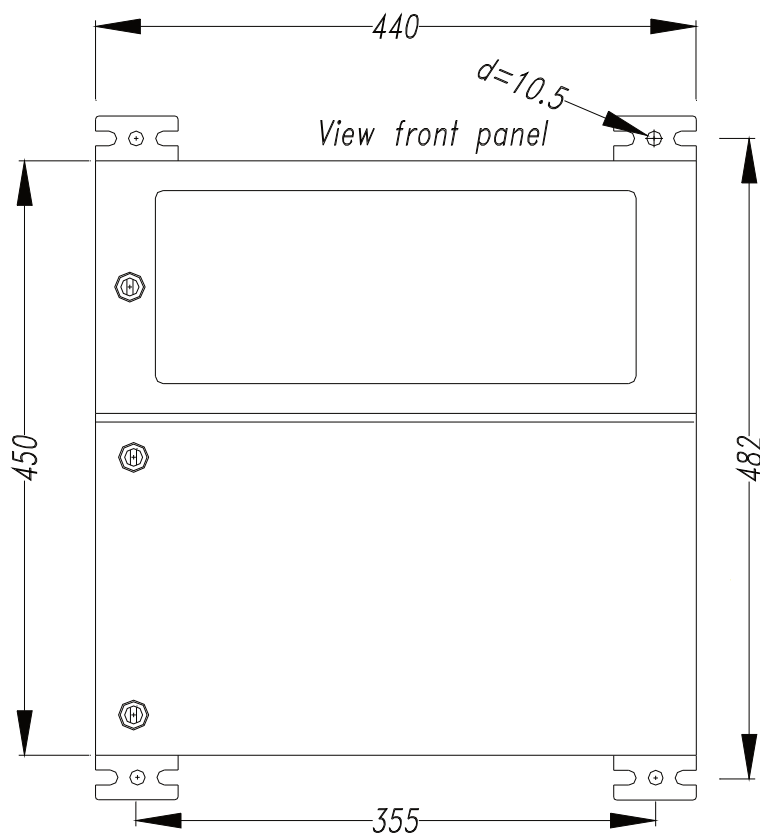
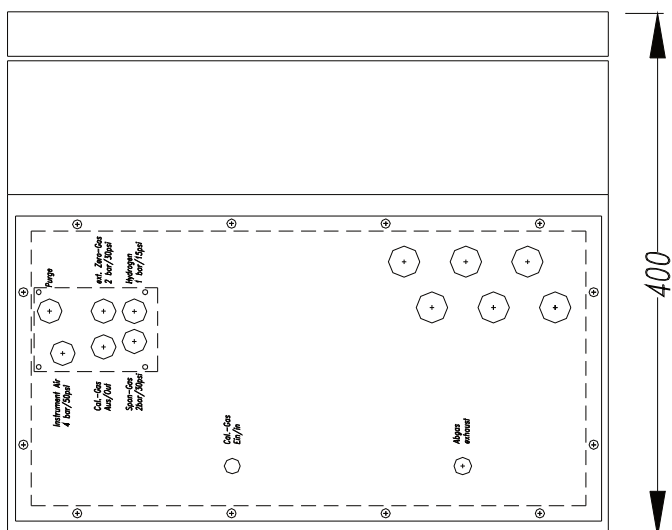
Algae
exhaust

Medgas
sample

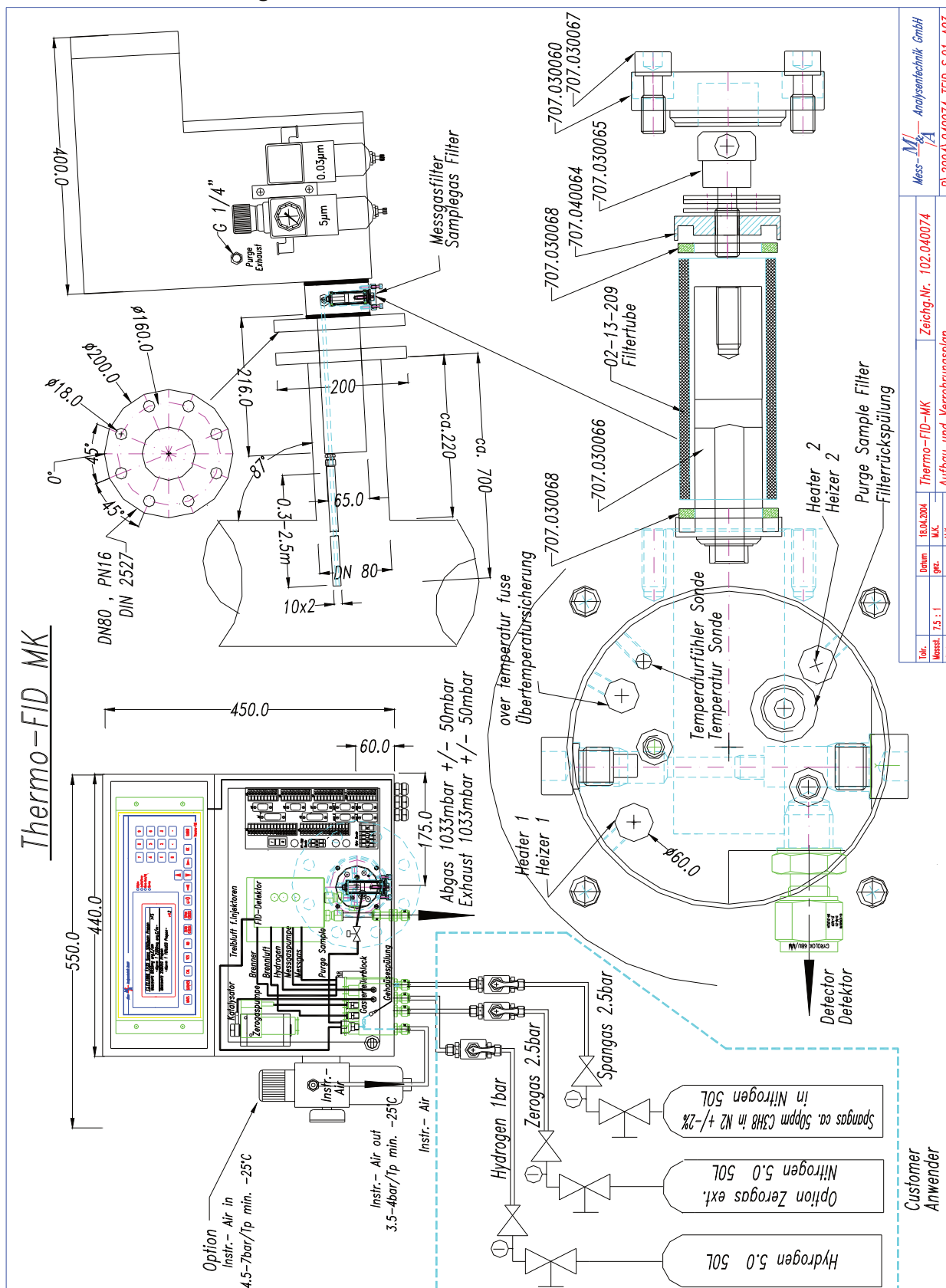
Cal-Gas
Entry OUT

Algae
exhaust

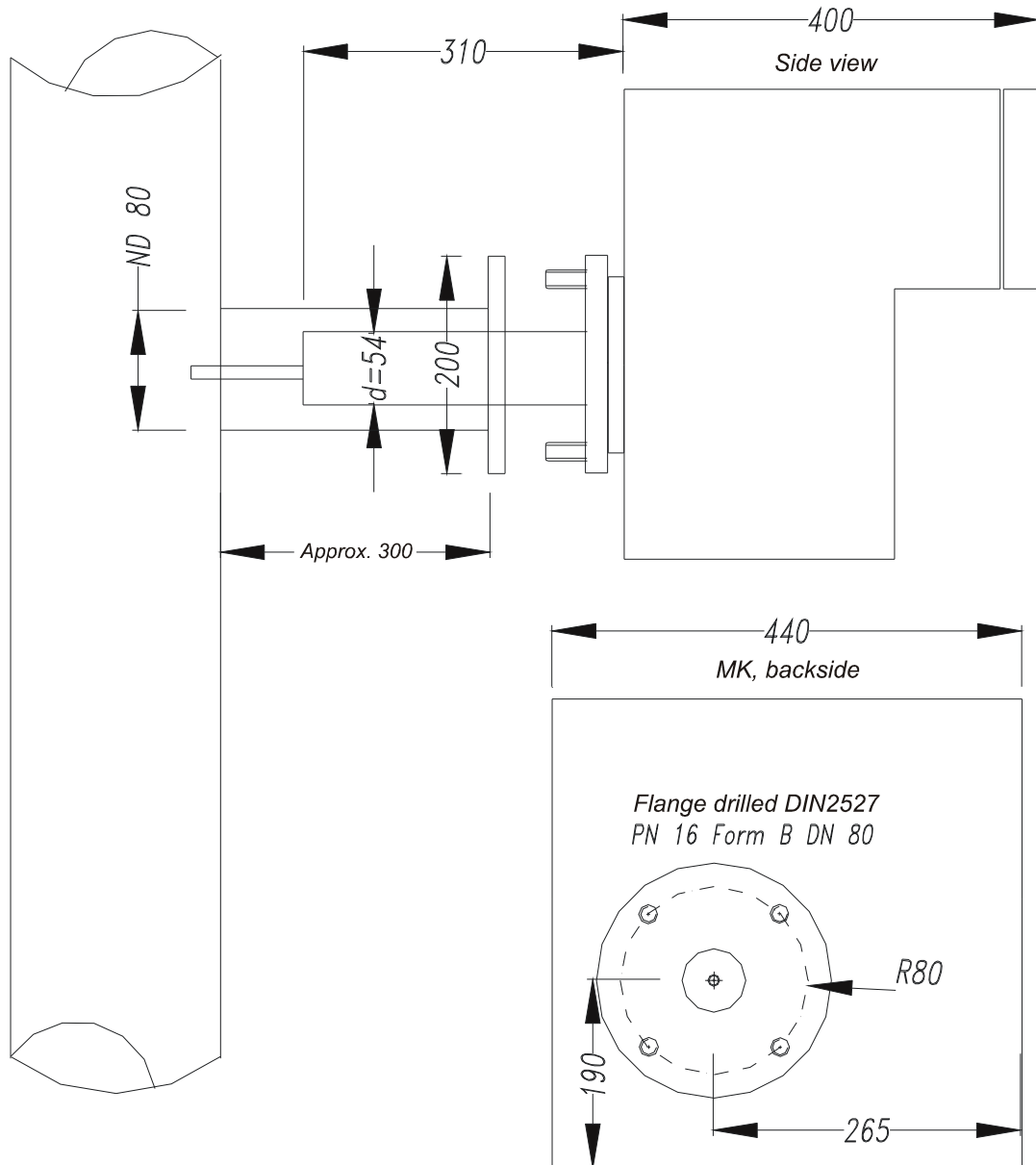
ANS_FE 24.04.96

Field Housing, model 'FE'
Thermo-FID model 'MK'
View bottom panel, Gas & COM interface connections


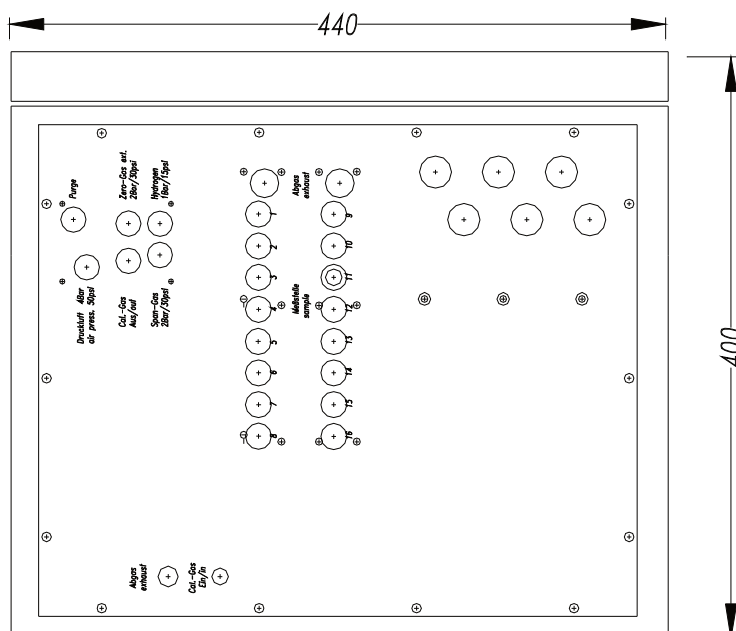
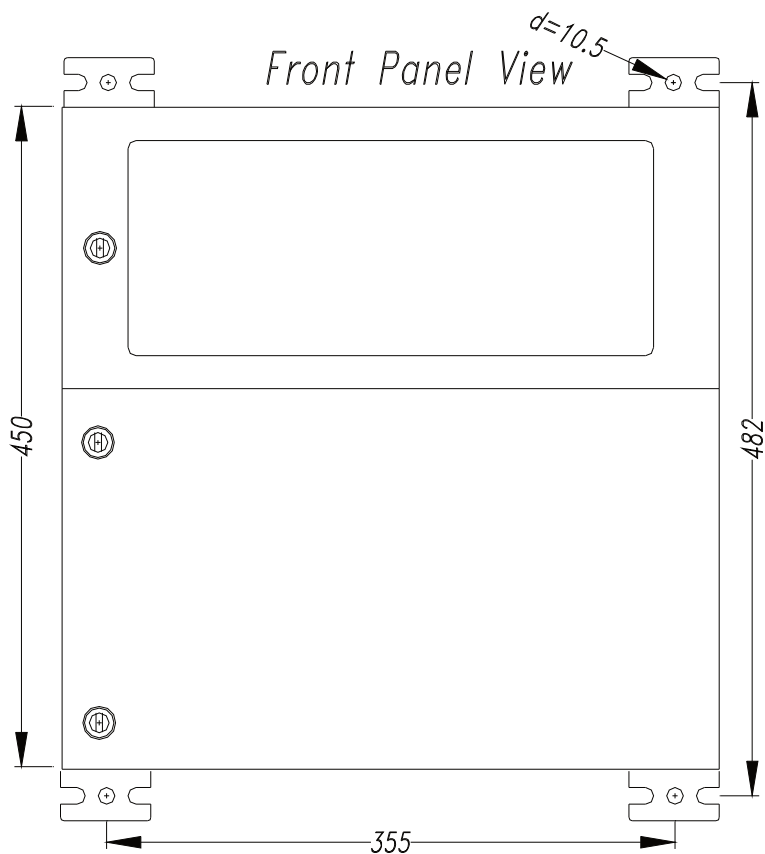
Dimension Field Housing MK since 2004



Dimension Field Housing



ANS_MKR 28.04.96

MSU16, 16 x Multi Point Sample Controller interface, Ambient
View Bottom Panel Interface

Front Panel View


ANS_FEMSU 25.11.96

• Installation and Start Up

• General advice **before** start up

Pneumatic

- ◆ Please check that all gas supply valves and regulators are closed at this time
- ◆ Please check all gas tubing for leakages (especially double check Hydrogen supply!)
- ◆ Please check all pressure settings, adjust to the required setting if needed
- ◆ Please provide exhaust conditions (back pressure free, to the environment or appropriate exhaust pipe)

Main Power

- ◆ Please check main power supply and setting (double check order and application notes concerning 115VAC supply for cat heater and heated sample line!)
- ◆ Switch on power
- ◆ The display shall now show >instrument warm up<

Press Service-Bottom NOW - Please follow self guiding menu structure for further set up information !

Factory Set Up

- ◆ The JFID comes with a standard factory set up. Customized end user set up may be performed during training or be specified for special factory setting at order placement.
- ◆ Please double check your application against factory set up conditions before measuring.
- ◆ Before start up and calibration please enter Span Gas Concentration (engineering units % or ppm) and number of Carbon atoms. Please refer to the label on your span gas bottle.
- ◆ Please notice that the standard span gas concentration was entered and used during factory test (500ppm).

• Instrument Start Up

- ◆ Please Open gas supply, valves etc. . (Please refer to set up procedure for gas supplies and double check pressure readings)

Self Test & Diagnostic:

- ◆ Once the instrument reaches the proper temperature, the instrument start self check and calibration procedure.
- ◆ The following diagnostic information is used and double checked for start up performance test:
 - ◆ Self test set point temperatures
 - ◆ Self test of all sensors
 - ◆ Electronically adjustments needed for best performance
- ◆ If the instrument does not perform correctly during start up self test, a 'clear text' message is displayed and the LED is indicating >action request<.
- ◆ Once instrument is in proper operational condition indicated on the display, the internal gas sampling system will be automatically started.
- ◆ Please double check Hydrogen supply again.

- ◆ The instrument is now performing the flame ignition and exact flame adjustment to the optimum operation and performance required.
- ◆ Calibration will be started after the flame conditions are performing to specification.

• Automatic Calibration

◆ Please double check

- ◆ Span gas bottle available and installed safely
- ◆ Open the valve
- ◆ Check gas connection to the instrument (or to the sample conditioning system, heated sample line etc.), perform check for leakage
- ◆ Check pressure setting at regulator
- ◆ Check if Span Gas Concentration meets the value entered in the menu

The instrument is now performing an automated calibration procedure.

- ◆ Zero Gas / Purge
- ◆ The instrument is adjusting the zero set up after the purge time.
- ◆ Span Gas
- ◆ The instrument is adjusting the span set up.
- ◆ Purge 1 by using Zero Gas (1/2 the typical Zero Gas purge time set up)
- ◆ Purge 2 by drawing sample (selectable purge time, menu driven)

• Initial/Reference Calibration, Service Request

- ◆ If the instrument has performed the calibration according to the set limits, the instrument then automatically switches into measurement mode.
- ◆ >Maintenance Request< is displayed if the set limits for calibration vs reference calibration are exceeding at least 10% (some applications 30%).
- ◆ Service and/or factory reference calibration is needed, if the limits exceed 30%.

Please notice that at smaller ranges, the instrument may show some minor variation from initial calibration during start up. Those variations will be eliminated after the first few weeks of operation.

◆ IMPORTANT NOTICE at small ranges/ambient

If the Hydrocarbon content in the environmental air is >10 mg/m³ and if those can not be converted to CO₂, an external Zero Gas Supply is needed.

◆ General Notice

- ◆ The available span gas flow should be greater than the sample gas flow in order to avoid uncontrolled dilution. The pressure setting at the span gas bottle should be at approx. 3 bar.
- ◆ The span gas concentration (Propane in Nitrogen or in synth.air) should be in the range 60-80% of the indication range picked by the operator.
- ◆ Always compare the reading of the JFID to the calibration, used span gas and 'Response Factor' if needed.

• Calibration using Response Factor

- ◆ According to the German guide line and 17th BImSchV, the following definition is used for the Response Factor.

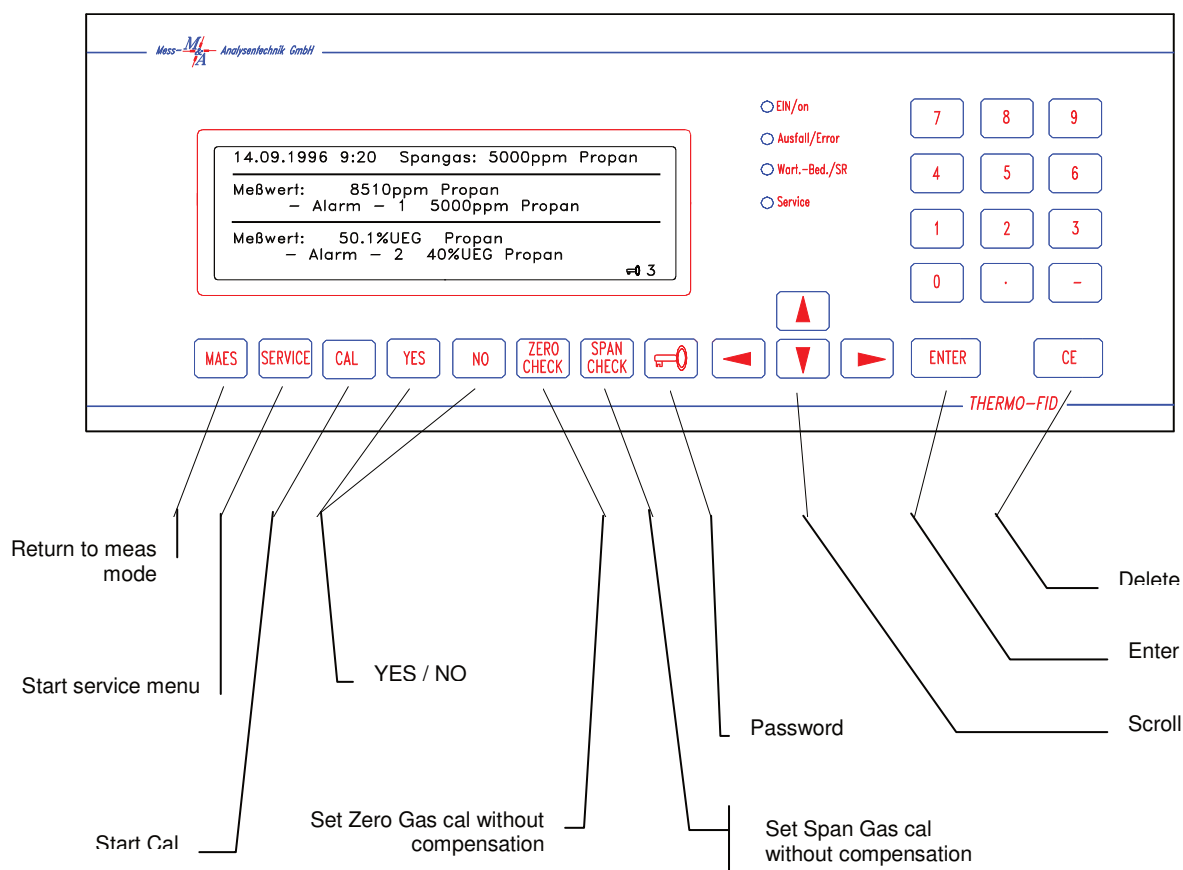
$$\text{Response Factor} = \frac{\text{Instrument Reading}}{\text{Set Point Value to achieve}}$$

- ◆ The reference n-Butane or Propane is used.
- ◆ The actual 'instrument reading' and 'set point value to achieve' are in engineering units 'mg/m³'.
- ◆ For verification and determination of the response factor, the actual component should be known and the span gas concentration is needed. In general, response factors can be determined by using span gas, or appropriate methods such as weighing etc..

◆ Please refer to the Response Factor listed in the manual

- ◆ The operator can enter various response factors for those components featuring only the different number of 'C'. Please make sure the correct number of org.C is entered.

• Front Panel - User Interface



The analyzer shows 'clear text' informations in the 8 lines of the back lit LC-display.

Quick Key Functions

SERVICE => Start Service Menu

See display, all relevant operations will be shown to pull down more menu items

All measurement activities will be performed and logged scrolling through the service menu!

All measure values and the menu headline will be displayed at the same time.

Please press <Enter> Key after selection of the menu item.

MEAS => Return To Measurement

CAL => Start automatic Calibration

• Software Tree

☐ **Measurement**
☐ **Service**
☐ **parameters**
☐ **funktion check**
☐ **actual erros**
☐ **error-history**
☐ **print of records**
☐ **initial calibriation**
☐ **programm info**
☐ **service**
☐ **back purge**
☐ **return**
☐ **parameters**
☐ calibration data

☐ measure outputs

☐ alarm and status

☐ reserve input

☐ temperatures

☐ data transmission

☐ start average

☐ system config

☐ sample switching

☐ return

☐ **function check**
☐ temperature

☐ vacuum system

☒ pressure gas

☐ measuring sys.

☐ operation hours

☐ external current inputs

☐ current output

☐ external regulator

☐ return

☐ **actual errors**
☐ show

☐ delete

☐ copy params

☐ insert params

☐ return

☐ **errors- history**
☐ **print of records**

parameters

actual errors

error history

delete buffer

data logger

return

☐ **Reference calibration**

Reference cal value

Flame optimisation

return

☐ **Menu information**
☐ **Service test**

Check OUTPUT

MSU

Return

☐ **Back Purge**

♦ Return

☐ **External Parameter (see also Item System Cnfiguration)**

• Instrument Menu Details

Calibration Data

- ◆ **Span Gas Concentration**
- ◆ Engineering unit span gas concentration (ppm, Vol%) see label on span gas bottle
- ◆ Span gas concentration
- ◆ Component name span gas
- ◆ Number of org.C (span gas)
- ◆ Response factor (see list attached)
- ◆ Zero offset (offset of zero reading at 2 x point calibration)
- ◆ Dilution Probe analog OUT 1 +2 =>see at top of the display (Hardware Option needed)

Combined measurement

- ◆ **Combined measurement (configuration and menu item only available by using status & alarm PCB)**
- ◆ **2 x Multi Point Sampling (MSU2), only available with SK-Elektronik 2/3 way valve heated plus status and alarm PCB**
- ◆ combined measurement =>YES/NO
- ◆ Meas 1 =>choose dilution probe
- ◆ Meas 2 =>choose dilution probe 2
- ◆ Results:
- ◆ Meas 1, value 1+2 shown on upper part display, analog out 1, configured 1+2
- ◆ Meas 2, value 3+4 shown on bottom part display, analog out 2, configured 3+4
- ◆ Dilution ratio pre set 1:1
- ◆ Purge Meas 1 channel 1+2 =>enter value between 2-999seconds
- ◆ MeasTime Meas1 channel 1+2 =>enter value between 1 second – 24 hrs
- ◆ Purge Meas2 channel 3+4 =>enter value between 2-999seconds
- ◆ MeasTime Meas2 channel 3+4 =>enter value between 1 second – 24 hrs
- ◆ If no MeasTime value is entered, the measurement value at the end of the purge time will be logged.
- ◆ **First / Second Dilution Probe**
- ◆ combined measurement =>YES/NO
- ◆ Meas 1 =>choose dilution probe
- ◆ Meas 2 =>choose dilution probe 2
- ◆ Results:
- ◆ Meas 1, value 1+2 shown on upper part display, analog out 1, configured 1+2
- ◆ Meas 2, value 3+4 shown on bottom part display, analog out 2, configured 3+4
- ◆ Dilution ratio =>enter value (see set up dilution orifice)
- ◆ Purge Meas 1 channel 1+2 =>enter value between 2-999seconds
- ◆ MeasTime Meas1 channel 1+2 =>enter value between 1 second – 24 hrs
- ◆ Purge Meas2 channel 3+4 =>enter value between 2-999seconds
- ◆ MeasTime Meas2 channel 3+4 =>enter value between 1 second – 24 hrs
- ◆ If no MeasTime value is entered, the measurement value at the end of the purge time will be logged
- ◆ **THC without Methane**
- ◆ combined measurement =>YES/NO
- ◆ Meas 1 =>choose Methane free
- ◆ Channel 1: org.C total; Channel 2: org.C-Methane
- ◆ Meas 1, value 1+2 shown on upper part display, analog out 1, configured 1+2
- ◆ Meas-value channel 1+2: org.C-Methane
- ◆ Purge Meas 1 channel 1+2 =>enter value between 2-999seconds
- ◆ MeasTime Meas1 channel 1+2 =>enter value between 1 second – 24 hrs
- ◆ If no purge time is configured, measuring value will be stored after time sequence ended.

- ◆ Meas value2, channel 3+4 Methane shown on bottom part display, analog out 2, configured 3+4
- ◆ Purge Meas2 channel 3+4 =>enter value between 2-999seconds
- ◆ MeasTime Meas2 channel 3+4 =>enter value between 1 second – 24 hrs
- ◆ If no purge time is configured, measuring value will be stored after time sequence ended.

If no MeasTime value is entered, the measurement value at the end of the purge time will be logged. A complete measurement cycle must be completed for proper operation. The sample gas must have a minimum content of 8% Oxygen.

- ◆ **Measurement Value 1+2 OUT (analog out, & COM1)**
- ◆ Engineering units (ppm, Vol%, %LEL, mg org.C/m3, g org.C/m3)
- ◆ Component name
- ◆ Number of org.C
- ◆ Response factor
- ◆ LEL of Component (in Vol% i.e. 1,7Vol% Propane = 100% LEL Propane)
- ◆ **Measurement Value 3+4 OUT (analog out 3+4)**
- ◆ See above @1+2 enter engineering units etc..
- ◆ The output of the measuring data 1+2 are at the top, the data for 3+4 are displayed in the lower part of the display.
- ◆ **Signal Noise Filter**
- ◆ Low range application may use the selectable signal noise filter algorithm (ring buffer). This special filter should only be performed through authorized services engineers.
- ◆ **Calibration time**
- ◆ Purge time Zero gas 10-900 seconds
- ◆ Span Gas available enter YES
- ◆ Notice: If you enter NO, the check of span gas pressure will be not checked and the cal adjustment will only take place for the zero point. The span point will not be changed.
- ◆ Purge Span gas 10-900 seconds
- ◆ Purge 10-900 seconds (after each calibration or after manual Span/Zero gas operation)
- ◆ Start auto cal enter day time (i.e. 08:00:00, Hr:Min:Sec)
- ◆ Calibration cycle day enter starting time in hrs after initial cal
- ◆ Calibration cycle week if entered YES, the above setting by day is ignored
- ◆ Enter week days the calibration should be performed
- ◆ The following calibration information is available on the display:
 - ◆ - last calibration display day/time
 - ◆ - next calibration display day/time
 - ◆ - actual delta according to last cal 0,3% Zero value / 0,8% Span value
 - ◆ - actual delta according to initial cal 1,3% Zero value / 2,8% Span value
- ◆ **Important notice:**
- ◆ **After an initial reference calibration, all reported calibration differences logged will be deleted.**
- ◆ **All cal-variations will be calculated from analog 1 output.**
- ◆ **Please refer to the maintenance request/Service request for differences greater than 10% / 30% of initial reference calibration.**
- ◆ **Notice: Linearization of the readings from factory/authorized personal only**

◆ Service Menu – Measure Analog output

- ## LEL Control

- ## Alarm and Status

Notice: The range/over-range set up will always refer to the first analog output (0/4-20mA).

- ◆ The next available range will be kicked in at 95% of actual range reading. The next available range everytimes is the previous range x 10. The following relay will be set for over-range acknowledgement (pre-set):

- ### Set Alarm and MeasValue average, Status Out

- ### Additional Signal input

- ◆ If configured (YES), the calibration can be initiated from an external relay switch.
- ◆ **IMPORTANT Notice:** Please refer to NAMUR guideline to avoid shortages and ground failure.

- ◆ If configured (YES), the calibration can be stopped from an external position (relay switch).
- ◆ **IMPORTANT Notice:** Please refer to NAMUR guideline to avoid shortages and ground failure.

External IN parameters for analog pressure control (span gas, Hydrogen, etc.)

- ◆ External pressure sensors can be connected to the A/D in/out at the Status & Alarm PCB (4-20mA).
- ◆ **Pressure sensor 1:** for control Hydrogen supply
- ◆ **Pressure sensor 2:** for control Span gas supply
- ◆ Configuration each:
- ◆ Pressure IN 0=inactive, 1=active
- ◆ If active:
- ◆ Enter Zero input signal value pressure sensor (0 or 4 mA)
- ◆ Enter full range pressure sensor (bar, mbar)
- ◆ Storage tank volume: enter >YES< if storage volume should be controlled
- ◆ Changed Storage Volume enter >YES< (new storage volume can be calculated)
- ◆ Storage Volume enter volume (m3)
- ◆ Gas component enter Name/Component (i.e. Hydrogen)
- ◆ Low volume Alarm enter pressure for pre alarm setting and signal output as maintenance request (change storage volume)

External IN parameters for volume flow (flue gas)

- ◆ The total org.C flue gas emission can be calculated and computed by using the second
- ◆ external analog input for e.g. the flue gas volume flow. The flow reading should be provided as
- ◆ 4-20mA current signal.
- ◆ Configuration:
- ◆ Volume flow IN 0=inactive, 1=active
- ◆ If active:
- ◆ Enter Zero input signal value pressure sensor (0 or 4 mA)
- ◆ Enter full range flow sensor (m3/hr)
- ◆ Name of Component enter component
- ◆ Response factor enter Response factor

External IN parameters free selectable N°1

- ◆ The result after initiating such input is selectable to call on either 'Maintenance Request' or 'Failure'
- ◆ System shut down (the measurement values are not used for averaging)
- ◆ Stop Purge
- ◆ Stop ignition
- ◆ Short circuit check only via external switching
- ◆ Contact: NO (normally open) or NC (normally closed)
- ◆ Delay time (avoid failure and contact problems)

External IN parameters free selectable N°2 (identical to N°1, except no system stop function)

- ◆ Sample pump stop (sample gas flow reported as failure)
- ◆ Stop Purge
- ◆ Stop ignition

Temperatures

- ◆ The temperature classification is done at the factory.
- ◆ The operator can configure the catalyst-, detector-, and probe temperature within the pre set min/max range. Any temperature outside of the given pre set ranges will be detected and reported as failure status. In addition, the probe low temperature can be configured to stop sample pump/sample flow to avoid contamination.

Notice: External temp-controller including feed back to FID is only available with the JFID 8x MSU temp controller.

This option includes 8x isolated PI-controller, power output 10A (110-230VAC). The temp.sensor must be PT100. The set up temperatures will be entered and controlled by the JFID.

Data Logger / Interface

- ◆ COM1 interface, V.24 (Epson compatible interface) can be used for data transmission.
- ◆ Data will also be stored in the internal data logger
- ◆ Measurement values (actual reading)
- ◆ Status information, Failure flag, Maintenance flag etc.
- ◆ Average values daily
- ◆ Average values monthly
- ◆ Average values yearly
- ◆ **Start time (average values)** => enter the start time for average-date storage.
- ◆ This time indicates the start time, all data will be stored or send to another data acquisition media, or printer referring to the menu set up of data averaging (1/2hr, daily, monthly, ..).
Average Value configuration must be set by entering the start time for the average period.
Storage capacity of the internal data logger is 250 pages DIN-A4 print format. For Data acquisition via PC please use the software 'GETLOG, provided by the factory.
Maintenance request will be indicated as soon as 90% of the storage capacity has been reached.

System configuration

- ◆ Vacuum system (factory 'level2' set up only)
- ◆ Clock
- ◆ Password
- ◆ The instrument is not configured in any password level at factory set up. After initial calibration and installation, the display is indicating level 2 password protection. The password levels shall now be configured for safe operation.
- ◆ **Password level '0'**
- ◆ All instrument set up and config. information available except calibration information. No configuration of the system possible at this level. Function keys are not active.
- ◆
- ◆ **Password level '1'** (Service engineer)
- ◆ All instrument data are available, including the calibration data.
- ◆ No configuration of the system, except changing the span gas concentration at this level.
- ◆ Zero check
- ◆ Span check
- ◆ Calibration
- ◆ Print protocol
- ◆ Actual failure report
- ◆
- ◆ **Password level '2'**
- ◆ All instrument data are available. Temperature classification and configuration of the
- ◆ Vacuum system is not possible at all from this level (factor set up).
- ◆ **Changes to password level 1 are possible from level 2.**
- ◆
- ◆ Main power
- ◆ The instrument displays the main power provided to the system.
- ◆
- ◆ Display adjustment
- ◆ The instrument display can be adjusted for optimum back light and contrast via the scroll keys.
- ◆
- ◆ **Printer**
- ◆ Printer (COM1) interface configuration

- ◆ **REMOTE CONTROL** (COM2) configuration (use software provided by factory)
- ◆ COM2 interface configuration as following:
 - ◆ Baud rate 9600 standard (selectable 300 – 19200)
 - ◆ Data bits 8
 - ◆ Stop bits 1
 - ◆ Parity 0
 - ◆ Hand shake xon / xoff
 - ◆ Modem initialising YES (standard modem will be automatically initialized)
- ◆ **Pressure Sensor**
 - ◆ The configuration of the pressure sensor should only be performed at factor set up!
- ◆ **Ejector pump**
 - ◆ Config. YES/NO If >YES<, the instrument air supply will be monitored. The min. instr.air pressure of >2,9 bar will be monitored, maintenance request will be displayed if pressure is indicated at 'low'.

MSU16, configuration of 16 x Multi Point Sample system

- ◆ The max. number of 16 sampling points can be configured (Status Alarm Card). Multi usage of individual sample point is possible (max. configuration up to 64 sample sequences). Digital NAMUR input signals are allowed to call on specific 16 x time MAMUR INPUTS for usage of free selectable sample points (channels) or contact closures. If 2 x alarm settings are needed for each channel/sample point, a second digital PCB is needed. Please notice, only 8 x sample points are available at this time. With this configuration, the 2nd alarm setting N°9 through N°16 are now the second alarm for sample point N°1 through N°8 (alarm 9 = second alarm for point N°1, etc...)
- ◆ **Config. Parameter each Sample point**
- ◆ **Sample point/valve 9-16:** ==>enter >YES< = max 16 sample points=>one alarm each
- ◆ **Sample point/valve 9-16** ==>enter >NO< = max 8 sample points=>two alarms each
- ◆ Enter sample point number (channel) 1-16 one/two alarm each according above
- ◆ Each will be configured:
 - ◆ **Name** max 11 characters
 - ◆ **Measurement value** (eng. unit) enter ppm, Vol%, %LEL, mg org.C/m3)
 - ◆ Name component enter name
 - ◆ Number of org.C enter number
 - ◆ Response factor enter factor (see list attached)
 - ◆ LEL of component measured enter Vol% (i.e. 1,7Vol%=100LEL Propane)
 - ◆ **Purge time sample point** enter time in seconds (max.900 sec)
 - ◆ Measuring value will be taken, logged and displayed after completion of purge time!
 - ◆ Measuring time enter value in >hr : min : sec<
 - ◆ If measure time is configured:
 - ◆ Actual MeasValue
 - ◆ Average MeasValue
 - ◆ Max. MeasValue during average period
 - ◆ Analog output signal
 - ◆ Only 1 dedicated analog output is available per sample point
 - ◆ Zero set up (offset) enter 0mA, or 4mA as Zero
 - ◆ Range slope
 - ◆ Range max i.e. 100ppm = 20 mA

- ◆ **Print measurement value** (Data print can be configured by entering a min value to initiate print. At alarm conditions or averaging conditions, all data will be printed)
- ◆ **Alarm MeasValue**
 - ◆ Only 1 dedicated analog output is available per alarm condition at each sample point
 - ◆ Set value N°1 (free selectable)
 - ◆ Set value N°2 (release alarm, free selectable)
 - ◆ Set relay output (no, or nc)
 - ◆ Number & Priority each sample point
 - ◆ The scroll keys can be used to open pull down menu items calling on different sample points (high lighted). To move priority of sample point listing, press the left scroll key (right scroll key) and press ENTER to move the sample point upwards (downwards). Repeat this procedure until finished. Configuration of each sample point will be kept in memory.

Function Control

- ◆ **Temperature**
 - ◆ Temperatures are displayed as actual reading and pre set value to compare with
- ◆ **Vacuum system** (display actual Pressure/Vacuum readings)
 - ◆ Sample gas pump & burner pump
 - ◆ Sample (after sample inlet filter) as differential pressure against atmospheric pressure
 - ◆ % of ejector pump work load
 - ◆ (If work load >98% and delta P >5mbar from set value, an instrument failure will be indicated)
- ◆ **Gas Pressure** (display actual pressure)
 - ◆ Instrument Air
 - ◆ Span gas
 - ◆ Sample (after sample inlet filter)
- ◆ **Measuring system** (notice: to leave this menu item press '0' or 'ENTER')
 - ◆ Display of igniting voltage during automatic ignition
 - ◆ Display of driving potential/voltage (Suction Voltage)
 - ◆ Display pressure and controller output (actual, pre set value) of Hydrogen supply
- ◆ **Detector Specification**
 - ◆ Size of critical orifice (Please consult factory or authorized personal for changes/special set up)
- ◆ **Operation hours** (display of instrument operating hours)
 - ◆ External current IN (Pressure readings external)
 - ◆ Displays actual configuration of external pressure sensors N°1 to N°3 plus storage tank volume)
 - ◆ Name: name the analog IN configured
 - ◆ Pressure: actual pressure of storage tank displayed
 - ◆ Usage: actual use over the last 24 hrs
 - ◆ Storage display number of days, storage volume
- ◆ **Volume Flow** external
 - ◆ Name name analog IN configured
 - ◆ Volume Flow actual volume flow displayed

- ◆ Mass concentration display org.C in kg/hr (mass volume flow)
- ◆ **Current OUT**
- ◆ Display analog 1 to 4
- ◆ Analog 1 4mA (x1; x10, ..etc. if configured range/overrange)
- ◆ Analog 2 4mA ..
- ◆ Analog 3 4mA ..
- ◆ Analog 4 4mA ..
- ◆ **External Temperatures**
- ◆ **JFID external temp. settings, control loop and actual readings are only available with SK-Elektronik optional 8 x external temp controller**

Errors/Failure (actual)

- ◆ Display display of actual status/failure information, maintenance request etc.
- ◆ Delete press enter to delete failure
- ◆ Copy parameter please consult factory or authorized personal for appropriate set up
- ◆ Insert parameters please consult factory or authorized personal for appropriate set up
- ◆ Return return to previous menu
- ◆ **Notice: Failure message 'ignition stopped': The start up sequence / cycle needs to be initiated by pressing 2 times the MEAS-Button**

Errors/Failure History

- ◆ Display of Start and End of failure history log, max. number of failure 64

Print Records/Protocol

- ◆ **Parameter configuration** print configuration data
- ◆ **Actual Error/Failure** print actual errors/failure
- ◆ **Error/Failure History** print failure, day and time occurred
- ◆ **Data Buffer (delete)** press enter to delete data buffer
- ◆ Ring-buffer of 4kB by config. 'handshake' at printer interface;
- ◆ **Data Logger** 512kB equals about 250 pages A4 format, free selectable read out of logged data
- ◆ Print off print data
- ◆ Capacity display capacity of logger
- ◆ Delete press delete for deleting data log
- ◆ Return return to previous menu
- ◆ Return return to previous menu

Initial Calibration (reference cal)

- ◆ **initial/reference calibration**
- ◆ Press YES (acknowledge) to start initial calibration cycle, purge, cal, measure
- ◆ Appropriate values / failure / maintenance request etc. will be displayed
- ◆ **Flame optimisation**
- ◆ Flame temperature is displayed. Flame optimisation only during factory set up (Data will be logged, initial cal will be performed)

Program/System Information

- ◆ Display of program version/Ref N°

Service Test

- ◆ Notice: All menu items/input changes will be stored and performed immediately after entering or acknowledgement at this menu item. It is not possible to overwrite output channels at this point.

Check OUTPUT

- ◆ Analog OUT go to the specific channel, enter number, return
- ◆ MeasValue Alarm enter '1' to close contact, enter '2' to open contact
- ◆ Status
- ◆ Return return to previous menu

Multi Point Sampling (MSU)

- ◆ Valves sampling enter '1' to activate, enter '0' to deactivate
- ◆ Analog OUT go to the specific channel, enter mA value, then
- ◆ return
- ◆ MeasValue Alarm enter '1' to activate, enter '2' to deactivate
- ◆ Return return to previous menu

Back Purge

- ◆ This menu item is only available with appropriate hardware configuration.
- ◆ During Back Purge operation, all Status information is flagged as 'Service'. Measurement values and Alarm values are logged during back purge and purge time.
- ◆ Start Back Purge enter YES to agree to back purge cycle config
- ◆ Start back urge enter time to start hh:mm:ss
- ◆ Back purge every enter time for cycle 1-900 Sec
- ◆ Time back purge enter duration of back purge 1-900 Sec
- ◆ Return return to previous menu

Configuration external Parameter

- ◆ Optional available using the second RS232 / RS422 interface (please consult factory).
- ◆ Stand By key > . < and > - <disable sample pump and hydrogen supply
- ◆ Return to Meas press function key >MEAS< to return to meas.mode

• Service & Maintenance

General

- ◆ Assuming proper sample gas- and instrument air supply (dry, particulate free, oil free), the maintenance free operation using heated ejector pumps at the exhaust of the JFID does allow a trouble free operation and maximum up time performance.
- ◆ Service and Maintenance Request is indicated and reported. The time between service and maintenance depends on the application and varies from time to time.
- ◆ Please notice that the portable JFID model PT is not designed for continuous online operation and may need extra service and maintenance (check weekly the membrane sample pump).

Inspection

- ◆ Check status information and gas supply
- ◆ Check sample conditioning and sample switching
- ◆ Check drift data calibration
- ◆ **Please notice: Optional analog high pressure controller is available for Hydrogen- and Span gas supply. Leak check of the gas supply system is possible. Leaks are indicated as 'Maintenance Request'.**

Safety Notice

- ◆ Please refer to the Safety Notice and Instructions in the first section of the manual. Please disconnect the analyzer from main power during repair on electronic items.
- ◆ Please let the instrument cool down before service and repair on the detector, catalyst etc. .

Change Flame Trap, Sample Gas Orifice

- ◆ disconnect heated sample gas line and use end cap to avoid contamination
- ◆ disconnect calibration line
- ◆ uninstall filter, replace filter (part N° 02-13-005)
- ◆ use special tool to take out the sample orifice, replace if needed (only use N°25 for portable unit, see membrane pump)
- ◆ replace gasket if damaged

Maintenance Request (standard configuration)

Clear Text Maintenance / Failure-Status – Information

- ◆ Span gas <1,5 bar
- ◆ Data lost at data buffer
- ◆ Stopped calibration
- ◆ Exceedance of accuracy >10%
- ◆ Plugged sample filter, plugged sample line, exceedance of differential pressure
- ◆ Temperature detector too high
- ◆ Span gas pressure <1,5 bar during calibration
- ◆ Stopped automatic flame optimization
- ◆ Signal '1' of additional INPUT (external maintenance signal)
- ◆ Probe temperature too low
- ◆ Probe temperature too high
- ◆ Failure external controller (may not be ready to operate)
- ◆ Printer failure (may not be ready to operate)
- ◆ Temperature Catalyst too high
- ◆ Temperature Catalyst too low
- ◆ Failure data logger
- ◆ Signal '2' of additional INPUT (external maintenance signal)
- ◆ Exceedance of calibration data by more than 30% against initial calibration
- ◆ Load current OUT '1' too high
- ◆ Load current OUT '2' too high
- ◆ Load current OUT '3' too high
- ◆ Load current OUT '4' too high
- ◆ Failure or shortage at external IN, Start Calibration
- ◆ Failure or shortage at external IN, Stop Calibration
- ◆ Failure or shortage at external additional INPUT N°1
- ◆ Failure or shortage at external additional INPUT N°2
- ◆ Thermo-element catalyst failure
- ◆ Thermo-element probe failure
- ◆ Flow failure sample point 1-8 (message 29 to 36)
- ◆ Flow failure sample point 9-16 (message 37 to 44)
- ◆ Failure external pressure reading N°1 (too low, less than set value)
- ◆ Failure external pressure reading N°2 (too low, less than set value)
- ◆ Leakage external pressure reading N°1
- ◆ Leakage external pressure reading N°2
- ◆ Load warning current OUT MSU 1-8 (message 49 – 56)
- ◆ Load warning current OUT MSU 9-16 (message 57 – 64)
- ◆ Failure instrument air pressure (<2,9bar)
- ◆ Failure instrument air pressure (>4.0bar)

Errors (standard configuration)

Clear Text Failure-Status – Information

- ◆ Hydrogen gas pressure too low
- ◆ Suction voltage failure
- ◆ Calibration exceedance too big, check detector, check Span gas
- ◆ Sample gas pump failure
- ◆ Burner pump failure
- ◆ Temperature failure detector
- ◆ Flame off
- ◆ Ignition stopped
- ◆ Noisy measurement value, no zero value adjustment possible
- ◆ Noisy measurement value, no span value adjustment possible
- ◆ Signal '1' of additional INPUT (external service signal)
- ◆ Probe temperature too low
- ◆ Probe temperature too high
- ◆ PT100/Thermoelement flame control failure
- ◆ Calibration data EEPROM failure
- ◆ Parameter EEPROM failure
- ◆ Vacuum sample point too high
- ◆ Plugged orifice
- ◆ Sample pressure too high
- ◆ Signal '2' of additional INPUT (external service signal)
- ◆ Shortage burner pump, controller
- ◆ Plugged filter
- ◆ Interface failure EEPROM data adjustment
- ◆ Time incorrect
- ◆ Orifice N°3 plugged or Hydrogen supply failure
- ◆ Parameter configuration needed
- ◆ COM detector failure
- ◆ Supplied Voltage less than 23 VOLT
- ◆ Instrument air failure
- ◆ Failure Igniter
- ◆ Shortage Igniter
- ◆ Failure EEPROM data adjustment status & alarm card
- ◆ Failure EEPROM data adjustment CPU
- ◆ Thermoelement detector failure
- ◆ Thermoelement probe failure
- ◆ Environmental temperature too high, failure fan or plugged filter
- ◆ Sample gas filter plugged, ventury nozzle plugged, shortage controller
- ◆ burner nozzle plugged, shortage controller
- ◆ vacuum pump failure
- ◆ shortage, failure sample gas pump
- ◆ shortage, failure burner pump
- ◆ sample exhaust failure

• Microprocessor Trouble Shooting

Service Request - Status

- ◆ If status "service request" occurs, the JFID is still in full operation mode. The equipment must be checked by an authorized service engineer.
- ◆ **Caution:**
This equipment should not be repaired by anyone except proper trained and qualified service personnel!
- ◆ If failure occurs, please refer to current failure in the service menu!

Service/Failure Status:

- ◆ Span gas pressure too low
- ◆ Check the pressure of the span gas supply. Necessary: Min. 5 bar abs.
- ◆ Check the secondary pressure at the pressure gauge: Min. 3 bar abs.

No span gas available

- ◆ Check that the span gas is joint correctly.
- ◆ Check that the valve of the span gas bottle is open.
- ◆ Check the pressure of the span gas supply. Necessary: Min. 4 bar abs.
- ◆ Check the secondary pressure at the pressure gauge: Min. 3 bar abs.
- ◆ Check the pressure regulator and change if necessary.
- ◆ Check the CPU and change if necessary.
- ◆ If you cannot find the failure reason please contact the factory for details.

Pressure of the Instrument Air is too low

- ◆ Check that the compressed air is joint correctly.
- ◆ Check that the valve of the compressed air supply is open.
- ◆ Check the pressure of the compressed air supply: Min. 5 bar abs.
- ◆ Check the secondary pressure at the pressure gauge: Min. 4,5 bar abs.
- ◆ Check the gas divider and change if necessary.
- ◆ Check the CPU and change if necessary.
- ◆ If you cannot find the failure reason please contact the factory for details.
- ◆ Note: You can bridge the compressed air control in the software menu "system config.". The report "pump 1 and pump 2 failure" will not appear if the compressed air is not available and the compressed air control is bridged.

Zero deviation is 10% or 30% between two calibration cycles

- ◆ perform initial calibration
- ◆ deviation will be set to 0%.
- ◆ **Note:** Pay attention to the drift over a long time period!
- ◆ Final point is 10% or 30% between two calibration cycles
- ◆ Make an initial calibration.
- ◆ Final point deviation will be set to 0%.
- ◆ **Note:** Pay attention to the drift over long time!

Sample gas flow too low

- ◆ Check that the filters and sample gas mains are clean.
- ◆ Open the sample gas mains at the FID sample input.
- ◆ If the sample gas flow keeps too low: Change the sample gas filter.
- ◆ If the sample gas flow keeps too low: Change the detector unit.
- ◆ If the troubleshooting was successful by opening the sample gas mains: Change the sample gas filter, clean and blow out the sample gas mains.

Temperature of the detector is too high

- ◆ Check the heating voltage on the 230/115V board at connector X1.1 and X1.2 depending on the operating voltage
- ◆ Verify pulsed voltage
- ◆ Check the voltage (24VDC) of relay 1 on the data transmission board
- ◆ If the voltage is available: exchange the relay.
- ◆ If the voltage is available and the relay is working normally: exchange the CPU.

Temperature of the catalyst is too high

- ◆ Check the heating voltage on the 230/115V board at connector X1.1 and X1.3 depending on the operating voltage
- ◆ Verify pulsed voltage
- ◆ Check the voltage (24VDC) of relay 2 on the data transmission board
- ◆ If the voltage is available: exchange the relay.
- ◆ If the voltage is available and the relay is working normally: exchange the CPU.

Temperature of the catalyst is too low

- ◆ Check the heating voltage on the 230/115V board at the mating connector X1.1 and X1.3 depending on the operating voltage
- ◆ If no voltage is available, check fuse 'cata', replace if broken
- ◆
- ◆ Check the voltage (24VDC) of relay 2 on the data transmission board.
- ◆ If the voltage is available: exchange relay 2
- ◆ If no voltage is available: Replace data transmission board (set pressure sensor again)
- ◆ If voltage is available: disconnect connector 1, measure resistance on X1,1 and X1,3
- ◆ If the resistance is greater than 1000 Ohm: exchange the catalyst.

Temperature of the sample probe is too high

- ◆ Check the heating voltage on the 230/115V board at the socket tube heating. Verify pulsed voltage
- ◆ Check the voltage (24VDC) of relay 3 on the network board
- ◆ If voltage is available: exchange relay.
- ◆ If voltage is available and relay is working normally: exchange CPU.

Remote JFID parameter set-up

- ◆ Interface 2 not ready? Check external data input: cable, controller

Printer or external data processing are not ready

- ◆ Interface 1 not ready? Check printer or recorder (cable, status etc.)
Check conformity of the data transmission protocol

Failure – Status Reports

- ◆ If status “Failure” occurs, the JFID will interrupt the normal measurement mode. All measurement values will be reset to zero and the limits will be set to values of the parameter status before this failure has occurred.
- ◆ The equipment must be checked by an authorized service engineer.
- ◆ **Caution:** This equipment should not be repaired by anyone except properly trained and qualified service personnel !
- ◆ Please refer and select the current error in the service menu!

Failures reported:

No hydrogen (fuel gas) available

- ◆ Check that the hydrogen is joined correctly
- ◆ Check that the valve of the hydrogen supply is open
- ◆ Check the pressure of the hydrogen supply: Min. 3 bar abs
- ◆ Check the secondary pressure at the pressure gauge: Min. 2 bar abs
- ◆ Check the gas divider and change if necessary
- ◆ Check the CPU and change if necessary
- ◆ If you cannot find the failure, please contact the factory or your customer support for details

Plugged Filter or plugged sample line, Differential pressure too high

- ◆ Check the Instrument Air supply
- ◆ Check the valves and regulator settings
- ◆ Check the pressure Instrument air supply: Min. 4,5 bar abs
- ◆ Check the secondary stage pressure: Min. 4,5 bar abs
- ◆ Check the gas pressure regulator and change, if needed

Zero deviation is too large (out of adjustable range)

- ◆ Check sample inlet filters, the sample line for contamination, check detector
- ◆ Open the sample gas INLET at the FID sample input, disconnect
- ◆ Start Calibration
- ◆ If the sample gas flow keeps too low: exchange the sample gas filter.
- ◆ If the sample gas flow keeps too low: exchange the detector unit.
- ◆ If the troubleshooting was successful, put back together and hook up calibration gas to sample inlet at probe tip.
- ◆ Change the sample gas filter, clean and blow back sample line

Sensitivity too low, Measurement value is not stable enough for span adjustment

- ◆ Check that the span gas is joint correctly
- ◆ Check that the valve of the span gas supply is open
- ◆ Check the pressure of the span gas supply: Min. 4 bar abs
- ◆ Check the second stage pressure at the pressure gauge: Min. 3 bar abs.
- ◆ If the sensitivity keeps too low: Open the sample gas INLET at the FID sample input
- ◆ Put in the span gas manual
- ◆ Verify gas flows out of the sample gas input !!
- ◆ IF YES =>change burner orifice (P/N 02-13-010), or change detector unit
- ◆ If it was not successful: Verify 24VDC at the span gas valve.
- ◆ If this was successful: exchange the span gas valve.
- ◆ If you cannot find the failure, please consult factory or your customer support for details.

Measurement value not stable enough for zero adjustment

- ◆ Check sample gas inlet filter for contamination or plugged
- ◆ Open sample gas INLET, start calibration
- ◆ If failure is still active, change sample gas filter
- ◆ If failure is still active, change detector
- ◆ If open sample gas line (disconnect INLET) and failure is still active during calibration across sample probe, change sample inlet filter and back purge sample line

Detector Temperature too low

- ◆ Check the heating voltage on the 230/115V board at the mating socket X1.1 and X1.2
- ◆ If no voltage is available: Check fuse of the detector.
- ◆ If the fuse is working: Check voltage (24VDC) of relay 1 on data transmission board.
- ◆ If the voltage is available: exchange relay1
- ◆ If no voltage is available: exchange DFÜ PCB
- ◆ If voltage is available: Pull out connector1, verify 90 Ohm on X2,2 & X2,4 (resistor of heater at X2.2 and X2.4)
- ◆ If the resistance is below 1000 Ohm: Verify <1 Ohm of the fuse at X2.3 and X2.4.
- ◆ If resistance is greater than 1000 Ohm, check over temp fuse on X2,3 & X2,4 (<1Ohm)
- ◆ If over temp fuse is o.k. and resistance of heater shows >180 Ohm, check each heater and replace, if needed.

Flame OFF

- ◆ Please refer to service menu item and actual failure report for trouble shooting

NiCr/Ni Thermo element failure, flame control

- ◆ disconnect cap on detector chamber, replace thermo element incl. Gasket

Flame does not ignite**Choose menu item Measuring System**

- ◆ check H2 set point reading during H2 test circle
- ◆ reading should be greater than +25mbar !!!
- ◆ reading just 'before ignition' should be +230mbar !!!
- ◆ Ignition voltage should be 1.2...1.8V

capillary/Orifice N°3 blocked or H2-Feed fails

- ◆ Set point +25mbar for H2 is not reached
- ◆ Check pressure regulator (1.5-2.0 bar abs) NOTICE: max pressure =2.0bar abs!!!
- ◆ Disconnect H2 1/16 – Cu – tubing from detector (no H2 should be flowing) If there is any leakage, change all gaskets and regulators.
- ◆ Check if hydrogen is leaking from the loose H2-fitting →if YES, change orifice at gas detector block.

Failure Suction (Driving) Voltage

- ◆ Please replace detector PCB

Failure Igniter

- ◆ Check if ignition voltage during ignition is 1.2 to 1.8 V
- ◆ Check under menu item 'Measuring System' if ignition voltage is <0.8 or >3.8 V
- ◆ IF YES => change ignitor
- ◆ If no ignition voltage is displayed →change PCB on detector

Failure no burner gas flow

- ◆ Disconnect burner feed from gas detection block and check flow via rotameter
- ◆ If flow is o.k. → blow back catalyst or change catalyst due to contamination issues
- ◆ If burner air flow is less than 10l/hr →change/clean burner orifice at detector
- ◆ Notice: If there are no failures or blockages found, change/clean the sample gas orifice and the burner nozzle (check gasket!!!). If this doesn't work →change complete detector assembly

Failure no Driving potential (missing driving voltage)

- ◆ check in menu section if driving potential is between >-300V and <-420 V
- ◆ If indicated voltage is less than -300V → change PCB on detector

Failure no sample gas flow

- ◆ Check sample gas inlet filter for contamination, check delta pressure
- ◆ Open sample gas tubing at FID input (measure sample point pressure which should be not less than 800mbar abs.)
- ◆ If sample gas flow is too low →change inlet filter
- ◆ If sample gas flow is still too low after filter change →change gas distribution block

Failure sample gas pressure too high

- ◆ Please reduce the front pressure to less than 1.600mbar, bleed off the overflow to a safe environment

Failure sample gas pressure too low

- ◆ If sample pressure is less than 700mbar, please use second sample gas pump

Failure sample gas pump

- ◆ Please replace ejector pump (only with model ES, TG, FE, MK)
- ◆ Please service membrane pump (model PT)
- ◆ Check delta pressure, if less than -650mbar: Replace if needed
- ◆ Check all exhaust conditions, remove any plugs and restrictions of flow

Failure burner pump

- ◆ Please refer to section 'failure sample pump'

Failure sample gas orifice, plugged

- ◆ disconnect sample gas line and filter cap
- ◆ replace sample inlet filter (including gasket!)

Capillary N² plugged or Hydrogen supply defect

- ◆ check secondary pressure Hydrogen supply (1,5-2bar abs.)
- ◆ Important notice: Hydrogen pressure should not exceed 2 bar !
- ◆ disconnect CU tubing (1/16") from the gas distribution block in order to double check leakage
- ◆ If needed, change regulator
- ◆ Check Hydrogen orifice and replace if needed

Failure Temperature sample line (sample probe) too low

- ◆ If the parameters are set to failure:
- ◆ Check the heating voltage on the 230/115V board at the socket tube heating
- ◆ If no voltage is available: Check the fuse sample line
- ◆ If the fuse is working correctly: Check supplied voltage (24VDC) relay on main PCB
- ◆ If the voltage is available: Change the relay
- ◆ If the voltage is not available: Change the CPU
- ◆ If the voltage is available: Change the tube

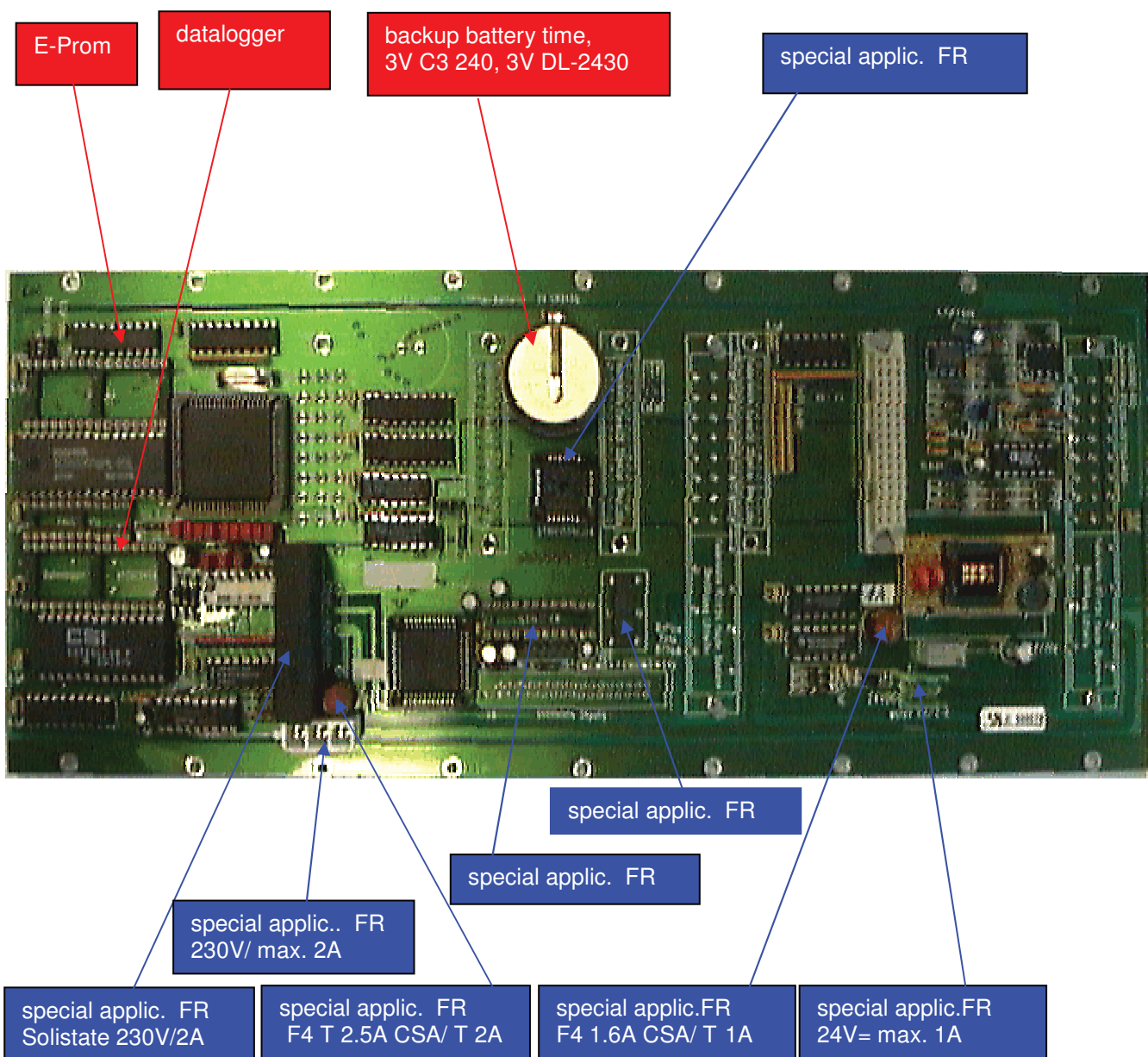
- **Electronic components and interface JFID**
- **JFID CPU**

Fuse Wickmann Type TR5, 250 VDC

Type 372, VDE/SEMKO, approval on component label

Type 374, CSA/UL, approval on lable

Please replace fuses only with appropriate replacement part!



- **JFID power supply (low voltages)**

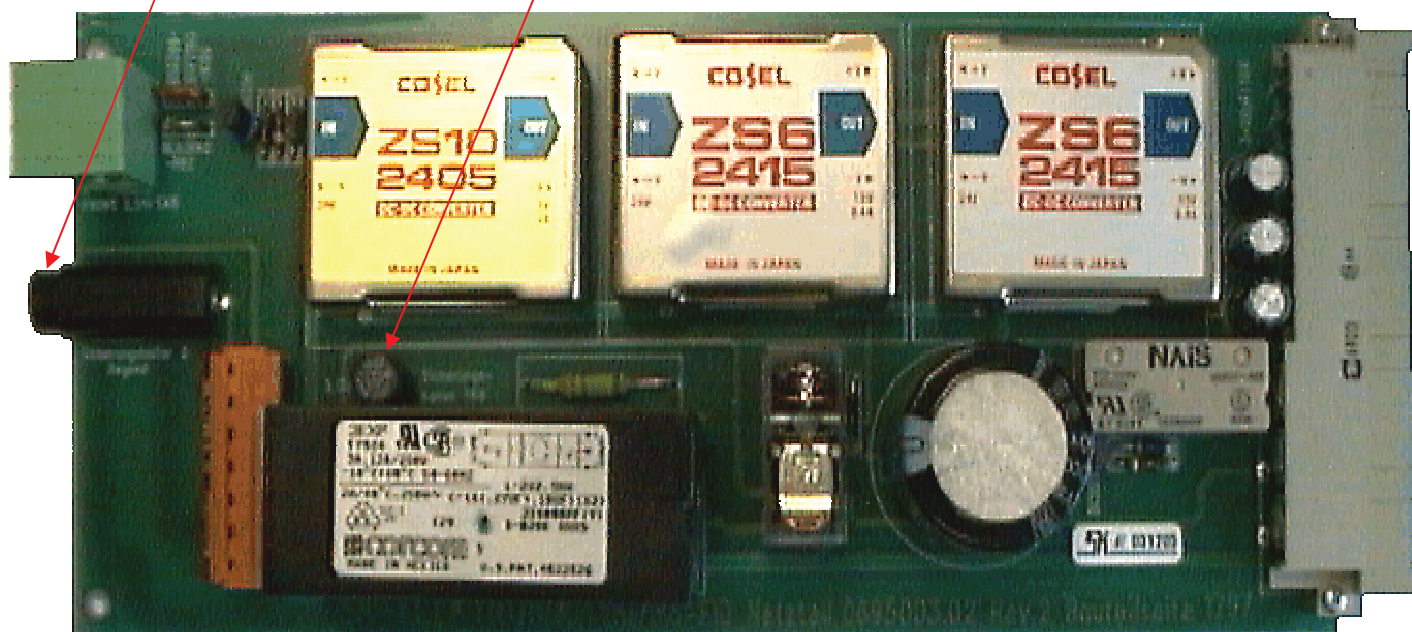
Fuse	Wickmann	Type TR5, 250VDC Ceramic-Fuse 5 x 20, 250 VDC
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Type 372 VDE/SEMKO, approval on label
Type 374 CSA/UL, approval on label
TYPE H VDE/SEMKO/UL, approval on label

Please replace fuses only with appropriate replacement part!

F2, line heater
T 6A CSA
T 4A

main fuse for int. psu 230/115V
T 5A CSA
T 3.15A



• JFID data transmission PCB

Fuse Wickmann Type TR5, 250VDC

Type 372 VDE/SEMKO, approval on label

Type 374 CSA/UL, approval on label

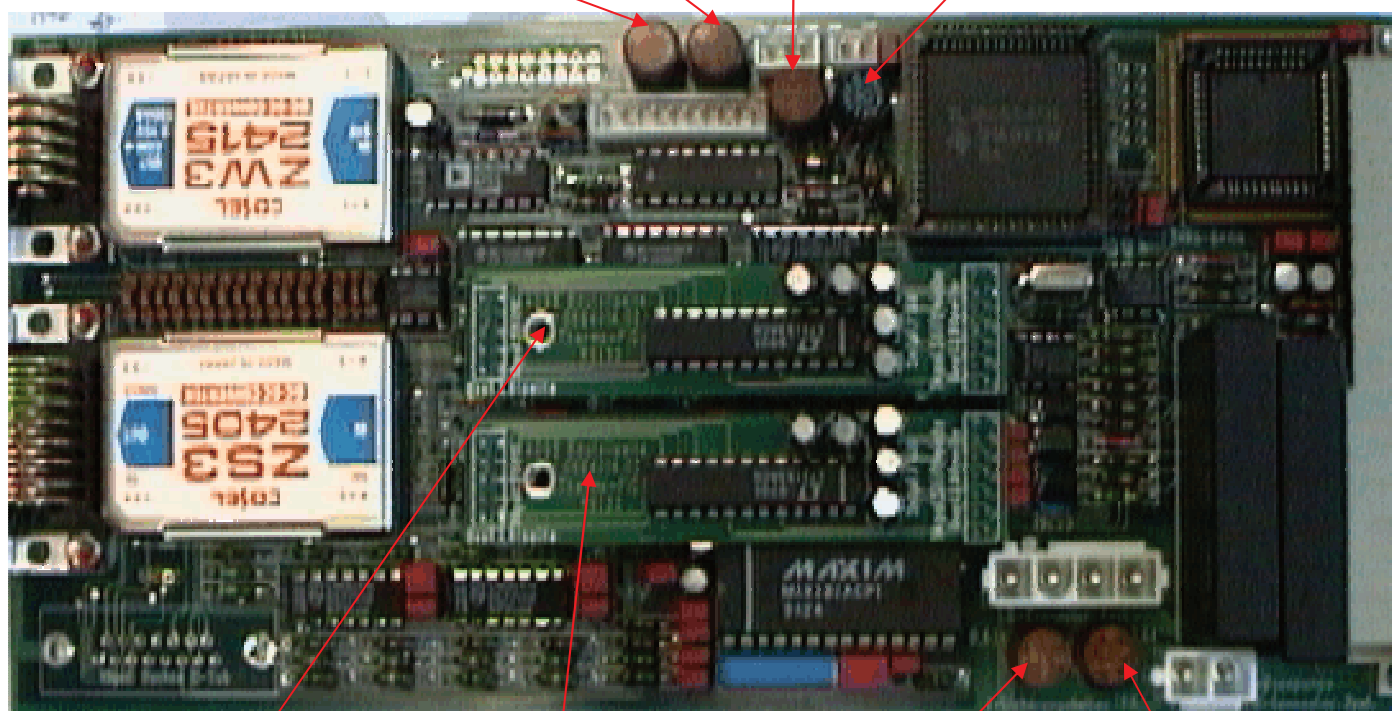
Please replace fuse only with appropriate replacement part!

F6, spangas valve
T 315mA CSA,
T200mA

F5, zero gas pump
zero gas valve
T 630mA CSA,
T 500mA

F3, ext./int.
samplegas pump
T 315mA CSA,
T 200mA

F4, fan
T 500mA CSA,
T 315mA



Modul COM2

Modul COM1

F2- heater catalyst
T 2A CSA, T 1.6A

F1, heater detector
T 2,5A CSA, T 2A

• Interface pins JFID COM1, COM2 and peripheral

COM1 Printer Interface; COM2 Remote Control Interface (RS232)

JFID COM1 and COM2 9-pol Sub-D male		Modem 9- pol Sub-D-female		Modem 25-pol Sub-D female	
◆ Pin 1	DCD	Pin 1	DCD	Pin 8	DCD
◆ Pin 2	RXD	Pin 2	RXD	Pin 3	RXD
◆ Pin 3	TXD	Pin 3	TXD	Pin 2	TXD
◆ Pin 4	DTR	Pin 4	DTR	Pin 20	DTR
◆ Pin 5	GND	Pin 4	GND	Pin 7	GND
◆ Pin 6	DSR	Pin 6	DSR	Pin 6	DSR
◆ Pin 7	RTS	Pin 7	RTS	Pin 4	RTS
◆ Pin 8	CTS	Pin 8	CTS	Pin 5	CTS
◆ Pin 9	Ri	Pin 9	Ri	Pin 22	Ri

• EPSON-Printer, Software-Handshake (XON/XOFF)

JFID COM1

9-pol Sub-D male.

◆ Pin 2	RXD
◆ Pin 3	TXD
◆ Pin 5	GND

Printer

25- pol Sub-D female

Pin 2	TXD
Pin 3	RXD
Pin 7	GND

• EPSON-Printer, Hardware-Handshake (RTS/CTS, DTR/DSR)

JFID COM1

9-pol Sub-D conn.

◆ Pin 2	RXD
◆ Pin 3	TXD
◆ Pin 5	GND
◆ Pin 6	DSR
◆ Pin 8	CTS

EPSON-Drucker

25 pol Sub-D female

Pin 2	TXD
Pin 3	RXD
Pin 7	GND
Pin 20	DTR
Pin 4	RTS

• PC connection at COM1, COM2 incl. Software-Handshake (XON/XOFF)

JFID COM1

9-pol Sub-D conn.

◆ Pin 2	RXD
◆ Pin 3	TXD
◆ Pin 5	GND

PC COM1 oder COM2

9 pol Sub-D conn.

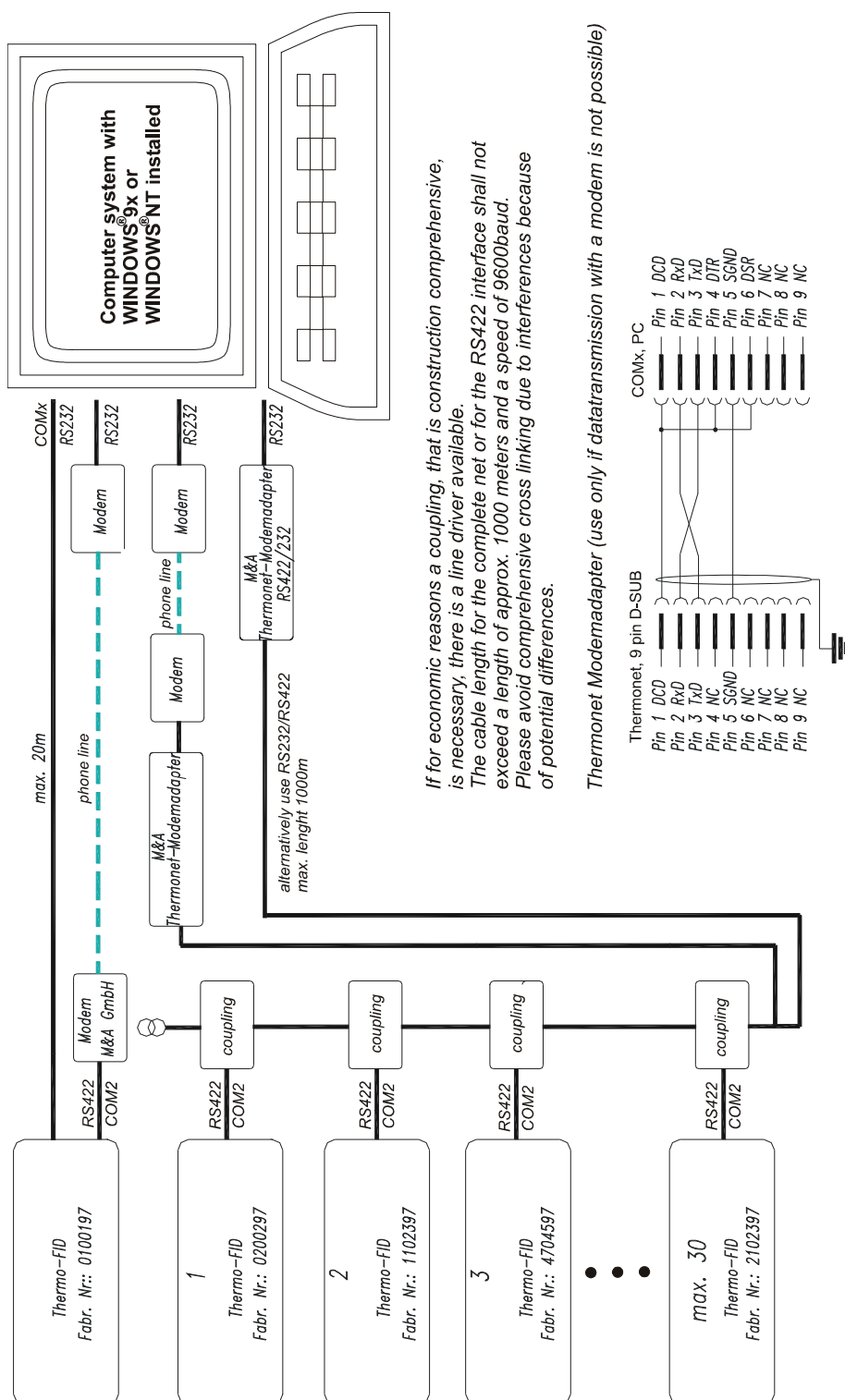
Pin 3	TXD
Pin 2	RXD
Pin 5	GND

PC COM1 oder COM2

25 pol Sub-D

Pin 2	TXD
Pin 3	RXD
Pin 7	GND

• Data PC Interface (Multi Drop)



Start up Remote Control

- Install Software **JFID-Remote** on PC mit Windows 3.1...WIN 95
- Start **JFID-Remote**
- Configure COM 1..2...etc..
 - Baudrate: 9600
 - Databit: 8
 - Parity none
- Stopbit: ON
- Xon/Xoff: ON
- RTS/CTS: NO
- Enter S/N or Manufacturing Number (see label)
- Choose Modem if appropriate
- Enter phone number (inkl. country code, area code and ext.. if needed)
- Enter OK =>the modem will dial

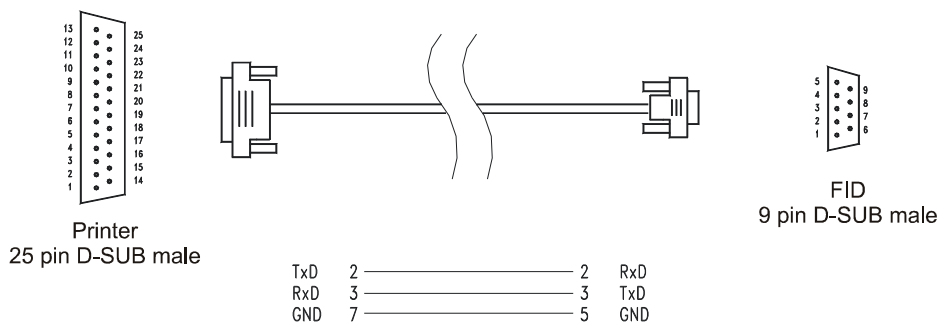
Important Notice:

Please be sure that you have installed an JCT Modem which is tested and pre-configured for your application.

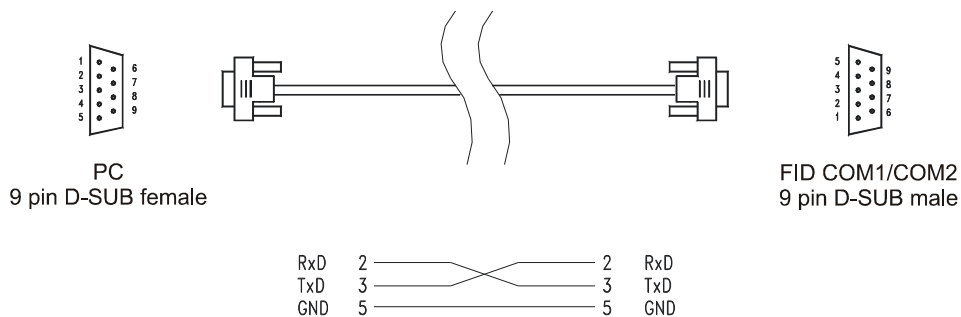
JCT does not take any responsibility if you use your own modem!

• Interface cable

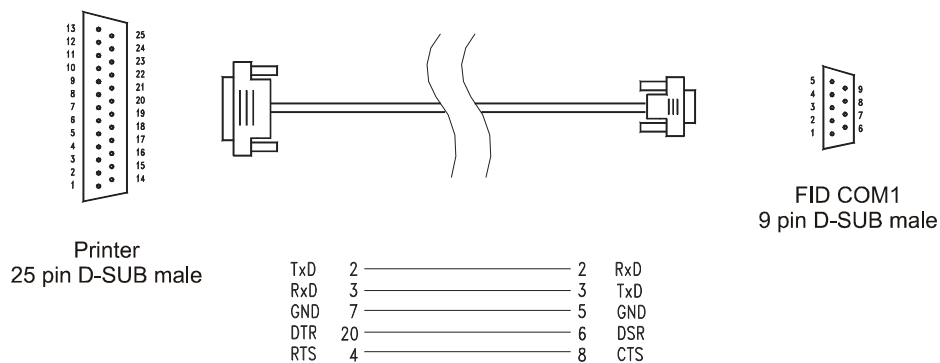
Connection cable Thermo-FID to printer



Connection cable Thermo-FID to serial interface PC
configuration for software handshake (Xon/Xoff)

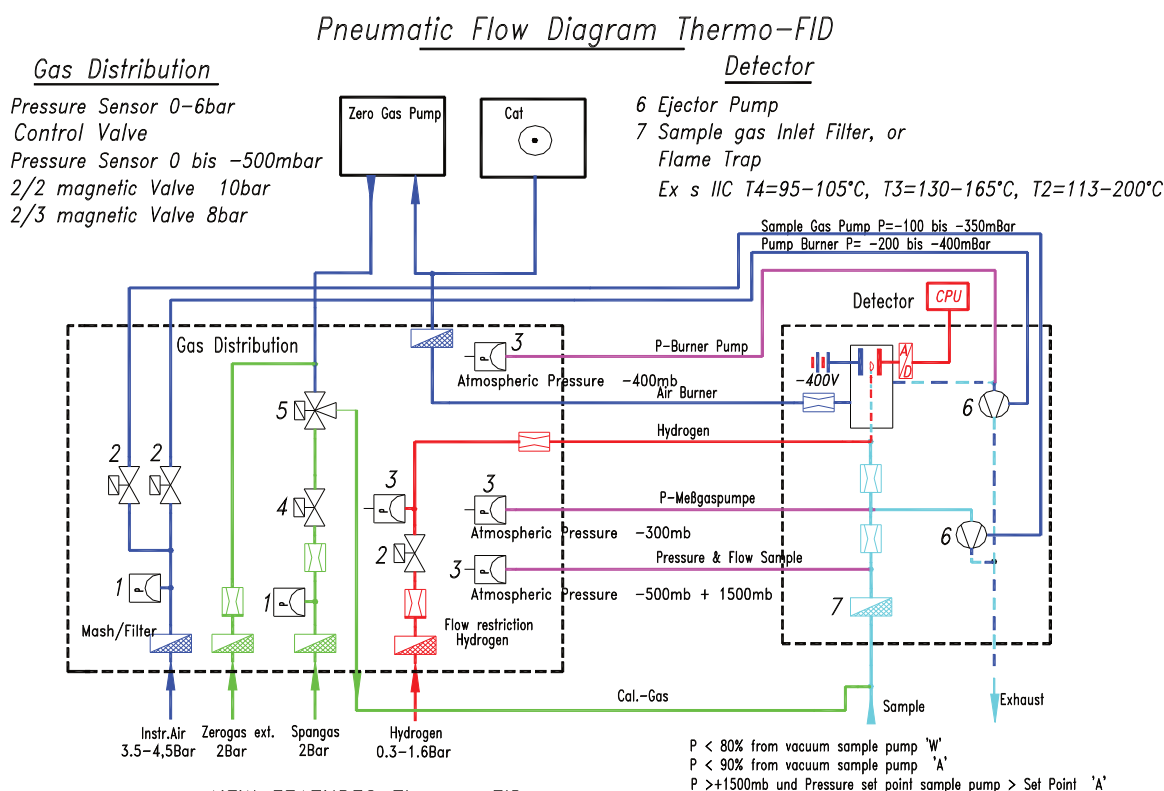


Connection cable Thermo-FID to printer
configuration for hardware handshake (RTS/CTS)



• Drawings & Component Details JFID

General flow schematic JFID



FID-Close Coupled Detector: The A/D-Converter is directly connected (closed coupled) to the elektrode (dynamic range => LEL - ppm)

Microprocessor controlled driving Voltage incl. operation/failure information

Microprocessor controlled Flame with automatic flame ignition and current control incl. operation/failure information

Microprocessor controlled flame adjustment reflects in stable response factor setting and Oxygen cross interference failure less than 3% 'without compensation-gas'

Zero gas and Burner gas is provided from environmental air accross the internal built into catalyst (with range less than 10mg' org.C/m³, Nitrogen is used for Zero gas (see external Zero gas interface)

The new designed Burning Chamber provides exceptional zero stability and is not sensitive to contamination

New designed vacuum controller (ejector pump, sample & burner) provides exceptional long term stability with no major influence to the measuring value from pressure variation

With sample gas flow setting at 25 NI/hr @1013mbar, the sample gas pressure may be vary between -300mbar and up to 3500mbar (orifice = 25)

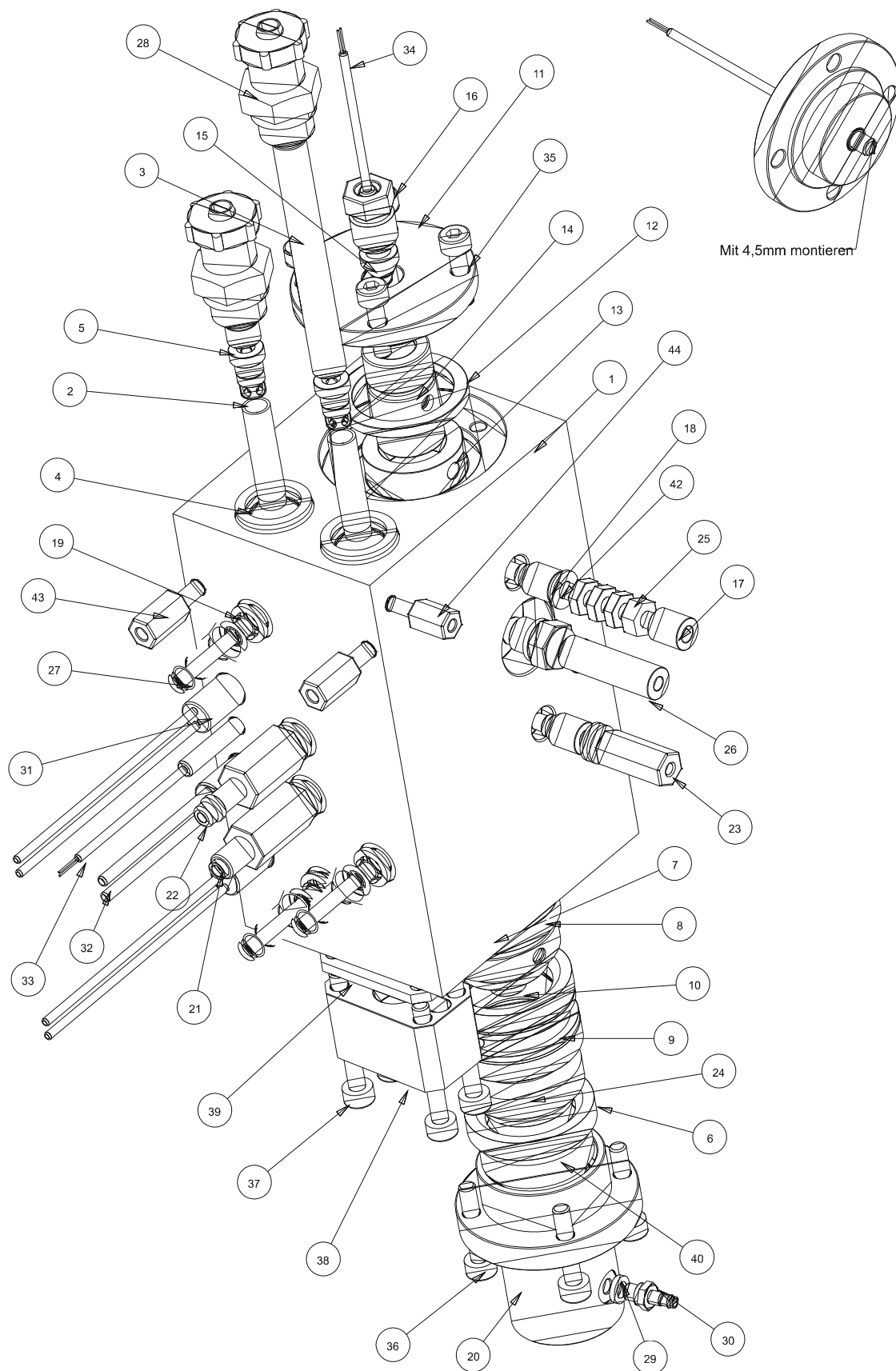
With sample gas flow setting at 90 NL/hr @1013mbar, the sample gas pressure may be vary between -300mbar and up to 3000mbar (orifice = 50)

Microprocessor controlled sample flow and sample conditioning (contamination, pressure)

Approved Flame Trap (Ex s IIC) at sample inlet, used also as sample inlet filter

Microprocessor controlled hydrogen supply and leak check

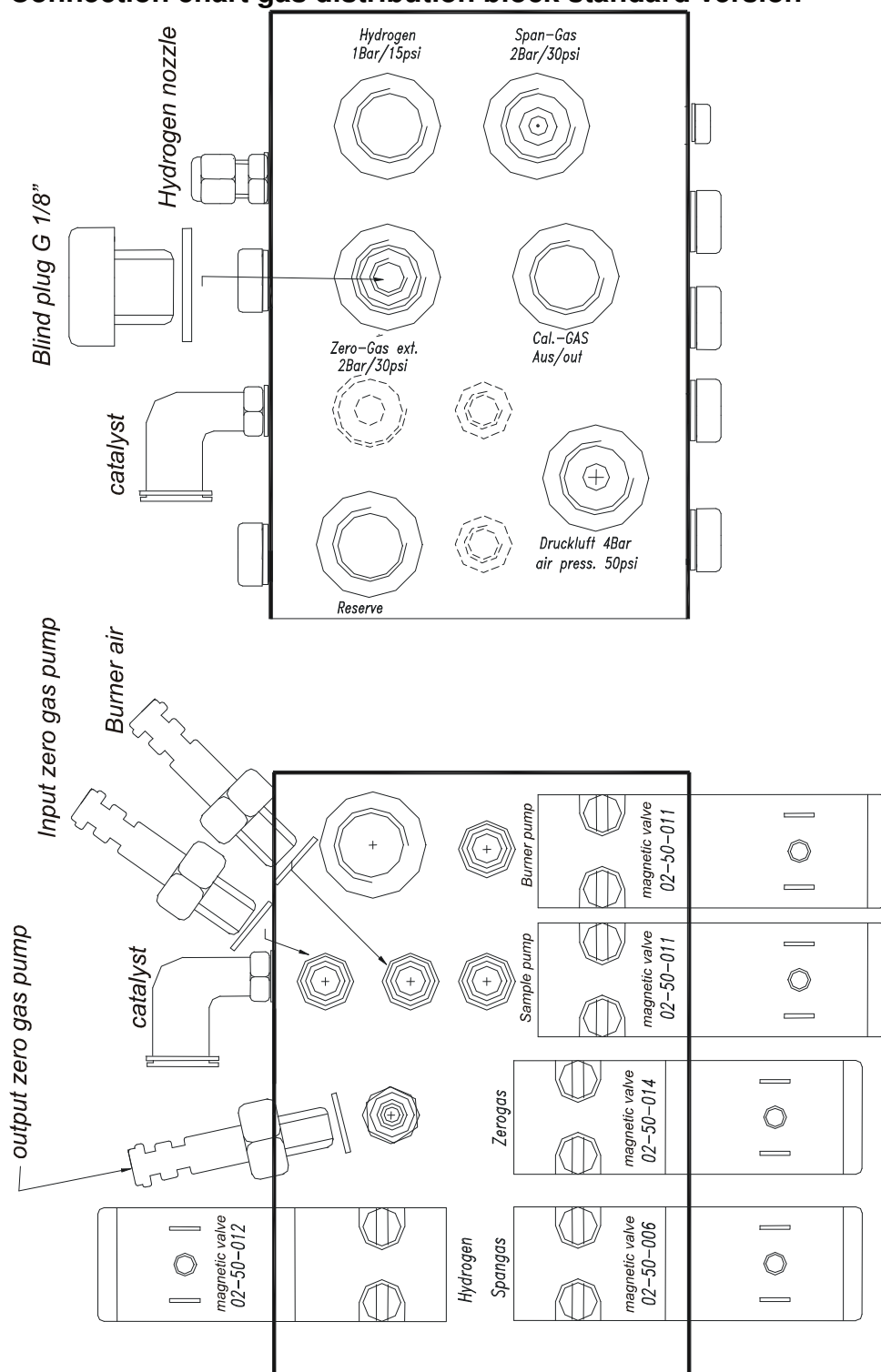
Detector assembly



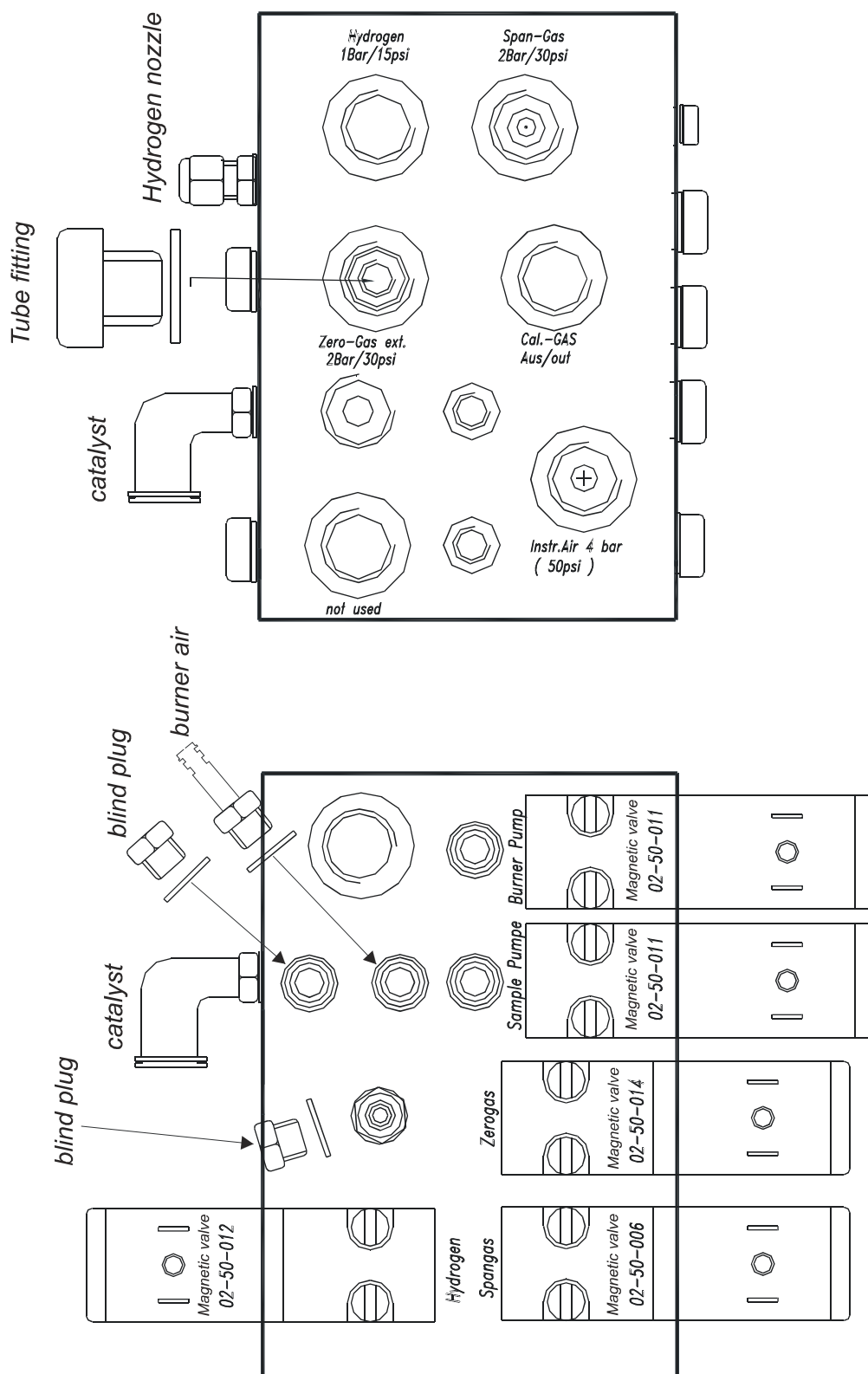
Übersicht Detektor/ Overview Detector				
Pos. Nr.	Stk.	Beschreibung Deutsch	Description English	Art.Nr.
1	1	Detektorblock	Detector block	707.070025
2	2	Injektor	Injector pump	707.040029
3	1	Abstandshülse für Messgaspumpe	Distance Ring for sample-gas pump	707.040032
4	2	Cu-Dichtung 10x13,5x1	Cu-gasket size 10x13,5x1	613.100135
5	1	Abstandshülse für Brennerpumpe	Distance Ring for burner pump	707.040033
6	4	Dichtring für Düsenstöcke	Gasket for nozzle-fitting	707.040051
7	1	Brennerfuss 025	Burner socket 025	407.040045
8	1	Abstandsring für Brennerfuss	Distance Ring for burner socket	707.040052
9	1	Abstandsring für Düsenstöcke	Distance Ring for nozzle-fitting	707.040050
10	1	Messgasdüse für Brenner 01	Sample-gas Orifice burner 01	407.040049
11	1	Brennerkopf	Burnerhead	707.040040
12	1	Brennerkopfdichtung	Gasket for burnerhead	707.040039
13	1	Isolierung Messelektrode	Isolation for Measuring-Electrode	707.040034
14	1	Messelektrode	Measuring-Electrode	707.040037
15	1	Dichtung für Temperaturfühler Flamme	Gasket Temperature-Sensor flame	707.040041
16	1	Schraube für Temperaturfühler Flamme	Screw for Temperature-Sensor flame	707.040042
17	1	Abstandshülse für AD Wandler	Distance sleeve for contactscREW Measuring-electrode	707.040038
18	2	Dichtkegel Kontaktschraube	Gasketcone for ContactscREW	707.040036
19	5	Cu-Dichtung 5x7,5x1	Cu-gasket size 5x7,5x1	613.050075
20	1	Filterkopf Standard	Filterhead standard (Monel)	707.030075
21	1	Rohrverschraubung Hydrogen	Tube-Fitting Hydrogen	707.040061
22	1	Brennluftdüsenhalter	Nozzle-Fitting, Burner Air 03	707.040062
23	1	Kontaktschraube Saugspannung	ContactscREW Driving-Voltage-Connection	707.040060
24	1	Düsenhalter mit Messgasdüse 025	Nozzle-Fitting incl. Sample-gas Orifice N°025	407.040056
25	1	Kontaktschraube Messelektrode	ContactscREW Measuring-Electrode	707.040035
26	1	Zünder	Igniter	407.040206
27	3	Schlauchnippel CRCN-M5-PK-4	Tube-nippel CRCN-M5-PK-4	616.013968
28	2	Schlauchnippelverschraubung CK-1/8-PK-4	Tube-fitting CK-1/8-PK-4	616.002027
29	1	Cu-Dichtung 3x5x1	Cu-gasket 3x5x1	613.030050
30	1	Schlauchnippelverschraubung CN-M3-PK-2	Tube-Fitting CN-M3-PK-2	616.015871
31	2	Heizelement 230V/160VA	Heating Element 230V/160VA	407.950097
32	1	Übertemperatursicherung 192°	Over-temperature fuse 192°C	407.950099
33	1	Temperaturfühler Detektor PT-100	Temperature-Sensor Detector PT-100	407.950102
34	1	Temperaturfühler Flamme PT-100	Temperature-Sensor Flame PT-100	407.950096
35	4	ISO 4762 - M3 x 12	ISO 4762 - M3 x 12	
36	4	ISO 4762 - M3 x 16	ISO 4762 - M3 x 16	
37	4	ISO 4762 - M3 x 25	ISO 4762 - M3 x 25	
38	1	Abgasflansch	Exhaust flange	707.040064
39	1	Dichtung für Abgasflansch	Gasket for exhaust flange	707.040065
40	1	Filterronde 5µm	Filter-Disc 5µm	307.001000
41	3	DIN 913 - M3 x 3	DIN 913 - M3 x 3	
42	3	DIN 6796 - 3	DIN 6796 - 3	
43	2	Abstandsbolzen I_A M3x10	Distance bolt I_A M3x10	
44	2	Abstandsbolzen I_A M2,5x8	Distance bolt I_A M2,5x8	
Optionen/ Options				
20	1	Filterkopf abgewinkelt PT	Filterhead elbow piece PT	707.030074
20	1	Filterkopf MK	Filterhead MK	707.030076
20	1	Filterkopf PE	Filterhead PE	707.030077
20	1	Filterkopf MSU-HT, MSU-Dampf	Filterhead for HT -Multi-Sampling	707.030078
20	1	Filterkopf mit T-Bohrung	Filterhead for T-whole	707.030079
7	1	Brennerfuss 050 He/H2	Burner Socket 05	407.040046
10	1	Messgasdüse für Brenner 08	Sample-gas orifice for burner N°008	407.040048
24	1	Düsenhalter mit Messgasdüse 010	Nozzle-Fitting incl. Sample-gas Orifice N°010	407.040054
24	1	Düsenhalter mit Messgasdüse 015	Nozzle-Fitting incl. Sample-gas Orifice N°015	407.040055
24	1	Düsenhalter mit Messgasdüse 035	Nozzle-Fitting incl. Sample-gas Orifice N°035	407.050057
24	1	Düsenhalter mit Messgasdüse 040	Nozzle-Fitting incl. Sample-gas Orifice N°040	407.040058
24	1	Düsenhalter mit Messgasdüse 050	Nozzle-Fitting incl. Sample-gas Orifice N°050	407.040059
32	1	Übertemperatursicherung 229°C	Over-temperature fuse 229°C	407.950100
32	1	Übertemperaturschalter	Thermal fuse	407.030106
31	2	Heizelement 115V/160VA	Heating Element 115V/160VA	407.950098
37	1	Filterronde 40µm ATEX	Filter-Disc 40µm ATEX	307.001001

Gas Distribution Block

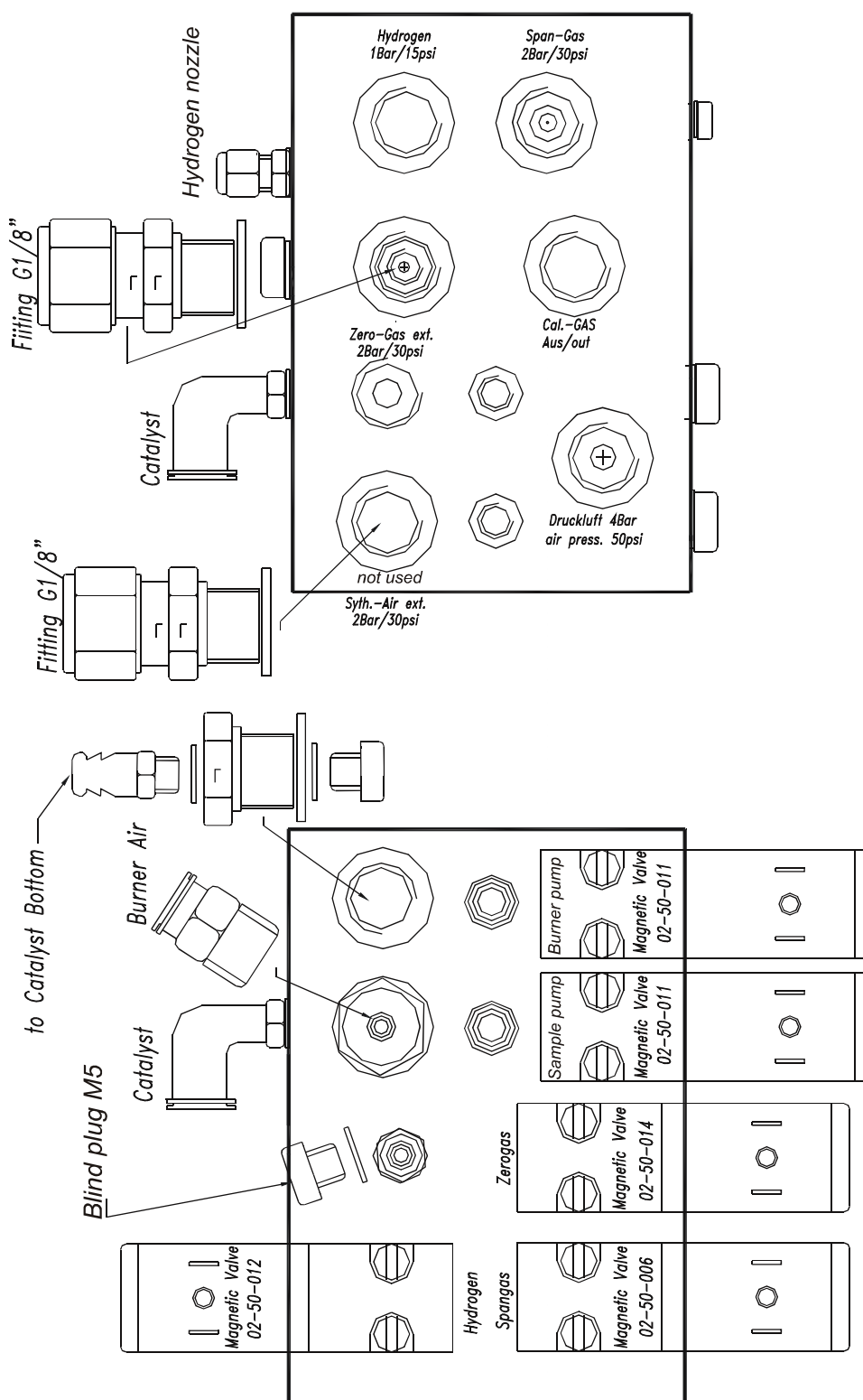
Connection chart gas distribution block standard version



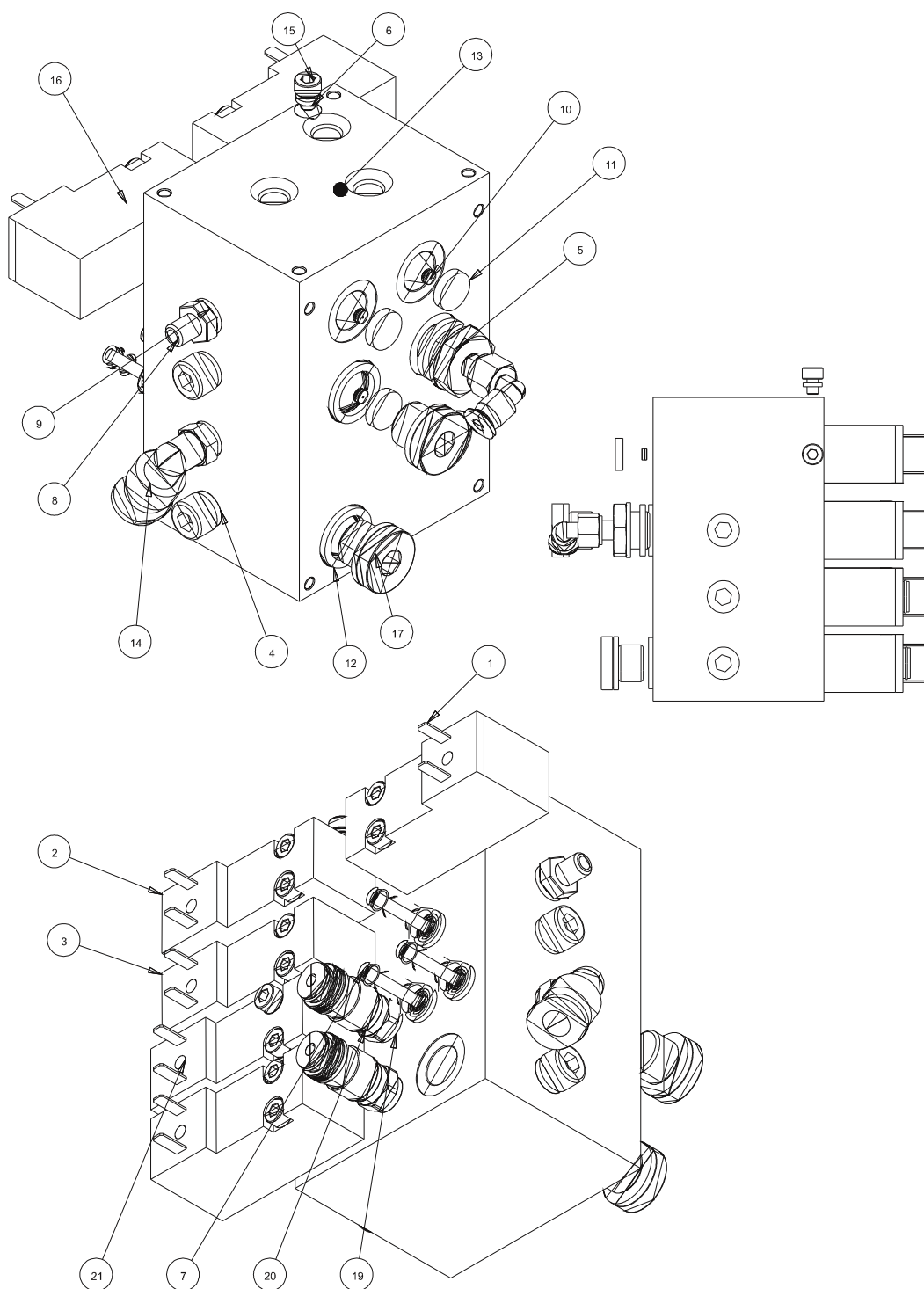
Connection chart gas distribution block with external zero gas



Connection chart gas distribution block with external zero gas and synth. air



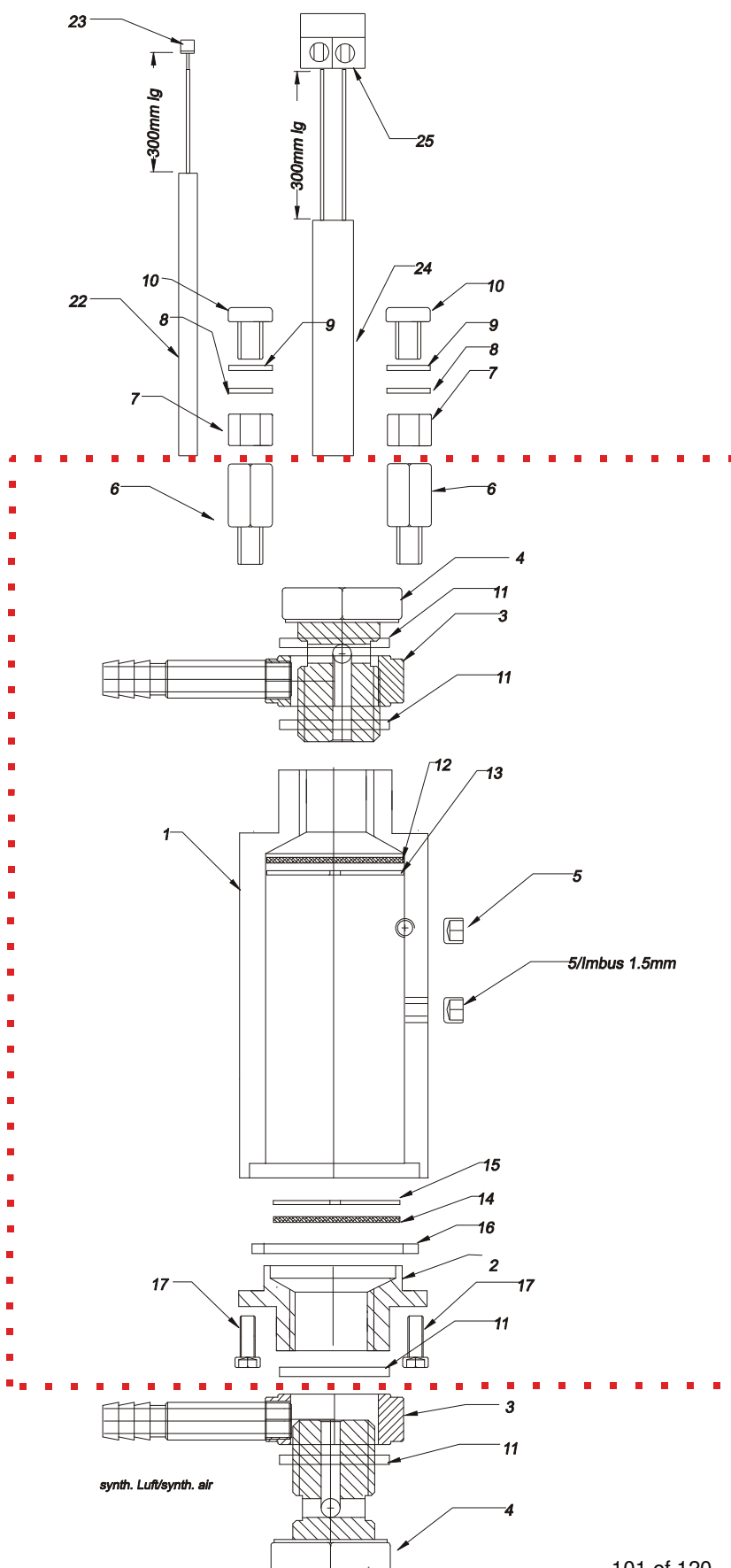
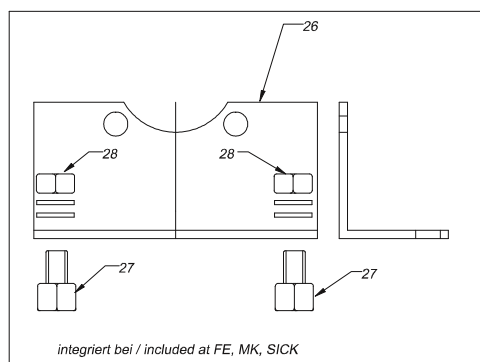
Gas distribution block assembly



Übersicht Gasverteilerblock / overview gas distribution block				
Pos. Nr.	Stk.	Bezeichnung	Description	Art.Nr.
1	1	Regelventil Hydrogen	regulating valve Hydrogen	407.060072
2	1	Schaltventil Spangas	switching valve Hydrogen	407.060074
3	1	Schaltventil Zerogas	switching valve zerogas	407060075
4	10	Dichtring 0-M5	sealing ring 0-M5	616.003565
5	5	DIN 912 - M5 x 6	screw EN ISO 4762 M5 x 6	600.302406
6	2	CU-Dichtung 3x5x1	copper sealing 3x5x1	613.030050
7	3	CRCN-M5-PK-4 13968	CRCN-M5-PK-4 13968	616.013968
8	1	Hydrogendüsenhalter 008	nozzle fitting Hydrogen 008	407.970033
9	1	Dichtring CU-Dichtung 5x7.5x1	copper sealing ring 5x7,5x1	613.050075
10	3	Düse 0.35	nozzle 0.35	707.980047
11	3	Filterrunde 8.5x2, 80µm	filter disc 8,5 x 2, 80µm	307.001002
12	3	Dichtring 0-M10	sealing ring 0-M10	616.002223
13	1	3842 D-M5i-1_8A	3842 D-M5i-1_8A	
14	1	153335 QSML- M5-6	153335 QSML- M5-6	
15	2	Innensechskantschraube M3x4 DIN 912	screw EN ISO 4762 M3x4	
16	10	Innensechskantschraube M3x18 DIN 912	screw EN ISO 4762 M3x18	
17	2	Verschlussschraube G 1/8" DIN 908 VA	lock screw G 1/8"	
18	1	153331 QSML-M5-3	153331 QSML-M5-3	
19	1	Gasverteilerblock alt	gas distribution block	707.060062
20	2	Schellkupplung M5	coupling M5	
21	2	Regelventil Unterdruckregelung alt	regulating valve underpressure	407.060073

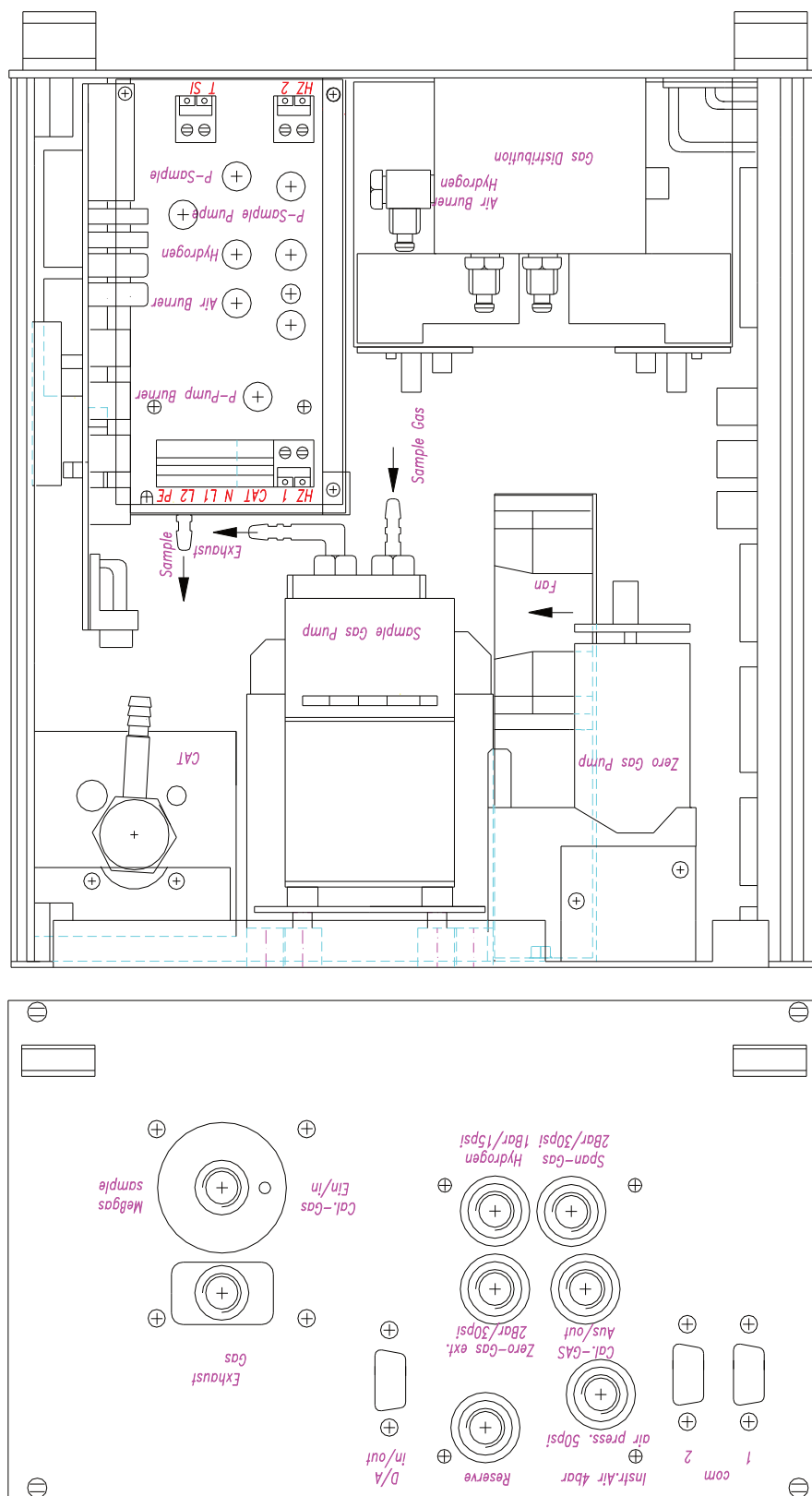
catalyst

Katalysatorbaugruppe
catalyst unit

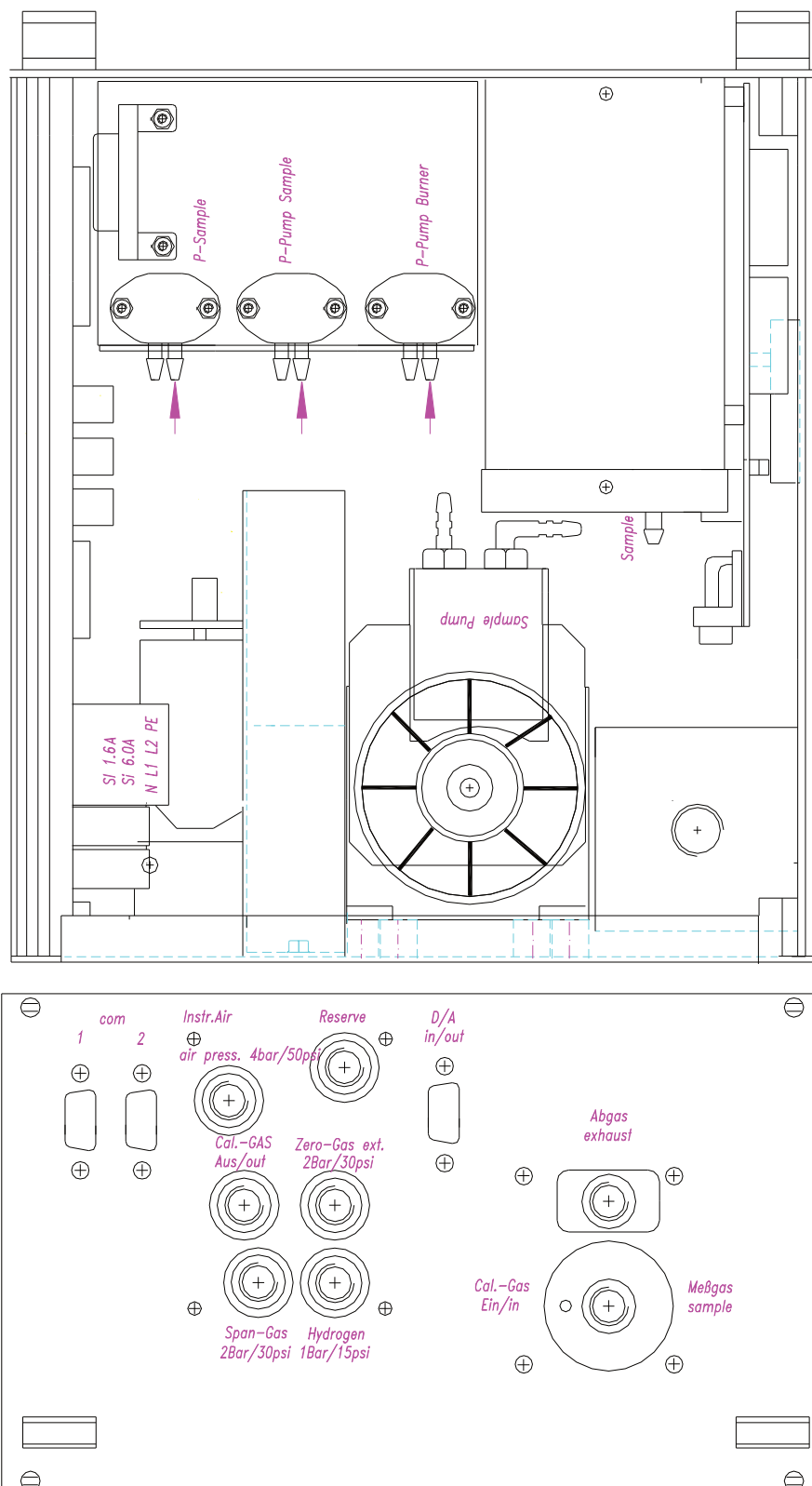


Übersicht Katalysator / overview catalyst				
Pos. Nr.	Stk.	Bezeichnung	Description	Art.Nr.
1	1	Katalysatorgehäuse	cabinet catalyst	
2	1	Katalysatorboden	socket catalyst	
3 und 4	1	Winkelverschraubung für KAT.-Luft M8	elbow fitting for catalyst air M8	407.040197.B
3 und 4	1	Winkelverschraubung für KAT.-Luft 1/4"	elbow fitting for catalyst air 1/4"	407.040197.A
5	2	Inbusgewindestift M3 x 3 Innensechskant		
6	2	Sechskantbolzen I/A M4 x 10		
7	2	Distanzhülse 4,3 x 6mm	spacer 4,3 x 6mm	
8	2, 4	Unterlegscheibe 4,3 VA		
9	2, 4	Fächerscheibe 4,3 DIN 6787 VA		
10	2, 4	Linsenkopfschraube Kreuz M4 x 6 DIN7985		
11	2, 4	Dichtungsring CU 14 x 18 x 1		
12	2	Edelstahlsieb 22, 10µm		407.980066
13	1	Sprengtring DIN472, 22, VA		
14	1	Edelstahlsieb 20, 10µm		407.980067
15	1	Sprengtring DIN472, 19, VA		
16	1	Dichtungsring CU 22 x 26 x 1,5		
17	1	Innensechskantschraube M3 x 8, DIN912, VA		
18	4	Isolierblechdeckel		
19	1	Isolierblechgehäuse		
20	1	Isolierblechboden		407.040091
21	1	Blechschrabe 2,9 x 6, DIN7981		
22	1	Temperaturfühler KAT PT100 ES/TG/ PT/KA	temp.sens or KAT PT100 ES/TG/PT/KA	407.000056
	1	Temperaturfühler KAT NICR-NI ES/TG/PT/KA	temp.sens or KAT NICR-NI ES/TG/PT/KA	407.000054
	1	Temperaturfühler KAT PT100 MK/FE/MSU	temp.sensor KAT PT100 MK/FE/MSU	407.000055
	1	Temperaturfühler KAT NICR-NI MK/FE/MSU	temp.sensor KAT NICR-NI MK/FE/MSU	407.000053
24	1	Heizer 230V für MK, FE, MSU	heating element 230V MK, FE, MSU	407.030113
	1	Heizer 230V für KA	heating element 230V KA	407.030114
	1	Heizer 230V für ES, PT, TG, NGA	heating element 230V ES, PT, TG, NGA	407.030115
	1	Heizer 115V für MK, FE, MSU	heating element 115V MK, FE, MSU	407.030116
	1	Heizer 115V für KA	heating element 115V KA	407.030117
	1	Heizer 115V für ES, PT, TG, NGA	heating element 115 V ES, PT, TG, NGA	407.030118
26	1	Befestigungswinkel KAT		407.980083
27	2	Sechskantbolzen I/A M4 x 5		
28	1	Mutter M4, VA		
	1	Füllung für Katalysator	filling for catalyst	615.018000
komplette Katalysatoren / complete catalysts				
Typ / model, suitable for			Anmerkungen / remarks	Art.-Nr. / part
MK, FE, MSU			alle KATs ohne Heizelement und Temperaturfühler	407.960078
ES, PT, TG, NGA			delivery without heating element and temp.sensor	407.960080
KA				407.960079

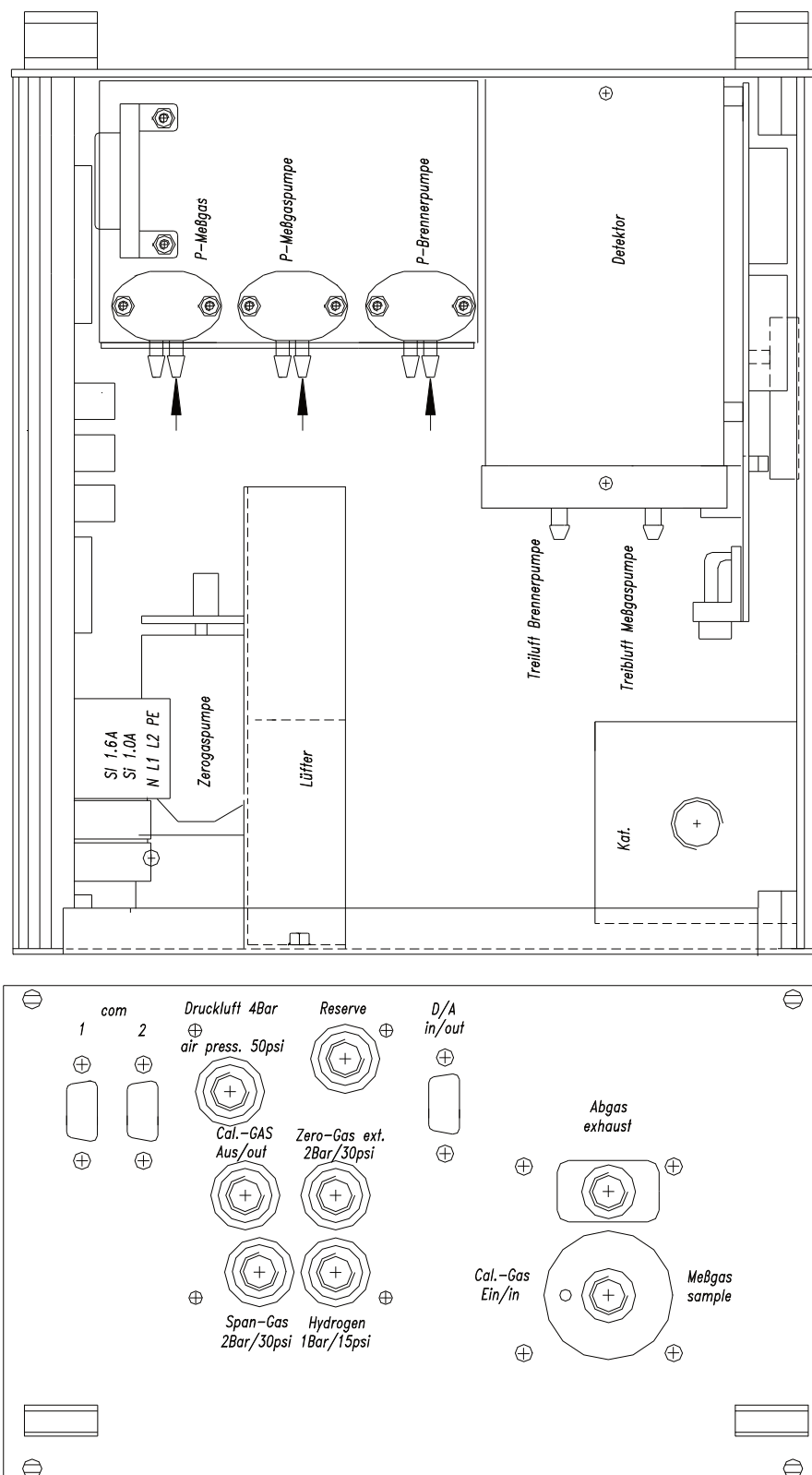
JFID with integrated membrane sample pump, top view



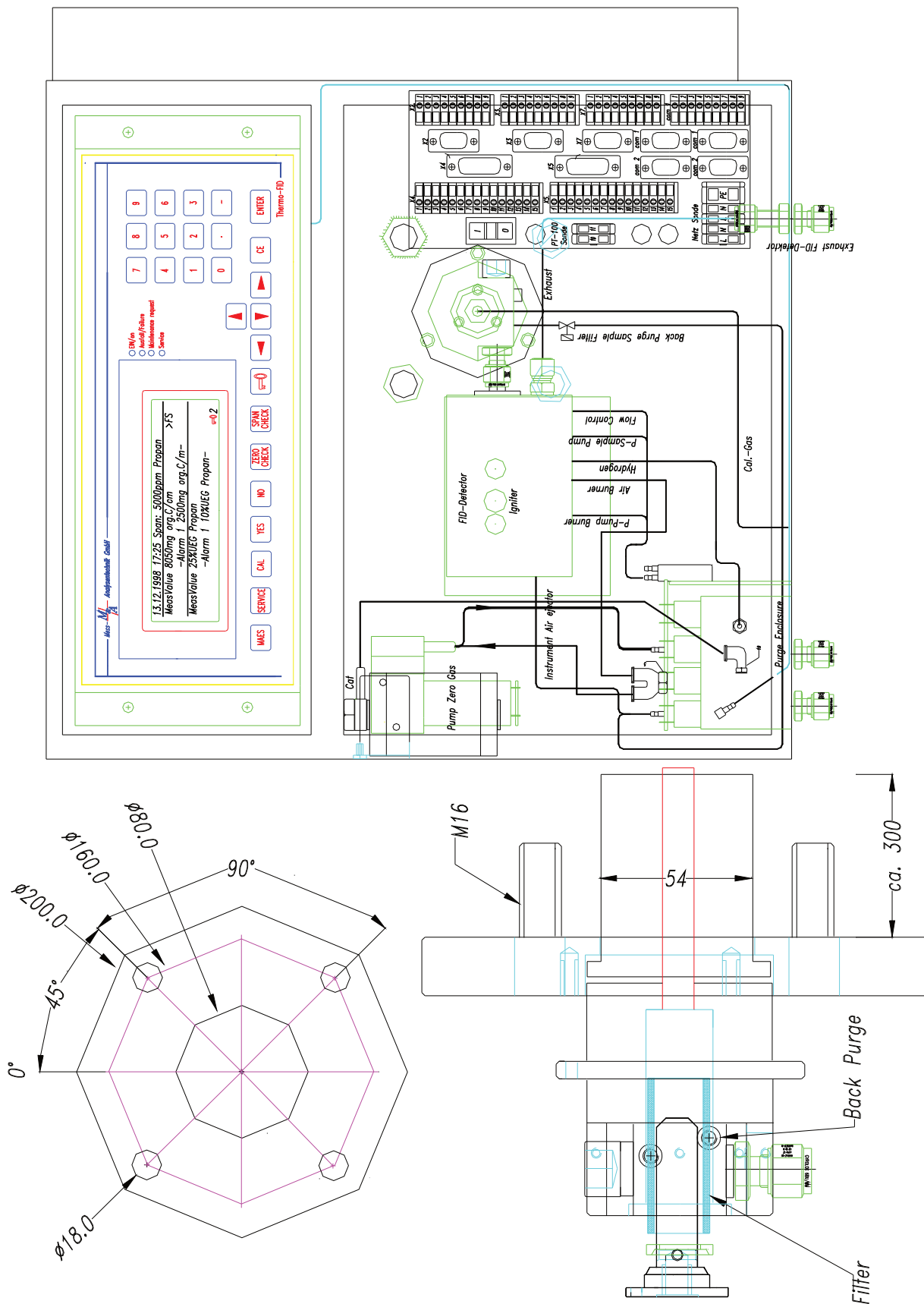
JFID with integrated membrane sample pump, bottom view



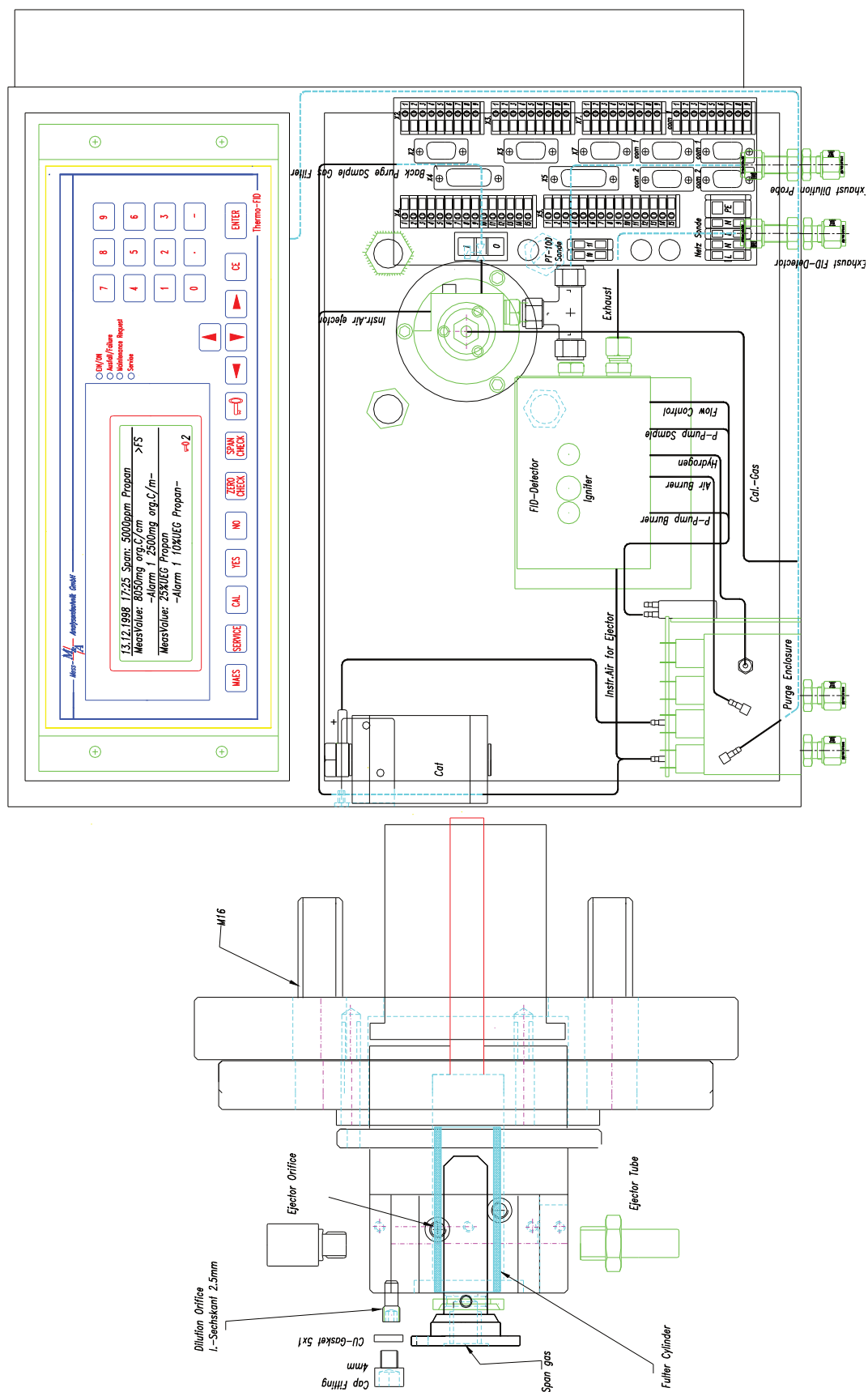
JFID cassette with ejector sample pump



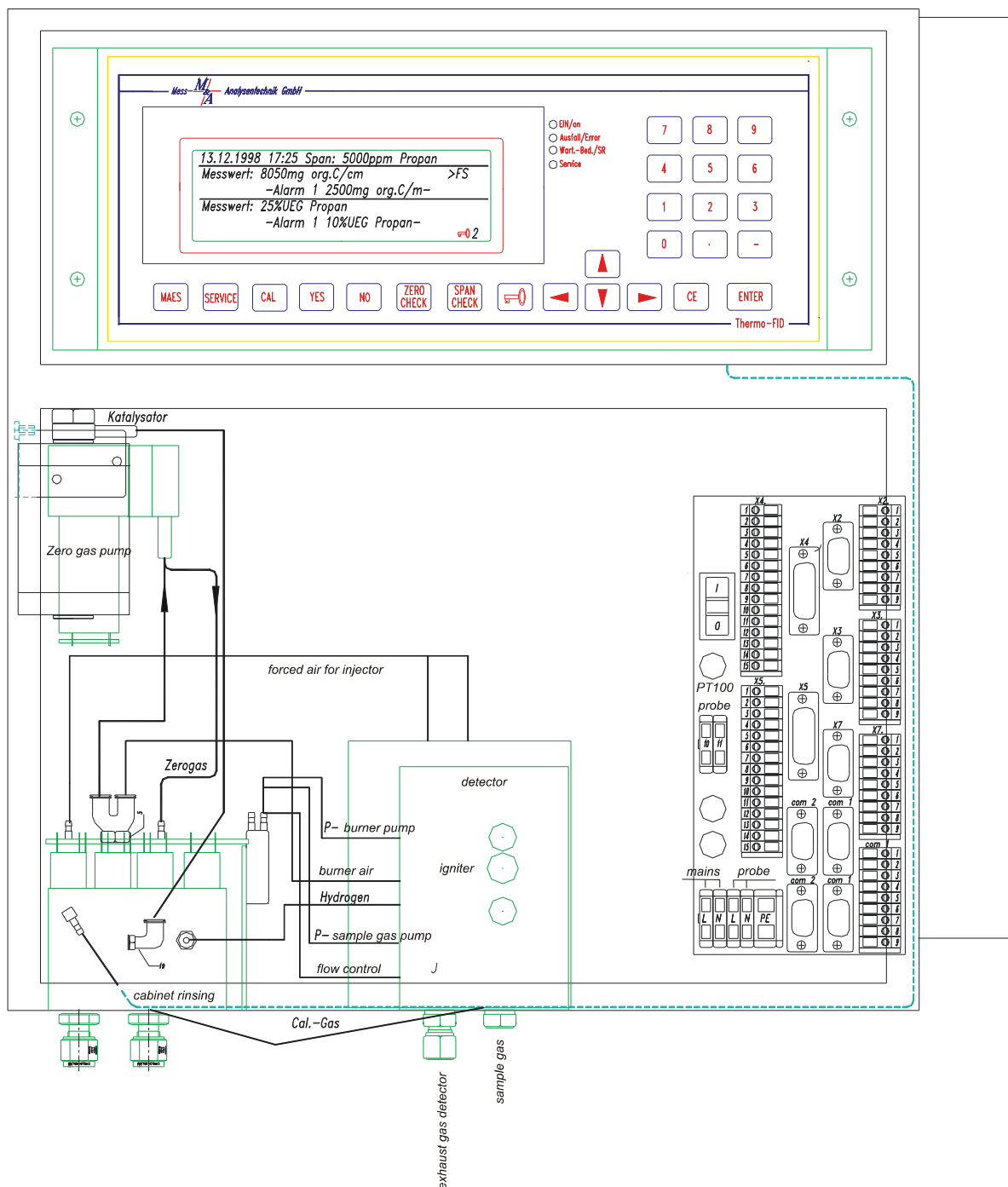
JFID-MK, front open view of field housing, probe, flange



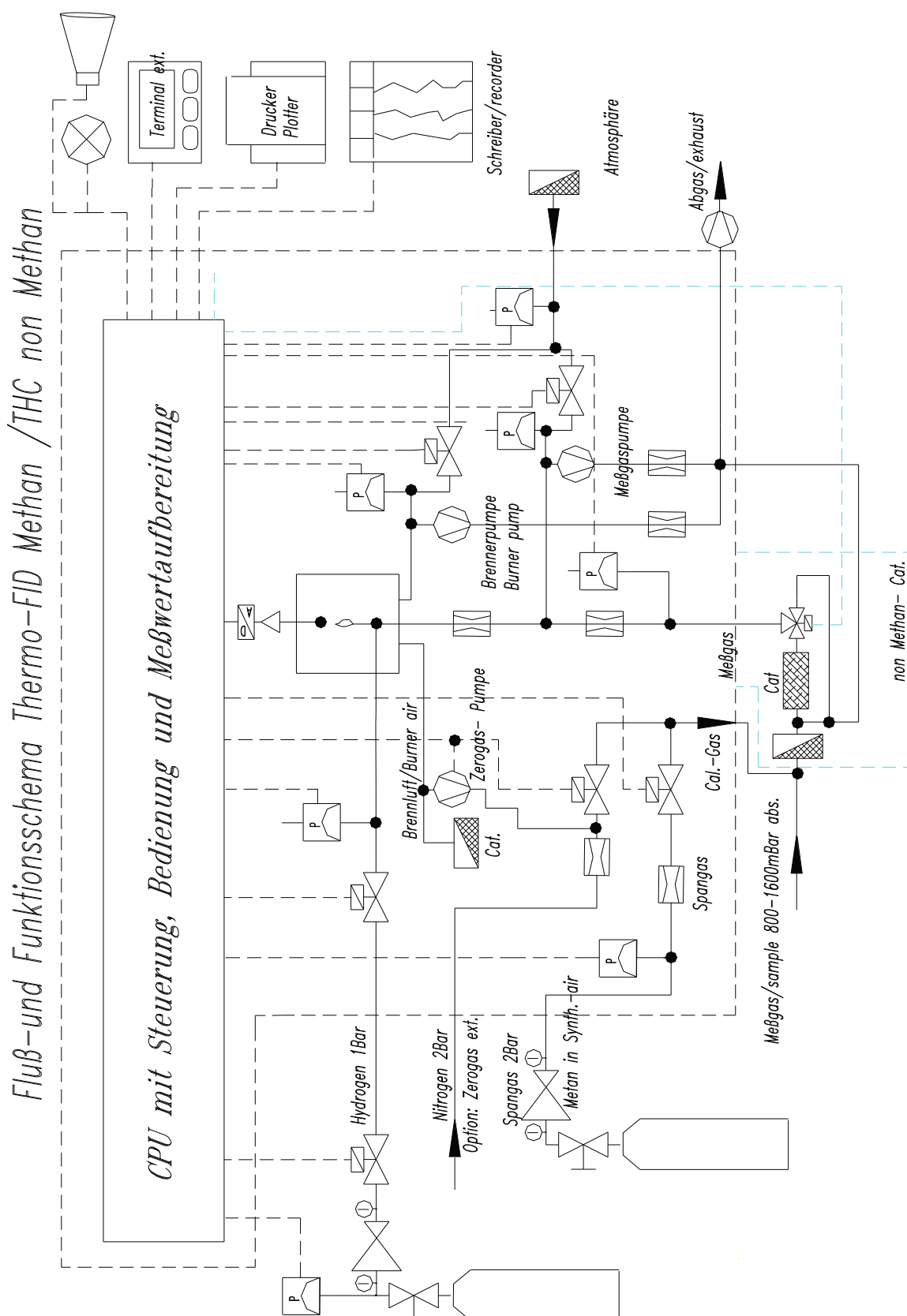
JFID model MK, incl. dilution probe



Field Housing

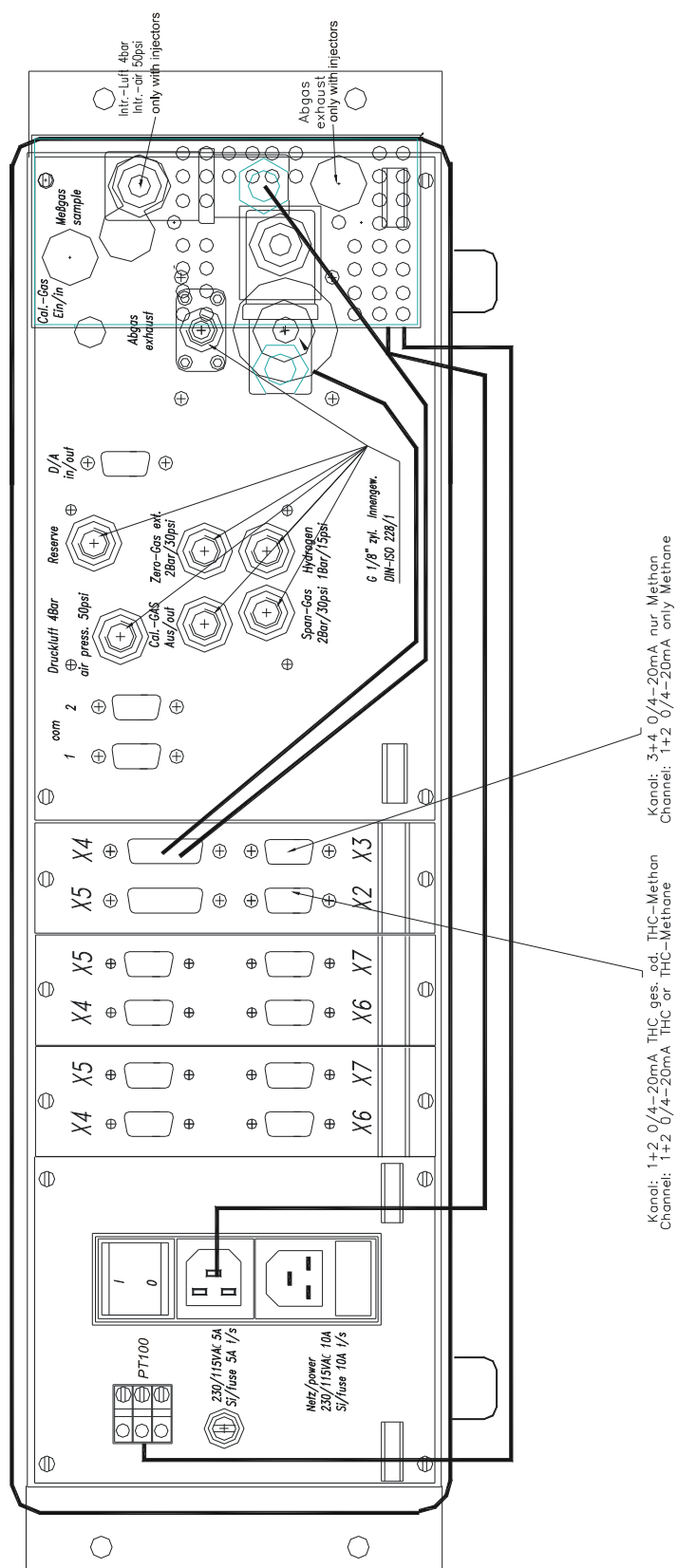


Methan non Methan principle flow diagram

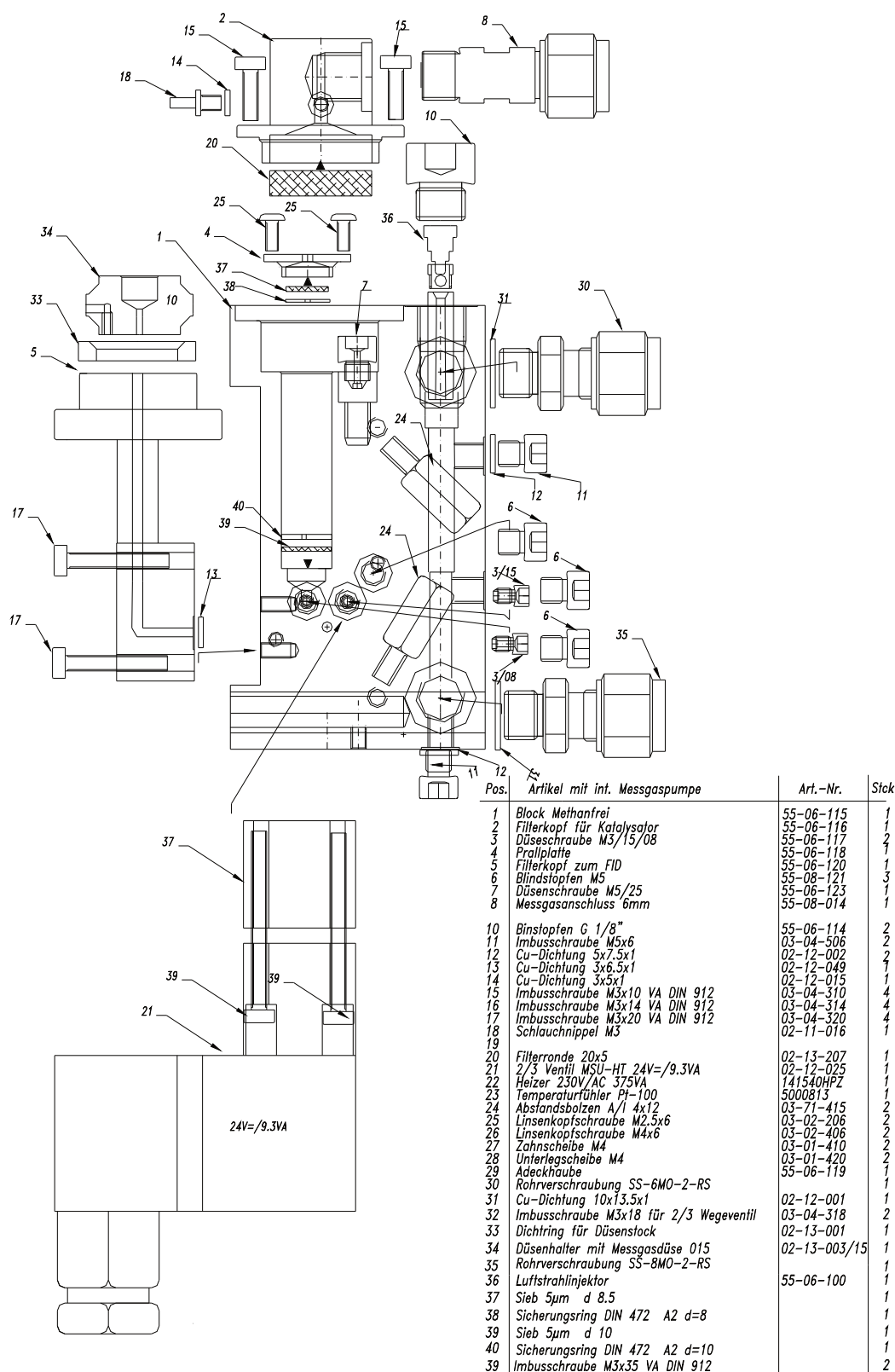


Methan non Methan with catalyst and injector

back view Thermo-FID 19" rack "ES" and table housing

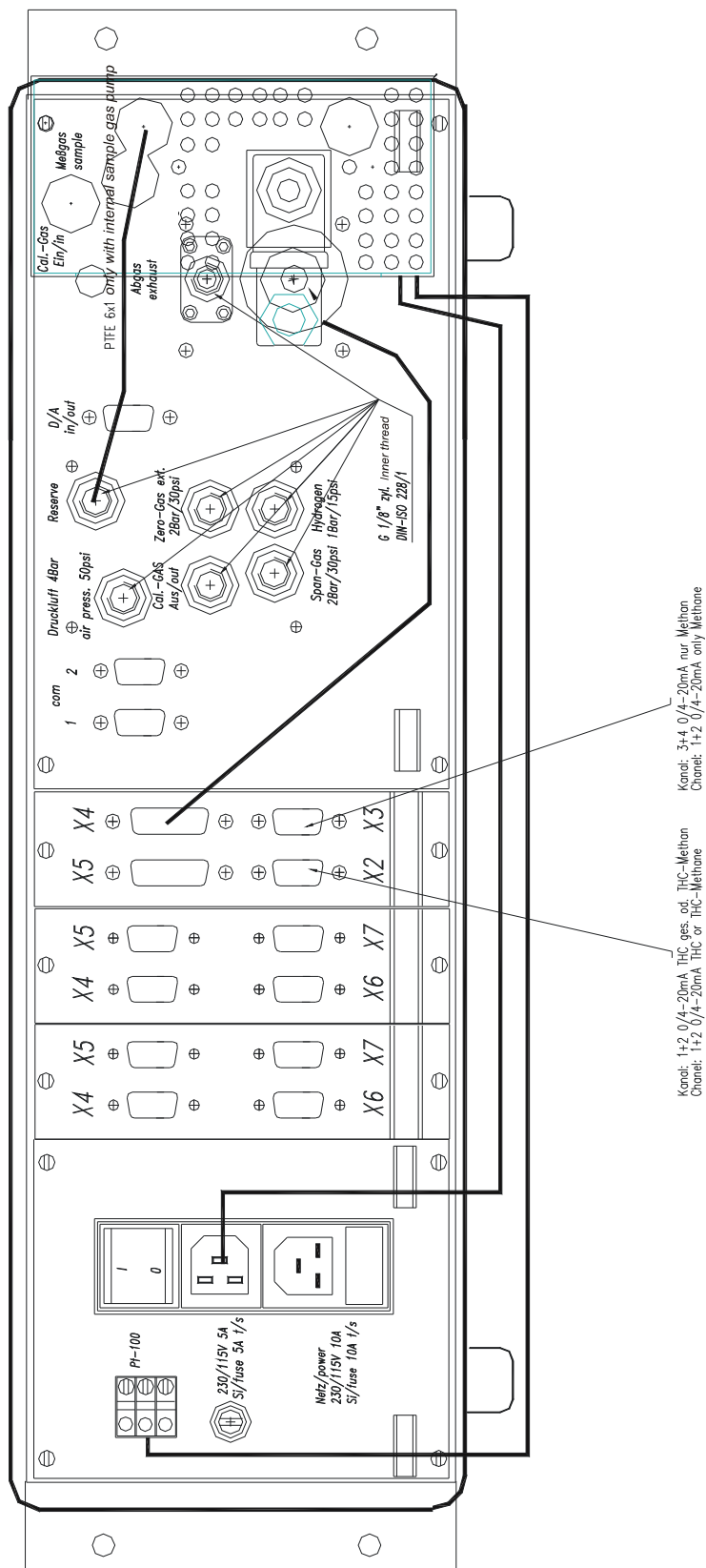


Methan non Methan with catalyst and injector

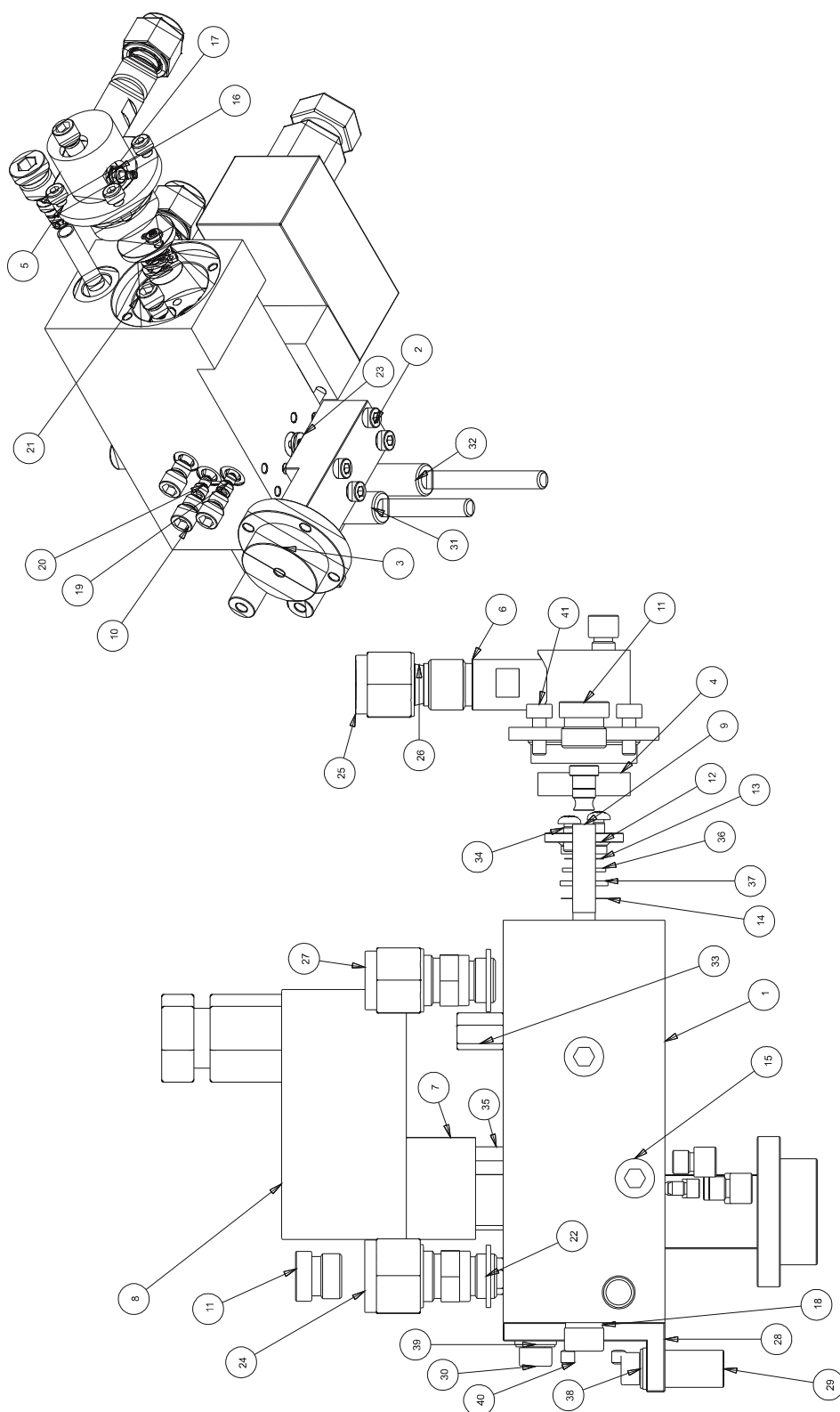


Methan non Methan catalyst with Sample pump

Back view Thermo-FID 19" rack "ES" and table housing "TG"



Methan non Methan catalyst with sample pump assembly



Übersicht methanfreier Katalysator / overview catalyst methan non methan				
Pos. Nr.	Stk.	Bezeichnung	Description	Art.Nr.
1	1	Block Methanfrei	Block non Methan	707.040076
2	4	Innensechskantschraube M3x18 DIN 912	allen M3x18 DIN 912	
3	1	Detektoranschluss Methan.k.u. Verd.-Sonde	connector cat. methan.and dil. probe	707.040077
4	1	Filterronde 5µm Standard	Filterronde 5µm standard	307.001000
5	1	Filterkopf f.Methan.k. u. Verd.-Sonde	Filterhead cat. methan.and dil. probe	707.040078
6	1	Messgasanschluss Methan.k.u. Verd.-Sonde	sample gas connector cat. methan.and dil. probe	707.040082
7	1	Distanzstück für Magnetventil	spacer for magnetic valve	707.040079
8	1	Magnetventil -HT 180 Grad	magnetic valve HT 180 degrees	407.040024
9	1	Injektor	Injector	707.040029
10	4	Blindstopfen M5x6	plug M5x6	707.040095
11	2	Verschlussschraube G 1_8 A DIN 908 A2	screw plug G 1_8 A DIN 908 A2	
12	1	Prallplatte	flapper	707.040094
13	1	Sieb D8 10µm	sieve D8 10µm	
14	1	Sieb D10 10µm	sieve D10 10µm	
15	3	DIN 912 - M5 x 6	screw DIN 912 - M5 x 6	
16	1	15871 CN-M3-PK-2	15871 CN-M3-PK-2	
17	1	CU-Dichtung 3x5x1	CU gasket 3x5x1	613.030050
18	3	CU-Dichtung 5x7.5x1	CU gasket 5x7.5x1	613.050075
19	1	Düsenhalter M3 D08	nozzle holder M3 D08	407.040096
20	1	Düsenhalter M3 D15	nozzle holder M3 D15	407.040097
21	1	Düsenhalter M5 D15	nozzle holder M5 D15	407.980046
22	2	CU-Dichtung 10x13.5x1	CU gasket 10x13.5x1	613.100135
23	1	Cu-Dichtung 3x6.5x1	Cu gasket 3x6.5x1	613.030065
24	1	Einschraubverschraubung SS-8MO-1-2RS	screw SS-8MO-1-2RS	
25	1	Überwurfmutter SS-6M2-1	nut SS-6M2-1	612.082300
26	1	Klemmring-Set-SS-6MO-SET	set of clamping ring SS-6MO-SET	612.092300
27	1	Einschraubverschraubung SS-6MO-1-2RS	screw SS-6MO-1-2RS	
28	1	Befestigungswinkel	bracket	707.040080
29	2	Abstandshülse für Befestigungswinkel	shim for bracket	707.040081
30	4	ISO 4762 - M4 x 10	ISO 4762 - M4 x 10	
31	1	Heizer 160VA für 2_3 Wegeventil	heater 160VA for 2_3 direction control valve	407.950103
32	1	PT100 für 2_3 Wegeventil	PT100 for 2_3 direction control valve	407.950104
33	2	Sechskantbolzen I_A M4x10	hex inner_outer M4x10	
34	2	BS 4183 - M2.5 x 6	BS 4183 - M2.5 x 6	
35	2	ISO 4762 - M3 x 35	ISO 4762 - M3 x 35	
36	1	DIN 472 - 9 x 0.8 Sicherungsring	DIN 472 - 9 x 0.8 circlip	
37	1	DIN 472 - 10 x 1 Sicherungsring	DIN 472 - 10 x 1 circlip	
38	4	KS B 1325 - A 4.3 Zahnscheibe	washer KS B 1325 - A 4.3	
39	4	DIN 125 - A 4.3 Unterlegscheibe	washer DIN 125 - A 4.3	
40	2	DIN 913 - M3 x 3 Gewindestift	setscrew DIN 913 - M3 x 3	
41	4	ISO 4762 - M3 x 8	ISO 4762 - M3 x 8	

Notes

