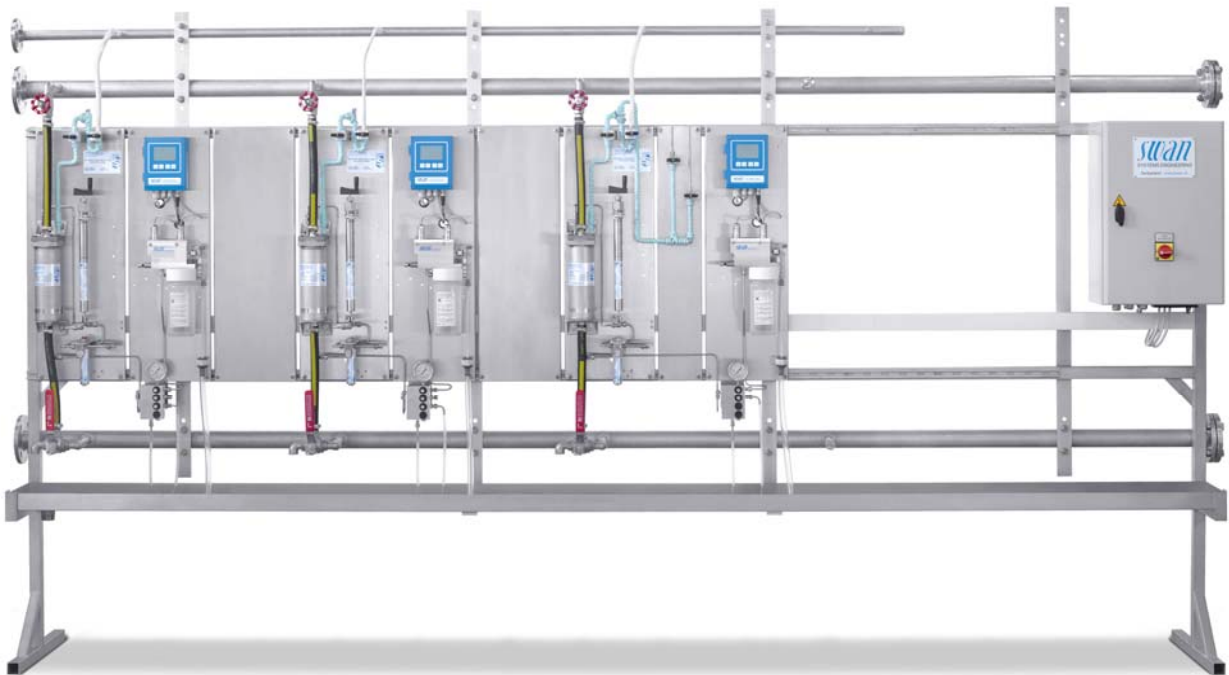




KEPAS

Sampling & Analyzing Station

Technical System Description



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1. System Description

1.1. KEPAS Sampling & Analyzing Station

The SWAN KEPAS Sampling & Analyzing station is a complete ready-for-operation system for the monitoring of water and steam quality in cycles using boilers with single pressure stage. With its standard configuration and pre-defined options, the KEPAS is suitable for installation in a variety of plants and also allows for future upgrades with additional instrumentation.

The self-standing racks, with straightforward layout of compact components offer the maximum in user comfort and safety.

1.2. Summary of Scope of Supply

- Sample conditioning and analysis rack, assembled, tested and packed for delivery FCA Hinwil CH (Incoterms 2010)
- Test documentation (see detail description)
- Standard system documentation (see detail description)
- Accessories and consumables for commissioning period (3 months)

2. Required operating conditions

The following conditions are required to ensure the smooth operation of the analyzing system:

2.1. Environmental conditions

- The location for the system must be such that it is protected from the following:
 - dust
 - frost
 - direct sunlight and radiation
 - strong vibrations
 - precipitation
 - flooding
- Area temperature: T min. = > 0°C, T max. = < 45°C. Non-condensing humidity.

2.2. Spare requirements

- System to be mounted on level floor, concrete foundation or metal grating with adequate mounting points.
- Footprint required: 2200 x 600 x 4000 mm (H x W x L)
- Required clearance for work space: min 1 m on the instrument side (see LAY_KEP_01)

2.3. Cooling Water

Cooling Water Requirements	
Quality	Demineralized Water (with max. 40% Glycol)
Conductivity	< 50 µS/cm after Cation Exchanger (25°C)
System pressure	min. 4 bar(a)
Design pressure	16 bar(a)
Pressure loss (cooling water inlet to outlet)	ca. 1.5 bar
Flow rate	ca. 5 – 6.5 m ³ /h
Inlet temperature	max. 40° C
Outlet Temperature (design)	55° C

2.4. Power Requirements

The following power supply must be available:

Voltage	Frequency	Phase Number	Wiring Designation	Consumption	Earthing System
230 VAC	50 Hz	1 Phase	L,N,PE	~0.5 kW	TN-S

Detailed information on electrical design can be found in the electrical wiring diagram EWD_KEP_01.

3. Sample lines and measured parameters

KEPAS is designed for the following samples in the water-steam cycle:

Possible Measurement Combinations									
Sample Line	Condition Ranges (design)		Parameters						
			Specific Conductivity	Acid Conductivity (after cation exchanger)	pH (with glass electrode)	pH (calculated value)	Dissolved Oxygen	Silica	Manual Grab Sample
Basic Assembly									
Feedwater	to 232°C	35 - 220 bar	●	●		●	○		●
Boiler Water	to 537°C	35 - 220 bar	●	●	○	●			●
Live/Sat. Steam	to 537°C	50 - 220 bar	●	●		●		○	●
Options									
Condensate	to 232°C	3 - 35 bar	○						○
Demin Water	to 45°C	4 - 16 bar						○	

¹⁾ Calculation of pH performed according to VGB method

4. Sample Preparation

4.1. General

Each sample line is equipped with a sample conditioning system to ensure the following:

- Reliable operation; the delivery of adequately cooled sample under constant pressure to the analyzing instruments.
- Safety for personnel (suitable shut-off elements, protection against high temperature and pressure)
- Low-maintenance operation

For the complete P&ID drawing from KEPAS, see attached PID_KEP_01.

4.2. Components

Description	Data Sheet	P&ID Ref
Shut-off valve, PFA- Packing, Bakelite handle	Den_SS-1VS4 (F-300594)	1, 2 ²⁾
High temperature shut-off valve, Grafoil packing	Den_SS-3NBS4-G (F-300599)	1, 2 ²⁾
Cooling Water inlet valve, 3-Way ball valve 3/4" Rp	Dms_SS-CW406 (F-300935)	3
Cooling Water regulating valve, 3/4" (straight seat)	Dms_SS-CW408 (F-301035)	4
Sample cooler TLF4225 (Water, Steam)	Den_SE-7-00686A (F-300567)	5
Pressure reducing valve, VREL	Den_SE-700744A (F-300571)	6
Filter, Series TF, 140 Micrometer Filter element	Den_SS-4TF-140 (F-300622)	7
Temperature shut-off valve, TSV without signal contact	Den_SE-7-01137E (F-300572)	8
Back pressure regulator, BPRV, with manometer	DenA8258XXXX_Back_pressure_regulator	9

²⁾ Dependent on sample pressure and temperature

5. Instrumentation

5.1. Monitors

Analytical Instrumentation is carried out exclusively by SWAN Monitors. For specific information on the instruments, refer to the attached datasheets.

SWAN Monitor	Measured Parameter	Data Sheet
AMI Deltacon Power	Specific and Acid Conductivity, pH calculated	DenA23461XXX_Monitor_AMI_Deltacon_Power
AMI Oxytrace	Dissolved Oxygen	DenA2240XX00_Monitor_AMI_Oxytrace_QV-Flow
AMI pH / SI	pH- Value	DenA2121XX1X_Monitor_AMI_pH_Redox_QV-Flow
AMI Powercon S	Specific Conductivity	DenA23441XX0_Monitor_AMI_Powercon_Specific
AMI Silica	Silica	DenA25431000_Monitor_AMI_Silica

5.2. Signal exchange

Signals are exchanged over PROFIBUS DP (customer interface is 2 clamps in the electrical cabinet).

In addition, selected analog signals (4...20mA) are individually wired to the cabinet. See details in the attached PID_KEP_01. One common digital alarm for the analytical instruments with hand wired analog signals is also wired to the cabinet (condition ALARM = Closed).

Spare clamps are available in the cabinet and can be used by the customer to wire additional signals.

For information on the signal interfaces and other electrical details, see EWD_KEP_01.

6. Documentation

6.1. Standard documentation

Standard Documentation for the KEPAS system includes:

- P&ID
- Layout Drawing
- Parts and Instrument List
- Spare Parts and Consumables List for 2 years
- Electrical wiring diagram with signals, component list and cabinet layout
- Operation manual for complete system and single components

Drawings are also available, upon request, in Autocad .dwg format, for the customer to adapt as needed (title block, project reference numbers, KKS labels, etc). SWAN Systeme will modify the drawings only when technical changes are required.

6.2. Test documentation

Test Documentation includes:

- Acceptance Test Protocol for complete system
- Protocol for Power and Signal tests
- Protocol Pressure and Leak tests
- Test certificates from sub-assemblies and components

The test documentation will be delivered on CD-ROM in .pdf format.

7. Additional

7.1. Spare Parts and Consumables

Material required for commissioning and the first 3 months of operation are included in the delivery.

7.2. Terminal points list

Terminal point	Connection type
Cooling water inlet / -outlet	1 x Flange with counter flange and 1 x blind flange, DIN 2633, DN50, PN16, A2, Welding neck
Sample inlets	Swagelok Compression fittings 1/4"
Line flushing (hot)	Flange and counter flange one-sided, DIN 2633, DN25, PN16, A2, Welding neck
Drain (cold)	ISO threaded nipple 1 1/2" R

8. Appendices

Nr.	Reference	Description
1	PID_KEP_01	P&ID drawing
2	LAY_KEP_01	General layout from complete system
3	EWD_KEP_01	Electrical wiring diagram
4	DenAXXXXXXXXXX	Instrument Datasheets