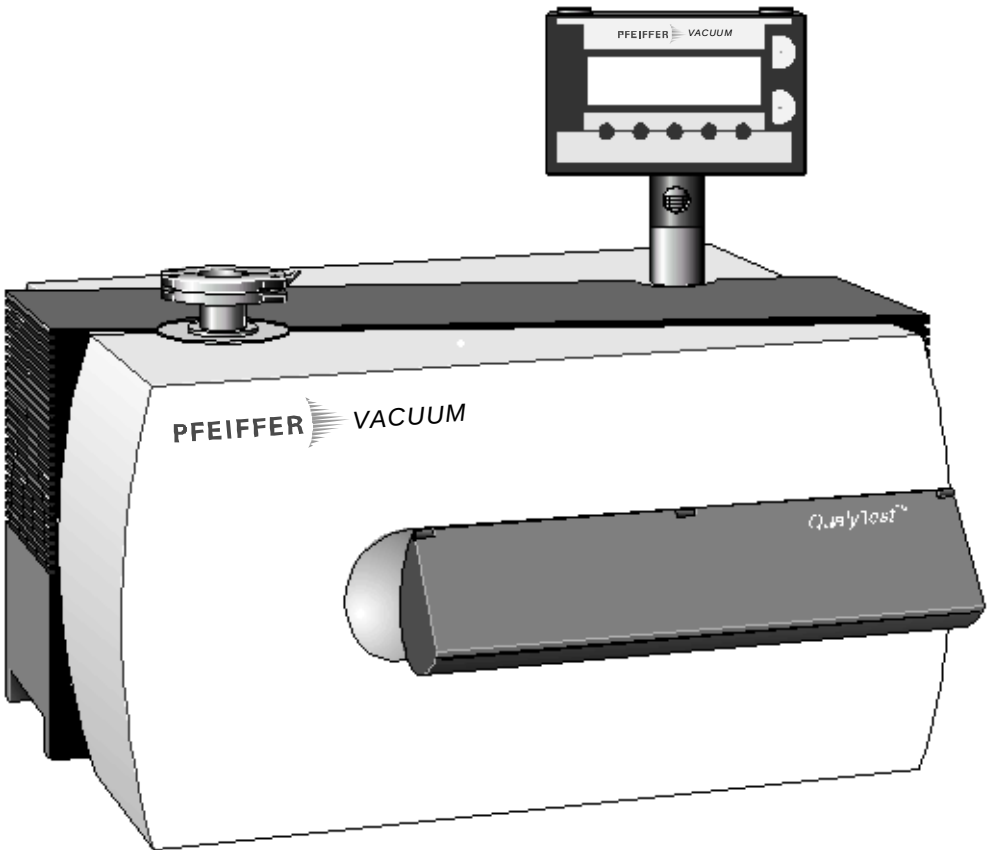
PFEIFFER VACUUM

QualyTest™
HLT 2xx



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1 IMPORTANT INFORMATION

Maintenance on the HLT 2xx may only be performed by persons who have been authorized by PFEIFFER *VACUUM* for this purpose.

Authorized persons:

Repair level I[1)]	Customer
Repair level II[1)]	Customer with technical education or PFEIFFER *VACUUM* Service Engineer
Repair level III[1)]	Customer with PFEIFFER *VACUUM* Service training[2)] or PFEIFFER *VACUUM* Service Engineer

[1)] → see maintenance schedule (page 22 - 23)
[2)] → PFEIFFER *VACUUM* offers courses to rapair level II and III.

1.1 Validity

This document applies to products with part numbers:

Type	Part number	Voltage	Roughing pump
HLT 260, QualyTest™	BG Z08 000	230 V~	UNO 005A
HLT 260, QualyTest™	BG Z08 001	120 V~	UNO 005A
HLT 260, QualyTest™	BG Z08 002	100 V~	UNO 005A
HLT 260, QualyTest™	BG Z08 050	230 V~	UNO 005A; without RC
HLT 260, QualyTest™	BG Z08 060	120 V~	UNO 005A; without RC
HLT 265, QualyTest™ Select	BG Z08 020	100 – 230 V~	extern
HLT 270, QualyTest™ Dry	BG Z08 010	230 V~	MVP 035
HLT 270, QualyTest™ Dry	BG Z08 011	120 V~	MVP 035
HLT 270, QualyTest™ Dry	BG Z08 012	100 V~	MVP 035
HLT 275, QualyTest™ Dry+	BG Z08 015	230 V~	Scroll pump
HLT 275, QualyTest™ Dry+	BG Z08 016	100 - 120 V~	Scroll pump

The part number can be taken from the product name plate.

The described functions, illustrations and data are given with the understanding that they are subject to change without notice.

1.2 Content of these maintenance instructions

The present maintenance instructions describe the periodic maintenance to be performed on the HLT 2xx.

For information on the operation of the equipment, a description of the equipment and the technical specifications please refer to the separate user's guide.

1.3 Safety information

Basic safety information

- When handling process gases please follow the applicable regulations and protective measures.
- Although helium is an inert gas it can cause asphyxiation in high concentrations.

- The test object and the gas fittings must be able to withstand the applied pressure gradient.
- Products returned to PFEIFFER *VACUUM* for service or repair should, if possible, be free of harmful substances (e.g. radioactive, toxic, caustic or microbiological). Otherwise, the type of contamination must be declared.
  (A copy of the "Declaration of Contamination" can be found on page 39. Additional forms can be obtained from your nearest PFEIFFER *VACUUM* service center.)
- The line filter, the power supply unit, the wiring board and the roughing pump have parts that are on voltages higher than 50 V. For this reason the power plug must always be disconnected before the HLT 2xx is opened for service work.

Explanations of pictograms

NOTE:
Information on correct handling or use.

CAUTION:
Information on preventing extensive equipment and environmental damage.

DANGER:
Information on preventing bodily injury or extensive property damage.

Vacuum area:
Always wear clean, lint-free gloves and use clean tools when working in this area.

1.4 General information

- Electrical components (circuit boards, EPROMs, electrical connections) are sensitive to electrostatic discharge and appropriate precautions must be taken. In particular the circuit boards and EPROMs must be stored in antistatic packing material.
- Failure to take appropriate precautions can void the warranty.
- PFEIFFER *VACUUM* declines any liability and the warranty becomes null and void if the product is modified or operated with accessories that are not listed in the corresponding product documentation.

1.5 List of documents

BG 805 263 BE	User’s guide HLT 2xx
BG 805 457 BE	Maintenance instructions HLT 2xx
PK 800 152 BN	User’s guide UNO 005A
PJ 11400	User’s guide MVP 035
PM 800 504 BN	User’s guide TMH 071
BG 805 268 BD	User’s guide LP 5xx
6999-04-250	User’s guide, Scroll pump Triscroll TS600

2 DESIGN AND FUNCTIONAL DESCRIPTION

The HLT 2xx is a microprocessor controlled leak detector that is equipped with the most advanced electronic and electromechanical components. All processes within the instrument are controlled automatically.

2.1 System overview

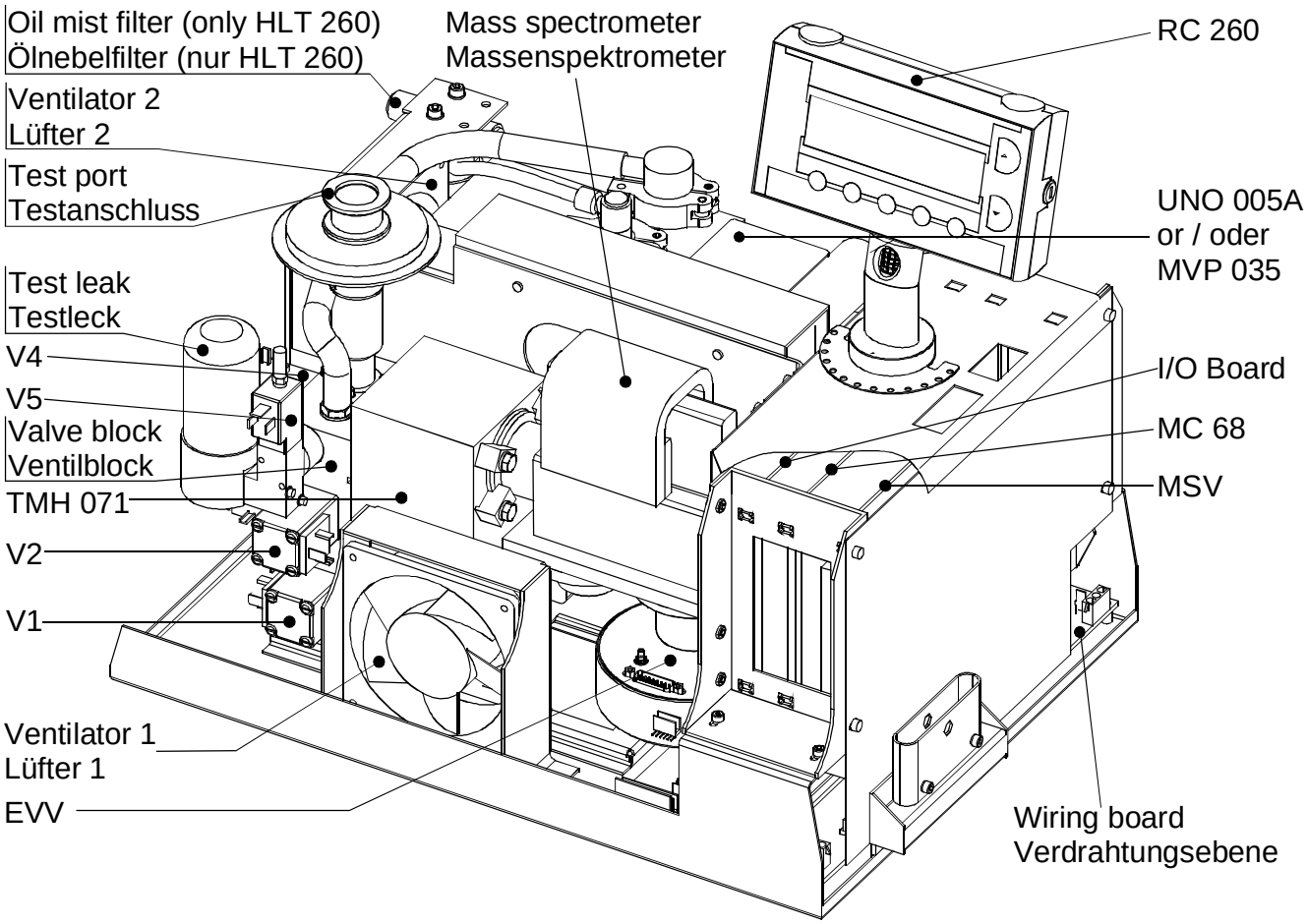


Fig. 2 HLT 2xx

2.1.1 Block diagram

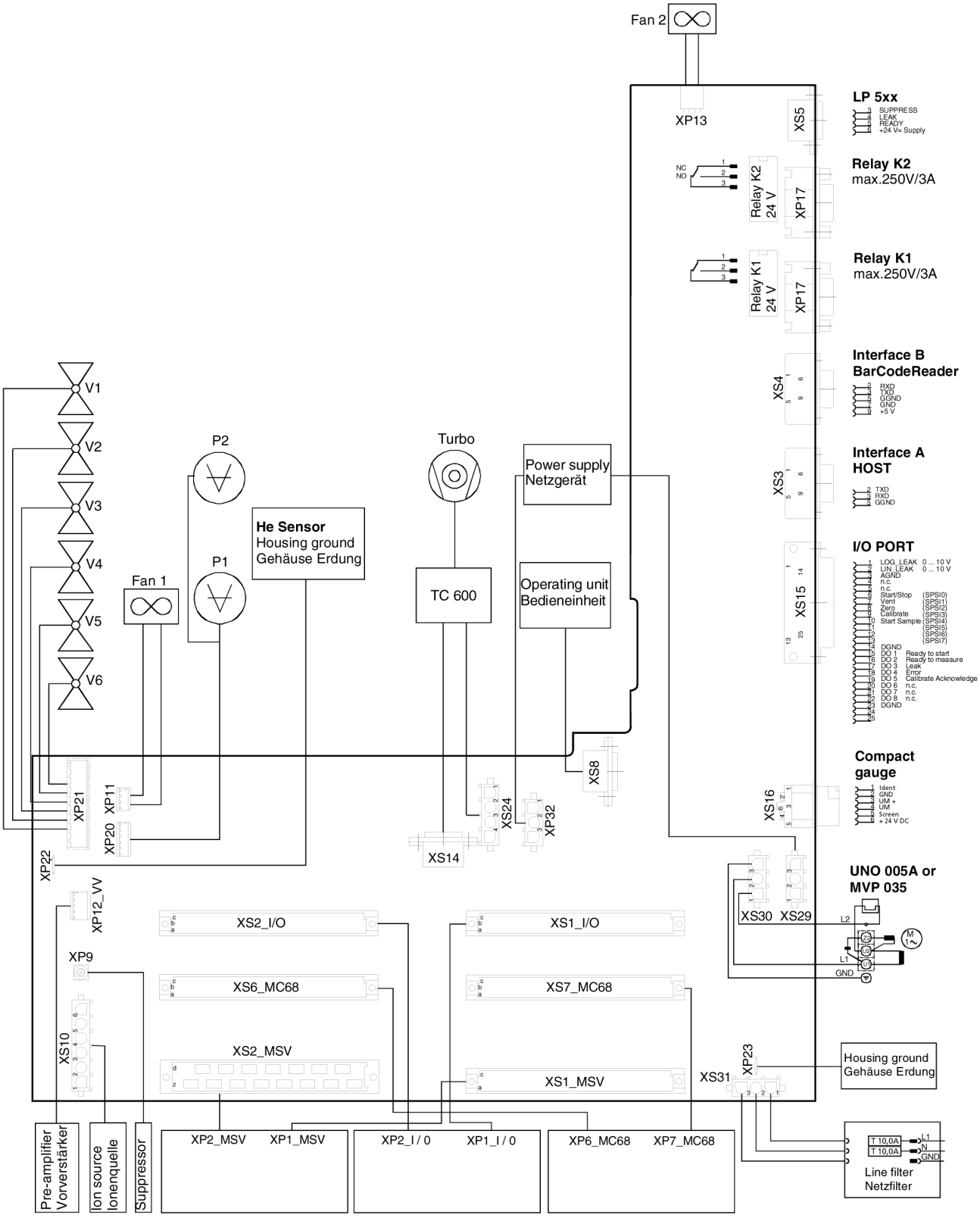


Fig. 3 HLT 2xx Block diagram

2.1.2 Power inlet and ground connection
(on the wiring board)

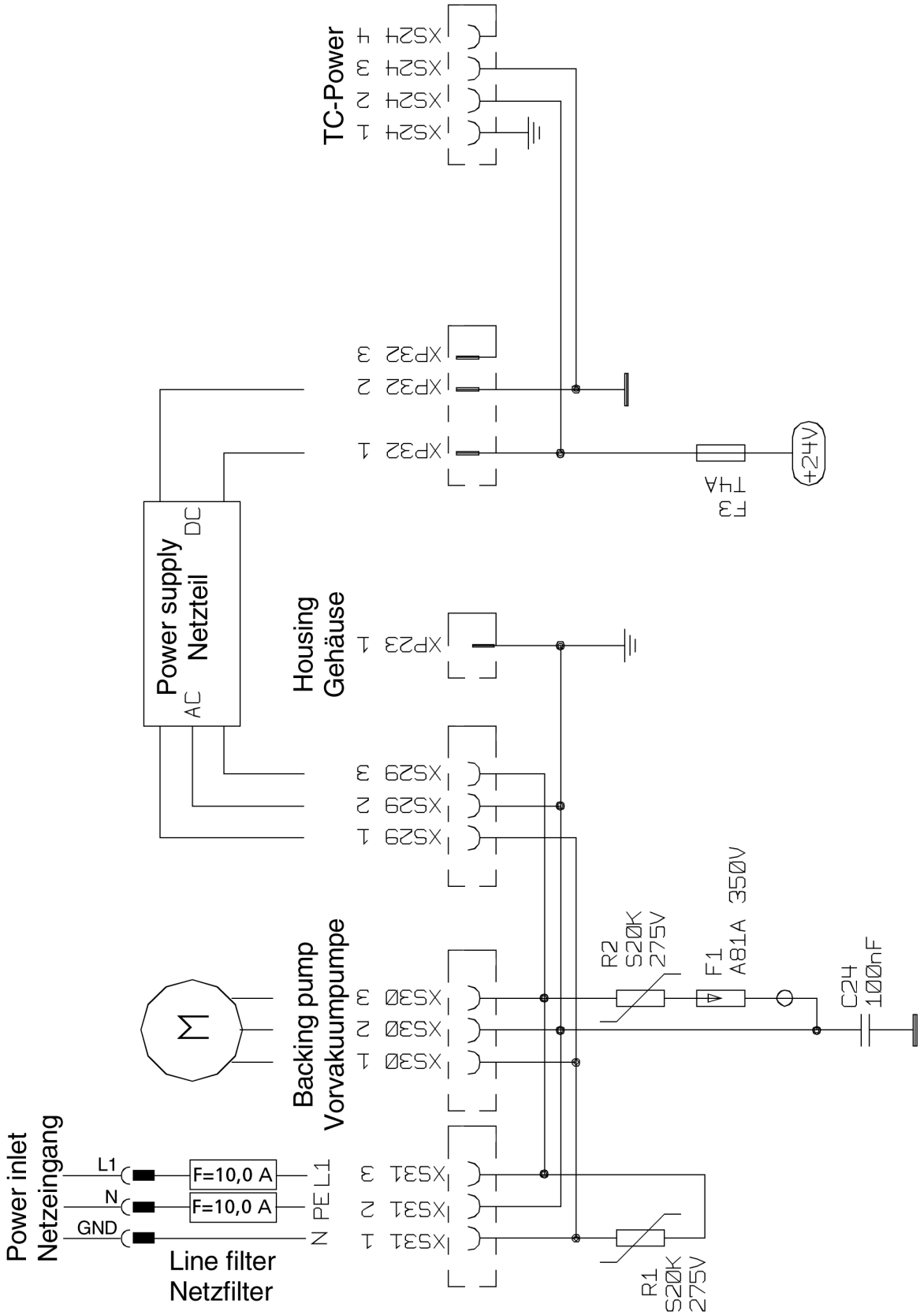


Fig. 4 Power inlet and ground connection

2.2 Pump system

The pump system consists of a roughing pump, a turbo pump, a helium detector and a valve block that established most connections between the helium detector and the test port. The layout of the pump system is schematically shown in Fig. 5.

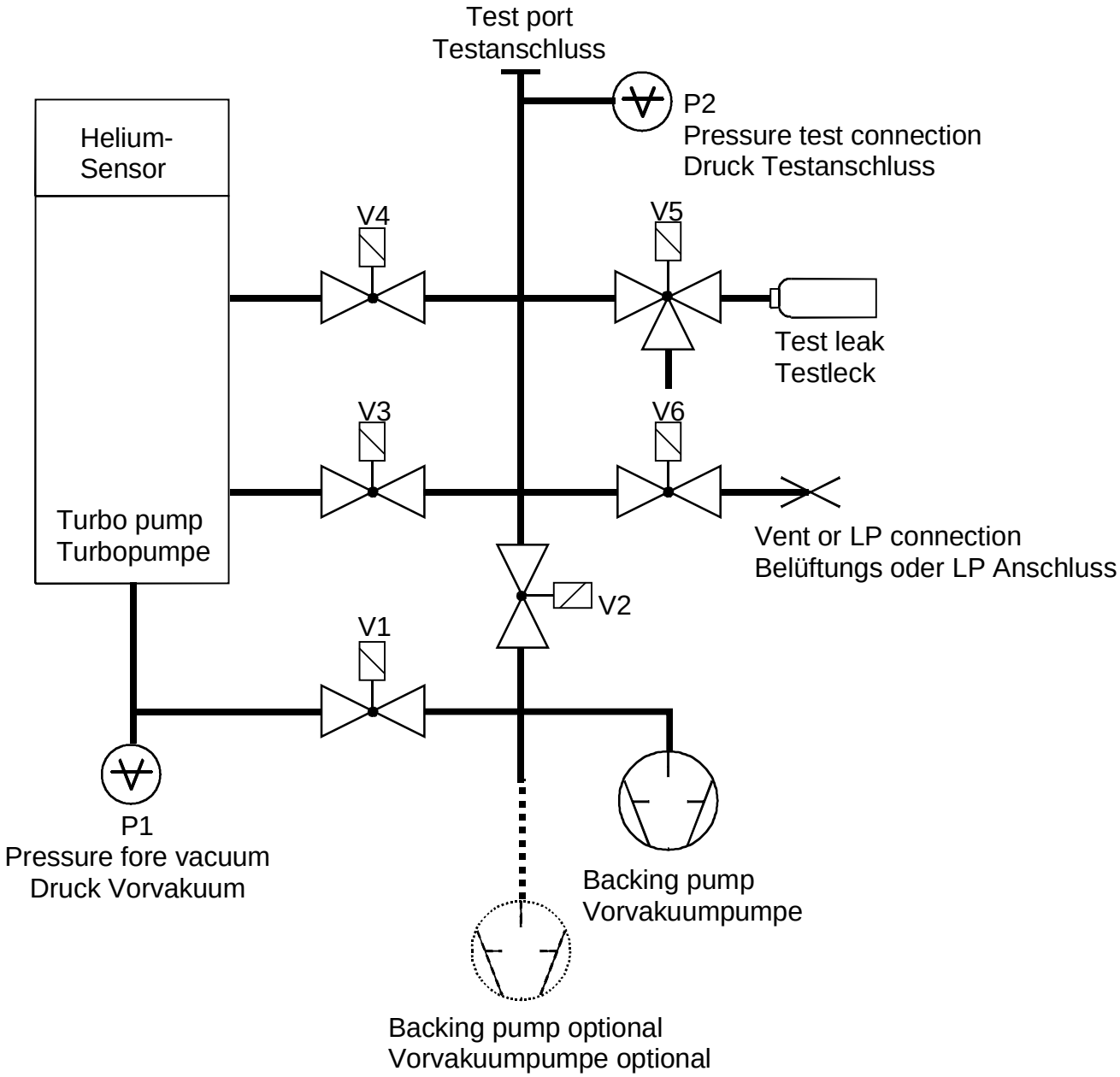


Fig. 5 Pump system HLT 2xx

The test object can be connected to the test port with a KF 25 flange. Valves V1, V2, V3 and V4 establish the vacuum connection between the test object and the helium detector in such a way that no operating state is created that is detrimental to the helium detector.

For calibrating the HLT 2xx a calibrated leak can be connected via valve V5.

Valve V6 is normally used for venting so that the test object can be removed from the test port after the test has been completed. However, it can also be used as a sniffer probe connection.

2.2.1 Roughing pump

a) **HLT 260:** UNO 005A (→ Fig. 6)

Single-stage, oil-immersed rotary vane vacuum pump with a nominal volume flow rate of 4 m^3/h at 50 Hz and 5 m^3/h at 60 Hz.

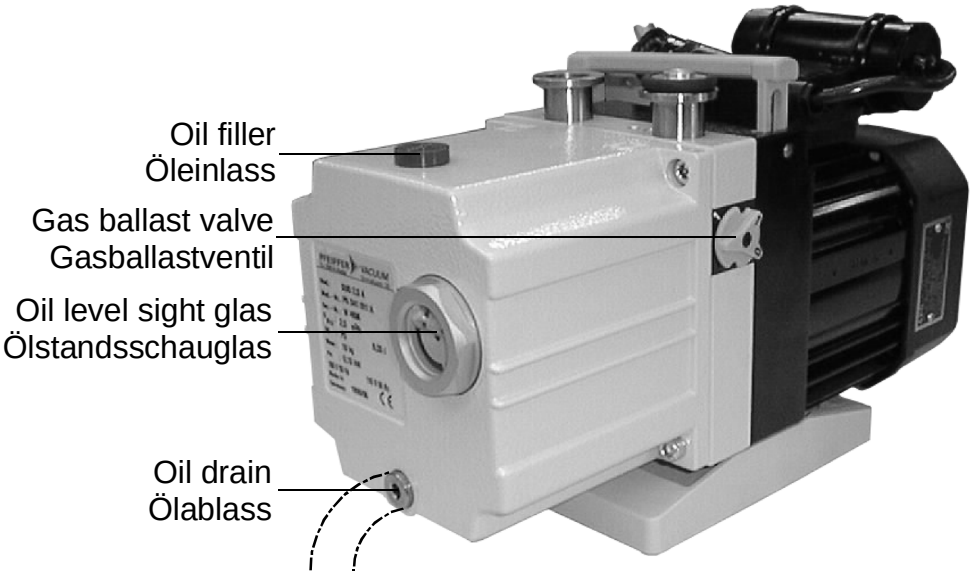


Fig. 6 UNO 005A

b) **HLT 270:** MVP 035 (→ Fig. 7)

Two-stage diaphragm vacuum pump for absolutely oil-free pumping of gases with a volume flow rate of 1.3 m^3/h at 50 Hz and 1.5 m^3/h at 60 Hz.

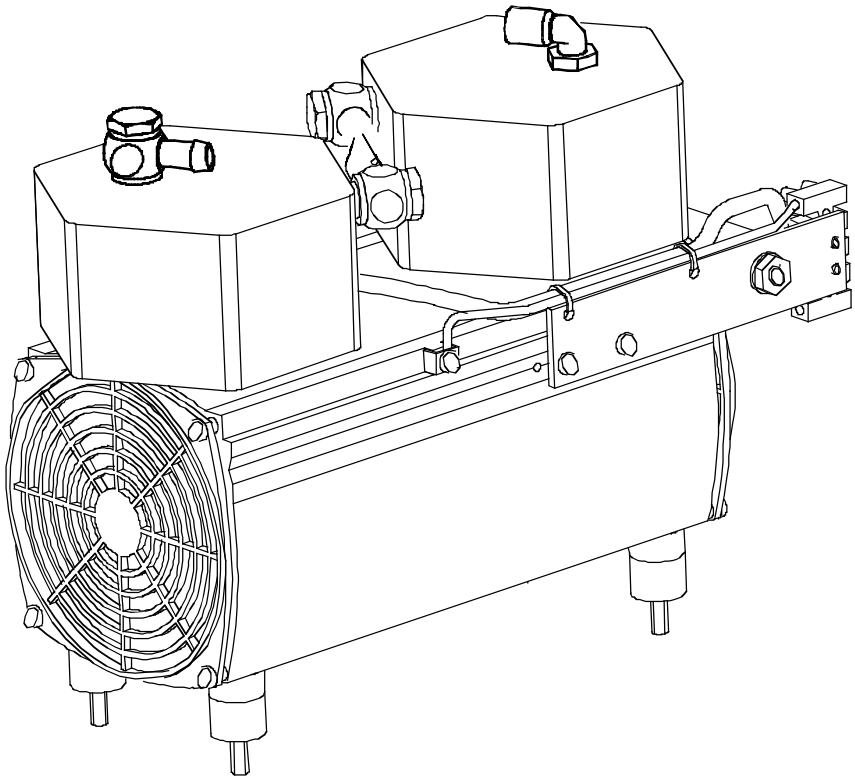


Fig. 7 MVP 035

c) **HLT 265:** External roughing pump

An external roughing pump can be connected to the HLT 265 via the KF 16 flange. If objects with a large volume need to be tested an additional roughing pump to the HLT 260 and HLT 270 can also be connected to the flange.

d) **HLT 275:** External scroll pump

Oil-free, 2-stage scroll pump with a nominal volume flow rate of 25 m^3/h at 50 Hz and 30 m^3/h at 60 Hz,

2.2.2 TMH 071 turbopump TC 600 drive electronics

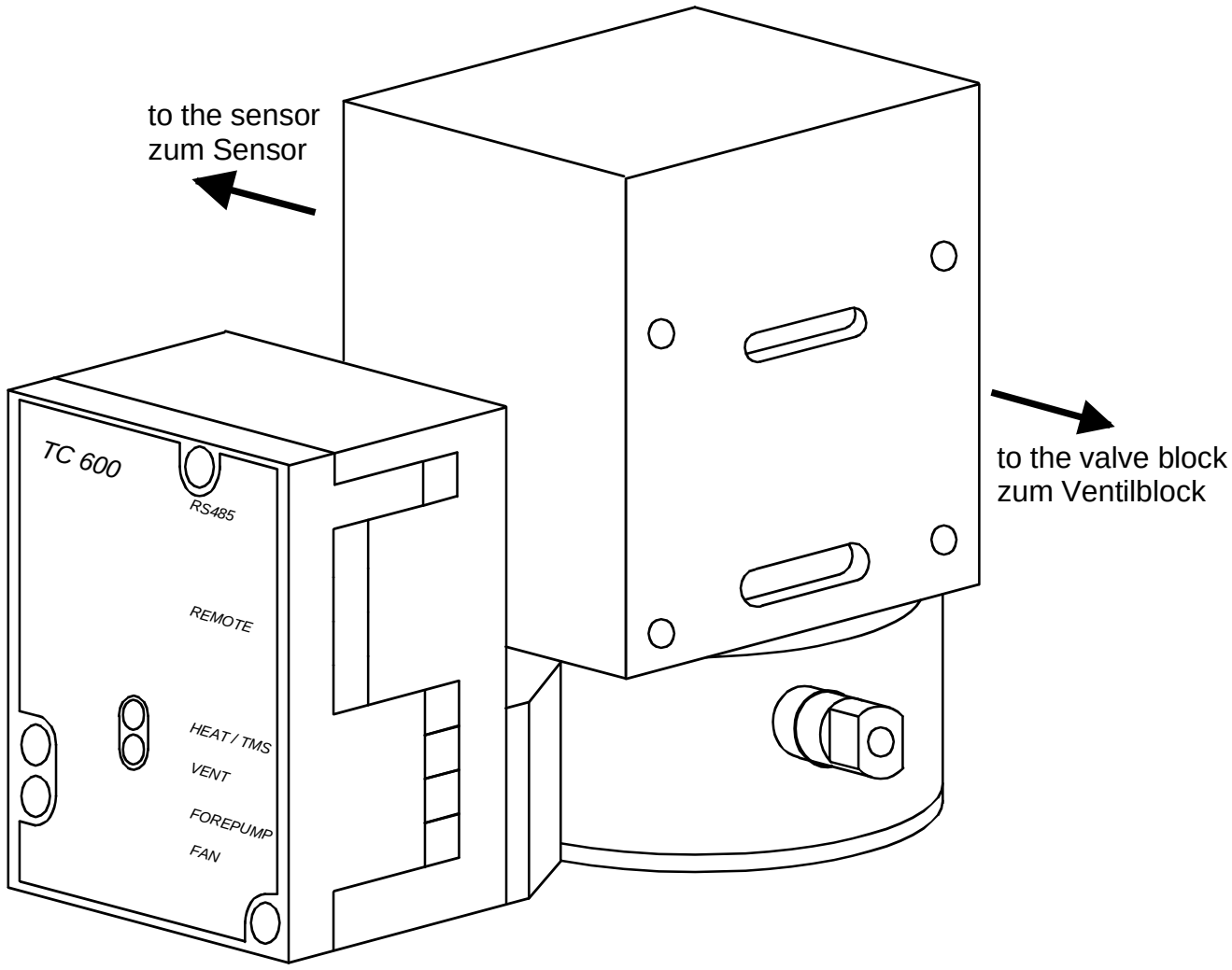


Fig. 8 TMH 071 with TC 600

2.2.3 Vacuum measurement

Pirani measuring elements P1 and P2

P1 measures the fore vacuum pressure in the turbomolecular pump.

P2 measures the pressure on the test port.

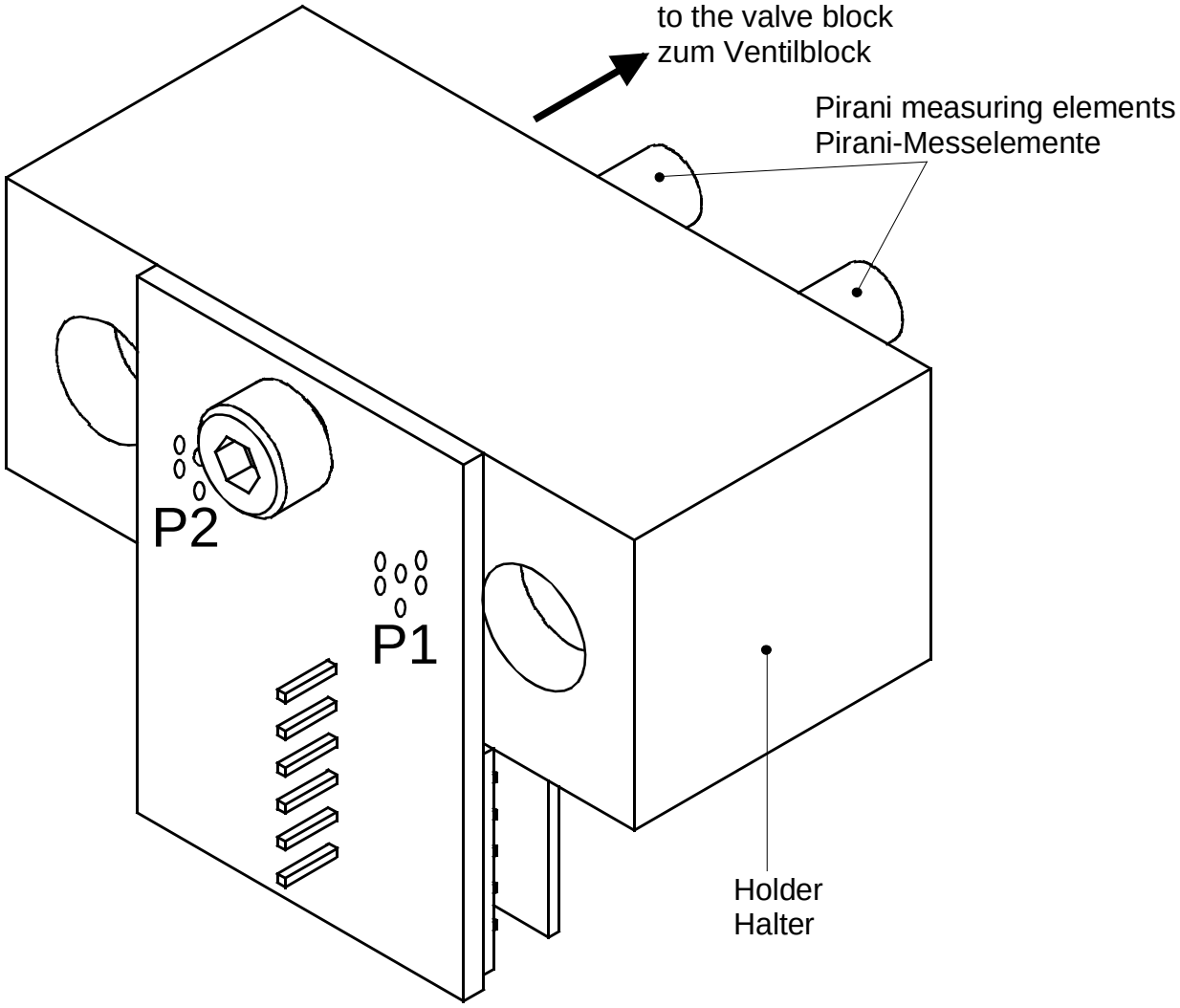


Fig. 9 Vacuum measurement

2.2.4 Valve block

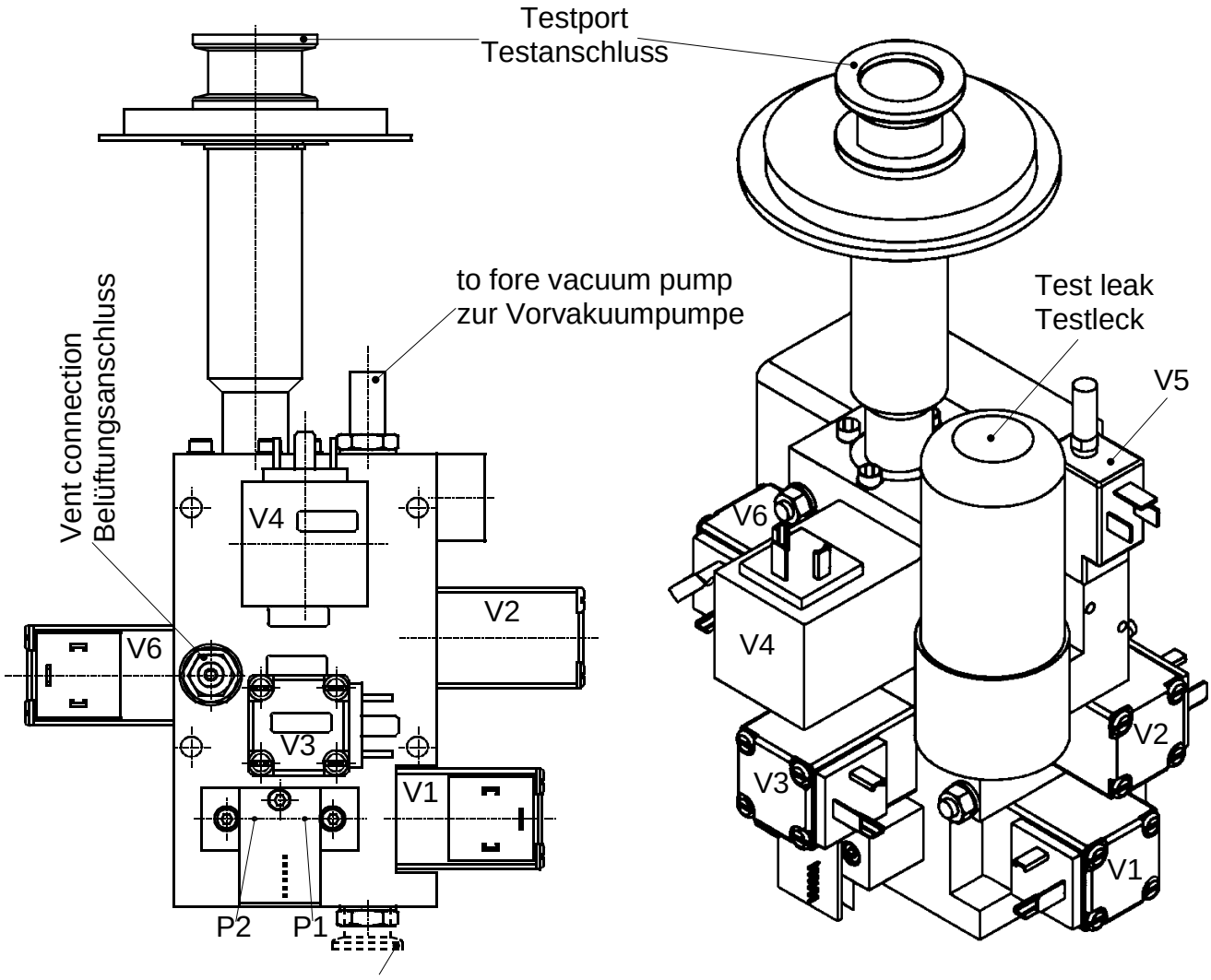


Fig.10 Valve block

Solenoid valves V1 to V6.

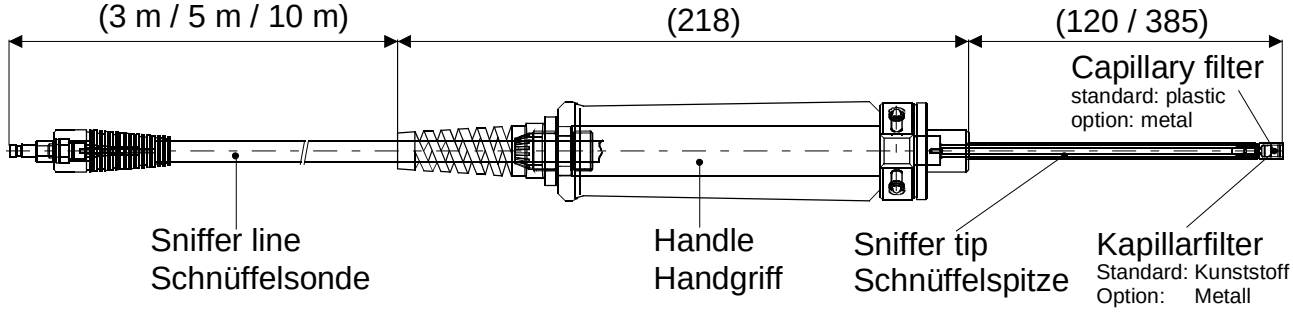
Depending on their function the valves have different nominal diameters and opening forces. V2 and V6 are concepted for 0.0 to 1.1 bar (open against atmosphere).
V1, V3, V4, V5 are conceted for 0.0 to 0.5 bar.

All valves open electromagnetically and close by spring force. They are controlled with 24 V=.

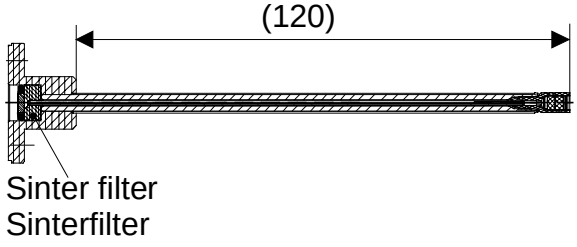
The tightness of the valves toward the atmospheric side is $< 10^{-9}$ mbar l/s. The tightness at the valve piston is normally $< 10^{-6}$ mbar l/s, but can be impaired by contamination without affecting normal operation of the HLT 2xx.

2.3 Sniffer line LP 5xx

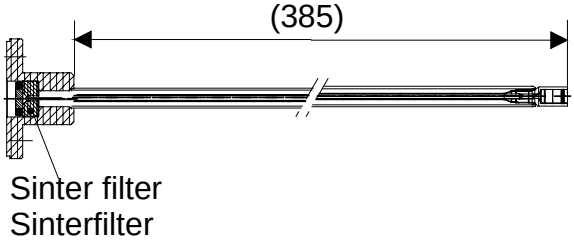
(→ User's guide BG 805 268 BN)



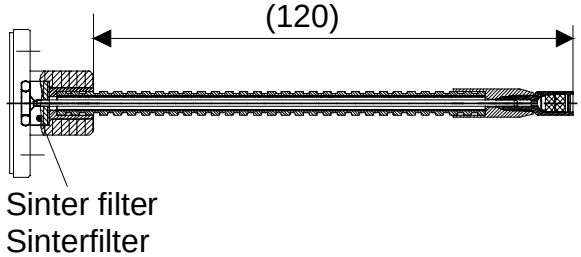
TP 312 Tip 120 mm stiff BG 449 215 -T
TP 312 Spitze 120 mm steif BG 449 215 -T



TP 385 Tip 385 mm stiff BG 449 216 -T
TP 385 Spitze 385 mm steif BG 449 216 -T



TF 312 Tip 120 mm flexible BG 449 217 -T
TF 312 Spitze 120 mm flex BG 449 217 -T



TF 385 Tip 385 mm flexible BG 449 218 -T
TF 385 Spitze 385 mm flex BG 449 218 -T

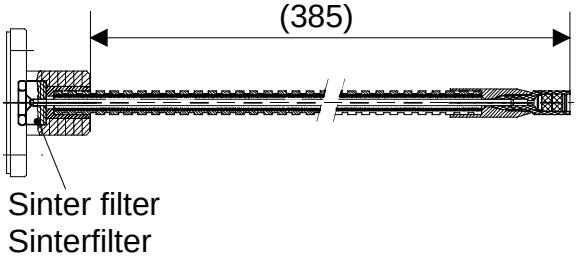


Fig. 2–11 Sniffer line with sniffer probe

Type	Ordering No.	Sniffer line length	Sniffer probe TP 312
LP 503	BG 449 207 -T	3 meters	120 mm stiff / BG 449 215 -T
LP 505	BG 449 208 -T	5 meters	120 mm stiff / BG 449 215 -T
LP 510	BG 449 209 -T	10 meters	120 mm stiff / BG 449 215 -T

Other sniffer probes (optional)

Type	Length/Characteristic	Ordering No.
TF 312	120 mm / flexible	BG 449 217 -T
TP 385	385 mm / stiff	BG 449 216 -T
TF 385	385 mm / flexible	BG 449 218 -T

Spare parts sets for LP 5xx: BN 845 979 -T (5 x sinter filter)
BN 846 392 -T (5 x capillary filter assembly)

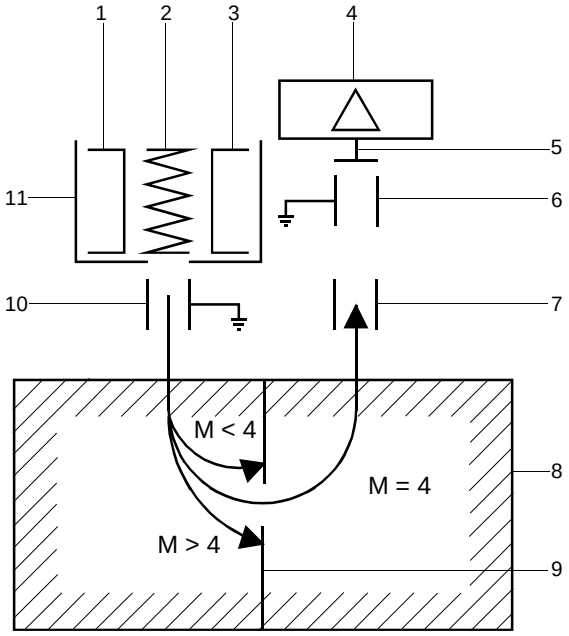
Option: BG 449 140 -T (Capillary filter: metallic version for rough duty)

2.4 Analytical system

2.4.1 Detection system

The detection system essential comprises the ion source, the magnetic separation system, and the ion collector.

The ion source ionizes neutral gas particles from which it generates an ion beam. The positively charged ions are accelerated out of the ion source and subsequently enter the magnetic field. There they are deflected into a circular path, the radius of which depends on the mass/charge ratio of the ions. Only the helium ions fulfill the separation conditions and reach the ion collector where they can be measured by the electrometer amplifier.



Legend:
1 Cathode 1
2 Anode
3 Cathode 2
4 Amplifier
5 Ion collector
6 Ion collector screen
7 Suppressor
8 Magnetic field
9 Intermediate orifice
10 Extractor orifice
11 Screening ring

Legende:
1 Katode 1
2 Anode
3 Katode 2
4 Verstärker
5 Ionenfänger
6 Abschirmung zu Ionenfänger
7 Suppressor
8 Magnetfeld
9 Zwischenblende
10 Extraktorblende
11 Abschirmring

Fig. 12a Principle of detection system

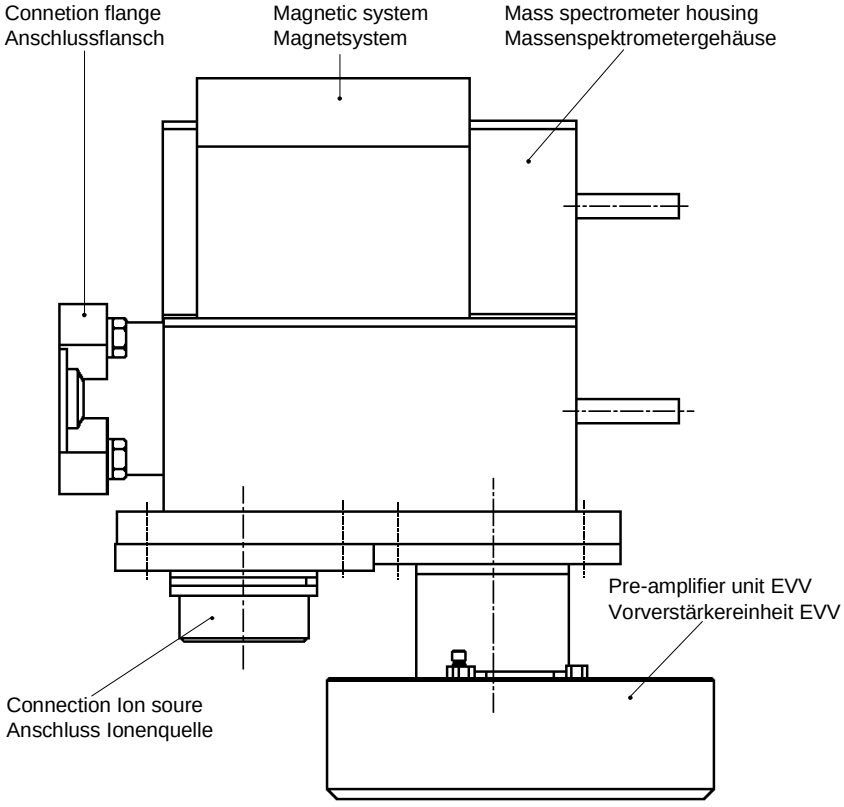


Fig. 12b Design of detection system

2.4.2 Mass spectrometer supply MSV

This module produces all voltages and currents required for operating the mass spectrometer:
– Anode heating voltage
– Cathode heating voltage
– Anode potential
– Suppressor potential

Faults in the mass spectrometer are detected and signaled to the MC 68. The mass spectrometer supply is monitored in MC 68.

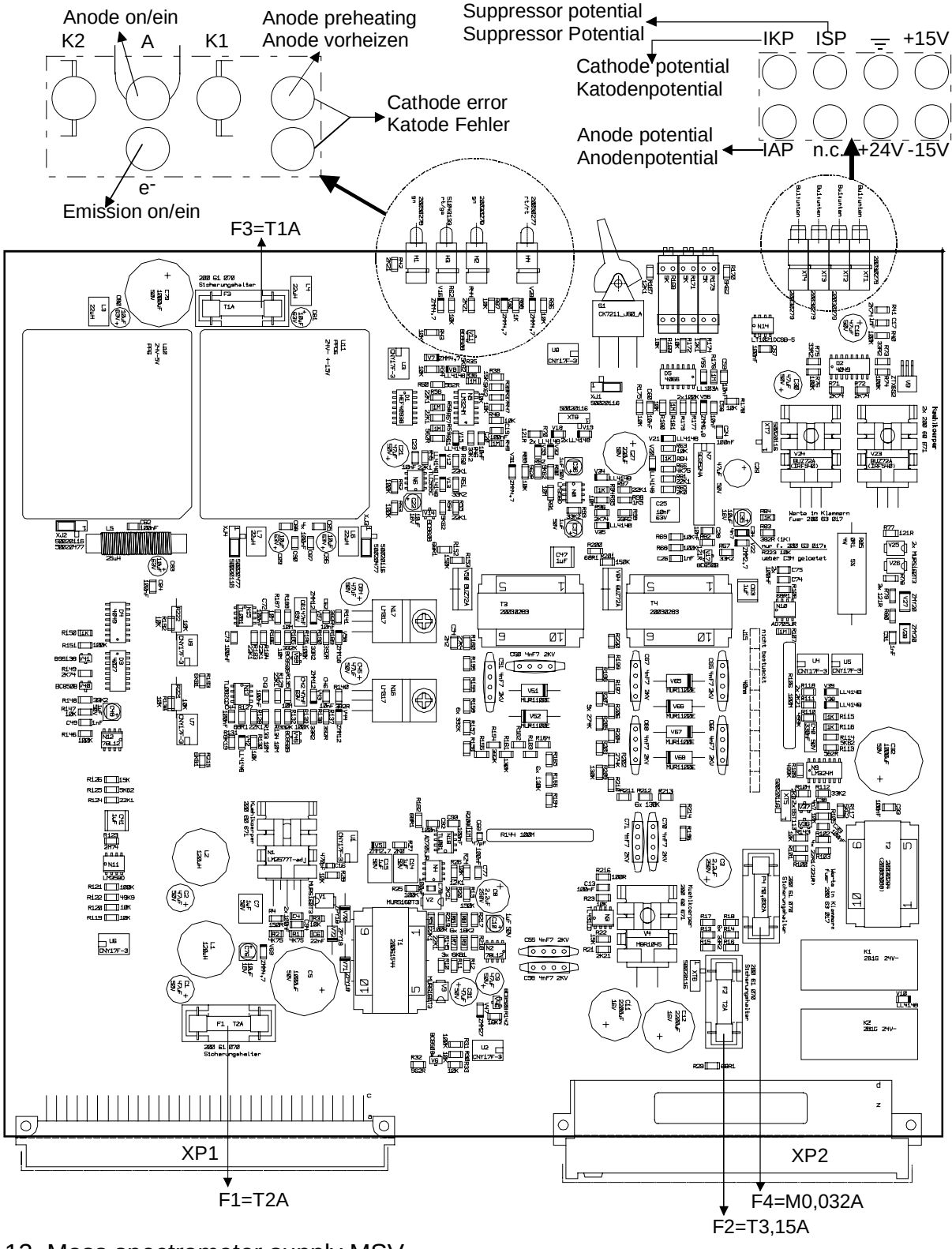


Fig. 13 Mass spectrometer supply MSV

2.4.3 Electrometer pre-amplifier EVV

The electrometer pre-amplifier converts the current flowing from the ion collector of the mass spectrometer into a voltage signal. It has four amplification stages. The MC 68 control board selects the required amplification stage and processes the analog output signal. The detection limit in the most sensitive range is approximately $1x10^{-15}$ A.

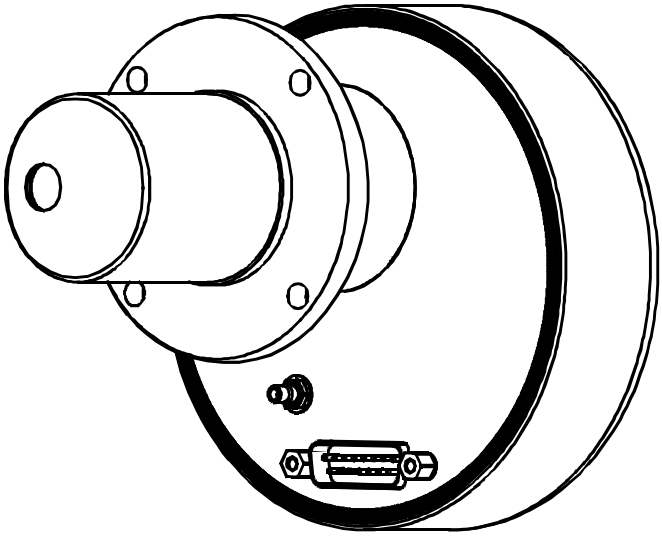


Fig. 14 Ion collector pre-amplifier unit

☞	**NOTE**: The ion collector pre-amplifier unit (→ Fig. 14) cannot be opened and repaired. The complete unit has to be replaced in the event of a fault.

2.5 Electronics

2.5.1 MC 68 Control board

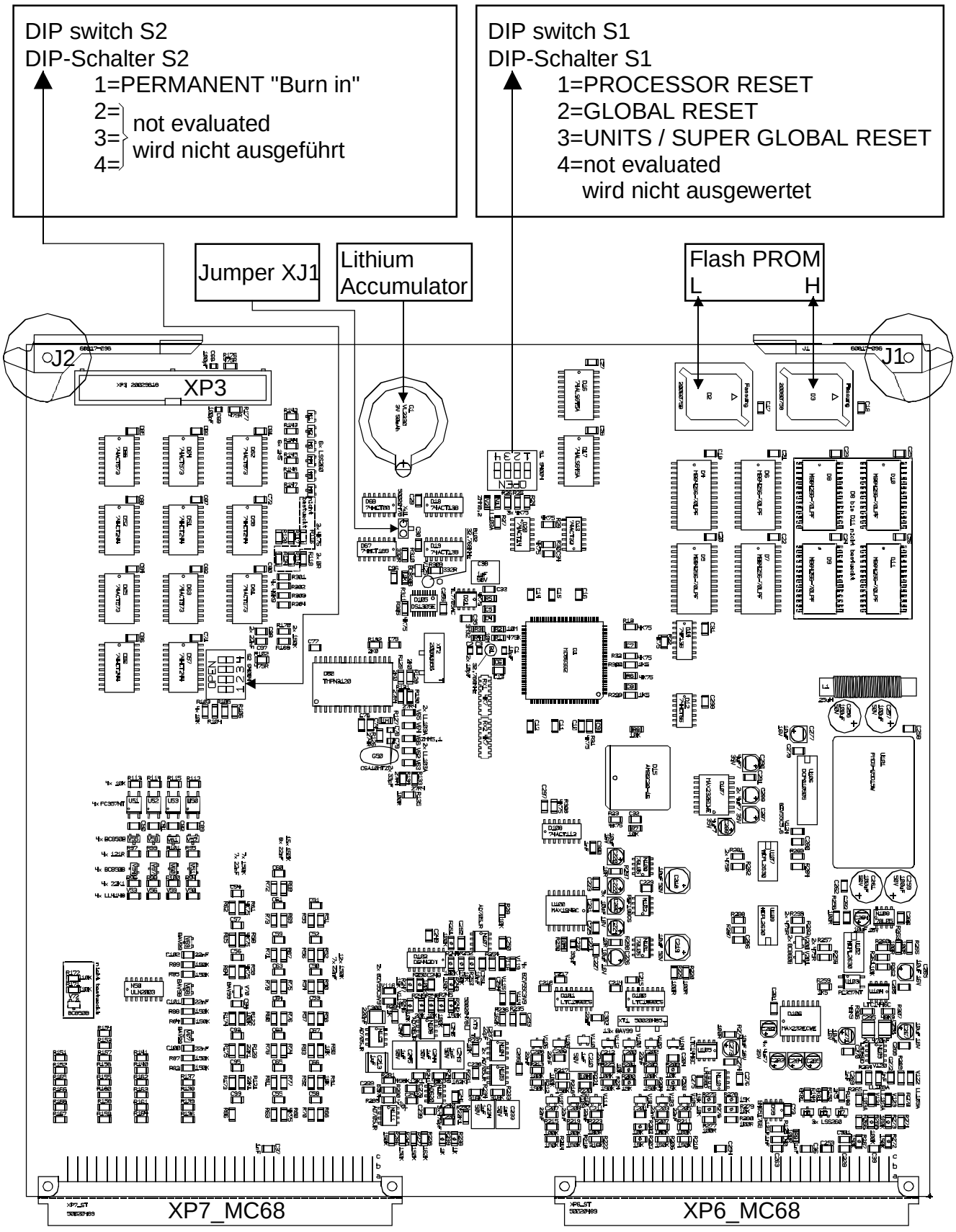


Fig. 15 MC 68, components side

2.5.2 I/O board

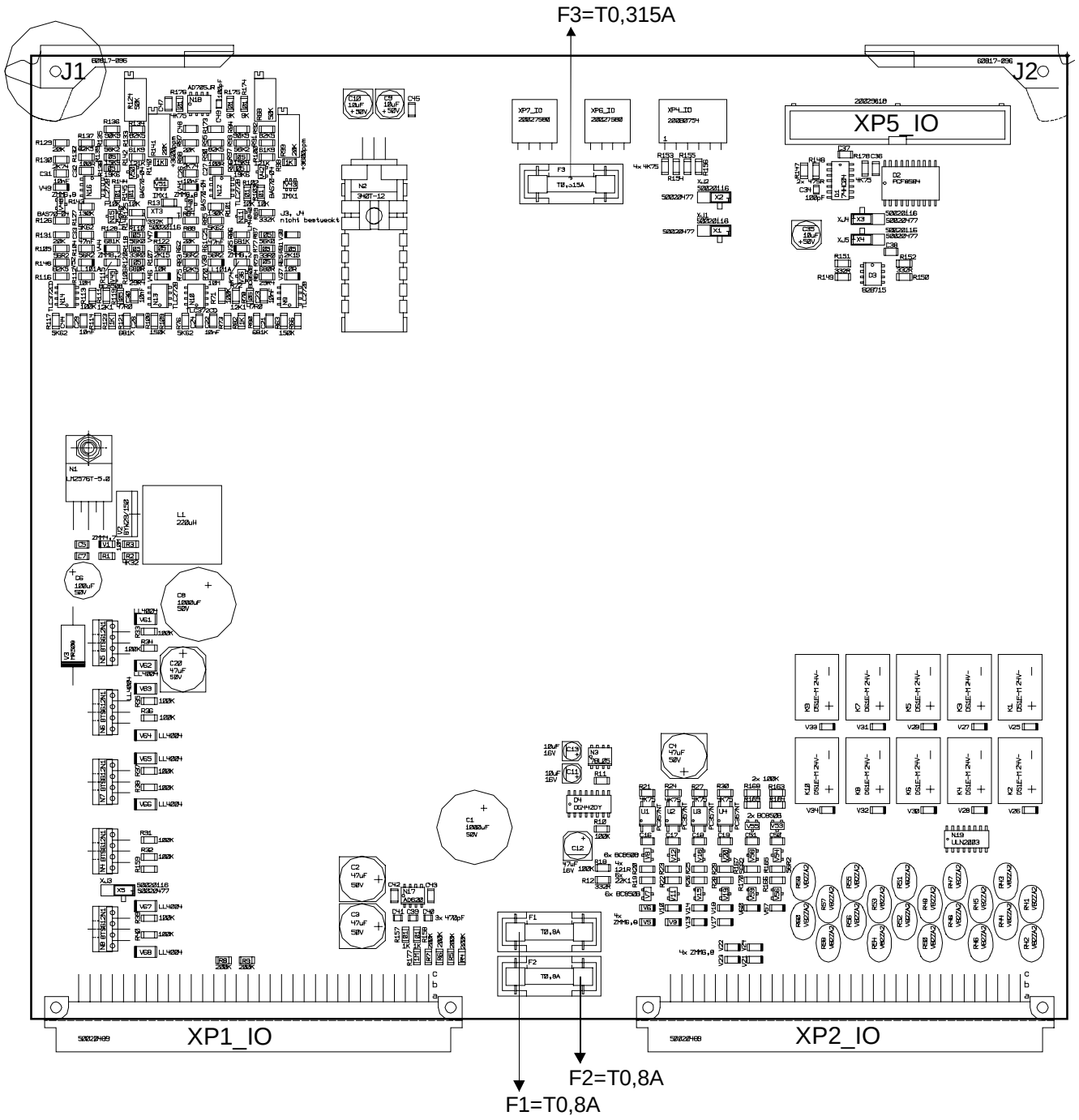


Fig. 16 I/O board

2.5.3 Wiring board

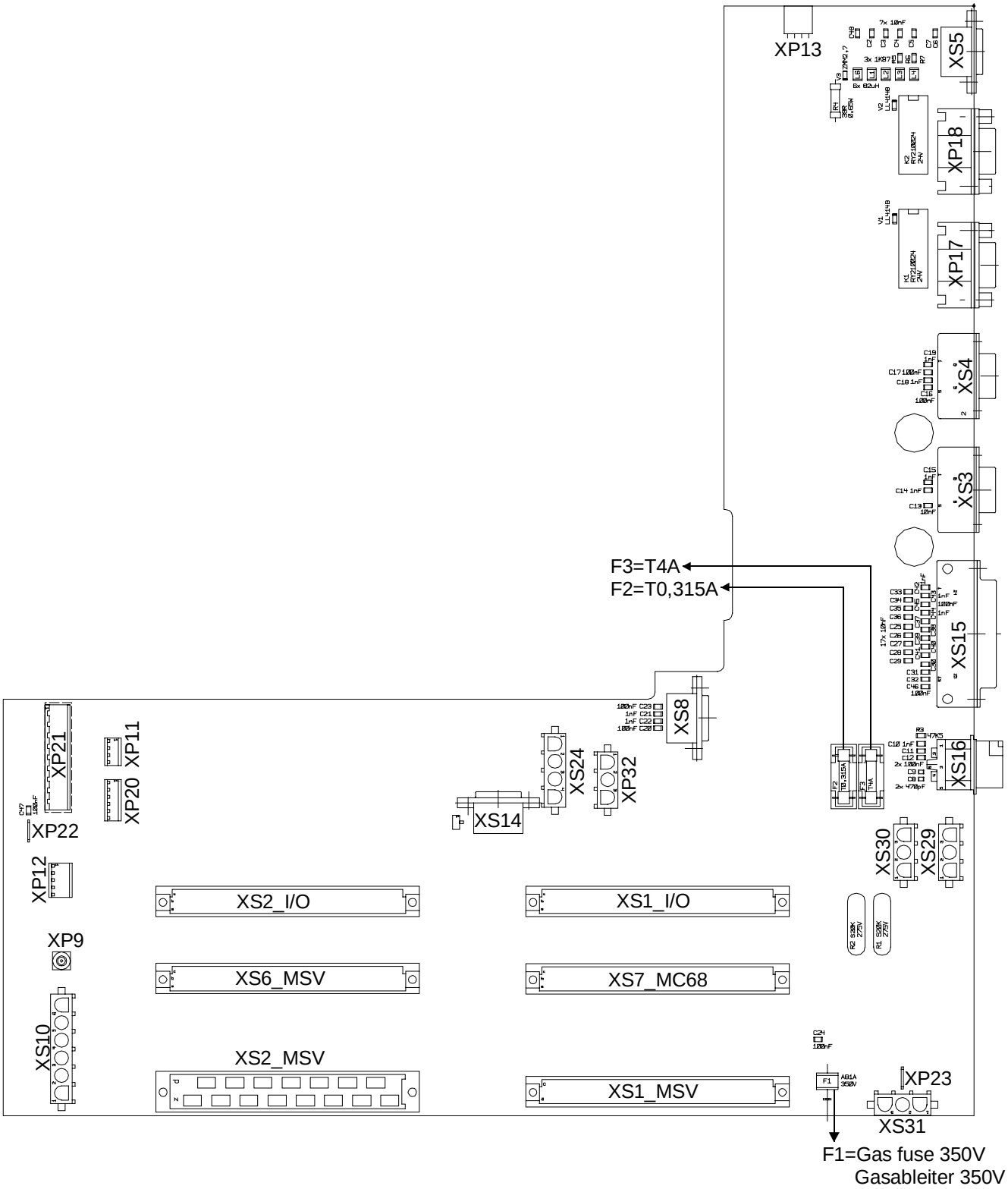


Fig.17 Wiring board

2.5.4 Fuses

Description	Fuse value	Dimensions	Function	Remarks
Main fuse				
F	T10 A	5 x 20	Mains fuse	
Wiring board				
F1	Gas fuse 350 V		Overvoltage protection mains	
F2[1)]	T0,315 A	5 x 20	+5 V Barcode connection	
F3[1)]	T4 A	5 x 20	24 V (Main fuse without TC Power)	
I/O-Board				
F1[1)]	T0,8 A	5 x 20	24 V_I Sniffer connection LP and total pressure and I/O Port	
F2[1)]	T0,8 A	5 x 20	24 V_{III} RC 260 and ventilator	
F3[1)]	T0,315 A	5 x 20	not used in HLT 2xx	
MSV				
F1[1)]	T2 A	5 x 20	24 V der MSV	
F2[1)]	T3,15 A	5 x 20	Anode heater	actually fuse value
F3[1)]	T1 A	5 x 20	24 V DC/DC converter for +5 V/±15 V	
F4[1)]	M0,032 A	5 x 20	Anode/cathode potential	

[1)] contained in the fuse set PT 110 050 -T.

Fuse set

PT 110 050 -T	**MSV / F1**	T2A	1	
	MSV / F2	T3,15A	1	
	MSV / F3	T1A	1	
	MSV / F4	M0,032A	1	
	IO / F1,F2	T0,8A	2	
	IO / F3	T0,315A	1	
	Wiring board / F2	T0,315A	1	
	Wiring board / F3	T4A	1	
	Main fuse	T10,0A	2	

3 HLT 2XX MAINTENANCE AND SERVICE

3.1 Maintenance and service schedule

Module Part number	Quant.	Task	Operating hours / weeks 160 1	 2150 13	 4300 26	 8600 52	 17200 104	User's guide	Rep. level	Location	Test equipment Comments	Material Description	Part No.	Ref. Chapter
Vacuum system														
UNO 005A	1	check oil level, replenish	X					PK 800 152 BN	II	os				4.2.1
Europe PK D31 822		change oil				X			II	os		maintenance kit **(4A)**	PT 110 010 -T	4.2.2
America PK D31 824		exchange UNO 005A							III	os	if defective	exchange UNO 005A, 230V/50Hz	PK D31 822#A	
Asia PK D31 823												exchange UNO 005A, 120V/60Hz	PK D31 824#A	
												exchange UNO 005A, 100V/50-60Hz	PK D31 823#A	
Oil mist filter	1	check, drain	X						II	os				4.3.1
B 8199 999 ET		replace filter			X				II	os		maintenance kit **(4A)**	PT 110 010 -T	4.3.2
		replace oil mist filter							II	os	if defective	replacement oil mist filter	B 8199 999 ET	
MVP 035	1	replace diaphragms			X			PJ 11400	II	os		maintenance kit **(4B)**	PT 110 011 -T	4.4.1
Europe B 8199 999 EM		exchange MVP 035							III	os	if defective	exchange MVP 035, 230 V/50 Hz	B 8199 999 EM#A	
America B 8199 999 EN												exchange MVP 035, 120 V/60 Hz	B 8199 999 EN#A	
Asia B 8199 999 EP												exchange MVP 035, 100 V/50-60 Hz	B 8199 999 EP#A	
TMH 071	1	replace lubricant reservoir			X			PM 800 504 BN	II	os		maintenance kit **(4AB)**	PT 110 010 -T	4.6.1
PM P02 810 A													PT 110 011 -T	
		exchange for bearing change					X		III	ws	if defective	exchange TMH 071	PM P02 810 A#A	4.6.2
		TC 600 exchange							III	os	if defective	exchange TC 600 **(without cable)**	PM C01 690 A#A	
Valve block	1	clean valve block, replace seals and valves				X			III	os		seal kit **(4C)**	PT 110 030 -T	4.7.3
B 8199 999 ER												spare parts kit to valve block **(4D)**	PT 110 040 -T	
		replace vent filter			X				II	os		maintenance kit **(4AB)**	PT 110 010 -T	4.7.1
													PT 110 011 -T	
		replace valve block							III	ws	if defective	replacement valve block	B 8199 999 ER	
Pirani measuring element	2	clean			X				III	os				4.7.2
P1, P2 BN 846 056 -T		replace							II	os	if defective	replacement Pirani measuring element	BN 846 056 -T	
Test leak	1	replace							III	os	if defective	replacement calibrated leak	B 8199 999 DW	
B 8199 999 DW														
Sealing coupling	1	replace							II	os	if defective	replacement sealing coupling	B 8199 999 ES	
B 8199 999 ES														

Legend:

Repair level I	Operator	
Repair level II	Customer trained on maintenance / Service engineer from sales company	
Repair level III	Service engineer from sales company	
os	on-site / on customer's system	
ws	shop	

= Maintenance work

*	Functional check; cleaning as required, replenishing the operating media, adjustment, tightening, leak detection
X	Perform maintenance work
1	Depends on process
2	Depends on media facility
3	Depends on operating conditions and application
(4)	Containing in the maintenance A → PT 110 010 -T B → PT 110 011 -T
(V)	Consumption materials

Module Part number	Quant.	Task	Operating hours / weeks 160 1	2150 13	4300 26	8600 52	17200 104	User's guide	Rep. level	Location	Test equipment Comments	Material Description	Part No.	Ref. Chapter
LP 5xx	1	replace capillary filter	**X(3)**					BG 805 268 BE	I	os	or if defective	set with 5 capillary filters **(V)**	BN 846 392 -T	4.9.1
3 m → BG 449 207 -T		replace sinter filter		**X(3)**					I	os	or if defective	set with 5 filters and O-rings **(V)**	BN 845 979 -T	4.9.2
5 m → BG 449 208 -T 10 m → BG 449 209 -T		replace LP 5xx							II	os	if defective	replacement LP 503	BG 449 207 -T	
												replacement LP 505	BG 449 208 -T	
												replacement LP 510	BG 449 209 -T	
Analytical system														
MSV B 8199 999 DZ	1	exchange							II	os	if defective	exchange MSV	B 8199 999 DZ#A	
EVV B 8199 999 EW	1	exchange							III	os	if defective	exchange EVV	B 8199 999 EW#A	
Heliumsensor	1	replace ion source							II	os	if a cathode fails immediately order a replacement ion source	replacement ion source, packed	B 8199 999 EU	
Magnetic system B 8199 999 EV	1	replace							III	os	if defective	replacement magnetic system	B 8199 999 EV	
Electrical, Electronics														
Power supply B 8199 999 EA	1	replace							III	os	if defective	replacement power supply	B 8199 999 EA	
Line filter B 8199 999 EB	1	replace							III	os	if defective	replacement line filter	B 8199 999 EB	
I/O-Board B 8199 999 EC	1	exchange							III	os	if defective	exchange I/O board	B 8199 999E C#A	
MC 68 (with firmware) B 8199 999 ED	1	exchange (incl. firmware)							III	os	if defective	exchange MC 68	B 8199 999 ED#A	
RC 260 (with firmware) B 8199 999 EE	1	exchange (incl. firmware)							II	os	if defective	exchange operating unit RC 260	B 8199 999 EE#A	
Lüfter (1) B 9199 999 EF	1	clean or replace filter mat	*	X(3)					I	os	blow out with compressed air	replacement filter mat (5 pieces) **(V)**	B 8199 999 EG	4.8.1
		replace ventilator							III	os	if defective	replacement ventilator	B 9199 999 EF	
Ventilator (2) B 9199 999 EF	1	replace ventilator							III	os	if defective	replacement ventilator	B 9199 999 EF	
Wiring board B 8199 999 EH	1	replace							III	os	if defective	replacement wiring board	B 8199 999 EH	

Legend:

Repair level I	Operator
Repair level II	Customer trained on maintenance / Service engineer from sales company
Repair level III	Service engineer from sales company
os	on-site / on customer's system
ws	shop

*	Functional check; cleaning as required, replenishing the operating media, adjustment, tightening, leak detection
X	Perform maintenance work
1	Depends on process
2	Depends on media facility
3	Depends on operating conditions and application
(4)	Containing in the maintenance A → PT 110 010 -T B → PT 110 011 -T
(V)	Consumption materials

= Maintenance work

Module Part number	Quant.	Task	Operating hours / weeks 160 1	2150 13	4300 26	8600 52	17200 104	User's guide	Rep. level	Location	Test equipment Comments	Material Description	Part No.	Ref. Chapter
Wagon (Option to HLT265 and HLT275)														
Fore vacuum pump	1	replace						BG 805 265 BDE	II	os	in case of malfunction			
On-off box		replace fuse							II	os	in case of malfunction	replacement fuse, 5 x 20, 1 A	B 4666 436	
		replace on-off box							II	os	in case of malfunction			
Retreatment roller 1001723	1	replace							II	os	in case of malfunction	replacement retreatment roller	1001723	
Ventilator B 5099 201 FQ	2	replace							II	os	in case of malfunction	replacement ventilator	B 5099 201 FQ	
Sound absorber	1	replace							I	os		replacement sound absorber cartridge	B 8199 999 XD	

Legend:

Repair level I	Operator	
Repair level II	Customer trained on maintenance / Service engineer from sales company	
Repair level III	Service engineer from sales company	
os	on-site / on customer's system	
ws	shop	

= Maintenance work

*	Functional check; cleaning as required, replenishing the operating media, adjustment, tightening, leak detection
X	Perform maintenance work
1	Depends on process
2	Depends on media facility
3	Depends on operating conditions and application
(4)	Containing in the maintenance A → PT 110 010 -T B → PT 110 011 -T
(V)	Consumption materials

3.2 Maintenance kits

Ordering No. Bestellnummer		Description Bezeichnung	Quantity Menge	Notes Bemerkung
(4A) Maintenance kit, HLT 260				
PT 110 010 -T	**TMH 071**	Lubricant reservoir	1	
	Ölnebelfilter	Filter	1	
	Vent connection	Screwed fitting + filter	1	
	UNO 005A	Oil	1 liter	
		Filter insert to oil mist filter	1	
	Ventilator 1	Air filter (set 5 pieces)	1	
(4B) Maintenance kit, HLT 270				
PT 110 011 -T	**TMH 071**	Lubricant reservoir	1	
	MVP 035	Wearing parts set	1	
	Vent connection	Screwed fitting + filter	1	
	Ventilator 1	Air filter (set 5 pieces)	1	
(4C) Seal set HLT 2xx				
PT 110 030 -T	**VV, vent, external pump connection**	Sealing ring R1/4IN, Nylon	3	
	TMH 071 – MS/ MS – IQ / MS – IF	Flat seal, 55/41,5 x 0,5	3	
	TL Capillary	O-ring, 1,78 x 1,02	1	
	TL	O-ring, 12 x 1,5	1	
	TL adapter	O-Ring, 12 x 1,5	1	
	TMH 071 – Fore vacuum connection	O-ring, 13,94 x 2,62	1	
	Test port	O-Ring, 19 x 3	1	
	Pirani element	O-ring, 3,69 x 1,78	2	
	TMH 071 – Valve block	O-ring, 30 x 3,5	2	
	VB – Pump	Centering ring, DN 16 KF	1	
	Test port	Centering ring, DN 25 KF	1	

Ordering No Bestellnummer		Description Bezeichnung	Quantity Menge	Notes Bemerkung
(4D) Spare parts kit for valve block				
PT 110 040 -T	**Spare parts for valve V5**	3/2- way valve **(4D1)**	1	
	Spare parts for valve V1, V2, V3, V6	2/2- way valve **(4D2)**	4	
	Spare parts for valve V4	2/2- way valve **(4D3)**	1	
(4D1) Spare parts kit for valve V5				
PT 110 041 -T	Core		1	
	Spring		2	
	Spring bolt		2	
	O-Ring		1	
	O-Ring		1	
	O-Ring		1	
(4D2) Spare parts kit for valve V1, V2, V3, V6				
PT 110 042 -T	Sealing hood		1	
	Spring		1	
	O-Ring		1	
(4D3) Ersatzteilsatz zu Ventil V4				
PT 110 043 -T	Sealing B SPE		1	
	Spring		1	
	O-Ring		1	

4 MAINTENANCE WORK

4.1 General

CAUTION:
Maintenance on the HLT 2xx may only be performed by persons who have been authorized by PFEIFFER *VACUUM* for this purpose.

Authorized persons:

Repair level I[1)]	Customer
Repair level II[1)]	Customer with technical education or PFEIFFER *VACUUM* Service Engineer
Repair level III[1)]	Customer with PFEIFFER *VACUUM* Service training[2)] or PFEIFFER *VACUUM* Service Engineer

[1)] → see maintenance schedule (page 22 - 23)
[2)] → PFEIFFER *VACUUM* offers courses to rapair level II and III.

CAUTION:
The safety instructions in Chapter 1.3 are to be conscientiously followed whenever maintenance work is performed.

CAUTION:
The power supply and the roughing pump have components that are on voltages higher than 50 V. For this reason the power plug must always be disconnected before the HLT 2xx is opened for service work.

Vacuum area:
Always wear clean, lint-free gloves and use clean tools when working in this area.

4.2 UNO 005A
(valid for HLT 260)

4.2.1 Check oil level and replenish
(weekly)

Required material: Mineral oil, 1 l, from maintenance kit, Ordering No. PT 110 010 -T

Procedure:

- Turn off the power switch.
- Detach the power plug.
- Remove operating unit RC 260.
- With socket wrench unfasten the latch on the right and left-hand side.
- Lift the hood perpendicularly upward.
- Detach the ground cable.
- Visually check the oil level and possible oil discoloration in the UNO 005 A by peeking through ventilator (2).
- If the oil level is below the minimal marker remove the oil filler cap with a screwdriver (→ Fig. 6), fill oil up to the max. marker and turn the screw in again.
- Replace the oil if it is discolored (→ Chapter 4.2.2).
- Reconnect the ground cable.
- Reinstall the hood and close the latches on the left and right-hand side with the socket wrench.
- Reinstall operating unit RC 260.
- Put the HLT 2xx back into service according to the user's guide.

4.2.2 UNO 005A, oil change
(annually)

Required material: Mineral oil, 1 l, from maintenance kit, Ordering No. PT 110 010 -T

Procedure:

- Turn off the power switch.
- Detach the power plug.
- Remove operating unit RC 260.
- With socket wrench unfasten the latch on the right and left-hand side.
- Detach the ground cable
- Lift the hood perpendicularly upward.
- With a screwdriver remove the oil filler cap (→ Fig. 6).
- Position an oil collection vessel and direct the oil drain tube (→ Fig. 6) into the vessel.
- With a open-end wrench size 13 and a hexagon-socket-screw key size 5 unfasten the drain screw on the drain tube (→ Fig. 6) and drain the oil.

- Lightly turn in the oil filler cap. Insert the power plug and allow the pump to run 5 to 10 sec. so that the remaining oil drains.
- Detach the power plug.
- With a open-end wrench size 13 and a hexagon-socket-screw key size 5 reinstall the drain screw on the drain tube.
- Remove the oil filler cap again and fill 0.33 l of fresh oil through a funnel.
- Reinstall the oil filler cap.
- Reconnect the ground cable.
- Reinstall the hood and close the latches on the left and right-hand side with the socket wrench.
- Reinstall operating unit RC 260.
- Put the HLT 2xx back into service according to the user's guide.
- Dispose of the waste oil in accordance with local regulations.

4.3 Oil mist filter

(valid for HLT 260)

4.3.1 Check the oil mist filter, drain it and clean the oil pan

(weekly)

Procedure:

- Turn off the power switch.
- Detach the power plug.
- Remove operating unit RC 260.
- With socket wrench unfasten the latch on the right and left-hand side.
- Detach the ground cable
- Lift the hood perpendicularly upward.
- Visually check the transparent plastic cylinder (→ Fig. 20).
- If oil is located in the plastic cylinder, manually unscrew the plastic cylinder by turning it counterclockwise and dispose of the collected oil in accordance with local regulations.
- Reinstall the plastic cylinder.
- Clean the oil pan with a cloth wet with alcohol.
- Reconnect the ground cable.
- Reinstall the hood and close the latches on the left and right-hand side with the socket wrench.
- Reinstall operating unit RC 260.
- Put the HLT 2xx back into service according to the user's guide.

4.3.2 Replace filter to oil mist filter

(semiannually)

Required material: Mineral oil P3, 1 l, from maintenance kit, Ordering No. PT 110 010 -T

Procedure:

- Turn off the power switch.
- Detach the power plug.
- Remove operating unit RC 260.
- With socket wrench unfasten the latch on the right and left-hand side.
- Lift the hood perpendicularly upward.
- Detach the ground cable.
- Manually unscrew the plastic cylinder by turning it counterclockwise and dispose of the collected oil in accordance with local regulations.
- First wipe the filter retaining screw with a dry piece of cloth, then unfasten it by hand, and remove it together with the filter.
- Put the replacement filter on the retaining screw and reinstall the retaining screw together with the filter.

Fig. 20 Replacing the filter of the oil mist filter

- Reinstall the plastic cylinder.
- Reconnect the ground cable.
- Reinstall the hood and close the latches on the left and right-hand side with the socket wrench.
- Reinstall operating unit RC 260.
- Put the HLT 2xx back into service according to the user's guide.

4.4 MVP 035
(valid for HLT 270)

4.4.1 MVP 035, replace the diaphragm
(semiannually)

Required material: Wearing parts set, from maintenance kit, Ordering No. PT 110 011 -T

Procedure:

- Turn off the power switch.
- Detach the power plug.
- Remove operating unit RC 260.
- With socket wrench unfasten the latch on the right and left-hand side.
- Lift the hood perpendicularly upward.
- Detach the ground cable
- Unfasten the two hoses (fore vacuum and exhaust line) on the diaphragm pump.
- With a Phillips screwdriver No. 2 unfasten 6 screws each on the head covers and simultaneously tilt down the two head covers toward the front, together with the connection lines.
- Remove two sealing rings each on the head covers.
- Also remove the intermediate plates
- Remove two valve plates each on the intermediate plates.
- Carefully turn the HLT 270 forward on its side.

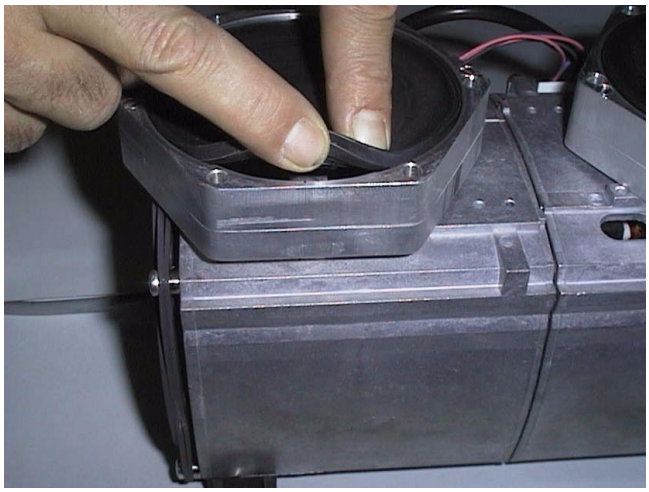


Fig. 21a lift diaphragm

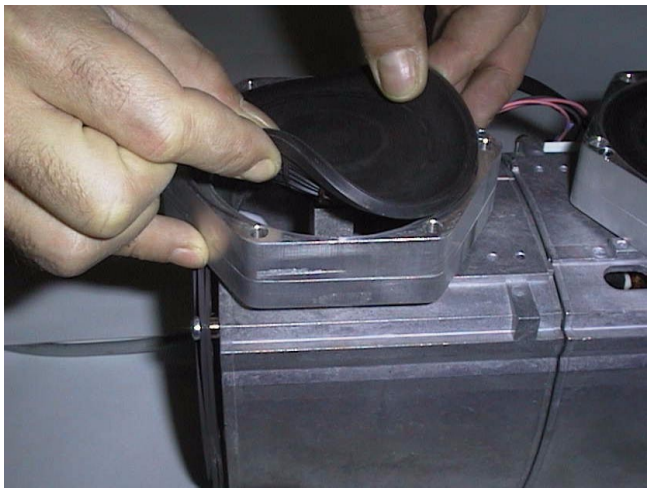


Fig. 21b unscrew diaphragm

⚠ **CAUTION:**
When removing the molded diaphragm make sure that the compensating washers do not get lost.

- With your thumb press in the molded diaphragm in such a way that you can grip it on the opposite side with the other fingers. (→ Fig. 21a).
- Unscrew the molded diaphragm from the pump housing by turning it counterclockwise (→ Fig. 21b).

- Clean contaminated parts and sealing surfaces with alcohol.
- Fit each new molded diaphragm with the same number of compensating washers as the old one.
- Screw in the new molded diaphragms.
- Carefully set the HLT 270 upright.
- Set the intermediate plates on the molded diaphragm and install the valve plates.
- Insert the sealing rings on the head covers and place both head covers together in the correct position on the intermediate plate.
- With a Phillips screwdriver No. 2 screw in and tighten 6 screws on each head cover.
- If an external roughing pump is used, reestablish the KF 16 connection to the external roughing pump.
- Reconnect the ground cable.
- Reinstall the hood and close the latches on the left and right-hand side with the socket wrench.
- Reinstall operating unit RC 260.
- Put the HLT 2xx back into service according to the user's guide.

4.5 Scroll pump

(valid for HLT 275)

4.5.1 Varian Triscroll TS600

Maintenace work according to Varian operating instructions

4.6 TMH 071

(valid for HLT 260, HLT 265, HLT 270, HLT 275)

4.6.1 Replace the lubricant reservoir

(semiannually)

Required material: Replacement lubricant reservoir from maintenance kit

Ordering No.	PT 110 010 -T
or	PT 110 011 -T

The system for lubricating the ball bearing is factory filled with TL 011. The lubricant needs to be changed at least once per year (under extremely heavy loads or unclean processes more frequently).

The complete lubricant reservoir must always be changed.

Procedure:

- In MANUAL MODE switch off the TMH 071 and wait until the rotational speed is <50 Hz.
- Vent the HLT 2xx by opening the valves V3 and V6.
- Turn off the power switch.
- Detach the power plug.

  ⚠ **CAUTION:**
  To prevent damage on the TMH 071 the HLT 2xx may not be moved for 4 minutes after it has been switched off.

- If an external roughing pump is used, detach the KF16 connection to the external roughing pump.
- Carefully set the HLT 2xx on its back or on ist right side in front view.

Fig. 22 Bottom of HLT 2xx

- With a hexagonal socket wrench size 19 (or, if your unit is equipped with a new TMH 071, with PFEIFFER tool PVM40498) unscrew the cap (→ Fig. 22) on the bottom.
- Remove the lubricant reservoir (→ Fig. 22) with two screw drivers and dispose of it in accordance with local regulations.
- Insert a new lubricant reservoir (according to PM 800 504 BN) and reinstall the cap screw.
- Set the HLT 2xx upright again.
- If an external roughing pump is used, reestablish the KF 16 connection to the external roughing pump.
- Put the HLT 2xx back into service according to the user's guide.

4.6.2 TMH 071, exchange for bearing change
(biannually)

Required material: Exchange TMH 071, Ordering No. PM P02 810 #A

⚠	**CAUTION** This work must be carried out by PFEIFFER *VACUUM* or a service engineer who has been trained by PFEIFFER *VACUUM*.

4.7 Valve block

(valid for HLT 260, HLT 265, HLT 270, HLT 275)

4.7.1 Clean or replace the screwed fitting with filter on the vent connection

(semiannually)

Required material: Replacement lubricant reservoir from maintenance kit

Ordering No.	PT 110 010 -T
or	PT 110 011 -T

Procedure:

- Turn off the power switch.
- Detach the power plug.
- Remove operating unit RC 260.
- With socket wrench unfasten the latch on the right and left-hand side.
- Lift the hood perpendicularly upward.
- Detach the ground cable

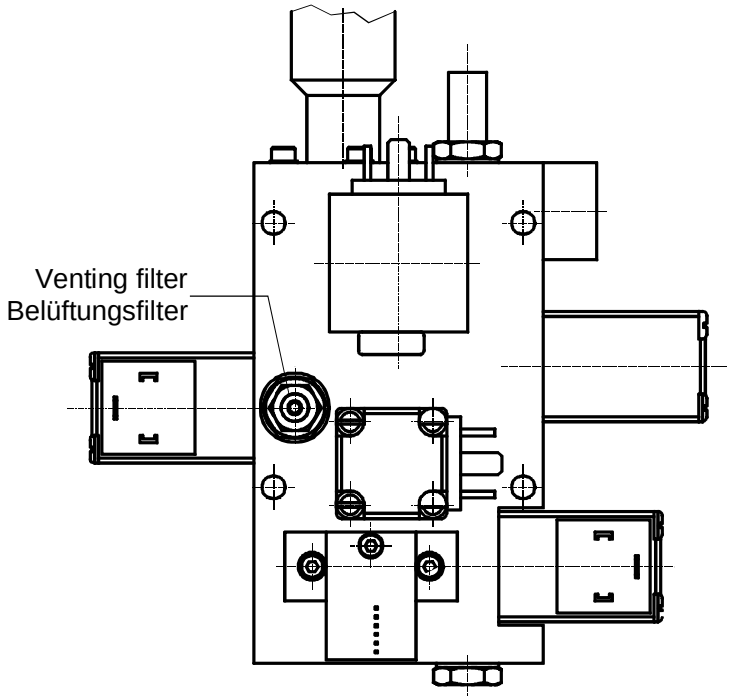


Fig. 23

- With a fork wrench size 12 unfasten the hose coupling on the valve block and pull the hose off the nipple (→ Fig. 23).
- With a hexagon pipe socket wrench size 17 remove the screwed fitting with filter.
- Install the replacement screwed fitting together with the filter on the valve block.
- Mount the hose on the nipple and tighten the hose coupling.
- Connect the ground cable.
- Reinstall the hood and close the latches on the left and right-hand side with the socket wrench.
- Reinstall operating unit RC 260.
- Put the HLT 2xx back into service according to the user's guide.

4.7.2 Clean the Pirani measuring elements P1 and/or P2
(semiannually)

⚠	**CAUTION** This work must be carried out by PFEIFFER *VACUUM* or a service engineer who has been trained by PFEIFFER *VACUUM*.

4.7.3 Clean the valve block, replace the seals and revise the valves
(annually)

Required material:

Seal kit, Ordering No.	PT 110 030 -T
Spare parts kit to valve block, Ordering No.	PT 110 040 -T

⚠	**CAUTION** This work must be carried out by PFEIFFER *VACUUM* or a service engineer who has been trained by PFEIFFER *VACUUM*.

4.8 Ventilator 1

4.8.1 Clean / replace the filter mat
(weekly / quarterly)

see User's guide HLT 2xx BG 805 263 BE

4.9 LP 5xx

4.9.1 Replace capillary filter
(weekly)

see User's guide LP 5xx, BG 805 268 BE

4.9.2 Replace the sinter filter
(quarterly)

see User's guide LP 5xx, BG 805 268 BE

4.10 Checking the Maintenance Work

The following sections suggest how to check that periodic maintenance work has been carried out.

⚠	**CAUTION:** In case of neglect of the maintenance work restrictions or refusal of warranty claims might apply.

4.10.1 Weekly Maintenance Work

Assembly	Work to be performed	→ Section	O.K.
UNO 005A	Check oil level and replenish	4.2.1	
Oil mist filter	Replace filter to oil mist filter	4.3.1	
Ventilator 1	Clean the filter mat	BG 805 263 BE	
LP 5xx	Replace the capillary filter	BG 805 268 BE	

The above work has been carried out by: .....

Date: ..... Signature: .....

4.10.2 Quarterly Maintenance Work

Assembly	Work to be performed	→ Section	O.K.
Ventilator 1	Replace the filter mat	BG 805 263 BE	
LP 5xx	Replace the sinter filter	BG 805 268 BE	
Sound absorber	Replace sound absorber cartridge	B 8199 999 XD	

The above work has been carried out by: .....

Date: ..... Signature: .....

4.10.3 Semiannual Maintenance Work

Assembly	Work to be performed	→ Section	O.K.
Oil mist filter	Replace the filter	4.3.2	
MVP 035	Replace the diaphragm	4.4.1	
TMH 071	Replace the lubricant reservoir	4.6.1	
Valve block	Clean or replace the screwed fitting with filter	4.7.1	
	Clean the measuring elements P1 and/or P2	4.7.2	

The above work has been carried out by: .....

Date: ..... Signature: .....

4.10.4 Annual Maintenance Work

Assembly	Work to be performed	→ Section	O.K.
UNO 005A	Oil change	4.2.2	
Valve block	Clean the valve block, replace the seals and revise the valves	4.7.3	

The above work has been carried out by: .....

Date: ..... Signature: .....

4.10.5 Biannual Maintenance Work

Assembly	Work to be performed	→ Section	O.K.
TMH 071	Exchange for bearing change	4.6.2	

The above work has been carried out by: .....

Date: ..... Signature: .....

CONTAMINATION DECLARATION

The service, repair, and/or disposal of vacuum equipment and components will only be carried out if a correctly completed declaration has been submitted. Non-completion will result in delay.
This declaration may only be completed (in block letters) and signed by authorized and qualified staff.

1 Description of product

Type _____
Article Number _____
Serial Number _____

2 Reason for return

_____
_____
_____

3 Operating fluid(s) used (Must be drained before shipping.)

_____
_____

4 Process related contamination of product:

toxic	no ❑ 1)	yes ❑
caustic	no ❑ 1)	yes ❑
biological hazard	no ❑	yes ❑ 2)
explosive	no ❑	yes ❑ 2)
radioactive	no ❑	yes ❑ 2)
other harmful substances	no ❑ 1)	yes ❑

The product is free of any substances which are damaging to health yes ❑

1) or not containing any amount of hazardous residues that exceed the permissible exposure limits

2) Products thus contaminated will not be accepted without written evidence of decontamination!

5 Harmful substances, gases and/or by-products

Please list all substances, gases, and by-products which the product may have come into contact with:

Trade/product name	Chemical name (or symbol)	Precautions associated with substance	Action if human contact

6 Legally binding declaration:

I/we hereby declare that the information on this form is complete and accurate and that I/we will assume any further costs that may arise. The contaminated product will be dispatched in accordance with the applicable regulations.

Organization/company _____

Address _____ Post code, place _____

Phone _____ Fax _____

Email _____

Name _____

Date and legally binding signature

_____

Company stamp

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