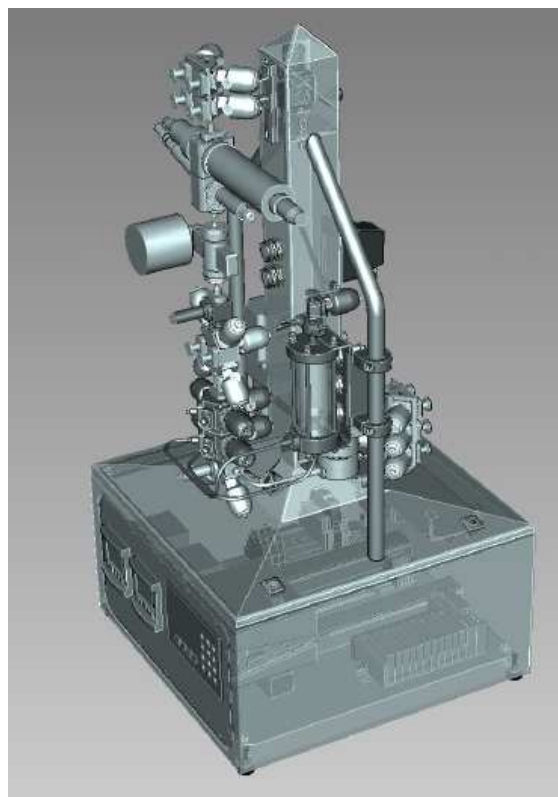


PK *Pilot*

Chromatography Systems



Pall Series of PK Chromatography Systems

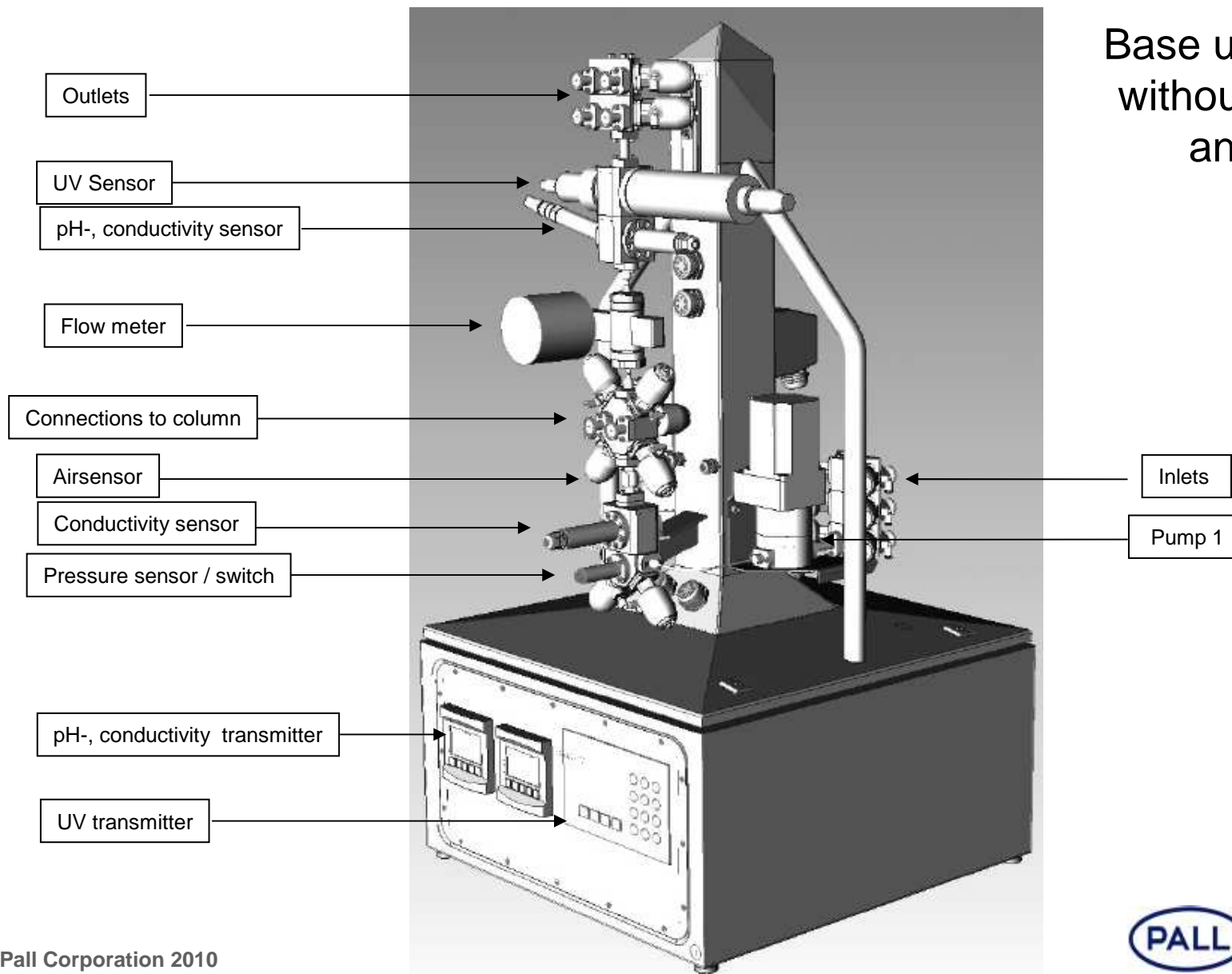


Pall PK *Pilot*



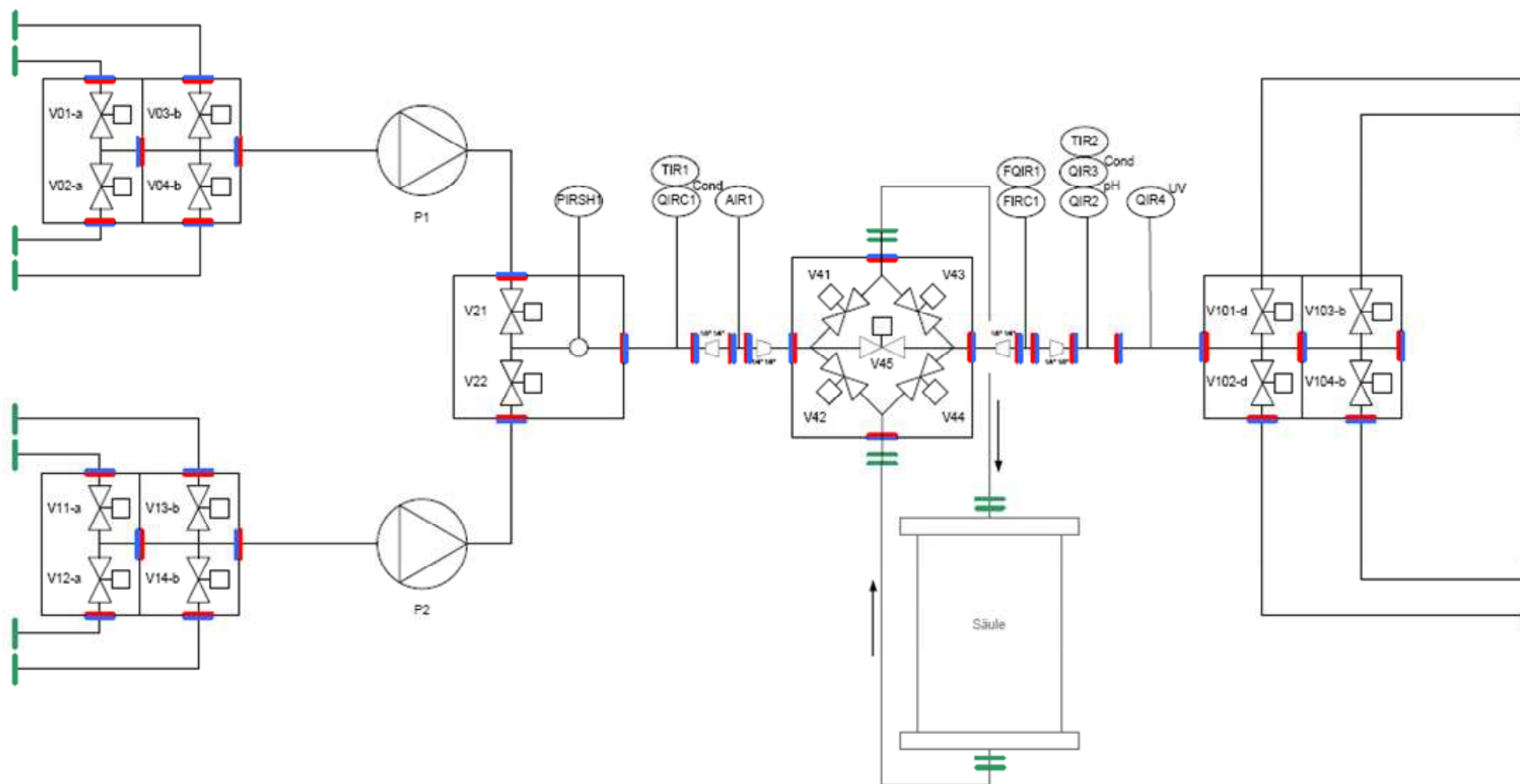
PK^{Pilot} Overview

Base unit shown
without cabinet
and PC



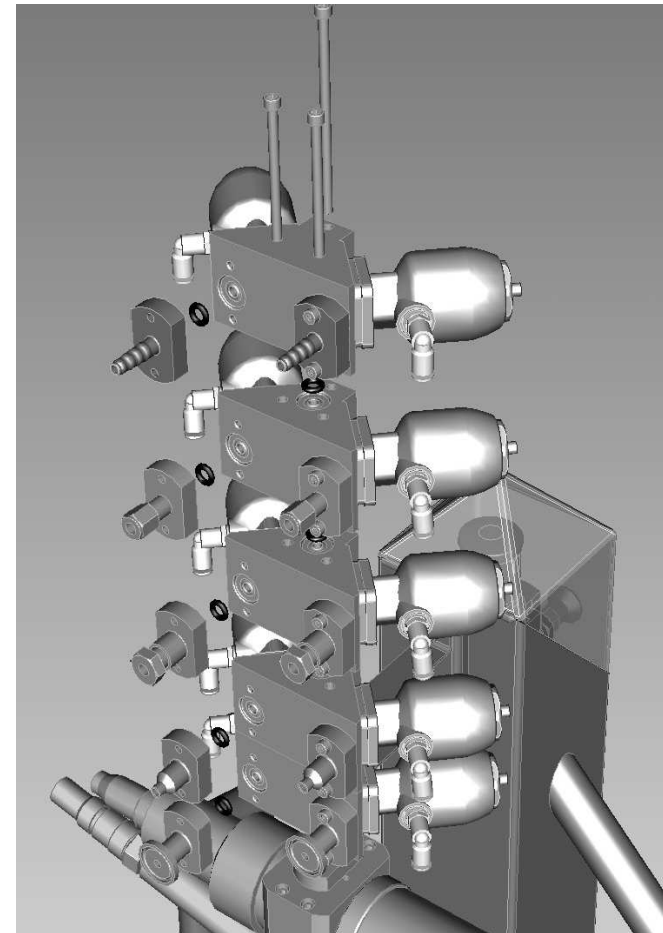
P&ID of PK^{Pilot}

TC 25 mm | DIN 11864 NF | DIN 11864 BF



High Flexibility

- Base unit with 4 exits as standard
- Additional valve pairs can be integrated easily
- Up to 14 fractions can be collected
- Similar capabilities also on inlet side
- Connections can be chosen between TC, quick couplings, hose barb, butt weld or screw fittings



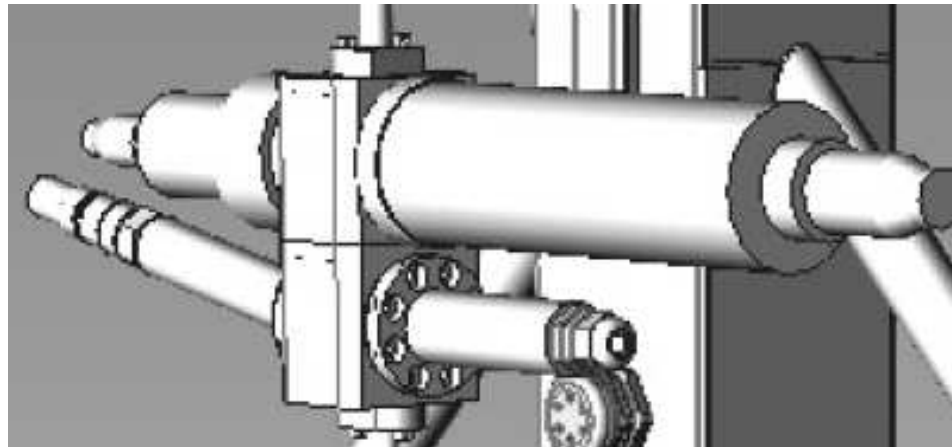
Components and Fluid Path

- Membrane piston pumps with minimised pulsation
- 2 Pumps for gradient formation and inline buffer dilution
- Flow rates: 16 - 2500 ml/min
- Components with aseptic connections to DIN 11864-3 A NF and BF for minimised hold-up volumes
- Material:
 - Stainless steel: 1.4435 / 1.4539
 - Valves: EPDM FDA/USP Class VI
 - Pump membrane: EPDM / PP
FDA/USP Class VI



UV, Conductivity and pH Senors

- **Compact flow-trough cell**
 - Minimised hold-up volumes
 - Flow-through mode
 - UV Transmitter C4000
 - pH / LF Transmitter Mettler Toledo M300 Series



Performance Data of PK^{Pilot}

System type	PK ^{Pilot} 1	PK ^{Pilot} 2	PK ^{Pilot} 3
Pipework ID	1/8"	1/4"	3/8"
Volume flow range	1-20 L/h	1-100 L/h	1-150 L/h
Max. flow velocities	1,7 m/s	1,7 m/s	1,0 m/s
Gradient / In-line-Verdünnung	Yes:	5-95 % ab 20 L/h 10-90 % ab 10 L/h 20-80 % ab 5 L/h	
Max. operating pressure	6 bar g		
Max. operating temperature	2 – 60 °C for Produktion, up to 80 °C CIP		
Product wetted materials	316L (1.4435), EPDM (gaskets), borsilicate glass, glass, saphire glass, PEEK		
Surface roughness	Product wet areas: Ra ≤ 0.6 µm, electro polished		
Pumps	2 x 4-piston membrane pumps (1-150 L/h)		
Number off inlets (incl.Product)	4-12 (in even numbers)		
Number off outlets	4-14 (in even numbers)		
Number of columns	1		
Flow direction relative to column	Forward, backward, bypass modes		
Optional bubble trap with bypass	Pre column, automated, filledt (3 off LS-Sensors Working volume approx. 0,15 L		
Optional filter with bypass	Pre column		

Hold-up Volumes

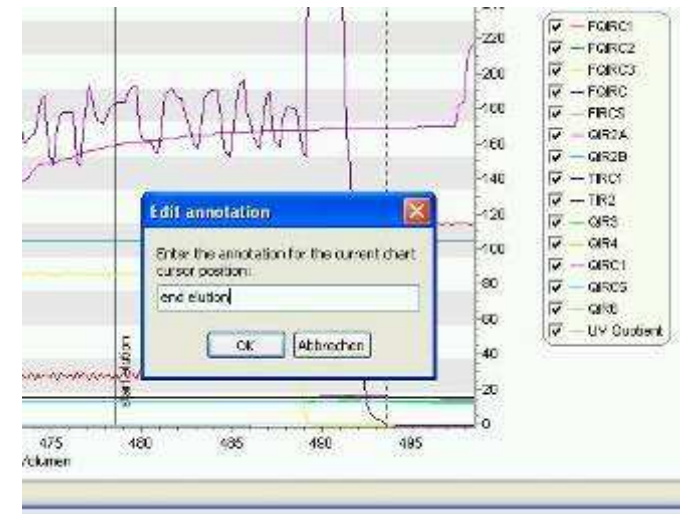
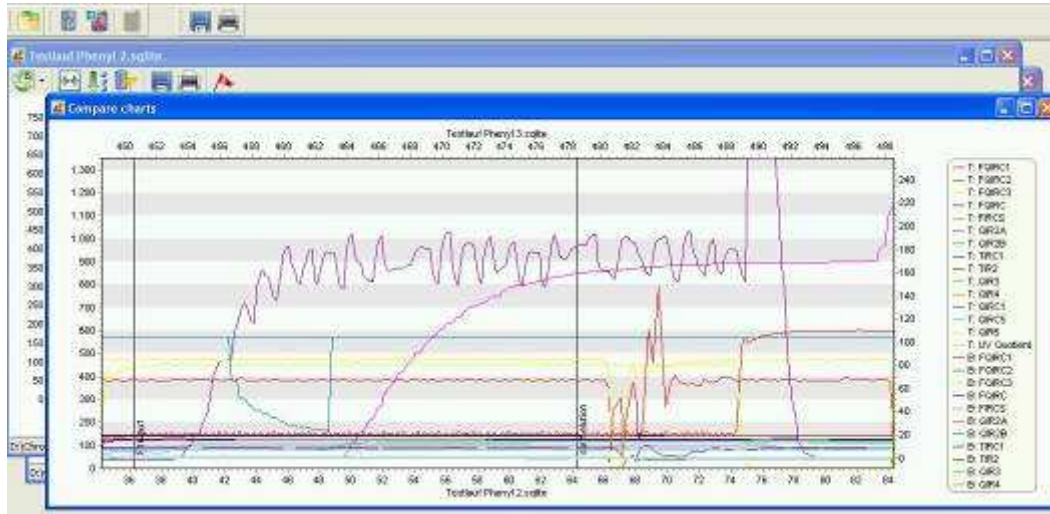
System	Inlet to column connection (ml)	Inlet to outlet (ml)
PK^{Pilot 1}	< 40	< 120
PK^{Pilot 2}	< 50	< 150
PK^{Pilot 3}	< 60	< 180

Features of PK^{Pilot} Software

- High variability in process design possible
- Easy Scale-up
- Intuitive generation of recipes
- Batch processing of recipes with scheduler function
- Manual or automated operation
- Trending / Reporting / Alarm Funktionen
- Integrierted analysis function

High Performance Analysis Software

- Setting and editing of chart markers
- Peak analysis (HETP, Integration)
- Comparisons with history trends
 - Up to 10 runs comparable
 - Up to 20 blots can be shown



High Performance Analysis Software

- **Precise analysis of batch results**
- **Result processing for reporting**
- **Data export function**
- **Process optimisation easier through comprehensive batch parameter and result documentation**
- **Intuitive user interface operation**
- **Batch records for documentation of reproducibility of results**

Scale-up to PK Systems

- Identical P&ID between PK^{Pilot} and PK systems for optimal scale-up
- Predefined Phases logic identical to PK systems for easy orientation during scale-up
- In future, all system run identical analysis software for comprehensive data analysis between PK^{Pilot} and PK systems
- Pall PK/PK^{Pilot} features and benefits can be exploited in all Low Pressure Liquid chromatography processes

