ABB MEASUREMENT & ANALYTICS | DATA SHEET

ACF5000

Multi-component FTIR emission monitoring system

ENGINEERED
TO OUTRUN



We help industries outrun – leaner and cleaner

From the pioneer in FTIR emission measurement technology

Long-term security, reliable and predictable

- Continuous measurement of the smallest limit values
- Market-leading, certified maintenance intervals of up to 12 months
- Attractive maintenance contracts with first-class service coverage
- Well-designed safety features to protect the system

Maximum flexibility and easy integration

- Measurement of 15+ components, including HF, HCl, NH_3, VOCs and formaldehyde
- Future-proof, digital interfaces for integration into existing systems
- Fully pre-configured system with a small footprint and modular design
- Integration, display and forwarding of signals from other measuring devices

Low operating, maintenance and installation costs

- QAL3: Automatic sensitivity drift test without test gas
- Air-driven injector pump, no moving parts, low condensate accumulation
- Low fuel gas consumption of the VOC module

User-friendly with optional remote maintenance

- Plain-text status messages and a simple user interface on a large display
- Access-controlled remote maintenance for service purposes via Ethernet or mobile network
- Comprehensive system diagnostics using a secure dynamic QR code

Certified as a matter of course

- Certified according to EN 15267 and EN 14181 by TÜV and MCERTs
- Compliant with US EPA specifications

Overview

Introduction

Due to increased requirements and expanded regulations in environmental protection, an increasing number of pollutants in ever-lower concentrations must be measured in combustion processes. Therefore, for long-term use, the analysis system should be able to cover measurement ranges below the legally required limits.

ABB is the world market leader in flue gas monitoring systems and has been a pioneer in FTIR technology for decades. With the ACF5000 multi-component analysis system for emission measurement, ABB offers an optimal solution for the long-term monitoring of even the smallest limit values.

ABB FTIR spectrometers have proven themselves in process plants due to their robustness, as their measurement technology features a very high degree of accuracy, selectivity and reliability. The FTIR measuring principle of the spectrometer forms the basis for drift-free operation and long adjustment intervals; this eliminates the need for expensive storage of hazardous and toxic test gases.

The analysis system adapts to future requirements, as the measurement can be expanded to include additional infrared-active components with software support.

The heated sampling and sample preparation system, as well as the heated measuring cell, enable the measurement of water vapor and pollutants, such as, HCl, NH_3, and HF, with the lowest detection limits.

The supply of the sample gas is provided by an electronically controlled air jet injector, which draws the gas into the measuring cell by using negative pressure. This dilutes the sample gas at the outlet of the measuring cell, reduces the amount of condensate produced and makes waste gas disposal safer. Since this sampling method operates without moving parts, maintenance costs are reduced while system availability and safety are enhanced.

Application area

- Municipal waste incinerators
- Sewage sludge incineration plants
- Hazardous waste incinerators in chemical plants
- Combustion-related processes
- Cement kilns
- Solvent recovery and destruction
- Denitrification and desulphurization in power plants
- Crematoriums
- Steel and aluminum smelters
- Brick, tiles and glass manufacturing
- Catalyst protection monitoring
- Research into combustion processes

System variants

The ACF5000 system variant depends on the measuring ranges specified when ordering.
System variants can be distinguished by their name plates.
Both variants use the sample gas line TBL01 and the probe tube Type 40, or optionally the heated probe tube Type 42.

System variant ACF5000 LCS
The ACF5000 LCS variant is characterized by its market-leading small measuring ranges. They make reliable and future-proof monitoring of the smallest limit values possible.

Even slight fluctuations in the ambient parameters can lead to undesirable deviations in the measurement at these levels.

Equipment:
- Standard control cabinet cooling unit for control cabinet air conditioning independent of ambient temperature.
- Filter unit GAC125 optimized for measuring the smallest concentrations.
- Certified for emission measurement within the European Union.

System variant ACF5000 (standard variant)
The standard variant has higher measuring range limits.

Equipment:
- Standard control cabinet fan for control cabinet air conditioning.
- Control cabinet cooling unit optionally available.
- Filter unit PFE2

… Overview

Assemblies

Gas sampling

NOTICE

Damage to components
For measurement gas extraction, only the assemblies specified by ABB may be used, as both the temperature controls and the securing functions are aligned to this.

- Stainless steel probe tube, unheated (Type 40) or heated (Type 42)
- Depending on the system variant, depending on the configured measuring ranges:
  - Standard: Filter unit, heated (Type PFE2), with non-return valve, with back-purging (option)
  - Smallest measuring ranges: Filter unit, heated (Type GAC125), with non-return valve, with back-purging
- Sample gas line, heated (Type TBL01)

Sample gas conditioning

- Sample gas conditioning block (ASP block), heated, with stainless steel microfilter and air jet injector
- Automatic purge and sample gas switching
- Flow rate, pressure and temperature sensors

Analyzer modules

- FTIR spectrometer with heated measuring cell
- Oxygen sensor (ZrO_2sensor)
- Flame ionization detector (FID, optional) for measuring the total carbon content (VOC)

Control, operation and display

- LCD display in the door of the analyzer cabinet
- AO2000 System controller in the door of the analyzer cabinet
- ACF5000 Electronics box AU1
- Controller for the air jet injector as well as the oxygen sensor and FID
- Interfaces for
  - Measured values and status signals (Standard: Ethernet with TCP/IP protocol and Modbus® TCP/IP protocol; options: Modbus, PROFIBUS®, analog and digital outputs, analog and digital inputs)
  - Remote control and diagnosis (mobile network and/or Ethernet)

Air purifier

- Zero gas (air) for the spectrometer and reference gas for the oxygen sensor and combustion air for the FID
- Purge gas for the FTIR spectrometer and the entire measuring system

Operation

The operation of the analyzer system is controlled fully automatically by the system controller:

- Visualization of all measurement results and status messages
- Manual operation of the system during commissioning and maintenance
- Remote diagnostics via Ethernet (LAN) or mobile network connection
- Self-diagnosis of the FTIR spectrometer with archiving of status signals and measurement data
- Optional automatic correction for dry/wet and comparative measurements (fixed O_2 value)

The FTIR measurement results are updated approximately every 30 s.

The system controller continuously monitors temperature, pressure and gas flow. This ensures reliability, accurate measurements and automatic correction.

If the permissible temperatures of a heated assembly are fallen short of, it is purged with clean air. All components in contact with the measuring gas are thus effectively protected from condensation.

The analyzer system can be connected to the company network via an Ethernet interface to transmit the measured values and status signals. The data can be read using the AnalyzeIT Explorer or AO OPC Server software tools.

The system time can be synchronized with a reference time using AnalyzeIT Explorer.

The mobile network connection allows the ABB service (after approval by the client) access for the purpose of remote diagnostics and scheduled preventive maintenance. This ensures maximum system availability.

Adjustment

All FTIR device-dependent factors are taken into account during the daily automatic recording of the reference spectrum.

Since the absorption spectra are absolute and do not drift, the zero point and sensitivity correction can be carried out using zero point gas only.

N_2 is used for the zero point adjustment of the VOC analyzer. 3 % O_2 is used for the zero point adjustment of the oxygen sensor.

To check the calibration manually, test gases and water vapor are simply applied to the measuring cell or sampling system in accordance with international requirements.

Validation unit for automatic testing of sensitivity drift without test gases

The analyzer system can optionally be equipped with a validation unit.

Using reference media that can be swiveled into the beam path, spectral absorptions specific to the measurement component can be generated (e.g. for HCl) - thus the validation unit can be used for precision or drift monitoring, e.g. as part of a QAL3 procedure or another drift monitoring method.

Since this method requires no test gases for the FTIR spectrometer during normal operation,this significantly reduces gas requirements and the associated logistics, including procurement costs.

Hydrogen monitoring of the analyzer cabinet (optional)

Function

If an FID (VOC Analyzer) is installed, the analyzer system can be supplied with the ‘Hydrogen monitoring of the analyzer cabinet’ option as an additional safety measure.

If a leak occurs in the hydrogen path inside the analyzer cabinet and hydrogen accumulates inside the cabinet, both the hydrogen supply and the power supply will be shut off before the explosion limit is reached – for example, 40 % of the lower explosion level (LEL). This ensures that no ignitable mixture can form.

Scope of delivery

The following components are installed in the analyzer cabinet:

- An ATEX-certified gas sensor with connection socket in the upper area.
- A solenoid valve on the outside of the right-hand side panel, which interrupts the hydrogen supply if the power supply fails or if a set limit value for the hydrogen concentration is exceeded (H_2safety valve). The solenoid valve is connected to the combustion gas inlet of the analyzer cabinet.

The following is additionally supplied:

- A gas warning system for evaluating the gas sensor signal,
- A contactor for disconnecting the power supply to the analyzer cabinet,
- A contactor for disconnecting the UPS if the system is prepared for a UPS.
- Instructions and further documentation for the gas sensor and the manufacturer's gas warning system.

… Overview

Approvals

- Approval as continuous emission measuring device according to EN 15267 parts 1 to 3 and EN 14181.
- The maintenance interval depends on the system variant:
  - Standard variant: Maintenance interval up to 12 months (MCERTS) or up to 6 months (TÜV).
  - ACF5000 LCS variant: Maintenance interval 3 months, for measuring total carbon content: 4 weeks.
- The internal validation unit (part of the approval) can be used as an alternative to separate test gas cylinders.
- Suitable for measurement tasks according to European Directives such as 2010/75/EC, 2000/76/EC, 2001/80/EC and quality assurance according to EN 14181
- The current certificates regarding product conformity are available at www.qal1.de/de/index.htm and www.csagroupuk.org/services/mcerts/mcerts-product-certification/mcerts-certified-products/.
- Compliance with US EPA 40 CFR 60 and US EPA 40 CFR 75

Specification

ACF5000 LCS

System variant with smallest measuring ranges for continuous emission measurement according to EN 15267.

Equipment:

- Standard control cabinet cooling unit for control cabinet air conditioning independent of ambient temperature.
- Filter unit GAC125 optimized for measuring the smallest concentrations.
- Certified for emission measurement within the European Union.

Sample components and measurement ranges

Note

The concentrations given in mg/m³ are decisive. Values in ppm are for orientation purposes only.

Sample components	Smallest measuring ranges	
FTIR spectrometer*		
H_2O	0 to 40 Vol.-%	
CO_2	0 to 30 Vol.-%	
CO	0 to 15 mg/m³	0 to 12 ppm
NO	0 to 50 mg/m³	0 to 38 ppm
NO_2	0 to 60 mg/m³	0 to 30 ppm
N_2O	0 to 50 mg/m³	0 to 25 ppm
SO_2	0 to 7.5 mg/m³	0 to 3 ppm
NH_3	0 to 3 mg/m³	0 to 4 ppm
HCl	0 to 3 mg/m³	0 to 2 ppm
HF	0 to 1.35 mg/m³	0 to 1.5 ppm
CH_4	0 to 5 mg/m³	0 to 7 ppm
CH_2O	0 to 12.5 mg/m³	0 to 9 ppm
VOC**	0 to 30 mg/m³	0 to 56 ppm
VOC analyzer (FID)		
VOC	0 to 15 mg/m³	0 to 28 ppm
Oxygen analyzer		
O_2	0 to 25 Vol.-%	

* The data for the FTIR spectrometer is based on an optical path length of 3.2 m.

** VOCs measured with the FTIR spectrometer (for process measurements only) consist of the representative organic compounds of methane ((CH_4), ethane (C_2H_6), propane (C_3H_8), benzene (C_6H_6), toluene (C_7H_8) and dichloromethane (CH_2Cl_2).

Measurement ranges should not be set within ignition limits. Additional sample components and measuring ranges on request.

Measuring range switching ratio

≤ 1:5

Extended measurement range switching ratios are available upon request.

Stability and influence effects

For small measuring ranges according to EN 15267 using the recommended system settings.

Cross sensitivity

≤ 4 % of span

Linearity error

≤ 2 % of span

Zero drift

is automatically corrected

Span drift

≤ 3 % in the maintenance interval

Response time T_{90} (Analysis system)

T_{90} ≤ 200 s, T_{90} ≤ 400 s for HCl, NH_3 and HF

Influence of changes in ambient temperature

< ±5 % of the measuring range per 10 K

Air pressure effect

none (automatically corrected by internal pressure compensation)

Detection limit (2σ)

≤ 2 % of measurement range

… Specification

ACF5000

Standard version with control cabinet fan or optional control cabinet air conditioning unit. For measurements according to EN 15267, this must be operated with the filter device of type PFE2.

Sample components and measurement ranges

Note
The concentrations given in mg/m³ are decisive. Values in ppm are for orientation purposes only.

Sample components	Smallest measuring ranges	
FTIR spectrometer*		
H_2O	0 to 40 Vol.-%	
CO_2	0 to 30 Vol.-%	
CO	0 to 75 mg/m³	0 to 60 ppm
NO	0 to 150 mg/m³	0 to 110 ppm
NO_2	0 to 80 mg/m³	0 to 40 ppm
N_2O	0 to 50 mg/m³	0 to 25 ppm
SO_2	0 to 75 mg/m³	0 to 25 ppm
NH_3	0 to 5 mg/m³	0 to 7 ppm
HCl	0 to 15 mg/m³	0 to 10 ppm
HF	0 to 3 mg/m³	0 to 3 ppm
CH_4	0 to 7.5 mg/m³	0 to 10 ppm
CH_2O	0 to 20 mg/m³	0 to 15 ppm
VOC**	0 to 30 mg/m³	0 to 56 ppm
VOC analyzer (FID)		
VOC	0 to 15 mg/m³	0 to 28 ppm
Oxygen analyzer		
O_2	0 to 25 Vol.-%	

* The data for the FTIR spectrometer is based on an optical path length of 3.2 m.

** VOCs measured with the FTIR spectrometer (only for process measurements) consist of the following organic compounds: methane (CH_4), ethane (C_2H_6), propane (C_3H_8), benzene (C_6H_6), toluene (C_7H_8) and dichloromethane (CH_2Cl_2).

Measurement ranges should not be set within ignition limits. Additional sample components and measuring ranges on request.

Measuring range switching ratio
≤ 1:5

Extended measurement range switching ratios are available upon request.

Stability and influence effects
For small measuring ranges according to EN 15267 using the recommended system settings.

Cross sensitivity
≤ 4 % of span

Linearity error
≤ 2 % of span

Zero drift
is automatically corrected

Span drift
≤ 3 % in the maintenance interval

Response time T_{90} (Analysis system)
T_{90} ≤ 200 s, T_{90} ≤ 400 s for HCl, NH_3 and HF

Influence of changes in ambient temperature
< ±5 % of the measuring range per 10 K

Air pressure effect
none (automatically corrected by internal pressure compensation)

Detection limit (2σ)
≤ 2 % of measurement range

System design

Version

Freestanding sheet steel cabinet, depending on the system variant with control cabinet fan or air conditioning unit.

Dimensions

Refer to **Dimensions** on page 14.

Weights

Part / component		Weight
Analyzer cabinet		Approx. 300 kg (661.4 lb)
Type 40 probe tube (unheated) depends on length	500 mm (19.7 in)	1 kg (2.2 lb)
	1000 mm (39.4 in)	2 kg (4.4 lb)
	1500 mm (59.1 in)	3 kg (6.6 lb)
	2000 mm (78.7 in)	4 kg (8.8 lb)
	2500 mm (98.4 in)	5 kg (11.0 lb)
Type 42 probe tube (heated) depends on length	1000 mm (39.4 in)	8 kg (17.6 lb)
	1500 mm (59.1 in)	10 kg (22.0 lb)
	2000 mm (78.7 in)	12 kg (26.5 lb)
Heated filter unit with protective box		
Type PFE2		20 kg (44.1 lb)
Type GAC125		16 kg (35.3 lb)
Type TBL01 sample gas line, heated		1 kg/m (2.2 lb/m)
System transformer from 100 V to 230 V (optional)		42 kg (92.6 lb)

Color

Light gray (RAL 7035)

Input, output and status signals

Measurement signals

Output via Ethernet or Modbus TCP® (analog and digital outputs, Modbus® and PROFIBUS® as an option).

Status Signals

The output and status signals of the measured values, the sample gas supply and conditioning system and the measuring mode are displayed on the display and control unit. Status signals: System failure, function check, maintenance request.

Additional status information for the option with analog and digital outputs: O_2 analyzer failure, FID/ASP block failure, FTIR spectrometer failure. Digital relay outputs: Potential-free contacts, open in de-energized state (fail safe).

Input signals

Analog and digital signals as an option.

Gas connections

Sample gas inlet

Special bushing for the heated sample gas line in the right-hand cabinet wall; screw connection on the ASP block for heated sample gas line TBL01-S (6/8 × 1 mm)

Sample gas outlet

Bulkhead fitting (stainless steel) for 12 mm tube

Test gases

Bulkhead fittings (PTFE) for 4/6 × 1 mm hose

Instrument air

Connection to the injector pump and the compressed air cleaning unit via bulkhead fitting (stainless steel) for 6 mm tube

Combustion gas for the FID

Bulkhead fitting (stainless steel) with flow restrictor (max. 10 l/h H_2) for 4/6 × 1 mm (option if an FID is installed in the analyzer system)

… Specification

Power supply

Main power supply

Input voltage	• 230/400 V AC, ±10 %, 3 phases* or • 120/208 V AC, ±10 %, 3 phases* or • 100/200 V AC, ±10 %, 3 phases (via transformer, on request)
Fuse (external)	3 × 20 A or 3 × 25 A
Line Frequency Range	50 to 60 Hz, ±2 Hz

* L1, L2, L3, N, PE, current-carrying neutral is not allowed.

Power

Module	Power consumption
Analyzer	approx. 2200 VA when switching on approx. 1500 VA when in operation
Heated probe tube, Type 42	
600 mm (23.6 in)	+ approx. 600 VA
1000 mm (39.4 in)	+ approx. 800 VA
1500 mm (59.1 in)	+ approx. 1200 VA
2000 mm (78.7 in)	+ approx. 1500 VA
Heated filter unit	
PFE2	+ approx. 250 VA
GAC125	+ approx. 800 VA
Heated sample gas line	+ approx. 90 VA/m
Cooling unit (optional, depending on system variant)	+ approx. 1000 VA

Leakage current

A leakage current of ≥ 9 mA can occur in the analyzer system during operation.

Uninterruptible power supply UPS

The option ‘prepared for UPS’ is not possible in the case of a 100 V AC power supply.

Input voltage	• 230 V AC, 1 phase* or • 120 V AC, 1 phase*
Fuse (external)	20 A
Power consumption	approx. 500 VA (incorporated into above values)
Line Frequency Range	50 to 60 Hz, ±2 Hz

* L, N, PE, current-carrying neutral is not allowed.

Service socket

230 V AC (socket type: F, CEE 7-3) or 120 V AC (socket type: B, NEMA 5-15R), 48 to 62 Hz, max. 5 A.

The service socket is located near the cabinet light fixture.

Safety

In accordance with EN 61010-1

Overvoltage category

II

Pollution degree

2

Ambient conditions

Transport- / Storage temperature

−25 to 65 °C (−13 to 149 °F)

Ambient temperature during operation

- With built-in fan (optional):
  5 to 30 °C (41 to 86 °F)
- With an integrated cooling unit
  (optional, depending on the system variant):
  5 to 45 °C (41 to 113 °F)

Relative humidity

- annual average max. 75%
- short-term: max. 95 %

Seldom and slight condensation permissible if the analyzer system is switched on and the FTIR spectrometer is purged.

IP rating

Analyzer cabinet: IP54

Requirements for the installation site

The analyzer system is intended for indoor installation only. The analyzer system must be protected from direct heat radiation, heavy dust exposure, corrosive atmospheres and vibrations.

Installation site altitude max. 720 m above sea level in accordance with EN 15267 (with length of sample gas line including probe = 60 m); greater heights on request.

Minimum distances when installing the analyzer cabinet:

Cabinet side	Minimum distance	
to the right	0.5 m (1.6 ft)	for the gas lines and the electrical lines as well as for air entry into the fan (option)
to the left	0.5 m (1.6 ft)	for air discharge from the fan (optional) or
	1 m (3.3 ft)	for the air conditioner (option)
at the front	1 m (3.3 ft)	for opening the door (hinged on the left)
above	0.5 m (1.6 ft)	

Sample gas inlet conditions

⚠ DANGER

Explosion hazard

Explosion hazard when measuring ignitable gas / air or gas / oxygen mixtures

- The gas analyzer may not be used for the measurement of ignitable gas / air or gas / oxygen mixtures
- The operator must ensure that the gas analyzer is only operated with a sample gas mixture in which the concentration of flammable sample gas is below the lower explosion limit (LEL).

ACF5000 – sample gas input conditions	
Temperature	
Controlled to 180 °C, ±2 °C by means of the heated sample gas line	
Pressure	
Permissible absolute pressure range:	Analyzer cabinet inlet leading to the sample gas handling block: 900 to 1100 hPa (0.9 to 1.1 bar)
Flow rate	80 to 300 l/h

Corrosive gases

- The analyzer module must not be used for the measurement of gases containing organometallic compounds, e.g. lead-containing fuel additives or silicone oils.
- If the analyzer system is used to measure HF, the seals in contact with the sample gas must be made of FFKM. This also applies in particular to the gas sampling probe including filter and the sample gas line, which may be supplied separately.

Note

The seals in the analyzer system that come into contact with the sample gas are generally made of FFKM.

… Specification

Operating gases and test gases

FTIR spectrometer

Test gases

Test gases for zero point adjustment	
Quality	Clean compressed air from the air purifier
Inlet pressure p_e	2000 hPa ±100 hPa (2.0 bar ±0.1 bar)
Flow rate	maximum 500 l/h

Test gases for span point adjustment	
Quality	Measuring component in N_2, 70 to 80 % of the measuring range (accuracy ±2 %)
Inlet pressure p_e	1500 hPa ±100 hPa (1.5 bar ±0.1 bar)
Flow rate	max. 500 l/h

Note

The test gases H_2O, HCl, HF and NH_3 are produced by a vapor generator through vaporization of distilled water, HCl, HF, or NH_3 solutions with known concentrations.

FID – Flame ionization detector (option)

Combustion air

Clean compressed air from the air purifier is used as combustion air.

Combustion gas

Combustion gas parameter	
Quality	Hydrogen (H_2), Quality 5.0
Inlet pressure p_e	1200 hPa, ±100 hPa (1.2 bar, ±0.1 bar)
Maximum combustion gas flow	approx. 4 l/h

Note

Provide two 40-l bottles and a selector station.
A flow restrictor that limits the combustion gas flow rate to 10 l/h is installed in the bulkhead fitting for connection of the combustion gas line.

Test gases

Test gases for zero point adjustment	
Quality	Nitrogen (N_2), quality 5.0
Inlet pressure p_e	1500 hPa ±100 hPa (1.5 bar ±0.1 bar)
Flow rate	maximum 500 l/h

Test gases for span point adjustment	
Quality	n-propane C_3H_8 in N_2, 70 to 80% of the measuring range (accuracy ±2%)
Inlet pressure p_e	1500 hPa ±100 hPa (1.5 bar ±0.1 bar)
Flow rate	max. 500 l/h

Note

Since the FID analyzer measures only the number of C atoms, the concentration of the end point gas must be converted from ppm or mg/m³ C_nH_m into ppm or mg/m³ C.

Oxygen sensor

Test gases

Test gases for zero point adjustment	
Quality	3 vol.% O_2 in N_2 (accuracy ±2%)
Inlet pressure p_e	1500 hPa ±100 hPa (1.5 bar ±0.1 bar)
Flow rate	maximum 500 l/h

Test gases for span point adjustment	
Quality	Clean compressed air (20.96 vol. % O_2) from the air purifier
Inlet pressure p_e	1500 hPa ±100 hPa (1.5 bar ±0.1 bar)
Flow rate	maximum 500 l/h

Instrument air

Parameter	**Value/Description**
Quality	According to ISO 8573-1 Class 2 Particle size: max. 1 to 5 µm, Particle density: max. 10 particles/m^3, Oil content: max. 0.1 mg/m^3, Dew point: max. vapor pressure dew point −40 °C
Inlet pressure p_e	5500 to 7000 hPa (5.5 to 7.0 bar)
Temperature	Maximum 40 °C
Flow rate	In normal mode 3000 to 3800 l/h, during adjustment briefly up to 5000 l/h

Notices on instrument air supply

- We recommend you set up a separate network for the instrument air supply, separate from the regular compressed air supply.
- Install a pressure controller and a shut-off valve in the instrument air connection lead as close as possible to the installation site of the analyzer cabinet.
- If filters and dryers are used because of the residual moisture and the oil as well as particle content in the instrument air, membrane dryers should be used. These ensure a constant O_2 and CO_2 content at the output and therefore offer ideal conditions for accurate measurements.

Compressed air for back-purging of the gas sampling probe

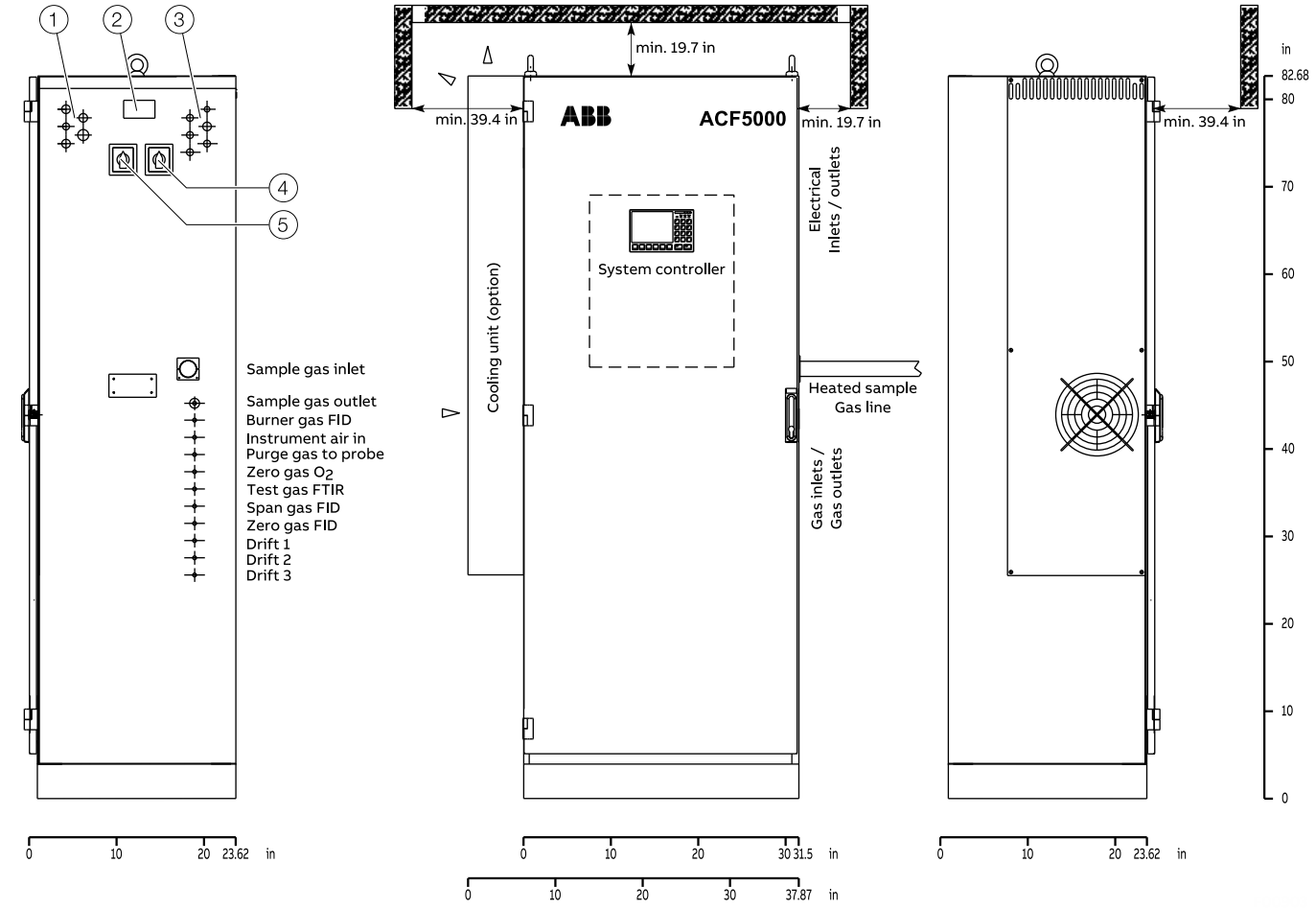
(optional, with filter unit PFE2)

Compressed air is needed to clean the sampling filter and the probe tube as well as for controlling the control valves.

Parameter	**Value/Description**
Quality	Instrument air
Inlet pressure p_e	maximum 6 bar for back-purge, approx. 4 bar as control air (needed for 2-stage back-purge with type PFE2 filter unit and with FID)
Flow rate	approx. 1600 l/min (duration of the back-purge process approx. 45 seconds)

Drawings

Dimensions



1. Cable glands Signals
2. Bus signals
3. Cable glands Power supply
4. UPS main switch
5. Power supply main switch

Figure 1: Dimensions ACF5000

Interior view

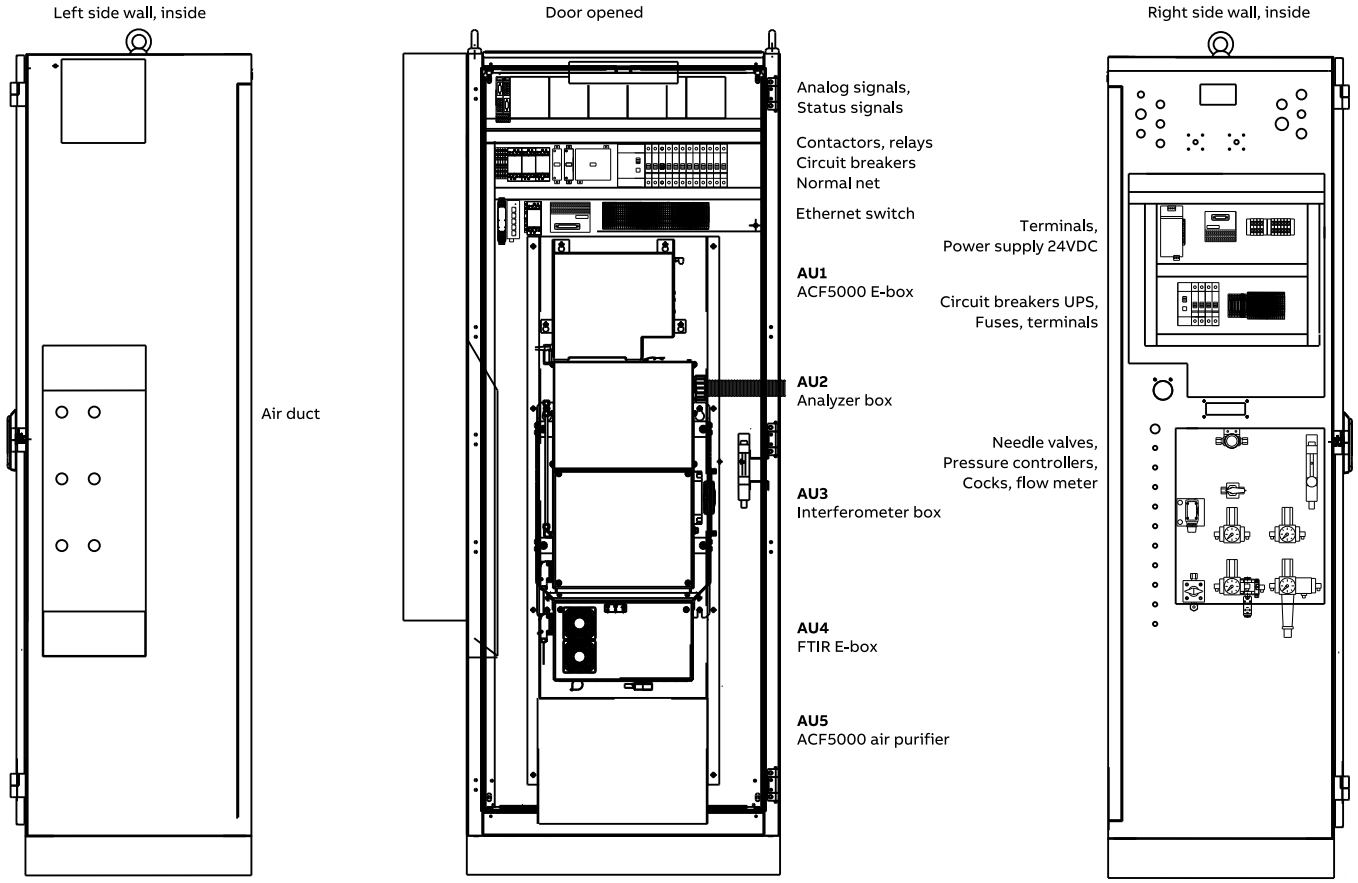


Figure 2: Interior view ACF5000

… Drawings

Pneumatic diagram

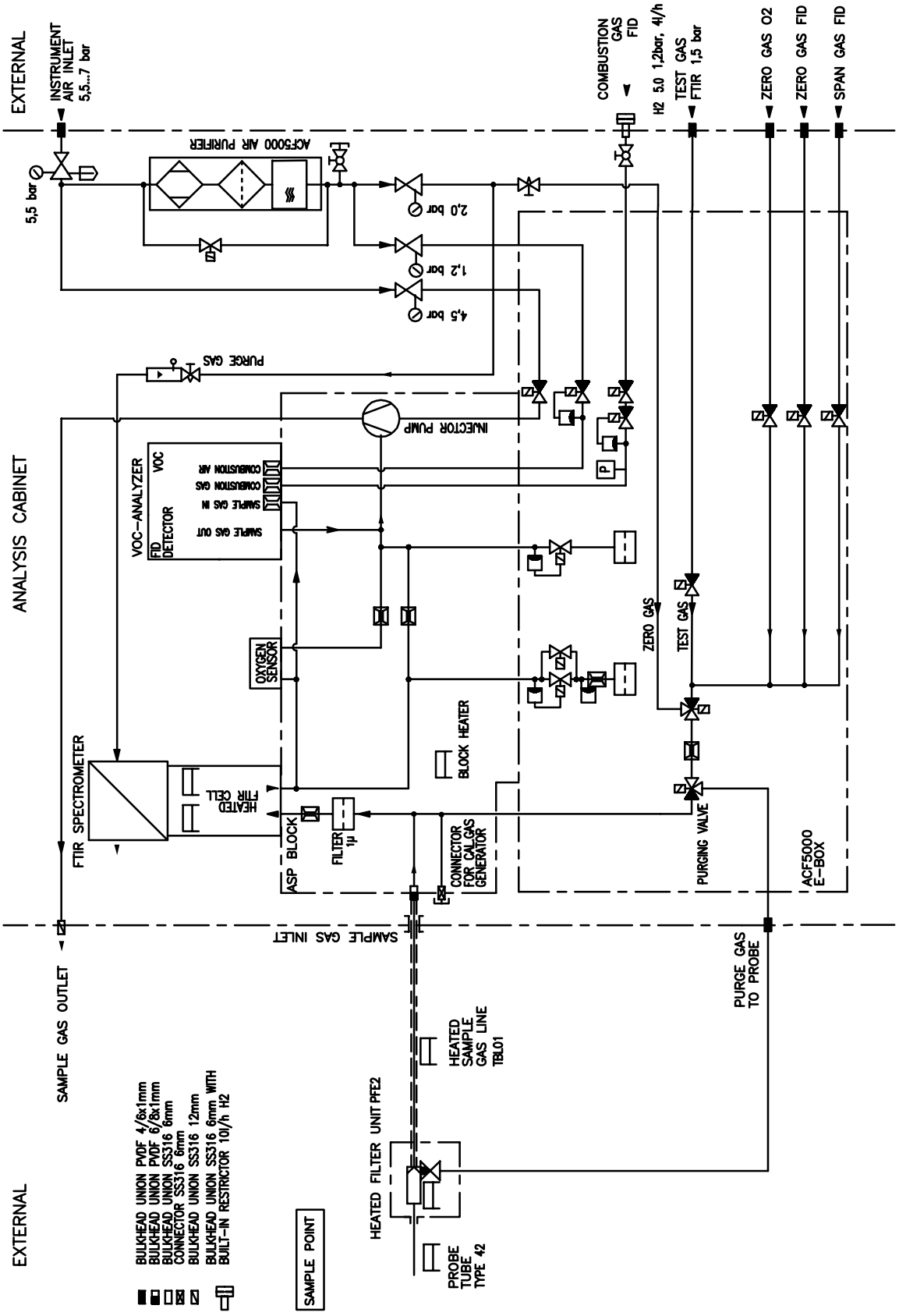


Figure 3: Pneumatic diagram, CE version

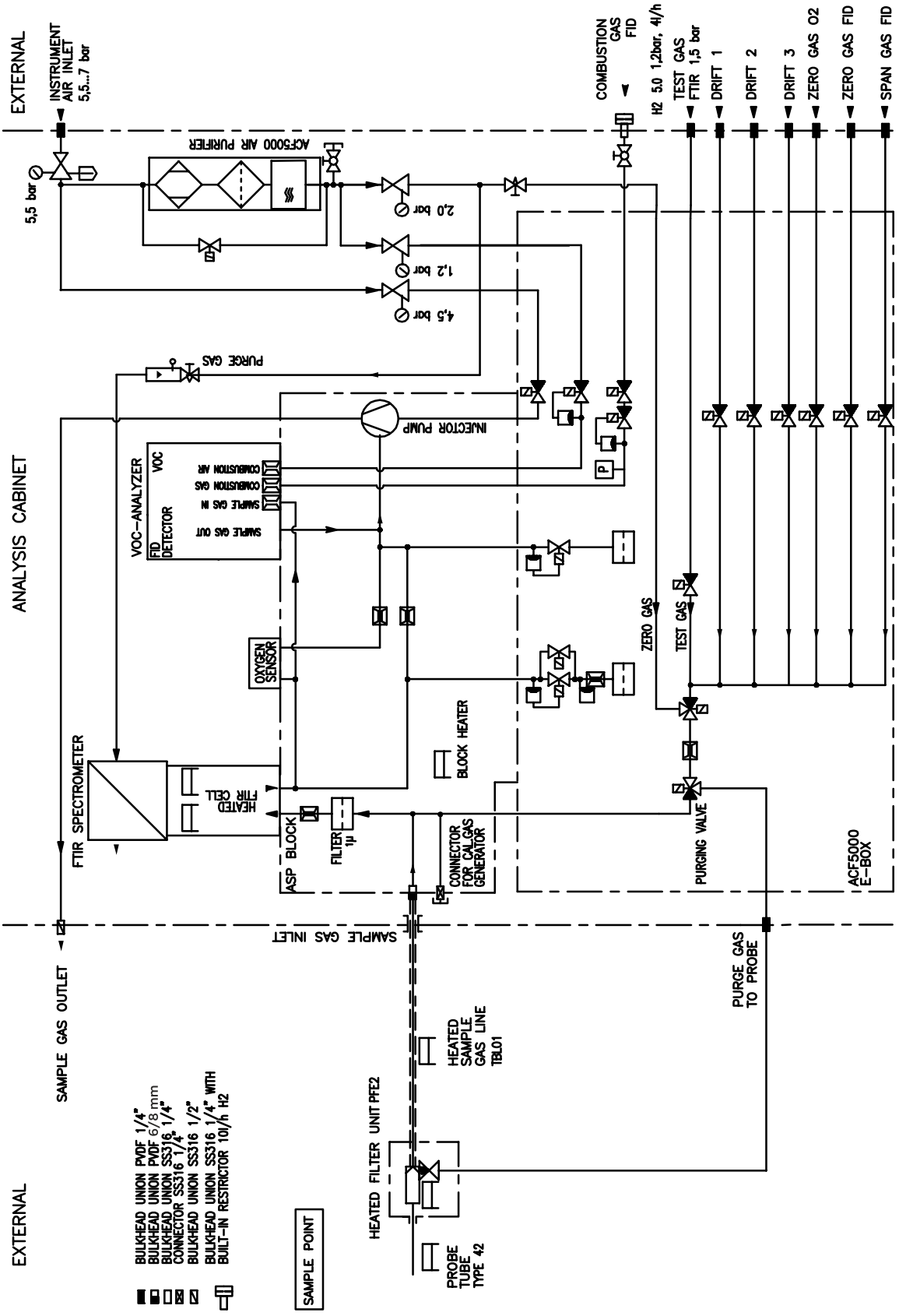


Figure 4: Pneumatic diagram, CSA version

Electrical connections

Power supply – CE version

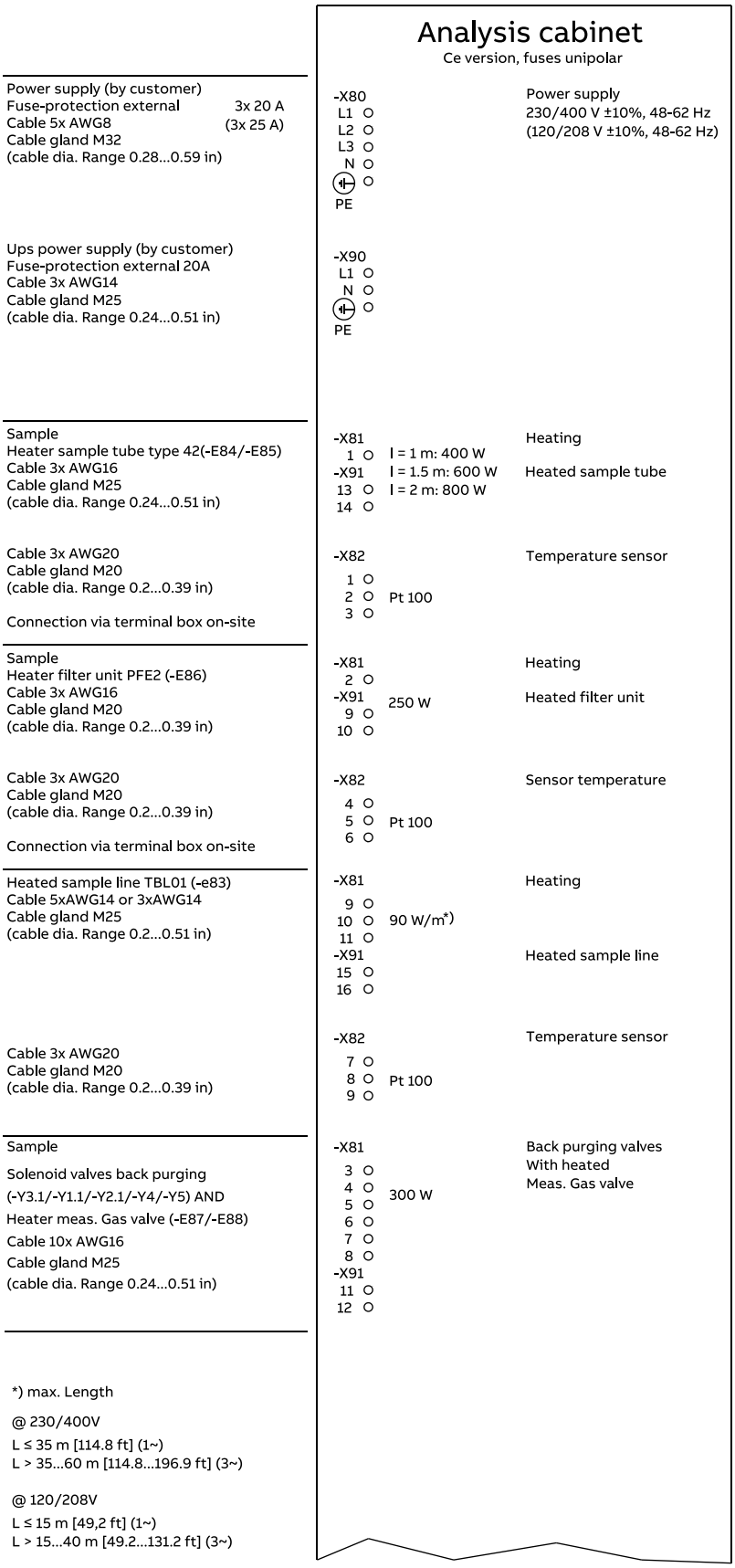


Figure 5: Power supply, CE version

Power supply – CSA version

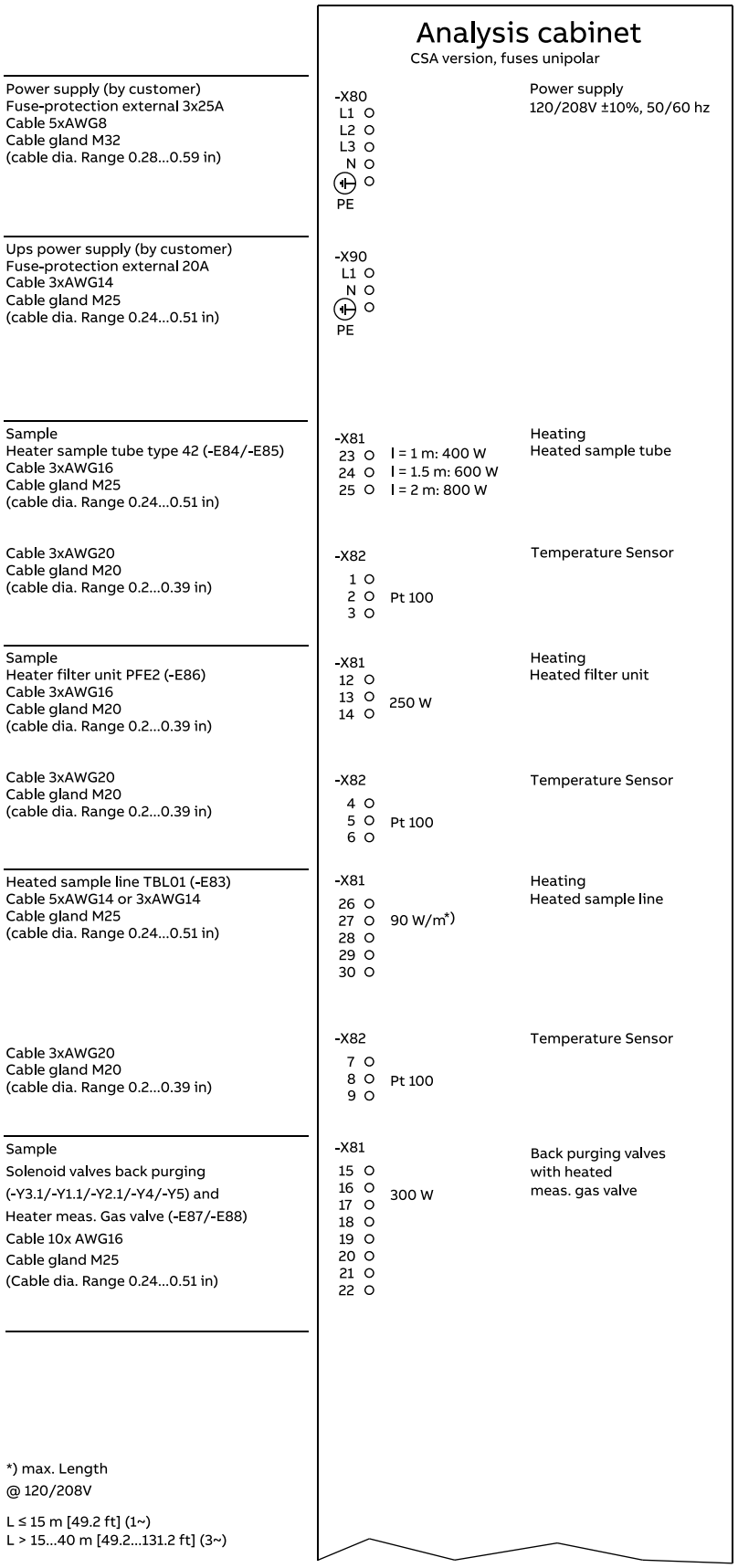


Figure 6: Power supply, CSA version

… Electrical connections

Input, output and status signals

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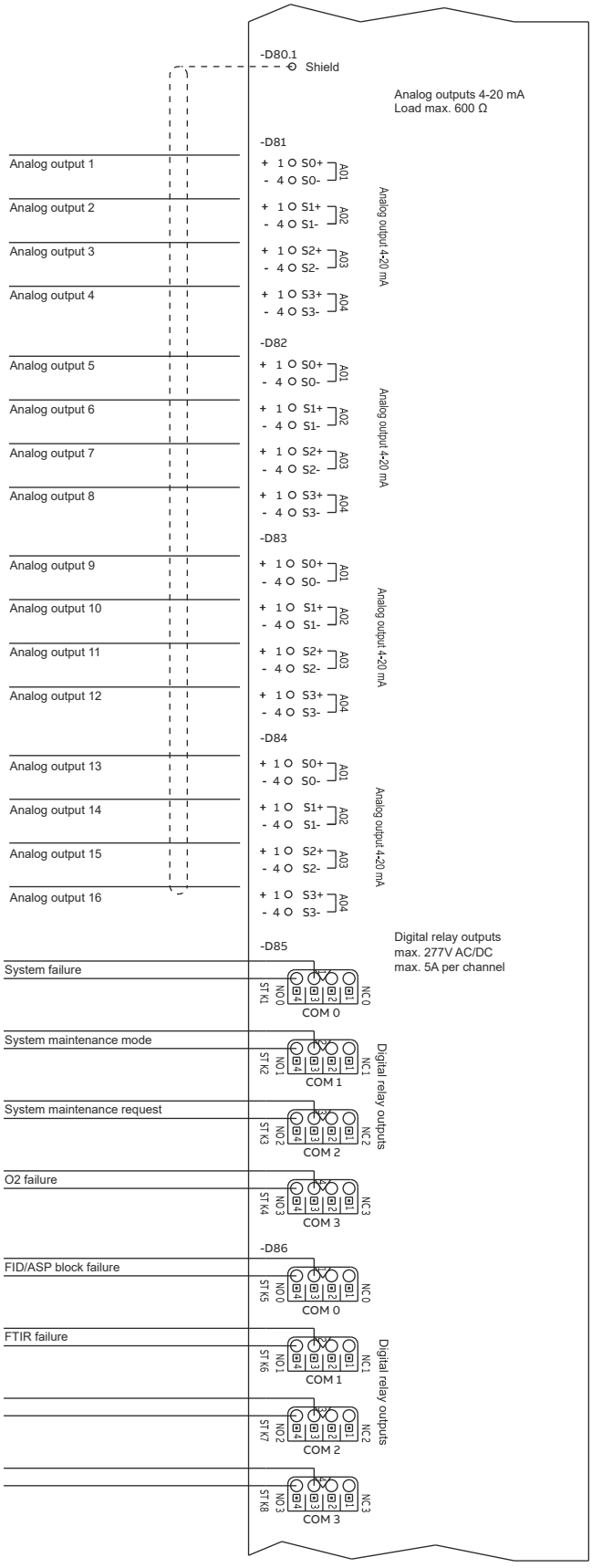


Figure 7: Input, output and status signals

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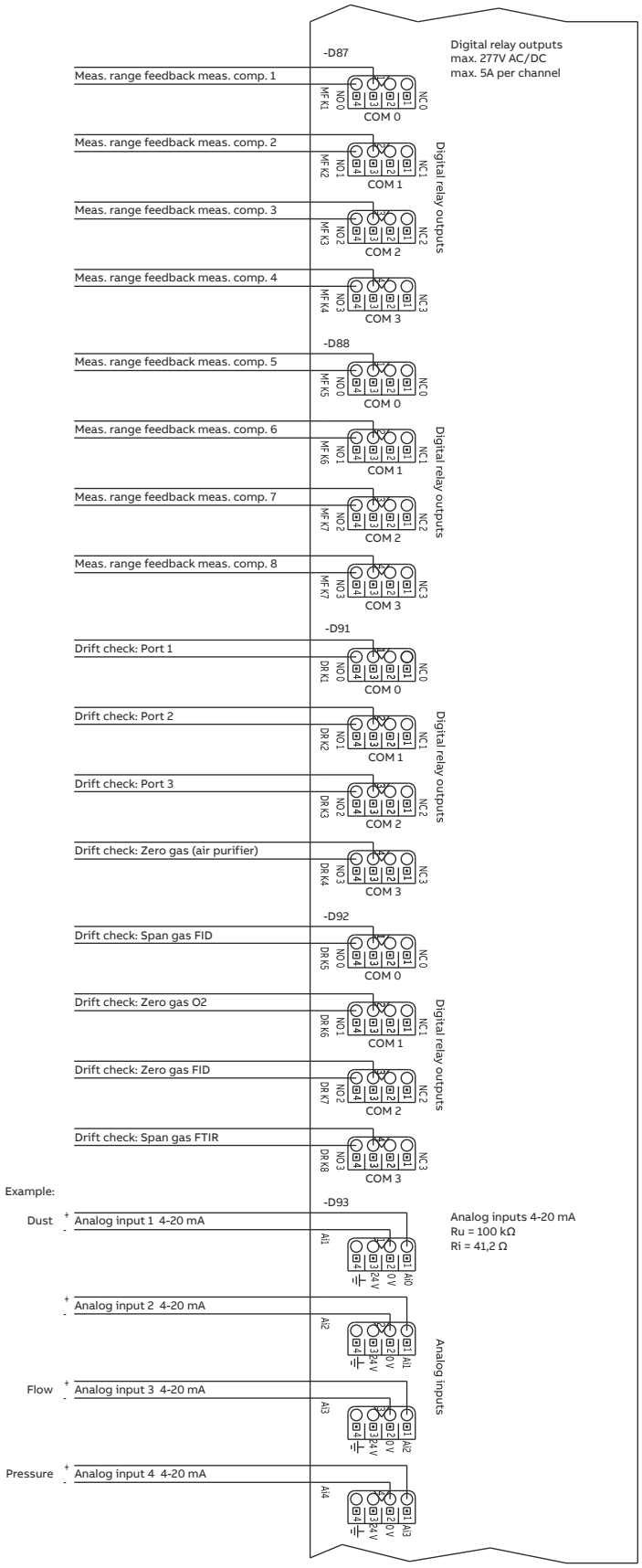


Figure 8: Input, output and status signals

… Electrical connections

… Input, output and status signals

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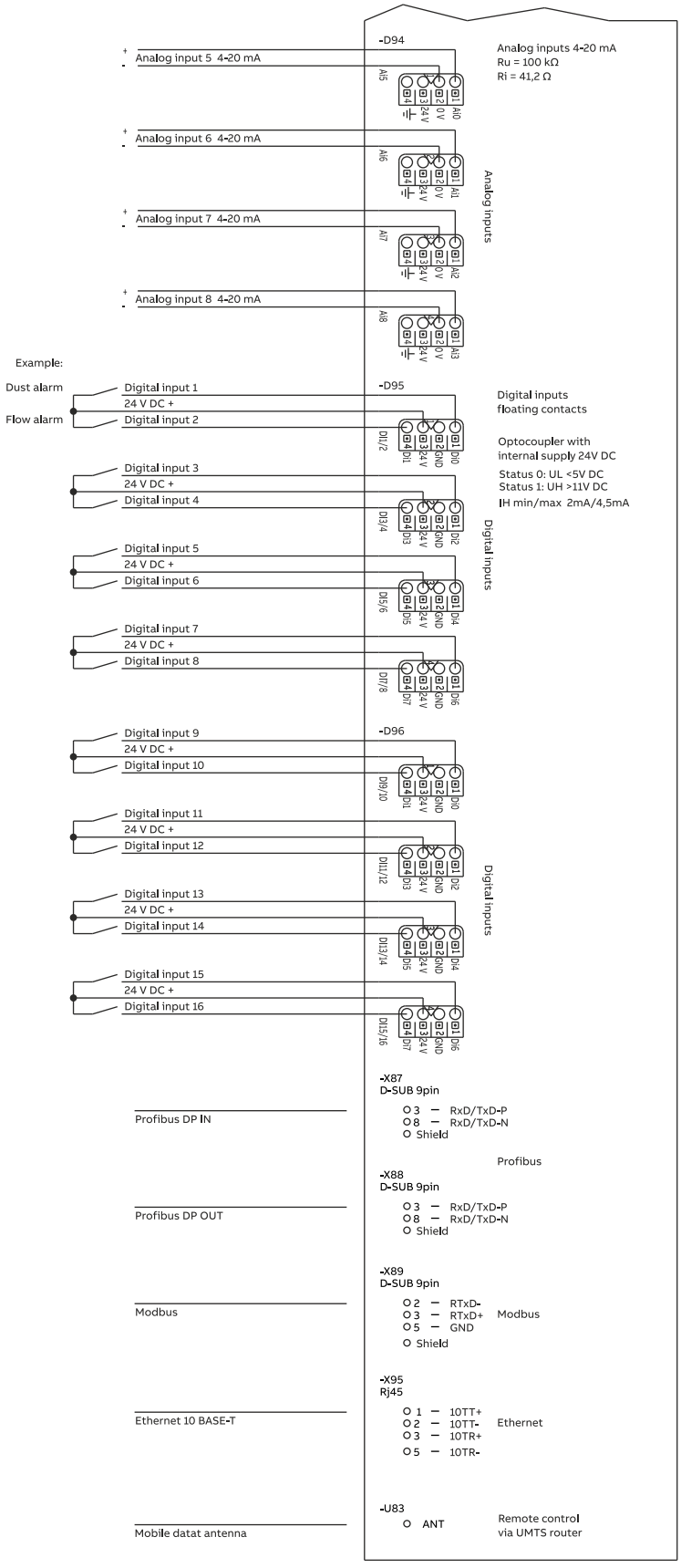


Figure 9: Input, output and status signals

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