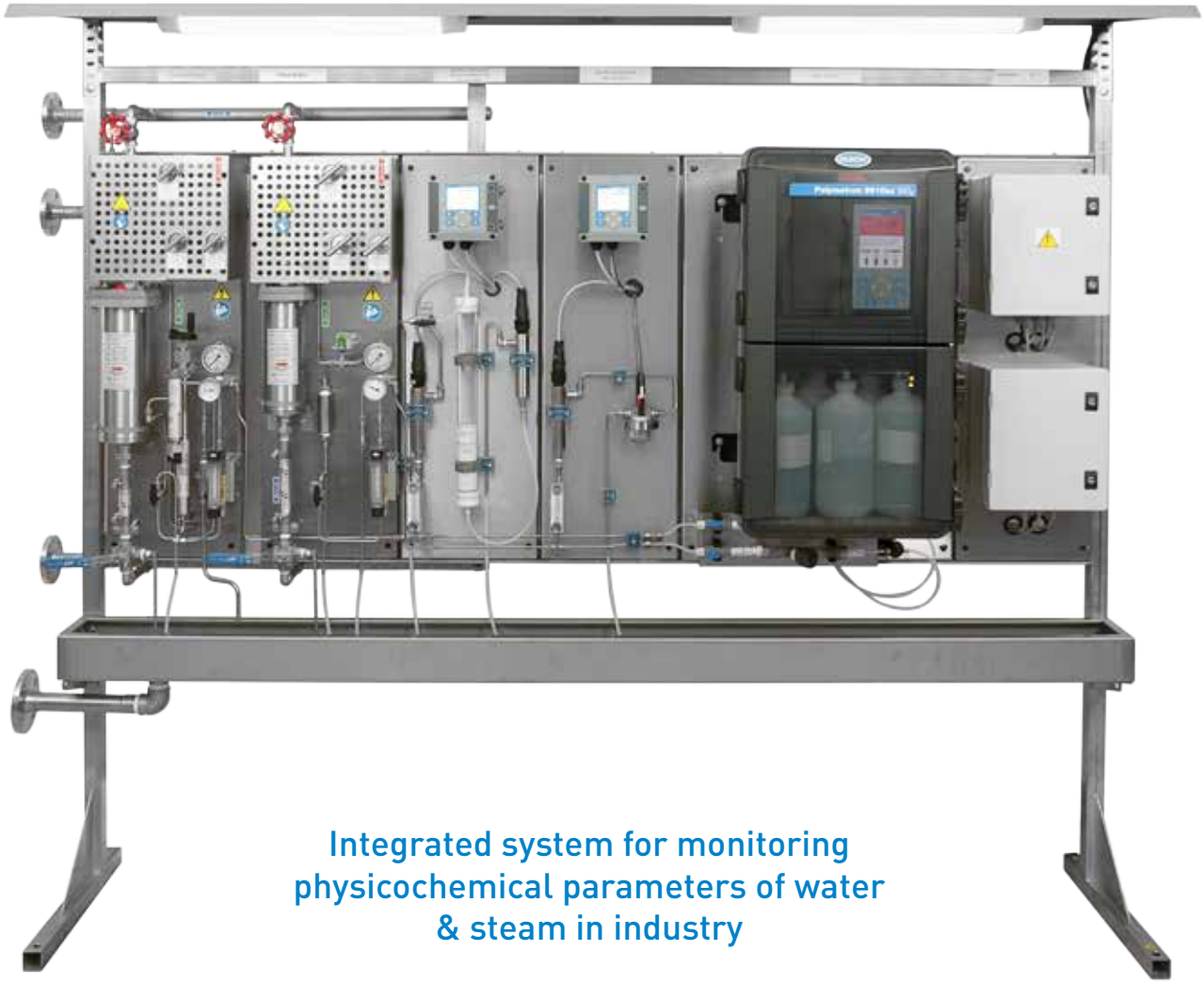
HACH®

Be Right™

EasySam®



Integrated system for monitoring
physicochemical parameters of water
& steam in industry

About EasySam®

Application

EasySam® is the first of its kind, available on the market, compact system for on-line monitoring of water and steam parameters in power plants, heat and power plants, incinerators etc.
On-line analyzers, used in EasySam® system, provide you with precise and real-time knowledge about the process status and can be implemented in both automatic process control and security systems.
In water-steam circuits of power plants, as well as heat and power plants, incinerators etc., samples of water and steam are usually extremely hot and under high pressure. Because of this, samples need to be cooled down and their pressure shall be reduced in order to prepare them for on-line analyzers and manual grab for laboratory use. Additionally, fixed and correct flow-rate of samples has to be set, in order to guarantee their representativeness.

All of this can be easily achieved: just install the EasySam®, connect the samples, cooling water and drain! The system is ready for operation!

Specification

In order to select an EasySam® compact sample preparation and analysis system correctly, for each sample: select appropriate sample preparation panel ESS (cooler, pressure reducer, thermal protection, etc.) and ESA panel(s) with analyzers, which will be connected to this ESS. For each ESA panel you must choose such options as: number of channels, types of signal outputs and accessories (shut-off valve, flowmeter, individual sink, etc.).

Then, decide whether connection of all panels will be made on your own, or the system shall be assembled and pre-wired on an ESR rack. You shall specify ESR rack options (material, number of panels to be mounted, electrical / signal box (es), length, etc.).
EasySam® will be provided with test certificates and standard technical documentation. The way of making ordering codes for components of the entire analytical system (ESS, ESA and ESR) is shown on next pages.

Features

- Versions for low (< 70 bar / 380°C) and high (< 345 bar / 540°C) sample parameters.
- Compact and very efficient cooler (minimizes cooling water demand).
- Adjustable and cleanable in place VREL® pressure reducer for pressures > 70 bar.
- Thermal shut-off valve TSV protecting personnel and analyzers against high temperature in case of lack of cooling water.
- Back Pressure Regulator / Relief Valve BPRV ensures both sample representativeness and system safety.
- Temperature indicator for each ESS panel.
- Reliable, credible and low operating cost analyzers of parameters: conductivity, pH, O_2, SiO_2, Na^+, PO_4.
- Possibility of setting sample flow-rates for individual analyzers.
- Individual sink for each panel or common gutter.
- Complete electrical assembly. Electrical and signal box(es).
- Ready for operation self-standing rack for all panels.
- Complete hydraulic assembly.

Sample panels for sample pressure up to 356 bar and temperature up to 621°C are available on request.

ESS - Requirements

NOTE

The following information is required for each ESS panel: sample name / pressure / temperature / tag number (if available) / cooling water type (surface, potable, softened, DEMI, other) / cooling water parameters (max. temperature and pressure, chlorides concentration, turbidity, pH, conductivity).

Requirements for cooling water

- Water after treatment (at least decarbonized water after filters) preferred.
- Pressure: 1.5 to 6 bar; temperature: up to 40°C (pressure drop downstream of coolers: 0.3 to 0.7 bar).
- Turbidity: below 50 NTU; pH: 7 to 12; conductivity < 100 µS/cm.
- Chlorides concentration: < 250 ppm for sample temperature 25 – 180°C; < 100 ppm for sample temperature 180 – 290°C, < 25 ppm for sample temperature 290 – 550°C (for higher chlorides concentration Inconel coolers have to be used).
- Cooling water demand (depends on sample temperature and number/type of analyzers connected):
  - for TLR-4225/42B5 cooler: 0.2 to 1.2 m^3/h for water and to 1.6 m^3/h for steam,
  - for FLR-6225/62B3 cooler: 1.2 to 2.7 m^3/h for water and steam.
- If cooling water with such parameters is not available, we can deliver a closed cooling water system (eg. CWIS - cooling water isolation skid or closed cooling water circuit supplied by chiller).

Sample flow demand for analysers:

- 200 ml/min for conductivity,
- 100 ml/min for pH, O_2 and Na^+,
- 150 ml/min for SiO_2 and PO_4, as well as 350 ml/min for grab sample.

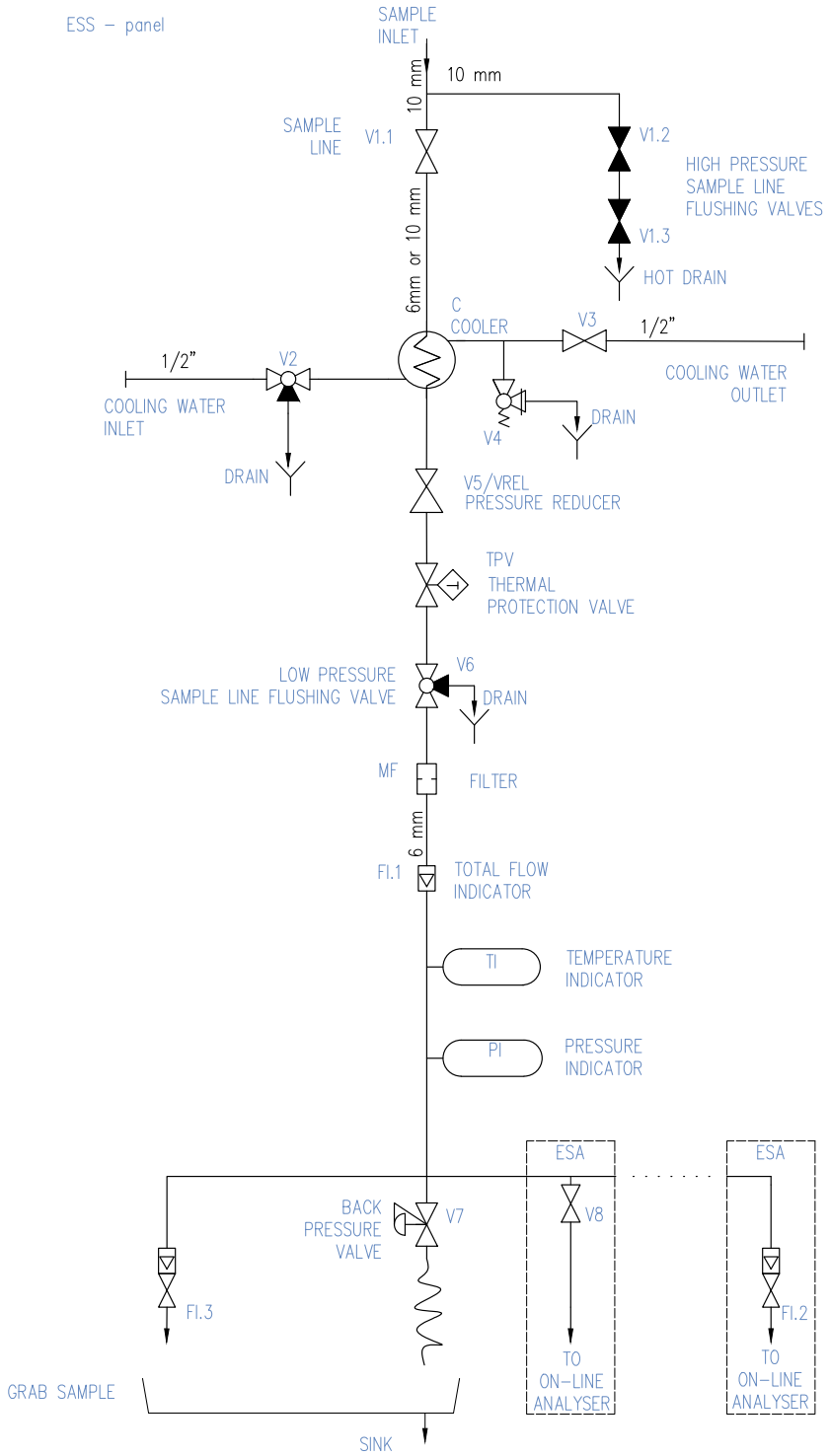
Customized sampling station

On request we can deliver sampling systems, which are tailor-made acc. to Customer's needs. They may include, but are not limited to:

- complete analytical container (with samplers, analyzers, power and signal distribution box(es)), completely pre-piped and pre-wired,
- closed cooling water circuit providing sample temperature at 25°C +/-1°C,
- technical and quality documentation.

EasySam® - P&ID

Each sampling panel is made of 304 stainless steel (EN 1.4301) or 316 stainless steel (EN 1.4401) – dimensions: 300 x 915 mm with all components pre-mounted and holes for easy mounting onto a rack or a wall.
Sample wetted materials: 316 stainless steel (EN 1.4401). Sample connections: 10 mm (on request: 6 mm, 1/4", 3/8", etc.); cooling water connections: 1/2".



	DESCRIPTION
V1.1	Sample inlet shut-off valve
V1.2	Sample flushing shut-off valve
V1.3	Sample flushing 2nd shut-off valve
C	Sample cooler:
	C1: TLR-4225
	C2: FLR-6225
	C3: TLR-42B5
	C4: FLR-62B5
V2	Cooler drain valve
V3	Cooling water throttle valve
V4	Cooling water safety valve
V5 / VREL	Pressure reducer: needle valve / VREL (Variable Pressure Reducing Element)
TPV	Thermal protection valve:
	TPV1: TSV - Thermal shut-off valve
	TPV1A: TSV -with alarm
	TPV2: HST - High sample temperature valve
	TPV3: TSSV – High pressure servo-controlled ball valve
V6	Low pressure flushing valve
MF	Filter
FI 1	Total flow indicator
	FI.1: Total flow indicator without alarm
	FI.1A.NO: Total flow indicator with alarm (NO)
	FI.1A.NC: Total flow indicator with alarm (NC)
TI	Temperature indicator
PI	Pressure indicator
V7	Back pressure valve:
	V7.1: BPRV (Back pressure / relief valve)
	V7.2: Relief valve
V8	Sample cut-off / regulating valve
FI.2	Flow indicator with regulating valve
FI.3	Flow indicator with regulating valve

Key components - ESS

Coolers

The highest efficiency sample coolers available on the market for water and steam samples. Compact design, very low cooling water demand. Various configurations of sizes and materials (including Inconel for low quality cooling water) available. For samples up to 345 bar at 540°C (356 bar at 621°C for supercritical parameters on request).

Thermal Protection Valve - TSV

Protects personnel, analyzers and sampling components against high temperature liquids. Suitable for pressures up to 303 bar.
Totally mechanical design requires no electricity, air or hydraulics. Simple reset push-button, optional dry contact for remote indication. Standard trip temperature 49°C (others possible). Constructed of 316 stainless steel (EN 1.4401).

Pressure reducer - VREL®

Adjustable sample pressure reducer for sample pressures above 70 and up to 345 bar (or 538 bar for Inconel version on request). "Rod–in–tube" construction allows precise control of flow and pressure without VREL erosion or dissociation of any components. All wetted parts are fabricated from 316 stainless steel (EN 1.4401). Cleanable in place, "in - situ", by retracting the rods without disconnecting from sampling panel.

Back Pressure Regulator - BPRV

The Back Pressure Regulator / Relief Valve (BPRV) maintains constant pressure and constant flow to analyzers while protecting the analyzers as a safety valve.
Precise pressure regulation and control when used in conjunction with a pressure reducer (VREL or pressure control valve).

HACH LANGE GmbH Willstaetterstr. 21,40549 Duesseldorf, Germany | P +49 211 5288 0 | www.de.hach.com

ESS panel - ordering code

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Sampling panel specification						Sample panel type							Language	
X	X	X	X	X	X	X	X	X	X	X	X	X	9	9

1. Panel configuration

ESS-1: for low sample parameters: < 70 bar / 380°C; (with **V5**, Ham-Let fittings).	1
ESS-2: for high sample parameters: < 345 bar / 540°C; (with **VREL**, Ham-Let fittings).	2
ESS-3: for low sample parameters: < 70 bar / 380°C; (with **V5**, Swagelok fittings).	3
ESS-4: for high sample parameters < 345 bar / 540°C; (with **VREL**, Swagelok fittings).	4

2. Sample flushing shut-off valve options

None	0
V1.2: Single sample flushing shut-off valve (< 110 bar acc. to VGB)*.	1
V1.2 + V1.3: Double sample flushing shut-off valves (> 110 bar acc. to VGB)*.	2
V6: Tree-way valve for low pressure flushing (grab sample during start-up)**.	3
V1.2 + V6: Single sample flushing shut-off valve & tree-way valve for low pressure flushing*, **.	4
V1.2 + V1.3 + V6: Double sample flushing shut-off valves & tree-way valve for low pressure flushing*, **.	5

**Hot drain shall be available.*
***Recommended for grab sampling during start-up (at low sample pressure).*

3. Cooler options

None (sample temperature < 45°C).	0
C1: TLR-4225 cooler, (316 stainless steel (EN 1.4401) tubing, 345 bar @ 540oC, for water and steam) Efficiency: < 1.8 l/min for water and < 1 l/min for steam.	1
C2: FLR-6225 cooler, instead of TLR-4225, (316 stainless steel (EN 1.4401) tubing, 345 bar @ 540oC, for water and steam) Efficiency: < 3.5 l/min for water and < 2 l/min for steam). Also for low pressure steam < 30 bar.	2
C3: TLR-42B5 cooler, instead of TLR-4225, (Inconel 625 tubing, 345 bar @ 593oC) for low quality cooling water.	3
C4: FLR-62B3 cooler, instead of FLR-6225, (Inconel 625 tubing, 234 bar @ 593oC) for low quality cooling water.	4
C1 + V4: TLR-4225 cooler & safety valve (10 bar) for cooling water.	5
C2 + V4: FLR-6225 cooler & safety valve (10 bar) for cooling water.	6
C3 + V4: TLR-42B5 cooler & safety valve (10 bar) for cooling water.	7
C4 + V4: FLR-62B3 cooler & safety valve (10 bar) for cooling water.	8

NOTE: *Take into account sample demand: 200 ml/min for conductivity, 100 ml/min for pH, 100 ml/min for O_2, 100 ml/min for Na^+, 150 ml/min for SiO_2, 150 ml/min for PO_4, 350 ml/min for grab sample.* ***NOTE 2:*** *Each set of cooler includes V2 and V3 valves.*

4. Thermal protection

None	0
None + PI: without thermal protection, with pressure indicator.	1
TPV.1: TSV Thermal shut-off valve (latching) - shuts sample off at temperature above 49°C. Pressure rating: 303 bar.	2
TPV.1 + PI: TSV Thermal shut-off valve (latching) - shuts sample off at temperature above 49°C. Pressure rating: 303 bar. With pressure indicator.	3
TPV.1A: TSV with alarm (dry contacts: max. 10 A at 250 VAC)	4
TPV.1A + PI: TSV with alarm (dry contacts: max. 10 A at 250 VAC), with pressure indicator.	5
TPV.2: HST Non-latching thermal shut-off valve instead of TSV (budget option). Pressure rating: 207 bar.	6
TPV.2 + PI: HST Non-latching thermal shut-off valve instead of TSV (budget option). Pressure rating: 207 bar. With pressure indicator.	7
TPV.3: TSSV High pressure servo-controlled actuated ball valve. Pressure rating: 500 bar.	8
TPV.3 + PI: TSSV High pressure servo-controlled actuated ball valve. Pressure rating: 500 bar. With pressure indicator.	9

5. Total sample flow indicator (without needle valve)

None	0
FI.1: Total sample flow indicator	1
FI.1A.NO: Total sample flow indicator with low flow alarm (dry contacts NO: max. 0.5 A, 230VAC)	2
FI.1A.NC: Total sample flow indicator with low flow alarm (dry contacts NC: max. 0.5 A, 230VAC)	3
MF + FI.1: 100 µm filter + total sample flow indicator	4
MF + FI.1A.NO: 100 µm filter + total sample flow indicator with low flow alarm NO	5
MF + FI.1A.NC: 100 µm filter + total sample flow indicator with low flow alarm NC	6

NOTE: *Filters are not recommended (as they change sample composition - filter out corrosion products).*

ESS-specification

6. Back Pressure Regulator / Relief Valve	
None (grab sample only)	0
None + **FI.3** without back pressure regulator / relief valve, flow indicator with regulating valve available (grab sample only)	1
V7.1: BPRV - back pressure regulator / relief valve – ensures representative sample (recommended)	2
V7.2: Relief valve instead of BPRV - budget version, without regulating function	3
V7.1 + FI.3: BPRV + flow indicator with regulating valve for grab sampling	4
V7.2 + FI.3: Relief valve + flow indicator with regulating valve for grab sampling	5

7. Analyzer 1: conductivity measurement - SC, CC, DCC or pHCal	
None	0
SC: Specific Conductivity	A
CC: Cation Conductivity after cation exchanger	B
DCC: Degassed Cation Conductivity	C
SC + CC	D
SC + CC + pHCal: SC + CC + pH calculated from conductivity (available for ammonia conditioned water only)	E
CC + DCC	F

8. Analyzer 2: pH measurement	
None	0
pH	G
pHCal (available for ammonia conditioned water only)	H

9. Analyzer 3: O_2 measurement	
None	0
Electrochemical O_2 (Clark cell)	I
Luminescence O_2	J

10. Analyzer 4: Na^+ measurement	
None	0
Na^+ 1-channel	K
Na^+ 2-channel	L
Na^+ 3-channel	M
Na^+ 4-channel	N

11. Analyzer 5: SiO_2 measurement	
None	0
SiO_2 1-channel	O
SiO_2 2-channel	P
SiO_2 4-channel	Q
SiO_2 6-channel	R

12. Analyzer 6: PO_4 measurement	
None	0
PO_4 1-channel	S
PO_4 2-channel	T
PO_4 4-channel	U
PO_4 6-channel	V

13. Panel	
Panel material: 304 stainless steel (EN 1.4301), no sink	1
Panel material: 304 stainless steel (EN 1.4301) with sink*	2
Panel material: 316 stainless steel (EN 1.4401), no sink	3
Panel material: 316 stainless steel (EN 1.4401) with sink*	4
** Option available only in case when the panel will not be mounted on an ESR rack.*	

14 & 15. Language version of the documentation	
Standard in english, choose 9-9; others language versions on request.	9 9

HACH LANGE GmbH Willstaetterstr. 21,40549 Duesseldorf, Germany | P +49 211 5288 0 | www.de.hach.com

EasySam®

HACH® Be Right™

ESA - Key components

9610sc – SiO_2 analyser

Silica analyzer 9610sc uses colorimetric measuring principle. Measurement result is displayed in 10 minutes after sampling. The analyzer has full data archiving feature. The device can operate without the need for reagents replacement up to 90 days (for 15 minutes measuring cycle). It is very durable thanks to the pressurized media circulation system. There are no peristaltic or piston pumps or other consumables except for reagents, which can be replaced in a fast and easy way.

9245 – Na^+ analyser

Sodium analyzer 9245 is equipped with an auto-calibration system and automatic electrode regeneration function. Using simple in preparation 10 ppm solutions, fully automated system enables precise 2-point calibration. A convenient measurement of the sample brought from the installation allows the user to check analyzer operation or measure of a process sample. Delivery of sample to analyzer is very easy; after measurement a device automatically returns to on-line mode.

K1100 – O_2 analyser

Oxygen measuring system consists of: 410 series transmitter, flow chamber and luminescent oxygen sensor. It uses optic measuring principle. Resistant to sample contamination. Short response time after oxygen trip – especially important at frequent installation shutdowns. Luminescent technology makes the K1100 sensor the most stable sensor with the longest calibration interval in the industry. Low maintenance cost (no electrolyte, no membrane).

9500 – pH, SC, CC, DCC and O_2 transmitter

9500 series transmitter was designed for measurements in pure and ultrapure water. It can operate with a broad range of sensors, i.e. 831x series conductivity probes for ultrapure water, 8362 pH system for low ion concentration water, electrochemical oxygen sensor in ppb range. The transmitter may be one- or two-channel, it features non-linear temperature compensation (for different boiler operation regimes), optional 3-rd analog output for pH calculated from conductivity.

Measured parameters

Each analyzer panel is made of 304 stainless steel (EN 1.4301) or 316 stainless steel (EN 1.4401), PP or PVC and includes a pre-mounted and ready for connection analyzer. It may contain sample cut-off valve and/or flowmeter with precise needle valve, which allows regulation of sample flow, as well as in/out tubing (also for multiple samples). In case the panel is to be mounted alone (not together with other sampling and analyzer panels on a rack), an optional sink, which diverts sample downstream of analyzer to drain, should be ordered.

A	Specific Conductivity – **SC**. Panel dimensions (w x h): 300 x 915 mm.
B	Cation Conductivity (after cation exchanger) – **CC**. Panel dimensions (w x h): 300 x 915 mm.
C	Degassed Cation Conductivity – **DCC** Panel dimensions (w x h): 600 x 915 mm.
D	Specific Conductivity & Cation Conductivity (after cation exchanger) – **SC & CC**. Panel dimensions (w x h): 300 x 915 mm. 2 – channel transmitter
E	Specific Conductivity & Cation Conductivity (after cation exchanger) & pH calculated from conductivity (pHCal) – **SC & CC & pHCal**. Panel dimensions (w x h): 300 x 915 mm. 2 – channel transmitter
F	Cation Conductivity (after cation exchanger) & Degassed Cation Conductivity – **CC** & **DCC**. Panel dimensions (w x h): 600 x 915 mm. Measuring range for all conductivity analyzers: 0,01 µS/cm - 200 µS/cm (higher ranges on request). 2 – channel transmitter
G	**pH** for ultra-pure water with ion-selective electrode 8362. Panel dimensions (w x h): 300 x 915 mm. Measuring range: pH 2 – 12.
H	pH calculated from conductivity (**pHCal**). Panel dimensions (w x h): 300 x 915 mm. Measuring range: pH 7 – 10.7.
I	Electrochemical (Clark cell) **O_2**. Panel dimensions (w x h): 300 x 915 mm. Measuring range: 0 – 2'000 ppb.
J	Luminescence **O_2**. Panel dimensions (w x h): 300 x 915 mm). Measuring range: 0 – 2'000 ppb.
K-N	**Na^+** (number of channels: 1 (K), 2 (L), 3 (M), 4 (N)). Panel dimensions (w x h): 600 x 915 mm. Measuring range: 0 – 10'000 ppb.
O-R	**SiO_2** (number of channels: 1 (O), 2,(P), 4 (Q), 6 (R)). Panel dimensions (w x h): 600 x 915 mm. Measuring range: 0 – 5'000 µg/l.
S-V	**PO_4** (number of channels: 1 (S), 2 (T), 4 (U), 6 (V)). Panel dimensions (w x h): 600 x 915 mm). Measuring range: 0 – 5 / 0 – 50 ppm.

Table 1: List of ESA panels (see ESA panels ordering code - Feature 1).

NOTE 1

pH calculated from conductivity (pHCal) is dedicated for NH_3 conditioned circuits

NOTE 2

Analysers of other parameters (TOC, Cl^-, oil in water, turbidity etc.) are available on request. Please consult Technopomiar company.

Also the following parameters can be measured together with two-channel transmitter. Each panel dimensions (w x h): 300 x 915 mm.					
1	SC + SC	**4**	CC + CC	**7**	pH + pH
2	SC + pH	**5**	CC + pH	**8**	pH + O_2
3	SC + O_2	**6**	CC + O_2	**9**	O_2 + O_2

Table 2: List of ESA panels (see ESA panels ordering code - Feature 2).

ESA - specification

By means of the table below you can configure measurement type, analyzer panel options as well as analogue, digital and binary types of outputs.

ESA panel - ordering code

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Specyfikacja panelu analizatorów	X	X	X	X	X	X	X	X	X	X	X	X	X	9	9

1. Analyzer (see Table 1 on page 9)

None	0
Specific Conductivity (SC)	A
...	...
PO_4 6-channel	V

2. Two channel transmitter* (see Table 2 on page 9)

None	0
Specific Conductivity (SC) & Specific Conductivity (SC)	1
Specific Conductivity (SC) & pH	2
Specific Conductivity (SC) & Electrochemical O_2 (Clark cell)	3
Cation Conductivity after cation exchanger (CC) & Cation Conductivity after cation exchanger (CC)	4
Cation Conductivity after cation exchanger (CC) & pH	5
Cation Conductivity after cation exchanger (CC) & Electrochemical O_2 (Clark cell)	6
pH & pH	7
pH & Electrochemical O_2 (Clark cell)	8
Electrochemical O_2 (Clark cell) & Electrochemical O_2 (Clark cell)	9

**Applicable only if option 0 (none) in feature 1 "Analyzer" was chosen.*

3. Sample shut-off / regulating valve

None	0
V8: Shut-off / regulating valve per each channel of analyzer (Ham-Let)*.	1
V8: Shut-off / regulating valve per each channel of analyzer (Swagelok)*.	2

** Choose 0 if you will specify a flow indicator with regulating valve in feature 4.*

4. Flow indicator with regulating valve*

None	0
FI.2: Flow indicator with regulating valve per each channel of analyzer.	1
FI.2A.NO: Flow indicator with regulating valve and low flow alarm (NO dry contact) per each channel of analyzer.	2
FI.2A.NC: Flow indicator with regulating valve and low flow alarm (NC dry contact) per each channel of analyzer.	3

** Not applicable for multi-channel analyzers (Na^+, SiO_2 and PO_4) - specify 0.*

5. Panel mounting version

Rack mounting	1
Wall mounting	2

6. Panel material

304 stainless steel (EN 1.4301)	1
316 stainless steel (EN 1.4401)	2
Polypropylene **PP**	3
Polyvinyl chloride **PVC**	4

NOTE: *Other panel materials available on request.*

7. Individual sink for panels

None	0
Sink	1

NOTE: *Indivitual sink not available when you will order an ESR rack (which will feature a gutter).*

8. Current outputs

4-20 mA outputs	1
4-20 mA outputs + HART (available for analyzers A to I)	2
4-20 mA outputs + RS485 with Modbus RTU (not available for analyzer J)	3
4-20 mA outputs + RS485 with Profibus DP	4

9. Alarm outputs (to be wired to signal box, if choosen)

None	0
1 relay	1
2 relays	2
3 relays	3
4 relays	4
5 relays*	5
6 relays*	6

** Five or six relays available for 9245 Na^+ analyzer only.*

14 & 15. Language version of the documentation

Standard in english, choose 9-9; others language versions on request.	9 9

NOTE

Go to page 13 for detailed instructions on how to configure an ESA analyzer panel, as well as an example of ordering code.

For each of the multi-channel analyzers, only one panel should be specified.

ESR - Specification

Sample (ESS) or analyzer panels (ESA) may be mounted individually or integrated into a free-standing front access rack, made of 304 stainless steel (EN 1.4301) or 316 stainless steel (EN 1.4401). The rack includes pre-mounted piping for cooling water inlet / outlet as well as sample drain(s). Flanged connections:

- for cooling water: DN20 (for 1 - 2 ESS panels) / DN32 (for 3 - 6 ESS panels) / DN65 (for 7 - 12 ESS panels),
- for cold drain (common gutter for grab sample and sample downstream of analysis): DN40,
- for hot drain (if sample line flush valve(s) was selected): DN25.
  All piping between sampling panels and analyzer panels is included. A roof over the rack and lighting options are available. Each rack has to be fastened to the floor.

ESR rack - ordering code

	Rack specification														
	X	X	X	X	X	X	X	X	X	X	X	X	X	9	9
1. Rack material															
304 stainless steel (EN 1.4301)	1														
316 stainless steel (EN 1.4401)	2														
2. Quantity of ESS panels without sample line flushing															
Specify number of ESS panels: from 0 to 9		...													
3. Quantity of ESS panels with sample line flushing															
Specify number of ESS panels: from 0 to 9			...												
4. Quantity of ESA panels 300 mm width															
Specify number of ESA panels: from 0 to 9 (in case of more than 9 panels, add remaining ones in feature 5)				...											
NOTE: *Take into account ESA panels: A, B, D, E, G, H, I, J and 1 to 9 (see Tables 1 and 2).*															
5. Quantity of additional ESA panels 300 mm width															
Specify number of ESA panels: from 0 to 9					...										
6. Quantity of ESA panels 600 mm width															
Specify number of ESA panels: from 0 to 9						...									
NOTE: *Take into account ESA panels: C, F and K to V.*															
7. Electrical box															
None							0								
Separate electrical box							1								
8. Signal box															
None								0							
Separate signal box								1							
Common electrical and signal box (NOTE: in feature 7 choose 0)								2							
9. Rack length															
up to 1.00 m									A						
1.01 - 1.50 m									B						
1.51 - 2.00 m									C						
2.01 - 2.50 m									D						
2.51 - 3.00 m									E						
3.01 - 3.50 m									F						
3.51 - 4.00 m									G						
NOTE: *Actual length (within this range) will depend on ESS and ESA panels number as well as boxes choice.*															
10. Lighting															
None										0					
Lighting (option availiable only when you will choose 1 in feature 11)										1					
NOTE: Lamps quantity: 1 lamp / 1 m of rack.															
11. Roof															
None											0				
Roof (has to be chosen if you specified lighting in feature 10)											1				
14 & 15. Language version of the documentation															
Standard in english, choose 9-9; others language versions on request.														9	9

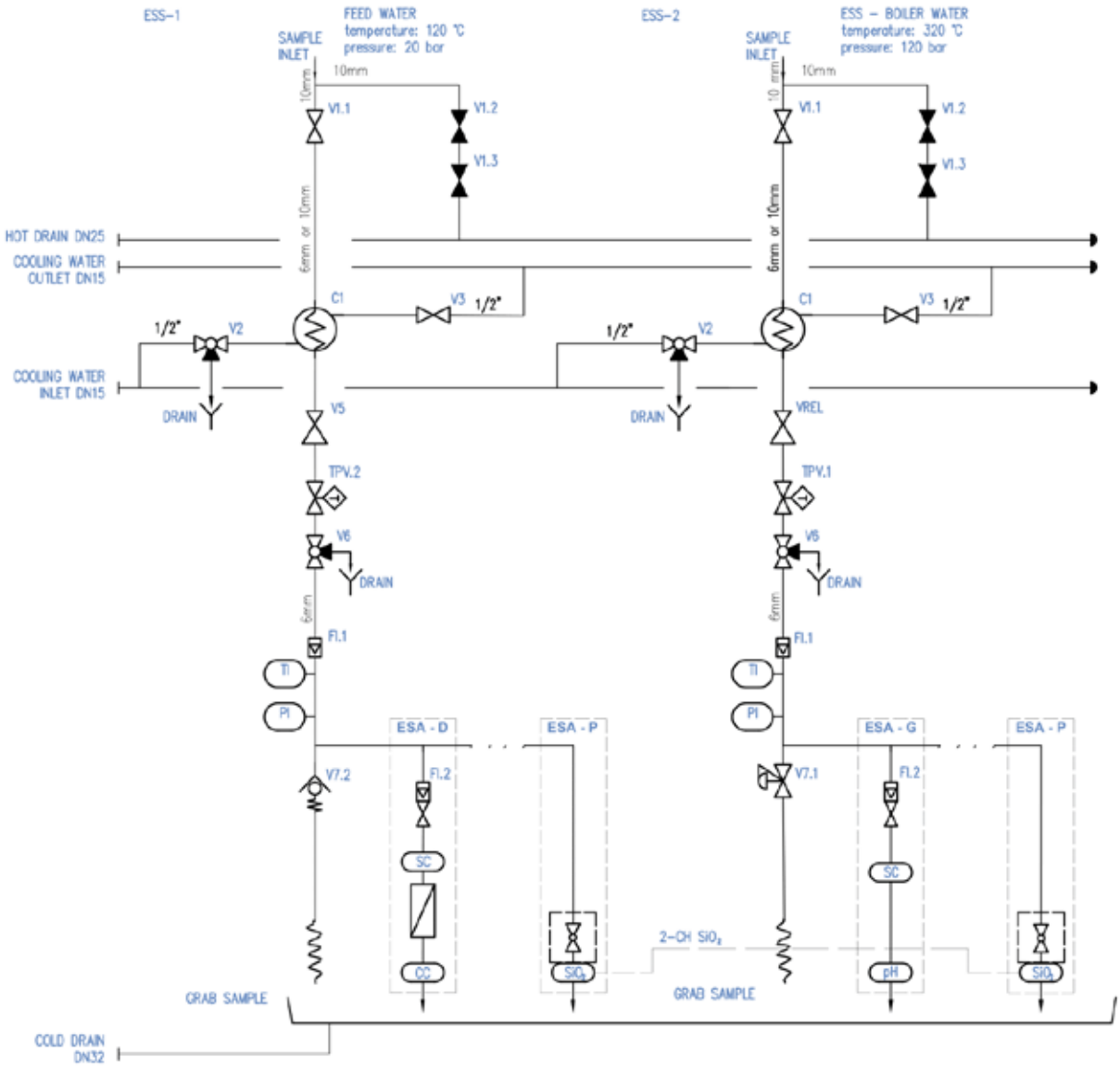
NOTE

Calculate the length of the rack in the following way: sum up the widths of chosen ESS sampling panels (300 mm) and ESA analyzer panels (300 or 600 mm, see Tables 1 and 2) and add the width of an electrical box (0.3 m ⩽ 5 ESA panels or 0.6 m > 5 ESA panels). Resulting length shall be quoted in 0.5 m steps (eg. for 3.1 m choose option F). Maximum rack length is 4 m (other on request).

EasySam configuration – In easy three steps

On the example of the ready-made measuring system, which P&ID is shown below, you can learn how easy configuration of your own EasySam® system is.
In order to properly configure all system components you have to make the following steps.

1. ESS - EasySam® Sampling panel



For each sample you shall start with configuration of sampling panel ESS. On this particular example above we have: "Feed water" sample at 120°C and 15 bar and "Boiler water" sample at 320°C and 120 bar. Demi cooling water (pressure 2 bar, temperature up to 32°C) is available.
With use of ESS ordering code table (see pages 6 and 7) for the first sample you shall choose:
(1) Low sample parameters (Ham-Let fittings) – option 1;
(2) Sample flushing single shut-off valve - V1.2 and tree-way valve for low pressure flushing - V6 needed by start-up – option 4;
(3) TLR-4225 cooler for sample demand < 1,8 l/min (as we will measure: SC, CC and SiO_2 in this sample, sample demand is: 200 + 150 + 350 for grab sample = 700 ml/min) – option 1;
(4) Thermal protection valve HST – TPV.2 (budget option) with pressure indicator – option 7;
(5) Total sample flow indicator – FI.1 – option 1;
(6) Back pressure regulator – V7.1: relief valve – V7.2 (budget version) – option 3.

Next, you shall specify, which analyzers shall be assigned to the sample.
(7) Specific Conductivity (SC) and Cation Conductivity (CC) – option D;
(8) - (10) No other analyzers - options 0;
(11) SiO_2 (2-channel) analyzer – option P;
(12) No other analyzer - option 0;
(13) If the panel has to be made of 304 stainless steel (EN 1.4301) and without individual sink - option 1;
(14) & (15) Those items determine language of documentation. You will receive documentation in English language. Others language versions on request.

Your first sampling panel ESS will have the following ordering code: ESS-1-4-1-7-1-3-D-0-0-0-P-0-1-9-9.

2. ESA - EasySam® Analyser panels

Your next step is configuration of ESA analyzer panels for each specified analyzer. In order to do that, look at Tables 1 and 2 (page 9) and at the ESA ordering code table (page 10).

(1) For SC and CC measurement there is one common panel with two-channel transmitter – option D;
(2) If option D was chosen in position 1 (see remark in ordering code table, page 10), choose option 0;
(3) As there should be sample flow control (see item 4 below), there is no need for any sample shut-off valve – option 0;
(4) Flow indicator with regulating valve FI.2 (which also shuts the sample off if necessary) – option 1;
(5) Rack mounting version of panel – option 1;
(6) If the 304 stainless steel (EN 1.4301) is chosen as panel material – option 1;
(7) As the panel will be mounted on a rack with common gutter – option 0;
(8) 4-20 mA current output – option 1;
(9) Analyzer failure alarm (1 relay) – option 1;
(10) – (13) No options are available here, choose X for all of them;
(14) & (15) Those items determine language of documentation. You will receive documentation in English language. Others language versions on request.

The first ESA analyzer panel will have the following ordering code:
ESA-D-0-0-1-1-1-0-1-1-X-X-X-X-9-9.
As also silica shall be measured in "Feed water" sample, you have to configure this panel separately.
(1) Two-channel SiO_2 analyzer (see Table 1 at page 9) – option P;
(2) As the option P was chosen in item 1 (see remark in ordering code table, page 10), choose option 0;
(3) – (4) As Na^+,SiO and PO_4 analyzers are equipped with sample inlet needle valves for sample flow control and shut off, choose 0 for both items;
(5) – (9) Like for previous panel – options: 1, 1, 0, 1, 1;
(10) – (13) No options are available here, choose X for all of them;
(14) & (15) Those items determine language of documentation. You will receive documentation in English language. Others language versions on request.

Second analyzer panel ESA will have the following ordering code:
ESA-P-0-0-0-1-1-0-1-1-X-X-X-X-9-9.
Following the example of the ESS sampling panel specification for "Feed water", an ESS sampling panel ordering code for "Boiler water" at 320°C and 120 bar shall be created. The ESS sampling panel for "Boiler water" will have ordering code:
ESS-2-5-1-3-1-2-A-G-0-0-P-0-1-9-9.
Then the ordering codes for ESA analyzer panels have to be configured.
For SC and pH measurements (acc. to P&ID scheme) common ESA panel shall be specified:
ESA-0-2-0-1-1-1-0-1-1-X-X-X-X-9-9.
The silica measurement in both samples is carried out by one but two-channel analyzer, for which the ordering code was specified above. Therefore, there is no need for specifying the code again.

3. ESR - EasySam® Rack

Your last step is specification of a free-standing rack, on which all ESS and ESA panels will be mounted. The steps for selecting the ordering code using the ordering code table on page 11 are shown below:

(1) Rack material: 304 stainless steel (EN 1.4301) – option 1;
(2) As there are no panels without sample line flushing – option 0;
(3) There are two ESS panels with sample line flushing – option 2;
(4) There are two ESA analyzer panels with 300 mm of width (see Table 1 at page 9) – option 2;
(5) As there are only two
(6) ESA analyzer panel
ESA analyzer panels – option 0; for SiO_2 measurement is 600 mm wide – option 1;
(7) Separate electrical box is not specified – option 0;
(8) Common electrical and signal box – option 2;
(9) The length of the rack has to be calculated: 2 x 300 mm (2 x ESS) + 2 x 300 mm (2 x ESA) + 1 x 600 mm (1 x ESA for SiO_2) + 300 mm (for electrical box) = 2100 mm, so between 2,01 and 2,5 m – option D;
(10) Lighting is very useful if the rack will be located in badly lit area, though it is an additional price adder. However in this example we choose it – option 1;
(11) A roof over the rack is an additional cost, but it is a good choice especially in boiler room, where there is a lot of dust – option 1;
(12) – (13) No options are available here, choose X for all of them;
(14) & (15) Those items determine language of documentation. You will receive documentation in English language. Others language versions on request.

The ESR rack, on which all ESS and ESA panels will be mounted, has ordering code:
ESR-1-0-2-2-0-1-0-2-D-1-1-X-X-9-9.

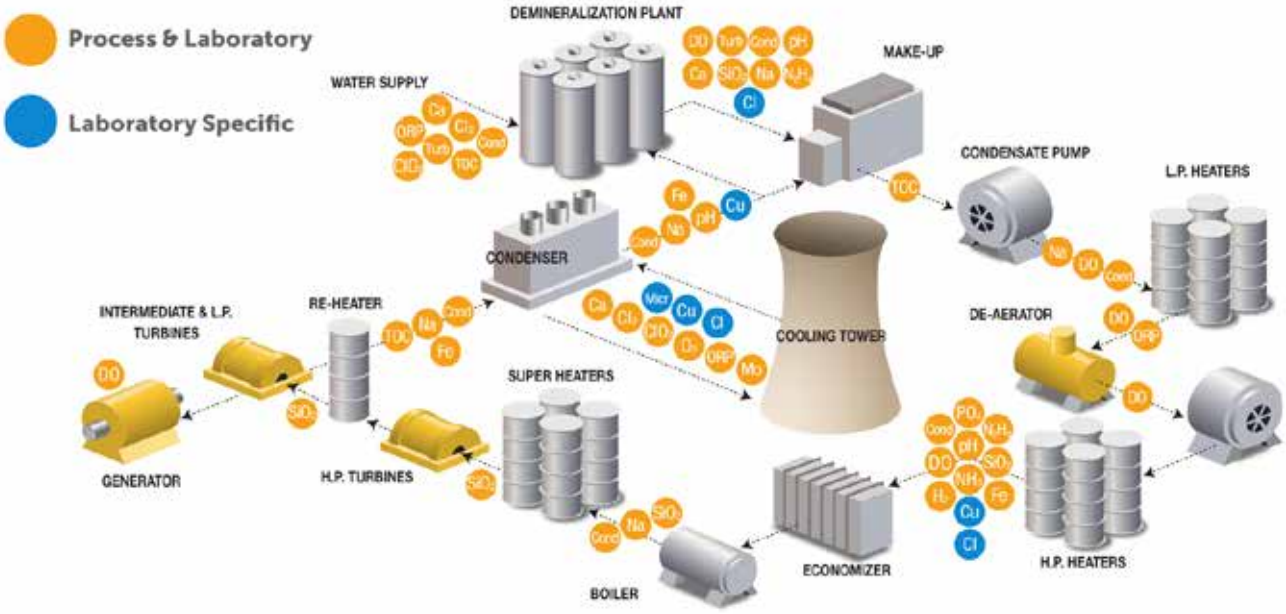
Ordering all the analytical system specified above (and shown on P&ID) requires the following ordering codes:

"Feed water" at 120°C and 15 bar (+ optional KKS or other Tag No.) with on-line SC, CC and SiO_2 analyzers:
ESS-1-4-1-7-1-3-D-0-0-0-P-0-1-9-9
+ ESA-D-0-0-1-1-1-0-1-1-X-X-X-X-9-9
+ ESA-P-0-0-0-1-1-0-1-1-X-X-X-X-9-9.

"Boiler water" at 320°C and 120 bar (+ optional KKS or other Tag No.) with on-line SC, pH and SiO_2 analyzers:
ESS-2-5-1-3-1-2-A-G-0-0-P-0-1-9-9
+ ESA-0-2-0-1-1-1-0-1-1-X-X-X-X-9-9.

All mounted on a one common rack:
ESR-1-0-2-2-0-1-0-2-D-1-1-X-X-9-9.

Key measured parameters



Water Treatment

- Cl — Chloride
- Cl_2 — Chlorine
- ClO_2 — Chlorine Dioxide
- Cond — Conductivity/Total Dissolved Solids (TDS)
- DO — Dissolved Oxygen
- Ca — Hardness/Alkalinity
- N_2H_4 — Hydrazine/Oxygen Scavenger
- ORP — Oxidation-Reduction Potential
- O_3 — Ozone
- pH — pH
- SiO_2 — Silica
- Na — Sodium
- TOC — Total Organic Carbon (TOC)
- Turb — Turbidity and Suspended Solids

Steam Cycle

- NH_3 — Ammonia
- Cl — Chloride
- Cond — Conductivity/Total Dissolved Solids (TDS)
- Cu — Copper
- DO — Dissolved Oxygen
- N_2H_4 — Hydrazine/Oxygen Scavenger
- Fe — Iron
- H_2 — Hydrogen
- ORP — Oxidation-Reduction Potential
- pH — pH
- PO_4 — Phosphate
- SiO_2 — Silica
- Na — Sodium
- TOC — Total Organic Carbon (TOC)

Cooling Water

- Cl — Chloride
- Cl_2 — Chlorine/Oxidants
- ClO_2 — Chlorine Dioxide
- Cond — Conductivity/Total Dissolved Solids (TDS)
- Cu — Copper
- Ca — Hardness/Alkalinity
- Micr — Microbiology
- Mo — Molybdate and Other Corrosion Inhibitors
- ORP — Oxidation-Reduction Potential
- O_3 — Ozone
- pH — pH
- Na — Sodium

HACH®

Be Right™

HACH LANGE GmbH
Willstaetterstr. 21
40549 Duesseldorf, Germany

P +49 211 5288 0
www.de.hach.com